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EDITORIAL
Railway Age

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The Needs of the Railways

THE PRESENT ISSUE of the *Railway Age* is devoted principally to the presentation of information intended to demonstrate and emphasize the present needs of the railways of the United States. Any presentation of the needs of the railways necessarily involves a presentation of the transportation needs of the American public, for whatever the railways really and legitimately need is something which they require in order to be able to render good, adequate and economical service to the public. President Wilson has issued a proclamation returning the railways to private management on March 1. The needs of the railways, in so far as they are needs which affect the rendering of service, are intimately connected with their requirements as regards the raising of new capital. Whether they will be able to raise adequate new capital will depend upon the kind of legislation enacted by Congress before they are returned to private operation. Therefore, all the information presented by us regarding their physical requirements is an argument for speedy and sound legislation.

This issue, aside from its news section, is roughly divisible into three sections. First, it is devoted to data showing the relative increases in the facilities of the railways and in the traffic handled prior to June 30, 1915, as compared with the increases in the traffic and the physical facilities within the last four and a half years. This information brings out strikingly the enormous deficiency of railroad facilities which has been allowed to accrue since 1915. Its demonstration of how much greater in proportion has been the increase in traffic than in the facilities provided for handling it within recent years is as striking as it is alarming. It shows clearly that the railways will be wholly unable to give satisfactory service in the near future, and that they will not be able to give satisfactory and adequate service for years to come unless there is immediately begun and carried out a program of additions, improvements and enlargements vastly exceeding any which has been carried out in the past.

Besides needing a vast increase in their facilities, the railways will have to be operated with the utmost efficiency and economy under private operation if they are to satisfy the public.

Prior to the spring of 1917 the railways were competitively operated. Under the Railroads' War Board, and subsequently under government operation, as conducted by the Railroad Administration, many new methods were adopted to co-ordinate the facilities and operations of the railways. Some of these have been good, some bad. Some of them have been of such a character that they would be beneficial to the railways as a whole at any time, and some of them are of such a character that they would be beneficial only in periods of car shortage and congestion. The railway managements should try to distinguish between the new methods which on the return to private operation it will be desirable to abandon and those which it will be desirable to retain. Therefore, in a second section of this issue we publish a number of articles regarding new methods which have been adopted on the railways since the United States entered the war in 1917.

While data regarding the development of the railroads during periods of five or ten years is interesting, hardly less interesting and significant at any given time is information regarding developments during the immediate preceding year.

In another section of this issue we publish our usual Annual Review statistics. These statistics for the year 1919 are well worth studying. No other statistics ever published have indicated so strikingly how nearly completely the development of railroad facilities in the United States has been stopped, and therefore how essential it is that measures shall be adopted having the purpose and effect of reviving railroad expansion.

The picture of the existing railroad situation made by the presentation of the contents of this issue of the *Railway Age* is, in some respects, a gloomy one; but it is an old saying that the darkest hour of the night is just before the morning light. The very fact that the railroads are today so far behind the needs of the country makes, or should make it, clear that a period of great activity and the expansion of railroad facilities lies immediately ahead. The commerce and industry of the United States would have to stop growing if the expansion of railroad facilities were not revived on a large scale. But the commerce and industry of this country never have stopped growing, and they are not going to.

We cannot refuse to believe that the reason and selfish interest of the public are going to combine to make it see that the railroad problem must be solved; and the solution of the problem will necessarily result in a revival of railroad expansion.

Vital Factors in the Railroad Problem

THE RAILROAD PROBLEM must be solved if the material well-being of the people of the United States is to continue to increase. The increase in the material well-being of the people depends upon increase in the production of the necessities, the comforts and the luxuries of human existence. As we have repeatedly pointed out, there can be no further substantial increase of production in the United States until transportation facilities are increased; for there can be no substantial increases of production without increases of the things transported, and the railways with their present facilities are moving practically all the commerce they can. But the substantial increase of transportation facilities waits and will continue to wait upon the solution of the railroad problem. The railroad problem has a number of vital factors. Among these are:

1—Capital

No considerable progress can be made in the expansion of railroad facilities until a vast amount of capital can be raised for investment in railroads. The raising and investment of this capital would be necessary, if adequate facilities were to be provided, under either government management, the Plumb plan, or private management. There is no system of management conceivable under which there could be a large increase in the amount of traffic handled by the railways without a large new investment in them.

The railways are going back to private management on March 1. Therefore, the new capital must be raised and invested, if it is to be raised and invested at all, by private companies. But private companies will not be able to raise it unless they can sell large amounts of bonds and stocks; they cannot sell bonds and stocks unless they can give reasonable assurance that they will be able to pay reasonable interest and dividends upon them; they cannot give this assurance unless their net operating income will justify it; and their net operating income will not justify it unless rates are made high enough to yield an average net operating income as large as that earned by other concerns in other lines of business.

So the matter of raising capital for railroads is found, in the last analysis, to be almost entirely a question of the regulation of rates. Rates have not been fairly and wisely regulated in the past, and therefore the investment of capital in the railroads has greatly declined. Will rates be fairly and wisely regulated in the future? That will depend mainly upon the provisions of the railroad legislation which undoubtedly will be passed by Congress within the next few weeks. We believe the new legislation will provide for a marked improvement in the policy of government regulation of rates. Therefore, we believe it will result in enabling the railway companies to raise more capital than they have been able to for years.

2—Labor

Sufficient and efficient labor is as essential to the adequate development and efficient operation of railroads as adequate capital. If the companies can get enough capital to make needed improvements, will they be able to get enough labor to do the work? Labor is now hard to get. The railroads have almost 200,000 more employees than they had two years ago. This is mainly due to the establishment of the eight-hour day. The amount of business being handled in proportion to the number of men employed is much smaller than it was two years ago. If it is found impracticable to get a large amount of additional labor, will it be found practicable to increase the efficiency of that now employed, thereby getting a largely increased amount of work done without a large further increase of employees?

Superficially, the present attitude of labor is not encouraging. There is complaint in all branches of industry that labor is inefficient—that it is not disposed to put its back into its work. Furthermore, the leaders of organized labor on the railroads have been opposed to returning to private operation and are advocating the Plumb plan. Besides, labor is much more generally organized on the railroads than it ever was before. Therefore, there is fear in many quarters that after private management is resumed a concerted effort will be made by labor to prevent it from being successful; and, of course, if such an effort were made it would take largely the form of a refusal on labor's part to perform its work in an efficient manner.

The problem presented is a serious one, but one whose seriousness could easily be exaggerated. The conduct of some of the principal railroad labor organizations within recent years, especially under government operation, has been such as to array against them public opinion, which formerly sided with them in their struggles with the railroad managements. The extent of the change in public opinion which has occurred is strikingly indicated by the fact that, in spite of all the denunciations and threats of the leaders of the railroad brotherhoods, a majority of the members of the United States Senate voted for the anti-strike provisions of the Cummins bill, which are much more drastic than any legislation which the railway executives ever dreamed of even suggesting. The railway legislation finally passed probably will not contain such severe provisions; but the public sentiment which they reflect will still exist; and if the railway companies show a disposition to be fair to labor a large majority of the public will side with them in any struggle which may occur. Especially would this be the case if there were reason to believe that the labor unions were making trouble in an attempt to force the country to adopt the Plumb plan; and as long as they advocate that plan every move they make will be open to that suspicion.

There are many thousands of railroad employees who are keenly conscious of the public disfavor into which the big railroad brotherhoods have fallen. There are many thousands of them who are not in favor of the Plumb plan and not opposed to a return to private operation. Many thousands more are opposed to a return to private operation only because they fear it will result in general reductions of railway wages—a fear which undoubtedly will prove to be baseless unless there shall occur radical changes in business conditions in the country which will necessitate reductions of wages in all industries. Therefore, many employees will welcome a return to private operation; and many who do not look forward with pleasure to it now will feel differently

after the change has been made; and these employees are going to do good work in future.

The efficiency of labor depends largely upon discipline, which consists of rewarding those who do good work and punishing those who do not. Good discipline will be hard to restore; but it will be much easier to administer it than it has been under government control, when it has been known that all differences arising between employees and their superiors could be appealed to bureaus and committees at Washington, and when it has been more difficult than usual to get rid of inefficient employees merely because they were inefficient.

It does not seem reasonable, and it certainly does not appear desirable, that the companies and the labor organizations should proceed upon the assumption that they are natural enemies, and that therefore their relation must permanently be those of antagonism and struggle. It is to the public interest and their own interest that they should seek a basis on which they can agree to co-operate in operating the railways and doing the improvement work needed on the railways as efficiently as possible.

Efficient production in this country is largely dependent upon efficient transportation; and the welfare of the laboring class more than any other is dependent on efficient production. The fact that they find it difficult to agree upon the division of what is produced is no good reason why labor and capital should not adopt plans of co-operation which would make as large as possible the amount of the product to be divided between them. The plans for more efficient co-operation between capital and labor should be worked out and adopted, in those fields in which labor is highly organized, by representatives of the companies and the labor organizations.

It may be regarded as asking for the millenium to suggest that labor organizations, in the interest of their own members, should exert themselves just as much to increase efficiency in transportation and production as to increase the share of what is produced which their members get; but we venture to make a prediction: Either the labor organizations will in time recognize it as a part of their function and duty to try to create efficiency in industry, or they will finally disappoint their members and destroy themselves by the methods which they are now using, which while intended to get more and more for labor, are many of them adapted to destroy the industrial efficiency upon which the real income of labor and other classes depends. Labor cannot go on forever getting more and more of what is produced, unless it will do its part in constantly increasing the amount of what is produced.

3—Materials

Assuming that the railways will be able to raise sufficient new capital, the problem of getting enough materials to make needed additions and improvements will be almost, if not quite, as difficult to solve as that of getting enough labor. During the war the steel mills and a large part of the other most important manufacturing plants of the country were worked to their capacity to produce things which were promptly shipped abroad and blown into the air. Meantime, building operations, the expansion of the plants of many classes of industries, and the operation of the so-called non-essential industries were virtually suspended.

Now that the war is over there is a vast demand from other industries and from all parts of the world for materials to make up the shortage of buildings, machinery for manufacturing plants and so on, that accrued during the war. The competition is especially active for materials of the kinds so largely used by railways, such as steel and lumber. If the railroads should go into the market right now for large quantities of materials they would meet with serious delays in getting them; and they cannot go into the market at once, because they do not know the kind of legislation under which they are to be regulated in future.

It seems safe to assume, however, that the new legislation is going to be much more favorable than that to which the railways have been subject in the past. The railway companies undoubtedly should proceed upon this assumption, and begin at once making their plans for extensive improvements. Especially, they should begin at once making inquiries and placing tentative orders for materials. If they should make no moves toward getting materials before the new legislation was passed, they might find their failure to do so had entailed serious expenses and delays.

Railway Developements in 1919

The statistics regarding railway development in the year 1919, which are given in the Annual Review section of this issue of the *Railway Age*, are in one respect at least the most striking statistics for any year which this paper ever published. They demonstrate that railway development in the United States came nearer to a dead standstill in 1919 than in any previous year since the first rail was laid in this country. The total capital expenditures made by the Railroad Administration in 1919 would not disclose this fact, because they are as large as the average annual expenditures. The fact that they were as large and that so little was accomplished with them is a striking proof of the extent to which the value of the railroad dollar has depreciated and of how much more must be expended in future years to make a given increase in railroad capacity than it has been necessary to make in past years.

In the year 1919 the total mileage of new lines built in the United States was 686 miles. This is the smallest figure which has been recorded by this paper since we began compiling the statistics of new construction in 1893. Furthermore, it does not represent a net increase in mileage. On the contrary, during the year 689 miles of main line railway in this country were abandoned for operation. Prior to the year 1915 the mileage of the country was steadily increasing, although the rate at which it was increasing had been diminishing for some years, and especially since 1910. The available statistics indicate that since 1915 the mileage of line abandoned has been greater than the new mileage. During the three years from 1917 to 1919, inclusive, our statistics indicate that operation was abandoned on 3,319 miles of line, while in the same period only 2,386 miles of extensions, branch and other new lines were completed.

Thus it appears that during the last three years there has been an actual decrease of 933 miles in the mileage of railways operated in the United States.

There was also a diminution in the construction of second, third and fourth tracks.

The statistics regarding the numbers of locomotives and cars ordered also make some striking new low records. Until this year the smallest number of freight cars ever ordered for the railways of the United States since 1901 was 62,669, this being the number ordered in 1908. In the year 1919 the number of freight cars ordered in the United States was only 22,062, and nearly all of these orders were placed by private car lines, as is shown by the fact that 15,295 of the total orders were for tank cars. The number of freight cars built for use on United States railways was much more satisfactory, being 94,981. The result, of course, of the number of freight cars built so far exceeding the number of freight cars ordered is that at the end of the year the car builders have almost no orders left upon their books.

Between the years 1901 and 1917 the number of passenger cars ordered for the railways of the United States was never less than 1,124 and ranged as high as 4,514 in 1909. In the year 1918 the number of passenger cars ordered was only 131, while in 1919 there was a small increase, the number ordered being 292. This means that in the two years of government control the number of passenger cars ordered in the United States has only been 423, which is about one-third as much as the smallest number of orders ever placed in a single year before.

The number of locomotives ordered was as low in proportion as the number of cars. The total number of locomotives ordered for railways in the United States was 214, and most of these were ordered for industrial roads. The smallest number of locomotives ever ordered in any year since 1901 was 1,182, while the largest number was 6,265. The number of locomotives built in the United States in 1919 for service in the United States was 2,055.

It is hardly necessary to make any comment on the foregoing statistics. Anybody who has any knowledge of the railroad business will at once see that the amount of new equipment actually built in 1919 was far less than the amount which is annually required for the replacement of that which must normally be retired. Furthermore, practically no provision for getting new locomotives and cars in 1919 has been made. The builders, in order to turn out a large amount of new equipment in the year, should have a large number of orders on their books on January 1. The locomotive and car builders of the United States are today practically out of orders, so far as the railways of this country are concerned.

The only thing which during the last year saved the railway supply and equipment industry from a complete collapse was orders from abroad. Foreign orders for locomotives amounted to 898 and foreign orders for freight cars amounted to 3,994. The number of locomotives built in the United States and Canada during the year to fill foreign orders was 1,110, and the number of freight cars built during the year to fill foreign orders was 61,813, only 30 of which were built by Canadian plants.

The Plain Duty of Congress

THE AMERICAN PUBLIC has decreed that the railways shall be returned to private management. President Wilson, in obedience to the unmistakeable mandate of the public, has issued a proclamation returning the railways to the companies which own them and has fixed March 1 as the date for their return.

This settles it that the railways are to be privately managed for some years to come at least, but it does not settle how efficiently it will be possible to operate them or how good service it will be possible for them to give under private management. These things are going to be determined by Congress. Under any given set of conditions the railways of the United States probably would be more efficiently operated and give better service under private than under government management. But how efficiently they can be operated and how good service they can render under either government or private management must depend very largely on the conditions under which they are managed. The principal questions now pending as to the conditions under which they are going to be managed by the railway companies are going to be settled for some time to come by the legislation which is to be enacted by Congress before they are returned to private management.

In order that it may be practicable for the railways to be efficiently operated and give good service, they must be able to raise sufficient capital for needed improvements and additions and they must be free from constant labor disturbances and from the constant threat of labor disturbances. Whether the companies are going to be able to raise sufficient capital is going to depend almost entirely, and the extent to which they are going to be subject to labor disputes, is going to depend very largely upon what Congress does.

So far as the immediate future is concerned, what the railway companies are going to be able to do in the making of additions to and improvements in their plants is going to depend not only on what Congress does but on how soon it does it. A large program of railroad expansion should be carried out in the year 1920. The facilities of the railways in proportion to the amount of commerce demanding movement were never so inadequate as they are now. There ought to be a large increase in railway facilities within the next year. If, however, the needed legislation is not passed some weeks before March 1, the date on which the railways are to be returned, it will be impossible to make the plans, to raise the capital, to form the organizations and to get the labor and materials necessary to fairly begin carrying out a large improvement program this year. To do the most practicable good the new legislation should be enacted by February 1.

Of course, speed in passing the new legislation is far less important than the adoption of legislation of the right kind. Once Congress has passed new railroad legislation it will probably have to stand for a long time, for it will be extremely difficult for years to come to get Congress and the public to again give the attention to the railroad problem that they are giving now.

It is unfortunate that the Esch bill, which has been passed

by the House, and the Cummins bill, which has been passed by the Senate, differ widely in many important provisions. This is sure to have a tendency to delay action. If, however, Congress really is inclined to dispose of the railroad problem for some years to come, it should not find it very difficult to combine the good provisions of both bills in such a way as to make a good measure.

The most important question involved is whether Congress will adopt a new rule regarding the way in which rates shall be regulated, and, if so, what that rule will be. If the new legislation does not satisfactorily settle this question it will do little or no good. The Esch bill as originally introduced in the House contained a rule of rate-making which, while imperfect, was a substantial improvement over the rule or want of rule in the existing act to regulate commerce. The House entirely struck out this proposed rule. The Cummins bill contains a rule of rate-making which if adopted would greatly better the position of the railways, which in the past have been unable to earn an average of five and a half and six per cent on the value of their properties, but which would be no better for railways which have been able to earn approximately six per cent, and would be worse for many of the most important systems in the country which have been able to earn six per cent or more.

The minimum which the law should require is that rates must be regulated in the future with the object, among other things, of enabling the railways to raise and invest enough capital to provide facilities with which they can give good and adequate service to the public. Surely Congress and the public want rates to be so regulated. If so, there is nothing that can possibly be lost and much that can possibly be gained by saying so in the law.

If, in addition, the law is to provide that the rates must be so fixed as to enable the railways as a whole to earn a minimum average of six per cent upon their combined valuation by groups and that any surplus over this earned by individual roads shall go partly to the road earning it and partly into a general railroad contingency fund, then certainly a road which earns more than six per cent should not, as provided by the Cummins bill, be practically deprived of all but one-third of its surplus earnings over, say, six per cent. The objection has been urged with great force against the provisions of the Cummins bill that it would not give to the better managed and more prosperous railways a sufficient incentive to efficient management or a sufficient opportunity to raise ample new capital on the best terms. It would be better not to provide for any specific average minimum rate than to reduce the incentive to efficient management on the part of many of the most important railway systems in the country.

The Cummins bill provides for the creation of a federal transportation board, whose principal duty it would be to study the transportation conditions of the country and make recommendations as to what should be done to improve them in the public interest. The Esch bill vests all the federal government's regulatory authority in the Interstate Commerce Commission. If no federal transportation board is to be created, then the law should require the Interstate Commerce Commission itself to act not merely as a semi-judicial body but as one whose duty it is to constantly strive to improve the transportation situation.

The Cummins bill provides for the voluntary consolidation of the railways during a period of years, and after the termination of this period makes the consolidation of the railways into a limited number of systems compulsory. The Esch bill would permit consolidations and agreements if the federal regulating authorities regarded them as desirable, but would not make them compulsory. The federal government has in the past tried to compel the dissolution of railroad consolidations, and it is now conceded on all hands that its policy in that respect has been wrong. It is not probable that it would produce any better results by a policy of compulsory consolidation than it has in the past by its policy of compulsory dissolution of consolidations. The railways should be authorized to make such agreements and consolidations as in the opinion of some federal tribunal will not be inimical to the public interest.

Everybody seems to agree that in future, issues of railroad stocks and bonds should be regulated and that the regulatory power should be vested exclusively in some federal body. The Cummins bill gives this authority to the proposed transportation board, while the Esch bill gives it to the Interstate Commerce Commission. It is clear that the policy of exclusive federal regulation of security issues should be adopted.

No feature of railroad regulation has in the past caused worse results than the exercise by the Interstate Commerce Commission of the authority to regulate interstate rates and by state legislators and commissions of the authority to fix state rates. The minimum which any new legislation should provide is that no state shall adopt any regulation which will burden or interfere with interstate commerce, and that the federal regulating body or bodies shall be charged with the duty of nullifying all state regulations of this kind.

Under government control the railway companies have accumulated a large indebtedness to the government. To require the speedy liquidation by the companies of the part of this indebtedness which is due to investments which the government has made in the railroads would embarass the companies seriously in raising capital for new additions and improvements. The debts of this kind which the companies owe to the government should be funded for a period of at least ten years.

In spite of the vast advances in wages which the government has made to railway employees they now are demanding vast further advances in wages. Railroad labor controversies are always likely to be settled in a way that is contrary to the public interest or to result in serious strikes. As long as no governmental machinery for settling controversies equitably is provided, and the right to strike remains unrestrained, there will be strikes.

The Cummins bill absolutely prohibits strikes on railroads and provides for a system of compulsory arbitration. The Esch bill does not prohibit strikes and provides a system for settling labor controversies which is favored only by organized labor. Under the Esch bill the boards of adjustment and the board of wages and working conditions would be composed of equal numbers of representatives of the employees and the companies, and no change in any

wages fixed or conditions of employment established by the Railroad Administration could be made except by the action of these boards. Since, for obvious reasons, the employees on the boards would never consent to reductions in wages or changes in conditions of employment which would be regarded as unfavorable to the employees, the effect would be to establish the present wages and conditions of employment as minimums. If, as probably would happen, the railway officers on these boards refused to consent to any advances in wages or changes in conditions of employment which would increase the expenses of the companies, the result would be that no decisions would be reached and that strikes would result.

It is very doubtful whether compulsory arbitration should be adopted and strikes absolutely prohibited at this time. As far as can be judged from past experience, the next step, it would seem, should be the establishment by law of boards of adjustment, composed equally of representatives of the employees and the companies, and the establishment of a board of arbitration to which appeal could be taken and on which the employees, the companies and the public would be equally represented. Strikes should be prohibited until controversies had been passed upon, first, by a board of adjustment, and, second, by the arbitration board.

If this plan would not work successfully, then probably compulsory arbitration should be the next step, although it is doubtful if any system will ever prevent strikes on railroads until the public has become more determined to prevent them than it is now. Public hostility to railway strikes is, however, much greater now than it ever was before, and it would not take many more of them to make it determined to prevent them.

Is the program outlined in the foregoing too ambitious to be adopted by Congress within a few weeks? Is it too favorable or too unfavorable to the railroad companies or to any other class which will be affected? The answer, we think, is to be found in the reports which the Senate Committee on Interstate Commerce made to the Senate and which the House Committee on Interstate and Foreign Commerce made to the House. These two committees are composed of the members of Congress who know more about the transportation problem than perhaps all other members of Congress. They had conducted hearings and studied the railroad problem for months. Each of them drew up a bill, which it reported, and we believe there is not a single provision the adoption of which we have suggested that was not favored by a majority of the members of each of these committees, although, of course, in a somewhat different form.

The members of these committees are the transportation experts of Congress. If the members of the Conference Committee, who represent these experts, will subordinate their comparatively unimportant differences of opinion, they can agree upon and report a good railroad bill in a comparatively short time. If a majority of the members of the Senate and House will accept the known views of their own experts, a railroad law will be passed which probably will solve the railroad problem for years to come. It is the plain duty of the experts in Congress to reconcile their differences of opinion and for a majority of the members of Congress to act in accordance with the views of their own experts.

The nation does not want government ownership. It wants private ownership and management. Private ownership and management will not be able to give the nation the good, economical and adequate railroad service it wants unless Congress creates the conditions essential to making it possible.

Director General Hines' New Year Wish

"My predominant wish for 1920 regarding public affairs is that prior to the termination of Federal control there shall be adequate railroad legislation which will be a sufficiently radical departure from the unsatisfactory railroad status prior to Federal control as to insure the continued development of railroad transportation in the public interest and the adjustment of railroad labor problems with mutual confidence and justice."

Why the Railroads Should Invest $6,000,000,000 in New Facilities Within the Next Three Years

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A
Series of Articles Giving the
Facts About the Present Railway Situation
in Detail

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Senator A. B. Cummings of Iowa, Chairman of the Senate Committee on Interstate Commerce

Six Billion Dollars for Capital Expenditures

Required Within the Next Three Years to Put Railways in Good Condition

WHAT IS THE EXTENT of the shortage of facilities for railroad transportation now existing in the United States? If there is a shortage of facilities it seems not unreasonable to assume that it should be made up during the next three years and that additional facilities should also be provided during those three years in proportion to the further growth of traffic during those years. If there is a deficiency in railroad facilities and it should be entirely made up during the next three years, what facilities would the railways have to provide and how much new capital would they have to invest in providing them?

The railways are to be returned to private operation on March 1. Congress is now deliberating upon the legislation under which they are to be returned. The kind of legislation it should enact depends in large measure upon the extent of the existing deficiency in railroad facilities and the amount of new capital which will have to be raised and invested in order to remedy that deficiency. Obviously, the larger is the amount of new capital which should be raised, the larger must be both the total amount of return and the percentage of return which the railway companies will be able to pay upon the investment in the railroad properties.

Some Things the Railways Should Acquire Within Three Years

6,000 miles of new line.
10,850 miles of automatic block signals.
13,177 locomotives.
15,000 miles of multiple main tracks.
30,000 miles of side and yard tracks.
24,500 passenger train cars.
712,400 freight cars.

Total investment needed in three years $6,010,000,000.

To make up a budget for a single railroad system for a single year is a very large task. To make up accurately a three-years' budget for all the railroads of the United States would be a task which would tax the knowledge and ability of the officers of all the railroads who are ordinarily assigned to making up budgets. The editorial staff of the *Railway Age* is conscious that its knowledge and ability are wholly inadequate to any such undertaking.

There are, however, available a large amount of data derived from actual past experience on which estimates of some value as to the future requirements of the railroads can be based, if the data are compiled and the reasoning on them is done by men who have a technical knowledge of the railroad business. These data relate to the past increase of the country's population, of its freight and passenger traffic, of the increases in facilities which have been made to handle the increased traffic, and of what were the wages paid to labor and the prices paid for material and equipment in the past and of the wages which must be paid for labor and prices which must be paid for materials now and probably in future. Of course, in basing conclusions upon data derived from past experience, certain assumptions must be made which may in future prove to have been incorrect. It must be assumed, for example, that the population will continue to increase in somewhat the same proportion as it has in preceding years; that the additional facilities required to handle a given increase in traffic would be about the same as they have been in the past, and that the amounts which these additional facilities will cost can be estimated with approximate accuracy from the present wages and prices.

If all or any of these assumptions should prove to be false, then the reasoning upon them would prove to be false. However, it does not seem logical to assume that in the railroad or any other industry in the United States future developments are going to be entirely different from past developments, unless some different and more highly artificial influences than those which have influenced past developments, are going to influence future developments.

Taking the past experience of the United States with respect to the growth of population, industry and commerce as a basis, the editorial staff of the *Railway Age* has been engaged for some weeks in trying to make as accurate an estimate as available information makes it practicable to make, of what the existing shortage of railroad facilities of various kinds is and of what additions of facilities it would be necessary to make during the next three years in order to bring the capacity of the country's railroad transportation

system abreast of the reasonable demands of commerce. The data which have been compiled, the calculations which have been based upon them, and the conclusions which have been reached are set forth in a series of articles which are published in this section of the *Railway Age*.

How Our Conclusions Were Reached

Doubtless the methods which have been used and the conclusions which have been reached are open to and will receive criticism. Some people will think that our estimates as to the needs of the railroads are too small, while others will think that they are too large. There are some interesting facts bearing upon the way our conclusions were reached, however, a recital of which may cause many persons who otherwise would be skeptical about their validity to be less skeptical about it. Some weeks ago one of the members of our staff made an estimate as to the present and future needs of the railroads, which was based upon a general consideration of the increase in investment which occurred between 1905 and 1915 and the increases in the amount of traffic handled which occurred during that period, and upon the amount of investment which had been made since 1915, the increases which had been made since then, the efficiency with which railroad facilities were utilized and the additional investment which had been made since 1915. The conclusion reached at that time was that to bring the railways abreast of the needs of the country within the three years 1920-1922, inclusive, would require a new investment of $6,000,000,000.

When it was subsequently decided to make a detailed study of the needs of the railways, assignments to make these detailed studies in respect to the needs for additional mileage, additional trackage and permanent stuctures, additional freight cars, additional passenger cars, additional locomotives, additional shop equipment and additional signal installations were given to nine different members of our editorial staff. Everyone of the men to whom an assignment was given was a technically trained man who is not only familiar in a general way with the railroad business, but who had had actual railroad experience. Four of the members of our staff who prepared these articles are mechanical engineers with railroad experience, three of them are civil engineers with railroad experience and two of them are men who have had years of experience in the signal departments of railroads. Each of them compiled and dealt with data in a branch of the railroad business with which he was technically acquainted and each of them made his estimate as to what was needed in that particular field independently of all the others. The following table gives their independent estimates as to the amount of capital expenditures which should be made in the respective fields in which they made investigations:

Additional main track	$1,250,000,000
Grade revision, cut-offs, elimination of curvature, etc.	600,000,000
Enginehouses and shops	250,000,000
Station buildings	300,000,000
Extensions	600,000,000
Signals	52,264,000
Freight cars	1,662,000,000
Passenger cars	532,000,000
Shop equipment	61,230,000
Locomotives	702,786,000
Total	$6,010,280,000

It should be observed that the foregoing figures are not the estimates of the total amounts which should be spent by the railroads for new facilities during the next three years, but the total parts of what should be spent which should be charged to capital account. In other words, this estimate roughly estimates the amount of new capital which the railroads should raise and invest during the next three years to bring their facilities abreast of the needs of American commerce. It includes nothing which should be bought for ordinary maintenance. Now, it is either a remarkable coincidence or it is highly significant that the estimate based upon general information which was made in the *Railway Age* some weeks ago was $6,000,000,000, while the combined amount of these estimates which have been made after studies, the thoroughness of which is indicated by the series of articles published in the immediately following pages, is $6,010,280,000.

The Viewpoint of Railway Executives

As we have already intimated, we do not anticipate that our estimates will be accepted as even approximately accurate by all students of the railway situation. The diversity of opinion which is likely to be expressed even by those best informed is illustrated by communications from four leading railroad executives, which we publish in an article which immediately follows this one. Samuel Rea, president of the Pennsylvania Railroad, in his communication says: "I hope you will not waste your energies debating what the country needs for the developments of the next few years. Concentrate on the question of how we are going to meet the situation in 1920." Mr. Rea then points out in a few highly significant sentences the acuteness of the financial situation which exists in the United States at the present time.

L. F. Loree, president of the Delaware & Hudson and chairman of the Kansas City Southern, says in his letter: "I have no sympathy with the stupendous estimates of the expenditures necessary for the immediate needs of the railroads." He goes on and points out why he has no sympathy with them. He adds, however, "If the railroads are to assume the burden of moving, on the day, the peak of the load, of expediting the movement at the expense of loading, of warehousing in their cars the storage demands of the trades, then no multiplication of equipment, tracks or men would satisfy the demands." Mr. Loree advocates a certain policy which he believes should be adopted in order to enable the railways to handle a much larger traffic without any proportionate increase in facilities.

Julius Kruttschnitt, chairman of the Southern Pacific, says in his letter: "For the ten years ending with 1917 about $660,000,000 has been spent annually for the construction of branches, extensions of existing lines, additional main tracks, station, yard and terminal facilities, buildings and structures, signals, roadbed, improvements, new equipment, etc. If there should be no material changes in present labor and material costs $660,000,000, equated for existing costs will have to be spent hereafter. Index numbers of the United States Department of Labor, Bradstreet's and other authorities show that the purchasing power of the dollar at the present time is approximately one-half of what it was in the ten years preceding 1917, so that approximately $1,320,000,000 will have to be spent to accomplish hereafter what the smaller sum did formerly." On Mr. Kruttschnitt's basis of estimating, which, however, makes no special allowance for the deficiency of railroad facilities which now exists, the capital expenditures made during the next three years by the railroads would have to be approximately $4,000,000,000.

E. P. Ripley, chairman of the Atchison, Topeka & Santa Fe, says in his communication: "It is impossible to make an intelligent estimate of the capital necessary to rehabilitate the properties and enlarge the same to meet the demands of the country. I think your estimate of six billion dollars is not too much. I cannot speak for all roads, but feel quite sure that it would be necessary for this amount to be spent if it could be obtained, and it can be obtained only under laws which would permit the roads to retain all they earn for their own use."

Some of the Facts on Which the Estimate is Based

We are conscious that our estimate is so large that it is more likely to be critcised on the ground that it is too large than upon the ground that it is too small. It should be borne in mind, however, that the deficiency of railroad faciilties unquestionably is greater both absolutely and relatively than it was at the beginning of the year 1917. There has not been a time since the fall of 1915, except during the first months in the early part of 1919, that the railways have been able to handle all the traffic that has been offered to them, in spite of the fact that meantime they have handled a traffic which has shown a vast increase over that of preceding years. In other words, throughout this period, except during the months mentioned, the industries of the country actually did offer to the railroads more traffic than they did or could handle, and throughout 1918, when the freight traffic was slightly larger than in any other year, it was moved under a system of permits and embargoes which absolutely excluded from transportation a large amount of "non-essential commodities."

As bad as were the congestion of traffic and car shortage in the years 1906 and 1907, they were not as bad as they have been within the last three years. In 1907, however, James J. Hill estimated that in order to put the railways in shape satisfactorily to handle the commerce of the country there should be invested in them during the next five years a total of $5,000,000,000, or $1,000,000,000 a year. Now two billion dollars would not at present wages and prices provide any more railroad facilities than one billion dollars did in 1907. Therefore, our estimate as to what should be done per year for three years is no larger than Mr. Hill's estimate in 1907 as to what should be done per annum for five years.

The comparative conservatism will be immediately perceived by anyone who will read the detailed articles published in this section of the *Railway Age*. The new mileage of railroad lines built in the United States was never less than 2,000 miles from 1896 to 1914, and it almost always exceeded 4,000 miles, frequently exceeded 5,000 miles and in 1902 was over 6,000 miles. Our estimate provides for new construction of only 2,000 miles per year during the next three years.

The Freight Car Situation

Our estimate as to the number of new freight cars which should be acquired within the next three years—712,400 in the United States, and about 800,000 in the United States and Canada—is based upon the indication of past experience as to the extent to which freight traffic and the average capacity of cars will increase, and as to the number of tons which it seems reasonable to assume can be carried one mile per year per ton of car capacity. The best available statistics show that since 1915 the total number of tons carried one mile per year has increased 45 per cent, while the number of freight cars owned by the railroad companies themselves has increased only 1.6 per cent. Furthermore, they indicate that there are many cars now in service which, for reasons of economy, ought to be retired as soon as practicable. Unless it is to be assumed that the freight traffic of the United States is to stop growing and begin actually decreasing our estimate regarding the number of freight cars needed now and what will be needed will, we believe, stand the test of the severest scrutiny.

Passenger Cars and Service

Prior to recent years the railways unquestionably provided too many passenger cars and ran too many passenger trains. It would be very difficult to convince anybody who rides frequently on the passenger trains in this country that there are enough cars or trains now. The overcrowding of cars on trains throughout the country has become so great that it is no longer possible to travel on any line handling a large passenger business with any comfort, much less pleasure. Our statistics regarding the passenger car situation bring out strikingly the reasons for this. In four and a half years passenger traffic has increased about 43 per cent, while the number of passenger cars has increased only about 2½ per cent. Between 1908 and 1916 the average number of passengers carried per car varied from 15 to 15.9. The number is now about 21, an increase since 1916 of 35 per cent. Between 1905 and 1916 the average number of passengers per train varied from 48 to 57. In 1917 it was 65, in 1918 it was 86, and now it is 90, an increase since 1916 of about 58 per cent.

Now, nobody who believes in efficient and economical railroad operation believes that the railways should ever return to the extravagant methods of handling passenger traffic which prevailed up to 1916. But it is surely not extreme to assume that under present conditions of passenger traffic they should provide enough passenger cars to handle an average of 17.6 passengers per car, which is what they did handle in 1917. While this would mean the light loading of many cars where the traffic is sparse, it would mean the heavy loading of most cars where the traffic is heavy. Our estimate as to the passenger car requirements of the railways—24,500 cars in three years—is based upon this 1917 average of 17.6 passengers per car.

The Locomotive Situation

With respect to locomotives, passenger and freight, our estimates as to the requirements are based upon the indications of past experience as to the number of tons of freight and the number of passengers which can be expected to be carried one mile annually per pound of locomotive tractive power, under normal transportation conditions. The estimated number of new locomotives required within the next three years is 13,177.

Block Signals Needed

Our estimates as to what should be done in the matter of installation of block signals are based entirely upon past experience. As a matter of fact this basis has been taken because it is the most conservative available, and not because we regard it as the right one. As our readers know, the *Railway Age* has for years advocated the installation of the block signal system on the entire railroad mileage of the United States, and if this were to be accomplished within any reasonable time, the rate at which signals would have to be installed would be much faster than is provided for in our estimate.

All the other estimates as to needed expenditures have been made as conservatively as any interpretation of the available data seemed to warrant. And it should be noted that the facilities which are included are by no means all those needed, but merely the principal ones. Furthermore, probably they do not include all even of the principal ones. For example, the great subject of electrification of certain classes of lines is looming more and more prominently on the horizon, and the electrification of any considerable mileage would involve vast capital expenditures although, of course, under present conditions no estimate regarding them can be made.

While the estimates we have made can be critcised in details, we believe that they are as nearly correct as any estimates that could be made regarding so vast and intricate a subject. Anybody who takes the trouble to read the following articles will hardly escape the conviction that the railways of the United States have fallen very far behind the requirements of the country within recent years, and that unless a vast program of railroad rehabilitation and expansion is begun soon, the industry, the commerce and the people of the country will suffer vast losses in consequence.

E. P. Ripley

L. F. Loree

Samuel Rea

J. Kruttschnitt

Corporate Executives' Views on Railway Problems

Stabilization of Railroad Credit, Adjustment of Labor Disputes and Control of Traffic Discussed

IN CONNECTION with the study of the requirements of the railroads which the *Railway Age* has conducted, it was desired to present the opinions of prominent railroad officers as to the problems the railroads would face in enlarging their facilities to take care of the growth of the traffic. With that purpose in view, inquiries were sent to the corporate heads of four important railroad systems. Their replies are given below:

Needed Capital Cannot Be Obtained If Earnings Are Limited

By E. P. Ripley

Chairman of the Board, Atchison, Topeka & Santa Fe

The limitation of earnings by law to six or seven per cent without a definite guarantee of earnings in any amount whatever will not enable the strongest roads to finance themselves, and even those having enough cash in the treasury will hesitate about putting more money into the property on such terms. In the two years of government control much depreciation has taken place, which must be made good, concerning which there will be great uncertainty and possibly protracted controversy, culminating in litigation. It is impossible to make an intelligent estimate of the capital necessary to rehabilitate the property and to enlarge it to meet the demands of the country. I think your estimate of six billion dollars is not too much. I cannot speak for all roads, but feel quite sure that the necessary amount would be spent if it could be obtained, and it can be obtained only under laws which would permit the roads to retain all they earn for their own purposes.

Stabilization of Credit and Settling of Labor Disputes

By J. Kruttschnitt

Chairman, Executive Committee, Southern Pacific

Before venturing an opinion as to the policy of the railroad companies in case "needed legislation" is passed, we should define "needed legislation."

All the ills that the railroads have been suffering for years may be ascribed to a common cause—weakened credit—due to inadequate income, itself caused by inadequate rates. The railroads if restored to private operation must look to private investors for the money necessary to add to existing and to provide additional facilities for the public need.

To attract investment the credit of the carriers must be restored and firmly established by a schedule of rates that will produce revenue sufficient to pay (a) expenses of operation, including labor and taxes, (b) a fair return on the property used in the public service, (c) an additional amount sufficient to attract investment in their securities wherefrom they may be enabled to provide the service needed by the public.

If any of the things enumerated above are not necessary, which can be omitted? "Must not the expenses of operation and the taxes be paid? Must there not be a fair return, to be fixed at a reasonable figure by a governmental agency, on the property used to furnish the public with transportation? Is it not essential, in the public interest, that the carriers, comprehensively considered, shall have the credit necessary to enable them to obtain the new capital needed to furnish the facilities which the public must have?

"And if all of these things are essential, why should Congress be reluctant to say so? And if Congress is reluctant to say so, must it not be because there is some doubt about it? If there is any doubt, why should anybody invest on the uncertainty? Is it not wise to give stability to the business of transportation by making a clear legislative declaration of the rule which will be applied and which investors may rely on? If there is any doubt about providing in the rates for any of the purposes mentioned, this is the time to say so and to give fair notice to investors. If there is no doubt there should certainly be no hesitation in so declaring."

If, in addition to the financial legislation outlined above, a plan for settling labor disputes is passed that, while giving paramount consideration to the public service, will also deal justly with the interests of labor and of capital, I believe the railroads would, as soon as possible, proceed diligently to make expenditures that would enable them to fully meet public demands.

A study of freight traffic and the corresponding expenditures for additional facilities affords a basis for estimating

future expenditures. In 1916 the increases in ton mileage from 1900 to 1915, projected into the future, indicated a probable aggregate ton mileage of the United States carriers of 345,000,000 in 1919. An estimate of the actual ton mileage for this year, based on published data for ten months, indicates a probable ton mileage of 360,000,000, or about four per cent more than an estimate made in 1916. For the ten years ending with 1917 about $660,000,000 has been spent annually for the construction of branches, extensions of existing lines, additional main tracks; station, yard, and terminal facilities; buildings and structures, signals, roadbed improvements, new equipment, etc. If there should be no material changes in present labor and material costs, $660,000,000 equated for existing costs will have to be spent hereafter. Index numbers of the United States Department of Labor, Bradstreet's and other authorities show that the purchasing power of a dollar at the present time is approximately one-half of what it was in the ten years preceding 1917, so that approximately $1,320,000,000 will have to be spent to accomplish hereafter what the smaller sum did formerly. Therefore, we must not forget that the carriers' revenues must be increased $80,000,000 *annually* to pay interest on these large *annual* outlays for additional facilities. Whether the railroads will be able to procure the necessary funds at all and, if so, whether at seven per cent, 6 per cent or 5 per cent or less, will depend on the action of Congress.

More Intensive Use of Existing Facilities the Remedy

By L. F. Loree

President, Delaware & Hudson

My experience has been that the first recommendation that may be expected regarding a property is the suggestion of large expenditures for double-tracking and additional equipment, and that these were seldom justified and were remedies that were not calculated to cure the real disease.

I have no sympathy with the stupendous estimates of the expenditures necessary for the immediate needs of the railroads. Our general method of approaching subjects of this character is perhaps the basic fault. Consider the question of the annual crop yield. The government puts out estimates of the acreage planted, the crop conditions, the probable yield, the expected prices, and finally arrives at a figure of 9 or 12 or 15 billion dollars, as the case may be, and the average mind following these successive steps comes to feel that the ultimate result is money in the bank. Now, the fact is far from that comfortable conclusion. First must be deducted the amount fed down to the stock on the farms; then reservation must be made of seeds for the next year's planting, and with other necessary deductions there is the carry-over in the hope of higher prices, the farmer engaged in the most hazardous of our productive undertakings quite naturally extending his speculative experience into the field of values.

Very largely we build up our mental impressions and draw our conclusions in the railroad world along equally fallacious lines. If indulged in they lead to a reckless investment of capital, to an extravagant provision of facilities and to assuming the entire responsibility, when much of it properly belongs elsewhere, with the ultimate effect that the business is not prosperous and that it incurs the hostility and condemnation of those it serves.

If the railroads are to assume the burden of moving on-the-day the peak of the load; of expediting the movement at the expense of loading; of warehousing in their cars the storage demands of the trades, then no multiplication of equipment, tracks or men will satisfy the demands. On the other hand, if, in their own interest and in that of the public, they insist on adequate reservoiring of the grain, bituminous coal, ore and kindred traffic largely seasonal in their character; the more adequate loading of cars by raising the minimums and by other devices, and such a mounting demurrage as will confine the use of the car to its transportation service, the present plant, when brought up to a proper state of repair, will be found to be reasonable, adequate and its expansion within the reasonable limits of a credit derived from rates designed to promote the growth of industry and agriculture.

Financing Requirements in 1920 a Serious Problem

By Samuel Rea

President, Pennsylvania Railroad

I hope you will not waste your energies debating what the country needs for the developments of the next few years, but rather concentrate on the question of how we are going to meet the situation in 1920. Normally about 100,000 freight cars should be retired and replaced each year. The government made provision for only half that number, and prior to federal control the railroads themselves were unable to provide in advance for the growth of business.

In 1920 the railroads must settle with the government for addition and betterment expenditures during federal control. They must also provide for proper addition and betterment expenditures during 1920 itself and also for maturing obligations. This they cannot do under present world-wide conditions except with the help of the government, and suitable provision should be made by the government to meet this situation by advancing the necessary funds, which will be represented by obligations of the railroads and repaid within ten years with suitable interest. Instead of doing this, orders have already been issued which will restrict new work at least until March 1, which must affect the rest of the year seriously.

Unless the public takes a more active interest in the new legislation proper funding provisions may not be made to cover the entire program. This means a restriction of transportation facilities and equipment and consequently of business next fall.

Photo by Courtesy of C. M. Winter.

With the Russian Railway Service Corps A Set of Car Coupling Hooks of Different Types Used for Instruction Purposes

Photo by Kadel & Herbert

The Need of Extensive Development of the Railways

How Much New Mileage Is Likely to Be Built in the Next Ten Years?—How Will It Be Financed?

By F. J. Lisman,

F. J. Lisman & Co., New York

PEOPLE IN MANY SECTIONS of the United States without adequate transportation facilities are anxiously awaiting the outcome of the railroad legislation, because they are naturally desirous of seeing their part of the country and their resources fully developed. Probably these people do not realize the fact that railroad construction hereafter will not be carried on on the same lines as heretofore. Formerly the promoters of new lines not only had the prospect of a fair rate of interest on their investment, but also the expectation of a substantial profit in the shape of additional earning capacity which could be capitalized through bonus stock, or paid out, over and above a fair return, to the parties furnishing the money. In the past at best it generally took longer to realize these expectations than was originally anticipated and in most cases during the waiting period the companies were unable to earn interest on the money invested. The original investors who had furnished the capital frequently became discouraged and sold out at a very heavy loss. At any rate, there was always the hope of profit, the proverbial gold pot at the end of the rainbow.

This period is done with, because under the present theory of capitalization of public utilities, these companies are at best entitled only to a fair return on the money if they should be successful, and have to take the chances of a loss at the same time. Of course, capital will not do this. People with money have many opportunities of investing it without risk, and if they take the risk they look for compensatory profit.

F. J. LISMAN, a New York banker, has had a broad experience in financing short line independent railroads in the United States. His personal detailed knowledge of the topography and resources of the country is remarkable.

With an international clientele before the war, F. J. Lisman & Company were in a position to advance $3,000 or $4,000 per mile on first mortgage bonds of proposed short lines, supervise the construction and distribute the bonds among their customers, taking the stock for their own services.

The construction of new railway lines might be subdivided into three different classes:

1. The construction of through lines or new links in existing systems which will form new through lines, either between different divisions of a system or in connection with other lines.

2. Lines to be built in connection with the development of mineral resources.

3. Purely agricultural lines which will bring lands capable of production nearer the world's markets.

Assuming that Congress passes legislation which will rehabilitate the credit of the railroad companies, the construction of railroads, which would mean new through lines or connecting links, will have to be done by existing railroad systems having established credits. New lines will be absolutely unable to obtain capital on the modern theory that the promoters are entitled only to a fair rate of interest.

During the last five years about the only new links of this kind which have been built are: The 40-mile extension of the Gulf, Mobile & Northern to Jackson, Tenn., making this road a through line between the Gulf of Mexico and the central states; certain branches of the Chicago, Milwaukee & St. Paul System connecting the road with Great Falls, Mont., and Spokane Falls, Wash.; the new low-grade division of the Seaboard Air Line from Charleston, S. C., to Savannah, Ga.; and the recently completed joint line of the Southern Pacific-Spreckles interests between Yuma, Ariz., and San Diego, Cal., making a new through route to the only good harbor of southern California.

At the present time there are no other links of this kind in course of construction, but there are a number of sections of the country in the south and west where links of through lines will probably be constructed hereafter. For instance, there is the probability of another through route between Washington, D. C., and New Orleans, La., by building a connection between the Seaboard Air Line at Birmingham, Ala., and the Illinois Central at Jackson, Miss. There is always the possibility with the growth of the Pacific coast, of the Hill lines entering California by way of the Pitt river valley. Any large development of undiscovered resources in the eastern part of the state of Oregon might hereafter mean the construction of additional railroad mileage which would serve this territory, besides forming new through connections. There is the contemplated short route between Denver, Colo., and Salt Lake, which would mean an extension of the Denver & Salt Lake through the Uinta Basin to some point near Provo, Utah.

Many of the Rocky mountain states need railroad facilities, the development of which, however, will naturally depend on the opening up of mineral resources or on irrigation developments. It is a safe assumption, however, that none of these through lines will be built for a number of years.

Railroads to Tap Mineral Resources.

Minerals are generally hauled for long distances and as a rule must be carried at a very low rate to competitive markets. This means the construction of heavy lines with low grades. The largest amount of mineral tonnage is coal. The coal mines of the United States are now capable, if labor and cars were available at all times, of producing a coal tonnage from 20 to 30 per cent in excess of the country's requirements. The railroads would probably be better off if no new coal mines whatsoever were developed, because if a new mine is opened, say on a branch of the Pennsylvania or the Chesapeake & Ohio, it would probably mean that the railroad company would operate an additional spur, do additional switching service and haul no more coal than it does at present. In other words, the new mine would merely take away some of the business which existing lines are capable of handling. Each one of the coal carrying railroads has a certain undeveloped territory naturally tributary to its lines and is bound to protect its territory by building branches for fear that some competitor might otherwise do so.

All the large coal carrying railroads have repeatedly been up against the following very unsatisfactory proposition, which has been a great source of trouble and friction: Some man, say Mr. Jones, will buy some coal lands, located 20 miles away from the railroad, at a very low price. Mr. Jones will open up the mine and build the Jonesboro Railroad, a 20-mile road running from the mine to a junction point with the trunk line. He will have to pay the full local rate from the junction point to tidewater. The Jonesboro Railroad will charge the Jones Mining Company and any other shipper 20 cents additional for its services. At first Mr. Jones and his neighbors will be content with this situation, but before very long he, or more likely his neighbors, will commence to complain to the state or Interstate Commerce Commission about the unjustice with which they are being treated. They will claim it is impossible for them to market their coal on account of this additional freight rate; that they are being throttled by discrimination on the part of the main line against them, etc. In many cases the railroad commissioners would listen to these complaints and the trunk line will then be compelled to give up 20 cents of its through rate to Mr. Jones's railroad for originating the business and a substantial present in the way of unearned increment would thereby be made to Mr. Jones and his fellow land owners.

Similar conditions were created in connection with the building of branch lines to develop lumber districts. A conspicuous example of this is the construction of the Northwestern Pacific Railroad into the heavily timbered country of northwestern California. This Northwestern Pacific Railroad was constructed at a tremendously heavy cost through a very difficult country in order to develop the resources of that section, based on an understanding with the land owners that they would have to pay a higher rate for bringing their timber to market than owners of lands in fully developed sections of the state. Promptly after the Northwestern Pacific was completed the lumbermen made bitter complaints to the California Commission and to the Interstate Commerce Commission about the extortionately high rates which made it impossible for them to compete with other districts and promptly "got relief." This really meant that the investment made in the Northwestern Pacific by the Santa Fe and Southern Pacific was largely reduced in value and that a present of the unearned increment was made to these lumbermen practically at the expense of the railroad.

The question of building branches for the purpose of developing mineral resources will probably be left, the same as heretofore, to the competitive spirit of existing companies. If we should have government ownership, the question will probably be left to the district or section which has the biggest political pull. Of course if mines, or other tonnage, should be discovered in some section entirely without railroad facilities; say, for instance, a high quality of coal should be discovered in the Powder river district of southern Montana and northern Wyoming, then undoubtedly branch lines would be built by the Chicago, Milwaukee & St. Paul and Hill Lines in order to secure a share of this business.

Construction of Branch Lines in Agricultural Sections

Generally speaking, an agricultural section is slow to respond to the construction of new railroad facilities. Settlers do not rapidly change their method of cultivation and new colonies are also slow in developing. The construction of a new railroad line into a good agricultural country promptly doubles the value of the land, and in the course of 20 years such lands increase from four to eight-fold over previous prices. Heretofore constructors of railroad lines have not participated in the huge values which they have created by their efforts. This has been so largely for two reasons:

(a) Because lands were not marketable or available as collateral in financial centers.

(b) Because the people who furnish money for railroads did not fully realize the huge values they have created.

Hereafter the railroad contractor will have to look for his profit to the enhancement of lands and other resources rather than to the profits of the railroad, and no construction will be undertaken unless some such profits can be assured; that is to say, that we may covert to land grants without tieing up large sums of money. Promising agricultural communities needing transportation facilities where owing to the scattered ownership, land grants are impossible will hereafter have to finance these roads themselves or do without railroads and will have to build first class automobile roads over which five-ton trucks may economically travel for distances of from 20 to 75 miles, carrying commodities for, say, five cents per ton mile. These rates will be somewhat higher than those prevailing on existing railroad branch lines, and the taxes in connection with the construction of motor roads will be a burden which should be spread, in accordance with the benefits derived, over all the land and property of the community which is to be developed, less such proportion as will be borne by the state and federal government.

During the period from 1896 to 1914 the average annual railroad construction in the United States fluctuated from 3,500 to 6,000 miles, being an average of 4,500 miles per annum. Probably 60 per cent of this mileage might be

classed as through lines with incidental local development, while the remainder was probably, to the extent of 15 per cent, mineral development, such as the Virginian Railway, the various coal branches of the Chesapeake & Ohio, Norfolk & Western, etc., and the balance for the purpose of local agricultural development.

The trunk lines will for many years be pressed to increase their yard and station facilities at important points, laying additional double track, reducing grades, acquiring equipment, etc. They are not likely to build agricultural branches unless operating expenses and interest on the new line is assured from the very beginning.

For purposes of comparison we may assume that the state of Iowa, as a fully developed state, needs no further railroad facilities, as there is probably no point in that state more than 15 miles distant from a railroad station. One of the least developed strictly agricultural states is Mississippi. The following comparison is therefore of interest:

	Iowa	Mississippi
Population	2,224,771	1,797,114
Area (sq. mi.)	56,147	46,750
Railroad mileage (1916)	9,946	4,438
Miles per 10,000 inhabitants	44.79	22.82
Miles per 100 sq. mi	17.89	9.57

It would appear that the state of Mississippi, in order to be on an equality with Iowa, would approximately have to double its present mileage. Certain sections of Alabama, Tennessee and even Kentucky are served on about the same basis as the state of Mississippi.

The need of railroad mileage west of the one hundredth meridian depends on the development of agriculture, which in turn depends on irrigation. People who know the country state that probably not to exceed 5 per cent of the huge area between the one hundredth meridian and the western range of the Rocky mountains can be irrigated economically. Of course this 5 per cent in most cases would be capable of intensive cultivation as soon as colonists can be found who know how to work irrigated lands. This is a problem for the future to solve.

How Much Mileage Will be Built Annually?

The big question now arises, how much mileage is likely to be built annually hereafter and how will an undeveloped section get needed transportation facilities?

Unless Congress creates a broad basis of credit for the railroads, we will drift to government ownership. It is to be hoped that government ownership will not mean log rolling and the pork barrel on the order of the River and Harbor bills. Unless bills are passed which will fully restore railroad credit, new construction will remain at a minimum. Even if such bills do pass, it can be taken for absolutely certain that the principle will be established of nothing over and above a fair rate of interest. In view of this there will be no new railroad companies incorporated and we are not likely to see much additional mileage built hereafter except with some kind of government aid.

Probably new construction during the next five years will not exceed 2,000 miles in any year and quite likely it will be very much less than that. New through lines will only be built after several years. Lines for mineral development, such as branches to coal mines, will be built only under pressure through fear of competition; let us say, for example, the fear that the Baltimore & Ohio may develop certain sections naturally tributary to the Pennsylvania Railroad, or by parties who own coal lands and who are willing to bear the cost of building and operating a branch line in order to increase the value of their coal lands and to market their output. Automobile roads must take the place of most branch lines and the sparsely settled states will have to enact legislation to aid in railroad construction, which will be more or less along the lines of drainage and irrigation development.

How They May Be Financed

Transportation, whether by railway or highway, is an improvement which creates additional values for each district, the same as drainage and irrigation. Methods for working out the details of distributing the burden proportionate to the benefits of irrigation or drainage districts have reached a fair degree of satisfaction. No doubt much progress will be made from time to time.

In the case of a drainage district, lands benefiting thereby each pay a proportion of the cost of drainage. Under the laws of many states, owners of swamp or wet lands, by complying with certain statutory requirements, are authorized to form a local drainage district. The local courts after a proper election appoint a commissioner to assess the cost of the drainage in proportion to the value of the lands benefited thereby. Irrigation matters are handled in a similar way, under the well-known Cary and other acts.

There is no reason why a district which needs transportation should not be authorized to form a transportation district in a similar way. Let us say a district containing 200,000 acres wants railroad facilities; that is, a 20-mile railroad costing say $500,000. The court could nominate a commission which would lay out this district and assess the lands for the cost of this railroad in proportion to the benefits received. Let us assume that the Walnut Creek district be authorized to issue $500,000, Walnut Creek Transportation District 5 per cent 40-year bonds, the interest on which would be $25,000 per annum, and the sinking fund, commencing in the seventh year would be $15,000 additional per annum. This would mean that these 200,000 acres would have to produce $40,000 annually from additional taxes. This assessment should be levied by the commission in accordance with the benefits received by the land, say $1 for the best land adjacent to the proposed railroad, this amount gradually diminishing in accordance with the value of the land and the distance from the stations. Presumably arrangements could be made with some existing connecting railroad to operate the Walnut Creek line and to guarantee the district against any deficit in operating expenses with a further agreement to pay part, or all, the interest on the bonds and sinking fund in accordance with the amount of tonnage originating along the line. Such bonds would be a quasi municipal security, tax exempt and readily marketable. The bonds would be a first lien on the lands the same as irrigation and drainage bonds, and the moneys necessary to pay their interest and sinking fund would be collected by the tax collector. The cost of building the railroad would then fall exactly where it belongs, that is, on the people who are benefited thereby.

The drainage laws provide for extraordinary assessments on land owners in case of a break in a levee and for other similar contingencies, which might be likened to a washout or the deficit in operating a railroad.

The taxation of these transportation railroad aid districts might be handled in a different way. For instance, in a live stock region it would be perfectly fair to tax every head of cattle or sheep passing out of the district at a given amount. In a mineral region a tax might be imposed on every ton of coal or any other mineral resources passing over the line.

Construction may be let by public tenders and the bonds must also be sold by public tenders after due advertising as prescribed by law.

If the prospective benefit to the land owners is not sufficient to induce the building of the railroad, then the road has no reason for existence and should not be built.

Of course no laws can thoroughly provide against incompetence of the authorities or against loose supervision of contractors. Probably the construction of these district aided railroads will cost more than those built by or under the eyes of owners. And the truth of the old adage "Public

waste is greater than private profit" is likely to again be proven.

In many cases completed districts it would be possible even before construction of the proposed line is begun, to obtain a contract with a connecting railroad not only to pay the operating expenses, but a part or possibly even the whole of the interest and sinking fund charges.

The leasing railway company would thus get cheap money through the sale of "tax exempt" securities, and would in any event avoid payment of taxes, which it should not be called upon to pay anyway before it is fully self-supporting. A railway has always created large taxable values even if it failed to earn its own operating expenses. There are many cases on record where the taxes paid by new railway lines to communities which it has served to create not only took all of its net earnings but sometimes upwards of 20 per cent of its gross earnings.

The quasi municipal transportation district will be the outcome of the new principle that capital is entitled only to fair interest on the money and to no profit. Under such conditions the men who reap the benefit must take the risk.

The Daylight Saving Agitation.

All New England is being agitated to favor the renewal of "daylight saving" next March, in spite of the adverse action of Congress; and unless a sober second thought is aroused to call a halt, there will probably be radical action by one or more legislatures. The three northern states, largely agricultural, are not enthusiastic and may not act; for there, as everywhere, the farmers are opposed to a change; but the Boston Chamber of Commerce is taking the lead and the urban interests are likely to have strong influence with the legislatures of Massachusetts, Connecticut, and Rhode Island. The people of New England sometimes repine at the way in which the rest of the country, the boundless west, looks upon their section as a remote corner; but in this matter they seem to be taking voluntary action to separate themselves, actually; for to set their clocks ahead when other states do not, is to introduce a confusion that would be absolutely indescribable. It may not kill anybody; neither will it draw any visible geographic line, or cause losses which can be measured in millions of money or tons of coal; but the confusion at railroad stations *and at other places,* would be felt by everybody, everywhere. The city authorities of New York City and of Philadelphia have already voted in favor of changing clocks in the Spring; and New England is perhaps counting on the magnitude of numbers as an argument; the six states and those two big cities contain some fifteen millions of people; but the people have not voted, the city fathers have not done much consulting, and the scheme remains provincial.

Judging by what little argument has appeared in print the proponents of "summer time " have not given very serious thought to the actual difficulties of the situation; they expect that their scheme will be able, simply by its boldness and its rapidity of movement, to compel the unwilling to follow. That argument was used to some extent in the Congressional agitation, when the war-time act was passed; but the situation at the present time is different. Farmers then were acquiescent, but they want their rights and they feel free, now, to fight for them. The war-time act also won over some of the objectors by citing the successful example of Great Britain; but Britain never tried to change clocks by districts; it was the whole country or none.

It goes without saying that our railroads will accommodate their passenger trains to the wishes of the people; they did it prior to November, 1883, when every state had its own standard of time and traveling salesmen had to have two (or more) minute-hands on their watches in order to facilitate reading the timetables of different roads. But the trouble with the present situation is that the problem is so confusing that by the time the different experiments had been completed the summer would be half over—probably wholly over.

The Congressional act prescribing standard time *still stands,* except as to the summer change. That is to say, the railroads, being interstate carriers, and subject to federal law, cannot lawfully set their clocks forward, either on March 28 or at any other time. The section of the law providing for this change was repealed. The rest of the act, including the clauses regulating the sittings of courts and other activities controlled by federal law, is still in effect. If the Pennsylvania Railroad wishes to accommodate Jerseyites who desire to go into New York City an hour earlier on Monday morning, March 29, it will have to get out a new timetable. It will have to run its 8 o'clock train at 7, the 7:30 at 6:30 and so on; and the passenger will have to have one watch for his house and office activities and another by which to catch trains. Philadelphia may want the same changes as New York; but Trenton, half way between, may, or may not; and Baltimore, more considerate to the farmers, may propose something else. If Massachusetts (or Boston alone) should change clocks, and Maine should not, the trains between Portland and Boston would accommodate some of the people and discommode others. The theorist or the thoughtless would settle this point by calling for additional trains, one set to accommodate Portland and another set to accommodate Boston; but that would involve an additional cost which the public would have to pay for. This payment might be camouflaged; but the actual scarcity of coaches, of locomotives, and of coal which might ensue, could not be concealed. Every passenger would suffer from it.

In short, the well-meaning people who wish to aid city people to get up an hour earlier in the morning without knowing it, ought to direct their efforts toward Congress. If it is permanently better to live all summer by dishonest clocks than to get out of bed in the morning when we ought to (*and want to*) simply by the act of the will (aided by a two-dollar alarm clock) there must be some way of composing the differences between city and country. The farmers and their cows need not be overborne; neither need the city man abandon his selfishness or his laziness. Congress can find a way, if it sets out to settle the problem rationally. But any action by state legislatures is little better than a vote to go back to the clumsy arrangements of 1883. Such laws would make William F. Allen (the father of standard time) turn in his grave. Railroad officers should arouse their Congressmen on this question without delay. The railroads could change a thousand timetables at a cost of a few hundred thousand dollars and could submit to all sorts of disturbances; but the people would be disturbing themselves more than they would the railroads; and it is for every railroad officer to show his neighbors, without delay, what the present agitation is leading to.

Sixty railroad scholarships will hereafter be offered each year by the Southern Pacific Company, in its agency school at San Francisco, for young men between the ages of 18 and 23. Appointments will be made by division superintendents and heads of departments, who will also be charged with the responsibility of finding places for the appointees upon graduation. The scholarships are designed to prepare young men for positions in the freight and passenger departments and the general offices of the company. The awards will also include the payment of a nominal sum while the appointee is being instructed. E. L. King, superintendent of telegraph, San Francisco, Cal., has been placed in general charge of the plan.

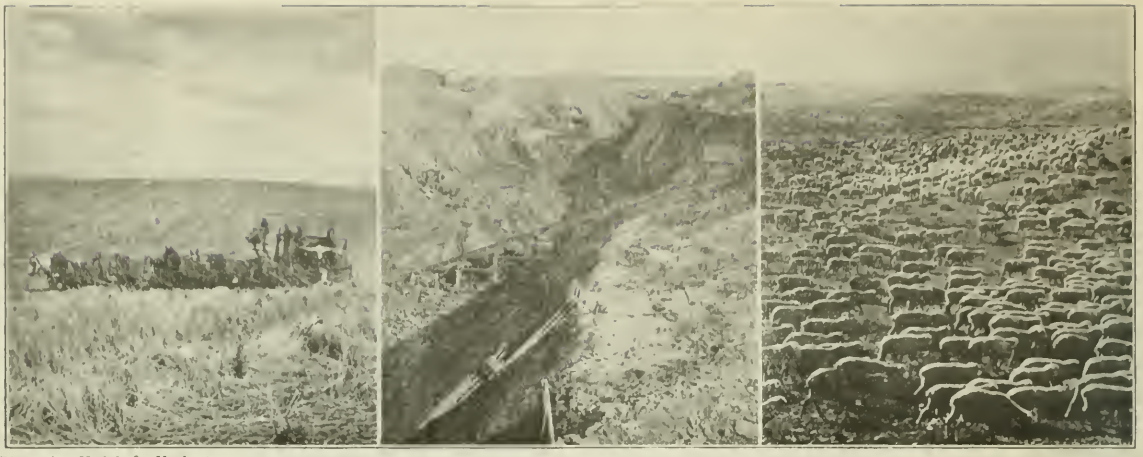

Photo by Kadel & Herbert

Railways Far Behind in Construction of New Lines

Comparisons with Previous Years and Survey of Undeveloped Areas Indicate Shortage of 6,000 Miles

OVER 6,000 miles of new railway lines should be built during the next three years if the roads are to meet the demands of the country for extensive development at the end of that period. This will require the expenditure of more than $500,000,000, and is entirely aside from even larger expenditures which will be required to equip the existing lines to the point where they will be able to handle the traffic confronting them expeditiously and with economy. Furthermore, these figures do not contemplate any rapid expansion, such as characterized the period from 1900 to 1907, when over 40,000 miles of lines were built, an increase of over 5,000 miles per year.

In the ten-year period from June 30, 1905, to June 30, 1915, the reports of the Interstate Commerce Commission show an increase in the miles of line owned by the roads of the United States of 35,688, while the records of new lines built for the years 1906 to 1915, inclusive, compiled by the *Railway Age*, show that 33,518 miles of lines were constructed. These figures show an average mileage of new lines built each year of approximately 3,500. Contrast this with the record since 1915. In the four years just ended only about 3,500 miles have been constructed, equivalent to one year's average in the period immediately preceding and an annual average of less than 900 miles. The fact that this decline began in 1914 and that the mileage built in that year was 1,500 miles less than in 1913 and that the decline has been constant since that time emphasizes the result of disturbed conditions during and since the war, but, while the sharpness of the drop was due to these causes, the underlying conditions undoubtedly would have caused a falling off in railroad building without the war. These underlying conditions have not yet changed materially, although the legislation now immediately in prospect has many possibilities. Furthermore, the country has had a recent lesson in the effects of a restrictive policy towards the railroads which should be considered when we are facing an era of widespread development.

It is probable that conditions will not change in the near future so as to require as large a program as was followed in the decade closing in 1915. The need for long extensions in the future, apparently, will be comparatively very much less than in the past. Still there are many large areas in the country now untouched by railroads and there is need for shorter branches to tap these undeveloped territories. Owing to the fact that construction of this character ceased almost entirely during the war period the roads are behind a normal schedule of extension building, and if the mileage of railroads is to be restored to a normal relationship with the commercial and industrial needs of the country by the year 1923, it seems conservative to believe that the accomplishing of this end will require the construction of at least 6,000 miles of additional lines during the next three years.

NEW THROUGH LINES, lines to develop agricultural resources, and lines to tap mineral deposits, are all possibilities of the future, but can no longer be undertaken as speculative enterprises.

The country which is benefited must, therefore, pay an assessment which will assure a fair return on the new capital invested. Such an assessment would be analogous to drainage district taxes.

New construction will be about two thousand miles a year.

F. J. Lisman's article, which appears on the preceding pages of this issue, discusses the practical possibilities of building railroads to develop new territory under present conditions. The *Railway Age* has long given careful study to this question and has supplemented its information, through correspondence with men more or less closely in touch with local affairs in the various states, whereby it has collected

a large amount of data as to the needs for new railroad building. It should be borne in mind that nowhere in this article or in Mr. Lisman's article is the subject of the intensive development of existing railroads discussed. Neither have we considered extensions designed to reach sources of traffic now served by other roads. In all that follows the assumption is made that where new railroad mileage is suggested, it is with the idea of developing a territory rather than of meeting a need for transportation facilities that has already been more or less fully met.

Furthermore, it cannot be assumed that because a line is mentioned as one which would develop territory not now provided with railroad facilities, such a line would be profitable. It was a curious and interesting fact that in the correspondence with state commissioners few hazarded the opinion that a railroad built to develop new territory would be of itself profitable, although some correspondents suggested that an indirect profit would accrue to existing lines through traffic brought to them by extensions. Mr. Lisman covers the economies of this situation quite fully, and it is mentioned here only to guard against misinterpretation of the specific mention of territory not served by an existing railroad.

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The New England District

For the purposes of this discussion the United States has been divided into six sections, following the lines of the operating divisions made by the United States Railroad Administration in establishing the regions, although the combinations in this article are a little different. Section One corresponds to the New England district of the Eastern region. Section Two includes the rest of the Eastern region (the Central and the Ohio-Indiana districts) and the Allegheny region. Section Three comprises the Pocahontas and the Southern regions, while Section Four corresponds to the Southwestern region. Section Five includes the Central Western region, and Section Six the Northwestern region.

The New England District Needs Few Lines

Generally speaking, the so-called New England district, which includes Maine, New Hampshire, Vermont, Massachusetts, Rhode Island and Connecticut, offers few opportunities for new through lines or for links in existing systems which will form new through lines. It is true that in New Hampshire, where the north and south roads are apparently ample for present needs, the public would be better served if more railroads were provided crossing the state east and west. This is, however, a matter of convenience rather than of necessity and the building of any considerable mileage of new lines in the state for years to come is unlikely.

In Vermont the situation is somewhat similar, although a line extending from Montpelier, in Washington county, north to a connection with the St. Johnsbury & Lake Champlain, and then still north along the course of Black river through Craftsburg, Albany and Coventry to Newport on the Canadian Pacific, a distance of approximately 50 miles, has been considered. Another line which has received attention in this state would provide a short line between the cities of Montpelier and Rutland by building directly over the mountains in a southwesterly direction from Montpelier, connecting with the Rutland and the Delaware & Hudson at Rutland.

A number of townships in the western and central part of Massachusetts are without transportation facilities, but they are, for the most part, sparsely settled and in themselves hardly warrant the construction of new lines. They are, however, in a direct line between Albany, N. Y., and Boston. The Boston & Albany enters Massachusetts from the west very nearly on the boundary between West Stockbridge and Richmond. It then bears to the north to Pittsfield before swinging south and east to Springfield. This line carries a very heavy traffic with enough tonnage perhaps to warrant the construction of a short line between the New York state line and Westfield. Such a line would supply the needed local service to a part of this undeveloped district. Probably neither Connecticut or Rhode Island is in need of additional lines.

The situation in Maine is somewhat different than that in the other states comprising this district. The Canadian Pacific traverses this state from east to west, its line practically dividing the state into two equal parts. The territory south of this road is reasonably well provided with railroad facilities. North of this line the situation is reversed, the only railroad serving this section being the Bangor & Aroostook, which traverses the northeastern portion of the state only, leaving a territory north of the Canadian Pacific and west of the Bangor & Aroostook, measuring approximately 80 miles east and west and 120 miles north and south, entirely without railway facilities. A considerable portion of this area is heavily wooded. When cleared the land is fertile and as it is taken over for agricultural purposes the necessity for railway facilities will become urgent.

Central and Ohio-Indiana Districts and the Allegheny Region

Of the states represented in this section New York, New Jersey, Maryland, Delaware and Pennsylvania were among the earlier states in the country to be developed by the railroads and offer few possibilities for extension, new lines or branches of any length. An examination of past construction records bears out this statement and discloses the fact that new construction in the first four mentioned states has been in negligible quantities for years past. In Pennsylvania the development of coal lands has been and will be an important factor in branch line construction and to this extent has constituted an exception. Only in exceptional years, over a 15-year period, has the new mileage to coal mines in this state totaled less than 60 miles, ranging from that

to more than 100 miles. While there are too many factors to be considered in the building of such lines to make a forecast safe it seems reasonable to expect that for some years to come new construction of this character will keep pace with past records.

The geographical location of Ohio and Indiana in reference to the building of the trunk lines between New York and Chicago and St. Louis and between the middle states and the Great Lakes has been the important factor in their development in a railroad sense. The most important recent

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Central and Ohio-Indiana Districts and the Allegheny Region

construction in either of these states was the building of the Indianapolis-Frankfort Railroad in Indiana which provides the Pennsylvania Lines with a direct route over its own rails from Indianapolis to Chicago.

East of Elkhart, Ind., the counties of Elkhart, Lagrange and Steuben adjoining the Michigan border, while well served with north and south lines, present an apparently legitimate need for an east and west line. This is a very productive section and a line which would connect with the New York Central at Elkhart on the west and with the Wabash, New York Central and some other railroad on the east, would afford a much-needed local service and an additional through route between Toledo and Chicago.

The railroad development in the southern peninsula of Michigan has been directly affected by its geographical location and the development of Canadian lines and the Great Lakes transportation system. Detroit is the natural gateway between southwest United States and Canada, and Port Huron is of only slightly lesser importance. Because of the advantages offered by water transportation the railroad system was well developed at a comparatively early date. No important construction of new lines has been attempted in recent years and the territory is reasonably well developed as far as local facilities are concerned. As a matter of fact, a large part of the mileage in the northern part of the Southern peninsula—the cut-over timber area—would not be justified on the present traffic.

Pocahontas and Southern Regions Need More Lines

In this section are included Virginia, West Virginia, Kentucky, Tennessee and the eastern states in the so-called cotton belt. Several of these states are badly in need of additional railroad facilities.

Ten counties in Virginia, i. e., King William, King and Queen, Essex, Mathews, Middlesex and Gloucester, to the west and south of the Rapphannock river, and Richmond, Lancaster, Northumberland and Westmoreland in what is called the northern neck of the state, between the Rappahannock river and Chesapeake Bay, are without a mile of railroad. These counties had a combined population of more than 96,000 in 1910, and, taken together, they contain an area in excess of 2,100 sq. miles. The ten counties are agricultural in character and the physical characteristics of the territory are such that construction would be a simple matter. The Richmond, Fredericksburg & Potomac and the Chesapeake & Ohio, both of which skirt the territory in question, would furnish outlets for any new lines built.

Another county, Buchanan, with a total area of 514 sq. miles and having a population of more than 12,000, is served only by the Big Sandy & Cumberland Railroad, a narrow gage line which traverses the central portion of the county northward to a connection with the Norfolk & Western in West Virginia. This county is said to be practically a solid mass of profitable mineral and the provision of adequate facilities

to develop the resources of this territory is a possibility of the near future. Very likely any new construction into this territory will find its outlet to the north, approximately on the route of the Big Sandy & Cumberland.

West Virginia, in the development of its mining territory requires constant additions to its railway mileage. An inspection of past construction records would lead one to believe that it is reasonable to expect at least 50 miles of new line should be constructed annually in the state for some years to come.

Probably the most needed new transportation line in Kentucky is one crossing the southern portion of the state from Cairo, Ill., to Cumberland Gap, Tenn. This would traverse a large part of the southern portion of Kentucky which is not at present served by transportation lines and would tap north and south lines east of Kentucky in Tennessee and west of Kentucky in Illinois. The development of coal fields in this state is another factor to be considered in a discussion relating to possible railroad building. Probably the most important of the recently constructed coal branch lines in the state is the Long Fork (Baltimore & Ohio) 26 miles in length which was completed in 1917. In addition to the probable construction to coal mines the state offers a more or less limited opportunity for extensions into agricultural regions still lacking proper railroad facilities.

Probably the largest territory in Tennessee untouched by railroads is comprised of Hardin, Wayne and Perry counties. Taken together the counties have a population exceeding 39,000 and contain an area of more than 1,200 sq. miles. From points in Hardin county the distance to the nearest available railroad is approximately 40 miles. Tennessee, in proportion to its area, is one of the least developed states in the south in-so-far as railroad facilities are concerned.

The areas in North Carolina bounded roughly by the cities of Wilson, Rocky Mount, Henderson, Weldon, Raleigh, Goldsboro, Newbern and Wilmington, are in need of addi-

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The Pocahontas and Southern Regions

tional railway facilities, as is Caswell county on the Virginian border. Within the first mentioned territory are numerous points 20 miles or more from a railway. In the second area an extension of the Dover & South Bound to a connection with the Atlantic Coast Line would supply the badly needed local service and reduce the distance from Wilmington to points north. Caswell county, which has a population of 15,000, and an area of 402 sq. miles is entirely without railroad facilities except in the extreme northern portion.

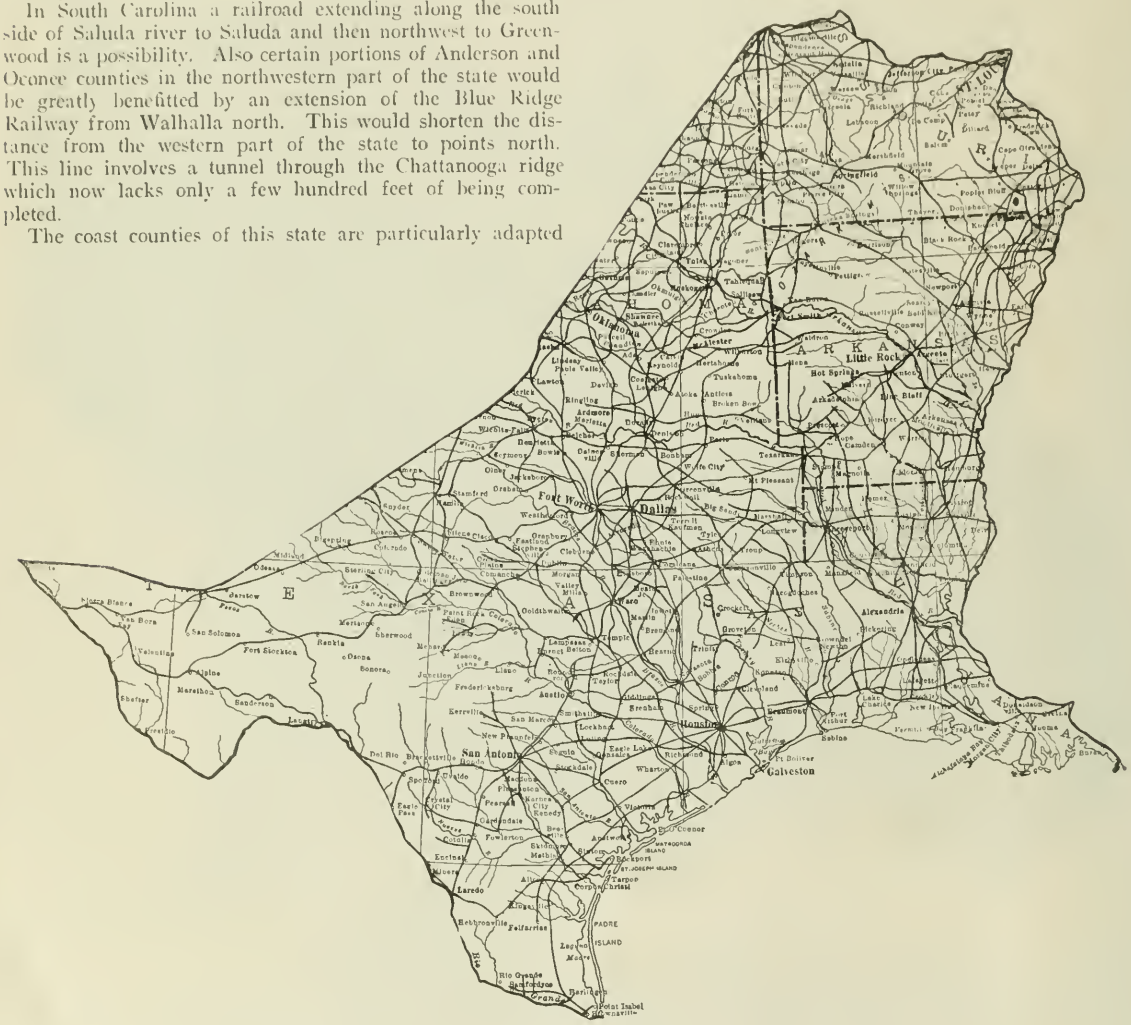
In South Carolina a railroad extending along the south side of Saluda river to Saluda and then northwest to Greenwood is a possibility. Also certain portions of Anderson and Oconee counties in the northwestern part of the state would be greatly benefitted by an extension of the Blue Ridge Railway from Walhalla north. This would shorten the distance from the western part of the state to points north. This line involves a tunnel through the Chattanooga ridge which now lacks only a few hundred feet of being completed.

The coast counties of this state are particularly adapted to truck farming. The portion of Charleston county lying east of the Wando river is almost exclusively devoted to this industry and is entirely without railroad facilities. A short line from Mt. Pleasant, near Charleston to McClellanville, connecting with the Seaboard Air Line, would be of great value in developing the industry and should bring good results to investors, if adequate rates were allowed to be charged.

Another line in this state which would open up a rich territory would extend from Branchville, in Orangeburg county, to Vance, on the Atlantic Coast Line, and to St. Paul in Clarendon county, connecting with the Northwestern Railroad of South Carolina. This would imply building a line approximately 55 miles long.

The most probable new line construction in Georgia is that projected up the Chattachoochee river valley northeast from Atlanta through Milton, Forsyth, Dawson, Lumpkin, Union and Towns counties and into Clay and possibly Macon counties in North Carolina. This line would exceed 100 miles in length and open up a fine section of the state, capable of very large development. Another line talked of would run northeast of Atlanta to Anderson, S. C., a distance of approximately 110 miles. Such a road would traverse a rich agricultural section of the state and would not involve expensive construction. Another line which would be desirable and probably self-sustaining and which has been under consideration for years would extend southwest from Atlanta through the counties of Campbell, Carroll or Douglas, Heard or Coweta and through Randolph county in Alabama.

There is not a county in Alabama not touched by a railroad. The counties of Lawrence, Marion and Winston are adjacent to one another and constitute the territory in the state with the poorest developed railroad facilities. The



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The Southwestern Region

character of the territory embraced, however, is such that the building of additional roads is unlikely. Clay, Randolph and Cleburne counties make up a second undeveloped area with the same handicap to additional construction.

Florida contains an area of 54,861 sq. miles and has 5,062 miles of railroads, or less than any other state in this section in proportion to its area. The future additions to its railroad system will to a great extent be built in connection with the agricultural development of the state.

Southwestern Region Fairly Well Supplied

There is included in the southwestern section the states of Louisiana, Arkansas, and parts of Missouri, Oklahoma and Texas. This section is fairly well served by through lines and most of the railroad building which will be done will be to develop new agricultural areas or tap new mineral resources.

Louisiana, with a population of about 1,800,000, has 5,603 miles of railroad or 12.34 miles per hundred square miles of territory, and 30.76 miles of railroad per 10,000 inhabitants. The state is a network of railroads with no squares of 50 miles or more without railroad facilities. It may, therefore, be classed as one of the states in which only a limited amount of new mileage is likely to be built in the immediate future.

Arkansas has a population of about 1,750,000 and has 5,294 miles of railroad, or 10.08 miles of railroad per hundred square miles and 30.55 miles of railroad per 10,000 inhabitants. There is one section extending north from Little Rock through the center of the state to the Missouri state line, with comparatively few railroads. From Little Rock, the Missouri Pacific runs northeast to the northeastern corner of the state, while this road also has a line from Little Rock following the Arkansas river northwest to Fort Smith. There is no railroad crossing the counties of Faulkner and Van Buren, a distance of about 100 miles. The Missouri & North Arkansas runs diagonally northwest across Cleburne county, touching the northern corner of Van Buren, and through Boone and Carroll county. This leaves a quadrilateral of approximately 50 miles from southwest to northeast, and 150 miles from southeast to northwest without railroad facilities. It is probable that this agricultural country could be further developed by the building of 100 to 150 additional miles of railroad.

Southern Missouri is fairly well supplied with railroads. The St. Louis-San Francisco running southwest from St. Louis through Springfield might at some future time find a northwest-southeast line running through Lebanon in Laclede county and serving Hickory, Dallas, Wright and Texas counties, an agricultural feeder that would develop new territory north of the Ozarks.

Oklahoma has a population of 2,246,000 with 6,454 miles of railroad or 9.30 miles of railroad per hundred square miles, and 29.64 miles of railroad per 10,000 inhabitants. Oil discoveries have brought great prosperity to towns such as Tulsa. Branch lines to serve newly developed oil districts are a possibility of the near future and some sections of the state still need railroad facilities. Osage county has the Midland Valley running diagonally through it from northwest to southeast, but it is possible that a line which has already been projected from Caney, Kansas, on the Atchison, Topeka & Santa Fe will be built southwesterly through Pawhuska on the Midland Valley to Fairfax on the Santa Fe. As an example of the development of the mineral resources, a line could be built from Ringling, the present western terminus of the Oklahoma, New Mexico & Pacific, north to a point on the Chicago, Rock Island & Pacific, or even possibly to Oklahoma City, and extended south of Ringling to the Texas oil fields south of the Red river. The northwestern corner of Oklahoma has comparatively little railroad mileage, and the territory between the Canadian and the Cimarron rivers would be developed by a line running northwest of Oklahoma City, extending possibly into the coal fields of New Mexico.

Texas has 15,866 miles of railroad or but 6.05 miles per hundred square miles of territory. The population is about 4,500,000, so that there is approximately 36 miles of railroad per 10,000 inhabitants. The development of the Texas oil fields will probably call for branch line building while in the strip of territory running southwest from Austin and Brownwood to the Rio Grande, varying in width from 100 to 200 miles, there is a lack of railroad facilities. A line from Shreveport on the St. Louis Southwestern to Beaumont, Texas, would run through virgin timber country and through territory which is supposed to contain oil.

Central Western Section Has Undeveloped Areas

This section includes the states of Illinois, parts of Iowa and Missouri, Nebraska, Kansas, New Mexico, Colorado, Wyoming, Oregon, Utah, Arizona, California and Nevada. It is a territory through which two ambitious projects were started for additional through lines, one the Denver & Salt Lake project, and partially built by the late David Moffatt of Denver, Col., and the other the Pacific Coast extension of the Denver & Rio Grande, the Western Pacific. Neither project has been financially successful.

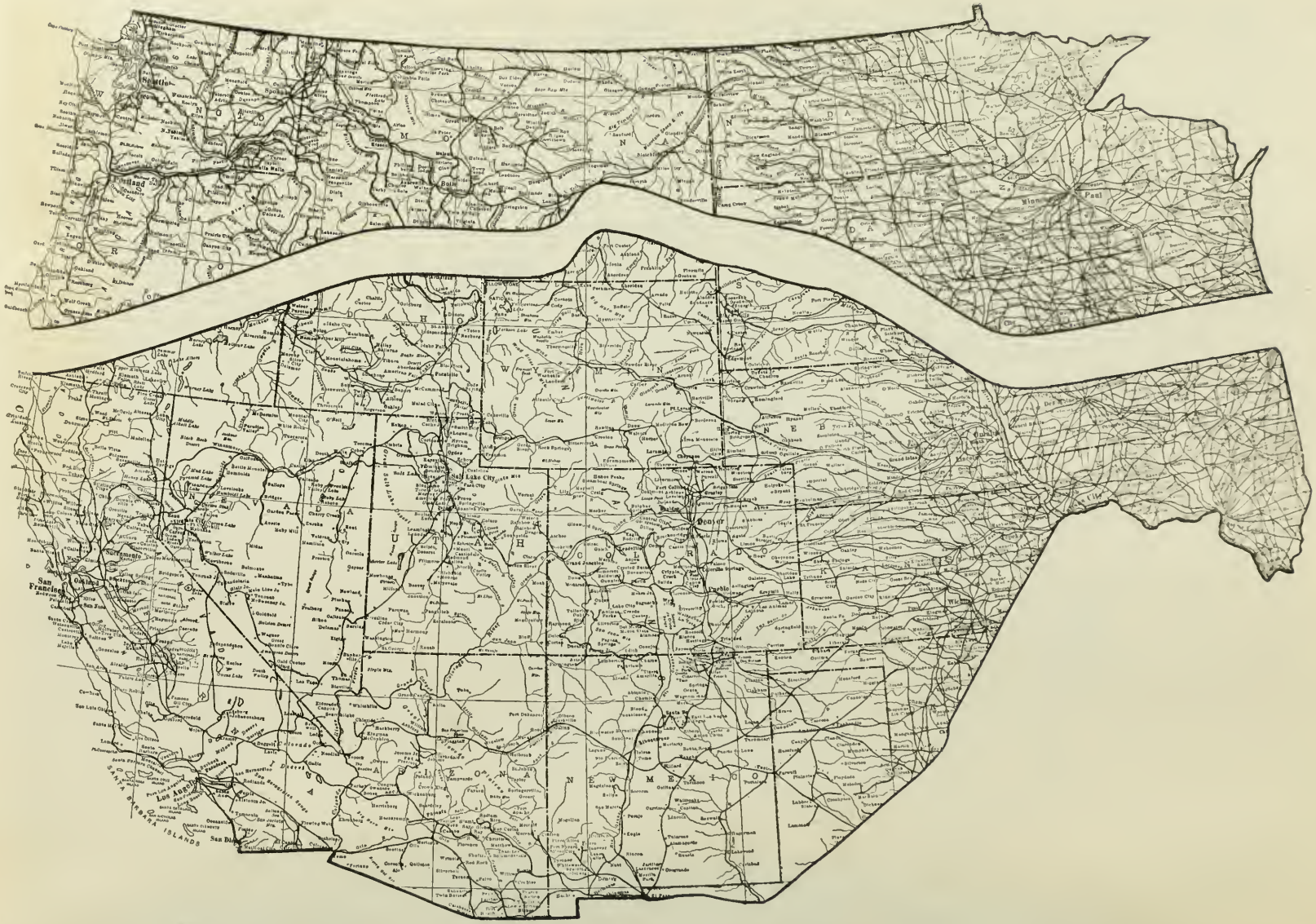
Illinois has a population of something over 6,000,000, and of these about 2,500,000 are in Chicago. The state has 12,141 miles of railroad or 21.67 miles to each hundred miles of territory, and 19.81 miles to each 10,000 inhabitants. The state is a network of railroads. The fact that it has on the west, the St. Louis and Rock Island gateways, with Cairo in the south, has led to a railroad development which appears to need little if any extension of length in the immediate future.

Iowa has 9,946 miles of railroad or 17.89 miles per hundred square miles and 44.79 miles of railroad per 10,000 inhabitants. The state has been the hotbed of railroad baiting, and is now oversupplied rather than undersupplied with railroads. There are few places in the state that are more than seven miles from a railroad station, and within the past few years about 100 miles of line have been abandoned and junked.

The northern part of Missouri is well covered by both east and west and north and south lines. Good roads rather than new railroads apparently are what this part of the country is most in need of.

Nebraska has a population of about 1,300,000, and has 6,169 miles of railroad or 8.03 miles per hundred square miles and 48.65 miles of railroad per 10,000 inhabitants. The map would indicate that there are large tracts of territory without railroad facilities, but since much of this territory is grazing land, it may be some time before railroad extensions into it would pay. The Chicago, Burlington & Quincy has a number of branch lines extending northwesterly from its main line into the counties of Boone, Wheeler, Garfield and Custer. Two of these lines terminate at Burwell in Garfield county, and Ericson in Wheeler county. The Chicago & North Western runs east and west about 60 or 70 miles north of these two towns. The territory north and west of Ericson and Burwell to the Chicago & North Western line has developed rapidly, and it is quite possible that a line from either Ericson or Burwell extending north or northwest to a connection with the Chicago & North Western would open up new agricultural territory which is now largely given up to grazing.

There is a strip of territory between the Burlington on the north and the Union Pacific on the south which in time will probably be developed through railroad branch line extensions by one or the other of the two east and west roads. The character of this development may be judged from what has taken place in the past. The Union Pacific threw out



Map Copyrighted by C. S. Hammond & Co.

The Central Western and the Northwestern Districts

a branch line northwest from Kearney to Callaway on this main line a few years ago. This was later extended to Grande Station and then to Stapleton. This line may possibly be extended gradually until it bisects the 60-mile wide strip of territory lying between the Union Pacific and the Burlington.

Kansas, lying just to the west, is rather better supplied with railroads than Nebraska. With a population of 1,800,000, the state has 9,344 miles of railroad, which is 11.43 miles per hundred square miles of territory and 51.25 miles of railroad per 10,000 inhabitants. There are no 50-mile squares without railroad facilities, and since the territory is agricultural, good roads and possibly some short branch line extensions of steam roads in the western part of the state will be the lines of future development, at least for some years.

New Mexico has a population of less than 500,000. It has a railroad mileage of 3,039 miles or 12.48 miles of railroad per hundred square miles of territory, but has 74.69 miles of railroad per 10,000 inhabitants. San Juan county, which is in the northwest corner of the state, contains large coal fields, and yet the only piece of railroad in the whole county is a branch of the Denver & Rio Grande running down to Farmington on the San Juan river. A railroad could be built north from Gallup up the Choiski Valley through coal fields to a connection with the Denver & Rio Grande at Farmington, about 100 miles of line.

The entire western border of the state is without railroad facilities except for the east and west line of the Atchison, Topeka & Santa Fe running through Gallup and the Southern Pacific and Atchison, Topeka & Santa Fe running through Deming, over 200 miles south. The country is mountainous, but probably contains very considerable mineral deposits, which of course can only be opened up through the building of railroad facilities.

In the central part of the state there is a north and a south line of the Atchison, Topeka & Santa Fe following the Rio Grande, and the New Mexico Central, running south to Torrance where it meets the El Paso & Southwestern. Southeast from Torrance there is a stretch of about 70 miles of country without railroad facilities and a connection could be built from Torrance on the El Paso & Southwestern to Rosewell, which is the second largest city in New Mexico. To go from Rosewell to Santa Fe, the capital of the state, one has to go northeast to Clovis, or take a stage or automobile across country to Carrizozo.

There is a fairly rich agricultural and grazing territory lying between Taos and Ute Park, which latter is the end of a branch of the Atchison, Topeka & Santa Fe. The territory around Taos appears to be worth developing. The line previously mentioned running southeast from Torrance, might possibly form the connecting link for a through road from Puget Sound to the Gulf of Mexico. There is now a grade built from Deming south to Columbus, and a possible route for a new railroad opening up a large amount of territory would be from Gallup south to Deming, and from there using the old grade to Columbus, and possibly extending south into Mexico.

Colorado has a population of a little less than a million, and has 5,701 miles of railroad or but 5.50 miles of railroad per hundred square miles of territory and 59.73 miles per 10,000 inhabitants. The eastern portion of the state is without north and south railroads, and the Chicago, Burlington & Quincy, the Chicago, Rock Island & Pacific, the Union Pacific, and the Atchison, Topeka & Santa Fe which cross the state from east to west have built almost no branch lines or feeders west of Denver and Pueblo. The country is grazing land, although fertile when put under cultivation. The entire southeastern corner of the state, a territory 60 by 100 miles, including the entire county of Bacha, is now without railroad facilities. Presumably, if this territory is to be developed, the Santa Fe would drop down a branch line from Lama or Las Animas. In the southwestern corner of the state there is mineral territory, mountainous and expensive to build into, but with large deposits of low grade ore. This territory is now served only by a narrow gage line of the Denver & Rio Grande. The Denver & Salt Lake (the Moffatt road) never got further west than Craig, and the territory between Craig and the Colorado-Utah state line—100 miles—is without railroad facilities.

Wyoming has a population of only 180,000 and has but 1,906 miles of railroad, or only 1.95 miles per hundred square miles of territory, but has 107.31 miles of railroad per 10,000 inhabitants. Cooke county is in the northeastern corner of the state in which the only railroad mileage is a branch which extends a few miles to Aladdin from South Dakota and the Chicago, Burlington & Quincy, which crosses just the southwestern corner of the county. There are supposed to be very considerable mineral deposits, including coal, gold and silver, the latter probably contained in low grade ore. There is considerable timber and the entire county is fairly well covered with large ranches raising cattle and sheep. Settlers live as far as 125 miles from the nearest railroad.

Big Horn county, which lies just west of the Big Horn mountains on the northern boundary of the state, is crossed by a line of the Chicago, Burlington & Quincy running north and south through it. The country of the Otto river and Greybull is understood to be very fertile and the government has under consideration the building of reservoirs and canals in connection with what is known as the Oregon Basin project, which would furnish water for land now impossible of cultivation. An east and west road, therefore, might be built from Greybull on the Burlington, west, possibly as far as Cody. There are supposed to be considerable coal and natural gas deposits in this territory.

In the center of Wyoming, Fremont county, more than 100 miles square, has only a branch line of the Chicago & North Western, extending into it as far as Lander, while the Burlington crosses the northeastern corner. The Shoshone Indian reservation, which is in the middle of Fremont county, is now being settled, and presumably an east and west line extending as far across the reservation as the foot hills of the Wind River range would open up a sugar beet and alfalfa country of good possibilities. Lincoln county which runs north and south along the western boundary of the state more than 160 miles, and is 50 miles across from east to west, has only one line, the Oregon Short Line, running across the southern end. The county is mountainous, but is supposed to be rich in low grade ores and coal. It has a water supply for extensive hydro-electric developments, but is now largely a live stock county.

Oregon has a population of less than 900,000 inhabitants. It has 3,067 miles of railroad or but 3.21 miles per hundred square miles of territory and 37.03 miles per 10,000 inhabitants. Practically the entire central portion of the state, a rectangle more than 200 miles square, is almost entirely without railroad facilities. Much of the country, however, is arid or mountainous country, and it is probable that only the discovery of minerals in large quantities would justify new railroad building.

Utah has a population of 439,000, and has 2,137 miles of railroad. This is but 2.60 miles of railroad per hundred square miles of territory and 49.60 miles of railroad per 10,000 inhabitants. The completion of the Denver & Salt Lake as a through route, has been mentioned under the discussion of Colorado railroads. Almost the entire southern half of the state is mountainous and arid, and the Los Angeles & Salt Lake, which now runs southwest from Salt Lake City through the western central section of the southern half of the state, has almost no local traffic. As in the case of Oregon, the discovery of minerals in large quantities

might justify new railroad building, but it is doubtful if agriculture would ever be a justification for branch line feeders from any of the existing roads.

Arizona has a population of about 200,000. It has 2,410 miles of railroad or 2.12 miles per hundred square miles of territory and 95.15 miles per 10,000 inhabitants. Large sections of the state are arid desert, some of which, however, may in the future be reclaimed through irrigation. In the southeastern portion of the state, there are rich copper mines and the railroad building in the near future will probably be confined to extensions of railroads to mineral deposits.

California has a population of about 3,000,000. It has 8,440 miles of railroad or 5.42 miles per hundred square miles of territory and 28.96 miles per 10,000 inhabitants. In the northeast corner of the state, there is a square of territory about 100 miles each way, without railroad facilities. This country, however, is not now developed, and while in time one or more lines may be built into it, there would hardly seem, at present, to be a prospect for any immediate profit from such building. The southern portion of the state is well supplied with steam and electric railroads.

Nevada has few railroads and few inhabitants, the population being 109,000, but parts of the state are rich in mineral resources. There are now 2,318 miles of railroad in the state or 2.11 miles per hundred square miles of territory, but this is equivalent to 218.97 miles of railroad per 10,000 inhabitants. From Las Vegas at the junction of the Las Vegas & Tonopah and the Los Angeles & Salt Lake, it is nearly 200 miles to the southern extremity of the three branch lines which the Southern Pacific has dropped down south from its east and west lines across the northern section of the state. This central southern portion of the state is a desert valley between barren mountain ranges. Silver and gold have both been discovered in parts of this territory and railroad building will depend on the extent of these discoveries and the grade of ore found.

Northwestern District Offers Good Opportunities

The northwestern district includes Wisconsin, Minnesota, the northern half of Iowa and South Dakota, all of North Dakota, Montana, nearly all of Washington, and Idaho. This comprises a great wheat growing territory and the fruit raising districts on the Pacific coast. In most of this territory, it is fairly safe to assume that a wheat growing country more than twenty miles from the nearest railroad station will and should have additional railroad facilities. The Chicago, Milwaukee & St. Paul, the Chicago & North Western, the Northern Pacific, the Great Northern, and the Minneapolis, St. Paul & Sault Ste. Marie have in the past done considerable competitive railroad building in this territory.

Wisconsin has a population of 2,500,000 and 7,693 miles of railroad, or 13.95 miles per hundred square miles of territory, and 30.86 per 10,000 inhabitants. No county in the state is without a railroad, and all but three counties are served by two or more railroads. It would appear that no part of the state is now in need of new lines.

Minnesota has a population of 2,300,000, and has 9,152 miles of railroad or 11.32 miles per hundred square miles of territory and 40.31 miles per 10,000 inhabitants. The southern and central parts of the state are covered with a fairly close network of railroad lines, but in the northern counties, especially Chacohaing and Beltrami, there is a large area not served by railroads. Most of this land is, however, cut over timber land. It would be expensive and difficult to redeem it for agricultural purposes and it is now very sparsely settled. Railroad extension into it would be for the development of the territory rather than to meet already existing needs. There are still some opportunities for competitive railroad building. That is, there are some counties which are served now by only a single road, but which might possibly support a branch line of some other railroad.

South Dakota has a population of a little over 700,000. It has 4,278 miles of railroad or 5.57 miles per hundred square miles of territory, and 61.72 miles per 10,000 inhabitants. The northwestern portion of the state has only two branch lines of the Chicago, Milwaukee & St. Paul extending west into it from the Missouri river. This leaves the counties of Perkins, Meade, Butte, and Harding almost without railroads. The territory however is rough and is not wheat country. Railroad building would be expensive and little likely to prove profitable in the near future.

North Dakota has a population of 752,000 and has 5,274 miles of railroad, or 7.52 miles per hundred square miles, and 72.09 miles per 10,000 inhabitants. The Great Northern, the Minneapolis, St. Paul and Sault Ste. Marie, and the Northern Pacific all have east and west main lines through the state and all have thrown off numerous branch lines to tap the wheat country. While there are points that are more than 20 miles from the nearest railroad, there are no large blocks of territory without railroad facilities. Some additional branch lines will probably be built but the total will amount to but a few hundred miles.

Montana has grown very rapidly in agricultural development in the last ten years. The estimated population in 1917 was 466,000. The total railroad mileage amounted to 4,847 or but 3.32 miles of railroad per hundred square miles of territory. This is an average, however, of 106.38 miles of railroad per 10,000 inhabitants. In the southeastern corner of the state, Carter and Powder River counties are without railroad facilities and in the northeastern and north central parts of the state, McCome, Garfield, Phillips and Valley counties have very little railroad mileage. A number of extensions of existing railroads have been discussed, and the state railroad commission has published a map showing proposed new roads. The principal ones are an extension of the branch line of the Great Northern from Hichey in Richla county, across the southern end of McCome county and the central portion of Garfield county, to connect with the eastern end of another branch of the same road which now runs east from Lewistown to Chipawa in Fergus county; a line from Dracut on the Chicago, Milwaukee & St. Paul, just west of Great Falls in Cascade county, west through the central portion of Lewis and Clark county, and across Powell county to Bonner just east of Missoula on the St. Paul; and a line from Allentown on the Montana Southern in Beaverhead county west and southwest through this county following the Hole river to Jackson.

Washington has a population of 1,600,000 and has 5,698 miles of railroad or 8.53 per hundred square miles of territory, and 37.58 miles per 10,000 inhabitants. The western portion of the state, with the exception of Jefferson county, is quite fully served with railroads, but in the central portion of the state in Okanogan, Ferry and Chelan counties, there are blocks of territory more than 50 miles square without railroad facilities.

Idaho has a population of 437,000. The state has 2,872 miles of railroad or 3.45 miles per hundred square miles of territory and 67.67 miles per 10,000 inhabitants. No county in Idaho is without railroad mileage, but there is a large section of the state without competing railroads. The Northern Pacific and the Chicago, Milwaukee & St. Paul serve the northern part of the state. From Grangeville, however, the southern terminus of a branch line of the Northern Pacific, southeast to the Western Pacific in Nevada—550 miles—and from Bend, Oregon, on the west to the Chicago, Burlington & Quincy in Wyoming—1,000 miles—there are only the lines of the Oregon Short Line and the Oregon, Washington & Navigation. These lines, which are part of the Union Pacific system, have their main line east and west with a number of feeder lines extending north and south.

Production Is Limited by Lack of Freight Cars

Equipment Has Not Kept Pace with Growth of Traffic— 800,000 Cars Needed in Next Three Years

THE GREATEST freight car surplus ever recorded on American railroads occurred in March, 1919, when there were 450,000 cars idle. Today there is a serious shortage. In November a strike of bituminous coal miners was called, which lasted four weeks. Cars in storage were emptied, yet at the present time the operators report that their production is curtailed not by a shortage of labor but by a shortage of cars. Municipalities and states have appropriated funds for the greatest road-building program ever inaugurated, but railroad officers have stated that it will be necessary to postpone the work because sufficient freight cars are not available for carrying the necessary material. Throughout this country the cry is for increased production. How can production be increased if freight cars are not available to haul the raw material, or what would it avail if the finished product could not be distributed?

There is probably nothing which indicates more strikingly the failure of railroad facilities to keep pace with the expansion of the country's industries than the inadequacy of the supply of freight cars. In the years before the war the number of cars ordered usually served as a barometer indicating roughly the general business condition, the magnitude of the freight traffic and the earnings of the railroads. Since 1916 there has been an unprecedented volume of traffic, accompanied by acute car shortages, but the roads have been unable to purchase new equipment.

Some estimate of the amount of freight equipment that should have been bought during the past four years can be made by a comparison with the preceding period. Taking as a basis for comparison the years from 1905 to 1915, the records show that the ton-miles of freight carried increased from 186,463,109,510 in 1905 to 301,398,752,108, or 61 per cent in 1913, which was the year of largest freight traffic in this period of ten years. During the same period of ten years, 1905-1915, the number of freight cars increased from 1,731,409 to 2,356,338, an increase of 624,929, or 36 per cent. In other words, the increase in the number of freight cars was 59 per cent as great as the increase in traffic. From 1915 to 1918 the freight traffic increased 45 per cent, yet during this period the number of freight cars in service increased only 36,532, or approximately 1.6 per cent. Assuming that the same rate of increase in the capacity of cars and the efficiency with which they were utilized prevailed during both periods, the increase from 1915 to 1919 should have been 26.6 per cent, or approximately 607,000 cars for the Class I roads. This would indicate roughly that there is a shortage of about 570,000 cars.

THE RAILROADS are at present unable to handle all of the traffic that is offered to them.

An analysis of the rate of growth in the past shows that while the present traffic is unusually heavy, further increases can be expected within the next few years.

Records of past performances indicate that the future business cannot be handled without serious shortages of equipment unless a great many additional cars are acquired.

What Traffic Can Be Expected in the Future?

The actual requirements for freight cars are, of course, dependent on the future traffic. In the judgment of many of the most competent authorities the railroads of this country will have to handle more business in the next three years than ever before. Walker D. Hines, in an address before the American Railway Guild on November 18, said:

"As well as I can estimate the situation, I believe we are likely to have a large railroad traffic in this country for some time to come. During the war many of the normal demands of the public had to go unsatisfied; there was much building which had to be postponed and many sorts of activities had to remain in abeyance. The opportunity has now come to satisfy those demands, and the building that is beginning to develop and the other activities which are now getting back to a normal basis create a demand for a very large railroad traffic. So I think the railroads must be prepared to handle a large business for a considerable period."

The isolated examples cited at the introduction to this article do not prove that there will be continued large demands for freight cars, except in so far as they are typical

of general conditions. There are some who contend that the traffic will decrease rather than increase during the next few years. To support this argument they cite the fact that the traffic during the past four years has been abnormally high. This is undoubtedly true as regards the traffic in 1916, 1917 and 1918. However, in 1918 and 1919 there has been practically no increase over 1917, and the present volume of business is not greatly in excess of what might normally be expected, due to the steady increase from year to year.

There have been instances when the freight traffic decreased, notably in the period following 1893, in the fiscal year 1908, and more recently in 1914 and 1915. Nevertheless, the return of normal business conditions has always shown that, regardless of temporary disturbing factors, there are underlying conditions as unremitting as time itself which cause the normal traffic to increase annually at a fairly definite rate.

The ton-miles of traffic for the United States is plotted for every year since 1888 in Fig. 1. These data are also shown in Table I. On this chart there are also plotted the population (see Table II) and the ton-miles of freight traffic per inhabitant (Table III). This chart shows very plainly the cumulative increases in the freight traffic and the variation in the two factors which affect it. It will be noted that there are no unusual variations in the population; in fact, the rate of increase can be foretold from previous census figures with a fair degree of accuracy. In Table II the estimated rate of increase in the population is shown from 1911 to 1922, based on previous census figures.

The number of ton-miles per inhabitant has fluctuated from year to year, but the chart shows quite plainly that there is a general increase for each succeeding decade, despite the annual fluctuations. The ton-mileage per person that might be expected under normal conditions is indicated by the dot and dash line. The actual traffic in 1917, 1918 and 1919 was considerably above the normal, as shown by the chart. These points have been practically disregarded in locating the normal lines, as they represent very unusual conditions. Figures above the normal can be expected for five or perhaps even ten years until the great volume of work deferred

Table I Freight Traffic in Ton Miles from 1888

1888	61,329,000,000	1905	186,463,000,000
1889	68,727,000,000	1906	215,878,000,000
1890	76,207,000,000	1907	236,601,000,000
1891	81,074,000,000	1908	218,382,000,000
1892	88,241,000,000	1909	218,803,000,000
1893	93,588,000,000	1910	255,017,000,000
1894	80,335,000,000	1911	253,784,000,000
1895	85,228,000,000	1912	264,081,000,000
1896	95,328,000,000	1913	301,399,000,000
1897	95,139,000,000	1914	288,320,000,000
1898	114,078,000,000	*1915	276,830,000,000
1899	123,667,000,000	*1916	343,099,937,805
1900	141,597,000,000	*1916 (calendar)	365,771,824,741
1901	147,077,000,000	*1917	397,935,177,017
1902	157,289,000,000	*1918	401,946,000,000
1903	173,221,000,000	†1918	398,442,019,620
1904	174,522,000,000		

*Classes I and II.
†Class I.
Figures for the years 1908 to 1915, inclusive, do not include figures of switching and terminal companies.

Table II Population and Annual Percentage Increase

1888	60,493,646	....
1889	61,781,699	....
1890	63,069,756	....
1891	64,362,238	....
1892	65,654,719	....
1893	66,947,201	....
1894	68,239,682	....
1895	69,532,164	....
1896	70,824,645	....
1897	72,117,125	....
1898	73,409,607	....
1899	74,702,088	....
1900	75,994,575	....
1901	77,612,569	....
1902	79,230,563	....
1903	80,848,557	....
1904	82,466,551	1.962
1905	84,084,545	1.924
1906	85,702,533	1.888
1907	87,320,533	1.853
1908	88,938,527	1.819
1909	90,556,521	1.786
1910	92,174,515	1.755
1911	93,792,509	1.725
1912	95,410,503	1.696
1913	97,028,497	1.668
1914	98,646,491	1.640
1915	100,264,485	1.614
1916	101,882,479	1.588
1917	103,500,473	1.564
1918	105,118,467	1.539
1919	.....	*1.516
1920	.....	*1.493
1921	.....	*1.472
1922	.....	*1.451
1923	.....	*1.430
1924	.....	*1.411
1925	.....	*1.392

*Estimated.

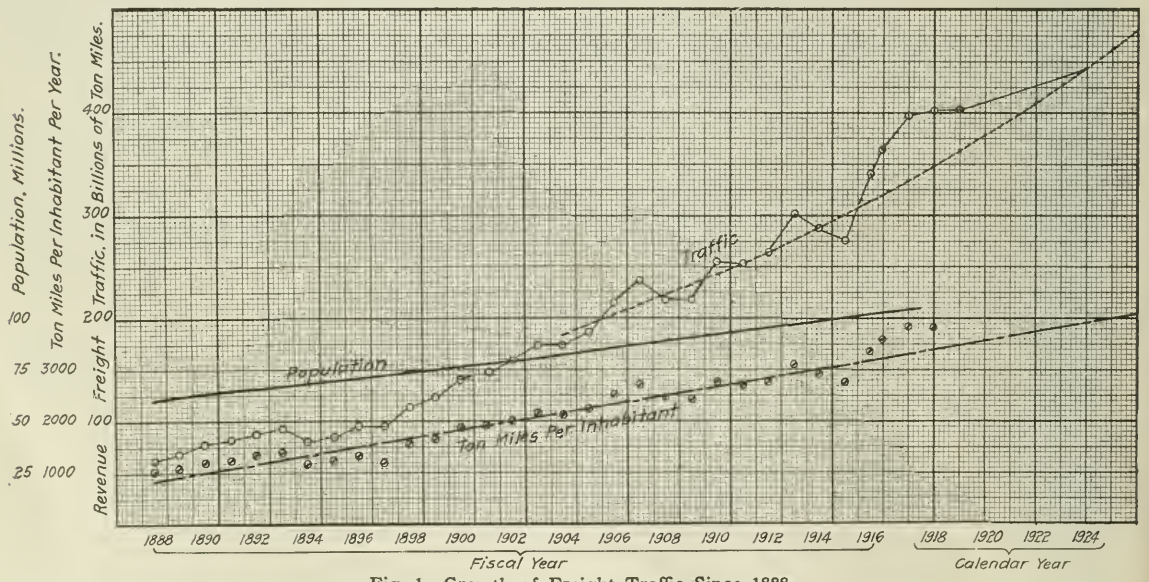


Fig. 1—Growth of Freight Traffic Since 1888

because of the war has been taken care of, but ultimately the traffic should return approximately to this normal line. From the slope of the line the normal rate of increase for the period from 1911 to 1921 has been determined. This

Table III—Ton Miles of Revenue Freight per Inhabitant

Fiscal Year			
1888	1,013	1904	2,120
1889	1,112	1905	2,215
1890	1,207	1906	2,520
1891	1,243	1907	2,710
1892	1,342	1908	2,455
1893	1,398	1909	2,420
1894	1,176	1910	2,770
1895	1,223	1911	2,700
1896	1,343	1912	2,770
1897	1,318	1913	3,100
1898	1,555	1914	2,920
1899	1,655	1915	2,760
1900	1,861	1916	3,370
1901	1,895	Calendar Year	
1902	1,970	1916	3,590
1903	2,145	1917	3,840
		1918	3,820

rate for the period given is approximately 2.63 per cent annually. Although the percentage of increase is decreasing from year to year and the rate given above would not be applicable for a longer period, the variation during the decade is so slight as to be almost negligible.

Since the rate of increase of the freight traffic is made up of two factors, (1) the rate of increase of the population and (2) the rate of increase of the ton-miles per inhabitant, it follows that with these two rates known the normal rate of increase in the traffic, which is the product of the two, can be determined. Furthermore, if the normal traffic for any year in the period is known, the normal traffic for the other years can be computed. The data on the normal freight traffic in this article are based on the ton-mileage for 1911, as this represents a fair average between heavy and light traffic. The normal rate of increase of the traffic, as calculated, varies progressively from 4.40 per cent in 1911 to 4.14 per cent in 1921. The traffic as computed from the basic factors is shown in Fig. 1 as a dotted line and is tabu-

Table IV—Normal Traffic for Each Year from 1904 to 1926

Fiscal year—		Calendar year—	
1904	186,105,000,000	1916	320,455,000,000
1905	194,735,000,000	1917	334,100,000,000
1906	203 690,000,000	1918	348,245,000,000
1907	212,990,000,000	1919	362,890,000,000
1908	222,635,000,000	1920	378,075,000,000
1909	232,640,000,000	1921	393,815,000,000
1910	243,020,000,000	1922	410,125,000,000
1911	253,784 000,000	1923	427,030,000,000
1912	264,945,000,000	1924	444,540,000,000
1913	276,515,000,000	1925	462 700,000,000
1914	288,510,000,000	1926	481,515,000,000
1915	300,950,000,000		
1916	313 840,000,000		

lated in Table IV. This has been extended ahead to 1926 in order to show the probable traffic in future years, and backward to 1904 to demonstrate how closely the rate of increase computed checks with the average traffic during the period from 1904 to 1911.

Since the actual traffic is considerably in excess of the normal traffic, the question naturally arises as to when the normal will be reached once more. As stated before, unusually heavy traffic can be expected for at least five years, and a line has therefore been drawn from the actual traffic of 1919 to the normal traffic for 1924. This should give a fair indication of the traffic that may be expected, disregarding abnormal factors.

Number of Cars Required

Having estimated the traffic to be expected, it becomes necessary to determine how many cars will be required to handle the business. The number of cars required to handle a given volume of traffic in the past would provide a basis for an estimate, but this would fail to take into account two important factors—namely, increased capacity per car and increased efficiency of utilization. Considering again the period from 1905 to 1915, the Interstate Commerce Commission records show that the average capacity of freight cars increased from 30.7 tons to 40.6 tons, or 32.2 per cent.

The efficiency of utilization of freight cars depends on the average tons per loaded car and the average revenue car-miles per day. The product of these two is the revenue ton-miles per car per day. All these factors are available from the statistics of the Interstate Commerce Commission and are shown in Table V.

Table V—Freight Car Mileage and Average Load

Year	Revenue car-miles per car per day	Tons per loaded car	Revenue ton-miles per car per day	Average capacity of car	Ratio, average load to capacity, per cent	Ton-miles per ton capacity per year
1905	16.3	18.1	298	30.7	59.0	3,500
1906	17.0	18.9	321	32.1	59.0	3,650
1907	16.5	19.7	325	33.7	58.5	3,520
1908	14.6	19.6	286	34.8	56.3	3.010
1909	15.0	19.3	290	35.3	54.7	3,000
1910	16.5	19.8	327	35.9	55.2	3,320
1911	16.0	19.7	315	36.9	53.4	3,120
1912	16.1	20.2	326	37.5	53.9	3,180
1913	16.2	21.1	363	38.3	55.1	3,460
1914	17.2	21.1	340	39.1	54.0	3,180
1915	16.1	21.1	328	39.8	53.2	3,000
1916	15.2	21.2	399	40.6	55.1	3,690
1916 (cal.)	17.8	22.4	422	41.0	55.6	3,760
1917	18.5	22.8	466	41.5	59.8	4,130
1918	18.8	24.8	469	41.9 (est.)	63.5	4,090
1919 (nine months).	17.6	26.6	425	42.2 (est.)	65.1	3,670
	15.2	27.9				

1913 to 1916 includes Class I and II roads only.
1918 and 1919 includes Class I roads only.

It will be noted that the revenue car-miles per day has increased very little since 1905; in fact, the figure for the first nine months of 1919 is as low as any in the table, with one exception.

On the other hand, the tons per loaded car show a fairly steady increase, as might be expected, due to the increase in the average capacity of the cars. The ratio of the average load to the average capacity gives a measure of the percentage of the available capacity which is utilized. The table shows that there has been a comparatively small increase in the ratio between the average load and the average capacity. This naturally suggests that the ton-miles hauled in any given time for each ton of car capacity would be nearly constant. The ton-miles per year per ton of freight car capacity have been tabulated in the last column.

By referring to the chart of freight traffic it will be noted that the ton-mileage is high in years of abnormally heavy traffic, but decreases again when the business falls off. Although there is a considerable variation in the figures, from a minimum of 3,000 in 1909 and 1915 to 4,130 in 1917, there has been no general change over this period. During the first nine months of 1919 the traffic was handled at the rate of 3,670 ton-miles per ton of capacity per year, which corresponds very closely with the figure for 1906. All the data indicates that the variation from year to year is largely due to the relation between the demand for cars and the supply.

It is significant that the ton-miles per ton of capacity per year has been in excess of 3,500 for the yearly period whenever there has been a car shortage, and has been below 3,500 when ever there was an ample supply of cars. This is borne out in a very convincing manner by the statistics for the first nine months of 1919, shown in Table VI. From February until June the traffic was below the average for the remainder of the year. During that period the ton-miles per ton of car capacity fell below the rate of 3,500 per year and records showed a large surplus of cars, the excess of idle cars on May 1 amounting to 387,656. On August 1 the surplus was reduced to 88,000, which is a normal condition,

as about 100,000 idle cars are needed in order to fill requisitions for cars without undue delay.

The high efficiency of car utilization attained in recent months may be advanced as evidence to prove that in the future heavier loading and greater mileage will prevail. This conclusion hardly seems warranted, however. The Car Service Section of the Railroad Administration has had broader powers than could be exercised by any similar body under normal conditions. During the war shippers submitted to drastic car service regulations, many of which are still in effect, but could not be retained indefinitely without strong opposition from car users.

Even with the present high demurrage rates many cars are held beyond the free time. As cars become more plentiful this practice will tend to increase, and as the proportion of the time during which the car is in the possession of the shipper increases the miles per car per day will decrease. Unless the carload minimum weights can be increased, which is doubtful, there is sure to be a falling off in the average carload; in fact, during August, 1919, the average was three tons less than in August, 1918. With these points in mind, it seems reasonable to assume that when normal conditions are re-established the ton-miles per ton of car capacity per year will be practically the same as in the period from 1905 to 1915.

It is evident, since one ton of freight car capacity should be provided for every 3,500 ton-miles to be moved during the year, that the aggregate capacity of the cars should increase at the same rate as the traffic. This has not been the case, as is shown by the chart reproduced below (Fig. 2) and the data in Table VII. In the chart the ton-miles for each year are indicated by circles and the normal hauling capacity of the equipment by dots. In 1906 and 1907 the car capacity was not as great as the traffic. During the years from 1908 to 1914 there was on the whole a plentiful supply of cars, which increased at a rate sufficient to keep a surplus during practically the entire period. Since that time,

Table VI.—Car Mileage and Average Load in 1919, Class I Roads Only

Month	Revenue car miles per car per day	Tons per loaded car	Revenue ton miles per car per day	Average capacity of car	Ton miles per ton capacity per year
January	14.2	29.0	412	42.2	3,560
February	13.6	27.7	377	42.2	3,260
March	13.9	27.6	384	42.2	3,320
April	14.3	27.3	391	42.2	3,380
May	14.3	27.8	398	42.2	3,440
June	14.6	27.6	403	42.2	3,480
July	16.4	27.9	458	42.2	3,960
August	17.0	28.0	476	42.2	4,120
September	18.5	28.4	525	42.2	4,540

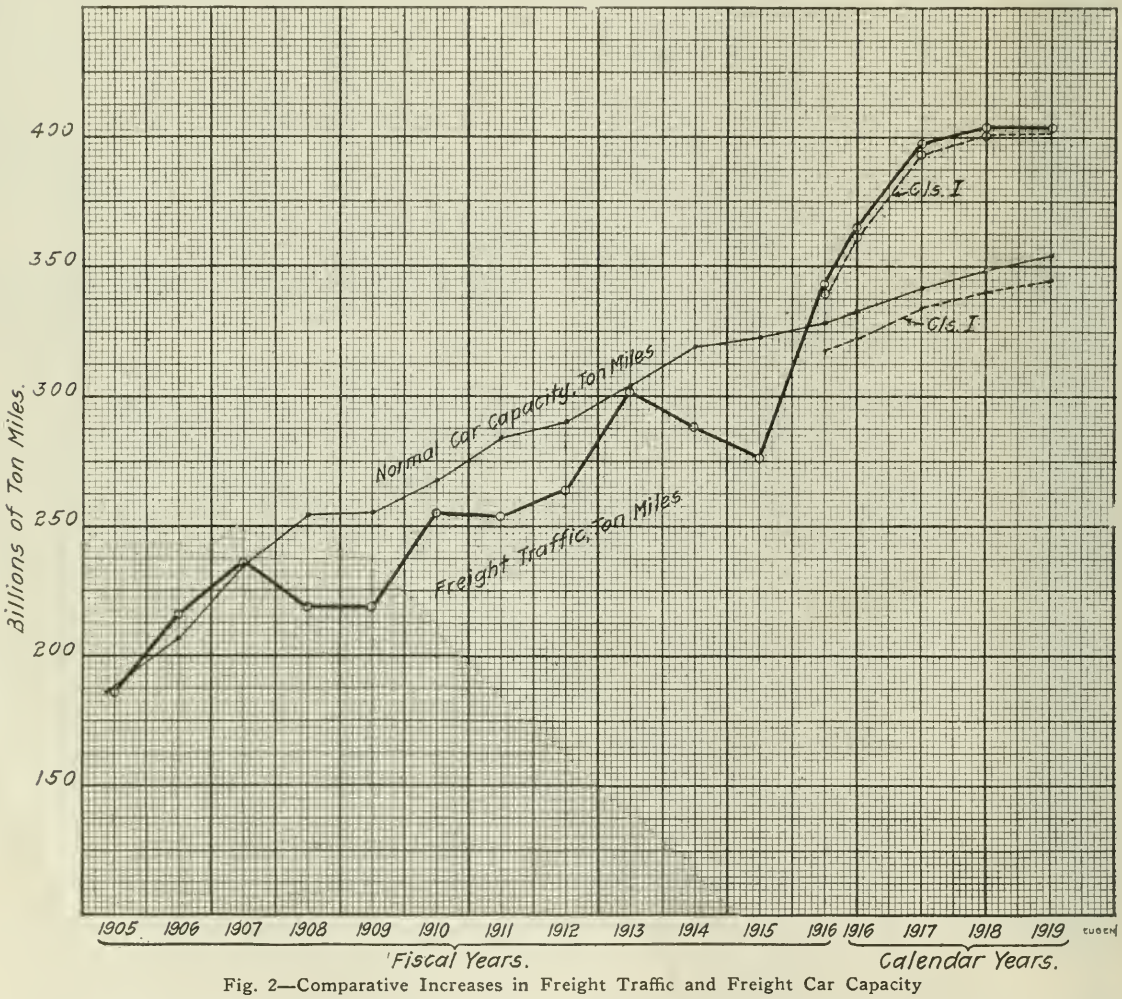


Fig. 2—Comparative Increases in Freight Traffic and Freight Car Capacity

however, the additions to the freight equipment have been far from adequate.

In the fiscal year 1914 the traffic fell off very markedly, and the number of freight cars ordered in that year was only 80,264. The fiscal year 1915 was also a period of business depression, and since 1916 higher costs and war conditions have reduced the purchases; consequently since 1914 there has not been a single year when the new cars bought have been sufficient to take care of the normal increase in traffic.

TABLE VII—FREIGHT TRAFFIC AND CAR CAPACITY

Year	Freight traffic in ton-miles	Number of freight cars	Capacity of freight cars, tons	Capacity in tons x 3,500
Fiscal year—				
1905.....	186,463,109,510	1,731,409	53,255,083	186,200,000,000
1906.....	215,877,551,241	1,837,914	59,059,302	207,000,000,000
1907.....	236,601,390,103	1,991,557	67,033,324	235,000,000,000
1908.....	218,381,554,802	2,089,302	72,663,665	254,000,000,000
1909.....	218,802,986,929	2,073,606	73,137,546	256,000,000,000
1910.....	255,016,910,451	2,135,121	76,578,735	268,000,000,000
1911.....	253,783,701,839	2,195,511	81,077,028	284,000,000,000
1912.....	264,080,754,058	2,215,549	82,965,418	290,000,000,000
1913.....	301,398,752,168	2,273,564	86,978,145	304,500,000,000
1914.....	288,319,890,210	2,325,647	90,977,098	319,000,000,000
*1915.....	276,830,302,723	2,356,338	92,237,691	323,000,000,000
*1916.....	343,099,937,805	2,326,987	92,945,535	326,000,000,000
Cal. year—				
*1916.....	365,771,824,741	2,358,169	95,124,679	333,000,000,000
	CLASS I ROADS ONLY			
Fiscal year—				
1916.....	339,870,323,675	2,236,312	90,766,094	318,000,000,000
Cal. year—				
1916.....	362,444,397,129	2,253,111	92,280,335	323,000,000,000
1917.....	394,465,400,493	2,301,947	95,467,054	333,000,000,000

*Includes Class I and Class II roads only.
Figures for the years 1908 to 1915, inclusive, do not include figures of switching and terminal companies.

The Class I roads in 1918 had 2,323,324 freight cars, with an aggregate capacity of approximately 97,000,000 tons. The increase in capacity during 1919 has probably not been more than 1,500,000 tons, making the present capacity 98,500,000 tons. As the figures on which the chart is based include the Class II and Class III roads, which own about 2.7 per cent of all railroad freight cars, this capacity must be increased by that amount to make it comparable with the other statistics. This would bring the total capacity for all roads to 101,100,000 tons. Under normal conditions this capacity would be sufficient to handle an annual traffic of 354,000,000,000 ton-miles, but since the traffic in 1919 will amount to about 400,000,000,000 ton-miles it is evident that there is not enough equipment to handle it in a satisfactory manner. On the basis of 3,500 ton-miles per ton of capacity per year, the present traffic would require a car capacity of 114,200,000 tons, or about 13,100,000 tons more than is now available. As the average capacity of cars now built is 50 tons, this would indicate that 262,000 additional cars must be provided to make up for the present shortage.

In addition to this the railroads should arrange to provide for future increases in traffic and supply the necessary surplus of about 100,000 cars. Assuming that business will increase at a constant rate and will reach the normal in 1924, the annual increase will amount to 8,108,000,000 ton-miles, which would require a capacity of 2,320,000 tons. Assuming that the average capacity of the cars built will increase to 55 tons, this would require 42,000 cars. This is not representative of the number that would ordinarily be needed to care for the increase in the traffic, because the present traffic is high and therefore the assumed rate of increase for the next three years has been made correspondingly low. Under normal conditions about 100,000 cars would be needed to provide for the increase in traffic.

Aside from the question of providing for the traffic, there remains the need for retiring old equipment from service. As the demand for freight cars has been greater than the supply for more than three years, cars have been kept in service whenever it was possible and the number retired has been very low. A comprehensive study of the retirements on roads owning 2,023,783 cars showed the status of retirements during 1915-1917 to be as follows:

CARS WORN OUT AND DISMANTLED
(Cars retired in connection with rebuilding are not included.)
ALL WOOD CARS

Class of cars	Number of cars	Average life of cars in years
Box	47,672	22.3
Stock	5,201	20.1
Flat	6,800	22.3
Gondola	24 630	18.0
Hopper	16.082	20.3
Refrigerator	4,591	21.7
Tank	81	24.6
Weighted average	105,057	20.9

It is significant that although the average age of the cars shown is 20.9 years, at the rate of retirement shown the equipment now in service would be replaced only at intervals of 55 years. The percentage of the total car equipment represented in this table is so large that the conditions which it discloses can be regarded as prevailing throughout the country. If this were the case it would indicate that the retirement of 120,000 cars which would naturally have been scrapped during the past three years has been deferred. The Railroad Administration has stated that of the 150,133 cars bad order on the fifteenth of November 19,300 were held out of service as not worth repairing. This is certainly a minimum figure. The deferred retirements amount to at least 100,000 cars, and although some of the box cars may be worth reinforcing and returning to service, not less than 75,000 cars should be scrapped.

The annual rate of acquisition of cars 21 years ago was approximately 120,000; therefore, at the present time this number must be retired each year unless the age of the cars in service is to be increased. The report of the Interstate Commerce Commission for December 31, 1917, showed that at that time the Class I carriers still had in service 904,007 freight cars not of all-steel or steel underframe construction. Until these light wooden cars have been scrapped the rate of retirement should certainly not be less than 120,000 cars per year. Assuming that 25 per cent of this equipment can be reinforced, there still remain 90,000 old cars to be destroyed during each of the next three years. The average capacity of the cars scrapped will be approximately 33 tons and the capacity of new cars 50 tons. Therefore, to replace the equipment ton for ton would require:

	Cars
For deferred retirements	49,500
For normal retirements.....per year	58,300

Summary

Summing up the cars needed to make up deficiencies, to provide for future increases and to take care of retirements, the total amount of equipment required during the next three years is found to be as follows:

	Cars
To make up the present shortage	262,000
To provide an adequate surplus	100,000
To take care of increases in traffic	126,000
To make up for deferred retirement	49,500
To care for normal retirements	174,900
Total cars needed in three years	712,400
Annual requirements	237,500

This is a conservative estimate of the equipment needed only by the railroad companies of this country. The private car lines own about 200,000 freight cars and the Canadian roads have also about 200,000. If the new equipment needed by these car owners bears the same relation to the total number owned that prevails for the railroads in the United States, the car building plants of this country and Canada should be called upon to furnish 830,000 cars during the next three years.

Type of Cars That Will Be Built

Few important innovations in freight car design have been introduced in the past decade, and the equipment built

during the next few years will probably not be radically different from the types now in service. Box cars form a large percentage of the equipment and little further increase in capacity is to be expected, as the opinion seems to prevail that nothing is gained by increasing the capacity of box cars above 40 tons. In open-top equipment, however, there is a strong tendency toward the use of high-capacity units. Ninety-ton cars are by no means uncommon, and experimental cars of 105 and 110 tons' capacity have been constructed. The operating results secured with high-capacity cars have been satisfactory, and they will probably be built in greater numbers.

The trend of material prices will no doubt affect the character of the new construction. Since 1916 the cost of wood has increased relatively more than the price of steel, and as a result all-steel cars can now be built as cheaply as cars constructed partly of wood. In the past many roads have been willing to pay a considerably higher price for an all-steel car. Under present conditions there should be a much greater demand for all-steel construction.

A well-known manufacturer of automobiles, which among other things are remarkable for their light weight, recently stated that railroads could save enormous amounts by building cars of alloy steels of high tensile strength, thus materially reducing the dead weight hauled. This proposal has been investigated, but the study failed to disclose the opportunity for effecting great economies, and there is little prospect that alloy steels will be used in car construction.

Freight cars have not been exempt from the economic forces that have been operating since 1916, consequently the unit cost of the equipment which the railroads buy in 1920 will be greatly in excess of pre-war prices. The lowest scale of prices for freight cars in recent years was that prevailing in 1914 and 1915. At that time cars could be bought for $800 to $900. By 1916 they had advanced to $1,100, in 1917 to $2,100 and in 1918 the average was about $2,850. The prices that will prevail during 1920 will depend on the cost of materials, and cannot be predicted with any degree of certainty. Under present conditions practically the same prices that existed in 1918 apply. It is probable that the 240,000 cars that should be built this year would cost between $670,000,000 and $700,000,000. Assuming that present prices continue the 712,000 cars needed in the next three years will involve an expenditure of approximately $2,000,000,000.

November Earnings Make Poor Showings.

THE EFFECTS of the loss of traffic due to the coal strike and the extraordinary expenses incurred in meeting it as well as the general tendency of expenses to increase are reflected in the November earnings of the railroads as indicated by preliminary reports. Returns from 170 of the Class I roads, show a net operating income of only $14,000,000. While the reports of the roads not included in this total may change the indication radically it is apparent from these figures that the showing for the month must be a poor one. The net operating income of the roads in federal control during the month of November in the test period averaged $83,000,000.

Director General Hines on December 31 authorized the following statement:

"It will never be possible to estimate completely the losses which the country has sustained on account of the coal strike. Among the heavy losses are those which the Railroad Administration has sustained and will sustain on account of loss of business and the extraordinary difficulties which it was compelled to overcome in order during the strike to give the public the most extensive operation of the railroads and the widest possible distribution of the available coal. These costly results will show in large measure in the month of November and again in December and probably to a substantial extent in January and even subsequent months. Undoubtedly there will be a very large deficit in operations in the month of November, most if not all of which would have been avoided but for the losses due to the coal strike.

"These losses were of two sorts. There was in November a heavy reduction in business due to the sudden diminition of the movement of coal which is the largest single item of traffic, and due in part to the shutting down or slowing down of other industries as they ran short of coal, and yet the temporary character of the loss of business was such as to preclude the possibility of any corresponding readjustment of operations so as to reduce operating costs. On the contrary, operating costs were seriously increased in many important respects. Only from 35 per cent to 45 per cent of the normal amount of coal was produced and yet this reduced production had largely to be transported over the most abnormal routes which had never been designed for the handling of coal in the direction and volume temporarily necessitated. Again the handling of railroad fuel was subjected to extraordinary burdens. Much coal which had been stored had to be reloaded, hauled to a new destination and again unloaded. In many instances coal had to be hauled hundreds of miles in order to supply railroad fuel, whereas ordinarily the needed coal supply was close at hand. For example, coal for Eastern Kansas and Oklahoma roads ordinarily obtained from Southeastern Kansas and Eastern Oklahoma had to be hauled from Pennsylvania and West Virginia. Much of the actual revenues which will be shown for November and also for December were for coal being handled at normal distances for railroad fuel so that the railroads using this coal in addition to handling this coal great and unusual distances on their own lines have to include in their operating expenses the freight received on this coal on other railroads and included in their operating revenues. In many parts of the country the railroads were suddenly confronted with the necessity of burning a character of coal to which the locomotives were not adapted and with which the firemen were not familiar, with the result that substantially less efficiency could be secured.

"It is important to emphasize that these results could not have been avoided by advance storage of coal because long prior to the strike being seriously threatened the general public demand for coal was so great that abnormal storage of railroad coal could not have been obtained except by depriving the general public correspondingly of coal which it was urgently seeking. The storage of railroad coal was already in excess of normal.

"In order to meet both railroad necessities and general public necessities, coal had to be switched to an unusual extent with resulting heavy terminal costs. These difficulties were seriously accentuated in the latter part of November and throughout the greater part of December by coal and stormy weather of almost unprecedented severity for the time of year in many parts of the country.

"In addition to the many millions of dollars of loss imposed in this way upon the public through the increased cost of railroad operation on account of the strike, there is the further unfortunate effect that railroad operations for November and Decembeer, and perhaps for a substantial period thereafter, will entirely lose their value as a measure of current railroad earning capacity."

A MALARIA SURVEY of the Central of Georgia right of way from Albany to Columbia, Ala., is now in progress under the direction of Dr. Abercrombie, of the State Board of Health of Georgia.

Adequate Motive Power for Railroads a Necessity

Much Additional Power Required—Obsolete Locomotives Should Be Replaced with Modern Power

AN EXPENDITURE of approximately $1,000,000,000 for new locomotives is necessary to furnish the motive power that will be required in the next three years by the railroads of the United States, to keep pace with the development of the country. The building program for that period should be very much more extensive than has been the case in recent years. New motive power must be provided to take care of the constantly increasing traffic and to replace obsolete and uneconomical locomotives that should be retired from service.

A conservative estimate, based on the average increase in railroad traffic and in the motive power during the decade ending with the year 1914, indicates that at least 698,000,000 lb. additional tractive power should be built between the present time and the end of the year 1922.

A striking phase of locomotive development during the period from 1905 to 1915 is that in addition to an increase of 34 per cent in the number of locomotives on American railroads, there also was an increase of 71 per cent in the aggregate tractive power. The manner in which the freight and passenger traffic and the motive power increased in the 10-year period and also the conditions that have prevailed since 1914 are shown in Table I.

RAPIDLY increasing traffic requires a large amount of new motive power.

An expenditure of $1,000,000,000 for new locomotives in the next three years is necessary to prepare the railroads to handle the business of the country.

Locomotive building program must be expanded to provide 13,177 modern locomotives in three years and 12,000 obsolete locomotives should be retired from service.

Heavy power units promote economy of operation, reduce the cost of handling and repair of equipment.

Statistics of the Interstate Commerce Commission show that the average distribution of tractive power is 63.5 per cent in freight service, 20.5 per cent in passenger service, 14 per cent in switching service and two per cent unclassified. The estimates of future requirements are based on these ratios, and the small percentage of new unclassified locomotives is included with those for freight service.

A great many locomotives have been continued in service during the war that probably would have been retired under normal conditions. At a low estimate the deferred retirements would amount to 5,000 locomotives and regular retirements to 7,000 locomotives of an average tractive power of about 24,000 lb. for the next three years. This makes a total of about 290,000,000 lb. of tractive power to be built to replace deferred and regular retirements.

Had the average tractive power of locomotives increased in recent years only at the same rate as in the decade just prior to the European war, the average tractive power of locomotives today would be 38,000 to 40,000 lb. and it would require about 18,000 of such units to furnish the amount of new motive power required. However, the tendency has been to greatly increase the power of each unit and on the

basis of locomotives built recently it would require 7,542 freight locomotives of 60,000 lb. average tractive effort, 3,218 passenger locomotives of 44,000 lb. average tractive effort, and 2,417 switching locomotives of 40,000 lb. average tractive effort to handle the increase in traffic and to replace obsolete locomotives which should be retired during the next three years, making a total of 13,177 locomotives of modern design that should be built in the three-year period.

Locomotive development is influenced by traffic requirements and the type of new locomotives has necessarily varied with the character of the lines over which they were to run. The trend has been toward a heavy increase in the average tractive power of each unit. This has resulted in a much greater operating efficiency and was achieved only through the joint efforts of railroad engineers and locomotive builders.

If the normal rate of increase in motive power, which took place during the decade ending with the year 1914, had continued without interruption during the succeeding years, the aggregate tractive power available at the end of the year 1918 would have been about 2,430,000,000 lb. The actual aggregate tractive power available on December 31, 1918, was 2,196,648,349 lb., a shortage of 235,600,269 lb. If the retirements of unfit and obsolete locomotives had been made at the same rate as in the years prior to 1914 this shortage would probably have amounted to 350,000,000 lb. The failure to retire from service such unfit units can only be justified by the exigencies of the war and now that this emergency has passed, all obsolete and uneconomical equipment should be retired with the least possible delay.

TABLE I—FREIGHT AND PASSENGER TRAFFIC AND THE AVAILABLE MOTIVE POWER FROM THE FISCAL YEARS 1905 TO 1918.

Year	Number of Locomotives: In U. S.	Per cent Inc.	Per cent Frt.	Per cent Pass.	Per cent Switch	Per cent Unclass.	Tractive Power: Aggregate, lb.	Per cent Increase	Average Per Loco.	Freight Traffic (Ton Miles)	Per cent Increase	Passenger Traffic (Passenger Miles)	Per cent Increase
1905	48,357	...	57.7	24.0	16.4	1.9	1,128,771,082	....	23,666	186,463,109,510	....	23,800,149,436	...
1906	51,672	6.9	57.8	23.7	16.4	2.1	1,260,633,673	11.7	24,741	215,877,551,241	15.8	25,167,240,831	6.0
1907	55,388	7.2	57.8	23.1	15.4	3.7	1,409,006,658	11.7	25,823	236,601,390,103	9.0	27,718,554,030	10.1
1908	56,733	2.4	59.7	23.2	15.4	1.7	1,477,758,536	5.0	26,384	218,381,554,802	d 8.0	29,082,836,944	4.9
1909	57,212	.8	59.3	23.3	15.4	2.0	1,503,971,444	1.8	26,634	218,802,986,929	2.0	29,109,322,589	.1
1910	58,947	3.0	59.3	23.2	15.5	2.0	1,588,894,480	5.1	27,282	255,016,910,451	21.0	32,338,496,329	11.1
1911	61,327	4.0	59.4	23.4	15.1	2.1	1,681,495,905	5.8	27,949	253,783,701,839	d 5.0	33,201,694,699	2.7
1912	62,262	1.5	58.8	22.9	15.0	3.3	1,746,964,128	3.9	28,634	264,080,745,058	4.0	33,132,354,783	d .2
1913	63,378	1.8	59.8	22.7	15.5	2.0	1,847,798,393	5.8	29,702	301,398,752,108	14.0	34,575,872,980	4.3
1914	64,760	2.2	59.8	22.6	15.5	2.1	1,931,953,982	4.5	30,420	288,319,890,210	d 4.0	35,258,497,509	2.0
†1915	63,850	...	....	....	....	...	2,014,201,500	4.3	.....	276,830,000,000	4.0	32,384,247,563	d 8.2
†1916	65,021	...	....	....	....	...	2,075,519,800	4.0	.....	343,099,937,805	20.3	34,213,596,127	5.7
†1917	63,858	...	....	....	....	...	2,145,698,000	2.4	.....	365,771,824,741	6.6	39,476,858,549	15.4
†1918	64,410	...	....	....	....	...	2,196,648,349	2.4	.....	401,946,000,000	9.9	42,566,342,892	7.8
1919	.....	...	....	....	....	...	*2,461,533,854	12.1	.....	*402,000,000,000	0.2	*45,600,000,000	7.1
1920	.....	...	....	....	....	...	*2,600,359,600	5.6	.....	*410,000,000,000	2.0	.....	...
1921	.....	...	....	....	....	...	*2,651,098,300	2.0	.....	*418,000,000,000	1.9	.....	...
1922	.....	...	....	....	....	...	*2,708,979,400	2.1	.....	*427,000,000,000	2.2	.....	...

*Estimated.
†1915 to 1918 Class I and II only.

TABLE II—U. S. R. A. STANDARD LOCOMOTIVES

Type	Service	Lb. tractive power	Average
Light 4-6-2	Passenger	40,700	
Heavy 4-6-2	Passenger	43,900	
Light 4-8-2	Passenger	53,900	
Heavy 4-8-2	Passenger	58,000	49,125
Light 2-8-2	Freight	54,600	
Heavy 2-8-2	Freight	60,000	
Light 2-10-2	Freight	69,400	
Heavy 2-10-2	Freight	74,000	64,500
0-6-0	Switch	39,100	
0-8-0	Switch	55,000	47,050

Note Mallet locomotives not included.

Freight Locomotives

In the year 1905 the freight traffic of the United States totaled 186,463,109,510 ton-miles and this increased at a fairly constant rate until in 1914 it had reached a total of 288,319,890,210 ton-miles, an average yearly increase for the decade of 5.46 per cent. This rate of increase if continued to the end of the year 1919 would have made a total freight traffic of 388 billion ton-miles. However, the statistics of the first ten months of the year 1919 and a conservative estimate of the probable volume of business for the months of November and December indicate that the actual freight business for the year will reach the enormous total of 402 billion ton-miles. These figures for the year 1919 may be taken as a basis on which to estimate the probable freight traffic for the next three years, which will probably reach 410 billion ton-miles in 1920, 418 billion ton-miles in 1921 and the stupendous total of 427 billion ton-miles in 1922.

To handle this vast amount of freight in 1920 it will be necessary to have an aggregate tractive power of 1,651,000,000 lb. in freight locomotives. This will require the building of a large amount of additional motive power. New freight locomotives to be built should average about 60,000 lb. tractive effort. That this average size of locomotives is a reasonable figure may be seen from Table II, giving the types and sizes of the standard locomotives designed and built under the direction of the Railroad Administration. There has been a great deal of criticism of these standard locomotives, but since they are the result of the joint efforts of a large number of practical railroad men and locomotive builders they are typical of the power that will be built for the more important roads. The average for all roads would be lower and it is quite probable that so far as the

TABLE III—FREIGHT LOCOMOTIVES

Year	No. of locomotives in U. S.	Tractive power, lb.	Tractive power to be built, lb.	Tons carried one mile (ton-miles)	Ton-miles per year per lb. of tr. power
1905	27,869	716,769,000	.....	186,463,109,510	260
1906	29,848	800,502,000	.....	215,877,551,241	273
1907	32,079	894,719,000	.....	236,601,390,103	265
1908	33,840	938,376,000	.....	218,381,554,802	233
1909	33,935	955,051,000	.....	218,802,986,929	229
1910	34,992	1,000,947,000	.....	255,016,910,451	255
1911	36,405	1,067,749,000	.....	253,783,701,839	238
1912	36,615	1,109,322,000	.....	264,080,745,058	238
1913	37,924	1,173,351,000	.....	301,398,752,108	257
1914	38,752	1,226,790,000	.....	288,319,890,210	235
Average 59 per cent of total locomotives.					
1915		1,279,019,000	.....	276,830,302,723	216
1916		1,317,855,000	.....	343,099,937,805	260
1917		1,362,417,000	.....	365,771,824,741	269
1918		1,394,871,000	.....	401,946,000,000	288
1919 Required		*1,619,000,000	.....	.....	
1919 In service		1,465,763,000	153,245,654	*402,000,000,000	262
1920		*1,651,228,353	32,218,090	*410,000,000,000	...
1921		*1,683,447,442	32,219,089	*418,000,000,000	...
1922		*1,719,693,918	36,246,476	*427,000,000,000	...
Total			253,929,309		

*Estimated.

tractive effort is concerned, the figures used in these estimates are not too high and represent the average locomotive that will be built in the immediate future.

The statistics of the Interstate Commerce Commission show that in the past years approximately 63.5 per cent of the total available tractive power was engaged in freight service and on that basis 248.3 ton-miles of freight were hauled during the year for each pound of tractive power of freight locomotives. The average ton-miles per year per pound of tractive power was somewhat in excess of 248.3 in 1918 and 1919, but an average taken over the entire period of 14 years from 1905 to 1918 was only 251.1 ton-miles per year per pound of tractive power. This average is subject to fluctuation and as will be seen in the tabulations the average ton-miles per pound of tractive effort in 1906 reached the extremely high figure of 273 ton-miles, but dropped to 235 ton-miles in 1914. It is for this reason that an average for a ten-year period during normal times is taken as a basis for calculating the work that will probably be done in the future. This average may be improved upon, but there is no certainty that such will be the case.

As already stated, the estimated freight traffic for the year 1920 will be 410 billion ton-miles and to haul it will require freight locomotives having an aggregate tractive power of 1,651,228,000 lb. As will be seen in Table III, 153,245,000 lb. additional tractive effort was needed to bring the aggregate for 1919 up to the proper point and to this amount must be added 32,218,000 lb. necessary to provide for the increase in freight traffic in 1920. The increase in freight traffic to 418 billion ton-miles in 1921 will require an increase of 32,219,000 lb. tractive power and the increase to 427 billion ton-miles in 1922 an additional 36,246,000 lb. Normal and deferred retirements of freight locomotives during the next three years make it necessary to provide 190,472,000 lb., and the proportional increase in unclassified locomotives an additional 8,091,000 lb., so that it will require an aggregate increase of 452,490,000 lb. tractive power in freight locomotives in three years. This makes a total to be built of 7,542 units of 60,000 lb. average tractive effort. As heavy freight locomotives cost approximately $82,000 in 1918, and it is quite probable that this price will continue, the total cost of freight locomotives required in the next three years will be $618,444,000. This is a yearly average of 2,514 freight locomotives costing $206,444,000.

Passenger Locomotives

The passenger traffic of the railroads of the United States during the decade ending with the year 1914 increased 11,458,246,073 passenger-miles or 48 per cent. During this same period the number of passenger locomotives increased only 25.8 per cent, but as in the case of freight locomotives the average tractive power increased rapidly.

The passenger locomotives in service in the year 1914 were 23 per cent of the total number of locomotives and the aggregate tractive effort amounted to 396,051,000 lb. or 20.5 per cent of the total for all classes. No figures being available as to the actual aggregate tractive effort engaged in passenger traffic in recent years it may reasonably be assumed that the same ratio that existed in 1914 (20.5 per cent), will apply. On that basis the passenger traffic for the year 1919 would have required 521,669,000 lb. tractive power, but as will be seen in Table IV the total available power was only 473,199,000 lb.

The total available tractive effort on December 31, 1918, being 2,196,648,349 lb. and assuming that 20.5 per cent of this amount was engaged in passenger traffic, this additional tractive effort required for passenger service to bring the total for the year 1919 up to normal would be 48,470,000 lb., and with the increase computed on the basis of 20.5 per cent, 11,404,000 lb. are required for 1920, 10,401,000 lb.

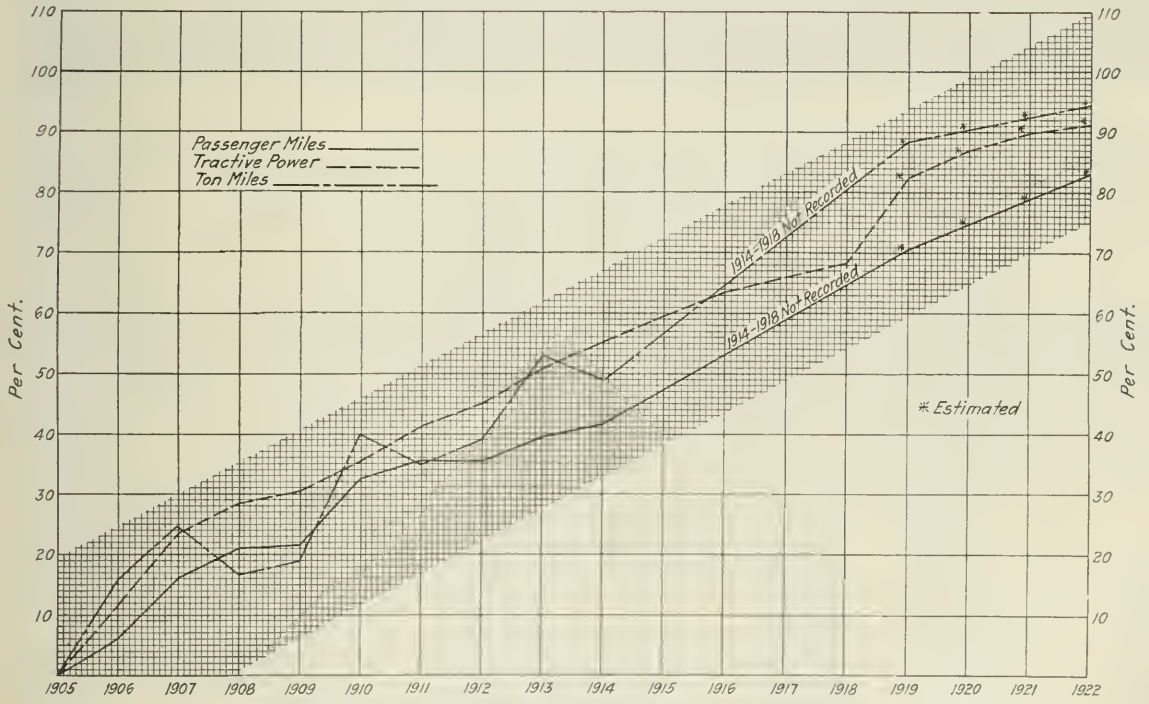


Chart Showing Comparative Increase in Tractive Power and in Freight and Passenger Traffic

for 1921 and 11,702,000 lb. for 1922. To replace the normal and deferred retirements of obsolete passenger locomotives 59,613,000 lb. are required, making a total increase of 141,601,000 lb. tractive power required to be built for passenger service in the next three years.

This would require a total of 3,218 units of 44,000 lb. tractive power each and as the probable cost of passenger

Table IV—Passenger Locomotives

Year	Number of locomotives in U. S.	Tractive power, lb.	Tractive power to be built, lb.	Passenger-miles
1905	11,618	231,398,000	.....	23,800,149,436
1906	12,249	258,430,000	.....	26,167,240,831
1907	12,814	288,846,000	.....	27,718,554,030
1908	13,185	292,960,000	.....	29,082,836,944
1909	13,317	308,314,000	.....	29,109,322,589
1910	13,660	325,723,000	.....	32,338,496,329
1911	14,301	344,707,000	.....	33,201,694,699
1912	14,762	358,127,000	.....	33,132,354,783
1913	14,396	378,798,000	.....	34,575,872,980
1914	14,612	396,051,000	.....	35,258,497,509
Average per cent of total locomotives				
1915	.....	412,911,000	.....	32,384,247,563
1916	.....	425,491,000	.....	34,213,596,127
1917	.....	439,868,000	.....	39,476,858,549
1918	.....	440,312,000	.....	42,566,342,892
1919	In service 473,199,081 / Required 521,669,000		48,470,081	45,600,000,000
1920	.....	*533,673,718	11,404,427	.....
1921	.....	*543,475,151	10,401,433	.....
1922	.....	*555,176,777	11,701,626	.....
Total			81,977,567	

*Estimated.

locomotives will approximate $60,000 each, it will necessitate a total expenditure of $193,080,000 for this purpose during the next three years.

Switching Locomotives

As shown in Table I, 15.6 per cent of the total number of locomotives in service were switching locomotives and on the basis of 14 per cent of the aggregate tractive power there were 323,160,000 lb. of tractive power in switching service in the year 1919. Additional power of 33,785,000 lb. tractive effort are required to bring the switching service to its proper proportions and this amount should be constructed

Table V—Switching Locomotives

Year	Number of locomotives in U. S.	Tractive power, lb.	Tractive power to be built, lb.
1905	7,923	158,028,000	.....
1906	8,485	176,488,000	.....
1907	8,529	197,260,000	.....
1908	8,785	206,886,000	.....
1909	8,837	210,555,000	.....
1910	9,115	222,445,000	.....
1911	9,297	235,409,000	.....
1912	9,311	244,574,000	.....
1913	9,834	258,691,000	.....
1914	10,685	270,473,000	.....
1915	.....	281,988,000	.....
1916	.....	290,572,000	.....
1917	.....	301,397,000	.....
1918	.....	307,530,000	.....
1919	On service 323,160,348 / Required *356,944,882		33,784,534
1920	.....	*364,050,344	*7,105,462
1921	.....	*371,253,762	*7,203,344
1922	.....	*379,145,116	*7,891,354
Total			55,984,694

*Estimated.

in the year 1920. To meet the normal increase in traffic in 1920 will require 7,105,000 lb., the increase in 1921 will require 7,203,000 lb. and in 1922 it will require 7,891,000 lb. additional tractive power.

Table V shows the number of switching locomotives in service from 1905 to 1914 and the increases in aggregate tractive power required in 1920, 1921 and 1922. Besides these increases, the deferred and regular retirements of switching locomotives to be replaced with modern power will require 40,712,000 lb., making necessary a total increase of 96,696,000 lb. tractive effort in the next three years. Taking 40,000 lb. tractive power as an average for this class of locomotives this would require 2,417 units, and at an average cost of $40,000 each, the total cost of switching locomotives to be built in the next three years would be $96,680,000, or a yearly average of 806 locomotives at a cost of $32,226,666, which represents the requirements of this class of the service.

Summary

The total increase in the aggregate motive power required in the next three years and the estimated cost is as follows:

Normal increase in lb. tractive power:	
Freight locomotives	261,928,000
Unclassified locomotives	8,099,000
Passenger locomotives	81,988,000
Switching locomotives	55,985,000
Total	408,000,000
Deferred and normal retirements in lb. tractive power:	
Freight locomotives	190,472,000
Passenger locomotives	59,613,000
Switching locomotives	40,712,000
Total	290,797,000
Cost of replacing retirements:	
3,175 freight locomotives	$260,350,000
1,332 passenger locomotives	79,920,000
1,017 switching locomotives	40,680,000
Total	$380,950,000
Cost of retirements when built:	
9,320 freight and unclassified locomotives	$142,400,000
2,760 passenger locomotives	41,700,000
1,920 switching locomotives	21,300,000
Total	$205,400,000

	Tractive power, lb.	No. of locomotives	Cost
Normal increase and retirements	407,999,000	7,653	$527,254,000
Deferred retirements	290,797,000	5,524	380,950,000
Total	698,796,000	13,177	$908,204,000
Average per year for three years	232,599,000	4,392	302,735,000

The cost of locomotives to be retired is taken as equal to the cost in the year 1905, when freight locomotives cost $15,250, passenger locomotives $15,100 and switching locomotives $11,100. This will retire from service locomotives costing $205,400,000 when built and the capital expenditures of the railroads for locomotives will therefore be $702,804,000 in the next three years, as shown below:

Total cost of locomotives to be built in three years	$908,204,000
Total cost of locomotives to be retired in three years	205,400,000
Addition to capital expenditures	$702,804,000

The total number of locomotives that should be built in the next three years is 13,177 and the total to be retired is 12,000 locomotives, making an increase of 1,177 in the number of locomotives. This number of retirements seems large as compared with the number estimated to be built, but this is accounted for by the greatly increased power of the individual units.

This policy would be beneficial in facilitating the movement of the traffic and also in keeping down repair costs and labor charges for crews and hostlers. A large locomotive can be coaled, watered, or repaired in practically the same time as a small one and having 60,000 lb. tractive power in one unit requires only one engine crew, while two units each of 30,000 lb. tractive power would require practically twice the expenditure for upkeep and operation.

This total expenditure of practically one billion dollars for new motive power is necessary if the railroads are to be prepared to handle the business of the country. It is essential that the need for additional motive power be given immediate consideration and the locomotive building program arranged for.

Over 600 cars of fuel will be sent from Ashland, Wis., to interior villages as a result of the demolition of the wooden ore dock of the Minneapolis, St. Paul & Sault Ste. Marie, at Ashland, which has lately been begun. The road has now a solid steel and cement ore dock, finished two years ago at a cost of about $1,000,000. A saw mill has been set up to convert the timber in the old dock into stove-wood.

24,500 Passenger Cars Needed in Next Three Years

With Remarkable Traffic Increase, Purchases Have Not Met Needs for Retirements Alone Since 1915

IN THE TEN-YEAR PERIOD ending June 30, 1915, the volume of passenger traffic on the railroads of the United States, as measured by the number of passengers carried one mile, increased 48 per cent. During this period the requirements of the increasing business were so closely met by the addition of new equipment that the average number of passengers per car never reached 16 nor dropped below 15. This required the purchase during the 10 years of 26,800 passenger train cars.

In the four and one half years since June 30, 1915, the number of passengers carried one mile has increased over 43 per cent, less than 4,000 cars have been purchased, and in 1919 there were an average of 21 passengers for every passenger carrying car of railroad ownership moved in revenue service. To provide for the present volume of passenger traffic on pre-war standards of service, without allowance for retirements, would require over 18,000 more passenger train cars than the railroads now own.

IN 10 YEARS to June 30, 1915, passenger traffic increased 48 per cent. The number of passenger cars increased 35 per cent.

In the four and one-half years since, traffic has increased over 43 per cent, but equipment has increased only 2.5 per cent.

There is a heavy shortage of passenger cars now.

To restore 1917 standards in three years would require the purchase of over 8,000 cars a year until 1923.

Conditions Prior to 1915

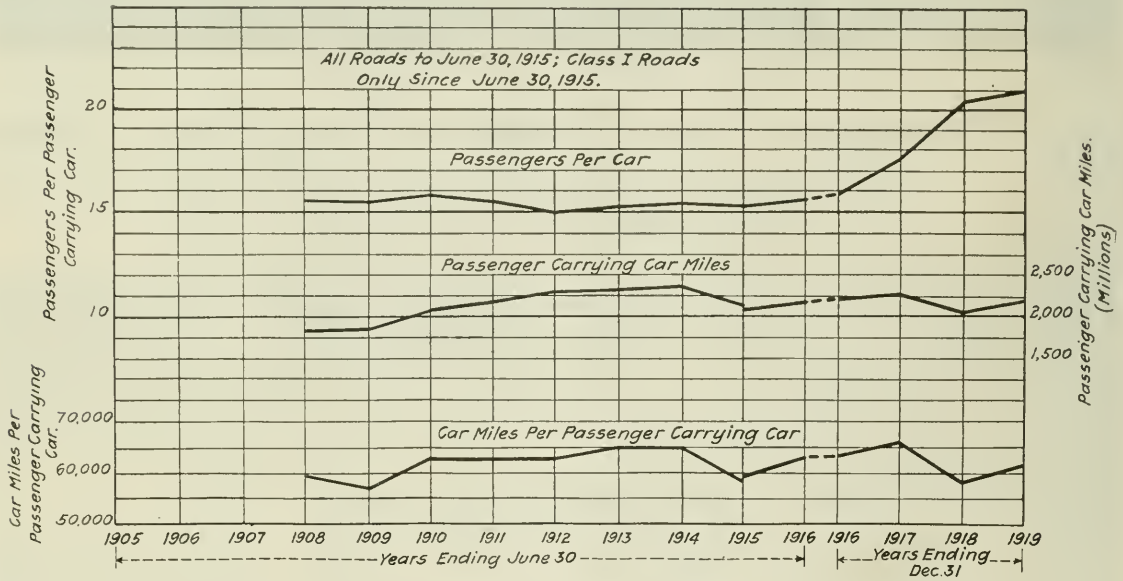
In Table I are shown the volume of passenger traffic, the number of passenger car miles and the number of passenger cars in service for each of the ten years prior to June 30, 1915. During 1905 the total revenue passenger movement was 23,800,149,436 passengers carried one mile. In 1915 there were 32,384,247,563 passengers carried one mile, representing a net increase at the end of the period of 8,584,098,127. With two exceptions during this period the trend of passenger traffic was steadily upward. During 1912 there was a slight decline in the amount of traffic, while in 1915 the decrease over the previous year was very large, amounting to 2,874,249,946 passenger miles. This reflects the general business depression following the outbreak of the European war and as a real measure of the trend of passenger traffic during the period, the difference in volume between 1905 and 1914, when the peak was reached, should be used. This is 11,458,-348,073, or a 48 per cent increase.

From 1908, the first year for which car mile statistics are available, the number of passengers per car remained remarkably constant—between 15 and 16. The minimum ratio of 15 occurred in 1912, a year of comparatively light traffic, and the maximum of 15.8 was reached in 1910, the year in which occurred the greatest increase in passenger mileage of any during the period. Another corelative fact of great interest indicated by this table is the close relation between the annual fluctuations in the volume of passenger business and the increases in the number of passenger train cars, the nature of each change in traffic being reflected by the increase in the number of cars in service during the next year.

During the eight years beginning with 1908 each passenger carrying car averaged about 61,500 miles per year. This average, however, is not a true reflection of the annual mileage per car during the period because of the comparatively low mileage during 1908, 1909 and 1915. During 1910, 1911 and 1912, the miles per car remained fairly constant with traffic showing a declining tendency and bet-

ter than an average increase in new equipment. It seems evident, therefore, that such a mileage can, on the average, be maintained without difficulty. During 1913 and 1914, with a falling off in the increase in new equipment for the two years and material increases in traffic following the decrease of 1912, the number of miles per car per year increased to over 64,000. The decrease to 58,200 miles per car in 1915, accompanying the marked falling off of passenger business, indicates an actual surplus of equipment during that year.

During the ten calendar years ending with 1914, the *Railway Age* reports a total number of passenger cars ordered of approximately 22,900, of which 78 per cent were for the steam railroads of the United States. During the same period *Railway Age* statistics show a total of approximately 34,400 passenger cars actually built in the United States and Canada. While it is evident that the statistics for the number of cars ordered is not as complete as for the number of cars built, it is reasonable to assume that approximately the same proportion in each case were for use on the steam railroads of the United States. On this basis it is evident that the railroads must have received about 26,870 new passenger train cars during the ten years from 1905 to 1915. But during this time the actual number of cars in service increased only 14,063 and it is evident that about 12,800 cars must have been retired. The yearly average for the ten years is, therefore, 2,687 new cars purchased, of which 1,280 replaced old cars retired from service and 1,406 were added to take care of the traffic increase.



The Number of Passengers Per Car, Passenger Carrying Car Miles, and Miles Per Car, 1908 to 1919

The War Period

During the four and one half years since June 30, 1915, passenger miles have increased 13,810,000,000, or 43.5 per cent. This is a larger proportionate increase than that for the ten years prior to 1915 and but slightly less than the actual maximum increase during the period from 1905 to 1914. There have been a number of extraordinary conditions contributing to this rapid increase in the volume of passenger business which make it evident that such a rate of increase could hardly have been expected under normal conditions. Following the depression of 1914 and 1915 there was a rapid recovery of business activity and during the next two years the growth reflects the great impetus which the industry and commerce of the country received through munition orders placed in this country by the Allies. Then in 1917 began the troop movement which continued with increasing volume during the early months of 1918 and was not completed until the middle of 1919, at which time the return movement was practically completed. Following the signing of the armistice there was an immediate increase in the volume of civilian travel for pleasure, which had been considerably curbed during the war.

During the first year and one half of this period there was actually less passenger equipment in service than at the beginning of the period and at the end of 1917 there were only about 300 more passenger cars in service than were shown for the fiscal year 1915. For the whole period of four and one half years, with its increase in volume of passenger business of over 43 per cent, the number of passenger cars in service increased by 2.5 per cent.

While the number of cars ordered during the four calendar years ending with 1918 was approximately 7,000, only 45 per cent of this number were for use on the steam railroads of the United States. Applying the same percentage to the approximately 7,490 cars built during the four and one-half years prior to December 31, 1919, only 3,370 passenger train cars were built for steam railroad use in the United States. As at least half of the cars built in 1915, or about 440, were probably in service prior to July 1, the beginning of the period under discussion, the number of new cars actually placed in service in the four and one half years probably did not exceed 2,930. As the number of passenger cars in service increased but 1,310 during the period, it is evident that about 1,620 cars were retired. An average of only 652 new cars were received by the roads annually, of which 360 were replacements and 291 were additions to the passenger carrying equipment of the country.

Comparing the years up to 1918, as shown in Table II, there is evident a growing inability of the equipment available to meet the heavy increase in traffic, which is shown by the increase in the number of miles per passenger carrying car per year from 59,600 in 1915 to 66,000 in 1917 with

a corresponding increase in the number of passengers per car from 15.3 in 1915 to 17.6 in 1917.

In 1918 there was a sharp decrease in car mileage due to the curtailment of service effected by the Railroad Administration. This and an increase in the number of cars in service of 961 resulted in lowering the average car miles per passenger carrying car from 66,000 to 58,600, but the number of passengers per car increased from 17.6 to 20.4 by far the largest increase ever recorded. Of course, the heavy troop movement, which was practically continuous throughout the year 1918, tended to increase this figure above that representing conditions prevailing in the handling of regular passenger business. The aggregate of this troop movement for the 22 months from January 1, 1918, to November 1, 1919, however, was 5,917,658,719 passenger miles, or only 14 per cent of the total volume of passenger business of the year 1918 alone, and can hardly have exercised a predominating influence on the average. Its effect may practically be eliminated by comparing 1917 with 1919, as the troop movement during these two years was confined to about one half of the year in each case, and here the increase is shown to have been over three passengers per car.

The sharp decline in passenger car mileage showing an average of 58,600 and 61,400 miles per car per year, respectively, for 1918 and 1919 following the high mileage during 1917, raises the question as to whether the change in conditions is actually due to a shortage of equipment or entirely to the war policy of the Railroad Administration. Assuming, however, that the equipment had been used to the same extent during these two years as it was during 1917, so that each passenger carrying car had averaged 66,000 miles for the year, the number of passengers per car would have increased to 18.1 in 1918 and 19.3 in 1919, clearly demonstrating that even under normal methods of handling passenger business there would still have been a rapidly growing shortage of equipment.

How Many Passenger Cars Are Needed?

The facts reflected by these figures have been firmly established in the mind of the traveling public for some time and statistical data is not needed to substantiate them. The data does, however, afford a basis on which to arrive at a reasonable estimate of the actual amount of new equipment which must be purchased before passenger service can be restored to a standard at all approaching that so steadily maintained during the eight years prior to the outbreak of the European war.

Passenger equipment may be divided roughly into two major classes: (1) passenger carrying cars and (2) express, baggage and postal cars. In the tables already referred to are given a clear presentation of the volume of passenger traffic and the total number of passenger carrying car miles to handle the traffic. This forms a fair basis for determining the needs for passenger carrying cars if the assumption is made that there has been no great change in the relative amount of car mileage made by equipment of railroad ownership and Pullman sleeping and parlor cars, or that there has been no material increase in the carrying capacity of passenger cars of railroad ownership. The remarkable uniformity of the number of passengers per car during the eight years prior to June 30, 1915, would indicate that these are reasonable assumptions. At the end of that period there were 10,884 passenger train cars of all-steel construction and 5,197 with steel underframes, a total in both groups of 38 per cent of the equipment in service, practically all of which had been built during that period, with no marked effect on the average car load.

The only measure of the expansion of express and postal

TABLE I—PASSENGER TRAFFIC, PASSENGER EQUIPMENT IN SERVICE AND EQUIPMENT MOVEMENT DURING THE 10 YEARS ENDING JUNE 30, 1915, FOR ALL STEAM RAILROADS OF THE UNITED STATES

Fiscal year	Passengers carried one mile: For the year	Passengers carried one mile: Increase from last year	Passenger carrying car miles: For the year	Passenger carrying car miles: Increase† from last year	Passenger per car	Passenger train cars in service: For the year	Passenger train cars in service: Increase over last year	Passenger carrying cars in service	Passenger miles per pass. carrying car	Car miles per pass. carrying car
1905	23,800,149,271	.....	.....	.....	....	40,713	.....	29,149	819,000	.....
1906	25,167,240,831	1,367,091,395	.....	.....	....	42,262	1,549	30,116	836,000	.....
1907	27,718,554,030	2,551,313,199	.....	.....	....	43,973	1,711	30,980	895,000	.....
1908	29,082,836,944	1,364,282,914	1,867,984,570	.....	15.6	45,117	1,144	31,440	931,000	59,400
1909	29,109,322,589	26,485,645	1,881,022,085	13,037,515	15.5	45,584	467	31,926	915,000	57,200
1910	32,338,496,329	3,299,173,740	2,048,597,509	167,575,424	15.8	47,095	1,511	32,702	988,000	62,700
1911	33,201,694,699	863,198,370	2,141,382,030	92,784,521	15.5	49,818	2,723	34,233	974,000	62,600
1912	33,132,354,783	—69,339,916	2,202,843,085	61,461,055	15 0	51,490	1,672	35,139	944,000	62,800
1913*	34,575,872,980	1,443,518,197	2,253,797,814	50,954,729	15.3	51,700	210	34,761	997,000	64,800
1914*	35,258,497,509	682,624,529	2,295,120,978	41,323,164	15.4	53,466	1,766	35,545	986,000	64,600
1915*	32,384,247,563	—2,874,249,946	2,120,335,744	—174,785,234	15.3	54,776	1,310	36,529	889,000	58,200
	Net increase over 10 years	8,584,098,127			Average 15.4	Total incr'se	14,063		Approx. average	Approx. average
	Per cent net increase...	36.				Per c. incr'se	34.6		950,000	61,500
	Maximum increase during the period (1914)....	11,458,348,073								
	Per cent maximum increase	48.2								

*Excludes Class III roads and switching and terminal companies. †Decrease indicated by minus sign.

TABLE II—PASSENGER TRAFFIC, PASSENGER EQUIPMENT IN SERVICE AND EQUIPMENT MOVEMENT DURING THE 4½ YEARS ENDING DECEMBER 31, 1919, FOR CLASS I RAILROADS OF THE UNITED STATES

Fiscal year	Passengers carried one mile: For the year	Passengers carried one mile: Increase from last year	Passenger carrying car miles: For the year	Passenger carrying car miles: Increase† from last year	Passenger per car	Passenger train cars in service: For the year	Passenger train cars in service: Increase	Passenger carrying cars in service	Passenger miles per pass. carrying car	Car miles per pass. carrying car
1915	31,789,928,187	.....	2,078,812,953	.....	15.3	52,690	.....	34,852	913,000	59,600
June 30, 1916.....	33,645,908,150	1,855,979,963	2,155,597,720	76,784,767	15.6	51,670	—1,020	34,180	986,000	63,100
December 31, 1916.	34,585,952,026	*2,796,023,839	2,178,152,768	*99,339,815	15.9	52,179	—*511	34,261	1,008,000	63,600
1917	39,476,858,519	4,890,906,523	2,235,006,367	56,853,599	17.6	52,977	798	33,923	1,163,000	66,000
1918	42,676,741,000	3,199,882,451	2,084,502,591	—150,503,776	20.4	53,938	961	35,639	1,195,000	58,600
1919‡	45,600,000,000	2,923,300,000	2,185,000,000	100,500,000	20.8	54,000	62	35,670	1,278,000	61,400
	Increase over 4½ years	13,810,071,813				Increase	1,310			
	Per cent increase.....	43.5				Per cent increase	2.5			

*Increases from the year ending June 30, 1915.
†Decreases indicated by the minus sign.
‡Estimated. Passenger miles and car miles are based on Railroad Administration reports up to September 30, and October 30, respectively, by assuming that the proportion for the remainder of the year to the total will be the same in 1919 as in 1918.

business is the increase in revenue reported by the railroads to the Interstate Commerce Commission from these two classes of business. In 1905, the revenue of all roads from mail service was $45,426,125, and that from express was $45,149,155. In 1915, the revenue of all roads from these two classes of service was $58,359,095 and $84,561,114, respectively. Taking both together, this is an increase from 15.8 per cent of all passenger train revenue to 17.9 per cent of all passenger train revenue. Revenue from express business, taken by itself, increased 87½ per cent. In 1915, the revenue from mail business of Class I roads only was $56,959,261 and in 1917, $58,775,765, an increase of only three per cent. Express business, however, increased from $82,952,087 to $123,673,777, or 49 per cent, and, from 10.6 per cent in 1915, had increased to 13.4 per cent of all passenger train revenue in 1917, while both sources of revenue constituted 19.8 per cent of all revenue in 1917.

Leaving out of consideration the first three years of the ten years prior to 1915, during the first two of which the number of passenger miles per passenger carrying car was light, and considering only those years for which passenger car mileage statistics are available, it will be found that the average number of passenger miles per passenger carrying car averaged about 950,000, which was equivalent to an average of about 61,500 miles per car per year with an average load of 15.4 passengers per car. To have handled the 45,600,000,000 passenger miles of passenger traffic in 1919 under these same conditions would have required a total of 48,000 passenger carrying cars, but there were only approximately 35,700 passenger carrying cars in service during that year, indicating a shortage of 12,300 cars.

But it is questionable whether passenger service should ever be restored completely to the competitive basis existing prior to 1915. It is generally conceded that more equipment was furnished than was needed economically to handle the business with a reasonable degree of comfort and convenience to the traveling public. On the other hand it is manifestly impracticable to attempt to continue to handle the present large volume of business without materially improving the accommodations furnished the traveling public. Since 1915 the number of passengers per car has increased from about 15 to almost 21. In view of the fact that this figure reflects the effect of the troop movement during the first half of the year, it will be highly conservative to assume that the service should be restored to the standards of 1917, when there were 17.6 passengers carried per car movement.

The steady maintenance of over 62,000 miles per passenger carrying car during the years 1910, 1911 and 1912, also indicates that it is practicable to maintain an average car mileage greater than 61,500 miles. It may also be considered as impracticable to maintain the high average of 1918 as this was partly affected by the troop movement during the latter half of the year, tending to raise the average above the amount practicably attainable with equipment in regular passenger service. Considering these facts it would seem reasonable to expect the maintenance of an average mileage per car throughout the country of 63,000 per year.

To have handled the 45,600,000,000 passengers carried one mile in 1919 on this basis would have required 41,080 cars, which is 5,480 cars more than were actually in service during the year.

If it be assumed that the service is to be restored to a normal basis within the next three years, there must be added to this figure the requirements to meet the normal increase of business which may be expected during that period. During the nine years from 1905 to 1914, which marked the maximum increase of business during the ten years prior to the outbreak of the European war, there was a total increase of 11,458,000,000 passenger miles, or 48 per cent. There has been an increase since the close of the fiscal year 1915, a period of only four and one half years, of 43 per cent. This, of course, has been affected by a number of extraordinary conditions resulting from the European war, but it is reasonable to expect during the next ten years under normal conditions of development an increase at least as great as that which took place during the decade prior to 1915.

On this basis the total increase during the coming ten years will amount to 21,800,000,000 passenger miles, or an average of 2,180,000,000 annually. Assuming for the next three years an annual increase of an even 2,000,000,000 passenger miles, the railroads will be required to purchase 5,400 additional passenger carrying cars during the three-year period to maintain the standards of service and equipment mileage outlined above. It will, therefore, be necessary to purchase 10,880 passenger carrying cars during the next three years.

During 1918 the passenger carrying cars of the Class I railroads made up 66 per cent of the total number of passenger train cars in service. Assuming the continuance of this ratio, which, however, has been gradually decreasing, it will be necessary to purchase 5,620 new baggage, mail, express, dining and other passenger train cars in addition to the passenger carrying cars, which include coaches, combination passenger cars and sleeping and parlor cars of railroad ownership. Of this number about 4,800 will be baggage, mail and express cars.

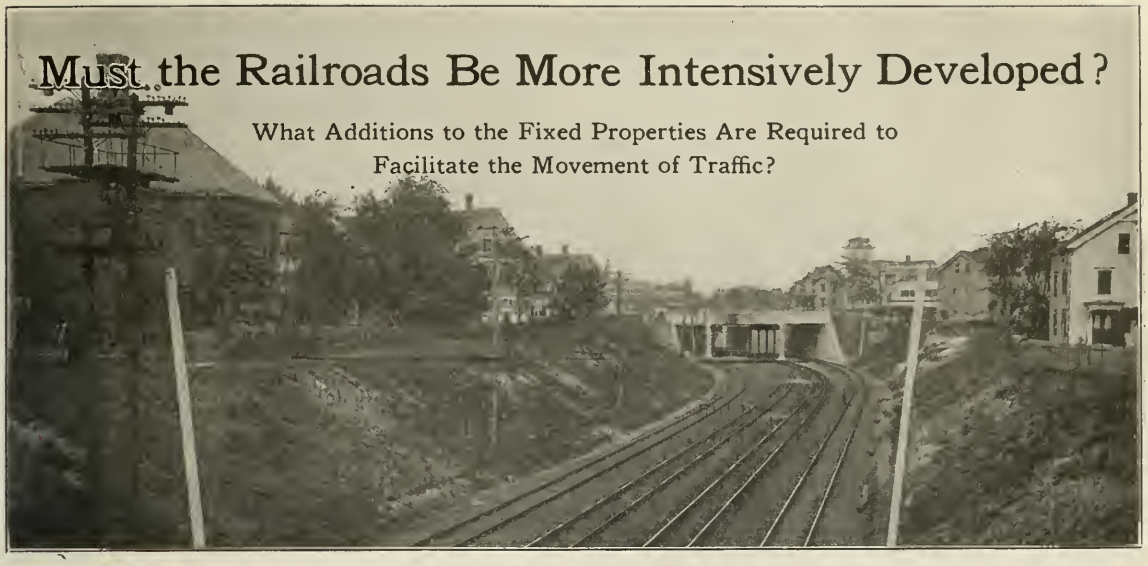
But this total is based on the assumption that there are no cars in service at the present time which have been kept in service beyond the dates at which they should have been retired. During the ten years prior to 1915 there was an average retirement of 1,280 cars annually. During the last four years there has only been retired an average of 360 cars each year. It is evident, therefore, that there are 4,140 cars now in service which should be retired at the earliest opportunity and on the same basis 3,840 more cars should be retired during the next three years. Adding these 7,980 cars to the actual increase required, it is evident that there must be purchased during the next three years a total of about 24,500 passenger train cars, or an average of 8,160 cars a year, if passenger service is to be restored to something approaching the standards maintained during 1917.

Since 1915 the prices of railway equipment have increased so rapidly that they undoubtedly have been one of the principal contributing factors in the small amount of equipment actually purchased. Such data as is available indicates that the increase which has taken place during the war period has been about 200 per cent or in other words that the equipment purchased now will cost approximately three times as much as the cost of similar equipment purchased in 1914. This ratio holds very closely true when applied to the prices for locomotives and freight cars paid by the Railroad Administration during 1918 and considering the increases in prices which have taken place since, it may be considered a conservative basis on which to estimate the capital required for the purchase of new equipment. Baggage, mail and express cars costing between $6,000 and $7,000 in 1914 will cost on an average of $21,000 to $22,000 at the present time, while steel coaches which cost $8,500 in 1914 can probably not be built at the present time for less than $25,000 to $26,000. Applying these prices on a weighted average basis of the proportion of these two classes of equipment to the total, a conservative price for the 24,500 cars required during the next three years may be taken at $24,000 each.

If the railroads are to restore and maintain passenger service to the standard of 1917, an expenditure, therefore, of $588,000,000 will be required for new equipment during that time; this is an average expenditure of $196,000,000 annually.

Must the Railroads Be More Intensively Developed?

What Additions to the Fixed Properties Are Required to Facilitate the Movement of Traffic?



EVERYONE KNOWS that the railroad facilities are inadequate, but since James J. Hill's famous estimate of this inadequacy there have been few other attempts at concrete analyses. Superficial consideration would lead one to use past progress on improvement work as a measure of the present needs, and this would be legitimate if the increases in traffic were approximately uniform, but this has not been the case, and the intensive development of the railroads, namely, their ability to handle a traffic of increasing density is obviously a function of this growing traffic. Consequently any serious attempt to determine the present deficiency of railway facilities should start with a study of the growth of traffic and the increase in traffic density.

In 1911 the Class I roads of the United States, operating 216,878 miles of line, carried a revenue freight traffic of 249,843,166,302 ton miles, which represents an average freight traffic density on the roads of the country of over 1,161,164 ton miles per mile of line. This was handled with the aid of 23,266 miles of second track, 2,410 miles of third track and 1,747 miles of fourth or more tracks, or a total of 27,391 miles of supplemental main tracks, in addition to 84,499 miles of track in sidings and yards. Contrast these figures with those for 1918, when the Class I roads with 233,064 miles of line carried 400,379,284,206 tons of revenue freight one mile with an average traffic density of 1,717,894 ton miles per mile of line. This was handled with the aid of 35,565 miles of multiple main tracks and 103,061 miles of sidings and yard tracks. The question raised by a study of these figures is whether the increase in supplemental tracks during this period of seven years has kept pace with the enormous increase in the density of traffic.

DURING the last few years the railroads have not been able to add to their facilities in proportion to the increased traffic. Analysis of requirements of fixed property shows the need of an expenditure of about $2,500,000,000 in the next three years to make up deficiency and provide for the current annual improvements.

Additional tracks will require $1,250,000,000, railway reconstruction $600,000,000, engine houses and shops $250,000,000, and station buildings, $300,000,000.

This, however, is only one of the many problems to be considered in a study of the necessity of further intensive development of the railroads of the United States. It embraces not only the question of the adequacy of the mileage of tracks to accommodate moving and standing cars, the number and sizes of buildings necessary for the conduct of freight and passenger business, the repair of locomotives and cars and the housing of employees, and the facilities required for the receiving, storage and delivery of water, coal and other supplies, but it also implies the introduction of improvements that will effect economies of operation as well as provision for non-productive investments, such as the larger passenger stations and grade separation work that must be provided in pursuance of public demands.

Are There Enough Main and Side Tracks?

To return to the subject of adequate trackage and its relation to the density of traffic. From 1905 to 1914 the net ton miles per mile of line increased 32.2 per cent, while the mileage of multiple main tracks increased from 9.2 miles per 100 miles of line to 12.6 miles, or 37 per cent. During the same period the mileage of sidings and yard tracks increased from 32.1 miles per 100 miles of line to 38.2 miles, or 19 per cent. Since June 30, 1914, the increase in traffic has taken place at a much more rapid rate, attaining practically the same percentage of increase in the 4½ years to December 31, 1918, as was effected in the preceding 10 years. The increase in the density of traffic was 32.1 per cent, but in this same period the increase in the proportion of supplementary main tracks to miles of line was only 7.8 per cent, and for sidings and yard tracks only 7.1 per cent. If we are to assume that the relation of the increase in

auxiliary tracks to the increase in traffic density during the period from 1905 to 1914 was normal (and it is safe to assert that it was not above normal), it may be argued that the net increase in miles of multiple main tracks and of sidings and yard tracks should be the same in each period. The following figures shed light on this assumption:

Multiple main tracks built from 1905 to 1914 incl.	14,038 miles
Multiple main tracks built from 1915 to 1918 incl.	3,425 miles
Deficit at end of 1918	10,613 miles
Siding and yard tracks built from 1905 to 1914 incl.	31,793 miles
Siding and yard tracks built from 1915 to 1918 incl.	9,667 miles
Deficit at end of 1918	22,126 miles

A more conservative method of arriving at an estimate is to assume that the average annual increase in auxiliary track mileage during the 10-year period should be the normal increase for the succeeding years.

Average annual addition to multiple main tracks 1905 to 1914 incl.	1,404 miles
Average annual addition to multiple main track 1915 to 1918 incl.	761 miles
Average annual deficit to multiple main track 1915 to 1918 incl.	643 miles
Deficit at end of 1918 (4½ years)	2,900 miles
Average annual addition to siding and yard tracks 1905 to 1914 incl.	3,179 miles
Average annual addition to siding and yard tracks 1915 to 1918 incl.	2,150 miles
Average annual deficit to siding and yard tracks 1915 to 1918 incl.	1,029 miles
Deficit at end of 1918 (4½ years)	4,650 miles

The actual deficit in multiple track facilities at the end of 1918 lies somewhere between the maximum figure of 10,613 miles, arrived at from a comparison of traffic densities, and that of 2,900 miles, based on the construction record of the 10 years preceding 1914. It is evident that the demand for multiple tracks is not directly proportional to an increase in traffic. On the other hand, it is equally evident that the unusually rapid increase in traffic during the last few years makes necessary the construction of a greater mileage of second and third main tracks than was required in the 10-year period used for comparison. For want of a better assumption, the average of these two shortages will be considered to represent the actual deficit. This average is 6,800 miles.

To arrive at the shortage of present siding and yard tracks a somewhat different ratio must be used, since the necessity for these tracks bears a more direct relation to the amount of traffic handled. For this reason it has been assumed that three-quarters of the difference between the two figures should be added to the smaller to give the present shortage of these facilities. This gives 17,800 miles.

If these deficiencies are to be made up in the next three years we must add to these totals the deficiencies for 1919 (say 1,550 miles of main tracks and 4,000 miles of side tracks), plus the normal additions to main tracks and side tracks to be made during the three years 1920 to 1922, inclusive. We will then obtain as the total additional miles to be built in the next three years about 15,000 miles of multiple main tracks and 40,000 miles of additional side tracks and yard tracks.

Taking $40,000 and $18,000, respectively, as the present costs per mile, these additional mileages indicate a required expenditure of over $1,250,000,000 for additional main tracks and yard and siding tracks. This estimated total may be compared with the amounts authorized for this purpose by the United States Railroad Administration. Over $210,000,000 was appropriated for this purpose during 1918 and 1919, and nearly $137,000,000 was actually expended.

It must also be borne in mind that these expenditures were for emergency purposes, under which only such projects were undertaken as could show quick results. This has been true especially of yard construction, which has consisted for the most part of the elaboration of existing layouts. Two large projects for new yards in progress during the war period, namely, the Cedar Hill yard of the New Haven and the Markham yard of the Illinois Central near Chicago, were discontinued after being partly completed.

The Importance of Reconstruction

The question of additional trackage has been discussed first because it is the most tangible, permitting of a more accurate measure of expression in actual figures. However, there are many other phases of the intensive development of the railways, which while not so readily demonstrated, are equally if not more important. Chief among these is the reconstruction of existing lines, primarily for grade and line improvement. It is impossible to make any accurate estimate of the probable amount of such work that could be done with profit. In many instances such work bears a close relation to the construction of double-track and may be done to obviate the construction of second tracks. As an instance under the old Stickney regime, traffic conditions on the Chicago Great Western line from Chicago to Dubuque were assumed to indicate the necessity for double tracking this line, and work was actually started on such a program, but as a consequence of reductions in grade and installations of automatic signals under the present management, it has been possible to handle a much heavier traffic on the single track line than that which was assumed to require immediate double-track construction. However, this is incidental to the real object of grade reduction, namely, greater economy of transportation, a principle that is too well known to require exposition here.

This subject bears an interesting relation to the work undertaken during the war period, particularly that authorized by the Railroad Administration during 1918. Under war conditions the elimination of congestion by increased capacity was the prime object and economy of operation alone was not considered sufficient justification for capital expenditures. As a consequence, practically the only grade reduction work prosecuted during the war was such as was well under way and could not readily be discontinued, or such as was incidental to the provision of additional tracks. For example, a certain amount of grade reduction work was carried on on the Big Four in connection with extensive second track work during the war, but the grade reduction was secondary; the real motive being to provide more trackage.

This calls attention to another reason why considerable grade reduction work, and with it, second-track construction should be undertaken in the near future. Under pressure to increase track capacity as quickly as possible, work has been undertaken, in general, at the most favorable locations, i. e., where the grading was the lightest. This afforded relief for congested single track, but the advantage of such work in increasing the tonnage ratings of locomotives will not be secured until the work is carried to completion for entire engine districts. As an instance, during 1918, a considerable mileage of second track work was done on the Hocking Valley between Columbus, Ohio, and Toledo, selecting those portions of the line where the least amount of work was involved in obtaining a 0.2 per cent grade line for northbound traffic. Among other gaps in the second track as the result of this plan is one between Columbus and Delaware which involves a pusher grade that cannot be eliminated without extensive change in location and while appreciable economies would result from the completion of this work, the nature of it was such as to lead to its postponement until a more favorable time. Considering the construction of additional main track and grade reduction together, extended projects like that carried on by the Chicago, Milwaukee and St. Paul in Iowa, Minnesota and South Dakota during 1912 and 1913 have been conspicuous

by their absence during the past five years. The notable exception to this rule was the improvement of the Southern Railway line from Washington to Atlanta, while in the west the nearest approach to this has been the Union Pacific double-track work in the Wahsatch mountains, in the territory just east of Green River, Wyo., and over Sherman hill. Other work started on the Union Pacific in 1918 in closing the gap in the double track between Evanston, Wyo., and Granger was discontinued on account of the war. This will unquestionably be resumed at the first favorable opportunity and is typical of much other work of a like nature remaining to be done, particularly in the west.

As pointed out in an article on the Rock Island System published in the *Railway Age Gazette* of May 19, 1916, that road is far in arrears in its double track program, and it is not alone in this. The national centralization of war work in the eastern states tended to concentrate the additions to railway facilities in that part of the country, and it is a notable fact that, with the exception of the Union Pacific improvements, very little grade reduction or additional track work has been done in the entire area west of the Mississippi River in the last five years.

That a great amount of work of this character remains to be done is indicated by the fact that one middle western road has recently completed surveys for a new double track line nearly 200 miles long which, while departing radically from the existing location, is primarily a low grade line designed to relieve the present congestion and promote economy of operation. It is impossible to prepare an accurate calculation of the amount of work of this character which should be done, but estimating, in view of past records, that the grades on one-half of one per cent of the mileage of the country should be reduced annually at a cost of $70,000 per mile, the normal annual expenditures for this purpose would approximate $100,000,000. Since only about $5,000,000 has been expended for this purpose during the last two years, it may safely be assumed that not over 20 per cent of the normal appropriations have been made in the last four years. Consequently, the amount which should be expended to promote economical operation during the next three years, including both the normal appropriations for this period and the deficiencies which have accrued, would approximate $600,000,000.

Engine Terminals

Engine terminal facilities have been referred to at some length in the article covering the additions and betterments work of the Railroad Administration. The periodic reconstruction and enlargement of these necessary adjuncts to the operation of railways will always be required as long as traffic increases, locomotives grow larger and operating arrangements are subject to modification. On account of the rapid change in requirements, roundhouses have usually been temporary structures, although construction in the middle west and east during the war period has tended towards more permanent forms of buildings. The general tendency also is to provide more complete facilities. Heating, illumination, water, steam and air service and electric current for power and welding are being installed on a much more elaborate scale than heretofore. The object lesson offered by these modern installations will serve to demonstrate more than ever the inadequacy of some of the older installations, nearly all of which are decidedly lacking in modern facilities. The same argument holds for the outside appurtenances—water service, coal and sand facilities, cinder and inspection pits and yard illumination.

Some of the old terminals permit of extensive reconstruction but railway history goes to show that a considerable proportion of them are so cramped for space that the additional capacity and improved facilities can be obtained only by resorting to new sites. As a consequence, the amount of new construction required is considerably larger than that indicated by the estimated increase in actual capacity necessitated by the circumstances. In other words, engine terminal construction is measured by the increase in engine housing capacity required plus that consequent to a high percentage of retirement. The same condition holds true in large measure of water and coaling service facilities. Increase in traffic is constantly resulting in the obsolescence of existing plants which calls for investments in entirely new facilities.

New shop buildings for the repair of locomotives like those recently completed on the Pennsylvania lines at several points in Ohio and Indiana, on the Union Pacific at Cheyenne, Wyo., on the Baltimore & Ohio at Glenwood, serve to demonstrate what a real shop should be. When it is considered that some of these new shops are equipped with 250-ton traveling cranes capable of hoisting and shifting the largest Mallet locomotives, while some roads are still conducting locomotive repairs in shops that have no overhead traveling cranes of any kind, it is readily understood that there is a large field for new shop construction.

As pointed out in the article on capital expenditures by the United States Railroad Administration, the additions and betterments to engine houses and shop facilities were made under the pressure of extreme necessity. The winter of 1917 and 1918 demonstrated the shortage of such facilities in a manner that was as conclusive as it was terrible. However, the endeavor to improve conditions cannot be said to have been entirely fulfilled. Like all other work done under war emergency, only the most serious cases were undertaken. Because traffic was concentrated in the east, these improvements were largely in the east and many railway officers have expressed the thought that the work accomplished thus far has but a beginning. Under the direction of the Railroad Administration $130,000,000 was appropriated for shop buildings, engine houses, tools and power plants, but little over $100,000,000 was actually expended. This is equivalent to an average of about $50,000,000 a year. It is safe to assume that this amount does not exceed the average annual requirements. Consequently, the expenditures of the next three years would equal at least $150,000,000 plus a deficiency of about $100,000,000 more or a total of $250,000,000.

Little Passenger Station Work Now in Progress

One class of railway construction that has been virtually at a standstill for a long time is that of passenger stations. Only two stations of first magnitude are now being built, namely, the St. Paul (Minn.) union station and the union station at Chicago, and work on both of these structures has only been resumed since the signing of the armistice. The prohibition of work not essential to the conduct of the war was especially severe with structures of this class. Villages, towns and cities all over the country were definitely estopped from demanding improvements of this character, but now that the war is over and with the roads returned to the owners, there is again an insistent call for large expenditures for this purpose. With the approval of the Illinois Central lake front plan at Chicago by the United States War Department, another great project will be ready for actual prosecution. However, the great field for expenditures of this kind will come not from the isolated cases of monumental structures but from the great number of stations of all sizes and classes which will be called for by municipalities the country over. While the railroads will make every endeavor to restrict expenditures for this purpose in order to use the money for more productive improvements, experience has shown that they will be compelled to make generous appropriations along these lines. From a study of the situation, $50,000,000 would seem to represent a conservative average annual requirement, so that normal

expenditures for the next three years plus a three-year deficiency would equal $300,000,000.

In the course of the preceding discussion reference has been made from time to time to various projects that have been deferred for one reason or another, but which must eventually be undertaken as soon as the opportunity affords. Among others may be mentioned the New York Central's Castleton cut-off held up by the "dog-in-the-manager" policy of the people of Albany, N. Y., the Great Northern belt line around St. Paul also involving extensive yard rearrangement, the $100,000,000 New York Central freight development on Manhattan Island and similar developments on the west side of the Hudson. Among projects of a less definite nature there are the proposed terminal unification at New Orleans, the freight and passenger terminals at Cleveland and Cincinnati, and plans for untangling the railway layout at East St. Louis, investigation of which is now under way. But important as these large projects are, the real field for the intensive development of the railroads lies in the smaller projects when considered in the aggregate. The extension of passing tracks, the enlargement of existing freight yards and the closing of gaps in double tracks, taken as a whole will sum up to large totals. The need of these additional facilities on all divisions of all railroads at the present time is as much responsible for the chronic car shortages as the actual deficiency in the number of cars.

Report on Cost of Living Does Not Justify Wage Increase

EXECUTIVE OFFICERS of the railroad shop crafts affiliated with the Railroad Employees' Department of the American Federation of Labor called on Director General Hines on December 20, just before the Cummins bill was passed by the Senate, to discuss, according to a statement issued by the Railroad Administration, "the question of the cost of living," which is taken to mean that they renewed their request for a general increase in wages which has been held in abeyance since August, when the President and Mr. Hines asked them to wait a reasonable time to allow the government an opportunity to try to reduce the cost of living. The representatives of the shop employees at the time announced that they would consider 90 days a reasonable time. According to the official announcement, Mr. Hines explained that he hoped to be able in a few days to give more definite advice on this subject, and it was agreed that a further conference would be held a few days later.

On December 22 Attorney General Palmer issued a statement in the way of a report to the public on the results of the government's campaign against the high cost of living, in which he announced that since August it had been held in check, whereas statistics had usually shown a rise in prices during the fall months and that a drop may be expected between January 1 and March 1. The report, which was authorized by a committee of government officials that have taken part in the campaign, including Mr. Hines, is understood to form the basis of the government's answer to any further wage demands.

The demands of the shop employees were originally presented in January and were based on an increase for skilled mechanics from 68 to 85 cents an hour. Increases ranging from 4 to 9 cents an hour were granted them in August by way of readjustment at the time, it was announced the government could not then consider further increases to meet the cost of living, because they would tend to increase it still further. Most of the other organizations of railway employees also presented demands, which have also been held in abeyance. What position they will take in view of the report that the cost of living statistics do not justify further increases has not yet been disclosed. It was stated on Tuesday that no definite date had yet been set for the conference with the shopmen, but B. M. Jewell, head of their committee, was quoted as saying they had no intention of striking. Mr. Palmer's statement was in part as follows:

"In August, in connection with the demands for increased wages by railroad shopmen, based on the increased cost of living, the President announced to the public the view that the cost of living would be lowered as soon as there were settled conditions of production and of commerce, as soon as the treaty of peace was ratified, and as soon as merchants, manufacturers, farmers and miners had a certain basis of circulations.

"In a statement to the shopmen themselves, the President declared that the primary step was to increase production and facilitate transportation, so as to make up for the destruction wrought by the war and the terrible scarcities created. The President added that the government had taken up with all possible vigor the task of bringing the profiteer to book, making the stocks of necessities in the country available at lower prices, stimulating production and facilitating distribution.

"The movement inaugurated at that time to gain control over the cost of living has been largely in the hands of the Department of Justice. It should be helpful to point out what has already been accomplished and what further steps are in contemplation.

"To assess the situation, it is necessary to look back and ascertain what the trend of prices has been in the past year.

"Taking retail food prices as a basis, the index numbers of the United States Bureau of Labor Statistics from 1911 to 1919 indicate that up to 1919 there has been a noticeable trend upward in such prices in the fall of the year, whereas, since August this year, such retail food prices have been kept practically stationary. By way of illustration, during the period, August to November, inclusive, 1916, there was an advance in retail food prices as indicated by the Bureau of Labor Statistics of 13 points; in 1917, 18 points; and in 1918, 16 points, as compared with no increase whatsoever in the corresponding period of 1919.

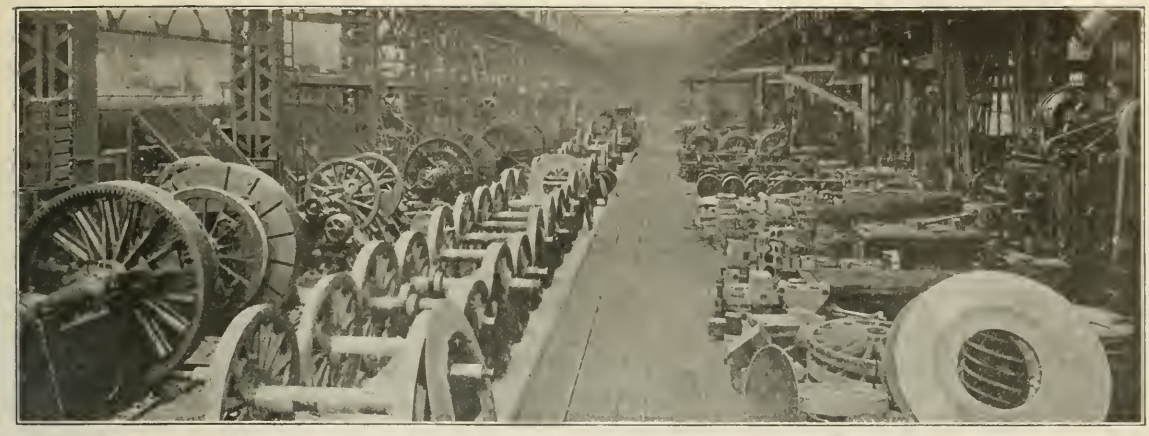
"Considering the four years from 1911 to 1914, inclusive, retail prices show a slight upward trend from September 1 to October 1, a greater upward trend from October 1 to November 1, and remained practically stationary from November 1 to December 1. During the four years from 1915 to 1918, inclusive, retail food prices show a decided upward trend from August 1 to September 1 and to October 1, and a slightly lessened but decided upward trend to November 1 and to December 1.

"This year, during September and October, an actual reduction in the general level of retail prices was effected as compared with August, while the figure for November, although slightly above that of October, shows no increase above the August returns.

"In other words, the official data clearly show the significant fact that the cost of living as indicated by retail prices was no greater in November of this year than it was in August, while during former years, extending back to 1911, the returns for November show a considerable increase over the August returns.

"The history of retail food prices indicates that a decided downward trend ordinarily may be expected in the part of the year between January 1 and March 1, and it is to be hoped that this trend will be accelerated this year by the campaign initiated by the government, which is just now getting well under way.

"The Department of Justice has instituted a thoroughgoing and nation-wide campaign, participated in by thousands of men and women, bringing about regulations in the cost of living through education and through moral suasion."



Lots of Work for the Machines

Shop and Enginehouse Equipment and Facilities

Over $146,000,000 Should Be Spent for Improved Shop Machinery and Equipment in the Next Three Years

RECORDS OF THE RAILROAD ADMINISTRATION show that during the past year 26 per cent of the motive power of the country was held out of service waiting for necessary repairs. This large proportion of unavailable power in 1919 was six per cent greater than that held out of service for the same reason during 1918. The future growth of American industry is absolutely dependent upon adequate transportation, which in turn can be assured only by repair shop facilities sufficient to keep motive power and rolling stock in serviceable condition.

It will undoubtedly be necessary to buy many new locomotives and cars to make up present deficiencies, but it is useless to purchase new equipment without providing the shops and shop facilities required to keep it in repair. Frank McManamy has said that "$10,000,000 expended on shop machinery and equipment before the war would have made government control unnecessary." This is probably an exaggeration, but the freight embargoes and general tie-up of business during the later part of 1917 undoubtedly were due in no small measure to the fact that necessary cars and locomotives were unserviceable. This condition was particularly true in the Eastern district where the congestion presented a most serious problem.

While it is true that the roads are not now confronted with the necessity of transporting immense quantities of war material, the difficulties of the present situation are accentuated by the rapid expansion of business since the signing of the armistice. During the war many of the normal demands and activities of the public had to go unsatisfied, but with the resumption of ordinary business after the war and with inadequate transportation facilities, the situation now confronting the railways is serious and will be increasingly so, especially if the country continues to produce large crops. The only solution is to provide new equipment and arrange for its proper repair, and do it now.

In attempting to make an estimate as to the amount that railway repair shops are behind in their shop and enginehouse equipment, it will be necessary to know how much has been spent for this purpose in the past few years. The shop machinery charge and the ratio of shop machinery to total operating expense for Class I carriers have been plotted over a period of years, beginning with June 30, 1911, as shown on the chart. The statistics upon which the chart is based were compiled by the Interstate Commerce Commission and are not available before June 30, 1911, because previous to that time there had been no subdivision of the maintenance of equipment account into shop machinery and other component parts.

The operating expense account covering shop machinery (Account 302) includes the cost of labor and material necessary to maintain machinery and tools located in locomotive shops, car shops, engine houses, foundries or shops of the buildings and bridges department. The charge includes the cost of repairing and replacing broken or worn-out machines, but new and improved labor-saving machines are charged against capital account. Electric power plant machinery when employed exclusively for operating shop machinery is included in Account 302, but machinery for general purposes, such as heating, lighting, fire protection and water supply are not included.

THE STATEMENT of Frank McManamy that "Ten million dollars expended on shop machinery and equipment before the war would have made government control unnecessary" indicates plainly a weak link in our transportation chain.

Past deficiencies in shop equipment must be made up, equipment must be provided to maintain the existing plant, and to anticipate future needs.

$146,158,000 is a conservative estimate of what must be spent in the next three years for this purpose.

Table I shows the data on which the chart is based. The total operating expenses and shop machinery charge for 1919 are estimated from statistics for the first 10 months of the year. As a means of determining the ratio of shop machinery to total operating expenses in 1918, the statistics

Table I—Statistics for Class I Carriers

For fiscal year ending	Total operating expenses	Account 302 shop machinery	Per cent of total expenses
June 30, 1911	$1,844,065,958	$10,061,423	.546
June 30, 1912	1,898,662,465	10,417,543	.548
June 30, 1913	2,108,947,614	12,182,668	.578
June 30, 1914	2,139,755,988	11,674,904	.546
June 30, 1915	2,021,160,614	8,916,891	.441
June 30, 1916	2,210,892,786	10,295,918	.466
December 31, 1916	2,357,398,412	11,517,657	.489
December 31, 1917	2,829,325,123	14,552,997	.514
December 31, 1918	3,948,132,200	27,520,000	.696
December 31, 1919	4,335,000,000*	30,250,000	.698

*Estimate based on statistics for the first ten months of 1919.

of six representative roads were obtained and are listed in Table II. The total of $6,670,649 spent on shop machinery annually by only six roads gives some idea of the immense market for tools and equipment afforded by American railways. Attention is called to the relatively high percentage which the shop machinery charge bears to the total operating expenses. This was caused by the large increases

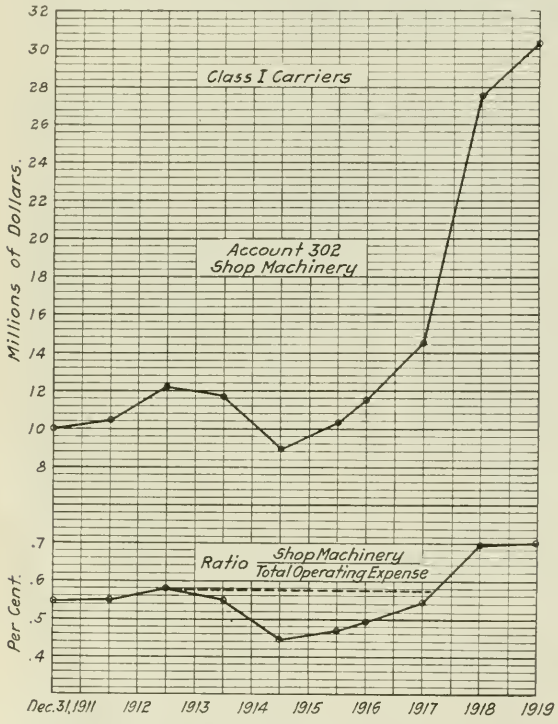


Chart Showing Shop Machinery Expenditures and Ratio of Shop Machinery Expense to Total Operating Expense, Class I Roads, From 1911 to 1919, Inclusive

in labor and material costs during 1918. Based on the relative totals, the ratio of shop machinery to the total operating expenses for 1918 would be .730 per cent, but to be conservative .696 per cent (the average of the individual ratios) is used.

Reference to the chart shows that in the fiscal year ending June 30, 1911, $10,661,423 was spent for shop equipment and to repair and replace worn-out shop machinery. There was an increase to $12,182,668 in the following two years, but for the succeeding four years the shop machinery charge was below normal. It was not only small, but a relatively small proportion of the total operating expense. This failure to keep repair shop facilities up to the necessary standard was due, as previously stated, to the difficulty of securing capital, scarcity of labor and the high prices and scarcity of materials. With the beginning of government control in 1918 capital was available, and the priority given to government orders made possible the purchase of railway equipment. Consequently the shop machinery charge practically doubled during the year 1918, as indicated on the chart. This does not mean, however, that twice as much machinery and equipment was repaired and replaced in 1918 as in former years. The fact is that twice as much money was paid for the usual amount of equipment. A canvass of machine tool builders and other manufacturers indicates that 100 per cent is a conservative estimate of the increase in cost of machine tools and shop supplies since 1916.

Referring to the chart, the ratio of shop machinery to total operating expense in 1911 was .546 per cent. This ratio increased to .578 per cent in 1913 and then, due to causes before stated, dropped below normal for the succeeding four and a half years. During 1918 and 1919 the ratio increased to .696 and .698 per cent, respectively.

There is no question that railroad shop facilities were inadequate even in 1913, and it is probable that in order for them to have increased in proportion with business demands the ratio of shop machinery to the total operating expenses should have increased uniformly from June 30, 1913, to December 31, 1918. If, however, the ratio is considered constant at .578 per cent during this period, as indicated by the dotted line, a conservative estimate of the deficiency in shop machinery during this period will be obtained. The difference between .578 and the actual ratio for any one year multiplied by the total operating expense for the corresponding year will give the difference between the amount of money that should have been spent on shop machinery for that year and the amount that was actually spent. These amounts have been calculated, and their sums

Table II—1918 Statistics of Six Representative Roads

Name of road	Total operating expenses	Account 302 shop machinery	Per cent of total expenses
Atchison, Topeka & Santa Fe	$144,912,375	$884,374	.610
Chicago, Burlington & Quincy	112,067,616	997,507	.890
Southern Pacific	113,652,897	738,237	.650
Chicago, Milwaukee & St. Paul	122,196,105	531,558	.434
Pennsylvania (Lines East)	333,624,523	2,886,760	.865
Pennsylvania (Lines West)	86,550,256	632,213	.729
Total	$913,003,772	$6,670,649	4.178
		Average per cent	.696

are shown in Estimate (a) as $9,835,000. However, the statistics given in Table I, and shown graphically in the chart apply to Class I roads only. The operating expenses of Class I roads are about 96 per cent of the total operating expenses of all carriers, and 4 per cent has been added to $9,835,000, making a total of $10,229,000. But this equipment and machinery should have been bought previous to 1917, and it will now cost 100 per cent more to replace it, which brings the deficiency up to $20,458,000.

During the years 1918 and 1919 the amount of money spent for shop machinery was greater than the average, but the machinery and equipment actually acquired was probably less than normal, due to the depreciated value of the dollar. The amount of money spent during the same period for additions and betterments to take care of increased business was wholly insufficient. The replacement value of railway shop machinery in the United States is $292,200,000. Inasmuch as the annual increase in equipment has been not less than 3.70 per cent and it will require at least 4.2 per cent increase in shop facilities to handle this equipment, the necessary additions and betterments may be expressed

as .042x2x292,200,000=$24,450,000. The total deficiency in shop machinery and equipment up to the present time, therefore is shown in Estimate (a) as $44,908,000.

Maintenance of Shop Machinery

Having determined the deficiency in shop machinery and facilities to date, it is necessary to estimate what repairs and replacements will be necessary in the next three years to maintain the existing plant. Referring to the chart, it will be noticed that in 1919 a total of $30,250,000 was spent on shop machinery. It is probable that this charge will continue to increase in the next three years, due to increasing labor and material costs, but to be conservative it has been considered constant at $30,250,000. Part of this charge goes to labor and should be separated from the strictly material charge. Data extending over a four-year period show that only 67 per cent of the shop machinery charge represents material, the balance representing the labor required to repair and replace the worn equipment. Consequently, as shown in Estimate (b), there is $20,250,000 worth of material in the annual shop machinery charge. This must be increased by 4 per cent to include all roads; and in a period of three years the total estimated amount of material to be bought will cost $64,470,000.

That this figure is not excessive may be shown by a consideration of reasonable depreciation charges for the three-year period. It is true that some shop machinery has been used for 20 years or more, but with the continual modern changes and improvements it is doubtful if any machine will have a useful and efficient life greater than 15 years. This means an annual depreciation of 6.67 per cent, which for three years on an investment of $292,200,000 is $58,500,000. In other words, the estimate of $64,470,000 for shop facilities would hardly do more than cover shop machinery depreciation.

Additions and Betterments

Additions and betterments, being chargeable to capital account, provide the necessary equipment to care for increased business. In order to estimate future needs, it is necessary to examine past expenditures for this account. In the 30 months from June 30, 1914, to December 31, 1916, only $6,063,719 was spent for shop machinery additions and betterments. During the following year $6,000,000, and in the first year of government control $7,698,596 were spent for machine additions and betterments, but that this amount was entirely inadequate for the needs is indicated by the fact that only 35.2 per cent of the authorized additions and betterments were actually made.

In estimating what must be done in the next three years in the way of additions and betterments to shop machinery, it is believed that the most accurate result will be obtained by determining the total value of railway shop machinery in the United States and assuming that this plant must be increased in the same proportion as the increase in equipment made necessary by new business. In the years 1905 to 1915 there was an increase in locomotives of 3.76 per cent and cars 3.70 per cent; but this takes into account only the numbers of cars and locomotives and does not consider their increased weight. Heavier machinery and tools will be required to repair this equipment, and if the equipment increase is assumed at 3.7 per cent per annum the machinery increase must be at least 4.2 per cent.

According to estimates made in 1916, the total value of railway shop machinery in the United States amounted to $146,100,000. Referring to Estimate (c), the replacement value of this machinery in 1919 would be at least $292,200,000. Assuming then that the plant must be increased 4.2 per cent per annum to care for the new equipment, the total investment in the next three years must be $36,780,000.

Conclusions

The total amount of money that should be spent during the next three years for shop equipment and machinery, as shown in Estimate (d), is $146,158,000. This amount is probably less than the actual needs, because every assumption in the calculation was made on the safe side. The magnitude of the result gives some indication of how serious the situation has become. The cost of all materials has practically doubled in the past three years, shop employees' hours have been reduced to eight hours and wages have increased on the average at least 100 per cent. To offset these increased costs and place back into service the locomotives now held waiting repairs, it will be necessary to make up previous deficiencies in equipment and modernize all shops.

Automatic and semi-automatic machinery, for example, should be more generally used in back shops where material is manufactured for the whole system.

Another field that deserves particular attention is the enginehouse machine shop. It would be hard to determine how many locomotives are held out of service and sent to the back shop for light repairs because of inadequate enginehouse equipment.

The material and equipment purchased for railway shops and included in this discussion is of almost infinite variety from belts, air hose, rope and packing to boilers, cranes, welding equipment, lathes, etc. The largest single item is machinery and tools. Approximately 38 per cent of the total material costs are for machinery, which means that during the next three years $54,100,000 should be spent for railway shop machinery and machine tools.

ESTIMATE

(a) Deficiency in shop machinery:		
From June 30, 1913 to December 31, 1917—		
.578 — .546 = .032 × $2,139,755,988 =	$685,000	
.578 — .441 = .137 × 2,021,160,614 =	2,770,000	
.578 — .466 = .112 × 2,210,892,786 =	2,475,000	
.578 — .489 = .089 × 2,357,398,412 =	2,095,000	
.578 — .514 = .064 × 2,829,325,123 =	1,810,000	
	$9,835,000	
Adding four per cent to include all roads	394,000	
Deficiency in shop machinery December 31, 1917	$10,229,000	
Cost of replacing in 1919	$20,458,000	
Deficiency in additions and betterments to December, 1919	24,450,000	
Total	$44,908,000	$44,908,000
(b) Maintenance of shop machinery (for three years 1920-1922).		
Annual shop machinery charge	$30,250,000	
But only 67 per cent is material	20,280,000	
Adding four per cent to include all roads	1,210,000	
Total material to be purchased annually	$21,490,000	
For three years	3	
Total	$64,470,000	$64,470,000
(c) Additions and betterments (for three years 1920-1922):		
Value of shop machinery in 1916	$146,100,000	
Replacement value in 1920	292,200,000	
Annual equipment increase of 3.7 per cent will require 4.2 per cent investment in machinery	12,260,000	
For three years	3	
Total	$36,780,000	$36,780,000
(d) Grand total (a) + (b) + (c)		$146,158,000

Is There a Deficiency in Signal Construction?

Comparison of Conditions for Past Four Years with Ten Years Previous Indicates a Shortage

THE BLOCK SIGNAL mileage (manual and automatic) in operation on the railroads of the United States increased from 44,574.7 miles of road on January 1, 1905, to 96,279.1 on December 31, 1914, or 51,704.4 miles, an average increase of 5,170.4 miles a year, while the total miles of road on which passenger trains operated increased from 151,455 to 193,180, or 41,725 miles between 1907 and 1914, inclusive, an average yearly increase of 5,216 miles. During this period the *automatic* block signal mileage increased from 5,116.3 to 29,600, or a total of 24,483.7, while the manual block system increased from 39,560.5 miles to 66,679.1, or a total of 27,118.6 miles. The number of revenue tons carried one mile per mile of road by all roads increased from 861,396 in 1905 to a maximum of 1,245,158 in 1913.

In contrast with these figures, the block signal mileage increased from 96,279.1 on January 1, 1914, to 99,350.8 in four years. During this time the total miles of road on which passenger trains operated decreased from 193,180 miles to 191,133, or 2,047 miles, as indicated in the Interstate Commerce Commission's tabulation of statistics pertaining to block signals, while the automatic block signal mileage *increased* from 29,600 to 36,593, or 6,993.7, and the manual block mileage *decreased* from 66,679.1 miles to 62,756.9, a drop of 3,922.2 miles. During this period, which covers that of the war and of government control, it is interesting to note that the number of revenue tons carried one mile per mile of road on Class I roads increased from 1,176,923 to 1,717,894, or 540,971 tons.

From a study of the above figures the question may be raised as to whether the block signal mileage has kept pace with the enormous increase in the amount of traffic handled by the railroads during the last four years. This is only one of many different questions confronting railway managements in connection with the future intensive development of their systems, but, because of the importance of block signals in facilitating the movement of traffic, in addition to increasing the safety of operation, it is one that should receive more careful consideration than has been given it in the past. In order to determine the deficiencies existing in this particular branch of railroad service, it will be well to consider the broad term "signaling" under its various subheads, such as automatic block, manual block and interlocking.

Have Automatic Block Installations Dropped Off?

During the 10-year period from January 1, 1905, to December 31, 1914, inclusive, marked progress was made in the installation of automatic block signals, the mileage of road equipped per year varying from a minimum of 1,387.6 in 1908 to a maximum of 4,350.5 miles during 1913. The total automatic block signal mileage installed during the 10 years was 24,483.7, or an average of 2,448.4 miles a year. In this connection it is interesting to note that of the total mileage of passenger lines operated, 7.1 per cent was protected by automatic block signals at the end of 1907, while at the end of 1914 this percentage had risen to 15.3.

Assuming the progress for the 10 years preceding 1915 as normal and comparing it with that for the four years from January 1, 1915, to December 31, 1918, inclusive, as obtained from the records of the Interstate Commerce Commission, we find that the progress in the late years has not been satisfactory. The mileage of road equipped with automatic block signals ranged from a minimum of 1,113.1 miles in 1915 to a maximum of 2,242.2 miles in 1917, the total for the four years being 6,993.7 miles, or only 2,643.2 miles more than was placed in service in 1913 alone. The average mileage installed was 1,748.4 per year, or but 360.8 miles more than was installed during the year of the panic in 1908, the lowest in the preceding 10 years, despite the fact that during this latter period the revenue tonnage handled was greatly in excess of that during the 10 years preceding.

From the above figures the net average annual deficiency in the construction of automatic signal mileage may be assumed to be at least the difference between 2,448.4 miles (the average for the 10-year period preceding 1915) and 1,748.4 or 700 miles, a deficit of 28.5 per cent. Therefore, in order to bring the automatic signal mileage up to that which would have existed if the normal rate of construction of the 10-year period had been maintained, without taking

A DEFICIENCY of 3,500 miles in automatic block signal construction has occurred during the past five years. The next three years should see 10,850 miles of automatic block signals installed to bring facilities back to normal.

Manual block signal mileage reached a maximum in 1914, then began to decline.

261 interlocking plants should be installed during the next three years.

$52,764,000 should be spent on signal work in this period.

into consideration the extraordinarily large increase in revenue tonnage which has occurred within the last five years, it would be necessary to make up a deficit of 2,800 miles which accrued from January 1, 1915, to January 1, 1919. From January 1, 1919, to January 1, 1920, the statistics published elsewhere in this issue indicate that a further deficit of 700 miles has also been created. Therefore the total deficit for the last five years is 3,500 miles. In order to bring the facilities up to where they would be if the normal rate of development were maintained, it would be necessary during the next three years not only to build the normal mileage of 2,448.4 miles per year, but also to make up the deficit of 3,500 miles. This would require the construction in the next three years of 10,847.2 miles. This is equivalent to 3,615.7 miles each year during this period.

Of the total mileage of passenger lines operated on the roads reporting block signals, 15.3 per cent was protected by automatic block in 1915 as compared with 19.1 per cent at the end of 1918. The commission's figures show that the total mileage of passenger lines operated on the road, shown in its tables, decreased from 193,180 miles of road in 1914 to 189,810 in 1916, but increased to 191,133 in 1918. This variation may be due to a number of causes, such as the abandonment of certain lines for passenger service or the discontinuance of operation on certain lines.

The deficiency in signal facilities may be considered from still another angle. A study of the Commission's reports for a period of five years indicates that increases in automatic block signal mileage occurred each year, on an average, on 23 systems. For the 10-year period this would indicate an installation of 106.5 miles per system, while for the last four-year period this has dropped to 76 miles for each

however, there was a net decrease of 517.6 miles in 1908 and another of 1,563.4 miles in 1914. The decrease in 1908 was due largely to the temporary closing of a large number of telegraph offices, while the larger decrease noted in 1914 occurred when the largest mileage of automatic block signaling which has been installed in any one year to date was placed in service, this mileage being 4,350.5, the decrease in the manual block in this year being very largely due to its replacement by the automatic block. During this 10-year period the mileage protected by manual block reached its maximum of 66,679.1 miles in 1914, during which year the total mileage of passenger lines operated also reached a maximum of 193,180 miles. A study of the percentages of passenger mileage operated and protected by non-automatic block during this period discloses the interesting fact that it ranged between 29.3 in 1908 and 34.5 in 1914, a total variation of 5.2 per cent, or an increase of 17.7 per cent, as compared with a variation of automatic block signals of from 7.1 per cent in 1907 to 15.3 per cent in 1914, an increase of 115.5 per cent.

Manual Block Signaling

During the four years from January 1, 1915, to December 31, 1918, inclusive, the total manual block signal mileage decreased from a maximum of 66,679.1 miles in 1914 to 62,756.9 miles in 1918, or 3,922.2 miles. The percentage of the passenger lines protected by this system dropped from 34.5 per cent in 1914 to 32.8 in 1918, as compared with an increase in the percentage protected by automatic block signals for the same period from 15.3 to 19.1 per cent. This decrease in the use of the manual block was evidently due to the replacing of the manual system by automatic

TABULATED DATA SHOWING STATISTICS PERTAINING TO BLOCK SIGNALLING IN THE UNITED STATES

From—	To—	Manual block mileage installed	Automatic block mileage installed	Total mileage (or year (net increase)	Total manual block mileage to date	Total automatic block mileage to date	Total block signal mileage to date	Total mileage (of road) passenger lines operated	Per cent protected by non-auto. block.	Per cent protected by auto block signals	Total per cent protected	Total per cent unprotected	No. systems reporting signal work
Jan. 1, 1905	Sept. 30, 1906	2,355.8	1,710.6	4,066.4	41,916.3	6,826.9	48,743.2	.....	....	....	....	....	...
Sept. 30, 1906	Jan. 1, 1908	5,959.4	3,976.1	9,935.5	47,875.7	10,803.0	58,678.7	151,455	31.6	7.1	38.7	61.3	84
Jan. 1, 1908	Jan. 1, 1909	517.6*	1,387.6	870.0	47,358.1	12,190.6	59,548.7	161,451	29.3	7.6	36.9	63.1	98
Jan. 1, 1909	Jan. 1, 1910	4,162.2	2,047.1	6,209.3	51,520.3	14,237.7	65,758.0	162,526	31.7	8.8	40.5	59.5	102
Jan. 1, 1910	Jan. 1, 1911	2,037.3	3,473.8	5,511.1	53,557.6	17,711.5	71,269.1	172,390	31.1	10.3	41.4	58.6	107
Jan. 1, 1911	Jan. 1, 1912	2,517.2	2,623.4	5,140.6	56,074.8	20,334.9	76,409.7	176,845	31.7	11.5	43.2	56.8	114
Jan. 1, 1912	Jan. 1, 1913	5,656.2	1,883.9	7,540.1	61,731.0	22,218.8	83,949.8	183,461	33.6	12.1	45.7	54.3	119
Jan. 1, 1913	Jan. 1, 1914	1,563.4*	4,350.5	2,787.1	60,167.6	26,569.3	86,736.9	185,986	32.3	14.3	46.6	53.4	127
Jan. 1, 1914	Jan. 1, 1915	6,511.5	3,030.7	9,542.2	66,679.1	29,600.0	96,279.1	193,180	34 5	15.3	49.8	50.2	150
Jan. 1, 1915	Jan. 1, 1916	1,112.0*	1,113.1	1.1	65,567.1	30,713.1	96,280.2	190,812	34.4	16.2	50.6	49.4	152
Jan. 1, 1916	Jan. 1, 1917	196.9*	1,843.5	1,646.8	65,370.2	32,556.6	97,926.8	189,810	34.4	17.2	51.6	48.4	156
Jan. 1, 1917	Jan. 1, 1918	1,214.9*	2,242.2	1,027.3	64,155.3	34,798.8	98,954.1	191,634	33.5	18.3	51.8	48.2	166
Jan. 1, 1918	Jan. 1, 1919	1,398.4*	1,794.9	396.5	62,756.9	36,593.7	99,350.6	191,133	32.8	19.1	51.9	48.1	157
					TOTALS								
Jan. 1, 1905	Jan. 1, 1915	27,118.6	24,483.7	51,602.3	486,880.5	160,492.7	647,373.2	1,387,294	....	....	....	....	...
Yearly average		2,711.9	2,448.4	5,160.2	48,688.0	16,049 3	64,737.3	173,412	....	....	....	....	...
Jan. 1, 1915	Jan. 1, 1919	3,922.2*	6,993.7	3,071.4	257,849.5	134 662 2	392,511.7	763,389	....	....	....	....	...
Yearly average		980.5*	1,748.4	767.9	64,462.4	33,665.5	98,127.9	190,847	....	....	....	....	...

*Decreases.

company. A careful survey of the present needs of individual roads has been made, based upon information furnished by those in close contact with the conditions on the respective lines and taking into account the increased tonnage, as a result of which the conclusion is that an average of 175 miles of automatic signaling should be installed during each of the next three years by each road making such installations in order to bring this type of signal construction back to a normal basis and to provide for the increased traffic. Assuming that the number of roads making such installations is 23, as before, this would indicate that the average mileage which should be installed each year would be 4,025.

From January 1, 1905, to December 31, 1914, inclusive, manual block signaling increased from a total mileage of 39,560.5 to 66,679.1, or 27,118.6 miles. During this period, block and to a decrease of 2,047 miles in the passenger mileage reported in the tables. As long as this passenger line mileage remains nearly stationary, the mileage protected by the manual block will likely continue to decrease in very nearly direct proportion to the increase of the automatic block signal mileage.

An increase in this type of protection may again take place when the passenger line mileage operated begins to increase materially, as the manual block may then be installed on stretches where the traffic density does not warrant the construction of automatic signals. For this reason the installation of this system will not be considered in connection with the present study of signaling required to bring the construction back to normal.

In studying the conditions affecting the construction of interlocking plants, one is handicapped by the lack of proper

statistical data. The Interstate Commerce Commission did, however, attempt to tabulate certain information of this nature in its annual signal statistics for the years 1913 to 1916, inclusive. An analysis of the data for the years 1914 and 1915 shows that of the total number of plants of all kinds 79 per cent were mechanical; 4.6 were electro-mechanical; five-tenths of 1 per cent were pneumatic; 3.9 per cent were electro-pneumatic and 12 per cent were electric. The average number of working levers per plant was 23.6.

Interlocking

The Commission's report for the year ending December 31, 1915, shows an increase of 2,904 working levers over those in service the previous year. Inasmuch as many of these levers were reported by more than one carrier, it is necessary to make an arbitrary estimate of the total number of new levers actually installed. Assuming that three-fourths of the 2,904 levers were reported twice, the total new levers actually installed would be 1,815, distributed as follows: 1,433 mechanical, 84 electro-mechanical, 9 pneumatic, 71 electro-pneumatic and 218 electric. During the same year statistics collected by the *Railway Age* showed a total of 2,595 levers installed, as compared with 2,904 given in the Commission's report, which would indicate that approximately 10 per cent of the new work was not reported to the *Railway Age*.

With the above as a basis, the statistics compiled by the *Railway Age* for the years 1916 to 1918, inclusive, show the following:

Year	Total number levers	Total plus 10 per cent	Total levers deducting duplications	Total mechanical levers 79 per cent	Total electro-mechanical 4.6 per cent	Total pneumatic obsolete	Total electro-pneumatic 4.4 per cent	Total electric 12 per cent	Equivalent number of plants
1916	2,135	2,349	1,468	1,161	67	...	64	176	62
1917	3,628	3,991	2,495	1,971	115	...	110	299	106
1918	3,172	3,448	2,180	1,722	101	...	96	261	92
Totals	8,935	9,788	6,143	4,854	283	...	260	736	260
Ave.	2,978	3,263	2,048	1,618	94	...	87	245	87

The Interstate Commerce Commission's statistics for the year ending December 31, 1916, show a total of 6,101 crossings of Class I and II railways with other steam railways and 2,543 with electric-interurban or street railways protected by gates, flagmen, interlocking devices, etc., while 4,371 crossings with other steam railways and 2,209 with electric-interurban or street railways remained unprotected. The available information from this source is as follows:

	Protected		Unprotected	
	Other steam railways	Electric interurban street rys.	Other steam railways	Electric interurban street rys.
June 30, 1915	5,903	2,491	4,164	2,215
June 30, 1916	6,030	2,497	4,220	2,210
December 31, 1916	6,101	2,543	4,371	2,209
Totals	18,034	7,531	12,755	6,634
Total increase	193	52	207	—6
Increase per year	132	34	138	—4

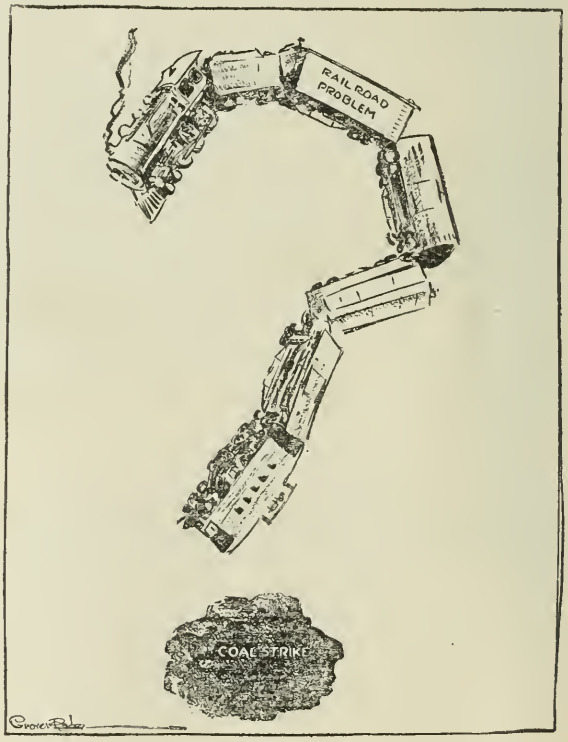
From the above table it would appear that unprotected steam road crossings increased slightly faster than those protected. The table does not include returns for switching and terminal companies, and as it represents the aggregate of figures compiled from the annual reports of Class I and Class II carriers, duplication exists with respect to crossings with "other steam railways," as each such crossing involves two railways; but since Class III carriers and switching and terminal companies are not covered by the compilation the extent of the duplication is obviously less than one-half of the number of such crossings shown.

In considering the above table in connection with the first one, it would appear that the installation of a number of working levers per year equivalent to the number of plants shown as the average per year would be a very conservative estimate of the work needing to be done along this line each year during the next three years.

Conclusions

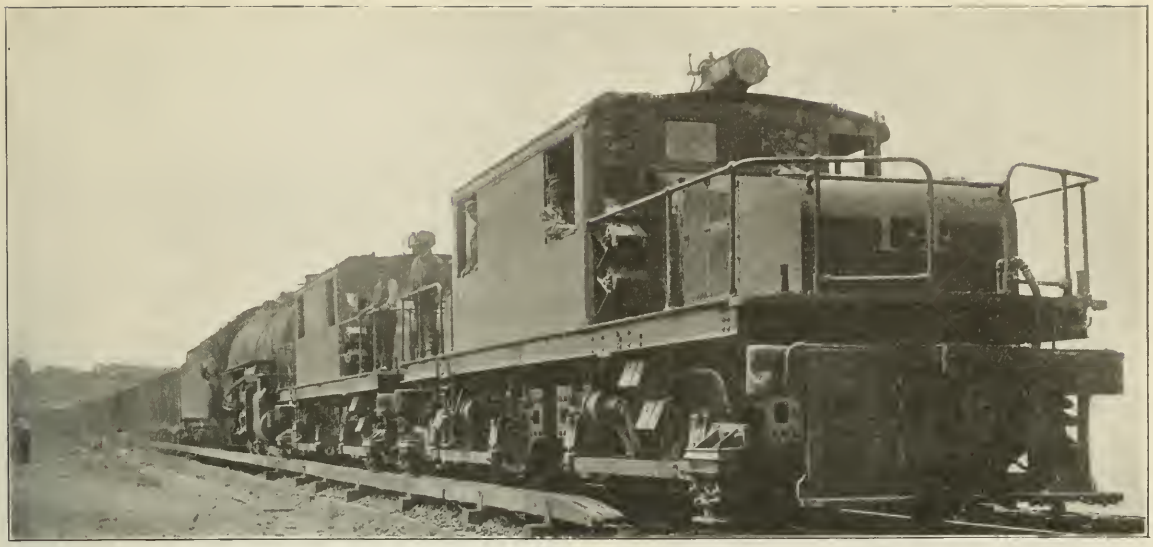
To sum up, the deficit in automatic block signaling which had accrued from 1915 to 1918, inclusive, was developed from two different angles: the deficiency per year during this period as compared with the normal construction during the 10-year period, and from a survey of the present conditions in the field. These methods gave mileages which should be installed each year for the next three years of 3,616 and 4,025, respectively, the average being approximately 3,820 miles. Assuming $3,800 a mile as a fair average present price for such installations, the total amount which should be invested in automatic block signaling each year for the next three years is $14,516,000, a total of $43,548,000.

In considering interlocking construction and taking the average total number of levers installed each year, as shown at the bottom of the interlocking table, it is seen that the estimated total that should be installed during each of the next three years is 2,048. With an average price per lever of $1,500 for all types, this will require an expenditure of approximately $3,072,000 a year. This gives a grand total for signals and interlockings of $17,588,000 a year, or $52,764,000 which should be spent on this class of construction during the next three years. The estimate of expenditures which it will be necessary to make in the next three years, if conditions are to be restored to normal, takes into account signaling only. It does not take into account expenditures which should be made by the railways for highway grade crossing protection.



From the Louisville, (Ky.) Courier-Journal

Harder Than Ever



Electric Locomotives Have Been Handling Trains on the Baltimore & Ohio for 24 Years

Electricity a Help in Intensive Development

Electrical Machinery Will Aid Materially in Increasing Efficiency and Capacity of Railroads

HAULING TRAINS with electric locomotives is one form of intensive railroad development, and the adoption of electric operation is generally based on one or both of two general reasons. First, the difficulties and dangers of steam operation in certain tunnels and terminals may make electrical operation necessary, and, second, where facilities in a certain section prove to be inadequate it may be found cheaper to electrify than to enlarge the existing facilities. Due to the fact that heavy trains can be hauled at higher rates of speed with electric locomotives than with steam, electric operation will in effect enlarge the facilities. This was the fundamental reason for the Pennsylvania's electrification of the Philadelphia terminal. Elsewhere in this issue is an article showing the need of intensive railroad development in this country, a part of which will probably take the form of electric operation.

THE use of electrical equipment on the railroads is increasing so fast that few railroad officers can afford to be without a working knowledge of things electrical.

It is essential that they keep pace with electrical development so that they may know its scope and limitations and in their own fields may be able to judge whether or not a certain application will be possible, desirable or economical.

New Traction Equipment

During the past year, 15 electric passenger locomotives were built for the Chicago, Milwaukee & St. Paul, and work was practically completed for extending the electrification of that road over the division from Othello to Seattle. Five locomotives were also built for the New York, New Haven & Hartford, for operation over the New York Connecting Railroad.

Ten of the new passenger locomotives for the Chicago, Milwaukee & St. Paul are Baldwin-Westinghouse locomotives and five were built by the General Electric Company. Both types are driven by 12 motors, but the method of transmitting the power to the track in each type is very different. In the Baldwin-Westinghouse locomotive power is transmitted from 12 motors to six driving axles by pinions and gears mounted on quills which in turn are connected to the driving wheels. The armatures of the motors on the General Electric locomotives are mounted directly on the 12 driving axles. The old equipment built by the General Electric Company was a spring gear type and consisted of 42 freight and passenger locomotives and four switchers. Some of the 42 locomotives were designed for passenger and the rest for freight service. Those which were designed for passenger service will be regeared for freight service and some of the 42 freight locomotives will be used on each of the two electrified divisions. The five new gearless locomotives are designed distinctly for passenger service and will be used on the Cascade division from Othello to Tacoma and Seattle. The ten new quill-geared locomotives were also designed for passenger service and will be used on the Rocky Mountain division from Harlowton to Avery.

The locomotives built for the New Haven are Baldwin-Westinghouse locomotives and are of the quill-geared type.

They are designed for operation on 11,000-volt, a. c. or 600-volt d. c. current and are similar to former designs except that they are equipped with 12 motors and 6 driving axles and weigh 180 tons. The former locomotives have four driving axles and weigh 120 tons.

Reasons for Electrification

Advocates of electric traction have in the past advanced a great variety of reasons why electric operation should be adopted. Some of these reasons were well founded while others were the extravagant claims of enthusiasts. Probably the best way to decide what the sound reasons are is to see exactly what has been done up to this time. The accompanying table has been prepared for the purpose:

Principal Trunk Line Electrifications in America

Name of road and section electrified	Kind of service	Cause of electrification	Began electric operation
Baltimore & Ohio, Baltimore, Md. Baltimore Tunnels.	Heavy passenger and freight.	Tunnel and terminal.	1895
New York Central New York -Harmon.	Heavy passenger.	Tunnel Terminal, Heavy service.	1906
New York, New Haven & Hartford, New York-New Haven.	Heavy passenger and freight.	Terminal heavy service.	1908
Grand Trunk, St. Clair Tunnel Co. Pt. Huron, Mich., St. Clair Tunnel,	Heavy passenger and freight.	Tunnel.	1908
Great Northern.	Heavy passenger and freight.	Tunnel.	1909
Michigan Central, Detroit River Tunnel, Detroit, Mich.	Heavy passenger and freight.	Tunnel and terminal.	1910
Boston & Maine, Hoosac Tunnel, North Adams, Mass.	Heavy passenger and freight.	Tunnel.	1911
Pennsylvania, Service into New York City Terminal.	Heavy passenger.	Tunnel and terminal.	1912
Butte, Anaconda & Pacific, Butte—Anaconda, Mont.	Heavy freight and passenger.	General economy.	1913
Norfolk & Western, Bluefield—Elkhorn, W. Va.	Heavy freight and passenger.	Heavy grade, tunnel.	1915
Pennsylvania, Philadelphia, Paoli, Pa.; and Philadelphia—Chestnut Hill.	Passenger.	Relief terminal. Congestion.	1915 1918
Chicago, Milwaukee & St. Paul, Harlowton, Mont., Avery, Idaho, Othello, Wash.—Seattle and Tacoma.	Heavy freight and passenger.	Heavy grade.	1915 1919
Canadian Northern, Montreal, Can.	Heavy passenger.	Tunnel and terminal.	1917
New York Connecting, Port Morris—Bay Ridge, N. Y.	Freight.	To reduce congestion and eliminate ferry service.	1918

The reasons as outlined in the table are not the only ones responsible for the adoption of electric traction, but are the apparent reasons. From the table it appears that in the early days where steam operation became undesirable, dangerous or impossible, electric operation was adopted to overcome the difficulties. In some cases this was done without much regard for expense. Now, however it is realized that there are actual economies to be gained in the electric operation of certain classes of service, due to the fact that it provides greater continuous pulling power than steam motive power. It applies particularly where intensive development is required. To gain the greatest economies of electric operation it is necessary to make a comparatively great expenditure for equipment, since not only do electric locomotives cost more than steam units of the same weight, but it is necessary to provide substations as well as an efficient distribution system, to say nothing of power houses and transmission lines if power cannot be purchased directly at the substations.

Actual comparison between steam and electric operation is in favor of the latter for as has been pointed out by C. H. Quinn, electrical engineer of the Norfolk & Western, eight electric locomotives have been doing the work done previously by 28 Mallets on that road. This is due partly to the fact that the hauling capacity per locomotive is increased and partly because the electric locomotives work more hours per day.

On the other hand, total costs of installation are in favor of the steam, and due to the increased interest charge incident to electric operation, there must be a decided saving in favor of the electric to induce conservative financial interests to make the expenditures, or else some other physical advantage must be the deciding factor.

To determine the advisability of electrifying requires very careful and extensive investigation. A form for such an investigation has been compiled by the Association of Railway Electrical Engineers, which will appear in their 1919 proceedings. This form was also published in the October, 1919, issue of the Railway Electrical Engineer.

Reasons for Electrification in Foreign Countries

Electric operation in many foreign countries has received more active consideration than it has in the United States because coal is expensive or unobtainable and water power is abundant. In contrast to this, however, is the proposed

Electric Wiring for Shop Power and Light Should Be a Part of the Building

electrification of the South African Railways. Water power is not available at all times throughout the year in South Africa, but coal at the pit is cheap.

In advocating electric operation for a part of the South African Railways, Merz & McLellan, consulting engineers, outline anticipated results as follows: One of the chief reasons for electrification was the purpose of increasing the capacity of the tracks as they now stand. The investigations were based on a 50 per cent increase in traffic. This is to be brought about by the increase in the average speed at which the trains will be operated and by increasing the train load so that greater tonnage can be hauled with a fewer number of trains. As most of the sections under consideration are single track lines, a reduction in the number of trains and an increase in speed will produce a great improvement in regard to delays at stations.

With the increase in speed, according to the above-mentioned report, less equipment will be required to handle the same amount of traffic. There will be a reduction in the amount of coal consumed, with the accompanying decrease in the number of cars used for the transportation of company coal. There will be an increase in engine mileage; thus fewer electric locomotives will be required. In addition to this, electrification would, on account of increase in speed, and the reduction in fuel consumed, make unnecessary the

purchase of 1,038 new 40-ton freight cars, or their equivalent, which would be required for dealing with the increased demands under steam operation. In regard to the suburban passenger trains operated under the multiple unit system it is universal experience that such improvements in traveling facilities produce a larger volume of traffic, which is due to a growth of the population in the remoter suburbs and to more frequent use of the improved services.

The saving in working expenses according to the study for the South African Railways, involves a comparison of the cost under steam operation of coal, water, wages of train crews, enginehouse expenses, lighting and heating, locomotive repairs, and depreciation; with, under electric operation, the cost of electrical energy; wages of train crews;

Trucks and Tractors Are Available for Many Different Classes of Service

enginehouse expenses; repairs and depreciation of the locomotives and motor equipment; depreciation, maintenance and working expenses of the sub-stations, and the maintenance of the track equipment necessary for electrification. On the four divisions of the South African Railways under consideration the estimated profit for electrical operation amounts to £801,900.

More lines have been electrified in the United States for passenger than for freight service. In England, with the exception of 18-route miles of mineral line which has been electrified by the North-Eastern Railway with great success, all the electrified railways are of the suburban type in that they are worked on the multiple-unit system. These facts make the following quotation of particular interest. In his presidential address delivered before the Institution of Electrical Engineers November 13, 1919, Roger T. Smith spoke as follows:

"It has already been pointed out that this analysis only indicates tendencies, but I think it may be claimed that basing the working costs of each kind of locomotive, steam and electric, on the average train-miles hauled in a year, and placing the known increase in train-miles hauled by an electric locomotive at reasonable figures for passenger and goods respectively, the passenger electric locomotive might have difficulty in earning sufficient revenue to meet all present charges and have enough to spare to pay for electricity and for interest on the electrical equipment, while the goods locomotive could much more than do so, provided in both cases electricity is bought or produced by the railway at ½ d. per kw.-hour at the generating station. I must, however, insist once more that in an analysis of this sort the actual conclusion come to, which is in the form of the weight of passenger train and of goods train (including the locomotive that can be hauled for the same working expenses now necessary for steam traction, has no intrinsic value and if applied to any individual case might be most misleading. All that the figures show is that in a typical case for the same working expenses now incurred by steam traction, electrification is more in favor of goods haulage than of passenger haulage, and among the railway economies necessary to pay the enormously increased working expenses the electrification of goods and especially of mineral lines ought to receive due consideration."

Material Handling Machinery

The term, material handling machinery, on the railroads includes a great variety of equipment from a hand truck to the largest locomotive crane and particularly as applied to the handling of freight, baggage and shop material, its adoption is one form of intensive railroad development. It is at present demanding more attention than ever before, because of the need of intensive development and because by its adoption the capacity of a freight house, a transfer, a pier, or a shop, can be increased. An old facility can be modernized without enlarging or rebuilding it. This last applies particularly to the use of electric trucks and tractors.

The most noteworthy adoption of material handling machinery in this country is probably the installation at Cincinnati, Ohio. All the railroads of Cincinnati have made arrangements with a private operating company for the installation of a patented system of terminal operation. The

All Locomotives Must Be Equipped with Electric Headlights Before July 1, 1920

completed system will consist of a combination of motor trucks, overhead electric traveling cranes and uniform containers, with which will be combined many forms of mechanical handling machinery such as industrial electric trucks, stacking and tiering machines, portable conveyors, etc. Special equipment will also be used for moving cars and it is estimated that the system will ultimately release 66,000 freight cars, previously used exclusively in "spotting," transfer, trap or ferry service.

An even more radical departure in the method of handling freight has been proposed in England and is now receiving consideration by the British government, and this system, known as the Gattie system, would eliminate all of the 74 freight yards in London.

Electric Trucks and Tractors

Electric trucks and tractors are now designed and built for a great variety of services. There are high and low platform trucks, drop frame trucks, various kinds of elevating platform trucks, trucks equipped with rigid and swinging cranes, trucks which perform the function of stacking

Electric Lights Are the Only Kind Adapted to All Kinds of Car Lighting Service

and tiering machines, and tractors for every kind of service. Each kind of truck is designed for a certain class of duty and care should be taken to pick the proper truck for the job. If this is done, remarkable results can be obtained by their use.

The railroads in general are not able to handle traffic

The Building Up of Worn Parts by Electric Welding Reduces Maintenance Expense

as they should and labor, whether or not it is a commodity, is at a premium. As trucks and tractors speed up the movement of traffic, displace labor and can be applied to piers, transfers, shops and storehouses without changing the buildings, it is safe to say that many more will be put into service after the roads are returned on March 1.

Electric Headlights

Substantial progress has been made in equipping locomotives with lights, which will meet the requirements of the Interstate Commerce Commission's orders of December 26, 1916, and December 17, 1917, the effective date of which was fixed as July 1, 1918.

Under the present order, all locomotives must be equipped by July 1, 1920, but unless the work moves forward more rapidly than it is at present, more time will be necessary.

Electric Car Lighting

The amount of car lighting equipment needed by the railroads is dependent largely upon the passenger car requirements. In another article in this issue it is pointed out that there will be 24,500 passenger cars needed in the next three years. As the largest number of cars ever built in one year in the United States and Canada was only 4,412, there will not be an immediate call for 24,500 car lighting equipments. The need will be great, however, for production may be increased and in addition to the equipment required for new cars, there will be a considerable amount required for replacement of straight storage, gas and oil lights.

Electric Welding

Electric welding as a science has developed very rapidly during the past three years. Almost every kind of broken or fractured machinery has been repaired by electric welding and the work of advancement in the science which is needed is to extend and perfect the work. Comparatively few roads have taken full advantage of the possibilities of electric welding. It is significant, however, that when it became necessary to repair the German ships in New York harbor it was only done successfully after railroad officers had been called into consultation and employees had actually been detailed from railroad shops to assist in the work.

Perfection of welding work depends largely upon good supervision and the proper training of operators. If certain general rules are adopted and followed closely, the success of the work is practically assured and it is highly probable that railroad managers will use a greater amount of welding equipment in getting the railroads back to their former standards.

Photo from International Film.

Armored Cars Used to Guard Passenger Trains in Egypt

Clerks in an English Railway Accounting Office

The Needs of the Accounting Department

Struggle to Keep Up with Demands for Statistics by the Management and Federal and State Authorities

FIFTEEN YEARS AGO the accounting department of one of the most important eastern railroads did not have a labor saving device in its offices, with the single exception of one typewriter. This may not have been typical of the great majority of roads, but it was probably representative of a large proportion. The work required was not only far less in volume than it is now, but far less complicated. Clerical labor was exceedingly cheap and in general, plentiful.

Up to the time that the United States government took over the American railroads, station agents and clerical help were relatively among the worst paid classes of employees on the railroads. The findings of the wage commission recognized this fact and the original increase in wages to railroad employees was on a sliding scale, which gave the lowest paid man a higher proportionate increase than the others. As a matter of fact, however, as the wage increases have taken place, one after another, station agents and clerks are not now highly paid, the average monthly wage of clerks in July, 1919, was about $112 when contrasted with men paid on an hourly basis.

This has two implications. The general demand and high scale of wages for unskilled labor make clerical work with its poor pay peculiarly unattractive, and only the least efficient workers, either men or women, are likely to stay in it. In the second place, it means that if the cost of living remains as high as it now is, there is an imminent possibility of some readjustment having to be made in the pay of the accounting forces.

The accounting department is not only a non-revenue producing department, but it is continually after all other departments to reduce expenses with the result that economy is an ideal or an obsession, as you are minded to look at it with the department in its own work.

It must be remembered that on January 1, 1918, a new set of books was opened for each railroad brought under federal control. With the return of the railroads to their owners these books will have to be closed, but the accounts between the federal auditors and the director general on the one hand, and between the director general and the owning corporations on the other, will take years finally to settle. It is the guess of some accounting officers who are in a position to know whereof they guess, that all of the tangled accounts and disputes will not be straightened out within 25 years.

Besides these burdens, arising out of federal control, and falling on the accounting department, there are the continually increasing demands of state and federal authorities. The new classification of commodities which carriers must compile monthly and report quarterly and annually to the Interstate Commerce Commission, for each class, and which must state the number of car loads and the number of tons originating on line and received from connecting carriers, has been increased from 38 to 70. The six monthly operating statistical reports, originated by the Railroad Administration operating statistics section, will in all probability be continued, and will be required monthly by the Interstate Commerce Commission.

Only a few of the many factors which are adding to the work of the accounting department can be mentioned in

> MARCH 1 will bring a flood of extra work to railroad accounting offices, which will require either large additions to the clerical force or the re-arrangement of the work through the more widespread use of labor saving accounting machines.
>
> Making it unnecessary to take on an extra man is as truly an economy as taking off a man.
>
> This result, however, cannot be obtained by waiting until after March 1.

detail. Past experience, however, would indicate that even were there no increase in business, the work of the accounting department would increase about 2 per cent a year and the present outlook is for an even more rapid increase than this, possibly as high as 5 per cent.

Accounting departments are now generally behind in their work. A return of the roads would tend to put them further behind. Piecemeal and temporary additions to the clerical force are both expensive and extremely unsatisfactory, while more careful training of forces implies higher remuneration as well as a considerable period of time before accomplishment can be hoped for. With every department asking for increased appropriations, the accounting department will have to show a particularly good case for any capital expenditures which it may wish to make. But it has a good case.

It is often difficult to prove to an executive officer that the installation of labor saving devices will cut down the payroll. As a matter of fact, because of the steady increase in the amount of the work required in the accounting department it almost never does. Men are not laid off because machines are installed. For this reason, new accounting machines are staved off as long as possible. It is, however, often a weakness on the part of an accounting officer to take on month by month additional employees, rather than to make a stand-up fight for labor saving devices which he feels convinced will eliminate the necessity for additions to the payroll. If the purchase of five calculating machines will make it unnecessary to add three clerks to the payroll this month, two in February, ten in March, and others later, it is short-sightedness indeed to put off the purchase of the machines. If the purchase of a calculating typewriter will permit an agent to get along without an additional assistant, there is just as real a saving, as there would be if, by the purchase of a typewriter, an assistant, already on the payroll, could be dropped.

There are two ways in which this problem can be attacked, and both methods of attack ought to be used. One is from the bottom up. The chief clerk of each division ought to make a study of the particular problems of his division and to lay the results of his study before his immediate superior, and this study should be combined with those made in adjoining divisions, and brought up to the head of the department. This is no new suggestion, of course, but often through timidity or short-sightedness, such a study is not made until an actual emergency arises, and then every one is so rushed as to preclude a scientific study being made at all. The point is that now anyone who is in close touch with the forces at Washington and in the federal and corporation accounting offices can foresee with a reasonable amount of certainty the crisis which will take place on March 1, and present actions should be governed accordingly.

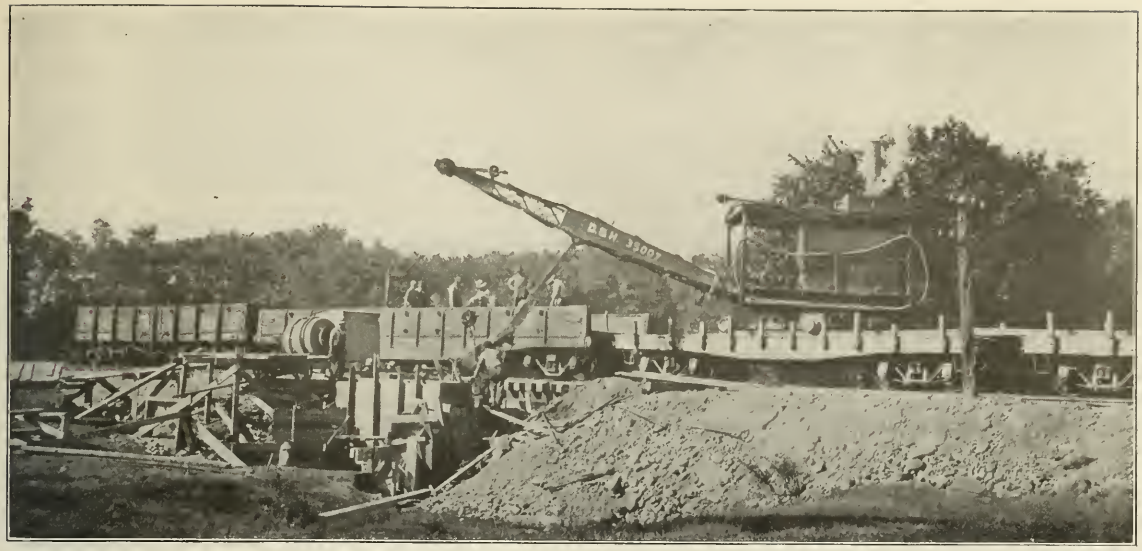
The other method of attacking the problem is to have an outside report made to the executive on the operation of his accounting department. Such an investigation should be welcomed. While it is perfectly true that an outsider cannot fully appreciate the minutia of the difficulties of any one particular office, as well as the man in charge can, the very fact that his eyes view the situation cleared of such detail, gives him an opportunity to make helpful suggestions which may be of great value.

Above all, the Railway Accounting Officers' Association, and the opportunities which it affords for interchange of ideas and the study of other methods, should be made use of.

The secretary of that association is the most valuable clearing house for ideas which the accounting officer of American railroads has. In touch with the work of all of the committees, he is abreast or ahead of the best accounting practices, and is able to perform a service, which if properly availed of, will be invaluable.

Committee on Standards for Locomotives and Cars, United States Railroad Administration

First Row—Seated (Left to Right): J. J. Tatum, general supervisor of car repairs, U. S. R. A.; F. P. Pfahler, chief mechanical engineer, U. S. R. A.; Frank McManamy, assistant director, division of operation, U. S. R. A., and chairman of the committee; John Purcell, assistant to federal manager, Atchison, Topeka & Santa Fe; A. W. Gibbs, chief mechanical engineer, Pennsylvania Railroad. Middle Row—Standing (Left to Right): C. E. Fuller, superintendent motive power and machinery, Union Pacific; F. F. Gaines, Board of Railroad Wages and Working Conditions, U. S. R. A.; W. H. Wilson, assistant to federal manager, Northern Pacific; H. T. Bentley, superintendent motive power and machinery, Chicago & North Western; J. E. O'Brien, superintendent motive power, Missouri Pacific; J. T. Carroll, general superintendent, maintenance of equipment, Baltimore & Ohio. Top Row—Standing (Left to Right): H. Zalkind, stenographer; J. W. Small, mechanical assistant to regional director, Southern Region, U. S. R. A.; E. A. Woodworth, secretary; H. L. Ingersoll, mechanical assistant to regional director, Eastern region, U. S. R. A.



Maintenance of Way by the Railroad Administration

Study of Limited Data Now Ascertainable Indicates That an Appreciable Decline in Upkeep Has Occurred

A STUDY OF THE MAINTENANCE of way practices and policies of the United States Railroad Administration is primarily a study of the practices and policies for the year 1919, for, as a matter of fact, the Administration did not start to formulate any well-defined plan for the upkeep of the properties until late in 1918. For a large part of the first year of government control, maintenance of way work was carried on by the local organizations without any definite plan of administration by either the central or regional offices. It was not until in August, 1918, that arrangements were made for an organization under the direction of C. A. Morse, chief engineer of the Chicago, Rock Island & Pacific, who was given the title of assistant director of the Division of Operation in charge of engineering and maintenance of way. Mr. Morse built up no large central organization, but conducted the affairs of the department largely through the agency of the engineering assistants to the regional directors, most of whom were appointed about the same time. Aside from their administrative duties in the several regions, these engineering assistants also served with Mr. Morse on a general committee on maintenance of way matters.

A large part of the activities of the newly formed organization during the remaining months of 1918 was devoted to the gathering of comparative data on maintenance of way work performed by the railroads during the period of government control up to that time, in the three-year test period and in preceding years. For instance, in November, 1918, a circular was issued to the railroads requiring them to supply very detailed information concerning rails, ties, ballast, tie plates and other physical features of their lines, together with traffic statistics for each sub-division. It was explained that this information was desired as the basis for an intelligent supervision of maintenance work.

This order and some later modifications of it, together with the financial difficulties of the Railroad Administration early in 1919, soon tended to cause some uneasiness among the officers on the individual railways, who concluded that the Railroad Administration was about to institute a drastic curtailment of maintenance expenditures. This led Director General Hines to issue a statement in February, 1919, denying that it was the Administration's intention to pursue a policy of retrenchment and reiterating the government's promise to return the properties in as good condition as when taken over.

However, it soon became evident that the Division of Operation did intend to exercise a much more rigid supervision over maintenance of way expenditures than had prevailed in 1918. Instructions were issued for the roads to submit maintenance budgets in order that they might be considered from a standpoint of their relation to expenditures in previous years. The roads were given to understand that the time required to examine these budgets would not serve to delay the work, but would provide a basis for pushing or

A COMPARISON of maintenance of way conditions today and two years ago presents a most difficult problem.

There are deficiencies in renewals of both rails and ties, but this deficiency is not as marked as had been supposed.

Expenditures for maintenance of way over a period of years are not directly comparable because of decreased value of dollar and reduced efficiency of labor.

All classes of maintenance of way labor are now fully organized.

curtailing the work later in the season if deemed necessary. Several obstacles developed in complying with these instructions so that a number of modifications were necessary and considerable delay was incurred before the information requested could be supplied.

Curtailment Instituted on June 1, 1919

No real issue with regard to maintenance of way policies took place until May 27, when Director General Hines publicly stated that the Railroad Administration was up to its contract obligation in respect to maintenance of way and issued orders tending to prevent excessive expenditures by requiring that the outlay on each road for the month of June should bear the same ratio to the operating revenues as the yearly average for the test period, except that the regional directors were granted authority to depart from this rule where cases of emergency required. This ruling was superseded the following month by specific instructions covering maintenance of way expenditures for the second six months of 1919. Nevertheless, it had already resulted in some radical curtailments of expenditures and considerable reductions in force. Moreover, the new regulations provided definite limitations, and railway officers were given to understand that the programs for the work as outlined were tentative and subject to change from month to month.

This change in the maintenance of way policy of the Railroad Administration from one of most liberal authority by the individual road to a plan for rigid control of expenditures led to a considerable undercurrent of resentment upon the part of railway officers, both federal and corporate, although much of this criticism would have been avoided if the statistical data on maintenance of way had been compiled soon enough to have permitted of the formulation of a maintenance program before the inception of the season's work. Coming in June, at the height of the season, this curtailment was particularly unfortunate.

Condition of Maintenance an Intangible Quantity

The condition of maintenance is an intangible quantity at best, and compliance with the provisions of the compensation contract with regard to maintenance may be subjected to wide variation as a consequence of personal equation. There is no denying that both the Administration and the railway corporate officers have recognized that in any litigation for the recovery of damages for under-maintenance or compensation for over-maintenance, the burden of proof would be on the plaintiff, and furthermore that the facts as to the condition of over or under-maintenance would be difficult to establish. This would seem to explain the common understanding of the Administration's policy with regard to compliance with the provisions of the contract, namely, that in the case of a property in excellent condition, to spend just enough to continue that condition and in the case of a depreciated property it would make expenditures equivalent to those made during the test period as equated for increased costs of labor and material.

The corporate officers of the roads have been reluctant to express themselves publicly with regard to these principles, but the representatives of the Administration, on the other hand, have repeatedly stated their position in no uncertain terms. In the testimony before the House appropriation committee, Mr. Hines evinced a subtle insight into railway management when he said:

> "It has been the tradition of the subordinate official, as against his own superior officer, or as against anyone else, that he wanted to maintain his property just as well as he could, and if he could maintain his property better than the corporation wanted it maintained, he would do it, because he just naturally wants his property in the best condition he can have it, and I take it that the subordinate officials will be just as anxious to do that under federal control as they were under private control and that they will spend all the money on maintenance that they can get to spend."

Mr. Hines also said that he thought that the railroad companies had fallen into two or three errors.

> "They assume," he said, "that the standard contract obligates the government to put into the property each year of federal control, on an average, the quantities of material and labor that were put into the property on an average per year during the test period. This is not the case," he declared. "The obligation is to turn the property back in substantially as good condition, and it will be practicable on many railroads to do that without expending as large quantities of labor and material as were expended during the test period on an average, and where it is practicable the government does not have to put in a larger amount. The provision that the same quantities of labor and material may be used is not an obligation, but is an option which the government may take if it is more favorable than the other standard."

No Definite Statement Can Be Made

Whether or not the roads are now in as good condition as they were on January 1, 1918, is a question not to be answered by anything short of a most thorough investigation. As aptly stated by one railway officer, "No ordinary inspection, such as could be made by riding over the road, would indicate a decided difference in the standard of maintenance under federal control and that of the test period." The true answer is one that cannot be forthcoming until some time after federal control has ceased. It is, therefore, necessary to rest content with such facts as are now available on the tangible accomplishments of the Administration.

Expenditures for maintenance of way during the period of federal control have been much larger than those for any other corresponding period. In 1918, Class I roads spent $649,595,710 for maintenance of way as compared with $442,109,862 and $421,775,812 for the calendar years of 1917 and 1916, respectively. For the first nine months of 1919, the outlay for maintenance on Class I roads was $575,122,124 as compared with $459,627,192 for the corresponding months of 1918 and $311,096,000 as the average for the first nine months of the test years. Expressed in percentages, the 1919 expenditures were 25 per cent and 85 per cent greater respectively than those for the corresponding period of 1918 and the test period average.

These enormous differences are accountable entirely or at least in large measure by the marked advances in wages and increased costs of materials, and one plan of the Railroad Administration officers in charge of maintenance of way has been to develop factors to represent these increases so that they might be applied to the expenditures as a means of obtaining a more workable basis of comparison between the expenditures during federal control and those of previous years. Railway corporate officers are inclined to the opinion that such factors do not tell the whole story unless some allowance is made for the decreased efficiency of labor at present and for the larger percentage of non-productive time under the eight-hour day.

The Rail Renewals

With the possible exception of the question of ties, the subject of rail renewals has probably given rise to more differences of opinion and criticism of the Railroad Administration than any other single phase of maintenance of way, but from the facts available it would seem that this had been largely brought about through a lack of definite information on the real status of the rail situation and a misunderstanding of the Administration's motive. From the data presented below, it would appear that the roads as a whole are not as far behind in the rail renewals as had been supposed.

At the time that the roads were taken over by the government, there were orders from the railways on the books

of the mills for 2,333,190 tons of rails, while the roads had 462,529 tons of rail on hand. Priority of other materials for the rolling capacities of the mills made it possible to obtain delivery on only 1,212,618 tons in 1918. During that year the roads laid 1,111,638 tons of new rail, leaving a stock on hand at the beginning of 1919 of 563,509 tons and orders for rails undelivered to the amount of 1,120,491 tons. With such a large tonnage still undelivered there was not much occasion for the Administration to place orders for considerable additional tonnage, but on May 17 one order for 200,000 tons was placed and in November a second order for 41,000 tons was awarded. During 1919, the mills made deliveries to a total of 1,161,491 tons, leaving an undelivered tonnage at the end of the year of about 200,000 tons. It is estimated that about 1,350,000 tons of new rail have been laid in maintenance of way during 1919 so that there will be a stock on hand at the end of the year of about 375,000 tons.

The significant figures in the above are the laying of 1,111,638 tons of rail in 1918 and 1,350,000 tons in 1919 together with a reduction in the stock of 462,500 tons minus 375,000 tons, or 87,500 tons. The performance in laying should be compared with the following statistics for past years.

Average amount of new rail laid for maintenance in seven-year period 1,405,857
Average amount of new rail laid for maintenance in ten-year period 1,377,569
Average amount of new rail laid for maintenance in three-year test period 1,328,316

From an inspection of these figures it is clear that the test period is not a fair basis for determining the deficiency of rail renewals at the present time, and, as there is no reason to assume that the renewals during the seven-year period preceding the test period were excessive, this seven-year period would appear to offer the best standard for comparison. On this basis, the average deficiency for the test period is 1,405,859 tons minus 1,328,316 tons, or 77,543 tons, which amounts to 232,629 tons for the three years. A similar computation gives a deficiency of 294,221 tons for 1918 and 55,859 tons for 1919, or a total of 350,080 tons for the two years of federal management, not including the decrease of 87,500 tons in stock. If we are to assume that the tons of new rail laid in the second half of 1917 (i. e., the twilight zone between the test period and the period of federal control) is one-half of the annual average for the test period, then the total deficiency in rail renewals at the present time is 232,629 tons plus 38,771 tons plus 350,080 tons, or 621,480 tons.

The Tie Situation

A discussion of the tie situation at the present time and of the practices of the United States Railroad Administration with respect to tie purchases and tie renewals must be essentially a discussion of the work of Forest Products Section of the Division of Purchases, United States Railroad Administration, for this body, in co-operation with the regional purchasing committees, virtually controlled the tie from the time that it was delivered by the "hacker" until it was ready for placing under the rail. Organized long before the maintenance of way activities of the Administration, it played an important part in federal control and its activities have been subjected to much adverse comment.

The Railroad Administration has been severely criticised for instituting a plan under which the producers were confronted with the necessity of disposing of their product according to the terms offered by a single important purchaser. Whatever objections are raised with respect to the methods pursued by the Forest Products Section, the conditions in the early days of 1918 pointed definitely to the need of a central organization, for with the demand far exceeding the supply in sight, the roads were bidding against each other for what ties were to be had, with the result that the prices rose rapidly and there were frequent complaints of the non-delivery of orders placed at lower prices, presumably because the contractors were disposing of their stocks on more favorable terms.

It has been contended by the tie contractors that the complete revision of practices which was brought about caused such an upheaval in the industry as to effect a most distressing influence on production. The Administration forces have inferred that the only class to suffer was the jobber or middle man and that the real producer, whether large operator or small, was fairly treated. They have also maintained that their plan offered the only feasible arrangement that would insure a fair distribution of the available supply and obviate gross exploitation of the roads.

The activities of the Forest Products Section were not limited solely to the procurement and distribution of ties. The section was also called upon to supervise the distribution of timber preserving material. There is no question but that these measures made it possible to obtain a larger output from the treating plants than would have been possible with the available supply of materials controlled by a limited number of treating companies. In this connection the section also drew up and put into effect a set of standard specifications covering the more common used processes involving the use of creosote and zinc chloride and combinations of the two.

What Has Been the Result

The production of ties in 1918 for use on the roads under government control, according to figures issued by the Forest Products Section, was considerably less than the normal production, the total being 65,499,720 ties. Based on totals complete to November 1, 1919, the estimated production of ties for the second year of government control is 94,775,000 ties. The stock on hand at the beginning of government control was 44,420,691 and, owing to the limited production during 1918, this stock had been reduced by the end of that year to 36,556,400 ties. With the increased production during 1919, it is estimated that the supply on hand at the end of that year was something over 50,000,000. In the case of treated ties, the number subjected to preservation in 1919 is estimated at 55,000,000, while the number of ties on hand awaiting treatment on November 1 was 21,805,220.

In the matter of insertions in track the following table shows the renewals for 1918 and the estimated renewals for 1919 in comparison with the renewals of the three test years and the averages for the ten-year period.

Record of Ties Inserted on Roads Under Federal Management

Ten-year average		92,293,395*
Test period average		94,835,443
1915	year ending June 30	101,931,879
1916	year ending June 30	98,211,454
1917	year ending June 30	84,610,248
1918		86,400,021
1919	(to November 1 76,580,185)	85,000,000 (Est. for the year)

*The total "average test period" includes 84 small roads with 6,847 miles and 1,625,896 ties, which roads do not enter into the total "average ten years" because of incomplete reports.

Since the average for the ten-year period, as explained by the footnote on the table, is not directly comparable with the rest of the table, obviously it cannot be used as a basis of comparison, and since there is no reason to believe that the tie renewals during the test period were excessive, the average for the test period would seem to offer the only available basis for comparison. This would indicate a deficiency in tie renewals during the two years of government control of about 18,000,000 ties, to be adjusted on the basis of a comparison between the stock of ties on hand at the beginning and the end of government control. This deficiency, however, does not express the full extent to which tie renewals are in arrears, for by examining the table it

will be noted that the renewals for the last year of the test period were very low, and furthermore no account is taken of the six months from June 30, 1917, to January 1, 1918, during which time the renewals presumably were not made at a greater rate than during the preceding year.

The discussion above has been based entirely on a comparison of quantities, whereas there has been no little comment on the tie situation with respect to the qualities. One of the most pronounced influences of the Administration's plans for tie allotments was to effect a very pronounced change in the distribution. During the past two years many roads have inserted in the tracks ties of species which never before were used in the particular locality.

One of the most notable cases of this was the shipment of a large quantity of Douglas fir trees to the eastern states. As a consequence of these circumstances there can be no question but that a considerable number of ties have been sent to sections of the country having climatic conditions not conducive to longevity of non-native timbers. It is also a fact that those roads which have been the best organized in the purchase, distribution and care of ties had their methods very largely upset by the government interference. On the other hand, the Forest Products Section's organization for the inspection of ties has resulted in a uniformity of quality the country over never before obtained, and it is certain that the roads which have normally followed rather loose practices with regard to the inspection and procurement of ties have been forced to accept a better quality of ties during the past two years than they formerly received.

While the centralized purchase of ties is undoubtedly an unworkable arrangement under private management of the roads, many of the practices introduced by the Forest Products Section can well be retained, and it is hoped that those roads which have been receiving a better quality of ties than they did under private management will profit by the lesson of government control.

As to Labor

Maintenance of way labor gained decisive victories in 1918 through the wage advances, the recognition of its organizations and the establishment of working rules as a part of the supplements to the general wage order. Labor activities in 1919 may well be compared to those of an attacking force which, having gained in its objective, devotes its energies to the strengthening of its position. All class of maintenance of way employees, including those of the grade of foremen, are now thoroughly organized in most parts of the country. This has been manifested publicly by the two-weeks' conference of the Brotherhood of Maintenance of Way Employees and Railway Shop Laborers at Detroit during the month of September and officially through the conclusion of an agreement between this same organization and the United States Railroad Administration on a set of rules and working conditions made effective on December 16.

In certain districts the new union has endeavored to emulate the practices of the older brotherhoods in railway service, and division officers are being compelled to devote a considerable portion of their time to hearings of grievance committees. Fortunately these tendencies are not general.

In spite of increased wages, shorter work days and recognition of the unions, employment in the maintenance of way department seems to be little more attractive today than it was three years ago. It may be that the shortage of help and the lowered efficiency so prevalent in this department is but a local manifestation of a national condition and that it cannot therefore be ascribed to any peculiarity of the management obtaining on the railroads during the last two years. Whatever the cause, there is no phase of maintenance of way work that offers a greater field for improvement than that represented by employment and personnel.

Gridiron Satire

THE FAMOUS GRIDIRON CLUB of Washington, D. C., presented a birdseye view of our experiences in government control at its annual dinner recently. Members of the club, principally Washington correspondents, took the parts of the actors in brief skits which "gridironed" many topics now occupying the attention of the public, among them the railroad problem.

The railroad skit dealt with "unscrambling the railroads." The actors represented William G. McAdoo, former director general; Director General Walker D. Hines, and an investor. The "gridironing" follows:

McAdoo—"The late Mr. Hogan said that you cannot unscramble scrambled eggs. He was wrong. By the excercise of a little magic, to which we modestly lay claim, we shall illustrate how the railroads of the United States may be scrambled and then in the twinkling of an eye, as it were, and so to speak unscrambled again. Can any one loan me a silk hat? I shall return it promptly and entirely undamaged."

(Man steps forward with silk hat. He is Mr. Investor, a well-known citizen.)

McAdoo —"I shall return it with its pristine beauty untarnished."

Investor—"Please be careful. That hat represents the sale of a Liberty Bond."

McAdoo—"Tut, tut—have no fear—we shall not hurt it in the slightest. I shall break this egg into the hat—so—" (breaks and drops egg and shell into the hat).

Investor—"Oh, my hat!"

McAdoo—"Tut—tut—sir. Have no fears. Trust me. Kindly turn your back. What you don't see won't annoy you. Now we take another egg and break it—so. Now we take some flour—add some coal—pour in some of this agreeable variety of ketchup—add a little sand—and finish with a dash of vinegar. Please don't groan, Mr. Investor. It is all right. All these ingredients are symbolic, gentlemen. Now we have the roads scrambled. This completes my part of the trick. I shall now pass the buck—I mean the hat—to my friend, Mr. Hines, who will, in his magic way, with a few passes produce the beautiful rabbit known as government operation and control, and return the hat undamaged to my good friend, Mr. Investor." (Investor groans.)

Hines (looks and glares at McAdoo)—"I am deeply indebted to Mr. McAdoo for his trust and confidence. I wish he had finished the trick. He hates the limelight and likes to retire while the retiring is good. But to the trick, gentlemen. Let me first cover the hat for esthetic and olfactory reasons. It is a little messy." (Covers hat with handkerchief, seizes wand.)

Hines—"I now make these mysterious passes—so—saying the cabalistic words—Hocus-pocus—1920—Brotherhoods—As Taught Me by Mr. McAdoo. Then I quickly raise the cloth and there we have—" (starts back, looking nervous). "Ah, I see, Mr. McAdoo forgot something. Let me add the Plumb plan." (Drops three plums and breaks another egg. Investor groans and tears his hair.)

Hines (continuing)—"Now we have it. Hocus—pocus—1920—presto." (Takes up handkerchief, looks—starts back, rushes to McAdoo, saying:)

Hines—"My God, Mac, I can't do the trick."

McAdoo—"That's your affair—not mine."

Investor—"My hat, my hat!"

McAdoo—"Give him back his hat."

Hines—"But this mess—what will I do?"

McAdoo—"Oh, hand it back. He can't kick."

Hines—"Here you are, sir." (Hands hat to Investor, who takes it and yells:)

"Investor—"What a mess! Oh, my hat! I can't use it. I can't clean it. I can't sell it. I can't give it away."

McAdoo and Hines—"Take it up to Congress. They'll fix it for you." (Both link arms, bow and go off.)

Photo from Keystone View Company.

Inclined Electric Railway Running to Corcovado at a Level of 1249-ft. Near Rio de Janeiro, Brazil

A Review of the Policies of the Railroad Administration

Special Emphasis Has Been Placed
on Those Features
Which May Be Used to Advantage
Under Private Operation

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Walker D. Hines, Director General of Railroads, United States Railroad Administration

Walker D. Hines
Director General

W. T. Tyler
Director, Operation

T. C. Powell
Director, Capital Expanditures

T. C. Prouty
Director, Accounting

Henry B. Spencer
Director, Purchases

Two Years of Government Operation

Results Appear More Favorable If Not Contrasted with Predictions of Government Ownership Advocates

E. Marvin Underwood
Director, Law

Edward Chambers
Director, Traffic

IF THE GOVERNMENT'S CONTROL of the railroads during the past two years had not been preceded and for a considerable time accompanied by such extravagant predictions as to its success by the advocates of government ownership, who viewed it in the light of a panacea for all the real and fancied evils, difficulties and inconveniences which attend the transportation business, and by those who with the practically unlimited powers conferred upon them by the federal control act foresaw such great possibilities from the unification and standardization of a railroad system of 260,000 miles, the popular verdict as to its accomplishments might now be somewhat more favorable than it is. All indications point to an overwhelming desire on the part of the American people, except that part represented by the railroad labor organizations who have reasons of their own for demanding that railroading by approporiation be continued, and one or two of the more radical farmers' organizations that for some reason have seen fit to support them, to have the railroads returned to private operation as speedily as possible. It is

Max Thelen
Director, Public Service

Swager Sherley
Director, Finance

W. S. Carter
Director, Labor

G. G. Tomlinson
Director, Inland Waterways

Brice Clagett
Asst. to Director General

apparent, however, that the spirit in which the opinion that private management should be restored is expressed is somewhat different from that in which the same idea was being voiced a year ago.

After a year of operation by the Railroad Administration, the sentiment against government railroading, on the part of those who were directly or indirectly affected without having a detailed knowledge of the situation, was largely inspired by disappointment and surprise that the government had failed to make good on the advance notices of the government ownership propagandists. Instead of huge savings resulting from unification, such economies as were effected were swallowed up in wage advances or in other war-time increases in the cost of operation. Instead of reductions in rates a large advance was required and was promptly put into effect. Instead of better accommodations for shippers and passengers the service, except to the most essential war industries, was deteriorated both by the necessity of giving preference to essential freight and by the growing shortage of facilities, while patrons of the railroads felt the effect of a lack of the former solicitude for their wants or requirements which resulted from centralization and lack of competition.

Instead of keeping labor satisfied the open-handed policy of a director general, who was generally recognized as a presidential candidate, seemed merely to inspire fresh demands. Some criticism of the Railroad Administration undoubtedly even resulted from the fact that it was less susceptible to political influences than some people would have liked, as certain governors and other state and municipal officers had occasion to learn, because those responsible for the operation of the railroads found it necessary to retain as their subordinates men who knew more about railroading than about politics, and the few politicians in the organization were not readily accessible on all occasions. Railroad officers on many occasions derived considerable satisfaction from being able to inform public officials that something they wanted would be grossly discriminatory.

While some of these manifestations of government railroading have continued into and through 1919 there has been a marked change in the situation. Instead of an aspirant for political preferment we have had as director general of railroads a trained railroad executive who has fully appreciated his responsibility and duty as a government officer and who had advanced sufficiently high in his own profession to be independent of any influence not commended by his own judgment. The task laid upon Mr. Hines was an entirely different one from that which faced Mr. McAdoo. While the former director general was given charge of the railroads for the purpose of getting the highest degree of efficiency out of them for war purposes, and while he assumed the additional burden of trying to revolutionize and reform them at the same time, Mr. Hines' job has been that of trying to restore normal conditions and to render an adequate railroad service day by day.

If he has not succeeded in overcoming all the objections to government operation which took form during the tenure of his predecessor, there are some at least who are beginning to recognize that even the government cannot make bricks without straw; cannot increase wages without increasing rates without incurring a deficit, and cannot furnish a 100 per cent car supply at all times without having money to buy new cars from time to time. There are, of course, many others who are fully convinced by this time, if they were not before, that the government is not organized to make the best bricks with what straw it has and that with the best intentions and the greatest ability a director general cannot make unlimited capital improvements when Congress both delays and reduces his appropriations.

If two years of government operation have brought these lessons home to the American people it will doubtless have accomplished as great a reform as Mr. McAdoo ever intended. There was a time when a large element of the public doubtless believed the claim of the railroad employees that their wages were inadequate, but the same people objected vigorously to the increases in rates which were needed to pay the wages demanded by the most highly organized employees. Those who complained most bitterly about car shortage were usually the same men who were loudest in demanding that the Interstate Commerce Commission keep down the freight rates when the railroads asserted they could not raise sufficient new capital under existing rates.

And when railroad officers tried to point out some of these facts they were told that if they could not increase wages, add to their facilities and at the same time reduce rates they had better step aside and let the government do it. It is not necessary to accuse the Railroad Administration of extravagance and gross inefficiency to point out that it has failed to fulfil the predictions made for it.

If the deficit of the Railroad Administration as compared with the standard return has been greater in 1919 than in 1918 it has been because the wage increases ordered in 1918 did not show their full effect last year, because they necessitated further readjustments which added large sums to the payroll, because the volume of traffic has been smaller than in 1918, and also because Mr. Hines and the President adopted the policy of refusing to take advantage of their power to advance freight rates on the ground that the deficit due to the falling off in traffic following the armistice should properly be charged off as a part of the war cost, and that it was preferable for the government to pay the deficit from the treasury for the time being rather than do anything to increase the cost of living during the readjustment period. Therefore the work of bringing up the rate level to its proper relation to the scale of expenses has been left for the companies after the return of the roads, although Mr. Hines has offered the assistance of his traffic department in making the necessary studies.

The year 1918 in the railroad business was one of reorganization, scarcity of labor and materials, and of emergency operation to keep up with the demands of the war machine and of the new methods incident to the policy of reorganization, unification and standardization, which was carried to such lengths that to many it appeared that the government intended to keep control of the railroads indefinitely. The past year has been one of readjustment and of effort to restore something like normal conditions, although the proposed reconstruction which was so much talked of a year ago has been mainly postponed as to the railroads as well as in other directions.

Successful Transportation Service the Object

When Walker D. Hines was appointed director general of railroads on January 1, after having served for a year as assistant director general, he issued a statement to the public in which he announced his policy in part as follows:

"From the first day of government control of the railroads I have been part of Mr. McAdoo's administration, and it will be my purpose as director general to carry forward the policies he has so ably put into effect—fidelity to the public interest, a square deal for labor, with not only an ungrudging but a sincere and cordial recognition of its partnership in the railroad enterprise, and fair treatment for the owners of railroad property and for those with whom the railroads have business dealings.

"Until the signing of the armistice the government's first railroad duty was to run the railroads to win the war, but now that the war has been won the government's railroad

job is to render an adequate and convenient transportation service at reasonable cost. There can be no greater civic triumph in time of peace than the performance of a successful transportation service for the 100,000,000 producers, consumers and travelers in this country. To participate in the achievement of this great object I invite all railroad officers and employees with whom I have had the great privilege of co-operating in their splendid war work."

The performance of a successful transportation service has been the one object toward which Mr. Hines has constantly and conscientiously striven. As far as his description of Mr. McAdoo's policies is concerned, he has followed them faithfully, although some of those he did not mention were perhaps allowed to fall into the background and were supplanted by those of Mr. Hines' own making. He has not introduced many innovations, as is indicated to some extent by the fact that while Mr. McAdoo in 1918 issued 57 general orders, the latest issued by Mr. Hines was No. 65, although he has, of course, issued a number of amendments or supplements to previous orders.

Appropriation Delayed and Reduced

One of the first steps taken by Mr. Hines after he became director general was to try to straighten out the finances of the Railroad Administration by obtaining some money with which to pay its bills and to assist the railroad companies in financing necessary additions and betterments. Whereas Mr. McAdoo started out with the cash on hand of the railroad companies and a revolving fund of $500,000,000 and did not have to square his accounts with the railroad companies before he left office, Mr. Hines was immediately faced with the necessity of asking Congress for an appropriation to cover the deficit and to provide funds for capital improvements. On January 24 he sent to Congress, through the Secretary of the Treasury, an estimate of $750,000,000, and when Congress failed to pass the bill and a later estimate was submitted it was necessary to increase the amount to $1,200,000,000. The reduction of this amount to $750,000,000 made it impossible to carry out even the modest program of capital expenditures that had been delayed by the failure of the first appropraition bill. The amount and character of the capital improvements made during the year, as far as shown by the available reports, is given elsewhere in this issue.

No new cars or locomotives were ordered during the year by the Railroad Administration. In fact, not quite all of the equipment ordered in 1918 has been delivered, because the failure of the appropriation bill made it necessary to slow up the manufacture. During the early part of the year cars were not needed and the equipment already ordered was being delivered faster than the railroad companies wanted to accept it. Moreover, the uncertainty of the government's tenure prevented making plans for the future. Designs had been prepared for standard stock, refrigerator and general service cars, and designs have recently been completed for a standard caboose; if the appropriation had been promptly granted some cars of these types probably would have been ordered. An order for 200,000 tons of rail was placed during the spring, and during the fall arrangements were nearly completed for placing another order for 200,000 tons, but after the steel strike was called only 41,000 tons were ordered.

State Commissions and Shippers Conciliated

Another of the first steps taken by Mr. Hines to indicate that he was trying to restore normal conditions was the creation of a separate Division of Public Service, of which Max Thelen, former president of the California railroad commission, was made director, and the undertaking of negotiations for the purpose of improving the relations with the state commissioners, which had been somewhat neglected during 1918. It was announced that the scope of the Division of Public Service would be to deal with the relationship between the public, including the shippers, and the Railroad Administration and the railroads under federal control.

After conferences with the state commissioners Mr. Hines announced that it would be his policy to cause their orders to be carried out as to matters of local service, safety and equipment, although he insisted on retaining the responsibility as to rates, because he was responsible for the revenues. The state commissioners were disposed to insist on their right to settle intrastate rate matters, but an agreement was reached providing for a test suit before the Supreme Court, and although the case was decided in favor of the director general his attitude of seeking the co-operation of the state authorities resulted in the removal of considerable friction.

Immediately after the armistice Senator Cummins had introduced a bill to restore the rate-making authority of the Interstate Commerce Commission for the deliberate purpose of preventing the Railroad Administration from making another summary increase in rates, and the bill was promptly passed in the Senate, but by the time the House got around to considering it Mr. Hines had indicated so plainly his intention of proceeding considerately and of working in co-operation with the Interstate Commerce Commission as to important rate matters that the House allowed the bill to be delayed, and after the President had vetoed it very little interest was displayed in the matter. However, the fact that the bill was pending was one of the reasons given by Mr. Hines for not taking up a rate advance, and it is perhaps possible that if it had not been proposed his course would have been different.

Relations with the shippers were also improved in many ways by the earnestness displayed by Mr. Hines in endeavoring to remove the causes for complaint which resulted from the rather hasty adjustments that had been put into effect following General Order No. 28.

Efforts to Restore Normal Conditions

One of the early moves made by the Railroad Administration in the direction of the restoration of normal conditions was the issuance of a circular in February by W. T. Tyler, director of the Division of Operation, directing a relocation of freight equipment more nearly in accordance with ownership than had been practicable during the continuance of the war conditions. This provided to a greater extent for the use by the owners of equipment of their accepted standards and also for the return of cars to the owning road for rebuilding, the application of betterments and repairs. Later on the distribution of cars and the issuance of embargoes by the Car Service Section was decentralized to a considerable extent by being placed more directly under the jurisdiction of the regional directors, and in general much more opportunity for "railroading at home" was afforded than had been the case in 1918.

On March 1 and at various later dates orders were issued which had the effect of restoring pre-war conditions by undoing to some extent the "scrambling" of the railroads which had been done the year before by restoring parts of several large systems to the regions in which their principal lines were located and regrouping many lines that had previously been put under the same management with some of their competitors. This regrouping was particularly manifest in the Southwest.

Railroad corporation officers were very anxious to have the Railroad Administration take some measures to restore to its former channels traffic that had been diverted to other lines during the war. It does not appear that very much was done along this line except to restore to shippers a large

degree of their former control over the routing of their freight, not by direct order but in practice, by refraining from placing restrictions upon the routing except for special reasons.

At the earnest request of shippers the war-time demurrage rates were reduced to the old basis, effective on August 1.

Passenger Service

Passenger service, which had been greatly curtailed during the war, which had been the cause of many complaints, was considerably improved during the year both by restoration of trains that had been taken off and by the restoration of parlor cars and observation cars and of the a la carte dining car service on many trains in place of the standardized table d'hote meals. A limited amount of advertising for passenger service was also undertaken. The marked shortage of passenger coaches and of Pullman cars continued, however, as there had been little addition to these classes of equipment for several years, and during the early part of 1919 the troop movement incident to the demobilization of the army was as great, if not greater, than it had been during the war.

The handling of the troop movement, under the direction of the Troop Movement Section, has called forth a large amount of praise from those who have been most familiar with the accomplishment. From May 1, 1917, to December 1, 1919, a total of 15,724,058 soldiers were moved by the railroads, making a total of over 7 billion passenger miles.

Traffic

Whereas in March the number of surplus freight cars was greater than had ever been recorded, in October the volume of freight traffic was the largest ever recorded for a month, reaching a total of 40,343,750,000 net ton miles, an increase of 1.3 per cent over October, 1918, whereas that month had shown an increase of 3.5 per cent over October, 1917.

For the eleven months period ended November 30, 1919, the net ton miles of revenue and non-revenue freight aggregated 361,331,207,000, as compared with 403,367,933,000 in the corresponding period of 1918, a decrease of 10.4 per cent, and as compared with 395,382,053 in 1917. The net ton miles per mile of road per day in the first eleven months of 1919 averaged 4,689, as compared with 5,227 in the corresponding period of 1918, and 5,180 in the corresponding period of 1917. The train miles decreased 11.8 per cent as compared with 1918, but the total car miles decreased only 6.6 per cent. The average number of unserviceable freight cars was 7.2 per cent of the total as compared with 5.8 in the corresponding period of 1918, and 5.7 in 1917.

The net ton miles per mile of road per day in the first eleven months of 1919, as compared with 1918 and 1917, were as follows:

	1919.	1918.	1917.
January	4,275	3,878	4,770
February	4,002	4,591	4,511
March	4,059	5,273	5,192
April	4,134	5,471	5,257
May	4,524	5,226	5,617
June	4,615	5,423	5,694
July	4,878	5,487	5,441
August	5,075	5,691	5,351
September	5,625	5,731	5,217
October	5,651	5,584	5,385
November	4,711	5,155	5,298
Eleven months	4,689	5,227	5,180

The number of passengers carried one mile is shown thus far only in the reports for nine months, during which time it aggregated 34,949,294,185, an increase of 6.7 per cent over the corresponding period of 1918. Preliminary reports for October indicate a substantial increase in October, 1918.

Car Supply

During the first part of the year, because of the falling off of traffic after the armistice, a very large surplus of freight cars accumulated, amounting in March to about 500,000. By September 1 this had given place to a car shortage, and during July and August there were numerous complaints of local shortages, particularly of open top cars. While the statistics of car surpluses and shortages have not been given out regularly, Max Thelen, director of the Division of Public Service, stated in an address recently that there was a shortage on November 1 of 57,160 cars. This compares with a surplus of 91,691 cars on November 1, 1918, and a shortage of 141,466 on November 1, 1917.

The heavy loading and prompt release of cars which increased the efficiency of the car supply in time of war was not continued during 1919, after the patriotic impulses inspired by the war had become somewhat cooled and after the regulations of the Food Administration requiring heavy loading had expired. For the eleven months ended November 30, the net ton miles per loaded car averaged 27.8, as compared with 29.2 during the corresponding period of 1918, and 26.9 in 1917. This, naturally, had a tendency to pull down the record for increased trainloading, but for the eleven months period the average net ton miles per train mile still showed an increase from 682 in 1918 to 693 in 1919. In the corresponding period of 1917 the average was 656. The average car miles per car day for the eleven months period was only 23.2, as compared with 24.8 in 1919 and 26.6 in 1917, but this average was brought down by the large number of idle cars in the early part of the year. For October the average was 27.3 as compared with 26 in October, 1918, and 25.9 in October, 1917.

Bad Order Cars

One of the points on which the Railroad Administration has received criticisms during the year has been the large number of bad order cars. During the early part of the year, when business was at a low ebb and when every effort was being made to reduce expenses, the cars needing repairs began to accumulate. Shop hours, which had been kept at 60 to 70 a week during the war, were reduced to 48, partly to reduce expenses and partly to relieve the heavy strain under which the men had been working. Later as traffic began to pick up the hours of the car repair forces were increased in the effort to put the equipment in shape for the heavy grain and coal traffic, but the strike of the shop employees interfered, and for a time there was considerable complaint. From August 16 to November 15 the number of bad order cars was reduced from 228,549 to 130,833, but these figures probably do not tell the entire story of the condition of the equipment.

Preparations for Return

After the President's announcement in his message to Congress in May that the railroads would be returned at the end of the year the Railroad Administration began to make some preparations for the return, and for several weeks recently, even after the question of the date became uncertain, it has been proceeding on the assumption that it might be expected to terminate its work on that date. Therefore, many preparations were made with that end in view.

Effective on October 1 per diem settlements for the use of freight cars were restored, in accordance with the code of per diem rules in effect July 1, 1918, with some exceptions. This was done in order to promote the policy of getting cars relocated on home lines to a larger extent, in accordance with the wishes of the corporate officers.

Also the regional and district traffic committees were instructed to clear their dockets of pending subjects, so far as possible, before the expiration of federal control. Instructions were issued to see to it that all contracts for purchases provided for freeing the government from any obligation after the date of its relinquishment of the railroads.

In anticipation of the early return of the roads efforts have recently been made both by the companies and by the administration to expedite the work of reaching agreements with the railroad companies on their compensation contracts, as is indicated by the list of contracts published elsewhere in this issue, which shows that approximately $750,000,000 of the $940,000,000 of annual rental has been covered.

Some of the more recent steps in the direction of preparation for the relinquishment have been the following:

An inventory of the property taken over by the government was ordered to be taken and brought up to December 31. It will now be necessary to extend this to March 1.

Conferences have been held with the American Railroad Association and with the corporate officers in an effort to decide which of the practices or organizations developed by the Railroad Administration shall be retained.

Effective December 1, the provisions of several general orders relating to passenger accounts were cancelled, and the practices in effect on December 31, 1917, relating to the apportionment of revenue from interline passenger traffic were reinstated.

Many of the provisions of the order relating to the use of universal interline way billing also were modified in order that the freight revenues at the end of federal control might be restated and allocated between the director general and the companies in a manner comparable to the stating and allocation of freight revenues at beginning of federal control.

An entirely new function was imposed upon the Railroad Administration by the strike of the bituminous coal miners. Because of the paramount need of the railroads for fuel if other consumers were to be supplied at all, and because it had a nation-wide organization and had had the foresight to make plans for meeting the crisis, while the organization of the Fuel Administration had been practically disbanded, the Railroad Administration was designated as the agent of the Fuel Administration and placed in charge of the allocation and distribution of coal. This task it seems to have performed with a marked degree of success, although, as was to be expected under such circumstances, it was not possible to please every one. The effect on the railroad earnings of the loss of traffic caused by the strike and of the extra expenses incurred in dealing with it have not yet been shown by the complete reports. One effect was to scatter again many of the open-top cars which efforts had been made to return to the owning roads in preparation for the relinquishment of federal control.

Numerous changes in the personnel of the Railroad Administration were made early in 1919, chief of which were the appointment of six new directors of divisions, including two new divisions. C. R. Gray and R. S. Lovett resigned in January as directors of the divisions of operation and of capital expenditures, respectively, and were succeeded by W. T. Tyler and T. C. Powell. Max Thelen was appointed director of the new Division of Public Service, succeeding to part of the duties formerly performed by C. A. Prouty, who remained as director of the Division of Accounting, and later in the year Swagar Sherley succeeded John Skelton Williams as director of the Division of Finance, while H. B. Spencer was made director of the new Division of Purchases. E. M. Underwood succeeded John Barton Payne as general counsel. Two of the regional directors also resigned during the year, A. H. Smith and C. H. Markham, and were succeeded by A. T. Hardin and L. W. Baldwin.

A considerable part of the Railroad Administration's central organization at Washington will have to be retained for some time after the relinquishment of its control over operation to wind up its affairs, settle its accounts and adjust disputes with the railroad companies, of which there will be a large number growing out of the contract provisions relating to the upkeep of the properties and to the expenditure for capital improvements. While the operating department will be considerably reduced, it is probable that the accounting and legal departments will have to be increased to take care of the work that will fall upon them. It is understood that Director General Hines will retain his office for some time to direct the readjustment.

The Gare de Lyon in Paris

Board of Railroad Wages and Working Conditions: Seated, Left to Right, F. F. Gaines, A. O. Wharton, W. E. Morse; Standing, Left to Right, G. H. Sines, J. J. Dermody, C. E. Lindsay, and J. A. Emmart, Secretary.

Wage Increases Under Government Control

Payroll Increased by a Billion Dollars, Eight-hour Basic Day and Time and One-half for Overtime Granted

WHETHER IT BE REGARDED as a development resulting from federal control or merely as one of the past two years, the railroads are being returned to private operation with a payroll about a billion dollars greater than that of the last year of private operation and under circumstances which give promise of little opportunity for any reduction. The principles of the eight-hour basic day and time and one-half for overtime also have become generally established throughout the railroad service. Because the increases in wages have been made by the Railroad Administration, it has become common to refer to the larger payroll costs as having been imposed by the government, although it has become apparent that the higher wage scale has become an almost universal phenomenon and that at least a very large part of the increase would probably have resulted under any form of management.

Moreover, it has recently become more clearly appreciated that the wages allowed by the Railroad Administration have not been substantially more generous than those paid to many other classes of workers, and in fact there are many examples of much larger increases in other lines of industry, notably in the steel industry, than were awarded by the Railroad Administration. While the wages of railroad employees were increased by the Railroad Administration, it is probably more correct to say that they have been the result of a general governmental policy rather than of any individual policy of the Railroad Administration, because the policy of the government to pay and to encourage high wages in the war industries and the general competition thus created has necessarily affected the wages paid in railroad service.

TWO YEARS of government operation have left the railroads an expensive legacy in the form of wage orders and agreements.

The shorter working day has resulted in an increase of 190,000 in the number of employees in service.

Pay roll cost per ton mile has greatly increased.

The average wage advance since 1915 has been about equal to the increase in the cost of living.

Regardless of the responsibility for the condition thus created, however, the effect on the railroads is the same and in this connection the manner and method by which the new wage scales have been put into effect are of greater importance than the question of responsibility. It is probably true that if the wage scales for large classes of employees had been continued to be fixed by individual roads or groups of roads the results might have been different from those resulting from the method of dealing with wage scales on a national scale and under a policy of standardization which has produced some extreme results in many cases, but the fact remains that the wages have been made as they have and in such a way that it will be most difficult to readjust them.

The Esch bill, passed by the House on November 17, contains a provision which was referred to as one for the adjustment of labor disputes in the future, which was frankly accepted as having been proposed by and having the full approval of the railroad labor organizations, which goes so far as to confirm for the future all acts and orders of the

Railroad Administration affecting hours, wages and conditions of employment, but it is manifest that this provision was completely overlooked by a large number of those who voted for it, and there is little prospect that it will be adopted by the Senate.

The fact that railroad wages were dealt with on a national scale, which ran into such large figures as to attract wide publicity, for a long time gave the impression that the employees were being dealt with much more generously than other classes of labor, but recent statistics indicate that this is not the case as far as organized labor is concerned and that the average increase in railroad wages since 1915 has closely approximated the increased cost of living during that time, about 73 per cent.

Eight-Hour Day Requires Increased Number of Employees

There has been another prevalent fallacy regarding the increase in the number of railway employees which has led some usually well-informed persons to discuss the situation as if they thought that the railroads were taking on so many men that they were standing in each other's way. This view was emphasized by the fact that the disclosure of the increase in the number of railroad employees followed only a short time after the issuance of publicity by Director General McAdoo, which gave the impression that the railroads were greatly handicapped by the shortage of labor and that the results being attained were being attained only by a great increase in the efficiency of labor. As nearly every one in touch with railroad affairs recognized that labor was becoming less efficient instead of more so, it was easy to believe that the increase in the number of employees was unnecessary, but as more detailed statistics have become available it is seen that while more employees are now used for a similar amount of work, the increase in employees has resulted largely from the necessary effect of the introduction of the eight-hour day, and while the number increased from December 17 to July 19 by 11.2 per cent, the number of hours worked was actually 3.9 per cent less, and the total compensation increased 36 per cent.

Of course, the eight-hour day was allowed by the Railroad Administration to large classes of railway employees who had not formerly enjoyed it, but it was not responsible for the introduction of the principle in railroad service. The eight-hour basic day was granted to the train service employees by the Adamson law at the insistence of President Wilson in 1916 as a means of averting a threatened strike, and an eight-hour day was granted the shop employees in the southeast by arbitration in 1917, but the Railroad Administration has extended it gradually to practically all classes of railroad service and has strengthened it by accepting the principle of time and one-half for overtime, which now applies to all classes, although not to the extent demanded by the labor organizations. Both the eight-hour day and time and one-half for overtime were being very generally adopted in other classes of employment during the war, particularly those engaged in production for the government.

Effect on Pay Roll

It is difficult or even impossible to calculate the exact effect on the payroll of the increases in wages made during the control of the railroads by the Railroad Administration because the amount of the wages depends so greatly on the volume of traffic, the number of men employed and the number of hours they work, and all of these factors, as well as the wage scales themselves, have been changed before the expiration of a full year. Director General Hines, in testifying before the House appropriations committee in June, estimated that on the assumption that the business of 1919 and the number of hours of work would correspond to those of 1917 the increase in wages over those in effect in December, 1917, would amount to $852,000,000. During the spring of 1919 additional increases estimated at $67,500,000 a year for the train employees and others were allowed; in August the shop employees were given additional increases estimated at about $48,000,000 a year, and Mr. Hines' recent proposal to allow time and one-half for overtime in freight train service is estimated at $36,000,000 a year.

These figures alone would produce an annual increase of approximately one billion, but with a heavier business than that of 1917 the amount would undoubtedly be increased. For the first part of this year the business was substantially below that of 1917, but since September 1 it has exceeded it and most of the available wage figures are for the first half of the year. While additional increases have been made in 1919, the effect of the previous increases has been lessened by the reduction in the volume of traffic and by the campaign to reduce expenses, which has resulted in a reduction of the number of hours worked by many classes of employees.

Average Wage Increase 56 Per Cent

Based on comparisons between December, 1917, and July, 1919, Director General Hines reported to the Senate on November 14 that the average percentage of increase in the unit of compensation for all railroad employees was 53 per cent, which would be increased to approximately 56 per cent by including the shopmen's increase not yet reflected in the figures, but that because of the reduction in hours the average increase in monthly compensation was 32.9 per cent, or 35.3 per cent, taking into consideration the shopmen's increase. The wages in December, 1917, were, however, on a higher basis than the average for that year because of the large number of increases made by the railroads during their last year of private management, and the increase for July, 1919, over the average for 1917 was given by Mr. Hines as 45.3 per cent. The average for July, 1919, was $121.50 as compared with $89.83 in December, 1917, and $83.64 in the calendar year 1917. A $32 increase per month for 1,894,000 employees would amount to only about $720,000,000 a year.

The following table shows the fluctuations of the total railroad payroll by months since January, 1917. The figures were compiled by the Railroad Administration, but there is a slight discrepancy in the comparisons because the figures for 1917 are for the Class I roads while those for the later years are for the Class I roads under federal operation, and about $4,000,000 a month should be added to the figures for May, June and July, 1919, for the back pay to the shop employees:

1917	1918	1919
$128,000,000	$165,000,000	$230,000,000
121,000,000	157,000,000	204,000,000
133,000,000	169,000,000	211,000,000
137,000,000	166,000,000	207,000,000
144,000,000	172,000,000	218,000,000
145,000,000	258,000,000	215,000,000
145,000,000	228,000,000	226,000,000
152,000,000	252,000,000	.....
146,000,000	261,000,000	.....
154,000,000	264,000,000	.....
153,000,000	247,000,000	.....
156,000,000	246,000,000	.....
Total..1,718,000,000	$2,593,000,000	$1,511,000,000

It will be noted that the average monthly payroll in 1917 was about $143,000,000, while in 1918 it was about $216,000,000, which is approximately the average for the seven months of 1919. The early months of 1919 are, however, those in which the business was lighter than in 1918, while by October the traffic had exceeded that of 1918. The figures for 1919 and 1918 are not comparable by months because most of the wage advances made last year were retroactive and amounts chargeable to the earlier number accumulated in the later months.

The increases in wages made by the Railroad Administra-

tion during the period of federal control have undoubtedly far exceeded the original expectations of any of those who had anything to do with fixing them. Originally intended to offset the increases in the cost of living which resulted from the conditions created by the war, the manner in which they were made and the increases being made in other lines of industry necessitated further readjustments in an upward direction, but at the same time the increases that were being made to labor generally undoubtedly had a large part in causing further increases in the cost of living, so that the final results in general can hardly be called disproportionate to the increased cost of living.

Railroad employees have recently been demanding further increases to keep pace with the cost of living on the ground that they have not had enough for that purpose, but their arguments are usually based on the increase in wages during the past two years as compared with an increase in the cost of living since 1913 or 1914.

Director General Hines stated in August that the pay of many subdivisions of classes of railroad employees had been so advanced as to be ahead of the highest point yet reached in the general average increase in the cost of living.

Effect of Wage Increases in 1918

The effect of the wage increases in 1918 is strikingly illustrated in a table published in the annual report of the Interstate Commerce Commission, which shows that the compensation paid to employees in 1918 was 65.62 per cent of total operating expenses, whereas from 1908 to 1917 it had fluctuated from 59.48 to 62.11 per cent. The compensation paid to employees per ton mile (including passenger miles reduced to a ton-mile basis) was 4.932 mills in 1918, whereas the highest point it had previously reached was 3.499 in 1914. The operating expenses per ton mile averaged 7.516 mills in 1918 as compared with 5.516 in 1917. The table follows:

RELATION OF LABOR COMPENSATION TO TOTAL OPERATING EXPENSES AND TO TRAFFIC, 1908-1918

Year ended	Railway operating expenses	Operating expenses per ton-mile[2]	Compensation paid to employees[2] Total	Per cent of operating expenses	Per ton-mile[1]
		Mills			Mills
June 30, 1908..	$1,710,401,791	5.596	$1,035,437,528	60.54	3.388
1909..	1,650,034,204	5.390	988,323,694	59.90	3.228
1910..	1,881,879,118	5.346	1,143,725,306	60.78	3.249
1911..	1,976,331,864	5.593	1,208,466,470	61.15	3.420
1912..	2,035,057,529	5.599	1,252,347,697	61.54	3.445
1913..	2,249,277,937	5.544	1,381,334,368	61.41	3.404
1914..	2,279,408,486	5.775	1,381,117,292	60.59	3.499
1915..	2,088,682,956	5.576	1,242,319,254	59.48	3.317
1916..	2,277,202,278	5.101	1,403,968,437	61.65	3.145
Dec. 31, 1916..	2,426,250,521	5.142	1,506,960,995	62.11	3.194
1917..	2,906,283,165	5.605	1,783,214,071	61.36	3.439
Dec. 31, 1917[3]..	2,829,325,124	5.516	1,739,482,142	61.48	3.391
1918[3]..	[4]3,971,810,155	7.516	[5]2,606,284,245	65.62	4.932

[1] Including passenger-miles reduced to a ton-mile basis. Mail and express traffic not included in ton-miles.
[2] The compensation is the total pay roll as reported. The proportions chargeable to operating expenses and to capital account, respectively, can not be distinguished.
[3] Class I roads only.
[4] Excludes expenses of companies whose properties are under Federal control.
[5] Excludes compensation of corporate organizations whose properties are under Federal control.

Eight-Hour Day and Time and One-Half for Overtime

While the Railroad Wage Commission was strongly disposed to a standard day, in so far as the nature of the service would permit it, its judgment was that the existing hours of service should be maintained for the period of the war and that the existing rules and conditions of payment should not be disturbed. In issuing General Order No. 27, however, Director General McAdoo said he was convinced that no further inquiry was needed to demonstrate that the principle of the basic eight-hour day is reasonable and that "all further contentions about it should be set at rest by a recognition of that principle" as a part of his decision. Recognition "of the principle of the eight-hour basic day in railroad service" was therefore made in the order, but the question as to what further steps could and ought to be taken to strengthen the application of that principle was referred to the Board of Railroad Wages and Working Conditions.

The train service employees had already been given the eight-hour basic day by the Adamson law, so the increases in wages awarded them by General Order No. 27 were net increases, but as to the employees whose basic day had previously been more than eight hours, the increased compensation established by the order was applied to the number of hours which had theretofore constituted the actual day's work. Where the actual day's work had been 10 hours, the new compensation covered the eight basic hours and two hours overtime and any additional overtime was to be paid pro-rata.

Under this order any reduction in the actual hours worked would tend to reduce the amount of the increase in pay, and, while the provisions of General Order No. 27 were later suspended by supplemental orders which gradually applied the principle of time and one-half for overtime, the effect was shown in the fact that while the increase in the unit rates of compensation in July, 1919, as compared with December, 1917, was 56 per cent, the average increase in the monthly earnings of the employees was only 36 per cent. While there was an increase of about 190,000 or 11 per cent in the number of employees, the number of hours worked was a decrease of 3.9 per cent. This condition will undoubtedly be changed to some extent, however, as the later supplements allowing time and one-half for overtime become effective. And the fact that the men did not receive the full amount of the increases allowed them by reason of the fact that they worked less hours than formerly has undoubtedly been one of the reasons for their dissatisfaction and their repeated demands for further increases.

In presenting their demands for an eight-hour day the organizations usually stipulated that they be given the former 10 or 11 hours' pay for eight hours' work, and while the general increases awarded them as an offset against the increasing cost of living may have given them the impression that they were getting what they asked, the later reductions in hours that were made when business fell off after the armistice presented the case in a different light.

The fluctuations in the total number of railway employees have been as follows:

October, 1917	1,733,115	March, 1919	1,823,220
December, 1917	1,703,748	April, 1919	1,830,093
October, 1918	1,855,911	May, 1919	1,864,561
January, 1919	1,848,774	June, 1919	1,863,741
February, 1919	1,840,197	July, 1919	1,894,287

While there has been a large increase in the number of employees, as a whole there have been considerable decreases in some classes, particularly in the train service employees. The largest increase shown is in the number of section men.

The following table, compiled from figures included in Director General Hines' report to the Senate, shows the increases or decreases in the number of employees by classes in July, 1919, as compared with December, 1917, and also the increase or decrease in the average hours worked per employee.

Wages and Earnings in July, 1919

Very elaborate statistics showing the wages, hours of employment, and daily, hourly and monthly earnings of railroad employees during the first seven months of 1919 as compared with December, 1917, and the calendar year 1917 were furnished to the Senate on November 14 by Director General Hines in response to a Senate resolution. These statistics were published in the delayed issue of the *Railway Age* for November 7 (published December 8, 1919). They show that the full effect of the increases in rates of pay had not been felt in the average monthly earnings, at least for the month of July, because of the reduction in hours

of work, but the effect in a month of heavier traffic might be different.

National Agreements

Another development of the labor policy of the Railroad Administration has been the execution of national agreements covering rules and working conditions, with the shop craft unions and the organizations representing the maintenance of way employees. The general order issued by Mr. McAdoo early in 1918 forbidding any discrimination against labor organizations tended to encourage the growth of many of the minor organizations and the policy of the administration has been to deal with the employees through their organizations almost exclusively. This has led to a very rapid increase in the membership of some of the organizations that formerly had very little strength and to their amalgamation in some instances, and the signing of the national agreements with organizations which some roads had formerly refused to recognize will naturally have a tendency to perpetuate their strength, particularly as the agreements contain many provisions which most railroads had formerly refused to acquiesce in.

NUMBER OF EMPLOYEES AND AVERAGE HOURS WORKED

Class 1 Roads Under Federal Control December, 1917, and July, 1919

Class of Employee	Number of employees December, 1917	Increase or Decrease	Average hours worked per employee: July, 1919	December, 1917	Decrease or Increase
General officers	7,452	7,432 —20	days 27.7	days 27.9	....
Division officers	11,136	12,511 1,375	days 29.4	days 30.6	days 1.2
Clerks (except No. 37)	195,097	216,764 21,667	213	230	(—)7.
Messengers and attendants	8,810	10,122 1,312	days 28.1	days 27.5	inc. .6
Assistant engineers and draftsmen	10,810	10,370 —440	days 26.6	days 26.7	.1
M. W. & S. foremen (excluding Nos. 10 and 28)	7,786	8,119 333	days 27.2	days 29.1	1.9
Section foremen	39,443	40,899 1,456	days 28.2	days 28.9	.7
General foremen M. E. department	1,665	1,707 42	days 29.9	days 27.1	inc. 2.8
Gang and other foremen, M. E. department	18,429	23,592 5,163	days 28.4	days 28.9	.5
Machinists	42,973	59,067 16,094	206	248	42.
Boiler makers	13,469	18,413 4,944	213	253	40.
Blacksmiths	8,369	9,898 1,529	200	224	24.
Masons and bricklayers	1,330	1,186 —144	202	223	21.
Structural ironworkers	852	673 —179	201	226	25.
Carpenters	50,848	50,854 6	201	234	33.
Painters and upholsterers	9,878	12,632 2,754	194	225	31.
Electricians	9,894	13,200 3,306	days 26.8	days 29.0	2.2
Air-brake men	5,846	7,781 1,935	217	280	63.
Car inspectors	20,763	24,258 3,495	239	328	89.
Car repairers	66,443	80,417 13,974	209	240	31.
Other skilled laborers	55,201	56,307 1,106	213	254	41.
Mechanics' helpers and apprentices	92,018	107,263 15,245	208	251	43.
Section men	212,663	286,300 73,637	207	251	44.
Other unskilled laborers	104,050	118,932 14,882	215	260	45.
Foremen of construction gangs and work trains	2,239	1,910 —329	228	316	88.
Other men in construction gangs and work trains	28,651	30,306 1,655	206	248	42.
Traveling agents and solicitors	5,245	1,355 —3,890	days 25.8	days 28.5	2.7
Employees in outside agencies	1,342	927 —415	days 27.8	days 32.5	4.7
Other traffic employees	510	426 —84	days 27.0	days 24.8	inc. 2.2
Train dispatchers and directors	5,158	5,413 255	242	258	16.
Telegraphers, telephoners and block operators	20,975	20,859 —116	234	245	11.
Telegraphers and telephone operating interlockers	7,588	8,243 655	232	252	20.
Levermen (non-telegraphers)	3,513	3,926 413	240	283	43.
Telegrapher clerks	11,178	11,362 184	237	273	36.
Agent telegraphers	19,149	19,065 —84	244	305	61.
Station agents (non-telegraphers)	14,411	13,898 —513	days 29.5	days 31.4	1.9
Station masters and assistants	614	605 9	days 30.3	days 31.8	1.5
Station service employees (except Nos. 5, 6, 37, 38, 39, 40 and 66)	110,647	115,255 4,608	223	273	50.
Yardmasters	3,835	3,905 70	days 30.3	days 32.4	2.1
Yardmasters' assistants (not yard clerks)	3,080	3,122 42	days 29.7	days 30.4	.7
Yard engineers and motormen	20,355	19,153 —1,202	237	275	38.
Yard firemen and helpers	20,821	19,559 1,262	231	271	40.
Yard conductors (or foremen)	20,362	18,785 —1,577	235	269	34.
Yard brakemen (switchmen or helpers)	50,874	47,815 —3,059	224	258	34.
Yard switch tenders	4,841	6,129 1,288	239	317	78.
Other yard employees	3,663	4,705 1,042	243	322	79.
Hostlers	8,493	10,687 2,194	240	337	97.
Enginehouse men	60,439	68,685 8,246	250	318	68.
Road freight engineers and motormen	32,923	30,405 —4,518	242	269	27.
Road freight firemen and helpers	35,549	31,608 —3,941	233	250	17.
Road freight conductors	26,320	24,501 —1,819	256	287	31.
Road freight brakemen and flagmen	65,242	60,525 —4,717	250	276	26.
Road passenger engineers and motormen	12,826	12,761 —65	220	224	4.
Road passenger firemen and helpers	12,433	12,413 —20	216	223	7.
Road passenger conductors	10,607	10,649 42	235	232	inc. 3.
Road passenger baggagemen	5,532	5,669 137	240	245	5.
Road passenger brakemen and flagmen	14,362	15,636 1,274	227	234	7.
Other road train employees	3,697	3,415 —282	239	241	2.
Crossing flagmen and gatemen	15,569	23,069 7,500	days 30.3	days 30.5	2.
Drawbridge operators	1,267	1,669 402	days 31.0	days 33.0	2.
Floating equipment employees	8,243	9,288 1,045	265	305	40.
Express service employees	.....	....	.....	.....	....
Policemen and watchmen	12,275	11,541 —734	days 30.2	days 31.7	1.5
Other transportation employees	5,492	5,470 —22	days 25.5	days 32.0	6.5
All other employees	18,203	20,876 2,673	days 28.2	days 29.3	1.1
Totals	1,703,748	1,894,287 190,539			

This report is compiled according to the classification prescribed by the Interstate Commerce Commission in accordance with the Act to regulate commerce, which classification has been the prescribed form since July 1, 1915.

The Interstate Commerce Commission classification sub-divides items 1 and 2, General Officers, and items 3 and 4, Division Officers, as between those receiving over and under $3,000 per annum, and sub-divide items 5 and 6, Clerks, as between those receiving over and under $900 per annum. As the sub-division of these classes on such a basis is purely arbitrary, and has no relation to the class of work performed, the sub-divisions are omitted on these reports.

The classification of employees prescribed by the Interstate Commerce Commission and used in the reports, does not correspond with the classification of employees used in the wage orders of the Railroad Administration, with the result that employees in a given class (of wage orders) receiving either higher or lower wages may be included with the employees of another class (of the Interstate Commerce Commission classification.)

A comparison of the number of employees in January, 1919, and December, 1917, is misleading, because in December, 1917, on account of the extreme cold weather, much outside work had of necessity to be suspended. In addition, there was a scarcity of labor, in consequence of the competition of war industries, and the generally higher wages paid by them which had attracted many employees from railroads.

On the contrary, the weather was exceptionally mild in January, 1919, and permitted the prosecution of an unusual amount of outdoor work; moreover, the labor supply was relatively greater because of higher wages, and in consequence of the cessation of war activities. In addition, the Railroad Administration had not yet been able fully to reduce its forces from what had been necessary to handle the peak load which was reached about the time of the signing of the armistice a cople of months earlier.

In considering the number of employees in view of the changes in the working conditions between 1917 and 1919, the number of hours worked should be carefully noted.

The agreement with the shop craft organizations represented by the Railway Employees' Department of the American Federation of Labor signed on September 20 contains 56 typewritten pages of rules and conditions, while a similar agreement with the maintenance of way employees signed on November 22 contains 12 pages. These agreements had been under consideration since the first part of the year, when they were proposed by the labor organizations. They were first worked out by committees representing the organizations and then submitted to the Board of Railroad Wages and Working Conditions which made recommendations to the director general and further modifications were made after negotiations between the director general and his staff and representatives of the union. Other agreements for other classes of employees also have been under consideration by the administration.

Strikes

There was a time when advocates of government ownership of railroads used to employ as one of their favorite arguments the assertion that government operation would prevent strikes. Railroad strikes on government owned lines in all parts of the world had become so common before our government took over the railroads as a war measure that the argument had lost most of its force, but as it is occasionally still used, for future application it may be well to note here that government operation of the railroads has not been entirely free from strikes, although the taking over of the roads in December, 1917, put a stop to some very serious threats of a general railroad strike.

There were several local strikes of shop employees in 1918, and in 1919 there have been a strike of clerks on the Nashville, Chattanooga & St. Louis during the early part of the year, some widespread strikes of shop employees which seriously interfered both with operation and the repair of equipment in August, a sympathetic strike of train employees on the Pacific Coast, and a strike of the express employees in New York City.

All of these strikes have been without the authority of the national organizations of the employees involved, and in most cases they were rather speedily terminated, with the assistance of the national officers, after the director general had delivered an ultimatum that after a certain time the striking employees would be regarded as having terminated their employment unless they returned to work. The director general has invariably refused to deal with the strikers until after their return to work. In general, however, the comparative freedom from strikes has been purchased by rather expensive concessions.

Labor Still Dissatisfied

After all that has been done for labor by the Railroad Administration both in the way of increased wages and in the direction of improved working conditions, the labor organizations have not been satisfied and at least in their public statements and in statements at hearings before the wage board have frequently been very bitter in their criticisms of the Railroad Administration on the ground of alleged discrimination between classes. So many revolutionary changes in wage schedules worked out in so short a time have naturally left many occasions for controversy on the questions of relationship between various classes of employees. As is frequently the case, however, the labor leaders have used a very different tone in utterances intended for public consumption and in thir direct negotiations with officers of the Railroad Administration and while they have besieged with their demands the officers of the Division of Labor and of the Division of Operation that have handled the details of the negotiations with the director general following the submission of recommendations by the wage board, it is understood that their attitude has been much less belligerent during these negotiations than in their published statements, even at times when their demands were being refused, as many of them have been.

The fact that the Railroad Administration has been able in some way to provide the necessary funds to meet the demands of labor has naturally led to more friendly relations than those that prevailed between the railroad officers and the labor executives at a time when the railroads had to resist all demands upon them because they could not know until after a long proceeding before the Interstate Commerce Commission whether it would be possible to earn revenues sufficient to pay increased wages. The demands of labor have long since exceeded any possibility of meeting them out of the share of railway income devoted to capital and the increases allowed them in 1918 exceeded the greatest amount ever paid in interest and dividends in any year. The result has undoubtedly been, however, that the improvement in the relation between labor and the central organization of the Railroad Administration has been to some extent at the expense of the relations with the local officers of the individual roads because labor has naturally looked to Washington and has less respect for the local officers.

In spite of their criticisms of the Railroad Administration, the labor organizations have almost unanimously declared for a continuation of government control and since their Plumb plan encountered so much opposition the work of their lobby in Washington and of their representatives in Congress has been largely concentrated on efforts to prevent the return of the railroads and to bring about a two-year extension of federal control.

This policy adopted by labor has undoubtedly been dictated by the fact that the government has been able to pay wages greater than the traffic would bear and make up the deficit from appropriations but has also been inspired to some extent by the fear that private management would endeavor to reduce the wages allowed by the government, as indicated by the provision in the Anderson amendment to the Esch bill designed to guard against just such a contingency.

Moreover, if the labor leaders really take their Plumb plan seriously and are not merely using it as a vehicle for their propaganda against a return to corporate management, a continuation of the present system of control might leave them in a better strategic position during the next election campaign.

Photo from International

Russia Will Be a Good Market for Railway Cars if It Ever Gets Back to Normal

Consolidated Ticket Office.

Traffic Field Changes Present Unsolved Problem

Retention of New Methods for Handling Freight and Passengers Requires Extensive Consideration

OF ALL THE VARIOUS DEPARTMENTS of railway operation it is probably true that none underwent such radical changes during the past two years as the traffic department. The transition from private to governmental control brought about certain of these changes automatically, while others were made as the conditions of unified operation became apparent. Still other changes were consummated later in the interests principally of efficiency and conservation. These departures from earlier practices have not come as the result of the introduction of new ideas by new men in the railroad field, for the men who have developed the practices we now know in the traffic field are the same men who, previous to government control, established and maintained the practices then known. Rather, these changes were brought about through the placing of the railroads in the country under one central administration and the elimination of competitive conditions.

THE TRAFFIC FIELD has undergone more radical changes during the past two years under government operation than any other field of railway operation.

Many of these changes have come as a result of the elimination of competitive conditions and the centralizing of control.

With a reversion to the competitive conditions of private control impending, the problem is presented of taking advantage of all the real lessons learned under unified operation.

Among the changes which have been made largely because of this conversion are the introduction of consolidated ticket offices, the disregard of routing instructions, the elimination of competitive train service, the discontinuance of off-line agencies and the discontinuance to a large extent of solicitation and advertising for the purpose of capturing traffic. In addition—and because of a combination of causes—there has been introduced an extensive use of the permit system and of embargoes in the handling of freight. Still other changes have taken place which might more aptly be attributed to a desire for increased efficiency and better service, among which might be mentioned the new methods of handling rates, the introduction of new way bills and the standardizing of many traffic reports.

In addition to the changes already enumerated there have been numerous minor changes in policies and performance in the traffic department. Many of these less important changes are such that their continuance after the return of the roads to private control would be impracticable because of the restoration of competitive conditions. As a matter of fact, it is conceded by both shippers and railroad men that these changes are merely innovations, applicable under government control, and will disappear automatically when the return to private control is made. For this reason only those radical changes in the traffic field which may become permanent, even under the competitive conditions of private control, are considered in this article. Certainly it would be most unfortunate if, after the return is made to private control, we were to fail to retain the advantageous features of the work which has been done by the United States Railroad

Administration in the traffic departments, and which will be of a constructive character under these conditions.

Consolidated Ticket Offices

Of all the changes made in the traffic field during the past two years, none has been as apparent to the general public, or more radical, than the consolidation of the many separate city or uptown ticket offices in the larger cities. Prior to government control it was customary for the various railroads to maintain small and often elaborately outfitted city ticket offices at points easily accessible to the traveling public. Soon after the lines were taken over by the government Director General William G. McAdoo issued orders discontinuing these separate city freight and passenger offices where the public could be served as conveniently at the depots, and consolidated ticket offices in the larger cities. This consolidation was first put into effect at Washington, D. C., and at Atlanta, Ga. Insofar as public service under government control and operation was concerned, the consolidated offices were regarded as successful, and the plan was soon extended to practically all of the larger cities, until the United States Railroad Administration is now operating 111 consolidated ticket offices in cities where, prior to government control, 563 separate offices were maintained.

The first reaction of the traveling public toward this change seemed to be, on the whole, one of approval. The new offices were, in the majority of cases, conveniently situated and, having adequate representation of all of the lines under federal control, proved to be a valuable aid both to those travelers who are familiar with our transportation system and to those who were not accustomed to traveling and who needed assistance in planning their journey. However, students of railway economics early saw many defects in the consolidated ticket office plan. As a temporary measure the closing the large number of separate ticket offices was in itself a considerable expense, as many of the railroads held long-term leases upon their quarters and had gone to considerable expense in making these offices attractive. In addition, there was the large expense of obtaining new and more commodious quarters for the consolidated offices and of providing adequate new fixtures. No figures are available concerning the relative cost of establishing and maintaining these offices as compared with that for the larger number of smaller offices maintained prior to government control, but it is believed that their establishment has resulted in added expense, rather than in reducing the expenditures which would have been necessary for the maintenance of the offices already established. This assumption, of course, is based on consideration of the consolidated ticket office as a temporary innovation.

As the offices continued to operate certain fundamental defects in the consolidated ticket office idea began to appear. From the standpoint of the success of government control and operation alone, these defects have not been as apparent as they otherwise would be, but, as an instance, it has been found that the operation of these offices has tended to create certain routes of passenger travel, to the detriment of others. To a large extent the elimination of competitive passenger train service has brought about this result, but it must, nevertheless, be considered in any discussion of the advisability of continuing consolidated offices. Closely allied with this defect is the handicap placed upon the less favorably situated railroads in obtaining their usual quota of passenger traffic. The placing of all railroad ticket-selling operations in one office has caused a diversion of traffic from these weaker lines to the stronger lines, so that passenger traffic on many of the weaker competitive roads has been greatly curtailed. One result has been to intensify the crowding of trains on certain lines.

When the return to private control is consummated the competitive conditions, which will be largely re-established, will make it improbable that the roads which have suffered through curtailment of their passenger traffic will be willing to continue to share a consolidated ticket office. The smaller and less favorably located roads will be forced to again actively solicit passenger traffic, as will the roads which have suffered because of the establishment of certain preferred routes. The result may be the gradual disintegration of the consolidated ticket offices and the re-establishment of the separate city or uptown offices.

Off-Line Agencies

On account of the keen competition for both passenger and freight traffic prior to government control and operation, separate off-line offices maintained by various transportation interests were well known and established institutions. These offices not only served as headquarters for soliciting agents, who were placed in practically all of the commercial centers of the country, but also as agencies of information where shippers could secure quotations of foreign and domestic rates and where certain functions were performed, such as the filing of passing reports on carload shipments, thereby facilitating the tracing of delayed cars, supervision over package car service, tracing of delayed merchandise, adjustment of claims, reconsignment of carload freight and the diversion of delayed or embargoed freight to connections. As in the case of the separate uptown ticket offices, these off-line agencies were discontinued soon after the inauguration of governmental control.

Unlike the change in regard to the city ticket offices, however, this move did not meet with the approval either of railroad men or shippers, and the shipping public immediately protested against the discontinuance of the services previously rendered by these agencies. Railway men on foreign lines saw in the move the diversion of much of their freight traffic through failure to have adequate representation at shipping sources. In as far as the traveling public is concerned, the Railroad Administration took the position that the services formerly performed by the off-line agencies could be performed as readily by the consolidated ticket offices in the various cities. To a certain extent, this position was well founded, but under this plan a foreign line is only nominally represented, and it therefore could not give the prospective passenger the service that he desired or was accustomed to.

With reference to freight traffic, it was found that the elimination of the services formerly performed by the off-line agencies meant the taking away of a real service to the shipping public and one which could not be performed by any other agency. That this fact was forcibly brought to the attention of officers of the Railroad Administration is disclosed by the fact that Director General McAdoo, in presenting a statement to the Interstate Commerce Committee of the United States Senate in January, 1919, stated that "It was found, however, that in some measure these agencies had performed real service to the public, and therefore the establishment of public service freight bureaus has been begun with a force trained to handle for shippers matters which were formerly handled by the off-line agencies." The move outlined in Director General McAdoo's statement has never been entirely carried out, and nothing so far has been produced by the Railroad Administration to fill adequately the place formerly filled by the off-line agencies.

It is now the general opinion of railroad men and shippers that the re-establishment of off-line agencies is necessary to the success of many lines, and that with the return to competitive conditions under private control these agencies will be re-established, at least in so far as the handling of freight traffic is concerned. It is also agreed that the abolition of the services performed by these off-line agencies has

been detrimental to both the carriers and to the shippers. Whether passenger representation will also be re-established depends to a large extent upon whether or not the consolidated ticket offices are retained. One proposal is that the off-line agencies shall be restored only in the larger centers of population and industry and that they shall take only upstairs offices. But competition will be the principal influence in settling what will be done.

Elimination of Competitive Passenger Train Service

During the first year and a half of government control, and especially during the first few months of it, the movement of troops and their equipment required the release of passenger train equipment wherever this could be accomplished without serious handicap to the traveling public. In addition, the enormous amount of freight to be moved demanded a curtailment of passenger service. The logical move was to reduce to a minimum that traffic which was least essential and most detrimental to expedited freight movements.

Accordingly one of the first moves of Director General McAdoo, upon his appointment as head of the nation's transportation system, was to initiate a thorough study into the passenger train requirements of the civilian population and eliminate competitive train service wherever possible. It was found, for instance, that the passenger train service between Chicago and St. Louis, Mo., could be reduced from 15 trains daily to 9 and still give adequate service between these points. Similarly duplicated service has been rendered for many years between many large terminals throughout the country, all of which was reduced in like manner. As a matter of fact, the traveling public in many cases was given better service, because the schedules of the passenger trains remaining were rearranged in such a manner that service between the two points was furnished oftener. With these curtailments there was also introduced the use of joint tickets good over any of the federal controlled lines between large terminals, thus giving the passenger an additional advantage over the former system.

Of all of the methods introduced in the handling of traffic it is generally conceded that this one can best be retained after the return to private control is made. It was to the detriment rather than to the benefit of our transportation system as a whole that competition had led to the development of extravagant duplication of service, so that two, three or even four trains left a point of origin at the same time for the same destination over different lines. However, responsibility for this condition cannot be placed entirely upon the competing railroads, for they were prevented in the past by the stringent laws from making any agreements for the division of passenger traffic or regarding the rendering of service. Whether or not there will be a reversion to this duplication of service by the competing railroads is a question which depends largely upon the latitude granted the companies in the railroad legislation to be passed by Congress. If the railroads are given the right to pool traffic much of this duplication can be avoided and the spacing of passenger trains can be developed.

Disregard of Routing Instructions

Similar to the changes already enumerated, the subject of the rerouting of traffic was brought forward immediately after government control became a war measure. At that time the freight traffic of the country had reached a state of acute congestion because of the enormous increase in the total traffic and because of the enormous quantities of war materials and foodstuffs which had to be moved quickly. Stringent measures were needed immediately to relieve the situation. It was found that a considerable amount of freight was moving by routes which intensified the congestion at certain points and that other freight was moving by circuitous routes due to the competitive conditions which had prevailed up to this time. The Railroad Administration decided to move war materials and freight traffic generally over more direct or less congested routes. In general this plan was adopted, and from that time to the present traffic has been diverted from its normal channels to those routes which are shorter or which avoided congested districts.

From the beginning shippers' instructions have been disregarded in so far as they have conflicted with what has been considered the best way, from a railroad standpoint, to move the traffic, and, although the results have not been entirely satisfactory to the shippers, much congestion has been eliminated and in many cases commodities have been moved more expeditiously. It is hardly to be expected that with the return of competitive conditions this entire disregard of shippers' instructions can be continued as the usual procedure. It is possible, however, that some arrangement may be made whereby disregard of shippers' instructions can obtain in times of stress to alleviate congestion. This determination of the matter, like many others incident to the change from governmental to private control, will depend partly on the legislation which will be passed by Congress. Provision may be made in this legislation for the vesting of power in the Interstate Commerce Commission or some other body to authorize disregard of shippers' instructions and the moving of freight by the best available route when the necessity arises. It is certain that, in-so-far as the general public is concerned, the vesting of this power in some central body will work to the ultimate benefit of all concerned and that the carriers will better serve the interests of the country in times of necessity if such action is taken.

Permit System and Embargoes

The extensive use of the permit system and of embargoes was a natural consequence of the enormous increase in traffic, and the resulting congestion at many of the railroad terminals at the time government control was adopted. The conditions called for drastic action of some kind, and it was found necessary to place embargoes immediately upon certain routes and terminals until the congestion could be relieved. Later it was found that the placing of embargoes did not entirely accomplish its purpose, and it was found necessary to install the permit system whereby the forwarding of freight to embargoed terminals and ports could be controlled at its source, thus relieving the stringencies of general embargoes and distributing the hardship attendant upon congested terminals.

It is generally conceded that the placing of embargoes and the installation of the permit system were necessities, and therefore no vigorous opposition has been developed. While the permit system has been practically suspended in-so-far as domestic traffic is concerned, it has remained effective as to export shipments and has recently been reinstated to assist in the movement of the enormous grain crop.

Like the disregard of shippers' routing instructions, these methods may be retained profitably as permanent features, for in times when congestion seems imminent it would be advisable to have such methods available and under the jurisdiction of some responsible body, by means of which the difficulties can be successfully avoided or overcome.

Advertising and Solicitation

The changes which have taken place in respect to the influencing and development of traffic by means of advertising and of active solicitation are intimately associated with the other innovations which have already been enumerated. Soon after the adoption of unified control as a war-time measure orders were issued by Director General McAdoo discontinuing all advertising and all solicitation, except the

agricultural development work which had long been carried on by the railways and which was intended primarily to develop new traffic.

The order was drastic and the results were far-reaching. Advertising campaigns on which individual railroads had been expending thousands of dollars were stopped immediately, as was the solicitation of traffic, which had come to assume a prominent place in transportation activities. The reason for such drastic action under government control was only too apparent. Advertising and the solicitation of traffic are both incidental to active and keen competition, and the elimination of this competition ended the need for activities of this nature. In addition, it was also true that at the time this order was issued the Railroad Administration was forced to recognize that more traffic than could possibly be handled was being offered to the railroads and that any further development work, either passenger or freight, at that time would only result in increasing the congestion which was already acute.

This curtailment of advertising and solicitation continued in effect until comparatively recently, when the Railroad Administration has again taken cognizance of the necessity for developing traffic. Accordingly, national advertising was again resumed by the Railroad Administration soon after the signing of the armistice. At the same time agricultural development work intended for the development of new traffic which had been practically dormant, was revived. At the present time the Railroad Administration is conducting a moderate advertising campaign to promote travel to the national parks and monuments and to populate and develop new areas.

There is no question as to the advisability of resuming both advertising and solicitation after the return to private control is made. Whether in the interests of economy and efficiency or not, competition will necessitate bigger advertising and solicitation campaigns and a resumption of the former means of increasing traffic.

Other Changes in the Traffic Field

It is not possible in an article of this length to discuss all of the changes which have taken place in the traffic field during the period of government control and operation, nor is it practicable adequately to discuss even those changes which may be termed major or radical changes. With the return of the roads to private control it is hardly to be expected that many of these changes can be made permanent in view of the probable resumption of competitive activities. However, it would be most unfortunate if the roads should be returned to private operation without full advantage being taken of such lessons as have been learned from unified control and operation. The inadequacy of railroad facilities of all kinds is now greater than ever before, and therefore the interests of both the railroads and the public demand that competition shall be restricted wherever its unrestricted operation will tend to interfere with rather than promote the more efficient utilization of facilities.

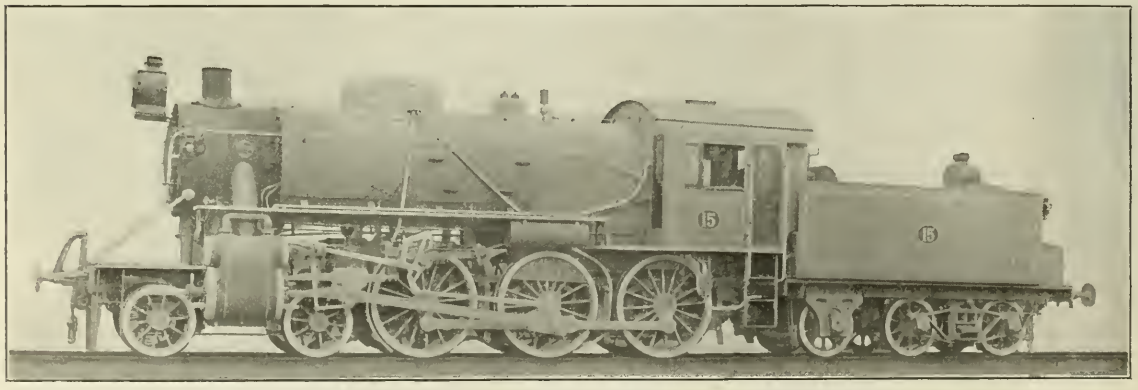
Grievances, General Order No. 65

In General Order No. 65, dated December 10, Director General Hines says:

"Grievances affecting employees belonging to classes which are or will be included in national agreements, which have been, or may be, made between the United States Railroad Administration and employees' organizations will be handled as follows:

"(a) Grievances on railroads not having agreements with employees, which grievances occurred prior to the effective date of any national agreement, will be handled by railroad officials in the usual manner with the committees and officials of the organizations affected for final reference to the Director of Labor, as provided in Circular No. 3 of the Division of Labor. Grievances on railroads having agreements with employees, which grievance occurred prior to the effective date of any national agreement, will be handled by railroad officials in the usual manner with the committees and officials of the organizations with which the agreement was made, for final reference to railroad boards of adjustment, as provided in general orders creating such boards. Decisions made as the result of such reference will apply to the period antedating the effective date of such national agreement and, from the effective date of that agreement, will be subject to any changes that are brought about by national agreement.

"(b) Grievances which occurred on the effective date of any national agreement, and subsequent thereto, will be handled by the committees of the organizations signatory to such national agreement for final reference to the appropriate railroad board of adjustment, except on roads where other organizations of employees have an agreement with the management for the same class of employees, in which case grievances will be handled under that agreement by the committees of the organization which holds the agreement for final reference to the Director of Labor, as provided in Circular No. 3 of the Division of Labor."



Ten-wheel Locomotive Built by the Baldwin Locomotive Works for the Norwegian Trunk Railroad.

This locomotive has 22.05 in. by 23.62 in. cylinders, a total weight in working order, engine only, of 128,800 lb., a weight on driving wheels of 107,000 lb. It is built for passenger service and will burn hard coal.

Unified Terminals Result in Increased Efficiency

Co-ordination Under Government Control Decreases Congestion and Improves Service

THE EXTENSIVE WORK done by the United States Railroad Administration in co-ordinating the operation of terminals has resulted in the saving of much money and considerable time, as well as in increasing the efficiency of terminal work. The co-ordination of terminals has been a prolific source of discussion for years, and when the government assumed control it was confidently expected by the public that the ideal would be exemplified immediately with stirring results. It was believed that an "Ebenezer" would be set up which would effect savings amounting to millions and would cause congestion and delay to vanish. Time has shown that congestion and delay did become appreciably less and that savings have been made, which, while perhaps not so great as expected, were considerable.

One of the weak links in the chain of American preparedness has been an insufficiency of terminal facilities, notably in the East. The great transportation lesson learned through the experience of the war has been that the railroads have not kept pace in their outlay for rolling stock and terminal facilities with the growing needs of the public, even aside from the war emergency.

The improvements in terminal operation possible through the co-ordination of facilities are best shown by narrating briefly what has been accomplished. Therefore the following information is presented by regions, the data being obtained from a report prepared by the Committee on Yards and Terminals of the American Railroad Association and the American Railway Engineering Association with the co-operation of the Railroad Administration:

INSUFFICIENT terminal facilities constitute a weak link in the American transportation system. Under government control the consolidation of forces and facilities was greatly expanded.

The outlook for a continuance of unification is not propitious, the concensus of opinion being that it is an excellent idea but impossible of realization following return of roads to private management.

Solving of the problem of inadequate terminal facilities, and of needed coordination of their operation, is imperative.

Eastern Region

The facilities and forces have been consolidated in the Eastern region at hundreds of small points, where little more than interchange facilities or small engine terminals exist. The unification of terminals has also been brought about in six of the largest cities, Buffalo, N. Y., Cincinnati, Cleveland and Toledo, Ohio, Detroit, Mich., and the New York and Jersey shore terminals at New York City, all or the facilities at each place being brought under the jurisdiction of a terminal manager. The Baltimore & Ohio passenger trains were diverted from the terminal of the Central of New Jersey on the west shore of the Hudson River at Jersey City, into the Pennsylvania terminal on Manhattan Island on May 1, 1918, while on September 15 of that year certain trains of the Lehigh Valley were also transferred to the same terminal.

The savings in money and time from these various consolidations in this region have not been estimated, but are declared to be large. Where facilities and forces were consolidated changes incidental to the handling of the business

by one organization instead of two or more were made, which eliminated duplication of work and permitted economies to be effected through the centralizing of particular duties with forces especially qualified to handle them. Among these items were the inspection of equipment at interchange points where the inspection forces were combined; the elimination of separate switching work at industrial plants; the consolidation of the freight houses of two or more roads by concentrating inbound freight at one house and outbound at another, both under one agent, and closing other freight stations, and the use by two or more roads of one road's engine terminals, coaling stations, etc.

No information is available regarding the saving, if any, in equipment resulting from these changes, except that, in a general way, the consolidation of work at yards and terminals has affected a more efficient handling of the business, with the result that shipments are moved in and out of terminals in a shorter time.

Several cases were reported in this region where the consolidation of freight and passenger stations resulted unsatisfactorily. These developed after the signing of the armistice and were largely due to the fact that at such points the public felt that there was no longer a necessity for a continuance of the inconvenience of having to go a considerable distance to a station handling the consolidated business.

Allegheny Region

The largest cities in the Allegheny region in which consolidations in terminal operation was effected were Philadelphia, Pa., Baltimore, Md., and the Jersey shore terminals opposite New York City. At these points car repair, roundhouse and switching facilities were co-ordinated and used jointly where practicable and single inspection at interchange points was effected. Carload and l.c.l. freight, including grain, coal, etc., and export freight were diverted freely to avoid accumulation. To accelerate the movement of cars and effect a saving in mileage, short routing was inaugurated wherever practicable and, where necessary to avoid accumulation, cars were diverted from stations of congested lines to those able to handle the traffic. In Baltimore 16 shorter routes were established and 23,150 cars diverted to July 1, 1919, while in Philadelphia 22 shorter routes were established and 12,681 cars diverted in this period. The permit system was in vogue on certain commodities to control the flow of traffic on all lines to those terminals doing heavy business and is still in use, so far as export business is concerned.

Following the armistice the traffic lessened, and on May 1, 1919, the offices of the terminal managers at Philadelphia and Baltimore were abolished, the operations at these terminals at the present time being supervised by the individual roads, while the co-ordinations and unification effected continue in force.

Pocahontas Region

Because of the few large cities in the Pocahontas region unification was not carried out to the extent that it has been in other regions. Except at Norfolk-Hampton Roads there are no large terminals in the region and therefore unified control has not entailed any radical changes in operation, the general benefit of such changes as were made having resulted from the centralization of control and the avoidance of duplication of supervision and service, rather than through any marked departure from the general practices of handling cars.

The unifications at Norfolk, Va., resulted in a reduction in yard, station and shop labor, in clerical forces and in tug service. At 27 smaller cities and towns served by the roads of the region, station, engine house and yard facilities were consolidated in part, with a reported reduction in expense and a material expedition of service.

Southern Region

While it was found that complete physical unification of the larger terminals in this region was practically impossible, the co-ordination of facilities was effected to some extent in 49 of the principal terminals and at 90 smaller points. Individual railroads in many cases had outgrown the facilities provided for handling their own business and no one line had a plant with capacity for taking over the entire business of the terminal and handling it as a unit. Consequently consolidation had to be restricted in such instances to the placing of all the units in one terminal under one general head. Terminal managers were appointed at Atlanta, Ga., Birmingham, Ala., Charleston, S. C., Jacksonville, Fla., Louisville, Ky., and New Orleans, La. While in only a few instances in the larger centers was it possible to abandon the use of existing facilities through the consolidation of two or more lines, at smaller points physical unification was possible, and in numerous such instances plants were abandoned and the activities of the lines, large and small, consolidated with regard to the most adequate available facilities, including yards, freight stations, roundhouses, etc. In such cases the additions resulted in more efficient operation with a substantial saving in money, although, because of the necessity of keeping separate accounts for each road, it was necessary to retain larger clerical forces than otherwise would have been necessary, this handicap also applying to the freight houses.

One of the considerable economies obtained in this region was through the consolidated use of equipment in l.c.l. service, resulting in the loading of one car daily to points to which each of the lines involved formerly sent one car every day partially loaded. Wherever roundhouse and mechanical department facilities for one road were found ample for the purpose of unification, similar facilities were discontinued on other roads, their organizations merged and a general yardmaster placed in charge.

Unification of Terminals in the West

From December 31, 1917, to June 30, 1918, all the Western lines were under the jurisdiction of a single regional director. The Western region was then divided into the Northwestern, the Central Western and the Southwestern regions. The unification of terminal and station facilities was carried further in the Western region than in any other area and as a result the annual savings were estimated at $2,769,632. The problems offered by the terminals at Chicago, Minneapolis-St. Paul and other large centers throughout the West brought with their solution changes which effected practically every point in the district.

Unification in the Chicago District

When the district was under the jurisdiction of the Western regional director, estimated annual savings were made at the Chicago terminals amounting to $407,346, and from July 1, 1918, to December 31, 1918, when the Chicago terminals were under the jurisdiction of the Northwestern regional director, estimated savings of $582,931 were effected, making a total of $990,277 estimated annual savings resulting from the steps taken toward the unification of terminal and station facilities at that city in the one year. Of this amount, $310,977 was saved by the abolishment, in April, 1918, of direct interchange facilities and the substituting therefor of the service of the Belt Railway; the establishment of one-line switching and one-line transfer services; the rearrangement of switching service, and the rerouting of interchange business.

The Chicago terminal district embraces approximately 2,500 square miles and extends from Lake Michigan to and including the main line of the Elgin, Joliet & Eastern. It is served by 40 railroads, all but a few of which have been retained under federal control. The number of cars for-

warded by the Administration lines to each other and to all points on their own lines approximates 40,000 per day. Since August, 1918, the Elgin, Joliet & Eastern has been used more extensively as a connecting link between Eastern and Western trunk lines for the handling of through freight not requiring icing, while the through perishable business is being concentrated on the Indiana Harbor Belt. Prior to the consummation of joint switching arrangements, industries located on the St. Charles Air Line were served by 19 roads; they are now served by the Illinois Central for itself and all the Eastern roads except the Michigan Central, which does its own work, and by the Chicago, Burlington & Quincy for all Western roads. This is one instance of many that have not only simplified operation but have also effected a substantial saving in engine hours.

Passenger business on the Baltimore & Ohio and the Pere Marquette between Pine Junction and 16th street has been diverted to the tracks of the Pennsylvania Railroad in both directions, thus freeing the Baltimore & Ohio Chicago terminal of all passenger business with its retarding effect on freight movements and also shortening by seven miles the distance traveled and by 40 minutes the time required by each passenger train so diverted. Inbound carrier lines have consolidated through l.c.l. freight into gateway and destination cars at their transfer houses for the outbound carriers, thus avoiding the rehandling of that tonnage at Chicago and the incident delay and expense. This loading now approximates 200 cars per week. The previous practice of railroads returning to each other less-than-car-load merchandise delivered in error has been discontinued and such shipments are now forwarded by receiving roads to the proper lines.

In August, 1918, the various railroad agencies located in the Union stockyards district were consolidated and placed under one organization known as the Stock Yards District Agency. Subsequent to the establishment of the agency the business in that district increased approximately 25 per cent over the corresponding period of the previous year, and by reason of the consolidation this unprecedented volume of business was handled in an orderly manner. From August, 1918, to April, 1919, inclusive, there were received at the Union stock yards 249,935 carloads of livestock and 49,525 cars were forwarded. During the week ending January 11, 1919, all weekly records for livestock received were broken as there were received during that period 9,205 cars, while the month of January, 1919, surpassed all past records for monthly receipts of livestock with a total of 33,430 cars, the expeditious handling of which testified to the value of unified operation. In September, 1918, a joint agency in the Board of Trade building was established to handle collections from the various grain receivers.

Steps Taken in the Northwest

Steps have also been taken toward the unification of tracks, terminal and station facilities at Minneapolis and St. Paul, Minn., which have resulted in an estimated annual savings of $217,534. The Twin City terminals are served by nine trunk and four switching lines and are under the direction of a federal manager, who is assisted by a terminal manager, the latter handling all detail matters. Each line within the terminal is represented by a superintendent or operating officer, who acts as a unit of the organization and reports to the terminal manager.

Under unified operation all industries at the Twin Cities having more than one switching line had their work assigned to one line, thereby saving duplication and also making for a saving in switch engine hours. All car orders are filled by the line upon which the industry is located, thereby avoiding cross hauling of "empties" through the terminals. Joint car inspection was established, which eliminated double inspection on all interchange tracks. A number of short haul movements were inaugurated, using any line or portion of line necessary to accomplish them, resulting in a saving of time as well as of mileage. The principal gain in the use of equipment has been through pooling whereby the milling districts have been supplied with cars in better shape than for a number of years.

The saving in mileage by the short routing of freight through this terminal, effected principally at the Minnesota Transfer, was approximately 3,150,000 car miles. Terminal delays have been materially reduced as a result of the building up of solid trains for road movement, the elimination of cross hauling in switching movement and the avoidance of double switchings at industries. It is estimated that terminal detention during the past year has been reduced nearly 50 per cent, while, because of the unification movement, the federal manager reports that there has been no congestion in the Twin City terminals during that time.

In September, 1918, unification of the terminals on the Puget Sound at Everett, Wash., Tacoma and Seattle were put into operation. While the first 60 days of the working was not entirely successful, later experience has proven to all concerned the value of the unification, although no exact data as to savings are available. A review of changes made by the unification of the Puget Sound Terminals appeared in the *Railway Age* of August 1, 1919, page 203.

Central Western Region

The establishment of a one-line transfer service between Omaha, Council Bluffs and South Omaha is estimated to have saved 24 hours' delay daily and resulted in an annual saving of $107,310. An annual savings of $60,000 has been made by the consolidation of car inspection forces.

The joint switching arrangements put into effect in the Western region is estimated to have resulted in an annual saving of 133,200 engine hours and a total of $799,200.

The Southwestern Region

At Galveston, Tex., the yards were operated as a unit and the interchange of cars was discontinued. Locomotive and car repair facilities were concentrated and freight houses were consolidated, as were local freight facilities. A central supervisory organization was established to administer the details of operation. There has been no congestion at Galveston since unification, the director asserts.

Little change was made in the operation at Houston, Tex., and Shreveport, La., where belt and terminal railroads were already in existence. At San Antonio, Tex., each railroad maintained its organization, kept separate records and carried its own terminal expense, etc. The unified organization in that city is comprised in a committee of the division superintendents of each road with the general manager of the San Antonio & Arkansas Pass as chairman. The unified terminal expense, including the salaries of the terminal trainmaster, the assistant terminal trainmaster and the clerical force, is divided between the railroads on the basis of the number of cars arriving at San Antonio on each road.

Conclusions

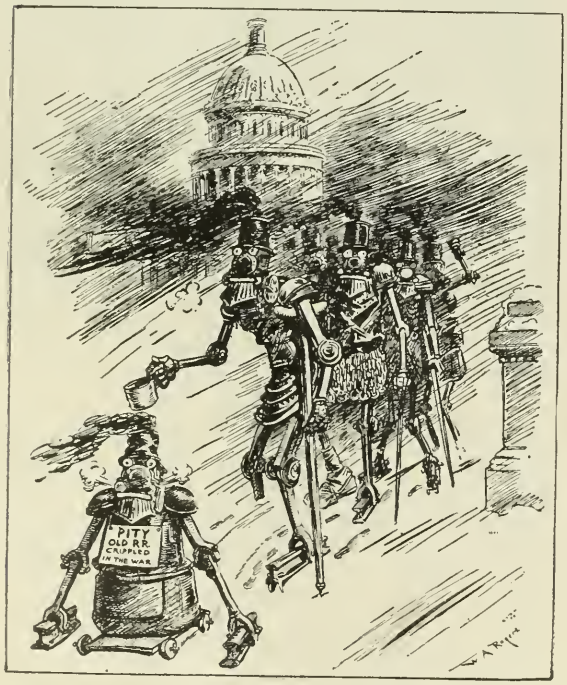
The outlook for the continuance of the unified operation of terminals following the return of the roads to private management is not bright. The consensus of opinion seems to be that it is an excellent thing but impossible of realization. While the benefits are numerous, the question resolves itself into the basic human principle that no one individual or corporation cares to create especially desirable facilities which a competitor may use equally as freely on their completion.

In general the most important benefits derived from unification are (1) the gain in the use of equipment through more expeditious handling, (2) reduction in terminal delay, resulting in a decrease in congestion and more expeditious service to shippers, consignees and the public generally, and

(3) a substantial saving in money. A secondary advantage is in the concentration of the handling of complaints.

The disadvantages of the unification of terminal facilities are few in number theoretically, but, in many cases, they present real difficulties. It has been urged that if a railroad knows that any terminal it may build can be used by any competing road that wishes to, it may refrain from building it. This argument is set forth with good reason. Another objection to unification is that the officers of the individual roads are better able to conduct terminal operation on their own line more efficiently than they could be conducted in a unified terminal. The practical railroad man knows that there are many physical difficulties in the way, particularly where no one road in a terminal center has facilities adequate to care for the combined business of the several railroads in the area. Another objection has been made by some shippers and consignees that the unification already carried out by the government caused them great inconvenience in making it necessary to go considerable distances to send and collect their freight after their business houses had been located with reference to the proximity of the terminal of the railroad which they patronized.

One of the most difficult and important problems in the country is that of terminal facilities. It probably means more to the producing and consuming public in the matter of delays, inconvenience and transportation burdens than any other phase of transportation. Generally speaking, cities and railroad traffic have outgrown existing terminal facilities The outstanding shortcoming in railroad transportation is inadequate terminals, and there can be no successful solution of the railroad problem which does not provide for their betterment. The time is past when wasteful terminal operation will be permitted to continue unchallenged. The willingness or the unwillingness of the carriers to acquiesce in such co-operative arrangements as plainly make for increased efficiency will be the deciding factor in the coming season of trial for private operation.



From the N. Y. Herald

The Return from the Wars

Troop Movement

The Troop Movement Section has won high praise for the smoothness and efficiency with which it has operated, in spite of the tremendous problems faced. From May 1, 1917, to December 1, 1919, 15,724,058 men, either just drafted or in uniform, were handled, the average being 507,421 a month, the maximum moving in July, 1918, when 1,147,013 men were handled. These men were carried the equivalent of nearly seven billion miles for one passenger.

To handle this tremendous business 315,367 Pullmans, coaches and baggage cars were used; 25,909 special troop trains were run an average distance of 759 miles, with an average number of men per train of 424; 4,109,327 men were carried in Pullman cars and 11,614,731 in coaches. Scarcely an accident marred this wonderful transportation record.

The average distance that drafted men were carried to camp was 388 miles, and the largest number handled to a single camp was 138,349, who were sent to Camp Lee, Va.

In transporting these men to seaboard the largest movement occurred in August, 1918, embracing 306,741. Sometimes entire army divisions of 28,000 men were moved at a time. To move a division requires 62 trains, 707 Pullmans (or 622 coaches), 62 kitchen cars and 62 baggage cars. Some of these trains were moved solid 3,500 miles across the continent.

Eighty per cent of the men were sent overseas through New York, 12 per cent through Newport News and a number through and out of Canada.

Four million men were called to the colors, one-half of whom were transported across the Atlantic. Immediately upon the signing of the armistice plans were made to demobilize as many as possible of the 2,000,000 men who had not gone overseas. They were discharged at the camps, all necessary arrangements being made for extra equipment on regular trains and for special trains for their prompt and comfortable movement home.

The overseas return movement began in December, 1918, during which month approximately 75,000 men were returned through the ports of New York, Newport News, Boston, Charleston and Philadelphia. The return movement gradually increased until the maximum number was reached in June, 1919, when 343,000 men were handled. This number exceeded by over 36,000 the largest number embarked for overseas service in any one month. At certain periods over 170,000 of our men were on the sea at one time. The number returned from overseas to December 1, 1919, totaled 1,990,223 officers and men.

The maximum amount of equipment required for troop movements at one time was approximately 1,500 Pullmans, 2,500 coaches and 500 baggage or express cars.

This wide-spreading and huge undertaking taxed the resourcefulness of everyone, but even during the turmoil cleanliness was not overlooked. Certain equipment was allotted for handling the men from shipside to camp, where the men were fumigated, as was also the equipment.

The late George Hodges, to whom the distinguished service medal was posthumously awarded, was the man whose initiative and executive ability shone forth in this work. He was ably assisted by C. F. Stewart, who succeeded Mr. Hodges as manager of the Troop Movement Section.

Dog team stages are to be used to transport freight between the ends of the southern and northern sections of the railroad which the United States Government is building in Alaska, according to recent press despatches from Nenana. A distance of about 130 miles separates the ends of the line being built south from Fairbanks and the line being built inland from Seward.

The Growth and Results of Car Service Activities

Organizations to Control Freight Equipment Accomplished Excellent Results in Crisis

THE RAPIDLY INCREASING FREIGHT TONNAGE offered to the railroads of the country for movement, accentuated in 1917 by the entrance of the United States into the war with the consequent quickening of industry and production, and the acute shortage of freight car equipment, demanded immediate and drastic action to avoid a complete tieup of the nation's transportation system. The condition and amount of the freight equipment in the United States has been such since 1916 that the enormous amount of war materials, foodstuffs and other commodities could not have been moved without the delegation of certain powers to a responsible and efficient organization. The responsibility for the exercise of these powers, therefore, fell first upon the Commission on Car Service of the American Railway Association and later upon the Car Service Section of the United States Railroad Administration.

PRIVATE CONTROL recognized the futility of meeting the traffic demands with the available equipment, unless drastic action could be taken. The Commission on Car Service was conceived as a result.

Profiting from the experiences of this Commission the Railroad Administration created the Car Service Section.

The conditions which brought about these steps have not been changed; the result must be a continuance of centralized supervision over the distribution of freight equipment.

Car Service Work Prior to Government Control

In discussing the accomplishments in the car service field during the past few years, it is necessary to review briefly the history of this phase of railway operation in order to obtain a background for a complete understanding of the steps which have been taken and the results which have been accomplished. Car service work in general began when the demand for freight equipment was greater than the available supply.

During the latter part of 1916 it became apparent to the American Railway Association that it would be necessary to arrange for a representative committee to sit in Washington and co-operate with the Interstate Commerce Commission on car service matters. Accordingly Fairfax Harrison, W. L. Park, C. M. Sheaffer, E. J. Pearson and W. A. Worthington were appointed to constitute such a committee, which continued to function until February 6, 1917. At a meeting of the American Railway Association held in New York on February 2, 1917, a new code of car service rules was adopted by the signatures of members of the association to an agreement to observe and enforce the rules, subject to three months' notice of intention to withdraw from the agreement. At this time a resolution was adopted authorizing the president, W. W. Atterbury, to appoint a Commission on Car Service of five members with plenary powers to co-operate with the Interstate Commerce Commission by sitting in Washington in the administration of the new code of car service rules and to make such necessary modifications in these rules as were required to prevent undue hardships.

The commission consequently appointed consisted of C. M. Shaeffer, general superintendent of transportation of the Pennsylvania Railroad, chairman; W. A. Worthington, vice-president and assistant to the chairman of the Southern Pacific; J. T. King, general superintendent of transportation, Atlantic Coast Line; W. C. Kendall, superintendent of car

service, Boston & Maine, and W. L. Barnes, superintendent of transportation, Chicago, Burlington & Quincy. This committee was reconstituted at a meeting of railway executives in Washington on April 11, 1917.

The Commission on Car Service was made a sub-committee of the Special Committee on National Defense (Railroads' War Board) and continued under the jurisdiction of the executive committee up to the time of the institution of government control as a war measure. The committee at this time had been enlarged by the appointment of Macy Nicholson, assistant to the vice-president of the Great Northern; G. F. Richardson, superintendent of transportation of the Southern Pacific; J. A. Somerville, general superintendent of transportation on the Missouri Pacific; D. E. Spangler, superintendent of transportation on the Norfolk & Western, and H. W. Stanley.

The new situation created by the declaration of war with Germany by the United States and the unprecedented increase in freight traffic offered to the railroads gave the Commission on Car Service an opportunity to attempt to distribute the available freight equipment of the country so that it would fill the traffic requirements as adequately as possible. Full authority was conferred on the commission by the executive committee of the Special Committee on National Defense to amend or suspend any rules affecting the handling of freight cars; to relocate such equipment, and to issue such rules, regulations or instructions as the exigencies of the situation required. New rules and regulations to govern the handling of freight cars were promulgated by the commission and approved by the executive committee, under which arrangement the commission acted virtually as the manager of a car pool embracing all the railroad owned freight equipment in the country. The enforcement of these new rules, which were essentially war measures, and the necessity for giving precedence and preference to the transportation of troops and war materials, necessitated the expansion of the Commission on Car Service, and before long a considerable office force and 18 inspectors, who conducted investigations and kept in touch with conditions at the principal centers of interchange, were working under its jurisdiction.

In addition, it was found necessary under the new regime to organize local committees at 25 important commercial centers to act for and in conjunction with the representatives of all lines in the city. This move was taken to decentralize as far as possible the work of the commission and enable it to devote more time to the consideration of the larger problems of car service. These local committees met twice a week and the scope of their action was not restricted except by general instructions and the car service rules. They were expected to anticipate difficulties; to supply remedies and to avoid complications, in addition to which they were to give special attention to such matters as the intensive loading of cars and the elimination of delay in loading and unloading. Furthermore, they kept in close touch with shippers, assisted in reducing accumulations of cars, administered embargoes, regulated car supply, and in general took care of many of the details which otherwise would have had to have been considered by the commission at Washington, the members of which were not as well versed in the local conditions existing at various points throughout the country and could not therefore formulate opinions as readily or as successfully.

The Car Service Section

This work was carried on by the Commission on Car Service up to the time of the inauguration of government control and operation. At this time the need for including the work performed by the commission as a function of the United States Railroad Administration was clearly seen and the Car Service Section formed by the merger of the Commission on Car Service and the Bureau of Car Service of the Interstate Commerce Commission was one of the first agencies created in the Division of Transportation. The officers of the new section included the members of the Commission on Car Service, with W. C. Kendall as manager. W. L. Barnes, E. H. De Grott, Jr., A. G. Gutheim, C. B. Felts, G. F. Richardson and J. A. Somerville were appointed assistant managers.

At the time of this conversion it was stated that the functions of the new Car Service Section should include the provision of equitable distribution of the various classes of freight car equipment, the regulation of transportation details to meet emergencies, and the maintenance of a proper balance between the government, the public and the carriers. The regulations issued at that time relative to the establishment of the new section stated that it should have charge of all matters relative to car service, including the relocation of freight cars; that it would provide, through the regional directors, for preference of car supply and movements where more than 10 cars were required; that it would receive such reports from the railroads as were required to keep it informed in regard to car service, embargoes or transportation conditions; that it would be informed promptly of all embargoes placed, modified, or removed, and that it would recommend embargo policies.

The Car Service Section as constituted at that time consisted of a central organization at Washington, the Eastern Railroads Car Pool with headquarters at Pittsburgh, Pa., and the various sub-committees which had been appointed under the regime of the Commission on Car Service. On July 1, 1918, a Refrigerator Car Department was organized at Chicago and placed under the jurisdiction of Mr. Barnes. At the same time a Tank Car Department to assist in the relief of a shortage of freight cars was organized in connection with the Refrigerator Car Department with headquarters at Chicago. On May 15, 1918, the activities of the Car Service Section were further extended by the establishment of a Car Record Office which compiled information regarding the location and movement of cars carrying material for the various government departments.

These facts complete the history of the Commission on Car Service and its successor, the Car Service Section of the United States Railroad Administration. With this brief history as a background, it is but fitting to outline the results the two organizations have accomplished during their existence. It must be remembered in this connection that the Car Service Section is, in reality, an inheritance from private control, and the results which have been accomplished cannot therefore be said to be entirely a result of governmental control and operation. It is true, however, that under such a form of unified control this section has been granted a latitude which would hardly be possible under the competitive conditions incident to private control.

The Result of Car Service Work

The pooling, distribution and relocation of freight equipment comprises the most important function of the Car Service Section. In addition there are several other functions which have been delegated to the Section which should properly be reviewed. Among these are the maintenance of a proper balance between the government, the public and the carrier; the handling of embargoes; the campaigns for the heavier loading of equipment; the establishment of adequate car service records, and the successful contact established with the shipping public.

In so far as the first and most important of these functions is concerned, the elimination of competitive conditions left the Car Service Section free to move empty freight cars to meet requirements at various points in the country, regardless of ownership. As evidence of what has been done in this respect it has been cited that during 1918 there were

850,000 such movements, including the movement of 700,000 box cars, but excluding the emergency movement of refrigerator cars and the relocation of coal cars between the various coal fields.

The Eastern Railroad Car Pool, which was inherited from private operation, was continued under the jurisdiction of the Car Service Section and aided in the proper handling of freight, especially coal in the eastern states. The idea of pooling equipment, which was taken from this inheritance or private control, was, to a certain extent, extended to the handling of all freight equipment of all the lines under federal control. The Car Service Section acted in general as the agency by means of which this pooling was controlled. Technically speaking, however, it is not possible to say that all of the freight equipment of the country was thrown into one car pool. The car service rules which have been in effect do not admit of this condition entirely, although in a general way the statement is true. The pooling of equipment, however, was extended to the Refrigerator Car Department upon the establishment of that institution and the refrigerator car equipment of the country was operated through this one agency, an abnormally heavy perishable commodity traffic being moved in this manner.

Certain advantageous results have been produced by this pooling, relocation and distribution of freight equipment. During the period of the war there was an urgent demand made upon the Railroad Administration for the expedited movement of lumber for use in the aviation section of the army, for constructing ships at the large ship yards and for other government work, such as the construction of cantonments and living quarters for war workers. The work accomplished by the Car Service Section in this respect may best be illustrated by stating that from April 21, 1918, to November 20, 1918, 150,000 cars of lumber were moved from the Pacific Northwest, or an average daily movement of 813 cars. The movement of coal and coke was another problem with which the Railroad Administration was confronted and which the Car Service Section solved successfully. The success of the extraordinary measures adopted to bring about this solution are demonstrated by the fact that practically all of the demands of the steel industry for coke, by-product coal and steam coal were met. In this connection it must be recalled that the Car Service Section, on October 10, 1918, established uniform rules for rating of coal mines by which the car supply is directed, which rules superseded previous methods which had led to different interpretations being placed upon the ratings of coal mines by different carriers. It is not possible to go into detail regarding the work which has been accomplished by the Car Service Section in the handling of the various commodities offered for traffic, but the two illustrations above tell the story of practically all other traffic.

From the maintenance standpoint, however, car pooling has proved to have some disadvantages. Under the provisions of the car pool, freight cars, when once leaving the home rails, do not tend to return toward the home line as long as they are in condition to be operated. The result has been that a very high percentage of the equipment on lines has been made up of foreign cars. This condition, in a measure, has led to a feeling of unjustified apprehension as to the condition of the equipment of the country owing to the fact that, generally speaking, only the cars badly in need of heavy repairs return to the home line, where the bad average condition of such equipment leads to an unjustified conclusion as to the equipment on foreign lines. The provisions of the pool have, however, increased the difficulties of properly repairing freight cars owing to the lack of proper material with which to maintain the equipment on foreign lines. It has also held up the betterment programs, which many roads already had under way and others were about to undertake, to rehabilitate much of the old wooden equipment of the country, so that it would be suitable for continued service under modern operating conditions.

Embargoes and the Permit System

From its inception the Car Service Section was responsible for the supervision of embargoes issued by railroads. The first plan adopted by the section established 26 zones throughout the country in which embargoes were issued simultaneously to each road in the zone in which the embargo was placed. This system was later greatly improved by a reduction in the number of zones and still further simplified by making the zones conform more nearly to the geographic regions into which the country had been divided for operating purposes.

The permit system was later installed by the Car Service Section because of the increased activities of many of the government departments and the critical transportation conditions in the winter and spring of 1918. War-time necessity caused individual roads and various government organizations to authorize special movements of government and other important freight in violation of the general embargoes which it had been believed would be adequate to prevent congestion. It was therefore agreed by the Car Service Section that uniform embargoes and a permit system should be installed. This permit system developed in two ways, one providing general and continuing exemption from embargoes for special commodities, and the second providing special exemption from embargoes or special shipments according to the need of the consignee and of public welfare. The second development later became general and the Car Service Section was called upon to control and regulate the issuance of these permits carefully.

All of the plans enumerated were later subjected to improvements. For instance, the issuance of embargoes was, comparatively recently, placed to a large extent under the jurisdiction of the various regional directors who are more closely in touch with the particular requirements of various sections of the country. However, throughout all of the refinements, which the issuance of embargoes and the administration of the permit system have gone, the Car Service Section has remained the real controlling agency in this work.

Car Service Section Campaigns

The Car Service Section, since its creation, has advocated many measures, the success of which has depended more upon shippers than upon the administration of orders. Probably the most successful and vital of these measures was the campaign conducted for the heavier loading of freight equipment. It was pointed out to the shipper in no uncertain terms that heavier car loading meant the release of a number of much needed cars for the handling of essential traffic.

Not only did the Car Service Section recommend heavier loading, but it also advocated changes in the size and in the manner of constructing packages and in the manner of placing goods in the packages, all of which contributed to the heavier and more efficient loading of freight car equipment and the consequent release of other equipment, which would in turn alleviate a serious shortage at other points.

Another campaign which produced excellent results in the more efficient use of freight equipment was the campaign for the advance movement of certain commodities. Early in April, 1918, traffic organizations and shippers were told of the advantages of shipping raw materials in the summer when traffic ordinarily is comparatively light. This plea met with a generous response on the part of the shipping public and the result was that when the critical months of the fall and winter came, it was found that the tension was greatly relieved because of the decreased amount of raw materials offered for movement.

Future of the Car Service Section

The Car Service Section of the United States Railroad Administration cannot properly be termed an innovation connected with government management. As stated before, the work which was taken over by the Car Service Section was performed successfully under private control by the Commission on Car Service. It is therefore quite generally conceded that the functions which the Car Service Section now perform will be taken over by some organization when the return to private control is made, since the necessity which first created the Commission on Car Service still exists. Therefore it is practically certain that the functions of the Car Service Section will be delegated either to a committee of the American Railroad Association, to a committee which will work in conjunction with the Interstate Commerce Commission or perhaps to a separate bureau which may be maintained in Washington under the jurisdiction of the Interstate Commerce Commission or as a government institution.

It is probable that the latitude which is now allowed the Car Service Section will be curtailed to some extent, for the competitive conditions of private control have not and will not make for complete harmony in the pooling, relocation and distribution of freight equipment. It is to be hoped that this power may be retained in some organization, at least until the number of available freight cars is large enough to meet the normal traffic demands of the country. Even then it is similarly hoped that the functions now performed by the Car Service Section can be retained at least as dormant measures which can be brought to life again should the necessity arise.

Coal Exports Permitted

DIRECTOR GENERAL HINES has authorized the following statement regarding the coal situation:

"In the two weeks which have passed since the bituminous coal miners returned to work generally, production has increased regularly. This has afforded a great measure of relief in those consuming sections customarily supplied by miners in the central competitive field and in the Southwest and in which sections consumer's stocks have been much depleted. Indicative of the better condition of such stocks is the fact that many of those consumers who were eager during the strike to obtain coal from the fields which had continued to produce in the East, have refused now to take such coal which the railroads moved West during the strike to protect such consumers, the additional freight rate from the East naturally entering into the price of the coal. It is necessary under these circumstances, that production of the Eastern fields be again turned into usual channels and usual markets, and among the latter is the overseas export market. Otherwise, a serious congestion of coal loads will inevitably develop on the railroads.

"After careful consideration of the entire situation, it has been deemed advisable to permit restricted resumption of overseas export movement of bituminous coal. Instructions have already been issued for such movement through the ports of Hampton Roads and Baltimore in an amount equal to about 50 per cent of the export tonnage handled through those ports in the month of October. Similar arrangements will be made at other ports as soon as the necessary details now under way can be perfected. At each port, however, the export dumping will be only allowed upon a restricted basis, the restrictions being made effective by railroad embargoes against the movement of coal to tidewater ports for export, and the issue of permits by railroads under the control of the regional directors authorizing the movement of specific coal against such embargoes.

"During the past two weeks, while production has been on the increase special provisions have been made for the export of coal to Cuba necessary there for sugar production ultimately to be moved to this country. In addition, a few other cargoes have been permitted by the Central Coal Committee, acting in conjunction with the representatives of the destination countries concerned, in order to take care of vital necessities among our allies, and also of foreign consumers whose output was contracted to be shipped to the United States.

Passenger Train Performance in November

DURING NOVEMBER 86.5 per cent of all passenger trains on Class I railroads under federal control made on-time runs or, if late at initial terminals on account of waiting for connecting trains, made as good as schedule time or better, according to a statement issued by the Railroad Administration. This is a slight decrease compared with October, when the percentage was 88.2 per cent.

In the same period 81.7 per cent of all passenger trains arrived at their destination on time, compared with 83.9 per cent in October.

Factors affecting train performance in November were the severe winter weather in northern and mountain states, heavy and continued rains in the South and Southeast, and the dislocation of traffic due to the coal strike, which also resulted in the necessity for using inferior locomotive fuel in certain sections.

Following are comparative figures showing passenger train performance in the various regions during November and October. Suburban trains are not included in this compilation:

Region	Month	No. of roads	Total trains operated	Trains which arrived on schedule time: Number	Trains which arrived on schedule time: Per cent of total trains	Trains which arrived on schedule time, or which, if late, made run in schedule time or less: Number	Trains which arrived on schedule time, or which, if late, made run in schedule time or less: Per cent of total trains
Eastern	Nov.	43	87,957	75,027	85.3	77,966	88.6
	Oct.	43	93,659	80,593	86.0	83,664	89.3
Allegheny	Nov.	15	72,938	64,525	88.5	67,040	91.9
	Oct.	15	77,480	68,286	88.1	70,882	91.5
Pocahontas ...	Nov.	3	8,421	7,277	86.4	7,495	89.0
	Oct.	3	8,923	7,897	88.5	8,262	92.6
Southern	Nov.	34	48,669	40,831	83.9	43,298	89.0
	Oct.	33	49,945	43,440	87.0	45,222	90.5
No. Western...	Nov.	15	24,149	17,149	71.0	18,351	76.0
	Oct.	15	26,274	21,288	81.0	22,286	84.8
Cen. Western..	Nov.	24	41,579	30,516	73.4	33,968	81.7
	Oct.	24	43,091	33,224	77.1	36,207	84.0
So. Western...	Nov.	22	20,005	12,816	64.1	14,721	73.6
	Oct.	23	20,806	13,772	66.2	15,724	75.6
Total and average for All regions...	Nov.	156	303,718	248,141	81.7	262,839	86.5
	Oct.	156	320,178	268,500	83.9	282,247	88.2

Photo by Courtesy of C. M. Winter.

With the Russian Railway Service Corps. A Fortified Railroad Section House

Fuel Conservation Effort Should Be Continued

Benefits Already Secured May Be Lost Unless Some Agency Is Provided to Carry on the Work

DURING THE TWO YEARS of its existence the United States Railroad Administration has put into practice many plans and developed organizations for centralized control of many phases of railroad operation which are unique in the annals of American railroad history, but not all of which are well adapted to continuation under private operation. These were primarily adopted as war measures, but the economic value of the results obtained in some cases has led to the serious consideration of how these activities may effectively be continued after the roads have been returned to be operated by their owners.

As has already been suggested, there are certain fundamental difficulties in the way of continuing under private control the work of any of the centrally organized departments of the Railroad Administration. Perhaps the most important of these difficulties is the strong feeling on the part of corporation and operating officers alike against the continuance of any centralized administrative control tending to usurp the responsibility and initiative of the local organizations in the management of their own properties.

Another serious difficulty is the lack of machinery for continuing any of the activities of the central administration, except such as is offered by the American Railroad Association, and this is an organization not adapted to function as an administrative body. The sentiment against the curbing of initiative in the fullest possible development of the talents of the individual is undoubtedly for the best interests of the future of American transportation and in keeping with American ideals. In the present situation, however, the fact should be recognized that many possibilities for the future welfare of the railroads have been developed by the Railroad Administration, and all prejudices should be laid aside in considering how these benefits may best be perpetuated.

In this connection the Fuel Conservation Section occupies a unique position. In a review of the history of the organization of and the methods employed by the section, which appeared on page 1011 of the November 21 issue of the *Railway Age*, the problem of the administration which led to the organization of this section is clearly stated. The public need for the most rigid economy in the use of fuel, as a war measure, was generally recognized, and the need for economy in the expenditure of the more than one-half billion dollars a year paid by the railroads for fuel, as a matter of good business is no less apparent.

The real problem of the section has been to secure recognition of the principle that the administration of this vast sum needs a supervision which cannot be obtained by any of the regularly organized departments of railroad operation, to none of which the most economical use of fuel is a matter of primary importance. The work of the section was, therefore, less administrative than educational and inspirational, the latter probably being the more important of the two.

The results obtained in the reduction of fuel consumption have been due less to a previous lack of knowledge as to the proper methods of handling and firing coal than to the incentive which has been supplied to each individual to put into practice the knowledge he already had. No previously untried methods have been developed by the Fuel Conservation Section; the essential facts and details of practice have been brought out and reiterated year after year in the reports and discussions at the annual conventions of the International Railway Fuel Association. The greater part of the educational work has been in convincing operating officers and executives of the neeed of a department the principal business of which is to secure the best fuel possible for the money spent and to see that no one is allowed to waste it.

The effectiveness of the inspirational work of the section alone is sufficient evidence that well-organized staff fuel supervision is essential if waste is to be eliminated. It is this principle, however, which years of effort on the part of the International Railway Fuel Association has been unable to bring to the attention of railway managements with sufficient force to overcome the prejudice and inertia in the way of the firm establishment of the fuel department as a regular part of the railroad organization. Judged by past developments, the work of the Fuel Conservation Section has advanced the status of fuel conservation farther than would have 10 or 15 years of normal pre-war development. This in a large measure was made possible by the extent to which patriotic zeal overcame prejudice during the war and to the

adoption of methods in the conduct of the affairs of the section which removed rather than excited opposition.

Much can and undoubtedly will be done by many of the railroads individually in maintaining and strengthening the staff organizations which have been developed during the war to handle fuel matters, whether or not a central organization is retained after the return of the railroads to private control. On many railroads, however, these organizations have not been installed for a sufficient length of time to function smoothly in relation to other departments, and there is grave danger that if left to themselves they will not be sufficiently strong to weather the reaction following the inspired efforts put forth during the war. For this reason every effort should be made to develop a practical means whereby the work of the Fuel Conservation Section may be continued until such time as correct principles of fuel control have become generally and firmly established in practice on the railroads of this country.

The principal objection to turning the work of the Fuel Conservation Section over to the American Railroad Association has little force in this case. The work of the section has essentially not been of an administrative character, and while the full authority of the Railroad Administration was back of the officers of the section, in practice this was almost never exercised. The methods which the section has so successfully developed lend themselves satisfactorily to the control of a non-administrative body, and with the same tact and patience which has been exercised by the personnel of the section during the war there is reason to believe that under the American Railroad Association excellent results could be obtained in consolidating and holding the gains already made.

One of the instruments of the section which can ill be spared at the present time is the comparative summary of locomotive fuel performance by railroads which has been compiled and published quarterly. The permanent maintenance of such information would be of great value, as comparative data of this kind may be very effectively used in keeping up a keen interest in fuel conservation. Whether or not they are maintained permanently, they should at least be continued for another year, or until such time as a fair measure of the full possibilities of fuel conservation become apparent.

The cost of continuing the work of the Fuel Conservation Section, estimated by the manager of the section as having amounted to three-tenths of one per cent of the value of the fuel saved during 1919, would be insignificant when distributed among the railroad companies benefiting. This, of course, does not include the cost of maintaining the fuel departments on each road, but these must, and if properly developed will, justify themselves in each case by preventing the waste of the funds paid out for one of the largest single items of railroad operating expenses.

Should the railroads as a whole, through the American Railroad Association, fail to continue the work of the section it would be entirely feasible for the principal roads in each regional district to take up the work, maintaining practically the present organization, the expense to be pro rated on the basis of gross earnings. Under this plan a central office should be maintained for the purpose of combining the regional statistics substantially as they are now compiled by the Fuel Conservation Section. The prospect for continued improvement in the unit fuel consumption, which for the three months of July, August and September, 1919, decreased 5.2 per cent in freight service and 3.5 in passenger service from the figures for the same period of 1918, would fully justify the slight expense of such a course or as many years as are required to develop the organizations and personnel needed on each railroad.

Supply Train Operation

THE SYSTEM of supply train operation as practiced on the Southern Pacific has been made the subject of the first product of the Southern Pacific's complete plant for making and presenting motion pictures. This picture, recently displayed at the convention of Railway Storekeepers in Chicago, received the approval of officers of the Store Section of the United States Railroad Administration, according to an article in a recent issue of the Southern Pacific Bulletin.

In describing this system the Southern Pacific Bulletin says in part:

"There are four supply trains operating monthly over 5,175 miles of main line and branch, and delivering every four weeks nearly 6,000 tons of miscellaneous material and supplies valued at $140,000. In turn, these trains collect about 3,000 tons each month of scrap and second-hand material; the number of requisitions handled is over 7,000.

"While the difference between delivering material by local freight and by supply trains represents an annual saving of well over $100,000, there are many advantages in supply train operation that cannot be estimated in dollars and cents, one of the most important being service. Supply trains carry a small surplus stock of the more important items over and above requisition requirements, and there is never a day they do not get many requests for material or supplies other than those called for on requisitions.

"Many times newly organized extra gangs are completely equipped with tools and supplies from these trains, thereby saving express and baggage shipments, and in some cases wires and correspondence, and at times expensive delays.

"By an established monthly supply train service material and supplies on line can be limited to actual thirty-day requirements, thereby avoiding waste, abuses, etc. The exchange system of tools, brooms, electric lamps, oil containers and everything that can be exchanged, results in much economy.

"Under the old system of delivering company material by local freight it often happened that owing to incorrect description shown on requisition the material shipped was other than what was actually required, and if not immediately returned was, in most cases, allowed to lie around and deteriorate until such time as the storekeeper or some division officer happened across it and ordered it shipped in.

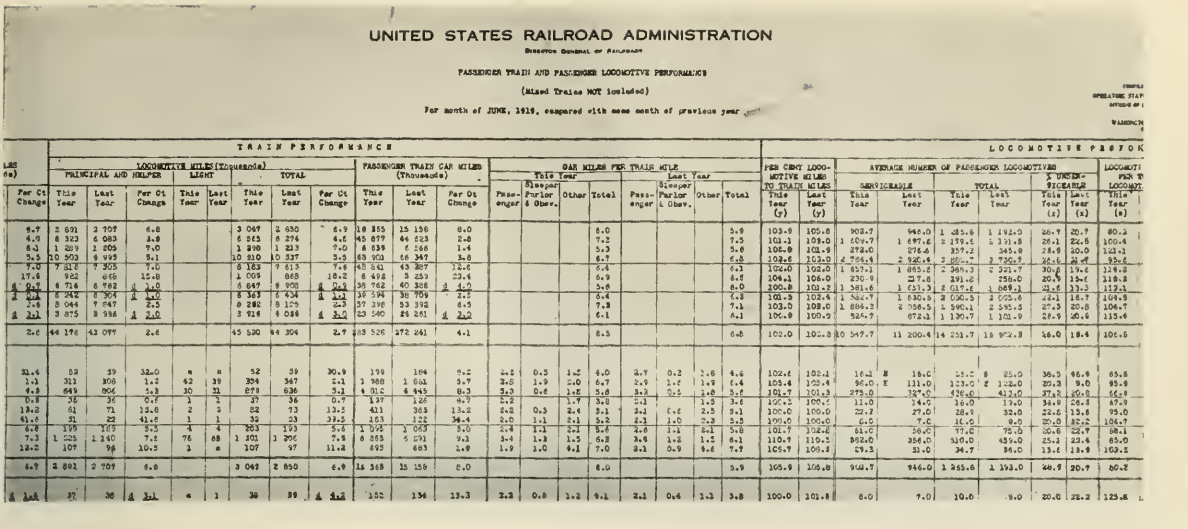
"Under the supply train system the division storekeeper and supply car storekeeper come into direct contact with the users of material and are in position to and do accomplish many substitutions, and correct on the ground, many errors. This also frequently avoids unnecessary purchases and eliminates an enormous amount of correspondence and return shipments.

"Another important feature in connection with this service is that it delivers the material where it is to be used. Frogs, switches, etc., are unloaded at points where they are to be installed. Culvert lumber, cattle guards, etc., are handled in a similar manner.

"Two of these trains operate out of the Sacramento general store and two from Los Angeles general store. Some of the branches are only covered every sixty or ninety days, as business does not warrant a thirty-day service.

"Superintendents usually accompany the supply train with their division engineer, roadmaster, signal supervisor, etc. This means a thorough monthly inspection of their division. Fire and watch inspectors also use this train to cover their districts, which would otherwise necessarily have to be covered by a motor car."

ALASKA'S MINERAL OUTPUT in 1919 is valued at about $18,850,000, while that of 1918 was valued at $28,254,000.



UNITED STATES RAILROAD ADMINISTRATION

DIRECTOR GENERAL OF RAILROADS

PASSENGER TRAIN AND PASSENGER LOCOMOTIVE PERFORMANCE

(Mixed Trains NOT Included)

For month of JUNE, 1919, compared with same month of previous year

TRAIN PERFORMANCE

LOCOMOTIVE PERFOR

LINE No.	LOCOMOTIVE MILES (Thousands) PRINCIPAL AND HELPER			LIGHT			TOTAL			PASSENGER TRAIN CAR MILES (Thousands)			CAR MILES PER TRAIN MILE This Year				CAR MILES PER TRAIN MILE Last Year				PER CENT LOCOMOTIVE MILES TO TRAIN MILES	AVERAGE NUMBER OF PASSENGER LOCOMOTIVES SERVICEABLE		TOTAL		% UNSERVICEABLE		LOCOMOTIVE MILES PER T LOCOMOT
	This Year	Last Year	Per Ct Change	This Year	Last Year	Per Ct Change	This Year	Last Year	Per Ct Change	This Year	Last Year	Per Ct Change	Passenger	Sleeper Parlor & Observ.	Other	Total	Passenger	Sleeper Parlor & Observ.	Other	Total	This Year (y)	Last Year (y)	This Year	Last Year	This Year (z)	Last Year (z)	This Year (a)
	2 691	2 707	6.6				3 047	2 850	6.9	18 355	15 156	8.0				8.0				5.9	103.9	105.8	902.7	946.0	1 255.6	1 192.0	28.7	20.7	80.2
	3 329	6 083	4.8				6 365	6 274	4.6	45 877	44 523	2.8				7.2				7.5	101.1	103.0	1 497.6	1 559.6	2 391.8	2 391.8	26.1	22.6	100.4
	1 209	1 209	7.0				1 298	1 213	7.0	6 939	6 546	1.4				5.3				5.6	108.9	101.9	278.0	276.6	357.2	345.9	28.6	20.0	121.1
	9 993	9 993	5.1				10 810	10 527	5.9	68 903	66 347	3.8				6.7				6.8	102.6	103.0	2 564.5	2 626.4	3 984.7	3 930.7	35.6	31.9	92.4
	7 813	7 305	7.0				8 183	7 613	7.6	48 841	43 387	12.6				8.4				8.3	102.0	102.0	1 857.1	1 865.2	2 968.3	2 921.7	30.6	19.6	118.2
	868	868	12.8				1 009	868	16.2	8 498	8 239	3.2				8.9				8.6	104.1	104.0	230.9	237.8	291.2	258.0	20.7	15.6	119.2
	6 716	6 762	0.7				8 647	8 908	2.9	58 762	60 326	2.6				5.8				6.0	100.8	102.2	1 581.6	1 631.3	2 615.6	2 649.1	21.6	13.3	123.1
	6 842	6 904	0.9				8 363	8 434	0.8	58 594	58 709	0.2				6.4				6.3	101.3	102.4	1 582.7	1 630.8	2 690.5	2 695.6	22.1	16.7	104.8
	6 044	7 047	2.3				8 282	8 175	6.5	57 340	53 332	6.5				7.1				7.1	103.0	103.0	1 884.3	2 056.5	2 940.1	2 995.5	27.3	20.8	104.7
	3 875	3 986	2.6				5 716	6 088	5.0	23 540	24 261	2.0				6.1				6.1	100.9	100.9	524.7	672.1	1 130.7	1 102.9	26.9	20.6	115.4
	44 176	43 077	2.6				45 520	44 304	2.7	383 526	372 241	4.1				8.5				6.8	102.0	102.8	10 547.7	11 200.4	14 251.7	13 902.8	26.0	19.4	106.5
	52	39	32.0	n	n		52	39	30.9	199	184	8.2	2.5	0.5	1.5	4.0	2.7	0.2	1.8	4.6	102.6	102.2	16.1	18.0	25.2	25.0	36.5	28.9	65.8
	311	308	1.2	42	39		354	347	2.1	1 980	1 861	5.7	2.8	1.9	2.0	6.7	2.9	1.5	1.9	6.4	103.4	102.4	96.0	131.0	122.0	122.0	27.3	9.0	95.9
	641	606	5.3	30	31		671	636	5.3	4 912	4 645	8.3	3.3	0.6	1.6	5.8	3.3	0.5	1.8	5.6	101.7	101.3	273.0	327.0	426.0	413.0	37.2	20.8	66.9
	36	36	0.6	1	1		37	36	0.7	137	122	8.7	2.2		1.7	3.8	2.1		1.5	3.6	102.3	100.5	11.0	14.0	19.0	18.0	34.9	26.4	67.9
	71	71	13.8	2	3		82	73	13.5	411	361	13.2	2.8	0.3	2.4	5.1	2.4	0.2	2.5	5.1	100.0	100.0	22.7	27.0	28.9	32.0	22.6	13.6	95.0
	21	22	4.6	1	1		32	23	39.5	163	122	34.4	2.0	1.1	2.1	5.2	2.1	1.0	2.3	5.5	100.0	100.0	6.0	7.0	14.0	9.0	20.0	25.2	104.7
	139	109	27.5	4	4		203	193	5.6	1 045	1 057	3.0	2.4	1.1	2.1	5.6	2.6	1.1	2.1	5.8	101.7	102.6	51.0	72.0	75.0	80.0	32.0	22.7	98.1
	1 525	1 140	7.5	75	68		1 301	1 206	7.8	8 855	6 591	9.1	3.4	1.3	1.5	6.2	3.4	1.2	1.5	6.1	110.9	110.5	352.0	356.0	510.0	459.0	25.3	22.4	65.0
	107	96	10.5	1	0		107	97	11.2	693	683	1.9	1.9	1.0	4.1	7.0	2.1	0.9	4.6	7.7	105.7	106.5	29.3	31.0	34.7	34.0	13.6	13.9	169.5
	2 691	2 707	6.6				3 047	2 850	6.9	18 355	15 156	8.0				8.0				5.9	103.9	105.8	902.7	946.0	1 255.6	1 192.0	28.7	20.7	80.2
	37	36	2.1	0	1		38	39	2.1	352	134	13.3	2.3	0.8	1.2	4.1	2.1	0.4	1.3	3.8	100.0	101.8	8.0	7.0	10.0	9.0	20.0	22.2	125.8

Railroad Administration Operating Statistics

The First Attempt at a Standard Scientific Set of Operating Statistics Permitting Comparisons Between Roads

THE DIVISION OF OPERATION of the Railroad Administration undertook to devise a series of reports to be made by the individual roads under government control, which would form the basis of control by the regional directors, and of judgment of the effectiveness of this control by the central administration. This work was placed in the hands of the Operating Statistics Section of the Division of Operation, which section was in charge of W. J. Cunningham, professor of transportation, Harvard University. The monthly reports of operating statistics are on seven forms numbered OS 1 to OS 7, and relate to (1) freight train performance; (2) passenger train performance; (3) locomotive performance; (4) distribution of locomotive hours; (5) freight car performance; (6) locomotive and train costs, and (7) income account.

The great value, as well as the great defect of the statistics compiled under the direction of a general manager or director of operation of the individual road has been that the form of the statistics is designed to meet particular conditions. The value of such statistics lies in the elimination of misleading generalities, and the close application which can be made to peculiarities in operating conditions. The weakness lies in the impossibility of making accurate comparisons between two different roads, and in the impossibility, in many cases, of understanding the statistics on their face; that is, without knowing the individual peculiarities of operating conditions which they were devised to show. Furthermore, operating statistics were often continued after their usefulness had vanished; continued in a form which had been devised to meet particular but temporary conditions, and which became worthless or worse than worthless, when these temporary conditions had radically changed.

It is proposed that the Interstate Commerce Commission require the roads, after their return to private operation, to compile and forward to the commission statistics similar to these of the Operating Statistics Section. The objections to this requirement arise from a number of different causes. In the first place, it puts a very considerable additional burden on the accounting department of many roads. If the statistics are valuable, however, in improving or keeping track of operating performances, this is not a valid objection. Another and far more serious objection is that in the mass of averages which are used in these reports, individual good and bad performances offset each other. It is argued that what the supervising office wants to know is the individual performance of locomotive 1062, with Engineman Brown and Conductor Smith in charge, with 80 cars over the up-hill district of the western division. Many roads were making daily and monthly reports which enabled the superintendent to study just these details.

If all railroad managements were as progressive and had adopted as scientific operating statistics as the Southern Pacific, the Seaboard Air Line or the Western Maryland, the setting of a standard such as is given in the operating statistics report would be of far less importance than it is. The truth is, however, that on many roads the operating statistics were perfunctory and unscientific.

The tests of whether or not a system of statistics is helpful in supervision of railroad operating results are:

Do the statistics draw attention to favorable or unfavorable changes?

Do the statistics within themselves furnish an explanation of favorable or unfavorable changes which are not the result of some extraordinary event or accident?

These tests when applied to Professor Cunningham's operating statistics show that the reports clearly indicate favorable or unfavorable changes, and these changes can be traced back to their causes in most cases. It is often said that operating statistics can be only a guide to the supervising officer as to when and from whom to demand an explanation. These Railroad Administration statistics do more than that. They furnish at least a partial explanation within themselves. They are a big step forward in the science of control of railroad operations through uniform operating statistics.

The Railroad Administration's Improvement Program

A Review of the Construction Progress Made During the Period of Government Management

ONE IMPORTANT FEATURE of the Railroad Administration's activities has been that relating to the expenditures for additions, betterments and extensions. Up to September 30, 1919, the total charges to capital account for this purpose for Class I roads, exclusive of that for equipment ordered by the Administration, was $721,528,680. Of this amount $457,776,347 was spent in 1918, so it is safe to say that the total for 1919 will be considerably smaller. Large as these expenditures appear when it is considered that they were directed by a single agency, it should be noted that the capital appropriation in 1918 is not as great as the total of the sums appropriated individually by the roads in 1917, when the capital charge for additions, betterments and extensions was $571,746,523 (for Class I and Class II roads).

The discussion following in regard to capital expenditures by the Railroad Administration is restricted to that portion of it relating to additions to the fixed property, that is, exclusive of equipment. Expenditures for this purpose on Class I roads from January 1, 1918, to September 30, 1919, amounted to $448,040,911 for additions and betterments and $25,928,064 for the construction of extensions, branches and other new lines. The problem encountered in the centralized expenditure of these large sums, the manner in which the work was carried out, and the results secured, constitute an interesting chapter of the story of government management of the American railroads and a review of this undertaking is presented below.

AUTHORIZATIONS by the Division of Capital Expenditures during the two years of government control have aggregated $676,684,763 for additions and betterments (exclusive of equipment) and $47,576,573 for extensions.

Obstacles to the expeditious prosecution of the work permitted the expenditure of only $448,040,911 for additions and betterments and $25,928,064 for extensions up to September 30, 1919.

During 1918 work was delayed by war conditions; in 1919 by financial difficulties.

The improvements represented by the expenditures for additions and betterments given above were undertaken in a desperate effort to increase the traffic-handling capacity of the railroads of this country as a war machine, after President Wilson had concluded, late in December, 1917, that this end could be best accomplished by centralizing the management of the roads under a government agency. The character of the improvements authorized was influenced to a large degree by the evidences of inadequacy demonstrated in the course of the memorable traffic blockades occurring in such rapid succession during 1916, 1917 and 1918, as to constitute one long-drawn-out congestion.

Having decided to operate the roads, it was but a short step to undertake the administration of capital expenditures also. In fact, the war conditions offered as many arguments for the one as for the other. With the enormous demands being made for capital for all manner of war purposes, it would have been extremely difficult for many of the roads to have raised sufficient money to carry on the necessary improvements. In the second place, war conditions demanded the restriction of capital expenditures entirely to such projects as were deemed necessary for the winning of the war, and, third, the establishment of priorities with respect to the limited quantities of material available was more readily administered by a centralized authority. The same principle applied also to labor, but was never put into effective practice.

The authorization of such enormous expenditures and

supervision of the work thus approved by one centralized authority represented a herculean task and required the creation of a special bureau organized especially for this work. The Division of Capital Expenditures was created in March, 1918, under the direction of Judge R. S. Lovett, chairman of the board of the Union Pacific, who had been serving for some time as chairman of the Priorities Committee of the War Industries Board. Judge Lovett appointed E. E. Adams, consulting engineer, and F. W. Sercombe, assistant controller, of the Union Pacific System, as his assistants. The work of this organization was supplemented by a committee headed by Francis Lee Stuart, consulting engineer, which passed on technical phases of the required additions and betterments. The activities of this committee was limited largely to the Eastern and Allegheny regions, where improvements were undertaken on the most intensive scale.

What the Work Involved

The nature of the work authorized to be carried on under the direction of the Railroad Administration is indicated by the table of capital expenditures on Class I roads:

water stations, shop buildings, engine houses, shop machinery and tools, and power plants.

The rule governing the decision to approve or disapprove work was the same in most cases. To justify undertaking a project, its completion must effect a real addition to the traffic-carrying capacity of the roads. In cases of work on which the roads had already invested considerable capital, some weight was given to the possible loss entailed in consequence of delay in its completion. Under this exception the roads were permitted to complete, or carry to a state of partial completion, such work as track elevation, passenger stations, grade revision, and a few new lines and extensions that were already under construction, but practically no new work of a similar nature was authorized. In the case of large passenger terminal projects in the course of construction the practice varied. Work on the stations at Jacksonville, Fla., and Richmond, Va., was permitted to proceed to completion. Similar passenger terminal improvements at Indianapolis, consisting primarily of grade separation, were allowed to go on, but the Chicago and St. Paul union station projects were suspended until after the signing of the armistice.

AUTHORIZATIONS AND EXPENDITURES IN CONNECTION WITH WORK CHARGEABLE TO CAPITAL ACCOUNT FROM JANUARY 1, 1918, TO SEPTEMBER 30, 1919, INCLUSIVE, FOR CLASS I RAILROADS BY CLASSES OF WORK

Class of Work	Estimated Cost of Work Authorized: During year 1918	Estimated Cost of Work Authorized: From January 1 to September 30, 1919	Estimated Cost of Work Authorized: Total, January 1, 1918, to September 30, 1919	Deduct unexpended balances as of June 30, 1919, for work completed or deferred	Estimated cost of work authorized in effect September 30, 1919	Expenditures: During year 1918	Expenditures: From January 1, to September 30, 1919	Expenditures: Total, January 1, 1918, to September 30, 1919
Additions and Betterments (Existing Lines)								
Widening cuts and fills, filling trestles, etc.	$7,570,485	$3,947,447	$11,517,932	$1,636,098	$9,881,834	$4,190,363	$3,652,417	$7,842,780
Ballasting	10,115,591	4,391,551	14,507,142	3,300,465	11,206,677	4,416,469	4,036,620	8,453,089
Rails and other track material	34,645,402	23,357,669	58,003,071	3,586,447	54,415,624	15,195,237	19,897,521	35,092,758
Bridges, trestles and culverts	42,635,698	17,132,072	59,767,770	8,456,628	51,311,142	24,089,064	13,316,133	37,405,197
Tunnel and subway improvements	2,397,464	700,130	3,097,594	521,608	2,575,986	1,235,919	662,043	1,897,962
Track elevations or depressions	$16,676,019	1,685,640	18,291,659	5,063,048	13,228,611	3,827,664	1,248,659	5,076,323
Elimination of grade crossings	12,053,906	3,787,558	15,841,464	2,028,400	13,813,064	4,361,286	2,665,448	7,026,734
Grade crossings and crossing signals	1,628,699	849,307	2,478,006	202,673	2,275,333	927,494	752,696	1,680,190
Additional main tracks	58,526,436	12,297,277	70,823,713	14,056,444	56,767,269	31,813,135	13,979,075	45,792,210
Additional yard tracks, sidings and industry tracks	122,612,008	20,759,767	143,371,775	26,202,756	117,169,019	61,296,503	30,551,448	91,847,951
Changes of grade or alignment	8,113,529	1,305,881	9,415,410	3,042,141	6,377,269	3,615,805	2,319,094	5,934,899
Signals and interlocking plants	14,558,065	2,165,973	16,724,038	2,227,827	14,496,211	6,689,059	5,439,952	12,129,011
Telegraph and telephone lines	5,769,432	1,174,747	6,944,179	679,865	6,264,294	3,048,278	2,124,808	5,173,086
Roadway machinery and tools	2,148,946	566,173	2,715,119	145,469	2,369,650	1,263,365	1,046,000	2,309,365
Section houses and other roadway buildings	3,252,771	1,375,716	4,628,487	610,048	4,018,439	1,987,967	1,440,508	3,428,475
Fences and snowsheds—right-of-way, snow or sand fences	1,874,724	777,381	2,652,105	281,480	2,370,625	953,866	834,998	1,588,864
Freight and passenger stations, office buildings and other station facilities	32,256,325	10,341,351	42,597,676	5,087,670	37,510,006	18,190,190	9,572,246	27,762,436
Hotels and restaurants	951,822	335,866	1,287,688	123,714	1,163,974	555,869	440,058	995,927
Fuel stations and appurtenances	7,962,965	2,716,480	10,679,445	753,388	9,926,057	4,402,086	3,783,906	8,185,994
Water stations and appurtenances	12,772,851	3,532,329	16,305,180	1,649,498	14,655,682	6,725,874	4,701,423	11,427,297
Shop buildings, engine houses and appurtenances	56,325,588	22,702,320	79,027,908	6,651,471	72,376,437	33,742,428	37,317,925	71,060,353
Shop machinery and tools	21,887,005	6,352,070	28,239,075	3,395,153	24,843,922	8,187,677	10,075,106	18,262,783
Electric power plants, sub-stations, transmission and distribution lines	18,472,736	4,298,328	22,771,064	1,084,364	21,686,700	7,313,101	7,606,491	14,919,592
Wharves and docks	5,652,741	1,531,497	7,184,238	2,441,019	4,743,219	1,690,622	2,014,510	3,705,132
Coal and ore wharves	5,816,271	908,631	6,724,902	561,069	5,153,933	4,654,626	685,028	5,339,656
Grain elevators and storage warehouses	2,928,970	1,711,629	4,640,599	881,845	3,758,754	1,728,891	1,582,107	3,310,998
Real estate	665,965	127,676	793,641	57,627	736,014	351,904	115,193	467,097
Assessments for public improvements	2,274,103	1,133,889	3,407,992	266,486	3,141,506	1,395,049	1,003,949	2,398,998
All other improvements	10,138,562	2,103,329	12,241,391	2,005,662	10,236,229	5,340,564	2,185,190	7,525,754
Total (excluding equipment)	$522,685,079	$153,999,684	$676,684,763	$97,000,383	$579,684,380	$263,190,357	$184,850,554	$448,040,911
Construction of extensions, branches and other new lines	43,007,435	4,569,138	$47,576,573	$11,048,254	$36,528,319	$17,942,615	$7,985,449	$25,928,064

Unfortunately, this fails to differentiate between the work initiated by the Railroad Administration and that undertaken before the government took over the railroads and to which the Administration gave its subsequent approval. Many of the roads had important work under way at the beginning of 1918, which they continued to prosecute pending the receipt of definite approval from the government or instructions to discontinue. This accounts, in a measure, for the size of some of the classes of improvements that could not be considered as war measures, as for instance freight and passenger stations, office buildings, track elevation and depression, bridges, and tunnel and subway improvements. Among the really vital items in this list may be mentioned additional main tracks, additional yard tracks and sidings, signals and interlocking, fuel stations and appurtenances,

The work of passing on all the budgets submitted to the Division of Capital Expenditures consumed a large amount of time, but the companies were notified individually of the approval of each item as soon as it was passed, so that a large amount of work was authorized before the first public statement of the Administration's betterment budget on May 18, 1918, when capital expenditures for additions and betterments and extensions to the amount of nearly $450,000,000 was announced. This work continued throughout the year, and by December 1, 1918, capital expenditures for additions and betterments to the amount of $507,687,414 had been approved, together with expenditures for extensions, branches and other lines to the amount of $39,644,301.

Every effort was made to expedite the work on the projects approved, particularly those on which the urgency was the

greatest. To this end, a corps of engineering assistants on the staffs of the regional directors were detailed to make frequent inspections of the work to ascertain what progress was being made, and institute measures to overcome any causes of delay. However, events occurring in rapid succession following the signing of the armistice on November 11, 1918, soon led to a marked change in this policy.

Very early in 1919 Director General Hines found it necessary to ask Congress for an additional appropriation of $750,000,000 to supplement the $500,000,000 revolving fund appropriated by Congress during the previous year, which had been largely exhausted in the temporary financing of capital expenditures and in paying the deficit from operation by the Administration. These facts were brought out in hearings before Congress, and on February 21 the appropriation bill was passed by the House, but as a consequence of filibusters in the Senate the bill was stranded when Congress adjourned on March 4. The serious difficulty which confronted the Railroad Administration as a consequence was the occasion for an immediate retrenchment in both capital and operating expenditures, and Director T. C. Powell, of the Division of Capital Expenditures, who succeeded Judge Lovett in January, 1919, very shortly announced that capital expenditures for the year would have to be financed very largely by the corporations and called attention to the fact that this would make it necessary to secure the approval of the corporate officers before proceeding with any new project.

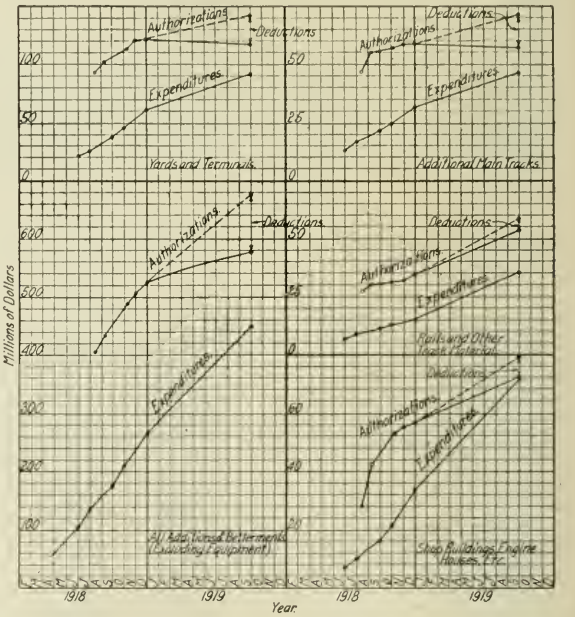
The steady increase in the deficit from operation through the first half of 1919, together with the action of Congress in cutting the appropriation from $1,200,000,000 to $750,000,000, when the bill was eventually passed in June, made it impossible for the Administration to alter its policy with regard to capital expenditures. For this reason only the most necessary work was authorized during 1919, but owing to the fact that there was a large holdover from work authorized during 1918, the work actually accomplished during the second year of government management did not fall far below the volume of work done during the first year.

A Study of the Progress Made

Like all other undertakings involving the use of men and materials during the war period, it was physically impossible to obtain the desired progress on the railway projects for increased facilities to the degree that would effectively ameliorate the railway congestion. Fortunately the armistice went into effect before the advent of the winter of 1918 and 1919, which in itself proved to be a very mild affair in comparison with its immediate predecessor. As given on the table, the expenditures for additions and betterments chargeable to capital account (exclusive of equipment) authorized up to January 1, 1919, for Class I roads, was $522,685,079, but of this total only about one-half, namely $263,190,357, was spent during that calendar year. This is illustrated effectively by the diagrams showing the expenditures and authorizations for all additions and betterments and also for several separate accounts under this head.

From these charts it is seen that during 1918 the rate at which the expenditures were authorized during the second half of the year was faster than the rate at which the work could be prosecuted. However, these charts cannot be taken to show the actual rate of completion of work. For instance, the chart on shops, engine houses, etc., indicates that more money had been spent by January 1, 1919, than was authorized on August 15, 1918, but this does not indicate that all of the work authorized on August 15 had been completed by January 1, since the amount spent on that date included considerable sums for work authorized later than August 15. As a matter of fact, through familiarity with a large number of these projects it is known that practically the only large engine terminals actually completed and ready for use in the winter of 1918 and 1919 were such as had been started or on which preliminary work was well in hand prior to the advent of government control.

The portions of the charts covering the second year of government control also bring out several pertinent points. First, that a considerable amount of additional work, other than that held over, was authorized; second, that much work was later deferred, and, third, that there is a considerable holdover for 1920. The grand total of authorizations for Class I roads chargeable to capital account was $676,684,763 on September 30, 1919. This was reduced by deductions for unexpended portions of work completed or deferred to $579,684,380. The total expenditure from January 1, 1918, to September 30, 1919, was $448,040,911. The charge for engine terminals and shops indicates a more complete fulfillment of the program than is warranted by the facts. It



Relation of Progress in Authorizations and Expenditures on Additions and Betterments

would appear that only about $3,000,000 worth of work remains to be finished, but actually there was a total on September 30 of $12,396,226 of authorizations in excess of expenditures, which is balanced by expenditures in excess of authorization of $9,275,658. Notwithstanding this, the showing is very much better than for the accounts covering yards and terminals and additional tracks. The appropriation for extensions, branches and new lines amounted to $47,576,573, of which $11,048,254 was eventually deducted. Expenditures to September 30 amounted to only $25,928,064, leaving an unexpended balance of $12,899,658.

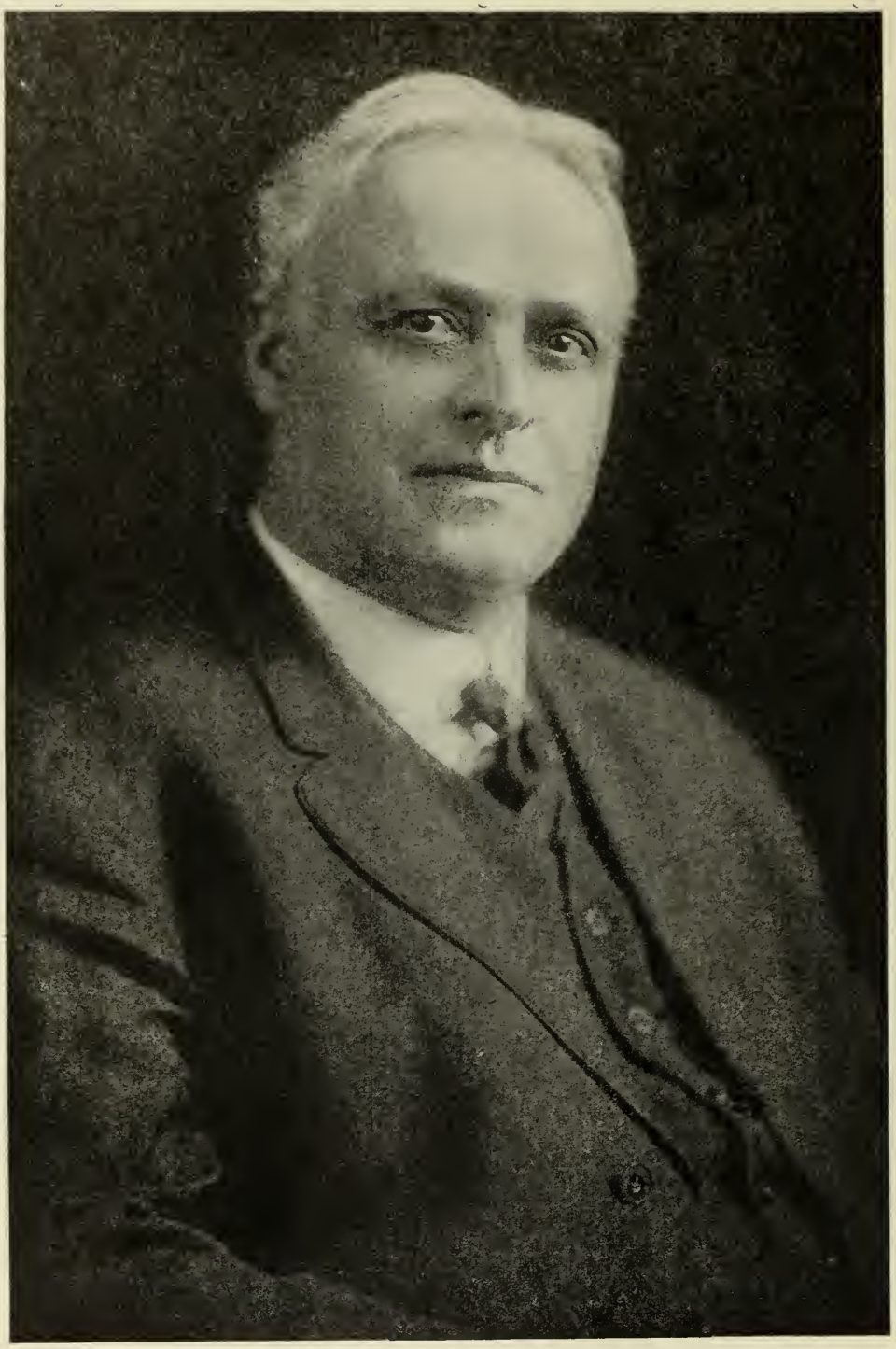
Taking into consideration the magnitude of the task and the serious obstacles to expeditious prosecution of the work prevailing during the war period, and later in 1919 due to failure of Congress to make needed appropriations, the progress made in additions and betterments is highly creditable not only to the officers of the Division of Capital Expenditures but also to the railway engineering officers who were directly responsible for the actual work done. It must be recalled in this connection that railway construction work during the war period was carried on in direct competition with a large amount of other government construction projects, and, while much of the other government construction work was conducted with a seeming disregard for all considerations of economy, the railway work was generally prosecuted with commendable conservatism.

Statistics of the Railways in 1919

Detail Studies of the Progress
Made by the Railroads of This Country
Last Year

Comparison with Previous Years

General Reviews of the Canadian and British
Railway Situation



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Hon. John J. Esch of Wisconsin, Chairman of the House Committee on Interstate and Foreign Commerce

Railway Revenues and Expenses in 1919

Net Federal Income Estimated at Approximately $400,000,000 Less Than Government Guarantee

By Julius H. Parmelee

LIKE ITS IMMEDIATE PREDECESSOR, the year 1919 is with difficulty placed in its true relationship to normal railway operation. The bulk of our railway mileage continued in the hands of the federal government, whose control over railway operation has extended into every phase of railroad activity. Furthermore, wages and other costs continued to rise as in 1918, a rise which the increased freight and passenger rates, in effect during the whole of the year just closed, did not prove sufficient to offset. With passenger and freight rates from 11 to 13 per cent higher than the average of 1918, yet the deficit under the government guarantee to be made up out of the public treasury was at least $150,000,000 greater than in 1918. That is, the total deficit will approximate $400,000,000 for 1919, as compared with a deficit of $236,000,000 in 1918.

What were the outstanding facts of the year? Both revenues and expenses broke the record, freight traffic was about nine per cent less than in 1918, passenger traffic about six per cent greater, and the deficit three-fourths greater. The aggregate deficit for two years of government operation will approximate $650,000,000.

WITH PASSENGER and freight rates 11 to 13 per cent higher in 1919 the estimated government deficit exceeds that of the year 1918.

Revenues 5.3 per cent greater, expenses 9.2 per cent greater and net operating income 17.4 per cent less than in previous year.

The railways earned 63 per cent of guarantee.

The aggregate loss to the government for the two years was between $625,000,000 and $650,000,000.

Revenues

Revenues of Class I railways passed the five billion mark by 175 million dollars. Through October they stood at $4,293,000,000, or a quarter of a million dollars greater than in 1918, which was the previous ten months' record. For the year as a whole, revenues were about $260,000,000, or 5 per cent greater than in 1918, and $1,780,000,000, or 52 per cent greater than the annual average of the test period.

Freight revenue for 10 months amounted to $2,950,000,000. For the year, I estimate a total of $3,550,000,000, which was $100,000,000 more than in 1918 (in spite of a freight traffic less than in 1918 by nine per cent), and $1,170,000,000, or about 50 per cent, greater than during the test period. In fact, the *freight* revenue alone for 1919 was greater than the average annual *total* revenues from all sources of operation during the test period, and almost equal to the total revenues of the year 1916.

The same analysis applies to the revenue from passenger business. Passenger revenue for 10 months amounted to $986,000,000. For the year my estimate is $1,200,000,000, which is about $170,000,000 greater than in 1918, and $510,000,000, or nearly three-fourths, greater than during the test period.

Other revenues, including receipts from mail, express, and other sources, amounted in 10 months to $357,000,000, or slightly less than in 1918. This indicates a total for the year of about $425,000,000.

These revenue returns are presented in tabular form below. The statistics are based on complete returns for the ten months to October 31, and on incomplete data for November and December. Although several complicating factors entered into the railway situation in those two months (such as the coal and steel strikes), it seems probable that revenues as a whole were at about the same level as during the corresponding months of 1918. Some railways lost heavily in revenue, while others gained; the net result will show but slight change.

RAILWAYS OF CLASS I.

	1919
Freight revenue.....	$3,550,000,000
Passenger revenue.....	1,200,000,000
Other operating revenue..	425,000,000
Total operating revenue	$5,175,000,000

The monthly percentage of increase or decrease in the several revenue accounts, compared with 1918, is shown in Chart I.

Expenses

As to operating expenses, they also stood at record height in 1919. Through the first 10 months they amounted to $3,615,000,000; for the year as a whole they approximated $4,375,000,000, which was $368,000,000, or 9.2 per cent, greater than in 1918, and $2,078,000,000, or 90 per cent, greater than the annual average of the test period.

To get an adequate perspective on expenses, it should be recalled that railway operating expenses were slowly growing each year up to and including 1916; that in 1917 the first effects of the rising level of prices began to be felt; that in 1918 the increased wages made effective by the Railroad Administration, together with the increased cost of material and supplies, jumped the expenses of that year more than

40 per cent; that the trend of rising wages and costs in 1919, while not so great as in 1918, yet continued at a marked rate.

To indicate the detailed facts underlying these statements, it may be instanced that expenses in 1916 were nearly 17 per cent greater than in 1915, the increase being more or less fully accounted for by increased traffic; that expenses in 1917 were about 20 per cent greater than in 1916, whereas traffic increased at only half that rate, or about 10 per cent; that expenses in 1918 were more than 40 per cent greater than in 1917, whereas traffic increased less than 5 per cent. For 1919, the record shows that expenses were greater than in 1918 by about 9 per cent, whereas traffic actually declined as compared with the previous year, passenger traffic showing an increase, which was more than offset by the decrease in freight traffic.

In other words, the increased expenses of 1916 were explained by growth of traffic, about half the increase of 1917 was due to increased traffic, while about one-eighth of the increase in expenses in 1918, and none of the increase in 1919, was due to the traffic factor. The last two clauses tell the story of the financial difficulties in which the Railroad Administration has found itself since January 1, 1918: wage increases and other increasing costs have been running far ahead of growth of traffic, and also ahead of efforts to meet the increased cost of operation by means of increased rates.

Operating expenses as a whole were 9.2 per cent greater in 1919 than in 1918. The greatest increase in any one principal account was in maintenance of way, which in-

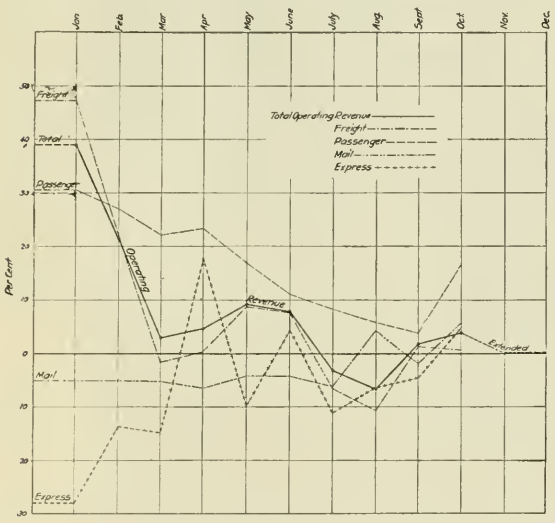


Chart I—Rate of Increase or Decrease of General Revenue Accounts by Months, 1919, Compared With 1918

creased 20 per cent; next in general expenses, which increased 11.6 per cent; maintenance of equipment increased nearly 10 per cent, and transportation increased more than 5 per cent.

Traffic expenses, which fell off one-quarter in 1918 as compared with 1917, continued to decrease in 1919, falling between 7 and 8 per cent.

The amounts represented by these various expense accounts in 1919 were as follows:

Maintenance of way	$782,500,000
Maintenance of equipment	1,215,000,000
Traffic	45,000,000
Transportation	2,165,000,000
General	125,000,000
All other	42,500,000
Total operating expenses	$4,375,000,000

Chart II shows the monthly percentage of increase or decrease in the various expense accounts, as compared with 1918.

Taxes were slightly greater than in 1918, or about $190,000,000. With due allowance for the items of hire of equipment, joint facility rentals, and uncollectible revenue, the income account of roads of Class I for 1919 (November and December partially estimated), as compared with 1918, is as follows:

Item	1919	1918	Increase or decrease Amount	Per cent
Operating revenues	$5,175,000,000	$4,913,319,000	$261,681,000	5.3
Operating expenses	4,375,000,000	4,006,894,000	368,106,000	9.2
Net revenue	800,000,000	906,425,000	d 106,425,000	d 11.7
Taxes	190,000,000	186,652,000	3,348,000	1.8
Equipment rentals, etc.	Dr 40,000,000	Dr 29,354,000	d 10,646,000	d 36.3
Net operating income	$570,000,000	$690,419,000	d$120,419,000	d 17.4
Ton-miles (millions)	398,000	435,000	d 37,000	d 8.5
Pasgr.-miles (millions)	45,000	42,606	2,394	5.6

From this showing it appears that the net operating income, corresponding to the standard return of $905,000,000

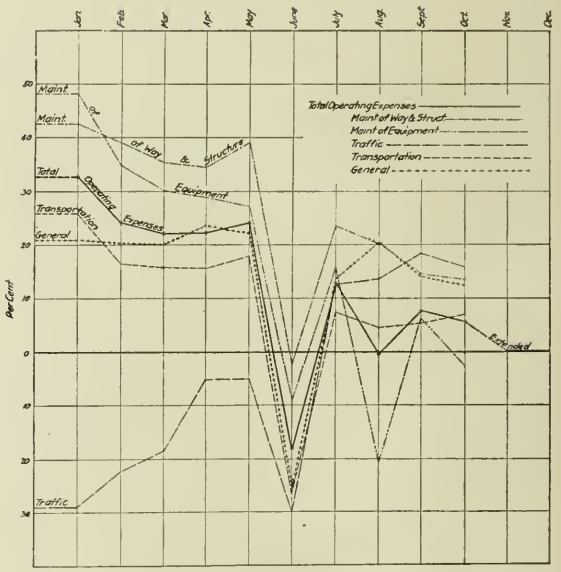


Chart II—Rate of Increase or Decrease of General Expense Accounts by Months, 1919, Compared With 1918

guaranteed to Class I railways by the federal government, was $570,000,000 in 1919, or $335,000,000 less than the guarantee. In other words, the railways earned only 63 per cent of their guarantee in 1919. This net operating income for 1919 was less than in 1918 by $120,000,000, or 17.4 per cent.

Turning for a moment to a comparison of the results of 1919 with those for the average year of the three-year test period (1915-1916-1917), we find that revenues, expenses, net income, and traffic for the two periods were as follows:

Item	1919	Test period average	Increase or decrease Amount	Per cent
Operating revenues	$5,175,000,000	$3,395,231,000	$1,779,769,000	52.4
Operating expenses	4,375,000,000	2,297,162,000	2,077,838,000	90.3
Net revenue	800,000,000	1,098,069,000	d 298,069,000	d 27.1
Taxes	190,000,000	152,427,000	37,573,000	24.6
Equipment rentals etc.	Dr 40,000,000	Dr 40,482,000	482,000	1.2
Net operating income	570,000,000	905,160,000	d 335,160,000	d 37.1
Ton-miles (millions)	398,000	363,500	34,500	9.5
Passgr. miles (millions)	45,000	34,286	10,714	31.2

A large part of the increased revenue was due to increased rates, and a part also to increased traffic. How great these two factors have been will appear from a scrutiny of the

trend in freight and passenger revenues. Freight revenue was greater than during the test period by $1,170,000,000, while passenger revenue was greater by $510,000,000. The freight traffic of 1919 was nearly one-tenth greater than that of the test period, while the freight revenue was greater by about one-half. It follows that one-fourth of the increased freight revenue of 1919 was due to increased freight traffic (transported, of course, at the higher rates) and some three-fourths to increased rates. Of the $1,170,000, then, $290,000,000 represents increase in traffic over the test period, and $880,000,000 increased rates. Passenger traffic in 1919 ran consistently about thirty per cent greater than during

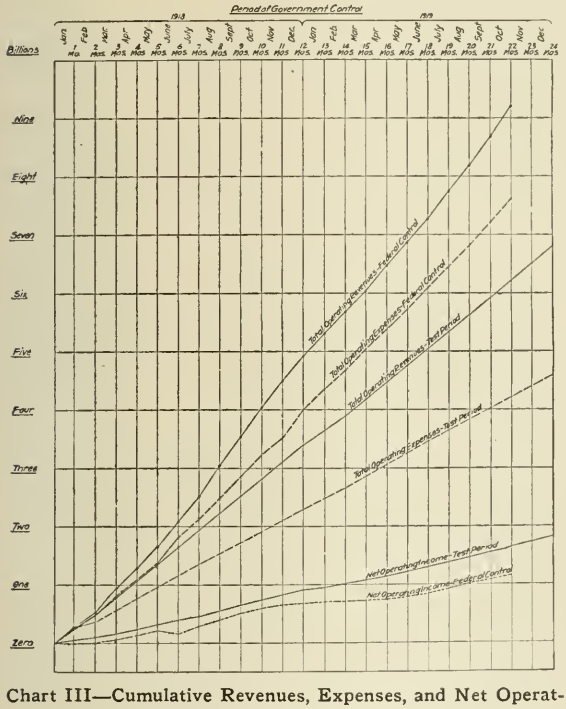


Chart III—Cumulative Revenues, Expenses, and Net Operating Income, Period of Federal Control (1918-1919) Compared with Test Period

the test period. If traffic was three-tenths greater, and revenues were three-fourths greater, it follows that about six-elevenths of the increased passenger revenue in 1919 was due to increased traffic, while the remaining five-elevenths was due to increase in rates. The amounts are respectively $280,000,000 and $230,000,000.

Operating expenses were 90 per cent greater than during the test period (compared with increased revenues of 52 per cent), and taxes were one-fourth greater. Freight traffic increased 9.5 per cent, and passenger traffic 31.2 per cent.

Deficit to Be Made Up from Public Treasury

For the two years of government control and operation the total deficit from the operation of Class I railways, to be made up out of the public treasury, is as follows:

	1919	1918	Two-years
Standard return	$905,000,000	$905,000,000	$1,810,000,000
Net operating income	570,000,000	690,419,000	1,260,419,000
Deficit	$335,000,000	$214,581,000	$549,581,000

This table indicates a total deficit for the two-year period, for railways of Class I, of nearly $550,000,000. Unfortunately, this is not the whole story, for the government is operating many smaller railways, the Pullman company, some electric railways, a number of water carriers and inland waterways, is guaranteeing the net income of the express companies, and is itself spending several millions a year for expenses of administration in the maintenance of the central Washington office and the regional offices of the United States Railroad Administration.

For example, the deficit shown above for railways of Class I in 1918 is $214,581,000. The total deficit for 1918, all operations, has been reported by Director General Hines as $236,184,040, or about twenty-one and a half millions greater than the deficit on Class I operations alone. The director general's statement is so illuminating that it is worth reproducing in condensed form below:

Deficits	Year 1918
Steam railways	$216,328,314
Sleeping car line	4,597,503
Water carriers and waterways	3,829,090
Express company (from July 1)	9,500,000
Expenses, U. S. R. R. Adm.	3,647,143
	$237,902,050
Credits	
Electric Rys. surplus (7 roads)	319,232
Miscellaneous net Crs. (bnk. int., etc.)	1,398,778
Total net deficit for 1918	$236,184,040

Corresponding statistics for 1919 are not available as this article is written, but it is clear that with a deficit of $335,000,000 from the operation of railways of Class I, the total net deficit of the Railroad Administration for the year will

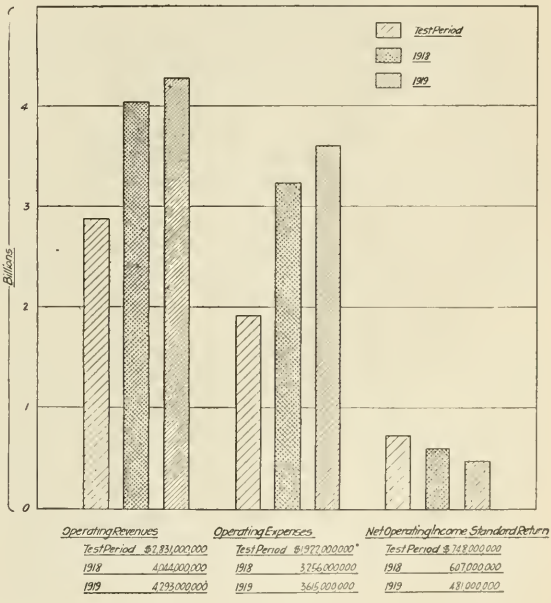


Chart IV—Revenues, Expenses and Net Operating Income for Ten Months to October, 1919, Compared With 1918 and Ten-Twelfths of the Test Period

approach, and in all probability surpass, $400,000,000. This will place the aggregate deficit for the two years somewhere between $625,000,000 and $650,000,000, a total which makes no allowance for possible credits or debits that may arise out of the adjustment of claims for under- or over-maintenance, the status of the material and supply account, loss and damage accounts, claims made by short-line railroads on account of diverted traffic, and other items not now ascertainable.

In this connection, it is of interest to quote from the report filed by Senator Cummins when he introduced Senate Bill No. 3288 (the Cummins Bill) on November 10:

"According to the estimate of the Railroad Administration, the net operating income of the systems in the hands of the government for the two years 1918 and 1918, will be $551,777,459 less than the compensation to which the carriers are entitled, computed as provided in the law and as prescribed in the standard contract; that is to say, when all accounts have been adjusted and paid the government will have lost that amount in its two years of operation. It is the opinion of the committee, without reflecting in any wise upon the Railroad Administration, that in the end the loss will be found to be much greater than the estimate submitted; but, however that may be, it must ultimately be paid from the treasury of the United States."

At a later point in the report, Senator Cummins proceeds on the assumption "that the government's loss for the two years will be, in round numbers, $600,000,000."

Chart III gives the cumulative revenues, expenses, and net operating income (in billions of dollars) of railways of Class I during the two years of federal operation, as compared with the test period. The striking feature of the chart is that the *expenses* of federal operation have almost consistently surpassed the *revenues* of the test period, whereas the net operating income has been consistently less.

Chart IV makes the same showing by years; the average year of the test period, the year 1918, and the year 1919. To facilitate exact comparison, the figures are for the ten months to October 31 of each year. The revenues and expenses have progressively increased; the net operating income has progressively declined.

Reasons for Increases

We proceed now to an analysis of the reasons why the revenues and expenses of 1919 showed the increases over corresponding accounts for 1918 indicated in the foregoing paragraphs.

First, as to revenues. It has already appeared, from the preceding discussion, that freight revenue in 1919 increased $100,000,000 over 1918, and passenger revenue $170,000,000, with a small decrease in the other revenue accounts.

The increase in total operating revenues was $262,000,000. As compared with 1918, freight traffic fell off about 9 per cent, so that increased rates were responsible both for making up the decrease in traffic and for the increase of $100,000,000 in freight revenue. The total amount assignable in 1919 to increased rates was about $400,000,000, or about 13 per cent. There was no general increase in freight rates during 1919, although many rate adjustments were made that in the aggregate had an upward tendency, but as the general increase of 1918 was in effect only half the year, the average for the whole of 1919 was clearly greater than the average for the whole of 1918.

The increase of $170,000,000 in passenger revenue, as compared with 1918, was due partly to increased rates and partly to increased traffic. Passenger-miles increased six per cent over 1918. Combining these two factors in their proper relationship, we find that about two-fifths of the $170,000,000, or about $68,000,000, was due to increased traffic and the balance, or $102,000,000 to increased rates.

It will be remembered that the increased passenger rates of 1918 were effective only from June 10, and that the full effect of the increase was therefore not reflected in the passenger revenue totals for that year.

"All other revenue" is composed of mail revenue, express revenue, and a number of miscellaneous revenue accounts. Mail revenue showed a mournful tendency to decrease, in spite of the fact that the railways were handling no less mail in 1919 than in 1918. In fact, the Postmaster General reported for the fiscal year ended June 30, 1919, that the record business of 1918 had continued during the year 1919. Yet the mail revenue for the first 10 months of 1919 was less than for the same period of 1918 by 2.8 per cent. The Postmaster General, describing the "scientific and businesslike method of railway mail pay," which he claims was installed as a result of his own active championship, states that this method "enables the department to pay for what it receives and the railroads to receive what they earn, which was not possible under the old system." Under the practical workings of the method, which has been vigorously protested by the railways, postal revenues in 1919 appreciably increased, whereas railway mail pay, or revenue received by the railways for transporting the increased mail traffic, showed a decrease.

Express revenue also decreased. For 10 months the decrease was nearly $6,000,000, or 5.7 per cent. This was in spite of increased express rates, in the benefits of which the railways of course had a share, and indicates the serious falling off in express business that took place in 1919.

Miscellaneous revenues other than mail and express showed slight increases in the aggregate.

It is, however, when we turn to the operating expense accounts that the startling nature of changes during 1919 makes itself apparent. Total expenses increased $368,000,000, or about nine per cent. The question at once arises as to what proportion of the $368,000,000 represented wages and what represented the cost of materials, supplies, etc.

Wages

As to wages, three factors enter into a comparison of payrolls for two periods. One is the number of men at work, the second is the number of hours or days per man, and the third is the rate of pay per hour or per day. The second factor multiplied by the third gives earnings per employee, and this multiplied by the number of men gives the total payroll.

Now in 1918, according to Director General Hines, the total payroll of railways of Class I under federal control was $2,593,000,000, of which $583,552,000 represented increased wages made effective during the year. Inasmuch as only part of the increases dated back to the first of the year, it is evident that the $583,552,000 did not reflect the full effect of all the 1918 increases, computed on an annual basis. While the exact effect of the 1918 increases cannot be stated, it is generally estimated as approximating $900,000,000 a year. Several additional general increases were made in 1919, which again will not be fully reflected in the 1919 payroll, but which are expected to aggregate about $150,000,000, as follows:

Trainmen in January (to complete the "war cycle")	$60,000,000
Police, dining car employees, etc.	5,000,000
Shopmen (from May 1)	50,000,000
Trainmen (from Dec. 1)	36,000,000
Total	$151,000,000

This amount, approximating $150,000,000, would seem to bring the total wage increases up to or above a billion dollars a year. Certain wage tables submitted by Director General Hines to the Senate in November, in response to a resolution of that body, show that between December, 1917, and July, 1919, the payroll increased from $153,039,988 to $226,140,935. This was an increase of $73,000,000 a month, or something less than $900,000,000 annually. The increase is due in part to the greater number of men on the payroll. On the other hand, the figures do not include the agreement with maintenance of way employees, effective December 16, 1919, nor smaller adjustments made in the wage scales of many subsidiary groups of employees; furthermore, they cover only in part the 1919 increases listed above. It is impossible to give proper weight to all these factors, but to say that wages have risen a billion dollars a year does not appear far from the actual facts of the case.

The director general's tables show, further, that with the increase in number of men, the average number of hours per day, or standard days per month, had decreased since 1917. The net result to the average employee, as shown in his pay envelope each month, was an increase in annual

earnings from $1,004 in 1917 to $1,433 in 1919 (July basis), a rise of 42.7 per cent.

Other costs than wages have also increased, driven upward by the inexorable trend of rising prices. The Railroad Administration reports that coal prices for the first nine months of 1919 were $3.45 per ton (including rail haul), as compared with $3.25 in 1918. This increase of 20 cents per ton, when applied to 150,000,000 tons, represents $30,000,000 in money; the chances are that the total will prove to have been much increased by the coal strike and the necessity that devolved on the railways of confiscating coal at high prices; this is entirely apart from the increased price of coal that may grow out of the strike settlement. Other materials than coal also suffered increases in 1919, although it is difficult to show exact amounts for each article.

In brief, it is next to impossible to ascertain what proportion of the $368,000,000 of increased expenses went to labor, and what proportion was absorbed by material costs. That the bulk of it, however, must have gone into the payroll is the inevitable conclusion, when one considers that the number of railway employees in 1919 was increasing, that their average earnings were growing, and that the 1918 wage increases did not become fully effective until 1919.

Normal taxes payable by the director general under the standard contract were about the same in 1919 as in 1918, but corporate taxes, which the railways must pay out of their own net income, and which includes the bulk of the special war taxes, were greater in 1919 than in 1918. They approximated $40,000,000 for Class I railways in 1918.

Finally, what is the outlook for the future? We have seen that for 1919 the net operating income of Class I railways was some $335,000,000, or nearly a million dollars a day, less than the standard return, without any allowance for additional return on money invested in railway property since July 1, 1917. Whatever may be the added efficiency of private operation, will it be offset by a deliberate campaign on the part of railway labor to bring about government ownership? There are possibilities in the situation that might easily add a tinge of pessimism to any forecast. At best, to require the railway industry to re-shoulder its burden of operation with a $335,000,000 deficit as an additional handicap is asking almost too much of human energy, no matter how willing or capable it may be. A horizontal increase in freight rates would assist the problem, but will such an increase be authorized quickly enough to save the bulk of the railway companies from bankruptcy?

If a larger traffic be assumed for 1920 than was handled in 1919, that would help solve the problem, provided the factor of labor and the factor of public opinion mutually determine to give private railway operation a fighting chance—the American square deal to which it is certainly entitled.

Photo from International

On the Mexican Border, Where Extensive Improvements Are Too Likely to Attract Bandit Raids

The Oakland Mole

The Oakland (Cal.) Mole, western terminus at the present time of the Southern Pacific, the Atchison, Topeka & Santa Fe and the Western Pacific, handles approximately 90 steam trains and 677 electric trains in and out every day, according to an article written by D. A. Porter, division engineer of the Western division of the Southern Pacific in the "Southern Pacific Bulletin." The average number of switching movements made within the limits of the Oakland Pier tower is 1,900 and under emergency conditions has reached 2,100—from 79 to 83 switching movements an hour, or over one a minute.

The 90 steam passenger trains comprise over 650 cars. The total number of passengers handled, according to Mr. Porter, averages 12,000 daily and the total number of passengers across the Bay of San Francisco via the Oakland Mole is estimated at 55,000 daily.

In addition Mr. Porter's article contained the following description of the facilities for handling freight on the Mole:

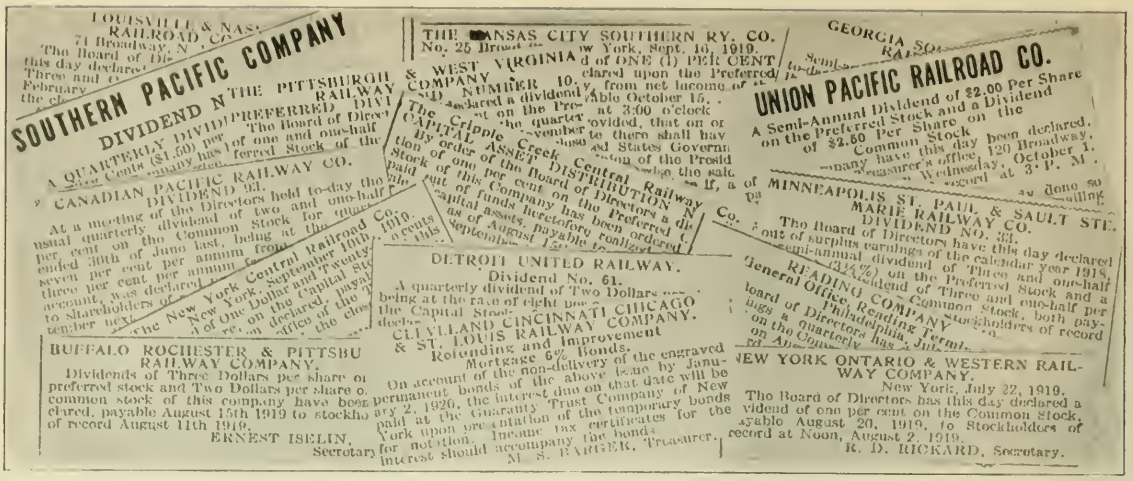
"The new freight slips are located on the south side of the mole. The present facilities consist of three units or wharves which are driven at an angle with the bulkhead line and are respectively 100 ft., 70 ft. and 75 ft. wide and each 875 ft. long. The completed work requires the use of nearly 5,000 piles and over a million and a half feet of lumber. Over three-quarters of a million cubic yards of dirt was removed to give the proper depth of water for berthing vessels.

"On Dock No. 1 is located a warehouse 80 x 380 ft. in size with a floor space of over 30,000 sq. ft.

"This shed is served by two depressed tracks down the center so that cargoes may be wheeled directly from sling to car. The entire side is made of sliding doors so that any portion can be reached conveniently. Night loading is facilitated by excellent lighting arrangements.

"Fifty vessels a month carrying lumber are unloaded at these wharves, carrying from 75,000 to 500,000 ft. of lumber. Tracks are so arranged on the lumber wharves that transfer may be made direct from boat to car. An average of 200 carloads a month, including all classes of freight, is received or shipped over these wharves. The facility with which lumber may be handled here is illustrated by the fact that one boat unloaded 155,000 feet of lumber in two hours."

"Switchmanship."—Big men nowadays tell us that to succeed we must be a good salesman and that we must sell something that we believe in and something that the buyer will not have to put on the shelf or sell at a sacrifice. What has a switchman to sell? A switchman sells his labor at so much an hour. He must sell his employer the best he has so that his employer can sell transportation. If the employer does not sell good transportation there is no business on the road and both switchman and employer suffer. Suppose you want to make a change from your present location to one where the prospects for you are better. You go to your employer and tell him of your intentions. You have been a good salesman and you have always sold him something that he could use. He likes you for your honesty, so he takes you into his private office and talks to you as father to son and volunteers to write a personal letter to your future employer. If he is personally acquainted with your future employer he will make it a point to look him up and have a talk with him and do all the good he can. He is sorry to lose you, but he is willing to help you, because you helped him. You leave his office in a happy frame of mind. If you have been a poor salesman you do not get such a reception. You will go to the office and tell your employer of your intention and he will reply: "All right." He calls in his clerk and tells him to give you an order for your time and a service letter. Your service letter will be something on the order of a prison record. It will give the color of your hair and eyes, weight and height.—*Duit Wright,* Illinois Central.



Dividend Changes on Railroad Stocks

Lehigh Valley Is the Only Important Railroad Which Made a Change in Its Regular Dividend Rate

THE SAME RENTALS were due the railroad corporations from the government for the operation of the roads in 1919 as in 1918. Since fixed charges and dividends are paid from this rental, there were no important changes in dividend rates, with the exception of the Lehigh Valley. The Lehigh Valley had been paying annual dividends at the rate of 10 per cent during the test period, and the rental from the government would have permitted a continuance of this rate, but since in the test period the dividend absorbed nearly the entire surplus of the company it was thought more conservative to reduce the rate from 10 per cent to 7 per cent in 1919.

There was a good deal of uncertainty about dividend payments by a number of the railroad companies. The situation was complicated by the fact that on the one hand the government was loaning money to the corporations for additions and betterments to their property, sometimes with the approval of the corporation and sometimes against the wishes of the corporation. At the same time the government was delaying the payment of the guaranteed rentals to the companies. Furthermore, the government was asking corporations which could use their corporate funds for additions and betterments to do so, and this left some corporations almost without corporate funds for a period of time. When, therefore, the regular dividend period came around the directors found themselves in the position of having book earnings sufficient to pay the regular dividends, but no funds immediately available. This lead to the practice of declaring dividends, payable when the funds became available, and in many cases with the proviso that the dividend be approved by the Railroad Administration. This meant delayed dividends to stockholders, with a certain amount of annoyance and even hardship to stockholders wholly dependent for their living on their income from investments.

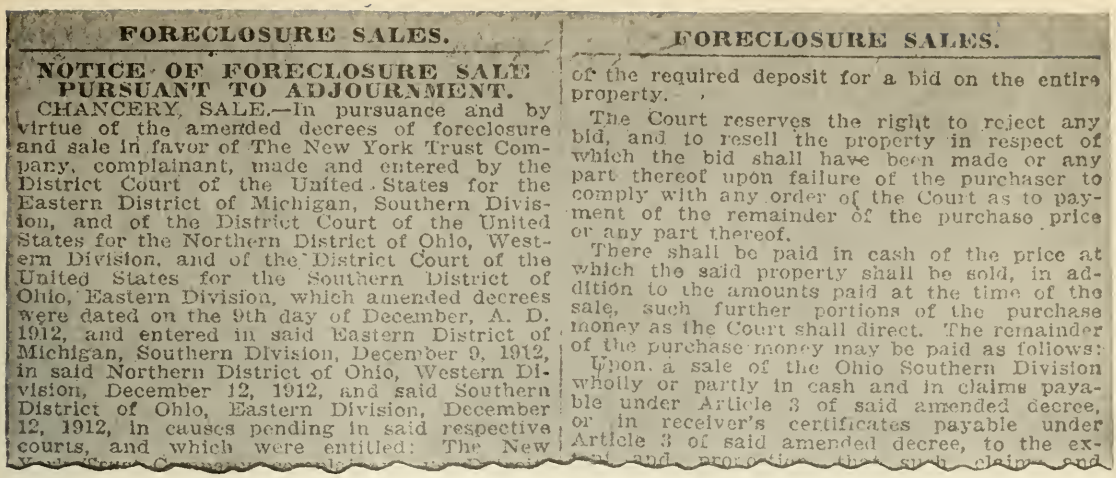
Certain dividend changes that took place in 1918 are still hanging fire, notably the cases of the Wabash preferred A stock and the Chicago, Milwaukee & St. Paul preferred. Both these stocks are investment securities, the preferred A of the Wabash representing the exchange or bonds in reorganization and the preferred of the Chicago, Milwaukee & St. Paul representing what for nearly a generation was considered one of the gilt-edge railway stock investments. The corporation officers of the St. Paul and of the Wabash have continued their efforts (begun in 1918) during 1919 to reach some basis of settlement with the United States Railroad Administration. In both cases the character of the stock is such that its holders should have the utmost consideration, consistent with justice, from the Administration and from the directors of the corporation. What the outcome will be, however, is still uncertain.

DIVIDEND CHANGES

Name of road	Per cent declared in 1919	Per cent declared in 1918	Annual rate in 1919	Annual rate in 1918
Baltimore & Ohio, Common	4	4½	4	4*
New York, Ontario & Western, Common	1	2	..	..
Western Pacific R. R. Corporation, Preferred	4	6	4	6
Western Pacific R. R. Company, Preferred	4	6	4	6
Lehigh Valley	8½	10	7	10
New York, Chicago & St. Louis, 1st Preferred	None	5	..	..
New York, Chicago & St. Louis, 2d Preferred	2½	None	..	..
Albany & Susquehana	12¼	9	9	9

* The regular dividend rate was reduced from an annual 5 per cent to an annual 4 per cent in the second dividend period of 1918.

The Ogden Public Library, Ogden, Utah, is planning to establish a department of transportation history, using for this purpose a recent gift of $8,000, representing the unexpended balance of money given by the Southern Pacific and the Union Pacific Railroad companies for the Golden Spike Celebration, held last May, in commemoration of the joining of the two roads near Ogden. The new department will include a museum containing relics of the union of the two roads and books dealing with this and other pioneer transportation events.



FORECLOSURE SALES.

NOTICE OF FORECLOSURE SALE PURSUANT TO ADJOURNMENT.

CHANCERY SALE.—In pursuance and by virtue of the amended decrees of foreclosure and sale in favor of The New York Trust Company, complainant, made and entered by the District Court of the United States for the Eastern District of Michigan, Southern Division, and of the District Court of the United States for the Northern District of Ohio, Western Division, and of the District Court of the United States for the Southern District of Ohio, Eastern Division, which amended decrees were dated on the 9th day of December, A. D. 1912, and entered in said Eastern District of Michigan, Southern Division, December 9, 1912, in said Northern District of Ohio, Western Division, December 12, 1912, and said Southern District of Ohio, Eastern Division, December 12, 1912, in causes pending in said respective courts, and which were entitled: The New

FORECLOSURE SALES.

of the required deposit for a bid on the entire property.

The Court reserves the right to reject any bid, and to resell the property in respect of which the bid shall have been made or any part thereof upon failure of the purchaser to comply with any order of the Court as to payment of the remainder of the purchase price or any part thereof.

There shall be paid in cash of the price at which the said property shall be sold, in addition to the amounts paid at the time of the sale, such further portions of the purchase money as the Court shall direct. The remainder of the purchase money may be paid as follows:

Upon a sale of the Ohio Southern Division wholly or partly in cash and in claims payable under Article 3 of said amended decree, or in receiver's certificates payable under Article 3 of said amended decree, to the ex-

Receiverships and Foreclosure Sales During 1919

One Important Reorganization Under Government Auspices Without Foreclosure Sale

THE LAW under which the President took over the operation of the railroads provided that no judgment could be made against the property of railroads which the President took if this property was used in operation. The owning corporations are receiving rental for the use of their railroad property on a basis entirely independent of their present earnings and expenses, and receiverships, therefore, of roads being operated by the government were nil. The seven small roads which are shown in the table of receiverships established in 1919 were none of them government operated roads, nor is there any particular significance to be attached to their bankruptcy.

A foreclosure sale of a large road usually marks the reorganization of the company's financial affairs on a basis which it is hoped will prove a favorable one for the operation of the road and the re-establishment of the company's

SUMMARY OR RECEIVERSHIPS FOR 44 YEARS

Year	No. of roads	Miles	Bonds and stocks
1876	42	6,662	$467,000,000
1877	38	3,637	220,294,000
1878	27	2,320	92,385,000
1879	12	1,102	39,367,000
1880	13	885	140,265,000
1881	5	110	3,742,000
1882	12	912	39,074,000
1883	11	1,990	108,470,000
1884	37	11,038	714,755,000
1885	44	8,836	385,460,000
1886	13	1,799	70,346,000
1887	9	1,046	90,318,000
1888	22	3,270	186,814,000
1889	22	3,803	99,664,000
1890	26	2,963	105,007,000
1891	26	2,159	84,479,000
1892	36	10,508	357,692,000
1893	74	29,340	1,781,046,000
1894	38	7,025	395,791,000
1895	31	4,089	369,073,000
1896	34	5,441	275,597,000
1897	18	1,537	92,909,000
1898	18	2,069	138,701,000
1899	10	1,019	52,285,000
1900	16	1,165	78,234,000
1901	4	73	1,627,000
1902	5	278	5,835,000
1903	9	229	18,823,000
1904	8	744	36,069,000
1905	10	3,593	176,321,000
1906	6	204	55,042,000
1907	7	317	13,585,000
1908	24	8,009	596,359,000
1909	5	859	78,095,000
1910	7	735	51,427,500
1911	5	2,606	210,606,882
1912	13	3,784	182,112,497
1913	17	9,020	477,780,820
1914	22	4,222	199,571,446
1915	12	20,143	1,070,808,628
1916	9	4,439	208,159,689
1917	19	2,486	61,169,962
1918	8	3,519	242,090,800
1919	7	244	11,886,779

SUMMARY OF FORECLOSURE SALES IN 44 YEARS

Year	No. of roads	Miles	Bonds and stocks
1876	30	3,840	$217,848,000
1877	54	3,875	198,984,000
1878	48	3,906	311,631,000
1879	65	4,909	243,288,000
1880	31	3,775	263,882,000
1881	29	2,617	137,923,000
1882	16	867	65,426,000
1883	18	1,354	47,100,000
1884	15	710	23,504,000
1885	22	3,156	278,394,000
1886	45	7,687	374,109,000
1887	31	5,478	328,181,000
1888	19	1,596	64,555,000
1889	25	2,930	137,815,000
1890	29	3,825	182,495,000
1891	21	3,223	169,069,000
1892	28	1,922	95,898,000
1893	25	1,613	79,924,000
1894	42	5,643	318,999,000
1895	52	12,831	761,791,000
1896	58	13,730	1,150,377,000
1897	42	6,675	517,680,000
1898	47	6,054	252,910,000
1899	32	4,294	267,534,000
1900	24	3,477	190,374,000
1901	17	1,139	85,808,000
1902	20	693	39,788,000
1903	13	555	15,885,000
1904	13	524	28,266,000
1905	6	679	20,307,000
1906	8	262	10,400,000
1907	6	114	13,777,000
1908	3	138	2,547,000
1909	12	2,629	250,033,000
1910	17	1,100	93,660,109
1911	13	1,386	40,741,543
1912	12	661	25,910,990
1913	6	1,159	86,163,850
1914	9	1,470	83,189,500
1915	11	3,914	285 258,782
1916	26	8,355	703,444,855
1917	20	10,963	557,846,348
1918	11	763	24,735,187
1919	8	459	15,479,587

*Operation suspended.
†Road abandoned.

credit. With the sale, however, of a small road this is not always the case. The foreclosure sale may simply mark a step in the downward progress by which one set of creditors gets out of the affair with what it can, but without the new owners of the property having any well-backed financial plan for the rehabilitation of the credit of the property and for its solvent operation. All of the roads shown in the table of foreclosure sales in 1919 are small ones not under government control. The Georgia Coast & Piedmont was sold with the proviso that the road could be junked. The Gulf, Florida & Alabama may be rehabilitated and another attempt made at profitable operation of the property. The others are short, unimportant lines, some of which may be junked.

RECEIVERSHIPS ESTABLISHED IN 1919

Name of company	Mileage	Funded debt outstanding	Stock outstanding
Altoona Northern	16	$125,000	$675,000
Colorado Springs & Cripple Creek District Railway	74	2,680,879	2,000,000
Eastern Kentucky	36	.....	3,455,900
Pacific & Eastern	33	300,000	500,000
Pittsburgh & Susquehanna	23	400,000	500,000
Timpson & Henderson	35	.....	250,000
Twin Mountain & Potomac	27	500,000	500,000
Totals	244	4,005,879	7,880,900

There was one important road, the Boston & Maine, which was reorganized under the auspices of the United States Railroad Administration and taken out of the hands of receivers on December 31, 1919. It is not, of course, shown in either table, because there was no foreclosure sale. The Boston & Maine was put into the hands of receivers originally because the rentals of its leased lines, which, of course, were a fixed charge on the earnings of the parent company, were so high as to leave no margin of safety in periods of depression or abnormally high operating expenses. Under the reorganization holders of stock of the leased lines exchanged their holdings for stock of the Boston & Maine, bearing the same rate of interest which they had received as rental, but temporarily scaled down 20 per cent and made contingent upon earnings. This exchange of a fixed charge for a charge contingent on earnings puts the Boston & Maine in a much sounder financial position, and the credit for bringing the change about is due in part to the United States Railroad Administration and in part to the receiver and of certain members of the reorganization committee.

FORECLOSURE SALES IN 1919

Name of company	Mileage	Funded debt outstanding	Stock outstanding
Artesian Belt	46	.....	$70,000
Elkin & Allegheny	15	480,000	476,300
Florida, Alabama & Gulf	26	500,000	150,000
Ft. Smith, Subiaco & Eastern	14	400,000	150,000
Georgia Coast & Piedmont	100	1,807,287	1,572,000
Gulf, Florida & Alabama	157	4,410,000	4,410,000
Ocklawaha Valley	46	.....	250,000
Waycross & Western	45	384,000	420,000
Totals	459	7,981,287	7,498,300

RAILROADS IN THE HANDS OF RECEIVERS

Name of road	Mileage	Date of receivership	Bonds of old company	Stock of old company	Total old company securities
Altoona Northern	16	Aug. 8, 1919	$ 125,000	$ 675,000	$ 800,000
Boyne City, Gaylord & Alpena	94	Nov. 19, 1913	800,000	669,300	1,469,300
Cape Girardeau Northern	104	April 14, 1914	1,500,000	110,000	1,610,000
Chicago & Eastern Illinois	1,136	May 27, 1913	59,289,000	18,267,900	77,556,900
Chicago, Peoria & St. Louis	255	July 31, 1914	4,000,000	4,000,000	8,000,000
Colorado Midland	338	July —, 1918	9,532,000	10,000,000	19,532,000
Colorado Springs & Cripple Creek District Railway	74	May 10, 1919	2,680,879	2,000,000	4,680,879
Creston, Wintersct & Des Moines	22	June 25, 1914	200,000	98,600	298,600
Dansville & Mt. Morris	15	June —, 1894	150,000	50,000	200,000
Denver & Rio Grande	2,610	Jan. 26, 1918	121,802,000	87,779,800	209,581,800
Denver & Salt Lake	255	Aug. 16, 1917	12,514,000	12,182,500	24,696,500
Eastern Kentucky	36	March 31, 1919	.....	3,455,900	3,455,900
Evansville & Indianapolis	146	May 27, 1913	2,500,000	2,000,000	4,500,000
Fellsmere Railroad	16	Jan. 5, 1917	.....	.....	.....
Ft. Smith & Western	254	Oct. 9, 1915	6,240,000	5,000,000	11,240,000
Georgia & Florida	348	March 27, 1915	7,820,000	8,750,000	16,570,000
Gould Southwestern	18	April 14, 1914	8,929	51,000	59,929
Greenville & Western	23	Aug. 29, 1917	460,000	50,000	510,000
Haynesville & Montgomery	9	March 1, 1917	41,000	50,000	91,000
Houston & Brazos Valley	29	Nov. 27, 1915	420,000	24,000	444,000
Illinois Southern	140	Sept. 18, 1918	3,398,000	5,000,000	8,398,000
International & Great Northern	1,160	Aug. 11, 1914	26,347,000	4,822,000	31,169,000
Kansas City, Mexico & Orient	964	April 17, 1917	31,000,000	20,000,000	51,000,000
Kansas City Northwestern	200	Feb. —, 1917	.....	.....	.....
Liberty-White	50	Nov. 12, 1914	4,050	300,000	304,050
Louisiana & North West	121	Aug. 23, 1913	2,250,000	2,300,000	4,550,000
Macon & Birmingham	97	Feb. 1, 1908	500,000	500,000	1,000,000
Manistee & North Eastern	190	Dec. —, 1918	1,172,000	1,172,000	2,344,000
Marshall & East Texas	72	Jan. 25, 1917	1,180,000	200,000	1,380,000
Missouri & North Arkansas	365	April 1, 1912	8,353,295	8,340,000	16,693,295
Missouri, Kansas & Texas	1,744	Sept. 27, 1915	101,728,750	76,283,257	178,012,007
Missouri, Kansas & Texas of Texas	1,792	Sept. 27, 1915	35,638,054	10,152,500	45,790,554
Nevada Short Line	12	Jan. —, 1916	.....	.....	.....
New Berlin & Winfield		Jan. 15, 1919	23,800	30,000	53,800
Ocilla Southern	110	July 12, 1918	416,000	265,000	681,000
Orangeburg Railway	17	June 17, 1916	.....	100,000	100,000
Pacific & Eastern	33		300,000	500,000	800,000
Palatine, Lake Zurich & Wauconda	15	Oct. 19, 1914	.....	230,000	230,000
Pine Bluff & Northern	10	Feb. 9, 1916	43,000	160,000	203,000
Pittsburgh & Susquehanna	23	Jan. 15, 1919	300,000	500,000	800,000
Pittsburgh, Shawmut & Northern	205	Aug. 1, 1905	14,655,000	15,000,000	29,655,000
Rome & Northern	28	Feb. 28, 1911	.....	1,000,000	1,000,000
St. Louis & Missouri Southern	8	April 13, 1915	.....	.....	.....
St. Louis, El Reno & Western	42	Oct. 9, 1915	817,000	970,800	1,787,800
Salina Northern	81	July 27, 1917	1,500,000	1,162,300	2,662,300
San Antonio, Uvalde & Gulf	317	Aug. —, 1914	4,413,000	280,000	4,693,000
Sharpsville	18	Jan. 27, 1897	68,779	350,000	418,779
Southwestern Railway	30	Nov. 11, 1917	354,000	35,000	389,000
Tennessee & North Carolina	37	Sept. 13, 1916	454,000	306,100	760,100
Tennessee Central	295	Dec. 31, 1912	12,232,900	7,941,500	20,174,350
Texas & Pacific	1,947	Oct. 27, 1916	54,621,000	38,763,810	93,384,810
Tidewater & Western	93	May 14, 1917	300,000	300,000	600,000
Timpson & Henderson*	35	Oct. —, 1919	.....	250,000	250,000
Toledo, Peoria & Western	248	July 2, 1917	4,895,000	4,076,960	8,971,960
Toledo, St. Louis & Western	454	Oct. 22, 1914	27,602,000	19,947,600	47,549,600
Trinity & Brazos Valley	360	June 16, 1914	8,760,000	304,000	9,064,000
Twin Mountain & Potomac*	27	1919	500,000	500,000	1,000,000
Wabash, Chester & Western	65	July 15, 1914	690,000	1,250,000	1,940,000
Waupaca Green Bay	3	Aug. —, 1917	75,000	1,400	76,400
Wichita Falls & Northwestern	329	June —, 1917	.....	2,000,000	2,000,000
Williamsport & North Branch	56	Jan. 8, 1917	545,000	1,324,662	1,869,662
	17,608		575,319,436	381,832,829	957,152,265

*Discontinued operation.

AGREEMENT BETWEEN THE DIRECTOR GENERAL OF RAILROADS

AND THE

..... COMPANY

PREAMBLE AND RECITALS.

This Agreement, made this ..... day of ....., 1918, between *William G. McAdoo,* Director General of Railroads, hereinafter called the Director General, acting on behalf of the United States and the President, under the powers conferred by the proclamation of the President heretofore referred to, and the

Status of the Railroad Contract Negotiations

129 Companies Have Agreed with the Government on Compensation for Use of Their Property

A TOTAL OF 128 CONTRACTS between railroad companies and the Railroad Administration covering the compensation to be paid by the government for the use of their property during the period of federal control have been executed. These include 96 Class I roads; 127 contracts provide for an annual compensation of $716,435,061, while 2 additional contracts provide for lump sum payments, amounting to $129,734.80. The total provided for in the contracts executed covers, therefore, about three-fourths of the estimated total of the standard return guaranteed under the federal control act, which is about $940,000,000. The roads that have not yet signed up include mainly those that have claims for special compensation greater than that proposed to be allowed by the Railroad Administration.

The list of standard contracts between the director general of railroads and carriers under federal control is as follows. (Where dates appear after the name of the road it indicates that the contracts became effective at some other time than January 1, 1918):

	Compensation
Abilene & Southern Railway Company (July 1, 1918)	$78,375.18
*Alabama & Vicksburg Railroad	322,854.47
*Atchison, Topeka & Santa Fe	42,810,310.80
Grand Canyon Railroad.	
Kansas & Southwestern Railroad.	
Rio Grande, El Paso & Santa Fe.	
*Gulf, Colorado & Santa Fe.	
*Panhandle & Santa Fe.	
*Atlanta, Birmingham & Atlantic Ry. Co	480,000.00
Atlantic & Western Railroad (August 1, 1918)	12,660.72
*Atlantic Coast Line Railroad	10,185,942.34
Washington & Vandemere.	
Tampa Southern.	
Augusta Southern Railway (November 1, 1918)	28,000.00
*Baltimore, Chesapeake & Atlantic Railroad Co	86,647.38
*Baltimore & Ohio	30,031,009.14
*Staten Island Rapid Transit Company.	
Sandy Valley & Elkhorn.	
B. & O. Chicago Terminal.	
*Coal & Coke.	
Long Fork Railway.	
*Bangor & Aroostook Railroad	1,575,171.64
Van Buren Bridge Co.	
Bennettsville & Cheraw (July 1, 1918)	29,077.92
Birmingham & Northwestern Railway (May 1, 1918)	34,522.86
*Boston & Maine	9,832,490.52
Vermont Valley Railway Company.	
Montpelier & Wells River.	
Barre & Chelsea Railroad Company.	
Sullivan County Railroad Company.	
Brooklyn Eastern District Terminal	$306,259.63
*Buffalo & Susquehanna Railroad Corporation	591,612.97
Buffalo Creek Railroad	409,397.76
*Buffalo, Rochester & Pittsburgh Railway	3,276,410.42
*Central New England	1,468,123.63
*Central of Georgia Railroad	3,402,064.26
Wadley Southern.	
Sylvania Central.	
*Central Vermont Railway	835,402.22
Central Vermont Trans. Company.	
*Central Railroad Company of New Jersey	9,352,301.13
*Charleston & Western Carolina Railway	466,921.15
Chesapeake Steamship Company	102,048.99
*Chicago & Northwestern Railway Company	23,364,028.55
Missouri Valley & Blair Ry. & Bridge Company.	
Pierre & Ft. Pierre Bridge & Ry. Company.	
Pierre Rapid City & Northwestern.	
Wolf River Valley.	
Wyoming & Northwestern.	
*Chicago & Western Indiana Railroad Company	1,509,330.15
*Chicago, Burlington & Quincy Railroad Company	33,390,079.61
Black Hill & Fort Pierre.	
Deadwood Central.	
Quincy, Omaha & Kansas City.	
*Chicago Great Western Railroad Company	2,953,449.94
*Chicago, Indianapolis & Louisville Ry. Company	1,620,258.75
Chicago Heights Terminal Transfer Railroad Company	67,131.89
*Chicago, Milwaukee & St. Paul Ry. Company	27,946,771.45
Tacoma Eastern Rilroad Company.	
Bellingham & Northern Ry. Company.	
Seattle, Port Angeles & Western Ry. Company.	
Milwaukee Terminal Ry. Company.	
*Puget Sound & Willapa Harbor Ry. Company.	
Gallatin Valley Railway Company.	
Chicago Junction Railway	916,804.03
Chicago River & Indiana Railroad Company	108,525.82
*Chicago, St. Paul, Minneapolis & Omaha Ry	4,934,789.51
*Chicago, Terre Haute & Southeastern Ry	922,784.87
*Cincinnati Northern Railroad	317,628.01
*Cleveland, Cincinnati, Chicago & St. Louis	9,945,738.41
Muncie Belt Railway.	
*Colorado & Southern	2,833,578.93
*Wichita Valley.	
Cumberland & Pennsylvania Railroad	255,692.10
*Delaware, Lackawanna & Western	15,749,476.74
Denison & Pacific Suburban Ry. Company	4,702.45
*Denver & Rio Grande	8,319,376.67
*Detroit & Mackinac Railway Company	310,664.04
Detroit, Bay City & Western	85,967.31
Detroit Terminal Railroad	186,460.40
Durham & Southern Ry. Company (July 1, 1918)	133,410.22
*El Paso & Southwestern	4,145,102.30
*Erie Railroad	15,729,068.09
*Chicago & Erie.	
Escanaba & Lake Superior	58,688.01
*Fort Worth & Denver City Ry. Company	1,891,386.40
Gainesville Midland	22,731.58
Galveston Wharf Company (August 1, 1918)	526,069.92
Georgia & Florida Railway (November 1, 1918)	88,000.00
Georgia, Florida & Alabama Ry. (September 1, 1918)	57,637.73
*Georgia Railroad	858,662.42
*Grand Rapids & Indiana	929,385.42
Green Bay & Western Railroad	331,954.91
Ahnapee & Western Ry. Company.	
Kewaunee, Green Bay & Western Railroad Company.	

Indentations indicate subsidiary parties to the one contract.
*Indicates Class 1 roads.

*Great Northern Railway	$28,771,360.78
Duluth & Superior Bridge.	
Duluth Terminal.	
Great Falls & Teton County.	
Great Northern Equipment Company.	
Great Northern Terminal.	
Minneapolis Western.	
Minneapolis Belt.	
Montana Eastern.	
Watertown & Sioux Falls.	
Gulf, Texas & Western Railway (August 1, 1918), lump sum	29,734.80
*Hocking Valley Railway Company	2,637,167.48
*Hudson & Manhattan	3,003,362.77
*Illinois Central	16,540,717.32
Chicago, Memphis & Gulf.	
Dunleith & Dubuque Bridge.	
Central Elevator & Warehouse Company.	
Mississippi Valley Corporation.	
Indiana Harbor Belt	296,053.57
*Kansas City, Mexico & Orient Railroad	150,000.00
*The Kansas City, Mexico & Orient Ry. of Texas	
Lake Erie & Eastern	127,081.06
*Lake Erie & Western	1,548,541.69
Leavenworth Terminal Ry. & Bridge Company	43,583.48
*Lehigh & New England Railroad Company	1,135,760.91
*Lehigh & Hudson River Railway	519,371.13
*Lehigh Valley Railroad	11,318,714.48
*Los Angeles & Salt Lake Railroad	3,414,751.10
*Louisville & Nashville Railroad	17,310,494.67
*Louisville, Henderson & St. Louis Ry	343,915.53
Louisiana & Mississippi Railroad & Transfer Company	41,689.33
Louisville & Wadley Railroad Company	5,367.23
*Maryland, Delaware & Virginia Ry. Company	49,543.23
*Maine Central Railroad Company	2,955,696.88
Memphis, Dallas & Gulf Railroad (July 1, 1918)	28,295.70
*Michigan Central Railroad	8,105,727.04
Chicago, Kalamazoo & Saginaw.	
Minneapolis Eastern Ry. Company	30,332.61
*Minneapolis, St. Paul & Sault Ste. Marie	10,578,977.09
*Minnesota & International Railway Company	202,455.24
*Missouri & North Arkansas (September 24, 1918)	175,000.00
Missouri & Illinois Bridge & Belt Railroad Company	102,518.06
Morgantown & Kingwood Railroad Company (March 21, 1918)	51,362.93
*Nashville, Chattanooga & St. Louis Railroad	3,182,089.03
New England Steamship Company	1,050,753.33
The Hartford & New York Trans. Company.	
New Bedford, Martha's Vineyard & Nantucket Steamboat Company.	
*New Orleans Great Northern Railroad Company	519,904.35
*New York Central Railroad	58,122,084.92
Kanawha & West Virginia.	
Zanesville & Western.	
*Kanawha & Michigan.	
*Toledo & Ohio Central.	
*New York, New Haven & Hartford Railroad Company	17,173,366.56
*New York, Ontario & Western	2,103,589.41
*New York, Susquehanna & Western	999,941.74
Wilkes Barre & Eastern.	
*Norfolk & Western Railway	20,640,899.98
New River, Holston & Western.	
Tug River & Kentucky.	
Virginia-Carolina Railway.	
Williamson & Pond Creek.	
Norfolk Southern	1,280,000
*Northern Pacific Railway	30,130,068.81
Big Fork & International Falls.	
Gilmore & Pittsburgh.	
Ocean Steamship Company of Savannah	1,048,782.69
Pacific Fruit Express Company	1,218,324.68
*Pennsylvania Lines (West)	15,154,719.81
Wheeling Terminal Railway.	
Cincinnati, Lebanon & Northern.	
Ohio River & Western.	
Manufacturers Railway.	
*Pennsylvania Railroad	53,603,427.58
Baltimore & Sparrows Point Railroad.	
*Cumberland Valley Railroad.	
*New York, Philadelphia & Norfolk.	
Union Railroad Company of Baltimore.	
Barnegat Railroad.	
Philadelphia & Beach Haven.	
Rosslyn Connecting Railroad.	
Philadelphia & Camden Ferry	401,556.86
Pittsburgh, Chartiers & Youghiogheny Ry	180,614.38
*Pittsburgh & Lake Erie Railroad	8,980,219.40
Port Huron Southern Railroad	11,025.78
Pullman Company	11,750,000.00
*Richmond, Fredericksburg & Potomac	1,136,973.75
*Rutland Railroad	1,023,883.21
Salina Northern Railroad (September 1, 1918)	15,000.00
St. Louis Merchants Bridge Terminal Ry	412,427.56
*St. Joseph & Grand Island Ry	373,811.11
St. Paul Bridge & Terminal Railway Company	67,509.40
Sioux City Terminal Railway Company	17,352.93
*Southern Pacific	47,959,898.08
*Arizona Eastern.	
*Houston & Texas Central	
*Galveston, Harrisburg & San Antonio.	
*Texas & New Orleans.	
Houston & Shreveport.	
*Houston East & West Texas.	
*Morgan's Louisiana & Texas Railroad & S. S. Company.	
*Louisiana Western.	
Lake Charles & Northern.	
Iberia & Vermilion.	
Sunset Railway Company	64,562.79
Susquehanna & New York Railroad Co. (September 1, 1918)	56,884.89
*Toledo, Peoria & Western Ry. Company	159,739.77
Terminal Railway Ass'n of St. Louis	2,574,510.88
*Texas & Pacific Railway Company	4,107,432.49
*Trinity & Brazos Valley (August 1, 1918), lump sum	100,000.00
Trans-Mississippi Terminal Railroad Company	665,391.57
Union Freight Railroad Company	32,009.69
*Union Pacific Railroad	$38,416,110.79
*Oregon Short Line.	
*Oregon & Washington Ry. & Nav. Co.	
Des Chutes Railway.	
Green River Water Company.	
Rattlesnake Water Company.	
Union Pacific Water Company.	
*Vicksburg, Shreveport & Pacific Ry. Company	337,947.96
*Washington Southern	467,230.04
Waterloo, Cedar Falls & Northern Railroad Company	374,373.41
Weatherford, Mineral Wells & Northwestern	31,148.57
*Western Railway of Alabama	288,237.53
Wrightsville & Tennille Railroad	41,027.82
Winston-Salem Southbound Railway	260,251.62
Wiggins Ferry Company	416,675.60
East St. Louis Connecting.	
St. Louis Transfer.	
*Yazoo & Mississippi Valley	3,862,317.83

96 Class 1 roads.

127 Contracts with annual compensation	$716,435,061
2 Contracts with lump sum of	129,734.80

WAIVER OF CLAIMS EXECUTED

Alcolu Railroad.
Asherton & Gulf Railway.
Blytheville, Burdette & Mississippi River.
Butte, Anaconda & Pacific.
Cairo, Truman & Southern.
Campbell's Creek Railroad.
Duluth & Northeastern.
Franklin & Abbeville.
Georgia Coast & Piedmont.
Grafton & Upton.
Hartford & Eastern.
Holton Inter-Urban Railway.
Kaydeross Railroad Corporation.
Lake Erie, Franklin & Clarion.
Laurinburg & Southern.
Lewiston, Nez Perce & Eastern.
McCloud River.
Moshassuck Valley.
Norton & Northern.
Ohio & Kentucky.
Potato Creek.
Raritan River Railroad.
Red River & Gulf.
Roby & Northern.
Salem, Winona & Southern Railroad Company.
San Luis Southern Railway Co.
Santa Maria Valley.
Savannah & Southern Railway.
Sierra Railway of California.
Skaneateles Railroad.
Tionesta Valley.
Tuckerton Railroad.
Virginia & Carolina Southern Railroad.
West Virginia Northern.
Woodward & Louisiana Central.
Winfield Railroad.
Woodstock Railway.
Wyoming & Missouri River.
Yosemite Valley.
Yreka Railroad.

The federal control act provides that where no contract has been made the President may, nevertheless, pay to any carrier while under federal control an amount, payable in reasonable installments, not exceeding 90 per cent of the estimated just compensation, remitting to such carriers its legal rights for any balance claimed, and under this provision sums have been doled out as needed to many of the companies that have not executed contracts.

The standard return for the companies that have not yet made contracts is shown in the following table giving the certifications of the average annual railway operating income for the test period as thus far made to the President by the Interstate Commerce Commission. (The list includes many roads that were reliquished by the Railroad Administration. Deficits are in italics:

Name of carrier	Income
Akron Union Passenger Depot Company	$8,289.92
Akron & Barberton Belt Railroad Company	30,103.76
Alabama Great Southern Railroad Company	1,703,179.65
Albany Passenger Terminal Company	5,648.49
Alton & Southern Railroad	23,121.87
American Refrigerator Transit Company[1]	546,707.97
Ann Arbor Railroad Company	526,882.96
Anthony & Northern Ry. Company	9,512.52
Arizona & New Mexico Ry. Company	300,965.13
Arkansas Central Railroad Company	6,838.58
Arkansas Western Ry. Company	d 6,575.51
Arkansas & Louisiana Midland Ry. Company	31,994.06
Arkansas & Memphis Railroad Bridge & Terminal Company	296,113.18
Asheville & Craggy Mountain Ry. Company	d 3,017.13
Ashland Coal & Iron Ry. Company	73,569.57
Atlanta Terminal Company	68,935.62
Atlanta & West Point Railroad Company	252,995.16
Atlantic City Railroad Company	222,066.04
Atlantic & St. Lawrence Railroad Company	d 4,271.12
Atlantic & Yadkin Ry. Company	d 57,470.72
Augusta Union Station Company	12,978.60
Augusta & Summerville Railroad Company	d 286.90
Baltimore Steam Packet Company[2]	100,793.08
Bath & Hammondsport Railroad Company	7,221.43
Beaumont, Sour Lake & Western Ry. Company	d 34,546.12
Beaumont Wharf & Terminal Company	4,191.72
Bellingham & Northern Ry. Company	40,305.24
Belt Ry. Company of Chicago	869,442.49
Bessemer & Lake Erie Railroad Company	4,674,714.44
Big Fork & International Falls Ry. Company	31,931.82
Bingham & Garfield Ry. Company	1,234,492.96
Birmingham Terminal Company	77,456.16
Black Mountain Ry. Company	34,285.23
Blue Ridge Ry. Company	37,887.22
Bridgton & Saco River Railroad Company	16,136.37

[1] No operating returns made to the commission. Operating income ascertained and certified at the request of the director general.
[2] Boat lines.
[3] Operated by electricity.
d—Deficit.

Name of carrier	Income
Brimstone Railroad & Canal Company	$42,113.26
Brownwood North & South Ry. Company	d 8,522.07
Bullfrog Goldfield Railroad Company	19,338.90
Calumet, Hammond & Southeastern Railroad Company	d 10,619.94
Calumet Western Ry. Company	d 3,216.89
Canadian Pacific Ry. Company lines in Maine	251,555.44
Canadian Pacific Ry. Company's Pacific Coast steamers in United States[2]	152,311.01
Carolina, Clinchfield & Ohio Ry	1,581,950.33
Carolina, Clinchfield & Ohio Ry. of S. C	46,013.14
Carolina Railroad Company	3,420.64
Carolina & Northwestern Ry. Company	64,599.62
Carolina & Tennessee Southern Ry. Company	d 2,092.94
Catasauqua & Fogelsville Railroad Company	141,512.32
Central New York Southern Railroad Corp	16,502.19
Central Indiana Ry. Company	d 61,743.10
Central Transfer Ry. & Storage Company	2,986.33
Central Union Depot & Ry. Company of Cincinnati	114,842.27
Champlain Transportation Co.[2]	d 2,864.54
Charleston Terminal Company	24,986.24
Charleston Union Station Company	12,368.57
Charlotte, Monroe & Columbia Railroad	d 344.43
Chattahooche Valley Ry. Company	42,341.29
Chattanooga Station Company	43,604.48
Cherry Tree & Dixonville Railroad Company	67,926.10
Chesapeake & Ohio Ry. Company	13,226,983.23
Chester & Delaware River Railroad Company	161,332.28
Chesterfield & Lancaster Railroad Company	1,267.43
Cheswick & Harmar Railroad Company	d 770.90
Chicago, Detroit & Canada Grand Trunk Junction R. R. Co.	195,202.69
Chicago, Milwaukee & Gary Company	d 37,514.03
Chicago, Peoria & St. Louis Railroad Company, Bluford Wilson and William Cotter, receivers	127,540.49
Chicago, Rock Island & Gulf Ry. Company	968,302.31
Chicago, Rock Island & Pacific Ry. Company	14,912,378.91
Chicago & Alton Railroad Company	3,178,314.92
Chicago & Eastern Illinois Railroad Company	2,946,000.88
Cincinnati, Burnside & Cumberland River Ry. Company	4,239.02
Cincinnati, Findlay & Fort Wayne Ry. Company	d 51,802.01
Cincinnati, Indianapolis & Western Railroad Company	422,212.83
Cincinnati, New Orleans & Texas Pacific Ry. Company	3,541,039.53
Cincinnati, Saginaw & Mackinaw Railroad Company	d 92,602.92
Clinton & Oklahoma Western Ry. Company	45,241.33
Coal Belt Electric Ry. Company	12,689.11
Colorado & South-Eastern Railroad Company	34,982.75
Columbia Union Station Co	4,569.48
Connecting Terminal Railroad Company	61,243.93
Cooperstown & Charlotte Valley Railroad Company	d 15,381.59
Copper Range Railroad Company	222,781.19
Cumberland Railroad Company	d 412.32
Cuyahoga Valley Ry. Company	d 413.73
Dallas Terminal Ry. & Union Depot Co	40,820.22
Danville & Western Ry. Company	135,308.08
Dayton Union Ry. Company	48,912.05
Dayton & Union Railroad Company	d 8,241.06
Death Valley Railroad Company	74,299.62
Delaware & Hudson Company	7,409,600.12
Delta Southern Ry	d 48,136.23
Dents Run Railroad Company	d 7,480.34
Denver & Salt Lake Railroad Company	353,289.67
Des Moines Union Ry. Company	148,666.76
Detroit, Grand Haven & Milwaukee Ry. Company	146,643.56
Detroit & Huron Ry. Company	d 21,157.26
Detroit, Toledo & Ironton Railroad Company	225,895.02
Detroit & Toledo Shore Line Railroad Company	456,512.17
Direct Navigation Company[1]	d 11,857.50
Duluth, Missabe & Northern Ry. Company	5,122,051.04
Duluth, South Shore & Atlantic Ry. Company	594,637.41
Duluth Union Depot & Transfer Company	32,175.84
Duluth & Iron Range Railroad Company	2,355,241.74
Durham Union Station Company	6,953.60
Eastern Texas Railroad Company	3,852.23
Eddystone & Delaware River Railroad Company	2,733.50
Elgin, Joliet & Eastern Ry. Company	2,862,177.21
El Paso Union Passenger Depot Company	20,050.45
Evansville & Indianapolis Railroad Company	d 112,280.21
Fairchild & North-Eastern Ry. Company	d 19,469.43
Farmers' Grain & Shipping Company	5,555.30
Florida East Coast Ry. Company	2,842,842.20
Fort Dodge, Des Moines & Southern Railroad Company	579,017.75
Fort Smith & Western Railroad Company	80,499.46
Fort Worth Belt Ry. Company	55,108.96
Fort Worth & Rio Grande Ry. Company	1,300.99
Frankfort & Cincinnati Ry. Company	8,435.07
Galveston, Houston & Henderson Railroad Company	127,366.25
Georgia Southern & Florida Ry. Company	511,457.13
Georgia Southwestern & Gulf Railroad Company	21,957.97
Gettysburg & Harrisburg Ry. Company	38,955.46
Gilmore & Pittsburgh Railroad Company (Ltd.)	40,376.93
Glenn-Pool Tank Line Co.[1]	11,592.22
Grand Trunk Milwaukee Car Ferry Company[2]	53,018.86
Grand Trunk Western Ry. Company	1,012,993.62
Greenwich & Johnsonville Ry. Company	49,534.30
Gulf, Mobile & Northern Railroad Company	558,337.86
Gulf & Ship Island Railroad Company	597,455.62
Gulf Terminal Company	25,754.02
Hamilton Belt Ry. Company	7,040.29
Hannibal Connecting Railroad Company	d 2,565.55
Harriman & Northeastern Railroad Company	51,645.62
Hartwell Ry. Company	4,393.75
Hawkinsville & Florida Southern Ry. Company	3,433.30
High Point, Randleman, Asheboro & Southern Railroad Co.	d 28,146.94
Houston & Brazos Valley Ry. Company	31,416.52
Huntingdon & Broad Top Mountain Railroad & Coal Co.	201,694.22
Indianapolis Union Ry. Company	226,781.02
International & Great Northern Ry. Company	1,394,945.98
Intermountain Ry. Company	9,204.31
Interstate Railroad Company	83,786.51
Iowa Transfer Ry. Company	2,414.96
Joliet Union Depot Company	22,664.53
Joplin Union Depot Company	30,044.58
Kankakee & Seneca Railroad Company	d 42,164.52
Kansas City, Clinton & Springfield Ry. Company	7,889.85
Kansas City, Shreveport & Gulf Terminal Company	6,014.66
Kansas City Southern Ry. Company	3,216,697.65
Kansas City Terminal Ry. Company	1,999,313.50
Kansas Southwestern Railway Company	d $43,852.04
Keokuk Union Depot Company	4,451.37
Keokuk & Hamilton Bridge Company	28,828.19
Kinston-Carolina Railroad Company	9,708.39
Lackawanna & Montrose Railroad Company	d 9,232.08
Lake Erie & Pittsburg Ry. Company	400,674.72
Lake George Steamboat Company[2]	28,608.72
Lake Superior Terminal & Transfer Ry. Company of Wis.	d 93.05
Lake Superior & Ishpeming Ry. Company	134,584.95
Lawrenceville Branch Railroad Company	d 501.01
Leavenworth Depot & Railroad Company	14,933.32
Lewiston & Auburn Railroad Company	d 22,251.78
Lexington Union Station Company	15,435.26
Lime Rock Railroad Company	22,349.89
Litchfield & Madison Ry. Company	116,597.96
Little Kanawha Railroad Company	d 11,339.35
Long Island Railroad Company	3,221,948.91
Lorain, Ashland & Southern Railroad Company	d 108,877.98
Lorain & West Virginia Ry. Company	137,277.98
Louisiana & Arkansas Ry. Company	407,987.27
Louisiana Ry. & Nav. Company	357,353.37
Louisiana Southern Ry. Company	25,463.28
Louisville and Jeffersonville Bridge and Railroad Company	169,701.70
Macon, Dublin & Savannah Railroad Company	90,575.92
Macon Terminal Company	79,741.69
Mackinac Transportation Company[2]	d 74,387.38
Manistique & Lake Superior Ry. Company	21,453.73
Manitou & Pikes Peak Ry. Company	29,922.68
Manufacturers' Junction Ry. Company	19,042.83
Manufacturers' Ry. Company (St. Louis, Mo.)	d 10,183.52
Marion & Southern Railroad Company	4,208.88
Marquette & Bessemer Dock & Nav. Company[2]	19,407.63
Memphis Union Station Company	121,353.84
Meridian & Memphis Ry. Company	29,215.74
Meridian Terminal Company	13,987.64
Michigan Air Line Ry	d 83,482.25
Middletown & Hummelstown Railroad Company	d 4,112.91
Middletown & Unionville Railroad Company	24,835.44
Midland Valley Railroad Company	444,345.95
Millers Creek Railroad Company	4,006.62
Mineral Range Railroad Company	147,432.29
Minneapolis & Rainy River Ry. Company	d 9,033.98
Minneapolis & St. Louis Railroad Company	2,639,857.25
Minnesota Transfer Ry. Company	96,250.07
Mississippi Central Railroad Company	309,216.35
Missouri, Kansas & Texas Ry. Company	5,853,831.21
Missouri, Kansas & Texas Ry. Company of Texas	621,773.00
Missouri, Oklahoma & Gulf Ry. Company	d 83,603.08
Missouri, Oklahoma & Gulf Ry. Company of Texas	d 44,358.33
Missouri Pacific Railroad Company	14,206,814.41
Mobile & Ohio Railroad Company	2,597,478.39
Monongahela Ry. Company	583,086.47
Montauk Steamboat Company, Ltd.[2]	d 27,895.39
Mount Hope Mineral Railroad Company	19,171.43
Munising, Marquette & Southeastern Ry. Company	93,281.70
Natchez & Louisiana Ry. Transfer Company[1]	432.01
Natchez & Southern Ry. Company	879.56
Nevada Northern Ry. Company	882,336.01
New Jersey & New York Railroad Company	d 8,710.35
New Orleans Terminal Company	565,034.70
New Orleans, Texas & Mexico Ry. Company	218,773.01
New Orleans & Northeastern Railroad Company	1,204,992.06
Newport & Richford Railroad Company	d 29,479.08
New York Bay Railroad Company	274,050.44
New York, Chicago & St. Louis Railroad Company	2,218,856.59
Norfolk Southern Railroad Company	1,166,990.77
Norfolk Terminal Ry. Company	44,336.94
Norfolk & Portsmouth Belt Line Railroad Company	48,667.65
Northeast Pennsylvania Railroad Company	d 23,793.83
Northampton & Bath Railroad Company	d 2,585.22
Northern Alabama Ry. Company	150,582.97
Northern Pacific Ry. Company	30,057,760.06
Northern Pacific Terminal Company of Oregon	99,709.18
Northwestern Coal Ry. Company	d 3,242.17
Northwestern Pacific Railroad Company	1,235,101.00
Northwestern Terminal Ry. Company	2,349.04
Ocilla Southern Railroad Company	d 9,826.26
Ogden Union Ry. & Depot Company	54,785.99
Old Dominion S. S. Company[2]	252,893.61
Ontonagon Railroad Company	126.67
Orange & Northwestern Railroad Company	d 27,441.12
Oregon Electric Ry. Company[3]	141,146.38
Oregon Trunk Ry	84,722.38
Paris & Great Northern Railroad Company	d 39,385.14
Peoria Ry. Terminal Company	38,402.38
Peoria & Pekin Union Ry. Company	306,513.72
Pennsylvania Terminal Ry. Company	175,240.89
Pere Marquette Ry. Company	3,748,196.09
Perkiomen Railroad Company	339,090.56
Philadelphia Belt Line Railroad Company	8,525.99
Philadelphia Grain Elevator Company[1]	98,749.82
Philadelphia, Newton & New York Railroad Company	2,565.67
Philadelphia & Chester Valley Railroad Company	5,074.21
Philadelphia & Reading Ry. Company	15,868,331.36
Philadelphia, Baltimore & Washington Railroad Company	3,610,839.54
Pickering Valley Railroad Company	24,917.31
Piedmont & Northern Ry. Company	435,789.34
Pine Bluff Arkansas River Ry	d 12,887.78
Pittsburgh, Cincinnati, Chicago & St. Louis Railroad Company	11,334,093.67
Pittsburgh & Shawmut Railroad Company	613,261.14
Pittsburgh & West Virginia Ry. Company	237,009.89
Pontiac, Oxford & Northern Railroad Company	d 13,861.01
Port Arthur Canal & Dock Company[1]	d 36,049.44
Portland Terminal Company	274,689.90
Port Reading Railroad Company	235,697.96
Port Townsend & Puget Sound Ry. Company	d 136.94
Potean Valley Railroad Company	d 3,232.19
Pueblo Union Depot & Railroad Company	32,688.87
Quanah, Acme & Pacific Ry. Company	98,939.02
Raleigh & Charleston Railroad Company	17,371.55
Railway Transfer Company of Minneapolis	105,014.44
Rapid City, Black Hills & Western Railroad Company	13,003.56
Reading & Columbia Railroad Company	18,230.27
Rio Grande Southern Railroad Company	144,365.69
Rock Island Frisco Terminal Ry. Company	167,034.76
Rupert & Bloomsburg Railroad Company	6,050.57

Name of carrier	Income
St. Johnsbury & Lake Champlain Railroad Company	d $23,150.77
St. Joseph Belt Ry. Company	44,854.81
St. Joseph Terminal Railroad Company	14,083.73
St. Louis, Brownsville & Mexico Ry. Company	983,890.01
St. Louis National Stock Yards Co	40,474.56
St. Louis & O'Fallon Ry. Company	99,702.27
St. Louis-San Francisco Ry. Company	13,690,212.98
St. Louis, San Francisco & Texas Ry. Company	d 327,035.36
St. Louis Southwestern Ry. Company	3,355,748.99
St. Louis Southwestern Ry. Company of Texas	555,164.52
St. Louis, Troy & Eastern Railroad Company	143,257.24
St. Paul Union Depot Company	86,942.39
Salt Lake City Union Depot & Railroad Company	70,434.88
San Antonio & Aransas Pass Ry. Company	373,051.70
San Antonio, Uvalde & Gulf Railroad Company	55,928.38
Sandy River & Rangeley Lakes Railroad	46,666.42
San Francisco & Portland S. S. Company[2]	36,769.13
Savannah Union Station Company	27,429.09
Schoharie Valley Ry. Company	10,707.82
Seaboard Air Line Ry. Co	6,497,024.85
Sharpsville Railroad Company	15,646.14
Shreveport Bridge & Terminal Company	48,229.99
Sidell & Olney Railroad Company	d 49,235.88
Sioux City Bridge Company	81,060.81
Southern Illinois & Missouri Bridge Company	120,011.67
Southern Pacific Terminal Company	207,444.48
Southern Ry. Company	18,653,893.15
Southern Ry. Company in Miss.	6,989.50
Spokane International Ry. Company	190,908.85
Spokane, Portland & Seattle Ry. Company	1,871,083.00
Standard & Hernando Railroad Company	d 12,773.51
Stewartstown Railroad Company	10,327.44
Stony Creek Railroad Company	17,368.77
Susquehanna, Bloomsburg & Berwick Railroad Company	49,722.26
Sussex Railroad Company	d 29,937.64
Tallulah Falls Ry. Company	5,353.98
Tamaqua, Hazelton & Northern Railroad Company	1,457.50
Tampa Northern Railroad Company	d 22,276.84
Tampa Union Station Company	14,660.40
Tampa & Gulf Coast Railroad Company	2,359.80
Tennessee Central Railroad Company	162,733.55
Texarkana & Fort Smith Ry. Company	318,729.68
Texas City Terminal Company	37,771.30
Texas Midland Railroad	59,348.35
Texas Southeastern Railroad Company	23,012.96
Tidewater Southern Ry. Company	7,251.27
Toledo, Saginaw & Muskegon Ry. Company	d 115,737.85
Toledo Terminal Railroad Company	252,999.43
Toledo, St. Louis & Western Railroad Company	994,294.38
Tonopah & Tidewater Railroad Company	182,638.84
Troy Union Railroad Company	11,852.69
Ulster & Delaware Railroad Company	128,009.47
Union Depot Company (Columbus, Ohio)	58,058.17
Union Ry. Company (Memphis, Tenn.)	84,690.41
Union Railroad Company (Pa.)	1,370,290.23
Union Stock Yards Company of Omaha (Ltd.)	149,812.64
Union Terminal Ry. Company	29,678.71
Union Terminal of Dallas	296,616.04
Virginia Navigation Company[2]	d 2,240.60
Virginian Ry. Company	3,247,603.41
Wabash Ry. Company	5,826,809.91
Ware Shoals Railroad Company	10,553.30
Waupaca-Green Bay Ry	2,780.19
Waynesburg & Washington Railroad Company	12,028.15
West Jersey & Seashore Railroad Company	952,681.93
West Side Belt Railroad Company	186,330.78
Western Cable Ry. Company	d 5,442.84
Western Maryland Ry. Company	3,079,593.35
Western Pacific Railroad Company	1,900,349.74
Wheeling & Lake Erie Ry. Company	1,586,037.32
Wichita Falls & Northwestern Ry. Company	145,245.24
Wichita Union Terminal Ry. Company	103,926.78
Wilkes-Barre Connecting Railroad Company	33,230.72
Williams Valley Railroad Company	2,486.86
Winona Bridge Ry. Company	$38,876.91
Woodstock & Blocton Ry. Company	14,918.83
Yadkin Railroad Company	52,950.56
York Harbor & Beach Railroad Company	5,371.74

Co-operative short-line contracts have been executed as follows:

Akron, Canton & Youngstown.
Alabama Central Railroad.
Alabama Central Railway.
Alabama, Florida & Gulf.
Alabama & Mississippi Railroad.
Alabama & Northwestern.
Alabama, Tennessee & Northern Railroad.
Arcade & Attica.
Atlanta & St. Andrews Bay Ry.
Atlantic Northern.
Augusta Northern.
Augusta Railroad.
Bartlett Western.
Batesville Southwestern.
Beaver, Meade & Englewood R. R.
Birmingham & Southeastern.
Bowdon Railroad.
Boyne City, Gaylord & Alpena R. R.
Bristol Railroad.
California Southern.
California Western Railroad & Navigation Company.
Carolina & Yadkin River.
Cheat Haven & Bruceton.
Carrollton & Worthville.
Chesapeake Western.
Chicago, Harvard & Geneva Lake Railway.
Charles City Western.
Columbia, Newberry & Laurens.
Coudersport & Port Allegheny.
Cumberland & Manchester.
Delaware & Northern.
Delaware Valley Railway.
East Carolina.
East Jordan & Southern.
Eastern Kentucky Railway.
Electric Short Line Railway.
Erie & Michigan Railway & Navigation Company.
Federal Valley.
Fernwood & Gulf.
Flint River & Northeastern.
Florida, Alabama & Gulf.
Fonda, Johnstown & Gloversville.
Franklin & Pennsylvania.
Gainesville & Northwestern.
Garyville Northern.
Glenmora & Western.
Georgia Northern.
Grasse River Railroad.
Green County (Ga.).
Indian Valley.
Ironton Railroad.
Jefferson & Northwestern.
Kalamazoo, Lake Shore & Chicago.
Kentucky & Tennessee Railway.
Kentwood & Eastern.
Kosciusko & Southeastern.
La Crosse & Southeastern.
Little River Railroad (Tenn.).
Live Oak, Perry & Gulf Railroad.
Loranger, Louisiana & Northeastern Railroad.
Manchester & Oneida.
Manistee & Northeastern.
Marianna & Blountstown.
Marion & Eastern.
Maryland & Pennsylvania.
Miami Mineral Belt Railroad.
Midland & Northwestern.
Midland Railway (Ga.).
Minneapolis, Red Lake & Manitoba.
Missouri Southern.
Modesto & Empire Traction Co.
Montana, Wyoming & Southern.
Morehead & North Fork.
Mount Hood Railroad.
Mt. Jewett, Kinzua & Riterville.
Natchez, Columbia & Mobile.
Nevada Copper Belt Railroad.
Newaukum Valley Railroad.
New Jersey, Indiana & Illinois.
New Orleans, Natalbany & Natchez.
Northwestern Railroad of South Carolina.
Norwood & St. Lawrence.
Oneida & Western.
Palatine, Lake Zurich & Wauconda Railroad.
Paris & Mt. Pleasant.
Pecos Valley Southern.
Pelham & Havana Railroad.
Pickens Railroad.
Pittsburgh, Lisbon & Western.
Pittsburgh & Susquehanna.
Preston Railroad.
Rapid Railroad.
Rockingham Railroad.
Randolph & Cumberland.
Rock Island Southern.
Rome & Northern.
Roscoe, Snyder & Pacific.
St. Louis, Kennett & Southeastern.
Sand Springs Ry.
Shearwood Railway.
South Georgia Railway.
South Manchester.
Tennessee, Alabama & Georgia R. R.
Tennessee Railroad.
Tuskegee Railroad.
Unadilla Valley Ry. Company.
Ursina & North Fork.
Valdosta, Moultrie & Western.
Virginia Blue Ridge.
Virginia & Truckee Railway.
Wabash, Chester & Western.
Washington & Choctaw.
Washington & Lincolnton.
Waycross & Southern.
Western Allegheny.
West Virginia Midland.
White River Railroad (Vt.).
Wildwood & Delaware Bay Shore Line.
Willamette Valley & Coast.
Wilmington, Brunswick & Southern Railroad.
Williamsport & North Branch.

Photo from International Film Service.

Laclede Turns Out to Greet General Pershing

The Floor of the New York Stock Exchange

The Railroads Facing Financial Difficulties

On the Basis of the Present Rates Many Roads Would Be Bankrupt Under Private Operation

Out of 180 roads earning a million dollars a year or more each, 117 operated at a cost for operation alone of 85 per cent of gross earnings, or worse, for the first ten months of 1919. The mileage of these 117 roads is about 120,000. Assuming that the net operating income of these roads averaged no higher in 1920 than it did in 1919, and that the roads were to be given back March 1, 1920, without any form of guarantee or increase in the rates, most of them would be bankrupt before the end of the year. Actual conditions, however, at the present time, are not quite as discouraging as this would seem to indicate.

The results of operation in the four months, July 1 to October 31 inclusive, have been in sharp contrast in many instances with the results for the first six months of 1919. Some of the roads that had a deficit from operation on June 30, 1919, now show something above operating expenses for the entire ten months. Only a very few roads are as bad off now as they were on June 30, 1919. On the other hand, the first six months of the year are for most roads, much less productive of net operating income than are the second six months. Were conditions in 1920 to be analogous to a year in which the roads earned as much in June 1 to October 31 as they did in 1919, it is important to note that the entire year's net would not however, be three times as great as for the four months mentioned, but would be somewhere between the net operating income as indicated by the ten months, January to October 1919, inclusive, and the four months, July to October, 1919, inclusive. In the test period the roads as a whole earned net a little over 38 per cent of the entire year's revenue in July to October, inclusive. We can, therefore, reconstruct a year on the basis of the four months, July to October, 1919, by using the net earnings as 38 per cent of the estimated year's total. This has been done in column 4 of the table.

In the ten months of 1919 there were 48 of the Class I roads which failed to earn even their net operating expenses. The table shows the larger and more important of the Class I roads, whose operating expenses were 85 per cent or more of their total operating revenues in the first ten months of 1919. Column 2 of this table shows the net operating income or deficit after the payment of operating expenses and taxes other than war taxes. This, of course, affects the government and not the owning corporations since the corporations are at present receiving a fixed rental for their properties from the government. The third column shows the operating income that would be earned in a full twelve months averaging the same as the first ten months of 1919. Column 4 shows the results that would be obtained in net operating income if the roads were to operate for an entire twelve months with as high an average net as that indicated by the four months from July 1 to October 3, assuming that in these months the road earned 38 per cent of the year's total. The fifth column shows the fixed charges of the owning corporations where the "other income" and rentals or other charges against the corporations do not make the comparison between net operating income and fixed charge entirely meaningless. Even, however, where this comparison is shown in the table, it does not mean that the net operating income will be the only

> **Even with the extraordinarily large earnings of the months, July to October, inclusive, and assuming that the first six months of the year were to be proportionately favorable many roads would be falling behind their fixed charges.**
>
> **Few, if any, railroads can operate at 85 per cent and remain solvent for long.**
>
> **Bonds of nearly all these roads and stocks of some of them were considered conservative investments.**

source of income from which the companies could have paid fixed charges, nor that the fixed charges shown are the only obligatory payments out of net.

Each road shown in the table might well be made the subject of special detailed study and even with such a study available, the estimate for 1920 earnings might conceivably fall far wide of the mark. Nevertheless, the table will repay careful study and contains some very interesting material for thought.

The Atlanta, Birmingham & Atlantic wiped off an operating deficit of over three-quarters of a million dollars for the first six months, and would, on the basis of the last four months, earn its operating expenses, although it, of course, would be bankrupt with nearly a half million dollars fixed charges unearned.

The Atlantic Coast Line is an exception to the general rule. In the first six months of 1919, it was earning at a rate which would have paid fixed charges and its regular 7 per cent dividends and left a safe margin to spare. In the last four months, it was earning at a rate which would and the scaled down dividends on the converted leased line stock, but on the basis of the last four months, annual interest charges would have been earned more than twice over.

The Buffalo, Rochester & Pittsburgh, on the basis of the ten months showing, would have fallen far behind its operating expenses alone, but on the basis of the last four months showing, it would have earned over half a million dollars net annually. It should be said in fairness, that the Buffalo, Rochester & Pittsburgh situation was peculiar. In the first six months of 1919, the iron furnace at Punxsutawney was shut down, and the Buffalo, Rochester & Pittsburgh lost all of its southbound ore tonnage. Added to this, there was an abnormally small movement of coal.

The Chicago, Milwaukee & St. Paul is another road that on the showing of the first six months would, without government guarantees, have been headed toward bankruptcy, but which during the last four months made a remarkably good showing in net, yet is not earning its fixed charges.

The Chicago, Peoria & St. Louis situation looks almost hopelessly bad, either in the light of the first six months or

	Col. I	Col. II Net operating income first 10 months 1919	Col III Net operating income 12 months on the first 10 months' basis	Col. IV Net operating income 12 months on the basis of July 1-Oct. 31, 1919††	Col. V Fixed charges in 1918
	Miles				
Atlanta, Birmingham & Atlantic	638	—$799,000	—$959,000	$28,000	$482,000*
Atlantic Coast Line	4,857	5,542,000	6,648,000	2,631,000	6,051,000a
Baltimore & Ohio	5,151	6,968,000	8,352,000	27,333,000	21,952,000*b
Boston & Maine	2,258	4,520,000	5,412,000	11,430,000	.....
Buffalo, Rochester & Pittsburgh	589	—656,000	—787,000	680,000	2,205,000*
Central of Georgia	1,918	1,349,000	1,618,000	1,977,000	1,987,000
Central of New Jersey	685	2,256,000	2,707,200	3,842,000	4,038,000
Central Vermont	411	—735,000	—881,000	—502,000	765,000*
Chicago & Alton	1,050	1,243,000	1,491,000	1,749,000	3,495,000
Chicago & Eastern Illinois	1,131	162,000	193,000	2,763,000	4,278,000†
Chicago Great Western	1,496	2,062,000	2,474,000	4,519,000	1,592,000*
Chicago, Milwaukee & St. Paul	10,647	5,403,000	6,963,000	12,517,000	16,767,000
Chicago, Peoria & St. Louis	247	—625,000	—750,000	—484,000	.....
Chicago, Rock Island & Pacific	7,594	10,267,000	12,295,000	19,561,000	9,518,000
Chicago, St. Paul, Minneapolis & Omaha	1,749	2,604,000	3,125,000	385,000	2,260,000
Cincinnati, New Orleans & Texas Pacific	337	655,000	786,000	—1,178,000	2,518,000*
Delaware & Hudson	875	2,206,000	2,647,000	4,338,000	2,938,000‡
Denver & Salt Lake	255	—717,000	—860,000	—394,000	490,000¶
Detroit, Toledo & Ironton	456	—407,000	—487,000	21,000	.....
Duluth, South Shore & Atlantic	599	184,000	221,000	625,000	1,041,000
Erie	1,989	503,000	603,000	7,536,050	10,449,000‖
Florida East Coast	764	963,000	1,155,000	960,000	1,200,000¶
Illinois Central	4,791	4,844,000	5,808,000	7,327,000	8,478,000¶c
International & Great Northern	1,159	—1,046,000	—1,255,000	—967,000	.....
Lehigh Valley	1,435	3,314,000	3,978,000	6,831,000	7,755,000*
Louisville & Nashville	5,013	9,589,000	11,508,000	15,429,000	7,450,000
Maine Central	1,216	—928,000	—1,114,000	—234,000	806,000
Minneapolis & St. Louis	1,645	254,000	304,400	1,666,000	2,060,000
Missouri Pacific	7,108	6,480 000	7,776,000	13,135,000	12,605,000
Nashville, Chattanooga & St. Louis	1,247	122,000	147,000	452,000	1,350,000*
New York, New Haven & Hartford	1,965	8,317,000	9,977,000	17,581,000	18,792,000*
Pennsylvania Railroad	5,361	19,550,000	23,460,000	42,352,000	.....
Pennsylvania Company	1,754	8,566,000	10,254,000	16,435,000	.....
Pittsburgh, Cincinnati, Chicago & St. Louis	2,383	2,964,000	3,557,000	5,285,000	.....
Philadelphia & Reading	1,127	6,229,000	7,476,000	12,938,000	.....
Rutland	415	86,000	108,400	422,000	476,000
St. Louis-Southwestern	939	2,342,000	2,810,000	3,436,000 }	
St. Louis-Southwestern of Texas	814	—1,004,000	—1,371,200	—518,000 }	2,265,000
Seaboard Air Line	3,563	2,155,000	2,486,000	2,705,000	4,591,000*
Southern Railway	6,982	9,280,000	11,135,500	17,140,000	11,855,000
Wabash	2,503	2,823,000	3,385,000	3,968,000	3,093,000
Western Maryland	700	40,000	47,500	1,110,000	2,310,000

NOTE.—This table shows only the larger of the 117 roads operating above 85 per cent in 1919.

*This includes rentals.

(a)The A. C. L. had in 1918 $1,318,000 income other than from operation, and received $2,570,000 dividends from its Louisville & Nashville stock.

(b)The Baltimore & Ohio had $5,201,000 income other than from operation in 1918.

(c)In 1917 the Illinois Central had $8,009,000 income other than from operation.

†In addition to the interest charges, rentals amount to $1,017,000.

‡This does not include $143,000 other interest and $1,947,000 rentals, but neither does the estimated operating income include other income or income from the mining of coal which in the total in 1918 amounted to over $3,188,000.

¶This is the 1917 figure, no 1918 figure being available.

‖Does not include $2,276,000 rentals of leased roads. On the other hand it is interest charges for the entire system of 2,257 miles while income is for 1,989 miles only.

††See text for method of calculating.

have only left two and one-half million dollars over and above actual operating expenses, and it could not have paid from earnings alone half of its fixed charges.

The Baltimore & Ohio, on the other hand, on the basis of the first six months, appeared to be pretty surely insolvent. On the basis of ten months, it would have fallen far short of earning fixed charges, but on the basis of the last four months, it would have paid its operating expenses, but would have barely earned its fixed charges.

The Boston & Maine showing is also striking. Its ten months earnings would have barely paid interest charges the last four months. Even on the basis of the last four months, the road would have fallen more than a half a million dollars behind its operating expenses.

The Delaware & Hudson, another strong, rich road, had it been dependent on railroad earnings alone, would have fallen behind its interest charges on the basis of the ten months, but on the basis of the last four months, would have earned sufficient from its railroad operations to pay not only its fixed charges, but also probably from its railroad operations and coal mining operations, its regular 9 per cent dividends as well.

Curtailed Construction Activities Mark the Year

Low Record Established for Mileage of New Lines Completed Is Indicative of 1919 Tendencies

During 1919 a total of 685.98 miles of new railway lines was completed and placed in service in the United states and 433.31 miles in Canada. This establishes a new low record for the United States, as the 1919 mileage built is less by 36 miles than the previous low mark for any year since the Civil war, of 722 miles established in 1918.

On the other hand, the mileage built in Canada is three times that of the previous year and is larger than that for any year since 1915, although it is only a fraction of the mileage built in 1913, when the new construction totaled almost 3,000 miles. The marked contrast between the stagnation in the development of railway lines in this country and the resumption of construction in Canada is a reflection of the difference in conditions under which the roads in these respective countries are laboring.

In multiple track construction the 405.32 miles of second track completed in the United States in 1919 is comparable with 681 miles completed in 1919. During 1919, 27.54 miles of third main track and 16.84 miles of fourth or multiple main tracks were completed in the United States as compared with 77 miles and 57 miles respectively in the previous year. Canada reported 9.15 miles of second track completed during the year.

The tendency toward restricted expenditures shown in the mileage reports is also reflected in other construction activities. The estimated cost of all work to be done on Class I roads during 1919, exclusive of equipment, totaled $413,626,354 of which amount only $153,999,684 was authorized during the year, the remainder representing the carry-over from appropriations made in 1918. Equating for present standards of money, last year's work is equivalent to an expenditure of less than $250,000,000 in pre-war dollars.

Very nearly 50 per cent of the total expenditures authorized for additions and betterments on Class I roads during 1919 was for improvements to existing roadway and tracks; approximately 33 per cent was for terminal improvements and 16 per cent for additional trackage, the remainder coming under the head of miscellaneous work.

During the year less than $4,569,138 was appropriated by Class I roads for extensions, branches and other new lines. This is indicative of the tendency towards the intensive rather than the extensive development of the more important lines of our transportation system.

Generally speaking, the year has been devoted to the completion of projects under way rather than to the inception of new programs. For this reason in the list of important projects under way, appended to this article, no attempt has been made to segregate the purely 1919 projects. On the contrary, the list includes all the projects carried over from 1918, which were reported less than 85 per cent completed on January 1, 1919, after excluding all those on which work has been suspended during the year.

A study of those projects which have been carried on under the direction of the Railroad Administration will show that the policy adopted during the war of concentrating attention primarily on that work most needed to increase the capacity of the lines rather than to promote economy of operation has been continued during 1919. As a result almost no work has been done towards the reduction of grades or the provision of additional facilities not actually required to eliminate

MILEAGE CONSTRUCTED in the United States during 1919 the lowest for any year since the Civil War.

Mileage in Canada larger than for the three preceding years, but far below the average prior to that date.

Multiple main track construction in United States also shows decrease.

1919 construction characterized by completion of projects already under way rather than by inauguration of new programs. Largely devoted to construction of engine and terminal facilities.

congestion. There has also been an almost complete cessation of the construction of classification yards, freight houses and stations and of terminal facilities other than those required to repair and maintain the motive power and equipment.

Most of the mileage of new lines completed during 1919 was in comparatively short sections; Oklahoma led this country with 91.60 miles, Texas was second with 86 miles, and California was third with 69.29. From an examination of the table showing its geographic distribution, it is apparent that a considerable portion was built in connection with the development of coal and oil lands.

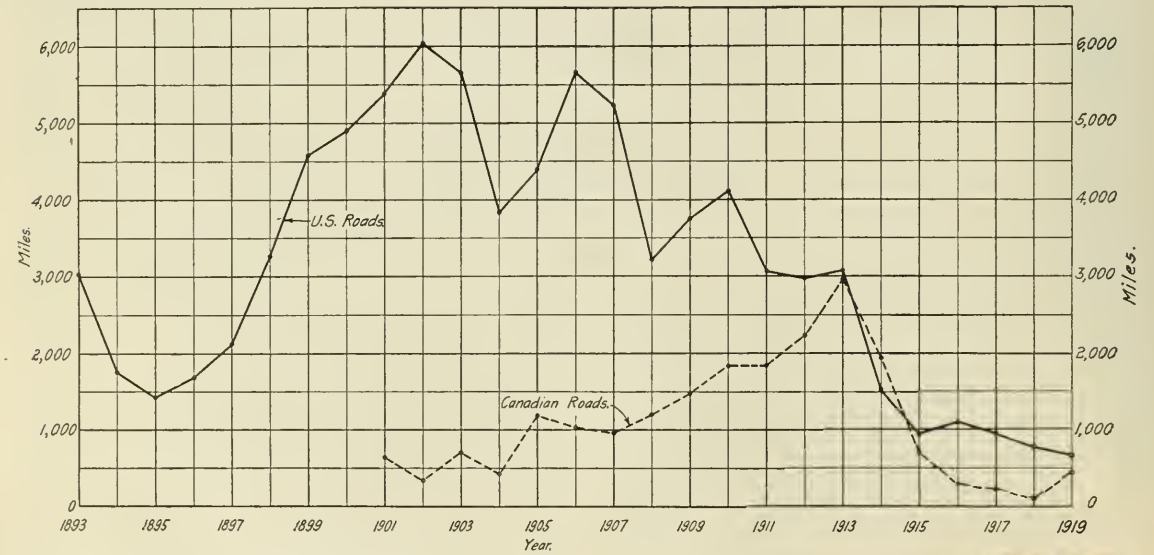
NEW TRACK BUILT IN 1919

		Miles				
UNITED STATES—	No. Cos. building	First track	Second track	Third track	Fourth or more track	Total
Alabama	2	11.50	29.70	.....	.....	41.20
Arizona	4	32.40	3.13	.....	.....	35.53
Arkansas	1	2.00	.....	.....	.....	2.00
California	2	69.29	.....	.....	.....	69.29
Colorado	1	.....	20.00	.....	.....	20.00
Delaware	1	.....	8.00	.....	.....	8.00
Florida	1	17.60	.....	.....	.....	17.60
Georgia	2	14.00	12.64	.....	.....	26.64
Idaho	1	4.00	.....	.....	.....	4.00
Illinois	1	6.50	7.81	.....	.....	14.31
Indiana	1	.....	9.00	.....	.....	9.00
Iowa	1	.75	.....	.....	.....	.75
Kansas	2	35.34	48.97	5.64	.....	89.95
Kentucky	4	48.94	30.55	.....	.....	79.49
Louisiana	1	.39	.....	.....	.....	.39
Maine	1	.50	.....	.....	.....	.50
Maryland	1	.75	.....	.....	.....	.75
Mississippi	3	62.50	.....	.....	.....	62.50
Nevada	1	2.26	.....	.....	.....	2.26
New Jersey	2	2.62	.....	21.90	13.40	37.92
North Carolina	1	.....	41.00	.....	.....	41.00
Ohio	1	4.08	.....	.....	3.44	7.52
Oklahoma	4	91.60	7.05	.....	.....	98.65
Oregon	3	51.90	.....	.....	.....	51.90
Pennsylvania	2	36.68	6.98	.....	.....	43.66
South Carolina	1	.....	86.35	.....	.....	86.35
Tennessee	2	23.50	23.36	.....	.....	46.86
Texas	3	86.00	10.50	.....	.....	96.50
Utah	1	10.50	15.82	.....	.....	26.32
Virginia	1	42.00	.....	.....	.....	42.00
West Virginia	2	24.00	.....	.....	.....	24.00
Wyoming	1	4.38	44.46	.....	.....	48.84
Totals	54	685.98	405.32	27.54	16.84	1,135.68
Canada	6	433.31	9.15	.....	.....	442.46

NEW TRACK BUILT IN 1918

		Miles				
UNITED STATES—	No. Cos. building	First track	Second track	Third track	Fourth or more track	Total
Alabama	1	7.60	.....	.....	.....	7.60
Arizona	1	55.00	1.97	.....	.....	56.97
Alaska	1	53.00	.....	.....	.....	53.00
California	3	40.09	60.77	.....	.....	100.86
Colorado	3	9.55	4.87	.....	.....	14.42
Connecticut	..	.....	.....	.....	2.00	2.00
Florida	4	104.78	1.75	.....	.....	106.53
Georgia	2	15.10	23.50	.....	.....	38.60
Idaho	1	10.84	.....	.....	.....	10.84
Illinois	3	5.40	23.37	3.00	18.00	49.77
Indiana	1	42.10	23.70	6.34	.....	72.14
Iowa	..	.....	9.12	.....	.....	9.12
Kansas	2	34.80	37.45	6.45	.....	78.70
Kentucky	1	12.28	9.00	.....	.....	21.28
Louisiana	1	3.00	3.01	.....	.....	6.01
Maryland	1	6.20	7.87	2.83	4.27	21.17
Maine	..	0.71	7.47	5.96	0.36	14.50
Massachusetts	1	0.17	2.42	4.44	0.50	7.53
Michigan	..	.....	0.66	.....	.....	0.66
Minnesota	..	.....	43.49	4.26	4.25	52.00
Mississippi	1	30.00	8.80	.....	.....	38.80
Missouri	1	1.01	13.27	.....	.....	14.28
Montana	..	.....	57.71	1.07	1.16	59.94
Nebraska	..	.....	13.58	.....	.....	13.58
New Jersey	2	5.93	7.24	4.33	5.78	23.28
New Mexico	..	.....	12.08	.....	.....	12.08
New York	5	6.57	30.31	12.29	4.89	54.06
North Carolina	2	6.30	15.83	.....	.....	22.13
North Dakota	..	.....	4.36	.....	.....	4.36
Ohio	1	8.00	94.70	19.20	15.62	137.52
Oklahoma	2	6.28	.....	.....	.....	6.28
Oregon	3	8.94	.....	.....	.....	8.94
Pennsylvania	7	45.80	34.03	6.78	0.60	87.21
South Carolina	1	38.80	41.72	.....	.....	80.52
Tennessee	2	20.00	4.00	.....	.....	24.00
Texas	3	39.70	20.96	.....	.....	60.66
Utah	2	16.13	.....	.....	.....	16.13
Virginia	2	11.38	8.00	.....	.....	19.38
Washington	2	7.53	2.30	.....	.....	9.83
West Virginia	5	60.57	32.19	.....	.....	92.76
Wisconsin	1	5.00	.....	.....	.....	5.00
Wyoming	2	3.01	20.05	.....	.....	23.06
Totals	70	721.57	681.55	76.95	57.43	1,537.50
Canada	..	135.08	4.28	.....	.....	139.36
Mexico	..	10.00	.....	.....	.....	10.00

In second-track construction South Carolina led the country with 86.35 miles. It is interesting to note that all this mileage was built by one company, the Southern, and that the adjoining state of North Carolina shows 41 miles completed by the same company. The mileage built by the Southern in these states last year, together with a short sec-



Curves of Mileage Built in the United States and Canada Since 1893

tion in Georgia, marks the completion of a project undertaken 17 years ago to provide this road with a double-track line between Atlanta, Ga., and Washington, D. C.

The signing of the armistice late in 1918 brought to a close the war's emergency under which much of the 1918 work was undertaken. This was followed by a period of uncertainty surrounding the return of the roads to private control. These factors had a direct bearing on the appropriations for construction during the year, curtailment being the natural result. With the carry-over projects, however, the year may be said to have been a fairly busy one, although it is common knowledge that the end of the year found the roads sadly in need of additional facilities. Whether 1920 will see the inauguration of a development program designed to supply the deficiencies is an open question, dependent on the final disposition of the roads and the promptness with which the decision is reached.

Miles of New Line Completed in the United States Since 1893

1894	1,760	1907	5,212
1895	1,420	1908	3,214
1896	1,692	1909	3,748
1897	2,100	1910	4,122
1898	3,265	1911	3,066
1899	4,569	1912	2,997
1900	4,894	1913	3,071
1901	5,368	1914	1,532
1902	6,026	1915	933
1903	5,652	1916	1,098
1904	3,832	1917	979
1905	4,388	1918	721
1906	5,623	1919	686

The amplification of engine terminal facilities has been the outstanding feature of the year's activities. During the year the Baltimore & Ohio completed and placed in service its heavy repair shop at Glenwood, Pa., at a cost of $1,732,605. The Boston & Maine completed three projects for improved engine house and yard facilities, at a cost exceeding $500,000 for each project, while the Union Pacific carried on an extensive program of terminal rehabilitation. These particular projects are cited as typical of what many roads have been doing along this line.

With exceptions, notably in Indianapolis, Ind., very little grade separation work has been done during the year. The same may be said in regard to new passenger stations, although the Jacksonville (Fla.) terminal station and its auxiliary facilities were completed and placed in service late in 1919.

In Canada the work on the Toronto terminal station is progressing, and the Grand Trunk Pacific line diversion project at Firdale, Manitoba, involving an expenditure in excess of $420,000, is 67 per cent complete.

Railroad Construction in the United States in 1919

Alabama Great Southern

Second Track: Through Burstall, Ala., and Vance, 29.70 miles.

Americus & Atlantic

First Track: Between Mata, Ga., and Methvins, 4.00 miles.

Apache Railway

First Track: In Arizona, not specified, 17.50 miles.

Atchison, Topeka & Santa Fe

First Track: Extension Bartlesville (Okla.) branch, mile post 84 to Tulsa, Okla., Holywood, Kan., to Galatia, 30 miles; Shattuck, Okla., to Spearman, Tex., 70 miles in Tex., 14 miles in Okla., total 84 miles.

Second Track: In Arkansas City, Kan., 2.88 miles; Eldorado, Kan., to Augusta, 9.90 miles; Winfield Junction, Kan., to South Winfield, 0.85 miles; South Winfield, Kan., to Arkansas City, 12.30 miles; Arkansas City, Kan., to Oklahoma State line 2.54 miles; state line to Newkirk, Okla., 7.05 miles.

Third Track: Turner, Kan., to Holliday, 5.64 miles.

Other Important Work Under Construction: New subway at State street, Emporia, Kan., cost $133,304, completed; new yard and coach cleaning facilities at Argentine, Kan., cost $148,947, and transfer freight house cost $150,264, completed; additional yard tracks at Augusta, Kan., cost $127,810 completed; yard changes at Guthrie, Okla., cost $149,901, completed; additional yards at Cushing, Okla., cost $185,321, completed; change of grade and alinement from Kansas-Oklahoma state line to Newkirk, Okla., cost $124,215, completed; additional yard track and station facilities at Richmond, Cal., cost $252,043, completed; additional water service at Seligman, Ariz., cost $116,088, 80 per cent completed; reservoir at Winslow, Ariz., 30,000,000 gal. capacity, cost $156,000, completed; Minkler Southern, building from Porterville, Cal., to Denver, 12.47 miles and 2 miles spur track, cost $541,297, 40 per cent completed.

Atlantic Coast Line

First Track: Between Palmdale, Fla., and Immokalee, 17.60 miles.

Other Important Work Under Construction: Additional freight facilities at Richmond, Va., cost $360,882, completed.

Baltimore & Ohio

Other Important Work Under Construction: Heavy repair shops at Glenwood, Pa., completed; water type ash pit at Glenwood, cost $117,400, completed; heavy repair shop at Cumberland, Md., completed; steel car repair shop at Mt. Clare, Md., cost $103,815, completed; Allegheny river bridge at Pittsburgh, Pa., cost $2,560,000, 15 per cent completed; bridge 66 on Pittsburgh division at Highland, Pa., cost $149,000, completed; classification yard at Elsmere Junction, Del., cost $116,657, completed; engine terminal improvements at Lorain, Ohio, cost $11,790, nearing completion; relocation of main tracks between North Dayton and Tippecanoe City, Ohio, cost $474,912, 90 per cent completed; improvements to engine house at South Chicago, Ill., cost $106,700, completed; engine house facilities at Storrs, Ohio, cost $100,500, 70 per cent completed; arch bridge at Painesville, Ohio, cost $102,500, 15 per cent completed.

Bessemer & Lake Erie

Second Track: Between K. O. Junction and Kremis, Pa., 6.98 miles.

Other Important Work Under Construction: Strengthening bridge No. 1 at Butler, Pa., cost $116,000, completed.

Birmingham, Selma & Mobile

First Track: Stewart to Jericho, Ala., 3.50 miles.

Black Mountain Railroad

First Track: Hulen, Ky., to Packetts Creek, 8 miles.

Boston & Albany

Other Important Work Under Construction: Renewal of bridge at Westfield, Mass., cost $250,000, 60 per cent completed; important freight and passenger facilities at Springfield, Mass., cost $750,000, 10 per cent completed; reconstruction of drawbridge at Chelsea, Mass., cost $280,302, 80 per cent completed.

Boston & Maine

Other Important Work Under Construction: Rebuilding bridge No. 180 at Zoar, Mass., cost $215,000, completed; engine house and yard facilities at Rotterdam, N. Y., cost $643,000, engine house facilities completed, yard facilities deferred; engine house and yard facilities at Lowell, Mass., completed, except signals which are deferred; engine house facilities at Dover, N. H., cost $460,000, completed; engine house facilities at Deerfield, Mass., cost $800,000, completed; additional yard facilities at Haverhill, Mass., cost $380,000, now in service; engine house improvements at East Somerville, Mass., cost $125,000, completed; diverting Hoosack river at Pownal, Vt., cost $290,000, completed; renewing bridge No. 35 at Haverhill, Mass., cost $446,300, to be completed by April, 1920.

Buffalo Northwestern

First Track: Waynoka, Okla., to Buffalo, 50.00 miles.

Cairo, Truman & Southern

First Track: In Arkansas, not specified, 2.00 miles.

Canton Railroad

First Track: In Maryland not specified. 0.75 miles.

Central Railroad of New Jersey

First Track: In New Jersey, branch to Federal Ship Yard, 0.62 miles.

Other Important Work Under Construction: Renewal bridge No. 1 and widening bridge No. 2 at Easton, Pa., cost $475,642, completed; storage yard at pier 18 Jersey City, N. J., cost $828,686, completed; coal pier 18 and power house at Jersey City, cost $2,102,542, completed; coal thawing shed at pier 18 Jersey City, cost $370,000, completed; additional track and yard changes at Allentown, Pa., cost $397,456, completed; renewal of bridge No. 214 at East Rahway, N. J., cost $397,571, and renewal of bridge No. 217 at Maurer, N. J., cost $568,269, to be completed by September, 1920.

Chesapeake & Ohio

First Track: Matha, W. Va., to Man, 13.00 miles; from Barnahas, W. Va., 3.00 miles; Ward, Ky., up Greasy Creek, 3.50 miles.

Other Important Work Under Construction: Fire protection on pier 4, automatic sprinkler system, cost $103,000, completed; west bound yard at Fulton, Va., cost $309,000, completed; extension to east bound yard at Hinton, W. Va., cost $302,300, to be completed by March, 1920; passing sidings at Whiteside, W. Va., cost $106,000, completed; renewal of bridge No. 44 at Clover Valley, W. Va., cost $153,516, completed; renewal of bridge No. 66 at Martha, W. Va., cost $135,678, completed; additional west bound yard at Russell, Ky, completed; water station at Silver Grove, Ky., cost $173,000, completed; shop facilities at Huntington, W. Va., cost $701,400, completed.

Chicago & Alton

Other Important Work Under Construction: Freight terminal at Kansas City, Mo., cost $148,828, completed; freight terminal at Chicago cost $1,400,000, work started.

Chicago & North Western

Other Important Work Under Construction: Minnesota river bridge No. 1603 at Mankato, Minn., cost $125,700, completed; bridge No. 1890 at Lick, Ill., cost $139,100, to be finished by June, 1920; passenger station at Clinton, Iowa, cost $282,000, completed.

Chicago, Burlington & Quincy

Second Track: Litchfield, Ill., to Walshville, 7.81 miles.

Other Important Work Under Construction. New Platte river bridge at Northport, Neb., cost $198,950, to be finished June, 1920; track elevation at Aurora, Ill., to cost $1,079,874; yard at Hawthorne, Ill., cost $259,332, completed; engine terminal at Eola, Ill., cost $183,603, completed; freight terminal at Chicago, cost $3,420,942, work under way; reservoir and pipe line at Edgemont, S. Dak., cost $125,161, completed; additional shop facilities at West Burlington, Iowa, cost $245,187, completed.

Chicago, Rock Island & Pacific

First Track: Chattanooga, Okla., to Grandfield, 18.00 miles.

Other Important Work Under Construction: Rebuilding bridge No. 5303 on Nebraska line, cost $114,832, 5 per cent completed; Water treating plants on Iowa division, cost $102,303, completed; new engine terminal at Burr Oak, Ill., cost $269,700, completed.

Cincinnati, New Orleans & Texas Pacific

Second Track: Kings Mountain, Ky., to Science Hill, 14.70 miles; Moreland, Ky., to South Fork, 8.30 miles; Helenwood, Tenn., to Robbins, 6.00 miles; from Huffman, Tenn., 17.36.

Cisco Northeastern

First Track: In Texas, not specified, 10 miles.

City of Prineville Railway

First Track: Prineville Junction, Ore., to Prineville, 19 miles.

Cleveland, Cincinnati, Chicago & St. Louis

Second Track: Briar, Ind., to Beach Grove, 9.00 miles.

Other Important Work Under Construction: Yard extension at Mattoon, Ill., cost $115,000, work completed except track; second track from Augusta, Ind., to Whitehaven, 11 miles, cost $1,158,900, grading and bridges, completed.

Delaware & Hudson

Other Important Work Under Construction: Yard improvements at Carbondale, Pa., cost $689,946, completed.

Delaware, Lackawanna & Western

Other Important Work Under Construction: Renewal of bridge abutments, mile post 293.56 at Avoca, N. Y., cost $11,817, 70 per cent completed; Sanfords crossing viaduct at Kearney Junction, N. J., cost $192,050, work under way.

Denver & Rio Grande

Second Track: Buttes, Colo., to Pueblo, 20.00 miles.

Other Important Work Under Construction: Division yard and terminals at Soldier Summit, Utah, cost $880,000, completed.

De Queen & Eastern

Other Important Work Under Construction: Broken Bow, Okla., and De Queen, Ark.

Duluth, Missabe & Northern

First Track: In Minnesota, Spur to Carson Lake; Spur to Hobart, Minn.

Elk Basin Railroad

First Track: Clarkia, Idaho, to Camp 16, 4.00 miles.

Erie

Other Important Work Under Construction: Separation of grades, Youngstown, Ohio, cost $147,800, completed; separation of grades, Girard, Ohio, cost $150,000, completed; engine terminal, Avoca, Pa., cost $294,000, completed; engine terminal, Brockwayville, Pa., cost $142,445, completed; engine terminal, Salamanca, N. Y., cost $237,293, completed.

Fort Worth & Denver City

Other Important Work Under Construction: Freight station at Wichita Falls, Tex., cost $114,443, 15 per cent completed.

Goshen Valley

First Track: Pearl, Utah, to Flora, 10.50 miles.

Great Northern

Other Important Work Under Construction: Renewing 858 feet of single track timber, snow sheds and 1412 feet of double track sheds, Leavenworth, Wash., to Drury and at Tye, cost $300,000, completed.

Gulf & Ship Island

First Track: From Hovey, Miss., to Kihm, 34.50 miles.

Gulf, Colorado & Santa Fe

Other Important Work Under Construction: Galveston (Tex.) Causeway (G. C. & S. F. share) $305,151, 60 per cent completed; raising grade main line Texas, fourth district mile post 330-409, cost $197,926, 80 per cent completed.

Gulf, Mobile & Northern

First Track: Between Barrets divide and Jackson, Tenn., 22.00 miles; McLain Junction, Miss., to North Blodgett, 24.40 miles.

Horse Creek Railroad

First Track: In Clay county, Ky., up Horse Creek, 4.70 miles.

Houston & Texas Central

First Track. Around Dallas, Tex., 6.00 miles.

Illinois Central

First Track: Golconda, Ill., extension on Golconda branch, 6.50 miles; Golconda extension to Rose Clare and Fairview mines.

Other Important Work Under Construction: At Chicago reconstruction of bridges from Sixty-third to Sixty-seventh streets, inclusive, cost $537,000, and from Fifty-first to Sixtieth streets, inclusive, cost $821,850, completed; raising tracks from Sixty-third to Sixty-seventh streets, cost $140,800, nearing completion; raising tracks from Fifty-first to Sixty-third streets, cost $286,000, completed; passenger stations at Fifty-third, Fifty-seventh and Sixtieth streets, cost $115,870, completed; reconstruction St. Charles Air Line bridge, cost $151,420, completed; power plant at Burnside shops, cost $169,918, completed; track elevation Grand Crossing to Kensington, cost $2,082,300, completed. Four-track bridge over Kankakee river at Kankakee, Ill., cost $346,357, completed; water facilities at DuQuoin, Ill., cost $100,000, completed; engine terminal at Mounds, Ill., cost $250,000, and overhead bridge and yard tracks, cost $172,000, completed; reduction of grade and change of alinement from Princeton, Ky., to Dawson, cost $802,000, completed.

Kansas City Southern

First Track: Asbury, Mo., to Lawton, Kan., 5.34 miles.

Knox Railroad

First Track: Between Union, Maine, and Warren, 0.50 miles.

Lake Erie & Western

Other Important Work Under Construction: Roundhouse at Lima, Ohio, cost $250,000, completed; roundhouse facilities at Peru, Ind., cost $156,510, completed; track elevation and freight house at Indianapolis, Ind., cost $900,000, to be completed in 1920.

Lehigh Valley

Other Important Work Under Construction: Hamburg Turnpike viaduct, cost $216,013, completed; changes account barge canal at Rochester, N. Y., cost $100,000, completed; engine terminal at Ashmore, Pa., cost $1,630,000, completed.

Louisville & Nashville

First Track: Lexington & Eastern, Blackey, Ky., up Rockhouse Creek, 3.66 miles. Branch in Perry county, 7.81 miles; Kentucky & Virginian, from Evarts, Ky., 2.80 miles; extension of Clover Fork branch, 9.77 miles; extension to Martin's Fork branch, 2.70 miles; in Harlan county up Capon's Creek, 6.00 miles.

Second Track: Corbin, Ky., to Arkle, 7.55 miles.

Magna Arizona Railroad

First Track: In Superior, Ariz., 10.63 miles.

Michigan Central

Other Important Work Under Construction: Engine terminal at Niles, Mich.; cost $1,378,500, completed; extending dock at harbor line at Detroit, cost $326,000.

Minneapolis, St. Paul & Sault Ste. Marie

Other Important Work Under Construction: Twenty-four foot concrete arch bridge at Blackhoof, Minn., cost $131,971, 40 per cent completed.

Missouri, Kansas & Texas

Second Track: Through Burk-Burnett, Tex., 10.50 miles.

Other Important Work Under Construction: Subway at Main street, Parsons, Kan., cost $167,500, completed.

Missouri, Kansas & Texas of Texas

Other Important Work Under Construction: Separation of grades, Dallas, Tex., cost $394,085, completed; double track through Burk-Burnett, Tex., mile post 11.95-16.10, 65 per cent of track laid.

Missouri Pacific

Other Important Work Under Construction: Raising track, Inter-River Drainage district, Poplar Bluff to Fisk, Mo., cost $225,878, 20 per cent completed.

Monongahela Railroad

Other Important Work Under Construction: Retaining wall at Hill street, Brownsville, Pa., cost $308,500, completed.

Nashville, Chattanooga & St. Louis

Other Important Work Under Construction: Engine terminal at Atlanta, Ga., cost $360,030, completed.

New York Central

Other Important Work Under Construction: At New York, Grand Central Terminal improvements, cost $3,651,805, 86 per cent completed; strengthening Park avenue viaduct, cost $121,600, 79 per cent completed; reconstruction of 149th street bridge, cost $449,900, 55 per cent completed, and reconstruction of Gun Hill Road bridge, cost $108,500, 57 per cent completed. Reconstruction of bridge 698-c at Rochester, N. Y., cost $128,450, 76 per cent completed. Elimination of grade crossings at Glasgow, Sodus, Waterloo and Mill streets, Clyde, N. Y., cost $195,021, completed; at Hotel avenue, Niagara Falls branch, Buffalo, N. Y., cost $400,390, completed, and at Court street, Watertown, N. Y., cost $130,000, 24 per cent completed. Third and fourth track, Syracuse Junction branch, Syracuse, N. Y., cost $460,000, 70 per cent completed; Solvay engine house, Syracuse, cost $900,000, 26 per cent completed; new engine house terminal at Watertown, N. Y., cost $1,363,000, completed; addition to Massey street yard, Watertown, cost $120,000, 45 per cent completed; extending car repair shop at East Buffalo, N. Y., cost $694,100, 88 per cent completed; additional eastbound yard at Minoa, N. Y., cost $250,000, 95 per cent completed; engine house extension and alterations at

Minoa, cost $347,000, completed; engine house improvements at De Witt, N. Y., cost $250,000, completed; additional yard tracks at Genesee Junction, N. Y., cost $246,000, 85 per cent completed; new yard west of Tower 4, at West Albany, N. Y., cost $546,107, 90 per cent completed; general improvements at Utica, N. Y., cost $297,946, 70 per cent completed; engine terminal and yard improvements at Gardenville, N. Y., cost $2,672,200, completed; change of alinement, elimination of grade crossings and changing bridges at Tonawanda, N. Y., cost $2,939,092, 75 per cent completed; extension to New Jersey Junction railroad tracks at West New York, N. J., cost $404,020, 52 per cent completed; third and fourth tracks, Granton to Little Ferry, N. J., cost $723,126, 64 per cent completed; extension of yard at Little Ferry, N. J., cost $313,535, 90 per cent completed; ice house and repair yard at Weehawken, N. J., cost $468,400, completed; pier K4 at Weehawken, cost $1,036,000, completed; freight repair shop facilities at New Durham, N. J., cost $200,000, 70 per cent completed; additions and extensions to engine house at Clearfield, Pa., cost $157,000, completed; additions to engine house facilities at Cherry Tree, Pa., cost $176,000, completed; additional shop facilities at Avis, Pa., cost $855,000, completed; extending passing sidings from Shawsville Tunnel to Walton, Pa., cost $150,000, completed; Himrod avenue viaduct improvements at Youngstown, Ohio, cost $310,285, 34 per cent completed; grade separation at Port Clinton, Ohio, cost $135,684, 30 per cent completed; enlargement of yard tracks at Coalbury, Ohio, cost $531,607, completed; new engine terminal at Coalbury, cost $950,000, completed; engine terminal and yard improvements at Collinwood, Ohio, cost $206,508, completed; extension to locomotive shops at Collinwood, cost $388,258, and extension to car shops, cost $65,000, completed; new yard at Rockport, Ohio, cost $960,885, 82 per cent completed; industrial track development and additions to Kinsman street yard, cost $212,310, 60 per cent completed; new yard and engine terminal at Minerva, Ohio, cost $1,068,000, completed; additional tracks and office at Indiana Harbor, Ind., cost $100,000, 90 per cent completed; grade separation at Detroit, Mich., cost $267,589, nearing completion; renewal of River Rouge drawbridge at Detroit, cost $270,500, 15 per cent completed.

New York, Chicago & St. Louis

Other Important Work Under Construction: Yard extensions at Bellevue, Ohio, cost $133,787, completed.

New York, New Haven & Hartford

Other Important Work Under Construction: Thames river bridge at New London, Conn., cost $2,740,000, completed; freight terminal and classification yard, etc., at Cedar Hill, Conn., cost $4,663,475, 67 per cent completed, of which 5 per cent was done in 1918, work progressing; passenger station at New Haven, Conn., cost $1,902,213, nearing completion.

Norfolk & Western

Other Important Work Under Construction: Coal handling machinery, pier No. 3, Lamberts Point, Va., cost $400,000, completed; engine terminal and yard facilities at Roanoke, Va., cost $1,710,000, work under way.

North Texas & Santa Fe

First Track: From Shattuck, Okla., Ellis county, 9.60 miles.

Oregon, California & Eastern

First Track: Klamath Falls, Ore., to Daisy, 20 miles.

Pearl River Valley

First Track: Between Dalton, Miss., and Anderson, 3.60 miles.

Pennsylvania Railroad, Lines East

First Track: Turtle Creek, Pa., branch extension, 8.40 miles; Champion, Pa., through Clarksville, 9.10 miles; at Steelton, Pa., 0.85 miles; at Leechburg, Pa., 0.22 miles; Dunning, Pa., to Saltsburg, 7.24 miles; Millsboro, Pa., to Mother, 7.98 miles.

Second Track: Harrington, Del., to Greenwood, 8.00 miles.

Other Important Work Under Construction: Revision and enlargement of yard at Meadows, N. J., cost $1,487,121, 52 per cent completed; relocation of passenger and freight station and yards at Princeton, N. J., cost $479,152, 90 per cent completed; westbound receiving and classification yard and transfer facilities at Waverly, N. J., cost $1,507,210, 44 per cent completed; construction of new No. 1 and No. 4 tracks from south end of Gunpowder river bridge, Maryland, to north end of Bayview yard, cost $1,290,983, 76 per cent completed; extension of No. 1 track from Severn tower to Arundel tower, between Baltimore and Washington, cost $456,845, 70 per cent completed; new pier and grain elevator, (Canton) Baltimore, Md., cost $4,977,707, 62 per cent completed; brick freight house at Washington, D. C., cost $107,000, completed; new locomotive shops, etc., at Marietta, Pa., cost $4,996,000, 1 per cent completed; additional engine house facilities at Shire Oaks, Pa., cost $543,021, completed; freight station and delivery tracks at Harrisburg, Pa., cost $637,874, 89 per cent completed; extension to engine house at Gray's Ferry yard, Philadelphia, Pa., cost $196,874, completed; two additional tracks from Fifty-eighth street, Philadelphia, to Gray's Ferry, cost $841,358, 80 per cent completed; Sixtieth street branch, Fifty-eighth street to junction with Chester & Philadelphia branch, cost $1,889,463, 50 per cent completed; bridges on Sixtieth street branch, Philadelphia, cost $190,446, 82 per cent completed; new engine house, machine shop and ash handling facilities at Greenwich, Pa., cost $1,410,790, 85 per cent completed; two-track joint line, Broad street to Delaware avenue and Hoyt street, South Philadelphia, cost $260,700, 60 per cent completed; underground bridge at Station avenue, Cornwells, Pa., cost $204,571, 19 per cent completed; overhead bridge at Edgely, Pa., cost $197,123, completed; new bridge at Red Bank, Pa., cost $418,596, completed; new bridge at Parker's Landing, Pa., cost $556,625, 75 per cent completed; new bridge at East Sandy, Pa., cost $432,179, completed; new bridge at Mahoning, Pa., cost $432,504, completed; extension Unity (Pa.) branch to Jamieson Coal & Coke Company's mine, cost $177,357, completed; removing 1,000 feet of cover at west end of Radebaugh (Pa.) tunnel, cost $518,231, completed; engine house facilities at Blairsville, Pa., cost $458,335, completed; slag track and fill at Sharpsburg, Pa., cost $817,434, 95 per cent completed; replacing bridge 17.08 with deckplate girders and concrete slab floors at Parnassus, Pa., cost $176,088, completed; branch from Chester to Girard Point, Pa., and connection with main line at Eddystone, cost $3,535,922, 88 per cent completed; reconstruction of bridge at Pequea, Pa., cost $234,319, 75 per cent completed; South Chester bridge, locomotive and car facilities at Thurlow, Pa., cost $708,143, 61 per cent completed; extension to power plant facilities at Juniata shops, Altoona, Pa., cost $1,354,772, 43 per cent completed; replacing bridge 57.99 at Reading, Pa., cost $316,796, completed; new engine facilities at Derry, Pa., cost $257,806, completed; extending tracks in eastbound receiving yard at Pitcairn, Pa., cost $135,931, completed; replacing bridge 70.62 at Aspinwall, Pa., cost $121,615, 42 per cent completed, and replacing bridge 11.01 with heavier deck trusses on westbound track at Social Hall, Pa., cost $283,590, completed; bridge 50.09 renewed with new truss slab floor at Pigeon Creek, Pa., cost $110,737, 85 per cent completed; concrete molding plant at Morrisville, Pa., cost $434,380, completed; change of line, grade and second track, Bulls Mill to Eldred, Pa., cost $430,683, completed; grade revision, Corry, Pa., to Brownell, cost $283,499, 98 per cent completed; Sullivan Way, undergrade bridge at Trenton, N. J., cost $154,857, completed; new engine house and shop facilities at Phillipsburg, N. J., cost $171,851, completed; new yard tracks at Robinvale yard, Metuchen, N. J., cost $145,324, 70 per cent completed; elimination of Hamburg turnpike grade crossing at Buffalo, N. Y., cost $184,648, 86 per cent completed; drawbridge over Raccoon creek, Bridgeport, N. J., cost $177,562, completed; bridge 11.99 at Ogden, N. J., cost $187,605, 90 per cent completed; new drawbridge at Sea Isle City, N. J., cost $177,477, to be finished by April, 1920; eliminating grade crossings from Spruce to Everett streets, Camden, N. J., cost $755,031, completed; new engine facilities at Gardenville, N. J., cost $1,023,106, completed; engine terminal at Perryville, Md., cost $642,994, 92 per cent completed; new yard replacing existing one at Edge Moor, Del., cost $2,558,000, 20 per cent completed; additional facilities and extension to existing facilities at engine house, Wilmington, Del., cost $1,380,880, 65 per cent completed.

Pennsylvania Railroad, Lines West

First Track: In Jefferson and Belmont counties, Ohio, 4.08 miles.

Fourth Track: Yankee Crossing, Ohio, 3.44 miles.

Other Important Work Under Construction: Engine terminal facilities at Conway, Pa., cost $587,550, completed; engine terminal facilities at Stark (Canton), Ohio, cost $3,261,000, 77 per cent completed; engine handling facilities at Crestline, Ohio, cost $1,450,000, completed; improved shop and engine house facilities at Wellsville, Ohio, cost $703,490, 76 per cent completed; enlarged engine terminal at Cleveland, Ohio, cost $216,955, completed; change of line at Delaware, Ohio, cost $1,741,849, 96 per cent completed; construction of car repair yard at Fort Wayne, Ind., cost $437,966, to be finished by February, 1920.

Pere Marquette

Other Important Work Under Construction: Engine terminal and yard facilities at New Buffalo, Mich., cost $550,000, work suspended.

Philadelphia & Reading

Third Track: Between Trenton Junction and Hopewell, N. J., 8.80 miles; Belle Meade to Manville, N. J., 12.10 miles; at Telford, 1.00 mile.

Fourth Track: Belle Meade to Manville, N. J., 12.10 miles; in Philadelphia, Pa., 1.30 miles.

Other Important Work Under Construction: Concrete arch bridge over Schuylkill river, Philadelphia, Pa., cost $915,374, completed; concrete engine house, Tulip street yard, Philadelphia, cost $255,487, completed; engine facilities, Saucon creek, South Bethlehem, cost $636,435, completed; auxiliary facilities at South Bethlehem, cost $626,525, to be completed by February, 1920; east end yard improvements at Rutherford, Pa., cost $142,921; engine house facilities at Darby Creek, Pa., cost $358,845, completed; overhead highway bridge and 4 additional tracks, Weston, N. J., to Manville, cost $267,657, completed; undergrade crossing at Asylum road, Trenton, N. J., completed.

Pittsburgh & Lake Erie

Other Important Work Under Construction: Enlargement of terminal yard at Hazelton, Ohio, completed; improvements at Groveton, Pa., cost $590,938, completed; extension of eastbound yard at McKees Rocks, Pa., cost $394,000, completed; replacing viaduct with embankment at Rankin, Pa., cost $573,370, 85 per cent completed; classification yard at Port Vue, Pa., cost $207,328, completed.

Pittsburg & Shawmut

Other Important Work Under Construction: Tunnel lining at Coulter, Pa., completed.

Pittsburgh & West Virginia

Other Important Work Under Construction: Fifteen-stall roundhouse at Rook, Pa., cost $120,000, completed.

Pittsburgh, Cincinnati, Chicago & St. Louis

Other Important Work Under Construction: Track elevation, Indianapolis, Ind., cost $966,006, 58 per cent completed; freight house at Indianapolis, Ind., cost $347,951, completed; new yard, engine house and shop facilities at Jefferson, Ind., cost $1,228,000, 55 per cent completed; engine terminal at Richmond, Ind., cost $1,149,412, 60 per cent completed; third and fourth track at Richmond, cost $1,200,870, 84 per cent completed, and main track work, 85 per cent completed; additional shop facilities at Logansport, Ind., cost $1,717,630, completed; additional shop buildings at Terre Haute, cost $625,120, completed; grade reduction, Frankfort, Ind., to Logansport, cost $630,015, completed; shop improvements at Columbia, Ohio, cost $2,566,907, completed, and engine terminal, cost $1,623,898, nearing completion; Seisto river bridge at Columbus, cost $200,600, 30 per cent completed; improvements to engine house facilities, Columbus, cost $791,609; yard facilities at Columbus, cost $1,097,922; improvements to engine house facilities at Bradford, Ohio, cost $798,817, completed; improved yard facilities at Dennison, Ohio, cost $1,663,690, 28 per cent completed; engine and shop facilities at Dennison, cost $475,300, 98 per cent completed; extension New Cumberland branch, Chester, W. Va., to state line, cost $151,828, 72 per cent completed, and from state line to Phillipsburg,

Pa., cost $1,405,041, 60 per cent completed, track work deferred on both sections; engine terminal facilities at Scully, Pa., cost $1,643,890, 41 per cent completed.

Pittsburg, Shawmut & Northern

First Track: Force, Pa., to Tyler, 2.89 miles.

Public Belt Railroad of New Orleans

First Track: At New Orleans, La., 0.39 miles.

Red River Lumber Company

First Track: In California, not specified, 10 miles.

Roanoke Railway

First Track: From North Carolina-Virginia state line to Gholsonville, Va., 10 miles.

Sioux City Terminal Railroad

First Track: In Sioux Cty, Ia., 0.75 miles.

Southern Pacific

First Track: Calipatria-Westmoreland to near Hoytville, Cal., 12.60 miles; between Harrington, Cal., and Hamilton, 46.69 miles; Mill City, Nev., branch extension, 2.26 miles.

Second Track: Between Stockham and Polvo, Ariz., 3.13 miles.

Other Important Work Under Construction: Dredging San Antonio estuary, West Alameda, Cal., cost $145,601, completed; new wharf facilities, Oakland Pier, Cal., cost $437,300, completed; concrete existing enlarged section of tunnel No. 25, Tunnel, Cal., cost $187,263, 70 per cent completed.

Southern Railroad

Second Track: Between Charlotte, N. C. ,and South Carolina state line, 4.1 miles; between North Carolina state line and Blacksburg, S. C., 5.72 miles; between Gaffney, S. C., and Cowpens, 12.97 miles; between Cowpens, S. C., and Mount Zion, 7.75 miles; through Greer, S. C., to south of Greenville, 29.91 miles; between Central, S. C., and Tugalo river, 30.00 miles; between Tugalo river and Cornelia, Ga., 13.64 miles.

Other Important Work Under Construction: New drawbridge over Congaree river, cost $117,000, completed; new bridge over Yadkin river, cost $170,000, completed; Twenty-first street viaduct at Birmingham, Ala., cost $119,705, completed.

Tennessee Railroad

First Track: Indian Fork, Tenn., to Fort Mountain, 1.50 miles.

Texas & Pacific

Other Important Work Under Construction: Engine terminal facilities at Texarkana, Texas, cost $110,000, completed; improvements to second track, Whitesboro to Fort Worth, Texas, cost $1,367,900, 50 per cent completed.

Toledo & Ohio Central

Other Important Work Under Construction: Shortening, enlarging and lining tunnel at Moxalala, Ohio, cost $120,000, completed.

Union Pacific

First Track: Winton branch in Wyoming, 4.38 miles.

Second Track: Buford, Wyo., to Hermosa, 11.11 miles; Pine Bluffs, Wyo., to Archer, 33.35 miles; Wahsatch, Utah, to Emory, 15.82 miles; Manhattan, Kan., to Junction City, 20.50 miles.

Other Important Work Under Construction: James street viaduct at Kansas City, Kan., Union Pacific share, $151,697, completed; engine terminals completed as follows: Green River, Wyo., cost $997,996; Council Bluffs, Iowa, cost $1,688,500, and at Junction City, Iowa, cost $1,220,024. Coal and ash handling facilities at Sidney, Neb., cost $194,050, completed; machine shop extension at Omaha, Neb., cost $546,571, completed; new machine shop at Cheyenne, Wyo., cost $1,713,463, completed.

United Verde & Pacific

First Track: Hopewell tunnel, Ariz., to Jeroma, 3.96 miles.

Verde Valley

First Track: In Arizona, not specified, 0.31 miles.

Vredenburgh Saw Mill Company's Railroad

First Track: In Alabama, not specified, 8.00 miles.

West Jersey & Seashore

First Track: In New Jersey on Seabrook branch, 2.00 miles.

Whitney Company's Railroad

First Track: Tilamook Bay, Ore., to Kilches river basin, 12.90 miles.

Willacoochee & Du Pont

First Track: Willacoochee, Ga., to Shaw's Still, 10.00 miles.

Winchester & Western

First Track: Between Winchester, Va., and Wardensville, W. Va., 0.40 miles.

Railroad Construction in Canada in 1919

Alberta & Great Waterways

First Track: In Alberta, mile 275.4 to 283.5, 8.1 miles.

Canadian National

First Track: Oliver branch, Alberta, between mile 44 and mile 100, 44.38 miles; Peace River Junction, Alberta, to White Court, 0.78 miles; Peace River, Alberta, from mile 33.80 to mile 38.10, 4.30 miles; Hanna, Alberta, from mile 2.17 southeast to mile 50.25, 48.08 miles; Luck Lake branch, Sask., to mile 19.75, 19.75 miles; on Melfort-Humbolt branch, Sask., 0.35 miles; Swift Current branch, Sask., from mile 84.43 to mile 97.39, 12.96 miles; Thunderhill branch, Manitoba, from mile 72.90 to mile 90.35, 17.45 miles.

Second Track: On Munson branch, Alberta, 6.75 miles.

Grand Trunk Pacific

Other Important Work Under Construction: Diversion at Firdale, Manitoba, miles 92 to 94, replacing temporary trestles with permanent openings and roadway, cost $420,000, 67 per cent completed.

Kettle Valley

First Track: In British Columbia, 5.75 miles.

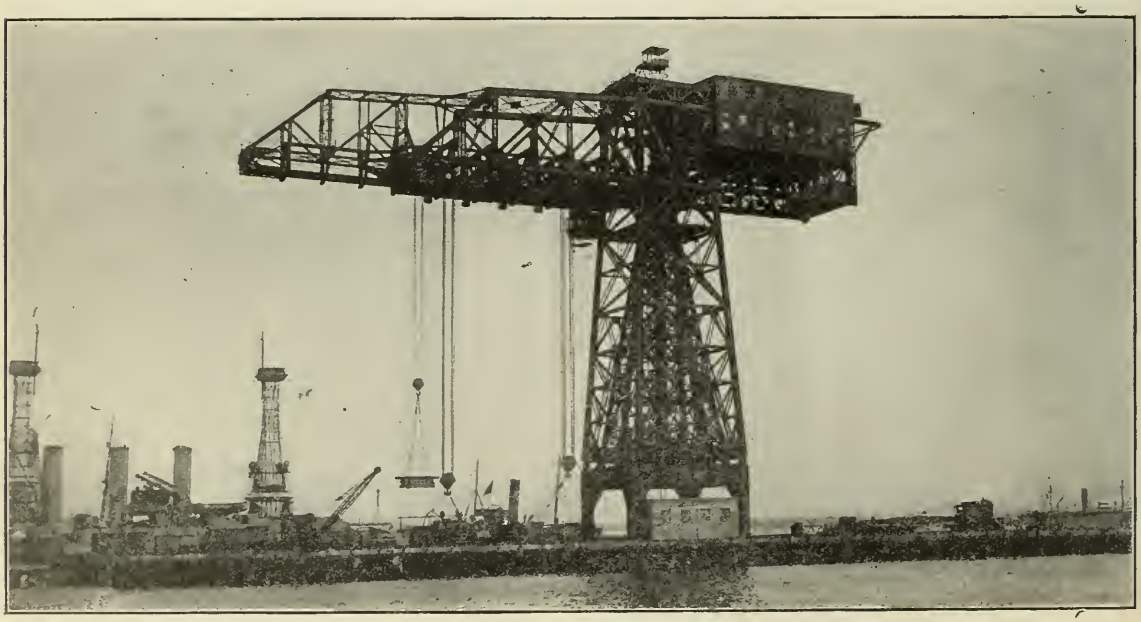
Pacific Great Eastern

First Track: Clinton, B. C., to Williams Lake, 113.00 miles.

St. John & Quebec

First Track: Westfield Beach to Frederickton, N. B., 70.00 miles.

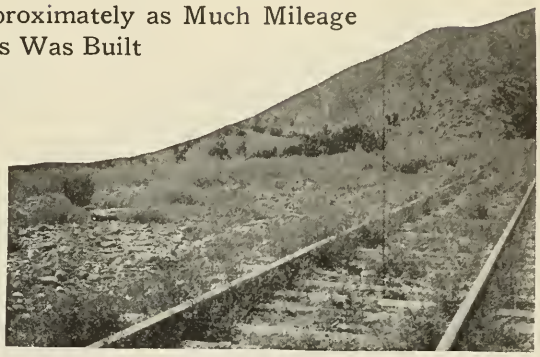
Second Track: Between Gagetown, N. B., and Westfield, 2.40 miles.



350-Ton Crane at the League Island Navy Yard—the Largest Crane in the World

Railway Lines Abandoned During the Year 1919

Operation Discontinued on Approximately as Much Mileage in the United States as Was Built



DURING 1919, 637 miles of main line railway was abandoned for operation in the United States. In addition, 61 miles of line abandoned in 1918, but reported too late for inclusion in that year's record, is included in the appended tabulation showing the names of the abandoned lines and their geographical distribution. Thus a total of 689 miles of line abandoned is shown in the 1919 record. This exceeds by three miles the mileage of new lines built during the year. Furthermore, 1919 is the third year in succession in which our reports have shown the mileage abandoned to have exceeded the mileage of new lines built. During the three years from 1917 to 1919, inclusive, operation was abandoned on 3,319 miles of line and in the same period only 2,386 miles of extensions, branches, and other new lines were completed and placed in service. Thus, during this period there has been an actual decrease of 933 miles in the mileage of railways in the United States.

These figures are borne out by a tabulation in the Interstate Commerce Commission's "Statistics of Railways in the United States for the Year Ending December 31, 1917," which shows the mileage of railways other than of switching and terminal companies, for the four preceding years as follows:

Year	Total mileage owned (Single track). Miles	Eastern District. Miles	Southern District. Miles	Western District. Miles
Dec. 31, 1917.....	253,626.13	61,120.98	51,405.65	141,009.50
Dec. 31, 1916.....	254,045.83	61,141.56	51,572.71	141,331.56
June 30, 1916.....	254,250.62	61,243.19	51,620.39	141,387.04
June 30, 1915.....	253,788.64	61,361.34	51,373.03	141,054.27

It will be noted that there is a decrease in total mileage owned, from June 30, 1915, to December 31, 1917, of 162 miles and from June 30, 1916, of 624 miles. It is interesting to note further that this tendency is shown in all three districts.

Of the total mileage abandoned in 1919, 361 miles have been abandoned permanently and the lines taken up. Operation has been discontinued on 337 miles more and petitions have been made to the state authorities for permission to dismantle many of these lines.

The Georgia Coast & Piedmont is the longest line which was abandoned during the year. This road extended from Brunswick, Ga., on the Atlantic seaboard, inland in a northwesterly direction to Collins. Its sale was confirmed by the United States district court at Savannah, Ga., on October 18, 1918, and it will be dismantled except for a few miles resold to citizens of Reidville, Ga.

The Michigan East & West, 72 miles long, between Manistee, Mich., and Marion, is the second largest line to be abandoned during the year. Operation on this line was discontinued on May 28, 1918.

With a few exceptions, notably the Sidell & Olney, parts of which are still in operation under the corporate names of the "Kansas & Sidell Railroad" and "Westfield Motor Railway Company," the abandonments this year have embraced the entire mileage of the roads listed in the tabulation. This is in marked contrast to the statistics of 1918 when nearly 225 miles of line was abandoned temporarily through consolidation under government control as a result of the policy of the Railroad Administration to co-ordinate the facilities of parallel lines in many instances. In other words, the abandonments of 1919 are in the main traceable to the inability of roads serving sparely settled territories with their consequent light traffic to operate without loss at the rates they are permitted to charge in the present period of high costs of labor and materials. It is interesting to note in this connection that on one road the operating ratio rose to 236 per cent before application was made to the commission in its state for permission to discontinue operation.

Another interesting fact is evident from a study of the geographical distribution of the abandoned lines. That is that 10 roads operating in the South Atlantic states abandoned 255 miles of line in a territory embracing several poorly developed agricultural states, while in the New England district only 28 miles of line was abandoned.

The comparison drawn at the beginning of this article between the new mileage of railway line built in the past three years and the mileage of line abandoned during the same period, which shows a net decrease of more than 900 miles of line in operation January 1, 1920, does not mean that the country is overbuilt with railways. On the contrary, many localities embracing large areas are suffering today from the lack of transportation facilities.

In considering the abandonments of 1919, the statistics of the two previous years should be borne in mind as well as the fact that during this period the prices of railway supplies, particularly steel, have been maintained at such high levels that selling lines for junk was often a profitable venture. Starting with 1917, as the high water mark, when 1,338 miles of line was abandoned, the mileage abandoned

THE AMOUNT OF LINES abandoned during 1919 was approximately equal to that built.

Operation has been discontinued on nearly 1,000 more miles of line than have been built during the last three years.

Almost all of the mileage abandoned last year is on roads on which operation has been discontinued entirely.

A large part of the mileage abandoned in 1919 was in Southern states, which are still lacking in railway facilities.

per year has decreased, although the decrease was not particularly marked in 1918 when 1,283 miles of line was abandoned. However, it should be borne in mind that of this total, 225 miles were abandoned through consolidations under federal control, a large part of which will, without doubt, be returned to operation, on the return of the roads to private control. In 1919, however, the drop in mileage abandoned was marked, being less than 700 miles. These figures at least present the thought that the country may be approaching the end of extreme railway abandonment.

United States	Lines abandoned permanently and taken up. Miles	Lines abandoned and not taken up. Miles
Arkansas & Gulf— Kimball, Ark., to Laark, La.	.....	7.00
Artesian Belt— Kirk, Tex., to Macdona	.....	3.10
Beaver, Penrose & Northern— Beaver, Colo., to Penrose	6.40	.....
Birmingham & Atlantic— Pell City, Ala., to Tallaqeda	23.50	.....
Central Railway of Arkansas— Brigg, Ark., to Fonda Jct	2.00	.....
Clarendon & Pittsford— Rutland, Vt., to Hollister	.....	19.00
Crystal River— Carbondale, Colo., to Placita	.....	20.60
Fort Smith, Poteau & Western— Poteau, Okla., to Witteville	.....	3.00
Georgia Coast & Piedmont— Brunswick, Ga., to Collins	98.40	.....
Interstate Railroad— Stonega, Va., to end of line	0.57	.....
Kansas City & Memphis— Rogers, Ark., to Fayetteville, Siloam Springs and Monte Ne	59.00	.....
Keweenau Central— Phoenix, Mich., to Mandan	13.00	.....
Lac La Belle, Mich., to Lac La Belle Jct	7.00	.....
Laurel Railway— Damascus, Va., to Mountain City	.....	16.00
Michigan East & West— Manistee, Mich., to Marion	.....	71.90
Neame, Carson & Southern— Carson Mill, La., to Pujo	.....	7.46
Pacific & Eastern— Butte Falls, Ore., to Medford	.....	33.00
Prairie Farm & Southwestern— Prairie Farm, Wis., to Emerald	30.00	.....
St. Joseph Valley— Elkhart, Ind., to Columbia	.....	70.00
Sidell & Olney— Yale, Ill., to Olney	27.60	.....
Temple, Northwestern & Gulf— Temple, Tex., to Messar	.....	3.30
Texas, Arkansas & Louisiana— Atlanta, Tex., to Bloomsburg	.....	8.00
Timpson & Henderson— Timpson, Tex., to Henderson	.....	34.00
Unicoi Railway— Unicoi Jct., Tenn., to Davisville	8.00	.....
Watauga & Yadkin River— North Wilkesboro, N. C., to Darby	.....	27.00
Elkville, N. C., to Grandin	.....	2.00
Waycross & Western— Milltown, Ga., to Cogdell	24.00	.....
Willacoochee & Du Pont— Willacoochee, Ga., to Lox	.....	12.00
	299.56	337.36
Canada	Miles	Miles
Victoria & Sidney— Victoria, B. C., to Sidney	16.00	.....

Lines Abandoned in 1918, But Received Too Late for Inclusion in the Report for That Year

United States	Lines abandoned permanently and taken up. Miles	Lines abandoned and not taken up. Miles
East Georgia Railway— Register, Ga., to Glennville	39.00	.....
Nantucket Railroad— Nantucket, Mass., to Siasconsett	9.10	.....
St. Louis & Missouri Southern— New Madrid, Mo., to Marston	8.00	.....
Savannah, Hinesville & Western— Hinesville, Ga., to McIntosh	5.00	.....
	61.10	.....

Packers to Dispose of Refrigerator Lines

The "Big Five" Chicago packers, in an agreement made between them and the government, at the request of Attorney General Palmer, will divest themselves within two years of all holdings in terminal railroads, in refrigerator car lines and in corporations packing and distributing figs, fruits, vegetables, preserves, beverages, syrups and all other articles unrelated to the meat industry. The packers will in the same term of years dispose of all holdings in the Chicago stockyards. In explaining the reason for divorcing stockyards, terminal railroads and refrigerator car lines from the control of the packers, Mr. Palmer said:

"Control of the stockyards and of other facilities appertaining to the stockyards carries with it, first, a profit derived from the meat industry levied upon it and collected before the animal is slaughtered, all of which profit, however, evidences itself in the ultimate cost which the consuming public must pay for the dressed beef. Secondly, a potential means of favoritism in dealing with commission men. Thirdly, a means to prevent the establishment of new packing plants. Fourth, a means to prevent the development and limit the number of new markets and to centralize and restrict business to the stockyards so controlled, and, fifthly, the peculiar and exclusive access to information concerning the receipts and sales of livestock.

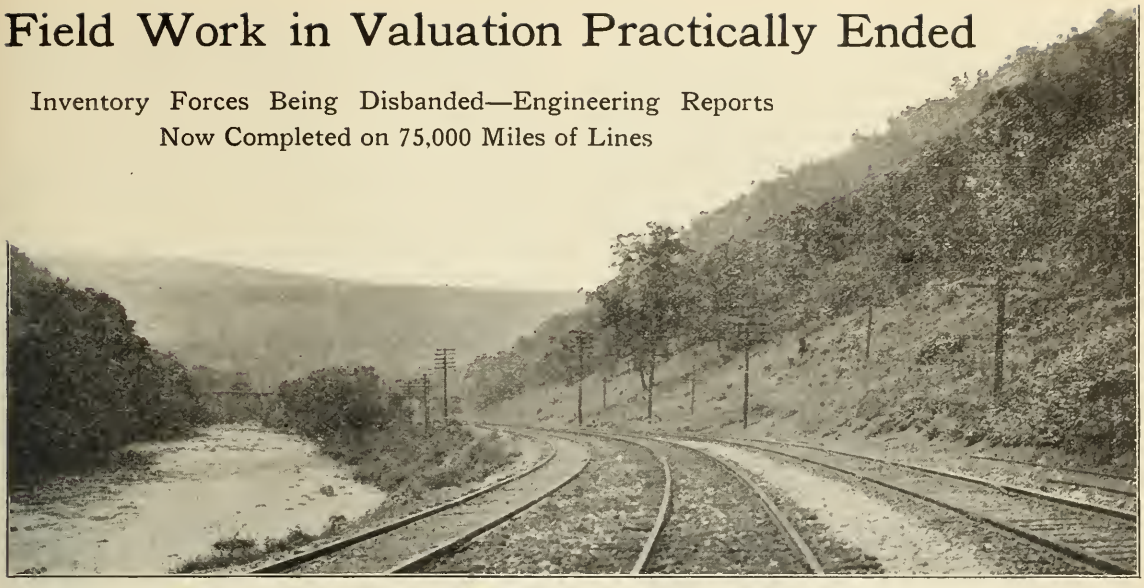
"The principal agent in stifling competition in the unrelated lines was the distributing system of the great packers," said Mr. Palmer, "and for the cure and prevention of these evils the defendants are enjoined perpetually from owning any capital stock or other interests in any corporation which is in the business in the United States of manufacturing, jobbing, selling, transporting, distributing or otherwise dealing in articles other than those directly connected with the meat business. The decree further enjoins the defendants from individually or jointly owning 50 per cent or more of the voting stock in any such corporation."

The agreement provides that immediately upon the entry of the decree of defendants shall commence to dispose of such unrelated commodities owned or handled by them, and shall commence to divest themselves of all their interests in firms, corporations and associations dealing in any of the so-called "unrelated commodities." Among the private car companies owned by the packers are the following: The Armour Car Lines, including the Armour Refrigerator Line, Armour & Co., the Armour Train Line, and the National Woodenware Company, totaling 5,558 cars; the Cudahy, Milwaukee Refrigerator Lines owning 240 cars, the Cudahy Milwaukee Tank Line owning 4 cars and the Cudahy Refrigerator Lines, the Cudahy Provision Refrigerator Line and the Cudahy Oil Tank Line, owning 1,431 cars; Morris & Co. Refrigerator Line and Morris & Co. Tank Lines, owning 2,738 cars; the Swift Refrigerator Transportation Company, including the Swift Livestock Transportation Company, Swift's Livestock Express, Swift's Refrigerator Line, owning 4,999 cars; and the Wilson Car Lines, owning 2,300 cars. The extent of the holdings of the packers in the terminal railways at Chicago cannot be determined, since attorneys for the packers are not prepared to make public any interpretation of the orders relative to the abandonment or retention of the refrigerator lines and other lines owned by their clients.

In a statement issued at Chicago following the announcement of the agreement, officers of the affected companies protested that they had broken no law and that the judgment has in no way been forced through proof of commercial guilt. The companies affected are Armour & Co., Morris & Co., Swift & Co., Wilson & Co., and the Cudahy Packing Company, their main subsidiaries and the principal stockholders and managers.

Field Work in Valuation Practically Ended

Inventory Forces Being Disbanded—Engineering Reports Now Completed on 75,000 Miles of Lines



Along the Line of the Baltimore & Ohio, Potomac River, Cumberland, Md.

IN SPITE OF THE HANDICAPS which have retarded almost all work during the year just closed, the Division of Valuation of the Interstate Commerce Commission has proceeded largely according to schedule in the prosecution of its work of valuing the properties of the carriers. The year has been marked by the completion of a large part of the inventory work by the field parties, followed by the disbanding of most of these forces, and by the completion of engineering reports on about 75,000 miles of lines.

Field Inventory Approaching Completion

Shortly after the inauguration of the valuation work in 1914, C. A. Prouty, director of the Division of Valuation, estimated that if he was allowed 12 railway and track parties in each of the five districts into which the country was divided for valuation purposes, he would be able to complete the field inventory of all of the railways in the United States as of the average date of January 1, 1920. Since that time the European war has intervened and other influences have arisen to affect the progress of this work adversely. The field work was particularly handicapped during the war by the loss of a large number of experienced employees whom it was necessary to replace by inexperienced and in many cases less efficient men. This condition has continued during the past year in spite of the fact that hostilities have been concluded, and has interfered seriously with the progress of the work. However, in spite of these unusual and unexpected handicaps the date originally set has seen this portion of the work practically completed according to schedule.

In brief, the present status of the work of the field forces in the inventorying of properties in the various districts is as follows: The field work in the Southern district has all been completed. In the Western district the roadway and track parties have completed their inventories, while the parties engaged in "branch" work (inventorying buildings, bridges and equipment) will continue for several months. In the Pacific district the roadway and track and the structural parties have completed their work and been disbanded, while the mechanical parties will continue well into the middle of next year. In the Central district it is expected that the roadway and track parties will complete their work in January, while the branch work will be finished about April 1. In the Eastern district about six of the twelve parties are now being disbanded owing to a lack of winter work and the rest of the roadway and track work will be completed with the remaining parties next summer at which time the branch work in this district will also be finished.

WORK of field forces practically completed and parties now being disbanded.

Engineering reports on 75,000 miles of lines now completed; expect to finish engineering reports on all roads by December 31, 1921.

Fifty-five reports served on roads to date and 50 more completed tentatively.

Too early to draw final conclusions, but total cost of reproduction exceeds carriers' book investment in all but nine of the first 52 valuations served.

Land and Accounting Sections Delayed

The field progress of the Land Section has not kept pace fully with that of the Engineering Section but since the time required in the office between the completion of the field work and the preparation of the report is considerably less in the Land Section than the Engineering Section, it is expected that the land reports will be filed as promptly as the engineering reports unless delay is encountered because of the failure of the carriers to furnish certain information at the time desired.

The most serious delay has been encountered in the Accounting Section, where it has been impossible to secure and retain an adequate force of accountants sufficiently experienced to complete and assemble the data into the reports.

Difficulty is primarily in the office, the field accounting work being well up to schedule.

In a recent letter addressed to the Valuation Committee of the National Association of Railway and Utilities Commissioners, Director Prouty expressed his belief that it would require about two years after the completion of the field work to prepare engineering reports upon all of the principal roads of the country. In other words, he expressed the hope that the Division of Valuation would have ready for the Interstate Commerce Commission engineering, land and accounting reports upon all the principal carriers of the country by December 31, 1921, when the Commission would then be in a position to fix the tentative valuations on these properties.

Many Engineering Reports Completed

After the completion of its preliminary engineering report on the property of any carrier, it is the practice of the Division of Valuation to submit it to the carrier informally to enable it to present any information which may cause the division to revise the report, in this way correcting inaccuracies and reducing the number of points in controversy to the minimum. After revision, the report is then submitted to the carrier formally and opportunity is offered it to file formal protests. After passing on these protests, the report is delivered to the Commission by the Division of Valuation, after which time all hearings are before the Interstate Commerce Commission itself.

Previous to December 31, 1918, engineering reports had been completed on about 25,000 miles of road, while reports were completed on about 50,000 miles additional this year. Director Prouty stated recently that he expects to receive similar reports on 75,000 miles of lines in 1920 and on the remainder in 1921.

Up to the present time valuations have been published by the Interstate Commerce Commission and served on three roads, the Texas Midland, the Winston-Salem Southbound and the Kansas City Southern, while it is expected that a report on the Atlanta, Birmingham & Atlantic will be published and served on the carrier in the very near future. The Division of Valuation has served tentative valuations on 55 properties up to the present time, including the four mentioned above, the larger roads in this group being the San Pedro, Los Angeles & Salt Lake; the New Orleans, Texas & Mexico; the Elgin, Joliet & Eastern and the Chicago, Terre Haute & Southeastern.

In addition, preliminary engineering reports have been completed on the properties of about 50 other lines and have been submitted informally to the carriers. Among these reports are those on a number of the larger roads including the Great Northern, the Big Four, the Chicago, Rock Island & Pacific and the Boston & Maine.

Since these tentative figures are now being given out by the Division of Valuation at frequent intervals and as others including those on a number of the larger properties will ap-

Road	Miles of Road Owned	Cost of Reproduction, New	Cost of Reproduction, Less Depreciation	Total Cost of Reproduction New of Common Carrier Property Owned Other Than Land, including carrier's portion jointly owned property other than land, if any; present value of carrier and non-carrier lands; property held for purposes other than those of a common carrier, and materials and supplies	Investment in Road and Equipment as Shown by Carrier's Books, as of the Date of Valuation
Atlanta, Birmingham & Atlantic	641.	$24,154,998	$19,408,810	.....	.....
Texas Midland	110.	3,382,004	2,527,417	$3,827,773	$2,748,171
New Orleans, Texas & Mexico	173.	7,668,975	6,471,984	.....	.....
Kansas City Southern	778.	44,194,645	36,495,757	.....	.....
Winston-Salem Southbound	90.	5,121,188	4,753,006	6,036,767	5,598,558
Elgin, Joliet & Eastern	....	36,418,605	27,899,986	40,329,575	38,683,120
Wrightsville & Tennville	102.82	1,563,556	1,180,617	1,864,775	899,097
Tocele Valley Ry	7.27	201,746	164,319	.....	.....
Alabama Central	8.75	85,428	68,482	86,567	96,000
St. Johns & Ophir	8.56	127,414	110,103	130,207	139,161
Missouri Southern	65.90	920,912	770,945	955,464	802,484
Ray & Gila Valley	11.007	582,414	503,489	.....	.....
Quincy Western (leased)	6.257	71,206	47,415	72,599	79,817
Tonopah & Tidewater	183.95	3,038,896	2,439,145	.....	.....
Bowden Ry.	13.278	118,874	95,043	.....	.....
Georgia Southern & Florida	497.061	10,297,657	7,690,371	12,166,751	12,273,374
The Georgia Northern	76.924	851,275	665,891	1,036,376	912,145
Death Valley	23.070	359,726	346,257	364,137	365,962
Dover & Southbound	26.354	230,857	160,551	235,257	79,776
Carolina R. R.	14.068	192,057	153,462	187,138	90,600
Hampton & Branchville R. R. & Lumber Co.	26.247	227,822	163,457	262,621	138,275
Arizona Southern	23.567	429,717	313,526	.....	.....
The New Mexico Midland	13.611	172,321	127,983	172,903	150,000
Sylvania Central	16.431	142,508	109,191	176,794	75,000
San Pedro, Los Angeles & Salt Lake	988.519	43,127,960	35,701,567	.....	.....
Louisville & Wadley	10.172	159,427	126,970	171,238	106,053
Albany Passenger Terminal Co	.....	101,272	95,057	151,669	104,184
Macon & Birmingham	96.998	1,828,873	1,437,961	1,963,236	1,006,230
Mississippi Eastern	16.610	262,350	189,790	301,788	173,476
Norfolk Southern System	902.186	24,067,274	19,799,999	.....	.....
Tampa & Jacksonville	54.735	575,274	444,800	.....	.....
Greene County	18.828	151,591	119,499	176,498	131,600
Rome & Northern	17.645	316,994	261,835	305,985	317,155
Carolina & Yadkin River	34.281	671,800	602,299	.....	.....
Flint River & Northeastern	23.236	239,547	191,792	284,430	235,925
Kinston-Carolina Railroad & Lumber Co	19.806	219,012	145,423	170,150	36,067
Central Railway of Arkansas	13.128	213,276	182,582	216,361	251,062
Alabama Northern	7.156	104,053	79,004	.....	.....
Wadley Southern	88.750	1,029,871	769,314	.....	.....
Chicago, Terre Haute & Southeastern	362.280	22,247,890	17,561,158	24,194,049	24,927,762
Hawkinsville & Florida Southern	93.005	1,144,728	864,766	1,312,740	703,529
Mississippi River & Bonne Terre	63.910	3,957,247	3,144,093	4,079,640	3,597,098
St. Francois County R. R.	9.878	226,301	162,633	.....	.....
Cimarron & Northwestern	21.333	297,528	206,622	299,030	269,431
Joplin Union Depot	.740	433,208	406,363	555,430	553,527
Talbottom Railroad	6.797	80,791	64,110	85,593	66,930
Northern Dakota Railway	21.188	214,390	156,932	223,904	215,870
Savannah & Northwestern	110.839	1,776,219	1,492,616	.....	.....
Santa Fe, Raton & Eastern	9.307	272,853	203,859	.....	.....
Evansville & Indianapolis	134.800	2,531,238	2,004,856	.....	.....
Farmers' Grain & Shipping Co	53.206	830,511	635,527	674,910	650,335
Brandon, Devils Lake & Southern	13.052	195.054	150.731	204,956	184,586
Fernwood & Gulf	32.401	661,141	522,752	679,291	605,855
Cape Girardeau, Northern	105.431	1,338,642	1,083,659	.....	.....
The Potomac, Fredericksburg & Piedmont	38.062	642,538	499,051	.....	.....

pear during the next few months, it is natural that much interest should be shown in the relation between these figures (incorrectly termed valuations) and the capitalizations of the roads. It is also highly important that such comparisons be made accurately and with a complete knowledge of the facts.

Comparisons Between Valuations and Capitalization

Already considerable inaccurate and misleading information is being disseminated. Typical of the misrepresentations being made is a statement of Representative Huddleston, which appeared in a recent issue of the Congressional Record in the debate of the Esch bill in which he stated that on the first 52 roads on which the Division of Valuation had made engineering reports, there existed a difference of $207,894,145, or 40 per cent, between the tentative figures of the Division of Valuation for cost of reproduction new and the investment account of the roads, which difference he characterized as water. As showing the possible intent of this comparison it may be noted that the Western Pacific is included in the list of roads presented, although no tentative report has yet been served on that road and the investment figure used, $156,318,136, was reduced to $92,085,260 on the reorganization of this company in July, 1916. A similar discrepancy appears in the statement with reference to the Atlanta, Birmingham & Atlantic, the investment account of which is listed at $53,325,752, although this company's capitalization was reduced to $39,255,787 at the time of its reorganization on December 31, 1915. These two inaccuracies account for over one-third of the so-called water in the capitalization of the 52 roads listed.

However, aside from such mis-statements there are other inaccuracies which may readily creep into these comparisons. Care must be taken to insure that the valuation and capitalization figures are for exactly the same properties, a problem of no mean proportions in some instances where the intercorporate relationships are more or less involved. This leads one to exclude ownership of all stocks or bonds in other companies. More important, the figures given out in the tentative valuations of the Division of Valuation include only the engineering reports on road and equipment, excluding all lands, materials and supplies in stock, cash on hand, etc.

When a comparison is made of the investment in road and equipment with a sum representing the figures contained in the Commission's reports by adding together the cost of reproduction including jointly owned property, lands, materials and supplies, but not cash on hand and other current assets, it is found that the sum so obtained exceeds the amount shown upon the carrier's books as investment in road and equipment in all of the tentative valuations so far served with the exception of nine of the companies named in Mr. Huddleton's statement.

When it is further recalled that the book cost of investment in road and equipment as shown in the accounts of the carriers is approximately 20 per cent in excess of the actual *net* capitalization of the roads, this comparison is all the more in favor of the railways.

Although no figures have yet been made public by the Division of Valuation as to its preliminary findings on several of the larger roads (the individual mileage of which exceeds the total for 55 roads already reported on), it is understood that they show no great over-capitalization and the preliminary totals for road and equipment alone are greater than the total capitalization of certain properties which have been more or less in the lime light in recent years.

In brief, while it is still too early to draw any general conclusion as to the ultimate result, the indications are that the final figures will not give much comfort to those critics of the railways who were mainly responsible for the enactment of the legislation requiring valuations to be made. The year now opening should see valuation reports completed on much larger mileage of lines which are more representative of the roads of the country, and will enable more accurate predictions to be made of the ultimate results.

The roads on which tentative valuations have been reported to date are shown in the table. The last two columns show comparisons between the total cost of reproduction new of common carrier property owned other than land, including the carrier's portion of jointly owned property other than land, if any, the present value of carrier and non-carrier lands, property held for purposes other than those of a common carrier, and materials and supplies, as contrasted with the investment in road and equipment as shown on the carrier's books as of the date of valuation for 35 roads.

Federal Railroad Company Proposed

A NOVELTY IN RAILROAD OPERATION is provided for in a bill introduced in the Senate on December 15 by Senator Norris of Nebraska, providing for the incorporation of a federal railroad company to purchase and operate the railroads of the United States. The bill provides that this corporation shall be authorized and empowered to lay out, locate, construct, furnish, maintain, operate *"and enjoy"* a railroad or railroads, together with the necessary telegraph and telephone lines and all necessary and useful appurtenances, anywhere within the United States, and that the corporation shall be vested with all the powers, privileges and *"annuities"* necessary to carry into effect the purpose of this act.

The bill does not state, however, the amount of the annuities that would be necessary for the proper enjoyment of such a railroad. The proposed federal railroad company is to have five directors appointed by the President and to hold office during good behavior and to be paid $12,000 a year each. It would have an authorized capital stock of $10,000,000,000 of common stock; in addition, an amount of employees' stock, not exceeding one-fourth of the book value of the property, which would be issued to and paid for by employees. The stock would be free from taxation of every kind except federal income and inheritance or state taxes, except that the income from an amount of stock not exceeding $50,000 would be exempt from all income taxes and any stock held by state, county, municipality and charitable, religious or educational institution not operated for profit would be made exempt from all taxation.

It would be made the duty of the company to acquire all the railroads of the United States as rapidly as it is able to sell stock for the purchase of the same, and to build connecting lines necessary to co-ordinate the railroads which it acquires, with a view to co-ordinating and consolidating all the railroads of the United States under one management in order to reduce transportation to as near cost as is possible, and to eventually retire all railroad bonds and indebtedness of every kind and of the common stock of the corporation. If the full amount of the stock offered by the company is not subscribed from other sources it is provided that the balance shall be subscribed for by the Secretary of the Treasury on behalf of the United States, who would secure the money by issuing government bonds at 4½ per cent. The stock of railroad companies would be purchased by selling stock of the federal company, and any profits that it might make would be used in paying off any bonded indebtedness of the railroads so acquired. The board of directors would have charge of the operation, maintenance and control of all property owned by the corporations and would employ all the officials, managers and employees necessary to operate the railroads, provided that it should not authorize the payment of any salary for any official or any employee in excess of $12,000 per year.

Railway Signals and Interlocking on the Decline

Signal Facilities Completed During the Past Year Indicate Much Less Than Normal Progress

A TOTAL OF 2,071 MILES of road in the United States and Canada was equipped with block signals in 1919 (tables A and D), while 46 roads (table G) built new interlocking plants or made changes in existing ones, a total of 153 plants being built or rebuilt. It is difficult to determine the exact mileage of additional block signals completed during the year; it is also hard to arrive at any definite conclusion as to the number of new interlocking plants of the various types installed during the same period, because a number of the roads failed to include in their reports sufficient information to show whether the facilities completed were additional or replaced older equipment. However, a careful survey of the statistics indicates that at least 489 miles of road equipped with automatic block signals during the year had previously been protected by manual or automatic block. Wherever automatic block signaling was in use previously the changes were due largely to the replacing of one type of signals with another or on account of the protecting of additional tracks.

A comparison of the above figures with similar ones published in the *Railway Age* of January 3, 1919, indicates that 27 miles less road was provided with block signals than was completed during the previous year. Of the 2,071 miles installed in 1919 2,024 miles represent the amount completed during the year on roads in the United States, 144 miles of which consist of manual block. This leaves 1,880 miles of road on which automatic block signals were installed during the year. Comparing this mileage with that reported by the Interstate Commerce Commission, as of January 1, 1919, and which is recorded in the table showing block signals installed in the United States during the 10 years preceding 1919, there appears to have been 85 miles more automatic block signaling installed during 1919 than in 1918.

The progress made during 1919 in adding to and improving signal facilities has suffered from the same influences which have retarded the normal growth and development of railroad facilities in general. The statistics accompanying this article indicate the status of the situation in-so-far as railway signal improvements are concerned. On the other hand, if one were to judge by the appropriations authorized by the United States Railroad Administration for block signal and interlocking work during 1919, he might be led to believe that the progress made in the construction of signal facilities during the past year was not far below the normal outlay. The expenditures authorized by the United States Railroad Administration, and which represent the estimated value of signal improvements requested by approximately 21 rods, as indicated in the reports of the Administration, amount to about $7,800,000. This sum, according to the records, covers additional facilities and the revision of existing facilities requiring extensive changes and renewals brought about on account of laying new rails, ballasting, etc.

It must not be forgotten, in this connection, that a dollar today has less than two-thirds of the purchasing power it had previous to 1916. In other words, the improvements in signaling made during the past twelve months have cost at least 50 per cent more than they would have cost prior to the war. The $7,800,000 improvements authorized by the Railroad Administration for 1919, if installed prior to the war, would have cost not more than $5,000,000, an amount considerably below that spent in normal times.

AUTOMATIC block signal mileage installed last year was the smallest with one exception, for a period of ten years.

Practically all signal construction has been deferred.

Maintenance programs covering heavy repairs and renewals have been restricted.

The automatic train control has received marked attention on the part of the Railroad Administration.

Due to the present unsettled conditions a majority of roads report incomplete programs for proposed signals and interlocking for 1920.

The Effect of Government Control

In reviewing railway signaling during the past year a number of questions have arisen relative to the effect government control has had upon the situation. These questions are answered best by summing up the views of those who are in a position to know the conditions existing in this field and by an inspection of the statistics.

1. *Effect upon the installation of signals:* The installation of automatic block signals and interlocking has practically stopped in almost every section of the country. Only

BLOCK SIGNALS INSTALLED IN THE UNITED STATES

During Each Year from January 1, 1907 to January 1, 1919*

Year	Miles of road: Automatic block	Manual block	Total
1909	2,047.1	4,162.2	6,209.3
1910	3,473.8	2,037.3	5,511.1
1911	2,623.4	2,517.2	5,140.6
1912	1,883.9	5,656.2	7,540.1
1913	4,350.5	— 1,563.4	2,787.1
1914	3,030.7	6,511.5	9,542.2
1915	1,113.1	— 1,112.0	1.1
1916	1,843.5	— 196.9	1,646.6
1917	2,242.2	— 1,214.9	1,027.3
1918	1,794.9	— 1,398.4	396.5

*Taken from Interstate Commerce Commission reports.

NEW BLOCK SIGNALS COMPLETED IN 1919; MILES OF ROAD

	Automatic (Table A) S. T. miles	D. T. miles	Total miles	Manual (Table D) S. T. miles	D. T. miles	Total miles	Both Total miles
United States	1,208	672	1,880	144	....	144	2,024
Canada	41	6	47	....	....	....	47
Total	1,249	678	1,927	144	....	144	2,071

NEW BLOCK SIGNALS UNDER CONSTRUCTION, DEC. 31, 1919

	Automatic (Table B) S. T. miles	D. T. miles	Total miles	Manual (Table E) S. T. miles	D. T. miles	Total miles	Both Total miles
United States	140	128	268	....	....	....	....
Canada	....	2	2	....	....	....	....
Total	140	130	270	....	....	....	....

NEW BLOCK SIGNALING PROPOSED FOR 1920

	Automatic (Table C) S. T. miles	D. T. miles	Total miles	Manual (Table F) S. T. miles	D. T. miles	Total miles	Both Total miles
United States	243	99	342	4	....	....	346
Canada	....	17	17	....	....	....	17
Total	243	116	359	4	....	....	363

INTERLOCKING SIGNALS

	Plants	Number of Levers: Mechanical	Electrical
Completed in 1919—			
United States	153	1,906	1,969
Canada	4	75	....
Under construction December 31, 1919—			
United States	46	677	785
Canada	3	8	....
Proposed for 1920—			
United States	36	331	398
Canada	3	39	....
Total, United States	235	2,914	3,152
Total, Canada	10	122	....
Total, United States and Canada	245	3,036	3,152

17 roads report automatic block signaling in course of construction and only 13 report automatic block signals proposed for 1920, while the statistics compiled one year ago showed 36 roads building and a like number reporting proposed work. The signal companies are doing very little work, and some of them have found it necessary to enter other lines of manufacturing in order to keep their plants running.

2. *Restriction of the maintenance program:* Ordinary maintenance has not been disturbed, but heavy repairs and replacements have been restricted. In some instances the roads have been handicapped in maintaining their signals, because it was necessary to keep within the limits of expenditures fixed by the test period. Where such conditions existed in some instances, the cause may have been due to the adoption of shorter working hours without applying increased forces. On some roads the signal facilities were in good shape during the test period and only required a minimum amount of maintenance, while later demanding heavier maintenance expenditures. As a result some roads have not been able to make the necessary heavy repairs or even to carry on a maintenance program that would enable them to put the signal facilities in the same conditions they were in prior to government control.

3. *Automatic train control:* Early in 1919 the United States Railroad Administration appointed a committee on automatic train control, which has investigated and prepared reports on a number of automatic train stops during the past year, some of which are in service in various parts of the country and were installed for the purpose of test. The tendency seems to be favorable to the use of train control devices as an adjunct to the signal system, and it is believed that within a reasonable time, assuming that the roads are turned back with the enactment of proper legislation, there will be a desire on the part of some of the more congested roads now equipped with automatic block signals to install train control devices for test over considerable distances, posibly to the extent of entire divisions.

4. *Wages and working conditions of the maintenance and supervisory forces:* Reports indicate that both the hourly and monthly basis of pay are in use. On some of the northern roads it has been found advisable to establish the monthly basis of pay in order to avoid overtime, which is necessary practically every day during the summer months in order to carry out the maintenance program. In other sections of the country where the maintenance program for the year can be distributed over a greater period, the necessity for overtime work is practically eliminated, and therefore no hardship results. In such cases the hourly basis of pay may be applied as a general proposition. The maintenance and supervisory forces have received increases in pay varying from 70 to 130 per cent over the 1915 rate, while supervisory officers have received increases varying from 16 to 100 per cent.

Statistics

The figures so far available, together with the data covering work now under construction and in respect to plants for 1920, are shown in the accompanying tables. The data will be found in the tables under nine heads, as follows:

A—Automatic Block Signaling Completed in 1919.
B—Automatic Block Signaling Under Construction.
C—Automatic Block Signaling Proposed for 1920.
D—Manual Block Signaling Completed in 1919.
E—Manual Block Signaling Under Construction (*None*).
F—Manual Block Signal Proposed for 1920.
G—Interlocking Completed in 1919.
H—Interlocking Under Construction.
I—Interlocking Proposed for 1920.

Work on Various Roads

From the reports received the largest mileage of automatic signals installed on a single road was on the Atchison, Topeka & Santa Fe, which placed in service 184 miles of single track and 61 miles of double track, using 389 signals. Other roads installing over 100 miles were the Chicago, Milwaukee & St. Paul, which completed 200 miles of single track signals, using 292 color-light signals on its electrified section, and 12 miles of double track, using 13 semaphore signals; the Chicago, Burlington & Quincy, which completed 53 miles of single track and 129 miles of double track signaling, with a total of 611 signals; the Illinois Central, which installed 134 miles of single track signaling in addition to 52 miles on the Yazoo & Mississippi Valley, the number of signals used on the Illinois Central installation amounting to 239 signals. The Northern Pacific installed 130 miles of single track signaling, with a total of 212 signals, and the Great

TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED IN 1919

Name of Road	Miles of Road S.T.	Miles of Road D.T.	From	To	No. of signals	Type of Signals	Control System	Remarks
A., T. & S. F.	..	4	Glorieta, N. M.	Fox Interlocking.	6	Union "S"		Replaces manual block.
	66	..	Christie, Cal.	Stockton, Cal.	100	Union "S" 3 pos. U. O.	Polarized line	
	118	..	Lanson, Cal.	Fresno, Cal.	214	Union "S" 3-pos. U. B.	Polarized line	
	..	61	Goffs, Cal.	Bagdad, Cal.	75	Union "S" 3-pos. U. O.	Polarized track	
A. & W. P.	32	..	Newman, Ga.	La Grange	42	Union "S"	A. P. B.	
	..	18	College Park, Ga.	Palmetto	21	Union "S"		Change from single to double track.
A. C. L.	6	..	Falling Creek, Va.	James Riv. Bridge	11	Union "S"	Polarized	
	..	..	Waycross, Ga.	Folston, Ga.	1	Union "S"	Polarized	
Balt. & Ohio	..	10						
	..	29	Toby, Pa.	Manila	15	Union "T 2"	A.C. normal clear	Three-track line; replacing manual signals, A.C. track and operating circuits.
			Sand Patch	Confluence	41	Union "T 2"	A.C. normal clear	
B. & M.	..	7	Cummings, Me.	No. Berwick	7	Union "B"	Polarized track	
	..	1	Salem, Mass.		6	Union "B"	Polarized track	
	..	3	Ayer, Mass.	Willows	4	Union "B"	Polarized track	Account of double track except at Salem, Mass.
	..	2	Chelmsford, Mass.		3	Union "B"	Polarized track	
Boston Elevated*†	..	1	Sullivan Square	Everett	12	3-Color light	A. C. single-trail	
C. N. E.	..	16	Hopewell Jct., N. Y.	Holmes	34	Union "S"	Polarized, D. C.	Track circuit.
C. R. R. of N. J.	..	4	North Branch, N. J.	White House	32	Union "S"	Polarized	Replacing manual block.
C. & O.	21	..	Gordonsville, Va.	Charlottesville, Va.	56	Union "L" light	A. P. B.	Four tracks replace two; revision of signals.
	..	13	Silver Grove, Ky.	Cincinnati, O.	38	Union "B" 3-pos. U. O.	Line	American train control.
	4	..	Cotton Hill, W. Va.	Gauley	6	Hall "L" 3-pos. U. O.	A. P. B. traffic lock'g.	Change from 2 to 3 pos., U. O.
	2	..	Liberty St., Cinc., O.	Brighton	6	Union "B" 3-pos. U. O.	A. P. B.	Single gauntlet.
C. & A.	..	1	State Pris., Joliet, Ill.	Joliet		Motor U. O.		
C., B. & Q.	..	50	Creston, Ia.	Red Oak, Ia.	130	60 deg., L. O.	Relayed track	
	24	..	Red Oak, Ia.	Balfour, Ia.	60	60 deg., L. O.	A. P. B.	
	..	8	Balfour, Ia.	Pacific Jct., Ia.	31	60 deg., L. O.	Relayed track	
	5	..	Pacific Jct., Ia.	Plattsmouth, Neb.	18	60 deg., L. O.	A. P. B.	
	..	4	Plattsmouth, Neb.	Orcapolis, Neb.	13	60 deg., L. O.	Line & track	
	15	..	Oreapolis, Neb.	Gibson, Neb.	41	60 deg., L. O.	A. P. B.	
	9	..	Dietz, Wyo.	Ranchester, Wyo.	33	60 deg., L. O.	A. P. B.	
	..	60	Zearing, Ill.	Wataga, Ill.	249	60 deg., L. O.	Double track A. P. B.	
	..	7	Wataga, Ill.	Galesburg, Ill.	36	60 deg., L. O.	Relayed track	
C. M. & St. P.	..	12	Junction Switch	Milbank, S. D.	13	3-pos., U. O.	A. C.	Three track middle, A. P. B.
	170	..	Othello, Wash.	Maple Valley	245	Color-light, 3-pos.	A. C.	
	28	..	Black Riv. Jct., Wash.	Tacoma	47	Color-light, 3-pos.	A. C.	Electrified section replace
C. R. I. & P.	..	6	Topeka, Kan.	Bishop	14	Union "S," D. C.	Polarized line	semaphore signals.
	..	9	Paxice, Kan.	McFarland	9	Union "S," D. C.	Polarized line	
	..	6	Tindall, Mo.	Trenton	12	Union "S," D. C.	Polarized line	Change from single to double track.
E. J. & E.	..	..	Waukegan, Ill.		1	3-pos., U. O.	Semi-automatic	
E. P. & S. W.	18	..	Lee, Ariz.	Forrest	..	Union "S," U. O.	Overlap	
G. N.	53	..	Skykomish, Wash.	Everett	90	Semaphore		
	24	..	Wenatchee, Wash.	Leavenworth	48	Semaphore		
	43	..	Hillyard, Wash.	Newport	85	Semaphore		
	..	6	Hillyard, Wash.	O. R. & N. Jct.	8	Semaphore		
I. C.	29	..	Gilman, Ill.	Gibson City	50	Hall "K," 3-pos., U. O.	Normal clear	Traffic direction.
	71	..	Springfield, Ill.	Marine	128	Hall "L," 3-pos., U. O.	Normal clear	Traffic direction.
	12	..	Vaughn, Miss.	Canton	20	Hall "K," 3-pos., U. O.	Normal clear	Traffic direction.
	22	..	Canton, Miss.	Asylum	41	Hall "K," 3-pos., U. O.	Normal clear	Traffic direction.
Y. & M. V.	..	9	Tennessee, Miss.	Lake Cormorant.	16	Hall "L," 3-pos., U. O.	Normal clear	Traffic direction.
	43	..	Lake Carmorant, Miss.	Coahoma	62	Hall "L," 3-pos., U. O.	Normal clear	
Interborough R. T.*†.	..	3	Utica Ave.	Eastern Parkway.	96	Subway light	A. C. track circuit with D. C. battery.	Two express tracks signaled for 1 min. 30 sec. headway, 2 local tracks signaled at curves and interlocking.
	..	3	Flatbush Ave.	Nostrand Ave.	20	Subway light	Control for local	Signaled at curves and interlocking only
	..	2	Borough Hall	Clark Street	51	Subway light	Relays and with automatic stops	Signaled for 1 min. 30 sec. headway.
K. C. C. Co., & St. J.*†	70	..	Kansas City, Mo.	St. Jo. & Excl. Sp.	100	Light and semaphore.	A. C.	Union.
K. C. T.	..	3	Kansas City, Mo.	Kansas City, Kan.	8	Elec.-pneumatic & A. C.	A. C. track circuits. D. C. sigs. 1 mile. D. C. sigs. 2 miles.	
L. V.	..	2	Delano, Pa.	Park Place	6	Federal	Line	
	1	..	Park Place, Pa.	Mahanoy City, Pa.	2	Federal	Line	
	2	..	Falling Springs, Pa.	Weldon	6	General	Line	
L. & N.	12	..	Jackson, Ky.	Oakdale	27	3-pos., U. O.	A. P. B., D. C.	
	..	10	Montfort, Tenn.	Cumberland River	19	3-pos., U. O.	Polarized D. C.	No overlap.
	51	..	Guthrie, Ky.	Mortons	93	3-pos., U. O.	A. P. B., D. C.	
Missouri Pacific	..	1	Valley J.		2			Replaced gas sigs.
N. Y. C. (Eastern)	..	8	Highbridge, N. Y.	Yonkers	21	Hall "L"	D. C., normal danger.	
	..	30	Fonda, N. Y.	Little Falls	46	Hall "L"	D. C., normal danger.	Third and fourth tracks.
	..	7	William St., N. Y.	Black Rock	17	Hall "L"	D. C., normal danger.	New.
	..	16	No. Buffalo, N. Y.	Niagara Falls	35	Hall "L"	D. C., normal danger.	Replace L. O. signals.
C. C. C. & St. L.	..	20	Middletown, Ohio	Dayton	32	3-pos., D. C., U. O.	Polarized line	
	11	..	Bridge Jct., Ill.	Lenox	10	3-pos., D. C., U. O.	Polarized line	
New York Municipal (Brooklyn R. T.)*†.	..	1	Times Square	59th Street	39	Color-light	A. C.	4-Track.
	..	1	59th Street	Lexington Ave.	16	Color-light	A. C.	All signals controlled by A. C. track circuits and have automatic stops, and also overlaps.
	4	..	Marcy Avenue	East N. Y.	50	Color-light	A. C.	4-track.
	..	2.5	Prospect Park	Avenue H	52	Color-light	A. C.	
	..	1.5	West End Line		14	Color-light	A. C.	
	..	1	Culver Line		14	Color-light	A. C.	
N. & W.	5	..	Clare, Ohio	Idlewild	15	Union "S," 3-pos., U. O.	Overlap	10-Volt D. C.
N. P.	..	2	Jamestown, N. D.	Pipestem	9	G. R. S. "2 A"		
	40	..	Glendive, Mont.	Jerry	76	G. R. S. "2 A"	A. P. B.	
	90	..	Forsyth, Mont.	Huntley	136	G. R. S. "2 A"	A. P. B.	
P. R. R.	..	5	Gunpowder, Pa.	Bengies, Md.	24	Position-light	A. C.	4-Track
	..	6	Bengies, Md.	North Point	14	Position-light	A. C.	2-Track
	..	2	Odenton, Md.	Patuxent	8	Position-light	A. C.	3-Track
	..	4	Pleasantville, N. J.	Meadows	8	Position-light	A. C.	2-Track
	..	17	Ancora, N. J.	Egg Harbor	28	Motor, U. O.	A. C.	2-Track, replace electro-pneumatic signals.
P. M.	40	..	Fowlerville, Mich.	Grand Ledge	54	Union "S" & "T"	Polarized line overlap.	
	19	..	Waverly, Mich.	Grandville	26	Union "S" & "T"	Polarized line overlap.	
	..	3	Grandville, Mich.	Wyoming	7	Union "S" & "T"	Polarized line	
P. & R.	..	8	Eastwicks, Phila.	Darby Creek, Pa.	38	Hall Incl. disk, H. & D.	Normal danger	Replaces single track manual telephone block.
	..	2	Yardley, Pa.	Trenton Jct.	7	Un. top post, A.C., U.O.	Normal danger	
	..	2	Trenton Jct.	Ewing Tower	10	Un. top post, A.C., U.O.	Normal danger	3-Track: Replaces Hall disc 29 sigs., of 78 are semi-automatic. 3 & 4-Track: automatic.
	..	4	Ewing Tower, N. J.	Tower Glenmoore.	9	Un. top post, A.C., U.O.	Normal danger	
	..	11	Tower Glenmore, N. J.	Belle Mead	52	Un. top post, A.C., U.O.	Normal danger	
	..	..	Palmyra, Pa.	Hummelstown	3	Hall Inclosed disk	Normal danger	3-Track.
P. & L. E.	2	..	Haselton, Ohio	Struthers	3	Un. "B," 2-arm, H. & D.	Polarized track	

TABLE A—AUTOMATIC BLOCK SIGNALS INSTALLED IN 1919—Continued

Name of Road	Miles of Road S.T.	Miles of Road D.T.	From	To	No. of signals	Type of Signals	Control System	Remarks
St. L.-S. F.	..	..	St. Clair, Mo.		2	Union "S" 3-pos. U. O.	Track circuit and line.	Added account of new passing tracks.
	..	..	Lebanon, Mo.		2	Union "S" 3-pos. U. O.	Track circuit and line.	
	..	..	Marshfield, Mo.		2	Union "S" 3-pos. U. O.	Track circuit and line.	
Southern	..	76	Charlotte, N. C.	Spartanburg, S. C.	96	G.R.S. "2 A"	A.C. Polarized	"Wireless"
	..	9	Toccoa, Ga.	N. Switz'l'd.	8	G.R.S. "2 A"	A.C. Polarized	"Wireless"
Southern, Western Lines: A. G. S.	..	7	Toomsuba, Miss.	Russell	12	Union "S" 3-pos. U. O.	D. C. track	Replaces manual.
	..	15	Tannehill, Ala.	Dowdle Jct.	12	Union "S" 3-pos. U. O.	D. C. track	Replaces single tk. signals.
C. N. O. & T. P.	..	5	Helenwood, Tenn.	Tunnel Jct.	10	G. R. S. "2 A" 3-pos. U. O.	D. C. track	Replaces single track automatic signals.
	..	2	Mountain Jct.	Lancing, Tenn.	5	G. R. S. "2 A" 3-pos. U. O.	D. C. track	
	..	2	Kings Mountain, Ky.	Fishing Creek	4	G. R. S. "2 A" 3-pos. U. O.	A. C. track	
	..	6	Hanging	So. Fork, Ky.	10	Union Motor	D. C. track	
S. P.	4	..	Wall Creek, Ore.	White Point	10	Union Motor	Automatic	
	2	..	Hilt, Cal.		5	Union Motor	Automatic	
	..	4	Tucson, Ariz.	Polvo	10	Union Motor	Automatic	Single to double track.
	8	..	Walker, Ore.	Goshen	12	Union Motor	Automatic	
	5	..	Jean, Ore.	Oswego	11	C. R. S. & S. Co., A. C. Light	Automatic	
	11	..	Portland division		28	Union Motor	Automatics	Extensions of various short signal districts.
G. H. & S. A.	..	12	El Paso, Tex.	Ysletta	26	Union "B" 2-pos. L. O.	Polarized track	
H. & T. C.	13	..	Hempstead, Tex.	Courtney	24	Union "B" 2-pos. L. O.	Line control	
U. P.: O. W. R. R. & N.	..	2	Kamela	Hanlon	6	Union "B"	D. C. with pol. track.	Replaces single track.
U. T. of Ind.*†	1	..	Anderson, Ind.	Pit Siding	2	Light	G. R. S.-A. P. B.	
W. M.	2	..	Knobmount, W. Va.	Seymour	4	Union "S"	Polarized line	
Total	1,208	672						
Canada								
C. P.	30	..	Galt, Ont.	Woodstock, N. B.	58	G. R. S. "2 A"	A. P. B.	
	2	..	Winnipeg Beach		1	G. R. S. "2 A"	Neutral track circuit.	
	3	..	Whytewold		2	G. R. S. "2 A"	Neu. track & line circ.	
	2	..	Bradbury		1	G. R. S. "2 A"	Neutral track circuit.	Protection to station limits.
	2	..	Engen		1	G. R. S. "2 A"	Neutral track circuit.	
	2	..	Garfield		1	G. R. S. "2 A"	Neutral track circuit.	
T. H. & B.	..	6	Kinnear, Ont.	Stoney Creek	9	G. R. S. "2 A"	Track and line	Changed A. P. B. to 2 track.
Total	41	6			73			

*Not under federal control.
†Electric.

Northern installed 120 miles of single track and 6 miles of double track signals.

The largest mileage installation of light signals was that of the Chicago, Milwaukee & St. Paul in the electrified section of its road referred to above, where 292 three-color light type signals were used, while the Pennsylvania Railroad installed 54 miles of two, three and four-track position-light signals, using 44 signals, replacing semaphore-type motor signals. Few other installations of light signals were reported, except on the Interborough Rapid Transit lines in New York City, where 167 subway light signals were installed during 1919. The Brooklyn Rapid Transit installed 185 color-light signals on approximately 10 miles of single, double and four-track lines during 1919.

In Canada only a small amount of block signal work was completed during the year. The Canadian Pacific reports 30 miles of single track A. P. B. signals installed between Galt, Ont., and Woodstock, N. B., using 58 semaphore signals. This road also reports five separate installations of short block station protection.

Only a few roads report automatic block signals under construction, the greatest mileage reported being at three

TABLE B—AUTOMATIC BLOCK SIGNALS UNDER CONSTRUCTION, DECEMBER 31, 1919

Name of Road	Miles of Road S.T.	Miles of Road D.T.	From	To	No. of signals	Type of Signals	Control System	Remarks
A. T. & S. F.	3	..	Hutchinson, Kan.		6	Union "S" and "T"		East of interlocking.
C. & O.	..	9	Russell, Ky.	Greenup, Ky.	19	Union "B," 3-pos., U. O.	Line	Change from 2 to 3 pos.
Ill Traction*†	17	..	Staunton, Ill.	Edwardsville, Ill.	30	Semaphore U. O.	A. C. track circuits.	
Interborough R. T.*†	..	2	Fordham Road	Gun Hill Road	9	Light		3-track—2 local tracks signaled only at curves. Middle not signaled.
	..	4	Hunts Point Road	Pelham Bay Park	16	Light		
	..	7	Chatham Square	129th Street	140	Light		Same as above except middle track signaled complete in both directions for 1 min. 30 sec. headway.
L. & N.	..	13	Maplewood, Tenn.	Brentwood	26	3-pos., U. O.	A. C. polarized track, no overlap	Automatic substation with two sources of power.
N. Y. C. (Eastern)	..	6	W. Haverstraw, N. Y.	Jones Point	11	Hall "L"	D. C., normal danger.	Replace lower quad.
	..	2	Tonawanda, N. Y.		3	Hall "L"	D. C., normal danger.	New (changes of line).
New York Municipal: (Brooklyn R. T.)*†	..	1.5	Lexington Avenue	Queens	25	Color-light	A. C.	G. R. S. Co.
	..	2	Rector Street	De Kalb Avenue	32	Color-light	A. C.	G. R. S. Co.
	..	2	De Kalb Avenue	Prospect Park	45	Color-light	A. C.	G. R. S. Co.
	..	4	Avenue H	Brighton Beach	47	Color-light	A. C.	G. R. S. Co.
N. Y., N. H. & H.	..	2.5	West End of Harlem River Branch					6-Track; revision of signals.
N. P.	83	..	Terry, Mont.	Forsyth	148	G. R. S. "2 A"	A. P. B.	
Pacific Electric*†	1	..	Los Angeles, Cal.		4	2-pos. color-light	A. C., 110-volt	
Pa. Lines	..	22	Alliance, Ohio	Massillon	38	Union Motor	Normal clear	New, for f'ght tracks.
	10	..	Leetonia, Ohio	Alliance	19	Union Motor	Normal clear	New signaling.
	..	5	Clymers, Ind.	Logansport	13	Union Motor	Normal clear	Replace manual block.
P. M.	26	..	Grand Ledge, Mich.	Elmdale	34	Union Motor	Polarized line overlap.	
	..	3	Wyoming, Mich.	Grand Rapids	8	Union Motor	Polarized line	
P. & R.	..	7	Belle Mead, N. J.	Manville Cross'g.	40	A. C. Mot. Union, U. O.	Normal danger	Replace Hall disk; 4-track.
			Manville Cross'g, N. J.	Bound Brook	5	A. C. Mot. Union, U. O.	Normal danger	Replaces Hall disk.
Southern	..	9	Mountain Jct.	H. F. Tower	15			
Southern Lines West: C. N. O. & T. P.	..	9	H. F. Tower, Tenn.	Mountain Jct.	15	G.R.S. "2 A" 3-pos. U. O.	D. C. track	
Virginian	..	17	Clarks Gap, W. Va.	Mullens	35	Union A. C. 3-pos., U. O.	Polarized track	
Total	140	128						
Canada								
C. N.	..	2	Calgary, Alberta		4	Union "S"	Track circuit	Signals electric lighted, low voltage battery.
T. H. & B.	..	..	Hamilton Tunnel		2	G. R. S. "2 A"	A. C. track circuits.	2-track—Changing track circuits from D. C. to A. C.
					6			

*†See footnote at end of Table A.

TABLE C—AUTOMATIC BLOCK SIGNALS—PROPOSED NEW CONSTRUCTION, 1920

Name of Road	Miles of Road S.T.	Miles of Road D.T.	From	To	No. of signals	Type of Signals	Control System	Remarks
Balt. & Ohio (East)	..	1	Schenley, Pa.	L. Junc.	15	Union "T 2"	Normal clear, d. c.	To replace manual.
	..	1	Pittsb'g, 33d St.		4	Union "T 2"	Normal clear, d. c.	To replace manual.
	35	..	Willow Grove, Pa.	Goehring	68	Union "T 2"	Normal clear, d. c.	To replace manual.
B. & O. C. T.	0.5	..	Blue Island, Ill.		1	Electric	Track circuit	Take siding indicator.
	0.5	..	Harvey, Ill.		1	Electric	Track circuit	
	1	..	Worth, Ill.		1	Electric	Track circuit	
C. M. & St. P.	..	15	Savanna, Ill.	Green Island, Ia.	16	Semaphore, 3-pos., D. C.		Replacing 2-pos., L. O.
	..	2	Milwaukee, Wis., U.D.	Grand Ave.	10	Semaphore, 3-pos., D. C.		Replacing 2-pos., L. O.
	122	..	Mobridge, S. D.	Hettinger, N. D.	220	Semaphore, 3-pos., D. C.	Overlaps	Signals taken from electrified section.
	17	..	Melstone, Mont.	Sumatra	27	Semaphore, 3-pos., D. C.	Overlaps	
	3	..	Tacoma, Wash.	Hillsdale	3	Semaphore, 3-pos., D. C.	Overlaps	
	2	..	Forsyth, Mont.		4	Semaphore, 3-pos., D. C.	Overlaps	
	3	..	Miles City, Mont.		4	Semaphore, 3-pos., D. C.	Overlaps	
	3	..	Roundup, Mont.		5	Semaphore, 3-pos., D. C.	Overlaps	
Denver & Interurban*†	5	..	Globeville, Colo.	Westminster	4	A. C.	A. C.	
E. P. & S. W.	12	..	Winkle, N. M.	Guadalupe	..		Overlap	
	38	..	Carrizozo, N. M.	Temporal	..		Overlap	
Interborough R. T.*†..	..	2	Utica Avenue	New Lots Avenue	9	Light		Signaled at curves and at interlocking only.
New York Municipal Brooklyn R. T*†....	1	..	Williamsburgh Bridge		20	Color-light	A. C. track and stops.	Time control (Federal Signal Co. to install).
N. Y. N. H. & H.	..	28	Boston, Mass.	Readville	95	3-pos., U. L. H. Q.	A. C.	Replace lock and block.
	..	7	Danbury, Conn.	Hawleyville	21	3-pos., U. L. H. Q.	A. C.	Replace telegraph manual.
Pacific Electric*†	..	4	Indian Village, Cal.	Sierra Vista	14	3-pos. Color-light	A. C. 110-volts	
	..	4	Covina Jct., Cal.	Romona Convent.	12	3-pos. Color-light	A. C. 110-volts	
Pa. Lines	..	2	Ashland Ave., Chgo.	Western Av., Chgo.	6	Motor	Normal clear	4-Track, replace manual block.
P. & R.	..	6	Myerstown, Pa.	Lebanon	18	Semaphore A. C. Motor.	Normal danger	
U. P.	..	27	Le Roy, Wyo.	Evanston	112	2-Arm L. O., 2-pos.	H. and D. signals, no overlap	
Total	243	99						
				Canada				
C. P.	..	7	Pasqua	Moose Jaw	10		Neutral track and line.	
	..	3	Percival		3		Neutral track and line.	
	..	2	Broadview	Station Limits	1		Neutral track and line.	One track only.
	..	3	Austin	Station Limits	1		Neutral track and line.	
	..	2	Minnitaki	Station Limits	1		Neutral track and line.	
Total	—	17						

*†See footnote at end of Table A.

different points on the Pennsylvania Lines, where approximately 40 miles are under way, of which 10 miles is single track and the balance double track.

Of the work proposed for 1920 only one road expects to install more than 100 miles of automatic block. This road is the Chicago, Milwaukee & St. Paul, which plans to install approximately 150 miles of single track signaling, using about 260 three-position upper-quadrant semaphore type signals recovered from the electrified section of its road, due to the installation of light signals in that territory. The reports from the various roads on proposed block signaling are rather incomplete, inasmuch as a large portion of the roads have not prepared programs or submitted budgets for 1920 signaling. Only one road in every 14 reports any proposed work.

Table D—Manual Block Signaling Installed in 1919

	Miles
Pacific Electric—Covina, Cal., to Lone Hill and La Verne to No. Pomona (single track)	4
Texas & Pacific—Fort Worth, Tex., to Baird (single track)	140
Total	144

Note.—The Pacific Electric installation is operated by electric train staff.

Table F—Manual Block Signaling Proposed for 1920

Canada	
Canadian Pacific—Saskatoon to Harfield (single track)	4
Total	4

Table D, covering manual block signaling completed during the year, shows approximately the same additional mileage as was reported last year. Only one road reports over 100 miles of line with this type of protection having been completed during 1919; the Texas & Pacific installed 140 miles between Fort Worth, Tex., and Baird, using 24 station signals, with telephone equipment.

Automatic Train Control

The use of automatic train control as an adjunct to automatic block signals has been reported as completed during 1919 on the Chesapeake & Ohio between Gordonsville, Va., and Charlottesville, the American Train Control device being the apparatus used. Another installation under construction has been reported by the Chicago, Rock Island & Pacific on approximately 25 miles of road between Blue Island, Ill., and Joliet, where the Casale safety device is being used.

Interlocking

The railroads have installed, enlarged or replaced about as many interlocking plants in 1919 as during the previous year. The total number of plants completed or on which important changes have been made is 147, as compared with 143 during 1918, while there are 46 plants now under construction as compared to 135 plants last year. The proposed new work for 1920, totaling 33 plants, is 48 less than the number proposed a year ago, although the figures given under the column of proposed work are far from complete, as a number of the roads which contemplate additional facilities are not yet prepared to announce their program. During the past three years the Interborough Rapid Transit Company, operating both elevated and subway lines, has made extensive improvements in block and interlocking facilities, and the work done or proposed by this company is conspicuously prominent in all three of the interlocking tables.

The figures in table G are to be taken as an exhibit of the work done rather than as showing the precise amount of the increase of interlocking apparatus in use in the country. A considerable part of the figures represent the reconstruction of old plants or important enlargements to provide for new tracks or the re-arrangement of tracks, rather than the construction of entirely new plants. Also, some duplications necessarily occur, as a joint plant may be reported by two or more roads. The same observations apply to tables H and I.

From the returns received, the largest electric interlocking plant completed during the year is one with 74 working levers, located at Coney Island Creek, on the Brooklyn Rapid Transit. Other roads completing electric interlocking plants with a comparatively large number of working levers are the New York Central, with one plant with 72 levers and another with 44 levers, both located at Rochester, N. Y.; the Chicago, Burlington & Quincy, with 58 levers, Hawthorne, Ill.; the Louisville & Nashville, with 53 levers, at Patio, Ky.; the Pennsylvania, with 46 levers, at Richmond Junc-

TABLE G—INTERLOCKING PLANTS COMPLETED 1919*

1	2	3	4	5
			No of working levers	
Road	Plants	Character	Mechanical	Electric
A. T. & S. F.	3	C.	30	*
	..	E. D. T.	14	*
A. C. L.	6	C.	68	..
	..	J.	22	*
	..	T.	..	162
Balt. & Ohio (East)	8	J	37	83
	..	T	..	47
	..	E.D.T.	58	..
Belt Railroad, Chicago	1	C.	9	..
B. & M.	1	C. Y.	..	56
Boston Elevated	2	T.	..	35
	..	J.	..	7
B. R. & P.	1	C. J.	..	33
C. R. R. of N. J.	2	E. F. T.	46	..
C. & O.	2	E. D. T.	42	*
C. & A.	1	C.	15	..
C. B. & Q.	2	J. T.	..	58
	..	C.	48	..
C. M. & St. P.	1	J.	29	..
C. R. I. & P.	4	E. D. T.	46	..
C. T. H. & S. E.	1	C.	13	..
G. N.	1	E.	6	..
G. T. (Western Lines)	1	C.	54	..
I. H. B.	1	C	64	..
Interborough Rapid Transit	11	....	..	114
I. & G. N.	1	C.	3	..
K. C. T.	2	J.	..	13
	..	C. J.	..	51
L. E. & W.	1	C.	4	..
	..	C. J.	15	..
L. & H.	1	C.	..	8
L. V.	3	J.	9	*
	..	Tunnel	19	..
L. & N.	11	C.	6	..
	..	E. D. T.	10	4
	..	J.	24	16
	..	J. D.	..	3
	..	D.	26	*
L. H. & St. L.	1	D.	3	*
M. O. & G.	1	C.	36	..
N. Y. C.	20	C.	39	..
	..	J.	93	..
	..	T.	80	..
	..	X.	307	164
	..	X. Y.	..	73
	..	E. F. T.	55	..
C., C. C. & St. L.	3	C.	72	*
	..	C. J.	..	64
M. C.	1	E.	18	..
New York Municipal, Brooklyn Rapid Transit	9	J.	..	29
	..	J. T.	..	41
	..	J. D. T.	..	74
	..	X.	..	131
N. Y. N. H. & H.	1	J. D.	..	42
N. P.	3	D.	5	..
	..	J.	5	..
	..	C.	12	..
Pa. Lines	4	X.	36	..
	..	D. X.	30	..
	..	J. X.	..	46
	..	C. X.	..	40
P. R. R.	12	C.	13	19
	..	D.	6	..
	..	T.	..	83
	..	X.	43	84
	..	D. X.	16	14
	..	J. X.	..	33
P. & R.	12	C.	13	19
	..	J.	62	54
	..	X.	42	26
	..	Y.	16	35
	..	Y.	Push Button	43
P. & L. E.	1	Y.	..	55
St. L.-S. F.	3	C.	84	..
S. A. L.	3	C.	10	..
	..	D.	3	..
	..	E.	2	..
Southern	2	C	4	42
Southern Lines West: C. N. O. & T. P.	1	J.	8	..
S. P.:				
Coast Lines	1	J.	11	..
G. H. & S. A.	5	C.	21	18
	..	C. J.	15	..
H. & N. O.	..	C.	16	..
U. P.	1	C.	9	..
Virginian	1	C.	4	..
Total	153	....	1,906	1,969
	Canada			
C. P.: Eastern Lines	3	C.	26	..
	..	C. J.	34	..
G. T.	1	D.	15	..
Total	4	....	75	..

tion, Ind., and with 40 at Logansport, Ind.; the Pittsburgh & Lake Erie, with 55 levers, at Neville, Pa., and the New New York, New Haven & Hartford, 42 levers, at Groton, Conn.

Electro-pneumatic interlocking plants have been installed on eight roads. A 122-lever plant on the Atlantic Coast Line at Myrtle avenue, Jacksonville, Fla., is apparently the largest installed during the year. Other plants of this type which were installed include the Atlantic Coast Line, Richmond, Va., Terminal, with 40 levers; Boston & Maine, with 56 levers; Boston Elevated, with 42 levers; Interborough Rapid Transit Company, with 114 total working levers; Kansas City Terminal, with 64 total working levers; Philadelphia & Reading, with 98 levers; Philadelphia & Reading, with 43 push buttons (non-interlocking freight yard). Approximately 25 electro-mechanical plants were installed, ranging in size from 6 to 45 working levers, and 63 mechanical plants were installed on various roads, ranging in size from 4 to 91 working levers.

Twenty-two roads report interlocking of various types under construction, the largest machine being 137 levers,

TABLE H—INTERLOCKING PLANTS UNDER CONSTRUCTION DECEMBER 31, 1918*

1	2	3	4	5
			No. of working levers	
Road	Plants	Character	Mechanical	Electric
A. T. & S. F.	1	C.	31	*
A. C. L.	3	C.	24	*
	..	J.	27	13
Balt. & Ohio (East)	1	J	..	37
B. & O., C. T.	1	C. J.	91	..
B. & M.	1	Y.	25	..
C. & O.	4	J.	20	64*
	..	T.	20	16*
			Push Button	
G. T. (Western Lines)	2	C.	..	41
	..	C. E.	13	..
I. C.	1	C.	24	..
I. T. Co.	1	C.	6	..
Interborough Rapid Transit	5	....	..	45
L. V.	1	J.	..	28
L. & N.	1	J.	16	*
Missouri Pacific	1	C	36	..
N. Y. C. (Eastern)	4	C.	67	..
C. C. C. & St. Louis	1	J.	..	42
	..	X.	73	..
	..	C.	50	*
New York Municipal, Brooklyn Rapid Transit	5	J.	..	69
	..	J. Y.	..	136
	..	T.	..	12
	..	X.	..	12
Pacific Electric	1	C.	8	..
Pa. Lines	1	J.	..	40
P. R. R.	2	X.	..	51
	..	X. D	4	7
P. & R.	6	C.	32	35
	..	J.	40	33
	..	X.	46	45
P. & L. E.	1	Y.	..	44
St. J. & G. I.	1	D.	24	..
Southern (C.N.O.T.P.)	1	E.D.T.	..	15
Total	46	....	677	785
	Canada			
				Miles
C. N.: Western Lines	2	E.	4	..
T. H. & B.	1	E.	4	..
Total	3	....	8	..

electric type, on the Brooklyn Rapid Transit at New York. The next largest machine will be a 67 working lever, mechanical type, on the New York Central at South Schenectady, while the third largest machine will be one of the electro-pneumatic type, consisting of 51 levers, on the Pennsylvania, at 60th street, Philadelphia and the next largest consists of a 50-lever electro-mechanical on the Cleveland, Cincinnati, Chicago & St. Louis, at Galion, Ohio.

Only 12 roads report any program for the installation of new interlocking plants or revisions for 1920. The largest installation reported is proposed on the Pennsylvania Lines West at Lectonia, Ohio, consisting of 52 working levers oper-

*In tables G, H and I a number of electro-mechanical plants (indicated by a star) have been reported without a separation of the electric from the mechanical levers; in which cases the number in the first column includes all of the levers of both kinds. In these three tables the number of plants entered against the name of each road represents the total reported by that road.

ABBREVIATIONS IN TABLES G, H AND I

C.—Crossing.
D.—Drawbridge.
E.—Electric ry. crossing.
E. D. T.—End of double track.
E. F. T.—End of four track.
E. T. T.—End of third track.
J.—Junction.
M.—Miscellaneous and unclassified.
S.—Station.
T.—Terminal.
X.—Crossovers.
Y.—Yard.

ating in an electric machine. The largest proposed mechanical machine reported will consist of approximately 48 working levers, and will be installed at East Argo, Ill., on the Baltimore & Ohio Chicago Terminal. The largest electro-

TABLE I—NEW INTERLOCKING PROPOSED FOR 1920*

1	2	3	4	5
			No. of working levers	
Road	Plants	Character	Mechanical	Electric
Balt. & Ohio (East)	4	E.D.T.	52	..
		C	12	..
		J	24	..
B. & O., C. T.	2	C.	20	..
	..	J.	48	..
C. I. & L.	1	C.	20	..
C. M. & St. P.	2	C.	13	..
	..	D	..	16
Interborough Rapid Transit	11	....	..	119
N. Y. C.:				
C. C. C. & St. L.	3	J.	35	..
	..	C. J.	30	45*
New York Municipal, Brooklyn Rapid Transit	1	X.	..	8
N. Y. N. H. & H.	2	Y.	..	85
Pa. Lines	1	C. X.	..	52
Southern (N.O.&N.E.)	2	D	..	18
Southern, Lines West:				
C. N. O. & T. P.	3	J.	21	9
	..	D.	..	..
	..	....	..	5
U. P.	4	C.	16	..
	..	T.	..	41
	..	E. D. T.	36	..
Total	36	....	331	398
	Canada			
C. N.:				
Western Lines	1	C.	13	..
C. P.:				
Lines West	2	C.	26	..
Total	3	....	39	..

*See note under Table G.

pneumatic plant of which we have been advised will have 59 levers and will be installed on the Interborough Rapid Transit, while the largest electro-mechanical machine will have 35 levers and will be located at Fairfield, Ohio, on the C. C. C. & St. L.

Corporate Partnership for New York Central Employees

IT HAS BEEN suggested on several occasions recently by students of railway affairs that if railway employees are sincere in their desire to acquire the railway properties of the United States, that there is, under the present system of organization, ample opportunity for them to do so without the assistance of radical plans such as the Plumb plan for government ownership of the railways and their operation by the employees. The fact that the individual employee has an opportunity at present to obtain representation in the management and a share of the profits of railway operation through the existing system of finance, has been recognized by certain employees in offices of the New York Central. The idea of carrying out the plan which is outlined below was conceived by C. F. Mayer, engineer of grade separation of the New York Central at Cleveland, Ohio.

The movement was started in the grade separation department of the New York Central at a meeting called by Mr. Mayer at which he explained the proposition to the employees and left its execution entirely to their judgment. The opportunity was given the men either to purchase stock in the New York Central outright or to acquire it through a ten-payment method somewhat similar to the methods by which Liberty Bonds were purchased during the war. Subscription blanks were passed out at this meeting and the return showed that ten shares would be subscribed for by the 13 men in the office, the three men not subscribing stating specifically that while they did not feel able to subscribe at the present time they were in hearty accord with the project and wished to be given an early opportunity to subscribe. The action taken in the grade separation department was soon circulated through other departments of the New York Central and as a result eleven additional shares were subscribed for by various employees.

In handling this matter through a bank it is necessary for someone to take the responsibility and Mr. Mayer assumed this for the men to whom he presented the project and who had approved it. The initial payments were received by Mr. Mayer from the subscribers and he made arrangements with a bank, ordered the stocks bought and delivered and attended to the collection of the monthly payments from the men subscribing.

In advocating the extension of this plan to other departments of the New York Central, Mr. Mayer has written a short memorandum on the subject in which he says in part:

"Has it ever occurred to you as an individual that at the present time, as in the past, the opportunity is present for every employee to obtain for himself representation in the management and a share of the profits through the existing system of finance, and some individual effort upon his own part; the direct amount of representation in the management and share in the profits being directly due to his own efforts and the co-operation of all employees of the New York Central System. The natural question is, "How can this be done?" The answer is, "By the purchase of New York Central Stock to the limit of individual means," and, to the statement that the individual has no means wherewith to buy stock, the answer is simple. Through the experience of the past few years it has been demonstrated that it is possible, upon limited salary to set aside each month a certain sum. The possibility of this method of saving has been fully demonstrated through the purchase of Liberty Bonds.

"The method of purchasing Liberty Bonds can well be applied to the purchase of stock, as by paying 20 per cent of the purchase price of the stock, any bank will accept the stock as security, pay the balance, and handle the same as a loan on the basis of monthly installments of 6 per cent. Further many reputable brokers are now selling stock on the 10-payment plan, whereby they require an installment of 20 per cent of the market value of the stock and the balance in 9 equal monthly payments with interest at 6 per cent on the deferred payments.

"To quote figures, on the basis of the present market value which we will take at $75 to serve as an illustration, the first payment would be $15 if placed through a broker, plus 1/10 of $2 or 20 per cent brokerage commission, subsequent to which the following nine payments, each one month apart, would average about $6.75; upon the payment of the last installment, the stock certificate would be issued in the name of the purchaser. This system, when applied, means that the individual is setting aside regularly a small amount of savings, which in nine cases out of ten he would not do under ordinary circumstances, or in case he did make the saving, the return would not be as great on his investment, due to the fact that the savings account pays normally about 4 per cent. By purchasing stock at $75, the par value of which is $100, he is obtaining (on the basis of present New York Central dividends) 5 per cent of $100 valuation, whereas if he purchases the share at $75 he nets approximately 7 per cent on his investment.

"Upon the complete payment for his stock, the same is turned over to the individual who thereby becomes a stockholder, and as such, is entitled to a vote in the management of the corporation. Upon receipt of the interest on the stock which he owns, he immediately participates in the profits of the corporation, and has thus obtained, through some effort upon his own part, the principles for which he is striving, in a manner based on equity, reason and the common good."

Consolidation Locomotive Built for Polish Government on Order for 150 Given to Baldwin Locomotive Works.

Few Railroad Orders for Locomotives in 1919

Foreign Business Totaling Only About 900 Makes Up Three-Quarters of Year's Output

THE NUMBER OF LOCOMOTIVES ordered for service in the United States during 1919—only 214—marks a record in the history of the railroads of the country so low as to be almost impossible of belief. The orders placed by Canadian roads either with American or Canadian builders totaled 58, while orders for export reached a total of 898, a total of all three of but 1,170. In other words, the foreign orders and the domestic together were barely sufficient to bring the total up to the domestic orders alone of the poorest year since 1901, namely, 1908, when only 1,182 locomotives were ordered for domestic service. The 1919 totals quoted above compare with figures for 1918 of 2,593 for domestic service in the United States, 209 for Canadian roads and 2,086 for the American forces in France or for export.

TABLE I. THE LOCOMOTIVE ORDERS OF 1919

For service in the United States	214
For service in Canada	58
For export to other countries	898
Total	1,170

In last year's review of the equipment statistics for 1918 (*Railway Age*, January 3, 1919, page 82), the point was made that nearly all the orders reported were placed by governments—that is, by the United States government as represented by the Railroad Administration or the Director General Military Railways, or by the state-owned railroads of foreign countries. This year the first two have kept out of the market, the one for reasons explained in more detail in other articles in the present issue, the other because of the cessation of the demands of war. The exchange situation and the difficulties of financing have at the same time prevented the state-owned and other roads of foreign countries from buying in the American markets in as great quantity as the demands of transportation in these countries might have made desirable. The gap between the cessation of government orders in this country and the resumption of purchases by the privately controlled railroads explains the extremely low figures for 1919. The total of locomotives ordered for domestic service represents only those locomotives ordered by lumber roads and industrial lines; there are but few orders for railroad service.

It is hardly worth while to sketch the developments of the year in the locomotive market. There have been no developments. It has been an idle year, from the standpoint of domestic business. The locomotive companies, at least as far as domestic business is concerned, have had to content themselves with looking ahead to the time when the railroads would be returned to private control and until the roads would be in a position to make up the motive power shortage that has resulted from the wear and tear of the biggest business in the railroad's history and from the comparatively small amount of purchases of the past few years.

The *Railway Age* has pointed out a number of times in the past the importance that foreign orders have played in locomotive business. They played a large share in 1916 and 1917 when they exceeded, and 1918 when they approached, the domestic orders. The *Railway Age*, however, did not look forward to a year in which the foreign orders would constitute over 75 per cent of all the orders placed, as was the case in 1919, or particularly to a year in which domestic orders would be so low as to allow the 75 per cent to be attained with a foreign total of only about 900. The foreign orders this year included business from all over the world. The Italian, Belgian and Polish orders of 150 each and the South African order for 70 made up the larger share of the total.

TABLE II. ORDERS FOR LOCOMOTIVES SINCE 1901

Domestic orders only

Year	Locomotives	Year	Locomotives
1901	4,340	1908	1,182
1902	4,665	1909	3,350
1903	3,283	1910	3,787
1904	2,538	1911	2,850
1905	6,265	1912	4,515
1906	5,642	1913	3,467
1907	3,482	1914	1,265

Domestic and Foreign

Year	Domestic	Foreign	Total
1915	1,612	850	2,462
1916	2,910	2,983	5,893
1917	2,704	3,438	6,142
1918	2,802	2,086	4,888

The number of locomotives built in the United States and Canada in 1919, according to the compilations of the *Railway Age*, was 3,272, of which 2,162 were built for domestic use and 1,110 for export. Of the domestic total 2,055 engines are shown as having been built in the United States for use on the railroads in this country and 107 in Canada for use in that country. The totals given are but one-half those of 1918, when 6,475 locomotives were produced in the United States and Canada. It will be noted, however, that the total domestic output of 1919 was considerably above that of the years immediately preceding 1918.

The *Railway Age* is somewhat unfortunate in having been unable to secure as complete figures of production this year as usual. One of the largest builders, the Baldwin Locomotive Works, has declined to give the paper its usual figures of export production, so that as to export production the editors have had to content themselves with making an estimate from other information, which it is hoped will be found sufficiently accurate to permit of the proper comparisons.

TABLE III—THE LOCOMOTIVES BUILT

	United States	Canada	Total
Domestic	2,055	109	2,162
Foreign	.....	.....	1,110
Total	.....	.....	3,272

Comparison with Previous Years

Year	Domestic	Foreign	Total	Year	Domestic	Foreign	Total
1896	866	309	1,176	1908*	1,886	456	2,342
1897	865	386	1,251	1909*	2,596	291	2,887
1898	1,321	554	1,875	1910*	4,441	314	4,755
1899	1,951	514	2,475	1911*	3,143	387	3,530
1900	2,648	505	3,153	1912†	4,403	512	4,915
1901	...	...	3,384	1913†	4,561	771	5,332
1902	...	...	4,070	1914†	1,962	273	2,235
1903	...	...	5,152	1915†	1,250	835	2,085
1904	...	...	3,441	1916†	2,708	1,367	4,075
1905*	4,896	595	5,491	1917†	2,585	2,861	5,446
1906*	6,232	720	6,952	1918†	3,668	2,807	6,475
1907*	6,564	798	7,362				

*Includes Canadian output.
†Includes Canadian output and equipment built in railroad shops.

An analysis of the production for the year, as compared with the orders for new equipment placed during the year, plainly shows that there is little hope that the 1920 production of the locomotive plants will rival that of 1917 or 1918. The builders have not now large unfilled orders ahead of them, and in the case of domestic orders there is practically no business left on the books. Of course, the return of the railroads to private control may result in large purchases of motive power. The roads here and the roads abroad as well need locomotives and need them badly.

The lists of orders appended are from official sources. They will, no doubt, suffer from a few omissions of small and less important orders, especially for export, but they will, nevertheless, show what business the locomotive plants have received during 1919. The *Railway Age* this year as last did not send out letters to all the railroads, because it was able to obtain such small amount of data as was necessary as to domestic railroad orders from the Railroad Administration. The usual letters were sent to the builders, and the output figures were obtained directly from them. Lists from the builders, as well as the usual weekly reports in the Equipment and Supplies column of the *Railway Age*, permitted the checking and amplification of the tables in the usual way.

Locomotives Ordered in 1919

Domestic Orders

Purchaser	No.	Type	Cylinders	Weight	Superheater	Brick arch	Valve gear	Mechanical stoker	Builder
Aberdeen & Rockfish R. R.	1	4-6-0	18 x 24	126,500	Yes	No	.....	.....	Baldwin
Apache Ry.	1	2-8-2	20½ x 28	179,000	No	Yes	.....	.....	Baldwin
Aurora, Elgin & Chicago	1	4-0-4	.....	100,000	Electric	freight	.....	.....	Gen. Electric
Bellgrade Lbr. Co.	1	Geared	.....	64,000	...	...	.....	.....	Heisler
Black River Lbr. Co.	1	Geared	.....	64,000	...	...	.....	.....	Heisler
Brooks-Scanlon Lbr. Co.	1	2-8-2	18 x 24	145,000	Yes	No	.....	.....	Baldwin
Brown Co.	1	Saddle tank	17 x 24	.....	...	...	.....	.....	Vulcan
Brown, Geo. C., & Co.	1	Geared	.....	52,000	...	...	.....	.....	Heisler
Burton-Swartz Cypress Co. of Fla.	1	2-6-2	16 x 24	114,000	No	No	.....	.....	Baldwin
Caddo River Lumber Co.	1	2-6-2	17 x 24	125,000	No	No	.....	.....	Baldwin
Caddo River Lumber Co.	1	2-6-2	17 x 24	125,600	No	No	.....	.....	Baldwin
Cairo, Truman & Southern	1	Geared	.....	94,000	...	...	.....	.....	Heisler
Canal Lumber Co.	1	Geared	.....	106,000	...	...	.....	.....	Heisler
Carey, Philip, Mfg. Co.	1	0-4-0	14 x 22	79,000	No	No	.....	.....	Baldwin
Central Warehouse Co.	1	4-0-4	.....	100,000	Electric	switch	.....	.....	Gen. Electric
Chattahoochee Valley	1	0-6-0	20 x 26	133,000	No	Yes	.....	.....	Baldwin
Cherry Valley Timber Co.	1	2-8-2	18 x 24	140,800	No	No	.....	.....	Baldwin
Chicago Mill & Lumber Co.	1	Geared	.....	44,000	...	...	.....	.....	Heisler
	1	Geared	.....	64,000	...	...	.....	.....	Heisler
Columbia & Nehalem River	1	2-6-2	18 x 24	133,000	No	No	.....	.....	Baldwin
Corn Products Refining Co.	1	0-6-0	19 x 24	132,000	No	No	.....	.....	Baldwin
Cowan, L. A.	1	Geared	.....	80,000	...	...	.....	.....	Heisler
Crescent Refractories Co.	1	0-4-0	10 x 16	36,000	No	No	.....	.....	Baldwin
Crucible Steel Co. of Am.	1	0-4-0	8 x 14	22,000	No	No	.....	.....	Baldwin
Darby, J. F., Lumber Co.	1	4-6-0	18 x 26	126,500	No	No	.....	.....	Baldwin
Dayton-Goose Creek Ry.	1	2-6-0	19 x 24	122,800	Yes	No	.....	.....	Baldwin
Deep River Lumber Corp.	1	2-6-2	12 x 16	55,000	No	No	.....	.....	Baldwin
Detroit Edison Co.	2	0-6-0	21 x 26	139,000	No	Yes	.....	.....	Baldwin
Donora Southern	1	0-4-0	15 x 22	80,000	No	No	.....	.....	Baldwin
East Tenn. & Western N. C.	1	4-6-0	16 x 22	98,800	No	No	.....	.....	Baldwin
Florala Sawmill Co.	2	2-6-2	15 x 24	92,000	...	...	.....	.....	Baldwin
Fore River R. R.	1	0-6-0	19 x 26	121,000	...	...	.....	.....	American
Foster Creek Lumber Co.	1	Geared	.....	150,000	...	...	.....	.....	Heisler
Frost, Johnson, Lumber Co.	1	2-8-2	18 x 24	143,400	No	No	.....	.....	Baldwin
Gale Lumber Co.	1	2-4-2	10 x 14	40,000	No	No	.....	.....	Baldwin
Gary, W. W.	15	Geared	.....	48,000	...	...	.....	.....	Heisler
Giles Bay Lumber Co., Inc.	1	4-6-0	18 x 26	140,000	No	No	.....	.....	Baldwin
Gulf Refining Co.	1	0-6-0	18 x 24	105,000	No	No	.....	.....	Baldwin
Gullege Lumber Co.	1	Geared	.....	80,000	...	...	.....	.....	Heisler
Harbeson, W. B., Lumber Co.	2	2-6-2	15 x 24	92,000	No	No	.....	.....	Baldwin
	1	2-6-2	17 x 24	127,800	Yes	No	.....	.....	Baldwin
Humble Oil & Refining Co.	1	0-4-0	11 x 16	43,000	No	No	.....	.....	Baldwin
Ind. Portland Cement Co.	1	0-4-0	8 x 12	22,000	No	No	.....	.....	Baldwin
Industrial Lumber Co.	2	2-6-2	16 x 24	107,800	No	No	.....	.....	Baldwin
Ironton R. R.	1	0-8-0	21 x 28	163,000	No	No	.....	.....	Baldwin
King-Ryder Lumber Co.	1	2-6-2	15 x 20	84,000	No	No	.....	.....	Baldwin
La Belle Iron Works	1	0-4-0	17 x 20	91,000	No.	Nc	.....	.....	Baldwin
Lamb Gary Lumber Co.	1	Geared	.....	48,000	...	...	.....	.....	Heisler
Leesville, Slagle & Eastern	2	2-6-2	17 x 24	122,000	No.	No	.....	.....	Baldwin
Lodwick Lumber Co.	1	2-6-2	13 x 22	79,000	No	No	.....	.....	Baldwin
La. Ry. & Nav. Co.	2	2-8-0	20 x 26	156,400	Yes	No	.....	.....	Baldwin
Lufkin Land & Lumber Co.	1	2-6-2	15 x 20	89,000	No	No	.....	.....	Baldwin
Madison Lumber Co.	1	Geared	.....	64,000	...	...	.....	.....	Heisler
Meridian Lumber Co., Ltd.	1	2-6-0	17 x 24	101,000	No	No	.....	.....	Baldwin
Midland	3	4-6-0	16 x 24	98,000	No	Nc	.....	.....	Baldwin
Mowbray & Robinson	1	Geared	.....	106,000	...	...	.....	.....	Heisler
Muskegon Ry. & Nav. Co.	1	0-6-0	22 x 26	154,000	No	No	.....	.....	Baldwin
Ozan Graysonia Lumber Co.	1	2-6-2	17 x 24	125,000	No	No	.....	.....	Baldwin
Pacific Electric	2	Electric	1,200 volt	120,000	...	...	.....	.....	Bald. - West'house
Pennsylvania R. R.	50	Passenger	.....	.....	...	...	.....	.....	Altoona shops
Petoskey Portland Cement Co.	1	0-4-0	14 x 22	79,000	No	No	.....	.....	Baldwin
Pickens R. R.	1	2-6-0	16 x 24	99,000	No	No	.....	.....	Baldwin
Pittsburgh Plate Glass Co.	1	0-6-0	18 x 24	105,000	No	No	.....	.....	Baldwin
Polleys Lumber Co.	1	Geared	.....	94,000	...	...	.....	.....	Heisler
Proctor & Gamble Co.	1	0-6-0	19 x 26	123,000	No	No	.....	.....	Baldwin
Rainey Wood Coke Co.	1	0-4-0	22 x 26	160,000	No	No	.....	.....	Baldwin
Red River & Gulf	1	4-4-0	15 x 24	89,060	Yes	No	.....	.....	Baldwin
Riter Conley Mfg. Co.	1	0-4-0	17 x 24	100,000	No	No	.....	.....	Baldwin
Ryan, Philip A., Lumber Co.	1	2-8-0	16 x 22	102,400	No	No	.....	.....	Baldwin

Purchaser	No.	Type	Cylinders	Weight	Super-heater	Brick arch	Valve gear	Mechanical stoker	Builder
Salt Lake & Utah	1	Electric	1,500 volt	100,000	...	...	.....	.....	Bald. - West'house
Sacramento & Northern	2	Electric	600 volt	120,000	...	...	.....	.....	Bald. - West'house
San Augustine Lumber Co	1	2-6-2	18 x 24	125,000	Yes	Yes	.....	.....	Baldwin
Sand Springs Ry.	1	Electric	600 volt	100,000	...	...	.....	.....	Bald. - West'house
Sandy River & Rangeley Lakes	1	2-6-2	12 x 16	54,000	No	No	.....	.....	Baldwin
San Luis Southern Ry.	1	2-6-0	17 x 24	100,000	No	No	.....	.....	Baldwin
Savannah & Atlanta	3	2-8-2	22 x 28	208,700	Yes	Yes	.....	.....	Baldwin
Savannah & Southern	1	4-6-0	4 x 22	82,000	No	No	.....	.....	Baldwin
Sewell Valley R. R.	1	2-8-2	18 x 24	144,000	No	No	.....	.....	Baldwin
	1	2-8-2	20½ x 28	179,000	No	Yes	.....	.....	Baldwin
Shevlin-Hixon Co.	1	2-8-2	20½ x 28	175,500	No	No	.....	.....	Baldwin
Smith-McCue Coal Co	1	0-4-0	20 x 16	12,000	No	No	.....	.....	Baldwin
Snoqualmie Falls Lumber Co	1	2-8-2	19 x 24	149,000	No	No	.....	.....	Baldwin
Smith, W. T., Lumber Co	1	Geared	.....	80,000	...	...	.....	.....	Heisler
Solvay Process Co	1	Geared	.....	72,000	...	...	.....	.....	Heisler
	1	Geared	.....	72,000	...	...	.....	.....	Heisler
Southern Pine Lumber Co	1	2-6-2	16 x 24	107,000	Yes	No	.....	.....	Baldwin
Standard Oil Co	1	0-4-0	6 x 10	13,600	No	No	.....	.....	Baldwin
Standard Oil Co. of La	1	0-6-0	17 x 24	110,500	No	No	.....	.....	Baldwin
Standard Oil Co. of N. J.	1	0-6-0	19 x 24	108,000	No	No	.....	.....	Baldwin
Steel & Tube Co. of America	1	0-6-0	19 x 22	123,000	Yes	Yes	.....	.....	Baldwin
	1	0-6-0	18 x 24	101,600	Yes	No	.....	.....	Baldwin
	1	0-6-0	18 x 24	100,000	No	No	.....	.....	Baldwin
Stimson, J. V., Hardwood Co	1	Geared	.....	64,000	...	...	.....	.....	Heisler
Stimson Veneer & Lumber Co	1	Geared	.....	64,000	...	...	.....	.....	Heisler
Surry Lumber Co	2	2-6-2	12 x 18	57,000	No	No	.....	.....	Baldwin
Terni. R. R. Ass'n of St. L.	15	0-6-0	22½ x 30	204,000	Yes	...	.....	.....	American
Tionesta Valley Ry.	1	Geared	.....	80,000	...	...	.....	.....	Heisler
Unadilla Valley	2	2-6-2	17 x 24	122,000	No	No	.....	.....	Baldwin
Union R. R.	5	2-8-0	25 x 32	262,000	Yes	...	.....	.....	Baldwin
Union Transportation Co	1	4-4-0	17 x 24	96,000	No	No	.....	.....	Baldwin
United Verde Copper Co	2	Switching	21 x 26	164,000	...	...	.....	.....	American
	1	Switching	21 x 26	164,000	Yes	...	.....	.....	American
Verde Tunnel & Smelter Co	2	Mallet	23½ x 37 x 32	448,000	Yes	...	.....	.....	American
Weed Lumber Co	1	2-6-2	17 x 24	123,000	No	No	.....	.....	Baldwin
Weirton Steel Co	3	0-4-0	16 x 24	100,000	No	No	.....	.....	American
	2	0-6-0	22 x 26	160,000	No	No	.....	.....	American
W. Virginia No	1	2-8-0	21 x 24	152,000	No	No	.....	.....	Baldwin
White, A. C.	1	Geared	.....	94,000	...	...	.....	.....	Heisler
Winston-Dear Co.	2	0-6-0	21 x 26	155,700	No	No	.....	.....	Baldwin
Wis. & Arkansas Lumber Co	1	2-6-0	17 x 24	111,000	No	No	.....	.....	Baldwin
Wis. Ala. Lumber Co	1	Geared	.....	126,000	...	...	.....	.....	Heisler
	1	Geared	.....	150,000	...	...	.....	.....	Heisler
Wood, R. D. & Co	1	0-4-0	17 x 24	100,000	...	...	.....	.....	Baldwin
Orders from Railways and Other Companies in Canada									
Canadian National	25	0-6-0	21 x 26	140,000	Yes	Yes	.....	.....	Canadian
Canadian National Rys	25	4-6-2	23½ x 28	260,000	Yes	...	.....	.....	American
Hydro Electric Power Commission	7	Electric	.....	.....	...	...	.....	.....	Can. Car & Fdy.
Oshawa Ry. (Canada)	1	Electric	600 volt	100,000	...	...	.....	.....	Bald. - West'house
Orders from Other Countries									
American Trading Co. (Cuba)	1	*2-8-0	18 x 24	125,000	...	...	.....	.....	American
	1	2-8-0	14 x 20	72,000	...	...	.....	.....	American
	1	2-6-2	.....	113,000	No	...	.....	.....	American
Belgian Government	75	2-8-0	24 x 28	186,000	Yes	...	.....	.....	American
	75	2-8-0	.....	.....	...	...	.....	.....	Baldwin
Broken Hill Prop. Co. (Australia)	2	2-8-2	.....	.....	...	...	.....	.....	Baldwin
Central of Brazil	6	4-6-2	21½ x 28	205,000	Yes	...	.....	.....	American
	7	2-8-0	21½ x 26	165,000	Yes	...	.....	.....	American
	5	2-8-0	17 x 20	93,000	Yes	...	.....	.....	American
Cerro de Pasco (Peru)	2	2-8-0	21 x 28	164 000	...	...	.....	.....	American
Cordoba Central (Argentina)	6	2-8-2	21½ x 24	165,000	Yes	...	.....	.....	American
	6	2-8-2	21½ x 24	165,000	Yes	...	.....	.....	American
Cuba R. R.	1	4-6-0	20 x 26	152,000	Yes	...	.....	.....	American
Danish State Rys.	16	2-6-0	460 x 610 mm.	44,630 kgs.	Yes	...	.....	.....	Baldwin
Dorada Extension Ry (Chile)	3	2-6-2	15 x 20	85,000	...	...	.....	.....	American
Egyptian State Rys.	30	2-6-0	.....	.....	...	...	.....	.....	Baldwin
	20	4-4-2	.....	.....	...	...	.....	.....	Baldwin
Federated Malay States Rys.	12	.....	.....	.....	...	...	.....	.....	Baldwin
Hershey Cuban	7	4-0-4	Electric freight	120,000	Electric	freight	.....	.....	General Electric
Imp. Karafuta Government (Japan)	4	2-6-2	14 x 22	90,000	...	...	.....	.....	American
	1	2-6-2	14 x 22	90,000	...	...	.....	.....	American
	2	2-6-2	14 x 22	90,000	...	...	.....	.....	American
Imperial Rys of Formosa	4	2-8-0	20 x 24	134,000	Yes	...	.....	.....	American
Italian State Rys.	150	2-8-0	21¼ x 27½	149,600	Yes	...	.....	.....	American
Jamaica Government Rys.	3	4-8-0	19 x 26	138,880	Yes	Yes	.....	.....	Canadian
	3	.....	.....	.....	...	...	.....	.....	Baldwin
Kaijama Mining Co. (China)	2	0-6-0	12 x 18	60,000	...	...	.....	.....	American
	1	Switching	12 x 18	.....	...	...	.....	.....	American
Korean Government	12	2-8-2	25 x 28	206,000	Yes	...	.....	.....	American
Lourenco Marques (Port. Ea. Africa)	5	2-10-2	.....	.....	...	...	.....	.....	Baldwin
	3	4-6-2	.....	.....	...	...	.....	.....	Baldwin
Mogyana Ry. (Brazil)	4	2-6-6-2	16½ & 26½ x 24	160,000	Yes	...	.....	.....	American
Mora & Mendoza (Cuba)	1	0-4-0	14 x 22	79,000	...	...	.....	.....	American
Mysore State Rys. (India)	5	2-6-4	.....	.....	...	...	.....	.....	Baldwin
Nigerian Rys.	10	4-8-2	18 x 23	133,000	Yes	...	.....	.....	American
Northern R. R. (France)	50	2-8-2	.....	.....	...	...	.....	.....	Baldwin
Norwegian State Rys.	2	4-6-0	22.05 x 23.62	128,800	Yes	...	.....	.....	Baldwin
	6	2-8-0	.....	.....	...	...	.....	.....	Baldwin
	7	2-6-2	.....	.....	...	...	.....	.....	Baldwin
	3	0-6-0	.....	.....	...	...	.....	.....	Baldwin
Pesant Co. (Cuba)	1	2-6-0	17 x 24	110,000	...	...	.....	.....	American
Polish Government	150	2-8-0	21 x 28	167,300	Yes	...	.....	.....	Baldwin
Prov. of Santa Fe R. R. (Argentina)	20	4-6-2	16 x 20	105,000	...	...	.....	.....	American
Hudson, Robert, Ltd. (for Port. Ea. Africa)	2	2-6-0	11 x 16	37,000	...	...	.....	.....	American
Shantung Ry. (China)	7	2-8-0	21 x 26	160,000	Yes	...	.....	.....	American
	?	2-8-0	21 x 26	160,000	Yes	...	.....	.....	American
	1	2-8-0	21 x 26	160,000	Yes	...	.....	.....	American
Sorocobana Ry. (Brazil)	8	2-8-2	19 x 20	125,000	Yes	...	.....	.....	American
South African Government Rys.	20	4-8-2	22 x 28	200,000	Yes	...	.....	.....	American
	20	4-8-2	22 x 26	195,000	Yes	...	.....	.....	American
	30	4-8-2	22½ x 26	205,100	Yes	...	.....	.....	Baldwin
South Manchurian Ry.	26	2-10-0	23x x28	202,000	Yes	...	.....	.....	American
	12	0-8-0	.....	.....	...	...	.....	.....	Baldwin
	6	0-8-0	.....	.....	...	...	.....	.....	Baldwin
South Manchurian	3	4-0-4	.....	112,000	Electric	freight	.....	.....	General Electric
Taiwan Rys. (Formosa)	3	2-8-0	20 x 24	134,000	...	...	.....	.....	American
Tata Iron & Steel Co. (India)	8	0-6-0	18 x 24	110,000	...	...	.....	.....	American
Trinidad Government Rys.	3	4-6-0	11 x 24	95,000	...	...	.....	.....	American
	3	Switching	11 x 16	43,000	...	...	.....	.....	American
United Fruit Co. (for Cuba)	2	2-8-0	17 x 24	.....	...	...	.....	.....	Baldwin
United Rys of Havana	10	2-8-0	20 x 26	160,000	...	...	.....	.....	American
	1	2-8-0	16 x 20	97,000	...	...	.....	.....	American
	4	0-5-0	19 x 24	130,000	...	...	.....	.....	American
	2	2-6-2	17 x 24	114,000	...	...	.....	.....	American

Tank Car Orders Predominated in 1919

Car Lines Almost Only Buyers of Freight Cars

Two-thirds of Orders Placed Made Up of Tank Cars—Little Foreign Business

THE NUMBER of freight cars ordered for domestic service in the United States in 1919 totaled only 29,893, marking, as brought out in the preceding article on locomotives, a figure so low as to make almost ridiculous a comparison with the domestic orders of previous years. There were ordered for service in Canada 3,837 freight cars and for export to other countries 3,994. These totals compared with domestic orders placed in 1918 for cars to be used in

TABLE I. THE FREIGHT CAR ORDERS OF 1919

For service in the United States*	22,062
For service in Canada	3,837
For export to other countries	3,994
Total	29,893

*Including tank cars, 15,295.

the United States of 114,113; for roads in Canada, 9,657, and for the American forces in France and for export to other countries, 53,547.

The exceptionally small domestic total in 1919 resulted from the fact that the United States Railroad Administration

TABLE II. ORDERS FOR FREIGHT CARS SINCE 1901

Domestic orders

	Freight cars		Freight cars
1901	193,439	1908	62,669
1902	195,248	1909	189,300
1903	108,936	1910	141,024
1904	136,561	1911	133,117
1905	341,315	1912	234,758
1906	310,315	1913	146,732
1907	151,711	1914	80,264

Domestic and foreign

Year	Domestic	Foreign	Total
1915	109,792	18,222	128,014
1916	170,054	35,314	205,368
1917	79,367	53,191	132,558
1918	123,770	53,547	177,317

has placed no orders for cars in 1919 and that the railroads have ordered but a very few. In fact, the larger part of the orders that have been reported have been placed by private car lines, as is shown in no more striking manner than by the fact that over two-thirds of the orders were for tank cars.

The orders for export, totaling in the neighborhood of but 4,000, were considerably below the totals of 1917 and 1918. They were less than one-fourth as great as those for 1915, the year in which the war demands began to make themselves effective. They were less than one-twelfth as great as in 1918. The domestic, Canadian and foreign orders combined were

TABLE III—FREIGHT CARS BUILT

	United States	Canada	Total
Domestic	94,981	6,391	101,372
Foreign	61,783	30	61,813
	156,764	6,421	163,185

Comparison with Previous Years

Year	Freight Domestic	Foreign	Total
1899	117,982	1,904	119,886
1900	113,070	2,561	115,631
1901	132,591	4,359	136,950
1902	161,747	2,800	162,599
1903	153,195	1,613	152,801
1904	60,955	1,995	60,806
1905*	162,701	5,305	165,155
1906*	236,451	7,219	240,503
1907*	280,216	9,429	284,188
1908*	75,344	1,211	76,555
1909*	91,077	2,493	93,570
1910*	176,374	4,571	180,945
1911*	68,961	3,200	72,161
1912†	148,357	4,072	152,429

*Includes Canadian output.
†Includes Canadian output and equipment built in company shops.

	United States			Canadian			Grand
	Domestic	Foreign	Total	Domestic	Foreign	Total	Total
1913	176,049	9,618	185,667	22,017	.....	22,017	207,684
1914	97,626	462	98,088	6,453	.....	6,453	104,451
1915	58,226	11,916	70,142	1,758	2,212	3,970	74,112
1916	111,516	17,905	129,421	.....	.....	5,580	135,001
1917	115,705	23,938	139,643	3,658	8,100	11,758	151,401
1918	67,063	40,981	108,044	14,704	1,960	16,664	124,708

only slightly over one-third as great as the domestic orders alone in the poorest year since 1901, namely, 1908, when but 62,669 cars were ordered for domestic service.

In the last year's review of the freight cars ordered and built in 1918 (*Railway Age*, January 3, 1919, page 86),

it was noted that the orders on hand at the end of 1918 promised a big year from the production standpoint in 1918. This promise has been borne out in a great measure at least. The production of freight cars in the United States in 1919 has totaled 156,764, of which 94,981 were for domestic service and 61,783 were for export. The total of 156,764 represents by no means as large a share of the productive capacity of the country as might be wished. It is, however, considerably in excess of the output of the car-building plants of the United States of 108,044 (124,708 including Canada) in 1918, or of 139,643 (151,401 including Canada) in 1917. In fact, it has been exceeded but twice since the big total of 284,188 (including Canada) in 1907, namely, in 1910, when there were produced in the United States and Canada 180,915 cars, and in 1913, when 207,684 were produced. In this connection it will be noted that a change in the compilation of the output figures has been made so that the United States and Canadian outputs have been separated, so as to show that of each country in more detail.

The unfortunate feature in the comparatively large output figures of 1919 is the small number for domestic use. While the total output is large it will be noted that that for domestic use alone, while it is above the level of 1918, when 67,063 cars were produced for use in the United States, is not up to the totals of 1916 or 1917 even, in which years the output of freight cars was not sufficient to keep up with the increasing demands of the business offered for railway transportation.

The comparison of output and new orders, as in the case of locomotives, shows that, whereas at the end of 1918 there was a promise for a comparatively large output in 1919, at the end of 1919 there is just the opposite promised for 1920. The books of the car builders are almost empty, and unfortunately they have ahead of them not even the small quantity of export orders that the locomotive builders have. The only solace of the situation is apparently the very evident fact that the railways of the country need cars badly and must have them in the immediate future.

The list of orders which follows is compiled from official sources. Letters were not mailed to the individual railroads this year, the small amount of data available concerning the railroads under federal control being obtained from the Railroad Administration. The usual inquiries were, however, sent to the private car lines, who offered their utmost co-operation in supplying the desired information. As in the case of the locomotive story preceding this article, the usual letters were sent to the builders. Through their co-operation the other material was amplified and corrected, and they also supplied the output figures quoted above and incorporated in the tables.

Freight Car Orders in 1919

Domestic Orders

Purchaser	No.	Class	Capacity	Construction	Weight	Draft gear	Trucks	Roofs	Builder
Acme Petroleum Co.	10	Tank	8,000g.	Steel	.....	.....	.....	.....	Gen. American
	10	Tank	10 000g.	Steel	.....	.....	.....	.....	Gen. American
Akin Gasoline Co.	10	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Am. Cement & Plaster Co.	1	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
American Cyanamid Co.	10	Covered hop.	140,000	Steel	58,000	Miner	Arch bar	Steel	Gen. American
American Linseed Co.	10	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
American Tar Co.	4	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Arkansas City Pipe Line Co.	20	Tank	10,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
*Armour Car Lines	500	Steel under frames for	beef cars		.....	.....	.....	.....	Bettendorf
Arrow Refining Co.	50	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Arrow Refining Co.	20	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Atlantic Coast Line	100	Phosphate	100,000	.....	.....	.....	.....	.....	Standard Steel
Bagdad Lumber Co.	40	Logging	.....	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Balfour Williamson & Co.	2	Tank	6,500g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Barrett Company	50	Ins. Tank	8,000g.	Steel	.....	Cardwell	.....	.....	Gen. American
Belcher Asphalt Paving Co.	3	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Berry, Jas. B., Sons, Inc.	50	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Bartlett, Aubrey	10	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Bigheart Prod. & Ref. Co.	100	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	100	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Bigheart Prod. & Ref. Co.	100	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
	100	Tank	10,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Bioren & Co.	100	Tank	80 000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	100	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Bolene Refining Co.	25	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Bower, Henry, Chem. Mfg. Co.	1	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Brier Hill Steel Co.	50	Gondola	140,000	Steel	45,026	Friction	Arch bar	.....	Am. Car & Fdy.
Brimstone R. R. & Canal Co.	23	Hopper	110,000	Steel	.....	Spring	.....	.....	Pressed Steel
Bunker Hill & Sul. M. & C. Co.	7	Hopper	110,000	Steel	.....	Spring	.....	.....	Pressed Steel
Burkburnett Refining Co.	50	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Cambria Steel Co.	25	Gondola	140,000	Steel	.....	Friction	.....	.....	Cambria
	2	Flat	140,000	Steel frame	.....	Friction	.....	.....	Cambria
	3	Hopper	140,000	Steel	.....	Friction	.....	.....	Cambria
	1	Box	140,000	Steel frame	.....	Friction	.....	.....	Cambria
	10	Gondola	140,000	Steel	.....	Friction	.....	.....	Cambria
	1	Hopper	140,000	Steel	.....	Friction	.....	.....	Cambria
	14	Gondola	140,000	Steel	.....	Friction	.....	.....	Cambria
	9	Hopper	140,000	Steel	.....	Friction	.....	.....	Cambria
Carnegie Steel Co.	2	Gondola	200 000	Steel	.....	Friction	.....	.....	Pressed Steel
Central of New Jersey	1,000	Hopper	110,000	Steel	.....	.....	.....	.....	Standard Steel
Central Steel Co.	50	Gondola	100,000	Steel	.....	Spring	.....	.....	Pressed Steel
Champion Fibre Co.	1	Hopper	110,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	5	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Champlin Refining Co.	80	Tank	8,060g.	Steel	42,000	Sharon	Arch bar	.....	Penn. Tank Car
	20	Tank	8,060g.	Steel	42,000	Sharon	Vulcan	.....	Penn. Tank Car
Chelsea Refining Co.	50	Tank	8,060g.	.....	.....	.....	.....	.....	Am. Car & Fdy.
*Chicago & North Western	25	Steel underframes for	caboose cars		.....	.....	.....	.....	Bettendorf
Chicago, Milwaukee & St. Paul	1,000	Box	80,000	.....	.....	.....	.....	.....	Company shops
*Chic., St. P., Minn. & Omaha	1	Steel underframe for	caboose car		.....	.....	.....	.....	Bettendorf
Chicago Short Line	15	Gondola	100,000	Steel frame	.....	Spring	.....	.....	Pressed steel
Chic., West Pullman & So.	30	Hopper	140,000	Steel	.....	Friction	.....	.....	Pressed steel
Clarendon Refining Co.	15	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Clow, James B., & Sons	1	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Commerce Petroleum Co.	50	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Commercial Car Line	25	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	25	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	25	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Conley Car Co.	100	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	25	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	5	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Coopers Greek Chemical Co.	4	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Cosden & Co.	40	Tank	8 060g.	Steel	40,000	Cardwell G-11 A	Vulcan	.....	Am. Car & Fdy.
	1	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	40	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Crescent Tank Line	10	Tank	80,000	St. und'frame	60,000	Cardwell G-11	Arch bar	.....	Gen. American
	10	Tank	80.000	St. und'frame	60,000	Cardwell G-11	Arch bar	.....	Am. Car & Fdy.

Items marked with an asterisk not included in totals.

Purchaser	No.	Class	Capacity	Construction	Weight	Draft Gear	Trucks	Roofs	Builder
Crescent Portland Cement Co...	9	Hopper	110,000	Steel	.....	Spring	.....	.....	Pressed Steel
Crossett Lumber Co.....	50	Logging	30,000	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Crown Oil & Ref. Co.....	300	Tank	8,000g.	.....	.....	.....	.....	.....	Am. Car & Fdy.
Cruikshank Bros.	1	Pickle	60,000	Steel	.....	Spring	.....	.....	Pressed Steel
Crystal Car Line.....	50	Tank	8,000g.	Steel	42,000	Cardwell G-11	Arch bar	.....	Gen. American
Cudahy Oil Tank Line.....	25	Tank	100,000	All steel	41,500	Cardwell G-11	Arch bar	.....	Chic. Steel Car
Eagle Refining Co.....	50	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
East Erie Commercial R. R.....	1	Hopper	110,000	Steel	.....	Spring	.....	.....	Pressed Steel
Eastern Steel Co.....	5	Gondola	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	17	Hopper	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Elk Creek Lumber Co.....	10	Logging	20,000	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Elk Refining Co.....	10	Tank	80,000	Steel	.....	Cardwell	Arch bar	.....	Al. St. Tank Car
Emery Mfg. Co.....	6	Tank	60,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	9	Tank	40,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Foco Oil Company.....	10	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Forney Cotton Oil & Ginning Co.	5	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Franklin Quality Ref. Co.....	5	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn Tank Car
Franklin Quality Refining Co..	10	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Freedom Oil Works.....	50	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn Tank Car
Freedom Oil Works.....	50	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
General Chemical Co.....	10	Flat	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
General Equipment Co.....	1	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Georgia Rosin Products Co.....	2	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	2	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Gillican-Chipley Co., Inc.....	10	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	10	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Glen Nina Tank Line.....	50	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Greenleaf-Johnson Lbr. Co.....	25	Logging	.....	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Gulf Refining Co.....	20	Tank	10,000g.	Steel	45,600	Cardwell G-11	Arch bar	.....	Std. Tank Car
	50	Tank	8,000g.	Steel	40,500	Cardwell G-11	Arch bar	.....	Gen. American
	100	Tank	8,000g.	Steel	40,500	Cardwell G-11	Arch bar	.....	Gen. American
	100	Tank	8,000g.	Steel	40,500	Cardwell G-11	Arch bar	.....	Gen. American
	100	Tank	8,000g.	Steel	40,500	Cardwell G-11	Arch bar	.....	Gen. American
	50	Tank	10,000g.	Steel	42,300	Cardwell G-11	Cast steel	.....	Std. Tank Car
	50	Tank	8,000g.	Steel	42,000	Cardwell G-11	Cast steel	.....	Std. Tank Car
	100	Tank	8,000g.	Steel	42,000	Cardwell G-11	Cast steel	.....	Std. Tank Car
		Tank	8,000g.	Steel	42,000	Cardwell G-11	Arch bar	.....	Standard Steel
Refinery Co., H. & H.....	20	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Hately Brothers Co.....	3	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Hewitt, D. E., Lbr. Co.....	6	Logging	20,000	.....	.....	.....	.....	.....	Am. Car & Fdy.
Holmes, Bulkley & Wardrop....	100	Tank	8,050g.	Steel	.....	.....	.....	.....	Penn. Tank Car
Hyman Pickle Co.....	1	Flat	80,000	St. und'frame	.....	Spring	.....	.....	Am. Car & Fdy.
Ill. Oil Co. of Rock Is.....	10	Tank	60,000	Steel	30,000	.....	.....	.....	Keith Ry. Equip.
	8	Tank	60,000	Steel	30,000	.....	.....	.....	Standard Steel
Imperial Refining Co.....	100	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Independent Refining Co.....	1	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Indian Refining Co.....	7	Oil Tank	8,000g.	Steel	39,000	Cardwell G-11	Arch bar	.....	Gen. American
	3	Acid Tank	7,000g.	Steel	40,600	Cardwell G-11	Arch bar	.....	Gen. American
International Vegetable Oil Co..	8	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Interstate R. R.....	510	Hopper	110,000	Steel	.....	Friction	.....	.....	Pressed Steel
Interstate Public Service Co....	5	Box	50,000	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Interstate Tank Car Corp.....	25	Tank	8,000g.	Steel	41,000	Cardwell G-11	Arch bar	.....	Am. Car & Fdy.
	25	Tank	8,000g.	Steel	41,000	Bradford	Arch bar	.....	Chic. Steel Car
Island Refining Co.....	1,400	Tank	.....	.....	.....	.....	.....	.....	Gen. American
Kellogg & Sons, Spencer.....	6	Tank	100,000	Steel	.....	Cardwell G-11A	Arch bar	.....	Am. Car & Fdy.
Kendall Refining Co.....	3	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	2	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	2	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Kellys Creek Colliery Co.....	1	Caboose	.....	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Kingan Refrigerator Line.....	100	Refrig.	60,000	St. ctr. sills	.....	Cardwell	Vulcan	Wood	Am. Car & Fdy.
Liberty Oil Co., Ltd.....	1	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Live Poultry Transit Co.....	100	Poultry	60,000	Steel	.....	Friction	.....	.....	Mt. Vernon
Livingston Refiners Corp.....	20	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	80	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Long Bell Lumber Co.....	50	Logging	60,000	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Lubrite Refining Co.....	50	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	20	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Lutcher & Moore.....	20	Logging	60,000	St. und'frame	.....	Spring	.....	.....	Bettendorf
Magnolia Petroleum Co.....	20	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	15	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	25	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	100	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	100	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	100	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Madera Sugar Pine Co.....	12	Logging	40,000	Wood	.....	.....	.....	.....	Gen. American
Manhattan Oil Co.....	100	Tank	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Mexican Petroleum Corp.....	600	Tank	10,000g.	Steel	40,000	Cardwell	Arch bar	.....	Gen. American
	200	Tank	10,000g.	Steel	40,000	Cardwell	Arch bar	.....	Std. Tank Car
	50	Tank	10,000g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Mid-Co Gasoline Co.....	2	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Midland Packing Co.....	15	Tank	8,050g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
Missouri, Kansas & Texas.....	300	Tank	.....	.....	.....	Spring	.....	.....	Pressed Steel
Moore, Edgar M.....	1	Gondola	100,000	Steel	.....	Spring	.....	.....	Pressed Steel
National Aniline & Chemical Co.	1	Hopper	110,000	Steel	.....	Spring	.....	.....	Pressed Steel
	1	Gondola	100,000	Steel	.....	Spring	.....	.....	Pressed Steel
National Lamp Works.....	1	Hopper	110,000	Steel	.....	Friction	.....	.....	Pressed Steel
National Tube Co.....	5	Flat	140,000	Steel	.....	Friction	.....	.....	Pressed Steel
Newport News S. B. & D. D. Co.	1	Flat	240,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Noble, Chas. F., Oil & Gas Co..	50	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	50	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	100	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
North American Car Co.....	50	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	50	Tank	80,000	Steel	.....	Cardwell G-11A	Arch bar	.....	Am. Car & Fdy.
Ohio Cities Gas Co.....	200	Tank	8 000g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Ozarka Co.	1	Tank	10,050g.	Steel	41,700	Cardwell G-11	.....	.....	Gen. American
P. & F. Tank Line.....	40	Tank	8,000g.	Steel	.....	Friction	.....	.....	Pressed Steel
Paragon Refining Co.....	72	Tank	8,000g.	Steel	.....	Friction	.....	.....	Pressed Steel
	5	Tank	10,000g.	Steel	.....	.....	.....	.....	Penn. Tank Car
Pease, F. M.....	20	Tank	8,050g.	Steel	.....	.....	.....	.....	Penn. Tank Car
	35	Tank	8,050g.	Steel	.....	.....	.....	.....	Penn. Tank Car
Pease, F. M.....	50	Tank	8,050g.	.....	.....	.....	.....	.....	Cambria
Pennsylvania	3,000	Hopper	140,000	Steel	.....	Friction	.....	.....	Std. Tank Car
Penn. American Refining Co...	1	Tank	80 000	Steel	.....	Cardwell	Cast steel	.....	Penn. Tank Car
Pennsylvania Tank Line.....	181	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	699	Tank	8,050g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Perry, Chas. T., & Co.....	1	Tank	100,000	Steel	.....	Friction	.....	.....	Penn. Tank Car
Petroleum Refining Co.....	14	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	2	Tank	6,500g.	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Peytona Lumber Co.....	10	Logging	30,000	Wood	.....	.....	.....	.....	Penn. Tank Car
Phoenix Cotton Oil Co.....	1	Tank	8,050g.	Steel	.....	Friction	.....	.....	Pressed Steel
Rainey Wood Coke Co.....	20	Coke	100,000	Steel	.....	Spring	.....	.....	Pressed Steel
	1	Gondola	100 000	Steel	.....	Spring	.....	.....	Pressed Steel
Ranger Refining Co.....	15	Coke	100,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
	25	Tank	8,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy.
	25	Tank	10,000g.	Steel	.....	.....	.....	.....	Penn. Tank Car
	20	Tank	10,050g.	Steel	.....	Friction	.....	.....	Mt. Vernon
Red River & Gulf.....	1	Caboose	60,000	Steel	.....	Spring	.....	.....	Am.Car & Fdy.
Rodger Ballast Car Co.....	1	Ballast	100,000	Steel	.....	Friction	.....	.....	

Purchaser	No.	Class	Capacity	Construction	Weight	Draft Gear	Trucks	Roofs	Builder
Roxana Petroleum Co. of Okla..	75	Tank	100 000	Steel	45,800	.....	.....	.....	Std. Tank Car
	25	Tank	100,000	Steel	40,800	.....	.....	.....	Std. Tank Car
Sacramento Northern	25	Box	80,000	Steel	.....	Spring	.....	.....	Mt. Vernon
Sheet & Tube Co. of Am.....	8	Coke	100,000	Steel	.....	Friction	.....	.....	Pressed Steel
Shell Co. of Calif.....	3	Tank	10,000g.	Steel	.....	Cardwell G-11A	Arch bar	.....	Am. Car & Fdy.
	3	Tank	10,000g.	Steel	.....	Cardwell G-11A	Arch bar	.....	Penn. Tank Car
Simms Oil Co.....	300	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Smethport Extract Co.....	3	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Snyder, T. E.....	10	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Sloss Sheffield Steel & Iron Co.	25	Coke	100,000	.....	.....	.....	.....	.....	Pressed Steel
Southern Extract Co.....	1	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Sparks Circus	4	Flat	60,000	Wood	.....	Spring	.....	.....	Mt. Vernon
	1	Stock	60,000	Wood	.....	Spring	.....	.....	Mt. Vernon
	1	Elephant	60,000	Wood	.....	Spring	.....	.....	Mt. Vernon
Staley, A. E., Mfg. Co.....	10	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
St. Mary's Gas Co.....	1	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Standard Oil Co. of La.....	2	Flat	60,000	Steel	.....	Spring	.....	.....	Pressed Steel
Standard Tin Plate Co.....	2	Hopper	110,000	Steel	.....	Spring	.....	.....	Pressed Steel
Stauffer Chemical Co.....	2	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Steinbeck Lumber Co.....	10	Logging	30,000	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Sterling Oil & Refin. Co.....	25	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Stoll Oil Co.....	10	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Stroud, B. B., Co.....	15	Tank	80,000g.	Steel	.....	Friction	.....	.....	Pressed Steel
Sun Co.	75	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
*Swift & Co.....	300	Steel underframes for		beef cars	.....	.....	.....	.....	Bettendorf
Terre Haute, Ind. & Eastern...	2	Box	60,000	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Texas Co.	15	Tank	5,000g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	4	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Texas & Pacific.....	110	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Transcontinental Oil Co.....	100	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Trumbull Steel Co.....	2	Flat	150,000	Steel	.....	Friction	.....	.....	Pressed Steel
Union Tank Car Co.....	3,500	Tank	100,000	Steel	51,000	Cardwell	Side frame	.....	Standard Steel
	750	Tank	100,000	Steel	51,000	Cardwell	Side frame	.....	Pressed Steel
	500	Tank	100,000	Steel	51,000	Cardwell	Side frame	.....	Cambria
	250	Tank	100,000	Steel	51,000	Waugh	Side frame	.....	Cambria
	250	Tank	100,000	Steel	51,000	Miner	Side frame	.....	Company shops
	250	Tank	100,000	Steel	51,000	National	Side frame	.....	Company shops
United States Government.....	200	N. g. gondola	22,000	St. und'frame	.....	Spring	.....	.....	Ralston
U. S. Industrial Alcohol Co....	114	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	10	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
U. S. Navy.....	4	Flat	150,000	Steel	.....	Friction	.....	.....	Pressed Steel
U. S. Stores Co.....	11	Box	.....	.....	.....	.....	.....	.....	Mt. Vernon
United Verde Copper Co.....	6	Flat	100,000	Steel	.....	Friction	.....	.....	Pressed Steel
	6	Gondola	100,000	Steel	.....	Friction	.....	.....	Pressed Steel
Universal Steel Co.....	2	Gondola	100,000	Steel	.....	Spring	.....	.....	Pressed Steel
Walsh, John R.....	2	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	1	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	3	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Walsh, John R.....	3	Tank	8,050g.	.....	.....	.....	.....	.....	Penn. Tank Car
Warner-Quinlan Co.	10	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car Fdy.
	10	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Warren Oil Co. of Penn.....	200	Tank	8,000g.	Steel	80,000	Cardwell	Arch bar	.....	Allegheny Steel
	9	Tank	10,000g.	Steel	100,000	Cardwell	Arch bar	.....	Gen. American
	10	Tank	6,000g.	Steel	80,000	Cardwell	Arch bar	.....	Gen. American
Weirton Steel Co.....	2	Flat	140,000	Steel	.....	.....	.....	.....	
West Penn Power Co.....	70	Hopper	110,000	Steel	.....	Friction	.....	.....	Pressed Steel
White Eagle Oil & Refin.....	20	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	30	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
White Oil Corp.....	300	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Wilburine Oil Works.....	5	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Wilhoit Refining Co.....	6	Tank	8,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	10	Tank	10,050g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
Willits & Patterson.....	20	Tank	8 050g.	.....	.....	.....	.....	.....	Std Tank Car
Witte, John H., & Sons.....	25	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy
	25	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy

Orders from Railways and Other Companies in Canada

American Cyanide.....	6	Transfer	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Anglo - Newfoundland Development	16	Box	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
	12	Flat	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
	1	Caboose	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
British American Nickel Corp...	4	.....	70,000	Steel	.....	Friction	.....	.....	Eastern Car
Canadian National	750	Box	.....	.....	.....	.....	.....	.....	National
	300	Stock	.....	.....	.....	.....	.....	.....	National
	500	Stock	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
	150	Refrig.	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
	250	Ballast	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
	550	Gen'l service	100,000	Steel frame	.....	Spring	.....	.....	Eastern Car
	500	Flat	80,000	St. und'frame	.....	Friction	.....	.....	Eastern Car
	6	Snow plows	.....	Steel frame	.....	Friction	.....	.....	Eastern Car
	80	Caboose	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Canadian Pacific.....	140	Ore	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Citadel Brick Co.....	125	Dryer	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Grand Trunk.....	44	Box	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
	2	Stock	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Imperial Oil, Ltd.....	100	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Imperial Oil Co.....	300	Tank	.....	.....	.....	.....	.....	.....	Can. Car & Fdy.
Southern Alberta Refineries....	1	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.

Orders from Other Countries

American Metal Co.....	2	Tank	80,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Am. Smelt. & Ref. Co.....	16	Ore	200 cu.ft.	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Anglo-Mexican Pet. Co.....	2	Tank	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Argentine North Eastern.....	30	Flat	60,000	St. und'frame	.....	.....	.....	.....	Am. Car & Fdy.
Baragua Sugar Co.....	3	Tank	8,000g.	Steel	.....	Friction	.....	.....	Pressed Steel
Broken Hill Prop. Co., Ltd...	6	Hopper	100,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy
Buenos Aires Ry.....	12	Tank	10,000g.	Steel	.....	.....	.....	.....	Am. Car & Fdy
Burma Mines	50	Ore	40,000	Steel	.....	.....	.....	.....	Pressed Steel
Caribbean Petroleum Co.....	2	Tank	30,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Central (Argentine)	20	Tank	.....	.....	.....	.....	.....	.....	Am. Car & Fdy.
Central Adelaida	20	Cane	60,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Central Patria	20	Cane	60,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Central Cabaiguan	10	Cane	60,000	St. und'frame	.....	Friction	.....	.....	Am. Car & Fdy.
Central Cunagua	60	Cane	60,000	St. und'frame	.....	Friction	.....	.....	Am. Car & Fdy.
	20	Cane	60,000	St. und'frame	.....	Friction	.....	.....	Am. Car & Fdy.
Central Estrella	30	Cane	60,000	St. und'frame	.....	Spring	.....	.....	Am. Car & Fdy.
Central Josefita	20	Cane	60,000	St. und'frame	.....	Spring	.....	.....	Am. Car & Fdy.
Central Toledo	30	Cane	60,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Central R. R. of Peru.....	60	Flat	77,150	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Cerro de Pasco.....	20	Ore	80,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Cerro de Pasco (Peru).....	80	Flat	60,000	Steel	.....	Spring	.....	.....	Pressed Steel
Chile Exploration Co.....	50	Ore	140,000	Steel	.....	Friction	.....	.....	Pressed Steel
Cintas, O. B.....	40	Cane	60,000	St. und'frame	.....	Spring	.....	.....	Am. Car & Fdy.
Colombian Northern	12	Gondola	40,000	St. und'frame	.....	.....	.....	.....	Am. Car & Fdy.
Cuban American Sugar Co.....	100	Cane	30,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.

Purchaser	No.	Class	Capacity	Construction	Weight	Draft Gear	Trucks	Roofs	Builder
Cuba Co	150	Box	80,000	Steel frame	.....	Friction	.....	.....	Am. Car & Fdy.
Cuba Northern Rys	250	Flat	60,000	Steel frame	.....	Friction	.....	.....	Am. Car & Fdy.
	250	Box	60,000	Steel frame	.....	Friction	.....	.....	Am. Car & Fdy.
Cuban Central	200	Box	60,000	Steel frame	.....	.....	.....	.....	Pressed Steel
	200	Flat	.....	.....	.....	.....	.....	.....	Standard Steel
	50	N. g. cane	30,000	.....	.....	.....	.....	.....	Gregg
Cuyamal Fruit Co (for Hond.)	15	Fruit	.....	.....	.....	.....	.....	.....	Magor
Dollar, R., Co. (Tao Ching Ry)	100	Gondola	80,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Destileria San Juan Matanzas	5	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Destileria El Infierno	5	Tank	80,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
*Federated Malay States	150	Underframes for coal cars			.....	.....	.....	.....	Nat'l Steel.
Garcis, Marcelino	10	Cane	60,000	St. und'frame	.....	Spring	.....	.....	Am. Car & Fdy.
Jamaica Gov't Rys	12	Flat	.....	.....	.....	.....	.....	.....	Magor
	30	Cane	.....	.....	.....	.....	.....	.....	Magor
Jamaica Government	36	Box	60,000	Steel	.....	.....	.....	.....	Nat'l Steel.
Leon, Domingo	25	Cane	60,000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Mecke & Co	5	Flat	20,000	Wood	.....	Spring	.....	.....	Am. Car & Fdy.
Miranda Sugar Co	2	Tank	80 000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
	2	Tank	80 000	Steel	.....	Friction	.....	.....	Am. Car & Fdy.
Pekin Suiyuan (China)	100	Gondola	80,000	.....	.....	.....	.....	.....	Gen. American
	500	Gondola	80,000	.....	.....	.....	.....	.....	Gen. American
Santa Cecilia Sugar Corp	12	Cane	60,000	St. und'frame	.....	Vulcan	.....	.....	Am. Car & Fdy.
South African Railways	300	Gondola	80,000	Steel	.....	.....	.....	.....	Pressed Steel
	200	Gondola	60,000	Steel	.....	.....	.....	.....	Pressed Steel
South Porto Rico Sugar Co	65	Cane	60,000	Steel	.....	Spring	.....	.....	Am. Car & Fdy.
Tela R. R. (Honduras)	50	Fruit	60,000	.....	.....	.....	.....	.....	Magor
Trinidad Gov't Rys	70	Cane	.....	.....	.....	.....	.....	.....	Magor
United Fruit Co	4	Tank	5,000g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
	2	Tank	6,500g.	Steel	.....	Friction	.....	.....	Penn. Tank Car
United Rys of Havana	300	Box	60,000	St. und'frame	.....	.....	.....	.....	Pressed Steel
	300	Flat	.....	.....	.....	.....	.....	.....	Standard Steel
	25	Ballast	80,000	.....	.....	.....	.....	.....	Standard Steel
Violet Sugar Co	10	Cane	60,000	St. und'frame	.....	Friction	.....	.....	Am. Car & Fdy.

Passenger Car Orders in 1919

Domestic Orders

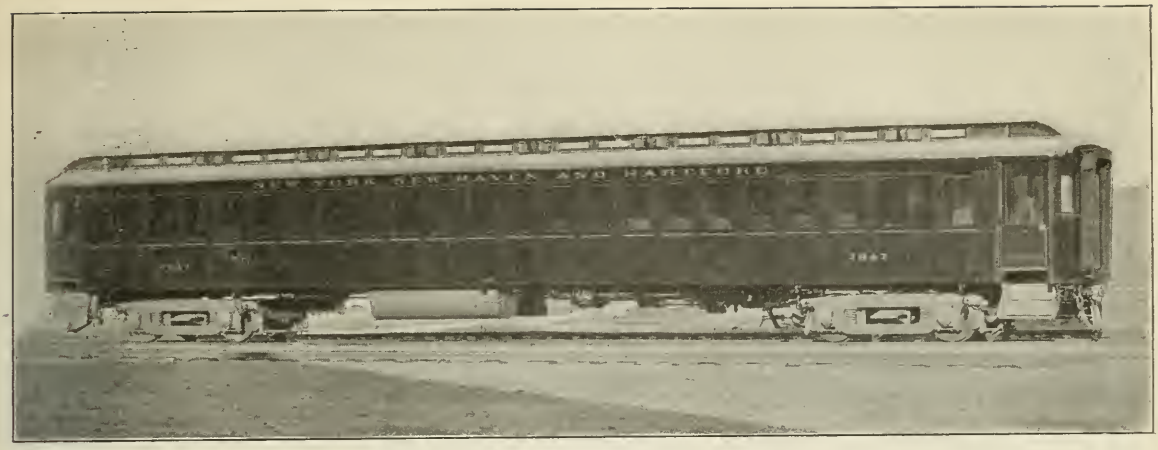
Purchaser	No.	Class	Construction	Weight	Lighting	If electric lighting: Axle generator equipment	If electric lighting: Batteries	Builder
Arms Pal. Horse Car Co	1	Horse	St. und'frame	.....	None	.....	.....	Pullman
	25	Horse	St. und'frame	.....	None	.....	.....	Pullman
Atlantic Coast Line	2	Dining	Steel	.....	Electric	.....	.....	Pullman
Butler County	1	Unit	Steel	.....	.....	.....	.....	Unit Ry. Car
Florida East Coast	1	Dining	Steel	.....	Electric	.....	.....	Pullman
Nash., Chattanooga & St. Louis	1	Bag & mail	All steel	.....	Electric	Stone-Franklin	Edison	Am. Car & Fdy.
	4	Baggage	All steel	.....	Electric	Stone-Franklin	Edison	Am. Car & Fdy.
	4	Coaches	All steel	.....	Electric	Stone-Franklin	Edison	Am. Car & Fdy.
	2	Coaches	All steel	.....	Electric	Stone-Franklin	Edison	Am. Car & Fdy.
Pullman Car Lines	150	Sleeping	Steel	.....	Electric	.....	.....	Pullman
St. Louis, Brownsville & Mexico	10	Coaches	All steel	.....	Electric	Safety	Willard	Am. Car & Fdy.
	5	Baggage	All steel	.....	Electric	Safety	Willard	Am. Car & Fdy.
Southern Pacific	15	Baggage	Steel	.....	.....	.....	.....	Pullman
Texas Pacific	50	Coaches	Steel	.....	Electric	.....	.....	Pullman
	12	Bag. & express	Steel	.....	Electric	.....	.....	Pullman
	5	Dining	Steel	.....	Electric	.....	.....	Pullman
	2	Postal	Steel	.....	Electric	.....	.....	Pullman
Saratoga & Encampment	1	200hp., 70 ft gasoline mechanical drive.			.....	.....	.....	McKeen
Washington Southern	1	Dining	Steel	.....	Electric	.....	.....	Pullman

Orders from Railways and Other Companies in Canada

Purchaser	No.	Class	Construction	Weight	Lighting	If electric lighting: Axle generator equipment	If electric lighting: Batteries	Builder
Canadian National	80	Colonist	.....	.....	.....	.....	.....	Can. Car & Fdy.
	30	Baggage	.....	.....	.....	.....	.....	Can. Car & Fdy.
	18	Sleeping	.....	.....	.....	.....	.....	Can. Car & Fdy.
	9	Dining	.....	.....	.....	.....	.....	Can. Car & Fdy.
	20	Tourist	.....	.....	.....	.....	.....	Can. Car & Fdy.
	20	1st class	.....	.....	.....	.....	.....	Can. Car & Fdy.
	20	Mail	.....	.....	.....	.....	.....	Can. Car & Fdy.
	13	Observation	.....	.....	.....	.....	.....	Can. Car & Fdy.
	50	Colonist	.....	.....	.....	.....	.....	Pullman
Canadian Pacific	30	Tourist	.....	.....	.....	.....	.....	Can. Car & Fdy.
	12	Dining	.....	.....	.....	.....	.....	Can. Car & Fdy.
	24	Baggage	.....	.....	.....	.....	.....	Can. Car & Fdy.
	12	Comp't tourist	.....	.....	.....	.....	.....	Can. Car & Fdy.
Grand Trunk	9	Mail	.....	.....	.....	.....	.....	Can. Car & Fdy.

Orders from Other Countries

Purchaser	No.	Class	Construction	Weight	Lighting	If electric lighting: Axle generator equipment	If electric lighting: Batteries	Builder
Colombian Northern	1	Observation	St. und'frame	.....	Oil	.....	.....	Am. Car & Fdy.
Compania De Argamasilla-Tomelloso (Spain)	1	200hp. gasoline mechanical drive.			.....	.....	.....	McKeen
Cuba Co.	5	1st class	St. und'frame	.....	Electric	Safety	Edison	Am. Car & Fdy.
	10	2d class	St. und'frame	.....	Electric	Safety	Edison	Am. Car & Fdy.
	5	Bag. & mail	St. und'frame	.....	Electric	Safety	Edison	Am. Car & Fdy.
	5	Express	St. und'frame	.....	Electric	Safety	Edison	Am. Car & Fdy.
	1	Private	St. und'frame	.....	Electric	Safety	Edison	Am. Car & Fdy.
Cuba R. R.	6	Passenger	.....	.....	.....	.....	.....	Pullman
*Federated Malay States	60	Steel underframes for passenger cars.			.....	.....	.....	Nat'l Steel
Grace, W. R., & Co	1	Comb. 1st & 2d cl.	St. und'frame	.....	Oil	.....	.....	Am. Car & Fdy.
Int. Rep. of Central America	1	1st class	Wood	.....	.....	.....	.....	Am. Car & Fdy.
	2	2d class	Wood	.....	.....	.....	.....	Am. Car & Fdy.
	1	Bag & mail	Wood	.....	.....	.....	.....	Am. Car & Fdy.
Madrid, Saragossa & Alicante	20	2d class	St. und'frame	.....	Gas	.....	.....	Am. Car & Fdy.
	30	3d class	St. und'frame	.....	Gas	.....	.....	Am. Car & Fdy.
Manila	25	3d class	St. und'frame	.....	Electric	Stone	.....	Am. Car & Fdy.
Mecke & Co	2	1st class	Wood	.....	Oil	.....	.....	Am. Car & Fdy.
	3	2d class	Wood	.....	Oil	.....	.....	Am. Car & Fdy.
	4	3d class	Wood	.....	Oil	.....	.....	Am. Car & Fdy.
United Rys. of Havana	8	1st class	St. und'frame	.....	.....	.....	.....	Wason
	12	3d class	St. und'frame	.....	.....	.....	.....	Wason



Passenger Car Orders Show Upward Trend

Production in 1919 Lowest on Record, but Prospects Are for Better Business

THE FIGURES showing the new orders and the production of passenger cars in 1919 indicate that that industry has as yet by no means recovered from the practical cessation of business resulting from the war and its attending circumstances. The number of passenger cars ordered in 1919 totaled 782, of which 292 were for service in the United States, 347 for Canada and 143 for export. Owing to the fact that there have been a number of passenger car orders placed within the last few weeks these numbers are considerably in excess of those of 1918, when 131 cars were ordered for domestic service and 26 for export, but, of course, they are not at all up to the totals for 1917.

TABLE I. THE PASSENGER CAR ORDERS OF 1919

For service in the United States	292
For service in Canada	347
For export to other countries	143
Total	782

TABLE II. ORDERS FOR PASSENGER CARS SINCE 1901

Domestic orders only

	Passenger cars		Passenger cars
1901	2,879	1909	4,514
1902	3,459	1910	3,881
1903	2,310	1911	2,623
1904	2,213	1912	3,642
1905	3,289	1913	3,179
1906	3,402	1914	2,002
1907	1,791	1915	3,101
1908	1,319		

Domestic and Foreign

Year	Domestic	Foreign	Total
1916	2,544	109	2,653
1917	1,124	43	1,167
1918	131	26	157

The production of passenger cars in the car building plants of the United States in 1919 (excluding Canada), totaling 466, of which 306 were for domestic use and 85 for export, is likewise far below the output for 1918, when 1,573 cars were built, including 1,481 cars for domestic use and 92 for export. In fact, the output of passenger cars in 1919 was the lowest since the compilation of these figures was begun.

The orders on hand for passenger cars at present promise a somewhat larger year from the production standpoint in 1920 than in 1919, and the fact that a buying movement has begun during the past few weeks should indicate that orders are to be expected in the near future on a much larger scale than has been typical of the year just past.

The tables showing the orders for passenger train cars are given on the opposite page.

TABLE III—PASSENGER CARS BUILT

	United States	Canada	Total
Domestic	306	160	466
Foreign	85	.....	85
	391	160	551

Comparison with Previous Years

Year	Passenger: Domestic	Passenger: Foreign	Total
1899	1,201	104	1,305
1900	1,515	121	1,636
1901	1,949	106	2,055
1902	From 1902 to 1907 passenger		1,948
1903	car figures in these two		2,007
1904	columns included in corre-		2,144
1905*	sponding frt. car columns.		2,551
1906*	.....	...	3,167
1907*	.....	...	5,457
1908*	1,645	71	1,716
1909*	2,698	151	2,849
1910*	4,136	276	4,412
1911*	3,938	308	4,246
1912†	2,822	238	3,060

*Includes Canadian output.
†Includes Canadian output and equipment built in company shops.

	United States			Canadian			Grand
	Domestic	Foreign	Total	Domestic	Foreign	Total	Total
1913	2,559	220	2,779	517	.....	517	3,296
1914	3,310	56	3,366	325	.....	325	3,691
1915	1,852	14	1,866	83	.....	83	1,949
1916	1,732	70	1,802	37	.....	37	1,839
1917	1,924	31	1,955	45	.....	45	2,000
1918	1,480	92	1,572	1	.....	1	1,503

Exports of Railway Supplies Break all Records

Figures for Only First Ten Months Rival Totals for Full Years from 1914 to 1918

An analysis of the figures for exports of railway supplies during the first ten months of 1919, that being the extent to which figures for the year are thus far available, brings out the interesting fact that with certain exceptions the exports for these ten months alone have been in excess of the exports of any entire year back to 1914. Taking rails as one important item, it is noted that the exports of this commodity to October 31 this year have totaled 568,065 tons, valued at $36,348,148. This tonnage has been exceeded only by that of all of 1916, in which year, however, because of the difference in prices the value of the exports of rails was considerably less.

The exports of freight cars in the first ten months of 1919 have totaled 19,253, valued at $45,578,934, as compared with the best preceding year, 1917, when freight cars valued at $26,769,793 were exported. The exports of freight cars in June, 1919, alone exceeded the exports of freight cars in all of 1918, this excluding, of course, the cars shipped overseas during that year for the American Expeditionary Forces. The exports of car wheels and axles for the ten months of 1919, totaling $10,533,448, are over double those for all twelve months of 1918 and several times those of the years immediately preceding.

The exports of locomotives for 1919 have not bulked so large. The number for the ten months has been about the same as in 1916, for which year, however, the value of locomotives exported was but half that of the ten months of this year. The number of locomotives exported from January to October this year has been about one-half the exports for either 1917 or 1918, although the values are more nearly comparable.

The year 1919 will, if the hopes of the advocates of export trade in the railway supply field come to pass, take its place in history as the year in which the war-time demands for railway equipment turned themselves into the more permanent trade of peace. While it is true that the export orders for cars and locomotives placed on the books have not been as large as might have been expected or desired, the above resumè will show that 1919 has made a most creditable record from the standpoint of export accomplishment.

Through the efforts of the Division of Statistics of the Bureau of Foreign and Domestic Commerce the business papers of the country have been enabled since January, 1919, to give their readers accurate and detailed figures of the monthly exports of their respective industries by countries of destination. The railway supply field has been covered under four heads, "Steam Locomotives," "Freight and Passenger Cars for Steam Railroads," "Car Wheels and Axles" and "Railway Track Material," and the monthly reports for these commodities have been published in the Foreign Railway News column of the *Railway Age* as soon as they have been made available.

Locomotive Exports

The totals of exports of steam locomotives for each of the ten months to October this year have been compiled for purposes of this article in Table I. From this table it will be observed that there were exported from this country, from January 1 to October 31 this year, a total of 763 locomotives, valued at $24,576,337. Comparing these figures with those of the preceding years, 1914 and 1918, at the bottom of the table it will be noted that the number of locomotives exported in the first ten months of 1919 alone was twice that of the

Table I. Exports of Steam Locomotives

	Number	Value
January	87	$3,076,543
February	85	2,584,269
March	27	852,224
April	55	2,193,168
May	97	4,040,551
June	78	2,356,909
July	17	322,775
August	69	1,539,540
September	78	2,326,339
October	170	5,284,019
Total for ten months of 1919	763	$24,576,337

* Comparison With Previous Years (Entire 12 Months)

Year	Number	Value
1914	383	$3,692,225
1915	228	2,115,866
1916	799	12,665,877
1917	1,442	18,243,248
1918	1,457	35,889,632

entire twelve months of 1914, over three times as great as the total for 1915, about the same as in 1916, but only about one-half the totals for 1917 and 1918.

This brings out in a striking way the great expansion of our export trade in locomotives due to the war, and emphasizes the usefulness of the steam locomotive as an instrument of warfare. The differences in value as between the several years given is not alone due to the increase in cost of railway motive power. It is also due to the fact that the United States has taken a new place in locomotive export trade and is now producing larger locomotives and in larger quantities than before the war. As far as 1919 itself is concerned, there is but little to say. Large shipments have been made to Italy, while Japan and Cuba have been regular purchasers. There have also been shipments to Russia on older orders noted from time to time.

Freight and Passenger Exports

Table II shows the exports of cars, freight and passenger. The table is a striking one, in that it shows for these ten months of 1919 exports of freight cars so considerably in excess of those of any of the five preceding years. The record for June alone is in excess of the entire export shipments in 1918, from the point of view of value, although not from that of number.

TABLE II. EXPORTS OF FREIGHT AND PASSENGER CARS

	Freight		Passenger	
Month	No.	Value	No.	Value
January	351	$509,644	6	$36,807
February	583	957,128	225	130,768
March	284	668,904	5	18,552
April	1,005	1,913,728	8	145,141
May	3,008	6,268,078	44	960,616
June	5,055	13,675,186	11	173,929
July	1,986	4,146,923	....	.....
August	2,888	4,721,439	1	1,800
September	1,774	3,538,002	12	81,975
October	4,319	9,179,902	5	13,950
Total for 10 months...	19,253	$45,578,934	317	$1,563,538

Comparison With Previous Years (Entire 12 Months).

	Freight		Passenger	
Month	No.	Value	No.	Value
1914	.....	$5,390,705	....	$2,018,853
1915	.....	1,198,806	....	509,024
1916	.....	23,298,759	....	820,518
1917	.....	26,769,793	....	815,791
1918	10,303	12,821,936	75	228,698

Table III gives the exports of car wheels and axles. The total for the ten months of 1919 is to be compared properly only with that for the year 1918, for the figures for the previous years give only car wheel exports and not car wheels and axles combined. Nevertheless, the fact that the exports for the ten months noted are in excess of those of all of last year is encouraging. The shipments during the year, as in the case of the other exports, have been to all parts of the world, although Japan, Italy and Canada have been especially large customers.

TABLE III. EXPORTS OF CAR WHEELS AND AXLES

Month	Value	Month	Value
January	$278,393	June	2,740,479
February	541,630	July	1,292,291
March	686,281	August	1,302,546
April	946,304	September	1,013,440
May	769,733	October	962,351
		Total for 10 mos.	$10,533,448

Comparison With Previous Years (Entire 12 Months)

Year	Value	Year	Value
1914	$414,371	1917	2,385,973
1915	183,290	1918	5,220,704
1916	741,542	Car wheels only prior to 1918.	

Track Material

Inasmuch as the orders for railway track material are not reported in as great detail as orders for cars and locomotives, Table IV showing the exports of railway track material should be of particular interest. The figures show that in the ten months ending in October only this country has exported 568,065 tons of rails, valued at $36,348,148—more from the standpoint of value than in any full year from 1914 to 1918, with the exception of 1917, when 594,389 tons were exported, and so much more from the standpoint of value as to indicate that for the full year the totals for 1919 will approach an amount double that of the best preceding year. The exports of track spikes compare similarly, with the exception that 1916 takes the place that 1917 takes in the case of steel rails. The exports of switches, frogs, splice bars, also present encouraging totals.

TABLE IV. EXPORTS OF RAILWAY TRACK MATERIAL

	Spikes		Rails		Switches frogs, splice bars, etc.
Month	Pounds	Dollars	Tons	Dollars	Dollars
January	3,509,054	189,408	65,024	4,221,563	543,330
February	4,206,228	258,073	66,900	6,023,982	905,264
March	4,185,816	193,987	48,955	3,051,611	515,535
April	7,799,630	413,292	60,463	3,416,590	1,063,437
May	6,642,827	437,392	76,134	4,902,970	1,881,626
June	9,727,943	484,466	67,028	4,208,872	1,359,725
July	3,803,927	209,054	32,707	1,870,583	289,232
August	4,009,107	216,154	48,700	2,768,558	538,914
September	4,298,046	179,197	58,424	3,403,771	473,753
October	2,899,162	130,941	43,730	2,479,648	533,246
Total for 10 mos...	51,081,740	2,711,964	568,065	36,348,148	8,104,062

(Comparison With Previous Years (Entire 12 Months)

	Spikes		Rails		S...
Year	Pounds	Dollars	Tons	D...	
1914	19,564,618	346,034	338,71		
1915	12,289,203	203,663	159,5		
1916	59,145,818	1,398,514	537		5,261,944
1917	42,809,961	1,502,430	59		9,108,617
1918	34,832,142	1,722,922	/		6,286,369

Considering the 1919 totals for ...ck material alone, it is worth noting that our ... for the year have been Japan, France and ...

Nevertheless, it is apparent ...ork that has been done thus far that the rail... ...eld is in a position such as it has never be... ... handle export trade on a permanent basis— ...n fact, so strong as to fulfill the prophesies of ...dent advocates of foreign trade. It must be born... also that the United States is handicapped at pres... ...e adverse exchange situation and by the difficulties ...ancing. On the other hand, it must also be remembered that thus far only one country other than ourselves, namely, Great Britain, has been able to engage in foreign business in railway supplies to any extent. The railway supply manufacturers of that country have been so busy supplying the demands of their own railways and those of India that with shortage of materials and labor difficulties they have not been able to compete with us on either price or delivery, even in some markets that have hitherto been exclusively British.

Nor have we as yet begun to receive orders from those countries—the former neutral countries of the world—from which it has been expected that we should receive the major portion of our export business. It seems safe to say under these circumstances that any improvement in the exchange situation, or the assistance to financing that may be permitted under the protection of the Edge bill, are going to see a continued and growing foreign trade in railway supplies.

There are those who observe that the catching up of the demands of our own railways will use up the capacity of our locomotive and car-building plants. The strong export organizations and forceful drives for foreign trade that are being made by some larger manufacturing companies should be a guarantee that the opportunities for export trade will not be let go by the board. Even if the railroads do find it possible to make up their back requirements in a very short time, the most optimistic do not believe that that will require all the capacity of the building shops of the country, which under proper conditions should aggregate over 7,000 locomotives and 300,000 to 350,000 freight cars yearly.

The House of Representatives in Session.

Railroad Legislation Still in Uncertain Stage

Conferees Face Many Difficulties in Reconciling Esch and Cummins Bills But Action Is Expected by March 1

LESS RAILROAD LEGISLATION has been enacted in 1919 than in any year for many years. State legislation has been kept to a minimum by the fact that the railroads have been operated by the federal government and because the Railroad Administration early in the year reached an understanding with the railroad brotherhoods by which they have applied to it rather than to state legislatures for what they wanted. In Congress the net result so far as actual enactment is concerned, as the Cummins and Esch bills are still in conference, has been one appropriation bill for $750,000,000 when $1,250,000,000 was needed, passed in June, when it should have been passed by March 4, and the bill to restore the rate-making powers of the Interstate Commerce Commission, which was vetoed by the President.

The legislation with which Congress has been struggling for a year is still unfinished.

While the President has greatly cleared the atmosphere by issuing the official proclamation relinquishing the railroads from federal control on March 1, and has finally put beyond argument the question of government or private operation, the terms and conditions under which the railroads are to be allowed to operate are still to be determined by the conferees of the Senate and the House, who are now at work in an effort to reconcile the conflicting provisions of the Cummins and the Esch bills, and by the votes of the two houses on their report. Therefore, in many respects, the future of railroad regulation is still in a stage of almost as great uncertainty as has prevailed throughout the year.

CONGRESSIONAL committees have been working hard on the railroad legislation but the task is still unfinished. The differences between the House and the Senate bills cause fear of great difficulty in reaching an agreement.

President's proclamation returning railroads as of March 1 clears atmosphere.

Question of Government ownership and operation put beyond stage of discussion. Five-year extension and Plumb plans met with little support.

Senate bill provides rate-making rule.

To say this is not to say, however, that nothing has been accomplished by the laborious and often tedious work of the two Congressional committees that have been wrestling with the subject or by those who have been working with or on them, as the case may be, because the narrowing down of the many plans, schemes and suggestions to the two bills that have now been passed by the Senate and the House, itself represents an important accomplishment. Some very ambitious plans, which at least had sufficient backing to render them the subject of widespread discussion and controversy, have been definitely set aside.

First of these stands the McAdoo proposal for a five-year extension of federal control, carrying the prestige of the director general of railroads and the secretary of the treasury, as well as the statement that it had been approved by the President, which no longer has anything to show for itself except one of the large variety of bills introduced in the House by Representative Sims and a record of hearings before the Senate committee on interstate commerce which was printed under the heading "Extension of Tenure of Government Control of Railroads" long after the plan had ceased to be considered by the committee.

Next came the Plumb plan which, offered with the accompaniment of threats of strikes, or even of revolution, and

with the alleged support of nearly 2,000,000 strongly organized railroad employees, enjoyed a considerable period of pitiful as well as pitiless publicity, caused by its absurdity as well as its audacity, but which also got no further than the introduction of a bill by Mr. Sims, who is not so particular about what kind of bills he introduces as some other Congressmen, and a declaration by the committee that it was impossible. The bill was not even introduced in the Senate.

After the Plumb plan had been found to be a failure except for propaganda purposes, as a vehicle for mud-slinging against the railroads, and after even Samuel Gompers had refused to endorse it, the same organizations that had put it forward began to concentrate their activities on a proposal that the railways be retained by the government for two years. This plan is also embalmed in a bill or two by Mr. Sims and actually reached the stage of a vote in the Senate, where it was defeated 65 to 11 on a motion by Senator La Follette to substitute it for the Cummins bill. Incidentally the investigation by a committee of Congress demanded by the railroad labor leaders of the charges made by Mr. Plumb before the House committee, which boiled down to an assertion that about $8,000,000 of railway capitalization is fictitious, has not appealed to members of Congress as being sufficiently worth while to expend the peoples' money on. A resolution providing for the investigation introduced by Representative Huddleston was referred to the committee on rules, which held two hearings on it of an hour or two each, attended by three members of the committee, and then did not even print the testimony.

The legislative program for the return of the railroads to private management, which now seems to be about to be fulfilled, dates from a message sent to Congress by the President at the opening of the session on December 2, 1918, when he declared that while he had no answer ready to the question of the permanent policy to be adopted towards the railroads and would welcome a Congressional solution of the problem, the one thing perfectly clear to him was that it would not be fair either to the public or to the owners of the railroads to leave the question unanswered and that it would presently become his duty to relinquish the roads, unless there should appear some clear prospect in the meantime of a legislative solution.

This declaration met with a prompt response in Congress and preparations were made for hearings before the interstate commerce committees to consider what ought to be done. The Railway Executives' Advisory Committee, now the Association of Railway Executives, held a meeting at New York on December 4 and adopted resolutions expressing the opinion that private operation should be fostered and preserved as a matter of national policy and that regulation should provide for the encouragement, protection and upbuilding of the railways as well as for the correction and check of any abuses.

The standing committee and the law committee were requested to consider and report back to the member roads proposals to accomplish results in accordance with the principles expressed and plans and methods to be favored in connection with the return of the railroad properties to their respective owners.

Five-Year Plan Shelved

Various organizations of shippers and others throughout the country also began to give consideration to the legislation considered necessary for the return of the roads and the Interstate Commerce Commission outlined a series of principles in its annual report to Congress, but the country was surprised on December 13 by the announcement of Mr. McAdoo's proposal for a five-year extension of federal control, in order to make possible a more complete test of government operation, which was accompanied by the statement that the President was in accord with the plan. Mr. McAdoo's recommendation, contained in a letter addressed to the chairman of the Senate and House committees, was based on the ground that it would be impossible to secure legislation during the short session of Congress that would provide a permanent solution of the railroad problem and that it would be wholly impracticable to attempt to operate the roads under the provisions of the federal control act.

The five-year proposal aroused immediate opposition in Congress and generally throughout the country, but Mr. McAdoo was given a full hearing before the Senate committee and was followed by Mr. Hines, who supported his recommendations. The committee, however, showed no disposition to accept the idea of the former director general and proceeded with the hearing until near the close of the Congressional session with a view to considering plans for permanent legislation. It did not even report on the five-year proposal and the House committee finally gave up the idea of holding any hearings on it.

During the early months of the year it was rather generally assumed that in the absence of legislation the President might relinquish the railroads about June 30 and there was a very general demand for an extra session of Congress to consider the railroad question, which in part inspired the filibuster at the close of the regular session on March 4, which caused the failure of the appropriation bill asked by Mr. Hines. On May 19 at the opening of the special session the President sent a message to Congress saying that the railroads would be returned to their owners at the end of the calendar year. This put Congress upon notice that its legislation prescribing the conditions under which the railroads should be operated for the future should be completed by the end of the year and the two committees prepared to tackle the problem at once.

Senate Committee Hearings

The Senate committee, during its hearings in January and February had heard from practically all of the various interests involved in the railroad problem and had received a mass of testimony covering over 1,500 printed pages on various more or less comprehensive plans for dealing with the railroads. The chief of these were the general outline of principles proposed by the Association of Railway Executives; the comprehensive Warfield plan proposed by the National Association of Owners of Railroad Securities; the Interstate Commerce Commission plan for rounding out the act to regulate commerce without radical changes, which was later embodied in the Esch-Pomerene bill introduced in both houses of Congress; the Warburg plan, proposed by Paul M. Warburg and later included in the plan proposed by the National Transportation Conference; the Amster plan for unified operation of the railroads under a corporation controlled but not owned by the government, which was later represented by the Lenroot bill; and the Plumb plan, which, however, received little consideration until its later presentation before the House committee. There were also numerous other plans, most of which had for their purpose an improvement in the system of railroad regulation and the retention of some of the advantages resulting from unified operation as demonstrated by the Railroad Administration, but proposals for continued government operation received little support.

After the extensive hearings that had been held during January and February and with the extensive record taken by the Newlands committee in 1916 and 1917 before it, as well as its own voluminous record in connection with the federal control act in 1918, the Senate committee saw little to gain in holding further hearings and within a few days after its organization appointed a sub-committee to consider

the testimony already available with a view of framing a bill and presenting it to the full committee. The sub-committee consisted of Senators Cummins, Kellogg, Poindexter, Pomerene and Robinson, who now constitute the Senate conferees on the railroad bill. They held almost continuous sessions for many weeks, during which they consulted informally with the most prominent representatives of the various bodies interested in railroad matters, and on September 2 Chairman Cummins introduced S. 2906 as the result of the work of the sub-committee. This was referred to the full committee, which held sessions almost every day until October 23, when, having adopted many amendments, the new bill, which was passed on December 20, was introduced in the Senate and favorably reported by the committee.

House Committee Hearings

The House committee on interstate and foreign commerce was behind the Senate committee to the extent that it had not held hearings during the last session, but its chairman, Mr. Esch, had given close study to the questions involved and on June 2 introduced the Esch-Pomerene bill which largely represented the views of the Interstate Commerce Commission. This was taken as the basis for the hearings which were begun on July 15 and continued almost daily until September 27, during which time 3,500 pages of testimony were given.

Commissioner E. E. Clark, chairman of the legislative committee of the Interstate Commerce Commission, spent a week before the committee explaining and supporting the provisions of the Esch-Pomerene bill, admitting that it was not intended to cover the whole ground but saying that the commission had not felt like expressing its views as to other plans in detail in advance of their presentation by their proponents. He was followed by numerous other witnesses, some of whom presented plans of their own, and discussed the plans proposed by others, but most of whom discussed or presented amendments to the Esch-Pomerene bill.

The railway executives presented their plan more in detail by putting it into the form of a bill, the Plumb plan was put into the form of a bill and introduced by Representative Sims, after which a week of the hearings was allowed to its proponents. The Warfield and Amster plans were also put in bill form as was a new compromise plan drafted by the National Transportation Conference called by the Railroad Committee of the Chamber of Commerce of the United States, which represented suggestions put forward by each of the principal proponents of separate plans of their own. The revised or new plans were at the same time filed with the Senate sub-committee which therefore had access to most of the new material developed before the House committee, although the Senate committee was less subjected to the influence of the large number of shippers' representatives and others who based their discussions mainly on the details of the Esch-Pomerene bill.

Following the hearings a sub-committee was appointed consisting of Representatives Esch, Barkley, Hamilton, Sims and Winslow, who are also the House conferees, who drafted a tentative bill which was never made public, after which amendments were adopted by the full committee and the Esch bill was introduced on November 8, followed by the report on November 10. Debate was begun on November 11 and on November 17 the bill was passed with some 50 amendments.

In the House committee opposition very speedily developed to the more radical changes in railroad regulating methods which had been proposed, such as the idea of reorganizing the railroads into larger systems proposed by Mr. Hines, the principle of a fixed minimum rate of return and a limitation of earnings included in the Warfield and National Transportation Conference plans, and the proposal for federal incorporation and curtailment of the powers of the state authorities included in the plan of the railway executives as well as others. The committee did accept the proposal of the executives to the extent of inserting a provision for a general instruction to the Interstate Commerce Commission as to the elements to be considered in determining the reasonableness of rates but it was later stricken out in the House.

The Senate bill probably resembles the plan proposed by the National Transportation Conference more closely than any other, not because that plan was adopted by the committee, but because both the plan and the Senate bill were made up by selecting and revising provisions of various other plans. It contains many of the suggestions made by the executives, the general principle of the Warfield plan for a minimum percentage of return and a division of excess earnings, and also many of the detailed amendments to the interstate commerce act proposed by the Interstate Commerce Commission, while the plan for a reorganization of the railroads into 20 to 35 competing systems bears some resemblance to the ideas suggested by Mr. Hines, Daniel Willard and others, although it is probably more accurate to attribute it to Senator Cummins himself, who has been gradually crystallizing the plan for two or three years as a solution of the strong and weak road problem.

The Esch bill is still largely an embodiment of the suggestions of the Interstate Commerce Commission and seems to be more closely in accord with the views of shippers and others whose interest is largely in the questions of rates and details of service than the Senate bill, which is more reflective of the views of financiers, business man and others who have looked at the railroad problem as a whole.

Government Ownership Is Not Even Seriously Considered

Neither the Senate nor the House treated very seriously the new demands that had been made for government ownership. In the Senate committee report the subject was dismissed briefly with a statement that it would be attended with so many disadvantages—notably the increased cost of operation—that it must be discarded. The Plumb plan was not mentioned. The House committee's report said that in view of the "widespread demand among the people that federal control cease as soon as suitable legislation could be enacted" the committee had not recommended government ownership as a solution. The Plumb plan was declared "impossible."

Conferees Face Difficulties

It has become plainly apparent that the conferees that have been meeting during the holiday recess are going to have great difficulty in reaching an agreement between the two bills and it is expected that their report will also arouse considerable debate in both houses before it is adopted. For this reason both railroad men and members of Congress expressed great satisfaction when the President not only fixed March 1 as the date for the return of the roads but in a way "cinched" the matter by issuing the formal proclamation so that it represents an act accomplished as far as the technical formality is concerned instead of a statement of intentions and therefore makes it much more difficult for Congress to try to give itself more time by postponing the date. While a majority of Congress wants to get the roads returned, it has become evident that labor intends to keep up the fight until the last ditch and some of the more susceptible Congressmen will stay put much more easily if the responsibility for action has already been taken by some one else.

The principal points on which the conferees are already encountering difficulties are the anti-strike provisions and the rate-making provisions of the Cummins bill, although the

House is also strongly opposed to federal incorporation and compulsory consolidation, or a transportation board. There are comparatively few provisions in the Esch bill to which the Senate has indicated opposition and if they could be accepted it would be possible to add the features of its bill to the Esch bill. On the other hand, a large part of the Esch bill is in the Cummins bill in a form differing only in comparatively unimportant details.

One of the most serious points of contention is involved in the labor provisions of the two bills and various compromises have been suggested, including the plan proposed by Senator McCormick of Illinois, patterned after the Canadian law, to prohibit strikes only for 60 days after a decision by the wage tribunal, which would be required to render a decision in 90 days. This was defeated in the Senate first by a tie vote of 30 to 30 and again by a vote of 33 to 30. Another compromise suggested provides for a tribunal including no partisan members.

The Esch bill contains no provision against strikes except the machinery for voluntary adjustment through boards of adjustment and commissions of labor disputes to which appeals may be taken, both composed of an equal number of representatives of the employees and of the managers, although some of the labor leaders are said to be suspicious of a paragraph which was left in the bill providing that "it shall be the duty of all carriers subject to this act and their agents, officers and employees to exert every reasonable effort and adopt every available and reasonable means to avoid interruption to the operation of a carrier," because another paragraph provides a penalty for violation of any of the provisions of the sections relating to labor disputes.

The Senate is expected, however, to object to the provision slipped into the Esch bill by the friends of the labor organizations confirming for the future the orders and decisions of the Railroad Administration relating to wages, hours and conditions of employment, and in view of the many severe criticisms of the Railroad Administration by members of Congress for having increased operating expenses it is difficult to see how they will explain voting for a provision confirming for the future the wage orders that have caused most of the increase in expenses after their attention has been called to the effect of this part of the bill.

The fact that the Senate voted by 46 to 30 to pass the Cummins bill does not necessarily mean that the majority of senators will fight to retain everything that is in it, because when they voted for the bill they were voting to send it to conference, as well as voting to give themselves a holiday recess, and were not voting to send a bill to the President for signature. The debate on the bill indicated a very apathetic attitude on the part of the senators generally, partly because of the great difference of opinion as to whether it is a pro-railroad or an anti-railroad bill. Many senators just at present are not anxious to be classed as either too friendly or too hostile toward the railroads.

While the discussion in Congress and before its committees throughout the year has been comparatively free from abuse of the railroads and has indicated a strong feeling on the part of many Congressmen that the roads have been too much restricted in the past and now need encouragement and help, this attitude has been assumed very gingerly by some who are not members of the committees and have not had the opportunity to fortify their opinions or get rid of their old prejudices by the aid of the detailed facts regarding the railroad situation which were presented by all classes of interests.

The extensive propaganda carried on against the bill by the labor leaders and the bitter attacks made against it by a few of the La Follette type on the ground that the bill constituted in effect a guaranty on the railroad capitalization, probably caused some confusion in the minds of many who did not believe all of the violent claims that were made against the bill but were not sufficiently familiar with the facts to answer them.

It was amusing at times to note the eagerness on the part of many senators to lay aside the railroad bill, which they were afraid might be "loaded," and take up the sugar bill, because regardless of the economic questions involved it seemed to be much easier politics to hold down the price of sugar than to assist an increase in freight rates. Even Senator Cummins, who in a few years has changed his attitude from that of a severe critic of the railroads to a sincere desire to promote the public interest by giving the railroads a better chance to succeed, showed some hesitancy in assuming the leadership in the new role and rather reluctant in supporting a 5½ per cent return, although admitting that the great problem was to attract new capital. He did use his general understanding of the facts of the railroad situation to good advantage, however, in answering the attacks made against the bill.

The Cummins bill as reported by the full committee and as passed by the Senate with comparatively little change is regarded as a great improvement over the bill, S. 2906, drafted by the sub-committee, which proposed to confiscate all earnings above a "fair return" and which contained many defects.

The principal point of contention involved in the entire discussion of the proposed railroad legislation during the past year, with the possible exception of the method of dealing with labor controversies, has been the question of a rule of rate-making designed to insure an adequate income to the carriers by a more specific expression of policy than the old rule that rates shall be "just and reasonable." The House committee throughout its hearings seemed inclined to rely entirely on the Interstate Commerce Commission but after Commissioner Clark had indicated in a general way that the commission might welcome a legislative declaration of policy, the committee adopted the general rate-making rule which was stricken out in the House.

The rule adopted by the Senate committee and later by the Senate is an evolution from the idea of a minimum guaranty, such as was proposed by Mr. Hines and others. The guaranty idea was discarded as being too liberal to badly located or poorly managed railroads, and as tending to promote lack of enterprise and efficiency. Both the Warfield and the transportation conference plans proposed the principle of a legislative assurance of a definite percentage rate of return upon the aggregate value by districts and a limitation upon the excess, by various provisions for distribution. Both plans provided for a rate of 6 per cent. For a time a division of the excess earnings with labor was discussed and such a plan was included in the Senate sub-committee bill but was discarded because of the expressed opposition of labor to the idea of profit-sharing. The railroad executives through their association opposed a fixed percentage and also a limitation although some of them favored both provisions.

The rate-making provisions of the Cummins bill as passed are stated in Section 6, which under the ordinary interpretation of conference rules must be accepted or rejected as a whole or modified only in detail, as follows:

Rate-Making Section of Cummins Bill

Sec. 6. In dividing the country into districts and the carriers into rate-making groups the commission shall have in view the similarity of transportation and traffic conditions therein. Rates of transportation shall at all times be just and reasonable and sufficient to produce a reasonable return upon the aggregate value of the property in each rate group used or held for the service of transportation.

It being impracticable to establish a level of uniform rates and charges within competitive areas which will sustain sundry car-

riers indispensable to the communities served by them, without enabling more favorably situated carriers to receive revenue from such rates, negligibly as to each service, but in the aggregate substantially and unreasonably in excess of the aggregate over a fair return upon their property, unless regulated in the interest of the commerce of the United States as a whole, it is hereby provided that, subject to the exceptions and conditions of this act, no carrier subject to the provisions of this act shall be authorized to receive and retain for the transportation services rendered such proportion of the rates and charges collected by it as may yield in the aggegate more than a reasonable return upon the value of its property held for and used in the service of transportation, determined as herein provided. In changing or modifying rates, fares, charges and classifications from time to time in the manner provided in the act to regulate commerce, as amended, and in viewing them from the standpoint of their effect in producing revenue in any rate-making group as a whole, the commission shall initiate, modify, or adjust rates, fares, charges, and classifications, as nearly as may be, so that the railway carriers as a whole allocated to each district and subject to this act shall earn an aggregate annual net railway operating income equal, as nearly as may be, to 5½ per centum upon the aggregate value, as determined in accordance with the provisions hereof, of the railway property of such carriers in the district held for and used in the service of transportation: Provided, That in this respect the commission shall have reasonable latitude in order to adjust any particular rate, fare, or charge which may be found unreasonably high or unreasonably low. And it may, in its discretion, add to the basis above mentioned one-half of 1 per centum upon the aggregate value of said property, to make provision, in whole or in part, as the case may be, for what are commonly known as non-productive improvements, betterments, or equipment, which, according to the custom heretofore prevailing, have been charged to capital account, but which, to the extent that such allowance for such purpose shall be reflected in the net operating income of the several carriers, to be determined by the commission, shall not be capitalized or used in any way as a basis for increased rates, fares, or charges by those carriers whose net operating income for the year exceeds 5½ per centum upon the value of their respective properties.

In so changing or modifying rates, fares, charges and classifications from time to time in the manner provided in the act to regulate commerce, as amended, the commission shall take into consideration the interests of the public, the shippers, the wages of labor, the cost of maintenance and operation, including taxes, the requirements for additional capital in order to enable the carriers to adequately perform their duties to the public, and the conditions under which the same can be secured; and shall, so far as practicable, adjust rates, fares, charges and classifications that the net operating income of the several carriers shall bear the same relation to the value of their respective properties. For the purpose aforesaid, the commission shall from time to time determine the value of the property in each district and rate-making group so held for and used in the service of transportation, and lower or advance the rates, fares, or charges for transpotation to produce, as nearly as may be, the net operating income above mentioned

If, under the above provisions, any carrier shall receive a net railway operating income in any year of more than 6 per centum, after allowance, as aforesaid, by the commission for non-productive improvements, upon the said value of its property, one-half of such excess between 6 and 7 per centum shall be placed in a reserve fund established and maintained by such carrier, and the remaining one-half of such excess between 6 and 7 per centum shall, within the first four months of the succeeding year, be paid to and recoverable by the board for the purpose of establishing and maintaining a general railroad contingent fund, as hereinafter described. Of any such excess above 7 per centum, one-fourth thereof shall be placed in the reserve fund to be established and maintained by the carrier and the remaining three-fourths thereof shall, within the time aforesaid, be paid to and recoverable by the board as a part of said general railroad contingent fund as hereinafter described

For the purpose of paying dividends or interest on its obligations, a carrier company may draw upon its said reserve fund whenever and to the extent that its annual net railway operating income shall fall below 6 per centum of the value of its property, determined as provided in this act.

In any year in which the said income of a carrier company which has accumulated and is maintaining a reserve fund equal to 5 per centum of the value of its property, determined as provided in this act, exceeds 6 per centum of such value, such carrier shall pay, within the first four months of the succeeding year, two-thirds of such excess to the board as a part of such general railroad contingent fund and the remaining one-third shall be retained by the carrier for such lawful use or disposition as it may determine: Provided, however, That any railroad corporation proposing to undertake any work of new construction may apply to the Interstate Commerce Commission for permission to retain for a period not to exceed ten years all or any part of its earnings from such new construction in excess of the amount heretofore in this section provided, for such disposition as it may care to make of the same; and the said commission may, in its discretion, grant such permission, conditioned, however, upon the completion of the work of construction within a period to be designated by the commission in its order granting such permission.

The aforesaid general railroad contingent fund and accretions thereof shall be administered by the board and invested in obligations of the United States or deposited in authorized depositaries of the United States, subject to the rules promulgated from time to time by the Secretary of the Treasury relating to government deposits. And the said fund and all accretions thereof shall be employed or invested or expended by the board in furtherance of the public interest in railway transportation by carriers subject to the act to regulate commerce in avoiding congestions, interruptions or hindrances to the railway service of the United States by carriers subject to the act to regulate commerce, or in furthering the public service rendered by them, either by way of purchase, lease, or rental of transportation equipment and facilities to be used by such carriers wherever the public interest may require, or by way of loans to such carriers, upon such fair and reasonable terms and conditions, in either case, as the board may prescribe.

The commission shall prescribe rules and regulations for the determination and recovery of the excess earnings of the respective carriers subject to this act over and above the reasonable maximum provided for herein. To that end the commission may, in addition to the exercise of its general powers, require such security or prescribe such reasonable regulations and conditions as it may find necessary.

The provisions of this section shall not be construed as depriving shippers of their right to reparation in case of overcharges, unlawfully excessive or discriminatory rates, or rates excessive in their relation to other comparable rates, but no shipper shall be entitled to recover upon the sole ground that particular rates may reflect a proportion of excess earnings produced and to be recovered in the public interest under the provisions of this act: Provided, however, That in the year 1925 and in every fifth year thereafter the commission shall determine what, under the conditions then existing constitutes a fair return upon the value of such railway property, and it may increase or decrease the 5½ per centum basis herein prescribed, or the basis for the determination of excess income.

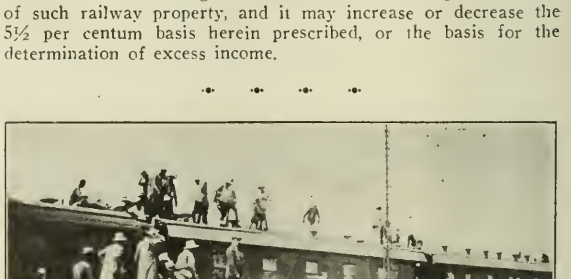


Photo by Courtesy of C. M. Winter.

With the Russian Railway Service Corps. Shortage of Cars at Harbin Compels Passengers to Ride on Roofs

Train used by the Prince of Wales in his tour through Canada.

Canadian Railway Developments During 1919

With the Taking Over of the Grand Trunk, the Government Now Owns Nearly 22,000 Miles

By J. L. Payne

Comptroller of Statistics, Department of Railways and Canals, Ottawa, Canada

THE YEAR 1919 will probably be remembered as the pivot, in the matter of time, on which turned the policy of railway nationalization in Canada. All that had preceded could scarcely be recognized as the assertion of a plan. Things had simply happened under the pressure of circumstances. Of this nature was the absorption of a number of small roads in the Maritime Provinces which, while independent units, were really feeders of the pioneer government railway, the Intercolonial. The monetary interests involved were relatively small, and the mileage was less than 500. This process occupied eight or ten years of time, and was not of sufficient importance to arouse controversy. It had been anticipated and did not materially alter the railway situation.

The first step toward the development of a really large state system was the retention of the National Transcontinental and its operation under Intercolonial management. This road was built by the government as the eastern section of the Grand Trunk Pacific, and was to be the public contribution toward Canada's second line across the continent; but it never passed out of government hands. The Grand Trunk Pacific felt unable to comply with the terms of acceptance, and, rather than have its 2,002 miles lying idle, it was, as has been said, put into operation under the Intercolonial. Having been constructed for the greater part of its length through an unsettled and comparatively unproductive territory, it was run at a loss.

Then came the taking over of the Canadian Northern, consisting of nearly 10,000 miles of line. While popularly referred to as a third transcontinental system, it had not reached that position except in a technical sense. Its eastern terminus was at Montreal, thereby connecting it with Atlantic navigation in summer, and only to that extent did it span the continent. It had a link lower down in the Province of Quebec, and another in Nova Scotia; but there was a hiatus of six or eight hundred miles between Montreal and an Atlantic port. In this uncompleted state as an ocean to ocean road it collapsed under the weight of its financial burdens and passed into the hands of government. This result came in the unavoidable sequence of events. The government was the guarantor of a very large volume of its bonds, and took possession rather than advance further millions to hold up a corporation at the end of its tether under war conditions.

Almost coincidental with the assumption of the Canadian Northern came the passing of the Grand Trunk Pacific, with its 1,682 miles, into receivership. The Minister of Railways became the official receiver for the same reason that had obtained in the Canadian Northern case. The government was the guarantor of the bonds. With the fate of the Grand Trunk Pacific went the Grand Trunk Pacific Branch Lines, a separate corporation operating more than a thousand miles of line in the West. The Dominion now had on its hands nearly 16,000 miles of railway and was confronted not only by very heavy and unlooked for responsibilities, but by the grave problem of recasting this huge

THE TAKING OVER of the Grand Trunk by the Dominion in November was the most important development of the year.

Without bringing the question of railway nationalization before the Canadian people, the government now finds itself in control of more than fifty per cent of the railroad mileage of Canada.

Railroad construction has practically ceased.

Labor situation much the same as that in the United States.

mileage into a system which would do two things: First, reduce the annual deficit to the smallest possible proportions, and, second, to develop such operating conditions as would create the reasonable hope of making one hand wash the other in time. There was considerable paralleling of mileage in the western provinces, growing out of the rivalry for traffic among the Canadian Pacific, the Canadian Northern and the Grand Trunk Pacific, and occasion was thus created for constructive planning for the future.

It is well to get these facts clearly in mind, because they had everything to do with the salient event of 1919—the taking over of the Grand Trunk. The government had come into possession of two large railways in the west, and had for half a century owned and operated the chief road in the east. It also owned the National Transcontinental between Quebec and Winnipeg; but that road, primarily intended as a connecting link for the Grand Trunk Pacific between the prairie provinces and the Atlantic, was relatively unproductive. The populous province of Ontario, lying in between, was fairly divided between the Canadian Pacific and the Grand Trunk. It produced enormous traffic.

In this situation the course of policy was obvious. To give the state system a reasonable chance, possession of the traffic arteries of Ontario was imperative, and it so happened that an easy opportunity to meet the needs of the time came with the breaking down of the Grand Trunk Pacific and Grand Trunk Pacific Branch Lines. These roads had two guarantors—the Grand Trunk and the government. The former was the primary endorser. Without going into a mass of details, it must suffice to say that the Grand Trunk was insolvent by virtue of its responsibilities attaching to these subsidiaries. It was already top heavy on the side of capitalization, and in these times of financial stress had no means of swinging its burdens. The government had on several occasions been compelled to come to its rescue. Thus, while not bankrupt on its own account, it was really so by reason of its obligations.

The government in November took over the Grand Trunk, on terms with which readers of the *Railway Age* are familiar. The railway situation in Canada was by this act vitally changed. More than 50 per cent of the total mileage of the Dominion was now in state hands. While this did not represent nationalization, it will be recognized as a long stride in that direction. The facts with regard to mileage are as follows:

Intercolonial	1,592.35
Prince Edward Island	278.81
Transcontinental	2,002.92
Canadian Northern	9,479.17
Grand Trunk Pacific	1,794.07
G. T. P. Branch Lines	1,036.79
Grand Trunk in Canada	3,578.80
Grand Trunk in U. S.	1,665.00
Lines in Maritime Provinces	485.00
Total	21,912.91

It is understood that this mileage is to be operated as a single system, which will make it very much the largest system on this continent. Other countries, notably Germany, India and Austria-Hungary, own and operate a larger mileage. In view of the duplication in the west, to which allusion has been made, there may be a reduction of the operating mileage as given above; but no definite announcement has been made in that regard. Be that as it may, it will be seen that the Government of Canada has a huge task on its hands, and the nature of that task will be better understood when two or three collateral facts are stated.

Every one of the roads in the new combination had a deficit in 1918. The total of these shortages cannot be accurately stated, owing to the absence of definite data in some instances as to fixed charges. This applies chiefly to the old government lines, the obligations of which appear in the general accounts of the Dominion and cannot be identified. There are also those indirect deficits arising from the need for capital expenditures to bring certain lines up to a sound operating standard. The Canadian Northern, for example, is in that class. When the matter was under consideration in Parliament a few weeks ago various estimates of the annual loss which was likely to result for the next year were offered, and ran all the way from $20,000,000 to $50,000,000. Under these circumstances it would be imprudent to offer further surmise; but it was frankly admitted by the Minister of Railways that an adverse difference between income and outgo could not be avoided at the outset. Official statistics for 1918 show that in that year the immediate deficit for the combined roads was in excess of $26,000,000. It would be possible within the compass of correct accounting to raise this figure considerably by the inclusion of capital charges attaching to the Intercolonial, Prince Edward Island and Transcontinental lines.

The capital liability involved in this large undertaking by the government cannot be calculated with absolute accuracy, owing to the situation with respect to the Grand Trunk. The common and preferred stocks, aggregating $245,000,000, are to be made subject to arbitration. On the surface, however, it exceeds $1,200,000,000. The operating revenues in 1918 for all the roads had a total of $135,000,000, omitting the American end of the Grand Trunk, as to which the figures are not available. The total for all roads in the Dominion was $332,000,000, which gives emphasis to the large place occupied by the Canadian Pacific among the units still outside of state control.

A novel feature of the situation as developed by the passing of the Grand Trunk is the control of mileage in the United States by the Canadian Government. That mileage, allowing for the Canadian Northern holdings across the boundary, will be above 1,900 miles. There was a time when such a fact would have been viewed with apprehension, as suggesting the possibilities of international complications; but that time has happily passed. The matter was not given prominence in the Parliamentary discussion which took place recently.

The attitude of public judgment toward the setting up of this large government railway system cannot be judged by anything that has yet happened. One prominent government journal opposed the acquirement of the Grand Trunk, while a somewhat hostile paper gave strong support. There would seem to be a general acceptance of the announcement that circumstances had compelled the action taken and thereby removed it from the realm of constructive controversy. There had long been a feeling that the administration of the Grand Trunk from England was unsatisfactory, and those who held that view are naturally disposed to approve the transfer to Canada. It is neither the disposition nor thought of the writer to offer a syllable of comment, nor to do more than set down the facts of the case in a judicial spirit.

The published statements of all the larger roads for the year ended June 30th last point to a substantial gain in gross earnings. In view of the increased rates which were in effect it cannot at this moment be said whether or not there was an actual growth in traffic. The indications are on the positive side. On the other hand, operating cost has shown persistent advances, and at this juncture nothing has occurred to warrant the hope of either stability or a decline. In this regard it will help to a clear appreciation of conditions in Canada to say they are essentially the same as those in the United States. The labor situation is identical, and, while strikes among railway men on this side of the line have neither occurred during the year nor are immediately threatened, it still remains a fact that the unions which govern on this side are international in jurisdiction.

The Houses of Parliament Where the Transport Bill Was Considered and Passed.

English Railroads During the Year 1919

Ministry of Transport Created—Nine Days' Strike—Operating Economies Greatly Needed

By Robert E. Thayer
European Editor of the *Railway Age*

LONDON, England, December 15, 1919.

ENGLAND ENTERS into the new year with its railways under the direct control of the government through the Ministry of Transport and with railway labor in a far more quiescent state than at the beginning of the year. It has strongly fought off nationalization for the present at least and has weathered a railway strike which has done much to clarify any bolshevic atmosphere which existed after the cessation of hostilities. The railway problems with which it is confronted at the beginning of the new year are the congestion of traffic, particularly at the ports; the making good of a deficit estimated at approximately $225,000,000 and the final settlement with the railwaymen who precipitated the nine days' strike in last September.

THE BIG problem confronting the English railways is the demand for greater economy in operation, both in the coordinating of resources and in the use and maintenance of the properties.

The Ministry of Transport, by coordinating all modes of transportation, is expected to find a final solution of the problem.

Railway rates are to be increased to meet an anticipated heavy deficit, but greater possibilities lie in more efficient operation of the railway plant available.

Ministry of Transport

The bill establishing the Ministry of Transport was introduced in the English Parliament on February 26, and after remaining there for five and a half months, during which 38 days were actually given to its discussion, was made a law on August 13. Sir Eric Geddes, who has had railroad experience in America, India and England in addition to having served as director-general of railways of the British forces in France, was made the first Minister of Transport.

In brief the purpose of this act is to bring under one department in the government the control of railways, light railways, tramways, canals and waterways, harbors and docks, roads and road traffic in order that transportation in its broadest sense may be coordinated for the welfare of the country. It is of a more or less temporary structure to remain in operation for two years for the purpose of studying and determining upon the permanent scheme of transport regulation for Great Britain. The power of the Minister of Transport is very broad, as he has complete control of operation, rate making, wages and compensation, improvements and extensions of all systems of transportation in the country. As a result of this bill it is natural that all competition between all methods of transport has ceased.

The organization of the Ministry of Transport consists of a Parliamentary Secretary who represents the Minister in Parliament, a chief mechanical engineer, a director-general of traffic, a director-general of civil engineering, a director-general of development, a secretary and solicitor combined in one office, a director-general of finance and statistics, a director-general of public safety and general purposes, a director-general of roads and a director-general of transport for Ireland.

At present the total staff employed by the Ministry of Transport totals 449 persons of whom 55 were previously

employed by railway companies, 14 by local authorities and 15 by engineering firms. No officers are shown as having been previously employed by canal companies, by road transport contractors, or motor car manufacturers. Out of this total 33 receive a salary of £1,000 (about $5,000) or more per year, the salary of the Minister of Transport being £5,000 ($25,000).

In addition to the above staff an advisory committee has been appointed consisting of 12 general managers from the railways and four representatives of the railwaymen's unions which will act in somewhat the same capacity as the Railway Executive Committee under which the railways were operated during the war but having less power. As far as actual operation of the roads is concerned, the Minister has stated that instead of a greatly increased control of the railways due to the formation of the Ministry of Transport, they will to a greater extent be conducted by their own management.

Railway Labor

At the beginning of the year, railway labor was decidedly in a discontented frame of mind. During the war, bonuses, which at the signing of the Armistice had reached the amount of 33 shillings per week (about $8), had been added to the men's weekly earnings to make up for the increased cost of living; the bonus was granted on a sliding scale basis and was given purely as a war measure with the expectation of a reduction as the cost of living decreased. At the cessation of the war a readjustment was made.

The locomotive drivers and firemen received as a final settlement standard wages sufficiently high to include the 33 shillings bonus. Later, attempts were made to adjust the wages of the other railways workers represented by the National Union of Railwaymen. These men had a lower wage scale and the government did not grant them a sufficiently high wage to include the 33 shilling war bonus; and it was this that led to the railway strike of September which was settled by a guarantee that existing wages would remain in effect to September, 1920, and that the subject of a standard wage would again be submitted to discussion. Negotiations with these men are still in progress. The eight-hour day for all members of the railway staff was put into operation on February 1, the railway shopmen obtaining a 47-hour week.

Since the strike negotiations between the railway unions and the government have led to an agreement whereby the railway workmen will participate to a certain extent in the control of the railways. An Advisory Committee, mentioned above, has been formed of which 12 members are general managers and four representatives of railways unions. In addition to this a Central Board has been established consisting of five railway managers and five representatives of the railway unions to discuss disputed matters concerning wages and conditions of service. If this board fails to agree on a question under discussion it is to submit the question to a National Wages Board consisting of four railway managers, four railway workers and four users of the railways, with an independent chairman to be appointed by the government. It has been agreed by the unions that no strike shall take place on account of a dispute until one month after the question in dispute has been referred to the National Wages Board.

During the war the railways suffered to a considerable extent by the loss of men, individual roads losing anywhere from 20 to 25 per cent of their staff. This interfered to a large extent with the work of the railways but with demobilization the railways have now a full complement of men.

Traffic Congestion

England has suffered, particularly during the war, by a severe congestion of traffic all of which resolves back to the war. About 600 locomotives, 30,000 freight cars and 1,600 passenger cars were sent to France during the war. In addition to this, because of the depleted forces, England has been unable properly to maintain the remaining equipment. Furthermore, due to the fact that railway freight rates were not increased, shipments which before the war were carried by coastal steamer service, were thrust on the railways because of the increase of freight charges by water. Another factor has also had a bearing on the situation. Due to the uncertainty of the market and the close margins upon which the merchants in Great Britain are working, consignments have been made in very small quantities and this has greatly reduced the car load.

The result of all this is that England is suffering from a lack of freight cars and until the old cars have been repaired and new cars built there is little prospect of much relief. It seems impossible, due to the very small freight cars used (they average from 10 to 12-tons capacity) to get the shippers to load the cars more nearly to their capacity. English railways have always made a feature of quick delivery in small quantities and it has been found practically impossible to force the shippers to fully load even these small cars to their full capacity.

The building of new cars has, of course, been greatly reduced. Most of this work was done in the railway companies shops. The experience of the Great Western Railway may be taken as typical. During the four years before the war that road built 10,000 freight cars, but during the five war years it was only able to build 1,500, and furthermore it was not able to keep up with the repairing of its old equipment.

The railway companies have hesitated to go into the open market for new cars on account of the high cost the outside builders are demanding. With the government in control of the railways and with the guaranteed return on the capital stock, and furthermore on account of the fact that there is still some feeling that the roads may ultimately be nationalized, the railways hesitate to make any excessive capital expenditures and it is only natural for them under these conditions to refrain from placing orders for cars at prices from 60 to 78 per cent higher than that which it would cost them to build the cars in their own shops.

As a solution to the car shortage problem, Sir Eric Geddes, Minister of Transport, has suggested recently that the government munition plants be put to work building freight cars; it is claimed that the Woolwich Arsenal, for instance, can turn out a car at £297 as against a price of £225 in railway shops and from £360 to £395 in car manufacturers' plants. All of these prices compare with the pre-war cost of £90 at railway shops.

The repairing and building of freight cars in both railway, government and industrial shops has been made more difficult and expensive on account of the eight-hour day, the new men that have had to be inducted into the service, and the lowering of the morale of the workmen which has been felt all over the world since the war. Added to this is the foundry molders' strike which has had its effect on all industries in Great Britain.

The effect of the manner in which the railways are taking over the coastal traffic is illustrated in the handling of coal from Wales. Before the war 61 per cent of the anthracite coal in Wales went to the seaboard with an average haul of 23 miles. Now this same quantity of anthracite is carried inland by rail with an average haul of 200 miles. The freight traffic through the Severn tunnel alone has increased 31 per cent. It is anticipated that the freight rates will be increased by January 15 to such an extent that the merchants will find it economical to use coastal shipping, and thus reduce the demands on the railways.

As an example of difficulty in increasing car loading the traffic on one railway may be mentioned which during one

month carried 2 per cent less tonnage but had an increase of 25 per cent in the number of consignments.

Deficit in Net Income

The latest statement published by the Ministry of Transport shows that there is an anticipated deficit of $225,000,000 expected for the year ending March 31, 1920. This has been caused by the greatly increased cost of labor and materials and the fact that freight rates have not been increased.

The English railroads feel particularly the increased cost of labor and materials, because before the war both these commodities were so extremely cheap. It has not been so necessary in the past to equip railway shops with labor saving machinery, because of the low cost of labor, as it has been in the United States. Furthermore all road construction and locomotive and passenger car building has involved more labor than that required for the same items in the United States.

Railwaymen now thoroughly appreciate the fact that more economical methods must be followed, and there is no department of the railways in which greater results can be obtained than in the mechanical department. As in the case of the freight cars, however, it is a question of how far the British railways will care to go in improving and modernizing their methods, which necessarily will involve heavy capital expenditures, because of the as yet undecided national policy to be followed in connection with the roads. The fact remains, however, that regardless of whether the roads are ultimately nationalized or whether they are returned to their private owners, vast improvements will have to be made if it is desired to decrease the present cost of operation.

Before the war the freight rates in England were high and any additional increase in these rates is not looked upon with favor by the shipping public. An increase, however, is necessary to put the roads on a paying basis, although there still remain great opportunities for reducing the cost of the operation.

Electrification

Electrification has received considerable thought in England for some time, but because of the war, developments in this respect have been curtailed. The experience of a number of English roads such as the Lancashire & Yorkshire, the London, Brighton & South Coast and the London & South Western in the electrification of their suburban lines has shown such splendid results that other roads are now seeking to follow their footsteps.

During the past year the South Eastern & Chatham, the Great Eastern and the North Eastern have been giving this subject serious consideration.

The North Eastern has already decided to electrify 80 miles of its own line. The South Eastern & Chatham have plans well developed for the electrification of its suburban territory, with ultimate plans for electrified lines through to the Channel. The Great Eastern is finding the Liverpool Street terminus in London inadequate to handle its suburban traffic and is making a careful investigation as to the cost of electrifying its suburban lines. What eventually will be done remains to be seen, as it again depends upon the manner in which finances can be arranged.

Possibilities for American Railway Supply Manufacturers

American railway supply manufacturers seeking a market for their products in England should look upon the situation as one demanding an improvement in the efficiency of railway operation. The cost of labor and material has risen to such an extent that the railways, if they are to maintain efficient service without the application of high rates must improve their operating methods. England has never had an Interstate Commerce Commission to drive down its rates and force the railways to economize, nor aggressive labor unions to demand labor saving and safety appliances, as have the railroads in the United States. Freight trains are operated with the chain coupling and without air brakes, and deficits are made up by an increase in rates. Lack of statistics has made it almost impossible properly to diagnose the railway problem, but it is anticipated that under the Ministry of Transport these statistics will be forthcoming; they should give strong indications as to where savings can be made and with the rapid growth in the strength of the railwaymens' unions, undoubtedly greater demands will be made for safety in operation.

Labor was so cheap in England before the war and is so high now that steps must be taken for more economical and efficient operation. Perhaps the greatest possibility for American railway supply manufacturers is that in the railway shops of Great Britain. Modern machinery, labor saving devices and more efficient operation is greatly needed. Mechanical department officers have acknowledged that with the greatly increased cost of labor, the eight-hour day and the increased cost of materials, drastic steps must be taken in order to economically operate their works. The question is, however, as to just how and when such improvements will be made, due principally to the fact that the railways now being under the control of the government and having a guaranteed return do not have the incentive to initiate heavy capital expenditures for the improvement of methods and for the reduction in the cost of operation.

From the Albany Knickerbocker Press

Help Yourselves!

General News Department

The American Association of Engineers announces that it will conduct its second annual conference of professional engineers in railroad service in Chicago, on March 15, 1920.

Fire did damage to the amount of $25,000 on the building containing the yardmaster's and local freight agent's offices of the New York Central at Weehawken, N. J., on December 21.

Arrests for smuggling liquor reported from London, Ont., December 21, involved 11 colored cooks, waiters and porters on a Grand Trunk express train, westbound. Officers boarding the train captured 33 bottles of whiskey and other liquors.

Immediate foreclosure against the Chicago, Peoria & St. Louis, now in receivership, is demanded by holders of the general and refunding mortgage bonds. The demand is made by a committee representing bond holders, in a letter to the Bankers' Trust Company, Chicago, trustee under the mortgage.

Extension of Annual Passes

Supplement 59 to Circular 20 of the Northwestern regional director extends all railroad, Pullman and steamship annual or time passes expiring December 31, 1919, to February 29, 1920.

An order has been issued notifying roads to proceed to issue, in the usual manner, passes for use after February 29. General managers are authorized to use their clerical forces for this purpose. The forms of passes should be approved by officers of the corporation.

"Merry Christmas!"

The Alabama, Tennessee & Northern is not a large road—186 miles, 21 locomotives, and 304 cars—but the corporation made itself prominent on Christmas Day by sending gifts of money to numerous officers and employees. One of the beneficiaries of this manifestation of the Christmas spirit has shown us a letter from John T. Cochrane, president and general manager, which says, in part:

"As a remembrance and in appreciation of your services and loyalty to our corporation, I take pleasure in handing you herewith a Christmas check.

"We are sending these checks to heads of departments, agents and office employees working on monthly pay and whose hours and conditions of service differ from others.

"Please accept this with the best wishes of our corporation, its directors and officers for a HAPPY CHRISTMAS, and my personal wish that your relations with the other officers of the corporation and myself will continue to be as pleasant and mutually satisfactory as I feel they are today."

Mr. Cochrane's act is so unusual that it has been called unique. Whether it is proper really to call it so we are unable to say, for it is about half a century since the last incident of the kind occurred, so far as memory serves.

A Surplus of Coal

Between 10,000 and 12,000 carloads of coal are standing on sidings and in yards in the Central Western region and unless assistance comes from some unexpected quarter the railroads probably will have to burn the coal themselves. The accumulation, about 600,000 tons, is an aftermath of the recent coal strike. Pursuant to the appeals of consumers suffering from the shortage, the Fuel Administration sent a great quantity of coal into this region from the Pennsylvania and Virginia fields. The shipments reached their destination at about the time a settlement of the strike appeared likely and as a result the coal, which was to retail for something more than $9 a ton, was left in the hands of the railroads. The total retail value is about $5,500,000.

Railroad Labor Leaders Object to Return of Roads and Anti-Strike Legislation

Officers of the 14 principal railroad labor organizations, including the four train service brotherhoods, at a conference with Samuel Gompers of the American Federation of Labor at Washington on December 29, adopted a declaration of principles expressing their dissatisfaction with the President's action in relinquishing control of the railroads as of March 1 and also their opposition to the anti-strike provisions of the Cummins bill, but saying nothing regarding the wage demands which most of them have pending before the Railroad Administration but which have been held in abeyance to give the government an opportunity to try to reduce the cost of living. It has been assumed that an effort would be made to press the wage demands before the railroads are returned, but the labor leaders recently have been expressing greater concern over the proposed anti-strike law, which would take away much of their power to force wage increases by threatening to strike. The representatives of the shop employees have had one conference with Director General Hines on their demands and are expected to resume the discussion at an early date. The declaration adopted at the conference with Mr. Gompers says:

"That is is the sense of the conference that the control of the railroads should be exercised by the government of the United States for a period of not less than two years, that a proper test may be made as to government control.

"That such test has not been given a fair opportunity during the war times or since.

"This conference is opposed to legislation making strikes of workers unlawful. It is the sense of this conference that penalty clauses in pending legislation on railroads against workers ceasing their employment should be eliminated.

"That the conference favors the enactment of beneficial features of the bills which tend to establish better relations between employees and carriers.

"That the beneficial clauses should be extended to the sleeping car and Pullman Company employees."

During the meeting Mr. Gompers was called out for a long conference with Daniel Willard, president of the Baltimore & Ohio.

Canadian Board of Adjustment

The Canadian Railway Board of Adjustment No. 1 recently issued decisions in two cases between the Toronto, Hamilton & Buffalo and the Brotherhood of Railroad Trainmen and between the railway company and the Order of Railway Conductors and the Brotherhood of Railroad Trainmen. The first decision was given in favor of the company and settled a controversy arising from the fact that a number of yard engines have been operated on the lines of this road by crews consisting of a foreman and one helper. The employees contended that this violated safe practice and that a safety rule should be incorporated in the trainmen's schedule stating that yard crews shall consist of not less than a foreman and two helpers. The company contended that the basis of the present assignment affords both safe and efficient operation and this stand was upheld by the Board. The second case involved a controversy over the application of Article 4 of Supplement 16 to General Order 27 of the United States Railroad Administration. The employees contended that regular passenger trainmen could not be used in freight service to make up monthly guarantees, whereas the

company contended that regularly assigned passenger men could be used in any class of service in order to make up their guarantees. The Board sustained the contention of the employees and decided that regularly assigned passenger men may not be used in freight service to make up monthly passenger guarantees.

Railway Business Association Dinner

The Railway Business Association, which for the last two years has held its annual meeting at Chicago, will resume this year its former practice of convening in New York. The meeting will be held at the Waldorf-Astoria Hotel on March 31—business session 11 a. m., luncheon 12:30 p. m., reports of convention committees and election of officers 1:30 p. m., dinner 7 p. m. The speaking program is to be announced later.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

Air Brake Association.—F. M. Nellis, 165 Broadway, New York City. Next convention, May 5-7, 1920, Chicago.

American Association of Demurrage Officers.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

American Association of Dining Car Superintendents.—S. W. Derr, C. R. R. of N. J., Philadelphia, Pa.

American Association of Freight Agents.—R. O. Wells, Illinois Central, Chicago. Next annual meeting, June, 1920.

American Association of General Baggage Agents.—E. R. Reynolds, C. G. W. R. R., Chicago.

American Association of Passenger Traffic Officers.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—J. Rothschild, Union Station, St. Louis, Mo.

American Electric Railway Association.—E. B. Burritt, 8 W. 40th St., New York.

American Electric Railway Manufacturers' Association.—C. F. J. Dell, 50 E. 42nd St., New York.

American Railroad Master Tinners', Coppersmiths' and Pipe Fitters' Association.—Otto E. Schlinck, 185 W. 5th St., Peru, Ind.

American Railroad Association.—J. E. Fairbanks, 75 Church St., New York:

Section I, Operating (including former activities of Association of Railway Telegraph Superintendents). W. J. Frippe (chairman), N. Y. C. R. R., New York, N. Y.

Telegraph and Telephone Division—M. H. Clapp, U. S. R. R. A., Washington D. C.

Section II, Engineering—E. H. Fritch, 431 South Dearborn St., Chicago.

Signal Division.—H. S. Balliet, 75 Church St., New York.

Section III, Mechanical (including former activities of Master Car Builders' and Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago. Next convention, June 9-16, 1920, Atlantic City, N. J.

Section IV, Traffic (including former activities of Freight Claim Association).—Robert C. Wright, (chairman), Assistant Director, Division of Traffic, U. S. R. R. A., Washington, D. C.

Section V, Transportation (including former activities of Association of Transportation and Car Accounting Officials).—E. J. Fearson (chairman), Federal Manager, N. Y., N. H. & H. R. R., New Haven, Conn.

Section VI, Purchases and Stores (including former activities of Railway Storekeepers' Association). J. P. Murphy, N. Y. C. R. R., Collinwood, Ohio.

Section VII, Freight Claims (including former activities of the Freight Claim Association).—H. C. Pribble (chairman), A. T. & St. Fe, Topeka, Kan.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention October 19-21, 1920, Atlanta, Ga.

American Railway Engineering Association.—(Works in co-operation with the American Railroad Association, Section II.) E. H. Fritch, 431 South Dearborn St., Chicago. Next convention, March 16-18, 1920, Chicago.

American Railway Master Mechanics' Association.—(See American Railroad Association, Section III, Mechanical.)

American Railway Perishable Freight Association.—E. F. McPike, 135 E. 11th Place, Chicago. Regular meetings, 2d Wednesday in March and September.

American Railway Tool Foremen's Association.—R. D. Fletcher, 1145 East Marquette Road, Chicago.

American Society for Testing Materials.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa.

American Society of Civil Engineers.—Charles W. Hunt, Engineering Societies Building, 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 33 W. 39th St., New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Train Despatchers' Association.—D. L. Darling, Northern Pacific Ry., Spokane, Wash.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next annual meeting, February 10-12, 1920, Hotel Sherman, Chicago.

Association of Railway Claim Agents.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J. Next meeting, May, 1920, Atlantic City, N. J.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago.

Association of Railway Executives.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

Association of Railway Telegraph Superintendents.—(See American Railway Association, Section I, Operating.)

Association of Transportation and Car Accounting Officers.—(See American Railroad Association, Section V, Transportation.)

Bridge and Building Supply Men's Association.—M. J. Trees, Chicago Bridge & Iron Works, Chicago.

Canadian Railway Club.—W. A. Booth, 131 Charron St., Montreal, Que.

Car Foremen's Association of Chicago.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

Car Foremen's Association of St. Louis.—Thomas B. Koeneke, Federal Reserve Bank Bldg., St. Louis, Mo.

Central Railway Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November, and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

Chief Interchange Car Inspectors' and Car Foremen's Association.—J. C. Keene, General Car Inspector, Wabash R. R., Decatur, Ill.

Chief Interchange Car Inspectors' and Car Foremen's Supply Men's Association.—D. B. Wright, Lehon Company, 45th and Oakley Sts., Chicago.

Eastern Railroad Association.—D. G. Stuart, Washington, D. C.

Freight Claim Association (See American Railroad Association, Section IV, Traffic).

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3rd Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, B. & O., Lima, Ohio.

International Railway Fuel Association.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May, 1920, Hotel Sherman, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn.

Maintenance of Way Master Painters' Association.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Building, Kansas City, Mo. Next convention, October 5-7, 1920, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 25-28, Curtis Hotel, Minneapolis, Minn.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass.

Master Car Builders' Association.—(See American Railroad Association, Section III, Mechanical.)

National Association of Railway and Utilities Commissioners.—James B. Walker, 49 Lafayette St., New York. Next convention, November, 1920, Washington, D. C.

National Foreign Trade Council.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 12-15, 1920, San Francisco.

National Railway Appliances Association.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in montb, excepting months of June, July, August and September.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meeting 3d Friday. in month, except June, July and August, 29 W. 39th St., New York.

Niagara Frontier Car Men's Association.—George A. J. Hochgrebe, 623 Brisbane Bldg., Buffalo, N. Y. Regular meetings, 3d Tuesday in each month, Tenjost Hall, Buffalo, N. Y.

Pacific Railway Club.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting 2d Thursday in month, alternately in San Francisco and Oakland.

Railway Accounting Officers' Association.—E. R. Woodson, 1116 Woodward Bldg., Washington, D. C. Next convention, May 12, Atlantic City, N. J.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York.

Railway Club of Pittsburgh.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4tb Thursday in month except June, July and August, Americus Club House, Pittsburgh, Pa.

Railway Development Association.—D. C. Welty, Missouri Pacific R. R., Little Rock, Ark.

Railway Electric Supply Manufacturers' Association.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

Railway Equipment Manufacturers' Association.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va.

Railway Fire Protection Association.—R. R. Hackett.

Railway Real Estate Association.—R. H. Morrison, C. & O., Richmond, Va.

Railway Signal Association.—(See American Railroad Association, Section II, Signal Division.)

Railway Storekeepers' Association.—(See American Railroad Association, Section VI, Purchases and Stores.)

Railway Supply Manufacturers' Association.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Next convention, June 9-16, Atlantic City, N. J.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

Roadmasters' and Maintenance of Way Association.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

Signal Appliance Association.—F. W. Edmunds, West Nyack, Rockland County, New York.

Society of Railway Financial Officers.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

Southern and Southwestern Railway Club.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

Southern Association of Car Service Officers.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

Supply Association of American Railway Tool Foremen's Association.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y.

Train Despatchers' Association of America.—J. P. Finan, A. T. & S. F. Ry., Needles, Cal.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. R. R., Cleveland, O.

Western Association of Short Line Railroads.—Clarence M. Oddie, Mills Bldg., San Francisco.

Western Railway Club.—J. M. Byrne, 916 W. 78th St., Chicago. Regular meetings, 3d Monday in month, except June, July and August.

Western Society of Engineers.—Edgar S. Nethercut, 1735 Monadnock Block, Chicago. Regular meetings, 1st Monday in month, except July and August.

Traffic News

The Southwestern regional director, by Supplement 3 to Order 189, calls attention to the fact that there are still many instances where freight is accepted and loaded in violation of embargoes and that cars are allowed to accumulate before placing embargoes. The first practice inevitably results in cars being delayed and the second results in many cars being held motionless under load for considerable periods. Embargoes must be placed early enough to admit of cars already in transit being moved to destination and unloaded.

According to a report on overseas traffic for the week ended December 17, 1919, made to the director general, 6,895 cars of commercial export freight were received at North Atlantic ports during this period, as compared with 1,352 cars for the same week of 1918. This shows an increase of 5,507 cars or 407 per cent for December 17, 1919, as against the corresponding period last year. Deliveries to ship covering the same period increased 5,529 cars or 470 per cent. At South Atlantic and Gulf ports as of December 14 there were 13,288 cars of export freight on hand, as against 13,228 cars on December 7, 1919, an increase of 60 cars. On December 17, 1919, there were 11,907,146 bushels of grain stored in elevators at North Atlantic ports. There were received during the week 3,043,241 bushels, while 2,919,946 bushels were cleared. The total amount of grain in elevators as of December 17 represents 60.5 per cent of the total elevator capacity of these ports. At South Atlantic and Gulf ports on December 17, 1919, there were 6,043,758 bushels of grain stored in elevators, representing 82 per cent of the total elevator capacity.

Coal Production

Bituminous coal production during the week ended December 20 was 86.4 per cent of normal, according to the Geological Survey bulletin, as compared with 48 per cent the week before. The total output, including lignite and coal coked, is estimated at 10,431,000 net tons. The average during the four weeks immediately preceding the strike was 12,089,000 tons. Unless later returns cause a downward revision of the estimates, the curve of 1919 production has again crossed that of 1918.

Railway Passes in Canada

The Board of Railway Commissioners for Canada has issued in General Order 274 an answer to the application of the Canadian Railway War Board, on behalf of the railway companies for an order regulating the issuance of free transportation under Section 345 of the Railway Act. The order permits the issuance of free tickets for the following:

Department of Immigration of Dominion of Canada: For such representatives of the Department as may be required by the Minister or Deputy Minister.

Departments of Immigration and Customs of the United States: For such representatives of the Departments as may be required by the Commissioner or Deputy Commissioner of Immigration or Collector or Deputy Collector of Customs in charge of the District.

Fire rangers within their respective districts, employed or authorized by Provincial governments.

Families of former and deceased employees of railways. Former employees of transportation companies and their families.

Deputy Ministers of Departments of the Federal Government, and those having the rank of Deputy Ministers.

With the order there is a memorandum outlining briefly the reasons for the Board's contention that the whole purport of Section 345 of the Railway Act was to give the railway companies, within certain limits, the right to carry traffic at free or reduced rates and to such classes of persons and in some cases individuals as the companies may decide upon, subject in certain cases to the approval and the permission of the Board of Railway Commissioners.

Intensified Efficiency

A motor manufacturer tells how L. B. Hawkins, of Moneta, Cal., who operates a fleet of eight Mack motor trucks, did a notable "stunt" recently when he responded to an urgent call from a seed merchant near Los Angeles, who wanted to ship 15 tons of seed in a particular rush to a town 225 miles away, and no freight car was available. Hawkins, with two trucks, one carrying ten tons and the other five, started out for Calexico the next morning. At night a stop was made and the trip resumed at dawn. Calexico was reached in thirty hours. A return load of 15 tons of dried milk was secured at El Centro, 10 miles from Calexico, and taken to San Diego, 100 miles. There a 15-ton lot of fish was taken and delivered in Los Angeles, 130 miles farther. Reaching home at Moneta at midnight, one of the trucks, with a trailer, delivered 17½ tons of tomatoes by next morning to a cannery 25 miles away. At a town nearby, a lot of well casing, 7½ tons, was taken on and delivered that night at Elsinore, 100 miles away over the mountains.—Moral: solicit return loads in a persistent manner.

City Traffic Bureaus

Thomas Purse, secretary of the Board of Trade of Savannah, Ga., following an inquiry made by him concerning the means of support of traffic bureaus in various cities, publishes a list of 23 cities, in which he summarizes the information which he has obtained. Savannah formerly enjoyed the benefits of a bureau sustained wholly by the city treasury, but this has now been abolished. Mr. Purse finds only 3 cities in which a bureau of this kind has municipal support: Charleston, S. C.; Columbia, S. C.; and Jacksonville, Fla.

Following are the names of the cities which replied to the inquiry, the sum named against some of the cities being the estimated cost of maintenance of the bureau for one year. The bureaus in most or all of these cities are supported by the Chamber of Commerce or a body performing the functions of such a chamber.

Atlanta, Ga.	$15,000	Galveston, Tex	14,000
Baltimore, Md.	.....	Jacksonville, Fla. (city appropriates $1,200; balance contributed by public subscription).	
Birmingham, Ala.	25,000	Memphis, Tenn.	15,000
Boston, Mass.	25,000	Nashville, Tenn.	15,000
Charleston, S. C., $8,000 (contribution from the city, $4,000).		New Orleans, La.	29,500
Chattanooga, Tenn.	.....	Philadelphia, Pa.	15,000
Chicago, Ill.	25,000	Providence, R. I.	.....
Cincinnati, Ohio	15,000	Richmond, Va.	.....
Cleveland, Ohio	15,000	Savannah, Ga.	.....
Columbia, S. C. (city appropriates $3,000; chamber of commerce provides the remainder; total not given).		Tampa, Fla.	.....
Detroit, Mich.	15,000	Trenton, N. J.	.....
		Wilmington, N. C.	.....

Smith Fifteenth Section Amendment Expires

The railroads are no longer required to obtain the approval of the Interstate Commerce Commission before filing a tariff containing an increased rate, but they may file them with the usual 30 days' notice, after which they become effective unless suspended by the commission. The amendment to the fifteenth section of the commerce act, adopted by Congress in 1917 at the suggestion of Senator Hoke Smith of Georgia, for the purpose of making it more difficult for the carriers to increase rates, expires by its terms on January 1. Senator Smith recently introduced a similar provision without the time limit, as an amendment to the Cummins bill, which was adopted and therefore becomes one of the points to be considered by the conferees, as the Esch bill contains no such provision. The effect of the amendment has been to reduce greatly the number of suspension proceedings because shippers have been given an opportunity to protest against a tariff before it is filed. In unimportant cases the commission issues a pro forma fifteenth section approval order.

The Ohio State Industrial Traffic League has instructed its officers to convey to Chairman Esch and Chairman Cummins the League's wish that this provision be perpetuated.

Commission and Court News

Interstate Commerce Commission

Apparently the Interstate Commerce Commission is still proceeding on the assumption that the railroads are to be returned at the end of the year, for it has been issuing this week special permission notices for the filing of freight rates on one day's notice but on condition that the approval is void if the tariff is not filed with the commission by December 31.

Report in Memphis-Southwestern Case

The Interstate Commerce Commission has issued its report on its Memphis-Southwestern investigation, in which a maximum distance scale of class rates is prescribed for distances not in excess of 350 miles between points in Arkansas, Oklahoma and southern Missouri. Existing class rates between Memphis, Tenn., and all points on class A railroads in Arkansas are found unreasonable and unduly prejudicial to Memphis to the extent that they exceed by more than reasonable bridge tolls the corresponding class rates contemporaneously applicable for like distances to intrastate traffic in Arkansas. Reasonable bridge tolls are prescribed. Existing class rates from Memphis to points in southern Missouri as defined in the report are declared unreasonable and unduly prejudicial to Memphis to the extent that they exceed by more than reasonable bridge tolls the corresponding class rates contemporaneously in effect from St. Louis, Mo., to the same points for like distances.

Class rates from Memphis to points in Arkansas are held unduly prejudicial to Memphis to the extent that they exceed by more than reasonable bridge tolls the corresponding rates for like distances from St. Louis. Rates and practices of the Missouri Pacific with respect to the concentration of Arkansas cotton at Memphis were not shown to be unduly prejudicial or otherwise unlawful, but the commission holds that the rates for back hauls on cotton to compress points should be published on a uniform basis.

Other points in the decision are:

Practice of the Missouri Pacific and the Cotton Belt with respect to charges for the delivery of cotton at Memphis and at East St. Louis, Ill., subjects Memphis to undue disadvantage.

Class rates from St. Louis to points in southern Arkansas are unreasonable and unduly prejudicial to those points and unduly preferential to Pine Bluff and Little Rock.

Class rates from Natchez, Miss., to certain points on class A railroads in Arkansas are unreasonable and unduly prejudicial to Natchez and unduly preferential of Memphis and Little Rock.

Class rates from Monroe and Shreveport, La., to points on class A railroads in southern Arkansas are unreasonable, unduly prejudicial to Monroe and Shreveport and unduly preferential of competing points in Arkansas to the extent that they exceed for like distances the corresponding class rates applicable to intrastate traffic in Arkansas.

Allegation that class rates from groups of origin in western trunk line territory to Fort Smith, Ark., are unduly prejudicial to that point and unduly preferential of points in eastern Oklahoma, not sustained.

Class and commodity rates from certain territories in the southeast to points in Arkansas are unduly prejudicial to Arkansas and unduly preferential of certain points in Oklahoma.

Reasonable maximum class rates approved between Memphis, Tenn., and Kansas City, Mo.

Fourth section applications by which the carriers parties thereto seek authority to continue lower class and commodity rates to and from competitive points along the Mississisippi river, St. Louis and south, than the rates to and from intermediate points, denied. Other fourth section applications considered and appropriate findings made.

Reasonable class rates established from New Orleans, La., to points in Arkansas, Oklahoma and Missouri river cities.

Class and commodity rates from New Orleans to interior points in eastern Kansas are, under present conditions, unduly prejudicial to those points and unduly preferential of Kansas City. A proper alignment suggested.

Differentials over Kansas City approved for constructing class rates to Omaha from New Orleans. Differentials over Omaha also approved for constructing class rates from New Orleans to Sioux City.

Proposed increased class rates from St. Louis to points in Oklahoma not justified.

State Commissions

The Railroad Commission of Louisiana has ordered the Louisiana Western to place its line between Salt Mine Junction, La., and Eunice in safe condition for the operation of trains by the replacement of ties, rails and other material within 90 days. A petition was filed with the Commission in September by citizens of Vermilion declaring this portion of the road to be unsafe. The Commission found that the rails are light, worn and badly out of alinement in many places, that the ties have rotted in such numbers as to be a constant cause of derailments and that there is little ballast.

The Board of Railway Commissions for Canada has requested the railway companies subject to its jurisdiction to signify whether they are agreeable to the issuance of a general order extending the application of the commission's General Order 18, relating to the smoke nuisance, to stationary plants and requiring that such stationary plants be equipped so as to prevent unnecessary emission of smoke. This action has been taken as a result of many complaints received concerning the nuisance arising in cities by reason of the smoke emitted from stationary plants of railways.

Position light signals, such as are used extensively on the Pennsylvania Railroad, if substituted for colored light signals, would largely contribute to the prevention of rear collisions. This is the opinion expressed in a statement presented to the Public Service Commission of the State of Pennsylvania by John P. Dohoney, chief of the commission's Bureau of Accidents. Mr. Dohoney gives this view as the judgment of men familiar with signals. He takes the position that "until the practicability of a system of automatic train control can be established, the most advanced method of signaling ought to be provided."

Court News

Railroad's Damages for Right of Way Taken for Highway

The Missouri Supreme Court holds that while, in that State, a railroad over whose right of way a public road has been condemned is entitled to receive compensation for all damages that may be reasonably anticipated and ascertained, it is not entitled to the expense of installing and the cost of maintaining an electric bell at the crossing, such bell being necessary as a safeguard against accidents.—Franklin County v. Missouri Pacific (Mo.) 210 S. W. 874.

Right of Way—Abandonment

The Supreme Court of the United States has settled the proposition that a railroad company to which a right of way has been granted by the general government cannot alienate any part of it so as to interfere with the full exercise of the franchise granted. Grand Trunk v. Richardson, 91 U. S. 454. Applying this rule the Kansas Supreme Court holds that where such a railroad has been granted by act of Congress a right of way 400 feet wide, it cannot be divested of its right thereto by abandonment or by suffering an individual to occupy a part of it for the period of the local statute of limitations.—Union Pacific v. Thedan (Kan.) 178 Pac. 441.

Foreign Railway News

Institute of Transport

London.

It is announced that Sir Eric Geddes, Minister of Transport, has decided to become first president of the newly recognized Institute of Transport.

Proposed Electrification of German Railways

London.

The Times Trade Supplement states that electrification of the German railways is being considered by the government, with a view to a reduction of expenditure in their exploitation.

Dutch Railways Electrification

London.

An abstract from Modern Transport states that it is intended to electrify the sections of the Dutch railway system running between Rotterdam, the Hague, Amsterdam and Amerfoort.

Italian Passenger Fares Increased

Press despatches report that Italian passenger fares are to be increased 80 per cent for first class, 60 per cent for second, and 50 per cent for third, in order to meet the increased cost of coal and labor

Electrification of Brazilian Railways

London.

An abstract from the Times Trade Supplement states that the cost of the electrification of the trunk line from Barra to Pirahy (Brazil) has been placed at £1,166,250, and it is stated that the work will not be completed until 1922.

Loss on Russian Railways

London.

An abstract from Russian Outlook states that half the locomotives in Soviet Russia need repair. The railway expenditure increased ten times to 7,300,000,000 roubles in 1918. The profit on the railways of 470,000,000 roubles under Czardom has been converted under Bolshevik rule into a loss of 5,500,000,000 roubles.

Electrification of the Narvik Railway

An article abstracted by the Technical Review from Teknisk Ukeblad states that the line which carries iron ore from Sweden to the ice-free harbor in Norway for transhipment to England, has been electrically worked for some years on part of the Swedish portion, namely, from the ore deposits to Riksgraensen on the Norwegian border. Electrification of the line from Lulea to Narvik is now in progress and it is expected that this will be completed early in 1922. A further portion of the Swedish line as far as the Gallivare station will be ready in a few weeks, but further extensions requiring about £950,000 are awaiting the sanction of the Swedish Parliament. The Norwegian portion is expected to be fully electrified by the end of 1921.

England's Rolling Stock Contracts

London.

The Leeds Forge Company, Limited, has received contracts for 12 all-steel carriages for the Union of South Africa railways, including six-day and sleeping, and six suburban vehicles, all fitted with four-wheeled pressed-steel bogies; 148 bogie 22-ton covered goods wagons for the conveyance of soda traffic over the Magadi sections of the Uganda railways; and 100 pressed-steel underframes and bogies for the refrigerator wagons for the South African railways, the bodies for which are being built in South Africa. These bogies are of the South African Railways' standard pattern, as the vehicles will be used on fast-timed passenger services. Messrs. Cravens Railway Carriage & Wagon Company, Limited, of Darnall, Sheffield, have received an order for 250 high-sided goods wagons, of 10 tons' capacity, for the Great Northern Railway, and they have also an order for 81 all-steel ballast wagons for the South Indian Railway.

North British Railway Changes

London.

W. P. Reid, locomotive superintendent of the North British Railway, retired from active service at the end of December. Mr. Reid started his railway career in 1876 under the direction of Dugald Drummond, the then locomotive superintendent of the North British railway, at the Cowlairs works. In 1883 he was placed in charge of the locomotive depot at Balloch, in 1889 he was removed to Dumfermline, in 1891 to Dundee, and in 1900 to the St. Margaret's depot, Edinburgh, which is the second largest locomotive depot on the North British railway system. It was in 1904 that he was made locomotive superintendent of the North British railway.

Owing to the retirement of W. P. Reid, the position of locomotive superintendent will be divided, and Walter Chalmers, the present chief draughtsman at the Cowlairs Works, Glasgow, will become chief mechanical engineer with charge of all workshops and dock machinery, while the position of locomotive running superintendent will be taken by John P. Grassick, at present district locomotive superintendent at the Eastfield Depot. The headquarters will be at Cowlairs, Glasgow.

Shortage of Freight Cars in Great Britain

The dearth of railway wagons, which is leading to general complaints by traders, has been accentuated to some extent by the increased consignments of merchandise for the Christmas trade, says an article in a recent issue of the Times (London).

The scarcity of wagons is real, the Times says, and is likely to continue. To a very large extent this is attributed to the attitude of the government toward the railways. With the nationalization of the railways still not a very remote possibility, the railway companies are staying their hands, and, while they are making and ordering wagons, the bulk of their work in this direction is being devoted to repairs.

There is a standard clause in most of the Railway Companies' Acts that they are not to be called on to furnish wagons for certain traffic, and neither the Ministry of Transport nor the Railway Executive Committee have the power to force the companies to provide more wagons. The railway companies have a very full programme of work, but they are not likely to embark on any large capital outlay until they have a better idea of what the future has in store.

The situation is still further complicated by the fact that the readjustment of railway rates, which is inevitable, is expected to do much to relieve the present congestion. The railway rates now are so favorable that traders are not prepared to consider other methods of forwarding their goods, but when the necessary readjustment is made coastal shipping will resume its proper place in our transport service. In railway circles it is believed that when that readjustment takes place the number of wagons now available, with those under repair, will be more than ample.

So far as privately-owned wagons are concerned, and of these there are 700,000, traders are in no hurry to increase the number. For this, again, the blame is laid at the door of the government. On the second reading of the Transport Bill Sir Eric Geddes stated that, if the Bill passed, one of the first acts of the government would be to acquire the private wagons on fair terms, and private owners not unnaturally see no prospect of useful capital expenditures in the acquisition of further wagons. From the beginning of the year to September 30, 8,480 wagons were constructed for the railway companies, and orders have been placed, mainly with the companies' own shops, for a further 22,600.

There are three main directions in which relief is expected on the railways. The first is the readjustment of the railway rates, which will enable other forms of transport to compete on even more equal terms; the second is the more speedy unloading of wagons and a greater realization of the national need, which will lead to a reduction in the number of wagons used as warehouses; and the third is an acceleration of work by the railwaymen.

Equipment and Supplies

Locomotives

THE BELGIAN GOVERNMENT has divided equally an order for 150 Consolidation type locomotives between the American Locomotive Company and the Baldwin Locomotive Works; an additional 200 locomotives will probably be placed with English builders. These locomotives will be equipped with superheaters and will have bar frames. The total weight in working order will be 186,000 lb. and on the drivers 164,000 lb. They will have 24 in. by 28 in. cylinders and 60 in. driving wheels, and will be of standard gage. In an unconfirmed report in our issue of December, page 1218, it was stated that 660 locomotives were ordered from the above companies.

Freight Cars

THE UNION PACIFIC is asking for prices on 3,000 40-ton capacity refrigerator cars.

THE SINCLAIR REFINING COMPANY, Chicago, is inquiring for 40 tank cars of 10,000 gal. capacity.

THE MISSOURI, KANSAS & TEXAS has ordered 300 tank cars from the American Car & Foundry Company.

F. A. PEASE, Chicago, has ordered 50 8,050 gal. capacity tank cars from the Pennsylvania Tank Car Company.

JOHN R. WALSH, Savannah, Ga., has ordered 3, 8,050 gal. capacity tank cars from the Pennsylvania Tank Car Company.

THE GLEN NINA TANK LINE, Buffalo, N. Y., has ordered 50 8,050 gal. capacity tank cars from the Pennsylvania Tank Car Company.

THE FRANKLIN QUALITY REFINING COMPANY, Franklin, Pa., has ordered 10 8,050 gal. tank cars from the Pennsylvania Tank Car Company.

THE SLOSS-SHEFFIELD STEEL & IRON COMPANY, Birmingham, Ala., has ordered 25 coke cars of 50 tons capacity from the Pressed Steel Car Company.

THE CHESAPEAKE & OHIO is in the market for 1,000 gondola cars; this is in addition to the inquiry for 1,000 hopper car bodies reported in our issue of November 28.

THE BIGHEART PRODUCING & REFINING COMPANY, Tulsa, Okla., has ordered 100, 8,050 gal. and 100 10,050 gal. capacity tank cars from the Pennsylvania Tank Car Company.

THE KEYSTONE ENGINEERING COMPANY, New York, is inquiring for 30 all steel box cars of 30 tons capacity and 300 single sheathed box cars of 30 tons capacity for export to China.

THE ANN ARBOR, reported in the *Railway Age* of December 5, as inquiring for 100 to 200 U. S. R. A. standard single sheathed box cars, has arranged to accept this equipment from the Railroad Administration.

The Brotherhood of Dining Car Conductors held its first national convention in Chicago the third week in December. Over 50 delegates, including J. A. Hennessey, national president, and other grand lodge officers, were present. The brotherhood was founded in January, 1918. The convention took up the question of the revision of the constitution and by-laws and the election of officers. The brotherhood is not associated with the American Federation of Labor. Its object, according to C. A. Clark, chairman of the general grievance committee, is co-operation with the different managements in an endeavor to raise the standard of dining car service to a higher plane. The decisions of the conference were not made public.

Supply Trade News

The Ross Manufacturing Company, Cleveland, Ohio, has recently moved into its new plant at 3160 West 106th street.

C. A. Pinyerd, supervisor in the Chicago office of the **Safety Car Heating & Lighting Company,** New York City, has been appointed sales representative with the same headquarters.

Hugo L. Siegel, formerly general sales manager for the Ford Roofing Products Company, is now with the **Walter A. Zelnicker Supply Company,** St. Louis, Mo., as assistant to the president.

Hal. R. Stafford, who has been chief engineer of the **Franklin Railway Supply Company, Inc.,** since this company took over the Economy Devices Corporation, died at his home in Plainfield, N. J., on December 9.

William A. Benson, formerly associated with the Adams & Westlake Company, Chicago, has been appointed assistant manager of sales in the Chicago district for the **Hanna Locomotive Stoker Company,** Cincinnati, Ohio.

Manning, Maxwell & Moore, New York City, owners of the Shaw Crane Company, Muskegan, Mich., will build a plant in the latter city at a cost of $2,000,000 for the manufacture of machine tools and other equipment.

E. A. Woodworth, secretary of the Committee on Mechanical Standards of the United States Railroad Administration, has resigned to become special representative for the **Chicago Pneumatic Tool Company,** with office at Chicago.

The Paxton & Vierling Iron Works, Omaha, Neb., has acquired the business formerly conducted by the Hoeschen Manufacturing Company, of the same city, and will continue to manufacture the Hoeschen bells and track instruments.

The St. Louis Machine Tool Company is building an addition to its plant at St. Louis, Mo., which will add about 13,000 sq. ft. to the floor space and practically double the capacity for the manufacture of grinding, polishing and tapping machines.

Joseph E. Nelson & Sons, engineers, Chicago, have opened a branch office at Kansas City, Mo., in charge of **D. C. Dugger.** Mr. Dugger, who has been mechanical engineer at the Chicago office, will have his Kansas City headquarters in the Kansas City Life building.

A. B. Lacy, purchasing agent of the Virginian Railroad, has resigned to become vice-president of **M. T. Blassingham & Co., Inc.,** Norfolk, Va. This company handles pine, oak and fir lumber for railroads and contractors; and cross ties for steam, electric and industrial properties.

The Louisiana Steel Company has been chartered at Shreveport, La., with a capital of $10,000,000, to build a steel plant in connection with the development of 7,000 acres of iron ore in Cass, Marion and Upshur counties, La. The incorporators are L. T. Weatherstone, Beaumont, Tex.; J. Niblett, Hughes Springs, Tex., and Fox Winnie, Newton, Kans.

The Schaefer Equipment Company, Pittsburgh, Pa., manufacturers of railway materials, has recently completed arrangements with the International Equipment Company, Ltd., Montreal, Quebec, **E. G. Jackson,** president, to handle its manufactures and sales in Canada.

I. F. Baker, of the Westinghouse Electric International Company, who has been located in the New York office of that company for the past two years, is now on his way to Tokio, Japan, where he will act as a special representative of the Westinghouse International Company. Mr. Baker entered the graduate student course about 1908, later serving in various capacities in the resale and contract sections of

foreign department, which later became the Westinghouse the sales department. In 1913 he was transferred to the Electric International Company.

Owing to the rapidly increasing use of the American staybolt and the reduced body staybolts by the railroads and industrials of this country, **Benson & Co.**, with general offices at 50 Church street, New York City, has been organized to promote the sales and service of the American Flexible Bolt Company products. **R. W. Benson**, general sales manager, is president of the new company. Both companies will maintain engineering service organizations to study locomotive boiler staybolt problems and aid in their solution.

Frank O. Wells, president of the **Greenfield Tap & Die Corporation**, and one of the prominent figures in the screw thread industry in the United States, has sold his entire holdings to Frederick H. Payne, vice-president. Mr. Wells retires as president and member of the board of directors and Mr. Payne has been elected president in his place. F. G. Echols, vice-president and general manager, has been elected a director of the corporation to fill the vacancy caused by the resignation of Mr. Wells, but Mr. Wells will remain with the corporation in an advisory capacity.

Arthur W. Wheatley, who was elected president of **Armstrong Whitworth (of Canada), Ltd.**, in November of this year, is now in full control and direction of the Longuiuel works. The works have, since their inception, been engaged in the manufacture of tool steels, small tools, railway tires, etc., and with the cessation of hostilities, the policy and energies of the firm were directed toward the further development of their products, especially of railway material for which there is a heavy demand. It is proposed also, to develop the manufacture of the all steel wheels for rolling stock.

The Reading Iron Company, Reading, Pa., has acquired the plant of the E. &. C. Brooks Iron Company, Birdsboro, Pa. This property adds to the manufacturing equipment of the Reading Iron Company 16 double puddling furnaces, with a three-high double muck mill, a 24-inch three-high skelp mill with four heating furnaces, a nail factory of 75 nail machines, and the company's skelp capacity is increased by 2,800 tons per month, with a corresponding increase in the production of finished wrought iron pipe. Through the acquisition of the George B. Lessig Company plant at Pottstown, Pa., last October, the Reading Iron Company secured an additional muck bar capacity of 2,600 tons per month.

The Gustin-Bacon Manufacturing Company, Kansas City, Mo., has purchased all machinery and equipment formerly used by the Emery Pneumatic Lubricant Company, of St. Louis, Mo., and has also acquired the exclusive rights to the manufacture and sale of the Emery brake cylinder lubricant. E. A. Emery, the originator of the Emery brake cylinder lubricant formula, has become associated with the Gustin-Bacon Manufacturing Company and has direct charge over the manufacture of this product. Due to certain essential ingredients being required for government use during the war period, the manufacturers of Emery brake cylinder lubricant was discontinued; but since these ingredients are again obtainable, the Gustin-Bacon Company is now manufacturing the lubricant.

The American Steam Conveyor Corporation, Chicago, announces that the Atlas Machinery & Supply Company is now handling the sale of the American steam ash conveyor in its St. Louis territory. This company has offices at 1416 Syndicate Trust building, St. Louis, Mo., and is a new sales organization in that vicinity. It is headed by Wm. H. Patton, who recently returned to the United States after two years' service in the army. Associated with Mr. Patton is his brother, W. R. Patton, who for the past 20 years has traveled the central west, engaged in the sale of power plant equipment. During the past four years he has represented several large manufacturers as district manager. N. B. Stewart, who has been identified with the power plant machinery business at St. Louis for 25 years, has also associated himself with this company.

Railway Officers

Railroad Administration

Operating

W. T. Peyton, terminal manager of the Ft. Worth Belt, with office at Fort Worth, Tex., who has formerly reported to the federal manager, will hereafter report to J. A. Somerville, general manager of the Texas & Pacific.

G. E. Passage, traveling engineer of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been appointed trainmaster of the Illinois division at Savanna, Ill. **Andrew J. Dutton** has been appointed trainmaster of the Des Moines division at Des Moines, Iowa.

Traffic

A. D. Grant, traveling freight agent of the Union Pacific, with headquarters at Omaha, Neb., has been appointed general agent at Lincoln, Neb., succeeding **A. R. Hall**, who has resigned.

James G. Carlisle, assistant freight traffic manager of the Central of Georgia, has resigned to become connected with the sales department of the Bibb Manufacturing Company, cotton mills, at Macon, Ga.

Fred Zimmerman, traffic assistant to the terminal manager of the Northwestern region, with office at Chicago, has resumed his position as vice-president of the Chicago, Indianapolis & Louisville, with the same headquarters.

F. C. Reilly, general freight agent of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., has resigned to become vice-president of the W. L. Zelnicker Supply Company, and **S. S. Butler**, assistant general freight agent, has been appointed his successor. **Robert N. Nash** has succeeded Mr. Butler.

H. B. Tooker, general freight and passenger agent of the Bingham & Garfield and the Ray & Gila Valley, with office at Salt Lake City, Utah, has been appointed traffic manager of both companies with the same headquarters. Mr. Tooker has also been appointed traffic manager of the Nevada Northern, with headquarters at Salt Lake City. On January 1, 1920, he will become traffic manager for various mining companies under the general management of D. C. Jackling, Salt Lake City.

Purchasing

A. B. Lacy, purchasing agent of the Virginian, has resigned to become vice-president of M. T. Blassingham & Company, Inc., Norfolk, Va. **Tom Moore**, general storekeeper at Princeton, W. Va., has been appointed Mr. Lacy's successor and **D. C. King** succeeds Mr. Moore.

Corporate

Traffic

H. B. Tooker, general freight and passenger agent of the Bingham & Garfield and the Ray & Gila Valley, with headquarters at Salt Lake City, Utah, has been appointed traffic manager of those roads and the Nevada Northern, with headquarters at San Francisco.

C. T. Bradford, assistant traffic manager of the Deering Southwestern, the Illinois Northern, the Chicago, West Pullman & Southern and the Owasco River, industrial roads subsidiary to the International Harvester Company, Chicago, has been appointed traffic manager of the harvester company and president and general manager of the above named roads, succeeding **Frank B. Montgomery**, whose death was announced in the *Railway Age* of October 17.

EDITORIAL

Railway Age

Table of Contents will be found on Page 5 of the Advertising Section.

Transmission of Power for Electric Trains

The three-wire system of transmission and distribution of electric power for the operation of trains has been proposed by Alfred Raworth, electrical engineer of the South Eastern & Chatham, England, and an article on this subject is presented in this issue of the *Railway Age*. Mr. Raworth has spent a considerable amount of time in this country inspecting and investigating electrified sections of our railroads, and has applied the experience of American railroad men in developing the innovation which he proposes. The three-wire system has been used for lighting and power distribution ever since electric power was commercially practical, but as applied to the operation of a single electric locomotive or electric train it is something entirely new. The scheme proposed provides for two conductor rails and duplicate sets of the equipment on the locomotive or car. These are added complications, but they are offset by distinct advantages. Direct current power at 3,000 volts supplied from conductor rails can be used for multiple unit cars with this system and the voltage drop through the ground or grounded rail from train to sub-station is practically eliminated. English railways, because of different conditions, are much harder pressed by the need of electrification than are the railroads in the United States. The indications are, however, that there will be a much more extended application of electrification in the country and it will be to our advantage to profit by the experience and the suggestions of railway men abroad.

Statesmen Getting Understanding of Railroad Problem

The most gratifying feature of the recent debates in the Senate on the Cummins bill is that they disclose that a large number of the statesmen of both political parties are getting a real understanding of the railroad situation and of the things needed to solve the problem which it presents. The knowledge of railroad matters which has been displayed by the members of the Senate Committee on Interstate Commerce, who conducted the railroad hearings and drafted the Cummins bill, is especially notable and striking. The addresses which have been made by Senators Cummins, Kellogg, Underwood, Townsend, Pomerene and some others have been among the ablest utterances that have ever been made by public men upon the subject of railroad management and regulation. The main criticism which has been justly passed upon discussions of railroad matters in the Senate and House in the past has related, not to the conclusions which public men have drawn, but to the gross ignorance of facts which they often have disclosed. Any man can be excused for drawing wrong conclusions from correct facts, for human reason is fallible, but no man can be excused for participating in a discussion except to get information if he doesn't take pains to learn the facts about the subject being discussed. The one member of the Senate committee who has shown that he is a Bourbon, in that he does not learn anything or forget anything, is Senator LaFollette. Whenever he has participated in the debates it has been merely to repeat the same misrepresentations and falsifications and to air the same prejudices which we long since learned to expect from him. He calls himself a Progressive and some people call him a radical, but as respects the railroad question he is still in the dark ages, and evidently intends to stay there. However, it is naturally to be expected of any man who was as antagonistic as he was to every proposal to promote the interests of the United States during the war that he will also oppose every proposal that may be made to promote the welfare of the United States during the period of reconstruction following the war. Senator Cummins, before he had studied the railroad situation thoroughly, used to talk very much like Senator LaFollette does now. He has shown that he is a statesman by broadening his views and changing his attitude as he has increased his knowledge; but LaFollette is still the same old LaFollette, and always will be—**cruel** as it is to say so!

Railroad Legislation and Increased Production

The people of the United States are looking forward to doing the largest and most prosperous business in 1920 that they have ever done. Increased production in all lines is being urged through innumerable channels, and the indications are that a real effort will be made by both capital and labor to secure increased production. Unfortunately, most public men and business men do not seem to realize that whether there will be or can be any substantial increase of production in 1920 will depend very largely upon what kind of railroad legislation Congress passes *and how soon it passes it.* With their existing facilities the railroads of the United States, working to their utmost capacity, cannot handle all the commodities the country can now produce. This was demonstrated clearly in 1917, in 1918 and in the early fall of 1919. It has been charged that the railways "broke down" under private management; but in 1918, under unified government operation, when the investment in facilities was $577,000,000 more than in 1917, they were able to move less than 2 per cent more freight than in 1917. The amount that the country can produce, or can benefit by its productive activities, depends on how much the railways can haul. Since the railways as a whole have been working to their capacity, it follows that there must be an increase in their capacity before there can be a large increase of production. There cannot be any substantial increase in the capacity of the railways in 1920 in time to enable them to handle the peak of the traffic of this year unless railroad improvement work on a large scale is begun soon; and it cannot be begun soon unless Congress speedily passes needed railroad legislation. Every day that Congress delays to pass needed railroad legislation it is reducing the amount of traffic the railways can handle in 1920, and therefore the amount of things that the United States can produce in 1920.

"Normal Operating Conditions" and the Railroad Deficit

THE RAILROAD ADMINISTRATION has issued a statement regarding the deficit incurred by it in operating the railroads during the 23 months from January 1, 1918, to December 1, 1919, which, taken at its face value, would convince many persons that the railways under private operation will not need any advance in rates. The statement doubtless was intended as an explanation and defense of the record which the Railroad Administration has made in incurring deficits rather than as an argument against an advance in rates. Unfortunately, many persons, to serve their own ends, will use it for other purposes. The Railroad Administration has a right to explain and defend its record. When, however, it does it in a manner that is adapted to do injustice and harm, as in this case, it becomes a duty to point out its inconsistencies and fallacies.

The main reason why the Railroad Administration's statement is adapted to mislead the public and do harm is that it attempts to show what the financial results of government operation would have been if the present passenger and freight rates had been in effect from January 1, 1918, without including in its estimate anything whatever to show what the financial results would have been if the present wages and working conditions of employees and the present prices of fuel, materials and equipment also had been in effect from January 1, 1918. The second reason why the statement is misleading is that it treats as "abnormal" practically all conditions which have tended to reduce net earnings under government control and as "normal" practically all conditions which have tended to increase them. If the statement had been deliberately prepared to afford a false basis for opposing advances in rates it could not have been better adapted to that purpose.

The Railroad Administration states that in the 23 months ending November 30, 1919, it incurred a deficit of $529,500,000. The total deficit really was much larger, since no allowances are made for interest on increased investment and several other large and important items. It divides these 23 months into four periods. The first period is the calendar year 1918, when the deficit was $236,500,000. This period, says the Railroad Administration, "was abnormal in being a war year and also on account of the fact that increases in freight and passenger rates were effective for practically only the last half of the year, while a large proportion of the increase in wages was retroactive to January 1, 1918. * * * It is estimated that if General Order 28 (the order making advances in freight and passenger rates) had been effective January 1, 1918, approximately $494,000,000 of additional freight and passenger revenue would have accrued to the Railroad Administration without any increase in operating expenses. If this additional revenue had been obtained, there would have been a surplus of about $14,000,000 from operation for the 22 months ending October 31, 1919, instead of the deficit shown above."

This reasoning is fallacious and misleading. It is true the advances in rates were not in effect from January to June, 1918, but neither were anywhere near all of the advances in wages which have been made. Upon what theory of fairness or logic does the Railroad Administration calculate what the results would have been if *all* the advances in rates had been in effect during the time, when certainly not more than one-half of all the advances in wages which have been made under government operation were in effect? Furthermore, during 1918 most railway employees were working on a ten-hour basis, while most of them are now working on an eight-hour basis, the result being there are now probably 150,000 more employees than there were in the first six months of 1918. The railway companies must in future do business on the basis of all the wages and conditions of employment which the Railroad Administration has established during the entire two years. It should also be noted in this connection that "war conditions" obtained in nine months of 1917, as well as in 1918; and if they were abnormal in 1918, they were equally so in 1917.

Second period, six months January-June, 1918, deficit $228,700,000: These six months, the Railroad Administration says, "reflected the slump in freight business following the armistice and the readjustment to peace conditions. This period reflects the increased wages for the full period and the greater portion of the present wage scale. It does not, however, include the increase to shopmen which was retroactive to May 1, 1919." This period was abnormally bad because of the sharp decline of traffic. In one important respect, however, it was abnormally good, the weather conditions in the first half of 1919 having been as favorable to economical operation as were ever known in that period. It was no worse in respect to the decline in traffic than periods that the railway companies have had to go through—as, for example, in 1908, and 1914 and 1915.

Third period, four months, July to October, 1919, inclusive, deficit $3,300,000: This period, the Railroad Administration asserts, "may be said to represent approximately normal operating conditions." This gives us the measure of what the Railroad Administration regards as normal. It was a period of *maximum* passenger and freight traffic and *extremely favorable* operating conditions. If the rates which the railways are to be given in future are to be based on the results obtained by the Railroad Administration under the almost ideal conditions of July to October, 1919, the number of railway companies that will soon be bankrupt will be larger than we have anticipated.

Fourth period, November, 1919, deficit $61,000,000: The Railroad Administration assumes the deficit in December will prove to have been relatively as large as in November. The operations of these two months, it says, "were so seriously affected by the coal strike as to destroy their value for estimating normal earning capacity." It is undoubtedly true that if the coal strike had not occurred, and no other great disturbance due to man or nature had come, net earnings in November and December would have been much larger. But the coal strike did come; and there is no reason for doubting that it also would have come under private operation. If it had come under private operation it would have produced very much the same effects on net earnings that it did under government operation. Therefore, it cannot rationally be excluded from consideration in determining what advance in rates the railways need.

The government has been operating the railways for 24 months. According to the Railroad Administration's reasoning, in 20 out of the 24 months the conditions were "abnormal" and it was only in the four months when the smallest deficit per month was incurred that "approximately normal operating conditions" prevailed. The trouble with all this reasoning is that it does not recognize the fact that ideal conditions are not normal conditions in the railroad business, under either government or private operation, but that it is perfectly normal for conditions constantly to develop which render it impracticable to secure the operating and financial results which theoretically ought to be obtainable. No year ever passes when some or all of the railroads are not hard hit by an Ohio river flood; or a San Francisco earthquake; or a strike of their shop employees, such as occurred on the Illinois Central, Union Pacific, Southern Pacific, and Missouri, Kansas & Texas a few years ago; or a coal strike, for coal strikes have occurred before; or an enormous decline in business, such as occurred in 1908, in 1914 and 1915, and again in 1919.

The railway companies of the United States would gladly

be insured in future against the possibility that they would have to make advances in wages before they could get advances in rates, but they constantly made advances in wages from 1907 to 1917, and meantime the average rates received by them declined. They would gladly be insured against railroad strikes, coal strikes, and all other kinds of strikes. Apparently, however, Congress does not intend to give them any such protection. They would gladly be insured against heavy declines of traffic, but nobody has devised any means by which this can be done.

Normal conditions in the railroad business are not ideal conditions, but average conditions, and average conditions from month to month and year to year are made up of good conditions and bad conditions. As long as the railroads must be managed under average conditions their rates must be made with reference to average, and not ideal conditions, or they will never be able to prosper and give good and adequate service to the public. We are quite willing to attempt to maintain the proposition that the Railroad Administration, during its twenty-four months of existence has had, on the whole, even better than average conditions under which to operate. The railroad deficit has not been due to "abnormal" operating conditions, whatever else it may have been due to.

Protection of Work Trains

"UNDER CONTROL" is an important phrase in train rules which ought to be the subject of systematic discussion and instruction much more generally than it is. Enginemen have to run "under control" many times on every run, and the varying circumstances under which the rule comes into effect (when they are controlling their speed by rule rather than by unrestricted individual discretion) are so difficult to define that the defining process ought to receive very careful attention. This subject will arise in the mind of everyone who reads the account of the collision near Adamsville, Alabama, on August 9, reported in another column.

The Interstate Commerce Commission investigator places the responsibility for this collision mainly, perhaps wholly, on the men who violated the rule to stop (at a red automatic block signal on single track) five minutes, and then proceed five minutes behind a flagman. We shall not quarrel with this decision; but it is to be recognized that where block sections are two miles long—or even one mile—the sending of flagmen ahead on foot is a process which often consumes a good deal of time, and it is not to be wondered at that operating officers will try their best to secure safety in some other way. In this instance, as so often occurs in freight train collisions and work train collisions on single track, a half dozen men made mistakes or ignored well known rules, and their conduct affords a number of useful lessons. The collision occurred at low speed and would have been almost a minor incident but for the fact that thirty-one workmen were injured, three of them fatally.

"Under control," on double track, where the only possible obstacle will be a standing train, means a speed low enough to be able to stop, before striking a visible, motionless obstruction; but if you are on single track, or on a yard track, where an opposing train or engine may be moving toward you, the speed must, of course, be much lower.

It is necessary in that case to require both of the opposing trains to stop in one-half the length of track seen to be clear. This is a very difficult rule to enforce. It is hard enough on a line of easy curves, as in yards; on eight-degree curves in rock cuts it may mean a rate of four miles an hour, or slower. At that rate the progress made is likely to be little better than simple flagging. All rules must allow some little margin for error, and in this matter the calculation of the margin requires too fine figuring—it is out of the question.

The use of automatic block signals greatly simplifies the question of train protection; but when a work train occupies the main track and the attempt is made to avoid the delays incident to the restrictions imposed by the block signal rules, a variety of complications is introduced and the question is whether it is possible to do this without losing more than is gained. Safety may hinge on apparently small points which the men in charge may fail to appreciate until too late. For example, in the Adamsville collision, both enginemen were on the outside of the curve, as the work-train engine was moving backwards; consequently both may have seen the opposing train a few seconds too late. On the work train the conductor, standing on the platform of the caboose, exercised the speed control functions of the engineman, but he did not have his hand on the air-brake lever, and he lost a little time in that way. Every day we see illustrations of the risk—usually very small, but yet a risk—of entrusting enginemen's duties to conductors and brakemen without giving them an engineman's training. Three seconds' time, no doubt, might easily have saved those three lives.

The flagman ought to have kept silent as to the exact location of the work train; but is there any use in trying to enforce rules so strictly as that? Probably not; and yet just such small things save lives; and if we are going to depend on the "under control" rule very small things must be taken into account.

The despatcher told the work-train conductor, informally, that the first northbound train would be the regular passenger; and in that, according to the record, gave erroneous information. He says that he would have made this formal, by issuing a meeting order, if the conductor had so requested. The conductor had no right to rely on such informal information; and so far as definite action is concerned it does not appear that he did; but who will say that that information was not, consciously or unconsciously, the influence that kept his hand off the air brake lever? Everybody likes to consider these insoluble questions when it is a matter of speculative discussion; why not keep them in mind in making the rules?

Someone above the despatcher had a hand in the complications; he issued two bulletins which figured in the case. These bulletins were not well worded, and one of them seems to have failed of its purpose because of negligence in posting or mailing; and the two ought to have been combined in one. Their merits and demerits cannot be discussed in this place, for to do so would take whole pages; but the mere perusal of them affords sufficient evidence of the need for extended examination of the whole question of protecting work trains whether they occupy a single-track line which is equipped with automatic block signals.

Including the engineman and the conductor of the northbound train we thus find six individuals at fault; and Mr. Borland's report brings out other weak points. To the trainmaster or other officer who has to instruct trainmen, the outstanding virtue of the block system is its simplicity; but when we suspend the block system—as we do every time a "stop-and-proceed" movement is made, and whenever a work-train conductor allows a flagman to give instructions which in the slightest degree modify the standing block signal rules—we suspend some of its benefits. It is of the highest importance to make very clear the distinction between block-signal protection and protection by flag without the benefit of the block signals; and to explain this distinction to conductors and enginemen until they understand it thoroughly. This may take ten times as many lessons, interviews, examples and punishments as would be consid-

ered necessary under our preconceived notions of adequate examinations; but reiteration, *until success is certain*, is the only safe rule for the trainmaster in giving rules to trainmen.

New Books

Applied Science for Wood-Workers. By W. H. Dooley, in charge of Navy Yard Continuation School for New York Board of Education 446 pages, 5¼ in. by 7½ in., illustrated, bound in cloth. Published by the Ronald Press, New York.

The purpose of this book is to provide an elementary course in applied science for the woodworking trades to bridge over the gap between the abstract knowledge of the principles of science acquired by the average high school student and the practical application of these principles in industrial life. The book is a compilation of considerable generally known data, supplemented by knowledge gained through practical experience. Of particular interest to woodworkers are the chapters on trees, lumber, and defects of wood, and in addition the book treats in a clear and concise manner of woodworking tools and their uses, modern foundry methods, heating, ventilating, paints and varnishes, electricity and other subjects, which although not directly related to the woodworking trades are of value to anyone engaged in mechanical pursuits. A series of questions and problems at the end of each chapter serves to bring out the salient points of each subject and to test the student's power of concrete application of the principles set forth in the text.

Proceedings of the American Railway Engineering Association, 1011 pages, illustrated, 6 in. by 9 in. Bound in cloth. Published by the American Railway Engineering Association, Chicago.

The proceedings of the twentieth annual convention, held at the Congress Hotel, Chicago, Ill., on March 18, 19 and 20, 1919, as published in this volume, are the smallest in the last eight or nine years of the association's history. The 23 reports of the standing and special committees cover only 740 pages, while the discussion was more brief and the monographs fewer in number, showing the effect of the war on the available time of the committees. The report on rail is, as usual, the longest and deals mainly with rail failures from interior fissures and the results of tests on splice bars made at the Altoona laboratory. The studies on economics of railway operation and of labor, which were touched upon in the year previous, have made considerable headway and are two of the important reports presented. Among other studies of special interest and value are those on iron and steel structures, including tentative specifications; the unified operation of terminals and the ticket-selling problem; the effect of signaling and the proper location of passing sidings on the capacity of single and double-track lines, and considerable data relative to masonry and concrete construction. Three monographs are included, "A Study of the Mechanics of Curve Resistance" by John G. Sullivan, consulting engineer, Canadian Pacific; "Practice in the Design of Concrete Floor Slabs and Flat Top Culverts" by George H. Tinker, bridge engineer, New York, Chicago & St. Louis; and "Service Tests of Cross Ties" by P. R. Hicks, engineer in forest products, Forest Products Laboratory, Madison, Wis.

The German Railroads have removed the limit on the size of express packages to 50 kilos (about 110 pounds), and there is therefore at present no limit whatever on the size of express packages which may be shipped by rail in Germany. The withdrawal of this regulation is the result of continued and urgent representations from various branches of German industry in all parts of Germany.

Letters to the Editor

The Shopmen's Agreement and Sunday Work

ROCHESTER, N. Y.

TO THE EDITOR:

Rule No. 6 of the new shopmen's agreement seems to be quite plain in its intent that the various crafts affected shall receive punitive overtime only outside of the bulletined hours on Sundays and holidays as well as week days. This agreement goes further, and in Rule No. 181 states that previous practices shall be retained only when not in conflict therewith.

Notwithstanding this fact, a number of railroads are still paying roundhouse employees and car inspectors on the old basis of time and one-half for Sundays and holidays.

Is it fair to single out one class of employees and present them with a half day's pay on certain days when it is recognized by all other employees and demanded by the public that a railroad must operate seven days a week?

The Twentieth Century Limited must run on Sundays, and the dispatcher who controls its movement receives his regular day's pay. The engineer who runs through snow, rain or sunshine at 60 miles per hour does not receive a punitive rate because he must work on Sundays and holidays. The conductor, the fireman, the brakeman and so on down through the many employees upon whom the responsibility for the safe movement of this wonderful train rests, receive a day's pay seven days a week.

Is it just to the public at large who have to foot the bill? We read in the daily papers that 625,000 shopmen are demanding an increase, and assuming that 20 per cent of this number are required to work seven days a week and 70c per hour as an average wage, we find that in a year of 52 Sundays and seven recognized holidays these men receive $20,650,000 as a premium above the fair compensation given on the other 306 days for identically the same effort.

Why should the director general permit the misinterpretation of Rule No. 6?

R. W. H.

Photo from International

The Railway Bridge Connecting Omsk with Kolomzeno, in the Region of the Latest Bolshevik Activities

The Jacksonville Station from the Plaza

New Union Railroad Facilities at Jacksonville

Passenger Operating Efficiency Increased Eighty Per Cent— Freight Interchange Capacity Doubled

To keep abreast with the rapid development of the state of Florida and the increasing importance of the city of Jacksonville as a railroad center, the roads entering hat city are now expending more than $3,500,000 in ex-panding their terminal facilities for the handling of freight nd passenger traffic. The improvements include a new Union station recently opened for service, enlarged freight nd passenger track facilities and the construction of three nodern interlocking plants to control the movement of trains hrough the terminal. The project is being carried on for he railroads by the Jacksonville Terminal Company.

The terminal company was organized and incorporated nder the laws of the state of Florida in April, 1894, for with the Atlantic Coast Line. The company was incorporated with a capital stock of $100,000, consisting of 1,000 shares of the par value of $100 a share. Each of the three original lines assumed one-third of the total issue of stock, with the exception of one share held out for each of the six directors. The capital stock was increased to $200,000 in 1902, a year after the Atlantic, Valdosta & Western was admitted into the corporation. The capital stock was then divided into four equal blocks, each of the four roads assuming 25 per cent of the total. The Atlantic, Valdosta & Western was afterwards purchased by the Southern Railway and was incorporated with the Georgia, Southern & Florida. The Southern Railway and the Georgia, Southern &

Looking Down the Concourse

he purpose of handling the combined business of the rail-oads entering the city and to replace the inadequate facili-ies for the handling of both passenger and freight busi-nesses at different and remote parts of the city. The orig-nal lines forming the corporation were the Jacksonville, St. Augustine & Indian River, which afterwards became a part of the Florida East Coast; the Florida Central & Pen-nsula, which was later taken over by the Seaboard Air Line; nd the Savannah, Florida & Western, which was merged & Florida obtained the stockholders' rights of the Atlantic, Valdosta & Western in the Jacksonville Terminal Company, each assuming 12½ per cent of the total. Thus at the present time the capital stock is distributed 25 per cent each to the Atlantic Coast Line, the Seaboard Air Line and the Florida East Coast and 12½ per cent each to the Southern Railway and the Georgia, Southern & Florida.

In 1904 the old terminal station building and the passenger and freight yards were built by the terminal com-

pany, and they remained in service up to the inception of the present project with few alterations. Since 1900 the development of the state of Florida has been remarkable and has been reflected in the increase in the amount of traffic, both freight and passenger, which passes through the city of Jacksonville, the gateway of traffic to the rest of the state, all of which is handled by the terminal company. This increase is shown in the table.

Year	Passenger trains	Freight cars interchanged
1900	19,000	40,000
1910	25,235	65,100
1917	29,800	314,000

In 1915 a committee of engineers, consisting of the chief engineers of the five roads entering the terminal, was appointed to devise means for the proper handling of this increased traffic, which is seasonal in character and at its peak in the winter months. Under its direction a certain portion of the facilities were redesigned in 1916 so as to double the capacity of the interchange facilities and to increase by 80 per cent the ease of operating passenger equipment.

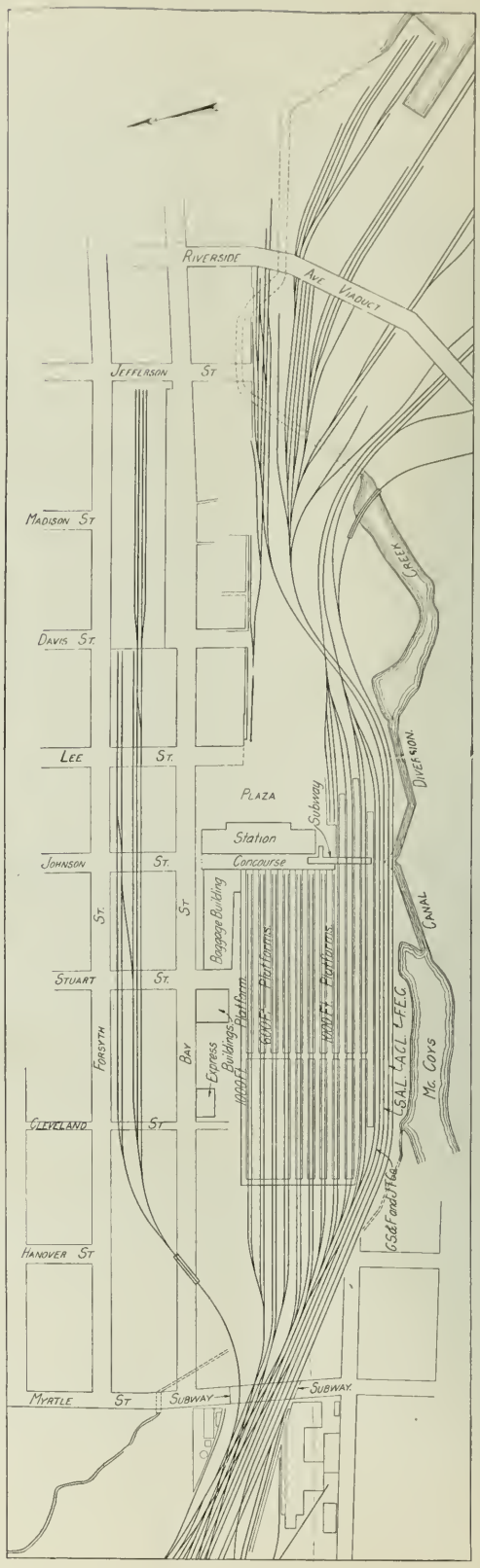
The plans perfected by the committee provided for the construction of a new Union passenger station, modern in all respects, the remodeling of the old passenger station for baggage handling purposes and extensive track changes, includ-

The Colored Waiting Room

ing a rearrangement of the thoroughfare tracks, a new passenger station track layout and increased track capacity for handling passenger coach equipment and for the interchange of freight.

The old passenger track layout at the station consisted of 17 parallel tracks over which train movements were controlled by hand. This is replaced in the new layout by a system of 26 tracks, consisting of 16 stub and departure tracks, 6 through passenger tracks and 4 through freight tracks, located from the station in the order named. In the new layout the train movements are controlled from an electro-pneumatic interlocking plant located at the throat of the yard, thus accelerating the movements of trains and securing approximately 75 per cent greater efficiency than the old system and permitting the accommodation of 75 per cent more travel.

In the old layout access to and from the station and tracks could only be had by crossing the tracks at grade, thus necessitating the breaking of the standing trains. The new layout is so arranged that access to departing trains is direct from the passenger station concourse, these trains backing into the station and receiving passengers from the ground level. Access to incoming trains is through a subway provided under the through passenger tracks, which are elevated slightly above the general level of the departure tracks. The



Track Plan of the Jacksonville Terminal Station

subway is approached from the concourse and the platforms by means of ramps, thus obviating the necessity of travelers crossing the tracks going to and from the trains or of breaking the trains. The freedom of movement of pedestrian travel is further ensured by means of a baggage trucking platform. The importance of these improvements is evident when it is considered that in the winter months the train schedule provides for 150 trains in 24 hours. With the switching this involves approximately 500 movements in the station per day.

The new coach yard which provides capacity for 115 80-ft. cars and the new freight yard with capacity for 306 40-ft cars, are located on the west of and about one-half mile distant from the passenger station track system. The interlocking installed with the track changes includes the main electro-pneumatic plant, located at the throat between the passenger station tracks and the coach and freight interchange yards to the west and two auxiliary electro-mechanical plants, one at the west end of the yard proper and the other east of the passenger station.

The Butterfly Sheds and Platforms

The construction of the new track layout necessitated the diversion of McCoy's creek, the outside freight and passenger tracks being located on a marsh about 100 ft. deep. Delay was experienced in this work, as it was necessary to dredge the new creek channel 12 times because of the soft material which was displaced when making the fill for the tracks. In this dredging work the material moved was wasted on the far side of the canal, raising the level of the adjoining land approximately four feet. In placing the fill for the tracks an excess of 75,000 cu. yd. of material was placed beyond the estimated quantity of 190,000 cu. yd. Settlement is still noticeable in this fill, and it is necessary to resurface the tracks frequently.

The Bay Street Elevation

The Passenger Station

The new station is located on Bay street on a site adjoining the old station building, from which it is separated by a concourse 50 ft. wide extending along the rear of the new station for its entire length. The building is of the Colonial type of architecture, the main portion being 360 ft. long, 78 ft. wide and 90 ft. high.

The structure is supported on concrete foundations resting on wood piles designed to carry 15 tons each. The exterior walls are finished in Mount Airy granite as a base, with Indian limestone above. The building faces on a spacious plaza, and this elevation is set off by a colonnade consisting of 14 massive limestone columns. Buff brick is used in the rear exterior wall and for the concourse.

The main entrance to the station is from the plaza and consists of three groups of seven doors each, leading directly into the main waiting room for white passengers, which occupies all the central portion of the building. The main entrance also serves as the carriage entrance, a marquise being provided beyond the colonnade. The plaza furnishes space for a loop drive and for parking purposes. Passengers having no business to transact in the station may go direct to the trains from the plaza by means of a walk around the south end of the station and a ramp to the subway, or they may enter the concourse from Bay street.

Interior of the White Waiting Room

The floor in the main waiting room is of marble and the finish consists of Tennessee marble with plaster above. Directly opposite the main entrance is the exit to the concourse, consisting of a group of seven doors in the center, flanked on each side with a group of three doors. The ticket offices are to the right of the room, separating it from the colored waiting room, an arrangement which permits of service to both white and colored passengers from the same offices. The telegraph facilities and the information bureau are located on the left and the right, respectively, of the main group of doors leading to the concourse, and are so arranged that service is to be had both in the waiting room and in the concourse.

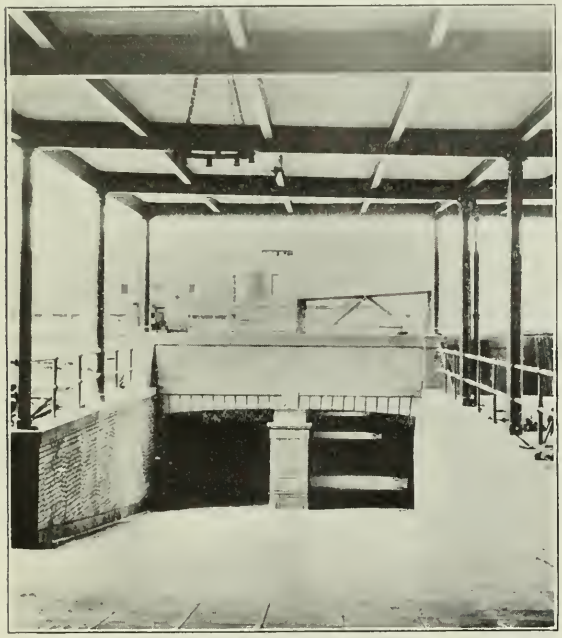
The entire south end of the first floor of the building is devoted to auxiliary station facilities for white passengers. A corridor leading to the left from the main room is flanked on the plaza side with comfort facilities for women and on the concourse side with a smoking room and toilets for men. The corridor provides space for telephone facilities, a soda fountain and a cigar stand and leads directly into the rooms devoted to dining facilities, consisting of a restaurant and a

lunch room. The kitchen facilities are located on the second floor above the restaurant.

The entire north end of the building is given over to facilities for colored travelers. The entrance to this portion of the building is from Bay street through three groups of three doors leading into a vestibule and up a ramp to the waiting room. The ticket facilities are directly across the room from the entrance, and the comfort facilities for women are located to the left of the entrance and for men to the right. The dining facilities are limited to a lunch room.

Both waiting rooms open into the concourse, which is provided with wall seats, thus furnishing additional waiting-room facilities. The parcel and baggage checking facilities, which are located in the old station building, are accessible from the Bay street end of the concourse.

The departure tracks are approached from the concourse through train gates. These 10 tracks are arranged in pairs, the spacing between pairs being 26 ft. and between tracks in the pairs 13 ft. The pairs are separated by low level platforms, temporarily constructed of timber because of settlement. Eventually they will all be of concrete and will be covered with butterfly type sheds. A separate platform has been provided for the trucking of baggage, on which all baggage is trucked around the head end of departing trains and then across the tracks to the desired train.



A View of the Subway Approach to Through Trains

The subway leading under the through passenger tracks is approached from the concourse, the platforms and the plaza by ramps laid on 10 per cent grades. It is of concrete construction, and its foundations extend approximately 8 ft. below the tide water. An automatic electric pump discharging into McCoy's creek has been installed to control the water.

A drainage system, consisting of a main sewer of 30-in. concrete pipe with 12-in. laterals between all the tracks, has been installed to serve the station, yard and trainshed. The main sewer extends entirely across the layout near the station end of the departure tracks and discharges into McCoy's creek. A very soft bottom was encountered in excavating, all of which was done by hand.

This improvement has been carried on under the general supervision of the engineers of the owning roads and under the immediate direction of L. G. Wallis, engineer for the Jacksonville Terminal Company. The firm of Irwin & Leighton of Philadelphia, Pa., is the general contractor for the construction of the main station building, subway and concourse and the remodeling of the old passenger station into a baggage building. The W. Z. Williams Company of Macon, Ga., was the contractor for the grading. All track work was done by the terminal company forces.

Northwestern Region Awards Safety Banner

The Southern Pacific (Lines North of Ashland) has been awarded a banner by R. H. Aishton, regional director of the Northwestern region, for obtaining the best results of those roads employing over 2,000 men in the Northwestern region during the recent National Railroad Accident Prevention Drive. Although employing 4,676 men and operating 1,222 miles of road, the Southern Pacific (Lines North of Ashland) had no reportable casualties to employees during the entire period of the drive, while during the same two weeks of 1918 one employee was killed and 13 were injured.

Soon after the plans for the drive were formulated by the Safety Section of the United States Railroad Administration, Mr. Aishton announced that he intended to present a banner to that road employing over 2,000 men and making the best record during the drive and to the road employing less than this number of men and similarly making the best record in this class. The banner to the road in the second group was awarded to the Chicago & Western Indiana, which employs 1,767, and had no reportable casualties to employees during the drive period, as compared to four injuries in 1918.

In a letter addressed to all officers and employees of the Northwestern region, Mr. Aishton also gave honorable mention to the Spokane, Portland & Seattle, because, while employing 2,245 men, it made a clear record during the drive; to the Duluth, South Shore & Atlantic, because, while employing 2,080 men, it also made a clear record during the drive, and to the Chicago, Milwaukee & St. Paul, because, with a working force of 71,550 men, it made the best record during the drive of any of the major roads in the region.

Mr. Aishton's letter also said in part:

"While these roads won signal honor by reason of their achievements during the drive, I am sure there is credit enough for all of us in the knowledge that, because of the care and thought and interest manifested by everyone concerned, so excellent reduction was made in deaths and injuries to employees. We should all take a good deal of pride also in the fact that the Northwestern region excelled the record of all other regions during the drive.

"It is my earnest wish that the officers and employees in this region will continue to so conduct themselves in their duties as railroad men that the work of conserving human life and limb will be constantly more successful."

Transportation Conditions in Alaska.—Except for the railroad construction during the year the transportation conditions in Alaska have been worse in 1919 than in any previous year, according to a statement from the U. S. Geological Survey. The coastal steamboat service has been unable to meet the demand for freight and passenger transportation, and the river steamer service on the Yukon and its tributaries has been worse than ever. These conditions have tended to discourage those who were planning new ventures,

Railroad Situation Reviewed by the Director General*

Legislative and Other Requisites for Successful Operation, Results of Two Years Under Federal Control

By Walker D. Hines

Director General of Railroads

I WISH, first, to summarize my thoughts on the solution of the railroad problem. For 26 years I have studied the development of railroad regulation. For most of this period I studied it from the standpoint of the railroad companies and for the last two years I have studied it from the standpoint of the general public.

As a preliminary to considering the solution, it is well to consider the condition of regulation in 1917, just prior to federal control.

Unfavorable Conditions Prior to Federal Control

While there were many different railroad companies, the service on the different railroads was inseparably linked in a common transportation system. Freight cars were interchangeable, rates were necessarily the same on different railroads in the same part of the country, wages of some classes of railroad labor were largely standardized and others were becoming so. Movements for either the increase or reduction of rates were joint and affected all the railroads in the particular territory and movements for the increase of wages were likewise joint to a considerable extent, and affected many railroads.

Despite these elements of interrelation affecting service, rates and wages, there were probably more than one hundred distinct railroad interests, at least fifty of which could be regarded as important. It was almost impossible to secure joint action by these interests and almost impossible to accomplish results without joint action.

Railroad labor was completely organized as to the train and enginemen and was largely organized as to some of the other classes, and there was a steady movement towards further organization on the railroads throughout the country. Railroad labor had become violently opposed to arbitration and no means existed for satisfactory dealing with labor problems. Common action on the part of railroad labor was much easier than common action on the part of the railroad managements.

Public regulation of the railroads was far reaching both as to service and as to rates. Congress and the state legislatures and some state commissions were constantly making regulations affecting service and increasing the cost. The movement was steadily in the direction of greater and more costly regulation of railroad service. The regulation of rates was almost universal. The Interstate Commerce Commission had practically complete control over interstate rates and nearly all the state commissions had control over the intrastate rates and from time to time state legislatures directly fixed the rates. The railroad executives frequently complained that they had no substantial control over the management of the properties.

The term private management had become largely figurative because important factors vitally affecting the control were largely prescribed by Congress and the Interstate Commerce Commission, by the state legislatures and the state commissions, and by the various labor organizations.

And yet while the public and labor through all these different agencies, were directly dealing with the problems of railroad management, there was no basis for securing common understanding by any two of these three interests. Each public agency worked by itself, without reference to the railroad managements or labor except through the medium of legal proceedings. The labor organizations formulated their policies and carried them out without reference either to the public or to the management except in the course of arms length negotiations. Each railroad management decided upon its own course as well as it could without the co-operation of either public representatives or labor representatives. The general result was a serious lack of understanding on the part of each of these three interests as to the point of view of the others.

While there was so much public regulation there was no definiteness whatever as to the basis of regulation. There was the general idea that rates ought to be enough to enable the companies to earn a fair return upon the fair value, but neither a fair return nor the fair value was subject of ascertainment.

Some of the railroads were prosperous and showed large earnings and large rates of returns upon their investment and upon their stock, so large in fact as to be a constant invitation to attacks on the part of elements of the public and of political life seeking rate reductions, and so large also as to stimulate discontent on the part of railroad labor. Other railroads had such poor returns that they found it impossible to raise the money necessary for needed improvements. Yet the rates had to be the same and the wages had to be substantially the same on these railroads so differently circumstanced.

On account of the great number of different railroad companies it was exceedingly difficult for them to concur in any affirmative program either as to rates or as to wages, and it has become strikingly noticeable that the railroad companies had not succeeded in carrying out a satisfactory program for the interchange of freight cars. In times of car shortage it was impossible for a company to get its own cars back on its line, and hence it was unwilling to give up the cars of other companies when it obtained them, and at times a condition of practical anarchy existed in dealing with freight cars owned by other companies.

The situation which I have depicted was frequently regarded as almost impossible by the railroad people. A joint Congressional committee, known as the Newlands committee, was appointed to study the difficulties, but before it reported the war conditions came and federal control began.

There was widespread pessimism as to the railroad situation. Expenses were increasing, and it seemed impossible to obtain increases in rates to reflect the increases in expenses. While there was much criticism of individuals in public authority, I wish to emphasize that it is my opinion that it was the system which was at fault and not the public authorities who administered the system. I do not believe any set of men could have been put in public office who could have made the system a success.

I do not believe we will ever obtain an effective solution without removing the fundamental difficulties which I have suggested.

First, I believe that there will not be a prompt and liberal

*Address before the Association of the Bar of the City of New York, New York City, January 7, 1920.

treatment of rate questions until profits clearly in excess of a fair return are appropriated in part to the public interest.

As an illustration, I have in mind one important railroad company whose railroad, even in this difficult year, will earn over 140 per cent of the standard return, and this company has in the past paid high dividends and in addition has had a large annual surplus. When the railroad companies apply for an increase in rates it will inevitably be urged that an increase ought not to be granted which would still further increase the large profits of this company. For example, an increase of 20 per cent in the freight rates of this company would give it a net operating income more than twice the standard return, assuming that it continued to enjoy the same business. I have no doubt that such a prospect would stimulate the most persistent opposition to the increase, and the result might be that an increase seriously needed by other companies would be defeated simply because the giving of the increase would yield what would be regarded as a grossly excessive profit for this favored company. I see no way to meet such a situation, except to provide for a division of the excess over a clearly reasonable return. Of course, enough of the excess should be given to the company to stimulate efficiency in operation, but beyond that point the fact that the company would get the excess would be a serious obstruction to the railroads in general getting an increase to which on the average they might be entitled. The excess thus appropriated for the public interest should be largely placed in reserves so as to protect the general railroad situation in unfavorable years. Such a course would quiet agitation, will stabilize the situation, and without it I believe it would be impossible to get prompt and liberal treatment of any rate increase question.

Essentials of a Permanent Solution

I believe there must be a definite standard by which the reasonableness of the general rate level can be measured. In the past there has been no appreciable standard. Plausible arguments could be made against any increase that was sought under any conditions. The rate-making body had to take all the responsibility and odium of creating a standard as well as applying it. In my opinion Congress itself should establish a general but workable standard and leave to the rate-making body the application of this standard according to the facts.

I do not believe that there can be successful regulation of the railroad industry without a basis for mutual understanding between those representing the public, labor and the owners, respectively. In the past there has been no basis for understanding except at the end of dispute and controversy. Each of the three great interests has worked to a large extent entirely aloof from the other two.

Capital, Labor and Public Must Meet on Common Ground

Yet the railroad enterprise is a great, common enterprise. It cannot be conducted without the exercise of the most vital public franchises; nor can it be conducted without the participation of a large body of skilled labor which makes a life career out of railroad employment; nor can it be conducted without the physical property which has been created by the investment of capital. We make a grave mistake in assuming that the representatives of capital can alone manage the situation. The scheme of the past has been on that false theory, and the result has been that the public has injected itself into the management through all sorts of agencies and labor has injected itself into the management through its organizations, not only through direct demands upon railroad companies but through demands on Congress and on state legislatures and public commissions for legislation and regulations affecting management. We have all three interests participating in the management in all sorts of ways, and yet there is no common ground on which these three elements can meet and exchange views and endeavor to reach conclusions. I believe the only sort of management which can be permanently effective is one which provides for an orderly participation at the outset of all three of these interests, instead of the past scheme which leaves each interest to pursue its own methods irrespective of the others, until an eventual contact is established in some form of controversy.

The fact is that in the past these two essential elements of the public and of labor have asserted their participation only through some form of controversy. The public side of it is asserted through hearings by legislative bodies or by commissions, and these hearings nearly always take on a controversial aspect and the result is that the railroad business is largely conducted through a series of law suits.

The labor side of the matter generally manifests itself in an even more controversial spirit.

In my opinion there must be a form of participation in the management from the outset, which will give each interest to start with an understanding of the reasonable needs and expectations of the other two interests. Out of this community of understanding I believe there will be evolved a much more successful disposition than will otherwise be possible.

But beyond the mere matter of understanding, it will be of vast importance to put on the public representatives and on the labor representatives a direct sense of responsibility for the rendition of the public service. This cannot possibly satisfactorily or completely arise out of the old system, and I do not see how it can be attained except by participation in management which I suggest.

When federal control began there had come to be a vivid realization of the great embarrassments to which a railroad company was subjected by reason of having to engage in the paradoxical practice of running down its credit in order to sustain it. A railroad company could not secure consideration for what it regarded as a necessary rate increase without painting an alarming picture of the critical situation which confronted it unless it got a rate increase. This was necessary because the rate-making tribunal had no first-hand information derived from immediate contact and a direct sense of responsibility for railroad management. The rate-making body approached the matter entirely in an attitude of skepticism. In order to overcome this attitude the railroad company had to stress all the difficulties of its situation, and frequently was rebuked by the rate-making body for discrediting its credit at the very time it was trying to improve it. Yet I believe this result was inevitable under the old system, and we will soon see precisely the same condition repeated if this feature of the old system shall remain in operation. The only way to avoid it is through some radical reconstruction of the management which will bring the public representatives into a direct understanding and also into a direct and original responsibility for the conduct of the business. Unless this can be done I believe it is only a question of time when the remaining vestiges of private management will come to be recognized as altogether impracticable.

Compulsory Consolidation Urged

I do not believe that any form of railroad operation can permanently succeed in this country when conducted through so many different railroad managements as at present. The public interest involved is almost completely homogeneous, because from one end of the country to the other the public wants adequate service and a complete interchange of equipment in order to obtain that service, and of course enjoys uniform rates regardless of the railroads on which the traffic is carried. The labor interest involved was largely homogeneous before the war, and is almost completely so at

present. We cannot, therefore, hope to succeed with a heterogeneous lot of railroad managements, over 100 in number, with perhaps at least 50 of a dominant character. These numerous managements will constantly embarrass each other in many ways. The great variations of prosperity and adversity will completely baffle people trying to understand the real facts as to the needs of the railroads. I believe that it will be essential to consolidate the railroads through some compulsory process into a few great corporations, upon the managements of which the public and labor will be adequately represented.

I know the argument is urged that this will be difficult to accomplish, but I have not the slightest doubt that it can be accomplished if the public realizes the necessity for it, and I am convinced that it is an absolutely necessary step if government ownership is to be permanently avoided.

I am also aware that the suggestion has been made that these consolidations should come about gradually by voluntary action, but my observation of the unsatisfactory results of the old scheme of public regulation and private management are that this situation will not wait for a gradual process of voluntary consolidation. I believe that either this matter must be dealt with in a comprehensive and effective compulsory way or that any scheme of legislation adopted will prove itself a disappointment and a failure long before voluntary consolidations can be worked out.

To recapitulate my views on a permanent solution of the railroad problem, I believe that there must be fundamental changes which will consolidate the railroads into a few great systems. I believe that the public and labor, as well as capital, must be represented upon the managements of these systems. I believe that a definite standard for rates must be established and that earnings clearly in excess of a reasonable return must be provided and must go largely to providing adequate reserves to take care of years of depression and at the same time enough of the excess must be left with the company earning it to provide adequate stimulus for efficiency. In my opinion, if an effort be made to return the railroads to private control without the fundamental reconstruction which I advise, the result will be progressively disappointing, and in a few years the dissatisfaction of the public will manifest itself through an insistent demand for a radically different plan, which is not likely then to stop short of outright government ownership.

The argument has been urged in response to such fundamental changes that we ought not to adopt an untried system but ought to retain the system of the past, with which we are familiar, but it is the very fact of our familiarity with the system of the past which compels me to believe that there must be complete departure from that system. I believe our past experience has demonstrated that the old system will not succeed. It certainly is a poor argument to insist that we should adehere to a failure as a permanent policy simply because we are familiar with it.

Turning to another highly important aspect of this general problem, I wish to point out the unusual difficulties which attend the immediate establishment of any plan of private management with adequate credit to provide the necessary capital needed for railroad development. These obstacles are not only embarrassing to railroad credit, but they also involve serious elements of injury to the public transportation service.

Railroad Credit

I believe there will be general agreement that this is one of the most difficult financial periods in the history of the country or the world. Obviously it will be more difficult to establish satisfactorily the credit of a large number of railroad companies at the present moment than it would be to do this at a later date when financial conditions generally have become better stabilized.

Railroad credit is dependent, of course, upon the conclusions which the investing public reach as to the earning capacity of the railroads. Necessarily these conclusions must be based upon past experience. The war and the conditions of unrest growing out of the war have created conditions which greatly impair the value of recent experience in railroad operations as a basis for forming conclusions as to actual earning capacity. No one would seriously contend that the year 1918 furnished a satisfactory basis for concluding what the railroads could earn on the basis of a given rate level, but as a matter of fact the year 1919 is going to be equally unreliable and probably more so. In the first six months of 1919 there was a sudden, abnormally heavy and abnormally prolonged slump in freight traffic at a time when the railroad operating machinery was just being readjusted from the war basis. The heavy deficits incurred during the first six months were due largely, if not almost wholly, to this condition. The next four months, from July to October, 1919, represented fairly normal conditions of reasonably heavy business, and in those months under unified operation the results were such that a very small increase in rates would have avoided any deficit. The months of November and December will be useless for comparative purposes, because they will be exceedingly costly by reason of the coal strike, which created an industrial condition unprecedented in this country.

With such conditions it is evident that those opposed to rate increases can find innumerable plausible arguments in favor of small increases and those in favor of large increases can support them by correspondingly numerous and plausible arguments. It is also evident that railroad investors will view with alarm the heavy deficits of the past, and probably will not be reassured without substantial increases. There probably could not be a more difficult time in which to readjust rates so as to reassure the railroad investor and at the same time reasonably protect the public.

By reason of this condition the public interest is confronted with a serious dilemma. How can it at the present moment make rates high enough to constitute adequate reassurance to railroad credit without at the same time making them much higher than would likely turn out to be necessary if the period of readjustment could be postponed until a time of more stable conditions. Undoubtedly if the policy be adopted of establishing independent railroad credit instantly at all hazards it would be only logical to make the rate increases large enough to do so.

There may easily arise out of these perplexities a situation which will fall short of what the railroad investor has been led to expect, and which consequently will not stimulate sufficient confidence in railroad credit.

On one point I believe there must be agreement, and that is that any rate increase which will at all establish an adequate credit for the various railroad companies operating independently on their own responsibility must be substantially greater than a rate increase which would protect the situation temporarily if unified control were continued until more stable conditions appear. This means that the public must pay a very substantial price in an additional increase in rates for the privilege of the immediate resumption of private management.

Car Shortages in Prospect

Again, it is clear that it will not be possible for the railroad companies to make satisfactory financial plans on the basis of the legislation now in prospect in time to commit themselves definitely to large orders for necessary equipment so as to meet the heavy requirements of next fall. For

months I have been pointing out that under existing conditions the Railroad Administration could not order and agree to pay for this equipment, and that therefore it could only be provided soon enough by immediately enabling the railroad companies to do so, so the prospects for getting it in time for next fall have largely disappeared. I believe it will be generally conceded that under federal control the unification of control has made the existing equipment go further and produce a greater volume of transportation than would be possible under the old form of private management. If, therefore, private management is resumed at a time when it will be impossible to secure the additional equipment necessary to admit of the numerous private managements giving a corresponding total of transportation service, it is evident that the public will pay an additional price through increased shortages in transportation in the next period of heavy business.

When I appeared before the Senate Committee on Interstate Commerce last February I pointed out the difficulties in the way of a transfer back to private management during the period of readjustment and expressed the opinion that the public would be better served, and with less cost, and railroad investors would be better protected, to continue the present federal operation long enough to tide over the readjustment period and also to admit of legislation with greater deliberation after the beginning of the next Presidential term. The Congress, however, has from the time of the first proposal of this plan appeared to be adverse to any procedure other than the adoption at the earliest possible moment of general legislation and the turning back of the railroads to private management under such legislation. Since it would be out of the question for federal control to be successful without the support of Congress, the necessary steps have been taken in accordance with the sentiment and purpose of Congress for the turning back of the railroads on March 1.

Advantages Resulting from Federal Control

In this connection let me say that, despite the widespread fashion of criticising federal control of railroads and attributing to it practically every condition that grew out of the war, my deliberate judgment is that federal control has rendered some very important public services which far outweigh any defects with which it may be chargeable. For one thing, it protected railroad credit through a period of most critical financial difficulty. When we consider on the one hand the precarious situation of public utilities in many parts of the country, and on the other hand the results which the railroad properties have enjoyed during federal control, it must be clear that a highly important service has been rendered in the protection of investment in railroad property and of the due returns therefrom. Equally important results have been obtained from the standpoint of the general public. In a time of great difficulty, and with an amount of equipment which was inadequate even before federal control began, the unified operation of the railroads has produced a total transportation service greater than ever before in the history of the country and has done it with far less congestion and delay than was characteristic of conditions of heavy business under private control. Generally speaking, the period of heaviest business is in the fall months. In these months, both in 1918 and in 1919, the business was heavier than in any corresponding periods prior to the war. A greater volume of traffic was moved and with far less congestion than was characteristic of the conditions of private management. I know on several occasions in the fall months prior to federal control the state of traffic congestion in some parts of the country reached such a state as to constitute a transportation crisis, but these conditions were obviated through the use of the opportunities which came from unified control. I attribute the achievement entirely to the opportunities which unified control gave and not to any superior wisdom which I claim was possessed by the Railroad Administration.

I want to emphasize the point that the railroads were placed under government control during the war and that the predominant motive during the war was the prompt movement of troops and war supplies. From January 1, 1918, to November 1, 1919, there were 13,446,859 soldiers, sailors and marines moved on the railroads in the United States, and this was equivalent to transporting one passenger 5,917,658,719 miles, thus necessitating the use of 213,749 railroad coaches and Pullmans and the movement of over 18,000 special trains. The civilian inconveniences, which have been dwelt upon so consistently, resulted in a very large measure from the primacy which had to be given to this war object.

Reasons for the Deficit

The fact that there has been a deficit from railroad operations under federal control has been regarded by many as conclusive evidence of the necessity for a precipitate return to private control, but the fact is that the deficit has not been due to excessive costs. The costs have not been relatively greater than in other lines of enterprise. The real reason for the deficit is due to the fact that the prices charged for railroad transportation have not been increased in keeping with the increases in prices of commodities. For the first six months of federal control there was no increase in the rates of transportation. If the increases in rates which were put into effect in the latter part of June, 1918, had been put into effect on January 1, 1918, at the very beginning of federal control, the Class I railroads would have shown a profit of about $14,000,000 at the end of October, 1919, at the expiration of 22 months of federal control, instead of a deficit of nearly $500,000,000. In other words, the deficit can fairly be said to have been due to the fact that the increase in rates was necessarily deferred six months. The entire deficit for the period from January, 1918, to October, 1919, both inclusive, for Class I railroads and large terminal companies in federal operation was $480,000,000, but if the rate increases made in June, 1918, had been effective January 1, 1918, from which time of course the increased expenses were largely effective, the additional revenue, without any increase in operating expenses, would have been $494,000,000, thus more than offsetting the deficit and leaving a profit of $14,000,000.

If the Railroad Administration had increased its rates 50 or 60 per cent, which was less than the increase in prices by private industries throughout the country and which, by the way, appears to be in line with the increases in rates now being proposed for railroads in England and in other European countries, handsome profits would have been shown instead of a deficit.

The indications are that, despite all the increases in cost which have been incurred by the Railroad Administration, a continuance of unified control could be made self-supporting upon a very small increase in rates, whereas a return to private management, with the necessity of establishing the credit of a great number of independent railroad companies, would undoubtedly call for a much greater increase in rates if the railroad credit is in fact to be successfully established.

While on the subject of results of the Railroad Administration I wish to correct the radically erroneous impression as to the treatment of labor. The increase in the rates of pay to railroad labor has by no means been out of line with the increases to labor in private enterprises, and in both instances the increases have been due to the conditions created by the war. It is a curious illustration of the aberration of the times that the increase in wages made by the Railroad Administration is regarded as a proof of politics

and inefficiency, while an even greater increase in some of the important industrial enterprises of the country is regarded as a perfectly natural response to business necessities.

Special stress has been laid by some of the critics of the Railroad Administration upon the increase in the number of employees.

This increase is principally accounted for by the establishment of the eight-hour day and involves no increase in the number of hours of labor paid for. Obviously if 80 hours of labor are to be done 10 employees will be required on the basis of an eight-hour day, as compared with only 8 on the basis of a 10-hour day, and yet only 80 hours will be paid for in either case. To a considerable extent it is undoubtedly true that the large number of employees has been due to the loss of experienced employees on account of the war and to the exceptional turn-over of employees which has been a natural characteristic of the industrial change and unrest. In these respects the Railroad Administration does not differ from other industrial enterprises. It is important to bear in mind that the number of hours of work paid for is in the control of the experienced railroad officers, as far as it can be controlled in view of general industrial conditions.

The Central Administration is constantly checking up this situation and bringing to the attention of local officers any cases which arise and which indicate the payment for unnecessary hours of work. The influence of the Central Administration, therefore, is consistently exercised in favor of a reduction in the hours of work paid for rather than in favor of an increase in the hours of work paid for.

No Politics in the Railroad Administration

Let me at this point digress to say that there has never been any solution of either officers or employees in the Railroad Administration for political reasons and that the assumption which is sometimes indulged that governmental activities create unnecessary positions for political reasons is absolutely without any foundation as far as the Railroad Administration is concerned. I do not believe there is a single officer of the Railroad Administration who has sought his position. It is strikingly an institution where the office has sought the man. There has never been any inquiry into the politics of an officer, and as a rule I am not advised as to the politics of the members of my staff or their subordinates, or as to the politics of the officers on the various railroads or their subordinates. Let me emphasize also that throughout federal control railroad operation has been in the hands of skilled railroad officers who have spent their lives in railroad service and, generally speaking, has been in the hands of the very same officers who conducted the same operations prior to federal control and will continue to conduct them after federal control.

Returning to the results of railroad operation under federal control, let me emphasize that the striking respect in which private enterprise has been more effective than the Railroad Administration is that the private enterprise has been so much more efficient in raising the prices which have been imposed upon the public, while the Railroad Administration has endeavored to protect the public and the business of the country from any unnecessary increase in the level of the railroad rate structure. Conditions in the early part of 1919 were so abnormal and unprecedented as to preclude any satisfactory and reliable readjustment of rates. It is thoroughly appreciated that the unfavorable return in the early months of 1919 was very largely, if not almost wholly, due to the abnormal slump in business. If an increase had then been made to produce the profits on the abnormally small business I am satisfied the step would have been exceedingly unjust to the public. The result in the fairly normal months of July to October clearly justified this prudent policy, because they indicated that in any normal volume of business the rate increase necessary under unified control would have been very much less than was indicated by the abnormal months preceding. The entire increase in rates since 1914 has been on an average for the country only about 33 per cent. In that time the increase in prices of the articles transported has varied from 60 per cent and 80 per cent up to 150 per cent.

Let me in conclusion again remind you of the conditions which prevailed in 1917. We get no clearer or more striking picture of these conditions than that which was presented by the railroad executives to the Interstate Commerce Commission in the late fall of 1917 in behalf of the effort then made to secure an increase in rates. The conditions were then summed up on behalf of the railroad interests as follows:

(a) Continuous increases in the cost of labor, fuel, supplies, taxes and of obtaining new capital;

(b) Inability to secure and retain efficient labor;

(c) Curtailment of maintenance expenses, which curtailment is due in part to inability to secure necessary labor and materials;

(d) Decrease in net operating income, notwithstanding large increase in operating revenues, in property investment, in carload and in trainload;

(e) Reduction in surplus, with consequent effect upon the credit of the carriers;

(f) Inability to secure new capital by the issue of stock, with the consequent weakening effect upon the financial structure;

(g) Inability to provide improvements and facilities, not only essential for the traffic of today, but equally essential for the traffic of the future.

Let us not forget that conditions of this character were the outgrowth of the imperfect system of management which existed at that time, and let us take the lesson to heart in considering whether there must not be a fundamental reconstruction of the scheme of management and regulation if any of the useful features of private control are to be re-established with any reasonable hope of their being permanently successful.

Discussion of Bridge Specifications

Because of the great importance of the subject and the impracticability of discussing it intelligently on the floor of a convention, the American Railway Engineering Association has adopted a rather unusual method of obtaining a full and thorough discussion of the proposed new specifications for steel railway bridges which were submitted to the association tentatively at the convention in March, 1919. Following the discussion on the floor of the convention, the Committee on Iron and Steel Structures solicited written discussion from the members in order that the report might be subjected to mature consideration during the ensuing year. Communications of this kind were received by the committee from 31 railway bridge engineers, bridge company engineers and others, and because of the value of the material thus obtained, it has been submitted to the members of the association in Bulletin 219 recently issued.

Following the lead of the discussion at the convention, the matters receiving the most extended attention in the written discussion were loads, stresses and impact and their relation to each other with respect to the provision for future ultimate loads. Following the line of his verbal discussion at the convention, P. B. Motley, engineer of bridges, Canadian Pacific, Montreal, advocates the use of

an equivalent uniform live load in place of the present Cooper wheel loading, while J. A. Bohland, bridge engineer of the Great Northern, St. Paul, Minn., takes the opposite stand. Some engineers assume the position that the Cooper wheel arrangement is now obsolete and should be modified, while others are inclined to the opinion that even though the Cooper loading is not ideal, it would be a mistake to make any change. R. L. Huntley, chief engineer, Union Pacific, objects to the establishment of the E-60 Cooper classification as the minimum, because he believes that E-55 will be found adequate in a great many cases. This view is expressed by a number of others, there being the usual anxiety as to possible action by state legislatures in fixing this high loading as a statutory minimum.

Objections are raised also to the new impact and column formulas. With the former, one objection relates to the use of the span length instead of the loaded length in determining the impact ratio to apply to web members. This would have the effect of reducing the size of web members near the center of spans. The same result is produced in another way by the new column formula which gives lower stresses for lower values of $\frac{1}{l}$ and higher stresses for higher values of $\frac{1}{r}$ than the old formula. Thus web compression members, being more slender than other parts of the trusses, would be allowed higher unit stresses than in the old specification. This calls attention to the criticism of the specification made at the convention with respect to the design of structures for future limiting loads. The use of a live load approximating the present day train loading, as provided for in the specifications, has a tendency to make these same members too weak for the future limiting load. It was for this reason that Paragraph 45 was inserted in the specification and this paragraph received a large amount of criticism in the discussion appearing in Bulletin 219. It is also apparent from this discussion that several of the critics did not understand the purpose intended by this clause, which has for its object an arbitrary increase in the size of members which might prove inadequate for the future loading. The common criticism was that the paragraph was awkward and illogical and that its purpose would not be readily understood by those not familiar with the intent.

Objections are raised to the provisions of Paragraph 49, relative to the proportioning of the top flanges of plate girder bridges because the new formula is much more severe than the old one. One criticism is that this formula did not provide sufficient distinction between through and deck bridges, since the deficiency of the bracing of the top flange in the latter is much more efficient than in the former.

Senator Harding on Anti-Strike Bill

Senator Warren G. Harding of Ohio, a candidate for the Republican presidential nomination, in a letter to E. J. Miller, secretary of a railway union at Newark, Ohio, defended his course in supporting the anti-strike section in the Cummins railroad legislation bill and defined his position toward organized labor.

"Organizatoin and collective bargaining, under wise leadership, have done more to advance the cause of labor than all other agencies combined, and any one who thinks to destroy sane unionism, by legislation or otherwise, is blind to conditions firmly established, and is insensible to a public sentiment which is deliberate and abiding," he said.

"But the advancement of unionism is one thing and the domination of organized labor is quite another. I subscribe to the first and oppose the latter. I do not believe in any class domination, and the long fight to remove the domination of capital, now fairly won, is lost if labor domination is substituted in its stead.

"This brings me to the specific reply to your inquiries relating to the Cummins bill and its anti-strike clause. I voted for the bill because I believed it to be the best measure presented to the Senate for the restoration of the railway lines to their owners.

"I favored the anti-strike clause because it applies to a public service under governmental regulation, in which Congress exercises its power to limit the return on capital invested, fixes rates at which the public must be served, enacts the conditions under which service must be rendered, and, finally, in the anti-strike clause, provides a capable tribunal for the adjustment of all labor grievances, so that no interruption in transportation need be apprehended.

"In our modern life all the people are dependent on railway transportation for food, comfort, health, security and the necessary materials for productive activity and attending livelihood. It has become a prime necessity. This transportation is a public service and is no longer a speculative private enterprise. It is not competitive, except as to quality of service. It is limited in profit and the investment comes under governmental restrictions. Expenditures are limited because earnings are limited.

"All this assumption in regulation is designed for the public good. Is it not wholly consistent and fair, then, that the same governmental authority should prohibit the paralysis of the public service, so long as it provides a competent tribunal to adjust all labor grievances and awards to railway employees every just consideration? I believe it not only consistent but a distinct advance in behalf of the public and the workmen alike.

"If the government, representing all the people, can not guarantee transportation service under any and all conditions, it fails utterly. If that same government cannot provide just consideration of the workmen operating the transportation systems it fails again. It ought to and must do both.

"It is far afield from the main question to talk about enslaving the laboring man. Nothing is further from the truth. Nobody holds such a desire or the semblance of such a thought.

"The law specifically preserves to the individual his right to quit his employment. It provides the government's guaranty of just treatment while he remains in the railway employment. Government itself is the lawful agent of justice.

"There has been no intent to interfere with the plan of collective bargaining in competitive, private enterprise. This provision deals solely with a public service, the continued and uninterrupted maintenance of which is vital to the whole people, and in the one act we pronounce public welfare paramount and at the same time commit the government to a plan of awarding full and prompt justice to every man engaged in the great and complex operation.

"I do not assert that the Cummins bill is perfect but it proclaims our government to be jealous as concerned about a service essential to the public and solemnly commits the same government to the just treatment of the men who perform that service.

"I do not know that such a law will prevent railway strikes, but I do know that it ought, and I think the great rank and file of railway workers ought to welcome it. It suggests the nation-wide aspiration for industrial peace with unfailing justice to all concerned, which is in the heart of the American millions today."

Frank Trumbull Retires from the C. & O.

Is Succeeded as Chairman of the Board of Directors of That Road by H. E. Huntington

H. E. HUNTINGTON, nephew of the late Collis P. Huntington, and a director of the Chesapeake & Ohio, has been elected chairman of the board of directors of the Chesapeake & Ohio and of the Hocking Valley, succeeding Frank Trumbull, resigned. Mr. Trumbull has by no means retired from active work. He is the chairman of the board of the Missouri, Kansas & Texas, and will, presumably, see that company through its reorganization. He is a director of the National City Bank of New York, chairman of the financial committee of the board of directors of the New York City Y. M. C. A., and an active trustee of the Tuskogee Institute, besides having broad personal interests.

Mr. Huntington will be 70 this month. He retired from active work ten years ago, and his acceptance of the position of chairman of the board of directors of the Chesapeake & Ohio and of the Hocking Valley, marks a continuing interest in these properties rather than any return to harness. George W. Stevens is now federal manager of the Chesapeake & Ohio, and will probably be elected president when the road is returned to its owners. C. E. Graham is now vice-president of the corporation, and on him will, in all probability, devolve much of the hard work which Mr. Trumbull is laying down.

The election of Mr. Huntington has a special interest for the older generation of railroad men. His uncle built a considerable portion of the road, and he, himself, from 1880, was superintendent of construction of the Huntington lines being built between New Orleans and Louisville, and was in direct charge of the Chesapeake & Ohio Southwestern. As a matter of fact, most of his railroad work was in the territory of the Chesapeake & Ohio. In 1884 he was superintendent of the Kentucky Central, which was being operated by the Chesapeake & Ohio. He became receiver of the Kentucky Central, and later its vice-president and general manager, holding this position until the road was sold to the Louisville & Nashville in 1890. During the time that he was an officer of the Kentucky Central, he had charge of the construction company which built the lines through Covington, Ky., and Cincinnati, Ohio, and which built the Ohio River Bridge. Mr. Huntington went to California in 1892, and became first assistant to the president of the Southern Pacific, and in 1900 was made second vice-president, and then first vice-president. He resigned from this position in 1904, but was active in business affairs until the year 1910. He was then 60 years of age and he quite definitely retired from the direct work of the management of the properties in which he, of course, retained a large financial interest.

H. E. Huntington

Frank Trumbull has been at work since he was a boy of 12. He was born in Arcadia, Mo., in 1858. His father was a minister and of an old New England family; while the family was poor and the boy had to begin earning his living at 12, he had inherited or acquired the foundations of a liberal education. Whether it was inherited or acquired, however, he developed a remarkable gift for writing terse, crisp English, lightened by a sense of humor. This sense of humor, unblunted by a life of hard work and health that has been far from good, has been a marked quality.

During the years when he would ordinarily have been going through the seventh and eighth grades, and the first two years of high school, Frank Trumbull was earning his living working first as a water boy and then at other jobs on the new railroads in the Southwest. When he was 16, he was taken in as a clerk in the controller's office of the Missouri, Kansas & Texas (it was 38 years later that he was elected chairman of the board of directors of this company), and for 14 years he worked up, step by step, through the accounting offices of the Katy and the Missouri Pacific, until in 1886, he was made auditor of the Texas & Pacific.

He went to Colorado in 1888, and for five years was in the wholesale coal business, and during this time made reports for New York and London bankers on various western railroad properties.

In 1893, he was appointed receiver and general manager of the Union Pacific, Denver & Gulf. This was the bankrupt branch of the Union Pacific which Mr. Trumbull developed, extended, connected with the Fort Worth & Denver City, and made into the Colorado & Southern. In this work he was associated with Grenville M. Dodge, and later with Edwin Hawley and with the Huntingtons. The road which Mr. Trumbull took charge of had about a thousand miles of line, and earned in 1893, $3,500 a mile gross. By 1899, the road had been made an independent property and was organized as the Colorado & Southern. Mr. Trumbull was elected president, with Grenville M. Dodge as chairman of the board. B. L. Winchell was vice-president and traffice manager. Harry Bronner was secretary and treasurer, and E. J. Berwin and H. Walters, with whom Mr. Trumbull had been associated in the East were on the board of directors.

At that time the Colorado & Southern had a total mileage of 762 standard gage miles, and 380 narrow gage miles. In the fiscal year ending June 30, 1900, the total operating revenues amounted to $4,238,000, and operating expenses to

$5,153,000. Earnings were at the rate of $5,712 per mile of road. It was not until 1902 that Edwin Hawley became a member of the board of directors, but Mr. Hawley and Mr. Trumbull retained their interest in the company until Mr. Trumbull effected the sale of a controlling part of the stock to the late James J. Hill. This sale took place in 1909. The total mileage operated June 30, 1908, was 1,952 miles. The total operating revenues amounted to $14,281,000, and the operating income amounted to $4,635,000. Operating revenues amounted to $7,393 per mile. The company had no floating debt, and was paying regular dividends on its first and second preferred stock.

In 1908, and when the Colorado & Southern sale was carried out, Mr. Trumbull was fifty, and his inclination probably was to retire. He had had many years of exceedingly hard work, and a great deal of sickness. It was just prior to this time that the Pennsylvania Railroad had divested itself of its interest in the stock of the Chesapeake & Ohio, and this stock was being held by the banking firm of Kuhn, Loeb & Company. Mr. Trumbull was persuaded by his associates to join them in the purchase of this stock and to become chairman of the board of directors of the company. A controlling interest in the Hocking Valley was for sale, and Mr. Trumbull bought this for the Chesapeake & Ohio. About the same time Edwin Hawley put through negotiations for the purchase by the Chesapeak & Ohio, of the line from Cincinnati to Chicago which is now known as the Chicago Line of the Chesapeak & Ohio. The Hocking Valley was a valuable investment for the Chesapeake & Ohio. The Chicago Line did not prove so valuable.

Frank Trumbull

The development of the Chesapeake & Ohio was somewhat slow, and in 1910 the property had difficulty in raising all of the new capital which could have been spent advantageously on the road. The stock which Mr. Trumbull and his associates bought, was not a majority of the total, and the other interests in the property retained a voice in its management. In the broader policies and developments, however, Mr. Trumbull's plans have been carried out and the Chesapeake & Ohio to-day is a magnificent railroad property with the earning capacity limited only by the general railroad situation, and its ability to raise and spend money for additional railroad facilities.

Frank Trumbull was largely instrumental in the formation of the Railway Executives Association which was originally the advisory committee of railway executives and of which he was the first chairman. His work in this connection has been that of a far-seeing statesman, ready to recognize the changes in public sentiment and in the conditions of railroad management and operation.

In his attitude toward the present railroad problem, there is brought up a side of his character which is not easy to fully understand and is harder to adequately describe. The difficulty lies in the fact that high idealism generally connotes a certain lack of shrewd practicality. High idealism, however, and shrewd practicality can be combined in the same man, as for instance in Lincoln. They are so combined in Frank Trumbull. It might be said that the idealism is shown in what he himself does, and the shrewd practicality in his ability to meet every man on his own ground. The building of the Colorado & Southern, with all that it meant to the development of the State of Colorado, was the working out of a high ideal, in the practical fashion which used to be considered typically American. In his discussion, however, of the present railroad problem, Mr. Trumbull never for an instant lets a belief in the value of private initiative, individual endeavor, successful competition, and the working out of the natural laws of economics and the survival of the fittest, interfere with his recognition of the fact that these are not the principles on which the American railroad question will be solved. He deals with public opinion and political bias as he finds it, and in a practical and hard headed way.

Perhaps there is something of the same contrast of characteristics in his relations with his subordinates, his associates and his business competitors. With his subordinates, he is considerate to an extraordinary degree. Probably himself sensitive, he is peculiarly thoughtful of the feelings of others. His business relations with his subordinates and with his associates are simple and straightforward, but he has the wholesome respect of the most domineering of the men who have been prominent in building up this country. When the question of the sale of the Chesapeake & Ohio stock was under discussion, it was said that the older J. P. Morgan said to Mr. Trumbull: "You people are from the West, we don't know you. We don't know what trouble you are going to make down here." Mr. Trumbull replied by telling the story of the small country boy who went to his first dance. He stood about for a little while and picked out the girl he thought prettiest, and went up to her and asked her for a dance. She replied that she did not know him and that she hadn't met him; but he assured her that that was all right, and that he was taking as much of a chance as she was.

Mr. Trumbull negotiated the sale of the stock of the Colorado & Southern to the late James J. Hill, and James J. Hill was in the habit of getting pretty much the best of every bargain. But in the sale and purchase of the Colorado & Southern, it can be said safely that Mr. Trumbull did not get the worst of the bargain. There are many men in New York and in other parts of the country with impregnable credit, but it cannot be said of all of them as it can of Mr. Trumbull, that the spirit of an agreement will always be as absolutely binding as the letter.

Sixty passengers injured by a hurricane is the substance of a cable despatch from Valencia, Spain, January 5, reporting the overturning of a passenger train near Denia, by a hurricane, on the 3rd of January.

A Plan for the Adjustment of Labor Disputes

Industrial Conference Outlines Tentative Proposals and Asks for Constructive Criticism

THE INDUSTRIAL CONFERENCE, convened by the President in Washington on December 1, has issued a preliminary statement in the desire that certain tentative proposals be given considerate study by interested individuals and organizations throughout the country. It will reassemble on January 12 and will then carefully consider any constructive criticisms that may be submitted to it.

The conference does not deem it useful at this time to enter upon a discussion of the causes of industrial unrest. It believes rather that its most important immediate contribution is the suggestion of practical measures which will serve to avert or postpone industrial conflicts.

"Our modern industrial organization, if it is not to become a failure, must yield to the individual a larger satisfaction with life," the introductory statement says. "It makes possible a greater production of material things. But we have grown so accustomed to its complexity that we are in danger of forgetting that men are today more dependent on each other than ever before. The spirit of human fellowship and responsibility was easier to maintain when two or three worked side by side and saw the completed product pass from their hands. Yet their co-operation was actually less necessary because each by himself was more nearly capable, if circumstances demanded, to meet the needs of life.

"Today we have a complex interweaving of vital interests. But we have as yet failed to adjust our human relations to the facts of our economic interdependence. The process toward adjustment, though slow, nevertheless goes on. The right relationship between employer and employee in large industries can only be promoted by the deliberate organization of that relationship. Not only must the theory that labor is a commodity be abandoned, but the concept of leadership must be substituted for that of mastership. New machinery of democratic representation may be erected to suit the conditions of present industry and restore a measure of personal contact and a sense of responsibility between employer and employee. The more recent development of such machinery with the co-operation of organized labor is a hopeful sign. But back of any machinery must be the power which moves it. Human fellowship in industry may be either an empty phrase or a living fact. There is no magic formula. It can be a fact only if there is continuous and sincere effort for mutual understanding and in unfailing recognition that there is a community of interest between employer and employee.

"Pending the growth of better relationships between employers and employees, the practical approach to the problem is to devise a method of preventing or retarding conflicts by providing machinery for the adjustment of differences. The conference believes that it is possible to set up a more effective series of tribunals for the adjustment of disputes than at present exists. To be successful, such tribunals must be so organized as to operate promptly as well as impartially. There must be full participation by employers and employees. There must be representation of the public to safeguard the public interest. The machinery should not be used to promote unfairly the interests of organizations, either of labor or of capital. The plain fact is that the public has long been uneasy about the power of great employers; it is becoming uneasy about the power of great labor organizations. The community must be assured against domination by either. On the other hand, there must be equal assurance that such machinery will not be used to discriminate against organizations of employees or of employers. Both should be protected. The right of association on either side should not be affected or denied as a result of the erection of such tribunals.

"The plan which follows does not propose to do away with the ultimate right to strike, to discharge, or to maintain the closed or the open shop. It is designed to bring about a frank meeting of the interested parties and cool and calm consideration of the questions involved, in association with other persons familiar with the industry.

"The plan is national in scope and operation, yet it is decentralized. It is different from anything in operation elsewhere. It is based upon American experience and is designed to meet American conditions. To facilitate discussion, the plan submitted, while entirely tentative, is expressed in positive form and made definite as to most details." The statement of the plan is in part as follows:

Plan for Boards of Inquiry and Adjustment

There shall be established a National Industrial Tribunal, and Regional Boards of Inquiry and Adjustment.

The National Industrial Tribunal shall have its headquarters in Washington, and shall be composed of nine members chosen by the President and confirmed by the Senate. Three shall represent the employers of the country and shall be appointed upon nomination of the Secretary of Commerce. Three shall represent employees and shall be appointed upon nomination of the Secretary of Labor. Three shall be representatives of the public interest. Not more than five of the members shall be of the same political party.

The tribunal shall be, in general, a board of appeal. Its determinations on disputes coming to it upon an appeal shall be by unanimous vote. In case it is unable to reach a determination, it shall make and publish majority and minority reports which shall be matters of public record.

The United States shall be divided into a specified number of industrial regions. The conference suggests 12 regions with boundaries similar to those established under the Federal Reserve system, with such modifications as the industrial situation may make desirable.

In each region the President shall appoint a regional chairman. He shall be a representative of the public interest, shall be appointed for a term of three years and be eligible for reappointment.

Whenever in any industrial region, because of the multiplicity of disputes, prompt action by the Regional Board is impossible, or where the situation makes it desirable, the National Industrial Tribunal may in its discretion choose one or more vice-chairmen and provide for the establishment under their chairmanship of additional regional boards.

Panels of employers and employees for each region shall be prepared by the Secretary of Commerce and the Secretary of Labor, respectively, after conference with the employers and employees, respectively, of the regions. The panels shall be approved by the President.

Whenever a dispute arises in a plant or group of plants which is not settled by agreement of the parties or by existing machinery, the chairman may on his motion, unless disapproved by the National Industrial Tribunal, and shall at the request of the Secretary of Commerce or the Secretary of Labor or the National Industrial Tribunal, request each side concerned in such dispute to submit it for adjustment

to a Regional Board of Adjustment. To this end each side shall, if willing to make such submission, select within not less than two nor more than seven days, at the discretion of the chairman, a representative.

When both sides shall have selected their representatives the chairman shall take from the top of the panels for the industry concerned, or in the case of employees for the craft or crafts concerned, names of employers and employees, respectively. The representatives selected by the two sides shall be entitled to a specified number of peremptory challenges of the names so taken from their respective panels. When two unchallenged names of employers and employees shall have been selected in this manner, they, with the chairman and the representatives selected by the two sides shall constitute a Regional Board of Adjustment.

The appointment of representatives of both sides shall constitute an agreement to submit the issue for adjustment and further shall constitute an agreement by both sides that they will continue, or reestablish and continue, the status that existed at the time the dispute arose.

The Board of Adjustment so constituted shall proceed at once to hear the two sides for the purpose of reaching a determination. Such determination must be by unanimous vote. In case the board is unable to reach a determination the question shall, unless referred to an umpire as provided in section 9, pass upon appeal to the National Industrial Tribunal.

If either side to the dispute fails, within the period fixed by the chairman, to select its representative, the chairman shall proceed to organize a Regional Board of Inquiry. Such Regional Board of Inquiry shall consists of the regional chairman, two employers selected in the manner specified from the employers' panel, and two employees selected in like manner from the employees' panel and of the representative of either side that may have selected a representative and agreed to submit the dispute to the board. If neither side shall select a representative within the time fixed by the chairman, the Board of Inquiry shall consist of the chairman and the four panel members only.

Upon the selection of a representative, within the specified time, the side concerned shall be entitled to the specified number of peremptory challenges as provided above. The representative shall have the right to sit on the Board of Inquiry and to take full part as a member of such board in the proceedings thereof.

The Board of Inquiry as so constituted shall proceed to investigate the dispute and make and publish a report, or majority and minority reports, of the conclusions reached, within 5 days after the close of its hearings and within not more than 30 days from the date of issue of the original request by the chairman to the two sides to the dispute, unless extended on unanimous request of the board or the National Industrial Tribunal. It shall transmit copies of this report or reports to the Secretaries of Commerce and of Labor, respectively, and to the National Industrial Tribunal, where they shall be matters of public record.

At any time during the progress of the inquiry at which both sides shall have selected representatives and agreed to submit the dispute for adjustment, the Board of Inquiry shall become a Board of Adjustment by the admission to membership on the board of such representatives. The side or sides which appoint representatives after the date fixed in the original request of the chairman shall, because of its delay, after a reduction in the number of peremptory challenges to which it otherwise would have been entitled.

The Board of Adjustment so constituted shall proceed to the determination of the dispute as though it had been organized within the period originally fixed by the chairman.

When a Regional Board of Adjustment is unable to reach a unanimous determination it may by unanimous vote select an umpire and refer the dispute to him with the provision that his determination shall be final and shall have the same force and effect as a unanimous determination of such Regional Board.

Whenever the questions involved in a dispute extend beyond the boundaries of a single region, the regions to which the dispute extends shall, for the purpose of such dispute, be combined by order of the National Industrial Tribunal, which shall designate the chairman of one of the regions concerned to act as chairman in connection with the dispute in question.

Two employer members and two employee members shall be chosen from the combined panels of the regions involved in the dispute under rules and regulations to be established by the National Industrial Tribunal. The members representing the two sides to the dispute shall be chosen as in the case of a dispute in a single region.

A Regional Board of Inquiry or of Adjustment constituted for a dispute extending beyond the boundaries of a single region shall have the same rights and powers conferred upon a Regional Board for a single region.

Whenever an agreement is reached by the parties to a dispute or a determination is announced by a Regional Board of Adjustment, or by an Umpire, or by the National Industrial Tribunal, the agreement or determination shall have the full force and effect of a trade agreement which the parties to the dispute are bound to carry out.

In connection with their task of inquiry and adjustment, the Regional Boards and the National Tribunal shall have the right to subpoena witness, to examine them under oath, to require the production of books and papers pertinent to the inquiry, and their assistance in all proper ways to enable the boards to ascertain the facts in reference to the causes of the dispute and the basis of a fair adjustment. Provision shall be made by law for the protection of witnesses and to prevent the misuse of any information so obtained.

In the presentation of evidence to the tribunal and the boards each side shall have the right to present its position through representatives of its own choosing.

The Secretary of Commerce and the Secretary of Labor in making nominations for the National Industrial Tribunal and in preparing and revising the regional panels of employers and employees shall from time to time develop suitable systems to insure their selections being truly representative.

The National Industrial Tribunal, the Regional Boards of Adjustment, and the Umpires shall in each of their determinations specify the minimum period during which such determinations shall be effective and binding. In case of emergency a Regional Adjustment Board or the National Industrial Tribunal may, after hearing both sides, after its determination by abridging or extending the period specified.

The terms of office of members of the National Industrial Board shall be six years; at the outset three members, including one from each group, shall be appointed for a term of two years, three members for a term of four years, and three members for a term of six years; thereafter three members, one from each group, shall retire at the end of each period of two years. Members shall be eligible for reappointment.

The regional panels provided for in section 5 shall be revised annually by the Secretaries of Commerce and of Labor, respectively, in conference with the employers and employees, respectively, of each region.

The establishment of the National Industrial Tribunal and the Regional Boards described shall not affect existing machinery of conciliation, adjustment, and arbitration established under the Federal Government, under the governments of the several States and Territories or subdivisions thereof, or under mutual agreements of employers and employees.

Any industrial agreement made between employers and employees may, by consent of the parties, be filed with the National Industrial Tribunal. Such filing shall constitute agreement by the parties that in the event of a dispute they will maintain the status existing at the time the dispute originated until a final determination, and that any dispute not adjusted by means of the machinery provided through the agreement shall pass on appeal to the National Industrial Tribunal for determination, as in the case of a dispute submitted on appeal from a Regional Board.

Objects of Plan

The main objects of the above plan are to secure national co-ordination and to stimulate the formation of bodies for local adjustment. The requirement of unanimity of agreement has by experience in the United States proved remarkably successful and should assure such confidence that neither side can rightfully refuse to submit to adjustment. A precedent condition of such submission is that the interruption of production shall be delayed. The frank meeting of the parties in controversy together with other men skilled in questions at issue always give promise of settlement. On the other hand, refusal to submit to the board not only inaugurates a legal inquiry but also prejudices the obstinate party or parties in public opinion. Moreover, the fact that membership on the board of inquiry is available to either party to the conflict singly would tend further to weaken the position of the other. When both parties join, the board at once becomes a Board of Adjustment, and conflict ceases by agreement until a determination is reached.

Statement as to Public Utility Industries

The plan here proposed presents greater difficulties in application to certain public utilities than to competitive industry. The continuous operation of public utilities is vital to public welfare. As the capital invested is employed in public use, so is the labor engaged in public service, and the withdrawal of either with the result of suspending service makes the people the real victim. While continuous operation of all utiltities is conducive to the general convenience of the people, that of some of them is essential to their very existence. Of the latter class the railways are a conspicuous example and bear the same relation to the body politic as do the arteries to the human body. Suspension produces practical social and economic anarchy and may impose hardship even to the point of starvation upon large sections of the community. The interruption in such essential public utilities is intolerable.

The conference believes that a plan of tribunals or Boards of Adjustment and Inquiry should be applied to public utilities, but in the adaptation of the plan two problems present themselves. First, governmental regulation of public utilities is now usually confined to rates and services. The conference considers that there must be some merging of responsibility for regulation of rates and services and the settlement of wages and conditions of labor. Such co-ordination would give greater security to the public, to employee, and to employer. Second, is the problem whether some method can be arrived at that will avert all danger of interruption to service. These matters require further consideration before concrete proposals are put forward.

Statement as to Government Employees

The government is established in the interests of all the people. It can be conducted effectively only by those who give to its service an undivided allegiance. The terms and conditions of employment in the government service are prescribed by law. Therefore no interference by any group of government employees, or others, with the continuous operation of government functions through concerted cessation of work or threats thereof can be permitted.

The right of government employees to associate for mutual protection, the advancement of their interests, or the presentation of grievances can not be denied, but no such employees who are connected with the administration of justice or the maintenance of public safety or public order should be permitted to join or retain membership in any organization which authorizes the use of the strike or which is affiliated with any organization which authorizes the strike.

The conference is not now expressing an opinion upon the propriety of the affiliation of other classes of government employees with organizations which authorize the use of the strike.

The principles above stated are not to be construed as inconsistent with the right of employees individually to leave the public service. It is, further, an essential part of the application of these principles that tribunals shall be established for prompt hearing of requests and prompt remedy of grievances. The legislation of the Nation, the states, and the municipalities should be improved in such a way as to prevent delay in hearings and to enable speedy action when there are grievances.

Further Work of the Conference

On reconvening the conference will continue its consideration of tribunals for the furtherance of industrial peace in general industry in the light of whatever criticisms and suggestions the publication of its tentative plan may call forth. It will receive reports of investigations that are being made for it. On the basis of such reports and of further study of these and the other subjects within its field, the conference hopes that it may be able to contribute something more toward the better industrial relations described in the words addressed to it by the President when he called it into being —relations in which "the workman will feel himself induced to put forth his best efforts, the employer will have an encouraging profit, and the public will not suffer at the hands of either class." To this end it invites co-operation of all citizens who have at heart the realization of this ideal of a better industrial civilization.

Freight Traffic Movement and Car Performance

THE NET TON MILES of revenue and non-revenue freight handled by the railroads under federal control in November aggregated 32,539,248,000, a decrease of 8.5 per cent as compared with November, 1918, according to the monthly report of the Operating Statistics Section. Train miles decreased 3.9 per cent and total car miles 2.9 per cent. The net ton miles per train mile decreased from 686 to 653 and the net ton miles per loaded car mile from 29.5 to 26.2. The percentage of unserviceable freight cars was 6.3 as compared with 5.6. The car miles per car day averaged 23.3 as compared with 24.6 and the net ton miles per car day averaged 436 as compared with 488, a decrease of 10.7 per cent.

For the eleven months ended November 30 the net ton miles aggregated 361,331,207, a decrease of 10.4 per cent.

The Union station project at Cleveland, Ohio, has been deferred, possibly killed, by the refusal of the Pennsylvania to join in the enterprise. The city council on December 29, by a majority of one vote, refused to amend the ordinance (authorizing the establishment of a station on the public square) so as to allow the Cleveland Union Terminals Company to proceed with the improvement without the co-operation of the Pennsylvania.

Weekly Traffic Report

According to a report on traffic conditions for the week ended December 30, 1919, made to Director General Hines, revenue freight loadings and receipts from connections for the various regions were as follows:

Eastern region—Revenue freight loaded, 200,658 cars, an increase of 6,931 cars over last year; receipts from connections, 225,115 cars, a decrease of 13,083 cars. Allegheny region—Revenue freight loaded, 181,431 cars, a decrease of 90 cars; receipts from connections, 153,289 cars, a decrease of 18,930 cars. Pocahontas region—Revenue freight loaded, 25,595 cars, an increase of 7,250 cars; receipts from connections, 13,635 cars, a decrease of 2,042 cars. Southern region—Revenue freight loaded, 123,937 cars, an increase of 11,822 cars; receipts from connections, 74,079 cars, an increase of 6,176 cars. Northwestern region—Revenue freight loaded, 105,845 cars; receipts from connections, 73,508 cars, an increase of 3,333 cars. Central Western region—Revenue freight loaded, 125,607 cars, an increase of 25,817; receipts from connections, 65,395, an increase of 6,545. Southwestern region—Revenue freight loaded, 63,625, an increase of 8,755; receipts from connections, 51,782 cars, an increase of 9,509.

A summary of the report follows:

Eastern Region.—Business conditions are improving generally and increased activities are noticeable in practically all branches of trade. Some industries are still affected by shortage of fuel and operating below normal capacity. There is continued improvement in the iron and steel situation, reports indicating 131 pig iron furnaces in blast, 56 out, an increase of 7 in blast over the previous week. Embargo on less carload freight destined Detroit has been cancelled by all lines, as situation is practically cleaned up. Regular and Christmas travel this year was very heavy, the business on the Monday and Tuesday preceding Christmas being particularly voluminous.

Allegheny Region.—Bituminous coal loading for the week showed an increase of 10,579 cars over the previous week, but there was some decrease in the loading of anthracite coal, which, however, was partly accounted for by extremely cold weather during the early part of the week. Increased shortage of box, grain, coal, double-deck stock and gondola cars, caused probably by cold weather and congestion, which affected movement westbound through Pittsburgh. There was some slight improvement in the refrigerator and flat-car situation. Reports indicate that 105 pig iron furnaces in blast, with 86 out of blast, which is a gain of two stacks over the previous week. Passenger travel has been exceedingly heavy, especially long distance travel during Christmas holidays.

Pocahontas Region.—With the exception of tidewater coal dumping, business showed a substantial decrease under the preceding week, due to car shortage and usual let-up in shipping incident to the holiday season. Account export coal restrictions, consignments of coal West were very heavy, but arrangements have now been made to issue permits for a limited tonnage of export coal. Christmas travel, especially that from schools, has been large, but the military movement has now been reduced to normal.

Southern Region.—Box car situation is slowly improving, but still unable to meet all requirements promptly. Shortage of open-top cars continues. Southern Pine Association reports balance of orders on hand December 22 22,503 cars. Shipments for the last week amounted to 2,573 cars, while orders were received for 2,952. There is continued improvement reported from Birmingham district in the pig iron situation, both production and demand being heavy. Twenty-six furnaces in blast and 15 out. There is an active movement of cotton factory products and mills generally operating on full time. Construction of a number of additional cotton mills in Carolina territory is reported.

Northwestern Region.—Business conditions generally continue to be affected seriously by the car shortage and severe weather, particularly in Pacific Northwest, but there is a healthy undercurrent and the amount of business being handled is limited by car supply and ability of carriers to move freight. Manufacturers, shippers and producers are unusually optimistic as to the future. While the iron ore shipping season has closed, there is much activity at all mines preparatory to very large shipments in 1920. Passenger traffic has held up very well, notwithstanding curtailment in service and irregular schedule caused by unprecedented cold weather for this season of the year.

Central Western Region.—Coal production during the week was exceptionally large, the loading being 54 per cent more than the same period of last year and 148 per cent more than the previous week. Wheat acreage sown in Missouri this fall is estimated to be 40 per cent less than last year and Kansas 21 per cent less. It is estimated that the far Western states will produce 35,400,000 boxes of apples this year, as against 143,100,000 boxes last year. With return of normal passenger train service travel has again been extremely heavy, particularly to California.

Southwestern Region.—Retailers report an exceedingly heavy holiday business, well above the volume of last year. Unfavorable weather conditions have interfered with fall plowing, resulting in a large decrease in acreage seeded to winter wheat as compared with last year. Decrease in Arkansas estimated at 200,000 acres. Grain Corporation is making a special effort to move large quantities of wheat from elevators at Omaha, Neb., and Wichita, Kan., in order to relieve the elevators and bring additional grain in from country stations. Regular passenger travel, both local and interline, was very good, and holiday travel was exceedingly heavy.

Fuel Situation.—Considering Christmas holidays, production of approximately eight million tons was good. There has been some necessary delay in Western regions disposing of late shipments of Eastern coal during strike, account local coals being available at less than the Eastern coal. Open top equipment being returned slowly by Western roads, resulting in some car shortage in Eastern regions. No accumulation coal on wheels at tidewater. Restricted dumping of coal for export being permitted to meet emergency requirements foreign countries, as recommended by state department. Coal production again sufficient to meet current requirements. Anthracite: Car supply good and production up to usual holiday output.

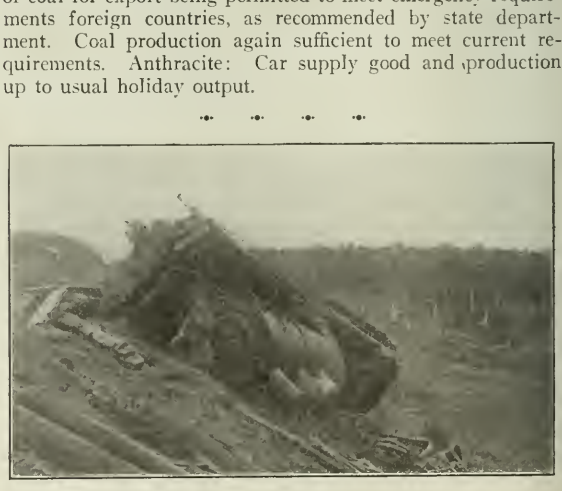


Photo from International

One of the Reasons the Trans-Siberian Has Not Been a Success in Recent Months

New Canadian Pacific Locomative for Freight Service

Mikado Type Locomotive for Freight Service

Canadian Pacific Builds New Equipment—Total Weight, 320,500 Lb.; Tractive Effort, 56,000 Lb.

By W. A. Newman

Engineer Locomotive Construction, Canadian Pacific

THE LOCOMOTIVE BUILDING program now being carried out by the Canadian Pacific includes four new types of locomotives; a Mikado type locomotive having a tractive effort of 56,000 lb., two classes of Pacific type locomotives with 43,700 and 42,600 lb. tractive effort respectively, and a Santa Fe type locomotive with a tractive effort of 66,000 lbs. All of these locomotives have been designed by the mechanical engineering department of the Canadian Pacific and are being constructed at the Angus shops in Montreal.

The initial order of 10 Mikado type locomotives has already been completed and one of them is described in this article. The other new types of locomotives are now building and will be described in later issues.

The design of the Mikado locomotives is largely based on the experience obtained from the earlier Mikado type which was designed and constructed by the Canadian Pacific in 1912. There are no radical departures from what is commonly accepted as standard practice. Close attention has, however, been paid to the design of every detail and no effort has been spared to produce a common-sense locomotive which will give reliable and efficient service.

The locomotives have a total weight of 320,500 lb., with 235,000 lb. on the driving wheels, which gives a factor of adhesion of 4.18. The cylinders are 25 in. by 32 in., driving wheels 63 in. outside diameter, which with a normal boiler pressure of 200 lb. per sq. in., gives a maximum calculated tractive effort of 56,000 lb.

The Boiler

The boilers are of the extension wagon bottom type, and are the first of this kind to be used on Canadian Pacific locomotives. This type of construction was adopted for several reasons; the steam dome can be located on the second course, which simplifies the seam construction on the third course; the standpipe is further away from the crown sheet where the greatest ebulition occurs; it shortens the dry pipe and consequently the length of the steam passage, and provides a greater steam storage space, which should be of material advantage in increasing superheater efficiency.

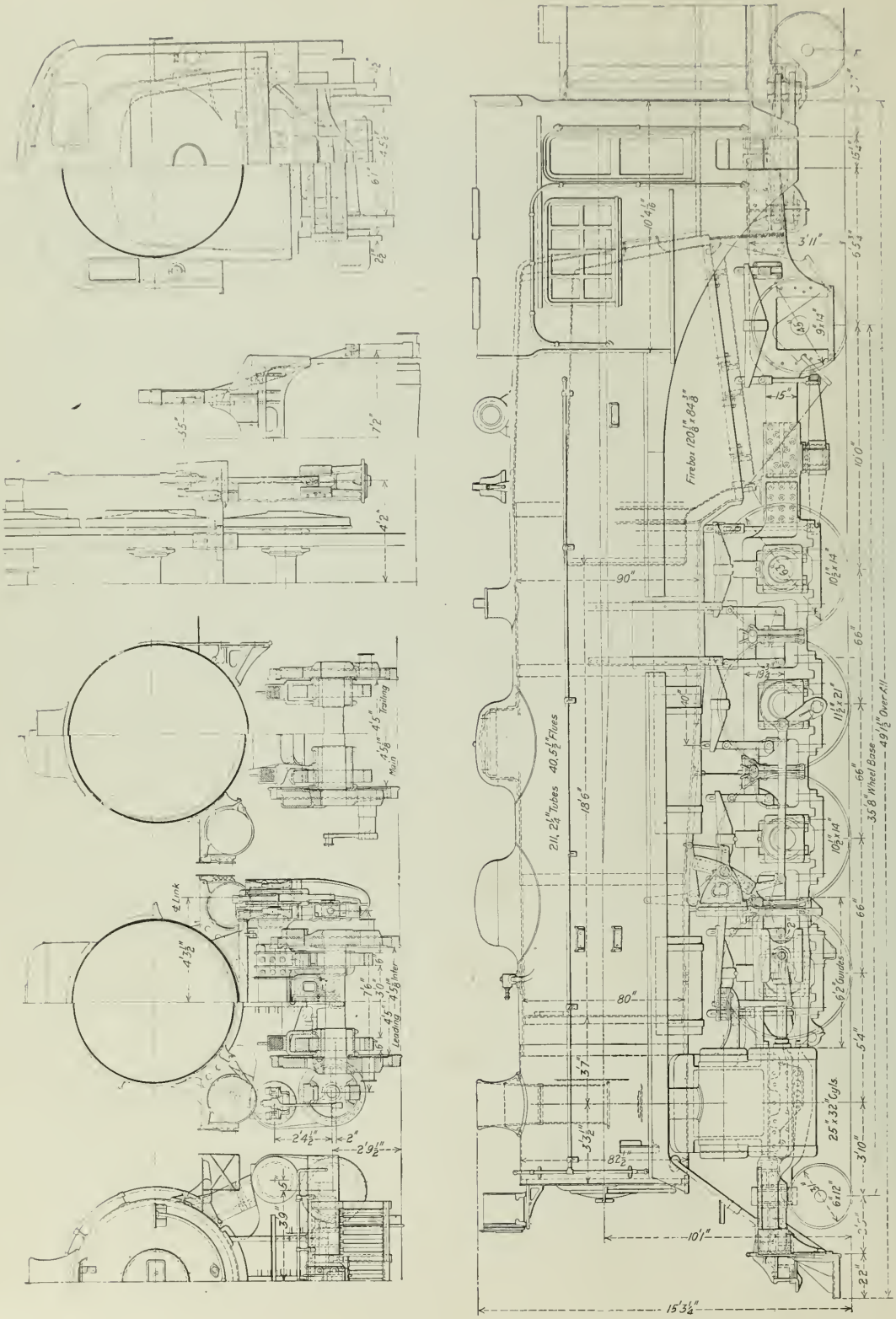
The boiler design is the result of a very careful study of boiler proportions and construction, every care being taken to insure ample steam generating capacity, combined with easy steaming qualities. The smallest details of construction were given close attention with ease of maintenance in view.

The capacity of the boiler in relation to the cylinder requirements is 102.5 per cent, based on Cole's ratios. The length of tubes is 18 ft. 6 in., which is a close approximation of the most efficient ratio of tube length to diameter. A 28-in. barrel combustion chamber is used, this being the first combustion chamber of this type on the Canadian Pacific. The mudring ends are of cast steel welded to wrought iron side pieces. The ends have drop corners to allow through riveting for the corner fastening of the inside firebox sheet.

The Frames

The frames are a little heavier than is usually found in general locomotive practice. This is chiefly on account of the difficulty experienced with frame breakages, particularly in sections of Canada where there are extremely low winter temperatures. The frames are of the single front rail type and it has been the experience of the Canadian Pacific that the majority of breakages with such frames come directly behind the cylinders. This apparently has been largely due to insufficient fastening to the cylinders and on account of the twisting strains set up due to the narrow bolting face of the cylinders in comparison with the total depth of the frame through the pedestals. In an attempt to correct this, a 15-in. depth of frame section at the back of the cylinders has been used and an extension lug carried forward from the top rail of the frame, which engages with and bolts to a vertical lug on the back wall of the cylinder casting. This gives a total vertical bolting face at the back of the cylinders of 29½ in., which it is expected will effectively counteract any twisting strain to which this section of the frame will be subjected. This construction is shown in detail in the illustrations.

In addition to being bolted to the usual side vertical bolting face underneath the cylinders, each frame is further secured by being bolted through a casting which extends between the locomotive frames and bears against extension lugs at the center of the cylinder castings. These lugs



Side Elevation and Cross Sections of Canadian Pacific Mikado Type Locomotive for Freight Service

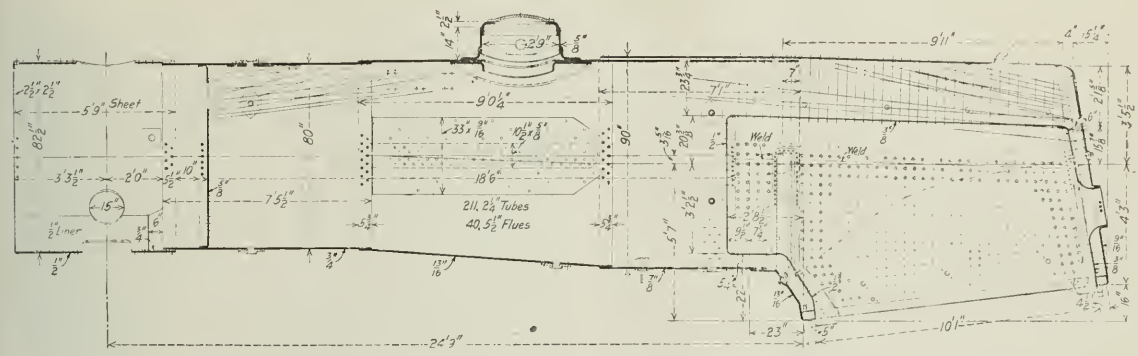
have a tapered face, and the whole casting is first driven in place, secured by vertical bolts, and then bolted horizontally through the frame and cylinders.

The frames are of a uniform width of 6 in. throughout. The depth of section at the top of the pedestal is 6¾ in., the minimum depth of the top rail between pedestals 5¾ in., and the minimum depth of the bottom rail 4½ in.

Trailing Truck

The locomotives are equipped with the Vaughan trailing truck, the extension frames being outside the trailing

sary for locomotives operating in cold climates, and a great deal of attention was given to the design of this ash pan. As far as possible, all corner angles are located outside the pan and straight joints in the plate are formed by flanging the plate to the outside, the joint being made with sheet asbestos. This construction removes a great many bolt heads from the inside of the pan. The ash pan doors are of the swinging type and are supported from pivot points located back of the center of gravity of the door, so that the doors are self-closing by their own weight. This is particularly advantageous from a standpoint of fire risk.



Extended Wagon Bottom Type Boiler for Canadian Pacific Mikado Type Locomotive

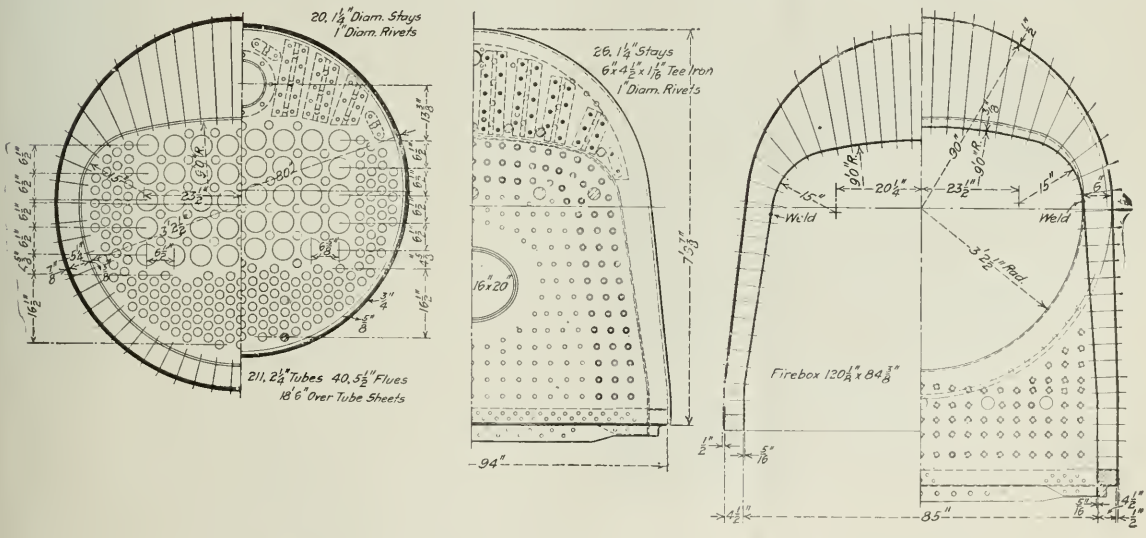
wheels and spaced 6 ft. 3½ in. center to center. No radius bar is used with these trucks, the guiding motion being obtained from inclined vertical faces on the journal boxes which bear against faces having the same incline on the pedestals attached to the extension frame. This type of truck has been used on Canadian Pacific locomotives for the past 13 years and has given satisfactory service.

Ash Pan and Grates

The chief advantages of this construction of rear frame are simplicity and the providing of an ash pan of ample capacity with very few relatively flat horizontal surfaces; this latter is indicated by ash pan drawing. An ash pan of ample capacity and with quick slopes is absolutely necessary for locomotives operating in cold climates, and a great deal of attention was given to the design of this ash pan. As far as possible, all corner angles are located outside the pan and straight joints in the plate are formed by flanging the plate to the outside, the joint being made with sheet asbestos. This construction removes a great many bolt heads from the inside of the pan. The ash pan doors are of the swinging type and are supported from pivot points located back of the center of gravity of the door, so that the doors are self-closing by their own weight. This is particularly advantageous from a standpoint of fire risk. The ash pan is supported by a combination cast steel bracket, which also forms a support for the grate side carriers.

The grates are of the butt finger type, 10 in. wide, are in four sections, and all are moving grates. Dead grates at the front and back have been eliminated. The center carrier is of very light cast steel construction and is reinforced along the bottom or tension member by a structural tee iron, shrunk in place and riveted. Careful attention was given to the design of the grate side carriers to eliminate warping. The design finally adopted has the side carriers in two sections. This permits a stiffer construction and also facilitates any repairs to firebox corners, as only one section of the grates need be removed.

The main and side rods are of ordinary carbon steel and



Half-Sections at Front Firebox Sheet, Front Tube Sheet, Backhead, and Through Firebox at Front and Back

present no unusual features, except that the front and back side rods have been made interchangeable; that is, the back right and front left side rods are identical. The piston heads are of cast iron and are considerably lighter than heads two inches smaller in diameter which have been used as standard on other Canadian Pacific locomotives. This is the result of a very close analysis, both mathematically and by actual tests, of the stresses in piston heads. The crosshead is a modification of that previously used as standard by the Canadian Pacific. The body of the crosshead is cast in one piece and takes removable cast iron wearing pads, which are in three sections, top and bottom, and are retained in place by side plates which are bolted to the crosshead body.

Rods and Motion Work

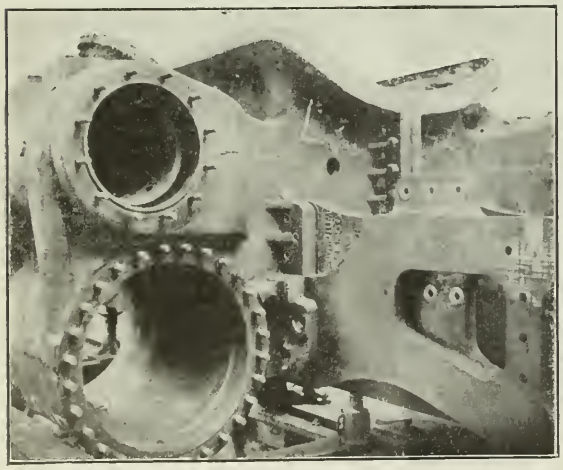
The union link connection to the crosshead is slightly unusual. It is apparently carried by the wrist pin, but actually works on a bearing which is part of the inside washer. This washer fits on a tapered shoulder on the crosshead body, so that the wrist pin is relieved of any thrust from the union link.

Although all motion parts are of ordinary carbon steel, particular attention has been given, in their design, to the reduction of weight with the result that the reciprocating parts are only 96 lb. heavier than those used on the lighter Mikado type engine, which is an increase in weight of 5.87 per cent, as against an increase in piston load of 31 per cent.

Sand Box and Cab Fittings

An oval sand box is used which has a capacity of 20 cu. ft. This is of built-up construction, the bottom being flanged in two parts and joined at the center by a riveted butt joint. The top is flanged in one piece. This gives an extremely light construction for the large carrying capacity, the total weight of the sand box empty being 975 lb.

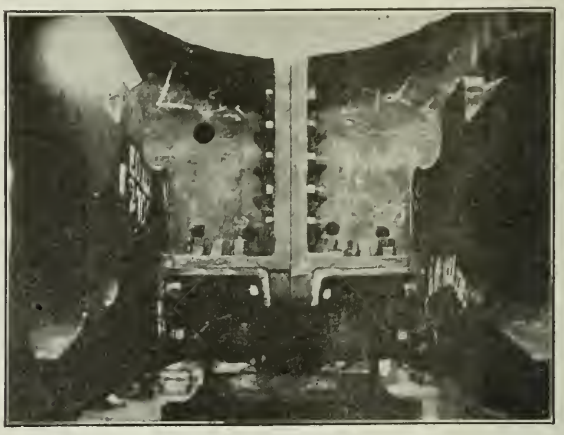
Every effort was made to obtain the most efficient layout



Extra Lug Attaching Cylinder Casting to the Frame

on the back head of the boiler so that all valves, the throttle lever, lubricator, air brake equipment, etc., would all be properly located, and at the same time permit both the engineman and fireman to have an unobstructed view of the water glass and steam gage.

The width of the firebox prevented locating the brakeman's seat in the usual position ahead of the fireman's seat and between the firebox and the cab side. The cab is of the Canadian Pacific standard vestibule type, and it was finally decided to locate the brakeman's seat directly behind the fireman's. The vestibule cab usually includes two lockers, one on either side of the cab, back of the doors. To make room for the brakeman's seat, the locker on the left hand side was omitted and the height of the locker on the right side increased to six feet. A fold-up brakeman's seat was then located on the left side in such a way that with the seat dropped in place and the door closed, a drop panel in the door forms a window to enable the brakeman to look out. This window is provided with a small arm rest of the usual construction, which folds inward when the door panel is raised. The locker on the right side of the cab is divided into two parts, the 4-ft. upper locker being lined with wood and furnished with coat hangers to take



Cast Wedge Reinforcement to Frame and Cylinder Casting

the crew's clothes. The bottom locker is used for supplies, signal equipment being carried in a wire rack located under the cab roof.

The Tender

The tender is of the water bottom construction with a total capacity of 8,000 Imperial gallons, which is equivalent to 9,600 American gallons, and has a coal capacity of 12 tons. The slope of the back coal sheet is 45 deg., which is sufficient to insure that all the coal is fed to the front of the coal space, and dispenses with the use of a coal pusher. This is Canadian Pacific standard construction, all locomotive tenders being fitted in this way. The tank bottom is in two pieces, having one longitudinal butt joint with inside and outside welts. The swash plate bracing has been very carefully worked out in order to eliminate all unnecessary strains on the riveting and to insure freedom from trouble from leaky tenders. The tank is supported by a Commonwealth one-piece cast steel underframe. The tender trucks are of the equalizer type with combination semi-elliptic and coil springs.

Special Equipment and Air Brake

These locomotives are equipped with Security brick arches, Cole extension main driving boxes, Franklin automatic driving box wedges, Franklin radial buffers, Franklin unit safety bar (of standard C.P.R. laminated design), Franklin vertical type steam grate shakers, Franklin No. 8 automatic firedoors, Economy engine truck, Nathan type "T" top checks, World safety valves, Detroit lubricators, Hancock non-lifting type "H.N.L." inspirators on the left side, and Hancock type "A" lifting inspirators on the right side, Ragonnet reverse gear, Never-Clog air sanders and Pyle-National turbo-generators with incandescent headlights.

The air brake is the Westinghouse schedule "ET" with cross-compound air compressors. Ample cooling surface

is provided in the air brake piping, 2-in. pipes being used between the compressor and the first reservoir. A parasite reservoir is also part of the air system with the pressure controlled by a Westinghouse parasite governor.

The locomotives are hand-fired and have proved exceptionally easy steamers, and quite live up to the expectations of economy in coal and water.

The principal data and dimensions are as follows:

General Data	
Gage	4 ft. 8½ in.
Service	Freight
Fuel	Bit. coal
Tractive effort	56,147 lb.
Weight in working order	320,500 lb.
Weight on drivers	235,000 lb.
Weight on leading truck	28,000 lb.
Weight on trailing truck	57,500 lb.
Weight of engine and tender in working order	498,600 lb.
Wheel base, driving	16 ft. 6 in.
Wheel base, total	35 ft. 8 in.
Wheel base, engine and tender	68 ft.
Ratios	
Weight on drivers ÷ tractive effort	4.18
Total weight ÷ tractive effort	5.7
Tractive effort × diam. drivers ÷ equivalent heating surface*	717
Equivalent heating surface* ÷ grate area	70.1
Firebox heating surface ÷ equivalent heating surface,* per cent	9.47
Total weight ÷ equivalent heating surface*	65.0
Volume both cylinders	18.9 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	261.0
Grate area ÷ vol. cylinders	3.72
Cylinders	
Kind	Simple
Diameter and stroke	25 in. by 32 in.
Valves	
Kind	Piston
Diameter	14 in.
Greatest travel	6½ in.
Outside lap	1⅛ in.
Inside clearance	⅛ in.
Lead in full gear	3/16 in.
Wheels	
Driving, diameter over tires	63 in.
Driving, thickness of tires	3½ in.
Driving journals, main, diameter and length	11½ in. by 21 in.
Driving journals, others, diameter and length	10½ in. by 14 in.
Engine truck wheels, diameter	31 in.
Engine truck, journals	6 in. by 12 in.
Trailing truck wheels, diameter	45 in.
Trailing truck, journals	9 in. by 14 in.
Boiler	
Style	Extended wagon bottom
Working pressure	200 lb. per sq. in.
Outside diameter of first ring	80 in.
Firebox, length and width	120⅛ in by 84⅛ in.
Firebox plates, thickness	Tube ½ in., crown and back ⅜ in., sides 5/16 in.
Firebox, water space	Front 5 in., back and sides 4½ in.
Tubes, number and outside diameter	211, 2¼ in.
Flues, number and outside diameter	40, 5½ in.
Tubes and flues, length	18 ft. 6 in.
Heating surface, tubes and flues	3,347.78 sq. ft.
Heating surface, firebox, including arch tubes	317 sq. ft.
Heating surface, total	3,664.78 sq. ft.
Superheater, heating surface	845 sq. ft.
Equivalent heating surface*	4,932.28 sq. ft.
Tender	
Tank	Water bottom
Frame	Cast steel
Grate area	70.3 sq. ft.
Weight	178,100 lbs.
Wheels, diameter	36 in.
Journals, diameter and length	6 in. by 11 in.
Water capacity	8,000 Imp. gal.
Coal capacity	12 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

Photo from International

A Czecho-Slovak Guard and Their Headquarters on the Trans-Siberian

The Relation of Valuation to Investment*

By Thomas W. Hulme

Vice-Chairman, President's Conference Committee at Valuation

THE PRESENT INVESTMENT is not necessarily what was originally put into the property. The corporate ownership may have changed hands upon a different basis; some portion of the physical property may have increased in value and some may have decreased in value. The Supreme Court of the United States has said that it is the property and not the original cost of it that is protected by the Constitution, and of which property the owner may not be deprived without due process of law. Therefore, as it is the property that is the investment, it means the investment is measured by the present value.

The determination of the value of property, i. e., of privately owned property, not in public use is ordinarily measured by what it would bring in exchange, usually determined by its earnings past, present, and prospective. But that cannot be the same thing when you come to deal with private property that is subject to public use, because there regulation enters immediately and, to a certain extent, determines the result. Now regulation cannot go to the extent of destroying the value of the property, nor can the owners of the property make such unreasonably high charges as to increase the value thereof. The problem, therefore, is how this situation is to be met. Where rates themselves are in question, the value cannot be determined by the capitalization of the net.

This problem, in the 25 years that it has been under consideration, has many times been before commissions and courts. Almost always they have dodged the real determination. They have approached it from the standpoint of what seemed to them fair, but as the Constitution stands in the way of taking any portion of the property, without due process of law, they have called their conclusions, value. These conclusions, reached by many different commissions, without the determination of correct principles by the courts, because they have not been definite or have not been reached with courage, have left the matter in an uncertain condition until, perhaps, the present time when it seems to be clarified.

The court has said that the value of such property should be determined by the exercise of a reasonable judgment in the consideration of all the pertinent facts, including the actual investment if known, the present cost of production of the property, its condition, its earnings, both at the present time and under contemplated rates, and all other pertinent facts.

When these decisions have been made, it has not usually been known to which of these factors the commission has given the greatest weight, but it has been quite clearly shown that, while in the few condemnation cases, that is, the taking of the ownership of a public utility, it was not only the physical property that had to be paid for, but it was also the value of the business, the enjoyment of the business, that had to be paid for. Nevertheless, there has been generally a tendency to deny in a rate proceeding that the business had to be taken into consideration, but, in a decision by the Supreme Court of the United States in June of this year (the Denver Water Company case), it seems to be clearly decided that, even in a rate proceeding, consideration must be given not only to the bare bones of the property, but also to the business of the utility. That seems to be in accordance with common sense, because I think it is generally recognized that a property is worth very much more after it has developed

*Abstract of address made before the Academy of Political Science, New York City, November 21, 1919.

a business than it would be immediately after its completion.

We, therefore, have, as I understand it, in the valuation of property privately owned but used for a public purpose, two major elements for consideration. First, the valuation of the physical property, next the valuation of the business, ordinarily referred to as "going concern" value; in the case of a private business not subject to Governmental regulation, it is commonly referred to as "good-will," although the term "going concern" embraces very much more than good-will. A local monopoly, such as water, gas or electric property, perhaps, cannot be said to have good-will, but a railroad where the business has been built up under competitive conditions as most of these railroads have been, enjoys good-will, so that in some cases the good-will would be present; in other cases it would not.

Our first consideration, therefore, is the determination of the value of the physical property. Unquestionably the courts have held, in many cases, that the cost of reproduction properly applied is the measure of the value of the physical property. In the case of any normal property, i. e., one whose existence is justified, it certainly must be held that it is worth its cost of reproduction under a proper method. It is conceded that there may be cases of railroads and other utilities that have been constructed where they are not needed, and I except that class of property to my contention. But great care must be taken in such a classification of any property lest injustice be done.

Now, I am not saying that the cost of reproduction must necessarily be at present-day prices, but I am saying it must be upon reasonable conditions that would be generally acceded to as being reflective of a general situation; if, however, any governmental authority should attempt at this time, when we have probably reached a permanent level of higher prices, to take the property of such a company, there is no doubt in my mind but that in a condemnation proceeding the court would hold that the trend of prices has been so unmistakably to a higher level that the present-day prices would apply.

Therefore, I say to investors that the weight of the decisions of our courts are so unmistakably in the direction of a protection to them in a valuation proceeding that they should not be misled by proceedings in the past which have been made solely from the standpoint of what somebody thought was "fair" to determine in a rate case.

What has been the effect of such valuations, such "fair" valuations? The unmistakable result has been to reduce the net earnings, to impair the credit until we have reached the present stage. Now, if the credit is to be restored, it must be through an authority to increase the charges to a point where they will not only yield a return on the present investment, but also yield a return on the amount of money that it is necessary to provide for extensions and additions and betterments.

So frequently governmental bodies overlook that point in establishing their rate basis. They try to fix it on what has been sufficient for the past, overlooking the fact that provision must also be made for the new capital that is going into the property. If we have in the case of a justified property that the valuation of its physical property should be its cost of reproduction, provided that property has been properly maintained for the purpose for which it has been used, we then have to consider what effect in reaching the total or true value of that property must be given to its earning power. Earning power means potential, future developments and not merely the present basis of earnings.

There are so many properties that are unquestionably worth more than their mere physical value that it seems to me it must be accepted that where, over a considerable period of years, those properties have yielded a return upon the investment that is more than the usual interest rate, it must be recognized that those properties, through the skill of their management or through the good fortune of their location or through all other causes and where the volume of their business has been developed, so that they have an earning capacity greater than the ordinary, they must be accorded to a value greater than their physical. In such cases, where the rates, under which their earnings are obtained, are not in question, the value of the properties would be what you are accustomed to think them to be, the economic value.

Without any attempt to make a contention that there must be a minimum value, it must also be apparent that any road that is doing a great volume of business, even though in the past under regulation which has really been in an embryonic state—regulators have to learn just as great business organizations have to be developed—that, when this investigation is completed by the Interstate Commerce Commission, they will have at hand the information that will, I think, give the answer to what is called the present railroad problem.

This work of the Commission is probably the greatest economic task ever undertaken. It has been under way now for a little more than six years. It has cost over sixty millions of dollars. The mere inventory work will, according to the director in charge, be completed by the end of the year 1921.

The commission has refrained from attempting to determine the principles of valuation of this class of property until its work can be further advanced and until the Commission shall have before it some of the representative types of property. It has scheduled a hearing in January next for argument upon the subject. At that time, there will be presented to it the views that I have just expressed to you and which, if they should be successful before the Commission, will, I am sure, be a full measure of protection to your investments.

Material Inventory to Be Taken as of February 29

Director Genral Hines has issued General Order No. 62-A directing that the material inventory required by General Order 62 shall be taken as of February 29, 1920, instead of during the months of October, November or December, 1919. Roads which have already taken an inventory in October, November or December, 1919, under General Order 62 will be permitted to adjust such inventory by addition of receipts and deduction of issues of material to February 29, 1920, when in the judgment of the federal manager accurate results may thus be obtained.

Accounting Circular No. 122, issued by the Division of Accounting says that the purpose of the inventory is to obtain an accurate list of every item of material in the possession of carriers under federal control which is not in actual use. A good many questions have been raised concerning this procedure on the ground that certain items were not included in the inventory as of December 31, 1917, and should therefore be omitted from the one as of December 31, 1919. Stocks of material are constantly changing, and it is impossible to determine definitely whether any certain material which may happen to be on hand at this time was not included in an inventory taken two years ago. It is necessary that the present inventory should include every item of material and supplies not in actual use, but in cases where articles have been temporarily removed from a locomotive or a car which is undergoing repair with the intention of replacing them in their previous locations, they should be listed in the inventory with sufficient detailed description so that they can be fully identified as a part temporarily removed from a unit of equipment during the repairs or rebuilding of such unit.

Direct Current Transmission for Electrification

Proposed System Would Deliver 3,000 Volt D. C. Power from Conductor Rails to Multiple Unit Trains

By Alfred Raworth

Electrical Engineer, South Eastern & Chatham, England

It is, possibly useful to consider at the present time, when railway electrification on a large scale appears to be imminent, the engineering methods that will be adopted, and particularly those which will be used in transmitting electrical energy between the substations and the trains.

The problem consists in delivering, over considerable distances, large blocks of power to trains in motion, and the difficulty of solution arises from the fact that, while a comparatively high pressure is necessary for the attainment of economical transmission, a comparatively low pressure is desirable for satisfactory operation of railway motors and their control apparatus.

Early examples of railway electrification embodied the use of direct current at 600 volts, a pressure admirable for the operation of electric train equipments but much too low for economical transmission, and involving a very close spacing of substations in order to keep the drop of pressure within reasonable limits.

Recognition of this fact has led to the pressure being increased up to 1,500 volts for use on motor car trains, but, while this pressure has been proved to be eminently suitable for the satisfactory operation of electric train equipments and not so high as to prohibit the use of conductor rails, it is still too low for the attainment of economical transmission in the case of long distance main lines carrying heavy traffic.

In order to overcome the disadvantages and expense of transmission at such low pressures, and to endeavor to render the direct current motor available for application to long distance main line railways, the pressure has been raised to 3,000 volts in the case of one railway now in operation in America and utilizing electric locomotives.

While it may be possible that the greater clearances and complications in control apparatus inseparable from the use of this pressure may be tolerated in an electric locomotive, it is quite certain that a pressure of 3,000 volts is too high for use on motor car trains.

Realization of these considerations is doubtless responsible for the recent suggestions of F. W. Carter* and Roger T. Smith† that it may be necessary, in connection with the electrification of our main line railways to instal two separate track conductor circuits, a low voltage conductor rail for the operation of suburban motor car trains, and an overhead wire for supplying current at high voltage to electric locomotives working long distance trains.

It must surely, however, be admitted that such an arrangement, resulting in increased cost of construction and reduced load factor on track conductors and substation apparatus would be, at best, only a makeshift, and inferior in every respect to a single system capable of handling, with equal efficiency and convenience, both classes of traffic.

Inseparably bound up with the problem of transmission between the substations and the trains, is the question of the measures to be taken to guard against the possibility of damage to other persons' property which may result from current leaking from grounded return conductors.

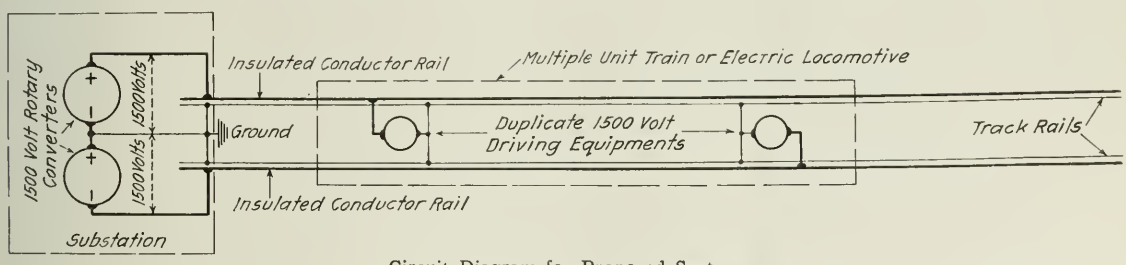
In certain cases, the tramway practice of using the running rails as a grounded return conductor has been followed, and in places where the drop of pressure in such grounded returns is more or less immaterial, this method may be justifiable; but, in thickly populated areas, such as those through which most British railways run and in which gas and water pipes, electric cables, apparatus and circuits liable to damage from stray currents abound, it is most certainly dangerous.

Some of the railways in England that have carried out electrification schemes have proceeded under Section 86 of the Railway Clauses Consolidation Act, 1845, which provides that it shall be lawful to use and employ locomotive engines or other moving power, while other companies, usually owing to the necessity of raising additional capital or of compulsorily acquiring land, have obtained special parliamentary powers.

Railway companies which have proceeded under the Railway Clauses Consolidation Act, 1845, are under no obligation to observe any regulations regarding the use of grounded return conductors, but they are, of course, liable to be proceeded against as a result of any damage which they may cause by the use of such grounded returns.

On the other hand, railways who have applied for special powers have, in some cases, been compelled to comply with the Board of Trade Regulation applicable to tramways, which limits to seven volts the permissible drop in grounded returns, and there has always been inserted in their Acts the following provision:

"When any department of His Majesty's Government represents to the Board of Trade that the use of electrical



Circuit Diagram for Proposed System

*Electric Review, July 18, 1919, p. 69.
†Presidential address to Institution of Electrical Engineers, November, 1919.

power under this Act injuriously affects or is likely to injuriously affect any instruments or apparatus, whether electrical or not, used in any observatory or laboratory belonging to or under the control of that department, the Board of Trade, after such inspection or inquiry as they may think proper, may by their regulations require the company to use such reasonable and proper precautions, including insulated returns, as the Board of Trade may deem necessary for the prevention of such injurious affection."

The clause quoted, usually referred to as the "Observatory Clause," places upon the railway the obligation of avoiding any chance of interference with scientific instruments installed in observatories and laboratories with the ever present possibility that, in the event of such damage occurring, the railway may be required to instal insulated returns.

It will be observed, therefore, that, in any case, it is necessary for a railway company, if they use the running rails as a grounded return, to provide that the drop in pressure shall be kept down to a very low value.

The difficulty of so doing will be appreciated when it is stated that the resistance of a pair of running rails is approximately .03 ohms per mile, and the current required at starting by an electric locomotive of a type suitable for working express passenger trains, or by a nine-coach train suitable for suburban services on main line railways, is about 3,600 amperes at 600 volts.

If we assume the condition in which two such trains are starting, opposite one another, one on each line of a railway with two lines of way, and midway between adjacent substations, so that half of the current required by each train is supplied by each substation, the drop in volts in a grounded running rail return would be, per mile length of section between substations:

At	600 volts	27
	1,200 volts	13.5
	2,400 volts	6.75
	3,000 volts	5.4

If it is decided to limit to, say, 27 volts, the drop in the grounded return, we find that the maximum distances between substations, for the conditions assumed will be:

At	600 volts	1 mile
	1,200 volts	2 miles
	2,400 volts	4 miles
	3,000 volts	5 miles

These distances may be increased in proportion to any increase in the negative drop which it is decided to allow, but it is important to remember that the condition of two trains starting in the middle of a section corresponds to the heaviest condition likely to arise, only in the case of very short sections. On a section of greater length, on lines over which a frequent service is operated, it will be possible that more trains may be in the section at one time, drawing a larger total current and necessitating a reduction in the distance between substations.

It will be obvious that this very close spacing of substations will produce a very bad substation load factor, resulting in high first cost and operating expenses, and will make such an arrangement, even with a pressure as high as 3,000 volts uneconomical for the equipment of long distance lines which are required to handle heavy traffic.

Some railways have endeavored to reduce the pressure drop in grounded returns by laying additional rails or feeders connected in parallel with the running rails, but this method, while failing to give the same security as an insulated return, may be, as in some cases in America in which a multiplicity of negative feeders are employed, even more expensive.

The installation of an insulated return conductor carries with it great advantages, in that it enables the permissible drop in the transmission system between the substations and the trains to be determined economically, and gives complete security against the dangers incidental to a grounded return; on the other hand, as usually installed, it possesses certain disadvantages in connection with the maintenance of insulation and the location and clearance of faults to ground.

How the Difficulties May Be Overcome

Having enumerated the difficulties of the problem of transmission between the substations and the trains in connection with long distance lines which are required to handle the heaviest traffic, it is proposed to suggest a method by which they may be overcome, that is to say, by which:

1. Direct current may be economically and efficiently produced in the substations and delivered to the trains at a voltage low enough to enable multiple unit equipments to be operated safely and satisfactorily.
2. Direct current may be transmitted at a potential from ground low enough to permit of the use of a conductor rail.
3. The voltage of transmission may be high enough to secure the maximum economy.
4. All danger of causing damage to other persons' property by electrolysis or leakage currents may be avoided.
5. The difficulties in connection with the use of an insulated return, as usually installed, may be eliminated.

The arrangement proposed is shown in the diagram and embodies the installation along each track of two insulated and protected conductor rails, connected as the outers of a 3-wire system, of which the running rails, bonded and cross bonded, would form a grounded neutral conductor.

Each conductor rail is at a potential of 1,500 volts, the one above, the other below the ground.

Each motor car train unit and each locomotive, in accordance with usual modern practice, carries two duplicate equipments, designed to operate at 1,500 volts, and the arrangement is such that each side of the system supplies the current for half of every train.

By these means, the system is quite perfectly balanced, and the running rails forming the neutral conductor will not normally carry current.

The only occasion upon which any current will be carried by the running rails will be when the collector shoe of a train is crossing a gap in a conductor rail, necessitated by special work in the permanent way, but in such a case, the current will only be that required by one 2-motor equipment, and it will flow only momentarily.

The arrangement, while securing the advantages of transmission at 3,000 volts through conductor rails of large sectional area, does not require any direct current machine, switchgear, train equipment, conductor rail, or other apparatus to work at more than 1,500 volts from ground.

Upon lines carrying the heaviest class of traffic, substations may be economically placed some thirty miles apart; they will, consequently, supply a large number of trains and will have the advantage of a good load factor.

The necessary conversion plant, instead of being distributed in small units in a large number of substations, each of which would of necessity contain a spare machine, will be concentrated in large units in fewer substations, thus reducing both the capital cost of the plant required and the substation operating expenses.

Estimates which have been prepared in connection with both suburban and main line electrification show that, when compared with other arrangements, the methods now proposed will result in lower first cost and lower operating expenses.

Valuation Arguments Heard by I. C. C.

Briefs Were Presented Upon the Question of the Final Value Which the Commission Should Find

ORAL ARGUMENTS were presented before the Interstate Commerce Commission on January 7 upon the question of the final value which the commission should find and report in the proceedings involved in valuation dockets Nos. 1, 2, 4, 5 and 6 for the properties under valuation and as to the elements to be considered and the weight to be attributed thereto in finding such final value in any case. Briefs on the question of final value had previously been filed by W. G. Brantley, Sanford Robinson and Leslie Craven, of counsel for the President's Conference Committee; P. J. Farrell, chief counsel of the Interstate Commerce Commission; C. E. Elmquist and J. E. Benton for the valuation committee of the National Association of Railway and Utilities Commissioners; by the Public Utilities Commission of Illinois, and by W. G. Brantley for the Atlanta, Birmingham & Atlantic and Winston-Salem Southbound railroads.

The brief on behalf of the President's Conference Committee is a voluminous one, taking up the principal points involved in the valuation proceedings and taking the position that the commission, in order to comply with the valuation act, is required to determine the value of each railroad as a railroad for the transaction of a railroad business, which includes consideration of earning power.

Mr. Farrell took the position in his brief that at present rate-making is the only purpose under the act to regulate commerce for which the commission can use a final value of common carrier property, but if in the future it becomes necessary to fix the final value of such property for some other purpose any necessary modification of the value for rate-making purposes can readily be made.

The brief on behalf of the state commissions urged that the commission should not find and report a final value on the ground that the valuation, which under the act is to be prima facie evidence of value, is something quite different from a single sum expressed in dollars and cents. The term "valuation," according to this argument, refers to the entire collection of data contained in the valuation report of the commission, and it is asserted that the commission's jurisdiction to find the ultimate value of a property arises only from its rate-making powers and not from the valuation amendment. The argument adhered to the position taken all along by the state commissioner's committee that the commission should not attempt to find and report the final value of the property of any carrier in these proceedings because the value for rate-making purposes may differ from the value for other purposes. A summary statement is presented of the main facts to be considered in finding the value in the instant cases.

The brief of the Illinois commission also took the position that the commission should not find a final or ultimate value of the railroad property as a unit, on the ground that the value is not the same for all purposes and that the final value for rate-making purposes must be determined as a matter of judgment and not as a matter of mathematical decision, and should be, first, fair to the public, and, second, fair to the carrier.

For the Atlanta, Birmingham & Atlantic and the Winston-Salem Southbound, Mr. Brantley adopted the rules, principles and arguments contained in the brief of the President's Conference Committee, but added a brief discussion of the particular points pertaining to those roads.

An extract from the brief of the President's Conference Committee on the determination of final value is as follows:

"The attention of the commission is invited to the language of Commissioner Prouty in *Advances in Rates, Eastern Case,* 20 I. C. C. 243, decided February 22, 1911, where he said:

> We are not fixing the value of a collection of ties and rock and steel rails, but of a railroad equipped and doing business. What is that railroad worth as a railroad for the transaction of a railroad business?

"The answer to this question, it may be said, is called for by the valuation act.

"The methods of the commission, so far as disclosed, only provide for the determination of 'the value of a collection of ties and rock and steel rails' and other physical properties of a railroad. The commission must go further, in order to comply with the valuation act, and determine the value of each railroad 'as a railroad for the transaction of a railroad business.'

"It being demonstrated that the total value of a railroad property is determined by a proper consideration of its structural value and its 'other values and elements of value,' which latter we have suggested can best be determined by first appraising the earning power of the property under reasonable rates, it only remains to offer briefly some suggestions as to the consideration which should be given to each of the two elements of value named.

"The commission in its order has directed that its attention be called to the elements which should be considered in determining final value and to the weight to be attributed thereto, and in response the carriers suggest that the two basic elements to be considered are structural value and earning power value as herein defined.

"There can be no presumption in the first instance that a railroad has been unwisely built, or built in a locality where there is not sufficient business to sustain it. In other words, there can be no presumption in the first instance that the existence of the railroad being valued is not justified. On the other hand, the presumption in the first instance, based upon the economic facts of a railroad property and the decisions of the courts should be that the railroad under valuation is a normal railroad and therefore has a total value at least equal to its structural value. This presumption, which is also in accord with the principle that 'justice demands that everyone should receive some compensation for the use of his money or property, if it be possible without prejudice to the rights of others' (*Reagan vs. Farmers' Loan & Trust Co.*, 154 U. S. 412), makes structural value of basic importance. It is, therefore, suggested that structural value is the first element to be given consideration in the determination of 'value for purposes under the act to regulate commerce.'

"Having determined upon the structural value of the property, in accordance with the rules herein suggested, the value of the earning power of the railroad should then be appraised.

"Earning power, as the cases herein cited show, measures the productiveness of the property. It is the measure of what is generally known as economic value. In the determination of the amount of this element of value there should be considered, among other things as hereinbefore pointed out, the capitalized amount of the net earnings, based upon a consideration of present and prospective earnings on the basis of existing rates. If the rates are in question, the

capitalization should be made also on the basis of assumed reasonable rates. The traffic of the carrier, and whether growing or decreasing in volume, the gross and net earnings of the property under existing rates, and the operating expenses of the property should all be analyzed, classified and considered. In the determination of whether or not the existing volume of business may be considered as permanent or as likely to increase, there should be considered the favorable location of the railroad with respect to command of traffic, the existence of traffic-producing industries along the line of the railroad, the wealth, population and resources of the territory traversed by it and whether increasing or diminishing, and the potential traffic, both present and future, which is accessible to the railroad.

"There should also be considered the advantages of connections with other carriers which the railroad may enjoy, the existence of favorable contracts for the use of property not owned by it, the existence of favorable contracts for the obtaining of fuel and supplies of other kinds, the favorable location and construction of the railroad from the standpoint of economy of operation, the character of the maintenance of the railroad, the franchise of the railroad, the good will of its patrons, the original and reproduction cost of establishing the business of the railroad and other elements.

"All these matters clearly come within the rule of the Supreme Court laid down in the *Minnesota Rate Cases, supra,* of 'relevant facts,' upon which there must be a 'reasonable judgment' in the determination of value.

"Value was said by the Supreme Court in the *Consolidated Gas Case,* 212 U. S. 42, to be 'to a considerable extent matter of opinion.' Manifestly, however, it must be an opinion, as the court later said, based upon 'a reasonable judgment having its basis in a proper consideration of all relevant facts.' 230 U. S. 352.

"Having determined the structural value of the railroad, and as well the value of its earning power, as herein suggested, the next step in the process of valuation is to determine from a consideration of these two elements of value the total value which shall be assigned to the property as a whole. It will be recalled that the Supreme Court in *Smyth vs. Ames, supra,* did not limit the determination of the total value to a consideration alone of structural value and earning power value, but added that 'We do not say that there may not be other matters to be regarded in estimating the value of the property.' These 'other matters' are clearly included in the valuation act in the broad phrase 'other values and elements of value.' The Supreme Court has said that 'Each case must rest upon its special facts' and that the ascertainment of value 'is not controlled by artificial rules,' nor is it 'a matter of formulas.' There must in each case be the exercise of a 'reasonable judgment' which shall be based upon a proper consideration of all the 'relevant facts' in that particular case, and if there be other elements than structural value and earning power value affecting the total value of a particular railroad, they too must be considered.

"If in a particular case the value of the earning power, determined as herein suggested, clearly exceeds the amount of the structural value, and if the reasonableness of the rates by which it has been determined is not fairly open to question, and if the railroad is well established and has had for a substantial period a continuous record of favorable earnings with every reasonable prospect that such record will continue, it is suggested that this value of the earning power should be accepted as the total value of the property. If the amount of it is determined in the way herein suggested, it will have been determined in accordance with both legal and economic principles.

"Such a railroad clearly possesses a total value in excess of its structural value, and the amount of the excess is rationally and logically determined by taking the value of the earning power as the total value, and it follows that the difference between the earning power value and the structural value will accurately measure the amount of the 'other values and elements of value.' It will, of course, be observed that in the determination of the value of the earning power capitalized net earnings will not have been taken as the measure, but will simply have been one of many elements considered in the determination of such value.

"It has heretofore been suggested that no contention is made that in any case capitalized net earnings are the sole measure of the value of a railroad. No such contention is made even where the net earnings are large.

"In connection with a consideration of net earnings, the economic fact that a potential power to earn may exist which is not disclosed by a consideration merely of the actual net earnings is to be kept in mind, and it is believed and suggested that a demonstrated capacity to earn under proper management and reasonable rates is, as a rule, a better guide to value than actual earnings.

"If the railroad under valuation is a normal one and actually has an established business and is earning money, we start with the presumption required by the authorities—that its total value is something in excess of its structural value. The problem is to determine the amount of the excess. That the total value of such a railroad must be in excess of its structural value is made manifest upon even a slight consideration of the many cases herein cited respecting 'going concern' value. It may possess such a potential power to earn, which for one cause or another has not been fully developed, as to give it a total value substantially in excess of this amount, unless the allowance for 'going concern' value be liberally and generously determined. The total value in such case must of necessity be determined by the exercise of a 'reasonable judgment' based upon a consideration of all the 'relevant facts' of the particular railroad.

"If the railroad clearly appears not to be a normal one, and is demonstrated to be one whose existence is not justified under the rule suggested in *Reagan vs. Farmers' Loan & Trust Co., supra,* and *Darnell vs. Edwards, supra,* the important element in the determination of its value is, as in the case of the normal railroad, its structural value, but the problem is, not how much more but how much less than such structural value is its total value. This determination calls for the exercise of a 'reasonable judgment,' based upon a careful consideration of all the facts affecting the present and *possible future value* of the railroad and affecting the character of the public service being rendered and probably to be rendered by it. The greatest care should be here exercised, to avoid any possibility of doing a gross injustice to the investors, who in good faith acquired the property and devoted it to the service of the public.

"The carriers are of opinion that the 'reasonable judgment' required in all cases to be exercised can best be given by those who, by reason of their special training and experience and by reason of their knowledge of the particular property and its surroundings, are best qualified to give a 'judgment' or opinion as to its value.

"The carriers respectfully urge that, in the case of each railroad property, the full and complete opportunity should be given to the owners thereof, in advance of any determination of value by the commission, to obtain and submit to the commission the opinion or judgment of one or more qualified appraisers as to the total value of the property. The carriers further suggest in this connection that the commission will hardly be in position to reasonably or properly determine the 'value for purposes under the act to regulate commerce' of any railroad property until such expert opin-

ions have been obtained and submitted, and the commission has had an opportunity to carefully consider them.

"In addition to what has been said the carriers suggest that the commission may derive some assistance in the determination of value by a consideration of the methods approved in various cases by the courts and others for arriving at the amount of the intangible values in railroad property which are subject to taxation. In all these cases the fact of the existence of intangible values is recognized, and the cases are devoted in the main to a consideration of methods for determining the amount of such in tangible values. These cases recognize the existence of the structural value, and all of them are in the main devoted to a consideration of the amount of value above structural value existing in a railroad property. Attention is here called to a few of these cases.

"The carriers would take the liberty of suggesting in conclusion that the situation confronting the commission in complying with the mandate of Congress, as expressed in the valuation act, is not one in which the commission can say, as the courts have frequently said in confiscation cases, that 'clear and convincing proof' of the amount of intangible values has not been submitted by the carriers, and therefore no report of same will be made.

"The commission is engaged in making a report to Congress of 'the value of all the property owned or used by every common carrier' subject to the provisions of the act to regulate commerce. Congress has directed how it wishes the report to be made, to wit: a separate report of the tangible and intangible properties of each railroad, and the commission is in duty bound to make such report in the case of each railroad. The burden, and as well the responsibility of making this report rests upon the commission and not upon the carriers. The connection of the carriers with the making of the report is merely to co-operate with and to aid the commission to such extent as the commission may require, and this brief is submitted in the spirit of co-operation suggested and directed in the valuation act."

Mr. Farrell's Brief

Mr. Farrell in his brief said that, generally speaking, when one uses the term "value" he has in mind the desirability or worth of a thing as compared with the desirability of money; in other words, the worth of a thing in dollars and cents, but while this definition is appropriate as applied to private property used for private purposes, it cannot properly be applied to private property used for public purposes for the reason that income from the latter is controlled by government regulation while income from the former is not. After quoting from court decisions, he said that it is shown that the basis of the earnings to which a carrier is entitled for its services is the reasonable value of the property used in connection with such services, that the carrier is limited to a fair return upon that value and also to such return as it can secure from reasonable charges for its services, and that the value for rate-making purposes is not necessarily either the actual value or the value to which the party would be entitled in condemnation proceedings.

"It, therefore, appears to us," he said, "that it would be improper to apply to a value for rate-making purposes the definition applied to value as that term is ordinarily used, and what is said here about value for rate-making purposes applies with equal force, we think, to all values of property used for common carrier purposes, for the reason that before a reliable estimate of the future earnings of a carrier can be made the value upon which the carrier has a right to earn must be known."

He also undertook to show that even when used in connection with common carrier property the term "value" has no definite meaning except where the purpose for which the value is to be used is indicated, and that in determining the value to be used in fixing rates it is not proper to consider the returns from rates already in existence, although one of the most important elements to be considered in a purchase case is the aggregate of the carriers' net earnings under reasonable schedules of rates. At the time the valuation act became a law there was not, nor has there been since, Mr. Farrell argued, more than one purpose for which the Interstate Commerce Commission would have occasion to use a final value of common carrier property. This condition, however, may not continue to exist, and on this account and for other reasons he thought the commission should describe as a value for rate-making purposes only any final value of common carrier property it may see fit to fix at the present time. If the commission finds it necessary hereafter to fix a final value for some other purpose it can consider in that connection the final value fixed by it for rate-making purposes.

The original cost to date, cost of reproduction new, depreciation, appreciation and going value, were mentioned as the most important elements to be considered in fixing the final value of property used for common carrier or other public purposes, and these elements were discussed separately in Mr. Farrell's brief. It is declared that no such term as "other values and elements of value" is known in valuation law and that when Congress inserted those words in the act it was done to avoid the appearance of having tied the hands of the commission and to make manifest its intention to leave the commission entirely free to exercise its own judgment and discretion in connection with the ascertaining and reporting of values and elements of value other than those specifically mentioned in the act. Other values and elements of value, which interested parties contend should be reported under the heading of "other values and elements of value," may be included, Mr. Farrell said, under the heading of "fair values."

In fixing the values of common carrier property for rate-making purposes, it is asserted, the commission will have occasion frequently to modify results reached by the application of general rules. For example, although in estimating cost of reproduction it is apparent that uniform rules must be used, there will undoubtedly be many cases where such application will produce a result which will either be too favorable or too unfavorable to the carrier, and where this happens the commission will take such action as may be necessary to do justice as between the carrier and the general public. If the investment accounts of the carrier, which are used in determining original cost, are erroneous either because they include items which should have been omitted or because sums of money expended which should have been charged thereto have been charged instead to some other accounts, it is assumed that the commission will make the necessary corrections.

The National Public Works Department Association will hold a convention at the New Willard Hotel, Washington, on January 13 and 14. The morning session of the first day will be spent in the organization of the meeting, while the afternoon session will be devoted for the most part to a discussion of the Jones-Reavis bill, already introduced in Congress, to create a department of public works. In the evening the practical results to be achieved by such a department will be presented by Hon. Frank C. Reavis, member of the House of Representatives. Following this, General R. C. Marshall, chief of the construction division of the United States Army, will address the convention on the practical economies secured by standardization of construction activities.

Orders of the Regional Directors

EXPORT BILLS OF LADING.—Circular 293 of the Central Western regional director contains instructions regarding the issuance of through export bills of lading to the Orient via New Orleans in connection with the Osaka Shosen Kaisha Steamship Lines and the Ocean Transportation Company.

Supplement 7, canceling Supplements 1, 3, 4, 5 and 6 to Circular 282 of the Central Western regional director, contains a complete list of steamship lines in connection with which through export bills of lading may be issued.

Employment of Apprentices.—The Northwestern regional director, file 42-1-100, states that statistics show that while there are 42,193 journeymen in the mechanical departments of the railroads in this region there are only 1,880 apprentices, or a ratio of one apprentice to 22.44 journeymen. Under the national agreement 6,559 additional apprentices can be employed. The circular adds that diligent efforts should be made to obtain the full ratio of apprentices, and special attention should be given to see that they are thoroughly instructed in the various branches of the trade in order that a sufficient supply of properly trained mechanics may be provided in the future.

Freight Car Distribution.—Supplement 18 to Circular 70 of the Northwestern regional director contains the following instructions, which are intended to assist in meeting the increased demand for grain cars:

"Effective at once, arrange to give the repair of grain cars preference over other classes of equipment. Additional forces should be employed where they can be used to advantage. Report as of Saturday of each week, the number of cars repaired and made fit for grain loading for the preceding week.

"Reports continue to reach me of grain cars used in other service where other equipment is suitable and available. Unless cars are being loaded directly into grain-producing territory, instructions should provide for the use of non-fit cars. From now on special attention must be given to supplying grain cars, particularly for the heavy corn crop, which now demands attention."

Unloading of Coal Cars.—The Northwestern regional director, in file 44-1-193, suggests that traffic and division officers should keep the necessity of prompt unloading of coal cars before all receivers of coal, and in any case of any delay in unloading should make a personal call upon the consignee and point out the necessity for unloading cars promptly.

Consignments to "Shipper's Order."—Circular 296, canceling Circular 259 of the Central Western regional director, calls attention to Rule 7 of the Consolidated Freight Classification No. 1. This rule, relative to consignments to shipper's order, applies to all shipments whether or not the tariffs governing are subject to the consolidated classification rules, also whether or not the billing of cars to "shipper's order" without specifying person to be notified is prohibited.

Inspection and Compression of Cotton.—Supplement 2, canceling Supplement 1, to Order 235 of the Southwestern regional director amends Section 3 of the original circular so that compressed cotton, properly covered with bagging and which is to be further compressed for high density within the territory governed by these rules, may be accepted without patches, provided in addition to the shipping marks there is firmly attached to each bale a waterproof shipping tag showing the name of shipper, point of origin, consignee and destination, and provided further that the shipper shows on this bill of lading "Cotton to be compressed to high density at ———." The circular also amends Section 7 of the original circular so that cotton linters compressed and shipped in lots of 75 or more bales per car, whether at carload rates or any-quantity rates, from one shipper at one shipping point to one consignee at one destination and not to be unloaded in transit for any purpose, may be received without tags; also cotton linters shipped through uncompressed from origin to destination, if in quantities sufficient to occupy the full available capacity of one car and at any-quantity rates from one shipper at one shipping point to one consignee at one destination.

Conferees on Railroad Bill Postpone Controversial Points

WASHINGTON, D. C.

THE CONFERENCE committee which is engaged in an effort to reconcile the differences between the Esch and Cummins railroad bills passed by the House and Senate, respectively, has held almost daily sessions with the exception of Sundays and holidays, but has thus far devoted its time principally to the ironing out of minor differences in the provisions of the two bills which are generally similar in purpose and on which it is comparatively easy to reach an agreement. Chairman Cummins of the Senate conferees has announced that considerable progress has been made as to these features of the work, but that the most important parts of the bills which are certain to arouse controversy have been set aside for consideration later, probably next week.

These include the rate-making, excess earnings, consolidation, transportation board and anti-strike provisions of the Cummins bill, some of which are likely to be sacrificed for trading purposes, but the point of deciding which will be so treated will not be reached until an agreement has been reached on what would be regarded as a fairly complete bill by those who are opposed to or not interested in the provisions named.

Among the points on which an agreement has been reached at least tentatively is the section relating to joint action by the Interstate Commerce Commission and state commissions in cases involving a conflict of jurisdiction, such as the Shreveport case. Both bills provide for co-operation and joint hearings by the state and federal authorities, and the Senate bill gives the Interstate Commerce Commission the power of final decision "to make such findings and orders as may in its judgment tend to remove any undue advantage, preference or prejudice as between persons or localities in intrastate commerce on the one hand and interstate or foreign commerce on the other hand." The original language also added "or any undue burden upon interstate or foreign commerce," which was agreed to be stricken out, thus making the effect of the provision practically that of the similar provision in the Esch bill.

Considerable attention has been devoted to the car service sections and it is understood that the Senate amendment relating to refrigerator cars submitted by Senator Pomerene was accepted with some modifications.

Swagar Sherley, director of the Division of Finance of the Railroad Administration, conferred with the committee on December 31, explaining the effect of the conflicting provisions of the two bills relating to the adjustment of the carriers' indebtedness to the government for capital expenditures and of the government to the railroads for rental.

The railway executives have filed with the conferees a memorandum outlining their objections to the rate-making sections of the Senate bill and a memorandum outlining the views of the state commissioners as developed at a meeting of the executive, legislative and valuation committees of the National Association of Railway and Utilities Commissioners, was to be presented by J. E. Benton, solicitor for the association. The conferees on Wednesday tentatively decided on $300,000,000 as the amount of revolving fund for loans to railroads. The House bill provides for $250,000,000 and the Senate bill for $500,000,000.

Executives Urge Assurance to New Investors

Conferees Asked to Adopt Rule of Rate-Making to Establish Railroad Credit—Section 6 of Cummins Bill Opposed

WASHINGTON, D. C.

DURING THE recent debate on the Cummins railroad bill in the Senate there was some controversy as to whether the railroad companies were for or against the bill. It was asserted by some of the opponents of the measure that the railroads were demanding its passage and were engaged in an extensive propaganda for that purpose, while Senator Cummins declared that most of the railroad executives did not like the bill. The position of the Association of Railway Executives as to what is undoubtedly the most important provision in the Cummins bill has now been plainly indicated by a memorandum filed with the conference committee now engaged in an effort to reconcile the differences between the Esch and Cummins bills by Thomas DeWitt Cuyler, chairman, and Alfred P. Thom, counsel, dealing with Section 6, which contains the rule of rate-making as it appears in the Cummins bill.

They say that the executives would favor as a rule of rate-making a minimum of 6 per cent on the aggregate values in a traffic group if the carriers are allowed to retain what they could earn from rates thus established. The provisions of the bill, which seek to standardize the net operating income of carriers by establishing a rigid percentage rule and requiring companies that earn over a given percentage to give up a part of their earnings, are opposed as both unwise and unconstitutional. Congress is strongly urged to make a clear declaration of national policy for the purpose of improving railroad credit, that investments hereafter made will be justified by the rate structure, and for this purpose the general rule of rate-making proposed by the Senate subcommittee in the original Cummins bill is suggested as a fair basis.

An abstract of the memorandum follows:

Section 6

Before proceeding to discuss the section, we desire to state, as we frequently indicated to the chairmen of the respective committees of the Senate and House during the consideration of this legislation, that the Association of Railway Executives would favor as a rule of rate-making a minimum percentage, to be fixed in the act, on the aggregate values in a traffic group, if the amount of the percentage is adequate and the several carriers are permitted to earn, for their services rendered, as much as they can from rates thus legally established and to retain such earnings as their own. It is the opinion of the executives that such percentage should not be less than 6 per cent.

Section 6, however, as it now stands, does not do this.

Its avowed purpose is to equalize, as nearly as practicable, the values, now inherently unequal, of the transportation properties of the several railroad carriers. These properties belong to different owners. This purpose is manifest not only from the general scope of the section, but from definite and unmistakable declarations of policy which the section contains.

For example, one provision requires that the Interstate Commerce Commission "shall, as far as practicable, adjust rates, fares, charges and classifications (so) that the net operating income of the several carriers shall bear *the same relation* to the value of their respective properties."

This equality of relationship does not exist now and has never existed heretofore.

The section further provides that, in order "to sustain sundry carriers," a specified rate structure shall be established, but prohibits "more favorably situated carriers," if they earn more than a designated amount, to retain a specified part of the revenues coming to them for the transportation services they render; in other words, this section requires the establishment of rates (thus making them lawful and requiring all carriers in the group to do business on that basis and to collect them from the public), the entire revenues from which "sundry carriers" are permitted to receive and enjoy as their own, whereas a part of the revenues of "the more favorably situated carriers" at the same rates for exactly similar, but more numerous and greater, services, is taken away, if the revenues exceed a specified amount. This is without reference to the number, extent or the value of the services rendered.

This assertion of power raises sharply the question whether, under our system of government, Congress may lawfully and directly, by legislative enactment, take away, to an extent dictated by legislative discretion or caprice, the property of one of its citizens and add to the property of another.

A discussion of this question of power will be postponed to a subsequent part of this note.

We shall undertake first to call attention to the question of wisdom and sound public policy which is involved.

I. Policy of the Proposal

1. The declared purpose of the enactment is "to sustain sundry carriers indispensable to the communities served by them." It cannot be denied that the method proposed is a wide and radical departure from anything heretofore favored in our American system of government. To justify an experiment so novel and so far-reaching, it at least must be certain to secure the result which is desired. That object is, as stated, to help "sundry carriers," which are those commonly referred to in this discussion as the "weak roads."

The argument is that competitive rates must, for economic reasons, be the same for all roads, "weak" and "strong" in the same traffic group; that if the "strong" roads alone were to be considered, Congress might lawfully exercise a discretion to make rates at a certain level; that this level would be too low to sustain the "weak" roads; that if the "weak" roads alone were to be considered Congress might exercise a discretion to establish rates at a higher level, but that rates thus fixed would produce too much revenue for the strong roads; and hence the plan of fixing rates high enough to sustain the "weak" roads, and of obviating the undesirable consequence of the "strong" roads earning more than Congress would like to see them have, by the simple expedient of taking the excess away.

THE PROPOSAL IS TO ACCOMPLISH THIS OBJECT BY ESTABLISHING A RIGID 5½ PER CENT RULE

No reference is here made to the additional one-half of 1 per cent which the commission may allow in its discretion for certain restricted purposes. This omission was for the sake of brevity and because the carrier would not be entitled to the full control and enjoyment of the addition and reference to it would not affect the argument. It is rigid at 5½ per cent for the general purposes of the carrier.

This object of securing a system of rates adequate to sustain the "weak" lines is to be accomplished by the enactment of a rigid statutory rule requiring rates in a traffic group to be fixed so that they will produce net revenues in the group of 5½ per cent on the aggregate value of the properties therein used for transportation purposes.

If these revenues are not as much as the prescribed 5½

per cent, the rates must go up. That is the aspect of the question which is alone considered by the advocates of the proposal, and manifestly that is the only aspect which will benefit, even temporarily, the "weak" lines.

But the proposal likewise peremptorily requires that if the revenues in the group at any time exceed 5½ per cent, the rates shall come down. If the rates, in pursuance of this peremptory requirement, are reduced below the present level of five and two or three-tenths per cent, the "weak" lines will be injured instead of helped.

This result must injuriously affect the "weak" lines unless they secure a compensatory proportion of the increased business. Is it to be reasonably expected that they will? Their "weakness" is, at least in large part, due to their having too little business and being unable, because of unfavorable location, to get more. The increase of general business will doubtless come in largest extent from the stronger communities which are served for the most part by the stronger lines. Moreover, business which is competitive, unless the experience of the past is to be reversed, will seek for the most part the more competent carriers.

When these two forces are considered, it seems reasonable to conclude that by far the larger share of increased business will seek the more competent carriers, and that, in any reduction of rates coming as the result of the application of the 5½ per cent statutory rule to increased business, the "weak" lines will be further weakened, rather than helped, as revenue earners.

Of course, the argument above made that the system devised to aid the "weak" lines, will, after a short time and in the process of the development of business, work out to their injury, will be at least partially answered if by the proposed system the lines which are now denominated as "strong" and are meeting from 80 to 90 per cent of the entire needs of the public for transportation, are by the process of taking away a part of their net earnings and the "equalization of values" which is proposed (thus depriving them of hope and incentive) reduced in efficiency to the dead level of the "weak" lines. In that event, there could be no inducement of superior efficiency to attract business to the hitherto more capable lines, and the weak lines might get a proportionate share of the increased business.

But this suggestion of an answer meets with two difficulties: First, while the proposed system, if successfully carried out, will undoubtedly reduce very substantially the ability of the strong lines to serve the public, and consequently their efficiency as public servants, it is doubtful whether this will be carried to the extent of taking away their entire transportation superiority over other lines; and hence, even in that event, there will be a certain amount of superior efficiency remaining which will attract the larger share of increased business; and, second, if the entire difference in transportation efficiency between the carriers is removed by reducing that of the carriers which are now rendering the most substantial service to the public, or if it is materially reduced, the policy of thus reducing such transportation efficiency of those carriers on which the public must most largely depend, would be condemned by the vast injury to the public which would ensue.

But it is insisted that the incentive to the use in the public service of initiative, energy, enterprise and efficiency would not be destroyed by the proposed plan, for the reason that it is not proposed to deprive the carriers which are at present strong of all reward of successful effort, as they are still left a part of their earnings over 6 per cent. It must be remembered, however, that they are also deprived of a very large part of their earnings over 6 per cent—of one-half of one per cent between 6 and 7 and of three-quarters of all over 7 per cent.

Is it not human nature to feel a very large reduction in incentive to effort, if by far the largest part of the reward is to go to some one else, and is the incentive at present existing, either to investment or to effort in the railroad industry, so great that it can, with due regard to the public interest, be substantially reduced?

If there could be a difference of opinion as to whether incentive to effort and efficiency will be as great with a denial of a very substantial part of the reward heretofore possible to successful effort—as to which I think there can be no reasonable difference of judgment—there manifestly can be no legitimate difference as to whether there will be a reduction of the incentive to investors if a substantial part of the rewards of success is denied them, when these rewards are at best inferior to those which may be expected from investments in other industries.

The experiment of this transfusion of the blood of efficiency from the strong and capable into the weak instrumentalities of commerce is too dangerous to be resorted to in this important field of economics.

Thus, it is apparent that the proposed plan must meet one of two alternatives, each too dangerous to be encountered; first, when business increases so that the net revenues of a group exceed 5½ per cent, the rates must come down, and this will injure, instead of help, the "weak" lines, unless they can secure a corresponding proportion of the increased business, which, inasmuch as they are now weak largely because of their unfortunate location and situation in respect to business, can not reasonably be anticipated; or, second, a large proportion of the increased business will be thrown to the lines that are now "weak" by the impairment of the efficiency of the lines on which the commerce of the company is largely dependent—a result which cannot be attained without substantial, and perhaps irremediable, injury to the public. Either horn of the dilemma would seem to condemn the proposal.

2. The importance of the problem, as it is called, of the "weak" and "strong" roads has been greatly overestimated from the standpoint of the public and does not justify the radical proposal to take away from some of the lines a part of their net earnings at lawful rates.

Mr. John E. Oldham, a banker of Boston, well and favorably known to the members of this committee, has made a study of this subject, and has embodied the result in an address delivered before the Academy of Political Science in the City of New York, on November 21, 1919.

In his preface he states: "Data are here presented which indicate that the number and importance of the railroads which are 'weak' because 'less favorably situated' and those which are 'strong' because 'more favorably situated' have been greatly exaggerated.

This same point is very strikingly and intelligently developed by Mr. Howard Elliott in his statement before the House committee.

The largest interest which the public has in this question is the maintenance and continuance of the facilities of transportation. The danger of any carrier, now doing a business in which any portion of the public has substantial interest, being unable to continue its service, is most remote. In fact, no instance of such discontinuance of operation by a useful carrier has ever occurred, so far as we are advised.

As pointed out by Mr. Oldham, the problem may be adequately dealt with by a fair adjustment of rates as to all carriers, except those which in their nature are mere feeders to larger lines, and the policy of consolidation suggested in this legislation would be adequate to deal with the latter part of the problem.

As to the others it takes, according to Mr. Oldham's figures, approximately 23 per cent of the gross earnings of the strongest roads to pay fixed charges and to maintain dividends, whereas it takes about 22 per cent of the earnings of the non-

dividend-paying roads to pay their fixed charges and dividends (21 per cent going, however, to fixed charges and 1 per cent to dividends), an approximate equality of conditions as to the proportion of earnings devoted to capital, which is very striking. Of course, there is undoubtedly a difference in capitalization, and it may be necessary in the orderly progress of business to correct errors in capitalization, if such errors appear.

The situation is one which can be dealt with by a calm exercise of judgment, and without any resort to radical or revolutionary measures.

Of course, there is an inequality of condition between the several rail carriers. No single carrier can be taken as a standard for all. It would not be fair to make rates for the strong alone, or for the weak alone. A comprehensive view of the condition of the various carriers must be taken and the rates, in the exercise of a wise and businesslike discretion, must be adjusted to a fair level, everything considered.

Such a method would adequately protect the public interest and give assurance of the continued operation of the instrumentalities of commerce. For the rest, it is wise to leave the matter to the orderly evolution of economic forces.

3. Aside from the consideration hereinbefore presented and aside also from the question of the lawfulness of the power thus to create and destroy property values at legislative discretion and by legislative fiat the proposal is fraught with consequences to our institutions and to our national safety too serious to be encountered.

If the power to take away from a carrier a part of its earnings at lawful rates is constitutional, its exercise would be all the more unfortunate and all the more dangerous, for then there would be no relief from it in the courts.

It must be remembered that it is the policy of these bills, and the undoubted determination of the public, to rely on private operation and private capital to furnish transportation to the public. To make this system a success, it is universally admitted that private investors must be attracted and induced—they cannot be coerced—to invest many hundreds of millions of dollars annually in improving and increasing, as commerce grows, the transportation facilities which the public must have.

This difficulty is not successfully met even if the proposal should furnish a temporary market for existing securities at present without a market. It reaches much further, and extends to the entire future of transportation. The new investor is the arbiter of the success or failure of the proposal, for he, in the nature of things, has the determination of the question of whether the required capital will be forthcoming and thus of the question whether the proposed system will succeed.

He will soon appreciate, if he does not now, that if this Congress can deprive the property in which he is asked to invest of the part of its earnings now proposed, another Congress, may take still more, and a third Congress a still larger amount, until the point is reached where the owners must resort to litigation to overthrow legislation which may spring from the political exigencies of the moment.

Moreover, the dangerous consequences can not be overestimated of introducing into our governmental system this novel and heretofore unasserted power to take away a part of the net earnings of some of the carriers at lawful rates simply because a certain Congress regards them, considered in and of themselves and for no reason other than their amount, as too large, and not as a result of a finding that the rates are unreasonable as between the carrier furnishing the service and the shipper receiving it.

If this power is wise and can be justified as to railroads which are now regulated, it will be equally wise and equally justified, and certainly equally possible, as to any other industry which may hereafter be regulated. The test of the power of governments to regulate an industry is the extent of the public interest in it, and that is very largely a matter of legislative, as contradistinguished from judicial, determination. If Congress hereafter concludes that the public safety requires the regulation of the supplies of fuel or of food or of the manufacture of basic necessities or of money, it may lawfully extend its power of regulation to include these important subjects.

If the owner of a coal mine, when fuel comes to be regulated, happens to have purchased his property with wisdom and to have thus secured a mine in which the coal lies close to the surface and can be economically produced, and has bought property conveniently located as respects transportation and from which he can put his products into the markets at small cost, the legislative authority may, under the power here asserted, conclude that his earnings from prices fixed by law are too large and may force him to surrender a large part of his advantage of location and of his other property values, in order that some coal miners back in the hills may prosper.

And so as to food, and so as to the manufacture of essential building materials, and so as to money, when these subjects severally come to be regulated.

In fact, money is now regulated to the extent of having the interest rates limited by law. This limitation—generally 6 per cent—was put upon money when there were no large aggregations of capital. Suppose a governmental authority were to say that the above mentioned rate, while reasonable for the man having small capital, will produce too great an earning in the case of large accumulations of capital, and were to take the excess away, by a new power never heretofore asserted and subject to no limitation except the legislative will, what answer could be made to such an assertion of power if Congress may now take away a part of the earnings at lawful rates of the successful railroad, simply because the amount of the net earnings exceeds the amount which the Congress then in authority may approve?

The underlying difficulty about the credit of the railroads is the manifest reluctance to permit them a measure of business success in any way comparable to that in other fields of industry. Nothing would do more to attract the investment of new and adequate capital than to abandon this attitude of jealous restriction and to declare a legislative policy giving these carriers a business chance and assuring them of the legitimate rewards of successful service.

The proposal, we submit, is no more in the real interest of the "weak" roads than it is in the interest of the strong. In the final analysis, the road which is at present "weak" is a factor in, and must rise or fall with, an industrial system which must be fair and just and sound in order that it may be stable, and in order that, under it, any interest may ultimately prosper and be safe.

It is not in the interest of the poor man, who has any possibility of a future, that the earnings of men who prosper by reason of energy, industry and thrift, shall go unprotected and be taken away. In order for the capable poor man to become prosperous, or to become an efficient and useful factor in our social organization, he must have hope both of success and of security in the enjoyment of the fruits of his efforts.

This is as true of industrial organization as of men, and the ultimate interests of a road at present "weak" will not not be promoted, even if there is for the present a temporary advantage, by the adoption of a principle in government which is subversive of the heretofore recognized foundations of the security of men in the enjoyment of what they earn. In the final analysis, this proposal is good for the "weak" roads, only if the socialization of property is, as a governmental policy, good for the needy.

It is respectfully submitted, therefore, that, from the standpoint alone of a wise public policy, the use of power pro-

posed in this section would be a grave economic error, the harmful effects of which would be far-reaching and could not be overestimated.

But, in our judgment, the proposed use of legislative power would be unconstitutional. We now proceed to a discussion of that question.

II. Is the Proposed Exercise of Legislative Power Constitutional?

The proposal is to equalize, by legislation fiat, the values, now inherently unequal, of properties owned by different persons. This is to be accomplished by one or both of two methods; first, by so adjusting the rates of the several carriers as to bring about the proposed equality; and, second, if the first method does not produce the entire result, by taking away from the successful carrier a part of its earnings.

Thus, it is not proposed to bring about the desired equalization of values by increasing up to the level of the others the values of those which are at present at a lower level, leaving the values of the more successful undisturbed. On the contrary, the proposition is to bring about the proposed equalization by reducing the values of some to the level of others, or by legislating values out of one and legislating values into another and, by this process, produce an intermediate level of equalization.

The proposal, therefore, involves the reduction of values which now exist by the means of direct legislative enactment, adopted for that clear and declared purpose. Senator Cummins has recently declared that, under rates now in existence, as well as under the rates in existence prior to federal control (which it must be noted were the result of 30 years of regulation), some of the carriers have been earning 6 or 8 and some 9 per cent, and that this will likewise be true under the 5½ per cent rule. Section 6 expressly provides that the earnings above a specified amount of such carriers as were here referred to by Senator Cummins shall be taken away.

This, by the terms of the bill, is to be done even if there is no change in rates; and earnings of these carriers would be taken away although they come from a body of rates now in existence and now entitled to be considered as not more than reasonable and just for the services rendered—in fact, from a body of rates publicly approved by the Interstate Commerce Commission in a report to Congress.

The bill likewise proposes to take away a part of the earnings, if in excess of a given amount, although every rate may be examined into by the Interstate Commerce Commission and found to be reasonable and just.

In other words, the proposal is to deprive the carriers of a part of their earnings, if over a given amount, without reference to the reasonableness or justness of the rates and with reference alone to the amount of the earnings.

It must be appreciated also that it is the purpose and effect of the proposal to take away a part of the earnings without reference to the quantity or the value of the services rendered.

Nor is any allowance made if larger net revenues come to one carrier, not from difference in rates, or from difference in values, or from difference in business, but entirely from wiser capital expenditures (reflected in economies in operation), and from more intelligent, more skillful and more economical management. In this case, as in the others, the sole test set up by the bill is the amount of the net earnings, and, notwithstanding they are the result of wiser expenditures and better management or more economical operation, so much of them as is in excess of the specified amount must be surrendered.

The fifth amendment protects the property of railroads as well as the property of individuals. It provides that no one shall be deprived of his property without just compensation. The inquiry, therefore, becomes pertinent as to what are the elements of the property of these carriers, and whether the bill proposes to take away anything that is property.

This subject has been maturely and frequently considered by the Supreme Court of the United States, and the principles involved are no longer in doubt. Among the principles settled by the Supreme Court and which can no longer be questioned, are the following:

1. The use of property is property.

(Citations omitted.)

It is unnecessary to multiply authorities. These cases have never been questioned and the soundness of the proposition which they announce has been universally accepted. It will be noted that there is no suggestion in these cases, or in any case, of a legislative power to limit earnings from lawful rates without regard to the number or the value of the services rendered.

In fact, such a proposition is directly in the teeth of the principles here laid down. These cases declare that the use of property is property and the value of the property varies with the number and productiveness of the uses, and they thus negative the underlying idea of the proposed legislation that, no matter how great or how valuable the uses to which the property is actually put, the value of the property cannot be permitted to vary and grow with these uses, but that a part of the use may be taken away and the value of the property thus reduced to an equality with property not used so beneficially or to the same extent.

The vice of the whole proposal is that it confuses the government's power over rates with an asserted governmental power over the amount of net earnings from lawful rates.

We are aware of no case, and none has been cited so far as we have been advised, which has sustained the legislative power to directly reduce or to directly regulate earnings. All the cases confine the government's power in the matter to its power to see that rates from which the earnings come are just and reasonable. It can reach earnings only indirectly through the constitutional exercise of its power over rates.

2. Again, advantage of location is a valuable element of property and is property protected by the Constitution.

Although it is thus declared, in a case which has never been questioned but many times approved, that the value of property is largely determined by the earnings which the property brings to its owners, it is proposed by this bill, without inquiry and without reference to the rates, or to the number or value of the services, to take a part of the net earnings away, by the arbitrary exercise of legislative power, if the amount is greater than that fixed by the statute; and, although this case likewise declares that "neighborhood to the centers of business and population," which is the advantage of location, constitutes a property right, the bill proposes in express terms to deprive certain carriers of this advantage of location by taking away a part of the earnings which they make, for the very reason that they are, in the language of the bill, "more favorably situated."

Doubtless the principles above stated will not be controverted by the advocates of this legislative proposal. The attempt will be made to avoid, rather than to question, them.

The argument to sustain the proposal is, in effect, that no effort is here made to take away the earnings of a carrier at reasonable rates, for the rates, although lawfully established, are not reasonable *quoad* the carrier whose earnings exceed the amount specified in the bill, and consequently the amount of net revenues which the carrier collects in excess of the amount specified in the bill never in fact belongs to it, and hence there is no violation of its property rights in taking this excess away. This taking is to be accomplished by attempting to impress on the alleged excess "a trust" in favor of the government and thus, in contemplation of law, preventing the carrier from ever coming into possession of the amount except as an agent for the government. This is described as

a method of "recapture" of the earnings, and seems to be based upon the idea that this, or some, method of intercepting the revenues before they actually reach the treasury of the carrier will be effective to create a different legal status in respect to the ownership of the earnings from that which would otherwise exist.

Manifestly, however, if the carrier has a right to these earnings, that right cannot be destroyed by the attempt to intercept them and impress them with a trust which would be in violation of the carrier's property rights to collect and hold them as its own. Nor, if the carrier has no right to them, is it necessary to resort to this friction of "recapture" in order to deprive the carrier of them. The carrier may be required to refund directly any amount it collects to which it is not entitled. They do not become the property of the carrier because the amount has been paid into its treasury. The carrier's claim and right of ownership arises because it has rendered the service for which the amount is compensation.

So that the question of the carrier's right to these earnings must be considered and determined on the merits of the question and entirely apart from, and unconfused by, these fictions of "a trust" and of a "recapture."

If they are the carrier's property, that ends the controversy, for if they belong to the carrier it will be universally admitted they cannot be taken away by this legislative proposal. If the rates are reasonable for the service, then, under all the authorities, the revenues from them belong to the carrier which has earned them, and in that event they cannot be taken away by any device.

If, however, the rates are unreasonably high and consequently, being an overcharge, do not belong to the carrier, the question still remains and must be determined as to who is entitled to the overcharge, before the theory of the bill can be sustained. For the theory of the bill is, that, being an overcharge, the excess amount belongs to the public, and in express terms a trust in respect to such excess is declared in favor of the public.

It is easy enough to understand how a trust may arise in favor of the shipper if he is required to pay an excessive amount, but on what theory can a right in respect to something the shipper has paid arise in favor of the government? Neither the general public nor the government has paid anything. The amount in dispute has been paid by certain individual patrons of the carrier. But the consequences of this relationship to the payment are sought to be avoided by the contention that the public has a duty to see that the interest of all the people in adequate transportation facilities is protected, and it is in view of this governmental duty and of the general public's interest in transportation that an attempt is made to create a trust in favor of the public.

It is difficult to understand, however, even if this governmental duty be admitted, how that proposition affects the questions here involved. If such a duty does rest upon the government, it must be performed by the government. The duty cannot be transferred by the government to the individual patrons of the carrier, for manifestly the duty does not rest upon these individual patrons of one carrier to provide transportation facilities for the other communities which may be in need of them. The entire duty of the individual patron of a carrier is performed when he pays a fair price for the transportation service he receives. If there is a duty beyond this, it rests upon him in common with, and in no greater degree than on, every other member of the public, and the burden cannot be placed on him alone.

This bill, however, asserts an exactly contrary view. It asserts a governmental power to impress upon the patrons of a successful carrier the burden of furnishing transportation to communities other than his own and in which he has no other or larger interest, and to which he has no other or larger duty, than any other member of the public at large. In other words, this bill seeks to impose upon the patrons and users of certain lines of transportation the burden of "sustaining sundry carriers indispensable" to the other communities which these "sundry carriers" serve.

If the rates are unreasonably high, and are made so for the purpose of sustaining "sundry carriers" in respect to which the persons who pay the unreasonable rates have no responsibility or special duty, how long will this class of shippers be content to bear this extraordinary imposition—a burden imposed on them alone?

The fact is that the proposal is an artificial device for dealing with a troublesome situation. What is really intended is not to place upon any special class of shippers a special burden, but to take from the more favorably situated and more competent carriers a part of their earnings to help other carriers which are thought to need help.

But it would not do for the legislation to admit that the earnings belong to the carrier that performs the service. To do so would be to admit a constitutional inability to take these earnings away. Therefore, to avoid the constitutional difficulty, there must be a declaration that these carriers have collected too much and that the excess does not belong to them.

But the troublesome question at once arises and must be answered: to whom do they belong—who is it that has paid this excessive amount, and why does not the excessive amount belong to those who have been required to pay too much? If so, the trust is in favor of these individuals and not in favor of the government. The declaration of the statute that the amount is negligible as to each transaction cannot alter the essence of the transaction. The government cannot justify the taking on the ground that the amount is small in each case. No statute is competent to deprive the individuals making the payment of the trust in their favor, for that is a property right protected by the fifth amendment. It must be admitted that the government has no constitutional power to use a carrier as its collection agent to collect from one of its citizens an amount in excess of what the citizen ought to pay for the service.

On the other hand, if the citizen ought to pay for the service rendered by the carrier the amount which is collected, the entire amount belongs to the carrier and cannot constitutionally be taken away. In neither aspect of the matter can a trust in favor of the government be created, and the attempted exercise of legislative power to that end must fall.

Moreover, there is still another difficulty which must be met. The question still remains whether in legal contemplation the amount attempted to be seized or recaptured is in fact excessive.

It is proposed in the bill to settle this question by a single test. That single test is the amount of the net earnings. If the net earnings exceed a certain amount, then the rates are to be considered excessive. If the net earnings do not exceed a certain amount, then the rates are not excessive.

In determining the question, the bill permits no consideration of the number of the services, of the character of the services, or of the value of the services. It permits no consideration of the wisdom of the capital expenditures in producing a property that may be economically operated, nor of the economies, the intelligence or the skill which characterize the operation of the property; it admits no force in a possible finding by the commission that all the rates are reasonable and just.

Without regard to any of these, the rates are conclusively presumed to be unreasonably high if only the earnings exceed this specified amount.

This view is exactly contrary to the decisions of the Supreme Court. That court holds, in the cases hereinbefore cited, that the uses of the property belong to its owner and

that in ascertaining the value of the property reference must be had to the number and the character of the services. The proposal in the bill is to disregard these entirely and also to disregard every element of management that goes to promote economy and to increase net earnings, and to make the question turn exclusively on the legislative judgment, arbitrarily arrived at without standard or measure, as to how much these earnings should be.

It is submitted that such a conclusion finds no support in any adjudicated case or in any principle of law heretofore accepted or regarded as sound.

III. Rule of Rate Making

There are certain things relating to the problem of rate-making that are so clear that they should be universally admitted.

In the first place, it should be admitted—and this is now being recognized in enlightened public opinion—that the highest interest of the public in respect to transportation is that the facilities and the service shall be adequate to the needs of commerce. While the amount of the charges is, of course, important, it is by no means as important as that there should be adequate and sufficient transportation facilities. It would seem clear, therefore, that the system of regulation should recognize this truth, and in ascertaining the amount of revenues which the carriers should be allowed to collect, should provide an adequate basis of credit to insure the public that the facilities and service which they need will at all times be provided.

In the second place, there should be no controversy that the rates should be sufficient to pay the expenses of operation, including labor and taxes.

In the third place, there should be no controversy that the rates should be adequate to provide revenues which will afford a fair return upon the property already held or used for the public service.

If the things thus enumerated are conceded—and it does not seem that they are open to legitimate controversy—it follows, at the least, that the rates which are established by governmental authority shall be such as will produce revenues sufficient to provide for them all; in other words, that the revenues from rates shall be sufficient to pay the expenses of operation, including labor and taxes, a fair return on the property held or used for the public service, and enough more to afford a basis of credit for the new capital which carriers must get from the investing public in order to meet the public requirements for facilities and service.

If the public interest in the adequacy of facilities and service is a paramount consideration, as we think it is, that fact should be recognized in the legislation, and a public authority should be charged with the duty of keeping itself advised as to the facilities and service which from time to time exist and the facilities and service which the public need, and as to the revenues required by the carriers, comprehensively considered, in order to enable them to furnish these facilities and service.

We, therefore, earnestly suggest that, if private investors are to be attracted, the least that Congress can do, as to rate-making, in order to give them an assurance of protection is:

To charge a governmental authority with the definite duty:

(*a*) Of keeping itself informed as to the facilities and service which are furnished and those which the commerce of the country requires, and as to the credit of the carriers and the amount of revenues necessary to enable them to provide the facilities and service that are needed; and

(*b*) Of fixing rates which will produce revenues sufficient to pay (1) the expenses of operation, including labor and taxes; (2) a fair return on the property held or used in the public service, and (3) an amount in addition sufficient, as a basis of credit, to enable the carriers, comprehensively considered in the various sections of the country, to obtain the capital necessary to enable them to furnish the facilities and service which the public need.

As above stated, there can be no doubt that all the things just mentioned must be provided for in the rates. If not, which of them can be omitted? Must not the expenses of operation and the taxes be paid? Must there not be a fair return, to be fixed at a reasonable figure by a governmental agency, on the property used to furnish the public with transportation? Is it not essential, in the public interest, that the carriers, comprehensively considered, shall have the credit necessary to enable them to obtain the new capital needed to furnish the facilities which the public must have?

And if all of these things are essential, why should Congress be reluctant to say so? And if Congress is reluctant to say so, must it not be because there is some doubt about it? If there is any doubt, why should anybody invest on the uncertainty? Is it not wise to give stability to the business of transportation by making a clear legislative declaration of the rule which will be applied and which investors may rely on? If there is any doubt about providing in the rates for any of the purposes mentioned, this is the time to say so and to give fair notice to investors. If there is no doubt, there should certainly be no hesitation in so declaring.

A prospective investor might very well reason that if Congress feels it necessary to refrain from the declaration of such a legislative policy, the administrative body, charged with the duty of fixing the rates, might reflect a similar hesitation. And that would be the end of private investment.

The sub-committee of the Senate recognized the force of these considerations and reported a rule of rate-making, which we understand was at one time slightly modified in the full committee, so as to read substantially as follows:

> "Rates of transportation shall at all times be just and reasonable. In changing or modifying them from time to time in the manner provided in the act to regulate commerce, as amended, and in viewing them from the standpoint of their effect in producing revenue in any rate-making group as a whole, the commission shall take into consideration the interests of the public, the shippers the wages of labor, the cost of maintenance and operation (including taxes), a fair return upon the value of the property in the group and used for or held for the service of transportation, the requirements for additional capital in order to enable the carriers to adequately perform their duties to the public and the conditions under which the same can be secured; and, for the purposes aforesaid, the commission shall from time to time determine the value of the property in each district and so lower or advance the rates of transportation, as nearly as may be, as to provide the revenues herein mentioned."

The full committee of the House reported a rule of rate-making as follows:

> "The commission shall be charged with the duty and responsibility of observing and keeping informed as to the transportation needs and the transportation facilities and service of the country, and as to the operating revenues necessary to the adequacy and efficiency of such transportation facilities and service. In reaching its conclusions as to the justness and reasonableness of any rate, fare, charge, classification, regulation, or practice, the commission shall take into consideration the interest of the public, the shippers, the reasonable cost of maintenance and operation (including the wages of labor, depreciation, and taxes), and a fair return upon the value of the property used or held for the service of transportation."

These two drafts are not very far apart. The principal difference is in the declaration as to credit.

The question again recurs, why should Congress hesitate to make a clear declaration on this subject? It must be recognized that proper credit is essential to the success of the system which Congress has chosen to rely on for transportation. If Congress hesitates to say this, that very fact indicates that the investment is hazardous. It must be borne in mind that Congress is making an appeal in this legislation to a new public—to an investment that is not as yet in the railroads—and if it fails to declare that the national policy is that investments which are hereafter made will be justified by the rate structure—regulated as they will be by governmental authority—then in frankness it must be realized that the appeal fails.

It is, therefore, our since hope that Congress will not be uncertain in its attitude on this question of credit.

Of the two rules above quoted, that from the Senate will give a stronger measure of assurance to new investors—an assurance which Congress may be certain is very badly needed.

We, therefore, respectfully ask why such a rule does not present a fair basis for the adjustment of the differences of opinion between the two houses?

November Deficit Increases

NET OPERATING INCOME of the railroads in November, 1919, reached the lowest point it has reached in November for 30 years, according to preliminary returns, amounting to only $22,000,000, as compared with $57,000,000 for this month in 1918, $76,000,000 in 1917 and $83,600,000, the average for November during the three-year test period. This makes the government deficit for the month $61,000,000, as compared with the standard return of the test period, or $53,000,000, as compared with one-twelfth of the annual rental guaranteed by the government, and brings the government's deficit from railroad operations for the year up to over $290,000,000. Adding this to the $236,500,000 loss in 1918 makes a total of $527,200,000 for the 23 months of government operation without counting the expenses of the Railroad Administration and the deficits from other than railroad operations, such as Pullman car lines, express, waterways, etc., for 1919, which have not yet been reported.

When the December returns are in it is estimated that the total loss of the government for the two years will be about $700,000,000, aside from whatever may be the results from the adjustment of the materials and supplies accounts, capital expenditures for war purposes and the maintenance accounts, etc. The administration statement does not give the earnings and expenses but a compilation of the returns to the Interstate Commerce Commission covering nearly all the roads shows the following comparison:

	1919	1918
Revenues	$436,100,000	$440,400,000
Expenses and taxes	417,000,000	383,900,000
Net operating income	19,100,000	56,500,000

According to this compilation the Eastern roads showed an actual operating deficit in November. Their expenses and taxes were about $4,200,000 in excess of the operating revenues. The Western roads earned about $20,400,000 net and the Southern roads about $2,900,000. Compared with the November average for the three-year test period the November revenues show an increase of $149,200,000, but expenses and taxes have increased $213,700,000. The net ton miles of revenue and non-revenue freight handled in November aggregated 32,539,000,000, a decrease of 8½ per cent as compared with November, 1918, while passenger traffic increased.

Director General Hines on January 3 authorized a statement discussing the November returns from which those who desire to do so may derive an argument that the Railroad Administration was financially successful during the four months preceding the coal strike, July to October, inclusive, because it shows a profit for those months of $45,200,000, as compared with four-twelfths of the annual rental, although in a parallel column it is shown that the net operating income in those months was actually $3,300,000 less than the proportion of the annual rental earned during the corresponding months of the three-year test period, ended June 30, 1917, which were the months of July to October, 1914, 1915 and 1916.

The statement also shows that if the increased rates had been in effect throughout the period of federal control there would have been a surplus for 22 months of $14,000,000. It might also be pointed out that, if this had been the case, while the result for 1918 would have been a profit of $257,500,000, instead of a deficit of $236,500,000, the result for 11 months of 1919 would still have been a deficit of some $290,000,000. The statement follows:

"As indicated a few days ago, the operating results for November were very seriously affected by the coal strike. Detailed statistics of the operating results for the month have now become available for practically all of the Class I railroads and large terminal companies in federal operation. These results indicate that there will be a net operating income for the month of November from the operation of these properties of $22,000,000, which represents a loss of $53,000,000 to the government, after allowing one-twelfth of the annual rental, or $61,000,000, on the basis of the net operating income earned during the average November of the test period.

"As it is now the end of the second year of federal operation, it appears to be a convenient time to review the operating results during the past two years of federal control. For this purpose, it seems appropriate to divide the period of government operation into four periods:

1. The calendar year 1918, which was abnormal in being a war year and also on account of the fact that increases in freight and passenger rates were effective for practically only the last half of the year, while a large proportion of the increase in wages was retroactive to January 1, 1918.
2. Six months ended June 30, 1919, which reflected the slump in freight business following the armistice and the readjustment to peace conditions. This period reflects the increased rates for the full period and the greater portion of the present wage scale. It does not, however, include the increase to shopmen which was retroactive to May 1, 1919, the full effect of which is shown in the last two periods.
3. The four months July to October, 1919, which may be said to represent approximately normal operating conditions.
4. The months of November and December, 1919, operations of which, as indicated above, were so seriously affected by the coal strike as to destroy their value for estimating normal earning capacity.

"In stating the results for these four periods in the following table, adjustments have been made for back pay included in the operating expenses for 1919, which were applicable to 1918, and adjustments have also been made for back pay in the four months ended October 31, 1919, applicable to six months ended June 30, 1919. The operations for October have also been credited with $6,000,000 on account of per diem charges between federally-operated

lines included in the equipment rents for the month, which represent a mere bookkeeping entry.

		After allowing in each month for one twelfth of the annual rental	After allowing for the proportion of the annual rental earned during the corresponding months of the Test Period
Calendar year, 1918	Loss	$236,500,000	*d* $236,500,000
6 months, Jan. June, 1919	Loss	282,900,000	*d* 228,700,000
4 months, July-Oct., 1919	Profit	45,200,000	*d* 3,300,000
November, 1919	Loss	53,000,000	*d* 61,000,000
Total 23 months ended November 30, 1919	Loss	$527,200,000	*d* $529,500,000

d Indicates deficit.

"The net gain or loss for these properties for the four periods named above on the basis of the accounts as they stand without making the adjustments for back pay and per diem charges was as follows:

		After allowing for monthly proportion of the annual rental	After allowing for the proportion of the annual rental earned during the corresponding month of the Test Period
Calendar year, 1918	*d*	$211,000,000	*d* $211,000,000
6 months, Jan.-June, 1919	*d*	292,500,000	*d* 238,300,000
4 months, July-Oct., 1919		23,300,000	*d* 25,200,000
November, 1919	*d*	53,000,000	*d* 61,000,000
Total 23 months ended November 30, 1919	*d*	$533,200,000	*d* $535,500,000

d Indicates deficit.

"It is estimated that if general Order 28 had been effective January 1, 1918, instead of in June, 1918, approximately $494,000,000 of additional freight and passenger revenues would have been accrued to the Railroad Administration without any increase in operating expense. If this additional revenue had been obtained, there would have been a surplus of about $14,000,000 from operation for the 22 months ended October 31, 1919, instead of the deficit shown above, and the loss for the entire 23 months' period would be about $30,000,000, for which the coal strike should be held responsible.

"The following comparison of net ton miles per mile of road per day indicates a decrease of 16.6 per cent for November, 1919, as compared with October, 1919, while the corresponding decrease of business in November, 1918, as compared with October, 1918, was only 6.7 per cent, and in November, 1917, as compared with October, 1917, only 1.6 per cent. This indicates quite clearly the serious dislocation of freight caused by the coal strike.

	Revenue and non-revenue ton miles per mile of road per day		
	1919	1918	1917
January	4,275	3,878	4,770
February	4,002	4,591	4,511
March	4,059	5,273	5,192
April	4,134	5,471	5,257
May	4,324	5,226	5,617
June	4,615	5,423	5,694
July	4,878	5,487	5,441
August	5,075	5,691	5,351
September	5,625	5,731	5,217
October	5,651	5,584	5,385
November	4,711	5,155	5,298
11 months ended November 30	4,689	5,227	5,180

"The preliminary reports on passenger traffic during November indicate that there was a substantial increase over November, 1918, but the additional revenue on this account was not sufficient to offset the decrease in freight revenue on account of the coal strike."

Mr. Hines had previously authorized a statement on December 31 attributing the unfavorable results to be shown for November largely to the effects of the coal strike and predicting that they would be extended through December and possibly into January. The statement follows:

"It will never be possible to estimate completely the losses which the country has sustained on account of the coal strike. Among the heavy losses are those which the Railroad Administration has sustained and will sustain on account of loss of business and the extraordinary difficulties which it was compelled to overcome in order during the strike to give the public the most extensive operation of the railroads and the widest possible distribution of the available coal. These costly results will show in large measure in the month of November and again in December and probably to a substantial extent in January and even subsequent months. Undoubtedly there will be a very large deficit in operations in the month of November, most if not all of which would have been avoided but for the losses due to the coal strike.

"These losses were of many sorts. There was in November a heavy reduction in business due to the sudden diminution of the movement of coal which is the largest single item of traffic, and due in part to the shutting down or slowing down of other industries as they ran short of coal, and yet the temporary character of the loss of business was such as to preclude the possibility of any corresponding readjustment of operations so as to reduce operating costs. On the contrary, operating costs were seriously increased in many important respects. Only from 35 per cent to 45 per cent of the normal amount of coal was produced and yet this reduced production had largely to be transported over the most abnormal routes which had never been designed for the handling of coal in the direction and volume temporarily necessitated. Again the handling of railroad fuel was subjected to extraordinary burdens. Much coal which had been stored had to be reloaded, hauled to a new destination and again unloaded. In many instances coal had to be hauled hundreds of miles in order to supply railroad fuel, whereas ordinarily the needed coal supply was close at hand. For example, coal for Eastern Kansas and Oklahoma roads ordinarily obtained from Southeastern Kansas and Eastern Oklahoma had to be hauled from Pennsylvania and West Virginia. Much of the actual revenues which will be shown for November and also for December were for coal being handled abnormal distances for railroad fuel so that the railroads using this coal, in addition to handling this coal great and unusual distances on their own lines have to include in their operating expenses the freight received on this coal on other railroads and included in their operating revenues. In many parts of the country the railroads were suddenly confronted with the necessity of burning a character of coal to which the locomotives were not adapted and with which the firemen were not familiar, with the result that substantially less efficiency could be secured.

"It is important to emphasize that these results could not have been avoided by advance storage of coal because long prior to the strike being seriously threatened the general public demand for coal was so great that abnormal storage of railroad coal could not have been obtained except by depriving the general public correspondingly of coal which it was urgently seeking. The storage of railroad coal was already in excess of normal.

"In order to meet both railroad necessities and general public necessities, coal had to be switched to an unusual extent with resulting heavy terminal costs. These difficulties were seriously accentuated in the latter part of November and throughout the greater part of December by cold and stormy weather of almost unprecedented severity for the time of year in many parts of the country.

"In addition to the many millions of dollars of loss imposed in this way upon the public through the increased cost of railroad operation on account of the strike, there is the further unfortunate effect that railroad operations for November and December, and perhaps for a substantial period thereafter, will entirely lose their value as a measure of current railroad earning capacity."

The American Society for Testing Materials will hold its annual meeting at the New Monterey hotel, Asbury Park, N. J., beginning on Monday, June 21, 1920. This is a departure from the precedent of long standing of holding the annual meeting at Atlantic City.

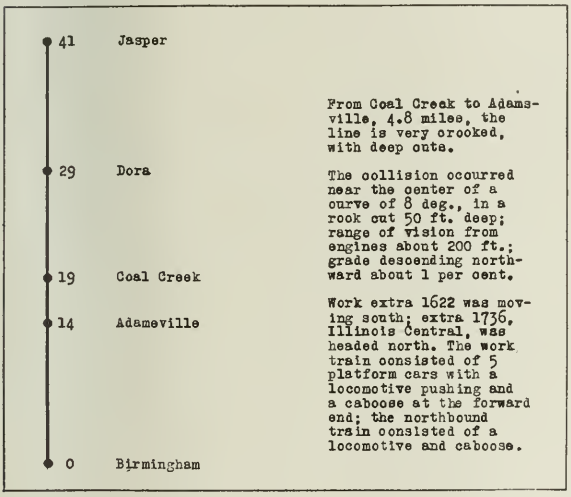
Report on Adamsville Collision

The Interstate Commerce Commission has issued a report, dated November 26, and signed by W. P. Borland, chief of the Bureau of Safety, on a butting collision which occurred on August 9, 1919, on the St. Louis-San Francisco, near Adamsville, Ala., resulting in the death of three and the injury of 28 employees. One of the trains was a worktrain, and the victims were laborers riding on a platform car, the engine being at the rear of the train.

Adamsville is 14 miles north of Birmingham, and the principal circumstances of the collision are indicated in the sketch. On this portion of the road trains of the Illinois Central are operated with the same rights as those of the St. Louis-San Francisco. The line is equipped with automatic block sgnals; and at the time of the accident the weather was clear.

Conductor Bazemore of the worktrain had stationed a flagman at Coal Creek and one at Adamsville, the latter with oral but not written instructions.

At about 3:20 p. m., while at Coal Creek, Bazemore talked with the despatcher over the telephone and was told that there would be no northbound trains ahead of passenger No. 926, due to leave Adamsville at 4:48; and he then decided



to go to Adamsville to clear the track for the passenger train. He followed extra No. 1619; and then the collision occurred about 4:30 p. m., while the worktrain was moving at six or eight miles an hour and the northbound train was at a standstill. Train 1736, while on the side track at Adamsville at about 4:15 p. m. was told by Bazemore's flagman that the work extra was working near milepost 719 (about one mile from Coal Creek), but to run carefully expecting to find it anywhere between Adamsville and Coal Creek. Train 1736, leaving Adamsville after the passage of 1619 southbound, found the first block signal (721.4, less than one mile from the station) in the stop position, but did not stop. The engineman however, sounded the whistle several times and ran at only about six miles an hour.

Bazemore said that he would have protected his movement to Adamsville by sending a flagman on train 1619 but for the fact that the despatcher informed him that engine 1619 was in poor condition and, as it was uphill, the train should not be delayed.

Bazemore rode on the platform of the leading end of the caboose; he saw the opposing train when about 200 ft. from it and then attempted to reach the air valve and set the brakes, but was pushed away from it by one of the three section foremen, with him on the platform, who rushed to get off. The report quotes Bulletin 191 issued December 5, 1918, and Bulletin 310, issued April 21, 1919, which read as follows:

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When conductors on worktrains drop off flags to one or both directions where they are at work, and who leave with these flagmen written flagging instruction to other trains to look out for them, they must not have these instructions to read to the approaching train to disregard the block; when the approaching train receives these written flagging instructions he must on arrival at block which is against him, flag through this territory until the worktrain is found. After closing in upon worktrain he may flag on worktrain to next passing track where his clear block is found * * * * * * Instructions are intended to avoid the indiscriminate use of flagging instructions by conductors authorizing the ignoring of the blocks which they have no right to do and to avoid the possibility of trains which appear to be under control colliding with worktrains which might be moving within work limits.

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All engineers:

Please be governed by the following instructions:

When a flag is at a red block with written instructions, the instructions will carry the engineer through from this red block to the next red block, but an intervening red block must not be passed. It will be necessary to flag through that territory. Conductors will be governed accordingly and where possible to do so, place their flag with written instructions at a point where there will be no intervening block between where the flag is located and where the worktrain is to be driven into the passing track or clear.

The summary of Bazemore's testimony says that he understood that a train order should have been issued for the movement of his train southward under the existing circumstances, but that it had been his custom to act on a "line-up," given by the despatcher. He did not know of Bulletin No. 310 before the accident.

Engineman Parker of 1736 said that the worktrain flagman told him to proceed to where the worktrain was located (milepost 719) and have the worktrain go to Coal Creek to let 1736 by, but to look out for the extra anywhere else on the main line, as it might have moved from milepost 719.

Engineman Parker justified himself for passing signal 721.4 in the stop position, by producing a copy of Bulletin No. 310; but later he admitted that he had never seen this bulletin prior to the accident; neither had he seen Bulletin No. 191 until after the accident. Having not seen these bulletins he was bound by the book of rules, which requires a stop of five minutes at an automatic block signal indicating stop, the train thereafter to proceed only following a flag, and under control. Knowing, however, that it was customary to pass stop signals, he had inquired and was told that there was authority for the practice.

Conductor Hargett of train 1736 saw the worktrain flagman at Adamsville but made no inquiry as to what he was there for, although Hargett must have been near his engine. Hargett had not seen either bulletin before the accident, but after the accident a copy of No. 310 was mailed to him. He knew that enginemen sometimes passed stop signals on oral instructions from flagmen, though there was no authority for doing so except custom; and in this case he would not have sent a flagman ahead even had he known that his engineman was passing a stop signal. He had not noticed the indications of the automatic block signals as he was busy figuring on where to meet an opposing passenger train.

The conclusion of the report is that the collision was due to the failure of Engineman Parker and Conductor Hargett properly to obey automatic block signal indications. Had they stopped five minutes at signal No. 721.4 and sent a flagman ahead the collision would have been avoided. Had Conductor Hargett been riding in the cupola of the caboose, or had he required the flagman to ride there he would have known that Parker had passed a stop signal. Neither of the train crews knew of the existence of Bulletin No. 310, and those on the work train had not seen either bulletin. These bulletins do not authorize trains to pass stop signals unless flagmen are stationed at such signals, and as this was not the case in this instance the bulletins do not apply; but "there can be no excuse for the dangerous condition resulting

from bulletins being in effect without the knowledge of employees."

The placing of the responsibility wholly on the northbound train is explained in the report in a brief discussion of the forms of train orders, followed by the conclusion that the worktrain had unrestricted right to move back and forth at will between Coal Creek and Adamsville, provided it cleared the time of first-class trains.

Failure of Bazemore to give written instructions to both flagmen is censured though this failure had nothing to do with this accident.

Mr. Borland holds that under Bulletin No. 310, train No. 1736 had the right to pass signal 721.4 without sending a flagman ahead; so that the collision would have occurred without any violation of rules had the flagman been at the signal instead of at Adamsville station; both trains would have right to the track between signal 721.4 and the succeeding northbound automatic signal. "Bulletins or rules authorizing trains to pass red blocks on single track line, under any circumstances, without full flag protection, are a serious detriment to safety in train operation."

Executives Plan for Resumption of Private Operation

The Association of Railway Executives and several of its principal committees held a series of meetings at Washington on January 3, 4, 5 and 6 to consider the various problems, with their multitude of details, connected with the transfer of railroad operations to the companies on March 1. The meetings of the standing, law and rate committees were held at the rooms of the Bureau of Railway Economics, and on Monday, January 5, there was a general meeting of the members of the association at the Hotel Washington. In addition, there was a meeting of the committee of seven, headed by General W. W. Atterbury, vice-president of the Pennsylvania Railroad, which is co-operating with the American Railroad Association regarding the organization of the railroads for operating purposes which is to take the place of some of the organizations maintained by the Railroad Administration.

The plans agreed upon as a result of the meetings include the adoption of rules for the distribution and interchange of freight cars, which include a per diem agreement and provision for the creation of a commission on car service, with plenary powers, to be located at Washington, where it will be in a position to co-operate with the Interstate Commerce Commission on car service matters. This commission therefore will be a development of the Commission on Car Service organized by the railroads, which was located in Washington in 1917 and which constituted the basis for the Car Service Section, later organized by the Railroad Administration, which has functioned during the past two years.

A continuation of the system of operating statistics established by the Railroad Administration through its Operating Statistics Section was also decided upon, as well as a continuation of the methods of collecting transportation charges established by the Railroad Administration, which are in general on a cash basis with uniform regulations governing the extension of credit.

At the general meeting, as well as at the meeting of the law committee, careful consideration was also given to the details of the proposed railroad legislation now in the hands of the Senate and House conferees. Thomas DeWitt Cuyler, chairman of the Association of Railway Executives, issued the following statement at the conclusion of the general meeting:

"When the President issued his proclamation stating that the roads would be returned to their owners on March 1, 1920, I stated that the companies would be prepared to resume operation on that date. They are now actively engaged in making their preparations. It is their earnest desire to give the public the benefit of any and all improvements in railway operation which have been adopted during the period of government control, and all such changes are being carefully examined and considered.

"Among those which have been agreed upon during the past two days are:

"1. The adoption of rules for the distribution and interchange of freight cars. This step was first taken by the railroad companies during 1917 in order to expedite the handling of the country's extraordinary traffic at that time. This method was continued by the U. S. Railroad Administration through its section on Car Service, and on March 1, 1920, the railroad companies will themselves constitute a commission on car service, and every effort will be made to utilize to its highest capacity the entire freight equipment of the country.

"2. The continuation of the system of operating statistics established by the Railroad Administration. These represent a considerable advance over previous statistics and give additional information with regard to car and locomotive performance, which will be useful in promoting efficiency on the resumption of private operation.

"3. The continuation of the present methods of collecting transportation charges, as provided in the director general's order No. 25. Such continuation is calculated to secure the prompt payment of transportation charges, and has the further advantage of putting all users of transportation upon a basis of equality with regard to credit.

"The various companies are engaged in arranging to re-establish agencies for the information and assistance of shippers in routing and tracing shipments.

"The companies, through this association, are trying, in a generous and liberal spirit, to agree with the government on the interpretations of the federal control act and of the standard contract between the government and the companies. Every effort will be made to avoid litigation and make final settlement prompt and fair.

"Careful consideration is being given to the need for additional equipment, and every possible effort will be made by the companies to provide such equipment.

"The companies are, of course, vitally interested in the railroad legislation now in conference between the Senate and the House. In this connection it is worth while restating what the railroad executives feel is required to enable the companies to give to the public the best possible kind of service. These essentials are:

"1. The creation of a government body charged with the primary duty of studying the transportation needs of the country in a liberal and constructive spirit and of advising Congress and the Interstate Commerce Commission from time to time as to what those requirements are.

"2. The enactment of a rule of rate-making which shall be sufficiently explicit as to state all of the elements which would not only make individual rates reasonable, but the sum total of rates adequate to insure to properly managed railroads a basis of credit for the expansion and development of their facilities to keep pace with the growth of the country.

"3. A sufficient national control over rates to prevent discrimination or unfair competition between the rates charged in one state as against the rates charged in another state, or for interstate traffic.

"4. Liberty to simplify and stabilize railroad transportation by permitting proper consolidations, subject to public approval. Such consolidations, however, not to be destruc-

tive of actual or potential competion in railway operation.

"5. A guarantee of the present rental paid by the government for a reasonable period.

"6. The creation for use during 1920 of a substantial loaning fund which will enable the companies to complete additions and betterments started but not completed during the period of federal control.

"The problems which the railroad companies are now engaged are the concern of every citizen. Transportation is the limiting factor on that enlarged production which the entire world needs. The expansion of railroad facilities had not kept pace with the growth of the country prior to the war, and the needs of the near future will run into billions of dollars. The credit to raise these vast sums cannot be had except by fair and liberal treatment by the public authorities and by good management on the part of the companies. The companies are making every possible effort to insure this good management on the resumption of private operation, and they confidently rely on the intelligence and good sense of Congress and the American people to do their share."

In addition to Thomas DeWitt Cuyler, chairman, and Alfred P. Thom, general counsel of the Association of Railway Executives, among those present were: W. G. Besler, president, Central Railroad of New Jersey; S. T. Bledsoe, general counsel, Atchison, Topeka & Santa Fe; E. N. Brown, president and chairman of the Pere Marquette and St. Louis-San Francisco; E. G. Buckland, president, New York, New Haven & Hartford and Central New England; E. C. Lindley, vice-president, Great Northern; H. E. Byram, president, Chicago, Milwaukee & St. Paul; W. R. Cole, president, Nashville, Chattanooga & St. Louis; A. T. Dice, president, Philadelphia & Reading; Howard Elliott, president, Northern Pacific; S. M. Felton, president, Chicago Great Western; W. H. Finley, president, Chicago & Northwestern; J. H. Eustis, president, Boston & Maine; Julius Kruttschnitt, chairman, Southern Pacific; E. E. Loomis, president, Lehigh Valley; L. F. Loree, president, Delaware & Hudson; Robert S. Lovett, chairman, Union Pacific; C. H. Markham, president, Illinois Central; William T. Noonan, president, Buffalo, Rochester & Pittsburgh; O. M. Spencer, general counsel, Chicago, Burlington & Quincy and Colorado & Southern; Mark W. Potter, president, Carolina, Clinchfield & Ohio; Samuel Rea, president, and General W. W. Atterbury, vice-president, Pennsylvania Railroad; T. M. Schumacher, president, El Paso & Southwestern; A. H. Smith, president, New York Central Lines; W. H. Truesdale, president, Delaware, Lackawanna & Western; A. C. Rearick, vice-president, Chesapeake & Ohio and Hocking Valley; F. D. Underwood, president, Erie; H. D. Howe, vice-president, New York, Chicago & St. Louis; William H. White, president, Richmond, Fredericksburg & Potomac and Washington Southern; and Daniel Willard, president, Baltimore & Ohio.

Differences of opinion between some of the railway executives as to the advisability of certain features of proposed railroad legislation, notably the rate-making and excess earnings provision of the Cummins bill, cropped out at the meeting but failed to change the policy of the association, as expressed in the memorandum on the Cummins bill filed with the conferees by Chairman Cuyler and General Counsel Thom. The extent of the so-called "split" in the ranks of the executives was, however, greatly exaggerated in newspaper accounts inspired by publicity work on behalf of the Warfield association. While the executive's association would favor a minimum of 6 per cent on the aggregate values in a traffic group provided the carriers are allowed to earn and retain as much as they can from legally established rates it is opposed to the present provision of Section 6 and has suggested as a compromise the rule of rate-making contained in the tentative bill drafted by the Senate sub-committee. Some of the executives, however, are in favor of the rule of the bill passed by the Senate, some because they regard it as generally satisfactory and others because of a fear that if it should be rejected no improvement on it could be hoped for, and the only alternative would be the Esch bill, which has no rate-making rule but leaves the whole question within the discretion of the Interstate Commerce Commission as to what is just and reasonable.

Daniel Willard, president of the Baltimore & Ohio, who some time ago resigned from the steering committee of the association because of a disagreement with its views, took a position at the meeting against opposition by the executives to the Cummins bill and Howard Elliott, president of the Northern Pacific, offered a resolution which was adopted, to the effect that the steering committee should confer with other organizations interested in the railroad legislation with a view toward co-operation. The other organizations include the Chamber of Commerce of the United States, the National Transportation Conference and the National Association of Owners of Railroad Securities, that have taken an active part in urging remedial legislation, while the latter two organizations have urged a plan similar to that of the Cummins bill. The Elliott resolution was adopted but not until after an amendment proposed by Judge R. S. Lovett had been added instructing the committee "not to agree to or recommend legislation which will take from any carrier any part of its net earnings received from rates established or approved by public authority." The vote for this amendment was 29 to 15. The minority included not only those who were in favor of the rule of the Senate bill but also several who said they had voted against the amendment on the ground that the committee needed no instructions.

At the meeting of the law committee and the general counsel on the following day objection to the attitude of the association was also expressed by a minority led by H. L. Bond, Jr., vice-president of the Baltimore & Ohio, and also a counsel for the Warfield association, and B. H. Inness Brown, general counsel for the Seaboard Air Line, who were joined by two others, out of a total of about 40 present, and announced their intention of forming a separate committee, Mr. Bond issued the following statement:

"It is the purpose of those of us who differ with Mr. A. P. Thom, counsel for the railroad executives' association, and some other attorneys, to form a committee of lawyers to assist in this crisis in doing in a helpful way what is necessary to secure constructive legislation for the railroads. We believe that it is not wise for the executives or counsel of railroads to start a propaganda, which seems to be the purpose of some of those on the other side, to defeat the constructive rate-making and financial legislation which is embodied in Section 6 of the Cummins bill. We recognize that the upper house of Congress, the Senate, with the approval and support of the prominent leaders of both of the political parties, has passed this financial legislation and we feel that we should be prepared to give any help we can to the conference in prefecting such legislation, preserving the fundamental features of Section 6 of the Senate bill. That section provides definitely that the value of all the property used in the transportation service shall be taken as the basis of rates for rate groups of carriers, and while it limits somewhat the net operating income that the several carriers may retain from earnings derived from such group rates, yet the limits prescribed permit every carrier to retain not less than six per cent on the real value of its property ascertained as such value would be ascertained in a condemnation proceeding.

"We have seen a number of attorneys of various railroads and a committee will be formed for the purposes named."

Views of Executives on Proposed Legislation

Section 6 and the Rule for Rate Making Are Covered in Another Article in This Issue

In an additional memorandum filed with the conferees on January 3 by Alfred P. Thom, general counsel, the Association of Railway Executives expressed its views as to other details of the proposed railroad legislation not covered in its previous memorandum on Section 6 and the rule of rate-making, as follows:

No attempt will be made in this preliminary memorandum to go into the details of the bills or to do more than to present certain salient features of the proposed legislation. Inasmuch as it has been necessary to prepare these suggestions in great haste, as the conferees are in session, request will be made to file hereafter a supplemental memorandum.

The references are to the Senate Committee Comparative Print, unless otherwise stated.

I. Termination of Federal Control

Inasmuch as the President has now made proclamation of his purpose to terminate federal control at 12:01 a. m. of March 1, 1919, it is assumed that the proposed legislation will be made to conform to this declared purpose.

II. Federal Control Act

It is proposed by the Senate to repeal the federal control act, preserving certain specified rights and powers. It is proposed by the House to leave the act in force, except as to certain powers which the President is forbidden to exercise after the end of federal control. Whichever plan is adopted, it becomes necessary to consider how the respective proposals will operate in respect to the settlement of matters between the government and the railroads, to which we respectfully call attention under the next heading.

III. Settlement of Matters Arising Out of Federal Control

Beginning at line 13, page 6 of the House bill; beginning with line 15, page 85, of the Senate bill.

Apparently neither of these provisions modifies Section 2 of the federal control act. By that section the President is not permitted to pay more to any company with which no agreement has been made than 90 per cent of the estimated annual amount of just compensation. It is respectfully submitted that this limit of 90 per cent should now be removed, and that the President should be authorized to pay the entire amount of compensation not exceeding the maximum set by Section 1 of the federal control act as modified by the exceptional conditions in the sixth paragraph of Section 1.

Moreover, it is respectfully submitted that the power of the President to continue to make contracts to cover the period of federal control should not be terminated by the return of the roads. A large number of contracts have not yet been made and it would be very convenient to permit the director general and the roads to agree upon a contract which would be the basis of the settlement of matters between them.

If one or other of these provisions is not adopted, there will be no way for a carrier to obtain more than 90 per cent of its compensation without resorting to the method prescribed by Section 3 of the federal control act, which would mean litigation as a method of settlement and would be very objectionable, and, moreover, might involve the necessity for special appropriations from Congress to pay any amount thus found due.

IV. Interurban and Street Railways

House bill, page 6, after line 10.

We respectfully ask that a provision be inserted excluding interurban and street railways from this legislation.

Those interested in carriers of this class fear the extension of street railroad wages and working conditions over their lines in the event their properties are included in the system of regulation, and they also are convinced that the national authority is not so related to the great volume of their business as to enable the national authority to make their rates sufficient to meet the burden of street railroad scales of wages and working conditions. The American Electric Railway Association has taken action in conformity with this request, and we respectfully bring it to the attention of the conference committee.

V. Executions on Judgments Based on Causes of Action Arising During Federal Control

Page 10, House bill; page 86, line 14, Senate bill.

At the end of Section 204 of the House bill, and after line 14, page 86 of the Senate bill, we respectfully ask that the following be inserted:

> "No execution or process, other than on a judgment recovered by the United States against a carrier, shall be levied upon the property of any carrier where the cause of action on account of which the judgment was obtained, grew out of the possession, use, control or operation of any railroad or system of transportation by the President under federal control."

The reason for this is that the federal control act permits actions to be instituted by any person against a carrier for a cause of action arising during federal control, and for which the United States is responsible. We seek, by asking the inclusion of the above provision, to avoid the seizure of the property of these carriers for the debts of the United States, and thus to avoid the necessity of the carriers paying such debts and collecting them out of the United States. The transaction is one between the United States and the person entitled to the cause of action, and should be pursued between those parties alone, without embarrassing or involving the carrier, which, in reality, has no relation to the matter.

VI. Refunding of Carriers' Indebtedness to the United States

Section 205 of the House bill, beginning at line 9, on page 10; Section 2 of the Senate bill, beginning at line 23, on page 89.

It will be observed that the provision of the House bill makes it obligatory on the President to set off the current indebtedness of the government to a carrier against the carrier's capital indebtedness to the government incurred for additions and betterments made during federal control. We respectfully request a re-consideration of this provision.

Indebtedness of the carriers to the government are of two classes: First, indebtedness for additions and betterments put upon the property by order of, or with the approval of the President, during federal control, and which, by Section 6 of the federal control act, the President was authorized to charge to the carriers, this proceeding involving the incurring of a very large indebtedness by the carriers to the government on capital account, which was made immediately payable; and, second, indebtedness of the carriers to the

government for money loaned, or due otherwise on open account.

The indebtedness of the government to the carriers is all on open or current account, arising out of unpaid compensation for the use of the properties, or from moneys or other assets received from the carriers, or from liabilities otherwise arising.

Manifestly, when an adjustment is made, if it be found that the government owes anything on account of compensation, which is an open and current account indebtedness—not an indebtedness on capital account—the carrier should be permitted to have its indebtedness to the government, which is likewise an open and current account indebtedness, satisfied by so much of the amount of compensation as the government is permitted to use as a set-off.

The House bill as it now stands would, however, forbid this, and would require that the current indebtedness of the carriers to the government remain unsettled, and that all amounts, permitted by the contract to be offset, be used in reducing the amount of the capital indebtedness to the government, incurred for the carrier by the President during federal control.

The amount of this capital indebtedness was made immediately payable because of the exigencies of the government. The government was monopolizing the sources of capital supply for war purposes, and felt obliged to keep others out of the financial market. If the carriers had been acting for themselves, their customary method of procedure with respect to these large capital expenditures would have been to finance them in advance of the work by obligations running over a considerable term of years. Inasmuch as they could not do this, it would seem only equitable for the government now to fund the capital expenditures for a reasonable period, say 10 years, and at a reasonable rate of interest.

This would not be only equitable, but distinctly in the public interest. Congress has selected the system of private ownership and operation as the reliance of the public for transportation. The system thus selected must be made competent and efficient. To do this the carriers must be able to obtain from the general public a large amount of additional capital in the immediate, or near, future. This, of course, could not be done if there was a large amount of open account indebtedness immediately due and not provided for. No appeal could be successfully made to the public to furnish capital for a carrier having a very large amount of floating indebtedness, the payment of which might be demanded at once.

The amount of the requirements of the carriers for additional capital will, after the termination of federal control, be caused by their need to provide for maturing capital obligations and for new equipment and additions and betterments essential to the efficiency of their transportation service.

The enormous amount needed for these purposes will be somewhat indicated by the following: In order to meet known and classified maturing obligations falling due year by year, the carriers of Class 1 will need on the average, exclusive of maturing equipment obligations, more than $139,000,000 each year of the next ten years, and perhaps an even larger amount. In fact, Chairman Esch, in his report to the House on this bill, filed a statement showing that the maturities, including equipment obligations, falling due in 1920, would aggregate $222,200,692, and those falling due in 1921 would aggregate $333,423,733. See House Report, pages 38-41.

In addition to this, the carriers will need each year for new additions and betterments, amounts variously estimated at from $575,000,000 to $1,000,000,000. It will probably be much more than the smaller of the figures just mentioned. The director general has, in a recent address, indicated that it has been necessary for the Railroad Administration, during federal control, to limit the additions and betterments, put upon the properties of these carriers, to those absolutely needed for war and other pressing transportation uses; and yet, in the year 1918, he spent for additions and betterments about $576,000,000. If this, as stated by the director general, was not an adequate amount, the capital requirements of the companies, if met to the extent required by the public interests, would probably not fall far short of $1,000,000,000 a year.

If the indebtedness of the carriers to the government remains unfunded and must be provided for elsewhere, the amount which they will have to go into the market to secure will be that much larger and will become absolutely prohibitory.

The carriers must attempt to secure the required amounts at a time when a new system of regulation will probably be in effect. Much of the money will be required before the results of that system have been satisfactorily demonstrated to the investing public. The carriers will also have to go into a market disturbed by war conditions, and where there will be tremendous competition for the funds available for investment.

And yet it is in the public interest that the carriers succeed in obtaining this money. The indebtedness of the carriers to the government for additions and betterments, incurred under the circumstances above mentioned, ought not be allowed to constitute an additional complication and embarrassment in this situation.

To avoid this, the government should not hesitate to carry this indebtedness for 10 years, in view of the fact that the reason it was made immediately due grew out of the war and the public needs.

It is certainly not too much to expect this of the government in regard to its own domestic transportation systems, on which its own people are dependent for their access to the markets, when for war purposes it loaned Belgium, at a time when Belgium was practically subjugated, more than $343,000,000; France more than $3,000,000,000; Great Britain more than $4,000,000,000, and Italy more than $1,500,000,000. There is no suggestion that these loans to foreign governments should be regarded as immediately due, and doubtless they will be funded. Certainly the government will not regard itself as a mere collection agency in regard to them. There are other and broader considerations which control the matter of this foreign indebtedness.

This should also be true in respect to the indebtedness of the railroads to their own government. This indebtedness was incurred under peculiar conditions and for war purposes, and enlightened public interest requires that the indebtedness be treated in such a way as not to hamper or break down the transportation systems of the country.

In adjusting the indebtedness of the government to the carriers, and of the carriers to the government, offsets, where permitted to be made at all, should be made of current account against current account, instead of attempting to offset *current* indebtedness of the government to the carriers against the *capital* indebtedness of the carriers to the government for additions and betterments. To do otherwise would require carriers to pay their capital indebtedness out of their current assets—a thing which is never done, except to a very limited extent. Current assets must be used by the railroads for current purposes, that is, for the most part, to pay current open account debts.

Moreover, it is in the public interest that the carriers should have, if possible, a working capital adequate to take care of the abnormal expenses to which they will be put in re-forming their organizations, in getting back their diverted traffic, and in bringing home and putting in proper order, their scattered equipment. Accordingly, we ask, in cases where money is due on account of compensation, that the

government, instead of regarding the matter merely from the standpoint of a collection agency, pay to the carriers a fair working capital (estimated to amount to one month's operating expenses), before it begins to reduce the amount to be funded.

Our request, therefore, is that a funding provision be inserted in the legislation which shall require such offsets as may be made, to be made, first, on the principle of current account against current account, and only permit any balance of such offset to be made against the capital indebtedness of the carriers for additions and betterments; the remainder due for additions and betterments to be funded and carried by the government for 10 years at a reasonable rate of interest.

We further ask, in cases where enough is due by the government to a carrier for the purpose, that the government shall pay the carrier one month's operating expenses as working capital before making any offsets or deductions.

This may be accomplished by taking the Senate provision on the subject of refunding, and adding at the end of line 23, page 90 (page 9 of the comparative print), the following:

> "Such application shall be made, first, upon the class of indebtedness fundable hereunder in notes payable on demand, any remainder to be applied on the class of indebtedness fundable hereunder for 10 years."

VII. Existing Rates to Continue in Effect

The Senate provision on this subject seems to have been omitted from the comparative print, and will be found in the Senate bill, page 89, lines 19 to 22. The House provision is found on page 11 of the comparative print, beginning with line 3, page 12 of the House bill.

The two provisions differ principally in that the Senate continues the rates, fares and charges, and divisions of joint rates, in force at the time of the repeal of the federal control act, in effect "until changed by competent authority;" while the House bill continues them in force and effect "until thereafter changed by state or federal authorities, respectively, or pursuant to authority of law."

There may be an important difference between these two provisions. This difference may be illustrated by the power in respect to divisions of joint rates. The power to change "by competent authority" in the Senate bill, may be broad enough to include a change in existing divisions by the carriers themselves; but it is considered doubtful whether the provision in the House bill which authorizes such change only by the exercise "of state or federal authorities, or pursuant to law" is broad enough to permit a change in divisions by the parties.

This, we submit, should be made entirely clear. An adequate supervisory power over divisions made by the carriers themselves is provided by both bills. (Senate bill, p. 176, beginning at line 30; House bill, p. 64, beginning at line 12; comparative print, p. 73). The divisions put into effect by the director general during federal control may not in any degree adequately reflect the rights or equities of the individual carriers under the changed relationship of private operation, and to avoid the necessity of keeping such a basis in effect until all divisions in the United States can be reviewed by the Interstate Commerce Commission, would justify an authority to the carriers to agree upon proper divisions in respect to the devisions now in effect, as they would have the right, under the proposed legislation, to agree in respect to any change in the divisions hereafter made.

VIII. Guarantees to Railroads After Termination of Federal Control

Sec. 207 House bill; House bill, p. 12, beginning with line 19; Senate bill, p. 94, beginning with line 21.

The House bill provides for the continuance of this guaranty for six months; the Senate bill, for its continuance until the commission renders its decision in respect to applications for changes in rates, not later than four months after filing with the commission of amended schedules, which shall be done within 60 days after the end of federal control.

It would seem that a longer period than six months should be allowed for a readjustment of the rates. It must be appreciated that, in order to get the rates properly readjusted, the applications for the increase must be passed on by both the federal and the state authorities. Considering the enormous task involved in preparing a statement of the readjusted rates, it is doubtful whether six months is adequate to get the work done by the Interstate Commerce Commission. The work before state commissions would doubtless involve a still longer period, and many of the interstate rates could not be made effective without corresponding changes in state rates.

It, therefore, is submitted that six months is not an adequate time. Certainly less than six months would not be adequate, and, therefore, if one or the other of these provisions is to be adopted, it would seem that the House allowance of time is more reasonable.

When we come to consider the amount of the guaranty, the House provision confines it to the amount of the corresponding six months during the test period; whereas, the Senate provision gives a proportionate part of the year. If the railroads had been returned to their owners on January 1, the House provision would doubtless have made the guaranty smaller in favor of the government. As they will not be returned until the first of March, the reverse may be true.

Moreover, the House bill confines the guaranty to carriers by railroad, or partly by railroad and partly by water. It must be remembered that properties other than those of strictly railroad carriers, or of carriers partly by railroad and partly by water, were taken over by the government, and the guaranty should be broad enough to cover these other properties. Besides, the guaranty should cover the compensation agreed on in any contract with the director general.

In considering the properties taken over, it will be found that there are certain cases in which, under the federal control act, the compensation differs from the railway operating income. There are other cases in which the President has taken over properties and has made contracts with companies that had no account denominated "railway operating income" during the test period. An illustration of this class of cases is that of companies owning fruit or refrigerator cars.

There is still a third class in which the President elected to take over not only the operating properties of a company —a terminal company, for example—but the benefit of leases or other properties made to outside parties. An illustration of the latter is the Southern Pacific Terminal Company, which operates wharves and docks, and owns a lot of warehouses and a grain elevator, which, at the beginning of federal control, were under lease to outside parties. The President took over these wharves and docks, and also the benefit of the leases on the warehouses and elevator. This was done in order to control them, and the President has received the rent accruing under the leases.

The language of the House bill is not broad enough to cover any one of these three cases. If the House bill is taken as a basis, we respectfully suggest that the following amendment be made:

Add after the word "period" in line 18, page 13, of the House bill, the following:

> "Provided, however, (1) that if the amount of agreed compensation in any contract between the President and a carrier differs from its average annual railway operating income for the test period, the amount of the guaranty to such carrier shall be the proportion of such agreed amount of annual compensation which the aver-

age of its railway operating income for the three corresponding six months of each year during the test period bears to its average annual railway operating income for the test period; and (2) in case of any property in respect to which there is an agreement between the President and a proprietary company which, during the test period, had no account denominated "railway operating income," then the amount of such guaranty shall be the proportion of the agreed amount of annual compensation which the average of its net income for the three corresponding six months of each year during the test period, from the properties taken over, bears to its annual net income from the properties taken over for the test period; and (3), in cases in which the President took over properties, other than strictly carrier properties, to be used by him, and also the beneficial interests of the lessee in leased properties, the guaranty shall be for the amount of the average net income for the three corresponding periods of six months each during the test period, for the properties and leases so taken over."

IX. Statement of Accounts to Ascertain Amount of Guaranty

House bill, page 15, lines 16 to 20; Senate bill, page 12, lines 10 to 16. We respectfully ask that paragraph (4), beginning with line 16 on page 15 of the House, be amended to read as follows:

"(4) The commission shall require a restatement of the expenses (other than for maintenance of way and structures, and of maintenance of equipment) for the guaranty period, to the extent necessary to correct any abnormal charge or credit to such expense for such period; likewise, the commission shall require a restatement of expenses and revenues for the guaranty period so as to include therein all revenues and expenses accruing due and applicable to such period, which have not been included in the accounts for that period."

The reason for making this charge will be apparent when attention is called to the fact that defining the guaranty as a railway operating income ascertained in the manner provided by Section 1 of the federal control act of March 21, 1918, will produce uncertainty and confusion in some instances, and in others inadequacy and injustice. At the beginning of federal control the Interstate Commerce Commission ruled that items of lap-over revenues and expenses should be included in the proper revenue and expense accounts, and afterward taken out and debited or credited to the director general of railroads or to the corporation, as might be appropriate. It is proposed to have the same kind of accounting at the end of federal control. Assuming that the roads are to be returned to their owners on March 1, 1920, the revenues for March will have some items therein that will subsequently be credited and paid to the director general; and likewise the March expense account will contain items of expense which will afterward be charged to and settled by the director general. After the first two or three months these items will not be very heavy, but they will come along for months after the guaranty period is closed. Therefore, some provision should be made in the proposed bill to take care of this situation, both as to revenues and expenses. In order to do this, the above change in paragraph (4) is suggested, which allows the proper readjustment to be made by the commission of both credits and debits.

X. Advances to the Carriers During the Guaranty Period on Account of the Guaranty

The House provision is found on page 13 of the comparative print, beginning with line 7, page 15. There is no provision on the subject in the Senate bill.

It seems essential that there should be some provision; and we respectfully urge the conference committee to agree upon an adequate provision to cover this point.

XI. Rate Making

Senate bill, p. 98, Section 6; House bill, p. 40, line 8; comparative print, p. 54.

We have made objections to Section 6 of the Senate bill in the brief already filed with this committee, which will be found reproduced as an appendix to this memorandum, and which we ask shall be read in connection herewith.

The point made in that memorandum, as to the purpose of Section 6 of the Senate bill to *equalize values,* is emphasized by a provision in Section 38 of the Senate bill, page 168, lines 12 and following, authorizing the commission to approve divisions which will satisfy certain conditions therein prescribed, one of which is that they will tend to *"equalize earnings between the carriers."*

The House bill, page 54, comparative print, makes no change whatever in the rule as to rate making as it is stated in existing law. This simply declares that all rates shall be reasonable and just, thus setting no standard, and providing no assurance to prospective investors beyond that vague and uncertain statement. The effect of this is to leave the matter of what the rates shall be entirely to the discretion of the administrative body. It furnishes to it no definite standard whatever, and thus places the fate of all the railroads in the hands of a commission with no standard, guide or mandate, except one so vague that its administration must vary with the membership and the varying conceptions of the commission which, from year to year, is liable to change in personnel. Unless there are certain principles of a definite nature declared by the statute, there can be no certainty as to a stable or constructive policy. Without more assurance of stability than is involved in a rule such as now exists, it must be apparent that no progress is made toward solving railroad problems and putting the transportation of the country upon a more certain and assured basis.

We, therefore, earnestly urge upon the committee to agree upon a rule of rate making which shall give assurance to the investing public that the essential element of stability in their investments will be regarded and provided for in rate making. For a more extended statement of the reasons for this request we refer to the memorandum on Section 6, and the rule of rate making reproduced in the appendix.

XII. New Loans for Railroads

House bill, p. 18, beginning with line 11; Senate bill, p. 93, beginning with line 11.

In the House bill the sum of $250,000,000 is appropriated to cover such loans; in the Senate bill, the sum of $500,000,000. The necessity for at least the larger sum of these two has been explained to the chairmen of the two houses by the steering committee of the Association of Railway Executives.

It has recently been found that, under existing market conditions, there is difficulty about floating even a gilt-edge general equipment obligation, and the probability must be faced that for a time, at least, in the disturbed conditions following the war and following a new system of governmental regulation of railroads, there will be little, if any, available market for railroad securities, and accordingly little, if any, opportunity to secure necessary funds from the public to keep the railroad facilities up to the requirements of the public.

A great deal of work involving additions and betterments is now in progress, and it will require a large amount of new capital in order to continue this work. It will be most unfortunate if the work on these additions and betterments has to be suspended. There would be a large amount of loss from the suspension, and, besides, the public would be deprived for a considerable period of facilities which they need. Accordingly, it seems absolutely necessary that the

government should provide for loans to the carriers for a limited period. The director general has estimated the amount that could be actually expended during the remaining ten months of 1920 at $400,000,000, but the requirements of the companies for commitments during this 10 months, or in a short time thereafter, will not be less than $750,000,000.

It would seem prudent, therefore, to adopt the larger figure of the two above mentioned. If it were not for the opinion which seems to prevail that the authority of the conferees does not extend to an amount larger than the largest contained in either of the bills, we would seek to impress upon the conferees the necessity, which we believe exists, for an amount even larger than the largest amount in either bill.

Attention is called to paragraph (*d*) of the House bill beginning with line 15, on page 20—also page 20 of the comparative print. This provision undertakes to make loans made by the government preferred liens upon the income and property of the applicant in the same manner and to the same extent that certificates issued by the receivers of the United States courts are preferred liens.

It is respectfully submitted that it is not competent for legislation to do this. The carrier itself could not, by agreement, supersede an existing lien on its property, and there is no power in Congress to take away, without compensation, the property right of a creditor already entitled to a lien.

In fact, the authority which a court in a receivership proceeding has to place a receivership obligation in advance of an existing lien is confined to the rights of the parties before the court, and is made possible only as a necessary means of granting the application of the parties for relief. For example, if the party before the court is the second mortgagee, asking for the foreclosure of his mortgage, the court would have the right, without infringing on his rights, to do anything necessary to give him this relief, including the issue of receiver's certificates to take rank ahead of his mortgage, but, even in that case, the court could not put such receiver's certificates ahead of the rights of the first mortgagee.

We respectfully submit, therefore, that this latter provision be eliminated.

XIII. Boards of Directors

Senate bill, p. 27, line 12.

Is it not possible to eliminate the provision of the Senate bill providing for representation of labor and of the public on boards of directors? Certainly this provision should be reviewed in the light of the conclusion finally reached as to the labor sections of the legislation.

It is exceedingly doubtful whether labor desires such representation. Even if it does, the proposed provision would relieve the boards of directors of a portion of the responsibility to the public for the performance of the duty of the carrier, and would impose a part of that responsibility upon labor and the public itself. It would, moreover, deprive the stockholders of the company of a board of directors which they can hold responsible to the extent now possible for the proper protection of their interests, and would change the management of the roads so fundamentally as to impair the desirability of ownership in such an industry. We hope it will not be found necessary to make such a substantial departure from the principles which have heretofore controlled.

If the policy is to be followed, however, we respectfully ask that the word "eleven" in line 24, page 127, be changed to the word "twelve," and the word "eleven," line 1, page 128, be changed to the word "twelve."

This amendment is desirable to take care of the Richmond, Fredericksburg Potomac Road. The state of Virginia owns about one-sixth of the stock of that company, and the laws of Virginia provide that the state shall appoint such a number of the directors as shall bear to the whole number of directors of the company the same proportion, as nearly as possible, as the stock held on behalf of the state in such company bears to the whole capital stock outstanding.

The majority of the stock of the company is owned by the Richmond Washington Company, which in turn is owned equally by six railroad companies.

There are now eight directors of the Richmond, Fredericksburg & Potomac, one appointed by the State of Virginia, six allotted to the six interested railroad companies, and one elected by the outside stockholders. It is desirable that all these interests should continue to be represented on the board. If only one member of labor and the public were required on boards consisting of 12 directors, the representation of these various interests would be as follows: one director for the employees, one for the public, two for the state, which would leave eight directors to be elected by the stockholders for the outside interests and for the majority holding of the stock. If the bill is not so amended, it would become necessary to give two directors to the state, the four directors provided for in the bill, which would leave only five to be elected by the other interests, and this would be too small a proportion, considering the necessity that each proprietary company shall have representation on the board.

XIV. Labor

Page 42; House bill, page 22, line 25; Senate bill, page 143, line 8.

The attitude of the railway executives on the question of provisions in respect to labor has been announced to one or both of the committees, and is well known. We regard continuous and uninterrupted service in transportation as absolutely essential to the public welfare, and the question of whether or not the integrity of the transportation service shall thus be preserved is primarily and principally an issue between the public and those who oppose. It can not be helpfully or usefully converted into an issue of a private nature between employers and employees, and hence the railway executives have steadfastly adhered to the position of not attempting to interfere, and are leaving the matter to be determined by Congress upon its responsibility to the whole people.

Without attempting to discuss the general policy to be pursued, we deem it our duty to point out a consequence of a provision in the House bill which makes permanent the conditions in respect to employment which were adopted under war conditions and largely for war purposes.

The specific provision referred to will be found on page 27, beginning with line 12 of the House bill, which declares that all decisions of a general character heretofore made by the United States Railroad Administration affecting the questions of wages, hours of service, or conditions of employment, are hereby confirmed and shall apply to all carrier lines subject to this act. Decisions have been rendered by the U. S. Railroad Administration, and which apply to the individual carriers subject to the provisions of this act, shall remain in effect until superseded by mutual agreement between the carrier and the employees or by decision of Railway Board of Adjustment Numbered Two, or Railway Board of Adjustment Numbereed Threee, or the proper Commissions on Labor Disputes made in accordance with the provisions of this act.

The undoubted effect of this will be to perpetuate all decisions of a general character, and also all decisions which apply to individual carriers made by the U. S. Railroad Administration. This is apparent because the decisions as to individual carriers must remain in effect until superseded by mutual agreement, or by the decision of certain boards, the membership of which is equally divided be-

tween the employers and employees. If there is no decision, there is no change. Consequently, there can be no change from what has been done by the U. S. Railroad Administration without the consent of the employers.

Of course, we can not conclude with any confidence that there will be no change hereafter in economic conditions, but even if there is such a change, conditions must remain as heretofore established by the Railroad Administration unless the employees consent. This, of course, puts the whole matter in the hands of the employees, and seems to us very unwise from the standpoint of the public.

XV. Rates Lowered to Meet Water Competition

Senate bill, page 166, line 19.

This provision prevents a carrier from increasing any rates which have theretofore been reduced to meet water competition, unless, after a hearing by the commission, it shall be found that such proposed increase rests on a cause other than the elimination of water competition.

This provision would prevent the commission from permitting an increase of a rate thus lowered, even as a part of a general increase of rates, and even if such increase is necessary to establish a harmonious rate system and to prevent discrimination.

It seems to us that the discretion of the commission ought to be enlarged. It is entirely conceivable that an increase of a rate theretofore reduced for the reason mentioned, might be not only justified, but required in the public interest.

We, therefore, suggest the insertion, at the end of line 25, of the words "or is justified in the public interest."

XVI. Division of Traffic or Earnings Between Carriers

Senate bill 168, line 12, and following.

Under this provision any carrier which desires a part of the traffic or earnings of another carrier can file its application with the Interstate Commerce Commission. That commission is empowered, upon such application, and under the circumstances there set out, and, if further of opinion that such division of traffic or such division of earnings will tend to equalize earnings between the carriers, and will not unduly restrain competition, to approve and authorize such division of traffic or earnings between the carriers. If the word "authorize," as here used, is construed to make lawful the division of such traffic or earnings without the consent of all carriers interested, the result would be to take the traffic and the earnings of one company and give them to another. This would be a most serious departure from the conception heretofore universally entertained of property rights of the carriers, and would be destructive, and, in our opinion, would be unconstitutional. If such a provision is to be left in the law we suggest that it be amended so that the words "if assented to by all the carriers interested" be inserted after the word "authorize" in line 22.

XVII. Reparation

The latest annual report of the Interstate Commerce Commission contains the specific recommendation that the present act to regulate commerce should be amended so as to provide that there shall be no recovery of reparation where a rate has been found unreasonable except upon proof that the person paying the rate has been actually damaged. In that report there is a reference to the Darnell-Taenzer Case, 245, U. S. 531, decided by the Supreme Court of the United States, in which Mr. Justice Holmes held that any one who had paid a rate found to be unreasonable could recover the excess over a reasonable rate without regard as to whether there had been actual damage or not.

In the International Coal Mining Case, 230, U. S. 184, it was held that in suits for reparation arising under *Sections 2 and 3 of the Act,* there could be no recovery of reparation unless the person claiming it could show that he had been actually damaged by reason of the discrimination, the rule governing the commission in awarding damages in such cases being the same as that which prevails in the courts.

Since the decision in the Darnell-Taenzer Case, the Interstate Commerce Commission has felt that it was deprived of all discretion in awarding damages where rates are found unreasonable.

The commission understands, and so states in its report, that this rule of law works a very great injustice, and indeed, brings about the very discrimination which the act was intended to prevent. This arises from the fact that when a shipper pays a given rate, he adds the rate to the price of the product. If thereafter he recovers the excess over what the commission considers to be a reasonable rate, he is simply getting his money twice, whereas the ordinary shipper, who does not resort to the commission, fails to receive this second award. We, therefore, suggest that the following new section be inserted on page 172, following line 12, using the text of the Senate bill:

"That Section 8 of the act to regulate commerce be amended so as to add at the end thereof the following:

"Provided, however, that no damages shall be awarded by the commission or by any court against a common carrier for a violation of Section 1 of the act to regulate commerce, approved February 4, 1887, as amended, as to the reasonableness of rates, except upon such proof of damages actually sustained by the party claiming the same as is required to sustain a recovery of damages based on a violation of Sections 2 or 3 of the act to regulate commerce, approved, February 4, 1887, as amended."

XVIII. State Rates

We again call attention to the fact that it is impossible to maintain a structure of interstate rates without corresponding changes in state rates, and that if the state rates are left to be finally determined by the states, it amounts to a surrender by the federal government of the power to regulate the rates on interstate commerce.

We likewise call attention to the fact that state rates may affect interstate commerce, not only by discrimination, but by a failure to bear a proportionate part of the burden of maintaining the instrumentality of interstate commerce, and to the further fact that promptness in the matter of adjusting state rates to a proper relationship with interstate rates, is absolutely essential to successful operation of the railroads and to justice between shippers in interstate and in state commerce, respectively.

We, accordingly, urge that a larger measure of control of state rates than that in either bill shall be agreed on, and that where a state rate is drawn in question before the Interstate Commerce Commission, the power of suspension of the state rate shall be conferred upon that commission.

XIX. Rates on Ordinary Live Stock to Include Compensation for the Service of Delivery and Unloading

Senate bill, page 179, lines 8 to 16.

The purpose of this paragraph is doubtless to do away with what is known as the "Chicago Live Stock $2.00 Switching Charge."

This charge was in litigation for many years, and the charge was finally upheld by the Supreme Court of the United States.

The paragraph which has been added provides that through rates for transportation of ordinary live stock destined to be received at public stock yards, shall include the service of unloading and delivery of inbound shipments into suitable pens, and the receipt and loading of outbound shipments.

The railroads entering Chicago do not own the terminal railways on which the live stock is delivered to the Chicago stock yards, nor do they own the stockyards. The duty of

the incoming carrier should end with the delivery to the connecting carrier at the terminal.

Notwithstanding the fact that the incoming carrier does not own the stock yards and should only be charged with the duty of delivering to its connection, the paragraph seems to go to the extent of requiring the stock to be unloaded into suitable pens. Persons in practical touch with transportation, advise that this would be almost impossible of performance, aside from the matter of additional cost.

The impression seems to have been, when this provision was inserted, that it was the practice of the railroad companies to separate their charges, and when a shipper of live stock asks for the rate from point of origin to the point of destination at the stock yards, he is given only the published tariff of the company, which does not include charges for terminal service, etc .

We are advised that this is a misconception, and that all terminal charges on live stock brought into Chicago for delivery at the stock yards are fully set forth in the tariffs, separate and apart from the transportation charge, so that there is no ground for a shipper's complaint that he is not informed of the amount of these terminal charges. Doubtless stock shippers are more familiar with the terminal charges than they are with the carriers' transportation charges.

We respectfully submit that this amendment is unnecessary, and ask its reconsideration.

XX. The Burden of Proof on Applications for Increase of Rates

Senate bill, page 181, line 16; House bill, page 68, line 7. The provision referred to is as follows:

> "At any hearing involving a rate, fare, or charge increased after January 1, 1910, or of a rate, fare or charge sought to be increased after the passage of this act, the burden of proof to show that the increased rate, fare, or charge, or proposed increased rate, fare, or charge is just and reasonable shall be upon the common carrier, and the commission shall give to the hearing and decision of such questions preference over all other questions pending before it and decide the same as speedily as possible."

The provision, as it is stated in these bills, is, in reality, merely a repetition of the language contained in the present act to regulate commerce, and may have been included in these bills without reflection as to changed conditions which new seem to us to make it inappropriate.

If the proposed provision becomes law, the carriers must, after federal control terminates, assume the burden of proof to show that the rates initiated by the President of the United States during federal control are just and reasonable. Inasmuch as the President could not have been acting from any selfish financial interest, the law should assume that the rates which he established under the authority of law are just and reasonable, and the burden should not now be placed upon the carriers to vindicate the President's act.

Undoubtedly the effect of the provision, as it now stands, is to create the presumption that all rates in effect at the termination of federal control are unjust and unreasonable, whereas other provisions of both bills clearly indicate the recognition by the Congress of the necessity for further increases in rates. With this recognition it would be manifestly unjust to write into the bill which recognizes such necessity a presumption that all existing rates are unjust and unreasonable.

We respectfully suggest that it is now proper to make a new start and only to put upon the carriers the burden of showing that an increase of rates made after the roads are returned to private operation are just and reasonable. We, therefore, suggest that the clause be made to read:

> "At any hearing involving a rate, fare, or charge increased after March 1, 1920, the burden of proof to show that the increased rate, fare, or charge, or proposed increased rate, fare, or charge, is just and reasonable, shall be put upon the carrier, and the commission shall give to hearings and decisions of such questions preference over all other questions pending before it, and decide the same as speedily as possible."

XXI. No Increase of Rates Except After Prior Approval by the Commission

Senate bill, p. 181, line 25.

A proviso was inserted on the floor of the Senate forbidding the filing, except after approval thereof had been secured from the commission, of any increased rate, fare, charge or classification.

It will be noted that this is entirely inconsistent with the provision of the bill providing for a suspension of rates by the commission. If the rates are to be approved before being filed, there is no need whatever for a suspension. If it may be suspended after being filed, there is no need for an approval prior to the filing of the same.

As an emergency matter, a provision similar to that now under discussion, was introduced into the law with the limitation that should expire on January 1, 1920.

Our understanding is that the Interstate Commerce Commission has never favored the clause. If our memory is not at fault, Commissioner Clark, in his testimony before the House committee, stated that no good had been accomplished by it, and that it was undesirable.

Its effect will be to seriously complicate the question of obtaining any increased rates. The commission must either go into an examination of every case before giving its approval, which would mean unending delay, or it must act in a perfunctory way and give its approval without consideration, the result in the last case being that the clause would have no value. We call attention to the fact that it is necessary to treat these carriers in a businesslike way if they are to be efficient in the service of the public. They may at any moment be loaded up with expenses which they cannot resist, and if this provision is enacted into law, the necessary revenues to make up for their increased expenses could only be secured after delay which could not be borne in any successful business. The success of these carriers is not a matter for them alone, or for them principally. Upon their success depends the entire commercial prosperity of the country, and it is, we submit, a short-sighted policy which would so surround them with restrictions and difficulties as to make it impossible for them to perform successfully their public duties. Nothing could embarrass them more than to so complicate the matter of obtaining adequate revenues as to make it impossible for them to survive.

We, therefore, earnestly suggest that the provision referred to be eliminated from the act.

XXII. Division of the Commission to Consider Questions of Valuation

House bill, page 72, line 14.

On this subject we have received a letter from the Honorable William G. Brantley, formerly a member of the House and now counsel for the President's Conference Committee on the Federal Valuation of the Railroads, which is as follows, and which we respectfully commend to the consideration of this committee:

> "My attention has been called to Section 429 of this bill as it passed the House, which amends the law respecting the creation of divisions in the commission to read as follows:
>
> " 'In all proceedings before any such division relating to the reasonableness of rates, or to alleged discrimina-

tions, or *to the valuation of railroad property* under Section 19*a*, not less than *three* members shall participate in the consideration and decision.'

"The present law as amended August 9, 1917, in the matter of the establishment of divisions by the Commission, provides that 'not less than *five* members shall participate in the consideration and decision' of all proceedings relating to the valuation of railway property under the Valuation act.

"The present law gives to the divisions all the power of the Commission. It provides that:

" 'The divisions shall have all the jurisdiction and powers now or then conferred by law upon the commission, and be subject to the same duties and obligations. Any order, decision, or report made or other action taken by any of said divisions in respect of any matters so assigned or referred to it shall have the same force and effect, and may be made, evidenced, and enforced in the same manner as if made, or taken by the commission, as provided in Section 169 hereof for rehearing cases subject to rehearing by the commission decided by the commission.'

"The language of the present law in the matter of rehearings by the commission requires all the formalities of obtaining a review of a decision by a division as is required for obtaining a review or rehearing of a decision by the full commission. The law provides that 'it shall be lawful for the commission in its *discretion* to grant such rehearing if sufficient reason therefor be made to appear.'

"It seems to me that the importance of the valuation work now being carried on by the commission is so great that the present law requiring at least five members of the commission to participate therein ought not to be changed.

"The truth is that in the determination of the rules and principles under which value is determined, the entire commission should participate and as a matter of fact, I think it is the purpose of the commission, and as well as their practice heretofore, so to do. I do not think, however, that it would be good legislation to enact a statute specifically conferring upon three members of the commission the vast powers and responsibilities created by the valuation act. I can see no reason or necessity for doing so in view of the past practice of the commission, and what is probably their present purpose.

"In my opinion the enactment of the legislation proposed would be in effect to minimize the importance of valuation by legislative declaration and would be an invitation to the commission to unload the responsibility of it upon three members.

"The Esch bill, as I understand it, proposes to increase the membership of the commission to 11, which proposed increase, it seems to me, is an additional reason for not changing the present law in respect to the number of commissioners who must pass upon valuation questions."

XXIII. Regulation of the Issue of Securities

Attention is called to paragraph 6 of the House bill, page 79, line 15, and to line 12, page 140 of the Senate bill.

These provisions authorize the carriers to issue securities and assume obligations or liabilities if approved as required by the bill, without securing approval otherwise than is specified in the act.

The object of this is to make the authority of the carriers complete to issue the securities and to adopt the plan of financing approved by the federal authority.

In order to make an issue of securities effective, it is frequently necessary to secure them by mortgages or otherwise, and there ought to be some authority in the federal act to make this security complete in case there should be an obstacle in the state laws in the matter.

We would, therefore, suggest that paragraph 6 of the House bill, and the corresponding provision in the Senate bill be made to read somewhat as follows:

> "The jurisdiction conferred upon the commission (if the house bill is adopted, or upon the board if the Senate view is adopted), by this section shall be exclusive and plenary, and a carrier may issue securities and assume obligations or liabilities in accordance with the provisions of this section without securing approval other than is specified herein, and may secure such securities, obligations or liabilities by mortgage, pledge or otherwise as it may deem appropriate. All such mortgages or other instruments securing any such securities or other obligations shall be filed for record with the Interstate Commerce Commission, and shall be recorded by the commission in a book kept by it for that purpose, which book shall be properly indexed and be open to public inspection. Such filing for record of mortgages or other instruments shall constitute notice of the contents thereof to all the world, and the lien created thereby shall take precedence of all judgments thereafter obtained, and of all conveyances, mortgages or other instruments of lien thereafter executed, and of all previously executed, except those which, prior to the passage of this act, have been duly registered or recorded in accordance with law."

XXIV. Oversight

If the Senate bill is adopted, attention is called to the fact that the word "commission" in line 6, page 140, of the Senate bill, page 88, of the comparative print, should, according to the context, be made to read "board." The board is the authority selected by the Senate to regulate the issue of securities and it is evident that in the Senate draft the word "commission" above mentioned was inserted by oversight.

XXV. Limitation on Passes in Favor of Physicians, Surgeons and Attorneys

It is proposed by the House bill, lines 22, 23 and 24, page 41, to forbid a carrier to issue passes in favor of its surgeons, physicians and attorneys at law, except to those "who devote the principal part of their time to the carrier's service."

We respectfully ask that this limitation be removed.

The prejudice against issuing passes to persons of the classes here mentioned arose out of a belief on the part of the public that these passes were not used to secure for the carrier strictly professional services, but to influence public or political opinion. Any abuse of this nature has long since disappeared, and there is now no need for additional legislation to deal with the matter. If the pass is not to a bona fide physician, surgeon or attorney, it is prohibited by existing law.

The test should not be the devotion of the principal part of the employer's time to the service, but the bona fide of the employment. If the employment is not bona fide for the purpose of securing the professional service of the physician, surgeon or attorney, it should be and is now forbidden by law. If the issue of a pass enables the carrier to have available for its proper uses the services of physicians, and surgeons at various points on its line, and of attorneys to attend to its smaller matters, the public interest is in no wise injured, and the ability of the company to obtain competent assistants without excessive cost is promoted. If the carrier cannot issue passes to employees of this class who are engaged in general practice, the cost of the service will become a serious one and this cost must be reflected in increased operating expenses. Moreover, especially in the case of physicians and surgeons, it is most desirable in the case of accident at a point which cannot be foreseen to have the services of the most competent physicians and surgeons avail-

able, not only to the employees but to the public, and the ability to do this is greatly promoted by being able to offer a professional man of this class free transportation.

It has been found to work well and to be indispensable to the organization on moderate terms of cost of a professional staff available in all localities. It involves no unfortunate or burdensome consequence to the public. On the contrary, it has relieved the public of a large amount of expense, as the costs of this service, if not provided for in this way, would have gone to increase the operating expenses.

It is respectfully submitted that, if the present law must be amended at all, the evil could be reached by inserting before the word "surgeons" the word "bona-fide," and by striking out the words "who devote the principal part of their time to its service."

XXVI. Long and Short Haul Clause

Page 65, lines 8 and 9.

Page 166 of the Senate bill.

Attention is called to the provision as it stands in the Senate bill, which forbids the commission, in giving relief from the rigid requirements of the section, to permit the establishment of any charge to or from the more distant points "that is not fairly compensatory for the service performed."

The rail carriers do not desire, and should not be authorized, to make a rate upon any commodity the transportation of which does not yield the cost of handling—commonly expressed as the out of pocket cost—and something more; in other words, that does not make some contribution to the expense of the carrier which would otherwise be thrown on other business. They, however, do desire and should be permitted to make a rate the equivalent of the price of transportation by water when the earnings desired from the rail service will pay for the cost of handling and contribute something towards meeting the general expenses.

Whether the commission will authorize relief from the long and short haul provision under the wording now in the bill will depend upon the construction they place on the words "fairly compensatory."

The carriers should not be required to take the chances arising out of such an uncertainty of construction.

It is most important, as Congress has always recognized, to have some relief from the rigid provisions of the long and short haul clause, and the provision as it now stands may make it impossible to obtain such relief and may destroy the elasticity which the commerce of the country requires in respect to this matter. The danger of the carrier charging less than its "out of pocket" cost with an addition of something more as a contribution to the general expense is, of course, remote, but could be absolutely guarded against by making the proviso read as follows:

> "but in exercising the authority conferred upon it in this proviso the commission shall not permit the establishment of any charge to or from the more distant points that does not yield some revenue in excess of the actual cost of the transportation of the commodity upon which the charge is made."

Unless the time-honored policy of Congress is now to be reversed and the uniform recommendation of the commission is now to be disregarded, the proposal of the Senate bill should be modified as we have above suggested.

XXVII. Common Directors

House bill, p. 82, line 1; Senate bill, p. 142, line 13.

It is the policy of both bills to promote proper consolidations. There are, at present, many useful systems made up of independently incorporated companies held and operated under a common stock ownership. It does not seem necessary in order to carry out the policy of these bills, that common directors in such companies should be forbidden, or that it should be necessary to go to the Interstate Commerce Commission for its approval. To authorize common directors in such cases would avoid a multitude of applications to the commission, save much of the time of that hard-worked body, and would be announcing merely a conclusion which would be the inevitable consequence of an application to the commission itself.

It is therefore urged that after the word "thereby" in line 7, on page 82 of the House bill, and after the word "thereby" in line 19, on page 143 of the Senate bill, there be inserted the following:

> "Provided, That nothing herein contained shall be held or construed to prevent the holding of the position of officer or director of more than one carrier in the case of a subsidiary, or subsidiaries, controlled through stock ownership, lease or otherwise, or in which subsidiary, or subsidiaries, such carrier has an equal stock interest, or in the case of a common carrier and another company, or other companies, controlled by a common stock ownership."

XXVIII. Automatic Train Stops

House bill, p. 83, line 23.

Perhaps there is no man in the country better qualified to give an opinion on the practicability of installing automatic train stops than General S. M. Felton.

He states that there has been no automatic control device yet developed that meets the specifications of the Engineer Section of the American Railroad Association, and he doubts if there ever will be. He declares that "It is an utterly impracticable scheme, it removes the responsibility of handling the train from the enginemen, and we would have much more serious accidents than we now have. An engineer would not have to be awake, alert and on the job all the time, because he would soon depend on the automatic device to protect him."

We commend to the consideration of the conference committee this opinion of General Felton, and request that the proposed provision shall be eliminated from the bill.

The foregoing suggestions have been prepared under circumstances which render them necessarily incomplete, and I respectfully request permission to file a supplemental memorandum for the consideration of the conference committee.

Accounting Work Transferred to Director General's Office

CHARLES A. PROUTY has resigned as director of the Division of Accounting of the Railroad Administration and has been appointed an advisory member of the director general's staff, in which capacity he will give attention to the principal accounting problems of the Railroad Administration and particularly to the accounting features of maintenance questions which arise under the provisions of the standard compensation contracts. The work of the Division of Accounting is transferred to the office of the director general and will be in charge of G. H. Parker, now financial assistant to the director general, who will have the title of comptroller. Correspondence of the character heretofore addressed to the Division of Accounting should be addressed to the comptroller. It is understood that this is a forecast of the form of organization which will be maintained to carry out the work which will remain after the relinquishment of control of the railroads by the Railroad Administration, which as such will cease to exist on February 29. Director General Hines has been authorized by the President's proclamation to take charge of the settlement of affairs and it is understood that other appointments may be made to his staff for this purpose.

General News Department

Glenn E. Plumb, counsel for fourteen railway labor organizations, has prepared and privately circulated an outline of a plan for extending the principles of his Plumb plan of so-called tripartite control to all industries except purely individualistic enterprises such as farming.

Five killed and 139 injured, is the record of the derailment at Vincent, Cal., in October, reported in the *Railway Age* No. 22, dated November 28, the persons killed being one passenger, two trainmen and two trespassers. An officer of the road advises that none of the passengers injured died from their injuries. The statement that five were fatally injured is an error.

The valuation of the railroads being made by the Interstate Commerce Commission will be completed within two years, Charles A. Prouty, director of the Bureau of Valuation of the Interstate Commerce Commission, predicted in testifying before the appropriations committee of the House of Representatives in support of the commission's request for an additional appropriation of $500,000 for carrying on the work.

The National Transportation Conference at its meeting in Washington, Wednesday, to consider its position on railroad legislation decided to support an amendment to the Cummins bill providing for a rate return of not less than 5½ per cent instead of as nearly as may be to that figure and to support a provision allowing the railroads to retain one half of the excess earnings and that calculations of net return be made by systems instead of individual companies.

A valuable record of the construction of the Quebec bridge has been prepared by the Engineering Institute of Canada, and published in Volume 32 (Part I and Part II) of its transactions. The first part contains the text matter and the second consists of a collection of drawings. The work includes papers presented before the institute by various engineers and constructors connected with the building of this monumental structure, and other material. There are contributions by C. N. Monsarrat, G. H. Dugan, George F. Porter, Phelps Johnson and A. L. Harkness; also a bibliography.

The State of Rhode Island, by act of legislature, proposes to establish "Rhode Island Standard Time," which for five months (not seven) in the summer will be one hour faster than Eastern Standard. At least, this is the substance of a bill, proposed by the Providence Chamber of Commerce and introduced in the legislature at its opening session this week. The width of Rhode Island, from east to west, at the widest part of the State, is about 35 miles, so that the proposed standard will be free from some of the worries of some standards; if it is right at the center of the state it cannot be more than about 1½ minutes out of the way in the remotest part of the territory which it governs.

The directors of the Indianapolis Chamber of Commerce, by unanimous vote, have telegraphed the Indiana senators and representatives in Washington calling for some measure to be passed before the railroads are returned to their owners, providing for (1) the extension of government rental until revenues are adjusted to cost, (2) the creation of a revolving fund for loans if the carriers cannot borrow from the investing public, (3) the refunding of carriers' debts to government on at least a ten-year plan, (4) a simple rule that rates shall be sanctioned to yield sufficient revenue to meet expenses of operation, including labor, and a fair return on the property held or used for the public interest and supporting a basis of credit for new capital which carriers must get from the investing public to meet the transportation requirements of the country.

The railway brotherhoods and other labor organizations, having received no encouragement from the Railroad Administration on their latest requests for increased wages, are working on a plan for reducing the cost of living through their own efforts by co-operative buying, production and distribution. Announcement was made in Washington on Wednesday last of the formation of the All-American Farmer-Labor Co-operative Commission, of which the officers of the railway unions are the officers to carry out the plan, and B. M. Jewell has issued a statement indicating the conclusion that increases in wages will not solve the problem, because they result in a vicious circle of increasing prices. The plans are to be perfected at another conference in Chicago, February 12.

Purchase by Employes of Unclaimed Freight

Circular No. 9 issued by the Claims and Property Section of the Division of Law, forbids officers and employees of railroads under federal control to purchase, directly or indirectly, over, damaged, refused, or unclaimed freight from any representative or agent authorized to dispose of such freight by sale.

Accounting Circular No. 120

Accounting Circulars Nos. 101, 109, and 115 require the accumulation of certain specific information for the year 1918 with respect to maintenance of property of the railroad companies taken over, in order that a comparison of the maintenance expenses of the test period with those of the period of federal operation may be made possible. Accounting Circular No. 120, issued by C. A. Prouty, director, on December 9, directs that similar information be compiled for the calendar year 1919, so that complete returns may be made for that year in the same manner as for 1918.

A Correction

Clement F. Street has called attention to a misstatement in the report of the discussion of the paper "Scientific Development of the Steam Locomotive," which appeared on page 1202 of the *Railway Age* of December 19. Mr. Street writes:

"What I did say, was that Mr. Muhlfeld did not submit any data to support the statements which he made regarding the cost of electric operation and without some data in support of his statement, I would question them. You say that I said, that the fuel performance secured on stoker-fired engines did not equal the results obtained by the best fireman. This is incorrect. The statement which I made was that stokers would, as regards fuel economy, not give any better results than obtained by an expert fireman, but would use 25 to 30 per cent less coal than the average fireman."

New York Railroad Club Dinner

The New York Railroad Club has introduced an entirely new feature in its program this year, and will hold a subscription dinner at the Hotel Astor on Thursday evening, January 15 at 6:30.

Herbert H. Vreeland will act as toastmaster. Addresses will be made by Honorable E. C. Stokes, ex-governor of New Jersey, and Honorable Job E. Hedges, of New York.

A special musical program has been provided under the direction of Miss "Bobby" Besler, daughter of the president of the Central Railroad of New Jersey, who spent a very considerable time during the war in Y. M. C. A. work among the American Expeditionary Forces.

Tables may be reserved for parties of eight or ten, and all applications must be in the hands of D. W. Pye, Tuco Products Company, 30 Church street, New York, N. Y., by January 12.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF AUGUST, 1919

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (Inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Alabama & Vicksburg	141	$147,127	$76,222	$243,608	$41,245	$31,769	$2,715	$104,556	$8,866	$191,547	78.62	$52,061	$11,417	$40,623	—$3,702
Ala. Great Southern	312	548,120	233,231	836,565	171,599	162,361	12,695	309,223	19,429	683,938	81.75	152,628	23,863	128,747	—143,373
Ann Arbor	301	301,740	82,460	404,439	35,714	51,815	3,632	183,705	9,210	284,089	70.24	120,349	16,700	103,616	35,124
Arizona Eastern	377	197,714	36,439	254,780	59,942	43,263	1,727	109,499	1,439	218,742	85.85	36,038	16,282	19,599	—67,317
Atch., Top. & Santa Fe	8,665	10,785,186	4,025,990	15,673,078	1,790,631	3,099,471	135,109	5,303,359	242,044	10,496,363	66.97	5,176,715	573,819	4,600,926	—842,749
Atlanta & W. P.	93	88,190	120,009	228,577	25,023	38,150	3,830	89,118	6,454	166,762	72.95	61,815	8,500	53,312	—7,831
Atlanta, Birm. & Atl.	639	266,718	103,438	403,484	—39,749	96,210	7,443	187,984	12,495	264,460	65.54	139,024	16,000	123,003	155,091
Atlantic Coast Line	4,874	2,349,110	1,401,055	4,050,711	774,034	322,036	62,080	2,073,521	108,838	3,867,417	95.47	183,294	225,000	—43,961	—1,698,533
Atlantic City	177	87,892	613,627	717,181	59,319	52,617	1,443	263,215	1,007	377,699	52.66	339,481	12,000	327,481	—72,656
Balto. & Ohio	5,151	13,487,516	3,128,447	17,821,467	2,624,476	4,740,391	158,430	6,859,052	357,066	14,873,174	83.45	2,948,294	369,309	2,577,289	—2,477,421
Balto. & Ohio Chicago Term.	90	.....	1	194,224	31,706	25,186	1,178	127,286	7,398	197,568	101.72	—3,344	26,542	—29,893	105,662
Balto., Ches. & Alt.	87	130,135	88,516	227,469	9,567	23,317	1,141	92,514	3,446	129,985	57.14	97,484	4,015	93,469	48,882
Bangor & Aroostook	632	237,637	83,298	341,115	93,935	106,153	3,774	136,325	10,684	358,044	104.96	—16,929	21,000	—37,941	—110,446
Beaumont, Sour Lake & West.	118	94,311	28,779	128,086	30,095	15,229	2,449	42,622	4,658	95,054	74.21	33,032	2,700	30,254	4,961
Belt Ry. of Chgo.	31	.....	.....	375,874	33,232	46,269	344	179,047	9,248	268,141	71.33	107,734	15,682	92,052	49,108
Bessemer & Lake Erie	217	1,421,926	65,255	1,519,337	186,343	352,745	9,908	395,114	19,416	971,117	63.91	548,220	14,500	533,708	—255,768
Bingham & Garfield	37	88,229	2,404	93,718	36,437	48,036	1,207	23,871	4,283	115,961	123.73	—22,243	7,802	—30,045	—182,419
Birmingham Southern	29	35,252	.....	42,661	3,844	4,939	755	26,379	3,344	39,261	92.03	3,399	1,999	1,401	—59,106
Boston & Maine	2,258	3,867,137	2,271,076	6,746,501	873,765	904,924	40,548	3,086,908	166,982	5,108,731	75.72	1,637,770	180,086	1,457,632	—984,766
Buffalo & Susq.	296	220,375	6,929	243,935	40,604	118,397	1,952	73,282	8,059	242,294	99.32	1,641	3,250	—1,609	—30,066
Buff., Rochester & Pitts.	589	1,149,471	169,308	1,377,378	220,541	416,859	15,555	567,310	32,769	1,255,560	91.15	121,818	27,000	94,807	—302,316
Canadian Pac. Lines in Maine	233	107,459	41,603	159,136	67,944	28,084	2,552	66,655	3,012	168,249	105.72	—9,113	11,000	—20,113	8,337
Carolina, Clinchfield & Ohio	282	462,293	44,667	513,170	77,131	98,103	4,428	156,290	16,863	352,612	68.71	160,558	16,300	144,258	18,426
Central of Georgia	1,918	1,054,181	638,314	1,847,237	349,407	307,934	36,331	732,177	56,190	1,482,061	80.23	365,176	65,580	297,968	—192,099
Central New England	301	481,331	25,737	528,146	147,056	97,818	3,024	235,513	13,945	497,336	94.16	30,810	16,000	14,644	—111,911
Cent. R. R. of New Jersey	685	2,940,756	1,009,619	4,214,642	544,719	920,098	26,225	1,903,590	82,412	3,494,763	82.91	719,879	157,386	562,492	—1,209,803
Cent. Vermont R. R.	411	355,585	118,924	517,569	143,970	106,646	8,634	298,395	17,663	578,949	111.85	—61,380	17,400	—78,810	—69,651
Charleston & W. Carolina	342	161,883	62,227	233,809	54,188	55,154	5,172	89,781	5,076	209,438	89.57	24,438	8,500	15,938	—20,192
Ches. & Ohio.	2,509	4,123,358	1,241,697	5,683,518	1,027,348	1,142,564	36,420	2,129,580	113,162	4,481,652	78.85	1,201,866	158,400	1,042,886	—1,853,268
Chgo. & Alton	1,050	1,205,359	645,784	1,974,806	387,194	464,067	24,051	854,539	45,747	1,780,931	90.18	193,875	113,920	79,843	—781,293
Chgo. & Eastern Illinois	1,131	1,614,716	471,099	2,244,753	362,847	490,417	24,497	849,184	45,690	1,783,667	79.45	461,086	79,500	381,330	391,030
Chgo. & Erie	269	717,226	124,125	909,951	90,080	118,868	11,393	426,482	28,746	678,052	74.52	231,899	27,678	204,219	14,742
Chgo. & N. W.	8,090	7,217,136	3,514,750	11,736,338	1,923,247	2,174,707	81,026	5,083,856	275,177	9,643,045	82.16	2,093,293	475,000	1,617,976	—535,215
Chgo., Burl. & Quincy	9,371	10,259,266	3,869,397	15,163,627	1,975,220	2,864,045	105,460	5,002,613	303,994	10,394,861	68.55	4,768,766	466,525	4,300,940	—92,186
Chgo., Great Western	1,496	1,487,402	610,612	2,234,317	361,689	410,839	26,885	787,672	44,905	1,646,417	73.68	587,901	54,772	533,469	—6,023
Chgo., Ind. & Louisville	657	786,727	291,137	1,170,604	113,783	258,571	14,409	467,614	26,023	891,039	76.11	279,565	48,140	230,799	—85,736
Chgo. Junction	12	.....	.....	354,214	48,922	36,103	68	212,921	5,311	303,326	85.63	50,888	5,972	44,837	125,445
Chgo., Milw. & St. Paul	10,648	9,107,755	3,058,234	13,414,257	2,657,742	2,830,837	68,654	5,652,038	305,094	11,607,865	86.53	1,806,392	539,252	1,263,209	—1,807,052
Chgo., Peoria & St. Louis	247	93,840	31,899	134,441	32,429	53,918	1,966	92,134	7,859	188,307	140.06	—53,866	6,100	—59,966	—72,687
Chgo., Rock Island & Gulf	474	290,347	99,531	413,483	78,131	61,703	6,039	163,228	12,076	322,467	77.98	91,016	13,155	77,773	—9,312
Chgo., Rock Island & Pacific	7,594	6,311,430	3,218,719	10,088,973	1,730,424	1,633,847	110,539	4,015,105	193,990	7,706,827	76.38	2,382,146	356,720	2,024,957	1,323,283
Chgo., St. Paul, Minn. & Omaha	1,749	1,351,703	742,438	2,231,433	402,341	318,581	22,580	1,051,382	61,987	1,870,915	83.84	360,519	105,196	255,139	—312,017
Chgo., Terra Haute & S. E.	374	360,517	26,043	397,926	61,863	134,768	2,192	144,131	8,863	352,913	88.68	45,013	14,500	30,513	—143,528
Cinc., Ind. & Western	321	231,543	66,313	321,655	48,045	80,706	5,093	138,399	13,468	286,690	89.12	34,965	10,243	24,722	86,067
Cinc., Lebanon & Nor.	76	76,132	10,434	100,970	26,874	23,914	1,409	59,593	773	112,562	111.48	—11,593	4,404	—15,997	26,148
Cinc., N. O. & Texas Pac.	337	800,090	331,282	1,197,136	240,841	318,693	21,645	575,355	53,681	1,217,677	101.71	—20,541	37,000	—57,579	—492,907
Cinc. Northern	251	205,889	28,618	242,956	27,389	49,794	1,907	80,291	3,619	163,000	67.09	79,955	13,400	66,551	48,628
Clev., Cinc., Chgo. & St. Louis	2,395	4,722,356	1,832,971	7,057,217	789,384	1,109,724	71,042	2,627,074	97,258	4,750,999	67.32	2,306,218	166,000	2,139,139	—1,191,255
Colorado & Southern	1,099	809,673	312,440	1,191,675	240,709	241,604	7,332	418,564	33,695	952,294	79.91	239,381	47,000	191,395	—163,814
Colo. & Wyoming	41	22,882	917	91,880	14,465	16,789	43	39,803	3,897	74,998	81.62	16 882	4,000	12,882	—13,072
Copper Range	141	64,932	13,288	85,594	29,961	18,899	1,680	45,197	2,525	98,263	114.80	—12,668	6,992	—19,660	—10,299
Cumberland Valley	163	408,848	92,348	535,243	88,742	99,709	6,291	164,659	9,995	370,114	69.14	165,129	7,382	157,748	—195,805
Delaware & Hudson	875	2,731,462	464,754	3,360,810	361,780	788,995	16,884	1,341,793	101,895	2,641,669	78,60	719,142	60,000	659,113	—358,229
Delaware, Lack. & Western	955	4,307,356	1,332,183	6,256,837	761,540	1,187,504	41,441	2,618,092	113,253	4,789,195	76.54	1,467,643	318,427	1,143,388	—470,927
Denver & Rio Grande	2,593	2,630,784	870,331	3,105,754	518,095	577,637	18,768	976,676	69,923	2,198,800	70.79	906,954	115,000	791,216	645,231
Denver & Salt Lake	255	212,935	75,202	295,296	79,533	65,681	1,005	133,572	5,557	285,349	96.63	9,948	9,000	914	18,100
Detroit & Mackinac	381	103,966	40,522	153,174	31,170	37,031	1,237	56,453	—5,927	117,181	76.50	35,993	9,386	26,607	—7,690
Det. & Tol. Shore Line	61	219,297	.....	219,900	18,157	21,308	1,353	63,982	4,772	109,572	49.82	110,328	6,900	103,428	47,939
Det., Tol. & Ironton	454	316,288	17,536	348,831	101,382	72,237	2,571	150,593	12,027	338,810	97.12	10,021	8,149	1,836	—103,039
Duluth & Iron Range	292	918,023	25,050	1,029,540	93,652	86,512	412	196,099	14,933	392,254	38.09	637,285	53,898	583,299	—424,821
Duluth, Miss. & Northern	412	1,744,503	52,587	1,858,610	180,720	125,245	2,046	338,750	17,636	666,061	35.83	1,192,548	93,994	1,098,554	—1,620,228
Duluth, South Shore & Atl.	598	257,443	139,256	427,993	102,446	71,521	4,273	166,233	9,543	359,525	84.00	68,468	20,000	48,455	—153,395
Dul., Winnipeg & Pac.	178	115,911	25,650	145,663	34,309	21,473	2,963	54,671	8,610	122,090	83.81	23,573	7,284	16,289	—12,727
East St Louis Connecting	3	.....	.....	121,239	18,751	18,876	248	70,662	3,350	111,910	92.30	9,330	3,634	5,696	—12,453
Elgin, Joliet & Eastern	831	1,101,674	6	1,323,037	159,058	251,894	5,167	556,846	26,601	999,313	75.53	323,724	53,250	270,474	—498,019
El Paso & S. W.	1,027	786,501	162,745	1,001,063	218,748	198,939	9,951	266,453	24,524	726,025	72.53	275,038	48,364	336,654	—292,437
Erie R. R.	1,989	6,529,979	1,508,435	8,716,373	995,303	2,167,575	63,710	3,709,930	210,838	7,195,322	82.54	1,521,052	269,475	1,249,202	746,064
Fla. East Coast	764	390,271	177,832	649,401	112,257	111,412	6,820	265,515	17,504	521,215	80.26	128,186	46,780	80,177	73,586
Fonda, Johnstown & Gloversville	88	42,838	78,444	126,992	11,413	8,135	850	39,100	5,145	64,644	50.90	62,348	9,900	52,447	13,160
Ft. Smith & Western	253	93,683	37,706	139,188	24,921	34,551	3,880	47,457	6,391	117,895	84.70	21,293	5,000	16,281	997

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF AUGUST, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decrease) comp. with last year.
					Maintenance of										
		Freight	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Ft. Worth & Denver City	454	$584,296	$394,954	$1,012 623	$62,208	$178,929	$4,537	$362,127	$25,187	$636,637	62.87	$375,986	$17,238	$358,565	$122,927
Ft. Worth & Rio Grande	235	83,845	69,631	162,046	25,124	18,848	1,325	63,408	5,017	113,721	30.17	48,326	2,983	45,341	28,558
Galv., Harris. & San Ant.	1,381	1,366,544	515,242	1,955,843	296,414	396,016	16,592	708,437	54,128	1,486,221	75.98	469,622	52,892	415,877	—438,005
Galv. Wharf	13	.....	.....	72,539	33,481	610	.....	27,884	1,332	81,471	112.31	—8,931	12,500	—21,431	—7,276
Georgia R. R.	328	221,177	202,176	452,678	47,062	101,453	10,984	225,061	13,889	398,655	88.06	54,023	5,950	48,073	—189,374
Ga. & Florida	348	51,003	26,025	81,543	29,737	18,607	1,868	52,439	5,582	108,233	132.73	—26,690	4,200	—30,890	—22,400
Ga. Sou. & Fla.	402	231,437	103,332	362,478	51,333	68,536	7,443	163,443	11,979	304,333	83.95	58,146	13,733	44,402	35,024
Grand Rapids & Ind.	569	501,812	305,424	865,347	82,905	149,144	11,728	355,179	21,162	626,197	72.36	239,150	25,951	213,195	43,840
Grand Trunk Lines in N E.	172	98,032	60,246	171,512	84,506	31,352	2,663	107,248	10,011	242,825	141.57	—71,313	14,500	—85,813	—24,187
Grand Trunk Western Lines.	1,001	1,517,476	372,704	2,064,225	307,593	302,372	20,233	748,239	44,559	1,427,964	69.17	636,261	50,315	585,933	912,540
Great Northern	8,172	5,803,736	2,044,274	8,659,021	1,475,095	1,157,225	52,814	3,330,042	162,822	6,321,296	73.00	2,337,724	516,035	1,820,610	192,990
Green Bay & Western	252	67,910	18,548	92,623	26,802	21,083	1,262	37,289	2,199	88,935	96.01	3,688	4,390	—702	—19,588
Gulf & Ship Island	307	150,589	59,315	223,491	46,599	49,480	4,116	84,566	8,880	194,031	86.81	29,460	11,408	18,049	—26,640
Gulf, Colo. & Santa Fe.	1,937	1,439,765	573,128	2,126,609	473,890	376,396	22,522	862,552	50,974	1,770,378	83.24	356,232	71,168	284,105	2,647
Gulf, Mobile & Nor.	424	185,497	58,281	256,560	50,140	43,492	7,211	105,989	10,611	215,998	84.19	40 562	11.627	28,877	10.181
Hocking Valley	350	1,146,421	123,711	1,349,664	130,070	333,782	6,656	392,842	21,464	884,318	65.52	465,346	50,500	414,846	—184,629
Houston & Texas Central.	247	514,185	254,850	818,313	162,001	129,303	6,628	320,345	19,519	639,734	78.17	178,579	34,459	143,961	—337,699
Houston, C. & W. Texas.	190	138,721	59,960	206,407	39,268	16,513	1.107	90,133	3,862	150 883	73.09	55,524	6.249	49,163	—40,337
Illinois Central	4.799	6,739,549	2,307,507	9,675,740	1,742.381	2,467,919	86,229	3,702,886	220,785	8,255 015	85.31	1,420,725	433,367	980,401	—917,453
Indiana Harbor Belt.	116	.....	.....	597,454	104.052	44,424	1,592	417,858	17,033	584,959	97.90	12,495	9,954	2,534	—12,103
International & Great Northern.	1,159	746,966	334,475	1,152,182	280,799	336,240	14,339	295,718	48,201	1,277,351	110.86	—125,169	23,500	—148.695	333,135
Kan. City, Mex & Orient.	272	118,290	22,499	148,934	49,401	39,099	2,748	70,955	9,858	172,061	115.52	—23,127	6,250	—29,377	5,787
Kan. City, Mex. & Orient of Texas.	465	85,066	22,215	112,386	29,447	40,778	2,993	70,226	8,641	152,085	135.32	—39,699	5,000	—44,699	—15,509
Kansas City Southern	774	975,013	243,221	1,321,801	161,130	279,294	27,132	569,385	42,496	1,018,226	77.03	303,575	61,250	241,526	66,950
Kansas City Terminal	27	.....	.....	132,709	28,945	20.819	.....	42,193	1,476	94,498	71.21	38.211	13 017	25.169	31,641
Kanawha & Michigan	176	351,997	56,807	418,956	55,260	153,774	1,968	135,198	13,686	359,886	85.90	59,070	18,957	40,111	—176,158
Lake Erie & West.	902	805,001	82,152	926,793	166,574	167,400	12,608	354,404	21,793	722,780	77.98	204,013	46,100	157,900	17,766
Lake Sup. & Ishpenning.	34	117,540	265	131,282	21.878	14.010	206	23,885	2,430	62,410	47.53	68,872	3,872	65.001	—152,800
Lehigh & Hudson River.	96	238,179	5,750	250,949	30,791	48,245	1,080	89,614	6,598	176,328	70.26	74,621	5,400	69,221	38,193
Lehigh & N. E.	234	432.139	1.627	446.808	44 644	64.954	1,983	131,608	8,771	251 959	56.39	194.849	7,380	187,469	—124,389
Lehigh Valley	1,435	4,852,701	747,946	6,036,877	892,738	1,429,624	41,687	2,467,657	100,774	4,952,728	82.04	1,084,149	182,750	901,371	—694,930
Long Island	398	632,112	1,729,298	2,616,921	295,291	360,709	11,371	1,054,662	49,463	1,785,698	68.23	831,223	94,428	736,549	—322,293
Los Angeles & Salt Lake.	1,168	870,808	378,692	1,331,819	106,120	261,193	18,669	433,982	31,549	890,743	66.88	441.077	71,597	369,363	86,093
Louisiana & Arkansas.	302	106,550	48,220	160 637	67,549	38,171	3,486	66,511	6,065	181,781	113.16	—21,144	11,216	—32,363	—4,492
Louisiana Ry. & Nav. Co.	349	250,566	42,801	304,263	60.185	50.651	3,991	96,611	7,931	219,369	72.09	84,894	14,000	70,894	5,751
Louisiana Western	207	187,660	117,441	321,175	81,572	53,411	4,571	94,099	10,756	246,487	76.74	74,688	8,778	65,936	—165,532
Louisville & Nash.	5,013	6,608,508	2,307,658	9,392,579	1,436,722	1,965,706	124,707	3,616,861	184,038	7,365,225	78.41	2,027,355	260,776	1,765,924	—2,028,685
Louisville, Hend. & St. L.	199	146,453	74,890	232,542	54,802	25,063	4,305	84,913	7,730	176,812	76.03	55,730	4,000	51,713	—42,090
Maine Cent.	1,216	870,210	602,993	1 570,276	279,294	294,133	14,179	759,155	34,857	1,390,360	88.54	179,915	75,623	104,136	—194,484
Md., Del. & Va.	82	73,790	87 330	164.360	10.985	17.447	522	86,133	2,125	117,212	71.31	47 148	1.894	45,254	13,490
Mich. Central	1,861	4,765,223	2,082,379	7,472,778	778,873	1,092,874	64,870	2,389,139	121,664	4,517,779	60.45	2,954,998	285,000	2,669,586	896,642
Midland Valley	388	244,706	92,288	349,365	74.322	60.130	3,002	121,315	11,310	270,079	77.31	79,286	6,787	72,347	50,706
Minn. & St. Louis	1,646	853,053	259,385	1,169,878	178,518	213,127	9,970	524,665	30,454	957,562	81.85	212,316	50,184	161,498	354,338
Minn., St. Paul & S. S. Marie.	4,243	2,472,639	902,530	3,638,154	596,689	493.739	29,208	1,390,011	78,212	2,610,312	71.74	1,027,842	251,325	776,225	—172,792
Mineral Range	101	53,656	361	58.893	13.564	19,330	474	24,942	912	59,222	100.55	—329	3,500	—3,829	36,045
Minn. & Int.	194	52.349	28,353	86.229	20,782	14.272	556	41,726	3,209	80,544	93.40	5,685	4,609	1,076	18,539
Miss. Cent.	164	48,819	33,245	85.073	26,001	32,651	1,369	35,117	5,847	100,984	118.70	—15,970	2,800	—18,716	—46,931
Mo. & North Arkansas.	365	74 998	64.208	147.034	44,594	30.115	2,782	65,949	11,232	154,622	105.17	—7.588	6,242	—13,999	—42,277
Mo., Kans. & Texas.	1,713	2,287,326	753,673	3,224,599	435,283	739,509	32,640	990,506	75,958	2,290,399	71.03	934,150	90,326	842,962	676,035
Mo., Kans & Texas of Texas.	1.796	1,349,900	797,129	2,290,969	486,396	425.452	25,057	1,102,024	74,420	2,131,708	93.04	159,260	47,828	110,746	—53,904
Mo., Okla. & Gulf.	332	110,140	22,815	139,805	67,331	47,112	2,263	65,330	6,854	189,134	135.28	—49.330	8,522	—57,939	—31,747
Mo., Pacific	7,301	6,015,753	2,060.978	8,608,824	1,688.002	1,531,175	98,019	3,303,812	213,657	6,867,393	79.77	1,741,430	263,015	1,475,525	—677,325
Mobile & Ohio	997	1,036,531	224,532	1,347,709	223.289	333,133	23,039	594,889	41,168	1,215,231	90.21	132,478	45,000	87,266	—117,041
Monongahela	108	389,117	21,430	416,168	57,171	45,271	1,217	84,913	8,412	196,984	47.33	219,185	5,000	214,185	88,523
Monongahela Connecting	6	.....	.....	165,585	27,582	50,082	529	74,220	6,536	158,950	95.99	6,636	1,482	5,153	—59,115
Montour	54	140 278	1,214	143,607	44.090	70,806	1,016	31,339	6,516	153,762	107.07	—10,155	2,552	—12,707	—46,522
Morgan's La. & Texas R. R.	400	406,065	187,114	627,038	115,576	101,057	8,516	263,313	19,434	506,163	80.72	120,875	29,796	91,026	—285,399
Nash., Chatt. & St. Louis.	1,247	1,174,964	504,881	1,778,184	295.553	352,406	39,409	739,188	44,280	1,477,912	83.11	300,273	50,000	249,492	—357,766
Nevada Northern	168	13,618	8,098	27,147	22,179	8,811	886	13,750	4,233	49,959	184.03	—22,812	22,223	—45,035	—190,852
Newburgh & South Shore.	7	.....	.....	35,579	18.242	28.922	.....	45,154	3.898	96,214	270.42	—60,635	4,041	—64.676	—118,829
New Orleans & N. E.	195	348,386	140,778	549,244	99,275	34,195	8,249	237,198	15,018	399,072	72.65	150,172	28,357	121,766	—6,147
New Orleans Great Nor.	284	163,645	55,720	226,548	35 297	35.530	2,604	80,930	10,570	165,371	72.99	61,177	9,000	52,176	—25,832
New Orleans, Texas & Mex.	191	125,047	54,780	185,605	47,236	37,431	3,904	48,370	6,602	145,242	78.25	40,362	10,000	30,340	39,089
New York Central.	6,075	17,286,725	9,099,773	29,525,184	3,356.294	5,204,569	230,787	10,529,060	706,917	20,421,987	69.16	9,103,197	1,042,649	8,057,149	824,554
New York, Chicago & St. L.	574	1,785.865	158,017	2,005,263	313,530	295.189	27,394	882,099	52,978	1,576,044	78.59	429.219	50,000	379,127	549.511
N. Y., N. H. & Hartford.	1,965	4,059,170	4,241,563	9,364,106	1,148,546	1,389,137	47,499	4,267,211	252,268	7,235,964	77.27	2,128,142	268,000	1,857,988	—1,530,776
N. Y., Ontario & Western.	569	650,396	637,746	1,459,120	165,353	210,448	8,788	456,053	21,937	862,579	59.12	596,541	27,000	569,541	199,105
N. Y., Phila. & Norfolk.	121	613,365	143,048	810,386	65,765	202,975	9,183	330,495	10,248	638,680	78.81	171,706	16,520	155,167	—57,809
N. Y., Susq. & Western.	135	270,306	69,139	375,617	38,424	49,443	3,314	181,229	8,450	280,859	74.77	94,758	37,111	57,268	—80,194
Norfolk & Western.	2,088	5,573,336	1,107,473	6,930,650	935,114	1,773,184	35,655	2,393,126	104,313	5,262,051	75.92	1,668,598	260,000	1,408,457	—1,768,145

The Brotherhood of Railroad Patrolmen

An international union of railroad policemen of the United States and Canada, under the above name, has been formed at Chicago. Charles E. Copeland is grand-president and W. L. Kahl is grand-secretary and treasurer of the brotherhood, with headquarters at 822 W. Ohio street, Chicago. The Chicago local is No. 1 and its territory covers the Chicago district.

The enrolment is composed of 900 railroad patrolmen and watchmen.

Signal Engineers—New York Section

The New York Sectional Committee of the Signal Division of the American Railroad Association will hold a meeting at Hotel McAlpin, 34th street, New York City, on the evening of January 22, beginning at 8 o'clock. Fred W. Bender, chairman of the committee in charge, announces that a paper on track circuits will be read, and he desires members to come prepared to give the paper full discussion; and to bring any friends who are interested in the subject. The meeting will be held in the grand ballroom, on the 14th floor.

N. P. W. D. Association

The name of the organization created to promote a National Department of Public Works—the Engineers', Architects' and Constructors' Conference on National Public Works—has been changed to the National Public Works Department Association. This organization has issued a call for a convention to be held in Washington on January 13 and 14, for the purpose of broadening the scope of the campaign, to adopt plans and policies for the subsequent legislative campaigns and by intensive work in Congress to focus attention on the situation. Invitations have been sent to the engineering organizations which were represented in the Chicago conference last April, to other technical organizations and to the industrial interests of the country, including the American Iron & Steel Institute, the National Railway Appliances Association, the Railway Car Manufacturers' Association, and the Railway Supply Manufacturers' Association. In response to a resolution supported by a brief presented by Engineering Council, the Board of Directors of the Chamber of Commerce has authorized the appointment of a special committee of the Chamber to investigate and report on the project for a department of public works.

Western Association of Short Line Railroads

Delegates to the annual meeting of the Western Association of Short Line Railroads, which was held at San Francisco, Cal., on December 4, took measures to affiliate with the American Short Line Railroads Association and elected the following as members of the Board of Directors: George W. Scott, president, Yreka Railroad Company; S. H. Smith, traffic manager, Sierra Railway Company of California; D. M. Swobe, vice-president and traffic manager, McCloud River Railroad Company; R. K. Minson, general freight and passenger agent, Arizona & New Mexico Railway Company; L. G. Cannon, vice-president and general manager, Nevada Northern Railway Company; E. M. Heigho, receiver, Pacific & Idaho Northern Railway Company; Guy W. Talbot, president, Walla Walla Valley Railway Company; A. M. Ardery, vice-president and general manager, Virginia & Truckee Railway; M. W. Cooley, general manager, Uintah Railway, and Clarence M. Oddie, general counsel and secretary of the Association.

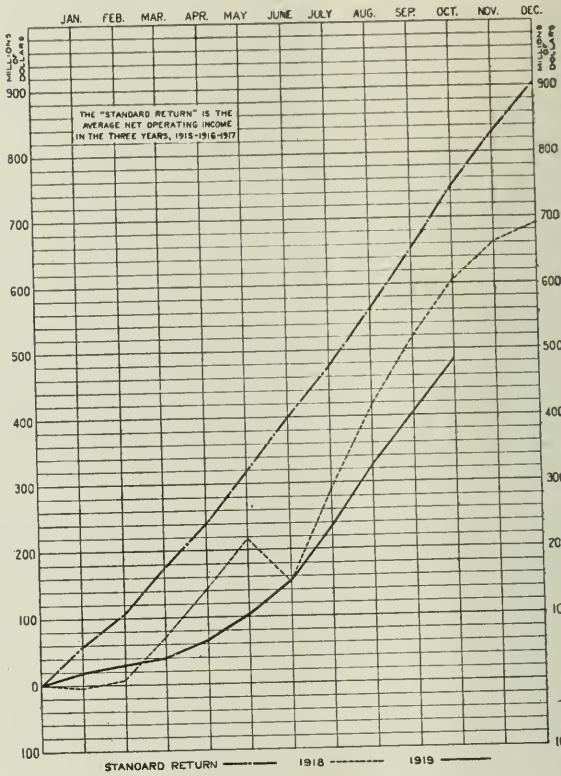
Immediately after the annual meeting of the Association the new board of directors met and elected the following officers for the ensuing year: President, D. M. Swobe; first vice-president, L. G. Cannon; second vice-president, George F. Detrick; general counsel and secretary, Clarence M. Oddie, San Francisco, Cal.

The board also elected Mr. Oddie and Mr. Detrick as the representatives of the Western Association of Short Line Railroads to serve on the executive board of the American Short Line Railroad Association at Washington.

The affiliation of the two associations was brought about in order that the American Association may be able to speak for all of the short lines in national matters and in order that the Western Association may be enabled to represent both the members of the American Association and its own members in matters arising in Inter-mountain States and on the Pacific Coast. By this arrangement nearly 450 railroads can act together.

Net Operating Income

The chart made by the Bureau of Railway Economics shows the net operating income of the Class 1 Roads in 1919, compared with the average in the test period (1915-1916-1917)



Net Operating Income, Cumulated by Months, 1918 and 1919, Compared with Standard Return, Class I, Railways of United States

on which government rental is based. The table gives the figures on which the chart is based.

NET OPERATING INCOME OF RAILROADS (CLASS I) IN 1919, COMPARED WITH TEST PERIOD (JUNE 30, 1914—JUNE 30, 1917.)

Month	Standard Return	Earnings in 1919
January	$56,613,000	$18,783,702
February	47,934,000	10,106,268
March	68,251,000	10,842,608
April	67,289,000	26,115,214
May	77,385,000	39,462,367
June	82,550,000	52,270,702
July	75,341,000	77,176,933
August	86,860,000	92,396,636
September	91,273,000	77,763,023
October	94,333,000	76,397,213
November	83,536,000	.....
December	73,282,000	.....

Railroad Thieves Punished

A resume of the activities of the Secret Service and Police Section of the Railroad Administration in dealing with thefts for the eight months of 1919 up to September 1, was made public recently. The record for August is typical. During that month 1,514 arrests were made for theft and 607 convictions were obtained, carrying with them total sentences

of 40 years in the penitentiary, 111 years in jails and reformatories and $12,000 in fines. In eight months property valued at $149,000 was stolen, of which $133,554 worth was recovered. The following figures show the principal totals for the eight months:

Arrests for theft	12,486
Employees arrested	4,164
Others (not employees)	8,322
Cases pending	4,472
Convictions	7,140
Penitentiary, total years	2,062
Jails and reformatories, total years	1,687
Dismissed, paroled or suspended	2,046
Fines imposed	$122,526
Approximate value of property stolen	$904,111
Approximate value of property recovered	$779,095

Safety at Grade Crossings

New Hampshire, like New York, is calling reckless automobile drivers to their senses. The Public Service Commission of the State, calling attention to frequent fatalities at crossings, and citing one where a man and a woman in an automobile were killed, and where also the locomotive and three cars of an express passenger train were derailed by the automobile, has issued the following notice:

IMPORTANT!

Automobilists' attention is called to section 2, chapter 88, Laws of 1917, requiring them when within 100 feet of a railroad grade crossing to reduce the speed of their cars to 10 miles an hour, under a penalty of a $50 fine, or imprisonment, not exceeding three months, or both such fine and imprisonment.

This law is enacted for the public safety and the Public Service Commission will endeavor to see that it is obeyed, even if it becomes necessary to recommend prosecution by the proper officials, and a revocation of the offender's driving license.

PUBLIC SERVICE COMMISSION,
By WILLIAM T. GUNNISON, Chairman.

The commissioners express the conviction that some drastic action should be taken, for not only people riding in automobiles, but the general public, traveling in passenger trains, are put in danger every day by careless driving. The notice is circulated by the Motor Vehicle Department of the State Government, the same as was done in New York.

Report on Port Chester (N. Y.) Collision

The Interstate Commerce Commission has issued a report, dated October 30, and signed by W. P. Borland, chief of the Bureau of Safety, on the rear collision of westbound freight trains near East Port Chester, Conn., on July 31, 1919, in which two men, an engineman and an instructor, in charge of an electric locomotive, were killed, and their bodies burned.

East Port Chester is just across the river from Port Chester, N. Y., and appears to be the name of the signal station near which the collision occurred. This collision was reported in the *Railway Age* of September 19, page 579. The conclusion of the officers of the road was that both of these enginemen had been asleep for several minutes when they passed a stop signal set against them. The present report gives interesting details, but no further essential facts or conclusions. The electric locomotive is about the size and shape of a large eight-wheel caboose, and the two enginemen were in the front end, the engineman at the right hand window and the instructor at the left hand. Helper Bruce, spoken of in the report as "fireman," was in the rear end of the motor, talking with a brakeman. Bruce says that when the train started from Stamford, seven miles east of the point of collision, he went forward to perform some minor duty, and was told by the engineman to go back to the rear of the motor. The helper and the brakeman had their first warning of danger at the moment when the collision occurred, not having felt any application of the brakes. The engineman, when found, was conscious and asked "what happened," repeating the question several times, he (as well as the instructor) evidently having been asleep when he crashed into the standing train.

The inspector places responsibility primarily on the engineman, but also says it was the specific duty of the instructor to observe and require proper performance of duty on the part of the engineman. The flagman of the leading train and also the conductor are censured for not having thrown off fusees as required by rule, their train having been stopped or slackened twice by adverse block signals. The accident, says Mr. Borland, again directs attention to the necessity of the adoption of some automatic train control device.

Fuel Situation in the Middle West

From December 16 up to the present time coal trains from the coal mining districts in Illinois, Iowa and Indiana have been running to the Chicago district on fast schedules to relieve the serious situation created in that district by the strike of miners and the consequent shortage of coal. At the time orders were issued which placed coal shipments on express schedules in the Northwestern and Central Western region, the Chicago district had not many days' supply of coal, and it had become apparent that drastic measures must be instituted to restore the coal supply to a normal basis. Several embargoes were necessary to expedite the movement of coal, among them a 10-day embargo on non-essential shipments, which was placed in effect on the Chicago, Milwaukee & St. Paul. In addition to this action, which has been taken in both the Central Western and Northwestern regions, all of Director General Hines' orders regarding the precedence of coal shipments over other classes of freight have been religiously put into effect. As a result of these movements, the fuel situation in the Chicago district has been greatly relieved and all of the large industries in this district have resumed full time operation. The steel mills in the Calumet region have abolished fuel conservation measures and are now operating full blast. Statistics compiled by John M. Glenn, president of the Illinois Manufacturers' Association, show that the losses suffered by Chicago due to the coal strike were in the neighborhood of $33,600,000. This computation was based only on the loss to manufacturing establishments and included neither losses to mercantile houses nor to employers in the payment of employees while idle.

A. R. E. A.

The nominating committee of the American Railway Engineering Association has made the following nominations for officers: for president, H. R. Safford, engineering assistant to the regional director of the central western region, United States Railroad Administration, Chicago, Ill.; for vice-president, L. A. Downs, assistant general manager of the Illinois Central, Chicago; secretary, E. H. Fritch, Chicago; treasurer, G. H. Bremner, district engineer, bureau of valuation, Interstate Commerce Commission, Chicago. The candidates for director are: E. E. Adams, consulting engineer, Union Pacific, New York City; J. M. R. Fairbairn, chief engineer, Canadian Pacific, Montreal, Que.; F. G. Jonah, chief engineer, Frisco Lines, St. Louis, Mo.; Edwin B. Katte, chief engineer of electric traction, New York Central, New York City; F. P. Patenall, signal engineer, Baltimore & Ohio, Baltimore, Md.; Thomas S. Stevens, signal engineer, Atchison, Topeka & Santa Fe, Topeka, Kan.; E. B. Temple, assistant engineer of the regional director of the Allegheny region, Philadelphia, Pa.; F. E. Turneaure, dean of the College of Engineering, University of Wisconsin, Madison, Wis.; J. E. Willoughby, chief engineer, Atlantic Coast Line, Wilmington, N. C. For members of nominating committee: W. A. Christian, senior civil engineer in charge of track and roadway for the bureau of valuation of the Interstate Commerce Commission, Chicago; Maurice Coburn, supervising engineer, Pennsylvania Lines, Indianapolis, Ind.; H. T. Douglas, Jr., chief engineer, Chicago & Alton, Chicago; E. A. Hadley, engineering assistant to the regional director, southwestern region, St. Louis, Mo.; C. M. McVay, division engineer, Kanawha & Michigan, Charleston, W. Va.; Arthur Montheimer, chief engineer, Elgin, Joliet & Eastern, Joliet, Ill.; U. E. Gillen, general manager, Toronto Terminals Railway Company, Toronto, Ont.; A. W. Newton, chief engineer, Chicago, Burlington & Quincy, Chicago; R. S. Parsons, chief engineer, Erie, New York, and W. P. Wiltsee, assistant engineer, Norfolk & Western, Roanoke, Va.

Traffic News

The total citrus crop to be moved from California this season will amount to over 40,000 car-loads, it is estimated in a statement issued recently by Hale Holden, director of the Central Western region.

The Chicago, Milwaukee & St. Paul, aiming to reduce materially the losses on perishable food stuffs, has created a new department, heated refrigerator service, in charge of O. M. Stevens. A new design of charcoal heater has been installed in 1,000 refrigerator cars in which are carried food products subject to injury by freezing.

Edward Chambers, director of traffic of the Railroad Administration, has issued a circular extending from December 31, 1919, to February 29, 1920, the date of expiration of Traffic Circular No. 9 authorizing railroads to apply special rates on roadbuilding material for federal, state or local governments.

The Houston Traffic Club, Houston, Tex., at its recent annual meeting elected a president of the club for the ensuing year—F. L. Clements, traffic manager of the Gulf Pipe Line Company. The annual banquet of the club was held at Bender Hotel, with about 150 members and guests in attendance.

The Traffic Study Club of Akron, Ohio, has been organized with a membership including traffic managers, assistant traffic managers, chief rate clerks and others interested in traffic and transportation problems. The purpose of the organization is to make a study of traffic and transportation conditions and to form a personal acquaintance between the traffic departments of the industries and of the railroads.

Excursion tickets at $1.25 round trip, Philadelphia to Atlantic City and return, good only on Sundays, are to be sold by the Pennsylvania and the Reading Railroads, beginning on Sunday, January 11. This is a resumption of the regular low-rate excursions which were in effect before the general advance in passenger fares made by the Railroad Administration in 1918. The distance from Philadelphia to Atlantic City by the Pennsylvania, is 60 miles.

A foreign trade service to give Chicago manufacturers data on freight rates, duties, insurance, markets, packing and other important phases of export selling, including railroad shipping, is being established by the Continental & Commercial National Bank of Chicago. The purpose of this department is to encourage direct selling to foreign buyers instead of passing the goods through the hands of brokers at seaboard points, with the necessity of paying a commission for their service.

The proviso in section 15 of the act to regulate commerce, that until January 1, 1920, no increased rate, fare, charge or classification shall be filed except after approval of the commission, expired at midnight, December 31, 1919. Many applications were filed during the closing days of the year on which it was not possible to act, and the commission has answered that these will not be acted upon because the expiration of the proviso removes the commission's jurisdiction with respect thereto. These applications will remain in the files of the commission with notation of the reasons for their not having been passed upon.

The records for revenue freight loading on lines in the Northwestern region for the week ending December 30, show substantial increases over those established for the corresponding period last year. The number of cars loaded with coal and coke increased from 8,854 during the week ending December 30, 1918, to 15,521 during the corresponding period this year. Increases were also recorded in the loading of livestock, lumber and forest products and miscellaneous freight, whereas slight decreases are recorded in the loading of grain and grain products and ore. The total number of cars loaded increased from 79,758 last year to 94,622 this year.

Shortage of grain cars continues to be acute in the Northwestern region, though the regional director has issued orders giving grain preference over all other commodities, and has directed that grain cars be given preference in the repair shops. Several grain receivers on the Chicago Board of Trade say that the most drastic orders can do little to relieve the situation; and they are as dissatisfied in the Central Western as in the Northwestern region. They are not much pleased with the regional directors' orders, but want absolute priority in transportation for their shipments.

The State of Nevada is the subject of an illustrated booklet for distribution among homeseekers which has been issued by the Agricultural Section of the United States Railroad Administration. Governor Emmet D. Boyle indorses the book, declaring that Nevada would regard it as an injury to herself, no less than to the prospective settler, if she should, by over-enthusiastic statements, induce persons to come there without having a fair chance for prosperity and happiness. The State has recently made an appropriation of $1,000,000 for land reclamation work. Through its Agricultural College and other State departments, Nevada offers valuable assistance to the settler in the permanent development of his farm. The booklet contains information regarding topography, climate, schools, roads and highways, transportation, principal crops, markets, grazing lands, dairying and poultry.

According to a report on overseas traffic for the week ended December 31, 1919, made to the director general of railroads, 5,047 cars of commercial export freight were received at North Atlantic ports during this period, as compared with 1,709 cars for the same week of 1918. This shows an increase of 3,338 cars or 195 per cent for the last week in December, 1919, as compared to the corresponding period in 1918. At South Atlantic and Gulf ports as of December 28, 1919, there were 12,936 cars of export freight on hand, as against 12,680 cars on December 21, 1919, an increase of 256 cars. On December 31, 1919, there were stored in elevators at North Atlantic ports 8,922,933 bushels of grain. There were received during the week 2,235,300 bushels, while 3,503,960 bushels were cleared. The total amount of grain in storage represented 45 per cent of the elevator capacity of these ports, as compared with 54.3 per cent for the week previous. There were 7,223,613 bushels of grain stored in elevators at Gulf ports on December 31, 1919, representing 71 per cent of the total elevator capacity.

Coal Car Situation in Illinois and Indiana

Some interesting figures have been compiled by the Northwestern regional director's office relative to the coal car supply in the Illinois and Indiana coal fields and to the commercial coal situation in the Chicago district. The tabulations show in general what has been accomplished in supplying coal cars to the mine fields in this district since the ending of the strike of bituminous coal miners.

Coal Car and Mines Situation, Illinois-Indiana Field

Date	Cars ordered for today's loading	Cars placed at mines	Additional empty cars available	Cars loaded previous 24 hours
December 17	3,974	4,386	8,656	2,880
December 18	3,556	5,373	8,001	3,152
December 19	6,935	9,199	11,778	5,467
December 20	6,129	8,416	9,395	3,675
December 22	6,658	8,187	9,280	5,394
December 23	6,664	8,133	7,555	5,245
December 24	7,258	7,918	6,840	6,363
December 26	7,353	7,990	6,217	5,975
December 27	7,796	7,839	5,489	5,496
December 29	9,080	9,234	6,166	6,459
December 30	7,728	8,029	5,188	5,923
December 31	8,545	8,359	5,317	6,487
January 2	7,699	8,818	5,049	5,839

Commercial Coal Situation—Chicago

Date	Cars on industry tracks for unloading	Cars held for industries	Total	Cars unloaded by consignee
November 1	.....	.....	3,622	.....
December 19	1,415	1,200	2,615	706
December 30	2,657	2,227	4,884	1,706
December 31	2,480	2,095	4,575	1,734

Campaign for Making Shipments Safe

For the past year the Official Classification Committee has been engaged in an intensive campaign of education regarding the interpretation and enforcement of its rules covering the proper packing, marking and handling of freight. During this period F. W. Smith, member of the committee, has addressed over 20,000 representatives of the carriers and shippers at 312 meetings in 101 different cities throughout official classification territory, 879 railroad agencies being represented, and the great majority of the attendance has been made up of the local station forces, the men who are actually employed in the enforcement of the rules of the classification. For the past two months Mr. Smith has addressed 2,785 railroad representatives at 24 joint meetings of Loss and Damage Claim Prevention Committees.

It is believed that the interest aroused will have a far-reaching effect in helping the carriers to reduce the enormous wastage annually paid out on account of the acceptance of obviously weak and improperly marked packages which formerly have been accepted for transportation.

Mr. Smith says that "one of the most pleasing features of the campaign is the hearty co-operation that is being given throughout our territory by manufacturers who appreciate that it avails but little to produce a superior article unless that article is delivered to the consumer in perfect condition."

Movement of Canadian Wheat Crop

In answer to criticism of the Canadian railways concerning the movement of the 1919 Canadian wheat crop, the Canadian Railway War Board has issued a statement, the preamble of which states that "no class of Canadian industry, urban or rural, is or has been losing money through failure of the Canadian railways to provide proper service. . . ." The statement outlines the situation in regard to the movement of the wheat crop and attacks the Canadian Wheat Board, whose chairman recently criticized the performance of Canadian railways. It says, in part:

"Whether the railways have carried out their obligations depends upon the answer to four simple questions:

"First—Are the lake and seaboard elevators filled? Second—Have they been kept filled? Third—Will they continue to be kept filled until the crop is sold? Fourth—Have these elevators been able during the grain season to furnish wheat to vessels as rapidly as vessels were available?

"The answer to these questions in every case and with but one reservation in one instance is 'Yes.' The records of the railroads is, therefore, absolutely vindicated. If they had knowingly accepted more wheat than they could have unloaded in the elevators they would then have been open to the charges of endangering public interests by wasting car capacity and track room in holding such wheat, and jeopardizing thereby the vital flexibility of their storage and terminal facilities.

"The only delays in the movement of wheat to the east out of the country have been due to the fact that the Canadian Wheat Board, which now endeavors to blame the railways, had itself prohibited the movement of wheat at any points in the greater part of Saskatchewan and in all parts of Alberta, between September 8 and September 26, at which date the embargo was removed in Saskatchewan. It was not until October 18 that it was modified in respect to Alberta and this embargo was not cancelled until November 18.

"It would be possible for the railroads to offer many excuses if there had been the least breakdown in their performance; first, the delays caused by the Canadian Wheat Board; second, the fact that the sudden cold weather augmented the coal movement eastward from Alberta during the month of October 23.55 per cent over what it had been in the previous year, thus making a demand for cars and track room eastward, at the same time as the wheat; third, the fact that the cold weather augmented the feed shortage increasing the volume of live stock shipment 55.2 per cent during the same period as compared with that period in 1918. It is, however, unnecessary for the railways to offer any excuses. The fact that the lake and seaboard elevators have been continuously filled with wheat; the fact that the eastern mills have been supplied; and the fact that the interior elevators in the west are not congested, are evidence of the hasty generalization which led to the attack by the chairman of the Canadian Wheat Board."

Three and a Third Millions of Tickets Sold in a Day

Frank Hedley, president of the Interborough Rapid Transit Company, New York City, on Tuesday, December 23, issued a statement thanking the people of the City of New York "for the co-operation which they gave Monday to the employees of the subway and elevated lines. On that day the Interborough carried the largest number of passengers in their history—3,308,486." (The figures give, presumably, the number of tickets sold, which on some days is, no doubt, larger than the number of persons actually traveling. Some passengers buy tickets for several days ahead. On the other hand some on Monday rode on tickets bought on a previous day.) Continuing, the statement said:

"The company appreciates the difficult work done by its employees and the efficient and patient manner in which they performed their duties under trying conditions, and believes that the public joins with it in hearty acknowledgment and thanks to them.

"The Interborough subway and elevated on Monday, carried a total of 3,308,486 persons, which was 534,223 more than were carried on the Monday before Christmas last year.

"The number of passengers carried on the subway and elevated on this one day was more than twice the usual number of passengers carried daily on the entire Pennsylvania Railroad system.

"In order to move this large number of people, 14,822 trains were run and there were no train accidents of any kind, and this huge number of people were transported in complete safety. This service was also maintained without any material delay, our reports showing that for the twenty-four hours ended at 9 a. m., Tuesday, there were but three delays, two of which—of 6 and 5 minutes respectively—occurred on the subway between five and six o'clock Tuesday morning.

"This is a record of which I am frank to say the company is very proud, and every employee is entitled to a substantial part of the credit. The achievement would have been impossible without good cheer and co-operation on the part of the public, and for that we are all very grateful."

Coal Production

An output of 8,261,000 tons of soft coal during Christmas week brought the total production from the beginning of the year 1918 to December 27, up to 451,618,000 tons, according to the weekly bulletin of the United States Geological Survey. With three working days remaining this suggests a total bituminous output for the year of 458,000,000 tons. This is the smallest in any year since 1915. Compared with the 579,386,000 tons of the record year, 1918, it is a decrease of more than 121,000,000 tons.

While the Christmas holiday caused a drop in total production, the rate per working day during the week ended December 27 was practically the same as that of the week before. The average for the five working days was 1,724,000 tons. This was 85.5 per cent. of the daily rate for the four weeks ended October 25, which may be regarded as normal.

The average for the week—85.5 per cent. of normal—is not, however, a true measure of the extent to which operations have been resumed in the union districts, for neither the day before Christmas nor the day after count as full working days. A better measure is found in the fact that on Monday, December 22, the output was 103 per cent. of normal, or in the fact that compared with production at Christmas time of last year, the week shows an increase of over 2,000,000 tons.

Car shortage reappeared as a significant factor limiting production during the week ended December 20. Its recurrence was a consequence of the extraordinary dislocation of traffic necessitated by the strike. Soon after the strike was settled the Railroad Administration had warned the public that during the period of readjustment local car shortages would be inevitable. The car supply in most districts was exceptionally favorable, but in certain fields of the northern and middle Appalachian region a shortage developed. Losses due to transportation disability were reported amounting to 37.7 per cent. in the Fairmont district; 40.2 per cent. in Somerset County and 30.3 per cent. in the Cumberland-Piedmont field. In these three districts the difficulty was the direct result of the general dislocation of distribution which accompanied the strike. To meet the shortage of coal in the central competitive field it was necessary to ship the coal mined in West Virginia and Pennsylvania largely to the Middle West, and very little to points east of the Allegheny mountains. This abnormal movement has interfered with the prompt return of empties.

Operators in the Logan district of Southern West Virginia reported a loss due to transportation of 43.9 per cent of capacity. It is stated by the railroads that the causes were a derailment which interfered with car placements on one day, and a congestion of westbound loads which obtained practically throughout the week.

Commission and Court News

Personnel of Commissions

Lewis Nixon, public service commissioner of the State of New York, First District (New York City), announces the appointment of **John H. O'Brien** as chief of the Transit Bureau at a salary of $10,000 a year; also of the appointment of **Morgan T. Donnelly** as third deputy public service commissioner at a salary of $7,500.

The Alaskan Engineering Commission has created a supply division and has appointed Lieutenant-Colonel H. P. Warren, recently discharged from army service, as engineer in charge with headquarters at Seward, Alaska. Col. Warren will have general supervision over all supplies required for the construction of the Alaska Northern. The commission has also created an accounting division and has appointed B. H. Barndollar, examiner of accounts and manager of the land and industrial department with office at Anchorage, Alaska, as examiner of accounts in charge of the newly created division. Mr. Barndollar will have charge of all accounting matters for all departments and will retain the same headquarters.

State Commissions

The San Francisco, Napa & Calistoga (Electric) Railway, with a view to giving the Mare Island Navy Yard direct rail communication with the mainland, is planning a connection with the rails laid by the government when it built the causeway between Vallejo, Cal., and Mare Island. To carry out this plan the company has applied to the Railroad Commission of California for authority to lay a single track crossing several streets at grade, in the city of Vallejo. This track will connect with the company's main line near Napa Junction, where interchange will be effected with the Southern Pacific.

Court News

Damages to Freight Not in Contemplation of Parties

In an action against a railroad company for damage to an asphalt plant transported by it and wrecked in transit, the Tennessee Supreme Court holds that no recovery could be had for overhead expenses due to the enforced idleness of the plaintiff's workmen, such item of damage not having been within contemplation of the parties. The railroad was not advised that delay in transporting the plant would result in a loss by such overhead expenses.—West Const. Co. v. Seaboard Air Line (Tenn.) 210 S. W. 633.

Lease of Freight Offices—Covenant as to Heating

In a suit for specific performance of a covenant by a lessor to heat "to a proper warmth for office purposes" the freight offices leased to a railroad, the provision relating only to the degree of heat to be furnished and not to the time during which heat was to be furnished, and being therefore ambiguous, the Massachusetts Supreme Court holds that evidence was admissible to show the conditions and circumstances under which it was made in order to ascertain whether it was intended to obligate for heating during the night as well as the day. The evidence showed that the lessor knew that the premises would be used as a railroad office at a freight terminal, and that it was necessary for the proper operation of the railroad to run freight trains on Sunday and at night when passenger traffic is light, and that it was necessary to keep a force of clerks at the freight offices continuously. On the evidence it was error to rule that the railroad was not entitled to have the premises heated 24 hours in the day, including Sundays and holidays.—New York Central v. Stoneman (Mass.) 123 N. E. 679.

Foreign Railway News

German State Railways

LONDON.

An article abstracted from the Frankfurter Zeitung by Modern Transport states that the transfer of the administration of the various German State railways to the government will take place on April 1, 1920, and not on April 1, 1921, as originally announced.

Types of Electric Locomotives on the Italian Railways

An article abstracted by the Technical Review from L'Industria states that one type of 3-phase electric locomotive, designated No. E.330, has a length of 11 meters between the buffers; it weighs 74 tons and is capable of developing about 2,900 hp. It has the triangulated system of connecting rods, liquid rheostat and electro-pneumatic contactors and switches. The traction motors can be connected in parallel or in cascade. The trucks are of a newer and lighter design. The triangulated connecting rod is of the open frame or lattice type. Special investigations were undertaken with a view to securing the proper balancing of the centrifugal forces, so as to obviate "knocking" at high speeds.

Two other groups of locomotives, Nos. E.331 and E.332, have also been introduced with satisfactory results. They are approximately the same in general design as No. E.330, but somewhat heavier, being 92 to 93 tons, while the hauling capacity is correspondingly reduced. They are also fitted with twin trucks so as to be able to take curves easily. The power is transmitted through auxiliary shafts and not by the triangulated system of connecting rods as in the other type. The electrical equipment, however, is different. In both the present types four running speeds are obtained as follows: two by commutating the poles and two by connecting in cascade.

Railway Progress in Rhodesia

The traffic manager of the Beira & Mashonaland and the Rhodesia Railways, Beach Smith, who went out from England in 1901 and is now in England on a long vacation, has recently given an English paper an idea of the progress made by these railways in fulfilment of Cecil Rhodes's dreams.

"In 1901," Mr. Smith is quoted as saying, "when I first went to Rhodesia, the only railways ran from Beira to Salisbury 374 miles, and from Cape Town to Buluwayo. Buluwayo and Salisbury are the two largest towns. They are now connected by rail, which has also been extended northwards from Buluwayo to the border of the Belgian Congo, nearly 500 miles away. The Belgians have continued the railway construction from the border to the Congo river system, and it is now possible to travel in comfort from Cape Town to Beira right through the heart of Africa to Boma on the west coast, or to Dar-es-Salaam on the east coast.

"Branch railways have been constructed to various outlying districts, and the total mileage of the Rhodesian railway system is now about 2,000 miles. Gold mining is the principal industry of the country, with farming as a good second. Considerable activity exists in such directions as chrome ore, lead, copper and asbestos mining. Cattle breeding is being rapidly developed, particularly in Matabeleland, the western portion of Rhodesia. Mashonaland, the eastern portion, is more suitable for maize growing, though cattle also do well. The purely laboring work in all industries is performed by the native Kaffirs, only skilled labor and work involving education and responsibility being done by white men. The natives as a rule do not speak English, a few of them can read and write, but they are, generally speaking, trustworthy and reliable in performing the tasks allotted to them if reasonable supervision is exercised. European wages are high, but the cost of living is also high. Probably the ratio between the two is much the same as exists in England today.

"A scheme has been prepared for providing free land for ex-soldiers desiring to settle in Rhodesia and possessing a little

capital. The prospect for them is very good. During the war Rhodesia probably suffered as little as any country. Food was plentiful. They had had no ration cards. As most of the exports were largely required for war purposes, a considerable stimulus was given to mining. Each month the railways carried to the port of Beira for export something like 5,000 tons of chrome ore, 2,500 tons of copper, 1,000 tons of asbestos, 1,000 tons of lead, etc., which was no doubt very useful in munition making. Then the country's grain supplies were also exported to England each year. When I left there were something like 50,000 tons of maize waiting for shipping, being the surplus from last season's harvest. Railway traveling in Rhodesia (as previously remarked) is far from being uncomfortable.

"All main line trains consist of modern corridor sleeping saloons, electrically lighted, each compartment containing a wash basin and most of the saloons a bathroom. Dining cars run on all the long-distance trains right up to the Belgian Congo and beyond. With regard to goods traffic I may say that practically the whole of the coal and ore traffic is carried in wagons of 38 tons capacity. and the smallest wagon carried 15 tons. The thing which impresses one most about the English railways after seeing them again after nearly nine years' absence is the diminutive wagons employed for goods traffic. I cannot imagine that any convenience attaching to their use can compensate for the enormous waste in haulage which they involve as compared with the big wagon."

Roumanian Railway Situation

[British Board of Trade Journal, Oct. 2, 1919.]

The Director General of Roumanian Railways made the following statement under date of August 18, 1919:

On November 12, 1918, at the time of the armistice, both in Wallachia and in Moldavia there were only 150 locomotives at the disposal of the Roumanian Government for the whole of the original Kingdom. In spite of this it was necessary to lose no time to arrange for the following transportation:

(1) Repatriation of more than 150,000 refugees, with their luggage, from Moldavia.

(2) Repatriation of the Roumanian Army, with all its munition depots and equipment.

(3) Redispatching, after reorganization, of the Roumanian Army of the Dneister, as well as that of the Theiss.

(4) Revictualling of the country with the cereals received from England and the United States at the ports of Constantza and Braila.

At the same time, it was necessary to busy ourselves from the first with reestablishing workshops to enable them to handle the repairs of locomotives and freight and passenger cars, tracks and bridges and station buildings and installations.

Need of Materials and of Credits.

One of the difficulties encountered in the repair of rolling stock was the absence of materials. All belting had been requisitioned. Luckily, however, a small amount of material was found in certain depots which the Germans had not had time to destroy. The workshops were started again in the month of December. The conditions of labor were miserable. Without clothes and food the morale was not conducive to hard work. But the most important cause of low output was the lack of materials. It was for this reason that the Government was obliged to stop piecework—the only means of controlling the work. It was impossible to establish rates for making any definite piece while the proper material was lacking, and it was necessary to employ other materials and to have recourse to methods invented locally for each piece. With coke and pig iron lacking, it is easy to imagine the output of the foundries.

The English mission at once realized the state of things and lost no time in arranging a credit of £500,000 for the materials that were urgently necessary. But this material could suffice only for two months, during which it was thought that Roumania, having obtained the desired help from the Allied Powers, would be able to put its rolling stock into condition again.

Unfortunately, the country is still awaiting other credits. To make matters worse, only a small quantity of the material promised has come to hand; scarcely 500 tons of the total of 2,000 has reached the workshops yet, or is in one of the Roumanian ports, or en route at the time of writing.

Condition of Rolling Stock.

In order to understand the condition of the locomotives it will suffice to say that since 1914 there have been no materials and that it was only by the interchange of parts at the expense of the rest of the locomotives that it has been possible to keep some going. The final limit has now been reached, however: 130 engines are still working but are momentarily in danger of falling to pieces. Since the armistice 280 engines have left the workshops to deal with the daily train kilometrage of 25,000 in the original Kingdom of Roumania. They would do more if it were not for the difficulties, in maintaining a good service due to the the destruction of the other installations such as telegraphs, which necessitates their stopping at every station, and by increasing the block length to the total distance between the stations. The destruction of the safety devices for the switches and signals, and, finally, the congestion of traffic, due to the insufficient number of trains, also promote delays. All these causes contribute not a little to the poor utilization of locomotives, without mentioning the low carlorific value of the coal from the Petroscani mines, especially for engines not adapted for coal burning.

Outside help has been insignificant. Sixty locomotives have been received from France, which have had to be put into workshops for assembling and for having the boiler tubes cleaned.

Conditions in Transylvania—Repairs to Tracks, Bridges, Stations, etc.

The railway system taken over from Hungary is none the better for having been used by the Germans and having been abandoned by the Hungarians. who took with them all they could.

Some difficulties have arisen from the union of three railway systems—Roumania, Austria, and Hungary—in Transylvania. The difficulties of different languages, different methods of working, etc., caused by the fusion of such different railway systems, will be apparent to any specialist, and their union will not be the work of a day.

The best proof of the activity of Roumanian engineers is the speed with which they have reestablished the railway tracks. Three months after the evacuation the train service was resumed on all Roumanian lines, with the exception of the two large bridges over the Danube and the Sereth. The rebuilding of these bridges is continuing.

The working is hindered greatly by the destruction of the safety apparatus, water installations, etc. Although of only secondary importance, they form together a sufficient cause of delay, and are the cause of the bad use of material. The state of the station building is the worst. Certain stations no longer exist. In this case, however, the authorities are not waiting for foreigners to help in the work, the materials for which can be found to a large degree in the country.

If the country can obtain credits for materials, the work of reconstruction would proceed rapidly. It will certainly be necessary to complete existing material with new cars and locomotives, unless these can be obtained from Hungary—i. e., the material belonging to the Transylvanian railways and that in which the Germans took from Roumania.

American Firms Offer to Establish Belgian Car Works

According to a despatch from Brussels, copyright by the Chicago Tribune, the Belgian Government has asked for offers for the building of railway rolling stock.

One offer has come from two American concerns, the despatch says, the Middleton Car Company and the American Car & Foundry Company, which combined efforts for the occasion. They offer to create on Belgian soil works for the construction of railway cars which would be installed on American lines. They would, however, employ exclusively Belgian labor; only the chiefs and the engineers would be Americans.

After the delivery of the ordered carriages this model factory would be put, free of charge, at the disposal of the Belgian State. It would constitute ideal repair workshops with a staff of 2,500 men, which would have gone through a five months "American training." The works would be connected by about eight miles of railroad.

The Middleton Car Company started in 1917 a model factory for the American Army in France at La Rochelle which has an output capacity of 110 railway carriages a day. The parts for the cars would come from the United States and would be put together in the Continental shops.

Commenting on the above despatch in New York, W. H. Woodin, president of the American Car & Foundry Company, said that such a plan had been considered while he was in Belgium recently, but that final action had not been determined and that consequently the matter had been dropped.

Equipment and Supplies

Locomotives

THE BOSTON & ALBANY is inquiring for 20 locomotives.

THE EL PASO SOUTHWESTERN is inquiring for 5 locomotives.

THE BINGHAM & GARFIELD is inquiring for 5 Mallet locomotives.

PERIN & MARSHALL, 2 Rector street, New York, have ordered 2 switching locomotives from the Baldwin Locomotive Works. These locomotives will weigh 58 tons on the drivers.

THE CENTRAL OF NEW JERSEY, reported in the *Railway Age* of November 19, as inquiring for 11 Mikado locomotives, has ordered this equipment from the American Locomotive Company.

Freight Cars

THE SEABOARD AIR LINE is inquiring for 2,000 fruit and vegetable cars.

THE HERF & FRERICHS CHEMICAL COMPANY, St. Louis, Mo., has ordered 8, 10,100 gal., 50-ton truck, tank cars from the Pennsylvania Tank Car Company.

THE LEVI SMITH REFINING COMPANY (Clarendon Refining Company), Clarendon, Pa., has ordered 3, 8,050 gal., 50-ton truck, tank cars from the Pennsylvania Tank Car Company.

PERIN & MARSHALL, 2 Rector street, New York, reported in the *Emergency Bulletin* of October 13 as inquiring for 80, 50-ton freight cars, including 50 flat cars, 20 coke and 10 self-dumping gondolas, has ordered this equipment from the National Steel Car Corporation, Hamilton, Ont.

Iron and Steel

THE GREAT NORTHERN RAILROAD COMPANY is inquiring for 2,160 tons of structural steel for bridges.

THE CHICAGO, BURLINGTON & QUINCY RAILROAD COMPANY is inquiring for 1,000 tons of structural steel for bridges.

The principal railroads have begun to place liberal orders for rails. An order for 250,000 tons is reported in the Chicago district on which rolling will be started at once, and in addition orders for between 100,000 and 150,000 tons have been tentatively placed. The Illinois Steel Company is said to have already begun rolling 40,000 tons for the Rock Island and the Union Pacific, 30,000 tons for the Great Northern, 12,000 tons for the Minneapolis, St. Paul & Sault Ste. Marie, 10,000 tons for the Chicago & Alton, 6,000 tons for the Chicago, Indianapolis & Louisville, and 5,000 tons for the Minneapolis & St. Louis. The Lackawanna Steel Company has orders for 15,000 tons for the Great Northern and 10,000 tons for the Northern Pacific. The Atchison, Topeka & Santa Fe will order shortly 70,000 tons; a part of the order will probably go to the Colorado Fuel & Iron Company. The Chicago, Milwaukee & St. Paul will order 20,000 tons. The Toledo, St. Louis & Western has bought 5,000 tons and the New York, Chicago & St. Louis is planning to order 7,500 tons.

Hotel System of Canadian Railway.—The Dominion Atlantic Railway, which runs through the district, connecting Yarmouth with Halifax, Nova Scotia, has purchased the Aberdeen Hotel at Kentville, Nova Scotia. Following the example of the Canadian Pacific Railway, the Dominion Atlantic Railway is planning to have its own system of hotels on its line. The Aberdeen is the second hotel acquired by the said railway during the present year. This hotel is very attractive and well situated. The Aberdeen will be operated the year around, and it is the purpose of the management to cater to general commercial interests as well as to tourist traffic. The other hotel is called the "Pines," and is located at Digby, Nova Scotia.—*Commerce Reports.*

Supply Trade News

The American Car & Foundry Company has begun to purchase approximately $200,000 worth of machine tool equipment.

E. E. Griest has been appointed general superintendent of the **Chicago Railway Equipment Company**, Chicago, effective January 2.

Edward D. Kilburn, who since March 16, 1917, has been New York district manager of the Westinghouse Electric & Manufacturing Company, was recently elected vice-president and general manager of the **Westinghouse Electric International Company**, New York, which was formed in the spring of 1919 to succeed the Westinghouse Electric Export Company. It handles the Westinghouse foreign business and is world-wide in its scope. Mr. Kilburn was graduated from Cornell University, and immediately after leaving college entered the employ of the Westinghouse Electric & Manufacturing Company, for a number of years being located at the Syracuse office of the company. Subsequently, he was transferred to the Westinghouse Machine Company, with headquarters at New Haven, Conn. In 1915 he returned to the Electric Company as manager of the power division of the New York office. A year later he was also made manager of the railway and lighting divisions, subsequently becoming manager of the office. **Maurice Coster**, who has been actively engaged for more than 30 years in handling the foreign interests of the Westinghouse Company, continues as vice-president of the International Company, with advisory duties.

E. D. Kilburn

J. H. Coley, sales manager of the **George D. Whitcomb Company**, Rochelle, Ill., has resigned after seven years' service to engage in other business.

The Cleveland Twist Drill Company has purchased a 17-acre factory site on the eastern outskirts of Cleveland, Ohio, to provide for factory enlargements it expects to make in the near future.

Stone & Webster, Boston, Mass., with offices also at New York and Chicago, announce that Frederick P. Royce, George O. Muhlfeld, Henry B. Sawyer, Frederick S. Pratt, Harry H. Hunt and Howard L. Rogers became partners in the firm of Stone & Webster, effective January 1.

The General American Tank Car Company, Chicago, will build a plant on the Mississippi river, a short distance above New Orleans, La., to cost $1,000,000. The new plant will include a machine shop and steel foundry for the manufacture of tank cars, gondolas, flat cars, etc.

John S. Worley, former member of the Engineering Board of the Bureau of Valuation of the Interstate Commission, in charge of the western district with headquarters at Kansas City, Mo., whose resignation from the latter body was announced in the *Railway Age* of November 21, 1919, has become a member of the firm of Thompson & Black, valuation engineers, New York City.

On January 1 all of the sales and contracting business that has for many years been carried by the **General Fire Extinguisher Company** was taken over by the **Grinnell Company, Inc.**, Providence, R. I.

J. F. Comee, formerly associated with the Camel Company, as representative at Chicago, has been appointed manager of sales, with headquarters at Chicago, for the **Hutchins Car Roofing Company**, Detroit, Mich.

John C. Barber, founder and president of the Standard Car Truck Company, Chicago, and inventor of over 75 railway truck appliances, died in Los Angeles, Cal., on December 27, 1919. He was the inventor of a device for limited lateral play in railway trucks which has been applied to about 20 per cent of the freight cars of the country. Mr. Barber was born in St. Lawrence county, New York, on December 12, 1844. In September, 1861, he enlisted in a Wisconsin regiment and served throughout the Civil war. In 1865, he began his railway career with the Chicago & North Western in its locomotive and car building department at Fond du Lac, Wis., filling various positions there for six years. He then became connected with the mechanical department of the Northern Pacific shops at St. Paul, Minn., and in 1873, was appointed superintendent of the car department of the Missouri, Kansas & Texas, with headquarters at Sedalia, Mo. From 1883 to 1885 he was superintendent of the Rio Grande division of the Texas & Pacific, with office at Fort Worth, Tex. From the latter date until he resigned to market his inventions, in 1896, he was in charge of the car department of the Northern Pacific at St. Paul, Minn. It was while serving in this latter capacity that he perfected his invention for lateral roller motion trucks. In 1898 he organized the Standard Car Truck Company, and of this organization he retained the presidency until his death.

J. C. Barber

The site and buildings occupied by the Symington Chicago Corp., at West 74th street and South Ashland avenue, Chicago, have been purchased by the United States Government for $235,000 and will form part of the arsenal system of the government.

The Duntley-Dayton Company, Chicago, manufacturers of pneumatic and electric tools, has changed its name to The Duntley Pneumatic Tool Company. There is no change of officers of the company, the change in corporate title having been for business reasons.

The Western Electric Company, New York, announces that assignments have been made to handle steamship and steam railroad business as follows: E. R. Morgan, at Boston, for New England territory; Wm. Lancaster, Richmond, Va., for Virginia and North Carolina, and R. D. Eves, at Cincinnati for Kentucky, Tennessee, southern Indiana, southern Ohio and the western part of West Virginia.

James H. Grose, Youngstown (Pa.) district manager of the **Carnegie Steel Company,** Pittsburgh, Pa., has been elected a member of the board of directors of the **Brier Hill Steel Company,** Youngstown, Ohio, succeeding **W. A. Thomas,** who has resigned, effective January 27, 1920. **I. Lamont Hughes** has been appointed to succeed Mr. Grose as district manager of the **Carnegie Steel Company.**

R. B. Jones and **E. E. Hart,** both formerly of the Dale-Brewster Machinery Company, Inc., Chicago, have resigned and organized the **Industrial & Railroad Supply Company,** with headquarters at 114 North Desplaines street, Chicago.

Paul E. Carter was appointed on January 1, 1920, resident manager of the Eastern district, with headquarters at 30 Church street, New York City, of the **General Railway Signal Company,** Rochester, N. Y., to succeed F. H. Jones, who has resigned to go into other business. With the exception of a year spent in the signal department of the New York Central at New York, and two years in the Corps of Engineers, United States Army, Mr. Carter has been continuously in the employ of the General Railway Signal Company since the time of his graduation in 1908, from the Rensselaer Polytechnic Institute. After some time spent on outside construction, he was successively employed in the Rochester factory testing department and the commercial engineering, advertising and engineering departments of the main office of the General Railway Signal Company at Rochester. In 1913, he was appointed resident engineer with headquarters at the New York office and early in 1917 was transferred to the sales department. Mr. Carter enlisted in the Officers Training Corps in May, 1917, returning from France as captain, Transportation Corps, in the summer of 1919. He shortly thereafter re-entered the employ of the General Railway Signal Company as sales engineer in its New York office, which position he held until his appointment on January 1, noted above.

P. E. Carter

Major J. L. Hays has been appointed electrical engineer of the Stone Franklin Company, with office at 18 East Forty-first street, New York City. Major Hays has a wide experience in electrical engineering problems, particularly as regards electrical car lighting. He was graduated from Lehigh University in 1909, with the degree of electrical engineer. Upon graduation he joined the electrical department staff of the Baltimore & Ohio and worked successively as mechanic, draftsman, inspector, general foreman and assistant engineer. From the Baltimore & Ohio he went to the Seaboard Air Line as electrical engineer and when war was declared with Germany he was commissioned as major in the Quartermasters Corps and was the officer in charge of the electrical section of the engineering branch, responsible for electrical construction for the army in the United States.

J. L. Hays

F. C. Thornley & Co., Inc., constructing and consulting engineers, recently organized with temporary headquarters at 18 West Thirty-eighth street, has opened permanent offices

at 31 West Forty-third street, New York. This company specializes in mechanical labor saving systems and is prepared to design, construct and organize for operation, installations for the economical handling of materials. As specialists in solving fuel problems the organization is also prepared to design, construct and organize for operation, locomotive coaling stations, transfer terminals, distributing yards and industrial plants. The company will also act as constructing and consulting engineers in the carrying out of large undertakings and difficult projects and make engineering and financial reports and appraisals.

S. F. Bowser & Company, Inc., have extensive plans under consideration for expansion during the coming year. The company plans the erection of a warehouse and office building at Dallas, Tex., and the organization of a subsidiary corporation to be known as **S. F. Bowser & Company of Texas,** for the sale of the Bowser products throughout that state and adjacent territory. **E. P. Murray,** formerly assistant general sales manager with headquarters at Chicago, will assume the management of the new company at Dallas. During the war the company closed its branch offices at Denver, Colo., Memphis, Tenn., and St. Louis, Mo. These offices will be re-established and a staff of managers and assistants have already been assigned. **A. S. Bowser,** assistant to the treasurer, with headquarters at Fort Wayne, Ind., has been appointed manager of the Denver office. **B. L. Prince,** who has been district manager of the Dallas office, has been transferred to the Memphis office. **Willard D. Smith,** connected with the sales department, has been appointed manager of the St. Louis office. A new district office will be established at Detroit, Mich., and **L. E. Porter,** assistant district manager at Fort Wayne, Ind., has been appointed district manager of the new Detroit office.

Arthur A. Frank, in charge of the western territory of the **Standard Railway Equipment Company,** New Kensington, Pa., with office at Chicago, has been elected president of the company. Mr. Frank was born at St. Louis, Mo. For a number of years he was connected with the transportation and mechanical departments of the Missouri Pacific. In 1911 he entered the supply trade field as secretary to the president of the T. H. Murphy Company, New Kensington, Pa., and later was promoted to the position of factory manager. In 1914 he was appointed sales agent of the Standard Railway Equipment Company in charge of the southwestern territory, with office in St. Louis, Mo. In July, 1918, he was transferred to Chicago in charge of the entire western territory, which position he retained until his recent election as president. In addition to the presidency of the Standard Railway Equipment Company he will retain his office as vice-president of the Pressed Steel Manufacturing Company, the Imperial Appliance Company and the Union Metal Products Company.

A. A. Frank

The Locomotive Terminal Equipment Association, Inc., has recently been organized by a group of manufacturers and dealers in equipment for use in locomotive terminals, for the purpose of studying the needs for improvement in locomotive terminals in order to secure quicker handling, repairing and turning of locomotives. In the distribution of such data as is developed from the surveys made or from other sources, a policy of impartiality is to be followed and no special advantage is to accrue to any individual firm or corporation that may be a member of the association. The officers are: President, William R. Toppan, manager railroad department, William Graver Tank Works; vice-president and secretary, Bruce V. Crandall; treasurer, John S. Maurer, secretary and treasurer, National Boiler Washing Company; general counsel, Frank J. Loesch. The board of directors consists of the following seven members: William R. Toppan, Bruce V. Crandall, Spencer Otis, president, National Boiler Washing Company; William Robertson, William Robertson & Co.; Frank W. Miller, president, F. W. Miller Heating Company; Robert A. Ogle, president, Ogle Construction Company, and Norman S. Lawrence, vice-president and assistant sales manager, Whiting Foundry Equipment Company. The association has headquarters at the office of the secretary, room 1824, Lytton building, Chicago.

The Westinghouse Air Brake Company, Pittsburgh, Pa., has created an export department to provide facilities adequate to handle the increasing export business and to develop its foreign trade to a greater extent than has been heretofore possible, with headquarters in the Westinghouse Building, Pittsburgh, Pa. **E. A. Craig** is export manager of the new department. He has been associated with the Westinghouse Air Brake Company for 32 years, beginning his career with that company in 1888. In 1905 he was appointed auditor and assistant secretary and in 1906 was made southeastern manager of the company. This department will be represented in the New York office by **W. G. Kaylor,** and in South America by **R. M. Oates.** The Westinghouse Air Brake Company controls the following foreign companies: The Compagnie des Freins Westinghouse, Sevran, France; the Compagnia Italiana Westinghouse dei Freni, Turin, Italy; the Westinghouse Brake Company of Australasia, Ltd., Concord West, New South Wales, Australia; the Westinghouse Eisenbahn Bremsen Gesellschaft, Hanover, Germany; the Societe Anonyme Westinghouse, Petrograd, Russia; and the Westinghouse Brake Company, Ltd., of London, England, represented in China by Jardine, Matheson & Co., Ltd., Shanghai; in Denmark and Sweden by Frants Alling, Puggaardsgade 4, Copenhagen; in Holland by Valliant & Sluyterman, Noordeinde 18a, The Hague; in Japan by Sale & Frazar, Ltd., Yaesu Cho, Tokyo; in Norway by "Vulkan," Jernstoberi and mek. Vaerksted, Christiana, and in South Africa by Bellamy & Lambie, 621 Consolidated buildings, Johannesburg.

E. A. Craig

Trade Publications

LINK-BELT ELEVATORS AND CONVEYORS.—The Link-Belt Company, Chicago, Ill., has recently issued a catalogue of 108 pages known as Book No. 375, devoted to the labor saving elevators and conveyors manufactured by this company. It is profusely illustrated, showing the different types manufactured and the various ways in which they can be utilized in handling bags, barrels, boxes, hay, lumber, miscellaneous freight, machinery, etc.

TANK FRAME LOCOMOTIVES.—In Record No. 94 the Baldwin Locomotive Works describes tank frame locomotives for narrow gage railways. These locomotives have been designed for operation on rough tracks and sharp curves and are particularly suitable for industrial, contractors' and other classes of special service. Illustrations of a number of locomotives of this type built by the Baldwin Locomotive Works are contained in the booklet, with tables showing their general dimensions.

Railway Financial News

ATLANTIC NORTHERN.—This railway is to move its headquarters from Atlantic, Iowa, to Kimballton, according to an order issued after a recent meeting of the board of directors of the company. At the same time it was decided to reorganize the company and action was taken looking to a new bond issue. It is planned to pay off the first mortgage bonds and it is expected to have left a fund of $11,000 as a working capital for the road.

BOSTON & MAINE.—In an editorial commenting on the Boston & Maine reorganization in the November 28 issue of the *Railway Age*, it was said that the increase in rates to go into effect in 1920 would add nearly $8,000,000 to the revenues of the Boston & Maine. This should have read $1,000,000.

CANADIAN NORTHERN.—William A. Read & Co. are offering an issue of $7,500,000 equipment trust 6 per cent gold certificates, due 1920 to 1929, at prices to yield from 6¼ to 6½ per cent, depending on maturity date. The issue is due in twenty semi-annual installments of $375,000 each, the first being due June 1, 1920, and the last December 1, 1929.

CANADIAN PACIFIC.—Honorary Col. Sir John Craig Eaton, president of the T. Eaton Company, Ltd., Toronto, Canada, has been appointed a director.

GRAND TRUNK PACIFIC.—W. P. Hinton, vice-president and general manager of this company with office at Winnipeg, Man., has been elected a director.

OAKLAND-ANTIOCH.—In an amended application filed by the reorganization Committee of the Oakland-Antioch Railway, the Railroad Commission of California is asked to further modify its previous orders so that the bondholders of the Oakland, Antioch & Eastern, the Oakland & Antioch and the San Ramon Valley may exchange their bonds for common and preferred stock of the new Oakland-Antioch Company. In exchange for such bonds, they are to receive 7 per cent preferred stock in an amount equal to 20 per cent of the bonds deposited under the reorganization plan and common stock in an amount equal to 100 per cent of the bonds so deposited. The reorganization committee further asks that the new company be permitted to issue approximately $6,550,000 of common stock and $1,330,000 of preferred stock, making a total issue of $7,880,000. In addition, the commission is asked to authorize the new company to execute a mortgage securing the payment of $3,000,000 of bonds and permit the new company to issue forthwith under such mortgage not to exceed $900,000 of 6 per cent serial bonds for the purpose of securing money necessary to pay off prior liens and non-assenting bondholders, provide working capital, pay such reorganization expenses as may not be paid otherwise and to pay cost of extensions, additions and betterments. The $900,000 of bonds, if issued, will constitute a first lien upon the properties now owned by the Oakland, Antioch & Eastern, the Oakland & Antioch and the San Ramon Valley.

SAN DIEGO & ARIZONA.—Conditions due to the war and the increased cost of labor and materials has added $710,912 to the cost of constructing this road, according to the Railroad Commission of California, in an opinion issued recently in connection with an order allowing the San Diego & Arizona to issue bonds to meet the additional expense. The bonds will be taken at par by the Southern Pacific, which advanced the money to meet demands of contractors and builders in order that construction work could go on. Previous orders issued by the commission provided for the issuance of $5,826,800 of preferred stock and $7,289,088 of bonds to the Southern Pacific, and John D. and A. B. Spreckels to reimburse them for money advanced for the road's construction.

SOUTHERN PACIFIC.—William Sproule has been elected a director to succeed Paul Shoup, resigned.

Railway Officers

Railroad Administration

Operating

M. J. Ruland, trainmaster on the Denver & Rio Grande at Provo, Utah, has been transferred to the Green River division, and is located at Soldier Summit, Utah.

W. H. Smith, assistant superintendent of the Los Angeles & Salt Lake at Salt Lake City, Utah, has been promoted to superintendent, succeeding **H. E. Van Housen,** retired.

F. S. DeVeny, assistant road foreman of engines of the Baltimore & Ohio, Chicago Terminal, has been promoted to trainmaster, with headquarters at Chicago, succeeding **J. W. Dacy,** deceased.

J. L. Close, superintendent of the Great Northern at Whitefish, Mont., has been transferred to the Harve division, succeeding **T. J. Dixon,** recently appointed acting superintendent at Great Falls, Mont., and now assigned to other duties.

E. F. Rummell, paymaster on the Chicago, Milwaukee & St. Paul, with office at Minneapolis, Minn., has been appointed acting superintendent of the Twin City terminals, succeeding **G. A. Van Dyke,** who has been assigned to other duties.

G. M. Mergen has been appointed acting trainmaster of the Salt Lake division of the Southern Pacific, with headquarters at Mina, Nev., with jurisdiction over the Mina subdivision, succeeding **V. S. Andrus,** who has been temporarily assigned to other duties.

C. L. Whiting, superintendent of the Northern Montana division of the Chicago, Milwaukee & St. Paul, with office at Lewistown, Mont., has been transferred to the Trans-Missouri division, with headquarters at Mobridge, S. D., succeeding **A. E. Campbell,** who has resigned.

Executive, Financial, Legal and Accounting

L. E. Katzenbach, federal treasurer of the Great Northern, with headquarters at St. Paul, Minn., has resigned. No successor will be named during the remaining term of government control.

B. W. Scandrett, general attorney of the Great Northern at St. Paul, Minn., has been appointed assistant general solicitor, succeeding **D. F. Lyons,** appointed general solicitor as the successor of Charles Donnelly, notice of whose new appointment appeared in the *Railway Age* Emergency Bulletin of October 13.

A. G. Wells, general manager of the Achison, Topeka & Santa Fe, Coast Lines, with headquarters at Los Angeles, Cal., has been promoted to federal manager of the Atchison, Topeka & Santa Fe, the Panhandle & Santa Fe, the Rio Grande, El Paso & Santa Fe, the Grand Canyon, the Kansas Southwestern, and the Atchison Union Depot and Railroads, with office at Chicago, succeeding **W. B. Storey,** whose election to the presidency of the Atchison, Topeka & Santa Fe was announced in the *Railway Age* of November 23 (issued December 10). **I. L. Hibbard,** assistant general manager at Los Angeles, has been promoted to general manager, succeeding Mr. Wells, and **J. R. Hitchcock,** superintendent on the Los Angeles division, with headquarters at Los Angeles, has been promoted to assistant general manager, succeeding Mr. Hibbard. **R. H. Tuttle,** superintendent of the New Mexico division, with headquarters at Winslow, Ariz., has been transferred to the Los Angeles division, succeeding Mr. Hitchcock, and **William Mathie,** trainmaster at Winslow, has been promoted to the position of superintendent, succeeding Mr. Tuttle.

Corporate

Executive, Financial, Legal and Accounting

William Sproule has resigned as district director of the Central Western region, with headquarters at San Francisco, Cal., to resume the position he held prior to the war as president of the Southern Pacific. **C. J. McDonald,** assistant district director at San Francisco, has been promoted to district director, succeeding Mr. Sproule.

Martin P. Blauvelt, whose resignation as assistant regional director of the Allegheny region was announced in the *Railway Age* dated October 10, and issued November 26 (page 762), has been elected vice-president in charge of the accounting and finance departments of the Illinois Central, with office at Chicago. Mr. Blauvelt was born at Suffern, N. Y., on February 25,, 1865, and was educated at Goshen Collegiate Institute. He entered railway service in 1885 as a clerk in the freight office of the Delaware, Lackawanna & Western, at Hoboken, N. J. On October 6, 1887, he became connected with the New York, Lake Erie & Western as a clerk in the office of the auditor of traffic. 1891 he was promoted to clerk in the office of the third vice-president and auditor. From January, 1893 to February, 1896, he was general bookkeeper and from the latter date until 1910 was consecutively chief clerk in the accounting department, assistant auditor, auditor and comptroller. In 1910 he was appointed comtroller of the Illinois Central, with headquarters at Chicago, a position which he held until July, 1917, when he resigned to become comtroller of the Lehigh Valley with headquarters at New York City. This position he retained until 1918, when he was appointed assistant to the regional director of the Allegheny region.

M. P. Blauvelt

Gerritt Fort, assistant director of the division of traffic of the Railroad Administration in charge of passenger traffic with headquarters at Washington, D. C., has resigned to become vice-president in charge of traffic of the Boston & Maine. Previous to federal control Mr. Fort was passenger traffic manager of the Union Pacific.

Traffic

J. T. Livsey has been appointed freight claim agent of the Savannah & Atlanta, with headquarters at Savannah, Ga.

Engineering and Rolling Stock

Lieutenant-Colonel B. Ripley has been appointed district engineer of the Ontario district of the Canadian Pacific, with headquarters at Toronto, Ont., succeeding **A. L. Hertzberg,** who has retired.

G. W. Bourne, traveling engineer and trainmaster on the Denver & Rio Grande, with headquarters at Helper, Utah, has been transferred to the Green River division, with office at Soldier Summit, Utah. **C. H. Wilcken** has been appointed to succeed Mr. Bourne at Helper.

Obituary

W. H. Norris, attorney for the Chicago, Milwaukee & St. Paul, with office at Minneapolis, Minn., died in that city on November 16, at the age of 87 years.

Charles H. Wiseman, division passenger agent on the Baltimore & Ohio, Western Lines, with headquarters at Cincinnati, Ohio, died in that city on December 11, at the age of 59 years.

George M. Brush, father of Mathew C. Brush, president of the American International Ship Building Corp., and prominent in the development of railroads in Minnesota, died at Philadelphia, Pa., on January 3, at the age of 74 years.

Frederick T. Fearey, organizer of the **Continuous Rail Joint Company,** New York, who served as president of that company and its successor, the Rail Joint Company, until his retirement about two years ago, died on January 5 at his home in New York.

Colonel Julian E. Buckbee, for many years prior to his retirement on a pension in 1910, chief clerk in the land commissioner's office of the Chicago & North Western, with office at Chicago, died at Hermosa Beach, Cal., on December 29, at the age of 75 years.

William W. Thompson, formerly and for many years treasurer of the Louisville & Nashville, died at his home in Louisville, Ky., on January 6, at the age of 73. Mr. Thompson was connected with the Louisville & Nashville for nearly half a century, having begun as a contractor for the construction of a short section of the road between LaGrange and Cincinnati. In 1867 he was appointed paymaster, and later treasurer.

John P. O'Donnell, M. I. C. E., of London, England, died early in December, at the age of 61. Mr. O'Donnell was a well-known signal engineer and manufacturer, and formerly had connections in the United States. He was formerly for several years in the service of the London & South Western, and had charge of important signal work on that road. He was chairman and managing director of the British Pneumatic Railway Signal Company, and installed the first automatic block signals in Great Britain, those on the London & South Western, between Grateley and Andover.

Joseph M. Denyven, general freight agent of the Mobile & Ohio, whose sudden death was announced in the *Railway Age* of December 26 (page 1268), was born in Dorchester, Mass., June 20, 1863, and began railroad work at the age of nineteen as clerk in the auditor's office of the Missouri Pacific. Mr. Denyven remained with the Missouri Pacific for four years, resigning to become rate clerk of the Mobile & Ohio, which position he held until 1888, when he was promoted to chief clerk in the general freight office. From December, 1890, to April 1905, he was assistant general freight agent and from that date until his death filled the position mentioned above.

Photo from International

The Railway Station in the Town Where the Czar Was Said to Be Assassinated

EDITORIAL

Railway Age

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Allocation of Operating Expenses

Effective January 1, 1920, Class I railroads are required to make an arbitrary assignment of all operating expenses which pertain to freight and passenger service to one or the other of these services. Heretofore, only such expenses as were directly assignable were required to be so assigned. The whole trend of the Commission's system of accounts has been towards rules which would make available the cost of moving a ton one mile and the cost of moving a passenger one mile. The present order is the necesary final step toward that goal. Many railroad accounting officers have steadfastly and conscientiously opposed this step on the grounds that it is based on an arbitrary assumption and is not therefore a legitimate function of sound accounting. Theoretically the objection can be sustained, but practically it is a question as to whether the arbitrary allocation of expenses cannot be made to serve some useful purpose. The separation of maintenance of way expenses which presents the chief difficulties is in general based on the cost of coal consumed in the two classes of service. The detailed rules prescribed may be reserved for further discussion, but the fuel basis of division appears to be as logical as any method so far suggested. Railroad operation, service and management will be the subjects of popular and political discussion for some time to come. A logical attempt at separating the expenses of freight and passenger service should be of value as material in this discussion.

The Railways of Cuba

The *Railway Age* presents on another page of this issue the first of a series of articles on the railways of Latin America, written by John P. Risque, a representative of the editorial staff of this paper, who is now traveling through South America for that purpose. The article in question, entitled "Cuba's Main Line Railways Are Well Developed," although the first written on the trip, is not the first Mr. Risque has written for the paper, for it follows the article entitled "Cuba's Sugar Cane Railways a Large Market," which was written before Mr. Risque left New York, and which appeared in three parts in the delayed issues of the *Railway Age* of October 17, 24 and 31, respectively. Mr. Risque has been in American railway service, and was at one time employed on the Mexican Central. Later he served as mechnical engineer of the United Railways of Havana and more recently in the railway department of the Cuban American Sugar Company, so that his fitness for observing railway conditions in Latin America will readily be realized. In the present series of articles, which eventually will have covered all the important railway systems of Central and South America, he will afford the readers of the *Railway Age* an opportunity to get an idea of these railways such as can only be obtained by the "man on the ground" who observes conditions from a practical and American point of view. The difficulty of securing information on the railways of a foreign country, particularly insofar as it concerns the details the supply man must have, is that it must usually be gleaned from statistics or from descriptions almost always written from a theoretical angle or by a man who writes for popular interest only. Frank Rhea's two reports on the markets for American railway supplies in Australia and the Far East, written for the Bureau of Foreign and Domestic Commerce, are, of course, notable exceptions. Mr. Risque's previous article on Cuba's cane railways, as well as the present article on Cuba's main line railways, show that he will be able to observe with a practical viewpoint and get out of his trip that detailed information which otherwise would be almost unobtainable. The *Railway Age* feels sure that his articles will be read with no small amount of interest, and hope that they will prove of real service to the readers of the paper, particularly to those who are making plans to cultivate the large market for railway supplies which Latin America presents.

Savings by Short-Routing Freight

Before and immediately after government control of railroads was adopted, claims were advanced regarding enormous savings which could and would be made under unified operations by moving freight traffic over the shortest available routes. There had been great waste under competitive private operation, it was alleged, because it had resulted in large amounts of traffic being handled by round-about routes. Even after government operation was adopted the Railroad Administration gave out alluring statements regarding the amount of freight which had been sent over shorter routes than would have been used under private operation, and the millions of dollars that had been saved.

The *Railway Age* expressed skepticism regarding the results which would be obtained by this "short-routing" campaign, because it was our impression that the amount of unnecessary roundabout routing was greatly exaggerated. What were the actual results of the short-routing campaign? The best test is the effect produced upon the average haul per ton of all the freight carried in 1918. The statistics of the Interstate Commerce Commission disclose that the average haul per ton in 1918 was the longest ever known, being 175.54 miles, as compared with 173.77 miles in 1917. Under unified operation and the "short-routing" campaign the average haul per ton actually increased. Of course, this was not due to unified operation. It was due to the economic laws which for some years have been causing the average haul to increase, and on the operation of which the Railroad Administration exerted no perceptible influence. When it is shown that the average haul actually increased it is necessarily shown that the large savings which have been claimed for short routing have been imaginary, or so small as to be not worth considering. Thus is punctured another of the many bubbles which the advocates of government ownership and operation have blown.

The fact that the average haul per ton increased, not only in spite of unified operation, but in spite of the largest advance in freight rates ever made, also shows that the advance in rates had no perceptible effect upon the movement of traffic. Some persons now argue that no further advance in rates should be made, because it would restrict the movement of traffic, and even make it impossible for some kinds of traffic to move. In view of the fact that the averag[illegible] increased in 1918 in spite of the advances in freigh[illegible]

such arguments cannot be given much weight. The effect of an advance in freight rates upon the movement of commodities depends largely upon the relationship of the amount of the rates charged to the value of the commodities. Since the average value of commodities of all kinds has increased at least three times as much in proportion in the last five years as the freight rates charged, it follows that a still further and large advance in rates could be made without affecting the movement of commodities.

One Reason for Intensive Development

FOLLOWING THE PASSAGE of the Adamson bill in 1916, the railroads were forced to submit to a virtual increase in the hourly rates paid to engine and train crews in freight train operation, and as a consequence there was a definite incentive to undertake such changes in operating arrangements as would tend to speed up the movement of traffic. But, while there was a disposition to do this under the influence of that insidious piece of legislation, there is now a positive necessity for it under the operation of Supplements 24 and 25 to General Order No. 27, of the Railroad Administration, granting time and one-half for overtime to train and enginemen in all classes of freight and transfer service. Attention has been called to this most emphatically by R. H. Aishton, regional director of the Northwestern region, in Circular No. 95, published elsewhere in this issue, and in which he proposes a number of practical rules for the operation of trains, organization of the personnel and improvement of facilities tending to expedite train movement. Mr. Aishton is president of the American Railroad Association, and one of the ablest railroad operating men in the United States, and therefore his instruction on this subject merit special study.

Special attention is directed to the recommendation covering additions and improvements to the physical property that would tend to overcome delays such as those incurred in the movement of engines in and out of engine terminals, the delivery of engines to their trains, the charging and testing of train air brakes, the making-up of solid through trains, the meeting and passing of trains on the line, the dispatching of trains out of yards and the clearing of the main line by trains when arriving at terminals.

This list and the suggestions for improving conditions are worth careful study and their tentative application to the conditions at any given terminal or engine district is certain to show opportunities for extensive improvements, to be made solely to reduce delays or dead time in train movement. Probably, chief among these would be projects for new passing tracks and extensions of existing ones, extensions to yard tracks and the construction of approach leads to yards. While such improvements do not appear very large when considered from the stanpoint of the individual instance, when contemplated in the aggregate they assume formidable proportions. At the same time it must be remembered that these additions to facilities concern only such as will expedite the departure and arrival of trains at terminals and reduce the interference of trains with each other on the line. None of these suggestions covers considerations relating to the economical and expeditious operation of the yard itself. In other words, a careful study of any *single* phase of the relation of effective conduct of transportation to existing facilities is sure to demonstrate very quickly how great the need for the intensive development of the railroad plant.

One of the most important recommendations made by Mr. Aishton is that in reference to the employment of more trainmasters for the purpose of increased supervision. The study of methods for preventing unnecessary delays to trains and the enforcement of the rules adopted for this purpose, will require the work of additional operating officers, and they should be men of initiative and ability of a high order.

The Automatic Train Control Committee Report

THE REPORT of the Automatic Train Control Committee submitted to W. T. Tyler, director of the Division of Operation, United States Railroad Administration, and abstracted elsewhere in this issue is deserving of careful study by all operating officers. Automatic train control has been advocated by the press and public for a number of years, the agitation being received after the recurrence of each bad collision. However, the need for some device of this character is gradually being recognized by railroad officers and the last year has perhaps witnessed a greater change in sentiment on this subject than any previous year.

As had been advocated editorially in the *Railway Age* in the past, any form of automatic train control should be considered as an adjunct to the block signal system. If it was possible to compel obedience to signal indications or were they always seen and observed, the necessity for automatic train control would not exist, since it may well be called the connecting link between the signal system and the train. But when accidents, such as those at Mount Union, Ivanhoe and South Byron occur on roads which are protected by up-to-date block signal systems, the necessity for some device to act when the engineman fails seems to become apparent. This condition is recognized in the conclusion reached by the committee in which it says, "That on lines of heavy traffic, fully equipped with automatic block signals, the use of train control devices is desirable."

The committee may well be congratulated upon the thoroughness and completeness with which it went into this subject. The committee states that "The installation of automatic train control appears feasible * * * to protect trains moving with the established direction of traffic on main tracks, but it is doubtful if a device can be developed to protect all movements in the large terminals without restricting train movements to a prohibitive degree. The necessity for automatic train control must be developed in each individual case." However, the majority of accidents have occurred to trains moving with the "established direction of traffic" and at points outside of the large terminal districts where the trains must of necessity be more or less under control.

As the committee states, automatic or manual block signals, as the conditions may warrant, should be installed on lines before installations of automatic train control are made. It is a logical conclusion that automatic train control should first be installed on those roads which are at present completely signaled and that such installations should later be extended as conditions may warrant. The success of such a system can only be established after tests have been conducted upon a large enough scale and under all weather conditions to demonstrate its feasibility thoroughly and to allow for proper development to take place. This, as in the case with the automatic signal system, cannot be accomplished in a day. At first such installations should not be made in congested districts, but in the open country and from the studies made from the efficiency tests at such points systems may be developed to meet the more severe conditions of operation in terminal territory. It is to be hoped that the near future will see trial installations made by progressive railway managements on such lines as are at present completely block signaled, and that a permanent committee may be appointed to function during

the remaining period of federal control and afterward as a part of the American Railroad Association, as this is one of the important matters before the railroad managements today.

The Division of Surplus Earnings

IT HAS BECOME universally recognized by students of the railroad problem that the most important question to be settled in the solution of that problem is the question of what rule shall be applied in determining how entire schedules of rates shall be made. Formerly the most important question regarding rate regulation was that of unfair discriminations between shippers and communities. After fourteen years of regulation under the Hepburn act, the question of unfair discriminations has been so far settled that the problem of rate regulation has become chiefly that of how rates must be fixed in order to enable the railways to earn a net return no smaller and no larger than the public welfare requires that they shall be allowed to earn.

Out of this question of what net return the railways should in the public interest be allowed to earn, has risen the further question of whether, if the rates are made high enough to yield the railways as a whole a reasonable net return, and the result is to enable some railway companies to earn more than they seem actually to need, there shall be taken away from these individual railways part of their surplus earnings to be used either by the government for its own purposes or improve the transportation situation as a whole.

The Cummins bill provides that the railways for rate-making purposes shall be divided into groups. Each group shall be allowed to earn an average of 5½ per cent on the combined valuation of all the railways in the group, which may be increased to 6 per cent in the discretion of the Interstate Commerce Commission. If any individual railway earns more than 6 per cent in any year one-half of the excess between 6 and 7 per cent must be put into a general railroad contingent fund and one-half into a reserve fund maintained for the carrier itself. Of any excess earned above 7 per cent one-quarter must be paid into the carriers' reserve fund and three-quarters into the general railroad contingent fund. After an individual carrier has built its own reserve fund up to 5 per cent it must turn into the general railroad contingent fund two-thirds of all its earnings over 6 per cent and may use the remaining one-third for its own purposes. The general railroad contingent fund would be used to make loans to railways that could not raise money on their own credit or to buy equipment to be leased to carriers that could not buy equipment on their own credit.

Over these provisions of Section 6 of the Cummins bill there has arisen an interesting struggle. It is not a struggle between different classes. There are financiers, business men, shippers and railway executives who are opposed to these provisions, and there are financiers, business men, shippers and railway executives who are in favor of it.

The attitude of the railway executives is, of course, of special interest. It has been charged in the propaganda of the Plumb Plan League and other anti-railroad organizations all over the country, that the railway executives are trying to get enacted into law a provision that the railways must be allowed to earn an average of 6 per cent upon the book cost of road and equipment. This assertion is entirely incorrect. While all of the heads of the railroad corporations are in favor of legislation specifically requiring the regulating authorities to so regulate rates as to enable the railways to raise enough capital adequately to develop their facilities, a majority of them are opposed to any provision fixing the average return that the railways shall be allowed to earn either on their valuation, or property investment, or capitalization. Furthermore, a majority of them are strongly opposed to any provisions such as those of the Cummins bill under which most of the surplus earnings of individual roads over 6 per cent would be taken from them and used for governmental or general transportation purposes. On the other hand, there is an energetic minority of railway executives who are in favor of some such provisions as those of the Cummins bill, although practically all of them agree that under the Cummins bill too large a part of the surplus earnings of the more prosperous railways would be taken from them.

Doubtless the public and many members of Congress have been puzzled by the widely different policies which have been advocated by the National Association of Railway Security Owners on the one side, and the Association of Railway Executives on the other, and by the differences of opinion which have risen even among the heads of the corporations, who represent primarily the stockholders, while, of course, the National Association of Security Owners represents primarily the bondholders. The differences of opinion between the railway executives are, however, easy to explain.

For various reasons the financial positions of the various railroad companies differ widely. There are some whose capitalizations and the ratio of whose expenses to their earnings are so low that, even when the railways as a whole have earned only between 4 and 5 per cent on the book cost of their road and equipment, these particular roads have earned in excess of 6 per cent on their capitalization or their book cost. While the provisions of the Cummins bill would increase the net operating income of the railways as a whole, it would substantially reduce the amount of net operating income which some of these more prosperous railways could retain and use for the development of their properties and the payment of interest and dividends. It is certainly not unnatural that the heads of these railroads should insist that their individual lines are entitled to earn all they can on rates which will yield the railways as a whole only an average reasonable return. It is logical for them to contend that rates which yield the railways as a whole only a reasonable average return must be reasonable rates, and that if a railway charges only reasonable rates it is entitled to keep all the net earnings it makes on those rates.

There is a second class of railways which are average railways, and which, if rates were so fixed as to yield an average of 6 per cent to all railways, would individually earn approximately 6 per cent. Most of the heads of these railroads are opposed to any division of surplus earnings because each of them hopes to be able to manage his property so efficiently and economically as at some time to make it earn more than 6 per cent, and if he makes it earn more he wants to use the surplus earnings to benefit the stockholders. There are, however, some managers of average railroads who are in favor of some plan dividing the surplus earnings, because they believe that if no such plan is adopted the large surplus earnings of the more prosperous roads will be used in future as they have been in the past as an argument against making rates as high as they should be for the railroads as a whole, that this argument will be effective, and that in consequence the average road will be denied opportunity in the future as it has been in the past to earn an average of even as much as 6 per cent.

There is a third class of roads which never in the past has been able to earn anywhere near 6 per cent, and would not in the future be able to earn that much even if the laws should provide for an average minimum return for all roads of 6, or even 7 or 8 per cent. They would be able to keep all of the increase in net earnings which would result to them from the advance in rates which would have to be made to enable the railways as a whole to earn an average of 6 per cent. Naturally, their managers regard a proposal to increase the average return earned by the railways as a

whole and then to take away a part of the surplus earnings of prosperous roads, in a very different way than that in which the heads of the prosperous roads regard it.

The line of division between the railway executives who are opposed to such a plan as that of the Cummins bill, and those who are in favor of it, does not fall exactly between the heads of the prosperous and the average roads, on the one side, and those of the poor roads, on the other. We think that the heads of all the railway corporations agree as a matter of principle that each individual road should be allowed to retain all the earnings that it can make on rates that are reasonable for the railways as a whole. There are many, however, who regard the question as one of expediency as well as of principle. While they recognize the soundness of this principle, they believe from past experience that unless the more prosperous lines are required to give up part of their surplus earnings the rates will never be made high enough to enable the railways as a whole to earn a reasonable average return, and that therefore, as a matter of expediency and in the interest of the railroad situation as a whole, some provision for the division of surplus earnings should be accepted. There are, however, not a few heads of poor roads who believe that the principle that the individual railway company should be allowed to keep all it can earn on reasonable rates is sound, and therefore should not be abandoned because it may establish a precedent for the abandonment of other sound principles respecting the ownership and management of private property.

There are numerous members of Congress who have devoted great study to the railroad problem and who are sincerely anxious to frame and secure the passage of legislation which will solve it in a way that will be equitable to all concerned, and to the best interest of the nation. The disagreements which have arisen among business men and railway officers have made the work of these public men extremely difficult. The difficulty is heightened by the fact that organized labor, as a part of its propoganda against private ownership, is strongly opposing any legislation intended to increase the average return earned by the railway companies.

In these circumstances, what is Congress to do? Congress, after having received all the information and facts which the experts can give it, should go back to first principles and consider what kind of legislation is most likely to promote the welfare of the American public. Now, the welfare of the American public is not dependent upon the prosperity and development of any individual railroad, whether rich or poor. It is dependent upon the development and prosperity of our railway system as a whole. From a transportation standpoint, the main thing which the public welfare demands is that a great expansion of railroad facilities shall be begun as soon as practicable, and that each railroad shall be managed with the maximum practicable efficiency in order that transportation facilities generally shall be increased, the net operating income of the railways as a whole must be so increased as to enable practically every railroad in the country to raise more new capital than it has been able to raise for years. In order to insure that each individual railroad shall be operated with the maximum practicable efficiency legislation and regulation must be such that every increase in efficiency on an individual road will increase in a substantial measure the net return earned and kept by the company that owns that road.

Now the enlargement of the country's transportation facilities must be made in future principally by the more prosperous companies, and it should be made by them chiefly by the issuance of stocks. The provisions of the Cummins bill so sharply restrict the amount of surplus earnings over 6 per cent that the prosperous roads would be allowed to keep that undoubtedly they would prevent these roads from selling at reasonable prices the large amounts of stock which they should issue within the next few years. Furthermore, they would greatly reduce the incentives to the most efficient operation of the more prosperous roads. The *Railway Age* believes that the best provision which could be adopted would be one which would require that the railways as a whole should be allowed to earn a minimum average of 6 per cent, and that none of the surplus earnings of any railway company should be taken from it. Surely under present railroad and financial conditions an average return of 6 per cent for all the railroads in the country would not be excessive. If, however, Congress should decide that the Interstate Commerce Commission, without instructions to that effect, would not allow the railways to earn an average of 6 per cent if the strong roads were to be allowed to retain all their surplus earnings, then probably it should provide for an average minimum return of 6 per cent, and for some taxation of the surplus earnings of the prosperous roads which would allow them to retain a larger part of their surplus earnings than the Cummins bill would allow. It certainly does not seem that any earnings less than 7 per cent should be taken away at all, and surely each company should be allowed to retain at least one-half of its surplus earnings in excess of that amount. Unless the more prosperous roads are to be treated more liberally than they are in the Cummins bill it would be better for Congress not to mention any specific percentages of return in the new legislation, but merely to require the regulating authorities to make the rates as a whole high enough to enable the railways as a whole to provide good and adequate service.

The whole issue is being beclouded by discussions of what the railroads are "entitled to." The vital question is not what the railroads are entitled to, but what the public is entitled to. The main thing which the public is entitled to under either government or private operation is good and adequate service, economically rendered. The railroad companies individually and collectively are not entitled to earn any larger return than they must have in order to render good, adequate and economical service. The public welfare demands that the railways individually and collectively shall be allowed to earn whatever return is necessary to enable them to render such service, and it should be borne in mind in this connection that the difference between what it will cost the public in freight and passenger rates if the railways are allowed, or not allowed, to earn an adequate return will be relatively very small. The gross earnings of the railways must in any event, if the companies are to be saved from insolvency, exceed $5,000,000,000 a year. The difference between what it would cost the public to let them earn an average of 5 per cent or an average of 6 per cent would be not more than $200,000,000 a year, or not more than 4 per cent of the gross earnings that they must be allowed to make in any event. If the provisions of the Cummins bill should be adopted the amount of surplus earnings which would be taken from the prosperous roads would be extremely important from the standpoint of these individual roads, but would be almost infinitesimal compared with the total amount the public must pay for transportation in any event if it is to get good and adequate service. The important thing, therefore, for Congress to decide, and the only thing of real importance for it to decide, is under what policy the railways as a whole are most likely to be enabled to provide the service which the public welfare requires.

At Prince Crossing, near Elgin, Ill., on the night of the second of January, a passenger train of the Aurora, Elgin & Chicago, consisting of a single electric motor coach, was derailed by striking a freight car which had fallen from the track of the Chicago Great Western crossing above the electric line at this point, and the motorman and one passenger were killed. Eight passengers were injured.

View of the Train-Sheds and Viaduct Approach to the Central Station. Havana Terminal Freight Yards, Warehouses and Bay on the left (City of Havana)

Cuba's Main Line Railways Are Well Developed

Conditions in Our Nearest "Foreign" Market as Studied by Railway Age Representative

By John P. Risque*

Part I

THE CUBANS, being good advertisers, display their oldest locomotive where "he who runs" may read. Instead of hiding it in a museum somewhere, they have put the oddly designed and fastidiously decorated old 4-2-2 of the Matanzas Railroad of 1843 in the east end of the train shed of the Union Station in Havana and within a hundred feet of the tracks over which 200 arrive and depart each day. That the attractions of this queer old timer's lines are not wasted, is evidenced by the keen interest displayed in the old engine at all times of the day, by travelers.

To the old sugar planter, whose father witnessed the arrival of this wonderful machine and its successors which have moved his cane crop faithfully from year to year, the exhibit on the platform is admired from the tip of its harmless pilot to the strange hook on the rear of the little four-wheeled tender. To him it is a pleasant reminder that Cuba started railroading fully eleven years ahead of the mother country, Spain. For, in 1834, by royal decree, an order was issued, authorizing the Department of Agriculture and Commerce of the Island of Cuba, to construct a railroad from Havana to Guines, a distance of 48 miles. In November, 1837, the line was ready for business and was operated by the government for five years; after which it was sold to private interests. Thus we have, an example of one of the oldest ventures in the operation of a railway under government control, ending eventually in private ownership, the details of the transfer of which and the reasons therefor would probably be interesting reading. Since the period of this sale additions, extensions, changes, betterments and consolidations of early lines into groups under one management, have attempted to keep pace with the remarkable industrial and agricultural growth of the island—and not without some success.

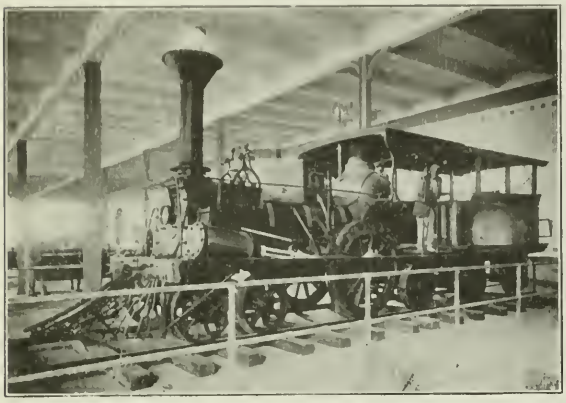
When the tourist to Havana from the United States becomes weary of the novel sights and excitements of perhaps the most "foreign" city he ever saw, he frequently retraces his steps to the dock where he landed, boards the ship and starts for home. His story to the folks back home will probably be full of the amazements of the largest city in Cuba and one of the quaintest in the world. But, due to lack of interest or through possible misinformation concerning travel, the average visitor learns little of one of the principal factors which made Havana great and is continuing to help to make her greater and richer. This factor is the railroad system of the island.

The reader who is interested and who plans to take a trip to Cuba "some day" should make a note of the fact that there is an active passenger agent on the Prado—and quite likely near the hotel—whose business it is to see that visitors are comfortably provided for in their trips to the country. He has all of the necessary information as to schedules, expense and accommodations. If the trip is going to be over night, he can provide reservations in comfortable Pullman cars as far as the traveler wants to go. And there will be no extra charge for electric lights in the berths.

In pleasant contrast to the excitement of the crowded city, the open country, with its tall coacoanut and royal palms, affords a change and a rest. Life at the way stations along the line provides an angle of observation of human nature not presented in the city. And if the tourist happens to be a railroad man he will find much to interest him. He will not fail to observe the presence of a large number of freight

*This is the first of a series of articles on the railways of Latin America which Mr. Risque is writing "on the ground" from his observations on a trip he i snow making as a member of the editorial staff of the *Railway Age*. Mr. Risque was formerly employed on one of the sugar cane railways of Cuba and his description of the cane railways has already appeared in his article written before he started on his trip, entitled "Cuba's Sugar Cane Railways a Large Market," which appeared in three parts in the issues of the *Railway Age* of October 17, 24 and 31, respectively.

cars from home; box, flat and gondola cars of all descriptions. If he chooses to make a list of the various cars from the states which he found in trains en route in both directions, on sidings at stations and at sugar mills, his list would be quite representative. If he had never been to Cuba before and was not advised how these cars got on the island, he might possibly surmise that on account of the acute shortage of cars on the Cuban lines Uncle Sam had been generous



Cuba's First Locomotive and the Engineer at Havana Central Station

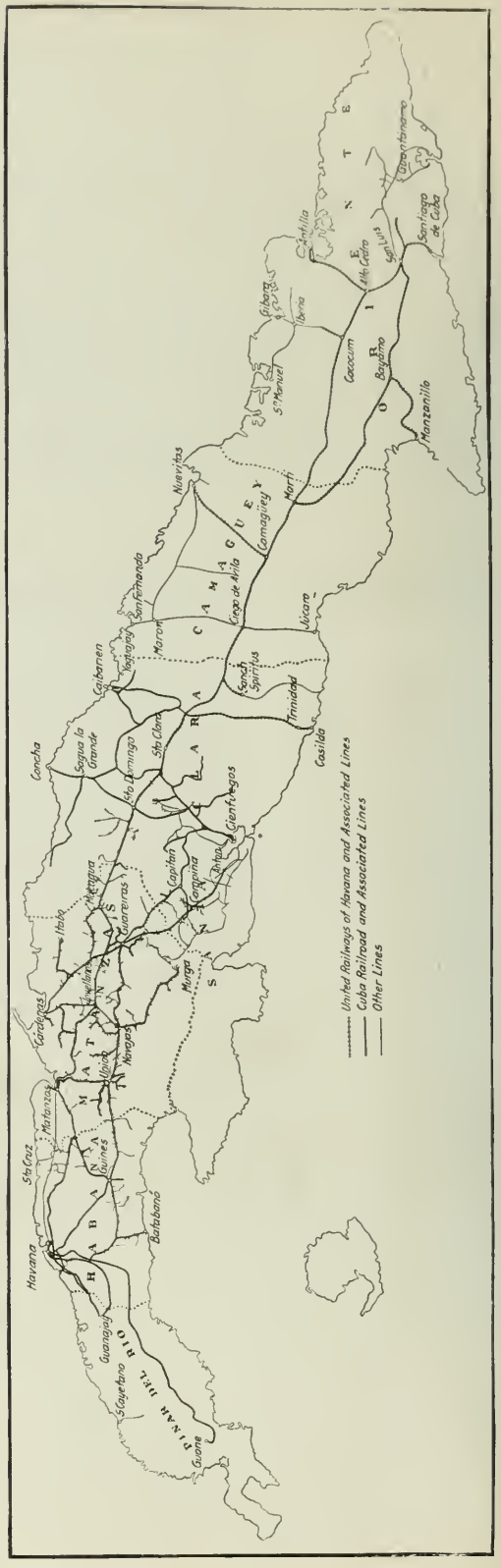
enough to ship some in by boat to help out. The facts in the case, however, show that all these cars, which seem to enjoy the climate if the length of their stay is any evidence, came to Cuba on their own wheels.

The Car Ferry Line to Cuba

In January, 1915, the Florida East Coast put the car ferry steamer "Henry M. Flagler" into service between Key West, Fla., and the port of Havana, 90 miles south. This ship has a length of 386 feet and a beam of 58 feet, has four

Central Station, Havana

tracks and carries 30 standard freight cars and makes a round trip between the two ports every day except Sunday. At Key West a slip is provided for the transfer, by track, of cars direct to the boat. A similar slip, operated by the Havana Terminal Company in Havana, unloads the cars for delivery in Havana or for transfer to any part of the island. The initial development of this business was rather



The Main Line Railways of Cuba

slow. Its introduction was an immediate challenge to a decade of tradition which had become accustomed to receiving freight by steamer, with all of the multiplied handling and piling on the wharf and reloading to railway cars which imports by steamer invariably involve. Finally, however, the merchants—and particularly the sugar mills—began to

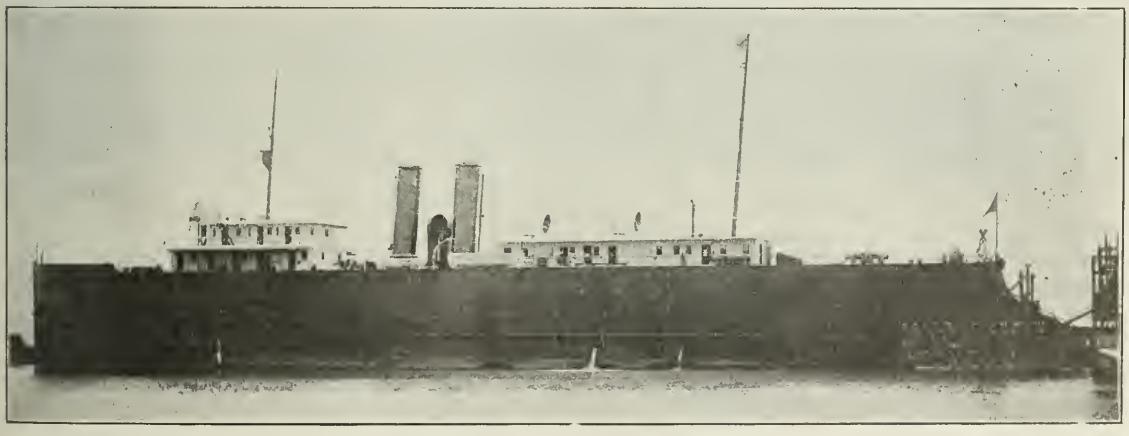
The Electric Line to Guines from Havana

realize what the new way meant to them, and it was soon found necessary to put on another boat. In the fall of 1916 the "Joseph R. Parrott," a sister ship to the Flagler, was added to the run. At the present writing this unique and ably managed rail link between the United States and Cuba is considerably overtaxed, and a third ship, similar to its predecessors, is now under construction and is expected to arrive for duty about July 1, 1920. Nor is it expected by the officers of the company that this will take care of the business. It is predicted that six of these boats will eventually be kept busy on this run. Under arrangements with the government of Cuba, bond is given for the exportation of the cars and no duty is assessed thereon.

An example of the economy offered by the ferry service is that of the shipment of locomotives from the builders in the United States to the public and private railroads of Cuba. These engines come in on their own wheels—all the way from the factory to the remotest plantation. Upon arrival the matter of preparation for running is a trifle. As most of the locomotives brought in here arrive "just in the nick of time" or six weeks late, depending upon the time they were ordered, the ferry has come to be known as a life-saver in many instances. Locomotives shipped via steamer come in endless boxes and crates, all of which are handled many times and finally arrive—frequently with all of the parts and sometimes not—at destination, where setting up is in order. Cars brought in on the ferry are "piled up." In a shipment of 15 cars, for instance, six cars may be on their own wheels and carrying the frames, trucks and bodies of the remaining nine. Machinery outfits of all kinds are loaded at the United States factory on the same cars, which are backed into the mill door for unloading.

The introduction of this service brought the California and Colorado cantaloupe to the Cuban's table. It also brings him plenty of grapes, both of which fruits were a luxury prior to the development of the ferry's service, on account of the limitations of refrigerator space on steamers and the almost prohibitive rates collected for its use. Fresh meats, butter and cheese from the middle west, cabbages, peaches and apples from eastern territory—in fact, products from the various sections of the United States—are handled as the seasons develop and brought into Cuba in as good condition via refrigerator cars as they are delivered to our own cities.

The development of business from Cuba to the United States has also participated in the success of the enterprise. Cuban winter vegetables are regularly shipped north in cars that are initially refrigerated at the icing station in Havana, sent to the fields, loaded and re-iced in re-passing through Havana. The pineapple industry, which, previous to the establishment of the car transport service, was in a languishing and dying condition owing to the necessity of many handlings when sent via steamer, which caused bruising and consequent decaying of the fruit. Shipments of this fruit via refrigerator cars from the fields to the markets of the United States have brought the annual shipments up from 600,000 crates to 1,500,000 crates in less than six years.



Steamer Joseph R. Parrott of the Florida East Coast R. R. Car Ferry Between Key West and Havana

The United Railways of Havana

Although to the average newcomer to Cuba who, starting out for a trip through the island from the Central Station in Havana, the railway map indicates no division of ownership, the lines are comprised of many different systems. Unless he happens to be a railroad man he will be unable to detect any difference in the equipment of the lines as he passes from one to the other.

Broadly speaking, the main lines of Cuba are made up of two groups—the Western and the Eastern. The Western systems are a combination of lines under English control and operation and the Eastern roads are American. The Western lines comprise the United Railways of Havana, whose rails traverse the provinces of Havana, Matanzas and Santa Clara as far east as the city by that name. The Western Railway of Havana, under direction of the United group, runs west from Havana to a point called Guane, near the western terminus of the island in the Province of Pinar del Rio—the point of origin of a majority of the tobacco and pineapple traffic of the island and a producer of livestock and vegetables. Another subsidiary of the United Railways is the Havana Central Railroad, which started out in 1902 as an American organization and was taken into the United combination in 1907. This line, electrified, runs from Guanajay to Havana, a distance of about 30 miles, and also operates a line to Guines and Providencia, about 35 miles. Six miles of street car line are under this company's control in Guanabacoa, an Havana suburb. The principal traffic of this line is melons and vegetables, as well as some tobacco and pineapples. A modern wharf, called the Paula Dock, as the Muelle de Luz, and the suburbs of Casa Blanca, Regla and Fesser, the locations of dry docks, small repair plants for ships and machine shops, respectively, as well as growing residential districts across the bay.

The Cuba Railroad

The principal eastern line of the island is an American system, known as the Cuba Railroad, frequently mistaken for an extension of the Western system just described. The Cuba Railroad's tracks start from Santa Clara in the province by that name and run through to Santiago de Cuba on the extreme southeastern end of the island. It traverses three of the largest (and most undeveloped) provinces, namely, Santa Clara, Camaguey and Oriente. This territory comprises over 70 per cent of the total area of the country, but its population is only half of the total on the island. In 1916 the Cuba Railroad took over the Camaguey & Nuevitas Railroad, which runs between the two points named, since which time the newly acquired branch has been extended to the port of Pastelillo, where the new owners constructed port and docks at a cost of $1,500,000. In March, 1919, the company completed the Trinidad branch between

Havana Cienfuegos Express, Showing English Design of Superheater 4-4-0 Type and Characteristic Track on the Central Railways of Havana.

is a part of this line's equipment and accommodates the largest steamers. The Marianao Railway, a suburban electric line, is operated by the United Railways and runs from Havana west to the Beaches, about 10 miles. The last unit in the United combination comprises the Cuban Central Railways, said to serve the richest agricultural zone in Cuba. This railroad system, prior to 1899, comprised several independent short lines, since which time they have been consolidated and operated as a unit. The system adequately serves the Province of Santa Clara, providing transportation to the east and west ends of the island by its connection with the main lines of the United and Cuban Railroad. The Cuban Central has terminals—important sugar export points—at three points, Cienfuegos on the south and Caibarien and Isabela de Sagegos on the north. It is said that with the exception of Matanzas, Cienfuegos is the most important sugar shipping point in Cuba, the Cuban Central Railways having constructed a thousand foot pier at that place in 1906. The United Railways of Havana operate five well-equipped passenger ferry boats on the Bay of Havana, running half hourly between the company's ferry piers, known

Fomentos and Casildas on the south coast through what is claimed to be some of the most difficult railroad construction country in Cuba. The cost of this new 40-mile line is said to have been in the neighborhood of $4,000,000. The principal traffic of the Cuba Railroad constitutes the hauling of through shipments of merchandise and machinery originating on the United Railways, the transportation of cane along its lines to mills, and the delivery of sugar to the ports of Antilla on Nipe Bay on the north and to Santiago de Cuba on the south. Agricultural products in general, livestock and lumber also constitute a large part of the business done by this company.

Electric Railway Receiverships during the year 1919 exceeded in number, mileage and capitalization those of any year since statistics have been compiled, states the Electric Railway Journal. The year 1919 saw 48 companies with a combined mileage of 3,781 and a total capitalization of $534,174,458 in receivership. Only 28 companies with a combined mileage of 2,625 and a total capitalization of $159,630,138 were sold at foreclosure during 1919.

Automatic Train Control Committee Makes Report*

Outlines Studies Made and Points Out Need of Further Investigation of Sixteen Devices

The Automatic Train Control Committee, which was appointed by the Director General a year ago, has made its report to W. T. Tyler, director of the Division of Operations, United States Railroad Administration. The committee recommends that it be continued or a similar body appointed to carry on its work until the end of federal control. It recommends further, that the present provisions be extended to provide for a permanent staff, and that, following the termination of federal control, a special committee of the American Railroad Association be appointed, such a committee to have the same standing as a section of the A. R. A., and to include a representative of the Bureau of Safety of the Interstate Commerce Commission as a member. It was further recommended that this committee or section of the A. R. A. continue the work thus far conducted by the Automatic Train Control Committee, which was appointed by the director of the Division of Operation, United States Railroad Administration in accordance with Circular No. 25, dated January 14, 1919.

The instructions to the committee as given in the circular were as follows:

"The committee will proceed at once to make a study of, and report upon, the automatic train control devices now undergoing test upon various lines of railroad or available for test with their recommendations for the installation and further practical test of any devices now or during their investigation made available for that purpose, which they may consider practicable and reasonably conforming to the purposes to be accomplished.

"The report of the committee will include their recommendations upon the requisites of automatic train control and their conclusions upon the mechanical or economic features of such of the devices as the committee may find available for practical use."

The personnel of the committee at the time of its appointment consisted of C. A. Morse, chairman, who at the time was assistant director, Division of Operation, United States Railroad Administration; W. P. Borland, chief, Bureau of Safety, Interstate Commerce Commission; C. E. Denney, assistant federal manager, New York, Chicago & St. Louis; H. S. Balliet, assistant terminal manager, Grand Central Terminal, New York City; Henry Bartlett, chief mechanical engineer, Boston & Maine; J. H. Gumbes, general superintendent, Pennsylvania Railroad; R. W. Bell, general superintendent of motive power, Illinois Central.

On June 1, 1919, Mr. Morse resigned as assistant director and from the chairmanship of the committee, and A. M. Burt, his successor, as assistant director, was appointed in his stead.

Outline of Work and General Considerations

The committee held its first meeting in Washington on January 23, 1919. Since that time 14 meetings of the full committee and 17 subcommittee meetings were held.

In order to enable the committee to become familiar with train control devices undergoing test it became necessary to arrange for inspections of such devices wherever tests were being conducted. To accomplish this end the committee made investigations and inspections of devices actually installed and operated, either as test installations or in actual service. Train control devices not undergoing road test but in laboratory form and which were brought to the committee's attention were also examined. Thirty-seven devices in all were inspected, in addition to which plans and specifications of 300 train control devices were also examined by the committee.

The relation of automatic train control to operating conditions has been very fully discussed by the committee, and all the elements of the problem have been considered. The committee has been especially careful to give full consideration to all devices that have been brought to its attention. It has endeavored through its inspections, the consideration of plans received and its discussions to obtain a comprehensive knowledge of the state of the art as it exists in this country at present. The following definition and requisites for automatic train control were adopted by the committee:

Definition: Automatic Train Control: An installation so arranged that its operation will automatically result in either one or the other or both of the following conditions:

First: The application of the brakes until the train has been brought to a stop.

Second: The application of the brakes when the speed of the train exceeds a prescribed rate and continued until the speed has been reduced to a predetermined rate.

Requisites for the Design and Construction of Automatic Train Control Devices

1. The apparatus so constructed as to operate in connection with a system of fixed block or inter-locking signals, and so inter-connected with the fixed signal system as to perform its intended functions—
   (a) in the event of failure of the engineman to obey the fixed signal indications, and,
   (b) so far as possible, when the fixed signal fails to indicate a condition requiring an application of the brakes.
2. The apparatus so constructed that it will perform its intended function if an essential part fails or is removed; or a break, cross, ground or failure of energy occurs in electric circuits, when used.
3. The apparatus so constructed as to make indications of the fixed signal depend upon the operation of the track element of the train control device.
4. The apparatus so constructed that proper operative relation between those parts along the roadway and those on the train will be assured under all conditions of speed, weather, wear, oscillation and shock.
5. The apparatus so constructed as to prevent the release of the brakes after automatic application, until the train has been brought to a stop, or its speed has been reduced to a predetermined rate or the obstruction or other condition that caused the brake application has been removed.
6. The train apparatus so constructed that, when operated, it will make an application of the brakes sufficient to stop the train or control its speed.
7. The apparatus so constructed as not to interfere with the application of the brakes by the engineman's brake valve or to impair the efficiency of the airbrake.
8. The apparatus so constructed that it may be applied so as to be operative when the engine is running forward or backward.
9. The apparatus so constructed that when two or more engines are coupled together or a pusher is used it can be made operative only on the engine from which the brakes are controlled.
10. The apparatus so constructed that it will operate under all weather conditions which permit train movements.
11. The apparatus so constructed as to conform to established clearances for equipment and structures.
12. The apparatus so constructed and installed that it will not constitute a source of danger to trainmen, other employees, or passengers.

In general the purpose of a block system is to provide a proper space interval between trains to protect against rear collisions in the assigned direction of traffic and against both rear and butting collisions on tracks signalled for movements in both directions. On roads where track circuit controlled block signals are installed it is evident that, if the rules are obeyed and the indications of the fixed signals along the roadway are at all times observed, understood and obeyed, accidents such as the the signal system is designed to prevent cannot occur, except in the unusual event of a signal failing to indicate an unsafe condition when such a condition exists.

Generally speaking, therefore, on tracks fully equipped with modern track circuit controlled block signals, train

*Abstract of Automatic Train Control Committee report made to W. T. Tyler, director, division of Operation, United States Railroad Administration.

collisions can occur only as the result of the (1) failure of brakes; (2) failure of signals to perform their functions; (3) failure of employees to comply with rules or orders, or (4) failure of employees to observe, understand or obey signal indications.

Train control devices will not prevent collisions due to brake failures, which are infrequent and comprise only a small percentage of such accidents. Failure of signals to perform their proper functions is a comparatively rare occurrence.

Track circuit controlled block signal systems are so designed that when any part fails the signal should display the stop indication. In some cases of failure, however, the signal indicates proceed even though it should indicate caution or stop. Such failures, known as "false clear" failures, contain a serious element of danger, but their infrequency makes the possibility of collisions from this cause very remote.

Collisions due to failure of employees to comply with rules or orders constitute a large proportion of the total number reported, but many of these could not have been prevented by an automatic train control device. Automatic train control devices may be expected to prevent only such accidents as are due to the failure of employes to observe, understand and obey signal indications. Failure to see or understand signals may be due to smoke, fog, snow, absence of the night signal indications, complexity in the scheme of indication, unfamiliarity of the engineman with the route over which the train is running, the diversion of his attention or his physical incapacity, etc. Failure to obey signal indications that are seen and understood are rare and include only those cases where enginemen in their anxiety to make time take chances, or where they use poor judgment in the interpretation of rules which permit them to exercise some discretion. Statistics show that most of the collisions which have occurred on tracks protected by track circuit controlled signals are due to the causes above enumerated.

There appears to be a popular misconception as to the number of fatalities that might be prevented by automatic train control devices. Statistics show that train collisions have been the cause of less than 6 per cent of the fatalities to persons, other than trespassers, occuring on the railroads of the United States in the five and one-half years ending December 31, 1918. Records of the Interstate Commerce Commission show the fatalities to non-trespassers on railroads of the United States from July 1, 1913, to December 31, 1918, inclusive, as indicated in the table.

The foregoing facts, however, should not be taken as minimizing the seriousness of the situation, and in considering them weight should be given to the further fact that many of the victims of train collisions are passengers who do not contribute by their negligence to the accidents and are entitled to the largest measure of protection that is reasonably possible; nevertheless, the limitations of automatic train control devices even the most complete and dependable that may be developed, should be clearly understood. All fatalities resulting from train collisions average per year from July 31, 1913, to December 31, 1918, inclusive, 296 or 5.6 per cent of the fatalities to non-trespassers on the railroads of the United States, and of this number many resulted from collisions occurring in yard tracks or at other places where they would not have been prevented by an automatic train control device.

The cost of an automatic train control system is an undetermined item which involves not only the original expense of installation, but also the cost of maintenance and the effect of its operation upon the capacity of existing facilities. If a device materially reduced the capacity of a railroad, its installation where heavy traffic is handled, might necessitate further expenditure for additional running tracks. A device to satisfactorily meet such conditions must therefore be one which will interfere as little as possible with the capacity of a railroad and this requirement may necessitate the addition of speed control apparatus at an increased cost for its installation and maintenance.

The question of installing automatic train control systems in such a manner that the normal operation of trains will not be interfered with is one of the most difficult problems to be solved. The primary function of a block signal system is to maintain a definite space interval between moving trains, but in addition thereto it enables trains to be moved safely without delay as, by giving an engineman information that the track ahead of his train is clear for a definite distance, he is enabled to proceed with confidence at the highest rate of speed which can be maintained with safety. Train movements are thus greatly facilitated, and this fact is so important and fundamental that, on multiple track roads of heavy traffic, it is recognized that to handle the volume of traffic now being moved would be impossible without the use of automatic block signals, unless additional running tracks were provided. Fundamentally, therefore, track circuit controlled automatic block signals, in addition to providing greater safety of train operation, add to the capacity of a railroad as do additional running tracks. In imposing automatic train control upon such a system this fact must be clearly borne in mind and in correcting unsafe conditions due to the failure of the human element the fundamental feature of the signal system itself, as above outlined, must not be unnecessarily impaired. There are other problems in connection with this subject, some of the most important being those of reliability, clearance and interchangeability.

	Year ending June 30						6 months ending December 31,		Year ending December 31			
	1914		1915		1916		1916		1917		1918	
	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent	No.	Per cent
Collisions	271	5.61	121	3.42	233	5.16	141	4.95	364	6.23	499	8.27
Derailments	262	5.42	180	5.08	194	4.29	91	3.18	176	3.01	290	4.81
Other train accidents	18	.38	21	.60	38	.84	18	.64	151	2.58	168	2.78
Train service accidents (including highway crossing accidents)	3,871	80.13	2,872	81.20	3,566	78.95	2,355	82.54	4,633	79.28	4,485	74.37
Non-train service accidents (industrial, etc.)	409	8.46	343	9.70	486	10.76	248	8.69	520	8.90	589	9.77
Totals	4,831	100.00	3,537	100.00	4,517	100.00	2,853	100.00	5,844	100.00	6,031	100.00

NOTE.—On account of change in the ending of the fiscal year from June 30 to December 31, in 1916, the figures for the last six months of 1916 are shown separately.

The Train Control Problem

Automatic train control is popularly regarded as a panacea for railroad accidents. Persons who are not familiar with railroad operating requirements generally fail to understand fully, the factors which must be taken into account in the practical use of train control devices. On this account a comprehensive statement of the questions involved from the standpoints of construction, maintenance and operation is desirable.

Briefly stated, the problem is to provide some appliance to furnish protection against accidents when employees disregard signal indications or, so far as possible, when signals improperly indicate proceed. The problem comprises two

main elements, one of which consists in reproducing upon a moving train, either by mechanical or electrical means, a correct indication of the condition of the track ahead; the other requires proper means for controlling the train in obedience to the indication given. The first element necessitates the use of suitable mechanism along the roadside, while the second requires the use of suitable mechanism installed upon the train, both of which must properly correlate and function interdependently. Important factors entering into the problem are:

a. Reliability in operation.
b. Inspection, maintenance and test to insure efficiency.
c. Clearance: Relation between parts of the device and obstructions of the roadside or train.
d. Capacity: The effect upon the traffic handled over a given section of railroad.
e. Interchangeability as between different devices on track used by railroads jointly.
f. Correlation with track circuit controlled block signaling and air brake apparatus.

It is obvious that an automatic train control device must be reliable in operation; that is, it must respond with certainty to all the conditions under which it should act, and should remain inert at all times when conditions are such that a train may proceed with safety. If the device fails to act when the danger it is designed to guard against is present, its intended function cannot be performed, and if it acts frequently when there is no danger, the interference with operation becomes serious and the device itself becomes discredited. The device must of necessity be exposed to all climatic conditions and must function properly during the most severe weather. It must also be protected from damage; the roadside mechanism from being torn out by objects dragging from passing trains, and the train carried mechanism from being struck by foreign obstacles on the roadside.

Proper inspection and maintenance of automatic train control devices will be more difficult than the inspection and maintenance of track circuit controlled signals, for the reason that part of the apparatus will be located on the roadside and another part upon the train. The roadside apparatus will naturally be looked after by the maintainers who keep the signals in order, while the apparatus carried on the train will be looked after by the mechanical forces in engine houses and shops. It will be a difficult matter to correlate the results of the divided inspection and maintenance so as to determine with certainty the cause of failures, and it will often be impracticable to bring the train apparatus and the roadside apparatus at a particular location into operative relation with one another for test purposes. The inspection and maintenance of the signal system itself will be increased by the use of an automatic train control device because certain elements will be added to the signal system.

The location of automatic train control apparatus on the train or on the roadside requires detailed study to secure satisfactory operation. Clearances are materially affected by tunnels, bridges, station platforms, track pans, grade and highway crossings, etc. Train control devices are of two general classes: (1) Those that depend for their operation on a physical contact of an element carried on the train with an element at a fixed location on the roadside. (2) Those that depend for their operation on an electrical or magnetic impulse without physical contact between the roadside and the train elements.

Many troublesome clearance problems enter into the application and use of the first class. If the roadside elements are located between the rails, they are likely to be torn out by objects dragging from moving trains. If the location be a short distance outside of the rail and near its level, snow plows and ballast spreaders which work to the level of the rails may be interfered with.

Part of the track element must be placed above the rail level, because if the train element is below that level it would be torn off by coming in contact with switch rails, crossing planks and other obstructions. With the non-contact devices the clearance difficulties are materially reduced, and evidently this fact has been one of the leading causes for the development work that has been and is now being done with this class of devices.

If a device is to act to stop a train only in emergencies caused by the failure of employees to obey signal indications, the automatic brake application must be made a sufficient distance away from the actual point of danger to bring the train to a stop before reaching that point, under the most unfavorable conditions. This involves the necessity of providing maximum braking distance for all trains equal to that required for any train on the road. This cannot be done without decreasing the track capacity, and on congested roads is therefore a matter for serious consideration. To overcome these difficulties speed control apparatus is being developed.

The joint use of track by two or more roads is frequent. This practice, as well as the joint use of terminal facilities, has been extended during the past two years and will, without doubt, become more general. It is necessary, therefore, that train control devices shall be so designed that the engine equipment of the various roads will properly function with the roadside apparatus on tracks used jointly.

Due to the infrequency of detouring in case of accidents and because of the safeguards thrown around such movements, it would not appear necessary that the train control apparatus should be designed to be operative in all cases on the engine of the detouring road, but the equipment detoured must conform with the clearance requirements on the road used. It is therefore highly desirable, and in certain localities necessary, that a train control device for practical use shall not restrict the free operation of the trains of several roads over the same track.

It is essential that train control apparatus shall be so designed that it may be superimposed upon the electrically controlled block signal system and not interfere with the performance of the signals. It is also essential that the engine apparatus of automatic train control devices shall be adapted to use with the present air brake system and shall not interfere with its practical operation.

Plans and Devices Examined

The committee examined 37 devices in various stages of development. All types, except one, were represented, and these were distributed among the various types as follows:

Plain mechanical trip	1
Electrically controlled mechanical Trip	10
Intermittent electrical contact	15
Insulated truck with short track circuit section	1
Intermittent induction	3
Inert roadside element	1
Non-magnetic rail	1
Continuous electrical contact	2
Continuous induction	2
Wireless	1
Combined insulated engine and inert roadside element	1
Combined plain mechanical trip and intermittent induction	1

Of the above list, 14 possessed some speed control features as part of the device and 25 were without such features. Defects, classed as "open circuit," due either to the requirement of the application of energy to produce a brake application or to the possibility that essential parts might be removed or broken without producing a stop, existed in six devices.

Generally, the governors used in those devices exhibiting speed control features have been of the centrifugal ball type, driven from an axle of the engine by belts of various kinds or by rigid connections. The method of transmission is obviously an important part of such a device and presents difficulties, some of which are due to the limited space available for the location of the speed control apparatus. One device examined took into consideration, in its speed control

apparatus, the braking effect which would be produced by the engineman's handling of the train. Some purely electrical speed control apparatus has been examined, but none which has been subjected to any extensive tests. One device depended for its speed control on the impact between the engine contact element and the roadside contact element, as related to the speed of the train in reference to the rate of inclination of the roadside contact element to the track.

The use of amplifiers in the form of audions or plictrons, designed to increase or modify the electrical energy in the train apparatus by the influence of the roadside element in non-contact types, is indicated in three devices. In each of the devices the amplifier is used in a different manner, but they are all in the experimental stage, and no tests under operating conditions have been made.

Plans, more or less complete, of 300 devices have been examined in addition to the plans of those that were inspected. These were divided among the various types as follows:

Plain mechanical trip	135
Electrically controlled mechanical trip	31
Intermittent electrical contact	63
Insulated truck with short track circuit section	9
Intermittent induction	4
Inert roadside element	...
Non-magnetic rail	2
Continuous electrical contact	40
Continuous induction	2
Wireless	1
Combined intermittent induction and intermittent electrical contact	1
Combined non-magnetic rail and intermittent electrical contact	1
Unclassified	11

The devices in service, or which have been installed for test purposes and also those that were examined by the committee in the shop or laboratory include the following: An installation on the United Railway & Electric Company, Baltimore, Md.; Automatic Control Company's device inspected in the office of the company at Indianapolis, Ind.; Clifford Automatic Train Stop Company's device inspected in the company's shop at Scranton, Pa.; an installation on the Key Route, Oakland, Cal.. Kinsman Devices: Six installations inspected, the New York Municipal Railway, the Interborough Rapid Transit, the Hudson & Manhattan, the Pennsylvania Tunnel & Terminal Company, the Philadelphia Rapid Transit Company and the Boston Elevated; Nevens-Wallace Train Control Company's device inspected at Waltham, Mass., on the Boston & Maine; Willson-Wright Safety Appliance Company's device inspected on the Washington Water Power Company's electric lines at Spokane, Wash.; American Railway Signals Company's device inspected at the laboratory of Thomas E. Clark, Detroit, Mich.; American Train Control Company's device inspected on the Chesapeake & Ohio, between Charlottesville, Va., and Gordonsville; Casale Safety Device Company's device inspected on the Chicago, Rock Island & Pacific, near Blue Island, Ill.; General Railway Signal Company's devices inspected at the shops and laboratory of the company in Rochester, N. Y.; General Safety Appliance Company's device inspected on the Spokane International; Gollos Railway Signal Company of America, device inspected in the office of the company at Chicago; International Signal Company's device inspected in the company's office at New York; Miller Train Control Corporation, device inspected at the Railway Appliances Exhibit in Chicago and on the Chicago & Eastern Illinois at Danville, Ill.; Orcutt Automatic Train Control Company's device inspected on the Millbury branch of the Boston & Albany; Shadle Automatic Train Signal Company's device inspected on the Cincinnati, Indianapolis & Western, near Indianapolis, Ind.; Simmen Automatic Railway Signal Company's device inspected on the Mewaba Railroad at Virginia, Minn., and on the Indianapolis & Cincinnati Traction; Thayer Automatic Signal and Train Control Company, examination was made of plans and some of the apparatus at Spokane, Wash.; Train Control Appliance Company's device inspected at the Railway Appliances Exhibit at Chicago. B. F. Wooding: Certain parts of this device were examined in New York. The type of appartus is the same as that tested on the Delaware, Lackawanna & Western, and inspected by the Bureau of Safety, Interstate Commerce Commission in 1917; Safety Block Signal Company's device inspected at Philadelphia, Pa. (has been tried on the Huntingdon & Broad Top Mountain Railroad); All-Weather Train Controller Company's device inspected at the company's shop in Newark, N. J.; National Safety Appliance Company's device inspected at the company's shop at San Francisco, Cal., and on the Western Pacific at Oroville, Cal.; Sprague Safety Control & Signal Corporation, device inspected at the company's laboratory, New York; Austen H. Fox's device inspected in the laboratory of the Fox Lenderoth Company, New York; Pittsburgh Train Control Company's device inspected at the company's laboratory in Pittsburgh, Pa.; Union Switch & Signal Company's device inspected at the company's shops at Swissvale, Pa.; Thomas E. Clark's device inspected at his laboratory in Detroit, Mich.; Schweyer Electric & Manufacturing Company's device inspected on the Colebreakdale branch of the Philadelphia & Reading; Richards-Ford Train Control Company's device inspected at the company's office at Baltimore, Md.

General Discussion

The installation of automatic train control appears feasible (assuming that a type to satisfactorily meet the operating conditions will be fully developed) to protect trains moving with the established direction of traffic on main tracks, but it is doubtful if a device can be developed to protect all movements in the large terminals without restricting train movements to a prohibitive degree. The necessity for automatic train control must be developed in each individual case.

As automatic train control is most necessary for the protection of high speed trains, the apparatus must be suitable, with reasonable maintenance, to operate efficiently on such trains at the highest permissible speed and must not restrict the operation of the engine over any track which it may use. The brake application as made by the train control device must be such as to safely bring the trains of various classes to a stop without endangering the controlled train or trains on adjacent tracks more than would occur if the brakes were applied by the engineman.

The fact that automatic train stop devices of the electrically controlled mechanical trip type are operated with a high degree of success on certain underground and elevated tracks cannot be regarded as conclusive evidence that such devices, or devices of other types intended to accomplish similar results, would be practicable for use on tracks in the open country, subjected to entirely dissimilar operating conditions. On the tracks where these devices are in successful use, the trains run are for passenger service, and their equipment is uniform in character; they are moved at comparatively moderate speeds; clearance conditions are uniform, and there are no weather conditions present to interfere with proper operation. On roads in the open country, on the other hand, the equipment of trains is not uniform, and the variation in train speeds is great; there is also considerable variation in the length and weight of trains, so that the braking effort required, varies widely between trains of different make up. Clearance and weather conditions on tracks in the open country also present difficult problems which are not present on underground and elevated tracks.

The committee believes that any comprehensive study of automatic train control must begin with the block system, as the principle of the block system is fundamental to the subject, and must be the foundation of any automatic train control system. The term "block system" covers any means for maintaining an interval of *space* between trains as distinguished from establishing an interval of *time* between trains at specified points. The signals used in the block system on the railroads of this country, indicate the condi-

tion of the blocks governed and convey certain information to employees responsible for the safe movement of trains. An automatic train control device is not a substitute for the block system, but is merely a means for compelling observance of the rules and practices prescribed for its operation, thus insuring that the block system, or space-interval method of train operation, will be observed.

The superiority of the block system as compared with other methods of train operation is generally recognized. It is in use on practically 100,000 miles of railroad, including the busiest roads or the busiest parts of practically all roads in this country. Notwithstanding the fact that accidents occur on block signaled roads, the use of the block system is, beyond question, attended by a material increase in the safety of train operation and travel. The first step, therefore, which should be taken on lines which are not operated under the block system, in order to meet the need for more complete train protection, is not experimentation with, or the adoption of some form of train control device, but the adoption of the block system itself, concerning which the results of years of experience in practical service on thousands of miles of railroad are available, firmly establishing its functions and value.

The amount of apparatus required and the rules and practices necessary to be followed to render the block system adequate for any railroad, depend upon traffic and operating conditions. On many lines where traffic is light, a simple form of manual block system, with the enforcement of proper rules, is adequate; on busy lines, an automatic block signal system, together with the enforcement of proper rules and practices, is necessary to economically provide protection for train movements, and the proper field for the use of automatic train control devices is in connection with this latter class. The consideration of automatic train control devices should be confined to this field, and any pressure or clamour for the introduction and use of such devices should not be permitted to divert attention from or obstruct progress in the vastly more important field of extending the use of the block system and instituting improvements in block signal apparatus and practices already in use. Constant progress and development is required to keep pace with traffic needs.

Limiting the consideration of automatic train control devices to their proper field of usefulness in connection with automatic signals, however, should not be construed as minimizing the importance or possible value of such devices. The practical development of automatic train control devices and their use to supplement existing automatic block signals for the purpose of compelling obedience to signal indications is highly desirable.

The use of train stopping devices on lines where trains are run on close headway will require the use of some form of speed control apparatus in order to maintain the required capacity. The need of speed control is recognized, but little progress has been made in meeting the requirements. Some of the conditions under which speed control may be used are: (1) To prevent a predetermined speed being exceeded regardless of track conditions. (2) To permit a train to proceed at a predetermined low speed after having been stopped by an automatic brake application. (3) To permit a train to pass a brake application point at a predetermined speed without receiving an automatic brake application. (4) To permit a train to pass an approach indication point without an automatic brake application provided the engineman properly observes the approach indication. (5) To permit a train to proceed without an automatic application of the brakes as long as the speed of the train is controlled in accordance with the signal indications.

In a considerable number of tests of automatic train control devices which have been conducted during the past several years, the apparatus tested has been far less substantial and rugged in construction than modern signal and interlocking apparatus in common use, notwithstanding that the operating conditions and requirements are, generally speaking, more severe for train control than for signal devices. In some cases, also, the installations tested were only temporary, and the apparatus was not so constructed and installed that successful operation for a considerable period of time could reasonably be expected. Many of these devices have been developed and tested by persons who were not familiar with signal apparatus in common use nor with many of the problems which are encountered in the application of these devices to railroad operating conditions. The development of signal apparatus and interlocking devices has been a comparatively slow process, during which countless devices have been proposed, many of them tested and used in actual service, and a comparatively small percentage retained in their original form. It follows that the development of automatic train control devices will probably be along similar lines.

Generally speaking, it may be said that the tests which have thus far been conducted have demonstrated that the functions of automatic train control devices are possible of accomplishment under actual service conditions. But while these functions may be accomplished under the conditions existing at comparatively isolated locations, with the high degree of maintenance ordinarily given to test installations of this character, it is an entirely different problem, and a far more complex one, to apply these devices to the various operating conditions encountered in railroad service, and to accomplish these functions day and night, year in and year out, on a large number of trains and on several hundred miles of a busy railroad. From a practical standpoint, automatic train control devices are still in the development stage, and many problems in connection with their practical application remain to be solved.

The development of automatic train control devices by individual enterprise must of necessity be extremely slow, and it is believed that the time has come when more active cooperation should be undertaken by the railroads. To accomplish this task, a systematic study of the problem must be continued, available engineering talent must be utilized to design and construct apparatus suitable for the purpose intended, apply it to meet various operating conditions, and conduct experiments on a more comprehensive scale than has been done in the past.

Conclusions of the Committee

The committee has reached the following conclusions:

1. That the relative merits of the various types of automatic train control cannot be determined until further tests have been made.

2. That more extended service tests (including complete records of performance) are necessary before a decision can be reached on the availability, for general practical use, of any of the devices that have been brought to the attention of the committee.

3. That on a large part of the railroad mileage in the United States, with a given amount of money available for protection purposes, a greater degree of safety can be obtained by installing block signals than by installing automatic train control devices.

4. That on lines of heavy traffic, fully equipped with automatic block signals, the use of train control devices is desirable.

5. That, complying with its instructions and without implying endorsement, the committee finds the following devices available for further test:

American Railway Signals Company.—Intermittent Electrical Contact Type.
American Train Control Company.—Intermittent Electrical Contact Type.
Automatic Control Company.—Electrically Controlled Mechanical Trip Type.
Casale Safety Device Company.—Intermittent Electrical Contact Type.
Clifford Automatic Train Stop Company.—Electrically Controlled Mechanical Trip Type.
General Railway Signal Company.—Intermittent Electrical Contact Type.
General Railway Signal Company.—Inert Roadside Element.

International Signal Company.—Intermittent Electrical Contact Type.
Miller Train Control Corporation.—Intermittent Electrical Contact Type.
National Safety Appliance Company.—Electrically Controlled Mechanical Trip Type.
Schwyer Electric & Mfg. Company.—Inert Roadside Element.
Shadle Automatic Train Signal Company.—Intermittent Electrical Contact Type.
Sprague Safety Control & Signal Corporation.—Induction Type.
Union Switch & Signal Company.—Continuous Induction Type
Wooding, B. F.—Intermittent Electrical Contact Type.
Willson Wright Safety Appliance Company.—Electrically Controlled Mechanical Trip Type.

6. That it does not appear necessary to make tests of all of the devices of a type to determine the availability of that type for general practical use.

7. That a committee on automatic train control should be continued.

The committee, therefore, submits the following recommendations:

1. That this, or a similar, committee be continued to the end of federal control, extending the present provisions for the employment of a permanent staff.

2. That, at the termination of federal control, the work of this committee be continued under the American Railroad Association. On account of the importance of the subject the work should be done by a special committee, having the same standing as a section of the association. The Bureau of Safety, Interstate Commerce Commission, should, as now, have representation on this committee. This committee should include in its work:

(a) Analysis of the reports of train accidents now made to the Interstate Commerce Commission.

(b) Authorization of tests to be undertaken and such supervision of them, in cooperation with the Interstate Commerce Commission, as may be necessary.

3. That arrangements be made by the Railroad Administration or, after the termination of federal control, by the American Railroad Association, for the further practical test, under rules that may be adopted by the committee, of such devices as may be available for that purpose. Such tests should include, in form prescribed by the committee: (a) record of performance; (b) record of installation cost, separate between roadside and train apparatus, and into unit costs; (c) record of cost of modifications of the existing signal system to accommodate the test installation; (d) record of direct operation and maintenance costs.

Administration Co-operating with Railroads on Tie and Rail Purchases

THE DIVISION OF PURCHASES of the Railroad Administration is co-operating with the railroad companies in determining a policy as to the purchase of ties and rails for use after the termination of federal control with a view to getting the necessary orders for future delivery placed without too great disturbance of the market by the resumption of competitive purchasing. H. B. Spencer, director of the Division of Purchases, after a conference with representatives of the regional directors, discussed the matter with representatives of the Association of Railway Executives, who finally referred it to the advisory committee headed by General Atterbury, vice-president of the Pennsylvania, and this committee has held further conferences with the Division of Purchases. As to ties decision has been reached that the Division of Purchases will continue its present practices until March 1 and the railroad companies are looking after their own requirements beyond that date. As to rails, the Railroad Administration has engaged to take at $47 a ton all open-hearth rail delivered during January and February with the understanding that the companies will take those not actually used during that time, and the companies are placing their own orders for future delivery.

Valuation Arguments

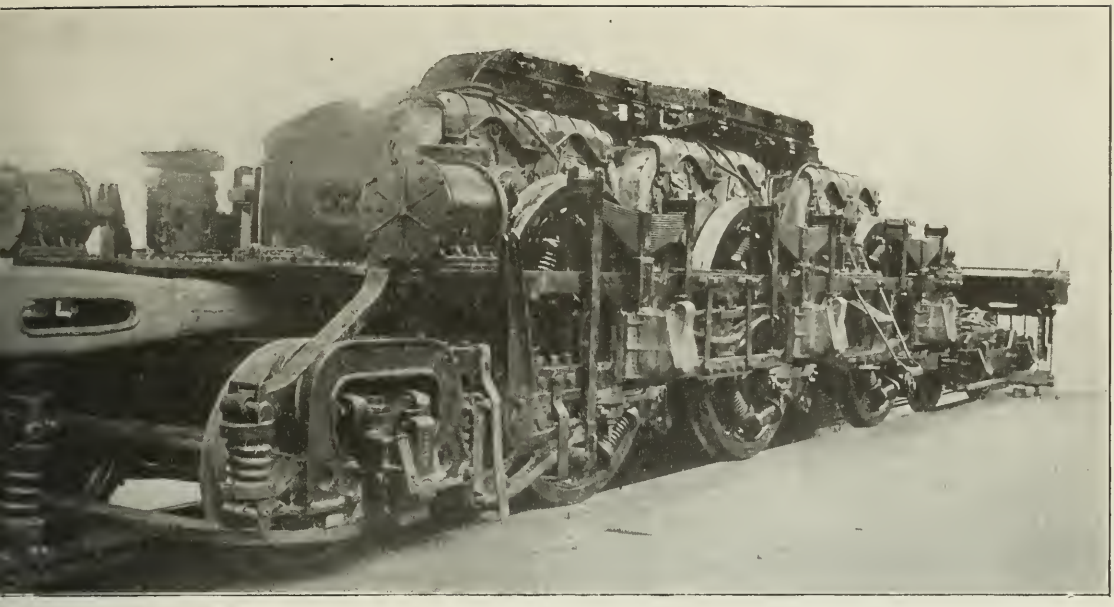
ORAL ARGUMENTS before the Interstate Commerce Commission on the elements to be considered by the commission in determining final value in the valuation proceedings now before the commission, which include only six cases but the principles of which will apply to later cases, were completed on January 9 after three days had been devoted to them. Extracts from the principal briefs were published in last week's issue. Oral arguments were presented by C. A. Prouty, director of the Bureau of Valuation of the commission; P. J. Farrell, chief counsel of the commission; W. C. Brantley and Leslie Craven of the President's Conference Committee, representing the railroads; S. W. Moore, representing the Kansas City Southern; J. E. Benton, A. E. Helm, Paul P. Haynes and Matthew Mills for the state commissions; and Glenn E. Plumb and Donald Richberg for the railroad brotherhoods.

The principal argument for the brotherhoods was presented by Mr. Richberg and was devoted mainly to the proposition which Mr. Plumb has advanced ever since he became the representative of the brotherhoods in the valuation proceedings, to the effect that the railroads are not entitled to the full value of their property, but that their interest is confined to the grants in their charters, which, he says, limit the use of the property to that of a public highway. Mr. Plumb made only a brief statement in which he argued from a provision in the first constitution of the State of Massachusetts that a corporation cannot be given property rights in excess of the measure of its service to the community and that no one can reduce to market value that which he possesses without parting with the possession or control of it. Director Prouty in his argument admitted that an allowance should be included in valuation for the going value, but took the position that the commission need not be too specific in explaining on what basis its final valuation was determined.

Chief Counsel Farrell aroused a controversy with the railroad lawyers by asking the commissioners to rely very largely on their judgment of the equity in the case and as to what values should be allowed for rate-making purposes. He would not include allowances for property donated, although the donation may have been to a predecessor of the present carrier and he cited a case of a road built for logging purposes which had earned sufficiently to amortise the cost of its property and was later devoted to public service as a common carrier for freight and passengers. In such a case he took the position that the value for rate-making purposes would be less than either the original cost or the cost of reproduction. Mr. Farrell also argued that as the Supreme Court would protect a railroad against the use of unit prices obtained in a period of low prices it would also protect the public against the use of unit prices derived in a period of high prices and argued that the cost of reproduction should be based on unit prices under normal conditions. He took the position that the prices used by the Bureau of Valuation as of 1914 represent normal conditions because they were based on a consideration of the fluctuations over a period of years.

The Kansas City Southern has filed a motion with the Interstate Commerce Commission for a re-hearing in its case on which the commission has served its valuation report, on the ground that the report is erroneous in many particulars. Permission is asked to file a brief in support of the motion.

"L'INFORMATION UNIVERSELLE" is publishing a volume, entitled "France," being a catalog of French industry, exports, etc. The 1919-20 edition will contain monographs on metallurgy, machinery in all its branches, hydraulics, electrical engineering, etc. All inquiries should be addressed to "L'Information Universelle, 101, Rue St. Lazare, Paris."



unning Gear of One Half of the Locomotive With Motors in Place

Electric Passenger Locomotives for the St. Paul

Ten Quill-Geared Units Will Be Used to Haul Passenger Trains Between Harlowton, Mont., and Avery, Idaho

THE TEN Baldwin-Westinghouse electric locomotives mentioned in the November 7, 1919, and February 1, 1918, issues of the *Railway Age* are now being deliv- d to the Chicago, Milwaukee & St. Paul for passen- service on the Rocky Mountain division. The completed motive complies very closely with the design which was cribed almost two years ago.

The motive power equipment for the initial electrified ision of 440 miles over the Rocky Mountains consisted of freight, 10 passenger and 4 switching locomotives. When was decided to electrify the division over the Cascade ntains 15 new passenger locomotives were ordered. Five these, built by the General Electric Company, described the October 24, 1919, issue of the *Railway Age,* will be d on the Cascade division; the other ten described in this cle will be used on the Rocky Mountain division. The ginal 10 passenger locomotives will be regeared for freight vice, and a part of the 42 freight locomotives will be used each electrified division.

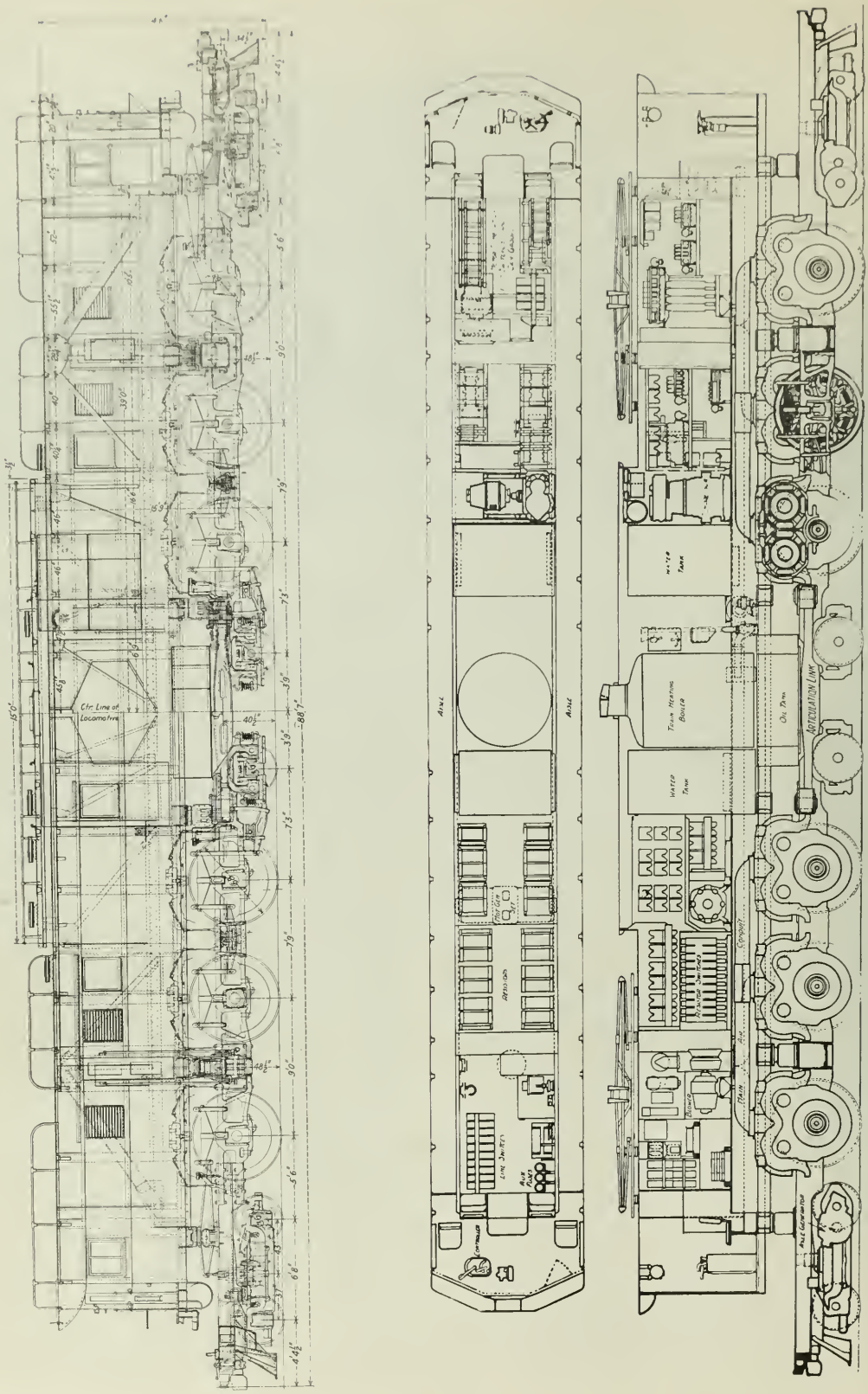
The new passenger locomotives for the Rocky Mountain ision will develop 4,200 horsepower for an hour without eeding the normal rated temperature of the motors and e a normal starting drawbar-pull of 100,000 lb. The wbar-pull may be increased until the wheels are slipped hout injury to the electrical apparatus.

The locomotive consists of two duplicate running gears of Pacific type, placed back to back, supporting a single . The wheel arrangement of the locomotive is 4-6-2-2-6-4, h 68-in. drivers, a rigid wheel base of 16 ft. 9 in. and a l wheel base of 79 ft. 10 in. Rigid and floating center s have been provided to relieve the cab structure of pull- and bumping strains, all such forces being transmitted ectly through the running gear.

Many of the desirable features of steam locomotives have been included in the mechanical design, and in the design of the electrical apparatus the makers have included equipment which was found to be particularly good in previously built electric locomotives. These points are essentially: the limited amount of high voltage auxiliary apparatus, the stability of the operation of the main motors, the wide range of speed operation and the disposition of the apparatus in its grouping and mounting.

The articulation of the various trucks was considered one of the most important points of design. It was the endeavor to have each truck laid down so that each one would take care of itself and would not have to be led along by any of its companion trucks. During a series of tests made at East Pittsburgh, Pa., this feature of the mechanical operation of the locomotive was pronounced and the locomotive was declared to have especially good riding qualities. An extensive study was also made of weight distribution and its equalization between trucks. With this latter end in view, comparatively long spring hangers have been used so that any slight increase or decrease in their length for the purpose of shifting the load does not have any noticeable effect on the position of the locomotive springs.

The 3,000-volt direct current power is conducted through the necessary switches and resistances to six motors of the twin-armature type mounted on the locomotive running gear. The two armatures of each motor are permanently connected in series, and the control is so arranged that at least two motors are always in series, with the result that the voltage across any one armature never exceeds the value of 750 volts during motor operation. In addition to this, the control is further arranged so that all main motor fields are connected on the grounded side of the circuit, thus maintaining most



Side Elevation and Plan and Section of Locomotive, Showing General Arrangement of Apparatus

of the voltage stresses on the motors practically in line with commercial usage for the past 15 or 20 years.

One motor is mounted over each driving axle on the frame of the locomotive, and power from each armature is transmitted by pinions to a gear with an 89:24 reduction. The gear is mounted on a quill shaft, which is also supported on the locomotive frame, and which surrounds the locomotive axle with an appreciable clearance. The connection between the driving wheel and the quill shaft is made by springs. One end of each spring is connected to the quill shaft, while the other engages a bracket on the spoke of the driving wheel.

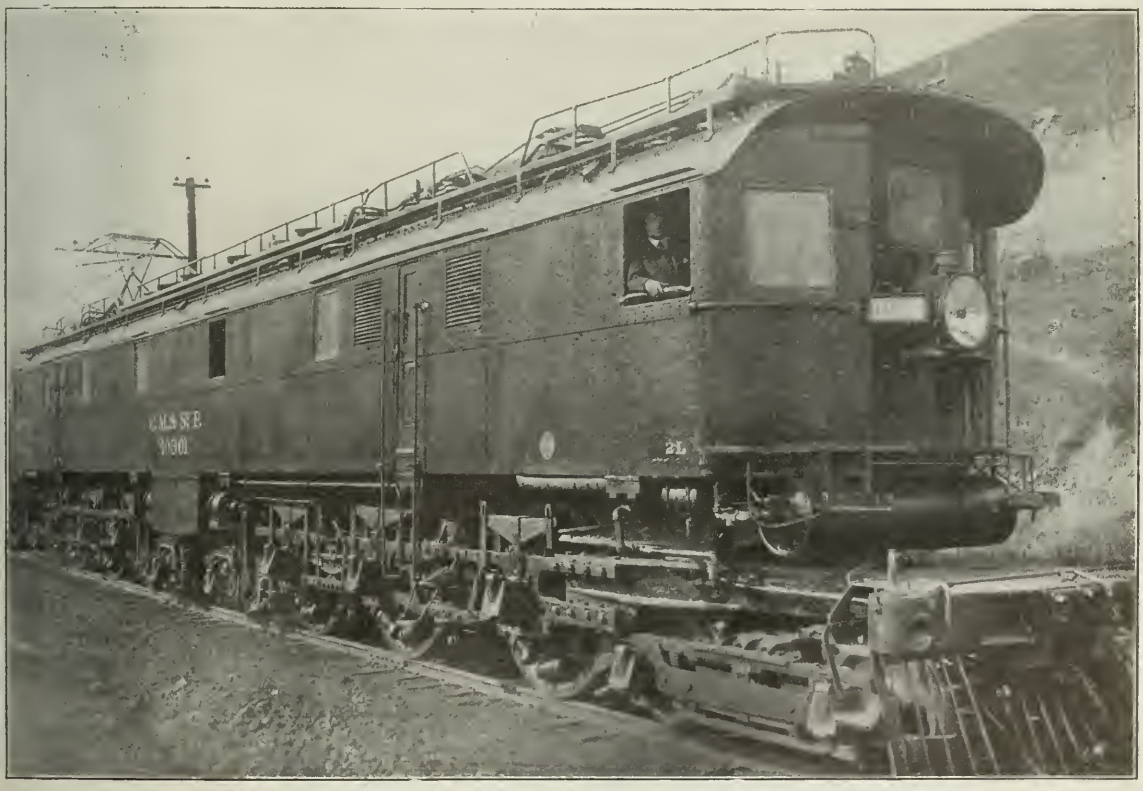
This arrangement permits the driving wheels to follow the unevenness of the roadbed, without affecting gear mesh, as well as cushioning the torque of the motor. In the design of this type of quill shaft the details have been governed by the experience obtained from the successful application of a similar type of drive on the New York, New Haven & Hartford locomotives, making due allowance for the increase in tractive effort.

The cab structure of the locomotive, which also partially encloses the main motors, contains the auxiliary apparatus necessary for the proper functioning of the motors. Enginemen's operating compartments are located at either end, connected by aisles extending along the side of the cab. All high voltage apparatus is enclosed in compartments to give complete protection to the engine crew while the locomotive is in operation. When the locomotive is "dead" easy access is afforded for inspection and adjustment of all apparatus by removing the compartment sides and by center aisles opening through expanded metal doors into the cross aisles.

The manner of regenerating power for operation on down grades used on these locomotives embodies features which have not been used before. The main driving motors are series motors, and in order to make them regenerate power to the line it is necessary that they be separately excited. The control of the excitation of the main motors for regeneration is initiated manually by the operator from the master controller, the exciting current coming from two small generators geared to one of the axles of each bogie truck. These small generators in turn are excited from an independent source, consisting of a motor-generator set operating in parallel with a small storage battery. All of the main motors are used during regeneration. Efforts have been made in the design of main motors and the axle generators to guard against any possibility of snow getting into the windings. One of the axle generators is mounted on each bogie truck in a standard street railway motor frame.

Condensed Table of Locomotive Weights and Dimensions

Normal trolley voltage	3,000 volts
Total weight	275 tons
Weight on drivers	336,000 lb.
Weight on lead trucks	66,000 lb.
Weight on trailing trucks	41,000 lb.
Total wheel base	79 ft. 10 in.
Driving wheel base	16 ft. 9 in.
Maximum rigid wheel base	16 ft. 9 in.
Diameter of drivers	68 in.
Diameter of lead truck wheels	36 in.
Diameter of trailing truck wheels	36 in.
Locomotive capacity at 23.8 m.p.h. (1 hr. rating)	4,200 H. P.
Normal starting tractive effort	100,000 lb
Normal speed on level track	55 m.p.h.
Capacity of steam boiler	4,000 lb. per hr.
Capacity of water tanks	25,500 lb.
Capacity of oil storage tank	750 gal.
Cab length	78 ft. 0 in.
Total overall length	88 ft. 7 in.



Chicago, Milwaukee & St. Paul Electric Passenger Locomotive.

Control

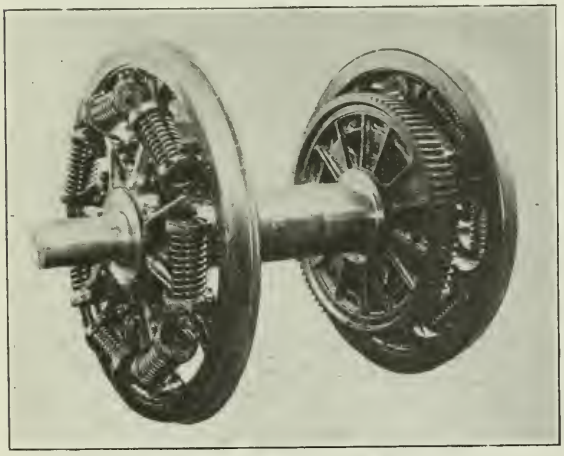
The locomotive control provides three motor combinations, giving one full series and two series-parallel connections.

The two latter connections consist of two parallel circuits of three motors in series and three parallel circuits with four motors in series. In each of these motor combinations three running notches are provided, which are full field, short shunt and long shunt. This provides a total of nine running speeds without resistance connected in the circuits.

While descending a grade the excitation of the motor field is entirely under the control of the engineman and may be increased or decreased as desired, causing corresponding increments and decrements to the regenerative effort of the locomotive, thus varying the speed of the train through any desired range. The full motor capacity of the locomotive is available for regeneration, and under all conditions of grade on which it will be used it should be able to handle any train down grade that would require double-heading on the way up.

Auxiliary Apparatus

Power for energizing the control circuit and operating the auxiliary apparatus, a small blower motor, the motor-driven air compressor, etc., when these are not being driven by the axle generator, is obtained from a small motor generator set and storage battery which are used to excite the fields of the axle generators. The high-tension winding of this set



Driving Wheels with Springs, Quill Shaft and Gear

is the only piece of revolving apparatus in a locomotive, with the exception of the main motors, which is connected to the 3,000-volt circuit. The low-tension side of the motor generator set is provided with slip rings for the generation of a low voltage alternating current for the headlight and for some of the interior cab lights. During motoring and when coasting without regeneration, the axle generators are automatically connected to the low voltage auxiliary circuit, so that the motor generator for the greater part of the time is only necessary for furnishing excitation to the axle generator field and for charging the storage battery. This reduces the necessary size of the motor generator set.

All main motor and resistance circuits are opened and closed by electro-pneumatic 3,000-volt switches which are standard for Westinghouse unit switch control. These switches are provided with blow-out coils for breaking the arc. Transfer of circuit where no high voltage current is broken is accomplished by means of cam-type contactor groups adopted for the purpose of reducing space and weight by the elimination of otherwise necessary unit switches. The control circuits of all unit switches and the cam-contactor groups are respectively interlocked electrically to prevent any improper functioning of the apparatus. All unit switches, cam-contactor groups, grid resistances, protective relays, etc., are mounted in compartments entirely closed off from the enginemen's cabs and the aisles of the locomotive, as previously mentioned.

The center compartment of the locomotive is given up entirely to an oil-fired steam boiler, its supply tank and auxiliaries. This boiler supplies steam for heating trains and is capable of evaporating 4,000 lb. of water per hour. Two storage tanks for water are provided, having a combined capacity of 25,500 lb. of water. There is also a tank for the fuel oil, with a capacity of 750 gallons. The boiler also feeds radiators in each of the operating cabs.

I. C. C. to Continue Railroad Administration Operating Statistics

The Interstate Commerce Commission has issued an order prescribing rules pertaining to operating statistics intended to continue, with slight modifications, the compilation by Class I steam railways of the basic data required on the forms on which operating statistics are now reported to the United States Railroad Administration. Such data will be reported in full in the annual report forms and a part of them will be reported monthly as specified in Schedule II of the rules. Though the order had been made effective as of January 1, 1920, the monthly reports will not be required by the Interstate Commerce Commission while the present monthly reports of operating statistics are made to the United States Railroad Administration. This order is not intended to abrogate the classification of train-miles, locomotive-miles, and car-miles for steam roads prescribed by the commission and effective on July 1, 1914, nor to cancel requirements as to operating statistics heretofore called for in annual reports.

The railroad executives had made plans for continuing the reports if the commission had not decided to do so.

The rules prescribed in Schedule I are as follows:

1. Average number of miles of road or first running track operated, and of other main tracks, not including yard tracks and sidings, should be shown for freight service and mixed service combined, and also for passenger service and mixed service combined.

2. Train-miles, locomotive-miles and car-miles should be reported in accordance with the classification of July 1, 1914. In addition, the direction of movement should be shown; that is, whether east or west. Where movement of traffic as a whole is not east or west, north should be substituted for east and south for west, or north and south should be combined with east and west according to traffic movement. Work equipment car-miles in transportation service freight trains should also be segregated. For comparisons with operating expenses under section 10, Schedule I, train-miles and locomotive-miles should also be reported in the following form:

Class of service	Train-miles	Locomotive-miles
Freight train[1]		
Passenger train[1]		
Total		

[1] Including a proportion of mixed and special train services based on car-miles in mixed and special trains.

3. Gross ton-miles in freight transportation service should be reported as outlined below. Gross ton-miles are defined as tons of 2,000 pounds behind locomotive tender (cars, contents and caboose) moved 1 mile. They are to be computed from conductors' train reports. Gross ton-miles in mixed-train and special-train services should be computed

from conductors' train reports in the same manner as gross ton-miles in freight-train service, but should include only the gross tons of freight cars and their contents, and of the caboose. Direction of movement should be shown as provided in paragraph 2.

GROSS TON-MILES

Class of freight service	East	West	Total
Freight train			
Mixed train			
Special train			
Total			

4. Rating ton-miles in freight-train service only shall be reported by direction of movement as indicated in paragraph 2. Rating ton-miles are defined as potential gross ton-miles which would be produced were all trains loaded to 100 per cent of the slow freight rating for normal summer weather conditions, with allowance for changes in rating over sections of the run. When the potential trainload in the direction of favoring grades is expressed in number of cars, an arbitrary tonnage rating should be used as the basis for rating ton-miles.

5. Net ton-miles, revenue and non-revenue, in freight transportation service will be compiled from conductors' wheel reports and will be reported as outlined below.

NET TON-MILES OF REVENUE AND NON-REVENUE FREIGHT

Class of freight service	East	West	Total
Freight train			
Mixed train			
Special train			
Total			

The ton-miles compiled from conductors' wheel reports may be used as a basis for arriving at the annual net revenue ton-miles of freight by subtracting the non-revenue ton-miles from the total. If net ton-miles are currently compiled from waybills, the waybill ton-miles should be used for net revenue ton-miles.

6. Train-hours of freight trains, both ordinary and light, not including mixed, special, or motor-car trains, shall be reported by direction of movement to show the elapsed time of trains between the time of leaving initial terminals and the time of arrival at final terminals, including delays on the road, as shown by the conductors' train reports or despatchers' train sheets.

7. Tons of 2,000 pounds of coal consumed by locomotives shall be compiled by classes of locomotive service. Equivalent coal tonnage for fuel oil used on oil-burning locomotives shall be included; and the same principle shall be applied to electric locomotives, by including equivalent net tons of coal, based on K. W. H. per net ton of coal consumed in generating power, used by electric locomotives. Coal used in generating power for electric multiple unit trains should not be included. The extent to which electric locomotives use water-generated power should be stated, and the reporting carrier should be prepared to furnish the locomotive-miles, in freight, passenger, mixed, special, and switching services, the gross ton-miles and the passenger-train car-miles involved in trains propelled by such water-generated power.

8. The distribution of locomotive-hours shall be shown in the following form.

All locomotives on the road, owned, leased, or rented, should be included, but owned locomotives in service on other roads should be excluded.

Returns for item 1 should represent the time in productive road (train and switching) service and in yard switching service. For locomotives in road service, the returns should be taken from conductors' train reports or despatchers' train sheets, and based on hours from leaving time at initial terminal to arriving time at final terminal, including train switching time and delays on road. For yard switching service, the information may be taken from yard records, and based on hours between the time a locomotive leaves engine terminal to begin yard switching work and the time it returns to engine terminal.

Returns for item 2 (*a*), hours at terminals, represents time at terminals before and after the period of productive service, exclusive of enginehouse time reported under 2 (*b*).

Item	Locomotive-hours in— Freight train service	Passenger train service	Yard switching service	Mixed, special, and work-train services	Total
A. Serviceable locomotives:					
1. On road or in yard switching service					
2. (*a*) At terminals					
(*b*) In enginehouses					
3. Stored					
4. Total serviceable					
B. Unserviceable locomotives					
Total[1]					

[1] The total number of hours divided by the number of hours in the year will give the average number of locomotives.

For road service, the returns may be taken from enginehouse and yard records, and based on hours between the time the locomotive is delivered to transportation department and the time the locomotive leaves initial terminal, and between arriving time at final terminals and the time the locomotive is delivered to enginehouse forces. For yard switching locomotives, data are to be taken from enginehouse and yard reports, and based on hours between the time the locomotive is delivered to transportation department at engine terminal and the time it leaves engine terminal for yard switching work; and hours between the time the locomotive reaches engine terminal at end of day and the time it is delivered to enginehouse forces.

Engines stored are those under white lead or stored in serviceable condition and available for service.

Unserviceable locomotives include those awaiting or undergoing repairs if held more than 24 hours on that account, including unserviceable locomotives stored or awaiting sale. In distributing unserviceable hours among classes of service, the normal assignment of a locomotive may be followed if it is not practicable to divide the time between the classes of service in proportion to the miles or days in each class of service since last general repairs.

9. In addition to the statement of freight cars owned there shall be stated the number of serviceable cars, excluding caboose and work equipment, and including home, foreign, and cars of private car lines, on line daily, the number of cars in or awaiting shops daily, including all "bad order" cars, and the total number of cars on line daily. These items should be shown separately for home cars and foreign cars. The number of the cars which are stored and which are included in the number of serviceable cars on line daily should also be shown. Under "cars stored" are to be included only such serviceable cars as are temporarily removed from transportation service on account of a falling off in business. Surplus cars not definitely stored are not to be included under "cars stored" nor should bad order cars be included under this head. The number of cars on line daily is to be determined by an inventory taken on the first day of each month, with a daily debit or credit adjustment from the summary of the interchange reports and the repair track and shop reports. The annual

figures reported will be the average of the monthly figures obtained by dividing the sums of the cars on the line each day by the calendar days in the month.

10. The following primary expense accounts shall be reported with the modifications indicated:

Item	Freight service[1]	Passenger service[1]
(1) Locomotive repairs (accounts 308 and 311, but excluding yard switching locomotives)		
(2) Train enginemen (accounts 392 and 393, including wages of motormen on electric locomotives, but excluding wages of motormen on motor-car trains.)		
(3) Fuel for train locomotives (account 394, including electric locomotive proportion and excluding motor-car train proportion of accounts 395 and 396)		
(4) Other locomotive supplies (including accounts 397, 398, and 399)		
(5) Enginehouse expenses—train (account 400)		
(6) Trainmen (account 401, excluding conductors and trainmen of motor-car trains)		
(7) Train supplies and expenses (account 402, excluding all charges on account of motor-car trains)		
Total—selected accounts		

[1] Including a proportion of mixed and special train expenses on the basis of car-miles in mixed and special trains.

Returns in accordance with the following outlines in Schedule II are to be made for each month, beginning with January, 1920, including comparative items for the same month of the preceding year. Cumulative figures from the beginning of the year should also be shown.

1. Average mileage operated:

Item	In freight and mixed service	In passenger and mixed service	In all services
Average number of miles of road			
Average number of miles of other main tracks			

2. Train-miles and locomotive-miles:

TRAIN MILES AND LOCOMOTIVE MILES BY CLASS OF SERVICE

Class of service	Train-miles	Locomotive-miles
Freight train		
Passenger train		
Mixed train		
Special train		
Motor-car train		
Total		
Work service		
Freight service[1]		
Passenger service[1]		

[1] Including a proportion of mixed and special train service based on freight and passenger car-miles in mixed and special trains.

3. Car-miles:

CAR-MILES BY CLASS OF SERVICE

Class of service	Freight-train car miles: Loaded	Freight-train car miles: Empty	Passenger train car-miles	Caboose	Work equipment car-miles
Freight train					
Mixed train					
Special train					
Motor-car train					
Work equipment in transportation service					
Total					
Work service					

4. Cars on line:

Items	Home cars	Foreign cars	Total
(*a*) Number of cars on line daily:			
(1) Serviceable			
(2) In or awaiting shops, including all "bad order" cars			
(3) Total			
(*b*) Number of cars stored included in (*a*) (1)			

For definition of terms under above head, see Schedule I, par. 9.

5. Gross ton-miles:

Freight train service	
Mixed train service—freight	
Special train service—freight	
Total freight gross ton-miles	

6. Net ton-miles, revenue and non-revenue, in freight mixed, and special services, from conductors' train reports.

7. Number of revenue tons carried and number of revenue tons carried one mile.

8. Number of revenue passengers carried and number of revenue passengers carried one mile.

9. Selected operating revenue and expense accounts separated between freight service and passenger and allied services according to rules prescribed.

Item	Freight service[1]	Passenger service[1]
(1) Locomotive repairs (accounts 308 and 311, but excluding yard switching locomotives)		
(2) Train enginemen (accounts 392 and 393, including wages of motormen on electric locomotives but excluding wages of motormen on motor-car trains)		
(3) Fuel for train locomotives (accounts 394, including electric locomotive proportion and excluding Motorcar train proportion of accounts 395 and 396)		
(4) Other locomotive supplies (including accounts 397, 398 and 399)		
(5) Enginehouse expenses—train (account 400)		
(6) Trainmen (account 401, excluding conductors and trainmen of motor-car trains)		
(7) Train supplies and expenses (account 402, excluding all charges on account of motor-car trains)		
(8) Freight revenue (account 101)		
(9) Passenger revenue (account 102)		
Total—selected accounts		

[1] Expenses should include a proportion of mixed and special train expenses on the basis of car-miles in mixed and special trains.

10. Quantity and cost of fuel:

(1) Net tons and total cost of coal charged to account 394.
(2) Gallons and total cost of oil charged to account 394.

The commission has also issued revised rules reviving the requirement that a separation of operating expenses between freight and passenger service be reported, which was suspended on October 23, 1917.

Mr. Hines to Federal Managers

DIRECTOR GENERAL HINES issued the following to federal managers under date of January 2, 1920:

"In entering upon the last two months of federal control, I ask anew for the greatest possible personal interest on the part of every federal manager in obtaining the best service for the public and in securing the greatest value in return for our operating expenditures and in making for these purposes every reasonable endeavor to secure the understanding co-operation of the employees.

"I have at all times felt the strong desire of the federal managers to carry forward operation on the best practicable basis, despite all the difficulties which were inevitably the outgrowth of the war conditions, and I have frequently testified to their loyal support. Nevertheless I wish to add again this personal word in appealing to them for their continued support up to the last minute of federal control. The railroad service is a continuing function and obligation, regardless of what management temporarily controls it, and we must all do our very best to prevent the prospective change of management from impairing in the meantime the efficiency of the work.

"Whatever we can do in these two months in giving the best service and in getting the greatest efficiency will also be an important contribution toward obtaining the best results in the future.

"Please, therefore, keep up and if possible intensify your vigilance and initiative and make sure that the same spirit continues to actuate all subordinates."

The Cummins Bill and the Railroad Problem*

A Discussion of the Financial and Labor Provisions of the Senate Bill Now in Conference

By Oscar W. Underwood
United States Senator from Alabama.

THE Senate of the United States has passed a bill relating to the transportation system of America that, if it becomes a law, will mark a new era in the history of the American Republic in at least one respect. The era of war between capital and labor and the great transportation lines of this country will cease. The era of settlement by reason, by arbitration, by the law of social justice will have begun. It is a practical question but it is a home question. This bill relates to the industrial life of the nation. It relates to the happiness and peace of the home life of the nation.

Legislation a Practical Question

This bill is not in entire accord with my views, although I supported it in detail; but in passing let me say there are few great bills that have passed the Congress of the United States in the 24 years I have represented this immediate constituency that in all their details have met with my approval. Great legislative enactments are matters of compromise, and men who desire to be constructive in legislation must accept the best obtainable to accomplish the desired result and can not expect that every detail of legislation will meet with their approval.

There are many problems embraced in the so-called Cummins bill that it is not necessary for me to go into. There are many pages devoted to changes of organic law suggested by the Interstate Commerce Commission. There is incorporated within the pages of this bill the entire and absolute control of the issuance of railroad securities for the future, the regulation of the issuance of railroad securities so that in the future there shall be no more so-called watered stock; so that the money that is invested in the railroads and must earn interest in the future must be money that is actually invested for the benefit of the public.

There has been practically no opposition to these features of the bill. Public sentiment has grown and drifted until almost by universal acclaim these features of the bill are recognized by the public as necessary in the public interest and have been accepted. I want to go to the battle line of the bill, the contested part of the bill, the questions where men differ, and give you my views for my support of the bill on these features.

This proposal for solution of the railroad problem is nothing new. For nearly five years I have been a member of the Senate, and my very first suggestion when I became a member of the Senate was that a joint commission should be appointed to work out the railroad problem and see if we could not place it on a solvent and safe working basis in the interest of the public. It was known as the Newlands resolution. Senator Newlands was chairman of the Interstate Commerce Committee. I wrote the resolution and asked Senator Newlands to introduce it. It was passed by both Houses, and a joint commission to work out the railroad problem was appointed. We had many hearings; we gave long consideration to financial, operating, and labor problems. But before we reached any conclusion or final determination of the question the Great War came on and the railroads came under governmental operation, and the work of our commission of necessity ceased. The men who were on that commission, though, sat upon the interstate committees of the House and Senate and wrote this legislation that has now gone to conference. So they were educated on the subject before it was actually taken up.

Labor, Finance, and the Public

There are two paramount sections in that bill. One is section 6, that involves finance, and one is section 29, and the immediately following sections that involve labor. And when you say finance, and when you say labor, you have the whole railroad problem before you, except one other word, and that is the public—the man who pays the bill. There was a time in the history of the development of the railroads when the main factors involved in the problem were the capital and the labor. But to-day the great American Republic has become the vital living force of this question that can not be overlooked in any just settlement of the problems involved.

Section 6 of the bill relates to finance. Under the old system of government regulation of railroads, you know in the beginning when Commodore Vanderbilt established one of the first great consolidated systems of railroads in the country, capital was the all-dominating factor. Capital could charge what it pleased for the transportation of freight, could order labor to do what it wanted to—could handle the whole situation without limitation. But since that day two great organizations have begun to function in the transportation system of the country. One is the government and the other is organized labor.

Four decades ago the Congress of the United States started to regulate the railroads, and in 1906 passed a bill that completed the direct control of the railroads, so far as freight rates were concerned. Organized labor commenced maybe five decades ago, certainly four decades ago; I can not remember the actual date. It was weak in the beginning, and grew and grew until it became a more powerful factor in the operating equation than the capital that owned the railroads.

The Rate-Making Problem

We are regulating railroads to-day in the interest of the shipper by regulating the freight rate for each piece of freight. The cost of carrying a ton of pig iron from Birmingham to Boston is not fixed by the general manager down here at the railroad office. Of course, I am talking now as if the government were not at present running the railroads, as if they were under private control. The rates are fixed by the Interstate Commerce Commission, and the toll that you have to pay to carry a ton of pig iron to Boston is $5. It does not make any difference whether you go to the Louisville & Nashville station or the Southern station or the Seaboard Air Line station, you pay the same price for carrying a ton of pig iron to Boston. So it is with a carload of feathers or a package of silk or anything else, the government fixes the rate. Suppose you are on the strongest railroad in the South with your town and your business—a railroad that has dense traffic and high earnings and is able to supply you with all the cars you want and

*From an address before the Chamber of Commerce and the General public at Birmingham, Ala., on January 2, 1920.

give you adequate service. Are you any more entitled to live and carry on your business from a public standpoint than the man who lives on a railroad necessary in the public interest, necessary to the development of the state, but enjoying a lighter traffic, and therefore to be denominated as a weak road? He has developed a coal mine or a farm or a factory or a grocery store. He wants to live and do business. Because fate has thrown him in a territory of light traffic and you are in a territory of dense traffic, do you think you ought to have any exclusive right to adequate railway service with which to get your goods to the ultimate market of consumption and he not have a corresponding right? Of course, all that depends upon whether his railroad can live and function and do business; and that depends on whether it can finance itself. If it can not finance itself, the development of the South and of the Nation and the fate of existing communities is restricted to a few railroads enjoying unusual advantages.

Now, the difficulty that confronted the Congress of the United States was this: Here is "A" railroad that started out in the beginning and wandered from one town to another. It was not built on a direct line, but it was built because one town wanted to connect with another, and it connected with another, and then they were joined together in one system. It went over mountains and hillsides; it went by circuitous routes; it built up the country. Then came along "B" railroad, after great commerce in the general territory was established, and built a direct line under modern engineering practice, avoiding the hills and building tunnels and making a short line. Now, bear this in mind: Eighty per cent of the revenue of all the railroads is derived from the long haul, the competitive haul, and only 20 per cent from local noncompetitive business. So that you see that a railroad, to live, must for its necessary return look to its competitive business—generally the long haul. It costs the "A" railroad much more to carry its freight to the final market of disposition, the railroad that was built under adverse conditions, than it does the "B" railroad, that was built by modern methods and goes a direct line. Both are necessary in the public interest. Both must survive. And yet they must carry freight at the same rate, because if "B" railroad carries freight more cheaply than "A" railroad all of the through freight goes over "B" railroad, and "A" railroad will starve to death. So far as the loss of capital is concerned, that might not be so serious. You might say, "Sacrifice the man who made a bad investment"; but, my friends, you sacrifice the man who made a bad investment in railroading only by sacrificing the railroad and business and happiness of the thousands and hundreds of thousands of people who live along that line. Their business must be made junk. Their opportunity to reach the ultimate market to dispose of their products wil be destroyed if you destroy the road. And that was one of the problems that confronted Congress.

There has been great pressure on the Interstate Commerce Commission in the last two or three decades for lower rates, or against any raise in rates, and if an active railroad with heavy traffic controlling heavy exchange traffic and heavy divisions of rates was making what seemed to be undue profits, the demand was that the rates on freight should come down or remain down, for higher rates would give it greater profits. Its condition was taken as the standard; it was held as the example, and when the rates came down or remained down on the strong road the weak road went into the hands of a receiver, the weak competitive road. Now, that is the great financial problem that has confronted Congress in all these months.

A New Test

But we have proposed a new system. You understand that the old basis of regulation of railroads was based on the effort to determine what was a just and reasonable charge for the transportation of a ton of pig iron from Birmingham to Boston, or a bale of feathers or cotton, or something else. But we found we could not leave it on that basis. There were some few roads that were successfully running and making money by reason of peculiar conditions. A large percentage of them were barely living and not giving adequate service to the public, and that is why you took them over for federal operation during the war, at great expense. Conditions had choked off most of the roads in the country, and when the war came on there was no agency or relief that could put life into them and make them function and carry the soldiers, carry the raw material, and carry on the nation's business during the war except the government itself; and it has cost you hundreds of millions of dollars because your legislation had choked off the majority of the roads before the war came on, and they were unable to meet the stress of war conditions.

Now, the problem that confronts the Congress is to turn these roads back so that all roads necessary in the public interest can function and all serve the public, whether the public lives on the lighter traffic road or the strong road. So we have changed the basis of rate making. The country is divided now into three rate-making districts, the western, southern, and northern. We have said that what is fair to the railroads in the way of return on its capital should be a just return on the fair value of its property. So that we have provided that the basis of freight rates in each district shall be adjusted so as to produce a return of 5½ per cent on the fair value of the railway property in the rate district. In other words, if the value of the railroad property —the real value now, not watered stock—if the real value of the railroads in the southern district is $5,000,000,000—and that is approximately about right—the return that these railroads, not individually, but as a whole, in this southern district are to be entitled to earn is as nearly as practicable 5½ per cent on $5,000,000,000; it would be something between $260,000,000 and $270,000,000—5½ per cent.

Do you think that is unjust? You can buy an untaxed government bond on the New York Stock Exchange to-day at a price that will yield 5 per cent. It sells enough below par to pay you 5 per cent, with valuable tax exemptions. Do you think you can make these railroads function unless you give that much—5 per cent—to investors in railway securities? Now, they do not get it if they do not earn it. Many of the roads will not earn it; they must work for it and earn it through efficiency if they get it; but on that basis of 5½ per cent the railroads will have a fair chance. Before the war, or the three years immediately preceding the war, the railroads had an average earning capacity of 5.22 per cent in the aggregate investment, and if this bill goes through they will in the aggregate have a right to earn—that is, their freight rates will be based on a yield of 5½, or 5.50, or an increase of twenty-eight one-hundredths of 1 per cent, or about $50,400,000 for all of the railroads of the United States. Now, that is not an unreasonable increase when you consider the scale on which everything else has increased, and the increased interest which must be paid to attract investments. Now, that is the net; you would pay a good deal more than that in freight rates. That is a net increase, not a gross increase. Of course, all increase in wage, all increase in coal, all increase in steel rails, in costs, goes into gross; but the railroads as a whole would get an increase of $50,000,000 in net; and it will cost more than $50,000,000 to make up to railway investors for the increased cost of money; or, you might say, for the depreciation of the value of money; and the increased value of everything else, for a ton of cotton or iron or merchandise will buy more transportation to-day than ever before in the history of the railroads.

But we did not stop there. Some of these railroads will not earn 5½ per cent on the fair value of their property devoted to public use. Some of them will earn more. We said heretofore that a railroad could earn all it could make. We now put a limitation upon its excess earnings. We have said that a railroad's earning capacity could be 6 per cent on its value, with a graduated proportion of any excess. If it is undercapitalized and earns 6 per cent on the fair value of its property, it will be more than 6 per cent on its capital stock. If it is overcapitalized, it will be less than 6 per cent; and then when its earnings goes to 6 per cent on real value, we have said that it can earn one-half of the earnings between 6 and 7, or one-half of 1 per cent more; and when it goes above 7 per cent, it can only keep for itself one-fourth of what it earns over 6 per cent. The balance has to go into a government fund, a government fund in the interest of the public, a government fund that can be loaned the railroads, weak or strong, that have to borrow money in order that they may compete with the great lenders of money in New York and hold down the price of interest, because you know you—the public—have got to pay that interest. You pay it. The railroad can not run unless you do pay it, and then the fund can be used to be invested by a government board or commission in buying locomotives and cars, and equipment of all kinds and renting it to the weaker roads or the roads that need it whether they are weak or strong. That is in the interest of the public. One of the great problems that you have to contend with is lack of cars, lack of facilities to get your product to the market. Under this bill no longer could it be said that one great concern in America can hold all the ice cars, the refrigerator cars, because if they try to make a monopoly of it the government would build some and furnish them where the public needed them, wherever congestion or scarcity might arise. That is in the interest of the people.

Incentive Not Destroyed

Now, there is complaint that we are limiting the earning capacity of these roads. We have given them the incentive to go on. There is no competition in rates now. There is only competition in service; but as this bill would allow them to earn one-half they earn between 6 and 7 per cent and one-quarter of 1 per cent above 7 per cent we would still hold out the inducement for competition in service. But as the government under this bill would direct the Interstate Commerce Commission of the United States that it shall levy freight rates on the public that will enable the railroads to earn—not on their capital stock but on their real value—to the extent of 5½ per cent, that is practically assuring the aggregate railway investment out of your pocket, Mr. Shipper, whether represented by issues of stock, if issued at real value, or by their bonds, if issued at real value, a return every year; and if the government fixes a reasonable return for them so that they can live and function, it is but just and right that the government shall say how far they shall have the privilege of earning out of the business of the American people.

Labor Provisions

Now, I want to come down to the other problem, and that is labor. It is just as vital to you as finance. Labor functioning properly in the great railroad system in this country is necessary to the life of the nation, so necessary to the life of the nation that when the men of America had to save the world from the Hun you told the man who was engaged in railroad labor he need not go to the firing line; that it was more necessary for him to stay on his job. That is how vital transportation is to the country, so we have taken a very radical step in the labor world in this bill.

I am not surprised that labor leaders have criticized it. It would be strange if they had not when first written in this bill and before the rank and file of labor had thought it out. But I think the step that the Senate has taken is necessary, not only for the protection of the American public but for the protection of railway labor itself.

I told you a while ago the provisions of this bill were reported from the Senate committee, 15 men voting, by a vote of 14 to 1. A motion was made in the Senate to strike out the labor provisions and was defeated by a vote of 47 to 25. Now, that may not mean much to you. Labor is a very powerful factor in politics, and labor leaders had come before the committee of the Senate and absolutely rejected the provisions of this bill. The Senators of the United States are elected to office by labor as well as by farmers and business men, and they are slow to defy the mandate of a great class unless they feel sure that they are right. And by a vote of 47 to 25 they refused to strike out of this bill its labor features. Now, I think, whether you represent labor or capital or the public, that that should give you cause for consideration. Why, I see men in this audience whom I have known for 35 or 40 years—men who have represented the great labor interests of this district. I don't think that any man there can say, although I have not always agreed with them, that my general attitude against labor in this district has been unfair. Six years ago, when I was a candidate for the Senate, I had some splendid endorsements from the very men who do not agree with me in this position.

The Precedent of 1916

Yet I want to make a confession to you. I am probably more responsible for the labor clause in the Cummins bill than any man in the Congress, because I first proposed it in the Senate. When the Adamson bill came before the Congress in 1916 it came there to avoid a great railway strike. The labor and the representatives of the railroads—I won't say labor and capital, because capital had little to say about it; it was the management of the railroads and the labor—could not agree. The President was appealed to and he could not bring them together, and, finally, labor itself asked the Congress to solve the problem by federal statute. Now, some people deny that. One of the leaders of the brotherhoods in my office a week or two ago denied that proposition. "Ah," he said, "but they had not done so officially";; that they had not officially asked the Congress of the United States to solve this problem by a statute; that there was nothing on their books to authorize such action. I said, "Mr. Wills, you came into this office and asked me to vote for the Adamson bill, and a committee from the Birmingham district representing railroad labor came to Senator Bankhead's office, met Senator Bankhead and myself and asked us to support the Adamson bill. We did not ask you for your credentials as to whether you had passed a resolution in your organization to favor the Adamson bill, but you told us that you were the representatives of the four brotherhoods, and you asked us to vote for it. Were we not justified in presuming that your organization was for it?" If they had not stood for it, and if the President of the United States had not asked for it the Adamson bill never would have become a law. What did they ask for? They asked for the government of the United States to fix the rate of wages and the hours of work. It came from labor, and it was going their way.

When men make a precedent they can not deny it. They must stand by their own handiwork; and if there are any railroad men in this hall to-night—I know there are—you know that every word I have just uttered is true. You were right in asking for it when a strike became inevitable. The peace and the happiness of the nation were threatened. There was nothing that could save it but the government, and the time had come when the government should function, and it did function. But I knew then that the Adam-

son law did not solve the problem; I knew then that if the final decision of governmental authority was right as a temporary expedient, it was right that the government should fix the rates of wages whenever and as often as the disagreements between management and employees became irreconcilable. I knew that we members of Congress knew nothing about the real equation involved. How did we know, with the many duties that we have to perform, whether the particular rate of so much per day paid to the man who sits in the engine cab was just or fair or not? The solution of that question requires an expert board, careful deliberation and consideration, and I proposed, when the Adamson bill came to the Senate—this is why I say I am primarily responsible for this proposition—when the Adamson bill came to the Senate I proposed in the committee on interstate commerce that the Interstate Commerce Commission in the future should fix the rate of wage and hours of work of the labor engaged by the great railroad transportation companies of America, and it was favorably reported to the Senate by the committee; and then, although Congress passed the Adamson bill, it got cold feet. It got scared, and when it came to the water jump it would not go over and rejected my amendment, and I only got 14 votes for it at that time.

Now, that is where this whole thing started, and that idea has grown and grown until it has been passed by the Senate by a vote of 47 to 25, and unless the conferees or the House of Representatives rejects it it will become the law, and if it becomes the law it will be obeyed. Make no mistake about that, the law will be obeyed.

A Nation-Wide Railway Strike

A few months ago we were facing a nation-wide coal strike. It looked as if there was no way out. One hundred and ten million people in America did what? They appealed to the President, to the government, and the government settled it. There was no permanent law on the statute books for it looking to the particular settlement, but it was worked out, partly under a war-time statute and partly through intervention by the administration. You are in a coal district. You may not have been alarmed, but how about the many hundreds of thousands of householders in America, when that strike was threatened,, who thought about winter coming on, the wife and the little ones by the fireside without coal to carry them through the winter? No fault of theirs. They had nothing to do with the determination of the question whether it was just or unjust; but yet, because one set of men said that this shall be done, and the other set of men said it shall not be done the great mass of the American people were to be made to suffer. That is the place where government should function. Government is organized for the purpose of protecting the great mass of the people who live in a community from the arbitrary act of any one class. In this country years ago, when capital was disposed to combine and organize the so-called trusts to control the commerce of the American people, the government, representing the people, stepped in and passed the so-called Sherman law, and to capital the government said, "So far and no farther." There have not been so many men sent to jail, but there has stood the signboard on the road, and every man has known where he must stop in the public interest.

Whenever a class arises in this country where caste and class are out of place, whenever a class arises in this country that threatens the life and the peace and happiness of the American people, whether it be capital or labor, or any other class, then comes the time that your government must function, and your representatives in public life who fail to stand up and do their full duty are recreant in their duty to the public and traitors to the cause of the people.

I say I am responsible for this provision of this bill—I mean its main feature—and I think it is just not only to the public but to labor. Labor has appealed to me many times in the past 24 years to vote for things they wanted, and I have most of the time supported their problems because I thought they were just.

There is a good deal of remedial legislation on the statute books that the railroad men of America have proposed and wanted that I proposed in Congress for them. So that I did not approach this subject adverse to them, but I approached the subject in an effort to do what was just both to them and to the American public.

This bill is not unjust to American labor in the railroads. Under its provisions it says that any two men or more engaged in railroad business shall not enter into a conspiracy to interfere with interstate commerce. It is not applied exclusively to men in the railroad business; the law says any two or more men shall not conspire to interfere with interstate commerce. That includes capital. Two or more general managers can not do it. Two or more men of the public can not do it. Two or more men of the public not connected with the railroad could go out here and oil the track to stop the running of trains, and they would be in violation of the law, or if two or more men engaged in the railroad business as employees conspired together that would be in violation of the law. It relates to everybody.

The Right to Quit Work

Now, I think that law is just, provided that in taking away the weapon of labor to battle upward you give labor something else to take its place. We did take away one weapon of labor to battle upward, but I want you to understand that for that antistrike provision we gave them something else in its place. That antistrike provision says that two or more men shall not conspire against interstate commerce, but it says that nothing in this act shall be construed to prevent any man from quitting his employment. There has been a good deal of talk about this bill taking away the personal right of men and making slaves of them. The act itself expressly negatives that position. But there is a very great difference between a man quitting his employment and striking. Quitting employment is a matter of personal liberty. It is a matter of personal right, a matter of personal freedom, but to strike means just what it says. It is a weapon of offense; it is a blow directed at the other man to accomplish a purpose. Quitting work is not all that is wanted in a strike, for somebody else takes your place. You want higher wages, fewer hours, or something else, and you exercise the blow to force the other man to come to your terms, just as you make use of a blow if you are in a personal combat on the street. That is what strike means. It is not an act of personal liberty, personal protection, individual rights; it is the big stick used against the other fellow. It is a joint or social action falling within the domain or functions of government where the results of the action directly affect the public welfare.

Universal Railroad Strike and the Public

Now, my friends, what does a universal railroad strike mean? It ceases to be a blow directed against capital, because, although capital may lose dividends for three of four months while labor is out on strike, that is infinitesimal compared with what is going to happen to the public. The owners of the railroads may lose a few dollars. Railway investment may lose the earning capacity in 90 days of a fourth of its dividends for a year. What does that mean? But little. It is an operating expense that will be paid in the end by the public. But a universal railroad strike for 90 days in America is directly aimed at the American public. A strike for 90 days means idle factories and foundries, men out of employment, women without food. A

strike for 90 days means that the milk trains have ceased to go into the great cities, and the infants are dying in their mothers' arms. A strike for 90 days means that the whole business life of the nation has ceased to function, and panic and disaster stalks in the land. The blow is not directed against capital. It is directed against the public to coerce the accomplishment of a result that the public, unorganized, has no power to control.

My friends, you who have spent your lives at the throttle of an engine, or as a conductor of a railroad train, tell me, if you produce that result in the Birmingham district, how long you could live in this district? Just think about it a minute. Suppose you deliberately, through your organizations, brought on a 90-day strike; assuming that your cause was perfectly just, that you were asking for higher wages and you were entitled to them, and you could not get them out of the railroad management, and because you could not get them out of the railroad management you brought on a strike for 90 days and paralyzed the business life of this nation and had infants dying in their mothers' arms and men starving for lack of food, how long do you think the public, your neighbor, would stand it? Before the 90 days were out there would be blood in men's eyes and the governor of Alabama would have his troops in Birmingham protecting your homes and your lives if you brought about that result, and you know it as well as I do.

Protection to Labor

I tell you that the provisions of this Cummins bill is the greatest protection that American labor has ever had offered it. American labor can not strike against the American public. More than that, think what it costs you. Let me ask an engineer or a conductor in this audience who has served a great railroad system for 20 or 30 years, and, by hard, faithful service, has finally become the engineer or the conductor of the fast mail. He runs out his 100 miles or his day's work in five or six hours. He makes the best wage on the road, or approximates it. He has earned his position for peace in life by labor. His position is just as much an accumulation of that man's time as if he had been a banker and saved his interest and invested it in property. He has invested it in good character and good service and has won his position, and you young, hotheads bring on a universal strike, scrap the whole business, and throw him out of employment; and then this man who is 60 years of age, maybe, after 30 years of service, must he go out and begin all over at the tail end of a freight train and lay on the sidetracks all night waiting to come home, and do the work over again that he did as a boy? And, if you are a youngster, when you get 30 years older do you want the accumulation of your 30 years to mean nothing more to you than that it can be scrapped overnight? That is what a universal railroad strike would mean to you. That is what the labor chiefs have asked you to maintain as a system. It is an impossible system, an impractical system, where it is a blow directed not against capital but against the American public.

Now, what have we proposed? What did I propose in 1916? Not that capital can exact the last hour of work from you, not that capital can enforce unjust conditions upon you, but that a board representing the government of the United States must hear your complaint at any day and reach a just determination as to what is fair and just to you and the public. That is what I proposed in 1916. And what does this bill propose? I did not suggest any penalty clause. I do not think the penalty clause is necessary, but I see no objection to the penalty clause, because I do not think anybody has a right to interfere with the transportation of interstate commerce. The public is too vitally interested. I do not care whether you are engaged in railroading, whether you are a general manager, brakeman, or the outside public, the penalty clause is not necessary, for once you have a government board to adjust wage scales and working conditions of railroads in America the strike is necessarily gone, because you can not strike against your government.

Common Sense

Labor is possessed of just as much common sense as other people. When this Cummins bill first came before the Senate all four brotherhoods came before the committee and protested, and Mr. Gompers came with them. I have known Mr. Gompers a good many years. Mr. Gompers always goes with his crowd. That is very natural. Twenty-five years ago when I first knew Mr. Gompers he was pretty radical. I had many occasions to talk to Mr. Gompers during war times, and he was quite conservative. Men get more conservative as they grow older. Now, Mr. Gompers came before the Interstate Commerce Committee and I cross-examined him on this bill. He said that he was opposed to the penalty clause, because it took away a personal right from these men. I differ with him because I do not think there is a personal right involved. The right to hit another man in the head is not a personal right. The right to quit is guaranteed by the bill. But I said, "Mr. Gompers, if we leave out the penalty clause of this bill, are you in favor of a government board fixing the wages?" He said no, he was not, because you could not strike against a government decision. He was right. You can not. Then I said, "Mr. Gompers, can you tell me some other way by which we can avoid a universal railroad strike in this country, and all the disaster that will follow in its wake, other than the method we have written in this bill?" He said no, that there was no other way. He did not believe this would, but he had nothing else to suggest. In other words, he proclaimed the doctrine that in this great Republic the force of capital or the force of labor must prevail and the battle field must be over the homes of America. That was in August. Last week the press dispatches said that the position of Mr. Gompers and the representatives of the four brotherhoods, in issuing their statement about this legislation, was that they were opposed to the penal features of the bills, but were prepared to accept the remedial part of the legislation, and asked that the legislation be extended to Pullman-car conductors, who had been unfortunately left out. What are the remedial features of the legislation? So far as the Senate bill is concerned it is that if there is a dispute as to wages or working conditions each side may select a certain number of arbitrators—five, I believe—and they shall try to agree.

If they agree, then that settles the difference. If they can't agree, then the question shall go to the board of transportation, a government board appointed by the President, and the board of transportation shall finally determine what is a just wage or what are just working conditions. Those are the remedial features of the bill. Instead of the board of transportation that is created by this bill, in 1916 I proposed the Interstate Commerce Commission, in principle the same. This is a very great change from the testimony that was presented before the committee. If that statement correctly presents the attitude of the labor leaders, is not that a change that has reflected the sentiment of the great mass of railroad workers of America, who want only what is just and what is right? I think it is. I think it is. Now, let me tell you: If you have a board, if this legislation goes through and you are not satisfied with your wages or working conditions, you, as an individual, if you are engaged in railroad employment, can carry the question to the board of transportation. Or if you belong to the labor union your union can demand arbitration, and if arbitra-

tion is not worked out satisfactorily, your union can carry it to the board of transportation and have it determined in a peaceful, orderly way and dispose of the question, and you will not lose your job.. Well, if you have those remedial features, what care you whether there is a provision in there that no man shall conspire to interfere with interstate commerce? While you sit in the cab of the engine, do you want some fellow to conspire to interfere with interstate commerce in a way that may throw your engine in the ditch?

The Public Pays the Bill

Since the war began the cost of running the railroads of America, as shown by the report of Mr. Hines, checked up by the Interstate Commerce Commission and its experts, has been $1,835,000,000 more than it was before the war started. Railroad capital has not paid that. It could not. Why, $1,835,000,000 is more than the railroads ever paid out in interest on their bonds and dividends on their stock in any one year of their existence. Some people say that this increased cost of wages and material ought to come out of the railroads. Of course, the man who says that is an anarchist. He wants to destroy the property. It could not come out of the railroads. One billion eight hundred million is nearly two billions of dollars. There are but eighteen billions of dollars engaged in the railroad business. Divide two billion into it, and it would take nine years for you to eat up all the capital that is invested in railroads, if it came out of capital. At the end of nine years you would not have anything left.

But, more than that, you can't take it out of railroad capital, because railroad capital has got to exist. If the L. & N. Railroad went broke the capital would remain, and the government would make you sell it to somebody else that would run the railroad. So you can't absorb railroad capital. Where does it come from? It came out of the public. Freight rates were increased 50 per cent and passenger rates were increased 25 per cent, and the public pays the bill. And who got it? One billion seven hundred and seventy-five millions of dollars of that increase went to labor, as shown by Mr. Hines report, and since that report came out another hundred million was absorbed in the adjustment of some minor matters. So that, in fact, the railroad labor has absorbed the entire $1,835,000,000 of increase in the cost of transportation. The next greatest item of cost to a railroad is coal. Before the war came on the railroads were buying coal at an average of $2.10 a ton. To-day they are paying $4 a ton, and one time it went up to $4.20 on an average.

Before the war the railroads were buying steel rails at $30 a ton. At one time during the war they got up as high as $57, and to-day they are selling for $47 a ton. Now, labor has absorbed all of the increase that the public is paying, and yet there is a further increase in the cost of coal, rails, oil, lumber, and everything else it takes to run a railroad. The railroads are very much worse off than they were before there was any increase in freight and passenger rates.

Double Charge Against Public

Now, labor is asking another billion dollars. From whom? Capital? No. Capital can't pay it. Nobody for a minute contends that capital can pay it. They are asking it from the public, the farmer who ships his cotton to market, the pig-iron man who ships his ton of pig iron to Boston, the grocer who is shipping his food to your house. Is that all it is costing you? In the debate in the Senate on this bill I heard it asserted that when you increase freight rates $1 that by the time that increase got to the consumer it amounted to $5. I think that was an exaggerated statement, and I don't stand for it; but that was asserted. But it certainly does increase the cost of commodities more than the increase in freight rates, because when the producer sells the raw material and ships it over the rails, the man who buys it, the manufacturer, adds the freight and the cost of the raw material together, and then multiplies his profit into it, whether it is 10 per cent or 25 per cent. When it gets to the jobber, he adds the cost of the goods and the freight together and multiplies his profit into it, and when it gets to the wholesaler he does the same thing, and the retailer does the same thing; and that profit runs all the way from 10 to 100 per cent. So I think you are safe to say that for every dollar of increased freight rates you put on the American people, whether you do it for labor or capital or anything else, you put a charge of $2 on the pockets of the American people when they come to consume it. When you put a dollar of freight on the food of the American people, you charge the American consumer $2 out of his pocket at least. As I say, some people asserted it was five times as much, but I think that is an exaggerated statement. Well now, if it is twice as much, then the charge that has been put on the American public for the increased cost of labor on the railroads is not $1,835,000,000, but is $3,670,000,000, and if you put another billion dollars on that for labor that they are demanding now, that is $2,000,000,000 more that the ultimate consumer of the American public has got to pay for, and that would be $5,000,000,000 since the war began as the price of increased labor on the railroads that the American consumer has to pay for. How are you going to get down the cost of living?

I am not in favor of cheap wages. It is a mighty good thing for any community and any public to pay labor as good a wage as it is possible without destroying business, because the wages of labor are always spent in the community to build it up and encourage business. But there is a line that you have got to draw. When you go with wages beyond a certain limit, business ceases to function. When you go beyond the limit, your producer or manufacturer that can not go into a competitive market and sell his goods at a profit then ceases to work.

Now, those are all the problem that you have got to solve in this great equation, with the life of the public involved. And as your representative in the United States Senate, do you want me to stand for the problem of solving that question on the battle field of a great strike, where force and anger and discord sit at the judgment seat, or do you want me to stand for the problem that a high court of governmental justice, a board appointed by the President of the United States, representing the best interests of all people of the United States, shall sit in judgment and decide the equation for you justly? That is what I have done. That is what I stand for.

Committees to Prepare for Return of Roads

DIRECTOR GENERAL HINES has appointed the following committees to arrange details connected with the transfer of the railroads to private operation March 1, and also to recommend the machinery necessary to liquidate the federal administration:

Liquidation Committee.—Chairman, John Barton Payne; Messrs. Powell, Sherley, Spencer, Underwood.

Committee on Claims.—Chairman, T. C. Powell; Messrs. Prouty, Tyler, Underwood.

Special Committee to Confer with Corporations in the Matter of Interest on Additions and Betterments.—Chairman, John Barton Payne; Messrs. Powell, Prouty, Sherley, Underwood, Parker.

Measures to Reduce Overtime in Train Service

Circular Issued by Director of the Northwestern Region Gives Valuable Suggestions to Cut Costs

R. H. Aishton, regional director of the Northwestern region, issued Circular No. 95, on January 8, calling attention to the fact that the granting of time and one-half for overtime to train and enginemen in all classes of freight service will greatly increase the cost of conducting transportation unless steps are taken to avoid overtime wherever it is possible to do so. The circular includes a list of 12 suggestions on the handling of trains, perfecting the organization and increasing facilities which will tend to avoid many delays in train movement. These suggestions seem so pertinent, are expressed in such concise language, and constitute an excellent code of practice, that they are published in full below:

Effective December 1, 1919, under the provisions of Supplements 24 and 25 to General Order No. 27, time and one-half for overtime has been granted to train and enginemen in all classes of freight service, including mine-run and transfer service.

Heretofore time on duty in excess of the established number of hours constituting a day, or when on a mileage basis, time on duty exceeding the number of miles divided by 12½, has been considered a penalty to be avoided, when possible, under normal conditions, but has had no financial significance when the service performed was equally as valuable as that furnished within the normal hours before overtime accrued, taking into consideration the fact that the overtime rate was pro-rata. However, with the payment of a punitive rate for overtime, it is manifestly essential that a careful study be made of operating methods and facilities, to determine whether the service performed on a punitive rate basis is sufficiently valuable to the railroads to warrant the working of men in excess of hours in which service can be required at the single time rate.

This question involves many problems that will require most careful analysis, and the adoption of improved methods of operation for the purpose of accelerating train movement. The following suggestions are made in connection with the study of this question:

1. Trains should not be ordered until it is known that they can depart at the specified time.

2. So far as practicable start trains from terminals at a time when movement will meet with the least interference by opposing or superior trains. Investigation at different times has shown that yard forces order trains to depart from terminals at times when opposing or superior trains will cause delays in departure from terminals and further delays en route. More close co-operation should exist between train dispatching and yard forces to avoid this condition.

3. Solid trains should be made up for terminals of the various freight divisions, instead of being made up in such manner as to require frequent stops to set out cars en route. No doubt lack of facilities in a great many cases will prevent the holding of cars sufficient length of time to accomplish this, but reports from inspectors reaching this office show that a great deal more of it can be done than has been done with the existing facilities.

It is well known that delays to cars waiting for solid trains in reality advances the movement to final destination, and avoids the expense incident to frequent switching, and which also adds to the possibility of damage to equipment.

4. Train dispatchers should keep yardmasters fully informed of trains en route so that arrangements can be made to relieve crews promptly on arrival at terminals, thus avoiding the payment of final terminal delay or overtime.

5. It has been demonstrated that the best showing is made on penalty time when the setting out and picking up of cars over a division is confined to the fewest possible trains that can properly handle the work. An unnecessary number of trains picking up and setting out cars between terminals is reflected in the movement of all trains. Careful study and the adoption of proper methods will confine delays to through trains between terminals, to clearing superior trains, stopping for coal and water and delays incident to the proper care of equipment.

6. Hostlers preparing engines for the road and placing them on the trains.

7. Discontinuance of the requirement that conductors check trains, secure waybills, etc., at important terminals. Efficient yard organization can be provided to do this work at much less cost than is involved in the delay incident to the work being done by conductors.

8. Increased supervision on the part of all division officers, but particularly by trainmasters and road foremen of engines, is of primary importance, and where there are not sufficient trainmasters to provide proper and complete supervision, additional trainmasters should be employed to devote their entire time to the supervision of train and yard operations.

9. Loading of merchandise cars for the various way-freight districts. Without doubt this will develop that freight trainmen are loading and unloading tons of freight which could be handled by other employees at a less cost. In determining this question, first consideration should be given to the prompt movement of merchandise, economical use of equipment, empty car haul, and reasonable tonnage per car.

10. The question of accelerating train movement is one which cannot be determined without an exhaustive study of practically every operating feature. While it is understood that good judgment will be used in rating locomotives, it is not expected that any reduction in tonnage will be made at this time, but instead the efforts of division organization should be concentrated on the elimination of delay which, after the last analysis, is the cause for overtime. Records indicate that some railroads showing the heaviest tonnage per train also show the highest speed per hour in train movement, which is entirely due to the operation of the greatest possible number of solid through trains, elimination of terminal delays and delays en route.

11. Granting time and one-half for overtime made possible the elimination of certain arbitraries and special allowances to train and enginemen in freight service at initial terminals and en route. Division officers should thoroughly understand that the elimination of the payment for these special allowances and arbitraries does not contemplate that there will be any increase of work heretofore performed at terminals or en route, and just as great attention should be paid now as heretofore to the elimination of initial terminal delay and work en route not incidental to the trip.

12. Additional or improved facilities involve consideration of:

(a)—Adequate enginehouse facilities, including in and outbound tracks, cinder pits, coal and water stations.

(b)—Running tracks between enginehouses and yards.

(c)—Installation of air-testing plants in all yards of any importance to insure that when an engine is coupled to the train, the air brakes will be in working order, and the regulation air brake test can be made without delay, thus eliminating delays which now occur by necessity of setting out cars on account of defective air-brake apparatus.

(d)—Extension of yard tracks to hold an entire train, and the extension of yard facilities to permit the accumulation of cars for solid through trains.

(e)—Extension of passing tracks to proper length to hold one or more trains, the lack of which now makes necessary the backing over in double-track territory to clear superior trains, and with the consequent interruption of traffic on the opposite main line.

(f)—Extension of second tracks in and out of terminals to permit prompt clearing of main lines.

These are, of course, only a few of the more important items for consideration in the question of minimizing punitive pay-

ments for overtime. I would urge that during the remainder of the period of Federal control, the efforts of yourself and other officers be effectively directed on the above and such other lines as may occur to you.

The Prevention of Loss and Damage

By A. C. Kenly

The prevention of loss and damage to less than carload shipments of freight, like all other problems, is comparatively easy, when attached on the right lines. It is simply the question of shippers, consignees and carriers "toting fair." The trouble in the past and even now is that each class is more or less inclined to "pass the buck," which means, usually that the carrier comes hindmost.

Toting fair means that shippers, consignees and carriers have certain duties and obligations to perform; briefly they are as follows:

(a) The proper and secure preparation of each article shipped, individually, in bundles or in containers. It is to be borne in mind that under modern transportation, based on speed, long trains and heavily loaded cars, there must be more or less of what is termed "rough handling"; and this in an increasing ratio as the journey is lengthened.

(b) The distinct and legible marking of each separate piece, bundle or container with full name of consignee and destination. Shippers should also show their name and address, preceded by the word "from."

(c) The obliteration of all previous shipping marks.

(d) Clear and legible bills-of-lading.

(e) Careful checking of pieces or packages when being loaded on trucks, to catch possible errors. For instance, a shipper may have ten bags of oats and ten of corn for two different consignees at stations on different roads (or the same road) but sent to station in different truck loads. There is a chance of one or more bags of oats being mixed with the corn and vice versa. The error may not be detected at the freight station. Many shippers would be astonished if they knew how often substitution mistakes occur in their own loading.

Carriers

(a) Should provide a sufficient and efficient force to properly transact the business of each agency. This includes competent receiving, loading, stowing, billing and delivering forces. When you take into consideration that the receiving and delivering of freight, the foundation of transportation is conducted through the station agent's forces, you would, naturally think that railroad managers would consider it of the most vital importance to properly equip each station with adequate man power and mechanical appliances. If all agencies were properly equipped, we should probably see material reductions in the clerical forces in claim department and other general offices.

(b) Train crews should be required to carefully handle freight in unloading way cars; and also be required to readjust the freight left in cars, after each partial unloading, so it will ride safely.

(c) Destination agents should check freight as received from cars; keep shipments for various consignees together and carefully check every piece of freight as delivery is made.

Consignees

Should bear in mind that carriers cannot, no matter how hard they strive, give perfect service. They should frankly acknowledge and accept the fact, that miscellaneous shipments must necessarily be loaded together in the cars, and that it is an impossibility to avoid some damage: and when the damage is slight, such as the loss of a small percentage of contents of a torn sack, or slight scratches on furniture, which they can easily remedy; or other trivial damages, they should accept them as being incident to transportation and not make petty claims.

The chief cause of partial loss of freight from and damage to freight shipped in containers, is the faulty container. Eliminate the improper container and you practically eliminate claims for damage and partial loss. Do carriers fully realize what that means to them? Not only a large reduction in claim payments, but also in their claim forces, with possible reduction in other forces due to decrease in claim investigations and the correspondence incidental thereto.

The elimination of the improper container means the substitution of the proper container. Here is my suggestion to carriers: The appointment of a committee consisting of say, five men; the committee to sit continuously. After deciding on the proper container or containers for each individual commodity or group of commodities, the committee should give detailed specifications as to the making of each container; how it should be closed after filling and how secured; and when necessary prescribe how the contents shall be packed. Photographs or drawings of the container in process of making and after being closed and secured, should be added as guides to shippers. The committee should take up, first, one or more of the articles now producing the most claims; for instance, goods shipped in sacks. Its method of procedure would be as follows:

It would call into consultation the manufacturers of sacks (who would be expected to bring samples of their sacks) shippers and receivers of sacked goods and carriers. Thoroughly discuss the required characteristics of the proper sack for each individual commodity. When goods are shipped in sacks containing varying quantities, then the proper sack for each unit of weight would be considered. If agreement cannot be reached by all interested, then the committee should sit as arbitrators. The committee would then promulgate its detailed specifications covering each style, size or type of sack adopted, including its weight, tensile strength, number of threads to inch, size of thread, articles to be shipped in it, weight, limit, and so on. Photographs or drawings would accompany the specifications. The specifications would then be put in the classifications and should become legal and binding.

Specifications covering wooden containers would describe the character of wood to be used, and then its thickness, the number and size of nails to be used and their location; and the number, position and character of straps to be used. Containers made of other material would be similarly specified. The committee should avoid trying to handle too many commodities at one time.

There is no reason why this committee should not prescribe general loading rules for l. c. l. shipments, also loading rules for carload shipments.

Carriers should establish a joint bureau to enforce all approved container and loading rules. Its inspectors should visit manufacturing plants to inspect containers in process of manufacture, should visit shippers to see that packing is properly done, that packages are fastened and marked, and that legible bills-of-lading are made. They should look into the receiving, loading, stowing, billing and delivery methods at stations and ride on local freights to observe how train crews handle, check and trim freight, reporting to head of bureau all violations observed. They must be live, hustling men, brimful of helpful suggestions and constantly animated by contagious enthusiasm.

One of the major troubles today is the lack of uniform enforcement of the specifications and rules already embodied in the classifications; therefore, it is hardly necessary to say, it would be useless to appoint this committee unless ample provisions were made for enforcing its findings.

Long Life for Creosoted Piles in Railroad Trestle

Thirty-five Years of Service Affords Conclusive Demonstration of the Value of Treatment

When the Louisville & Nashville built its bridge across the Ohio river at Henderson, Ky., in 1884, it constructed a pile trestle approach on the Indiana end in which 177 of the bents were of creosoted piles. All of these piles remained in service until 1917 when steps were taken to renew the trestle and some of them were not replaced until late in 1919. In other words, these piles had a service life of 35 years. This service period by no means represents the total average life of the piles since other considerations than the physical condition of the piles required the renewal of the structure at this time. As a matter of fact, only 15 per cent of the piles were in a state of decay that

Characteristic Rot in the Five Per Cent of the Pile That Decayed at the Ground Line

would demand their replacement. Aside from the demonstration of the value of timber preservation afforded by this structure, a careful study of the piles removed also serves as an excellent lesson on the use of good material, thorough treatment and painstaking, high-grade workmanship.

The record afforded by this structure is particularly conclusive because it was made during the service of one man, A. B. McVay, supervisor of bridges and buildings for the Louisville & Nashville at Evansville, Ind. Because of the particularly convincing character of the evidence presented in this demonstration of the value of timber preservation, it is fitting that some study be made of this structure and such details as could be ascertained concerning the treatment, character of the timber and methods followed in the construction as might possibly be interpreted as having some influence on the record secured.

The Henderson bridge trestle is about three miles long and all except 177 bents were driven with untreated timber. A large part of the structure is level, with bents from 14 to 18 ft. high, but for some distance near the river bridge, the grade rises on a 1.25 per cent grade, so that the height of the bents in the portion driven with treated timber runs to as much as 40 ft. Four-pile bents were used throughout, with panels 15 ft., center to center of bents, notwithstanding the fact that a considerable portion of this part of the trestle is on a 2-deg. 30-min. curve. The piles were treated in 1883 and driven in the spring and summer of 1884. Creosoted caps 10 in. by 14 in. in section were used, but the bracing and deck were of untreated timber. The piles were driven in typical river-bottom alluvial soil in a location normally above water level, but subject to overflow at times of high water in the river.

The deck was renewed in 1896, at which time the caps were replaced by cypress, while all of the untreated bracing was renewed in kind. In 1915, 12 of the original piles were replaced because of decay, and in 1917 it became apparent that about 15 per cent of the piles were in a condition that called for early removal. This consideration alone would not have justified any procedure other than piece-meal replacement of the defective piles, but for certain other complicating circumstances. The four-pile bents, many of them over 30 ft. high and located near the curve, were affording too small a factor of safety for the increased train loading. With 15 ft. panel lengths, the idea of adding additional piles to the bents was not deemed feasible because of the greater expense for heavy stringers required to obtain the desired factor of safety in the chords.

Because of these considerations, renewal of the treated portion of the trestle was authorized in 1917, 221 new 6-pile bents being required. That year 73 of the old bents were replaced by 88 new 6-pile bents spaced about 12 ft. on centers. In 1918, 42 more new bents were driven and the rest

Manner of Chamfering Piles to Reduce Diameter

in 1919. Simultaneous with this work the existing open deck was replaced by a timber ballast deck.

An examination of the old piles renewed shows that the teratment was excellent. They were creosoted at the Louisville & Nashville plant at Gautier, Miss., under the direction of the late J. W. Putnam, but no record of the exact nature of the treatment is available, although the depth of oil penetration would presume a heavy and extended period of steaming. Of the piles evidencing any decay, very few

had decayed butts. This was, no doubt, the result of special precautions taken to protect the heartwood of the piles which had been exposed by cutting off the butts to receive the caps. In the first place, the pile butt was completely covered by the cap in nearly all cases. A cap 14 in. wide was partly responsible for this, but the really effective measure was an artificial reduction in the size of the pile butt (where necessary) by adding it to an octagonal prism of about 14 in. on the short diameter. This was done *before* treatment. After each pile was cut off two holes were bored in the top and filled with hot creosote oil which was also coated thoroughly over the top of the pile.

Only about 10 per cent of the piles requiring renewal showed serious rot at the ground line. The most serious cause of decay arose from a practice pursued when the bracing timbers were renewed in 1896. In a misguided effort to get good bearing for the braces, many of the old piles were adzed deeply, exposing the less heavily treated material.

New Piles Driven to Replace Old Ones in Place for 35 Years

Some decay also started around bolt holes, although the holes for fastening the original bracing were, for the most part, carefully plugged at the time that the bracing was changed. The characteristic rot at these places consists of a small opening leading into a cavity of appreciable size in the interior.

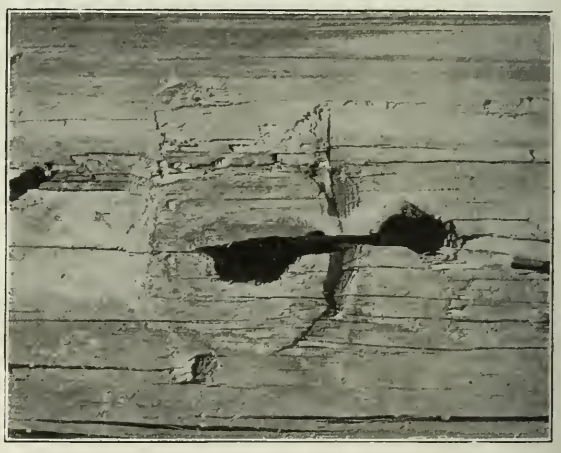
An interesting comparison is afforded in this structure by the fact that all of the trestle that was not constructed of the creosoted piles was driven with red cedar piles that gave a life of about 18 years. All renewals of these cedar piles were made with untreated pine piles that have since been renewed at least once, so that the creosoted piles have given more than twice the life of the untreated wood. The long life secured from these piles is clearly the results of the use of good timber, correct treatment and a careful regard for the detailed precautions necessary to insure a continuity of the shell of protected timber on the exterior of the pile. Eventual decay, where it occurred, was in most cases the result of a failure to secure absolute perfection in this regard. It is entirely clear that the small percentage of piles requiring renewal at the present time would be even smaller than it is but for the unfortunate cutting of the piles at the time that the braces were renewed.

Other Examples of Long Life

While there is probably no other single instance that shows an equally complete record, there are many other examples of long life for treated piles on the Louisville & Nashville, notably along the Gulf coast, where this road was the pioneer in the treatment with creosote in an effort to stop the destructive action of marine borers. While it has been found that treatment with creosote is not an absolute protection against this difficulty, although it is an unquestioned deterrent, the creosoted piles have demonstrated a most remarkable life in their resistance to decay from normal atmospheric influences.

How the Piles Were Improved by Sizing Them for Braces

The Louisville & Nashville has 10 structures over salt water between Mobile and New Orleans, where the teredo is more or less active. The borers are active in the waters of the Pascagoula river, Biloxi bay and Bay St. Louis, which are crossed by long creosoted pile trestles having drawbridges, and in one case fixed spans on pile piers.



Rot Around a Bolt Hole

The trestle at Bay St. Louis contained about 3,600 piles driven in 1879. At the present time 90 per cent of these piles are still in service, but, of course, protected against the teredo. In 1908, 60 new bents were driven in this trestle on account of settlement of the old bents, but none of the old piles were decayed. The trestle between Biloxi and Ocean Springs contains 1,200 piles driven in 1878. No record of these removals

could be obtained, but the proportion of removals has not been greater than 10 per cent.

These two bridges originally had bents of four piles each, but in 1912 longer caps were put on top of the old caps and two piles, one on each end of the bent, were driven, to give greater bearing power for heavy traffic.

Because of a fire which destroyed a large portion of the records of the Louisville & Nashville, it is impossible to give a detailed record of all the piles in these structures. The following, however, is a complete statement concerning 5,093 piles in bridges between Mobile and New Orleans driven in 1877 to 1879. After these piles had been in service some 12 or 14 years, examinations made below the water line indicated the need of some form of protection against further action by the teredo and other marine borers, as a consequence of which most of the piles have been incased in terra cotta or cast iron pipe filled with sand. This protection, however, has no bearing on the resistance of the pile to decay from atmospheric causes and as seen in the record below, 81 per cent of the piles are still in service:

Piles still in service unprotected against marine borers	617
Piles protected with pipe in 1892-93	3,513
Piles replaced in 1904, mostly because of storm damage	320
Piles replaced in 1906, mostly because of storm damage	112
Piles replaced from failure, decay and teredo—no date	95
Piles replaced in 1908 on account of settling	436

Percentages	Per Cent
Piles still in service unprotected against marine borers	12.1
Piles still in service protected, 1892-93	68.9
Piles replaced in 1904	6.3
Piles replaced in 1906	2.2
Piles replaced—no date	1.9
Piles replaced because of settling	8.6
	100.0

Some speculation is naturally raised as to possible influences favoring this long life. Salt spray from storms has been suggested as possibly coating the piles with a certain amount of salt which is known to have a certain degree of toxic value. On the other hand, these piles are located in a territory of very heavy rainfall, so that this protection would be washed off frequently, while the temperature is rarely cold enough to cause freezing, so that the climate is generally much more conducive to fungi propagation than in most all other parts of the United States.

A good grade of timber, thorough treatment and high-class workmanship in construction has had much to do with the success of these Gulf installations, as in the case of the Henderson bridge trestle. All of the piles were chamfered the same as at Henderson and the tops were thoroughly coated after cutting them off for caps, while galvanized iron has been used extensively to protect all horizontal surfaces against the collection of rain water.

Photo from International Film Service.

Armored Car in Siberia Made from an American Built Gondola Car

Commissioner Woolley Says Return of Roads Means Higher Cost of Living

Interstate Commerce Commissioner Robert W. Woolley, one of the men who presumably will soon have occasion to pass upon an application of the railroad companies for an advance in freight rates, is still issuing statements objecting in advance to the idea of an increase, as an argument for his contention that the railroads should be retained under federal control. Mr. Woolley's position is that such an increase will be multiplied in its effect on the cost of living and he quotes Director General Hines as having said repeatedly that no increase would be necessary if the railroads were retained under federal control. In Mr. Hines' public statements he has merely stated that the Railroad Administration could get along with a smaller increase in rates than would be necessary for the separate railroad companies. In a statement given out for publication on January 12 Mr. Woolley said in part:

"When the President issued his order returning the railroads to private control on March 1, in my opinion he served notice on Congress to the effect that it would have not only to act promptly but assume responsibility to the people. Last May, he indicated to Congress that the present arrangement, speaking generally, was a mere rope of sand; that it was possible for the director general to maintain only a semblance of morale in his organization with the tenure of federal control so uncertain, and that unless Congress enacted legislation better adapted than the federal control act to effective administration during the delicate reconstruction period he would exercise the option vested in him and return the roads on January 1.

"We all know that Congress failed to function on schedule, that it would have been disastrous to the assets of the roads themselves, and incidentally, to the whole financial situation, if the return had been made without adequate new legislation. If the President had merely said he would postpone the date of return until March 1, Congress might have become even more easy-going. So, as a practical matter, it was necessary to shift the responsibility.

"But this does not alter the situation economically at all in these perilous days. As a matter of fact, it isn't accurate even to speak of them as the reconstruction period, because that cannot begin until the peace treaty has been ratified. What the American people are really confronted with, and what Congress is really dealing with, though some of its leaders seem not to recognize the fact, is, first, the danger of still higher cost of living; and second, the danger of further labor troubles and greater economic unrest. In formulating from the essence of two manifestly bad bills a measure for the permanent return of the railroads now to private control and operation, no matter how desirable such return may eventually be, Congress to my mind is doing the one thing that inevitably means higher prices and early comfort for the socialists.

"The railroad executives are prepared to file application for a general increase in freight rates. For months their press bureau has been trying to lull the people into the belief that this increase will prove a benefit rather than a hardship and a peril.

"I am informed that the measure of the increase will have to be at least 25 per cent. A few days ago, an official of one of the leading New England lines stated that the increase in New England would have to be as much as 39 per cent. Based upon 1918 freight receipts, a 25 per cent increase would mean $875,000,000 additional which the shippers would have to pay annually. But the shipper passes this along to the consumer or back to the producer of the raw material who has to stand the cost of transportation to the primary market. He so states frankly in the cases which

come before the Interstate Commerce Commission. He makes no bones of it.

"The consumer catches an increase in freight rates in the shape of an accumulation of increases. He is bound to because he is at the mercy of the manufacturer, the wholesaler, the retailer, and generally the commission man, as to each single material that enters into a finished article, and then as to the article itself. Director General Hines stated at St. Louis last June that the ratio was five-fold. In other words, he said that if rates were increased $300,000,000, the consumer would pay to the extent of $1,500,000,000. An $875,000,000 increase in freight rates would mean $4,375,000,000 the consumer would pay. This would have an immediate effect of increasing the living cost of families of five by something like $215 per annum.

"That fact alone is troublesome and bodes ill enough, but with the return of the railroads to private control the government releases the only peg it has for holding in place at least one end of the so-called vicious triangle, viz: the three principal elements in the cost of manufactured articles—labor, raw material, and transportation. Possibly in six months, surely within twelve months, the railroads would come back to the Interstate Commerce Commission with just as good a case as they will make on March 1, for another increase in freight rates. Where would it all end? With finances of the world topsy-turvy, with everything in the flux, who could call a halt?

"Why should this be necessary when the President stated only a few months ago that an increase in freight rates at this time would not be in the public interest and Director General Hines has said repeatedly in the past few weeks that no increase will be necessary if the roads are retained under federal control—this in spite of the fact that the coal strike and the steel strike caused the roads to fail to earn the standard return by approximately $55,000,000 in the month of November, and that another falling short of the standard return, though of smaller proportions, is to be expected from the same cause for December? With an operating ratio of 84 per cent under federal control, due to economies possible under unified operation, but impossible with the roads severally managed, this desirable result is obtainable.

"Only a few days ago, the vice-president of one of the principal railroads in the country walked into my office and introduced himself to me. He said that he was opposed to government ownership of railroads, and that he thought the one way to prevent government ownership by January 1, 1921, was for federal control to continue until we are well over the shoals of reconstruction. He cited the fact that with little or no increase in passenger equipment the railroads were handling something over 30 per cent more passengers than ever before, that with only a moderate increase in freight equipment, including locomotives, an enormously increased freight traffic was being efficiently handled, and gave as an instance, that whereas on October 1, 1917, the freight car shortage had been 147,000 cars, it was only about 57,000 in October, 1919. He said he could foresee a car shortage and a break-down in service that might cause people to rise up and demand government ownership forthwith. It is due, of course, largely to the elimination of waste in handling cars. Today a car is at home no matter where it is, and does not actually have to move except in response to traffic demands. But under private control when a car had discharged its load, it was started back to the home line. Of course it was loaded if possible, but it went empty if there was no freight to put into it. Great Britain saw the folly of this sort of thing during the war, and by proper regulation of the moving of cars of coal alone eliminated 700,000,000 ton miles per annum, on a total track mileage of something like 26,000 miles. Consider that our rail mileage is something like 257,000 miles, and you can see what eliminating waste haulage means.

"What do those who think they can see some temporary selfish advantage to be secured by the prompt return of the roads to private operation imagine would happen in this country? Would there not be unrest in all classes? Would it be confined to labor alone?

"Let me correct an impression as to just what is occurring under federal control. The so-called standard return is the average net operating income for the railroads taken over by the government in the three fiscal years ending June 30, 1917. In two of these years, this income was around the billion dollar mark, but in one of them—1915—it was $727,000,000. Only twice before in the history of our railroads, in 1910 and 1913, has the net operating income for one year exceeded the $800,000,000 mark. In 1918, under federal control the operating income was $728,000,000—a million more than in 1915, the first of the three years used in the standard return, and $23,000,000 more than it was in 1914. With the exception of six years prior to 1916, it was higher under federal control in 1918 than it ever had been in the history of our railroads. Yet, one reads of operating deficits. There is no deficit. With the prices of materials soaring and necessitating an expenditure for maintenance of $1,741,483,895, or $777,247,093 more than the average annual expenditure for maintenance of the same properties in the test period under private control—for the first 10 months of 1919 the government's expenditures for maintenance exceeded those of the test period average by 100.4 per cent—, with a wage increase covering 12 months and a 25 per cent rate increase covering 6 months, the government simply failed to earn in 1918 within something over $200,000,000 of a generously guaranteed rental, based on the returns for one normal year and two miracle years. These are facts the importance of which can not be over-emphasized in the light of the charge so recklessly and freely made by the railroad executives that the carriers are headed for bankruptcy under federal control. In 1908, the net operating income was $115,000,000 less than in 1907; in 1914, it was $125,000,000 less than in 1913, and this under private control. Nobody heard of operating deficits in those days. Inasmuch as these shrinkages happened under private control, they were due to economic reasons and not to mismanagement.

"With commodity traffic shrinking almost to the vanishing point after the signing of the armistice on November 11, again it takes no Solomon to prophesy that if the railroads had been under private control the shock absorbing capacity of the federal reserve act might have been tested to the bursting point to tide us over resulting financial disturbances caused by wholesale receiverships of the railroads.

"Now, of course, traffic of all kinds is moving again, and Director General Hines, the former head of the great Santa Fe system who is doing such an admirable job, is authority for the statement that the carrying capacity of the railroads is likely to be tested for at least five years to come. With this assured business in sight as a guarantee, and the statement of the director general himself that no further increase in freight rates under continued federal control would be necessary, why should Congress, representing the interests of all the American people, decree that it is preferable to incur a minimum increase of 25 per cent in freight rates as a starter and no one knows how much higher price levels.

"I am opposed to government ownership if there is any plan under private control by which the roads may be efficiently and economically handled in the interest of the public and owners of their stocks and bonds alike. In my opinion the only hope of preventing it lies in holding the roads for a period that will carry us over the reconstruction days and back to normal, when it may be possible to fix just what the measure of rates should be under private control. Meanwhile, American genius will have ample opportunity to do its best to meet the situation."

Glenn E. Plumb Proposes Industrial Reconstruction

Principles of Plumb Plan Extended to All Industries Except Individualistic Enterprises

Washington, D. C.

A POLITICAL PROGRAM for the reconstruction of the existing industrial system by the extension of the Plumb plan, or of its principles, to all forms of industry except "individualistic" enterprises owned and operated by the same individuals, has been proposed by Glenn E. Plumb, counsel for the organized railway employees, in a memorandum furnished to the press. This was generally predicted at the time the plan for the acquisition of the railways by the government for the benefit of the employees was urged before Congress during the summer, but at that time Mr. Plumb was not ready to discuss its application to industries other than railroads. The details of the application of the plan, which as worked out in the provisions of the Sims bill as applied to railroads aroused so much criticism, are not given in the latest statement, which describes the plan as one for giving the three interests, public, capital and labor, an equal authority in the direction of industry and an equal share in the benefits. Critics of the Plumb plan as applied to railroads can find no such equality in it, because capital was given no voice whatever in the direction of the business and no share in the profits beyond a fixed rate of interest, while two-thirds of the board of directors were to be chosen by the officers and employees and one-third was to represent the public interest.

In the new plan varying methods for the division of the profits and of the authority are proposed, dependent upon the nature of the industry.

The program which Mr. Plumb submits "to the consideration of the American people" as the means by which the evils of the existing system as he sees them is summarized as follows:

"First, as to railroads and all means of transportation of persons, commodities, and intelligence, the adoption of a plan for the public ownership and democracy in the control of the operation of the railroads and all such transportation facilities in accordance with the principles of the Plumb plan, with such modifications of details as may be needed to effectuate the general principles above outlined.

"Second, as to all industries based upon grants, privileges, exploitation of natural resources, and enjoyment of monopolies, the adoption of the necessary legislative policy through local enactments either to acquire public ownership of such utilities, with the extension of the principles of the Plumb plan to their control and operation, or the adoption of a tripartite representation of the public, private capital employed and labor in direction and control of such industries, with equal authority, and a division of the savings of efficiency between the public, on the one hand, and labor and capital on the other hand; labor and capital sharing on an equality in proportion to the value of their investments.

"Third, as to all industries engaged in production not based on grants of privileges or monopolies, the adoption of legislation either local or national requiring all corporations organized for the conduct of such industries to recognize the right of labor as the investors of present human creative effort to participate with capital, the investors of past creative effort, in the control and management of the industry, and to share in the profits of such industries on terms of equality with capital.

"Fourth, individualistic industries—farms and productive enterprises owned and operated by the same individuals—shall, by the adoption of the three foregoing paragraphs, be freed from all encroachments of privilege under which they are now suffering, and thereby restored to economic and industrial freedom; that the administration of all such industries shall be left entirely to the individuals owning and operating them, relying upon the restored freedom of the law of supply and demand to protect the interests of the public, the interests of labor and capital in such industries being joined in the same individuals.

"The interests of agricultural laborers and tenant farmers will be promoted inevitably by community acceptance of the principles of a fair division of rewards for service which are outlined for industries of large capitalization."

Describing the evils of the existing system and the reasons for proposing his plan, Mr. Plumb says in part:

The Evils to Be Remedied

"The existing industrial system is crashing about our ears. The natural wealth of this country is far beyond computation. Its organized productive capacity exceeds all present demand. Large and increasing percentages of its workmen are now engaged in the production of non-essentials which they themselves cannot purchase. Profits are exacted from the essential industries, whose products are consumed by the workers, in order to support industries whose products they cannot enjoy.

"Labor is treated as a commodity to be purchased at the lowest price obtainable in the market, just as are all the products of labor, things transferable in the open market. Capital, which labor has produced in the past in excess of its living demands, is concentrated in the hands of a few who had no part in its production. This capital represents not only the increased productivity of human effort but also undue profits exacted from consumers in higher prices and from labor in lower real wages.

"Under the existing system the owners of capital have had placed in their hands a monopoly of the management of all industry, with power to fix wages paid to labor, prices paid by the consumer and profits received by the owners of capital, and have also the power to determine the nature, quantity and quality of goods produced without regard to any consideration of the right of the public to require that essential products shall first be produced and non-essentials from the surplus of productive power remaining after supplying the need for essentials.

"The wages so fixed by such management bear no relation to the value to society of the services of labor which creates the products upon which profits are exacted.

"The prices so fixed bear no relation to the need of society for such products and the profits so exacted bear no relation to the value of services actually rendered by the owners of capital.

"In every industry there are three interests essential to its existence; first, the need of society for the products of that industry; second, the rights of those who furnish the capital to supply tools, material and equipment from the use of which society's need may be met and, third, labor, that human impulse which creates out of the tools, materials and equipment furnished by capital the commodities or services that society requires.

"As each industry is dependent upon the existence and cooperation of these three distinct interests, so every industry is dependent upon all other industries for the production of the tools, equipment and materials necessary for taht industry and as the source of the means by which the public may

purchase the commodities of that particular industry. All industries are dependent upon transportation as affording the avenue of exchange and distribution of raw materials, semi-fabricated materials and finished products.

"This complete interdependence of one industry upon all others is the result of the development of co-operative specialized production. The welfare of each industry is essential to the prosperity of all others. The well-being of those employed in each industry reacts beneficially upon the well-being of all those employed in other industries. Conversely, profits wrongfully exacted from those employed in one industry prejudicially affect all of those employed in other industries in direct proportion as the purchasing power of the first body of employees is reduced, and thereby their ability to consume the products of their own and other industries is diminished.

"Since these three interests, the need of society, the rights of those who own capital and the productive capacity of those engaged in industry, are equal in importance to the existence of the industry, it necessarily follows that they must have an equal authority in the direction of the industry; for if one interest exceeds the other two in authority, that one uses its excess power for its benefit at the expense of the other two; if two exceed one, they will exert their excess power to the point of crushing the weaker interest, and with its extinction the industry fails and can only be revived when the third interest can again be induced to participate in the restoration of the industry.

"The recent coal strike is a speaking illustration of this principle. Society demanded coal to prevent its suffering. Capital owned ample tools, equipment and materials with which to meet that demand. But labor refused to co-operate with the other two interests and ceased to function as the creative power. The reason for its cessation was that under the authority exercised by those owning tools, equipment and material labor believed it was deprived of its share in the industry for the benefit of capital. The public was deprived of its necessities also for the benefit of capital, no matter what price the public was willing to pay. The public then joined its authority with that of capital to compel labor to serve. That attempt was a failure. The industry died and became a corpse, to be revived only when labor again consented to resume its function after its demands had been met to such an extent as to procure its further co-operation.

"Under the existing system there is no point of common interest between society's need, the profit-seeking of capital, and the interests of labor. The three fundamental interests are held apart by wholly diverse attitudes towards the industry. The public seeks to buy as cheaply as it can without regard to profits or wages. Capital seeks to obtain the highest profit it can without regard to the need of society or the rights of labor; and the laborer, being treated as the merchandiser of a commodity, naturally seeks to sell as little of that commodity as he can for as much as he can get, without due regard for the interest of capital or the need of society.

"This complete diversity of interest and the total lack of a common interest is responsible for the existing condition of industrial warfare. It creates classes in society separated by irreconcilable distinctions and interests. Though individuals may pass from one class to another, their passing marks the end of their possible affiliation with the class they have left, and compels the adoption of the interests of the class which they enter.

Industry Analyzed

"We have four divisions of industry today, each distinct in the characteristics which differentiate these divisions from each other, and yet having actually common interests throughout.

"For the purpose of this analysis we divide industry into the following classes:

"First, those industries which are individualistic in ownership and organization. In such industries the individual owner combines in himself all of the interests on which industry is based; that is, he is capitalist, laborer and consumer. The agricultural industry, as now conducted, is the best example of this class. The small artisan, contractor and manufacturer also come within this classification.

"The second division includes all industries formerly individualistic, but which through organization have so developed that ownership is separated from labor and concerns itself only in direction and supervision of production, in which it engages the efforts of others who have no share in ownership.

"The third division embraces those industries which are based upon a grant from society in the shape of a franchise, grant of privilege or monopoly. These industries include all public service corporations, except interstate commercial transportation, and all industries engaged in exploiting natural resources. In all such public service industries the owner voluntarily devotes his property to the public use under the terms of the franchise granted to him and submits the conduct of the business to such public regulation as the terms of his grant require. He may, however, withdraw his property from the public service and surrender his franchise at his option unless precluded by the terms of the grant, but may completely withdraw his property from such service at the expiration of the term of his grant.

"The fourth division includes only railroads and commercial transportation facilities. This division is separated from the preceding public service industries by the following marked distinctions: The preceding public service industries are under local control, created by local authorities, and subject to local regulation. Railroads are national public highways, and, while created by state legislative enactments, conduct their interstate transactions only by consent of the federal government. The federal government alone has exclusive authority to control the agencies of interstate commerce, including transmission of intelligence, to construct and operate post and military roads, and to control shipping on navigable streams throughout the United States. In the case of the railroads, the property constituting a railroad is irrevocably dedicated to the public for highway purposes, to be used in the manner permitted by law, and may not be withdrawn from the public use except by legislative consent emanating from the same source that grants or controls the exercise of privilege.

"In all of such industries it is the need of society for the products of that industry or the service which it renders that calls the industry into being. In the first two classes, where society has made no grant, the free working of the law of supply and demand protects the public interest. The individual who invests in such industry knows that his profits depend upon supplying better goods, more goods and cheaper goods than his nearest competitor within range of his immediate market. If he fails to meet this demand his competitor controls the market and his investment ceases to be productive. He profits only as he meets the demand of society for more, better and cheaper products.

Public Interest Defined

"The public interest may be expressed as follows: It is the right of the public to obtain better, cheaper and more products or service *as the progress of the arts permits the making of more and better goods or service at a lower cost of production.* In the two last named classes of industry, that is, public service corporations, natural resources and railroads, this need of society has been crystalized into a grant. This grant in the hands of its possessors is valuable

property. It is deemed to have earning power, a capacity for producing profits. That capacity for profit is measured exactly by the amount of charge which the public must pay for the service rendered in excess of what is required to pay the legitimate demands of labor and capital. To protect the public against extortion it has retained the right to regulate these charges. The Constitution denies the power of the public so to exercise its power of regulation as to deprive the owner of the property of his investment actually, honestly and prudently made ,or of a fair return upon such investment. If society pays more than this amount which the owner retains as profit, society pays more than it is lawfully required to pay, and the owner receives more than he is lawfully entitled to receive.

"This introduces perpetual conflict between society in the exercise of this public regulation and the agent it has created for its service. Whatever society may pay in excess of the just demands of capital and labor is an exaction which deprives society of the power to consume a corresponding amount in value of other products and necessities and confers upon the owners of these agencies that power of consumption which they themselves cannot expend in meeting their own demand for necessities, but which finds its distribution only through supplying luxuries and procuring greater revenues for those who benefit by these exactions.

Interest of Owners of Capital

"The owner of capital never invests in an industry of the first two classes unless in his judgment he can make a profitable investment. The public never guarantees the mistakes of private judgment. There can be no compulsion of investment in these classes. In the last two classes, based on grants of society requiring service, capital is essential. It can only be procured with the consent of its owners. Therefore, such terms must be offered as will induce the making of the investment. To induce such investment the public must guarantee, first, its integrity; second, that rate of return which satisfies the investor in rendering the service required of him. These terms are always expressed in the contract. They are matters of contract pure and simple. That contract is defined by the terms of the charter which states the extent of the grant, the obligations assumed by the grantee and the benefits to be received by the grantor.

"In this discussion investment must be clearly distinguished from service. If the owner of capital invests his money and then also invests his services, he is entitled to receive reward for the service just the same as though he were not the owner of capital. He is entitled to receive return on his capital just as though he rendered no service. He cannot by combining in himself the two functions increase his right to personal return in either capacity. If he does receive more than just compensation for services and a fair rate of interest on his capital, he then enjoys a special or exclusive privilege district from the rest of the community, in violation of that fundamental provision of our government which was best expressed by President Adams in his draft of the Massachusetts constitution, adopted in 1780, as follows:

" 'Article 6. No man, corporation, or association of men have any other title to obtain advantages or particular or exclusive privileges distinct from those of the community than what arises from the measure of services rendered to the public.'

"Also:

" 'Article 7. Government is instituted for the common good, for the protection, safety, prosperity and happiness of the people and not for the profit, honor or private interest of any one man, family or class of men.'

"Labor is the expression of the human power to create. Applied to the use of tools, equipment and materials, it is the agency that supports all production. Like capital, the labor of an individual is his own exclusive property. He may render or withhold his services as he sees fit. He may demand such terms as he will, and if those terms are not complied with he may refuse to serve. But the necessity to provide for hunger, cold, shelter and clothing compels the rendering of service. To withhold service in spite of such necessities means the surrender of life, the extinction of the individual. Sometimes the effort required to meet these necessities becomes so great that existence becomes unbearable, life a horror and extinction a thing to be desired.

Rights of Labor

"Every man has the right to live, provided he renders service. In return for that service he is entitled to receive the service of others in the shape of the commodities comprising life's necessities which others produce. *The measure of what he shall receive depends entirely upon the amount in value of service which he renders. He is entitled to receive an equivalent amount in value of the services of others.*

"The wage system disregards this human right. Under the wage system he receives only enough for his services as will entitle him to procure of the services of others the bare necessities of existence, this without regard to the value of the service which he renders to the community.

"The pressure of the existing system tends so to lower wages as to give to labor so bare and meager an existence as is not worth the effort of prolonging. The present system by raising the price of commodities deprives consumers of the means of purchasing more than the bare necessities of life and gives to the owners of capital all of the constantly increasing values reflected by the difference between actual cost of production and the price at which commodities are sold—diverting this increased value from the common use of the community to the special use of a highly privileged class.

The Remedy

"To correct this system there must be absolute equality between the three interests—the public, capital, labor. In order to permit equality there must be equal authority.

"To accomplish this end, I submit to the American people the true foundation for the reconstruction of our industrial system. This requires that the grant of society, existing either in a privilege, monopoly or grant, shall be deemed the investment which society makes in that industry benefited by the grant; that the capital required to support the industry shall also be deemed an investment. Labor, the creative power of individuals employed, shall be deemed an investment.

"Society shall receive profits on its investment in the shape of better, cheaper and more service.

"Capital shall receive its share in guaranteed protection of investment and that current rate of return which in the markets of the world procures the acceptance at par of the securities which represent invested capital.

"Labor shall receive as its return upon its investment of human effort that rate of wages which in the free markets of the world procures the service of that class of labor and, in addition to wages, shall receive its share of all of the savings which labor can effect in the processes of production.

"In those industries which should properly be owned by the community, and where the capital employed has an absolute guaranty of integrity and return, all of the savings reflected in the greater productive power of increased efficiency should be evenly divided between the public, who consumes the products or service of that industry, and labor, which creates such products or service. In such industries employing private capital to render public service, based on a

grant, the public, or consumers, should still enjoy one-half of the savings of such efficiencies. Capital and labor jointly should receive the benefit of the other half, to be distributed between capital and labor in the proportion of their respective investments; that is, capital should receive that proportion of such savings which the interest on capital bears to the wages paid to labor. The public's half in such savings, scientifically computed and certified, should be reflected in a reduction of price to the consumers of the service rendered.

"In industries of the second class, that is, those industries engaged in production but not based on the enjoyment of a public grant, privilege or monopoly, there are two forms of investment—that of capital and that of labor. In such industries both classes of investors should share in the direction and control of the industry equally and in the distribution of the profits in the proportion which their respective investments bear to each other.

"If this system were universally applied to production, every producer would receive, as a producer, in increased earning power one-half of all efficiencies created in the process of production of the industry in which he or his capital is employed, and as a consumer he would receive in the increased purchasing power of his earnings one-half of all efficiencies created by all other producers in all other industries.

"By this method of distributing the wealth created by industry, each individual would be assured of receiving in return for his service an equivalent amount in value of the services of all other producers whose commodities he consumes. By no other method of distribution can a producer be protected in his right to exchange his service to society for an exact equivalent in service rendered by all the other members of society.

"Such a system protects every individual in both of his social interests; that is, his interest as a producer and his interest as a consumer. It extinguishes all class distinctions. It brings into being the promise of the founders of our country that under our government there shall be equal opportunity for all, with special privilege for none. It protects to the fullest extent every interest which the owner of capital possesses under the Constitution. It also fulfills the prime purpose of government, in that it protects to every citizen the full enjoyment of the gains of his own industry. It requires no amendment of the fundamental law. It merely requires adoption."

Radical Issue Seen at Issue in Presidential Campaign

The coincidence of the Jackson Day dinner of the Democrats at Washington an January 8 with the issuance of various statements, letters or speeches relating to the railroad question aroused considerable discussion as to the part it is to play in the presidential campaign. Former Director General McAdoo did not attend the dinner, but in a letter referring to the incapacity of Republican leadership he said: "The railroad problem bungled and no promise of a real or permanent solution in the Cummins and Esch bills now in conference. These bills leave the fundamental untouched. The public interest is not protected, while increased rates, inefficient transportation and general disappointment will result." Mr. McAdoo did not touch in the letter upon his remedy for railroad difficulties, although his five-year plan is still recalled. Director General Hines 'speech before the New York Bar Association, in which he combined a defense of his administration of the railroads with his ideas for their future regulation, was published in the morning papers alongside of Mr. Plumb's plan. The description of Mr. Plumb's so-called tripartite scheme of industrial management, the primary purpose of which is to oust capital as an important factor, was compared with Mr. Hines' declaration for giving both labor and the public a more direct participation in railroad management, although the two ideas are, of course, widely different. The Plumb statement had previously been given out to the newspapers for release on January 15, but had been picked up from other sources by the Associated Press and published prematurely, according to Mr. Plumb's office, although the fact that this happened to bring it out on the day that Mr. Hines' speech was published and on the day that Mr. Bryan was declaring for "the right of the people to own and operate all necessary monopolies in the interest of the public" gave huge delight to the Plumb plan leaders. Mr. Bryan's scheme for federal ownership of trunk lines and state ownership of local lines is, of course, a very different thing from the Plumb plan, even if it were not qualified by the words "in the public interest," but neither party is particularly anxious to interpret its ideas too specifically, because both are keen for the advantage of whatever glamor either may attract. Mr. Bryan has tried to interject himself into the solution of the railroad question on several recent occasions, both in speeches and by appearing rather suddenly before the House committee during its consideration of the railroad bill during the summer. He then appeared very eager to butt into the limelight which had been focussed upon Mr. Plumb, but was somewhat nonplussed to find that the committee had progressed beyond mere general ideas for and against government ownership, and he declined to express an opinion either way as to details of the Plumb plan, although he did object to its proposal to give two-thirds of the directorate to the officers and employees and only one-third to the public. Senator Pomerene of Ohio, who also considers himself a presidential candidate, replied to Mr. Bryan at the dinner, opposing both the Plumb plan and government ownership. He mentioned the difficulty that would be experienced in floating an issue of government bonds with which to buy the railroads and also told of the wide distribution of railroad securities, of which, he said, while some are held in Wall street, some are held by washerwomen.

It is reported that Mr. Plumb proposes to hold a conference with Mr. Bryan shortly to discuss their proposed plans for the railroads.

Traffic Committees to Close up Work

Because of the postponement of the return of the railroads from January 1, the date originally expected, to March 1, Directors Chambers and Thelen, of the divisions of traffic and public service, on January 7 issued revised instructions to the regional freight traffic committees as to the closing up of their work. The instructions issued on October 22 are continued in effect and all freight traffic committees are requested to continue to work as now organized until the end of federal control in order not only to dispose of subjects now before them, but to be in a position to handle promptly any matters which Directors Chambers and Thelen may find necessary to refer to them for consideration or for further information.

It is stated that the large number of applications and reports which have reached the two divisions from the committees in the last few weeks will require active efforts for the next few weeks. No applications for changes in freight rates are to be forwarded to the divisions on or after February 1 except such as may be in response to requests or instructions from one or both divisions and the committees are to begin at once the compilation of a report to be made promptly after the close of business January 31 showing all applications for freight rate authority or reports from committees forwarded to Washington on or before that date on which rate authority has not been issued or other definite action taken.

Railroad Labor Organizes Co-Operative Commission

Apparently convinced that there is little hope for further wage increases from the Railroad Administration and knowing that their prospects in that direction will not be favorable after the return of the railroads to private management, the officers of the railroad labor organizations are showing indications of a gradual acceptance of the idea that increases in wages do not constitute a remedy for the increased cost of living and that it may be more profitable for them to attack the problem directly. The advisory board of the Brotherhood of Locomotive Engineers publicly expressed its appreciation of that idea last summer when it asked the President to use the powers of the government to reduce prices as an alternative to further wage increases, and this brotherhood has refrained from presenting any new wage demands of its own to the Railroad Administration, although most of the other railroad unions did so, and it has asked that it be given similar treatment if any increases are allowed to the others. Now that Mr. Hines has persisted for several months in his declaration that a new cycle of wage increases must not be started, the brotherhoods, the shop crafts and some of the others have announced a plan of joining with certain farmers' organizations in a scheme of co-operative buying, production and distribution in an effort to reduce the cost of living.

While no announcement has been made that the plan contemplates a withdrawal of any of the wage demands, there have been indications for some time, more particularly since the Senate passed the Cummins bill with an anti-strike clause, that they preferred not to press them too hard. B. M. Jewell, acting president of the Railway Employees' Department of the American Federation of Labor, who has been conferring with Director General Hines regarding the wage demands of the shop employees, issued a statement regarding the co-operative movement in which he said that "an increase in pay will not solve the problem" because higher wages accompanied by higher prices result in a "vicious circle."

The wage demands presented during the summer were accompanied by many threats of strikes unless they were met before the return of the roads. When the Railroad Administration showed powers of resistance to the demands the labor leaders began to take counsel of their fears that the railroad companies might try to reduce wages and began to agitate for an extension of federal control. Threats were then made of strikes if any anti-strike bill should be passed but after the Cummins bill had been reported to the Senate including the anti-strike provision, it was apparently regarded more seriously and during the recent efforts to defeat it there has been very little threatening, in public, at least. While the prevailing opinion in Washington seems to be that the anti-strike section will not be adopted, and while labor leaders say that two-thirds of the members of the House are against it, it is evident that the danger that it might be adopted has had a salutary effect. After the President had disregarded the demand of the labor leaders that he retain the railroads some rather sensational newspaper articles were published forecasting a railroad strike on the strength of the threats previously made, but while conferences have been held with the Railroad Administration there has been little of the old-time belligerent attitude. Possibly the campaign against the Cummins bill and for the retention of the railroads is engrossing all their efforts but the subject of wage increases has been allowed to drift somewhat into the background. Labor leaders in Washington profess to be firmly convinced that Congress may yet be persuaded to force the President to keep the railroads but they are not saying much about what will happen if they are disappointed.

The formation of the All-American Farmer-Labor Co-operative Commission, "to conduct a vigorous campaign for direct dealing between farm producers and city consumers, and as soon as feasible, between city producers and farm consumers, was announced at Washington on January 7. Further plans for the organization of co-operative stores and possibly a co-operative bank are to be considered at a conference at Chicago in February. W. S. Stone is general treasurer of the commission, L. E. Sheppard, vice-president, and other railroad labor officers are also connected with it, including A. E. Barker, president of the maintenance of way employees' organization, which recently announced the establishment of co-operative factories for the production of clothing and other necessities used by its members. The commission is said to be proceeding entirely independently of Mr. Gompers and the American Federation of Labor.

Some interesting labor politics, which the labor leaders are not inclined to discuss openly, may be perceived in the maneuverings which have been connected with the various proposals which they have put forward in recent months. After the Atlantic City convention of the American Federation of Labor it was announced that working arrangements had been made between that organization, which already included the six shop crafts and several other railroad unions, and the four transportation brotherhoods, and that they were about to take out charters as members of the federation. It was also stated that the federation had endorsed the Plumb plan, which had previously been endorsed by the brotherhoods, or at least by their officers, but it later appeared that this was not the case and that both President Gompers and his executive council declined to do so, although Mr. Gompers' name had been and still is used as honorary president of the Plumb Plan League.

While conferences between between the A. F. of L. officials and the executives of the brotherhoods were frequent, no further announcement was made of their affiliation with it and when Mr. Gompers was requested by the President to name 15 delegates to the Industrial Conference held in November only one railroad labor leader was included and the brotherhoods announced their intention of staying away. The difficulty was removed by the appointment of all four brotherhood executives as delegates to the conference but when the A. F. of L. delegates bolted the brotherhood leaders remained until the close of the session. Later the federation and the brotherhood leaders joined in an invitation to the farmers' organization to a joint conference in Washington in November and only one of the latter accepted. Then the brotherhoods joined with some other farmers' organizations in a conference at Chicago which endorsed the Plumb plan and they are now working together on the co-operative plan with which Mr. Gompers' organization seems to have little connection. While 14 of the railway labor organizations joined in several public statements addressed to the President, the director general or to Congress, regarding wages and legislation, the engineers and conductors withheld demands for increased wages while the others were presenting theirs.

After Mr. Gompers had turned down the Plumb plan and Congress also had indicated very little interest in it, the agitation for it in Washington was allowed to die down, although the propaganda throughout the country was continued, and the railroad labor lobby at Washington turned its attention to its demand that the railroads be retained under federal control for two years. Mr. Gompers joined in this —with some reluctance and after considerable pressure had been brought to bear, according to reports,—but he announced at the same time that he was opposed to government ownership, and merely wanted a further test of federal operation. In the opposition to the proposed anti-strike legislation the federation and the brotherhoods have been working in close

co-operation but it is said that there are several points on which they are not yet in harmony. The American Federation of Labor, after having had its fingers burnt by its connection with the steel and coal strikes, has recently been trying to assume a less radical position than that into which it had been drawn, but just as it was beginning to enjoy its reputation for a conservatism, Mr. Plumb came out with his ultra-radical scheme for extending the principles of his plan to all industries except those classed as individualistic. This latest phase of his activity seems as yet to have no definite backing except that of its author but if it should receive endorsement by any of the labor organizations the result would be to widen some of the numerous breaches in their ranks.

Shippers Oppose Provisions of Cummins Railroad Bill

Representatives of 147 shippers' organizations having a combined membership of more than one million shippers handling live stock, coal, grain, lumber, oil, furniture, brick, dairy products and various other commodities, and aggregating more than 75 per cent of the tonnage of the country, met in Chicago on December 30, to consider national legislation which will precede the return of the railroads to private ownership. As a result of the conference a memorial was adopted, addressed to the Joint Conference Committee of the United States Congress considering the Cummins bill providing for the termination of federal control.

The resolutions adopted as a result of the conference and outlining the views of the shippers are as follows:

The Cummins bill proposes to create a new commission to be known as the Transportation Board. It is contemplated by the said measure that this new tribunal shall take over a number of the functions now exercised by the Interstate Commerce Commission in relation to the control over public service; and that it shall further invade the province of the Interstate Commerce Commission in the establishment of reasonable rates by making public recommendations in rate advance cases without the necessity of conducting any public hearing in regard to the same.

The creation of an additional federal board of this character is wholly unnecessary, and will serve to create confusion and conflict in the regulation of our common carriers.

The Interstate Commerce Commission commands the confidence of the American people, and it merits our continued support. The powers of the Commission should remain unabated and should be added to so as to enable it to effectually deal with national transportation problems.

Our system of railroad regulation as it existed prior to the recent war was the product of a generation of development, by the trial of cases before various tribunals and by the enactment of legislation from year to year resulting in the gradual evolution of a system which protected the just rights of both the shippers and the carriers. We want these pre-war conditions restored at the earliest possible moment without any more experiments or revolutionary changes. Business demands an immediate restoration to normal pre-war peace conditions.

We are equally opposed to any attempt to abridge the jurisdiction and functions of state commissions. We, as representatives of the shippers of the country are united in urging Congress to immediately restore the powers of the commissions and the courts, both state and federal, as they existed prior to the war.

We oppose any permanent form of a guaranty of, or limitation upon, the earnings of railway companies, as provided in the Cummins bill; but we do not object to a continuation of the standard return provided in the railroad control law approved March 21, 1918, for such a reasonable time as may be found necessary during the present transition period.

We oppose the appropriation by the government of the surplus earnings of any railway company.

We are opposed to the compulsory consolidation of railroads as provided in the Cummins bill. Guaranteed returns to any private industry removes the powerful incentive for personal initiative. It is economically unsound and socialistic in character; and such provisions should be eliminated from the measure.

We oppose the scheme of rate making groups, the standardization of earnings therein and the federal incorporation of railroads as provided for in the Cummins bill.

We are opposed to the pooling of the earnings of our common carriers.

We are in favor of the passage of legislation which will provide for the return of the railroads to their owners at the earliest possible moment and permit operation by them.

The public, being wholly dependent upon the daily, uninterrupted, continuous operation of our common carriers, we are in favor of the enactment of legislation that will effectually prevent a catastrophe that would call a general railroad strike, and which will at the same time fully recognize the just rights of the laborer and all parties in interest.

We favor legislation which will direct the Interstate Commerce Commission to investigate the rail and water transportation facilities of the United States with the view of making such recommendations to Congress as may be deemed advisable for the further development or unification of the same.

The meeting was called by Clifford Thorne, former member of the Iowa state railroad commission and the session was presided over by Judge S. H. Cowan of Fort Worth, Tex., counsel of the National Livestock Shippers' League. The call to the conference was signed by the National Livestock Shippers' League, the National Lumber Manufacturers' Association, the American Federation of Furniture Manufacturers, the American National Livestock Association, the National Paving Brick Manufacturers' Association, the American Face Brick Association, the Hollow Building Tile Association, the American Fruit and Vegetable Shippers' Association, the Live Poultry and Dairy Shippers' Traffic Association, the Corn Belt Meat Producers' Association, the National Federation of Co-operative Livestock Shippers, the National Association of Corrugated Fibre Box Manufacturers, the National Council of Co-Operative Grain Elevators' Association, the National Kraut Dealers' Association, the Independent Salt Manufacturers, the Illinois Coal Traffic Bureau and the Peoria (Ill.), Board of Trade. In addition, practically every organization of shippers throughout the country was invited to send representatives to the conference.

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Mexican Troops and Their Mode of Transportation

Increased Efficiency in Maintenance of Way Work*

What Must Be Done to Insure Greater Economy in the Vast Expenditures Made for This Purpose?

By A. M. Burt
Assistant Director, Division of Operation, U. S. Railroad Administration

THE EXPENDITURE for maintenance of way and structures of the Class 1 railroads of the United States for the year 1919 will be in the neighborhood of $750,000,000, representing about one-sixth of the total operating expenses of these roads. Reduced to a daily basis, this means that it requires more than two million dollars a day to keep the railroads in condition for use. While this is much less than the amount spent for conducting transportation and considerably less than the cost of maintenance of equipment, it is nevertheless one of the major items that go to make up the total cost of operation. The increased cost for maintenance of way purposes has been very large, so that now fully one million dollars a day more is being spent for this purpose than was spent three years ago.

The magnitude of these expenditures and the very large increases should make us all stop and take thought. The question that immediately presents itself in connection with them is whether progress is being made toward increased efficiency—if so, whether the maintenance of way department is keeping in step with the other departments in this essential matter, and whether some changes in methods can be made to secure better results. It is, therefore, of value to consider the differences that now exist in methods designed in increase efficiency as between the maintenance of way and the other departments of a railroad. In comparing these methods we find the following conditions standing out very prominently:

In connection with transportation operations many measures of work done have been devised and are in daily use, and the supervisory officer is constantly in touch with the situation through various reports. In maintenance of equipment work some measures of work done have been devised, although their application is much less general than in the transportation department.

In maintenance of way work any measures of work done are, generally speaking, conspicuous by their absence. There is, in this work, no way of striking a balance between cost and output or of showing in any definite way whether the work is being done with greater or less efficiency than heretofore. On many roads a budget system is in use, but no matter how well such a system is carried out it does not supply the measure of work done. The supervisor knows that he has been allowed a certain amount and believes that he has spent this amount judiciously, but he has no way of knowing definitely whether he has accomplished more or less than the supervisor on an adjoining district or of knowing whether he is making an improvement or the reverse as compared with his past record.

It seems clear that some measure of work accomplished is very desirable. There is nothing that stimulates thought and initiative to such an extent as a little competition with one's neighbor. It puts an element of sport into the job and not only helps the work, but is a most developing condition for the individual. It is realized that the character of maintenance work makes it especially difficult to establish measures of work accomplished such as are in common use in connection with transportation matters, but there is apparently a tendency to magnify the difficulties of the subject and to assume the attitude, "What's the use? It can't be done." It surely must and will be done in a much larger measure than it is being done at present, and, if it is to be well done, the practical maintenance men must take an active interest in the subject and do their bit in solving the problem. When we have done anything in one way for years we all are apt to consider that way as being the only right one and to consider the subject as a closed book. This, in a measure, is the present attitude of mind, but we have got to shake ourselves loose from such an attitude if progress is to be made.

If the practical maintenance men do not take an active part in this matter there is danger of the work being put on a statistical basis to such an extent that no good results will be accomplished. There has been some of this in the past in other departments, where in some instances statistics have been undertaken so involved in detail that the result was nothing more than a work of the imagination. The maintenance men must make a special effort to insure against such a mistake as this in connection with their work. On the other hand, some progress is possible in simple ways, and something of this kind must be undertaken.

To illustrate what might be done but is not: Several years ago a certain railroad used its maintenance forces for packing ice. The work was completed in December or January, and the following spring, about the time the mosquitoes began to get bad, a statement of the cost of the work was returned to the division from some source generally unknown. This report was turned over to the roadmaster, who was then very much engrossed in his spring work and who usually classified it as "Interesting, if true," checked it with a lead pencil and filed it away in its proper box where it could be used by his clerk in the event of his being called upon to make any explanation. No daily records were kept while the work was in progress.

Some time later the work of packing the ice was turned over to a contractor, and immediately the job was organized on a business basis. The foremen were required to make a report each night showing the amount of ice packed, the payroll in total and per ton and the delays in time and labor cost. In this way each foreman was kept in close touch with his work without being unreasonably burdened with details. If he was delayed for switching, he had something tangible to show the yardmaster; if he had an unreasonable amount of trouble with his hoisting engine, the fact immediately showed up and received attention; or, if his force was out of balance, that fact was immediately called to his attention by the increase in his unit cost. It would have been entirely feasible to have had a similar plan when the railroad was doing the work with its own forces, but no such plan was used. Many similar instances could be cited, going to show that advantage has not been taken of the opportunities that are readily available.

Every maintenance man should be giving this problem the most thoughtful and constant attention, and without question the subject deserves more attention from managers than it has had in the past.

The following is offered by way of suggestion:

1. Better facilities should be provided for the exchange of ideas. Local roadmasters' and supervisors' associations should be encouraged. Such associations are most helpful if

*From the U. S. Railroad Administration Bulletin.

discussions are kept along general lines and away from matters having only a narrow and local interest. The time of the men away from their routine work is well spent. There is less experience with foremen's associations, but apparently considerable benefit might be derived from them.

2. Attendance at national maintenance of way meetings should be actively encouraged and liberal allowances should be made for the expenses of men attending such meetings. The men always bring back ideas and inspirations that result in more efficient work.

3. The question of getting a more general dissemination of ideas and information through publications should be considered. There should be a more general use of the maintenance of way periodicals.

4. The problem should be worked out from the inside and by the talent already on the individual railroads. There is plenty of such talent, and, by encouraging the local men to work out the problems, morale will be improved. They can do the work much better than it can possibly be done by any so-called efficiency expert from the outside. In doing this each man should be given proper credit for his ideas and his part in the work.

The New Year is at hand, and the opportunity of the maintenance of way man is here. We look forward, confidently, to his making the most of that opportunity.

New Mine Ratios and Car Distribution Rules

THE FOLLOWING new rules have been promulgated by the Car Service Section in Circular CS-31 (Revised), to govern uniformly the rating of coal mines (other than anthracite) and car distribution to such mines. They will supersede the rules contained in Car Service Section Circular CS-31, and are to be made effective on all railroads loading coal (other than anthracite) in season to permit car distribution to be made in accordance therewith, beginning January 10, 1920.

RULES FOR RATING COAL MINES LOADING COAL

The following rules shall govern the rating of coal mines (other than anthracite) as the basis for the distribution of empty cars to such mines:

(*a*) The daily capacity of each mine (other than mines covered by paragraphs *b* and *c*) shall be determined by taking the total coal tonnage shipped by the mine during the preceding month, dividing it by the number of hours worked in producing it (see paragraph *e*), and multiplying the quotient by the number of hours in the recognized workday (not more than 10 hours) of the individual mine. The result shall be termed the "daily rating" of such mine and shall be the basis on which cars shall be distributed to it.

(*b*) The daily capacity of a mine which is served jointly by or for two or more carriers (steam, electric, or water) shall be determined by taking the total tonnage shipped by the mine via all such carriers during the preceding month, dividing it by the number of hours worked in producing it (see paragraph *e*), and multiplying the quotient by the number of hours in the recognized workday (not more than 10 hours) of the individual mine. The result shall be termed the "gross daily rating" of such mine and shall be the basis on which cars shall be distributed to it; provided, that if track or other limiting conditions further restrict its ability to ship via (note *a*)..... railroad, such conditions shall be the limiting factor for the (note *a*)..... railroad's daily rating of such mine.

(*c*) The daily capacity of a mine delivering part of its output to a coking plant, to locomotives at the tipple, or to local trade shall be determined by taking the total coal tonnage shipped in railroad cars during the preceding month, dividing it by the number of hours worked (see paragraph *e*), and multiplying the quotient by the number of hours in the recognized workday (not more than 10 hours) of the individual mine. The result shall be termed the "daily rating" of such mine and shall be the basis on which cars shall be distributed to it.

(*d*) When the fires are withdrawn from part (or all) of the ovens at an operation coking part of its output, for the purpose of shipping coal production formerly used in charging ovens, the daily rating of the mine shall be increased to include the average tonnage per day so diverted in the previous month until the beginning of the next rating period, at which time the daily rating of the mine shall be determined in accordance with paragraph *a* or *c*, due allowance being made for such average tonnage so diverted in computing the new daily rating. A corresponding decrease of the mine's rating will be made when the ovens are again placed in blast.

When a mine that has been coking its entire output desires to ship coal and the fires are withdrawn from part (or all) of its ovens, it shall be given a daily rating for coal shipments corresponding to the average tonnage of coal formerly coked until the beginning of the next rating period, at which time the daily rating of the mines shall be determined in accordance with paragraph *a* or *c*.

(*e*) In determining the number of hours worked in each day at a mine, time will be counted from the established time for beginning work (or the actual time if earlier or later than the established time) on the tipple until the dumping of coal finally ceases for the day, making deductions for the noon intermission when it is taken and for the time lost by reason of being blocked with loads, waiting for additional empty cars, or other railroad disability; provided, that if a greater number of hours is worked in the mine than on the tipple, the mine hours must be reported also, and the number of hours worked in the mine must then be used as the number of hours worked in producing the coal. (See paragraphs *a*, *b* and *c*.) Time may be deducted for railroad disability only when such railroad disability actually reduces the quantity of coal dumped that day. Time may be deducted when tipple is used for dumping coal into locomotives only when the tipple can not be simultaneously operated for loading cars.

(*f*) Daily ratings determined in accordance herewith will be revised monthly and made effective on the 10th of the month following the month's performance on which the rating is determined.

(*g*) If a mine be idle for a period of one full calendar month or more, the last rating determined will be the rating when work is resumed, provided the mine conditions be substantially the same as when the mine closed.

(*h*) Rating for development purposes based on current performance will be assigned to a new operation in previously undeveloped coal. A new mine will be furnished with a supply of cars sufficient to enable it to work freely in the course of development for a period not exceeding 6 months after shipments are begun; provided, that if theretofore its ability to load 150 tons per shift (not, however, to exceed 2 shifts per day) is established, it shall then be rated. A new operation of any other character shall be entitled to a develoment rating for a period of one month after shipments are begun.

(*i*) Each mine shall report on a prescribed form to the ..... (note *b*) ..... promptly at the close of each day:

1. The number of hours in the recognized work day;

2. The established time for beginning the day's work;
3. Actual time work was begun this day on the tipple;
4. If the noon hour intermission is taken, how long;
5. Time lost during the day account:

Waiting for railroad cars or other railroad disability..hours;
Strikes or mine labor shortage.....hours;
Mine disability .....hours;
No market .....hours;
All other causes .....hours;

6. Time work on tipple ceased for today;
7. Number of hours worked to-day on the tipple, ...; and in the mine, ...(See paragraph *e*);
8. Number of net tons of coal loaded for shipment via ..... (note *a*) ..... railroad;
9. Total number of net tons of coal produced and shipped via each other outlet.

Joint mines shall furnish this daily report to each carrier serving them.

If after notice from the railroad an operator persistently fails to furnish this daily report, he will be penalized by curtailment of his car supply to the amount of 25 per cent of distribution for one week.

(*j*) At the close of each month the mine manager or superintendent in charge of actual operation shall report under oath on a prescribed form to the ..... (note *b*) ..... having jurisdiction, separately for each mine for each month, as follows:

1. Number of hours in the recognized workday;
2. Total number of net tons of coal produced;
3. Total number of net tons of coal shipped via the .... (note *a*) ..... railroad;
4. Total number of net tons of coal shipped via each other outlet;
5. Total number of hours worked during the month. (See paragraph *e*.)

This report must be forwarded not later than the 3d of the month following that for which the statement is furnished; provided, that where the location of the mine makes it inconvenient to furnish a report under oath by that date, a report not under oath may be forwarded, and the sworn report forwarded not later than one week after. Joint mines shall furnish this monthly report to each carrier serving them.

(*k*) If an operator declines or persistently fails to make reports or to make accurate reports to the carrier as required herein, it will be assumed that the mine worked full hours in producing and loading into railroad cars the tonnage shipped, and the daily rating will be computed accordingly.

(*l*) A statement showing the mine ratings which will govern the car distribution for the succeeding month will be furnished as soon as such ratings are ascertained to such coal mines on this railroad as make application for the same. Such statement will show the mine rating of each mine and the total mine ratings of each coal loading district and the aggregate ratings for all mines and all districts on this railroad, and the percentage of each such figure to the total.

Note *a.—Designate the name of issuing railroad.*

Note *b.—Designate title of proper officer of issuing railroad.*

Rules Governing the Distribution of Cars to Coal Mine Tipples (Other Than Anthracite).

Whenever the available car supply in any region (or district) is such that all orders for cars can be filled, cars shall be placed at each mine in accordance with its daily order, except that whenever a mine holds unbilled coal loads, it shall be entitled only to empty cars equal in number to the difference between the rating last established for the mine and the number of unbilled coal loads so held. Whenever the available car supply is such that all orders for cars can not be filled, each mine shall be given its prorata share of cars in accordance with the following rules:

1. The daily rating, or the daily order for cars if less than the rating, shall be the basis for car distribution.

2. Grouping of mines, or pooling of cars as between mines, will not be permitted.

3. On application of mine operators and in the discretion of the railroad, cars may be placed on such days only and at such mines only as may elect to work, and overs and shortages in car supply resulting from this distribution shall be adjusted on succeeeding days.

4. Each mine operator shall report to the car distributor at .....(note 1) ..... p. m. daily:

(*a*) Number of unconsigned loads on hand at 7 a. m.

(*b*) Number of empty and partly loaded cars on hand at 7 a. m.

(*c*) Additional number of empty cars received during the day.

(*d*) Aggregate number of empty cars received during the day.

(*e*) Number of cars loaded during the day.

(*f*) Number of empty cars standing over at close of day.

(*g*) Number of empty cars standing over at close of day which were received prior to 7 a. m., ...cars; and prior to 10 a. m.,.....cars.

(*h*) Number of partly loaded cars under tipple at close of day.

(*i*)Number of unconsigned loads on hand at close of day.

(*j*) Additional number of empty cars required for loading following day.

(*k*) Note 2.

Copies of orders for cars for a mine that is joint with any other carrier (steam, electric, or water) shall be filed with a designated representative of each such carrier. Such combined requisitions must not exceed the gross daily rating of the mine.

5. The recognized standard car for coal car distribution is 50 tons. Others are compared thereto by tenths of a car; *i.e.*, 80,000 pounds capacity equals eight-tenths (.8) of a car; 140,000 pounds capacity one and four-tenths (1.4) cars, etc., and cars must be charged and car distribution records maintained accordingly.

6. (*a*) All cars placed at a mine during each period of 24 hours ending at 10 o'clock a. m. (or when Sundays or holidays intervene, the longer period ending at 10 o'clock a. m. of the day immediately succeeding the Sunday or holiday) shall be charged against the mine on the day when such period ends; provided, that if the cars placed at 7 o'clock a. m. (not including partly loaded cars) do not equal or exceed in number 25 per cent of the daily rating (or order if less than the rating) then no cars will be charged against the mine that day except such as are loaded on that day.

(*b*) Cars placed between 10 o'clock a. m. and the time the mine ceases work for the day, if loaded or partly loaded on the day placed, will be charged against the mine on that day.

(*c*) All cars of other than railroad ownership (commonly called "private cars") placed for owners loading will be considered as ordered.

7. The pro rata share of cars to which each mine is entitled, except as provided in rule 9, shall be based on its rating (or order when less than its rating). When a mine has empty or partly loaded cars which were placed prior to 7 a. m., or unconsigned loads standing over at the close of the day's business, such cars shall be charged against it each service day thereafter while they are detained, except as otherwise provided in rule 6.

If on any day a mine be furnished with cars totaling less

than 100 per cent of its rating (or order if less than its rating) and for any cause whatever other than railroad responsibility fails to load the entire number, the mine shall be considered as having been furnished 100 per cent of its requirements, and its order shall be arbitrarily reduced to the number of cars furnished.

8. Private cars and such cars as are assigned to mines by the Car Service Section, United States Railroad Administration, will be designated as "assigned" cars. All other cars will be designated as "unassigned" cars.

9. If the number of assigned cars placed at a mine during any period, as provided in rule 6, equals or exceeds the mine's pro rata share of the available car supply, it shall not be entitled to any unassigned cars. The assigned cars, together with the mine's requirements, will be eliminated, and the remainder of the available car supply pro rated to the other mines, based on a revised percentage by reason of such elimination.

10. If the number of assigned cars placed at a mine during any period, as provided in rule 6, is less than its pro rata share, based on a revised percentage, it shall be entitled to receive unassigned cars in addition thereto to make up its pro rata share.

11. If a mine receives more or less cars than it is entitled to during any period, as provided in rule 6 (and after eliminating assigned cars as provided in rule 9), it will be charged with a surplus or credited with a shortage accordingly, and the discrepancy adjusted as promptly as practicable.

12. A statement showing the car distribution for the preceding month will be furnished as soon as such distribution is ascertained, to such coal mines on this railroad as make application for the same. Such statement will show the car distribution of each mine, the total car distribution of each coal loading district, the aggregate distribution for all mines and all districts on this railroad, and the percentage of each such figure to the total.

NOTE 1. *Hour may be named by the issuing railroad.*

NOTE 2. *Issuing railroad may ask additional necessary information pertaining to car supply.*

Rules for Autogenous Welding

THE FOLLOWING RULES adopted by the Committee on Standards for Locomotives and Cars, U. S. Railway Administration, for the purpose of preventing the abuse of autogenous welding for purposes for which it is not well adapted, have been sent to the regional directors by Frank McManamy, assistant director of the Division of Operation, with instructions to direct all roads to observe the rules in the construction or repair of locomotive boilers, so that any failures which may have been caused or contributed to by unrestricted or improper use of autogenous welding may be prevented:

1. Autogenous welding will not be permitted on any part of a locomotive boiler that is wholly in tension under working conditions; this to include arch or water bar tubes.

2. Staybolt or crown stayheads must not be built up or welded to the sheet.

3. Holes larger than 1½ in. in diameter when entirely closed by autogenous welding must have the welding properly stayed.

4. In new construction welded seams in crown sheets will not be used where full size sheets are obtainable. This is not intended to prevent welding the crown sheet to other firebox sheets. Side sheet seams shall be not less than 12 in. below the highest point of the crown.

5. Only operators known to be competent will be assigned to firebox welding.

6. Where autogenous welding is done the parts to be welded must be thoroughly cleaned and kept clean during the progress of the work.

7. When repairing fireboxes a number of small adjacent patches will not be applied, but the defective part of the sheet will be cut out and repaired with one patch.

8. The autogenous welding of defective main air reservoirs is not permitted.

9. Welding rods must conform to the specifications issued by the Inspection and Test Section of the United States Railroad Administration for the various kinds of work for which they are prescribed, which specifications will be issued later.

Atlanta, Birmingham & Atlantic Will Not Be Scrapped

PRESS REPORTS stating that there is a definite movement on foot among security holders of the Atlanta, Birmingham & Atlantic to liquidate the entire property, abandon the road and scrap it for what its physical properties will bring in the open market have brought forth a vigorous denial from W. G. Brantley, president and general counsel of the road. In denying that such a movement had been started, Mr. Brantley said in part:

"I have understood since the newspaper publication that some restlessness existed among certain of our income bondholders over the failure of the corporation to pay any of their interest coupons during the period of federal control. The facts about this interest are that the corporation earned and paid these interest coupons from the date of the issue of the bonds until the beginning of federal control. The corporation did not succeed in having a contract for its compensation executed by the director general until December 5, 1919. The contract as executed provides an amount barely sufficient to pay the corporate expenses and interest on the bonds of the corporation, including the income bonds. Interest on the underlying bonds has been regularly paid during federal control, and the money has now been received with which to pay the past due coupons on the income bonds, and arrangements are now being perfected to pay these coupons.

"The Atlanta, Birmingham & Atlantic is well located. It serves important sections of the country which without it would have no railroad service. It handles a large volume of business. Its record shows economy and efficiency of operation and that if granted reasonable rates it has a substantial earning power. Even prior to federal control, however, the railroad's income suffered because of a very low ton-mile rate, due largely to the inequality of rate divisions with connecting lines. Prior to the period of federal control the owners of the property planned to remove the inequalities to a great degree by extending the railroad from Waycross, Ga., to Jacksonville, Fla. Financial arrangements had been made and substantial steps taken to build this extension when the coming on of the world war stopped them.

"Obviously the owners of the property can make no definite plans at this time for the building of this extension until the pending legislation in Congress has been disposed of and the nature of the legislation enacted is known. The owners of the property would like to complete the extension and to further develop the property so as to accomplish the real purpose of its original building."

The Illinois State Tax Commission has announced that the total valuation of the steam railroads of Illinois for the year 1919 is $574,742,228. The valuation of the electric lines is placed at $40,873,538. Under a new law providing for the assessment of one-half of the valuation, the steam lines will pay taxes on approximately $287,371,114.

Weekly Traffic Report

According to a report on traffic conditions for the week ended January 5, 1920, made to Director General Hines, the revenue freight loadings and receipts from connections for the various regions for this period as compared to the same period last year were as follows:

Eastern region—Revenue freight loaded, 166,999 cars, an increase of 26,764 over last year; received from connections, 231,709, an increase of 27,994. Allegheny region—Revenue freight loaded, 148,377 cars, an increase of 15,117; receipts from connections, 153,851, an increase of 10,646. Pocahontas region—Revenue freight loaded, 29,368 cars, an increase of 7,037; receipts from connections, 13,292 cars, an increase of 123 cars. Southern region—Revenue freight loaded, 94,549 cars, an increase of 22,284; receipts from connections, 71,933 cars, an increase of 16,213 over last year.

Northwestern region—Revenue freight loaded, 94,622 cars, an increase of 14,864; receipts from connections, 76,026 cars, an increase of 18,403. Central Western region—Revenue freight loaded, 103,315 cars, an increase of 24,939; receipts from connections, 66,011 cars, an increase of 20,216. Southwestern region—Revenue freight loaded, 50,349 cars, an increase of 14,505; receipts from connections, 49,175, an increase of 14,116.

For all the regions local loadings increased 125,510 cars, or 18½ per cent, while receipts from connections increased 107,711 cars, or 16½ per cent.

A summary of the report follows:

Eastern Region.—There has been considerable increase in freight traffic reported in practically all directions. Conditions at Detroit have improved, and while there has been some congestion recently at Toledo this is also showing improvement. Movement into and out of Chicago has increased and eastern roads are in fair shape. Chicago elevators report stock on hand December 27 as 23,267,000 bushels of grain, compared with a stock of 23,502,000 reported on December 28 last year.

Allegheny Region.—Loading of coal has reached normal stage. Full car supply was maintained for anthracite coal loading, but as to bituminous fields the present car supply is practically on same basis as was in effect prior to the coal strike. Coal dumped at tidewater increased 43,174 tons over the previous week. There is an increased shortage of box cars, grain cars, open and gondola cars for miscellaneous loading, but improvement in flat car, stock car and refrigerator car situation. Reports from the iron and steel territory indicate 110 pig iron furnaces in blast, 81 out, a gain of 5 stacks in blast as compared with the previous week. Delivery of grain to vessels at seaboard showed an increase of 504,000 bushels over the previous week. Elevators 27 per cent full. Both through and local passenger traffic was very heavy during the Christmas holidays, and there was some shortage of Pullman sleeping cars as well as steel coaches.

Pocahontas Region.—General business conditions appear to be good, and reports indicate a satisfactory holiday trade. Coal loading showed some improvement over the previous week, but is still below normal. Miscellaneous car supply was sufficient and coal car supply about equal to requirements in view of the light loading.

Southern Region. — General business conditions show a very satisfactory improvement as compared with the corresponding week of last year, evidenced by an increase of about 24 per cent in the local loading. The box car situation is slowly improving, but shortage of flat cars continues acute. Good supply of refrigerator cars on hand to protect perishable movement from Florida. Movement of fertilizer showed a material increase over previous week and heavy movement expected to continue some little time. Heavy passenger travel throughout the Southern region necessitated the operation of 322 extra sleepers and 587 extra coaches.

Northwestern Region. — Future outlook is encouraging, both manufacturers and dealers being optimistic as to future conditions, but the car shortage has a depressing effect. Weather has moderated somewhat, but the general movement of traffic was adversely affected by car shortage, particularly for the movement of grain and forest products. All equipment available for grain loading is quickly absorbed. Coal mines generally have resumed operations, but the output has not yet reached normal. Passenger business shows a decided improvement.

Central Western Region. — Coal production during the week was very heavy, the loading being 60 per cent greater than the same period of last year. Mines were furnished with 100 per cent equipment during the past week. Embargo on eastbound traffic at inter-mountain gateways was modified on January 2 to permit acceptance of traffic by all gateways except El Paso. It is estimated that the navel orange crop in San Joaquin Valley, Cal., amounted to 17,516,000 boxes and movement will be completed within the next two weeks. Estimated production of lemons for California this year is 5,310,000 boxes. This will approximate 50,000 cars of citrus fruit. Passenger travel has been much heavier than for the same period last year, some lines reporting as much as 40 per cent increase.

Southwestern Region.—Business conditions were generally satisfactory, and figures of local loading show substantial increase as compared to same week of last year. Notwithstanding high prices, there is good demand for building materials, and prospects for building in the next few months are encouraging. All lines report heavy holiday travel, estimated at 10 per cent increase over last year, except in Texas, where it is estimated the increase ranged from 20 to 50 per cent. Generally speaking, sleeping-car equipment was adequate, but there was considerable congestion in coaches.

Illinois Central Granted Extension on Terminal Ordinance

An extension until February 21 of the time limit for the acceptance by the Illinois Central Railroad Company of the Illinois Central Terminal Ordinance of the Chicago city council, providing for the Chicago lake front terminal project, has been granted by the council. The ordinance was passed in 1919 and the railroad was given six months to consider the plan, the time limit expiring January 21, 1920. The railroad company asked that the ordinance be amended to provide for the financing of the improvements for which it will pay. The city and the road have been unable to agree upon that amendment. Recommendations for the granting of the permit to the Chicago South Park Board for the proposed lake front improvement, which includes the terminals, had been prepared by the War Department Engineers at Washington, D. C. Before such a permit is granted, however, various modifications and restrictions must be accepted by the Chicago interests. The report has been forwarded to Secretary of War Baker, but before acting upon it Secretary Baker will give a hearing to representatives of the South Park Board and the Chicago city council, the Illinois Central and other interested parties.

The railroad company asked for the amendment because of prospective national railroad legislation intended to control the issuance of securities. The form of an amendment has been under consideration by the attorneys for Chicago, the Chicago South Park Commissioners and the railroad company without an agreement having been reached as yet. The railroad wishes to stipulate in the ordinance that the

railroad improvements shall be financed by long-term notes or bonds.

The City Council deemed it inadvisable to assent to this, believing that the Interstate Commerce Commission, or some other agency which may be created to supervise common carriers, may desire that some of the improvements be paid for out of current receipts or by short-term notes.

Railroads in Allegheny Region Unscrambled

DIRECTOR GENERAL HINES has announced that in preparation for the return of the railroads to their private owners on March 1 in accordance with the proclamation of the President, the following changes in the Allegheny region have been ordered, effective January 15:

The Western Maryland is released from the jurisdiction of Federal Manager C. W. Galloway of the Baltimore & Ohio Eastern Lines and M. C. Byers is appointed federal manager of the Western Maryland.

Mr. Galloway's jurisdiction is extended as federal manager over the entire Baltimore & Ohio system, thus putting under his jurisdiction the lines now under the jurisdiction of R. N. Begien as federal manager of the Baltimore & Ohio Lines West; also the B. & O. affiliated lines and properties which are now under the jurisdiction of C. H. Ewing, federal manager of the Reading.

The B. & O. Lines in the Shenandoah Valley are transferred to the jurisdiction of Federal Manager Galloway from that of Federal Manager E. H. Coapman of the Southern Railroad.

The jurisdiction of Federal Manager C. H. Ewing of the Philadelphia & Reading is extended to include the Gettysburg & Harrisburg Railroad and the Philadelphia & Reading between Shippensburg and Harrisburg, releasing those lines from the jurisdiction of Federal Manager Galloway of the B. & O.

The jurisdiction of Federal Manager Elisha Lee of the Pennsylvania Lines East is extended to include the Cumberland Valley Railroad, releasing that railroad from the jurisdiction of Federal Manager Galloway of the B. & O.

The arrangements thus made will be carried out so as to maintain the co-ordination and economical operation of the properties as a whole during the remainder of federal control.

Women in Railroad Service

AN ANALYSIS OF THE FIGURES compiled by the Women's Service Section of the Railroad Administration shows the continued employment of women in railroad service, with few changes. On October 1, 1919, there was a reduction of but six-tenths of one per cent, compared with the previous quarter.

On October 1 the total number of women employed in railroad service was 81,803, compared with a maximum number employed during the war of 101,785. During the year to October 1, 1919, the percentage of decrease in those employed was 19 per cent. Clerks, including ticket sellers, accountants and cashiers, showed the smallest decrease, namely, 12.2 per cent. However, as of October 1, 55 Class I roads reported that they had increased the number of their women employees, these additions amounting to 1,151, chiefly in clerical work.

During the year the employment of women as laborers and in other capacities requiring too great muscular exertion was discontinued.

Orders of Regional Directors

UNECONOMICAL CAR-LOADING.—The Central Western regional director, Supplement 8 to Circular 218, calls for better use of cars. During the last ten days of November, 4,463 cars were loaded with salt, the tonnage of which was sufficient for only 3,718 cars had the carrying capacity been fully utilized. The order suggests that instructions be renewed and careful consideration be given to the matter of double and triple loading.

Bad Order Cars.—The Northwestern regional director, file 16-1-101, states that the loss of time over the holiday season, together with severe weather experienced during this period, has resulted in a very large increase in freight cars waiting for repairs, and suggests that every possible effort be made to make all bad order revenue cars available for service as soon as possible.

Overtime for Train and Enginemen.—Circular 95 of the Northwestern regional director states that, effective December 1, 1919, under the provisions of Supplements 24 and 25 to General Order 27, time and one-half for overtime has been granted to train and enginemen in all classes of freight service and suggests that a careful study be made of operating methods and facilities to determine whether the service performed on a punitive rate basis is sufficiently valuable to all railroads to warrant the working of men in excess of hours in which service can be required at the single time rate.

Regulations for the Enforcement of National Prohibition.—File 49-1-117 of the northwestern regional director contains advance information on the rules and regulations which are now being prepared by the Federal Prohibition Director relative to the transportation of liquor. According to the circular, these rules and regulations contemplate, in addition to the consignor securing from the local prohibition director a permit to make the shipment and the consignee furnishing a permit to receive it, that each railroad shall secure a blanket permit to engage in the transportation of such liquors as may be lawful and that records shall be kept at shipping points and destination of the shipments and deliveries.

SENATOR NELSON, on January 10, presented in Congress a memorial from Dr. C. H. Mayo, of Rochester, Minn., remonstrating against the adoption of the provision in the Esch railroad bill, which is designed to prohibit the issuance of railroad passes to local surgeons who do not give substantially all of their time to railroad work.

Photo from International

A Sanitary Disinfecting Car on the Trans-Siberian

National Public Works Department Association Convention

A CONVENTION of the National Public Works Department Association was held in Washington, D. C., on January 13 and 14, 1920, to review the work of 1919, give the opportunity for the presentment and discussion of committee reports and to formulate policies for the ensuing year. This association had its inception in April, 1919, when a joint engineering meeting was held in Chicago to consider the proposal to advocate the creation of a National Department of Public Work. Seventy-four technical societies with a total membership of 105,000 were represented at the Chicago meeting, which resulted in the formation of an Engineers, Architects and Constructors' Conference, and subsequently in the association named above.

During the meeting in Chicago, the activities of which were recorded in the *Railway Age* for May 2, 1919, page 1103, three permanent committees were formed. These were: An executive committee, one to draft a bill for the creation of a Department of Public Works, and a committee to conduct a campaign for the passage of the bill. The convention held this week was featured by the reports of these committees. The bill drafted is known as the "Jones-Reavis" bill, and was introduced into Congress on June 25, 1919. It changes the name of the Department of the Interior to the Department of Public Works, and provides for the transfer of non-engineering activities of the Interior Department to other branches of the Government and transfers certain bureaus concerned with construction activities now attached to the departments of War, Treasury, Commerce and Agriculture to the Department of Public Works. Its object is to create a department of the Government with an organization technical in character, which would permit of a unified control over public works and a grouping of bureaus along functional lines in the interest of economy in the administration of the construction activities of the Government.

To direct the attention of the public to the situation which resulted in the movement a campaign by states has been carried on by the Association and the reports submitted to the convention by the various state committees constituted an instructive and interesting feature of the session held Tuesday morning. These reports embraced the methods followed in arresting public attention, the measures taken to keep Congress advised of public sentiment and the results.

The evening session on Tuesday was devoted to addresses by Hon. Frank C. Reavis, House of Representatives, and Gen. R. C. Marshall, Chief of the Construction Division, U. S. A. Congressman Reavis pointed out the practical results to be achieved by a National Department of Public Works, drew particular attention to the duplication of work by the several uncorrelated bureaus having to do with public works under the present methods of administration of such work, and dwelt at length on the increased cost and decreased efficiency resulting from this divided responsibility. Gen. Marshall outlined in an interesting and striking way the economies which should result to the Government from the adoption of standard construction specifications in the place of the many and varied ones now enforced by the various bureaus in charge of construction work. He pointed to the work of the Construction Division of the Army, which adopted standard specifications, as concrete evidence of the economies that might be expected to accrue from this source alone with the construction work of the Government under one head as provided for in the "Jones-Reavis" bill.

Wednesday's program was arranged to provide an opportunity for the members of the various state teams to confer with members of Congress in reference to the bill, in the morning, and to report back to the convention in the afternoon. The reports of the state teams were followed by a discussion of ways and means for financing the Association and the reports of the committees on Text of Bill, New Organization, Nominations and Election of Officers and Resolutions. The committee on Text of Bill recommended that the text be left unchanged, and the recommendation was accepted by the convention as was the suggestion of the Committee on Organization that the scope of the Association be enlarged to include representatives from business organizations, professions other than those already included, and social and other organizations.

M. O. Leighton was unanimously re-elected chairman of the Executive Committee

Governor Allen Indicts Brotherhood Leaders

GOVERNOR HENRY J. ALLEN of Kansas, in speaking to to the extraordinary session of the Kansas State Legislature, called on January 5, 1920, charged the leaders of the four railway brotherhoods with attempting to control the government through coercion and with having "initiated the present insane notion that an organized minority is greater than government itself." The extraordinary session was called primarily in the hope that a "court of industrial relations" might be established which will provide a substitute for strikes and lockouts and protect the public against the abuses which now come upon it during the course of industrial controversy. In his message Governor Allen outlined the industrial legislation which he believes should be enacted in the state of Kansas to avoid such situations as recently arose during the strike of bituminous coal miners. After producing statistics showing the number of strikes and the cost of these actions to both the public and the industries concerned, especially during the recent coal strike, he said:

"The miners are being urged by a lot of professional labor officers who live off the exploitation of labor controversies, who fight this legislation because they realize that with its enactment their peculiarly radical type of leadership will be unnecessary. From all over this state there is coming a flood of protest from various union bodies who are not concerned in this bill, who do not belong to the essential industries affected by it and who have made absolutely no study of the plan, but who are being urged by professional labor leaders to protest. Those most active in leading the fight against the bill are the officers of the four railway brotherhoods.

"These gentlemen, who constitute the aristocracy of organized labor, have less real concern in the proposed bill than any of the other essential industries touched by the bill, because of the interstate character of their employment. Nevertheless, they are leading this fight because of the orders they have received from their national leaders that no legislation making it unnecessary for organized labor to use the club of the strike is to be permitted. These men established the first sad record in the United States of government by coercion. They initiated the present insane notion that an organized minority is greater than government itself when they brought about by intimidation the enactment of the Adamson law. This victory over government, obtained while these leaders held their stop watches on Congress, gave rise to the belief on the part of the more radical labor leaders that the general public had no rights which labor was bound to respect. These leaders have now come to Kansas in the hope that they may, by reminding the legislative members of the political power of their organization, secure from intimidated legislators the same sort of victory in Kansas they forced in Washington. I have a feeling that these enthusiastic promoters of industrial warfare upon the public underestimate the Kansas spirit."

General News Department

Canadian currency, according to a recent order, must not be accepted by employees of government operated railroads because of the fluctuation of exchange rates.

Lewis Pilcher, secretary of Section 7 (Freight Claims), of the American Railroad Association, has moved his office from Richmond, Va., to Chicago, Ill., where his address is 431 South Dearborn street.

The Utah Associated Industries have addressed a letter to senators and representatives in Congress advocating the early return of railroads to their owners, with legislation that will make possible the successful operation of the lines under private ownership.

At the Western Railway Club, Chicago, Monday evening, January 19, Leslie R. Pyle, supervisor of fuel conservation in the Central Western Region, will read a paper on "The Preparation of Locomotives at Enginehouses and Shops and Its Relation to Fuel Economy."

H. T. Swegman, chief of the bureau of claims in the legal department of the Pennsylvania Lines, with office at Chicago, has been elected president of the Chicago Steam Railroad Claim Conference, an organization composed of the members of the claim office staffs of the roads centering in Chicago.

Ernest R. Dewsnup, professor in the department of transportation of the University of Illinois, has been elected to the chair of commerce at the University of Liverpool, Liverpool, England. Mr. Dewsnup, who is well known in transportation circles of the United States as a result of his investigations and writings on transportation subjects, will sail for England in February.

The United Mine Workers of America at the recent reconvened convention at Columbus, Ohio, voted affirmation of the action of the union's international officers in accepting President Wilson's proposal to settle the recent strike of bituminous coal miners. According to reports of the meeting the vote was taken only after three days of debate on the motion, which was presented by the head of the Pennsylvania miners' organization.

The American Association of Engineers, Chicago, has made arrangements with the producers of six screen weeklies whereby the association will furnish lists of engineering work, photographs of which will be of interest to the public. The motion picture companies will then arrange for photographs to be taken for display in their firms. The association requests the co-operation of engineers in calling to their attention projects which would be of interest in this way.

Senator Hoke Smith, of Georgia, has offered in the Senate a resolution calling on the Interstate Commerce Commission to investigate and report upon living conditions of trainmen who are compelled to lie over between trips at terminals of railroads, and also to investigate "the feasibility on the part of railroad companies of furnishing to their men such accommodations." One of the Senator's constituents has thus far failed to induce the Railroad Administration to pay him a large salary for supervising the work of improving the conditions referred to.

Herbert C. Hoover, head of the civilian relief commission for Europe and at present vice-chairman of the President's Industrial Commission, will be the guest of the Western Society of Engineers, Chicago, the last week in February at which time the Washington Award, founded by John A. Alvord, a member of the society, will be presented to him for "pre-eminent services in promoting the public welfare as chairman of the Commission for Relief of Belgium and as Food Administrator of the United States." Mr. Hoover has intimated that the final report of the Industrial Commission will be the topic on which he will speak on this occasion.

The nation-wide strike of steel workers, which went into effect on September 22, 1919, was officially ended on January 9, according to an order issued by the national committee of the steel workers' union. The order declared the committee's decision was forced by ruthless misuse of power by the steel corporation, the press, the courts, federal troops, state police and public officials in denying steel workers the right of free speech and free assemblage and the right to organize. The order added that the union will launch an immediate campaign to further organize steel workers.

Engineering Council has sent letters to 50,000 engineers outlining the character of work under way, and in immediate prospect, and soliciting funds for the support of this work. A tentative budget which has been prepared contemplates the receipt of $15,000 from member societies and $30,000 from general contributions; and expenditures of $12,000 each for the general office at New York and for the Washington office, which latter has in charge the campaign for the creation of a National Department of Public Works. The total expenditures for 1919 were $50,000, half of which went for the support of the Washington office and $13,500 for the engineering societies' employment bureau.

Senator Norris, of Nebraska, has introduced in the Senate a resolution calling on the Interstate Commerce Commission to report to the Senate, first, to what extent, if any, part or all of the proceeds from the sale of stocks or bonds by railroads have been used for other than proper and legitimate purposes, giving in each instance the railroad, the extent of the practice, the purposes to which the proceeds were used and the names of the officers guilty; and, second, to what extent, if any, directors and other officers of interstate railroads are directors or other officers of corporations having business dealings or financial relations with such railroads, with particulars as to such relationship and the effect it may have had.

Shades of Bill Carlisle!

The ticket agent of the Southern Pacific at Stockton, Cal., was held up recently by a lone masked bandit and forced at the point of a gun to turn over approximately $275 in currency. The holdup occurred as the agent was closing the office for the night, and the bandit, after forcing him to hand over all of the money in sight, caught a freight train which was passing at the time.

Committee for Registering Engineers

Engineering Council in October, 1918, authorized the creation of a committee to investigate the subject of licensing or registering engineers, architects and surveyors. After 14 months' work the committee submitted its report accompanied by a recommended uniform registration law at the December meeting of the council which voted to receive the report and to give it and the proposed law immediate and wide publicity. The report shows that ten states have already enacted laws registering engineers and at least 18 states have laws registering architects. These laws are not uniform in character and have often proved a serious detriment. The recommended law, framed with a view to its adoption, uniform, throughout the states, creates a state board of registration consisting of seven members appointed by the governor, of which at least three shall be professional engineers and three architects, with a term of office of four years. In the main, all engineers, architects and surveyors over 25 years

of age who submit satisfactory evidence to the board that they are qualified to practice engineering, etc., will be eligible for registration when the application is accompanied by the proper fee. Certificates of registration will be issued which may be revoked or re-issue refused by the board for any gross misconduct or incompetency, charged and proved against a registered engineer, architect or surveyor.

Material Handling Machinery

The Material Handling Machinery Manufacturers' Association will hold a convention at the Waldorf-Astoria Hotel, New York City, on Thursday and Friday, January 29 and 30. All persons interested in the art of mechanical handling are invited to attend. This association is composed of and is organized in the interest of makers of cranes, hoists, winches, conveyors, industrial trucks, tractors, bulk handling machinery, elevators, motors, electrical control apparatus, batteries, ball-bearings, wire-rope, manilla rope, hand lift trucks, etc. There will be a luncheon at the hotel on Thursday. Information may be had from Z. W. Carter, secretary, 35 West 39th street, New York City.

Fire Hazards

The Southwestern regional director, by circular 261, citing careless handling of torches, orders that: (1) The use of torches be confined to "under and around" locomotives; (2) That particular care be exercised when using torches both as to handling and storing; when not in use they should be kept in metal receptacles, never in wooden lockers; (3) That where electricity is available electric lights should be installed so as to make torches unnecessary. The director recommends the following rules: That greasy waste, coal oil torches, oils, and matches be not stored in wooden clothes lockers, but in metal boxes or racks; that all clothing be hung up, and that frame cupboards shall not rest on floors; cupboards must have slanting tops, wire screen or ventilated doors, and be built into the wall so that rubbish will not accumulate behind them. Clothes cupboards should not be permitted in paint or smith shops, foundries or oil houses, unless made of solid sheet iron with proper ventilation and set on fireproof supports. All cupboards must be inspected and cleaned at least once each month.

New Union Station at Cleveland to be Started

Definite announcement has been made by the Cleveland (Ohio) Union Terminals Company of its intention to begin the construction of a $50,000,000 union passenger station at Cleveland early in the present year. On December 30 the Cleveland City Council adopted an ordinance which made possible the construction of the new station without the co-operation of the Pennsylvania. This requires that work be begun by March 6, 1920, the station to be completed within five years and the lines within the city limits to be electrified in ten years. Negotiations for the construction of a new union station at Cleveland have been in progress for several years. According to the Cleveland Union Terminals Company, the New York Central and the Cleveland, Cincinnati, Chicago & St. Louis are officially committed to the project and it is expected that their declaration of intention to accept the charter granted by the city will be filed in the immediate future. The Erie, the New York, Chicago & St. Louis and the Wheeling & Lake Erie are, according to these reports, pledged to accept the plan and only the Pennsylvania and the Baltimore & Ohio have failed so far to sanction the project. A description of the proposed new station appeared in the *Railway Age* of March 21, 1919, page 755.

National Agreement for Clerks

A national agreement covering rules and working conditions for railroad employees represented by the Brotherhood of Railway & Steamship Clerks, Freight Handlers, Express and Station Employees has been signed between the director general of railroads and the officers of that organization, effective January 1, 1920, and to continue in force during the period of federal control. The request for a national agreement for these employees was made last summer and has been under consideration since that time, first, by a committee representing the regional directors and the employees, next, by the Board of Railroad Wages and Working Conditions and, finally, between the director general and members of his staff and representatives of the clerks' organization.

The agreement just signed covers rules relating to seniority, discipline, etc. The chief item in the agreement is that time and one-half for overtime after eight hours will be paid to all employees affected except certain employees having light or intermittent work whose present monthly pay is preserved for the present hours of work. The agreement also provides for giving all employees covered one day's rest every week as far as practicable and where the operation of the railroad would not be affected thereby.

Conferees Make Progress on Railroad Bill

The conferees on the railroad bill have practically reached an agreement on the comparatively minor differences between the Senate and the House bills, according to an announcement by Senator Cummins, and on Monday, January 12, began the discussion of the more controversial features of the proposed legislation, which are involved in the provisions of the Cummins bill that were not in the Esch bill. These include the percentage rule of rate-making, limitation of earnings, compulsory consolidation, transportation board and federal incorporation, which are enough to keep the conference committee busy without definite results for several days. In a general way they represent the ideas which the Senate committee put into its bill and which the House committee left out of its bill, although the House committee did propose a general rule of rate-making which was eliminated by the House, and therefore they include the points on which there is a sharp difference of opinion between the Senate and House conferees, both of which have already been backed up by the votes of their respective houses. It is generally believed that some at least of these controversial provisions of the Cummins bill will be sacrificed in order to gain the acceptance of the others, but at this writing the discussion in the conference committee had not progressed sufficiently to indicate which, if any, would be most likely to prevail, or to what extent they might be modified to make them more acceptable. By tacit consent, the labor sections, including the prohibition against strikes, were postponed for discussion after the financial provisions have been considered.

Speedy Return of Railroads Advocated

The directors of the Minneapolis (Minn.), Civic & Commerce Association have adopted resolutions advocating the speedy return of railroads to private ownership. They ask:

(1) That Congress make equitable provision for re-establishing railway credit; that until railway credit has been so re-established under supervision of the Interstate Commerce Commission, the present guaranteed compensation be continued, and if necessary the government loan capital to the carriers at reasonable rates of interest.

(2) That the Interstate Commerce Commission be authorized to fix minimum and maximum rates, and in co-operation with the state railroad commissions, co-ordinate interstate and state rates;

(3) That, under supervision of the Interstate Commerce Commission, an agency be created to hear and arbitrate wage disputes; and that lockouts and strikes be prohibited during the consideration and determination of disputes;

(4) That the Interstate Commerce Commission be enlarged so as to properly exercise all of its present functions and in addition be given plenary power over:—

a—The issuance of all railway securities.
b—The transportation needs, facilities and service througbout the country.
c—The use, control and supply, as well as the movement, distribution and operation of trains, including re-distribution of traffic necessitated by congestions and the joint use of terminals.
d—To prohibit extension of present lines or construction or acquisition of new lines by any carrier until it has obtained from the Commission a certificate of public necessity and convenience.
e—To require the construction of docks, and of rail connections between rail and water carriers.

REVENUES AND EXPENSES OF RAILWAYS

TEN MONTHS OF CALENDAR YEAR 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (Inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Norfolk Southern	906	$364,585	$202,095	$597,171	$114,020	$89,715	$7,511	$261,402	$21,860	$494,824	82.86	$102,347	$16,000	$86,340	$114,802
Northern Alabama	112	80,687	16,566	99 840	5,122	4,818	1,322	48,854	1,593	61,709	61.80	38,131	3,400	34,731	—6,792
Northern Pacific	6,610	5,644,713	2,171,040	8,553,553	1,376,952	923,430	61,103	3,060,135	183,572	5,739,297	67.09	2,814,256	682,279	2,130,655	—1,086,035
Northwestern Pacific	538	380,424	281.297	724,350	92.253	65,380	6,691	272,861	12,609	452,309	62.44	272.041	25,424	246.079	—35.136
Oahu Ry. & Land Co	114	223 653	26,646	260.201	37,188	19.240	2,861	57,491	5,611	122,101	46.92	138.099	10,000	128.099	24,788
Oregon Short Line	2,347	2,663,754	729.728	3.606,337	253,884	521,491	20,109	966,407	95,271	1,921,320	53.27	1,685,017	172,005	1,512,965	241,402
Oregon-Wash. R. R. & Nav. Co	2,070	1,947.187	670 826	2,792.984	329.112	332.256	34,550	999,409	95.773	1,811,307	64.85	981,677	113.614	867.721	—68,706
Panhandle & Santa Fe	772	528,506	139,815	694,698	78,038	178,486	3,986	235,366	14,714	510,571	73.49	184,128	20,895	163.091	100,801
Penn. R. R.—East	5,367	23,316.856	11,389,294	37,567,580	4,621.442	9,469,289	270,191	14,505,678	717,145	30,191,466	80.36	7,376,114	943,107	6.430.964	—1,343,217
Penn. R. R.—West	1,754	7,558.686	2,031,137	10.217,574	1,475.208	2,355,603	79,077	3,953,642	184,733	8,131,313	79.58	2,086,261	329,448	1,756,627	250,020
Peoria & F. O	19	16,959	2,607	85,785	15,215	25,473	551	62,891	4,921	109.051	127.12	—23,266	9,500	—32,766	—13,224
Pere, Marquette	2,232	2,337.655	788,178	3,394.815	207.725	605,711	31,413	1,221,639	69,673	2,147,777	63.26	1,247,039	63,545	1,183,289	1,100,369
Perkiomen	41	83 487	13.320	99,856	6,406	4.015	46	36,751	242	47,478	47.54	52.378	1.800	50 578	24.663
Phila. & Reading	1,127	5,350,413	933,655	6,673.391	774.714	1,498,126	38,226	2,833,336	149.787	5,312,237	79.61	1,361,153	143.228	1.217,925	—664,802
Phila., Bethlehem & N. E	71	.....	.....	67.259	5,922	10,380	455	49,867	843	67,467	100.30	—208	1.050	—1.258	—20.194
Pitts. & Lake Erie	224	2,149,485	271,538	2,589 626	236,509	665,703	12 808	874,144	44,298	1,834,686	70.84	754.941	72,000	682.940	—751,635
Pitts. & Shawmut	103	111,741	3,372	115,905	42,925	23,645	1,565	37,193	3,108	108.435	93.55	7,469	993	6,477	—10.930
Pitts. & W. Va	63	104,785	10.479	129.578	27,625	41.487	1.874	59,079	7,095	143.370	110.64	—13.791	9,470	—23,288	5.116
Pitts., Shawmut & Nor	204	102,396	7 032	112.093	32.007	47 818	903	43,772	13.153	137,655	122.80	—25.562	1.878	—27.441	36.187
Pitts., Cincin., Chicago & St. Louis	2,383	5,222,405	2,105,767	7,910,348	1,329,861	2,230,212	102.517	3,130,432	176.270	7.046.353	89.07	863.995	243.192	620.581	—1,277,856
Port Reading	21	159,707	.....	227.052	20,702	23,413	18	104,771	230	149.134	65.68	77.918	9.000	68,918	—44 016
Quincy, Omaha & Kansas City	255	80.671	30,868	119.735	38.586	20.567	102	56,785	1,157	117.025	97.73	2,709	3,053	—343	—7,757
Rich., Fred. & Pot	81	310.778	255.653	627.368	39 851	81 008	4,404	101,095	13,068	342,506	54.59	284,862	13,135	271,726	—120,929
Rutland	415	212,376	160,692	453,464	77,125	104,733	4,802	188.173	11,545	387.615	85.47	65.849	19.609	46.211	—32.601
St. Joseph & Grand Island	258	195.816	43.641	255.089	46.409	40.630	2,309	129.615	12,896	232 570	91.17	22.519	11.856	10.644	42.553
St. Louis, Brownsville & Mex	548	280.007	161,575	468.287	103,774	68,038	4,004	129,511	14,697	320,024	68.33	148,263	10.000	138,153	—88,555
St. Louis Merch. Bridge Terminal	9	.....	530	293,538	52.731	29,924	699	169.133	6,313	258,800	88.16	34,738	8,000	26.738	—92 864
St. Louis-San Fran	4,761	4,326 232	2,357,052	7,016.817	987,159	1,115,857	52,572	2,429,926	173.178	4,750.551	67.70	2,266.266	194.667	2,069.790	1.218.786
St. Louis-San Fran. & Texas	134	138.965	32,569	179,573	22,447	22,800	1.829	65.877	7.097	120 050	66.85	59 524	1.629	57 895	54 181
St. Louis S. W	939	947,749	237,492	1,221,071	157,232	219.165	16,858	356,063	45,088	798,727	65.41	422,344	37,770	384,422	—88,846
St. Louis S. W. of Texas	814	432,590	169,300	635,932	120 926	175.535	10,257	302,179	23.097	630.139	99.08	5.792	21,000	—15,669	—119,091
St. Louis Transfer	6	.....	.....	107,553	13,177	10,555	170	44,003	2.599	72,594	65.63	36,959	230	36.729	—26,205
San Antonio & Aransas Pass	736	239.532	149,231	411,833	124,389	113,498	6,617	241,409	16,351	501,984	121.89	—90,150	15.000	—105.190	32.655
Seaboard Air Line	3,563	1,677,460	1,123,753	3,081,681	565,441	601.270	64,994	1,409,165	115.777	2,781.755	90.26	299,926	135,000	164.395	31,778
South Buffalo	11	41,837	.....	84,271	7,166	14.932	675	69,220	1,404	93,397	110.82	—9.126	3.667	—12.793	—58.489
Southern R. R	6,982	7,403,177	3,588.593	11.736.143	2,458.191	1,748,262	121,084	4,546,302	272,514	9,221,946	78.58	2,514,198	324,960	2,186.234	—991,604
Southern R. R. in Miss	278	77,255	63,504	150.641	39.118	16,702	2,037	70,132	4,276	132,266	87.80	18.375	9.000	9.113	—13 046
Southern Pacific	7,049	9,398.837	3,956 679	14,429,313	1,746.859	2,404,067	124.323	5,291,632	269,116	10,148,856	70.33	4,280.458	665,817	3,609.258	—2,509.099
Southern Pac. S. S. Lines	...	985.811	48,254	1,068,148	6,464	276,454	14,634	741.477	23,911	1,062,941	99.51	5.207	2,560	2.641	—56.226
Spokane Int.	156	83,274	20 721	107,428	23,097	9,368	1,810	33,273	4,414	71,793	66.82	35.635	4.012	31.623	665
Spokane, Port & Seattle	554	421.730	211,742	668,438	62.863	61.898	5,350	188.550	20.668	343,601	51.25	325,837	59.200	266.629	—48.163
Staten Island Rapid Transit R. R	23	103,379	102,744	231,334	25,001	21,987	936	102.073	8.621	158.618	68.56	72 716	17.000	55.713	524
Tennessee Central	292	163,366	56 530	224,423	62,135	35.210	2,747	102.612	6,133	208.837	93.05	15 586	5,135	10.397	—122.252
Terminal R. R. Assn. of St. Louis	36	.....	4,295	340.562	81.135	43.873	837	133.508	4.519	267,436	78.52	73,126	28,250	44.876	—67,227
Texas, Kansas & Ft. Smith	87	102.938	20,365	132,487	10,733	16.207	654	51.089	3,112	81,398	61.43	51,089	6.458	44.612	17 530
Texas & N. O	469	461,598	195,732	730,232	106.099	138,921	4,833	234,093	14.079	542.283	74.26	187,949	21,356	166.527	—103,599
Texas & Pacific	1,946	1,999,440	1,051,437	3,221.224	405,991	641.072	28,531	1,268.045	71.076	2,441,995	75.80	779,229	100 000	679,049	361,278
Toledo & Ohio Central	435	836.268	81 131	958,837	139,525	198.643	6.019	362,399	17,936	727,660	75.88	231.176	32,716	198.453	—150,037
Toledo, St. Louis & Western	454	750 027	68.607	852,468	152.719	151.433	6,675	322,099	12.182	645,108	75.67	207,360	26.000	181,360	—142,189
Toledo, Peoria & Western	247	98.050	50,908	153,759	20.555	45,169	1.839	69,083	5,189	141.834	92.24	11,925	8 500	3.425	—18.557
Trinity & Brazos Valley	368	88.571	28.586	123,632	47 588	44,111	2,161	72,155	7,218	173,232	140.12	—49,600	5,623	—55,253	2,306
Ulster & Delaware	128	72,180	60,863	151,066	21.244	19.171	1,220	82,878	5,179	130,104	86.12	20,962	4,800	16,162	—6,648
Union Pacific	3,614	7,841,827	2,187,605	10,776,694	1,150 185	1,779,245	46,374	2,786,881	215,962	6,203,608	57.56	4,573,087	286,758	4,285,853	—236,665
Union R. R.	40	.....	.....	731,859	77,498	232.769	232	380,577	7 390	698,466	95.75	33,392	7,714	25 678	—144 547
Utah Railway	98	110,330	651	111,251	15.864	20.356	211	21,306	2,410	60,149	54.06	51,103	3,072	48,031	—37,251
Vicks., Shrev. & Pacific	171	175,455	89,992	293,295	42,921	58,715	7,588	92,776	12,663	217,570	74.18	75,724	15,242	60,466	82 868
Virginian	523	1,025.708	77,491	1,207,196	167.689	187,321	4,942	364 612	16,684	742,752	61.53	464,445	35,700	428,683	—14 871
Wabash	2,503	1,903,694	997,950	3,147,359	733,860	630,542	53,091	1,840,244	113,723	3,399,172	108.00	—251,813	112,092	—364,222	—1,598,648
Washington Southern	35	122.254	218,323	398.008	30,785	38,992	2,090	115,102	—1,892	190,831	47 94	207,178	6 370	200,708	—26.033
West Jersey & Seashore	361	354.600	1,473,007	1,930.075	145,921	260,635	8,467	595 019	20,376	1,036,392	53.69	893,683	50,403	843,267	151,681
West Md.	688	1,123,572	128,886	1,378 495	218,501	395,834	16,167	467,213	51,851	1,164,783	84.49	213,712	43,200	170 512	129,489
West. Pacific	1,041	1,211,100	213,503	1,477.043	206,539	178,968	9,299	363,059	35,138	816.055	55.24	660.988	45,911	615,005	22 710
West. Ry. of Ala	133	90,492	90,109	194,041	23,393	32,537	3,798	67,505	5.999	137,019	70.61	57,023	7.500	49,523	15,228
Wheeling & L. E	511	990,182	72,052	1,191,042	322,523	245,972	4,810	425,109	25,673	1,027,065	86.23	163,977	61,825	102,127	—54,448
Wichita Falls & W. W	328	145,368	58,332	211,342	68,094	17.289	1,169	103,721	5.439	195,712	92.60	15,630	9,000	5 496	21,572
Yazoo & Miss. Valley	1,381	1,926,422	525,936	2,534,564	349,212	466,197	17,414	711,337	47,640	1,592,569	62.83	941,995	65,583	876,250	242,352

REVENUES AND EXPENSES OF RAILWAYS

EIGHT MONTHS OF CALENDAR YEAR 1919

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance of		Operating expenses				Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Ala. & Vicks	141	$1,187,747	$501,630	$1,809,952	$343,085	$415,167	$15,081	$259.760	$69,578	$1,616,879	89.33	$193,073	$88,834	$104,058	—$95.491
Ala. Great Southern	312	4,713,304	1,620,929	6,690,106	980,356	1,688,786	106,021	2,690,473	148,600	5,661,530	84.62	1,028,576	192,658	834,990	—543,649
Ann Arbor	301	2,131,193	473,344	2,752,124	436,072	444,843	38,269	1,317,435	87,119	2,324,256	84.45	427,868	126,400	301,069	198,246
Ariz. Eastern	377	1,943,291	348,230	2,459,585	605,965	380,346	17,108	821,005	58,057	1,910,860	77.69	548,725	130,255	418,116	—465,319
Atchison, Topeka & Santa Fe	8,643	74,119,493	29,264,649	108,923,545	15,301,334	25,294,609	1,128,440	40,021,003	2,038,579	83,434,493	76.59	25,489,052	4,399,608	21,065,333	—8,556,063
Atlanta & W. P.	93	829,671	771,705	1,779,545	216,651	327,640	24,506	679,792	51,441	1,320,785	74.22	458,760	68,000	390,718	—26.896
Atlanta, Birm. & Atlantic	639	2,427,232	622,439	3,256,676	770,160	1,014,947	55,493	1,905,700	98,826	3,845,772	118.08	—589,096	128,000	—718,370	—435,053
Atl. Coast Line	4,861	26,200,738	12,759,925	41,522,311	6,196,197	8,804,759	475,415	18,535,186	886,441	35,138,293	84.62	6,384,018	1,685,000	4,685,038	—3,094,286
Atl. City	177	969,866	2,100,415	3,213,775	364,174	391,280	11,478	1,478,316	10,676	2,256,782	70.22	956,993	96,000	860,993	140,931
Baltimore & Ohio	5,151	83,387,569	21,994,731	113,901,884	17,590,319	35,955,945	1,269,364	50,852,630	3,047,893	109,590,777	96.21	4,311,107	2,945,153	1,355,943	—5,042,089
Baltimore & O. Chic. Term	90	.....	3,052	1,201,013	262,965	335,309	9,005	980,026	72,058	1,697,344	141.32	—496,330	223,007	—719,900	46,279
Baltimore, Ches. & Atlantic	87	663,591	357,506	1,057,535	115,251	341,428	8,418	612,053	27,591	1,104,742	104.46	—47,206	26,135	—73,341	81,680
Bangor & Aroostook	632	2,516,892	592,063	3,271,970	690,664	911,019	31,858	1,296,489	100,691	3,077,295	94.05	194,675	168,000	24,765	—230,732
Beaumont, Sour Lake & W.	118	609,693	196,784	846,435	220,440	155,618	14,897	377,807	40,685	809,446	95.63	36,989	21,600	15,235	—275,604
Belt. Ry. Co. of Chicago	31	.....	.....	2,319,104	207,663	410,070	2,885	1,411,154	62,666	2,094,439	90.31	224,665	123,744	100,921	24,878
Bessemer & Lake Erie	217	8,124,065	302,415	8,641,402	951,561	2,571,487	87,111	2,709,703	155,546	6,455,094	74.69	2,186,309	116,000	2,070,204	—389,091
Bingham & Garfield	37	714,383	16,790	762,939	310,343	316,361	10,634	218,755	34,318	907,095	118.89	—144,156	55,095	—199,252	—1,212,846
Birmingham Southern	29	292,607	.....	390,114	32,295	49,818	5,616	184,970	26,076	298,774	76.58	91,340	14,304	77,036	—107,737
Boston & Maine	2,258	26,358,307	14,325,695	45,310,568	6,353,397	8,654,375	327,366	24,530,624	1,354,460	41,485,096	91.55	3,825,472	1,409,724	2,414,953	—1,053,941
Buff. & Susq	296	1,335,529	55,942	1,475,031	332,271	728,287	14,127	503,162	61,342	1,639,188	111.12	—164,157	26,000	—190,157	—260,771
Buff., Roch. & Pitts	589	7,719,536	1,043,692	9,110,518	1,542,126	3,204,975	118,750	4,514,123	262,506	9,660,028	106.03	—549,510	216,000	—766,042	—1,402,005
Canadian Pac. Lines in Me	233	1,360,519	406,426	1,862,526	408,560	427,830	20,817	1,186,566	28,654	2,072,427	111.26	—209,901	88,000	—297,901	—43,196
Carolina, Clinchfield & O	282	3,479,041	270,246	3,819,365	610,647	947,765	37,692	1,200,448	109,697	2,905,656	76.07	913,709	130,400	783,229	178,200
Central of Ga	1,918	8,372,704	4,251,329	13,882,020	2,640,053	2,788,777	275,464	6,029,997	465,910	12,192,036	87.82	1,689,985	479,177	1,204,407	—1,493,726
Central of New England	301	3,801,589	193,061	4,179,876	1,026,085	790,037	21,579	1,974,399	114,971	3,933,692	94.11	246,184	128,000	117,792	—321,400
Central of N. J	685	21,036,229	5,608,760	28,764,109	3,424,812	7,202,394	193,128	13,579,045	696,043	25,218,567	87.67	3,545,542	1,259,538	2,285,837	—2,485,417
Central Vermont	411	2,666,178	685,978	3,680,136	760,840	930,278	61,803	2,314,360	140,755	4,219,529	114.65	—539,393	139,200	—678,749	—395,220
Charleston & W. Carolina	342	1,432,712	416,070	1,932,818	353,843	361,311	35,292	952,167	43,829	1,746,442	90.35	186,376	68,000	118,376	—164,228
Ches. & Ohio	2,502	34,353,830	10,096,791	47,126,902	7,560,962	10,202,665	292,250	18,354,310	889,702	37,552,579	79.68	9,574,323	1,343,641	8,226,311	—1,050,539
Chicago & Alton	1,050	11,100,851	4,238,836	16,276,672	2,777,776	4,389,809	203,177	6,999,742	390,241	14,834,258	91.13	1,442,414	507,974	933,082	—1,203,722
Chicago & Eastern Ill	1,131	11,559,907	3,203,502	15,909,698	2,517,744	5,636,391	179,992	6,921,108	376,601	15,683,471	98.57	226,228	636,092	—413,071	—1,162,877
Chicago & Erie	269	5,369,242	813,284	6,717,796	793,609	1,133,886	86,690	3,464,074	226,077	5,726,383	85.24	991,414	239,287	752,038	833,129
Chicago & N. W.	8,090	57,267,726	22,954,531	87,608,260	13,547,217	18,012,586	587,470	40,062,493	1,977,028	74,868,621	85.45	12,739,639	3,800,000	8,934,002	2,122,524
Chicago, Burl. & Quincy	9,372	66,512,328	22,993,975	96,717,098	14,959,514	19,315,185	715,877	37,712,777	2,517,434	76,209,714	78.79	20,507,384	3,592,820	16,893,740	592,817
Chicago Great Western	1,496	8,903,427	4,020,565	13,903,947	2,357,628	3,145,012	209,314	6,063,034	355,963	12,234,705	87.99	1,669,242	458,314	1,209,866	235,363
Chicago, Indianapolis & Louisville	657	5,260,985	1,876,231	7,827,006	910,976	1,871,763	110,960	3,302,221	206,268	6,480,250	82.79	1,346,755	303,871	1,041,699	253,478
Chicago Junction	12	.....	.....	2,368,090	545,568	381,592	813	1,814,192	57,323	2,799,488	118.22	—431,398	22,332	—453,808	—250,337
Chicago, Milw. & St. Paul	10,647	66,575,557	20,082,835	95,125,159	14,854,570	27,020,886	715,781	44,235,372	2,480,868	89,678,747	94.27	5,446,412	4,198,589	1,226,875	—2,280,194
Chicago, Peoria & St. Louis	247	773,048	199,871	1,039,612	295,478	508,451	22,084	671,129	70,219	1,567,354	150.76	—527,742	56,566	—584,323	—428,663
Chicago, Rock Island & Gulf	474	2,124,820	675,582	2,964,580	530,896	568,856	54,788	1,356,861	94,326	2,613,843	88.16	350,737	105,239	245,104	—419,219
Chicago, Rock Island & Pacific	7,594	44,726,881	20,292,512	69,019,105	11,302,213	15,517,225	819,704	30,125,860	1,604,694	59,641,965	86.41	9,377,140	2,805,644	6,567,323	736,859
Chicago, St. Paul, Minn. & Omaha	1,749	11,140,712	4,921,662	17,223,825	2,533,882	3,120,514	163,936	8,253,214	478,510	14,660,435	85.11	2,563,390	829,638	1,730,884	145,551
Chicago, Terre Haute & S. E	374	2,340,817	174,948	2,584,416	434,419	1,168,154	25,016	1,019,255	68,540	2,727,196	105.52	—142,781	116,000	—258,798	—436,244
Cincinnati, Indianapolis & West	321	1,359,957	426,967	1,969,513	380,153	587,952	40,068	1,059,538	105,781	2,178,981	110.63	—209,468	81,963	—291,431	—194,351
Cincinnati, Lebanon & Nor	76	535,101	60,050	708,286	138,206	151,659	10,724	409,990	7,192	717,770	101.33	—9,485	34,654	—44,139	—39,611
Cincinnati, N. O. & Texas Pac	337	7,643,269	2,499,009	10,669,227	1,421,165	3,357,922	184,008	4,100,660	274,461	9,402,272	88.12	1,266,272	306,119	957,045	—785,968
Cincinnati Northern	251	1,595,516	152,145	1,897,338	293,684	421,856	17,774	670,477	38,089	1,441,891	75.99	455,447	71,900	383,391	269,154
Cleve., Cinc., Chicago & St. L	2,395	30,997,641	11,145,738	45,617,372	5,826,066	8,917,702	608,625	18,717,367	875,780	35,312,097	77.40	10,305,276	1,461,000	8,837,739	—727,054
Colorado & Sou	1,100	6,394,180	1,625,569	8,476,765	1,411,540	1,930,339	68,179	3,185,202	283,134	6,934,868	81.81	1,541,897	376,000	1,162,470	—508,507
Colorado & Wyoming	41	190,135	9,404	745,298	86,544	141,092	1,078	339,178	30,565	598,457	80.29	146,841	32,000	114,841	—46,818
Copper Range	141	509,878	98,241	657,660	201,242	138,631	13,556	292,181	22,534	668,144	101.59	—10,484	49,905	—60,390	—105,560
Cumberland Valley	163	2,874,818	570,468	3,680,072	660,063	847,537	52,245	1,465,416	90,220	3,121,383	84.81	558,689	68,581	489,829	—693,942
Del. & Hudson	875	19,199,547	2,100,772	22,558,368	2,843,615	6,257,058	145,708	10,023,353	859,464	20,371,931	90.31	2,186,437	480,000	1,699,232	857,171
Del., Lack & West	955	33,733,626	8,173,583	46,761,204	4,734,114	9,676,524	329,837	19,977,184	895,725	36,088,510	77.17	10,672,694	2,494,148	8,158,634	—1,241,369
Denver & Rio Grande	2,611	14,500,498	4,347,747	20,045,011	3,244,961	5,014,055	155,762	6,961,289	549,514	16,254,752	81.09	3,790,259	845,000	2,941,527	346,712
Denver & Salt Lake	255	1,441,428	299,903	1,795,205	598,169	668,272	7,654	1,029,717	39,827	2,343,639	130.54	—548,434	72,000	—620,522	—266,872
Detroit & Mackinac	381	725,172	253,548	1,034,379	174,787	285,818	21,225	504,555	73,360	1,059,146	102.39	—24,766	61,919	—86,686	—130,093
Detroit & Tol. Shore Line	61	1,517,133	.....	1,550,571	148,441	148,652	8,202	436,385	32,334	773,424	49.87	777,148	76,396	700,745	219,548
Detroit, Tol. & Ironton	456	2,127,080	102,178	2,378,809	711,911	772,817	21,254	1,134,982	102,605	2,743,569	115.33	—364,760	65,222	—430,329	—86,545
Duluth & Iron Range	292	5,105,681	182,751	5,688,113	646,461	720,855	3,515	1,434,696	112,696	2,919,972	51.33	2,768,142	287,797	2,479,692	—142,677
Duluth, Miss. & Nor	410	12,740,046	357,051	13,501,526	1,220,142	1,043,801	17,188	2,393,234	145,952	4,830,983	85.78	8,670,543	492,951	8,177,592	704,184
Duluth, South Shore & Atl	599	2,066,727	794,337	3,054,726	650,420	543,596	46,451	1,477,715	75,857	2,833,004	92.74	221,722	163,003	58,589	—122,155
Duluth, Winnipeg & Pac	178	1,024,553	190,225	1,258,827	241,009	240,527	20,214	563,991	63,725	1,135,976	90.24	122,851	65,459	57,389	—13,402
East St. L. Connecting	3	.....	.....	797,796	118,398	193,596	2,263	513,811	26,963	855,397	107.22	—57,601	20,745	—78,346	—31,547
Elgin, Joliet & East	828	11,364,213	9[illegible]	13,276,500	1,200,331	1,610,115	52,958	5,131,384	204,232	9,769,354	73.58	3,507,146	435,771	3,071,460	201,238
El Paso & S. W	1,027	6,309,318	1,408,890	8,136,649	1,305,421	1,610,115	77,552	2,321,992	200,710	5,574,532	68.15	2,562,117	429,446	2,132,215	—1,561,742
Erie	1,989	43,984,555	9,222,906	58,416,831	6,994,658	18,652,684	495,375	28,992,992	1,614,488	57,075,477	97.70	1,341,354	2,051,097	—725,390	3,718,050
Florida East Coast	764	3,889,685	2,110,946	6,743,664	1,114,673	1,207,035	62,733	3,088,680	128,888	5,681,919	84.25	1,061,745	304,813	754,729	—1,012,723
Fonda, Johnstown & Gloversville	88	269,817	526,963	830,483	87,517	70,903	5,176	315,353	40,277	519,227	62.52	311,256	44,200	267,056	15,890
Ft. Smith & West	253	694,699	213,818	973,305	190,640	244,106	29,474	358,299	51,245	877,744	90.18	95,561	40,000	54,740	12,113

REVENUES AND EXPENSES OF RAILWAYS

EIGHT MONTHS OF CALENDAR YEAR 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of—										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Ft. Worth & Denver City	454	$4,570,285	$2,134,569	$6,980,027	$686,250	$1,328,793	$35,560	$2,563,373	$197,567	$4,834,231	69.25	$2,145,797	$151,988	$1,992,764	$1,[illegible]84,780
Ft. Worth & Rio Grande	235	490,027	402,020	954,591	220,355	181,695	9,162	512,807	48,305	972,324	101.85	—17,733	24,452	—42,513	—86,633
Galv., Harris. & San Ant	1,381	9,620,207	3,737,159	13,997,825	2,086,147	3,052,753	140,860	5,361,817	426,032	11,187,462	79.92	2,810,363	423,141	2,383,021	—1,751,201
Galv. Wharf	715	.....	.....	556,582	202,390	6,141	169	217,746	12,636	513,580	92.27	43,003	100,000	—56,997	—231,084
Georgia	328	2,411,777	1,218,156	3,891,876	414,730	657,688	63,351	1,908,147	133,671	3,178,930	81.68	712,946	48,600	664,291	—659,449
Georgia & Florida	348	441,907	159,278	639,074	220,973	159,671	15,694	410,573	44,493	851,405	133.22	—212,331	33,619	—246,731	—203,099
Georgia, Sou. & Fla	402	1,820,649	771,013	2,830,425	470,104	655,070	49,474	1,338,665	84,467	2,603,501	91.98	226,924	109,518	117,037	—68,601
Grand Rapids & Ind	569	3,383,295	1,371,041	5,159,259	718,969	1,155,055	83,129	2,511,499	176,992	4,664,256	90.41	495,004	206,453	288,514	—111,764
Grand Trunk Line in N. E	172	1,739,059	312,786	2,455,739	750,130	322,487	23,626	1,525,196	99,564	3,046,731	124.06	—590,992	98,000	—688,992	—137,082
Grand Trunk West. Lines	1,001	10,645,003	2,380,747	14,175,305	1,787,655	2,597,070	135,118	6,443,884	379,232	11,376,637	80.25	2,798,668	401,829	2,393,418	2,800,542
Great Nor	8,241	47,602,003	12,635,971	66,157,951	12,525,177	11,962,106	443,825	27,957,951	1,226,775	54,979,660	83.10	11,178,291	3,554,286	7,618,682	4,835,050
Green Bay & West	252	574,821	132,274	754,102	165,183	189,271	9,170	335,071	15,450	714,095	94.69	40,006	35,121	4,885	—31,283
Gulf & Ship Island	307	1,098,058	372,563	1,591,585	423,296	363,782	30,539	665,738	72,288	1,555,555	97.92	33,030	86,476	—53,717	—403,838
Gulf, Colo. & S. Fe	1,934	8,622,448	3,402,968	12,723,580	2,856,363	2,329,976	129,913	5,603,193	390,795	11,274,944	88.61	1,448,635	569,341	874,186	—1,486,054
Gulf, Mobile & Nor	424	1,306,931	354,981	1,751,939	369,051	420,568	44,083	827,032	78,500	1,736,034	99.09	15,905	89,178	—73,614	—249,035
Hocking Valley	350	5,963,148	773,687	7,199,904	848,187	2,402,866	48,516	2,494,227	169,289	5,960,766	82.78	1,239,137	361,782	873,191	—543,699
Houston & Texas Cent	847	3,696,256	1,668,495	5,676,679	1,094,477	1,041,960	56,337	2,431,043	157,372	4,790,074	84.38	896,605	275,931	612,365	—915,501
Houston E. & W. Texas	190	1,074,392	359,818	1,501,079	277,991	175,175	7,833	705,529	33,885	1,200,413	79.96	300,666	50,490	249,256	—85,160
Illinois Central	4,789	48,398,398	15,849,770	69,055,673	12,100,056	18,364,536	612,402	28,872,332	1,790,558	62,016,782	89.80	7,038,890	3,280,042	3,739,886	—4,239,170
Indiana Harbor Belt	116	.....	.....	4,182,833	737,812	797,708	13,802	2,694,619	133,628	4,377,568	104.66	—194,736	79,933	—274,678	143,924
International & Great Nor	1,159	6,389,588	2,128,690	9,082,135	2,172,836	2,404,268	101,378	4,621,811	329,956	9,677,534	106.55	—595,398	233,500	—829,832	—1,810,376
Kan. City, Mexico & Orient	272	650,579	141,781	832,205	335,836	314,295	11,922	477,090	59,756	1,198,898	144.06	—366,692	50,051	—416,763	—135,908
Kan. City, Mex. & Orient & Texas	465	544,857	112,072	697,664	268,893	319,412	12,490	487,113	61,878	1,149,786	164.80	—452,122	39,906	—492,030	—311,448
Kan. City Southern	774	7,272,433	1,566,934	9,564,997	1,635,198	2,155,573	142,055	3,964,853	331,497	8,216,690	85.90	1,348,307	517,784	826,212	—1,424,183
Kan. City Terminal	26	.....	.....	881,400	131,769	187,130	.....	371,114	10,427	709,740	80.52	171,659	154,067	17,516	22,354
Kanawha & Mich	176	2,239,569	456,237	2,787,419	410,363	1,030,809	19,911	1,045,096	103,280	2,609,472	93.61	177,947	145,926	32,017	—942,029
Lake Erie & Western	902	5,349,110	521,550	6,149,154	1,110,743	1,836,724	95,801	2,774,505	190,357	6,003,652	97.63	145,502	254,700	—111,414	—659,682
Lake Superior & Ishpeming	34	557,757	1,905	627,588	153,933	143,114	1,604	133,814	20,298	452,764	72.14	174,824	27,682	147,742	—302,813
Lehigh & Hud. Riv	96	1,578,141	32,252	1,670,262	207,756	373,885	12,443	712,162	46,672	1,352,918	81.00	317,343	41,100	276,225	59,456
Lehigh & N. E	230	2,218,550	12,689	2,351,046	341,249	514,214	19,781	853,073	75,875	1,802,601	76.67	548,445	65,191	483,254	—400,982
Lehigh Valley	1,435	32,732,547	4,620,745	41,093,756	6,072,978	10,951,909	335,013	19,075,990	864,231	37,440,662	91.11	3,653,093	1,245,850	2,405,757	—950,747
Long Island	398	3,865,616	11,345,187	16,771,375	2,200,601	2,675,163	97,842	7,713,825	380,557	13,179,080	78.58	3,592,296	732,977	2,856,449	—912,640
Los Angeles & Salt Lake	1,168	7,658,698	2,744,524	11,031,123	1,807,550	2,306,134	143,995	3,694,932	241,135	8,487,421	76.94	2,543,703	544,315	1,998,043	378,461
Lou. & Ark	302	1,007,599	299,014	1,355,385	392,267	324,092	26,877	617,795	48,838	1,409,869	104.01	—54,484	90,858	—145,393	—259,250
Lou., Ry. & Navigation Co	349	1,868,574	289,941	2,284,129	620,236	427,495	29,847	1,067,758	62,077	2,207,413	96.64	76,717	112,000	—35,432	—364,825
Lou. Western	207	1,652,482	896,865	2,659,544	400,562	473,639	32,657	762,636	86,246	1,772,342	66.64	887,202	73,560	813,461	—494,505
Lou. & Nash	5,013	48,738,216	16,442,675	68,746,669	10,782,238	17,471,506	914,588	28,921,487	1,507,789	59,841,647	87.05	8,905,022	2,044,154	6,853,451	—6,086,049
Lou., Hend. & St. Louis	199	1,302,989	518,125	1,900,522	401,059	264,034	47,068	749,220	59,601	1,520,982	80.02	379,540	32,000	344,064	—98,094
Maine Cent.	1,216	7,181,777	3,263,557	11,249,298	2,049,616	2,517,269	97,760	6,475,308	286,753	11,450,076	101.78	—200,779	604,986	—805,983	—663,226
Md., Del. & Va	82	536,489	323,787	881,022	74,636	239,199	5,021	578,141	16,702	913,698	103.70	—32,676	14,025	—46,722	20,962
Mich. Cent.	1,861	32,134,272	12,965,235	49,210,577	6,585,417	9,487,904	521,674	18,578,557	888,917	36,629,488	74.43	12,581,089	1,540,000	11,036,957	2,379,174
Midland Valley	388	1,802,969	643,463	2,538,208	534,903	443,831	19,572	935,393	95,050	2,028,750	79.92	509,459	55,274	452,882	—97,304
Minn. & St. Louis	1,646	6,105,019	1,828,357	8,320,564	1,495,743	2,063,569	82,254	4,142,064	236,035	8,012,513	96.29	308,050	407,002	—102,869	136,038
Minn., St. Paul & S. S. Marie	4,243	19,483,069	5,323,715	26,493,728	4,119,440	5,392,705	195,652	11,277,554	606,912	21,731,318	82.02	4,762,410	1,557,604	3,203,108	2,258,323
Mineral Range	101	491,443	3,299	517,655	94,423	171,411	3,467	291,711	7,844	569,144	109.94	—51,489	28,500	—79,989	—38,913
Minn. & Int	194	482,865	198,137	722,343	178,804	125,874	4,059	382,860	27,827	719,424	99.59	2,919	37,239	—34,334	—60,301
Miss. Cent.	164	403,559	225,902	663,589	163,301	248,068	10,100	276,910	46,567	744,946	112.26	—81,357	26,075	—107,638	—314,799
Mo. & N. Ark	365	603,390	321,315	985,190	506,199	300,034	15,675	504,386	71,263	1,396,644	141.76	—411,453	50,869	—463,454	—511,807
Mo., Kans. & Texas	1,714	15,372,797	5,270,007	21,801,549	4,024,329	6,153,238	214,475	7,567,485	618,121	18,662,941	85.60	3,138,608	721,387	2,415,193	732,849
Mo., Kans. & Texas of Texas	1,796	9,543,851	5,053,870	15,688,183	3,277,689	2,815,225	173,462	7,962,303	590,226	14,952,412	95.31	735,771	386,209	345,112	212,070
Mo., Okla. & Gulf	332	686,330	143,691	880,998	423,952	373,447	14,769	537,421	56,300	1,407,731	159.78	—526,733	68,038	—595,392	—303,764
Mo Pac	7,156	40,998,936	13,478,041	58,390,072	11,688,469	13,100,132	671,194	24,976,566	1,631,090	52,344,568	89.64	6,045,504	2,120,740	3,902,464	—5,019,674
Mobile & Ohio	996	7,708,901	1,457,887	9,725,181	1,633,083	3,185,838	187,120	4,733,901	316,132	10,062,236	103.46	—337,055	413,022	—750,969	—1,073,543
Monongahela	108	2,132,763	163,257	2,312,678	496,045	288,874	7,905	713,382	57,065	1,563,271	67.59	749,407	40,000	709,387	113,890
Monongahela Connecting	6	.....	.....	1,133,292	188,239	414,552	4,146	578,585	55,905	1,241,427	109.54	—108,135	16,895	—125,029	—331,942
Montour	54	788,994	11,461	839,513	236,905	475,237	10,154	214,681	51,655	990,306	117.96	—150,793	18,848	—159,647	—190,534
Morgan's Lou. & Texas	400	3,268,549	1,396,130	4,948,406	800,340	1,032,846	63,436	2,091,763	160,222	4,164,685	84.16	783,721	244,919	537,591	—1,313,003
Nash., Chatt. & St. L	1,247	8,144,373	3,560,196	12,517,103	2,270,308	3,202,227	266,773	5,678,366	349,988	11,840,726	94.59	676,378	400,000	273,715	—2,365,129
Nevada Nor	168	856,235	79,539	979,358	163,779	167,458	7,240	281,288	34,663	655,474	66.92	323,883	155,262	168,621	—574,957
Newburgh & South Shore	7	.....	.....	984,618	161,422	240,162	.....	496,135	29,728	927,447	94.19	57,171	58,798	—1,627	—86,613
New O. & N. E	195	2,690,548	1,016,594	4,235,302	680,245	850,771	64,047	2,004,357	120,102	3,761,502	88.81	473,800	226,856	246,454	—527,086
New O. Great Nor	284	1,104,507	353,293	1,521,767	303,142	329,742	18,934	658,585	68,528	1,382,086	90.82	139,682	76,860	59,952	—315,554
New Orleans, Tex. & Mex	191	879,998	294,127	1,246,242	314,230	293,879	22,443	426,242	48,195	1,122,542	90.07	123,700	80,000	43,619	—246,634
New York Cent	6,075	119,902,636	56,752,590	199,523,825	26,011,869	41,827,207	1,781,613	83,764,392	5,020,757	161,386,366	80.88	38,137,459	7,349,120	30,777,107	9,820,828
New York, Chicago & St. Louis	574	13,791,876	1,420,329	15,640,290	1,988,177	2,827,944	206,850	6,500,110	419,386	11,972,237	76.54	3,668,052	435,000	3,232,331	871,750
New York, N. H. & Hart	1,965	29,860,467	29,141,051	66,511,822	9,051,437	13,230,498	364,806	33,205,631	2,117,547	59,144,451	88.92	7,367,371	2,144,000	5,210,075	—3,453,259
New York, Ont. & West	569	4,212,261	2,078,082	7,438,489	1,093,441	1,677,345	66,257	3,212,154	183,413	6,232,611	83.78	1,205,879	206,800	999,111	—11,579
New York, Phila. & Norfolk	121	3,992,907	971,282	5,328,058	423,267	1,274,108	69,402	2,496,275	90,030	4,502,048	84.49	826,010	135,381	690,608	9,805
New York, Susq. & West	135	1,769,499	452,625	2,546,967	247,122	411,032	16,794	1,587,365	64,762	2,327,200	91.37	219,767	251,855	—32,792	—149,782
Norfolk & West	2,087	39,116,424	7,353,377	48,674,715	6,584,147	13,792,024	283,750	18,045,669	835,807	39,672,218	81.50	9,002,497	2,080,000	6,921,416	—3,448,618

REVENUES AND EXPENSES OF RAILWAYS

EIGHT MONTHS OF CALENDAR YEAR 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of—								
		Freight.	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.				
Norfolk Southern	906	$2,656,917	$1,188,120	$4,096,919	$866,319	$787,224	$61,144	$2,150,088	$166,600	$4,035,137	98.49	$61,782	$147,840	—$86,290	$304,115
Northern Ala.	112	601,940	106,586	732,996	157,507	43,782	10,373	473,213	14,739	699,470	95.42	33,527	27,500	6,027	—194,850
Northern Pac.	6,577	45,178,418	13,081,792	62,803,514	11,321,616	10,549,540	491,546	24,128,473	1,473,573	48,601,349	77.38	14,202,165	4,799,396	9,391,816	—2,165,072
Northwestern Pac.	526	2,111,466	1,637,750	4,160,636	794,220	548,556	42,137	1,808,906	99,903	3,307,245	79.48	853,391	183,159	669,268	—432,202
Oahn Ry. & Land Co.	114	887,125	209,131	1,177,733	144,115	125,769	6,625	358,044	43,572	676,569	57.44	501,164	80,000	421,164	—15,851
Oregon Short Line	2,347	17,665,039	4,604,623	23,815,264	4,368,014	3,988,789	131,915	7,150,507	707,576	16,816,448	70.61	6,998,815	1,309,578	5,687,752	—880,224
Oregon-Wash. R. R. & Nav. Co.	2,070	12,195,671	4,392,681	17,989,768	3,332,314	2,714,015	224,056	7,184,721	748,018	14,412,493	80.11	3,577,276	910,744	2,664,421	—771,571
Panhandle & Santa Fe.	712	2,826,631	748,114	3,749,806	802,906	1,278,593	30,976	1,794,138	118,513	4,012,940	107.01	—263,134	137,954	—401,964	—996,379
Penn. East	5,367	156,065,400	69,435,693	245,947,509	35,620,088	68,120,936	2,080,034	107,672,971	5,827,516	223,740,566	90.97	22,206,942	7,243,172	14,953,634	—710,666
Penn. West.	1,754	48,835,306	13,896,296	68,182,033	9,641,799	17,897,607	590,792	29,364,123	1,484,931	59,463,810	87.21	8,718,223	2,469,972	6,246,523	3,558,659
Peoria & Pekin Union	19	228,025	29,814	767,518	137,608	289,915	6,556	602,911	42,393	1,079,384	140.63	—311,867	76,000	—387,867	—239,191
Pere Marquette	2,232	16,445,493	3,969,886	22,094,391	2,484,042	4,278,312	2,227,135	9,152,458	571,631	16,793,267	76.00	5,301,124	424,173	4,874,959	2,736,401
Perkiomen	41	620,159	66,398	712,464	42,680	34,734	178	288,663	2,418	368,839	51.76	343,625	14,400	329,225	97,461
Phila. & Reading	1,127	37,167,399	7,055,952	46,925,511	4,964,016	12,119,915	295,605	23,084,665	1,067,887	41,666,704	88.79	5,258,807	1,145,825	4,112,889	—5,196,059
Phila., Beth. & N. E.	71	.....	.....	540,614	62,463	98,894	2,663	340,929	8,646	513,594	95.00	27,020	10,533	16,487	—127,608
Pitts. & L. E.	224	15,409,617	1,717,884	18,612,933	3,313,991	5,351,711	115,873	6,575,427	350,166	15,717,400	84.44	2,895,534	600,500	2,294,799	—3,707,044
Pitts. & Shaw.	103	702,227	33,218	745,989	265,512	315,425	12,842	281,746	24,450	899,975	120.64	—153,985	7,782	—161,767	—213,014
Pitts. & W. Va.	63	693,317	78,144	877,150	445,234	318,968	10,554	433,565	44,058	1,304,404	148.70	—427,254	91,503	—518,888	—477,925
Pitts., Shaw. & Nor.	204	641,091	47,780	712,780	194,484	377,671	7,772	297,815	60,475	938,247	131.63	—225,468	14,732	—240,218	132,565
Pitts., Cinc., Chicago & St. L.	2,383	39,639,381	14,517,929	59,909,972	7,829,845	17,950,174	691,269	26,910,382	1,384,139	55,324,762	92.34	4,585,210	1,912,380	2,670,944	—1,851,533
Port Reading	21	1,050,020	.....	1,684,180	139,068	111,852	128	818,191	7,795	1,077,032	63.94	607,147	72,000	535,147	182,388
Quincy, Omaha & K. C.	255	460,994	204,643	711,731	279,083	124,889	1,787	363,986	10,996	778,211	109.34	—66,480	24,331	—90,875	—8,561
Rich., Fred. & Pot.	81	2,591,596	2,312,675	5,328,661	430,251	683,560	35,173	1,715,992	104,697	3,051,151	57.25	2,277,511	101,094	2,176,341	520,751
Rutland	415	1,647,920	885,717	3,075,593	520,954	763,336	54,895	1,462,886	90,557	2,898,193	94.23	177,400	152,755	24,581	—41,271
St. Joseph & G. I.	258	1,452,565	343,941	1,898,255	381,583	278,162	15,042	1,036,169	93,250	1,811,893	95.45	86,361	76,577	9,702	—31,211
St. Louis, Brownsville & Mex.	548	2,228,505	1,035,504	3,456,272	602,391	572,605	42,562	1,021,759	125,682	2,365,000	68.42	1,091,271	80,000	1,010,800	350,339
St. Louis Mech. Bridge Term.	9	.....	4,832	1,850,626	446,556	326,981	5,930	1,401,002	48,303	2,228,772	120.43	—378,145	64,000	—442,154	—556,287
St. Louis-San Francisco	4,761	32,350,082	14,415,146	49,248,660	7,834,374	9,771,856	417,423	19,012,521	1,420,994	38,320,012	77.80	10,928,649	1,852,808	9,057,964	2,852,683
St. Louis, San Fran. & Texas.	134	818,566	131,681	1,009,709	169,415	161,626	13,284	524,405	49,111	917,841	90.90	91,868	12,270	79,418	—97,887
St. Louis S. W.	939	6,635,336	1,412,560	8,379,989	1,402,219	1,886,098	134,898	2,666,205	313,600	6,451,745	76.98	1,928,244	342,799	1,583,334	—1,211,995
St. Louis S. W. of Texas.	814	2,916,610	979,993	4,151,858	1,066,341	1,433,077	65,814	2,174,766	187,066	4,916,024	118.41	—764,165	168,000	—933,490	—945,150
St. Louis Transfer	6	.....	.....	679,860	93,880	94,409	1,540	329,679	17,746	537,255	79.02	142,605	930	141,675	11,385
San Ant. & Aransas.	736	1,809,410	769,588	2,753,183	790,992	839,913	48,746	1,549,689	135,221	3,361,615	122.09	—608,432	120,000	—728,999	—332,079
Seaboard Air Line	3,563	16,044,592	8,753,825	27,137,718	4,022,787	5,651,862	487,716	12,926,049	865,055	24,167,318	89.05	2,970,401	1,080,000	1,886,422	—1,071,980
South Buffalo	11	292,145	.....	720,938	39,278	127,271	2,740	430,893	14,310	614,492	85.23	106,446	29,333	77,113	—156,554
Southern R. R.	6,982	50,916,684	25,062,056	82,108,698	15,208,824	17,492,945	972,943	35,931,410	2,116,631	72,324,881	88.08	9,783,817	2,595,607	7,141,232	—12,862,138
Southern R. R. in Miss.	278	649,512	377,063	1,101,867	292,772	154,921	18,032	617,008	33,056	1,115,786	101.26	—13,919	72,000	—86,332	—71,662
Southern Pacific	7,049	69,915,893	27,515,373	105,165,843	17,578,781	20,858,711	901,959	40,544,832	1,887,419	83,825,671	79.70	21,340,172	5,034,536	16,282,958	—3,893,473
Southern Pac. S. S. Lines.	.....	6,146,446	372,559	6,870,343	75,293	1,811,013	97,703	5,148,994	199,158	7,332,160	106.72	—461,818	83,609	—545,433	—739,106
Spokane Int.	156	534,611	130,298	685,441	138,610	62,592	13,372	234,494	34,979	482,224	70.35	203,218	36,018	167,200	—30,837
Spokane, Portland & Seattle	554	3,197,631	1,202,962	4,730,458	792,308	671,520	45,880	1,607,165	156,039	3,290,788	69.56	1,439,670	473,600	965,758	—848,267
Staten Island Rapid Transit.	23	683,602	645,330	1,522,748	203,833	202,291	7,796	793,678	71,928	1,279,525	84.02	243,223	104,000	139,178	74,893
Tennessee Cent.	293	1,191,167	383,006	1,666,089	613,781	404,687	22,667	801,064	52,592	1,893,983	113.68	—227,894	41,080	—269,170	—577,610
Term. R. R. Assn. of St. L.	36	.....	27,800	2,441,886	589,230	442,319	6,323	1,107,405	45,008	2,218,050	90.83	223,836	213,955	9,872	—205,146
Texarkana & Ft. Smith.	87	702,866	136,705	924,634	153,070	157,713	8,214	424,570	25,707	764,051	82.63	160,582	52,976	107,531	—64,571
Texas & New Orleans.	469	3,411,678	1,352,980	5,192,576	943,131	1,377,569	38,248	1,880,205	114,685	4,571,069	88.03	621,507	170,845	446,946	—889,750
Texas & Pac.	1,946	15,149,517	6,284,254	22,550,769	3,194,002	4,700,817	202,220	10,344,931	573,511	19,190,044	85.09	3,360,725	709,823	2,647,852	79,848
Tol. & Ohio Central.	435	5,026,153	522,471	5,858,279	1,007,498	1,774,918	50,998	2,485,494	134,138	5,473,376	93.42	384,902	257,349	127,504	—414,977
Tol., St. Louis & West.	454	4,396,355	338,989	4,968,713	912,933	1,052,607	45,632	2,120,508	93,782	4,223,850	85.01	744,864	208,000	536,760	—516,502
Tol., Peoria & West.	247	624,721	387,983	1,065,778	216,626	307,806	16,996	553,339	44,242	1,136,567	106.64	—70,789	68,000	—138,789	—66,564
Trinity & Brazos Valley.	368	607,043	163,516	809,655	312,669	351,063	14,203	480,599	58,726	1,217,260	150.34	—407,605	45,625	—453,331	—194,470
Ulster & Delaware.	128	426,622	161,692	735,011	120,391	150,445	11,069	528,185	37,210	851,207	115.80	—116,197	38,400	—154,650	—132,588
Union Pac.	3,614	49,671,909	14,525,788	69,293,410	9,943,722	12,645,870	365,514	19,904,026	1,854,708	46,318,221	66.84	22,975,189	1,906,626	21,063,234	963,634
Union R. R.	40	.....	.....	5,185,513	613,690	1,457,706	2,077	2,777,809	60,142	4,910,369	94.69	275,145	57,996	217,149	122,645
Utah Ry.	98	713,823	4,437	725,758	96,577	165,607	1,711	149,552	16,504	429,952	59.24	295,806	29,619	266,188	—182,937
Vicks., Shreveport & Pac.	171	1,341,151	617,231	2,111,740	361,288	464,154	27,094	785,147	70,378	1,726,835	81.77	384,906	86,636	297,976	70,674
Virginian Ry.	522	1,179,694	465,335	7,348,173	1,214,647	1,673,924	38,363	2,734,003	131,632	5,787,145	78.75	1,561,028	289,700	1,271,259	—453,506
Wabash	2,503	21,468,527	6,641,933	30,092,926	4,808,560	5,655,849	428,367	15,827,521	908,562	27,807,505	92.41	2,285,421	864,684	1,416,668	—2,550,738
Wash. Southern	35	1,061,696	1,625,444	3,191,416	274,292	318,174	19,794	950,389	42,365	1,640,953	51.41	1,550,463	52,362	1,498,064	502,263
West Jersey & Seashore.	361	2,303,300	5,414,346	8,249,266	1,589,367	1,521,025	65,079	3,860,118	169,312	7,246,667	87.84	1,002,599	372,374	629,728	—22,862
West. Md.	702	7,844,103	717,538	9,346,881	1,747,466	3,035,957	139,367	3,764,294	351,746	9,131,802	97.69	215,079	345,600	—130,521	—17,562
Western Pacific	1,041	6,444,380	1,180,846	7,932,229	1,899,853	1,451,902	93,872	2,540,006	195,042	6,325,062	79.73	1,607,166	370,722	1,235,676	—884,784
Western R. R. of Ala.	133	908,969	664,671	1,690,788	209,327	336,859	24,212	638,331	50,566	1,287,099	76.12	403,689	60,000	343,687	11,012
Wheeling & L. E.	511	7,040,283	434,412	8,280,919	1,683,928	1,864,137	47,268	3,288,906	203,585	7,108,817	85.84	1,172,102	445,225	726,016	—293,105
Wichita Falls & N. W.	328	959,401	318,856	1,340,399	389,859	195,700	9,668	728,036	54,426	1,377,688	102.78	—37,289	75,452	—113,243	150,078
Yazoo & Miss.	1,381	11,460,945	3,426,499	15,538,631	2,534,772	3,325,850	124,411	5,802,038	386,106	12,009,353	77.28	3,529,279	475,068	3,052,256	302,734

Traffic News

Oscar F. Bell, traffic manager of the Crane Company, Chicago, has retired and J. A. Brough, assistant traffic manager, has been promoted to that position.

D. M. Denison, general freight agent of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has been elected a member of the St. Paul (Minn.) District Freight Traffic Committee.

The Canadian Pacific now runs its passenger trains to and from the Central Station at Ottawa, Ont., the Broad street station having been abandoned for passenger service. The Central Station now accommodates 36 trains a day.

The Duluth, Missabe & Northern moved 16,821,209 gross tons of iron ore for the season just closed as compared with 20,567,288 gross tons during the preceding season. The decrease in tonnage has been attributed to labor troubles.

O. M. Odell, formerly in the freight traffic department of the Missouri Pacific, at Joplin, Mo., has been appointed traffic manager of the Dahlstrom Metallic Door Company, Jamestown, N. Y., succeeding J. H. Dasher, who has resigned.

H. M. Remington has been appointed assistant manager of the traffic bureau of the San Francisco Chamber of Commerce, succeeding John S. Willis, resigned. Mr. Remington has had long experience with the Michigan Central Railroad and the Interstate Commerce Commission.

Director General Hines announced on January 7 that the Central Coal Committee during the preceding 10 days had been permitting the overseas export of bituminous coal upon specific authorization in each case up to about 50 per cent of normal. It was expected that within a few days the aggregate export tonnage could be increased, but recent developments indicate that not only will this be impossible for several weeks, but it may become necessary to again curtail the overseas tonnage. The committee does not desire to again go into widespread distribution of coal but will not refrain from taking charge of distribution in individual cases, under the authority of the priority list, if this becomes necessary.

The Chamber of Commerce of the State of New York, at a meeting in New York City on January 8, adopted a resolution, to be sent to Washington, protesting against the recent reductions in freight rates from Ohio and other central territory to South Atlantic and Gulf ports; reductions made with a view to favoring the movement of export freight over those routes. The Chamber declares: That the central territory referred to is naturally tributary to north Atlantic ports and that there is no legitimate reason for making low rates to the south at the present time; that if reasonable notice had been given a protest would have been made before the new tariffs were put into effect; that this arbitrary effort to divert the traffic from its natural channels is economically unsound; that there is no congestion at northern ports warranting this action if the lines are permitted to use their facilities to the best advantage; that the situation will be greatly improved with the return of the railroads to private ownership; and that the Shipping Board has been allocating steamships to southern ports unreasonably. From Youngstown, Ohio, to New York the distance is 494 miles; to New Orleans 1,131 miles; yet the rate has been made the same to both places. On iron and steel articles, the rate, 32 cents per 100 lb., is the same to New Orleans, in disregard of the long-and-short-haul rule. Shipments to New Orleans go through Cincinnati, whence the rate is 39 cents to New Orleans and the same to New York. A similar comparison is made in connection with rates from Cleveland, Ohio, to Jacksonville, Fla. The southbound railroads have to carry freight 1,400 miles at the usual charge for 400 miles; and, it is claimed, most of the cars have to be returned north empty.

Commission and Court News

Interstate Commerce Commission

Time-Limit for Filing Freight Claims Unreasonable

The commission declares unreasonable the recent practice of some roads in refusing to settle freight claims more than two years and one day old (and the practice of all federal roads since last July, when the Railroad Administration directed the roads to defer such payments for a time, in order to insure uniform practice) and decides that the bill-of-lading provision should be amended.

This two-year clause in the uniform bill-of-lading was made the subject of a complaint by the National Industrial Traffic League. By this clause, which is section 3, paragraph 3, suits for loss, damage or delay of freight, must be instituted within two years and one day. Many railroads construed this as forbidding the payment of valid claims for loss and damage after the expiration of the two years and one day. At the same time, other railroads were continuing to pay such claims, in accordance with the former general custom, construing the clause in question as prohibiting the bringing of suits, but not forbidding the voluntary payment of valid claims. The Merchants' Association of New York City, and many other organizations, intervened as parties to the complaint.

The decision was on the complaint of Jacob E. Decker & Sons, against the director general, the Minneapolis & St. Louis Railroad Company and others. The commission finds that reasonable and non-discriminatory and non-prejudicial provisions to be applied for the future would be substantially as follows:

"Suits for loss, damage or delay shall be instituted only within two years and one day after delivery of the property, or, in case of failure to make delivery, then within two years and one day after a reaosnable time for delivery has elapsed; Provided, however, that where claims for loss, damage or delay have been duly filed with the carrier and such claims have not been definitely declined in writing by the carrier before the beginning of the last six months of the two-years-and-one-day period, then suit thereon may be filed within six months from the date the claims are definitely declined in writing by the carrier, but not after. Where claims for loss, damage or delay are not filed, or suits are not instituted thereon, in accordance with the foregoing provisions, the carrier will not be liable and such claims will not be paid."

The defendants will be expected to modify their bill-of-lading provisions within 60 days.

Personnel of Commissions

Douglas Brookman has resigned as chief counsel for the Railroad Commission of California to begin private practice of law at San Francisco, Cal. He will be succeeded by Hugh T. Gordon, attorney for the Commission at Los Angeles, Cal. Mr. Brookman has been the legal adviser of the Commission for the last seven years.

State Commissions

The Board of Railway Commissioners for Canada has ordered that the present freight tariffs of the railway companies subject to the jurisdiction of the board be continued in effect. The order continues indefinitely the 25 per cent increase in freight rates, made in August, 1918.

The Railroad Commission of California in its annual report for the year ending June 30, 1919, shows that in the 12 months covered by the report the commission held 612 public hearings and met 269 times at the offices of the commission in San Francisco. During this period 80 formal complaints and 803 formal applications were filed with the commission.

The number of decisions handed down was 943. During the same period the commission received 2,290 informal complaints and instituted 13 cases on its own initiative.

The Board of Railway Commissioners for Canada recently ordered that the demurrage tolls to be charged for delays to cars at Winnipeg, Man., because of the general strike in that district, be $1 per car per day from the commencement of the strike to the fifth day after its termination. This compromise was offered by the railway companies, but the Winnipeg Board of Trade and other commercial organizations wanted more favorable terms and protested to the Board. The order sustaining the position of the railways was issued by the Board after extended hearings.

Because of the present car shortage which is said to be hampering many Oregon industries, and "throwing thousands of men out of employment," Fred E. Buchtel, chairman of the Public Service Commission of Oregon, has asked officers of the Railroad Administration for relief and has also addressed an appeal to Oregon senators and representatives. Commissioner Buchtel, in his communications, has not complained of the local distribution of cars in Oregon, but calls for drastic remedies to be applied at Missouri river points and east, so that freight and empty cars shall be expedited. The Public Service Commission of Oregon is at the same time urging the loading of cars to full capacity, prompt loading and unloading and other remedies to relieve the shortage.

Court News

Quarantine Regulations—Unloading for Inspection

The Iowa Supreme Court holds that the quarantine regulations requiring carriers to unload for inspection horses brought into Iowa from points west of the Missouri river, unless a certificate of health is attached to the way bill, do not require a railroad to unload a shipment of horses at the yards nearest the Missouri river, but only at the yards nearest the river on its own line.—Marks v. Rock Island (Iowa) 169 N. W. 764.

Doing Business in State

The Georgia Supreme Court holds that a foreign railroad corporation, which neither owns, leases, nor operates any line of road within the State of Georgia, is not "doing business" within the State, in the sense that liability to service is incurred, because it maintains an office and employs an agent, resident in the State, for the merely incidental business of soliciting freight, especially where the cause of action did not grow out of, and had no connection with, business so initiated.—V. S. & P. v. De Bow (Ga.) 98 S. E. 381.

Duty as to Sale of Perishable Goods

A terminal carrier received an interstate shipment of peaches in bad condition, and the consignee refused to accept it. The peaches had to be sold promptly. The Iowa Supreme Court holds that the sale did not amount to a conversion. The condition of the peaches was the result of insufficient refrigeration provided by the initial carrier. The connecting carrier was liable only for damages resulting from its own negligence, and not for that of the initial carrier.—E. H. Emery & Co., v. Chicago, B. & Q. (Iowa) 170 N. W. 540.

Crossing Accidents

The California District Court of Appeal, Third District, holds that under a complaint for death at a crossing alleging that the engineer in charge of a locomotive negligently, without giving whistle or bell signal, ran the locomotive across the highway at a great rate of speed, while the crossing was concealed from view by buildings and box cars, no recovery could be had on the ground that the placing of the box cars and buildings was a negligent act; as this would not be of itself a negligent act as to persons traveling over the crossing.—Fimple v. Southern Pacific (Cal.), 177 Pac., 871.

United States Supreme Court

Electric Power to Interstate Trains as Part of Interstate Commerce

A lineman in the employ of the Southern Pacific received an electric shock while wiping insulators, which caused him to fall from a steel power pole, producing injury which approximately caused his death. The California Supreme Court affirmed an award by the State Industrial Accident Commission under the Workmen's Compensation Act against the company, which took the case to the United States Supreme Court. At the time of the accident the company maintained a power house at Fruitvale, California, where it generated electric current which moved its cars engaged in both interstate and intrastate commerce. From the generators this current passed along main cables, through transforming station, to the trolley wires, and thence to the motors. When he received the shock, the deceased was engaged in work on one of the main lines.

The Supreme Court of the United States holds, (opinion of Mr. Justice McReynolds), that the work was part of interstate commerce, and the State Workmen's Compensation Act did not apply, therefore the judgment below must be reversed. Power is no less essential than tracks or bridges to the movement of cars. The accident occurred while the deceased was wiping insulators actually supporting a wire which then carried electric power so intimately connected with the propulsion of cars that if it had been short-circuited through his body, they would have stopped instantly. His work was therefore directly and immediately connected with interstate transportation and an essential part of it. Mr. Justice Clarke dissenting. Southern Pacific vs. Industrial Accident Commission. Decided January 5, 1920.

Taxation of Main Tracks, Sidetracks and Buildings

To pay the cost of a district road improvement contemplated, an Arkansas act made it a charge upon all of the real property, railroads and tramroads in the district. The tax was imposed upon the assessed value of the main track, side tracks, rolling stock, buildings and material of the St. Louis, Iron Mountain & Southern apportioned to the road district under a state law for the valuation of railroad property. The rate was the same for all real property in the district. The company, in the District Court, obtained a decree permanently enjoining the tax to the extent that it was imposed on personal property—rolling stock and materials. From that part of the decree no appeal was made. But the District Court dismissed the railroad's bill so far as applicable to the real estate—the main track, side tracks and buildings. The Circuit Court of Appeals reversed this and enjoined the collection of the tax on the real estate on two grounds:

(1) Because the including of the franchise and other intangible property of the company resulted in a "higher rate of taxation" on the railroad's property than on the other property in the district, and

(2) Because the evidence failed to show that the company would derive any benefit from the improvement of the highway.

The Road-District took the case to the Supreme Court of the United States, and that court, on the first point, sustains the district, holding that the basis for assuming that the franchises of the railroad company were added as a separate personal property value to the assessment of the company's real property becomes, upon the record in the case, much too unsubstantial to justify invalidating the tax involved, if it were otherwise valid. The act creating the Road-District declares that all real property within the district, including railroads and tramroads, will be benefited by the building of the highway more than the cost thereof, as apportioned in the county assessment of each piece of property within the district. The Supreme Court has decided that such legislative determinations can be assailed under the Fourteenth Amendment only where the legislative action is "arbitrary, wholly unwarranted," "a flagrant abuse, and by reason of its arbitrary character a confiscation of particular property." (Wagner v. Baltimore, 239 U. S., 207, and Houck v. Little River Drainage District, 239 U. S., 254.) The railroad's receiver

called four witnesses, three of them engineers and one a superintendent of the company, who testified in general terms that the highway, a little less than 3½ miles long and the principal road to the village of Alma, was not and never would be of any benefit to the railroad. The Road-District called three residents of Alma, who testified that the road would increase the railroad's business and divert business from Van Buren, where there was a competing railroad. The court added the fact that anything that develops the territory which a railroad serves must necessarily be of benefit to it, and that no agency for such development equals that of good roads. The holding of the Circuit Court of Appeals that the railroad would not be benefited by the improvement was therefore not sustained and the decree of the District Court was affirmed.—Branson v. Bush (receiver St. L., I., M. & S.). Decided December 22, 1919.

Compensation for Carrying Empty Mail Bags

In an action by the St. Louis, Iron Mountain & Southern against the United States it appeared that the railroad operated a line between Tower Grove, Mo., and Texarkana, Ark. So much of the line as lies between Poplar Bluff and Texarkana was aided in construction by a land grant by acts of 1853 and 1866, providing that government property and troops should be transported free of charge. Pursuant to the act of May 27, 1908, making appropriations for the Post Office Department, the Postmaster General withdrew from the mail mail bags despatched empty, and sent them by freight over the company's line, beginning July 1, 1910. The Postmaster General made deduction of this entire freight charge for all empty bags between Texarkana and Poplar Bluff from the railroad's bill, which called for payment for the empty bags at the full commercial rate. The Court of Claims decided against the railroad. 53 Ct. Cl., 45.

Two questions were presented: (1) Could the empty mail bags be lawfully withdrawn from the mails merely for the purpose of reducing the railroad's compensation for mail transportation service? and (2) Assuming that they were lawfully withdrawn and shipped by freight, were they "property" of the United States within the purview of the land grant acts of 1853 and 1866?

The Supreme Court of the United States (opinion by Mr. Justice Day), answers the first question in the affirmative. For the purpose of fixing compensation in the weighing of the mail, Congress, by the act of May 27, 1908, directed that the weight of the empty bags should be withheld in determining the average weight of the mails as the basis of fixing compensation, and this action of Congress violated no contractual or other right of the railroad. The second question was also answered in the affirmative, the empty bags, being property of the United States, must be carried free as per the land-grant provision. The court saw no reason why Congress might not regard empty mail bags, being returned for further use, as no longer a part of the mails. Under the land grant acts the railroad, in consideration of benefits received, was bound, when required, to transport troops and property of the United States free of charge. The empty mail bags were property and belonged to the United States.

Mr. Justice Reynolds dissented, on the ground that though the mail bags are property of the United States in a certain sense, whether full or empty, they are elements of the mail whether going out or coming back. He added: "A clear distinction between property of the United States and United States mail is preserved by the very language of the land grant statutes; and, I think, Congress had no purpose—if, indeed, the power—to convert mail into property within the meaning of these statutes simply by directing carriage of the former in freight trains. The purpose was to secure transportation at less than former cost, and to such end Congress, in effect, commanded that emptied bags, a portion of the mails for which rapid movement is not essential, 'shall be transmitted by either freight or express,' and compensation made according to the ordinary rates. Under this interpretation the railroad would suffer no oppressive burden and contemplated economies would be effectuated."—St. Louis, Iron Mountain & Southern vs. United States, decided January 5, 1920

Foreign Railway News

In answer to an inquiry in Parliament Sir Rhys Williams, parliamentary secretary to the Minister of Transport, stated recently that between November, 1918, and July, 1919, the number of persons employed on the railways increased from 500,000 to 600,000.

According to a statement in the English Parliament, the amount allowed in the estimated expenditure on the railways during the current financial year for the six shilling per ton increase in the price of coal was £3,000,000. This increase has since been removed and a further decrease of four shillings was made.

Coal Shortage on Austrian Railways

The Austrian railways were forced to suspend passenger service during Christmas week on account of shortage of coal, all coal reserves being exhausted.

The Simplon Express

As indicating the gradual resumption of international railway travel in Europe it is noted that on January 1, the Simplon express began to run as a through train, with dining and sleeping cars, from Paris to Bukarest and Belgrade.

May Buy Austrian Railway System

Reports that American capital may be invested in railway properties of the former central empires again crop up in a report from Trieste to the effect that Austria is negotiating with a Franco-American syndicate for the sale of the Danubian fleet and the Austrian State Railways for 40 billion francs.

Sardinian Railways Pass Over to the State

The chief normal gage railways on the sland of Sardinia, which have hitherto been worked by a private company, were absorbed in the system of the Italian State Railways on January 1. The services will be thoroughly reorganized. rolling stock overhauled, and various other improvements effected.

Swiss Railway Electrification

Progress in the electrification of the Swiss railways is reported by the fact that the middle of December was fixed for the opening of the Davos and the Filisur line for passenger traffic. It is hoped to have finished the electrification of the line between Davos and Klosters sometime during the coming year, and in 1921 between Klosters and Landquart and between Reichenau and Disentis.

Receipts and Expenditure on Swiss Railways

LONDON.

An article abstracted from the Schweizer Export Review by the Technical Review states that in the first six months of this year the Swiss State Railways brought in 35½ million francs from increased tariffs. The average price of coal in 1918 was Fcs. 153 ($30) per ton as against Fcs. 27 ($5.40) before the war. For the year 1920 the expenditure upon maintenance and electrification is estimated at 125 million francs. The 8-hour working day increases the expenditure by several million francs, and it seems doubtful whether the goods traffic will reach pre-war figures. The estimate for 1920 is as follows: Receipts, 328 million francs; expenditure, 288 million francs. The net receipts therefor expected to be 40 million francs, which will not suffice to pay interest on debentures, and it is difficult to see how this deficit will be covered.

Among the various methods discussed for meeting the antici-

pated deficit, it has been considered that sufficient consideration has not been given to the serious effect of the enhanced cost of transport upon manufacturers competing for foreign trade.

Central African Railways

Sanction of the Portuguese government has been obtained, according to British authority, for certain modifications of the original concession for the construction of the railway from Beira to the Zambesi river, connecting with the Nyasaland Railways, reported in the Foreign Railway News column of October 3, page 715. The line, of about 170 miles in length, will be constructed by an English company, whose debentures will be guaranteed by the British Nyasaland Protectorate. The link to be known as the Trans-Zambesi Railway, will connect the Nyasaland Railway with the South African and Rhodesian systems, so that it will be possible to travel by train from Cape Town via Salisbury and Beira to Blantyre.

Railway Connection With Finland

According to a report from the British Minister at Stockholm, the railway line connecting the Swedish and Finnish railway systems at Haparanda and Tornea was recently opened. The interconnection of the Finnish and Swedish railway systems has been under consideration since the extension of the Swedish northern trunk line to the Tornea Valley, i. e., some time before the war. The importance of the junction of the two lines is diminished by the fact that the Swedish and Finnish gages are different, so that goods and passengers cannot be forwarded from Sweden to Finland by through trains. The new line, however, obviates the transhipment of goods by sea, as they have hitherto, as a rule, been sent across the Gulf of Bothnia.

Electrification of Swedish Railways

An abstract from the Swedish Export by Engineering states that the Railway Council are now considering the electrification of the Stockholm-Gothenburg line; the proposal will probably be laid before the Riksdag next year. The grant required is estimated at about 60,000,000 kronen, not allowing for locomotives. It is estimated that this amount should be spread over three years.

The Railway Council has also proposed that the electrification of the Gellivara-Svarton railway already decided upon should be pushed on more rapidly.

England's Railway Material Exports

London, England.

The returns of the Board of Trade state that the exports of railway material from Great Britain for the first ten months of 1919 were as follows:

	First ten months, 1919	First ten months, 1918
Locomotives	£1,120,025	£1,004,591
Rails	1,570,913	436,597
Passenger cars	395,420	346,361
Freight cars	1,483,917	270,859
Wheels and axles	594,533	303,255
Tires and axles	743,374	494,080
Chairs and metal sleepers	294,427	115,907
Miscellaneous permanent way	639,237	495,136

The weight of the rails exported dnuring the first ten months of the present year was 97,752 tons as against 23,828 tons for the same period in 1918, and of chairs and metal sleepers 20,366 tons as against 7,327 tons during 1918.

French Train Services Cut Down

The Paris correspondent of the Times, London, reported recently that the coal shortage has necessitated the cutting down of railway passenger traffic to a minimum on certain lines. The state line from Paris to Dieppe, had two day expresses, one each way, cut, leaving only two day expresses three times a week. On the Paris-Granville route two expresses were cancelled, and on the Paris-Brest route two expresses also. The railway authorities expect to save 50 tons of coal daily on the state system. On the Eastern Railway one express each way between Paris and Basle and one express each way between Mulhouse and Basle are the chief modifications. Restrictions on other systems were being worked out, at the time the report was made.

German Engine Works Busy

In an article on the transport and coal question in the Börsen Courier, quoted in the Railway Gazette (London), a leading German manufacturer of locomotives says:

"It might appear that the German locomotive industry is specially interested in receiving orders from the State Administration. The opposite is really the case. In the large locomotive works in Germany new locomotives are being built, mainly out of pre-war material, and production in the workshops has increased that it may be said to have reached the peace-time standard. The Hanoverian Maschinenfabrik, for instance, is at the present time building some 32 new locomotives monthly, with the employment of 5,000 permanent workers. Having regard to the present economic situation in Germany, the only strange fact about this is that these locomotives are all sold to foreign countries. The prices which foreign countries are offering for German locomotives are such as to enable the manufacturers to provide themselves with all kinds of material, not only machinery, oil, etc., but also coal either from Germany or abroad."

Spacing Out the "Rush Hours"

The London Traffic Advisory Committee is considering a proposal for relieving traffic congestion during the rush hours. The suggestion is that government departments and other large employers of labor should mutually arrange their hours of opening and closing so as to space out the "rush hour" traffic over a larger period, both in the morning and evening. The principal insurance companies already release thousands of their clerks by 5:30 p. m., and it has now been suggested to the Advisory Committee that it may be found practicable to alter the standard hours of attendance at government offices from 10 a. m. to 5 p. m., to 9 a. m. to 4 p. m. if it be found feasible to devise some spacing-out scheme of the kind, the result should be an amelioration of the "rush hour" problem, which it is very difficult to obtain in any other way under existing conditions. The whole problem has become greatly accentuated this year by the general introduction of the shorter working day which, by enabling very large numbers of employed persons to start later and return earlier from their work, has still further increased the numbe of people traveling during the most congested hours. As in American cities, even under existing conditions, the accommodation provided on the London underground railways is so much in excess of requirements during the greater part of the day, that the actual seat-mileage would suffice for three times the number of passengers, without taking the strap-hanger into account.

Railway Notes from South Africa

Johannesburg, November 10, 1919.

The outstanding feature to be recorded this month is a further increase in the tariffs for the conveyance of passengers, parcels, live-stock, goods and coal traffic and other miscellaneous services on the South African Railways as from November 4, 1919.

On passenger fares, season tickets excluded, a special levy of 10 per cent has been added to the already existent 10 per cent surcharge, thus making a total levy of 20 per cent on normal rates. As regards season tickets, the previous surcharge of 5 per cent has been increased to 10 per cent. Parcels and excess luggage traffic are now charged at a revised rate based on the 1913 scale plus 25 per cent (previous to the 4th November the existing scale was that of 1918, plus a 10 per cent levy).

The rates for live-stock traffic have now been increased from a surcharge of 10 per cent to 25 per cent. On goods traffic, including bunker coal and coal for local consumption conveyed distances over 500 miles, the previous surcharge of 10 per cent has been raised to 25 per cent. No alteration has,

however, been made in the railage charges on export cargo coal and coal for local consumption, conveyed distances not exceeding 500 miles. The previous surcharge of 10 per cent on all miscellaneous charges, such as for example cartage private sidings charges, storage and handling charges, has been increased from an existing 10 per cent to 25 per cent.

The financial year which started April last was commenced with a deficit of £950,000 odd on the previous year's working. Further, although the revenue derived since the inception of the new financial year up to the week ended November 1, 1919 exceeded the estimates by £59,549 and £1,044 in the administration of the railways' and harbors' affairs respectively, the excess of expenditure over receipts for the period April 1 to August 31, 1919, was £249,746, thus making the total debit balance up to that date £1,200,042.

The main causes of this serious position was the increased war bonuses, advances in wages to several grades of the staff, payment for Sunday duty to the salaried staff, the increased cost of living, the enhanced cost of materials and the operation of the eight-hour work day. The war bonuses alone amount to about 1½ millions sterling per annum, all of these factors entailing heavy additional expenditure. As regards the charges for the landing and shipping of cargoes at all Union Harbors it has been notified that where this work is done by the Administration an increase of 6d will be levied as from December 1 next on the existing rate per harbor ton.

Eight-Hour Work Day

The general application of the eight-hour day to the staff of the South African Railways and Harbors is proceeding as well as can possibly be expected. At the end of September last nearly 80 per cent of the total staff comprising some 39,000 Europeans graded in 200 odd complete ranks, besides a number of unallied ones, were working under the new system. A fairly large number of station officials, gatekeepers and pumpers and practically all the lightkeepers in the service of the Administration are still working the old hours. (The lighthouses of the Union are administered by the Railways and Harbors management.) The charge in connection with these grades has made it necessary to engage and train a large number of learners and to provide accommodation and facilities for them. The biggest difficulty in making the change has arisen in connection with the running staff. As the outcome of a conference of the Running Staff held on September 17, and three consecutive dates, at which the general manager, besides a number of other prominent railway officials were also present, it was decided to apply the eight-hour day basis to the running staff as from September 25 last in connection with all the runs and services where the final eight-hour day working could be applied. As a result of this decision shunting, ballasting and banking, the working of breakdown trains, the majority of the suburban and railcar services and a considerable number of passenger and goods train and engine runs will be paid for on the eight-hour basis at once and further similar services will be paid for on the same footing as the necessary changes are made. It is anticipated that in most cases where the change over will not necessitate heavy new works, the actual eight-hour day working will be in operation by the end of the current year. It has been decided that all employees to whom the eight-hour working day will apply will be paid on the eight-hour day basis as from December 25 next. In addition to the very considerable improvement in the working condition of the Railways' and Harbors' staff, which the change is bringing about, the alteration in hours must have a considerable effect on the employment question in South Africa. As a result of it all servants of the department who have been on active service are being absorbed without displacing competent temporary assistants who were carrying out their duties during their absence, and in addition to these, more than 1,000 additional men, mostly returned soldiers have been engaged. A large programme of new works such as quarters, improved watering supplies, improvements to line such as doubling, tunnels, deviations, and reductions in grades, new crossing places, rest rooms, locomotive exchange depots, etc., will have to be carried out to meet the changed working conditions and many of these works have already been authorized and put in hand.

Equipment and Supplies

Locomotive Deliveries, Week Ending December 27

The Railroad Administration has issued the following statement of locomotives shipped during the week ended December 27:

Works	Road	Number	Type
American	T. & P.	4	Santa Fe
	St. L. S. F.	7	U. S. R. A. 6 W. Sw.
	T. & P.	2	Pacific
		13	
Lima	P. M.	2	U. S. R. A. 8 W. Sw.
Baldwin	N. & W.	2	Mallet
	M. V.	1	10 W. Sw.
		3	
Total		18	

Cars Built in Railroad Shops in November

The Railroad Administration has issued the following statement of new cars constructed in railroad shops during the month ended November 30, 1919:

Class of cars	Steel	Steel under frame	Steel center sills	Wood	Total
Freight—					
Stock	..	3	..	3	6
Hopper	1	..	..	2	3
Gondola	..	..	..	..	..
Flat	..	2	..	1	3
Coke rack	..	..	..	..	..
Work car	..	1	1	1	3
Misc. freight cars	..	..	..	4	4
Caboose	..	..	..	3	3
Box	..	..	74	77	151
Refrigerator	..	..	..	..	..
Total freight	1	6	75	91	173
Grand total	1	6	75	91	173

Cars Constructed in Railroad Shops

The Railroad Administration has compiled the following totals showing the passenger and freight cars built in railroad shops during the first eleven months of 1919, as compared with the totals for all of 1918. The totals given, with an estimate to cover December, were included in the totals given in the statistics for the year in the *Railway Age* January 2:

FREIGHT CARS—CARS CONSTRUCTED IN RAILROAD SHOPS.

Type	Number: Year, 1918	Number: 11 Months 1919	Total
Passenger—			
Dining	4	....	4
Dining observation	2	....	2
Passenger coach	1	2	3
Passenger baggage	10	....	10
Passenger and mail	4	....	4
Baggage	51	4	55
Express	24	....	24
Milk	5	....	5
Total passenger train cars	101	6	107
Freight—			
Stock	1,099	405	1,504
Hopper	857	341	1,198
Gondola	1,726	75	1,801
Flat	304	128	432
Coke rack	20	13	33
Work car	85	96	181
Miscellaneous freight	....	36	36
Caboose	613	351	964
Box	3,834	2,839	6,673
Refrigerator	125	10	135
Total freight train and work equipment cars	8,663	4,294	12,957
Total cars constructed in R.R. shops	8,764	4,300	13,064

Locomotives Constructed in Railroad Shops

The Railroad Administration has compiled the following table showing the locomotives built in railroad shops in 1919. The totals given, with an estimate for December, was included in the annual production figures given in the statistics of 1919 in the *Railway Age* of January 2:

LOCOMOTIVES—NEW LOCOMOTIVES CONSTRUCTED IN RAILROAD SHOPS.

Type	Constructed in R.R. shops		
	Year, 1918	11 Months 1919	Total
Mikado	68	7	75
Mountain	....	....	....
Pacific	123	12	135
Santa Fe	....	....	....
Mallet	2	2	4
Mohawk	....	....	....
Consolidation	10	6	16
10 W. Sw.	3	10	13
8 W. Sw.	10	....	10
6 W. Sw.	8	....	8
Decapod	40	82	122
Mogul	4	....	4
Total	268	119	387

Locomotives

THE BOSTON & MAINE is inquiring for 20 Santa Fe type locomotives.

THE MISSOURI, KANSAS & TEXAS is inquiring for 10 Pacific, 20 Mikado and 10 eight-wheel locomotives.

A. M. PUNTE & Co., Havana, Cuba, have ordered two plantation locomotives from the Bell Locomotive Works, Inc.

THE VOTEY ORGAN COMPANY, Garwood, N. J., has ordered one storage battery switching locomotive from the Bell Locomotive Works.

THE WEST CONSTRUCTION COMPANY, Knoxville, Tenn., has ordered two contractors' locomotives from the Bell Locomotive Works, Inc.

THE DIAMOND MATCH COMPANY has ordered one switching locomotive from the Bell Locomotive Works, Inc., for its Spokane, Wash., plant.

THE STEVENSVILLE-DESDEMONA OIL RAILWAY OF TEXAS has bought six freight and two passenger locomotives from the Bell Locomotive Works, Inc.

THE UNION PACIFIC is in the market for 100 locomotives, including 19 2-8-8-0 Mallet type, 25 Santa Fe type, 16 Mikados, 10 Pacifics, 30 six-wheel switchers.

THE CENTRALE SANTA DOMINICAS RAILROAD, San Domingo, West Indies, has ordered three general utility locomotives from the Bell Locomotive Works, Inc.

MITSUI & Co., New York, have ordered 4, eight-coupled tank locomotives from the American Locomotive Company, for the Taiwan Electric Power Company.

Freight Cars

THE UNION PACIFIC is in the market for 45 caboose cars.

THE INLAND STEEL COMPANY, Chicago, is inquiring for 60 cars.

THE DAVIDSON CHEMICAL COMPANY, Baltimore, Md., is in the market for 20 50-ton ore cars.

THE AMERICAN STEEL COMPANY of Cuba is inquiring for 15 steel underframe, steel superstructure cars, 36 ft. long.

THE BELGIAN STATE RAILWAYS have revived an inquiry for from 2,000 to 10,000 gondola cars of 20-ton capacity.

THE AMERICAN SMELTING & REFINING COMPANY is inquiring for from 10 to 16 50-ton general service gondola cars, and 50 50-ton box cars.

MITSUI & Co., New York, have ordered from the American Car & Foundry Company, car material consisting of all metal parts, except the couplers, draft gears, spring and air brakes, for 300 30-ton capacity wood underframe box cars.

SOPHUS BERENDSEN, 15 Broad street, New York, is in the market for 200 tank car bodies with glazed lining, to be used for transporting wine.

THE UNITED RAILWAYS OF HAVANA have ordered 300 30-ton box cars and 300 25-ton flat cars from the American Car & Foundry Company. These cars will have steel underframes.

Passenger Cars

THE BOSTON & ALBANY is inquiring for 30 passenger cars.

THE DELAWARE, LACKAWANNA & WESTERN is inquiring for 35 suburban coaches.

THE CENTRAL OF NEW JERSEY is inquiring for from 25 to 50 passenger coaches.

THE ERIE RAILROAD is inquiring for 30 60-ft. passenger cars, six passenger and baggage cars and four baggage cars.

THE UNION PACIFIC is inquiring for 40 70-ft. chair cars and 25 baggage cars and has placed orders with the Pullman company for 7 dining cars, 5 of which are to be assigned to the Los Angeles & Salt Lake and 2 to the Oregon Short Line.

Iron and Steel

THE WHEELING & LAKE ERIE has placed orders for 4,000 tons of rails with the Carnegie Steel Company, Pittsburgh, Pa., on the basis of $55 for Bessemer and $57 for open hearth at the mill.

MANNING, MAXWELL & MOORE, INC., New York City, have ordered 875 tons of structural steel from the McClintic Marshall Construction Company, Pittsburgh, Pa., for the construction of a foundry plant at Muskegon Heights, Mich.

MITSUI & Co., New York, are in the market for about 100 steel transmission towers calling for 6,000 tons of steel for one of the Japanese hydraulic electric companies, and are also inquiring for 3,000 tons of rails and accessories for use on the Siamese State Railways.

Miscellaneous

THE ANN ARBOR has ordered 5,000 tons of rails from the Lackawanna Steel Company, Lackawanna, N. Y.

SPECIAL REFRIGERATOR CARS have had to be provided on the Northern Pacific for the extraordinary number of carcasses of slaughtered elk shipped from Gardiner, Mont., recently, and also at Livingston, Mont. The early commencement of winter drove the animals down to Yellowstone Park during the open hunting season, resulting in the killing of over 3,000 animals. At the height of the season from 100 to 170 carcasses were shipped daily from Gardiner.

NEWS FROM VALDOSTA.—The Georgia & Florida and the Valdosta, Moultrie & Western railroads have adjusted their differences and the crossing of their tracks within the city limits of Valdosta has been laid. The V., M. & W. is now rapidly building its tracks toward Toombs street terminal; within ten days the physical connection with the Georgia Southern & Florida road will be severed, and the V., M. & W. will commence using its own terminal, which is near the business center of the city. The V., M. & W. will commence then the erection of its shops on its terminal property, to build its cars and other equipment. The first work will be the construction of two motor cars, which will be placed in the passenger service between Valdosta and Moultrie and by which passengers can go to Albany in less than half the time now required. The company will also manufacture three motor cars for the trade and is now in possession of several orders for such cars from other roads.—Savannah (Ga.) News.

Supply Trade News

H. H. Hendricks, formerly connected with the Ryan Car Company, Chicago, has been appointed a salesman for **The Camel Company**, Chicago.

The **Railway Motor Car Company**, Hammond, Ind., contemplates the erection of a power plant and machine shop at its plant to cost approximately $200,000.

C. H. Beck, special representative of the Safety Car Devices Company at Pittsburgh, Pa., succeeds C. R. Ellicott as assistant eastern manager at New York.

John W. Fogg, sales representative of the **Boss Nut Company**, Chicago, with office at that city, has been promoted to railroad sales manager, with the same headquarters.

The **Wm. Graver Tank Works**, Chicago, announces that it has changed its name to the **Graver Corporation**. There is no change in the management, ownership or directorate.

A. L. Stephenson, credit manager of the **National Malleable Castings Company**, Cleveland, Ohio, has been appointed local treasurer for the company at its Indianapolis (Ind.) branch, a newly created position.

C. R. Ellicott, assistant eastern manager at New York of the **Westinghouse Air Brake Company**, Pittsburgh, Pa., has been promoted to eastern manager, with headquarters at New York, vice **Joseph R. Ellicott**, retired.

Fred C. Dunham, formerly assistant to the president of the National Railway Appliance Company, has been elected vice-president of the **Hutchins Car Roofing Company**, Detroit, Mich. Mr. Dunham's headquarters are 103 Park avenue, New York City.

A. P. Van Schaick, special representative at Chicago of the **American Chain Company, Inc.**, Bridgeport, Conn., has been appointed assistant general sales manager of the company, with headquarters at the Grand Central Terminal, New York City, effective January 5.

Charles Nourse, until recently in charge of the engineering department of the **Heald Machine Company**, Worcester, Mass., has severed his relations with that company to accept a position with the **Lombard Machine Company**, Worcester. **Victor Bergstrom** succeeds him.

On December 31, 1919, the business of manufacturing and selling Delco-Light products heretofore conducted by the **Domestic Engineering Company**, Dayton, Ohio, was transferred to the **General Motors Corporation**. The business will be operated until further notice by the **Delco-Light Company**.

C. C. Humberstone has been appointed Chicago sales manager of the **Anchor Packing Company**, Philadelphia, Pa., under the jurisdiction of J. T. Landreth, western sales manager with headquarters at Chicago. Mr. Humberstone was formerly connected with the engineering department of the Pennsylvania.

J. P. Bourke, who during the war, with the rank of major, was assistant to the quartermaster general and later assistant chief of staff to Major-General Omar Bundy, has returned to the service of the Ewald Iron Company, Louisville, Ky., as resident manager in charge of eastern territory, with office at New York.

J. C. McCune, special engineer at Wilmerding, Pa., has been appointed assistant to district engineer eastern district, with headquarters at New York, and **J. H. Woods**, of the commercial-engineering department at Wilmerding, Pa., has been appointed engineer of the export department, with headquarters at Pittsburgh.

Henry P. Thompson, a district representative at Cincinnati, Ohio, of the **American Steam Conveyor Corporation**, Chicago, has added to his sales engineering staff **Albert A. Casey**, who will push the sale of the American steam jet conveyor in that territory. Mr. Casey is a mechanical engineer, and a graduate of the Ohio State University.

The Vanadium Corporation of America, 120 Broadway, New York, has bought all of the properties, excepting cash, receivables and securities, of **Primos Chemical Company**, the **Primos Exploration Company**, and the **Primos Mining & Milling Company**, producers of vanadium, molybdenum, tungsten and other steel alloys, and having valuable deposits of these elements in Colorado, and a large refining plant at Primos, Delaware county, near Philadelphia, Pa.

Joseph Robinson, the inventor of the Robinson connector and formerly president of the **Robinson Connector Company**, has again become associated with the company. This follows an absence from the company of two years during which time Mr. Robinson has had no managerial or mechanical association with it. In his new association he will act in an advisory capacity, working in cooperation with A. R. Whaley, vice-president of the company and formerly vice-president of the New York, New Haven & Hartford Railroad. Mr. Robinson was born in Dayton, Wash., on July 21, 1889. His family later went east to Illinois where, after leaving school at the age of 12, he worked on a farm until he was 14. He then went west again and worked in a blacksmith shop until the age of 18 when he opened an office at Salem, Ore., as a designer of special machinery. While doing this work his attention was drawn to the need of a better means of coupling hose on railway trains. He worked out the design of the Robinson connector for this purpose and after a study of the problem he came east with the device in 1909 and in 1910 organized the Robinson Connector Company of which he became president. For the next eight years he devoted his efforts to the development of the business represented by the company, until 1918, when he turned his interest over to other hands who, since that time, have endeavored to develop the device. Mr. Robinson retaining only the ownership of the patents, but no other connection than lessor with the company until his return to it as noted above.

J. Robinson

The Cleveland office of **B. M. Jones & Co., Inc.**, New York, selling agents for Mushet steels and Taylor iron, has been moved from 824 Engineers building to 115 St. Clair avenue, N. W., where the office and warehouse have been combined. **Walter E. Sargent**, formerly of Detroit, Mich., is now connected with the New York sales office of the company at 192 Chambers street.

The Fairbanks Company, Chicago, has purchased practically the entire capital stock of the H. Channon Company, Chicago, and will enlarge the business of the latter company to include several new lines. The Channon Company started as a ship chandlery, but since the decline of shipping on the Great Lakes, has been engaged in the manufacture of contractors' supplies, tents, and miscellaneous articles. A new organization has been formed with **H. G. Elfborg**, formerly with the Ajax Forge Company, Chicago, as president, **Benjamin Berntsen** and **C. C. Viehoff**, vice-presidents and **John H. Hanley**, secretary.

Bush, Roberts & Schaefer Company

A new corporation, the Bush, Roberts & Schaefer Company, with offices in Chicago and New York, has been formed for the purpose of acting as engineers and contractors for general railroad construction work such as terminal facilities, reinforced concrete and steel bridges, viaducts and track elevation work.

The corporation was formed by Colonel Lincoln Bush, formerly chief engineer of the Delaware, Lackawanna & Western and more recently a consulting engineer with headquarters in New York City, together with the officers and directors of the Roberts & Schaefer Company, Chicago. However, the new company is not a subsidiary of the Roberts & Schaefer Company. The latter company will continue independently its operations, which have extended over a period of 16 years, in the building of locomotive coaling stations, cinder handling plants, material transfer plants and other storage and handling installations, whereas the new company will confine its operations to general railroad construction work. It is proposed also that the new company will undertake contracts for government, state, county or municipal work.

Col. Lincoln Bush

Col. W. R. Roberts

E. E. Barnett

J. J. Roberts

F. E. Mueller

C. P. Ross

Colonel Bush, who becomes president of the Bush, Roberts & Schaefer Company, graduated from the University of Illinois in 1888. For notable engineering work the latter institution in 1904 conferred upon him the degree of Doctor of Engineering. He entered railway service in May, 1888, as assistant engineer maintenance of way, of the Wyoming division of the Union Pacific with headquarters at Cheyenne, Wyo. In July, 1889, he was appointed assistant engineer on location of the Pacific Short Line, with headquarters at Ogden, Utah, and continued in this position until January, 1890, when he became assistant instructor in descriptive geometry at the University of Illinois. In April, 1890, he became assistant engineer with E. L. Corthell in bridge work at Chicago, Ill. From December, 1891, to May, 1896, he was chief draftsman, designer and estimator in the western office of the Pittsburgh Bridge Company and from May to December of the latter year was draftsman in the bridge department of the Chicago Drainage Canal. In December, 1896, he returned to railway service as assistant to the bridge engineer of the Chicago & North Western, with offices in Chicago. In January, 1899, he was appointed acting division engineer of the Iowa division of the same road, with headquarters at Boone, Iowa, and in December of the same year was appointed bridge engineer of the Delaware, Lackawanna & Western, with headquarters at Hoboken, N. J. In October, 1900, he was appointed principal assistant engineer of the same road and in February, 1903, chief engineer. In the latter capacity he discovered the sand jack for lowering great weights, such as the 1,000-ton double deck draw bridge at Newark, N. J., and in addition invented the Bush type of train shed and the Bush type of track construction. On January 1, 1909, he engaged in private practice as a consulting engineer and contractor with headquarters in New York City. In this work he was engineer or consultant on the design and construction of 13 Bush train sheds and acted in an advisory capacity in several large railway construction projects in Pennsylvania. At this time Colonel Bush was also president and chief engineer of the Talbot Construction Company, vice-president and chief engineer of F. M. Talbot Company, and vice-president, treasurer and chief engineer of Flickwir & Bush, Inc. In October, 1917, Colonel Bush entered the service of the war department as a civilian and reached the grade of colonel in the Quartermasters Corps of the United States Army on August 24, 1918. He was honorably discharged on March 31, 1919, since which time he has been engaged in private practice as a consulting engineer, with headquarters at 1 Madison avenue, New York City.

The present directors of Roberts & Schaefer Company, together with Colonel Bush, will be the officers and directors of the new company. Col. W. R. Roberts, president of Roberts & Schaefer, becomes chairman of the board of Bush, Roberts & Schaefer Company.

Colonel Warren R. Roberts, president of Roberts & Schaefer Company, will hold the position of chairman of the board of directors of the new company, Edward E. Barrett, vice-president of Roberts & Schaefer Company, will be vice-president of the new organization, John J. Roberts, treasurer of Roberts & Schaefer Company, will be treasurer, and Frank E. Mueller, secretary and chief engineer of Roberts & Schaefer Company, will be secretary. The above, with Colonel Bush and Clyde P. Ross, contracting manager of Roberts & Schaefer Company, will constitute the board of directors of the new company.

Colonel Warren R. Roberts, president of the new organization, was graduated from the University of Illinois in 1888 and immediately entered the service of the Lassig Bridge Works, Chicago. He was later promoted to the position of chief draftsman of this company. During the years intervening between this period and 1894 he occupied different engineering positions in the city of Chicago. In 1894, he became assistant to the bridge engineer of the city of Chicago. In 1896 he was one of the incorporators of the H. M. R. Construction Company, Chicago, and in 1897 he entered construction work with two of his brothers. In 1904 Colonel Roberts, with J. V. Schaefer, John J. Roberts and Frank E. Mueller, formed a co-partnership known as Roberts, Schaefer & Company, to pursue the work of engineering and contracting in a specialty line of top works for coal mines. In September of the same year the corporation of Roberts & Schaefer Company was formed and Colonel Roberts was appointed president. In 1917 he entered the service of the War Department in the Construction Division of the United States Army as a major and in the spring of 1918 was promoted to lieutenant-colonel. Soon after he was promoted to the rank of colonel. Since his discharge from the army, Colonel Roberts has returned to his duties as president of the Roberts & Schaefer Company.

Edward E. Barrett, vice-president of the Roberts & Schaefer Company and also vice-president of the new Bush, Roberts & Schaefer Company, was graduated from the University of Illinois in 1893 and for eight years after his graduation was in charge of hydrographic surveys and the construction of dams and levies on the Mississippi river under the direction of the United States Engineering Corps. During the year 1900, Mr. Barrett was assistant engineer on the Chicago, Burlington & Quincy, being identified with double tracking work in the state of Iowa. Later he became associated with Fairbanks, Morse & Company as civil engineer, handling the construction of locomotive coaling stations and other railroad structures. In 1904 he became associated with Roberts & Schaefer Company, later becoming vice-president and director, which position he holds at the present time.

John J. Roberts treasurer of the Roberts & Schaefer Company, and of the Bush, Roberts & Schaefer Company, received his education at the University of Illinois. In 1893 he entered construction work, acting in various capacities on bridge building construction and on other projects until 1901.

At this time he was appointed chief estimator for Henry W. Schlueter Company, Chicago, and continued in that capacity until October, 1902, when he became assistant chief estimator of the George A. Fuller Company, with headquarters at New York City. At the time of the formation of the Roberts, Schaefer & Company, Mr. Roberts became one of the original co-partners. When that company was incorporated in September of the same year, Mr. Roberts became secretary and treasurer of the corporation. He relinquished the position of secretary in 1917 but has continued as treasurer of the corporation.

Frank E. Mueller, secretary of the Roberts & Schaefer Company and also secretary of the new corporation, graduated from Purdue University, Lafayette, Ind., in 1900, and in 1901 received a mechanical engineer's degree at that institution. In July, 1901, Mr. Mueller became associated with the Link Belt Machinery Company, Chicago, as a draftsman and after serving in that capacity for several months was promoted to assistant to J. V. Schaefer, who at that time was a salesman. In February, 1904, he left the Link Belt Machinery Company with Mr. Schaefer, who, with Colonel Warren R. Roberts, John J. Roberts and Mr. Mueller, formed the co-partnership of Roberts, Schaefer & Company. Mr. Mueller was appointed general superintendent of the new organization and in September, 1904, when the co-partnership was incorporated under the name of Roberts & Schaefer Company, he was appointed general superintendent and chief engineer. In addition Mr. Mueller was later appointed secretary and a director of the company.

Clyde P. Ross, contracting manager of the Roberts & Schaefer Company and a director of the new organization, graduated from the Chicago Manual Training School in 1898. He became connected with the engineering department of the Link Belt Company, Chicago, where he was engaged in the designing of coal washing plants, coal mining plants and various types of elevating and conveying machinery for the handling of coal. In March, 1904, when the Roberts, Schaefer & Company was organized, one of the original organizers, Mr. Schaefer, placed Mr. Ross in charge of design as chief draftsman. He held this position until 1907, when he was promoted to the position of principal assistant engineer. In 1909 he was elected a director of the Roberts & Schaefer Company.

National Steel Car Company Changes Hands

Robert J. Magor and associates have bought the plant and property, and taken over the assets and liabilities of the National Steel Car Company, of Hamilton, Canada, and will continue the business under the name of the National Steel Car Corporation with a capital of 100,000 shares of no par value stock.

R. J. Magor

The plans of the new corporation are to substantially increase its freight car manufacturing facilities and also develop on a large scale the motor truck business, which in the old company was only carried on in a very small way.

Mr. Magor, who is president of the Magor Car Corporation, New York, engaged in the car building business, has been elected president also of the new corporation. He was born on July 6, 1882, at Montreal, Canada, was educated in high schools and also received private tuition. In November, 1905, he entered the car building business with the Canadian Car & Foundry Company and in June, 1910, left the service of that company to take over the management of the re-organized Magor Car Company plant at Passaic, N. J. Since Mr. Magor took over the management of this plant the production has been increased ten times, and extensions are now being made, to be completed in the early spring, that will double the present capacity of the plant. In 1912 Mr. Magor assisted in designing the plant of the National Steel Car Company, Hamilton, Canada, and two years later was elected to the board. In the early part of 1919 he was made consulting vice-president, and as the company sustained large losses on a French war contract it was necessary to reorganize it, additional capital being put in. This was done by submitting to the company a proposition of purchase during November which was accepted, and on December 18, 1919, the purchase was completed and Mr. Magor was elected president of the National Steel Car Corporation, Ltd.

Financial and Construction

Railway Financial News

LEHIGH VALLEY.—Col. George T. Slade, former vice-president in charge of operation of the Northern Pacific, and during the war director of railroads behind the lines in France, has been elected a director of the Lehigh Valley.

CAROLINA, CLINCHFIELD & OHIO.—This company has proposed to the holders of its $6,000,000 5 per cent Elkhorn first mortgage gold notes, due January 1, 1920, the extension of the notes for two years to January 1, 1922, at interest increased to 6 per cent, holders to be paid in consideration of the extension $20 bonus for each $1,000 note.

NEVADA COUNTY NARROW GAGE.—This company has applied to the Railroad Commission of California for authority to redeem $83,000 par value of its 7 per cent bonds by the issuance of 5 per cent 30-year bonds. In June, 1913, the commission authorized the company to issue bonds to the extent of $500,000. It was the intention of the company to use $162,000 of these bonds to redeem outstanding bonds, and this was done to the extent of $83,000. The recent application is to secure permission to redeem these bonds.

Railway Construction

LOUISIANA & NORTHWEST.—This road, according to George W. Hunter, receiver, is locating and will build a new branch line at a point two miles north of Homer, La., into the oil fields west of Homer. The main spur will be between five and six miles in length with sidings for the various oil producers, the total mileage aggregating approximately 12 miles. In addition to the construction of this new branch the existing line will be improved to enable it to handle increased traffic from the oil fields.

SALT LAKE & DENVER RAILROAD COMPANY.—This company has been incorporated at Salt Lake, Utah, with a capital of $500,000, for the purpose of constructing a railroad through the Uintah basin, Utah. The articles of incorporation provide for the construction of a railroad from near Provo, Utah, to Craig, Colo., where it will connect with the Denver & Salt Lake. Governor Simon Bamberger of Utah is the chief promoter of the road and president of the new company. The plans for the financing of the road call for the issuing and selling of $10,000,000 of 7 per cent preferred stock in the Utah-Colorado Industrial Corporation, which is to be incorporated under the laws of Delaware, which corporation will hold the entire stock of the Salt Lake & Denver Railroad Company. The capital stock of the railroad company is divided into $100 shares, and the eleven directors each hold 10 shares, in addition to which Governor Bamberger holds 400 shares as trustee. Application has also been filed with the Public Utilities Commission of Utah for a certificate of public convenience and necessity. The incorporators are Governor Bamberger, president; W. S. McCormick, J. R. Walker and E. E. Jenkins, vice-presidents; Lester C. Freed, treasurer, and W. W. Armstrong, John P. Howard, E. A. Culbertson, James W. Collins, Frank Pingree and E. O. Howard, additional directors. O. J. Grimes, secretary to the governor, has been appointed secretary of the railroad company, and Governor Bamberger is named as general manager of the road, in addition to the presidency.

The route of the proposed railroad will be an easterly direction from Provo, through Wasatch, Duchesne and Uintah counties, and thence northeasterly through Rio Blanco county, Colo., to Craig, a distance of approximately 310 miles. The line has been located by survey and is subject to only minor changes, to be made as required by construction. The articles state that the company will commence construction "as soon as it conveniently can be begun, weather conditions permitting, subject, however, to obtaining the consent of the Public Utilities Commission of Utah.

Railway Officers

Railroad Administration

Operating

P. L. Clarity, trainmaster of the Great Northern, has been appointed superintendent of terminals, succeeding **J. McNaught,** appointed trainmaster.

P. D. Shand, trainmaster of the Denver & Rio Grande, at Pueblo, Colo., has been transferred to the Salt Lake division, with headquarters at Provo, Utah, succeeding **E. K. Merkle,** transferred.

J. C. Goodfellow, trainmaster of the Southern Pacific at Los Angeles, Cal., has been transferred to Niland, Cal., succeeding **R. E. Southworth,** who has resigned. **C. M. Murphy,** trainmaster at San Luis Obispo, Cal., has been transferred to succeed Mr. Goodfellow.

H. T. Wyatt, chief clerk to the federal manager of the Baltimore & Ohio Western Lines, with headquarters at Cincinnati, Ohio, has been appointed train master of the Newark division, with headquarters at Newark, Ohio, succeeding **W. Streck,** who has been assigned to other duties.

Byron J. Peaseley, whose appointment as superintendent of motive power of the Vicksburg, Shreveport & Pacific, the Alabama & Vicksburg and the Mississippi-Louisiana Transfer was announced in the *Railway Age* of October 3 (delayed issue, printed Nov. 19), page 719, was born at Decorra, Ill., December 21, 1867. He attended the public schools at Burlington, Iowa, and in 1883 began work as a laborer and machinist's apprentice for the Chicago, Burlington & Quincy at West Burlington. His railroad work was then interrupted temporarily while he attended a business school which he left to go to the Atchison, Topeka & Santa Fe as machinist at Fort Madison, Ia., where he remained until 1894, when he entered the employ of the Fort Madison Gas & Gasoline Engine Company. For almost four years subsequent to this period he was a fireman and engineer and then went to the Illinois Central as machinist at East St. Louis, Ill., from which city he was transferred to Carbondale as division and wrecking foreman. Later Mr. Peaseley was with the Denver & Rio Grande as foreman at Helper, Utah, but returned to the Illinois Central at East St. Louis to serve respectively as roundhouse foreman, shop foreman and general foreman until September, 1906, when he left to become general foreman of the Missouri Pacific at Bixby, Ill. While in that position he was promoted to master mechanic at Ferriday, La., and was, six months later, transferred to the Missouri division with headquarters at De Soto, Mo. In February, 1914, he was promoted to superintendent of shops at Argentina, Ark., and later appointed master mechanic of the roads of which he is now superintendent of motive power.

Financial, Legal and Accounting

John W. Mulligan, assistant real estate and tax agent of the Chicago, Rock Island & Pacific, with headquarters at Chicago, has been promoted to real estate and tax commissioner, succeeding Thomas J. Newkirk, deceased.

C. H. Nero has been appointed auditor of passenger receipts of the New York, New Haven & Hartford and other roads under the jurisdiction of Edward J. Pearson, federal manager, succeeding **H. S. Snow,** assigned to other duties.

Engineering and Rolling Stock

N. P. White, roundhouse foreman of the Northern Pacific at Duluth, Minn., has been promoted to master mechanic of the Minnesota division at Staples, Minn., succeeding **William Radke,** deceased.

C. H. Koyl, engineer of water service of the Great Northern at St. Paul, Minn., has been appointed to the newly created position of engineer of water service on the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, Ill.

Luke J. Gallagher, locomotive engineer, has been promoted to road foreman of engines of the Rocky Mountain division of the Northern Pacific, with headquarters at Missoula, Mont., succeeding **H. E. Day**, who has been granted leave of absence.

A. M. Davidson, assistant engineer on the Baltimore & Ohio, Western Lines, with headquarters at Cincinnati, Ohio, has been promoted to assistant division engineer, with the same headquarters, succeeding **L. A. Robenheiser**, who has been transferred.

C. H. Judson, assistant valuation engineer of the New York Central, Lines West of Buffalo, at Cleveland, Ohio, has been appointed assistant engineer in charge of the work in connection with Valuation Order No. 3 for the lines West of Buffalo, with the same headquarters.

F. C. Moeller, roundhouse foreman of the Chicago, Rock Island & Pacific, at Blue Island, Ill., has been promoted to general foreman in the locomotive department at Cedar Rapids, Iowa, succeeding **S. C. Mueller**, whose promotion to master mechanic was announced in the *Railway Age* of December 26.

J. A. Marshall, road foreman of engines of the Northern Pacific, at Duluth, Minn., has been appointed acting master mechanic of the Lake Superior division, with the same headquarters, succeeding **J. E. Goodman**, who has been given a temporary leave of absence. **C. P. Cunliff**, engineman, has been promoted to succeed Mr. Marshall.

Purchasing

F. E. Johnson, storekeeper of the Baltimore & Ohio at Mt. Clare, Baltimore, Md., has been appointed assistant general storekeeper at Baltimore; **H. Shoemaker**, district storekeeper of the Northwest District, with headquarters at Cleveland, Ohio, has been appointed Mr. Johnson's successor and Mr. Shoemaker has been succeeded by **J. G. Calori**.

Corporate

Executive, Financial, Legal and Accounting

E. H. Boles, general counsel of the Lehigh Valley with headquarters at New York City, has also been elected vice-president.

R. W. Harrington has been appointed to the newly created position of general attorney of the Canadian National with headquarters at Vancouver.

F. W. Charske, assistant to the president of the Union Pacific, with headquarters at New York City, has been appointed controller of the Union Pacific, the Oregon Short Line and the Oregon-Washington Railroad & Navigation Company, with the same headquarters.

E. O. Griffith has been reinstated as assistant to the president of the St. Louis, Southwestern Railway Company and the St. Louis Southwestern Railway Company of Texas, with headquarters in the Railway Exchange building, St. Louis, Mo. Mr. Griffin will have charge of purchases, materials and supplies.

Peter F. Finnegan, traffic manager of the Baltimore & Ohio, Western Lines, with headquarters at Cincinnati, Ohio, has resigned to accept the vice-presidency of the Union Tank Car Company, New York city, with headquarters at that city. Mr. Finnegan was born at Syracuse, Ind., on November 4, 1877. He received his education at the Chicago Business College, and entered railway service on May 4, 1895, in the transportation department of the Baltimore & Ohio at South Chicago, Ill. From January to December, 1899, he was connected with the Pullman Company, returning to the Baltimore & Ohio in 1900 as chief clerk in the general freight department at Chicago. Later he was appointed general freight and passenger agent of the Baltimore & Ohio Chicago Terminal, a position which he held until 1916, when he was promoted to general western freight agent with the same headquarters. Later his jurisdiction was extended to include the Northwest district. In 1917 he was appointed assistant to the director of the division of traffic of the United States Railroad Administration, with headquarters at Washington, D. C., holding that position until November, 1918, when he was appointed freight traffic manager of the Baltimore & Ohio, Western Lines.

Traffic

Frank W. Robinson, traffic manager of the Oregon-Washington Railroad & Navigation Lines, with headquarters at Portland, Ore., has been appointed traffic manager of the Union Pacific System, the position he held prior to government control. The appointment is effective March 1.

Archibald Fries, traffic manager of the Baltimore & Ohio and other roads under the direction of C. W. Galloway, federal manager, has resigned from federal service and has been appointed general traffic manager of the Baltimore & Ohio, with headquarters at Baltimore, Md. **M. Golder Shumate** has been appointed acting traffic manager under the Railroad Administration, succeeding Mr. Fries.

Obituary

Mahlon D. Miller, superintendent of the New York, New Haven & Hartford at Waterbury, Conn., died January 5, at his home in that city.

Clarence Farleigh Parker, formerly vice-president of the Illinois Central and the Central of Georgia, with headquarters at Chicago, died at his home in Chicago January 6, after an illness lasting three years and which necessitated his retirement from active work in 1917. Mr. Parker was born at Charleston, Ill., on February 14, 1865, and received his education at Washington University, St. Louis, Mo. His railroad work began in 1888, when he entered the employ of the St. Louis, Alton & Terre Haute, his duties at that time being mainly confined to the train service departments. From then until January 1, 1896, he was consecutively car accountant, secretary to the general manager and purchasing agent and assistant general manager and purchasing agent of the same road. On January 1, 1896, he was appointed general manager and remained in that position until April 1 of the same year when he went to the Illinois Central as general agent at St. Louis, Mo. (From this time until his retirement in 1917, Mr. Parker continued in the service of the Illinois Central.) On May 12, 1902, he was appointed coal traffic manager and filled that position until June 1, 1904, when he was appointed purchasing agent, in which capacity he became well known to many central western railroad and railway supply men. His successful supervision over the Illinois Central's purchases during the period from June 1, 1904 to January 17, 1912, led to his appointment as vice-president on the latter date. As vice-president Mr. Parker retained supervision over the purchasing departments. On April 8, 1912, he was also appointed vice-president of the Central of Georgia and executed the duties of that position, in addition to those of vice-president of the Illinois Central, until the time of his retirement.

C. F. Parker

EDITORIAL

Railway Age

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What Is Sauce for the Goose

No little interest is being taken in the project of the Brotherhood of Maintenance of Way Employees and Railway Shop Laborers to purchase and operate several clothing factories and knitting mills in an effort to reduce the cost of living for its members and those of other railway brotherhoods. As this organization has declared itself favorable to the Plumb plan, it will, no doubt, undertake to conduct its recently acquired business according to the principles of this well-advertised plan for railway management. Under such an arrangement the operation of these factories would be in the hands of a board, one-third of whom would come from the mill workers, one-third from the foremen and superintendents of these factories and one-third from members of the brotherhood. It would also provide that one-half of any surplus earnings after the payment of all interest charges would be distributed among the workmen and the other half would go to the brotherhood. Surely some such plan should be carried out, for if we understand the virtues of this system correctly it will be possible to reduce the cost of stockings and underwear by at least one-half.

Accident Record for Year 1918

Twenty million, nine hundred and fifty-four thousand, three hundred and fifty dollars is the total amount of damage to railroad property in train accidents in the United States in the calendar year 1918, as reported in the last accident bulletin of the Interstate Commerce Commission (Bulletin No. 70), which was issued last week (twelve months after the close of the period dealt with). This is not the most important figure in the bulletin, for the record tells of 9,286 persons killed and 174,575 injured in that year; but the money item is the basis of one of the important lessons of the exhibit. This is the day of big figures, and we must take care not to confuse our minds with mere bigness; this huge sum, after all, is less than one-half of one per cent of the gross earnings of the roads for that year, and it averages only about $11.46 per thousand locomotive miles; but, on the other hand, the total is more than 37 per cent above the total for 1917, which in its turn was about 28 per cent above 1916; so that the situation deserves consideration. Moreover, the damages paid for freight lost and destroyed and on account of deaths and injuries to passengers and employees must be added to these totals, making the aggregate penalty for not preventing collisions and derailments perhaps 100 per cent greater; or, say, for 1918 forty millions, and for 1917 thirty millions of dollars. The fact that these figures are now a year old does not lessen their value—they are the newest we have. In what may be considered its most important feature—persons killed in train accidents—the present report affords a sobering comparison: passengers, 286; 1917, 131; employees, 554 and 451; increases of 118 per cent and 23 per cent. Two hundred and twenty of the 286 passengers killed in 1918 met their deaths in collisions, a fact which should give point—if anything further is needed to give point—to the report of the Train Control Committee, issued last week and noticed in the *Railway Age*, page 227. This committee, by the way, makes one of its most significant suggestions in a paragraph which the director of the division of operation had not asked for—the one to the effect that on a large mileage of American railroads the first need is not for refinements, like the automatic train stop, but for the simple block system.

Limitations of Autogenous Welding

The rules restricting the use of autogenous welding, issued by the Committee on Standards for Locomotives and Cars, are published elsewhere in this issue. There has been some anxiety regarding the promulgation of such rules, but their provisions would seem to indicate these were due to misconceptions as to what the restrictions would be. The most ardent advocates of welding realize that the process has its limitations and that progress will be hampered if welding is applied to types of construction for which it is inherently not adapted. The rules in general are to be commended in the interest of safety. Similar regulations, prepared by a committee of the Mechanical Section of the American Railroad Association, have already been put in effect to govern the welding of various parts of cars. A convincing argument for the limitation of autogenous welding in locomotive fireboxes is found in the eighth annual report of the chief inspector of locomotive boilers. This report states that the investigations of failures of fireboxes indicate that in numerous instances the violence of the explosion was greatly increased by the failure of sheets welded by the autogenous process. Examples are cited to show that disastrous failures occurred, due to the slight overheating of the welded seams, while in riveted fireboxes, even where the water level fell several inches below the crown sheet, no failure of the seams occurred, but only a bagging of the sheet, which generally is not attended by any serious personal injury. In view of these facts, the recommendation that welded seams in side sheets shall be not less than 12 in. below the top of the crown sheet seems a wise provision. The other rules are reasonable, and, as compared with prevailing practices, should entail but little additional trouble or expense. On the whole, the regulations form a safety code to govern the use of autogenous welding on locomotives, and as such they should receive the support of all railway officers.

America the Leading Exporter

The British Board of Trade returns of exports of railway materials which are quoted from time to time in the Foreign Railway News column of this paper indicate that the United Kingdom's business along this line is rapidly being raised from its low war-time level. Presumably, however, the totals are not increasing as fast as our British friends would like to see them increase and for the time being at least, our own totals are considerably above those of the British. In view of the fact that the United Kingdom is practically our only competitor at present in export business in railway supplies, it is interesting to make a comparison between our

own and its figures. To effect a ready comparison of this kind we have taken the latest returns of the Board of Trade, now completed up to the end of November. We have translated them from pounds to dollars at a rate of $5 to the pound, which divergence from the present exchange rate of $3.70, or thereabouts, we hope our readers will permit, in view of the varying rate of exchange over the past two years to which the figures apply, the difference between the British and American rates with various countries, and the otherwise great difference in the comparative totals. The comparative figures follow, the British totals being those of the Board of Trade, the American those of the Bureau of Foreign and Domestic Commerce:

	First eleven months of 1919		First eleven months of 1918	
	United Kingdom	United States	United Kingdom	United States
Locomotives	$6,997,615	$25,687,646	$5,225,105	$23,897,339
Freight cars.....	10,133,610	53,943,804	1,521,530	10,378,517
Passenger cars...	2,830,080	1,597,788	2,734,025	824,400
Rails	9,142,955	39,542,606	2,351,965	23,721,884
Car wheels and axles	7,595,100*	11,390,957	4,441,220*	6,236,351

*British totals classified under two heads, "Wheels and Axles" and "Tires and Axles."

The feature of these figures is, of course, the striking advance in the British totals and the surprisingly great difference between the British and American figures, the latter being in 1919 in several cases three times the British totals. It will be apparent that the British, like ourselves, are letting little grass grow under their feet in going after export trade. The rapid increase in the export business in railway supplies from both countries is a clear commentary on the statement that has often been made in these columns that there is a remarkably large market throughout the world for railway supplies, and that there are only two countries in the world, or three, including Canada, in a position to take advantage of it.

How Much Rates Have Been Advanced

The Railroad Administration has made public some very interesting statistics showing the results of the advances in railway rates which have been made since government control was adopted. The common way of stating the advances has been that they have amounted to 25 per cent in the case of freight rates and 50 per cent in the case of passenger rates. The true results are reflected in the increases which have occurred in the average revenue earned per ton mile and per passenger mile. As a result of proceedings brought by the railway companies the Interstate Commerce Commission granted about one-half of a 15 per cent advance to the eastern lines in 1917 and the rest of this advance early in 1918. The statistics of the Railroad Administration show that in the calendar year 1917, the last year of private operation, the average revenue per ton mile was .715 cents, while in 1918 it was .858 cents. In the five months ended May 31, 1918, it was .746 cents, in the five months ended May 31, 1919, .979 cents, and in the nine months ended September 30, 1919, .967 cents. The increase in the first five months of 1919 over the same months in 1918 was 31.2 per cent, and the increase in the nine months ended September 30, 1919, over the fiscal year 1914 was 33.8 per cent.

The increase in the revenue per passenger per mile has been much smaller. The average passenger rate in 1917 was 2.09 cents, in the first five months of 1918 2.144 cents, and in the nine months ended September 30, 1919, 2.528 cents. The average revenue per passenger per mile in the first five months of 1919 was 18.5 per cent more than in the first five months of 1918, and in the nine months ended September 30, 1919, it was 27.9 per cent more than in the fiscal year 1914. The statement of the Railroad Administration points out that the increase in the average revenue per ton mile since 1914 has been only 33.8 per cent, while the percentage of increase in retail food prices in 1919 over 1914 was almost 81 per cent. As already indicated, the increase in the average passenger rate was less even than the increase in the average freight rate.

In other words, the increase in the cost of railroad transportation has been only about one-third as great since 1914 as the increase in the most important prices entering into the cost of living, and yet we are told that no further advance in rates should be made because it would cause an enormous increase in the cost of living! The reason why a further advance in rates is necessary is that the railroads' cost of living, owing to conditions over which they have had no control, has increased far more in proportion than their rates and revenues, and they cannot be restored to a basis of solvency, much less to a basis on which they can give good and adequate service, without a further advance in their rates.

Manufacturing Specialties in Railroad Shops

Among the important factors that have contributed to the efficiency and economy of railroad operation in America, one that must receive recognition is the ingenuity of inventors of special appliances. There are many men among the rank and file of the railroad workers who devote a large share of their leisure time to the development of some device designed to effect an improvement in the method of doing some particular piece of work. These men are actuated partly by the desire to invent something, but more largely by the hope of substantial rewards for their labor. To find a market for their inventions they look not to the railroads, but to the manufacturers of railway equipment. There are good reasons why the railroads have not given active support to employees who have devised new methods or designed new types of equipment. Some of the most important inventions have been so radical as to seem at first wholly impractical and it would be difficult for the roads to assist one employee in working out his ideas and refuse aid to another. Furthermore, the cost involved in the numerous trials that are necessary in order to secure the best design of equipment and to determine the proper method of operating it, is often so great as to be prohibitive unless the device can be used on a large scale. Even after an appliance has passed the experimental stage the railroads often find it is not economical to maintain the special equipment needed to manufacture it or the corps of experts required to secure the utmost efficiency in its operation.

The reasons given above explain why the burden of developing new methods and new devices has fallen on the supply companies and not on the railroads. Some roads have recognized that the supply companies were the logical agency to carry on such work and have not hesitated to adopt patented specialties. Other roads have endeavored to use as few patented articles as possible, and have tried to devise substitutes or have waited until the patent expired and have then begun to manufacture the article for their own use. It is doubtful whether anything is gained by such practices. The value of a special appliance as offered by a supply company consists not merely in the value of the patent, but is enhanced by the more efficient manufacturing methods which the supply company can use and the accumulated experience which is available through its service organization. A substitute device designed to avoid an infringement of the patent is almost certain to be inferior to the patented article. If a road waits for the patent to expire, the device is often out of date before it is applied.

The manufacture of patented articles by the railroads, if carried on to any great extent, is sure to bring about an undesirable reaction. Many of the appliances which are most valuable to the railroads require years of development and promotion before they become generally adopted. If the roads pursue the policy of manufacturing in their own shops devices on which the patents have expired, the supply companies will hesitate to undertake the development of any radical improvements that are not liable to be adopted immediately. This in turn will discourage the invention of such innovations and as a result progress will be retarded.

These are the practical considerations that should keep the railroads from making patented devices. There is also the ethical aspect of the matter to be considered. Do not the railroads owe a certain debt of gratitude to the supply companies, which should keep them out of the manufacturing field after a device has been perfected by the railway supply manufacturers in the interest of the railroads? The roads cannot eat their cake and have it. If the supply companies are denied the reward of their enterprise in undertaking what is usually a highly speculative venture, it is not to be expected that they will continue the policy of developing appliances for railroad use, which in the past has been of such material benefit to the transportation industry.

A Crisis in the Cross Tie Market

THE TIE MARKET is now in a predicament that bids fair to exert as serious an influence on the production of ties during the present winter as did the complete disruption of tie-distributing agencies which followed the inception of government control of the railroads in the early months of 1918. At that time tie-cutting was brought to almost a complete standstill through an ill-advised attempt to fix prices arbitrarily, and it was nearly a year before approximately normal production could be restored. Now that producers and railroads alike have perfected their arrangements to conform to the system of procuring and distributing ties set up by the Forest Products Section of the federal Division of Purchases, the production is again being seriously retarded because this system is about to be abandoned, and no definite plan has yet been adopted indicating what the policy of the railways will be after they are returned to private control. A tie cannot be cut, seasoned, inspected, accepted and delivered in a day. This is a process requiring the lapse of several months, and unless some scheme is devised that will insure the continuance of this process while the transition in management is in progress we are destined to lose the output during that interval.

Under government control the ties have been bought on the basis of a series of established maximum prices, and the railroads in producing territories have served as the Administration's agents in taking up the ties cut along their lines, subject to distribution by the Division of Purchases. These prices will cease to be effective on February 29, while the roads which have been receiving more ties from the producers than they apply on their own lines have no assurance that they will be able to dispose of the surplus ties they have on hand on that date. The same situation holds with respect to the standard specifications now in effect. While these seem to meet general approval and their adoption by the American Railroad Association has been talked of, until such adoption has been announced officially there will be a great deal of uncertainty on this score also.

The effect of these circumstances is readily appreciated. The producer hesitates to go on cutting ties when he does not know who will buy them, what the prices will be or what specifications will apply. The roads in tie-producing areas are notifying the producers that they will now receive only such ties as they can use in their own tracks. The contractors are unable to set up operations until they know what sort of sale contracts they can make with the individual roads. Efforts made to perfect a working agreement between the Division of Purchases and the corporate managements, whereby the former would have authority to act in behalf of the latter in this matter until such time as the corporate purchasing departments would begin to function, have thus far been unsuccessful. So also has been an attempt to have the roads agree to a continuation of the established prices until June 1.

Under the stress of the uncertainty as to the actual outcome of the legislation now being formulated at Washington, it is but natural that railway executives should feel that all other matters are inconsequential for the time being. However, it is certain that unless something is done that will immediately produce a positive impetus in the production of ties, the railroads will suffer serious consequences when on March 1 they will all enter the tie market at the same time. With production at the minimum and limited stocks, they will be at the mercy of sellers who have scores of buyers competing for their limited supplies. Presumably this would accrue to the advantage of the tie contractors, but there is no question but that they also would prefer to conduct the business upon a more conservative basis founded on a prearranged plan under which they could make preparations in advance of the demand. The railroads have not yet recovered from the effects of a similar situation two years ago, and it would be unfortunate if they should undergo a repetition of it now because of an inability to profit by the experience of the past.

Commissioner Woolley on Railway Rates and Cost of Living

THE RAILWAY COMPANIES are preparing to petition for an increase in freight rates after the roads are returned to private operation. Their case will be passed upon by the Interstate Commerce Commission. The commission is a semi-judicial body. It seems reasonable to assume that the members of a body performing semi-judicial functions will hear all the evidence and arguments in a case before passing judgment. It is most important that members of the commission should do this in the present juncture, because its decision in the approaching rate advance case will largely settle in the minds of the people and investors of the United States the question whether the commission is going to permit the railway companies to earn a sufficient net return.

Robert M. Woolley is a member of the commission. In spite of his semi-judicial position Mr. Woolley apparently has not waited to hear the evidence and arguments to be presented before making up his mind regarding the proposed advance in rates. He has prepared a statement which was published in the New York Herald on January 12, 1920, in which he has made plain that he is opposed to the advance which he assumes the railway companies will ask for. The stand he has taken is astounding. No less astounding are the reasons he gives for it.

He says he is "informed that the measure of the increase will have to be at least 25 per cent." He objects to it mainly upon the ground that it will cause an enormous increase in the cost of living. We quote as follows from his statement: "Based upon 1918 freight receipts, a 25 per cent increase would mean $875,000,000 additional which the shippers would have to pay annually. But the shipper passes this along to the consumer or back to the producer of the raw material, who has to stand the cost of transportation to the primary market. * * * The consumer catches an increase in freight rates in the shape of an accumulation of increases.

He is bound to, because he is at the mercy of the manufacturer, the wholesaler, the retailer and, generally, the commission man, as to each single material that enters into a finished article, and then as to the article itself. Director General Hines stated at St. Louis last June the ratio was five-fold. In other words, he said that if rates were increased $300,000,000 the consumer would pay to the extent of $1,500,000,000, and a $875,000,000 increase in freight rates would mean $4,375,000,000 the consumer would pay. This would have an immediate effect of increasing the living cost of families of five by something like $215 per annum."

If Mr. Woolley's arguments were well founded it might be accepted as affording conclusive ground for not advancing freight rates. The truth is that it is wholly without foundation. Statistics which recently have been compiled and made public by the Railroad Administration and by the Bureau of Labor Statistics completely refute it. The statistics of the Railroad Administration referred to are given in a press notice issued by Director General Hines on January 14. The statistics of the Bureau of Labor Statistics referred to were published in the Monthly Review of that bureau for October, 1919, long before Mr. Woolley made his extraordinary statement.

The statistics issued by Director General Hines to which we have referred show that in the year ended on June 30, 1914, the average freight rate per ton per mile of the railways of the United States was 7.23 mills, and that in the five months ended May 31, 1918, it was 7.46 mills, an increase during this four years of 3 per cent. The Bureau of Labor Statistics shows that between 1914 and May, 1918, the average increase in the wholesale prices of commodities in the United States was 91 per cent, or 30 times as great in proportion as the increase in the average freight rate. Obviously the almost negligible increase in rates which occurred during those four years had almost no effect upon the average cost of living.

We come next to the period when there were made the largest advances in freight rates that ever occurred in this country. Whereas in the five months ended May 30, 1918, the average freight rate was only 7.46 mills, in the five months ended May 30, 1919, it was 9.79 mills, an increase of 31.2 per cent. This was chiefly due to the large advance in rates made by the Railroad Administration in May, 1918. If Mr. Woolley's theory as to the effect of an advance in freight rates upon the cost of living were correct, then this increase of over 31 per cent in the average freight rate would be found to have resulted in an enormous increase in the prices of commodities. What was the actual result? The Bureau of Labor Statistics shows that between May, 1918, and May, 1919, the average increase in wholesale prices was only 15 per cent.

The foregoing figures probably would be sufficient to refute Mr. Woolley's entire contention, but let us go somewhat more into detail. Bearing in mind that the increase in the average freight rate in the first five months of 1919 over the first five months of 1918 was over 31 per cent, let us see what were the actual changes meantime in the prices of certain important commodities of general consumption. The Bureau of Labor Statistics gives details of the retail prices of eleven important kinds of dry goods in cities throughout the United States on May 15, 1918, which was just before the large advance in rates, and on May 15, 1919, almost a year after it was made. On Mr. Woolley's theory, after the advance in rates was made the manufacturer would have passed it along to the wholesaler, the wholesaler would have passed it along to the retailer, the retailer would have passed it along to the consumer, and when the consumer bought the goods the advance in freight rates would have resulted in an enormous increase in the prices he had to pay. What actually occurred? The statistics of the Department of Labor show that throughout the United States there was actually a decline in the retail prices of most of these important kinds of dry goods between May 15, 1918, and May 15, 1919. In Chicago, for instance, the prices of eight of the kinds of dry goods for which prices are given were less on May 15, 1919, than on May 15, 1918, while the prices of two were higher. Mr. Woolley lives in Washington and has had every opportunity to ascertain what changes took place in the prices of dry goods there after the advance in rates was made. The statistics of the Bureau of Labor show that in his own city in the year after the advance in freight rates the prices of six of the kinds of dry goods mentioned declined, while the prices of two increased.

The largest advances in prices which have occurred within the last five years have been those for foodstuffs. The statistics of the Bureau of Labor show, however, that much the greater part of these increases occurred while railway rates were actually declining, and that the advances in prices which have occurred since the rates were advanced have been far less in proportion than the advances in the rates. Taking 22 food articles, ranging all the way from sirloin steak to oranges, the Bureau of Labor Statistics shows that if the weighted average prices of these commodities on August 15, 1913, be taken as 100 per cent, then their weighted average prices in 1917 were 148 per cent, in 1918 170 per cent, and in 1919 191 per cent. While freight rates actually declined between 1913 and 1917, the average increase in prices was 48 per cent; and while the advance in freight rates between 1918 and 1919 was 31 per cent, the weighted prices of articles of food advanced only 21 points, representing a percentage increase in prices of just about 30 per cent.

The foregoing facts obviously destroy Mr. Woolley's entire theory as to the effect of freight rates upon the cost of living. If an advance of 31 per cent in the five months ended with May, 1919, as compared with the five months ended with May, 1918, produced no perceptible effect upon the cost of living, how can it be rationally argued that a further advance of 25 per cent would have the perfectly enormous effect upon it which he predicts? The fact is that freight rates are so small compared with the value of most commodities that they exert very little influence upon their prices.

There is another point regarding this matter which Mr. Woolley completely ignores. He advocates a continuance of government control upon the ground that under that policy no large advance in rates would have to be made. But the railroads under government control in 1919 incurred a deficit of $400,000,000. Under a continuance of government control, and in the absence of a large advance in rates, they undoubtedly would continue to incur a correspondingly large deficit. This deficit must be paid from the public treasury. The taxes paid into the federal treasury now consist chiefly of income taxes and excess profits taxes. If the railroad deficit were wiped out by an advance in rates, excess profits taxes could be reduced at least $400,000,000 a year. Now, everybody who has studied the subject realizes that the way in which excess profits taxes are being levied is causing an increase in business expenses and in prices out of all proportion to the amount of revenue derived from them by the government. It follows that a reduction of the excess profits tax would have a tendency to reduce the cost of living. If an advance in freight rates would tend equally to increase the cost of living, the one would offset the other.

The statement issued by Mr. Woolley affords the railway companies extremely good reason for fearing that, whatever may be the case as to other members of the Interstate Commerce Commission, they cannot hope to secure an unbiased hearing and a fair decision from him. It constitutes another strong argument for Congress adopting in the pending railroad legislation a rule of rate-making which will be just to the companies and which the Interstate Commerce Commission will be directed to apply.

Letters to the Editor

Good Logic

DUNKIRK, N. Y.

TO THE EDITOR:

It matters not how opposed one is to capital, or whether we call labor a commodity or by some divine appelation, in the final analysis it must be admitted that the interests of both are identical, and that both are necessary phenomena of our civilization. The sooner these fundamental truths are appreciated, the sooner will the march of progress be resumed and the sooner will the many clouds upon the social and political horizon be dispelled.

As railroad men our responsibility in this crisis is at least as great as that of any other group in the industrial world. It matters not whether one be an official, a mechanic, a brakeman, a section hand, or what not, it should be borne in mind that we are all part of one large family. We should face the responsibility as individuals, and stop "passing the buck."

What helps one is also a benefit to the other. We should therefore broaden our interests from the mere hours of labor and the maximum per hour we can get for it with the minimum effort. If the evils of this critical period are to be corrected there must be greater co-operation both in spirit as well as in deed. In other words, we must return to the spirit that won the war.

It takes one hand to wash the other, and moreover we can't leave one dirty and expect the other to remain clean. Railroad work of almost any character tends to make a man upright and square. It teaches men to give as well as to take. For that reason alone it is but natural that the railroad man should lead in the forward movement. His stand will decide the balance in either direction in this matter of greatest importance—the happiness of all.

CHARLES WEISS.

A Personnel Department for the Railways

HARLEYVILLE, Okla.

TO THE EDITOR:

The editorial in the *Railway Age* for December 19 on the above subject recalls some pregnant facts. The one greatest trouble with railroad supervision has been that many times the right man was not put into the right place. When an employe receives a letter from an officer with the language all butchered up, or is handed a telegram to send which he cannot read because the fellow could not write, it certainly weakens the employe's respect for his superior. There should be some plan formulated where all employes on a railroad would have something to look forward to. Let the general manager announce that he will soon be in need of a trainmaster, calling on all those desiring to qualify to make application to him; send out examination questions to be returned to him, with a thesis of a few hundred words. After the papers are graded let it be known who is the winner, and the lucky man will take a new lease on life, and so will all the others who have competed with him.

Just because a man has worked on the section all his life is no sign that he will make a foreman, neither is it a fact that, because a man has run an engine all his life, he will make a road foreman of engines or a trainmaster. The average man has difficulty in keeping calm when he is run around by others whom he knows to be no more competent than himself. I known how it goes myself, as I had to take a back seat several years ago because the general manager had a young son, just out of college; he wanted the boy to learn the railroad game, and so made him a superintendent. It is intelligence and ability to deliver the goods that in these days must be injected into the railroads; keep out the pets and the nephews.

J. L. COSS,
Despatcher, C. R. I. & P.

Train Rules and Their Enforcement

SPRINGFIELD, MASS.

TO THE EDITOR:

How is it that after all the years of work and consultation and discussion with which the standard code of train rules has been nursed and patched during the past 20 years we still have so much faulty stuff in it? This thought comes to mind on reading your editorial of December 5, discussing the new rule-book of the Virginian Railway, and the letter printed in the issue of December 12, page 1131, on good and bad whistling. Why should the Virginian Railroad Company, or any railroad company, be racking its brains in this 20th century, in the effort to "perfect" rules which, in the hands of competent men, would have been perfected 25 years ago? I refer, of course, as did you in most of your comments, to the form of the rule, not the substance. For changes in practice it is necessary, of course, to make changes in rules. Vestibule trap doors, and various air brake refinements and other things did not come into the trainman's experience twenty-five years ago, and rules which affect a man's duties in connection with new things, must be brought up to date. But in every new rule book that comes out we see innumerable points in which the language has been changed without improving the substance. Can the committees which handle these things give us any definite information as to whether or not we are getting anywhere?

When it comes to whistling it is the facts, not the words, which interest the seeker after light. By that letter we are reminded that there is no recognized and workable standard by which to weigh the relative importance of the rights of the public and the rights of the railroad in the matter of the noise nuisance. Every railroad seems to pursue an independent policy, and nearly every engineman does the same—or, rather, he has a policy which is mainly one of neglect.

The locomotive whistle is a real nuisance. Railroad officers recognize this as well as do the rest of us—if they happen to live near a large freight yard where enginemen do as they please. Nuisances require constant and rigid regulation. The right of the public is to the best practicable degree of quietness—and the public includes farmers as well as those in crowded towns. Probably for most of the time—the farmer—and also his family—is so busy that he does not give much attention to annoying noises; but if he is idle only one week in a year he deserves consideration during that week.

The railroad, of course, must have reasonable protection against the negligent wayfarer, and the perverse drivers who seem always to be trying to get hit by a train at a crossing. But there is no use in going to extremes. The railroad lawyer, worried by prejudiced juries, will tell his general manager to sound the whistle so loud and so long that even the stone-deaf shall have no excuse; but the innocent citizen demands, rightfully, that the superintendent shall adopt and enforce more reasonable measures.

After all, it is the old question of lazy discipline. The hardest characters to deal with are not the enginemen who make a very long blast because they believe it to be more suitable than one of reasonable length, but, rather, those whose mental operations are so unsystematic that they take

no thought at all. The indolent minded engineer takes as little thought as he thinks will be safe and not prevent his getting away with it.

On the Boston & Albany, where the single "long" blast was in use at crossings for a long time after the rule was changed on most roads, the superintendent had to call enginemen to account frequently for causing annoyance to residents; but after long tutelage the best of the runners complied with their instructions. They reduced the single blast habitually to about one second.

I have had occasion, recently, to notice the whistle of a factory which had been complained of as an illegal nuisance, because of its excessive noisiness. This whistle now sounds regularly in only one second—and it is satisfactorily effective, apparently. It is heard readily enough by all except the wilfully deaf. Superintendents who have required all whistling to be "cut short" as much as possible and who for the crossing signal have required each "long" blast to be made in less than one second have found entire satisfaction in doing so. It must be confessed, however, that such satisfaction is not very long-lived. The superintendent has the almost impossible task of getting half-hearted subordinates to second his efforts. The really business-like superintendent provides a buzzer in the examination room by which the examiner can give demonstrations. A "high-brow" railroad officer in this State did that, some years ago; and he really made the enginemen understand what he wanted of them. There is little doubt, however, that that superintendent has long since died of grief!

E. MOSEMAN.

Walschaert Valve Gear Used in This Country in the Seventies

TAUNTON, Mass.

TO THE EDITOR:

It may interest the readers of your paper to learn that the Walschaert valve gear, so common on our newer and more modern locomotives, was used many years ago by one of the locomotive builders of this city—William Mason.

Mr. Mason was a famous locomotive builder in his day and he used many ideas that were considered advanced, and they were. The first locomotive that he equipped with the Walschaert valve gear was named the "Wm. Mason" and Mr. Mason's 536th locomotive. It was of the Fairlie type with 16 in. x 24 in. cylinders, 42 in. drivers, and weighed 38 tons.

The Walschaert valve gear, as we well know, is a foreign idea. Where did Mr. Mason get it? From information I have received, I think I am justified in stating that the Lehigh Valley was the first to use this gear and that it had two locomotives thus equipped. One of them was named the "Wyalusing"; the name of the other I do not know, nor do I know to whom on the Lehigh Valley to give the credit for the introduction of this gear, but that road used it.

From 1856 to 1874 Mr. Mason built for the Lehigh Valley no less than 49 locomotives and I am certain that in one of his visits to that road he saw one of these locomotives with this valve gear, and because of certain trouble he was having with the cranks on his Fairlie and later his bogie locomotives, adopted it as the means of solving his problem. After 1874 Mr. Mason built probably one hundred locomotives, called bogies, equipped with this gear.

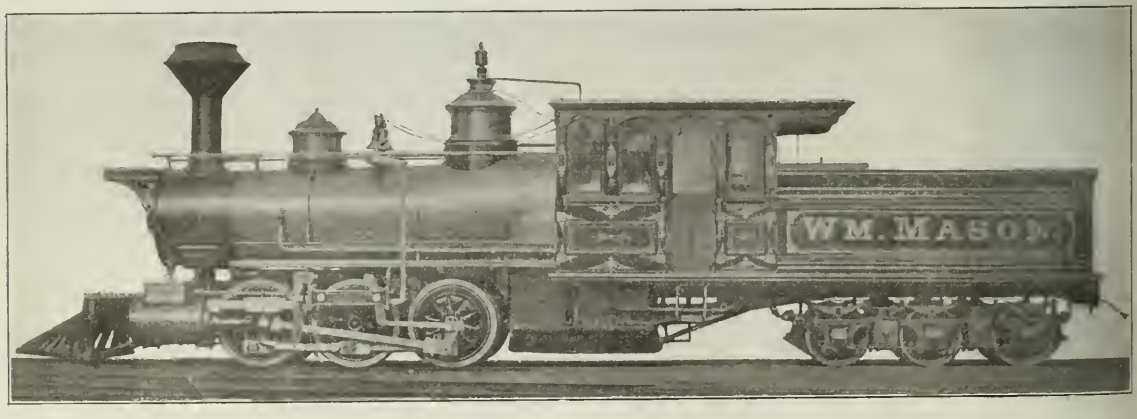
There may be some of the older men who will see this letter that attended the Centennial held in Philadelphia in 1876.

Do any of them remember that small narrow-gage bogie that ran on the tracks on the grounds? Mr. Mason had one of his bogies there and it was equipped with the Walschaert valve gear. The locomotive attracted considerable attention, but the wiser ones shook their heads. The gear was too complicated and they saw no need for adopting it—then.

Times and ideas change! The advantages of this gear have become apparent to all of us. Mr. Mason was simply 25 years ahead of his time, and the mechanical world was not ready to adopt this gear. I think, therefore, that the credit for introducing this gear on the American railways should go to Mr. Mason, for in view of what we know, while we can credit the Lehigh Valley with having two locomotives thus equipped, at a date prior to 1874, still the "Wm. Mason" on the Boston, Clinton & Fitchburg will rank in that same class, the first to be equipped with the Walschaert valve gear coming from the shop of Mr. Mason and the third locomotive to be equipped with this gear in this country.

CHAS. E. FISHER.

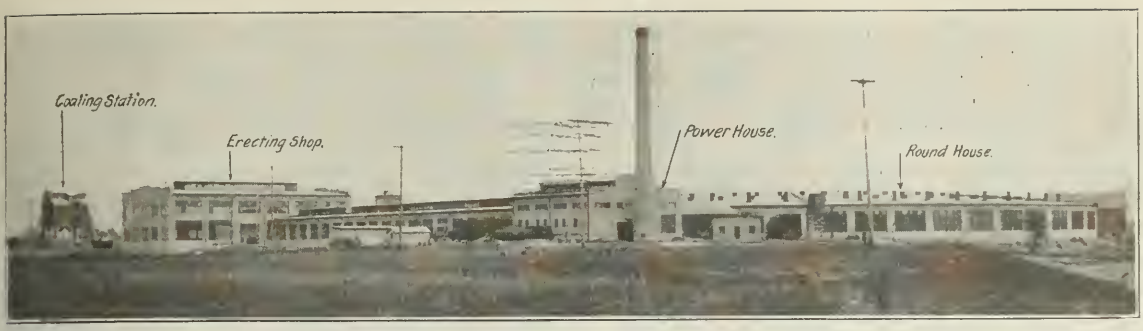
COLONEL J. H. ELLIOTT, formerly general manager of the Texas & Pacific, with office at Dallas, Tex., and vice-president of the



Walschaert Valve Gear Applied to Locomotive Built for New Bedford Railroad in 1874

built for New Bedford Railroad, which ran from Taunton to New Bedford, Mass. The Boston, Clinton & Fitchburg having acquired title to the New Bedford Railroad, the locomotive was ordered marked "B. C. & F. R. R." This locomotive was delivered to the road on September 5, 1874—

Weatherford, Mineral Wells & Northwestern, with the same headquarters, and recently in the service of the American Expeditionary Force in Germany, has returned to the United States and has been discharged from the army. It is expected that he will return to his former position.

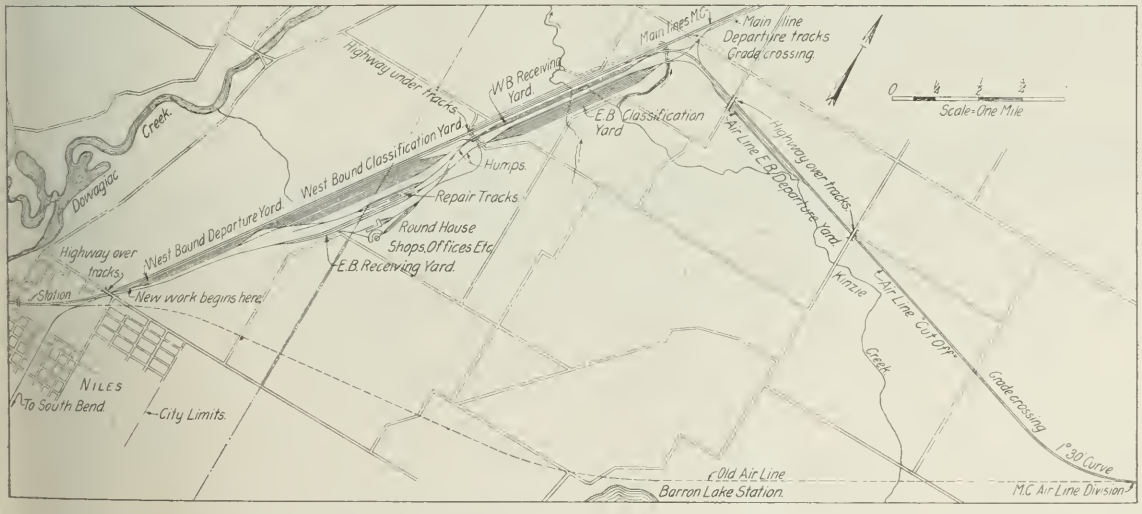


The Terminal Buildings

Michigan Central Builds Large Classification Yard

The Niles, Mich., Project Involves a Change in Divisional Points and an Expenditure of Over $4,000,000

ONE OF THE RELATIVELY FEW large classification yards which has been built by the railroads while under government control is that at Niles, Mich., now under construction by the Michigan Central, to facilitate the operation of freight trains between Jackson, Mich., and Chicago, Ill. This undertaking, involving the handling of over 2,000,000 cu. yd. of dirt and the laying of approximately 75 miles of track, will, when completed, cost over $4,000,000. It will replace the Michigan City, Ind., terminal, which is



Location Plan of Terminal Yards, Buildings and Air Line Cut Off

minals at Jackson, Mich., Michigan City, Ind. ,and Kensington (Chicago), Ill. The length of the old middle division (Jackson to Michigan City) was 153 miles via the main line and 141 miles via the Air line, a branch which left the main line at Jackson and connected with it again just east of Niles. The Western division (Michigan City to Kensington) was only 43 miles long. The length of the Middle division made it difficult to move trains between these points in the 16-hour limit. With the terminal located at Niles, to be abandoned except for such facilities as are needed in local work, and will also serve both the Air Line and South Bend branches. When finished, the project will include large east and westbound receiving, classification and departure yards, a car repair yard, a 30-stall engine house, a locomotive shop, office buildings, etc., oil houses, a 600-ton coaling station, a $50,000 hotel and a double track cut-off, having four departure tracks, to connect with the Air line.

The main line of the Michigan Central from Detroit, Mich., to Chicago was operated with freight engine terminals at Jackson, Mich., Michigan City, Ind. ,and Kensington (Chicago), Ill. The length of the old middle division (Jackson to Michigan City) was 153 miles via the main line and 141 miles via the Air line, a branch which left the main line at Jackson and connected with it again just east of Niles. The Western division (Michigan City to Kensington) was only 43 miles long. The length of the Middle division made it difficult to move trains between these points in the 16-hour limit. With the terminal located at Niles, the engine districts are more evenly divided, the middle division now being 116 miles via the main line and 104 miles via the Air Line while the Western division is lengthened to 80 miles. In addition, there is the further advantage that freight passing over the South Bend branch, which connects the main line at Niles, moves directly through the terminal without any intermediate movement over a part of the main line.

The yards extend from the east city limits, parallel with the main line for a distance of about four miles and required the purchase of 1,100 acres of cultivated land at a

cost of approximately $150,000. This land was somewhat rolling in character, and both excavation and embankment were necessary to bring it to the required grades; three grading camps were installed to do this work, each being supplied with a complete complement of steam shovels, dump cars and teams, etc. The work on the west end of the terminal was comparatively light being chiefly cuts and fills of an average depth of four feet, which were easily handled with a ¾ cu. yd. Erie shovel and teams. The section in the vicinity of the humps called for a heavy fill which was made from a trestle 3,500 ft. long, that was widened as the work progressed until over 1,000 ft. of it was wide enough for 28 tracks. This necessitated the moving of about 340,000 cu. yd. of material. The eastern end

The $50,000 Hotel and Master Mechanics' Offices (at Left)

of the terminal is on somewhat lower ground and will, when completed, require a fill of over 600,000 cu. yd. of dirt to bring it to the final grade.

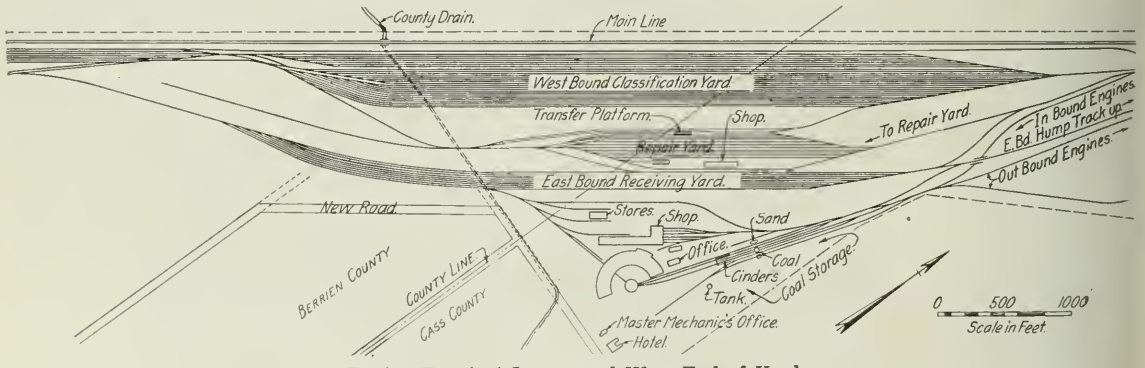
In order to facilitate the moving of trains over the Air Line division it was decided to build a double track cut-off having a four-track departure yard which connects with the east end of the receiving and classification yards, in this way eliminating the necessity for the crossing of the current of traffic on the main line by trains over this division. This cut-off also avoided an ascending grade of 0.76 per cent, between Niles and Barron lake on the old line, which was double the maximum on the remainder of the line. One end of the part of the old line will be kept in service to provide an outlet for a large amount of ice

In the building of the terminal it was found advisable to divert several highways and to straighten, bridge or divert numerous creeks and drain ditches. In connection with the highway diversions all grade crossings are being eliminated through the terminal, with the exception of a highway which crosses the eastern end of the yard where there are but two tracks. The final accomplishment of this plan will make necessary the building of several new highways, three subways and two overhead crossings, one of which spans the six-track Air Line cut. The installation of one of the

Enginehouse Interior Showing Arrangement and Type of Wheel Pits Used

subways will require the raising of the main line 14 ft. above its present at a point near the center of the terminal, and the moving of about 125,000 cu. yd. of material.

One large creek, known as Kinzie creek, which wound its way across the terminal near its widest point, was diverted and made to pass under the east end of the yard where there were only three tracks. This diversion required the excavation of about 100,000 cu. yd. of earth and the



Engine Terminal Layout and West End of Yards

which this lake furnishes each year. This construction of the cut-off called for a trestle fill over marshy ground and a long deep cut, six tracks wide, and furnished a considerable amount of the dirt for filling in the terminal. The land adjoining the cut is of a sandy nature, streaked in spots with a fair grade of ballast material and as it is owned by the railroad, the cut is being widened to furnish such additional ballast or filing as may be needed now or in the future. Double track will be laid this season only as far as the junction of the new line with the old, but it is expected that the entire Air Line division will be double tracked through to Jackson within the next few years.

building of two additional highway and three small railway bridges, but effected a saving of approximately $100,000 in the estimated cost of bridging the creek where it originally lay. The extension of the old bed where it is dammed by one of the new highways forms the source of supply for water used in the yard. Smaller creeks and drain ditches were straightened or enlarged or both and conducted under the tracks through 72 in. reinforced concrete pipes laid in 5 ft. sections which were built by the C. F. Massey Company, Chicago, according to a design by the engineering department of the Michigan Central.

Freight trains from the west division leave the main line

at the city limits and enter the eastbound receiving yard, which consist of eight tracks laid on 13 ft. centers and 4,200 ft. long in the clear. From the receiving yard are cars are pushed over the hump into the eastbound classification yard, which has 24 tracks with a minimum length of 4,000 ft. in the clear laid on alternate 13 and 15 ft. centers. Eastbound trains are made up on two 4,200 ft. departure yard tracks which begin just east of the Air Line cut-off, and parallel the main line. The westbound arrangement is similar, having a receiving yard of the same number and length

North Branch of Kinzie Creek Division

of tracks and a slightly larger classification yard (28 tracks) of an equal minimum length of 4,000 ft. in the clear and also laid on alternate 13 and 15 ft. centers. The westbound departure yard consists of four tracks paralleling the main line and ending at the east city limits, which also have a minimum length of 4,200 ft. When completed, the car repair yard will have eight repair tracks, 1,400 to 1,900 ft. in the clear, laid on alternate 20 and 22 ft. centers, four transfer and "cripple" tracks, two depressed wheel tracks, an unloading and transfer platform, and a large independent car repair shop.

The tracks of the receiving and classification yard are connected by ladders at each end laid on an agnle of 9 deg. 26 min., with the center line of the yards; No. 9 frogs, being used throughout the terminal. Switching will be done over two humps which follow closely the A. R. E. A. standard profile, with grades 0.5 per cent ascending to the ladders, increasing to 1 per cent through the ladders of the receiving yard, then to 1.67 per cent leading to the crest of the hump. Beyond the summit a short 2 per cent run-off changes to 1 per cent descending through the ladders of the classification yard, reducing to 0.5 per cent for two-thirds the length of the yards and from there level to the end of the yard.

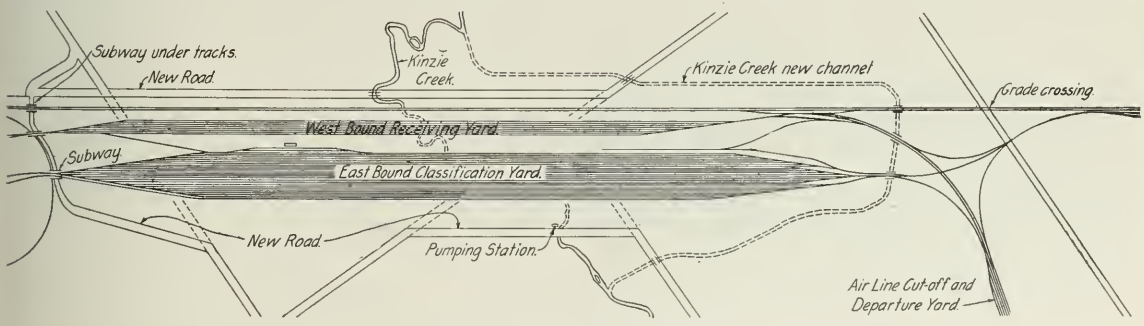
The enginehouse layout has six tracks, two inbound, one outbound, one cinder pit track, a coal receiving track, and a coal unloading track which passes over the receiving hopper of a 600-ton Link-Belt coaling station, having four discharge chutes, only three of which are used, the fourth being over the coal receiving track. The two inbound tracks and the cinder pit track pass under the coaling station. The inbound tracks also pass over 125-ft. concrete cinder pit, where the cinders are dumped, wet down and shoveled into cars standing on the lower center track. Water is delivered to engines through three standpipes from a 100,000-gal. steel tank, which is kept filled by a pumping station located on Kinzie creek and delivering water at the

Six Track Overhead Crossing on the Air Line Cut-Off

rate of 1,200 gal. per min. through approximately 9,000 ft. of 12-in. main.

In accordance with the plan of the rest of the yard, the movement of the engines in and out of the yards and through these tracks has been carefully worked out to follow the one-way feature. Inbound Middle division engines will leave their trains in the westbound receiving yard and pass over the hump to an inbound engine track leading through a subway under the eastbound track to the roundhouse; inbound Western division engines leave the trains at the receiving yard, run about 300 ft. east and then switch back on the second inbound track to the enginehouse. All outbound engines leave the roundhouse by the single outbound engine track, the Middle division engines passing directly out and over the eastbound hump to a thoroughfare leading to the extreme west end of the departure yard, while Western division engines make a 10-deg. loop under all tracks in the vicinity of the hump through two subways and then move west over a thoroughfare track between the main line and the classification yard. An interesting feature at this point is the carrying of this engine track and one of the road diversions through the same subway, the highway conforming to the curve of the track until it clears the second structure.

A modern 30-stall enginehouse located opposite the center of the westbound classification yard has been so designed that further additions may be made as desired. The build-



Eastern End of Niles Terminal

ing is of the shed roof type with reinforced concrete foundations resting directly on the ground, the outside walls and the two firewalls, which are spaced every 10 stalls, being of brick.

The roof is a wooden structure covered with Barrett Specification roofing and supported by four concrete posts between each pair of stalls carrying large concrete girders running both radially and circumferentially. The space over the doors, the end and the entire back wall with the exception of stall No. 11, which has a large door opening on an emergency outbound track is mainly of steel sash windows with mechanically-operated sections for ventilation, while 36-in. Dickinson all-steel smoke jacks are installed to provide outlet for the engine exhaust.

The stalls are 109 ft. 9 in. deep, 15 ft. wide at the door and 25 ft. 7 in. at the back. The pits are 94 ft. long and 3 ft. 8 in. wide for a depth of 10 in., then widening to 4 ft. and forming recesses for the protection of the roundhouse heating system which consists of four 2-in steam pipes fastened by brackets to the walls on each side of the pits. With a depth of 3 ft. 6 in. at the rear end, drainage is obtained by a fall of one inch in 10 ft. toward a tunnel 3 ft. by 3 ft. 8 in. in cross-section located at the door end, which also carries the steam mains for heating the roundhouse. Ample foundation for jacking is provided by heavy reinforced concrete pit walls measuring 2 ft. 6 in. thick, 4 ft. 5 in. in depth and covered with 3-in. oak planking, the rest of the enginehouse flooring consisting of five inches of concrete.

The rear walls of stall 20 to 24 inclusive are offset 12 ft. 3 in. to allow the installations of two air-operated hoists which are set below the level of the floor and serve as turntables in the handling of trucks and drivers between the wheel pits and the shops. The removable sections of rails over the pits are carried as a part of a heavy four-wheel truck running on a wide gauge track set at 90 deg. with the enginehouse tracks.

The turntable is 100 ft. in diameter, the outer edge of the

Engine Terminal Layout, Showing 125 ft. Cinder Pit in the Foreground

turntable pit being 95 ft. from the doors of the roundhouse. It is supported on a conical roller center and driven by a 22-hp. heavy duty electric tractor furnished by the George P. Nichols & Bros., Chicago, the power being supplied through a current collector located in the base.

On the far side of the roundhouse there is located the boiler washout equipment, a fuel oil house, an office building, an oil house and the main shop. All of these structures are of reinforced concrete and brick with the exception of the washout system which is built of wood. The oil house is of modern fireproof construction with a tile roof laid on concrete slabs, and has three rooms, the first of which is completely equipped with Bowser oil pumps, the other two being for the storage of waste and the housing of an oil reclaiming system; the storage tanks for both the new and reclaimed oil are in the basement.

The main shop building is L-shaped, 486 ft. long and 60 ft. wide with a 140-ft. wing 102 ft. deep which has six tracks leading into it. It has a monitor type roof with the center bay raised 6 ft. to afford better light and ventilation, the wing or erecting shop having an additional space due to the higher walls made necessary by the installation of a 30-ton traveling crane. All machinery incidental to the operation of this shop is driven by electric motors, power being furnished at 4,000 volts, with transformers installed at the shop and pumping station reducing it to 440 volts for motor use and 220 volts for lighting purposes.

The rest of the building is given over to forge rooms,

A View of the 30 Stall Roundhouse and 100 ft. Turntable

tool rooms, wheel shops, air compressors, lavatories, toilets, etc., with the boiler room at the far end where three 150-hp Wicks boilers are now installed with space for two additional when necessary. For the present coal is unloaded by hand from cars into bunkers extending along the rear wall of the boiler room and having a total capacity of six cars; although the final installation will include a complete coal unloading system, the boilers, however, remaining hand fired. The ashes are removed by raking them over a 6-in. inlet to a steam slusher pipe, which is operated by the suction generated through the introduction of the full capacity of a 2-in. steam pipe under 130 lb. pressure.

In addition to these buildings, a large three-story train despatcher's office is being built between the crests of the two humps, while an old farm house near the roundhouse is being remodelled for the master mechanic's offices. Adjoining the latter a large hotel for train crews is practically completed at a cost of $50,000. This is a two-story firepoof building with basement, 68 ft. across the front and 88 ft. deep.

The transfer of the terminal to Niles, Mich., will necessitate the moving to that town of about 535 men from the Michigan City shops and yards, about 80 per cent of whom are married, thus creating a demand for approximately 400 houses. The town itself, with a population of 8,000, was already short nearly 75 dwellings for its own needs. As a result real-estate activity has been aided and encouraged as far as possible by the Michigan Central through their representative, H. S. Evans, special engineer, who is located at Niles. Largely through the efforts of the road about 180 houses have either been completed or are in the last stages of construction. A large part of the money needed for this work was advanced by Dodge Brothers, Detroit, Mich., in one loan of $500,000 which was handled by a local building and loan society, which made loans at 5 per cent up to two-thirds of the value of the property and not to exceed $3,000. The new addition, known as East Lake Terrace, lies just inside the northeast corner of the city limits and is now being connected with the company shops and hotel by a 18-ft. concrete road. With the town still short nearly 300 houses, the railroad will, for the present, be forced to transport the majority of its employees from Michigan City to Niles and back daily, a distance of 37 miles each way.

For financial reasons only a part of the terminal is being finished for operation this year. This will include all of the buildings, the coaling station, etc., the car repair tracks,

the westbound receiving and classification yards, and the double track Air Line cut-off. It is expected that the remainder of the project which consists of the east and westbound departure yards, the eastbound receiving and classification yards and four departure tracks on the Air Line cut-off will be completed in 1920. At the present time the westbound classification yard is being used for freight in both directions and is being operated in connection with the westbound receiving yard. Switching is being done over a temporary and modified hump with two tracks laid at different levels and on different grades, the upper track being used for switching from the receiving to the classification yard, and the lower for a thoroughfare for engines and eastbound trains made up in the classification yard.

The terminal was planned by and constructed under the direction of the engineering department of the Michigan Central; George H. Webb, chief engineer, and J. F. Deimling, assistant chief engineer, with W. D. Elder, engineer and E. P. Phelps, special engineer, in the field. The grading and concrete bridge work was done by the Dominion Construction Company, Toronto, Can., while the building contracts were let to Joseph E. Nelson & Sons, Chicago, and they were erected under the supervision of H. A. Horning, superintendent of buildings.

Conference Committee Still Far From Agreement on Railroad Bill

WASHINGTON, D. C.

THE CONFEREES who have been at work since December 22 trying to evolve satisfactory railroad legislation out of the conflicting provisions of the Esch and Cummins bills, during the early part of the week were still as far apart as ever on the controversial features of the Cummins bill which are not in the Esch bill, including the rule of rate-making and the limitation of earnings in Section 6, the plan of compulsory consolidation into 20 to 35 systems, the transportation board and federal incorporation. The Senate members of the conference committee have been insisting on these provisions as essential to legislation to safeguard the return of the railroads while the House conferees have been equally insistent against them.

The labor provisions were not discussed last week but have been taken up this week and Senator Cummins said that the conferees would not yield on the anti-strike section and that it would be necessary to take a vote of the respective houses on it. It is reported that some of the Senate members accused the House conferees of endangering, by their attitude, the passage of legislation by March 1, but that the House members declined to accept the responsibility. It is also said that there was almost as much objection to the principles of the Senate bill which propose to remake the railroad structure on a theory of standardizing the conditions of the various railroad systems, as to the rate-making rule, although the two are designed to work together.

After the Senate conferees had exhausted their arguments without making much of an impression the House conferees were asked to get together among themselves in a hope that a respite from the controversial atmosphere of the conference room might offer some new angle of approach to a harmonious conclusion and only two-hour sessions of the conference were held on Thursday and Friday and none on Saturday although the meetings were resumed on Monday.

A possible compromise is said to have been suggested by Representative Esch in the form of the general rate-making instruction to the Interstate Commerce Commission including no definite percentage or guarantee and no limitation of earnings, which was proposed by the House committee and rejected by the House. It has been expected that it would be necessary for the conferees to ask instructions from their respective houses before any agreement is reached, but the parliamentary situation is such that it is very difficult to do so. The Senate bill is technically an amendment to the House bill, and while the conferees could report an agreement to accept the Senate amendment with amendments, they have not yet discovered any other way to report except a disagreement as to the bill as a whole.

While some alternatives to detailed provisions of Section 6 have been discussed, most of the argument has been devoted to the principle of a minimum guarantee to the railroads in a rate group and a division of excess earnings and this has resulted so far in a practical deadlock, although members of the conference committee have said that the situation is by no means hopeless.

Senator Cummins told newspaper men Monday night that he felt strongly that there would be no use in turning back the railroads without at least giving them a probability of successful operation and that under the Esch bill they could not borrow funds for improvements. He said he would never vote for a minimum percentage unless accompanied by a limitation of excess earnings. The Senator also said that while there was some dispute about it, he was of the opinion that the President would not rescind his proclamation relinquishing the roads as of March 1, but that Congress could order him to keep the roads in the absence of satisfactory remedial legislation. However, he said, Congress would not do so. The conferees do not consider it absolutely necessary to have legislation by March 1, although of course they regard it as highly desirable and hope to be able to finish their work by that time.

There are some among those who are following the subject closely who believe or fear that the differences of opinion may be adhered to so stubbornly as to endanger the entire bill but the plan adopted by the conferees is such that a failure to agree on the distinctive features of the Cummins bill would still leave substantially the Esch bill. While the Esch bill has been severely criticised for what it does not contain, and because it does practically nothing to restore the credit of the railroads, it does contain several important provisions and many changes in the interstate commerce law which probably would be regarded as constituting important improvements to the system of regulation were it not for the fact that the all-important question of the adequacy of rates is left absolutely in the discretion of the Interstate Commerce Commission.

It is understood that the proposal that attention first be given to ironing out the differences in detail in the part of the bills designed to effect a similar purpose originated with the House conferees, who naturally believe in the Esch bill and are opposed to what they call the radical innovations of the Cummins bill.

Among the provisions of the bills which were similar in intent, but which required modification and which have now been agreed upon in principle, if not as to the exact language, are those for the $300,000,000 revolving fund from which to make loans to the carriers, a six months' extension of the guaranteed standard return, a continuation of existing rates until changed by competent authority, a 10-year funding of the indebtedness of the railroads to the government, power in the Interstate Commerce Commission after joint hearings and co-operation with state commissions to set aside a discriminatory state rate, power in the commission to fix minimum rates, and a measure of relief to the short line railroads that were not taken over and relinquished by the Railroad Administration.

The $300,000,000 loan fund was agreed upon as a compromise between the $500,000,000 fund proposed in the Senate bill and a $250,000,000 fund proposed in the Esch bill. The conferees have agreed to omit from the bill the amend-

ment to the Senate bill offered by Senator Smith to continue the requirement of approval by the Interstate Commerce Commission before a tariff containing an increased rate can be filed. The former amendment to the law to this effect expired by its terms on January 1.

In reaching an agreement on the provisions relating to joint action by the Interstate Commerce Commission and state authorities in cases involving a conflict of jurisdiction, in which the Interstate Commerce Commission was given final authority in both bills, the conferees acceded to the requests of the state commissioners by eliminating the provision authorizing the federal body to set aside a state rate because of "any undue burden upon interstate commerce." It was argued that this would make it possible to deprive the states of any authority over intrastate rates. The conferees also agreed to adopt the Senate provision which would permit railroads to complain to the Interstate Commerce Commission of state rates. The conferees have accepted the provision in the Esch bill authorizing the Interstate Commerce Commission to require a carrier to instal automatic train stop or train control devices upon the whole or any part of its road on at least a year's notice.

Questions as to how the Interstate Commerce Commission shall ascertain the value of railway property for the purpose of establishing rates which will produce a definite percentage of return upon the value within a rate making group, as well as other questions relating to Section 6, were discussed by the conferees with members of the legislative committee of the Interstate Commerce Commission, Commissioners E. E. Clark, H. C. Hall and C. C. McChord, on January 16. They were also accompanied by C. F. Staples, valuation analyst in the commission's Bureau of Valuation. It is understood that questions have been raised among the conferees as to the practicability of making rates in this way and as to how the value of the property in a group would be determined during the years which will elapse before the completion of the valuation now being made by the commission and that the commissioners were called in to discuss these points, as well as the general subject of the financial needs of the railroads.

On Tuesday the conferees again met the legislative committee of the Interstate Commerce Commission and the day was devoted to a discussion of several technical features relating to the administration of the act to regulate commerce, but not to Section 6.

The conferees have been suffering from no lack of expert advice. Voluminous memoranda of arguments for and against various sections of the bills, with reasons why this should be left out or that put in have been filed with them by organizations interested in the legislation, while other members of Congress are being besieged individually by the various "lobbies"—to use an old-fashioned term which is no longer strictly applicable to the present day methods of influencing legislation, but for which no satisfactory substitute has been evolved. If the word may still be used, there have been at least ten different varieties of lobbies working on the conferees and other members of Congress in connection with the railroad bill, to say nothing of the sub-varieties that represent differences of opinion within the various groups. These include the railroad lawyers, which also have an insurgent faction, the labor leaders and their legislative agents, the state commissioners, the Interstate Commerce Commissioners, the representatives of the Warfield association, the railroad committee of the Chamber of Commerce of the United States, the radical wing of the organized shippers led by Clifford Thorne, the more conservative shippers represented by the National Industrial Traffic League, the waterway enthusiasts, various kinds of farmers' organizations and many individuals or other organizations. The short line railroads also have their special interest in features of the bills.

Railway executives and counsel who disagree with the action of the executives' association in opposing the rate-making sections of the Cummins bill have been busy discussing the question with members of Congress and in trying to line up others of similar view who would prefer to accept the present provisions of the bill with or without modifications, to running the risk of having no legislation at all to guide the Interstate Commerce Commission in fixing rates. Daniel Willard, president of the Baltimore & Ohio, has been the most active of this group.

The labor lobby is exceedingly busy, both in opposing the Cummins and Esch bills and in advocating the retention of federal control and many of the labor representatives have professed supreme confidence both in the defeat of the anti-strike section and in causing such a disagreement on the entire question of railroad legislation that it will be necessary for the government to retain the railroads. While they are inclined to refer to the President's proclamation as a statement of the President's intentions rather than as an official act formally relinquishing the railroads as of a future day, they profess to be counting on Congress to order an extension of federal control.

The memoranda filed with the conferees by the railway executives, the National Association of Owners of Railroad Securities, the National Shippers' Conference, a group of manufacturers' associations and others have been noted separately in this and previous issues of the *Railway Age*. The National Association of Railway & Utilities Commissioners also filed a long memorandum objecting to the many provisions of the two bills curtailing the authority of the states, to the percentage rule of rate-making in the Senate bill, and to the transportation board.

In a memorandum filed with the conferees by the National Transportation Conference a modification of Section 6 of the Senate bill is suggested to make it provide for a net return of not less than 5½ per cent instead of "as nearly as may be" to that amount, and that the railroads may retain one-half instead of only one-third of net income above six per cent. A similar suggestion was made in the memorandum filed by counsel for the National Association of Owners of Railroad Securities.

C. A. Prouty, director of the Bureau of Valuation of the Interstate Commerce Commission, has written a letter to a Representative on the conference committee, strongly supporting the rate-making rule of Section 6 of the Cummins bill on the ground that the limitation of excess earnings is necessary to insure a rate level for the average road that will be sufficient to sustain railroad credit and prevent a failure of private operation that would result in ultimate government ownership.

A delegation of representatives of farmers and labor organizations from Iowa called on Senator Cummins on January 16 to oppose the return of the railroads. They were headed by Col. S. W. Brookhart, who gave out a statement charging that the unfavorable results of government operation were brought about by railroad officers who desired to discredit government operation.

The War Risk Insurance Act, as was announced, is much more liberal than before. Wartime insurance, or United States Government life (converted) insurance policies may be made payable to a greatly increased number of beneficiaries. The benefits include payment in one sum at death, or in installments, at the option of the insured; a greatly increased rate of compensation for disability; a provision for double total permanent disability to be compensated for at the rate of $200 a month; and a provision for compensating payments, where the disability is rated as partial and temporary, or partial and permanent, on a percentage basis commensurate with the reduced earning capacity of the insured.

Preparation of Locomotives at Terminals and Shops*

Fuel Economy Requires Thorough Work in the Back Shop and "Stitch in Time" Policy in Roundhouse

By Leslie R. Pyle,
Supervisor Fuel Conservation, Central Western Region, Chicago

Locomotive maintenance is one of the vital features of railroad operation. During the past two years, locomotives all over the United States have been turned through terminals so rapidly that a great many times needed repairs have been dispensed with. So far as one can see, there is no indication of a decrease in business; therefore, now is the time to take a definite stand for a better standard of locomotive maintenance.

The writer would urge for consideration and adoption, the standardization of the best practices for each piece of work to be done. Aimless effort, however diligent, will not produce the results that are possible through a well-defined plan and a standard by which to gage every effort. These standards should be blue printed, each print containing written instructions describing in detail how each job should be handled. This will insure every shop or drop-pit doing the work in the same manner. When a better practice is developed, the print should be changed to cover the improvement. If this is followed conscientiously, every shop will be doing the work in what is known to be the best way. Improved methods and practical short cuts are always acceptable and suggestions offered by anyone in any position should have thoughtful consideration. We should encourage men in subordinate capacities to give us their ideas and such ideas, when found to be practicable, should be adopted and the employee given the credit for the improvement.

Although it is realized that enginemen can and do waste fuel with locomotives in first-class condition, it is obvious that the engineer will have no control over the fuel waste due to cylinders out of round, valve gear out of square, etc. When we consider that from 85 to 90 per cent of the total railroad fuel is consumed on the locomotive there can be no doubt about the need for careful, painstaking preparation of the locomotive, first in the shop and then in the enginehouse.

Shop Maintenance

Naturally the shop is where the foundation is laid for the preparation of the locomotive which will result in fuel conservation. Usually when the locomotive enters the shop it is accompanied by a work report showing what work is considered to be necessary. Too often when a locomotive is received in the shop a council is held to determine just how little work can be done. This often results in work being neglected which should have been done in the shop, where facilities tend to reduce the cost of every operation.

At present but four to six per cent of the total heat developed is applied to the draw-bar in the form of useful work. Anything which tends to lower the efficiency of the locomotive is taken from the four to six per cent at the draw-bar and not from the 96 per cent total heat liberated in the firebox. This is why we lay such stress on the locomotive being thoroughly overhauled in the shop.

Bearing in mind that the power developed by the locomotive is produced in the firebox through the liberation of heat generated by the fuel when it is burned, we should consider the condition of the firebox and boiler when the locomotive is sent from the shop.

The firebox should be free from all steam leaks. Flues should be well set in the sheet, so that there will be no trouble from their leaking while the engine is in service. This also applies to welded flues.

Boiler sheets and tubes should be absolutely clean and free from scale. There should be enough well-located wash-out plugs to enable boilerwashers to keep the sheets and tubes clean through the use of properly designed wash-out nozzles.

Grates and grate bars should be in good repair with well-designed shaker levers, which will make the shaking of grates under service conditions a practical operation. A locking device should be provided to hold the grates level under the fuel bed, thus preventing holes in the fire and burnt-off grate fingers.

Arch tubes should be applied to locomotives not already equipped. It should be known that the ends of the tubes are beaded or belled sufficiently to provide against any possibility of the tube pulling through the sheet. These tubes should be thoroughly cleaned if dirty when reaching the shop.

The front end draft appliances should be installed according to a definite standard which has been arrived at as the result of road tests. These tests should have developed the practical setting for the petticoat pipe, if used, the draft plate and the size of the nozzle tip, to insure a free steaming locomotive burning the average quality of fuel used. Blue prints should be furnished all shops and roundhouses, showing the standard front end setting and size of nozzle tip for each class of locomotive. Front end appliances should be set according to this print when engines are turned out of the shop.

The petticoat pipe should be well supported on hangers which hold it in a direct line with the smokestack to insure the exhaust jet passing through the center of the stack. The joints between the base of the nozzle stand and cylinder saddle and between the nozzle tip and the top of the stand should be perfectly tight. Steam leaks at these joints materially affect the steaming qualities of a locomotive. Steam pipe joints should be thoroughly ground in, insuring no leaks here.

The superheater should be applied according to blueprints furnished either by the superheater company or by the railroad company. If these prints are followed no other directions should be necessary.

If the stack or cylinders are changed while the locomotive is in the shop the whole machine should be leveled up and the center of the nozzle tip plumbed with the center of the stack to insure the exhaust jet passing through the center of the stack. This should be emphasized, because it is a common thing to find the exhaust jet out of line with the center of the stack.

Before the locomotive leaves the shop a hydrostatic test should be applied, making a final inspection of all joints in the smoke box, a cap being placed over the nozzle tip when making the test. This may appear to be useless work, but it has been a common occurrence to find engines just out of the shop with steam leaks in the front end.

With draft appliances well arranged to provide draft

*Abstract of a paper read before the Western Railway Club, Chicago, on January 12.

through the boiler and the firebox, it becomes necessary to go below the mud ring to insure an adequate opening in the ash pan which will admit sufficient air to burn the maximum amount of fuel consumed under any working conditions. This should be an opening which will not clog up with cinders or with snow and ice in cold weather. An opening which is covered with netting is not satisfactory, as it is too easily stopped up. There are a great many locomotives in service today lacking sufficient area of opening through the pan to admit air enough for complete combustion under normal conditions. Knowing this, it is earnestly recommended that all locomotives be provided with the necessary amount of opening through the pan. This may involve radical changes in pan construction, but the results obtained from such changes justify the expense.

With the power plant in condition to furnish the heat necessary to convert water into steam, we must proceed to the devices which use the steam. Steam is used primarily to haul the train, and for this reason we will consider the valve gear first. Circular No. 19, sent out by the Fuel Conservation Section, illustrates in a striking way the loss of fuel due to defective steam distribution. This circular brings out the fact that from 9.4 to 18.4 per cent of the steam was wasted, due to distorted valve gear.

While the engine is in the shop all pins and bushings in the valve gear should be renewed if they are worn at all. There should be a definite standard of valve setting for each class of locomotive. Valves should be set according to this standard before leaving the shop. If this is done carefully and all lost motion removed from the valve gear through the elimination of worn parts, we have made a good start towards the economical use of steam.

In the shop, if the wear in the cylinders is 1/16-in. or greater, they should be re-bored. Packing rings should be supplied, which have been turned to compensate for the material taken out of the cylinders. If the valve bushing is worn 1/32-in. near the bridges it should be re-bored and the necessary rings supplied.

A good plan to insure packing rings of the proper size is to have a definite standard of boring practice, a specified amount being taken out of the bushing each time it is bored and the cylinder packing rings turned and marked to correspond with the mark on the bored bushing. If this plan is followed, packing rings can be kept in stock to compensate for the bored bushing.

After taking care of the valves and cylinders we should give the engineer every assistance in using the right cut-off while running the engine by putting the reverse lever and reach-rod up in such a manner that they can easily be handled. We can all recall locomotives which have been sent out of the shop with the reverse lever and reach-rod in such a condition that it required both the engineer and the fireman to handle the lever. This does not lead to co-operation from the man who has to operate the locomotive.

The power reverse gear should be overhauled at the same time the engine is. Reverse gears of this type should be as good as new when leaving the shop. There has been a great fuel waste through power reverse gears creeping, and it has been found due to leaks in the operating mechanism, worn parts, allowing lost motion to develop, or through poor or worn packing.

Air compressors should be in good repair when placed upon the locomotive in the shop. All piping connected with brake equipment on the locomotive should be put in such a manner that there are no air leaks. It has been found by tests that leakage as high as 15 pounds per minute existed on the engine alone.

Steam used by auxiliary equipment amounts to six per cent of the total heat developed. This is why we stress the maintenance of such equipment as mechanical firedoors, bell ringers, headlight dynamos, steam grate shakers, cylinder cock operators, etc. All auxiliary equipment should be overhauled and tested in the shop to insure the maximum of good service.

Devices or valves which have to be operated by engineers and firemen should be, wherever possible, within easy reach of them to insure efficient operation of the device. When men have to go out of their way to reach valves the full value of the devices is not always obtained.

Hot boxes waste more fuel than people generally realize. If a locomotive is delayed 30 minutes with a hot bearing on a busy piece of track this delay is not confined to the one train and engine, but is passed on to numerous trains behind, the loss being cumulative. Special attention should be paid to the fitting of brasses and weight distribution on the axles to prevent hot boxes on locomotives.

Radiation losses on a locomotive amount to approximately five per cent of the total fuel consumed. A large portion of this loss may be prevented by thorough insulation. It is recommended that all steam pipes to air pumps, injectors, etc., be insulated with asbestos from ¼ in. to ½ in. thick, depending upon the amount of room around the pipe; then covered with asbestos canvas, which in turn is covered with retort cement, thus making a weather and heat proof job. This applies to steam piping in the cab.

There is about 50 sq. ft. of uninsulated surface around the water legs of nearly all locomotives, which could be insulated with very little trouble to assist in preventing some of the five per cent loss in radiation.

Stoker equipment should receive thorough attention while in the shop. One particular part of the stoker equipment which has caused considerable waste of fuel is the conveyor trough underneath the deck. When the conveyor is working, coal is pushed over the top of this trough and thrown on the ground. Inspection develops that this condition still exists, and it should be eliminated.

An apparently simple matter, but one which is wasting fuel, is the condition of the deck around the grate levers. It is common to find large holes around these levers through which coal is constantly lost while the engine is in service. In the first place, such holes should not be cut in the deck, but if they do exist they should be covered with strips of metal.

Where the air pump exhaust is tapped into the smoke arch and goes out through the smoke stack, this connection should be changed to the exhaust passage in the saddle. There are two reasons for this; one is that the exhaust passing through the front end creates a draft on the fire which cannot be controlled by the enginemen and wastes considerable fuel; the other is that as the air pump is usually working more or less, the exhaust from the pump will assist in relieving a vacuum in the exhaust passage when the throttle is closed and the train moving, which in turn reduces the amount of soot and gases drawn from the front end into the cylinders.

It will be impossible to touch on the general overhauling of the locomotive, but the parts and devices mentioned have been dwelt upon because they have a direct influence on fuel consumption. It is true that they can be neglected and the engine will get over the road, hauling the train and apparently none the worse for the neglect. While it may not be visible in the operation of the locomotive, lack of repairs to these parts does waste fuel. As this waste is preventable and is no doubt many times greater than the cost of making the repairs, we do not hesitate to recommend that such repairs be made.

It is easier to win when you are in the lead than to catch up when you get behind. The habit of starting early and starting right is not acquired by any sudden resolve. It must be built by careful practice and steady training—by conscientious study, with the application of the best rules

and regulations. Plan your work, then work your plan, making every play and every day a definite advance toward the goal, which should be 100 per cent locomotives.

Roundhouse Maintenance

In considering roundhouse maintenance, we must assume that the officer responsible for locomotive maintenance is allowed sufficient time to make necessary repairs. On nearly all railroads the transportation officer often requires the turning of the power so rapidly that locomotives do not receive needful repairs. One superintendent told at a division fuel meeting that he wa srunning his engines until the stack fell off and the bell rolled over into the field. In starting engines out in this condition he realized that they were not fit to go, but gambled that they might make a successful trip. His testimony was that he often had to send a second engine to get the first one in.

Sooner or later locomotives have to be repaired, and under the present operating conditions we cannot look forward to a slump in business which will make it possible to hold engines in the roundhouse long enough to do work on them which has accumulated. If the mechanical officer is successfully to maintain the locomotives in condition for economical and successful service "the stitch in time" rule must be put into effect. This means that repairs have to be made as the need for them develops. He should be the judge of when a locomotive is fit to leave a roundhouse ready to make a successful trip. Often locomotives are hurried out and fail, necessitating the use of a second engine, which many times has to give up a train of inferior class to take a superior train to a terminal. Such practices cause delays and congestion on the railroad and could be avoided generally if locomotives received necessary repairs.

As in the shop, we will consider the maintenance of the boiler and firebox as the first consideration. The boiler should be kept clean by frequent and thorough washings, preferably with hot water. It is generally accepted that hot water wash-out plants materially reduce the time required to wash boilers, and by using waste steam to heat the water used for washing and filling a direct fuel saving is accomplished.

It is important that sufficient pressure be used, with nozzles so designed that the water will reach all parts of the boiler. With well located wash-out plugs it will then be possible to thoroughly clean the boiler at each wash-out. This, of course, implies that where water contains scale-forming elements some form of water treatment be used.

It is evident that there is a decided loss in heat transmission when boiler sheets are allowed to accumulate a scale deposit. Water treatment and thorough boiler washing will practically eliminate scale from locomotive boilers in any kind of water. When boilers are kept clean it is comparatively easy to maintain the flues free from leaks.

There should be an inspection of the flues each trip, and where necessary, they should be calked, or expanded and calked, depending upon the practice standardized on each railroad. Where flues are welded in, welding outfits should be maintained at terminals so that when the welds break they can be re-welded. Firebox leaks, even though they do not cause failures, waste fuel and where locomotives are allowed to run with flues in a condition that causes failures or near-failures, an excessive amount of fuel is consumed per trip. Flues which will not make a successful trip should be changed.

Any neglect in the maintenance of any part of the grates or shaking apparatus tends to discourage the intelligent use of grates by engine crews and they should be thoroughly maintained.

Frequent inspections should be made in the front end. When reports are made that the engine does not steam, do not make any change in the draft appliances. The steam pipes should be subjected to a hydrostatic test to determine whether there are any leaks in the superheater elements or return bends, steam pipes, at the base of nozzle stand, or at the base of the nozzle tip. If everything is tight and set to the adopted standard, someone should ride the engine to locate the trouble. Find the real trouble; do not change appliances or reduce the nozzle, except for weather or special fuel conditions.

It should be known by inspection that flues, both on superheated and non-superheated locomotives, are kept clean. Nearly all roads have flue cleaning organizations, but it has been found necessary to check up the work of these men to insure their doing it thoroughly. The Fuel Conservation Section has issued circulars showing the loss in fuel due to stopping up of large flues on superheated locomotives. This loss varies from .04 per cent to 2.6 per cent, with five to seven flues plugged, to 21 to 24 per cent, with 18 flues plugged.

If, for any reason, valves become out of square through lost motion in the valve gear or accident, they should be squared up immediately. A lame engine advertises itself to everyone.

Cylinder and valve rings should be renewed when necessary to prevent blows, which are exceedingly wasteful of steam and materially affect the hauling power of the locomotive. Many roads have adopted a 30-day inspection of cylinder and valve rings. Such inspection develops many worn rings which would not be reported. This practice is recommended for consideration by roads not doing it. If an engine has been out of the shop for a long while and the cylinders have become worn ⅛ in. or more, they should be re-bored and fitted with packing rings turned to fit the re-bored cylinders, such rings being maintained in stock.

Hot box reports should receive prompt attention. If a locomotive is equipped for the use of water on hot bearings developing enroute, it should be known that there is no stoppage in the line of water travel to insure an available supply of water when the need arises. Water cooling equipment on locomotives should not in any way relieve the roundhouse from prompt attention to defects causing hot bearings.

A habit has prevailed to some extent which has been expensive wherever practiced. That is, allowing locomotives due for the shop in two or three months to run with valves out of square, with cylinders blowing, leaky flues, or some defect which materially affects the successful operation of the locomotive. Repairs are not made because at some time in the future the locomotive is expected to go in the shop. The money wasted by not making repairs which would have permitted the economical and successful operation of the locomotive would have been saved many times over while the engine was waiting to go to the shop.

All auxiliary devices, such as bell ringers, headlight dynamos, firedoors, steam grate shakers, power reverse gear, etc., should be kept in good repair. Many of them are put on the locomotive to increase the economy of locomotive operation and unless they are maintained, the effect is just the opposite.

No lost motion in power reverse gear levers and connections should be allowed and no air leaks in the piping should exist. If these two things are taken care of and the packing is well maintained, there should be little trouble from reverse gears creeping. Usually, the engineer is relieved from oiling the reverse gear and oftentimes this is neglected in the roundhouse, resulting in a dry piston, which means a slow acting gear.

Injectors should be maintained so that they will go to work without excessive attention on the part of the engine crew. One of the most annoying features with which enginemen have to contend is an injector which will not go to work unless fussed with for some time. This causes unnecessary safety valve operation and oftentimes an actual

neglect of the fire, all contributing to a direct fuel waste.

Firedoors of the manually operated type should be evenly balanced, insuring ease of operation, equipped with a good latch on the door to hold it open when the track is rough or in going around curves. It is impossible to fire well if the door closes while the fire is being put in. The chain should be hung so that the fireman can reach it and open the door with a minimum effort. In fact, he should be able to open the door and close it between each scoopful of coal fired, hardly knowing that the door is there.

Safety valves should be coordinated with the steam gage so that the blow-back should not be more than three or four pounds.

The apron between the deck of the locomotive and the shovel sheet should be level. An apron which is curved or bent in any manner makes it difficult for the fireman to stand securely while firing. To enable the fireman to practice skillful firing, there should be no hindrance to a full, easy play of the muscles. Bent or curved aprons and roughed shovel sheets hamper the smooth work of a fireman materially. The shovel sheet should be level and free from any obstructions which will interfere with the movement of the shovel over the sheet and should extend back far enough into the coal to allow the fireman to get practically all of the coal out of the pit. A coal guard should be placed in the right gangway to prevent coal from being pushed out.

Brick arches should be maintained as shown by standard instructions.

Steam leaks around the locomotive are not only a Federal defect, but are wasteful of steam.

The air brake system on the locomotive should be maintained free from leaks and the compressor should be in as near 100 per cent condition as possible.

It is necessary to use a drifting throttle on superheated locomotives to insure good lubrication. If a drifting throttle is to be used, we should provide the engineer with a throttle that will stay set in any position desired. Many throttles of necessity are shut off entirely or are nearly wide open and the engineer has to use a stick or try and hold the throttle in a drifting position, which is practically out of the question.

Engineers must be encouraged to make out the necessary reports for the guidance of the roundhouse foremen in maintaining the locomotives. A locomotive inspector, preferably an engineer, who would meet incoming engines while the crews are still on them, talk with the crew about the locomotive performance, help them make necessary tests to determine blows, etc., assist the engineer in making out his work report and possibly make out a separate one and then check the work done on the locomotive when it comes out of the roundhouse, can be of untold value to any mechanical organization, as these men not only uncover many defects but help educate the engineer to make out intelligent work reports, saving the mechanics considerable time hunting for defects shown by vague reports.

Terminal Handling

After the actual mechanical work of preparing the engine for service has been finished, we are going to assume that the transportation officer is co-operating with the mechanical officer, making it feasible to place a definite order for the locomotive for a certain time. Definite printed instructions should be posted in every roundhouse showing just how far in advance of leaving time each class of power should be fired up and just how the fire should be built. The fire builders should follow this line-up.

To prevent pops opening in firing up, the blower should be shut off before the maximum steam pressure has been reached. This, of course, implies that the instructions to the fire builder provide against any heavy firing which would have built up too heavy a fire before leaving time.

When air brake men come around to test the air pump and brakes, they should not put more coal in the firebox and run the pressure up to the maximum, going away and leaving the pops blowing indefinitely.

Too many times, when the fire is built, an excessive amount of water is put into the boiler. When the engine is taken out of the house and placed on the storage track so full of water that it is impossible to work the injector any more, there is bound to be an excessive operation of the safety valves. When the engine crew arrive and the boiler is full, it is impossible for the fireman to build up the right kind of a fire without the loss of a great deal of fuel through the safety valves. The boiler should be filled with sufficient water to prevent any danger of low water before steam pressure enough is obtained to work the injectors. The fire should be built up gradually, using just enough fuel to raise the temperature high enough to make all necessary tests before the engine goes into service.

From 20 to 30 per cent of the total fuel consumed by the locomotive is used around terminals and there is room for real economy in the building of fires, if it is systematically supervised.

After the fire is built and the engine taken out of the house, just enough fire should be maintained to keep water enough in the boiler to provide against low water. With the boiler supplied in this manner, it is possible for the fireman to build up a fire of the right depth without excessive popping.

Hostlers should be taught by demonstration the way the fire should look when the engine is taken out of the roundhouse and inspection should be made of every fire before taking the engine out of the house. When poor fires are being built, a report should be made to the roundhouse foreman to prevent a continuance of such practice. Lack of attention to fire building, resulting in poor fires being turned out of the roundhouse, has been responsible for many delays due to cleaning fires between terminals.

Cylinder cocks should always be opened and the engine started slowly when being taken out of the house or moved around the terminal by the engine watchman or hostlers. The cylinders nearly always contain water and unless the cylinder cocks are open and the engine moved slowly, this water is worked directly through the cylinder and out the stack. The writer is of the opinion that a great many of our cylinder leaks are caused by working water through the cylinders around terminals.

When engines are placed on the outgoing track, all tools and oil cans should be on the engine in good condition so that the crew will not have to run around looking for supplies, which takes time away from their regular duty of preparing the locomotive. Incoming locomotives should be despatched with the greatest possible speed to insure all of the time possible in the roundhouse for necessary work. If the roundhouse is too small to handle the business, it is better to take out the engine which has been repaired and make room for an incoming engine needing repairs than to keep the incoming engine outside for several hours and then when it is in the house have to turn it out again without having time to do the necessary work.

The writer has come in contact with many different local conditions which handicapped thorough mechanical repairs. In one instance last winter, on a certain railroad the superintendent and master mechanic were found cleaning fires on the cinder pit to assist in moving power through the terminal. It is obvious that many things which have been suggested in this paper will be lost sight of under such conditions, but we must have high ideals or our general practice will be of a low standard.

It is wholesome to meditate upon things done which have been a benefit. It is helpful to look back upon those

things done which proved a detriment. We cannot change the past, but we are endowed with the power of retrospection that we may improve the future.

Discussion

E. P. Roesch, agreeing with the author of the paper as to the practices recommended, laid emphasis on the fact that good maintenance implies a place in which the work can be done. As an instance of the lack of proper facilities, he recalled a visit to a six-stall roundhouse through which the foreman was trying to put 30 locomotives, with the temperature 34 deg. below zero. After 24 hours some of these engines were still waiting outside the house. Mr. Roesch suggested that for the price of one locomotive, one or two stalls might be added to this roundhouse, easily reducing the time required to handle engines through the house for repairs 20 per cent and thus effecting a 20 per cent increase in the power available from such a terminal.

Mr. Roesch emphasized the need for fixed draft appliances leaving the size of the nozzle the only variable, to be changed only because of weather conditions or changes in the kind of fuel. He stated that provision for adjustment of the deflector plate led to the use of this plate as a means of repairs when the engine is reported not steaming, instead of locating and repairing the real cause of the trouble. Referring to the recommendations in the paper relative to the testing of superheater dampers, he considered it much better to test the damper with steam or air pressure rather than by hand because the effect of lost motion in the mechanism was not revealed in the latter case. The angle of the damper should be 60 deg.; the vertical position retards the passage of the gases and has an adverse effect on fuel consumption. In referring to ashpans, he said that the type of pans on some locomotives has made the design of a suitable ashpan impossible. He considered that, during November when the roads in the west were receiving all kinds of eastern coal for which the draft appliances of the locomotives were not adapted, good ashpans with ample air opening and slope sufficient to insure that all ashes would move down into the pan rather than laying on the sheet and blocking the draft, would have made it possible to handle the strange fuels successfully with only slight changes in the exhaust nozzle.

An important point in the maintenance of proper valve setting which Mr. Roesch emphasized was the necessity of establishing correct postmarks, as these are the basis on which corrections in the valve setting are made in the roundhouse. Mr. Roesch also recommended the keeping of mileage records of air pumps and overhauling them on a mileage basis rather than on the basis of conditions as determined by tests.

H. C. Woodbridge stated that he did not believe there was any lack of knowledge as to what should be done in the proper maintenance and handling of locomotives, proper practices being quite generally understood; but that there must be some underlying reason why these things have not more generally been done. He gave as this reason the failure to properly dispatch trains, sending them out at times when conditions are such that it is impossible for them to get over the road. Mr. Woodbridge strongly advocated the establishment of a regular schedule of time intervals for the departure of trains, enough regular departing times being established to meet the maximum requirements, but never despatching a train except at one of these established times. With such times properly selected, the trains would move over the road with the minimum interference and locomotives would come to the terminals one at a time rather than in fleets as they now frequently are.

There was some discussion on the loss of coal over the tops of stoker conveyor troughs in which it was brought out that provision for correcting this difficulty is available in the form of a plate for closing the top of the trough.

R. M. Osterman (Locomotive Superheater Company) referred to the importance of the proper maintenance of damper openings, upon which depends the correct relative distribution of the flow of gases through the small and large tubes. The damper operating mechanism is subject to wear and needs attention, the same as any other machine.

There was considerable discussion relative to the use of proper unit supports in the superheater flue in which it was brought out that the supports are being spot-welded to the units before they are placed in the boiler, which insures that they will remain properly placed. An objection to this was raised on the ground that all of the wear, whether due to the sliding of the unit in the tube from differential expansion or to pounding caused by the vibration of the unit in the tube, was all on the flue which is inaccessible, instead of on the unit which is frequently removed from the boiler and can be built up with a gas or electric welding outfit.

Referring to the recommendation in the paper that a locomotive inspector be employed to meet incoming engines while the crews are still on them, the suggestion was made that the duties of this man justified the appointment of a yard foreman of engines with authority at the terminal similar to that of the traveling engineer on the road. Good results were reported from a practice somewhat similar to this, an outgoing inspector being employed with authority greater than that of the federal inspector to hold engines out of service. The discussion brought out the fact that the mechanical department is not entirely free to carry out what is known to be the best methods of handling locomotives. Part of the responsibility in this matter and in other matters pertaining to fuel conservation belongs to operating department, the maintenance of way department in the elimination of unnecessary slow orders and to the signal department in eliminating improperly operating signals, both of which reduce the number of unnecessary stops and slowdowns.

Eugene McAuliffe, manager of the Fuel Conservation Section, spoke on the broader aspect of the coal problem, emphasizing the need of placing the coal-mining industry on a sounder, more stable basis, in the accomplishment of which the railroads as the largest consumer of fuel would reap the greatest benefit.

Administration Places Rail Orders

In accordance with the plan of co-operation agreed upon between the Division of Purchases of the Railroad Administration and the railway executives, whereby the Railroad Administration has agreed to take all the open hearth rail at $47 a ton that can be delivered before March 1 and the corporations will pay for that which is not actually used before that date, the Railroad Administration has made contracts with the Illinois Steel Company, the Lackawanna Steel Company and the Colorado Fuel & Iron Company for all the open-hearth rails they can turn out before March 1 at a price of $47. The Illinois Steel Company estimates that it can deliver 25,000 tons, the Lackawanna Company 15,000 tons and the Colorado Fuel & Iron Company 2,500 tons. The Midvale Steel & Ordnance Company offered to roll 30,000 to 40,000 tons at a price of $57, but the offer was not accepted, and the Bethlehem Company was not in a position to take additional orders. The Railroad Administration in the spring of 1919 ordered 200,000 tons of rails and in the fall ordered 41,000 tons additional.

Lands Owned by the Louisville & Nashville, in Alabama suitable for farming, are to be offered for sale when the railroad shall have been released from the custody of the government. Earl M. Adams has been appointed land agent of the road for Alabama.

Annual Report of Regional Director Aishton

In his annual report for the year 1919 to Director General Hines, R. H. Aishton, regional director for the Northwestern region, reported that improved freight conditions following the signing of the armistice permitted the restoration of passenger train service which had been discontinued during the war. A net increase of 1,709,918 passenger train miles per annum was reported.

Analyzing the operating statistics for the region during 1919, the report said:

"The freight train performance for 1919 was naturally affected with the signing of the armistice, which stopped the extremely heavy movement of war materials and supplies to the seaboard. In October, 1918, we had 6,041,121 net ton miles, dropping to 4,200,159 in January, 1919. With the gradual return to normal conditions, however, each month showed an increase, and by September, 1919, we were moving about the same tonnage as in 1918.

"The percentage of loaded to total car miles has been kept very close to the 1918 record. In October, 1919, we had a percentage of 70.1, as against 69.9 per cent in October, 1918. With the decrease in business during the first part of the year, naturally there was a decrease in the average miles per day per car, due to a surplus of equipment. This gradually improved with the increase in tonnage, so that in September, 1919, we were able to make 28.3 miles per car per day, as against 26.0 miles in September, 1918.

"Due to serious drought in Montana reduced rates were arranged for movement of stock out of the state for feeding in other states, also for movement of feed into Montana to afford relief in districts where feed was not available. It was necessary to transfer a large number of stock cars to this territory to provide prompt movement for this stock. Drought conditions, with consequent crop failure in Montana, caused a very serious loss in revenue. Reduced rates on live stock and feed added considerably to this burden.

"The passenger train revenues in the Northwestern region have been very satisfactory, indeed. The revenue per passenger train mile throughout the entire year has been well above 1918. In January we earned $1.745 per passenger train mile, as against $1.456 in January, 1918. In September, 1919, the revenue per passenger train mile was $2.436, as against $2.164 in September, 1918. The same general increase prevailed throughout the year.

"Naturally the general decrease in traffic during the fore part of the year, together with the increase in wage adjustments, affected the ratio of operating expenses to operating revenues. The operations for the nine months, January to September 30, 1919, inclusive, show the ratio of operating expenses to operating revenues to be 82.0 per cent for 1919, as against 81.2 per cent for 1918."

Regional Director Aishton reported that the unification of terminals, consolidations and joint switching arrangements made in 1918 were continued throughout 1919, "with resulting free movement and economical handling of traffic." In the Northwestern region, he reported, 86 passenger stations and 134 freight stations were closed by reason of these unified arrangements. In only 16 instances unifications were discontinued and stations reopened for public convenience.

Director Aishton commented at length on the work of the district agency at the Union Stock Yards, Chicago, which he declared had made a "wonderful record." The agency handles the business of 23 trunk lines and two switching lines which was formerly handled in 25 individual offices. The regional director cited numerous economies and efficiencies effected by the agency.

The report outlined the organization of a "Claim Prevention Department," which the regional director asserted had resulted in elimination of 160,000 claims against roads in the Northwestern region, representing a total saving of $5,000,000. The report also outlined an intensive campaign for accident prevention on the lines, which the regional director said resulted in a decrease in casualties of 77 per cent.

A shortage of labor was indicated by the report, which on this point said: "All railroads, regardless of increased wages, have experienced considerable difficulty in obtaining both skilled and unskilled labor. Apprentices are not up to quota, averaging about 1 to every 22 journeymen, where this ration should be 1 to 5. Machinist apprentices are nearest to quota, while boilermakers, blacksmiths and moulders are difficult if not impossible to obtain. These things have naturally affected the mechanical activities."

Looking forward to the resumption of corporation control of the roads, Mr. Aishton said:

"So long as the transportation facilities of this country do not fully meet the demands of business there will be criticism of any failure to make the best possible use of available facilities; this result is more easily accomplished under the present conditions of centralized control, but with complete co-operation and proper organization it should be possible when corporation control is resumed, and it would seem advisable to continue some of the things which have been inaugurated during this period of federal control, including the following:

"Continuation of the permit system which insures against congestion at terminals by controlling the original loading of freight.

"Continuance of embargo control in some practical form that would regulate and unify the issuance of embargoes. Presumably this could not be made mandatory, but a commission with general jurisdiction could have authority to supervise embargoes and recommend the issuance or withdrawal of restrictions.

"Supervision of passenger train service and schedules. No recent additions have been made to passenger train equipment, the business now offered is being handled with difficulty, although under present conditions it has been possible to eliminate unnecessary trains and do everything which insures the best possible use of available equipment; until passenger train equipment is greatly increased it will be impossible for individual roads to act independently without aggravating the present shortage of passenger carrying facilities and provoking public protest and creating sentiment favorable to anything which promises improvement.

"Committee control of rate-making. Excepting those who have unusual means of influencing rate legislation, including the control of important competitive traffic, the present method of handling rate matter is not unpopular. It affords protection against destructive action by individual railroads, whether such action is influenced by desire to secure advantage in connection with competitive business or due to error in estimating revenue results of proposed rate changes. The Interstate Commerce Commission has expressed approval of the plan and has definitely suggested that it can be continued."

The Louisiana & North West made a record in reconstruction recently, when five bents of bridge 23-7, a timber trestle, were knocked down by the derailment of two cars of a train. Exactly 24 hours later five bents were put up and another train passed over the bridge. A large part of the material used in the reconstruction of the structure was at the time of the accident standing timber in the forest some miles distant. An order was given to a lumber company for the required material, which was cut, milled and transported to the site of the bridge, where it was fitted and erected by bridge forces, working under the direction of T. R. Barger, roadmaster.

Security Association Urges Necessity for Regulation of Earnings

THE NATIONAL ASSOCIATION of Owners of Railroad Securities, through its advisory counsel, has filed with the conferees on the railroad bill a memorandum replying to that of the Association of Railway Executives. The rate-making rule of Section 6 of the bill, with some modifications, was insisted upon as necessary to the salvation of the railroads and a legal argument was included to show that the method proposed for adapting the rate structure to the circumstances of the individual roads by reducing the earnings of the more prosperous lines instead of holding down the rate level is not novel and has been sustained by the courts in the past. Emphasis is placed on the assertion that Mr. Thom and Mr. Cuyler do not represent the views of all the executives and it is asserted that "it is obvious that the position asserted in the memorandum could not meet with the approval of an association of executives organized to promote the common interests of the American railways or the public interest in transportation."

The position assumed by the authors of the executives' memorandum, the association says, destroys itself, as sufficient revenue to sustain the public interest in transportation cannot be provided without adequate provision for the regulation of excess earnings, and any rule or method of rate-making is unworkable and impracticable unaccompanied by such a provision.

"The definite rule is essential to the survival of the railroads," it declares. "The rule and the regulation of excess earnings are essential in the public interest. That rate increases are necessary is indisputable. There is, accordingly, an irreconcilable conflict beween adequate rate levels assured through any formula whatsoever and unregulated excess earnings. The untenable criticism of Section 6 expressed by Mr. Thom and Mr. Cuyler, representing the views of one group of members of the Railway Executives' Association, constitutes the most emphatic as well as the most elaborate and persistent attack up features of the only definite rule of rate-making which intensive study of the problem during the past year has produced. There is no other formula in either bill or available to the conferees which can be regarded as tangible, definite, workable or adequate. Other criticism of the principles of that or any rule of rate-making sufficiently tangible to preserve the railway structure from disintegration proceeds for the most part from the advocates of government ownership, or from those whose tone is obviously hostile to the successful rehabilitation of the existing systems or to their resumption freed from the old warfare with representatives of organized shippers. We are, accordingly, justified in accepting the criticisms expressed by Messrs. Thom and Cuyler as the only surviving protest against any principle embodied in Section 6 which warrants refutation."

Reference is made to Director General Hines' speech in which he said that one road now earning over 140 per cent of its standard return would earn over 200 per cent if the rate level should be increased 20 per cent, and the question is asked as to whether this road shall be *forced* to earn 200 per cent of its standard rental as the only alternative to the destruction of the transportation system as a whole. The memorandum also points to the statement of the executives that they would favor as a rule of rate-making a minimum percentage on the aggregate values of a traffic group, if the percentage were adequate and the roads allowed to retain any excess, as approval of the principle of the rate-making rule of Section 6, and continues in part:

"This principle and the regulation of excess earnings are approved not only by the owners of the large part of outstanding railroad securities, who also constitute the potential investors in future issues, and by the director general of railroads, but by Commissioner Edgar E. Clark, and by Judge C. A. Prouty, the dean of the regulatory bodies of the United States.

"A definite percentage return on railway values in each rate district embodied in Section 6 has the approval of the group of railroad executives represented by Messrs. Cuyler and Thom. It is well known that the principle underlying the entire section has the approval of the other group of executives whose attitude was expressed with singular force by Mr. Daniel Willard, at a meeting of the Association of Railway Executives held on January 5. Having also the approval of experienced present and former members of the commission, of the director general of railroads, and of the majority of investors, we feel certain that the conferees must be assured that the deliberate judgment of the Senate committee, sustained by the Senate, expressive of the only adequate rate-making provision before the conferees, is sound in principle and necessary to be retained as the basis for remedial legislation.

"With Section 6 mutilated or eliminated there is discernible in the situation no effectual process by which the commission would be enabled to adjust rates or rate levels so as to avoid railway strangulation and eventual government ownership.

"The paper complains of the Senate bill because it does not perpetuate disparity in value and in ratio of return. The authors assert in effect that the prevailing discredited system of rate making which regards only the unit of service has become in some vague way a vested right, notwithstanding the commerce clause, and is exempt from any checking test or process. According to our view there is nothing un-American or shocking in the exertion by Congress of its power to regulate commerce with the ultimate view to the earning by every necessary carrier of a reasonable return and no more upon the fair value of its property. The whole purport of the paper herein reviewed is a protest against that ideal as 'socialization,' 'subversive,' and 'appalling to contemplate.'

"The involved effort to demonstrate that the weak lines will suffer most from the 'restriction,' lapses into an extended argument to demonstrate that the importance of the problem of the so-called 'weak' and 'strong' roads has been greatly overestimated from the standpoint of the public 'and does not justify the radical proposal to take away from some of the lines a part of their net earnings at lawful rates.'

"That assertion is the more amazing in view of the rate history of the past decade demonstrating that the commission will not afford adequate relief to the average carrier, when appropriate relief to that carrier would automatically expand the income of what the commission has referred to as affluent competitors which require no relief. That situation is a matter of recorded rate history and not opinion. It should be common knowledge that the public would not tolerate a different conclusion. A few roads might become the temporary recipients of excess earnings as a result of passing sympathy for the more necessitous, but the reaction would be prompt, disastrous and permanent. None should know it better than those executives who have been conspicuously unsuccessful in the past in their efforts to secure relief without a definite rule for rate making coupled with the regulation of excess earnings. Mr. Hines' illustration of one railroad which would be enabled to earn a net operating income of 200 per cent of its standard return as a result of a 20 per cent increase in rates is conclusive. The subject should be no longer debatable.

"We are unable to discern in their suggestions any realization of the emergency or of the necessity for definitive and effective remedial legislation. Their expressed point

of view is possible only to those who regard the situation from the standpoint of the small number of roads which, as pointed out by the director general of railroads, are apparently able to survive even under present conditions.

"In point of fact, proposals are now current for the dismantling of approximately one thousand miles of railroad located principally in the state of Georgia.

"The whole argument comes down to the proposition that the Congress of the United States may not, under the commerce clause, adopt a system of legislation appropriately designed to sustain the competitive agencies of transportation, although the system proposed would permit every carrier disposed to complain to receive and retain a fair and reasonable return upon the full value of its property devoted to the public use. To assert that conclusion is nothing short of the assertion that Congress is without power appropriately to regulate commerce as a whole in the interest of the people of the United States.

"We have shown that carriers may not complain of appropriate legislation regulating rates where the carrier disposed to make complaint is permitted to realize a fair and reasonable return upon its investment. Therefore, the sole inquiry under Section 6 is whether or not the carriers in the several groups are prevented by the rate level established by Section 6 (viz.: 5½ per cent, with ½ of one per cent optional with the commission) as distinguished from preventions resulting from the exigencies of competition or the risks of the venture, from realizing a reasonable primary return, and secondly, whether having realized such reasonable primary return the percentages fixed by the section for retention by the carrier are fair and reasonable, to wit: six per cent, with the graduated proportion above six per cent.

"We have always contended that the first question would be avoided beyond peradventure by a provision to the effect that the 5½ per cent level should be the minimum; that is, that rates should be adjusted to produce 'not less than 5½ per cent,' rather than 'as nearly as may be' 5½ per cent, leaving the adjustment of rates with relation to that minimum with the commission, which may be relied on to protect the public. But the 5½ per cent, with ½ of one per cent allowable for unproductive improvements in the discretion of the commission, is at least comparable to the aggregate return in the past, and when taken in connection with the specific requirements of the section, suggests that a rate level could not possibly be considered as subnormal or confiscatory which complied with the provisions and spirit of Section 6. So much for its constitutionality. As a matter of sound and constructive policy the expression 'not less than' is obviously desirable.

"In like manner we have thought that it is desirable to make the provisions relating to the disposition of excess earnings sufficiently flexible to meet extraordinary cases which might arise in which 6 per cent, with the stipulated proportions of the excess over 6 per cent, might not be found to be a reasonable percentage for the carrier to retain if earned. The chance of any such conclusion being asserted is so remote that the question would appear to be academic, and to be sufficiently protected by the obligation of the commission to arrive at the full value of the respective railroad properties in order to determine the amount, if any, of the excess earnings to be retained. A provision that any excess earnings be divided equally between the carrier earning them and the public railway fund would doubtless remove any objection to the ratio of division.

"In the application of the provisions of Section 6 relating to the regulation of excess earnings, it is desirable that separate corporations which are operated as a single system should be treated as a unit in applying the process.

"In view of the fact that private operation will be resumed in the midst of a fiscal year and before the termination of the standard rental, it would be appropriate to provide that the application of the provisions of Section 6 as to excess earnings shall become effective at the beginning of the first calendar year after the return of the railroads to their owners and shall not apply to earnings accruing prior to that date."

Percentage of Increase in Freight and Passenger Rates

DIRECTOR GENERAL HINES has authorized a statement showing the increases in the average receipts per ton mile and per passenger mile during the past year, as compared with 1914 and with intermediate periods in the following table. He also shows that the increase in rates has been much less than the increase in costs or in prices generally:

AVERAGE REVENUE PER TON-MILE AND PER PASSENGER-MILE—CLASS ONE ROADS

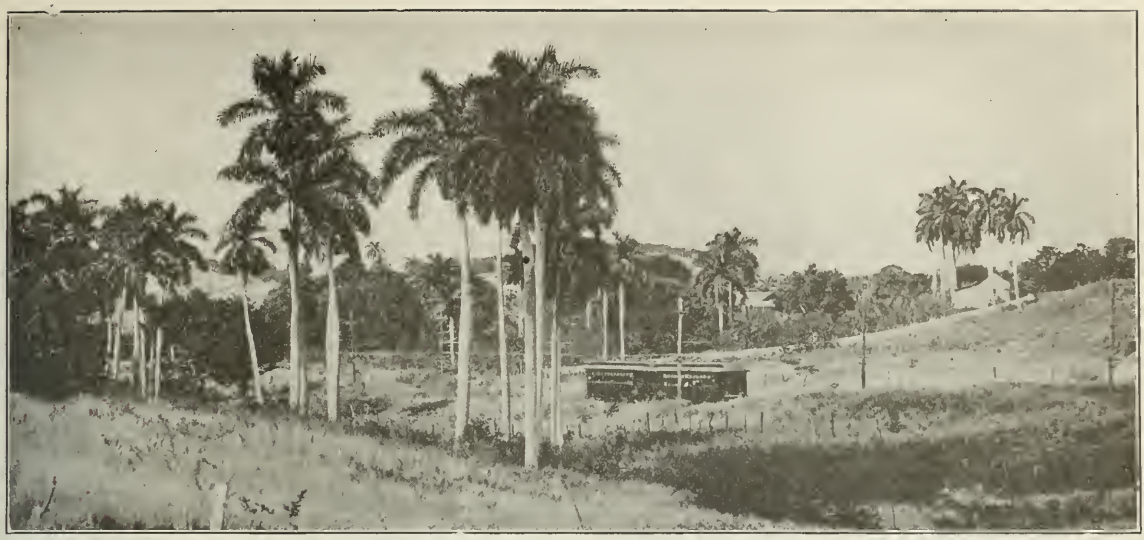
Period	Average Revenue per Ton Mile (Cents)	Average Revenue per Passenger Mile (Cents)
Year ended June 30, 1914	.723	1.976
Year ended June 30, 1915	.722	1.979
Calendar year, 1916	.707	2.042
Calendar year, 1917	.715	2.090
Calendar year, 1918	.858	2.413
5 months ended May 31, 1918	.746	2.144
5 months ended May 31, 1919	.979	2.540
9 months ended Sept. 30, 1919	.967	2.528
Percent of Increase		
5 months ended May 31, 1919, over 5 months ended May 31, 1918	31.2%	18.5%
9 months ended Sept. 30, 1919, over 5 months ended May 31, 1918	29.5%	17.9%
9 months ended Sept. 30, 1919, over year ended June 30, 1914	33.8%	27.9%

"The average revenue per ton mile and per passenger mile for the five months ended May 31, 1918, was on the basis of rates just prior to General Order No. 28, which provided for a general increase in rates estimated at approximately 25 per cent," he says. "It will be noted that the increase for the five months ended May 31, 1919, compared with the five months ended May 31, 1918, was 31.2 per cent in freight service and 18.5 per cent in passenger service. As the ratio of freight revenue to passenger revenue is about three to one, this would represent a weighted average increase of approximately 28 per cent in freight and passenger revenue.

"It will be noted that the average revenue per ton mile and per passenger mile for the nine months ended September 30, 1919, is slightly less than for the five months ended May 31, 1919, due to a larger proportion of traffic moving at lower rates.

"The per cent of increase in the average revenue per ton mile for the nine months ended September 30, 1919, compared with the year ended June 30, 1914, was only 33.8 per cent, and the corresponding increase in the average revenue per passenger mile was 27.9 per cent. It is apparent, therefore, that so far as transportation rates are concerned the increase has been very much less than the increased operating cost which the railroads along with all other industrial enterprises have had to meet, and also very much less than in items other than transportation which go to make up the cost of living. For instance, the percentage of increase in retail food prices for the nine months January to September, inclusive, 1919, as compared with the nine months January to September, inclusive, of 1914, was 80.9 per cent."

THE RED CROSS CANTEEN at the New York Central station at Buffalo, N. Y., was closed on January 2. The canteen was conducted in the station two years and served more than 600,000 men of all branches of the service, besides many members of the allied forces.



On the Guines Division of the Havana Central Railroad

Cuba's Main Line Railways Are Well Developed*

Conditions in Our Nearest "Foreign" Market as Studied by Railway Age Representative

By John P. Risque

Part II

THE HAVANA TERMINAL COMPANY is an organization which was formed to simplify the unsatisfactory conditions caused by the entrances of various railroads into the city of Havana at several different points, the results of this action providing the city with as modern a railroad station as probably exists in Latin America, with an entrance for all trains over an elevated structure of about a kilometre in length. The facilities of the passenger station are modern in every respect, the building being four stories in height, of which the three upper floors are given over to the accommodation of the administrative offices of the companies comprising the lines entering Havana. New freight yards, located a short distance east of the new station, were put into operation in 1912 at about the time the station was opened for business, and contain two large steel warehouses for the handling of freight, access to which is easy in comparison to other facilities of the same nature, such as the docks in various sections of the water front. During the crop season, when traffic is heavy, congestion at the freight warehouses amounts to practically an embargo. The business of the island at present has already outgrown the facilities, which in 1912 were considered ample and with plenty of room to spare. Shippers complain that the lines are unable to cope with the situation, application for freight and express shipments encountering delays of from a week to ten days. A more or less frequent occurrence of strikes of all variety has not tended to relieve the situation.

The Guantanamo & Western, a sugar road operating about 125 kilometers of line at the extreme eastern end of the island, and the Guantanamo Railroad, as well as a few other small and unimportant lines in this district, are listed in the annual reports of the Cuban Railroad Commission, but are of little interest in a description of principal traffic.

Other Railways

Considerable activity along the north coast is evidenced by the extensions of the Northern Railroad of Cuba, a reorganization of the ancient Jucaro & San Fernando Railroad, which operates between the two towns named. This line literally cuts the island in two, running practically north and south. The new line, completed last year, runs from a point called Moron, on the old north and south line, east to Nuevitas on the bay of Nuevitas, where, at Port Tarafa, the actual terminal, extensive improvements are contemplated. This road opens up a hitherto undeveloped and comparatively inaccessible territory, a rich cane district, and great things are expected of it. The company has been considering the erection of locomotive and car repair facilities at Moron for some time, but no news is at present obtainable as to the progress of these plans. It is expected that the shops will represent an investment of a million dollars. At the present time repairing is done at Ciego de Avila, where the old original road described crosses the line of the Cuba Railroad.

The Hershey Railroad

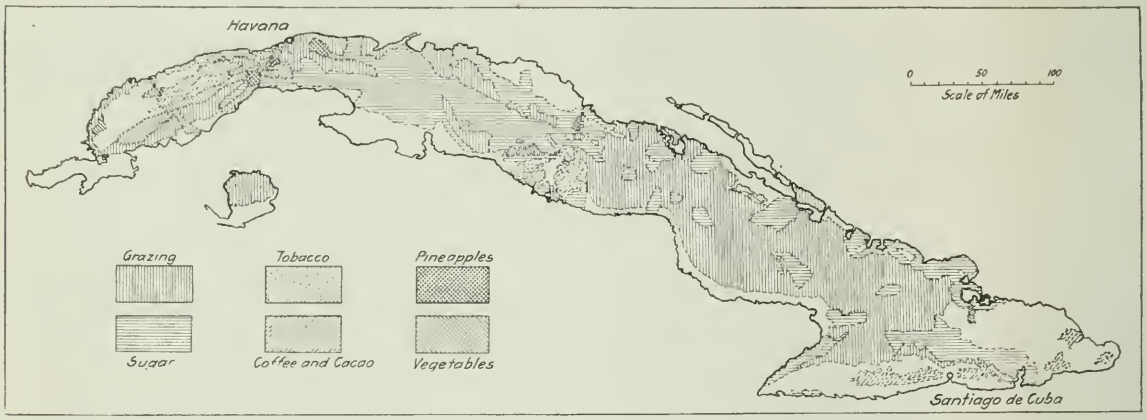
Another interesting development on the north coast, but further west, is that of the Hershey Railroad, now under construction in two directions—to the west toward Havana and to the east toward Matanzas—from a point about half way between the two cities. At this point is located the new sugar mill completed in 1916 by the promoters of the rail-

*The second of two articles on this subject. The first appeared in last week's issue.

road, the Hershey chocolate interests of Hershey, Pa., and the site of the mill lies a few kilometers north of the station, called Bainoa, on the Havana-Matanzas line of the United Railways of Havana. A branch of the new line runs to the Bay of Santa Cruz, a few kilometers north of the principal line, and another branch is to be built from the Havana terminus to Cojimar, a nearby suburb, which provides exceptional bathing facilities. The road is being pushed as fast as material and labor supply will permit; rails are of 85-pound steel and the motive power will be electricity, generated at the mill and transported through an overhead wire to pantagraph collectors on the motor cars. When completed the line will represent a length of about 125 kilometers of track. The district traversed by the new line, while comparatively small, is rich and undeveloped and gives promise of a good return. As the line has not been finished, sugar from the Hershey mill is delivered to the United Railways at Bainoa at the present time. Originally conceived as a sugar line to provide for the hauling of cane to the mill and transporting of sugar to port, recent activities of the promoters have stirred the political circles of the community to a feverish pitch. Some unfavorable comments and charges of graft have been directed at the company through the press, claiming that the company's petition to the government for a subsidy savors of high finance. The recent announcement that the line had been voted a subsidy of $12,000 a mile has resulted in an agitation fraught with extreme hostility to the builders. It is difficult to determine whether this expression represents the opinion of the people or whether it is merely an outburst from interests who would combat the idea on general principles; at any rate, poor old Liborio, who is the personification of the Cuban people, is being held up as the goat by those who would have them believe that the American corporation is "putting something over" on them. Whatever the situation may be in its political respects, it is evident that the line is going to be finished and equipped just as Mr. Hershey and his associates intended, and time will tell whether or not his foresight and determination has added or detracted from the welfare of the community. It is quite likely that an indication of the new line's popularity and importance will be signified immediately upon its completion by a rush of both freight and passenger business between Havana and Matanzas, and the alleged and temporary set-back connected with its financing may be forgotten. Hourly electric trains on this single-track line are expected to cut down the time between the two points about half an hour. The passenger terminal at Havana will be at Casa Blanca on the east side of the bay and the Matanzas entrance on the bay of that name on the outskirts of the city of Matanzas.

The description of this relatively small line is given more for the sake of illustrating the handicaps which often attend the promotion of worthy enterprise in Latin America than for any other purpose. New projects will be invariably assailed from some quarter or another and may as well be expected. If the deal is of genuine benefit to the community it will have a fair show, for the inhabitants are not as blind to progress as some of their own members would have people believe.

There is at the present time on the press in Havana a useful volume called a Memoria. It cites the various activities of the Cuban Railroad Commission for the year 1918 and contains some extremely interesting figures for manufacturers who would cultivate the trade of the railroads of Cuba. The 1917 edition is procurable, but is somewhat out of date in relation to the tonnages, passengers hauled and the equipment of all of the public lines which operate under the jurisdiction of the commission referred to. The title of this volume is "Memoria sobre los Ferrocarriles," and it can be obtained by writing (in Spanish) to the Commission de Ferrocarriles de la Isla de Cuba, Havana. This volume, principally in Spanish, refers particularly to proceedings affecting extensions, taking up tracks, addition and taking off of trains and modifications of tariffs. However, the tables in the back of the volume, of which there are 18, set forth in detail about every kind of information which would relate to the possibilities of business, including length of lines, recent additions, number of passengers hauled during the year, tonnages hauled, classifications of tonnages and direction of the traffic, a division of passenger and freight rolling stock, as well as tables setting forth the relative financial standing of the respective companies.



Cuba's Agricultural Development

Reference may be made here to previous articles dealing with the extent of privately owned cane railroads operated by about 195 sugar mills on the island, exact figures for which are unobtainable, as they make no reports to the commission. The importance of these cane lines, however, was pointed out in the articles dealing with this subject and published previously. The principal business with the railroad end of these important enterprises is conducted by the sugar mill supply houses located in Havana and at other cities on the island, lists of which are obtainable.

Physical Characteristics of the Cuban Lines

From the standpoint of rolling stock, there is little to be said of the comparison between American standards and

those in use in Cuba, with exception of weight of passenger equipment. Passenger cars are shorter and much lighter, four-wheel trucks of American type being used universally. Standard M. C. B. couplers are the rule and gages are 4 ft. 8½ in., with the exception of certain sections on the Cuban Central Railways, which are 3 ft. Other small lines not enumerated in this article are of narrow gage. Standard American box cars predominate, as well as other types of freight

Stone Ballasted Right of Way on the Western Railway of Havana in the Province of Pinar Del Rio (Orange groves on the right)

cars familiar in the United States. Steel equipment both in passenger and freight service, with the exception of steel cane cars, has not made the appearance, and its adoption is evidently remote. The standard through sleeping cars operated from Havana to Santiago and to Cienfuegos are light, with the characteristics of the travel of the country that it is difficult to imagine a Cuban train without them. They are generally old stock and proclaim it by their shape. Small windows, high up, and hard, wooden seats of the slat type, running crosswise of the car. These cars handle perhaps 75 per cent of the travel, yet they are always well maintained and extremely clean.

Locomotives, with the exception of a few here and there on the English-owned lines of the United Railways of Havana, are of American design and manufacture and include conventional types of light Pacifics and Consolidations. Some British built Ten-wheelers and Consolidations are in evidence, as well as a few American, or 4-4-0 types, with the sand boxes omitted from the top of the boiler. Cuba Railroad locomotives are Ten-wheelers—both for passenger and freight—and look conspicuously all alike. Superheaters, brick arches and all other modern economy-producing devices are accepted as a matter of course. So representative of the rolling stock on American lines, with the exception of weights, are those to be found in Cuba, that there is little to compare, unless it be to draw attention to a custom of painting pilot beams and front number plates a bright red. This, a distinction worn by locomotives running out of Havana, is said to constitute an effective precaution against possible head-on and other collisions.

Due to war and reconstruction difficulties, the Cuban lines are not an exception to the list of sufferers due to lack of rails. The difficulty of procuring ties is said to be aggravated by the fact that the sugar mills will buy them at prices considerably in excess of what the public lines are willing to pay. Signals are few in number. Despatching of trains is done on the "via libre" system, a station to station system, handled by telephone or telegraph. Bridges have been principally brought from the United States, although some have

Cane Laden Carts Waiting at a Railway Station for Cars

mounted on two four-wheel trucks, but are modern and comfortable in every respect, even to electric lights in berths and throughout the car.

Passenger trains carry first-class and third-class coaches on every train, and the latter invariably outnumber the former. Just why there are no second-class coaches is somewhat of a mystery, but it is said that they were once used but that the first and third class cars divided all of the business. It seems that the Guajiro — the Cuban gentleman farmer—either took the best or the worst and declined the middle ground. The third class coaches so thoroughly agree

been brought from England. Generally speaking, the entire equipment of Cuban railways, with an exceptional purchase here and there, originates in the United States, partially due to the preferential duty in effect as well as proximity of the market.

Car and Locomotive Repair Facilities

The United Railways repair all of the locomotives on their lines at the extensive shops at Cienaga, near Havana, with the exception of Cuban Central engines, which are maintained at Sagua la Grande. The output of the Cienaga loco-

motive shops is said to be a locomotive per day, which, with the installation of $250,000 worth of new machinery recently ordered, will increase the capacity 30 per cent. A new shop for tender and tank work is planned to liberate the space which the boiler shop contributes to this department under present arrangements. Forgings, patterns and castings are made on the job, and complete outfits for acetylene welding are a part of the equipment, with two 400-ampere and one 200-ampere electric welding machines included.

A constructive step toward the education of the future mechanic has recently been taken in the inauguration of a school for apprentices, of which there are more than a hundred at the Cienaga work shops. Five years constitutes the term served by the young Cuban at the trade, and he gets three hours per week free tuition in a course which covers mathematical and geometrical instruction, machine drawing, the use of the slide rule, mechanics, graphic statics and dynamics. Lectures on the air brake, locomotive running, signaling and allied subjects are also a part of the training to which the younger engineers and firemen are also invited in their spare hours.

The administrative offices of the mechanical department are located at the shops in commodious quarters built for the purpose. All cars are repaired at the Luyanó shops, a suburb which is a considerable distance from the point at which locomotive repairs are carried on. Car and locomotive repairs for the Cuba Railroad are carried out at Camaguey, and the combination plants are located a short distance east of the Camaguey railroad station, where the Cuban administrative offices of the company are located.

Improvements

Although the various lines are keeping pace with the abnormal increase in business as best they can, the outstanding betterment at present being carried out is the conversation of locomotives to oil. The United Railways have recently received a quantity of fuel oil tanks for installation on locomotive tenders. These tanks were made in the United States to measurements furnished by the railway to the contractors. Three hundred conversions are on the program, and they are being put through as fast as possible. Sugar mills are also converting their engines, a great number of them already having made the change. The Cuba Railroad still burns coal, and no information is available as to just when it will turn to oil, which is considered an inevitable step. The oil is brought from the Tampico, Mexico, fields and stored in special plants being rapidly built for the purpose.

Labor

Those who are dissatisfied with labor conditions at home will find no relief in Cuba, as the conditions are about the same—possibly worse. Labor, both skilled and unskilled, is scarce and high priced. As the basis of the Cuban artisan's calculation is founded on the prices of food and clothes, which are much more expensive than in the United States, the results are in accordance. Expert mechanics in Havana are paid as high as $9 a day for eight hours, but this rate obtains only among men of exceptional qualifications.

The wholesale conversions to oil may be taken as a measure of the interest displayed by Cuban railroads and other industry in labor-saving devices. General complaint is lodged against American shippers for neglect in attending

Interior of the Erecting Shop at Cienaga, United Railways of Havana

EQUIPMENT ON CUBAN RAILROADS

Length in kilos.	United Rys. 1,142	Cuban Central Ry. 617	Western Ry. of Havana 238	Havana Central 116	Cuba R. R. 977	Guantanamo and Western. ..	Cuba Nothern 77	Guantanamo ..	Caracas ..	Caibarien a Moron ..
Locomotives—										
Passenger	43	11	11	..	17	2	7	..	..	2
Freight	162	82	18	5	132	12	11	9	17	6
Switching	21[1]	5	1	10	7	1	4	..	2	..
Total	226	98	30	15	156	15	22	9	19	8
Passenger Train Cars—										
First class coaches	46	8	6	..	24	2	3	1	..	3
Third class coaches	81	31	16	..	49	6	14	3	6	3
Combination coaches	9	14	1	..	1	1	..	..	3	..
Dining	..	..	..	..	..	..	..	..	..	..
Parlor	1	2	2	..	..	..	..	..	1	1
Sleeping	3	..	..	..	18	..	2	..	..	..
Baggage, express and mail	44	17	7	3	28	3	1	2	3	2
Other	29[2]	4	6[3]	33[3]	..	..	1	..	..	..
Total	213	76	38	36	120	12	21	6	13	9
Freight Train Cars—										
Box	1,892	1,055	307	84	1,361	175	152	73	208	229
Flat	4,043	2,339	248	172	2,271	78	70	44	153	9
Stock	96	13	13	8	100	5	4	..	..	20
Coal	258	102	10	25	141	20	13	..	8	12
Tank	47	44	..	..	40	34	8	15	12	5
Refrigerator	..	..	..	..	9	..	..	..	..	..
Other	9	1	3	..	839	..	..	155	260	..
Caboose	150	..	..	..	..	210	..	..	..	..
Total	6,505	3,554	651	289	4,761	522	247	287	641	275
Company Service Cars	207	92	42	35	199	22	5	..	18	3

[1]Electric. [2]25 Multiple unit. [3]Multiple unit.

to details, and a great many houses have sold many more thousands of dollars of American products than they will be able to obtain on account of the restive conditions in the markets of the North. As the transportation facilities of the ferries from Key West are considerably overtaxed, as stated previously, relief from that source is almost impossible. Congestion and consequent delay at the docks add to the general difficulties of getting merchandise to Cuba.

The forthcoming crop of sugar is estimated to be worth in the neighborhood of $500,000,000, and if such a thing is possible, money is expected to be more plentiful in Cuba

New Janeo Station, Looking East

than it is at present. A considerable proportion of this money is likely to find its way into railroad extensions and betterments, additions to rolling stock, etc., and an analysis of the possibilities would perhaps pay those of the manufacturers of the United States who feel that they could deliver the goods. If they are not sure that they can come through on the terms agreed and in the time specified it would be advisable for them to make no efforts in this direction, as every case of an American inability to "come through" is noted here by unfriendly bidders in the market, who consider it simply a matter of time when they will get the preference. Manufacturers who are serious in their interest in the markets of these parts should by all means take stock of the inefficiency of the class of "missionary" work they think they are doing. Catalogues in English are, with the exception of their uses in a certain restricted circle, a waste of paper, printing and postage.

Railways Far Behind in Construction of New Lines

IN AN ARTICLE under this heading in the January 2 issue of the *Railway Age*, page 18 and following, six maps were used showing the existing railroads. For the purpose of making these engravings, we used a railway map copyrighted by C. S. Hammond & Company, New York, cutting it into sections to correspond with the operating regions of the United States Railroad Administration. We are informed that the maps as we published them contained mistakes due to our method of reproduction. We are, of course, entirely responsible for these mistakes, the purpose of the article being served by a rough reproduction. There was no intention of reflecting in any way on the excellent character of the complete C. S. Hammond & Company map being a thoroughly comprehensive map of the entire United States railway system, and which we have no doubt is accurate in detail.

Report of Allegheny Regional Director

A VIGOROUS CAMPAIGN to insure passenger trains running on time, with the result that during November last out of 729,386 passenger trains operated 88.5 per cent arrived on time and 91.9 per cent maintained schedule or made up time, is outlined in the annual report for the year 1919 of L. W. Baldwin, regional director for the Allegheny region, to Walker D. Hines, director general of railroads, for the year 1919.

Mr. Baldwin's report shows a great increase in passenger travel in 1919 as compared with 1918. During the year ended December 31, 1919, there were 7,851,319,252 revenue passenger miles over the railroads operating in the Allegheny region, as compared with 7,118,475,453 for the year 1918.

Mr. Baldwin calls attention in his report to the fact that the lines in this region were called upon even during 1919 to handle a very large number of troops returned to the United States and afterwards demobilized, and that this interfered with the supplying of equipment for the movement of civilian passengers. During the year a total of 8,772 troop trains were operated, handling 3,418,333 men. In addition, 220,113 troops were moved on regular trains, making a total of 3,638,446 men handled. The peak of the troop movement was reached in the month of July, 1919.

In order to mould a better and closer feeling on the part of patrons towards the railroads operating in this region, a campaign was conducted among employees having relations with the public to impress upon them the value of courtesy and efficient service. Monthly regional meetings were held, at which representatives from all roads were present and accomplishments and plans discussed. The results of this campaign were reflected in the large number of letters received from patrons of the roads in the region commending various employees for courtesy and efficiency.

Effective June 1, 1919, freight train schedules in the Allegheny region were established to provide regular and reasonable fast service for all perishable freight, including house merchandise. The schedules were established on the basis of performing satisfactory service most economically, and after a complete study of the traffic requirements which was made in conjunction with the Eastern region there were many common points to consider. The volume of perishable traffic handled during the year 1919 was much heavier than in the preceding year. To December 1, 1919, the grain delivered to vessels increased 33,723,980 bushels, or 64.5 per cent compared with the same period of 1918, the movement to seaboard regulated under the permit system, which avoided accumulation in cars and allowed it to move in accordance with available vessels.

The regional director states that the normal movement of freight traffic was to a certain extent affected by strike of the steel workers and the longshoremen in New York harbor and to other causes beyond the jurisdiction of the Railroad Administration. These conditions necessitated the placing of embargoes, which were modified from time to time, to permit the business to move in keeping with the ability of the consignees to handle currently, conditions becoming normal November 19. While the strike of bituminous operators did not necessitate any embargoes, the roads were called upon and successfully handled the movement and distribution of a large volume of coal on hand and produced during this time—November 1 to December 10—to essential industries and territories where needed. Due to the necessity of having to move a large volume of coal to the West, normal operating conditions in the Allegheny region were interrupted, and the roads in the Western end of the region were called upon to carry heavy burdens, which they did with credit.

The campaign for minimizing personal injuries was carried on with much activity during the year 1919. Officers

of the various roads were impressed with the necessity of keeping employees interested in avoiding personal injuries to themselves, other employees, passengers and trespassers. The result produced during the first nine months of 1919 compared with 1918 shows a decrease in total casualties of 7,747, or 24 per cent.

There was a total of 1,423 train accidents on Class I roads in the Allegheny region, where damage amounted to $500 or more during the first 10 months of 1919, as compared with 1,587 train accidents during the corresponding period of the year previous, a decrease of 155, or 9.8 per cent.

For the first 10 months of the year 1919 the loss and damage claims presented showed a decrease of 253,138, or 23 per cent, compared with the same period during the previous year. Incident to the freight-claim prevention work was the establishment of matching-up bureaus at New York, Philadelphia, Baltimore and Pittsburgh and periodical meetings of agents at smaller common points to bring together astray less-carload freight and waybills of freight reported short. As an illustration of the activities in this direction, the bureau in the month of November, 1919, brought together astray freight and waybills on freight reported short, such freight approximating in value $630,000.

Activities in the police departments of the railroads in the Allegheny region produced very good results towards eliminating thefts of property, thereby reducing claims for loss, trespassing and malicious acts on the premises. Special and co-ordinated action was taken at Jersey shore terminals and other important centers to prevent theft of freight.

The campaign in the region for the prompt handling and full loading of freight cars covered activities in many departments. Among the principal ones were the prompt classifying and movement of cars at terminals, the repairing or transferring bad-order loads, effecting prompt placement, loading and unloading, switching after loaded or unloaded and loading to capacity by shippers. Many details were involved, requiring continuous supervision, and closely following a defined plan applicable to local conditions to obtain the desired results. When demands for equipment became acute, car expediting committees were appointed at the larger terminals to devote their energies to increasing car efficiency by locating and correcting causes for car delays, handling with shippers and receivers of freight and with employees.

The campaign for a reduction in the initial and final terminal detention of trains in the Allegheny region was started in July, 1918. There has been a reduction in this period of an average of 50 minutes in initial terminal detention and 20 minutes in final terminal detention for each freight train run in the region, and, based on the number of trains run in November, 1919, the performance as compared with July, 1918, reflected an annual saving of $6,000,000 in wages and fuel, which amount was a direct saving, and nothing provided a greater incentive or advantage to satisfactory operation than did the reduction in terminal detention.

The total tons of coal consumed by railroads operating in the Allegheny region decreased 3,031,481 tons, or 14.20 per cent, and the total cost decreased $11,462,404, or 17.95 per cent, for the first nine months of 1919, as compared with the corresponding period in 1918. The total saving for the year 1919 over the same period last year in passenger and freight service due to decreased consumption per unit of service amounted to $4,099,471.

Mr. Baldwin reports that during the first 10 months of 1919 the total overtime, pro rata and punitive, for all classes of employees decreased 41,979,326 hours, or 48.8 per cent, and the amount paid for overtime decreased $18,762,658, or 39.7 per cent, as compared with same period in 1918.

The regional director states that the economical co-ordination of facilities was continued throughout the year, resulting in a total saving of $15,912,679. During the year, on roads where pay trains were operated, arrangements were made to discontinue them and instead pay employees by check. As an illustration of the economy effected, the annual saving on the Pennsylvania Railroad Lines East amounts to approximately $200,000.

In concluding his report, Mr. Baldwin adds that the co-operation of officers and employees of the railroads in the Allegheny region contributed to the success in handling the business and accomplishing the results obtained during the year.

New Plan for Financing Standard Equipment

The Railroad Administration and representatives of the Association of Railway Executives have signed an agreement on a new plan for the financing of the 100,000 freight cars and 2,000 locomotives ordered by the Railroad Administration in 1918 and allocated by it to the railroads, by which each railroad to which equipment has been allocated with executive and individual equipment trust agreement obligating itself to pay for the equipment in 15 annual instalments with interest at 6 per cent and will issue equipment trust notes to represent the annual instalments. This takes the place of a plan for the national railway equipment trust worked out by the administration, the executives and a bankers' committee which it has so far been found impracticable to carry out, but provision is made, if it shall subsequently be found practicable to carry out that general scheme, for the railway corporations to participate in the formation of a national equipment corporation and to co-operate in carrying out such a plan.

The director general has also agreed to allow interest at 6 per cent upon the cost of equipment or additions and betterments thereto for its use during federal control. The memorandum of agreement is signed by S. H. E. Freund and Swager Sherley for the Railroad Administration and by Mark W. Potter and S. T. Bledsoe, representing the railway executives, and is intended to set forth the understanding agreed to by the director general of railroads which shall be recommended to the several railway corporations by the Association of Railway Executives. An acceptance of the plan must be made by the corporations on or before February 7.

The memorandum of agreement provides:

(1) Each railway corporation to which equipment has been allocated by the director general will execute an equipment trust agreement covering such equipment, whereby it will obligate itself to pay for the equipment over a period of 15 years in equal annual installments with interest on the amount of the unpaid installments at the rate of 6 per cent per annum and will issue equipment trust notes to represent such annual installments. Such agreements will contain the usual provisions applicable to equipment trust agreements of railroad equipment.

The making and acceptance of such an equipment trust agreement shall be an acceptance of all the terms of this memorandum and contemporaneously with execution of such equipment trust agreements this memorandum shall be ratified, confirmed and adopted by proper resolutions of the railway corporation's board of directors or executive committee.

The director general agrees that the cost to any railway company of financing its allocated equipment shall in no event be greater than on a basis of 6 per cent per annum on the amount of its outstanding equipment obligations, exclusive of obligation under paragraph (3) of this agreement, or under such equipment trust agreements made under and pursuant to the provisions of this paragraph.

It is understood nothing contained in this agreement or

other agreements and understandings with the railway corporations limits in any manner the right or power of the director general to dispose of such equipment notes; and he shall have the right to any saving that may be made in sale of the securities of the National Equipment Trust hereafter referred to, if consummated, which may be disposed of on a better than 6 per cent basis.

(2) If the director general contemporaneously with the execution of the equipment trust agreements by the several railway corporations or at any time subsequently shall desire to carry out as nearly as may be under the existing conditions the general scheme of the National Railway Equipment Trust plan heretofore considered, the several railway corporations who have executed equipment trust agreements pursuant to paragraph (1) of this memorandum will, upon request of the director general, participate in the formation of the National Equipment Corporation and co-operate in carrying out such plan, provided that all expenses thereof or consequent upon action taken under this paragraph will be borne wholly by the director general. No one of said railroad corporations is to be liable for the failure of any other corporation to participate or co-operate.

Such trust may include also any unallocated equipment, and any equipment for which payments have been advanced by the director general.

As between the railway corporations and the director general all fees for counsel of bankers' advisory committee will be borne by the director general.

The director general shall be the sole judge of the cost or expense incurred hereunder insofar as he may be liable for the same.

(3) The several railway corporations will assume and pay the cost incident to the preparation and delivery of their several equipment trust agreements and of the notes to be issued thereunder.

(4) The director general shall have the sole right to select the trustee or trustees under the individual equipment trust agreements and for the National Equipment Trust if consummated. The charges, fees, or other compensation of such trustee or trustees shall be reasonable and just for the service rendered.

(5) The railway companies, reserving to themselves all their rights to use equipment owned or held in trust for them, or in which they are interested as a carrier either directly or indirectly, in preference to all other equipment, agree that all equipment included in the several equipment trusts herein provided for shall at all times be considered railroad owned equipment for all purposes relating to its use and shall be entitled to all the rights and privileges of railroad owned equipment.

(6) Railway companies accepting the equipment and executing an individual equipment trust agreement, as provided herein, waive all claims under Section 6 of the federal control act because of the allocation of such equipment.

(7) The railway companies severally agree that the director general at his option may apply the equipment depreciation and retirement credits in favor of such companies respectively arising under the standard contract or arising under similar conditions in the case of roads not having a contract, (a) on indebtedness growing out of capital expenditures for equipment; (b) on indebtedness of the character covered by Section 4 of the standard contract commonly designated as open account; or (c) any indebtedness due the director general evidenced by a note of the company whether accrued or unaccrued, the director general to apply the credits on any or all of the classes of indebtedness above set forth in such order and amounts as he may see fit.

If the director general fails to elect to apply said depreciation and retirements credits under the option above given him on or before March 15, 1920, such credit to be effective as of March 1, 1920, or some prior date, then the company shall have at its option the right to have the same applied either to (a) expenditures for equipment under section 4 of the federal control act, paragraph (c) of section 4 of the compensation contract, or (b) maturing obligations under equipment trusts, with proper interest adjustment.

It is expressly understood the amount ultimately due on account of depreciation and retirements of equipment, in accordance with the provisions of the standard form of contract (which provisions shall apply to this matter whether or not a road has made a contract), and neither the applying of any amount as a credit, as above provided, nor the use of the basis upon which same is computed, shall in any way enlarge or diminish or otherwise affect the obligations or rights of the director general or of the several railroads under the aforesaid compensation contract provisions.

(8) The director general agrees that upon the cost of equipment or additions and betterments thereto compensation at the rate of 6 per cent per annum shall be allowed under section 4 of the federal control act and under paragraphs (c) of section 4 and (d) of section 7 of the compensation contract. This agreement is made without prejudice to the fixing of the rate percentum to be paid upon cost of additions and betterments, less retirements in connection therewith (other than equipment) and upon the cost of road extensions.

(9) It is further agreed if the director general or the railroad company shall, under and in pursuance of the option stated in paragraph 7 of this memorandum, have applied any part of the accrued depreciation reserve or retirements credits on any indebtedness of the company to the director general, that the amount upon which the director general is required to pay compensation, pursuant to section 4 of the federal control act or paragraphs (c) of section 4 and paragraph (d) of section 7 of the compensation contract, shall be reduced by the amount so applied from and after the making of such application, provided the director general must give notice to the company within 30 days thereafter of the exercise of such option.

(10) Pending the execution of an equipment trust agreement by any railway company in respect to equipment allocated to it, this memorandum shall not operate to revoke any outstanding agreement of such railway company with reference to the financing of its equipment or disposition of its depreciation and the retirement credits.

(11) Nothing in this memorandum contained shall be construed as a waiver of the rights of the director general or any railway company under the federal control act or any company's contract, except and to the extent that this memorandum otherwise specifically provides and except, as herein specifically provided, the rights of the parties shall be as fixed by the federal control act and the companies' compensation contract.

(12) The director general agrees to indemnify and protect the corporations against and from all claims, demands, costs and expenses in any manner accruing upon the use of any patented inventions employed in or about the equipment allocated to the corporations or any thereof. In addition thereto the director general agrees that he will proceed with all reasonable dispatch to secure for the protection of the corporations during the life of the equipment, releases or licenses from the owners of all patented inventions employed in or about the equipment or any thereof as to which he has not heretofore procured releases or licenses, or as to which patented invention was not purchased from the owner of the patent or his authorized licensee.

(13) Upon the execution and delivery by any carrier of its equipment trust agreement and the notes to be delivered thereunder, the letters of the director general of October 28, 1918, and December 3, 1918, to Thomas DeWitt Cuyler

and others shall be considered as withdrawn and cancelled as to such carriers, but the provisions in this paragraph shall not be construed to keep such letters in effect if by reason of any state of things prior hereto said letters may have been withdrawn as to any particular carrier.

(14) Nothing in this memorandum contained shall be construed as indicating the obligations proposed to be assumed shall in any case be joint, the purpose being that each railway corporation shall assume only the several obligations for itself.

(15) This memorandum is intended to set forth the understanding in respect to the subject matter hereof agreed to by the director general of railroads and which shall be recommended to the several railway corporations, members of the Association of Railway Executives, by Thomas DeWitt Cuyler, chairman thereof, and will be authenticated by Swager Sherley, director, Division of Finance, United States Railroad Administration, on behalf of the director general of railroads, and Thomas DeWitt Cuyler, chairman, and Alfred P. Thom, general counsel, for Association of Railway Executives.

Despatch being essential to the successful carrying out of this memorandum, acceptance of the terms of it and of the substance of the form of equipment trust agreement must be made on or before February 7, 1920, on which date the agreement herein proposed may be withdrawn by the director general, except as to those railroad corporations which shall have accepted. Acceptance by a proper executive officer, accompanied by assurance of appropriate action of board of directors or executive committee follow in due course (if impossible by that date), shall be deemed a compliance herewith.

Clifford Thorne Disagrees with Director General Hines

Clifford Thorne, as chairman of the legislative committee of the National Shippers' Conference, has sent to the conferees on the railroad bill a letter replying to statements made by Director General Hines in his address at New York on January 7 which, he says, "have led some people to the conclusion that it is necessary to remake the whole transportation structure of the country." He objects to Mr. Hines' "attempt to give the impression that our railroad system was a failure under private operation subject to the regulatory system in existence prior to the war," and he produces statistical exhibits to deny that continuous increases in the costs of labor and materials without adequate advances in rates has caused a curtailment of maintenance expenses, a decrease in net operating income or a reduction in surplus with the consequent effect upon the credit of the carriers.

The decline in the net earnings of the carriers since January 1, 1918, he says, is due to war conditions, and he quotes from Mr. Hines' statement that if the rate advance had been in effect from January 1, 1918, the government would have had a surplus up to October 30. He does not explain what bearing that has on the relation between earnings and expenses shown in 1919, when the rate increase was in effect for the full year. He also calls attention to a statement recently authorized by the director general to show that "in the manner in which the Railroad Administration keeps its accounts" it earned a surplus above the government guaranty for July, August, September and October, but he does not show of what advantage that fact is to railroads that keep their accounts in a different manner.

The particular point which Mr. Thorne desires to make is that "Congress can safely restore the railroads to the regulatory system as it existed prior to the war without any drastic, fundamental, revolutionary changes," after making suitable provision for the protection of railroad earnings during the present transition era and the loaning of necessary capital to the railroads. "We believe," he said, "that the restoration of the railroads to their owners will result in the adoption of many economies. The cost of supplies will undoubtedly tend to recede from their present high level in the near future. If the railroads can prove they need rate advances the Interstate Commerce Commission will grant them. The commission has acted wisely in the past."

Utah Central Railroad Jubilee

A jubilee, commemorating the fiftieth anniversary of the driving of the last spike completing the construction of the Utah Central, was held at Salt Lake City on January 10. The jubilee consisted of three parts, first an informal reception at the Hotel Utah, second a banquet for those who were engaged in constructing the road and third, a meeting in the Mormon Tabernacle in the evening. At the informal reception the original tie, still containing the last spike driven at 2:00 p. m. January 10, 1870, was exhibited. The reception was attended by approximately 250 of the original builders of the road, who were the guests of the city, free transportation being furnished to all the veterans and all expenses paid.

The Utah Central connected Salt Lake with the Union Pacific at Ogden. It is now absorbed in the Union Pacific system (the Oregon Short Line.) The souvenir program, prepared by the committee in charge, says in part:

"For 22 long years prior to 1870 a steady stream of caravans consisting of ox teams, mule teams, horse teams, hand carts, pack trains and pony express had poured into Salt Lake Valley. Across deserts, fording streams, climbing mountains, these pilgrims had toiled. Hunger, disease, exposure and frequent encounters with hostile Indian bands had been their daily lot. Thousands had died enroute and were buried by the wayside.

"By the spring of 1869, the Union Pacific railroad had been completed to Ogden and it was announced that the capital of Utah was not to be included in this transcontinental system. Not to be denied, however, the disappointed settlers of these valleys immediateily organized a company to build a connecting line of their own.

"On May 7, one week after the driving of the Golden Spike at Promontory, (completing construction of the transcontinental line) ground for the Utah Central was broken. Capital, materials and labor were generously forthcoming to finance and carry through the undertaking and the last obstacle to an early completion was removed when rails and rolling stock were obtained from the Union Pacific. And so, in seven months from the day that the Union Pacific was completed the new Utah Central was ready for operation and Salt Lake City had railroad connection to the outside world.

"A mammoth celebration was planned and on January 10, 1870, the day appointed, 15,000 joyful people assembled. State officials, high church dignitaries, leading business men and military representatives from Camp Douglas were guests of the occasion. At 2 p. m., President Brigham Young drove the last spike, officially completing the new road."

Among the present day railroad men who addressed the veterans at the jubilee banquet were D. C. Spencer, general passenger agent of the Los Angeles & Salt Lake and the Oregon Short Line, and H. V. Platt, general manager of the same roads. At the evening meeting there were addresses by E. A. Bock, Mayor of Salt Lake City, Charles W. Nibley, vice-president of the Sumpter Valley Railway, and Andrew Jenson, president of the Utah State Historical Society.

Railway Mail Pay Rates Increased by I. C. C.

Space Basis Approved, but Compensation of Carriers to Be Adjusted Back to November, 1916

WASHINGTON, D. C.

A CONSIDERABLE SLICE of the Railroad Administration's deficit for the past two years will be transferred to the post office department as a result of the decision of the Interstate Commerce Commision announced on January 15 in the railway mail pay case. The commission finds that the space basis system of compensating the railroads for the transportation of the mails, provided for in the act of July 28, 1916, is fair and reasonable and requires its extension to all mail routes on March 1, 1920, but it orders large increases in the rates for the different classes of mail service which are made retroactive to November 1, 1916. The railroad companies will benefit by the readjustment of the rates for services performed from that date to January 1, 1918, and a 25 per cent additional increase is ordered for service performed since January 1, 1918. It is authoritatively estimated that the increase for the 14 months ending December 31, 1917, will approximate $22,000,000, and that for 1918 and 1919 it will amount to approximately $73,000,000, which will go to the Railroad Administration, while about $35,000,000 a year will be added to the mail revenues of the railroads for the future.

The retroactive increases will not only more than wipe out all the surpluses claimed by the post office department for several years, but will also require a supplemental appropriation because the department has based its calculations on its confidence that the tentative rates which have been paid would be sustained.

On the day that the commission's decision was rendered the House passed the post office appropriation bill for 1921 which contained an item of $60,000,000 for inland mail transportation, which includes the railway mail pay. Under the administration of the space basis system installed experimentally on November 1, 1916, the compensation of the railroads has been reduced from an annual basis of $64,000,000 to $50,000,000 as of September 30, 1919. It is believed that under the new rules it will be increased to something like $85,000,000. The railroads had proposed to the commission a plan of basing their compensation largely on the weight of the mails at rates which would produce $95,000,000 for the service performed in 1917.

Under the law of July 26, 1916, which was proposed by the department, after the report of the Bourne commission. the postmaster general was authorized to install the space system as a test on certain routes, and tentative rates were fixed which were to be paid pending the commission's decision after an investigation of the whole subject. The postmaster general put the space basis in effect on about 90 per cent of the routes and contended before the commission for a continuation of approximately the same rates under a plan which it was estimated would pay the railroads about $54,000,000 annually. Under the law he is required to readjust the payments for the service performed since November 1, 1916, in accordance with the rates found reasonable by the commission. For the period to January 1, 1918, the commission prescribes a scale of rates based on 27 cents per mile for a 60-foot R. P. O. car and 28 cents for a 60-foot storage car in place of the rate of 21 cents tentatively fixed in the law, with proportionate rates for smaller units of space, but these rates are to include the initial and terminal service for which separate allowances were made in the law. A further increase of 25 per cent is found reasonable for services performed since January 1, 1918, and the commission also prescribes a basis of separate payment for the cost of side, terminal and transfer services heretofore performed by the railroads without compensation.

The separately operated short line railroads are considered separately and rates 20 to 50 per cent higher than the regular rates are prescribed for lines not exceeding 50 and 100 miles, respectively.

In addition the commission has prescribed rules with respect to the authorizations of space by the department which will relieve the roads of many arbitrary practices of the post office department and are intended to insure compensation to them for the full service performed. The department has had a practice of reducing its authorizations in such a way as not to pay for much of the service which the railroads contended was necessarily required but which the department argued was for the convenience of the railroads.

On the weight basis of payment that formerly prevailed it was shown by department exhibits at the hearings that the annual mail pay on the basis of a weighing from March 27 to April 30, 1917, would have been $69,000,000.

It is estimated that on the basis of the 1917 service the mail revenue for that year on the increased rates will be readjusted to about $77,000,000 instead of the $58,775,000 actually paid to the railroads, and that for the 14 months from November 1, 1916, to the beginning of federal control the railroad companies will receive back pay amounting to about $22,000,000. For 1918 it is estimated that with the 25 per cent increase, the mail revenues will be increased to about $90,000,000 for Class I roads instead of the $53,341,000 actually paid, and that for 1919 the total will be about $89,000,000 instead of $53,000,000. This makes the total retroactive payment due the Railroad Administration for two years about $73,000,000. The amount of the increase to the railroads for the future may be somewhat less than the retroactive payment if the department continues its policy of gradually reducing the amount of space authorized each year, in spite of the increase in the volume of mails, but under the regulations now prescribed by the commission it will have to pay for some of the space required by its orders but which it did not authorize or pay for.

The report points out that it is not fair to charge the department for space which it does not use and which would necessarily be operated by the railroad anyway, but that it is not fair to the railroad for the department to ignore the wasted space resulting where a car is placed in a train to accommodate the mail and the authorization is reduced en route where there is no opportunity to cut off the car. "It ought not to be disputed," the commission says, "that when the department orders or authorizes a definite amount of car space, the rate to be paid therefor must cover the cost of hauling the empty space necessarily hauled to provide the service requested." Whereas the railroads claimed that the unauthorized space which it was necessary to operate exceeded the authorized space by 31.2 per cent, and the department claimed it was but 4.5 per cent, the commission uses a basis of calculating it which produces a result of 19.4 per cent, by dividing the unused space in proportion to the space used for passengers, mail, baggage and express in the other than full cars. The present mail space rates allowed the railroads approximately covered operating expenses in April, 1917, the commission finds, but allowed little, if anything, for taxes and return on investment.

The commission's report, which is by Commissioner C. C.

McChord, includes a review of the history of railway mail pay legislation, under which the rates have heretofore been fixed by Congress, and of the voluminous statistical evidence submitted by the railroads and the department in accordance with the law of 1916. The text of the order of the commission is as follows:

Text of the Order.

It is ordered, That the following system, rules, and ratings be established on or before March 1, 1920, and be observed, maintained and applied to the transportation of mail matter of the United States by railroads subject to the act of July 28, 1916, *supra,* until further order or orders of this commission:

1. That the space-basis system inaugurated under authority of the act of July 28, 1916, *supra,* shall be continued as herein modified and be extended to all mail routes; and that the postmaster general shall, on or before March 1, 1920, place on the space basis the routes now paid on the weight basis.

2. That the initial and terminal allowances permitted in the act shall be canceled and abolished, payment in lieu thereof being included in the rates hereinafter prescribed.

3. That the fair and reasonable rates of payment for transportation of mail matter as of November 1, 1916, and to January 1, 1918, are as follows:

	Cents
For one mile of service by a 60-ft. R. P. O. car	27
For each mile of service by a 30-ft. apartment car	15
For each mile of service by a 15-ft. apartment car	10
For each mile of service by a 60-ft. storage car	28
For each mile of service by a 30-ft. storage space	15
For each mile of service by a 15-ft. storage space	8
For each mile of service by a 7-ft. storage space	4½
For each mile of service by a 3-ft. storage space	2½
For each mile of service by a 15-ft. closed-pouch space	10
For each mile of service by a 7-ft. closed-pouch space	5
For each mile of service by a 3-ft. closed-pouch space	3

For separately operated railroads not exceeding 100 miles in length, and not less than 50 miles in length, 20 per cent additional to the above rates; and separately operated railroads less than 50 miles in length, 50 per cent additional: *Provided,* That the minimum payment on any mail route, over any part of which mail is transported not less than six days a week, shall be $50 per mile per annum.

The fair and reasonable rates on and after January 1, 1918, are 25 per cent additional to the rates prescribed as of November 1, 1916.

The law fixes the rates for railroads which were constructed in whole or in part by a land grant made by Congress at 80 per cent of those herein prescribed.

4. Where authorizations are made for cars or apartments of the standard lengths of 60, 30 and 15 feet, and the railroad company is unable to furnish such cars or apartments of the length authorized, but furnishes cars or apartments of lesser length, but which are accepted by the department to be sufficient for the service, payment shall be made only for the actual space furnished and used, the compensation to be not exceeding pro rata of that provided for the standard length authorized. The postmaster general may accept cars and apartments of greater length than those of the standard requested, but no compensation shall be allowed for such excess lengths, except that where an oversize car is furnished storage units may be authorized therein on the basis of actual measurement.

In computing the car-miles of full and apartment railway post-office cars, the maximum space authorized in either direction of a round-trip car run shall be regarded as the space to be computed in both directions.

In computing the miles of service of a storage car or lesser unit, the maximum space authorized in either direction of a round-trip car run shall be regarded as the space to be computed in both directions unless any part of the car containing such unit be used by the railroad company in the return movement.

5. All regular authorizations for full railway postal cars, apartment railway post-office cars, and full storage cars may be discontinued, in accordance with the needs of the service at established railway passenger or freight division points or junctions at which the train is scheduled to stop.

6. All units of emergency space needed to supplement regular authorizations shall be of 3, 7, 15 or 30 feet without duplication or grouping, and such units shall be discontinued, increased, or decreased at any point where a fluctuation in the volume of mail carried requires a change from one unit to another.

7. Whenever a regularly authorized unit of storage or closed-pouch space, combined with an emergency unit, necessitates the use of more than 30 feet of linear space in a baggage car, or storage car used exclusively for the mails, a 60-foot car shall be authorized and paid for on the basis of the round trip, provided the car is not used by the railroad company in the opposite direction.

8. Whenever a regular authorization is exceeded on 50 per cent or more of the trips during a period of 30 consecutive days, the next higher unit shall be authorized. This rule will not apply to the month of December.

9. Where the railroad companies are required by the department to perform side, terminal, or transfer service, they shall be separately compensated for such service, unless the service is performed in or directly contiguous to railway terminals and depots. The amount to be paid therefore shall be measured by the amount paid by the railroad to contractors plus 3 per cent; and where the service is performed by agents or employees of the railroad companies the payment shall be for the value of the pro rata time of such railway agents or employees while engaged in rendering the service, including cost of vehicular service that may be necessary, with the addition of 3 per cent.

Where the railroad companies contract for such service contracts shall be left to the lowest responsible bidder upon advertisement. Readjustment for such service shall be made annually. The railroad companies shall submit certified copies of each contract to the postmaster general on or before July 1 of each year showing the rate of payment for the ensuing year, and the amounts specified in such contracts plus 3 per cent shall be accepted as the basis of payment to the postmaster general heretofore prescribed. The railroad companies shall also furnish the postmaster general each year, on or before July 1, a detailed statement of the daily time consumed in handling the mails by their agents or employees at each point where side, terminal or transfer service is performed, which statement shall be verified by a responsible official of the company conversant with the facts, and such verified statement shall compute the pro rata payment of the agent or employee performing the service, based on the time actually consumed, and the amount named in the statement plus 3 per cent shall constitute the basis of payment for the next ensuing year, unless in special cases, and for good cause, the postmaster general may require further statements and verifications from any particular railroad company at other periods of the year.

10. That from time to time, at least once in two years, the postmaster general, upon notification to the railroads, and with their presence and assistance, shall conduct tests to determine the number of sacks and outside packages that will fill a foot or 3 feet of space in a car, and the results thereof shall be reflected in changes in rules, where necessary, in the count of sacks and packages as the basis for measurement.

11. That the provisions of the act of July 28, 1916, except as herein modified, shall remain in full force and effect.

12. That payments for transportation of the mails, and the services connected therewith, shall be made each month after the service has been performed.

It is further ordered, That a copy of this order be served upon the postmaster general, the director general of railroads, and all carriers by railroad subject to the act of July 28, 1916.

Report of the Commission

Following is an abstract of the report:

This proceeding was instituted and conducted under provisions of section 5 of the act of Congress of July 28, 1916.

The act authorizes and directs the postmaster general to readjust the compensation to be paid common carriers by railroad from and after the 30th day of June, 1916, or as soon thereafter as practicable, for the transportation and handling of the mails and furnishing facilities and services in connection therewith, upon conditions and at rates therein provided. It also empowers and directs this commission to fix and determine from time to time the fair and reasonable rates and compensation for the transportation of mail matter by railroad, and the service connected therewith, and to prescribe the method or methods, by weight, or space, or both, or otherwise, for ascertaining the rate or compensation. There is a further provision that pending our decision the existing methods and rates of railroad-mail pay shall remain in effect, except on such routes or systems as the postmaster general shall select, and to the extent he may find it practicable and necessary to place upon the space system of pay in the manner and at the rates provided, with our consent and approval, in order to properly present the matters referred to in other sections of the act.

Following the passage of the act the postmaster general made application to us to place upon the space system, in the manner and at the rates provided in the law, certain routes or systems selected by him. By order of August 29, 1916, we gave consent and approval and the postmaster general stated the routes and systems so selected upon the space basis of pay from November 1, 1916.

The postmaster general thereafter filed his statement containing the matters and things required by the law. Subsequently the department and railroads agreed upon a weighing and statistical period, hereinafter called the test period, beginning March 27, and ending April 30, 1917, during which there should be procured data with reference to space in passenger trains devoted to the several services performed in and by said trains and the operation of the space, and also with reference to the revenues and expenditures of the railroads to show the revenues derived from passenger, baggage, express and mail service, and the cost of performing each service.

Accordingly the postmaster general directed that the mail be weighed upon all mail routes in the country for the test period. Upon forms and under instructions prepared jointly by the department and a committee selected by the railroads, called the Railway Pay Committee, reports were rendered by the greater part of the mail-carrying railroads showing the distribution of space in cars moving in passenger trains, the revenue from the several classes of service, and a division of the cost as between passenger and freight and as between passenger, baggage, mail and express. The reports were checked, reviewed and corrected by correspondence. The basic figures and the totals were thereby brought into harmony. The points in dispute are narrowed chiefly to the apportionment of space and to a lesser extent the apportionment of expenses.

The study of the statistical data and reduction of them to tabulations and statements required nearly two years of painstaking effort on the part of both the department and the railroads. These efforts have resulted in very complete showing as to space devoted in passenger trains to passenger, baggage, express and mail services, revenues derived from each service and the cost thereof. Extended hearings were had at which a large number of statistical and other exhibits were filed and explained by their compilers.

Following the act of July 28, 1916, the postmaster general placed upon the space basis substantially all mail routes except closed-pouch routes. The remainder of the routes were continued upon the weight basis as provided in the act of 1873 and subsequent acts.

As before stated, payment by the government for transportation of the mails was upon the weight basis from March 3, 1873, to November 1, 1916, with additional payment to those carriers operating R. P. O. cars of greater length than 40 feet on the basis of space per mile of operation. Payment is still made on the weight basis for a part of the service.

When the space basis was stated the cars that had been operated for years under the weight basis, and the units of space that had been used by carriers throughout the country, were generally prescribed by field officers of the department as authorizations under the space system. The first effect was to increase the pay of the carriers. In a short time there began a "shaking down" process, as it is termed by the department. This involved reductions in authorizations to meet the space needs of the department. Between November 1, 1916, and June 30, 1918, it is asserted by the department, the operation of the space-basis system resulted in 19.28 per cent less car space used than was required to conduct the service under the weight system. This had the effect of reducing the annual pay to the carriers.

In practical operation regular authorizations are made in the division of railway adjustments of the department in Washington, upon reports received from the field men of the railway mail service, the superintendent, and chief clerk, as to how much space they regularly require on a certain train. The first question is with respect to the amount of mail that would be forwarded on the train. The superintendent then determines whether the authorization shall be closed, pouch, storage or distribution in an R. P. O. or apartment car. He makes a formal report, stating what space is needed, and giving his reasons why mail should be handled on the train in question. The report is then passed through the division of railway mail to the division of railway adjustments, and if approved an order is prepared for the signature of the second assistant postmaster general, and when signed the order is sent to the railroad, and the company is notified that the ordered space is needed on that train.

If a regular authorization in any train is not sufficient to carry all the mail offered and there are frequent tenders of what is called "emergency" mail, the superintendent makes a report to the department and additional space is ordered under conditions similar to those described with respect to the inauguration of space authorization in a new train. There is a general rule or practice in the department that where regular authorizations are exceeded 20 days or more in a month regular authorizations to include the additional mail are made.

All distributing authorizations and full storage cars are paid for on a round-trip basis. This applies to all storage cars used in one direction in regard to which the company can make affidavit that a return empty movement was made.

In mixed cars carrying mail, express and baggage the railroad company is paid not on the actual space used but on the count of sacks carried.

The reduction in miles of service since November 1, 1916, per annum, on different dates, is shown by the following:

Date	Miles
November 1, 1916	577,867,985.00
March 27, 1917	557,151,915.99
June 30, 1917	541,943,368.47
March 31, 1918	510,486,407.58
June 30, 1918	504,961,489.99
Per cent of decrease	12.61

The per cent of increase or decrease in miles of service for each unit is as follows:

	Increase	Decrease		Increase	Decrease
60-ft. R. P. O. cars	.....	20.85	15-ft. storage cars	.....	25.25
30-ft. apartment cars	.....	24.01	7-ft. storage space	.....	9.82
15-ft. apartment cars	11.11	.....	3-ft. storage space	2.80	.....
60-ft. storage cars	.....	22.71	7-ft. closed-pouch space	.....	3.50
30-ft. storage cars	.....	34.11	3-ft. closed-pouch space	.....	2.13

The following exhibit, which shows the annual payment for carrying mails on space-basis routes during the periods indicated and payments for certain quarters specified, with a small part of the actual payments for the fiscal year 1919 estimated, was introduced by the department:

Quarter ending	Authorized annual rate of expenditures	Actual payments. Regular	Emergency	Total
Nov. 1, 1916	$64,447,982.47	.....	.....	.....
Dec. 31, 1916	.....	.....	.....	.....
Mar. 31, 1917	.....	.....	.....	.....
June 30, 1917	57,177,596.02	.....	.....	.....
Sept. 30, 1917	55,376,734.58	$13,677,641.59	$90,473.10	$13,768,114.69
Dec. 31, 1917	53,913,763.53	13,198,322.48	1,016,157.66	14,214,480.14
Mar. 31, 1918	52,749,507.61	12,621,766.69	445,058.10	13,066,824.79
June 30, 1918	52,022,070.43	12,790,680.67	562,301.39	13,352,982.06
Sept. 30, 1918	50,121,405.50	12,546,107.10	431,416.37	12,927,523.47
Dec. 31, 1918	47,706,842.46	12,209,223.45	1,378,602.30	13,587,825.75
Mar. 31, 1919	49,434,924.85	12,079,151.37	663,048.57	12,742,199.91
June 30, 1919	49,918,031.16	12,362,132.87	782,820.75	13,144,953.62
Sept. 30, 1919	50,209,667.62	.....	.....	.....

The operation of the space basis has not resulted in reduction of pay to all railroads. The following table shows the effect on the annual pay of railroads named under two weight basis and under the space basis. Three sets of figures are given:

1. What the mail pay would have been if the quadrennial weighing system had remained in effect.
2. What the pay would have been if the weighing of the test period had been substituted for the quadrennial weights.
3. Pay according to space authorized on March 27, 1917.

Name of road	1	2	3
Boston & Maine	$492,055.52	$585,645.01	$800,711.73
New York, New Haven & Hartford	709,394.24	1,010,410.79	1,033,928.84
Maine Central	235,281.60	269,129.64	312,114.68
Pennsylvania R. R.	3,353,720.81	4,028,378.72	3,188,622.82
Atchison, Topeka & Santa Fe	2,587,639.15	3,053,690.97	2,249,344.92
Union Pacific	2,693,241.73	2,962,628.89	1,766,115.84
Southern Pacific	2,281,982.71	2,497,741.31	1,615,960.82

It will be noted that the railroads having comparatively short mail routes show increased earnings under the space basis.

It is stated by a division superintendent of the department that reductions in authorizations after January 1, 1918, were due largely to the discontinuance of a great deal of passenger-train service which was made over the entire country under orders of the Railroad Administration, and that it was aleo due in part to consolidation of loads which was accomplished on some railroad systems to a great extent at the request of railroad representatives.

It also appears that in recent years the postmaster general has found it expedient to decrease the number of R. P. O. cars and apartment cars and to substitute smaller for larger units. The distributing service is performed to a larger extent in terminal post-offices. There are 47 terminal railway post-offices in the country, in each of which more or less mail is distributed. To illustrate, in the terminal railway post-office at Kansas City, Mo., mail for the city of Los Angeles, Cal., is distributed and placed in sacks for delivery to mail carriers who serve residents of the latter city. This avoids the necessity for distribution en route or at the city office in Los Angeles.

Statistical Data as to Cost of Service.

The exact amount of the administrative expense of the space basis of payment for carriage of the mails, as compared with the expense of the weight basis, can not be determined from the record. It seems probable, however, that the total expense attendant upon the administration of the two services is about the same.

In entering upon an ascertainment of the cost of the mail service there was full co-operation between the department and the railroads. This resulted in substantial agreement as to the methods that should be pursued in the allocation and apportionment of expenses and the ascertainment of property investment as between freight and passenger service.

The forms provided for reporting all space operated in passenger trains, classified according to the use to which the space was devoted. Representatives of the railroads insisted that they should be prepared in such manner as to enable the notation thereon of excess, unauthorized and unused space claimed to have been necessarily operated in connection with the mail service. The department acquiesced in this for statistical purposes only, denying that such space claims could be properly charged against the mail service. At the same time the reservation was made by the railroads to present such claims as a part of their case. The railroads desired that, with respect to closed-pouch and storage mails carried in baggage cars, the full space actually occupied by such mails should be measured by railroad employees, and so reported as mail-space operation. The department would not agree to this method, and it was not included in the instructions.

The instructions to the railroads also provided for the allocation of common expenses of passenger and freight service in accordance with the rules of the commission so far as they extend, and apportionment of the remainder chiefly by the use of a basis similar to that employed by the commission in *Western Passenger Fares,* 37 I. C. C., 1. The agreement reached eliminates much of the controversy usually attendant upon cost ascertainments in rate cases. The controversy here is not primarily with respect to cost methods, but chiefly with respect to the space that properly should be charged to or against the mail.

It is unfortunate that agreement could not have been reacred with respect to a division of space as between passenger, mail and express moving in the same trains, or with respect to the use of complementary space operated in connection with authorized mail space. In the absence of such an agreement there is a difference of some $50,000,000 a year in the amount the department believes it should pay on the basis of the figures submitted, and the amount the railroads assert they are fairly entitled to on the same basis.

The differences between the department and the railroads regarding the apportionment of passenger-train revenues between passenger, mail and express, and the revenues and expenses per 60-foot-car mile for the month of April, 1917, are shown by the following:

Item	Dept. Ex. 74, plan 2, class I roads	R.R. Ex. No. 3, selected-account basis
Revenues—		
From passenger, including baggage and miscellaneous	$56,185,050.04	$56,258,770.22
From express	8,125,086.20	8,134,235.34
From mail	4,329,776.34	4,333,333.54
Expenses—		
Passenger, including baggage and miscellaneous	42,223,639.71	41,527,914.68
Express	6,585,260.96	6,472,566.66
Mail	3,484,115.04	4,330,999.40
Per 60-foot-car mile operated—		
Passenger revenue, cents	26.94	27.5
Express revenue cents	21.66	22.1
Mail revenue cents	22.44	17.8
Passenger operating expenses cents	20.22	20.3
Express operating expenses, cents	17.58	17.6
Mail operating expenses cents	18.06	17.8

Distribution of Space in Passenger Service.

Inasmuch as the chief controversy revolves about the question of the space used as contrasted with the space authorized in the mail service, it is important to ascertain, if possible, just what ratio of space not authorized to that authorized should be added in order to truly represent the mail service rendered by the railroads of the country.

It is insisted by the railroads that a consolidation of the reports of all authorized and operated service, if accurately

made, furnishes complete and accurate data as to the several classes of space operated, as such services were actually conducted during the test period.

The department contends that the whole purpose of the statistical inquiry with respect to the operation of space was to ascertain the amount of it necessarily operated in connection with the mail service, and the other services operated in passenger trains, in order that the approximate ratio of such operation for each class of service might be ascertained for the purpose of applying the ratios, where appropriate, to the division of expenses of operation, etc., and that, therefore, every excessive claim against the mails for operation of space, where such operation was unnecessary in the performance of the mail service, and where it was unauthorized by the department for that purpose, is improperly included in the space charged to the mails, and to that extent improperly increases the mail ratio and decreases the ratios for the other services.

The marked difference between the claims must in some way be adjusted before any conclusion can be reached. It seems reasonably clear that the contentions of neither party to the controversy can be accepted in their entirety. It is to be remembered that when the space basis was inaugurated the railroads had in their possession for use of the mails equipment that had come into being from many years of operation under the weight-basis system. It is altogether probable that had the space basis been in operation during the same period different cars and other mail facilities would have been operated. The space basis was imposed on a condition that had grown up during more than 40 years of operation. Units of space authorized by the department do not conform to equipment now operated by carriers. There is not known to passenger-train equipment in this country a car 30 feet or 15 feet in length. The authorization of a car of either length, or equivalent space in a car, presupposes that the car, or the space, will constitute part of a car that may be 40, 50, 60 or 70 feet in length. Unless carriers are permitted to use the cars they have acquired during years of mail service a large economic waste in the purchase of new and the disposition of old equipment is involved, which it is not to be presumed Congress intended when it passed the law establishing the space basis. In other words, it is impracticable to apply to existing railroad mail-equipment facilities the exact needs of the department regarding space for transportation of the mails.

For example, the authorization by the department of 3 or 7 feet of space in a baggage car, already in the train, and which car would form a part of the train even if there were no mail authorization, is a different situation from the authorization of 15 feet of space in a car which has to be put in the train to meet the demand for space or the authorization of 30 feet of space in a car at an initial point which is cut to 15 feet and then 7 feet as the train moves along its route. In the first case, very little additional transportation service is imposed on the railroad, and in the two other cases there is a direct additional transportation service, the necessary part of which should be paid for by the department. It certainly is not just for the department to pay for service it does not require or use, as is the case where a 3-foot or 7-foot units in a baggage car is required for part of a train run, and the railroads charge the space authorized through to the end of the train run and back. Neither is it just that the department should always pay for a full car for an entire train run where it has no use for any space in the car for a part of the run. Economic train operation may indicate that at some division point the empty car may be dropped from the train. It is also not just to the railroad to ignore the wasted space resulting where a 60-foot car is placed in a train to accommodate the mail at the point of origin and the authorization is reduced en route at points where there is no opportunity to change the consist of the train. In such case the extra service is required for the mail, although it may be that the department needs only part of the car the whole or a part of the distance of the train run.

Instances in great numbers might be given to show that neither the department nor the railroads, in the matter of mail space, were inclined to recede from the utmost claims made by them.

In making the space apportionment the railroads followed the principle that all space in cars or apartments devoted to the carriage of one class of traffic should be assigned to that class of traffic exclusively, without regard to the extent of its actual occupancy, and that all space in cars or apartments devoted to more than one class of traffic should be divided among the participating classes in proportion to the space directly assignable thereto. The unoccupied space in mixed cars is divided by the railroads on the basis of the ratio of the maximum authorizations in both directions to the space occupied by baggage and express.

The principle followed by the department, except to a limited extent, was to charge to the mail the car or space authorizations only, and to measure the cars and space in cars, as the basis for calculations of space necessary to transport the mails, in accordance with requirements of the department at the initial point and en route.

In answer to the contention of the railroads that the maximum of cars and of space when authorized shall be charged to the mails in a cost ascertainment over all train runs, and to the full length thereof, whether required or used by the mails or not, it is to be said that is an undue extension of the readiness-to-serve principle. The department should be charged with whatever the service necessarily requires in the operations of trains and cars, but beyond this limitation any charge of space may not, with propriety, be made against the mail service.

In answer to the department it may be pointed out that our obligation under the law may not with propriety be confined to the ascertainment of cost wtih respect to the space system prescribed in the act, but is to be extended to determine what cars and space were necessarily operated in connection therewith in order that we may determine the fair and reasonable compensation to be paid in the future for whatever system we may prescribe. To this end we need to determine not only the space that was authorized and required by the department during the statistical period, but the average service that was necessarily performed by the railroad, and the average service that will be required to be performed in connection with either the space basis or the weight basis. In short, the primary question is, what was the cost to the railroads for transporting the mail during the test period, under the conditions of operation at that time?

Under any system the department must authorize R. P. O. and apartment cars as the needs of the postal service require. Under any space system authorizations of cars for storage of mails and lesser space units must rest with the department. The extent to which, in practical operation of trains, the authorized space requires complementary space, rests largely with the practical men who control and direct the make-up and movement of trains. It is impractical, if not impossible, to examine each train movement on each of the 1,800 space mail routes of the country to ascertain whether or not in every instance there had been, during the test period, the most economical operation of trains and cars. The question is to be determined on the basis of the fair average conditions as to operation and service, with due consideration of the interests of the department and the railroads.

A great deal of evidence and much space on brief are devoted to a claim of injustice in charging to mails excess space in a car or part of a car furnished by the railroads which were larger than the authorizations. For example, the carrier furnished a 70-foot car to fulfill a 60-foot authorization, or a

70 or 60-foot car in fulfillment of a 50-foot authorization. Under any system that may be devised for ascertaining the compensation to be paid carriers for transportation of mail for many years to come the cars now possessed by the railroads must be used. It is not disputed that these cars were acquired and put into service with the approval of the department. They constitute the only equipment for mail transportation the railroads possess. It is not fair to them that no share of the excess space operated should be counted against the mails during the test period.

One possible method of apportionment of the disputed space, to be discussed more fully hereafter, is as follows: The entire space in full cars is assigned to the service for which operated, together with the used or authorized space in all other cars, and the entire unused, unauthorized and unoccupied space in such other cars is then apportioned according to the used and authorized space in the other than full cars. According to this method, the unauthorized space charged to the mail space would exceed the authorized by 19.4 per cent as against a corresponding figure produced by the railroads of 31.2 per cent and by the department of 4.5 per cent, as shown above.

Cost of the Service.

A question that is first presented for determination with respect to the cost of the service is what is the actual revenue and expense per 60-foot-car mile in the mail service. To answer this question involves two separate processes: 1, The division of revenues and expenses as between the freight and passenger services, including in the latter the mail and express; and, 2, the subdivision between passenger proper, including baggage and miscellaneous express, and mail. Substantial agreement was reached as to the first of these processes for the month of April, 1917, but wide differences exist between the parties in the application of the data underlying the second process.

The result of the separation between freight and passenger train service is shown below:

Passenger-Train Service, Including Passenger, Baggage, Mail and Express, April, 1917

Item	Revenues: Total	Revenues: Per 60-foot-car mile cents	Operating expenses: Total	Operating expenses: Per 60-foot-car mile cents	60-foot-car miles included
Railroad Exhibit No. 3-140	.....	...	[1]$52,331,481	19.7	265,680,422
Class I. roads	$68,726,330	25.9	[2]54,898,155	20.7	265,680,422
Department Exhibit No. 74. Class I roads	68,639,919	25.9	52,293,016	19.7	265,491,137

[1] Selected-account form. [2] Locomotive-ton-mile basis.

Both exhibits agree in computing the operating revenues per 60-foot passenger-train car-mile at 25.9 cents. Owing to the relatively small differences in operating expenses shown in the foregoing table, it does not seem necessary to go extensively into the methods of making the separation of expense. We, therefore, are justified in finding that for the Class I roads covered in the exhibits, the operating expense for the month of April, 1917, per 60-foot passenger-train car-mile, was 19.7 cents.

Item	Car-foot miles	Per cent
Passenger, baggage and miscellaneous	13,999,158,722	75.27
Express	2,293,162,529	12.33
Mail—		
Authorized	1,295,527,931	
Excess over authorized	93,298,010	
Unauthorized	123,326,960	
Unused passenger and baggage ends and parts of R. P. O cars	100,249,983	
Total mail	1,613,402,884	8.68
Unoccupied space in mixed cars	691,905,766	3.72
Grand total	18,697,629,901	100.00

There is practically no dispute about the total amount of space actually run in passenger trains. But the representatives of the department assert that much of the space assigned by railroads to the mail service was not necessarily run in connection with that service. According to railroad Exhibit No. 6, the distribution of train space on 140 Class I roads for the 35 days of the test period was as follows:

The witness for the railroads then made a distribution of item No. 4 according to the space occupied by each service in mixed cars, as interpreted by him. The preceding percentages then became: passenger and baggage, 76.99; express, 13.87; grand total mail, authorized and unauthorized, 9.14. The authorized mail space was 6.966 per cent of the total train space; that is, the total mail space exceeded the authorized by 31.2 per cent.

The witnesses for the department, by transferring from mail service to passenger service a certain amount of the space charged against the mail service in the railroad exhibits, as before stated, arrived at the figure of 7.28 per cent as that chargeable to the mail service. The authorized space alone was 6.96 per cent of the total. The total mail space in plan 2 of the department, as given above, exceeds the authorized by only 4.5 per cent. In other words, the authorized mail space must be increased 31.2 per cent according to the railroads' claim, and 4.5 per cent according to the more liberal of the two department plans, in order to arrive at the train space, chargeable to the mail service.

If the full cars are charged to the service for which they were run as actually measured, and if all of the unauthorized, excess, and unused space in combination and mixed cars is divided according to the used space in the other than full cars, the authorized being counted as the used in the case of the mail, we reach the following result:

Class of service	Car-foot mileage—millions. Test period. (All roads reporting.) Full cars	Mixed and combination cars: Used[1]	Mixed and combination cars: Share of unused	Total	Per cent
Passenger, baggage and miscellaneous	12,996	1,349	511	14,856	78.06
Express	1,642	694	263	2,599	13.65
Mail	[2]760	592	224	1,576	8.29
Total	15,398	2,635	998	19,031	100.00

[1] Authorized in the case of mail. [2] Includes 32.2 millions not authorized.

According to the preceding, the mail space necessarily operated in excess of the authorized was 19.4 per cent of the authorized. As above stated, this is in contrast with the 4.5 per cent according to the department exhibits and the 31.2 according to the railroad exhibits.

Using the data in department Exhibit 74, we find that for the 16,051,577,390 car-foot-miles included, the passenger-train operating expenses were $52,922,238 for April, 1917. Of this amount the direct allocations were: Passenger, $5,073,340; express, $23,020; mail, $132,374. The remainder, $47,693,504, should be apportioned on a car-foot-mile basis; that is, 8.29 per cent should be assigned to mail, or $3,953,791. Adding the $132,374 directly assigned, we have a total of $4,086,165 chargable for the mail proportion of the car-foot-mile service above indicated. The 16,051,577,390 passenger-train car-foot-miles are equivalent to 267,526,290 60-foot car miles. But of these only 8.92 per cent, or 22,177,929, are mail-car miles. This gives an operating

expense per 60-foot mail-car mile operated of 18.4 cents. If the operated mail-car mileage is taken at 19.4 per cent of the authorized, the authorized car-miles included would be 18,574,481, and the expense per authorized mail-car mile becomes 22 cents. In other words, under this calculation, the present mail-space rates allowed the railroads approximately covered operating expenses in April, 1917, but allowed little, if anything, for taxes and return on investment. Apportionments of property to the various services were made by railroads and the department, but the dispute as to unauthorized space affects these apportionments as well as those relating to operating expenses. According to the department Exhibit 74, it would appear for the passenger-train service of the roads included, the taxes were $3,219,721; the equipment and joint-facility rents $555,406; and 6 per cent on the investment, $221,955,996. One-twelfth of the latter combined with the two preceding items gives $22,271,460. Of this, 8.29 is chargeable to mail service for the month, or $1,846,304. Per authorized car-mile this is equivalent to 9.9 cents. The total rate per 60-foot authorized car-mile thus becomes 31.9 cents. The actual mail revenue given in this exhibit for April is $4,379,420. Per authorized 60-foot-car mile this averages 23.6 cents.

But there are other methods of obtaining an estimate of the amount of mail pay that should have been received by the railroads in April, 1917. Exhibit 51 of the department gives the equated 60-foot-car miles as 252,195,307 for the service authorized as of March 27, 1917. On the basis of the passenger-train 60-foot-car mile revenue, passenger, express, and mail combined, shown by the department Exhibit No. 74 for April, 1917, 26.94 cents, the total pay per annum would be $67,941,416. This would allow nothing for the empty space necessarily hauled in furnishing the authorized space. Increased by the 4.5 per cent, being the proportion of empty space for which the department concedes responsibility, the amount becomes nearly $71,000,000 per annum and increased 19.4 per cent in accordance with the plan of space apportionment explained above the amount becomes $81,122,050.

If the 60-foot express-car mile revenue be used—that is, 21.66 cents derived from department Exhibit No. 74, the annual pay would be $54,625,503 and, with the 4.5 per cent added, about $57,000,000. If the express-car foot-mile revenue shown on the same exhibit under plan 1 be used a larger figure is obtained. The railroads would add 31.2 per cent instead of 4.5 per cent, and in addition would allow something for the emergency service not included in the authorizations.

According to department Exhibit No. 11, the computed annual mail ton-miles for the year 1917 were 826,090,715. At 4.5 cents per ton-mile, which is the ton-mile payment to the railroads by express companies in April, 1917, for all classes of express, the mail pay would be $37,174,082. This would take no acount of the fact that the average load per car is heavier for express than for mail, a large part of the mail being transported in cars with distributing facilities. It would seem to follow that the rate per ton-mile for mail should be higher than for express. The car-mile basis seems the more nearly proper one in comparing mail and express payments to the railroads. At the express car-mile revenue of 21.66 cents shown in department Exhibit No. 74, the 252,195,307 authorized car-miles would yield $54,625,503.49. In railroad Exhibit No. 3, 22.1 cents is shown as the express revenue per 60-foot-car mile. If this is applied to the 333,891,255 total 60-foot mail-car miles claimed by the railroads, the annual mail pay as of April, 1917, becomes $73,789,967.

Exhibit No. 38 of the department shows for each railroad carrying the mails the numbers of the space routes; the numbers of former weight routes or parts of routes covered by such space routes with their termini and length; the year the mails last weighed on the former weight routes; the average daily weight of mails ascertained from such weighings; the annual rate of pay for transportation and railway post-office car service as adjusted under the provisions of the act of 1873 and amending acts, based upon the average daily weights of mails taken at last weighing on such routes; the average daily weights as ascertained by the weighing of the test period; and the annual rate of pay applicable under the weight basis of 1873. It also shows for routes continued on the weight basis the same character of information. The results for all railroad companies are shown to be as follows:

Annual rate of pay under adjustments upon the weight basis under the provisions of the act of 1873 and amending acts:	
Transportation	$58,186,630.27
Railway post-office cars	3,977,675.03
Total	$62,164,305.30
Annual rate of pay applicable to weights of mail ascertained by special weighing, March 27 to April 30, 1917:	
Transportation	$65,569,234.07
Railway post-office cars	3,977,675.03
Total	$69,546,909.10

We are not impressed with the argument advanced by the department to the effect that if payment for the service is reasonable on the average, that railroads not operated under average conditions may with propriety be required to perform the service at or below cost; or that the relationship of the government to the railroads is such that we may require them to transport mail at lower rates than would otherwise be fair and reasonable. Reduced to its last analysis, the claim is that because the public is peculiarly interested in transportation of the mails, and the railroads are quasi-public utilities, they may be, with propriety, required to transport mail for the government at rates lower than we would be justified in prescribing under ordinary circumstances and conditions. The necessary corollary is that any resulting deficiency must be made up from other traffic. We have examined the conditions under which the mails are transported, and have not found that the nature of mail transportation service is so distinguished from ordinary transportation business that any departure from the ordinary rules for determination of the reasonableness of rates and compensation is justifiable.

In many respects the mail service required differs from that connected with any other. For example, the service must be furnished on demand and must be given preference over any other service performed by railroad passenger trains; and extraordinary care and attention must be given to speed and connections with other trains under penalty of a fine for failure to deliver.

These distinguishing features and a number of others indicate that in some respects the conditions of service are more exacting and burdensome than conditions with respect to other services in passenger trains. The matters referred to by the department should have consideration in fixing fair and reasonable rates and compensation, but they do not justify us in prescribing unreasonably low rates for such service.

At the hearing the department and the railroads each submitted a plan for the ascertainment of payment for mail transportation and methods of operation of the service. The department plan proposes a continuance of the existing space-basis system with certain modifications.

Department Exhibit 81 shows the estimated and apportioned expense, including the directly allocated expense, for the mails, and the net income at the same rate per car-mile as the railroads derive from the carriage of express, based on like estimates and apportionments. On this basis a uniform rate is deduced which is applied to the authorizations as of March 27, 1917. It is contended by the department that the fair and reasonable rate or compensation for the transportation and service, on the bases of estimated cost

and fair return, should not exceed $54,415,778.96 per annum on the basis of the authorization on the date named, or 21.5 cents, or pro ratio thereof, a 60-foot-car mile of service for any unit of space.

It is asserted by the department that the space-basis system has operated satisfactorily so far as the administration of it is concerned; that it has been administered fairly and in keeping with the spirit of the law, and has been applied uniformly throughout the country; that it has permitted of departmental economies not possible under the weight-basis system, and that it has saved the government large sums of money. The system is a new one, and the proposed changes in the plan are those that have been found from experience to be necessary in order to do justice to the railroads and the department.

The specific advantages of the space-basis system are asserted by the department to be that only the service specifically authorized is required of the railroads, and all service authorized and performed is paid for; that it enables the department to better control dispatches of mails and to maintain closer supervision of the service; that it insures a better adjustment of the postal service to the needs of the department; that it conserves car equipment; that it compensates for unusual variation in the volume of the mails, and for all emergency service; that it harmonizes with the greater use of terminal railway post-offices; that it will tend to standardize cars and car units; that it gives recognition to frequency of service which is ignored under a weight basis; and that it is a practicable, equitable and satisfactory system under the condition of mail transportation in this country.

The railroads contend that the plan of the department based upon the payment fixed in the law will result in grossly inadequate payment to them, and that the proposed modifications of the rules do not cure the deficiencies in the system which its operation has disclosed.

The railroads further contend that the deficiencies inherent in any space-basis system as a measure of payment for service grow out of four circumstances: (1) In ignoring weight, it is irresponsive to the volume of traffic handled by the railroads either collectively or individually, is therefore unjust and incorrect in principle as applied to the entire traffic, and results in an inequitable distribution of pay among the several lines and routes; (2) it does not conform pay to train operation and train consist; (3) it necessarily involves the substitution of count for measurement with respect to 55 per cent of the authorizations made; (4) in its final results it is dependent upon administrative interpretations and rulings.

It is pointed out by the railroads that the effect of the space basis has been to reduce their pay approximately 20 per cent below that accruing from its original installation, accompanied by an increase of more than 20 per cent in the volume of the traffic.

The plan proposed by the railroads is a weight-basis system, except only so far as R. P. O. apartment cars and closed-pouch service are concerned. The transportation of the cars is to be paid for on the basis of a car-mile rate with respect to the linear feet of distributing space in each car. The plan of payment is modeled after the weight basis as provided in the law of 1873, but is simplified in some respects. Weights are to be ascertained annually on the plan under which weights have been taken in the past, except that railroad employees are to do the weighing, and that the cost of the field work shall be borne by the railroads.

The plan is designed for uniform application throughout the country, but a "differential" of 33 1/3 per cent higher rates is suggested for application in New England territory, including Lang Island, where, it is asserted, relatively higher operating costs prevail in connection with the mail service than in other parts of the country.

It is estimated by the railroads that their basis of payment, if applied to the weights of mail hauled, and the service performed by them during the month of April, 1917, allowing for 7 per cent profit on the value of the property and for the New England differential, but not for a short-line-railroad differential suggested would yield them an annual compensation of $95,034,182.

With respect to the weight basis the railroads contend: (1) That payment according to the weight carried is the only basis of payment for transportation of mail matter which properly measures the volume of the traffic handled, makes proper distribution of the pay according to the relative amount of traffic handled, and is in keeping with ordinary principles applied to the assessment of charges for transportation of property; (2) that under the weight basis pay may be, and is, made for each separate class of service adjusted to particular characteristics; (3) the weight basis is founded on correct principles; the weight hauled and the distance of the hauls are the prime factors; it insures direct response to the volume of the traffic, either as a whole or by individual railroads; (4) it is only by the adoption and maintenance of a weight-basis system that a rational scheme of payment can be determined, which will readily respond to an increase in the amount of mail matter transported; (5) that it is easily applied, and reduces to a minimum department rule and regulation.

With respect to the proposed plan of the railroads the department asserts that the rates would yield the railroads annual compensation greatly in excess of that which is fair and reasonable for service performed; that in many respects the rates would result in inequalities of payment between railroads, and that the rates are all unduly high because based on excessive and unreasonable calculations as to space operated.

Reasonableness of the Present Rates

Throughout the proceeding the railroads asserted that rates and compensation received by them for transportation of the mails and services connected therewith were and are much lower than reasonable; that the annual aggregate payment is unremunerative and unduly low, and that it is not equitably distributed as between railroads. It is asserted that this is shown by comparisons of the growth of the mails transported with the payment therefor. Exhibits filed by the railroads show that between 1900 and 1917, postal revenues increased from $102,354,579 to $329,726,116, or 222 per cent, while railway-mail pay increased from $37,315,724 to $62,750,557, or 68 per cent. Between 1907 and 1918 postal revenues very nearly doubled, while railway-mail payment increased but 13 per cent. It is shown that postal receipts from 1900 to 1918 increased over 200 per cent, and that the percentage thereof paid to railroads has declined over 50 per cent.

The mail service of railroads in 1898 amounted to 272,714,000 ton-miles. In 1917, as shown by the weights of the test period, the ton-miles of service were 826,090,000. It is asserted by the railroads that this shows that the service increased 202.91 per cent, while the pay was increased about 80 per cent.

It is shown that during the period from 1898 to 1917 the work performed by railroads in handling freight as measured by ton-miles of revenue freight increased 246 per cent. The growth of mail and freight traffic was about the same in percentage. The increase in freight revenue was 222 per cent. There was during the period a decline in ton-mile earnings of from 7.53 to 7.15 mills, or 5 per cent. If the decrease in the ton-mile rate for mails was the same, railroad earnings from the increased mail traffic in 1917 would have been $98,640,000. During the same period passengers carried 1 mile increased from 13,000,000,000 to 39,000,-

000,000, or 200 per cent, as compared with an increase of about 202 per cent in the volume of the mail. The revenue per passenger-mile increased from 1.97 cents to 2.09 cents, or 6 per cent. Applying the same percentage of increase in unit rates for carrying the mail, and allowing for the increase in the volume of the mail, the railway-mail pay in 1917, to have kept pace with the relative increase in passenger revenue, would have been $110,000,000. There are no data in the record as to ton-miles of express for the same period, but from 1908 to 1917 the express revenue of the railroads increased 312.67 per cent. A similar increase in mail revenue would have produced $141,440,000. If out of the increased postal receipts of 1917 the railroads had received the same percentage as in 1898, payments for the mail would have been, in the aggregate $126,960,000.

It is also contended by the railroads that existing rates for mail transportation are unduly low as compared with rates for transportation of the same or analogous articles by freight or express. Freight-traffic officers in the eastern, southern, western and New England territories made studies of the earnings from mail traffic as compared with earnings from freight traffic. It is asserted that 60 per cent of mail tonnage, consisting of parcel post, is directly competitive with railroad freight service. That is to say, the owner of articles transported may and does, at his election, employ the service of the department, conducted for it by the railroads on their passenger trains, or the freight service of the railroads on their freight trains. It is further insisted that in arriving at a reasonable basis and scale of rates for the transportation of this matter by mail consideration should be given to the rates charged for the transportation of the same articles by freight, with proper allowance for the superior character and greater cost of the mail service.

What Should Be the Basis of Payment?

Determination of a basis upon which the compensation of railroads for transporting the mails of the country should be computed has been a perplexing problem from the beginning. The service is varied in character and is rendered under such conditions with regard to speed and care that no system has yet been devised that has met the approval of both the department and the railroads.

In 1876 the President appointed a commission known as the Hubbard commission, to investigate and report on the subject of railway-mail pay. In April, 1878, it recommended that a system which recognized space, cost and speed should be established. Other commissions or committees of the Congress or the department made reports to the Congress in 1883, 1901, 1911 and 1914. Each recommended the adoption of some space system, except the Wolcott-Loud commission in 1901, one member of which, in a separate report, favored the space basis. The commission of 1883 recommended a system which would take into consideration "weight, space and speed." The report of a committee in 1914 was to the effect that the space basis should be adopted. The latter report resulted in the passage of the act under which this proceeding was instituted.

During all these years there has been ceaseless controversy between the railroads and the department. The chief contention of the former has been that payments have been unreasonably low for the service rendered. On the other hand, the department has contended, with equal earnestness, that payments have been greater than the required service warranted. The successive investigations were confronted with the same difficulty of determining the cost of the service on any basis. In the instant proceeding extraordinary efforts have been made to determine the cost to the railroads. The results obtained are fairly open to criticism in some respects; nevertheless, we have before us enough reliable data to enable us to reach an approximation of the cost of the service as a guide to the establishment of rates of compensation to the railroads that shall be fair and reasonable. Having reached this conclusion, we are confronted with the problem of the manner in which the service shall be stated to determine its amount as the basis of payment.

Rapid development of the parcel-post service has made variation in the volume of the mail from day to day an increasingly important element. It is obvious that weight of the mail taken once for one month and dating from the beginning of the fiscal year, is by no means as accurate an ascertainment of the volume of the movement for the entire year as is required for the application of a ton-mile rate. It may be conceded that weights taken once a year involve less uncertainty with respect to a measure of the volume of the traffic than weights taken once in four years, but such a degree of uncertainty would still remain as would doubtless perpetuate the controversies that have been the common experience of the past years.

According to authorizations of March 17, 1917, 48.79 per cent of the total payment to railroads was made for transportation in full cars. Of this 30.90 per cent was for transportation in R. P. O. cars. The largest quantity of mail is transported in full storage cars. The average load in full storage cars was about 6.5 tons. A steel storage car weighs 50 tons. The average load in R. P. O. cars was about 2.5 tons, and the weight of the car about 60 tons. If the railroad is required to haul 50 tons of car-weight in hauling 6.5 tons of mail, and 60 tons of car-weight in hauling 2.5 tons of mail, the chief source of expense is in transportation of the car. For example, if one mail route transports in a car 2 tons of mail the haulage necessary, counting the weight of the car at 50 tons, is 52 tons; and if over another route 10 tons is hauled in the car, the total weight would be 60 tons. The relation between the two routes, so far as expense is concerned, is more nearly 52 to 60 tons, and not 2 to 10 tons, not counting the cost of loading and unloading.

The railroads insist that variation in storage-car loading over different routes and in different parts of the country is so marked that the space-basis system is not, and can not be made, responsive to the volume of the service. Full storage-car loadings are shown for 30 states of the Union. In 4 states the average loading during the week of April 12 to 18, 1917, was below 5,000 pounds; in 11 between 5,000 to 10,000 pounds; in 9 between 10,000 and 15,000; in 3 between 15,000 and 20,000; in 2 between 20,000 and 25,000; and in 1 over 25,000. The assertion is that the space basis gives no recognition to the differences in weight and therefore is improper. The criticism as applied to the system of rates applicable to storage cars now in effect is not without some merit. It is shown of record that on routes over which large quantities of storage mail are regularly transported there has been the largest percentage of reduction of revenue since the space-basis system was established. If this be admitted, and if it be conceded that the heavy storage routes are now underpaid, it does not follow that any space-basis system of rates should be condemned. We might with equal propriety condemn the weight-basis system because under the per-ton-mile rates proposed by the railroads in this case solid trains of heavily loaded storage cars for long distances would yield much greater relative revenue than would result from the movement of lighter loaded cars for short distances. The fact is that the storage-car load moving over any particular route does not vary to any material extent from year to year, and therefore it is feasible to so fix the rates per car-mile as to give due recognition to heavier loading in such cars.

In mixed cars where the smaller units of space are required and authorized weight is not the chief element of the service. On the other hand, it seems practicable by an adjustment of rates per unit on the space basis to take into consideration the peculiar features of the mixed-car service.

Service in R. P. O. and apartment cars is such that the weight of the mails forms an insignificant element of transportation expense. The average weight of mails in R. P. O. cars is about 2.5 tons; in 30-foot apartment cars, less than 1 ton, and in 15-foot apartment cars, about one-fourth of a ton. An R. P. O. car weighs 60 tons, and the average weight hauled therein bears so little relation to the weight of the car that the increase in the cost to the railroad because of the load of mail can hardly be computed. The same thing is to be said of the apartment cars. The railroads in their plan propose that the linear feet of distributing facilities in the car shall be the basis of payment, rather than the weight of the load of mail.

The space basis encourages the use of cars and space in trains to the extent that they are needed to meet the requirements of the mail service. Under a weight basis there is no special incentive for either the department or the railroads to economize in the use of cars, or space in cars.

The space-basis system has been in operation with respect to 90 per cent of the volume of the mail transported for about three years. It has been in operation for the larger part of the time when conditions with respect to rail transportation were not normal. Early in 1918 many passenger trains were withdrawn from service in all parts of the country, and there were many changes of routes and authorizations consequent thereupon that probably would not have otherwise been made. There was insistent demand upon the department from the railroads to consolidate and increase loading wherever possible, and to conserve the use of equipment to the utmost extent. It is doubtless true that during the test period conditions were about normal. That period, however, was only five months after the system had been initiated. At that time it was still a new system to the department and the railroads alike. Its installation and operation have evidenced no break in the continuity of mail movement throughout the country and the three years of its duration has demonstrated that it is a workable system.

Defects in the administration of the system have been acknowledged by the department, and suggestions have been made by it with a view to their correction. The record discloses others which may be avoided in rules to be prescribed. For example, from the exhibit filed by the department on argument, heretofore reproduced, it appears that on Septembr 30, 1917, one year after the space basis was established, the payment for emergency authorizations amounted to $90,473.10. On June 30, 1919, the payment for this class of service was $782,820.75, or an increase of about 765 per cent. This marked increase in emergency authorizations indicates, if it does not demonstrate, that the department has not made its regular authorizations large enough to care for the mails tendered to the railroads from day to day. Regular space authorizations which continue indefinitely enable the railroads to make their train consists to conform thereto, and reduce to a minimum the opportunity for controversy and dispute.

It is essential to the social and commercial life of the nation that the mails shall be handled promptly and transported rapidly from point to point throughout the country. To insure this it is necessary that control of transportation of the mails by railroad should be lodged with the postmaster general. He does, and he should, designate the trains in which the mails shall be carried; the kind of cars, and the manner of movement between designated points so as to best serve the interests of the people; and, in general, he must hav administrative control of the transmission of the mails by railroad as well as by other means. This control he should exercise, no matter how the service is stated as the basis of payment for it. It is in the interest of the government to have the compensation fixed on a basis that will enable the department to so supervise the service as will insure a wise and judicious expenditure of the public money, and at the some time encourage the use of railroad facilities so as to minimize economic waste.

Side, Terminal, and Transfer Service.

Side, terminal and transfer service consists of carrying the mails between railroad stations and post-offices and between railroad stations.

Railroads have performed the service since 1873, at least. Payment for the service has at no time been separately provided, but has been included in the line rate. When the weight basis was established in 1873 railroads continued to perform the service without special contract. At its inception, and for many years thereafter, this character of service was relatively unimportant. In later years, and especially since the passage of the parcel-post law, the service has become a distinct financial burden upon some railroads. This is especially true as regards short lines, where it frequently happens that the side and terminal service costs represent a large part of or even exceed the total payment. The amount of the service on one route differs materially from that on another. It is therefore inequitable as between railroads to include the payment for the service in the line rate. Railroads that perform the service at relatively great expense are underpaid, and those that have little of the service to perform or perform it at small expense are overpaid. Neither is it possible to fix one rate that will result in fair and reasonable compensation to each railroad.

There is every reason from an economic standpoint why the railroads should continue to perform the service. It is a most important service to the public. The people have to pay for it in the end. The arrangement that will result in the least expenditure of the public money, and at the same time do justice to the railroads should be adopted. The railroads are on the ground, and doubtless can perform the service more cheaply than anyone else. If in all cases the department must provide for the performance of the service it would either have to require postmasters to do it, which might result in demands for increased compensation, or to employ contract mail messenger service, which service can rarely be obtained as cheaply, or under the circumstances, as reasonably, as the railroads can perform it.

We do not understand that the railroads object to performing the service, but in case they do perform it they ask to receive fair and reasonable compensation therefor. This they are entitled to, and rules and regulations can be made that will insure it.

Short-Line Railroads.

There are many so-called short-line railroads in the country. Most of them transport the mails. It is estimated by the department that the total pay to short-line railroads on account of transporting the mails for the year 1917 was about $800,000. Compared with the aggregate payment to all railroads the amount is small, but to some short lines the payment for transporting the mails is an important consideration.

The short lines were represented by special counsel, who contend that because of greater operating expenses they are entitled to higher rates of pay than may be found reasonable for trunk-line railroads.

The department contends that if there is to be a differential allowed the short lines over the rates prescribed for trunk lines the amount of it should be measured by the net income, 3.06 cents per car-mile, realized by the trunk lines.

It is not practicable to prescribe rates for short lines that in each instance will produce the same relative return. It is equally impracticable to base rates on the cost of the service as shown by each one. We can approach substantial justice to them by treating them so as to give due recognition to their

passenger operating revenues on the average, as compared with the average of similar revenues of the trunk lines. Much of the service by short lines is authorized in the lesser units, and comparatively higher rates for such units might, in a measure, furnish nearer adequate payment for the service they perform. Many of them perform a great deal of side, terminal and transfer service, the expense of which is to be hereafter assumed by the department.

The rates we prescribe will in some instances represent a reduction in the annual compensation of some short lines. This, however, does not mean that the rates are not fair and reasonable. On some short lines rates on the weight basis of 1873 have yielded as high as $1.49 per ton per mile. This occurred where the amount of mail was comparatively large and the movement but one round trip a day. In order, however, that the short lines shall receive due recognition of the conditions under which they operate a provision for a minimum payment may be made on all mail routes.

Application of Rates Found Reasonable

At the hearing the department objected to evidence submitted by the railroads to show that operating costs had materially increased during the year 1918. The ground of the objection appears to be that ascertainment of cost of the service as of the test period could not be used as the basis for rates at a later period and under other circumstances.

The railroads contend that the operating costs of April, 1917, are a conservative average of costs throughout the period from November 1, 1916, to December 31, 1917, and that wage and price levels have greatly increased since the last-named date. It is asserted by the railroads that wage and price levels from January 1, 1918, to the date of hearing and since were fairly represented by the operating costs of the months of October and November, 1918, at which time most wage increases had taken place, and had been made retroactive to the first of the year. A study of operating costs for the months of October and November, 1918, made by the railroads, based on the cost of operation per train-mile, as disclosed by our records and the records of the Railroad Administration, was, as asserted by the railroads, an increase in operating expenses of about 49 per cent per train-mile 1918 over 1917. During the period, it is asserted by the railroads, there has been additional capital investment on steam roads of $578,396,428. Adding to the investment in road and equipment as of December 31, 1917, the additions to capital account during the year 1918 and dividing the same between passenger and freight, and between passenger, mail and express, and apportioning the taxes of 1918, excluding income taxes, and allowing for the percentage of increase in cost of operation at 45 per cent, the railroads calculate that the revenue sufficient to pay operating expenses and taxes and a return of 7 per cent on the value of the property devoted to the mail service in the year 1918 exceeds by more than 30 per cent a similar yield for 1917.

The railroads contend that under the department plan of apportioning expenses as between freight and passenger, a total compensation sufficient to pay operating expenses computed on the basis of the railroad apportionment of space, taxes, and a 7 per cent return upon investment under the conditions of 1918 is $121,675,988 as compared wth $93,981,267 required to produce the same result in 1917. The former amount exceeds the latter by more than 30 per cent. It is insisted by the carriers that upon the basis of these figures they are justified in suggesting the addition of 30 per cent to the scale of rates that may be found reasonable under the conditions of 1917 as the basis of reasonable compensation to be applied for the future and to the period since January 1, 1918.

It is the contention of counsel for the short lines that we have jurisdiction to fix fair and reasonable rates of mail pay for each of the fiscal years beginning July 1, 1916, and ending June 30, 1919; and to readjust the rates at any time after the lapse of six months from the entry of an order by us. It is also contended that we have power to direct the postmaster general to pay reparation to certain railroads where they were required to perform side and terminal services for payment alleged to be unfair and unreasonable.

Under the law, as we construe it, we are empowered to fix fair and reasonable rates from the date the rates named in the statute became effective. When we have made finding, any questions with respect to readjustment of payment rest, under the law, with the postmaster general. We have no jurisdiction in this proceeding to award reparation to any railroad as the result of our findings.

We do not find that the New England railroads should be given an increase of 33 1/3 per cent over the rates prescribed as generally applicable. As tables already presented have shown, the space basis is in itself more favorable to the New England carriers in general than the weight basis. The failure of the weight system to afford adequate payment for transportation of the mails arose chiefly because it gave no recognition to frequency of service except, of course, in the case of R. P. O. cars. The hauls of mail in New England are comparatively short, and mail is carried on a larger number of trains than the average. In the scale we prescribe due recognition is given to frequency of service, and the relatively higher rates for smaller units will yield to the carriers in the New England territory a greater compensation than they have enjoyed in the past.

In addition to this we provide that the carriers in New England, as elsewhere, shall be relieved from the cost to them of side and terminal services.

While the passenger operating expenses in New England are somewhat higher on the average than in the country as a whole, this is not true of all the New England lines, and there are many carriers in other parts of the country whose situation is equally unfavorable.

On the whole, reasonable payment is provided for the railroads. Doubtless there will result here and there some inequality or injustice to particular roads which may require readjustment. Earnest and hearty co-operation between representatives of the department and the railroads to carry out the plan prescribed will go far to insure that the mails of the country will be transported under conditions that will conserve the public interest and the railroad interest, and will at the same time reduce to a minimum the controversies and misunderstandings of past years.

Photo from International Film Service.

Floods in the South. Bridge Over the Chattahoochee at West Point, La., two Spans of Which Were Carried Away

Mr. Hines Asks Co-Operation of Shippers

DIRECTOR GENERAL HINES has issued the following statement to the shippers of the United States:

"Indications are that the demand for transportation during the remainder of January and February will be extraordinarily heavy for this season of the year, and I take this means, first, of giving assurance that the Railroad Administration proposes until the last day of federal control to make every effort to meet this extraordinary demand as fully as possible and, second, of pointing out some of the limitations which are operative now and which will continue to be for some time to come upon the performance of full transportation service.

"For the week ended January 3, 1920, the number of cars of revenue freight loaded show an increase of 162,228 cars over the same week of 1919 and an increase of 216,269 cars over the same week of 1918. There is promise of even greater increase as the winter progresses.

"This increased demand is doubtless due largely to the fact that as a result of the cessation of industrial activity following the signing of the armistice business was in abeyance in the spring of 1919, as was indicated by the fact that there were large surpluses of cars in all parts of the United States lying idle during those months. Business was again interfered with by the abnormal difficulties due to the coal strike in November and December, but since then the accumulated business has been demanding transportation with a rush.

"The equipment available, despite the great use to which it has been put, is in practically normal condition at the present time and has been constantly improved since the shopmen's strike in August, 1919, which materially interfered with repairs.

"In the three years preceding federal control the average number of freight cars acquired per year (including equipment rebuilt at company shops) was 97,158, and after allowing for retirements the net average addition was only 9,627 cars per year. During the two years of federal control the average number of freight cars acquired per year will be approximately 84,500, and after allowing for retirements the net average addition will not be greatly in excess of the average net additions during the preceding three years. During these two years no freight cars could be acquired in addition to cars ordered prior thereto but delivered during federal control, except a total of 100,000 freight cars, all of which are included in the average per year above stated for the two years of federal control. The 100,000 cars were ordered in 1918 and represented the maximum for which material and labor could be obtained, in view of the demands for other war necessities. It was impracticable in this order to provide for any additional refrigerator, stock, or flat cars, and there is an especially serious shortage in these classes of equipment. No freight cars could be ordered in 1919. This was due to the clearly understood policy of Congress in favor of the early return of the railroads to private ownership and because of the resulting lack of appropriations to be used for new capital expenditures.

"In February, 1919, I recommended a definite extension of federal control, and gave as one of the important reasons the faot that it would admit of entering at once upon an extensive program for increasing the equipment and improving the terminal and other facilities of the railroads to take care of the growing business of the country. This view was not acted upon, and no program for acquiring important amounts of additional equipment has yet been entered upon. In October, 1919, I pointed out the pressing needs of the situation to the chairmen of the congressional committees, and the matter has been specifically brought to the attention of the railroad companies.

"But the Railroad Administration has not at any time been, and of course is not now, in position to obtain the additional new equipment which is needed. Such equipment is chargeable to capital account, and of course therefore must be paid for by the railroad companies.

"To make this inadequate amount of equipment go as far as possible the Railroad Administration has pooled equipment in order to equalize the supply as far as possible and give all shippers as equal treatment as possible under the circumstances; has made use of the permit system in order to avoid accumulations; has appointed special terminal committees to speed up the movement of freight through terminals where a great deal of delay has occurred in the past; during the prevalence of difficult situations in the wheat-growing territory has given preference to the loading of wheat on the ground; has placed the refrigerator car supply of the country under one agency to get the maximum utility out of all such cars available; has carried on a constant campaign to bring about heavier loading of equipment during the prevalence of the greatest need for the movement of coal and at the present time has given coal preference for loading in open-top equipment; has eliminated circuitous routes as far as practicable; has transferred locomotives at different times to the portions of the country where they were needed the most; and has given special attention through centralized agencies to take care of seasonal requirements and meet peculiar conditions which have resulted from bad weather and certain drought conditions, and in every way has tried to the very utmost to make the equipment and locomotives available do the greatest possible amount of service.

"By reason of these expedients of unification the railroads were enabled in the fall of 1919 to handle an exceptionally large business under exceptionally difficult conditions. The postponement of buying in the spring concentrated an extraordinary demand for commodities in the fall. For example, there was an exceptionally small output of coal in the first six months of the year and a consequent intense demand for coal in the fall. Beginning with a movement of 11,000,000 tons of coal per week early in September, the railroads built up this movement to over 13,000,000 tons in the week ending October 25, making an average weekly movement largely in excess of any pre-war movement. At the very time when the demands of business of all sorts were becoming most pressing, the necessity arose for moving the wheat crop. From July 6 to December 26, 76 per cent of the wheat crop was moved from the farms; the volume moved was 645,318,000 bushels—7,940,000 bushels more than had been moved during the same period of 1918.

"The problem has been intensified by the falling off in loading per car from 1918, when under pressure of the war very heavy loading was secured. The loading per loaded freight car fell from an average of 29.2 tons in the first 11 months of 1918 to 27.8 tons for the same period of 1919, or a decrease of 4.89 per cent, this representing a loss of more than 105,000 cars available for loading. This falling off has occurred in spite of continued efforts of the Railroad Administration, assisted by the cooperation of many shippers.

"Nevertheless, the Railroad Administration proposes to continue to utilize to the end of federal operation all the advantages given by unified control; it wishes to give shippers this assurance and to ask their continued cooperation."

THE SOUTHERN PACIFIC COMPANY has applied to the Railroad Commission of California for authority to lease its tracks between Seeley, Cal., and El Centro to the San Diego & Arizona. It is declared in the petition that the lease is desired because the public interest will be best served by the use of the line for the through service of the San Diego & Arizona rather than to make Seeley a junction point.

New York Railroad Club Holds Annual Dinner

Singing of Miss "Bobby" Besler and Address by Job E. Hedges Features of Big Meeting

Almost 1300 New York Railroad Club members and their guests attended the annual dinner of that organization held in the Grand Ball Room of the Hotel Astor, New York, on the evening of Thursday, January 15. The dinner was the first affair of its kind to be held by the club and the large attendance as well as the presence of a large number of the leaders in the railway and railway supply business in the vicinity of New York indicate how great was the measure of the dinner's success.

The dinner was presided over by H. C. Manchester, superintendent of motive power of the Delaware, Lackawanna & Western, who is president of the club, and H. H. Vreeland, of New York, who has been associated with the club in various official capacities from its early days, was toastmaster. The diners were also addressed by Job E. Hedges, a lawyer of New York, and at present receiver of the New York Railways Company, operating the green car lines in New York City.

The entertainment feature of the evening was the singing of Miss "Bobby" Besler, daughter of W. G. Besler, president of the Central of New Jersey. Miss Besler was in France for 18 months with the Y. M. C. A. in the A. E. F. and she made a special hit by leading mass singing by the diners of those songs which she had used when in France with the American Expeditionary Forces.

Mr. Manchester made the address of welcome. He has only recently been elected president and so he took advantage of the occasion to present for the club to Miles Bronson, general superintendent of the electric division of the New York Central, the retiring president, a silver loving cup in appreciation of Mr. Bronson's services to the club as its president.

Mr. Vreeland in his remarks outlined briefly the history of the New York Railroad Club and emphasized its importance as a means of education and advancement for the younger men in the railway field.

Mr. Hedges spoke of his problem as receiver of the New York Railways Company and emphasized how difficult it was to secure a favorable public opinion in favor of rate adjustments permitting a proper return on the property with which he was connected, or others like it, as well as proper expansion and development.

"The most difficult, the most necessary and the most trying thing under our form of government," he said, "is to create a public opinion on any topic, and as the country gets larger and the people more numerous and the questions more complicated, it is absolutely impossible for the general public to understand all the peculiar problems that affect the general public. And it is not remarkable that they don't understand them, because the public itself can only understand, as a rule, one topic at a time, that in which it is most interested and which most vitally affects it, and therefore every man's public is that part of the general public in which he lives and with whom he has a kindred topic. People talk idly and glibly about appealing to public opinion, as if it were a sort of general arbiter of all our questions. As a matter of fact, the general public only know something where it immediately affects them. Now, whether in New York City, only by way of illustration, there should be accorded an increase of rate, it doesn't settle the question of the attitude of the public to the transportation problems at all. It only settles the attitude of the public toward a particular transportation problem at a particular time. And therefore every big industry in these United States, no matter what it is, will never be permanently successful in establishing itself with the general public until it educates the general public along its own lines and its thoughts as it grows. And that applies to everything.

"I wouldn't want any one in this room to think that I am unintelligent enough to assume that I know much about the railroad business, but I know this—or at least I believe it—that the railroad business would never find itself in its present unfortunate condition if it had educated the public as it progressed from the beginning until now. Government can do much, not everything. The public schools are a great desideratum and a necessary part of our national education.

The public schools cannot do everything. The public schools can teach enough of language, or ordinary history, of middle-class education, so that a person need not go wrong if he desires not to go wrong. Anything beyond that of public education must be done by individuals. It isn't their contractual civic obligation to do it, because the state is supposed to do it, but the sensible thing is to anticipate our position by having people with full knowledge of the facts.

"I can understand, from reading, that when railroads were projected, in many cases they had to be projected practically by force. There is no doubt about it. There wasn't every mind in the United States that could understand or vision the proposition of extending a railroad from the Atlantic Coast to the Pacific. There were very few minds big enough in vision to understand that on these roads rested the success and advantage of the people who opposed them. Nothing remarkable about that; and the men who took those roads and made them took chances with everything. I can understand that in cities where subjects are made a matter of discussion for the advantage of the discussers, the general public stands on the side line as a sort of umpire of the game. There is no difficulty about appreciating that. But the crowd on the side lines would consider it their problem if they knew what it was all about. I assume that there are doctors who can prescribe something which will stop pneumonia and save a life, and yet there are homely remedies that help—to wear rubbers or to carry an umbrella is of some assistance. But you cannot describe rubbers and an umbrella in long and scientific words. Therefore, there is no reaction in favor of the proposition that if you had those things you needn't hire longer words at a higher price. . . .

"Now, therefore, the final question of all these topics, railroad or otherwise, is how can people active in a particular industry so educate a public with which they are brought in contact, regardless of other questions affecting the public, that they are thinking in the same terms of language. And you cannot persuade the average mind unless you can talk in the same language that that mind uses. The average mind knows about a dividend. Of course, everybody does that. But the relationship of construction to cost of production, to wage, to return on capital, is predicated on the intelligence a man happens to have in his own particular line, and if from that you can argue by analogy of the bigger topic, why, the proposition is solved.

"Take this city. Within two years there has been taken out of the transit securities—we won't discuss why—two hundred of millions of dollars of values. Those securities represent that diminution in the markets where securities are sold and purchased. Now, if that can happen with five millions of people listening to this discussion, and waiting for their representatives to settle it, what right have you or I as railroad men to assume that that public can be informed within ninety days, and the thought only taken up when the discussion is placed before public officials by petition.

"Now, the deduction from that is that in a great republic like this—and its test of stability is its test of numbers—you cannot expect intellectually that a hundred millions of people can understand one-tenth of the topics proposed to them when many men of intellect and without morals, or of understanding, or without understanding, are taking the destructive and not the constructive side. It seems strange that after we have been a nation 143 years, that railroads have to argue for their rights; that people who hold stocks and bonds and want to use these transportation companies, and freight and passenger traffic, whatever it may be—that they have got to be continually besieging some one to let them live, to beg the public to let them serve the public. Why isn't the public taking the initiative and putting them in the way of getting the best service out of them? I want to say—and I am convinced of it the more I read and observe—that every industry has got to educate its own immediate public, and that specialized education plus the education of the schools is the only thing that will preserve Americanism."

E. C. Stokes, ex-Governor of New Jersey, was also to have spoken but was unable to attend because of illness.

The dinner was arranged by a dinner committee consisting of C. C. Castle, vice-president of the National Railway Appliance Company; D. W. Pye, president of the Tuco Products Corporation, and Roy V. Wright, managing editor of the *Railway Age*.

Annual Meeting of the American Society of Civil Engineers

THE SIXTY-SEVENTH ANNUAL MEETING of the American Society of Civil Engineers was held in New York on January 21 and 22, 1920, inclusive. The program for this meeting included business sessions on the morning and afternoon of January 21, with the president's reception in the evening, and an excursion to the Port of Embarkation of the United States Army at Hoboken, N. J., and the Brooklyn Navy Yard on the morning of January 22, with an informal smoker that evening.

The Special Committee to report on Stresses in Railroad Track presented its second progress report on Wednesday morning. This was presented under the following headings: Tests to Determine the Effects of Speed and Counterbalance on Stresses in Rail; Track Depression; Depression, Flexure and Bearing Pressure of Cross Ties and, Transmission of Pressure in Ballast. The committee has been co-operating with a similar committee of the American Railway Engineering Association and the report was presented simultaneously to the two societies.

The most important feature of Wednesday's session was the discussion of the report of the Committee on Development which suggested the basis for desirable changes in the activities of the society. From this discussion the sense of the meeting was developed and crystallized in the form of resolutions which are to be submitted to members for a letter ballot. These resolutions outline in a concrete way the recommendations of the Committee on Development and are so worded that action on them on the part of the members of the Society will be determinative of policy. In brief, the recommendations of the Committee provide the basis for both the internal and the external development of the Society and that the Society adopt the principle of becoming active in national, economic, industrial and civic affairs and for that purpose enter into co-operation with other engineering organizations of the country and that a national engineering organization be formed with the purpose of considering all matters of common interest to these professions and to further the public welfare wherever technical knowledge and training are involved.

The following officers and directors were elected for the year 1920: President, Arthur P. Davis; vice-presidents, Francis Lee Stuart and R. A. Cummings; treasurer, Arthur S. Tuttle; directors C. W. Hudson, Carleton Greene, John A. O'Connor, J. C. Hoyt, Anson Marston and D. C. Henny.

CANADIAN PACIFIC DANCE. After the departure of the last train from the Windsor street station of the Canadian Pacific at Montreal, Quebec, on the evening of December 31, the huge waiting room and concourse of the station were turned over to the road's employees for their annual entertainment and New Year's Eve ball. Approximately 6,000 employees attended as guests of the executive officers of the company. This is the first instance on record where an entire station of the size of the Windsor street station has been wholly turned over to employees, for entertainment purposes.

Report of the Division of Public Service

Its Business Is to Represent the Interests of the Traveling Public and the Shippers

The Railroad Administration has made public the annual report of Max Thalen, director of the Division of Public Service, to Director General Hines for the year 1919. This is to be followed by reports of the other divisions, which will be released from time to time.

"The Division of Public Service is in effect a full-fledged railroad commission or public service commission operating within the Railroad Administration," says the report. "It is an agency to which the public may appeal informally by letter or in person for redress from unjust, unreasonable or discriminatory railroad rates or service, with assurance of prompt, courteous and sympathetic consideration.

"This division was created for the purpose of insuring that the interest and the point of view of the shipping and the traveling public receive full consideration in all action taken by the Railroad Administration. The advice of the division is asked in all matters of importance affecting the public.

"In importance, the adjustments range from the installation of additional passenger trains down to the inclusion in the menu of the dining cars of the 'St. Louisan' of the Pennsylvania Lines West of shredded wheat biscuit at the request of a passenger who stated that he missed this particular form of nourishment on that train for the first time in six years."

An analysis of the service complaints handled by the division from February 1, 1919, to December 1, 1919, apart from those handled by the Bureau for Suggestions and Complaints showed that 20 involved consolidated ticket offices, 64 express service, 172 freight service, 52 grade crossings, 598 passenger service, 75 spur tracks, 108 station facilities, 110 station service, 39 miscellaneous complaints and 418 car shortage.

"In each of these cases," the report says, "personal attention has been given to the complaint and every effort made to develop the facts and to have a just and reasonable service established in case it was not already in existence. Many of the matters listed involved large questions of policy which it was necessary to consider with other divisions of the Railroad Administration and in some instances with the director general personally." Thirty-eight requests for service improvements were investigated directly on the ground by a representative of the division.

Railway Service Adjustments

The report cites the following important railroad service adjustments effected in 1919 in which the divisions of operation, traffic and public service, working with the regional directors and federal managers, were concerned:

1. The restoration of passenger service following the signing of the armistice. Up to June 30, 1919, 11,461,758 passenger-train miles were reinstated out of a total of 67,290,562 eliminated up to December 31, 1918.

2. Many readjustments of passenger train schedules have been secured in order to effect improved connections and to provide more adequate and convenient service for commuter traffic.

3. Accommodations for the public at passenger stations have been improved.

4. Additional freight trains have been put on where existing service was inadequate, faster schedules have been established in some instances, especially for perishables and live stock, and schedules have been readjusted to provide better through service.

5. Modified instructions were formulated and issued covering the operation of the "sailing day" plan, meeting as nearly as possible the objections of all concerned. Complaints on this subject have been subsequently only occasional and sporadic.

6. The division has given individual attention to many complaints of car shortage from all sections of the country.

The report outlines the appointment of special terminal committees in 73 of the more important terminals of the country for the purpose of doing everything in their power to expedite car movement and to increase freight car efficiency. Representatives of the Railroad Administration and of the shippers' organizations serve on these committees, and the report sets forth that constructive results of a high order have been secured.

Until this division was created, the report says, there was no public regulatory authority anywhere in the United States with jurisdiction over interstate passenger service, while as to interstate freight service the jurisdiction of the Interstate Commerce Commission was limited to certain matters of car service and of safety. In complaints affecting railroad service the Division of Public Service acts in conjunction with the divisions of traffic and operation. Investigations are conducted through the regional directors or federal managers of the various railroads. When deemed necessary a representative of the division makes personal investigation on the ground. The division also acts in co-operation with the several state railroad commissions in matters of local railroad service, safety and equipment.

Duties of Division

The Division of Public Service performs the following duties among others:

(1) Receives, follows up and makes disposition of complaints from the public concerning rates, fares, charges, classifications, regulations and practices affecting freight, passenger and express traffic of carriers under federal control.

(2) Exercises joint jurisdiction with the Division of Traffic over the establishment and modification of rates, fares, charges, classifications, regulations and practices affecting freight, passenger and express traffic and over the various freight-traffic committees of the Railroad Administration.

(3) Receives, follows up and makes disposition of complaints from the public concerning railroad service matters—freight, passenger and express.

(4) Acts as a "friend at court" for the short-line railroads.

(5) Supervises the relationship between the Railroad Administration and the state railroad commissions and other local public authorities.

The division was created on February 9, 1918, and joined with the Division of Accounting, with Charles A. Prouty as director. On February 1, 1919, the division was organized separately, with Max Thelen as director.

The report outlines the steps taken to protect the interest of the public in all rate changes made through tariffs filed with the Interstate Commerce Commission by the director general of railroads as the agent of the President under the federal control act.

Subsequent to the creation of the Division of Public Service, it was provided that all proposed changes in rates

should first be drawn to the attention of this division with opportunity to be heard. All changes in rates made subsequent to the establishment of the Division of Public Service are made with the concurrence, express or implied, of that division, provided that if the director of traffic and the director of public service are unable to agree the matter may be taken to the director general personally for his decision.

For the purpose of giving consideration to petitions for modifications of existing freight rates, rules and regulations, freight traffic committees conveniently located in the various sections of the country were established by the Railroad Administration in the summer of 1918. These committees consist of representatives of the carriers and of the shippers.

"The shippers' representatives on these committees," the report says, "are appointed by the director of the division on the recommendation of the various shippers' organizations. Originally the carriers had one more representative than the shippers on each of these committees, but in February, 1919, this was changed to give both carriers and shippers equal representation."

The report outlines the methods used by the various committees in handling applications for changes in rates, and sets forth in detail the regulations issued during the year designed to expedite the procedure and insure the efficient handling of these applications. After the various committees have passed upon these applications they are forwarded to Washington, where the Division of Public Service is given an opportunity to pass upon them.

"Between July 1, 1918, and November 30, 1919, inclusive," the report says, "18,570 freight rate authorities were issued authorizing the filing of rate changes with the Interstate Commerce Commission. During the same period 21,262 applications for freight rate authorities were submitted by the various freight traffic committees. Many of these applications have been denied and a few are still under active investigation."

The report outlines the steps taken by the directors of traffic and public service to cut down the time consumed in disposing of freight rate applications, which resulted in a substantial reduction.

An analysis of the freight rate authorities issued during July to November, inclusive, 1919, shows that the average length of time between the date of docketing the request for rate change by the freight traffic committee affected and the forwarding of the application to Washington was 1 month and 28 days. The average time during which the applications were pending before the divisions of traffic and public service in Washington was less than 14 days.

So great has been the improvement in the handling of these matters by the various freight traffic committees and so speedy the final determination of most of the matters submitted that only few complaints as to delay have come to the Division of Public Service during the last six months of 1919, according to the report.

In six important rate cases the Railroad Administration sought the advice of the Interstate Commerce Commission, and in 155 cases proposed rate changes were taken up with the state railroad commissions affected. An analysis of freight rate authorities issued in June, July, August and September, 1919, presented in the report, shows that 70 per cent of the rate changes agreed to were reductions made at the request of shippers, 9 per cent reductions made at the request of carriers, 6 per cent advances made at the request of carriers, 3 per cent advances made to meet Interstate Commerce Commission decisions, and the remainder miscellaneous changes.

"Of the rate changes made since August 1, 1919," the report says, "63 per cent affected only interstate rates and 37 per cent included intrastate rates. Of the interstate rate changes 76 per cent were reductions, 12 per cent advances, 7 per cent combined reductions and advances, and 5 per cent advances to meet decisions of the Interstate Commerce Commission. Of the changes in intrastate rates, 88 per cent were reductions, 8 per cent were advances and reductions combined, and 4 per cent were corrections of errors."

"Prior to October, 1919," the report says, "the Division of Public Service was not consulted as to changes in existing passenger fares. The division, however, handled a number of complaints as to passenger fares and made satisfactory adjustments in all of them except in the matter of Arizona, New Mexico, Nevada and other intermountain states for a reduction of their main line passenger fares to the basis of 3 cents per mile. The division handled 246 applications of the American Railway Express Company for changes in rates and service, of which 234 have been granted. Forty of these applications were suspended for investigation by the division and 19 were referred to interested state commissions for advice and suggestions.

Changes in Rates, Rules and Regulations

The report cites the following important changes in rates, rules and regulations made by the Railroad Administration subsequent to June, 1918:

(1) Reduction of 10 cents per ton in rates on specified road-making materials when consigned to and the freight charges paid by federal, state, county, parish, township or municipal governments, to encourage road building.

(2) Consolidated Classification No. 1.

(3) Revision of grain rates, placing primary markets on a proper relative adjustment.

(4) Uniform rules and regulations governing the handling of transportation of live stock.

(5) Export class and commodity rates from central territory to South Atlantic and Gulf ports.

(6) Establishment of import and export rates via Pacific coast ports.

(7) Establishment in connection with Inland Waterways Division of through rates by water and rail, and by rail and water via Mississippi river and Warrior river.

(8) Increase in minimum weights on grain and grain products for the purpose of increasing car efficiency and to meet emergency, such minimum weights to expire not later than March 31, 1920.

(9) Emergency storage charges for the detention of refrigerator cars and of cars loaded with lumber held for reconsignment—to secure release of badly needed equipment.

(10) General adjustment of Oklahoma class and commodity rates.

(11) Establishment of uniform express packing rules.

(12) Perfecting of arrangement by which certain classes of cases request that reparations may be paid to shippers is made by the Railroad Administration to Interstate Commerce Commission, no claim to be declined without prior conference with the Division of Public Service.

Bureau for Suggestions and Complaints

The Bureau for Suggestions and Complaints was established in the summer of 1918 as an agency to which the public might make complaints, suggestions and recommendations as to the service which was being rendered by the Railroad Administration. On receipt of these complaints or suggestions the bureau takes the matter up with the proper authorities and sees to it "that relief is accorded where merited."

The report sets forth that up to December 1, 1919, the bureau received a total of 26,055 initial letters. In September, 1918, 3,702 were received. In November, 1919, the number had dwindled to 691.

"The falling off in the number of initial letters received," says the report, "is probably due both to the wearing off of the novelty of the bureau and to the improved ser-

vice, both freight and passenger, which has been rendered by the Railroad Administration during the progress of federal control. The letters received by the bureau cover almost every branch of railroad service, particularly in connection with the transportation of passenger, freight and express."

The report sets forth the following list of subjects handled by the bureau in which relief has been secured, the subjects in which the largest number of adjustments have been made appearing first: Changes in and additions to passenger train schedules; improvement in handling of freight at junctions; changes in hours of service; establishment or protection of train connections; addition of cars to crowded passenger trains; repairs of and additions to passenger and freight facilities; improvement in heating, lighting, ventilation and sanitation on trains and in stations; removal of incompetent or discourteous employees; additional employees; improvements in express service; improvements in dining-car administration and operation; additions to dining-car means; construction of shelter sheds for passengers; protection of railroad grade crossings; enforcement of safety rules; additional freight service; interchangeable acceptance of tickets; handling of trains in stations; arrests and convictions for pilfering freight; carrying passengers on local freight trains; sale of daily newspapers on trains; and providing seats for pay passengers against passes.

The statistical record of the business handled by the Bureau for Suggestions and Complaints, the report says, does not present a true measure of the value of the bureau to the Railroad Administration, to the railroads and to the public. The very existence of the bureau has given the traveling and shipping public assurance that it had a "friend at court," and through the instrumentality of the bureau local officials of the Railroad Administration have been given an opportunity to become acquainted with the point of view of the public in many instances in which this opportunity would not otherwise have been afforded.

Short Line Railroad Section

The Short Line Railroad Section of the Division of Public Service, the report sets forth, handled during the year a variety of complaints and requests for assistance from the 2,500 short-line roads. The report outlines the following matters in which action important to the short-line roads was taken:

(1) Reasonable and satisfactory bases were agreed upon for charges for the making of repairs upon short-line equipment and for locomotive rentals.

(2) The right of short-line railroads eligible to receive a co-operative contract to file waiver of claims entitling them to two days' reclaim on per diem charges, and also reparation for diversion of competitive freight, was established.

(3) It was decided that refunds and reparations should date back to April 1, 1918, both for lines entering into the co-operative contract and for those filing waiver of claims.

The report sets forth that the Division of Public Service is the point of contact between the Railroad Administration and the state railroad and public service commissions, and outlines the steps taken in February, 1919, to clarify the relationship between the administration and the state commissions and to establish a plan of co-operation. The result of a conference held in Washington, February, 1919, was a general order issued by the director general which established a general basis for co-operation. Under the provisions of this order, the report says, the Railroad Administration and nearly all the state commissions have worked together in complete accord, each party animated by a desire for harmonious and effective action in the public interest.

The report outlines the steps taken to clear up confusion and embarrassment arising with reference to the financing of public improvements affecting railroad properties, ordered by state commissions and other local public authorities, and says:

"While the inability of many of the railroad corporations to do financing during the period of federal control and the condition of the accounts as between the Railroad Administration and some of the railroad corporations have been such as to preclude in many cases the financing of proposed public improvements by or on account of the railroad corporations, there have nevertheless been many cases in which local public improvements involving charges to capital account of the railroad corporations have been carried forward under the instructions of the director general."

The report outlines the close touch which the Division of Public Service has kept throughout the year with the various organizations of shippers in dealing with various problems. confronting them.

The report also shows in detail the modifications in 1919 of general orders issued prior to the armistice.

The work of the Car Service Committee, which was headed by the director of the Division of Public Service, is also covered by the report. The report, commenting on car conditions, said:

"The Car Service Committee has drawn attention to the necessity in the public interest of the following two steps as vital to enable the transportation system of this country to meet the heavy requirements which will undoubtedly be made thereon during the year 1920:

"1. Continuation of pooling of freight-car equipment and motive power. It is conservatively estimated that the increased utility of the freight-car equipment resulting from such pooling amounted in 1919 to at least 15 per cent.

"2. The prompt construction of a large amount of additional freight-car equipment of various types, including box cars, refrigerator cars, gondolas and hoppers, flat cars and stock cars.

"Unless both the foregoing measures are energetically adopted, the transportation system of the country may find itself unable to handle the nation's requirements for the transportation of freight in the late summer and the fall of 1920."

Manufacturers' Associations Favor Cummins Bill

THE FOLLOWING STATEMENT was presented to Senator Cummins and Representative Esch on January 14 by a delegation of business men expressly authorized to represent the manufacturers' organizations of Massachusetts, Connecticut, New Hampshire, West Virginia, Tennessee, Georgia, Missouri, Alabama, Montana, California, Kansas, Delaware and South Dakota:

"We believe that most of the manufacturers in other states are in accord with our views.

"We feel that the time has come for the enactment of fundamental laws which, when private operation is restored, will enable the railroads to render adequate transportation service.

"We believe that most of the admirable provisions of the House bill (except the labor provisions) should be enacted into law, but we believe that a fundamental plan must be added to it if private operation is to be successful.

"We, therefore, favor the essential features of the plan which are set forth in Section 6 of the Senate bill.

"We believe that equally important with the rate-making rules is adequate safeguards against the possible interruption of transportation service. We believe that this vital problem is approached courageously by the Senate bill, and that the minimum of relief that should be afforded is some form of compulsory arbitration."

General News Department

Southern Pacific Lines north of Ashland have been ordered transferred from the North Western to the Central Western region.

Drilling for oil is the object of certain lessees who have taken possession of some tracts of the Northern Pacific Railway Company's land in Montana.

A fire in the freight yard of the New York Central at DeWitt, N. Y., near Syracuse on the 16th of January, damaged the coal storage building to the amount of $50,000.

A fire in the Boston & Maine yard at Boston, Mass., on the 18th of January destroyed two wooden three-story buildings containing the Railroad Young Men's Christian Association and a freight office; estimated loss, $80,000.

The Cumberland & Pennsylvania Railroad, heretofore under the jurisdiction of Federal Manager C. W. Galloway, of the Baltimore & Ohio, has been ordered by the director general of railroads to be placed under the jurisdiction of M. C. Byers, federal manager of the Western Maryland.

Fines amounting to $1,200 were imposed on the Baltimore & Ohio Railroad Company in the United States District Court at Pittsburgh, Pa., on January 12, for violation of the law limiting the length of time which animals may be kept in cars without being taken out for water and rest.

The United States Chamber of Commerce, in response to a request made by Engineering Council, has appointed a special committee to consider the advisability of submitting the question of the establishment of a National Public Works Department to a referendum by the Chambers of Commerce throughout the country.

Senator Smoot of Utah has introduced a bill in the interest of many of the short line railroads which would exempt from the provisions of Section 10 of the Clayton act any railroad all of whose stock or property is owned by a person or corporation whose plant, shops, mills, or factories such railroad is principally engaged in serving, and also any director, agent, manager or officer of such railroad.

The airplane mail carriers between New York and Chicago are using new and larger machines having a capacity of 1,500 lb., and the postmaster at New York announces a new time table as follows: Leave the flying field at Newark, N. J., 10 miles west of New York, at 6:30 a. m.; arrive at Cleveland 11:30 a. m.; Chicago, 2:30 p. m. The eastward trip begins at Chicago at 6 a. m. and the mail is due at the New York post office at 5 p. m. Trips are made each day except Monday. Coincident with this announcement comes the report from Washington that the House has refused to make any appropriation for the use of the post office department in carrying letters by airplane for the next fiscal year. The Congressmen, however, are said to intend, not discontinuance of the service, but the establishment of a separate air service department to take the place of the activities in this field of the War Department, the Navy Department and the Post Office Department, the services of which different departments are said to overlap.

The Safety Section of the United States Railroad Administration reports that in the month of October, on the railroads operated by the government, 194 employees were killed and 9,776 injured, a decrease as compared with October, 1918, of 105 killed and 2,056 injured. These and other data are shown in Safety Bulletin, No. 11, issued on January 15. For the ten months ending with October the casualties to employees numbered 27,037 less than in the same period of 1918. Looking at this statement, A. F. Duffy, manager of the section, calls on safety supervisors to visualize a crowd of 27,000 healthy and whole-bodied employees and renew their efforts to stimulate everybody to do still better. Estimating that 85 per cent of accidents to persons are preventable, he calls for a further large reduction. He finds from his records that where the attendance at the regular safety committee meetings has been kept up to a high standard, the accident reduction shows progress, while in cases where the attendance has fallen off and interest has slackened, the accident record shows an increase. Supervisors are called on to see that attendance and personnel are maintained.

Railway Brotherhood to Make Clothing

The Brotherhood of Maintenance of Way Employees and Railway Shop Laborers has bought four clothing factories, and promises to reduce prices from 25 to 60 per cent. The factories include knitting and underwear companies at Ypsilanti, Mich., a glove factory at Williamston, Mich., and a tubing factory, making tubing used in gloves, in Watertown, N. Y. Unverified reports of such action have been in circulation since the authorization of such a campaign at the national convention of the brotherhood in Detroit, Mich., in September, 1919. The present report has been confirmed by officers of the brotherhood, who announce that the purchases thus far consummated represent an initial investment of approximately $1,000,000 and are "but the first steps" in a campaign to reduce the cost of living for members of the brotherhood. It is proposed to sell to the members of all railway brotherhoods.

Restore the Human Links

Our salvation depends on wage earners and wage payers getting together as never before. Let the human links between wages, personal output and private management be restored. This is a world change. Nevertheless, America, first among the nations, must come to it or the very conditions of her democracy will go to the scrap heap. The country today is in the throes of a personal revival. Opinion, both public and private, is forcing the issue of personal output on the workers, on the brotherhoods, on the employers. And the public is willing to pay for the new industrial spirit in lavish fashion. Let supervision and regulation by the Government take note of these things. Until something is done by the Government along these lines to stimulate the private manager and the personal output of the railroad workers rates, wages and financial adjustments will continue to see-saw with leaks in the human equipment. For the rest be is remembered that as champions of the new industrial alignment there is now everywhere in America a Governor Coolidge and a Police Commissioner Curtis in the background.—*James O. Fagan in N. Y. Times.*

Mexican Government Policy Hampers Railroad Fuel Oil Supply

The policy of the Mexican government in the restriction of development of American oil properties in Mexico is seriously hampering the supply of Texas railroads with fuel oil. C. N. Whitehead, federal manager of the Missouri, Kansas & Texas System, the Missouri, Oklahoma & Gulf and the Oklahoma Belt, has outlined the present situation in a letter to Allison Mayfield, chairman of the Texas Railroad Commission as follows:

"You will recall that we have made a contract for burning Mexican oil in our locomotives, and have incurred a great deal of expense in changing engines and constructing storage facilities. A number of other Texas railroads use Mexican oil.

"It has come to our attention that the American oil producers operating in Mexico are being hampered and harassed by the Mexican government to an extent which may prevent deliveries of oil to Texas railroads. This would be a great calamity, as not enough local oil can be obtained in Texas, at any price, for locomotives of those lines, and coal burning engines could not be secured in time to prevent a very serious tie-up of tranporta-

tion. The situation seems to us of such seriousness as to justify us in bringing to the attention of the State Department this particular feature of our relations with Mexico, in order that arrangements may be made with the Mexican government, if possible, to permit free movement of oil for railroad purposes."

Director General on Inspecting Tour

Director General Hines is planning to leave Washington on Tuesday, January 27, for an inspection trip over several lines, during which he will meet most of the regional directors and discuss with them current problems relating to car supply and other matters, in an effort to keep the railroad organization functioning with the highest efficiency until the end of the period of federal control. He will first go over the Baltimore & Ohio, to Chicago, where he will meet the three western regional directors on January 28; from there to Louisville, where he will address the Transportation Club on January 29; back to Chicago by the Pennsylvania Lines and from Chicago to New York over the same lines. At Louisville he will see Regional Director Winchell and at New York he will see Regional Directors Hardin and Baldwin.

Aiming at the Bull's-eye

The National Republican Club, New York city, proposes legislation for restoration of the railroads to their owners as follows:

"Continued general supervision of the roads by the Federal Government.

"Division of the powers of the Interstate Commerce Commission to administrative and judicial.

"Enactment of legislation fixing a fair and reasonable scale of wages for the railroad employees.

"No lockout or strike shall take place in the transportation service until after an investigation of grievances by an impartial committee and the report of the committee has been published.

"Make such terms as would provide a reasonable return upon the investment, and further guarantee an agreed return upon railroad securities."

This platform was propounded at a meeting in New York on January 17. The principal address at the meeting was by William Church Osborn, chairman of the executive board of the Texas & Pacific. Mr. Osborn referred to the proposed evening-up process, as between weak boards and strong ones as a "take-off." By "take-off" he means that "the Government must take off from the big fellow's earnings enough to keep the little fellow from going under." The day of profit in steam railroads, he is convinced, has gone, and it is hopeless to look forward to the revival of a system of individualism in their control. The situation today is that many railroads are making no profits, while a few are making substantial profits. To meet the situation created by the existence of strong and weak roads, the principle of the supertax should be applied to railroad earnings. After a road is given its fair return of 5½ or 6 per cent and another 4 per cent for betterment of plant and depletion, I would tax each added per cent of earnings on the principle of the surtax. The first per cent distributable surplus would be taxed, the second per cent would be taxed still more, and so on. This scheme is not subject to objections on the ground of constitutionality, as are many other schemes, and it would eliminate exorbitant profits, which, rightly or wrongly, have become obnoxious to the people of the United States."

Dr. Jacob Gould Schurman, president of Cornell University, was one of the speakers at the meeting. He exposed the fallacies of the Plumb plan in most incisive terms. "To turn over the railoads to average men is going to distribute wealth more equally while it lasts, but will make no provision for the creation of more wealth. There is no way of creating wealth except by good business organization and hard work. It is essential that men of the type of James J. Hill shall continue to lead in our business. I agree that the railroads must no longer be run for profit, but to get such men as Hill some way must be found to make an appeal to the self-seeking nature of men. Some provision must also be made to attract capital. In the presentation of socialistic schemes too much attention is given to the problem of dividing up the wealth that exists; we must in some way stimulate the accumulation of large fortunes to provide more to divide up among us. I venture to say that the solution of the problem of efficient railroading will be found in making the jobs of managing them more attractive by the financial rewards attached to them. This will be more effective than any other means."

Ivy L. Lee spoke in a similar strain, emphasizing the point that undue limitation of profits would destroy those incentives which had operated to bring the ablest men into the railroad business. It would eliminate those reasons which railroads had for practicing economy, and capital would not be attracted to the railroads. "The great problem," he continued, "is to prevent men and money from going into other lines of endeavor. It must be remembered that in so far as improvements are concerned, the railroads today are stagnant. An officer of the Pennsylvania told me today that only a few days ago had the last phase of the great New York improvement, projected in 1902, been completed. It took eighteen years to finish that piece of work; yet today nothing is being planned by the railroads to meet the future. Capital is going into other lines of industry. I was told by the member of a great banking firm the other day that they had noe one railroad security in their vaults, but each day we see these same people floating bonds for motion-picture enterprises, grocery stores, and lyceum circuits."

The recommendations for railroad legislation as presented in a committee report emphasized the Government's weakness in yielding so completely to the demands of the brotherhoods. "The Government has encouraged the expectation on the part of organized groups that by a sufficiently aggressive action wages could be raised without regard to injury to the service or to the rights of the public. With this situation the railroads after March 1 will be confronted. The Government has no right to leave this matter to be settled by the processes of industrial war between the railroad owners and the railroad employees."

Wood Preservers' Convention

The American Wood Preservers' Association will hold its sixteenth annual meeting at the Hotel Sherman, Chicago, on February 10, 11 and 12. This association, which is composed largely of railway men, is devoted to the perfection and extension of the processes of treating timber for preservation against decay and destruction by insects, and in the education of the public in the economic value of treated timber. The program for the meeting, which follows the line of these objects, is as follows:

TUESDAY MORNING

Opening exercises and business.

TUESDAY AFTERNOON

Report of Committee No. 6; preservatives....E. B. Fulks, chairman
What Light Creosote Oils Have Done in Wood Preservation .....Ernest Bateman
Report of Committee No. 10, Non-Pressure Treatment .....L. L. Hill, chairman
Perforation of Douglas Fir.....E. M. Blake
The Penetration of Creosote in Various Sizes of Sawed Lumber and Round Piling.....Ralph H. Rawson
Determination of Water in Creosote Oil Storage Tanks .....W. E. Jackson

WEDNESDAY MORNING

Report of Committee No. 4-A—Service Records.George E. Rex, chairman
(a) Tie Service Records.....Lowry Smith, sub-chairman
(b) D. L. & W. Service Test Records of Ties .....C. E. Gosline, sub-chairman
(c) Southern Pacific, Oakland Long Wharf.F. D. Mattos, sub-chairman
The Separation of Cross Ties.....H. von Leer
Report of Committee No. 5—Plant Operation.W. H. Grady, chairman
Iodine-Starch-Potassium Ferricyanide Color Reaction Test to Determine Penetration of Zinc Chloride in Cross Ties.....Galen Wood

WEDNESDAY AFTERNOON

Rapid Deterioration of Sap Pine Ties Due to Unusual Weather Conditions.....C. O. Deabler
Fungi That Attack Cross Ties.....C. J. Humphrey
A Theory on the Mechanism of the Protection of Wood by Preservatives.....Ernest Bateman
Results of Preliminary Steaming in Treatment of Air-Seasoned Ties .....S. S. Watkins

THURSDAY MORNING

Report of Committee No. 9, Terminology....H. B. Hoyt, chairman
Report of Committee No. 7, Purchase and Preservation of Treatable Timber.....H. S. Sackett, chairman
Report of Committee No. 8, Wood Block Flooring and Paving.....F. W. Cherrington, chairman
Report of Committee No. 4B, Service Records, Flooring and Paving.....Walter Buehler, chairman

THURSDAY AFTERNOON

Closing Business.

Traffic News

Henry A. Palmer, editor of the Traffic World, will address the Cleveland (Ohio) Chamber of Commerce on January 27, on the Plumb Plan.

Seventeen thousand five hundred dollars is the amount of fines imposed on the Pennsylvania in the United States Court at Cleveland, on January 19, for violation of law in not collecting demurrage on cars of iron ore.

The director general of railroads has contracted with the Dubuque Boat & Boiler Works, of Dubuque, Iowa, for the construction of a steel transfer barge to be used in connection with the railroad incline at East St. Louis, Ill., for handling freight by the Mississippi river barges and connecting railroads.

The consolidated classification committee has issued a docket of subjects to be considered at hearings at New York on February 2, 3, 4 and 5, Atlanta on February 9 and at Chicago on February 16 and 19, for the consideration of petitions from shippers for changes in rules, descriptions, ratings and minimum weights.

The rate on coal by water from Hampton Roads and from Baltimore to New England points has been advanced 75 cents a ton, according to announcements published last week; the rate to Providence now is $2.50 a ton. The Shipping Board announces that it has been losing money while carrying coal at the former rate.

The American Association of State Highway Officials, at its recent convention at Louisville, Ky., instructed its executive committee to take steps to impress upon Congress the necessity in considering railroad legislation of making provisions for more open cars before the opening of the next road building season.

Oscar F. Bell, whose resignation as traffic manager of the Crane Company, Chicago, was announced in the *Railway Age* of January 16 (page 270), has also resigned as treasurer of the National Industrial Traffic League, and E. C. Wetmore, traffic manager of the Selton Manufacturing Corporation, Chicago, has been appointed his successor.

Thirty-three thousand one hundred and twenty bales of cotton were loaded into the steamship Daniel Webster, of the United States Shipping Board, at Galveston, Tex., recently said to be the largest single cargo of cotton ever loaded into a vessel anywhere in the world. This cotton was compressed to high density and was valued at $9,300,000.

C. H. Markham, president of the Illinois Central, was the principal speaker at the eighth annual meeting of the Southern Hardwood Traffic Association which was held at Memphis, Tenn., on January 20. The afternoon session of the convention was devoted to a conference of railroad officers and shippers and a general discussion followed the address of Mr. Markham.

The El Paso (Texas) Traffic Club was organized on January 7, and the following officers and directors were elected: President, S. H. Wilson, first vice-president, Richard Warren; second vice-president, J. L. Steward; third vice-president, Wade Cunningham; secretary-treasurer, A. U. Tadlock. Directors: W. S. Dawson, general claim agent of the El Paso & Southwestern System; W. G. Martindale; W. S. Stallings, district superintendent of the Pullman Company; E. W. Skipworth; C. C. Lassiter; J. H. Pierson; W. R. Brown; O. W. Callahan and J. C. Neely.

Through trains to and from the City of Mexico will not be established in the near future notwithstanding numerous predictions. According to L. Valdes, general freight and passenger agent of the National Railways of Mexico, such action has been discussed with the Pullman Car Lines, but owing to the postponement of the return of the Pullman properties to the owners, the question has been held in abeyance. It is, however, probable, according to Mr. Valdes, that when the Pullman Car Lines are returned, through sleepers will be run from Mexico City to San Antonio, Tex., or St. Louis, Mo.

The large new docks of Cunard Steamship Line in New York harbor, heretofore referred to as under contemplation, are to be begun in February, according to an announcement by the chief American representative of the line. The location of the proposed docks is on the west side of the Hudson river, opposite 42d street, New York, and between the freight terminal of the New York Central at Weehawken and that of the Erie Railroad about two-thirds of a mile south. The plans call for eight piers with double-deck steel superstructure, each pier 1,000 ft. long. Complete power equipment for loading and unloading will be provided.

The Pennsylvania station, Seventh avenue, New York City, is used by about 86,700 passengers a day; 32,700 of these to and from the west through the Pennsylvania Tunnel, and 54,000 to and from the east by the Long Island Railroad trains. The Long Island Railroad, which began its occupancy of the Pennsylvania station by the use of a small section in the northeast corner, now carries an increased number of passengers every month and additional platform facilities are being provided. At present the Long Island trains use three platforms and five tracks, but this capacity will be increased about 40 per cent. Season-ticket passengers on the Long Island road in the first nine months of 1919, numbered 27 per cent more than in the same period of 1918.

The Topeka (Kan.) Traffic Association has adopted resolutions approving the return of the railroads to their owners on March 1, opposing provisions in the proposed laws seeking the (a) creation of a transportation board, (b) consolidation of railroad systems, and (c) limitation of return which carriers may earn. The association favors the enactment of laws conferring upon the Interstate Commerce Commission (a) jurisdiction over the issuance of securities, (b) power to compel joint use of terminals and terminal facilities, (c) authority to fix specific rates, also minimum and maximum rates, (d) to control over additions and extensions, (e) to permit poolings of cars, (f) to remove discrimination caused by state authority, and (g) to permit consolidations where public service would be served.

The New York State Barge Canal which, with the Hudson river, makes a waterway from Buffalo to New York City, is in large measure unused because of inadequate terminal facilities; and E. S. Walsh, the state superintendent of public works, tells the lawmakers at Albany that they must appropriate $25,000,000 more in order to get any reasonable benefit from the $164,600,000 which already has been spent on the canal. Outstanding claims arising out of construction contracts will probably take $10,000,000 from the state treasury and $15,000,000 will be needed to build grain elevators. Profitable traffic on the canal is out of the question, except with a large movement of grain eastbound; and this grain cannot be taken away from the railroads without better elevator and storage facilities for export business at New York. Under present conditions canal boats bringing grain to New York have to wait a long time to get the freight loaded into ocean vessels.

A Highway Transport conference will be held at Chicago, January 24 to 31, inclusive, one of the sessions of which will be devoted to the general subject of "The Motor Truck and Railroad Freighting." This session, which will be held on the evening of Monday, January 26, will be opened by an address by W. J. L. Banham, general traffic manager of the Otis Elevator Company, who will speak on "Costs and Service Comparison." The discussion on this subject is to be started by Frank T. Bently, traffic manager of the Illinois Steel Company. H. Lorenzen, general superintendent of the Hartman Furniture & Carpet Company, will also speak on "The Economic Range of the Motor Truck." On Thursday, January 29, the morning, afternoon and evening sessions will be under the direction of the National Highway Traffic Association in conjunction with its annual convention; and among the committee reports which will be presented at the morning session is the report of the Association's Committee on "Inter-relationship of Highway, Railway and Waterway Transport." This report will

be presented by Professor Henry E. Riggs, of the University of Michigan.

According to a report on overseas traffic for the week ended January 14, made to Director General Hines, there were 5,793 cars of commercial export freight received at North Atlantic Ports, as compared with 1,438 for the same period in 1919, showing an increase of 4,355 cars or 302 per cent for January 14, of this year as against the corresponding period last year. At South Atlantic and Gulf Ports as of January 11, 1920, there were 12,711 cars of export freight on hand, as against 12,630 cars on January 4, an increase of 81 cars. On January 14, 1920, there were 8,212,435 bushels of grain stored in elevators at North Atlantic ports. There were received during the week 2,886,758 bushels, while, 951,829 bushels were cleared. The total amount of grain in elevators at these ports represented 42.6 per cent of the total elevator capacity. There was a total of 6,549,798 bushels of grain stored in elevators at Gulf ports, representing 62.6 per cent of the total elevator capacity.

Ralph Peters, federal manager of the Long Island Railroad, has informally notified the New York State Public Service Commission that it is desired to advance passenger rates to the basis of three cents a mile. At present rates the enormous traffic in the New York suburban district is carried at a loss. This notice, apparently, is preliminary to a formal application for authority to raise the rates after the railroad is taken out of the hands of the government. The Public Service Commission says that the matter cannot be considered until made the subject of a formal application; and it has written to the director general at Washington, protesting against any advance in the rates except with the consent of the State Commission. Moreover, the Public Service Commission has filed, at Washington, a protest against those provisions in the railroad bills, now before Congress, which would limit or curtail the authority of State Commissions in regard to intrastate passenger and freight rates.

According to a report on overseas traffic for the week ended January 7, 1920, made to Director General Hines, 5,220 cars of commercial export freight were received at North Atlantic ports during this period, as against 975 cars for the corresponding period in 1919. This shows an increase of 4,245 cars for January 7, of this year, compared to the same date in 1919. Deliveries for January 7, 1920, exceeded those for the same period in 1919 by 4,799 cars. At South Atlantic and Gulf ports as of January 4, 1920, there were 12,630 cars of export freight on hand, as against 12,936 cars on December 28, a decrease of 306 cars. On January 7, 1920, there were stored in elevators at North Atlantic ports 7,479,314 bushels of grain. There were received during the week at these ports 2,539,949 bushels of grain, while 4,088,715 bushels were cleared. Deliveries exceeded receipts by 1,548,766 bushels. The total amount of grain in elevators as of January 7, represents 44 per cent of the total elevator capacity of these ports, as compared with 45 per cent for the previous week. At Gulf ports there were 7,404,047 bushels of grain in elevators as of December 31, 1919, representing 71.5 per cent of the elevator capacity.

Freight Congestion in Texas Oil Fields

The rapid development of the new oil fields in Texas has led to considerable congestion on the railroads in that region and has been the subject of repeated complaints. The Texas Industrial Traffic League has telegraphed Edward Chambers, director of the Division of Traffic, and to Max Thelen, director of the Division of Public Service, of the United States Railroad Administration, declaring that, on the day given, there were 2,000 carloads of freight on the Missouri, Kansas & Texas, south of Denison, destined to M., K & T. points in the oil territory west of Waco, some waybills being dated as far back as July. The message continued: "The development of the oil territory is vitally retarded. It is essential that these commodities, consisting of practically everything from oil-well supplies to portable houses, be moved. Industry tracks and warehouses in that section are idle and empty. For 30 days the average daily movement from Waco west was 53 carloads, consisting principally of company material and merchandise. This movement is futile, as there are over 700 delayed cars in Waco alone. Conditions indicate practically the absolute collapse of Missouri, Kansas & Texas transportation, the only channel of access to this particular territory. Our local appeals are futile, and this appeal is for some drastic action to relieve this intolerable situation. . . ."

Trunk Line Railroads Object to Equalization of Export Rates to Southern Ports

The Eastern trunk line railroads are making vigorous protests against the export freight rates put into effect by the Railroad Administration on December 1, prescribing the same rates on goods for export to the Gulf and South Atlantic ports from certain Central Freight Association territory as are concurrently in force to New York. The New York Central, the Pennsylvania, the Baltimore & Ohio, the Erie and others regard these Southern rates as inimical to their interests as tending to divert traffic from New York, Philadelphia and Baltimore. The protest of the Chamber of Commerce of the State of New York was noted in last week's issue. There has since been made public a letter written by Daniel Willard, president of the Baltimore & Ohio, as chairman of the presidents' committee, Official Classification territory, to Director General Hines on November 26, before the tariffs were made effective, asking that the proposed rates be not established. A copy of his letter was sent to the Interstate Commerce Commission with the statement that it is the belief of the eastern carriers that the proposed change is uneconomic, unfair and unjustified and that it was the intention of the interested corporations when the roads are returned to corporate control to apply to the commission for cancellation of the rates in question in the event they were published by the administration as then contemplated. Mr. Willard in his letter said in part:

"The establishment of the rates creates an entirely new situation or condition from any that has heretofore existed. To accomplish the purpose stated will require the movement of a considerable part of the business affected substantially double the distance from a great part of the territory involved. It will work to short haul a number of the carriers upon whose lines the business originates and reduce their earning power accordingly. It wil have the effect of introducing such an abnormal rate adjustment in the territory under consideration as to constitute a menace to the rate structure as a whole. In the event that a considerable volume of traffic should be diverted it will have the effect of introducing an uneconomic burden upon the carriers in that it will require the transportation of much of the business twice the distance that it would move through normal and well established channels."

Director General Hines replied to Mr. Willard's letter on December 8 as follows:

"These rates have been under consideration for nearly a year past. Numerous conferences have been held upon them. The publication is the last thing to be done. It was only after very thorough analysis and consideration that they were authorized. The basis is the same as is in effect to New York, Boston, Portland, Me., Montreal, St. John and Halifax, Canada. This same basis has been in effect from the same points of origin to New Orleans for many years past. It is practically extending the New Orleans rate to other Gulf ports and to South Atlantic ports south of Norfolk. Eastern railroads have no good grounds for objection on the basis of mileage as the distance to the Canadian ports is very considerably greater than to the South Atlantic or Gulf ports. The gross revenue will not be changed by the new adjustment and the divisions of these rates will be fair and reasonable. If any thing is thought to be out of line with the divisions after the roads are returned to private operation it can be readily adjusted by application to the Interstate Commerce Commission. You, I think, appreciate the difficulty at times in the past moving export freight through the ports of New York, Baltimore and Philadelphia. The expense at those ports is constantly increasing. It is a question whether the cost to carriers for the further haul to South Atlantic or Gulf ports as compared to New York and and Philadelphia is as great as if the traffic was handled via the ports last mentioned. It is certainly in the best interest of the country as a whole to distribute the export traffic in a reasonable way among all ports, which is what we have in mind in this adjustment.

"I believe these rate changes will make no serious reduction in the revenues of the Central Freight Association carriers."

Commission and Court News

State Commissions

The Wisconsin Railroad Commission has called upon the steam roads operating in the state to furnish it with prints of all right-of-way and track maps and profiles as prepared for the division of valuation of the Interstate Commerce Commission.

The Wisconsin Railroad Commission's grade-crossing engineer has been making a survey of the work before him, and making a program for the year. There are in the state about 9,500 grade crossings of railroads by highways. Of this number about 500 have flagmen or warning devices. As a means of warning automobile drivers, an illustrated poster is being prepared by the commission to be put up in railroad stations, hotels and garages.

The Southern Pacific, the San Francisco-Oakland Terminal and the City of Richmond have been ordered by the Railroad Commission of California to make improvements, costing approximately $50,000, to an underpass in MacDonald avenue, Richmond. The order directs that the Southern Pacific, as its share of the improvements, shall build an adequate pedestrian tunnel, with sidewalk approaches on its right-of-way and station grounds, north of the existing subway. The San Francisco-Oakland Terminal is ordered to rearrange and reconstruct its tracks.

Personnel of Commissions

Harold D. Sammis, connected with Railroad Commission of California in various capacities since June, 1913, has been appointed secretary of the Public Service Commission of Nevada.

Carl C. Witt, district engineer of the western district of the Interstate Commerce Commission, with office at Kansas City, Mo., has been appointed a member of the Engineering Board of the Division of Valuation of the Interstate Commerce Commission in charge of valuation work in the western district, with the same headquarters, succeeding **J. S. Worley,** whose resignation was announced in the *Railway Age* of November 21, 1919 (page 1034).

Court News

Freight House Not "Improvements" of Land

Where a railroad company built a freight house on a lot, on the assumption that it was entitled to possession of the lot, the Tennessee Supreme Court holds that, in subsequent condemnation proceedings by the railroad, the defendant, who had previously been adjudged the owner of the lot, would not be entitled to recover for the improvements. Such improvements are not built to improve the land, or to enhance its ordinary utility, but to be used as a part of an easement for public purposes entirely independent of the ordinary uses of the ground.—Southern R. Co. v. Pouder (Tenn.), 208 S. W., 332.

Trespassers on Trains

The Utah Supreme Court holds that a trespasser ordered by trainmen to leave a passenger train as he was in the act of getting under it to steal a ride, and before he had succeeded in gaining a position of safety, who was run over and injured while endeavoring to make his exit, could not recover where the order to leave was unaccompanied with any threats of violence which would cause him to lose his self-control. And the railroad owed the plaintiff no duty to equip its trains in such a way that the rear engine would have control over the automatic air brakes in the train, or that stop signals given by the train air whistle could be passed directly to the leading engine.—Bergman v. D. & R. G. (Utah) 178 Pac. 68.

Furnishing Suitable Cars—Coopering Cars

Under Iowa Code, section 2116, it is the general duty of the carrier to furnish shippers suitable cars, but the particular duty of coopering its cars to make them tight for sand is, under section 2128, governed by its tariffs; and where these tariffs oblige the carrier to furnish only the lumber for cooperage, the railroad is not liable in addition for the cost of labor and nails employed by the shipper in coopering.—Hawarden Sand & Gravel Co. v. C. & N. W. (Iowa) 171 N. W. 735.

"Engaged in Furthering Railroad's Business"

A railroad had a crew engaged in removing a platform at one of its stations. A member of the crew found a revolver in a leather case which had been hidden under the platform by some unknown person and handed it to one Mayer, the "gang boss." Mayer attempted to break it open, and in the attempt discharged it, wounding another member of the crew. The Minnesota Supreme Court held that Mayer, while manipulating the revolver, was not "engaged in furthering the railroad's business" and that the railroad was not liable for the consequences of such manipulation—Larson v. D., M. & N. (Minn.), 172 N. W. 762.

Use of Public Spur Tracks

The Iowa Supreme Court holds that where a railroad company has laid a track for the convenience of a limited section, it cannot grant, nor can a single shipper acquire, a right to the use of the track for his particular business to the exclusion of other shippers, in view of the Iowa statute forbidding discrimination. The fact that the general business has been diminished to small proportions has no tendency to show that the track has lost its public character.—Northern Gravel Co. v. Muscatine North & South R. Co. (Iowa) 171 N. W. 787.

Terminal Company a Common Carrier

The Wisconsin Supreme Court holds that a terminal and transfer railway company, incorporated under the Wisconsin statute, and engaged chiefly in switching cars of other companies, operates a steam railroad as a common carrier within the state Workmen's Compensation act, which denies compensation to "employees operating, running or riding upon, or switching freight or other trains, engines, or cars for a railroad company operating a steam railroad as a comman carrier," unless both employer and employee shall have accepted the provisions of the act in writing." An employee of such a company injured while engaged in switching box cars was therefore held not entitled to an award under the act.—Waldurn v. Lake Superior Terminal & Transfer R. Co. (Wis.) 170 N. W. 729.

United States Supreme Court

Compensation for Carrying Mail—Cases Decided Against Railroads.

The Supreme Court of the United States has decided against the railroads the claims of the Northern Pacific, the Seaboard Air Line, the New York Central and the Kansas City, Mexico & Orient for carrying the mails for sums above the amounts allowed and paid by the Postmaster General. The four cases were independent of one another, but as the claims all depended for their validity upon a denial of the Postmaster General's power to pass Order No. 412, they were considered together. They were rejected by the Court of Claims. (53 Ct. Cls. 258), The question was this: The pay for carrying the mails is determined by the average weight carried. To ascertain this average the mails are weighed for a certain number of consecutive days, and for some time before 1907 the total weight was divided by the number of working days—if the number of days was 35 (including Sundays) it was divided by 30, the number of "working days"; if 105 by 90. But on June 7, 1907, the Postmaster General issued an order, No. 412, "that when the weight of mail is taken on railroad routes the whole number

of days included in the weighing period shall be used as a divisor for obtaining the average weight per day." In other words, Sundays were included and treated the same as week days. This of course diminishes the average weight and therefore the pay of the railroads. They denied the authority of the Postmaster General to make the change and sued for the additional sum that under the old practice they would have received.

After reviewing the legislation on the subject from the act of March 3, 1873, the court says, by Mr. Justice Holmes, concurred in by the Chief Justice and Justices Brandeis and Clarke, that by the act of March 3, 1905, the average weight (i. e., of course, the average weight for the year) should be ascertained "by the actual weighing of the mails for such a number of successive working days not less than 90, etc.," the increase in the number of days manifestly being for the purpose of more nearly hitting the average for the whole time. The statutes do not mention the divisor to be used in order to get the average desired. In 1873 mails were not carried on Sundays except over a comparatively small proportion of routes and therefore, the court says, "six was the fairest single divisor. Now, on the other hand, it is said that the mileage of the seven-day routes is much greater than that of the six-day routes. Therefore now to weigh for Sundays as well as other days and to divide by seven is the fairest single rule that can be found.

"But it is said that when an average is directed to be reached by weighing for say 30 working days it is implied that you are to get the average by using the number of working days on which the mails were weighed as a divisor, that working days mean week days, and that if in fact Sundays are used as working days, the divisor is not affected because the statute only contemplated six for a week. But the supposed implication of the statute disappears when it is remembered that the average wanted is not the average for the weighing days only but the average for the year. It is plain, too, that, whether 'working days' be read to mean week days or the days on which work was done in fact, the statute contemplates the working days and the weighing days as identical and therefore affords no ground for demanding the advantage of a dividend of seven and a divisor of six, which is what the railroads want. Various make-weights are thrown in to help the construction desired by the roads, but they seem to us insufficient to change the result that is reached by reading the words."

Mr. Justice Day and Mr. Justice Van Devanter dissented. Mr. Justice McReynolds took no part in the decision of the cases.

Mr. Justice Pitney, with whom concurred Mr. Justice McKenna, concurred in the affirmance of the Court of Claims' judgments, but upon grounds somewhat different from those expressed in the opinion of Mr. Justice Holmes. Mr. Justice Pitney is of opinion that the words "successive working days" in the clause in the act quoted mean successive week days; and since the aggregate weight for the weighing period must be subjected to division in order to ascertain the average weight per day, it naturally follows that the divisor should be the same number of "working days" (that is, week days) that are included in the period. But the Postmaster General had liberty of action within the minimum rates prescribed. And the railroad companies, other than such as had been aided by grants of lands or otherwise, were free to carry the mails at rates offered, or refuse them, as they chose. Further, by section 212 of the act of June 8, 1872, if, because of the refusal of the railroads, the Postmaster General was unable to make contracts at a compensation "not exceeding the maximum rates," or for what he demed a reasonable and fair compensation, he was at liberty to use other means of carriage. And, as the Court of Claims held, the railroads in fact accepted the Postmaster General's offers as contained in the readjustment notices based on Order No. 412, by proceeding to perform the prescribed service in accordance therewith and accepting the compensation due to them therefor. The concurring opinion concludes: "There is no finding nor any contention that the amounts allowed them were not compensatory; and, upon the wholefi it seems to me that, although he [the Postmaster General] erred in failing to apply the week-day divisor to the weighings, this did not render the readjustment based thereon wholly void, or permit the carrier, after transporting the mails and accepting the stated compensation without further objection, afterwards to treat the readjustmhent orders as nullities." Northern Pacific and others v. United States. Decided January 12, 1920.

Foreign Railway News

LONDON.

The South Manchurian Railways are reported to be constructing some 12 to 16 additional furnaces at their Anshan-chau iron works to secure an annual output of 1,000,000 tons of pig iron.

LONDON.

The Uruguayan Government has taken over the Uruguay East Coast Railway, and it is intended to extend the tracks and generally to place the line in first-class working order. A large amount of new rolling stock will be required.

LONDON.

An abstract from the Times Engineering Supplement states that the Buenos Ayres Chamber of Deputies has authorized a French company to construct a railway across the Federal territory of Formosa for a distance of 300 kilometers. This concession has been obtained in competition with another company formed with Brazilian, Argentine and North American capital.

Czechoslovakia Needs Cars

Production of goods in Czechoslovakia is reported as being greatly hampered by lack of railroad cars. The country, it is said, needs more than 100,000 but has only 53,000.

Dogs to Guard French Railway Sidings.

LONDON.

Modern Transport is authority for the statement that watch dogs are to be specially trained to guard goods in French railway sidings. A training depot for these dogs is to be established near Paris.

New Locomotives for Prussian State Railways

LONDON.

During the month of August, last, 223 new locomotives were delivered to the Prussian State railways by the locomotive works. In September, 137 were delivered, and in October, 96. The railways have on order at the present time 2,055 locomotives.

Battery Driven Railway Cars on Swiss Railways

LONDON.

An abstract from the B. B. C. Mitteilungen by the Technical Review states that owing to the scarcity of coal, the administration of the Swiss Railways has introduced battery-driven cars for shunting operations at stations of mediums size, and for the transport of goods. The cars exert a tractive effort of 1,000 kg. at the wheel rims at a speed of 12 km. per hour, corresponding to a power of 44 h. p.

New Director General of Transportation in France

LONDON.

General Gassouin has been appointed as permanent delegate of the Ministry of Public Works, to handle transportation problems other than those now in the hands of the existing exploitation and traction committees. He will have authority over all services of the Ministry. His title will be Directeur-General des Transports, and he will be assisted by a committee known as the Comite des Transports.

Railway Construction in Chile

LONDON.

An abstract from the Times Engineering Supplement states that in the province of O'Higgins the construction of the new railway from Paine to Talagante will cost $2,000,000, and the railway from Donihue to Coltauco will cost $750,000. In Valdivia there are also two railway undertakings arranged for, one being from Loncoche to Villarica, to cost $200,000, and the second, the line from Cocule to Rio Bueno, to cost a like amount. Other railway projects are those in the prov-

ince of Santiago from San Antonio to Cartagena; in the province of Cautin from Freire to Cunco, and in Colchagua from Larrain Alcalde to Pichilemu.

Exports of Car Wheels and Axles in November

The exports of car wheels and axles during November totaled only $857,509, this being the lowest total reported since last May. France, "Gibraltar" and Japan took one-half of the total for the month. The detailed figures as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

EXPORTS OF CAR WHEELS AND AXLES IN NOVEMBER

Countries	Dollars	Countries	Dollars
Finland	76,050	Brazil	39,919
France	300,992	Chile	1,505
Gibralter	153,870	Ecuador	1,357
Italy	70,150	British Guiana	339
Spain	584	Peru	701
England	36	Venezuela	541
Canada	12,129	China	6,888
Costa Rica	1,604	Japan	116,735
Guatemala	1,038	Russia in Asia	1,449
Salvador	319	Philippine Islands	10,581
Mexico	13,038	British West Africa	212
Jamaica	124	British South Africa	242
Trinidad and Tobago	296	German Africa	186
Cuba	45,164		
Argentina	1,460	Total	857,509

Exports of Cars in November

The exports of freight cars in November totaled 3,963, valued at $8,364,870. These totals were not as great as those of October but they were over double those of September and considerably in excess of all the other preceding months with the exception of June. The largest shipments included in the November exports were to France and Italy. The detailed figures of exports of passenger and freight cars for steam railways as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce for November are as follows:

EXPORTS OF CARS FOR STEAM RAILWAYS IN NOVEMBER

	Passenger		Freight and other	
Countries	Number	Dollars	Number	Dollars
France	..	.....	2,289	5,377,360
Italy	..	.....	1,350	2,592,900
Canada	..	.....	22	9,995
Mexico	2	30,000	30	44,750
Cuba	2	4,250	261	330,475
Chile	..	.....	1	3,120
Japan	..	.....	10	6,270
Totals	4	34,250	3,963	8,364,870

Canadian Firms Asked to Bid on Supplies for Melbourne Electrification

The Weekly Bulletin of the Department of Trade and Commerce of Canada reports in a recent issue that tender forms and specifications have been received from Mr. C. Hartlett, Acting Trade Commissioner, Melbourne, for material required by the Victorian Government Railway Department, Melbourne.

These tender forms are open to inspection of interested Canadian manufacturers at the Department of Trade and Commerce, Ottawa (refer file No. 20603).

Tenders in conformity with the specifications are to be addressed to the Secretary, Victorian Government Railways, Melbourne, Australia.

Particulars of the requirements are briefly outlined in the Bulletin thus:

No.	Date of Closing	Particulars.
32911.	March 3, 1920.	—20 copper plates (approximately 11 tons), as specified.
32912.	" 3, 1920.	—2½ tons copper rod, 1 inch diameter, as specified.
32913.	" 3, 1920.	—19.28 cwt. locomotive seamless copper tubes and pipes, as specified.
32914.	" 3, 1920.	—1,000 solid drawn copper or brass boiler tubes, as specified.
32927.	" 31, 1920.	—12,000 metal filament lamps, and 2,000 carbon filament lamps, as specified.

Electricity for Italy Instead of Coal

LONDON.

The Technique Moderne in a recent issue gives a proposal of Emile Guarini for replacing transport of coal from Belgium to Italy by rail, by means of long distance transmission of electricity, which, according to M. Guarini, would reduce costs by more than one-half.

The distance between the Belgian colliery centers and Lombardy is 1,200 kilometers. M. Guarini suggests burning the coal in situ, thus permitting of the utilization of powdered coal and coal of poor quality. The power thus produced would be transmitted at 150,000 volts through France to Lombardy. The author estimates that the cost per kilo-watt-hour transmitted electrically will be eight centimes as against 18 centimes—the cost of coal plus freight—by rail.

Exports of Locomotives in November

The exports of steam locomotives in November were considerably below the totals for October and September. The total number exported in November was 60, of a value of $1,111,309. Cuba and Argentina were the largest customers for the month, the former receiving 19 and the latter 11.

The detailed figures as compiled by the Bureau of Foreign and Domestic Commerce are as follows:

EXPORTS OF STEAM LOCOMOTIVES IN NOVEMBER

Countries	Number	Dollars
Norway	3	125,200
Spain	1	9,644
Canada	1	13,975
Guatemala	1	2,700
Mexico	4	49,699
Jamaica	2	21,000
Cuba	19	334,122
Dominican Republic	2	29,120
Argentina	11	345,400
Brazil	7	125,550
Ecuador	1	4,300
China	1	935
Hongkong	1	7,464
Japan	1	6,200
Philippine Islands	3	27,000
Portuguese Africa	2	9,000
Total	60	1,111,309

Exports of Railway Track Material in November

The Exports of steel rails, amounting to 54,342 tons, valued at $3,194,458, in November, were greater than those of October but not as great as in September. The exports of spikes and switches, frogs, splice bars, etc., during the month were, on the other hand, among the lowest of the year. The detailed figures as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

EXPORTS OF RAILWAY TRACK MATERIAL IN NOVEMBER.

	Spikes		Steel Rails		Switches, frogs, splice bars, etc.
Countries	Pounds	Dollars	Tons	Dollars	Dollars
Belgium	.....	.....	515	32,648	.....
France	.....	.....	3,362	256,607	2,044
Netherlands	17,500	1,750	844	51,342	1,183
Norway	.....	.....	6	770	3,181
Portugal	5,454	412	69	4,424	.....
England	.....	.....	.....	.....	923
British Honduras	.....	.....	162	10,050	.....
Canada	8,915	477	535	25,802	43,083
Guatemala	18,100	849	.....	.....	.....
Honduras	16,000	833	505	26,769	2,369
Panama	.....	.....	25	1,274	1,155
Mexico	108,880	4,147	409	18,836	14,201
Jamaica	600	54	20	1,200	3,405
Trinidad and Tobago	.....	.....	3	225	398
Other British West Indies	8,960	385	.....	.....	466
Cuba	885,360	35,332	6,680	376,520	86,403
Danish West Indies	600	21	.....	.....	.....
French West Indies	8,774	752	.....	.....	657
Dominican Republic	32,000	1,175	149	10,561	1,257
Argentina	18,690	712	.....	.....	946
Bolivia	39,778	1,304	1,299	77,495	103,845
Chile	46,600	2,800	103	5,542	13,258
Colombia	.....	.....	156	10,278	844
Ecuador	19,675	859	.....	.....	4,161
British Guiana	.....	.....	445	21,762	30
Dutch Guiana	.....	.....	202	9,838	7
Peru	23,488	924	2,119	102,927	9,489
Venezuela	3,471	226	113	5,015	3,319
China	1,813	42	982	47,104	1,610
British India	.....	.....	352	22,099	2,739
Straits Settlements	2,310	58	35	2,101	2,487
Dutch East Indies	.....	.....	3,838	199,615	84,960
Hongkong	224,840	4,320	200	6,620	214
Japan	317,934	10,235	24,168	1,440,072	37,403
Siam	110,000	7,454	.....	.....	.....
Australia	.....	.....	.....	.....	437
New Zealand	.....	.....	50	3,300	479
Philippine Islands	88,081	11,631	3,243	173,651	20,611
British South Africa	335,850	26,169	3,753	250,016	7,593
Portuguese Africa	.....	.....	.....	.....	3,750
Total	2,343,673	112,921	54,342	3,194,458	567,756

England's Railway Rolling Stock

LONDON.

In a recent statement to members of the House of Commons on the railway question, Sir Eric Geddes, Minister of Transport, said that there was not one of the belligerent countries whose railways were regaining their ordinary position with regard to traffic with less dislocation than England. In this connection the Ministry of Transport issued the following statement showing the percentage of wagons and locomotives under or awaiting repair in November in England and other foreign countries:

	Wagons Per cent.	Locomotives Per cent.
Great Britain	6	21
Poland	10	30
Czecho-Slovakia	12	38
Greece	14	24
France	15	22
Italy	18	27
Hungary	24	73
South Russia	25	49
Austria	35	37
Roumania	42	71
Bulgaria	44	63

England's Export of Railway Material

LONDON.

According to the Board of Trade returns, the value of railway material exported during the eleven months ended November, was as follows, the corresponding figures for 1918 being also stated:

	First eleven months of 1919	First eleven months of 1918
Locomotives	£1,399,523	£1,045,021
Rails	1,828,591	470,393
Carriages	566,015	546,805
Wagons	2,026,722	304,306
Wheels and axles	709,841	327,844
Tires and axles	809,179	560,400
Chairs and metal sleepers	298,255	139,324
Miscellaneous permanent way	2,886,816	1,152,439

The weight of rails exported was 114,215 tons for the first eleven months of 1919 as against 25,475 tons for the same period of 1918, and of chairs and metal sleepers 20,539 tons for the first eleven months of 1919, as against 8,711 tons for the same period of 1918. During November locomotives to the value of £97,681 went to India and £36,722 to South Africa. Rails to the value of £16,522 went to India.

Railway Conditions in China Show Improvement

PEKING, December 20.

With the close of the year the railway situation in China shows more promise of action than at any period during the past four years. The Ministry of Communications is evidencing a capacity for decision hitherto unsuspected. In the last issue of these notes, the arrangements for the general interchange of goods wagons were outlined. Since that time an adjourned meeting of the traffic managers has been held, and at the insistence of the Ministry a uniform classification of goods was drawn up to take effect at the beginning of the year. Five lines participated in the conference. Three other lines are so situated that they will have to follow the example of their larger connections, and the remaining government lines are so disconnected that there will be no need of extending the new classification to cover their business until connections are built through. The new classification is much more detailed than the former classifications—containing as it does some 1,500 commodities compared with no more than 500 in any of the old classifications. As a further step toward an efficient goods service it was agreed to quote rates uniformly in kilometres after January 1, 1921. This will require considerable preparation upon the "English" lines. After the same date it is proposed also to begin through-billing of goods with the accounting to be done in the clearing house of the Ministry of Communications. The clearing house accountant is at present drawing up the forms which will be required for this work.

* * *

The promise of an early appearance of the annual report for 1918 was fulfilled by the appearance of the document before the end of November. It can be said therefore that in its railway statistics the Ministery is fully "up-to-date."

FRANK H. CLARK ARRIVES IN PEKING

The rumor, reported in the last issue of these notes, that the Ministry has engaged four foreign experts to assist in the standardization of rolling stock is now abundantly confirmed by the arrival of these gentlemen in Peking. One is Frank H. Clark, formerly superintendent of motive power of the Baltimore & Ohio. The others are T. R. Johnson, formerly commissioner of railways, New South Wales, and latterly engaged in consulting work in London; M. Taton, personal representative of M. Painlevé, formerly Minister of War, France, who was engaged by the Ministry, but is unable to come at present, due to political conditions in France, and Dr. Hirai, the present Japanese Adviser to the Ministry. In addition to the standardization of rolling stock, this group will attempt to standardize signal practice, bridge dimensions and other maintenance practice.

PEKING-SUIYUAN MAY BE EXTENDED

A great deal of interest has been aroused by the announcement that from January 1, 1920, the Peking Hankow and the Pekin Suiyuan lines will be amalgamated. It should be explained that when the former director of the Peking Hankow, Dr. C. C. Wang, whom many readers of the *Railway Age* met in New York last spring, left for France as technical adviser to the Chinese Peace delegation, the director of the Peking Suiyuan, Lieut.-Gen. Tinge was appointed to act for him. Wang has returned, but the influence of his friends has not been strong enough to prevent his receiving the Irish promotion of technical delegate to the Siberian Railway Commission. Dr. Wang is considered one of the foremost of American returned-students. Gen. Tinge it was who contracted the loan of 4,000,000 yen last December on the Peking Suiyuan line, which was noted in these columns at the time. Vernacular reports have it that he now intends to contract a refunding loan with the Japanese sufficient to take up the Franco-British loan on the Peking Hankow and to build the Peking Suiyuan line through the Urga. To do this he will give a blanket mortgage upon the combined lines. Financially this is entirely feasible, for the combined properties are now earning in excess of 12 per cent upon the investment, and the government equity in the two properties at present rates of exchange is equal to fully three times the combined loan obligations. But there is still another aspect of the situation. Gen. Tinge is closely associated with Gen. Hsu Shih Chen, "little Hsu," who as a means of restoring the pro-Japanese element to some degree of public favor, was allowed to proceed with a troop toward Mongolia, which had the effect of securing from the Mongolian authorities the cancellation of Mongolian autonomy, which had been effected at the instance of Russia in the early days of the Republic. It is commonly supposed that "little Hsu" has dreams of conquest, and if he is furnished with a line of rail from Mongolia to deep water at Hankow, where Japanese warships ride at anchor the year around, he will be able to set up an interior empire. While such imaginings seem a bit highly colored, undoubtedly there will be a considerable consolidation of power in the interior. Immediately, however, it will make possible the shipping of certain supplies of ore to the Hang Yang works, opposite Hankow, which are under contract, for years to come, to supply Japanese firms with pig iron at a very low pre-war price. Construction work is now under way beyond Fengchen, the present terminus of the Peking Suiyuan line.

ICE FREE PORT FOR TIENTSIN

Another project of some importance is for the construction of a new port with railway lines, to serve as an outport from Tientsin much as Woosung serves Shanghai. The point selected is said to be ice-free, whereas the river at Tientsin is not only ice bound in winter, but frequently mud-bound in summer. The project has been approved by the Chihli Assembly and has the support of the civil and military governors brothers) of Chihli. The rail line proposed would intersect the Peking Mukden line at Tonghsan and proceed into the interior to Jehol, where it would join up with the southern extremity of the proposed Japanese lines from Manchuria.

UNION STATION FOR PEKING PROPOSED

Gen. Tinge is said to be actively planning a union passenger station for Peking. According to report, this union station is to be located at the extreme southern part of the city, whereas at present, the two depots serving the two most important lines, are located opposite each other, almost in the geographical centre of the city. The third station, that of the Peking Suiyuan, however, is inconveniently located on the west side of the city, but is connected with the Peking Mukden station by the "Round City" branch.

Equipment and Supplies

Equipment for Belgian State Railways

Further details are now available concerning the inquiry for cars for this system, reported briefly in the Equipment and Supply Column of last week's *Railway Age*. A cablegram from the American Consulate at Brussels, dated January 14, to the Bureau of Foreign and Domestic Commerce follows: The State Railways of Belgium have opened bids for 15,000 coal cars, made of sheet iron of 20 tons' capacity and with lateral doors. One-half of this number are to be equipped with the screw-working brakes and the other half with hand brakes. Also, bids are desired for 3,000 flat cars of 20 tons each, and for 800 baggage cars, each with a compartment for parcels and also with an elevated lookout box. Bids with terms of payment and the time of delivery are desired at once. The awarding of contracts was fixed for January 21, but it is possible that the time will be extended. The interested parties should cable.

A press despatch from Ottawa, Ont., dated Wednesday, reported that orders for $10,000,000 worth of equipment have been placed in Canada, including 15 engines and 3,000 freight cars, which will probably be distributed among the Montreal Locomotive Works, the Canadian Locomotive Company, the National Steel Car Company, Canadian Allis Chalmers and other manufacturers. The report says that the business is subject to arrangement of credit facilities under the new plan of accommodation to be granted by the Canadian Government where needed.

Standard Cars and Locomotives

Up to January 20, 92,412 of the 100,000 standard freight cars ordered by the Railroad Administration in 1918 had been delivered, leaving 7,588 to be completed. Of the total, 12,680 were built in 1918 and 77,423 in 1919. All of the standard locomotives will have been delivered by the end of this month but 11 mikados of a special order placed for the Central Railroad of New Jersey are scheduled to be delivered in March.

Most of the locomotives which the Railroad Administration has been using during the period of federal control on roads other than those of their owners have now been "unscrambled" by being returned to their owners. According to a recent report there were still 515 locomotives off their own lines, of which 95 were in the Allegheny region, 66 in the Central Western region, 135 in the Eastern region, 49 in the North Western region, 15 in the Pocahontas region, 104 in the Southern region and 51 in the Southwestern region, but 236 included those whose location off line is a system affair over which the Railroad Administration need not concern itself. The location of 155 was required by public necessity and apparently they will still be so required to be off line on March 1. The location of 95 off line was at that time required by public necessity but there was some prospect of relocating it before March 1 either through termination of the necessity, by a rearrangement of equipment, or by repair of unserviceable equipment in shop. Only 29 locomotives were classified as being off the line for reasons not required by public necessity.

Locomotives

THE CHICAGO, BURLINGTON & QUINCY will be in the market soon for 5 Mikado type locomotives.

THE CHICAGO, ROCK ISLAND & PACIFIC, it is expected, will be in the market soon for a number of locomotives.

THE EGYPTIAN STATE RAILWAYS have ordered 30 Mogul type locomotives from the Baldwin Locomotive Works.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for a second-hand six-wheel switching engine, with weight on drivers of about 70 tons, and for a second-hand Mikado type locomotive, weighing, including tender, from 200,000 to 250,000 lb. Also for 25 sets of second-hand 60,000 lb. capacity all steel trucks, with air cylinders, triple valves and automatic couplers.

THE EL PASO & SOUTHWESTERN, reported in the *Railway Age* of January 9, as inquiring for 5 locomotives, has ordered 5 Mikado type locomotives from the American Locomotive Company.

THE UNITED FRUIT COMPANY has ordered from the H. K. Porter Company, two 4-wheel oil burning locomotives with trailing struck, having a weight of 10,000 lb. on drivers and 30 in. gage, for use on the Jamaican Division of its lines.

Freight Cars

THE CARNEGIE STEEL COMPANY is inquiring for 3 freight cars.

THE DETROIT CITY RAILWAYS are inquiring for 1, 50-ton, hopper bottom, coal car.

THE TENNESSEE COAL, IRON & RAILROAD COMPANY is inquiring for 20, 50-ton coke cars.

THE CANTON HANKOW is in the market for 50 high-side gondolas, of 35-ton capacity.

THE CANADIAN NATIONAL RAILWAYS will be in the market soon for a number of freight cars.

THE GOODYEAR TIRE & RUBBER COMPANY, Akron, Ohio, is inquiring for 200 cars of 70-ton capacity.

O. B. CINTAS, Havana, Cuba, has ordered 20 flat cars and 10 tank cars from the American Car & Foundry Company.

THE M. A. HANNA COMPANY, Wilkes-Barre, Pa., has ordered 50 mine cars from the American Car & Foundry Company.

THE OLIVER IRON MINING COMPANY, Duluth, Minn., is inquiring for 30-yard, all-steel stripping cars in lots of 25, 50, 100 and 130.

THE BANGOR RAILWAY & ELECTRIC COMPANY, Bangor, Me., has ordered 3 box cars and 3 flat cars from the American Car & Foundry Company.

THE STEEL COMPANY, Pottsville, Pa., has ordered 17, 50-ton steel hopper cars and 5, 50-ton gondolas from the American Car & Foundry Company.

THE UNION PACIFIC, reported in the *Railway Age* of January 2, as asking prices on 3,000 refrigerator cars has increased its inquiry to 4,000 cars.

THE LIDGERWOOD MANUFACTURING COMPANY, 90 Liberty street, New York City, has ordered 88, 50-ton wooden flat cars from the American Car & Foundry Company.

THE UNITED RAILWAYS OF HAVANA have ordered 300, 30-ton box cars and 300, 25-ton flat cars, all with steel underframes, from the American Car & Foundry Company.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for some gasolene tanks, 3/16 in. and ¼ in. body of 10,000 and 20,000 gal. capacity.

THE NEW YORK CENTRAL, reported in the *Railway Age* of November 27, as inquiring for 1,000 hopper car bodies for the Pittsburgh & Lake Erie, has ordered this equipment from the Standard Steel Car Company. These cars are to have a capacity of 110,000 lb.

Passenger Cars

THE MISSOURI PACIFIC is inquiring for 20 baggage and express cars, also for 10 coaches.

THE MISSOURI, KANSAS & TEXAS is inquiring for 58 passenger train cars of various types.

Supply Trade News

M. J. Butler, managing director of Armstrong-Whitworth of Canada, Ltd., Montreal, and formerly chairman of the Board of Management of the Canadian Government Railways, has retired from active business.

Harvey DeCamp, purchasing agent of the Gulf & Ship Island, the Mississippi Central and the New Orleans Great Northern with offices at Hattiesburg, Miss., has been elected vice-president of the Certes Supply Company, St. Louis, Mo.

C. M. Rogers has resigned as supervisor of stationary plants on the Chicago, Rock Island & Pacific, with office at Chicago, to become manager of service of the **Locomotive Fire Box Company,** Chicago, with headquarters at 630 Marquette building.

The Joyce-Cridland Company, Dayton, Ohio, manufacturers of Joyce jacks, including hydraulic, railway, public service, shipbuilding, mining, and contractors' jacks, announces the opening of a New York office for the convenience of the domestic and export trade, on the fifth floor of the Grand Central Palace, 45th street and Lexington avenue.

R. B. Fisher, assistant to the president of the Buda Company, Harvey, Ill., has been appointed general sales manager, directing the domestic and foreign sales and advertising departments. **W. P. Hunt, Jr.,** general sales manager and secretary, will continue as sales manager of the railway department and secretary of the company.

C. P. Patrick, vice-president of the Master Boiler Makers' Association, and general boiler inspector on the Erie, has been appointed general manager of the Chicago, Wilson, Welding & Repair Company, with headquarters at Chicago, succeeding **E. S. Fitzsimmons,** who has resigned to become assistant sales manager of the Flannery Bolt Company, Pittsburgh, Pa.

The Locomotive Export Association of New York City has filed papers with the Federal Trade Commission in accordance with the provisions of the Webb-Pomerene Act seting forth the details regarding its organization to export locomotives and parts thereof. The stockholders include the Baldwin Locomotive Works, the American Locomotive Company and the Montreal Locomotive Works.

John J. Nicholson has been elected president of the **Murphy Varnish Company,** Newark, N. J.; **Charles J. Roh** has been elected vice-president and a member of the board of directors; **Franklin Murphy, Jr.,** has retired from the presidency to become chairman of the executive committee and **Franklin Murphy, Sr.,** former governor of New Jersey remains as chairman of the board of directors.

A contract recently signed between the **Fairbanks Company,** New York, and the **Lincoln Electric Company,** of Cleveland, Ohio, gives the Fairbanks Company the exclusive distribution of Lincoln electric motors for industrial applications. This line includes alternating current motors for two-phase and three-phase circuits in capacities from one-half to 500 hp., for all commercial voltages and frequencies, and direct current motors from one-half to 150 hp.

At the annual meeting on January 15, of the Canadian Car & Foundry Company, Montreal, Que., the following new directors were elected: W. H. Woodin, president of the American Car & Foundry Company; Andrew Fletcher, president of the American Locomotive Company; Lewis L. Clarke, president of the American Exchange National Bank, New York, and Francis H. Clergue, of Montreal. Erskine Hewitt and J. F. Taylor retired as directors and there were two vacancies on the board.

Arthur G. Henry, metallurgist for the Illinois Tool Works and secretary of the American Steel Treaters' Society since its organization in September, 1918, has resigned from both offices to become special representative for the Vanadium Alloys Steel Company, Latrobe, Pa., with offices at 566 W. Randolph Street, Chicago. Mr. Henry has been succeeded on the board of directors of the American Steel Treaters' Society by **W. H. Eisenman,** business manager of the Society who becomes, in addition, secretary combining the two offices with the title of executive secretary.

The Falls Hollow Staybolt Company, Cuyahoga Falls, Ohio, announces the appointment of the following sales representatives: Chas. Hubbard & Co., 81 Fulton street, New York; Warren Corning & Co., Transportation building, Chicago; Certes Supply Company, Frisco building, St. Louis, Mo.; Spalding & Small, 1010 Hurt building, Atlanta, Ga.; Read-Rittenhouse Company, 1234 Commercial Trust building, Philadelphia, Pa.; Berger-Carter Company, Tenth and Mississippi streets, San Francisco, Cal.; A. M. Castle & Co. of Washington, Seattle, Wash.; and Austin & Doten, 102 North street, Boston, Mass.

Trade Publications

Pipe Cutting and Threading Tools.—A new catalogue, No. 12, of Beaver cutting and threading tools for pipe has been published by the Borden Company, Warren, Ohio. It contains list prices and data for complete tools and extra parts and a large number of illustrations.

Asbestos.—In the October 31 issue of the *Railway Age* there appeared a short review of the first number of Asbestos, a monthly magazine, in which it was stated that the publisher is the Magnesia Association of America. This is an error, as the booklet is published by Secretarial Service, 721 Bulletin building, Philadelphia, Pa.

Continuous Rail Crossing Frogs.—An illustrated pamphlet of 16 pages, known as "Installation Book A," has recently been issued by the Eymon Crossing Company, Marion, Ohio, describing the continuous rail crossing frogs made by this company. The general construction and operating features of these crossings are shown by means of photographs of installations on various railroads of the country.

Link-Belt Electrical Hoists.—The Link-Belt Company, Chicago, Ill., has recently issued a new catalogue, 100 pages, illustrated, known as Book No. 380, which covers electric hoists, mono-rail trackwork, electric telphers, overhead traveling cranes and devolving locomotive cranes. Considerable data and information relative to the different types manufactured, their dimensions and capacities has been given in connection with the illustrations and drawings.

Lane Electric Crane.—A new bulletin has been issued by N. B. Payne & Co., New York City, sole agent for Lane electric cranes manufactured by the Lane Manufacturing Company, Montpelier, Vt. The bulletin illustrates and describes the several styles of electric cranes manufactured by this company in which steel girders or heavy timbers of long leaf yellow pine are used. It also contains a complete set of specifications and dimensions of the various styles.

Concrete Tanks.—In a 36-page bulletin recently issued, the Portland Cement Association gives a resumé of the present use of concrete in the form of tanks for the storage of water, oil and other liquids. Some idea of the extent of the use of concrete for this purpose is obtained from a statement that 790,000,000 gal. of oil storage capacity has been provided in concrete tanks. A list of the names of oil and industrial concerns using concrete tanks for oil is given with the location and the dates of construction.

Paasche Portable Painting Equipment.—A four-page illustrated bulletin has been issued by the Paasche Air Brush Company, Chicago, devoted to the various types of paint spraying equipment manufactured by this company. The illustrations show the various styles of gas, electric or hand-driven equipment in actual operation in painting exteriors and interiors of buildings, stacks, tanks, etc. The bulletin also contains specifications, sizes and prices of the various types and information concerning the manner of assembling this equipment.

Railway Financial News

ATLANTA, BIRMINGHAM & ATLANTIC.—The Columbia Trust Company of New York announces that it has received sufficient funds from the government, under the compensation contract between the roads and the Railroad Administration, to pay interest at the rate of 5 per cent per annum on past-due coupons of the railroad's 5 per cent income bonds. The coupons, numbered 5, 6 and 7, were due, respectively, September 1, 1918, March 1, 1919, and September 1, 1919. On and after Monday, January 12, 1920, says the announcement, the coupons will be paid at the rate of $25 each when accompanied by appropriate income tax certificates.

ARTESIAN BELT.—See San Antonio Southern.

BOSTON & MAINE.—The first dividend to stockholders since March 1, 1913, has been declared in the form of a distribution of $2.67 a share to holders of the old preferred stock of the road. Neither the common stock nor the new first preferred, the latter having been issued in exchange for stock of leased lines taken in by the recent organization will share.

The Boston & Maine has made application to the New York Public Service Commission for approval of the issue of its mortgage bonds amounting to $10,273,000, to mature on January 1, 1929, and to bear interest at 6 per cent. The company says the director general of railroads on December 6, submitted expenditures for additions, extensions, betterments and improvements to the company and its subsidiaries amounting to $8,129,805, and estimated expenditures, $11,124,866. The petition asks that $8,000,000 of the bonds be issued for cash at par, or to the director general of railroads at par, upon such arrangement as to receipt and disposal of the proceeds and interest during federal control as the company's directors may agree. The remaining bonds, $2,273,000, are to be used for taking up present outstanding mortgage bonds issued to the director general on December 1, 1919, the connection with the consolidation of various New England lines into the Boston & Maine.

CHICAGO, ROCK ISLAND & PACIFIC.—This company has applied to the Public Utilities Commission of Illinois for an order authorizing the refund of its outstanding short term notes in the aggregate amount of $1,500,000, secured by a pledge of $3,000,000 face value of its first and refunding bonds, by the issuance of $1,500,000 short term notes.

LAS VEGAS & TONOPAH.—In the course of its plan of liquidation this company has sold the controlling interest in the Bullfrog Goldfield Railroad to Althouse & La Grange, of New York. The Bullfrog Goldfield extends from Beatty, Nev., to Goldfield, a distance of about 80 miles, connecting with the Tonopah & Tidewater at Beatty, and with the Tonopah & Goldfield at Goldfield. The road was built in 1907. It connects with southern California, over the Las Vegas & Tonopah, and it continued in operation until the latter road was extended to Goldfield.

In 1914, the two roads entered into a joint operating agreement, using the Bullfrog-Goldfield tracks. This agreement continued until 1918, when a new one was made, providing for the joint operation of the Bullfrog-Goldfield between Beatty and Goldfield, and the Tonopah & Tidewater between Ludlow and Beatty. The Las Vegas & Tonopah services were discontinued permanently on November 1, 1918.

LEHIGH VALLEY.—James F. Bell, vice-president of the Washburn-Crosby Company, has been elected a director of the Lehigh Valley, succeeding James McLean, deceased.

SAN ANTONIO SOUTHERN.—This company has been incorporated at San Antonio, Tex., with a capital stock of $250,000, by the purchasers of the Artesian Belt Railroad. The new owners of the road plan to extend the line south from Christine to some point on the Rio Grande, a distance of about 125 miles.

Railway Officers

Railroad Administration

Regional

Charles A. Phelan, operating assistant of the Allegheny region at Philadelphia, Pa., has resigned.

Federal and General Managers

Elisha Lee, federal manager of the Pennsylvania, Eastern Lines, has had his jurisdiction extended over the Cumberland Valley which has been released from the control of C. W. Galloway.

C. H. Ewing, federal manager of the Philadelphia & Reading, has had his jurisdiction extended over the Gettysburg & Harrisburg and the Philadelphia & Reading between Lurgan, Shippensburg and Harrisburg, Pa., which have been released from the control of C. W. Galloway.

M. C. Byers, general manager of the Baltimore & Ohio at Hagerstown, Md., has been appointed federal manager of the Western Maryland and the Cumberland & Pennsylvania, with the same headquarters, these lines having been released from the jurisdiction of C. W. Galloway.

C. W. Galloway, federal manager of the Baltimore & Ohio, Lines East and West, has had released from his jurisdiction the Cumberland Valley, the Gettysburg & Reading, the Gettysburg & Harrisburg, and the Philadelphia & Reading, between Lurgan, Shippensburg and Harrisburg, Pa. Mr. Galloway has had his jurisdiction extended over the Staten Island Rapid Transit, the Staten Island, the Baltimore & New York and the Baltimore & Ohio properties and piers on Manhattan Island, all of which have been released from the control of C. H. Ewing, federal manager; and over the Dayton & Union and the Dayton Union, released from the jurisdiction of **R. N. Begien;** also over the Baltimore & Ohio between Harrisburg, Va., and Lexington, Va., of which, until recently, **E. H. Coapman** was federal manager.

I. L. Hibbard, whose promotion to general manager of the Atchison, Topeka & Santa Fe Coast Lines was announced in the *Railway Age* of January 9, page 21), was born at Woodhull, N. Y., July 8, 1857. Mr. Hibbard began railroad work in 1876 as a warehouseman in the service of the Erie, and later served as freight clerk. From 1881 to 1884 he was employed as a stenographer in the general freight office of the Indianapolis & St. Louis, Mo., and from 1884 to 1886 he held a similar position in the office of the master of transportation of the Wabash, St. Louis & Pacific. In 1886 Mr. Hibbard was appointed trainmaster of the latter road and served in that capacity until 1890 when he was appointed trainmaster of the Southern California. In December, 1896, he was appointed agent of the same road at Los Angeles, Cal., and in October, 1897, became superintendent of the Tibuquerque division of the Santa Fe Pacific, now a part of the Atchison, Topeka & Santa Fe, at Winslow, Ariz. From October 1, 1903, to February 1, 1905, he was superintendent of the Los Angeles division of

I. L. Hibbard

the Atchison, Topeka & Santa Fe with headquarters at San Bernardino, Cal., and on February 1, 1905, he was appointed general superintendent of the Santa Fe Coast Lines. In April, 1913, Mr. Hibbard was appointed acting general manager of the Santa Fe Coast Lines, performing the duties of A. G. Wells, who had been granted a leave of absence because of sickness. Upon Mr. Wells' return to active service in October, 1913, Mr. Hibbard resumed his duties as general superintendent. In November, 1916, he was promoted to assistant general manager, serving in that capacity until his recent further promotion.

C. H. Lantry, who recently returned from service in Russia with the Russian Railway Service Corps, has been appointed assistant to the general manager of the Northern Pacific.

A. G. Wells, whose promotion to federal manager of the Atchison, Topeka & Santa Fe, the Panhandle & Santa Fe, the Panhandle & Santa Fe, the Rio Grande, El Paso & Santa Fe, the Grand Canyon, the Kansas City Southwestern, and the Atchison Union Depot & Railroads was announced in the *Railway Age* of January 9, (page 217), was born at Guelph, Ont., November 18, 1861. Mr. Wells entered railway service in 1876 as a machinist apprentice on the Kansas City, St. Joseph & Council Bluffs. From that time until March 1, 1893, he was successively a clerk in the motive power department of the Chicago, Burlington & Quincy, clerk to the purchasing agent of the Atlantic & Pacific, to a division superintendent of the Atchison, Topeka & Santa Fe, and to the general superintendent and trainmaster of the Atlantic & Pacific; assistant to the general manager of the Ohio & Mississippi, general superintendent of the Ohio, Indiana & Western and division superintendent of respectively the Peoria, Indianapolis and St. Louis divisions of the Cleveland, Cincinnati, Chicago & St. Louis. In September, 1893, he was appointed assistant to the first vice-president of the Atchison, Topeka & Santa Fe with headquarters at Chicago and continued in that capacity until November 1, 1894. Appointed general superintendent of the Atlantic & Pacific on January 1, 1895, he held the position until June 30, 1897, when he was appointed general superintendent of the Santa Fe Pacific. In September, 1897, he was also appointed general superintendent of the Southern California In addition to these two, he was also made general superintendent of the San Francisco & San Joaquin Valley in October, 1899. From January, 1901, to February, 1902, he served as acting general manager, and on February, 1902, was appointed general maanger of the Atchison, Topeka & Santa Fe Coast Lines, a consolidation of the three lines over which he had been acting as general manager. In April, 1913, Mr. Wells was granted a leave of absence for six months because of ill health. Returning to his duties as general manager of the Santa Fe Coast Lines in October of the same year, he continued in the capacity of general manager until his recent appointment as federal manager.

A. G. Wells

R. N. Begein, federal manager of the Baltimore & Ohio, Western Lines, has been appointed general manager of the same lines, as well as of the Dayton and the Dayton Union, with headquarters at Cincinnati, Ohio.

Operating

R. D. Miller, trainmaster of the Milwaukeee (Wis.) Terminals division of the Chicago, Milwaukee & St. Paul, has been appointed trainmaster of the Northern division, with headquarters at Milwaukee, succeeding **C. A. Turney,** who has been transferred to succeed Mr. Miller as trainmaster of the Milwaukee Terminals division.

Traffic

V. A. Braunstein has been appointed assistant general passenger agent of the Chesapeake & Ohio, with headquarters at Richmond, Va., succeeding **W. O. Warthen,** deceased.

Engineering and Rolling Stock

E. A. Black, signal supervisor of the Franklin district of the New York Central, Lines West of Buffalo, with headquarters at Ashtabula, Ohio, has been appointed chief signal inspector, with headquarters at Cleveland, Ohio, succeeding **J. C. Seaman,** who has been appointed signal supervisor of the Cleveland district, with headquarters at Elyria, Ohio. **L. L. Whitcomb,** signal supervisor of the Cleveland district, with headquarters at Elyria, has been transferred to succeed Mr. Black at Ashtabula.

Corporate

Executive, Financial, Legal and Accounting

F. M. Whitaker has resumed his duties as vice-president in charge of traffic of the Chesapeake & Ohio and the Hocking Valley, with headquarters at Richmond, Va., which position he held prior to federal control.

J. D. Woodworth, traffic assistant to the regional director of the Northwestern region, will resume his former position as second vice-president in charge of traffic of the Northern Pacific, with headquarters at St. Paul, Minn., on March 1.

I. B. Koons, since July, 1918, assistant to W. G. Besler president of the Central of New Jersey, has resumed, effective December 15, his position as vice-president and freight traffic manager, with headquarters at New York, which he held prior to Federal control.

Gerritt Fort, assistant director of the division of traffic of the Railroad Administration in charge of passenger traffic, who resigned to become vice-president in charge of traffic of Boston & Maine as announced in the *Railway Age* of January 9 (page 218), was born November 12, 1865, at Cedar Rapids, Ia. Mr. Fort began railroad work in 1884 as clerk to the superintendent of the Burlington, Cedar Rapids & Northern at Cedar Rapids. He left that road in 1887 to become clerk to the auditor of the Wabash at Chicago under the receivership, a position he held for two years and some months when he resigned to accept the appointment of chief rate clerk in the general passenger department of the New York Central & Hudson River at New York. In September, 1891, he was promoted to chief clerk in the same department and in January, six years later, became secretary for the Central Passenger Association at Chicago. In September, 1900, he became assistant general passenger agent of the Union Pacific, executing the duties of that office for seven years or until 1907 when he was appointed assistant to the vice-president of the New York Central and three years later made general passenger agent of the same road, lines East of Buffalo. A few months after receiving the appointment just mentioned, Mr. Fort left the New York Central to return to the Union Pacific as passenger traffic manager and in December of the same year he also took over the traffic managership of the Oregon Short Line. It was while holding these positions that he was appointed, in February, 1918, shortly after the establishment of federal control of the roads, assistant director of the division of traffic with headquarters at Washington, D. C.

Gerritt Fort

Hale Holden, regional director of the Central Western region of the Railroad Administration, has been elected president of the Chicago, Burlington & Quincy and the Colorado & Southern, effective on the termination of his connection with the Railroad Administration. He has agreed to remain with the Railroad Administration temporarily and probably until the termination of federal control. Mr. Holden was president of the Burlington prior to federal control.

Traffic

P. W. Reed has been appointed general freight agent of the Gulf, Florida & Alabama, at Pensacola, Fla.

Engineering and Rolling Stock

H. C. Booz, corporate engineer of the Pennsylvania, Eastern Lines, with headquarters at Philadelphia, has resigned, effective February 1, to become chief engineer of the Berwind-White Coal Mining Company.

E. O. Smith, master mechanic on the St. Louis & Hannibal, with headquarters at Hannibal, Mo., has been appointed to the newly created position of master mechanic on the Louisiana & North West, with office at Homer, La.

James Hanahan, roadmaster for the Alaskan Engineering Commission, with office at Anchorage, Alaska, has been promoted to assistant superintendent of tracks, with local jurisdiction over the maintenance and construction of tracks from Anchorage northward to the end of the line.

Special

J. F. Coffey, assistant manager of the land and industrial department for the Alaskan Engineering Commission, with office at Anchorage, Alaska, has been appointed manager of that department, with the same headquarters, succeeding to part of the duties of **B. H. Barndollar,** who has been appointed head of the accounting division of the Alaskan Engineering Commission.

E. R. McFarland has resumed his duties as telegraph and telephone superintendent for the Alaskan Engineering Commission, with headquarters at Anchorage, Alaska, succeeding **J. J. Longacre,** acting superintendent, who has resumed his duties as chief electrician of the light and power plant at Anchorage. Prior to the recent reorganization of the Alaskan Engineering Commission, which controls the Alaska Northern, Mr. McFarland has been temporarily assigned to other duties.

Obituary

Winslow T. Perkins, formerly division superintendent of the Boston & Maine at Boston, Mass., died in his home at Malden, Mass., January 15, at the age of 83 years.

Eugene R. Francisco, traveling auditor of the Wabash, was killed by a train at St. Louis, Mo., on January 2. He was 72 years old and had been in the employ of the Wabash for 40 years.

Norman J. Lee, formerly general agent of the New York, New Haven & Hartford, with office at New Haven, Conn., died at his home in New Haven, January 1, after an illness of several months.

W. O. Warthen, assistant general passenger agent of the Chesapeake & Ohio at Richmond, Va., died December 30, 1919, at his home in Richmond. Mr. Warthen had been in failing health for almost a year.

William T. Gorrell, formerly master car builder of the Philadelphia & Reading at Reading, Pa., died December 13, 1919, at his home in Reading. Mr. Gorrell was pensioned February 1, 1914, having become 70 years of age.

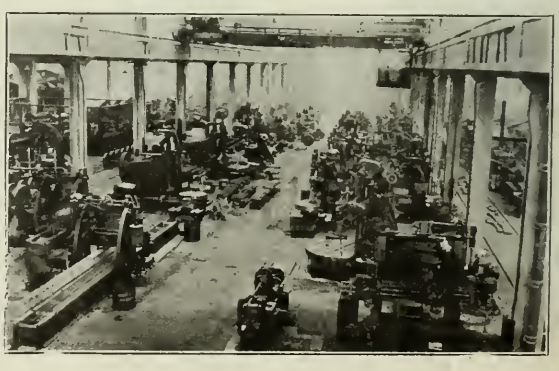
Perry Maxson, pioneer railroad builder, died at his home in Emporia, Kan., on January 8, at the age of 96 years. Mr. Maxson helped to organize and build the Missouri, Kansas & Texas through Kansas, making a treaty with the Indians for the right-of-way.

E. D. Parker, formerly assistant general freight agent on the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Minneapolis, Minn., died in St. Paul, Minn., on December 7, 1919, at the age of 81 years. Mr. Parker retired from active railroad service in 1910.

George Weston, well known transportation engineer and railroad builder, died January 6 at Philadelphia, Pa., after a brief illness. Mr. Weston was born in Kalamazoo, Mich., January 30, 1861. He began railroad work at the age of nineteen as rodman for the Missouri, Kansas & Texas. Some years later he engaged in the construction of railroads in the middle west. In 1887 he became associated with Charles T. Yerkes, an engineer in charge of laying Chicago cable lines, and shortly after installed several trolley lines in Chicago. About a year ago he and his brother organized the firm of Weston & Co., consulting engineers on transportation and valuation work, with offices at Chicago.

Judge Leigh Richmond Watts, consulting counsel of the Seaboard Air Line, died December 30, 1919, at his home in Portsmouth, Va., at the age of 74 years. Judge Watts was born at Portsmouth on December 12, 1843. He served in the confederate army during the Civil War, and in 1867 was graduated from the University of Virginia Department of Law. Having practiced his profession in Portsmouth for some time Judge Watts was, in 1883, appointed counsel for the Seaboard & Roanoke Railroad, the parent system of the Seaboard Air Line. He served in that capacity until July, 1890, when he was appointed general counsel of the Seaboard Air Line System, which position he filled until 1917, when he withdrew from active duty and became consulting counsel.

Edward Raymond, assistant general manager of the Eastern district of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., died in that city on January 13, at the age of 61 years. Mr. Raymond gave his entire railway service to the Atchison, Topeka & Santa Fe, beginning in 1877 as a section foreman. Prior to December, 1910, he was successively section foreman, roadmaster, trainmaster, assistant superintendent and division superintendent. On the latter date he was promoted to general superintendent of the Western district of the eastern lines, with headquarters at Newton, Kan. In 1914, he was temporarily appointed to the position of assistant to the vice-president in charge of operation, with office at Chicago, holding that position until April, 1915, when he resumed the duties as general superintendent of the eastern lines of the Western district. In September, 1916, he was transferred, as general superintendent, to the Eastern district, eastern lines, with headquarters at Topeka. In 1917, the title of his office was changed to assistant general manager, the duties remaining the same. He retained that position until his death.



Machine Bay in the Shop of the A. E. F. at Nevers, France

EDITORIAL

Railway Age

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Effect of Delays in Passing Legislation

Probably criticism of the Senate and House Conference Committee on railroad legislation because its members have not speedily agreed on a report to their respective houses would be energy wasted. The delays that are responsible for the present situation occurred before the conferees were appointed. It is not surprising that important differences have arisen between them; and since important differences have arisen, it will take time to effect an agreement. But there is one important fact which the members of the Conference Committee and other members of Congress should not overlook,—viz, that every day's unnecessary delay in passing the railroad legislation will effect adversely the amount of freight the railways will be able to haul for the people of the United States next fall and winter. Railroad facilities are inadequate to handling all the commerce now offering. Every day that passes they are becoming more inadequate. No substantial increase of them will or can be begun until the legislation under which the railways are to be returned to private operation shall have been passed. Soon the year will be so far advanced that no orders placed for equipment and no contracts placed for the enlargement of yards and terminals can be carried out in time to be of any advantage in the handling of traffic next fall or winter. That the railways will have extremely serious trouble in handling the country's commerce throughout the present year, and especially next fall and winter, is now a foregone conclusion unless for some reason there is a heavy decrease of traffic. The sooner Congress acts the less serious the conditions will be; and the longer it delays the worse they will be.

Making the Best Use of Equipment

Director-General Hines on January 20 issued a statement to the shippers of the country urging them to co-operate with the Railroad Administration until private operation is resumed in making the best practicable use of freight cars. Shippers should do this in their own selfish interests. As Mr. Hines pointed out, there has been only a very small increase in the number of freight cars in the country within recent years. The railway companies could not provide enough during the last years of private operation because of inadequate rates and earnings and war conditions. The Railroad Administration could not do so because of war conditions in 1918 and because Congress did not provide the necessary funds in 1919. Meantime, there has occurred an enormous increase of traffic, except during a few months last spring; and there is good reason for expecting this to continue. Mr. Hines points out that in the week ended January 3, the number of cars loaded was 162,228 greater than in the same week of last year and 216,269 greater than in the corresponding week two years ago. The business offering is so large that without the co-operation of the shippers, the Railroad Administration cannot handle it, nor, without the shippers' co-operation will the railway companies be able to handle it later. One of the principal reasons why it has been possible for the railways to move such a vastly increased traffic within recent years without any corresponding increase of facilities has been the co-operation they have received from shippers in the heavier loading of cars. Recently, however—doubtless because of the patriotic motives arising from the war have ceased to operate—the average tons loaded per car has been declining. This injures both railways and shippers by reducing the amount of traffic which can be and is moved; for even if equipment were used to the practical limit of its capacity there would hardly be enough to handle the traffic now offering. It will be months at least before any considerable additions can be made to existing railroad facilities. Meantime all the business that is moved at all must be moved with the existing facilities. The easiest and most effective means available of causing the maximum practicable business to be moved will be for the railways and the shippers, both before and after the roads are returned to private operation, to co-operate in securing and maintaining the maximum practicable loading of cars. If the demands on the railways continue as heavy as they are now, the lighter shippers load cars for many months to come, the more of their products they will have left on their hands because the railways cannot haul them.

Steel Corporation Stock Sold to Employees

In talking to railroad employees a few years ago, L. F. Loree, now president of the Delaware & Hudson, suggested that if they were not satisfied with the way the properties were managed, it would not take a great while for them to buy control of the company. This is not as fanciful as it sounds, and if the present rate of the purchase of stock in the United States Steel Corporation by employees continues, it will not be many years until the employees will hold a larger block of stock than any other single individual interest in the steel corporation. The corporation first offered common stock to its employees in 1910 and since that time has made an offer each year at prices varying with the market price of the stock. During this period, employees have subscribed to $51,300,000 in shares of stock or over 10 per cent of the $500,000,000 stock outstanding. For the first time, this year the stock is offered to employees at the full market price. As a matter of fact, the offering price on Wednesday, January 14, when the announcement was made, was 106, or about a point above the quotations for the day on the New York Stock Exchange. The employee, however, pays for the stock on the instalment plan and furthermore receives a bonus of $5 per share per year for five years in addition to the regular dividends on the stock. If he sells the stock in less than five years, his bonus ceases. Even this year, therefore, the offering price to employees is very much lower than the market price, provided the employee holds the stock for five years. Last year employees took $15,561,000 of common stock and since the amount of stock which any employee can subscribe for is proportionate to the wage received, and the average wages per employee in 1919 are estimated at $1,900 as against $1,685 in 1918, considerably more than $15,000,000 in stock will probably be subscribed for this year. No offering of railroad stock

has ever been made to employees covering a period of years on as an attractive basis as that of the United States Steel Corporation offering, but in the success of this steel corporation experiment, might there not be food for thought for Glenn E. Plumb? If railroad employees want representation in the management and direction of the affairs of their company, why shouldn't they honestly and openly buy it instead of asking the tax payers to put up money. Something for nothing was the substance of the Plumb plan, but employee participation in ownership need not rest on any such uneconomic and unjustifiable scheme as the steel corporation's experience has proved.

Commissioner Woolley Denies Prejudging Railway Rate Case

Commissioner Robert W. Woolley of the Interstate Commerce Commission, has written us a letter, which we publish on another page, commenting upon certain editorials which were published in our issue of January 23. These editorials criticised a statement by Mr. Woolley published recently in the New York Herald, in which the Commissioner opposed the return of the railways to private operation upon the ground that it would result in a demand for large advances in freight rates, and that these advances in rates would result in a huge increase in the cost of living.

Mr. Woolley denies that he has "prejudged" the railways' case, and states that "once the railroads are back in the hands of their owners, their needs brought to the judicial attention of the Commission will be quite another matter."

In view of Mr. Woolley's statement, we cheerfully withdraw our assertion that he has "prejudged" the railways' case.

We also agree entirely with the position he takes that "an Interstate Commerce Commissioner is well within his rights in discussing proposed legislation." We believe, however, that an Interstate Commissioner in discussing railway questions, should be especially careful, because of his peculiar relationship to the railroad business, to base his discussion upon facts, and, for reasons we gave in the editorials to which Mr. Woolley refers, we believe that, in predicating his argument regarding rate advances largely on the proposition that an advance in rates causes a five times greater increase in the cost of living, he was very far from basing it on facts.

In those editorials we gave a large amount of statistical data tending to show that there never has been any such relationship between rates and the cost of living as that on which he so largely based his argument. In his letter to us, Mr. Woolley refers to "certain figures quoted by you and compiled by the Bureau of Railway Economics, an organization financed by the funds of railroad corporations," which he says were "misleading." We fear that Commissioner Woolley did not do us the honor to read our editorials very carefully before writing us regarding them, for we did not quote in them a single figure that had been compiled by the Bureau of Railway Economics, although that Bureau has our confidence as a reliable source of information. All the figures we quoted, as we clearly indicated in our editorials, were compiled by the Railroad Administration and by the Bureau of Statistics of the Department of Labor, both branches of the United States Government. The Commissioner does not point out wherein they were misleading. We would gladly give him space in our columns to do so. If any of them were "misleading," however, the government of the United States and not the railway corporations must be held responsible.

Railway Stockholders Losses

The stocks of a dozen or twenty of the largest American railroads were considered by conservative bankers in the decade 1895 to 1905 as a sound investment for at least a part of the funds of individuals dependent on their income from investments for their living. Outstanding among this list were the Pennsylvania and the Atchison, Topeka & Santa Fe, with the Chicago, Milwaukee & St. Paul, the Baltimore & Ohio, the Northern Pacific and the Chesapeake & Ohio as close followers. Since 1901 the Pennsylvania stock with a par value of 50 has sold at 85, and the Atchison, Topeka & Santa Fe with a par value of 100 has sold at over 125. A few days after the announcement of the roads being taken over by the government and a fixed rental being guaranteed the corporations, Pennsylvania sold at 47 and Atchison sold at 87. At the end of last week Pennsylvania sold at 42 and Atchison at 84. About half of the total number of stockholders in the Pennsylvania are women. It may be assumed that almost all of these stockholders are dependent on their income from investments for their living, and it is probably safe to say that more than three-quarters of the stockholders of both Pennsylvania and Atchison are dependent on their income from investments. Neither of these stocks yielded a high enough rate of return in the period 1895 to 1905 to be attractive investments for a business man, and neither was in any sense of the word speculative. The financial structure of both corporations is sound and conservative. Bonds are not the predominant part of the capitalization as they are on so many other American railroads, and each year large additions have been made to the property through the expenditure of money which could have been paid out in dividends.

Fifteen years ago St. Paul was regarded as a gilt-edge stock, Baltimore & Ohio was in almost the same class, and Northern Pacific ranked about equally high. Since 1900 St. Paul has sold at just under 200, and is now selling at about 36; Baltimore & Ohio sold at over 125 and is now selling around 31; Northern Pacific sold above 200, excluding the Northern Pacific corner in 1901, and is now selling around 78. The Chesapeake & Ohio, the Lehigh Valley and the New York Central are investment stocks, as is shown by the fact that Chesapeake & Ohio has since 1900 sold at 92. Lehigh Valley with a par of 50 sold at over 121, and New York Central with a par of 100 sold at over 174. The Chesapeake & Ohio is now around 55, Lehigh Valley 43 and New York Central 68. It will have to be both a simple and a thoroughly sound economic basis on which Congress re-establishes railroad credit if the woman stockholder, who has seen a reduction of $40 per share in the price of her Pennsylvania stock or of over $40 per share on the Atchison stock, is to regain her faith in railways as an investment.

The Chief of Engineers, U. S. A. and the Railways

Engineers in railway service have been assigned to two general classes, the first embracing those who are primarily engineers and the second those who are essentially railroad men. Members of the first class have been accused of interesting themselves in engineers and engineering, to the exclusion of matters concerning the railroads not directly related to their profession. However, it is also possible to err in the opposite direction, and there are in fact some railway engineers who pay little or no attention to matters not directly related to the business of the corporations which employ them. As a consequence, they are very likely to overlook matters of direct bearing on their work which they had

failed to appreciate because of superficial consideration.

No better illustration of this can be cited than that arising through the vacancy in the position of chief of engineers, United States Army, for which Colonel Lansing H. Beach was recently nominated. Superficially this would seem to be a matter of very little concern to railway engineers, except as they may be interested in the profession of engineering as a whole. However, a little reflection will show that the chief of engineers, U. S. A., exerts a most profound influence on certain matters of real importance to the railroads. Through the authority of the United States War Department over navigable waters, the decision of the chief of engineers must be obtained to plans for bridges, docks and other engineering works where the interests of the railroads are thrown in contact with those of the waterways, so that he is in a position to require an expenditure of many thousand dollars in excess of the amount which the railway officers had deemed adequate at the inception of the undertaking. In the establishment of dock lines, the determination of bridge span lengths for river channels and regulations governing the design, maintenance and operation of movable bridges, the decision of the chief of engineers is one from which there is practically no appeal. It is, therefore, of great importance to the roads that he be a man of broad vision whose interest in waterways will be tempered by an appreciation of the value and necessity of railway transportation.

Previous to the nomination of Colonel Beach no little interest was taken, particularly among railway engineers who had been in military service, in the suggestion that Colonel William C. Langfitt be appointed to this position, because of the reputation he earned in overseas service as ranking officer of the Thirteenth Engineers (Railway), as brigadier general in command of several of these units, and later as chief of engineers, A. E. F.

Fifteen Years Development of Pullman Car Traffic

SINCE THE PUBLICATION of the article in the January 2 issue of the *Railway Age* dealing with the needs of the railroads for additional passenger equipment, additional data has become available which throws some light on the relative development of traffic carried in railroad and Pullman passenger cars and of the increase in the number of Pullman cars which has been made to keep pace with the growth of sleeping and passenger car traffic. In the absence of this information the discussion in the article referred to was confined to equipment of railroad ownership only.

During the ten years ending on July 31, 1915, the number of passengers carried in Pullman equipment increased from 14,969,219 to 21,489,301, or 44 per cent. During the same period the number of cars of all classes owned by the Pullman Company increased from 4,138 to 7,303, or 76½ per cent, but the performance of these cars as measured by car miles showed a proportionately smaller increase of 57 per cent. The number of car miles during the year ending July 31, 1905, was 444,986,296, while for 1915 it was 700,480,779.

At the close of the fiscal year ending July 31, 1919, there were 7,622 Pullman cars of all classes which during the year had carried a total of 33,103,307 passengers and had made 734,031,856 miles. An increase in the number of passengers carried during the four years since July 31, 1915, of 54 per cent has been handled with an increase in the number of cars of 4.4 per cent and in the number of car miles run during the year of slightly less than 5 per cent.

It is unfortunate that there is no record of the number of passenger miles made by travelers in Pullman cars. To determine what the actual traffic increase has been, involves a knowledge of the average miles per passenger trip as well as a knowledge of a number of passengers carried. The best data available on this point are the average receipts per passenger as reported by the Pullman Company. During the seven years from 1911 to 1917, inclusive, the average receipts per berth passenger were $2.47, with a minimum yearly average of $2.43 and a maximum of $2.53. The average receipts per seat passenger were 62 cents for the entire period with a minimum yearly average of 60 cents and a maximum of 63 cents. An estimate of the actual mileage per passenger on the basis of these figures would be complicated by the fact that the average receipts per berth passenger are a weighted average of the rates for uppers, lowers, staterooms and compartments. The uniformity of the proportion of passengers for each of the two classes of Pullman cars and of the average receipts per passenger during the period mentioned, seems to justify the conclusion that there was little change in the average miles traveled per passenger during the normal years preceding the war, and that the number of passengers carried may be considered approximately proportional to the number of passenger miles in each year.

It is evident that during the ten years prior to July 31, 1915, there was an increase in the number of Pullman cars greater than the increase in traffic seemed to demand. This is explained by the fact that during this period the construction of steel sleeping cars was developed to a practical point and coincident with the large increase in the number of steel passenger cars of railroad ownership a large number of steel Pullmans were built. These replaced the older wood equipment on many roads, particularly the large eastern roads, but the wood equipment was not actually retired from service. The number of cars in service in 1915, therefore, indicates an actual surplus of available equipment part of which, however, could not be considered available for universal service. This is indicated by the fact that while the number of Pullman passengers per car per year was 3,620 in 1905, it had dropped to 2,940 in 1915. Likewise, the miles per car per year had decreased from 107,600 in 1905 to 96,000 in 1915.

Developments during the last four years, however, have materially changed this situation. With an increase in the number of passengers carried in Pullman cars of 54 per cent, there has been an increase in the number of cars of but little more than 4 per cent. It is true that this has been accompanied by almost no increase in the number of miles per car per year, each car making but 96,400 miles during the year ending July 31, 1919, as compared with 96,000 during the fiscal year 1915. There has, however, been an increase in the number of passengers per car per year from 2,940 to 4,340. This represents a 17 per cent increase in the number of passengers per car per year as compared with 1905, and such data as is available indicates that the ratio for none of the years prior to 1915 varied much from that of 1905. That this increase in service was effected without a material increase in the miles per car clearly reflects the results of the Railroad Administration's policy of filling sleeping cars, uppers and lowers alike.

There are two reasons which make difficult any attempt to arrive at a close estimate of the additional amount of sleeping and parlor car equipment required to meet the needs of the present and immediate future on the basis of past developments: first, the abnormal increase in the number of cars built during the decade prior to 1915, and second, the possibility of much greater utilization of the equipment than was ever developed during the pre-war years. Much of the wood equipment which has long been in use has rendered invaluable service during the war in the movement of troops. The gradual extension of the use of steel equipment, how-

ever, probably will considerably exceed the actual need for new cars and it is inevitable that the surplus wood equipment must be of rapidly decreasing usefulness under normal conditions. It is also probable that with the return of the railroads to private operation, the full effect of the lesson in efficient utilization of sleeping car equipment will not be retained by the public and there will be a demand for some choice of accommodations, which has been denied the traveler during the past two years. An increase in the number of cars sufficient to reduce the number of Pullman passengers per car to 4,000 on the basis of the business handled in 1919 alone would require about 700 additional cars, without considering the question of retirements, while to retain this ratio with an increase in traffic during the next few years proportional to the average increase which took place during the decade prior to 1915 would require almost 1,000 more.

This cannot be considered a close estimate, but it certainly may be considered as indicative of the fact that a large number of Pullman sleeping and parlor cars will be needed during the next few years to take care of the demand of the traveling public for a return of some measure of the choice of accommodations enjoyed before the war and to meet the inevitable growth in the passenger traffic of the railroads.

The Onawa Collision

THE TABLE OF TRAIN ACCIDENTS to be printed for the month of December will include two accidents in which pasenger cars were burned and pasengers injured by fire, some of them fatally; an unusual record, recalling numerous distressing events of 30 years ago, when every passenger car carried a stove.* The first of these two accidents (in which three passengers were killed) occurred near Muscatine, Iowa, on December 4. A gasoline passenger car was derailed; and the fire originated in the gasoline, a cause which did not figure in the passenger train accidents of the last century. The second accident, a butting collision near Onawa, Maine, occurred on December 20, killing 24 persons, altogether. It was reported in the *Railway Age* of December 26, page 1256. This collision was due to a very old cause—forgetfulness or misreading of orders on the part of the men in charge of a freight train, who ought to have waited on a side-track for the second section of an opposing passenger train. This collision occurred in what is often called a remote corner of the country; but it was on a road, the Canadian Pacific, which has maintained a record for the safe carriage of passengers that has been quite remarkable; thus mocking the calculations of those who put too much emphasis on averages and good omens, and on safety records which depend on well-known American methods of train operation long since acknowledged to be defective. The way in which fatal blunders sometimes combine under circumstances like those at Onawa is very familiar; it was vividly illustrated no longer ago than last September at the Interstate Commerce Commission's investigation of a collision at Brooklyn, Ohio, which was noticed in the *Railway Age* of November 7, page 904.

Collisions on single track are not usually charged against faults in or abuse of the space interval system; and yet in a case like this the same principle is involved as in the space interval, in that there is no question concerning clocks or watches. We see here—as well as in the September collision referred to, and innumerable other instances—the futility of depending for safety, for any appreciable length of time, on ordinary men's unaided memories. At Onawa, at Brooklyn and at Nashville (July, 1918), a signal fixed on a roadside post, *regularly employed, for all trains,* would have accomplished what a paper in the enginemen's and conductors' pockets did not accomplish. In short, as has been said a hundred times, the block system, complete, absolute and for 24 hours every day, is the only workable system of train operation under which the superintendent can have reasonable peace of mind.

The Canadian Pacific reports this line through the State of Maine as operated under the manual block system, as will be seen from the Interstate Commerce Commission's annual statement, but the reports of the cause of this collision indicate that the absolute space interval is not maintained in all cases. In thus relaxing or omitting a part of the safeguards, the Canadian Pacific is not alone. Numerous other roads have the same practice. Moreover, this statement by itself is not sufficiently comprehensive to go to the root of the matter as viewed from the standpoint of the traveling public. Chief W. P. Borland, of the Bureau of Safety, in his annual report to the Interstate Commerce Commission on December 1, last, had occasion to say:

> "On some roads employing the manual block-signal system, dangerous practices are followed and rules violated to such an extent as to render the block-signal system entirely useless in preventing the very accidents which it was intended to eliminate. Such conditions exist with the full knowledge of responsible operating railroad officers, who by their failure to correct these practices and to enforce strict obedience to the rules actively contribute toward breaking down the morale of the service and the system of discipline which they should exercise every endeavor to maintain."

The situation is that we have in general use on single track lines four methods of working the manual block system: (1) the absolute block system for all trains; (2) the same, with permissive blocking whenever that is deemed necessary for the purpose of saving time; (3) the absolute block system for the protection of the rear of passenger trains only, which means, usually, its entire suspension for a part of the movements every day; (4) either of these systems with irregular variations or informal disobedience of rules as referred to by Mr. Borland. He has spoken of this in previous public statements, so we have no reason to doubt the existence of a real basis for his sweeping general assertion. He might have made a statement still more sweeping; that while on some roads there is general indulgence in the loose practices which he mentions, and which surely break down the morale, there are other roads where there is very weak adherence to the block system, without disturbance of morale; the rules recognize the every-day suspension of the space-interval principle, and the officers who make the rules profess to believe that this is necessary; that they cannot afford the full protection of the complete system.

The only one of the four above-mentioned plans which any one recommends for general use is the first one, with, perhaps, an arrangement allowing the use of the second one under constant and detailed supervision by a high, responsible officer—not an ordinary train despatcher. (Substituting the time interval for the block system is not the same as permissive blocking.) No one publicly recommends anything but the best. Practice which is not the best—in fact is not safe—may or may not be public; but, in the words of Mr. Borland, it is carried out "with the full knowledge of responsible operating officers." The only rational conclusion, therefore, to be drawn from this official governmental declaration, is that the Interstate Commerce Commission ought to go on and expose such bad practices in sufficient detail and with sufficient persistence to secure their correction. (And such exposure would be educational on some roads not definitely to be classed as negligent.) Otherwise this grave accusation may have to be classed, along with some other deliverances of the commission, as nothing more than a glittering generality—a futile waste of paper. The Onawa collision, by itself, is likely to be forgotten; but its lesson, as related to other lessons which have been promulgated from Washington, is too serious to be lost.

*In the rear collision at Ivanhoe, Ind., on June 22, 1918, where 79 persons were killed, there was fire in some of the cars; but the next most recent case of magnitude that we find in the records was the butting collision at Tipton Ford, Mo., on August 5, 1914, when 43 persons were killed. A gasoline car figured in this collision, and the accident was spoken of as the first great disaster from a gasoline car. The present record indicates that it may not be the last.

Why a New Rule of Rate Regulation is Necessary

THE REALLY VITAL QUESTION under consideration by Congress in respect to hte proposed railroad legislation is whether a new rule for the regulation of rates shall be established by law, and if so, what its provisions shall be. As this paper repeatedly has pointed out, unless the new legislation does establish a new rule for rate making, it will be practically valueless no matter what it may provide regarding other matters.

The rule of rate making provided by the Interstate Commerce act, as it now stands, is, in substance, that all rates must be just and reasonable, and that if the Interstate Commerce Commission shall find any rate unreasonable or unjustly discriminatory it shall fix the reasonable rate thereafter to be charged. Probably, if this rule had been broadly interpreted throughout the time it has been in existence it would have proved sufficient. But it has been interpreted and applied in such a way that if Congress should leave it unchanged the hope of investors and railway executives that the railways will be given opportunity to earn and pay a sufficient return upon existing and future investment in them would be finally destroyed.

The interpretation which usually in theory and almost invariably in practice has been put upon the present rule has been that it has meant that entire schedules of rates should be fixed barely high enough to avoid violation of the constitutional rule against confiscation of property. The regulating commissions have not by any means been solely responsible for this. Congress and various state legislatures have passed laws providing for the valuation of railroad properties and have, either specifically or in effect, told the commissions that rates should be based upon the valuations. But the whole theory of basing rates upon valuation was evolved by the courts to protect the property of railway and public utilities companies from absolute confiscation. Therefore, when Congress and the legislatures have passed laws providing for valuations without in any way indicating what return should be allowed to be earned upon the valuations, their action has not unreasonably been construed as giving a mandate to the regulating commissions to make rates no higher than was necessary to avoid confiscation.

Now, while unquestionably it is the duty of the courts to set aside rates which are confiscatory, it does not by any means follow that legislatures and administrative bodies should follow the policy of making rates only barely high enough to avoid confiscation. The courts, in upholding or setting aside rates, are governed by constitutional principles, while lawmakers and administrative bodies, so long as they keep within the constitution, should be governed entirely by considerations of public policy and public expediency. The public welfare demands, not that rates shall be made as low as they can be without confiscation, but that they shall be made no higher than is necessary, but at least as high as is necessary, to enable the railways as a whole to give good and adequate service. Now, rates may be made high enough to avoid confiscation, and yet be made so low as to render it impossible for the railways to raise sufficient capital to provide good and adequate service. This is exactly what has been done in the past; and it is the principal reason why the expansion of the railways was rapidly declining before the great war, and why, when this country entered the war, the railways could not handle all the traffic that the industries of the country could give them.

The statistics regarding the amount of new investment made in the railways year by year, and the extent of the increase in their facilities before the great war began, are available to everybody. They demonstrate that from 1910 to 1917 there was a rapid decline in new investment and in the amount of facilities provided. It has, however, been denied that this decline in railroad investment and expansion was due to the way in which rates were regulated. For example, it has been pointed out by certain members of the Interstate Commerce Commission that the operating income earned by the railway companies in the three years ending with 1917 was larger than in any three preceding years in their history. Commissioner Woolley, in a recent statement, referred to the three years 1915, 1916 and 1917 as "one normal year and two miracle years." But Mr. Woolley and others who discuss the matter in this way persistently ignore the fact that while the amount of operating income earned in these three years was larger than in any preceding three years, the amount of investment represented by railroad properties also was larger than ever before, and that in consequence the percentage of operating income earned upon the investment was by no means the largest ever earned.

The book cost of road and equipment has been accepted for years by the Interstate Commerce Commission as the only available basis for making intelligent comparisons between the net returns earned by the railways from year to year. The statistics given by the Commission in its annual reports show that from the time it made its decision in the first important rate advance case, that of 1910, until the year 1916, there was a steady and rapid decline in the percentage of operating income earned on book cost of road and equipment. In 1910 this per cent was 5.73; in 1911, 4.87; in 1912, 4.62; in 1913, when the traffic was the largest it had ever been up to that time, 5.12; in 1914, 4.19; and in 1915, 4.09. The average during the five years 1911-1915, inclusive, was only 4.56 as compared with 5.41 in the preceding five years. Mr. Woolley refers to 1915 as "a normal year." The percentage of return earned in that year was the lowest since 1899. In what sense, then, was it a "normal" year?

In 1916 there was the largest increase in traffic and the largest volume of traffic ever handled up to that time. In 1917 there was a still further increase in traffic. These are the years which Mr. Woolley calls "two miracle years." The statistics of the Interstate Commerce Commission show that the percentage of return earned in 1916 was 5.8, and in 1917, 5.45. The percentage of return earned in 1916 was the largest ever reported, but that earned in 1917 was less than in 1910, 1907 or 1906, and was just about equal to the average earned in the five years 1906 to 1910 inclusive. The years 1916 and 1917 were good years, but to refer to them as "miracle" years is a gross exaggeration.

Besides, the railways cannot raise large amounts of capital on the basis of having two or three good years out of each ten. It is the average amount which they earn over periods of years that determine their prosperity and their credit. Now, even including the so-called "miracle" years, the average return earned in the seven years 1911 to 1917 inclusive that is, in the seven years following the time when proceedings in the first rate advance case were begun—was less than 4.9 per cent. This average for seven years, which, in point of volume of traffic handled included both good and bad years, is the best measure of the return permitted to be earned by the Interstate Commerce Commission and other regulating bodies. It was not enough or nearly enough. This is demonstrated by the fact that the annual investment made in railways declined from over $800,000,000 in 1911 to $264,000,000 in 1915, and $281,000,000 in 1916.

It is unjust, however, as we have already intimated, to place the entire responsibility for the policy of federal regulation followed upon the Interstate Commerce Commission. Every time an important case involving advances in rates has been before the Commission it has been the subject of discussion in Congress. The railways have been denounced in these discussions, and threats have been made as to what would be done to the Interstate Commerce Commision if it granted the advances. In at least one instance a bill was introduced by a member who was opposed to advances in

rates providing for the abolition of the Interstate Commerce Commission. The real or supposed attitude of Congress has had harmful effects upon railroad regulation.

Congress created the Interstate Commerce Commission, which is an administrative body performing only functions delegated to it by Congress. It passed the laws under which the Commission has acted. It has known the interpretation that has been put upon these laws, and the way they have been administered. It has acquiesced in their interpretation and administration. It passed the law under which the Commission is making a valuation of railroads. It is entirely within the power and province of Congress to say whether rates shall be regulated as they have been in the past, or in a different way. If it does not lay down a new rule the conclusion probably will be drawn, and not without justification, that it desires rates to be regulated in future as in the past. If they are regulated in future as in the past there can be no doubt as to what the results will be. The service rendered by the railways will necessarily become more and more unsatisfactory and inadequate; the commerce of the country will be strangled and responsibility will rest mainly upon Congress.

The purpose for which a new rule of rate making should be adopted is plain. This purpose should be to stop the regulation of rates upon the theory that they should be made as low as they can be without confiscation, and to cause the commencement of the regulation of rates upon the principle that they should be made sufficient to enable the railways to provide the service which the welfare of the country requires that they shall provide. The adoption of such a rule should and would result in a large advance in rates. But without such an advance in rates the railways will not be able under private management to render the service that the welfare of the country demands; and the nation will be driven into government ownership, with the result that the cost of transportation which the public will have to bear in the form of rates or taxes or both will be far heavier than the burden that would be put upon it by making rates sufficient to enable private management to be successful.

Failure to Expand Railways Will Cause National Disaster

THE PEOPLE AND CONGRESS of the United States are living in a fool's paradise so far as the railroad question is concerned, and unless they awaken to a realization of what the railroad situation actually is, and to its relationship to the rest of the business and industry of the country, the result, in our opinion, is bound to be, within a comparatively few years, an industrial and financial convulsion.

The panic of 1873 was one of the most disastrous business catastrophes that we have ever had. There is good reason for fearing we shall have another due to similar causes, unless the public and Congress act soon and wisely regarding the railroad problem. The whole question is before Congress now. If Congress adopts legislation which will give the railway companies an opportunity adequately to expand their facilities the crisis probably will be avoided. If Congress and the regulating authorities do not give the railways opportunity adequately to expand their facilities, sooner or later, the crisis will come.

Reference has been made to the panic of 1873. The historians tell us it was due chiefly to the excessive investment which had been made for some years before in the construction of railroads. So many railroads were built into undeveloped territory that it was impossible to give them the traffic and earnings needed to enable them to earn an adequate return upon the investment. A large part of them became bankrupt and ruined those who had invested in them. The ruin of these investors pulled down banking houses that had advanced them credit. Thus the finances and industry of the entire country became involved.

The public invested too much of its capital in railroads then and too little in other industries. Within recent years it has been investing too much of its capital in other industries and not enough in railroads. The results are written large in the statistics regarding the increases which have occurred in railroad traffic and in railroad facilities. Within the last four years the freight traffic actually handled by the railways has increased about 45 per cent. Meantime, the number of freight cars in service has increased only about 2 per cent. These figures indicate the proportionate increases that have occurred in traffic and in railroad facilities of all kinds. This enormous increase in freight has been the result of the increase in production of other industries—manufactories, mines, farms, lumber mills, and so on—and this increase in the production of other industries has been mainly due to the increase in the capital invested in them. On the other hand, the very small increase in railroad facilities has been due to the relatively small amount of investment which has been made in railroads recently. The result has been that the railroads for four years have been unable, except during a few months last spring, to handle all freight that has been offered to them. The coal operators have been complaining that the shortage of cars has been the chief factor in limiting the production of their mines. In the northwest the railways cannot haul all the lumber which the mills can produce. The Governor of Kansas the other day wired the director general of railroads that 45 per cent of all the wheat grown in that state last year was still in the hands of the farmers.

It should be obvious that in the long run it will do no good to invest more and more capital in manufactories, coal mines, lumber mills and farms unless the factories, mines, mills and farms can send to market their increasing products. The thing required to make it practicable to move more products is to enlarge the capacity of the railroads. That can be done only by investing more capital in them. But the records of the New York Stock Exchange show that, in spite of the present shortage of railroad facilities, we are going right on investing vast amounts of additional capital in other industries while relatively only a small new investment is being made in the railroads.

The results which must come if we continue this process are plain. Those who are investing these billions of dollars of new capital in other industries will try to increase their production in order to earn a return upon their increased investment. The railroads will be unable to transport their additional products to market and it will be impossible to continue the increased production. But if those who have invested this new capital are unable to increase their production they will be unable, just as the railroads were in 1873, to earn and pay a return upon their new investment. When they become unable to earn and pay a return upon it they will become bankrupt, as the railroads did in 1873. When they become bankrupt they, like the railroads in 1873, will pull the financial structure of the country down with them.

The *Railway Age* has made the most careful estimate it has been able to on the basis of the data available, and has reached the conclusion that to enable the railways to make up the deficiency of facilities which now exists, and to provide for the normal growth of business, will require an investment of $6,000,000,000 within the next three years. That strikes many people as a very large estimate. It amounts to $2,000,000,000 a year for three years. But we are told that the automobile manufacturers of the United States have plans for building 2,000,000 cars this year. At an average price of $1,000 that many cars would cost $2,000,000,000 . If the country can spend $2,000,000,000 for automobiles in a single year, many of which are used chiefly for joy-riding, is it unreasonable to estimate that it

ought for three years to invest $2,000,000,000 a year in increasing the facilities of the railroads, the rendering of good and adequate service by which is indispensable to the country's industrial growth and prosperity? Of one thing we may be sure; if we spend $2,000,000,000 a year, or anything like that amount, for automobiles, and make correspondingly large investments in other industries, and do not make the investment in our railroads which is necessary adequately to increase their facilities and enable the country to increase its production, we shall be doing our best to make conditions favorable for a commercial and industrial convulsion which will shake the world.

Meantime, we venture to doubt whether this vast automobile building program could be carried out, even if all the labor and materials needed were available. The materials must be hauled to the factories by the railways, but it is very doubtful if the railways can do it. Besides, automobiles are not of the greatest value for either pleasure or business unless there are good roads on which to run them. The various governments of the country have appropriated about $633,000,000 for the construction of new highways during 1920, which is five times as much as ever was appropriated in any year before. That road-building program will not, and cannot, be carried out in 1920 because the railways have not enough of the kind of cars required to haul the road-building materials.

Similarily, many of our other projects for huge expansion of business will be speedily strangled unless the capacity of the railroads is increased. We have heard much talk of the need for increased production as a means of reducing the cost of living and increasing the prosperity of the people of the United States, and allaying the industrial unrest. But no matter what way you turn in the consideration of this question of increased production, you are brought up short by running into the fact that the railroads with their existing facilities have during most of the time for four years been handling all the commodities they can, and that therefore there cannot be any large increase of production in the United States until there has been a great expansion of railroad facilities. This expansion of railroad facilities would have to be made before there could be a large increase of production if the government were going to continue to operate the railroads. It will have to be made if the railway companies, to which the roads are to be returned on March 1, are to be able to handle a substantially enlarged amount of traffic.

Since the welfare of the entire country depends upon a great increase of production, and since it cannot be secured without a great increase of railroad facilities, we naturally come to the question of how this increase in railroad facilities can be secured. It can be secured in only one way, and that is by reducing the amount of capital we are investing in other industries and increasing the amount of it being invested in railroads. But people with capital will not invest it in railroads, any more than in any other kind of industry, unless they are convinced that they will get as large a return by buying railroad securities as by buying the securities of concerns of other kinds. The only way people with capital can be convinced that the railroads will be able to pay attractive interest and dividends will be by the adoption of legislation and the fixing of railroad rates which will give the railroads an opportunity to earn relatively as large returns as are earned in other industries.

Some people say that the railways should be allowed to earn only "a fair return upon their fair value." What the railroads must pay in interest and dividends to raise capital is determined not by anybody's theory as to what is "a fair return" for them, but by what return those who own the capital are willing to accept. The present situation in the railroad business is mainly due to the fact that for ten or fifteen years those who have regulated our railroads have so fixed the rates that the companies have not been able to pay those with capital to invest as much as those who had the capital have insisted upon receiving.

The railroads are to be returned to private operation on March 1. Congress is now engaged in framing the legislation which is to be passed before they are returned. The principal question before it is whether it will adopt into law a new rule requiring the Interstate Commerce Commission, or whatever body regulates the rates, to regulate them differently in the future from the way in which they have been regulated in the past. The main thing which the new rule should require, whatever the particular form given to it may be, is that the rates and not operating income of the companies shall be made large enough in the future to enable the railway companies to raise enough capital adequately to develop their facilities.

This is not primarily a railway question. It is primarily a public question. If the public is not to be overwhelmed by a great commercial and financial disaster the railway companies must be enabled to provide adequate facilities, and, from the public point of view, the crucial question is how much they must be allowed to earn and keep from their earnings in order to provide these facilities. Probably if the railways should be allowed to earn an average of 6 per cent, and only a reasonable part of the surplus earnings of individual companies over 6 per cent were taken from them, the companies would be able to raise sufficient capital. On the other hand, a provision such as that of the Cummins bill taking from the more prosperous roads two-thirds of all their surplus earnings over 6 per cent would largely destroy the incentive to efficient operation of these roads and to the large investment in their stocks which ought to be made.

The sentiment of the people of the country, and especially of the business men of the country, is overwhelmingly opposed to government ownership and operation of railroads. There are, however, many people who are opposed to government operation but who do not seem to realize what the present railroad situation actually is, and what must be done to enable the railways to give good and sufficient service under private management. Although under government operation the railways on the present rates have incurred a deficit this year of about $400,000,000 and have failed by at least $700,000,000 to earn a return equivalent to 6 per cent, there are many persons who seem to think that no advance in rates will be necessary to put the companies on their feet again and enable them to raise large amounts of new capital—or at least that only a comparatively small advance in rates will be necessary. Persons who believe thus have either failed to inform themselves as to the facts or are deceiving themselves. Since 1917 the operating expenses of the railways have increased $1,600,000,000 a year, while the advance in rates made under government operation is yielding about $1,000,000,000 a year. That is the situation in a nutshell so far as operating expenses and rates are concerned.

We are today at the crisis in the consideration of the railroad problem. It is either going to be dealt with in such a way as to enable private management to succeed and to raise and invest the capital needed adequately to develop railroad facilities, or it is going to be handled in a way that will prevent these things from being done. We have little doubt that if it is not settled right now, the commercial and industrial catastrophe which we have anticipated will come within a few years. The railroads will break down; but probably many thousands of people will attribute their break-down, not to the government's failure to deal intelligently with the railroad problem, but largely or wholly to shortcomings of private management. That probably would mean the adoption of permanent government ownership and operation of railroads.

The present railroad situation is due entirely to the policy of government regulation which long was followed, and to

developments since government control was adopted. In other words, the government is almost entirely responsible for it. For fifteen years warnings have been given that this would be the result of the government's policy, but they have not been heeded. By passing needed legislation and passing it promptly the present Congress can make possible the expansion of railroad facilities which the welfare of the country imperatively requires. If the present Congress does not do it, then it will be responsible for the industrial and financial disaster which will surely come. Can the Republican party, which controls the present Congress, assume responsibility for the results of its failure to pass needed legislation?

New Books

Proceedings of the International Railway General Foremen's Association. 162 pages, 6 in. by 9 in., illustrated, bound in leather. Published by the association, William Hall, secretary, Winona, Minn.

This book contains the proceedings of the International Railway General Foremen's Association convention, held September 2-5, 1919, in the Hotel Sherman, at Chicago, Ill. The addresses delivered before the convention by R. H. Aishton, regional director of the Northwestern region and L. A. North, president of the association, are given in full. The various papers read before the convention and the discussion of the subjects by the members are recorded. Among the papers were several touching on safety first. Other subjects considered were welding of locomotive cylinders, autogenous welding of locomotive parts and several papers on the design and maintenance of draft gear.

Applied Science for Metal-Workers. By W. H. Dooley, in charge of Navy Yard Continuation School for New York Board of Education. 467 pages, 5¼ in. by 7½ in., illustrated, bound in cloth. Published by the Ronald Press, New York.

This book is similar in character to Applied Science for Wood-Workers by the same author, and covers in the same way the general principles of science common to all industries. It presents in an easily understood form practical applications of the principles underlying the metal workers' trades. In addition to a presentation of the data necessary to equip the student for the intelligent study of industrial science it deals in a practical way with modern foundry practice, the making of wrought iron and steel, machine shop practice, sheet metals, structural steel and other subjects relating to the metal working trades. A series of questions and problems on each subject gives the student a thorough examination and illustrates in a lucid manner the purpose of the work performed as well as the methods used in performing it.

Proceedings of the American Railroad Association, Section III—Mechanical. 668 pages, 6 in. by 9 in., illustrated, bound in cloth. Published by the association, 75 Church street, New York.

This volume contains the proceedings of the American Railroad Association, Section III—Mechanical, and covers all of the matters formerly treated separately in the proceedings of the Master Car Builders' Association and the American Railway Master Mechanics' Association. Complete reports are given of the various addresses delivered at the convention by men prominent in railroad affairs, and also the reports of the numerous committees and the discussions thereon. Of particular interest are the papers relating to fuel economy, mechanical stokers, powdered fuel and welding in its various phases, as applied to both the car and locomotive fields.

Letters to the Editor

A Letter from Commissioner Woolley

Interstate Commerce Commission, Washington

To the Editor:

I have read with much interest your editorials in the *Railway Age* of January 16 and 23 on my statement published in the New York Herald of January 12.

Aside from the fact that certain figures quoted by you and compiled by the Bureau of Railway Economics, an organization financed with the funds of railroad corporations, are misleading, I challenge the charge that I am prejudging a case.

I think you will agree, upon second thought, that an Interstate Commerce Commissioner is well within his rights in discussing proposed legislation. Once the railroads are back in the hands of their owners, their needs brought to the judicial attention of the Commission will be quite another matter.

R. W. Woolley.

Audible Block Signals

Buffalo, N. Y.

To the Editor:

I notice in the government report on the rear collision at Port Chester, Conn., on July 31, printed in your issue of January 9, that the adoption of an automatic train stop is again recommended; but nothing is said about audible signals. What is the matter with the humble and inexpensive and time-honored torpedo? The standing train is censured for not throwing off fusees; but fusees never would have awakened those sleeping enginemen. Torpedoes, no doubt, would have aroused them.

The inspector discreetly refrained from recommending that trains be run ten minutes apart so that a trainman could go back with torpedoes; but why does he not recognize the opposite horn on the dilemma? The torpedo has done great service; no doubt it has many a time awakened a sleeping engineman. But we have shortened our time interval and now it is impossible to make use of the torpedo; and it is time to face the alternative. Some other audible apparatus must be introduced to take the place of it. What is the matter with the device which was used on the Burlington road some years ago by which a man on a caboose could fix a torpedo to the rail while moving along at considerable speed?

Or, if that thing is a failure, why not an audible signal connected with the block signal? In England, the signalman, can reinforce the visual signal with a torpedo, controlled from the tower; why do we not have our automatic signals made equal to the English human signal operator?

If all hands, are going to continue to work at cross purposes in the matter of automatic train control we shall never get anywhere. Another thing that I find in your issue of January 9 is that the Railway Executives have asked Congress to take no action in connection with the use of automatic train stops; General S. M. Felton says that they would make enginemen careless. As I understand it, this claim has long since been disproved. Ask the Chicago & Eastern Illinois.

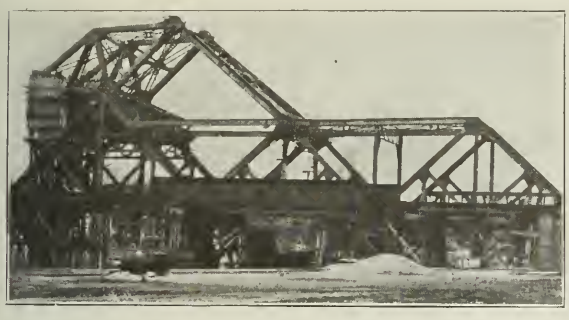
This being the situation—and the demand of the public that the railroads shall stop killing passengers by the carload being just as insistent as ever, if only it knew how to find expression—the thing to do is to look up the merits of the audible signal.

E. Adams.

New York Central Relocates Line in Tonawanda, N.Y.

New Location Eliminates Eleven Grade Crossings and One Bridge Over the Barge Canal

In order to meet the changed conditions incident to the New York State barge canal improvements in the cities of Tonawanda and North Tonawanda, N. Y., the New York Central is now engaged in an extensive line revision project in these cities. The work involves the construction of a new double track roadbed approximately two miles long



The Bascule Bridge at the Barge Canal Crossing. Temporary Girder and Trestle Structure in Foreground

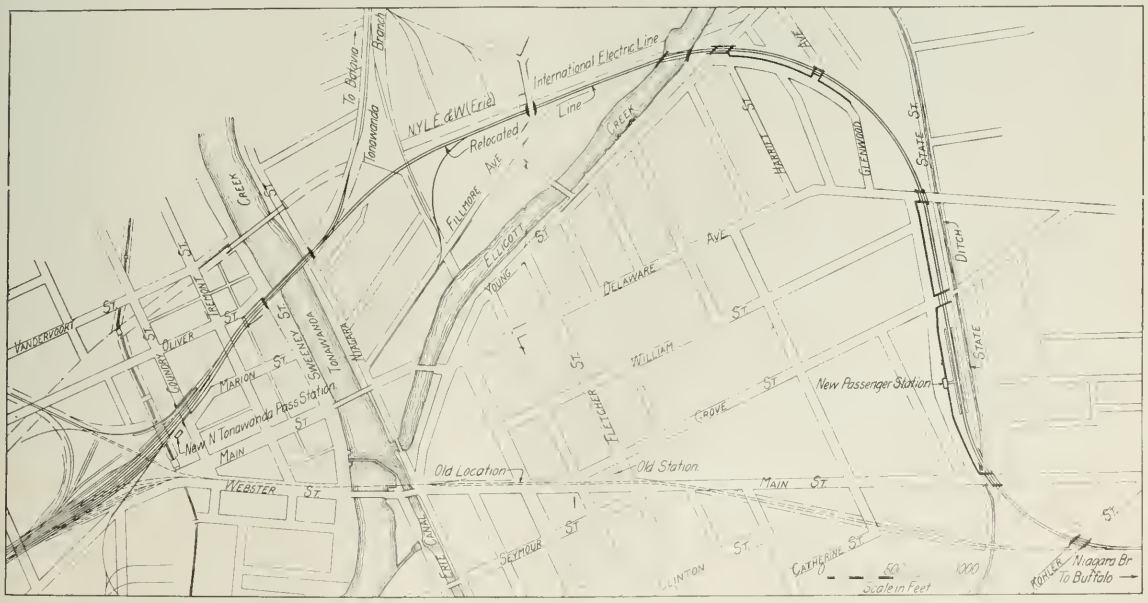
with 11 concrete and steel structures carrying the new line over the streets, a 200-ft. fixed truss bridge over Ellicott creek, a bascule lift span over Tonawanda creek, 3,500 ft. of new streets, 2,500 ft. of retaining walls, new passenger station layouts in both cities and improved freight yard facilities in North Tonawanda. Construction was begun in July, 1917, and it is estimated that the work will be completed this year.

The cities of Tonawanda and North Tonawanda are located on Lake Erie, approximately 10 miles north of Buffalo, N. Y. As may be seen on the map they are, in effect, one community, separated into two sections by Tonawanda creek, which marks the boundary between the two municipalities. Tonawanda is served by two lines of the New York Central, both of which extend across the creek into North Tonawanda. A third line of the road enters North Tonawanda and all three lines converge to a junction in the latter city.

Of these lines the Niagara branch, which extends from Buffalo through the Tonawandas to Niagara Falls, is the most important. This branch enters Tonawanda from the south on a double track roadbed, crosses seven streets at grade and runs in Main street to the bridge over Young street. It crosses the Erie canal and Tonawanda creek by means of a fixed, single-track bridge and continues in North Tonawanda, as a single track line, to the junction previously mentioned. In North Tonawanda the line involves a lengthwise occupancy of Webster street, the principal thoroughfare of the city and crosses two intersecting streets at grade.

The Tonawanda branch from Batavia enters Tonawanda from the east on a private right-of-way. Within the city proper this is a single track line which crosses Tonawanda creek by means of a single track fixed bridge and continues to North Tonawanda junction, the western terminus of the line, crossing two streets at grade.

The Lockport branch enters North Tonawanda from the north and terminates at North Tonawanda junction. Apart from the freight yard improvements at the junction this line is not directly affected by the present project. The only other steam road physically entering either city is the Niagara Falls branch of the Erie which enters Tonawanda from the south, crossing the Tonawanda branch of the New

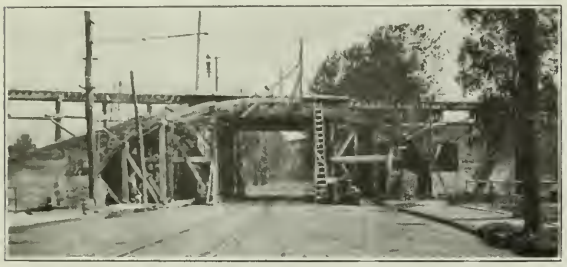


Map of Parts of Tonawanda and North Tonawanda, N. Y., Showing the New York Central Relocation

York Central at grade just south of Tonawanda creek and continuing across the creek by means of a fixed bridge into North Tonawanda and to Niagara Falls. The Lehigh Valley enters Tonawanda, crosses Tonawanda creek and passes through North Tonawanda on the rails of the New York Central.

In connection with the Barge Canal improvement in the two cities, Tonawanda creek has been canalized and developed into a harbor for docking lake-going vessels. This necessitated the rebuilding of the railroad bridges across the creek as the old structures provided insufficient underclearance to meet the requirements of canal operation.

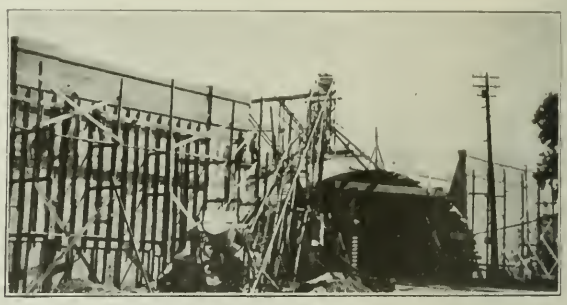
The present creek bridge on the Niagara branch is on a summit approached by grades exceeding 1 per cent, making it impractical from an operating standpoint to raise the existing structure. Replacing this bridge on the old site with a lift span was also undesirable as it committed the road for years to come to the old location at grade in and across the streets of both cities, involving speed restrictions



Timber Centering Was Used in All Arches

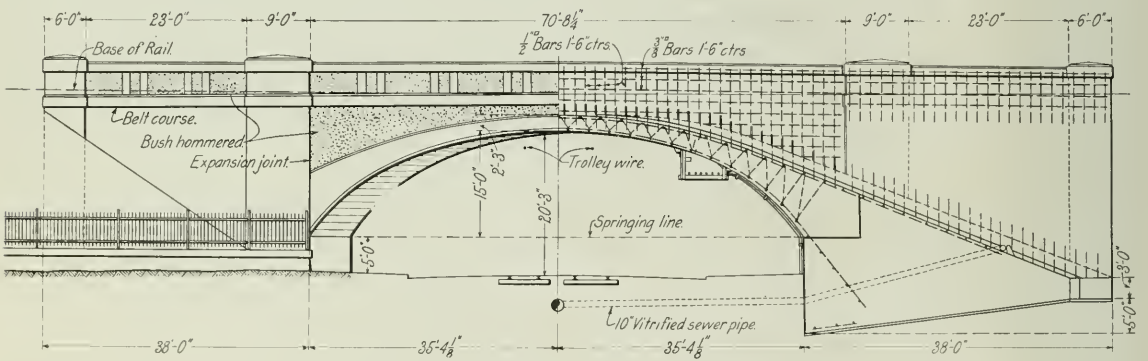
and great danger to street traffic. Also this line, under the old conditions, involved single track operation in Webster street, North Tonawanda, and over the creek bridge. This part of the line carries a very heavy traffic consisting of more than 100 regular train movements per day. Including switching, a movement is made on an average of every 11 min., so that if this line was to be made permanent it was essential that a second track be laid in Webster street. For these reasons it was decided to abandon the present location and three plans for relocation were considered.

Of the three proposed locations, a line which contemplated a relocation of the Niagara branch to the west of the present location, was abandoned as it necessitated two lift bridges over Tonawanda creek (one each in the relocated line and in the Tonawanda branch); a second line proposed a relocation of both branches, bringing them to a junction in Tonawanda before crossing the creek on a common bridge. This relocation involved a new line passing through the residential sections of both cities and was abandoned because of the prohibitive cost of the right-of-way. The third location, the plans for which were adopted, provided for the abandonment of the old location of the Niagara branch from a point south of Kohler street, near the southern limits of Tonawanda to the junction of the three lines in North Tonawanda, mentioned previously, and its replacement by a double track elevated line which skirts the edge of the resi-



The Concrete Plant with Incline and Distributing Chute at Main Street Arch

dential section of the city, departing from the old location at the south end by means of a 5 deg. curve to the right, for a distance of approximately 1,588 ft., thence on a tangent to Delaware avenue, then on a 4 deg. curve to the left across Ellicott creek, joining a tangent paralleling the Erie right-of-way and extending past the plants of the McKinnon Chain Company and the National Roofing Company and then by a 3 deg. curve to the left to a junction with the Tonawanda branch just south of Tonawanda creek. From this point to the northern limits of the work the new line follows closely the present location of the Tonawanda branch. While the new location involves an increase in the length of line and a 5 deg. maximum curve it permits the carrying of the tracks of both the Niagara and the Tonawanda branches over the creek on one bridge, while at the same time the 11 dangerous grade crossing and the lengthwise occupancies of Main and Webster streets are eliminated.



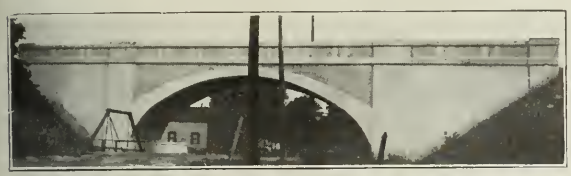
Elevation and Section of Typical Subway Arch

The territory traversed by the new location is flat and low. The depression of intersecting streets was, therefore, out of the question and the grade of the tracks was fixed at an elevation sufficient to provide a minimum underclearance of 13 ft. at structures carrying the line over the streets. At trolley crossings this clearance was increased to 14 ft.

More than 500,000 cu. yds. of filling material was re-

quired for the building of the double track elevated roadbed. The material used is chiefly clay secured from borrow pits, located to the west of the present location of the Niagara branch. It was moved from the pits by steam shovels, transported in narrow gage equipment and unloaded in the embankments from temporary trestles.

The completed structures consist of reinforced concrete arch spans over Main and Grove streets and Delaware and Glenwood avenues, a through girder bridge at Freemont street, a deck girder bridge with concrete floor and ballasted track at Kohler and Young streets, a fixed truss span 200 ft. long over Ellicott creek and the bridge over Tonawanda creek. Of these the last mentioned is the most important, being comprised, from south to north, of a through girder span



The Arch Structures Present Pleasing Architectural Features

over Niagara street, Tonawanda, a short deck girder span, a 100-ft. bascule lift span over the main channel, a fixed span supporting the counterweight, a second deck span and a through girder span over Sweeney street, North Tonawanda.

The lift span is a single leaf Strauss heeled trunnion structure and the fixed span is a simple A truss.

The new structure is located approximately on the site of the old bridge. It was, however, erected free from traffic as in meeting the requirements of canal operation it became necessary to make certain temporary changes at the bridge site. This consisted in the building of a detour line to the west of the old location whereby a temporary crossing of the creek was made by means of a wooden trestle in which the required 50-ft. clear channel for the barge canal was provided by sliding one of the half through girder spans from the old bridge on skids to temporary bridge seats, provided

Type of Through Girder Bridge

in the detour line, consisting of cribbing surrounded by steel sheet piling.

The arch bridges on the line are all similar in design and appearance, all being finished with solid copings relieved with vertical panels of plain finished concrete, the panelling being accentuated by the bush hammered finish of the surrounding concrete. The Delaware avenue arch is typical of the others. The tracks at this point are on a 4-deg. curve and a 0.05 per cent ascending grade westward. The avenue is 66 ft. wide and crosses under the tracks on a skew, the angle formed between a tangent to the center line between tracks at the intersection of the center line of the avenue, and the center line of the street being 69 deg. 30 sec. The structure is entirely clear of the street with its abutments located on the street lines.

In preparing the foundations for the abutments a total of 424 timber piles were driven. The maximum load per pile is 20 tons and the piles were driven in a vertical plane parallel to the face of the arch and inclined toward the center of the street, giving a batter of 1½ in. to the foot. To prevent sliding the foundations were inclined toward the center of the street, the elevation at the toe of the abutment being 5 ft. below the elevation at the heel. The structure was built in sections in the order indicated on the plan showing the construction joints. Between construction joints each section of the structure is monolithic, the concrete being poured continuously until a section was completed.

The arch ring was designed for a live load of 800 lb. per sq. ft. and an impact of 400 lb. per sq. ft. The timber centering was left in place until the fill had been placed behind and on top of the abutments.

To provide drainage the backs of the arch and the abutments were covered with 18 in. of cinder fill. A membrane waterproofing covered with a 2-in. protective coating of 1:2 cement mortar was provided for protecting the arch ring and the spandrel walls. The tops of the abutments and the backs

A Typical View of the Fill and Dumping Trestle

of the retaining walls were waterproofed with coal tar pitch at least 1/8-in. in thickness.

The steel bridges over the streets are also similar, each comprised of one roadway and two sidewalk spans of the usual type supported on gravity abutments and steel bents at the curb line. The Freemont street bridge floor is of the steel trough type, while a ballasted deck was used on the bridges at Kohler and Young streets.

The bridge over Ellicott creek consists of second hand steel trusses of 200 ft. spans released from the West Shore road at Fort Plain, N. Y. The floor and lateral systems in this structure are new.

While a wet clay subsoil was encountered throughout the job, necessitating the driving of piles under all structures, no particular difficulties were encountered in erecting the masonry supports. At the Tonawanda creek bridge floating equipment consisting of the pile driver, a clam shell and a derrick boat was utilized in preparing the foundations.

All bridge abutments are of the gravity type. The equipment used in placing the concrete in the forms consisted of distributing towers with ordinary batch mixers or Jaeger Machine Company mixers which were operated in conjunction with inclined tracks, over which concrete buggies were operated, the power for operating the mixers and the buggies being furnished by a gasoline engine. Niagara river washed gravel was used in all the concrete. This was brought in by barges and carted to the particular job.

Incident to the new work a rearrangement of the Mc-

Kinnon Chain Company plant was necessary, involving the relocation of Freemont street and its bridge over Ellicott creek. The work comprised approximately 250 ft. of new street, the construction of new concrete substructure for the bridge and the moving of the old bridge span. This latter was accomplished by the floating method without serious interruption to street traffic.

Present Status of the Work

With the exception of the new bridge over Tonawanda creek and a transformer house and a signal station for controlling the bridge and the train movements over the two

The Bridge Over Ellicott Creek

branches, which, as previously mentioned, come to a junction in Tonawanda, the work, up to the present time, has been confined principally to that part of the line lying within the limits of the city of Tonawanda. On this section all of the structures are completed and the double track embankment has been placed between Kohler street and Tonawanda creek. The passenger station and freight yard improvements have not yet been undertaken.

This project is being carried on under the direction of George W. Kittredge, chief engineer of the New York Central, and J. W. Pfau, engineer of construction. The New York State Dredging Corporation is the general contractor.

C. H. Markham Addresses Southern Hardwood Traffic Association

INCREASED RATES commensurate with the increased cost of operation of the railroads, more cars, more engines and more trackage, are a few of the things which railroads of the United States must have when the roads are returned to private owners, C. H. Markham, president of the Illinois Central, told 250 members of the Southern Hardwood Traffic Association at the afternoon session of its seventh annual meeting at Memphis, Tenn., on January 20.

"Railroad business is no different from your business," said Mr. Markham. "It must be conceded that in order to give the service you should have, there must be an increase in rates commensurate with the increase in service. I want all things left in the hands of private owners of the property. I don't want the government's hands on anything I have to operate. Understand, I am not objecting to government control, but I do not want government operation."

At this point he briefly discussed the competition between the rail and waterways, and explained that there really was no competition between these two, but that the one that could give the service and rates would always get the business.

"There is nothing the matter with the railroads today that money and time cannot cure," Mr. Markham continued "There is a great necessity now and in the future for increased facilities. What the railroads need is more cars, more engines, more tracks, double tracks, switching facilities and enlarged terminals. First, we ought to have 700,000 cars built in the next four years, but I don't believe they can be furnished. I don't see anything for the next three years but continued difficulties with the car shortage. The railroads can only handle a per cent of the business.

"Your figures show that 200,000 cars are needed today. I don't believe that you can get 100,000 in the next 18 months. The material is not available and you can't get labor. How can you possibly increase the number of cars and locomotives to take adequate care of the increase in business? It will not solve the problem to turn it over to the government."

In this connection he pointed out that in the five years before government control of the railroads 475,000 cars were built, and in the previous five years only 692,000 cars were built. He placed the depreciation per year at 100,000, which has not even been provided for under government control.

S. M. Nickey, Memphis, was elected president of the association during the morning business session, succeeding James E. Stark. The other officers elected were: R. J. Hackney, Memphis, first vice-president, and Elliott Lang, Memphis, treasurer. Vice-presidents in charge of the various districts of the association were elected as follows: T. M. Brown, Louisville, Ky.; Fred W. Mowbray, Cincinnati, Ohio; W. B. Morgan, New Orleans, La.; and Frank C. Cannon, Helena, Ark. Vice-presidents elected to head the various standing committees were: S. B. Anderson, Memphis, legislative committee; B. F. Dulweber, Greenwood, Miss., car supply; George C. Eheman, Memphis, finance and auditing; James E. Stark, Memphis, export traffic; T. E. Sledge, Memphis, rate book; Walker L. Wellford, Memphis, rate adjustment; John W. McClure, Memphis, assessment and membership; O. M. Crebs, Memphis, demurrage and storage; George W. Hand, Cincinnati, freight claims.

Resolutions were adopted by the association urging the federal government to pool the car supply of the country and also to build at least 250,000 cars to be leased to railroads at terms specified by the Interstate Commerce Commission. Another resolution adopted related to railroad legislation, and contained several principles which were published in a recent association circular. Another resolution adopted stated that it was the sense of the meeting that the Treasury Department be requested to modify its rulings so as to permit through bills of lading certificates of exportation to be attached to papers at the port.

That the government should build cars to be leased on a per diem basis which could be at least self-sustaining was the suggestion of James E. Stark, president of the association, in his annual report, which practically opened the convention.

"I believe it is proper and feasible for the government to build cars to be leased on a per diem basis which could be at least self-sustaining if not profitable to the government," he said. "I understand the Railroad Administration has built about 80,000 cars, but these were built for and sold to individual railroad companies; my suggestion is that the government should build not less than 200,000 cars that can be used when needed, and these cars should be government owned and a charge made for their use on the railroad they are on, and on a basis that would eventually pay for the cars, and thereby get action to relieve the car situation earlier than could be done by the railroad companies themselves."

THE RAILROAD ADMINISTRATION has executed a compensation contract with the Southern Pacific Terminal Company for $284,761.

Annual Report of Women's Service Section

How the Railroad Administration Has Looked After the Welfare of Its Women Workers

In the creation of the Women's Service Section of the Division of Labor it was recognized that the welfare of the women employees should have especial consideration, says W. S. Carter, director of the Division of Labor, in his annual report to the director general.

"In the conduct of the work of this section the Railroad Administration is fortunate in the selection of those who administer the work," he says, "as is made evident by the enormous amount of work done in a new field in so short a time. It would be unfortunate for the women railroad employees should the work of this section terminate with the end of federal control of the railroads. The officers of this section are as follows: Manager, Pauline Goldmark; field agents, Edith R. Hall, Helen Ross, Florence E. Clark."

Following is an abstract of the annual report of the Women's Service Section by Pauline Goldmark, which is included in Mr. Carter's report:

The outstanding feature of the year has been the continued employment of women in the service. While the number has decreased 20 per cent since the highest point reached on October 1, 1918, it still remains two and a half times larger than before the entrance of the United States into the war. Recently, moreover, there has been an increase again in the total number employed by certain roads.

An important development during the past 12 months has been the final discontinuance of certain forms of railroad work which women performed under unsuitable conditions, or which involves too great muscular effort and undoubted danger to their health.

Of special interest in its bearing on the employment of women have been the high rates of pay which they are receiving (compared with wages ordinarily paid them for similar work in private employ), owing to the observance by the railroads of the administration's ruling that women shall receive the same rates as men when employed in the same class of work. Of great benefit also for the women in the service have been the extension of the eight-hour day, the reduction of night work and of the seven-day week.

The section has been active in improving physical conditions of work, including health and comfort facilities, and proper hours of work, and also to insure the correct application of the wage orders so that there might be no discrimination against the women employees. Many conferences were held with railroad officials on the best methods of putting the recommendations of the section into effect. It has also been necessary for the manager of the section to deal directly with the higher officials in a number of cases involving moral issues, which are likely to arise in so large a service.

Much time also has been spent on complaints coming from women employees in order to assure an equitable settlement. It has been necessary to instruct them in the proper procedure to be followed. While the wage orders specify that individual grievances in the initial steps are to be handled by the committees of the various organizations, yet whenever large groups of women employees were affected and appeared to be unfairly deprived of the rights assured them under the wage orders, the Women's Service Section has made adjustments. It has also brought to the attention of the administration the needs of unorganized groups of employees, such as laundry workers, seamstresses, matrons, etc., who have no other channel of communication. Special complaints coming from outside agencies interested in the general welfare of women in industry have been dealt with by the section.

Inspections have been made by the manager and the three field agents of the section which cover the employment of approximately 13,000 employees, located in 23 states and the District of Columbia. A great variety of conditions has been reported on, which, together with the quarterly reports of the railroads on the number of women in their service, is the basis for the report.

Number of Women Employees

By request of the administration the railroads have filed quarterly reports with the Women's Service Section on the number of women employees, which have been compiled for current use and printed once a year. Regular reporting began January 1, 1918. These figures have proved extremely useful in showing the rise and fall in the number of women employees and the occupations in which they are working. They have, in fact, thrown light on the whole chapter of women's new position in the railroad world, and make it possible to estimate how far the various employments are likely to be permanent.

The extent of the change is best shown by a comparison of the figures of January 1, 1917, giving the pre-war level, with the later statistics. They show that the number almost doubled during the year 1917, viz.:

	Jan. 1, 1917	Jan. 1, 1918	Oct. 1, 1918	Oct. 1, 1919
First-class roads	[1]31,400	61,162	101,785	81,803

[1] Estimate based on returns from 106 roads employing 25,428 women.

The high-water mark of women's employment came on October 1, 1918, when there were 101,785 in the service, an increase of 66 per cent in the first nine months of 1918, and a gain of approximately 225 per cent as compared with pre-war conditions.

This change was not made without difficulties. It was found at first that the conventions of the railroad world were unfavorable to the admission of women in many positions, and it was only the extreme shortage of male labor, due to the draft and the attraction of higher paying occupations, that made the substitution possible. A number of managers, foreseeing an acute need of labor if the war was to continue, began to insist in 1917 on the introduction of women in every class of work. This process went on steadily until the armistice.

The policy of the different railroads varied in regard to using this new labor supply. The largest number employed by any one road at the time of maximum employment was 14,992. Nineteen of the more important lines (employing 57 per cent of the total number) had doubled or more than doubled the number of their women employees by October, 1918. Seven roads increasing 60 per cent or more are given below:

Roads	Number of employees, Jan. 1, 1918	Number of employees, Oct. 1, 1918	Increase (Per cent)
(1)	3,152	5,075	61.0
(2)	2,038	3,353	64.5
(3)	829	1,391	67.8
(4)	934	1,613	72.7
(5)	1,074	2,064	92.2
(6)	753	1,567	108.1
(7)	5,777	14,992	159.5

After the armistice there was an immediate reduction in the total number of women employees, which showed especially in the reports for April 1, 1919, when the decrease amounted to 14.9 per cent compared with the maximum of October 1, 1918. The total decrease on the date of the last

report is 19.6 per cent. The percentage of loss, however, has grown very much less in the last quarters of the year.

NUMBER OF WOMEN EMPLOYED BY THE RAILROADS ACCORDING TO TERRITORY

CLASS I ROADS

	Oct. 1, 1918	Jan. 1, 1919	Apr. 1, 1919	July 1, 1919	Oct. 1, 1919
Eastern territory..	54,955	54,975	46,251	43,705	43,310
Southern territory.	11,447	11,012	10,295	9,430	9,262
Western territory..	35,383	33,750	30,014	29,197	29,231
Total.....	101,785	99,737	86,560	82,332	81,803

Comparison with figures of October, 1918, shows that in the western and southern territories the number showed an appreciable decline by January 1. In the eastern territory, on the contrary, no reduction was reported until April 1.

The reasons for the total decrease must be carefully considered for an understanding of the present status of the women employees. Two important factors were in part responsible—first, the return of men from service with the army and navy who were reinstated by the railroads according to their seniority, and, second, the drastic reduction of labor force on the railroads of the country, made by the administration early in the year in order to effect necessary economies. In both cases, on account of their lower seniority rights, women were properly laid off.

Among other causes there undoubtedly was a weeding out of inefficient workers during these months and the removal of women workers from a number of occupations. The Railroad Administration requested that the employment of women be discontinued in trucking, in track work, and as parcel-room attendants, on account of the risk of overstrain and injury.

During the past year the dismissals have not been balanced to any great extent by the addition of new women employees. In many offices the number had reached as high as 50 per cent or more of the whole force in 1918. Many officials did not wish to have such a preponderatingly large percentage of women in their offices; hence, a tendency has been noted not to take on more women when vacancies occur, even in positions formerly held by them.

More recently, however, there has been a slight turn in the tide. The figures for October, 1919, show that 55 Class I roads have actually increased the number of women in their service. The additions are in most cases small, but 8 roads have each taken on or recalled to service 40 or more women, and the total additions have amounted to 1,151 women, scattered in all classes of employment, but chiefly in clerical positions.

NUMBER OF WOMEN EMPLOYED BY THE RAILROADS ACCORDING TO CHARACTER OF OCCUPATION

CLASS I ROADS

Summary of Eastern, Southern and Western Territories, 1919. (Compiled from Quarterly Reports of Railroads.)

Classes of employees	Jan. 1	Apr. 1	July 1	Oct. 1
1. Attendants	1,814	1,424	1,272	1,216
2. Bridge tenders	1	3	19	....
3. Car department	1,525	1,094	931	881
4. Clerical or semi-clerical	74,945	67,715	64,741	64,656
5. Cleaning	5,473	4,738	4,676	4,735
6. Elevator operators	100	100	96	92
7. Messenger service	754	624	562	549
8. Personal service	2,863	2,443	2,410	2,450
9. Roundhouse work	1,290	779	595	596
10. Shop work	2,829	1,318	1,082	1,047
11. Signal service	234	171	138	156
12. Station agents, assistants, agent-operators	1,175	1,203	1,136	1,104
13. Supervisors of women employees	105	88	86	88
14. Switch tenders and other yard work	37	28	26	14
15. Telegraph operators	2,584	1,955	1,722	1,663
16. Telephone and telegraph operators (in train movement)	2,122	1,561	1,519	1,316
17. Train service	94	80	71	58
18. Warehouse and docks	736	369	412	330
19. Watchwomen	721	588	566	602
20. Other service	335	267	272	250
Grand total	99,737	86,560	82,332	81,803

It will be seen from the above compilation that the decreases for the class of clerical workers during 1919 have been proportionately less than for any other, namely, 12.2 per cent, as compared with the total diminution of 19.6 per cent.

From the point of view of occupation, the greatest change has taken place in the shops and roundhouses. The publicity given to these new and more sensational forms of women's work during the war had given rise to a mistaken impression as to the extent to which they were used. As a matter of fact, the number in this class never exceeded 7,210. It has now fallen to approximately 2,500. To explain this shrinkage, it must be remembered that women were largely used as laborers in these places and were often found unsatisfactory, because too much heavy labor was required of them. Under these circumstances it was inevitable that they should be dropped when man labor again became available. This criticism, however, does not apply to the women in the more skilled occupations and to those employed as shop cleaners.

Next in the decrease are the operators handling train messages, namely, 1,472, October 1, 1919, compared with 2,833 a year previous, a drop of 48 per cent. A great many women in this class have been furloughed from their positions by the return of men from military service, as these jobs are highly prized, and are not willingly relinquished by their former occupants.

Women have not been displaced so largely in occupations in which they have long been employed, such as car and station cleaning. The number, for instance, declined only 15.4 per cent. This decrease was caused principally by the fact that women are less employed to clean the outside of cars, which is very exerting work, and are no longer required in many places to work on night shifts.

Data From Field Inspections

Beginning early in the year, the eight-hour day has been put increasingly into effect in all the railroad occupations in which women are employed. The inspections of the Women's Service Section show that of a total of 12,908 women employed in all classes of work, 90 per cent were working 48 hours or less (i. e., a day of 8 hours or less), compared with a total of 70 per cent working these hours in 1918, as stated in last year's report. The number of women employed more than 60 hours amounted to 2.2 per cent as compared with 8 per cent in this group in 1918. It is to be noted that almost the entire number working these long hours were car cleaners, namely, 235. Beginning last October, however, this class has had its hours reduced to eight a day, since they were then included in the new shop-craft agreement, which stipulates these hours.

Only 645 women were employed on night or evening shifts —namely, 4.2 per cent of the total, and that more than half of this number worked 48 hours or less per week. The ages of the women so employed were found to be as follows: Over 21 years of age, 569; under 21 years, 41 (35 unreported).

The largest number of women on night duty are in the clerical group, principally telephone switchboard operators in private exchanges and to some extent clerks in offices where the work is necessarily continuous both day and night. The operators who report trains and handle train messages are another class employed on three tricks, covering 24 hours. Nearly 63 per cent of the operators included in this table are on the second and third tricks; that is, they either report for work or finish between 10 p. m. and midnight. As the newer comers they have the less desired hours, not having acquired sufficient seniority to entitle them to a choice of the best tricks.

Watchwomen, who are stationed at grade crossings, were, on the other hand, found to be working only first and second tricks, and therefore ended their day's work not later than 10 o'clock at night.

Employment on seven days a week still persists in various classes of work; 3.7 per cent of the total number were work-

ing 365 days a year. The reduction in these figures as compared with previous practice is partly explained by the removal of women from certain occupations, such as laborers and cleaners in roundhouses.

The car cleaners are conspicuous for their continuous toil, being on duty every Sunday in the month, or else having reliefs only once or twice a month. With the decrease of their daily hours from 9 or 10 to 8 a day, under the new shop-craft agreement, as above described, Sunday work will also be eliminated. Beginning last October, it is now to be permitted only every other week, and since the punitive rate of time and a half is paid for Sunday work, every effort will obviously be made to reduce it to the lowest amount compatible with the needs of the service.

A large percentage of the matrons and janitresses also have unbroken days of service. They are on duty in public waiting rooms, where their duties cannot be discontinued on any one day of the week, as it is difficult to secure reliefs, since only two or three are employed in any given locality. This, however, does not relieve the management from the responsibility of requiring such continuous service from this class of workers. As a case in point, a certain matron may be mentioned who, according to her own statement, had never had a day off in her five years of service, except when she was ill and her daughter was allowed to take her place.

Although only a small proportion of the total number of women employed as telegraph and telephone operators in train movement, by all railroads of the country, is included in Table IV, it probably indicates conditions which prevail for the majority of these workers, i. e., two days a month as "time off" as the maximum. Of the 97 operators above included, 31 have reliefs twice a month and 59 have no days of rest. In an occupation which involves such constant responsibility as reporting trains, and receiving and delivering train messages, it is indeed surprising to find so little progress made in the regularizing of the weekly day of rest. It would seem from the point of view of safety alone to warrant correction.

The improvement of working conditions for women during the year has been marked on many roads. The increasing interest is no doubt due to the good effects observed in the war industries of attending adequately to the workers' physical needs. Direct supervision of health has unquestionably justified itself for both men and women. The latter were found to react favorably to improved surroundings, even more quickly than men, so that there can be no question of the desirability of providing facilities insuring higher standards of comfort.

When women were first brought into the service there were practical difficulties in making place for them, especially in the shops and yards, on account of the lack of toilets, dressing rooms, etc. The construction of these accommodations during the war emergency was most difficult, and often could not be undertaken as extensively as was desirable. Even at the present time the inability of the railroads to incur expenses has handicapped improvements, and in many places only the most urgently needed changes have been made, and accommodations are still insufficient. Inspections by the Women's Service Section have revealed such serious defects in a number of places that immediate correction has been insisted on. In striking contrast with neglect of this kind, it has been found that a number of roads are making ample arrangements for the women employees, adding to the usual facilities, rest, lunch and first-aid rooms. They state that their employees are performing better work in response to these improvements.

Rest rooms have been one of the features which have been most appreciated by the women employees. The furnishings include one or more couches or cots to be used in cases of emergency, or for temporary indisposition, if a special first-aid room is not provided. The Women's Service Section discovered in course of its inspections places where no proper care was given to the needs of women employees, and girls who were sick were found lying on the floor.

In many instances the rest rooms are used at the noon hour for lunch rooms; equipment being provided for heating food, etc., thus eliminating the bad practice of eating sandwiches in the office or work rooms. This arrangement is found useful especially in outlying offices where outside lunch rooms are not accessible. The rest rooms are also used for dressing rooms wherever the occupations necessitate a change of clothing, as for instance in the case of car and office cleaners and laundry and shop work.

Especially gratifying results have been seen on the roads which have in their service a special supervisor of women employees. As a result of a systematic policy, these offices have been able to secure the most suitable equipment in the various places of women's employment on their lines, to keep continuous oversight of these places by occasional visits, and in general to see that the facilities are put to the best use. During the last year and a half, nine of the railroads, most of them large systems, have employed women supervisors, who are exclusively occupied in women's service work. Six are holding positions directly under federal managers.

In order to discuss the special problems which have resulted from the employment of women and to exchange information on the most practical methods of making necessary comfort and health provisions, the Women's Service Section arranged a conference with these officials, which was held in Chicago last October. Fifteen representatives of the railroads were present at these meetings. It is gratifying to report the excellent co-operation of these officials with the Women's Service Section. They are in a position on their various lines not only to improve conditions for women employees, but to deal personally with problems affecting them, which can more appropriately and more effectively be dealt with by a woman than by men officials.

The labor laws regulating the employment of women have been observed almost without exception, as directed in the first wage order of the administration. In regard to sanitation and general facilities the experience of the Women's Service Section shows that the standards are generally higher than those required by the laws.

Difficulties have been met, however, in limiting the hours of work as specified by various states. It has been necessary in a few instances for the Women's Service Section to make adjustments to secure compliance with the law. While the eight-hour day on the railroads is now almost universally observed, occasional overtime in certain offices, such as the accountant's and paymaster's, is held to be indispensable. In a number of cases it has been found possible to secure a substantial reduction of the extra hours by distributing the work among a number of employees in a given office, rather than requiring it of a special group. Even in certain paymasters' offices work has been distributed more evenly throughout the month by writing checks in advance. In case, however, it has been found that overtime cannot be eliminated in a given position, then it becomes necessary for the women to exercise their seniority rights in bidding on other positions which they can hold without infraction of the law. This issue has occasionally come up in bulletining positions on which women are not allowed to bid, but adjustment has in each case been made without loss of seniority rights. The Women's Service Section has followed the policy of urging reduction of excessive hours whenever they occurred, whether or not the state law applied to the occupation concerned. It has drawn the attention of the local officials not only to the extra cost of overtime, but to the impaired efficiency of the workers due to night work and resulting fatigue.

This section has also been called upon to intervene in a

case where the labor law was unfairly used as an excuse for discharging women. This happened in a state where the law specifies a lunch period of at least 30 minutes for them. The new shop craft agreement allows only 20 minutes when two eight-hour shifts are employed, this time being given without deduction in pay. There was thus an apparent conflict between the two provisions, and as a result a number of women car cleaners lost their jobs. The Women's Service Section was, however, able to have them reinstated after securing an agreement that they should be allowed to take 30 minutes for their lunch period in the spread of 8 hours, with the proviso that 20 minutes of that time should be paid for as it is for the men and that 10 minutes should be on their own time. It thus proved possible to avoid the overlapping of the two shifts of workers, which was the purpose of this section of the shop craft agreement, and at the same time to comply with the law affecting women employees.

This case illustrates one of the special activities of the Women's Service Section in obviating unfair discrimination against women employees which has arisen sometimes under the labor laws, and occasionally under other circumstances.

Wages

Women employees have shared in all the wage increases given to the various classes of railroad employees. The rates now being paid are calculated according to the increases specified in the wage orders of the administration. The proportion the women are receiving exceptionally high wages as compared with the usual remuneration given them for similar work outside the railroad service.

Attention is drawn to rates for laundresses and seamstresses compared with wages in other occupations. A majority of the 306 women employed in the railroad laundries and sewing rooms are conspicuously underpaid. Their wages correspond on the whole to the commercial rates, which are known to be on a low scale of remuneration. One-half of the total number were receiving rates ranging from 19 to 28 cents. Twenty-seven laundresses wrongly rated at 19 cents were recently given the increase per hour authorized under Supplement No. 7 to General Order No. 27, but the original wages were so low that even with this increase the pay is very poor, now being 22½ cents per hour. In another laundry 28 employees were affected by the state minimum wage law (effective last May), which increased their hourly rates from 24 to 28 cents. Of the 306 comprised in the investigation of the Women's Service Section 233, or 76 per cent, were receiving less than $70 a month.

In view of the degree of skill required, the present rates still constitute a grave inequality as compared with the pay of railroad employees doing unskilled work, as, for instance, the station cleaners, also included in the same table, 87.1 per cent of whom are receiving $60 or more per month, or the car cleaners (in the next table), who are now being paid 45 cents an hour, or $93.60 a month. In fairness to the

Rates of Pay per Month for Women Employees in Various Classes of Railroad Work

Occupation.	Number of employees whose rates of pay per month are— $39 and under $40.	$40 and under $45.	$45 and under $50.	$50 and under $60.	$60 and under $70.	$70 and under $80.	$80 and under $90.	$90 and under $100.	$100 and over.	Total.
Office girls and messengers	..	2	7	35	28	24	5	..	..	101
Telephone operators (switchboard)	..	..	..	..	11	133	67	21	5	227
Matrons and supervisors	..	..	..	5	24	34	21	4	3	91
Cleaners and janitresses	..	12	2	13	18	112	31	15	6	209
Restaurant employees	..	..	..	6	17	..	1	1	11	36
Crossing watchwomen	..	..	..	4	27	12	3	..	..	46
Miscellaneous	..	..	..	..	..	4	5	7	8	24
Laundresses	27	4	28	76	57	20	24	1	..	237
Seamstresses in linen rooms	..	..	10	10	21	10	9	8	1	69
Total	27	18	47	149	193	349	166	57	34	1,040
Per cent	2.6	1.7	4.5	14.3	18.5	33.6	16.0	5.5	3.3	100

[1] At $69.

majority of the women come under the order for the clerks—namely, Supplement No. 7 to General Order No. 27.

In the course of inspections by the Women's Service Section the wages paid to the women in various classes of employment were ascertained. The following tables have been made up from this material. They, therefore, give the wages being paid at the time of inspection. Recently increases have been made for certain classes under the new shop craft agreement, which will be mentioned below:

Rates of Pay per Month for Women Employed as Clerical Workers

Number and per cent of employees whose rates of pay per month are— $45 and under $50	$50 and under $60	$60 and under $70	$70 and under $87.50	$87.50	$87.51 and under $95	$95 and under $105	$105 and under $115	$115 and under $125	$125 and under $135	$135 and over	Total
43	287	137	223	5,317	977	1,953	731	241	185	30	10,124
0.4	2.8	1.4	2.2	52.5	9.7	19.3	7.2	2.4	1.8	0.3	100

This group includes clerks of all kinds, checkers, ticket sellers, information clerks, parcel-room attendants, baggage checkers, etc. The minimum rate of pay for them is specified in the wage orders as $87.50. Approximately 50 per cent receive this exact amount and 41 per cent a higher rate. Those receiving less than $87.50 (6.8 per cent) are engaged in such occupations as sorting waybills, tickets, etc., and work not requiring clerical duties, in the nature of copying, transcribing figures, making entries of records, etc. According to Interpretation No. 20 of this order they are not entitled to the full clerical rate. With the exception of this small laundresses and seamstresses it is to be hoped that they will be given a new classification as soon as possible.

Rates of Pay per Hour for Attendants, Coach Cleaners, and Laborers

Occupation.	Number of employees whose rates of pay per hour are— 28 cents and under 30 cents.	30 cents and under 33 cents.	33 cents and under 36 cents.	36 cents and under 40 cents.	40 cents and under 45 cents.	45 cents.	Total.
Attendants, storeroom	..	..	8	74	62	20	164
Car cleaners	43	361	416	190	102	..	1,112
Laborers	..	..	147	183	77	8	415
Total	43	361	571	447	241	28	1,691
Per cent	2.5	21.3	33.8	26.4	14.3	1.7	100

The above gives the wages for attendants, car cleaners and laborers. The majority are receiving hourly rates of 33 cents to 40 cents. The car cleaners recently received a substantial increase under the new agreement of the Railroad Administration with the Railway Employees' Department, American Federation of Labor, which brings the present rate for all car cleaners up to 45 cents an hour, effective October 20, 1919, and retroactive to May 1. They are now entitled to overtime rates for Sunday and holiday work and all overtime beyond eight hours a day.

The laborers included in the above classification were employed in shops, roundhouses, and yards. The majority of them were employed to sweep and clean the shops. A number were engine wipers and others were operators of electric trucks at freight transfer stations and docks.

The more skilled employees of the shops and roundhouses are graded as craftsmen and helpers, the latter formerly receiving 45 cents an hour, but now 49 cents. The inspections covered 82 of this class holding the following positions: Oilers, box packers, operators of bolt threaders, nut tappers and drill presses; hammer operators, and helpers of coremakers, patternmakers, painters and upholsterers. Few women were in the higher paid positions. Seventeen were doing upholstering and were receiving the full rate for carmen of 68 cents an hour; three were in the third year and receiving 62 cents. A scattering of machinists and moulders were receiving 50 or 53 cents an hour, according to their length of service.

The women employed as telegraph and telephone operators, who are handling train orders, blocking and reporting trains, receive a minimum rate of 48 cents, as specified in Supplement No. 13 to General Order No. 27. The range of their wages is given below:

Rates of Pay per Hour for Telegraph and Telephone Operators Handling Train Orders, Blocking, and Reporting Trains.

Number of women employees whose rates of pay per hour are—						
48 cents	52¾ cents	54½ cents	56 cents	57½ cents	63 cents	Total
4	18	21	35	4	1	83

The group of women in this occupation are largely "on the extra list"—that is, the reserve list—and are called upon to fill occasional vacancies caused by illness or "temporary vacancies" up to 30 days pending the permanent filling of the positions after advertising and bidding in. Many of the women were formerly holding fixed positions, but have been reduced to the "extra list" by the return of men from military service and by reduction of traffic owing to the coal strike, etc. It has been found in the course of inspection that of a total of 201 women operators, 93 were on the extra list, and therefore their earnings were entirely irregular. Another cause for uncertain earnings is the seasonal variation in the jobs.

Except for this group and rare lay-offs in other occupations on account of reduction in labor force, railroad work is, on the whole, continuous without seasons of unemployment. While the above wage tables specify the rates of pay and do not give the earnings, it is, however, true that these rates give a good picture of the actual pay. Attendance in railroad service is good compared with most industries, and, as a general rule, no deduction is made for occasional absence on account of illness. It is fair to say, on the whole, that the earnings of an individual worker should average approximately the amount payable on full-time employment.

One of the attractions of the railroad work for women undoubtedly lay in the high rate of wages as compared with the pay in other positions open to them. The Railroad Administration safeguarded the interest of the men as well as the women employees, by preventing any undercutting of the rates for the latter. It stipulated in its first wage order that they should receive the same rate of pay as men for the same class of work. After a test of one and a half years it can be said that this principle has in fact been applied by the railroads. It has not been the mere formula of "equal pay for equal work," so variously interpreted in other industries and so often devoid of real benefit to the women who are working in the same occupations with men. There has been no question of adjusting the wage to the production of the individual employee—a method which experience shows to be most difficult of practical application.

In railroad work the standardization of rates has been worked out to such an extent that the rate is put on the position and not on the person. This means that the quality and quantity of service expected of any employee in a given position or job is fixed, and the rate for the same has been settled by collective bargaining. It follows that under these conditions the women are being put to a real test of capacity. They must measure up to the requirements of a given position or else be displaced by a person who is more capable of performing the duties.

During the war emergency undoubtedly a large number of the women employed had had no previous training (except stenographers and comptometer operators), and had to be instructed in the details of their work. There was also no time to make a careful selection of candidates. Even with the best methods of training it is probable that a certain percentage of the employees could not have been brought up to high standards of work. But the inefficiency, which is often complained of, should not be attributed to women alone. Even before the United States entered the war the railroads were suffering a depletion of their best workers on account of the low rates of pay which prevailed before federal control. In 1917 they were facing a literal breakdown of their clerical forces. Many of the new men who were employed at this time were admittedly poor material. In fairness to the women employees, this fact should be emphasized in considering the various estimates of their efficiency which are made by their superiors. Under the changed conditions of the labor market, with men again available, the women have, of course, to meet the test of capacity. It is important, however, that the test should be fairly applied and that no other consideration but efficiency should be allowed to enter.

Positions Held by Women

Instead of quoting favorable or unfavorable opinions in regard to the value of women's accomplishment in the railroad service, it will be more profitable to apply the test of experience to this moot question and to set forth some specific facts as found by this section. With this idea in mind, as well as to collect information on methods of training, a preliminary study of a number of offices was begun a few months ago. The special purpose of the inquiry was, in brief, to discover in what new positions women were placed in the various offices, and in what class of work they had shown the greatest ability.

The inquiry has so far covered 11 offices in various parts of the country, which were chosen without reference to the attitude of the officials toward the women employees, but which should as far as possible be representative of general conditions. It was believed necessary to take large units in order that the methods of dealing with large numbers of employees might be observed where the problems of training are more difficult than in the smaller offices where the personal element plays a large part in the instruction of newcomers. Further, offices of various kinds were included in order to make possible the examination of different classes of position. The list includes five types which are given in the following table, together with the number of men and women employees:

Name of office	Number of employees		
	Men	Women	Per cent women
Car accountant	74	268	78.3
Freight claim	91	86	55.0
Freight auditor	985	979	50.0
Local freight	100	97	40.0
Auditor disbursements	211	98	32.0
Total	1,461	1,528	51.1

The first significant fact which emerges from the table is the large percentage of women in all of the offices as compared with men, amounting to more than 50 per cent; and in the second place the great variation in the different offices, running from 32 to 78 per cent. While this inquiry has covered too small a proportion of the clerical workers to yield general conclusions, it gives significant examples of advancement which will be described below.

The largest proportion of women is found in the office of car accountant, this preference being explained to a great

extent by the character of the work. Much of it consists of mechanical entering of records showing car movement—a job which requires patience and accuracy, but which offers less chance of advancement than work in other offices. There is in addition a vast amount of work in making ready the tickets for the car-record clerks. This preparation consists of filing on pegs the "cut ups" or small tickets, the handling of which requires nimbleness of fingers.

Office of Car Accountant

Women, however, have been intrusted also with more responsible tasks in the office of car accountant. They have been working on the tracing desk in one of the offices for some time securing information on the movement of foreign cars. This involves going through records to locate the car and putting the information in written form. Women are also showing executive ability in this department—one of them holding position of head clerk in charge of car-record work has 81 women under her. Two are heads of local and foreign per diem bureaus, the former supervising 9 women and 3 men, the latter 6 women and 3 men. Among the more important positions involving some skill in clerical work is the head of a per diem unit in private line mileage and her assistants, who compute the mileage, and on their calculations payments are made. Practically all of the above desks have been filled by women for a number of years.

Auditor of Freight Claims

The chief objection which has been urged against women is their lack of familiarity with railroad work. A boy who grows up in the service acquires general knowledge as he advances from job to job. There is no doubt that women were handicapped in this respect when they first began work on account of this lack of experience, especially in outside work, and because of their lack of familiarity with the materials used. Women have, therefore, only rarely qualified as clerks at a freight-claim desk, as this requires a full understanding of claims. One of the railroads furnishes an example of systematic instruction in this work: A group of women were given lectures for one month on the various types of claims, details of rule book, etc. They were then taken to freight houses to see how freight is handled; they learned the trade name of commodities; they visited yards to examine loaded freight cars on the tracks; they observed the construction of empty freight cars and went to car-repair shops to examine damaged ones; they visited local stations to observe the agent's work in handling freight, and then traveled by way freight to see the methods of handling this class of goods. Finally the group was taken to the shipping department of several large factories to see how articles are packed. In fact, as the agent said, they saw and learned a great deal more about the movement of freight than most men in the offices knew, and they were thus able to begin the work of investigating claims with a background of actual knowledge. It enabled them to qualify for highly paid positions, which had previously been considered too difficult for them. They are now receiving salaries ranging from $120 to $150 per month.

Office of Freight Auditor

Work in the freight auditor's office ranges from that which is simply mechanical to that requiring technical railroad knowledge. Women first entered this office through the machine jobs, and have almost completely displaced men in this class of work, viz., typewriting, comptometer, punching cards for the Hollerith tabulating machine, etc.

A few women have been in the more difficult jobs in the offices of freight auditor for some time; the larger number, however, have advanced only recently through the application of the seniority rule. One woman has had some 12 years' experience in revising local and interline waybills. Last February she bid in on the job of reviser in the overcharge claim bureau and obtained this desk, ranking next to the head clerk in this bureau. The shortage of revisers during the war emergency made it necessary for this same office to hold a night class for both men and women. As a result a woman is now head of one of the units, revising local waybills, with four women assistants.

Making up of statements for foreign lines, which requires a knowledge of the division of accounts among the roads, is work which a few women are also doing. One woman was on this desk when the more difficult system of percentage was used under corporate control. Another woman in a correspondence department is handling the adjustment of agents' accounts, a job requiring familiarity with their work on the line as well as an ability to deal with people through correspondence. Women are also found as unit heads on correction accounts, on initial jobs in the claim bureaus, and in the tracing bureaus. Executive jobs which require less technical railroad knowledge, but which demand considerable ability in directing the work of others, are also filled by women; two women direct comptometer bureaus, which do the work for the whole freight auditing offices, one being in charge of 38 and the other in charge of 30 subordinates. The training of the new operators rests largely with the heads, for while they may know how to run the machine, they are not acquainted with the railroad accounts on which they must work.

One of the most interesting points made clear in this brief inquiry is the disparity of practice in the different offices which were visited. Whereas, for instance, one set of officials may say that the employment of women is impossible in given positions, in another office women may be found employed in these jobs for some time and giving satisfaction. In two railroad offices, for instance, there were no women on any form of revision, while in the third, one woman has been on revising work for at least 12 years, and at present there are six or seven employed, not only in the revision of local waybills, but also of overcharge claims, both in the simplest and most expert forms of this work.

It may be said that even in the limited field of this inquiry women have been found in practically every form of work. As far as machine operations are concerned they are said by their superiors to be careful and accurate and to pay close attention to the minute details of the various operations. In a number of general offices the women's performance shows not more than one-half of 1 per cent error per month. Several machine operators, for instance, had an almost perfect record in punching cards during three successive months, although they were doing thousands a day. In the less skilled occupation of sorting, girls are said to show greater dexterity and speed than boys who were formerly employed, and are said to be more orderly and better behaved.

As far as the more responsible clerical positions are concerned, requiring special knowledge, women have at least reached the initial jobs in bureaus doing expert work. They began entering the office of car accountant in other than machine positions many years ago, and there are instances of women holding such positions 25 or 30 years. On the other hand, as far as this inquiry shows, even today women have been only a few months in some of the more important clerical positions.

Testimony from their superiors indicates that women will undoubtedly progress further in all forms of work. While in some offices there is hesitation in encouraging them to advance into the more responsible positions, in other offices there is distinct effort to put no obstacle in their path—in fact, they are being urged to bid on the higher positions. While some officials are still testing out the capacities of their women employees, others are emphasizing the need of

training as the only requisite for further advancemnt. As on official put it, "If women have a desire to advance and get a well-rounded background, as a young man must do in orderto secure promotion, they can do any class of work." Another official stated, "We used to hire women in positions set aside for them, such as stenographers. Of course, they never had a chance to develop. We start the boy in at the bottom as office boy and give them a long ladder to climb. Things are changing now. If the women are started at the bottom like the boys and given the chance, they will climb, too."

There is no doubt that the new seniority rules opened up the door of advancement to a much larger group of women than had previously had these opportunities and that women in general have eagerly taken advantage of these new openings. The conditions under which they are working are more auspicious in regard to the cardinal points of wages and advancement than have been previously offered them in any other field.

Railroad Conferees Considering Compromise

THE CONFEREES on the railroad bill are still a long way from an agreement on the most vital features of the proposed legislation, but have at least progressed to the point of considering compromise propositions on the questions on which they are farthest apart, and when they adjourned on Tuesday until Thursday, expressed a greater degree of hopefulness than they have heretofore. The adjournment was taken because Senator Cummins went to New York on Wednesday to address the Association of the Bar.

On Friday, January 23, an early adjournment was taken to the following day to allow the House conferees, who had reiterated their refusal to accept the Senate's rate-making rule, an opportunity to present a substitute. On Saturday morning they offered a proposal which consists essentially of the rate-making rule which was in the Esch bill as reported by the commitee, which was eliminated by the House. This is a general instruction to the Interstate Commerce Commission without any definite percentage or other standard of reasonableness. To it was added the idea of rate-making groups contained in the Cummins bill, that is, whereas the rule of the Esch bill would require the commission to take into consideration a fair return on value, the proposed substitute would require that the value and the return be figured for each group or district. The substitute proved unacceptable to the senators, and on Monday, Senator Cummins offered a counter proposition to amend Section 6 to provide for a readjustment of the percentage of return by the Interstate Commerce Commission every three years instead of every five years. He also suggested that a provision might be made as to what the commission should take into consideration in readjusting the percentage. This would not meet, however, the objection to the limitation of earnings.

It is understood that there has been considerable pressure brought to bear on the conferees because of opposition to Section 6 in the House, and also to some extent in the Senate.

While all the news that has come from the conferees indicates very little progress from the state of deadlock in which the conference began, and while this fact has led to many predictions that the legislation will fail, it is believed that the loss of prestige of the Republican party if it should be unable to pass a railroad bill after two years of condemnation of the Democratic management of the railroads, constitutes a much stronger reason for confidence that the conferees will ultimately reach some kind of an agreement before the date on which the roads are to be returned to their owners.

All indications point to a failure of any legislation dealing with railroad labor in connection with the proposed legislation as to railroad regulation. The conferees have devoted several days to the conflicting labor provisions of the Cummins and Esch bills, and have announced that they are so hopelessly deadlocked that they will probably have to refer the question back to their respective houses for a vote. Neither side of the conferees is willing to yield its position on the anti-strike provision, which is favored by the Senate and disapproved by the House, and therefore little consideration has been given to the other details of the labor provisions of the two bills, which also vary widely.

The Esch bill contains the provision confirming for the future the wage orders of the Railroad Administration and providing for bi-partisan boards of adjustment to deal with wage questions, with no referee to decide in case of a disagreement. The Cummins bill provides wage tribunals, but gives a power of final decision in case of a disagreement to the transportation board. If these should be referred back to the House and Senate, each body would doubtless adhere to its original position, and neither side would be able to prevail. The Senate would insist on its anti-strike clause, while it seems certain that the House would not accept it unless labor should commit some overt act which would further arouse sentiment against it. There are also many advocates of the idea of taking the labor provisions out of the railroad bill, to be considered later separately, so as to simplify the issues, on the theory that the labor question is complicating the issues which represent the primary purpose of the legislation.

A delegation of representatives of the Farmers' National Council and of several labor organizations appeared before the conferees on January 26, and persuaded five of them to listen to their arguments for a two-year extension of government control. The farmers' organization was represented by George P. Hampton and B. C. Marsh, but the conferees sought in vain for any farmers in the gathering. H. E. Wills, legislative agent of the Brotherhood of Locomotive Engineers, said railroad employees expected that a two-year extension would lead to still further extensions. William Coleman, of the Wisconsin State Federation of Labor, and David Kugler, of the Milwaukee Trades Council, told the conferees that labor would try to defeat members of Congress who do not express his views on railroad legislation. Mr. Coleman also urged an investigation of the management of the roads under the Railroad Administration, declaring that efforts had been made to discredit the idea of government ownership.

On the following day they went to the White House, accompanied by Secretary Morrison of the American Federation of Labor, and left a letter for the President.

Labor leaders in Washington continue to predict confidently that neither the Esch nor the Cummins bill will pass, and that the railroads will be retained by the Government. Sometimes they say the President will rescind his proclamation of relinquishment, although many lawyers hold that he could not do so if he were so inclined, and sometimes they say that Congress will order him to keep the roads. It is understood that they have a considerable following in the House, as many of the representatives are more dependent upon labor votes than senators whose constituency is statewide.

The statements of the labor leaders, however, are not influencing the Railroad Administration in its preparations for relinquishing its authority at midnight on February 29.

The Railroad Committee of the United States Chamber of Commerce has filed with the conferees a memorandum urging that the Interstate Commerce Commission be given power to suspend the effective date of proposed interstate rates when the commission is satisfied, after informal hearing, that such rates would unduly burden interstate commerce.

Annual Report of Regional Director Holden

Hale Holden, regional director of the Central Western region, in his annual report for the year 1919 to Director General Hines stated that the movement of traffic throughout the year was generally free from serious interruption, although operations were characterized by several features that caused congestion in certain localities. He pointed out that during the six months following the signing of the armistice freight traffic offered for transportation was considerably less than for the corresponding months of the previous year, but that during the fall months of 1919 the volume of business was again extraordinarily heavy.

Mr. Holden called attention to the fact that during the first six months of 1919 there were 2,634,186 cars of revenue freight loaded on the railroads in his region as compared with 2,960,593 cars in the same six months in 1918, or a decrease of 326,407 cars in the first six months of 1919 under the first six months of 1918; whereas during the last six months of 1919 there were 3,217,570 cars of revenue freight loaded as compared with 3,107,531 cars during the last six months of 1918, or an increase of 110,039 cars in the last six months of 1919 as compared with the last six months of 1918. As to cars of revenue freight received from connections there was also a decrease in the first six months of 1919 as compared with 1918, and an increase in the last six months of 1919 as compared with the same period in 1918. The number of cars of revenue freight received from connections in the first six months of 1919 was 1,534,554, as compared with 1,612,174 in the first six months of 1918, or a decrease of 77,620 cars. During the last six months of 1919 there were 1,838,283 cars of revenue freight received from connections as compared with 1,642,320 in the same period in 1918, or an increase of 195,963.

As to grain, Mr. Holden showed that while the total cars of grain loaded in 1919, 352,858, showed a decrease for the year as compared with 1918, 357,474, or 1.3 per cent, nevertheless with the exception of the loading during February and March following the general curtailment of business throughout the country at that time, the loading of grain by months was in excess of that in 1918. He called attention to the fact that decreased loading from primary markets because of uncertain market conditions at that time affected the loading as a whole.

Considering total cars of grain and grain products loaded there was an increase in 1919 as compared with 1918 of 27,485 cars, or 5.5 per cent, the total cars of grain and grain products loaded in 1919 having been 530,134, and in 1918, 502,649.

The loading of livestock also showed an increase in 1919 over 1918, the total number of cars of livestock loaded on the railroads in the Central Western region in 1919 having been 651,936 as compared with 649,515 cars in 1918, or an increase of 2,421 cars, or .4 per cent. On the other hand, coal loading was generally lighter than in 1918.

In this report, Mr. Holden calls attention to the fact that during the year 2,202 solid trains of California fruit, with a total of 80,161 cars, an average of 38 cars per train, were moved to the Missouri River and Chicago.

For the year 1919, there were 77,669 cars rerouted in this region, netting a saving of 12,065,849 car miles, an average of 155 miles per car. Of these cars rerouted, 45,712, or 58 per cent were rerouted at point of origin, with a saving of 7,776,909 miles, an average of 170 miles per car.

Through the consolidation of facilities put into effect in this region during the year, the government was saved a total of $199,797.

The total expense of consolidated offices in the Central Western region, including Chicago, for 1919, was $1,022,525.31, a saving of $347,062.71, or 24.3 per cent, as compared with individual offices for the year 1917. Mr. Holden states in his report that should the consolidated offices continue throughout 1920, there will undoubtedly be a still further reduction in the cost of operation, for the reason that the offices abandoned by lines in the consolidation have been practically disposed of and the loss in rents and other expenses in connection therewith will not be a charge against the unification as they have been during the year 1919.

During the year 1919, Mr. Holden reports that considerable passenger train service that had been eliminated during the period of the war was restored. This increase in service amounted to 4,558,913 miles per annum for the entire region. Passenger travel in the region during the year was heavy, particularly summer tourist and convention travel. For the nine months ended September 30, the passengers carried one mile were 9.3 per cent over the corresponding period of 1918. For September alone the passengers carried one mile increased 26.3 per cent over the same month in 1918.

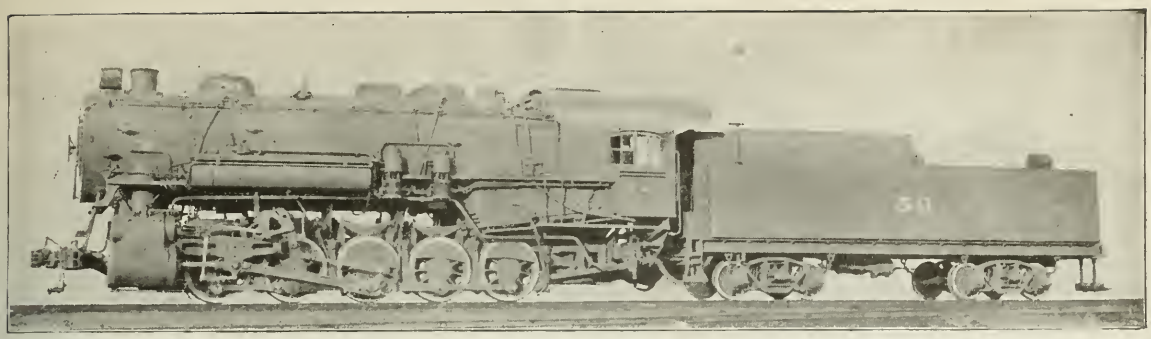
During the 10 months ended October 31, 1919, 56,452,668,000 net ton miles were handled in freight traffic, compared with 62,572,456,000 net ton miles for the same period in 1918, a decrease of 9.8 per cent. This traffic was taken care of with 91,167,000 freight train miles in 1919 as compared with 100,838,000 in 1918, a decrease of 9.6 per cent. The decreases were generally due to the fact that coal traffic which averages about 50 tons per car decreased so very much during 1919 as compared with 1918.

Mr. Holden states that the railroads generally in this region have been well maintained and in some instances the shortage of a normal program in 1918 was overcome in 1919. Special effort was made to confine the work of maintenance of way to prescribed hours of service and to avoid the expenditures of overtime, resulting in a marked reduction of overtime and its ratio to total expenditures. To the end of October, 1919, 77 per cent of the total tie requirements had been inserted, compared with 79 per cent for the same period in 1918. However, by comparing the actual number of ties inserted in 1918 with that of 1919, there is an increase of 4.4 per cent for the 10 month period of 1919 over the same period in 1918. To the end of October 62 per cent of the total estimated rail program had been laid and 23 per cent of it was available for placing in track.

Railroads operating in the Central Western region during the first 9 months of 1919 effected a saving of $4,473,252 in fuel or 8.1 per cent over the same period in 1918, based on a 1,000 gross ton miles unit. For the entire year, Mr. Holden estimated that the saving in this direction would be $5,000,000.

The activities of the regional supervisor of safety have met with good results in the region during the year. According to Mr. Holden's report for the 10 months ended October 31, 1919, there has been a reduction of 200 fatalities and 2,264 injuries under the corresponding months of 1918.

The Hon. E. C. Drury, Premier of the Province of Ontario, Canada, recently suggested that the Temiskaming & Northern Ontario, owned by the Province, be sold to the Dominion government, to be made a part of the Canadian National Railway System. The reported suggestion disclosed a division of opinion as to the advisability of such action, and business men in the district now served by the Temiskaming & Northern Ontario have united in opposition to such a move. The Cobalt Board of Trade, for instance, sent a protest to Premier Drury urging that the suggestion be discarded. The daily press of the district, however, has been divided, several prominent publications urging that, if the provincial government should sell the road to the Dominion it should be on condition that the line be extended northward to tidewater at James Bay, a distance of 190 miles from Cochrane.

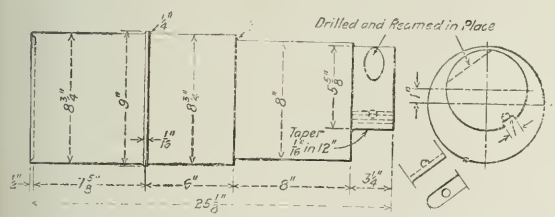


Chesapeake & Ohio Switcher for Heavy Service

Heavy Ten-Wheel Locomotives for Switching Service

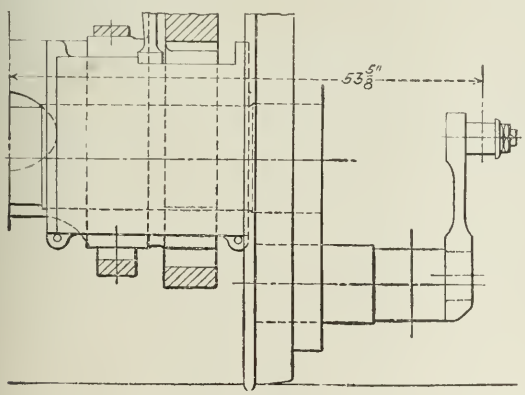
Switching Locomotives Having 63,000 lb. Tractive Effort Built for the Chesapeake & Ohio

THE DEMANDS made upon switching locomotives by the heavy tonnage trains of the present day have resulted in the building of some very heavy ten-wheel switching locomotives for the Chesapeake & Ohio. The tonnage of many trains has grown to such proportions that they are



Main Crank Pin with Offset Eccentric Boss

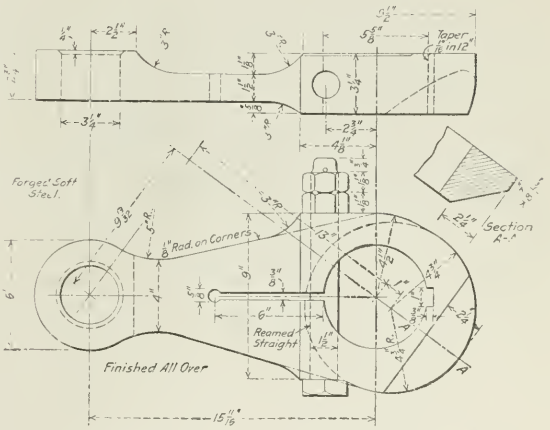
beyond the capacity of any locomotives used for switching, except the Mallet type locomotives. These ten-wheel switching locomotives are the largest and heaviest non-articulated



Application of the Eccentric to Give Clearance Above the Rail

switchers ever built. The total weight on drivers is 295,000 lb. and the tractive effort is 63,000 lb. They were designed by the mechanical department of the Chesapeake & Ohio with the co-operation of the American Locomotive Company, which built the locomotives at its Richmond works. Some very interesting and difficult problems were encountered in the design of these locomotives, but the results have been very satisfactory.

The driving wheels all have flanged tires 5¾ in. wide, and in order to keep the wheel base at a minimum are made as small in diameter as practicable. With 51-in. diameter wheels spaced as closely as possible, the total wheel base is

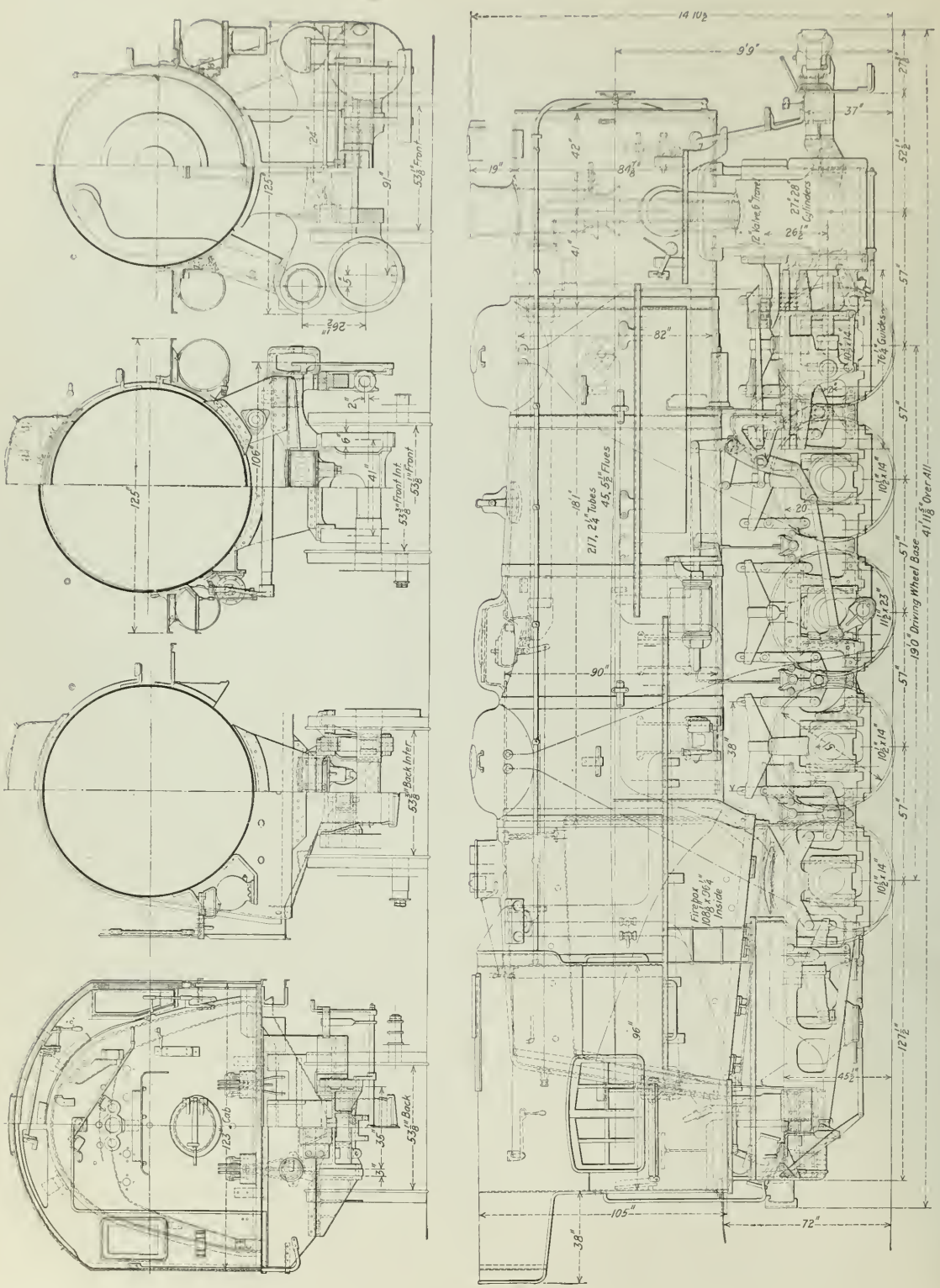


Eccentric Crank for C. & O. Switcher

only 19 ft., and these locomotives can pass over curves of 14 deg. without the use of lateral motion driving boxes.

The steam pressure is 185 lb. per sq. in. and the cylinders are 27 in. in diameter with a 28-in. stroke. The small driving wheels with this 28-in. stroke and the large crank pins necessary for an engine of this high power made the question of clearance of main rod straps and eccentric cranks a rather difficult problem. The hub of the eccentric crank was kept above the rails the required distance by making the main crank pin boss eccentric, as shown in the drawings.

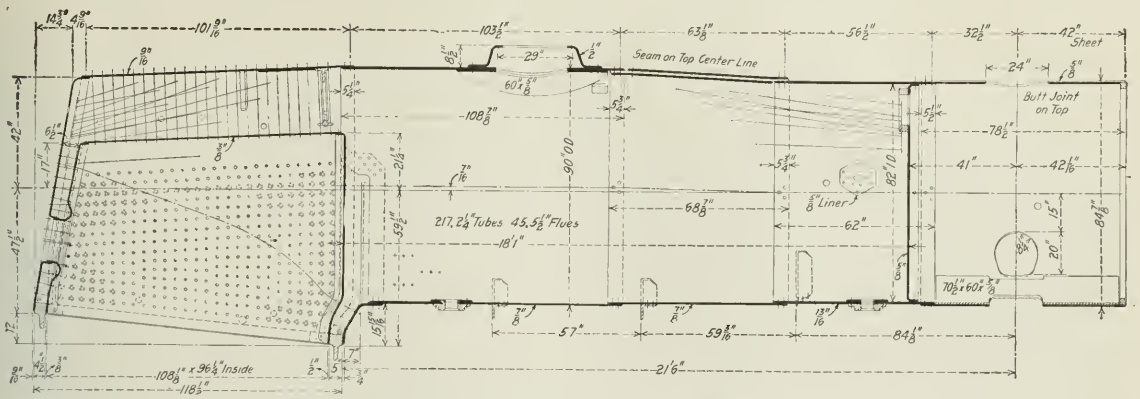
The side rods are of a design differing from the usual arrangement. Instead of the usual rear knuckle joint connection the fourth crank pin is made with two journals, and the back crank pin is extended in a manner similar to the style



Elevations and Sections of the Chesapeake & Ohio Ten-Wheel Switcher

used on many American type eight-wheel locomotives. The back section rod is independent of the forward side rods and is on the outside, in line with the main rod. The guides and crosshead are of the Laird type, the crosshead shoe being solid bronze with very liberal bearing surfaces, designed to give long wear.

The total length of this locomotive from the front bumper course. The longitudinal seams are on the top center line, have inside and outside welt strips and are strongly riveted. The circumferential seams are lapped 5½ in. at the smoke box, with a double row of rivets; 5¾ in. at the two intermediate seams, with double rows of 1¼-in. rivets and 5¼-in. at the firebox with a double row of 1⅛-in. rivets. The boiler is equipped with a Schmidt superheater, having a

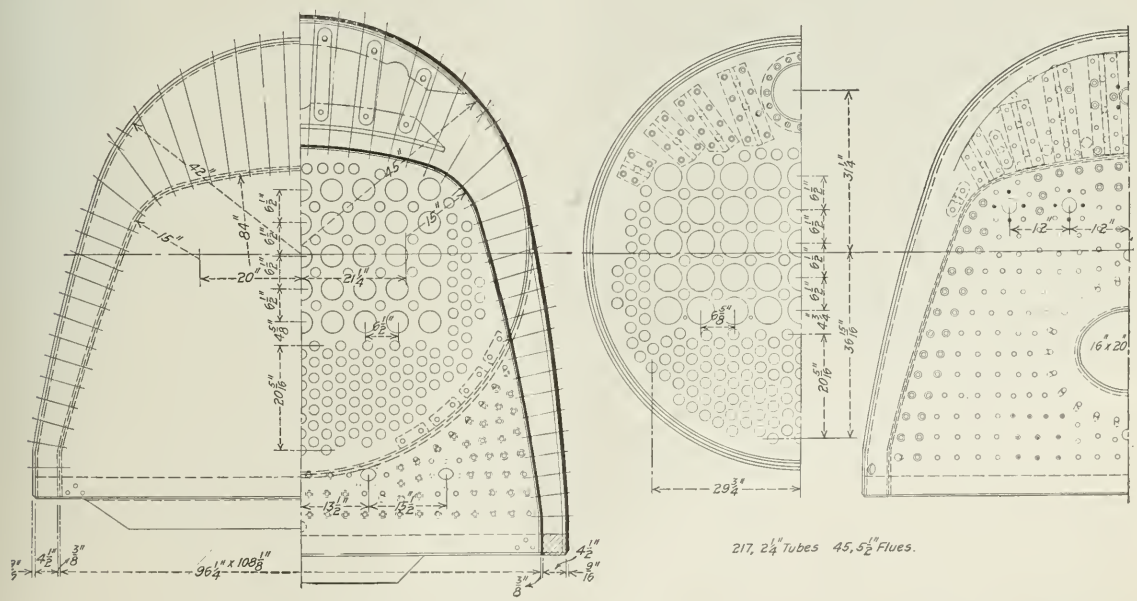


Extended Wagon Top, Radially Stayed, Boiler for Chesapeake & Ohio Heavy Switcher

to the tender end sill is 75 ft. 9¼ in., the overall height is 14 ft. 11¾ in. and the width over running boards 10 ft. 5 in. The lococomotive frames are 6 in. wide and have ample depth over the pedestals to provide the required strength to support the heavy weight of the locomotive. The journals

heating surface of 945 sq. ft. The firebox is 108⅛-in. long by 96¼ in. wide inside, has an average height of 72⅝ in. and a grate area of 72.2 sq. ft.

The tender tank is built unusually low and long and the side plates of the coal space are set in to permit an unob-



Cross Sections of Boiler for Chesapeake & Ohio Heavy Switching Locomotive

of the main driving axles are 11½ in. by 23 in. and the other four axles have journals 10½ in. by 14 in.

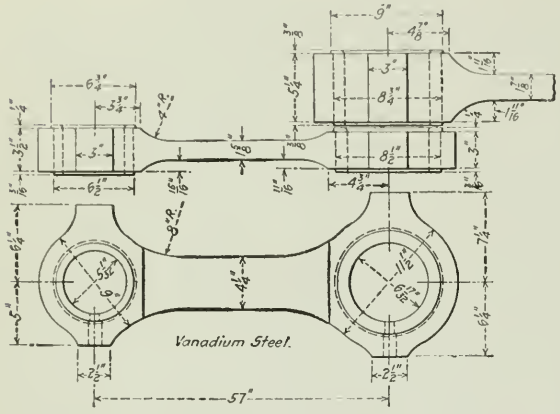
The cab fittings are arranged on the backhead in the most convenient location for the engineman and particular care has been taken to afford an unobstructed view in both directions from the cab.

The boiler is of the extended wagon top type with a wide firebox. It has an inside diameter of 88¼ in. at the dome

structed view of the rear. The tank is 32 ft. long by 10 ft. wide by 5 ft. high inside, and has a water capacity of 15,000 gallons. The coal space has a capacity of 15 tons. The tender frame is of cast steel, having side sills 10 in. deep and intermediate sills 13 in. deep. The vertical webs of these sills are 1-in. thick and are very strongly ribbed and webbed, making a most rigid frame that will withstand any stress that may be put upon it in heavy switching service.

The tender trucks are of the same design as those used under the tenders for the Chesapeake & Ohio Mallet type locomotives. The truck side frames are 6 in. wide and are of cast steel. The bolsters are also of cast steel and are supported by triple elliptic steel springs. The wheel base is 5 ft. 10 in., the wheels 33 in. in diameter and the journals 6 in. by 11 in.

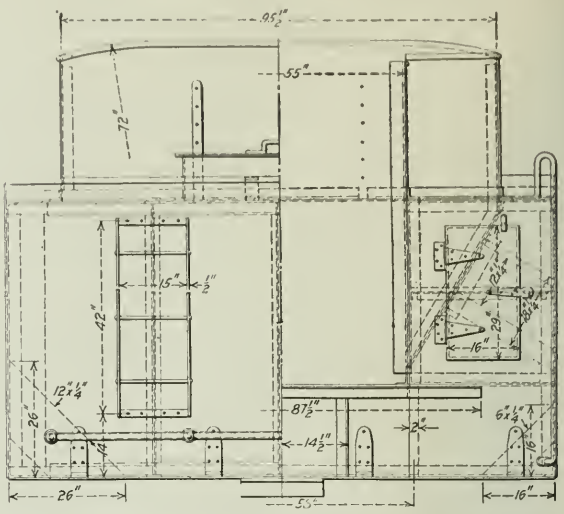
The specialties include the Cole long main driving boxes,



Back Section Rod Outside of Side Rods and in Line with Main Rod

Watters pneumatic sanders, Nathan lubricators and non-lifting injectors, Hancock combined stop and check valves and hose strainers, "Loco" incandescent headlight equipment, Consolidated safety valves, Franklin pneumatic grate shakers, Lewis power reverse gear, Economy radial buffer, Farlow-Westinghouse draft gear, Sharon tender and pilot couplers, Commonwealth cast steel pilot beam and tender frame, Hunt-Spiller gun iron cylinder and valve packing rings and steam chest bushings, Cambria Coffin process axles, Schmidt

tive effort might be a maximum without any unnecessary weight being added to the locomotive as a whole. The results obtained from them since they were placed in service in February, 1919, has been very satisfactory. They have not only handled the heavy trains easily but have proved



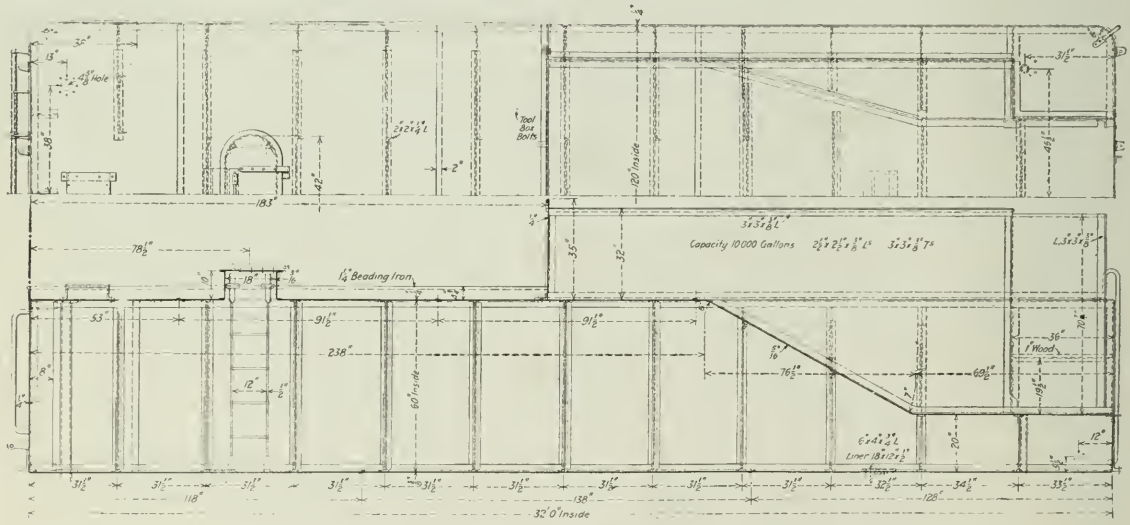
Section and End Elevation of Tender for C. & O. 10-Wheel Switcher

to be as well adapted to lighter switching service as the medium-sized locomotives.

The principal weights, dimensions and ratios are as follows:

General Data

Gate	4 ft. 8½ in.
Service	Switching
Fuel	Soft coal
Tractive effort	63,000 lb.
Weight in working order	295,000 lb.
Weight on drivers	295,000 lb.



Half Plan and Side Elevation of Tender for Chesapeake & Ohio 10-Wheel Switching Locomotive

superheater and Westinghouse-American brakes with two 9½-in. pumps. The piston rods and crank pins, the frames and the main and side rods are of vanadium steel.

In the design and construction of these locomotives careful attention was given to the smallest detail so that the trac-

Weight of engine and tender in working order	478,100 lb.
Wheel base, driving	19 ft.
Wheel base, total	19 ft.
Wheel base, engine and tender	60 ft. 3¼ in.

Ratios

Weight on drivers ÷ tractive effort	4.68
Total weight ÷ tractive effort	4.68

Tractive effort × diam. drivers ÷ equivalent heating surface*	629
Equivalent heating surface* ÷ grate area	70.5
Weight on drivers ÷ equivalent heating surface*	57.4
Total weight ÷ equivalent heating surface*	57.4
Volume both cylinders	18.55 cu. ft.
Equivalent heating surface* ÷ vol. cylinders	277
Great area ÷ vol. cylinders	3.84
Cylinders	
Kind	Simple
Diameter and stroke	27 in. by 28 in.
Valves	
Kind	Piston
Diameter	12 in.
Greatest travel	6 in.
Wheels	
Driving, diameter over tires	51 in.
Driving journals, main, diameter and length	11½ in. by 23 in.
Driving journals, others, diameter and length	10½ in. by 14 in.
Boiler	
Style	Extended wagon top
Working pressure	185 lb. per sq. in.
Inside diameter of first ring	82 in.
Firebox, length and width	108⅛ in. by 96¼ in.
Tubes, number and outside diameter	217—2¼ in.
Flues, number and outside diameter	45—5½ in.
Tubes and flues, length	18 ft. 1 in.
Heating surface, tubes	2,300 sq. ft.
Heating surface flues	1,166 sq. ft.
Heating surface, firebox†	232 sq. ft.
Heating surface, total	3,698 sq. ft.
Superheater heating surface	935 sq. ft.
Equivalent heating surface*	5,100.5 sq. ft.
Grate area	72.3 sq. ft.
Tender	
Tank	8-wheel
Frame	Cast steel
Weight	183,100 lb.
Wheels, diameter	33 in.
Journals, diameter and length	6 in. by 11 in.
Water capacity	10,000 gal.
Coal capacity	15 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.
†Includes arch tubes.

Labor Head Criticizes Railroad Administration

THAT THE RADICAL rather than the conservative element of organized labor has been favored by the government through the United States Railroad Administration is the charge made by Earl H. Morton, president of the Order of Railroad Station Agents, in a recent letter to Senator Warren G. Harding. As proof of his contention Mr. Morton said in part:

"When the railroads were taken over by the government former Director General McAdoo laid down the policy of the open door. When he issued General Order No. 8 he created the Lane Commission and permitted all classes of railroad employees, whether organized or unorganized, to appear before the commission through their representatives and state their grievances before their employers, who also had an opportunity to state their side of the case. After hearing both sides the commission had the authority to render a verdict in accordance with the testimony submitted. This seems to me a fair, common-sense way of bringing employer and employee together.

"Since the resignation of former Director General McAdoo there has been gradually brought about, through the domination of a certain group of organized labor, a decided change in the policy of the Railroad Administration which is detrimental to the interests of conservative union organizations, also to the unorganized employees. For an illustration: General Order No. 65 in Section B reads as follows: 'Grievances which occur on the effective date of any national agreement, and subsequent thereto, will be handled by the committees of the organizations signatory to such national agreement, for final reference to the appropriate railway board of adjustment, except on roads where other organizations of employees have an agreement with the management for the same class of employees, in which case grievances will be handlled under that agreement by the committees of the organization which holds the agreement, for final reference to the Director of Labor, as provided in Circular No. 3 of the Division of Labor.'

"To the experienced employee this means simply that the right to be represented by his chosen organization is not only denied him but only the organization signatory to a national agreement can handle his grievances. The rational, conservative employee may not care to affiliate with the radical element of organized labor, who are the only people who have been given the opportunity to draft these national agreements. This work was done by committees paid from the public treasury, and thus the government gave its sanction to the radical rather than the conservative element of labor."

In the same letter Mr. Morton, speaking for the conservative element of organized labor, approves the anti-strike clause in the Cummins bill as follows:

"Much has been said about the anti-strike clause in the Cummins bill and perhaps too little has been said about its good features. As president of the Order of Railroad Agents, I can see no great harm to the railroad employees as a result of the passage of this clause. The machinery established by this bill would result in making the working conditions and salaries of railroad men so satisfactory that they would have no cause to strike, while the general public would have the assurance of the uninterrupted transportation service."

Annual Report of Southwestern Region

EXTRAORDINARY TRANSPORTATION conditions, particularly in Texas, during the year 1919, due to the unprecedented oil development and the very unusual rainfall are given particular attention in the annual report for the year 1919 of B. F. Bush, regional director of the Southwestern region, to Walker D. Hines, director general of railroads.

"Transportation conditions in Texas during the year have presented extreme difficulties and have had the unremitting attention of the railroad officers," said Mr. Bush. "There were three extraordinary conditions local to the state of Texas. One was an oil development unprecedented in the history of Texas or any other state. Another was a rainfall of unprecedented volume throughout the year, largely damaging some crops, making it exceedingly difficult to care for others, making wagon roads almost impassable in many parts of the state, and last, but not least, having such a deleterious effect on the track structure as to make safe and economical train operation most difficult. Many of the lines of railroad in Texas are of light design and construction respecting subgrade, banks, ditches, ballast and rail, and it was not possible to find the means to provide the new capital for a substantial improvement in the track structure of these lines by the application of new and stronger materials. The third condition was the production of a wheat crop, principally in western Texas, at least three times the normal wheat crop of the state.

"All of these conditions presented in themselves the greatest difficulties to satisfactory railroad transportation, especially since they were supplemented by difficulties of a more general character.

"The oil development was principally upon the Texas & Pacific, the Missouri, Kansas & Texas, and the Wichita Falls & Northwestern. In every instance the development produced an unheard of amount of inbound and outbound freight and passenger traffic, for which existing facilities had never been designed and were consequently wholly inadequate. The provision of needed additional facilities called for large amounts of new capital. The railroad companies were not in position to furnish the money. The government was not in position to furnish the money because of the imminent early termination of federal control and of the lack of appropriations which could be devoted to the enlargement of the railroad facilities of the country. Never-

theless, substantial capital expenditures were made on these railroads in Texas on account of the extraordinary pressure to meet the local necessities. But, the carrying on of this work was greatly hampered by the continued rainy season. The unloading of cars in the oil regions was greatly delayed, first, because of the insufficiency, in a great many instances, of the consignees' facilities for unloading, and second, because the wagon roads were so nearly impassable as to make it exceedingly difficult to haul the material away from the cars. This added to a congestion which would have been extremely great in any event. The passenger travel and express travel were greatly increased and the more the effort was made to take care of the passenger travel, the greater was the interference with the handling of the necessary freight traffic. These difficulties were all the greater because almost without exception the oil development occurred on branch railroads or railroads of light construction which were not adapted to the movement of heavy locomotives or other heavy equipment.

"The extraordinary large crop of wheat was in a territory where no such crop had ever been obtained before, and where there were practically no facilities for local storage. The wheat had to move to a large extent for export via Galveston. The elevators at Galveston were speedily filled up, vessels were slow in coming to the port, the situation was further complicated by the Gulf storm, and a condition arose whereby the more the railroads attempted to furnish cars to load wheat the more congested the railroads became and the more cars were takn out of active service, by reason of the inability to rapidly get rid of the wheat at Galveston. By degrees this situation was improved through the diversion to Galveston of a large additional number of vessels, but meanwhile the farmers suffered great inconvenience and loss through their inability satisfactorily to care for their wheat, this being greatly accentuated by the unprecedented amount of rain.

"The entire situation as to car supply was further complicated by the general condition that for sometime prior to the beginning of federal control the railroad companies of the country had not as a whole bought enough new freight cars to make good the wearing out of existing equipment and to keep pace with the growth of the country. In the first year of federal control the number of freight cars obtainable was absolutely limited by the relatively small amount of material which could be taken from other pressing needs of the war and devoted to the construction of freight cars. During the second year of federal control no further orders for freight cars could be placed because the railroad companies could not furnish the money and no government appropriations were available therefor on account of the early approach of the end of federal control. At the same time the business in the fall months was up to the maximum that had ever been moved in the country before, and the loading per car was much less heavy than it was the year before under the stimulus of war necessities. All these elements combined to produce great scarcity of equipment. This was in part overcome by the unified control of equipment by the Railroad Administration but it was impossible to overcome it entirely. Yet there was, taking the country over, less car shortage than had occurred in several years prior to federal control. This condition operated to accentuate the difficulties incident to handling the unprecedented grain crop at the congested terminals where there was neither sufficient storage nor shipping to take care of the situation.

"A general resumption of tourist passenger traffic on the railroads of the southwest was indicated in the report. During the year passenger train service had been increased at the rate of 2,947,375 miles per annum, or 8,075 passenger train miles per day. Of this increase 5,965 passenger train miles per day represented service which had been discontinued during the war and which was restored, and 2,110 passenger train miles per day was new service established. The gradual reduction in the movement of troops permitted the establishment of necessary additional passenger service, the report said. From January 1 to November 15, 1919, according to the report, Southwestern region lines handled 1,253 troop trains. The report characterizes the passenger traffic for the period covered as "exceptionally large."

"During the first six months of the year there was a substantial reduction in freight traffic movement with an increase in cars on lines, the majority of which were surplus and stored for prospective loading. This condition continued up to and including July when traffic commenced to increase to such an extent as to reduce the car supply to a shortage, which has continued through the year."

According to the report, local freight loading on the lines in the Southwestern region showed an increase during the period from January 1 to November 15, 1919 over the same period of 1918 of 91,347 cars or 3.5 per cent. Up to December 1, 58,000 cars of wheat had been moved to primary markets in the region, an increase of 40 per cent over the same period of last year.

Regional Director Bush reported the creation of a "Freight Service Organization" which stationed competent traffic men at principal junction points to expedite freight movement.

"The practice of handling freight in train-lots of 20 or more cars" the report said, "was continued this year, and the commodities so handled consisted principally of oil, grain, ore, sulphur, molasses, government freight, fruits, vegetables, and other perishable commodities. This resulted in expediting transportation service and minimized the cost."

Commenting on the car supply during the year, the report said: "Upon signing of the armistice, surplus of equipment of all classes accumulated rapidly, due to decreased loading, and in consequence a large amount of equipment was delivered to this region for storage and prospective loading. With 110 per cent of equipment owned on the lines and a surplus of 28,000 cars on January 1, 1919 the accumulation continued until March 20 when a surplus of 71,000 cars was reported, at which time about 31,000 cars had been stored. On June 1, 1919 the region as a whole had 140 per cent of equipment on line.

"Arrangements were made early in the year to inspect, repair and set aside box cars for moving the wheat crop. On July 1 a total of 27,000 grain cars had been stored, or 20,000 cars more than the previous year."

The heavy movement of traffic, Director Bush reported, made additional locomotives necessary, and the southwestern region is now using 55 locomotives belonging to lines of other regions. "Heavy traffic, both passenger and freight," said the report. "and a shortage of locomotives on some lines has taxed power to the maximum during the present year. It was necessary to borrow engines from other regions to handle the business, and notwithstanding shops have been operated to their capacity, except when the forces were on strike, it has not been possible to greatly improve the general condition of locomotives over last year."

The report commented upon a "general shortage of all classes of labor during the entire year particularly in the maintenance and mechanical departments."

"Bridges, buildings and other structures are in good condition. The roadway has been properly maintained, although a large amount of work has been required and a considerable increased expense made necessary by the excessive rainfall throughout the Southwest not only in the spring of this year but particularly during the fall and winter months."

Director Bush reported that work is under way on the transformation from coal to oil burners of locomotives on the Missouri, Kansas & Texas of Texas, the Wichita Falls & Northwestern, the Texas & Pacific, the Trans-Mississippi Terminal and the Gulf Coast Lines.

The report also recorded progress in the work of preventing loss and damage freight claims, accident prevention, fuel conservation and fire prevention.

The Annual Report of the Division of Labor

W. S. Carter Urges Continuance of Bi-Partisan Boards of Adjustment After Termination of Federal Control

THE CONTINUATION of the railway boards of adjustment created by the Railroad Administration to handle controversies arising out of the application of wage orders and other disputes between the officials and employees of railroads is urged by W. S. Carter, director of the Division of Labor of the Railroad Administration, in his annual report for 1919 to the director general. These boards have no jurisdiction over the recommendation, issuance and interpretations of wage orders and in this respect, therefore, Mr. Carter's recommendation is in contrast with the labor provisions of the Esch bill passed by the House at the request of organized labor, which provides for boards of adjustment to have jurisdiction over wage matters. The boards provided for by the House bill would be bi-partisan without any umpire or neutral member and in this respect would be similar to the Railroad Administration boards. An abstract of Mr. Carter's report, which includes the reports of the boards of adjustment and also that of the Women's Service Section, published elsewhere is as follows:

In the report of the Division of Labor for 1918 the methods and purposes of creating this division were explained. The work of this division has been developed to the extent that at the present time the number of officers and employees is 97. This includes the central offices of the division, Railway Boards of Adjustment, and the Women's Service Section. Its principal purpose has been for the director of the division to act in an advisory capacity to the director general, to adjust controversies between the railroads and their employees, and to endeavor to create harmonious relations between the officers and employees on all railroads. The executive authority of the director of the division is limited to decisions mutually agreed upon by the Division of Labor and Division of Operation of the Railroad Administration. Because of the volume of business thus transacted the directors of each of these divisions have appointed assistant directors who devote much of their time to investigations, hearings, and conferences in formulating decisions in labor matters. The pages following indicate the general character of work performed by the Division of Labor during the year 1919.

The Division of Labor received and assembled all necessary evidence, including necessary approval of the chief operating officer of the railroad and the chief executive officer of the organization concerned, and filed with proper Railway Board of Adjustment in accordance with provisions of General Orders, Nos. 13, 29, and 53, during period January 1 to December 15, 1919, a total of 2,658 cases. Of these, 1,314 were referred to Railway Board of Adjustment No. 1, 875 to Railway Board of Adjustment No. 2, and 469 to Railway Board of Adjustment No. 3.

This division also received, assembled necessary evidence in accordance with Circular No. 3 of the Division of Labor and referred to the three assistant directors of the Division of Labor a large number of submissions affecting employees not having representation on Railway Boards of Adjustment, which cases were later given due consideration and decisions rendered by the Division of Labor in accordance with Circular No. 3.

In addition to receiving and forwarding to the Board of Railroad Wages and Working Conditions all requests for interpretations of wage orders and receiving and forwarding to Railway Boards of Adjustment Nos. 1, 2 and 3 all submissions coming within their jurisdiction, this department has maintained permanent files for the Division of Labor on all such cases, and has attached the decisions and rulings in each case as issued.

This preparatory work is of such large volume that it has required the assignment of a special assistant in charge of a section of the Division of Labor.

Methods of Adjustment of Controversies Between the Railroads and Their Employees

As stated elsewhere, a memorandum of understanding has been reached with the 14 organizations of railroad employees, representing a vast majority of all employees, to refer all disputes that are not adjusted on the individual railroads to Railway Boards of Adjustment. Under this understanding most of the controversies have been decided in accordance with the provisions of the general orders creating such boards.

There remained, however, for practically all classes of employees many railroads on which no agreements existed, and in order to provide means by which such controversies could be disposed of Circular No. 3 was issued with the approval of the director general.

Under the provisions of Circular No. 3 a large number of investigations have been made, hearings held and correspondence conducted, in order to reach an equitable decision.

In handling this character of work it has been specialized to the extent that certain of the assistant directors have been assigned supervision over the cases coming from certain of the organizations of the railway employees and much of the time of these assistant directors has been devoted to this work. The policy of the Railroad Administration is that where matters of this character are referred directly to the Division of Labor for adjustment, representatives of the Division of Labor and the Division of Operation co-operate to the extent that decisions rendered have the approval of both divisions. (The report gives a list of decisions rendered by the Division of Labor in this manner, without reference to Railway Boards of Adjustment.)

Work of Field Representatives

It was found advisable early in federal control of the railroads to select a corps of field representatives, who could be detailed to go to the locality in which a controversy arose and to advise all concerned as to the proper methods of adjusting same. Investigations of labor matters are necessary in many cases and these field representatives have been assigned to that work. In the selection of persons to perform these duties effort has been made to secure the services of those who have had large experience in similar matters, with the result that their work has been highly gratifying. The services of these men are utilized in the following manner:

1. Investigation of complaints of railroad and express employees which have been handled by correspondence and upon which further information is required to enable us to determine the exact conditions. These complaints are in connection with conditions of employment, discharge from service, rates of pay, application of wage orders, etc.

2. Arranging for conferences between committees representing employees and officials of the railroads for the adjustment of grievances or the preparation of joint statements submitting such grievances to the administration for decision.

3. Advising employees on strike or threatening strike as to the manner in which their grievances should be presented

to the administration for attention, and of the attitude of the Railroad Administration in regard to illegal strikes or other suspension of work to force the granting of certain demands. These representatives have been particularly successful in this branch of the work, having obtained the return to work of the striking employees or averted suspension on practically every occasion upon which they have been instructed to participate.

The personal contact of these representatives with employees and officials has been most effective in conveying a proper understanding of the desires of the administration in regard to the handling of labor matters, and their services have been appreciated by both the representatives of the employees and the officials, and they take a great deal of pride in the work they have accomplished.

National Agreements with Railway Employees' Organizations

During the year 1919, up to December 31, national agreements were entered into by the director general with the Railway Employees' Department of the American Federation of Labor for employees engaged in the mechanical trades, their apprentices, helpers, etc.

A national agreement was also entered into in the same manner with the Brotherhood of Maintenance of Way Employees and Railway Shop Laborers.

A request has been filed with the director general by the Brotherhood of Railway Clerks for a standard set of working rules for employees coming within the jurisdiction of that organization. This request is now under consideration and will be disposed of as promptly as possible. (This agreement has since been signed.)

A request has been filed by the Brotherhood of Railroad Signalmen for a standard set of working rules, which request is being considered. (This agreement has since been signed.)

The Brotherhood of Stationary Firemen and Oilers has also submitted a request for a standard set of working rules, which will be disposed of as promptly as practicable.

Railway Boards of Adjustment

Railway Boards of Adjustment, Nos. 1, 2 and 3, have been delegated authority to decide controversies arising between the officials of the railroads and the organizations of railway employees under agreements in effect at the time that such controversies arise. These boards were created through memoranda of understanding entered into by the regional directors and the chief executives of the organizations of railway employees.

It will be noted that Railway Boards of Adjustment have no jurisdiction over the recommendation, issuance, and interpretaions of wage orders, their duties being confined to decisions of controversies arising out of the application of wage orders and to decisions on all other disputes between the officials and employees on railroads working under agreements.

The work of these boards demonstrates not only the advisability of the creation of such boards but the necessity of their continuance, either under federal control of railroads or thereafter. The fact that boards are "bipartisan" without any "umpire" or "neutral member," and all of which members are experts in railroad agreement matters, have led both officials and employees to have confidence not only in the fairness of decisions reached but as to the technical ability of the members of the boards to pass intelligently upon all controversies submitted for decision.

Where controversies, sometimes of the simplest character, formerly resulted in negotiations extending over months or years, resulting in strained relations bewteen the officials and the employees, such controversies, when not promptly disposed of by the officials and employees are referred to boards of adjustment for final decision without any personal feelings in the matter.

Reference to the reports of these boards indicates the enormous amount of business submitted for final disposition.

The railroads are represented by officials, or former officials, especially delegated to carry on the work of the boards, and the employees are represented by officers of their own organizations.

The successful operation of these boards of adjustment is not only due to the plans and methods of their institution, but to the mental attitude of those selected to represent the diverse interests. It has been the theory that every person accepting a position on these boards realizes that he is no longer a partisan but is expected to assume a judicial attitude in each and every case upon which he is called to make decision.

The following is a report of Railway Board of Adjustment No. 1 covering the period from January 1, 1919, to January 1, 1920:

In submitting this report the necessity of brevity is fully appreciated. However, the report would be incomplete were attention not directed to the latter part of the year 1918, when the work of the board was seriously handicapped by the influenza epidemic, which halted many hearings, and as a consequence the cases awaiting the consideration of the board January 1, 1919, were substantially augmented.

The cases from the Oregon-Washington Railroad & Navigation Co. (129 in number) being the first on the docket, the entire month of January was devoted to the controversies from this line.

The month of March and part of April were entirely consumed by the submission of 226 cases from the Denver & Rio Grande, which did not include 14 cases submitted later and decided in the month of August, nor 4 other cases that had been decided by the board prior to this time. The month of April was, to a great extent, spent in discussing the question of "payment for overtime at the rate of time and one-half" in accordance with special direction of the director general.

An adjournment of the board during the month of May was necessitated by triennial conventions of two organizations. As a result of these extraordinary conditions there was an accumulation of 511 cases June 1, 1919. However, the board proceeded to hold night sessions and work many Sundays, which increased the output of decisions to a general average since June 1 of 108 per month without an increase of operating cost.

Since the board was organized there have been submitted to it, under General Order No. 13, 1,657 cases and under General Order No. 27, 84 cases. The board has rendered 1,497 decisions under General Order No. 13 and 79 decisions under General Order No. 27, making a grand total of 1,576 cases decided to date. In addition thereto, the board has been requested to act as a board of arbitration on four cases, all of which have been passed on.

The total number of cases on hand at the close of the year is only 166. The board should be able to dispose of a majority of these cases in January and currently each month thereafter.

The following is a report of Railway Board of Adjustment No. 2, covering the period from January 1, 1919, to December 31, 1919:

From January 1 to July 1 E. F. Potter was chairman of the board and George W. Pring vice chairman. At the first meeting held in July, in accordance with the rules governing the board, George W. Pring succeeded Mr. Potter as chairman, and R. J. Turnbull was elected vice chairman.

The board has been in session 252 days since January 1, 1919, up to December 31, 1919, showing an average of four

and one-half controversies passed upon at each of its meetings.

There have been six hearings held during the past year on controversies presented by the railroads and organizations, and while there have been other requests for hearings, the board has felt that the information contained in the con-

REPORT ON BOARD OF ADJUSTMENT NO. 2

This Board had on hand as of January 1, 1919, unfinished controversies	32
From January 1 to December 31, cases received	1,217
Total	1,249
Decisions rendered on controversies	1,141
Controversies returned to the Division of Labor for transmission to Railway Board of Adjustment No. 3, as the controversies did not come under the jurisdiction of this Board	20
Cases canceled, due to contending parties arriving at settlement themselves	6
Cases canceled, due to improper rendering of statements, and on request of both parties to the controversy	3
Controversies returned account dispute not being under jurisdiction of any Board of Adjustment	1
Controversies returned to the Division of Labor for adjustment	4
Controversies returned account duplication	2
Total	1,177
Leaving controversies on hand	72

troversies and additional information obtained through correspondence with the railroad and organization officials was sufficient to enable it to act without incurring the additional expense and time which would be needed to carry on a hearing. This action was in line with the instructions laid down for the board in General Order No. 29.

The following is a report of Railway Board of Adjustment No. 3, covering the period from January 1, 1919, to December 31, 1919:

DISPOSITION OF REGULAR DOCKETS

Decisions rendered—	
Clerks	73
Maintenance of way employees	25
Switchmen	2
Telegraphers	308
Board of Adjustment No. 2, concurred in	3
	411
Returned to Director Division of Labor—	
Clerks	1
Telegraphers	32
	33
Returned to Board of Adjustment No. 2, no jurisdiction	1

DISPOSITION OF SPECIAL DOCKETS

Decisions recommended—	
Clerks	171
Maintenance of way employees	41
Telegraphers	3
Board of Adjustment No. 2, concurred in	4
	219
Returned to Director Division of Labor—	
Clerks	12
Maintenance of way employees	1
Switchmen	1
	14
Referred to Railway Board of Adjustment No. 2—	
Maintenance of way employees	2

REGULAR DOCKETS NOW BEFORE THE BOARD

Clerks	7
Maintenance of way employees	4
Telegraphers	22
Switchmen	1
	34

SPECIAL DOCKETS NOW BEFORE THE BOARD

Clerks	28
Maintenance of way employees	3
	31

Strikes of Railway Employees During 1919

During the year 1919 a considerable number of minor strikes occurred, practically all of which were not authorized by the organizations of which the employees were members. A major proportion of these strikes were adjusted through the initiative of the Division of Labor. In some instances the representatives of this division used their good offices to bring about a final adjustment, but in other instances the activities of the representatives of the division ceased when the strikers returned to work and the original controversy was referred by mutual consent back to the officials and the employees of the various railroads to adjust.

In only one instances—that of the clerks' strike on the Nashville, Chattanooga & St. Louis Railroad — was the entire railroad involved, and this strike was entered into by the local representatives of the clerks' organization and without proper authorization of the executive officer of the Brotherhood of Railway Clerks; therefore it may properly be classed as an illegal strike. Practically all of the other strikes, except that of train service employees, principally in the vicinity of Los Angeles, were confined to terminals or local offices, and with but slight effort the men were induced to return to work when the proper method of adjusting their grievance was explained to them.

It is believed that a vast majority of these unauthorized strikes arose out of the fact that the employees at these local points did not fully understand that a proper tribunal had been created by the Railroad Administration, to which all controversies should be referred, and that equitable decisions would be reached by such tribunal.

While a large number of water-front employees are on the payroll of some railroad under federal control, controversies arising among such employees since the beginning of the world war and previous to federal control were usually adjusted through local harbor commissions, and the controversies usually affected not only the railroad employees but the employees in other industries at the same port. This difference in adjusting controversies for this class of employees made it necessary to continue, so far as possible, these local wage boards or commissions, with the result that such controversies were handled by local representatives of the Division of Operation instead of by the Division of Labor.

Public Welfare Demands Efficient Transportation

By Edgar E. Clark

Member of Interstate Commerce Commission

I AM ONE OF THOSE who are glad that private ownership and operation (of the railroads) under government regulation are to be resumed. I should regard government ownership and operation of our railroads as unfortunate and as fraught with danger under our form of government.

With the termination of the present federal control, private ownership and operation will enter upon its last trial in this country. If it fails, government ownership will inevitably follow. If it fails it will in large part be due to the fact that the public and the patrons of the roads withhold the assistance that they can and should accord.

One of the biggest of our problems and one that calls for thought and action on the highest and biggest plane is the railroad problem. We have many men of broad vision and far-reaching imagination, but it is neither derogatory of them nor extravagant to say that none of them had the conception of the resources of our country and the possibilities of production therein that, in the light of the accomplishments of the past five years, he now has.

I have said that the railroad problem is one of the biggest of our problems. Some say it is our most intricate problem, and some say that it is so intricate as to be hopeless. I concede, of course, that the problem is full of intricacies but, looking at it broadly, it seems to me that there are certain features that can be easily comprehended, and that, when comprehended aright, solve the big problem and relegate the intricacies largely to the category of details which may be entrusted to those who are charged with administration, supervision, and regulation.

As transportation is the very life blood of national safety,

*From an address before the Philadelphia Traffic Club, Philadelphia, Pa., on January 19, 1920.

of economic growth, of industrial and agricultural development, and of commercial success at home and in the markets of the world, I start with the proposition that we must have transportation agencies that are separately and in the aggregate as big and efficient as present conditions plus the expansion and growth of the immediate future demand.

Our railroads, admittedly the best and most efficient in the world, are not adequate or equal to that demand.

Inasmuch as we must have transportation agencies that are sufficient and efficient, it follows that if they are not, or can not be, provided under private ownership, they must be provided by the government.

Private capital and enterprise will not provide the transportation agencies we need and must have, unless private capital invested therein can find a reasonable reward.

The interest on capital necessary to provide transportation agencies, as well as the cost of maintaining and operating them, must be paid by the users of those agencies, or in whole or in part from the public treasury. It is, therefore, in the public interest, as well as to the interest of those who pay transportation tolls, that our transportation agencies shall furnish efficient service at the lowest cost commensurate with that service and a fair reward to those who provide it.

Inasmuch as the public must pay for the capital invested in transportation facilities, the public is interested in having those facilities employed in the most effective and economical way. It has a right to demand that the carriers, to the extent of their ability, shall develop and maintain that kind of use of the facilities. It has also the duty to assist in that development and maintenance by arranging its demands for and use of the facilities with a recognition of the rights of the carriers, the public, and others who wish to secure transportation.

The interest upon the purchase price of a freight car works while the freight car lies idle. If the carriers were to have tracks, terminals and equipment sufficient to meet at any time the maximum demand that might be made upon them, it is certain that large portions of those facilities would lie idle a substantial part of each year and often for the major part of each year or for several consecutive years. The interest on the investment and depreciation of the facilities, nevertheless, would accrue, day by day and year by year, with no holidays or vacations, and with no regard for the 8-hour day.

It behooves us, then, to devise and carry out plans that will provide the needed transportation with the least investment and the highest efficiency in the use of the facilties.

During the summer months of each year, our railroads have thousands of idle coal cars and hundreds of idle locomotives. The operators of coal mines are unable to market the coal that they could mine and must close down a large part of the time. Their employes are thrown into enforced idleness, with all of its attendant evils, and the organizations necessary to proper operation of the mines become seriously impaired. With the approach of cold weather comes a feverish demand for coal and this is shortly and generally followed by a car shortage. All recollection of the idleness among miners and of coal cars during the summer fades away and manufacturers, public utilities, domestic users and state institutions call loudly for cars and more cars. Not infrequently great inconvenience, loss, extra expense and suffering result.

Why is it not logical to avoid this by providing a much greater part of the winter's needs in the summer months? The railroads can transport coal at less cost in the summer than in cold weather and have in the summer an abundance of cars and power. They can, therefore, afford to haul coal at a lower rate in the summer. It is not unlikely that the coal operator can produce coal more cheaply in warm weather. At any event it is to his interest to keep his mine in operation as regularly as possible and to thus maintain his organization. It is clearly in the interest of the general good to keep the men who mine the coal more regularly employed. Why, then, should not the coal producer, and the coal dealer who can obviously handle the coal more cheaply in warm weather, sell coal at a lower price during the summer months?

If the coal dealer sells at a lower price and the railroad transports at a lower rate from say April 1 to September 15 each year, why should the consumer not be glad to take advantage of that opportunity to provide a substantial part of his winter's supply during that period? The reduction in price and freight would largely, at least, compensate him for the investment and the extra expense of providing storage, and he would avoid the risk, trouble, anxiety and annoyance of shortage or impending shortage in the winter. The railroads, the operators, the dealers and the consumers would have made a large contribution to the general welfare and none of them would have made a serious or undue sacrifice. If this plan could be fairly tried for five years I believe that it would be a success and that no one would wish to abandon it.

The statement that bituminous coal can not safely be stored for a few months is effectively answered, and disproved, by pointing to the fact that millions of tons of it are transported each summer via the Great Lakes and distributed from enormous storage docks at west bank Lake Michigan ports and at the head of the lakes.

A constantly and rapidly increasing part of the traffic of our country demands the use of refrigerator cars. The crops upon which important sections rely must be moved in refrigerators and must move within a few weeks. Why should we not have, under a common ownership, administered by a joint or common agency, a mobile supply of refrigerator cars that would insure an adequate supply at the various seasons of the year to the several sections where they are needed, and that could thus be employed practically all of the time?

I repeat, gentlemen, that the country's walfare demands adequate and efficient transportation. The public must, and I believe is willing to, pay reasonably for that kind of service. In many particulars the railroad is largely at the mercy of those who employ it. In other particulars the shippers are largely at the mercy of the railroads. The railroads and their patrons have interests that are in many ways in common. Disregard of this fact and action or expression based on pure selfishness have done much to create and promote misunderstanding and friction, both of which could be avoided if each would have in mind the rights and interests of the other and endeavor to promote and foster their common interests. The railroad must have the good will of the public that it serves if it is to attain the highest measure of success. The best way to secure and hold that good will is to deal frankly and openly with the public, taking it into confidence, as it were, and appeal to its sense of reason and fair play. There must be less of long-range firing back and forth and more of conferences around the peace table. The dark days of war have shown us a splendid spirit on part of the shippers generally. They responded cheerfully to requests that they load cars to capacity, that they promptly load and unload cars used by them and that they accept delivery of freight at places other than, and less convenient to them, than the usual places. It is true that we were all spurred on then by the determination to win the war and a realization of the commanding part our railroads must play in that effort.

I accord full credit to each and everyone who contributed in personal service, money, effort or patriotic words and thoughts to the winning of the war and the saving of the institutions upon which our government is founded and which are so dear to all true Americans. But if we can unite our wills and our determination, and marshal our best

thoughts and efforts, to save the country in time of war, why can we not likewise unite our wills and marshal our efforts to save the country in time of peace, whether the danger be from insidious teachings of enmity to government, or from evil economic or industrial influences that, because of lethargy, indolence or indifference on our part, cause irreparable rust and decay?

Gentlemen, I enter my subscription to the fund of common good from earnest and helpful co-operative effort, and I solicit your contributions.

Report of the Central Coal Committee

STEPS TAKEN BY THE GOVERNMENT to meet the coal shortage arising from the recent coal strike and the results obtained are outlined in the report of H. B. Spencer, chairman of the Central Coal Committee of the Railroad Administration, to Director General Hines. The Central Coal Committee had full charge of the distribution of bituminous coal during the strike situation; by order of United States Fuel Administrator Harry A. Garfield it was vested with the full powers of the Fuel Administration under the Lever food and fuel control act and executive orders of the President for the control and distribution of coal.

In giving out the report of the committee, Director General Hines said:

"I wish to express my appreciation of the faithful work which was done by the Central Coal Committee, the regional coal committees and the various local coal committees. Suddenly confronted with an unprecedented and nation-wide fuel problem growing out of the coal strike, these gentlemen devoted themselves unreservedly to the task of ascertaining the needs of the various parts of the country, devising ways to meet those needs, handling the infinity of complex questions that speedily arose and expediting methods for securing payment for the coal produced. They had the hearty co-operation of the United States Fuel Administration, of the United States Shipping Board and of the Division of Operation of the Railroad Administration, of other officers of the Railroad Administration and of the regional organizations as well as the local railroad organizations in the transportation of the extraordinary amounts of coal which had to be carried from Pennsylvania and West Virginia to new and distant destinations. Considering the great possibilities for public alarm and public inconvenience and suffering growing out of the most destructive strike the country had ever known, I feel that the results achieved by these coal committees in conjunction with the railroad operating officers constitute a public service of great importance."

Summarizing the results of the committee's work during the strike period, the report said:

"The available coal was so distributed during the period of the strike that the emergency needs of all essential consumers were amply provided for. In the Central and Southwestern regions and the western part of the Northwestern region, where consumers' stocks were very small at the beginning of the strike, difficulties were experienced in getting coal to them, but these difficulties were overcome, and while some non-essential industries in these particular territories were forced to close, some partially and some entirely, during the latter part of the strike period, there was no general suspension of manufacturing and no actual suffering for the want of fuel.

"In the eastern part of the country, where consumers' stocks were generally larger at the beginning of the strike, the shortage was not felt so soon, and it was not until nearly the close of the strike period that any industries in this section were forced to close down, and then only in isolated cases.

"Adequate publicity was given to the arrangements made by the Railroad Administration to provide coal for the needs of the essential consumers, and all of the railroads as well as the various coal committees received and acted on applications promptly."

Previous to the strike, the report said, the railroads had been ordered to accumulate a 30-day supply of coal, either by purchase or by holding commercial coal en route. On October 31 the director general ordered all railroads under federal control to hold subject to his orders all bituminous and lignite coal then on wheels or thereafter to be loaded. Concurrently with these orders, orders were issued vesting the Central Coal Committee with authority for coal distribution, creating regional coal committees representing the Railroad Administration and the Fuel Administration jointly in each railroad region, and re-establishing the priority list for coal distribution which had been fixed by the Fuel Administration during the war.

Discussing the coal supply available for distribution during the strike period, the report said: "There was available for distribution by the Fuel Administration through the agency of the Railroad Administration, including the entire supply of railroad coal both on cars and in storage and current mine production during the period November 1 to December 13, approximately 46,239,550 tons of coal. Of this quantity 24,292,950 tons were loaded on cars at the mines during this period, equivalent to 36 per cent of the estimated normal loading during the same length of time. The daily loading varied from a minimum of 17 per cent of normal to a maximum of 45 per cent. By far the larger part of the production was secured from the non-union fields of the Pocahontas, Allegheny and Southern regions.

"In the total of approximately 21,946,000 tons of coal on hand and available for distribution on November 1, the railroads had 10,946,585 tons of coal which belonged to them, representing approximately 26 days' supply based on their normal consumption."

The railroad fuel supply on hand varied from 71 days' supply in the New England region to 6 days' supply in the Pocahontas region.

"By a prompt survey made in anticipation of the strike," the report continued, "it was found that the number of days' railroad supply on hand in various parts of the country reflected with a considerable degree of accuracy the situation of other consumers in the same territory. The territory in the northwest, supplied with coal from upper lake docks, was assured of its winter supply, as its dock storage program was complete before the close of lake navigation.

"The total coal in possession of the railroads November 1, including commercial and railroad fuel, represented approximately two weeks' supply for all consumers in the country. The production during the strike period was equivalent only to the requirements of the first five classes on the fuel administrator's priority list, leaving no coal available out of current production to supply industries whose operations could not be classed as essential for the immediate needs of this country.

"Throughout the strike there was practically no production in the large producing field known as the central competitive district, including western Pennsylvania, Ohio, Indiana and Illinois. Consumers in that part of the country having relied on their proximity to the mines insuring their regular supply, had generally very small reserve stocks, which in many instances were soon exhausted. A similar situation existed in the middle west, particularly in Iowa, Nebraska, Missouri, Kansas and Oklahoma.

"The problem presented to the coal committees was therefore to secure the most equitable distribution in all sections of the country of the current production among essential consumers, as their stocks were depleted, conserving to the great-

est possible extent the reserve supply in possession of the railroads at the beginning of the strike.

"The transportation west of the large quantity of coal produced in the Pocahontas region and the eastern mining districts of the Allegheny region, the greater part of which would normally have been used in the east, involved considerable realinement of transportation, as existing railroad facilities were not designed for a westbound movement of this magnitude. On December 15 the reserve supply in possession of the railroads had been reduced to 10,692,400 tons—only about one week's supply for all consumers in the country.

"With reasonably accurate knowledge as to the stocks in each region and the current production, it was possible to allocate the coal available so that the emergency requirements of all consumers except manufacturers of non-essentials were provided for."

The report described the movement of large quantities of coal from the Pocahontas and Allegheny regions to Memphis, St. Louis, Chicago and points farther west, which developed until, by the termination of the strike, approximately 4,000 cars of coal per day, about 40 per cent of the total output of the Pocahontas and Allegheny regions, were being moved in this way from extreme east to extreme west. Ohio and Indiana were also supplied from the Allegheny and Pocahontas regions by rail, the movement reaching a total of 1,340 cars per day. The large stocks on hand in New England permitted the limitation of shipments to New England to the movement through Pocahontas and Allegheny district tidewater ports.

The Southwestern region was supplied with 15,097 cars from the Pocahontas region by way of Memphis and St. Louis during the strike period. A shortage of bunker coal at Gulf ports and the need for railroad fuel there led to the shipment of Pocahontas coal by tidewater from Hampton Roads to Galveston, for which movement the Shipping Board furnished tonnage.

The Central Western region requisitioned 21,076 cars of eastern coal during the strike period, and the Northwestern region received during the emergency 22,413 cars of eastern coal. Coal stocks in the upper lake docks, the report said, were confined practically to the normal lake dock consumers. Canada, according to the report, was supplied with 150 cars of eastern coal a day, which was distributed by the Canadian fuel administrator.

Discussing the conservation measures adopted and the restrictions placed on coal deliveries, the report said:

"The actual emergency needs of all consumers of bituminous coal were supplied as long as the available supply in the various sections of the country permitted. As the reserve supply in the hands of the railroads was reduced and the need in the respective regions increased, the regional committees, working with the state, county, and city officials and with business and other similar organizations in the various communities, placed such restrictions on the furnishing of coal by the railroads to consumers not in the essential classes as was necessary to assure an adequate supply for consumers in the first five classes on the fuel administrator's priority list for as long a time as practicable. General restrictions placed in accordance with instructions issued by the Central Coal Committee were universally and cheerfully complied with.

"The tidewater export embargo," the report said, "was and is still being maintained and will be until the needs of consumers in this country have been properly safeguarded.

"While coal was moved expeditiously to all points, there was nevertheless an unavoidable delay in getting it to the ultimate consumer, which resulted in apprehension on the part of the shipper that notices would be received too late for them to render bills to the divertee and secure payment within the same period that was ordinarily their trade custom. There is every indication that the operators were promptly paid and those whose financial needs were acute received special consideration, in many cases by the railroads taking coal from their mines as it was produced and paying for it instantly.

"The Railroad Administration also endeavored in every way that could be thought of to work out a plan by which the shipper might receive payment for his coal when it was shipped, and to extend or help his credit so as to enable him to borrow money on his coal which was held or diverted. Insuperable obstacles were encountered, and there was no other course than to expedite by every means at command the bringing of the shipper into communication with the divertee so that his invoice might be put promptly into the hands of the party who must pay it."

Orders of the Regional Directors

Conservation of Grain Cars.—The Northwestern regional director, file 20-1-374, calls for particular attention to be given to increasing the supply of cars for grain loading, especially corn from country stations and grain from terminal markets where the movement is not restricted by embargoes. Particular attention should be given to localities where, because of lack of storage or the bad condition of corn, the emergency is more acute. Positive instructions should be issued that will insure that cars suitable for grain are not loaded away from grain territory.

Cars for Fertilizer.—Freight Car Distribution Notice 26 of the Northwestern regional director quotes instructions from W. C. Kendall, manager of the Car Service Section, to the effect that the movement of fertilizers, including agricultural lime, having already begun, and dealers and farmers having been impressed with the importance of unloading promptly, it is imperative that cars be supplied as called for, without delay.

Freight Claims.—Time limit, Supplement 3 to Circular 84 of the Northwestern regional director contains modifications of the provisions of Supplement 2 to Circular 84 regarding the two-year and one-day limitation in the conditions of the bill of lading. The Interstate Commerce Commission having held that the limitation in the bill of lading does not prohibit the payment after two years and one day of meritorious claims if seasonably filed, claims on account of shipments moving prior to federal control, if filed within the period prescribed in the bill of lading, should be paid or declined on their merits, provided that, in every case, the consent of the corporation to such payment is first obtained. Until further notice, claims on account of shipments moving during federal control, if filled within the period prescribed in the bill of lading, should be adjusted on their merits, notwithstanding the two year and one day clause in the bill of lading.

Export Bills of Lading.—Supplement 8, canceling Supplement 7 to Circular 282 of the Central Western regional director, amends Paragraph 5 of the original circular by naming a list of authorized steamship lines in connection with which through export bills of lading may be issued.

Supplement 7 to Circular 252 of the Southwestern regional director contains several exceptions to Section 3 of the original circular headed "Ocean Contracts and Guarantees."

Supplement 2 to Circular 257 of the Southwestern regional director states that the notations to appear on through export bills of lading contained in Paragraph C of Section 9 of the original circular should also appear on through bills covering shipments for Antwerp.

Movements of Pulpwood.—Supplement 1 to Freight Car Distribution Notice 15 of the Northwestern regional director states that it is necessary that full car supply be provided for all shipments of pulpwood destined to manufacturers of newsprint paper.

Colorado Commission Urges Building Three Tunnels

State Bond Issue, Authorized by Popular Vote, Suggested as Means of Financing Projects

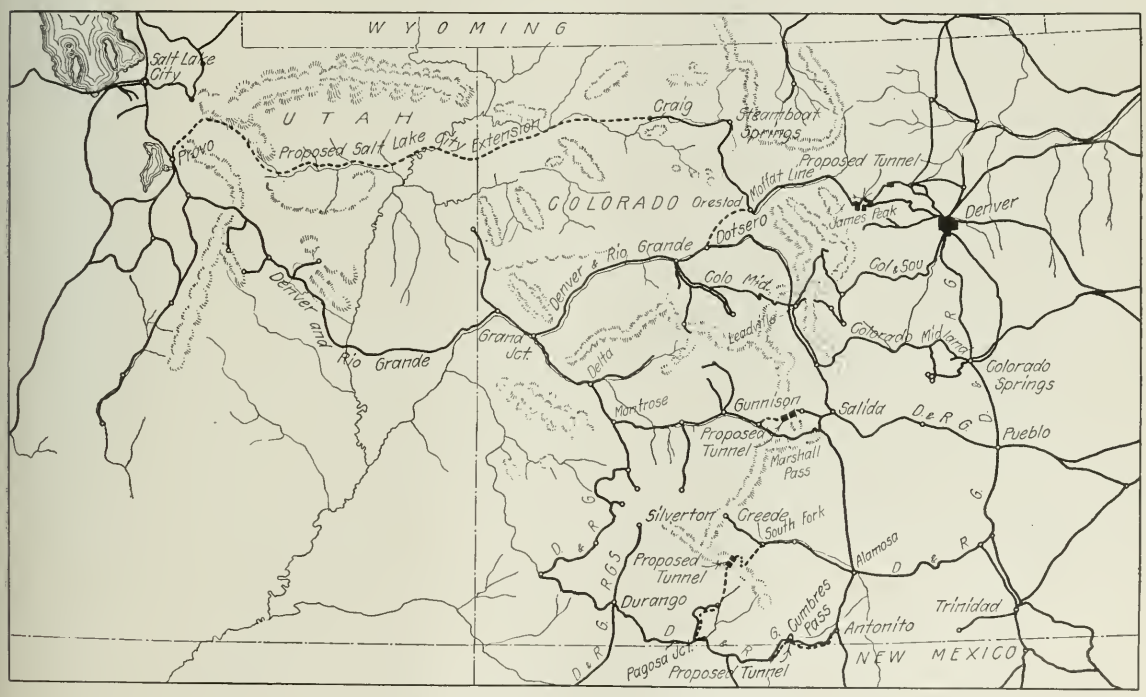
THE BUILDING of three railroad tunnels in Colorado, the Moffat tunnel, the Cumbres Pass tunnel and the Marshall Pass tunnel, by means of a state bond issue authorized by an amendment of the state constitution to be voted for by the people at the next general election, has been recommended by the State Railroad Commission of Colorado in its first annual report to Governor Oliver H. Shoup. Concerning the three projects the report of the commission says in part:

"The heavy grades and great elevations on all the railroad lines in Colorado crossing the continental divide—which traverses the central portion of the state from its northern to its southern boundaries—obstruct railroad operations by making the operation of the roads unusually slow and expensive, so that traffic, where it has been developed, naturally follows lines to the north and to the south of Colorado, where the grades are easier, and much business is thus deflected from the established commercial centers of the state.

"The members of the State Railroad Commission, charged with the duty of endeavoring to correct these conditions, have given consideration to ways to improve this poor transportation situation and have reached the conclusion that the greatest improvement in conditions would result from the building, as soon as possible, of three important railroad tunnels through the main range, at moderate elevations and at the following available sites where the range is thin: One 6.4 miles long, from the drainage basin of the Platte to the drainage basin of the Grand river, near the line of the Denver & Salt Lake (Moffat Road) at James Peak, at an elevation of 9,100 ft.; one 6 miles long, from the drainage basin of the Arkansas to the drainage basin of the Gunnison river, near Marshall Pass, at an elevation of about 9,500 ft.; and a shorter one near Cumbres Pass, from the drainage basin of the Rio Grande to the drainage basin of the San Juan river. If these tunnels were constructed the grades on the main lines of the east-and-west railroads in Colorado (now having maximum grades of from three to four per cent, excessively expensive to operate) could soon be reduced to a maximum of two per cent—a moderate gradient found in places upon most of the heavy traffic transcontinental railroads in this country—and the tunnel portals would be located in forested areas where no extraordinary snow conditions would need to be combated in the winter time.

"The commission has reached the conclusion that the construction of these three main range tunnels is feasible, that the annual expenditure necessary for and during their construction would be a moderate sum, and that their construction and use on terms providing reasonable compensation to the builders would be of great value to the railroads; that it will require approximately four years after work upon them is begun to construct the longer ones; and that their construction would quickly solve the greatest difficulties now embarrassing the Colorado transportation situation.

"The commission is of the opinion that the construction of these tunnels is a matter of great public concern, and that their construction should be undertaken by the state of Colorado after securing from the railroads which would use them enforceable contracts for their use on terms reasonably re-



Map Showing Location of Tunnels

munerative to the state. If these constructions, needed in the public interest, are to be carried on without delay, we believe that in all probability the work will have to be done by the use of public credit. The properties of the railroads which would use these tunnels are now in the hands of the courts under receivership proceedings, and their operation and maintenance are being carried on by the federal government. No definite proposals for payment for the use of the proposed tunnels have been secured from their probable owners. However, since the construction of the proposed tunnels would result in vastly improved and cheapened operating conditions for these roads, as well as in great advantage to the people of the state common sense would lead to the conclusion that arrangements can be made—if the state proposes to build them—for the use of the tunnels by the railroads on terms which will pay interest on their cost and provide a sinking fund to discharge, within a reasonable term of years, the principal of the bonds issued to build them—whether the railroads continue in receiverships or continue to be owned by corporations, or come to be owned by the federal government.

"It has been customary with courts, when railroad properties have come into the hands of court receivers, to authorize the issue and sale of receivers' certificates when necessary to provide money required for their preservation and conduct, such certificates being generally a first lien upon the properties on account of which they are issued. It seems not unreasonable to assume that in the case of the Colorado railroads which would use the proposed tunnels, which are shown to be necessary to their proper operation and preservation, the execution by the receivers of contracts between the railroads and the state for their use and for securing their prompt construction by public authority might properly be authorized and ordered by the courts in which the properties rest under receivers, without delay and under fair agreements which would be binding upon the railroad properties when the receiverships are concluded.

"If these tunnels are now to be built by the state of Colorado an initiated amendment to the state constitution, authorizing the State Railroad Commission to build them, providing for a bond issue necessary to defray their cost and specifying terms of their construction and the terms of contracts for their use by the railroads, should be submitted to the voters of the state for approval at the next general election."

Just how these tunnels could be constructed by the people of Colorado, in other words, the legal method of procedure for accomplishing the desired result, is outlined in a statement by Herbert S. Hadley, counsel for the commission. This statement is included in the report of the commission to Governor Shoup.

Description of the Projects

Major L. D. Blauvelt, consulting engineer of the commission, is the author of a map and a detailed report of the proposed tunnels which contain a more adequate description of the projects. Major Blauvelt's contribution to the report is substantially as follows:

"From a glance at the accompanying map one may see the railroad situation as at present existing in western Colorado. The northwest, middle west and southwestern territory is penetrated and served by four operating lines of railroads, two of which are narrow gage. All have grades of 3 per cent and over, and three have grades of 4 per cent, each wending its circuitous way to the summit of the Rocky Mountains. In no case is this summit less than an elevation of 10,000 ft. above sea level, and in one instance as high as 11,660 ft. Climatic conditions at these altitudes during the greater part of the year are such as to render rail transportation intermittent, unreliable and a source of anxiety and excessive expense to both railroads and shippers alike.

"These adverse transportation conditions can be relieved, the excessive grades and curvatures reduced and the very severe climatic conditions eliminated by the construction of tunnels piercing the granite rocks of the mountain ranges below the present summits, over which the railroads pass. The location of the roads at the lower elevations within forest areas affords to a greater degree protection from the severe blizzards of the higher altitudes.

"Fortunately, not far from the existing railroads crossing the mountains into western Colorado there are places at comparatively low elevations where the topography is such as to afford desirable locations for tunnels of not excessive length and in close proximity to the existing lines of railroads. These tunnels would be so located that with construction of reasonably short connecting lines to the present operated lines of railroads they will serve and form a part of the existing railroads.

Northwestern Colorado

"This extensive and but partially developed territory is served by the Denver & Salt Lake (Moffat Road), located approximately midway between the Union Pacific on the north and the Denver & Rio Grande on the south, with its present western terminus at Craig, Colo., about 100 miles east of the Colorado-Utah boundary. As originally planned, it was to have been a connecting link in the great system of transcontinental railroads, and its construction was in keeping with up-to-date, first-class railroad practices; grades limited to 2 per cent, maximum curvature of 10 deg., and contemplated tunneling of the continental divide.

"It is needless to refer herein to the causes that led to the postponement of the tunnel construction, and in lieu thereof the expedient was adopted of building a temporary line over the summit of the continental divide with 4 per cent grades and 16 deg. curves. A large portion of this temporary line is above timber line and exposed to the most severe weather conditions of any of the Colorado railroads, resulting in conditions during the winter months that often are prohibitive to successful or dependable operation.

"The future development of the resources of the state tributary to this railroad is dependent upon improved transportation facilities, and without the construction of a tunnel avoiding the heavy grades and the high crossing of the continental divide the Moffat Road has practically reached the limit of its carrying capacity.

"Extensive surveys have been made from time to time to determine the best location for a tunnel through the continental divide to relieve the existing operating conditions of the railroad via the 4 per cent temporary line over Corona Summit, resulting in the location of a 6.4 mile tunnel at an elevation of 9,100 ft. above sea level, with its eastern portal on the South Boulder watershed near Newcomb, Colo., a distance of 0.6 mile from Moffat Road and with its west portal on the Fraser river watershed two miles from the station of Vasquez, Colo. These surveys have determined the selected tunnel site to be the only one that exists at as low an elevation of 9,100 ft. directly west of Denver and for many miles north or south of the Moffat Road.

"The construction of this tunnel would eliminate all of the 4 per cent grades and the 16 deg. curves of the Moffat Road. It would save 2,500 ft. of rise and fall, some 8,000 deg. of curvature, and no portion of the road would be near timber line, avoiding severe snow conditions and shortening the line 23½ miles as compared with the present operating line.

"With the assurance of the construction of a 6.4-mile tunnel, securing dependable transportation facilities, the development of the resources of the 10,000 sq. miles of territory tributary to the Moffat Road would be assured, operating conditions for the railroad would be on a par, if not more

favorable, than any other railroad in the state, and the toll that the railroad could pay for the use of the tunnel would be more than sufficient to cover interest charges on the cost of construction and provide a reserve for the retirement of the bonds issued for the tunnel construction.

"As a further aid to the development of northwestern and middlewestern Colorado, consideration should be given to the construction of 42 miles of standard gage railroad from Orestod, Colo., on the line of the Denver & Salt Lake, 127 miles via the tunnel from Denver, following the valley of the Grand River westerly to Dotsero, Colo., a station on the Denver & Rio Grande, 343 miles from Denver.

"Surveys were made of this route under the writer's direction in 1913, and it was demonstrated that a practical line could be constructed without serious physical difficulties, securing a maximum gradient of ¾ per cent and 8 deg. maximum curves. Such construction would save 173 miles in the haulage of freight destined to Denver and points northeast and originating at points west of Dotsero. The same saving is applicable to freight originating in Denver and east and destined to Dotsero and west if routed via the Denver & Salt Lake. The saving in time to the shippers of the Grand valley on transportaiton of perishable freight and livestock would be an incentive to increase a profitable exporting of fruit, cattle, sheep and hogs.

Middlewestern Colorado

This territory is served by two lines of the Denver & Rio Grande, one its main line from Denver and Pueblo, Colo., to Salt Lake City, Utah, and Ogden, crossing the continental divide west of Leadville, Colo., at Tennessee Pass, and providing transportation to that portion of the "Western Slope" tributary to the Grand river valley west of Dotsero.

"The second route of narrow-gage construction branches from the main line of the Denver & Rio Grande near Salida, Colo., detours to the south and west, and by 4 per cent grades and sharp curvature climbs to the summit of the continental divide at Marshall Pass, 10,680 ft. above sea level. It then descends westerly through the towns of Gunnison, Colo., Montrose and Delta to a junction with the main line at Grand Junction, Colo.

"It is particularly the betterment of the transportation facilities, afforded in middlewestern Colorado and the adjacent country by this narrow-gage route, that your commission has under consideration. Here are to be found similar transportation difficulties to those which handicap the development of northwestern Colorado. Steep grades, excessive curvature and the severe climatic conditions encountered at the great elevations obtained in crossing the continental divide, together with the limitations of narrow-gage equipment, all combine to make railway operation costly and unsatisfactory.

"Engineering investigations show that a tunnel can be located to pierce the continental divide northerly from Marshall Pass at an elevation of 9,500 ft. above sea level and not to exceed 6 miles in length, having its eastern portal near the station for Garfield, Colo., on the Monarch branch of the Denver & Rio Grande and its western portal in the valley of the Tomichi river below the town of White Pine, Colo.

"Preliminary investigations indicate that the connecting lines from the tunnel portals to the present operated road can be constructed with grades not to exceed 2 per cent and maximum curves not over 10 deg., and with a moderate readjustment of lines. The construction of this tunnel and connecting lines would reduce the maximum curvature from 25 deg., as at present existing over Marshall Pass, to 10 deg. via the tunnel line, and the maximum grades from 4 per cent to 2 per cent, eliminate 1,300 ft. of rise and fall and avoid the serious snow conditions affecting the operation of the present narrow-gage line over Marshall Pass.

"In connection with this tunnel construction certain grade reductions and line revisions should be considered at places on the existing operated line that will afford an eastern outlet for the exports of this middlewestern territory via a low grade standard gage railroad to Pueblo and the east.

Southwestern Colorado

"Southwestern Colorado and that portion of northern New Mexico tributary and dependent on its rail outlet through Colorado is served by a branch line of the Denver & Rio Grande, being of standard gage construction from Pueblo to Antonito, Colo., then narrow gage over the continental divide at Cumbres Pass at an elevation of 10,015 ft. above sea level, then westerly to Durango, Colo., and Silverton, with a standard gage line from Durango extending to Farmington, N. M. The country west and northwest of Durango is served by the Rio Grande Southern, a narrow-gage line connecting with the Denver & Rio Grande at Durango.

"In the development of this great southwestern territory the continental divide again interposed its difficulties to economic and satisfactory railway operation. Cumbres Pass is reached at an elevation of 10,015 ft. by the introduction of 4 per cent grades and 20 deg. curvature. The climatic conditions at this point are as bad, if not more severe, than any along the main range at this altitude and, as in northwest and middlewest Colorado, the country is dependent for its development upon railroad transportation which is now unsatisfactory and inadequate.

"Surveys have demonstrated the practicability of a tunnel below Cumbres Pass of about one mile in length, and its connecting lines from either portal to the present operated line would have grades not exceeding 2 per cent. The construction of this tunnel and connecting lines would materially reduce the distance between common points east and west of the tunnel.

"With that portion of the main line standard gaged from Antonito via the proposed tunnel under Cumbres Pass to Durango, southwestern Colorado would have standard-gage railroad connections with Pueblo and markets north and east, with grades not to exceed 2 per cent, other than about 23 miles of 2½ per cent and 3 per cent approaching La Veta Pass.

"An alternate tunnel location avoiding Cumbres Pass and tunneling continental divide south of the station of South Fork, Colo., on the standard gage Creede branch of the Denver & Rio Grande, is practical. This tunnel would be approximately 1½ miles long, and the lines of approach to either portal would connect the Creede branch from a point near South Fork with the narrow-gage railroad west of Cumbres Pass near Pagosa Junction, Colo.

"Pending further engineering investigations to determine the relative cost of construction and the operating advantages of the two lines under consideration, it is questionable as to which tunnel should be adopted, but the construction of either would fulfill the requirements necessary to afford greatly improved and much needed rail transportation to southwestern Colorado.

"It is not practical without further engineering investigations to prepare a detailed estimate of the cost of the proposed tunnels. My knowledge of the situation and of conditions now existing warrant the conclusion that if the construction of the tunnels were begun, to be completed within about three and one-half years, the cost would not be excessive compared with what it would have been if undertaken five years ago.

"There are no difficult foreseen obstacles to overcome in the construction of the longer tunnels. The locations of all the proposed tunnels are adjacent to operated lines of railroad, affording transportation for labor, machinery and supplies.

Supervisory Officials Object to Being Unionized

WASHINGTON, D. C.

A COMMITTEE representing the Grand Order of Supervisors of Railroads is in Washington trying to defeat a provision of the Cummins railroad bill offered as an amendment while the bill was in the Senate, by Senator Spencer of Missouri, which, they believe, would tend to "unionize" the subordinate railroad officers and align them with the labor organizations of the employees instead of treating them as members of the official family.

The Spencer amendment provides for the creation of a special board of adjustment, similar to those provided for various classes of employees, to have jurisdiction over controversies respecting wages and working conditions of subordinate officials in case of differences between subordinate officials and the companies which are not adjusted with the executive officers. Subordinate officials are defined in the bill to mean "those heretofore classified as such by the United States Railroad Administration, and such other classes as may be so designated by the (transportation) board."

It is understood that Senator Spencer offered his amendment at the request of three organizations representing train despatchers, yardmasters and car and locomotive foremen, and was led to believe that it represented the general desire of supervising or subordinate officials to have a board at Washington to handle their grievances. While the organizations named seem to have come to the conclusion that labor union methods would be more advantageous to them, than their classification as officers, the Grand Order of Supervisors has undertaken to show the conferees that large numbers of supervising officials do not share in that belief. They assert that they should not be treated as labor organizations, and that the creation of the proposed board would tend to separate their interests from those of their companies, and of other officers; particularly as the Railroad Administration has not made any classification of subordinate officials, and under the terms of the bill it would be entirely uncertain which classes of officials would be included. The Railroad Administration has designated certain classes as officers, thereby drawing a line between classes of officials.

The Grand Order of Supervisors of Railroads, of which T. M. McGurty of the Pennsylvania, is president, with headquarters at Columbus, Ohio, includes in its membership train masters, assistant train masters, general yard masters, yard masters, assistant yard masters, terminal and junction agents, traveling auditors, claim adjusters, assistants to all operating officers, master mechanics, general foremen, foremen, assistant foremen, gang foremen, mechanical department piece work inspectors, supervisors of store rooms and accounting departments, supervisors of relief department, supervisors of signals, supervisors of freight and passenger departments, supervisors of shops, supervisors of car repairs, master car builders, supervisors of wrecking department, supervisors of bridges and buildings, supervisors of electrical department, supervisors of safety department and supervisors of mechanical drafting department, on 56 different railroads. Its constitution contains an anti-strike clause. It declares that it is voicing the sentiment of all of its members, and it is sure that it states that of 95 per cent of all supervising officials in protesting against the Spencer amendment. The reasons for objecting to it are stated in Mr. McGurty's letter of protest as follows:

"The Railroad Administration under government control has not in any way attempted to separate any officer or officials of the railroad, but on the contrary, has kept them intact. Their latest instructions to the regional directors, dated December 8, 1919, specifically mention that the supervisors, such as general foremen, round house foremen, departmental foremen and assistants will be classified as officers, and given the same consideration as officers in other departments.

"To draw any line of demarcation in the rank of supervisors or supervising officers in any department other than provided for in the original bill, would break down and absolutely destroy efficiency.

"We know that this amendment would automatically place us in the same ranks with the other employees now affiliated with and controlled by the A. F. of L., which is undesirable at any time, and particularly at this time, for the reason that all concerted efforts must be centered to stabilize the general unrest now among railroad employees.

"It will be readily seen how discipline would be destroyed by placing subordinate officials and officials in the position that this amendment would necessarily do, if it was enacted into the statute, for the reason that confidence would be impaired by separating the close relations necessary in carrying out instructions for the maximum production.

"The so-called national agreements between the boards now existing have kept our class of employees separate from the labor organizations, and have wisely done so, while the special board provided for in this amendment would be detrimental rather than beneficial to the public, the railroads and the supervisors.

"Our experience as practical supervisors has proven to us that the boards created under federal control have done much to break down this relationship between officers and employees. From this experience it is our knowledge that the special board created in the amendment will break down the relationship now existing among the officers

"As railroad officers, we feel confident that we can adjust more satisfactorily any difference in the family than we can by separating the family and take the grievances to any board or committee outside."

"We had," said Mr. McGurty, "a very interesting and instructive conversation with Senator Spencer, who advises us that his object in fathering this amendment was as follows:

"That he was led to believe that it was the general desire of the supervising officers or subordinate officials to have a board of this kind and that he believed at the time it would be best for all concerned. However, his information was gathered without general investigation, for the reason that the question came up suddenly.

"He gave us considerable time and consideration, and advised that if we could secure the majority of the officers of the respective so-called sub official organizations, that he would gladly suggest the amendment be given no consideration. This we considered a very fair proposition. However, we know we cannot secure this, for the reason that the leaders of the train despatchers, yard masters and mechanical foremen associations, who were the men who solicited and urged him for this amendment, are men who have always affiliated with the labor unions and are now affiliated with them as individuals. Consequently, their sentiments are thoroughly in accord with the labor union practices, and are more concerned about the welfare of the labor organizations rather than in the efficiency of our railroads or the welfare of the public generally. For example, during the last strike of shop employees on the railroads last August, the leaders of the latter organization issued instructions that their members should not perform any services to keep the railroad trains in operation, the results of which were that the public suffered."

GRADE CROSSING ACCIDENTS, as reported by the Steam railroads in Wisconsin to the Wisconsin State Railroad Commission numbered, in the last quarter of 1919, 33. The reports show that 15 persons were killed and 55 injured. Of the total number reported, 23 were accidents involving automobiles, in which 14 were killed and 20 injured.

Annual Report of Regional Director Hardin

Indicates Gradual Return to Normal Railroad Operating Conditions and Growth of Export Trade

A GRADUAL RETURN to normal railroad operating conditions following the end of war-time transportation demands, and a continued growth in export freight business were indicated in the annual report of A. T. Hardin, regional director of the eastern region to Director General Hines.

"Conditions were unsettled at the beginning of the year," the report said, "Due to the sudden stopping of traffic in war materials, with consequent falling off in freight business, the readjustment of business from a war to a peace basis, the large number of experienced employees who had left to enter the government service and other war activities and whose places had been filled by inexperienced employees, and the lowered condition of freight and passenger equipment due to continuous service during the strain of the war period.

"All of the roads have been in a position to handle a larger volume of traffic than offered, there having been a marked and cumulative falling off in freight business following the armistice and continuing until March, since which time there has been a gradual and continuous increase, although below the volume of the corresponding months in 1916. Passenger traffic has been heavy, each month showing an increase over the same month of 1917 and 1918, and since April a steady increase in volume. The decreased traffic was handled promptly and without interruption during the year, except for minor temporary accumulations."

Figures included in the report showed that following a decrease in February of 15.9 per cent in the net ton miles of freight handled as compared with February, 1918, the traffic in March dropped still further until it was 32.8 percent below the 1918 figures, the freight situation gradually improved until in October the net ton miles handled was only 4.5 less than the figure for October, 1918. Passenger traffic maintained a steady increase over 1918 figures throughout the year.

In export freight the eastern region railroads handled more than twice as much traffic as was handled by the roads during 1913 or 1914 and 7.2 percent more than was handled in the record year of 1918.

The increase in export freight traffic, the report explained, was handled in spite of three different strikes of marine workers and boatmen in New York harbor during the year. The report outlined the steps taken to meet the situations which grew out of these labor disturbances, and pointed out that the congestion in and about New York harbor made it necessary to re-route freight by all rail routes to New England.

"To meet the falling off in traffic, forces were reduced and retrenchment of expenditures effected wherever practicable. Among the measures of economy adopted were the reduction to a minimum of Sunday and holiday work, particularly at interchange points and where conditions permitted a reduction in the number of hours of operation at terminals, yards, stations, shops and engine-houses; alternate day local forces and branch line freight service and consolidation and unification of facilities and forces wherever practicable."

The report asserted that a campaign for fuel economy had saved about $9,200,000 for the eastern region lines and that an additional saving of $7,955,000 had been made by consolidating operations at various terminal points. The report listed various traffic changes designed to effect economies and said:

"The total amount saved by these various reductions and economies it is not practicable to estimate. It has of course been necessary to restore forces and service with the gradual increase in business since March, but this has been done only as the necessities required it in order that prompt and efficient service might be rendered at all times."

"The return to more nearly normal conditions of traffic," the report said, "Has resulted in the percentage of loaded to total car miles increasing from 64.3 percent in December, 1918, to 71.2 percent in August, and 71 percent in September. In October the showing was not so good, declining to 69.4 percent, ascribable to the heavy movement of empty coal cars to the mines for loading in anticipation of the miners' strike."

The report set forth that freight claims in the Eastern region are now being adjusted more promptly "and probably with less friction with the public than ever before." Claims unsettled on December 1, 1919, were 115,000, as against 333,418 on December 31,1918, and 362,480 on December 31, 1917. The roads paid out in 1919, however, $36,000,000 on account of loss and damage, as against $17,110,634 in 1918, and $10,261,160 in 1917.

"The number of claims on hand unadjusted on December 1, 1919, was less than the number presented monthly," the report said, "the average claim now being settled in thirty days. Special efforts have been concentrated on claims over four months old, the number of such claims being reduced very materially during the year. The increases in the amount of claims paid is in large measure due to the increased value of the property transported, the unsettled labor conditions incident to the war and to increased activity in the settlement of claims which has resulted in the final charging off in 1919 of a considerable number of claims on 1917 and 1918 business which accumulated during the war."

The report explained in detail the steps taken to prevent damage claims, and the precautions taken to cut down the increase in loss and damage charged to theft.

The report outlined the difficulties confronting the roads in the work of maintenance and repairs, and said: "Speaking in general and with the exception of the shortage in the amount of major materials used, the roads in the region as a whole have been reasonably well maintained. In some instances a material shortage of labor has made it very difficult to carry out the maintenance program as made out. Where roads had apparently overexpended in 1918, every possible effort has been made to reduce the expenditures during the latter part of the year to the actual necessity from the standpoint of safety in operation. On the other hand, where roads underexpended in 1918 and a material increase in the maintenance budget was necessary this year in order to get the road back in as good condition at the end of the year as of January 1, 1918, no reductions have been made and every effort possible has been made to carry out the necessary work. In most cases, results have been reasonably satisfactory, except where the shortage in tie-supply, rail requirements or other conditions over which we have no control, have made it impossible to apply the necessary materials."

"Over 90 per cent of all passenger trains arrived at terminals less than thirty minutes late during the eleven months to December 1.

"Passengers carried one mile by Eastern region railroads for the first nine months of 1919 were 8,530,433,185, which

is an increase of 8.2 per cent over same period of 1918 and an increase of 11.3 per cent over same period in 1917.

"There has been a heavy increase in suburban passenger traffic in and out of the larger cities due to the restricted housing conditions in the cities forcing people into the suburbs.

"The sale of railroad and sleeping car tickets at the same window has improved efficiency both in the selling of tickets and in the equal loading of Pullman cars to utilize all of the space.

"During the first ten months of the year there were handled on the Eastern region railroads 4,775 troop trains, a total of 1,037,283 train miles, carrying a total of 2,028,273 officers and men.

"For the past 25 years the practice has been for customs inspectors at frontier points, Buffalo and Detroit, to examine all hand baggage of passengers on through trains, marking or stamping same for the information of the customs officer at the opposite frontier point. This has resulted in a great annoyance and constant complaint from passengers; but it has been found impossible in the past to have the practice changed. However, the matter was again taken up early in 1919 and it has been arranged with the Treasury Department to substitute for such inspection the certificate of the conductor of the train covering any passengers boarding the train in Canada, the customs inspectors confining their attention to such passengers, leaving undisturbed the baggage of through passengers.

"Continuing the measures adopted immediately following the armistice close co-operation has been maintained with the Allied Shipping Board, the War and Navy departments, the Grain Corporation, Belgian Relief, etc., in arrangements for transportation to the seaboard of the things that were most needed, the transportation to storage or otherwise of the considerable quantities of munitions and war material no longer required abroad and in providing transportation for the prompt handling of the returning overseas forces. Close and careful study was given to the changed conditions and transportation requirements of the country incident to the transition from a war to a peace basis with a view of bringing about normal conditions on the railroads as rapidly as it could be done.

"With a view to better controlling the export situation incident to the increase in commercial export, a Delinquent Bureau was placed in operation to keep a record of the unloading of lighters; any accumulation for a consignee resulting in the refusal of further permits until relieved. Hearty co-operation was obtained from practically all of the steamship lines, consignees and export houses, as all were anxious to keep off the delinquent list. To further conserve lighterage facilities, 412 vessels were docked at railroad piers for direct loading from the piers and large quantities of provisions, flour and other freight for Belgian Relief, United States Food Administration and the Allied Governments were handled in this way. Some full cargo commercial freight was also loaded direct from piers but the possibilities of handling such shipments in this manner are more limited due to the fact that numerous steamship companies have their own docks on which they accumulate their cargoes.

"During the sugar beet loading season of 1918-19, 28,136 cars of sugar beets were loaded, being an increase of 12,700 cars or 76 per cent over previous year. There is also a heavy movement of the new crop now in progress.

"The reduction in the volume of traffic moving resulted in a surplus of freight cars; the maximum number stored being 40,700 box cars on January 16, and 49,145 open-top cars on March 3. By the end of February, however, the surplus of available box cars had been absorbed by heavy demand from automobile manufacturers and other industries in the Pittsburgh district, Michigan and the Ohio—Indiana territory making it necessary to curtail delivery of empty box cars to other regions, and to Canadian roads.

"During April the Belgian Relief Commission's shipping program was completed, approximately 900 ships having been loaded with about 5,000,000 tons of supplies, the movement having continued heavy during the months succeeding the armistice.

"During May the British ministry cleaned up practically all of the large amount of steel which it had stored on the ground adjacent to Atlantic piers during the war period and the French Government was making rapid progress in loading its steel from ground storage. A further relinquishment of shipping by the Allied Governments for commercial purposes was announced.

"With a view to having maximum storage facilities ready for the prospective unprecedented grain movement during following months, arrangements were made in conjunction with the United States Food Administration to dispose of grain on hand at rail termini over thirty days; and Grain Control Committees were appointed at all principal grain distributing centers to regulate the movement.

"The return to normal conditions has resulted in a reversal of the tendency which was noted in 1918 in that there has been a substantial increase in westbound freight traffic and a decrease in the eastbound resulting in a more evenly balanced traffic, the percentage of loaded to total car miles in September showing an increase of approximately 5 per cent over corresponding month in 1918.

"To speed up the movement of equipment through terminals and the prompt loading and unloading and release of cars by consignees, Terminal Efficiency Committees were organized at all important terminals throughout the territory in the early part of October and considerable has been done by these committees in effecting better car movement by the careful checking of yards and industry tracks and as a result of studies to expedite traffic movement through the terminals.

"In anticipation of the strike of bituminous coal miners extraordinary efforts were made to move empty coal cars to the mines in October and during the last two weeks of that month the use of open top cars was restricted largely to coal loading, with some exceptions to permit loading of ore and limestone from vessels at lake ports to release the boats for reloading lake coal, also for the loading of sand and gravel for building construction. This action resulted in a considerable increase in production of both bituminous and anthracite coal, Eastern region roads loading on October 27, 7,133 cars of bituminous coal, the heaviest production for any one day during Federal control of which we have record.

"Movement of livestock, dressed beef, provisions and other perishables from Chicago has been heavy throughout the year and reached the peak movement in October when an average of 1,281 cars per day were handled, which is the record daily movement for the period of federal control. The traffic has been handled promptly and owing to favorable weather without a delay, except labor difficulties at the Seaboard causing temporary accumulations due to the shipments forwarded after permits had been canceled and before restrictions could be made effective.

"The total number of cars of bituminous coal loaded on Eastern region roads in 1919 to November 30 was 1,089,746, a decrease of 445,448 cars, or 29 per cent compared with same period previous year. Anthracite coal loaded totaled 977,532, a decrease of 166,721 cars, or 16 per cent.

"Anthracite coal production has continued uninterruptedly during the year except for a period of about one week during September when the miners on the Delaware & Hudson Railroad went on strike and about 50 per cent of the miners

on the Delaware, Lackawanna & Western Railroad struck in sympathy; the decreased tonnage reflecting the lowered demand, as a full car supply was available at all times.

"There were 18,495 cars of automobiles loaded by Eastern Region railroads up to December 31, 1919. A representative of this office was stationed at Detroit when the car shortage occurred to apportion the car supply and regulate shipments and the situation has been taken care of to the satisfaction of shippers since, notwithstanding that at times difficulty has been met in fully supplying the demands.

"The receipts of California fruits at the Erie piers, New York City (where the bulk of this traffic is handled), for the eleven months to December 1 have totaled 21,862 cars, and is estimated for the year 25,000 cars. The best previous yearly movement was in 1917, when 17,877 cars were handled, the movement this year exceeding the best previous record by 7,123 cars, or 39 per cent.

Effective December 1, 1918, tug despatching for the Baltimore & Ohio, Central Railroad of New Jersey, Delaware, Lackawanna & Western, Erie, Lehigh Valley, New York Central, Pennsylvania and Port Reading railroads was consolidated in the office of the marine director, New York Harbor, and the tugs of these roads practically pooled, in that wherever it was possible for the tugs of one road to advantageously tow boats for other roads it was so arranged. As a result, during the months of December, 1918, and January and February, 1919, when tug boat crews were working twelve hours per day, there was a large decrease in the amount spent for the charter of privately owned tugs, which have always been used to assist in towing where railroads did not have enough steam of their own.

"Considerable interchange of lighterage equipment has also been arranged between the various railroads, and in the case of car floats especially this greatly facilitated the prompt movement of cars, as there are no privately owned car floats to be chartered in New York harbor. In order to take care of increased movement of freight for lighterage delivery, it has been necessary to charter a considerable number of privately owned lighters and scows, but the rates paid for the hire of same have been kept down to the minimum by reason of having the chartering of equipment for all roads performed by a charter master, thereby eliminating competitive bidding by one road against another, which would naturally raise the charter rates when there is a scarcity of equipment.

"The rerouting of pulp wood from the White Mountain division of the Boston & Maine Railroad to mills on the Maine Central, resulted in saving of from 53 to 93 miles' haul, depending upon the originating stations.

"There has continued during 1919 the arrangements put in effect last year for the handling in solid trains of livestock, fresh meats, poultry and other perishable freight from Chicago, St. Louis, Cincinnati, Buffalo and other western points on specific days of the week via roads best fitted to handle them, thus making reduction in the feeding requirements for livestock as well as in the number of fast trains required to handle this freight. The decrease from Chicago has been an average of six trains per day, and the average cars of this high-class traffic per train has increased from 25 to 35.

"The Eastern Freight Inspection Bureau was established April 1, 1919, for the purpose of inspection of freight shipments to uncover improper packing, marking, description, weighing and routing of shipments, checking of weight agreements, scale supervision, egg inspection, investigation of claims where inspection is involved, supervision of transit arrangements, demurrage and storage, and livestock inspection. Considerable economies have attended the work of the bureau to date although it is still in the formative stage, the savings in July, August and September amounting to $848,000,000. In addition there was a gain in weight secured by inspection of 57,000 tons, approximately 60,000 packages, improperly marked or packed, were rejected, and several thousand cases of improper marking personally brought to the attention of shippers.

"By the consolidation of tariffs of the various carriers under the Eastern Freight Tariff Bureau, saving in printing cost alone of approximately $228,000 was effected during the year. The bureau now has under way the compilation of consolidated exceptions to official classification for trunk line and New England territory, a consolidated westbound routing guide, a consolidated St. Paul tariff and consolidated class rate tariffs between trunk line and New England territories. The Central Territory Freight Tariff Bureau, which is a continuation of the former bureau maintained by the Central Traffic Association, also extended its activities by the issuance of consolidated tariffs, and now have under way various additional consolidated issues for publication in the near future.

"Considerable progress was made in the reclamation of usable material from scrap, resulting in large savings; and a constant effort has been made to dispose of scrap material by sale to keep the amount on hand to a minimum. Special attention has also been given to the reduction of stocks of material on hand to the lowest possible point consistent with taking care of current requirements, by transfer of surplus materials to roads requiring same, instead of ordering new material, and by limiting purchases of new materials by careful scrutiny of requisitions.

"New stores methods have been put into operation on all roads as far as practicable, and through frequent inspections conditions have been greatly improved, all stores employees being placed under the supervision of the Stores Department, uniform stock books installed and up-to-date methods of storing and handling material adopted."

Accident Bulletin No. 70

The Interstate Commerce Commission has issued Accident Bulletin No. 70, dated September 22, 1919, giving the usual statistical report of collisions, derailments and other accidents for the quarter ending December 31, 1918, and for the twelve months ending on that date. In train accidents, in the twelve months, 286 passengers, 554 employees and 117 other persons were killed and 4,655 passengers, 4,250 employees and 433 other persons were injured. These totals compare with the following totals for 1917: Passengers killed, 131; employees killed, 451; others killed, 109. In "train service" accidents, in 1918, 233 passengers, 2,374 employees and 1,878 other persons were killed and 3,427 passengers, 43,306 employees and 5,268 other persons were injured, as compared with 212 passengers, 2,330 employees, and 2,091 other persons killed and 3,194 passengers, 48,491 employees and 5,514 other persons injured in 1917. In the quarterly bulletins, trespassers are segregated; and the term "other persons," as here given, includes only those not trespassing. In all of the tables "passengers" include persons carried under contract, such as postal clerks and stock drovers; and employees are divided into two items, those on duty and those not on duty. The item "trespassers" includes some employees in each case.

Thus we have a total of 72,841 casualties in 1918, and 80,537 in 1917, as follows:

	1918		1917	
	Killed	Injured	Killed	Injured
Total Nontrespassers	5,442	61,339	5,324	67,141
Trespassers	3,255	2,805	4,243	3,829
	8,697	64,144	9,567	70,970

A third class, "nontrain" accidents, makes a further addition as follows:

Industrial employees, 1918, 491 killed and 108,457 in-

jured; other persons killed 98, and injured, 1,974; adding these to the totals in the small table above we have 9,286 persons killed and 174,575 injured, a total number of casualties for 1918 of 183,861. For 1917 the nontrain accidents totaled 520 killed, and 123,835 injured; making the grand total for that year 10,087 killed, 194,805 injured, and a total number of casualties of 204,892.

For the year 1918 the death list is further swelled by the addition of 97 victims of train accidents and 611 of train service accidents who were reported as injured, but who died subsequently, and whose deaths were reported by the railroads. Adding these 708 to the 9,286 the total of fatalities in the year amounts to 9,994.

The bulletin analyzes many classes of accidents in great detail. Those at highway grade crossings, which are included under the head of train accidents, or train service accidents, are tabulated separately so as to show whether it was a trolley car, an automobile, an ordinary vehicle or a pedestrian which occasioned the accident. Automobile accidents are further classified in a statement showing the number of persons in automobiles. The total number of automobile accidents in 1918 was 2,267, and in 1917 it was 2,074; the total number of persons to whom casualties occurred in 1918 was 4,224 and in the preceding year 4,072; and in each year a few persons on trains were injured in these accidents.

In another table all train accidents and train service accidents resulting in casualties to trespassers are shown, with the total in each state of the Union; and the trespassers are divided into those under 14 years of age, those 14 to 21, and those older; and the last named class is separated into two items, one including tramps and the other including all other persons.

Collisions, in 1918, numbered 8,715, and the damage to cars, engines and roadway was $6,810,990; derailments, 13,568; damage $12,922,920; total train accidents, including miscellaneous, 24,695; damage $20,954,350. The number of locomotive miles run in the year was 1,827,286,803, making the average number of accidents per million locomotive miles, 13.52.

Table No. 61 shows the losses in each kind of collision, and each class of derailment, and classifies the persons killed and injured in these accidents. Table No. 62 divides train service accidents into ten classes, and classifies the persons killed and injured. Table No. 63 is a similar exhibit for nontrain accidents. These last, for the year 1918, numbered 110,922. The number of casualties to shopmen per million hours, was 40.4; to trackmen 17.4. Nine pages are given to further analyses of causes of accidents, and details of bodily injuries; and then a dozen pages are given to further analyses in statements which show totals for each separate railroad. The statement for the eastern district shows 70 railroads; for the southern district 30; and that for the western district 82.

Fifteen pages are given to reports of investigations made of accidents during the quarter ended December 31, 1918; 14 collisions, 3 derailments and the accident at Bedford, Ohio, on October 3, 1918, which resulted in the death of 20 persons and the injury of 19 who were standing on the track at a station, and were struck by a passenger train which approached not under control. Finally the bulletin contains an appendix showing a tabular summary of reports of accidents investigated during the calendar year 1918.

The Seaboard Air Line water terminal at Savannah, Ga., is being improved to admit of loading large vessels. The Globe Dredging Company is dredging slips to accommodate ships of 25 to 35 ft. draft. A total of 10,000 square feet of berthing space will be available with 26 ft. of water at mean low tide.

Transportation Conference Plan

The memorandum filed with the conferees on the railroad bill by the executive committee of the National Transportation Conference, called by the Chamber of Commerce of the United States, follows:

"The executive committee of the National Transportation Conference begs leave to call to the attention of the conference committee now considering the bills passed by the Senate and the House for the regulation of the railroads certain points which are deemed to be of vital necessity:

"1. The enactment of a statutory rule of rate-making for the guidance of the Interstate Commerce Commission is urged as a measure of prime importance, which must be adopted to bring about the re-establishment of railroad credit and to insure its maintenance upon a stable basis. It is the judgment of the committee that this necessary rule of rate-making should include the following provisions:

a. A general rule similar in language to the rule contained in Section 6 of the Senate bill now in conference, or to the rule that was embodied in the House bill as it came from the committee on interstate and foreign commerce of the House. The substance of such a rule is that the statute shall direct the Interstate Commerce Commission to establish or authorize rates and fares that will yield a fair return upon the value of the property used or held for the service of transportation.

b. The rule of rate making should provide for the establishment of rates and fares designed to yield not less than a stated minimum return upon the aggregate fair value of the property of the railroads devoted to the public service. The National Transportation Conference, after careful consideration of this question, reached the conclusion that the future revenues of the railroads must, in the aggregate, be sufficient to yield a net return of not less than 6 per cent per annum upon the aggregate fair value of the property of the railroads devoted to the public service in each of the several sections into which the country may be divided by the Interstate Commerce Commission for rate making purposes. The executive committee of the transportation conference would now urge upon the conference committee of the Senate and House that the rule of rate making which may be adopted shall, if possible, provide for a minimum return of not less than 6 per cent per annum upon the fair value of railroad property aggregated by appropriate traffic sections of the country. The Senate bill has provided in its rule of rate making for "a net operating income equal, as nearly as may be, to 5½ per centum upon the aggregate value of railroad property." The executive committee of the National Transportation Conference is firmly convinced that under existing conditions 5½ per cent is not an adequate return; but if it be impossible for the conference committee to revise this 5½ per cent upward, we strongly urge that at the very least the phrasing of the Senate bill be changed from "as nearly as may be 5½ per cent" to "not less than 5½ per cent."

If legislation for the future regulation of the railroads is successful in accomplishing its purpose, railroad credit must be re-established and must be stabilized. A rule of rate making limiting net railway operating income to a maximum of only 5½ per cent upon the aggregate value of the railroads would not enable the railroad companies to secure capital. Private ownership and operation of the railroads would inevitably be a failure.

c. The well-known facts as to the wide differences in the earning capacities of the several railroad companies and systems must necessarily be taken into account in the formulation of any rule of rate making. Rates sufficient to yield a fair average return upon the aggregate value of all railroad properties will afford the more prosperous railroads revenues in excess of their needs and larger than the public should be called upon to provide. It is therefore necessary, in order to establish rates which shall, for the country as a whole, be reasonable, to require companies receiving from a basis of rates so established, earnings in excess of a reasonable minimum stipulated by statute, to turn over to public authority a part of such excess earnings to be used by the public for the more certain stabilization of railroad credit, and for the larger development of transportation facilities.

The Senate bill provides for the division of excess earnings between the carriers and the public by stipulating that of the excess above 6 per cent, one-half of the first 1 per cent shall be placed in a reserve fund maintained by the carrier, and one-half

shall be contributed to a general railroad contingent fund, and that of the excess above 7 per cent one-fourth shall be placed in the carrier's reserve fund and three-fourths shall be paid into the general railroad contingent fund. When the reserve of any carrier equals 5 per cent of the value of its property, the carrier may retain one-third of its income above 6 per cent, and shall turn over the remaining two-thirds to the general railroad contingent fund.

It is the judgment of the executive committee of the transportation conference that the Senate bill provides for taking such a large share of the excess earnings of railroad companies as to run the risk of lessening private enterprise and initiative. The incentives for economy must not be taken away from railroad companies. If this were done the public would lose a great benefit resulting from private ownership and operation of the railroads. The National Transportation Conference recommended that one-half of the earnings in excess of 6 per cent of individual companies should be retained until the company contingent fund reached 6 per cent of the value of the company's property. Up to this point one-half of the excess earnings, and beyond this point, two-thirds of the excess earnings, were by the plant of the transportation conference to be turned over to a general contingent fund which was to be used for the stabilization of railroad revenues and credit. Under this plan the railroads having income in excess of 6 per cent would derive more benefit from their excess earnings than they would derive were the division of excess earnings to be made in accordance with the provisions of the Senate bill.

If it is not practicable for the conference committee to adopt without change the rule of the transportation conference as regards excess earnings, it is recommended that provision be made for the division of all earnings above 6 per cent equally between the carrier and the general railroad contingent fund administered by government authority. It is suggested that, as a compromise, a 50-50 rule of division be adopted. Such a division of excess earnings would not discourage individual incentive and private initiative, nor would it allow even the most prosperous companies to retain incomes which the public might consider exorbitant—so excessive as to cause the authorities responsible for the regulation and establishing of rates to hesitate to provide rates and revenues adequate to the needs of the less prosperous carriers.

"The Senate bill provides for the establishment of a transportation board and the House bill does not. The National Transportation Conference early in its deliberations became convinced that a federal transportation board should be created to perform the many executive functions that must be exercised in administering the legislation for the future regulation of railroads.

"The conference thought that it would be wise not to take from the Interstate Commerce Commission any of the tasks it now performs, although some of them are executive in nature. The Commission has developed the organization for performing the work it is now doing without drawing heavily upon the time and energy of individual commissioners for the supervision of its executive bureaus. The great task of the Interstate Commerce Commission is the regulation and, for the future, the establishment and adjustment of railroad rates and fares. This is a semi-judicial task for which the Interstate Commerce Commission by organization and training is especially fitted. The future control of railroad rates by the Commission will be more complete than past regulation has been. In the judgment of the Transportation Conference it will be unwise to add largely to the duties and responsibilties of the Interstate Commerce Commission by imposing upon it the obligation to carry out the provisions of the proposed legislation for the administrative regulation of railroads. The new duties are so large and of such an exacting nature that a new agency should be created for the performance of the new duties. There should be no conflict of jurisdiction as between the Interstate Commerce Commission and the Transportation Board. Neither body should be subordinate to the other, each should have its definitely defined duties and responsibilities, and act with complete independence and authority."

The members of the executive committee of the National Transportation Conference signing the memorandum are: George A. Post, chairman; Harry A. Wheeler, Emory R. Johnson, Alexander W. Smith, Daniel Willard, W. W. Salmon, Edward J. Frost, Frederick J. Koster, Walter S. Dickey, Paul M. Warburg.

The National Industrial Traffic League on Railroad Legislation

The National Industrial Traffic League has definitely announced its stand on proposed railroad legislation in the following recommendations which have been sent to members of the Joint Conference Committee of the United States Senate and the House of Representatives:

The National Industrial Traffic League having previously presented its views on railroad legislation to the Senate and House committees respectfully submits the following additional recommendation:

We oppose continuation of federal control after March 1, 1920.

We advocate striking from the bill all reference to a Transportation Board and favor reposing all regulatory authority in the Interstate Commerce Commission.

We advocate striking from the bill the provision requiring compulsory consolidation of carriers, but favor voluntary consolidation subject to approval by the Commission.

We favor inclusion of so-called anti-strike legislation substantially as proposed in the bill as amended by Senate, except to substitute the Interstate Commerce Commission for the Transportation Board. If the joint Conference Committee cannot agree on these provisions the League then favors enactment into the law, substantially the present Canadian Arbitration Act with the added provision that the findings of the Commission shall be made public within 90 days.

We are unalterably opposed to fixing by legislation any specific minimum or maximum rate of return or the distribution of so-called excess earnings, leaving to the Commission the provision of adequate revenue.

We endorse the provisions of the bill beginning with line 15, page 85 to and including line 9, page 88, with the following language added after line 9, page 88: "That all reparation or other claims arising out of transportation over common carriers under federal control made against or filed with the Director General or that may be filed with the Commission within 90 days after this act becomes effective, shall be under the control of the Commission and subject to orders of the Commission which shall act in the place and stead of the Director General in receiving, considering and disposing of all such claims; and to this end the Director General shall turn over to the Commission all records, files and papers in his possession at the date this act becomes effective relating to reparation claims, and the records, papers and files or any part thereof, relating to other claims shall be accessible to the Commission. Any payments in settlement of any claim shall, as to that transportation or part thereof performed by any carrier or carriers operated by the Director General, be made out of any of the moneys or funds described in this act for the liquidation and settlement of shippers' claims arising during Federal control provided that the period of federal control shall not run or be computed against the statute of limitations governing formal procedure concerning any claim referred to in this Section, if formal procedure be begun within the period defined herein."

We recommend the incorporation of the following additional provision after line 12, page 92: "That upon the conclusion of their work all records of the officers of the Directors of Public Service and Traffic, and of all freight traffic committees of the United States Railroad Administration shall be turned over to the Interstate Commerce Commission."

We oppose any consolidation of the express companies like the formation of the American Railway Express Company and therefore oppose any legislation that will permanently continue that consolidation. We favor legislation permitting consolidation after thorough investigation and approval by the Interstate

Commerce Commission to the extent that reasonable competition may be preserved.

Other changes recommended in the letter are concerned chiefly with the phraseology of the bill.

Report of Division of Law

COMPENSATION CONTRACTS between the government and railroad corporations covering 232 railroads for the use of the properties during government control had been made as of January 1, 1920, and the annual compensation to railroad companies involved in completed contracts was $717,153,182.10, or 71 per cent of the total annual rental of $917,000,000 paid by the government to the companies, according to the annual report for the year 1919 of E. Marvin Underwood, general counsel of the Division of Law of the Railroad Administration, to Director General Hines. Mr. Underwood added that negotiations with railroad corporations as to many additional compensation contracts are being actively pushed. He also pointed out that in addition to the so-called standard contracts covered above there have been 133 so-called co-operative contracts executed between the Railroad Administration and smaller railroads, mostly so-called short-line railroads.

"It is appropriate to state," said Mr. Underwood in connection with the standard contracts, "that the actual negotiations between the Railroad Administration and the companies has progressed satisfactorily and as rapidly as could be expected in view of the difficult questions of fact to be determined in each case and the high degree of care and accuracy required. Practically all the larger systems of transportation and a great many of the smaller ones have executed compensation contracts."

Referring to claims of companies for special compensation in addition to the "standard return" provided for in the federal control act, Mr. Underwood stated that such claims had been filed by 124 railroads for compensation amounting in all to $92,318,789.39, and that of these claims, 35 have been allowed in part, totaling $7,493,618.53, 67 have been denied, totaling $45,686,276.74, and 8 have been withdrawn, totaling $553,754.15, leaving still pending 14 claims totaling $9,324,288.15.

Mr. Underwood also reported that 13 railroads with claims in addition to their standard return, aggregating $11,037,359.97, have applied for the appointment of boards of referees under the provisions of the federal control act, that one of these petitions has been dismissed, and in one an agreement has been reached. No decisions have been rendered in the remainder, although hearings have been held in six additional cases.

Mr. Underwood described in detail litigation affecting the railroads under government control during 1919, and reviewed various rate questions in which the Railroad Administration has been concerned. He pointed out that as far as possible the Division of Law of the central administration has acted in an advisory capacity, and has worked through the legal staffs of the various carriers which were under federal control.

Very gratifying progress in avoiding loss and damage claims on the railroads and in promptly settling such claims presented was outlined by Mr. Underwood in his description of the work of the Claims and Property Protection Section of his division. He pointed out that for all railroads under federal control the number of unsettled claims on hand had decreased from 806,707 on April 1, 1919, to 465,722 on November 1, 1919, or a decrease of 340,985 in seven months. During the same period there were 2,439,682 of such claims presented, and of these, 2,780,677 were disposed of. The number of unsettled loss and damage claims more than four months old, also was reduced from 363,476 on April 1, 1919, to 148,683 on November 1, 1919, or a reduction of 214,793 in seven months.

"During 1918 effort was of course concentrated upon the service necessary to the movement of troops, munitions and supplies," said Mr. Underwood, "although every effort consistent with the existing emergency was made to give satisfactory service to the general public.

"At the beginning of 1919 energy was directed to the restoration of service to a pre-war basis, and on January 6, 1919, a nation-wide campaign to prevent loss and damage to freight in transit was started. In order to co-ordinate individual efforts of the various railroad companies, study conditions, bring about co-operation, and make suggestions for improved service, regional prevention officers were suggested and appointed by the regional directors. The result so far obtained in this campaign is very gratifying."

In connection with fraudulent claims, Mr. Underwood reported that the claims of 51 individuals, firms and corporations have been investigated, indictments have been secured in 5 cases, 29 are under further investigation, and 17 have been found not to be fraudulent.

"Following the established custom of the Railroad Administration to minimize as well as prevent loss and damage," said Mr. Underwood, "it was considered advisable to investigate the methods employed by all railroads under federal control in the handling and disposition of over, damaged, refused and unclaimed freight, to establish proper precautionary efforts to conserve the value of such freight to the owners and railroads. In April, 1919, investigations were instituted, and up to the present time have been completed on 93 railroads, and it has developed that in many cases individuals, firms and corporations disposing of this class of freight for the railroads did not make proper returns. Criminal prosecutions are in progress in various cities, and thus far recovery has been secured to the railroads of about $137,000. The completion of these investigations on all federal controlled railroads will bring about a noticeable improvement in the practices of the individual railroads in the handling, recording and disposition of this class of freight."

Canadian Railway Situation

E. W. BEATTY, president of the Canadian Pacific, in a recent article in the Montreal (Que.) Gazette presented an interesting sidelight on the present Canadian railway situation. Mr. Beatty said:

"There are many people who look upon Canadian railways as custodians of magic fortunes which cannot be exhausted. That bookkeeping should be as simple and inexorable in its tale of losses and vanished profits to a railway as it may be to a corner grocer is to these people unthinkable. It apparently does not occur to them that to no public is it more important than to the Canadian public that the good reputation of its railway securities in the world of thrift and investment should be carefully guarded.

"To those, however, who understand these things clearly and who view the matter from the standpoint of broad public interest, it is at once apparent that the Canadian public pays a very low rate for the quality of service rendered, and that a time is rapidly approaching when, if Canadian railway securities are not to be made less desirable to investors than almost any other kind of industrial security, railway rates will either have to go up or railway operating costs go down. Such persons recognize that it is not because the situation of the railways is an easy one that certain companies have been able to show net earnings—very low net earnings compared to the actual cash invested in the industry—but because in the past the shareholders of such companies have been, as

they are today, courageous persons willing to supply the means for constructive enterprises in which no one but themselves had faith, and because, too, their officers have been skilled, resourceful and loyal business men, assisted by staffs filled with the spirit of pride and devotion to their work. This, indeed, is the thing which has made it possible for Canada's railroads to function successfully during the war without making anything like the demands that foreign roads —less efficient in serving their community, yet earning the same rates and paying the same wages—have made up their public exchequers. I do not believe that this strain upon the railways and this tendency to weaken the general reputation of Canadian railway securities should continue. The servant, after all, is worthy of his hire, and railway capital is not less worthy a servant than other forms of capital whose earnings have not been so consistently depressed.

"The net earnings during the war years of those companies which showed net earnings would have been much lower had the Canadian railroads been making expenditures for maintenance which circumstances would have justified but which conditions prevented during that period. These arrears have now to be made up. During 1919 the Canadian Pacific laid 70,000 tons of steel rail. In place of, say, 2,000,000 ties, worth 44c in 1914, the Canadian Pacific laid 4,434,000 ties at 85c per tie. The sensational advance in the rate of railway wages is well known. Further advance may be necessary within the very near future, as indicated by discussions in the United States. The price of coal for locomotives was $3.09 in 1913. Now it is $4.77. The cost of hauling an average train (freight or passenger) one mile has risen from $1,604 in 1913 to $2,494 in 1918. It is higher today. The operating expenses of one mile of line in 1915 were $4,152; in 1918, $7,046, and today they are even greater. On the other hand, railway rates, taking all classes of revenue together, have advanced scarcely 25 per cent.

"I venture to say no other industry in the Dominion can show such moderation."

War Department Commandeers Rails for Railroad Administration

WASHINGTON, D. C.

BECAUSE the steel companies have not been sufficiently interested in turning out rails for the Railroad Administration at $47 a ton, the administration has taken advantage of the fact that the country is still technically at war because the treaty of peace has not been ratified or proclaimed and has induced the War Department to issue orders commandeering 72,500 tons of steel rail to be delivered by March 1, under the powers conferred by Section 120 of the national defense act passed in 1916.

This authorizes the commandeering of munitions or other materials and supplies needed for military purposes or other purposes connected with the military needs, and its exercise at this time is on the theory that all of the troops have not yet been moved and that the railroads under federal control are still being used for military purposes.

Of the total, 36,000 tons are required to be furnished by the Carnegie Steel Company, the Illinois Steel Company and the Tennessee Coal & Iron Company; 16,500 tons by the Bethlehem Steel Company, and the balance, 20,000 tons, by the Midvale Steel & Ordnance Company, which recently offered to roll rail at $57 a ton when the administration was willing to pay only $47. When the Railroad Administration recently attempted to place contracts for rail to be delivered before March 1, the Illinois, Lackawanna and Colorado companies were willing to accept but 42,500 tons. The requisitions for 72,500 tons made by the War Department are in addition to those orders, mentioned in last week's issue.

There has been gossip to the effect that the steel companies preferred other business than rail at the price of $47 a ton, which was the price recommended by the Peek committee last year after a long controversy with the Railroad Administration, and that they have hoped to obtain higher prices after the return of the railroads to private management and the resumption of competitive buying.

The various interpretations that have been used in Washington in answer to the question as to whether or not the war is at an end for various purposes has occasioned some cynical comment. The President recommended a repeal of the war-time prohibition act on the ground that the war was at least over for practical purposes. The Department of Justice held that the wage contract with the coal miners had not yet been abrogated by the termination of the war and the war-time powers of the Fuel Administration were revived to deal with the strike.

Director General Hines held last summer that he would not be justified in exercising his war-time powers to make a general increase in freight rates. But the need of several railroads for rails is such that the Division of Purchases considers that the use of war powers to induce a larger output by the steel companies is warranted. It is said that the steel companies rather resent the use of the technicality but that they are not disposed to make any formal opposition to the order.

Freight Locomotive and Freight Train Costs

THE TOTAL COST of freight train service, including locomotive service, per 1,000 gross ton miles, which had been decreasing each month of 1919 up to and including August, has shown an increase in September, October and November. In November, according to the monthly report of the Operating Statistics Section of the Railroad Administration, it was 122 cents, as compared with 116.1 cents in November, 1918, and as compared with 105.8 cents in October, 1919. In October it was less than for October, 1918. Per locomotive mile and per train mile in November the cost was also greater than in November, 1918. The cost of freight locomotive service per locomotive mile in November was 119.7 cents, as compared with 113.5 cents in November, 1918. In October it was 109.8 cents. The cost of freight train service per train mile in November was 170.3 cents, as compared with 163 cents in November, 1918. In October it was 159.8 cents. The combined figures for all regions and the comparative figures for 1918 are as follows: (Costs for 1918 have been readjusted for back pay, while the costs for 1919 apply to the month of November only, the back pay applicable to previous months having been eliminated.)

	November	
	1919	1918
Cost of locomotive service per locomotive mile (cents)	119.7	113.5
Locomotive repairs	39.4	36.6
Enginehouse expenses	37.4	36.6
Train enginemen	21.0	19.1
Locomotive fuel	46.7	44.8
Other locomotive supplies	3.7	3.6
Cost of train service per train mile	170.3	163.3
Locomotive repairs	54.6	52.7
Enginehouse expenses	8.8	9.4
Locomotive fuel	53.	51.4
Other locomotive supplies	4.2	4.1
Train enginemen	23.9	21.9
Trainmen	27.3	25.8
Train supplies and expenses	7.3	7.1
Cost of total train service per 1,000 gross ton-miles	122.0	116.1
Locomotive repairs	37.2	37.5
Enginehouse expenses	39.2	37.5
Locomotive fuel	38.0	36.6
Other locomotive supplies	3.0	2.9
Enginemen and Trainmen	36.6	34.0
Train supplies and expenses	5.3	5.1

General News Department

Director General Hines left Washington Tuesday evening to go to Louisville to address the Transportation Club (on Thursday) and to inspect the railroads en route; but he postponed his trip to Chicago, where he had expected to confer with the Western regional directors and federal managers on Wednesday, in order not to call the federal managers in from their roads, as they have many cold-weather problems just now. From Louisville Mr. Hines was to go to New York to confer with the eastern regional directors.

Fifteen minutes is sufficient length of time for stealing a thousand dollars' worth of freight; or at least this is the main feature of the report of a robbery on the Boston & Maine near Woburn, Mass., on the night of January 14. A long freight train had stopped on a side track in a lonely locality to wait for a passenger train, and was there only 15 minutes; but in the morning it was discovered that cigars and other property to the value of the sum named had been taken out of one of the cars of the train. Some of the stolen goods had been left in the bushes beside the track.

Employees killed on the Pere Marquette, in 1919, numbered 22, but only six of these cases could be called unavoidable. This fact—that 72.7 per cent of the fatalities could easily have been prevented—is enlarged upon in the safety supervisor's annual bulletin. In only three cases was the question of physical conditions or appliances concerned. Of the 19 fatalities in train service the bulletin says: "This proportion does not prove that train service is naturally so much more hazardous than other service; about four out of every five cases are due solely to unsafe practices which could easily be guarded against. But it does prove that train service is mighty unsafe employment for an unsafe man."

The Material Handling Machinery Manufacturers' Association announces that the convention which was to be held at the Waldorf-Astoria Hotel, New York City, on January 29 and 30, has been postponed, and will be held on February 26 and 27. Manufacturers from any part of the United States will be welcome, and especially makers of overhead cranes, hoists, conveyors, trucks, tractors and trailers. Reservations for the luncheon may be procured from Secretary Z. W. Carter, 35 West 39th street, New York City.

Utah is the title of the latest illustrated booklet issued by the Agricultural Section of the United States Railroad Administration. Governor Simon Bamberger writes the introduction, and he says that agriculture is one of the chief industries of the state. In various parts of the state land in practically all stages of cultivation may be obtained at reasonable prices. The book contains descriptions of the valley of the Great Salt Lake, northeastern Utah, valleys of central Utah, eastern Utah, Utah Basin, southwestern Utah, northwestern and Utah's Dixie (Washington County); with articles on live stock, farming, dairying, poultry, crops under irrigation, dry farming and social life.

William S. Menden, chief engineer of the Brooklyn Rapid Transit Company, has been tried in the Supreme Court of New York, at Mineola, on a charge of manslaughter in connection with the derailment on that road in Brooklyn, N. Y., on November 1, 1918, when 92 passengers were killed; and on Monday last was acquitted by direction of the judge. Three other officers of the company had already been tried on a similar charge, two of them being acquitted, and the third going free because of the disagreement of the jury. It appears that the prosecution expected to convict the chief engineer because he had not installed automatic block signals with a time control element such as are in use on the Interborough Rapid Transit Company at certain important stations. The judge said that no man could reasonably have been expected, prior to this accident, to exercise the foresight which would have been requisite to install such a device. The derailment, which was caused by excessive speed on a sharp curve, was immediately due to the error or incompetence of an inexperienced motorman. Testimony was presented at the trial to the effect that 23 miles an hour had been proved a safe rate of speed over the curve.

Contracts Executed

The Railroad Administration has executed compensation contracts with the Northwestern Pacific for $1,338,000; the San Antonio & Aransas Pass for $456,684; the Chicago, Rock Island & Pacific for $15,880,601; the Minneapolis & St. Louis for $2,812,008; the Galveston, Houston & Henderson for $127,366, and the Hamilton Belt for $7,040.

Charles Warren Hunt Elected Secretary Emeritus

Charles Warren Hunt, secretary of the American Society of Civil Engineers, has resigned from that position and has been appointed secretary emeritus of the society and granted six months' leave of absence. No action has as yet been taken by the Board of Direction in the matter of naming a successor to Mr. Hunt and in the interim Col. H. S. Cracker will serve as acting secretary.

Correction

In the abstract of the report of the Automatic Train Control Committee published in the *Railway Age* of January 16, on page 232 the name of the Nevens-Wallace Train Control Company—electrically controlled mechanical trip type, was omitted from the list of devices found available by the committee for further test and the description of this type was incorrectly printed after the name of the National Safety Appliance Company, whose device is of the induction type.

Disastrous Collision Near North Bay

In a rear collision of west bound passenger trains on the Canadian Pacific at Corbell, about eleven miles east of North Bay, Ont., on Sunday, January 25, eight or more persons (seven passengers and a sleeping car conductor) were killed and 21 injured. The temperature at the time of the collision was about 30 degrees below zero, and the leading train, through express No. 1, had been stalled by some cause due to the cold weather, and the rear car was run into and crushed by the second section of the same train. Newspaper reports indicate that torpedoes had been put on the rails for the protection of the standing train, but that they were not heard by the engineman of the second section.

California Railroad Commission Recommends New Terminals at Los Angeles

The Railroad Commission of California has issued a report, made by its engineers, covering the results of a two-years' study, which recommends the construction in Los Angeles of a new union passenger station, new freight station, elimination of grade crossings and other improvements estimated to cost altogether $32,233,445. The proposed location for the passenger terminal is on a site extending from Commercial street to Alhambra avenue along the east side of North Main street, and the estimated cost is $10,000,000. The union freight station to cost $2,500,000, would be built at the site of the Atchison, Topeka & Santa Fe freight yard. A subway would be required from the Pacific Electric station at Sixth and Main streets, along Main street to and under the new passenger terminal, and (changing to an elevated roadway) to and across Alice street bridge to Brooklyn avenue. This would cost $2,500,000. Elimination of all important grade crossings on the banks of Los Angeles river, from North Broadway to Butte street would cost $4,000,000; and the elimination of 61 street crossings, eight electric railway

crossings and two steam railroad crossings between Los Angeles and Pasadena, would cost $6,700,000.

The report recommends a joint railroad between Los Angeles and Pasadena to be used by the Atchison, Topeka & Santa Fe and the Los Angeles and Salt Lake.

Statistics of Safety Committees' Work

H. M. Mayo, superintendent of safety of the Southern Pacific and other lines in Texas reports that in the month of December Safety Committee members reported 149 violations of safety rules by employees, each of whom was warned of the danger he had incurred. These cases are classified as follows:

	Violations
Riding engine pilots	Nine
Adjusting drawheads with foot (car moving)	Fourteen
Failing to use blue flag	Six
Breaking air hose	Six
Lining couplers (cars moving)	Seven
Chocking moving car	One
Employees boarding moving cars	Nine
Others boarding moving cars	Ten
Using open lights at oil tanks	Three
Jacks improperly block and defective	Twelve
Using burred tools	Fifteen
Failure to use goggles at grinding wheels	Thirteen
Lounging under cars	Eight
Throwing loose boards with nails	Sixteen
Crossing between moving cars	Eleven
No protection from flying rivets	Five
Stepping on foot board of approaching engines	Four

"What argument can be put forward in defense of this situation," says Mr. Mayo. "Are not practices such as these actually criminal? Life ought to be worth something, yet you gamble with it as though it could be bought on the bargain counter."

Chemists Seeking Work

Of the 5,400 chemists who served the country in the War Department during the great war a considerable number are still looking for suitable occupation, and Major General William L. Sibert, Director of Chemical Warfare Service, appeals to employers needing chemists to consider these men. In his department, Seventh and B streets, Washington, a clearing house has been established and the qualifications of these chemists are on record there.

Major Frederick M. Crossett, chief of the Relations Section of the Chemical Warfare Service, calls attention to the peculiar value to their country of the service rendered by these men. Many of them made themselves voluntary prisoners. They agreed to live within the stockades surrounding the works in which were carried on the secret processes worked out by American chemists that gave the United States an immeasurable superiority over Germany in chemical warfare. They gave up the chance to go abroad. They worked apart and, from the nature of the case, the public for two years knew nothing of them. They remained at their posts until after the armistice was signed.

Information can be had from either General Sibert or Major Crossett, Unit F, Floor 3, Seventh and B streets N. W., Washington.

Director General to Give Answer on Wage Demands

The wage demands of the railroad labor organizations, many of which have been pending since last summer and fall, will be discussed at a conference with Director General Hines in Washington on February 2 or 3 next week. As it is regarded as certain that he will not consider it possible in the short remaining period of federal control to comply with the large demands that they have made, or to do anything more than make some readjustments for the purpose of maintaining the proper relationship between classes of employees, the developments from the meeting as to the attitude that will be assumed by the labor leaders are being looked forward to with interest.

The Brotherhood of Railroad Trainmen announced last week its intention of pressing the Railroad Administration for a definite answer on its demand for a general wage increase filed on July 1, last year. W. G. Lee, president of the brotherhood, telegraphed to Director General Hines for an appointment for January 26 and called a meeting of his committeemen and grand lodge officers at Washington on that date, but Mr. Hines replied that he was leaving on that day for an inspection trip and suggested that another date be arranged after February 1. At the same time Mr. Hines invited the officers of the other labor organizations to a conference so that he could talk to them all at once. Most of the 14 organizations have requests for general increases pending, although the engineers and conductors have not filed any definite demands. Hearings have been held by the Board of Railroad Wages and Working Conditions and reports have been made to the board by the director general, but under his instructions they have been confined to the question of readjustments of alleged inequalities.

Farmers' and Labor Unions' Committees Urge Two More Years of Federal Control

A delegation of representatives of labor and farmers' organizations called at the White House on January 27 and after making some speeches to Secretary Tumulty, left a letter addressed to the President, urging a two-year extension of federal control of the railroads. The delegation included several of those who gave the President similar advice on December 17 shortly before he issued his proclamation returning the railroads as of March 1.

In the letter the delegates declare that the Congressional committee is in such a hopeless tangle over the Cummins and Esch bills that it will be impossible to reach a practical solution of the railway problem before March 1.

"On December 17, last," reads the letter, "representatives of leading organizations of farmers, of the American Federation of Labor and state federations of labor, of the railway brotherhoods, and shop crafts, presented to you a letter strongly urging that the period of government operation be continued for at least two years, so that there will be a more thorough and more consistent trial of government operation. * * * In the six weeks since then the sentiment throughout the country has been continuously increasing in favor of this two-year extension until we can accurately state that this is the preponderant desire of the farmers and of organized labor forces of most of the states of the Union. This, too, is the sentiment of the unorganized farmers and workers of America.

"The return of the railroads will involve an increase in freight rates of 25 to 40 per cent, which mean an increase in the cost of living, as estimated by your director general of railroads, of at least $4,000,000,000 a year. This will be nothing short of a national calamity.

The farmers' organizations were those represented by George P. Hampton and Benjamin C. Marsh.

Safety Instruction in Schools

The National Safety Council, Ralph C. Richards, president, has issued a pamphlet, which railroads are asked to buy at five cents each and to circulate among school authorities, wherein will be found a short argument advocating the introduction, in public and parochial schools, of a book by Dr. E. C. Payne, containing an attractive scheme for teaching safety habits to children and youths. Fred Meyers, Wabash Railroad, St. Louis, Mo., chairman of the steam railroad section of the National Safety Council, in a letter to railroads which are members of the council, points out the value of safety work in schools already done by many railroads and the useful results to be expected from further activity in this direction.

A syllabus for teachers, including a complete outline of a plan for teaching, has been prepared from Dr. Payne's book, and can be had at nine dollars a dozen copies.

Dr. Payne's method includes the incorporation of safety questions into ordinary subjects, arithmetic, language, etc., and the encouragement of the children of a school to organize themselves into an association with the high ideal of being responsible for the welfare of the community in which they live. A sample question, under the head of arithmetic, reads: "If the population of the United States was 91,972,266 in 1910, and the accidental deaths are 54,300, to what would the population of the United States be reduced by accidents alone in ten years if population did not increase in other ways?" In the teaching of drawing, the pupils are called upon to make pictures of children doing dangerous things, and they attach to these pictures suitable and instructive "slogans." Through reading classes, pupils are led to convey to their parents all sorts of useful information about prevention of accidents. In composition, pupils assigned to these subjects are found to make unexpectedly rapid progress in language. In Cleveland, Ohio, pupils have learned, and have taught, important lessons in safety through amateur theatricals.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER, 1919

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of									
		Freight.	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	141	$164,971	$58,892	$243,222	$35,887	$53,668	$3,802	$84,990	$10,526	$191,521	78.74	$51,702	$11,417	$40,234	$16,422
Alabama Great Southern	312	814,471	189,548	1,069,829	84,028	263,587	13,394	317,275	17,088	702,436	65.65	367,393	15,294	351,822	249,092
Ann Arbor	301	366,317	59,298	448,874	50,507	96,211	4,648	211,921	9,723	373,026	83.10	75,847	16,700	59,142	—14,010
Arizona Eastern	377	209,902	53,219	288,144	41,620	47,834	1,737	99,184	16,809	209,580	72.73	78,564	58,694	19,722	—79,870
Atchison, Topeka & Santa Fe	8,665	12,364,728	4,054,311	17,564,713	2,050,332	3,592,469	143,958	5,739,494	237,856	11,692,685	66.56	5,872,028	899,614	4,970,078	1,046,316
Atlanta & West Point	93	157,026	91,550	278,037	34,344	46,475	3,342	101,373	11,709	201,429	72.44	76,609	1,000	75,599	3,495
Atlanta, Birmingham & Atlantic	639	259,488	81,125	373,989	98,448	126,102	9,743	224,911	14,480	473,751	126.67	—99,761	16,000	—116,252	—67,963
Atlantic City	177	143,777	130,288	292,773	87,198	30,167	1,246	174,492	1,068	294,242	100.50	—1,470	22,086	—23,561	—202,946
Atlantic Coast Line	4,879	3,617,761	1,337,921	5,342,483	806,969	1,160,155	75,070	2,356,722	111,209	4,531,003	84.81	811,481	200,000	609,102	—4,023
Baltimore & Ohio Chicago Terminal	90	.....	3	205,982	34,980	36,067	1,040	132,509	7,321	217,426	105.56	—11,444	26,542	—37,986	79,173
Baltimore & Ohio	5,151	11,616,554	2,220,908	15,346,512	1,884,426	4,858,282	148,796	6,636,673	342,389	14,052,912	91.57	1,293,599	481,144	811,852	574,202
Baltimore, Chesapeake & Atlantic	87	90,105	29,622	126,277	11,762	22,406	1,027	77,533	3,542	116,270	92.07	10,007	4,025	5,982	24,651
Bangor & Aroostook	632	440,887	93,353	562,042	121,452	154,461	3,420	210,322	11,103	507,725	90.33	54,318	23,000	31,314	—55,536
Beaumont, Sour Lake & Western	118	93,418	24,780	123,462	24,798	25,359	4,345	50,607	4,994	110,102	89.17	13,361	2,700	10,603	—30,913
Belt Railway Co. of Chicago	31	.....	.....	322,111	30,271	54,124	418	223,798	7,366	315,977	98.07	6,134	15,682	—9,549	—7,192
Bessemer & Lake Erie	217	719,361	38,758	782,877	112,766	365,715	9,764	291,937	19,538	806,303	102.99	—23,426	21,500	—44,952	— 211,802
Bingham & Garfield	37	143,364	2,026	148,155	34,759	41,884	1,126	37,820	3,699	119,946	80.95	28,209	11,799	16,410	—79,367
Birmingham Southern	29	34,642	.....	42,482	5,288	5,555	753	30,281	3,035	44,912	105.72	—2,430	1,999	—4,429	—53,366
Boston & Maine	2,258	4,117,560	1,676,222	6,467,373	710,424	1,518,844	36,894	3,324,523	135,467	5,770,812	89.22	696,561	199,030	497,449	886,406
Buffalo & Susquehanna	296	59,129	6,434	70,748	40,574	105,790	3,904	41,543	9,367	201,177	284.35	—130,430	3,250	—133,683	—58,786
Buffalo, Rochester & Pittsburgh	589	651,672	133,592	838,928	206,781	474,446	13,815	494,869	31,474	1,223,536	145.84	—384,608	10,000	—394,622	—267,998
Canadian Pacific Lines in Maine	233	132,731	48,922	195,282	40,251	57,280	2,170	124,731	3,075	227,405	116.44	—32,123	18,300	—50,423	—55,235
Carolina, Clinchfield & Ohio	282	457,401	32,238	503,791	71,404	144,497	9,252	171,172	12,341	408,450	81.07	95,340	16,300	79,033	—22,905
Central New England	301	498,814	25,121	561,220	103,990	110,962	3,467	247,756	15,419	481,594	85.81	79,625	16,000	63,373	168,090
Central of Georgia	1,918	1,163,936	544,219	1,901,123	462,691	396,085	32,925	803,755	61,143	1,753,040	92.21	148,082	87,546	58,184	—280,432
Central of New Jersey	685	2,745,645	710,996	3,953,430	475,737	1,177,111	29,804	1,890,039	73,650	3,673,128	92.90	280,302	349,346	—69,048	17,855
Central Vermont	411	376,824	89,291	511,084	76,283	143,475	9,176	256,327	16,964	505,512	98.91	5,571	17,400	—11,958	70,639
Charleston & Western Carolina	342	215,213	54,911	290,285	58,385	57,737	6,183	137,878	5,492	265,676	91.52	24,609	9,364	15,235	—38,652
Chesapeake & Ohio	2,516	4,013,080	911,770	5,354,030	982,628	1,994,401	50,514	2,460,413	108,248	5,625,747	105.07	271,717	158,400	—430,324	—2,573,207
Chicago & Alton	1,050	1,124,155	513,820	1,769,532	348,787	652,370	22,281	999,403	48,545	2,087,093	117.94	—317,560	61,000	—378,966	—596,821
Chicago & Eastern Illinois	1,131	1,118,084	395,518	1,680,567	327,164	794,313	16,916	805,457	50,553	2,005,494	119.33	—324,927	56,500	—381,983	—664,405
Chicago & Erie	269	719,245	62,670	884,407	88,070	153,913	10,140	448,629	25,291	730,870	82.62	153,537	53,000	100,532	—210,131
Chicago & North Western	8,090	8,113,315	2,883,674	12,130,562	1,531,112	2,880,824	72,301	5,880,625	260,927	10,725,664	88.41	1,404,898	475,000	929,314	—341,062
Chicago, Burlington & Quincy	9,371	8,947,716	2,756,328	12,796,377	1,535,604	3,046,159	83,026	5,394,875	356,350	10,512,776	82.15	2,283,601	466,217	1,813,859	—1,099,284
Chicago Great Western	1,496	1,313,778	450,188	1,913,829	276,145	444,239	24,844	899,233	46,968	1,703,994	89.04	209,835	54,975	154,776	136,051
Chicago, Indianapolis & Louisville	657	666,460	239,917	1,003,316	114,930	335,279	13,458	542,075	26,468	1,044,760	104.13	—41,444	47,440	—89,019	—133,391
Chicago Junction	12	.....	.....	335,099	44,485	52,783	122	246,808	6,244	350,442	104.57	—15,343	2,128	—17,472	—1,798
Chicago, Milwaukee & St. Paul	10,658	9,332,210	2,150,003	12,723,080	1,833,143	2,901,693	61,853	5,966,088	332,201	11,228,770	88.25	1,494,309	559,148	865,186	694,527
Chicago, Peoria & St. Louis	247	82,527	27,553	121,361	32,206	73,170	1,823	89,310	7,980	204,455	168.47	—83,084	6,100	—89,194	—20,357
Chicago, Rock Island & Gulf	463	362,826	96,683	493,822	68,247	61,465	6,790	236,388	12,445	386,547	78.27	107,275	19,864	87,431	—19,141
Chicago, Rock Island & Pacific	7,594	6,476,532	2,538,374	9,649,589	1,693,114	2,480,626	100,064	4,500,467	209,504	9,024,125	93.51	625,464	538,835	85,503	—372,452
Chicago, St. Paul, Minneapolis & Omaha	1,749	1,832,153	653,723	2,637,757	281,640	493,351	21,183	1,245,375	62,413	2,117,697	80.28	520,060	114,673	404,317	34,171
Chicago, Terre Haute & S. E.	374	104,571	20,892	135,169	59,080	130,322	3,549	96,935	9,026	299,936	221.90	—164,767	14,500	—179,267	—221,877
Cincinnati, Lebanon & Nor	76	100,777	9,710	126,913	17,408	22,539	1,132	50,564	1,897	93,541	73.90	33,372	7,771	25,594	21,027
Cincinnati, Indianapolis & Western	321	223,508	49,675	297,931	57,199	128,528	6,619	140,706	13,835	347,864	116.75	—49,934	4,561	—64,563	—31,957
Cincinnati, New Orleans & Texas Pacific	337	1,317,535	238,944	1,635,010	355,166	574,440	22,629	808,395	31,721	1,801,635	110.19	—166,625	35,547	—204,254	—376,379
Cincinnati Northern	251	202,404	17,711	227,737	30,087	74,341	1,854	95,297	4,497	206,075	90.48	21,662	13,400	8,099	—44,283
Cleveland, Cincinnati, Chi. & St. Louis	2,408	4,089,239	1,404,049	6,061,072	788,458	1,337,980	72,150	2,930,140	107,696	5,278,028	87.08	783,044	220,000	561,414	—850,905
Colorado & Southern	1,099	719,458	203,279	990,237	150,252	294,930	8,956	409,883	48,736	919,923	92.88	70,315	47,000	23,168	—347,666
Colorado & Wyoming	41	9,006	1,347	13,614	4,802	7,069	130	12,028	3,435	27,465	201.73	—13,850	4,000	—17,850	—35,653
Cumberland Valley	163	305,362	69,978	412,248	65,132	108,867	6,285	119,007	11,773	311,793	75.63	100,455	9,887	90,563	—208,442
Delaware & Hudson	875	2,399,230	238,679	2,818,936	354,838	917,725	16,591	1,323,344	110,978	2,754,413	97.71	64,523	87,000	—22,859	—198,871
Delaware, Lackawanna & Western	956	4,500,535	955,778	6,140,294	733,154	1,235,980	37,989	2,607,745	117,063	4,792,067	78.00	1,348,227	318,427	1,029,573	—464,650
Denver & Rio Grande	2,594	2,082,505	559,126	2,829,991	387,467	697,808	22,942	1,047,098	70,369	2,264,559	80.02	565,432	140,000	425,161	—118,142
Denver & Salt Lake	255	224,301	30,076	261,474	66,424	94,112	750	117,222	5,564	284,071	108.64	—22,597	9,000	—31,611	—240,629
Detroit & Mackinac	381	112,754	35,036	157,932	11,344	39,303	1,693	66,139	5,982	123,972	78.49	33,960	5,886	28,074	118,791
Detroit & Toledo Shore Line	61	210,216	.....	210,934	38,912	5,523	1,635	72,468	9,212	127,752	60.56	83,182	7,900	75,282	—3,543
Detroit, Toledo & Ironton	454	294,724	13,248	322,773	80,836	108,176	4,730	170,565	22,676	387,019	119.90	—64,246	9,043	—73,290	18,006
Duluth & Iron Range	292	370,530	25,211	435,417	143,238	119,669	446	185,814	15,363	464,779	106.74	—29,362	22,429	—52,040	—25,785
Duluth, Missabe & Northern	412	895,548	46,144	1,035,879	218,105	171,832	3,093	413,418	28,520	836,586	80.76	199,293	51,278	148,015	—51,682
Duluth, South Shore & Atlantic	598	274,995	107,823	415,636	58,380	78,176	4,866	237,972	8,581	393,912	94.77	21,724	20,000	1,685	—62,120
Duluth, Winnipeg & Pacific	178	129,709	31,010	164,123	34,443	27,164	2,532	69,647	8,587	142,433	86.78	21,689	12,777	8,912	—40,675
East St. Louis Connecting	3	.....	.....	89,109	13,503	—7,639	285	113,263	3,145	122,571	137.55	—33,461	2,544	—36,005	19,976
El Paso & Southwestern	1,027	987,540	196,282	1,249,360	232,718	216,756	9,675	338,494	26,855	833,753	66.73	415,608	100,000	315,607	11,829
Elgin, Joliet & Eastern	831	981,126	4	1,186,784	168,871	343,429	6,405	589,468	24,014	1,131,693	95.35	55,091	48,850	6,181	—748,578
Erie	1,989	5,786,104	989,858	7,627,120	833,560	2,355,209	61,175	3,739,933	194,514	7,233,686	94.84	393,434	376,000	17,017	—666,580
Florida East Coast	764	537,187	222,443	864,562	138,711	148,517	9,667	332,122	17,764	655,090	75.77	209,472	28,882	180,568	213,596
Fonda, Johnstown & Gloversville	88	27,506	65,304	97,213	10,662	8,123	531	43,085	5,740	68,140	70.09	29,073	4,900	24,173	1,981
Fort Smith & Western	253	109,356	32,284	150,248	27,322	38,283	4,030	55,014	7,199	132,987	88.51	17,260	5,000	11,825	—4,527
Ft. Worth & Denver City	454	617,868	360,615	1,020,521	107,385	228,580	6,958	281,458	26,318	653,989	64.08	366,532	34,379	332,076	115,917
Ft. Worth & Rio Grande	235	86,624	68,754	166,292	29,661	24,800	2,187	60,011	5,898	122,557	73.68	43,734	2,983	40,745	52,577

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Galveston, Harrisburg & San Antonio	1,181	$1,548,867	$441,501	$2,083,433	$221,189	$394,142	$17,419	$623,549	$54,999	$1,326,557	63.67	$756,875	$52,892	$703,555	$570,860
Galveston Wharf	13	.....	.....	128,115	29,979	1,234	.....	29,650	2,293	79,767	62.26	48,348	12,500	35,849	38,394
Georgia	328	492,414	149,967	690,621	75,933	106,752	8,189	286,725	17,222	495,022	71.67	195,599	5,950	189,646	—50,532
Georgia & Florida	348	58,718	23,792	89,443	48,559	18,393	2,343	58,787	6,029	134,112	149.94	—44,669	4,200	—48,869	—41,007
Georgia Southern & Florida	402	220,899	118,122	366,149	56,134	101,403	6,481	193,791	11,755	370,222	101.11	—4,072	28,934	—33,028	—64,732
Grand Rapids & Indiana	569	524,317	166,973	744,378	67,982	195,386	11,758	364,588	22,248	663,519	89.13	80,860	25,951	54,875	1,769
Grand Trunk Western	1,001	1,433,184	284,671	1,878,972	238,958	308,160	12,084	980,125	75,857	1,622,616	86.35	256,357	59,273	197,022	—173,429
Grand Trunk Lines in New England	172	221,956	35,172	290,357	130,618	85,182	1,937	104,862	8,957	348,219	119.92	—57,862	14,500	—72,362	5,292
Great Northern	8,176	6,939,998	1,646,559	9,418,965	1,424,537	2,342,013	58,262	4,241,461	152,587	8,340,163	88.54	1,078,802	1,052,351	25,184	—1,945,676
Green Bay & Western	252	97,580	18,036	123,080	15,122	27,451	1,042	42,705	1,696	88,016	71.51	35,064	4,420	30,644	27,979
Gulf & Ship Island	307	165,953	41,939	225,738	64,240	60,489	5,724	90,255	9,271	230,443	102.08	—4,705	22,970	—27,880	—35,737
Gulf, Colorado & Santa Fe	1,937	1,763,987	560,207	2,458,186	579,356	290,601	19,065	867,723	50,717	1,804,123	73.39	654,731	163,153	490,731	54,357
Gulf, Mobile & Northern	467	208,496	50,566	271,342	68,565	67,502	7,674	126,099	11,462	276,443	101.87	—5,100	11,707	—16,872	18,297
Hocking Valley	350	633,883	97,991	796,447	107,040	371,661	6,391	404,267	19,885	911,647	114.46	—115,200	56,336	—171,536	—284,716
Houston & Texas Central	847	764,469	248,627	1,075,362	149,496	175,900	5,503	364,816	21,853	717,746	56.74	357,616	34,459	322,910	205,127
Houston, East and West Texas	190	162,380	48,732	221,718	33,775	28,214	1,145	95,779	4,011	162,926	73.48	58,793	6,248	52,473	—1,099
Illinois Central	4,799	5,702,321	2,035,821	8,463,829	1,884,075	2,662,666	87,425	3,768,635	215,854	8,668,763	102.42	—204,934	488,267	—696,651	—1,821,938
Indiana Harbor Belt	116	.....	.....	550,015	70,778	94,973	1,904	395,926	17,251	580,832	105.60	—30,817	11,059	—41,876	28,432
International & Great Northern	1,159	1,042,651	317,255	1,451,545	297,453	353,106	15,514	552,135	45,106	1,273,018	87.70	178,526	22,882	155,446	58,120
Kanawha & Michigan	176	211,288	51,800	275,226	64,332	121,300	2,151	132,305	13,561	333,649	121.22	—58,422	18,958	—77,380	—151,943
Kansas City, Mexico & Orient	272	199,066	18,856	224,767	37,545	54,925	5,912	37,409	11,692	197,483	87.86	27,284	6,250	21,022	80,665
Kansas City, Mexico & Orient of Texas	465	153,744	24,672	184,057	38,958	62,193	6,378	91,055	11,269	209,853	114.02	—25,796	5,000	—30,801	—5,688
Kansas City Southern	774	940,150	221,293	1,282,704	166,056	280,395	16,326	445,901	35,480	941,731	73.41	340,973	61,250	279,510	262,592
Kansas City Terminal	27	.....	.....	112,123	27,504	24,753	.....	53,805	1,507	109,945	98.05	2,178	41,625	—39,447	—32,913
Lake Erie & Western	902	696,866	61,645	803,986	151,426	246,517	15,963	366,654	24,708	805,269	100.16	—1,283	46,700	—48,053	—139,767
Lehigh & Hudson River	96	203,057	4,750	217,525	29,996	44,632	2,186	110,525	6,072	193,411	88.91	24,113	7,866	15,650	—24,391
Lehigh & New England	234	363,665	2,504	394,742	55,787	73,527	2,587	121,883	9,557	263,341	66.71	131,401	10,860	120,541	25,697
Lehigh Valley	1,435	4,677,005	526,054	5,705,823	997,421	1,754,838	22,054	2,460,547	111,989	5,367,192	94.06	338,631	163,000	175,186	—604,776
Long Island	398	585,552	950,072	1,747,113	234,333	472,314	12,153	1,092,722	51,473	1,880,240	107.61	—133,127	94,428	—228,540	—218,294
Los Angeles & Salt Lake	1,168	1,131,544	386,969	1,623,962	132,606	190,763	16,469	563,048	28,640	977,816	60.21	646,145	54,640	591,084	326,749
Louisiana & Arkansas	302	167,704	51,788	226,079	57,446	35,701	3,668	78,748	7,355	182,729	80.82	43,351	26,210	17,083	4,609
Louisiana Ry. & Nav. Co	349	261,019	37,701	308,509	84,370	75,521	3,836	117,329	8,651	289,707	93.91	18,803	18,000	803	—15,932
Louisiana Western	207	243,042	106,679	370,315	30,978	60,253	4,518	83,287	10,223	191,354	51.67	178,961	8,778	170,158	65,151
Louisville & Nashville	5,013	6,336,480	1,947,341	8,825,435	1,521,248	2,453,110	128,804	3,782,126	196,942	8,135,277	82.17	690,158	260,714	429,327	—244,761
Louisville, Henderson & St. Louis	199	143,065	59,007	215,001	44,954	29,999	3,884	87,316	7,842	173,995	80.92	11,005	4,000	36,947	—37,769
Maine Central	1,216	989,714	387,819	1,494,711	234,443	371,717	11,437	743,294	34,143	1,396,512	93.43	98,199	80,680	17,446	38,973
Maryland, Delaware & Virginia	82	75,840	26,208	105,546	24,789	43,064	935	70,921	2,163	141,871	134.41	—36,325	1,908	—38,233	21,597
Michigan Central	1,861	4,666,279	1,591,534	7,000,358	759,011	1,510,921	68,424	2,847,357	118,085	5,384,565	76.91	1,615,793	285,000	1,330,451	—181,222
Midland Valley	391	226,410	93,526	334,259	84,822	63,815	4,118	146,598	14,492	313,846	93.89	20,412	6,786	13,615	—31,469
Mineral Range	101	63,580	426	67,121	13,063	16,260	338	31,135	895	61,691	91.91	5,430	3,500	1,930	—15,162
Minneapolis & St. Louis	1,646	856,682	205,610	1,130,817	183,660	329,420	11,113	608,971	29,925	1,160,938	102.66	—30,121	52,991	—83,231	—55,680
Minneapolis, St. Paul & Sault Ste. Marie	4,243	2,876,933	708,865	3,847,139	490,171	687,154	28,312	1,771,013	79,651	3,069,842	79.79	777,297	211,580	565,555	240,183
Minneapolis & International	194	48,037	35,061	88,363	10,331	20,770	500	41,385	3,179	76,166	86.19	12,198	4,405	7,790	4,619
Mississippi Central	164	61,266	25,528	90,524	60,018	41,388	1,328	37,984	6,449	147,168	162.55	—56,644	2,800	—59,516	—61,845
Missouri & North Arkansas	365	82,539	39,250	131,245	55,792	43,649	4,908	73,620	12,298	190,217	144.93	—58,972	6,241	—65,243	—42,079
Missouri, Kansas & Texas	1,713	2,093,874	649,873	2,932,146	504,283	963,168	30,061	1,211,447	86,352	2,809,143	95.80	123,003	131,084	—9,128	—802,836
Missouri, Kansas & Texas of Texas	1,796	1,521,548	740,745	2,432,996	520,497	436,201	27,157	1,407,675	92,276	2,501,968	102.83	—68,971	83,094	—152,712	—374,848
Missouri, Oklahoma & Gulf	332	85,684	20,919	114,404	78,569	80,699	2,467	79,419	7,622	249,095	217.73	—134,691	8,500	—143,307	—113,759
Missouri Pacific	7,301	5,724,599	1,722,244	8,038,351	1,917,112	1,804,762	82,967	3,670,696	222,448	7,724,538	96.09	313,813	277,374	34,097	—1,540,468
Mobile & Ohio	997	1,118,243	180,386	1,376,663	271,790	430,732	28,247	669,197	46,422	1,447,260	105.12	—70,597	45,000	—115,809	—52,492
Monongahela	108	329,743	22,941	359,431	80,619	34,211	747	93,514	7,739	216,830	60.32	142,602	—5,000	147,596	97,039
Monongahela Connecting	6	.....	.....	245,807	24,548	41,311	559	76,182	7,315	149,916	60.98	95,892	2,097	93,796	82,173
Montour	56	14,752	1,428	21,881	20,244	54,194	1,313	16,899	7,211	100,331	45.85	—78,450	1,527	—79,977	—43,710
Morganis, Louisiana & Texas	400	537,911	170,270	751,934	77,079	154,571	8,150	265,683	19,427	526,906	70.07	225,028	29,796	195,148	—17,899
Nashville, Chattanooga & St. Louis	1,247	1,436,338	405,545	1,950,824	336,102	522,114	44,874	775,268	43,753	1,727,679	88.56	223,144	85,000	137,703	—170,366
Nevada Northern	168	142,421	9,982	157,842	30,154	30,720	889	42,890	5,314	110,167	69.79	47,675	10,758	36,917	—51,770
New Orleans & N. E.	195	415,645	103,152	585,717	116,086	166,108	8,339	231,621	14,511	541,112	92.47	44,606	21,727	22,726	64,907
New Orleans Great Northern	284	133,432	41,709	184,379	36,455	46,831	3,726	90,331	11,060	188,786	102.39	—4,407	15,069	—19,512	—53,428
New Orleans, Texas & Mexico	191	146,874	28,509	182,120	47,201	43,859	6,095	59,741	6,907	166,282	91.30	15,838	10,000	5,797	10,731
New York Central	6,075	15,277,123	6,751,813	25,642,731	2,494,894	5,654,633	214,970	10,737,047	620,631	20,221,830	78.85	5,420,901	1,094,026	4,323,134	—2,311,957
New York, Chicago & St. Louis	574	1,533,936	83,649	1,684,850	201,540	383,937	25,621	845,126	54,929	1,515,905	89.97	168,945	50,000	118,837	—334,728
New York, New Haven & Hartford	1,965	4,505,991	3,747,993	9,527,248	1,234,493	1,780,142	34,549	4,418,549	324,099	7,960,979	83.56	1,566,269	392,000	1,170,341	1,714,422
New York, Ontario & Western	569	521,629	118,391	781,753	164,543	213,471	9,732	428,469	22,184	838,400	107.24	—56,647	30,000	—86,693	123,571
New York, Philadelphia & Norfolk	121	613,112	86,112	754,946	77,843	263,220	9,271	326,220	11,749	710,022	94.04	44,924	23,806	21,041	—31,830
New York, Susquehanna & Western	135	240,025	58,786	333,720	59,143	55,751	1,479	220,602	8,362	345,334	103.47	—11,615	—40,700	—52,331	—130,091
Newburgh & South Shore	7	.....	.....	84,899	12,719	21,759	.....	56,119	3,661	94,259	111.02	—9,360	5,564	—14,923	—42,455
Norfolk & Western	2,088	5,795,809	728,486	6,872,061	1,197,121	2,180,896	39,290	2,552,223	114,551	6,107,074	88.86	764,986	260,000	504,129	—1,438,859
Norfolk Southern	906	344,232	142,900	523,511	119,699	123,686	9,926	276,047	21,264	550,904	105.23	—27,393	16,000	—43,765	—81,363
Northern Pacific	6,626	6,987,527	1,698,472	9,410,240	1,128,640	1,682,702	89,725	5,550,915	192,973	6,775,534	72.00	2,634,705	716,721	1,916,676	—1,416,826
Northwestern Pacific	538	380,915	180,070	623,175	136,330	85,847	4,878	247,377	13,884	490,546	78.71	132,629	25,647	106,971	62,979
Northern Alabama	112	102,555	14,005	118,763	20,765	6,957	1,587	45,705	1,752	76,765	65.18	41,998	3,801	38,198	17,869

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF NOVEMBER, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Oregon Short Line	2,347	$2,685,053	$575,092	$3,480,564	$308,923	$424,747	$17,133	$1,016,108	$85,949	$1,912,569	54.95	$1,567,995	$258,145	$1,309,706	$274,906
Oregon-Washington R. R. & Nav. Co.	2,070	1,850,107	551,429	2,595,920	465,288	434,756	38,273	1,069,299	96,784	2,123,736	81.83	472,184	113,614	358,026	131,365
Panhandle & Santa Fe	772	589,084	144,792	764,259	69,384	216,767	4,107	290,310	15,492	595,796	77.95	168,463	20,895	147,568	176,314
Pennsylvania Railroad, Western	1,754	5,944,078	1,697,980	8,444,196	1,373,586	3,004,189	77,016	3,726,310	195,914	8,456,010	100.14	—11,813	512,201	—525,248	1,203,891
Pennsylvania Railroad, Eastern	5,371	16,814,972	6,881,472	26,928,303	5,635,300	10,549,982	252,873	14,431,286	293,316	32,278,241	119.86	—5,349,938	891,722	—6,250,719	—7,699,052
Peoria & Pekin Union	19	27,444	3,042	101,555	16,057	42,551	795	74,562	4,823	138,788	136.66	—37,232	9,500	—46,732	—9,023
Pere Marquette	2,230	2,613,306	483,797	3,404,145	343,304	699,331	30,055	1,395,907	74,114	2,550,673	74.92	853,472	62,021	791,415	142,226
Perkiomen	42	90,407	8,037	101,811	6,405	4,637	13	36,624	319	48,017	47.16	53,794	51,427	52,367	—18,796
Philadelphia & Reading	1,127	4,399,015	956,989	5,725,498	622,797	1,723,783	40,599	3,124,638	143,812	5,625,563	99.12	49,934	143,228	—93,599	—862,206
Philadelphia, Bethlehem & N. E.	71	.....	.....	73,013	11,804	10,703	408	58,207	1,115	82,236	112.63	—9,224	1,110	—10,334	—59,199
Pittsburgh & Lake Erie	224	1,534,155	236,826	1,979,770	262,179	913,691	14,168	794,946	49,128	2,036,152	102.84	—56,381	72,000	—128,385	—892,104
Pittsburgh & West Virginia	63	143,080	11,351	165,501	42,970	65,073	1,403	53,591	6,268	177,197	107.06	—11,696	11,467	—23,170	6,529
Pittsburgh & Shawmut	103	31,093	4,474	37,004	21,669	39,148	1,056	23,473	2,936	88,282	238.57	—51,278	—7,485	—43,793	—64,937
Pittsburgh, Cincinnati, Chi. & St. Louis.	2,383	4,707,068	1,688,449	7,180,718	1,325,559	3,267,510	108,731	3,621,948	182,875	8,582,815	119.52	—1,402,097	483,657	—1,886,170	1,899,237
Pittsburgh, Shawmut & Northern	204	59,957	6,079	68,711	22,555	43,275	1,330	42,256	5,597	115,016	167.39	—46,304	1,821	—48,125	35,411
Port Reading	21	179,872	.....	217,046	15,019	1,359	18	76,583	1,045	94,024	43.32	123,022	18,229	104,793	59,443
Quincy, Omaha & Kansas City	255	71,108	26,826	105,680	36,415	22,466	127	48,771	1,685	109,367	103.48	—3,687	3,053	—6,759	66,473
Richmond, Fred. & Potomac	81	282,949	215,292	568,422	43,912	92,392	5,368	232,654	17,745	399,778	70.33	168,645	28,676	139,964	—240,520
Rutland	415	246,419	135,755	448,926	62,478	98,051	4,279	199,236	11,480	377,058	83.99	71,869	19,543	52,009	118,914
St. Joseph & Grand Island	258	197,714	27,658	248,131	75,926	48,571	2,240	133,291	12,685	272,713	109.91	—24,582	11,839	—36,422	4,646
St. Louis, Brownsville & Mexico	548	332,338	127,960	493,125	140,780	97,046	13,790	143,811	16,570	411,997	83.54	81,128	10,000	70,664	—30,635
St. Louis Merchants Bridge Terminal	9	.....	680	299,556	57,212	7,195	792	257,729	5,699	328,627	109.70	—29,070	9,898	—38,968	24,248
St. Louis-San Francisco	4,761	4,674,116	1,419,541	6,997,915	1,030,830	1,405,684	58,689	2,692,981	175,846	5,361,686	76.61	1,636,229	205,500	1,428,803	220,222
St. Louis Transfer	6	.....	.....	99,376	14,137	—2,823	195	56,931	2,075	70,514	70.95	28,862	43	28,819	16,799
St. Louis, San Francisco & Texas	134	108,186	21,905	141,124	17,102	22,330	1,837	73,728	3,869	118,868	84.22	22,257	1,629	20,604	21,162
St. Louis Southwestern	939	1,142,708	183,299	1,386,478	165,518	303,156	19,613	387,111	39,557	919,107	66.29	467,372	37,770	429,563	255,520
St. Louis Southwestern of Texas	814	485,743	146,004	683,371	191,756	258,029	10,166	344,243	26,316	830,171	121.48	—146,800	21,000	—167,822	—28,285
San Antonio & Aransas Pass	737	283,700	117,993	419,041	204,903	131,923	3,835	186,731	15,704	541,903	129.31	—122,862	15,000	—138,130	—183,367
Seaboard Air Line	3,563	2,417,209	878,550	3,539,893	718,656	790,094	67,211	1,684,958	100,204	3,387,486	95.69	152,407	135,000	16,916	—13,837
South Buffalo	12	15,565	.....	51,446	7,516	13,142	443	24,451	1,419	56,970	110.73	—5,524	3,667	—9,191	—33,817
Southern	6,982	7,120,468	2,621,182	11,146,188	2,174,379	2,289,608	137,468	5,110,976	284,044	10,063,438	90.28	1,082,750	339,638	740,744	—317,578
Southern Ry. in Mississippi	278	120,054	60,363	192,501	41,888	19,427	3,798	85,535	4,205	154,852	80.44	37,649	7,500	30,119	3,066
Southern Pacific	7,049	10,641,709	3,798,428	15,721,987	1,880,961	2,896,120	110,998	5,557,887	276,292	10,954,366	69.67	4,767,621	317,277	4,448,648	2,139,158
Southern Pacific Steamship Lines	...	575,214	27,846	639,141	10,430	253,756	13,360	506,018	26,863	810,427	126.78	—171,286	9,997	—181,324	—359,687
Spokane International	156	103,828	18,337	124,380	27,246	9,829	2,570	41,029	5,059	85,362	68.63	39,018	7,196	31,822	16,259
Spokane, Portland & Seattle	538	424,457	150,289	618,220	107,049	80,524	8,277	221,843	20,918	440,948	72.70	177,272	75,000	102,204	—39,927
Staten Island Rapid Transit	24	82,599	71,374	174,139	20,124	33,007	1,065	97,938	9,491	161,626	92.81	12,524	20,000	—8,106	2,701
Tennessee Central	292	136,077	44,000	190,582	61,707	69,628	4,142	117,753	6,217	259,445	136.13	—68,864	7,175	—76,052	—76,806
Terminal R. R. Assn. of St. Louis	36	3,403	.....	342,895	120,995	18,525	2,781	214,981	4,509	362,786	105.80	—19,891	45,926	—65,954	—100,254
Texarkana & Fort Smith	87	147,592	19,784	179,029	12,508	37,586	1,453	61,072	2,935	115,499	64.52	63,530	6,458	57,852	6,020
Texas & New Orleans	469	453,748	161,385	687,280	121,491	201,498	4,524	198,997	13,814	573,024	83.37	114,256	21,356	92,852	20,175
Texas & Pacific	1,946	2,080,122	1,007,669	3,287,872	487,372	726,186	23,769	1,341,019	73,608	2,673,493	81.31	614,380	173,755	439,056	54,836
Toledo & Ohio Central	435	478,235	73,859	592,701	153,090	263,166	8,056	307,101	16,397	750,881	126.68	—158,180	31,568	—189,766	—117,519
Toledo, Peoria & Western	247	77,353	52,645	140,161	33,445	46,477	2,166	72,822	5,337	160,248	114.33	—20,086	8,500	—28,586	—2,810
Toledo, St. Louis & Western	454	721,957	18,087	773,785	122,294	188,148	7,488	347,959	12,083	677,851	87.60	95,934	25,000	70,934	123,652
Trinity & Brazos Valley	368	129,030	25,822	161,053	40,790	40,869	1,862	65,511	6,631	155,662	96.65	5,391	10,408	—5,020	—64,665
Ulster & Delaware	128	51,878	19,862	92,811	20,599	19,513	1,255	63,099	5,709	110,610	119.17	—17,798	1,800	—19,594	—11,176
Union	40	.....	.....	593,166	110,691	265,707	251	351,289	6,937	734,875	123.88	—141,709	9,000	—150,709	—314,871
Union Pacific	3,614	7,220,006	1,680,776	9,644,475	1,372,370	2,025,666	41,561	2,976,747	247,834	6,891,299	71.45	2,753,176	339,455	2,411,980	—785,291
Utah	98	138,281	612	137,247	19,861	22,580	168	26,280	2,212	71,102	51.81	66,145	6,790	59,355	18,872
Vicksburg, Shreveport & Pacific	171	185,306	87,091	295,246	49,003	60,132	5,140	105,039	12,323	234,847	79.54	60,399	20,242	40,085	31,581
Virginian	523	878,505	58,635	1,000,667	136,448	255,510	5,257	394,664	17,690	810,684	81.01	190,583	24,500	166,083	3,814
Wabash	2,503	3,145,803	795,115	4,312,598	872,380	821,435	55,826	2,203,973	120,671	4,097,843	95.02	214,755	112,092	102,090	—460,233
Washington Southern	35	115,950	137,545	321,051	46,307	38,828	2,944	124,766	8,875	224,999	70.08	96,052	16,476	79,550	—156,059
West Jersey & Seashore	361	276,400	413,758	769,395	169,514	221,919	7,537	500,169	22,695	927,738	120.58	—158,344	52,025	—210,396	—21,037
Western Maryland	689	882,195	79,519	1,123,170	163,647	438,559	18,163	427,465	51,332	1,110,440	98.86	12,731	43,200	—30,469	103,467
Western Pacific	1,041	1,028,464	142,432	1,220,182	185,222	194,948	14,224	355,724	27,834	797,456	65.35	422,726	59,845	362,779	262,257
Western Ry. of Alabama	133	141,801	69,219	227,404	27,309	46,685	3,124	79,358	7,413	167,678	73.73	59,725	3,000	56,725	—12,644
Wheeling & Lake Erie	511	639,258	60,745	800,154	85,474	256,152	6,362	421,852	27,024	801,155	100.12	—1,002	64,300	—65,331	—126,785
Wichita Falls & N. W.	328	694,632	44,050	249,646	66,090	48,732	1,636	138,949	5,930	261,337	104.68	—11,691	11,178	—22,877	27,234
Yazoo & Mississippi Valley	1,381	1,670,159	531,306	2,320,574	354,988	477,684	17,651	799,296	46,743	1,695,306	73.05	625,268	94,583	530,304	—122,025
Lake Superior & Ishpenning	34	67,170	270	76,375	15,810	15,840	258	26,355	2,478	60,741	79.52	15,634	3,872	11,762	—1,304
ELEVEN MONTHS OF CALENDAR YEAR 1919															
Alabama & Vicksburg	141	$1,670,839	$687,706	$2,530,800	$463,914	$549,374	$22,657	$1,003,999	$98,421	$2,160,542	85.37	$370,257	$123,257	$246,132	—$21,713
Alabama Great Southern	312	6,779,442	2,261,117	9,559,490	1,356,675	2,401,616	145,736	3,606,405	202,405	7,778,867	81.37	1,780,822	248,081	1,531,349	—234,473
Ann Arbor	301	3,179,088	655,052	4,050,284	566,078	715,953	51,794	1,874,098	116,283	3,324,781	82.08	725,502	176,500	548,530	365,140
Arizona Eastern	377	2,624,565	500,657	3,366,099	752,769	553,570	23,843	1,109,783	107,500	2,584,001	76.76	782,097	221,798	559,670	—678,178
Atchison, Topeka and Santa Fe	8,649	112,356,213	41,200,933	162,387,311	21,306,966	36,961,195	1,561,956	56,865,214	2,760,776	118,992,351	73.27	43,394,960	6,654,641	36,707,596	—2,519,092
Atlanta & West Point	93	1,218,671	1,049,212	2,534,502	312,849	459,040	34,308	952,305	77,314	1,869,247	73.75	665,255	78,500	586,643	—48,408
Atlanta, Birmingham & Atlantic	839	3,353,726	875,606	4,530,659	1,077,160	1,404,849	81,719	2,564,926	138,264	5,267,760	116.26	—737,101	176,000	—915,107	—463,611

REVENUES AND EXPENSES OF RAILWAYS

ELEVEN MONTHS OF CALENDAR YEAR, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Atlantic City	177	$1,335 352	$2,668,471	$4,199,449	$564,998	$503,122	$18,290	$2,058,326	$14.630	$3,160,388	75.25	$1,039,062	$152,173	$886,880	—$280,363
Atlantic Coast Line	4,865	36,743,192	16,742,943	57,158,218	8,685,225	12,587,458	675,670	25,207,301	1,214,767	48,678,062	85.16	8,480.156	2,310,000	6,151,415	—4,027,425
Baltimore & Ohio, Chicago Terminal	90	.....	3,050	1,864,224	380,487	490,946	12,446	1,395,409	91,605	2,424.052	130.03	—559,828	302,634	—863,189	247,993
Baltimore & Ohio	5,151	124,868,854	29,309,067	166,874,203	24,476,392	51,523,860	1,727,478	71,861,967	4,085,715	154,898,986	92.82	11,975,217	4,181,185	7,779.832	—1,010,338
Baltimore, Chesapeake & Atlantic	87	948,249	482.252	1,486,508	166,817	417,508	11,398	858,247	38,372	1,492,341	100.39	—5,832	38,175	—44,011	43,480
Bangor & Aroostook	632	3,660,182	864,918	4,766,257	1,062,090	1,340,072	41,931	1,835,063	134,293	4,481,325	94.02	284,932	234,885	48,134	—348,251
Beaumont, Sour Lake & Western	118	889,652	279,051	1,226,463	279,290	233,539	23,268	515,631	55,810	1,107,538	90.30	118,925	29,700	88,978	—325,674
Belt Ry. Co. of Chicago	31	.....	.....	3,433,976	325,949	608,835	3,993	2,034,261	86,896	3,059,935	89.10	374,041	170,790	203,251	269,831
Bessemer & Lake Erie	217	11,267,972	454,852	12,009,127	1,366,114	3,713,055	114,820	3,750,637	212,870	9,158,184	76.26	2,850,942	166,500	2,684,281	—1,173,755
Bingham & Garfield	37	1,094,953	22,468	1,159,121	418,969	447,591	14,176	316,108	45,411	1,265.080	109.14	—105,959	89,991	—195,951	—1,587,484
Birmingham Southern R. R	29	401,493	.....	522,793	46,989	64,917	7,763	266,508	35,783	421,960	80.71	100,832	20,301	80,532	—249,105
Boston & Maine	2,258	39,373,680	20,088,744	66,142,695	8,592,309	13,155.306	450.563	34,662,304	1,860,765	59,117,637	89.37	7,025,057	2,006,825	5,017,304	—363,325
Buffalo & Susquehanna R. R. Corp	296	1,841,430	74,156	2,012,577	493,836	1,047,298	21,827	698,192	88,676	2,349,828	116.75	—337,251	35,750	—373,004	—346,042
Buffalo, Rochester & Pittsburgh	589	10,972,735	1,443,857	12,949,772	2,176,753	4,792,751	159,274	6,207,724	358,147	13,719,507	105.94	—769,735	280,000	—1,050,302	—1,622,070
Canadian Pacific Lines in Maine	233	1.692.265	561,732	2,385,215	561,087	555,129	28,116	1,471.673	38.030	2.653,199	111.23	—267,984	128.000	—396,284	—30.929
Carolina, Clinchfield & Ohio	282	4,942,285	374,956	5,417,999	835,109	1,381,703	54,910	1,691,870	148,952	4,111,121	75.87	1,306,878	179,300	1,127,397	235,610
Central New England	301	5,629,413	271,629	6,178,555	1,413,744	1,117,125	32,201	2,749,257	159,325	5,478,275	88.66	700.280	176,000	523,151	81,021
Central of Georgia	1,918	11,880.904	5,864,938	19,591,635	3,955,056	4,063,443	379,984	8,393,721	653,809	17,451,476	89.07	2,140,160	722,883	1,406,911	—2,028,895
Central of New Jersey	685	29,950,748	7,866,546	40,926,536	4,958,402	10,850,939	286,853	19,255,004	927,207	36,456,316	89.07	4,470,220	2,282,657	2,187,394	—4,776,890
Central Vermont	411	3,883.265	990.268	5.338,422	1,023,961	1,372.120	85,293	3.196.852	194.929	5,893,519	110.40	—555,097	191,400	—746,800	—446,531
Charleston & Western Carolina	342	2,095,135	567,906	2,798,015	523,356	542,025	53,297	1,370,367	59,047	2,548,092	91.06	249,923	88,383	161,491	—318,805
Chesapeake & Ohio	2,505	48,683,380	13,255,693	65,799,339	10,808,167	15,925,929	411,892	35,954,111	1,223,071	54,672,762	83.09	11,126,577	1,818,841	9,302,439	—6,384,012
Chicago & Alton	1,050	15,646,250	5,875,103	22,890,226	3,951,248	6,564,763	271,447	9,903,968	542,900	21.347,533	93.26	1,542,693	676,680	863,637	—2,118,631
Chicago & Eastern Illinois	1,131	16,493,775	4,463,726	22,623,057	3,496,341	8,159,917	232,897	9,536,791	522,925	22,033,036	97.39	590,021	805,502	—219,991	—2,298,063
Chicago & Erie	269	7,664,752	1,031.628	9.504,852	1,052.001	1,585,509	116,753	4,759,646	302,693	7,851.810	82.60	1,653.042	372,965	1,279,976	464,499
Chicago & Northwestern	8,090	85,311,561	32,268,885	128,495,802	19,013,006	26,779,297	805,157	57,700,122	2,766,893	108,037,908	84.07	20,457.894	5,225,000	15,221,468	1,295,727
Chicago, Burlington & Quincy	9,372	98,147,468	32,609,995	141,282,136	20,078,536	29,520,875	973,981	53,972,018	3,560,555	109.448,136	77.46	31.833,999	4,989.023	26,816,229	2,302,282
Chicago, Great Western	1,496	13,325,110	5,504,192	20,268,695	3,306,105	4,504,310	287,256	8,686,565	500,188	17,428.115	85.98	2,840.580	623,238	2,216,661	1,410,713
Chicago, Indianapolis & Louisville	657	7,633,230	2,645,900	11,277,926	1,342,349	2,972,933	156,247	4,843,234	286,963	9,712.714	86.12	1,565,212	447,452	1,116,348	—129,628
Chicago Junction	12	.....	.....	3,391.416	736.944	553,031	1,100	2,513,345	75,470	3,879,891	114.41	—488,475	28,717	—517,275	—197,547
Chicago, Milwaukee & St. Paul	10,648	97,807,161	27,574,081	137,783,972	21,176,538	36,890,182	964,038	62,384,268	3,534,041	125,517,256	91.09	12,266,717	5,867,226	6,267,962	778,174
Chicago, Peoria & St. Louis	247	1,194,069	280,869	1,574,776	415,220	731,604	30,284	942,705	94,750	2,214,480	140.62	—639,704	74,866	—714,586	—382,932
Chicago, Rock Island & Gulf	463	3,267,113	992,549	4,536,434	712,733	804,114	77,032	1,975,246	131,624	3,711.717	81.82	824,717	158,121	666,175	—289,256
Chicago, Rock Island & Pacific	7,594	66,660,242	28,825,363	101,427,337	16,971,440	23,102.653	1,134,142	43,242,072	2,207,583	87,052,528	85.82	14,375.009	4,015,207	10,359,979	206,759
Chicago, St. Paul, Minneapolis & Omaha	174	16,736.760	6,941.354	25,319,887	3,577,454	4,667,129	235,063	11,806,457	668,008	21,109,382	83.37	4,210.505	1,197,305	3,008,241	549,829
Chicago, Terre Haute & St. Louis	374	3,395,610	238,847	3,735,701	622,455	1,682,808	33,991	1,456,792	97,252	3,910,565	104.68	—174,864	159,500	—334,383	—820,648
Cincinnati, Lebanon & Northern	76	826,146	89,641	1,078,691	195,090	241,329	14,599	591,431	10,982	1,053.432	97.65	25,259	53,388	—28,136	—99,281
Cincinnati, Indianapolis & Western	321	2,014,669	589,116	2,861,232	560,680	937,250	59,692	1,484,387	146,327	3,198.021	111.77	—336,789	125,622	—462,489	—362,944
Cincinnati, New Orleans & Texas Pacific	337	10,899,629	3,290,614	14,930,165	2,270,137	4,892.905	251,466	6,188,749	375,177	14 058 827	94.16	871.338	414.214	450,546	—1,678,673
Cincinnati Northern	251	2,368,830	208.526	2,653,227	385,811	602,875	23,897	947,808	52.161	2,012,552	75.85	640.675	112.100	528,254	222,475
Cleveland, Cincinnati, Chic. & St. Louis	2,397	45,738,293	15,673,837	66,622,180	8,188,142	12,971,058	834,787	27,190,950	1,195,698	50.894,148	76.39	15,728,031	2,057,000	13,661,088	—1,165,046
Colorado & Southern	1,100	8,873,278	2,320,958	11,870,656	1,949,845	2,849,528	93,678	4,402,381	397,927	9,774,178	82.33	2,096,479	517,000	1,575,604	—983,619
Colorado & Wyoming	41	240,757	13.065	890,339	111,839	168,835	1,570	396,957	41,539	720.739	80.95	169,600	44,000	125,600	—730,010
Cumberland Valley	163	4,039.463	802,624	5,192,270	917,617	1,166.277	71,166	1,942,822	126,347	4,231,329	81.49	960,941	94,063	866,468	—1,042,766
Delaware & Hudson	875	27,060.008	3,011,417	31,868,866	4,027,891	9,095,372	216,998	14,097,990	1,190,590	28,964 024	90.88	2.904,843	714.000	2,183,256	—581,154
Delaware, Lackawanna & Western	955	47,310,616	11,394,038	65,516,900	7,061,831	13,806,270	451,981	27,736,270	1,249,549	50,965,827	77.79	14,551,074	3,449,429	11,079,889	—3,956,061
Denver & Rio Grande	2,593	21,698,602	6,350,728	29,850,621	4,560,596	7,202,161	219,005	10,142,857	763,421	23,357,216	78.24	6,493.404	1,230,000	5,258,601	751,943
Denver & Salt Lake	255	2,163,920	413,875	2,658,205	794,550	1,019,807	10,224	1,405,118	57,104	3,306,804	124.38	—648,598	99,000	—748,182	—20,235
Detroit & Mackinac	381	1,090,272	361,644	1,538,285	242,056	408,221	30,307	699,430	101,054	1,479,899	96.20	58,386	84,683	—26,298	14,747
Detroit & Toledo Shore Line	61	2.219.130	.....	2,255,356	231,166	204,724	12,520	659,068	50.984	1,157,873	51.33	1,097.513	100.096	987,410	321,777
Detroit, Toledo & Ironton	456	3,128,796	147,281	3,476,796	984,923	1,053,451	33,752	1,627,590	51,207	3,850,972	110.92	—379,175	100,311	—479,884	—68,024
Duluth & Iron Range	292	7,030,468	246,415	7,833,188	996,666	1,088,830	5,089	2,025,436	158,261	4,277,426	54.60	3,555,762	395,243	3,159,364	—759,952
Duluth, Missabe & Northern	411	17,775,331	494,138	19,734,662	1,788,683	1,527,446	24,483	3,673.543	220,384	7,249,825	36.73	12,484,837	806,936	11,677,901	—819,229
Duluth, South Shore & Atlantic	599	2,983,927	1,124,855	4,397,413	870,934	779,794	60,206	2,122,360	101,383	3,988,474	90.70	408,939	223,003	185,681	—192,463
Duluth, Winnipeg & Pacific	178	1,421,231	278,712	1,752,753	356,420	339,963	28,200	764,574	89,711	1,585,530	90.45	167.223	94,235	72,986	—46,497
East St. Louis Connecting	3	.....	.....	1,099,046	157.143	235,017	2,996	794,309	36,862	1,225,980	111.54	—126,934	27,865	—154,798	—43,596
El Paso & Southwestern	1,027	9,106,430	1,996,104	11,710,341	2,057,932	2,304,423	108,438	3,227,042	280.141	8,063,665	68.85	3,646,676	626,173	3,020,040	—1,687,273
Elgin, Joliet & Eastern	829	14,871,521	101	17,315,078	1,755,317	4,563,316	75,266	6,849,612	282,182	13.523,571	78.10	3,791.507	591,120	3,200,404	—1,455,805
Erie	1,989	63,646,210	12,460,372	83,677,123	9,805,222	26,290,605	686,288	40,603,807	2,205.374	80,064.884	95.68	3,612,239	3,072,572	519,627	2,396,898
Florida East Coast	764	5,378.660	2,705,230	9,124,703	1,535,169	1,680,316	88,017	3,963,204	190.366	7,560,126	82.85	1,564.577	418,789	1,143,155	—438,624
Fonda, Johnstown & Gloversville	88	370,118	723,832	1,139,587	131,332	97,571	6,823	442,303	55,991	734,020	64.41	405,566	58,900	346.667	5,784
Fort Smith & Western	253	1,083,755	316,672	1,490,639	273,993	349,423	41,108	527,492	71,192	1,270,142	85.20	220,497	55,000	164,138	61,073
Ft. Worth & Denver City	454	6,491,189	3,229,592	10,109,666	978,062	1,975,560	50,552	3,619,419	275,864	6,934,105	68.59	3,175,561	223,162	2,951,169	1,536,704
Ft. Worth & Rio Grande	235	773,880	511,315	1,487,845	313,719	250,616	15,141	720,227	67,598	1,367.303	91.89	120,541	33,402	86,774	74,586
Galveston, Harrisburg & San Antonio	1,381	13,694,230	5,000,377	19,624,292	2,764,754	4,390,131	190,804	7,199,664	589,881	15,299,517	77.96	4,324,776	581,818	3,737,625	—1,431,275
Galveston Wharf	13	.....	.....	854,882	316,364	10,272	169	303,851	17,534	774,473	90.53	80,409	137,500	—57,091	—233,557
Georgia	328	3,814,248	1,647,017	5,868,356	615,515	975,731	89,687	2,715,709	185,636	4,584,211	78.11	1,284,145	66,450	1,217,633	—899,066
Georgia & Florida	348	620,794	229,894	907,978	360,465	219,532	20,930	579,c60	62,054	1,242,642	136.85	—334,664	46,219	—381,664	—312,367
Georgia Southern & Florida	402	2,525,525	1,070,838	3,933,832	668,881	951,673	67,198	1,883,886	118,978	3,716,620	94.47	217,213	167,307	49,227	—149,277
Grand Rapids & Indianapolis	569	5,025,329	1,985,551	7,578,496	949,080	1,715,896	115,599	3,571,941	260,037	6,643,087	87.65	935,409	284,306	651,018	125,923
Grand Trunk, Western	1,001	15,417,569	3,312,011	20,408,489	2,586,363	3,375,734	184,625	9,249,014	559,121	16,007,365	78.43	4,401,123	570,969	3,826,328	3,259,647

November Earnings

In the eleven months ended November 30, 1919, 186 Class I roads and 17 switching and terminal roads earned net operating income amounting to $503,049,514, according to the monthly summary issued by the Interstate Commerce Commission. This compares with $664,480,245 in the corresponding period of 1918, and with $832,000,000 for the corresponding months of the test period, thereby indicating a deficit for the government for 11 months of $329,000,000. A preliminary statement issued by the Railroad Administration recast the accounts so as to show a loss of only $293,000,000 for this period. The Interstate Commerce Commission figures do not correspond exactly with those of the Railroad Administration because they include a few roads not under federal operation. The operating ratio for 11 months was 84.66, as compared with 80.73 in 1918.

For November the Interstate Commerce Commission report shows a net operating income of $21,966,992, as compared with $57,270,158 in November, 1918. The operating revenues for the roads as a whole show the effect of the coal strike very little, having decreased only $2,776,000, as compared with November, 1918, but the eastern roads show a falling off in revenues of $23,000,000. The freight revenues of the roads as a whole, however, fell off $19,000,000, while the passenger revenues increased $10,000,000 and the express revenues $4,000,000. Expenses show an increase of $25,000,000, of which $10,000,000 was in maintenance of equipment, $4,000,000 in maintenance of way, and $8,000,000 in transportation, showing that the unfavorable results of the month are largely due to other causes than the coal strike. The commission's figures are shown in the large table. The average railway operating income per mile for November (item 22, $125) compares with an average for November, 1914, 1915 and 1916, of $378 per mile.

RAILWAY REVENUES FOR NOVEMBER AND FOR ELEVEN MONTHS.

Item	November Amount 1919	November Amount 1918	November Per mile of road operated 1919	November Per mile of road operated 1918	Eleven months Amount 1919	Eleven months Amount 1918	Eleven months Per mile of road operated 1919	Eleven months Per mile of road operated 1918
1. Average number miles operated	234,159.32	234,047.09	.....	.....	233,950.00	234,287.84	.....	.....
Revenues:								
2. Freight	$303,511,167	$322,551,705	1,296	1,378	$3,253,139,834	$3,148,523,766	13,905	13,439
3. Passenger	92,322,627	81,766,019	394	349	1,078,222,658	939,618,167	4,609	4,010
4. Mail	4,283,114	4,244,888	18	18	47,728,608	48,954,789	204	209
5. Express	14,755,913	10,695,145	63	46	111,621,167	113,370,896	477	484
6. All other transportation	10,851,544	10,514,682	46	45	115,824,015	116,119,655	495	496
7. Incidental	12,013,757	10,687,905	52	46	120,108,508	114,468,506	513	488
8. Joint facility—Cr	585,990	591,740	3	3	6,265,095	5,433,399	27	23
9. Joint facility—Dr	185,278	136,896	1	1	1,968,560	1,596,932	8	7
10. Railway operating revenues	438,138,834	440,915,188	1,871	1,884	4,730,941,325	4,484,892,246	20,222	19,142
Expenses:								
11. Maintenance of way and structures	66,645,163	62,694,295	284	268	714,198,357	586,221,354	3,053	2,502
12. Maintenance of equipment	112,210,717	102,094,322	479	436	1,115,552,557	1,001,259,690	4,769	4,274
13. Traffic	4,006,003	3,319,293	17	14	42,905,777	45,409,835	183	194
14. Transportation	192,415,151	183,992,084	822	786	1,979,388,602	1,855,384,388	8,461	7,919
15. Miscellaneous operations	4,412,448	3,253,575	19	14	44,508,260	35,406,458	190	151
16. General	10,723,907	9,918,523	46	43	114,244,141	102,233,691	488	436
17. Transportation for investment—Cr	480,955	451,796	2	2	5,424,701	5,141,814	23	22
18. Railway operating expenses	389,932,434	364,820,296	1,665	1,559	4,005,372,993	3,620,773,602	17,121	15,454
19. Net revenue from railway operations	48,206,400	76,094,892	206	325	725,568,332	864,118,644	3,101	3,688
20. Railway tax accruals (excluding "War Taxes")	18,820,349	15,910,468	80	68	177,017,268	173,168,302	757	739
21. Uncollectible railway revenues	143,521	32,045	1	...	810,400	549,630	3	2
22. Railway operating income	29,242,530	60,152,379	125	257	547,740,664	690,400,712	2,341	2,947
23. Equipment rents (Dr. Bal.)	5,880,036	1,612,843	25	7	30,827,833	12,945,730	132	55
24. Joint facility rent (Dr. Bal.)	1,395,502	1,269,378	6	5	13,863,317	12,974,737	59	56
25. Net of items 22, 23 and 24	21,966,992	57,270,158	94	245	503,049,514	664,480,245	2,150	2,836
26. Ratio of operating expenses to operating revs..%	89.00	82.74	...	...	84.66	80.73	...	...

*Credit item. §Debit item.

National Agreement for Signal Employees

A national agreement covering rules and working conditions for employees represented by the Brotherhood of Railroad Signalmen of America, effective February 1, 1920, has been signed between the director general and the officers of that organization, to continue in force during the period of federal control. The request for this agreement was made several months ago by this organization and has been under consideration since that time. The agreement covers rules upon seniority, discipline, etc., and provides that there will be no change in the agreement during federal operation until after 30 days' notice has been given by either party. In the agreement a classification is outlined.

Stop the Waste!

This is the heading of a large placard, red and black, dealing with freight-damage claims, which has been posted by the Transportation Department of the Southern Railway and addressed to "Every Employee of the Southern Railroad Lines and Associated Railroads, wherever located, in whatever department." Among other things it says:

"You, as an individual, must play your part in the game of prevention of the loss of and damage to freights, if we are to win. If any man among us hasn't the courage to stand up and come to tip-toe and do the thing that he knows will protect the property which he in his job is charged to safeguard, then let him stand aside and keep out of the way of those who will 'carry on.'

"What do you say? Will you go along with us and 'carry on' for a return to pre-war basis?

"This isn't a 'drive,' it's a call to come along and do your duty to mankind and your Railroad.

"Mr. Agent: Post this in your office and warehouses and see to it that every human being connected with the station under your jurisdiction understands and discharges the duty he owes to his Railroad and himself. * * *

"Mr. Conductor: Post this in your cab and not only talk to the boys in your crew about it, but see that the stuff is handled right. I am counting on you to set the example. Waste in local way service is one of the heaviest contributors to the loss and damage account. It isn't necessary for me to enter into detail; *you know better than anyone else how freight should be handled.*

"Mr. Engineman: That last application of the emergency when you froze her to the spot destroyed valuable property and cost your railroad heavily. Have a care, old fellow, shocks in transit are expensive, and you can materially reduce them.

"Mr. Yardmaster: Post this in your office and at other points where your forces will be reminded what an unusual shock in switching means to the merchandise car. *Seriously consider the cost.* * * *

"For ten months, January to October, inclusive, Southern

Railroad Lines paid for loss of and damage to freights as follows:

1917	$752,561
1918	1,035,917
1919	3,262,872

"Remember this money is gone; it cannot be turned into ties, rails, cars or new cabooses. Will you cut a million and a half off these figures during 1920? *You did the trick once before; why not force history to repeat itself?*

"It is said that the two big things of today are love and service. Imagine the unhappiness of the man who doesn't love his work to a point where he will through that love for mankind and his chosen profession go the limit to render 100 per cent service. * * *

"[Signed] W. H. Gatchell."

Freight Efficiency on the Erie

A. J. Stone, Federal Manager, in a circular addressed to division officers and employees of the Erie Railroad says that the transportation department is doing work better than has been done before and better than is being done on some neighboring railroads. Referring first to improvement in freight car movement he reports the following figures:

AVERAGE MILES PER CAR PER DAY

October 1916	26.6
October 1917	25.7
October 1918	30.1
October 1919	37.5

The increase in 1919 over 1917, which was the year previous to Federal operation is 45 per cent. Averages reported from neighboring roads for October, 1919, compare with the Erie as follows:

AVERAGE MILES PER CAR PER DAY.

Erie Railroad	37.5
D. L. & W.	30.7
New York Central	27.8
Lehigh Valley	24.2
Baltimore & Ohio (Lines East)	24.0
Baltimore & Ohio (Lines West)	29.4
Pennsylvania (Lines East)	24.8
Pennsylvania (Lines West)	21.4

This increased mileage per car per day was not accomplished by running trains fast with light tonnage, as will be seen by the following statement:

AVERAGE GROSS TONS PER TRAIN PER MILE

October 1916	1787
October 1917	1932
October 1918	1927
October 1919	2067

An increase of over 15 per cent since 1916.

"Having moved the cars faster, and increased the train load at the same time, it will be interesting to know what each man did to produce this result. Taking the total number of hours worked by all the engineers, firemen, conductors and brakemen on the entire railroad and dividing it into the total number of tons handled one mile, the following appears:

SYSTEM AVERAGE; GROSS TON MILES PER MAN ONE HOUR

October 1916	1902
October 1917	1883
October 1918	1991
October 1919	2552

"Each man on a train working an hour in 1919 represented the movement of 2,552 gross ton miles, an increase of 34 per cent over 1916."

While recognizing the efforts of all classes, Mr. Stone calls particular attention to the fuel record, "The firemen (assisted more or less by the engineemen) have made the following good record:

POUNDS OF COAL BURNED TO MOVE 1,000 GROSS TONS ONE MILE

October 1916	172
October 1917	174
October 1918	168
October 1919	155

"Thus it will be seen that in 1919 ten per cent less coal was burned to move a given load of 1,000 gross tons one mile than in 1916. Ten per cent of the Erie locomotive fuel consumption for a year amounts to about 400,000 tons.

"It is gratifying to know that the physical performance of handling the equipment and traffic is being carried on with an efficiency never before attained. It is expected and believed that you will keep up the stroke and show the same improvement during the coming year as has been shown during the past year. . . ."

Commission and Court News

Personnel of Commissions

George R. Kibbe, of Fruitvale, Cal., has been appointed chief accountant of the department of finance and accounting of the Railroad Commission of California. Mr. Kibbe was formerly with the United States Shipping Board Emergency Fleet Corporation.

Court News

Trespassers Crossing Tracks

The Kansas Supreme Court holds that no public way is established across a switchyard merely because pedestrians for many years had so frequently trespassed thereon that they had worn a beaten track across it. Any one who undertakes to cross a switchyard of many tracks, where engines and cars are likely to be moving at any time in the regular course of the railroad's business, is held a trespasser and does so at his own peril. The only duty of the railroad company and its employees towards such trespassers is not to wilfully injure him.—Allen v. Missouri Pacific (Kan.) 178 Pac. 395.

Fraudulent Injury Claims—Proof of Other Offenses

In a prosecution for obtaining money from a railroad company by falsely pretending to have been injured by its negligence, the Iowa Supreme Court holds that evidence that the accused had made similar claims against other railroad companies was admissible to show motive and scheme and purpose to defraud. The falsity of the claim must be proved independently of other instances wherein the accused had defrauded other railroad companies; but when the falsity of the claim has been shown, the accused's intent may be shown by previous similar transactions whereby he obtained money from other companies.—State v. Kouzen (Iowa) 171 N. W. 137.

Obstruction of Street While Changing Grades—No Liability for Injury to Business

The New York Court of Appeals holds that a railroad company causing the obstruction of a street during the making of improvements eliminating grade crossings under orders of the Public Service Commission is not responsible for damage to one's business by reason of the erection of a temporary structure. Where improvements are lawfully made in a public street which do not involve direct encroachment upon private property, the person or corporation making them is not liable for consequential damages unless they are caused by negligence, misconduct or want of skill.—Ramme v. Long Island, 226 N. Y. 327, 123 N. E. 747.

Federal Control—Suits Against Railroads

The Massachusetts Supreme Court holds that a railroad guard's right to damages for breach of his contract of employment is a vested right of property, enforceable, under General Order No. 18a, in the Superior Court for the county, where, in contemplation of law, the guard had his residence. It is also held that the order of the Director General of Railroads that suits against carriers, while under federal control, must be brought in the county where the plaintiff resides, or where the cause of action arose, having been issued after action had been begun, is inapplicable, so that the guard could resort to any court of competent jurisdiction, though no attachment on mesne process could be made, and, if a judgment was obtained, no execution could be levied on the railroad's property.—West v. N. Y., N. H. & H. (Mass.), 123 N. E. 621.

Foreign Railway News

The State and South Railways of Austria are reported by the Times (London) Trade Supplement, to have been acquired by French financiers.

Extension of Greek Railway

Le Petit Journal, of December 30, reports that a party of 50 French railway experts was leaving Paris that day for Athens to supervise the organization of the Greek railways, which are to be materially extended after the coming into force of the Treaty of Versailles.

Oil Fuel in South America

LONDON.

A large number of the South American railroads are converting their locomotives from coal to oil, fuel consumption. Among those that have already made considerable progress in this direction are the Buenos Aires Western Railway, thereby saving a sum of £3 per ton on the fuel consumed; the Buenos Aires Great Northern, the Entre Rios, the Cordoba Central, the Venezuela Central, the Bolivia railway which has all necessary oil at its own doors, and the Central Argentine Railway.

Electrification of the Central of Brazil

LONDON.

An Anglo-Italian syndicate is reported to have presented to the Federal Government of Brazil an elaborate scheme for the electrification of the Central railway, a Government owned enterprise. A similar project has already been put before the Administration by a French syndicate and the granting of the concession will depend upon the terms offered. It is believed that the government engineers are in favor of the French offer being accepted.

Definitions of Export Quotations

The National Foreign Trade Council, 1 Hanover Square, New York, is issuing a small 15-page booklet containing definitions of export quotations and general recommendations for a standard American export practice. These suggestions have been adopted by a conference of the Foreign Trade Council and eight other associations. They bring out the advisability of abandoning the use of abbreviated forms of export price quotations, but their real purpose is to effect a simplification and standardization of American practice as to export terms.

Railway Reconstruction in Serbia

A semi-official statement, recently issued in Belgrade, states: "The Roumanian Minister in Belgrade lately called on M. Davidovitch, Serbian Premier, and informed him, in conformity with instructions received, that the Roumanian Government had waived the seizure of building material for the bridge over the Save and of the 400 railway trucks and 13 locomotives hitherto kept back in Roumania. This material, which was detained by the former Roumanian Government, was essential for the reconstruction of the railway bridge over the Save destroyed by the Austrians at the time of their retreat, and the failure to repair the bridge has been causing an interruption of direct communication between Constantinople and Salonica and Western Europe for the last few months."

Railway Needs in Jugoslavia

The richest Jugoslav province, Wojwodina, has only one railroad communication with Serbia, that over the Sava bridge at Semlin. As this railroad is glutted with the traffic with Croatia, Bosnia, Dalmatia, and Slovenia, as well as the transit traffic with Roumania, Wojwodina is almost entirely cut off from Serbia. The Belgrade *Trgovinski Glasnik* says the Guaranty Trust Company is in favor of building a large railroad bridge over the Danube between the Banat town Kovin and the Serbian Smederevo. As influential circles in the Banat and in Serbia are in favor of the project, it is probable that work will soon be begun.

Germany Forbids Misuse of Freight Cars

LONDON.

The Technical Review gives an abstract from the Zeitung des Vereins Deutcher Eisenbahnverwaltungen, which states that the German Minister of Commerce issued the following proclamation on November 2, 1919:

1. It is forbidden to use for other purposes wagons allocated to special duties, also wagons which have been unloaded are not to be reloaded without the permission of the railway authorities.
2. It is forbidden that goods should be delivered to the railways for despatch, if such goods come under the heading of goods which have been scheduled as unsuitable in the public interest for such transport.
3. Any person who disobeys the above two clauses is liable to imprisonment for 12 months and to a fine of £750 or to one of these penalties.
4. The Act becomes operative by its publication.

Appropriations for New Lines in Bolivia

The Chamber of Deputies of Bolivia has recently passed two loan bills, one for the appropriation of 8,700,000 pesos for the construction of small railways and the improvement of the sanitation system; and another for the appropriation of 2,500,000 pesos to be used on the Yungas-Beni Railway. The route for the proposed railway, which has been previously mentioned in these columns, to run from the city of Puno, Peru, around the end of Lake Titicaca to Guaqui, the Bolivian port on that lake, is to be surveyed in the near future. This route will eliminate the need of trans-shipment of goods there and will thus effect the lowering of the freight rates from Mollendo, Peru, to La Paz, Bolivia.

The English Channel Tunnel

In order to expedite decision respecting the construction of a tunnel under the English Channel, a deputation of the Channel Tunnel Committee of the House of Commons recently called upon the Prime Minister. His attention was called to the fact that no serious engineering difficulties were anticipated; that the time necessary for completion would be five years; and the total cost would be $155,728,000, or double the pre-war estimate. There was said to be great enthusiasm for the scheme in France.

The Prime Minister in replying stated that the problem would be carefully examined from the engineering, military, naval, and air points of view, and "if the military advice is favorable the ministry will certainly be prepared to support the plan on general grounds."

New Line for Mexico

The Rio Grande border town of Ojinaga, which has figured prominently in revolutionary affairs of Mexico during the last several years, is to obtain a railroad outlet, according to official announcement that has just been made. It is stated that the Department of Communications and Public Works of the Mexican government has authorized the construction of a railroad from Juarez to Ojinaga, 250 miles, and that the survey for the proposed line has been ordered. The route of the road follows closely the course of the Rio Grande. Although its primary purpose is to provide means for the quick transportation of troops and supplies in case of border disturbance, it will also serve to open to development a considerable stretch of valley territory that is susceptible of reclamation by means of irrigation. It is planned to ultimately extend the line from Ojinaga southeast to a connection with the Eagle Pass-Torreon division of the National Railways of Mexico. The proposed extension will be about 400 miles long. The cost of building the road from Juarez to Ojinaga will be borne jointly by the federal government and the Chihuahua state government, it is announced.

Mexico to Spend $2,000,000 for Equipment

An appropriation of 4,000,000 pesos, equivalent to $2,000,000, has just been authorized by the Mexican government for the purchase of rolling stock for the National Railways of Mexico. Most of the new equipment will be second-hand and will be purchased in the United States. There is at present such a shortage of cars and engines upon the different divisions of the National Railways that it is impossible to move but a small percentage of

the traffic that is offered. Thousands of box cars have been wrecked by bandits and revolutionists during the last several years. The shops of the railroad at Saltillo, Aguas Calientes and other points are doing considerable work in the matter of reconstructing damaged cars and engines, but the number which is being turned out is far from sufficient to meet the demands of traffic. Thousands of new railroad crossties are needed to repair the rundown condition of the system. Large orders for materials have been placed in the United States and some shipments of crossties have been received. In the more isolated parts of the country where timber is scarce the sidetracks have been torn up by poverty-stricken natives and the crossties used for fuel.

Train Ferries for African Lakes

A proposal to employ train ferries for the great lakes on the African continent, has been offered in England by H. Wilson-Fox, M. P. The project is reported as especially desirable, for a considerable time must necessarily elapse before the Cape to Cairo Railway is an accomplished fact, and anything, therefore, that is practical and calculated to expedite transport in the regions to be traversed should be welcomed. Mr. Wilson-Fox emphasizes that for the purpose of train-ferry service, the Byasa, Tanganyika and Victoria Nyanza systems have the great advantage that they are not tidal—although this does not mean that provision need not be made at the docks for appreciable changes of level, which may be due either to the seasonal rainfalls or by the action of the long-continued winds.

The lake routes indicated run practically north and south and represent in the aggregate about 850 miles, and Mr. Wilson-Fox estimates that at present prices it would cost about $20,000,000 to construct railways over this distance, as against a cost of $6,000,000 for train ferries, or a saving of $14,000,000.

In regard to the Victoria Nyanza, Mr. Wilson-Fox does not anticipate that the use of train ferries on that great lake will be restricted to north-to-south routes. He fully expects that in days to come there will be quite a number of other ferry services, notably between Kisumu (Port Florence), and the ports on the northern and western shores, for the purpose of developing the valuable agricultural regions in the vicinity of the lake, and particularly those lying to the west, northwest and north, by giving them better communications with the shortest route to the east coast via the Uganda Railway.

Europe to India by Rail

The fascinating idea of effecting railway communication between Europe and India has been advocated for many years. and it is perhaps not generally recognized, says the Railway Gazette, London, that this project is now well on the way to fruition owing to the construction and development of military railways in the Mesopotamian theatre of war. In that vast country, there are now approximately 1,000 miles of railway, about 250 miles being standard gage line, which was constructed in 1915 by the Germans as part of the Berlin-Bagdad scheme, has been extended to Baija, a point only some 200 miles southeast of Nisibin, to which place the Germans have extended the Konia-Mosul line.

Additionally, a meter gage line is now being operated between Bagdad and Quaritu on the Persian frontier, while construction is proceeding on an extension to Khermanshah. The existence of these two lines, together with the approaching completion on the meter gage of the Bagdad-Basra through railway, mark a decided advance in the railway development of the Middle East, and with the tendency of the Indian lines to extend into Persia, there would appear to be every probability of the through line between Europe and India via Persia being completed in a very short time. All that would then remain to place England into direct rail communication with her Far Eastern possessions is the completion of the Channel tunnel, which would now appear to be well within the range of practical politics.

The subject is of considerable interest, concludes the Railway Gazette, more especially in view of the industrial and agricultural development of the Middle East, and as there appears to be every possibility of considerable railway development in Persia in the near future, the throughout mail route may soon be an accomplished fact.

American Locomotives for Jugoslavia

Commerce Reports in its issue of January 22 gives the following translation from the "Pravda" of Belgrade, of December 11, relative to the prospective purchase of American locomotives by the Jugoslav Government:

"The question of locomotives will soon be favorably settled. In the first place, the plans decided upon during the last few days in Vienna by M. Kristan will have a decisive effect on this subject. The departure of MM. Kristran and Sartchitch for Prague and Berlin has to do with the same question. Then, too, it is probable that the steps taken by M. Drachkovitch may result in the return of the locomotives taken from us by the Bulgars as well as of those lent by us to the Allies at Salonica. Now that the treaty of peace with Bulgaria has been signed, a special commission will be sent to that country to bring back the locomotives which were taken from us.

"Moreover, the Government has received very favorable offers for the delivery of locomotives, notably from a large American firm. The State should make an agreement with this firm, by which it would be bound to furnish us, in six months, at least 100 new locomotives according to our specifications to run on our tracks. The firm does not ask our Government to start payment on these locomotives until three years after the signing of the agreement. During all this time the State will not even be obliged to pay interest. The liquidation of the debt and the payment of interest will not begin until the end of the third year. So we will obtain immediate possession of the locomotives, which are an absolute necessity to us, without having to pay any of the purchase money for three years. Because of the material advantage which these offers hold out to our country, the Government has decided to treat with this house through M. Zlatkovitch, Under Secretary of the Ministry of Communications."

Railway Congestion in the United Kingdom

There is hardly an issue of any British engineering publication or daily paper coming to this country at the present time that does not speak of the congestion on the railways of the United Kingdom, or the difficulties caused by the shortage of railway wagons.

The latest question is whether the greatly increased railway rates which went into effect on January 15 will help in remedying this condition by, for example, sending freight by coastwise steamship.

The Times, London, however, believes that those who take this view are holding themselves open to disappointment. Speaking of the situation as it relates particularly to congestion at the seaports, it says in a recent issue:

"The real remedy," it says, "is to increase the capacity of the railways for carrying goods, and this means more wagons. So that, unless the Ministry of Transport is prepared to take immediate steps to increase the number of wagons, the rise in railway rates can only be a half-measure, which will disappoint the large public expectations that are certain to be built upon it.

"The chief reason for the scarcity of railway wagons, as we understand the matter, is not the controversy between the Ministry of Transport and the private builder about the fair cost of producing new trucks. It is uncertainty about the railway policy of the government. The railway companies will not build wagons so long as the threat of railway nationalization—with the possibility of the commandeering of their property at prices which they may think confiscatory—is hanging over them; and private companies, which would normally be building their own wagons, are not building them now because they, too, are afraid that they may be requisitioned by the government as soon as they are built. If the government could make up their mind about their railway policy, and would tell the railway companies and the public what it is to be, there might be some prospect of the necessary wagons being produced quickly. Till then the only possible expedient is for the Ministry of Transport to bring back the wagons which are still in France much more quickly, and to repair them with far greater speed and efficiency."

Increased Railway Rates in the United Kingdom

New freight rates resulting in increases of from 25 per cent upwards were put in effect on the railways of the United Kingdom on January 15. The new rates are expected to yield £50,000,000 (or $200,000,000 at a conversion rate of $4 to the pound), which it is hoped will make the railways self-supporting, or, in other words, bring about "equilibrium between the receipts of the railways and their heavily increased expenditure due to higher wages and enhanced cost of material." Passenger rates were increased 50 per cent during the war, but freight rates were not changed until the present increase was made.

It is difficult to indicate to American readers just how the increases have been made. The Times (London), however, outlines the changes as follows:

The new rates show a very heavy increase on the existing charges, varying from 100 per cent to 25 per cent, with in many cases the addition of a flat rate of from 3d. to 6d. per ton, irrespective of distance. The 100 per cent increase applies to small parcels and to certain "empties," two classes of traffic which have grown enormously recently and to which the railway companies have attributed some of the congestion recently. The charges for coal, coke and patent fuel are increased by 25 per cent and a flat rate addition of 3d. per ton. Other merchandise in Class A of the General Railway Classification is increased by 30 per cent, and in Class B by 50 per cent, with a flat rate addition of 3d. per ton. Merchandise in Class C of the general railway classification is increased by 50 per cent, with a flat rate addition of 6d. per ton; while merchandise in Classes 1 to 5 of the general railway classification is increased by 60 per cent, with a flat rate of 1s. per ton. Rolling stock is increased by 60 per cent, and the charge for livestock conveyed at truck rates by 60 per cent, with a flat rate addition of 1s. per truck. Carriages of every description are subject to an increase of 60 per cent, with a flat rate addition of 2s. 6d. per vehicle. Merchandise and parcels sent by passenger train, including perishable merchandise, will be increased by 50 per cent.

There are certain modifications and exceptions to the increases in the different classifications. Fruit, vegetables (other than hothouse produce), eggs, butter, cream, soft cheese and poultry conveyed by passenger train or other similar service will only be subject to an increase of 25 per cent. Potatoes and vegetables in Class C and roots in Classes B and C, and fruit, hay and straw conveyed by merchandise train in loads of two tons and upwards will be charged an increased rate of 25 per cent, with the flat rate addition applicable to their class. For merchandise and livestock conveyed to and from Great Britain and Ireland the existing surcharges will be reduced. Milk, manure in bulk, packed manure, basic slag and lime for agricultural purposes are not to be subject to any increase in the existing rates.

The Times further explains that this raising of the rates is necessary, for one thing, to fulfil the promise of the government, when the railways were taken over from their proprietors for war purposes, that the undertakings should be handed back "unimpaired in net revenue-earning capacity." The railway companies themselves refuse all responsibility for the heavy increases in the wages of railway labor and for the various concessions granted to railwaymen in the matter of hours and conditions of employment.

The Railway Companies' Association—the organization representing the directors of railway companies—intimates that the increased rates and charges will remain in force for 18 months after the expiration of the period of government control, in order that the railway companies may apply to Parliament for necessary alteration in their statutory powers.

Equipment and Supplies

Locomotives

THE GREAT NORTHERN is in the market for 45, 2-8-2 type locomotives.

THE NATIONAL RAILWAYS OF CANADA are inquiring for 25, 4-6-2 type locomotives.

THE DELAWARE, LACKAWANNA & WESTERN is in the market for 6 Pacific type locomotives.

THE VIRGINIA & CAROLINA SOUTHERN has ordered 1 locomotive from the Baldwin Locomotive Works.

THE NORFOLK SOUTHERN has ordered 3, 0-6-0 switching locomotives from the Baldwin Locomotive Works.

THE FLORIDA EAST COAST is in the market for 2, 0-6-0 switching locomotives and 6 Pacific type locomotives.

THE CANTON-HANKOW has ordered 8, 2-8-0 type and 4, 4-6-0 type locomotives from the Baldwin Locomotive Works.

THE JAMAICAN GOVERNMENT RAILWAY has ordered 7, 4-8-0 type locomotives from the Canadian Locomotive Company and 1, 4-8-0 type locomotive from the Baldwin Locomotive Works.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for a saddle tank switching engine, with cylinders 19 by 24 in., drivers 46 in. or 48 in., and a tractive power of about 30,000 lbs.

Locomotives Delivered in December

The Railroad Administration has compiled the following statement of locomotives shipped for the month ended December 31, 1919:

		On order prior to federal control		USRA administration orders		Constructed in railroad shops			
Name of road	Region	Type	No.	Type	No.	Type	No.	Total	Builders
A. & B.	Southern	Mikado	1	.....	..	.....	..	1	Baldwin
B. & O.	Allegheny	.....	..	USRA Mall.	18	.....	..	18	Baldwin
L. V.	Eastern	Santa Fe	10	.....	..	.....	..	10	Baldwin
Mo. Pac.	Southwestern	.....	..	USRA Mount.	5	.....	..	5	American
N. & W.	Pocahontas	Mallet	2	.....	..	.....	..	2	Baldwin
P. M.	Eastern	.....	..	USRA 8W.Sw.	5	.....	..	5	Lima
P. & R.	Allegheny	.....	..	USRA Colso.	11	.....	..	11	Baldwin
P. R. R.	Allegheny	.....	..	.....	..	Pacific	3	3	P. R. R
St. L-S. F.	Southwestern	.....	..	USRA 6W.Sw.	7	.....	..	7	American
Sou. Pac.	Cent. W.	.....	..	.....	..	Switch	3	3	Sou. Pac.
T. & P.	Southwestern	Pacific	7	.....	..	.....	..	7	American
T. & P.	Southwestern	Santa Fe	12	.....	..	.....	..	12	American
T. of St. L.	Southwestern	6W. Sw.	3	.....	..	.....	..	3	American
V. S. & P.	Southwestern	Pacific	2	.....	..	.....	..	2	Baldwin
Total			37		46		6	89	

Freight Cars

THE GREAT NORTHERN is inquiring for 1,000 ore cars of 75 tons capacity.

THE GLOBE SHIPBUILDING COMPANY, Superior, Wis., is inquiring for 2 flat cars.

THE ALASKAN ENGINEERING COMMISSION, Seattle, Wash., is inquiring for 4 box, 4 gondola and 6 flat cars.

THE SOUTH AFRICAN RAILWAYS have ordered 60 bogie cars and 10 cattle cars, from the American Car & Foundry Company.

THE TEXAS COMPANY, New York, has ordered 400, 8,050-gal. capacity tank cars with 40-ton trucks from the Pennsylvania Tank Car Company.

THE CONLY CAR COMPANY, Pittsburgh, Pa., has ordered 50, 8,050-gal. capacity tank cars with 40-ton trucks from the Pennsylvania Tank Car Company.

The Rajah Oil & Refining Company, Youngstown, Ohio, has ordered 2, 8,050-gal. capacity tank cars with 50-ton trucks from the Pennsylvania Tank Car Company.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for a few tank cars, with shell at least 5/8 in. thick, for transporting creosote oil.

The Marcus Ruth Jerome Company, Neville Island, Pittsburgh, Pa., has ordered 3, 8,050-gal. capacity tank cars with 40-ton trucks from the Pennsylvania Tank Car Company.

Passenger Cars

The Sorocabana Railway (Brazil) is inquiring for 5 first-class and 10 second-class passenger cars.

The Canadian Pacific has ordered 18 steel sleeping car frames and trucks from the National Steel Car Corporation.

The Pennsylvania Equipment Company, Philadelphia, Pa., is in the market for 1 combination coach with baggage compartment and compartments for colored and white passengers.

Iron and Steel

Sophus Berendsen, 15 Broad street, New York, is in the market for 10,000 to 12,000 tons of fabricated bridge steel.

The Chicago, Burlington & Quincy has ordered 35,000 tons of rails from the Illinois Steel Company, South Chicago, Ind., and 20,000 tons from the Colorado Fuel & Iron Company, Denver, Col.

The United Fruit Company has ordered 455 tons of 40-lb. rails and 70 tons of 16-lb. rails, with the necessary fastenings, from the United States Steel Products Company, and has also divided an order for 32 switches and frogs complete to go with the 40-lb. rail, and 24 switches and frogs to go with the 16-lb. rail, all 30-in. gage, between the United States Steel Products Company and the Weir Frog Company. An order for the spikes has been given to W. Ames & Co., Jersey City, N. J. The above is to be used on the Jamaican division of the United Fruit Company's lines.

Track Specialties

The Pennsylvania Railroad (Lines East) has awarded a contract for Bonzano Thomson rail joints to the Q. & C. Company, New York.

Signaling

The New York Central has ordered from the General Railway Signal Company an electric interlocking machine, model 2, unit lever type, 36 levers, for B. R. Tower, Nottingham, Ohio; installation to be made by the railroad company's forces.

The Atchison, Topeka & Santa Fe has placed an order with the Union Switch & Signal Company, Swissvale, Pa., for a Saxby & Farmer interlocking machine having a 48-lever frame, with 38 working levers, to be installed by railroad forces at Emporia Junction, Kan.

The Southern (Western Lines) has placed an order with the Union Switch & Signal Company, Swissvale, Pa., for a type "F" electric interlocking to be installed at New River, Tenn. Several Switch movements of this plant will be located 3,000 ft. from the tower.

The Pennsylvania Lines (West of Pittsburgh) has ordered an electric interlocking machine, model 2, from the Central Railway Signal Company, for Pennsylvania avenue, Pittsburgh, Pa.; 51 working levers and 13 spare spaces; installation to be made by the railroad company's forces.

The Southern Railway (C. N. O. & T. P.) has ordered from the General Railway Signal Company an electric interlocking machine for the drawbridge at Tennessee river, near Chattanooga; 16-lever machine with 11 spare spaces; installation to be made by the railroad company's forces.

Supply Trade News

Arthur Haller, of the New York office of the **American Locomotive Company,** has been promoted into the company's sales department, with headquarters at Chicago.

Willis E. Martin, treasurer of the **H. K. Porter Company,** Pittsburgh, Pa., died on January 12, after a prolonged illness. Mr. Martin had been connected with this company for 44 years.

C. E. Laverenz, inspector in the Ordnance Department of the United States Navy, has been appointed special railroad representative of the **Chicago Pneumatic Tool Company,** with headquarters at Chicago.

The Barco Manufacturing Company, Chicago, has increased its capital stock to $500,000 and contemplates building a new factory to accommodate the manufacture of several new devices which it expects to put on the market in the near future.

The machine works engineering department and 75 of the engineers of the **Westinghouse Electric & Manufacturing Company,** East Pittsburgh, Pa., were transferred on January 14 to Lester, Pa., near the South Philadelphia works of the company.

Harry Miller, assistant chief engineer, at the Harvey (Ill.) plant of the **Buda Company** has been promoted to chief engineer, succeeding R. B. Fisher, whose promotion to general sales manager was announced in the *Railway Age* of January 23 (page 335).

Arthur Elliot Allen has been appointed district manager at New York for the **Westinghouse Electric & Manufacturing Company,** to succeed **Edward D. Kilburn,** who has been elected vice-president and general manager of the Westinghouse Electric International Company. Mr. Allen is a native of Toronto, Canada, and received his education in England and also in this country. In June, 1902, he entered the employ of the Westinghouse Electric & Manufacturing Company at its Newark works, subsequently being placed in charge of the test department, where he remained until 1910. In that year Mr. Allen was loaned by the management of the company to the International Electric Protection Company, for which company he acted as chief engineer. After completing that temporary work, he returned to the employ of the Westinghouse company, being assigned to the supply division of the New York sales office. On December 1, 1915, Mr. Allen was appointed manager of the supply division of the New York office, which position he retained until he joined the Canadian Overseas Forces as a private in October, 1917. Later he was sent to the Canadian Officers' Training Camp, and went overseas as a technical officer. While overseas, Lieutenant Allen was stationed in England at the Salisbury Plains school for navigation and bomb-dropping. This school was by far the largest one operated by the Royal Air Forces and Lieutenant Allen was charged with the maintenance of all its engines and planes. In September, 1918, he was attached to the "Bombing Berlin"

A. E. Allen

squadron as a technical officer. This was the squadron which was detailed to drop bombs on Berlin in retaliation for the bombing of English towns. The signing of the armistice, however, ended the war before this squadron arrived at the front. After being honorably discharged from the army Mr. Allen returned to the New York office of the Westinghouse company as executive assistant to the manager, from which position he was promoted to manager, as above stated.

The Duff Jack Sales Company, Ltd., with headquarters in Oxford Circus House, 245 Oxford street, London, W. 1., England, has been formed to represent the **Duff Manufacturing Company**, Pittsburgh, Pa., in the British Isles, and has been given the exclusive agency in this territory for Duff and Barrett jacks.

J. B. Johnston, formerly manager of the **Ordnance Department** of the Crucible Steel Company of America, at Harrison, N. J., has been appointed general manager of the **Standard Scale & Supply Company**, Pittsburgh, Pa. This firm specializes in the building of railroad track scales and heavy duty industrial scales.

Albert Schmid, consulting engineer of the **Westinghouse Electric & Manufacturing Company** and in general supervision of the interests abroad of the **Westinghouse Lamp Company**, died in New York on December 31 at the age of 62 years. Mr. Schmid was not only closely identified with the early development of electrical machinery in the United States, but was also prominent in the electrical world of France, Switzerland, Italy and Great Britain. Mr. Schmid was born in Zurich, Switzerland, in 1857 and received his education in that city. He was in the employ of the French Westinghouse Air Brake Company when Mr. Westinghouse met him in the early 80's, and, being impressed with his ability, invited him to come to America. Soon after his arrival Mr. Schmid turned his attention to designing work for the Westinghouse Air Brake Company, then located in Allegheny, Pa., where his keen mechanical perception and insight brought him rapid advancement. When Mr. Westinghouse became interested in the Union Switch & Signal Company and started there his original electrical work, he engaged Mr. Schmid as his chief designer and engineer in that field. Shortly after, in 1886, he was transferred to the newly created Westinghouse Electric Company, becoming its first chief engineer, and in 1896 its general superintendent. In 1897 he went to Europe for the purpose of studying the continental development in the electrical art and the manufacturing possibilities there, and, as a result of this trip, the formation of the French Westinghouse Company was soon under way. He was made director general of that organization. He also held the positions of director of the Westinghouse Electric Company, Ltd., of England, president of the Compagne des Lampes a Filament Metallique, of France, and at the time of his death, in addition to his position as consulting engineer for the American Westinghouse Company, he represented the Westinghouse Lamp Company and had general supervision of its interests abroad.

A. Schmid

J. G. Miles has been appointed supply division manager at Seattle, Wash., of the **Westinghouse Electric & Manufacturing Company**, succeeding **C. V. Aspinwall**, now the company's representative at Spokane, Wash. Mr. Miles has served for a long time in the supply department of the Westinghouse company, having been for several years head of the insulation section at East Pittsburgh, Pa.

A. R. Horn, who served for over ten years as inspector of devices of the **Q & C Company**, New York, in connection with its Chicago Office, died at Minneapolis, Minn., on December 28, 1919, at the age of 70. Before his connection with the Q & C Company Mr. Horn was division superintendent of the Wisconsin Central Railroad.

W. C. Dyer, superintendent at the Harvey (Ill.), plant of the Buda Company, has been elected president of the **Buda Engine Service Company**, a subsidiary of the Buda Company, with headquarters at New York City. **J. R. Mayeski**, chief clerk in the Chicago office of the Buda Company, has been appointed to assume a part of Mr. Dyer's former duties as superintendent.

A. W. Ransome, manager of the New England territory of the **Blaw-Knox Company**, Pittsburgh, Pa., with offices at Boston, Mass., has been transferred to San Francisco, Cal., as manager of the Pacific Coast territory, with offices in the Monadnock building, San Francisco. Mr. Ransome is succeeded at Boston by **O. A. Olstad**, formerly connected with the New York office of the Blaw-Knox Company.

The Chicago Pneumatic Tool Company, Chicago, has appointed **Edward A. Woodworth** and **C. E. Laverenz** special railroad representatives on the staff of manager of western railroad sales, with headquarters in the Fisher building, Chicago. Mr. Woodworth has been for two years secretary of the Committee on Standards, United States Railroad Administration, Washington, D. C. Prior to his engagement in the government service he was associated with the Oxweld Railroad Service Company and O'Malley Barre Valve Company. He was formerly chief clerk to the general mechanical superintendent of the Chicago, Rock Island & Pacific Railroad, and previous to that was in the shops of that road as a mechanic. Mr. Laverenz for several years was an inspector in the ordnance department of the United States Navy and previously held positions as boilermaker and foreman on the Chicago & North Western and the Illinois Central.

The Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has announced the following promotions among its officers at East Pittsburgh; **Alexander Taylor**, for many years manager of works, has been made assistant to vice-president in general charge in all plants of production, stocks and stores. **R. L. Wilson**, general superintendent, has been promoted to works manager of the East Pittsburgh Works. **E. R. Norris** has been appointed director of works equipment in charge of machinery, tools and methods in the various plants. **C. B. Auel** has been appointed manager of the employees service department. Other appointments include: **G. M. Eaton**, chief mechanical engineer of the company; **C. W. Johnson** and **H. W. Cope**, assistant directors of engineering; **C. H. Champlain** and **E. S. McClelland**, assistant works managers; **John E. Bonham**, assistant to works manager; **E. S. Brandt**, supervisor of equipment and methods; and the following were appointed as managers of the engineering departments indicated: **A. M. Dudley**, automobile equipment; **R. P. Jackson**, material and process; **F. E. Wynne**, railway equipment department; and **G. H. Garcelon**, small motor.

Trade Publications

Opportunities for Technical Graduates.—Opportunities for technical graduates are very thoroughly explained in an illustrated pamphlet bearing that title, recently issued by the Westinghouse Electric & Manufacturing Company. This booklet describes, in considerable detail, the plan which has been developed by this company for the training of the graduates of technical schools at all of its various works. In the booklet is included a list of prominent Westinghouse men who originally entered the company as graduate students, as well as a complete list of schools from which over 5,000 students have entered the employ of the company.

Financial and Construction

Railway Construction

Canadian Light Railway Construction Company, Ltd.—This company plans to build a metre gage railway from Elk Lake on the Temiskaming and Northern Ontario to Gowganda, Ont. Construction will commence in the spring. It is also the intention of this company to run extensions from Gowganda into the Fort Matachewan and West Shining Tree districts in Ontario. The company is working on plans to build a loop line leaving the Temiskaming and Northern Ontario at Swastika, passing through the Kirkland Lake, Larder Lake, Skead Township and Boston Creek areas and connecting again with the Temiskaming and Northern Ontario at its Boston Creek station. Both lines will be light narrow gage and temporary, built with the idea of giving undeveloped districts immediate transportation facilities.

Canadian National Railways.—Work was completed during 1919 on an extension of 4.92 miles of first and second track from Halifax Ocean Terminal station, Nova Scotia, to Fairview Junction. Also on 3 miles of second track from Athol, N. S., to Little Forks, and on one mile in New Brunswick from mile 1.5 to mile 2.5. Work is now under way on double track and diversion from Moncton, N. B., to mile 3.5 New Castle subdivision, to cost $208,000, 80 per cent completed, and to be finished in June, 1920; also on double track from Springhill Junction, N. S., to Maccan, cost $430,000, 55 per cent completed, to be finished by July next, and on double track and diversion from St. Rosalie Junction, Que., to Bagot, cost $488,000, 60 per cent completed, to be finished by June, 1920. Other work under way includes continuation of construction at Halifax Ocean Terminal, N. S., to cost $1,600,000, which is about 75 per cent completed; yard extension at Dartmouth to cost $190,000, 60 per cent completed; double tracking mile 0. to mile 7.69 between Truro and Belmont, cost $605,000, 58 per cent completed. Improvements at the St. Malo shops cost $500,000, 98 per cent completed; engine facilities, coaling plant, etc., at Sydney, cost $100,000, 61 per cent completed, and installing standard gage and third rail on the Prince Edward Island Railway, cost $144,660, 95 per cent completed.

Delaware, Lackawanna & Western.—The Board of Public Utilities Commissioners of New Jersey has made a report indicating the manner in which the work of elevating the tracks of the Delaware, Lackawanna & Western, through East Orange, N. J., should be done but not ordering the work to be carried out. This action of the commissioners will be followed in the near future by an order requiring the work to be done. The tentative plans for these improvements call for the reconstruction of about 1.75 miles on the main line for three tracks instead of the present two tracks, and about three-quarters of a mile on the Montclair branch, involving the placing of about 90,000 cu. yd. of embankment and 50,000 cu. yd. of concrete. Sixteen grade crossings are to be eliminated and new passenger stations are to be built at East Orange, and at Brick Church. The passenger stations at Grove street on the main line, and at Ampere on the Montclair branch are to be remodeled.

Gainesville-Sherman Traction Company.—Under this name a company, with a capital stock of $1,500,000, will soon be incorporated in Texas to build a railroad from Gainesville, Tex., east to Sherman, about 40 miles, passing through Callisburg, Whitesboro, Sadler and Southmayd. It is proposed to open construction bids about February 1. The estimated cost of the line is about $1,500,000, including bridges, trestles and culverts, $161,970; rolling stock, $180,000; terminal buildings, $65,000, and freight and passenger stations, $15,640. It is proposed to use gasoline locomotives. Connection is to be made at Sherman with the Texas Electric to Dallas, Tex., Sherman and Denison. The incorporators of the new line are: President, George M. Easley; vice-president and general manager, Burt C. Blanton; secretary, Shearon A. Bryan; treasurer, J. Dabney Day; general counsel, George A. Robertson, and supervising engineer, Henry E. Elrod. The office of the company is in the Insurance building, Dallas.

Gulf & Desdemona.—A charter has been given to this company, with a capital stock of $500,000, to construct a steam railroad from Comanche, Tex., to Eastland via De Leon and Desdemona, about 50 miles. The line from De Leon to Desdemona is now being graded and it is expected to begin the laying of steel some time during the present month. The construction contracts call for the completion of the road to Desdemona by September 1, 1920, and into Eastland by July 1, 1921. The promoters expect to have the line in operation before September 1, 1920. The road will have trackage and terminal rights over the Ringling lines in Eastland. L. B. Williams, of Fort Worth, is president; A. E. Hampton, vice-president; H. Burks, secretary-treasurer, and Jerome P. Kearby, of Comanche, general counsel. The temporary general offices of the company are at De Leon.

Oklahoma Southwestern.—This company is in the process of incorporation and will build a new line between Okmulgee, Okla., and Bristow, running into an undeveloped oil country. The new company is to be capitalized at $2,000,000, but it is expected that the construction and equipment of the road will cost at least twice this amount. The main line will be approximately 35 miles long and will connect at Okmulgee with the St. Louis-San Francisco and the Okmulgee Northern. Connections will be made at Briston with the Frisco Lines. The officers of the new road, all of whom are officers of the Mineral Belt, are as follows: T. B. Slick, president; J. A. Frates, Sr., first vice-president; J. A. Frates, Jr., vice-president and general manager; W. Matthews, vice-president and chief engineer; J. H. Grant, general attorney; G. E. Matt, auditor and treasurer. The temporary offices of the company are at Miami, Okla.

Pacific Great Eastern.—This road is considering the relocation of 15 miles of its line near the Cottonwood river, B. C. The track has been subject to continual subsidence, and requiring the extensive use of piles and trestles to maintain the line and surface. The new location would shorten the route by five miles; would lower the crossing between Ten Mile lake and the Cottonwood river by 37 ft., and would eliminate considerable curvature. The Cottonwood river crossing on the new location would require a bridge 400 ft. long, as compared with the present one comprising 1,800 ft. of steel work and 1,200 ft. of trestle. The estimated cost of the relocation, a survey of which has been completed, is $500,000.

The Chicago, Burlington & Quincy is reconstructing its elevators at Murray Yard, Kansas City, Mo., which were recently destroyed by fire. The work will cost approximately $500,000.

Railway Financial News

Akron, Canton & Youngstown.—See Northern Ohio.

Chicago & Eastern Illinois.—A statement has been issued by a committee, of which George C. Van Tuyl, Jr., is chairman, to the holders of five per cent first lien coal bonds of the Chicago & Eastern Illinois Railroad Company, regarding the organization of the Indiana & Illinois Coal Corporation under the laws of the state of Delaware. The new corporation will have an authorized capital stock of $4,057,000 of 7 per cent cumulative preferred, and 40,000 shares of common stock without par value. The property, held under a mortgage securing the coal bonds of the Chicago & Eastern Illinois Railroad Company, has been transferred to the new company. Announcement is made by the committee that it is prepared to divide among the holders of the certificates of deposit for the coal bonds all the preferred stock of the new corporation and 30,439 shares of its common stock, and the remaining 9,561 of the latter are to remain in the treasury of the new corporation under the terms of the distribution plan.

New York Central.—Bertram Cutler and Albert H. Harris have been elected directors to succeed Carl R. Gray, resigned, and Horace E. Andrews, deceased.

The Grand Trunk System, after using the Dempsey coding system in the transmission of telegrams for over a year, has ordered 600 additional copies of the code book, making a total of 2,100 copies now in use on its lines.

Railway Officers

Railroad Administration

Operating

W. C. Hurst, general superintendent of the Chicago, Peoria & St. Louis, has been appointed general manager, effective February 1.

R. H. Allison, division superintendent of the Atchison, Topeka & Santa Fe at Chillicothe, Ill., has been appointed assistant general manager of the Eastern District of the same road, with headquarters at Topeka, Kan., succeeding **E. Raymond,** deceased.

C. D. Hogan, vice-president of the Gulf, Mobile & Northern Railroad Company, has been appointed general manager of that road and of the Meridan & Memphis for the Railroad Administration, with headquarters at Mobile, Ala., succeeding **W. F. Owen,** resigned.

Lieut. Col. H. C. Nutt, general manager of the Los Angeles & Salt Lake at Los Angeles, Cal., has resigned to become president of the Central Equipment and Coal Commission which represents Italy, England and France and has charge of all bituminous coal mining and distributing operations in Silesia.

C. W. Fee has been discharged from army service and has resumed service with the Northern Pacific as trainmaster at Tacoma, Wash., the position he held prior to the war. **H. Cavanangh,** who assumed Mr. Fee's duties during the latter's absence, has resumed his former position as assistant chief despatcher at Tacoma.

L. A. David, superintendent on the Missouri Pacific, with headquarters at Falls City, Neb., has been transferred to Little Rock, Ark., succeeding **W. E. Brooks,** who has been transferred. **W. E. Kirk,** superintendent at Van Buren, Ark., has been transferred to Falls City, succeeding Mr. David, and **D. H. Robinson,** assistant superintendent at Sedalia, Mo., has been promoted to superintendent to succeed Mr. Kirk at Van Buren.

Financial, Legal and Accounting

F. H. Palmer, auditor of capital expenditures of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., has been appointed auditor of miscellaneous accounts with the same headquarters.

E. M. Devereux, federal treasurer of the Baltimore & Ohio and other roads under the control of A. W. Galloway, federal manager, has had his jurisdiction extended over the Staten Island Rapid Transit, the Staten Island and the Baltimore & New York.

Engineering and Rolling Stock

E. G. Lane, chief engineer of the Baltimore & Ohio, Eastern and Western Lines, with headquarters at Cincinnati, O., has been appointed engineer maintenance of way of the same road, Western Lines, and of the Dayton & Union and the Dayton Union, with the same headquarters.

Traffic

J. G. Krener has been appointed assistant general passenger agent of the Western Maryland and the Cumberland & Pennsylvania, with temporary headquarters at Baltimore, Md.

W. McN. Knapp has been appointed assistant general freight agent of the Central of Georgia in charge of freight service agencies, effective December 30. He succeeds **J. G. Carlisle,** resigned to engage in other business.

T. H. Lee has been appointed assistant general freight agent and **C. B. Oakley,** general agent of the Western Maryland and the Cumberland & Pennsylvania, both with headquarters temporarily at Hillen Station, Baltimore, Md.

Corporate

Executive, Financial, Legal and Accounting

N. D. Maher, regional director of the Pocohontas region, with headquarters at Roanoke, Va., has been elected president of the Norfolk & Western, effective March 1.

Traffic

C. P. Hoch has been appointed general agent of the Kansas City Southern at New York. **Henry Brown** has been appointed general agent at Chicago; **B. A. Rogers,** general agent at St. Louis, Mo.; **J. M. Carriere,** general agent at New Orleans, La.; **J. B. Blanton,** at Tulsa, Okla.; **G. H. Dougherty,** at Dallas, Tex.; and **C. M. Wilkinson,** at San Antonio, Tex.

James D. Watson, assistant to the director of the Division of Traffic of the United States Railroad Administration, has been appointed general traffic manager of the St. Louis Southwestern Railway Company, with headquarters at St. Louis, Mo. Mr. Watson was born on June 30, 1870, at Port Huron, Mich., and began railroad work in August, 1880, with the St. Louis, Iron Mountain & Southern as a messenger. He later served in various positions in the machinery, car, store, operating and traffic departments and, in October, 1895, was appointed contracting agent and traveling freight agent of the St. Louis Southwestern. In 1901 he was promoted to division freight agent, with headquarters at Little Rock, Ark. In 1904 he was appointed chief clerk in the general freight office at St. Louis, Mo., and in 1906 was promoted to assistant general freight agent with the same headquarters. He was appointed vice-chairman of the executive committee of the Southwestern Tariff committee, with office at St. Louis in 1913 and the following year became assistant freight traffic manager of the St. Louis Southwestern, with headquarters at St. Louis, Mo. In 1915 the title of his office was changed to assistant general freight agent, which position he held until May, 1917, when he was promoted as assistant to the first vice-president of the St. Louis Southwestern. The same year he was also appointed assistant to the president of the St. Louis Southwestern of Texas. In April, 1918, he was appointed assistant to the chairman of the inter-regional committee in charge of railroad operation for the Railroad Administration at St. Louis and East St. Louis, Ill., relinquishing his duties with the Cotton Belt in order to assume active charge of the new work. In September, 1918, he was appointed assistant general freight agent of the Louisiana & Arkansas, with headquarters at St. Louis. In the latter part of 1918 he was appointed assistant to the director of the Division of Traffic of the Railroad Administration, which position he held until his recent appointment.

Obituary

John K. V. Agnew, formerly general superintendent of the Pere Marquette, died on January 17 at Grand Rapids, Mich.

H. H. Seaverns, traffic manager of the Chicago & Illinois Midland, with headquarters at Chicago, died at his home in Chicago, January 20.

Howard T. Wilcoxon, assistant general counsel for the Pullman Company, died on January 22 at his home in Evanston, Ill., at the age of 50 years.

Max Lindemann, civil engineer, who, prior to his retirement in 1905, was connected with the Chicago, Milwaukee & St. Paul in the maintenance department, died in his home at Epworth, Iowa, on January 20, at the age of 77 years. Mr. Lindemann did pioneer work for the Chicago, Milwaukee & St. Paul in the Dakotas and Minnesota in 1870 and was employed in 1881 by the Canadian Pacific in the construction of its lines from Winnipeg west.

EDITORIAL

Railway Age

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We publish elsewhere in this issue a very interesting interview which Commissioner Clark, of the Interstate Commerce Commission, has given to the Baltimore Sun on the subject of the rule of rate making which should be adopted in the pending railroad legislation. Commissioner Clark points out that with an operating ratio of 85 per cent or more it is clear the railways must have an advance in rates if they are to remain solvent and expand their facilities under private operation. He avoids advocating the exact provisions of Section 6 of the Cummins' bill, which in effect provide for the appropriation for general railroad purposes of two-thirds of the earnings over 6 per cent which may be made by any individual railroad. On the other hand, he makes clear that he believes it is expedient for Congress to provide that rates must be so made as to yield an average return of 5½ or 6 per cent for the railways as a whole, and that in the case of railways earning more than this some part of their surplus earnings should be taken away. He repudiates the idea that any part of the earnings taken from the more prosperous roads should be given to the unprosperous ones. We infer from his reference to the present policy of the government in taxing excess profits that he would prefer to see any part of the surplus earnings of the stronger lines taken by the government taken in the form of taxes rather than in any other way, although perhaps this inference is not justified. Whether our readers agree with Mr. Clark or not, they will, we believe, find the views that he expresses illuminating and constructive.

Commissioner Clark on the Rule of Rate Making

The Union Pacific's order for 4,000 refrigerator cars placed last week should serve as a good beginning for the purchasing of cars and locomotives, which is apparently scheduled to take place as soon as the railroads are returned to their owners on March 1. The order is, with the exception of the Union Tank Car Company's orders for 5,500 tank cars placed last year, the largest domestic order which has been placed since the standard cars were ordered by the Railroad Administration in the spring of 1918. It is the largest which has been placed for any American railroad system since the orders for standard cars. It is not the Union Pacific's order for cars, however, which one takes to indicate a forthcoming buying movement in cars and locomotives so much as the Equipment and Supplies column of the *Railway Age,* which we have often had occasion to refer to as the barometer of the railway supply field. The orders which have been reported in the Equipment and Supplies column so far this year have not, it is true, been of record-breaking calibre, but the number of items covering both orders and inquiries is a clear indication that the great buying movement we have been reading about in the papers is at last by way of reaching the railway field, and that apparently orders are soon to be expected in considerable amounts. During January orders were reported in the column for 32 locomotives, 6,220 freight cars (including the Union Pacific order) and 25 passenger cars for domestic service and 213 locomotives and 1,080 freight cars for export. At the beginning of this week there are outstanding, however, inquiries for 266 locomotives, approximately 5,500 freight cars and something like 300 passenger cars for domestic service as well as a number for export. The barometer, to say the least, is rising and indications are for good weather ahead.

The Equipment Market

There is little doubt that, following the return of the railroads to private control, a strong and justifiable plea will be made by the owners for increases in rates. Similarly it is probable that strong arguments in opposition to any advance in rates will be made by shipping interests before the Interstate Commerce Commission. The *Railway Age* in the past has pointed out the fallacy of the popular theorem that railroad rates are extortionate. It does no harm to call attention to the matter again. Comparative figures are illuminating, even though familiar to the practical railroad man. A railroad carried a box of hosiery valued at $225 a distance of 60 miles for 52 cents. The drayman who carted it one-eighth of a mile received 50 cents for his service, and a merchant made a profit of 50 cents on the first pair of ladies' hosiery sold from the box. A car of coal was transported 110 miles at the rate of $1 per ton. The teamster charged $1.50 for delivering the coal a distance of a half mile. A shipment of household goods was carried 70 miles for $7 by a railroad. The moving-van operator received $6 for carrying the same goods one mile. A sack of grass seed was transported to a point 125 miles distant for 69 cents. The seed was valued at $38, and had the sack been punctured accidentally and even two pounds lost, the claim for the loss would have exceeded the total charge for transportation of the seed. A shipment of canned goods consigned to 65 retail merchants of a certain city was delivered from a point 80 miles distant. The freight rate was less than 1 cent per can, yet the merchants realized, by sale, 6 cents per can more than the canned goods cost them. From the superintendent to the section hand, each railroad employee should use every occasion to explode the "rate extortion" myth by comparisons such as these.

A Comparison of Railroad and Other Charges

The Railroad Administration suggested that one trust company be appointed trustee for the equipment trust certificates which are to be issued to finance the equipment purchased by the Railroad Administration and assigned to the various railroad companies. The profit involved to a bank in acting as trustee for a mortgage is generally not very great, although, of course, in the present case the size of the mortgage, being between $300,000,000 and $400,000,000, makes the aggregate sum paid to the trust company considerable. Furthermore, there is rightly a prestige attached to this particular case that brought out keen competition between the largest of the banks with trust departments. Only a bank with a large trust organization could adequately perform the service of trustee

Trustee for Equipment Certificates.

under a mortgage covering 2,000 locomotives and 100,000 freight cars owned by different railroads in different parts of the country. The largest of the New York trust companies are the Guaranty, Central Union, Bankers, and Equitable. The National City Bank also now has a trust department. In Philadelphia there is the Commercial Trust Company. All of these probably made a bid for the trusteeship of the equipment trust certificates. The decision was left to a committee of the Association of Railway Executives, and the Guaranty Trust Company of New York was selected. This selection is subject to the approval of the members of the association, but there were representatives of the various financial interests on the committee itself, so that its opinion ought to be representative of the opinion of the association. As indicative of the keenness of the competition for the honor, some of the competitors of the Guaranty are suggesting now that the trusteeship should be divided up and parceled out among three or four or more trust companies. A splitting up of the trusteeship might quite possibly increase the expenses and detract from, rather than add to, the effectiveness of the supervision of the trustee.

Why the Railroads Need a Loan from the Government

The problem of providing railroad service adequate to handling the commerce of the United States is not one of providing for meeting the requirements of some future time, but one of meeting a situation which is acutely pressing at this moment. The railroads cannot handle all the traffic which is being offered to them now. With almost no new facilities being provided, and the existing facilities being subjected to the severest service, our transportation facilities are actually becoming smaller while the demands upon them are growing larger. The question presented is not merely how the railways are going to be enabled to handle the traffic next year, or the year after, but also how they are going to be enabled to handle it in 1920.

If constructive legislation for the return of the railways to private operation had been passed six months, or even three months ago, the conditions confronting the country would not be so bad. But apparently the new legislation will not be passed much before the roads are returned on March 1. If the companies are to be able to provide new equipment and other facilities in time to be of any use in 1920, they should begin placing orders for this purpose immediately after the roads are returned to them. Orders which are delayed for months, or even for weeks, after March 1 cannot be filled before the heavy business of the fall and winter of 1920 will have to be moved.

The mere passage of legislation, however good, will not be enough to restore railroad credit sufficiently to enable the companies to go into the market and place orders immediately on the large scale on which they ought to be placed. Even after the proposed legislation shall have been passed, the position of the companies will not be strengthened, as it must be, until some unmistakable indications have been given as to what advance in rates will be made. But if large orders are not to be placed until a rate advance case can be fought out, it will be some months before they can be placed.

Congress, however, has it within its power to enable the railway companies to place immediately after the new legislation is passed substantial orders for equipment and other facilities. To provide merely for the replacement of the number of locomotives and cars normally retired, the companies should order at once at least 100,000 freight cars, 2,000 locomotives and 4,000 passenger-cars. This equipment, the statistics of the last 14 years show, will be needed merely to replace equipment which in the normal course of events should be retired in 1920. In other words, it is needed, not to make up the deficiency of equipment now existing, but to prevent the amount of equipment in service from being actually reduced. The number of cars and locomotives mentioned would cost, at present prices, about $500,000,000. In order that the railway companies may be enabled to order them at once, they must be afforded at once the capital necessary to buy them. Apparently, there is only one way in which this can be done, and this is by Congress providing by legislation for the making of an immediate government loan to the companies of not less than $500,000,000, and preferably of $750,000,000, this amount to be returned to the government as soon as the credit of the companies is re-established.

It is in no spirit of criticism of Congress that we say that the conditions which have rendered it desirable, or even necessary, that the government should make a large loan to the railway companies have been created by Congress itself. They are due to the delays which have occurred in the consideration of the railroad legislation. If, as we have indicated, satisfactory legislation had been passed some months ago the question of advances in rates could have been taken up and disposed of, and the companies would have known early in the year 1920 just where they stood. Regardless of the causes of the delays in the consideration of the legislation, the delays actually have occurred, and now with March 1, when betterment and improvement work of all kinds should be actively begun, only three weeks away, what legislation is going to be passed and what rates the companies are going to be allowed to charge are still unsettled.

The need for action which will enable the companies immediately to place orders for equipment which will at least provide for the normal annual replacements, is not merely a railroad need.

It is a public need, because unless the railways get soon at least the amount of equipment which has been mentioned they are going to be worse handicapped in handling commerce in 1920 than they ever have been before. While Congress is considering the broader phases of the problem of railroad legislation, it should recognize the fact that in the interest of American industry and commerce, and therefore in the interest of the entire people, it should adopt special measures to enable the companies to begin at once the work of rehabilitation.

The Crucial Test—Will Private Management Meet It?

Private ownership and operation of railways in the United States is going to be put to the severest test beginning on March 1, 1920, to which it has ever been subjected. The existing facilities of the railways are inadequate to the handling of the present and prospective freight traffic, no matter how efficiently they may be operated. To secure the greatest practicable efficiency will require the exercise of the greatest possible ability, initiative and resourcefulness by the managements of the individual lines and close and unselfish co-operation by the managements of all the railroad companies.

The ablest and most efficient practicable operation of the individual lines will require the building up by the various companies of the strongest possible organizations. This, in turn, will require that all appointments to and promotions in the organizations shall be based upon the experience and ability of the men appointed or promoted. This has been the usual but not the universal practice upon American railways. There always have been some cases where favoritism in different forms has played a part, and of course wherever it has played a part the results have been harmful.

When government operation was adopted the government

took into its service most of the able railway managers, although it made the mistake of excluding from its organization numerous men whose experience, training and ability were such that it should have spared no effort to secure their services. With the return to private operation approaching most of the able men who have served the government are being invited to return to the service of the companies. The net result of the developments probably will be that after the railways are returned the official personnel of most roads will be as strong as, or stronger than, it ever was.

There are some cases, however—fortunately, not many of them—where, in the building of the new organizations, other considerations that experience and proved ability seem to be important factors. These cases are attracting much attention in the railroad world and are being made the objects of criticism by railway officers, high and low. The motives and acts of railway directors and executives should under present conditions be as much above suspicion as Caesar insisted that the virtue of his wife must be. Any failure on the part of directors and executives in rebuilding their organizations to act exclusively on the principle of endeavoring to secure for their stockholders and the public the most efficient operation and the best service will react injuriously, not only upon the managements of individual railways, but on the railways as a whole.

The managements of most companies seem to realize that the highest degree of co-operation between the various railways as well as the highest measure of ability in the management of the individual properties will be requisite to the success of private operation. But unfortunately there are some managements which apparently have been so filled with resentment by certain methods which have been adopted under government operation that they are disposed to disregard or deny the need for a greater degree of co-operation than that which formerly existed under private operation, and to return to many of the extreme competitive and uneconomical practices which formerly prevailed. Some of them apparently would be in favor of abolishing all centralized control of the distribution of freight cars, all joint operation of terminals, all consolidated city ticket offices, and of re-establishing all the outside traffic agencies which formerly existed. A large majority of railway officers seem to have learned some important lessons from the experience of the last three years, but some apparently have not.

The future of the railways of the United States is partly in the hands of Congress and the Interstate Commerce Commission and partly in the hands of their directors and executive officers. The companies are very properly demanding that Congress and the Interstate Commerce Commission shall deal fairly with them. At the same time Congress, the Interstate Commerce Commission and the public have a right to demand, and will demand, that the directors and executives shall deal intelligently and fairly with their stockholders, other railroads and the public. The terrible experience through which the railroads have passed during the last 10 or 15 years has been largely due to the fact that the managements of a few railroads have not dealt thus, and that by their failure to do so they have brought unjust discredit upon the managements of the railroads as a whole. The managements of this comparatively small number of railroads have not only rendered it impossible to defend what they have done, but have made it extremely difficult, and, indeed, almost impossible, effectively to defend private management as a policy.

The main reason why the railways are going back to private management on March 1 is that the results of government operation have been so disappointing to the public. The only sure way to perpetuate private management will be to so conduct it in future as to avoid the unjust grounds for criticism of it which have so often been afforded in the past.

The Net Results of the National Safety Drive

"SAFETY FIRST" is not an exact science. Figures in enormous quantities have been published to impress the careless—and all of us—with the reduction that the safety specialists have caused to be made in the monthly and annual totals of bodily injuries; and these do, indeed, help us in our efforts to grasp a rather elusive subject; but at best they affect our thoughts only indirectly. Manager Duffy, of the Safety Section of the Railway Administration does well, therefore, to emphasize what may be called the non-mathematical aspect of the benefits of the recent "drive" for National Railroad Accident Prevention. Some of the other aspects have apparently been twisted, not to say distorted, into a shape leading to unwarranted conclusions. No great harm has been done; but it is just as well to train our eyes to see straight. Mr. Duffy says, in his congratulatory letter to the regional safety officers and to the individual railroads:

"We have received some glorious reports of results that cannot be embodied in the tables. The figures tell but a small part of the story; they do not and cannot show the real outstanding fact of the accidents that were actually prevented and that will be prevented by reason of the education gained during these intensified efforts. Facts were brought out that will be helpful in locating unsafe persons as well as things. Gains have been accomplished which might not have been striven for in the ordinary everyday easy processes of standing still, or mild progress. The team work and intense enthusiasm has done much to humanize railroading, for it has brought the higher officers in intimate personal touch with the lowest workers. See to it that the lessons taught and learned are a permanent inspiration and guide for the future; to stop now would be like sowing for a bountiful harvest and not reaping when matured."

It is, indeed, wonderful; the word is not misused. On the other hand, our "every-day easy processes of mild progress" are wonderful. It is a wonder that, knowing better, we are so careless of our lives and limbs and most of our possessions. Why do brakemen on freight cars go on doing the risky things which, by the *witness of their own eyes*, they know to have led to the death of a fellow brakeman within a month? If the circumstances of a fatal accident to a trainman are learned by hearsay instead of by ocular evidence they will fade out of the mind of fellow trainmen in a few days—perhaps in a few hours.

In view of the prevalence, everywhere, of these very human traits, it is, indeed, a matter for hearty congratulation when anything—reasonable or unreasonable, matter-of-fact or fancy, expensive or inexpensive—can be done to lessen the distresses of body and of mind which our hospital records pile up in such enormous aggregate figures every year.

The twisting and distortion to which we have referred is observable mainly in the adoption of unwarranted and deceptive comparisons. The first error is in forgetting what a very small proportion of the employees, even in the most dangerous occupations, are likely to sustain bodily injuries in any one year. Freight brakemen, let us say, are injured (on the average) once in ten years, or 520 weeks. In two weeks, therefore, the chance (not the certainty) is that one man in 260 will be injured. This makes an average for two weeks a very intangible thing; it has little effect on any but studious minds. Many of the items in Mr. Duffy's final statement show ciphers in both columns, last year and this year. Figures do not lie; but ciphers may deceive by silence. By taking a very large number of men, spread over a large territory, the averages of even a short period of time will make an instructive picture, but the comparison must not be pressed too far. Some well-managed roads

showed losses in safety, instead of gains, when this comparison was made between periods of only two weeks each.

Comparisons between railroads may be vitiated by any number of conditions not measurable in figures. S. M. Metcalfe, superintendent of the Safety Section of the Northern Pacific, has called attention to the fallacy of making comparisons on the basis of the decrease in casualties. To present a more satisfactory comparison he has prepared a statement in which the casualties are shown in percentages of the number of men in service. If a railroad had a poor record last year, and an exceptionally good one during the period of the "drive," it shows a large percentage of decrease in casualties, while other roads whose casualty record was good in both periods take, on that basis, a lower position in the list. Mr. Metcalf's compilation for the two weeks of the drive is as follows:

EMPLOYEES KILLED AND INJURED, OCTOBER 18-31, 1919.

Rank	Name of Railroad	Number of employees	Casualties to employees	Casualties per 10,000 men employed
1.	Atlantic Coast Line	24,307	3	1.2
2.	Union Pacific	33,200	7	2.1
3.	Illinois Central	52,222	12	2.2
4.	Seaboard Air Line	16,647	4	2.4
5.	Southern Pacific Company	49,778	15	3.0
6.	Chicago, Burlington & Quincy	56,334	29	5.1
7.	Delaware, Lackawanna & Western	25,369	13	5.1
8.	C. M. & St. Paul	71,550	43	6.0
9.	Southern R. R. Lines	62,587	44	7.0
10.	Denver & Rio Grande	12,162	9	7.4
11.	Norfolk & Western	31,317	25	8.0
12.	Northern Pacific	34,921	30	8.5
13.	Delaware & Hudson	15,390	13	8.5
14.	Penna. Lines West	88,114	76	8.6
15.	N. Y., N. H. & Hartford	38,876	34	8.7
16.	Pere Marquette	11,460	11	9.6
17.	Atchison, T. & Santa Fe	46,965	46	9.8
18.	Chesapeake & Ohio	25,400	25	9.8
19.	Great Northern	39,914	41	10.2
20.	Erie	37,724	39	10.3
21.	Chicago & Eastern Illinois	10,424	11	10.6
22.	Michigan Central	23,434	26	11.1
23.	Missouri, K. & T.	12,786	15	11.7
24.	Chicago, St. P. M. & O.	10,125	12	11.8
25.	Boston & Maine	30,337	36	11.9
26.	Minneapolis, St. P. & S. S. M.	15,858	19	11.9
27.	Central R. R. of N. J.	16,500	21	12.7
28.	Baltimore & Ohio	76,802	102	13.3
29.	Lehigh Valley	26,366	35	13.3
30.	A. T. & S. F. Coast Lines	15,239	21	13.7
31.	Gulf, Col. & Santa Fe	10,821	16	14.8
32.	Penna. Railroad	185,138	276	14.9
33.	Rock Island	44,419	66	14.9
34.	Chicago & North Western	54,539	87	15.9
35.	Philadelphia & Reading	34,143	56	16.4
36.	St. Louis-San Francisco	26,454	51	19.2
37.	C. C. C. & St. Louis			
38.	New York Central	99,534	199	20.0
39.	Louisville & Nashville	49,039	101	20.6
40.	Texas & Pacific	13,782	31	22.5
41.	M. K. & T. of Texas	11,452	26	22.7
42.	Southern Pacific Lines	19,982	50	25.0
43.	Missouri Pacific	39,495	125	31.4

It is desirable to reflect on the points here brought out, that we may give them their true weight. The political candidate says that his platform is like the platform of a passenger car: to get in by, but not to travel on. We may say that these columns of figures are a good thing by which to get in—to the workman's mind; but as a permanent thing in his every day thoughts they may not have great vitality. He must have something more human. The motion-picture car, with its safety story, has, no doubt, aroused thousands of minds which were not touched by figures, and very little touched by ordinary lectures. The silver cup given by B. F. Winchell, regional director at Atlanta, and the banner awarded by R. H. Aishton, of the Northwestern region, were manifestations of a good idea. These may seem a little too much tinged with fancy for such a prosaic business, but they may be trusted to serve a good purpose. When one good road shows ten or twenty times as many casualties per thousand men employed as are reported by another road equally well managed we may be sure that our studies must embrace something besides tables and figures.

Mr. Duffy, in his enthusiasm, refers to the "glorious reports" received from this, that or the other railroad. But he is speaking forth only words of truth and soberness. No fault can be found when he breaks away from tabular statistics, with a view to getting at our hearts. But at the same time each man has the duty of "punching the time clock" on his own mental habits—things that no foreman can get at—every day and every hour. Self-congratulation, within bounds, may do no harm; but words alone do not get us anywhere. One of the significant statements of Mr. Duffy's review is that the drive exposed "unsafe persons" as well as unsafe things. The unsafe person, if a pronounced case, needs to be put out of the service, for the good of the rest of the employees. It is everyone's duty to keep as far as possible from getting into that class. In short, the duty to make safety the first consideration presses on all sides. The conscientious workman aims to be a "safe person" for the benefit of his own reputation; also because it is a duty to his employer; and also because of his devotion to his family. And, conscientiousness aside, he has good reason to avoid bodily injury just on the basis of common selfishness!

Accurate Cost Data Needed

IN MAKING CLAIMS for the relative advantages of steam and electric locomotives much care must be exercised in presenting accurate figures and in presenting them in such a manner as to avoid misinterpretation. Two years ago E. W. Rice, Jr., president of the General Electric Company made the following statement:

"It is estimated that something like 150,000,000 tons of coal were consumed by the railroads in the year 1917. Now we know from the results obtained from such electrical operation of the railroads as we already have in this country that it would be possible to save at least two-thirds of this coal, if electric locomotives are substituted for the present steam locomotives."

Evidently Mr. Rice meant that most of this coal could be saved by the use of water power, as a modern steam locomotive can develop power under test conditions at about 2¼ pounds of coal per horsepower hour, while the manufacturers claim that it is possible to deliver power to the rail with an electric locomotive for something less than 2 pounds per horsepower hour. The electric locomotive in this case is supplied with power from a large steam plant and the value of 2¼ pounds for the steam locomotive does not include stand-by losses.

Mr. Rice's statement has since been used many times by advocates of electrification to show why steam roads should electrify and in so doing they have fallen badly into error. For example, a well-known technical publication recently interpreted the statement as follows:

"It has been conservatively estimated that one pound of coal when burned under boilers in a modern electric power house will do the work of three pounds in the steam locomotive, and the showing is even better in such severe climates as that which exist in the northwest. On the basis of present consumption this represents roughly a saving of one hundred million tons of coal annually."

If such a comparison is to be made, electric locomotives should be compared with the best of steam locomotives, since new electric motive power must compete with the most modern steam equipment. Saving the nation's coal is a worthy cause, and the railroads will support it if they can at the same time see a saving in ton-mile costs. Ton-mile costs unfortunately involve a host of details other than fuel costs. Complete costs of electrical operation must be obtained which are entirely separate from those for steam operation. Such data when produced will greatly assist in solving a much-mooted question and will be of tremendous value to all roads considering electrification.

Letters to the Editor

Credit for Excellent Results in Creosoting Due J. W. Putman

New York City

To the Editor:

I was very much interested in the article in your issue of January 16 in regard to the long life of the creosoted piles in the Louisville & Nashville trestle at Henderson, Ky. Several years ago I had occasion to call attention to the excellent results obtained from the piles used in the construction of the railroad wharf at Cartagena, Colombia, in the waters of the Carribean Sea where the teredo are very destructive. I was therefore particularly interested in learning from your article that the creosoting of the trestle at Henderson, Ky., was done by J. W. Putnam, who I believe was also responsible for the good work done on the piles used by us in Colombia in 1892 and much other work done about that time. I think that while the explanation of the long life is undoubtedly due in part to the heavy creosoting, Mr. Putnam should be given a great deal of credit for the very intelligent, careful and conscientious work which he did in those early days.

F. Lavis.

The Need for Automatic Train Control

New York City.

To the Editor:

December 15: "FIVE KILLED; EIGHT OTHERS HURT; fastest passenger train on Norfolk & Western in smash-up."
December 20: "TWENTY-THREE DEAD, THIRTY-FIVE HURT, in Maine rail wreck; engines met head-on."
January 25: "FIFTEEN DEAD IN CRASH ON CANADIAN ROAD. First section of Vancouver Express sleeper telescoped by engine of second section."

These recent news headings, telling the all too familiar story of butting collisions, are but typical of that class of accidents which are not only preventable but the continuation of which is absolutely inexcusable. The pertinency of this opinion is sufficiently emphasized by the special report of the government automatic train control committee, and the annual reports of the Interstate Commerce Commission and of the Up-State Public Service Commision of New York, all urging automatic train control.

As you are aware, the first report was for a time suppressed; and as the refusal to publish it was practically coincident with the presentation of a memorial on the railway bill to the Senate and House conferees by Mr. A. P. Thom, purporting to represent the Association of Railway Executives, in opposition to the inclusion in the bill of the mandatory clause in the Esch bill relating to automatic train control, I promptly demanded, as an interested party, that the report should be made public.

Mr. Thom's quotation of authority for the opposition to this vital improvement was singularly inapt. It was as follows:

> Perhaps there is no man in the country better qualified to give an opinion on the practicability of installing automatic train stops than General S. M. Felton. He states that there has been no automatic control device yet developed that meets the specifications of the Engineer Section of the American Railroad Association, and he doubts if there ever will be. He declares that "It is an utterly impracticable scheme; it removes the responsibility of handling the train from the enginemen, and we would have much more serious accidents than we now have. An engineer would not have to be awake, alert and on the job all the time, because he would soon depend on the automatic device to protect him.

Mr. Felton's experience as a railway administrator, emphasized by the high position which he held as such in the military service of the government, may be freely admitted but this does not qualify him as an authority on the subject of automatic train control. When he states that automatic train control is an utterly impracticable scheme, and expresses the conviction that nothing can be devised to meet the requirements which have been time and again officially listed, he ventures into a field of prophecy already contradicted by accomplished facts.

The same profession of impossibility of engineering accomplishment has steadily opposed every radical improvement in railway equipment and operation; in the face of which the air brake has been developed, the car stove has been discarded, the automatic car coupler has been prescribed, the automatic block signal system has been installed and steel cars are taking the place of wooden ones; and grade crossings, despite the prophecy of bankruptcy by the head of one of the most important roads entering Chicago, have been abolished in that city.

Mr. Felton's statement that automatic train control, limited in his vision to a "device," would remove the responsibility from the engineman and be productive of more serious accidents, is simply an opinion. It is not supported by experience with regard to the installations already made, whatever their shortcomings, and utterly mistakes the psychology of an engineer when the intent and action of a proper system is considered.

Contrary to his assertion, I unhesitatingly affirm that automatic train control—not an automatic "stop," but a system which will marry together the braking system of a train and the wayside signals, which are in fact themselves automatic and take the place of direct visual study of track conditions—will not only safeguard trains from collisions in case of the inability of the engineer to see, understand and obey his signals, and from dangerous speeds on curves and cross-overs, but will tend to make him even more alert and capable, than at present.

Automatic train control is not only a necessity; it will prove one of the most important improvements in railway operation. Its inevitable adoption on sound lines will, of course, be facilitated when railway administration and operation approach the subject with more open minds, and when an administrative government body is empowered to enforce decisions as to safety equipment arrived at by competent technical and operating officials.

It may be further prophesied that the new conditions which will surround the return of the railroads to private operation will bring home to both their officers and boards of directors a more intimate appreciation of at least the moral responsibility for preventable accidents.

I think I am safe in confirming the statement which appeared in your news columns, that with regard to the objection raised before the conferees, it will fail in its purpose; and the final railway bill will reserve to the government the power to enforce its recommendations in the matter of automatic train control.

Perhaps I may be permitted to refer very briefly to a couple of comments in your editorial columns, the first referring to the marrer and place of development and the second seemingly implying that the collisions which have occurred would have been averted by the use of visual block signals.

If you mean by "congested territory" the terminals of a great railroad I am heartily in accord with you that automatic train control at first should not be installed in such locations. It is not needed there, except to a limited extent, because trains being taken in or out of a terminal are moved at moderate speeds over a complication of switches, and the engineers and firemen are both specially alert. The place, however, for development is not out "in the country somewhere," on a somewhat indeterminate section of road, but upon a thoroughly typical section, where all kinds of signal

and interlocking apparatus are in use; where there are multiple tracks, switches and cross-overs, and where the traffic comprises both passenger and freight trains of a variety of character. It is only under such conditions that the full operation and benefit of automatic train control can be realized, and on the operation of which judgment can finally be passed.

In your issue of January 25, referring to the Accident Bulletin of the Interstate Commerce Commission for the calendar year 1918, you said:

> In what may be considered its most important feature—persons killed in train accidents—the present report affords a sobering comparison: * * * Two hundred and twenty of the 286 passengers killed in 1918 met their deaths in collisions, a fact which should give point—if anything further is needed to give point—to the report of the Train Control Committee noticed in the *Railway Age*, page 227. This committee, by the way, makes one of its most significant suggestions in a paragraph which the director of the division of operation had not asked for—the one to the effect that on a large mileage of American railroads, the first thing is not for refinements, like the automatic train stop, but for the simple block system.

With regard to the use of automatic block signals, no one of ordinary sanity will question their usefulness; but that their introduction will stop collisions is an inference not borne out by facts, for, as it has been frequently pointed out by the Bureau of Safety, disastrous accidents of this character are as frequent in block signal territory as in any other.

In this connection permit me to call attention to the conditions shown in a later document, the annual report of the Interstate Commerce Commission for 1919, in which it is stated that in the year ending June 30, 1919, among the accidents investigated there were 53 collisions, with 261 deaths and 1,083 injuries. Of these 53 collisions 28 occurred on roads equipped with some form of block signal system, 19 on roads with the time-table and train order system, and six in yards. In other words, the majority of collisions, with resulting deaths and injuries, occurred in block signal territory; hence there is not the slightest reason to assume that if the roads which operated on the train order system had been equipped with block signals there would not have been as many accidents as actually occurred.

Both automatic train control and the automatic block signal system are based upon the same fundamentals. Ordinarily they should go hand in hand, the one a supplement to the other; but undoubtedly there are conditions in which there may, with entirely satisfactory results, be a combination of automatic train control with an abbreviated wayside signal system.

FRANK J. SPRAGUE.

An Audible Cab Signal

NEW YORK CITY.

TO THE EDITOR:

In your issue of January 30, we noticed a letter from a correspondent at Buffalo, N. Y., Mr. E. Adams, on the need and value of an *audible* signal to supplement the visual signal.

For the information of your correspondent, and all others interested in this matter, we desire to say that our automatic train stop does just that very thing, by giving an audible signal at every distant signal by means of a whistle in the engine cab, the length of the whistling showing whether the visual signal indication was "clear" or "danger."

The action of the device is direct and infallible. By an upward movement of only one-half inch, as the contact shoe glides over the ramp, the plunger opens the air valve that releases the train-pipe air, whose escape blows the audible signal whistle. If the signal indication is "clear," the downward movement of the plunger, as the contact shoe leaves the ramp, closes the air-valve, after a short audible signal has been given, but before any braking action is begun. If the signal indication is "danger," the air-valve is not reclosed by the said downward movement, and a long audible signal is given by the escaping train-line air while the automatic application of the brakes is being made.

A full illustrated description of this device, and its remarkable two years' record, was published in the *Railway Age Gazette* of April 13, 1917.

THE INTERNATIONAL SIGNAL COMPANY,
JEAN F. WEBB, PRESIDENT.

Manufacturing Specialties in Railroad Repair Shops

NEW YORK CITY.

TO THE EDITOR:

In my opinion your editorial on "Manufacturing Specialties in Railroad Shops" in the *Railway Age* of January 23, page 282, is based on strictly sound and common sense arguments. You could very well have gone a step further, however, and have discussed the question in its broader relationship to the labor situation at large. There is at present, and has been for some time, a big shortage of skilled labor—at least there is in effect a shortage. From such observations as I have been able to make in studying operations in industrial, and particularly in railway shops, I am under the distinct impression that this so-called shortage would be almost nil if every workman put forth his best efforts and gave an honest day's work for the present high wages that he is receiving. He would, in fact, be heavily rewarded for this extra effort for the increased production would tend to reduce the cost of living and his wages would have a greater purchasing value. Leaving this phase of the question aside, however, no one questions the fact that the present high cost of living is due to the shortage of labor and restricted production.

It is up to the railroads, therefore, to do their full part in conserving the present available supply of labor. Government control and war conditions have saddled the railroads with a lot of rules and regulations concerning wages and working conditions that will make it mighty hard to maintain the properties and equipment in a satisfactory condition when the roads are returned to their owners on March 1. Facing these conditions it seems like folly for any railroad shop to manufacture specialties which have been developed by and may be purchased from railway supply manufacturers. The manufacturers with highly specialized facilities, and comparatively small and highly supervised plants can produce the manufactured goods at a smaller cost and with less labor than a railroad shop which must of necessity, give prime attention to the repair and maintenance of equipment and which can only do the manufacturing work as a side line.

Railroad mechanical department officers without the treasury of the United States Government behind them will have their hands full making good on the job of maintaining equipment under private operation, without attempting to make a showing on paper by trying to invade the field of the railway supply manufacturers. These officers must also keep in mind the duty of the railroads in helping to conserve the labor supply.

This letter is intended simply to supplement your editorial and should be read in connection with it.

OBSERVER.

THE IOWA FARM BUREAU FEDERATION, at its annual meeting at Des Moines, on January 9, adopted resolutions opposing government ownership of public utilities, and demanding the return of the railroads to their owners under regulations assuring adequate service at just rates.

Train Consisting of Three Motor Cars and Three Trailers

Electrification of Melbourne Suburban Railways

Over 300 Miles of Line Involved—Design of Catenary Structure Includes Many Features of Merit

IT WAS as far back as 1896, sixteen years after the State took control of the railways in Victoria (Australia), and the State now owns all but 14 miles of track, that the question of electrifying the Victoria railway system was seriously considered, but it was not until 1912, after several investigations had been made, that any active steps towards electrification were taken. At that time it was decided to electrify the lines in the Melbourne suburban area (Fig. 5) in accordance with the plans of Charles H. Merz, of Merz & McLellan, consulting engineers, of London. These plans involved the electrification of some 300 miles of line—the total mileage of the State railways in Victoria is about 4,300 miles—in the immediate vicinity of Melbourne. The suburban railways cover a large area, in spite of there being an excellent cable tramway, and deal with a large amount of traffic which in other cities is dealt with by street railways, interurban railroads or motor omnibuses. The longest individual line extends 26 miles from the city.

In order to determine more accurately the most economical system of electrification to be adopted, alternative bids were obtained for the installation of the single-phase and direct-current systems. The single-phase system called for a plant to generate 3-phase current at 25 cycles which was to be distributed to the substations, and there split into single-phase current and supplied to the trains at 11,000 volts. The direct-current system called for a plant to generate 3-phase current at 25-cycles and 3,300 volts which was to be distributed to the substations at 20,000 volts and there

Fig. 1. The Power Station at Newport

converted to direct current at 1,500 volts, the trains to be operated on the multiple unit system. A comparison of the cost* of these two systems showed that the single-phase system would be 23 per cent greater in first cost than the direct-current system and further, it was estimated that the cost of operation of the direct-current system would be about $350,000 or 21.7 per cent less per year than the single-phase system. It was thus decided to adopt the d.c. system. It has been reported that the total cost of the work will be about $16,000,000, which is some 2 or $3,000,000 more than the estimate. On account of the war, the work has been delayed and the cost of materials has increased, and this accounts for the increase in the total cost over the estimate.

The railways being state owned, it is intended eventually to utilize the plant provided for the operation of the railways to develop a more extended use of electricity throughout the state. This would improve the load factor and thus make it possible to produce the power at a low rate. A scheme is already under consideration for the unification of the generation and distribution of electric power throughout the state. The increased cost of coal has, in all parts of the world, affected the situation in Australia. The cost of generating the power was based on a price of $2.40 per ton,

Fig. 2. Interior View of the Turbine Room

but the cost has now risen to about $4.40 per ton. While this increases the cost of the generation of power it does, to a greater extent, increase the cost of the operation of steam locomotives, and thus will show a larger profit from electrification.

Most of the work in electrifying the lines was done during the war. The main contracts were placed in March, 1913, and the work was started in November, 1913. The first electric train was run on May 29, 1919.

Power Station

It was decided to adopt a site for the power house (Fig. 1) at Newport, which, although it is not located at the geographical center of the electrified system, had certain advantages in connection with condensing water, sub-soil, etc., which compensated for the additional expenditure on transmission cables. The site adjoins the Williamstown Ferry and occupies 36 acres. The existence of a stone breakwater enabled the intake and discharge of the condensing water to be separated in a manner which is not ordinarily obtainable without considerable expense. The site has been laid out to contain two power stations side by side, one of which has been built. This station is laid out to contain six 10,000 k.w. turbo-alternators which suffices for present requirements and allows for two spare sets for the purpose of standby and overhaul. The two boiler houses are located at right angles to the turbine room, each with its own coal store and coal handling machinery. Between the two boiler houses is a space occupied by a general pur-

Fig. 3. Coal Hoppers and Conveying Belt

pose building containing stores, water storage tanks, workmens' accommodation, laboratories, test tanks, etc., a satisfactory arrangement from the architectural point of view and efficient as regards administration and working.

Power is developed by six turbo-generators (Fig. 2) of the Parson reaction type, operating at a steam pressure of 200-lb, with a superheat of about 200 deg. F. and a vacuum of 28¾ in, and at a speed of 1,500 r.p.m. These generators produce 3-phase current at 3,300 volts and 25 cycles which is stepped up to 20,000 volts for transmission to the substations. The generators are ventilated by fans of the Siroc-

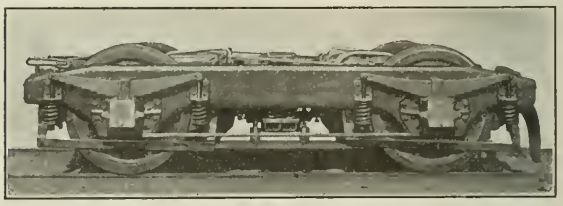


Fig. 4. Motor Truck for One of the Multiple Unit Cars

co type driven by 30 hp. Wsetinghouse induction motors. Each prime mover is treated as far as possible as an independent unit with a separate set of auxiliaries such as pumps, transformers, etc., for each unit. The turbine-room is provided with a 60-ton 75-ft. crane, having an auxiliary hoist capable of lifting 50 tons. Although experience seems to indicate that oil in transformers presents a negligible fire risk, it was thought wise to instal transformers belonging to each generator in a separate chamber outside the turbine room. The transformers are separated by intervening chambers containing air filters, neutral resistances, etc.

Condensing Plant

Condensing water is taken from the water front on one side of a retaining wall and returned to the river on the other side of this wall. Water passes from the river to a

*These figures, as well as a few others in this article, were taken from an article by C. T. Stephenson in the Industrial Australian and Mining Standard of August 28, 1919.

pit between the two boiler houses, from which it is picked up by the circulating water pumps, through a channel made into sections, each of which can be worked separately. The suction of the pumps are so arranged that four pumps can always draw from the one section of the channel should the other section be shut down for cleaning and repairs. The circulating pumps are located in a pit below the pump house basement so that they are flooded at all stages of the tide. They are driven, through flexible couplings, by induction motors located on the turbine floor level.

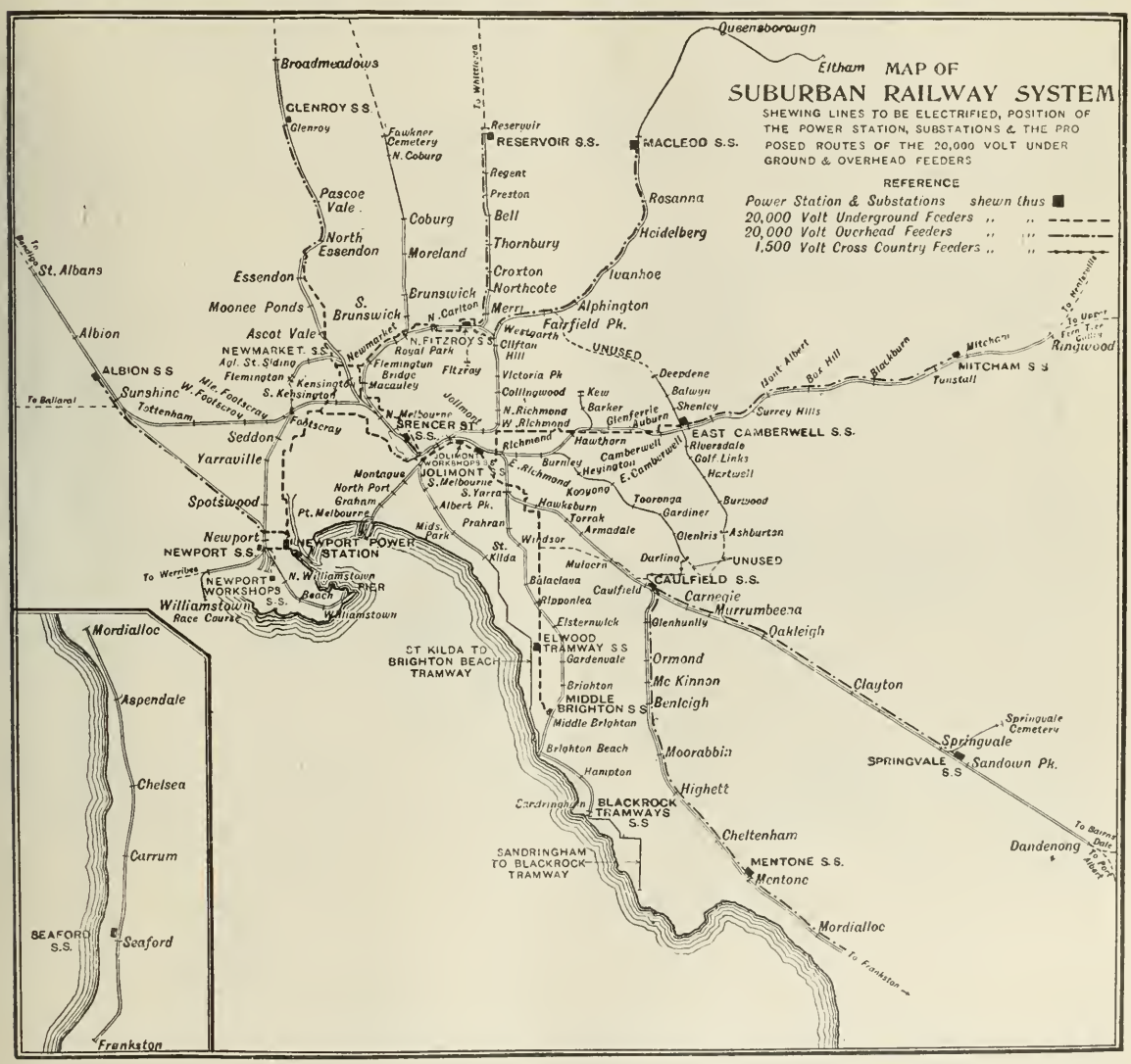


Fig. 5. Map Showing the Location of Power Stations, Substations and Transmission Lines of the Melbourne Electrified Railways

Boiler Plant

The generators are provided with steam from 12 Babcock & Wilcox marine type water tube boilers having a normal evaporation of 30,000 lb. at 210 lb. boiler pressure. These boilers are provided with chain grate stokers, Green economizers, superheaters and Sirocco draught fans. The superheaters provide a superheat of 220 deg. F. The boilers are arranged in pairs, six on each side of the boiler room.

The feed pumps are located in the pump house, the feed-water being taken from hot wells. The feed-water is supplied by the condensed steam from the turbines and is further heated by the exhaust steam from the feed pumps and auxiliary turbines. The losses in water are made up from the city mains.

Coal is received in 15-ton hopper cars and dumped into large hoppers below the track between the boiler house and the storage yard. It then passes to bucket conveyors which carry it over weigh bridges—weighing four buckets at one time—to the coal bunkers (Fig. 3) above the boilers or by a central conveyor to a coal storage yard. Motor driven crushers are provided below the hoppers in the track where the coal may be crushed when necessary. The coal carried by the central conveyor to the storage yard is automatically dumped where required, and in addition a grab bucket operated by an electric jib crane of the luffing type further

distributes the coal over the storage area. The coal from the storage yard is delivered back to the boiler house through an underground passage by a system of conveyors.

The ash handling apparatus is of the suction type, two sets being provided. The ashes are drawn into a receiver located above a track on which the ash cars are located and are subject to a fine stream of cooling water as they pass into the receiver. A few half-ton trucks running on narrow gage rails under the furnaces are provided for handling the ashes in case of emergency.

Switch House

One of the most interesting features of the installation is the switch house. This is parallel to the turbine room but about 120 ft. from it, there being no attempt to provide ready communication between the switch house and the engine room staff except by telephone and telegraph. A

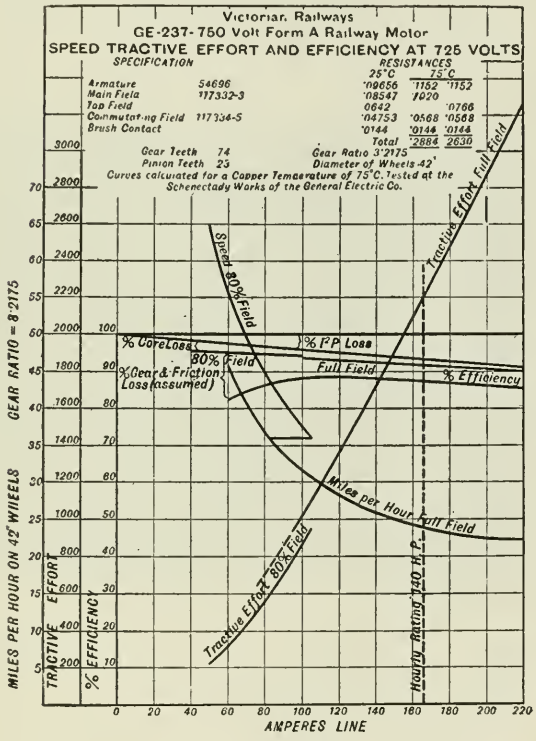


Fig. 6. Diagram of Traction Motor Characteristics

feature of the switch gear is the arrangement of the bus-bars. The power station bus-bars are divided into two sections by means of a section switch, each substation being fed from both sections. So far as security of supply is concerned, there, the arrangement may be regarded as equal to duplicate bus-bars without the complication and expense of the latter.

Each phase of the main switches has a separate single-pole switch in an oil tank, the parts working in air being isolated from the parts working in oil. Each single pole switch has multiple breaks arranged vertically close together in the middle of the tank in series, with insulating barriers between adjacent breaks, there being four breaks in the single-pole generator oil switches. These are so connected that upon the switch opening under load the mutual induction of the arcs produces a radial blow-out effect towards the insulated wall of the tank. Opening speeds up to an

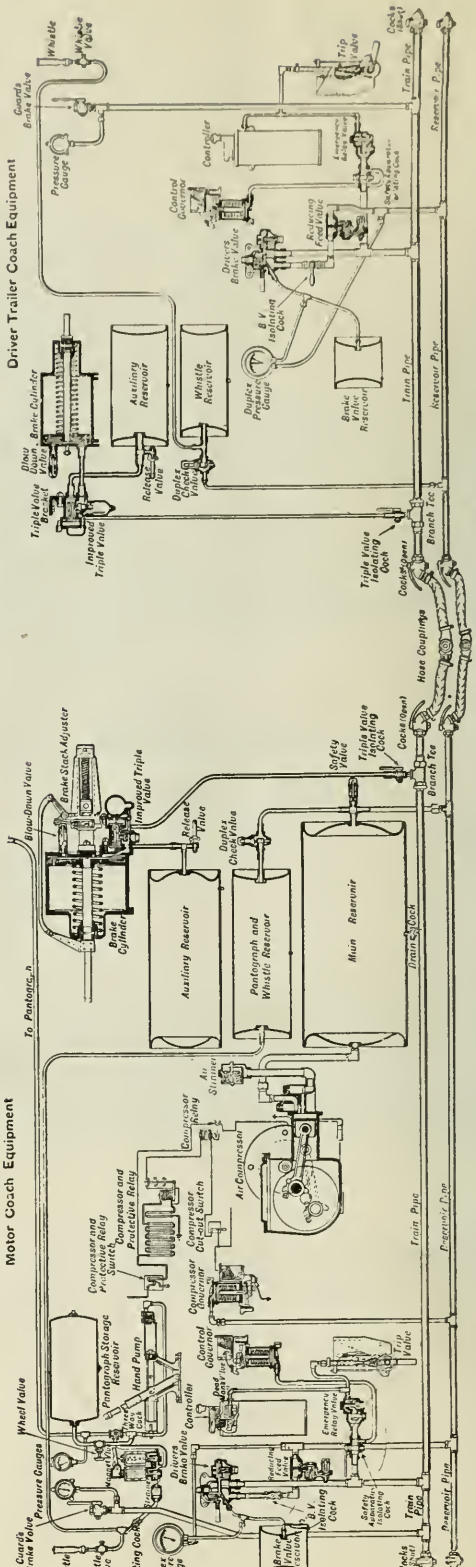


Fig. 7. Arrangement of Air Brake Apparatus for Multiple Unit Cars

equivalent of 50 ft. per second can be obtained, aluminum being employed to ensure rapid acceleration. The gases produced are discharged to the outer passage way.

The 3-phase oil switch will safely open a short circuit on a system controlling power of a rated capacity of 240,000 kilovoltamperes. The operating gear consists of a rotary type magnet actuating a countershaft through a toggle mechanism and tripping box, the magnet being excited from a 110-volt battery supply and contactor, operating from the control board.

In addition to red and green indicating lamps, there is an alarm bell device to give warning when the switch has opened. In spite of the heavy mechanical construction, the tripping mechanism is operated by a small ½-lb. solenoid with 1½-in. travel.

The generator equipments are fitted with Merz-Price protective gear, while feeder equipments have split conductor protective gear. Each generator has an emergency control pillar and load indicator fixed in the engine room.

The control room is situated at the end of the switch house. In it is centered not only the control of the main power station switches of the generators and transmission feeders, but all electrical operations throughout the entire transmission and conversion system are directed from this point. On the control engineer rests the responsibility of all electrical switching operations and his control is absolute. A gallery is provided for visitors, although there are very few signs of activity during operations. The most striking feature is a huge diagram covering one wall of the room showing the position of all switches and electrical apparatus. Facing it are control switchboards covered with instruments. In the center of the room is a table supporting automatic telephone instruments and the log book.

Distribution System

Thirteen 20,000-volt feeders radiating from the Newport power house to the substations in the central area are included in the present scheme, 9 being of .15 sq. in. and four of 0.1 sq. in. cross sectional area. Paper insulated, lead covered, wire armoured cables are employed, all of the split conductor type. The cables are mainly laid in trenches in the streets owing to the very limited space available alongside the railway lines.

The trench averages 4 ft. in depth, and the cables are 1 ft. 9 in. between centers, covered by boards. Special precautions are taken in the cast iron joint boxes to prevent air pockets being formed when being filled with compound.

In the outlying districts the supply to the substations is provided by overhead transmission on the track equipment structures. The overhead transmission lines are carried on brackets extending from the sides of the masts away from the tracks, the three phases, each of the two separate wires of .035 sq. in. being placed directly above one another, and supported on chain type insulators. This enables the split conductor protection system to be used throughout the high tension transmission system. Telephone cables are laid along the route of the 20,000-volt transmission, there being an automatic telephone exchange at Jolimont substation for 50 lines. This provides communication between the control room, all substations, and certain important signal boxes from which switching of the overhead contact wires is regulated Such 1,500-volt direct current feeders as are employed are paper insulated, lead covered, and for the most part wire armored, being of .75 sq. in. and in a few cases 0.5 sq. in sectional area.

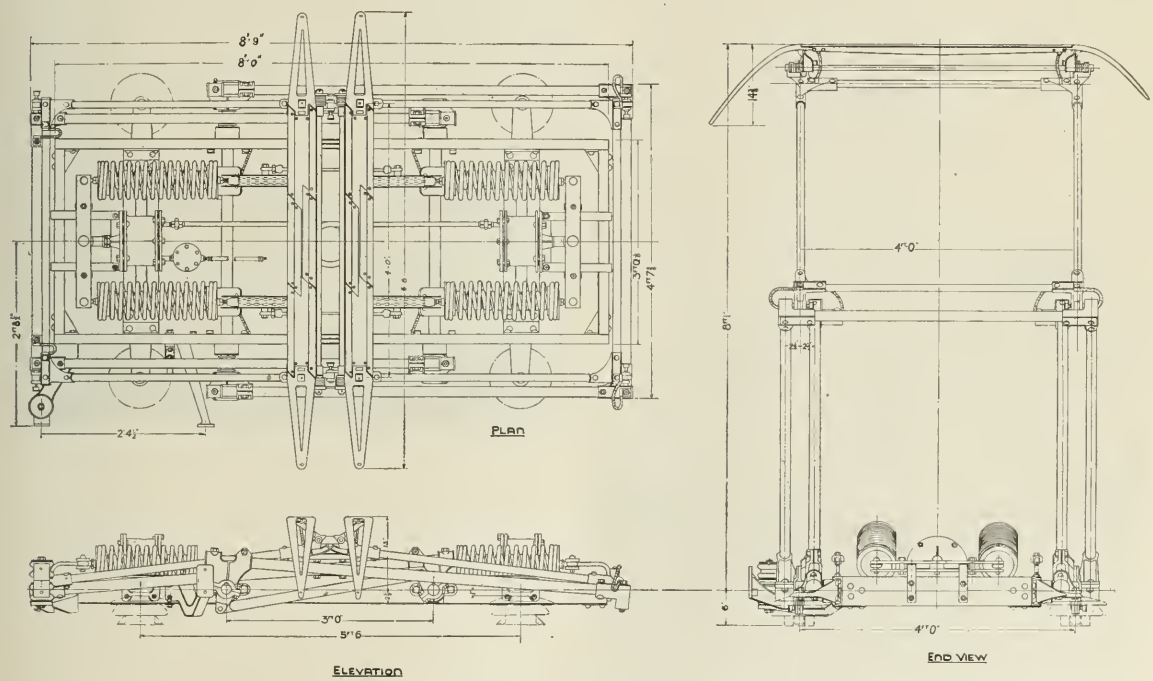


Fig. 8. Arrangement of Pantagraph Collector

Substations

Fifteen railway traction substations are being provided, and there are in addition two tramway substations, one at Elwood for supplying the St. Kilda-Brighton electric tramways, and the other at Sandringham for supplying the Sandringham-Blasckrock tramway. At Spencer street a substation is also being built to take over the supply of lighting

to Flinders street, Spencer street and other stations, as well as to supply the State Government offices and power to the railway workshops.

There are two static substations, one at Newport workshops and one at Jolimont workshops.

The substation buildings are of brick with flat concrete roofs covered with malthoid. Special attention has been paid to the ventilation, numerous large screened openings being provided in the basement and vertical louvres above the roof level. Each traction substation building consists of two or more bays for the rotaries, with an unloading bay, and the larger substations have a bay for signaling equipment, the switch house and operating gallery being in an annex to the main building. Each rotary is installed in a separate compartment, so that during the starting up and operation of any particular rotary the chamber is screened off, the locking gear on the entrance gate being interconnected with the 20,000 volt switches controlling the supply

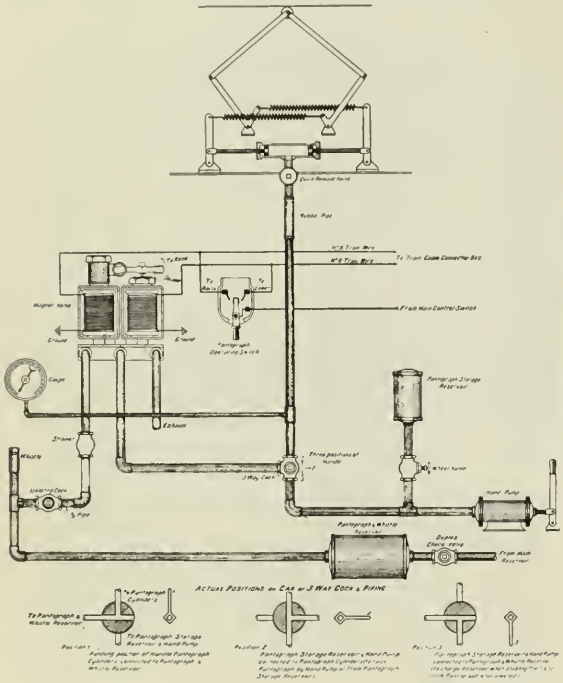


Fig. 9. Diagram Showing Pantagraph Control Apparatus

to the rotary static transformers and also with the operating levers controlling the 1,500-volt d.c. gear, so that it is impossible for an operator to come into contact with live metal.

High Tension Switchgear—The 20,000-volt switchgear is of the cellular type, the cells being constructed of brick and the cell doors are completely interlocked with the main oil switches and isolating switches, so that access cannot be obtained to live conductors. The switchgear is arranged on three floors. On the ground floor are installed the cable terminal boxes, earthing and isolation switches and instrument transformers; on the first floor are installed the oil switches which are of large breaking capacity, each unit consisting of three single-phase switches in strong steel tanks. The whole connections in the oil switch cell are insulated and the doors to the cell are dust tight. The gallery giving access to the switch cells is open to the outer air, so that in the event of a fire occurring in one switch cell, it can be dealt with from the outside. The oil switch tanks are provided with vent pipes which discharge the gases formed when opening circuit into the open gallery; on the second floor are the bus-bars and bus-bar isolating switches. These bus-bars are split by means of a section switch, so that maintenance work and repairs can be carried out without shutting down the whole of the substation. The operating gear for the 20,000-volt switches and isolating switches is on the operating gallery, which is in front of the oil switch cells.

Direct Current Switchgear—The 1,500-volt d.c. switchgear and the positive bus-bar are installed on the ground floor below the operating gallery and all isolating switches and circuit breakers are operated by signal levers from the operating gallery above. The switchgear is mounted in brick cells with the automatic circuit breakers on the top. The chamber containing the switchgear and circuit breakers is specially ventilated. The negative and equalizer bus-bars are run in the basement below the rotary converters.

Signalling Switchgear—The 2,000-volt single phase signaling switch gear is of the Reyrolle armor clad type, specially developed for the purpose. It is installed on the operating gallery.

Auxiliary Switchgear—The 440-volt switchgear for controlling the auxiliary and signalling supplies is of the Metropolitan-Vickers ironclad type and is mounted on the

Fig. 10. Supporting Structure for Overhead Wire Covering Six Tracks

gallery above the auxiliary transformers, in one bay of the main building. The 110-volt d.c. switchgear for controlling the lighting motor generators, the tripping and operating battery, etc., is of the usual slate panel type and is mounted upon the operating gallery.

Rotary Converters—Four sizes of rotary converter are at present in use or building, made by Siemens Bros. Dynamo Works, Ltd., the British Westinghouse Electric & Manufacturing Co. Ltd. (now the Metropolitan-Vickers Electrical Co. Ltd.), and by the General Electric Company (New York), the two hour ratings being 3,000 kw., 2,250 kw., and 750 kw. The 750 kw. machines being destined for installation in outlying substations with a comparatively infrequent train service, have been specially designed with a drooping characteristic, since the overloads are relatively more severe and the regulation of less importance.

The conditions laid down were the conversion of 3-phase current at 19,000 volts, 25 cycles, into direct current at 1,500 volts with a leading power factor of .95 at normal load. A compound winding on the larger sizes compensates for a drop in pressure of 10 per cent at double full load.

The machines are six-phase, with 12, 6 or 4 poles. They are arranged for self-synchronizing. The 3,000 kw. machines are designed to carry 6,000 kw. for short periods and pro-rata in the case of the other sizes, except in that of the 750 kw. machines, which are designed to carry 2,000 kw. for short periods.

Rolling Stock

The trains are operated on the multiple unit system, every second or third car being equipped with motors. In the present case it was the intention to make up units of a motor car and trailer both equipped for driving from one end, but up to the present time only a limited number of trailer cars have been equipped with the driving apparatus. The normal six-car train has a motor car with its driving end outward at each end of the train with a third motor car about the center of the train. There are some 700 coaches in use on the electrified lines at the present time. These are made up of 359 motor coaches, 56 trailers equipped

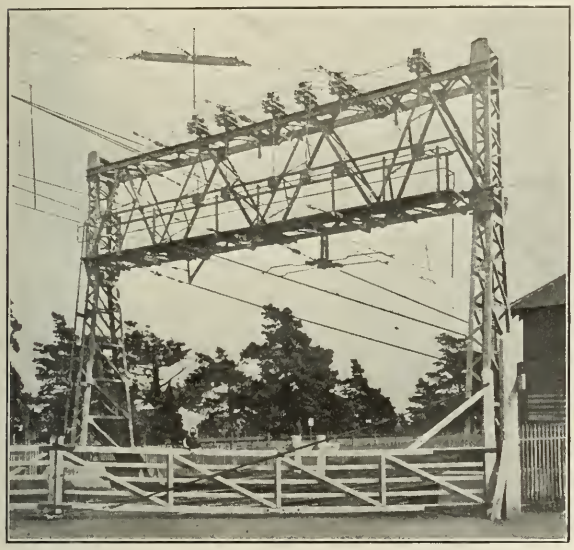


Fig. 11. Tensioning Structure for Smaller Spans

with driving apparatus on one and 287 trailers with no driving apparatus. No special type of car has been designed for use at Melbourne, the existing rolling stock being converted for electrified operation. All of these cars are equipped with side doors of either the swing or sliding type opening into compartments. Some of these cars have but two partitions, one of which is solid, preventing any communication between the compartments of that car. Each of these compartments have center aisles with two passenger seats on one side and three on the other. Doors, however, are provided at the entrance to each seat. There are no vestibules to these cars which makes it impossible to pass from one car to another.

The underframes of the motor coaches are made up of 10-in. by 3½-in. by 25.39-lb. channels for side and end sills with intermediate sills, cross bearers and diagonal braces of 6-in. by 3-in. by 14.5-lb. channels. The draw gear is anchored to a 10-in. by 3½-in. channel secured between the intermediate sills. The underframe is covered by ⅛-in. steel plate which, in addition to strengthening the structure, provides a fireproof protection between the underframe and the body. These underframes are 58¾ in. long by 9 ft. wide with 42 ft. truck centers.

The motor trucks (Fig. 4) are made up of ½-in. pressed steel side frames, the bearing springs being of the laminated type 4 ft. long and are fitted with double auxiliary spiral springs at each end. The bolsters are made up of two pressed steel plates 5-in. thick and are of the swing type. They are supported on four spiral springs at each end. The whole base of the truck is 8 ft. 6 in. The wheels are 42 in. in diameter and the journals are 9 in. by 5½ in.

The motor cars weigh 104,800 lb. and 107,150 lb., the heavier cars having a weight per passenger seat of 1,280 lb. for 84 passengers. The driving trailers weigh 58,850 lb. and 61,768 lb., the heavier car having a weight per passenger seat of 735 lb. for 84 passengers. The non-driving trailer cars weigh 36,950 lb. and 61,376 lb., the heavier of which having a weight per passenger seat of 653 lb. for 94 passengers.

These cars are equipped with Westinghouse air brakes, the clasp type of brake being used. Air is supplied by means of a two cylinder single acting electrically driven air compressor, one being supplied to each motor coach. A main reservoir pressure of 100 lb. is carried, and the compressor is automatically thrown into action when the pressure falls to 90 lb. A train line pressure of 80 lb. is carried. The brake cylinder is 16 in. in diameter and the braking force is equal to 110 per cent of the tare weight of the motor car with 60-lb pressure in the brake cylinders. The braking force on the trailers is, however, 100 per cent of the tare weight. The cars are also equipped with air signals.

Every driving car is fitted with a "pilot" or "deadman's" valve and a trip valve, which are connected to the top side of the emergency relay valve attached to the train pipe. The arrangement of the air brake apparatus is shown in Fig. 7.

The motor equipment consists of four G. E. No. 237 motors of 140 hp. with two motors connected permanently in series. The armatures are connected to the axles through single reduction gears. They are geared to give a maximum

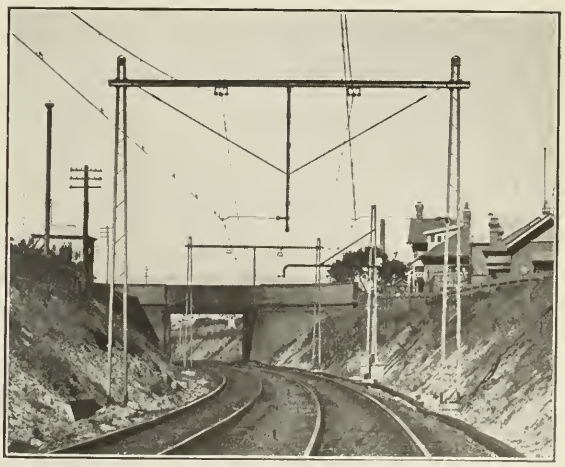


Fig. 12. Intermediate Supporting Structures on Curved Tracks

speed of 52 m.p.h. on level tangent track. The characteristic curves of these motors are shown in Fig. 6.

The arrangement of the pantograph is shown in Figs. 8 and 9. The total pressure of the pantograph on the contact wire is such that with a reasonably clean wire the pantograph is able to collect considerably over the 500 amperes, the normal maximum operating current for each motor coach, without sparking from a contact wire .25 sq. in. cross section. The pantograph has a working range between 14 ft. 6 in. and 21 ft. 6 in., extension being by means of springs worked by pistons in cylinders mounted on the frame of the collector. Air for operating the pistons is supplied from the pantograph and whistle reservoir in the first instance by a hand pump installed in the guard's compartment, air, however, being obtained from the main brake reservoir when the latter is charged. The pantograph is controlled by means of two

electro-pneumatic valves which can be operated electrically or by hand.

The master controller is of standard type, but as the actuation of the contactors is automatic the controller only has four points in the forward direction and two in the reverse direction, the first point in either direction being known as the "switching" or "lap point," and the second point being the "series" position.

Permanent Way and Overhead Equipment

The total mileage which has been electrified is approximately 335 track miles including sidings. Most of the lines are double track. There are, however, two miles of 3 track line, over 5 miles of four-track line, and over 3 miles of six-track line. The rails used are of T-section weighing 100-lb. per yard, being double spiked to untreated hardwood ties. These ties are 9 ft. by 10 in. by 5 in. and are spaced 2 ft. 10 in. apart between rail joints and 1 ft. 8 in. apart at the joints. The ballast is made up of bluestone and is about 15 in. deep. The gauge of the track is 5 ft. 3 in. spaced on 11 ft. 8 in. centers. The minimum structure clearance above platform level on tangent track is 7 ft. from the center of the track. This is increased to 8 ft. on 800-ft. curves. The smallest curve has a radius of 600 ft. All curves have a 150-ft. easement approach. The 9 miles between North Melbourne and Broad Meadows has an average grade of 85 per cent and the maximum permissible speed on this section is 52 m.p.h. The maximum grade of any importance is one of 2 per cent.

The 1500-volt direct current is transmitted to the motor

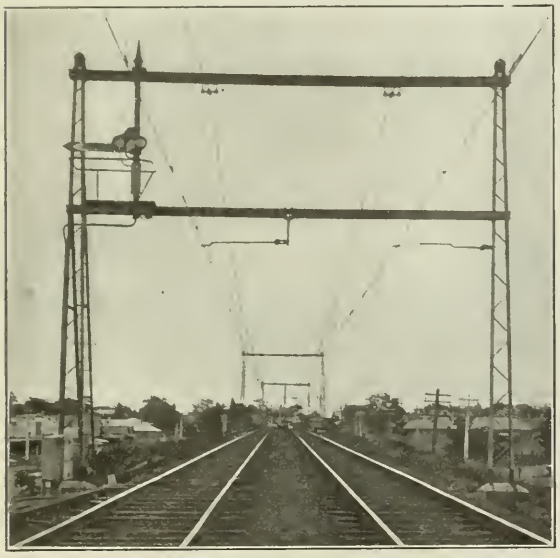


Fig. 13. Intermediate Supporting Structures Adapted for Carrying Signals

coaches through overhead contact wires arranged on the simple catenary system. The number of conductors was kept at a minimum to avoid interference with signals; only one catenary wire and one contact wire are used, there being no auxiliary feeder cables.

The supporting droppers between the catenary cable and contact wire have at the lower end a short length of chain, so that the tendency of the contact wires to lift under the upward pressure of passing pantographs is not restricted by the weight of the dropper or of the catenary cable to which it is attached. Automatic tensioning of the contact wire is provided for by a system of floating balance weights at each end of tension sections, the relative movement of the contact wire and catenary cable being provided for by a horizontal sliding attachment to the droppers.

The normal construction on main suburban tracks is 0.25 sq. in. hard drawn grooved copper contact wire supported by flexible droppers at intervals of 15 ft. from a stranded hard drawn copper cable of .25 or .375 sq. in. There is thus an equivalent of 0.5 sq. in. of copper over each track, there being no feeders other than the supporting catenary wire. The contact wire is automatically tensioned at each end of a 3,000 ft. length of approximately 2,500 lb. The catenary wire normally has a 10 ft. 9 in. sag at the center of a 300-ft. span at 60 deg. F., with a maximum tension of approxi-

Fig. 14. Another Method of Carrying Signals on Intermediate Supporting Structures

mately 3,200 lb. and is anchored about every 3,000 ft.

The normal contact wire height is 16 ft. 6 in. over the main suburban tracks at 70 deg. F., but over grade crossings the minimum height is 18 ft., while under low bridges, which are numerous, the minimum height is 14 ft. 6 in. above rail level, giving a vertical clearance of 12 in. between the contact wire collecting surface and the underside of the bridge. As the maximum height of projecting ventilators on country rolling stock is 14 ft. 2 in., some considerable care had to be exercised to avoid trouble. It was finally decided to retain the flexible contact wire beneath low bridges.

To obtain satisfactory alignment, and to ensure that the pantograph with a normal upward pressure of between 25 and 30 lb. at a speed of 50 m.p.h. would not raise the contact wire more than two inches, a maximum grade of 1 in 150 was adopted, and where possible a grade of 1 in 250, except where speeds were limited. Where a steam service is also being used the insulators are arranged so as to avoid the direct blast of the locomotive exhaust. The importance of careful alignment will be realized as temperature limits between 27 deg. F. and 175 deg. F. had to be allowed for.

Supporting Structures.

The supports for the catenary construction consist of tensioning anchoring structures about 3,000 ft. apart with lighter intermediate structures at 300 ft. intervals on tangent track and closer at curves.

The tensioning structure extending over six tracks is shown in Fig. 10. This structure is made up of 8-in. channels with angle bracing, and the masts are made up of 6-in. by 6-in. by ½-in. angles with lighter angles for bracing. The masts are anchored to concrete foundations. Twelve contact wires are tensioned from the bottom member of the span. Chains attached to the contact wires pass over pul-

leys on the lower span member and carry weights located in the right hand mast. The catenary wires are rigidly anchored to the top member of the span. Tensioning structures for smaller spans are of similar construction but are made of lighter material (Fig. 11).

The intermediate supporting structures for curved tracks

Fig. 15. Overhead Wire Supports Used at Bridges

are indicated in Fig. 12. The masts are made up of 7-in. channels and the span is made up of 6-in. latticed channels. A guiding arm extends down from the middle of the span made up of a two 4-in. channels for the purpose of guiding the contact wires. This arm is braced to the ends of the span by tie rods provided with turn-buckles.

The structures built for supporting the overhead wires serve also as a signal bridge in certain cases, and Fig. 13 and has a 120-ft. span. At this point there are a number of crossings which complicate the overhead wiring. The span of this structure is made up of four main cords of a pair of 4-in. by 4-in. by ½-in. angles with 3-in. by 3-in. by ½-in. and smaller angles used for bracing. The design of the bridge is such that with the legs fixed the expansion and contraction is permitted by a rising and lowering of the span. The overhead construction used in the yards is shown in Fig. 17.

All overhead equipment structures, signalling bridges and overline road bridges to which line work is attached are bonded to the track rails through a paper spark gap, .001 thick, between two aluminum discs. By this means the structures are normally insulated from the rails, and the liability of unbalancing of traction return current in the

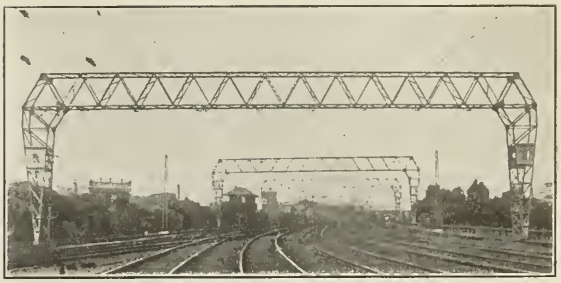


Fig. 16. Supporting Structures for Contact Wires at Terminals

running rails due to leakage of current through imperfectly insulated structures is reduced to a minimum. This precaution is taken as it is necessary to limit the unbalancing of current through the impedance bonds connecting the sig-

Fig. 17. Method of Supporting Contact Wires Over Yards

and Fig. 14 shows the adaptation of an intermediate supporting structure for this purpose.

Fig. 15 shows the construction of intermediate overhead wire supports at bridges or viaducts and indicates in addition another method of guiding the contact wire on curves.

An example of supporting structures for the contact wires over a large number of tracks is shown in Fig. 16. This is a pin arch structure located at North Melbourne junction

nalling track circuits which are operated by alternating current. Should the insulation between the overhead wires and supporting structures break down the spark gap punctures and the structure is connected to the nearest rail, thus giving a comparatively low resistance return to the substation.

The up and down tracks of all routes are electrically insulated from each other, and all routes are as far as possible separately fed. At extensive junctions the overhead

wires of a number of tracks are connected together and treated as one section, and are usually sectioned at both ends. An air section insulation is employed between track sections where the speed of trains exceeds 25 m.p.h. Over crossovers and leading-in tracks to sidings where train speed is restricted the tracks are electrically insulatel from each other by means of section insulators in the catenary and contact wires. Ordinary terminal strain insulators are employed in the catenary wire and continuous feed section insulators in the contact wire.

Sectioning points are located with reference to traffic requirements and the position of crossovers, being on the outlying lines from 2 to 3 miles apart.

Signal System*

Automatic signaling of the upper quadrant, three position type, which is extensively used in the United States, is used throughout the electrified portion of these railways. The light sginals are red, yellow and green for "stop," "caution" and "proceed," respectively. The marker light, always red, which is located on the opposite side of the signal mast from the automatic signal is used as a fixed signal. The automatic signal arm has a pointed blade indicating that after having stopped at such a signal for a specified time, the driver is authorized to proceed into the next section.

The interlocked signal is a two-arm signal, the top arm being called the normal speed arm and the lower arm the low speed arm. On the Victorian railways this arm limits the speed to 25 m.p.h. Each arm works in the three positions as in the case of the one arm automatic signal. The interlocking signals have square ends which denotes an absolute stop. There is placed below these two signal arms and on the same side as the signal mast, a hooded electric lamp with a yellow lens known as the low speed signal, which indicates that a speed of 10 m.p.h must not be exceeded.

Dwarf signals similar to those used on the Chicago & North Western are provided in yards for switching movements. In this case the "stop" indication at night is represented by a purple colored lense instead of red.

Track circuits are operated with alternating current at 6 volts. Signal mechanisms are operated by induction motors at 110 volts, and the signals are lighted by 6-volt ½-candle power lamps.

A few signals have been installed which give indications by colored lights for both day and night service. These consist of electric lamps of higher candle power with different colored lenses, namely, red, yellow and green, the whole arrangement being heavily hooded as a shield against daylight.

Automatic train stops are used in the electrified territory as shown in Fig. 18, consisting of a movable arm operated by an electric motor. There is a detection rod coupled to the end of the train stop arm which actuates electrical contacts in the circuit of the signal so that if anything should happen to this arm the signal would be set at "danger."

The switching points are unlocked, switched and relocked by a single stroke on one lever instead of using separate levers for the locking and switching movements. A sensitive electric detector is fitted to the arrangement so that a very small movement of either the switch or lock will cause the signal light over the switch to show the "danger" indication.

Wherever possible twin paper insulated lead sheathed cables are used to carry the wire. Where it is not possible to use this, Kerite insulated wire has been used.

The power for the signalling system is taken from the Newport Power station and transmitted to the substations at 20,000 volts. From this point it is delivered to the signal power transmission mains at 2,200 volts and stepped down to 110 volts for signal operation and 6 volts for track circuits.

*Abstracted from an article by F. M. Calcutt, published in the August 28, 1919 issue of the Industralian and Mining Standard.

Illuminated diagrams showing track arrangements are provided in the signal cabins.

The three-position signal and automatic train stop, mechanical impedance bonds, alternating current relays, time release mechanisms and the Kerite insulated wire were imported from America. The high tension switching gear, main transformers and lead cables were obtained from Great Britain.

Owing to the difficulty in obtaining material, the development of this improved system of signalling has not progressed as rapidly as anticipated.

General

Owing to the war, difficulty was experienced in obtaining the desired material. Among that which was purchased from

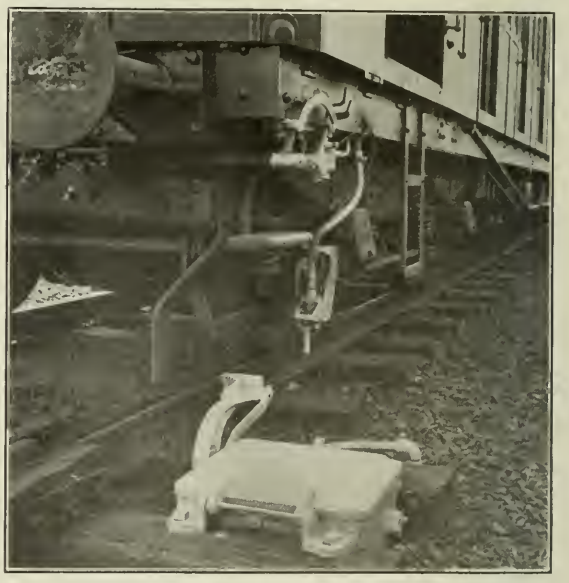


Fig. 18. Type of Automatic Stop Mechanism Which Is Used on the Electrified System

the United States may be mentioned the motor equipment for the cars and some of the substations equipment from the General Electric Company of New York, and electrical train stops and signal apparatus from the General Railway Signal Company.

The whole of the work has been carried out to the plans and specifications of Messrs. Merz & McLellan, consulting engineers, of London, through their local Melbourne representative, E. P. Grove, in conjunction with the Electrification Committee of the Railway Department of Victoria. The scheme owes much of its success to the energy and ability of the late E. B. Jones, for some time one of the Commissioners.

The Western Society of Civil Engineers, Chicago, held its annual dinner at the Morrison Hotel in that city on Wednesday evening, January 28. Retiring president Baldwin, vice-president of the Illinois Central Railroad Company, presided. Major-General Leonard Wood was the principal speaker of the evening. The officers elected for the ensuing year include: president, F. K. Coapland, president Sullivan Machinery Company, Chicago, and first vice-president, C. F. W. Felt, chief engineer, Atchison, Topeka & Santa Fe System. The plans for the ensuing year include the creation of a railroad section.

Director General Hines Answers Criticisms

In Letter to Newspaper Editors He Analyzes the Principal Points of Complaint Against Federal Control

WASHINGTON, D. C.

WALKER D. HINES, director general of railroads, has addressed to the editors of each of the newspapers of the country a letter analyzing the principal features of federal control of the railroads which have been the subject of public discussion. He says that it is not written to promote any particular solution of the railroad problem but merely represents a sincere effort to bring about a clear understanding, because he feels that "whatever the principle on which the railroad problem is to be solved, the public interest will be promoted by a correct appreciation of the real significance of the matter I discuss." The letter follows:

The railroad problem is so complex and so important that it deserves honest-minded analysis; and this not because the plan of any one group of advocates should be supported but because the best solution, upon whatever principle it proceeds, will be promoted by clearness of understanding of the facts. I therefore bespeak your careful consideration of the following effort to analyze the principal features of federal control which are now so much under discussion:

1. **The alleged excessive costs of railroad operation by the Railroad Administration.**— The confused notion finds support that while the increased operating cost in private enterprise is due to war conditions, a corresponding increase in railroad operating cost is due to mistakes of the Railroad Administration. Such an argument assumes that the railroads should have been, and in the future can be made to be, independent of economic conditions which have affected and will affect every other industrial enterprise. The public will deceive itself to its own injury if it is led to rely upon this fallacy.

Simply as an illustration, reference will be made to the largest private enterprise in the country. Moody's Manual for 1919 shows that the operating costs of the United States Steel Corporation increased from $494,800,000 in 1914 to $1,240,800,000* in 1918 (the figures for 1919 not yet being available), this being an increase of $746,000,000. That is, the expenses of the Steel Corporation in 1918 were 151 per cent more than its expenses in 1914. The public naturally assumes until the contrary is shown that this increase was the normal result of enlarged production and necessary increases in prices and wages due to war conditions.

The operating costs of the railroads for 1919 can now be closely approximated and therefore will be used for comparison because they are larger than for 1918. The operating costs for the Class I railroads were $2,140,000,000 for 1914 and were approximately $4,324,000,000 for 1919, being an increase of $2,184,000,000. In other words, the operating costs in 1919 were 102 per cent more than the operating costs in 1914. But many people are disposed to assume until the contrary is proved that this increase in railroad operating costs is due to mistakes of the Railroad Administration and not to enlarged production of transportation or to necessary increases in prices and wages.

We find that the Steel Corporation's tonnage of finished products increased about 55 per cent in 1918 over 1914, with the result that its increase in its cost per ton of finished product in 1918 was 61 per cent as compared with 1914. The increased service of the railroads in 1919 will be not less than 26 per cent in excess of the service in 1914, so that this would indicate an increased cost per unit of service on the railroads of not more than 60 per cent in 1919 as compared with 1914.

In thus endeavoring to illustrate the all-pervasive increase in costs by this comparison between the principal steel enterprise and the railroad enterprise, the selection of the steel operations in 1918 for comparison with the railroad operations in 1919 is believed to be clearly less favorable to the Railroad Administration than the comparison would be if the 1919 figures of steel operation were now available. This is true because private industry, as well as the railroad industry, was subjected in 1919 to unfavorable conditions not prevailing in 1918, such as a slump in business in the first half of the year, interferences with the volume of business later in the year on account of strikes, the more complete effect of increased prices and wages, and the general relaxation in effort, which in 1919 has characterized all industry as compared with 1918. These additional difficulties are all reflected in the railroad operations for 1919.

Of course, no exact parallel can be claimed between any two radically different enterprises, and yet every fair-minded person must appreciate that until the contrary is shown the same presumptions of necessity for increased cost should obtain in considering railroad operating costs as in considering the operating costs of great private enterprises. Certainly the public can not afford to fool itself by thinking that the railroads can be operated in a state of isolation from all those influences which have affected every other line of human activity, public and private, in this country and in other parts of the world as the result of the greatest economic and social upheaval that the world has ever known.

It would be surprising if complete analysis did not indicate a more successful adjustment to the new conditions arising out of the war by the Steel Corporation with its unbroken continuity of management and policy extending over a period of nearly 20 years, and its ability to plan with confidence for the future, than by the United States Railroad Administration. It must be remembered that the Railroad Administration was created almost over night as a war emergency and avowedly as a purely temporary expedient; that it was consequently unable to create a really permanent organization or to hold throughout even its temporary life some of its most experienced members, and was without opportunity to carry out comprehensive policies of a reasonably permanent character either as to capital expenditures for new equipment and improvements or as to operation in respect of establishing permanent and more effective relationships between the management and the employees, and in other respects. Considering the exceptional difficulties thus confronting the Railroad Administration, it is noteworthy that despite the all-pervasive influences of war conditions the increase in operating costs has been kept as low as it has been. It should also be appreciated that to an important extent the showing is relatively so favorable because of the very substantial savings which have been practical under unified operation notwithstanding its being hampered so seriously by the shortness and uncertainty of its duration.

Public discussion always assumes, except when railroad operation is under consideration, that on account of the conditions growing out of the war the purchasing power of money is greatly decreased, so that it requires perhaps from $1.80 to $2 to buy as much materials and labor as $1 would have

*In showing this figure for operating costs for 1918 there has been excluded the amount of federal income, war profits, and excess-profits taxes shown by the Steel Corporation's annual report to its stockholders.

bought in 1914. Thought on this point should be clarified so that it will be generally appreciated that the dollar to be expended by the railroads for their operating costs can not be expected to go any further on the average than the dollar expended by anybody else.

While so frequently ignored in discussion, yet there can not be serious denial that in the purchase of materials and supplies such as steel and iron, lumber, crossties, coal, etc., the railroads must pay the very heavy increases in prices which are paid by others similarly situated. These increases of themselves account for much of the increased expenses, although, of course, as in other industrial enterprises, the cost of labor is the largest element, and this will be separately referred to.

2. **The alleged extravagant increases in wages of railroad labor.**—Employees who work for the railroads are confronted with the increased cost of living just like other people, and increased wages for railroad employees have been not only necessary, but just. Contrary to the popular impression, the increases to railroad labor have not been out of line with increases to labor generally. Referring again, purely for the purpose of suggestive illustration, to the United States Steel Corporation, the head of that corporation stated last spring as to the average of all its steel products that the direct labor cost per ton in March, 1919, was $34.61, as compared with $15.13 in 1913, an increase of 119 per cent. The Department of Labor in its monthly labor review for November, 1919, shows that the pay per hour to labor in the iron and steel industry increased on the average 121 per cent in 1919 as compared with 1913. The average increase in the rate per hour for all railroad employees for the year 1919 as compared with the year 1913 will not exceed 100 per cent, and such average increase at the end of 1919 with all readjustments then in effect will not exceed 106 per cent.

When the Wage Commission, of which Hon. Franklin K. Lane was chairman, reported in the spring of 1916 on the wages of railroad employees, it pointed out that contrary to common conception railroad employees were not highly paid, that 51 per cent received during 1917 $75 per month or less, and 80 per cent received $100 per month or less. The leading executives of the eastern railroads, when they appeared before the Interstate Commerce Commission in the fall of 1917, laid stress upon the fact that their earnings were not sufficient to enable them to pay adequate wages in competition with other industries.

In making the important increases which were as indispensable for the railroads as in other enterprises, and which were long overdue in the case of the railroads, the government could not escape the policy of reasonably uniform treatment and the result of this policy operated to produce numerous individual cases of abnormally large wage increases, but the matter, from the standpoint of its total cost to the railroads and the public, must be considered as a whole, and the average increase per hour to railroad employees as a whole has been no more than was responsive to the conditions which have forced heavy increases upon all industrial enterprises and has not been out of line with what other enterprises have done.

If this subject is viewed in the light of the facts, the conclusion can only be the pay per hour to railroad employees on the average makes a reasonable comparison with what has been done in private enterprises.

3. **The alleged excessive increase in the number of railroad employees under federal control.**—The increase in the number of employees has been due principally to the adoption of the eight-hour day. Prior to federal control many classes of employees worked 10 hours per day and in some instances even longer, although the adoption of the eight-hour day had already made substantial progress on the railroads.

There have been many comments on the fact that in July, 1919, there was an increase of 11.2 per cent in the number of employees over the month of December, 1917. Since July, 1919, was a month favorable to much outside work calling for additional employees and December, 1917, on account of the severe weather, was a month unfavorable to outside work and besides there was at that time an admitted scarcity of railroad employees on account of competition of munitions plants, etc., and the other war demands, a more reliable comparison of the difference between the number of employees under private control and under federal control is the comparison of the entire year 1917 with the entire year 1919. On the latter basis there was an increase of 9.7 per cent in the number of employees for the year 1919, and yet the actual number of hours of work paid for was 5.9 per cent less in 1919 than in 1917. This is explained by the fact that during the year 1917 the employees worked on an aevrage 261.4 hours per month, while during the year 1919 the employees worked on an average 218.5 hours per month (but it must be remembered that they were paid only for the hours worked, although, of course, at an increased rate per hour).

People who believe it is good public policy to require employees in the railroad industry to work on an average throughout the year 261.4 hours per month can, of course, make an issue with the Railroad Administration as to the propriety of the policy of the eight-hour day which has resulted during the year 1919 in reducing the average number of hours worked per month to 218.5, but in the interest of an intelligent understanding of the matter, the issue ought to be clearly made upon this broad question of policy. The matter ought not to be confused by some vague assumption that this increase in the number of employees is due to some insidious influence of the Railroad Administration in the interest of inefficiency.

It is also highly important to make clear that this increase in the number of employees on account of the eight-hour day does not involve in general an increase in the payroll, because generally the pay is based not upon the number of employees but upon the number of hours worked. The rate of increase in pay per hour above referred to completely reflects the increased wage, yet the tendency to confusion on these matters is so marked that frequently the total increase in wages is referred to, and in addition the increase in the number of employees is mentioned on the erroneous assumption that that constitutes a corresponding further increase in operating cost.

Surely the public is entitled to be set right upon this proposition. It should not be led to think that the mere substitution of private control for the temporary federal control will bring about the decrease in the number of employees to the pre-war basis. Such a decrease will not come in any general sense except through a return to the longer working day which obtained in 1917. Prior to federal control the train and engine men had the basic eight-hour day by virtue of the Adamson act, but on the average all other classes of railroad employees had a working day substantially in excess of eight hours, though the eight-hour day had been adopted on some railroads as to some classes of employees.

A further, but relatively minor, element working in favor of an increase in the number of employees is one which has been experienced by the railroads in common with all other forms of industrial enterprise. This grew out of the loss of experienced employees both during the war and since, the extraordinary movement of employees from one employer to another resulting in an exceptional labor turnover, and a widespread psychological unrest which seems to characterize every class of our citizens and which results in many employees being less attentive to their work. Similar causes have manifested themselves in enterprises generally. Certainly those who think both fairly and clearly cannot in the

same breath excuse this condition as unavoidable in private enterprises and charge it to the weakness of federal control in the case of the railroads.

There is a predisposition to assume that any governmental activity is actuated by a purpose to increase the number of employees, and from this premise, which is entirely mistaken as to the Railroad Administration, many erroneously attribute the increase in the number of railroad employees to some political preference for a larger rather than a smaller number of employees. The Railroad Administration has never had any such purpose. On the contrary, the local railroad officers are expected to control this matter to the fullest practicable extent, and the Central Administration is constantly investigating local conditions and using its authority as well as its influence to stimulate local managements to avoid all unnecessary employment. These local managements are the same skilled railroad officers who operated the railroads prior to federal control, and who will still continue to operate them after federal control is ended. There has not been at any time any element of politics in the selection of either officers or employees by the Railroad Administration either in the central or regional offices or on the various railroads.

4. The deficit from railroad operations.—This to a greater extent that anything else calls for clear and honest analysis. A deficit is due either to costs beings too high or to revenues being too low. Fair-minded investigation will show, as is above explained, that the increases in cost have been in line with the unavoidable conditions which have controlled railroads as well as private enterprise. Of course, no industry so extensive as the railroad industry could be free from numerous incidents admitting of criticism, but, broadly speaking, the increase in costs has been fairly related to the changed conditions growing out of the war. This being true, the real explanation of the deficit is that the rate increase of 1918 could not be made effective soon enough and that perhaps railroad rates were not increased quite enough to pay all of the necessary increases in cost during the period of the war and readjustment.

To begin with, it was not practicable for the Railroad Administration to initiate any general increase in rates and put it into effect until June 10, 1918, as to passenger rates, and until June 25, 1918, as to freight rates. Thus, nearly six months of heavily increased costs had passed before these increased rates could be made effective. If these increases could have been made effective at the very beginning of federal control *there would have been no deficit whatever from railroad operations up to and including the end of October, 1919.* The entire deficit on the Class I railroads for that period of 22 months of federal control of $480,200,000 would have been more than wiped out if the rate increases had been effective January 1, 1918.

The results for November and December, 1919 will be useless for the purpose of estimating normal earning capacity because of the extraordinary interference with business and increase of operating burdens growing out of the unprecedented coal strike, which so seriously interrupted and dislocated railroad traffic throughout the country. Large deficits for these two months prove nothing except the destructiveness of the coal strike.

The normal expenses of operation have been higher in 1919 than in 1918 because of still greater costs of materials and supplies and because of various readjustments in wages which were not completed in 1918. It may be that on these accounts, even under federal control, a small additional increase in rates would be necessary to make the railroads self-sustaining, but the Railroad Administration has felt that conditions were too abnormal and were changing too rapidly to make a satisfactory basis for the determination of what this additional increase ought to be. This abnormal character was due largely to the remarkable slump in freight business following the armistice and lasting throughout the first six months of the year, and has been further accentuated by the unprecedented conditions of the coal strike in November and December.

The rate structures of the country are so complex that unnecessarily frequent changes therein are exceedingly disturbing to business interests. The general increase made in 1918 was carefully planned to avoid such difficulties as far as possible, and it is believed it involved less difficulties than any other plan which could have been then devised, but, nevertheless, the readjustments which were called for by business interests, so as to avoid interference with established relationships, have for nearly a year and half occupied most of the time of 33 freight traffic committees located throughout the country and made up of representatives of the shippers and the carriers and have called for over 20,000 changes in the rates put into effect by the general rate increase. It has been the judgment of the Railroad Administration that for the sole purpose of providing revenues for the government during federal control the making of a further general modification of such complicated and delicately inter-related rate structures should not be entered upon without an adequate understanding as to the amount of revenue which it would be necessary to raise and that the conditions during 1919 have been too abnormal to admit of drawing a correct conclusion, although the strong indications are that under a continuance of unified control a large general increase could probably be avoided altogether. Of course, with a return to private control consideration immediately thereafter of rates to sustain the credit of the railroad companies is inevitable.

The deficit, therefore, is really due to this conservatism of the administration in deferring a rate increase until it could be reasonably sure as to the basis upon which it ought to be computed. The result has been simply that for the time being the deficit in railroad operations has been made good through general taxation of the public instead of through the special taxation arising from an increase in rates.

There is a popular catch-phrase argument to the effect that two years of government control of the railroads have cost the country several hundred million dollars. The fact is that government control has cost the amount of operating expenses during federal control plus the rental, and, as above shown, these operating expenses do not in the aggregate reflect more than the perfectly normal influence of the extraordinary conditions which have told on railroad operation as well as on other enterprises. By reason of the impossibility of anticipating with precision the amount of the increased operating cost, and by reason of the earnest desire to avoid unnecessary disturbances of the complicated rates structure, a part of the added cost has not been made good by rate increases, and therefore has had to be made good by general taxation. But the cost is the same in either event, is paid for by the public in either event, and is due to war conditions. The cost which has been placed upon the public by private enterprises which have increased their prices enough not only to anticipate and cover their war operating costs, but also to produce unprecedented profits, has been immensely greater than any cost placed upon the public by the federal control of the railroads. The entire average increase in freight and passenger rates from 1914 to 1919, taking the country as a whole, has not exceeded 33 per cent, while the increases in the prices which the public has paid for the products of private enterprise in that time has been from 60 per cent. to 150 per cent and higher.

Those who think there should have been under federal control general increases in rates as often as necessary to take care immediately of the entire expense of railroad operation so that no part of it would be taken care of even temporarily

through general taxation are, of course, entitled to criticise the policy of the Railroad Administration, but here again the issue should be clear-cut and should not be confused.

It would be most unfortunate if the public is misled into believing that the deficit is due to federal control and is to be cured by the termination of federal control, only to find that what will really cure the deficit will be an important increase in rates. Such an increase would equally cure the deficit under federal control, and in fact it is likely that a substantially less increase would be necessary because the full saving from unification could be preserved under federal control, and further, because under private control a wider margin of earnings will presumably be necessary to support the separate credit of the respective individual companies operating independently.

5. The railroad service.—Clear thinking requires consideration of the plant with which the government has had to perform the service. At the beginning of federal control it was conceded that for several years on account of high prices, difficulties as to railroad credit and general uncertainty as to the future, insufficient new equipment had been obtained. During the first year of federal control the amount of new equipment obtainable was limited absolutely by the amount of material which could be taken from other war purposes and devoted to the construction of railroad equipment. It was, therefore, impossible to construct any passenger, mail or express cars, or any refrigerator cars, stock cars, or flat cars, but the Railroad Administration was able to obtain the material necessary to construct 100,000 freight cars of other types.

During the second year of federal control, although more material was available, it was not practicable to construct additional equipment because of the near approach of the termination of federal control and the clearly expressed opposition of Congress to the idea of a further development of railroad facilities through the use of government funds by the Railroad Administration. In January and February, 1919, the Railroad Administration advised a definite extension of federal control, urging that in that way comprehensive plans could be put into effect for increasing railroad equipment and facilities to the extent called for by the prospective business of the country. This view was not acceptable to Congress, and there has been no basis for providing additional equipment. Accordingly, the Railroad Administration has had to operate with an amount of equipment that was insufficient.

At the same time there has been an extraordinary volume of business. From January 1, 1918, to November 1, 1919, there were over 13,000,000 soldiers, sailors and marines moved on the railroads, this being the equivalent of nearly 6,000,000,000 passenger miles, necessitating the use of 215,000 railroad coaches and Pullman cars and the movement of over 18,000 special trains. At the same time the movement of the civilian population reached proportions in excess of anything ever before experienced. The result was that the volume of passenger travel in the year 1918 was 8.1 per cent more than 1917, and the volume of passenger travel in 1919, up to October 31, was about 20 per cent more than in the corresponding period of 1917. Civilian inconveniences incident to this extraordinary passenger travel, which had to be handled without increase in passenger equipment, were inevitable.

The freight traffic for 1918 was in excess of that for 1917, which up to that time had been the heaviest year. During the first eight months of 1919 the freight traffic was considerably less than in either 1918 or 1917 on account of the great slump in business. But in the months of September and October, 1919, the traffic was greatly in excess of 1917, and for a part of the time in excess of that in 1918, notwithstanding the fact that the Railroad Administration was unable in 1919 to secure the heavy car loading which as a measure of patriotism had been obtainable in 1918.

Therefore, despite all criticism of the service, the Railroad Administration, with an inadequate plant, has actually performed an exceptional volume of service, and it has done this with less congestion than was ever known in previous periods of heavy business in recent years. Even at present, in the face of extremely difficult weather and the adverse effect of the influenza on railroad labor, a heavy volume of traffic is being moved. Of course, it cannot possibly satisfy the demand because of the insufficiency of the equipment and because the demand itself is most abnormal, due to the voluntary postponement of business last spring and its enforced postponement in the fall on account of the steel and coal strikes.

Throughout federal control the service has been performed under the direction of the same railroad officers who were in charge during private control, and they have had the benefit of a unified use of locomotives, cars, shops and other facilities, which has added to the practicability of performing such a heavy service with such insufficiency of equipment. In passing, it is not out of place to mention the peculiar service rendered the public in anticipation of, during and after the coal strike. Prior to the strike coal transportation was increased up to 13,200,000 tons per week (even more than the war record). During the strike eastern coal was supplied to the west (where, generally, no coal was being produced) over routes never normally contemplated. During the strike the distribution of all coal was handled by the Railroad Administration. After the strike the equipment, badly dislocated on account of the abnormal long hauls to the west, was readjusted, so that in two weeks production was back to the normal winter basis.

6. The condition of the property.—A great confusion is frequently apparent about the condition of railroad property, it being assumed that the property is dilapidated and will be turned back to the private owners in a condition hardly susceptible of operation. This is utterly untrue. The railroads are functioning effectively, are carrying an extraordinary traffic and are in condition to carry it. With respect to equipment, locomotives will be in relatively good condition, considering that they will just have gone through from three to four months of winter weather, much of it severe. Passenger cars will be in good and safe condition, although the inability to obtain new equipment for the reasons above explained results in the equipment being on an average practically two years older than at the beginning of federal control, and there has perhaps been some loss in appearance. Despite claims to the contrary, freight equipment will compare favorably with the condition at the beginning of federal control, considering that its two years' additional age has not been offset by the purchase of as much new equipment as would have been purchased but for the obstacles above explained. During last summer the percentage of bad order cars attained, and on account of the shop strikes remained at, a high figure, but for several weeks has been down to a normal basis. As to roadway and structures, the government will likewise be able to show that on the average it has closely met its obligation to return the property in as good condition as when received. Undoubtedly difficulties as to obtaining ties, rails and ballast, and shortage of labor in putting them in, have resulted in shortages in these respects on various railroads, but not so as to interfere with the adequate performance of the public service, and to an important extent, on the average, any shortages in these respects promise to be offset by overmaintenance in other respects.

7. The effect upon investors resulting from federal control and its policy toward rate increases.—A disposition has been developed in many quarters to think that in some way federal control has been injurious to investors

in railroad securities. The fact is that such investors have been far better protected than they would have been without federal control. With all the existing uncertainties the prices of railroad stocks in general compare favorably with their prices in the month or two prior to the time federal control was decided upon, although some of the stocks are much lower. But many investors seem to think that the Railroad Administration owed them a duty to increase rates so that at the end of federal control the railroads would be generally self-supporting without any reference to the permanently established rate-making authorities. This entirely misconceives the function of the Railroad Administration. That function was to initiate rates so far as might be deemed expedient in order to sustain the cost of operating the railroads *as a unit* during federal control, and the important practical objections to premature or unnecessarily frequent increases in rates during federal control have been stated above. Congress did not contemplate that the director general would undertake to decide upon the rate structure necessary to enable all the various railroad companies to operate their properties separately and in competition and sustain their credit while doing so. The latter function is one which has never been taken away from the Interstate Commerce Commission and other permanent rate-making authorities and ought to be handled by them. If investors dissatisfied with the status of their railroad securities will compare the prices of the securities of railroad companies under federal control with the prices of securities of public utility companies not under federal control, the protection which has been accorded by the government, during federal control, to the railroad investors will be very apparent.

I have attempted this analysis with the earnest desire of clarifying the general understanding of the subjects discussed, believing that such clearness of understanding will be distinctly helpful in reaching correct conclusions upon the general railroad problem, and I submit my statements in the confident belief that they will be considered on their merits by a very great majority of the editors throughout the country.

Weekly Traffic Report

ACCORDING TO A REPORT on traffic conditions for the week ended January 22, 1920, made to Director General Hines, revenue freight loadings and receipts from connections for the period mentioned as compared with the corresponding date for 1919 for the various regions were as follows:

Eastern region—Revenue freight loaded, 201,179 cars, an increase of 22,548 over 1919; receipts from connections, 232,610 cars, an increase of 28,629 over 1919. Allegheny region—Revenue freight loaded, 106,887, an increase of 20,512; receipts from connections, 153,711 cars, an increase of 2,922. Pocahontas region—Revenue freight loaded, 33,033 cars, an increase of 3,749 cars; receipts from connections, 15,311 cars, a decrease of 294 cars. Southern region—Revenue freight loaded, 127,055 cars, an increase of 17,335 cars; receipts from connections, 80,049 cars, an increase of 17,479. Northwestern region—Revenue freight loaded, 122,258 cars, an increase of 10,888 cars over last year; receipts from connections, 76,230 cars, an increase of 4,861. Central Western region—Revenue freight loaded, 124,621 cars, an increase of 19,277 cars; receipts from connections, 67,531 cars, an increase of 6,237 cars. Southwestern region—Revenue freight loaded, 63,425 cars, an increase of 10,668 cars; receipts from connections, 54,285 cars, an increase of 11,271 cars.

A summary of the report follows:

Eastern Region: Report dated January 24 states that amount of freight traffic offered for movement shows considerable increase but acceptance has been restricted by necessary embargoes by reason of accumulations resulting probably from severe feather conditions of the past ten days. Passenger travel holding up well but there has been a great deal of delay to trains particularly through Central New York and New England owing to weather conditions.

Allegheny Region: Report dated January 23 shows low temperatures prevailing and resulting conditions have made it necessary to establish embargoes against eastbound traffic destined to New England and New York state points. Operations in New York harbor continue to be affected by icy conditions, but there is a slight improvement in accumulations for the New Haven and Long Island railroads. Some improvement is also noted in the accumulations beyond Toledo but the Allegheny region holdings are still heavy. Last reports indicate 124 pig iron furnaces in blast, 65 out of blast, a gain of 5 stacks as compared with the previous week.

Pocohontas Region: Report of January 23 states that with the exception of coal and coke business of the region as a whole shows some improvement over corresponding week of last year. Coal and miscellaneous car supply short throughout the region. Movement of freight traffic materially interfered with by slides and wire trouble caused by heavy sleet and rains.

Southern Region: Report dated January 22 indicates continued shortage of box cars due to increased traffic. Fertilizer movement has opened up and an increasing shortage is to be expected. Rice production in Louisiana 1919 estimated 19,712,000 bushels, which is the largest agricultural crop of the state. Reports indicate that additional cotton mills will be constructed in the Carolina territory. Mills continue operating on full time and there is a free movement of cotton factory products which should continue for some time to come. Travel generally during the past week was very good.

Northwestern Region: Report dated January 24. General business conditions continue favorable with manufacturers able to sell all the goods they can produce. In jobbing and wholesale lines more orders are being received than can be filled and future indications point to a continuation of this condition. Coal mines operated to full capacity and 100 per cent car supply was furnished. Movement of through coal from head of the lakes was very heavy but considerably curtailed account car shortage. Lumber business shows increased activity. Demand for lumber from all markets is unprecedented and nothing will prevent an era of prosperity in the lumber business except lack of transportation facilities. Passenger business continues heavy. Travel to California is unusually heavy and all available sleeping car space to that territory is taken far in advance.

Central Western Region: Report of January 23. Congestions still exist on some of the lines between Chicago, St. Louis and the Missouri River, due to accumulation of Eastern lines. Report on the food situation in Idaho indicates that the supply of food for livestock is rapidly diminishing and for the seven eastern counties of the state it is estimated that there will not be enough hay to last through the season. There is about 20 per cent less live stock on feed at present than ordinarily during this period of the year. Passenger travel continues to be considerably heavier than during this period last year, the heaviest movement being to California.

Southwestern Region: Report for week ending January 17 states that numerous shippers and receivers interviewed were quite optimistic in their comments on business conditions in general, the volume of output is greater than in corresponding period of last year and would be increased considerably if carriers were able to furnish sufficient equipment. Spring movement of vegetables has started from Gulf Coast territory estimated at 10,700 cars to move between now and June 1. This is an increase of approximately 100 per cent over last year's movement. So far weather conditions have been very

satisfactory and present condition of crop justifies the above estimate. Lumber interests report plenty of orders on file but complain of the scarcity of cars. Heavy output of coal continues and some car shortages developed during the week. Regular passenger travel normal with adequate equipment provided.

Freight Traffic Movement and Car Performance

THE VOLUME OF FREIGHT handled by the railroads under federal control during December, as measured by net ton miles of revenue and non-revenue freight, was only 0.5 per cent less than for December, 1918, in spite of the decrease in coal tonnage caused by the strike, according to the monthly report of the Operating Statistics Section of the Railroad Administration. The ton miles aggregated 33,462,298,000, as compared with 33,639,389,000. Because of a change in the reports, however, this report covers 31 days, while that for December, 1918, covered only 30 days.

For the calendar year 1919 the net ton miles totalled 394,804,349,000, as compared with 437,018,918,000 in 1918, a decrease of 9.7 per cent, and as compared with 427,341,924,000 in 1917.

In December the train miles increased 3.7 per cent and the car miles decreased 0.8 per cent. The net ton miles per train mile decreased from 666 to 638 and the net ton miles per loaded car mile from 29.7 to 27.7. The net ton miles per mile of road per day were 4,685, as compared with 4,716. The car miles per car day averaged 22.3, as compared with 22.8, and the net ton miles per car day averaged 438, as compared with 436. The percentage of unserviceable freight cars was 6.2, as compared with 5.8, and the percentage of loaded to total car miles was 71.1, as compared with 65.9.

For the calendar year decreases in net ton miles are shown for all regions and districts, ranging from a decrease of 5 per cent in the Allegheny region to 16.3 per cent in the Ohio-Indiana district.

The net ton miles per mile of road per day averaged 4,688, as compared with 5,184 in 1918 and 5,121 in 1917.

The following table, showing the revenue and non-revenue ton miles per mile of road per day by months for the years 1919, 1918 and 1917, indicates the sharp drop in freight traffic during November and December, 1919, as compared with October, which is attributed to the coal strike:

	1919.	1918.	1917.
January	4,275	3,873	4,770
February	4,002	4,591	4,511
March	4,059	5,273	5,192
April	4,134	5,471	5,257
May	4,524	5,226	5,617
June	4,615	5,423	5,894
July	4,878	5,427	5,441
August	5,075	5,691	5,351
September	5,625	5,731	5,217
October	5,651	5,584	5,385
November	4,711	5,155	5,298
December	4,685	4,716	4,489
Twelve months ended December 31	4,688	5,184	5,121

The complete statistics for the year are given in the following table, which shows the effect of the reduction in average car loading while the average train load was increased 1 per cent:

FREIGHT TRAFFIC MOVEMENT AND CAR PERFORMANCE

(Including Freight and Mixed Trains)

12 Months Ended December 31, 1919, Compared With Same Period of Previous Year

	Average Miles of Road Operated		Net Ton Miles Revenue and Non-revenue (Thousands)			Net Ton Miles Per Mile of Road Per Day		Train Miles (Thousands)			Net Ton Miles Per Train Mile		
	This Year	Last Year	This Year	Last Year	Per Ct Change	This Year	Last Year	This Year	Last Year	Per Ct Change	This Year	Last Year	Per Ct Change
Total, New England District	8,112	8,137	10,768,542	11,460,168	d 6.0	3,637	3,859	22,826	26,544	d 14.0	472	432	9.3
Total, Central District	22,343	22,400	69,048,087	81,383,755	d 15.2	8,467	9,954	82,706	97,067	d 14.8	835	838	d 0.3
Total, Ohio-Ind'ana District	6,870	6,863	14,566,585	17,413,455	d 16.3	5,808	6,952	18,364	21,586	d 14.9	793	807	d 1.7
Total, Eastern Region	37,325	37,400	94,383,214	110,257,378	d 14.4	6,927	8,077	123,896	145,197	d 14.7	762	759	0.3
Total, Allegheny Region	19,753	19,711	80,036,069	84,287,518	d 5.0	11,101	11,715	91,461	101,750	d 10.1	875	828	5.7
Total, Pocahontas Region	5,095	5,061	23,054,665	26,477,946	d 12.9	12,398	14,333	19,127	23,206	d 17.6	1,205	1,141	5.6
Total, Southern Region	38,344	38,355	47,110,720	52,285,609	d 9.9	3,366	3,735	86,948	102,300	d 15.0	542	511	6.1
Total, Northwestern Region	47,201	47,243	54,799,334	60,317,458	d 9.1	3,181	3,498	86,338	92,227	d 6.4	635	654	d 2.9
Total, Central Western Region	51,482	51,588	68,277,435	74,375,693	d 8.2	3,634	3,950	111,494	120,018	d 7.1	612	620	d 1.3
Total, Southwestern Region	31,513	31,625	27,142,902	29,017,316	d 6.5	2,360	2,514	54,717	57,290	d 4.5	496	506	d 2.0
Grand total, all Regions	230,713	230,983	394,804,349	437,018,918	d 9.7	4,688	5,184	573,981	641,988	d 10.6	688	681	1.0

	Freight Car Miles (Thousands)								
	Loaded			Empty			Total		
	This Year	Last Year	Per Ct Change	This Year	Last Year	Per Ct Change	This Year	Last Year	Per Ct Change
Total, New England District	461,968	481,282	d 4.0	181,069	204,290	d 11.4	643,037	685,572	d 6.2
Total, Central District	2,536,496	2,754,380	d 7.9	1,134,835	1,341,609	d 15.4	3,671,331	4,095,989	d 10.4
Total, Ohio-Indiana District	471,371	540,178	d 12.7	226,326	270,843	d 16.4	697,697	811,021	d 14.0
Total, Eastern Region	3,469,835	3,775,840	d 9.1	1,542,230	1,816,742	d 15.1	5,012,065	5,592,582	d 10.4
Total, Allegheny Region	2,367,623	2,450,076	d 3.4	1,208,317	1,280,161	d 5.6	3,575,940	3,730,237	d 4.1
Total, Pocahontas Region	564,857	660,036	d 14.4	373,793	444,752	d 16.0	938,650	1,104,788	d 15.0
Total, Southern Region	1,887,353	2,011,608	d 6.2	767,422	903,776	d 15.1	2,654,775	2,915,384	d 8.9
Total, Northwestern Region	2,103,436	2,190,833	d 4.0	909,997	939,141	d 3.1	3,013,433	3,129,974	d 3.7
Total, Central Western Region	2,727,637	2,726,162	0.1	1,193,733	1,248,971	d 4.4	3,921,370	3,975,133	d 1.4
Total, Southwestern Region	1,105,088	1,138,028	d 2.9	483,257	482,319	0.2	1,588,345	1,620,347	d 2.0
Grand Total, all Regions	14,225,829	14,952,583	d 5.1	6,478,749	7,115,862	d 8.9	20,704,578	22,068,445	d 6.2

	Average Number of Freight Cars on Line Daily						Net Ton Miles Per Loaded Car Mile			Per Cent Loaded To Total Car Miles			Car Miles Per Car Day			Net Ton Miles Per Car Day		
	Serviceable		Total			% Unserviceable												
	This Year	Last Year	This Year	Last Year	Per Ct Change	This Year	Last Year	This Year	Last Year	Per Ct Change	This Year	Last Year	Per Ct Change	This Year	Last Year	Per Ct Change	This Year	Last Year	Per Ct Change
Total, New Eng. Dis.	94,114	100,111	101,689	105,694	d 3.8	7.4	5.3	23.3	23.8	d 2.1	71.8	70.2	2.3	17.3	17.8	d 2.8	290	297	d 2.4
Total, Central District.	393,496	450,532	425,017	478,580	d 11.2	7.4	5.9	27.2	29.5	d 7.8	69.1	67.2	2.9	23.7	23.4	1.3	445	466	d 4.5
Total, Ohio-Ind. Dis.	81,761	91,430	88,703	97,632	d 9.1	7.8	6.4	30.9	32.2	d 4.0	67.6	66.6	1.5	21.5	22.8	d 5.7	450	489	d 7.9
Total, Eastern Region..	569,371	642,073	615,409	681,906	d 9.8	7.5	5.8	27.2	29.2	d 6.8	69.2	67.5	2.5	22.3	22.5	d 0.9	420	443	d 5.2
Total, Allegheny Region	441,705	488,584	485,745	525,493	d 7.6	9.1	7.0	33.8	34.4	d 1.7	66.2	65.7	0.8	20.2	19.4	4.1	451	439	2.7
Total, Pocahontas Region	87,335	84,844	93,993	89,609	4.9	7.1	5.3	40.8	40.1	1.7	60.2	59.7	0.8	27.4	33.8	d 18.9	672	810	d 17.0
Total, Southern Region.	280,184	280,302	300,267	293,883	2.2	6.7	4.6	25.0	26.0	d 3.8	71.1	69.0	3.0	24.2	27.2	d 11.0	430	487	d 11.7
Total, No'west'n Region	339,503	318,033	363,155	339,842	6.9	6.5	6.4	26.1	27.5	d 5.1	69.8	70.0	d 0.3	22.7	25.2	d 9.9	413	486	d 15.0
Total, Cen. W. Region.	353,392	320,939	377,989	339,688	11.3	6.5	5.5	25.0	27.3	d 8.4	69.6	68.6	1.5	28.4	32.1	d 11.5	495	600	d 17.5
Total, So'west'n Region	205,117	178,365	215,267	186,228	15.6	4.7	4.2	24.6	25.5	d 3.5	69.6	70.2	d 0.9	20.2	23.8	d 15.1	345	427	d 19.2
Grand total, all Regions	2,276,607	2,313,140	2,451,825	2,456,649	d 0.2	7.1	5.8	27.8	29.2	d 4.8	68.7	67.8	1.3	23.1	24.6	d 6.1	441	487	d 9.4

Henry U. Mudge

HENRY U. MUDGE, formerly president of the Chicago, Rock Island & Pacific and later of the Denver & Rio Grande, died at his home in Denver, Colo., on January 30.

Mr. Mudge was one of the large group of successful railway executives who have demonstrated the feasibility of climbing from subordinate tasks to positions of great importance. He entered railway service in 1872 as a section hand and water boy in a construction gang on the Atchison, Topeka & Sante Fe. His promotion from this time on was gradual rather than spectacular. By 1889 he had acquired a thorough knowledge of railway operation, having served during this period, for two years as a telegraph operator, one year as brakeman and baggageman, seven years as a conductor on freight, passenger and work trains, one year as a train dispatcher, two and one-half years as a roadmaster, two and one-half years as a trainmaster and a few months as an assistant superintendent.

H. U. Mudge

Mr. Mudge was rewarded for his years of conscientious work and study when, on July 1, 1889, he was appointed superintendent of the Rio Grande division of the Santa Fe. He continued in this capacity until January, 1893, when he was transferred to the Western division with headquarters at Pueblo, Colo. In May of the same year, he was promoted to general superintendent of the Western Grand division of the same road and, from June 10, 1894, to February 1, 1896, held a similar position with jurisdiction over the Eastern Grand division. From the later date until January 1, 1900, during which time the Santa Fe was reorganized, Mr. Mudge acted in the capacity of general superintendent of the system. On January 1, 1900, he was appointed general manager and continued in this capacity until May 1, 1905, when he was appointed second vice-president of the Chicago, Rock Island & Pacific.

During this period, from 1889 to 1905, he participated, as an operating officer, in the extensive development of the Santa Fe. As such he was brought into contact with the solution of both local and general problems pertaining to this development and was called upon to advise upon and assist in its consummation.

Mr. Mudge's subsequent railway career requires more than announcement of the positions held. In connection with this portion of his career, it should be recalled that the syndicate purchase of the Rock Island, the reorganization of its board of directors and the organization of the two holding companies, the Rock Island Company of New Jersey and the Chicago, Rock Island Company of Iowa, took place in 1901 and 1902, and the purchase of the Frisco and Alton stock in 1903, all while Mr. Mudge was general manager of the Santa Fe and in no way connected with the Rock Island. Other financial transactions, which were criticised by the Interstate Commerce Commission, were either accomplished before he became connected with the Rock Island or before he became a director of the road, with the exception of the sale of the Frisco stock; and, as a matter of fact, were carried out entirely by a group of important financial interests, and not by the men in direct charge of the property.

He was elected president of the Chicago, Rock Island & Pacific on December 1, 1909, and as president of a road that was being severely criticised for its financial transactions, Mr. Mudge was called upon to face many difficulties. Whatever may be said in criticism of these financial transactions was not applicable either to Mr. Mudge, or to B. L. Winchell, his immediate predecessor as president. In regard to the sale of the Frisco stock, Receiver J. M. Dickinson at the time of Mr. Mudge's resignation as president, said: "It should be understood that there was a marked differentiation between him (Mr. Mudge) and most of the other directors, in that the transaction for which he voted as a director (the sale of the Frisco stock) was presented and acted upon at a meeting at which he was elected a director, and immediately upon his election, and also, in that he was not a stockholder either of the Rock Island Company of New Jersey or the Chicago, Rock Island & Pacific Railroad Company of Iowa."

The Rock Island went into receivership in 1915 and Mr. Mudge was appointed co-receiver of the property. He resigned from this position on October 1, 1915, and was immediately appointed chief executive officer at the request of Receiver Dickinson, who desired Mr. Mudge to remain in charge of the operation of the road. On November 5 of the same year he resigned as president and chief executive officer and was elected president of the Denver & Rio Grande with offices in Denver, Colo.

It was the plan of the directors of the Denver & Rio Grande at that time to get a president for the property who had no connection with other roads. The president of the Denver & Rio Grande had been holding the same office on the Missouri Pacific, the Iron Mountain and the Western Pacific, which previously had been under the same general financial control—a condition which had been changed shortly before Mr. Mudge went to the property.

Mr. Mudge resigned from his position with the Denver & Rio Grande in October, 1917, and retired from active participation in transportation affairs.

During his active railway service Mr. Mudge was unusually popular with his subordinates, with the public and with the executives of other railways. He was generally recognized as one of the ablest operating men in the country. As president of the Rock Island and later of the Denver & Rio Grande, his democratic manner and his open methods of conducting business gained for him the respect, not only of other railroad men, but also of the patrons of the road and of the press.

Commissioner Clark on the Rule of Rate Making

THE BALTIMORE SUN, in its issue of January 28, published an interview with Commissioner Clark, of the Interstate Commerce Commission, on the subject of the rule of rate making which should be adopted in the pending railroad legislation. The interview apparently is authentic and is very interesting, not only because of the views expressed but because of Commissioner Clark's long experience on the Commission and his high reputation for courage, independence and fairness among both shippers and railway officers. The interview is as follows:

"In the first place it must not be assumed that anything I have to say is in criticism of the policy that has been pursued by the Railroad Administration. It is a matter of common knowledge that the operating expenses of the railroads of the country have increased in much larger proportion than their revenues. The first heavy increase in the wages of the railroad employees was made retroactive for six months or for one-half of the first year of Federal control; whereas the increase in rates was applicable only to the last six months of that year. Putting aside the question of the relationship between the wages and revenues for that year, and considering merely the calendar year just closed, the figures show that the operating ratio has been over 85 per cent. That means that out of every dollar received in revenues 85 cents has been paid out in operating costs, leaving 15 cents to cover taxes, interest on funded debt and return on other investments. No railroad could operate successfully under such a ratio.

Can't Have Two Rates

"Now the question comes as to whether we shall have by legislative direction a standard or recognized, reasonable level of rates. That proposition is contained in Section 6 of the Senate bill. Our experiences of the past show that for an accumulation of many reasons, including advantageous location, wise administration and popular management, some of the roads are very prosperous, and others are not, under the same level of rates. The unprosperous roads are important to the communities they serve and could not be abandoned without irreparable injury to many industries in these communities. They cannot charge higher rates than the prosperous roads under competition, as that would be the surest way for them not to get business. The great mass of tonnage moves along the line of least resistance in the way of freight rates. Therefore, if increased rates are to be given to the unprosperous roads that need them, they must also be given to the prosperous roads which do not need them.

"The only way that the unprosperous roads can be afforded real relief is by fixing a limit on the amount which the more prosperous roads may retain out of their earnings under the established rates. Some say that this is unconstitutional. But I do not see any great difference in principle between that proposal and the policy we have been pursuing in other directions. For example, we have been collecting excess profit taxes on the one hand and lending money in farm loans on the other; or we have been collecting income taxes graded in percentages according to the size of the individual income.

"Moreover, the plan proposed is just what would result if a single corporation or the Government owned all the railroads. The aggregate revenues, in that case, would be spread over all the properties, although some of them would earn more than the average and some less.

For Reasonable Rates

"The necessities for more coordination of our systems of transportation have been demonstrated, and it seems to me that the best way of accomplishing this is by having an established, recognized, reasonable level of rates and a limitation on the amount which any carrier may retain. I have been and am against the proposition of taking the excess earnings from the prosperous roads and giving them to the unprosperous ones. But if the rates are fixed on a level that will permit of the reasonably profitable operation of the less advantageously located roads, operated on business lines and not held down by an overpowering burden of fictitious or injudiciously acquired debts, the excess earnings under these rates of the prosperous roads must be limited.

"I see no way of selecting a basis except by averaging the value of the properties in a given group and, having averaged these for a basis, it seems to me proper for a limitation on earnings to be fixed at the top. I believe that the moral and psychological effect of a recognized standard, fixed by legislation, would be far greater than that of any plan which would leave the determination of the base to be worked out by an administrative tribunal like the commission. I also believe that if it were fixed by Congress it would be accepted by the country as a settled question and would close all arguments and discussion as to what the standard percentage should be.

5½ Per Cent Not Extravagant

"A return of 5½ or 6 per cent is certainly not an extravagant one. Figures which we have compiled and presented show that the return from rates in past years of Class 1 railroads, which are railroad having gross revenues in excess of $1,000,000 annually, have reached a trifle over 5 per cent on the book cost of the roads and equipment.

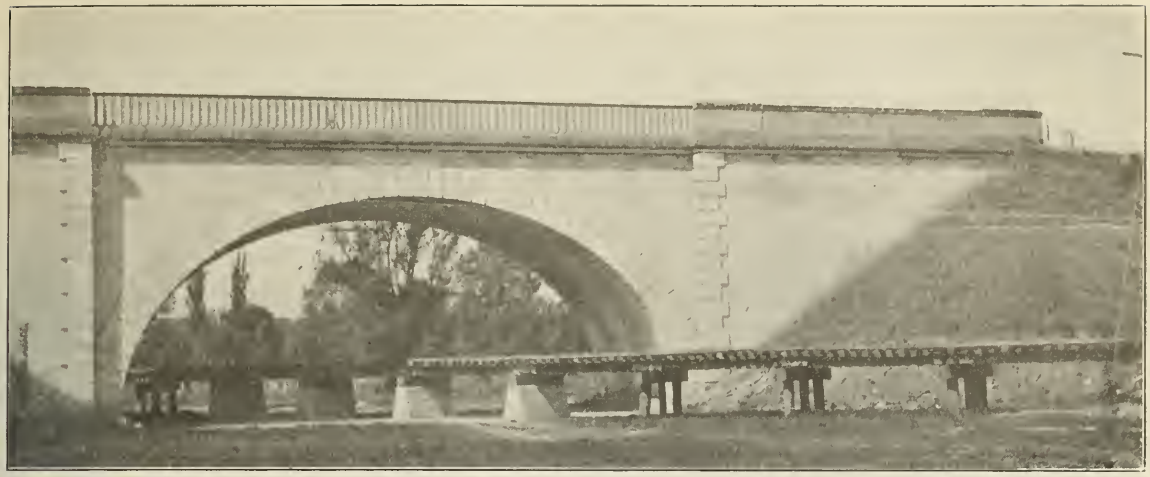
"In the meantime the railroads of the country must continue to run under Government regulation. The fact that a plan presents some difficulties is no sound reason to condemn it, if the principles underlying it are right.

Must Give Fair Treatment

"I am not disposed to rehash the evils of the past. I consider them seriously as applied to certain individual roads and as pointing the way for the avoidance of mistakes in the future. What we need more than anything else now is a realization by the owners of the railroad properties that they will receive fair treatment at the hands of the Government. If their properties have been looted and saddled with indefensible burdens of debt, they will have to work out their own salvation under fair treatment. The railroad managements must realize that the transportation business has got to be conducted on the same principles as any other business, and, being a public service under Government regulation, all people must be treated alike.

"The public must understand that private capital is not going to furnish the facilities of transportation unless assured of a reasonable return on its investment. The only alternative to private ownership and management of the railroads is Government ownership and operation. Therefore, the managers of the properties and the public each should contribute its fair share to relations between the railroads and their patrons, which shall be free from discrimination, fair as to service, and fair to the carriers in regard to the compensation they receive for services rendered."

THE LANSING (MICH.) TRAFFIC CLUB, composed mainly of traffic representatives of merchants and manufacturers, has been organized with the following officers: president, Normah W. Secor, Olds Motor Works; vice-president, Carl P. Hodges, Duplex Truck Company; secretary-treasurer, John T. Ross, Lansing Chamber of Commerce; executive committee, N. W. Secor; K. P. Hodges; J. T. Ross; Marshall S. Graham; John Thomson (agent, New York Central); H. E. McGiveron; W. W. Vanderbilt.



Bridge Under Chemin de Fer de l'Est near Void

The Light Railways of the Battle Front in France

How American Lines Were Built, with Reference to French, English and German Practices

By Lieutenant-Colonel Frank G. Jonah
Chief Engineer, St. Louis-San Francisco, St. Louis, Mo.

THE FOLLOWING NOTES are the results of the writer's experience and observation in the construction and operation of "Light Railways" while acting as major of the Twelfth Engineers (Railway), U. S. A., assigned to the British army, and serving on the Picardy front from August 21 to October 27, 1917, and from that time until December 16, 1918, as chief engineer of the Department of Light Railways of the American Expeditionary Forces. The Light Railway was a development of the great war, and was gradually extended in scope and importance until, at the close of hostilities, the mileage of the lines ran into the thousands. These railways were among the principal agencies of transportation, having been, in fact, the link between standard-gage lines and the trenches.

It was found by the British, in 1916, that the transportation of supplies, necessary for the dense concentration of men at the front, could not be accomplished satisfactorily on the highways, and that some supplementary means of conveyance were necessary; therefore, orders were given for the development of a comprehensive system of light railways for the following primary reasons:

(1).—To relieve the highways of traffic: In addition to the wear and tear on motor transport and the excessive use of gasoline, the wear on the roads was leading to a heavy traffic in road material, so that a large part of the traffic hauled by motor trucks was road material (crushed stone or gravel) to repair the damage which their own traffic was creating; and, consequently, there would be a great saving in labor in maintaining the roads if other means of transportation were developed.

(2).—To assist in a rapid advance over shell-torn areas when the roads were useless for motor transport and little better for horse transport.

(3).—To convey road material for the rapid repair of roads in the destroyed zones.

(4).—To reduce manual labor at the front.

The lines were developed so completely that, eventually, nearly all heavy material was transported by the light railways, leaving the highways clear for light, fast-moving automobiles, trucks, and ambulances. The rail-head, or terminus, on the standard-gage line was usually 8 or 10 miles back of the front line—far enough to be out of range of the enemy's ordinary shell fire. Between the rail-head and the front, the standard-gage line was generally destroyed by enemy operations, oftentimes as he retreated.

At the rail-head were concentrated the supplies for a certain sector, consisting of ammunition, rations, forage, road material, building material, fuel, barbed wire, fence pickets, concrete material, culvert pipe, plank, track material, tools—in short, everything necessary for the sustenance of troops and for their means of offensive and defensive operations; and it was the function of the light railways to carry these supplies to the forward battery positions and front line trenches.

The lines were also used in moving troops up to the front, bringing back the relieved troops to their rest areas and the wounded from the front, and extensive use also was made of these lines in salvage operations. The extent to which they were developed can be readily expressed by stating that for every mile of front which an army held, there were ten miles of light railway supplying it.

The gage of track used by all the armies on the western front, including the German army, was 60 cm. (23⅝ in.), usually laid 2 ft. by the British and Americans. There was a great advantage in this uniformity of gage, as it permitted interchange of equipment among the Allies and the immediate use of the captured German tracks after successful offensives.

*Abstracted from a paper published in the Proceedings of the American Society of Civil Engineers for January, 1920, to be presented on March 3, 1920.

In a general way, the characteristics of the lines on the different army fronts were similar. Grades of 3 per cent and curves with a radius of 30 m. were freely used to facilitate rapid and easy construction. Embankments were made with 9-ft. crown, cuts with a 14-ft. base at sub-grade.

The French track was of built-up sections, 5 m. long, the rail weighing 9 kilos per meter, with steel ties, 1 m. long, riveted to the rail. The British used a rail weighing 20 lb. per yd. A certain amount of track was laid in short sections bolted to steel ties, but the greater part was laid with rails at least 24 ft. long, on wooden ties, 4 by 6 in. by 4 ft. 6 in., as it was found that track laid on wooden ties was much more easily kept in line and surface than that laid on steel ties. The American track was generally constructed on wooden ties, of rail weighing 25 lb. per yd., in 30-ft. lengths.

Table 1—A. E. F. Light Railway Freight Cars

	Box, covered	Gondola	Flat	Dump V shape	Tank
Capacity	600 cu. ft. / 22,000 lb.	210 cu. ft. / 22,000 lb.	22,000 lb.	27 cu. ft.	2,000 gal.
Weight	10,900 lb.	9,000 lb.	8,000 lb.	1,050 lb.	12,200 lb.
Length, inside	19 ft. 10 in.	19 ft. 8¾ in.	22 ft. 1 in.	5 ft. 8 in.	19 ft. 5½ in.
Width, inside	5 ft. 5 in.	5 ft. 3 in.	5 ft. 3 in.	4 ft. 8 in.	5 ft. ½ in.
Height, inside	5 ft. 8 in.	2 ft.	5 ft. 7 in.	.....	.....
Length, over coupler	24 ft. 1¼ in.	24 ft. 1¼ in.	24 ft. 1¼ in.	6 ft. 9 in.	24 ft. 1¼ in.
Width, over all	6 ft. 6¼ in.	5 ft. 7 in.	5 ft. 7 in.	4 ft. 8⅝ in.	5 ft. 7 in.
Height, over all from rail	8 ft. 4¾ in.	4 ft. 4⅝ in.	.....	4 ft. 5 in.	.....
Height, to floor	2 ft. 4¼ in.	2 ft. 4¼ in.	2 ft. 4¼ in.	.....	2 ft. 4¼ in.
Height of coupler	17 in.	17 in.	17 in.	17 in.	17 in.
Wheel base, truck	3 ft.	3 ft.	3 ft.	24 in.	3 ft.
Distance, C. to C. trucks	15 ft.	15 ft.	15 ft.	.....	15 ft.
Diameter of wheels	15¾ in.	15¾ in.	15¾ in.	14 in.	15¾ in.

A certain amount of track in built-up sections, with a rail, 5 m. long bolted to steel ties, was kept on hand for use at the extreme front. Sections of track in this length could be handled by a squad of men and coupled up without making any noise, and consequently were preferable for work near the trenches. Such sections also had advantages when building at night.

The German lines were built with rail weighing about 17 lb. per yd. on steel ties, bolted to the rails. They were extremely well built and had a greater mileage than the French and American armies. Their extensive use of these railways was due to the fact that they were short of rubber tires and gasoline, and could not depend on motor transport to the

Table 2—A. E. F. Light Railway Steam Locomotive

Type	2-6-2
Gage	23⅝ in. (60 cm.)
Working pressure	178 lb. sq. in.
Curve, minimum radius	65 ft. 7⅜ in. (20 m.)
Driving wheel base	5 ft. 10 in.
Total wheel base	15 ft. 7 in.
Length between couplers	21 ft. 7 in.
Height of coupler, rail to center line	16½ in.
Width, maximum	6 ft. 5 in.
Height, maximum above rail	9 ft. 3 in.
Weight on drive wheels	23,500 lb.
Weight on front truck	5,000 lb.
Weight on rear truck	5,500 lb.
Total	34,500 lb.
Tractive effort	6,225 lb.
Ratio of adhesion	3.7
Coal capacity	1,700 lb.
Water capacity	486 gal.

extent that the Allies did; but they were in a position to develop steam railway transportation, as they held the coal and steel districts of France and Belgium.

The speed with which tracks could be constructed by the different allied armies was practically the same. In September, 1917, the British stated that the construction of 1 mile of track, including ballasting, required 2,100 man days of labor. The "French Manual of Light Railway," issued in April, 1918, stated that their average had been ¾ m. per man per day, which is equivalent to 2,146 man days per mile.

On the American front, the most important line, and the best constructed, was the connection between the central shops and storage yards at Abainville and the front line system at the Sorcy rail-head, a line of 18½ miles long, on which the average speed of construction was 2,640 man days per mile. As this line, together with the shops and yards at Abainville, and the Sorcy rail-head, was the most important light railway job constructed by the American forces, and as several interesting engineering problems were presented in their construction, they will be described in some detail.

Most Important American Line

When the American troops first went into the line in the St. Mihiel Sector, the base from which their supplies were drawn was Toul. As the French had troops in the line immediately east of the Americans, and were also using Toul as a base, it became congested, and the French suggested that the Americans build an independent rail-head at Sorcy, 11 miles west of Toul, which was done. This rail-head had the necessary facilities for transferring material from broad gage to narrow gage, and from car to motor truck; also warehouses, platforms, etc. It was regarded as very convenient, and represents a typical layout.

From this rail-head at Sorcy, the American forces built a 60-cm. line to Cornieville (5 miles), where connection

Table 3—A. E. F. Light Railway Gas Locomotive

Type	4-wheeled, 4-cylinder, 4-cycle, vertical, water-cooled
Gage	23⅝ in. (60 cm.)
Wheel base	4 ft. 0 in.
Horse-power	50
Fuel capacity	30 gal.
Length over all	13 ft. 0 in.
Width over all	5 ft. 2 in.
Height over all	8 ft. 5 in.
Height of coupler, rail to center line	16 in.
Weight, total	14,000 lb.
Transmission	2 sets of speed change gears
Draw bar pull (Level track)	High gear, 1,500 lb. / Low gear, 3,000 lb.
Speed	Low gear, 4 m. p. h.; high gear, 8 m. p. h.
Brakes	Hand brakes to all drivers

was made with the French system of light railways radiating from Toul. They also took over the operation of the French lines on the west half of the sector, St. Mihiel-Pont-a-Mousson.

The location for the central shops and storage yards of the "Light Railway" system was a matter for careful deliberation. Many sites were examined and reported on, the objections to most of them having been that they were either too close to the front, too far to the rear, too far to the left, or too far to the right. It was necessary to find a location that would afford ample space for a large yard, with standard gage rail connection, and preferably canal connection as well. It was desirable also to have a location, at least, 30 km. back of the front line, as prisoners of war could be used if they were kept back that far; however, the Americans did all their work with their own troops.

Abainville, 2 km. north of Gondrecourt, was recommended by the writer, in March, 1918, as a suitable location for shops and yards, which recommendation was approved. Subsequent events proved it to be a most desirable location, as it was directly behind the St. Mihiel and Argonne fronts,

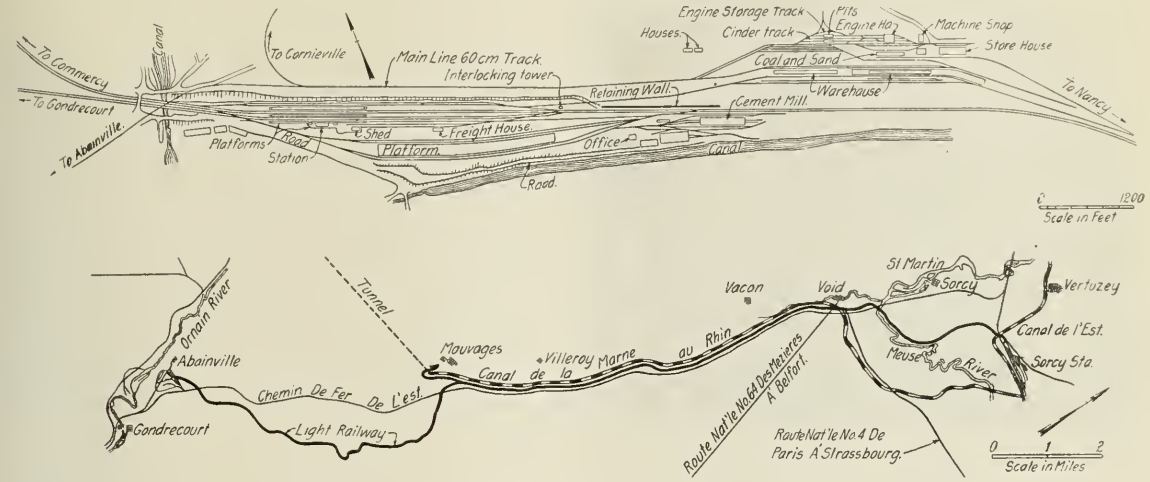
on which the greater part of the American operations were conducted. Abainville was 35 km. back of the line, and was not within the area usually bombed by the Germans.

The shops were designed for the repair of light railway locomotives and gasoline tractors and for the assembly and repair of freight equipment; and the yards were designed for the storage of track and bridge material. The whole plant covered an area of 116 acres. The track arrangement was such that material coming up from the ports on standard-gage was unloaded in the storage yard and subsequently taken to the front, as required, on the light railways.

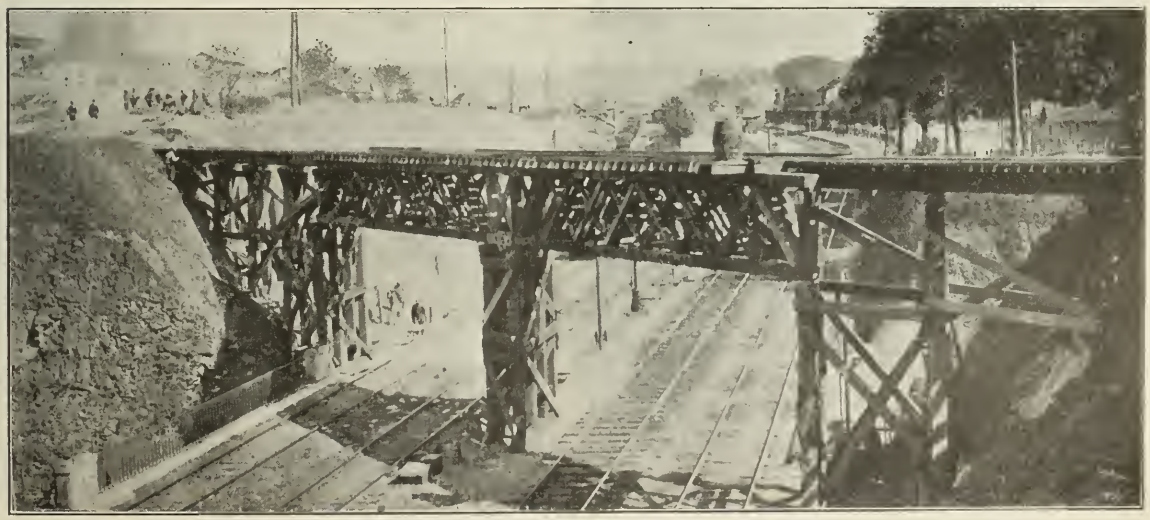
The shop buildings consisted of the Austin type of steel building, and were erected by the American troops under the direction of a superintendent of the Austin Company, who had been sent over for that purpose. The buildings were of steel framework, boarded in with lumber obtained in France. The buildings were generally 40 ft. wide, 200 ft. long, and included an erecting shop, machine shop, gas-engine and auto repair shop, planing mill, two storehouses, car shop, foundry, blacksmith shop, power-house and oil house.

Skillful Location Required

In the construction of the line leading from these shops to the Sorcy rail-head, it was stipulated by the French authorities, that there should be no grade crossings of the standard-gage railways and no interference with navigation on the canals. These requirements necessitated skillful location. The line was projected on the French standard contour maps (1 to 20,000) a study of which showed the feasibility of a line with grades not to exceed 3 per cent. An examination of the route showed that the necessary crossings of standard-gage tracks could be made under the main line viaducts or through large culvert openings. These points were selected as the governing conditions of the location and the line was run accordingly. It was found th



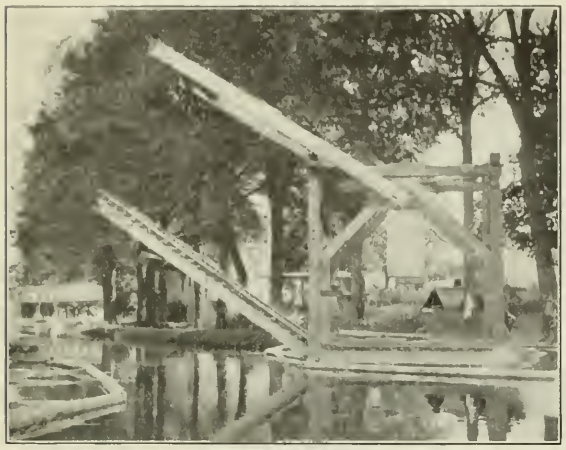
The Light Railway Railhead at Sorcy and the Location of the Light Railways from Abainville to Sorcy



Bridge Over Chemin de Fer de l'Est, at Sorcy (Meuse).

French maps were extremely accurate—the summit elevations checked out exactly—the grade line and work was just what was expected.

It was necessary to cross the Marne-Rhine Canal at Void. The limited room for the 60-cm. line in this town necessitated crossing the canal at an angle of 68 deg., requiring a span of about 28 ft. to preserve the standard 6-m. width of



Lift Bridge Over the Canal at Void

waterway at right angles. Fortunately, the American engineers had some bridge stringers 8 by 16 in. by 28 ft., which had been sent over from the United States. The writer designed a counterweighted lift bridge with this material, which could be operated by one man. This proved so successful, that a standard plan was made for lift bridges, and as it was expected that most of the canal crossings could be

Lift Bridge Over the Canal at Void (Meuse)

constructed at right angles, a complete bridge was built and kept in reserve.

At Sorcy, it was necessary to cross the main line of the Chemin de Fer de l'Est, and it was near the junction of the line from Gondrecourt with the main line, that four main line tracks were crossed. The railway at this place crossed over the canal, and the 60-cm. line was located to cross the standard-gage tracks and canal at the same place. Fortunately, this crossing occurred in a cut, so that the line could be carried across with the minimum of bridging.

No girders or spans were available for this crossing, and it was necessary to design and build a bridge with the available material. It was found that two deck Howe trusses, with a few bents of trestle approach, would fit the conditions, give the necessary clearances, and would be the most practicable type of structure. These trusses were built of 5-in. by 10-in. road plank, and each truss weighed about 4½ tons. There was a locomotive crane working in the yard, which could lift 5 tons, so that after the bents were erected, the trusses were picked up by the crane and set in place in a few minutes. The whole bridge was framed and erected in five days, with no interference to standard-gage lines.

The Meuse river was also crossed by this line. At the place of crossing the stream was 125 ft. wide, with 14 ft. of water, and had very little current. The main line of the Chemin de Fer de l'Est was crossed in the Meuse river bottom through an overflow relief opening.

The types of engines and cars used on these railways are detailed in the tables. The steam engines would handle 60 tons of freight up a 3 per cent grade, but were not used up to the point where their smoke and steam would betray their presence to the enemy; some little distance back from the front lines they would be cut off, and the cars were handled to the extreme front by gas engine. The operating rules were extremely simple, and despatching was done by telephone.

Illinois Central Chicago Terminal Status

AGREEMENTS ON AMENDMENTS to the Illinois Central electrification and lake shore improvement ordinance has at last been reached by the City of Chicago, the railroad and the Chicago South Park Board. It is probable that a government permit for the $110,000,000 improvements will be issued within 30 days. Charles H. Markham, President of the Illinois Central, has informed the city council that formal approval of the ordinance, the financial amendment agreed to by the city, and the War Department's reservations, was given at a meeting of the railroad's board of directors in New York on January 26.

The Chicago South Park Board has already filed its acceptance with the city, although another acceptance will be required owing to changes agreed to at the railroad's request. According to Attorney Walter L. Fisher, the city's representative, Secretary of War Baker, has signified his willingness to accept the amendments which the Illinois Central requested.

The much debated amendment, to which the city's representatives have at last agreed, would allow delays resulting from refusal by the government to permit the issuance by the railroad of long-term securities to be added to the time limits set in the ordinance. The amendment also would permit extensions of the time limits if delay in selling securities results from government orders. It specifies, however, that the railroad shall "proceed with all due diligence" to procure government approval of its plan for financing the project and also in selling the stocks and bonds issued. It is further stipulated that the corporation counsel of the City of Chicago may appear before any tribunal set up by the government to pass on railroad finances and argue the city's side of the case.

It is probable that, if the permit is issued soon, the Chicago South Park Board will submit a bond issue of $30,000,000 to the voters this spring to pay for its part of the improvement. If the federal permit is granted at once it is probable that work will begin this summer, as the last moot point has been settled.

Return of Roads and Cost of Commodities*

Only 1.3 Cents of Every Dollar of Increased Costs in 1919 Was Due to Higher Railroad Freight Rates

By Julius Kruttschnitt
President, Southern Pacific Company

In the petition of organized labor leaders, headed by Mr. Gompers, presented to the President on December 17, this statement occurs:

"Director General Hines and members of the Interstate Commerce Commission have shown clearly that the return of the railroads will involve an increase in freight revenue of close to a billion dollars, the rates being increased 25 to 50 per cent. This increase in rates, according to these same authorities, will be reflected in an increased cost of living of at least $4,000,000,000 a year, possibly $5,000,000,000. The American people cannot and should not stand such increases."

In a similar petition filed by organized labor leaders with the President on January 27, the following statement occurs:

"You are aware that the return of the railroads will involve an increase in freight rates of 25 to 40 per cent, since an additional railroad revenue of close to $1,000,000,000 will be needed. Such an increase in freight rates means an increase in the cost of living, as estimated by your director general of railroads, of at least $4,000,000,000 a year. This will be nothing short of a national calamity."

These are misstatements unfounded on fact that have so frequently been made that, if unchallenged, will deceive many who are without data necessary on which to base a correct opinion.

We can make a forecast of the future by remembering the past. The outbreak of the European war in 1914 marked the beginning of the rapid rise of prices from which we now suffer.

The cumulative effect of all steam railroad freight charges, which in their remotest ramifications can affect the values of commodities for the year 1914, which marked the opening of the war, has been weighed, and the same has been done for 1919. To establish the influence of freight charges on the high level of commodity prices in 1919 compared with 1914, the Interstate Commerce Commission's methods of computing tonnage and revenue statistics and ours in establishing prices being the same in both periods will not affect the soundness of these conclusions:

	1919	1914
Average commodity value per ton of "freight originated"	$119.00	$56.00
Freight charges per ton originated	2.80	2.00
Increase in cost to consumer, 1919 over 1914	63.00	....
Increase in freight charges per ton	.80	....
Relation of freight increase to cost increase	1.3%	....

In other words, only 80 cents out of $63, or 1.3 cents out of every dollar of increase in value of commodities in 1919 was caused by increased freight charges; the responsibility for the remaining $62.20, or 98.7 out of every dollar, must be sought elsewhere. It was not caused by freight charges.

Period	Freight Rates	Prices
1890 to 1895	—11%	—10%
1895 to 1900	—10%	+23%
1900 to 1905	+ 2%	+ 3%
1905 to 1910	+ 1%	+11%
1910 to 1915	— 3%	+ 9%
1915 to 1917	— 1%	+59%
Dec., 1917, to May, 1918	0%	+ 7%
May, 1918, to May, 1919	+25%	— 9%
May, 1919, to Dec., 1919	0%	+17%

The figures in the following table, giving the fluctuations in freight rates and commodity prices for 30 years (Bradstreet's index numbers, 1892-1919; index numbers for 1890 and 1891 compiled on basis of U. S. Department of Labor index numbers), show at a glance that freight rates have had a substantially negligible influence on commodity prices:

Prices rose 23 per cent, 1895 to 1900, notwithstanding a fall in freight rates of 10 per cent.

Prices rose 59 per cent, 1915 to 1917, although freight rates fell 1 per cent.

Prices fell 9 per cent May, 1918, to May, 1919, while freight rates rose 25 per cent.

Freight revenue on Class I roads for 10 months of 1919 was $2,950,000,000; a rate increase to produce 25 per cent more revenue would add $850,000,000 thereto annually. This is fifty-eight one-hundredths of 1 per cent of the estimated aggregate value of all steam railroad-borne commodities for 1919. The average value of each ton transported was $119; a rate increase to produce 25 per cent more freight revenue would add but 69 cents, raising the average value per ton to $119.69.

The inaccuracy of Mr. Gompers' statement as to effect of 25 per cent and 50 per cent increases in freight revenue on commodity values is shown thus:

	Actual addition to commodity values	Mr. Gompers' statement of addition to commodity values	Percentage of error
25 per cent. increase freight revenue over 1919	$850,000,000	$4,000,000,000	370
50 per cent. increase freight revenue	1,700,000,000	5,000,000,000	190

Government Operation Not Conducted at a Profit

In the same petition Mr. Gompers and other labor leaders say:

"Government operation, as reported by Director General Hines, showed a net profit at the rate of $168,000,000 a year for the three months prior to the coal strike."

A similar statement was recently made by Senator La-Follette.

In the petition filed by the labor leaders with the President on January 27, they say:

"The inefficiency of private operation of the roads is admitted by the owners in their demand for higher freight rates if the roads be returned and a guaranteed compensation, while, under government operation, present rates are yielding a net profit."

There is no shadow of excuse for such assertions, as correct data are public property. The only way to ascertain whether or not the government is earning a surplus in the heavy traffic months of 1919 is to compare the revenue in those months with that of the same months during the test period. Mr. Gompers does not state to what three months he refers, but the Operating Statistics Section of the United States Railroad Administration issues monthly a condensed income account (Form O. S. 7-B), from which the following footnote is taken:

"Standard return for this period is based on the proportion which the railway operating income in the same period of the three years of the test period bore to the total railway operation income during the test period."

This is said to be "closer to the facts than the former

* From an article in the February 2 issue of American Railroads, issued by authority of the Association of Railway Executives.

method of applying one-twelfth of the standard return to each month." This statement shows that during the three months of August, September and October 30.2 per cent of the entire year's net revenue is normally earned, whereas one-fourth of the entire year's earnings would be only 25 per cent. It further shows for the 10 months ending October, 1919, the net federal income from operating the roads was $121,000,000, or 20 per cent less than the same period of 1918, and that the net federal income for this period was $259,000,000 less than the standard return properly allocated to this period. As there are two more months of the year, this deficit is likely to be increased by one-fifth, making it, say, $310,000,000 for the whole year, instead of a net profit at the rate of $168,000,000 per year as stated by Mr. Gompers. He is, therefore, wrong in his calculations of what government operation would probably produce by a matter of $478,000,000 per annum, a percentage of error of 184 per cent.

Traffic Expert Sounds Warning to the Public

IT WILL TAKE FIVE YEARS to bring the railroads of the United States up to a point where they can meet transportation demands of shippers when the railroads are returned to private ownership, is the warning recently given to the public by Seth Mann, traffic manager of the San Francisco (Cal.) Chamber of Commerce and member of the Western Freight Traffic Committee, with headquarters at Chicago. Patience and more patience during the next few years is the keynote of Mr. Mann's appeal, which follows in part:

"The first year after the return of the railroads to private control will be one filled with difficulties and obstacles to be met by the private carriers. It may be fairly anticipated that for at least a year they may not be able to furnish a transportation service equal in efficiency to the government service. The public should be prepared for this emergency, and the carriers should adopt a new attitude toward the public which will keep them informed of existing conditions. Failing in this, the public demand may swing back to public ownership.

"Upon the whole, competition in service produced in the past a better service than the United States Railroad Administration has been able to give. It remains to be seen whether the private owners can excel the government administration in the future. The shippers of freight are convinced that the dangers of public control far exceed any disadvantages attaching to lack of uniform or consolidated operation under private management. On the other hand, they look forward to the return of competition and the control of the various systems of railroads by the respective private organizations of expert railroad managers as an immediate solution of the transportation question.

"It is time to speak a word of caution and to advocate a patient though watchful waiting. The transfer of control from the government to private corporations comprehends a tremendous financial and economic change, a change surrounded by many more difficulties and problems than the taking of the roads by the government. This was a war measure and the winning of the war was the prime consideration. The American people clearly understood the situation and uncomplainingly and patriotically accepted it. Now, however, upon the return of the roads the situation is purely economic. The sentiment of patriotism is not involved. The conditions, however, have been fundamentally altered in the meanwhile, and the re-establishment of effective transportation systems out of the welded system of the whole country is complicated at once with hundreds of problems never before met in the history of railroads. These problems cannot be solved in a day or a month, or perhaps in years. It is during this time that the public should be patient.

"Some of these problems requiring time for solution concern the insufficient car supply. The total number of box cars now in service is less than the number in service five years ago, while the demand for cars is greater. The locomotive power at present available is not adequate to the present demand. Under centralized authority it has been possible for the federal organiaztion to make distribution of equipment wherever required. With the return of the roads the problem at once presents itself of reaching some agreement for the control of distribution of cars not now sufficient in number for the business of the country.

"There will be a natural tendency to restore passenger trains that have been discontinued, with the addition of parlor cars and observation cars. It will be necessary for many roads to run passenger trains that have been taken off for economical reasons, leaving them with no passenger train service between given points. This will call for more passenger cars, with the result that the total passenger business of the country will be less efficient than it is now and dissatisfaction and complaint will follow until the situation is remedied. It is generally conceded that it will require more than one year to bring about any appreciable increase in railroad facilities, and at least five years with the expenditure of great sums of money to bring them up to the transportation demands of the country.

"In the meanwhile there should develop a new kind of railroad publicity and a new attitude of officers and employees toward the public. The public should be kept informed of the difficulties of reorganization and of the progress made and the plans for the future. The carriers will doubtless keep in close touch with shippers' organizations, consulting them as to changes contemplated in rates, rules, regulations and practices, to the end that a better understanding of the aim and purposes of the railroads may be extended to the public and that the public may know that carriers are working to the end desired by the public, namely, an efficient transportation service at a reasonable cost, and are working in the right way.

"One of the most significant events of the federal administration is the demonstration that railroad officials and shippers' representatives can accomplish traffic work competently and effectively together. The plan of the freight traffic committees has been successfully carried out, the representation on these committees being equally divided between the carriers and the public. This system, which has been in operation for over a year and a half, has effectively, and latterly with reasonable promptness, dealt with the railroad rates throughout the United States.

"It is plain that the carriers during the coming year will find it to their advantage to consult these shippers' organizations and to keep them advised as to contemplated action in the solution of the unnumbered railroad problems that arise in the future of railroad transportation. These organizations will form the natural conduit through which this information will flow to the public, and they will render their most cordial service in helping to solve these problems. This situation should bring about a new era in transportation, in which the public shall be made to feel that it is no longer excluded as hostile, but is taken into confidence as the friend and advocate of efficient transportation service under the management of private owners.

"A patient and careful trial should be given to private ownership under the new and extended system of regulation now under consideration of the conference committee of the House of Representatives and Senate. While the new enactment has not yet been passed by Congress, the Esch bill, which is the House bill, and the Cummins bill, which is the Senate bill are before the public, and many of the additional regulations are certain of passage. Under these statutes a new and extended system of regulation of railroads will be inaugurated, and should be given a fair trial. The duration of this trial should not be less than five years.

Bituminous Coal Mining Industry Must be Stabilized*

A National Problem in Which the Railroads Have a Vital Interest; Seasonal Coal Rates a Remedy

By Eugene McAuliffe

WITHIN A PERIOD of two years the coal industry of the United States has assumed not alone national but international importance.

During the winter of 1917-1918, due to lack of sufficient transportation facilities, largely occasioned by a prolonged period of extraordinarily rigorous winter weather, the nation's coal supply became exhausted and a condition approaching panic overspread that portion of the country lying east of the Mississippi river and including the cities of Chicago, New York, Cincinnati, Cleveland, Detroit, Pittsburgh, Washington and thousands of lesser places, all of which were carrying a vital portion of the nation's war load. Railroad trains and steamships stood idle in the face of a world crisis, and to save the advance of the American Expeditionary Force from becoming a charge on the bounty of our allies Great Britain sent a collier from a Canadian port to coal our supply ships waiting in New York harbor for the fuel necessary to cross the Atlantic.

With a recovery from this situation the nation set itself to the task of providing, during the year 1918, a supply of fuel sufficient to meet every demand, with the result that 579,385,820 tons of soft coal and 98,826,084 tons of anthracite coal was produced and distributed. The signing of the armistice on November 11, 1918, with a sharp recession in railroad and industrial consumption, plus an extraordinarily mild winter, created a requirement so far lessened as to cause the people completely to forget their bitter experiencs of the year before. Today we are a nation substantially without coal, and a repetition of the winter conditions of 1917-18 would, perhaps, bring about a measure of suffering and deprivation equal to or even succeeeding that of two years ago.

The Magnitude of the Coal Industry

The total production of bituminous coal in the United States for the calendar year 1918 of 579,385,820 tons carried a total value of $1,491,942,849, an average of $2.58 per net ton, and the anthracite produced in the state of Pennsylvania, 98,826,084 net tons, was valued at $336,480,347, an average of $3.40 per ton.

The total production of coal, anthracite and bituminous, in the United States from 1807 to 1918 inclusive, was 12,809,017,354 net tons. It is suggestive of the growth in importance of the coal industry that the 1918 production equalled 5.6 per cent of the total coal produced in the United States in the preceding 110 years. In 1880 the population of the United States slightly exceeded 50,000,000; in 1918 the population of the country had grown to 105,000,000, an increase of 110 per cent. The per capita consumption of coal in the meantime has increased from 1.42 to 6.44 tons, or an increase of 483 per cent.

Between 1850 and 1910 the rate of production of our coal mines practically doubled each ten years; this ratio of increase implies that the production of each decade to which it applies equals the total previous production.

The coal industry, basic and fundamental as it is, is not a healthy industry. It suffers from recurring ailments, including periods of stagnation followed by periods of high blood pressure and hysteria.

*From a paper read before the Associated Engineering Societies of St. Louis, Mo., December 10, 1919.

The occupation of mining coal has always attracted labor; in fact, labor of a rather superior sort has gone into the mines at times, and on the whole the miner is either in the majority of cases a good citizen or has the makings of one. But the business is unstable, speculative and unreliable alike to producer and consumer.

Conditions That Surround the Industry

Certain ingrained conditions exist which bring this situation about, the principal one being that of irregularity and lack of continuity of employment. The volume of material produced, the expense and deterioration that attend the storage of the product of a bituminous mine make it impossible to begin the day's operation unless two conditions are complied with: first, cars in which to load the day's production; second, a market in which to place the coal produced.

In the manufacturing of any other commodity storage for a few days, a week or even for several months' production can be provided. Thousands of men may be employed in the furnaces and mills producing steel, although no immediate market for the production may exist, but the work can go on and a relatively limited area will suffice for the storage of a material portion of the year's production of steel, totaling perhaps 40,000,000 tons. Grain and grain products can be stored in elevators and warehouses, lumber can be piled outside the mills to season and improve in the interim between the time of sawing and shipment; but not so with coal. The extra handling and the storage at the mines when no cars are available for shipment would mean a measure of degradation that would absorb the margin of profit made from the production, and when the market was forthcoming the cars required for reloading in excess of those necessary for the direct operation of the mine might not be forthcoming; and if cars were available an additional load would thereby be placed on the carriers.

The fundamental and crying necessity of the business is stabilization. The production curve, work day curve and worker's wage curve, as well as the profit and loss curve, all show too many peaks and valleys. These are conditions that must be cured if the business is to be removed from the domain of moral and financial uncertainty.

The number of days that the coal properties work per annum present a striking commentary on the measure of the fixed charges that accrue against each ton of coal produced. The average mine day throughout the United States will not equal eight hours in duration, piece-work labor rarely works a full eight-hour day, and while the bituminous mines worked in 1918 the maximum number of days shown in any year since 1890, when the compilation of work-day statistics was begun, but 83 per cent of the 300 working days were employed in producing coal. The average number of days worked in all bituminous and anthracite mines in the United States from 1910 to 1918 inclusive, are as follows:

Year	Bituminous	Anthracite
1910	217	229
1911	211	246
1912	223	231
1c13	232	257
1914	195	245
1915	203	230
1916	230	253
1917	243	285
1918	249	293

When the figures for 1919 are compiled the result may prove as discouraging for the bituminous industry as that shown for the year 1914.

Related to the handicap of lost time, largely due to strikes and lack of cars in which to load the production, is the even more unfortunate seasonal spread suffered by the coal industry, whereby during certain seasons of the year the demand for fuel falls off to one-half the working capacity of the mines and in certain districts to an even lower point. During these depressed periods price demoralization becomes becomes quite prevalent and mine labor, without power to earn, becomes correspondingly unhappy. A depressed period is invariably followed by one of hysterical demand and production, consumers in their frenzy bidding against each other to cover their requirements, it not being uncommon for purchasers to place orders for coal under the conditions just outlined equivalent to 500 per cent of their actual requirements.

The characteristic spread in demand, as between seasons, is well illustrated by the following statement of minimum and maximum month's production for the four-year period immediately preceding our entrance into the world's war:

	Minimum			Maximum		
Year	Month	Tons	Per cent of year	Month	Tons	Per cent of year
1913	April	34,169,000	7.1	October	46,164,000	9.7
1914	April	23,609,000	5.6	March	45,455,000	10.8
1915	February ..	29,321,000	6.6	December ...	45,814,000	10.3
1916	April	33,628,000	6.7	January	46,596,000	9.3
Average		30,181,750	...		46,007,250	...
Ratio		100 per cent			152 per cent	

The Strike of November 1, 1919

The result of this lack of stability in the industry, supplemented by the prevailing world-wide disturbances that have existed for some months, is wholly responsible for the general strike of November 1, 1919, ordered in defiance of existing contracts, a situation which culminated in mine labor challenging not only the integrity of the Chief Executive and Congress, but the United States courts as well.

The mine workers, smarting under the instability of the industry, sought a remedy in the declaration of September 22, 1919, which in substance demanded:

(a) A sixty per cent increase in wages.

(b) A six-hour day, five days a week, working time to count from entrance into until exit from the mine, instead of from arrival and departure from the working face as at present.

c) Time and a half for overtime and double time for Sundays and legal holidays.

(d) That double shift work be substantially abolished.

(e) That all contracts now in force in the bituminous field shall be considered as having expired on November 1, 1919, new contracts to run concurrently in all districts for a period of two years.

(f) A weekly pay-day to be substituted for the existing semi-monthly pay day and the penalty for illegal striking now in force to be abolished.

Mine workers have some argument for the punitive demands made, which, however, if allowed ,would increase the cost of the nation's bituminous coal $2 per ton, or a total of $1,031,983,776 per year, based on the 1919 requirements.

Why the Industry Should Be Stabilized

The effect of this fluctuating load placed upon the overtaxed transportation facilities of the country represents another great source of economic waste. During the summer months, the railroads, who own 974,547 coal-carrying cars, are ordinarily taxed for storage room in which to place their idle cars. Certain roads whose freight traffic is 50 or 60 per cent coal are compelled to send their cars abroad in order to find room for them. The matter of securing a per diem earning by placing their idle cars in service on other roads is another factor that cannot be overlooked.

With a decreased volume of freight traffic and earnings, repair forces and the purchase of car repair material are perforce restricted, and as each succeeding coal car remaining on the line develops the necessity for heavy repairs it is shoved back to the storage tracks, there subject to the pilferage of its expensive metal bearings, lubricating material and other removable and saleable parts. When the demand for coal sets in a hurried effort to organize a labor force is made, and the railroads enter into competition with the usual general fall demand for semi-skilled labor, which it frequently takes weeks to whip into but a reasonably efficient working machine. Again, the necessary repair material is frequently lacking, while non-coal carrying mileage is consumed in the hurried attempts made to recover the cars scattered abroad during the idle period. When measured from the standpoint of transportation requirements alone, it can safely be said that the stabilization of the bituminous industry would preclude the necessity of the railroads buying a single coal car for a period of at least two years, with a corresponding decrease in the demands made on locomotives and terminal facilities.

Stabilizing the industry would not only improve the condition of mine labor but would also very largely stabilize the car maintenance problem. A car that is moving and earning will always be maintained and repaired, and a marked increase in the average car miles per day would quickly materialize. When the rapidly growing coal tonnage of the country is considered in connection with the prices paid for it (prices must always bear a certain relation to the cost), any situation or condition that materially affects the cost of production becomes a matter of major economic concern.

When discussing the cost if idle time the distinction between a coal mine and a plant located on the surface must be given consideration. When the manufacturing plant is shut down for a holiday the doors are closed and the watchman is the sole tenant. This is not the case with a coal mine. The forces of nature work unceasingly. Water, gas, the downward movement of the roof and the upward heaving of the roadways and working forces continue to take place, and a large superintendence and labor force must be maintained each hour in the 24.

That a reduction of idle time losses would bring about an extraordinary decrease in production costs is borne out by a study of the results of short working hours suffered by 73 operators located in the New River district of West Virginia during the year 1917 which was made by Messrs. Garnsey, Norris and Allport, the Engineers' Committee of the United States Fuel Administration. The study covered the losses occasioned by an insufficient car supply over a 12 months' period and developed the facts presented in the following:

When car supply is below normal by this percentage	Coal cost is above normal by this percentage
5	3.0
10	6.0
15	9.0
20	12.0
25	15.5
30	19.5
35	24.0
40	29.0
45	34.5
50	40.5
55	47.0
60	54.5
65	64.0
70	74.0
75	85.0
80	98.0
85	113.0
90	136.0
92	156.0

Even though labor be paid a daily wage sufficient to admit of an adequate monthly return in the idle season, such an excess payment will lead to further recessions in production during the periods of peak load demand. Mine labor as it exists today has peculiar characteristics; high wages seemingly do not offer an incentive for continuous work. There

is a well-defined disposition to make a given monthly wage, regardless of the rate paid or the opportunity offered for work, and in some cases a limit on maximum wages is made effective through the mine workers' union.

The measure of the working time lost by failure of mine workers to report on individual days, even when the opportunity to work is seriously restricted by lack of market or transportation facilities, offers a startling paradox and one that the public is little familiar with. The average loss of potential working time in various mines as measured by the actual number of men who fail to report, compared with the total men on the pay roll on the days when work is available, frequently ranges from 10 to 25 per cent. Accurately maintained figures covering a period of 14 months for one mine showed that the cumulative loss was 9.4 per cent. In another mine during the month of October, 1919, with 25 potential working days and with a self-ordered strike impending, the loaders lost 25.7 per cent of the possible time they might have worked.

The penalty that attaches to a mine operation from a continuous loss of from 8 to 25 per cent of its producing power, heavy maintenance and interest charges accruing in the meantime is self-evident.

In justice to the mine worker, I will venture the opinion that if the unstable characteristics of the business were eliminated he in turn might develop a corresponding measure of stability.

To put the bituminous coal industry on a stable basis steps must be taken: (1) To provide more regular employment for mine labor (2) to reduce the cost of producing the total coal requirements of the country, with a corresponding reduction in cost to the consumer; (3) to avert periods of coal famine and interference with industrial production; (4) to remove a material portion of the heavy tax on transportation facilities during the fall and winter season, when operating costs are at the highest point and when the movement of cotton, grain and other agricultural products must be provided for.

The production and movement of coal during the period January to August, 1919, inclusive, with the production and movement necessary to complete the estimated requirement of 500,000,000 tons for the year and the actual production by months for the year 1918 are set forth in the table. If the nation's requirements are 500,000,000 tons a year, the monthly production and movement should approximate the figures set forth in the third group in the table.

Proposed Basis for Annual Production and Movement of 500,000,000 Tons of Bituminous Coal

Month	*Production Jan. to Aug., 1919, inclusive, with requirements Sept. to Dec., inclusive, to total 500,000,000 tons		*Production under urge of war pressure, 1918		Rate of production to stabilize mine, labor and transportation demand	
	Tons per month	Per cent of total	Tons per month	Per cent of total	Tons per month	Per cent of total
January	41,485,000	8.4	42,227,000	7.3	40,000,000	8.0
February	31,556,000	6.3	43,777,000	7.6	40,000,000	8.0
March	33,719,000	6.8	48,113,000	8.3	42,000,000	8.4
April	32,164,000	6.4	46,041,000	8.0	42,000,000	8.4
May	37,547,000	7.5	50,443,000	8.7	42,000,000	8.4
June	37,055,000	7.4	51,138,000	8.8	42,500,000	8.5
July	42,754,000	8.6	54,971,000	9.5	42,500,000	8.5
August	42,880,000	8.6	55,114,000	9.5	42,500,000	8.5
September	50,207,500	10.0	51,183,000	8.8	42,500,000	8.5
October	50,207,500	10.0	52,300,000	9.0	43,000,000	8.6
November	50,207,500	10.0	43,895,000	7.6	43,000,000	8.6
December	50,207,500	10.0	40,184,000	6.9	38,000,000	7.7
Total	500,000,000	100.0	579,386,000	100.0	500,000,000	100.0

*Production as reported by U. S. Geological Survey.

How Can Stabilization Be Accomplished?

To bring equalization about it will be necessary for all consumers, including railroads, industries and domestic dealers and distributors, to purchase during the months of March to August inclusive about 50,000,000 tons of bituminous coal that is now ordinarily purchased during the remaining six months of the year. This will not prove a serious task if divided proportionally among all consumers, but in order to bring about this result something more than argument or appeal must be offered; it has been proved that threatened interruptions in production, with the consequent penalty of higher costs and interference with business, will not make the average person provident. To obtain any substantial general results, its value not only must be established but paid for in cash at the end of the current month; in other words, 50,000,000 tons of soft coal for storage purposes will be purchased only when there is an immediate and definite reward for the purchase.

Several years ago the anthracite industry undertook the solution of its problem of recurring periods of light and heavy demand by making a reduction of 50 cents a ton in the selling price effective April first, this concession being reduced at the rate of 10 cents a month until the basic price was restored. The few companies engaged in the production of anthracite coal, heavily capitalized and well managed and in the majority of instances controlled by transportation companies, were able to work out by uniform agreement certain direct methods for the establishment of this arrangement, which in a few years has thoroughly taught the users of anthracite to make their purchases of hard coal during the summer months.

The fact that there are several thousand producers of bituminous coal, detached from railroad corporate alliances and subject to drastic anti-trust legislation, makes any definite agreement as to selling prices impossible and illegal. The intense competition that ordinarily prevails among the producers of bituminous coal during the periods of light demand and ample transportation facilities frequently leads to reductions in mine prices that often exceed the seasonal reduction made by the anthracite producers in the sale of that product. But the fact remains that only limited amounts of soft coal are stored outside of portions of New England and on the Great Lakes docks, where in nearly every case seasonal water transportation is a compelling factor.

The problem presents physical, economic and social aspects that can be solved by the employment by the transportation companies of an enlargement of the means long employed by the anthracite coal producers to adjust the anthracite demand more nearly to correspond to the production. The publication of seasonal coal freight rates with a reduction from the established basis from March to August inclusive, would assist very materially in remedying the existing conditions. The result of this adjustment is now made possible under the present measure of government rate-making control, which no doubt will be maintained and perhaps extended when the roads are returned to corporate management.

The theory of seasonal coal rates is not revolutionary; it has been in force in restricted localities for years. I have suggested that the reduction should take effect on March first in order that the coal accumulated during the six low rate months be consumed during the period of high railroad transportation costs to prevent carrying over the large tonnage now frequently on hand during the spring and summer months.

This principle should not be construed as one that might be used for the depression of coal freight rates; on the other hand, rates should be made with due regard to the interests of the transportation companies and the public. The reductions made during the months of March to August inclusive should be added to the basic rate and a corresponding increase maintained in force during the remaining six months of the year. It is important that the high and low rate periods be balanced, otherwise large industrial consumers, who buy approximately an even amount of coal monthly, would pay on an average throughout the year either more or less than the basic rate. Seasonal adjustments should be so applied

as substantially to maintain the existing coal rate relationships, and the rates governing coal moving to docks for export and bunker purposes should be exempt from the seasonal revision. The summer reduction, however, should bear such a relation to each of the several rates in effect as to give the greatest encouragement to the summer purchase and storage of coal at the points most remote from the source of supply in order to dispose of the long haul business during the winter season which is invariably compelled to pass through one or more highly congested terminals, and to restrict the radius of coal car activity during the winter months. Where the distance between the source of production and consumer is relatively short, and a rate of 75 cents or less a ton obtains, no reduction in freight rates should be made.

Much that is unfortunate has happened in the way of deterioration and losses occasioned by spontaneous combustion in the storage of certain bituminous coals. However, in the great majority of cases coal has been stored without regard to the selection of the proper grade and size to be stored, and the most indifferent conditions frequently surround such storage. In recent years, serious study as to the proper method of storing and handling bituminous coal has been made by various engineers and coal users, and there will be no difficulty in securing and handling, if necessary, 100,000,000 tons of bituminous coal that will store without serious loss.

National Regulation of the Industry

The extraordinary depression of the industry during the summer of 1919, together with the unfortunate strikes of November first, 1919, has strengthened my belief not alone in the desirability, but the imperative necessity for establishment of a Federal coal regulatory body whose duty it should be to analyze and make public all of the conditions that surround the coal mining industry. The relative earnings of the industry and its employees should be measured accurately and the wage demands of mine employees should be determined and maintained on a basis sufficiently high to insure the mine worker an adequate living for himself and his dependents with the same margin above the cost of living that is accorded men engaged in contemporary lines of employment. The hours of employment offered and available to mine workers, with the per cent of available time actually worked by individual employees should be accurately recorded, and the necessary recommendations made toward securing individual, as well as collective efficiency.

It is unfortunate that the government body now engaged in collecting the statistics covering the weekly production of coal were denied the scant appropriation necessary to do the work, which is now being carried on through the medium of an allowance gratuitously made by a trade organization. Without these statistics the nation, insofar as this industry is concerned, would be working in the dark. The conservation of the nation's coal supply and the distribution of the fuel produced in the several districts in such manner as will reduce transportation losses incident to the unnecessary cross hauling of fuel, are matters of national importance which are deserving of study. This body, constituting in effect a coal clearing house, should be established and maintained on the high plane occupied by our courts and should, therefore, be placed beyond the control or influence of partisan politics.

A few months ago the coal industry of the country clamored for ships and the privilege of exporting coal to European nations who were suffering the pangs of a coal famine of four years duration. The president of the United Mine Workers' organization personally crossed the sea to demand this opportunity for his members. Today, as the result of the hysterically caused partial cessation of production which took place on November first, the ships taken from other traffic after bitter contest are back in that service and the fires of our European allies, France and Italy, are being allowed to go out. We are writing pages of our history today that we will wish to forget in the years to come.

Coal is a basic commodity; it lies at the foundation of our national welfare; it is the real heart of our industrial system. Separate from our internal situation we can not forget that we are a component and vital part of that world which has hardly yet begun to recover from a cataclism of five year's duration, and the pressing demands of our sister nations for fuel should be met. We have fuel. They are pleading for heat and light. The opportunity to serve our neighbors and ourselves should not be strangled by production and transportation disturbances.

The Public's Stake in the Railroad Problem*

By Francis H. Sisson

Vice President of the Guaranty Trust Company of New York

With March 1, the date fixed by President Wilson for the return of the railroads to private control, only five weeks off, the question as to what is going to happen to the railroads is again the paramount issue of the day. And it is occasioning a particular concern because of the apparent deadlock between the Senate and House conferees over the pending railroad legislation.

If that deadlock continues much longer, there will not be time enough in which to enact adequate and satisfactory permanent legislation before the date set for turning the carriers over to their rightful owners. In that unfortunate event, either the President must postpone the return of the roads or Congress must pass temporary legislation which will extend the Government guarantee to the railroads for a period of months. And the resort to either alternative would be deplorable for many reasons, but chiefly because every day that the railroads are held under government control means just that much more deterioration in rolling stock and equipment—which now are dangerously inadequate to meet the increasing demands upon our transportation facilities.

Only a few days ago the director general of railroads, in discussing "the pressing needs of the situation," to use his own phraseology, explained: "The Railroad Administration has not at any time been, and, of course, is not now, in position to obtain the additional new equipment which is needed. Such equipment is chargeable to capital account and, of course, must be paid for by the railroad companies."

An indication of what this state of affairs and the delay in restoring the roads to private management means in cost and inconvenience to business generally throughout the country may be gathered from one fact, namely the existing shortage of cars which is preventing many industries from obtaining sufficient transportation facilities to supply their demands for raw materials and manufactures. The high cost of living, in fact, is attributed partly to the shortage of refrigerator cars in which perishable produce is shipped. Twenty thousand additional such cars are said to be needed to equip our railroads properly in this respect.

The most important problem to be solved in connection with the railroad tangle is that relating to the fixing of rates, of course. The question as to what rule shall be applied in determining the schedule of rates overshadows all others.

The Esch, or House, bill leaves this question for the Interstate Commerce Commission to answer, and, consequently, in view of past experience, does not meet the requirements of the critical situation. The financial and physical plight

*From an address before the Traffic Club of New York, at the Waldorf-Astoria Hotel, January 27, 1920.

of the railroads today should offer ample evidence of the peril that would impend were the fixing of fair rates left to the Interstate Commerce Commission.

The Cummins, or Senate, bill provides that the railways, for rate-making purposes, shall be allowed to earn an average of 5½ per cent on the combined valuation of all railways in the fixed group, which may be increased to 6 per cent in the discretion of the Interstate Commerce Commission. If any individual railway should earn more than 6 per cent in any year, one-half of the excess between 6 and 7 per cent would be put into a general railroad contingent fund and one-half into a reserve fund maintained for the carrier itself. Of any excess earned above 7 per cent, one-quarter would be paid into the carrier's reserve fund and three-quarters would go into the general railroad contingent fund. After an individual carrier had built its own reserve fund up to 5 per cent it would turn into the general railroad contingent fund two-thirds of all earnings in excess of 6 per cent, and would be permitted to use the remaining one-third for its own purposes. The general railroad fund would be used to make loans to railways that could not raise money on their own credit or to buy equipment to be leased to carriers that could not buy equipment on their own credit.

A great deal of controversy has been occasioned by these provisions in Section Six of the Cummins bill, revolving about the questions whether there shall be a limit placed on the earning capacity of the railroads and whether the excess earnings of the stronger and more efficiently operated roads shall be divided with the weaker and less efficiently run roads.

The Paramount Issue

But the real issue involved is clear and simple. It should be recognized as such by Congress. The vital question is not what the railroads are entitled to, but what the public is entitled to. And the answer is self-evident. The public is entitled to, and must have, adequate, economical transportation service. The continued prosperity of the country is contingent upon the public obtaining that kind of service—and as soon as possible. The railroads must be allowed to earn enough to provide it. And in order to provide that service the railroads will be compelled not only to equip themselves efficiently but also to expand their facilities.

It has been pointed out that the gross earnings of the railroads must in any event, if the companies are to be saved from insolvency, exceed five billion dollars a year. It is difficult to understand how such a feat would be possible if the railroads be handicapped by a 6 per cent maximum earning power in attracting the new capital that is so imperatively needed to provide proper equipment and extend facilities. At least a billion dollars a year in new capital will be required by the railroads for several years; one authority recently estimated the amount at two billion dollars a year for three years.

Adequate transportation cannot be obtained without credit; credit cannot be secured without fair earning power; earning power cannot be sufficient without fair rates and just regulation.

Or, to approach the proposition from the standpoint of labor, efficient transportation is not possible without competent service, and competent service is impossible without fair wages and working conditions. Fair wages cannot be paid unless warranted by earning power, and earning power would be inadequate without fair rates.

Again, to approach the problem from the standpoint of the shipper, there will not be adequate or efficient transportation to bear his goods to market unless rates are high enough to command sufficient credit to invite capital, and pay sufficient wages to attract labor.

From every standpoint, we revert to the question of rates and, as the determination of that question lies in the hands of the public, through its duly authorized representatives, the correct solution of the problem should depend only upon the public understanding of it. The chief danger of the situation is that the public, through failure to understand and appreciate the importance of the problem, may permit a solution, in whole or in part opposed to the general welfare, to be worked out under the pressure of selfish interests.

Roads Vital to Domestic and Foreign Commerce

Our railroads should be taken out of the field of exploitation into that of sound economics. They present a business problem to a business people, and should be accorded a solution conceived and worked out in the same spirit as our banking system.

Today this problem assumes even a greater importance than in the past, because of world conditions. The markets of the world lie open to American commerce and industry. If we can produce and distribute our surplus products economically so as to meet the competition of the world, we can continue and assure American prosperity.

Unless the United States safeguards its position by sound business practices, Europe, liberated from war and quickened by its necessities, eventually will again command international commerce.

No factor enters into this opportunity of greater importance than inland transportation. The railroads of this country must be able to furnish the transportation which will assure the production and movement of American goods, if we are to be factors in the world's trade. Such efficiency will demand many millions of new capital, scientific regulation and operation, and the elimination of the waste and the friction which have been forced upon the railroads.

New capital can be attracted as I have stated, only upon the basis of adequate earnings and fair regulation assuring a return which will make railroad investments and operation attractive. Neither brains nor money nor labor can be commandeered into such service or obtained without fair compensation. The railroads must have more partners and fewer creditors, more friends and fewer exploiters.

A non-political banking system has met our great test. Our next great step in economic progress should be toward a non-political railroad system. Only upon such a basis can we hope to maintain our prosperity through our ability to market our products. I would re-emphasize this point. Every farmer, every manufacturer, every laborer, every business man in the country is vitally concerned in efficient transportation as the first necessity of commerce.

The railroad problem is the immediate and intimate problem of all of us as citizens, and tax-payers, consumers and producers. If we are not able to solve this fundamental economic question fairly and sanely in the public interest through our duly accredited representatives, we shall have loosened the very cornerstone of our whole economic structure and must be prepared to see it tumble about us carrying disaster to special interest and general interest alike. Democracy faces the test. Can it function efficiently in such a crisis or must it learn the lesson through years of experiment and disaster? That is the question of the hour.

The greed of either capital or labor, the ambitions of politicians seeking an issue, the selfishness of shippers fighting to save dimes and losing dollars, the prejudices of theorists—the mistakes of the past and the animosities of the present—should not be allowed to interfere with the solution of the problem. The public stake in this situation is greater than that of any or all of the parties directly concerned and must be protected. Furthermore, the very protection of the public's interest implies justice and fair dealing to all, which cannot be assured by any other policy.

At Durand, Mich., railway employees have organized a co-operative association, for the purpose of operating a community store. The association will be capitalized at $10,000.

Annual Report of Southern Regional Director

B. L. Winchell, regional director for the Southern region, in his annual report for 1919 to Walker D. Hines, director general of railroads, told of distinct progress in the direction of getting more passenger trains on time in the South, outlined the advantages secured from unifications of terminals and ticket offices, paid particular attention to efforts made to give adequate service to shippers, and outlined general railroad operations throughout the South.

Mr. Winchell stated that with the resumption of more normal conditions following the war a total of 44 passenger trains with average daily train mileage of 3,695 were restored during 1919 and new passenger train service inaugurated to meet new conditions necessitated adding to the service 26 trains averaging 1,878 train miles per day, making a total of 70 additional passenger trains per day, averaging 5,573 train miles per day.

The report submitted gave figures from January to October, 1919, inclusive, on passenger train performances, indicating that while in January 85.4 per cent of the passenger trains in the Southern region maintained schedules or made up time between terminals, 90.45 per cent maintained their schedules or made up time between terminals in October.

Mr. Winchell pointed out that the consolidated ticket offices in the Southern region handled a much larger volume of business during 1919 than in 1918 or than was handled by the individual city ticket offices before government control in 1917.

Summarizing his conclusions as to the results of unifications in the Southern region, Mr. Winchell said "beneficial results were greater than had been anticipated, in spite of limiting conditions, and out of the experience may come a program looking toward ideal terminal operation in the future and abandonment of the practice of individual roads expending large sums for independent terminals which frequently duplicate existing facilities.

"No complete test of the merits of unification is possible without providing modern facilities to meet the enlarged requirements, a thing which could not be undertaken under the temporary regime of the Railroad Administration.

"There are limits beyond which actual physical unification should not be carried. For example, in large cities a single great freight house probably would be undesirable both because of the impracticability of economically operating such a plant and because of the long distances over which shippers would be obliged to haul their freight. However, a main or central receiving and delivery house with branches advantageously located, all under one organization, might solve the problem."

The regional director pointed out that early in 1919 there was a growing car surplus because of lack of business, but that after June 1 increasing demands began to reduce the surplus and by August 1 it became difficult to meet all demands for cars. Mr. Winchell showed how the appointment of special committees on car handling and terminals, on which the public has been represented, materially assisted in facilitating the movement of cars.

He continued: "The furnishing of cars for the movement of the Florida fruit and vegetable crop, the Georgia peach crop and cantaloupes from various sections was handled by the Refrigerator and Tank Car Department of the Car Service Section in co-operation with the Fruit Growers' Express, the regional organization participating to the extent of assisting the movement of empties to the best advantage. There was no shortage of cars at any time during the year for these movements, and the transportation in general was satisfactory, with the exception of a temporary shortage of ice for the Georgia peach movement, due to the inability of the Fruit Growers' Express Company to secure a sufficient supply. The supply of cars for the movement of watermelons was handled through the regional organization and every advantage taken of short routing and relocation of equipment to insure a full supply with a minimum of waste equipment. There was no shortage of cars for this movement."

Mr. Winchell stated that the coal situation became acute in October owing to the strike of coal miners, effective November 1, and pointed out that as a consequence special efforts were put forth to move cars to the mines to insure a maximum output, and that good results were secured from this drive until the day of the strike, November 1.

The work of preventing loss and damage to freight was dwelt upon particularly by the regional director, who stated that the material increase in the value of all commodities handled by all railroads has greatly augmented their accounts for loss and damage, even though there has been no material increase in the number of claims presented. He stated that while complete statistics were not available, reports from 70 per cent of the total mileage of all roads in the South showed that for the representative month of June, 1919, compared with the same month in 1918, there was a decrease in the number of new claims received of 30 per cent and a decrease in the amount of money claimed of 37 per cent.

"We have endeavored," said Mr. Winchell, "to develop the commodities upon which our losses are heaviest and to study the situation as relates to them, with the view to the elimination of the cause for such losses."

Mr. Winchell also paid particular attention to service work on the railroads in his region, telling of the establishment of the Southern Freight Service Bureau, with central offices at Atlanta and branches in 15 cities in the Southern region.

"The efficiency of the bureau has steadily increased," he said, "as has also the volume of the work handled. The central and branch bureaus handled approximately three thousand tracers per week, and in addition undertook to aid shippers in other ways, either directly or by placing their requests or difficulties before the proper officials of the railroads involved."

The total movement of traffic in the South in consideration with that of 1918 did not keep pace with the increases shown in some of the other regions, the regional director said, because of the abnormal volume of military traffic moved through the Southern region in 1918, because of the exceptionally large 1919 grain crop in other regions, because of the insufficient number of ships available at Southern ports for the prompt movement of export traffic, and because of the strike of employees at the phosphate mines lasting several months and largely restricting the production of tonnage of this commodity, which is a considerable item.

Discussing the increase in operating expenses and the consequent shrinkage in net operating revenue in 1919 in his region, Mr. Winchell stated that this situation was mainly affected by the use of a uniform and nation-wide higher scale of wages, by the fact that there were irreducible expenses of operation which could not be made to fully accord with reductions in the traffic movement and by the results of the unauthorized and illegal strike of shopmen in August, which affected lines in the South to an unusual degree.

The Refractories Traffic Association, at its annual election held at St. Louis, Mo., on January 4, choose the following officers for the ensuing year: A. H. Killinger, traffic manager of the Laclede-Christy Clay Products Company, president; F. W. Depp, traffic manager of the Evens & Howard Fire Brick Company, vice-president; J. C. Iselin, traffic manager of the Blackmer & Post Pipe Company, secretary.

Highway Transport Conference at Chicago

Deficiency in Transportation Facilities Cited as an Aid to the Development of Motor Transport

That the existing deficiency in railway transportation facilities will require the utilization of the motor truck and motor transport for short-haul freight transportation was the theme embodied in practically all of the papers read before the sessions of the Highway Transport Conference, held at Chicago from January 24 to 31 inclusive. A large majority of these papers referred at length to the data concerning this deficiency published in the Six Billion Dollar Number (January 2) of the *Railway Age*, and drew the conclusion from these figures that, inasmuch as this enormous deficiency cannot be made up within the next few years, the motor truck must—and will be—extensively used for the handling of l.c.l. freight for distances varying according to the condition of public highways. In support of these conclusions a great many cost and service comparisons and predictions were marshalled, all tending to show the inability of our present transportation plant to handle short-haul traffic adequately and economically and the necessity, from a financial standpoint, of the consignment of this type of traffic to motor transport.

The convention was opened on Saturday evening, January 24, with an address by Governor W. L. Harding of Iowa. The following three days, and on Friday, January 30, afternoon and evening sessions were held, the afternoon sessions being primarily for those engaged in the motor truck business and the evening sessions primarily for motor truck owners, operators, shippers and others interested in highway transportation. On Thursday morning, January 29, afternoon and evening sessions were scheduled, under the direction of the National Highway Traffic Association in conjunction with its annual convention. The morning session, however, was postponed and a portion of the session's program was presented in addition to the regular program arranged for the afternoon and evening sessions of the same day. The closing session was held on Saturday afternoon, January 31.

Of particular interest to railroad and traffic men interested in the development of the motor truck as a short-haul carrier were the papers read at the evening session on January 26 devoted to the general subject of "The Motor Truck and Railroad Freighting." At this session W. J. L. Banham, general traffic manager of the Otis Elevator Company, Chicago, presented a paper on "Cost and Service Comparisons," the disucssion on which was started by Frank T. Bently, traffic manager of the Illinois Steel Company, Chicago, H. Lorenzen, general superintendent of the Hartman Furniture & Carpet Company, Chicago, also presented a paper at this session on "The Economic Range of the Motor Truck," the discussion on which was started by Charles W. Reid, manager of the Transportation Bureau of the Federal Highway Council, Washington.

Mr. Banham, in making cost and service comparisons between short-haul freight moved by rail and by motor truck, said in part:

"There seems to be no question at the present time that the carrying of l.c.l shipments to short-haul points by rail is not only expensive to the shippers but is also unprofitable to the carriers. Until recently it seemed to be almost necessary for the shippers to use the rail carriers for the movement of their l.c.l. shipments to nearby points, regardless of expense and delay, as the motor truck operators did not seem to make any organized effort to take care of this class of freight.

"It is extremely difficult for the carriers to figure the cost of transportation of package freight hauled short distances, and particularly to such points on which they do not have a through car movement. It is equally difficult for the shippers to ascertain the cost of transporting similar freight. Transportation costs do not necessarily mean l.c.l. freight rates and motor truck rates, although both rates are a part of the transportation costs.

"What I understand to be a true transportation cost is all expense involved in making a shipment, starting with the boxing or packing expense, together with handling expense in the shipping department, the loading of freight on teams for delivery to the freight house, teaming charges from the shipping department to the local freight house, and additional labor incidental thereto. To this must be added the l.c.l. freight rate and additional charge for cartage at the delivery point, with such other expenses that may be caused by requests for tracing, duplication of shipments lost or damaged in transit, entering of claims, checking of freight bills, delay to shipments in transit and the expense of carrying additional stock to take care of freight in transit when moving via rail carriers.

"If you will make an analysis of the charges covering your shipments it will be of interest for you to know the amount it costs to make l.c.l. shipments, and if you will compare these costs against the same shipments moving via motor truck you should be in position to eliminate a number of the cost items by reason of the fact that it is not necessary to go to the same expense for packing or boxing freight shipments when moving via motor truck, inasmuch as there is usually no transfer in transit.

"For the information of truck users I have compiled some figures showing the cost of freight movement compared with the same movement via motor truck. These figures are worked out on an average basis, and while substantially correct they may not cover peculiar local conditions. We have included in the freight cost the first-class rate, plus 30 cents per hundred pounds teaming charges at shipping and receiving point. To these costs must be added 17 per cent for the cost of carrying the increased weight caused by heavy boxing and 24 cents per hundred pounds for the increased cost of boxing. The rate via motor truck covers delivery from the shipper's warehouse to the receiver's warehouse, and I have averaged this rate and believe it to be a fair one to use in connection with the freight movement.

Comparison of Costs Between L. C. L. Movement and Motor Truck Transportation on Per One Hundred Pounds.

From Newark, N. J., to:	Via freight	Via motor truck
Yonkers, N. Y.	$1.00	$0.20
New York City	.88	.15
Passaic, N. J.	.88	.15
Paterson, N. J.	.88	.18
New Brunswick, N. J.	.88	.35
Trenton, N. J.	.88	.55
Philadelphia, Pa.	.98	.75
Downington, Pa.	1.11	1.10
Bridgeport, Conn.	1.12	.75
New Haven, Conn.	1.12	.80
Waterville, Conn.	1.12	.85
Hartford, Conn.	1.12	.95
Providence, R. I.	1.21	1.15
Port Jefferson, L. I.	.98	.75
Asbury Park, N. J.	.94	.45
Allentown, Pa.	1.05	.75
Bethlehem, Pa.	1.02	.75
Easton, Pa.	.95	.70
Kingston, N. Y.	1.06	.75

"I consider one of the greatest savings made possible by motor truck transportation to be in lumber and other ma terial used for packing, together with additional labor and other charges incidental thereto. The amount of this saving,

however, will be controlled largely by the material to be boxed or packed and how much less protection can be used when moving via motor truck as against a l.c.l. movement via rail.

"Any comparison of service between rail movement and motor truck movement is entirely in favor of the motor truck, as it is necessary for the motor truck operators to make delivery in the shortest possible time in order to operate their equipment financially successfully.

"The congestion of freight on the various piers and terminals is caused largely by the accumulation of l.c.l. shipments, and I am of the opinion that this congestion can be largely relieved by the increased use of motor truck transportation to short-haul points."

Mr. Bently, in discussing Mr. Banham's paper, cited the existing deficiency in transportation facilities and the opportunity for the development of the motor truck as a short-haul carrier, however emphasizing the fact that until this deficiency is so made up that the railroads will be enabled to adequately handle road-building materials highways cannot be constructed and the motor truck will therefore be unable to give such service as will permit of its establishment as the logical carrier for short-haul l.c.l. traffic.

Mr. Lorenzen, after stating that the economic range of the motor truck is governed by: first, good roads; second, legislation; third, the kind of hauling; and, fourth, the rate or remuneration, said in part:

"The opportunity for motor truck freighting is immense. Railroads and express companies are no longer giving the prompt service to which the public is entitled, rates are going up and service is going down; the so-called short-haul has forever furnished the argument of the railroad companies for increase in freight rates. It is the so-called short-haul that will give motor truck freighting its start and its first economic range, and the greatest opportunity to demonstrate that express service is possible between cities lying from 95 to 100 miles apart.

"It is said that back of every railroad employee there is an investment of about ten thousand dollars in equipment of one kind or another. It is represented in rolling stock, in roadbeds, in tracks, vast buildings, depots, repair shops, etc. This is an investment which creates a fixed charge that the motor truck owner is not concerned in.

"The improved railroad transports merchandise a distance of one thousand miles at perhaps a less expense than the stage coach did for a distance of fifty miles. At that, transportation cost during the last few years has increased steadily, and with the increase of transportation cost the railroad's expenditure for equipment has increased proportionately—we will grant this—but with a range of motor truck transport scientifically worked out, rates will be much less."

The haulage problem of the farmer was discussed at the Tuesday evening session. The necessity for the quick movement of commodities produced on farms to nearby markets was emphasized, and the comparison between the service which could be rendered by motor transport and the service which is now being rendered by rail carriers was presented.

The evening session on Wednesday was devoted to a discussion of developments in transportation, particularly the rural motor express and the "ship-by-truck" movement.

The two sessions on Thursday, January 29, held under the direction of the National Highway Traffic Association, were devoted to the presentation of the reports of committees of the association and the reading of papers on the general subject of highways and motor transport. Professor Henry E. Riggs, of the University of Michigan, prepared the report of the committee on "The Inter-relationship of Highway, Waterway and Railway Transport." This report was presented to the association by Professor A. H. Blanchard, professor in charge of highway engineering and highway transport, University of Michigan, and president of the National Highway Traffic Association. The report in general contained recommendations to the association as to the various phases of the highway transport problem, which should be studied by a committee during the coming year. In closing his report, Professor Riggs stated that without question the railroad is and always will be the most efficient carrier for long-haul traffic, but that motor transport for short-haul traffic should be developed to supplement our railroad system.

At both of the Thursday sessions it was charged by several of the speakers that railroad interests are not wholeheartedly behind the development of the motor truck as a short-haul carrier, although it is readily admitted that this traffic is handled by the railroads at a loss. Supplementing this charge was another, brought forward by speakers on the legislative aspect of the situation, who charged that many of the state railroad commissions are under the control of railroad interests and are therefore doing all in their power to hinder the development of motor transport.

Derailment at Grand Isle, Vermont

ELEVEN PASSENGERS suffering from frost-bitten limbs, after being partly submerged in Lake Champlain, when the temperature was 38 deg. F. below zero, was the exciting outcome of a derailment which happened on the Rutland Railroad near Grand Isle, Vt., on Saturday morning, January 31, about 6 o'clock. Northbound passenger train No. 51, made up mainly of sleeping cars from New York and Boston, was thrown off the track by a broken rail and one sleeping car fell down a low bank and was overturned, breaking the ice and lodging partly in the water of the lake. Most of its occupants

Passengers in Lake Champlain with Water 70 Degrees Below the Freezing Point.

were thrown to the front end of the car, and, until rescued, were in imminent danger of being frozen in the icy waters. Passengers in the two sleeping cars at the rear of the train, not overturned, joined the trainmen in rescuing the victims, and as soon as possible they were taken to hospitals and hotels in Burlington, about 20 miles south of the point of accident. About twenty passengers altogether, were injured, but aside from the suffering due to cold the injuries were all classed as not serious.

The accident happened near the bridge across Hibbard Bay. The two engines, baggage car, and one sleeper held to the tracks as the train went bumping along for several hundred feet, and the fore part of the train was on the bridge when the other cars rolled off and down the bank.

Conferees Come to Agreement on Railroad Bill

Statutory Rule of Rate Making Accepted With Fifty-Fifty Division of Earnings Over Six Per Cent

WASHINGTON, D. C.

A NEW ERA in the regulation of the railroads will be inaugurated on March 1 under the terms of the agreement reached on Wednesday, February 4, by the conference committee that has been working since December 22 to reconcile the conflicting features of the Esch and Cummins bills passed by the House and the Senate respectively. A few details and refinements of language remained to be settled, but it was announced that the final report of the conferees would be submitted to Congress by the first of the week and that it would undoubtedly be accepted by Congress before March 1.

The agreement as announced provides for a statutory rule of rate-making by which the Interstate Commerce Commission will be required to so regulate rates as to provide a net return of 5½ per cent, with a permissive ½ per cent additional for what are generally termed non-productive improvements, on the aggregate value of railroad property in a rate-making group or district, and railroads earning over 6 per cent on their value will be required to contribute one-half of the excess to a general railroad contingent fund, to be administered by the commission. After two years from the passage of the act, or after a year and one-half from the expiration of the six-months' period also provided in the bill during which the railroads will continue to be guaranteed the present standard return, the Interstate Commerce Commission may readjust the percentage and change it from time to time thereafter, but for the period named, which was to be definitely determined after further conference, the bill will constitute a general guaranty to the railroads as a whole of 5½ per cent upon the value by groups and thereafter the commission will be required to observe a definite percentage standard of reasonableness. The provisions for a division of the excess earnings are to remain effective. Provision is also made for the building up of individual railroad reserve funds until they reach 5 per cent of the value, after which any excess earnings may be used for any proper corporate purpose.

The House conferees therefore agreed to accept not only the principle but most of the details of Section 6 of the Cummins bill, except that the commission may change the percentage after two years, instead of every five years as provided in the Cummins bill, and the railroads are allowed to retain a more liberal division of the excess earnings. The Cummins bill provided for the retention of only one-half between 6 and 7 per cent and one-fourth above 7 per cent until the individual reserve funds are built up and one-third above 6 per cent thereafter. The House bill contained no rule of rate-making and the House conferees held out until the last against the stating of any percentage in the law, although they were willing to have the commission determine a percentage.

To win the acceptance of Section 6 the Senate conferees sacrificed the other distinctive features of the Cummins bill providing for a prohibition against strikes, for a plan of compulsory consolidation with reincorporation under federal charters, and the transportation board, which was to take over many of the administrative functions of the Interstate Commerce Commission and some new ones created by the bill.

In place of the anti-strike clause an agreement was reached on a plan for the settlement of labor controversies by a series of adjustment boards, composed of an equal number of representatives of the railroad managements and the employees, and an appeal board of five members appointed by the President to give final decisions in cases where the adjustment boards are unable to agree and to represent the public interest.

The details regarding the number and organization of the labor boards, as well as several other important but comparatively minor provisions of the bill, were to be taken up by Senator Cummins and Representative Esch on Thursday for final adjustment. Meanwhile the exact details of the language to be used has not been made public. The members of the wage boards will not lose their representative character, they will retain their connection with the railroads and the labor unions and will not be government officials, the purpose being to preserve as much as possible of the idea of voluntary adjustment, but the appeal board will decide where they are unable to agree and Senator Cummins said that it would protect the public interest against an agreement that might represent a burden upon the public, which is taken to mean that it would have a veto power. It is hoped that a final decision of such a board would have sufficient backing of public opinion to prevent a strike except in the most serious cases.

The House conferees persistently refused to accept any plan that would make strikes unlawful, even without a penalty, representing that it would be impossible to get a bill through the House including such a provision, over the opposition of the labor organizations. The House is also strongly opposed to the idea of a percentage standard of rate-making and it is expected that the inclusion of this feature will require more of a fight in the House than in the Senate against the bill as a whole, but the determination of the Republican majority to pass a railroad bill before the date set by the President for the return of the railroads to private management is counted upon to put it through.

The provisions of the House bill for permissive consolidations with the approval of the Interstate Commerce Commission will be retained, strengthened by authorizing the commission to make a general survey and prepare a general plan of consolidation with which all voluntary plans for consolidation must comply before being approved. The plan for federal incorporation, which was an incident to the Senate bill plan for consolidation, was abandoned and the obstacle of state laws against consolidation will be overcome by the direct legislation for consolidation.

As a result of the elimination of the proposed transportation board, all regulating authority as far as interstate commerce commerce is concerned will remain centered in the Interstate Commerce Commission, which will be enlarged by the addition of two additional members, making a total of 11, and their duties and powers will be greatly increased by the bill. As there has been a vacancy in the commission since January 1, 1919, this will require the appointment of three new commissioners. In addition to the enlarged functions of the interstate commission provided for in the sections of the bill relating to rates, regulation of security issues and of car service, it will also be given a considerable measure of control over the action of state commissions by the enactment into law of the principles of the Shreveport decision. The conference report will contain the provision for joint hearings by the state and interstate commissions in cases involving a conflict of state and interstate rates and in case of disagreement the federal commission is given power to set aside a state rate which is found to be unduly discriminatory against interstate commerce, or to make such orders as may be necessary to remove an undue discrimination or preference against interstate commerce. Carriers were also given the right to

challenge a state rate for discrimination by filing a complaint with the Interstate Commerce Commission, with the consent of the commission. Also one of the final acts of the conferees was a decision that in addition to the provision that existing rates shall remain in effect until changed by competent authority existing rates put into effect by the director general may not be changed except by the Interstate Commerce Commission during the six months guarantee period during which the United States is sponsor for the income of the carriers. This is to prevent action by state authorities to reduce the rates made by the Railroad Administration and was directly inspired by the fact that the attention of the conferees was called to an order recently issued by the Illinois Public Utilities Commission suspending, as of the date that the railroads are returned to private management, all rate increases initiated by the director general during the period of federal control.

The conferees were advised on Wednesday, February 4, that the Illinois commission did not actually intend to displace the rates on that date but its order was taken at its face value, as it would automatically have restored the state two-cent fare law and the Illinois commissioners' classification, and was taken as a warning of what might be done in other states.

As has been previously reported the conferees have agreed upon a $300,000,000 revolving fund from which loans may be made to railroads and also upon a 10-year period for the funding of the indebtedness of the carriers to the government, but there are important differences between the Esch and Cummins bills on this provision on which the terms of the reconciliation have not yet been disclosed. The provisions for a six months' continuation of the guaranty also contain details of vital importance not yet announced. Provision is made, however, by which the Interstate Commerce Commission may recast the accounts so that the guaranty will not cover abnormal expenditures for operation and is authorized to limit the charge to operating expenses for maintenance to the standard provided for in the standard compensation contracts, which is based on the expenditures during the test period equated for increased prices and wages.

It is understood that the conferees have definitely decided to drop the provision in the Esch bill, inserted at the request of the labor organizations, confirming for the future all wage orders of the Railroad Administration until superseded by mutual agreement or by the action of a bi-partisan wage adjustment board. They also eliminated the amendment to the Senate bill offered by Senator Smith of Georgia requiring railroads to secure the approval of the Interstate Commerce Commission before filing a tariff containing an increased rate. They accepted the language of the Senate bill which does not give the Interstate Commerce Commission power to prescribe minimum joint rail and water rates. The House amendment to the Panama canal act to authorize the commission to allow railroads to operate boat lines on the Great Lakes and in coastwise service if found by the commission to be in the public interest, in spite of reduction of competition, was eliminated. The Senate amendment to the long and short haul clause, proposed by Senator Poindexter as a rigid rule but modified to give the Interstate Commerce Commission discretion to allow relief from its strict interpretation, was accepted with a provision that the rate made to meet competition shall be "reasonably compensatory."

The form of the report of the conferees will be a recommendation that the House recede from its disagreement from the Senate amendment to its bill and that it and the Senate agree to the amendments to the Senate bill, which is technically an amendment to the Esch bill, and the conferees will write the new bill. It is expected that the report will be acted upon promptly in both houses and that it will precede the proposed discussion of the peace treaty in the Senate.

Asked for his opinion of the bill as agreed upon, Senator Cummins said: "It is neither as good nor as bad as it might be."

Alfred P. Thom, counsel for the Association of Railway Executives, has filed with the conference committee a supplemental memorandum making suggestions for points to be considered on various phases of the proposed legislation. He suggested that as a means of making certain that the President is not confined by the federal control act in cases where no compensation contract has been signed, to the 90 per cent of the standard return provided for in the act, the insertion of the following in parenthesis (without the limitation of the 90 per cent imposed by Section 2 of the federal control act).

He also suggested that the President be given authority in his discretion to "compromise" matters in dispute in order to adjust many of the vastly complicated matters within a reasonable time and without endless litigation. Objection was made to the provision in the House bill that the period of federal control shall not be computed as a part of the period of limitation in actions against carriers or in claims for reparation to the commission for causes of action arising prior to federal control.

If the provision of the Senate bill relating to the temporary guaranty to railroads after the termination of federal control is retained, Mr. Thom suggested that the language providing for the expiration of the guaranty when the commission renders its decision as to rates be omitted so that the guaranty may be continued until the rates approved by the commission go into effect.

Regarding the labor provisions, it was suggested that in the public interest it is desirable to localize as much as possible any matter of controversies between employers and employees by providing that all matters of personal discipline arising on the lines of a carrier should, so far as possible, be dealt with on that line and the consequences restricted to that line.

The provisions imposing upon carriers the duty to make disposition of coal cars in accordance with respective requirements of the bills were objected to on the ground that the Interstate Commerce Commission is already fully empowered to deal with this subject and has in many instances promulgated rules and regulations for the guidance of carriers. A memorandum by A. G. Gutheim of the Car Service Section of the Railroad Administration is quoted, in which Mr. Gutheim says there is no particular reason why special legislation should be enacted to protect shippers of coal in the use of a particular equipment which their commodity requires. Mr. Gutheim gives a history of the assigned coal car situation during the past three years and declares that the Cummins bill not only abolishes assigned cars for railroad fuel loading but abolishes the assignment of a private car to its owner's mine for the owner's loading. Regarding the assigned car situation, Mr. Gutheim says:

"During 1917 railroads quite generally were obtaining their fuel coal by assigning cars to mines holding contracts to ship such coal on one or another form of contract. Such mines were then protected in the supply of cars to the extent of their fuel coal contracts even though the regular car distribution was not sufficient to provide a full car supply for all mines.

"When the Fuel Administration began to function it seized upon the assigned car method of protecting railroads as a means of protecting the consignment of coal to certain consumers whose output was deemed essential in the war program. As a result of this, by about December, 1917, when federal control was in sight, so many cars were being assigned for particular railroad and commercial loading that the cars available for ordinary commercial distribution on many railroads were practically nil.

"When the Railroad Administration began to function and the question of renewing the contracts for fuel coal came up,

representatives of the administration, according to the coal operators, flatly announced to the operators that they proposed to use assigned cars for the purpose of getting a better price for railroad fuel. However this may be, there was naturally a considerable protest by coal operators against assigned coal cars, and a determined fight to abolished the practice was begun. This was taken up by the National Coal Association, and about March, 1918, the Fuel Administration also became a proponent of the abolishment of assigned cars for coal loading. The director general of railroads was of opinion that such assigned cars should be continued. An impasse between Messrs. Garfield and McAdoo resulted, and the question was carried to President Wilson, who adopted the Fuel Administration's view, abolished assigned cars, but simultaneously ruled that the government maximum price of coal in all districts should be cut 10 cents per ton.

"It is interesting to note here that the Railroad Administration in their contentions claimed that the assigned car method of loading railroad fuel would save them approximately $60,000,000 a year. The Fuel Administration was expecting an output of 600,000,000 tons of bituminous in 1918. It may be that this is where the 10 cents per ton figure came from.

"Assigned cars for railroad fuel loading were then abolished. It was appreciated by the Fuel Administration that one result of this might be to embarrass the railroads in obtaining adequate shipments of locomotive fuel. Therefore, it was agreed by the Fuel Administration that railroad fuel supply should be furnished in complete fulfillment of all requirements through the medium of the district representatives of the Fuel Administration in the various coal producing districts, railroad fuel being placed in Class 1 on the priority list.

"The particular point to bear in mind is that with the abolishment of assigned cars for railroad fuel loading, the government maximum price was cut 10 cents per ton, and there was a positive guarantee of an adequate supply of railroad fuel by a government body in a position to fulfill that guarantee.

"After the Fuel Administration ceased to function in February, 1919, there was for a long while a considerable surplus of coal cars and a slack market for bituminous coal. In consequence, the railroads had no difficulty in obtaining their fuel. With the advent of a car shortage period in July, 1919, however, the Railroad Administration found that it did not have the power of assigned cars in order to obtain its fuel, nor did it have any method of enforcing shipment on railroad fuel contracts, on account of the Fuel Administration having ceased to function, and its district representatives being no longer at work. The result was that many railroads became embarrassed by reason of inadequate fuel supply and there was a constant struggle on many roads to get enough fuel to keep on a safe margin. In a few instances railroads were advised by the Car Service Section not to accept billing of commercial coal from mines holding railroad fuel contracts until the obligations on such contracts had been fully met by those mines. The coal operators individually and through the National Coal Association questioned the legality of this action, taking the position throughout that the Railroad Administration could not utilize assigned cars to obtain railroad fuel, nor could it enforce preferential loading of railroad fuel out of the regular daily distribution of cars.

"This is the situation which the proposed legislation aims to perpetuate. The legislation was requested by the National Coal Association. There are important members of that Association who do not favor this legislation, and who are perfectly willing that the railroads should continue to buy coal on the assigned car basis.

"The legislation proposed is not necessary. There is no reason, after full and complete jurisdiction over car service is given to the Interstate Commerce Commision or the Transportation Board, why the Congress should legislate for the particular benefit of one class of shippers on a question of car service. If the arguments which were presented to the Fuel Administration and to the President in justification of the abolishment of assigned cars in time of war are meritorious in time of peace, the operators have merely to prove that to the Interstate Commerce Commission to obtain a just and reasonable rule for car distribution to coal mines. The commission should not be ousted of this particular phase of car service jurisdiction by particular legislation on the part of Congress.

"However, if this legislation is to stay in the bill, four things are necessary. First, there should be some assurance to the railroads that if they may not get their fuel supply by assigned cars, then preferential shipment of that coal should be guaranteed them by the legislation which abolishes the assigned cars. Second, Congress should not legislate in detail as to the counting of cars and the balancing of distribution on a fourteen-day basis. It is difficult enough now, when the railroads are accounting for car distribution to mines on a monthly basis, to even up in the month period. It would be impossible, with due regard to the interests of the country for coal production, to balance on a fourteen-day period basis, especially during extreme winter weather. Third, there have been instances in the past, and there undoubtedly will come instances in the future, when, in order to protect bunker coal requirements for the Navy, it is necessary to furnish preferential or assigned cars to certain mines, and this may well happen in time other than that of war or threatened war. Some leeway should be given to take care of emergency situations, either for the government or other consumers.

"Further, it is to be observed that the Cummins bill not only abolishes assigned cars for railroad fuel loading but abolishes the assignment of a private car to its owner's mine for the owner's loading. This is a direct confiscation of property rights and inevitably will raise serious questions of compensation to be accorded such private car owners if that is done. It should not be done except in case of dire emergency and the existing provisions of the Cummins bill are sufficient to authorize the regulatory body to take private cars for public use in case of emergency. That is enough, as under ordinary circumstances the private car owner should have his property protected. In the Esch bill an amendment to the original bill was made by inserting on page 47, lines 4 and 5, after the word "ownership," the words "as between carriers." The effect of this legislation is to permit the regulatory body to take care of emergencies by disregarding car ownership when the cars are those of common carrier railroads, but not when the cars are privately owned. It would be advisable to take out these words which have been inserted in the Esch bill, and, if necessary to protect the private car owner, the definition of what constitutes an emergency in which private cars might be used for the general benefit of the public could be made more rigid and the regulatory body's action thereby more restricted.

"If elimination is not possible, then the provision of the Esch bill referred to above should be adopted in preference to that of the Cummins bill. The provision of the Esch bill is practically declaratory of the existing law, while the provision of the Cummins bill goes far beyond existing law."

Mr. Thom also proposed the insertion of a provision that officers and agents whose duty it is to collect charges for transportation service shall be charged with the duty of collecting such charges within 24 hours after receipt by the shipper or consignee of the bill for such charges, except that credit may be extended for 48 hours after receipt in cases

where a surety bond satisfactory to the carrier is given. The purpose of the foregoing, he says, is by force of the statute to do away with the extensive credits which are being demanded of the carriers by some of their patrons. A rule similar to this has been put into effect during federal control and has been found to work most admirably. Mr. Thom says it has resulted in a large decrease in the amount of money uncollected, estimated for all roads to be $112,000,000.

Because of the public importance of a rail and water line through the Great Lakes, Mr. Thom suggested either that the Panama canal act be confined to the Panama canal or that an exception be made of the Great Lakes. The conferees on eWdnesday decided to reject the House amendment to the Panama canal act, thereby making no change in the existing law on the subject.

The Citizens' National Railroads League, of which Nathan L. Amster of Boston is president, filed a memorial with the conferees replying particularly to the memoranda filed by the National Shippers' Conference and the Association of Railway Executives, which, it is stated, "bear every evidence of being inspired by motives other than those of seeking to attain railroad legislation that will accomplish the greatest good for the greatest number." It is declared that the Association of Railway Executives in many respects does not properly represent either the view of the majority of railroad executives or the interest of the majority of the railroad security holders and that that of the so-called shippers' conference does not clearly represent the sentiment of, and is contrary to, the opinion and recommendations of a great majority of American shipping and commercial interests. It is urged that the railroad legislation should provide for ample and sufficient revenue to yield at least 6 per cent on the value of the properties in public service, that the full indebtedness of the railroads to the government should be funded for a period of 10 or 15 years and that the government should provide a revolving fund of $1,000,000,000 for loans to the railroads at low interest rates to preclude the necessity of their having to go to the "old Wall Street interests" for their financing.

Distribution of Rails Commandeered and Ordered for Railroad Administration

THE DISTRIBUTION between railroads of the 73,500 tons of open hearth rail commandeered for the Railroad Administration by the War Department, as reported in last week's issue, is as follows:

Bangor & Aroostook	250 tons
Chicago, Indianapolis & Louisville	500 tons
Cleveland, Cincinnati, Chicago & St. Louis	2,000 tons
Detroit, Toledo & Ironton	1,000 tons
Erie	2,000 tons
Grand Trunk Western	500 tons
Hocking Valley	500 tons
Lake Erie & Western	1,000 tons
Michigan Central	1,000 tons
New York, Chicago & St. Louis	1,500 tons
New York, New Haven & Hartford	4,000 tons
Toledo & Ohio Central	500 tons
Toledo, St. Louis & Western	1,000 tons
Wabash System	2,000 tons
Total Eastern Region	17,750 tons
Baltimore & Ohio	6,000 tons
Bessemer & Lake Erie	500 tons
Central of New Jersey	1,000 tons
Grand Rapids & Indiana	500 tons
Pennsylvania Eastern Lines	20,000 tons
Philadelphia & Reading	1,500 tons
Western Maryland	5,000 tons
Total Allegheny Region	30,000 tons
Chesapeake & Ohio	1,000 tons
Norfolk & Western	4,000 tons
Virginian	1,000 tons
Total Pocahontas Region	6,000 tons
Atlanta, Birmingham & Atlantic	500 tons
Carolina, Clinchfield & Ohio	700 tons
Charleston & Western Carolina	500 tons
Cincinnati, New Orleans & Texas Pacific	500 tons
Gulf, Mobile & Northern	500 tons
Louisville & Nashville	2,000 tons
Louisville, Henderson & St. Louis	500 tons
Mobile & Ohio	1,000 tons
Nashville, Chattanooga & St. Louis	1,000 tons
Norfolk Southern	500 tons
Richmond, Fredericksburg & Potomac	700 tons
Total Southern Region	8,400 tons
Gulf Coast Lines	1,000 tons
Kansas City Southern	1,000 tons
Missouri Pacific	2,000 tons
Total Southwestern Region	4,000 tons
Chicago & Alton	1,000 tons
Chicago, Rock Island & Pacific	5,000 tons
Kansas City Terminal	1,000 tons
Total Central Western Region	7,000 tons
Chicago Heights Terminal	100 tons
Minneapolis & St. Louis	250 tons
Total Northwestern Region	350 tons

The division of the commandeering orders as reported in last week's issue was slightly incorrect, or has since been revised, and is as follows:

Illinois Steel Company	11,350 tons
Carnegie Steel Company	13,500 tons
Tennessee Coal, Iron & Railroad Company	12,200 tons
Bethlehem Steel Company	10,450 tons
Midvale Steel & Ordnance Company	26,000 tons

Orders also have been placed amounting to 44,000 instead of 42,500 as previously reported, including 27,000 to the Illinois Steel Company, which will roll 2,000 tons for the Chesapeake & Ohio, 5,000 for the Baltimore & Ohio, 5,000 for the Chicago, Rock Island & Pacific, 10,000 for the Pennsylvania Western Lines, and 5,000 for the New York Central. The Colorado Fuel & Iron Company will furnish 2,500 tons for the El Paso & Southwestern and the Lackawanna Steel Company will furnish 14,500 for the Erie, New York Central and Delaware, Lackawanna & Western. This makes a total of 117,500 tons ordered since the first of the year.

Mr. Hines Explains Rail Orders

DIRECTOR GENERAL HINES on January 30 authorized the following statement regarding the commandeering of rails by the War Department, as reported in last week's issue:

"An erroneous impression has been created by publications regarding the action of the Railroad Administration in arranging to secure steel rail to meet its urgent needs. The Railroad Administration urgently needs approximately 120,000 tons of steel rail which it ascertained should be rolled in about three weeks. It is essential that this rail be secured as promptly as possible.

"The Railroad Administration has been seeking since October to secure sufficient rail, but has found it impossible to do so largely because of conditions arising out of the recent steel strike.

"In view of the urgency of the situation commandeering orders for a part of the needed rail have been issued on the request of the Railroad Administration. The price to be paid to some mills for rail delivered under these orders has been agreed upon at $47 a ton, and as to others a reasonable price will be fixed in accordance with the provisions of the statute."

Apparently Mr. Hines wished to correct the impression given by several newspaper stories that the rails were commandeered because of a controversy as to price, instead of as to delivery. The Midvale company has persistently demanded $57 a ton, but the companies that voluntarily accepted orders took them at $47.

THE SCHOOL TEACHER.—Men who train minds are not so well paid as the men who mind the trains.—*J. G. Schurman.*

Farmers Declare for Return of Railroads

Executive Heads of Six National Organizations Urge Congress to Take Prompt Action

THE EXECUTIVE HEADS of six large national farmers' organizations, at a conference at the headquarters of the National Board of Farm Organizations at Washington on January 30, took issue with the statements that have been reiterated in season and out of season by George P. Hampton and Benjamin C. Marsh, of the Farmers' National Council, that the farmers of the country are for continued government operation of the railroads. In a joint memorial which was sent to all members of Congress, the heads of the six organizations declared that the farmers of the United States are emphatically opposed to government ownership or continued government operation of railroads and desire the expedition of legislation providing for their return to private management.

The memorial adopted by the conference restated the positions taken by the various organizations as adopted at their recent annual meetings and expressed the belief that their "convictions are shared by a vast majority of the farmers of the country." The declaration as to railroads was one of a series, in which it was asserted that farmers are continuing their best efforts to maintain production and demand that labor and capital shall "earnestly and consistently speed up their part of the production so urgently needed." "We have reached the critical point in regard to shorter hours of labor," the memorial declares, "and a 44-hour week will neither feed nor clothe the world." The right to cease work, for adequate reasons, is declared to be unassailable, but "no right exists to compel men to strike or to prevent others from working."

Regarding railroads the memorial said:

"Ownership of Railroads. The government ownership or continued operation of railroads is most emphatically opposed. It is against good public policy and the principles of sound Americanism. We are convinced that any possible emergency calling for such operation has passed; that its continuance is costly, inefficient and inadvisable. We urge Congress to expedite the enactment of legislation providing for the proper reorganization, re-equipment and control of the railroads under private ownership; that this legislation be as plain as possible and providing as few restrictions and complications as will properly protect the superior interest of the public in the operation of railroads. We are opposed to a government guarantee of dividends or a government subsidy."

The memorial was drafted by the following executives: W. U. Drummond of Oklahoma, chairman of the board of governors of the International Farm Congress; J. R. Howard of Iowa, president American Farm Bureau Federation; T. A. Atkeson, Washington representative of the National Grange; R. F. Bower, National Farmers' Union; O. G. Smith, president Farmers' National Congress, and John D. Miller, National Milk Producers' Federation. Other organizations represented at the conference were the State Farm Bureau Federations of Indiana, Vermont, New Jersey and West Virginia; the State Granges of Maryland, Massachusetts, Delaware and New Jersey; the American Cotton Association, the Farmers' Union of Oklahoma, Washington and Virginia, and the Dairymen's League of New York. The memorial was unanimously adopted and was signed by every person participating in the conference.

Mr. Marsh or Mr. Hampton, or both, of the Farmers' National Council, have been very vociferous in Washington in declaring that the farmers are unanimously for government ownership or for a two-year extension of federal control. They have appeared at hearings before Congressional committees considering railroad legislation, they have demanded special hearings, they have issued many statements to the press and they have left letters at the White House which have been given to the press as having been presented to the President. While claiming to represent farmers, and it is understood that they do represent some of the more radical of the farmers' organizations because they frequently present letters from them, on several recent occasions they have appeared in connection with groups of labor leaders and have assumed to speak for both labor and the farmers. On the day of the conference at which the memorial was drafted Mr. Marsh was quoted in the newspapers as having testified before the Senate Committee on Commerce that Wall Street controls the policies of the National Grange and other national farmers' organizations other than his own.

George F. Hampton, managing director of the Farmers' National Council, has sent a letter to the President of the Senate, the Speaker of the House and the chairman of the Senate and House committees on interstate commerce, attacking the memorial filed by the officers of the six farmers' organizations and claiming that they do not represent the sentiment of the farmers. Mr. Hampton called attention to the statement in the memorial opposing a government guaranty of dividends or a government subsidy and says that "these gentlemen must now be busy fighting the return of the roads since the pending legislation for their return provides for a guaranty." Mr. Hampton overlooks the fact that the return of the roads has been provided for without legislation by the proclamation of the President and that the pending legislation when passed probably will not provide for a guaranty.

E. A. Calvin, Washington representative of the Association of State Farmers' Union Presidents, has also sent to members of Congress a letter to show that farmers' organizations are opposed to government ownership and operation. The letter is in part as follows:

"As considerable is being said in the press and elsewhere to the effect that delegations of farmers have recently visited Washington, demanding that the government retain control of the railroads for at least two years, and stating that this is the wish of the farmers of this country, I feel it to be my duty as a representative of the farmers to set forth their views on this question and to transmit to you resolutions which were adopted by different farm organizations representing the actual American farmers.

"At the annual meeting of the Oklahoma division of the Farmers' Educational and Co-operative Union of America, held on August 19 and 20, 1919, the following resolution was unanimously adopted:

" 'We view with alarm and oppose the government ownership of railroads, and especially the Plumb plan, of the government buying the railroads at public expense, turning them over to the railroad employees, and guaranteeing the railroad employees whatever wages they demand and a division of the profits. If Congress in its wisdom does this, we ask them to also buy all of our farms and their equipment, hire the farmers to operate them at two-thirds of the hourly wage scale paid the average railroad employee, and sell the production to the consumer at cost.'

"This about expresses the views of an overwhelming majority of the farmers of the nation, who are members of the Farmers' Union and other farm organizations in the several states, including Louisiana, Alabama, Ohio, Texas, Illinois

and Iowa, which organizations adopted similar resolutions opposing government ownership.

"At the annual meeting of the American Farm Bureau Federation, held in Chicago, November 14 last, the following resolution was adopted:

" 'We are opposed to government ownership of public utilities. We demand the early return of the railroads to private control, under such conditions and regulations as will render adequate service at just and equitable rates. We particularly demand immediate attention to restoring the efficiency of livestock and other perishable transportation, both in car equipment and train schedules.'

"If there is any class of our citizens who have suffered from inefficient railroad service and delay in transportation in the last two or three years it is the farmers; and you can take it as a fact, if we are to believe what they say in their resolutions, that a majority of the farmers of this nation desire the return of the railroads to their owners at the earliest possible moment, and we consider the President's announcement that they shall be returned on March 1 as sound in principle and highly expedient under existing conditions.

"At the fifty-third annual session of the National Grange at Detroit, Mich., November 18, 1919, the following resolution was adopted:

" 'While recognizing the evils of uncurbed power growing from swollen fortunes in the hands of unscrupulous and ambitious individuals, the National Grange declares that in a government of a free democracy is lodged ample power to curb all such evils. We declare our opposition to government ownership and to nationalization of business and industry. We favor the safeguarding and protection of private property as only by the full development of the right of private property can there be perpetuated the full measure of individual initiative and emulation upon which a democracy is based and by which its future is assured.'

"All fair-minded people will readily agree that the above is sound in principle and in harmony with our democratic form of government. The experience of the last three years of the government's endeavoring to engage in operating and conducting different lines of business has demonstrated the folly of nationalizing business under control of the federal government by commissions or licenses, and the fact has been asserted and has not been denied that when the government endeavored to produce castor oil those in charge of this industry for the government succeeded in producing only two quarts at a cost of several million dollars. I feel safe in asserting that if this task had been left to the common-sense farmers of Iowa, Missouri, Kansas and Oklahoma, where castor oil beans are grown, that the government would have received an abundance of castor oil at a minimum cost."

A New Report on the Salaries of Technical Men

Engineering Council's Committee on Classification and Compensation Submits Its Findings

A NEW IMPETUS has been given to discussions of the adequacy of engineers' salaries by the report recently submitted to Engineering Council by its Committee on Classification and Compensation of Engineers. At the meeting of Engineering Council on December 18, 1919, this report was received and the classification for engineers in railroad, municipal and federal, state, county service embodied in this report was adopted. This classification has been made sufficiently general to cover all branches of engineering service. As a consequence its nomenclature as applied to any particular class, such as railway engineering, is not specific. On the other hand, the body of the report contains some very pertinent observations on the present status of the engineer, although the specific examples cited concern governmental or municipal work rather than the railroads. The following are excerpts taken from such portions of this report as would be of greatest interest to railway men.

Findings and Conclusions of the Committee

The investigations have shown the lack of any adequate or consistent employment policy with respect to professional engineers. This is evidenced by the following conditions which are believed to be largely responsible for the unsatisfactory status of men engaged in this class of work:

1. Absence of any uniform system of grading of positions.
2. Lack of uniformity in titles of positions with respect to duties.
3. Inequalities in compensation for positions of the same grade.
4. Generally inadequate compensation for services rendered.

To the end that these conditions may be corrected and proper and equitable conditions of employment established, the following principles and practices are recommended by the committee, though not yet acted upon by the Council.

1. Positions should be classified in accordance with the type of work, and with the character of the duties to be performed and the qualifications necessary for their performance, as indicated by a system of grading.

2. Within the salary limits fixed for each grade, there should be a system of advancement through the grade based upon experience gained in the position and upon proof of increase in the proficiency of the employee in performing the duties of the grade.

3. Promotions from grade to grade should depend upon the existence of a vacancy in the higher grade and proof that the employee is qualified to fill the vacancy.

4. The determination of salary adequate to procure for and retain in engineering work a high class of employees, should take into account and properly weigh the following considerations:

(*a*) The capital invested, both in money and in time, in obtaining the requisite fundamental training.
(*b*) The amount and character of experience and the degree of personal ability required.
(*c*) The relative value of the classes of work to be performed.
(*d*) The amount paid for similar service in other lines of work.
(*e*) The amount necessary to enable the employee to maintain a standard of living commensurate with the general standards of the community for positions of similar dignity and responsibility.

5. In the interest of an adequate social policy, no position likely to be occupied by individuals of an age to assume family responsibilities should fail to pay an amount sufficient to permit the maintenance of the average family in reasonalbe decency and comfort.

6. In the interest of the employees as a whole and of the employer, a system should be established by which employees

who fail to maintain satisfactory standards of service should be removed, transferred, demoted, or retired as may be equitable in the circumstances.

Classification of Engineering Positions

The grades proposed, which appear to be well adapted to use not only in all of the services represented but also for all other forms of engineering activities, have been divided into two classes: Professional service, which is deemed to include men who have received an engineering degree from an educational institution of recognized standing or who have obtained similar qualifications through practice of the profession and by mastering the fundamentals of engineering science, and sub-professional service, which includes assistants with at least a high school education, who enter upon the practice of the profession in the performance of responsible duties for which an engineering training is not essential, but who through experience and study may fit themselves for the higher grades. The classification with the minimum experience requirement for the various grades, is as follows:

	Experience in years	
Professional service	With degree in engineering	Without degree in engineering
Grade 1—Chief engineer	12	16
Grade 2—Engineer	8	12
Grade 3—Senior assistant engineer	5	9
Grade 4—Assistant engineer	2	6
Grade 5—Junior assistant engineer	0	4
Sub-professional service		
Grade 6—Senior aid, office	0	5
Grade 6—Senior aid, field	0	5
Grade 7—Aid, office	0	2
Grade 7—Aid, field	0	2
Grade 8—Junior aid, office	0	0
Grade 8—Junior aid, field	0	0

The application of these classes to railway engineering is illustrated by the assignment of the following descriptive terms used in railroad parlance to these various classes:

1. Chief Engineer—chief engineer of maintenance of way.
2. Engineer—electrical engineer, mechanical engineer, bridge engineer, tunnel engineer, maintenance of way engineer, signal engineer, division engineer, district engineer, structural engineer, valuation engineer, designing engineer, etc.
3. Senior Assistant Engineer—senior assistant electrical engineer, senior assistant mechanical engineer, senior assistant bridge engineer, etc.
4. Assistant Engineer—similar to senior assistant engineer.
5. Junior Assistant Engineer—engineer inspector, etc.
6. Senior Aid—chief draftsman, chief computer and chief inspector.
7. Aid—draftsman, computer, instrumentman and inspector.
8. Junior Aid—junior draftsman, tracer, rodman and tapeman.

Striking Comparison with Results of Earlier Investigation

In 1913, a committee was appointed by the board of direction of the American Society of Civil Engineers to investigate the conditions of employment and compensation of civil engineers. This committee was headed by the late Alfred Noble, who was succeeded as chairman by Nelson P. Lewis. In his final report, presented at the annual meeting of the society held in 1917, the committee gave the results of its canvasses, comprising returns from 6,378 engineers, of whom 1,319 were non-members.

The committee advised that the analysis of the returns showed that the pay received by members of the society was generally about 25 per cent above that of non-members. It also reported that from the meager information obtained it was "convinced that the compensation for engineering work compares favorably with that received by men of any other profession," and that there was need for "better trained engineers rather than of more engineers."

That a radical change of heart has since taken place on the part of responsible department heads is clearly evidenced. It also appears that the respondents in the case of the previous investigation were largely confined to the classes receiving maximum compensation.

A comparison with the pay of the industrial worker who serves under the engineer also bears testimony to the fact that, while admitted by none as to value, the actual compensation for brawn is to-day greater than for engineering brain. The need for setting up some scale of compensation for the engineer to correct this serious condition is, therefore, obvious, as is also that for the inquiry now being carried on by the committee. Unless a radical improvement can be brought about, it seems evident that the profession cannot attract to or retain in it men of the caliber required to command the respect in which it has heretofore been held by the public, and that so long as they are continuously struggling with the problem of making even a bare living, their efficiency will be minimized and their incentive to work with other than a purely selfish interest will be lacking.

The committee is impressed with the method which has been followed by the federal section in setting up a standard of compensation based on a readjustment to the new conditions as to cost of living, this being dependent on an award made on October 24, 1918, by the Shipping Wage Adjustment Board, which was designed to provide a uniform national wage scale for all shipbuilding workers, including a scale of compensation for draftsmen and copyists. A further comparison has also been made with scales proposed by other organizations, which seems to justify the schedule of salaries now suggested by the committee for discussion, which is as follows:

Schedule of Salaries Suggested for Discussion

Grade	Total years required with professional Degree	Experience to qualify without professional Degree	Salary Range Minimum	Salary Range Maximum
8—Junior aid	..	0	$1,080	$1,560
7—Aid	..	2	1,680	2,400
6—Senior aid	..	5	2,520	3,240
5—Junior assistant engineer	0	4	1,620	2,580
4—Assistant engineer	2	6	2,700	4,140
3—Senior assistant engineer	5	9	4,320	5,760
2—Engineer	8	12	5,940	No limit
1—Chief engineer	12	16	8,100	No limit

The committee is not prepared at this time to recommend the adoption of any definite schedule of compensation, and it is not at all clear as to the wisdom of fixing even a minimum limit on the highest grades of service or of keeping the maximum of one grade below the minimum of the grade above, all of which questions are now receiving its serious consideration, as is also the question concerning the provision to be made for advancing within the limits of a grade, for which a plan is suggested by its federal section. It would seem to the committee that, pending the completion of the investigation, the scale of compensation herein presented and the plan for promotion within a grade is adapted to general use in all branches of engineering service. The committee believes, however, that a general discussion of this question is desirable.

The committee responsible for this report consists of 11 members arranged in groups in a major committee and in railroad, state, municipal and federal sections. The personnel of the railroad section includes: Francis Lee Stuart, chairman, consulting engineer, New York City; Frank H. Clark, consulting engineer, New York City and Bion J. Arnold, consulting engineer, Chicago.

Locomotive running is not so fatal as in some quarters it is supposed to be. At Sparkill, N. Y., on the west shore of the Hudson river, Cassie Mabie, a retired engineman of the Erie Railroad, who flourished in the nineteenth century, is still living, at the age of 103 years. This we have on the authority of the Erie Railroad Magazine. Sparkill, evidently, is a healthy location. But, as a promoter of longevity, the Sparkill climate has its limitations, for in the same magazine is a notice of Garret Iseman, another veteran engineman of the Erie, who died in Sparkill on the 8th of December at the age of 96. Iseman was promoted from fireman to engineer in the year 1847, when James K. Polk was president of the United States. In the early eighties he ran the Chicago express between Jersey City and Port Jervis.

Work of the Division of Law

THE ANNUAL REPORT of the Division of Law of the Railroad Administration to Director General Hines, by E. Marvin Underwood, general counsel, which was abstracted in the *Railway Age* of January 30, states that whereas the last annual report of the division shows that approximately 1,000 cases were then pending on the docket of the Interstate Commerce Commission, on January 1, 1920, there were pending on the commission's former docket 907 complaints against the director general and carriers under federal control. During 1919, 852 formal complaints were filed and notice thereof served upon a representative of the division acting as statutory agent for the director general. During the year 892 hearings have been held in different parts of the country and 151 cases have been argued and submitted to the Interstate Commerce Commission, many of which involve important rate adjustments in every part of the country. In addition to the general supervision over the work of the attorneys for various railroads 30 cases have been tried, briefed and argued by attorneys connected with the Central Administration. The report also contains the following regarding claims for transportation charges in dispute with the War Department and claims for consideration pending before the claims board.

"The War Department has questioned a number of bills rendered by the Railroad Administration covering freight and passenger charges on the ground that the rates were unreasonable or illegal. There have been prepared and filed a great many appeals to the comptroller of the treasury from the ruling of the auditor of the war department. The comptroller of the treasury has held in several cases that these bills, involving a substantial amount of revenue, should not be paid as rendered.

"Early in the war the railroads of the country were called upon by the War Department to do a vast amount of construction work in connection with military camps located throughout the country, such as additional trackage, grading, construction of side tracks, and railroad facilities of almost every kind. With few exceptions this work was not covered by formal contract. In many instances the work was authorized by a letter written by an officer of the war department in charge of the work at the camp, and in others there were oral agreements.

"Effective March 2, 1919, an act was passed granting authority to the Secretary of War to audit and pay the claims of those who had performed work for the war department under contracts either express or implied. This act applied to all claims arising prior to November 12, 1918, and required that they be filed prior to June 30, 1919. The Secretary of War organized a board known as the War Claims Board for the purpose of passing upon all claims of this character. The War Claims Board in turn organized a subordinate board known as the Claims Board, Transportation Service, War Department. The latter was charged with the duty of examining and passing upon claims filed by railroad companies or the Railroad Administration covering the class of construction work to which the act applied. Under instructions from the director of the Division of Capital Expenditures the various federal auditors filed their claims with the Claims Board in accordance with the instructions issued by the Claims Board, which instructions were supplemented by A. H. Plant, chairman of the accounting section of the Association of Railroad Accounting Officers. Presentation of these claims to the board was made by this division. The board has heard a number of claims presented by the Southern Railroad, by the Pennsylvania Railroad and the Chicago, Burlington & Quincy Railroad. The claims filed with this board aggregate approximately $15,543,593.81. It it believed that the matters are proceeding satisfactorily and that the Claims Board will soon be in a position to make definite reports upon a number of claims.

Need of Strong Men in Railroad Service*

THE COUNTRY is thoroughly sick of government operation of our railroads, not alone because the quality of the service has fallen off, but because there is an evident deterioration in morale and efficiency. In December, 1919, the railroads were handling less business than they did in July, 1917, yet they are now employing 200,000 more men to handle the smaller amount of business than were employed under private management for a larger business.

The return of the railroads to private management on March 1 will be of supreme importance in enabling the companies once again to restore esprit de corps. During the last two years many of the ablest and most promising young men in the railroad business have gone into other and more profitable lines. From one large railway a considerable number of civil engineers in 1917 went into the army as officers in the engineering corps, and not one of these men has returned to the railroad business.

The attacks upon the men to whom the railroads pay substantial salaries and the hampering restrictions of regulating bodies make the young men feel that the railroad business offers no chance for the display of brains. Enormous capital is necessary to do the railroad business, but to be economically administered it must continue to attract the very best type of American brains.

To bring that about it is essential that the American people understand the unique contribution to the welfare of the country made by an efficient railroad officer.

It is important that the people should manifest their belief that in the most honorable and attractive of American businesses adequate rewards should be made available to men capable of administering railroad property economically and in the public interest.

The supreme need is the restoration of public faith in those who run our railroads. We have a new generation of railroad managers in office today—most of them men of high patriotism and imbued with a sense of fidelity to public interest. It is high time that we stop giving so much attention to criticisms of railroad abuses in the past, and while making impossible similar abuses in the future concentrate our attention on supporting with our faith and our praise the railroad men on whom we must depend for our commercial facilities.

No great railroad improvements are being projected today, yet commerce is going forward at an amazing pace. Railroad facilities do not come into being over night. They must be planned years in advance, and unless our commerce is to be absolutely throttled we must take effective steps immediately to catch up as best we can with what has been lost in the stagnation of railway development during recent years.

The country is growing by leaps and bounds, with opportunities for commercial advancement undreamed of, yet we find ourselves on the threshold of return to private ownership with our railroad business—equipment, personnel and plans for the future—in a condition of virtual sterility and stagnation. Nothing is more vital at this moment than that the people make their Congress understand that public sentiment is strongly behind the movement for constructive railroad legislation.

The Utah Manufacturers' Association has telegraphed to Utah congressmen urging the retention of the anti-strike clauses in the proposed railroad legislation. The association, representing 200 manufacturers, believes that public servants should be prohibited from demoralizing the industries of the country by concerted action.

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*From an address by Ivy L. Lee, before the People's Institute, Cooper Union, New York City, January 27.

Application of Automatic Signals and Train Stops*

Preventable Collisions Emphasize Necessity of Automatic Train Control as Adjunct to Visual Signals

By C. C. Anthony
Consulting Signal Engineer, Santa Rosa, California

IT IS FROM THE POINT of view of blocking that the automatic signal interests the operating man. Of course, block signaling or block operation can be carried on without automatic signals, by purely manual signals, and it is carried on in this way over a large mileage of road in this country and to a great extent in England.

The block system itself is a perfectly simple provision for preventing collisions between trains moving on the same track, at least this is the fundamental purpose—leaving out of account protection against open switches, broken rails and the like. This is accomplished by dividing the railroad, or each track, if there is more than one track, into sections called "block sections" or, for short, "blocks." A signal is located at the entrance of any section, and this is so controlled or operated, whether by men or automatic devices, as to indicate "stop" whenever that section is occupied by a train. When the section is no longer occupied the signal will show "Proceed" or "Clear" for that piece of track.

Theoretically the block system should be a perfect protection against collisions; that is, the signal at the entrance of any given block should always indicate "Stop" when the block is occupied, and if every train that approached such a signal stopped, we could not possibly have a collision. But familiar facts show that this is not always true. The block system is not a perfect protection against collisions; and there are two reasons. One is that the signals, however they are operated, are not infallible and they occasionally go wrong, showing an indication corresponding to a clear piece of track when the track is occupied; and, on the other hand, the men who run the trains do not invariably stop when a signal indicates "Stop."

There are two classes of signal failures. One class is that in which the signals indicate "Stop," when there is no occasion for stopping, as the track is clear—this is a safe situation, a failure on the safe side. It may stop a train unnecessarily, but it would not directly lead to an accident, and so we commonly call these failures "safe failures." In all well-managed block systems these are the more frequent failures. But in spite of all care a signal will occasionally indicate "Clear," or "Proceed," when the track is occupied. However, the records show such failures to be extremely rare. I think it is generally conceded that a good record is one such failure in a million operations of any given signal; and in some cases it is much better than that. For instance, on the subway lines about New York the records are far above that. For one whole year on the Hudson & Manhattan subways, which pass under the Hudson river, with an enormous traffic, not a single failure of that kind was reported. On the other hand, the record shows that the failures of the men are rather numerous. The engineman for one reason or other occasionally fails to act properly upon the indication of a signal.

When an accident occurs which a signal ought to have prevented there are three possible conditions which may have contributed to it. (1) A signal may have failed and given a wrong indication, which led to the accident. (2) The engineman may have failed to take the proper action when the signal gave the right indication, and (3) There may be doubt as to which of these two things entered into the affair.

These cases of doubt are, of course, the most troublesome ones to everybody concerned. Occasionally they are cleared up by some fortunate circumstance in the way of a witness—some employee of the road happened to be on the spot and saw the indication of the signal when the train passed it. I have known of more than one case of that kind; and it is a great relief to have the case settled in some such w But there remain a great many cases in which it is impossible to prove absolutely where the fault lay. The only thing to be done then is to make a most thorough inspection and test of all the apparatus concerned, and, as is often done, to place men day and night to watch the operation of the particular signal for rather a long period, in order to find out whether there is anything to indicate a possibility of a false-clear failure. The final result is usually to arrive at a reasonable probability. If it is found to be reasonably probable that the signal was working properly, then there is nothing left but to lay the blame on the engineman. For the rest of his life the engineman may feel that he is unjustly treated in having to bear the blame for the accident. Probably in every case where the engineman survives such an accident, he says he is sure he had a clear signal; and I don't doubt that in most cases he is perfectly honest about it. The chances are he would not have gone ahead and gotten into trouble deliberately if he had recognized that he had a "Stop" signal. For a good many years all the important accidents on our American railroads have been investigated by inspectors employed by the Interstate Commerce Commission; and they are supposedly unprejudiced people. Time and again, as I have noticed in their reports, they have, after making thorough tests and going into the case as completely as possible, been forced to the conclusion that the signal must have been working properly and that the engineman was the man to blame.

Taking the false-clear failures of the signal: All those that are recorded are extremely few; and even if some cases were added where there is a reasonable probability of such failure, there are still a very small number of failures of that kind. The cases are very much more numerous in which the enginemen are known to have taken the wrong action on the proper signal, and in which there is a reasonable probability that they have done so.

This naturally brings up the question: What is the remedy?

Probably every one would say, "Why not devise something that will work in connection with the signals and automatically stop the train if an engineman fails to take the action he should?"

That brings up the second part of the subject, automatic train stops.

Automatic Train Stops

This question was first asked many years ago; in the years that have gone by the answer has been pretty well worked out. Numerous inventors have been working for years to devise apparatus for that purpose. Many have had very little knowledge of railroad conditions; in many cases

*Abstract of a paper presented before the Pacific Railway Club, San Francisco, November 13, 1919.

their devices have been quite worthless; and again, a man has invented something good that someone else invented a short time before. But through it all, a good many people have worked intelligently and conscientiously on this problem, with the result that at the present time it can be said to be practically solved. There are several devices that are practical and workable at the present time. It would occur to almost anyone that the result could be accomplished by means of a trip placed on the ties at the side of the track, or even overhead, to strike the arm of a valve on the engine and allow the air to escape from the train pipe and apply the air brakes.

One of the first methods in this country was to place a glass tube on the top of the engine cab, connected with the main air pipe or train line, and provide an arm that swung out over the track from the signal when the signal indicated "Stop"; so that, if the engine should pass the stop signal, the arm would break the glass tube, allow the air to escape and apply the brakes. I think the first application of that very simple scheme was on an engine on the Pennsylvania Railroad; and it happened that that engine made trips through the tunnel at the summit of the Allegheny mountains. When winter came on, icicles formed in the tunnel, and one day the tube struck an icicle, broke, and stopped the train in the tunnel. It then became apparent that the glass tube was not very practical for an ordinary railroad—in that sort of a climate at any rate; nevertheless, that very same simple device is in use on an electric line on the coast.

Another simple arrangement—a small arm that swings up when the signal is at "Stop" and opens a valve on the engine or car, is in use in the subways of New York, Philadelphia and Boston, and, to a very limited extent, on the Pennsylvania Railroad—on its line running into New York through tunnels under the Hudson river. A variation of this arrangement consists of a long bar of steel, having a gentle slope upwards from one end and then a level portion, placed on the ends of the ties just outside the rail; a shoe on the engine strikes the incline and, as it is raised, operates whatever may be desirable on the engine. The bar, called a ramp, usually serves also to conduct electric current to the engine device through the shoe. Several systems have employed or propose to employ this arrangement.

But all those devices which involve actual mechanical or physical contact between devices on the roadway and devices on the engine are looked upon by a great many railroad people with some disfavor. The feeling is that, at high speeds, they are likely to receive severe shocks, and be interfered with in the cold parts of the country by ice and snow, or be damaged by things falling off trains or lying on the track. Many people who have looked into this subject feel that they would prefer a device which would be free from the necessity of any contact between devices on the engine and those on the track. This particular branch of the subject is what technically is called "getting on to the engine."

The whole automatic-stop proposition may be divided into three sections: (1) The control, in conenction with the signal system or the block system, by which the apparatus may be set in motion whenever conditions require it. (2) The means of "getting on to the engine"; and (3) The means, on the engine itself, of stopping the train.

In the present development of electrical science, it is quite possible to get on to the engine without any physical contact whatever. Everyone is familiar, in a general way, with the action of a magnet. For instance, take a pocket compass and pass a permanent magnet over it and the needle will swing. There is some kind of invisible influence passing through the air, glass and metal from the magnet, producing motion. In the present development that influence, known as "magnetic induction," can be used quite successfully for the purpose we have in view. It simply means a larger magnet than the one you may have used as a toy, and a suitable device on the engine to be affected by it. Then again there is electro-magnetic induction. It has been known almost as long as there has been any electrical science that an electric current sets up a magnetic effect which will influence an adjacent circuit whenever the current is started and stopped, or changed in strength. That kind of induction has been employed for the purpose.

To win approval an automatic train stop should conform to certain principles. It ought to be reliable and acceptable to experts. One of the most important principles is one that the signal man calls the "closed-circuit principle." In his experience with signaling apparatus he has developed the fact that the operation of a signal to allow a train to proceed should depend upon the flow of current in any electric circuits by which that signal is controlled, the reason being that the most usual failures of electrical apparatus and circuits are due to such things as broken wires or loose connections, or failure of the power or whatever may be provided to furnish the current. If the flow of current is necessary to give a clear signal, any interruption, whether intentional or accidental, will give a stop signal, or cause a safe failure; and it is felt that automatic-stop apparatus should work on the same principle, so that the most probable failures of the apparatus will not be on the dangerous side but will merely result in a train being stopped when it need not be stopped. This is called the closed-circuit principle because originally it referred almost entirely to electric circuits. Now the term has been extended even to devices using compressed air.

The real question now, is *not* "Why should not a device be invented or designed to do this thing?" but, "Why should we not have a device to do it?" In other words, why should it not now be used on the railroads. The devices have been pretty well developed to a practical point and the question now is, "Why aren't they in more extensive use?"

The answer is that all sorts of difficulties are anticipated. I believe that when signals were first introduced on railroads people generally anticipated difficulties. They said: "Why, one of these signals may some day stop a train when there is no need of stopping it. We cannot stand for such delay. We shall have all kinds of trouble." At one time I put in an entirely new kind of block system on a stretch of single track on the Pennsylvania railroad. The operating people on the ground shook their heads in despair and said, "The day that system goes into service this railroad will be tied up. We shall not be able to move a train through this piece of track." But the day it went into service and forever after we got better service over that particular piece of track than ever before. This same feeling cropped up here and there in connection with the automatic block system. They said, "It will impede traffic; stop trains unnecessarily; interfere with smooth and speedy operation." But the fact has been quite the contrary. It has improved operating conditions on our railroads. And it actually enables more trains to be run over a given track in a given time than could safely be run without it.

When we come to the automatic train stop we find that same old feeling: "We are going to have all kinds of trouble; the device will fail occasionally and stop trains when there is no occasion to stop them"; there will be very great difficulties in meeting practical operating conditions." Having studied the subject somewhat carefully, I may say of this fear what Mark Twain said, as you may remember, when he heard a report of his death: "It is much exaggerated."

I believe the automatic train stop as it is now developed can be applied to railroads, if proper intelligence is used in laying out the locations for the stopping devices, etc., and used in connection with the signal system, so that the

operation of trains will not be seriously interfered with and the safety of operation will be decidedly increased. I think the real feeling of a great many railroad officers is and has been for a number of years that the automatic train stop must come. In effect they say, "We cannot improve the accident record materially; we cannot get the degree of safety we all want without the automatic stop; we must have it sooner or later—and in any event it may be forced by Government action." At the same time there is still a tendency to delay. But I believe that the time has come when those fears should be laid aside; and, in view of the accident record and the earnest desire of everybody connected with railroads to improve the safety of operation, that the time is actually here now when the automatic stop should be applied on a fairly large scale.

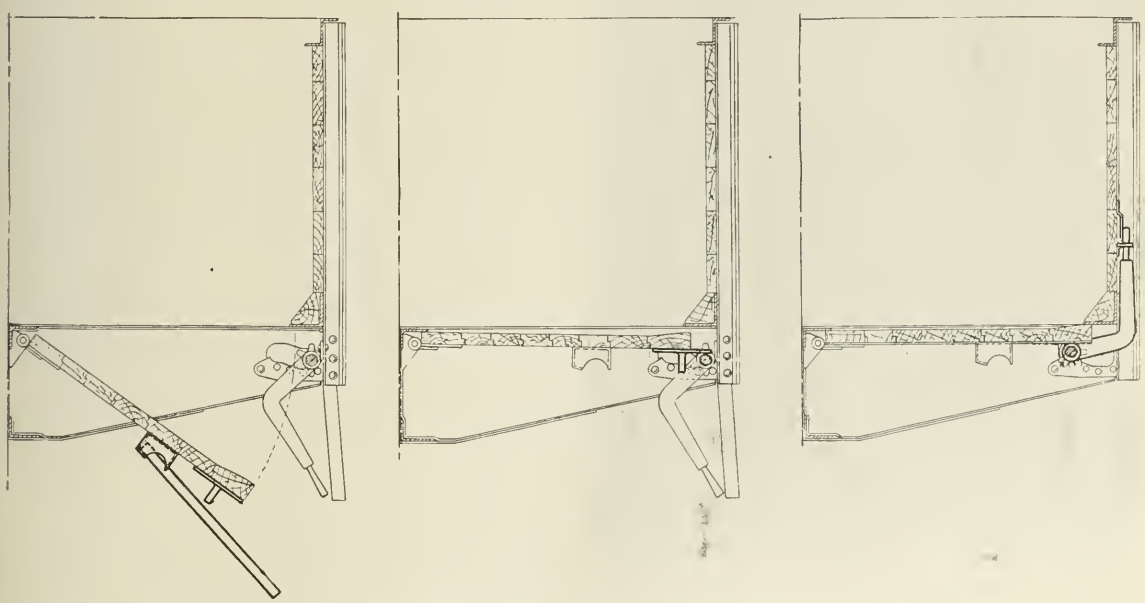
Hart-End General Service Car and Hart Door Gear

TO BE OF THE GREATEST VALUE when handling bulky commodities such as coal or road-building materials, the drop doors on general service gondola cars should occupy the maximum possible proportion of the floor area in order that the least amount of shoveling may be necessary to clear the car. Such cars have been built with doors occupying the entire length of the floor on both sides of the center sill. In these designs, however, it has been difficult to secure sufficient structural strength at the corners to prevent the frame from being distorted from the use of the push pole to such an extent that the doors bind and are not easily operated. This difficulty has resulted in the exclusion of drop doors and the use of a solid floor between the bolsters and end sills on many of these cars. Another difficulty which has discouraged the use of doors beyond the bolsters is the fact that with these doors included the operating mechanism must be placed at the end sills of the car at each corner, where it is usually unprotected from abuse which frequently renders the mechanism inoperative.

With these two objections to the usual design of completely self-dumping gondola cars in mind, the National Dump Car Company, Chicago, has developed a design of drop-bottom gondola, known as the Hartend general service car. The purpose of this design is to provide a stiff end construction, incorporating a solid floor plate from the end sill to the bolster at each end of the car, but arranged in such a manner that the load in this part of the car may be dumped at the sides, as it would be through a drop door. The manner in which this has been accomplished is indicated in the illustration showing the end elevation and interior of the car. Between the bolster and end sill at either end the floor plates are sloped downward and outward from the center sill, in effect forming a hopper at each corner of the car. The outer sides of these hoppers are closed by swinging doors hinged at the top and easily closed and locked by hand. This design provides a rigid end construction, provides for the complete discharge of the load with practically no shoveling, and incidentally provides cubical capacity in the corner hoppers for from one and one-half to two tons additional load. A level floor is retained between the bolsters, so that the suitability of the car for loading with lumber, rail, ties or other similar material is unaffected. As the hopper doors are readily operated directly by hand, this design permits the drop door shaft operating mechanism to be placed at the bolster, where it is not exposed to damage from corner blows as it is when located at the ends of the car.

Another feature of recent development which is included in the construction of the car illustrated is a simple door locking and dumping mechanism which may be applied to the doors of any general service gondola car of the usual design.

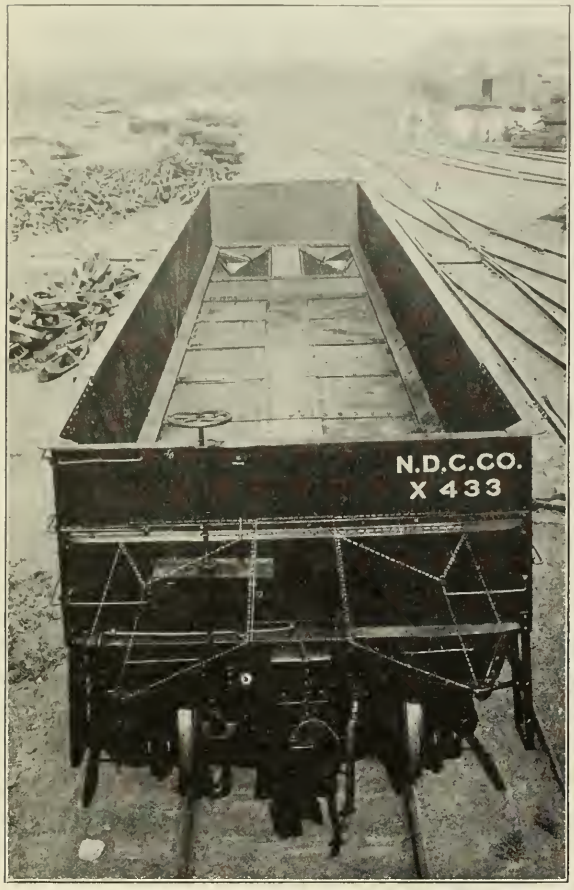
Generally speaking, door-operating mechanisms are more or less troublesome to maintain in satisfactory operating conditions. Where chains are used to raise the doors they usually offer some obstruction to the movement of material in unloading, and frequent readjustment is required to insure uniformity in closing all of the doors operated by one shaft. In the Hart door gear no attempt has been made to provide for the closing of the doors by the operating mechanism, and all chains or other flexible connections between the doors and the shaft have been eliminated. Each door is closed by



Half Sections of the General Service Car Showing the Operation of the Hart Door Gear

hand and temporarily latched, after which each group of doors is permanently locked as a unit. In unloading, a half turn of the permanent locking shaft releases the whole group.

For closing the doors each is provided on its under side with a metal socket and fulcrum, so arranged that when the end of a short lifting bar is inserted in the socket the bar is held in a position convenient for raising the door. Mounted in short slots formed near the outer ends of the cross members of the underframe is a rolling shaft. When the doors are opened this shaft is moved to the outer ends of the slots close to the side of the car, so that it clears the outer edges of the doors. With the shaft in this position, as each door is raised by means of the lifting lever, a simple sliding latch on the under side of the door is moved out so that it rests on the shaft, thus temporarily securing the door in the closed



Interior and End of the Hart-End Car Showing the Side Hoppers at the Ends.

position. When all of the doors in each group have thus been secured they are permanently locked in the closed position by rolling the shaft inward through one-half revolution. For this purpose an operating lever is permanently attached to each shaft. In locking the doors this lever is turned up against the side of the car and locked in position with a sliding link which is dropped over its end. As the shaft travels inward it engages the downwardly projecting lug or handle on the temporary latch and moves the latch back, so that in dumping it offers no obstruction to the dropping of the door.

The drop doors are divided into two groups on each side of the car, with the operating lever on each locking shaft located at the bolster end of the shaft. To dump all of the doors in each group the link is raised off the end of the shaft-operating lever, which is then turned outward and downward through approximately one-half revolution, thus rolling the shaft out from under the doors and allowing them to drop by gravity.

By referring to the drawings, it is evident that the rack on which the shaft is rolled is given a slight upward inclination toward its inner end that tends to close the doors tightly against the bottom of the car when the shaft is locked. By closing each door individually any dirt or obstruction which might interfere with its proper closure is cleaned off, so that the doors are closed and locked easily without being distorted themselves or putting excessive strains on the locking mechanism. Should they become warped or sprung, however, the slight downward movement of the shaft in its outward travel provides a range of approximately one inch, within which a sprung door offers no difficulty to the operator in temporarily latching it prior to locking the group with the shaft.

A sample car incorporating the end hopper and the Hart door operating mechanism has been in service for several months handling soft coal. In this service it has proved to be self-clearing, and incidentally has demonstrated its advantage in many instances, where cars are being unloaded into wagons on a team truck, of making it possible to dump a small portion of the load at one corner to afford a place for shoveling without dumping an entire quarter of the load.

1919 Deficit Stated at $349,000,000

COMPLETE STATISTICS for the earnings and expenses of the railways in December and for the calendar year 1919 are not yet available, but preliminary figures have been compiled and Director General Hines on January 31 authorized a statement estimating the net operating income of the Class I roads and terminal companies for December at about $12,700,000, which represents a deficit for the month of $62,300,000 as compared with one-twelfth of the annual rental, and a loss of $59,800,000 as compared with the average net operating income for December of the test period. After making various readjustments the Railroad Administration's statement places the loss for two years of federal operation, the amount by which the net operating income fell below the guaranteed return, at $594,200,000 and for the year 1919 at $349,200,000, which makes the loss for 1918, $245,000,000. On this basis the net operating income for 1919 would be about $551,000,000 and that for 1918 would become $655,000,000, as compared with $974,000,000 in 1917.

This covers railway operations alone; it is understood that the expenses of the Railroad Administration, which are not included in the monthly reports, and its outside operations, such as Pullman car lines, waterways and express, will show an additional loss of about $100,000,000 for the two years. Mr. Hines' statement attributes the unfavorable showing for November and December mainly to the effects of the coal strike on both earnings and expenses. He does not, however, show either the earnings or the expenses for December and his usual monthly statement showing the final figures for November has not yet been given out, although a statement giving the preliminary figures was made public. He says that the loss for the two months, $111,500,000, was practically all due to the strike and that if it had not been for the strike and if Mr. McAdoo had made his general rate advance effective about six months sooner than he did the railroads would have about earned their guaranty for two years.

It might also be stated that if Mr. Hines had put into

effect on January 1, 1919, the increase in rates which the railroads are preparing to ask of the Interstate Commerce Commission there might not have been a deficit of $349,000,000 for 1919. It is probably just as well for the reputation of railroad men generally, and particularly for those in the central office of the Railroad Administration, that Mr. McAdoo did not have $494,000,000 additional revenue in 1918, because that would have produced a surplus of $249,000,000 for Mr. Adoo in 1918 and would not have reduced Mr. Hines' deficit of $349,000,000 in 1919, which would undoubtedly have led to to some comparisons much more invidious than those which have resulted from contrasting the net operating income for 1918 and 1919 with that for 1915, 1916 and 1917.

As compared with December, 1918, the volume of traffic in December, 1919, shows little change as a result of the coal strike, but the effect is shown by the sudden drop from the peak of October. The net ton miles of revenue and non-revenue freight fell of 0.5 per cent, as compared with December, 1918. The Central district of the Eastern region shows a reduction of 5.7 per cent, but the Eastern region as a whole shows an increase of 2 per cent. The Allegheny region, which was particularly affected by the strike, shows a reduction of 7.1 per cent and the North Western region a reduction of 12.5 per cent

As compared with October, however, the net ton miles per mile of road per day showed a reduction much more marked than in either 1918 or 1917. In October, 1919, the average was 5,625. This fell off to 4,711 in November and 4,685 in December, whereas in 1918 the reduction was from 5,584 in October to 5,155 in November and 4,716 in December, and in 1917 the reduction was from 5,385 in October to 5,298 in November and 4,489 in December.

For the calendar year 1919 the total net ton miles showed a reduction of 9.7 per cent as compared with 1918, and 1918 showed an increase of 1.8 per cent over 1917.

The net ton mile of revenue and non-revenue freight handled by the railways in 1919 was 394,804,349,000 as compared with 437,018,918,000 in 1919. This is a decrease of 42,214,000,000 or 9.7 per cent. If this had all been revenue freight and had paid the average rate of .967 cents which Mr. Hines has stated was the average for the first nine months of 1919 it would have added something over $400,000,000 to the gross earnings, which would have wiped out the deficit if it had not cost anything to handle it. At the operating ratio of 84.66 shown for 11 months of 1919 it would have reduced the deficit by only about $63,000,000, although the larger amount of business, of course, should have reduced the operating ratio. But if the freight rates had been advanced 10 per cent in 1919 approximately $380,000,000 would have been added to the earnings without increasing the expenses, and the deficit would have been avoided. The railroad companies will want more than 10 per cent because they want more net operating income, for the increased traffic and the increased investment required properly to handle the increased traffic, than they received in the years ending June 30, 1915, 1916 and 1917, in spite of the fact that Commissioner Woolley refers to two of them as "miracle years."

Mr. Hines' statement was in part as follows:

"As has been heretofore explained, the destructive effect of the coal strike was particularly severe upon railroad operations in November and had even greater cumulative effect on December, in which month the dislocation of transportation became exceedingly serious. There had to be a drastic temporary curtailment of passenger service and every element of operation and traffic movement was made more difficult and less profitable. The result is that these two months, which should have shown little if any loss in the absence of this adverse influence, showed a total loss of $111,500,000 after allowing for two-twelfths of the annual rental, or a total of $117,200,000 after allowing the proportion of the annual rental corresponding to the proportion of the annual net operating income which was earned in these two months of the test period. The details for November have been given and preliminary statement for December is shown below.

"As December completed the second year of federal operation it is desirable to call attention to the fact that during the two years of federal operation, including of course the two coal strike months of November and December, 1919, the loss, after allowing for the two years' rental, was $594,200,000. If the increase in rates which became effective in June, 1918, had become effective on January 1, 1918, the entire loss for the two years, after paying the rental, would have been about $104,000,000, which is more than accounted for by the loss in the two coal strike months of November and December.

"It is only fair to say that the increased rates were in effect all of the year 1919 and that if the year 1919 be considered by itself there appears a loss of about $349,200,000. Of this loss, $228,700,000 occurred in the first six months of 1919 and was very largely accounted for by the abnormal and prolonged slump in freight business following the Armistice and practically all of the remainder of the loss, except $3,000,000, is accounted for in the two coal strike months of November and December, 1919.

"The preliminary report of the operating results for practically all of the Class (1) railroads and large terminal companies in federal operation indicate that the net operating income for the month of December, 1919, from the operation of these properties, will be about $12,700,000. This represents a loss of $62,300,000 to the government, after allowing for one-twelfth of the annual rental of $900,000,000, or a loss of $59,800,000 as compared with the net operating income earned in the average December of the test period.

"In stating the results for 1919 and 1918 adjustment has been made for back pay included in the operating expenses for 1919 which was applicable to 1918 and adjustment has also been made for back pay in the four months ended October 31, 1919, applicable to the six months ended June 3, 1919. The operations for October have also been credited with $6,000,000 on account of per diem charges between federally operated lines included in the equipment rent for the month, which represented a mere bookkeeping entry, and the operations for 1918 have been charged with like amount to offset a corresponding bookkeeping entry in July, 1919, when per diem charges were discontinued between federal lines.

"The preliminary reports on passenger traffic during December indicate a small increase over December, 1918. The passenger miles for the 11 months ended November 30, 1919, were about 8.5 per cent greater than during the same period of 1918, and 18.6 per cent greater than during the same period of 1917".

A Scene at Tientsin, China

General News Department

The general offices of the Georgia Railroad and of the Charleston & Western Carolina, at Augusta, Ga., were destroyed by fire on January 24; estimated loss $50,000.

The National Association of Railroad Tie Producers has postponed its annual convention, scheduled to be held at the Hotel Sherman, Chicago, on February 12 and 13, until March, on account of the influenza epidemic. Definite dates will be announced later.

The American Institute of Consulting Engineers, through its Council, has elected the following officers: President, Alexander C. Humphreys; vice-president, S. Whinery; secretary and treasurer, F. A. Molitor. The secretary's office is at 35 Nassau street, New York City.

The Industrial Conference, called by President Wilson in an effort to work out a plan for the settlement of industrial disputes, is reported as about ready to submit a final plan embodying suggestions received on the tentative plan made public a few weeks ago. Daniel Willard, president of the Baltimore & Ohio; L. E. Sheppard, president of the Order of Railway Conductors, and Glenn E. Plumb, counsel for the railway labor organizations, have testified before the conference, and other railway labor leaders were expected to appear before it this week.

The United States Civil Service Commission announces examinations, all over the country, on March 3 and 4, for the position of examiner under the Interstate Commerce Commission, salary $3,000 to $5,000. Examiners hold public hearings on important questions. Persons taking this examination must be at least 25 years old, and must have had two years' actual experience in legal work, or in lieu thereof, three years' experience with state or federal commissions, or in responsible legal or traffic positions. The commission may also select men under this examination for valuation work and other duties.

By a strike of 1,200 freight handlers at the stations of the Boston & Maine and the Boston & Albany in Boston, begun on January 28, westbound shipments had to be largely embargoed for a week and freight movements in all directions in and around Boston were seriously hampered. On Wednesday of this week the strikers voted to return to work at once, pending a decision at Washington of their demands for increased pay. The strike was started as a protest against the long time taken by the Washington committee to settle the wage demands. The freight handlers of the New York, New Haven & Hartford did not strike.

The Carnegie Corporation, of New York City, has given $5,000,000 for the use of the National Academy of Sciences and the National Research Council. A portion of the money will probably be used for the erection of a building in Washington which will house these two beneficiary organizations, and the remainder will be used as a permanent endowment for the National Research Council. The Council is a democratic organization composed of delegates from approximately 40 scientific and engineering societies of the country. Organized in 1916 as a measure of national preparedness, the Council has, since the war, been reorganized and now purposes to stimulate and promote scientific research in industry, agriculture and medicine.

Rocky Mountain and Pacific Coast Douglas Fir

While no authentic records are available concerning the relative durability of Pacific Coast Douglas fir and Rocky Mountain Douglas fir crossties inserted in the same localities, the Forest Products Laboratory, Madison, Wis., has found that such records as there are, fail to show any appreciable difference, contrary to the general belief that the Rocky Mountain fir is the most durable. The coast grown fir, because of its greater density, is somewhat harder and stronger than the mountain grown, but since ties of coast grown fir are generally cut from the poorer parts of the tree, there is little or no difference in the durability of either kind when used for crossties. It has been observed, however, that the former will take preservative treatment with slightly better results.

American Foundrymen's Association

The board of directors of the American Foundrymen's Association, at its annual meeting held in Cleveland on January 13, voted unanimously in favor of holding the convention and exhibit of the association this year in Columbus, Ohio, during the week beginning Monday, October 4. The exhibition buildings on the Ohio State Exposition Grounds will be used for the exhibits. Adjoining buildings provide lecture halls and meeting rooms.

Sodium Fluoride a Timber Preservative

Recent service tests made by the Forest Products Laboratory, Madison, Wis., of sap-pine and red oak ties treated with sodium fluoride, zinc chloride and creosote have indicated that the sodium fluoride treatment has many possibilities as a timber preservative. These service tests, which were the result of a series of laboratory tests, started in 1914 in conjunction with the Tennessee Coal, Iron & Railway Company and the Baltimore & Ohio. After five years' service the ties treated with the three above-mentioned preservatives were all sound, while untreated ties installed at the same time were in various advanced stages of decay. Other tests have been started since 1914 in order to secure more complete data on the possbilities of the sodium fluoride treatment in comparison to other methods of timber preservation.

Northwestern Lumbermen on Railroad Legislation

The Northwestern Lumbermen's Association held its annual convention at Minneapolis, Minn., on January 20, 21 and 22, and sent to members of the House Committee at Washington resolutions urging legislation to permit the return of the railroads to their owners, with proper supervisional control by the Interstate Commerce Commission. The lumbermen favor leaving to the state commissions such regulatory powers "as will enable them to function properly on local and intrastate matters;" a statutory provision that freight rates shall be adequate, as well as reasonable; the continued pooling of freight cars; the joint use of terminals; a law giving the Interstate Commerce Commission full power over cars, and legislation "preventing any general railroad strike." They are against any form of permanent guarantees, against limitations of earnings as now provided for in the Senate bill, and against pooling of earnings. They would oppose the proposed transportation board, on the ground that it will create confusion and divide responsibility.

Material Specification for Tank Cars

The Mechanical Section of the American Railroad Association has recently issued circular No. S III-92, giving notice that the suspension of the requirement for boiler plate steel, flange quality, for plates of class III tank cars, as authorized by circular No. S III-67, dated October 10, 1919, is extended to continue in effect until April 1, 1920, only.

The material for all plates of tanks of class III tank cars built after that date must comply with section 2 (a) of the specifications for class II tank cars, 1919 edition, page 21, which reads as follows:

"Material—(a) For cars built after April 1, 1920, all plates for tank and dome shall be of steel, complying with the Ameri-

can Society for Testing Materials specifications for boiler plate, flange quality."

The tank car specifications, as revised 1919, effective February 1, 1920, are now ready for distribution, and will be supplied at the following prices to members of the association: 100 copies or more, $15 per 100; 50 copies, $8; less than 50 copies, each 25 cents.

Tie Producer's Convention

The annual convention of the National Association of Railroad Tie Producers will be held at the Hotel Sherman, Chicago, on February 12 and 13. The first day will be devoted primarily to the consideration of routine business matters of the organization. The program on Friday is as follows:—

10 A. M.—Report of Special Committee on Specifications, Walter Polman, chairman.

10:45 A. M.—Practical Reforestation, with especial reference to financial return, Howard Andrews.

11:30 A. M.—The Present Railway Problem, and its relation to the National Association of Railroad Tie Producers, Samuel O. Dunn, editor *Railway Age*.

2:00 P. M.—Production and Shipment of Cross Ties on the West Coast, E. M. Blake.

2:30 P. M.—The manufacture of cross ties with saw mills and its possible influence upon cross tie prices, R. J. Witherell.

3:15 P. M.—Closing business.

Railroad Outrages in Mexico

Instances of attacks, derailments and dynamiting of trains in Mexico during the year 1919 numbered 64, according to an official Mexican report which has been made public at Washington. The instances reported were chiefly in (a) the northern part of the country (b) on the Mexican Railway between Mexico City and Vera Cruz, and (c) on the Tehuantepec line.

The report makes a point of the fact that the greater number of these wrecks as a result of rebel activities occurred during the first half of the year. In the last half the United States forbade shipments of arms and munitions, including dynamite, into Mexico, but the decrease in the number of outrages was credited in the report to changes in the personnel of the railroad administration, the appointment of General Manager Fontes to run the railroads, and his activities on inspection trips. The building of a series of blockhouses along the Vera Cruz-Mexico City line and named by soldiers is given as a reason for the decrease on that line.

The railroads suffered losses of $50,000, eight locomotives and 170 freight and passenger cars as a result of the rebel raid. In addition to this, more than $250,000 worth of freight and baggage was reported to have been destroyed or stolen by rebels.

Three Great Dates

"The Three Great Dates in History, or Gone, Gone, Going," is the subject of a recent safety bulletin issued by the safety organization of the Pere Marquette and associated roads. The three great dates are, according to the bulletin, January 1, 1863, when Abraham Lincoln issued the Emancipation Proclamation which, followed by the Thirteenth Amendment, put an end to slavery; January 16, 1920, when the Eighteenth Amendment to the United States Constitution became effective, abolishing the manufacture and sale of intoxicating liquors for beverage purposes, and February 19, 1918, when the director general of railroads created the Safety Section and established a safety organization on every railroad under federal control.

In discussing the relation of these dates to each other the bulletin says:

"Slavery and liquor have been abolished by amendments of the United States Constitution, but carelessness cannot be reached in that way. It is a thing in and of ourselves, and only by education and personal discipline can it be subdued. That we are subduing this enemy within us is proved by the fact that during last year there was a reduction of over 20 per cent in the number of employees killed and injured on the railroads of this country, in spite of the fact that the roads were handling the largest volume of traffic in their history. But really we have only made a start. The time will come when carelessness, like slavery and rum, will no longer figure as one of our social problems."

North Western Executive Personnel to Be Changed

Current reports, apparently authentic, indicate that radical changes will be made ni the operating personnel of the Chicago & North Western when it is returned to its corporate owners on March 1. These reports state that the following will not return to the North Western staff: R. H. Aishton, formerly president and now regional director of the Northwestern region; S. C. Strickland, formerly general manager, lines east, and now federal manager; E. E. Nash, formerly assistant general superintendent and now assistant to the federal manager; Jas. C. Davis, federal general solicitor; L. S. Carrol, formrely general purchasing agent and now federal purchasing agent; ;C. D. Brandriff, formerly general auditor and now federal auditor; A. A. McLaughlin, now assistant general solicitor, and A. B. Jones, formerly local treasurer at Chicago and now federal treasurer.

Regarding the organization wrich will be formed after March 1, it is stated that W. H. Finley, now president of the corporation, will continue in that capacity; Marvin Hughitt, Jr., prior to government control vice-president in charge of operation, will resume that position; F. J. Burke, at present purchasing agent of the Superior Coal Company, Chicago, will succeed Mr. Carrol as purchasing agent; F. Walters, formerly general manager, Lines West, now general manager, will continue in the latter capacity, and F. H. Hammill, general superintendent of the Union Pacific, with headquarters at Omaha, Neb., will become assistant general manager. It is also indicated that W. J. Towne, now assistant general manager Lines West, will be appointed engineer maintenance of way after the return is made.

Corporate officers of the Chicago & North Western who are in a position to verify or deny these rumors have refused to make any definite announcements at this time.

The Corbeil Collision

The rear collision of passenger trains on the Canadian Pacific near Corbeil, Ont., eight miles east of North Bay, on Sunday, January 25, about 11 a. m., briefly reported in the *Railway Age* of January 30, resulted in the death of eight passengers and a sleeping car porter, and the injury of four trainmen and 21 passengers. The inquest, held at North Bay on January 26, as reported in despatches of the Canadian Associated Press, brought out the principal circumstances.

Westbound passenger train No. 1, first section, was stalled because of low steam. Engineman J. R. Davidson sounded his whistle as a signal to the flagman to go back, and Flagman T. J. Curley went back and placed torpedoes on the rail. Curley says that he went back 20 telegraph poles. After restoring boiler pressure Davidson called in the flagman. After a time he whistled again and finally got a proceed signal about 12 minutes after the first call. He had moved his train forward a very short distance when he felt the shock of the collision, which caused his engine to break away from its train. Curley had got back to within a short distance of his train when he saw that the second section had not heeded his torpedoes. He then made hand motions to stop it, but apparently not until the oncoming train was very close to the point of collision. Isidore Godin, engineman of the second section, said that he did not see the train ahead until he was within a car's length of it. He had not heard any torpedoes, and he was running 35 miles an hour or faster at the time he struck. The rear car of the leading train, an observation car, was completely crushed, and the two sleeping cars next ahead of it were wrecked. The locomotive fell over to one side and lodged on one of the sleeping cars.

Flagman Curley, about a half hour after the collision, went

back and gathered up the fragments of the torpedoes. In testifying concerning the torpedoes he said that those now in use were not as good as those formerly supplied.

The collision occurred on a curve to the left; but the fireman of the second section did not see the train ahead until the moment of collision.

Two locomotive engineers testified concerning experiences with torpedoes and told of instances where they had failed to explode; and one of these witnesses said that on the day of the collision he had run over torpedoes near Bonfield but did not hear them, and only knew of their presence by the smell of gunpowder.

The coroner's jury recommended that the road use the block system.

Annual Exhibition of the N. R. A. A.

Successfully solving the problem of allotting space to 32 new exhibitors, the board of directors of the National Railway Appliances Association has completed the assignment of exhibiting space for the twelfth annual exhibition to be held at the Coliseum and Annex, Chicago, from March 15 to 18, inclusive, in conjunction with the annual convention of the American Railway Engineering Association and the stated meeting of the Signal Section of the American Railroad Association. The accommodation of the additional number of exhibitors was accomplished without changing the general floor plan which has proved so successful in past years. When the applications from the regular exhibitors were received it was found that they were asking for 20 per cent more space than was available. The problem was solved by assigning only the usual amount of space to all of the old exhibitors and then curtailing the space allotted in several cases. The result has been that there are but three companies whose request for space has not been fulfilled this year as compared with 35 at this time last year.

The decorative scheme adopted by the Association for its exhibition this year will be apple green and white, with the partitions between the booths and the signs in gold bronze. A ceiling is to be arranged, composed of three festoons of alternate apple green and white which will cover the entire ceiling.

A new feature has been instituted this year in that the Association is planning to handle all furniture, electrical fixtures and decorative effects, instead of, as heretofore, allowing this work to be handled by outside agencies. In addition the Association has restricted the furniture to either oak or mission.

The list of exhibitors who have been assigned space is as follows:

Adams & Westlake Company, Chicago.
Adams Motor & Manufacturing Company, Chicago.
A. G. A. Railway Light & Signal Company, Elizabeth, N. J.
Air Reduction Sales Company, New York.
Alexander Crossing & Equipment Company, Chicago.
Alexander Milburn Company, Baltimore, Md.
American Abrasive Metals Company, New York.
American Chain Company, Inc., Bridgeport, Conn.
American Hoist & Derrick Company, St. Paul, Mich.
American Kron Scale Company. New York.
American Malleable Castings Association. McKee's Rocks, Pa.
American Rail Joint Company, Philadelphia, Pa.
American Railroad Signal Supervisors' Association, Chicago.
American Railway Bridge & Building Association, Chicago.
American Spike Company, New York.
American Steel & Wire Company, New York.
American Valve & Meter Company, Cincinnati, O.
American Vulcanized Fibre Company, Pittsburgh, Pa.
Anchor Company, New York.
Armco Iron Culvert & Flume Manufacturers' Association, Middletown, O.
Austin Company, Cleveland, Ohio.
Balkwill Manganese Crossing Company, Cleveland, Ohio.
Barrett Company, New York.
Bay City Foundry & Machinery Company, Bay City, Mich.
Benjamin Electric Manufacturing Company, Chicago.
Bethlehem Steel Company, Bethlehem, Pa.
Boss Nut Company, Chicago.
Blaw-Knox Company, Pittsburgh, Pa.
Bryant Zinc Company, Chicago.
Buda Company, Chicago.
Buffalo Forge Company, Buffalo, N. Y.
Cambria Steel Company. Philadelphia, Pa.
Carbic Manufacturing Company, Duluth, Minn.
Carter Bloxonend Flooring Company, Chicago.
Chicago Bridge & Iron Works, Chicago.
Chicago Flag & Decorating Company, Chicago.
Chicago Malleable Castings Company, West Pullman, Ill
Chicago Pneumatic Tool Company, Chicago.
Chicago Railway Signal & Supply Company, Chicago.
Clark Car Company, Pittsburgh, Pa.
Cleveland Frog & Crossing Company, Cleveland, Ohio.
Copper Clad Steel Company, Chicago.
Crerar, Adams & Co., Chicago.
Detroit Graphite Company, Detroit, Mich.
Diamond State Fibre Company, Bridgeport, Pa.
Dickinson, Paul, Inc., Chicago.
Dilworth Porter & Co., Pittsburgh, Pa.
Duff Manufacturing Company, The, Pittsburgh, Pa.
Edison Storage Battery Company, Orange, N. J.
Edison, Inc., Thos. A., New York City.
Electric Storage Battery Company, The, Philadelphia, Pa
Equipment Corporation of America, Chicago.
Eymon Crossing Company, The, Marion, Ohio.
Fairbanks Company, The, New York.
Fairbanks, Morse & Co., Chicago.
Fairmont Gas Engine & Railway Motor Car Company, Fairmont, Minn.
Federal Signal Company, Albany, N. Y.
Federal Sign System (Electric), Chicago.
Frog, Switch & Manufacturing Company, The, Carlisle, Pa.
General Electric Company, Schenectady, N. Y.
General Railway Signal Company, Rochester, N. Y.
Gilbert & Barker Manufacturing Company, Springfield, Mass.
Gosso Company, The, Chicago.
Gould Storage Battery Company, Chicago.
Graver Tank Corporation, East Chicago, Ind.
Gurley, W. & L. E., Troy, N. Y.
Hall Switch & Signal Company, Garwood, N. J.
Hatfield Rail Joint Manufacturing Company, Macon, Ga.
Hayes Track Appliance Company, Richmond, Ind.
Hazard Manufacturing Company, Wilkes-Barre, Pa.
Hebard, W. F., Chicago.
Hubbard & Co., Pittsburgh, Pa.
Hyatt Roller Bearing Company, New York.
Imperial Belting Company, Chicago.
Ingersoll-Rand Company, New York.
Johns-Manville Company, H. W. New York.
Jones & Laughlin Steel Company, Pittsburgh, Pa.
Jordan Company, O. F., East Chicago, Ind.
Kalamazoo Railway Supply Company, Kalamazoo, Mich.
Kaustine Company, Inc., Buffalo, N. Y.
Kelly-Derby Company, Inc., Chicago.
Kerite Insulated Wire & Cable Company, New York.
Keystone Grinder & Manufacturing Company, The, Pittsburgh, Pa.
Kilborne & Jacobs Manufacturing Company, Columbus, Ohio.
Lackawanna Steel Company, Lackawanna, N. Y.
Lehon Company, The, Chicago.
Liberty Steel Products Company, Inc., New York.
Long, Chas. R., Jr., Company, Louisville, Ky.
Lundie Engineering Corporation, The, New York.
Lufkin Rule Company, The, Saginaw, Mich.
Luther Grinder Manufacturing Company, Milwaukee, Wis.
M. W. Supply Company, Philadelphia, Pa.
Macomber & Whyte Rope Company, Kenosha, Wis.
MacRae's Blue Book Company, Chicago.
Madden Company, The, Chicago.
Massey Concrete Products Corp., Chicago.
McGraw-Hill Publishing Company. New York.
Mercury Mfg. Company, The, Chicago.
Miller Train Control Corporation, Danville, Ill.
Monroe Calculating Machine Company, New York.
Mudge & Company, Chicago.
National Carbon Company, Inc., Cleveland, Ohio.
National Indicator Company, Long Island City, N. Y.
National Lead Company, New York.
National Lock Washer Company, The, Newark, N. J.
National Malleable Castings Company, The, Cleveland, Ohio.
National Railway Appliance Association, Chicago.
National Surface Guard Company, Chicago.
National Water Main Cleaning Company, New York
Nichols & Brother, Geo. P., Chicago.
North American Engine Company, Algoma, Iowa.
Ogle Construction Company, Chicago.
Okonite Company, The. Passaic, N. J.
O'Malley Beare Valve Company, Chicago.
Oxweld Railroad Service Company, Chicago.
P. & M. Company, The, Chicago.
Page Steel & Wire Company, New York.
Peyton Safety Rail Joint Company, Centralia, Ill.
Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.
Pocket List of Railroad Officials, New York.
Positive Rail Anchor Company, Marion. Ind.
Protective Signal Manufacturing Company, The, Denver, Colo.
Pyrene Manufacturing Company, Chicago.
Pyro-Non Paint Company, Inc., New York.
Q & C Company, New York.
Rail Joint Company, The, New York.
Railroad Herald Company, The, Atlanta, Ga.
Railroad Supply Company, The, Chicago.
Railway Review, Chicago.
Ramapo Iron Works, Hillburn, N. Y.
Reade Manufacturing Company, Hoboken, N. J.
Reading Specialties Company, Reading, Pa.
Richards-Wilcox Manufacturing Company, Aurora, Ill.
Roadmasters' & Maintenance of Way Association, Sterling, Ill.
Roberts & Schaefer Company, Chicago.
Safe Lock Switch Machine Company, Lexington, Ky.
Sellers Mfg. Company, Chicago.

Signal Accessories Company, New York.
Simmons-Boardman Publishing Company, New York.
Snow Construction Company, T. W., Chicago.
Southern Pine Association, New Orleans, La.
Southern Railway Supply & Equipment Company, St. Louis, Mo.
Squire Cogswell Company, Chicago.
Standard Asphalt & Refining Company, Chicago.
Steel Sales Corp., Chicago.
Sullivan Machinery Company, Chicago.
Sumner Engine Company, Fairmont, Minn.
Templeton, Kenly & Co., Ltd., Chicago.
Thompson Signal Company, Los Angeles, Cal.
Toledo Scale Company, Toledo, Ohio.
Track Specialties Company, New York.
Train Control Appliance Company, El Paso, Tex.
Torchweld Equipment Company, Chicago.
Union Switch & Signal Company, Swissvale, Pa.
U. S. Wind Engine & Pump Company, Batavia, Ill.
U. S. Light & Heat Corp., Niagara Falls, N. Y.
Verona Tool Works, Chicago.
Volkhardt Company, Inc., Stapleton, N. Y
Walls Frogless Switch & Mfg. Company, Kansas City, Mo.
Waterbury Battery Company, The, New York.
Wayne Oil Tank & Pump Company, Ft. Wayne, Ind.
Western Electric Company, New York.
Wharton & Company, Wm., Jr., Inc., Easton, Pa.
Wheaton & Probasco, Ionia, Mich.
Woolery Machine Company, Minneapolis, Minn.
Wyoming Shovel Works, The, Wyoming, Pa.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

Air Brake Association.—F. M. Nellis, 165 Broadway, New York City. Next convention, May 5-7, 1920, Chicago.

American Association of Demurrage Officers.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

American Association of Dining Car Superintendents.—S. W. Derr, C. R. R. of N. J., Philadelphia, Pa.

American Association of Freight Agents.—R. O. Wells, Illinois Central, Chicago. Next annual meeting, June, 1920.

American Association of General Baggage Agents.—E. R. Reynolds, C. G. W. R. R., Chicago.

American Association of Passenger Traffic Officers.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—J. Rothschild, Union Station, St. Louis, Mo.

American Electric Railway Association.—E. B. Burritt, 8 W. 40th St., New York.

American Electric Railway Manufacturers' Association.—C. F. J. Dell, 50 E. 42nd St., New York.

American Railroad Master Tinners', Coppersmiths' and Pipe Fitters' Association.—Otto E. Schlinck, 185 W. 5th St., Peru, Ind.

American Railroad Association.—J. E. Fairbanks, 75 Church St., New York:

Section I, Operating (including former activities of Association of Railway Telegraph Superintendents).—W. J. Fripp (chairman), N. Y. C. R. R., New York, N. Y.

Telegraph and Telephone Division—J. F. Caskey (chairman), Supt. of Telegraph, Lehigh Valley.

Section II, Engineering—E. H. Fritch, 431 South Dearborn St., Chicago.

Signal Division.—H. S. Balliet, 75 Church St., New York.

Section III, Mechanical (including former activities of Master Car Builders' and Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago. Next convention, June 9-16, 1920, Atlantic City, N. J.

Section IV, Traffic.—Robert C. Wright (chairman), Assistant Director, Division of Traffic, U. S. R. A., Washington, D. C.

Section V, Transportation (including former activities of Association of Transportation and Car Accounting Officials).—E. J. Fearson (chairman), Federal Manager, N. Y., N. H. & H. R. R., New Haven, Conn.

Section VI, Purchases and Stores (including former activities of Railway Storekeepers' Association). J. P. Murphy, N. Y. C. R. R., Collinwood, Ohio.

Section VII, Freight Claims (including former activities of the Freight Claim Association).—Lewis Pilcher, 431 South Dearborn St., Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention October 19-21, 1920, Atlanta, Ga.

American Railway Engineering Association.—(Works in co-operation with the American Railroad Association, Section II.) E. H. Fritch, 431 South Dearborn St., Chicago. Next convention, March 16-18, 1920, Chicago.

American Railway Master Mechanics' Association.—(See American Railroad Association, Section III, Mechanical.)

American Railway Perishable Freight Association.—E. F. McPike, 135 E. 11th Place, Chicago. Regular meetings, 2d Wednesday in March and September.

American Railway Tool Foremen's Association.—R. D. Fletcher, 1145 East Marquette Road, Chicago.

American Society for Testing Materials.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 21, 1920, New Monterey Hotel, Asbury Park, N. J.

American Society of Civil Engineers.—Col. H. S. Cracker (acting secretary), Engineering Societies Building, 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 33 W. 39th St., New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Steel Treaters' Society.—Arthur G. Henry, Illinois Tool Works, Chicago.

American Train Despatchers' Association.—D. L. Darling, Northern Pacific Ry., Spokane, Wash.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next annual meeting, February 10-12, 1920, Hotel Sherman, Chicago.

Association of Railway Claim Agents.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J. Next meeting, May, 1920, Atlantic City.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago.

Association of Railway Executives.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

Association of Railway Telegraph Superintendents.—(See American Railroad Association, Section I, Operating.)

Association of Transportation and Car Accounting Officers.—(See American Railroad Association, Section V, Transportation.)

Bridge and Building Supply Men's Association.—M. J. Trees, Chicago Bridge & Iron Works, Chicago.

Canadian Railway Club.—W. A. Booth, 131 Charron St., Montreal, Que.

Car Foremen's Association of Chicago.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

Car Foremen's Association of St. Louis.—Thomas B. Koeneke, Federal Reserve Bank Bldg., St. Louis, Mo.

Central Railway Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November, and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

Chief Interchange Car Inspectors' and Car Foremen's Association.—J. C. Keene, General Car Inspector, Wabash R. R., Decatur, Ill.

Chief Interchange Car Inspectors' and Car Foremen's Supply Men's Association.—D. B. Wright, Lehon Company, 45th and Oakley Sts., Chicago.

Eastern Railroad Association.—D. G. Stuart, Washington, D. C.

Freight Claim Association (See American Railroad Association, Section VII, Freight Claims).

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3rd Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, B. & O., Lima, Ohio.

International Railway Fuel Association.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May, 1920, Hotel Sherman, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn.

Maintenance of Way Master Painters' Association.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Building, Kansas City, Mo. Next convention, October 5-7, 1920, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 25-28, Curtis Hotel, Minneapolis, Minn.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass.

Master Car Builders' Association.—(See American Railroad Association, Section III, Mechanical.)

National Association of Railway and Utilities Commissioners.—James B. Walker, 49 Lafayette St., New York. Next convention, November, 1920, Washington, D. C.

National Foreign Trade Council.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 12-15, 1920, San Francisco.

National Railway Appliances Association.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meeting 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Pacific Railway Club.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting 2d Thursday in month, alternately in San Francisco and Oakland.

Railway Accounting Officers' Association.—E. R. Woodson, 1116 Woodward Bldg., Washington, D. C. Next convention, May 12, Atlantic City, N. J.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York.

Railway Club of Pittsburgh.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month except June, July and August, Americus Club House, Pittsburgh, Pa.

Railway Development Association.—D. C. Welty, Missouri Pacific R. R., Little Rock, Ark.

Railway Electric Supply Manufacturers' Association.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

Railway Equipment Manufacturers' Association.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va.

Railway Fire Protection Association.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

Railway Real Estate Association.—R. H. Morrison, C. & O., Richmond, Va.

Railway Signal Association.—(See American Railroad Association, Section II, Signal Division.)

Railway Storekeepers' Association.—(See American Railroad Association, Section VI, Purchases and Stores.)

Railway Supply Manufacturers' Association.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Next convention, June 9-16, Atlantic City, N. J.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

Roadmasters' and Maintenance of Way Association.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

Signal Appliance Association.—F. W. Edmunds, West Nyack, Rockland County, New York.

Society of Railway Financial Officers.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

Southern and Southwestern Railway Club.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

Southern Association of Car Service Officers.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

Supply Association of American Railway Tool Foremen's Association.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. R. R., Cleveland, O.

Western Association of Short Line Railroads.—Clarence M. Oddie, Mills Bldg., San Francisco.

Western Railway Club.—J. M. Byrne, 916 W. 78th St., Chicago. Regular meetings, 3d Monday in month, except June, July and August.

REVENUES AND EXPENSES OF RAILWAYS

ELEVEN MONTHS OF CALENDAR YEAR, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (Inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Grand Trunk Lines in New England	172	$2,230,698	$428,462	$3,136,977	$1,105,460	$504,032	$31,409	$1,858,928	$132,633	$3,996,691	127.41	—$859,715	$141,500	—$1,001,215	—$256,117
Great Northern	8,222	71,772,040	18,043,401	98,444,270	16,827,088	18,200,108	622,927	40,328,518	1,689,702	78,918,730	80.17	19,525,539	5,956,275	13,561,419	2,478,256
Green Bay & Western	252	876,962	183,714	1,130,519	234,947	280,390	11,944	465,244	20,903	1,013,373	89.63	117,146	48,352	68,794	—10,432
Gulf & Ship Island	307	1,577,083	500,705	2,247,071	594,085	547,753	45,175	940,072	100,808	2,232,257	99.34	14,814	131,071	—117,138	—536,739
Gulf, Colorado & Santa Fe	1,935	13,550,166	5,065,274	19,684,498	4,338,646	3,394,174	184,867	8,077,987	534,740	16,473,673	83.68	3,210,826	874,829	2,329,568	—1,270,565
Gulf, Mobile & Northern	435	1,931,366	506,360	2,569,343	559,414	617,707	64,011	1,176,386	112,806	2,518,189	98.01	51,153	124,378	—73,887	—237,462
Hocking Valley	350	8,996,943	1,116,541	10,797,807	1,225,766	3,533,974	65,607	3,715,018	227,985	8,765,894	81.18	2,031,913	519,118	1,508,630	—724,968
Houston & Texas Central	847	5,776,218	2,379,534	8,660,113	1,577,747	1,614,944	72,887	3,496,515	218,128	6,979,155	80.58	1,680,958	379,306	1,298,062	—662,076
Houston, East & West Texas	190	1,559,598	505,593	2,165,322	384,601	282,042	10,794	997,451	46,087	1,720,975	79.47	444,347	69,235	373,744	—57,578
Illinois Central	4,792	69,083,584	22,093,390	98,134,460	17,821,013	27,175,827	853,715	40,578,359	2,448,888	89,300,368	90.99	8,834,093	4,658,181	4,147,542	—8,521,898
Indiana Harbor Belt	116	.....	.....	5,997,296	1,063,916	1,155,038	19,329	3,997,706	188,075	6,424,065	107.11	—426,769	110,910	—537,688	256,990
International & Great Northern	1,159	9,260,839	3,094,837	13,193,565	3,009,490	3,516,205	146,027	6,569,803	461,343	13,779,719	104.44	—586,154	303,381	—890,752	—2,417,079
Kanawha & Michigan	176	3,216,343	610,672	3,957,192	604,978	1,469,439	27,425	1,454,497	143,464	3,699,817	93.49	257,375	202,799	54,572	—1,323,275
Kansas City, Mexico & Orient	272	1,107,693	195,608	1,362,481	484,386	480,251	20,856	735,573	86,296	1,807,363	132.65	—444,881	68,801	—513,864	—171,731
Kansas City, Mexico & Orient of Texas	465	911,866	185,029	1,156,066	375,633	489,110	22,102	751,087	88,395	1,726,326	149.32	—570,260	54,906	—625,279	—323,616
Kansas City Southern	774	10,334,949	2,239,637	13,643,253	2,126,814	3,020,364	177,432	5,371,222	429,850	11,111,866	81.44	2,531,386	706,136	1,819,871	—1,180,933
Kansas City Terminal	26	.....	.....	1,268,580	219,979	276,039	.....	542,382	16,065	1,068,834	84.25	199,747	278,117	—78,447	—21,447
Lake Erie & Western	902	7,769,125	724,757	8,915,210	1,554,125	2,485,655	135,304	3,883,787	261,981	8,316,347	93.28	598,863	394,800	202,758	—460,269
Lake Superior & Ishpeming	34	884,060	2,533	997,160	208,822	188,273	2,266	213,638	27,816	640,815	64.26	356,344	38,697	317,647	—455,307
Lehigh & Hudson River	96	2,344,261	45,361	2,474,427	297,998	529,342	17,320	1,040,646	64,152	1,949,459	78.78	524,968	64,699	459,653	179,469
Lehigh & New England	231	3,415,564	18,396	3,613,943	538,636	756,799	29,219	1,239,540	106,315	2,668,919	73.85	945,025	90,811	854,214	—124,747
Lehigh Valley	1,435	47,687,648	6,290,933	59,085,659	9,093,028	16,383,750	436,815	26,561,128	1,162,904	53,840,038	91.12	5,245,622	1,754,600	3,489,022	—2,621,427
Long Island	398	5,745,542	14,678,551	22,649,915	2,900,072	3,950,887	143,612	11,054,580	536,060	18,745,403	82.76	3,904,512	1,016,261	2,883,459	—1,824,099
Los Angeles & Salt Lake	1,168	10,844,088	3,921,580	15,704,547	2,163,478	3,164,018	199,607	5,294,636	332,225	11,579,854	73.73	4,124,693	739,859	3,382,702	604,617
Louisiana & Arkansas	302	1,425,527	442,218	1,938,182	584,860	446,649	35,759	835,308	69,741	1,971,828	101.73	—33,646	139,399	—173,333	—274,312
Louisiana Ry. & Nav. Co	349	2,655,708	406,333	3,220,197	897,291	614,856	42,647	1,399,960	86,985	3,041,740	94.45	178,457	166,000	12,255	—317,370
Louisiana Western	207	2,380,828	1,213,700	3,766,801	526,917	695,689	45,430	1,033,659	117,499	2,442,311	64.83	1,324,490	99,895	1,224,275	—472,808
Louisville & Nashville	5,013	69,985,434	22,693,522	97,869,337	15,340,049	25,667,662	1,309,483	40,210,321	2,088,149	85,016,137	86.86	12,853,200	2,826,413	10,018,603	—6,951,546
Louisville, Henderson & St. Louis	199	1,827,891	710,578	2,660,885	538,846	360,955	59,712	1,017,109	83,912	2,060,535	77.43	600,350	44,000	555,536	—186,209
Midland Valley	388	2,550,126	919,603	3,603,480	819,232	671,337	40,277	1,364,068	151,587	3,046,500	84.54	556,981	75,633	479,909	—281,061
Maryland, Delaware & Virginia	82	780,128	440,458	1,251,820	116,060	320,220	9,037	807,979	23,531	1,276,829	101.99	—25,008	19,721	—44,750	3,916
Michigan Central	1,861	47,240,125	18,170,617	71,738,232	8,932,807	14,063,983	715,916	26,561,459	1,234,272	52,327,711	72.94	19,410,521	2,395,000	17,010,223	3,477,193
Maine Central	1,216	10,235,523	4,543,267	15,941,865	2,892,710	3,764,907	134,882	8,783,252	394,486	16,010,288	100.42	—68,423	841,968	—910,865	—858,707
Mineral Range	101	670,491	4,142	704,523	136,309	228,677	4,395	375,154	10,761	755,296	107.20	—50,773	39,000	—89,773	—94,441
Minneapolis & St. Louis	1,646	9,190,526	2,506,913	12,283,146	2,156,408	3,020,734	118,779	5,940,017	326,894	11,554,533	94.06	728,613	553,615	170,487	106,228
Minneapolis, St. Paul & Sault Ste. Marie	4,243	28,916,094	7,591,996	39,009,994	5,803,808	7,865,495	271,319	16,316,388	844,832	31,292,650	80.21	7,717,343	2,262,558	5,452,565	2,486,446
Minneapolis & International	194	627,329	286,998	971,424	231,736	185,940	5,501	506,759	37,584	967,521	99.59	3,903	51,681	—47,795	—33,882
Mississippi Central	164	581,973	306,862	934,035	272,228	344,322	13,846	386,955	65,143	1,082,493	115.89	—148,458	34,475	—183,238	—439,257
Missouri & North Arkansas	365	888,734	462,164	1,439,268	655,377	422,607	25,028	705,634	100,758	1,908,342	132.59	—469,074	69,593	—539,976	—539,914
Missouri, Kansas & Texas	1,713	22,154,715	7,354,966	31,260,718	5,545,698	8,900,248	315,797	10,814,635	869,086	26,575,524	85.01	4,685,194	1,025,640	3,655,698	—900,116
Missouri, Kansas & Texas of Texas	1,796	14,045,193	7,452,035	23,083,750	4,856,985	4,293,401	257,593	11,841,933	854,513	22,299,475	96.60	784,275	634,652	143,617	—321,144
Missouri, Oklahoma & Gulf	332	1,062,316	206,709	1,346,878	657,729	589,144	21,265	782,281	77,979	2,131,091	158.22	—784,213	93,538	—878,870	—541,267
Missouri Pacific	7,196	60,350,464	18,864,764	84,920,780	17,272,614	18,972,614	924,193	35,595,112	2,297,408	75,430,175	88.82	9,490,605	2,946,861	6,513,961	—5,837,659
Mobile & Ohio	996	11,301,971	2,015,350	14,118,261	2,513,033	4,564,852	267,444	6,694,097	462,796	14,511,573	102.78	—393,312	543,022	—937,827	—1,079,997
Monongahela	108	5,081,864	230,683	3,348,978	673,097	406,123	10,306	1,009,282	79,759	2,178,567	65.05	1,170,411	45,000	1,125,385	274,132
Monongahela Connecting	6	.....	.....	1,761,332	274,744	576,099	5,741	827,454	77,767	1,761,805	100.02	—473	22,102	—22,575	—301,134
Montour	56	1,085,557	15,272	1,157,396	316,558	664,698	13,629	302,648	72,692	1,369,446	118.32	—212,050	23,763	—235,819	—283,183
Morganis, Louisiana & Texas	400	4,770,495	1,900,180	7,085,703	1,160,279	1,481,161	88,549	2,834,207	218,188	5,804,193	81.91	1,281,510	334,309	945,398	—1,264,042
Nashville, Chattanooga & St. Louis	1,247	12,192,096	4,895,111	18,235,553	3,211,967	4,702,563	380,993	7,917,064	480,858	16,787,068	92.05	1,448,485	585,000	860,138	—2,611,777
Nevada Northern	168	1,246,754	109,840	1,422,155	248,700	254,768	10,267	405,816	48,661	969,614	68.17	452,541	197,343	255,197	—811,928
New Orleans Great Northern	284	1,516,712	492,914	2,098,825	418,093	471,976	27,044	910,367	98,134	1,930,058	91.95	168,767	109,913	55,875	—419,370
New Orleans & N. E.	195	3,822,876	1,359,280	5,897,546	1,079,476	1,330,995	89,147	2,689,733	157,612	5,402,458	91.60	495,088	298,667	195,231	—699,174
New Orleans, Texas & Mexico	191	1,345,273	405,621	1,843,018	455,253	434,365	33,678	574,643	67,935	1,590,660	86.31	252,358	110,000	142,101	—197,702
New York Central	6,075	172,116,438	78,167,960	283,859,373	35,435,720	61,358,734	2,475,555	116,528,501	6,982,248	227,098,519	80.00	56,760,854	10,632,994	46,110,802	906,043
New York, Chicago & St. Louis	574	18,984,199	1,729,037	21,349,919	2,660,403	4,009,369	281,734	8,939,806	582,658	16,516,694	77.36	4,833,225	545,000	4,287,224	399,142
New York, New Haven & Hartford	1,965	44,513,743	40,933,604	96,602,392	12,879,500	19,330,401	485,042	46,453,886	2,973,213	83,771,273	86.71	12,831,119	3,320,000	9,486,956	—2,277,319
New York, Ontario & Western	569	5,888,667	2,581,403	10,067,523	1,604,088	2,411,638	96,333	4,514,578	248,607	8,879,242	88.19	1,188,280	296,800	891,455	66,565
New York, Philadelphia & Norfolk	121	5,807,541	1,261,245	7,589,568	632,035	1,985,940	96,996	3,457,240	124,417	6,503,071	85.68	1,086,497	201,954	884,229	—75,156
New York, Susquehanna & Western	135	2,494,212	636,841	3,564,606	430,352	592,548	23,325	2,196,185	89,836	3,332,370	93.48	232,236	370,366	—138,873	—549,855
Newburgh & South Shore	7	.....	.....	1,152,149	198,126	302,710	.....	628,999	42,614	1,172,449	101.76	—20,300	76,752	—97,052	—296,100
Norfolk & Western	2,088	57,228,154	9,962,585	70,354,702	9,687,270	20,838,613	400,404	25,670,479	1,178,871	57,970,067	82.39	12,384,635	2,860,000	9,521,993	—6,700,418
Norfolk Southern	906	3,825,323	1,685,387	5,877,076	1,233,690	1,142,594	89,085	2,943,478	230,198	5,643,410	96.02	233,666	195,850	36,847	—296,456
Northern Pacific	6,588	67,188,161	18,758,280	92,656,752	15,221,997	15,996,169	694,134	34,630,194	2,049,244	69,560,192	75.07	23,096,560	6,970,598	16,107,205	—6,030,064

REVENUES AND EXPENSES OF RAILWAYS

ELEVEN MONTHS OF CALENDAR YEAR, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (Inc. misc.)	Maintenance of: Way and structures.	Equipment.	Operating expenses: Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Northwestern Pacific	529	$3,216,708	$2,219,333	$6,086,414	$1,168,110	$788,540	$55,788	$2,561,561	$143,345	$4,737,776	77.84	$1,348,638	$259,877	$1,087,327	—$405,686
Northern Alabama	112	900,425	148,586	1,079,558	237,869	63,755	15,046	628,402	19,605	964,518	89.34	115,041	38,500	76,533	—274,948
Oregon Short Line	2,347	26,452,017	6,482,150	35,099,593	5,169,133	5,659,806	182,348	10,239,665	1,016,152	22,915,978	65.28	12,183,615	1,911,733	10,269,495	355,786
Oregon-Washington R. R. & Navigation	2,072	18,016,882	6,206,058	26,200,642	4,618,057	4,033,010	322,411	10,362,810	1,040,144	20,645,304	78.79	5,555,338	1,251,585	4,299,958	—285,625
Panhandle & Santa Fe	772	4,448,668	1,173,390	5,885,540	1,009,304	1,921,081	43,937	2,593,176	162,513	5,717,447	97.14	168,093	200,640	—33,735	—431,050
Pennsylvania R. R., Western	1,754	70,400,863	19,225,264	97,634,793	14,157,227	26,868,957	826,807	41,258,431	2,094,969	85,944,825	88.02	11,689,968	3,644,796	8,039,755	2,518,781
Pennsylvania R. R., Eastern	5,371	221,078,328	94,712,103	345,812,671	51,340,115	101,082,994	2,857,999	152,818,563	8,133,021	322,590,866	93.28	23,221,806	9,895,298	13,299,414	—11,109,663
Peoria & Pekin Union	519	306,214	40,256	1,119,755	197,137	448,302	8,567	825,883	58,375	1,538,263	137.37	—418,509	104,500	—523,009	—269,984
Pere Marquette	2,232	24,269,167	5,570,740	32,370,466	3,293,254	6,354,145	312,950	13,162,101	799,588	24,029,969	74.23	8,340,497	610,662	7,727,502	3,409,347
Perkiomen	41	888,156	90,963	1,014,831	65,928	47,875	221	398,530	3,580	516,360	50.88	498,471	19,054	479,417	29,413
Philadelphia & Reading	1,127	53,054,583	9,956,003	66,767,564	7,123,552	17,477,856	415,435	32,346,718	1,495,861	59,055,959	88.45	7,711,605	1,575,509	6,135,573	—6,016,799
Philadelphia, Bethlehem & N. E.	71	.....	.....	759,449	92,279	133,981	3,932	508,188	11,866	750,245	98.78	9,203	13,863	—4,660	—223,275
Pittsburgh & Lake Erie	224	21,127,911	2,428,736	25,574,280	4,029,207	7,984,237	162,875	9,141,088	489,481	21,820,509	85.32	3,753,771	816,500	2,937,032	—6,402,359
Pittsburgh & West Virginia	63	1,064,204	108,518	1,310,668	552,894	492,108	13,990	595,984	63,780	1,805,236	137.73	—494,568	127,897	—622,602	—441,448
Pittsburgh & Shawmut	103	970,457	46,198	1,031,742	346,055	432,697	16,634	385,893	33,230	1,214,509	117.71	—182,767	2,267	—185,034	—225,782
Pittsburgh, Cincinnati, Chic. & St. Louis	2,383	57,001,196	20,153,229	85,100,764	12,060,590	27,345,052	994,342	37,961,176	1,960,647	81,122,341	95.32	3,978,423	2,896,870	1,077,960	—4,741,142
Pittsburgh, Shawmut & Northern	204	941,902	65,965	1,041,922	272,248	534,457	11,085	443,102	77,253	1,338,188	128.43	—296,266	20,354	—316,639	172,930
Port Reading	21	1,502,514	.....	2,314,469	213,948	156,150	182	1,080,436	12,127	1,462,842	63.20	851,627	117,459	734,168	120,862
Quincy, Omaha & Kansas City	255	667,931	285,005	1,021,674	388,670	194,240	2,335	525,939	15,456	1,123,790	109.99	—102,117	33,490	—135,696	108,173
Richmond, Fredericksburg & Potomac	81	3,400,607	3,076,627	7,108,047	566,269	986,255	47,981	2,386,445	150,132	4,242,599	59.68	2,865,448	156,039	2,709,322	—113,829
Rutland	415	2,375,754	1,282,655	4,423,785	745,554	1,067,694	68,448	2,055,399	126,289	4,073,858	92.08	349,927	211,800	137,746	118,372
St. Joseph & Grand Island	250	2,090,455	466,261	2,699,266	571,340	441,380	22,079	1,429,724	135,146	2,605,356	96.52	93,911	112,125	—18,313	—39,296
St. Louis, Brownsville & Mexico	548	3,230,964	1,480,891	4,999,339	999,634	835,066	67,910	1,441,779	174,395	3,518,785	70.38	1,480,553	110,000	1,369,331	176,527
St. Louis Merchants Bridge Terminal	9	.....	6,960	2,853,613	595,958	437,113	8,238	2,097,053	67,119	3,205,480	112.33	—351,868	89,897	—441,774	—527,916
St. Louis-San Francisco	4,761	47,183,852	20,481,300	71,361,399	11,248,183	14,031,391	595,745	26,948,753	1,926,221	54,600,841	76.51	16,760,558	2,462,708	14,274,286	3,213,532
St. Louis Transfer	6	.....	.....	1,024,556	131,182	116,664	2,041	484,115	23,912	757,914	73.97	266,643	1,215	265,427	209,109
St. Louis, San Francisco & Texas	134	1,109,554	202,920	1,406,478	250,693	229,836	18,567	747,013	63,859	1,309,968	93.13	96,510	17,155	79,143	—90,348
St. Louis Southwestern	939	9,736,014	2,000,978	12,263,214	1,987,745	2,680,135	184,726	3,705,440	413,636	9,033,453	73.66	3,229,761	456,109	2,771,407	—555,498
St. Louis Southwestern of Texas	814	4,316,925	1,426,721	6,140,556	1,636,273	2,093,320	94,676	3,152,585	254,498	7,218,765	117.55	—1,078,210	231,000	—1,310,610	—901,608
San Antonio & Aransas Pass	736	2,655,824	1,166,854	4,068,285	1,257,889	1,233,724	65,833	2,159,880	184,808	4,887,805	120.14	—819,520	165,000	—986,125	—771,550
Southern Ry.	6,982	73,646,849	33,518,742	116,929,031	22,012,581	25,145,881	1,383,949	50,829,027	2,968,405	103,212,179	88.20	13,716,852	3,628,573	10,020,358	—18,823,597
South Buffalo	11	352,003	.....	882,267	62,587	171,094	4,099	520,575	18,731	777,086	88.07	105,181	40,333	64,848	—227,881
Southern Ry. in Mississippi	278	999,684	540,884	1,651,182	424,134	220,279	27,198	863,058	46,078	1,580,743	95.73	70,439	97,500	—27,563	—46,817
Seaboard Air Line	3,563	22,835,239	11,451,928	37,495,978	5,900,975	8,072,408	686,258	17,719,346	1,162,973	33,833,446	90.23	3,662,533	1,485,000	2,172,075	—1,983,928
Southern Pacific	7,049	103,837,652	39,602,429	155,044,818	22,764,238	29,949,235	1,320,046	57,580,790	2,679,775	117,170,590	75.56	37,874,228	6,427,277	31,419,733	—671,728
Southern Pacific Steamship Lines	.....	8,178,952	526,524	9,159,867	110,770	2,370,871	2,139,229	7,090,085	276,818	9,987,772	109.03	—827,905	113,570	—941,559	—1,410,097
Spokane International	156	858,850	185,880	1,072,680	215,522	92,941	19,975	356,580	49,075	731,577	68.20	341,103	51,239	289,865	18,486
Spokane, Portland & Seattle	538	4,592,124	1,686,306	6,742,562	1,097,952	911,379	68,147	2,265,829	220,193	4,589,574	68.07	2,152,988	667,000	1,485,488	—926,456
Staten Island Rapid Transit	23	946,958	869,472	2,071,810	280,745	299,873	11,510	1,090,711	100,698	1,783,538	86.08	288,272	161,000	126,607	32,936
Tennessee Central	293	1,636,092	528,143	2,289,776	799,535	577,021	33,442	1,134,505	70,787	2,614,509	114.18	—324,732	58,350	—383,300	—650,390
Terminal R. R. Assn. of St. Louis	36	.....	36,734	3,589,972	831,892	577,131	8,864	1,662,172	57,075	3,174,534	88.42	415,438	323,066	92,083	—209,918
Texarkana & Ft. Smith	87	1,099,970	195,811	1,413,977	204,472	239,617	11,796	592,601	34,979	1,077,524	76.20	336,453	72,508	263,844	—16,483
Texas & New Orleans	469	4,838,130	1,857,918	7,334,275	1,337,672	2,058,726	50,275	2,557,338	155,590	6,476,508	88.30	857,770	234,912	618,456	—452,674
Texas & Pacific	1,946	21,375,601	9,496,906	32,598,691	4,590,387	6,976,458	274,766	14,288,107	795,891	27,192,468	83.41	5,406,223	1,083,578	4,315,296	418,135
Toledo & Ohio Central	435	7,260,257	742,465	8,462,234	1,432,783	2,557,610	72,272	3,583,412	184,354	7,859,882	92.88	602,352	350,964	251,317	—321,130
Toledo, Peoria & Western	247	887,346	543,664	1,512,968	310,104	441,496	22,823	777,906	59,161	1,608,914	106.34	—95,947	93,500	—189,447	a —61,196
Toledo, St. Louis & Western	454	6,634,754	427,346	7,423,814	1,366,517	1,625,612	65,968	3,088,813	128,684	6,272,980	84.49	1,150,834	289,000	861,706	—554,504
Trinity & Brazos Valley	368	971,008	237,681	1,266,668	473,941	488,213	20,015	666,271	80,560	1,729,000	136.48	—462,703	72,155	—534,963	—80,878
Ulster & Delaware	128	613,790	302,445	1,125,572	181,681	208,750	14,783	722,053	53,962	1,186,440	105.41	—60,867	49,800	—110,745	—79,457
Union R. R.	40	.....	.....	7,116,479	931,987	2,147,392	2,807	3,831,058	81,360	6,993,548	98.27	122,931	81,981	40,949	—480,163
Union Pacific	3,614	74,701,037	20,268,452	102,216,189	13,874,570	18,705,072	504,238	28,822,076	2,598,358	66,790,572	65.34	35,425,617	2,859,851	32,556,724	—483,312
Utah	98	1,132,061	6,020	1,140,678	153,591	237,630	2,229	228,651	23,756	645,857	56.62	494,821	45,532	449,288	—166,009
Vicksburg, Shreveport & Pacific	171	1,923,530	881,592	3,028,926	510,278	655,441	45,141	1,094,097	108,192	2,441,594	80.60	587,332	142,554	444,288	144,770
Virginian	522	9,328,373	653,437	10,992,836	1,699,755	2,392,921	52,079	3,941,653	184,057	8,265,756	75.19	2,727,079	363,200	2,363,648	26,655
Wabash Ry.	2,503	31,940,870	9,249,388	44,224,914	7,386,459	8,457,700	599,192	22,134,277	1,264,041	40,094,257	90.65	4,130,657	1,200,959	2,924,877	—3,147,017
Washington Southern	35	1,365,707	2,137,615	4,211,151	383,006	452,373	26,488	1,303,794	64,640	2,276,626	54.06	1,934,525	81,597	1,852,861	211,184
West Jersey & Seashore	361	3,264,500	7,139,300	11,166,879	2,108,589	2,231,795	89,720	5,436,376	234,952	10,159,810	90.98	1,007,067	528,448	477,912	120,350
Western Maryland	699	11,310,181	995,396	13,498,764	2,441,711	4,506,276	195,004	5,233,386	504,148	13,014,356	96.41	484,408	475,200	9,208	895,263
Western Pacific	1,041	10,148,670	1,753,851	12,366,278	2,386,056	2,051,930	138,186	3,690,922	278,140	8,754,846	70.79	3,611,433	532,390	3,078,027	355,877
Western Ry. of Alabama	133	1,276,946	874,295	2,322,753	288,636	476,653	33,814	852,027	70,459	1,760,918	75.81	561,835	73,500	488,329	—87,482
Wheeling & Lake Erie	511	9,873,247	611,206	11,643,196	2,193,074	2,748,380	69,389	4,663,630	278,129	9,983,548	85.75	1,659,648	635,425	1,023,135	—751,052
Wichita Falls & N. W.	328	1,557,197	456,336	2,106,374	606,480	296,054	14,833	1,136,270	73,854	2,127,491	101.00	—21,117	106,446	—128,250	229,450
Yazoo & Mississippi Valley	1,381	16,746,104	4,906,851	22,636,222	3,630,117	4,946,034	173,590	8,121,936	526,263	17,229,678	76.10	5,406,543	699,798	4,703,968	202,023

Traffic News

George P. Gwin of the Ford Motor Company, Pittsburgh, Pa., has been appointed assistant traffic manager of the Torbensen Axle Company, Cleveland, Ohio.

An association of commercial travelers has petitioned the Congressional conferees on the railroad bill to provide for the sale of 2,000-mile books at 20 per cent less than ordinary passenger fares.

R. D. Sangster, transportation commissioner for the Kansas City (Mo.) Chamber of Commerce, has been appointed industrial commissioner for the St. Louis (Mo.) Chamber of Commerce, effective March 1.

The $10-a-day penalty charge for detention of refrigerator cars after five days beyond free time will be discontinued on February 10, the Division of Traffic of the Railroad Administration having filed a tariff amendment to that effect.

The Secretary of War has approved the application of the director general of railroads for the use of 900 linear feet of of wharfage and 50,000 square feet of storage space at the army supply base, New Orleans, La., for the barge line operated by the Mississippi-Warrior River Section, Division of Inland Waterways, of Railroad Administration.

The Silk Association of America and the Merchants' Association of New York City have complained to the Railroad Administration about a decision, recently announced, to refuse to carry raw silks as ordinary freight. If this order is due to the fact that large quantities of silk have been stolen, the Administration is asked to consider that the same is true of other valuable commodities; and it is observed that if the Administration decides that it is unable to cope with thefts in transportation it will lay open to severe criticism.

The Railway Association of Canada, at the request of a member railway, has modified Clause 3 of Circular 98, of January 31, 1919, governing the return of freight cars to United States roads. By the rule in question, which was adopted to obviate delays in time of war traffic pressure, empty cars were returned to the States via the nearest junction point, but now it is decided that when a load cannot be obtained a car shall not be offered to an intervening carrier which has not previously handled the car. The road holding the car must return it to the United States through its nearest junction with a United States railroad, or else through a junction on the home route.

The National Industrial Traffic League announces favorable results from its conferences with the Division of Public Service and the Division of Traffic of the United States Railroad Administration, concerning freight claims. Its committees report that there is every assurance that all meritorious claims will be paid. It is expected that claims which have accrued under federal control will be received by the individual lines and then referred to a special committee, at Washington, representing the Railroad Administration, which will work out some plan for payment, probably out of an appropriation to be made by Congress. The Railroad Administration fully appreciates the situation.

The Southern Railway announces the restoration of the through passenger trains between Cincinnati and Atlanta which were discontinued last August because of the necessity of rebuilding the bridge over Tennessee river just north of Chattanooga. The new bridge, designed to carry the heaviest locomotives and cars, has been finished, and the new timetables went into effect on January 20. The principal through trains are the Royal Palm between Chicago and Miami, Fla., the Ohio special between Cincinnati and Jacksonville, and the Cincinnati-New Orleans Limited, between Cincinnati and New Orleans by way of Birmingham and Meridian. The new bridge is 1,800 ft. long, 14 deck girder spans and one truss span, 310 ft. long. The truss span is a lift draw. This and four of the deck spans are made wide enough for two tracks as are all of the piers, but the railroad at present is single track.

According to a report on overseas traffic for the week ended January 21, 1920, made to Director General Hines, there were 5,157 cars of commercial export received at North Atlantic ports, while 5,436 cars were delivered. The receipts at these ports increased 3,741 cars, or 264 per cent compared with the same week in 1919. At South Atlantic and Gulf ports, as of January 18, 1920, there were 11,796 cars of export freight on hand, as against 12,711 on January 11, decrease of 915 cars. On January 21, 1920, there were 9,017,363 bushels of grain stored in elevators at North Atlantic ports. There were received during the week 3,259,820 bushels, while 2,780,203 bushels were cleared. At Gulf ports on January 21, 1920, there were 6,301,058 bushels of grain stored in elevators, representing 62 per cent of the elevator capacity.

Thefts of freight recently reported from Darlington, S. C., were carried out by collusion between checkers in a freight house and employees of wholesale merchants. The freight clerks, after checking certain goods short, sold the property to retail merchants through the medium of truck drivers of wholesale houses. Five white men and three negro truck drivers have been arrested. Railroad and municipal police at Chicago recently arrested four men and two women charged with the theft of $150,000 worth of merchandise from railroads and express companies in Chicago during the past year. At Detroit, Mich., the police department of the Michigan Central reports the arrest of four men charged with crime in connection with thefts of thousands of dollars worth of merchandise from freight cars in the Detroit yards within the last six months. Wearing apparel, tobacco and other property valued at $14,000 has been recovered.

Movement of Bituminous Coal

Director General Hines has authorized a statement denying reports recently issued to the effect that the Railroad Administration has discontinued the control over the movement of bituminous coal. "The responsibility for exercising this control where necessary was placed upon the Railroad Administration during the coal strike and the responsibility still exists," he said. "As far as practicable, such coal is being allowed to run from the mines to consignees as billed, but it has been found necessary to continue to restrict the movement of coal for export and in some cases to make diversion of coal from designated consignees. These restrictions and diversions continue to be necessary because of the loss of production of coal during the strike, the very serious dislocation of equipment resulting from the sending of coal produced in the East during the strike to the West, the very unfavorable weather in a large proportion of the coal producing territory, and the depletion of railroad forces by the influenza. All these influences have combined to make it exceedingly difficult for certain public utilities, essential industries and some railroads to secure coal absolutely necessary for current operation and to meet these emergency cases diversions are being made in performance of the duty placed upon the Railroad Administration. With the continuance of the present bad weather indications are that such control will have to be continued for the present at least. The situation has been complicated by the depletion of reserve stocks of public utilities and industries which under normal conditions would be available for use at the present time of the year thus making necessary the delivery of new coal to such organizations. As a result, recently coal has been diverted to an extent from the Pocahontas region to public utilities, industries and railroads in the Allegheny and Eastern region to prevent their shutting down. In spite of the severe weather and the dislocation of coal cars due to the coal strike, the efforts to move coal have resulted in considerably more bituminous coal being transported in recent weeks than in the same period in the last three years. For instance, the amount of bituminous coal, including coal made into coke, moved during the four weeks ended January 31 in 1920 and in the corresponding period of the three preceding years follows: 1920, 44,004,000 tons; 1919, 37,796,000 tons; 1918, 33,422,000 tons; 1917, 41,092,000 tons."

Mail Pay for Short Lines

S. S. Ashbaugh, counsel for the American Short Line Railroad Association, has filed a petition with the Interstate Commerce Commission for additional findings and supplemental orders in the railway mail pay case to provide that the 20 per cent additional rate allowed short lines shall apply to mail routes not less than 50 miles in length and that the 50 per cent additional shall apply to routes 50 miles or less in length; that the minimum pay of $50 per mile per annum shall apply to space routes after November 1, 1916, and to weight routes from July 1, 1916, to March 1, 1920; that an order be made fixing reasonable mail pay on all weight routes operated by the short lines, as such between July 1, 1916, and March 1, 1920, and on their weight routes which were made space routes by order of the postmaster general; that additional findings be made as to side and terminal service and that an order be issued fixing the weight, size, postage and conditions for the transportation of parcel post packages.

Anthracite Shipments for December

The shipments of anthracite for December, 1919, as reported to the Anthracite Bureau of Information at Philadelphia, made the largest record for that month since 1915: a total of 6,138,460 gross tons, against 5,971,671 tons in November, an increase of 166,789 tons, and a gain of 400,000 tons, as compared with December, 1918. As compared with 1916, the latest normal year, the increase was about 550,000 tons. Shipments by initial carriers were as follows:

	December 1919	December 1916	Coal Year 1919-1920	Coal Year 1916-1917
P. & R. R.	1,442,571	1,040,643	10,741,052	9,424,306
L. V.	1,057,627	964,007	9,689,287	9,038,756
C. of N. J.	506,840	527,080	4,798,731	4,781,181
D. L. & W.	907,119	953,565	8,109,167	7,875,133
D. & H.	674,172	591,874	6,068,559	5,368,560
Penna.	414,155	449,052	3,747,376	4,114,390
Erie	679,827	634,190	5,801,163	5,609,681
N. Y. O. & W.	171,465	147,007	1,535,828	1,431,156
L. & N. E.	284,684	275,329	2,619,218	2,025,214
	6,138,460	5,582,747	53,110,381	49,668,357

Regular Conferences with Shippers

Seth Mann, attorney and traffic manager of the San Francisco Chamber of Commerce, lately a member of the Western Traffic Committee at Chicago, and recently returned to San Francisco, appeals to the public to exercise patience during the period of rehabilitation of the railroads. He says:

"It will require more than one year to bring about any appreciable increase in railroad facilities, and at least five years, with the expenditure of great sums of money, to bring them up to the transportation demands of the country. In the meanwhile there should develop a new kind of railroad publicity and a new attitude of officers and employees toward the public. The public should be kept informed of the difficulties of reorganization and of the progress made and the plans for the future. Shippers' organizations should be consulted as to changes contemplated in rates and practices, to the end that the public may know that carriers are working to the end desired by the public, namely, an efficient transportation service.

"One of the most significant events of the federal demonstration that railroad officers and shippers' representatives can work effectively together. The plan of the freight traffic committee has been successfully carried out, the representation on these committees being equally divided between the carriers and the public. This system, which has been in operation for over a year and a half, has effectively and latterly with reasonable promptness dealt with the railroad rates throughout the United States. For 17 months ending with November last, 21,262 applications for freight rate authorities were acted upon, and 18,570 freight rate authorities were issued. The public representatives on the committees were almost invariably traffic experts connected with shippers' organizations. These shippers' organizations will form the natural conduit through which information will flow to the public, and they will render their most cordial service in helping to solve traffic problems. This situation should bring about a new era in transportation, in which the public shall be made to feel that it is no longer excluded as hostile, but is taken into confidence as the friend and advocate of efficient transportation service."

Commission and Court News

Interstate Commerce Commission

The Commission has ordered a reopening of the case involving the Southern Pacific's ownership of Atlantic steamship lines for testimony on the propriety of granting the permission asked by the company to operate an irregular steamship service between Atlantic ports and Gulf ports.

State Commissions

The Public Utilities Commission of Illinois has suspended for 120 days from March 1 certain intrastate rates filed by a number of roads: the Atchison, Topeka & Santa Fe, the Baltimore & Ohio Chicago Terminal, the Chicago Junction, the Chicago, Rock Island & Pacific, the Chicago, Terre Haute & South Eastern, the Michigan Central, the Terminal Railroad Association of St. Louis, the Toledo, Peoria & Western, and several smaller roads. It is explained that the rates ordered by the federal government on June 24, 1918, have never been approved by the Illinois Commission and this suspension is to give time to consider whether or not approval will be given.

Court News

Assault by Station Agent—Railroad Not Liable

A station agent, also employed as express agent, attacked a person who called for a shipment, against whom he had a grudge arising out of prior dealings as agent, because the caller rebuked him for swearing. The Louisiana Supreme Court, in an action against the railroad and express companies for damages, holds that neither is liable, because the offense was not committed within the scope of the agent's authority; and judgment for the plaintiff was annulled. Godchaux v. Texas & Pacific (La.) 81 So. 706.

Crossing Accident—Contributory Negligence

Where the owner of an automobile riding in it while his son was driving, when approaching an obstructed crossing in bad condition, watched his son, who he was afraid could not handle the car properly, instead of looking for the approach of a train, though he knew it was about train time, so that the automobile was struck before it cleared the tracks, the Louisiana Supreme Court held both father and son barred from recovery by their active negligence, the doctrine of last clear chance having no application.—Leopold v. Texas & Pacific (La.) 81 So. 602.

Excessive Damages for Failure to Provide Berth Purchased

A woman who was ill and weak bought a ticket on a Pullman car for a berth convenient to one occupied by her physician and to another occupied by her nurse. She was subsequently told by the conductor that this berth had been sold, but that she would have another in the same car. Another conductor subsequently in charge of the car told her this berth also had been sold and that she would have to take a berth in another car. This threw her into a highly nervous state, rendering her extremely ill and prostrate, and she was permitted to remain in the car by other passengers voluntarily giving her a berth. In an action for damages the Mississippi Supreme Court held, by a divided court, that the Pullman Company was liable, but the court unanimously held that the damages awarded in the trial court, $2,000, were excessive, and ordered them reduced to $300.—Pullman Co. v. Anderson (Miss.) 81 So. 276.

Risks Assumed in Flagging Trains

The Kentucky Court of Appeals holds that where an experienced trackman who was acquainted with the track and who had been supplied with the customary lights to guide his steps, fell and was injured while hurrying to flag a train at night, in obedience to his foreman, his injuries were due to one of the ordinary risks of his employment. It is generally known that wooden cross-ties after a time become decayed on the sides, without being rendered less serviceable for their purpose and that the ties usually project above the surface of the ground. It is not practicable for a railroad company to maintain tracks of such smoothness and dryness as to remove all probability of a section hand striking his toe and falling.—L. & N. v. McIntosh (Ky.) 210 S. W. 181.

Reasonableness of Demand for a Flag Station

The Oklahoma Supreme Court holds that an order of the Corporation Commission, requiring the Kansas City Southern to stop two of its trains, upon being flagged, at a point called Baptist is unreasonable, unjust and void. The evidence showed that Baptist is not a town or village, but a point in a thickly settled farm district. A mail station and post office had been established there, but were discontinued several years previously. The point is about midway between Watt and Westville, Okla., between eight and nine miles apart, at both of which there are railroad facilities. The term "adequate and reasonable facilities" is not capable of exact definition; it calls for such facilities as may be fairly demanded.—Kansas City Southern v. State (Okla.) 178 Pac. 662.

Suits Against Railroads Under Federal Control

The Federal District Court for the Eastern District of Louisiana, New Orleans Division, holds that it was the purpose of Congress in adopting the act of March 21, 1918, to allow litigants to sue the railroad companies, just as they had theretofore been able to do, and in such courts as have jurisdiction under the general law. It is held competent for the director general to stipulate in what jurisdiction he might be sued, but his authority to make rules and regulations would not authorize the setting aside of the plain provisions of the statute as to the companies. No harm can come to the railroad corporations. It will be incumbent upon the director general to defend the suit, and to make payment, in the event of a recovery, out of his receipts. The question of an adjustment as between the government and the railroad is one which will come up and be settled when the roads are turned back to their owners, or other disposition of them made. In the meantime, should recovery be had, it is clear, under the terms of the act, that no execution can issue against the physical property of the road.—Johnson v. McAdoo, 257 Fed. 757.

Duty Towards Persons on Track After Discovery

In an action for damages for the death of a person killed, while walking along a spar track operated by the defendant, by a coal car which was being pushed by an engine down a slight grade with the steam off, at about five or six miles an hour, the testimony of the engineman showed that he could not see the track ahead and sent a switchman to sit on the front end of the car to keep a lookout. The switchman testified that he saw the deceased on the track 100 yards ahead, but it was shown that the track was frequently used all day by the company's employees and others, and that within two car lengths of the deceased, the latter turned aside as if to leave the track, and that, upon discovering that he was not going to leave the track, the switchman gave the stop signal. It was held by the Alabama Supreme Court that the switchman's duty, so far as subsequent negligence was concerned, dated, not from his discovery of the deceased upon the track, but from the moment he became aware that the deceased was ignorant of the approaching train; and, the evidence not showing such negligence, judgment for the plaintiff was reversed.—Saginaw Lime & Lumber Co. v. Hale (Ala.) 81 So. 15.

Foreign Railway News

American Locomotives for Finland

Consul Parker W. Buhrman reports from Helsingfors, under date of December 10, that "delivery has just been made to the Finnish Government of 15 American locomotives. The government is highly pleased with these engines and is in need of about 20 others. Any deal would involve the extension of credit on account of the present unfavorable exchange."

Nicaragua to Have New Railway

Despatches from Managua, Nicaragua, say that negotiations for the raising of a loan of $10,000,000 have been completed. The money is to be used to improve the highways of the principal departments of Nicaragua and to construct a railroad from west of Matagalpa to the Atlantic seaboard. One railroad building company, the advices state, has offered to construct the railroad in three years.

Electrification Work in Switzerland

Some rather critical remarks concerning the methods of British manufacturers and a strong appeal for their correction are contained in a communication to the Engineer (London) from its correspondent in Berne, who writes on "Electrification Work in Switzerland."

"Electrification work in Switzerland," the correspondent says, "is steadily advancing—indeed, it is being pushed forward so rapidly that, despite the difficulties of procuring the necessary material and labor, it is hoped that the Gothard line between, approximately, Ertfeld and Faido may be run by electricity by about next July. At the beginning of September a credit of 5,000,000f. was granted the Federal Railways solely for the purchase of electric machinery for the line. By the end of 1922 it is calculated that 364 kiloms. will be electrified, not including the Berne-Thun line, which is already worked by electricity, or the Brigue-Sion line, on the Simplon route, also already electrified. For all these stretches the Swiss Federal Railways will require 122 electric locomotives, and of that number not half has as yet been ordered. Electrification work on the Gothard has been delayed because of difficulty in installing the electric equipment. Moreover, it is very hard to get the required number of insulators. For the stretch between Erstfeld and Bellinzona alone, for instance, 47,000 are needed, and up to a few weeks ago only 27,000 were available, although 10,000 were expected from America. Of course, the Swiss Federal and other railways would have been very glad to get much of their electric plant from British firms; but the middleman, who before the war was usually a German, and who arranged the business between Swiss and British firms, disappeared, and apparently there was no one to take his place. And our people in England are either too indifferent or too slow to take advantage of this opportunity afforded them.

"To show the amount of business which British firms might do now, I may say that the electrification of the Swiss Federal Railways alone will require twenty years, and will cost about 125,000,000f. a year. Here, therefore, is a national undertaking which, although that of a small country, implies an expenditure of altogether 2,500,000,000f., and almost all the plant required for it could be supplied by British firms, if they would but bestir themselves. The total of the network of the Swiss Federal Railways at the end of 1918 was 3,018 kiloms., and it is expected that the 1,128 kiloms. belonging to the first section of these railways—that is, about two-fifths of the whole, and the most important lines—will be electrified within less than ten years.

British Conspicuous by Their Absence

"Owing to the war and to five lean years, the debit balance of the Federal Railways amounted at the end of 1918 to 128,620,354f., and rumors are afloat that some American

syndicate is willing and anxious to supply the Federal Railways with all the necessary money, material and rolling stock for their electrification, which would take then, it is asserted, less than one year. But I cannot confirm the truth of the report. That United States engineering firms are doing something to capture the Swiss engineering market is an undoubted fact. Not only do they regularly send out well-got-up illustrated catalogues, with prices in francs, measures in meters, and weights in kilogrammes and zentner, but competent travelers are visiting Swiss firms in order to endeavor to do business with them. So far as British commercial men are concerned, however, they are conspicuous by their absence.

"Occasionally we happen to see a paragraph in the newspapers about the 'British Board of Trade,' but that apparently covers everything which the Swiss at present know about British commercial life. Electrification, moreover, is in the air at present in Switzerland. Not only is the utilization of Swiss water power being very seriously considered—utilization not for railways alone, but for domestic heating and other household purposes, owing to the extreme and prolonged coal scarcity, but some of the smaller lines, such as the Rhaetian Railway, in the Grisons, are considering or actually at work introducing electric traction. The stretches between Thusis and Filisur, and Filisur and Davos are at present being electrified so fast that it is hoped electric traction may be used very shortly.

"Of course, it must not be thought that Switzerland has no technical electrical industry of her own. Such an industry has existed for years past, and is not a growth of the war, although before the war the Swiss themselves did not take much account of it.

"A good many of the raw materials can be obtained from Great Britain only, and in that case, again, not only is there no one to put these articles on the Swiss market and facilitate Swiss technical electrical works procuring them, but if a Swiss electrical expert at present wishes to go to England to make purchases all manner of obstacles are placed in his way."

Before the war, a Swiss financier told the Engineer correspondent, he avoided doing business in Russia owing to the Russian system of passport regulations, but that he had recently been to England to find a system in force there almost worse.

"I am not sure, of course, how many million francs' worth of machinery trade have been lost to Great Britain owing to this episode, but I know that the orders which this financier intended to place there have gone to the United States. The machinery ordered, I may say, is not for Switzerland alone, but for other countries—even for Russia. At the present time ships are going laden with machinery to certain parts of Russia and returning laden with tobacco, wool, flax, and hides in exchange.

"And now we have the Swiss, who before the war bought their electro-technical articles and apparatus mainly from Germany, purchasing them mostly in their own country, and not in Germany. Since 1913 there has been a great increase of Swiss exports of, for instance, accumulators and accumulators plates; batteries and mounted electros; apparatus and instruments for measuring and reckoning electricity; telephonic and telegraphic machines; all sorts of instruments and apparatus for applied electricity, electric incandescent lamps, &c. Altogether 12,000 people are employed in the Swiss electro-technical industry at present, and, although it has enough raw material for the Swiss market, there is not enough for export purposes, and here, again, England might supply what is wanted.

"But it is not merely in the supply of raw materials for electrical works in Switzerland that British firms might find a market. They might find it in supplying machinery plants of all kinds. Thus, according to the Federal Railway estimates for 1920, there is an item of 121,913,440 f. under the heading of 'construction,' of which 51,332,640 f. are to be spent on electrification alone.

"Although Switzerland is a small country, nevertheless, the Swiss market is not to be despised. The geographical position of the country in the heart of Europe lends it more commercial significance than it would otherwise possess."

Equipment and Supplies

Locomotive Deliveries, Week Ended January 17

New locomotives were shipped during the week ended January 17, as follows:

Works	Road	Number	Type	Individual engine No.
American	T&P	2	Santa Fe	540-41
		2		
Lima	PM	1	USRA 8W.Sw	1410
	LE&W	2	USRA 8W.Sw	4250-51
		3		
Total		5		

Locomotive Deliveries, Week Ended January 10

New locomotives were shipped during the week ended January 10 as follows:

Works	Road	Number	Type	Individual engine No.
American	T of St L	9	6-W.Sw	170-8
		9		
Lima	PM	4	USRA 8-W.Sw	1406-9
		4		
Total		13		

Cars Built in Railroad Shops in December

The Railroad Administration has compiled the following statement of new cars constructed in railroad shops during the month ended December 31:

Freight—	Steel	Steel underframe	Steel center sills	Wood	Total
Stock	..	1	..	16	17
Hopper	..	..	..	2	2
Gondola	..	..	..	..	..
Flat	..	..	..	3	3
Coke rack	..	..	..	..	..
Work car	..	2	..	2	4
Miscellaneous freight car	..	..	..	31	31
Caboose	..	..	..	2	2
Box	..	..	23	55	78
Refrigerator	..	..	..	..	..
Total freight	..	3	23	111	137

W. H. Woodin Says Railways Need 849,500 Cars

William H. Woodin, president of the American Car & Foundry Company, has made an investigation as a result of which he estimates that the railroads of the United States will need 849,500 cars during the next three years. It is Mr. Woodin's opinion that while this need, if it is supplied, will run into a tremendous amount of money, the railroads will begin to renew their equipment, once the carriers have been returned to private ownership, and that the money will be forthcoming to finance the undertaking. Unless measures to increase the efficiency of the railroads are consummated he considers that there may be a serious interference with the normal ebb and flow of business. He draws attention to the fact that even now some factories have been forced to close because they cannot get materials, this being due to the car shortage.

To make up the present apparent shortage it is asserted 240,000 cars are needed. Replacement for retirement through the next three years will require 234,300 cars, and to take care of increased business it is estimated that 375,200 cars will be needed in the three-year period. The replacement figure is determined on the basis of an average retirement of 3½ per cent a year and the increased business figure on the basis of a gain of 5 per cent a year.

The following table shows the requirements for replacement and increased business during the three years:

	Replacement	To Handle Increased Business
1920	73,500	118,500
1921	78,000	125,000
1922	82,800	131,700

These requirements, Mr. Woodin believes, are not beyond the capacity of the car builders of the country, but it is believed that under the present adverse conditions regarding purchase of steel and other materials it would not be possible to turn out more than 600,000 cars, or some 200,000 a year.

Locomotives

THE PERE MARQUETTE is inquiring for 10 Pacific type locomotives.

THE FLORIDA EAST COAST is inquiring for 2, six-wheel switching locomotives.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE is inquiring for 5 locomotives.

THE INTERSTATE RAILROAD has ordered 1, 2-8-0 type locomotive from the Baldwin Locomotive Works.

THE GRAND TRUNK.—It is understood that this road will build 25, 0-6-0 switching locomotives at its own shops.

THE CUBA CANE SUGAR CORPORATION has ordered 9, 2-8-0 type locomotives from the Baldwin Locomotive Works.

THE SOROCABANA RAILWAY (Brazil) has ordered 4, 4-6-2 type locomotives from the American Locomotive Company.

THE CHICAGO & NORTH WESTERN is negotiating with the American Locomotive Company for repairs on 10 locomotives.

THE CHICAGO, BURLINGTON & QUINCY, reported in the *Railway Age* of January 23 as about to issue inquiries for 5 locomotives, has ordered 5, 2-8-2 type locomotives from the Baldwin Locomotive Works.

Freight Cars

THE CHESAPEAKE & OHIO is inquiring for from 25 to 50 caboose cars.

THE GRAND TRUNK is in the market for 3,000 automobile cars and 1,000 flat cars.

THE GLOBE SHIPBUILDING COMPANY, Superior, Wis., is inquiring for two flat cars.

THE GREAT WESTERN SHOWS, INC., St. Paul, Minn., is inquiring for one show car.

THE MINNEAPOLIS, ST. PAUL & SIOUX ST. MARIE is inquiring for 1,000, 40-ton flat cars.

THE DAVIDSON CHEMICAL COMPANY, Baltimore, Md., is inquiring for 20, 70-ton flat, and 20, 50-ton hopper cars.

THE VIRGINIAN, reported in the *Railway Age* of October 10 as inquiring for 1,000 steel coal cars, has renewed its inquiry for this equipment. The cars are to have a capacity of 120,000 lb.

THE PARAGON REFINING COMPANY, Toledo, Ohio, has ordered 100, 10,000-gal tank cars from the Haskell & Barker Car Company, Inc., Chicago. The acceptance of the order marks the entrance of the car company into a new field of car building.

THE UNION PACIFIC, reported in the *Railway Age* of January 23 as inquiring for 4,000 refrigerator cars, has ordered this equipment from the following builders: 900 cars from the Pullman Company, 900 from the American Car & Foundry Company, 300 from the Mount Vernon Car & Foundry Company, 700 from the Haskell & Barker Car Company, 200 from the Pacific Car & Foundry Company, and 1,000 in its own shops.

Passenger Cars

THE GRAND TRUNK is in the market for 50 baggage and express cars, 15 express refrigerator cars and 10 express horse cars.

THE PORTUGAL RAILROAD COMMISSION is inquiring for 91 passenger train cars of various types. Further information may be obtained from the American Machinery Syndicate, 37 West 39th street, New York.

Supply Trade News

The **Streator Car Company,** Streator, Ill., is building a new plant at Kankakee, Ill., which will be devoted to the building of steel cars.

C. E. Bransfield, foreman for the **Standard Car Construction Company,** Masury, Ohio, has been promoted to general superintendent.

The Union Tank Car Company has acquired 120 acres of land in Lima, Ohio, with the intention of erecting car shops in the future on the site.

The capital stock of the **Highland Iron & Steel Company,** Terre Haute, Ind., has been purchased by the **American Chain Company, Inc.,** New York City.

Evarts Shankin Barnum, of the G. M. Basford Company, New York, died at his home in Ridgewood, N. J., on February 3, of pneumonia, after an illness of eight days. Mr. Barnum was born in Louisville, Kentucky, in 1883 and received his education at Perdue University, from which he graduated in 1906. His entire business life was connected with railroad work. Immediately upon his graduation from the University, he entered the service of the Pennsylvania Lines West as apprentice, machinist, foreman, general foreman, roundhouse foreman and motive power inspector. Leaving the railroad in 1917 he joined the editorial staff of the Simmons-Boardman Publishing Company as an associate editor of the Railway Age and the Railway Mechanical Engineer, and later became associated with the G. M. Basford Company and was in charge of the copy department of that company.

E. S. Barnum

The Q and C Company, New York, has purchased the Everett Snow Melting Device, formerly manufactured by E. A. Everett, 123 Liberty St., New York.

Frederick W. Renshaw, president of the Globe Seamless Steel Tubes Company, Chicago, died on February 1 at his home in Evanston, Ill., at the age of 39 years.

B. G. Koether, district sales manager at Detroit, Mich., for the **Hyatt Roller Bearings Company,** New York, has been promoted to vice-president, with headquarters at Harrison, N. J.

The **Air Brake Safety Appliance Company** has been incorporated at Indianapolis, Ind., with a capital of $10,000 for the manufacture of a safety device to be used in connection with air brakes.

W. J. Stanton, for a period covering 18 years in the testing, engineering and sales departments of the General Electric Company, has taken a position with the **Ohio Brass Company,** Mansfield, Ohio.

F. H. Maple, superintendent of the Point St. Charles (Que.) plant of the Canadian Steel Foundries, Ltd., Montreal, Que., has been appointed foundry superintendent of the **American Steel Foundries'** plant at Alliance, Ohio.

H. B. Kirkland has been discharged from service as captain in the Construction Division of the United States Army assigned to the Chicago Ordnance Storage Depot, effective January 15, and has resumed his duties as president of the **Concrete Mixing & Placing Company,** Chicago.

William R. Mau, general superintendent of the **Rich Tool Company,** Chicago, has been appointed Chicago district manager of the Vanadium-Alloys Steel Company, Pittsburgs, Pa., with offices at 566 West Randolph street, Chicago. Mr. Mau succeeds T. W. Bigger, who has resigned to become general manager of C. M. Bigger & Company, Chicago.

Arthur E. Blackwood, manager of the New York office of the **Sullivan Machinery Company,** Chicago, has been promoted to vice-president in charge of finance and accounting, with headquarters at Chicago. **Louis R. Chadwick,** manager of the company's office at Spokane, Wash., has been transferred to the New York office, succeeding Mr. Blackwood. **Robert T. Banks,** sales engineer, with office at El Paso, Tex., has been promoted to manager of the Spokane office, succeeding Mr. Chadwick.

H. P. Wingert has resigned his position as general purchasing agent of the American Brake Shoe & Foundry Company to become the president of the **American Commodities Company** with offices at 30 Church street, New York. This company is a new organization recently formed to engage in the handling of fuel, foundry supplies and railway materials. Mr. Wingert is well known in railway circles. Beginning his business life as a messenger boy, he became a telegraph operator and later held positions of responsibility with the Pennsylvania Railroad, the New York Central and the Central Railroad of New Jersey. He resigned as assistant to the purchasing agent of the Central Railroad of New Jersey to become purchasing agent of the American Brake Shoe & Foundry Company at the time of its organization in 1902. In 1918 Mr. Wingert was made general purchasing agent of the same company, which position he held until taking up his new duties as president of the American Commodities Company.

H. P. Wingert

At the annual meeting of the board of directors of the **Railway Audit & Inspection Company, Inc.,** Philadelphia, Pa., held on January 23, 1920, **E. C. Hathaway** resigned as president, effective February 1, and was elected chairman of the board. The following officers were also elected: **H. H. Brown, president,** succeeding Mr. Hathaway; **T. C. Cary,** first vice-president and general manager; **C. E. Horney,** second vice-president and treasurer; **W. W. Groves,** third vice-president and sales manager; and **Walter H. Taylor,** secretary.

The **Orton & Steinbrenner Company,** Chicago, has established six new agencies and offices in this country and Canada. The agencies are: The Bonsack Machinery Company, 1601 Boatman Bank Building, St. Louis, Mo.; the Utah Machinery Company, Salt Lake City, Utah; the Southern States Machinery Company, Birmingham, Ala., and Wonham, Bates & Goode, 145 St. James street, Montreal, Que. New offices have been established at 1707 Franklin street, Denver, Colo., in charge of **P. Kranefeld,** and at 505 Lumsden building, Toronto, Ont., in charge of **T. J. McGovern.** The Minneapolis, Minn., office, in charge of **Frank J. Ross,** has been moved from the Corn Exchange building to the Metropolitan Life building.

S. F. Bowser & Co., Fort Wayne, Ind., has organized a subsidiary company to be known as the **S. F. Bowser & Co. of Texas,** at Dallas, for the sale and distribution of Bowser products in that state and parts of the adjoining states of Oklahoma, Arkansas and New Mexico. The company has at present an office at Dallas. The purpose of the new company is to more easily take care of the sales end of the business in that territory and to relieve the Fort Wayne office of the details connected with the work that will be carried on there. A warehouse similar to those of the company at Albany and San Francisco will be erected at Dallas. The officers of the new company are as follows: **S. F. Bowser,** president; **S. B. Bechtel,** vice-president; **H. J. Grosvenor,** secretary; **W. G. Zahrt,** treasurer, and **L. P. Murray,** manager. In addition, at the home plant, a large modern power plant is to be built, and a pit for about 75 car loads of coal. The Bowser company will also put up a building for the bank recently formed for the employees. It is to be built near the home plant and will be for the convenience of the community as well as the employees.

Harry S. Goldman has been appointed northwestern representative of the **A. G. A. Railway Light & Signal Company** and sales manager of **Gifford & Co.,** with headquarters at Chicago, succeeding **O. E. Berggren,** who has resigned to become connected with the American Magnesia Products Company, Chicago. Mr. Goldman was born at Indianapolis, Ind., on January 26, 1892, and was graduated from Rose Polytechnic Institute in 1914. He entered the signal department of the Illinois Central on October 1, 1916, and continued in the employ of the Illinois Central until September, 1917, when he entered the United States Army as a lieutenant of Engineers. He was discharged in May, 1919, and returned to the signal department of the Illinois Central as signal draftsman, continuing in this capacity until January 12, 1920, when he was appointed northwestern representative of the A. G. A. Railway Light & Signal Company and sales manager of Gifford & Co., with headquarters at Chicago.

H. S. Goldman

The Western Electric Company, Inc., 195 Broadway, New York, has reorganized its railroad representative staff under the direction of **George H. Porter,** manager of the railroad department, as follows: The Western district representatives are: **J. P. Casey,** St. Louis, Mo.; **W. J. Schott,** Kansas City, Mo.; **George Chestnut,** Houston, Tex.; **G. N. Hoffman,** Salt Lake City, Utah; **W. H. Laufenberg,** Denver, Colo.; **J. E. Coad,** Dallas, Tex. Those for the Coast district are: **I. A. Shorono,** Seattle, Wash.; **J. G. Loomer,** Los Angeles, Cal.; **H. A. Case,** San Francisco, Cal.; **Jack F. Ryan,** Portland, Ore.; **J. H. Kelley,** Tacoma, Wash.; **C. A. Martin,** Spokane, Wash. Central district: **Otto Danielson,** Chicago; **E. B. Elliott,** Chicago; **A. J. McCall,** Omaha, Neb.; **Tom Wheatley,** Cleveland, Ohio; **R. D. Eves,** Cincinnati, Ohio; **W. H. McGann,** Cincinnati, Ohio; **R. W. Tenbroeck,** Toledo, Ohio; **C. E. Roberts,** Indianapolis, Ind.; **W. H. Tompkins,** Milwaukee, Wis.; **E. B. Denison,** Minneapolis, Minn.; **G. E. Brown,** Duluth, Minn.; **A. W. Hillis,** Detroit, Mich.; **A. Schwenck,** Grand Rapids, Mich. Eastern district: **Oscar Lepper,** Pittsburgh, Pa.; **A. B. Thomson,** New York; **Charles R. Wharton,** Philadelphia, Pa.; **Fred Jaeger,** Philadelphia, Pa.; **James**

Stuard, Philadelphia, Pa. **E. R. Morgan**, Boston, Mass. Southern district **William Lancaster**, Richmond, Va.; **H. B. Stanton**, Savannah, Ga.; **W. R. Phillips**, Jacksonville, Fla.; **J. W. Smith**, Atlanta, Ga.; **A. L. Frankenberger** remains at St. Paul, Minn., and **Sidney Greenfield** at Baltimore, Md.

A. N. Lucas, superintendent of the locomotive shops of the Chicago, Milwaukee & St. Paul, at Milwaukee, Wis., has been appointed district manager of the **Oxweld Railroad Service Company**, with headquarters at Chicago. He assumed his new duties on February 1. Mr. Lucas entered railway service as a boilermaker apprentice. In 1881, he went with the Chicago & North Western at Escanaba, Mich., remaining there until January, 1883, when he returned to Green Bay, Wis., to enter the service of the Milwaukee Northern, now part of the Chicago, Milwaukee & St. Paul System. Here he was subsequently appointed boilermaker foreman and in January, 1901, was transferred to Dubuque, Iowa. He remained at Dubuque until April, 1904, then being transferred to the Milwaukee shops, where he was promoted to general foreman of boiler work for the entire system. In May, 1917, he was promoted to assistant superintendent of motive power and a year later was placed in charge of the locomotive department of the Milwaukee shops as shop superintendent. Mr. Lucas is a past president of the Master Boilermakers' Association, and is at the present time a member of the executive board of that organization.

A. N. Lucas

American Car & Foundry Has Substantial Interest in Canadian Company

William H. Woodin, president of American Car & Foundry Company, in announcing recently that his corporation had bought a substantial stock interest in the Canadian Car & Foundry Company, said that "this purchase has been made as a direct response to Sir Henry Drayton, Minister of Finance, in his recent address here to American industrialists and capitalists, to make investments in Canada. As far as our interests are concerned, the Canadian Car & Foundry Company will remain under the same management and there will be practically no change in its present organization."

At the last meeting of the board of directors Mr. Woodin was elected chairman of the executive committee of the Canadian concern, Jonathan Curry chairman of the board, and W. W. Butler, president of the company. Andrew Fletcher, president of the American Locomotive Co., and Lewis A. Clarke, president of the American Exchange National Bank, are also directors of the Canadian company.

"The plants of the Canadian Car & Foundry Company," said Mr. Woodin, "are in excellent condition, and it has a thoroughly efficient, loyal organization. It is in a position to do a great deal of work, and if the very great demand for railroad equipment that is necessary to carry on the railroads of Canada materialize this company should be very profitable for some time to come.

"There are very many lines of mutual co-operation between the two companies which will work out to the great benefit of both of them. This is especially true in the export business, and we feel that there is going to be a great deal of this in the immediate future. The Montreal works of the Canadian Car & Foundry Company are especially advantageously placed to serve the export trade."

Speaking of the outlook for equipment business, Mr. Woodin added: "Since my return from Europe, I have been more and more impressed with the fact that there is a very great number of equipment orders awaiting the equipment companies in this country. The railroads of every country in the world are greatly in need of locomotives, cars and rails, and as they must be kept in condition to carry on the commercial requirements of these countries, vast purchases must be made along these lines. I do not want to appear too optimistic, but I cannot help seeing the tremendous world requirements in these commodities."

Mr. Woodin also said that there is little probability of foreign equipment makers competing with American companies for domestic business; that American Car and Foundry Company is not doing much in the car building line, but has plenty of repair work on hand.

New Officers of the Murphy Varnish Company

As briefly noted in the Supply Trade News column of the *Railway Age* of January 23, 1920, **John J. Nicholson** has been elected president of the **Murphy Varnish Company**, Newark, N. J.; **Charles J. Roh** has been elected vice-president and a member of the board of directors; **Franklin Murphy, Jr.**, has retired from the presidency to become chairman of the executive committee and **Franklin Murphy, Sr.**, former governor of New Jersey, remains chairman of the board or directors.

Franklin Murphy, Jr.

Franklin Murphy, Jr., who becomes chairman of the executive committee of the company, is the son of Franklin Murphy, the founder of the company. He has been associated with the Murphy Varnish Company since immediately after his graduation from Princeton in 1895. He was successively a factory man, an office man and a salesman, and after a thorough training in all branches of the business, became an executive of the company. He was elected president and remained at the head of the company until January 1 of this year. He has been an influential factor in the rapid progress of the business in recent years, and retires from the presidency owing to ill health.

John J. Nicholson, the new president of the company, succeeding Franklin Murphy, Jr., was born in Cleveland, O., in 1861. He started in business with the company in 1888 as cashier and bookkeeper at the Chicago branch. He became private secretary to Governor Murphy in 1893, resident manager at Boston in 1896, Newark resident manager in 1905, general sales manager in 1906, vice-president with residence in Chicago in 1909, and first vice-president in 1915. Mr. Nicholson as resident manager in the different branches of the company and later as general sales manager has acquired a wide acquaintance among paint and varnish men and among the railroads and other important buyers of painting materials. Of late years

J. J. Nicholson

he has represented the company at most of the important conferences in the trade.

C. J. Roh, general sales manager and newly appointed second vice-president of the Murphy Varnish Company, is 40 years of age. He joined the Murphy forces as an office boy in 1900. He was successively assistant to the present manager at Newark, and manager at Boston and when the company consolidated its Boston and Newark branches was made manager at Newark, in 1910. He was appointed general sales manager in 1919. Mr. Roh was given charge of the jobber business of the company a year ago as a part of his duties, and has seen it grow under his direction from a small beginning to one of the most important branches of the business.

C. J. Roh

E. Fred Wood, formerly vice-president of the **International Nickel Company,** New York, died suddenly at New York on January 5. Mr. Wood was born in Milwaukee on August 28, 1858, and was educated in the public schools of his native city and later graduated from the University of Michigan. After leaving college he devoted himself to the study of metallurgy and in connection with his studies made extensive trips through the various mining camps of the west. He lived for a year at Leadville and other mining towns, where he pursued his studies and obtained his practical experience. He later entered the employ of the Carnegie Steel Company and rose to the position of assistant general superintendent of the Homestead plant, which position he held for a number of years, and, during the period of the big strike at the plant, when Mr. Frick was shot, Mr. Wood was in entire charge of the plant.

He was looked upon by Mr. Carnegie and his associates as one of the valuable men of the organization. He joined the International Nickel Company at the time of its organization, becoming first vice-president of the company and a member of the board of directors and of its executive committee, and he was an important factor in developing the mining, smelting and refining business of the company. When the United States entered the World War, Mr. Wood resigned his official connection with the International Nickel Company and became a member of the Committee on Production of the War Industries Board, serving continuously on this board during the entire period of the war, without compensation.

Annual Dinner of Chicago Railway Equipment Company

The twenty-seventh annual dinner of the Chicago Railway Equipment Company was held at the Union League Club in Chicago on the evening of February 3. The annual dinner of this company has grown from one which formerly was participated in merely by the directors and officers of the company to one which si now attended by numerous business men in addition to the officers of the company. The number of guests at the annual dinner was about 75. President E. B. Leigh acted as toastmaster and the following addresses were made: "The Importance of Educating the Public Regarding the Problems of Railway Maintenance," by Bruce V. Crandall; "Railroad Morale," by Samuel O. Dunn; "The Rights of Labor Combinations in Relation to the Public Interest," by James A. Emery; and "Excess Prophets," by Frank W. Noxon.

Mr. Emery, who is an eminent lawyer, discussed fully the question of the legal as well as the moral right of employees of essential industries, especially transportation, to engage in strikes the obvious purpose of which is to force the giving of concessoins to them by depriving the public of essential services and commodities. He made clear that from an economic standpoint strikes in essential industries are not merely attacks upon employers but present a direct issue between the public and the employees. He made clear that from a legal standpoint the public has power, not merely to place restrictions upon strikes in essential industries, but absolutely to prohibit them. He referred to the law creating an industrial court which has been adopted in Kansas, and suggested that a result of the creation of this court is likely to be a body of law which will serve to protect the interest and rights of the public from attacks made upon them by labor combinations.

Trade Publications

Brake Rod Jaw.—The Schaefer Equipment Company, Pittsburgh, Pa., describes and illustrates in a four-page pamphlet the Schaefer drop-forged brake rod jaw for attachment to brake rods. The method of applying the jaw is simple and is illustrated. It is claimed that the jaw may be removed and reattached without any danger from failure and that it may be applied and reapplied without loss. The pamphlet also shows the results of pulling tests on six different jaws fastened on 7/8-in. brake rods, which were made at the Pittsburgh Testing Laboratory.

Steel Pipe.—National Bulletin No. 24A, issued by the National Tube Company, Pittsburgh, Pa., shows graphically the remarkable growth of the steel pipe industry from 1888 to the present time. The chart indicates a decrease in the production of wrought iron pipe during this period. Quotations are given from the editorial columns of three current periodicals in the iron field to show the reasons for the popularity of steel pipe and its probable permanence. Included in the bulletin is a chart showing the relative production of wrought iron and steel skelp from 1888 to 1918.

Valves.—Catalogue and price list No. 10 of Nelson valves has been issued by the manufacturers, the Nelson Valve Company, Philadelphia, Pa. The book contains 156 pages, 5 in. by 7½ in., and is bound in cloth. It is divided into three parts, devoted respectively to bronze, iron and steel valves, with an introduction describing the general features of the design and the service rendered. The valves are made in gate, globe, check and non-return patterns for practically every class of service found in power plant work, etc. The book contains numerous illustrations and the data is conveniently arranged.

Insulation Products.—The Franklin Manufacturing Company, Franklin, Pa., has issued a 77-page catalogue, entitled Heat Insulations. This catalogue contains descriptions of the company's insulation products, including 85 per cent magnesia pipe covering, railroad special pipe covering, Franklin carlining, asbestos millboard, wool-felt covering, etc. Packing and shipping directions are included. The back part of the catalogue contains considerable engineering information in the form of tables and data to be used in the solution of heat insulation problems. Instructions for the use of these tables are given and several concrete examples are worked out.

Draft Gears.—Force and Its Applied Principles is the title of a 28-page booklet, bound in stiff paper cover, which has just been issued by the Union Draft Gear Company, Chicago. The booklet explains concisely and non-technically the elementary relationship of force and motion, defining the terms used. How these principles apply to the operation of the draft gear is then set forth and the booklet concludes with a discussion of draft gear capacity and the essentials of draft gear testing. A table for the conversion of miles per hour into height of fall in feet, for use in calculating the energy in moving cars for speeds from 1 to 10 miles per hour by half-mile intervals, is included.

Railway Officers

Railroad Administration

Central

Ralph Blaisdell has been appointed treasurer of the Railroad Administration, with headquarters at Washington, D. C., succeeding **Charles A. Lutz**, resigned.

George H. Parker, financial assistant to Walker D. Hines, director general, with headquarters at Washington, D. C., has been appointed controller for the Railroad Administration, with the same headquarters; **D. E. Brown**, assistant director of accounting for the Railroad Administration, with headquarters at Washington, has been appointed assistant controller.

Federal and General Managers

Charles O. Jenks, assistant general manager of the Great Northern, with office at Seattle, Wash., has been appointed assistant federal manager, with headquarters at St. Paul, Minn.

Operating

L. E. Strouse has been appointed trainmaster of the Dubuque and Cedar Rapids districts of the Minnesota division of the Illinois Central, with headquarters at Dubuque, Iowa, succeeding **H. G. Duckwitz**, who has been assigned to other duties.

J. H. O'Neill, general superintendent of the Western division of the Great Northern, with headquarters at Seattle, Wash., has been appointed assistant general manager of the lines west of Williston, N. D., with the same headquarters, succeeding **C. O. Jenks**, promoted; **F. S. Elliott** has been appointed to succeed Mr. O'Neill.

E. W. Scheer, general superintendent of the Northwest district of the Baltimore & Ohio, Western Lines, with headquarters at Cleveland, Ohio, has been transferred to the Maryland district, Eastern Lines, with headquarters at Baltimore, Md., succeeding **M. H. Cahill**, resigned; **E. A. Peck**, assistant to the general manager of the Eastern Lines, with headquarters at Pittsburgh, Pa., has been appointed to succeed Mr. Scheer.

M. C. Blanchard, acting superintendent of the Missouri division of the Atchinson, Topeka & Santa Fe, with headquarters at Marceline, Mo., has been appointed superintendent of the Illinois division, with headquarters at Chillicothe, Ill.; **C. L. Mason**, acting superintendent of the Kansas City division, with headquarters at Kansas City, Mo., has been transferred, succeeding Mr. Blanchard, and **H. M. Duncan** has been appointed to succeed Mr. Mason.

Engineering and Rolling Stock

F. K. Tutt, acting general master mechanic of the Missouri Pacific, with headquarters at St. Louis, Mo., has been appointed mechanical superintendent of the Missouri, Kansas & Texas.

Corporate

Executive, Financial, Legal and Accounting

F. M. Rivinus, general solicitor of the Norfolk & Western for the Railroad Administration, has been appointed corporate general solicitor with headquarters at Philadelphia, Pa.

W. T. Tyler, director of the Division of Operatoin of the Railroad Administration, has been elected vice-president in charge of operation of the Northern Pacific, but will remain with the Railroad Administration until March 1.

I. W. Booth, assistant secretary of the Norfolk & Western, has been appointed secretary and assistant treasurer; **L. W. Cox** has been appointed assistant secretary, both with headquarters at Philadelphia, Pa.

William G. Macdowell, vice-president of the Norfolk & Western has been appointed assistant to **N. D. Maher**, notice of whose election as president of that road was given in the *Railway Age* of January 30 (page 396).

Thomas M. Pierce, general counsel for the Terminal Railroad Association of St. Louis, Mo., has been promoted to acting president and a director of the association, succeeding **William S. McChesney, Jr.**, deceased.

J. W. Coxe, federal auditor of the Norfolk & Western, has been appointed controller of the Norfolk & Western Railroad Company; **W. H. Wilson**, auditor of disbursements for the Railroad Administration, has been appointed assistant controller, and **Joseph B. Lacy** has been appointed treasurer, each with headquarters at Roanoke, Va.

A. C. Needles, federal manager of the Norfolk & Western, and prior to federal control, general manager, has been elected vice-president in charge of operation, with headquarters at Roanoke, Va. **T. S. Davant**, traffic assistant of the Pocahontas region, has been elected vice-president in charge of traffic, with headquarters at Roanoke. **E. H. Alden**, secretary and treasurer, with headquarters at Philadelphia, Pa., has been elected vice-president in charge of finances, with the same headquarters; and **Charles S. Churchill** has been re-elected vice-president in charge of real estate, purcheses and valuation, with headquarters as before at Roanoke.

Operating

W. M. Neal has been appointed assistant general superintendent of the Quebec District of the Canadian Pacific, with headquarters at Montreal, Que.

Obituary

Edward P. Ripley, chairman of the board of directors and formerly president of the Atchison, Topeka & Santa Fe, died in Santa Barbara, Cal., February 4, as the result of complications following an operation performed several months ago. An account of Mr. Ripley's career will be published in next week's issue of the *Railway Age*.

William S. McChesney, president of the Terminal Railroad Association of St. Louis, died at his home in St. Louis, Mo., January 28. Mr. McChesney was born August 5, 1856, at Cynthiana, Ky. After being graduated from the Transylvania University at Lexington, Ky., he began railroad work at the age of twenty-three as passenger agent of the Ohio & Mississippi, now part of the Baltimore & Ohio. Later he became general traveling passenger agent of the Louisville, Cincinnati & Lexington and then general agent of the Louisville & Nashville at Lexington. While holding the position just named he was promoted to superintendent of the same road at St. Louis and some time afterwards appointed vice-president and general manager of the Terminal Railroad Association. In 1903 he was elected president.

Wm. S. McChesney, Jr.

EDITORIAL

Railway Age

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The salary of an Interstate Commerce Commissioner is now fixed at $10,000 a year. Under the proposed legislation it will be increased to $12,000. This increase is not sufficient. Under the proposed legislation the members of the commission will have more difficult duties to perform and more important responsibilities to bear than they have in the past. Furthermore, the cost of living of the members of the Commission has increased as much as that of other people. The ability of the men who will accept commissionerships always will be dependent largely upon the salaries paid. The commissioners ought to be paid, not $10,000 or $12,000 a year, but $25,000. Probably it would be impracticable to get Congress to provide for salaries of this amount, but surely it ought not to be impracticable to get Congress to provide for the payment of $15,000 a year, which is the amount now received by members of the New York Public Service Commissions. Under the proposed legislation there will be 11 commissioners. Therefore, it would make a difference of only $33,000 a year to the taxpayers of the United States whether each commissioner was paid $12,000 or $15,000. The public ought not to be stingy with men performing the very difficult duties and carrying the heavy responsibilities of members of the Interstate Commerce Commission. To pay them under existing conditions any salary less than $15,000 would be penurious and almost disgraceful.

The Salaries of Interstate Commissioners

A railroad executive of long experience recently stated that he had great faith in the final good judgment and common sense of the American railway workers. There has, however, been entirely too much of careless and extravagant expressions on the part of some of the labor leaders. Those leaders can profit greatly if they "will keep their ears close to the ground" and listen to the expressions of the more thoughtful of the men who make up their organizations. To say the least, nothing good has been accomplished by the radical expressions of the leaders and probably great harm has been done to both the railroads and the men themselves. The Brotherhood of Locomotive Engineers was for many years looked upon as a conservative organization; because of this its demands were very carefully listened to and quite generally acceded to. Unfortunately, however, for the brotherhood, it has departed from its earlier standards, or rather its leaders have. The following paragraph is quoted from the January number of the official journal of that organization: "It might seem odd for railroad employees to oppose rate raising, on the reasoning that what is good for the railroad should be good for the employees, but it works the other way; for the more successful the railroad, the more powerful an opponent has organized labor to contend against, as these corporations recognize no right lacking the punch to force its recognition." Fortunately there is little question but what the members of the labor organizations generally disapprove of this sort of thing and realize that it is actually hurting their cause. If our country is to pass successfully through the present crisis, a determined effort must be made by the railway and industrial managements and the labor organizations to try to get together on a good sound basis. There is great need for broad-minded and sane thinking on the part of all concerned. Moreover, not only the railroad employees, but the public generally, will suffer if immediate action is not taken to improve the financial condition of the railroad properties in order that investors may be encouraged to buy railroad securities.

Labor and Financial Strength of Railroads

There are well authenticated reports that the Pennsylvania Railroad Company is considering the adoption of a plan for the decentralization of the management and operation of its property. The general scheme which is understood to be under consideration is briefly outlined in a short article which is published in our News section. The main features would be the division of the property into several districts and the placing in charge of the immediate management of each district of an executive vice-president, who, subject to the general policies adopted by the directors, the president and the administrative vice-presidents at Philadelphia, would exercise practically all the authority that ordinarily is exercised by the president of a railroad. This would make it practicable for local conditions, affecting both employees and the public, to be dealt with more promptly, efficiently and satisfactorily than they ordinarily can be on a highly centralized system. It is understood that somewhat similar plans are being considered by the managements of other large systems. There was an excessive tendency toward centralization of management under private operation before government operation was adopted. This tendency has been carried to an unprecedented extreme under government control. In point of investment represented and traffic handled, the Pennsylvania is the largest system in the country. The new policies which its management apparently is about to initiate will be as interesting as they will be significant. The results gained will be closely studied and should be valuable to the company, the employees and the public.

Proposed Changes in Pennsylvania's Organization

A railroad officer of extensive experience on several large railroads in different sections of the country is responsible for the statement that "railroad officers live too much in the past." What he intended to convey was that railroad officers, by comparing the records of their own road, division, terminal or other unit with the records for that unit in previous years, are continually looking backward; in his opinion they are contented if they surpass the record of their own unit for the previous year, when they should rather be comparing their results with the very best records made by other roads. It must be admitted that conditions vary so greatly on the different roads, or even on different parts of the same road, that it is often impossible to draw useful conclusions from comparative statistical data; this was particularly true before the Railroad Administration adopted standard operating statistics. On the other hand, we are too prone to assume that because of this difficulty the operating officer is justified in dismissing the whole matter from his mind with a clear con-

Do You Live in the Past?

science. There is no excuse for not examining and studying continually the methods and practices followed by others, no matter how different the conditions may be, nor for failing to experiment with those that seem to promise results. Then, too, it is not impossible in most cases to locate another road or another point at which conditions are quite similar to your own and to make comparisons with such points. The railroads of this country are about to enter a new era, and while it is well enough to compare all kinds of records with those made in the past, the whole situation has so changed that every one has a pressing duty to keep constantly looking forward, carefully studying every step that is taken. No railroad officer is exempt from the duty of striving to adopt the very best methods that may be developed by the most progressive men, wherever they may be.

Freight Rates and the Cost of Living

In its issue for January 23 the *Railway Age* published an editorial criticising an argument which had been made by Interstate Commerce Commissioner Woolley against the return of the railways to private operation and the advance in freight rates which this would make necessary. Mr. Woolley based his argument on the premise that any advance in rates which was made would result in an increase in the cost of living *five times* as great as the amount of the advance in rates. The *Railway Age*, in the editorial referred to, contended that there was no foundation in fact for Mr. Woolley's proposition that an advance in rates would cause an increase in the cost of living *five times* as great; and we cited a large number of statistics compiled by the Railroad Administration and the Bureau of Statistics of the Department of Labor showing that the changes in freight rates and in the prices of commodities within the last seven years have differed from each other so widely as to indicate that there is no such relationship between changes in freight rates and in prices as would be shown if every advance in rates actually did cause, or tend to cause, an increase in the cost of living five times as great as the advance in rates.

We thought we made clear that we were not discussing the general relationship of railway rates to the cost of living, but merely Mr. Woolley's views upon the subject. It seems, however, that we did not succeed in doing so. Some newspapers have criticised our editorial upon the ground that we contended that an advance in rates would not increase, or even tend to increase, the cost of living. The esteemed New York Sun, for example, has declared that our argument was "unsound," because, as it truly says, "You cannot get away from the fact that if the railroads must receive a 20 per cent increase—and they may need more—it will have to be paid by the American people." Mr. Woolley has written a letter to the Sun thanking it for having "riddled the fallacious contention of the *Railway Age* * * * that an increase in freight rates is not necessarily reflected in the cost of an article to the consumer."

We should dislike greatly to have anybody think that the editors of this paper are so ignorant of economics or so stupid that they would argue that changes in railway rates, whether upward or downward, do not affect, or at least tend to affect, prices and the cost of livign. The comments of both the Sun and Mr. Woolley completely misstate the position taken by this paper. Mr. Woolley, if he really read our editorial, knew perfectly well when he wrote his letter to the Sun that we had not made the contention that "an increase in freight rates is not necessarily reflected in the cost of an article to the consumer." We always have recognized, and we recognized in the very editorial in question, that, *other things being equal*, advances in rates do increase the cost of living. We said in one place in that editorial, "The fact is that freight rates are so low compared with the value of most commodities that *they exert very little influence upon their prices*," thus explicitly recognizing the fact that they do exert some influence. The point we discussed in the editorial in our issue of January 23, however, was not whether an advance in rates would tend to increase the cost of living, but *whether Mr. Woolley was right in arguing that it would increase the cost of living five times the amount of the advance in rates.*

Mr. Woolley's whole argument was based upon a proposition which implied that advances in rates have a peculiar and especially momentous effect upon the cost of living. Now, what are the obvious facts? The most important fact to be considered is that the freight charges paid by every business man or concern—farmer, manufacturer, wholesaler, retailer, mine operator—are simply one item in the expense of conducting his or its business, other items being wages of labor, cost of materials, taxes, and so on. Any change, upward or downward, which occurs in any one of the many items entering into the total cost of conducting any kind of business is pretty sure to affect, sooner or later, the prices the concerns engaged in that line of business charge for their goods; and of course every change in prices affects the cost of living. But does anybody believe that a 20 per cent increase in the wages paid by a particular class of concerns, or in the cost of their materials, will cause an increase *five times* as great in the prices these concerns charge the public? Certainly not. If every increase in any important item in the costs of any class of business concerns resulted in an increase in its prices *five times* as great, a relatively small upward movement of business costs in general would speedily force prices so high that the market would be destroyed. But if it cannot be rationally contended that an increase in any other item of business costs will necessarily have a five times greater effect upon prices and the cost of living, then, how in the name of reason, can it be contended that an advance in freight rates will have an effect five times as great as itself? What the *Railway Age* has contended heretofore, and what it contends now, is, not that an advance in rates will not affect the cost of living, but that not a scintilla of valid evidence ever has been, or even can be, cited in support of the proposition that it will cause an increase in the cost of living *five times* as great as the advance in rates. On the other hand, reason suggests, and large amounts of evidence can be cited, indicating that no change in rates ever did produce any such effect.

How much effect, then, would any given advance in rates have upon the cost of living? *Other things being equal,* it probably would have an effect directly in proportion to the amount of the advance in rates. In other words, *other things being equal*, an advance in rates of a half billion or a billion dollars probably would cause an increase in the cost of living of a half billion or a billion dollars. In many cases, especially in the cases of cheap and bulky commodities, the exact increase in rates would be added to the prices; in other cases less would be added, and in other cases more. Whether more or less than the entire advance in rates would be passed along to the consuming public would depend on business conditions existing at the time.

Under the conditions existing just at present probably not all or even most of the advance in rates would in the long run be passed along to consumers. Under government operation the railways in 1919 incurred a deficit of about $400,000,000, which must be paid from taxes. A reasonable advance in rates would wipe out this deficit; this would reduce the amount of taxes the federal government would have to collect; and this reduction of taxes would tend to reduce the cost of living. Furthermore, an increase in rates sufficient to attract new capital into the railroad business would cause an increase in railroad facilities; this would help to make practicable a larger increase of general production than otherwise would occur; and whatever tends to increase production necessarily tends to reduce the cost of living. It is evident,

therefore, that while an advance in freight rates would, in some ways, tend to cause an increase in the cost of living, it would tend in other, and probably more important ways, to cause a reduction of the cost of living.

And now let us ask in conclusion, just how much effect railway freight charges actually do have upon the cost of living of the American people? When we reduce the statistics to the lowest practicable units we find that the freight service rendered by the railways is equivalent to *hauling one to nof freight eleven miles every day for every man, woman and child in the United States,* and that for rendering this service the railways receive, at present rates, *10 cents*—less than the price of admission to a movie show. If freight rates should be increased an average of 25 per cent the railways would then, on the average, haul one ton of freight eleven miles each day for each man, woman and child for 12½ cents.

Which would be more likely in the long run to keep down or reduce the cost of living—to keep the daily freight charge per inhabitant at 10 cents, and thereby render it impracticable for the railways to increase the amount of freight they can haul per inhabitant, or to increase the daily freight charge per inhabitant to 12½ cents, and thereby enable the railways to increase the amount of freight they can haul for each inhabitant?

The Proposed Railroad Legislation

THE MOST IMPORTANT provisions of the proposed railroad legislation which the Senate and House Conference Committee has been considering are those relating to the rule which should be applied in the regulation of rates. These provisions would be more accurately described as relating to the regulation of net operating income, as the real question involved is what return the railway companies should be allowed to earn to enable them to raise enough capital adequately to develop their facilities.

The provisions upon which the conferees have agreed are, as we understand it, in substance as follows: Rates are to be so fixed as to promote the public welfare by enabling the railways to earn a return sufficient to enable them to raise enough capital adequately to develop their facilities. The regulation of interstate rates is to be left entirely in the hands of the Interstate Commerce Commission, which is also to have power to prevent state authorities from making state rates which will unduly burden or discriminate against interstate commerce. The commission is to divide the railways into rate-making districts. During the first six months of private operation the present government guarantees are to remain in effect. The commission is to fix rates, which, for at least 18 months after the termination of the government guarantees, will enable the railways in each rate-making district to earn an average return of at least 5½ per cent upon the aggregate valuation of their properties. It may in its discretion allow them to earn an additional one-half of one per cent, which must be invested in unproductive improvements and not capitalized. This would result in some railways earning less than 5½ per cent and some more. Any railway which earned more than 6 per cent would be allowed to retain one-half of the surplus for its own use and be required to pay the other one-half to the government, which would use it to build up a general railroad contingent fund from which loans could be made to railroad companies that desired them, or equipment could be bought and leased to railroad companies. At the expiration of two years the commission itself must determine what percentage of returns the railways should thereafter be allowed to earn and, having done this, must so make the rates as to enable them to earn the return fixed.

Would these provisions, if adopted, re-establish railroad credit and thereby enable the companies to raise sufficient new capital? Only the test of experience can answer that question. There are numerous important points which the proposed legislation would leave unsettled. Let us venture to make certain assumptions as to the way they would be settled.

First, the method to be used in determining the value of the railroads, both during the next two years and subsequently, is unsettled. The commission is engaged in making a valution, but it will be a long time before it is finished. The only tangible basis on which to compute the percentage of return earned meantime by an entire group of railways would be their combined book cost of road and equipment. While the book cost of the railways as a whole probably is not widely different from their total value, the book costs of some individual lines are more than their value, while the book costs of other railways are less. It seems fair to assume that, in arriving at the return that entire groups of railways would be allowed to earn until its valuation work was finished the commission would use their combined book cost, but that in deciding what was the value of each individual railroad, and therefore whether it should be allowed to retain all that it earned, the commission would take into consideration all the evidence it might have available as to the value of the road. As its valuation of all the railways advanced toward completion, the commission doubtless would use it more and more as the standard for determining the return which the railways should be allowed to earn. The railway companies need not regard this prospect with much apprehension, as it appears almost certain that the valuations of a large majority of roads will exceed their book costs.

When the time came, in two years or more, for the commission to determine anew the percentage of return which the railways should be allowed to earn, would it probably fix a higher or lower percentage than that fixed in the proposed legislation? It is only fair to the commission to assume that that would depend on the way in which the legislation had worked up to that time upon transportation and financial conditions then and, to some extent, upon the prevailing public sentiment. The most reasonable assumption seems to be that the commission would not reduce the return allowed. Some people regard the provision authorizing the commission within a few years to change the percentage of return as a bad one. The *Railway Age* believes that it gives a desirable flexibility to the law and is, therefore, a good provision.

The proposed legislation undoubtedly will improve the market for the sale of railroad bonds. What the railroads need today, however, is to raise new capital chiefly, not by the sale of bonds, but by the sale of stock. Would the proposed legislation improve the market for railroad stocks? It must be borne in mind that only the stronger companies have been able to any considerable extent for some years to finance by the sale of stocks and that under the proposed legislation the government would take one-half of all in excess of 6 per cent which any railroad earned. This division of surplus earnings would tend to hinder the railway companies subject to it in selling stock. On the other hand, as Judge C. A. Prouty, director of the Division of Valuation of the Commission, recently has forcibly pointed out, the impairment of the credit of the railway companies has been due largely, if not mainly, to years of uncertainty as to their financial future. Judge Prouty goes so far as to contend that the impairment of their credit has been entirely due to this uncertainty and that their net return in the past has been adequate. Very few railway officers or financiers will accept this view, but they will all agree that the uncertainty as to the financial future of the railways has been very largely responsible for the ruin of many of them. As Judge Prouty has pointed out, whether this uncertainty will be removed will depend, not only upon the legislation passed, but upon

the way in which it is administered by the commission. If, however, the commission administers it as Congress evidently intends to, most of the uncertainty will rapidly be eliminated.

Some railway executives and financiers are vigorously advocating the proposed legislation, which is sufficient evidence of their confidence in it. Others, and especially those representing railways which on any reasonable rates would earn more than 6 per cent, are just as vigorously opposing it. It seems to the *Railway Age* that while the legislation would necessarily be an experiment, its adoption would be a long advance toward the solution of the railroad problem. The largest average return on their book cost the railways as a whole ever earned in five consecutive years was in the years 1906 to 1910, inclusive, and amounted to 5.41 per cent. Whether, after deductions from the surplus earnings of the more prosperous roads, the average return under the proposed legislation would be about this amount would depend upon whether the commission permitted the railways to earn the one-half of one per cent which it would be authorized to let them earn for unproductive improvements. The current rate of interest is higher than it was during the five years mentioned, but on the other hand the period from 1906 to 1910 was one of great agitation and uncertainty regarding railroad legislation.

The proposed legislation cannot be called generous or even liberal, but it can truly be said that it would provide a much better system of regulation than that to which the railways have been subjected for the last 14 or 15 years. The attitude of most railway executives was, we think, well expressed by Chairman Cuyler of the Association of Railway Executives, when he said in a statement issued on February 5: "There can be no question that the conferees of the two committees of the House and Senate have had an earnest desire to do justice to the railroads. If the bill be enacted by Congress the railway executives and the owners of the properties will accept the bill in good faith, with the earnest hope that it may be productive of the desired result, namely, the protection of the present credit of the roads and the extension of that credit so that they may provide in the future adequate facilities for the transportation system of the country. * * * If it does not, the railroads will confidently look to Congress for such additional legislation as may be necessary to further protect the companies and the public."

The Latest Strike Threat

On February 9 President Barker of the Brotherhood of Maintenance of Way Employees and Railway Shop Laborers issued an order calling for a strike on February 17 at 7 a. m. A strike by this, the youngest of the railway brotherhoods, is more or less of an uncertain quantity. Although it claims some 300,000 members, it may lack the cohesion and unity of action necessary for successful action. One element of weakness lies in the fact that its membership includes many track foremen who have long been honored as belonging to the most loyal group of railway employees.

In the absence of severe winter weather, a defection in the ranks of railway men employed in the maintenance of tracks and structures and as laborers around shops and engine terminals obviously will not immediately cause a serious interference with the operation of the trains except as it will obstruct the operation of coaling stations, pumping plants, engine terminals etc., but there is no denying that a general strike by these men for any extended period now will result in a deterioration of the tracks that will cause serious difficulties.

The brotherhood which has made this strike a possibility was brought into being during the period of government control, although it must be recognized that the latent germ was present in the ranks of the railway laborers some time before January 1, 1918. The maintenance of way foremen, who form an important factor in this organization, have long been among the underpaid in the railway ranks. Officers of the maintenance of way department had also long complained that the rates paid to their laborers were so low as to recruit only the dullest and least efficient men on the market. These conditions were, no doubt, responsible for some sporadic attempts at organization among employees of this group in certain sections of the country, notably in the southeast, in New England and in parts of Canada. A few abortive strikes were also on record.

The railroads consistently combated these attempts at organization, and were usually successful, but it must be admitted that they did little or nothing to remove the underlying causes for the unrest. However, there was nothing in the condition at the end of 1917 that could not have been satisfactorily ameliorated by the institution of an intelligent program for the welfare and increased efficiency of this class of employees.

Whether the roads could or would have undertaken such a step can be relegated to the realms of conjecture. All possibility for such action was removed by the creation of the United States Railroad Administration, under which a labor policy was adopted which virtually *required* the organization of all large groups of employees into closely-knit unions. The machinery set up for the disposal of labor difficulties was centralized at Washington; the employees could meet this body only through centralized representatives. Moreover, groups of employees were more than once admonished to perfect their organizations before they submitted grievances. With this background, the remarkable growth of the Brotherhood of Maintenance of Way Employees and Railway Shop Laborers into a union that claims 300,000 members and with funds at its disposal that made it possible to invest upwards of $1,000,000 in clothing factories, will be readily appreciated.

The occasion for the strike, according to the officers of the brotherhood, lies in the failure of the Railroad Administration to grant a 40 per cent increase in wages demanded last summer when the several railway brotherhoods raised vehement objections to the continued rise in the cost of living. Director General Hines announced that the good offices of the government would be brought to bear in an effort to obtain a reduction in the cost of living, and requested that the unions withhold their demands until the government could demonstrate its ability to do this. The union now avers that it has waited patiently for this reduction to take place and seeks to hold Mr. Hines to his promise before his authority shall have expired with the end of government control.

Whatever the merits of the case, the strike is unwarranted for two reasons: (1) The brotherhood has no right to wrest from the Railroad Administration, on the eve of its demise, concessions which must be binding on railway stockholders who have no voice in the negotiations; (2) a strike is not the proper way to settle a controversy, since any strike of a large mass of railway employees, like the recent coal strike, threatens the very lifeblood of the nation. The other railway brotherhoods are also parties to this controversy with the Railroad Administration, but for some reason have allowed the youngest member of the family to take the initiative in this case. Whether this is due to a maturity of judgment, which has also caused them to allow the Maintenance of Way Brotherhood to take the first step in the plans for the co-operative manufacture and distribution of necessities, cannot be determined. It is at least an interesting circumstance.

It is an ill wind that blows no good, and perhaps after all a strike of the maintenance brotherhood will serve a very useful purpose in giving the people of this country just the object lesson they need to cause them to demand the restoration in the conference draft of the railroad legislation, the teeth that have been extracted from the anti-strike clause of the Cummins bill.

Bringing the Younger Men into the Large Railway Associations

One of the most marked developments in the national engineering societies during the last three or four years has been an awakening of interest in the younger men of the profession who constitute the potential source of membership of the future. The American Railway Engineering Association is now considering means whereby it may attract the younger engineers in railway service into this organization in large numbers. Since its problem is the same as that facing other similar societies in the railway field, interest in the broad question involved extends far beyond membership in the one society mentioned.

Societies such as the American Railway Engineering Association are organized not for pecuniary profit but for the mutual improvement of the members and for the investigation of problems and the dissemination of interest of value to them in their regular duties. Therefore, the good which an organization can accomplish is increased with the addition of numbers to its ranks.

The benefits of membership in a technical railway association are derived in a number of ways. In the first place, the proceedings of an organization such as the American Railway Engineering Association, the Master Mechanics' Association and the Master Car Builders' Association stand pre-eminent in their respective fields as the courts of last resort regarding information which they cover. Another advantage of membership arises from the opportunity to attend the annual meetings and to participate in the discussions of the subjects under consideration. No one interetsed in the branch of railway activity covered by such an association can fail to benefit from the discussions of such questions as are broought up on the floor of the convention.

However, with all of their advantages it has been evident that these organizations have not been attracting the younger men to the extent that would appear desirable. A survey will show that relatively few men below the rank of division officers are joining these associations. The reasons for this are not hard to find. The young men are, usually, unable to leave their roads to attend the annual convention at a time when their superior officers are also absent. Also if present they hesitate to participate in the discussion in the presence of their superior officers. Likewise it is difficult for them to leave their work for the time necessary to attend committee meetings held at distant points throughout the year.

In the solution of this problem the large associations can well afford to study a plan which the Railway Signal Association has in effect. This is its sectional committee organization through which local group organizations have been perfected in 18 railway centers in the United States, 2 in Canada and 1 in England. These sections, each with its local organization, hold three or four one-day meetings annually. They are so located that nearly every member of the association is within a night's ride of the headquarters of a local section and is thereby able to attend its meetings with the minimum loss of time. Since these meetings are largely local in character and without verbatim stenographic reports free discussion is promoted, while sufficiently general notes are taken to preserve the conclusions of the members for permanent record. While the preparation of the program is in the hands of the local committees, certain of the subjects are assigned by the executive committee of the parent society so that continuity of work is assured throughout the country.

In this way the Railway Signal Association is bringing the advantages of membership to large numbers of men in the field, many of whom are unable to attend the annual convention. This plan has much to commend it to other associations as a means of making their organizations real, live factors in the promotion of their work among the largest possible number of employees in their respective departments of railway operation.

The Lesson of E. P. Ripley's Career

E. P. Ripley's career teaches as many valuable lessons as can be learned from the life of any railroad man by the present and oncoming generation of railroad managers. He was not, in the ordinary sense, a railroad financier. He made the Santa Fe a very successful property financially, but this was due almost entirely to able administration of the property which was directed in well-balanced proportions to making it a first-class property physically, to developing all the resources of the territory which it traversed and thereby securing the maximum available traffic, and to operating it economically, but always with due consideration of the desirability and even necessity of giving the public good and adequate service.

The success of Mr. Ripley's work was due not merely to ability but very largely to character. He was, to use a slang word, as "square" a man as ever lived. He was criticised for many things, but probably the most thorough investigation of his career, if every transaction of his life were considered in the light of all the conditions, would fail to disclose that he ever did a really dishonorable or dishonest thing.

Having done his duty and having caused the Santa Fe to do its duties as he understood them, Mr. Ripley was most pertinaciously insistent that other people should do their duty by him and the railroad. He was a good employer, but when the employees in the Santa Fe shops struck for reasons which he was sure afforded them no justification, he fought their unions to a finish, won, and established the open shop. He did his best to render good service at reasonable rates, but when the state and national governments attempted to subject the railways to regulation which he regarded as unfair and harmful, he fought them in the arena of public opinion with all his strength and with every legitimate weapon available. He spoke his mind in addresses, letters, interviews and magazine articles, and also established a publicity organization which was one of the best in the country. When public discussion did not produce the desired results he resorted to the courts, although he did not like litigation.

He took up the cudgels as promptly with financial interests whose influence he believed was being used to hurt the Santa Fe as with the regulating authorities. When the Harriman interests acquired a large amount of stock in the Santa Fe, E. H. Harriman, as was his wont, began to try to dictate the policy of the Atchison. Mr. Harriman was a very great man, and few men ever successfully opposed him, but Mr. Ripley calmly informed him that if he continued to press his views Mr. Ripley would join with him in asking the stockholders for their proxies and see which would get the larger number of them. Mr. Harriman wisely refrained from accepting the challenge and Mr. Ripley continued to manage the Santa Fe in his own way.

The highest integrity and ability in the management of his railroad, the rendition of the best service practicable to the public, and then unflinching courage in fighting everybody who attempted to treat unfairly the railroad company and its stockholders—these were the principal qualities which made Mr. Ripley one of the most successful railroad men that America has produced.

His career should be an inspiration to every ambitious young man in the business. He rose from the bottom to the top without "pull" or any special favoring condition, and he died in the fullness of years and of reputation. Let us hope that no system of railroad ownership or management ever will be adopted which will make it more difficult, or even impossible, for men to have similar careers in the railroad business in future.

Edward Payson Ripley

E. P. Ripley's Death Ends Great Railroad Career

Head of Santa Fe Was Man of Extraordinary Character and Personality as Well as Administrator of Rare Ability

As announced in last week's issue of the *Railway Age,* Edward Payson Ripley, chairman of the board of directors of the Atchison, Topeka & Santa Fe Railway Company, died at his winter home in Santa Barbara, Cal., the night of Feburary 4.

Mr. Ripley's death took from the railroad business of the United States one of the most remarkable men who have ever participated in its affairs. Probably it is no exaggeration to say that when he passed away he was the leading railroad man of the United States. It was not merely his ability, which was very great, and his character, which was rugged and dominating, but also his long experience as the head of a great railroad system and his unsurpassed ability to co-operate with other railway executives in all important matters, that had raised him to a position of such preeminence. The average period during which men serve as heads of great railroads is short. Mr. Ripley, on the other hand, had been the head of the Santa Fe System for twenty-four years. Several generations of railroad presidents have come and gone during this period.

Despite his age and his long tenure of service he had kept himself young and forward looking. The consequence was that as time had gone on his views regarding what policies the railways as a whole should follow or advocate were more and more eagerly sought, and never had the opinions expressed by him carried so much weight with his associates in the railroad business as they did toward the end of his career. It happens in the cases of many great men that they reach the height of their reputations in middle life and that afterward their reputations and influence decline. Mr. Ripley's reputation and influence grew more during the last ten years of his life than during any preceding period.

While he had been sick a good deal recently his death came unexpectedly, and was a shock to his family and friends. In the late summer of 1919, when the weather was very hot, he attended a meeting of the Association of Railway Executives in New York. He seemed to be feeling well, and while returning from New York on the train made an engagement to play golf the next week. But by the time he arrived in Chicago, he was tired out, which was attributed to his suffering from the heat during the trip. On arriving at Chicago he went to his home at Riverside and became seriously ill He was taken to a hospital where, after he had been given opportunity partially to recover his strength, two operations were performed. They were very painful but successful. Late in the year he went to his winter home in California. He seemed to be getting stronger all the time, and three days before he died wrote to one of his friends in the east that he hoped and expected soon to be able to play golf again.

No brief article could do even partial justice to the life and work of E. P. Ripely. He was not only a successful railroad developer and administrator, but a man of extraordinary character and personality. No better proof of his ability could be afforded than the history of the Santa Fe under his management. When the panic came in 1893 it was operating 7,480 miles. When Mr. Ripley became president on January 1, 1896, it was just emerging from receivership, and had been reduced to 6,430 miles. It had 962 locomotives, 641 passenger cars and 27,719 freight cars. Its annual report for the year ended December 31, 1918, showed that at that time it had an operated mileage of 11,456 miles, 2,122 locomotives, 1,667 passenger train cars and 70,458 freight train cars.

These statistics, however, give a very inadequate idea of the extent of the property's development under Mr. Ripley's administration. It had been extended to San Francisco on the west and to Chicago on the east, and from a road which was an unballasted streak of rust it had been transformed to one in fine physical condition. In 1896 the book cost of the property was about $372,000,000 and it had outstanding a capitalization of about $396,000,000. At the end of 1918 its investment in road and equipment was $631,500,000, investment in physical property, franchises, etc. of all kinds was over $710,000,000, and its outstanding capitalization was about $633,000,000. In 1896 its passenger mileage was about 283,000,000 and its ton mileage about 1,749,000,000, its total earnings being $30,000,000, its operating expenses $22,000,000 and its net earnings about $8,000,000. In 1918 the ton miles handled by the system amounted to about 14,200,000,000 and the passenger miles to about 1,700,000,000, its total earnings being about $188,000,000, its operating expenses about $136,000,000 and its net earnings about $52,000,000. The common stock was put on a dividend basis in 1901 and since 1907, excepting in 1909, has regularly paid 6 per cent; and there has been accumulated a surplus of about $42,000,000, practically all of which is invested in the property.

Mr. Ripley was one of the railroad president who were not appointed federal managers of their properties when the corporations were separated from the properties in May, 1918. He remained as president of the corporation on his own initiative, however. Immediately after the government's policy of appointing federal managers was announced he wrote a personal letter to Director General McAdoo, saying that he hoped government operation would be successful, but that in view of his age he could not consider accepting a federal managership, and indicating that he would prefer that it should not be offered to him. Mr. McAdoo in reply wrote him a very cordial letter.

Mr. Ripley's outstanding characteristics as a railroad manager were sound judgment, broad knowledge, rare skill in selecting and developing men, and unlimited courage.

When he became the head of the Atchison it had control of the St. Louis & San Francisco. The Frisco was released, mainly, no doubt, because it was felt that it was not a natural part of the system and that it would be possible to develop the property, traffic and earnings of the Santa Fe better without it. The Santa Fe itself also had a number of unprofitable lines. Mr. Ripley never believed in continuing to own and operate lines merely for competitive purposes, and he got rid of many lines of this sort. He never hesitated to do a thing that was sound and right merely because he might be criticised for it. He himself a few years ago related to the writer the following incident which illustrated this characteristic:

The Santa Fe had built a line, then called the Witchita & Western, running from Wichita, Kan., to Bucklin. From Pratt, Kan., to Bucklin, a distance of approximately 100 miles, this branch line closely paralleled the main line of the Rock Island. The Rock Island naturally had an advantage in soliciting and handling traffic in this territory.

"I decided to tear up our line from Pratt to Bucklin," said Mr. Ripley. "The lawyers said that I couldn't do it, but I did it anyway. I gave the stations to the farmers for schoolhouses and that placated them and we never had any trouble about it." Mr. Ripley paused and the almost im-

perceptible smile which was characteristic of him played over his features as he added, "There was one fact about that transaction that has never been published. Cable (the president of the Rock Island) gave the Santa Fe $500,000 for tearing up that line." That was in the days before the anti-trust law was strictly enforced.

There were numerous other cases where, in order to avoid building or operating unprofitable lines, Mr. Ripley united with the executives of other railways in arranging to operate tracks jointly or even in building lines jointly. For instance, the Santa Fe and the Southern Pacific jointly built the Northwestern Pacific.

Mr. Ripley bore the reputation of being one of the most combative men in the railroad business. He always spoke out what he thought about everything and there were many who criticised him upon the ground that in this way he did himself and the railroads harm. As the years went by, however, and the views that he expressed and the predictions he made regarding government regulation and other matters were vindicated his blunt outspokenness caused his reputation and influence with his associates in the railroad business and with the public to grow greater.

While he was a severe critic of government regulation, it is not so generally known that he was among the railway executives who were most willing to acept any kind of increased regulation which he regarded as reasonable. Some years ago he related to the writer an incident which preceded the enactment of the Hepburn law, which, we believe, has never been published. In 1905 President Roosevelt began an agitation to secure the enactment of legislation which would give the Interstate Commerce Commission authority, when it found a rate unreasonable, to prescribe and put into effect a rate which it regarded as reasonable. He invited Mr. Ripley to lunch at the White House, laid his plan before him, and said in substance, "If the railway people will agree to accept legislation containing this provision I will let them write the bill themselves. It must, however, be written in such a manner as to give the Interstate Commerce Commission the authority I have indicated. That is all I want, and that I must have."

Mr. Ripley agreed with the President that his proposition was reasonable and said he would present it to the railroad presidents. He gave a dinner which 22 railroad presidents attended. He presented President Roosevelt's proposition and urged the railroad executives to accept it. Nineteen presidents voted against accepting it and only three in favor of it, two of these three being Mr. Ripley and A. J. Cassatt, then president of the Pennsylvania Railroad Company.

"I had to go with my friends," said Mr. Ripley, "so we told President Roosevelt that we couldn't accept his proposition. He immediately started a gigantic campaign to get the legislation he wanted. He whipped us and the passage of the Hepburn act was the result. I have always felt that if we had accepted President Roosevelt's proposition at that time the railroads would have been spared a great deal of trouble. The agitation carried on to secure the passage of the Hepburn act largely created the hostile public opinion which was responsible for much of the state and national legislation subsequently enacted."

It has been reported that Mr. Ripley was elected president of the Santa Fe as a result of a compromise, the members of the board being deadlocked between two other men. Commenting upon this report, Mr. Ripley once stated the facts to the writer as he then understood them. The story reflects great credit upon Mr. Ripley and also upon another great American business man who long since passed away, P. D. Armour.

Mr. Ripley left the general manageship of the Burlington to become vice-president in charge of traffic of the Chicago, Milwaukee & St. Paul in August, 1890. At that time secret rebating was rife on American railways. The Armour interests then, as now, owned a large interest in the St. Paul, and the elder P. D. Armour was a director of the St. Paul company. Mr. Ripley soon found that the St. Paul was practicing unfair discrimination on a large scale in favor of Armour & Co. He protested against this to Roswell Miller, who was then president of the St. Paul Mr. Miller pointed out to him that the St. Paul was merely doing what other railways were. Mr. Ripley insisted, however, that if he was to remain vice-president of the road Mr. Miller must take the matter up with Mr. Armour. Mr. Miller did so, but Mr. Armour was immovable. A conference between Mr. Armour and Mr. Ripley himself finally was arranged. There was some very animated conversation, but Mr. Ripley stood to his guns. He pointed out to Mr. Armour that continuance of the practices he complained of would result in a scandal which would injure the St. Paul, the Armour interests and Mr. Ripley himself, and declared that he did not intend to have his reputation smirched. Mr. Armour found that he had encountered a man who had a will quite as strong as his own, and finally yielded.

Sometime afterward Mr. Ripley was out on the line in his car one of the members of his party awakened him in his drawing room and told him the newspapers had announced that he had been selected for president of the Santa Fe. Mr. Ripley said this could not be because he had not been consulted. He was on his way back to Chicago, however, and when he arrived there he found the report was true. When he made inquiry as to how he had happened to be selected he learned that among those whom the directors of the Santa Fe had consulted regarding the best man for its presidency was P. D. Armour. Mr. Armour had told them that the man who by reason of his courage and ability should be their choice was E. P. Ripley; and it was largely through Mr. Armour's influence that Mr. Ripley was elected.

Mr. Ripley's great success as a railway administrator probably was due as much to his judgment of men and to his willingness to give authority to those whom he trusted as to any other of his characteristics. Among the leading railway men who were developed on the Santa Fe while he was president were W. B. Storey, who suceeded him as president; Walker D. Hines, now director general of railroads; H. U. Mudge and J. E. Gorman, both subsequently president of the Rock Island; W. C. Nixon and W. B. Biddle, both subsequently president of the Frisco, and several others who might be mentioned.

His way of working was interesting. The first principle with him seemed to be to master all the information available pertaining to the railroad business, and especially to the business of the Santa Fe. Having possessed himself of this knowledge he was equipped to pass upon almost any question of policy which was presented to him, and he passed upon them with an ease and promptness which would have been inexplicable to anybody who did not know the vast amount of information which he always had available.

Outwardly he seemed gruff and short, but those who frequently came in contact with him learned that he was the gentlest and kindest-hearted of men. He gave the heads of departments of the system almost unlimited authority, but he always knew everything that was being done and could be as severe in his criticisms as he could be cordial in his commendations. He made all his decisions so quickly that while he was one of the most successful railroad administrators who ever lived, he never seemed to be very busy and it was always possible for anybody who had any business to transact with him to get access to him at almost any time.

He never seemed to be driving himself hard and he had numerous ways of getting recreation. He was an omnivorous reader of books and magazines of all kinds, and probably no other railway executive ever read so many newspaper

clippings as he did. He was very fond of golf, and played a good game. When he was at his winter home in Santa Barbara he played golf almost every day and during the summer when he was in Chicago he always found time to play frequently. He loved cards and played a very good hand at whist.

He could be very curt when things went wrong owing to causes that could have been avoided, but he was a marvel of patience regarding unfortunate occurrences which could not be helped. The writer once traveled from New York to Chicago with him on his private car. The train to which it was attached in New York was scheduled to arrive in Chicago at 5 p. m. the next day. Not long after leaving New York, however, a hot box developed on Mr. Ripley's car. Repeated efforts were made to remedy it, but they were unsuccessful and the car was finally cut off the train. After hours of work on the hot box the car was put on another train, but the hot box soon developed again, and again the car was put off, this time at Marion, Ohio. It was later put on another train, and a car repair man rode the train from Marion to Chicago working on the hot box every time the train stopped.

The experience was enough to have tried the patience of Job; but it never fazed Mr. Ripley. Almost every time the train stopped he got out and calmly watched the car repair men work on the hot box, after which he would get back in his car and resume playing cards. Instead of arriving at Chicago at 5 p. m., he arrived there at 5 a. m. the next day, but throughout the entire experience he never manifested the slightest impatience.

In his manner and in his mode of living he was one of the simplest of men. In fact, he was as totally devoid of everything savoring of ostentation as a man could be. As he grew older he manifested an increasing fondness for the company of young men, and this probably was one of the principal reasons why he remained young in heart to the end.

Mr. Ripley's married life was an extremely happy one. On his seventieth birthday in 1915 a dinner was given to him in Chicago by the officers and directors of the Santa Fe, which was attended by important railway men and business men from all over the country. The one feature of the dinner which will live longest in the memory of those who attended it was the toast to his wife, who was in the gallery, which Mr. Ripley offered immediately after he began to speak. He said:

"Before proceeding I desire here to pay tribute of praise to her who forty-four years ago joined her fortunes to mine and who ever since has provided the comforts and rest of a quiet home; and twice has accompanied me through the valley of the shadow of death; who has watched over me mentally, morally and physically, and who is mainly responsible for such success as I have had in conserving mind and body. I ask you, friends, to join in drinking the health of my wife."

While Mr. Ripley's career was an extremely complete and well-rounded one, and while on his retirement to the chairmanship of the Santa Fe on Mr. Storey's election as president late in 1919 he had decided to do no more hard work, his death, in view of the conditions existing in the railroad industry at the present time, may very truly be said to be "untimely." His sound and courageous counsel would have been invaluable to his associates in the railway business in dealing with the many difficult problems which will be presented after the railways are returned to private control on March 1.

Mr. Ripley was born at Dorchester, Mass., on October 30, 1845. He began railway work in 1868 as contracting agent for the Star Union Line at Boston, Mass. From October, 1870 to 1872, he was clerk to the general eastern agent of the Chicago, Burlington & Quincy, and from the latter date to 1875, he was New England agent. He then became general eastern agent, and on June 15, 1878, he was made general freight agent. He held the latter position until 1887, when he was appointed traffic manager, and the following year he was promoted to general manager of the Burlington. In August, 1890, he was chosen third vice-president of the Chicago, Milwaukee & St. Paul, which position he held until he became president of the Santa Fe on January 1, 1896.

Hines Urges Continuation of Terminal Committees

CONTINUATION after the expiration of federal control of the special terminal committees created by the Railroad Administration was urged by Director General Hines in a letter to R. H. Aishton, president of the American Railroad Association.

"I am writing this letter to suggest the desirability of continuing after the expiration of federal control the special terminal committees which have been appointed and are operating in seventy-three of the principal railroad terminals in the country," he said.

"For some time I have been of the opinion that in the railroad terminals lies the greatest possibility for making constructive improvements in the transportation service. These special terminal committees were accordingly appointed for the purpose of doing everything in their power to speed up and improve the transportation service within the terminals. Among other matters to which those committees have given and are giving particular attention are the following:

1. Lack of switching power.
2. Delays in interchange of equipment.
3. Delays in prompt placement of cars for unloading and pulling out of loaded cars.
4. Delays in loading and unloading equipment.
5. Delays in the movement of cars awaiting billing.
6. Bad order cars.
7. Heavier loading.

"A number of these committees are also engaged in making and maintaining accurate yard checks showing the time consumed in the movement of freight through the terminals and indicating the respects in which improvements in the service can be made.

"Each of these committees consists of a number of operating officials and also one representative of the shippers, having equal standing with the other members of the committee and nominated by commercial organizations.

"Most of these committees have done very good work, and I consider it highly desirable, from the point of view of continued and improved efficiency of operation in the terminals, that they should be continued after the end of federal control and that the representation of the shippers thereon should be continued.

"While I appreciate the difficulties of getting joint action of this character under private management, I think that advantage both to the public and the railroads is such as to make it desirable for you to consider calling this matter to the attention of the advisory members of the executive committee of the American Railway Association and in that way to the attention of the railway executives."

E. L. Dalton, traffic manager of Montgomery Ward & Company, Chicago, has been promoted to general traffic manager. J. D. Collier, assistant traffic manager, has been promoted to traffic manager, succeeding Mr. Dalton, and R. M. Vowels, chief clerk in the traffic manager's office, has been promoted to assistant traffic manager, succeeding Mr. Collier.

Car Shortage

THE SUBJECT OF CAR SHORTAGE was given a general airing in the Senate on February 11 in connection with a resolution introduced by Senator Gronna of North Dakota to instruct the Committee on Agriculture to investigate "the alleged lack of supply and failure to supply an adequate number of stock cars and cars for transporting grain and other farm products during the period of federal operation of the railroads, and the charges of wilful interference by certain officials of the Railroad Administration with the successful operation of the railroads by the government." The discussion, which resulted in no conclusion, centered largely around the question as to whether the investigation should not be made by the Committee on Interstate Commerce. Senator King insisted that it be amended for this purpose. Senator Cummins, chairman of the committee on interstate commerce, objected to this, saying:

"There is a car shortage in the United States, a very serious shortage. This shortage has been long known for it is of long standing. The interstate commerce committee has investigated the subject very many times. In fact, it has been in continuous investigation of the subject for more than two years and it knows all there is to be known in regard to the matter. When the railways passed into the hands of the government there was inadequate car equipment and at short intervals during the years before there was a car shortage. It is pretty well known that in order to maintain the car equipment it was necessary to supply 100,000 cars each year. Even that condition would not provide for the growing commerce of the country. During the two years of federal control, for reasons which I need not particularize, the government has not furnished the 100,000 cars each year and naturally and inevitably we are now suffering from even a greater car shortage than we were when the government took possession. These are facts which are perfectly well known and nothing can be accomplished by referring the resolution to the committee on interstate commerce."

Senator Overman referred to the charges of wiflul interference and asked whether they had ever been investigated.

"That subject, too," said Senator Cummins," has been now and then exploited before the Interstate Commerce Committee, but I do not think that that is true. There may have been an employee here and there, a few employees, who have desired to discredit government operation by infidelity and inefficiency, but I do not think that any such practice has been general or prevalent enough to be really worth while investigating. I am not speaking against the passage of the resolution. All I say is that it would simply involve further labor without any results. I know three is a car shortage and the committee knows about what the car shortage is and we are doing everything i nour power in the construction of a new railroad bill to put the railways of the country in a position so that they may supply themselves with the cars that are absolutely necessary in order properly to do the business of the country. The railways are about to be returned to their owners and I am infinitely more interested in the preparation and passage of a bill that will enable their owners to operate them successfully than I am in investigating a charge that during the last two years there has been some inefficiency or some intentional effort on the part of employees to discredit government operation."

Senator Sterling suggested an amendment to the resolution, which was agreed to, that it be broadened to include wilful neglect of officials or employees, as well as wilful interference.

Senator Kellogg presented a table showing that from 1913 to 1917 the railroads had acquired an acreage of 120,000 new freight cars a year and had retired an average of 91,000 each year, making a net addition of 29,700, and that for two years and two months the government has purchased only 100,000 cars, although the traffic has increased 50 per cent since 1915. He said he did not think the Railroad Administration or the officers working under it for the government have wilfully failed to perform their duty, but that "the great central, cumbersome organization in Washington, trying to operate 260,000 miles of railroad, is impossible and inefficient and could not be otherwise, with all due respect to the ability and integrity of the men who are trying to perform the task."

Senator McKellar offered an addition to the resolution, which was agreed to, to make the investigation cover the recent order of the director general "restricting empty cars to the grain districts, the reasons therefor, the interference with normal business caused thereby in other districts where cars are now."

Railroad Administration Creates Division of Liquidation Claims

DIRECTOR GENERAL HINES on February 5 announced that T. C. Powell, having resigned as director of the Division of Capital Expenditures of the Railroad Administration, effective February 15, because of his election as vice-president of the Erie, the Division of Capital Expenditures would be discontinued on that date. Mr. Powell was also chairman of the claims committee of the Railroad Administration. In view of the necessity for making continuous provision for the settlement of questions arising out of federal control, the Division of Liquidation Claims is created, effective on February 15, with Max Thelen, now director of the Division of Public Service, as director, in addition to his present duties. The new division will have jurisdiction over capital expenditures and claims relating thereto, and also claims relating to maintenance, and will include the necessary technical force.

E. E. Adams, engineering assistant to the director of the Division of Capital Expenditures, resigned on January 1 to return to his former position as consulting engineer of the Union Pacific at New York.

The law, accounting and finance divisions of the Railroad Administration as well as the new division will have plenty of work to do long after the relinquishment by the government of the operation of the railroads, but the other divisions will begin on that date to disband. None of them, however, will be able to quit at once and it is probable that various sections will wind up their work at different times.

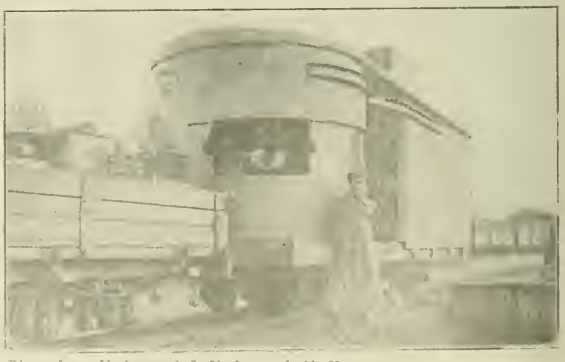


Photo from Underwood & Underwood, N. Y.

An Esthonian Armored Train

Success or Failure of Railroads Depends Upon I.C.C.

Government Holds Carriers in Hollow of Its Hand, Says Director Prouty in Discussion of Railroad Valuation

WASHINGTON, D. C.

WHETHER THE PRIVATE MANAGEMENT of the railroads which is to be resumed on March 1 shall succeed or fail, must depend largely upon the Interstate Commerce Commission, says C. A. Prouty, director of the commission's Bureau of Valuation, in a memorandum filed with the commission upon the question of final value, which was discussed in oral arguments before the commission on January 7. The government, he says holds the carriers in the hollow of its hand through its power to dictate rates and the difficulty as to railroad credit has been caused not by insufficient earnings but uncertainty as to the policy of the government. These points are made by the director for the purpose of emphasizing the importance of the valuation now being made by the Interstate Commerce Commission and he declares that to remove the uncertainty that has heretofore existed the commission must determine the value of each property and the government, either Congress or the commission, must declare the return which is to be permitted upon that value. His remarks are especially pertinent in view of the fact that the conferees on the railroad bill have agreed upon a bill which provides a percentage of return to be fixed for a time by the law and thereafter by the commission upon the value of railroad property. Director Prouty also contends that the value for rate-making purposes rests largely in the judgment of the tribunal called upon to determine it.

An abstract of the director's memorandum, in which he discusses the question of final value from a practical standpoint without any attempt to cite or apply the numerous legal decisions, follows:

I.

The importance of a valuation of the railroad properties of this country has long been apparent to students of that problem; it has now become obvious to all, even the unthinking. On March 1 next private ownership enters upon its final test. If it succeeds it will become the permanent policy of this country. If it fails in the estimation of the public, government operation must result. Whether it succeeds or fails must depend largely upon this commission.

The question is one of revenue—how to give the carriers the necessary money and credit without unduly taxing the public. The carrier must have sufficient with which to pay its expenses and a fair return upon its property and it must have in addition sufficient credit to provide for the development of its facilities. If it can not obtain the necessary money for this latter purpose, or if it must obtain that money at an extravagant figure, the public of necessity suffers.

It is often charged that the decline in railroad credit has been due to insufficient earnings, but this statement is not warranted. The earnings of the so-called test period—that is, the three years ending June 30, 1917, were sufficient, but railroad credit steadily declined. The trouble has been the uncertainty. The public has come to realize that the government holds these carriers through its power to dictate their rates in the hollow of its hand, and the doubt as to what the policy of the government is to be has been the disturbing factor. To remove that uncertainty the commission must determine the value of the operative property of each common carrier and adopt a method of keeping that valuation good from year to year. The government, either Congress or the commission, must declare the return which is to be permitted upon that value. The beginning of a solution of this railway problem is the statement of such a value.

Our field work in the engineering section has been substantially completed. Our field work in the land and accounting sections will by the end of this year be well advanced toward completion. Within the next two years it is hoped that reports will be filed from all sections upon most railway systems of significance. It is desirable that the commission should proceed as speedily as it properly can with the naming of a final value.

II.

In a memorandum filed with the commission upon the first valuation hearing I stated that this value to be fixed by the commission was not the exchange or condemnation value, so called, but was rather that sum upon which, giving due consideration to all relevant facts, a fair return ought to be allowed. Nothing which has transpired in all the elaborate discussions then and since has in anywise tended to alter that opinion. Attention should, however, be called in this connection to the fact that the thing valued in the two cases is not the same and that this alone might account for the different method applied in the ascertainment of that value and the different result attained. In a condemnation proceeding everything connected with the property is taken—the franchise, the physical property, the business which has been created; while in this proceeding you are seeking a value for only that property which the carrier has devoted to the public use. Neither the franchise nor the business of the carrier is involved.

III.

In a paper prepared for the public utilities section of the American Bar Association I attempted to review the decisions of the Supreme Court touching this question of rate-making value and reached the conclusion that such a value could not be controlled by the application of any inflexible rule but rested largely in the judgment of the tribunal which was called upon to determine it. The commission is accumulating certain facts, like cost of reproduction, original cost, etc. From these facts a value must be deduced and stated. Now, there is no hard and fast rule by which the commission can apply these facts; no "formula," in the language of the Supreme Court, which can be used for the working out of such value. The commission must intelligently view these facts and from such consideration deduce a value, and unless it is apparent that the commission in so doing has proceeded upon some clearly erroneous principle, the value so deduced will not be disturbed by the Supreme Court.

This does not mean, however, that the commission in its statement of value can proceed without method. It must have some plan or theory and must apply to every case that same plan or theory. It can not say: "We think that Road AB, upon consideration of all the facts, is worth $100,000,000; that Road XY. upon consideration of the same facts, or substantially the same facts, is worth $150,000,000." No such valuation, even if it were accepted by the court, would commend itself to the public or sustain the test of actual experience. The commission must have some theory which can be applied to all cases and it must have a theory or plan which is not only capable of stating a value today but which will permit of the correction of that value as the property is increased or diminished for the future.

I desire to state my opinion of the way in which this should be accomplished, and in doing so it should be clearly understood that I am speaking for myself alone. This is a subject which has been necessarily very much discussed by those con-

nected with the Bureau of Valuation, and I believe that as to most which I shall propose we are in substantial accord; but the subject is one of tremendous importance; the decision of the commission is likely to be accepted as final; opinions widely differ as to what under all the circumstances should be done; and I do not, therefore, desire at this time to endow what I am to say with any artificial consideration that it expresses the view of the Bureau of Valuation.

IV.

In the making of this valuation, the commission acts under certain limitations, the most important of which is that it must accept and apply the decisions of the Supreme Court. While this question in its broader aspects is political and economical, it may always become in its final analysis judicial since the carrier by alleging that the value which you fix is confiscatory under the Constitution of the United States may always bring that value to the bar of the federal court of last resort. You must, therefore, in so far as this court has laid down a principle applicable to the stating of this value, observe that principle. Looking, then, first of all, to the decisions of the United States Supreme Court, how far can you proceed upon the strength of such decisions?

The thing which stands out most prominently in the reading of those opinions, and which is reiterated again and again and never departed from, is that you are to value the *property* which is at the time of the valuation being devoted by the carrier to the public use. That property may be endued with certain elements of value, and its rate-making value may perhaps be added to or subtracted from by various considerations, but the thing with which you deal is always the property which is being devoted to the public service. It is not the franchise, for the carrier has not devoted its franchise to the use of the public. That is a contribution by the public for the purpose of permitting the carrier to devote its property to the public use.

You are not valuing the business, nor the strategic position, nor the operating advantages of the carrier, for none of those are property devoted to the public service. They are all retained by the carrier which continues to enjoy, under the rate to be fixed, the full benefit of these advantages.

Go back to the very beginning, before this carrier has begun to render a public service, and what is the property which at the inception of that service it devotes to the public use. Manifestly, it is its physical property and that is all the property which it ever devotes to that use, although, as suggested, this property may possess different elements of value at different times.

The decisions of the same court make it equally plain that the commission is to determine the value of that property as of the date of its valuation, *i. e.*, in its depreciated state. That has been clearly assumed by the court in all the cases before it and was expressly so ruled in the Knoxville Water case and the Minnesota rate cases. This being so, the commission will generally begin its inquiry by taking the figure which is shown in our inventory as cost of reproduction new less depreciation.

This may not invariably be so. It may sometimes happen that the original cost of the property, if the construction be recent and the facts clearly ascertainable, may be more satisfactory than the estimate of reproduction furnished by our engineers; but ordinarily that figure is not obtainable and the commission will therefore begin as above.

This figure does not, however, represent the value of the property. Since that property was new certain changes have taken place. Most of the property has depreciated and is for that reason of less value, but certain of it has appreciated and is of greater value. It is universally admitted that an old and seasoned roadbed is worth more for the transaction of business than a new one.

Now, the Supreme Court has declared that just as depreciation must be subtracted, so appreciation must be added. The fact that the commission finds great difficulty in determining the value of this appreciation in dollars is no excuse for not doing so.

I have previously pointed out to the commission that appreciation is largely a process of nature and that in so far as it involves the expenditure of money that cost is paid for as a part of operating expense, and therefore by the public. If, therefore, the carrier has enjoyed sufficient earnings with which to pay its operating expenses, a proper sum for depreciation, and a return upon the investment, there is no reason in equity why anything should be allowed for appreciation. It seems to me, however, that the Supreme Court clearly indicates that something should be added on this account even though the value so reached may finally be modified by other considerations.

The commission must also add something on account of going concern value. After the decision of the Des Moines gas case it was assumed in many quarters that nothing need be added for going value in a rate case, but the language of that case was squarely opposed to this interpretation, and still later in the Denver water case the court expressly held that an addition for going concern should be made. Probably the most difficult part of your task is the determination of the amount to be added for this item.

In attempting to analyze the concept defined as going concern value, it has seemed to me that there were three varieties, or, more properly expressed, perhaps, three elements, which might attach to and overlap one another in the same property. These may be designated commercial, early losses, and structural.

Commercial.—This kind of going value arises out of the *successful* operation of the property. This property has been established as a going concern. Experience has shown that it is a profitable concern. Plainly this kind of value depends upon the earnings of the railroad past and prospective.

It was this kind of going value which the master declined to allow in the Des Moines case and properly, as the court finally held. Three hundred thousand dollars, in his judgment, is the amount which a purchaser would pay over and above the mere cost of reproducing the property and upon which a seller would insist by reason of the fact that this gas plant has demonstrated its commercial worth.

I can not believe that this kind of going value can be at all considered by you in finding the rate-making value for which you are in search, and for several reasons.

(*a*) You are asking for the value of the property, not for the value of the business. The value which you seek is a permanent value, depending upon what the carrier is devoting to the public service, and not a value which varies with the fluctuations of the stock market or the ups and downs of net earnings.

Consider for a moment the Texas & Pacific. Here is a property of magnificent prospects which did not materialize. For many years it struggled along, a part of the time in the hands of a receiver and the rest of the time just going in. A few years ago, however, on that portion of the line west of Fort Worth, which had been the poorest portion, oil was discovered, and that development and what goes with it has converted that part of the Texas & Pacific from a worthless into a profitable piece of property. Can it be that this discovery doubled and tripled the value of the property devoted by that carrier to the public service upon which it was entitled to earn a fair return if it could under reasonable rates? If oil were to be struck upon the Texas Midland, would this affect the rate-making value of that property? If so, every gusher which comes in, or goes out, raises or lowers that value.

Let us assume a case of a different kind. Here is a railroad connecting two important business centers and the only road which does connect those centers. Its traffic is large and its net earnings have been ample. The prosperity of this road,

however, had attracted attention. A rival is built. Perhaps two roads are constructed. The business which formerly went by one line is now divided by two or three, the total amount not being materially increased. That railroad which was formerly extremely prosperous can not pay its operating expenses. Is it possible that the building of the second road divided by two the rate-making value of the first and that the building of the third entirely destroyed that value in the case of all three?

The files of the commission afford another most excellent illustration of this same proposition. It will be remembered that some years ago the citizens of Cincinnati brought a petition asking that rates upon the Cincinnati Southern be reduced, and it was demonstrated upon that hearing that the Cincinnati Southern upon the business which it transacted earned a very large return upon its investment, or upon what it would cost to reproduce the property. The petitioners contended that the commission should establish rates which would yield only a fair return upon the cost of that property.

It appeared that the earnings of the Cincinnati Southern were largely from its through business, and that this through business depended upon the fact that it was under lease to the Southern Railway, which was able to divert to it an extensive traffic. Without the Southern Railway, without the through business which came to it from that source, the property would hardly have earned under existing rates a fair return upon its cost.

The commission held in that case that reference must be had, not merely to the Cincinnati Southern, but to other roads handling the same kind of traffic which must be affected by a change in rate upon the Cincinnati Southern, and the Supreme Court accepted that view. Now, it is possible that if upon the termination of the lease of the Southern of this property there were to be a readjustment of connections and of ownership so that the Southern no longer passed over to the Cincinnati Southern its through business, that circumstance would reduce the value of that property from something very much above its cost or its investment to something very much below?

(*b*) It is not unjust to the carrier if this commercial value be disregarded in the statement of the rate-making value. If a carrier has favorable connections, a strong strategic position, unusual operating conditions, it continues to enjoy the benefit of all these advantages. The Kansas City Southern has shown you that of the five roads within the territory in which it operates, upon which rates must be the same, it has superior advantages of various kinds. If this be so, then, when the common competitive rates are established, the Kansas City Southern under those rates will enjoy net earnings in excess of those of its competitors exactly in proportion as it possesses above them these so-called advantages.

To recognize commercial value in determining the rate-making value would be unjust to the public, for if the value be determined by capitalizing these advantages and a rate fixed upon that value, and if the carrier in the use of that rate also enjoys the benefit of these advantages, is there not a duplication?

(*c*) In no one of the cases which have come before the United States Supreme Court has the claim that exchange value ought to determine the rate-making value been approved. There was in the original Smyth-Ames case a suggestion that the market value of stocks and bonds should be considered, but that suggestion has been repeated in no subsequent case and never has been acted upon in any case.

The whole proposition involves a legal absurdity. A rate-making value is to be stated for the purpose of determining a fair rate. Commercial value is determined by the rates actually in effect. If, therefore, commercial value is to determine rate-making value, and rate-making value is to determine the rate, then the present rates must be right. The Supreme Court has several times in other connections pointed out the fallacy of this reasoning in a circle.

In the Minnesota rate cases the court had before it the Minneapolis & St. Louis, a very poor road, with the Great Northern and Northern Pacific, two very prosperous roads, but here it is nowhere suggested by any person that a different rule for the ascertainment of the fair value of these properties should be applied for this reason.

It is confidently believed that the commission must reject value as determined by earnings or exchange value as a measure of the rate-making value which is to be stated.

Early losses.—A second kind of going value is associated with early losses in the operation of the property.

It must be admitted that many railroads which ought to have been built and which have subsequently justified their building did not during the first years of their operations yield a proper return upon the investment. Unless the right of the owners of such a property to recoup themselves in later years of prosperity for these early losses is recognized, it must be evident that private capital will not embark in the construction of railroads. Clearly some way must be found by which to permit this recoupment.

At the same time it is equally apparent that losses can not determine the value of a property. Otherwise the property which pays the least would be the most valuable and that value would be an ever-increasing amount. Unless a carrier justifies within a reasonable time its building and is able to make up the losses which it sustained in the early years of its operation, the owners should suffer the loss which ought not to be allowed to enhance the value of the property.

This would mean that there should be a definite period, differing perhaps with different carriers, within which losses might be recouped, and that unless the loss had been made good within this period the value should not be increased on that account. For my own part I am extremely reluctant to admit that an operating loss can ever add to the value of the property upon which the carrier is entitled to an earning for all time. Such losses might well be regarded as an asset of the value and the carrier permitted to amortize the same provided it can do so within a reasonable period to be fixed.

Structural going value.—Before a railroad can be successfully run its operating organization must be built up. This is not accomplished by simply hiring so many people. The relation between these people must be established. A working organization must be developed. The same people, after this organization is perfected, will transact much more business and in a much more satisfactory way than at the beginning.

It is also necessary that the operators of these railroads become familiar with the property. Its weak points and its strong points must be developed. What traffic it can handle to advantage, both through and local, and how that traffic is to be obtained and how handled must be thought out. No organization can economically handle the business of a railroad until that railroad is thoroughly understood.

Finally and perhaps principally, this railroad must establish itself with the public. People must learn that there is such a railroad, must come to know the extent to which it can be used, must have confidence in its ability to transact the business which is committed to it.

This kind of going value inheres, so to speak, in the property itself. This railroad, considered purely as an instrument for the obtaining and the transacting of business, has this added element of value. This property has been put into motion. It has become an instrument of traffic. It has acquired a business and is handling that business. It has developed its organization for that purpose. It has established itself as a railroad in the estimation of the public. This kind of going value attaches to the property itself and is the same whether the exchange value of that property is great or small.

If I am right in my contention that structural going concern value and appreciation should be added to the depreciated value of the property, in what way are these values to

be determined. This is for the commission and is entirely a question of judgment. The commission is under no obligation to state the mental processes by which it arrives at that conclusion, nor does it seem to me that it should attempt to do so. I wish, however, to point out to the commission the method which I would myself pursue in the hope that it may lead to discussion which will be of real help to the commission in the solving of this problem.

Take a railroad which is just completed and ready to be put into operation. It starts off. From the first its equipment begins to depreciate and continues to depreciate. With the road this is otherwise. Certain parts of that portion of the property begin to appreciate from the first. The facts in this respect need not be repeated. The road solidifies, its weak spots develop, it becomes adapted to its use. Its organization is perfected. Its business is established. All this requires a certain amount of time and costs a certain amount of money and adds to the value of this railroad.

I have said in my own mind that the value of this property, considered as an instrument of traffic, as a means of getting and transacting business, would be as great at the end of five years as at the beginning. In some respects the property has deteriorated, in other respects it has improved, and above all it has been put into operation. This, of course, is entirely a question of judgment which would be answered very differently by different people.

If this assumption is correct it becomes possible to state the combined amount of appreciation and going value of this kind, for while there is no way in which we can very satisfactorily determine appreciation as such or going concern value as such, we can determine the depreciation, and if the depreciation is equal to the combined appreciation and going concern value, you have in that way a figure which can be used.

Now, depreciation in the average railroad in the first five years is between 5 and 10 per cent, depending upon the property. It should be noted that we are speaking of the road and not of the equipment. If we assume that appreciation and going concern value are some 7 or 8 per cent of the cost of reproducing the road, including general expenditure but excluding land, that sum should be added to the depreciated cost of the property in reaching its value.

Up to this point we have, I think, followed the plain indication of the Supreme Court. For the purpose of determining what is to be done with the value thus obtained reference may be had to an actual case, and the Texas Midland may be selected as that case.

Stated in accordance with the plan suggested, the figures would be as follows:

Cost of reproduction, less depreciation	$2,597,389
Add 7½ per cent of cost of road new, including general expenditures, excluding land	214,025
Present value of lands	254,749
Materials and supplies	96,875
Working capital	60,000
Total	$3,223,038

The report finds that the investment upon the Texas Midland may equal, but does not exceed, $2,893,360. Cost of reproduction new plus the present value of lands is $3,715,835.

If we substract from the value above suggested materials and supplies and working capital, since these are not included in original cost or investment, we have left $3,066,172, which is $649,000 less than cost of reproduction new plus present value of lands, and about $175,000 in excess of original cost, but the difference between the original cost and the present value of lands is over $200,000, which takes care of the entire excess of the proposed value over investment.

For my own part, considering the history of the Texas Midland, I am satisfied, from an examination of the whole matter, that something in the vicinity of $3,225,000 would be a fair value upon which to permit the owners of this property to earn. That value includes materials and supplies and working capital. The materials and supplies are stated at the amount actually on hand upon the date of valuation. Ordinarily this figure can probably be accepted.

In some investigations made by me for the director general I reached the conclusion that operating revenues for one month would fairly indicate the amount which should be allowed for working capital and that rule has been applied in this case. I do not suggest it to the commission with much confidence.

It would probably be sufficient if the commission was to omit these two items from the value stated, supplying them later in case an actual use of a total rate-making value were to be made. Owing to change in prices, both materials and supplies and working capital would exceed today what they properly were in 1914.

If an attempt were made to state a value for the Kansas City Southern by the same method which has been applied to the Texas Midland, a somewhat less satisfactory conclusion would be reached. In its statistical return to the commission as of June 30, 1914, the Kansas City Southern reported that it was unable to state the cost of its property. The accountants of the commission have gone back to the original construction records, as they were kept by the construction companies, and from these and the records of the carrier have been able to determine the amount actually invested. The carrier itself agrees that this sum did not exceed in round numbers $45,700,000.

If a value were to be built up as in case of the Texas Midland it would be some $4,000,000 or $5,000,000 less than these actual expenditures. This is very largely accounted for by the fact that in case of the Kansas City Southern there has been practically no increase in the value of its lands, that is, the present value as stated by us is only a trifle larger than the actual original cost, a very unusual thing with as old a property as this.

It will also be noted from an examination of the history of the property that this railroad has in recent years been rebuilt so as to secure much greater economy of operation, grades having been eliminated, curves reduced, heavier rail laid, etc. In the course of this reconstruction large amounts of property were of necessity abandoned, and it is quite probable that more or less of the property retired may not have been written out of the accounts of the carrier.

The history of the development of this carrier presents a good illustration of a class of items which in my opinion should be added to the value of the property. This railroad was projected and built to serve as the most direct line between Kansas City, representing the great grain-producing area west of the Mississippi river, and the Gulf of Mexico. It was to be the short line by which the products of that enormous territory would reach tidewater.

In order to accomplish this purpose it was necessary to make a connection with the ocean. The terminus of the road must be such that ocean-going vessels could load and unload at its docks. To accomplish this it was necessary to construct a canal and a tidal basin at Port Arthur at the expense of about $1,000,000. When this had been constructed and was in operation it was conveyed to the United States government upon condition that the government should maintain it and should also make Port Arthur a port of import and export.

Now, it seems to me that this $1,000,000, which was actually expended in the construction of this tidal basin, is an element of value which should be added to the value of the Kansas City Southern. That railroad is practically worthless without it. It was a part of the original plan under which the road was constructed. The promoters of the road actually expended that money, and the facility could not have been furnished, the road could not have been completed without its expenditure. Looking to the purposes for which it was built it was cheaper and more advantageous in every way for the carrier to convey this property to the government as it did

rather than to retain it itself. It seems to me, therefore, that in equity and good conscience you must add the cost of producing that facility to the value of the Kansas City Southern as otherwise stated.

You will frequently find, I think, as you examine the various properties coming before you similar items of expenditure. The outlay has been necessary in the development of the property. It represents an actual expenditure and often a thing now in existence, but it is not embraced in cost of reproduction with or without depreciation. It has been our theory that in showing cost of reproduction the engineer should deal only with the property in existence. That he can see; about that he knows. If you allow him to go further and to speculate as to what may have been done or may not have been done and the cost of it you introduce into that figure an element of uncertainty which ought not to be there. It has seemed much better to us that items like the canal and turning basin of the Kansas City Southern should be presented to the commission when it fixes the value of the property. Whether a particular item should be allowed is for the commission in each case.

The state commissions have been inclined to insist that original cost should control. This, under the decisions of the Supreme Court, can not be since it is the *present value* of the property and not its *original cost* which you are to determine. Original cost is, however, one of the items for consideration.

It should be noted that there may be a distinction between original cost and investment. For example, the Elgin, Joliet & Eastern, one of the carriers before the commission in this proceeding, claims to have made additions to its property now in existence to the amount of approximately $1,500,000 out of operating expenses. The items of property so paid for appear in our inventory and would be included in the original cost of the property now in existence as being devoted to the public service. Upon the other hand, that item would not be included in investment. If the claim of the carrier were sustained by our investigation that item would be reported separately for such consideration as the commission might give it.

Original cost is not estimated except in a limited way, as indicated in the Texas Midland opinion, but is always reported when the records of the carrier permit. Every effort is made to ascertain and report the investment, and this can frequently be done with a considerable degree of assurance. Just what use can be made of these two items of information must depend on the individual case. Certainly they are both of significance and should always receive careful attention.

What I am attempting to do is to point out to the commission that the Supreme Court has apparently decided:

1. That the fixing of a final value is an act of judgment upon a review of all the relevant facts; but

2. That in reviewing and applying these facts up to a certain point a definite plan has been approved, which can in ordinary cases be safely followed.

V.

Assuming that a value has been fixed as of a certain date, in what way is that value to be kept good? It has been often asserted that before this valuation could be completed it would be out of date and of no service, and unless some method can be devised by which the valuation can be kept up to date, by which we can know from year to year what the value of these properties is, the valuation itself will in fact soon be worthless or at least of diminished and diminishing account.

My own thought has been that when a value had once been determined as of a certain date, we might add to this value actual expenditures for additions and betterments and deduct actual cost of retirements.

Order 3 has been adopted for the purpose of accomplishing this thing. Under that order carriers are required to keep in a certain specified way their records of additions and retirements. An authority must be issued in every case, either for the addition or for the retirement. In case of the addition a completion report must be made up in every instance. These completion reports are not filed with the commission, since to care for them all would be an almost intolerable burden, and, it seemed to us, an unnecessary one, but the carrier is required to file from time to time a list of these projects and at the end of each year is required to file a statement showing the amount of money expended in each project and the cost of each retirement. We must know whether these amounts are properly arrived at, and this will require a considerable but not an excessive amount of work when the system is once fairly inaugurated and under way.

Assuming that these records have been properly policed and that we have at the end of each year a statement of retirements and additions, would it not be entirely fair to state the value of this property by subtracting the cost of the retirement and adding the cost of the betterment. It is true that you do pass in a way from the structural to the investment theory, but it is also true that nothing perhaps more fairly represents the value of the betterment, for the time being, at least, than its actual cost when known.

These completion reports are kept by valuation sections and in the units of our inventory, so that it would be possible at any time, were it desired, to bring these inventories to date and apply whatever price might seem just. Personally I do not believe this will ever be done. It would be a considerable task to do it after an interval of several years, but the means will be available.

Two possible difficulties exist in the accomplishing of this plan—depreciation of structures and increase in value of lands.

If the commission would prescribe a definite rate of depreciation for the different classes of equipment the books of the carrier would at any time show roughly the depreciated value of its equipment. In case of the average railroad more than 10 or 15 years old, it can safely be assumed that maintenance takes care of depreciation. Carriers insist, and the best thought I have been able to give the matter convinces me of the correctness of their position, that this rule can be safely applied. A new road must, of course, be depreciated during the early years of its operation, and special properties must be individually treated. For example, maintenance would not take care of depreciation in case of the terminal company which owns the South Station at Boston, upon which an engineering report has just been submitted. The principal item there is the station itself, and while that building would stand for an almost indefinite time, still it is reasonably certain that in the changing needs and conditions of Boston that station, in process of time, will become obsolete. Some annual allowance for depreciation should therefore be made. On the whole, however, depreciation offers no obstacle to the execution of this plan.

With lands it is different. Carrier lands have been increasing in most sections of this country for the last half century. They are increasing rapidly just now, and while the prices of today are abnormal and will recede, still at the end of 10 or 20 years the present value of carrier lands as we report that item will undoubtedly be greater and in some instances materially greater than on valuation date.

Apparently there is no way in which this item can be corrected save through a reappraisal, or what is equivalent to that. For my own part I very strongly feel that carriers ought not to be allowed any increment of value in case of their carrier lands. The right to use private lands for the construction and maintenance of these avenues of public transportation is not property; it is more analogous to a franchise. There is little distinction between the right granted a carrier by a municipality to use a portion of its street and that acquired under its charter through the exercise of eminent domain. It is perhaps just to allow this increase in value up to the present time since it has been generally understood that this was to be done; but such an added value has no basis of

equity and ought to be forbidden probably by an act of Congress.

VI.

This war, with its consequent inflation of values, has introduced another element of great significance into this valuation. Our engineering prices are determined as of June 30, 1914. The cost of reproducing a railroad today would be at least 75 per cent more than in 1914 and the cost of equipping it would be two and one-half times as much. If reproduction cost is to govern, and if present values are to determine cost of reproduction, the value of the railroad property of this country has been doubled without the expenditure of a dollar upon the part of its owners.

It is evident that if these prices continue permanent, even to a modified extent, a question of tremendous importance is presented which may even involve a constitutional amendment, and upon that question I express no opinion whatever. If the commission were to make a valuation upon the basis of present prices and to establish rates which would yield a fair return upon that valuation, most unfortunate results must ensue. We should assume for the present that these prices are abnormal, as most men believe they are, and should proceed accordingly.

Upon this assumption it seems to me that exactly the method above outlined should be followed. A value should be determined as of the valuation date of each property, applying prices of 1914 or normal prices, and to that value should be added the actual expenditures made by the carrier for additions and betterments to its property. In that way the carrier will be given the benefit of higher prices in so far as it has been obliged to pay those prices in the improvement of its property. This would be entirely just as to those roads which bear a valuation date previous to June 30, 1916, for up to that time there had been no considerable advance in price. A moment's consideration will show that it might not be just to a road bearing a later valuation date.

The Texas Midland was valued as of June 30, 1914, and all additions since that date are to be put in at actual cost. Suppose that the Texas Midland were to be valued as of June 30, 1919. Assume also that certain additions and betterments had been made during the years 1917, 1918, and 1919. These additions would appear in the inventory and to that inventory would be applied the prices of 1914. The carrier would not therefore be allowed the full amount of its expenditures for improvements in recent years. This would manifestly operate to the disadvantage of those carriers whose valuation date is subsequent to June 30, 1916, when prices began to advance.

For the purpose of equalizing this it has been the thought of the Bureau of Valuation that while we should make up our inventory as of the valuation date, and should apply prices as of June 30, 1914, we should permit the carrier to show the excess of its actual expenditures for additions and betterments over the price as established by us since prices began to advance and that this excess should be added to the cost of reproduction as of the valuation date.

Lands can not be handled in this manner. If the carrier is to be allowed for the unearned increment in value of its operative lands, I see no way in which this can be arrived at with accuracy except by a new appraisal. An estimate of the percentage of increase could probably be made with considerable accuracy.

I may perhaps say that up the present time there has been no great increase in the value of terminal lands and these constitute the major part of that item. Rural lands have in some instances in the newer parts of the country very materially advanced.

As stated in the beginning I have not attempted in this memorandum to discuss or apply court decisions. All I have attempted to do here is to merely suggest a practical method which might be followed in stating a final value. I feel very strongly that the present emergency requires that the commission should at the earliest possible moment begin the determination of such values and should continue it as rapidly as may be.

It has all along been my thought that the commission ought not to state a value until it could know what the general effect of any plan adopted by it might be. Our work has gone far enough so that I feel satisfied in my own mind that the plan suggested would not result in any violent dislocation of railroad values and would be fairly just to the carrier and the public.

Plumb Plan League "News"

The issue for February 7 of "Labor," the weekly newspaper published by the Plumb Plan League, carries on its first page an editorial in large type headed "Wanted; 200 Workers and Farmers in Congress," in which labor and the farmer are advised to begin to organize now and to mobilize their votes to accomplish this purpose. The editorial says there are nearly 90,000,000 wage earners and farmers in the United States, yet they have not more than a score of representatives in both branches of Congress, whereas the lawyers have 260 members and the bankers have many times their quota, as have the packers and food gamblers. The steel trust, the sugar trust, the lumber trust and the mine owners are said to be more than adequately represented.

This issue of "Labor" has been looked forward to with some interest because of its previous predictions that the conferees on the railroad bill would be unable to agree, that there would be no railroad legislation by March 1, and that the railroads would be retained by the government. The conferees announced their agreement on Wednesday, February 4, in the form of a compromise between the Esch and Cummins bills, without the anti-strike clause, but including the rate-making rule which has been so violently opposed by the labor press. The Plumb paper does not include this news. Its story on the conferees says Congress may soon make a final decision on the railroad issue and that everything indicates that the conferees on the railroad bills have encountered another snag and that their plan to report a compromise bill will not succeed. It is stated that "the conferee" failure to reach an agreement is due not to their inability to get together, but to the fact that they are afraid to present to the House and Senate a compromise which is acceptable to Wall Street. They fear that such a proposal would be overwhelmingly defeated.

The Plumb paper continues to discuss the Esch and Cummins bills as if they were intended to return the railroads to their owners on March 1 and to ignore the fact that that has been accomplished by the President's proclamation relinquishing the roads as of March 1, which was issued on December 24 without waiting for the legislation; and it strongly advises its readers to "write today and ask your Senators and Congressmen to vote against any conference report which returns the railroads to private ownership and to support the proposition looking to a two years extension of federal control."

"Labor" also prints a letter from Robert W. Woolley of the Interstate Commerce Commission, calling attention to the fact that the paper in its previous issue had misquoted him as advocating government ownership of railroads in a speech at Washington. Mr. Woolley begged to say that in no statement of his, no matter when and where delivered, has there been a declaration for government ownership; that what he has said is that "it will never do to return to the old order of things and that the only practical thing to do in the present situation is to continue federal control for a period of at least two years in order that time and American genius may be given a chance to work out a permanent solution of the railroad problem."

The Kin-Han Railway Buys Prairie Type Locomotives

THE KIN-HAN RAILWAY of China, running from Pekin to Hankow, has purchased 10 Prairie type locomotives from the Lima Locomotive Works. These locomotives are to be used in either freight or passenger service.

A number of difficult engineering problems, due to track conditions, were encountered in the design of these locomotives. There were very close limitations of weight for both the engine and tender. There were also rigid requirements in connection with the counterbalancing of the reciprocating parts and the locomotives were required to pass over 22-deg. curves. To meet these conditions and produce a satisfactory design of locomotive required great care in designing and construction. The engines have been built and fully meet the requirements in all particulars.

The limitations of weights made it necessary to design all the parts as light as possible, consistent with the proper strength. The built-up type of construction of plates and angles was freely used in the main frames and the tender frame bracing wherever it was found that such a construction could be satisfactorily employed. Care was taken to produce a symmetrical, clean looking design, and wherever it was feasible the parts were made in one piece. For example, the guide yoke and the link supports were made in an integral casting, thus eliminating bolted connections and reducing the weight of the parts.

The limit for the dynamic augment at a speed of 60 klm. (37.3 miles) per hour was specified at 15 per cent of the static wheel load. In order to come within these requirements and at the same time provide the proper counterbalance, the reciprocating parts were made of very light design and a special method was employed to secure an exact adjustment of the counterweights in the driving wheels. The dynamic augment requirements were met and by means of careful adjustment the proper counterbalance was secured for the reciprocating weights.

The boiler is of the extended wagon top type, radially stayed and fitted with a combustion chamber. The locomotives are equipped with superheaters and the reversing mechanism is of the Lawson patented screw type, which provides for easy operation and is fitted with a positive locking device and an indicator which shows the exact cut-off at which the engine is being operated.

The tender is of the six-wheel, rigid wheel base type, with plate side frames, the journal boxes working in pedestals riveted to the outside plates of the frame. The two rear pairs of wheels under the tender are equalized. The tender tank is 20 ft. 8 in. long by 9 ft. 8 in. wide by 4 ft. 2 in. high inside, and is built up of ¼-in. steel plate reinforced with 2½-in. by 2½-in. by 5/16-in. angles. The coal space is 4 ft. 9 in. wide and is 6 ft. 2 in. long at the floor, extending back on the slope sheet for a distance of 5 ft., giving a coal capacity of 13,300 lb. The water capacity of the tender is 4,800 U. S. gallons.

Great care was necessary in making the tender design to meet the limitations of axle load as given in the specification. In general, the locomotive was designed along the lines of American practice and the builders were given a free hand in the construction of details so long as they were kept within the limitations of the specifications. The general dimensions of the locomotive, as well as the actual weights as compared with the weight limitations are given in the following table.

	Actual weights	Limit of weight
Engine		
Front drivers	32,600	33,000
Main drivers	32,600	33,000
Back drivers	32,000	33,000
Total drivers	97,200	99,000
Engine truck	28,400	28,500
Trailing truck	30,400	31,300
Engine, total	156,000	158,800
Tender		
Front wheel	30,400	30,800
Middle wheel	30,600	30,800
Back wheel	30,600	30,800
Total	91,600	92,400

General Data

Gage	4 ft. 8½ in.
Service	Mixed
Fuel	Soft coal

Prairie Type Locomotive with Six-Wheel Tender Built by the Lima Locomotive Works for the Kin-Han Railway of China

Tractive effort	25,500 lb.
Weight in working order	156,000 lb.
Weight on drivers	97,200 lb.
Weight of engine and tender in working order	247,600 lb.
Wheel base, driving	13 ft. 10 in.
Wheel base, total	31 ft. 7 in.
Wheel base, engine and tender	53 ft. 10 in.
Cylinders, diameter and stroke	20 in. by 26 in.
Valves	
Kind	Piston
Diameter	12 in.
Wheels	
Driving, diameter over tires	59 in.
Driving journals, main, diameter and length	8½ in. by 11 in.
Boiler	
Style	Extended wagon top
Working pressure	170 lb. per sq. in.
Outside diameter of first ring	61⅛ in.
Firebox, length and width	84 in. by 54¼ in.
Tubes, number and outside diameter	132—2 in.
Flues, number and outside diameter	21—5¾ in.
Heating surface, tubes and flues	1,418 sq. ft.
Heating surface, firebox, including arch tubes	207 sq. ft.
Heating surface, total	1,625 sq. ft.
Superheater heating surface	366 sq. ft.
Grate area	31.6 sq. ft.
Tender	
Tank	U-shape
Frame	Plate
Weight	91,600 lb.
Journals, diameter and length	5¼ in. by 10¼ in.
Water capacity	4,800 U. S. gal.
Coal capacity	13,350 tons

THE PORT OF SAGUA, CUBA, is to be improved, principally by means of dredging, at a cost of about $2,000,000.

Railroads Hampered by Severe Weather Conditions

DIRECTOR GENERAL HINES on February 6 authorized the following:

Severe storms ranging over practically the entire eastern section east of Ohio and extending as far south as West Virginia have seriously interfered with railroad operations in the last 48 hours. These storms have added to the difficulties which resulted in January and December from storms in the West, in Michigan, in Ohio and in a large part of the bituminous coal producing region. The situation has been further complicated by the wide prevalence of influenza among railroad employees. For instance reports this morning showed 2,000 employees of the New York Central alone ill with the influenza. These unsatisfactory conditions, of course, interfere with railroad traffic, and it is to be anticipated that they will influence railroad earnings unsatisfactorily. However, the regional directors affected report that the officers and employees of the various railroads are doing their utmost to keep traffic moving and overcome the extreme difficulties.

Regional Director Hardin of the Eastern region, with headquarters at New York, has reported a severe blizzard in New England, the Middle Atlantic states and in the northern part of New York. Floating operations at New York have been practically suspended during the storms. The weather has seriously interfered with railroad operations and passenger train performance, on account of freezing switches, high winds, drifting snow, etc. The railroads are loading material for filling washouts with the object of restoring service as soon as the tide permits.

Regional Director Baldwin of the Allegheny region, with headquarters at Philadelphia, has reported severe weather conditions throughout the eastern part of his region, the south end of West Jersey and Seashore Railroad being covered with water and necessitating the use of steam engines to pull electric trains, 800 feet of the Ocean City branch having been washed out, the Stone Harbor branch having been partially washed out and tracks also being out of service near Townsend Inlet. The Wildwood branch was also out of service on account of high water and part of the tracks at Cape May was washed out.

Regional Director Maher of the Pocahontas region with headquarters at Roanoke, reported heavy rains along the Virginian Railroad, with a number of small slides on New River division. He also reported water over Low street in Norfolk, Va. Mr. Maher pointed out that the dumping of coal at Hampton Roads was light on account of danger in undertaking to berth or unberth vessels in the gale. The situation at Norfolk and Hampton Roads has interfered with the delivery of coal to other parts of the East.

Weather conditions in many parts of the country were worse in December and January than they have been for several years previous. For instance, the mean monthly temperature in Chicago in the month of December, 1919, was 21.4, which was lower than the mean monthly temperature of December, 1918-17-16-15 and '14, and, similarly, the lowest temperature in Chicago in December, 1919, was 8 degrees below zero, whereas the lowest temperature in the five preceding years was 3 degrees below zero in December, 1917. In Chicago, Toledo, Duluth, St. Paul, and Albany, N. Y., the mean monthly temperature was lower in January of this year than in January of any of the five preceding years with the single exception of January, 1918. The lowest temperature in Albany in January, 1920, was 17 degrees below zero, which was lower by 6 degrees than in the January of the five preceding years.

In spite of these adverse weather conditions the railroads loaded more traffic in January and December just past than in the two preceding years. The total number of cars loaded in the four weeks ended January 24, 1920, which are the last figures available, was 3,322,928 cars, whereas during the same period in 1919, 2,829,444 cars were loaded and in the same period in 1918, 2,619,481 cars were loaded. In the four weeks ended December 27, 1919, a total of 3,100,972 cars were loaded, whereas in the same period in 1918, 3,004,179 cars were loaded and in the same period of 1917, 3,044,610 cars were loaded.

Railroads in 1919 Earned Only Half of Standard Return Set by Cummins Bill

THE NET OPERATING INCOME of the Class I railroads in 1919 was about $515,000,000, which represents a return of only 2¾ per cent on their estimated investment of $19,000,000,000, according to a preliminary compilation of the monthly returns to the Interstate Commerce Commission. This is just half of the 5½ per cent prescribed as the standard in the Cummins-Esch bill as agreed upon by the conferee committee and represents about 57 per cent of the standard return guaranteed to the railroads during federal control. The Railroad Administration statements increase the amount somewhat by charging back into 1918 the retroactive wage payments which extend back into that year although paid in 1919.

The preliminary figures show that while total operating revenues passed the five billion dollar mark for the first time, amounting to $5,181,000,000, the operating expenses and taxes increased by an even greater amount, totalling $4,666,000,000 for the year. The deficit as compared with the standard return on this basis is about $390,000,000, although Mr. Hines' preliminary statement, after recasting the accounts, placed it at $349,000,000. The Railroad Administration's complete statement for December and the year has not yet been issued. Figures for 193 roads, operating 232,000 miles, for December show operating revenues amounting to $450,507,568, an increase of 2.69 per cent over December, 1918; operating expenses, $412,326,315, an increase of 4.54 per cent; taxes, $22,038,030, an increase of 50 per cent, and net operating income, $12,410,261, a decrease of 53.92 per cent. For the Eastern district the decrease in net operating income was 137 per cent, for the Southern district it was 40 per cent and for the Western district it was 5.74 per cent.

The railroads having operating revenues above $25,000,000 (which report about 80 per cent of the total operating revenues of the Class I roads), according to the monthly report of the Interstate Commerce Commission, earned in 1919 a net operating income of $429,551,778, as compared with $546,687,677 in 1918. Their total operating revenues were $4,127,463,039, as compared with $3,910,928,814 in 1918, and their total operating expenses were $3,498,244,648, as compared with $3,188,919,166. Two of these roads, the Chicago & Eastern Illinois, and the Pittsburgh, Cincinnati, Chicago & St. Louis, had operating deficits for the year, while 16 had deficits for December. For December the $25,000,000 roads had a net operating income of $14,089,435, as compared with $21,647,841 in 1918.

Senator Hoke Smith's resolution, noticed in the *Railway Age* of January 16, page 264, calling for an investigation of the living conditions of trainmen when lying over at terminals remote from their homes, and of feasibility of requiring railroad companies to furnish better accommodations, was adopted by the Senate; and the Interstate Commerce Commission, in accordance with the resolution, has ordered an inquiry.

Annual Report of the Division of Operation

Demobilization, Revival of Business, and Danger of Coal Shortage Presented Difficult Problems

CONTINUANCE OF MANY reforms in railroad operation inaugurated under the federal control of the lines was recommended in the annual report for 1919 of W. T. Tyler, director, Division of Operation of the United States Railroad Administration, submitted to Director General Walker D. Hines. The report pointed out in detail the efficiencies and economies accomplished in various phases of railroad operation and the advantages which it says would follow the continuance of these measures when the federal control of the roads is terminated.

Director Tyler emphasized the benefits derived from the permit system for the control of freight shipments. He pointed out the congestion which results from indiscriminate efforts to move freight for which the railroads have no outlet. "The trouble is," he said, "that huge quantities of freight are loaded and started forward for which there is no outlet, which are in excess of the ability of the consignee to accept promptly, which exceed the digestive capacity of gateways and terminals, or for which vessels are not available at the ports." The remedy for this condition, Mr. Tyler's report said, is the control of this freight at its source through the permit system, to the measure of the consignee's ability to accept, the railroad's facilities, or the ports' capacity. The report continued:

"With the advent this year of heavy traffic, the physical limitations of the railroad plant as well as the question of vessel supply promptly made themselves felt, and had it not been for the vigorous use of the permit system as developed under federal control serious congestions would undoubtedly have occurred.

As it was, the operation of the permit system made it possible to keep the heavy export business moving through the ports, keep the coal for tidewater and lake transshipments under control, move the heavy grain crop in an orderly manner, and at the same time handle a maximum volume of other business through the avoidance of congestion and the freeing for other loading of cars power and facilities which would not otherwise have been available. From time to time shortages resulted in 1919 in the car supply for some commodities, but these shortages were minimized through the permit system.

"It is exceedingly important that the substantial benefits of the permit system should not be lost with the end of federal control and arrangements should be made for its continuance under some central organization of the carriers, such organization to have power to establish permanent or temporary agencies for the issuances of permits from time to time as may be necessary. This organization should also be authorized to require of the various roads the repuorts and information necessary to the successful handling of the permit system."

Director Tyler, commenting on the handling of the car supply for the year, said: "Another factor in the successful handling of the heavy business has been the centralized control of the cars which has made it possible to relocate equipment without reference to initials in accordance with the demands of commerce. This is another feature which should be continued under proper limitations under a central organization of the railroads themselves.

"The common use of cars was not only successful with reference to the box, stock, and flat cars, but it was particularly so as in the case of refrigerator cars, which since July 1, 1918, have been handled by the Car Service Section through a branch office located at Chicago. Tank cars have also been handled through this agency. With an increase of more than 20 per cent in the movement of fruits and vegetables compared with last year and an increase in the distances hauled, this business was handled with signal success, notwithstanding what would, except for this centralized control, have been a serious shortage of refrigerator cars. Some shortages in refrigerator cars have resulted, particularly on the Pacific Coast, and additional refrigerators are needed by the railroads."

In its formal recommendations as to the handling of the car supply, the report said:

"The experience of the Car Service Section during the past years has made it quite clear that there should be continued some uniformity of method of car control and distribution as between portions of the country, railroads, stations and shippers. The result of the two years' work has produced, among other things, uniform rules to govern the distribution of coal cars and grain cars, and this establishes practical uniformity with respect to the car supply for the two most important commodities handled by the railroads. There is, however, room for improvement along these lines with respect to other of the important tonnage-producing articles.

"It is therefore recommended—

"That the railroads continue the work of establishing uniformity in rules governing car supply for the various important commodities handled.

"That the campaign which has been continued now for two years under varying circumstances for the more effective utilization of equipment by heavier loading be continued.

"That every effort be made to continue and extend the pooling of lake and tidewater coal; the railroads maintaining the necessary organizations at all times to handle traffic so pooled.

"That arrangements be made to set up, at least in skeletonized form, the organization necessary to control the movement of traffic to and via ports whenever traffic conditions warrant by the placing of embargoes and the issuance of permits."

Looking forward to the conditions which the railroads must meet in the near future, the report said:

"The locomotives of the country are in better condition as a whole than they have ever been before during a period of very heavy business, and while they number above 65,100, an adequate program for new power should be adopted at an early date in order to take care of the commerce which are abundant reasons for believing must be handled by the railroads in the months and years which lie just ahead.

"There have been completed in the first nine months of 1919 442 locomotives which were ordered prior to federal control, 989 locomotives built to standardized design prepared by the United States Railroad Administration, and 103 locomotives constructed in railroad shops, making a total of 1,534 new locomotives placed in service during the first nine months of the current year.

"The program in repairing freight cars, with the new cars added, has resulted in rapidly making available an increased number of cars for the handling of the business of the fall and winter, but these cars will not be sufficient for the requirements of next year, unless all signs fail, and a comprehensive car-building program should be adopted by the railroads as early as practicable.

"Inadequate facilities for making repairs to locomotives

and cars which were emphasized by railroads receiving heavier power during the war without proportionate increases in facilities made maintenance of equipment a difficult operation. Wherever possible terminal facilities were consolidated to promote efficiency as well as to reduce overhead expenses. This permitted us to utilize the best of facilities for the benefit of all the roads; 844 terminals have been so consolidated during federal operation.

"From the beginning the mechanical department of the Division of Operation has diligently endeavored to maintain the equipment without any idea that economies should or could be realized by reducing maintenance which the equipment ought to receive, but with the thought that the fullest possible measure of maintenance should be given, trying through greater vigilance to get more maintenance per dollar of money expended than would be obtained if such vigilance were lacking."

Discussing standardization of locomotives and freight cars, Director Tyler reported:

"Experience with these standardized locomotives and cars has shown them to be of exceptionally good design and construction. The locomotives, wherever tested against similar locomotives built to individual designs, have shown superiority in the matter of efficiency and economy in operation, and while it is yet too early to give definite figures with respect to maintenance, it is being demonstrated that the standardized fittings and design of parts will reduce maintenance costs."

The coordination of terminals was recommended by Director Tyler as a continuing policy for the railroads. He said:

"That the Railroad Administration has been justified in the consolidation of terminals is shown by the results obtained from this operation. The terminals have not only been operated more economically but more efficiently, congestions have been lessened or avoided, terminal delays reduced, car supply increased by the saving of cars from less-carload service by consolidating those formerly loaded in duplicate for the same destinations, empty car mileage avoided, and the interchange of cars with connections greatly facilitated.

"The benefits from the unification of terminals are so many and the improvement of the service so marked that it is to be hoped that whatever the status of the railroads, there may be serious consideration given to each case of consolidation, unification, or coordination before it is discontinued.

"This should be done, also, in each case of the use of single-track parallel lines as double track and the coordination or unification of water terminals, etc., so that the plans worked out under Federal control which have resulted in greater transportation efficiency may be retained under private operation where it is practicable to do so."

In discussing maintenance of way work, Director Tyler said:

"In handling the maintenance of way work one of the most important items that had to be met was the increasing cost of labor and material. As expenditures for maintenance of way and structures represent about one-sixth of the total operating expenses, naturally this phase of railroad administration has been prominent during the year and a consistent effort has been made to increase efficiency. Regional directors have held frequent conferences on the subject with their federal managers, who in turn have gone into it with their subordinates with a view to stimulating interest in the effort to improve supervision over maintenance matters and to increase the efficiency of the workmen. It is felt that important progress has been made and that the work done in this direction will be a benefit to the railroads for the future."

Outlining the conditions which the Division of Operation confronted during the year, the report said:

"The year 1919 has been divided very evenly between a period of business depression, during which there was a very general hesitation on the part of the purchasers due to unsettled price conditions, and one of tremendous business revival in practically all lines.

"From a condition in which there were stored over 480,000 freight cars for which there was no loading, developments were such that a little after midyear these were not only quickly absorbed, but a condition of shortage developed.

"In short, the recovery of business was rapid and so complete that from the smallest month's business since 1915 (February, 1919) with its 25,700,000 ton miles, the tons one mile for October totaled 40,300,000, or the greatest in the history of our railroads except for the one month of August, 1918, when the war pressure was at its height."

Director Tyler's report dwelt on the enormous amount of transportation involved in the handling of troops during the war and during a large part of 1919. He pointed out that on November 30, 1919, approximately 94 per cent of the 4,000,000 men called to the colors had been released from service and returned to their homes.

He recited that from April, 1917, to November 30, 1919, there had been moved 15,724,058 men, involving the equivalent of nearly 7,000,000,000 miles of travel by one passenger; he also pointed out that 25,103 special trains had been operated, these trains averaging 424 men per train and 759 miles traveled per train, 12 cars per train, and 21 miles per hour. He showed that a total of 279,106 passenger cars, including sleeping cars, 22,300 baggage cars, and 26,524 special freight cars for troop impedimenta, totaling 327,930 cars, had been used in connection with troop movements. He also showed that a total of 150,000 sick and wounded men have been moved by the railroads from ports to hospitals, etc., throughout the country, for which the most careful preparation and best possible service was arranged. Two hundred and fifteen cars were especially assigned in this service, and solid trains with sick and wounded were run from New York as far as Camp Kearney, Calif., and Camp Lewis, Wash.

Director Tyler's report showed that in May, 1919, the Secretary of War said, regarding the handling of troops by the railroads: "The splendid cooperation received from the railroads, both in prompt dispatch of the troops overseas and in handling the return movement, is greatly appreciated by the War Department, and the magnitude of this undertaking is the admiration of all."

The report reviewed in detail the steps taken by the division to handle the movement of the grain crop, coal and coke production, commodities moving in refrigerator cars, and other large freight movements through the Car Service Section.

Early in September it was determined to be necessary to move a minimum of 11,000,000 tons of coal a week in order to provide for the needs of the country. From that time on until the beginning of the bituminous coal-miners' strike on November 1, this figure of 11,000,000 tons a week was exceeded each week, the total rising to 13,200,000 tons during the week ended October 25; this figure constituting a new high record for the country. Subsequent to the coal strike intensive efforts were again made to load a maximum of coal, with the result that the movement on December 29 had reached the rate of 13,000,000 tons a week.

As to the grain crop, report showed that according to the Wheat Corporation's latest available records, there were moved July 1 to December 12, 1919, 625,484,000 bushels of wheat from the farms, or about 674,000 bushels more than moved during the same period in 1918. During same period of 1919, there had also been ground by the mills 314,444,000 bushels of wheat, or 19 per cent more than in

same period in 1918, and according to the estimates of the Wheat Corporation of wheat to be moved, 73 per cent had been moved from the farms. The report pointed out that in December the western roads were greatly hampered in the movemnt of what and corn crops by reason of an unusually early and severe storm of snow, which, together with the unreasonably cold weather, brought about some congestion. The report also pointed out that, considering the wheat crop as a whole, there was about 2 per cent more grown in 1919 than in 1918, but that there was considerably more transportation involved in the movement for the reason that it was grown in States more remote from point of consumption. For instance, Texas produced 240 per cent more wheat in 1919 than in 1918 and Oklahoma produced 160 per cent more in 1919 than in 1918. The report also stated that the total corn crop to be moved by rail will involve approximately 418,000 carloads.

The report reviewed in detail the steps taken to insure conservation of coal by the railroads, and said:

"A conservative estimate places the total savings made for the year 1919 as compared with 1918 at $45,789,000. This sum is not large when compared with the total fuel bill, which will approximate $665,000,000. It is nevertheless a gratifying figure when it is considered that the results were accomplished without appreciable additional capital expenditure for the purpose, without radical change in existing equipment and facilities, and that the cost for organization to do this has been small. In other words, this saving is largely the result of effort to secure carefulness in the use of fuel instead of heavy capital investment for improved facilities."

Director Tyler declared that with increasing fuel prices the fuel conservation work is assuming progressively greater importance as time goes on, and that it should by all means be continued.

The report outlined the work done in promoting safety in railroad operation, and said:

"As an example of what can and is being accomplished in this very important matter, it may be mentioned that as a result of the nation-wide campaign, October 18-31, 1919, the percentage of decrease compared with the same period of 1918, was, killed 34.9 per cent, and injured 54.6 per cent. Surely this good work should not be discontinued."

Weekly Traffic Report

According to a report on traffic conditions for the week ended January 29 made to Director General Hines, revenue freight loaded and freight received from connections for the various regions was as follows:

Eastern region—Revenue freight loaded, 187,365, an increase of 11,924 cars; received from connections, 209,004, an increase of 428 cars. Allegheny region — Revenue freight loaded, 176,842 cars, an increase of 12,500 cars; received from connections, 142,496, a decrease of 48 cars. Pocahontas region—Revenue freight loaded, 30,457 cars, an increase of 894 cars; received from connections, 14,969 cars, a decrease of 584. Southern region—Revenue freight loaded, 126,097 cars, an increase of 19,558; received from connections, 76,766 cars, an increase of 13,059. Northwestern region—Revenue freight loaded, 114,606 cars, an increase of 13,171 cars; received from connections, 70,935 cars, an increase of 1,906 cars. Central Western region—Revenue freight loaded, 118,984 cars, an increase of 20,155 cars; received from connections, 67,335 cars, an increase of 6,619 cars. Southwestern region—Revenue freight loaded, 62,068 cars, an increase of 8,941 cars; received from connections, 54,013 cars, an increase of 9,271 cars.

A summary of the report follows:

Eastern Region.—There has been a considerable falling off in the movement of freight as compared with the recent heavy increases over last year, due to weather conditions during the past week, with resulting accumulations and necessary embargoes. Conditions, however, are very much improved as compared with the previous week. Passenger movement has been considerably restricted by severe weather and delayed trains, also apparently by the influenza epidemic.

Allegheny Region. — Operating conditions are somewhat improved as a result of more favorable weather. There is, however, an accumulation of eastbound traffic for movement through Chicago and also for movement via New York. Embargoes have been extended to prevent further increase. Continued activity in the iron and steel territory. Reports indicate four additional pig-iron furnaces being put in blast during the week. Travel, both through and local, is normal for this season of the year, being very heavy to Florida and other southern resorts.

Pocahontas Region.—Owing to restrictions on the exportation of coal, tidewater coal dumped showed a substantial decrease. Coal and coke loading also showed a considerable reduction under the previous week. General movement of freight throughout the region was good and weather conditions are favorable, but miscellaneous loading shows some decrease.

Southern Region.—Loading of freight generally was very heavy. Sufficient number of refrigerator cars on hand to protect the perishable movement from Florida. Movement of cotton to the ports was very heavy, showing large increases over corresponding period of last year.

Northwestern Region.—General business conditions continue good and the outlook from the manufacturing viewpoint is very favorable. In spite of high prices the demand for all manufactured articles is greatly in excess of the supply, and all industries have a large number of unfilled orders on hand. Industrial development throughout the region is booming and many reports are received of new industries and additions to existing plants, also of the building of a large number of new homes to take care of increased housing demands. Movement of cars has been interfered with by unfavorable weather conditions and influenza epidemic affecting employees. Passenger traffic shows an increase over last year, but is not as heavy as in preceding weeks, due probably to less local travel. Travel to California continues heavy.

Central Western Region. — Crop conditions in Southern California have been much improved by recent rains. Passenger travel generally continues heavy, but it is anticipated that the California movement will commence to fall off within the next week.

Southwestern Region.—Conditions are unchanged from the last few weeks, a very large volume of traffic being available, but movement is severely restricted by shortage of cars of all kinds. The total loading, however, showed substantial increases over the same week of last year. Regular passenger travel continued very good throughout the week. Business from St. Louis district to Southwest Texas was very heavy. Through travel to and from California via El Paso unusually good.

The Detroit (Mich.) Board of Commerce, through its Transportation Committee, has compiled a list of recommendations for relieving the badly congested railroad terminal facilities of the city. All shippers and receivers of freight are urged to redouble their efforts to promote freight car efficiency. First, by routing cars so that they will arrive in Detroit on the railroad which is to deliver them to the consignee. This will save delay in the terminal. Second, by loading all cars to full visible or carrying capacity. Third, by ordering cars only when actually required. Fourth, by prompt unloading of cars and notice thereof to the carrier.

A Statesman's Reply to the Brotherhood

THE FOLLOWING CORRESPONDENCE has passed between Congressman Pell of New York and the Brotherhood leaders:

JOINT LEGISLATIVE BOARD OF THE STATE OF NEW YORK.

HON. HERBERT C. PELL, JR.,
House of Representatives,
Washington, D. C.

Honorable and Dear Sir:

We, the undersigned representatives of the four train service organizations of the State of New York, at a conference held at Albany, N. Y., on January 21, 1920, after giving full consideration to the various measures now before Congress, with respect to the operation and maintenance of the railroads of the country, desire to record ourselves in favor of the so-called "Two Year Extension Government Control Bill," and in opposition to the so-called "Cummins' bill" and "Esch bill," and do hereby respectfully direct your consideration to the provisions of the two year extension bill, and in opposition to the two bills named.

Very truly yours,
W. C. WISH,
Brotherhood of Locomotive Engineers.
THOMAS E. RYAN,
Brotherhood of Locomotive Firemen and Enginemen.
JOHN E. GRAY,
Order of Railway Conductors.
JOHN FITZGIBBONS,
Brotherhood of Railroad Trainmen.

HOUSE OF REPRESENTATIVES.
WASHINGTON, D. C., January 26, 1920.

MR. JOHN E. GRAY,
1303 Second street,
Rensselaer, N. Y.

Dear Mr. Gray:

I have received your letter containing the resolution of the four railroad brotherhoods advocating the extension of government control for two years.

I feel that ordinary honesty demands a categorical answer. I do not feel that there is any probability of the successful continuation of government ownership. During the stress of war when every patriotic man was doing his best work, especially when employed by the government, the efficiency of railroad operation fell off very considerably, and I do not believe that when the government service loses the glamor of being a war activity there will be any reason to expect an increase of efficiency. If the government took over the railroads it would create a mass of political placemen, which could very readily control elections throughout the country, and would, I fear, subject us to a bureaucracy; also, you would have the extensions of railroads controlled by considerations of politics.

The whole discussion of the railroads today must be based on one hypothesis, that the railroads must run. The question is a perfectly practical one of how best they can be made permanently to give adequate service to the public.

It is not for us to approach this question as devotees of one economic dogma or another, or as the advocates of one or another class of the community. The only matter really under discussion is method. We have the suggestion of government ownership. That, of course, would preclude a great many evils, mainly in financing, that have characterized the railroads in the past, and that may very well, if unregulated, characterize them in the future. I myself, however, am very strongly opposed to government ownership. In the first place, under private management you get a much easier adjustment to changing conditions and much greater flexibility, which is necessary in every business in the world, but especially in one like the railroads, where we have to consider seasons, business conditions, and manufacturing conditions, and where more complex questions have to be answered than in other enterprises. All these things can be met much more easily under private control. Anybody who has dealt with the government can see that.

Almost all the objections that have been made to private ownership in the past have been based on errors of finance, not on errors of administration. Obviously you cannot treat a great railroad system as you would a corner grocer, and simply say that it can do what it will with its own. There are too many interests involved. A man in the position of the manager of a large railroad is more or less in the position of a trustee, and he must be treated accordingly. A proper regulation of the financing of railroads is a perfectly practical thing to have, without having governmental administration of the road itself. The elementary principles of law and justice can be applied properly to financing a road, but there are no such clear rules that will apply to running it. For that reason, among others, I am very much in favor of private ownership.

Suppose the government takes over all the roads. I think I am right in saying that there are about two million men directly or indirectly employed by the railroads. That raises immediately the question of promotion. We start off with a staff, but some men will go out. Others have to be promoted to take their places. If you advance your men by seniority, that simply means automatically firing your good men. If a man merely works up by the length of time he has served, obviously the more capable man would be able to rise more rapidly elsewhere. So you will develop a rather incompetent bureaucracy. If, on the other hand, you try to make any system of selection, you are bound to get a political machine. The men will owe their positions to the party in power, and to that party will be their first allegiance rather than the general public. It is an unfortunate condition, but it is a fact. In either case you will get absolutely incompetent service.

Under government ownership unquestionably you would have a certain amount of sectionalism, of which about 90 per cent would be absolutely honest. I do not mean that under a Republican administration there would not be an inch of road built south of the Mason and Dixon line, or that the Democrats would not allow a spur track to go up in New England, but there will be a tendency for each man to serve his own district. That is only natural. For example, I understand the railroad needs of my district quite well. I would try to meet them because I understand them. I do not understand the conditions in other parts of the country so well, and they do not appear to me as important. In the same way you would give twenty dollars to help out some unfortunate man among your employees who had broken his leg, and you would not think anything about it, but you feel a great glow of magnificent charity if you give five dollars to help the starving people in East India. The thing is distant.

Now the dominant party will of necessity serve those districts from which it comes. In that way you will not get a road constructed primarily to serve the public as you will under private ownership. Remember that a railroad will only make money if it serves the public, and money will not come in unless the public wants to use the road. You cannot compel a man to go on the Pennsylvania Railroad. He travels on the Pennsylvania because he finds it a useful road. He does not go on the R. O. & T., because he does not have to, and because it is useless to him. One road is of service to the community, and the other is not. A road takes in money only in proportion to its value to the community. In a privately run road where profits is the primary incentive, real, genuine and immediate public service will be a necessary concomitant to its successful management.

There is one other phase which I should like to consider. That is the question of great improvements. We have in New York City the Pennsylvania Terminal, an extraordinarily expensive building, built in the time of Mr. Cassatt at great expense to serve the Pennsylvania road for a long time ahead. Another case is on the Lackawanna, where an enormous expense was incurred in straightening out a part of the road a couple of miles long. Such things, while undoubtedly profitable in the end, do not pay for themselves immediately. With our system of elections every two years, it will be impossible for any administration to burden itself with improvements of this sort, because each succeeding railroad administrator will have to show a record of low rates. The man who looks ahead will have a bad record and the public will not think of the future.

Government ownership will certainly bring politics into the administration of railroads. It will certainly result in the management either being a bureaucracy or a political machine. It will result in sectionalism in the expansion of the roads. These three things seem to be insuperable objections to government ownership, and for these reasons I shall not vote for the extension of government ownership. I am,

Yours very sincerely,
HERBERT C. PELL, JR.

The Bryan Solution for the Railroad Problem

Representative Everett Sanders Takes the Nebraska Politician to Task in Humorous Speech

In view of the large amount of publicity that has been given recently to William Jennings Bryan and his advocacy of government ownership of railroads, which has even led to some talk about a combination between Bryan and Plumb, Representative Everett Sanders of Indiana thinks that there ought to be some publicity given to the actual details of Mr. Bryan's scheme for handling the railroads. In a brief speech in the House on January 27 Mr. Sanders afforded some amusement by resurrecting some of Mr. Bryan's views as given to the House committee during its railroad hearings last summer. The following are some extracts from the Congressional Record report:

Mr. Sanders of Indiana: Mr. Chairman, I want to speak briefly on the railroad question, dealing particularly with the "Bryan plan" for solving the railroad problem. The "Plumb plan" has had its day in court, but the "Bryan plan" has been sorely neglected. It has escaped the notice of the country generally that on August 29, 1919, William Jennings Bryan, appearing before the Interstate and Foreign Committee, announced his platform.

Now, when the man who said "Coo" to one Democratic national convention and thereby defeated all other aspirants and nominated himself for the presidency and who said "Boo" to another Democratic national convention and thereby defeated one of the greatest Democratic statesmen of the last quarter of a century and nominated a man who almost fastened international socialism upon his country, it is high time the country knew about his paramount issue.

To those who believe that young men dream dreams and old men see visions, I respectfully recommend a careful reading of Bryan's remarkably visionary testimony before our committee. But first, to prove that the presentation was meant to be in the nature of a platform, I read from his testimony. Said Mr. Bryan:

"My plan is only presented for consideration that it may be kept in mind when the people decide these questions." (Hearings, vol. 2, p. 1695.)

When we consider this frank statement that his real forum was to be the political campaign the essentials of his plan become an interesting study, for they are so formed as to make a bid for votes in every direction and are as refreshingly impracticable and charmingly visionary as any of his previous paramount issues. But let us see the plan in his own words:

"I beg to propose as alternative what may be described as a dual plan, which contemplates the ownership and operation of a federal trunk-line system, sufficient to reach into every state and make each state independent by giving it an outlet for all it has to sell and an inlet for all it has to purchase, and the ownership and operation of all the other lines by the states in which the lines are situated. * * * (Hearings, vol. 2, p. 1684.)

"* * * Now, the dual plan adapts itself not only to our form of government, but to our conditions in this country. A trunk line, only sufficient to reach into every state and furnish each state an outlet, and thus make it independent, instead of costing eighteen or twenty billions of dollars, would not cost, I should say, over four or five billions. The plan does not contemplate the nationalization of every railroad that runs through two or more states. It contemplates a bare, skeleton government trunk line that will give to every state a position of independence, and thus enable it to treat without coercion or compulsion with the states adjoining. Because a railroad runs through a number of states is no reason why it should be regarded as a trunk line and owned by the federal government. The fact that it runs through several states would not interfere at all with operation by each state on the part of the line that is within the state. * * * (Hearings, vol. 2, pp. 1688-1689.)

"* * * This plan not only lessens the amount that will be necessary to inaugurate, so far as the national part is concerned, but it has another advantage, namely, that it distributes the question over time as well as over space. It divides a great problem now confronting the people into 49 problems—1 for federal government, and 1 for each of the 48 states—and it permits the settlement of the question as the people of each state are ready to settle it. If a state does not desire to take over and operate the lines within its borders immediately, it can, if it wishes, leave them in private hands until the sentiment of the people of the state is ready for government ownership." (Hearings, vol. 2, p. 1689.)

[Laughter.]

He candidly admits that it is experimental and that it may take years to get it to working. Witness this:

"If a state does not desire to immediately enter upon the state ownership and operation of the railroads within its borders, it can leave these railroads in private hands until the sentiment of the state is ready.

"Not only that, but the plan gives us an opportunity to test out the system. A great many people might hesitate to try a new policy on so large a scale; they would say, 'If it does not succeed, we will have spent an enormous amount of money, and we will find it difficult to return to the old system,' but if you distribute this question over a number of years the states that wait will have the benefit of the experience of the states that try, and if the theory upon which the change is made proves to be unsound in practice, it can be stopped, and a return can be made with less loss and with less derangement of business." (Hearings, vol. 2, p. 1690.)

[Laughter.]

This quoted testimony also shows that he intends to take the railroad companies by the nape of the neck and make them take back the roads in case state ownership does not prove a success. Besides, he coddled himself into the sublimest calm by pondering in his dreams over the happy thought that the states that wait could watch the floundering of the states that just jumped right in and possibly keep out of the whirlpool. Let me repeat his language:

"If you distribute this question over a number of years, the states that wait will have the benefit of the experience of the states that try, and if the theory upon which the change is made proves to be unsound in practice it can be stopped and a return can be made with less loss and with less derangement of business." (Hearings, vol. 2, p. 1690.)

[Laughter.]

Experiments seem to be his particular delight, and the multiplicity of experiments possible under his plan seems to have about the same effect upon him as the needle did on the famous character of Sherlock Holmes. I read further from his testimony:

"A trunk line only sufficient to reach into every state * * * would not cost, I should say, over four or five billion dollars. (Hearings, p. 1188.) But, gentlemen of the committee, the plan that I suggest to you has this advantage, namely, that if there is any doubt in the minds of those who are willing to try government ownership, it gives a chance to try it without investing as much as would be necessary to buy all the railroads. Further, I beg to suggest that if you have 48 states, each one with its system of transportation owned and operated by the state government, you have 48 experimental stations." Hearings, pp. 1690-91.)

He admits on examination that what we really need is a practical solution. But the mere fact that we would first

have to pass the bill by the House and Senate, then amend a few state constitutions, educate the people in favor of it, get 48 state legislatures to act favorably thereon, and have endless and hopeless confusion during the interim does not disturb the sweetness of his dreams. [Laughter.]

Listen to the following:

"Mr. Sanders of Indiana. Of course, with the railroad problem before us now, what we want is a practical solution.

"Mr. Bryan. Yes.

"Mr. Sanders of Indiana. Your proposed solution would require, first, the adoption of it by Congress. We could, of course, issue no edict to the states. It would require the adoption by each of the states of the same plan?

"Mr. Bryan. Yes, sir.

"Mr. Sanders of Indiana. A great many of the states would have to change their constitutions. Some of the states might not adopt the plan at all. This is quite conceivable, is it not?

"Mr. Bryan. No; it is not conceivable, if you will pardon me. That is, when a plan is tried it is either demonstrated to be a success or a failure. If it is demonstrated to be a success, it is only fair to assume it will be adopted.

"Mr. Sanders of Indiana. Of course, the plan will not be in its entirety until it is adopted by all the states. So the plan, as a plan, can not be tested until it is adopted by all the states, and hence its success or failure could not influence any of the states to come in.

"Mr. Bryan. Oh, I beg your pardon. The failure of one state to adopt it will not interfere with the other states adopting it at all.

"Mr. Sanders of Indiana. Well, suppose Illinois does adopt the plan and suppose Indiana and Wisconsin do not. Now, would Illinois have the right to condemn the Pennsylvania Railroad at the state line, coming across there, and take it over?

"Mr. Bryan. No; not the interstate line.

"Mr. Sanders of Indiana. Well, you already have the national——

"Mr. Bryan (interposing). I thought you meant the government line. It could condemn any part of any other line; it can today. If the Pennsylvania can condemn the individual's property, do you doubt the state that gave it that right can go out and condemn the railroad?

"Mr. Sanders of Indiana. It is your opinion that the state of Illinois could condemn a part of an interstate railroad and control it? Well, that would dismember the road for interstate purposes.

"Mr. Bryan. Not at all.

"Mr. Sanders of Indiana. How would it operate.

"Mr. Bryan. The board that had control of the roads in Illinois would act in conjunction with the board that had control in Indiana, if it was a government road, or, if a privately owned road, with the manager, and they would arrange for their joint operations. You would have to assume that a road would not look out for its own interests in order to take any other position.

"Mr Sanders of Indiana. Would you prevent any railroad company from engaging in interstate commerce?

"Mr. Bryan. No; and I think you can safely leave that matter to the United States. The federal government will really set the price and terms of interstate commerce.

"Mr. Sanders of Indiana. What would be your estimate of the number of years that it would take to put that plan into effect?

"Mr. Bryan. I would not attempt to guess, because it would be merely a guess, and my experience has led me to be a little cautious about fixing a time. It is easier to tell the direction of the wind than to measure its velocity; it is easier to tell the trend of events than it is to tell how soon a thing will be accomplished.

"Mr. Sanders of Indiana. Would you release any of the federal control after that plan had been adopted, or would you continue federal control until it had been completely adopted?

"Mr. Bryan. I think that would have to be determined by the conditions as they arose. There is this general proposition that I have always gone on, namely, that the people will have as much sense tomorrow as they have today, and probably more light. Therefore, you can safely leave until tomorrow the decision of questions that cannot be decided today.

"Mr. Sanders of Indiana. But in formulating a plan we have to decide on something, and I was wondering whether in your plan it was your purpose to continue federal control until all the states had adopted your plan, or whether it was your purpose that when Illinois, say, had adopted the plan federal control would be withdrawn.

"Mr. Bryan. If the federal government's trunk line reached out into every state its control over interstate commerce would, I think, be more effective than under any commission or board.

"Mr. Sanders of Indiana. Then, would you release federal control?

"Mr. Bryan. It might be possible to release it; but I do not think it is necessary to decide that question until we reach it." (Hearings, vol. 2, pp. 1706-1707.)

Mr. Sanders of Indiana: I understood that Bryan and Plumb were going to join hands, and I wanted the country to know the Bryan plan so the people would know the result of the combination.

Mr. Longworth: Does Mr. Bryan suggest a method of financing this scheme?

Mr. Sanders of Indiana: That does not bother him in the least.

Mr. Longworth: That is negligible, is it not?

Mr. Sanders of Indiana: Yes.

Mr. Longworth: The furnishing of this $5,000,000 is a negligible proposition?

Mr. Sanders of Indiana: Yes. That is a feature the people can decide. Notice that he gives national control of some trunk lines. That, he thinks, will catch those favoring nationalization. He proposes state control of many lines to please those who favor states rights. He permits private control if they do not like the experiment, thus appealing to those believeing in private control. He uses great care not to offend the Plumb Plan League, and gives the following clear-cut statement on that plan:

"Mr. Denison. You may have expressed your views before I came into the room in reference to the question that I am going to ask, and if you did you need not repeat them. I wanted to ask you whether or not you think that the so-called Sims plan, or the Plumb plan, as embodied in the Sims bill, would be a good thing for this country?

"Mr. Bryan. I have not felt that one could safely answer that question "yes" or "no," because if one makes an answer "yes" or "no" to that the statement is apt to go out without qualification, and he is put in a position that is not his true position. I would not want to answer whether the plan is good or bad, because it might seem like an indorsement of it or a condemnation of it. I have pointed out two or three things that I thought were good, and I have pointed out some things that I thought were bad, simply in conjunction with the discussion." (Hearings, vol. 2, p. 1704.).

I hope no member here but entertains a high personal opinion of the great commoner, and to be sure that I shall leave you all feeling kindly toward him I will read you the following tribute he paid you:

"But while we could reduce the rates in the state we could not do it in Congress as well as we could in the state. I do not think we ever can, on the theory that the farther a Congressman gets away from home the more difficult it is to watch him, and therefore the more difficult it is to make him serve the public." (Hearings, vol. 2, p. 1697.)

[Laughter.]

With the greatest domestic problem of a century before this great legislative body, upon the proper solution of which depends the happiness of all our people, we ought all to have a prayer of thanks upon our lips that the country has been spared the disaster of the "Bryan plan." [Applause.]

The Ohio legislature has passed and sent to the governor for approval a bill permitting railways to make passenger fares three cents a mile. The law is to go into effect in May, and it would appear that if federal control of the railways is terminated on March 1 the roads will be subject, in the intervening time between that and May, to the law limiting intrastate fares to two cents a mile.

Annual Report of the Division of Traffic

Freight Rate Structure Readjusted to Meet Peace Conditions —Passenger Service More Normal

THE STRIKING INCREASE in passenger travel during the last two years which has been largely responsible for the difficulty of supplying sufficeint passenger equipment was indicated in the annual report of Edward Chambers, director of the Division of Traffic of the Railroad Administration, to Walker D. Hines, Director General of Railroads, for the year 1919, today. Mr. Chambers showed that a total of approximately 46,202,827,365 passenger miles was handled in 1919, or an increase of 17.3 per cent over 1917 and an increase of 33.6 per cent over 1916.

"With constantly increasing volume of passenger business and little hope of early additions to passenger train equipment," said Mr. Chambers, "it is important from the viewpoint of public convenience that there be no abandonment of the present plans for the conservation of service."

Director Chambers pointed out that as soon as possible after the ending of the war former train service has been restored to such extent as seemed justified by the public need without, however, the reinstatement of expensive duplicate service and without distributing the arrangements instituted during the early months of the Railroad Administration under which the arriving and leaving time of trains of the different railroads between common points was adjusted to serve best the public convenience. He added that certain train schedules have been shortened to permit of faster service between the larger commercial centers, some of the limited trains have been restored to their former schedules, a number of observation cars have been put back into service, and new sleeping car lines have been inaugurated. He pointed out that the train service added in the western part of the United States alone in excess of train mileage canceled during the war was represented by 9,216,206 additional train miles per year. This being necessitated by tourist travel, development of commerce generally, and especially the new oil developments in the Southwest. Mr. Chambers also pointed out that a consistent effort has been made to effect desirable and convenient connections between passenger trains at interior junctions, and a competitive campaign has been conducted with very successful results, having for its object an increase in the number of trains on time.

Mr. Chambers pointed out that it was impossible to make many of these changes to bring about better service to the public until well along in 1919, because of the very heavy soldier travel due to the return of the Army from France, which continued until well along into the summer.

Consolidated ticket offices have now been established in 108 centers, according to Mr. Chambers. "These offices receive seemingly the universal commendation of the public." He said that the saving in rental alone resulting from these consolidations amounts approximately to $1,846,976 annually, and the saving in salaries and miscellaneous expenses amounts to even more, in spite of the material increase in wages granted to the employees. He added that should the consolidated offices continue throughout 1920 there would be a still further reduction in the cost of operation.

Among other improvements in service mentioned by Mr. Chambers was the bettering of meals on dining cars, unification of terminal facilities, uniformity in service and prices for meals at rairload stations, standard table d'hote meal checks, standard size menu cards and also uniform prices for tonsorial and clothes-pressing service. He also pointed out that baggage equipment has been pooled so as to reduce to a minimum the congestion of baggage and the incidental delays resulting therefrom. Further progress has also been made in the matter of simplification of time tables, folders, etc., and provisions have been made for the issuing of additional consolidated time tables showing the schedules by different rairloads between common points, thus adding materially to the convenience of the public. The travel bureaus have been created, with headquarters in New York, Chicago and Atlanta, for the accommodation of the public and the dissemination of information. As a result, reports from the Interior Department show that during the summer of 1919 the national parks enjoyed the greatest patronage in their history.

Director Chambers pointed out many simplifications which have been brought about under unified control in the preparation and publication of tariffs, the handling of rate questions, routing of freight, etc.

Newly developed traffic on the railroads of the country has made necessary the establishment of more new commodity freight rates during the reconstruction period following the war than have been established at any other time in the history of the lines, according to the report.

"The conditions during the reconstruction period," the report said, "have made it necessary to establish more new commodity rates to move newly developed traffic than at any other time in railroad history."

The report summarized the work as follows:

"During 1918 our main efforts were directed to assist in winning the war by furnishing the required service and enabling the movement of war traffic to be as free as possible, regardless of commercial conditions. Our plans were changed soon after the signing of the armistice, and early in 1919 we began to devote our energy to assist in the prompt restoration of normal commercial conditions and revise the rate structures where it could be done consistently and with advantage, but bearing in mind the cost of the service. Many maladjustments have been eliminated, former differentials have been restored where practicable, and the rate structures of the carriers put in much better condition than before federal control by the consolidation of individual tariff issued and cancellation of obsolete rates. Many new industries have developed during the year, and their rate requirements as to inbound rates on raw materials and outbound rates on commodities were provided."

Outlining the principal rate adjustments made by the division during the year, the report said:

"While the work of the Division of Traffic in the adjustment of freight rates, classifications, charges and rules governing the transportation of traffic has continued to consist largely of a revision of the increased rates, etc., established by General Order No. 28 for the purpose of restoring relationships, removing the minor discriminations and otherwise bringing about the better adjustment without material advance or reduction in the level of the rates, there have been a number of important adjustments made, of which the following may be mentioned:

"In the Middle West and Southwestern territory there has been published a revision of the rates on grain to the primary markets and to the gulf ports for export, which has the effect of restoring former relationships and practically all cases bringing about an equalization through the several primary markets, and this readjustment met with practically the unanimous support of the grain dealers of the territory.

"A similar adjustment of the grain rates in the North-

western territory was proposed, but having met with objection from some of the shipping interests involved, the matter was referred to the Interstate Commerce Commission for its advice.

"The freight rates on all classes and commodities between points south of the Ohio and east of the Mississippi river on the one hand and points west of the Rocky mountains on the other hand, have been published on an equality with the rates between the Pacific coast territory and the Eastern states north of the Ohio river. This adjustment made a considerable reduction in most of the rates involved and has had the effect of placing the manufactured products of the South on a parity with those of the Northern and Eastern states in the Pacific coast markets and of making lower rates into the South on Pacific coast products.

"Many reductions have been made in the rates on potash from various western producing points where the production of potash was stimulated by the need of this material for munitions during 1918, and where it was found necessary to reduce the freight rates to enable these American producers to continue their operations and supply potash for its ordinary use as fertilizer material in competition with that imported from foreign countries.

"In 1919 the federal government and practically all of the states renewed their road-building programs and appropriated large additional sums for this work. To aid in this work the Railroad Administration authorized a reduction of 10 cents per ton on road-building materials, consisting of sand, gravel and crushed stone, when consigned to and the freight charges paid by the various branches of the government.

"Complaint having been made by shippers in adjoining states that the classification and rates within Illinois constituted a discrimination against the adjacent sections, a revision of the Illinois rates and classification was undertaken through the administration's freight traffic committees, but on account of the many objections received to the rates proposed by the committees it was concluded to ask the Interstate Commerce Commission to investigate the matter and give its advice and recommendation, and this procedure was followed."

Setting forth that the restoration of more nearly normal commercial conditions, the increase in American ships in the foreign trade, and the congestion of freight at port demonstrated the need for equalizing the rate bases to and from certain territories and ports, the report listed the following changes in export and import rates:

The revision of both import and export rates via Pacific coast ports, more nearly to equalize the shipping routes via the Atlantic and gulf ports.

The publication of revised export rates from points in central territory to the South Atlantic and gulf ports to relieve the congested North Atlantic ports.

The revision of rules covering port and handling charges on the Pacific coast under which steamship lines assume liability for demurrage charges resulting from their failure to take the goods when delivered in time for scheduled sailings.

The resumption of the issue of export bills of lading via Atlantic ports and on understanding with the steamship lines sailing from the North Atlantic ports that they will assume demurrrage charges due to their delays on shipments delivered by the rail carriers in time for scheduled sailings, in connection with which the free time has been extended to 15 days.

The report outlined the efforts of the division to consolidate tariff issues and said:

"In the Eastern region, for example, during this year 471 tariffs, totaling 31,266 pages, were replaced by 10 consolidated issues covering 3,175 pages and the printing costs reduced from $318,208 to $89,537. The shippers and carriers were supplied with the same information as before at one-third the cost.

"Consolidated Freight Classification No. 1, which has now been published and filed with the Interstate Commerce Commission and with state commissions, to become effective on December 30, 1919, is in substantial accord with the recommendations of the commission and represents very material progress toward uniform classification. The uniformity in rules, descriptions, package provisions and minimum weights will do away with much of the trouble heretofore experienced by both carriers and shippers in the handling of traffic from one classification territory to another."

The report set forth that joint rail and water rates have been generally established during the year, with differentials against all-rail routes between the same points.

The "sailing-day" plan established during the war has been modified to allow necessary latitude to shippers in routing their shipments, the report said. This eliminated one of the greatest means of securing heavy loading of merchandise cars, but efforts to improve loading have continued.

Reports from 71 large loading points show an increase from 14,799 to 15,037 pounds per car over the same period last year," the report continued. "An active campaign has been waged by the operating and traffic departments to secure heavier loading of carload shipments, and this has met with considerable success, although the loading is not as heavy as in 1918."

Revision of passenger fares under the federal order making 3 cents per mile the basic passenger rate is practically completed, the report said.

"All local division tariffs," it continued, "as well as many joint interline tariffs have already been reissued and are now in effect. It is anticipated that the remainder of the joint interline tariffs upon which work is now in progress will be completed and made effective at an early date, and when this has been done the entire passenger rate fabric of the country will have been revised on a basic rate of 3 cents per mile, except where a higher basis was in effect prior to federal control.

"In the issuance of permanent tariffs uniformity and standardization have been accomplished with respect to fares, routes, forms of tariffs, rules, regulations and practices, enabling a more ready inspection on the part of the public and facilitating the handling of traffic by ticket agents."

The report reviewed the efforts of the division to establish unified rules for handling perishable freight and live stock and set forth the steps taken to expedite the handling of claims, which have rapidly increased in number.

The character of express traffic changed materially during the year, the report said.

"During 1918," it continued, "large amounts of war material were sent by express, but this was replaced in 1919 by a large volume of fruits, vegetables and merchandise. High prices have warranted many perishable shipments by express which ordinarily moved by freight. The high cost of merchandise has led merchants to carry smaller stocks and to turn them quickly, resulting in a greater use of express transportation. Something over a million pieces of express matter, weighing approximately 40 lb. each, are handled each day. The business on the whole has been handled with dispatch. Ordinary box cars were fitted for passenger train service and used in emergencies to accomplish this result."

The report reviewed the aid given the farmers of the country by the agricultural representatives of the railroads cooperating with the agents of the Department of Agriculture and described the farm-improvement work in various parts of the country.

Director Chambers called particular attention to the organ ization set up for handling rate questions, mentioning specifically the fact that the shipping public has been given equal

representation with the railroads on the various freight traffic committees which pass locally on suggestions for rate changes and outlining this procedure as follows:

"The freight traffic committees, established in 1918 and composed of both railroad traffic officers and representatives of the shipping public, have been continued during 1919, with the addition of district committees at Omaha, Neb., and Salt Lake City, Utah.

"The membership of all these freight traffic committees was increased to include as many representatives of the shipping public as there were railroad traffic men on each.

"These committees have been engaged chiefly with the completion of the revision of freight rates, charges, etc., as increased under General Order No. 28, with applications from the shipping public for the publication of rates to meet new conditions, and with the removal of discrimination where it was shown in existing rates.

"All subjects of interest to the shipping public were docketed and made the subject of hearings, at which time all interested were given an opportunity to present their views.

"In order to expedite the handling of applications made by the district freight traffic committees the practice was established during the year of having those committees send direct to Washington applications covering traffic between points within a district, and this has considerably reduced the amount of work which it had been necessary for the general committees to handle and has enabled them to dispose of practically all subjects which were brought before them during the year."

Orders of the Regional Directors

Gasoline Fires. — Circular 263 of the Southwestern regional director cites a gasoline fire which resulted in a loss of $8,620, due to the negligence of a car repairer who worked on a leaky tank car with an open flame lantern, in violation of all regulations. The bulletin emphasizes the importance of observing all rules governing the transportation of explosives and other dangerous articles.

Permit System for Grain Shipments—Supplement 7, canceling Supplements 1 to 6, inclusive, of Circular 247 of the Southwestern regional director, referring to the permit system on shipments of grain to primary markets says: Individual permits are required on all grain shipments from country points destined to or via North Atlantic ports mentioned on page 5 of Circular No. 247; Individual permits are required on all grain shipments moving from one primary market to another primary market; no permits whatever are required on grain shipments from country points to primary markets nor from country points or primary markets when destined to Pacific or Gulf ports, either domestic or for export.

Shipping Day Plan.—By circular No. 264 the Southwestern regional director orders the dissolution of the regional committee appointed for the purpose of developing the concentration of merchandise loading and the sailing day plan. The committee's files have been referred to the American Railroad Association and it is suggested that, if this association should take up any question with respect to the package freight problem prior to the termination of federal control, the railroads should extend full co-operation.

The Southern Pacific has engaged quarters for a freight office in Boston, 12 Milk street, the same place occupied by the company before the railroads were taken over by the government. J. H. Glynn, the former agent, is again in charge. The office is already open, but will not sell tickets or route freight before March 1.

Report on Vincent Derailment

The Interstate Commerce Commission has issued a report, dated December 5, and signed by W. P. Borland, chief of the Bureau of Safety, on the derailment of eastbound passenger train No. 50 on the Southern Pacific, near Vincent, Cal., on October 29, when two employees, two trespassers and one passenger were killed and a large number of persons were injured.

As reported in the *Railway Age* of November 28, in the monthly accident record for October, this derailment was due to excessive speed on a curve of 8 deg. 10 min., over a descending grade of 2.2 per cent. The engineman and fireman were killed.

The government inspector examined the trainmen and all persons having knowledge of the movement of the train, and finds no fault in the brake system or its management, or in the condition of the track; but concludes that the superelevation of the outer rail was not sufficient for the speed at which the train was running. This elevation is from 4 in. to 4⅛ in., and the rule allows passenger trains to run over the curve at 40 miles an hour. All of the trainmen and other witnesses estimated the speed of this train at about 35 miles an hour, except an employee of the road connected with the commissary department, riding on the train, who had noticed while on the tangent approaching the curve that the speed was unusually high, and who believes that it was as much as 40 or 45 miles an hour; he began to get frightened.

He was expecting an application of the brakes to be made, but the speed continued to increase and in a few seconds he felt a sudden jar like an emergency application of the brakes—which was the derailment. In its conclusion the report says:

"It is believed that the track conditions existing at this point did not afford an adequate margin of safety for a speed of 40 miles an hour. The elevation was insufficient for the maximum rate of speed permitted. According to the recommended practice of the American Railway Engineering Association, the theoretical elevation of the outer rail on an 8° 10′ curve, if trains are to be operated over it at a speed of 40 miles an hour, should be slightly over 8½ inches; with an elevation of 4 inches, the maximum speed allowed should be only slightly over 27 miles an hour. While it is true that the overturning speed of a train on a curve of the degree and elevation here under consideration is much greater than 27 miles an hour, nevertheless overturning speeds are entirely matters of calculation and theory, whereas the speeds shown as safe speeds are more or less matters of common knowledge based on practical experience. A very large margin must necessarily be maintained between theoretical overturning speeds and the speeds authorized for common practice, in order that proper allowance may be made for errors in estimating speed, worn rails, and slight imperfections in track or equipment which may not be serious enough to warrant repair or replacement, but which, combined, materially reduce the factor of safety. The elevation recommended for common practice is designed to provide the necessary margin of safety and no speed should be permitted which is greater than that recommended for the existing elevation and curvature. If it is not desired to increase the elevation on account of heavy grades or for other reasons, or if the required elevation is beyond the dictates of good practice, then the obvious remedy is to reduce the maximum permissible speed accordingly.

"This accident was caused by excessive speed. It is believed that had the speed of trains on this curve been restricted in accordance with the recommended practice of the American Railway Engineering Association for the existing elevation, this accident would not have occurred."

Railroad Bill Nearly Ready

Following the announcement on February 4 that the conference committee had reached an agreement on the most important features of the bill for the regulation of the railroads after their return to private management, the committee has been busy with the actual drafting of the compromise bill with the expectation that the conference report would be ready for submission to the House and Senate before the end of the week. The actual drafting of the language of the provisions agreed upon by the committee was left mainly to Senator Cummins and Representative Esch, chairman of the House committee, who have been assisted by experts from the legislative drafting bureau and also by the legislative committee of the Interstate Commerce Commission. They were to report their work to the full conference committee for its approval.

One of the principal points left unsettled when the agreement was announced last week was as to the exact period during which the 5½ per cent standard of net operating income should be fixed by law. It is understood that two years from the date of the passage of the act has now been determined upon. There were also many important variations in the text of the two bills which had been agreed upon in principle but as to which the exact language used is of importance. Chief among these provisions as to which the final details had not been announced before the filing of the conference report were those relating to the funding for 10 years of the indebtedness of the railroads to the government, the six months' guaranty of the present standard return and the constitution and powers of the wage boards. The Cummins bill was more liberal to the roads in its funding provisions than the Esch bill, which required the deduction of a large part of the sum owed to the railroad companies for current rental from the total owed by the companies for capital expenditures. Also the Esch bill provided a guarantee based on the income for the corresponding months of the test period, while the Senate bill allowed half of a year's guarantee.

Arrangements have been made for the early consideration of the bill in Congress, although the fact that a longer time was required than had been expected to whip the details of the bill into shape prevented its being reported to the Senate before that body took up the Peace Treaty on Monday. It is confidently predicted by the conferees and by party leaders in the Senate and the House that the bill can be passed before the railroads are relinquished on March 1 but there is a chance that opposition in the House may cause more delay than is counted upon.

Representatives Sims and Barkley have announced that they would not sign the conference report and are expected to lead the fight in the House against the rate-making and temporary guaranty provisions of the bill, in an effort to force it back to conference for the elimination of those sections. It is believed that they will find considerable support for this opposition on the Democratic side but that they will not attempt to make a party issue of the question, as reported, because on a straight party vote the Republicans have a strong majority and because they expect to secure some Republican votes against these provisions. The bill will be taken up first in the House, probably on Monday, and later in the Senate. House Republican leaders predict it will be passed during the week.

Thomas DeWitt Cuyler, chairman of the Association of Railway Executives, authorized the following statement regarding the position of the executives:

"It must be a source of gratification to all those interested in the welfare of the railroads in this country that the conferees have arrived at an agreement to report a bill which, it is hoped, will be protective both to the security holders and the share holders of the properties, and to the public at large.

"There can be no question that the conferees and the two committees of the House and Senate have had an earnest desire to do justice to the railroads. If the bill be enacted by Congress the railway executives and the owners of the properties will accept the bill in good faith with the earnest hope that it may be productive of the desired result, namely the protection of the present credit of the roads, and the extension of that credit so that they may provide in the future adequate facilities for the transportation system of the country. It cannot be too strongly emphasized that this question does not affect alone, nor even principally, the owners of these properties. The public is much more concerned. If the transportation system of the country is not adequate to its needs, the country must suffer.

"It is, therefore, earnestly hoped that the protection of the credit the proposed bill seeks to establish will prove successful. If it does not, the railroads will confidently look to Congress for such additional legislation as may be necessary to further protect the companies and the public."

On the basis of the 1919 showing as to earnings and expenses, and taking the property investment as the value, the percentage standard of the Cummins bill would require an increase in net operating income of about $625,000,000 to produce a return of 6 per cent and $530,000,000 to produce 5½ per cent. The property investment as reported by the Interstate Commerce Commission as of December 31, 1918, was $19,005,065,000. Five and one-half per cent on this would be $1,045,000,000 and 6 per cent would be $1,140,000,000. The latter figure would be $625,000,000 more than the net operating income for 1919, which was about $515,000,000. This would be about 17 per cent of the freight revenues. Six per cent would also represent an increase of $200,000,000 over the present guaranteed standard return of about $940,000,000, but it would represent an increase of only $40,000,000 over the net operating income of the roads in the calendar year 1916, which was $1,100,000,000. That represented a return of 6.17 per cent upon the property investment for that year. In only one other year has the return exceeded 5½ per cent. In 1910 it was 5.68, but for the investment of that year only $826,466,000 was required to produce that result. In 1918 the return actually earned by the railroads was only 3.83 per cent and for 1919 it is estimated at about 2.75 per cent.

To the extent that railroads would contribute to the general railroad contingent fund half of their earnings over 6 per cent, the amount actually available to the companies would be reduced from the figures given.

The property investment and the railway operating income as stated by the Interstate Commerce Commission in its annual report for the years 1908 to 1918, excluding switching and terminal companies, with the addition of estimated figures for 1919, is shown in the following table:

Year ended—		Investment	Railway operating income	Return on investment Per cent
June 30,	1908	$13,213,766,540	$645,680,235	4.89
	1909	13,609,183,515	732,642,083	5.38
	1910	14,557,816,099	826,466,756	5.68
	1911	15,612,378,845	768,213,345	4.92
	1912	16,004,744,966	751,266,806	4.69
	1913	16,588,603,109	831,343,282	5.01
	1914	17,153,785,568	705,883,489	4.12
	1915	17,441,420,382	727,546,101	4.17
	1916	17,689,425,438	1,043,017,290	5.90
Dec. 31,	1916	17,842,776,668	1,100,545,422	6.17
	1917	18,574,297,873	986,819,181	5.31
	1918	19,005,065,288	728,376,209	3.83
	1919	.....	515,000,000	2.75

A motor transportation engineering course is to be added to the curriculum of New York University, according to a recent announcement by Charles H. Snow, dean of the School of Applied Science. The new study, which is considered an indication of the ascending importance of motor truck transportation, is to be given by F. Van Z. Lane, chief transportation engineer of the Packard Motor Car Co., Detroit, Mich.

Wood-Preservers' Association Meets at Chicago

Discusses Service Obtained from Treated Timbers Used in Railway Track, Structures and Cars

THE SIXTEENTH ANNUAL MEETING of the American Wood-Preservers' Association was held at the Hotel Sherman, Chicago, on February 10, 11 and 12, inclusive. The program arranged for the meeting covered a wide array of subjects from a review of the cold facts, of actual results secured with treated ties, piles and other timbers, to technical details of plant operation and theoretical discussions of the action of preservative materials in overcoming the action of organisms causing decay.

The officers of this association for the past year were: President, J. B. Card, Indiana Zinc Creosoting Company, Chicago; first vice-president, A. R. Joyce, Joyce-Watkins Company, Chicago; second vice-president, C. M. Taylor, superintendent, Port Reading Creosoting Company, Port Reading, N. J.; secretary-treasurer, F. A. Angier, superintendent of timber preservation, Baltimore & Ohio, Baltimore, Md.

The opening session was called to order promptly at 10 o'clock Tuesday morning by J. B. Card, president. Frederick B. Vose, chairman of the Ways and Means Committee of the Chicago Association of Commerce, welcomed the convention to the city. He emphasized the necessity of conserving men as well as materials. J. H. Waterman, superintendent of timber preservation of the Chicago, Burlington & Quincy, Galesburg, Ill., replied to Mr. Vose in behalf of the association.

The report of the secretary showed a present membership of 305, a gain of 23 during the last year. Among these members are 74 employees of 33 different railroads and 12 employees of the United States Railroad Administration. The report of the treasurer showed a balance of $714.88.

In his address President Card referred to the difficulties which had confronted the timber-treating industry during the war. He concluded with a strong plea for Americanization.

Registration of 250 indicates largest attendance ever recorded.

Tie Service Tests

A report on service tests of ties was presented by C. E. Gosline, chairman of the sub-committee on Tie Service Tests, which was confined to the results of an inspection of a part of the Delaware, Lackawanna & Western, including the Lackawanna Railroad of New Jersey. The general use of treated ties was started on the former road in 1910, hard wood being used on curves and soft woods on tangents. Large flat-bottom tie plates and screw spikes were used as a protection against mechanical wear. After the first two years the ties were adzed and bored before treatment which consisted of the empty cell (Lowry) process. During the four years from 1915 to 1918, inclusive, only 188 ties were removed on account of failure. Of the 200,000 creosoted ties on the Lackawanna Railroad of New Jersey, 25,000 were oak, beech and maple, 145,000 pine and 30,000 gum. Since the construction of the road in 1910-11, a total of 64 ties have been removed on account of failure, in the following amounts:

TREATED TIES REMOVED

	1915	1916	1917	Total
Pine	1	12	10	23
Gum	40	..	..	40
Oak	1	..	..	1
Total	42	12	10	64

The conclusions of the committee were:

1. That the best information pertaining to the life of untreated and treated ties can be had from detailed and accurate records of tie renewals over long periods, and it is urgently recommended that all railroads keep such records.

2. That the treated life of coarsewood ties cannot be obtained when used in tracks of heavy curvature over which there is heavy traffic under the present method of protection against mechanical wear as practiced on this railroad.

3. That particular attention should be called to the following table of tie renewals, which shows that excellent results are being obtained from the use of creosoted ties:

D. L. & W. TIE RENEWALS

Year	Miles of track	Total number of ties	Ties inserted for renewals: Untreated	Treated	Total	Percentage of total ties inserted to total ties in track	Ties inserted per mile
1908..	2,439	6,722,329	676,943	.....	676,943	10.1	277
1909..	2,475	6,813,721	581,952	.....	581,952	8.5	235
1910..	2,500	6,877,974	258,927	163,433	422,360	6.1	169
1911..	2,614	7,186,346	173,815	409,680	583,495	8.1	223
1912..	2,619	7,200,509	180,428	425,498	605,926	8.4	231
1913..	2,644	7,262,170	209,434	534.042	743,476	10.2	281
1914..	2,627	7,242,294	194,512	476,370	670,882	9.3	255
1915..	2,663	7,346,825	304,405	438,832	743,237	10.1	279
1916..	2,656	7,331,287	165,281	352,614	517,895	7.1	195
1917..	2,663	7,349,178	108,629	308,097	416,726	5.7	157
1918..	2,671	7,369,734	83,867	240,199	324,066	4.4	121

The annual report on service tests records of ties was also presented. This included a complete list of the test records on file at the Forest Products Laboratory, Madison, Wis., and covered 38 sheets of tables.

DISCUSSION

George E. Rex, Santa Fe, stated that the record on the Lackawanna proved that ties could be preserved against decay for as long a time as they would resist mechanical wear. F. J. Angier, Baltimore & Ohio, called attention to the need for correction in records to account for miles of track in switches and bridges, which on his road amounts to about 5 per cent. Mr. Rex said that the committee was at work on a standard method of keeping records. Lowry Smith, Northern Pacific, explained a theoretical study of tie renewals based on percentages of renewals each year for ties of a given service life. This showed that renewals at certain times during cycles might be much more or much less than the average, and might thus give a wrong impression as to the exact benefits to accrue from treatment.

Plant Operation

The Committee on Plant Operation presented a report on mechanical devices other than locomotive cranes for the handling of treated material, and the locomotive crane, its uses and limitations, the devices being divided into seven main classes as follows:

A—Stationary stiff-legged derrick with movable boom.
B—Cable-ways.
C—Stationary crane with electric hoist.
D—Movable electric hoist—Gantry type.
E—Movable electric hoist—Monorail type.
F—Locomotive crane.
G—Miscellaneous.

Except where otherwse specifically stated, the report dealt with the loading of open-top cars only.

Type A, whether hand or power operated will load ties into

open top cars in tram-car lots at present for about 1½ cents each.

Type B, the cable-way, is only of limited usefulness in this field.

Type C is a stationary steel framework erected transversely over the tram tracks and the standard gage tracks at the loading platform. An I-beam at the top supports a traveling electric hoist capable of lifting a tramload of ties or other material. The hoist is operated by two laborers —one who manipulates the hoist and helps fasten the chains, handle the tram car bales and move the trams, and another who trips the trip hooks, drops the railroad cars into position, fastens the chains, handles the bales and moves the trams. On a test, 10 trams containing 433 7-in. by 9-in. 8½-ft. ties were handled by two men in 1 hr. and 30 min., or 138 ties per man-hr.

Type D, the gantry crane, is shown in a photograph. The traveling steel framework, which supports the hoist, spans two standard-gage tracks which may have a third rail for trams if needed. No loading platform is used. The hoist is operated from a cab at the ground level, and the device permits of three dimension handling of the loads. Three men are required to operate this hoist, a hoist runner, a man on the ground handling chain slings, and a tripper on the car being loaded. On a test by this method 10 trams containing 485 7-in. by 8-in. 8½-ft. ties were loaded into open-top cars in 50 min., or 194 ties per man-hr.

Type E consists of a steel framework erected longitudinally over a standard gage track carrying a monorail from which a traveling electric hoist and cab are suspended. This device differs essentially from Types C and D in that the chain slings of the latter are replaced by a pair of grapple hooks sufficiently large to handle a tramload of ties or other material at one time. Two men are required to operate this crane. On a test 10 trams containing 645 6-in.

The Angier Tie Loader

by 8-in. 8-ft. ties were handled by this method at a rate of 276 ties per man-hr.

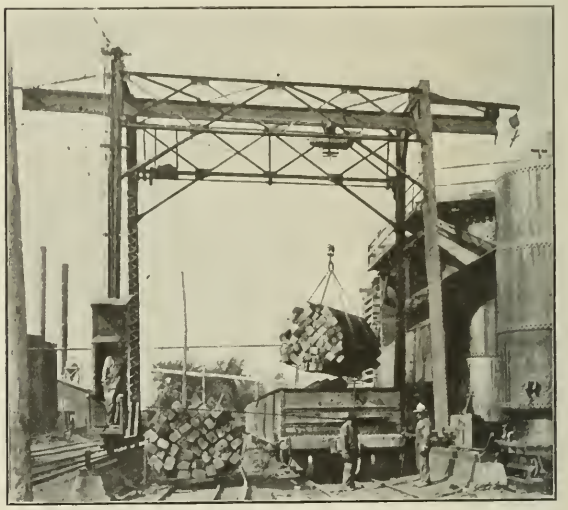
Type F is the locomotive crane. The general preference is apparently for the 8-wheel M. C. B. truck type of crane, with a boom having an effective working radius of 10 to 35 ft., and a maximum lifting effort of 15 to 20 tons at the minimum radius. For handling treated crossties with a locomotive crane, no better method is known to the committee than that practiced in a number of plants, whereby tramloads of ties are slung from the tram to their place in open-top standard gage cars in chain or wire rope slings. This practice requires two or three men besides the craneman—one or two removing bales and placing slings, and one releasing slings and trimming loads. On a test of 18 trams containing 1,080 6-in. by 8-in. 8-ft. ties were loaded into coal cars in 45 min., or 360 ties per man-hr.

Type G is the Angier tie loader, a device of value in loading treated ties into closed cars, saving much of the heavy lifting incident to doing this work entirely by hand. It is operated by day laborers or piece workers, generally the latter, and effects savings of about ⅛ to ¼ cents per tie on the piece work basis at the plants where used. This machine is patented, the patent being due to expire in the latter part of 1920.

On mechanical devices other than locomotive cranes for handling untreated material, the work of the subcommittee was confined to machines for the handling of railroad cross ties, several loaders and stackers were described but none was recommended.

The conclusions of the committee were that:

1. Where open-top cars are available, treated ties can be loaded at a great saving of labor and money if some type of crane



Loading Ties With a Gantry Crane

is used. The locomotive crane has the advantage that it may be used about the plant for other purposes.

2. A locomotive crane is practically indispensable where heavy timbers, poles or piles are handled.

3. No perfected, satisfactory mechanical means have been found for loading into box cars.

4. Considerable work has been done in attempting to design some satisfactory machine for stacking and loading untreated ties, but so far no entirely successful machine has been made.

A Theory on the Mechanism of the Protection of Wood

By Ernest Bateman

Chemist in Forest Products, United States Forest Products Laboratory, Madison, Wis.

There are at least two methods of protecting wood from destruction by living organisms: (1) By controlling the conditions necessary for the life of the organism and thus inhibiting its growth; (2) by the injection of a material which will kill or poison the organism itself or any enzymes through which it may accomplish its work. The first of these means is not practical if the wood is to be used for its usual commercial purposes, since it means control of the temperature, of the moisture content, and of the air content of the wood itself, and it is therefore necessary to resort to the use of a poison.

It would seem reasonable to expect that any material which is poisonous enough to kill an organism of any kind

must first be soluble in the body fluids of that organism, at least to such an extent as to permit a lethal dose to be taken at one time. All wood preservatives must, therefore, be soluble in water to a certain extent, and in this respect at least, oil solutions and inorganic salt solutions must be similar, differing chiefly in the mechanism by which they provide a reserve supply of the poison.

The theory proposed may be summarized as follows:

1. Any substance to be an efficient wood preservative must be soluble in water at least to the extent of producing a toxic water solution.

2. Creosote oil may be considered as consisting of two groups of compounds, one of these being sufficiently soluble in water to render it toxic, the other insoluble and hence not toxic.

3. The non-toxic oil acts as a reservoir for the toxic oils and feeds them automatically, when needed, to the moisture in the wood.

4. The difference between oil preservatives and inorganic salt preservatives as far as this theory is concerned, is in their method of retaining the reserve supply of toxic materials. Zinc chloride has no reserve supply, all the material being soluble in the usual amount of moisture present in air-dry wood. Sodium fluoride may have a reserve supply in the form of solid crystals due to the use of a saturated solution in treatment. Creosote oil may have a considerable reserve supply stored in the oil itself, this supply being fed to the wood as it is needed.

Mr. Bateman presented a second paper wherein he discussed the effect of light oils in timber preservation based on a study of service tests extending over a long period of time and observations on the character of the oils used in past years, concluding with the following questions relative to the correctness of the prevailing understanding as to the relative importance of light and heavy oils in the timber preserving industry:

1. Since these light oils containing 60 per cent or more of oil distilling below 235 deg. C. have preserved both poles and ties beyond their mechanical life, is there any need of a higher boiling oil?

2. Would we not obtain a better penetration and hence longer life by using a low boiling oil?

3 Could these light oils be obtained cheaper than our standard creosote?

4. Since the toxicity of coal tar creosote seems to be measured by the amount of oil distilling below 270 deg. C., ought we not to put a limit upon the amount which may distill above that point in both our creosote and our tar solutions?

Report on Terminology

The Committee on Terminology presented a report on the standardization of titles of employees at timber preserving plants which included an organization chart adaptable for either large or small plants. The committee found that a great variety of titles are now used to designate officers or employees doing approximately the same work; that not enough consideration is being given men in charge of this work and that there is, in regard to employees, a great variation in rates for positions implying approximately the same duties. The committee recommended that the titles of employees be brought to a standard insofar as possible so that the title of a position defines the duties and responsibilities more clearly; that the importance of the industry be brought to official and public attention in so far as possible with a view of increasing the compensation of the men in charge of the work and continuing the interest of competent men in the industry; and that inasmuch as timber preservation is primarily an engineering problem, that it should be included in the engineering department.

The definitions presented by the committee were as follows:

Manager Timber Department.—In charge of timber preservation, inspection, distribution of ties and timber, and conservation of forest products.

Supervisor Tie and Timber Inspection and Distribution.—Reports to manager timber department and is in actual charge of tie and timber inspection and distribution.

Superintendent Timber Preserving Plant.—Reports to manager timber department and is in actual charge of the timber preserving plant.

Chief Lumber Inspector.—Reports to supervisor tie and timber inspection and distribution and is in charge of lumber and timber inspection.

Chief Tie Inspector.—Reports to supervisor tie and timber inspection and distribution and is in charge of tie and switch tie inspection.

Chief Treating Engineer.—Reports to superintendent timber preserving plant and is in charge of treating engineers, firemen, mechanics, and the general mechanical upkeep of the timber preserving plant.

Treating Engineers.—Report to chief treating engineer and handle equipment during process of timber treatment, making necessary run calculations.

Assistant Treating Engineer.—Reports to treating engineer, being an apprentice to him.

General Foreman.—Reports to superintendent timber preserving plant and is in charge of all outside labor connected with the handling and transportation of material in the yard.

Chemist.—Reports to superintendent timber preserving plant, checks the treatment of material, makes all necessary analyses and does research for the advancement of the industry in general.

Chief Clerk.—Reports to officer in whose office he is located and has charge of all office work in connection with that office.

Car Construction

Due to the disturbing condition surrounding railway car shops the committee on car construction was unable to present a detailed report on the actual condition existing in the more important car shops. Instead, special study was presented on the causes of defective conditions necessitating repairs to wooden freight equipment at the Missouri, Kansas & Texas shops at Denison, Tex. This showed that of the 399 cars repaired during the month of July, 1919, an average of 82.3 per cent of the repairs were due to decay in the following percentages:

Description	Decay ft. b.m.	Per cent	Other ft. b.m.	Per cent	Total ft. b.m.
Draft timbers	.....	...	150	100.0	150
End sills	4,422	34.4	8,400	65.6	12,822
Deadwood	18	7.4	224	92.6	242
Long sills	40,185	68.0	20,622	32.0	60,807
Sub-sills	545	26.2	1,494	73.8	2,039
End posts	1,226	32.4	2,562	67.6	3,788
Coal car sides	9,337	80.1	2,311	19.9	11,648
Running boards	9,365	97.3	256	2.7	9,621
Roofing	23,632	100.0	... ...	.....	23,632
Siding	28,065	89.5	3,264	10.5	31,329
Lining	22,602	89.1	2,748	10.9	25,350
Decking	74,465	95.4	3,586	4.6	78,051
Grain strips	5,971	96.5	216	3.5	6,187
	219,833	82.3	45,833	17.7	265,666

As a means of introducing preservative methods along lines of least resistance, the committee recommended the application of refined coal-tar creosote oil, conforming to the Railroad Administration Specification R 828 A, either by spraying or brush application to all points of contact, of sills, posts, braces, of freight car equipment. These treatments are recommended for application to new construction only when more efficient means are not available. Such an application is most practical for repair work, as conducted under present conditions. Wherever possible the preservative should be heated to 150 deg. F., but during the summer a properly refined oil may be used without heating. An application made in this manner with refined creosote is more economical and decidedly more effective than with other miscellaneous proprietary products now employed.

Rapid Deterioration of Sap Pine Ties

By C. O. Deabler

Tie and Timber Agent, Southwestern Region, St. Louis, Mo.

I believe a record should be made of conditions in the production of sap pine ties during the past year that any criticism or reflection of sap pine as a suitable wood for cross ties may be intelligently answered. Furthermore, there will probably be failures of ties produced and treated during this period, which in time to come, may invite unfavorable comment of a treating plant or the treating industry.

From reports of the United States Weather Bureau for a period of 29 years, it has been found that the months of October and November, 1919, were decidedly abnormal in the states of Arkansas, Louisiana and Texas. They were characterized by comparatively high temperatures, excessive and very frequent rainfalls, and an absence of sunshine. The humidity during this entire period was abnormally high. All of these circumstances were extremely favorable to the rapid development of all sorts of decay-producing fungi, not only those responsible for the decay of timber, but all forms affecting agricultural crops. It is not at all surprising, that with these climatic conditions prevailing throughout the region in which sap pine cross ties have been produced, a marked development of the chief sap pine destroying fungus, took place.

Another point of interest deals with the rapidity with which ties become infected and subsequently decayed. In ordinary seasons a pine tie, when cut during the latter part of the summer, has usually been found to be free from this infection for at least three or four months. But during the latter part of 1919, this rate was much accelerated. A tie in a lot hauled to the tie yard within 24 hours after it was made and there stacked in approved fashion on a well-drained cinder-covered yard was found to be badly infected 93 days after it was cut from the tree.

One point in connection with the life history of this fungus, which it is important to remember in all points of this discussion, is that there is a certain definite period in the life history of the fungus where its presence cannot be recognized by an outside inspection of a piece of timber. This will explain why a great many ties which were inspected and pronounced perfectly sound, using the best visual inspection possible, showed fruiting bodies on the outside after several weeks in transit and could then easily be detected as infected ties.

We all realize and agree that the sap pine tie is not of a desirable wood, compared with the species previously used by most roads, but tremendous drain on our hardwood forests, and high prices, brought about by the unusual conditions during the past three years, made it necessary for railroads to consider other than hardwoods.

It should also be pointed out that the type of production during the past summer differed considerably from that previously secured, even in sections where pine ties had been produced. In previous years the number of pine ties produced was limited to the minimum quantity needed by the railroads. This year no limit was put on production and they came out in such vast quantities that by the end of September, there were between three and four million sap pine cross ties on the right-of-way. This flood, furthermore, was brought about rather suddenly as will be readily evident from figures of the number of ties inspected during July, August, September and October in the Southwestern Region, which were as follows:

July	1,393,906	September	2,624,202
August	1,855,822	October	2,296,907

Many of these ties, made as they were by people unfamiliar with pine tie production, were possibly not handled as expeditiously as they should have been in bringing them from the woods to the right-of-way, and considerable deterioration probably took place while the ties were still in the hands of producers. Attention should also be called to the fact that this very large production took place during a season of the year when wood cut from pine trees was in the best possible condition for rampant infection. These conditions, taken in connection with the extraordinary climatic conditions already mentioned, all contributed to the extensive deterioration which actually occurred.

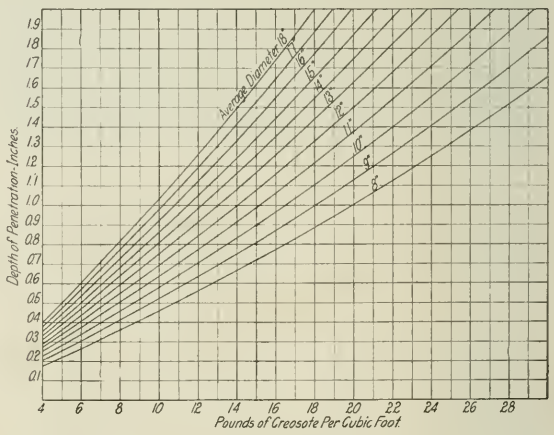
It would be a hard problem to give all the reasons for the deterioration of the sap pine cross ties in the Southwestern region during 1919. Summing up the situation, however, it was brought about largely by the extraordinary climatic conditions, the unlimited production, congested transportation, and the failure of some producers not familiar with sap pine preservation, to realize the need for getting the ties to the right-of-way before infection had taken place.

The sap pine cross tie should reach the treating plant as quickly as possible, and be treated at the proper time. Many plants estimate the age of cross ties when arriving at the plant and add to this age the customary time allotted for the proper seasoning, treating the ties at the expiration of this time. This system should be corrected, as ties are received quite frequently at treating plants and carded for some date of treatment, when they vary several months in age. This results in some ties being treated too green and others beyond the proper time. My suggestion is to correct this estimating of the age of ties by the use of the dating hammer as soon as it can be applied, and separate the ties at the treating plant.

Other Subjects Discussed

A report on service tests of flooring and paving was presented which confined itself to an account on the causes of fires in bridge floors at Detroit, Mich., Kansas City, Mo., and Portland, Ore.

The roadway of the Belle Isle bridge across the Detroit river was floored with creosoted wood blocks 3½ in. deep on a creosoted plank substructure. In 1915 this bridge was destroyed by a fire which, it is supposed, originated from the ignition of some dry and untreated side walk timbers by sparks from a municipal asphalt wagon. The fire spread rapidly to the creosoted structure, the collapse of the roadway timbers being accompanied by a collapse of a large portion of the steel spans.



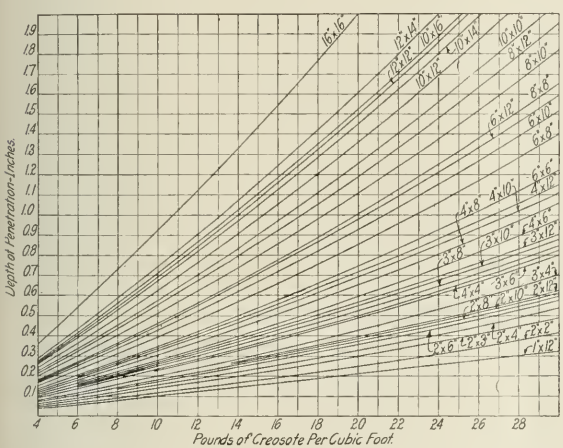
Relation of the Intensity of Treatment to Depth of Penetration in Round Piling

The creosoted timber substructure of the Missouri river bridge at Kansas City which caught fire in August, 1919, consisted of a creosoted plank roadway, the fire being caused by sparks from a locomotive passing under the bridge.

The Portland, Ore., bridge is a double deck structure, the lower deck being used for railway traffic while the upper deck is for street car traffic, vehicles and pedestrians. The floor system of the upper deck is composed of 4-in. Douglas fir creosoted blocks laid on creosoted planks and ties of the same material. The fire is supposed to have started in some untreated lumber located on the bottom chord of the lift-span, spreading rapidly until it had destroyed the upper deck for a length of about 430 ft.

At Detroit and Portland, it was found that where it was necessary to tear up the roadway in order to reach the fire underneath, the spread of the flames was greatly accelerated by the draft thus created, rendering the fire very difficult to combat. At Kansas City on the other hand, the planking was not disturbed and the fire was extinguished without any difficulty.

The penetration of creosote in various sizes of sawed lumber and round piling was described in a paper by R. H. Rawson, consulting timber engineer, Portland, Ore. In order to get at the fundamentals of the question, Mr. Rawson co-ordinated the data that he had collected on the subject and put these in such shape that some definite idea might be obtained relative to the depth of penetration of creosote in different sizes of material. The theory on which he worked was that the wood contains a certain volume of cavities, or open spaces, which can be filled with preservatives. Once



Relation of the Intensity of Treatment to Depth of Penetration in Squared Timbers

the values for the voids have been determined, the amount of creosote required to fill the wood to a certain depth can be readily computed. The results, as plotted to show the relation between penetration and the amounts of preservatives absorbed by sawed timbers and poles, are shown in the two diagrams.

The effect of preliminary steaming in the treatment of air seasoned ties was discussed by S. S. Watkins, Watkins Creosoting Company, with regard to the specifications of the United States Railroad Administration which required the use of preliminary steam in the Burnettizing and Card treatments of air-seasoned ties. When these specifications became effective in 1919, it was decided by the plant management to maintain pressure periods of the same duration and intensity as had been the usual practice in order to study the effect of the preliminary steaming. The results arrived at are not in any sense experimental, but represent the summaries of the daily plant operating records, the relative condition of the ties treated being as nearly the same as could be obtained in ordinary practice.

The tests showed that due to the use of preliminary steam, the net absorption in the treatment of red oak ties was increased 12.6 per cent and the net absorption in the treatment of sap pine ties was increased 52.2 per cent.

The iodine-potassium ferricyanide-starch color reaction test for determining the penetration of zinc chloride in crossties was described in a paper by Galen Wood, chemist, Port Reading Creosoting Plant, Port Reading, N. J., wherein he stated that it is very evident that in treating wood with water soluble salts, some indicator is necessary to determine the penetration of the colorless solution into the wood, if control of the work and the efficiency of the treatment is desired. The iodine method which he presented for determining zinc chloride penetration is based on the principle that zinc ferricyanide liberates free iodine and free iodine in turn gives a dark blue stain with starch solution, thus making the depth of penetration clearly visible.

Committee No. 10 on Non-pressure Treatment presented a report related to the problems encountered in the butt treatment of cedar poles of which undoubtedly the most important both to the plant operators and to the consumers of butt-treated poles, is how to secure not only a uniform penetration of oil throughout the treated portion of each pole, but also to produce a uniformity of treatment of the different poles in a charge. The extent of seasoning and the condition commonly termed as "case hardening" bears directly on these variations.

The results of the study made indicate that the condition technically known in lumber seasoning as "case hardening" is not the same as the condition referred to by the same name in the pole treating industry. Case hardening in poles appears to be caused by irregularities in the conditions controlling air seasoning. The "case hardened" pole sections all had a hard, glossy appearing surface, and usually one or more large checks extending deeply into the heart of the pole were present with practically no small checks. It appears, therefore, that in general the "case hardened" poles or areas can be identified by the absence or lack of distribution of numerous small checks and the presence of a few large checks, and that until a practical method of overcoming the effect of "case hardening" on penetration of oil is developed, a greater uniformity in treatment may be secured by classifying poles and treating only non-"case hardened" ones. Experiments made with poles soaked in water and in zinc chloride solutions failed to demonstrate any benefit from such preliminary treatment.

A report on the creosoted piling removed from Long Wharf, Oakland, Cal., dealt with the classes of piling used in that structure, their longevity, condition on removal, etc., after from 21 to 29 years of service in salt water. This structure and conditions relating to it were described in an article in the *Railway Age* of July 4, 1919, page 27.

Hunter J. von Leer of the Indiana Zinc Company, Terre Haute, Ind., raised a question as to the necessity of separating ties in groups according to their absorptive properties and presented an extended argument in which he contended that thoroughly satisfactory results can be obtained without going to the extra expense and trouble of this separation.

The Committee on Promotion and Education reported that work had been continued during the year looking toward the establishment of an organization which could bring means for the conservation of timber through treatment and proper methods of treating it to the attention of those interested in the use of timber.

The annual dinner of the association was held in the Hotel Sherman Wednesday evening. Samuel O. Dunn, editor of the *Railway Age,* was the speaker, taking for his subject the present railroad situation.

A paper on the determination of the amount of water in stored creosote by W. E. Jackson, explained how a two-inch pipe painted with white lead placed in a tank of creosote would disclose relative depths of unmixed oil, emulsion of oil and water, by the effect on the paint. This subject was also discussed by S. R. Church of the Barrett Company, who described a method of handling oil in tanks that would insure a higher degree of accuracy than is commonly obtained.

E. M. Blake gave an account of the development of the process of perforating timbers that resist treatment in order to secure a deeper and more uniform penetration of the preservative. This subject was covered in an article in the *Railway Age* for December, 1919, page 1203.

Train Accidents in December[1]

THE FOLLOWING is a list of the most notable train accidents that occurred on the railways of the United States in the month of December, 1919:

Collisions

Date	Road	Place	Kind of Accident	Kind of Train	Kill'd	Inj'd
5.	Gulf C. & S. F.	Kopperl, Tex.	bc	F. & F.	0	5
6.	Gulf C. & S. F.	Belton, Tex.	rc	P. & F.	0	8
9.	Erie	Newton, Ind.	rc	F. & F.	1	1
16.	Nashville, C. & St. L.	Phelps, Ga.	bc	P. & F.	0	2
†18.	Norfolk & W.	Walton, Va.	rc	P. & P.	5	17
19.	Chi. & N. W.	Missouri Val.	rc	P. & P.	0	11
*†20.	Canadian Pacific	Onawa, Me.	bc	P. & F.	24	35
25.	Wabash	Granite City	rc	P. & F.	0	7
29.	Wabash	Litchfield	rc	P. & F.	0	5

Derailments

Date	Road	Place	Cause of derailment	Kind of Train	Kill'd	Inj'd
1.	Chi., Ind. & L.	Greencastle	b. rail	P.	0	0
3.	Ft. Worth & D.	Fruitland	b. rail	P.	0	31
*†4.	M. B. & S.	Muscatine, Ia.	d. rail	P.	3	12
7.	Penn.	Bengies, Md.	acc. obst.	P.	0	1
8.	C. C. & O.	Kermit, Va.	.....	P.	0	13
8.	C. C. C. & St. L.	Marion	d. switch	P.	0	0
†10.	Lehigh V.	Auburn	b. rail	P.	1	32
11.	Balt. & Ohio	Glenwood, W. Va.	.....	F.	0	1
†15.	Atlantic C. L.	Tarboro, N. C.	ms.	P.	1	3
18.	Balt. & Ohio	Chemical	b. rail	P.	0	4
19.	Chicago & Alton	Mt. Forest	b. rail	P.	0	31
†21.	St. Louis-S. F.	St. James	b. axle	P	3	76
26.	Chi., Ind. & L.	Springville	unx.	P	0	1
31	D., L. & W.	Montrose, Pa.	unx.	P.	1	1

The trains in collision near Kopperl, Tex., on the 5th, were northbound freight No. 38 and southbound freight No. 37, the southbound being at a standstill on the main track. The other train came on at good speed on a descending grade. It should have entered the side track but there was a dense fog and it appears that the speed was not under proper control. Five trainmen were injured.

The trains in collision, near Belton, Tex., on the 6th, were an eastbound special passenger train of 12 coaches (occupied by 750 Chinese traveling in bond from San Francisco to Havana, Cuba, by way of Key West, Fla.), and a preceding freight, the passenger train running into the rear of the freight, which was at a standstill. Four trainmen were injured and four of the Chinese sustained slight cuts and bruises. The collision was due to excessive speed within yard limits where the rule requires trains to run under control.

The trains in collision on the Erie Railroad at Newton, Ind., on the 9th of December, were through freights. The leading train was at a standstill, and was run into at the rear by the following train, which approached at uncontrollable speed on a descending grade, by reason of the failure of the airbrakes, due to ice having formed in the air line between the second and third cars of the train. The conductor had noticed the falling pressure on the gage in the caboose, and with his men, had gone on top of the cars and was setting brakes; but was not soon enough to prevent the collision. The engine and eight cars were knocked off the track and a part of the wreck fell against the signal cabin at the crossing of the Pennsylvania Lines, knocking it down. An engineman of the Pennsylvania, in the cabin, was killed, and the signalman and one brakeman were injured.

The trains in collision on the Nashville, Chattanooga & St. Louis, at Phelps, Ga., on the night of the 16th, were northbound passenger No. 6, and southbound freight No. 47. Both engines were damaged, and the engineman and fireman of the passenger train were injured.

The trains in collision at Walton, Va., on the night of the 18th, were eastbound passenger No. 4 and following passenger train No. 26. The leading train was standing at a watertank, and its two rear coaches were badly damaged. Five passengers were killed and six employees and 11 passengers injured. The collision was due to the failure of the engineman of train No. 26 to run under control, after passing a red automatic block signal.

The trains in collision on the Chicago & North Western, near Missouri Valley, Iowa, on the 19th, were westbound passenger No. 215, which had just entered the main line from the Sioux City line, and westbound fast mail train No. 9, which ran into the rear of No. 215, damaging the rear sleeping car. Eleven passengers were slightly injured. The collision was due to "non-observance of signals on the part of the brakeman of No. 215 and the engineman of train No. 9."

The trains in collision on the Canadian Pacific near Onawa, Me., on the 20th, were a westbound passenger and an eastbound freight. The freight engine knocked the passenger engine off the track and into the ditch and crushed two passenger cars. Twenty passengers and four employees were killed and 33 passengers and two employees were injured. The wreck took fire from the locomotive fireboxes and some of the victims were reported burned, but none fatally. The passenger was the third section of regular westbound passenger, No. 39. The freight had met the second section at Bodfish, two miles west of Onawa and should have waited there for the third. The freight, while standing at Bodfish waiting for the passenger trains, received an order, form 19, giving it time on the fourth section of No. 39; and it appears that the men in charge of the freight acted as though this had given them time on the third section. This accident was reported in the *Railway Age* of December 26, page 1256.

The trains in collision at Granite City, Ill., on the 25th, were a westbound freight and a westbound passenger, the passenger running into the rear of the freight and wrecking several cars. The passenger engine was overturned, and the engineman and fireman were slightly injured. Five other persons were injured.

The trains involved in the accident near Litchfield, Ill., on the 29th, were a northbound freight, moving at low speed, a northbound passenger train, No. 6, and a southbound passenger No. 17. No. 6 ran into the rear of the freight, wrecking the caboose and several cars, and blocked the southbound track; and No. 17 ran into the wreck. Several cars in the southbound train were thrown off the track. One employee was injured, also four passengers slightly. The freight had not been properly protected by flag.

The train derailed on the Chicago, Indianapolis & Louisville, near Greencastle, Ind., on the first, was southbound passenger No. 3. The two rear cars ran off the track by reason of a broken rail; but no persons were injured.

The train derailed near Fruitland, Tex., on the 3rd, was a southbound passenger. Five coaches were thrown off the track by a broken rail and 31 passengers were injured.

The train derailed on the Muscatine, Burlington & Southern, near Muscatine, Iowa, on the evening of the 4th, was a southbound passenger consisting of a single gasoline motor car. The car was thrown off the track by a defective rail and was overturned. The gasoline took fire and three passengers were killed and 10 injured. The bodies of the killed were burned beyond recognition. Two employees were injured.

The train derailed at Bengies, Md., on the evening of the 7th, was southbound passenger No. 129. The locomotive struck an automobile on a crossing, and with one baggage car and five passenger cars, was derailed. The occupant of the automobile was killed.

The train derailed on the Carolina, Clinchfield & Ohio

[1] Abbreviations and marks used in Accident List: re, Rear collision——bc, Butting collision——xc, Other collisions——bc, Broker——d, defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc, obst., Accidental obstruction——malice, Malicious obstruction of tracks, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

near Kermit, Va., on the 8th, was a southbound passenger. Two coaches were overturned and 13 passengers were injured.

The train derailed near Marion, Ind., on the night of the 8th, was southbound passenger No. 3. Running at 40 miles an hour the express car and smoking car were derailed in a cut and badly damaged. There were in the train about 75 passengers, all of whom escaped injury. The cause of the derailment was a defective switch, a broken lug allowing the switch point to become loose.

The train derailed near Auburn, N. Y., on the 10th, was a southbound passenger No. 282. Two coaches were overturned and 33 passengers were injured, one of them fatally.

The train derailed at Glenwood, W. Va., on the evening of the 11th, was northbound passenger No. 73. The engine was thrown off the track by a broken rail and six cars also left the rails. One passenger was injured.

The train derailed at Tarboro, N. C., on the night of the 15th, was southbound extra freight No. 970. The 26th car in the train was thrown off the track at a switch and with two other cars and the caboose was wrecked. The wreck took fire from the overturned stove in the caboose and was partly burned up. The conductor was killed and three trainmen were injured. It is believed that the switch was thrown under the moving train.

The train derailed at Chemical, W. Va., on the 18th, was an eastbound passenger. Two coaches were thrown off the track by a broken rail, and fell down a bank. Four passengers were injured.

The train derailed near Mount Forrest, Ill., on the 19th, was northbound passenger No. 76. Two baggage cars were overturned. Thirty-one passengers were injured; all but one of the injuries being classed as "slight." The cause of the accident was the breakage of a 100 lb. rail, found to be piped.

The train derailed near St. James, Mo., on the 21st, was eastbound passenger No. 10, second section. By the breaking of an axle under a coach, six coaches were derailed, and three passengers were killed or fatally injured. Seventy-six other passengers were injured, all but five of the injuries being classed as "slight."

The train derailed near Springville, Ind., on the 26th, was a westbound passenger. The locomotive was ditched, and the fireman was slightly injured.

The train derailed near Montrose, Pa., on the 31st, was local passenger No. 752. While descending a steep grade at about 25 miles an hour, a milk car was derailed, and with the locomotive, was overturned, and the engineman was killed. The fireman was injured. The cause of the derailment was not determined.

Canada.—Seven train accidents received prominent mention in Canadian newspapers in the month of December. In a rear collision on the Canadian Pacific, at Milan, Que., on the morning of the 11th, a trainman and another person on a freight train, not an employee, were killed, and three trainmen were injured. A westbound special passenger train occupied by coolies from France, en route to China, ran over a misplaced switch and into the rear of a freight, standing on a side track. It is said that the switch light indicated clear. At Marona, Ont., on the 20th, there was a collision due to a maliciously misplaced switch. Five derailments, none of them reported as resulting in fatal injuries, occurred as follows: On the 18th, at Smith's Falls, Ont., on the Canadian Pacific, two coaches overturned. At Chip Lake on the Canadian Northern on the 17th and at Edson on the same road on the 18th, the through express train in each case. At Fredericton Junction, N. B., on the 26th, train No. 40 of the Canadian Pacific. At Edmonton on the 29th, the Canadian Northern express, the third accident in that region to that train within two weeks.

Wage Demands Refused by Director General and Referred to President

WAGE DEMANDS PRESENTED by the 14 principal organizations of railway employees, which it has been estimated would add from $800,000,000 to $1,000,000,000 to the payroll of the railroads if granted, were definitely refused on Wednesday, February 11, by Director General Hines, but at the request of the organizations his report on the matter and their arguments were referred to the President with his recommendations for a final decision. President Wilson was to give the final answer of the government on the question of further increases in pay of railway employees at a conference on Friday morning with a committee of three chosen by the labor leaders, including B. M. Jewell, acting president of the Railroad Employees' Department of the American Federation of Labor, E. J. Manion, president of the Order of Railway Telegraphers and Timothy Shea, acting president of the Brotherhood of Locomotive Firemen and Enginemen. It was expected that he would confirm the decision given on edWnesday by Federal Director Hines and counsel a little more patience pending further efforts to reduce the cost of living as a desirable alternative to wage increases that would tend to increase it still further.

Director General Hines did not publicly announce his decision, stating merely that he had been unable to reach an agreement with the labor leaders, but it was understood from other sources that he had reiterated his insistence throughout the week or more of negotiations with the officers of the 14 organizations, that he was in no position to grant further general wage increases before relinquishing the railroads to private management, that the employees had already received increases commensurate with the increase in the cost of living and that a further general increase would only tend to aggravate the situation by resulting in further price increases. His final answer to the requests for further wage orders which were presented during last summer and fall, and which have been thoroughly investigated at public hearings and otherwise by the Board of Railroad Wages and Working Conditions, was given after the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers and the Brotherhood of Railroad Trainmen had threatened strikes unless their demands were acceded to. A strike of the maintenance of way employees has been called for February 17 and the trainmen's brotherhood has taken a strike vote. The statement authorized by Mr. Hines after the final conference on Wednesday was as follows:

"Since February 3, the director general has had frequent conferences with the chief executives of the railroad labor organizations for the purpose of devising means for disposing of the pending claims for wage increases. During these conferences the executives of the labor organizations have expressed their views with great ability and frankness. The director general has not been able to agree with them as to how the problem should be disposed of in the view of the early termination of federal control, and is now laying before the President the representations of the executives of the organizations and also his own report for the purpose of obtaining the President's decision in the premises. In any event the conferences have been decidedly helpful in bringing out a clearer development as to the real issues involved and as to the character of evidence pertinent to those issues and the discussion throughout has been characterized by courtesy as well as candor and with a sincere purpose on the part of all to try to find a solution."

A committee of 10 representing the maintenance of way brotherhood called on Mr. Hines on Thursday and formally notified him of the strike vote. Another conference was also to be held with W. G. Lee of the trainmen, who on January 23 had served formal notice that "on and after February 23

the brotherhood must be considered as having withdrawn from or served its connection with any and all of the provisions of General Order No. 13 and the brotherhood's representative on Railway Board of Adjustment No. 1 will be withdrawn on that date." General Order No. 13 was issued by Mr. McAdoo early in 1918 to put into effect an agreement covering the adjustment of grievances signed by the regional director and the heads of the four train service brotherhoods. Mr. Lee said in his notice that "General Order No. 13, executed during the war as a war measure, has now been continued more than a year after the close of the war, and the pressure coming to me rom train and yard men throughout the country to press the wage demands presented last July to a favorable conclusion compels me to give official notice to you."

The maintenance of way brotherhood has not served a 30-day notice, unless the presentation of its demands last summer may be so construed. On November 22 it signed with the director general a national agreement effective on December 16, which contains a clause providing that there shall be no change in it until after 30 days' notice.

The Brotherhood of Railroad Trainmen is taking a strike vote of its general committee, because under a change in its constitution a referendum vote of the membership is no longer required, but in his letter ordering the strike vote, Mr. Lee stated specifically that if a strike were called no strike benefits would be paid because the brotherhood's $1,500,000 fund would only last a few days and it must be conserved.

The conference which began on February 3 was precipitated by a request from Mr. Lee for a conference on his demands. Mr. Hines then invited all of the 14 organizations to a conference so that he might discuss the situation with them all at once. Neither the engineers nor the conductors had filed formal wage demands, although all had signed a letter to the director general insisting that unless the cost of living were reduced they must have an increase in wages. Last August the President and Mr. Hines had insisted that the wage demands be held in abeyance pending the government's campaign to reduce prices, and the position taken by the organizations was that the government has utterly failed in its efforts to reduce living costs and it was up to it to "make good" by an increase in wages. Neither the Railroad Administration nor the labor leaders has given out any of the details regarding the discussion at the conferences, but it is understood that Mr. Hines has relied on statistics comparing the wage increases and increases in the cost of living and has taken the position that the cost of living has at least been held in check during a time of the year whenit normally rises.

A. E. Barker, president of the maintenance of way brotherhood, which claims between 300,000 and 400,000 members, participated in the conference last week but left for Detroit declaring that Mr. Hines had not promised anything and that he did not believe he was going to. On February 9 the general chairman issued orders directing a strike for 7:00 a. m., Tuesday, February 17, unless the Railroad Administration had granted the demands by Saturday, February 14. Mr. Barker said that it was decided to issue the strike call before the Railroad Administration should have an opportunity to pass the burden to the private owners of the railroads.

On Tuesday the labor officers left with Mr. Hines a long communication, to which he replied verbally on Wednesday, after which they presented another, which may have been the request for an appeal to the President. Shortly thereafter Mr. Hines and his associates who have participated in the conferences, W. T. Tyler, W. S. Carter, J. G. Walker and J. A. Franklin, left the room to give the labor leaders an opportunity to decide whether they wanted to amplify their statements. In a few minutes they announced that their previous statements had covered the ground and after a conference with his associates, Mr. Hines gave out the statement that the matter would be referred to the President. Mr. Hines has kept the President advised on the progress of the negotiations through frequent conferences with Secretary Tumulty and it was stated that the President would take up the matter at once.

In a statement issued Wednesday night, W. G. Lee said:

"The trainmen take the position that more than a reasonable time has since elapsed and that the cost of living has not been reduced, but instead has been increased since that time, and that it is now up to the federal government to make good the pledge made by the President in his letter of last August as understood by labor.

"I expect to get the written answer of the director general to the trainmen's request at the next conference with him, aftr which the special committee of 20 officers and general chairmen, authorized by the international convention of the brotherhood to handle the subject, will take final action relative to its disposition."

The other labor leaders were not expected to issue a statement until after hearing from the President.

It was announced that President Wilson would have a personal conference with the labor committee at 10:30 Friday morning, and Mr. Jewell, Mr. Manion and Mr. Shea were selected to call upon him. Mr. Hines' report, together with the communications addressed to him by the labor leaders outlining their position and their arguments were transmitted to the President about 3:00 p. m. on Thursday. It is believed that the labor leaders expected that his answer would be that recommended by Mr. Hines and that most of them were prepared to report to their followers that they had gone as far as they could, although the maintenance of way men and the trainmen were represented as being in a rather belligerent attitude.

From the Cleveland Plain Dealer

"Don't get excited, she'll come to all right."

The Railroad Labor and the Freight Rate Problems*

If Strikes Must Come Let Them Come Now—Cannot Society Survive the Contest?

By Charles A. Pronty
Director of Valuation, Interstate Commerce Commission.

IN THE PAST I have stood among the so-called friends of labor. I have favored most laws enacted for the benefit of labor. Among other things, I have always been a most earnest advocate of the right of labor to organize. Capital is organized. The owner of a factory is a single entity acting as a unit; unless the labor of that factory has the right to get together and act as a unit also, it cannot fairly compete with capital. I still implicitly believe in this right and I would not object to a law which punished an employer who discharged an employee for the reason that he was a member of a labor organization.

I have further insisted in the past upon the right of organized labor to strike. I favored making labor in this respect an exception to the general rule against monopolies and conspiracies. I am still for that exception. While we should by the creation of boards of conciliation and in every other proper way remove the inducement to strike, still the final right must remain. The strike is the offensive weapon of labor and to take it away is to rob labor of its only effective means of self protection.

While, however, this should be the general rule there are certain exceptions to that rule. Just as the control of certain kinds of property is taken out of the hands of its owners, so certain kinds of labor must forego this right to strike, and for exactly the same reason. Of this the railroad is the most conspicuous instance.

You all perfectly understand that the private property which is invested in our railroads is not controlled by its owners, but by the government. The government determines, or may determine, how a railroad shall be constructed and equipped, upon what schedule its trains shall be operated, and above all the amount which it may charge for its service. All this is for the reason that the railroad is performing a service of such immediate importance to the entire community that the public must in this manner protect itself.

What is true of the money invested in these railroads is true of the labor which operates them. The government cannot say to a dollar of private capital, "you shall invest in a railroad," nor can it say to an individual, "you shall work for a railroad," but it can say and should say both to the man and to the dollar that when once embarked in railroad service it shall so conduct itself as not to inflict injury upon the public which it serves.

Consider for a moment what this situation is. The railroad labor of this country is so organized that it can at any given moment stop operations by rail in any section of this land, or throughout the country as a whole. And what does a strike of that character mean? What would it mean to you here in Boston? It would mean death from cold and starvation. It would mean riot and bloodshed and whatever else goes with the letting loose of famished humanity.

So long as that is possible, and so long as the government has no power to protect itself against that possibility, there is no government. If one class in this community can say to every other class, pay us so much more for our services or you shall starve, there is no longer a democratic form of government.

And such a possibility is no mere fancy. Within sixty days responsible labor leaders have declared that a general strike should come unless their demands were met. The President said the coal strike was unthinkable, but it came.

The Cummins bill deals with this situation by prohibiting strikes upon the part of the men and lockouts upon the part of the employer. A tribunal is provided to which the claims of both parties may be presented, and the decision of that tribunal is final. The right of the individual to quit work is not interfered with, but the conspiracy to quit by concerted action is made unlawful and prohibited.

Let Battle Come Now

It has been said that railroad labor would not permit the passage of such legislation, that it would prevent it by a general strike. The provision is right. That or its equivalent must be enacted if we are to live under a government by law and not by force. For my own part I do not for a moment believe that the railroad labor of this country would decline to obey such an act, although it would earnestly oppose its passage. I cannot believe that the railroad employees of my own little state, Vermont, probably the best paid and the most intelligent of any class of labor in that state, would wilfully defy a statute of the United States even though called upon to do so by radical labor. But if I am wrong, if the enactment of this legislation means a railroad strike with or without sympathetic strikes, let it come. We can meet it now better than we can later on. If society cannot survive that contest it is not worth preserving.

Higher Rates Must Come

To my mind there is no way in which to take care of the Boston & Maine and these other lines except by an increase in their gross revenues. There ought to be some increase in traffic which may help, but in the main this must come from an advance in their transportation charges.

It is said that rates have already been advanced and that business cannot endure a further advance. While it is true that both passenger and freight rates have been increased, it is also true that those rates are still relatively low. They are high measured in dollars, but are low measured either by the cost of service or the value of the article transported.

Cost of transportation has ordinarily increased less than any other considerable item of cost entering into a manufacturing total. Reckoned in per cent of the value of the things transported, the freight rate is today lower upon most articles than it has been for the last twenty-five years. While passenger fares, upon the railroads of southern New England have been advanced time after time, there never was a period when so many people traveled and paid their fares with such apparent ease as today.

Nor do I believe tht the business of New England would be seriously crippled by a further advance in freight rates, provided that your competitors were forced to bear the same increase in their transportation charges. But if your transportation charge is for any reason increased more than that of your competitor, you are at once placed at a disadvantage. It is this feature of the situation which has troubled me, and it is to this which you gentlemen should give the most earnest attention.

Do not infer that I am advocating any wild increase in

*From an address before the Associated Industries of Massachusetts, at Boston, February 2, 1920.

rates. Some increase must in my opinion be made. That increase should be just as little as it can be and serve the purpose. The public should demand of the Boston & Maine efficiency and economy, but it must permit, if private operation is to continue, a reasonable return upon the fair value of the property which is being used in the public service, and for the first year that return, in the interest of the public, should be too great rather than too small. Whether this advance should be upon both passenger and freight traffic, whether it should equal 15, or 20, or 25 per cent, must be determined by a painstaking investigation in which you gentlemen should participate.

Turning to Auto Truck

It may be objected that a further advance in short distance rates will divert traffic from the railroads to truck and this without doubt would finally, and in my opinion, ought to result. A large part of the traffic between the cities of southern New England and points from 20 to 100 miles distant, depending upon the character of the traffic, should move by automobile rather than by train. In the past it has been a cardinal principle with railroads to get all the traffic upon the best terms possible. A more discriminating policy will prevail for the future. It is coming to be understood that it costs money to handle traffic and that in the interest of the general public, including the carrier, business should be handled by whatever means a satisfactory service can be rendered with the greatest economy. Sometimes this is by water, sometimes by rail, sometimes by automobile, and it is my conviction that in the near future there is bound to be a marked development in the direction of the latter.

Merging Railroad Systems

What shall be done for the immediate assistance of our New England railroads is a burning question, but what is to be the final disposition of these same railroads is a much broader and more important one.

After years of effort to enforce competition between railroads, it has finally come to be generally realized that there can be no competition in the rate and that competition in the service often costs more than it is worth. Students of the subject generally agree that there should be a putting together of the weaker and the stronger properties, and that without this it will be found extremely difficult to care for the weaker road which must in some way be done if private ownership is to be permanent. Now when this unification comes what is to be done with our railroads? That question not only will arise; it has arisen and is before us.

Two things should be kept in view in all discussions of a transportation situation; rates and service. New England is a transportation unit and I have always felt that rates in all portions of New England should be the same. Just as the transportation charge upon the branch lines ought to be the same as that upon the main line, so the charge upon the thin line in a section like New England should be no higher than that upon the more dense line. The whole territory is one industrial unit and each part should contribute to the other.

So long as the railroads of New England are independent it is impossible to accomplish this. Rates which are ample for the New Haven would not pay the cost of operation upon the Maine Central, as abundantly appears from the results of the last year which I gave you. If, however, these roads were merged into a single unit the same rate might be applied nor would the traffic of any section feel appreciably the added burden.

Now the plan most likely to secure for New England the same rates as prevail generally east of the Mississippi would be the consolidation of our New England lines with some strong east and west line. If, for example, the New Haven were turned over to the Pennsylvania and the Boston & Maine were to become a part of the New York Central, that result would be very likely to follow.

Looking to the matter of service, there are arguments both ways. If the east-and-west consolidation plan were to be adopted, turning the New Haven over to the Pennsylvania, leaving the Boston & Albany with the New York Central as it is, and combining the Boston & Maine either with the New York Central or possibly with the Erie and the Delaware & Hudson, provided some system sufficiently strong could be worked out upon that basis, we should have two or three strong east and west lines competing for that business in which New England has the greatest interest; namely, the export business through the port of Boston and the transportation of raw materials, food and manufactured articles from and to the West.

Rail Failure Studies by the Bureau of Safety

The report of W. P. Borland, chief of the Bureau of Safety, Interstate Commerce Commission, for the year ending June 30, 1919, contains some comments on rail failures as the cause of accidents, with particular reference to crescent-shaped base fractures, shattering cracks in the center of the head, and injuries to the metal of the tread resulting from "wheel burning." This portion of the report is abstracted below:

Accident investigations involving the failure of materials, conducted during the year, and those in progress, have included the examination of rails which displayed different types of rupture, defects in track construction and failure due to equipment. Work of this class has reached that stage when it has become imperative to enter upon prolonged and exhaustive investigation of a number of basic, fundamental questions which are common causes and are responsible for a large number of rail failures.

A type of failure of common occurrence is presented in the display of crescent-shaped base fractures. Examples of this type are numerous, amounting to hundreds of instances. The origins of these breaks are practically all found in seamy metal located along the under side of the base of the rail. Some seams are very pronounced, while others are obscure. Service conditions, sooner or later, make the presence of these seams known, ultimately leading to rupture. Their rate of development is affected by track conditions, the weight of equipment and rates of speed being factors, while not unlikely the hardness of the rails in a chemical sense has an influence on the results.

Some rails have displayed crescent-shaped breaks only after a period of 10 or 12 years in the track, while others in a lesser number of months. The progressive character of these breaks is well illustrated in those rails which were a long time in the track before failure. While in many cases the seams are continuous, the fractures usually begin over ties, gradually working their way upward until they appear on the upper side of the flange, or perchance pieces of the flange are detached before the presence of the seams becomes otherwise known. Rails are weakened and square breaks result from seams which have partially developed in the base. Rail-failure statistics classify many broken rails as square breaks, which have their origins in longitudinal seams in the bases and which belong to the group of failures represented by crescent-shaped breaks.

Primitive tests of rails for acceptance under current specifications do not cover the feature of longitudinal seaminess, and even special tests fail to show the ultimate weaknesses which arise after a large number of repeated stresses have been received in the track. Rails fail in which the longitudinal seaminess is very obscure, a circumstance which is

disquieting since the original seam from its limited size presents peculiar difficulties of elimination.

Attention has recently been directed to a peculiar condition which prevails in the central zone of metal in the heads of some rails. A shattered state of the metal has been found, consisting of microscopic cracks, which become pronounced after pickling in hot acids. Similar but less frequent manifestation have been witnessed in the steel at the junction of the web and the base of the rail. These short shattering cracks, which extend lengthwise, crosswise and oblique to the direction of rolling, contain between their faces no foreign inclusion, nor do the cracks in all cases follow grain boundaries, but frequently pass through the grains as well as around them. The cause for their occurrence has not been ascertained, nor has it been determined at what stage or stages in the fabrication of the rail they make their appearance. One example may be mentioned, however; a finished rail was heated and quickly but not suddenly quenched, whereupon when subsequently pickled in hot acid short shattering cracks were displayed in the center of the head. In this case the cracks were therefore thermal ones.

Rails from the track have furnished examples of shattered heads, and new rails which have not been in service also have displayed them. A number of both new and old rails have been examined in this investigation. Up to the present time, rails with shattered heads have been found among those of the harder grades of steel; softer rails and those of early domestic and foreign manufacture have not displayed them.

The shattered zones have been found prevalent in rails which failed in the track, due to the presence of transverse fissures. Incipient cracks would be expected to promote the formation of transverse fissures, at least when oriented in the plane in which transverse fissures are developed. The discovery of shattered zones in the heads of rails may lead to an explanation of the proneness reported in rails of certain heats which display transverse fissures although laid in widely separated and remote parts of the track. It would not be proper, however, to hold out the hope that shattered heads alone lead to the formation of transverse fissures, since there are examples of such in otherwise intact metal. The considerable number of shattered cracks present in a short section of rail introduces a selective feature in conditions of service in locating the origin of a transverse fissure. It would appear that the formation of split heads would also be promoted by the presence of the shattered cracks, many of which are disposed parallel to the length of the rail.

Still another matter of importance has been brought forward upon which investigative work is in progress. This subject pertains to the failure of rails caused by "wheel burning" so-called—that is, the scoring and hardening of a layer of metal at the running surface of the head. The slipping of the driving wheels of the engine in starting a train causes the scoring. It is attended with local heating of the top of the head, intense heating as the sparks emitted indicate. The rapid abstraction of heat, by conductivity of the mass of metal of the head next below, results in the hardening of the surface metal. The depth of penetration of this hardened zone is not great, but this portion of the head is left in a very hard and very brittle state. Derailments result from the fracture of rails thus affected, the incipient points of rupture being located in or adjacent to the hardened metal.

While rail failures of this kind seem to admit of ready explanation, nevertheless, when critically considered and taken from a metallurgical point of view, they involve questions upon which further information than now available is demanded. The fractured surfaces of rails failing in this manner show fractures of tension, with origins at the hardened zones. But it has been found that the scored and hardened metal is in a state of internal compression. As such, the metal in compression virtually should have a strengthening influence. However, if the heating results in the formation of thermal cracks in the hardened metal a weakening effect is produced. Two influences are thus recognized, the tendencies of which are in opposition to each other.

Owing to the large number of scored rails in service, as there is hardly a station in the country at which there are not examples of this kind in some degree, it becomes a matter of importance to acquire data upon these phenomena. It is an obscure question to define, if possible to do so, when rails with such surface conditions have reached a stage of danger. This subject is also one upon which data are being acquired in connection with accidents now under investigation.

Portable Utility Light

A NEW TYPE OF LIGHT for highly localized lighting has recently been placed on the market by the Western Electric Company. This light is for use at close ranges where the light is to be located at distances not greater than 125 feet from the object or surface to be illuminated. With the light operating on a 100-foot throw, a 100-foot spread is obtained at an angle of 60 degrees.

It is claimed that the unit gives a smooth white light without gleam or glare. A hammered glass reflector is used in conjunction with a 200-watt Type C lamp. The unit is of rugged construction and will withstand rough usage.

The hammered glass reflector is spring suspended in a one-piece cast-iron housing. The housing is closed by a wire glass front, which is fitted into a recessed cast-iron ring. This forms a door which is hinged at the bottom and secured by a hand latch, thus affording easy access to the interior of the housing. The recessing in the ring makes the interior of the housing weather-proof.

Front and Rear Views of the Portable Light

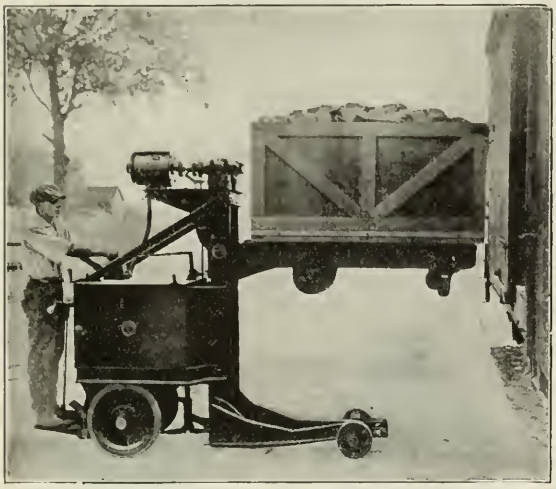
The lighting unit is furnished in either a black or gray weather-proof enamel finish. It is 9¼ in. high and weighs approximately 30 lb. The base is 9 in. in diameter, giving the light stability when mounted on a flat horizontal surface. The unit can also be mounted on either vertical or flat surfaces, such as walls, poles or roofs, by virtue of a heavy universal joint which fastens the housing to the base. All adjustments can be made without the use of tools.

This type of light has a wide range of applications. In railroad work it can be used for lighting transfer tables, coaling stations, inspection pits, loading platforms, cranes, roundhouses and drawbridges. On marine work it can be used for lighting docks, dredges, slips, loading operations, canal locks, dry docks and pile drivers. Its industrial applications cover even a wider variety of uses, such as lighting shop yards, material yards, coal yards, well drilling, coal tipples, erecting shops, machine shops, tramways and inclines, conveyors and all kinds of emergency work.

High-lift Elevating Platform Truck

An industrial truck, which with its own power elevates the loads to sufficient heights to put the material in box cars or stock rooms without rehandling, has been developed by the Lakewood Engineering Company, Cleveland, Ohio. This new truck performs the functions of a tiering machine as well as those of a load-carrying storage battery truck, and is called the Tier-Lift truck. It can elevate a two-ton load to a maximum height of 76 in. or to any intermediate height.

It has always been customary to transport material by means of hand trucks or some kind of power-driven truck which acted as a carrier only, but with this method men are required to transfer and lift the loads, and even when cranes are available considerable manual labor is required to handle the material. The use of the Tier-Lift truck, however, releases the cranes from considerable work, gives a more flexible distribution system and reduces the waste of man-power. The



Tier-Lift Elevating Truck Made by the Lakewood Engineering Company.

height to which material can be piled economically is greatly increased and the storage capacity of a given floor doubled or tripled by the high lifting feature. The storing of material on skids to prevent rehandling in the storeroom is also made practical. Where the material is such that it can bear the weight of loads above, the loaded platforms can be piled on top of each other. The labor cost is thus reduced, material can be handled more quickly and storage capacity of the floor space is greatly increased. With the arrangement shown any loaded platform in the racks may be removed without disturbing the other loads, thus giving flexibility in the storeroom.

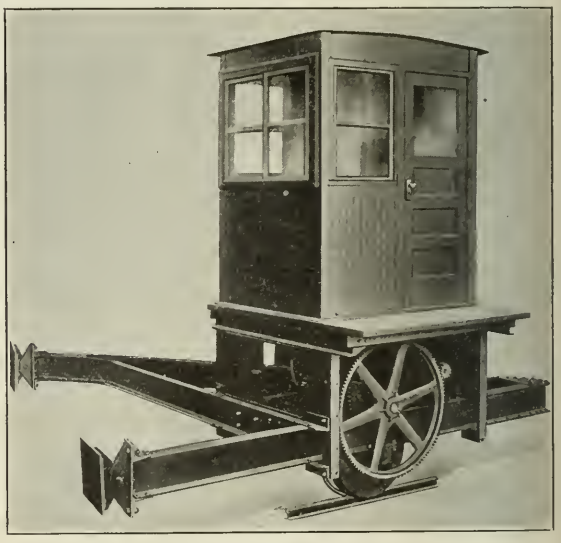
It is claimed that the four-wheel steer allows the truck to turn in a circle 92 in. in radius, thus permitting operation in narrow aisles or congested parts of the plants and giving easy entrance into box cars, small storerooms, etc. The same form of drive is used in this truck as in the Lakewood tractor. There are three speeds forward and three speeds reverse. The controller handle is conveniently located for operation for travel in either direction. The lifting mechanism is operated by means of a specially designed controller, with one speed in either direction. The lifting is done through two steel worm screws, a separate motor being used to supply the power.

The load platform is carried by a cantilever type support and the load is balanced over the carrying wheels. Ball bearings are used throughout, and by a special design the friction losses in elevating and lowering the load platform are greatly reduced. It is claimed that the truck is easy to operate, and its use will effect a considerable saving of both time and labor.

The Whiting Heavy Duty Turntable Tractor

The Whiting Foundry Equipment Company, Harvey, Ill., has recently started manufacturing a heavy duty tractor for turntables of any capacity and pit-rail radius. The main frame of the tractor is V-shaped, built up of eye-beams and channels rigidly connected and attached to the turntable by steel hinges in such a manner as to prevent any vertical movement of the tractor when a locomotive is run on or off the table. The frame is extended outside the traction wheel in order that counterweights may be applied where additional tractive effort is required for heavy conditions.

The driving mechanism consists of a variable speed, reversible heavy duty type of motor located on the top of the structural frame driving two cast steel and forged steel pinions with cut teeth to a chilled iron traction wheel. Lubrication is accomplished through or by means of compression grease cups. The brake is asbestos lined and operates in either



The New Whiting Tractor

direction of rotation. The sandbox is located directly underneath the cabin floor and consists of a steel box with a vertical swinging valve connected to a sand agitator, both the valve and the agitator being operated from within the cab.

The tractor is equipped with an enclosed wood cab in which are located the controller which is the standard reversible drum type, the safety switch, the sanding control and the brakes. A trap door in the floor of the cab gives access to the machinery for inspection and oiling.

All wiring is in accordance with the Underwriters National Electric Code and is protected by iron conduits as far as possible. The current collector is arranged to be applied overhead or underneath the table and is enclosed in a water and steam proof housing.

General News Department

Compensation contracts have been executed by the Railroad Administration with the Mobile & Ohio for $2,597,478 a year, and with the Alabama Great Southern for $1,703,179.

The Pacific Railway Club, at its regular monthly meeting on February 12, discussed developments in traffic jurisprudence, the transportation activities of the United States Department of Agriculture, and whether or not the "street-men" will come back.

Frank McManamy, assistant director of the Division of operation of the United States Railroad Administration, will address the next meeting of the Western Railway Club on February 16 at Chicago, on "The National Agreement with the Shopmen."

Arthur L. Robinson, assistant to the general superintendent of the Wabash, with headquarters at St. Louis, Mo., has been appointed to a newly created position in which he will supervise the adjustment of controversies between the management and the employees.

The Norfolk Southern has been awarded the silver cup for the best safety record in the Southern region in the two weeks of November, when the National Railroad Accident Prevention drive was on. This is the cup which was offered by B. L. Winchell, regional director, before the drive was started. The delay in announcing the winner is due to the fact that another road, the Richmond, Fredericksburg & Potomac, was almost evenly tied with the Norfolk Southern. Each road reported three casualties, but the Richmond, Fredericksburg & Potomac had not quite so many employees in service.

William Carlisle, the notorious train bandit, by his sensational resumption of activities, seems to have made train robberies popular in the Far West. The latest incident of this nature occurred on the eastbound Union Pacific Overland Limited as the train was traveling between Fremont, Neb., and Omaha. A lone bandit, after imprisoning six mail clerks in closets or on the vestibules, rifled several registered mail pouches and escaped through a skylight as the train was nearing a junction near Omaha. Another similar robbery was recently reported on the Southern Pacific near Richmond, Cal.

The Senate on February 10 adopted a resolution introduced by Senator Frelinghuysen, directing the director general of railroads to inform the Senate as to the extent of his authority with respect to the distribution of coal, conferred upon him by order of the fuel administrator, the exercise of the powers so delegated at the present time and the agency or agencies under the control of the director general now exercising such powers. It is reported that the information is desired as a preliminary to an inquiry as to the power of the commission appointed to settle the question of wages of coal miners to increase the price of coal.

The Western Pacific recently applied to the Railroad Commission of California for authority to abandon a portion of its lines between Grizzly spur and Marsh spur, formerly part of the old Boca & Loyalton railroad. According to the application the company has in contemplation the construction of a new station at Beckwith, Cal., which will be built if the application for the track abandonment is granted by the commission. The Western Pacific has also applied for authority to abandon that portion of its road lying between Moy, Cal., and Carnegie. This trackage was originally a part of the line extending from Stockton, Cal., to Tulsa.

A statistical expert, at a salary of from $3,600 to $4,500, is called for by the United States Civil Service Commission, applicants to be college graduates and with at least three years' experience in the analysis of railroad statistics. The Interstate Commerce Commission wants one man of this class, at $4,200, to take charge of the compilation of monthly operating statistics, reported by the railroads, and to prepare monthly reviews of the results. Applicants must be 25 years old but not over 50. Forms for applications may be had from the Civil Service Boards in the principal cities, but applicants will not have to report for examination at any place.

Employees killed on the railroads of the United States, operated by the government, in the month of November, 1919, numbered 231 and employees injured 10,191, as compared with 359 killed and 11,248 injured in November, 1918. These are the totals shown in Bulletin No. 12, issued by the Safety Section, United States Railroad Administration. The bulletin gives the usual data concerning safety meetings held during November, which numbered 1,890. Manager A. F. Duffy reminds the supervisors of safety of the several railroads that the Washington office desires to complete its records, up to March 1, as soon as practicable after the termination of government operation.

The temperature of the water in Lake Champlain, between Grand Isle and North Hero, Vermont, on the morning of January 31, when some passengers were suddenly plunged into the lake by the derailment of the car in which they were riding, was not 38 degrees below zero; that was the temperature of the air, and the most that it is safe to say concerning the water is that its temperature was tending in that direction as rapidly as possible. This is the reply to a number of correspondents who have been disturbed by the statements concerning temperature which were made in the account of the derailment published last week, page 434. It is cheerfully admitted that the figure printed under the illustration was "greatly exaggerated."

Engineering Council has requested the Secretary of War to publish a report which has been made by an engineering board of review on the work done by the Construction Division of the United States Army under the severe handicaps of war conditions. This board of review, consisting of Francis Blossom, of Sanderson & Porter, New York; Charles A. Morse, chief engineer, Chicago, Rock Island & Pacific, Chicago, and W. Sanders Davies, public accountant of New York, was appointed in July, 1918. Its report analyzes the subject in much detail and is said to contain information of great technical value which Engineering Council desires be made public because of its official character and its authoritative review of the greatest aggregation of engineering activities that the world has ever seen.

A conference of representatives of Engineering Council, the joint conference committee of the four national engineering societies, and of the trustees of the United Engineering Society, was held in New York on January 23, to consider how the welfare activities of American engineers, now being conducted by Engineering Council, shall be continued until the organization recommended by the Joint Conference Committee shall become effective (if adopted by these societies). Resolutions were adopted recommending that the amount contributed to Engineering Council by each of the four founder societies should be increased from $3,000 to $5,000 for 1920 and by the American Society for Testing Materials from $600 to $1,000. It was further recommended to the five societies composing Engineering Council that the members of these societies be appealed to for contributions of two dollars per capita for the support of the welfare work of

Engineering Council. It is planned to call a conference of representatives of national, local, state and regional engineering organizations, to perfect the comprehensive organization, to be held in Chicago in April.

The Illinois Manufacturers' Association has recently issued several circulars urging its members to take a more active part in advocating the inclusion of certain clauses in the railroad legislation to be adopted by Congress. At the annual meeting of the association held at Chicago on January 9, resolutions were unanimously adopted urging that the Senate and House of Representatives conferees agree on legislation which will assure a net operating income of not less than five and one-half per cent on the combined values of the railroads in each classification territory and which will provide a tribunal to settle all disputes as to wages and working conditions, making it unlawful for two or more employees of the roads to conspire to quit the employment for the purpose of compelling the railroads to change wages or terms of employment. Sometime later, in a circular entitled "Headed for the Rocks," the association stated that, "A precarious situation exists in Washington in reference to the pending legislation having to do with returning of railroads to their owners. The only solid phalanx is that representing the brotherhoods." The circular therefore urged members of the association to wire their representatives in the Senate and House, and urged them to use all their influence with the conferees to bring about an agreement that will assure a net income of not less than five and one-half per cent.

The extensive snowstorm of February 5 and 6 in New York, Pennsylvania and New England, caused a general paralysis of freight traffic on nearly all the railroads and innumerable delays of passenger trains. The insufficiency of the shoveling forces made it necessary to call upon freight handlers for this work at Utica, N. Y., and other places. In Massachusetts some large industries, partly because of delays of freight, sent their employees to help the railroads clear away snow. Embargoes already in effect, together with delay forced by the storm, resulted in short supplies of food and fuel at a number of New England towns. Except on parts of the New York, New Haven & Hartford passenger trains had resumed nearly normal operations by Sunday, the 8th, though through trains from the west continued to run very late. The New Haven road, in southeastern Massachusetts, reported as late as Monday, the 9th, that only one-third of its regular trains were running. On the Midland division 50 per cent of the service had been restored. Branch lines were blocked by numerous derailments and main lines suffered from the same cause. This necessitated single-track operation on many sections, entailing long delays. In restoring facilities the New Haven road gave first attention to long-distance passenger, and Boston papers reported on Tuesday, the 10th, that "within the five-mile zone" no suburban service was being given. This district is served by the Boston Elevated. Braintree, ten miles from Boston, was the first stop for nearly all trains and towns between there and Boston complained that they had had "no passenger service for six days." On Tuesday a further fall of snow complicated matters.

New York Railroad Club

The February meeting of the New York Railroad Club will be held on Friday evening, the 20th, at 29 W. 39th St., New York City. The principal speakers will be James H. Hustis, president of the Boston & Maine and L. F. Loree, president of the Delaware and Hudson, and the subject for discussion will be the question of how the railroads shall conduct themselves when they are returned to private operation.

Southern Pacific Sanitary Inspector

W. B. Scott, federal manager of the Southern Pacific, the San Antonio & Aransas Pass, the San Antonio, Uvalde & Gulf and the Trinity & Brazos Valley, has appointed a chief sanitary inspector, with headquarters at Houston, Tex., for lines under his jurisdiction. The sanitary inspector will examine and supervise utilities used by the public. His authority will cover the personal inspection of food and of persons handling food on dining cars and boarding cars and in eating stations, both to see that the foods are pure and that patrons shall not incur risk of infection of any character. The sanitary inspector's work will also cover an examination of all cars and all facilities used by the public and by employees, as well as stations, warehouses and shops, with a view of removing possible contamination and of conforming to the laws of health and comfort.

Telegraph and Telephone Division Spring Meeting Called Off

The Telegraph and Telephone Division of the American Railroad Association will not hold a spring meeting at St. Louis, Mo., on March 30, 31 and April 1, as was announced in the December 26 issue of the *Railway Age*, on page 1233. A circular under date of January 21 was sent out by J. F. Caskey, chairman of the T. & T. Division A. R. A., and superintendent telegraph, Lehigh Valley, saying that in order to conserve the best interests of the division the Committee of Direction has decided not to hold the spring meeting. The fall session will be held on September 22, 23, 24. Formal notice covering the place of this meeting, which is the annual meeting, will be sent out later.

Army Port Terminals

The Secretary of War has announced the appointment of an advisory board to act for the War Department in an advisory capacity on all matters connected with the future use for commercial purposes of the new army port terminals. The department desires to make the best possible use of these facilities with a view to assisting in the upbuilding of the American merchant marine. The terminals owned by the department are located at Boston, New York, Port of Newark, Philadelphia, Norfolk, Charleston and New Orleans. The board includes T. C. Powell, who has just resigned as director of the Division of Capital Expenditures of the Railroad Administration, to become vice-president of the Erie; R. C. MacElwee, first assistant director of the Bureau of Foreign and Domestic Commerce, Department of Commerce; E. T. Chamberlain, United States Commissioner of Navigation; H. B. Walker, president of the Old Dominion Steamship Company, and Brigadier-General Frank T. Hines, chief of transportation service of the War Department.

Western Association of Short Line Railroads

Delegates to the annual meeting of the Western Association of Short Line Railroads, which was held at San Francisco, Cal., on Dec. 4, elected the following as members of the Board of Directors; D. M. Swobe, vice-president and traffic manager, McCloud River Railroad Company, San Francisco; L. G. Cannon, vice-president and general manager Nevada Northern Railway Company, East Ely, Nev.; George W. Scott, president, Yreka Railway Company, San Francisco; A. M. Ardery, vice-president and general manager, Virginia & Truckee Railway Company, Carson City, Nev.; Clarence M. Oddie, general counsel and secretary of the association, San Francisco; D. C. Eccles, president, Sumpter Valley Railroad Company, Ogden, Utah; Guy W. Talbot, president, Walla Walla Valley Railway Company, Portland, Ore.; George F. Detrick, president, Sacramento Northern Railway Company, San Francisco; O. W. Lehmer, general manager, Yosemite Valley Railway Company, Merced, Cal.; C. N. Hamlin, general manager, Sierra Railway Company of California, Jamestown, Cal.; Charles T. Bliss, general manager, Lake Tahoe Railway & Transportation Company, San Francisco; F. C. White, president and general manager, California Western Railroad & Navigation Company, Ft. Bragg, Cal., and M. W. Cooley, general manager, Uintah Railway Company, Mack, Col. The report of this election in the *Railway Age* of January 9, page 208, was in error in including the names of S. H. Smith,

traffic manager, Sierra Railway Company of California; R. K. Minson, general freight and passenger agent, Arizona & New Mexico, and D. M. Heigho, receiver, Pacific & Idaho Northern, and in omitting the names of Messrs. Eccles, Detrick, Lehmer, Hamblin, Bliss and White.

Electrical Workers Strike on St. Paul

Chicago, Milwaukee & St. Paul shopmen employed in the shops at Deer Lodge, Mont., recently engaged in an unauthorized strike because of a desire to force a decision in matters pending before the arbitration board at Washington. As a direct result of the difficulty practically the whole electrified division of the St. Paul, extending from Harlowton, Mont., to Avery, Idaho, has been operated with great difficulty. Federal officers of the road, on hearing of the strike of the shopmen, requested them to await arbitration. However, the shopmen refused and 48 hours later, the electrical sub-station operators on practically the whole electrically-operated division walked out in sympathy with the shopmen. Electrical experts and officers of the electrified division took the places of the sub-station operators as far as possible and in many places on the division it was found necessary to use steam to maintain service. Director General Hines was immediately notified and after stating that the sub-station operators' strike was in violation of their contract, issued a 48-hour ultimatum, and the men acceded to his request and returned on February 5. Conditions have been restored to normal and it is believed the difficulty will be adjusted at Washington. Approximately 300 shopmen and 60 sub-station operators were involved. During the strike some through passengers were detoured over the Northern Pacific.

Grain Movement in the Central West

The effect of Director General Hines' recent order giving preference and priority to the furnishing of box cars for bulk grain loading from February 8 to February 18, inclusive, in central western states, is not as yet apparent. Daily reports of the number of cars suitable for grain loading, ordered, placed and loaded daily are to be made to the regional directors having jurisdiction over the states affected and it is believed that, when these reports have been compiled, the serious situation brought about by lack of cars suitable for the movement of this commodity during the past few weeks, will be greatly alleviated.

With the issuing of the order on February 5, many protests were registered by different industries in the middle west. Many of these protests were due to a misunderstanding of the order. The order, as issued by the director general, stated: "Because of the imperative necessity to provide a greater movement of bulk grain, the grain loading roads serving the states of Illinois, Minnesota, Montana, Missouri, Iowa, North Dakota, South Dakota, Nebraska, Oklahoma, Colorado, Wisconsin, Kansas, Arkansas and Texas will give preference and priority in the furnishing of box cars for bulk grain loading February 8 to 18, inclusive, after providing for the loading of l. c. l. merchandise, paper, wood pulp and sugar. This means that to the extent necessary to fill requirements, all available box car equipment suitable for the use in handling these commodities will be confined to this class of traffic." Representatives of several industries, especially those engaged in handling building materials, protested against the order, believing that it meant a general embargo upon the shipment of all freight. The order was later explained as applying only to cars suitable for grain loading, and would not greatly affect the movement of building materials and similar commodities.

The Hudson Bay Railway

More than a quarter of a century ago the desire was expressed in public quarters that communication be established with Hudson Bay. Saskatoon, Edmonton and Calgary joined with Winnipeg in the demand for a shorter outlet for western grain. Finally, in 1908, location work was begun, and in 1911 the railway was already under construction. After the lapse of nine years, the railway is still uncompleted. From The Pas to the second crossing of the Nelson River at Kettle Rapids, 332 miles, the track is laid and ballasted. For the remaining 92 miles to Port Nelson the grading is completed. Over $13,500,000 has been expended on the railway and over $6,000,000 on the harbor improvements at Port Nelson. It is estimated that the work on railway and harbor can be completed at an expenditure of eleven millions. During the last three years little work has been done either on railway or harbor improvements. As in many other business undertakings, success or failure can be determined only by the actual operation of the project. The indications are in favor of the new route providing an outlet for thirty million bushels of western wheat at a smaller cost than by the already completed route to the eastern seaboard. On these indications the country has already invested over thirteen millions. The time has come when further delay should not be permitted to jeopardize the expenditures which have already been made on this route.

The people of Manitoba have a special interest in the territory which was acquired by the Province in 1912. The marketed production for the last fiscal year from the resources of Northern Manitoba—copper, silver, gold, fish, timber, hay, livestock and fur—was three and a half millions. The stimulus which the railway, in its half completed form and with a fortnightly service, has given to production, can be traced in practically all the items enumerated. When the railway reaches the Bay it will throw open a large new area for investigation and financial enterprise. The indispensable tool for production in northern territory is the railway.—Manitoba Free Press.

Railroad Administration's Output of Speeches—Three Millions

An accomplishment of the Railroad Administration not heretofore mentioned was made public the other day by Senator Smoot, of Utah, who is conducting a campaign for a curtailment of the use of print paper by government departments. According to a table put into the Congressional Record by the Senator, the Railroad Administration stood second among government departments in the output of speeches, having been exceeded only by the Treasury Department. During the period covered by the report, July 1, 1916, to September 15, 1919, the number of speeches printed at the Government Printing Office and charged to departmental appropriations, not including speeches of Congressmen, was 30,144,362, and their estimated weight was 894,101 pounds; estimated cost, $109,066. This Senator Smoot declared to be "a wicked waste," and he used up some $240 worth of space in the Congressional Record to elaborate upon it.

The Treasury Department led in the output of speeches, with a total of 25,066,000 lbs., of which nearly all—24,058,000 lbs.—was credited to W. G. McAdoo. Practically all were Liberty loan speeches, including an address to railway employees, of which 2,200,000 copies were printed. The Railroad Administration was credited with 3,055,500 copies, weighing 29,000 lbs., the cost of which represented, however, an addition of only $2,410 to the $600,000,000 or $700,000,000 Railroad Administration's deficit. These included 1,000,000 copies of Mr. McAdoo's address at Altoona, Pa., on September 12, 1918; 2,000,000 copies of "A Life Sentence," by Rev. J. F. Weinman; 15,000 copies of Charles N. Rambo's address before the Railroad Fire Protection Association, 15,000 of Frank McManamy's address before the New York Railroad Club, 5,000 of H. W. Belknap's address before the National Safety Council, and 10,000 each of two speeches and 500 of another by Walker D. Hines. The executive office came third in the list with a total of 1,163,862 copies, of which all but 40,000 were speeches by the President. These were heavier than the railroad speeches, weighing 79,497 lbs. None of the other departments were in the million-copy class and Mr. McAdoo and the Rev. J. F. Weinman were the only ones in the list who had as many as a million copies of a single

speech printed. Mr. McAdoo's Liberty loan speeches were given a circulation of from 1,000 to 6,500,000 copies each.

Senator Smoot has threatened to compile a similar table on Congressional speeches and some day may produce figures on the time, paper and expense required of the Railroad Administration and the Interstate Commerce Commission, as well as other departments, in conducting investigations in response to Senate resolutions, which are frequently put through by "unanimous consent," because no one objects, and often require a formal investigation when the only information really desired could be obtained by an inquiry over the telephone.

Pennsylvania Planning for Changes in Organization

The railway companies generally are giving careful consideration to the question of what changes should be made in their organizations before the railways are returned to private operation. Among the companies that are considering important changes is the Pennsylvania Railroad Company.

The Pennslyvania is considering important changes, not only because of the approaching termination of federal control, but also because about two years ago the parent company resumed direct operation of its leased lines west of Pittsburgh, reaching Chicago and the Great Lakes. Since then there have been many changes in the personnel of the organization caused by retirements on account of an age limit of 65 or 70 years having been reached, and other vacancies being caused owing to deaths or resignations. The management, therefore, has found it necessary to review the entire field from beginning to end.

The board of directors, we are told, in considering the organization changes needed, is especially keeping in mind, first, the necessity of furnishing the best possible service to the public; second, the necessity of making the best possible use of plant and equipment, which now represent an investment exceeding $2,000,000,000; third, the necessity of securing closer relations with employees so that their wages and working conditions and efficiency may have proper supervision and attention, and for the necessity of keeping in close touch with the public so that relations with the public may be made the best practicable. The Pennsylvania has, of course, the largest freight and passenger traffic of any railroad system in this country, or indeed, in the world; a traffic which is not only very large, but among the densest, and therefore among the most difficult to handle.

One of the principal suggestions under consideration is that instead of concentrating the entire management at Broad Street Station, Philadelphia, there shall be created several district or executive vice-presidents, to be located at Chicago, St. Louis, Pittsburgh, Philadelphia, and perhaps other points, and that the powers of these vice-presidents in dealing with the public, the employees and the general operation of the property shall correspond to those of a president of a railroad company. Each of these vice-presidents would have a complete staff of officers representing all departments—transportation, traffic, accounting, treasury, and civil and mechanical engineering. The vice-presidents and their staffs would carry out the policies laid down by the directors, the president and administrative vice-presidents at the Broad Street Station in Philadelphia, who would supervise the new organization and further a financial policy that would strengthen the company and its employees. This should insure prompt decisions on all matters affecting the public.

The Pennsylvania management displays no pessimism as to the future of railroads, provided reasonable legislation is enacted. Its great desire in resuming the operation of its system is to get its men to render the best practicable public service, and also to expand its facilities and equipment, provided financial conditions will justify. In short, the management desires to resume the policy that for 75 years secured high physical standard and service, fair dividends to the stockholders and a very efficient organization. It feels that the railroad business will demand the best brains in the country for its successful direction.

Traffic News

Norman W. Secor, traffic manager of the Olds Motor Works, Lansing, Mich., has been elected president of the newly-organized traffic club of Lansing.

A. B. Weyant, of the Michigan Tanning & Extract Company, Petoskey, Mich., has been promoted to traffic manager, succeeding J. W. Bottriell, who has resigned.

N. J. Miller, formerly chief clerk in the freight claim department of the Chicago & North Western at Chicago, has been appointed traffic manager of the Associated Fruit Company, Chicago.

The annual meeting of the Traffic Club of Milwaukee, Wis., was held on February 7 at Milwaukee. Henry A. Palmer, editor of the Traffic World, Chicago, and Milton W. Baer, of Milwaukee, addressed the meeting.

The Panama Railroad Steamship Line has bought from the United States Shipping Board four former German ships. These four vessels, aggregating 15,569 tons, were interned at Colon by their German owners at the beginning of the war.

At Palm Beach, Fla., on the night of the fourth of February twelve through trains from New York and Boston, composed mostly of sleeping cars, arrived within a few hours, all of them having been delayed by a flood in Georgia. Some of these trains were sixty hours behind time.

The Kansas City Southern has reopened its freight and passenger agency in the Marquette building, Chicago, to serve the Michigan, northern Indiana, northern Illinois, eastern Iowa, Wisconsin, and Minnesota territory. Henry Brown, general agent, has been placed in charge of the reopened office.

The Southern Pacific has reopened its Chicago traffic office in the Southern Pacific building, 35 West Jackson boulevard. The personnel of the new office will be the same as it was before the office was abolished, with C. L. McFaul, general agent of the freight and passenger department, and H. H. Gray, city passenger agent.

The Traffic Club of New England held its ninth annual banquet at the Copley-Plaza Hotel, Boston, Mass., on February 10. The speakers for the evening were Gerrit Fort, recently elected vice-president in charge of traffic of the Boston & Maine, and T. C. Powell, director of the Division of Capital Expenditures of the Railroad Administration.

The Southern Pacific announces in California that the 4,000 new refrigerator cars recently ordered by the Pacific Fruit Express Company will be ready, most of them, in time for the autumn shipments of fruit this year. The Pacific Fruit Express Company has now in service about 15,000 refrigerator cars, so that a total of 19,000 will be available in the fall. One thousand of these cars will be built in California by the shops of the Pacific Fruit Express Company at Roseville and at Los Angeles.

A resolution was introduced in the Senate on February 9 by Senator Gronna to instruct the committee on agriculture and forestry to investigate the alleged lack of supply and failure to supply an adequate number of stock cars and cars for transporting grain and other farm products during the period of government operation of railroads, and also the charges of wilful interference by certain officials of the Railroad Administration with the successful operation of the railroads by the government. Senator King objected to the resolution unless the investigation were to be made by the committee on interstate commerce and its consideration, therefore, was postponed until the following day.

The Board of Railway Commissioners for Canada has been appealed to by traffic representatives of Canadian railways to postpone its order issued in August, 1919, instructing railways to adopt joint tariffs whereby freight may be shipped over one or more lines and compelling the publication of these tariffs. The order was issued after a report had been made by James Hardwell, chief traffic officer of the board, recommending that such action be taken. Representatives of the Canadian railways have asked for a rehearing of the whole matter on the ground that the coming amalgamation of the Grand Trunk with the Canadian National Railways altered the situation and that the order had been issued without all parties having been given full opportunity to investigate the move thoroughly.

Because of the imperative necessity to provide greater movement of bulk grain, the grain loading railroads serving the states of Illinois, Minnesota, Montana, Missouri, Iowa, North Dakota, South Dakota, Nebraska, Oklahoma, Colorado, Wisconsin, Kansas, Arkansas and Texas have been given instructions by the Railroad Administration to give preference and priority in the furnishing of box cars for bulk grain loading from February 8 to 18 inclusive after providing for the loading of less than carload merchandise, print paper, wood pulp and sugar. This means that to the extent necessary to fill requirements all available box car equipment suitable for the use in handling these commodities will be confined to this class of traffic. Railroads have also been instructed to secure the full co-operation of grain dealers, farmers, commercial organizations and others interested in order that this special movement may be as successful as possible.

According to a report on overseas traffic for the week ended February 4, made to Director General Hines, there were 4,364 cars of commercial export freight received at North Atlantic ports, as against 2,572 cars for the same week in 1919. This shows an increase of 1,692 cars or 153 per cent for February 4, 1920, as against the corresponding period in 1919. Deliveries to ships during the same period increased 2,776 cars or 82 per cent. At South Atlantic and Gulf ports as of February 2, 1920, there were 11,760 cars of export freight on hand as against 11,668 cars on January 25, of the same year, an increase of 92 cars. On February 4, 1920, there were 8,290,638 bushels of grain stored in elevators at North Atlantic ports. There were received during the week 2,693,824 bushels, while 2,784,871 bushels were cleared. The total amount of grain in elevators at these ports represented 42 per cent of the total capacity. At South Atlantic and Gulf ports as of January 28, 1920, there were 5,637,410 bushels of grain on hand, representing 53.7 per cent of the total elevator capacity.

Liquors Not So Prominent

The Eighteenth Amendment to the Constitution of the United States will of course visit the local freight agent. Intoxicating liquors must still be recognized, for they may legally be transported for medicinal and other lawful purposes, but the tariffs will not hereafter treat these commodities with any excess of respect. The Division of Traffic of the Railroad Administration has issued an order authorizing the cancellation on 10 days' notice of all commodity rates or exceptions to classification now published on intoxicating liquors, such as brandy, whisky, rum, gin, beer, ale, porter and wine, under whatever terms they are now described in the tariffs, except that carload commodity rates on alcohol, denatured alcohol or wood alcohol shall not be canceled. The order provides that where commodity descriptions now include both intoxicating and non-intoxicating liquors—for example, a description including both beer and cereal beverages—the intoxicating liquors shall be eliminated from the description and the present rates continued on the non-intoxicating liquors.

The order does not cancel ratings provided on liquors in the regular classes—in the Consolidated Classification or in state classifications—and these ratings will hereafter apply on such shipments as may be made without violation of law.

Commission and Court News

Interstate Commerce Commission

Joseph Stewart, special assistant to the attorney general for the postmaster general, has filed a brief with the Interstate Commerce Commission against a motion filed on behalf of the short line railroads for additional findings and supplemental orders in the railway mail pay case.

Personnel of Commissions

Henry C. Stuart, former governor of Virginia, whose nomination for appointment as a member of the Interstate Commerce Commission, to succeed **James S. Harlan,** was sent to the Senate by the President on February 6. Governor Stuart sent a letter to the president on the following day declining the appointment. Governor Stuart was for a time a member of the Virginia State Corporation Commission. In his letter he expressed the opinion that he was not properly qualified for the office and did not wish to be tied down to public office. He learned of his nomination from the newspapers.

State Commissions

The Canadian Northern Pacific Railway Company has been granted authority to open its line from Sooke, B. C., to Victoria, about 25 miles, provided that the speed of trains approaching highway crossings shall not exceed 10 miles an hour.

The Board of Railway Commissioners for Canada has authorized the Canadian Northern temporarily to run trains over its MacRorie branch from Eston, Sask., westward about 20 miles to Glidden, subject to the condition that speed of trains shall not exceed 18 miles an hour.

Court News

Federal Control—Suits Against Companies—Liability for Negligence

The North Dakota Supreme Court holds that General Order No. 50 is not warranted by the Rail Control Act of March 21, 1918, in so far as it purports to be applicable to causes of action already vested. Section 10 of the Act is held to authorize the bringing of actions against the carrier corporations during the period of federal control. The Director General is not authorized to appear and defend suits brought against the corporations. They, during the period of federal control, remain legal entities entirely capable of suing and being sued. The liability or nonliability of a carrier corporation for acts of alleged negligence occurring during the period of federal control is a judicial question to be determined by the courts. The question whether or not a carrier corporation may be liable for the negligence of an employee during the period of federal control is not decided.—Macgregor v. Great Northern (N. Dak.) 172 N. W. 841.

Commissions' Right to Alter and Fix Grain Rates

The Illinois Supreme Court has directed the reversal of an order of the Illinois Public Utilities Commission requiring the Cleveland, Cincinnati, Chicago & St. Louis, in connection with the Atchison, T. & S. F., the Chicago & Alton, Chicago & Eastern Illinois, Chicago, B. & Q., Rock Island, Illinois Central and Wabash, to establish joint rates for all grain moving in carload lots from certain points mentioned on the several divisions of the C. C. C. & St. Louis to Chicago. As the basis of the Commission's order on which these rates were established on complaint of the Chicago Board of Trade, the Commission had found "that the rates complained of are unjust and unreasonably

high." The court holds that in such cases the proof should show and the Commission should find, that the public convenience and necessity demanded, before the Commission is authorized to establish, a through route and joint rate, either because the rate charged is unjust, unreasonable, or excessive, or because there is no satisfactory through route or joint rate in existence. The convenience and necessity of the public are the controlling considerations in a hearing of this character, and the public to be considered is the producer of the grain and the consumer of it. There was no evidence in the record to support the jurisdictional fact that public convenience and necessity demand the establishment of through routes and joint rates, and no finding by the Commission in its order of that fact. Therefore, it was held the circuit court erred in confirming the Commission's order.—Public Utilities Commission v. Cleveland, C. C. & St. L., 288 Ill. 502, 123 N. E. 547.

Intrastate Storage Charges Paid Not Recoverable

Consignees sought in an action at law to recover "track storage" charges paid on intrastate shipments consigned to them in accordance with tariffs filed with the New York Public Service Commission. The plaintiffs had previously filed with the commission a complaint that the charges were unjust and unreasonable, and the commission held they were entitled to recover them on that ground. The railroad company refusing to repay, the action was brought. The New York Court of Appeals, affirming a judgment of the lower court, holds that there can be no recovery. Although the common law authorizes an action at law by the injured consignee to recover moneys paid, under protest or duress of goods, as exorbitant or unreasonable charges, the right of recovery may, under the laws of New York, differing from those of many other jurisdictions, be waived by voluntary payment. The State has the right, through the Public Service Commission, to prescribe reasonable charges for intrastate transportation and services, and sections 26, 40, 48 and 49 of the Public Service Commission Law do not authorize the commission to make an order allowing the recovery of "track storage" charges made by a railroad in accordance with tariffs duly filed with the commisison. All the parties interested, shipper, consignee and carrier, are presumed to know and bound to act in conformity with tariff rates. Such rates existing at any time cannot be attacked in a common law action.—Murphy v. New York Central, 225 N. Y. 548, 122 N. E. 700.

Depot, Wharf and Transfer Facilities

In denying a writ of mandamus to compel the Atlantic Coast Line and the Clyde Steamship Co. to comply with an order of the Florida Railroad Commissioners to rebuild and repair the wharf adjacent to and lying immediately between the railroad's depot and the St. Johns river in Astor, Florida, the Florida Supreme Court holds that, in determining the validity and reasonableness of an order of the commissioners requiring wharf and depot facilities to be furnished, regard should be had for considerations that show whether the facilities may justly be required for the convenience and safety of the public to be served, and whether the expense to the carrier is so out of proportion to the advantages thereby afforded to the public, or so affects its earnings, as to impose an unlawful burden upon the carrier. Where such an order is shown by the admissions in the pleadings to be so unreasonable with reference to the past and present conditions affecting the matter as to unlawfully invade the carrier's property rights, the order should not be enforced by mandamus, particularly when it appears that the prospective growth of the carrier's business does not clearly warrant the requirements of the order. Orders of the raiload commissioners, requiring particular depot and transfer facilities to be furnished for the convenience, not for the safety, of patrons, will not be enforced by the court by mandamus when the burden to the carrier would be so out of proportion to the benefits to accrue to the public as to show the orders to be unreasonable and unjust.—State v. Atlantic Coast Line (Fla.) 81 So. 498.

Foreign Railway News

Railway fares in Austria, already several times those of before the war are to be taxed 30 per cent. This announcement was made by the government last week. It includes also charges on baggage.

Extensive reduction of Sunday traffic is contemplated in France, the government having laid before the Central Committee of Railways a proposition to suspend all freight trains from 7 o'clock Saturday evening until 8 o'clock Monday morning, and to run very few passenger trains on Sunday. The objects are to secure rest for the employees, greater safety for the public and economy in operating expenses and to save coal.

Disastrous Collision in France

Fifteen persons were killed and thirty injured in a butting collision reported from Dijon, France, on February 5. It occurred at Perrigny-sur-l'Orgnon, about twenty-one miles east of Dijon. A standing freight train was run into by an express passenger train.

Electrification Is Being Considered by the Tasmanian Railways

Electrification is being considered by the Tasmanian Railways. The Times Trade Supplement (London) says that when the Tasmanian Parliament considered the Government's proposal to build a railway from Hobart to the Huon, the appropriation of £4,000 for the survey of a route for a "steam or electric" railway was only passed on the condition that the survey should be for an electric railway.

Belgian State Railways Buy Locomotives

London, England.

The Belgian State railways have placed orders for 150 locomotives with the American Sales Corporation, one-half of which will be built by the American Locomotive Company and one-half by the Baldwin Locomotive Works; also 200 have been ordered from Armstrong Whitworth & Co., of England, and 100 are to be built by Belgian locomotive builders. There remains an order for 50 more which is now under negotiation.

New Trans-Zambesia Railway

The Times Trade Supplement (London) says that the construction work on the Trans-Zambesia railway will be begun in April at the end of the summer rains. The junction with the Beira-Rhodesia line will be about 22 miles from Beira (not far from Fontesvilla) and the line will run thence almost due north to the Zambesi river. The grading will not be extensive. The new railway nowhere attains an altitude of more than 1,052 ft., and the ascent and descent on each side is gradual. This line will form part of the proposed through route from Cape Town to Lake Nyasa, via Bulawayo, Salisbury and Beira.

Australia Manufacturing Railway Supplies

Several Australian engineering firms have taken up the manufacture of railway supplies, and the Chief Commissioner for Railways, James Fraser, of New South Wales, has expressed complete satisfaction with the local products. He said that he had been pleased to give preference to Australian manufactures and he had not had to pay higher prices than for goods of the same quality from foreign sources. The New South Wales railway administration has been making axles, wheels and tires for both freight and passenger cars in its own shops, and shortly everything required for making a locomotive, with the exception of boiler plates and copper tubing and plates, will be made in Australia, and even the latter will be produced in Australia before long. Mr. Fraser said that he had been promised deliv-

ery next March of copper tubes by an Australian manufacturer, at a slightly lower figure than that for which he could get copper tubes abroad.

The New Zealand Government has placed a contract with an Australian shop for 20 express locomotives. This shop has already turned out over £300,000 worth of work to the complete satisfaction of the New Zealand railways.

English Railroads Rule Against American Purchases

London, England.

Because of the very disadvantageous rate of exchange, directors of several of the English railroads have issued instructions that no purchases are to be made in America except where it is absolutely impossible to obtain the same products elsewhere. Lines are being drawn more closely day by day against purchases in America by the railways in all European countries, due to the great disparity in the value of money. Furthermore, the railways in every country are making, as never before, every attempt to make purchases within their own frontiers. This will have a serious effect on English business which relies to such a very great extent on its export business to balance the necessary imports.

London Underground Seeks Government Control

There was a statement issued a few days ago that the Underground Railway combine in London had requested the Ministry of Transport to take over the control of the roads, as it was found impossible to meet expenses; but the Ministry of Transport does not appear to be making any preparations to do so. The combine has deposited a private Parliamentary bill asking permission to increase fares on all of its lines. The companies controlled by this combine are the Metropolitan & District railway, the London Electric Railway, The London General Omnibus Company, the Central London railway, the City & South London railway, the M. E. T. Omnibus Company, the M. E. T. Tramways, the London United Tramways, the Gearless Bus Company and the Metropolitan Tramways. In other words, the combine controls all underground railways, street railways and motor bus lines in London.

It has been stated that the loss on the business of 1919 will amount to about £2,500,000, this in spite of the fact that the fares on all of these lines are materially higher than before the war. All earnings are pooled, and it is stated that of the deficit mentioned the motor bus service is responsible for about 75 per cent.

Italian Railway Strike

London.

At 6 o'clock Tuesday morning, January 20, the Italian railways were crippled by a severe railway strike which extended from station masters down. From press reports it is stated that the demands of the railwaymen amount to an increase of 70,000,000 lire ($14,000,000). The minimum wage for the lowest grade to be 1,000 lire ($200) a month, which is an extremely high wage according to existing Italian standards. The government has offered a distribution of a bonus of 1,000,000 lire ($200,000) which was rejected by the men's leaders. Every protection was being given to non-strikers, soldiers and voluntary workers, the stations being guarded by troops and patrols being placed along the line.

It has been stated that a large portion of the railwaymen did not favor the strike, but have been coerced by extremists and that the general public opinion is unsympathetic towards the strikers. Press despatches on the fifth day of the strike indicate that there is a gradual improvement in the service, but the situation in the North remains particularly serious. In Southern Italy and Sicilly it has been stated that the strike is a failure.

The Central News despatch states that an express train having been stopped at a small station near Pisa, a number of travellers with revolvers ordered the strikers to continue the journey which they did. It has also been stated that there were several cases of firing on trains and in one instance a soldier was wounded.

An Exchange despatch states that automobile lines have been established to overcome the disorganized transportation facilities and that at Reggio 45 strikers were sentenced to various terms of imprisonment for threatening volunteers.

On January 26, six days after the strike was called, it was stated that two trains were running daily between Rome and Milan and were operating practically on normal time. At that time the government seemed to be successfully resisting the demand of the strikers and the men were becoming discontented on account of the fact that the leaders stated that two days' strike would bring the government to their knees.

Mr. Vauclain Returns From France

Samuel M. Vauclain, president of the Baldwin Locomotive Works, Philadelphia, returned this week from a trip to France, during which he studied industrial conditions in that country. He tells the manufacturers of America that Europe will call both for raw materials and manufactured articles; but we must understand that liberal time must be given for payment. He does not believe that this country should make direct financial loans to Europe; he agrees with the statement recently issued by our Treasury Department, disapproving such a loan. France needs a great variety of raw materials and manufactured articles. Just now she is in great need of plumbing supplies. The entire country needs to be put on a sanitary basis and the people are determined to introduce the comforts and conveniences which are found in America. A leading Paris dealer in plumbing contracts has orders on his books amounting to millions of francs but cannot fill them because he cannot get the materials.

We, in America, should use our money, not to send abroad, but to stimulate industries which will make goods to be sent abroad. Mr. Vauclain thinks that European factories are rapidly getting in shape to resume business. He was struck with the rapidity with which the industries of France have absorbed the men discharged from the army.

Labor Situation in England

Supplementing the report regarding the adjustment of railwaymen's wages, there was published recently in the Railway Review, the official organ of the labor unions, the following resolutions of the National Union of Railwaymen regarding the acceptance of the wage settlement:

"That this conference, having heard the reply of the Government to our resolutions and the further explanations of the general secretary, while fully appreciating the inclusion of our Irish brothers and the offer for grades not originally included, also the proposals for meeting the hardships of those whose combined rates are higher than the proposed new standards, again reaffirm our belief that the only equitable method of standardization is by taking the highest maximum of each grade or group of grades, and while the only means to obtain this at present is by a general strike, recognize that such a course is unwise, and therefore decide to accept the settlement under protest, and instruct the general secretary to call a special general meeting immediately the final proposals for signalmen and other outstanding grades are completed.

"That this conference, after hearing the explanations upon a flat rate to each member affected, as against the actual amount for those members whose basic rate would be higher than the combined war wage and original rate, by the general secretary, decide to accept the flat rate."

Transport Workers Demand Increases

As a sequel to the railwaymen's demands in wages, the National Transport Workers' Federation issued on January 26, an application for an advance of 10 shillings a week in the wages of adult road transport workers, except tramway and omnibus drivers and conductors. Fourteen trade unions are affiliated with this Federation, which include about 120,000 workers. The demands affect particularly the drivers of horse drawn vehicles, steam wagons and commercial motor cars. Last August an advance of 4 shillings a week was obtained which brought the war wage up to 34 shillings a week.

Moulders Resume Work.

After a strike extending over several months, the iron founders, core makers and iron and steel dressers' union have voted to resume work on the employers' offer of an advance of 5 shillings a week. Although the union has officially accepted this settlement, there has been some difficulty in many sections to get the men to return to work.

Equipment and Supplies

Locomotives

The Louisville & Nashville is inquiring for 20 Mikado type locomotives.

The Kentucky & Tennessee has ordered one 2-8-2 type locomotive from the Baldwin Locomotive Company.

The Chicago Great Western has ordered 10 Mikado type locomotives from the Baldwin Locomotive Works.

The Mysore State Railways (India) have ordered 5 2-6-4 type locomotives from the Baldwin Locomotive Works.

The Minneapolis, St. Paul & Sault Ste Marie has ordered 25 Mikado type locomotives from the American Locomotive Company.

The Canadian Pacific is building 5, 2-10-2 type locomotives at its own shops. These are in addition to 10 recently completed in the same shops.

The Canadian National is negotiating with the Montreal works of the American Locomotive Company for the purchase of 25 locomotives.

The Foundation Company, Woolworth building, New York, has ordered two 4-wheel saddle tank locomotives from the American Locomotive Company. These locomotives will have 16 in. by 24 in. cylinders.

The Tientsin-Pukow (China) has ordered 20 Mikado type locomotives from the American Locomotive Company. These locomotives will have 20 in. by 28 in. cylinders and a total weight in working order of 194,000 lb.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for one second-hand Shay geared locomotive, to weigh 36 to 40 tons and for one second-hand 20 or 22-ton road locomotive.

The Madrid, Zaragossa & Alicante Railway (Spain) has ordered 15 Pacific type locomotives from the American Locomotive Company. These locomotives will have 23 in. by 26 in. cylinders and a total weight in working order of 187,000 lb.

The Board of State Harbor Commissioners, San Francisco, Cal., has ordered one 6-wheel switching locomotive from the American Locomotive Company. This locomotive will have 20 in. by 24 in. cylinders, and a total weight in working order of 106,000 lb.

The United Fruit Company has ordered 2 Consolidation type locomotives from the Baldwin Locomotive Works for use on its lines in Honduras. These locomotives will use oil for fuel and will have 17 in. by 20 in. cylinders and a total weight on drivers of 90,500 lb.

The Florida East Coast has ordered 10 Pacific and 2 six-wheel type locomotives from the American Locomotive Company. The Pacific type locomotives will have 22 in. by 26 in. cylinders and a total weight in working order of 204,500 lb., and the six-wheel type locomotives will have 20 in. by 26 in. cylinders and a total weight in working order of 160,000 lb.

The Delaware, Lackawanna & Western, reported in the *Railway Age* of January 30, as being in the market for 6 Pacific type locomotives, has ordered this equipment from the American Locomotive Company. These locomotives will have 25 in. by 28 in. cylinders and a total weight in working order of 300,000 lb.

The Toledo Terminal Railroad has ordered 2 Consolidation type and 2 six-wheel switching locomotives from the American Locomotive Company. The Consolidation type locomotives will have 2 in. by 28 in. cylinders and a total weight in working order of 200,000 lb., and the six-wheel type will have 21 in. by 26 in. cylinders and a total weight in working order of 148,000 lb.

Freight Cars

Harley Woolsey & Co., Mahomet, Ill., are inquiring for two box cars.

The Andrews Steel Company, Newport, Ky., is inquiring for one slag car.

The Canadian Pacific is inquiring for from 1,000 to 2,000, 55-ton box cars.

The Chesapeake & Ohio plans to build from 25 to 50 cabooses in its own shops.

The Vermont Marble Company, Proctor, Vt., is inquiring for one snow plow.

The Danville Brick Company, Danville, Ill., is inquiring for three steel dump cars.

Dwight P. Robinson & Co., New York, are inquiring for four bottom-dump coal cars.

The Donner Steel Company, Buffalo, N. Y., is inquiring for 20, 70-ton gondola cars.

The Sun Shipbuilding Company, Chester, Pa., is inquiring for ten, 50-ton flat cars.

The Union Oil Company of California, Los Angeles, Cal., has purchased 150 tank cars.

The South India Railways Company, London, Eng., is inquiring for eight timber trucks.

De Huff & Hopkins, Philadelphia, Pa., are inquiring for one special car to transport a boiler.

The Hornes Zoological Arena Company, Kansas City, Mo., is inquiring for flat and box cars.

The Barber Asphalt Paving Company, Buffalo, N. Y., is inquiring for three special car bodies.

The Bradford Supply Company, Bradford, Pa., is inquiring for 25 tank cars of 10,000 gal. capacity.

The Clinton Sugar Refining Company, Clinton, Iowa, is inquiring for 25 tank cars of 8,000 gal. capacity.

The South Porto Rico Company, New York, is inquiring for 24 rocker dump cars and 24 steel flat cars for export.

The Chile Exploration Company, New York, has ordered 35 oil tank cars from the Standard Steel Car Company.

The Newport Rolling Mills Company, Newport, Ky., is inquiring for one, 75-ton gondola and one, 75-ton flat car.

The Ft. Wayne & Indianapolis Traction Company, Ft. Wayne, Ind., is inquiring for six, 30-ton, 40-ft. box car bodies.

Fox Brothers & Co., New York, have ordered 100 cane cars from the American Car & Foundry Company, for export to Cuba.

Robert H. Hassler & Co., Indianapolis, Ind., have ordered one all-steel box car from the American Car & Foundry Company.

The Indianapolis & Cincinnati Traction Company, Indianapolis, Ind., is inquiring for three stock cars and three, 36-ft. flat cars.

The Cuba Railroad Company, New York, has ordered fifty, 50-ton, 8,000-gal., tank cars from the American Car & Foundry Company.

Dwight P. Robinson & Co., 61 Broadway, New York, has ordered 3 steel hopper cars of 20-ton capacity from the Magor Car Company.

The Magnetic Pigment Company, New York, has ordered from the Pennsylvania Tank Car Company one acid tank car, of 100,000 lb. capacity.

The United Fruit Company has ordered from the Magor Car Company 36 banana cars of 10-ton capacity, and 15 cars of 5-ton capacity, for use on its lines in Jamaica.

A. E. Staley Manufacturing Company, Decatur, Ill., has ordered from the Pennsylvania Tank Car Company, 60, 81,050-gal. capacity tank cars, equipped with steam heating coils.

The Baldwin Locomotive Works, Philadelphia, Pa., has ordered fifteen, four-wheel cane cars, with hand brakes, for export to Cuba, from the American Car & Foundry Company.

The West India Sugar Finance Corporation, New York, has ordered 200 cane cars and 25 flat cars, all of 20-ton capacity from the Magor Car Company. These cars are for export for account of the Atlantic Fruit Company.

Passenger Cars

The Hornes Zoological Arena Company, Kansas City, Mo., is inquiring for passenger cars.

R. J. Dorn & Co., New York, are inquiring for one railroad motor car for export to Cuba.

The Norwegian State Railway is negotiating with the St. Louis Car Company for the purchase of passenger train equipment.

The Prestolite Company, Indianapolis, Ind., is inquiring for ten standard gage electric passenger cars, including four motor cars and six trailers.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for one second-hand 36 ft., or shorter, passenger coach.

The Delaware, Lackawanna & Western, reported in the *Railway Age* of January 16, as inquiring for 35 suburban coaches, has ordered this equipment from the Pullman Company.

Iron and Steel

The Norfolk & Western is in the market for about 1,000 tons of fabricated steel, for use on a bridge over the New river in Virginia.

The Canadian Pacific has ordered 140,000 tons of 85-lb. steel rails from the Algoma Steel Corporation, Sault Ste. Marie, Ont., for delivery this year.

Machinery and Tools

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for one or two wheel presses of 150 tons capacity, and about 39 in. between strain bars.

Miscellaneous

The Ohio Cities Gas Company, Columbus, Ohio, is inquiring for a small, gasoline motor, inspection car.

The Missouri, Kansas & Texas has ordered two highway crossing signals from the A. G. A. Railway Light & Signal Company, Elizabeth, N. J.

Signaling

The Canadian Pacific has ordered from the Union Switch and Signal Company a 16-lever Saxby & Farmer interlocking machine, to be installed near Watson, Sask.; also a similar machine for Russell, Man.

The Philadelphia & Reading has awarded a contract to the Union Switch & Signal Company, Swissvale, Pa., for the installation of automatic block signals on four tracks between Myerstown, Pa., and Lebanon, six miles. This installation will operate on alternating current and there will be 18 blocks. All main line crossovers will be equipped with switch indicators. This road has also awarded a contract to the same company for the installation of a type "F" electric interlocking plant at Myerstown.

Supply Trade News

Theodore L. Dodd & Co., Chicago, have been appointed district sales representatives for the **Titusville Forge Company**, Titusville, Pa.

The Thompson Electric Company, Cleveland, Ohio, announces that it has moved into more commodious quarters at 226 St. Clair avenue, N. E.

Paul W. Shale, associated with the sales and cost departments of the **Brier Hill Steel Company**, Youngstown, Ohio, has been promoted to secretary to the president.

F. H. Myers, assistant secretary of the American Association of Engineers, Chicago, has been appointed sales engineer of the **Certain-teed Products Corp.**, Chicago.

Hugh Brennan, formerly president of the Dooley-Brennan Agency, Chicago, has been appointed manager of the advertising department of the **Imperial Belting Company**, Chicago.

Alexander MacDonald Graver, vice-president of the **Graver Corp.**, East Chicago, Ind., died at his home in Chicago on January 31. Mr. Graver was one of five brothers who control the Graver Corp., formerly the Graver Tank Works. He was born at Pittsburgh, Pa., on May 15, 1883, and was educated at the University of Michigan, from which institution he graduated in 1905. He then entered the engineering department of the Wm. Graver Tank Works, where he had charge of the electrical and steam equipment and remodeled the company's manufacturing plant. In 1908 he entered the purchasing department and soon after assumed charge of the purchase of steel plates. From 1910 to the time of his death, Mr. Graver was identified with the sales department of the organization and for the past two years has been virtually sales manager, although holding the title of vice-president of the organization.

A. M. Graver

C. B. Ferry, vice-president of the Chicago, Milwaukee & St. Paul, has been elected a director of the Associated Welding Companies, Inc., New York City, a corporation formed recently by thirteen electric welding companies.

The Sherritt & Stoer Company, Inc., announces the opening of new offices, storeroom and warehouse at 2006 and 2008 Market street, Philadelphia, where it will maintain a permanent exhibition of machine tools, railway and machine shop equipment.

J. F. Surridge, who served two years as major with the 35th Engineers, and was recently discharged from the United States Army, has been appointed superintendent of the car department of the **American Steel Company of Cuba**, at Havana, Cuba, effective December 5, 1919.

The Ball Lumber Company, Eugene, Ore., successor to the Valley Tie & Lumber Company, Eugene, has perfected plans to expand its service and business and has appointed **R. J. Menz**, identified for many years with the marketing of Pacific Coast lumber products in the Portland, Ore., and Seattle, Wash., districts, manager and sales manager.

Westinghouse Air Brake Company

Joseph R. Ellicott, who on January 1, 1920, retired as eastern manager of the Westinghouse Air Brake Company, but has been retained by the company, in a consulting capacity, as was briefly noted in our issue of January 16, page 276, was born in Batavia, N. Y., and received his education in the public schools of Grand Rapids, Mich. He made his start in business with the First National Bank of that city, and later became cashier. He subsequently served on the Chicago & North Western Railway, going from that road into the manufacturing business with the Ajax Forge Company, Chicago. He represented the Griffin Wheel & Foundry Company, serving several years as eastern sales manager. He then left the wheel business and started in the railway supply business for himself. He organized and directed the General Agency Company. In 1898 he became general manager of the Standard Air Brake Company. He negotiated control of this company to the Westinghouse Air Brake Company in 1901, and since that time was general manager of the Westinghouse Air Brake Company. Mr. Ellicott was president of the American Electric Railway Association for several years, having always been closely identified with the interests of that organization.

Charles R. Ellicott

Jas. R. Ellicott

Robt. Burgess

C. H. Beck

A. K. Hohmyer

W. G. Kaylor

John B. Wright

Charles R. Ellicott has been promoted to eastern manager, at New York. He was born in Chicago on November 13, 1881. He received his early education in the public schools of New York, and was graduated from Yale-Sheffield School in 1902. The same year he entered the employ of the Westinghouse Air Brake Company, at Wilmerding, Pa., as special apprentice. After serving two years in the engineering and commercial departments, he was made representative in the New York office, covering both commercial and engineering work. In 1913 he was made assistant eastern manager of the Westinghouse Air Brake Company, and Westinghouse Traction Brake Company. On January 1, 1920, Mr. Ellicott was made eastern manager of both companies, succeeding Joseph R. Ellicott, retired. C. R. Ellicott has been actively associated for a number of years with the activities of the Manufacturers' Association in connection with the American Electric Railway Association in the east.

Robert Burgess has been promoted to southeastern manager, with office in Washington, D. C. He was born in New Haven, Conn., and attended public school there, graduating from grammar and high schools. He began railway service with the Louisville & Nashville under the late Mr. Pulaski Leeds, as machinist apprentice. On completion of his apprenticeship course he continued with the company in the various capacities of air brake repairman, round house foreman, locomotive fireman and engineer, and general air brake inspector. He joined the Westinghouse Air Brake Company organization in 1893 as assistant instructor in the company's air brake instruction car. In 1896 he was assigned to the southern district, with headquarters at Atlanta, Ga., and for several years at Richmond, Va. He has since that time represented the company continuously in that district as mechanical inspector and commercial representative.

Carl H. Beck has been appointed assistant eastern manager at New York. He was born in Butler, Pa., graduated with the class of 1905 in mechanical engineering from Pennsylvania State College. The same year he entered the special apprenticeship course prescribed by the Westinghouse Air Brake Company. He was a specialist on the introduction of the ET Locomotive brake equipment, personally superintending the installation of this equipment on some of the first locomotives building at the Baldwin and American Locomo-

tive works. Following these field activities he returned to the factory as assistant foreman. Later he returned to field service in the southwestern territory, with headquarters in St. Louis. In 1910 he was made commercial representative in the electric railway field, becoming prominently identified in the development and introduction of the safety car equipment. Mr. Beck's study of electric railway operation has made him an authority on transportation problems.

John B. Wright has been promoted to assistant district manager in charge of the Pittsburgh office district. He was born on July 27, 1875, in Pleasantville, Pa., and received his education in the public schools there and at Central State Normal School, Lock Haven, Pa., graduating in 1896. He worked for about 18 months with the Cambria Steel Company, at Johnstown, Pa. In February, 1899, he entered the service of the Westinghouse Air Brake Co., at Wilmerding, Pa., as a clerk in the engineering department. After serving for some time as chief clerk in that department, he was transferred to the general office in charge of engineering correspondence, and later was made assistant to the vice-president. In May, 1919, he was appointed assistant southeastern manager.

A. K. Hohmyer has been promoted to the position of assistant western manager, Chicago, Ill. He was born in Pittsburgh, Pa., and attended the public schools of that city. In February, 1901, he started to work for the Westinghouse Air Brake Company, in the general office, as office boy. He passed rapidly and successively to the order department, engineering department, and other departments until February, 1909, when he was transferred to the Chicago office as office manager. He remained in that position until 1913, when he was appointed commercial representative. He continued to work in that capacity until January 1, 1920, the time of his promotion to assistant western manager.

Wm. G. Kaylor has been promoted to representative of the newly organized export department of the Westinghouse Air Brake Company, with headquarters in New York. He was born in Indianapolis, Ind., attending public school there and graduating from the Manual Training High School. He graduated from Purdue University in 1905, and entered the employ of the Westinghouse Air Brake Company at Wilmerding, Pa., as a special apprentice. The first year he served in the experimental and engineering departments, and the following year in field work, covering the equipment of electric locomotives for the New York Central at the various building plants throughout the east. He also installed the first air brake equipment on the all steel passenger cars in interurban New York City service. He acted as mechanical expert in connection with the introduction of electric service on the main lines of both the New York Central and New York, New Haven & Hartford railroads. After serving as assistant for several months to the resident engineer he became actively engaged in November, 1911, in commercial work, specializing in the traction brake field.

William R. Gummere, who for a number of years represented the **Independent Pneumatic Tool Company**, of Chicago, in Cleveland, Ohio, has again become affiliated with that company at the Pittsburgh branch, which is under the managership of Harry F. Finney.

Improvements and remodeling to cost approximately $3,500,000 are being carried out at the car works of the **Pullman Company.** The improvements include a new three-story building of mill construction and a new press building, 80 ft. by 200 ft. The old foundry buildings are being remodeled to furnish additional space. The purpose of the improvements is to provide adequate facilities for the manufacture of automobile bodies.

The Imperial Belting Company, Chicago, has opened a special railroad sales department under the direction of **A. G. Pickett** as general manager. Mr. Pickett was formerly connected with the railroad and power specialties department of the H. W. Johns-Manville Company, New York City. The following sales engineers will be under the direction of Mr. Pickett: **Edward H. Willard, David L. Jennings** and **William D. Otter**, all formerly with the H. W. Johns-Manville Company; **William G. Willcoxen**, formerly associated with the Boss Nut Company, Chicago, and **Edward A. Woodworth**, formerly secretary of the Committee on Standards for Locomotives and Cars of the United States Railroad Administration. A new office has been opened in the Merchants' National Bank building, St. Paul, Minn., in charge of **Blake C. Hooper.**

The Williams-Hayward Company has been incorporated at Chicago for the manufacture of varnishes, enamels and paint specialties. **LeRoy A. Williams**, for 21 years associated with the railroad department of the Flood & Conklin Company, Newark, N. J., is president of the new company and **Oscar C. Hayward**, for 18 years manager of railroad sales of the Tousey Varnish Company, Chicago, is vice-president. **Otto Woldt** has been appointed head of the manufacturing department and **Max Huhnholz** superintendent of the enamel and paint specialties department. The company has purchased a modern varnish factory with a capacity of approximately 500,000 gal. of varnish annually, to which complete mills for the manufacture of enamels and paint specialties have been added. The main offices of the company and its plant are located at 2526 West Van Buren street, Chicago.

Fairbanks, Morse & Co., Chicago, have changed from a closed to an open corporation and have changed the company's capitalization from 25,000 shares of common stock of $100 par value, representing assets of $20,000,000, to 325,000 shares of no par value. The present stockholders will receive ten shares of new stock for each old share now held. Of the remaining 75,000 new common shares, 50,000 will be issued at once, an initial offering to employees of 12,500 having been oversubscribed, and 37,500 shares having been purchased by a Chicago brokerage concern, which will offer that amount publicly. The final 25,000 shares of new stock will be reserved for subscription by employees and for future financing. Fairbanks, Morse & Co. was founded in 1858 and this is the first time in its history that outside capital has been taken into the business and employees been given an opportunity to purchase stock of the company. Upon completion of the present financing, the net assets behind the new common stock will be $23,687,500, or $78.95 a share, exclusive of good will and other intangible items.

Trade Publications

BLAWFORMS.—The Blaw-Knox Company, Pittsburgh, Pa., has issued a small illustrated folder showing, through the medium of photographs and descriptive matter, the various types of concrete construction work where Blawforms have been used, and conveying a general idea of their application to such classes of work.

W. C. K. CITY.—Westinghouse, Church, Kerr & Co., engineers and constructors, New York City, have recently issued an eight-page folder which contains a large composite illustration of all the different classes of structures which were designed and constructed in their entirety by this company. The balance of the folder is devoted to a description of these and other classes of construction work that have been done by this company on a cost plus basis.

AUXILIARY DEVICES GOVERNOR.—Instructions for the installation and care of the auxiliary devices governor have been published for distribution by the Westinghouse Air Brake Company, in a 12-page booklet bound with stiff covers and designated as General Instructions No. 2360. The construction and operation of the governor is described and is supplemented by sketches with the parts numbered and named. Instructions are also given for adjusting the pressure.

BOILER FEED CONTROL.—A 24-page booklet entitled Saving Fuel Automatically and Scientifically in the Boiler Room has been published by the Northern Equipment Company, Erie, Pa. It is based upon matter that was prepared for the United States Fuel Administration during the war and compares hand and mechanical feeding with mechanical regulation, as performed by the Copes regulator, being illustrated with a number of charts and diagrams to emphasize the value of scientific control.

Financial and Construction

Railway Financial News

Chicago Great Western.—A meeting of the stockholders of the Chicago Great Western has been called for April 6 to consider the question of the consolidation of the Wisconsin, Minnesota & Pacific with the Chicago Great Western. The Wisconsin, Minnesota & Pacific extends from Winona, Minn., to Mankato with a branch to Osage, Ia., a total mileage of 277 miles. All of its stock is now owned and held in the treasury of the Chicago Great Western, which formerly operated the road as lessee under an agreement which provided that the surplus earnings should be paid over to the parent company, the latter guaranteeing the payment of interest on the bonds of the subsidiary to the extent of such interest. In 1912 the net earnings of the Wisconsin, Minnesota & Pacific were not sufficient to pay the interest on its $6,232,000 first mortgage bonds and the coupons due October 1, 1912, were not paid. In July, 1913, the Chicago Great Western offered to the holders of these bonds 50 per cent in its own 4 per cent, first mortgage bonds and 50 per cent in preferred stock together with cash in payment of all defaulted coupons with accrued interest. Practically all of the bonds were thus exchanged.

Chicago & North Western.—The stockholders are asked to authorize at a meeting April 13, a first and refunding mortgage to secure bonds not to exceed three times the outstanding stock of the company due May 1, 2037. These bonds may be issued from time to time by the board of directors to retire the present indebtedness of the company and to provide for future capital needs. Stockholders are also asked to authorize the purchase of the Wolf River Valley, the Belle Fourche Valley, the Macoupin County Extension, the Iowa Southern, the Missouri Valley & Blair Railway & Bridge, the Wyoming & North Western, the Pierre, the Rapid City & Northwestern, the Pierre & Fort Pierre Bridge, the De Pue, Ladd & Eastern and the Albany Rail Road Bridge, all now controlled through the ownership of the entire outstanding stock.

Grand Trunk.—Sir Alfred Smithers, chairman of the board of directors, has called a meeting of the shareholders on February 19 at London, England, to ratify the agreement made with the Canadian government for the acquisition of the Grand Trunk Railway System.

Northern Ohio.—This railroad, now a part of the New York Central System, being leased to and operated by the Lake Erie & Western, is to be taken over by the Akron, Canton & Youngstown, an agreement having been made by the directors of the Lake Erie & Western and those of the Akron, Canton & Youngstown, to transfer the lease to the latter, after the return of the railroads to their owners by the government. The lease is for 999 years from April 1, 1895. The road came into the control of the New York Central, along with the Lake Erie & Western, about 20 years ago. It extends from Akron, Ohio, westward 162 miles to Delphos. The Akron, Canton & Youngstown, according to the Official Guide, operates only about 8 miles of line, but it has extensive terminal properties in Akron. The new acquisition will give it a connection with the Cleveland, Cincinnati, Chicago & St. Louis, at New London, 53 miles west of Akron, and with the Toledo, St. Louis & Western at Delphos.

Richmond, Fredericksburg & Potomac.—A special commission representing the interests of the state of Virginia has formally approved the merger of the Washington Southern Railway with the Richmond, Fredericksburg & Potomac Railroad under the name of the latter company. The effect of the merger is practically a purchase of the Washington Southern, which operates 88 miles of the Richmond-Washington line between Quantico, Va., and the south end of Potomac Bridge, including the Potomac yards, at a price of $8,000,000. The road is estimated by the special commission to be worth more than $10,000,000.

Texas State Railroad.—Bids will be received by the Texas Board of Prison Commissioners, Huntsville, Tex., for the purchase or lease of the Texas State Railroad, extending from Rusk, Tex., to Palestine, and containing approximately 36 miles of track, together with all property belonging thereto, including rights of way, tracks, depot, sites and buildings, rolling stock and other equipment. The bids are to be opened on March 1, on the following basis:

1. Unconditional purchase and subject to the obligation of the successful bidder to maintain and operate the line.
2. Unconditional purchase without obligation on the part of the successful bidder to maintain and operate the line.
3. Lease of railroad for a stated term of years.

The railroad will not be sold unless a cash payment is made at the time of the sale equal to the face value and accrued interest of bonds owned by the school funds of Texas against the Texas State Railroad.

Washington Southern.—See Richmond, Fredericksburg & Potomac.

Wisconsin, Minnesota & Pacific.—See Chicago Great Western.

Railway Construction

Canadian Pacific.—President E. W. Beatty is quoted by Canadian papers as saying that the company desires to proceed this year with the construction of the branch lines in the prairie provinces which were begun last year, provided men are available to do the work. At present, however, the supply of labor seems to be decidedly short.

Long Island.—The New York Public Service Commission, First district, has ordered the Long Island Railroad to build a new bridge over Flushing creek, on the Port Washington branch, in Flushing.

Salt Lake & Denver.—The Utah Manufacturers' Association, at its fifteenth annual convention at Salt Lake City, January 14, adopted resolutions pledging the support of its members to this proposed railroad into the Uintah Basin, a description of which appeared in the *Railway Age* of January 16 (page 279). The action was taken immediately after an address on the construction of the line was made by R. S. Collett, a resident of the Uintah Basin.

Central Western Shippers on Railroad Legislation.—Representatives of several Western commercial organizations and associations at a meeting in Chicago have adopted and sent to the members of the Congressional Conference Committee the following requests and suggestions: (1) strike from the bill all reference to the creation of the so-called transportation board; (2) strike from the bill the provision requiring compulsory consolidation of the railroad systems; (3) agree to a rule for rate-making which shall provide for the grouping of the transportation systems into three groups for rate-making purposes conforming to the present three freight classification groups, and that the Interstate Commerce Commission, for a period not exceeding five years, shall adjust rates of carriers as a whole in each group so as to provide a net operating income of not less than 5½ per cent upon the aggregate value of the carriers as a whole in each group, without any division of excess earnings of individual carriers about 5½ per cent, and (4) adopt the labor and anti-strike provisions of the bill. The meeting was attended by representatives of the Wisconsin Manufacturers' Association, the Indiana Manufacturers' Association, the Michigan Manufacturers' Association, the St. Paul Association, the Rockford (Ill.) Manufacturers' & Shippers' Association, the Chicago Furniture Manufacturers' Association, the American Furniture Manufacturers' Association, the Illinois District Traffic League, the Michigan Traffic League, and the Illinois Manufacturers' Association.

Railway Officers

Railroad Administration

Operating

H. D. Mudgett has been released from military service and has resumed his position as trainmaster of the Montana division of the Northern Pacific.

W. B. Foster, general superintendent of the Lines West of the Chicago, Milwaukee & St. Paul, with headquarters at Seattle, Wash., has resigned to engage in other business. No successor has been appointed.

H. J. Councilman has resumed his duties as trainmaster on the Northern Pacific, with headquarters at Duluth, Minn., succeeding **Frank L. Birdsall**, who has been transferred to Jamestown, succeeding **J. J. Mulroy**, assigned to other duties.

G. A. VanDyke, superintendent of terminals of the Chicago, Milwaukee & St. Paul, with headquarters at Minneapolis, Minn., has been appointed superintendent of the Twin City Terminals division, with the same headquarters, succeeding **E. F. Rummel**, acting superintendent, who has been appointed trainmaster of the River division, with headquarters at Minneapolis, succeeding **M. T. Skewes**, assigned to other duties.

M. C. Blanchard, division superintendent of the Atchison, Topeka & Santa Fe, with headquarters at Marcelina, Mo., has been transferred to Chillicothe, Ill., succeeding **R. H. Allison**, whose promotion to assistant general manager was announced in the *Railway Age* of January 30 (page 396). **C. L. Mason**, division superintendent at Kansas City, Mo., has been transferred to Marceline, succeeding Mr. Blanchard, and **H. M. Duncan**, terminal superintendent at Chicago, has been transferred to Kansas City, to succeed Mr. Mason. **C. E. Taylor**, of the Terminal Efficiency Committee of the United States Railroad Administration, with headquarters at Chicago, has resumed his former position at Chicago, succeeding Mr. Duncan.

Financial, Legal and Accounting

W. E. Bacon, federal auditor of the Chicago, Terre Haute & Southeastern, with office at Chicago, has resigned to engage in other business.

Traffic

F. W. Bale, assistant general freight agent of the Buffalo, Rochester & Pittsburgh, has resigned.

Engineering and Rolling Stock

B. H. Bryson, first engineer on the Fort Dodge, Des Moines & Southern Railroad, with headquarters at Fraser, Iowa, has been appointed chief engineer of that road with the same headquarters.

Egnar Johnson, acting roadmaster on the Houghton division of the Duluth, South Shore & Atlantic, with office at Marquette, Mich., has been appointed roadmaster, with the same headquarters.

H. O. Kelley, assistant engineer of the Wabash at St. Louis, Mo., has been appointed division engineer, with the same headquarters, succeeding **D. C. Bowman**, who resigned to become chief engineer of the Industrial Track Construction Company, of St. Louis.

F. P. Patenall, signal engineer on the Baltimore & Ohio, Eastern Lines, with office at Baltimore, Md., has had his jurisdiction extended over the Western Lines. **E. T. Ambach**, engineer of signals on the Western Lines, with office at Cincinnati, Ohio, has been appointed assistant signal engineer, Western Lines, as a result of this extension of jurisdiction.

C. H. Chambers, road foreman of engines on the Atchison, Topeka & Santa Fe, with office at Las Vegas, N. M., has been appointed assistant air-brake instructor, with headquarters at La Junta, Col., succeeding M. O. Davis, who has resigned. Mr. Chambers will have jurisdiction over the Western, Arkansas River, Colorado and New Mexico divisions.

C. D. Peckenpaugh, who was temporarily assigned to other duties, has been reappointed to his former position as superintendent of the Aurora division of the Chicago, Burlington & Quincy, with headquarters at Aurora, Ill. **E. J. Worden**, acting superintendent of the Aurora division, has resumed his position as superintendent of the La Crosse division, with headquarters at La Crosse, Wis., and **F. E. Haines**, acting superintendent of the La Crosse division, has been reappointed to his former position as assistant superintendent of the Ottumwa division with office at Ottumwa, Iowa.

Special

C. A. Conner has been appointed traveling engineer and trainmaster of the Green River division of the Denver & Rio Grande, with office at Helper, Utah, succeeding **C. H. Wilcken**, who has resigned.

Corporate

Executive, Financial, Legal and Accounting

W. H. White, assistant general manager of the Boyne City, Gaylord & Alpena, has been elected president, with headquarters at Boyne City, Mich.

E. H. Alden, whose election as vice-president in charge of finances of the Norfolk & Western was announced in the *Railway Age* of February 6 (page 460), was born in Bridgewater, Mass., in 1866. He began railroad work in March, 1891, as chief clerk to the secretary of the Norfolk & Western and has given his entire service to that company. When A. J. Hemphill, secretary and assistant treasurer, resigned in March, 1905, Mr. Alden was chosen his successor and held that position until his recent election. In addition, he has served for six years on the executive committee of the Society of Railway Financial Officers and was president of the society in 1916 and 1917.

E. H. Alden

Milton H. Smith, who has served as president of the Louisville & Nashville under federal control, will continue in that capacity when the road is returned to private ownership; **W. L. Mapother**, federal manager of that road, will resume his former position as vice-president.

B. F. Bush has tendered his resignation as regional director for the Southwestern region and has been elected president of the Missouri Pacific, the office which he held prior to federal control, effective upon the termination of his connection with the Railroad Administration.

P. F. Finnegan has been elected a vice-president of the Union Tank Car Company in charge of its car service de-

partment; all correspondence relative to the movement and operation of the Union Tank Car Company's cars heretofore addressed to E. C. Sicardi should in future be addressed to Mr. Finnegan at 21 East 40th street, New York.

L. W. Baldwin, regional director of the Allegheny region and formerly vice-president and general manager of the Central of Georgia, will resume the duties of vice-president when the road is returned to private ownership. A sketch and photograph of Mr. Baldwin were published in the *Railway Age* of September 20 (page 662) when he succeeded Mr. Markham as regional director.

W. T. Tyler, director of the Division of Operation of the United States Railroad Administration, who has been elected vice-president in charge of operation of the Northern Pacific, as announced in *Railway Age* of February 6 (page 460), was born at Janesville, Wis., on July 29, 1870. He entered railway service in June, 1883, as a messenger on the Wisconsin Central and was later an operator and despatcher on the same road. In 1889 he was employed as a brakeman on the Milwaukee, Lake Shore & Western, now a part of the Chicago & Northwestern. From that time until 1891, he was brakeman and conductor for the Northern Pacific, and from 1891 to 1900 was, consecutively, yardmaster, trainmaster and superintendent of the Great Northern. Appointed superintendent on the St. Louis, Iron Mountain & Southern in 1900, he was promoted to general superintendent of the same road the following year. The following eight years he was, successively, general superintendent and general manager of the St. Louis & San Francisco. In 1915 he became superintendent on the Northern Pacific, with headquarters at Pasco, Wash., and on February 1, 1917, was appointed general manager of the St. Louis Southwestern. On May 15, 1917, was elected first vice-president of this road and on November 1, 1917, resigned to become assistant to the vice-president in charge of operation of the Northern Pacific. On January 22, 1918, Mr. Tyler was appointed assistant to the director to the Division of Operation with headquarters at Washington and was appointed senior assistant director on July 1, 1918. Mr. Tyler succeeded Carl R. Gray as director of the Division of Operation on January 15, 1919, in which capacity he has served up to the present time, and in which will continue until March 1, when the roads will be returned to private control.

W. T. Tyler

Operating

H. T. Hamilton has been appointed assistant manager of the Nacozari Railroad, with headquarters at Nacozari, Sonora, Mex.

C. A. Phelan, operating assistant of the Allegheny region for the Railroad Administration, whose resignation was announced in the *Railway Age* of January 23 (page 336), has been appointed general manager for the receiver of the Missouri & North Arkansas Railroad Company, with headquarters at Harrison, Ark.

L. H. White, general superintendent and car accountant of the Boyne City, Gaylord & Alpena, has been appointed general manager, with headquarters at Boyne City, Mich., succeeding F. O. Barden, resigned; Clark Haire has been appointed general superintendent, succeeding Mr. White and F. J. Beals, assistant car accountant at Boyne City, has been appointed superintendent of car service, with the same headquarters.

Traffic

A. J. Poston has been appointed general agent of the passenger department of the Southern Pacific Lines, with headquarters at New York.

G. J. Brady has been appointed assistant general agent of the freight department of the Southern Pacific Lines with headquarters at New York, effective March 1.

M. Dailey, general manager of the Chicago & Illinois Midland, has also been appointed traffic manager with headquarters at Taylorville, Ill., succeeding H. H. Seaverns, deceased.

J. C. Murray has been appointed general freight and passenger agent for the receiver of the Missouri & North Arkansas Railroad Company, with headquarters at Harrison, Ark.

C. M. Evans has been appointed assistant general freight and passenger agent of the Southern Pacific Atlantic Steamship Lines, "Morgan Line," with headquarters at New York, effective March 1.

E. C. Elliott has been appointed district passenger agent of the Grand Trunk, with headquarters at Bonaventure Station, Montreal, Que., succeeding Joseph Quinlan, granted leave of absence previous to his retirement April 1, under the pension act of the company.

C. S. Fay, general freight agent of the Southern Pacific Lines for the Railroad Administration, has been appointed general freight agent of the New Orleans-Havana Line and southern freight agent of the New York-New Orleans Line, with headquarters at New Orleans, La., effective March 1.

William Simmons has been appointed general freight and passenger agent of the Steamship Lines of the Southern Pacific operating between North Atlantic and Gulf ports—"Morgan Line"—with headquarters at New York, effective March 1. C. M. Evans has been appointed assistant general freight and passenger agent, with the same headquarters, and becoming effective the same date.

J. T. Monroe, general passenger agent of the Southern Pacific Lines and the Lake Charles & Northern, for the Railroad Administration, at New Orleans, La., has been appointed general passenger agent of the New Orleans-Havana Line and the New York-New Orleans Line of the Southern Pacific, with the same headquarters, effective March 1. F. L. Pickering has been appointed assistant general agent of the passenger department, with headquarters at New York.

G. G. Herring has been appointed general agent of the Southern Pacific Lines, with headquarters at Pittsburgh, Pa. The following have also been appointed general agents: F. T. Brooks, with headquarters at Philadelphia, Pa.; L. C. Bouchard, at Memphis, Tenn.; S. C. Chiles, at 165 Broadway, New York; C. T. Collett, at St. Louis, Mo.; H. F. Kern, at Kansas City, Mo.; L. B. Banks, at Denver, Colo.; W. W. Hale, at Detroit, Mich.; F. E. Scott, at Cincinnati, Ohio; C. L. McFaul, at Chicago, Ill.; J. H. Glynn, at Boston, Mass.; S. J. Brown, at Birmingham, Ala.; W. B. Johnson, at Baltimore, Md.; D. Asbury, at Atlanta, Ga. The appointments become effective March 1.

Obituary

Fred Mertsheimer, formerly general superintendent of the Mexico & Orient, died in Kansas City January 29, at the age of 73.

Richard I. Wilby, formerly engineer maintenance of way of the Toledo, Peoria & Western, died in Deerfield, Mass., January 11.

Col. Le Grand Cannon, vice-president and general manager of the Nevada Northern, died on January 26, at East Ely, Nev., at the age of 72 years.

M. J. Brew, division engineer of the Chicago Terminal division of the Chicago, Rock Island & Pacific, with headquarters at Chicago, died on February 3, at his home.

EDITORIAL

Railway Age

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The Rising Barometer

The comments made in the *Railway Age* editorial columns two weeks ago relative to the rising barometer of the railway supply field as represented by the Equipment and Supplies column of this paper have been borne out so far in February rather better than was expected. During the month of January orders were reported in the column for 32 locomotives, 6,220 freight cars and 25 passenger cars for domestic service and 213 locomotives and 1,080 freight cars for export. The orders reported in the first two issues only of February—that is, excluding the present issue—already show orders for 97 locomotives for domestic service and 55 for export, while in the present issue there will be found reference to orders for a number in addition. The orders for freight cars have not been so encouraging. In the first two issues orders were reported for 336 freight cars for domestic service and 480 for export and for 35 passenger cars for domestic service. Indications that the buying movement that is expected to come with the return of the railroads to private control is momentarily gaining headway, are, however, shown by a reference to the inquiries that have recently been issued. In the first two issues of February such inquiries were reported for 62 locomotives, 75 passenger cars and no less than from 6,100 to 7,100 freight cars for domestic service. Further than that these totals will be augmented by a number of items that are reported in this week's issue, including particularly an inquiry for 2,028 refrigerator cars for the American Refrigerator Transit Company and one for from 122 to 222 passenger train cars for the New York Central. As was noted in the previous editorial the totals have thus far not been surprisingly large, but they are nevertheless sizeable and the number of inquiries and the many sources from which they come are very favorable indications. It is safe to say that the barometer has only begun its upward rise.

"Under Control" in a Smoky Tunnel

To run "under control" may mean a speed of from one mile an hour anywhere up to 40 miles an hour. A general manager, writing to the editor in connection with our recent discussion of the protection of work trains (*Railway Age*, January 9, page 155), calls attention again to the importance of educating trainmen in this matter. So elastic a term needs frequently to be restated, and a good many enginemen and conductors need to be jogged by the trainmaster; they are not likely to do much self-education wholly from their own volition. The point is again brought to mind by the West Philadelphia collision, reported in another column of this issue. In that case a passenger train had to move under control through a tunnel so filled with smoke that practically the engineman could not see beyond the front end of his engine. This collision occurred 200 ft. outside of the tunnel, and the government inspector thinks that if the speed had not been over 10 miles an hour (the rate at which the engineman professed to believe he had been running) the bump would have been averted. Inside the tunnel, however, if we accept the testimony of the flagman who tried to stop the oncoming train, 10 miles an hour would have been a dangerous rate. Even at one mile an hour it would no doubt have been necessary, in that smoke, to depend on somebody's hearing instead of the engineman's eyesight to avoid bumping a standing train. In short, we may say that in a smoke-filled tunnel the term "under control," insofar as it depends on the engineman's use of his eyes, is out of the question. The absolute block system is the only rule that can be called entirely safe. The rules might require that the flagman of a standing train should *always* be able to give notice of the presence of his caboose (if not in motion) at least 100 ft. away, but there would be much difficulty in carrying out even that simple rule. The principle of putting the whole of the responsibility on the engineman and none on the standing train is probably favored, over the rule of divided or duplicate responsibility, by the great majority of operating officers who decide the question wholly on the basis of reason, excluding questions of expediency; and therefore, again, the conclusion must be that the absolute space interval is the only satisfactory rule for running through tunnels which are liable to be filled with smoke.

The Metric System

There is constantly going on in this country organized propaganda for the adoption of the metric system of weights and measures. The organizations which have endeavored to create this pro-metric sentiment have recently been very active, and it is expected that a bill will soon be introduced in the House, making the use of the metric system, and that only, compulsory in all departments of the government. There is no question that the pro-metric propagandists intend this merely as an entering wedge to commit Congress in favor of the metric system and the bill, if passed, would no doubt be followed by drastic compulsory metric legislation for the whole country. Members of the House of Representatives and the Senate have received a deluge of communications urging the enactment of metric legislation, and in the absence of opposition, the legislators may form the opinion that there actually exists a widespread sentiment in favor of the substitution of metric weights and measures for our present system. However, investigation has disclosed that the greater part of the communications sent to legislators have been inspired by a campaign conducted by the so-called World Trade Club of San Francisco. This organization, we are reliably informed, is not a club in the ordinary sense of the term, the name being adopted merely to add prestige to a movement being carried on by a wealthy man who has made the metric system his hobby. Thus the artificial sentiment has been created almost solely by one individual and does not represent the views of manufacturers or responsible business men in this country. Regardless of the questionable methods that have been adopted to manufacture pro-metric sentiment, it will be well to consider the metric system on its merits. It was first adopted in France by drastic legislation enacted in 1793. The law was repealed by Napoleon in 1812, and even though the metric system had been in force for 19 years the people soon resumed the use of their old system of measures. In 1837 the metric laws were reinstated, with the omission of

the decimal division of the year, of the day and of the circle. Now, after 85 years of compulsory use of the metric system, the old French units still survive in some of the French industries.

The experience of France has shown that old units never entirely disappear and the metric units introduce complication, resulting from a dual system. It is hardly necessary to point out how vitally the railroads would be affected if the use of metric weights and measures by all departments of the government were made compulsory. In all reports to the Interstate Commerce Commission the units would have to be changed from miles to kilometers, from pounds to kilograms, from ton-miles to metric ton-kilometers, etc. The cost of this work would be appalling in its magnitude and the benefits would be infinitesimal in comparison with the confusion and complexity that would result. When it is considered that the system was made compulsory in France when modern organized manufacture had scarcely begun and yet its complete adoption has not been accomplished after 112 years, it will be realized that the railroads would do well to oppose this proposed legislation.

Railroad Bill Reported

THE TEXT of the railroad bill as reported to Congress this week and published elsewhere in this issue contains many important modifications from the original bills passed by the Senate and the House, the principal points of which have been announced before, except the labor provisions which were rewritten on Monday at the suggestion of Director General Hines for the purpose of making them more workable and applicable to the present situation. However, the exact language used is of the greatest importance and the making public of the text reveals many features of the plan of the bill which have not been clearly understood or which have been decided by the conferees only within a few days.

The rate-making rule, which is based on Section 6 of the Cummins bill, but is now contained in Section 422, represents a much greater degree of flexibility than the original provisions, which were such that most people have erroneously referred to it as providing for a "guaranty" of 5½ per cent. While the original bill fixed the percentage and provided that the Interstate Commerce Commission should readjust it every five years the bill now states that the commission "shall from time to time determine and make public what percentage constitutes a fair return" and the 5½ per cent fixed by the bill is stated in a proviso. This serves to emphasize the fact that the commission is after all made the arbiter of the destinies of the railroads because not only is it to determine the value to which the percentage is to be applied but the entire section is filled with qualifications which refer back to the judgment of the commission.

It is understood that for a time the conferees proposed to state that the property investment accounts should be taken temporarily as the basis of value but in the final text the commission is authorized to utilize the results of its investigation under the valuation act, "in so far as deemed by it available" and to "give due consideration to all the elements of value recognized by the law of the land for rate-making purposes" and to "give the property investment account of the carriers only that consideration which under the law it is entitled to in establishing value for rate-making purposes." It is also left discretionary with the commission as to whether or not it shall state the percentage by rate groups or for the carriers as a whole.

There is also another opportunity for the exercise of judgment by the commission as given in the factors which it is to take into consideration in estimating what rates will produce a given percentage, such as what is "honest, efficient and economical management" and "reasonable" expenditures for maintenance.

For the purpose of determining which railroads earn over 6 per cent and therefore will be required to contribute half of the excess to the general railroad contingent fund computations are to be based on the railroad systems under common control and management, irrespective of the accounting returns of the various parts of such system.

The guaranty to the railroads for six months of half of a year's standard return is also qualified in several ways. It is not to be available to a road that does not by March 15 file an acceptance of the provisions of the bill, which include one that any excess above the guaranty shall be paid to the government, and the Interstate Commerce Commission is directed to require the restatement of accounts other than the maintenance accounts to correct any disproportionate or unreasonable charge and there shall not be included in operating expenses for maintenance more than an amount fixed by the commission, which shall so far as practicable apply the rule set forth in the standard contracts, which bases the upkeep during federal control on the expenditures of the test period after equating for increases in prices and wages. Special provision is made for the short line railroads not taken over or relinquished from federal control.

The provisions relating to the funding of carriers' indebtedness to the government have been considerably revised and now provide that the indebtedness of the government to the carriers may be deducted "so far as deemed wise by the President" but only to the extent permitted under the compensation contracts and there is a proviso that gives the carriers enough of their rental to pay interest, taxes and other corporate expenses, regular dividends and one twenty-fourth of last year's operating expenses for working capital. To assist the President in making settlement on this basis he is given an additional appropriation of $200,000,000.

Present rates are safeguarded against arbitrary reductions by state authorities by a provision that they shall not be reduced for six months unless such reduction is approved by the Interstate Commerce Commission.

The labor provisions as redrafted are very much like the plan originally proposed by the Association of Railway Executives. Whereas it was intended by the conferees to create several boards of adjustment for various classes of employees it was finally decided to leave such boards to be established by agreement between carriers and representatives of the employees or subordinate officials on a purely voluntary basis and to avoid the possibility of different boards rendering different treatment to different classes of employees most of the jurisdiction over wages is conferred on the Railroad Labor Board which will have headquarters at Chicago. The powers of this board are such as to create practically a plan of compulsory arbitration but without a penalty to enforce it. An interesting provision is that which prevents any reduction of wages fixed by the Railroad Administration for six months, which is also the period during which the railroads are guaranteed.

The bulk of the bill is made up of amendments to the Interstate Commerce Act which greatly increase the powers and duties of the Interstate Commerce Commission along lines which have long been urged by the railroad officers, shippers and the commission itself, although the changes which these three have urged are not all the same. The commission may approve consolidations proposed by the carriers but it is required to prepare a plan for the consolidation of the railways of the continental United States into a limited number of systems, preserving competition as fully as possible and maintaining existing routes and channels of trade and commerce wherever practicable. Consolidations made must be in harmony with this plan but it may be changed from time to time.

Section 501 of the bill again extends the effective date of the provisions of Section 10 of the Clayton act, relating to railroad transactions with persons or companies with which they have an interlocking interest, until January 1, 1921.

The provision authorizing the commission to require the installation of automatic train control devices has been changed to require at least two years' notice instead of one year.

The provisions for representation of labor organizations on railroad directorates have been eliminated.

Transportation Conditions Are Extremely Bad

STATISTICS regarding "car shortage" and information regarding conditions generally in the country indicate that with the return of the railways to private operation less than 10 days away, the transportation situation in the United States is the worst that it ever was, except possibly in the winter of 1917-1918, at the time when government operation of railroads was adopted. The net car shortage on January 31, 1920, was 88,200. This compares with a net shortage of 90,000 on January 31, 1918, and 98,000 on February 1, 1918.

The accumulations of cars under load at various points of congestion on February 6, 1920, amounted to 117,000 as compared with 150,000 when government operation was adopted.

It is well, in this connection, to recall the conditions which existed in the winter of 1917-18. The weather was the worst in its effect on transportation ever known. Not only was it extremely cold, but the snowfall was enormous, and heavy snow extended farther south and therefore affected more railway lines than for many years. The traffic being handled was the heaviest ever known. The difficulties of handling it had been greatly increased by the concentration by the government of enormous orders for war materials in a comparatively small area in the eastern states, and by orders for preference to be given to government freight being abused to such an extent that 80 per cent of the freight of some of the eastern lines was being handled under preference orders. Government operation was adopted upon the ground that it was neccessary in order to remedy these conditions, but the car shortage continued to grow until on March 1, 1918, it amounted to 138,000 cars.

The railways recently have been struggling with very bad weather conditions. The temperature has been low and the eastern states recently have been visited by a blizzard and snowfall only less severe than the storms of 1917-18. It cannot be said, however, that the weather conditions generally have been as bad as they were two years ago. The coal strike in November and December demoralized traffic and the effects of it are still being felt, but even the coal strike has been hardly as demoralizing as were the government priority and preference orders of two years ago. In the winter of 1917, before government operation was adopted, the railways had been forced to put out many embargoes, but they did not, and could not, use the permit and embargo systems to anything like the extent that the Railroad Administration recently has been using them. The extensive use of permits and embargoes has helped the Railroad Administration in two ways. First, it has enabled it to refuse to try to load freight which railway officers knew could not be taken without increasing the congestion. Second, it has tended to keep down the car shortage figures, because when concerns making a particular class of commodities know that their commodities have been embargoed, they usually cease to place orders for cars until the embargoes have been lifted. If, therefore, the Railroad Administration had not been able to use the permit and embargo systems as it has, the car shortages and the accumulations of cars reported undoubtedly would be larger than they are. In one important respect the situation probably is much worse now than it was two years ago. The amount of freight seeking transportation which the railways are unable to accept for movement undoubtedly is vastly larger than it was then.

Just before and after government operation was adopted, it was charged all over the country that the railways under private management had "broken down." If that charge could be fairly made then, the charge may be as truly made now that under government operation they have "broken down." As a matter of fact, under both private and government operation the managements have shown great ability and energy in dealing with difficult and almost impossible conditions. The government, however, is not handing the railways back under transportation conditions any better than they were when they took the roads over, and the inability of the railways to handle the entire commerce of the country unquestionably is much greater than it was when government operation was adopted.

As figures already given indicate. the car shortage continued to increase after the roads were taken over by the government and amounted on March 1 to almost 140,000 cars.

Conditions also probably have grown worse since February 1, 1920, although statistics are not available to show that this is the case. It will be surprising if the statistics for March 1 do not show a car shortage greatly exceeding that which existed on February 1.

The present shortage of cars exists in spite of the fact that the railways recently have handled more traffic than they ever did before at the same time of the year. The amount of anthracite coal moved in December broke all records, and the amount of bituminous coal moved in January broke all records. The total freight handled in December declined owing to the coal strike, but in January and in the first week in February the total freight traffic handled exceeded all past records.

The present transportation conditions are not due to the fact that the railways are not handling more traffic than ever before at this time of the year, but to the fact that there is more traffic to handle than there ever was, and that the facilities for moving it are more inadequate than they ever were.

New Books

Commodity Classification. Compiled by the Railway Accounting Officers' Association. E. R. Woodson, secretary, 1116 Woodward Bldg., Washington, D. C.

The Interstate Commerce Commission has ordered that beginning January 1, 1920, Class I and II railways shall report to the Commission quarterly and yearly the tonnage of commodities carried, divided among 70 classes. A sub-committee of the Railway Accounting Officers' Association's Committee on Freight Accounts has prepared a list of commodities arranged under this classification. This has been published in pamphlet form by the association. There are about 3,000 connections listed alphabetically, with the classification number opposite each. The pamphlet also contains a list of these commodities arranged according to their classification. This is in the nature of an official interpretation of the Interstate Commerce Commission's rules and has been made standard by the Accounting Officers' Association. The work is quite comprehensive and the book will be a necessity to all accounting officers dealing with the subject; it will also be useful to station agents and operating and traffic men generally.

Letters to the Editor

Common Sense in Naming Stations

PORTLAND, ORE.

TO THE EDITOR:

Frequently but little attention is given to the matter of station names. Names are often selected that are inappropriate and confusing, sometimes duplicating names that already exist on the same railroad or in the same state on another line. This should be avoided. There is a general tendency for the better in these matters, however, and some companies are beginning to give the selection of station names more attention, co-operating with various state and federal officers that are interested in the same work.

The final authority on geographical names in this country is the United States Geographic Board at Washington, composed of representatives of various departments and bureaus. Names and spellings approved by that board are required to be used on government maps and publications, to the exclusion of all other forms. Of course, there is no law compelling companies or people generally to use the forms adopted by the United States Board, but common sense would indicate that after this board has spent considerable time investigating and deciding on proper forms the presumption is in favor of the use of the names so selected.

As a rule the United States Geographic Board adopts a name or a style of spelling only in disputed cases, and never except after a thorough investigation. Local usage is approved as a general thing, unless there is a good reason to the contrary. The board has issued a set of suggestions regarding the selection of new names, believing that more care should be given the picking out of names for new places or unnamed geographic features. Long and clumsy names should be avoided. Names of complicated spelling should be avoided; but equally undesirable are names of a commonplace character, such as Elk Creek, Beaver Creek and Bald Mountain. There are too many of such names in the country. Oregon has a half a dozen Clear Lakes. Good Indian names are desirable, also names of Spanish and French derivation. Possessive forms should always be avoided when possible. Hudson Bay is the correct name, not Hudson's Bay. There are hundreds of stations such as Clark's, Dodson's, Mitchell's that should be Clark, Dodson or Mitchell. The suggestion of ownership should not be conveyed in geographic names.

The officers of the Oregon-Washington Railroad & Navigation Company and of the Northern Pacific Railway have done good work in the elimination of possessive names and styles not approved by the United States Geographic Board and of forms not adopted by the Post Office Department. In some cases the names used by the railroads were better than those used by the government, and the latter have been changed. The Southern Pacific no longer uses possessive names for stations. Other lines might well follow the examples of these companies.

A fruitful source of geographical confusion is to be found in railroad advertising literature. These often contain information that has been handed down from one edition to another without correction. The United States Geological Survey is carrying on detailed surveys all the time, and its maps contain later and better data with every new issue, information that is far superior to surveys that may be used by map publishers based on field work done a half-century ago.

The United States Geological Survey and the United States Geographic Board are always willing to furnish the latest available information regarding names, elevations and extent of modern surveys, if addressed at Washington, D. C. It is better to get this information from Washington direct than to copy it from maps made years ago and based perhaps on doubtful surveys. The Oregon Geographic Board (Portland) has a large amount of accurate data on hand covering the Pacific Northwest, historical and geographical, and is glad to give assistance. The secretary of the board is Lewis A. McArthur. Too many folder maps show evidence of guess work. Good money is spent by railroads in publishing maps that are attractive but not accurate.

M. P. O.

More About Adequate and Efficient Supervision

IOWA.

TO THE EDITOR:

On page 99 of your issue of December 10, I note an article entitled "Supervision versus Efficiency." Being a supervisor, I am, of course, greatly interested in anything published relative to this class of employees.

It is quite possible that the road on which the writer of the above mentioned article is employed tolerates conditions mentioned by him in his article, and "An Observer" is no doubt in a better position to know this than the ordinary official who is confined to one town or one division.

On the railroad on which I am employed in the capacity of supervisor, we have men traveling on the road who are assigned to general efficiency work; they are experts in their line and permit of no laxness of supervision or efficiency on the part of supervisors. I can safely say that there are no salaries being drawn for supervision where supervision is not being done and there are no foremen "obtaining money under false pretences."

The supervisor of today must be efficient. He must be diplomatic; he must deal fairly with his men; he must make their working conditions as pleasant for them as is possible so far as his authority will permit. At the same time he must be firm and dignified and wide awake and on the job every minute in order to get a fair day's work out of every man in his employ. He must work in harmony with his superintendent, his master mechanic, or any of the various other officials with whom his duties bring him in contact.

The official acting in the capacity of "General Efficiency Man" should be an organizer and if his organization has deteriorated to such an extent that his supervisors are drawing their money "under false pretences" it is surely in a deplorable condition.

An organization of this kind should never be advertised. Advertising conditions of this sort is liable to result in doing harm to other organizations which are striving to be perfect. My advice to "An Observer" would be to roll up his sleeves and do a little house cleaning where it is most needed and build up an organization which will get results for every dollar expended. Being a supervisory official myself, I cannot let this item go without comment: if I did I should be allowing all supervisory officials to be classed with the inefficient, which my 25 years' experience tells me are greatly in the minority.

A. SUPERVISOR.

THE REFRIGERATOR INDUSTRY IN JAPAN.—A society for the organization of the refrigeration industry is being established in Japan. Foodstuffs will be conveyed from Manchuria to Japan in ships fitted up with refrigerating apparatus. Big refrigerating factories are to be constructed at Dairen, Fousan, Moji, Kobe, Yokohama, Tokio and Tsingtao, and all railways will be provided with refrigerator vans. The society's capital is fixed at about £2,000,000 sterling.—*The Engineer, London.*

A 100-Car, 5,000-Ton Freight Train, East-Bound at Thelma on the St. Paul.

A Comparison of Electric and Steam Motive Power*

From Which It Would Appear That the Steam Locomotive Has About Outlived Its Usefulness.

By A. H. Armstrong
Railway and Traction Engineering Department, General Electric Company.

DURING THE YEAR 1920 the people of the United States will pay out for automobiles, not commercial trucks or farm tractors, but pleasure vehicles, a sum of money considerably greater than the estimated requirements of our steam railways for that year. The railways, however, may find it very difficult and perhaps impossible to secure the large sums needed without government aid, notwithstanding the fact that the continued operation and expansion of our roads is of vital necessity to the welfare and prosperity of the country and all its industries. The will of the American public has always been constructive and undoubtedly in due time its voice will be heard and properly interpreted by its representatives in Washington with the resulting enactment of such laws as will permit our railways to again offer an attractive field for the investment of private capital.

The purpose of this paper is not to discuss the politics of the situation nor any necessary increase in freight rates that may be required to make our roads self sustaining, but rather to offer certain suggestions as to the best manner of spending the sums that must ultimately be provided for new construction and replacements.

During the war period many lessons have been most clearly brought home to us and not the least of these is that there is something inherently wrong with our steam railroads. During the three generations of its development, we have become accustomed to look upon the steam engine as properly belonging to the railway picture with little thought given to its wastefulness and limitations, but around which railway practice of today has gradually crystallized.

During the winter of 1917-18 our railways fell down badly when the need was the greatest in their history. It is true that the cold weather conditions were unprecedented and the volume of traffic abnormal, but the weaknesses of steam engine haulage were disclosed in a most startling and disastrous manner. Delayed passenger trains in cold weather can be endured by the traveling public in suffering silence or voluble expression, according to temperament, but blocking our tracks with frozen engines and trains, serious reduction of tonnage in cold weather and the prohibitive delay in transportation of freight in times of great stress is quite another thing and plainly indicates the inability of the steam engine to meet overloads and adverse climatic conditions.

In marked contrast to the adjoining steam engine divisions, the 440 miles of electrified section of the Chicago, Milwaukee & St. Paul continued to do business as usual all through that trying winter of 1917-18. The electric locomotives brought both freight and passenger trains over the electrified tracks on schedule time or better; in fact, it was quite customary to make up on the 440-mile electric run fully two hours of the time lost by passenger trains on adjoining steam engine divisions. While the results obtained upon the Chicago, Milwaukee & St. Paul were perhaps more spectacular due to the greater mileage electrifically equipped, other electrified roads contributed similarly attractive records. The reliability and permanency of the comparison between steam and electric locomotive haulage is sufficiently guaranteed therefore by the results of several years' operation, to justify drawing certain conclusions regarding the merits of the two types of motive power. The following analysis of the railway situation is therefore offered for the purpose of exposing the fact that railroading today is in reality steam engine railroading and the general introduction of the electric locomotive will permit fundamental and far-reaching changes being made in the method and cost of hauling freight and passenger trains.

The writer is not proposing the immediate electrification of all the railways in the United States, as many roads of lean tonnage would render no adequate return upon the large

*Abstract of an address delivered before the Schenectady section of the American Institute of Electrical Engineers.

capital investment required, but offers the following table of total operating statistics simply as a measure of the magnitude of the problem confronting us in the future. In this country it should be noted, however, that we have already installed electric power stations during the past 30 years equal to twice the estimated capacity required for the electrical operation of every mile of track in the country today.

The tonnage passing over the tracks of our railways may be subdivided in a most interesting manner as shown in Table I

TABLE I

TOTAL TON-MILE MOVEMENT

All Railways in United States Year 1918.

		Per cent	Ton miles
1	Misc frt cars and contents	42.3	515,000,000,000
2	Revenue coal cars and contents	16.23	197,000,000,000
3	Loco. revenue driver wt only	10.90	132,300,000,000
4	Passenger cars all classes	16.13	196,000,000,000
	Total revenue frt. and passenger	85.56	1,040,300,000,000
5	Railway coal	5.00	60,600,000,000
6	Tenders all classes	6.50	78,800,000,000
7	Locomotive railway coal	.39	4,700,000,000
8	Locomotive non-driving wt	2.55	31,000,000,000
	Total non-revenue	14.44	175,100,000,000
	Grand total—all classes	100.00	1,215,400,000,000

The first four items, representing 85.56 per cent of the total ton miles made during the year 1918 may be regarded as fundamentally common to both steam and electric operation. The last four items, however, are seriously affected by introducing the electric locomotive to the extent of completely eliminating items 6 and 7, reducing item 5 by possibly 80 per cent and item 8 by one half. Of the total of 14.64 per cent affected, therefore, it may be assumed for purposes of comparison that approximately 12 per cent or 146,000,000,000 ton miles at present hauled by steam engines over our roads will be totally eliminated with electric locomotive haulage. This ton mileage eliminated is equal to over 20 per cent of items 1 and 2 representing the revenue producing freight traffic on our railways. In other words, if all our railways were completely electrified they could carry one-fifth more revenue producing freight tonnage with no change in present operating expenses or track congestion.

It is evident that the greater part of the tonnage reduction effected by electrification is included in items 5 and 6 representing the railway coal movement in cars and engine tenders. The steam engine tender will, of course, entirely disappear while the railway coal haulage will be largely curtailed by utilization of water as a source of power and the establishment of steam power houses as near the coal mines as an abundant supply of good condensing water and load demand will permit. While water power should be utilized to the fullest economical extent, the greater portion of the railway power must undoubtedly be supplied by coal, due to the unequal geographical distribution of water power available.

Two-Thirds of the Coal Wasted

Even with coal as a source of power, it may not be fully appreciated just how enormous is the saving made by burning fuel in large modern power stations under the most efficient conditions possible, instead of under the boilers of 36,000 engines, which by necessity must be designed and operated for service rather than for fuel economy. During the year 1918 the fuel used by railways is reported as shown in Table II:

TABLE II

Railway Fuel 1918

Total coal production—all grades	678,211,000 tons
Used by steam railways	163,000,000 tons
Percentage of total	24 per cent
Total oil marketed U. S.	355,927,000 bbls.
Used by steam railways	45,700,000 bbls.
Percentage of total	5.8 per cent
Coal equivalent of oil at 3½ bbls	13,000,000 tons
Total equivalent railway coal	176,000,000 tons

A quarter of all the coal mined in the United States is consumed on our railways and the following analysis will point out some features of this extreme wastefulness which are inseparable from steam engine operation.

During the year 1910, exhaustive tests were made upon the Rocky Mountain division of the C., M. & St. P. to determine the relation existing between horse power hours work done in moving trains and coal and water consumed on the steam engines in service. The summary, Table III, gives the result of these tests.

TABLE III

C. M. & ST. P. ROCKY MOUNTAIN DIVISION

Coal and Water Used

	Water per hp.	Water per lb. coal	Coal per hp. hr.
Three Forks-Piedmont	39.6	5.08	7.75
Piedmont-Donald	35.4	4.70	7.54
Deer Lodge-Butte	39.7	4.85	8.31
Butte-Donald	40.4	4.86	8.74
Harlowton-Jenny	38.0	4.09	8.90
Jenny-Summit	44.2	4.65	9.48
Three Forks-Piedmont	41.4	6.51	6.37
Piedmont-Donald	40.2	5.63	5.78
Average of 8 tests	39.86	5.04	7.86

The above records were obtained during the portion of the runs that the engines were doing useful work in overcoming train and grade resistance, that is, all stand-by losses were excluded. The through run, however, included such losses in the following magnitude.

Adding standby losses to the average of 7.86 lb. per hp. obtained in the preceding eight tests, the total actual coal consumed under the engine boiler in 24 hours divided by the actual work performed by the engine was found to be 10.18 lb. per hp. at the driver rims.

TABLE IV

STANDBY LOSSES

	Coal per hour
Fire banked in roundhouse	150 lb.
Cleaning fires for starting	800 lb.
Coasting down grade	950 lb.
Standing on passing track	500 lb.

As the result of this particular series of tests it was determined that standby losses raised the coal consumed while doing useful work by 30 per cent. It should be appreciated in this connection, moreover, that this value was obtained on through runs with no yard switching service or adverse climatic conditions. It may be concluded therefore that under all conditions of service fully one-third the coal burned on our steam engines today is absolutely wasted in standby losses of the general nature indicated above.

Supplementing these tests, a thirty-day record was kept of all coal used on the entire Rocky Mountain division and the total engine, tender and train movement reduced to horse-power hours, resulting in a value of 10.53 lb. coal consumed per hp. at the driver rims. Both the above values were based upon constants of 6 lb. per ton train resistance at all speeds and seven-tenths lb. per ton per degree of curvature as determined in part by dynamometer car tests and representative of general railway operation. Reducing the average coal values of test runs and 30-day record per hp. hour to electrical constants we arrive at the results shown in Table V.

TABLE V

COAL EQUIVALENT PER KW. HR.—STEAM OPERATION

Coal per hp. hr. at driver rims	10.27 lb.
Coal per kw. hr. at driver rims	13.75 lb.
Coal per kw. hr. at power supply on basis 55 per cent efficiency	7.56 lb.

It is this last figure of 7.56 lb. of coal burned on steam engines to get the equivalent tonnage movement of 1 kw. hr. delivered from an electric power station that is of special interest to this discussion. Comparing coal and electrical records on the Butte, Anaconda & Pacific before and after electrification results in arriving at a value of 7.17 lb. of coal previously burned on the steam engines to equal the same service now performed by one kilowatt hour input at the substations, a figure comparing favorably with 7.56 lb. above arrived at by an entirely different method.

Making due allowance for the fact that Roundup coal is somewhat low in heat units, it is nevertheless within the limits of reasonable accuracy to assume that the steam engines operating over all our railways are consuming coal at a rate

Analysis of Roundup Coal Used

Fixed carbon	49.26 per cent
Volatile carbon	38.12 per cent
Ash	7.74 per cent
Moisture	4.88 per cent
B. t. u.'s	11,899

closely approximating 12.75 lb. of coal per kilowatt hour of useful work done, as measured at the driver rims or 7 lb. per kilowatt hour as measured at a power station and including for convenience of comparison the transmission and conversion losses inherent to electrical operation.

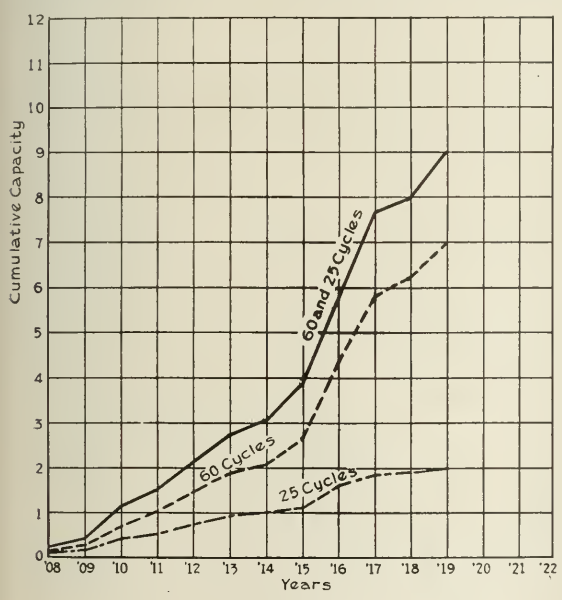
An electric kilowatt can be produced for so much less coal expenditure than 7 lb. that we are now in position finally to forecast the approximate extent of the coal economy that would result from electrification.

Table VI

Relation between kw. hr. and ton miles
C. M. & St. P. Avery-Harlowton, Year 1918

	Passenger	Freight
Average weight locomotive	300 tons	284 tons
Locomotive miles 1918	651,000	1,431,500
Loco. ton miles	195,000,000	407,000,000
Trailing ton miles	434,406,000	2,903,099,000
Total ton miles	629,406,000	3,310,049,000
Kilowatt hours	24,890,000	105,287,000
Watt hrs. per ton mile	39.6	31.9
Ratio loco. to total	31%	12.3%
Watt hrs. per ton mile combined movement	33.2	
Ratio loco. to total combined movement	15.25%	

All power values (Table VI) are given at the point of supply from the Montana Power Company at 100,000 volts,



Comparative Sales of 60 and 25 Cycle Turbines

and include deductions made for the return of power due to regenerative braking of the electric locomotives on down grades and amounting to approximately 14 per cent of the total. Owing to the excessive rise and fall of the profile of the electrified zone of the C., M. & St. P., its operation is materially benefited by regenerative electric braking and the value of 33.2 watt hours per ton mile for combined and passenger movement should possibly be raised to the round figure of 40 to make it apply more nearly to conditions universally obtaining on more regular profiles.

Hence referring again to the ton mile values of Table I:

Total ton miles 1918	1,215,400,000,000
Watt hrs. ton mile	40
Kw. hrs. total movement	48,700,000,000
Coal required at 7 lb. per kw. hr	170,000,000 tons

The actual equivalent coal consumed on our steam railways for the year 1918 is given as 176,000,000 tons, closely approximating the figure of 170,000,000 tons estimated above from the operating results obtained on the C., M. & St. P. electrified zone. These several values check so closely as to justify the completion of the fuel analysis of the railways, Table VII.

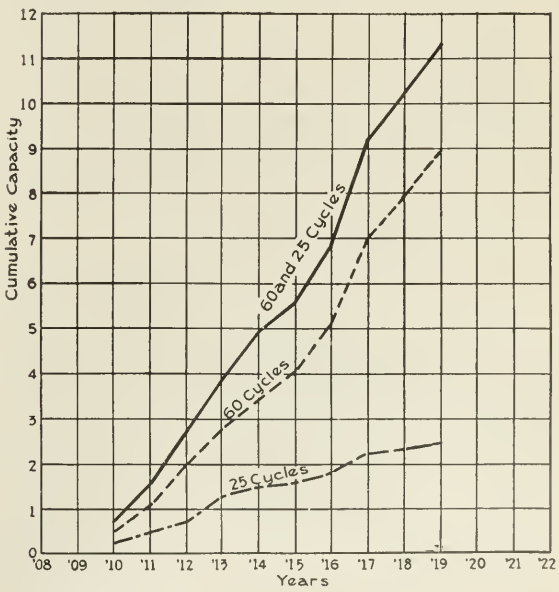
Table VII

Coal saving by electrification

Total ton miles steam	1,215,400,000,000
Reduction by electrification	146,000,000,000
Total ton miles electric	1,069,400,000,000
Kw. hrs. electric at 40 watts	42,776,000,000
Coal on basis 2½ lb. per kw. hr	53,500,000 tons
Equivalent railway coal 1918	176,000,000 tons
Saving by electrification	122,500,000 tons

The startling conclusion arrived at is that approximately 122,500,000 tons of coal or more than two-thirds the coal now burned on our 63,000 steam engines would have been saved during the year 1918, had the railways of the United States been completely electrified along lines fully tried out and proved successful today. This vast amount of coal is 50 per cent greater than the pre-war exports of England, and twice the total amount consumed in France for all its railways and industries. Moreover, the estimate is probably too conservative, as no allowance has been made for the extensive utilization of water power which can be developed to produce power more cheaply than by coal in many favored localities.

From figures given, the following conclusion is arrived at



Comparative Sales of 60 and 25 Cycle Transformers

in the matter of power station capacity required for complete electrification of the railways in the United States.

Railway Power Required

Kw. hr. electric operation 1918	42,776,000,000 kw. hr.
Average load 100 per cent load factor	4,875,000 kw.
Power station capacity at 50 per cent load factor	9,750,000 kw.

It appears therefore that approximately 10,000,000 kw. power station capacity would have been sufficient to run all the railroads for the year 1918, or one-half the station capacity which has been constructed during the past thirty years.

In order of magnitude, therefore, it is not such a formidable problem to consider the matter of power supply for our electrified railways, and it becomes evident also that the railway power demand will be secondary to industrial and miscellaneous requirements.

Such being the case, the question of frequency of electric power supply becomes of great importance, if full benefit is to be obtained from extensive interconnected generating and transmission systems, covering the entire country. Indeed, with the full development of interconnected power systems supplying both railway and industrial load from the same transmission wires, the above assumption of 50 per cent load factor for the railway load can be materially bettered.

TABLE VIII

ESTIMATED POWER STATION CAPACITY UNITED STATES YEAR 1918

Central stations	9,000,000 kw.
Electric railways	3,000,000 kw.
Isolated plants	8,000,000 kw.
Total	20,000,000 kw.

In this connection a method of limiting the troublesome peak load hitherto considered inherent to railway power supply has been in successful operation on the electrified C., M. & St. P. zone for the past year. With unrestrained peaks, the load factor was approximately 40 per cent, but this low value has been raised to nearly 60 per cent by the installation of this inexpensive and most satisfactory device, known as the power limiting and indicating apparatus.

TABLE IX.

LOAD FACTOR RECORDS, C. M. & ST. P., 1919.

	Duration of peak, per cent	Load factor, per cent
April	6.4	59.3
May	4.6	56.1
June	1.6	56.5
July	0.7	55.6
August	4.1	54.7
September	9.5	58.8

The above readings cover the performance on the 220 miles of the Rocky Mountain division supplied by seven substations controlled as a unit. A load factor of nearly 60 per cent brings the electric railway within the list of desirable customers and makes it possible for power companies to quote attractively low rates for power.

Returning again to the question of power supply, it is instructive to note the general trend toward a higher frequency as evidenced by the turbine and transformer sales of the General Electric Company during the past decade.

It is quite evident that 60 cycles is rapidly becoming the standard frequency in America and many instances are of record where it has replaced lower frequencies, principally 25 cycles. This fact in no manner handicaps the future development of electric railways, as entirely satisfactory power can be obtained from 60 cycle transmission lines through rotary converters or synchronous motor generator sets, depending upon the direct current trolley voltage desired. Indeed, a growing appreciation of the declining importance of 25 cycle power generation in this country contributed largely to the demise of the single phase system as its chief claim for recognition is wiped out with the introduction of the motor generator substations required with 60-cycle supply.

From the power station standpoint, the electrification of our railroads admits but one conclusion. We have some 63,000 engines now in operation and their average combined load amounts to approximately four million horsepower at the driver rims, or only an insignificant total of 65 hp. for each engine owned. It is true that owing to shopping and for one cause or another a large proportion of these engines are not in active service at all times, still the average 24-hour output of each engine is less than 10 per cent of its rating. In the case of the C., M. & St. P. electrification, the average load of each individual electric locomotive is only 15 per cent of its continuous rating, but by supplying power to 45 electric locomotives from one transmission system, the average combined load factor is raised to nearly 60 per cent, a figure which could even be surpassed on roads of more regular profile. Furthermore, when the railway load is merged with the lighting and industrial power of the district and the whole diversified load supplied from the same 60 cycle transmission and generating system, it is quite evident that all the conditions are most favorable for the efficient production of power. In this country such an achievement will probably be governed by the laws of economic return upon the capital required, because our vast natural fuel resources are popularly regarded as inexhaustible, but in Europe there is the compelling spur of stern necessity behind the movement to economically utilize the water powers they possess in place of the coal they cannot get.

While the much discussed subject of power generation and transmission is a very vital part of the railway electrification project, chief interest centers in the electric locomotive itself. Few realize what a truly wonderful development has taken place in this connection in a comparatively few years and how peculiarly fitted this type of motive power is to meet the requirements of rail transportation. Free from the limitations of the steam boiler and possessing in the electric motor, the most efficient and flexible known means of transmitting power to the driving axles, the electric locomotive gives promise of revolutionizing present steam railway practice when its capabilities become fully recognized. The only limits placed upon the speed and hauling capacity of a single locomotive are those imposed by track alinement and standard draft rigging. Only questions of cost and expediency control the size of the locomotive that can be built and operated by one man, as there are no mechanical or electrical limitations that have not been brushed aside by careful development. Just what this means in advancing the art of railroading is as yet but faintly grasped any more than the boldest prophet of 20 years ago could have fully pictured the change that has taken place at the Grand Central terminal, as the result of replacing steam by electricity.

Progress in utilizing the capabilities of the electric locomotive has been slow. It is hard to break away from life-long railway traditions established by costly experience in many cases. In consequence, the electric locomotive has thus far simply replaced the steam engine in nearly similar operation. Even under such conditions of only partial fulfillment of its possibilities, the electric locomotive has scored such a signal operating success as to justify giving it the fullest consideration in future railway improvement plans.

On the C., M. & St. P., 42 locomotives have replaced 112 steam engines and are hauling a greater tonnage with reserve capacity for still more. On this and other roads, it has set a new standard for reliability and low cost of operation. In fact, although no official figures have yet been published, it is an open secret that the reduction in previous steam operating expenses on the C., M. & St. P. are sufficient to show an attractive return upon the twelve and a half millions expended for the 440 miles of electrification, without deducting the value of the 112 steam engines released for service elsewhere. As the electric locomotive is destined to leave its deep impression upon the development history of our railways, it is fitting that the remainder of this address should be devoted to its consideration.

Our steam engine construction is unsymmetrical in wheel arrangement, and further handicapped with the addition of a tender to haul its fuel and water supply, must run single ended. The result has been much congestion at terminals and the necessary roundhouses, always with the inevitable turntable, ash pits and coal and water facilities, have occupied much valuable land and in addition steam operation has greatly depreciated the value of neighboring real estate. The contrast offered by the two large electric terminals in New

York City is too apparent to need more than passing comment and similar results may be expected on the fulfillment of plans for electrifying the Chicago terminals.

While it has been a simple matter to design electric locomotives to run double ended at the moderate speeds required in freight service, the problem of higher speed attainment exceeding 60 miles per hour, has presented greater difficulties. The electric motor is, however, so adaptable to the needs of running gear design that electric locomotives are now in operation which can meet all the requirements of high speed

The Grand Central Terminal, New York, as It Appeared in 1906

passenger train running. These results also are obtained with less than 40,000 lb. total weight and 9,500 lb. non-spring borne or "dead" weight on each driving axle, and finally, but not least, with both front and rear trucks riding equally well, a success never before achieved in locomotives of such large capacity.

There is as yet no general acceptance of a standard design of electric locomotive. Geared side rod construction for heavy freight service and twin motors geared to a quill for passenger locomotives appear to find favor with the Westinghouse-Baldwin engineers, while the General Electric Company goes in for the simple arrangement of geared axle motors for freight and gearless motors for passenger locomotives. In both Switzerland and Italy the side rod locomotive enjoys an almost exclusive field. How much of this preference for side rod construction is due to the restrictions imposed by the use of alternating current motors is hard to determine, but the facts available indicate the uniformly higher cost of repairs of this more complicated form of mechanical drive both in this country and abroad.

The electric railway situation in Italy is further complicated by the employment of three phase induction motors with all the attendant handicaps of double overhead trolleys, low power factor, constant speeds and overheating of motors resulting from operation on ruling gradients with motors in cascade connection. In many respects the non-flexible three-phase induction motor is poorly adapted to meet the varied requirements of universal electrification, and in consequence Italian engineers are still struggling with the vexing question of system which may, however, be in a fair way of settlement through the adoption of a standard of 50 cycles as the frequency of a nation wide interconnected power supply, thus throwing the preponderance of advantages to high voltage direct current.

Low Cost of Maintenance

The extreme simplicity of the gearless motor locomotive appeals to many as does its enviable record of low maintenance cost, reliability and high operating efficiency, as exemplified by its unvarying performance in the electrified zone of the New York Central for the past twelve years.

The Grand Central Terminal, New York, as It Appears Since It Was Electrified

TABLE X

MAINTENANCE COSTS, NEW YORK CENTRAL

	1913	1914	1915	1916	1917	1918
Number locomotives owned	48	62	63	63	73	73
Average weight, tons	118	118	118	118	118	118
Cost repairs per locomotive mile (cents)	4.32	4.03	4.45	3.78	4.01	6.26

The high cost of living did not appear to have reached this favored locomotive until the year 1918.

The records on the C., M. & St. P. locomotive are equally remarkable when considering their greater weight and more severe character of the service.

TABLE XI
LOCOMOTIVE MAINTENANCE COSTS, C. M. & ST. P.

	1916	1917	1918
Number locomotives owned	20	44	45
Average weight, tons	290	290	290
Cost repairs per locomotive mile (cents)	8.21	9.62	10.87

In both these instances the cost of repairs approaches closely to 3c per 100 tons of locomotive weight. Giving due credit to the excellent repair shop service rendered in each case, it is instructive to note that 3c per 100 tons maintenance costs of these direct current locomotives is less than half the figures given for any of the alternating current locomotives operating in the United States or in Europe.

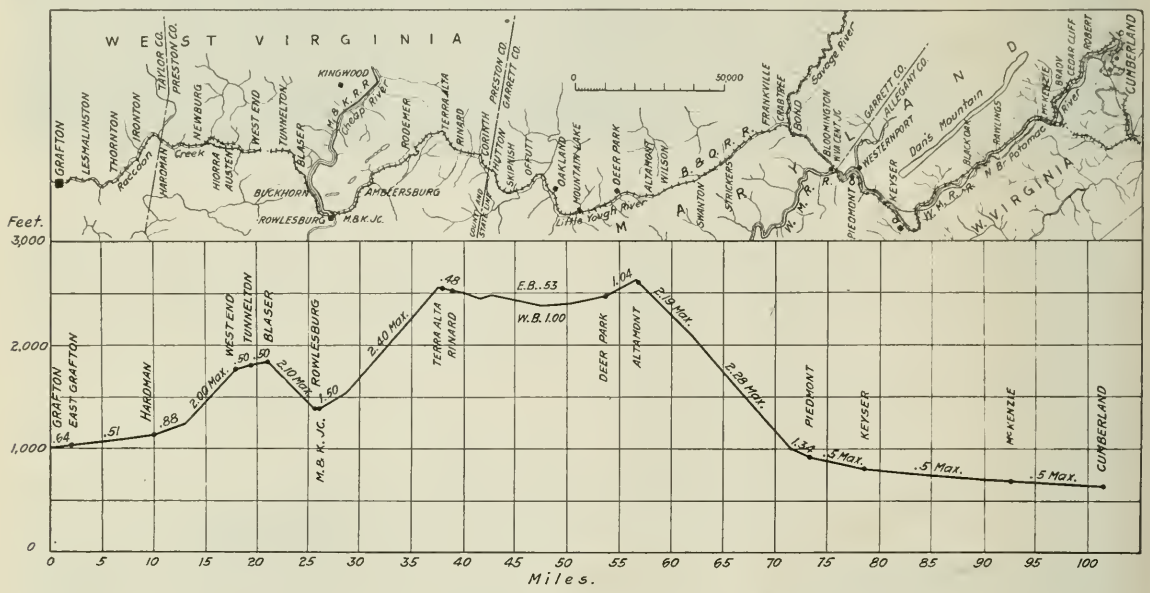
Compared with the cost of repairs of equivalent steam engines, the above figures for electric locomotives are so very favorable as to justify the general statement that electric motive power can be maintained for approximately one-third the cost of steam engines for the same train tonnage handled. As locomotive maintenance is a measure of reliability in service and in a way expresses the number of engine failures, it is quite in keeping with the records available to state also that the electric locomotive has introduced a new standard of reliability that effects material savings in engine and train crew expense as well.

Electrification and Operating Costs

While the first cost of electrification is admittedly high, it may in certain instances be the cheapest way to increase the tonnage carrying capacity of a single track, especially in mountain districts where construction is most expensive and steam engine operation most severely handicapped. In this connection a comparison of steam and electric operation on the C., M. & St. P. may be summarized as follows:

For the same freight tonnage handled over the Rocky Mountain division, electric operation has effected a reduction of 22½ per cent in the number of trains, 24.5 per cent in the average time per train and has improved the operating conditions so that nearly 50 per cent more tonnage can be handled by electric operation in about 80 per cent of the time it formerly took to handle the lesser tonnage by steam engines. This means a material increase in capacity of this single track line which may be conservatively estimated in the order of at least 50 per cent and probably more. In other words, on this particular road, electrification has effected economies which sufficiently justify the capital expenditure incurred and furthermore has postponed for an indefinite period any necessity for constructing a second track through this difficult mountainous country.

A careful study of the seriously congested tracks of the Baltimore & Ohio, between Grafton and Cumberland, disclosed vitally interesting facts. Company coal movement in coal cars and engine tenders constituted over 11 per cent of the total ton miles passing over the tracks. In other words, due to the very broken profile of this division, the equivalent of one train in every nine is required to haul the coal burned on the engines. Taking advantage of this fact and the higher speed and hauling capacity of the electric locomotive and its freedom from delays due to taking on water and fuel, it is estimated that the three tracks now badly congested with present steam engine tonnage, could carry 80 per cent more freight with electric locomotive operation. The coal output of the Fairmont district is largely restricted by the congestion of this division and it is probable that equal relief with continued steam engine operation could not be secured without the expenditure of a much larger sum for additional track facilities than would be needed to put electric locomotives upon the present tracks.



Map and Profile of the Cumberland Division of the Baltimore & Ohio

Further instances could be cited where the benefits of electrification are badly needed and many of these are coal carrying roads, among which the Virginian Railway stands out conspicuously as a good opportunity to make both a necessary improvement and a sound investment.

Reviewing the progress made in a short twenty years, we have seen the steam turbine and electric generator drive the reciprocating engine from the stationary power field. The same replacement is now taking place on our ships, big and small, notwithstanding the fact that the marine reciprocating engine is a very good engine, indeed, and operates under the

ideal conditions of a steady load and constant speed. And now the steam locomotive must in turn give way to the electric motor for the same good reasons that the reciprocating steam locomotive has become obsolete and fails to respond to our advancing needs. Electrification affords a cheaper and better means of securing increased track capacity and improved service than by laying more rails and continuing the operation of still more steam engines in the same old wasteful way.

To conclude the startling picture of our present railway inefficiency, we are today wasting enough fuel on our steam engines to pay interest charges on the cost of completely electrifying all the railways in the United States, fuel that Europe stands in sad need of and which England and Germany, the pre-war coal exporting countries, cannot now supply. With operating expenses mounting to 82 per cent of revenue, in addition to constructive legislation and real cooperation on the part of the government in the matter of rates and safe guarding invested capital, is wise direction in the expenditure of the large sums that must speedily be found and used to bring our railways abreast of the times. Accord full honor to the reciprocating steam engine for the great part it has played in the development of our railways and industries, but complete the work by replacing it with the electric motor and enter upon a new era of real railroading.

Winter Railroading in the East and Canada

THE RAILROADS and Old Boreas are having unusual combats in all quarters this year. The Reid-Newfoundland Railway (narrow gage), 546 miles long, reported last week an "express" train as reaching destination three weeks late. Some of the snow drifts required days of shoveling and the passengers reported that rations ran short; at times fish was about all they had to eat. At St. John, New Brunswick, 1,100 freight cars in the yards of the Canadian National Railways were so buried in snow and ice that only by hand-shoveling and picking by large gangs of men for many days were they extricated.

From the central part of Canada, which has large forces of experienced snow fighters, we have no unusual reports; but out in Alberta a trainload of passengers who arrived in Edmonton on Sunday, January 25, six days behind schedule, had such a serious time that they gave the newspapers long and detailed accounts of their sufferings supported by affidavits. This was on the Edmonton, Dunvegan & British Columbia, a line which extends from Edmonton about 400 miles up toward the North Pole. That region is so thinly populated that the one passenger train of this railroad runs only twice a week. Passengers in stations suffered from cold, and then, on boarding the trains, complained of lack of drinking water. The thermometer went to 60 below zero, Fahrenheit, and, according to a mechanical engineer who was on the train, the locomotives were all leaky or otherwise out of order, and five of them together failed to keep the passenger cars warm. At McLennan, the junction of the Peace river and the Spirit river lines, passengers waiting for the connecting train had to go to dwellings some distance away to get warm. One local newspaper prints the names of 67 passengers who signed a statement setting forth their discomforts. This road is also in difficulties in regard to freight, grain dealers complaining to the Canadian government that wheat to the amount of a million bushels is liable to be spoiled by moisture because of lack of freight cars unless relief is forthcoming without delay.

On Monday, February 16, northern New York and a large part of New England were visited by a heavy snowstorm, accompanied by high wind and low temperatures, and freight traffic was almost paralyzed before it had fully recovered from the difficulties of the storm of 10 days previous. On some branches and minor lines all traffic, both passenger and freight, was suspended for 12 to 24 hours or more. At Syracuse, N. Y., the thermometer registered 10 degrees below zero, and all railroad lines north of that city were reported on Monday as having no trains moving. Scores of trains were stalled in drifts, and some small villages had most of their food supplies eaten up by passengers. The main line of the New York Central was kept open only by the most heroic efforts all the way from Albany, N. Y., westward to Ashtabula, Ohio. High-class freight was kept moving with a considerable degree of success, but the heavy freight trains were motionless. Buffalo reported six inches of snow and a high wind, with trains many hours late from the south, east and west by all roads. Auburn, N. Y., reported no passenger trains in or out on Monday. This storm followed a thaw, and consequently switches were frozen at innumerable places.

On Tuesday there was a decided rise in temperature, and conditions were much improved.

In the storm of February 4-5 the difficulties in New England were worst in southeastern Massachusetts and in Rhode Island; but on the 16th trains were badly delayed in western Massachusetts and in Vermont and New Hampshire. From Concord, N. H., it was reported that the Boston & Maine was experiencing its worst tie-up in years. There, as in New York, the weather had been mild on Sunday, and on Monday switches and side tracks were frozen solid.

The New York, New Haven & Hartford had hard work not only in eastern Massachusetts but also on its line west of the Hudson river (the Central New England). Prior to the storm of February 4 the depth of snow on the ground was about 12 inches. Snow, sleet, rain and warm weather alternated for ten days and on February 15 a quick drop in temperature froze ice over the rails in many places throughout the company's lines. Some through passenger trains reached their destinations 24 hours behind time. As noted last week, many less important runs had to be omitted altogether.

In New England, as well as along the lines of the New York Central, the demands of cities for men in cleaning streets, and the general high wages paid to laborers, made very difficult the task of securing help. The New Haven road took about 1,300 men out of freight houses to handle shovels and picks, and about 1,700 were furnished by industries adjacent to the railroad, these latter being used largely to help in clearing freight yards and tracks other than the important main tracks. Altogether, the New Haven had nearly 8,000 men engaged in shoveling and picking. Train crews did a good deal of shoveling, and officers ran engines and snowplows.

Where the ice was thick the snowplows and flangers were almost useless and pneumatic tie-tampers were fitted with prone picks and used with considerable success in clearing switches. Three heavy Jordan spreaders were fitted with steel teeth on their nose-pieces and were successfully used in clearing the rails. These special expedients for dealing with ice were used mainly in and around Providence, R. I., where the ice formation was the worst. A statement credited to the Regional Director says that, in face of the adverse conditions, the New Haven road did wonderfully efficient work toward recovery.

On Tuesday, the 17th, the southern part of Michigan was reported as in the grip of the winter's worst storm, many trains being stalled in snowdrifts on the Pere Marquette and the Grand Rapids & Indiana.

In the region of New York City delays to trains because of obstructed tracks were less serious than farther north; but large numbers of freight cars had to be held many hours, and even days, because of difficulties of delivering in the

city, where the trucking of freight was paralyzed worse than before for 30 years because of snow and ice in the streets. The milk supply was seriously curtailed for one day.

Labor Threatens Congress

A THREAT OF DEFEAT for every member of Congress who votes for the conferees' report on the railroad bill was contained in a communication received February 13 by members of Congress from the Plumb Plan League.

"We say to you very frankly that labor is thoroughly aroused to the menacing potentialities of pending railroad legislation," the communication said, "and it regards with great alarm, and not without justification, the evil effects that will flow to the public and particularly to the workers if this compromise measure is enacted.

"Labor contends that this legislation has been framed solely with one interest in view—the aggrandizement of a powerful financial group—and that the public welfare will be best served by retaining the railroads under government control for a period of not less than two years, permitting fuller consideration and more equitable solution of this vexing problem."

The attention of Congressmen is called to the statement sent to editors by Mr. Hines, with the following comment:

"It is an illuminating resume of the direct benefits that were attained during the period of government control of railroads and sharply refutes much of the misrepresentation that has been disseminated by advocates of private control."

The League also sent copies of "Labor," the Plumb plan newspaper, containing an editorial denouncing the rate-making and labor provisions of the bill as agreed on by the conferees.

As to the labor provisions, the following comment was made: "Congress is being asked to adopt as a substitute for the vicious anti-strike clause of the Cummins bill a provision for adjustment of labor disputes. This is so crudely drawn and is so manifestly unfair to labor that it will add to our industrial difficulties instead of decreasing them."

Declaring that "a more colossal fraud was never perpetrated on a free people," the reference being to the rate-making and financial provisions of the conferees' bill, the editorial closes as follows: "Every man who votes for the conference report should be marked by his constituents and retired to private life at the first opportunity."

The announcement of a tentative agreement with the President on a plan for settling the wage controversy and the President's statement that federal control would end "in 16 days" caused no let-up in the campaign of the labor organizations to force a continuation of government control through the medium of Congressional action. A conference of representatives of the American Federation of Labor and the railroad labor organizations with members of the House friendly to labor was held at the capital on the evening of February 17, at which labor reiterated its demands for an extension of government control for two years and its opposition to the labor provisions in the pending bill. While the conference was in session, however, word was received of the latest change in the labor provisions of the bill adopted during the day by the conference committee at the suggestion of Director General Hines, so that disputes which threaten to tie up interstate commerce must be referred to a board of labor appeals appointed by the President, including three representatives of the public, and with a provision that a majority decision to be binding must be subscribed to by at least one of the public representatives.

Frank Morrison, secretary of the American Federation of Labor, who was presiding, then suggested that the conference adjourn subject to call after the report had been thoroughly studied.

The new plan adopted by the conference "won't work," said W. N. Doak, vice-president of the Brotherhood of Railroad Trainmen. "It might as well not be created. If you want chaos in the country among these men you will get it with this sort of thing."

B. M. Jewell, acting president of the railroad employees department of the American Federation of Labor, was also quoted as saying that the railroad workers "want to get out from under an appeal board and don't want any more boards created."

Among the other labor officials present were Timothy Shea, acting president of the Brotherhood of Locomotive Firemen; L. E. Sheppard, president of the Order of Railroad Conductors; J. J. Forrester, president of the Brotherhood of Railway Clerks; W. H. Johnston, president of the International Association of Machinists; E. J. Manion, president of the Order of Railway Telegraphers; Martin J. Ryan, president of the Brotherhood of Railroad Carmen, and C. J. McGowan, acting assistant president of the Brotherhood of Boilermakers and Iron Shipbuilders.

Among the Congressmen were: Republicans—Zihlman, Maryland; Nolan, California; Murphy, Ohio; Burks, Pennsylvania; Sinclair, North Dakota; Baer, North Dakota; Strong, Kansas; Cole, Ohio; Garland, Pennsylvania; Morin, Pennsylvania; Ricketts, Ohio. Democrats—Huddleston, Alabama; Ayers, Kansas; Sherwood, Ohio; Bankhead, Alabama; Casey, Pennsylvania. Independent—Keller, Minnesota; Carss, Minnesota; Kelly, Pennsylvania.

Resolutions were adopted declaring that the labor officers have never endorsed or approved of either the Esch or Cummins bill, except that part of the Esch bill known as the Anderson amendment, which would confirm for the future all wage orders of the Railroad Administration until superseded by mutual agreement or by the decision of a bi-partisan board. The resolutions also said: "All classes of employees can be properly represented on three boards of adjustment, and by three commissions on labor disputes, and there is no necessity for additional boards. The present bona fide and regular labor employees' organizations have protected, and will properly protect, all railway employees. The creation of additional boards will cause confusion and create friction, thereby interfering with the present orderly process of disposing of labor disputes. Suppose the conferees recommend to Congress for adoption a bill that contains provisions for the settlement of disputes between railroads and employees different than herein stated, we must urge that the proposed law be defeated in its entirety."

A final protest against the return of the roads was made in a letter addressed to members of Congress on Tuesday by the heads of fourteen railroad labor organizations, declaring that "receiverships are inevitable if the railroads are unscrambled and each left to shift for itself" and that this situation may easily lead to "world-wide bankruptcy." Generally the labor organizations have taken the position that the pending railroad bill would put the roads "On Easy Street." Calling attention to the "colossal savings economies and efficiencies" under federal operation the letter says a reversion to private management will mean an increase in freight rates of from 25 to 50 per cent. "A matter of vital interest" it continues, "is the enlisting of the employees so that they will work harmoniously, willingly and efficiently. It is a colossal waste to exclude from railway operations the contributions of 2,000,000 men with lifelong experience in the railway industry."

NEW COAL DISCOVERIES have been made in southern Chile. One of these, near La Union, is estimated to contain 40,000,000 tons, and a special railway is being built to the Rapallo Station.

New Tribunal Proposed to Settle Wage Demands

President and Mr. Hines Refuse Decision Before March 1, But Persuade Employees to Await Investigation

WASHINGTON, D. C.

PRESIDENT WILSON has averted the strike of the maintenance of way employees ordered for February 17, but the troublesome and persistent question of railroad wages, like the rate question and several others, has been put over for settlement after the return of the railroads to private ownership. The answer of the President given to the railroad labor organizations on February 13, in accordance with the recommendations submitted to him in a report by Director General Hines, does not settle the matter, but postpones the issue for further investigation and for a decision by a new tribunal which will function after the relinquishment of the railroads. Just what this tribunal will be and how much has been settled was left somewhat in doubt by the manner of the announcement, but the conferees on the railroad bill rewrote the labor provisions on Monday for the purpose of insuring that it will be the proposed board of labor appeals. After stating the "unalterable position of the government" the President announced the steps he proposed to carry out. The reply of the labor leaders was not quite responsive to his statement, but outlined the steps they proposed to carry out.

President Wilson repeated his statement of last August that a temporary basis of living cost ought not to be made the occasion for a permanent wage increase, but in order that the consideration of wage matters should not be postponed indefinitely he proposed to bring about the earliest practicable organization of any machinery provided by the pending railroad legislation for dealing with wage matters or, in the event that no such provision is made by law, to use his influence to get the companies and the employees to agree on a special tribunal to settle the matter. He also promised to constitute a committee of experts to begin an immediate investigation of the entire problem for the purpose of expediting its solution. Meanwhile he requested that the organization which had a strike order outstanding withdraw it immediately.

To this the labor leaders replied objecting to waiting for the creation of a tribunal by legislation but tentatively accepting the proposal for the creation of a tribunal joint agreement of the railroads and the employees by promising to submit it to their constituencies at a meeting called for February 23 at Washington with certain conditions, including one that a binding decision be handed down within 60 days after the agreement to establish the tribunal. They asked that meanwhile the President secure the agreement of the railway executives and they specified that the special commission should be composed of an equal number of representatives selected by each side. Director General Hines on Monday telegraphed to T. De Witt Cuyler, chairman of the Association of Railway Executives, asking him to designate a committee to meet at Washington with Railroad Administration officials to discuss "railroad wage questions and related subjects."

As it is likely that the Esch-Cummins bill which provides machinery for the settlement of wage disputes, including a board representing the public, will become a law about as soon as any plan agreed upon at a meeting on February 23 could be put into effect, there appears to be a question as to whether the law can be forestalled in the way suggested by the labor leaders. As the President later referred to their reply as "indicating the purpose of the organizations generally to conform to the principles" of his message, he apparently did not consider their interpretation of his proposal as any usurpation of executive authority.

Mr. Hines conferred on Sunday with Senator Cummins and submitted a revised draft of the labor provisions of the bill intended to make sure that it will fit the present case and this was adopted with some modification on Monday by the Conference Committee. Therefore unless the President should anticipate the legislation by the creation of an independent tribunal the wage question will be referred to a board composed of three representatives of the public, three of the railroads and three of the employees, with a provision that a majority decision to be binding shall be subscribed to by at least one of the public representatives.

Although neither the President nor Mr. Hines yielded to the renewed demands for further increases in wages, it turns out that the statement published last week that they had refused them, which was based on information that they had neither given nor promised any higher rates of pay, was somewhat too positive. They did refuse to accede to the demands, but they did so by declining to render a final decision as insisted upon by the labor officers during the short remaining period of federal control. Director General Hines said in his report that criticism of the Railroad Administration for postponing a final decision would not be warranted because "it is physically impossible for the Railroad Administration to dispose of these matters."

The President did settle the doubt which had persisted in some quarters as to whether the insistence on the wage demands might not create a situation which would lead to a further retention of the railroads by the government. This doubt had been created by positive statements by labor leaders that the roads would not be returned on March 1, but it was probably effectively dispelled by his statement that "federal control will end in 16 days," to which he added that it was proper that he reassure the employees that their claims would be properly and promptly disposed of.

By giving a new lease of life to the wage demands the President also settled for the time being the newspaper talk about a general railroad strike. The officers of 14 of the 15 organizations that had presented demands, only two of which had threatened a strike, promptly accepted the President's proposals, with some interpretations of their own. These included W. G. Lee of the Brotherhood of Railroad Trainmen, who had ordered a strike vote and had served a 30-day notice upon the Railroad Administration. The fifteenth organization was the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers, which had definitely ordered a strike for February 17, and which did not join with the other organizations in replying to the President's proposal. The strike order was not postponed until after Mr. Hines had followed the President's statement with a strong telegram to President Barker of the maintenance employees' organization, informing him that such a strike would merely cause a loss of the brotherhood's status, after the President had sent him another telegram, and after the officers of the other organization had brought considerable pressure to bear upon him.

Mr. Barker telegraphed Mr. Hines Saturday night that the strike had been indefinitely postponed in compliance with recommendations of the brotherhood's committee at Washington.

The plan of settlement announced from the White House on Saturday, February 14, leaves the railroad wage question about where it was when the railroads were taken over in December, 1917. At that time practically all classes of railroad employees were demanding increases in wages to keep

pace with the increased cost of living or with increases which some of the classes had already received. When the demands were later presented before the Railroad Wage Commission the commission estimated that they amounted to about one billion dollars a year. At the present time the railroads are confronted with more demands from practically all classes of railroad labor, amounting to something like a billion dollars a year, to meet the higher cost of living and to establish proper relationships between various classes. In 1917 there was no established tribunal ready to pass upon the question, but it had been left in the hands of the President by the railroad executives and with some reservations by the labor unions.

At that time the railroads were awaiting a decision from the Interstate Commerce Commission on their application for an increase in rates to help them pay for wage advances they had already made. For some time now the railroad companies have been preparing to ask the commission for another increase in rates to enable them to pay for the wage increases as well as other advances in operating costs that have been made during the past two years. The principal points of difference in the situation as it exists today and as it was at the end of 1917 is that both the rate base and the wage base from which calculations now must start are higher than they were, the rate base being about 30 per cent higher and the wage base about 50 per cent higher. However, the provisions of the Esch-Cummins bill, reported to Congress this week, and the fact that all wage advances since 1917 have been made by governmental authority, give a greater degree of assurance than has existed heretofore that any new ones will be reflected in the rate level.

No authoritative estimate of the total wage increase demanded has been made, but Director General Hines in his report says his wage board has estimated that merely to equalize all employees on the basis of the average increase of a group of 5 per cent of the employees would cost $375,000,000 a year and that even this small group as well as the others is now demanding large additional increases.

As announced in last week's issue, President Wilson received a committee representing the 15 organizations of railroad employees (although there was some question as to whether it was authorized to represent the maintenance of way employees) at their request on the south portico of the White House on February 13. He handed them a prepared statement containing his answer to their demands and his proposals, based on a report and recommendations submitted to him by Director General Hines on the day before, together with communications representing the demands of the 15 organizations. This was the first personal conference that the President has held since his illness with any one but members of his family, physicians, visiting royalty and one or two of his closest associates.

Timothy Shea, president of the Brotherhood of Locomotive Firemen and Enginemen; B. M. Jewell, acting president of the Railway Employees' Department of the American Federation of Labor, and E. J. Manion, president of the Order of Railroad Telegraphers, who constituted the committee, talked with the President for 5 or 10 minutes and went away promising to submit a reply within 24 hours. Meanwhile J. B. Malloy and a committee representing the maintenance of way brotherhood and W. G. Lee and a committee representing the trainmen, who had placed their organizations on a slightly different basis from the others by ordering a strike in the case of the first organization, and by breaking off the agreement in the case of the second, had called on Director General Hines, who had promised to give them each a reply in writing, taking the same position as that announced by the President.

The labor executives except those representing the maintenance of way brotherhood held a series of conferences at the American Federation of Labor building and drafted their reply to the President, which was submitted to him shortly after noon on Saturday, after which it was given out, together with copies of the President's statement, Mr. Hines' report to him and some of the correspondence between Mr. Hines and the 15 organizations.

President Wilson's statement of February 13 was as follows:

President Wilson Proposes New Wage Tribunal

I address you as the chief executives of the largest railroad organizations, which are among the most important industrial democracies in the country. I ask you to bring this message and its enclosure to the attention of your members on all the railroads to the end that they, at first hand, may understand the government's view as to the present situation. I am confident that with this personal understanding on their part they will see that the position of the government is not only just to all interests, but is, indeed, unalterable, and also protects the interest of the railroad employees. The fundamental theory of labor organizations is that their membership is intelligent and capable of reaching enlightened conclusions, and I think it is of paramount importance at the present time that this great body of American citizens shall have the fullest opportunity personally to consider the national problem of railroad wages in its national aspect and shall not in the absence of this opportunity form erroneous impressions on the basis of local or fragmentary information.

I have received two letters on this general subject signed by all but two of the executives to whom this letter is addressed. I have read those letters with the greatest care and have taken them fully into consideration.

On the 25th of last August, I publicly announced the conviction that a large permanent and general increase in railroad wages ought not to be made upon the basis of the level of the cost of living then prevailing if that cost of living level were to be merely temporary, and I counselled railroad employees to hold their demands in abeyance until the time should arrive when it could reasonably be determined whether that level of the cost of living was temporary or not. They have patriotically and patiently pursued this course and in general have shown an admirable spirit in doing so.

I then anticipated and made it clear in my public statement that the time for determining whether or not the level of the cost of living was such as to be the basis of a readjustment of wages might not arrive until after the expiration of federal control and accordingly gave my assurance to the railroad employees that in that event I would continue to use the influence of the executive to see that justice was done them.

Federal control will end in 16 days and in accordance with the policy as explained to the employees, it is now eminently reasonable and proper that I take such steps as will reassure them that their claims will be properly and promptly disposed of. This is all the more necessary because inevitably the change from federal control to private control will in the absence of special provision involve delay in dealing with these matters which could not be otherwise than disquieting to the employees.

I wish, therefore, to announce to all railroad employees at this time that I propose to carry out the following steps:

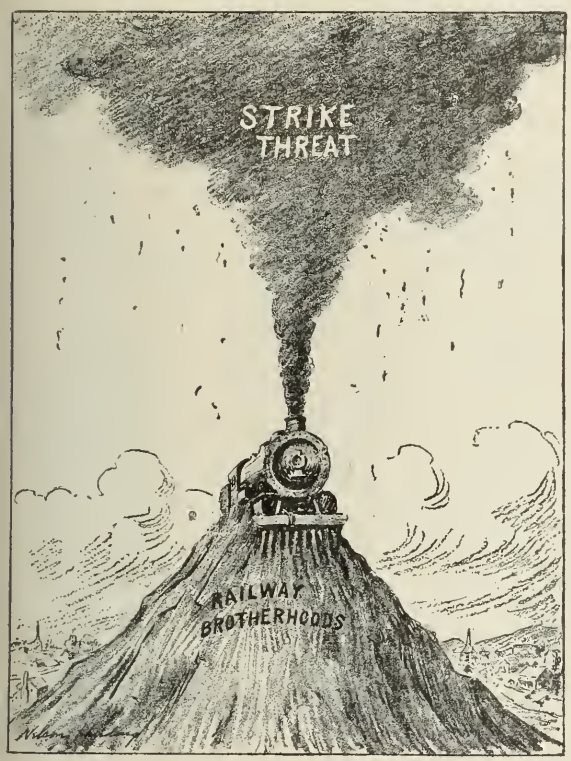
1. In the event that in connection with the return to private control provision shall be made by law for machinery for dealing with railroad wage matters I shall promptly use my influence, and so far as such law confers power upon me I shall promptly exercise that power, to bring about the earliest practicable organization of the machinery thus provided.

2. In the event that no such provision is made by law for dealing with these matters I shall employ the influence of the executive to get the railroad companies and the railroad employees to join promptly in the creation of a tribunal to take up these problems and carry them to a conclusion.

3. I shall at once constitute a committee of experts to take the data already available in the various records of the United States Railroad Administration, including the records of the Lane commission, and of the Board of Railroad Wages and Working Conditions, and to analyze the same so as to develop in the shortest possible time the facts bearing upon a just and reasonable basis of wages for the various classes of railroad employees with due regard to all factors reasonably bearing upon the problem and specifically to the factors of the average of wages paid for similar or analogous labor for other industries

in this country, the cost of living, and a fair living wage, so as to get the problems in shape for the earliest possible final disposition. The views of this board will serve as a guide to me in carrying out the assurance I gave to the employees last summer that I would use the full influence of the executive to see that justice was done them and will, I believe, be a means of avoiding what might otherwise be a long-drawn out investigation of facts. While I propose to act at once in regard to this matter, and to avoid any delay in doing so, I shall, nevertheless, invite the co-operation of the railroad corporations and believe they will appreciate that it is to their interest, as well as to the public interest, to get these matters promptly settled.

I am sure it will be apparent to all reasonable men and women



From the Brooklyn Daily Eagle

Threatening Another Eruption

in railroad service that these momentous matters must be handled by an agency which can continue to function after March 1, and therefore cannot at the present stage be handled to a conclusion by the Railroad Administration.

The accompanying report which the director general of railroads has made to me makes it clear that it has been wholly impracticable for the Railroad Administration to dispose of these matters up to the present time. Not only were the demands for general wage increases necessarily held in abeyance by reason of the policy announced by the government last summer, but the demands for increases to correct inequalities were so general and far-reaching as to become in themselves demands for general wage increases and were so complex and conflicting that despite continuous application on the part of the Board of Railroad Wages and Working Conditions and the other agencies of the Railroad Administration, the subjects could not be presented for even preliminary consideration by the director general until the present month, and then in an incomplete form and with a lack of ability on the part of the wage board to reach an agreement growing out of the largely conflicting condition of the data as presented.

Not quite six months have elapsed since I expressed my belief and hope that the then high cost of living could be regarded only as temporary. This high cost of living (which in some respects has become even higher but in other respects has already begun to respond to the corrective factors which have been and are at work) is the product of innumerable influences, many of them of world-wide operation. In the nature of things these readjustments could not come with rapidity. The campaign which the government has inaugurated to aid in controlling the cost of living has been steadily gaining in momentum, will continue to be aggressively conducted, and I believe will have an increasingly beneficial effect, and this notwithstanding the fact that some of the most needed remedial measures which I recommended to Congress have not been adopted. However, preparation, consideration and disposition of these important wage matters ought not in my opinion to be postponed for a further indefinite period, and I believe the matters involved ought to be taken up and disposed of on their merits at the earliest practicable time.

Pending the consideration of these problems by the director general of railroads and by me, at least one class of railroad employees has indicated its unwillingness to await a conclusion and has announced its intention of striking. A strike of railroad employees would at any time be highly injurious to the public and particularly at this time would be harmful not only to the entire country, but to the railroad employees as well. Any interruption of transportation will of course have a serious adverse

From the N. Y. Tribune

Taking His Dog Along When He Goes for the Milk Isn't Going to Help Matters Any

effect upon the industrial life of the nation at a peculiarly critical period.

Under the circumstances, therefore, I have the right to request and I do request that any railroad labor organization which has a strike order outstanding shall withdraw such order immediately and await the orderly solution of this question. The railroad men of America have stood loyally by their government throughout the war—they must in the public interest and in their own interest continue to do so during this delicate period of readjustment.

I believe that every intelligent railroad employee will recognize

the extreme importance of continued co-operation with the government in this matter, and that any other course will prove not only a grave injury to the public, of which railroad labor is such an important part, but a serious blow to the important principle of collective bargaining and will merely delay rather than expedite the just and prompt solution of these important matters.

This was addressed to B. M. Jewell, acting president, Railway Employees' Department, American Federation of Labor; W. S. Stone, grand chief, Brotherhood of Locomotive Engineers; Timothy Shea, acting president, Brotherhood of Locomotive Firemen and Enginemen; L. E. Sheppard, president, Order of Railway Conductors; W. G. Lee, president, Brotherhood of Railway Trainmen; S. E. Heberling, president, Switchmen's Union of North America; E. J. Manion, president, Order of Railroad Telegraphers; James W. Kline, general president, Brother of Blacksmiths and Helpers; William H. Johnston, president, International Association of Machinists; Martin F. Ryan, general president, Brotherhood of Railway Carmen of America; Louis Weyand, acting president, Brotherhood of Boilermakers and Iron Shipbuilders; John J. Hynes, international president, Amalgamated Sheet Metal Workers International Alliance; James P. Noonan, international president, International Brotherhood of Electrical Workers; A. E. Barker, grand president, United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers; James J. Forrester, general president, Brotherhood of Railway Clerks; D. W. Holt, president, Brotherhood of Railroad Signalmen of America.

The reply sent to the President on February 14, signed by all of the above or their representatives, except Mr. Barker, was as follows:

Labor Leaders Call Meeting to Accept President's Proposal with Interpretations

We, the undersigned chief executives of the railway labor organizations signatory hereto, have been jointly conferring on your letter of February 13, and note the following conclusions have been reached by you:

1. "Consideration and disposition of these important wage matters ought not in my opinion be postponed for a further indefinite period, and I believe the matters involved ought to be taken up and disposed of on their merits at the earliest practicable time."

We understand from this that you are referring to the policy of the government as announced August 25, 1919, and that you now believe the time has arrived when prompt disposition of general wage increases for railway labor should be made. In the interest of labor in general, and especially railroad labor and railroad operation, we are extremely gratified to note that you now recognize the necessity for promptly disposing of these vexatious problems; also that you recognize that railroad labor has patriotically and loyally complied with your request of August 25, 1919.

2. We are further gratified to note that you now state that due regard shall be given "to all factors reasonably bearing upon the problem, and specifically to the factors of the average of wages paid for similar or analogous labor for other industries in this country, the cost of living, and a fair living wage."

We have been especially pleased with your recognition of these principles. It has been our feeling that the present movement has been different from what is ordinarily termed a wage movement.

We have felt that our wages should be adjusted to meet radical changes in living conditions, and that the government was morally bound to consider the situation, and to assure us as far as possible that this would be done before the termination of federal control of the railroads.

During the entire period of the war we felt and acted upon the principle that our country's emergency was not a period for demanding an improvement in our economic conditions. We have been reluctant to believe that the Railroad Administration could not finally dispose of these wage matters before the expiration of government control, and are greatly disappointed that after due consideration you also think that this is impracticable.

We understand from your letter that you have definitely decided that the subject matter must be dealt within one of the two following methods:

1. "In the event that in connection with the return to private control provision shall be made by law for machinery for dealing with railroad wage matters I shall promptly use my influence, and so far as such law confers power upon me, I shall promptly exercise that power, to bring about the earliest practicable organization of the machinery thus provided."

2. "In the event that no such provision is made by law for dealing with these matters, I shall employ the influence of the executive to get the railroad companies and the railroad employees to join promptly in the creation of a tribunal to take up these problems and carry them to a conclusion."

In this connection we have been pressing the necessity for immediate relief, and urge that you do not require us to await the creation of a tribunal by legislation to deal with this problem. We feel justified in saying that we do not believe that railroad employees will willingly accept any plan which contemplates delay.

It is our earnest conviction that the situation warrants us urging that you promptly indicate to railroad labor that you will create by agreement a special tribunal to deal with this specific and important problem.

With a full realization of our responsibilities, however, we have decided to submit to our constituencies the advisability of the creation of a special joint commission composed of an equal number of representatives selected by the railroad companies and the railroad labor organizations signatory hereto by agreement, and invested with full authority to deal with this particular controversy on the basis of the following principles:

1. Rates of pay for similar and analogous services in other industries.
2. Relation of rates of pay to increased cost of living.
3. A basic minimum living wage sufficient to maintain a railroad man's average family upon a standard of health and reasonable comfort.
4. That differentials above this basic minimum living wage be established, giving among other things due regard to skill required, responsibility assumed, and hazard incurred; decisions of this tribunal to be handed down within 60 days after agreement to establish it, and to be final and binding upon all railroads in the United States and employees whom we represent.

In compliance with your request that we submit your message and its enclosure to the memberships, we have issued a call for the necessary representatives of the organizations to meet in Washington, D. C., February 23, when your letter of February 13 and enclosure, together with the above proposal will be presented to them for consideration and determination.

Pending this action on our part, we respectfully request that you take necessary steps to place this proposal before the executives of the railway companies and secure their agreement thereto, so that when our representatives convene on February 23 we will be able to place before them a definite basis for final action.

Director General Walker D. Hines' report and recommendations, submitted to the President on February 12, were as follows:

Director General Hines' Report

Almost without exception the numerous classes of the two million railroad employees are pressing for substantial increases in wages and the very few classes not pressing such demands are insisting that their wages must be increased if the demands of other related classes are granted in whole or in part.

These demands were presented to the Railroad Administration's Board of Railroad Wages and Working Conditions, beginning with the latter part of last summer and continuing through the fall. So far as the demands were for general increases in wages, they were held in abeyance in accordance with your policy announced last summer that the permanent general wage increases ought not to be made until there had been a reasonable opportunity to determine whether the then prevailing high level of the cost of living was of a temporary character. The demands, so far as they were based on claims of inequality with other classes of railroad employees, were promptly considered by the board.

The demands of the shopmen were based largely on the cost of living and on the claim that similar employees in outside industries are receiving higher wages. The Brotherhood of Railroad Trainmen's claim was based largely on the cost of living and on the claim that the wages then paid did not constitute a living wage for the employees. The conductors demanded material increases for all classes and the continuation

of the differentials compared with the brakemen as established by the present wage orders. The clerks' organization claimed that employees represented by them had not received increases equal to those granted to the shopmen and to the telegraphers. The maintenance of way employees and enginehouse laborers claimed that they had not received equal treatment with the shop men and particularly that they had not received equal treatment with maintenance of equipment mechanics. The firemen claimed that the train and engine employees had not reecived increases proportional to those granted to shop men and referred particularly to the increases granted to carmen. The switchmen did not make any claims as to inequality, but based their request for

From the Birmingham Age-Herald

Just Help Yourself

increased wages on the cost of living and the necessity for employees having a minimum wage. The telegraphers demanded that their rates be standardized with a resulting increase to nearly all of them.

As illustrating the complexity and wide scope of these matters, the labor members of the board, in suggesting a basis they thought would bring about equalization, estimated that the cost of such equalization would be approximately $375,000,000 per annum. This figure was arrived at by taking the average monthly increase of a small group of railroad employees, embracing only about 5 per cent of the total number of railroad employees, and estimating how much additional increase in money per month it would be necessary to give the other classes of railroad employees in order to equalize on certain theories with this small group. Even this small group is now demanding large increases. This figure of $375,000,000 is much less than the employees are demanding. Broadly speaking, the increase of each one cent per hour for all railroad employees of all classes would, with allowance for incidental overtime, cost considerable in excess of $50,000,000 per year. The following indicates the principal, but not all, of the contentions advanced by the principal classes of the railroad employees involved:

The Brotherhood of Railroad Trainmen

Passenger brakemen to be increased from $120 per 30-day month to $150 for 26-day month.

Baggagemen be increased from $124.80 for 30-day month to $160 for 26-day month.

Assistant conductors be increased from $144 for 30-day month to $179 per 26-day month.

Freight brakemen in valley territory be increased from $4.08 per day to $5.88 per day with 10 per cent increase over these rates wherever the grade exceeds 1.8 per cent.

Yard foremen or conductors increased from $5.33 per day to $7.20 per day.

Yard helpers or brakemen be increased from $5 per day to $6.90 per day.

Switch tenders be increased from $4 per day to $5.90 per day.

Also time and one-half for all Sunday and holiday service.

Also guarantee 26 days' pay per month for regular employees in all classes of service.

The Order of Railway Conductors

Passenger conductors be increased from $180 per 30-day month to $225 for 26-day month.

Through freight conductors be increased from $5.40 per day to $7.65 per day in valley territory, with increases in the mountain rate from $5.81 to $8.37 per day.

Local freight rates be increased from $5.92 to $8.38 per day in valley territory, with increase in mountain rate from $6.26 to $9.13 per day.

The Brotherhood of Locomotive Firemen and Enginemen

Road freight firemen to be increased an average of $1.84 per day over present rates.

Yard freight firemen to be increased an average of $2.25 per day over present rates.

Passenger firemen to be increased from present average rate of $4.31 per day to $6.50 per day, an increase of $2.19 per day.

The Brotherhood of Locomotive Engineers

While presenting no specific requests, notice was served that the engineers desired increases in wages proportionate to any increases granted other employees.

All road employees, as distinguished from yard employees, in the four foregoing organizations, get proportionately increased pay per day when they make mileage in excess of 100 miles and in freight service get time

From the Louisville Courier-Journal

Every Knock's A Boost

and one-half for time consumed in excess of what would be required on the guaranteed speed basis, which is 12½ miles per hour.

The Switchmen's Union of America

Foremen or conductors be increased from $5.33 per day and night to $8 per night and $7.50 per day.

Helpers or brakemen be increased from $5 per day or night to $7.50 per night and $7 per day.

Switch tenders to receive same rate as helpers.

Time and one-half for Sundays and holidays.

Maintenance of Way and Enginehouse Laborers

Rate for all mechanics in the maintenance of way department to be increased from basic rate of 53 cents per hour to uniform rate of 68 cents per hour.

Rate for all trackmen and other laborers to be increased from rates

running from 38 cents to 40 cents per hour to a uniform rate throughout the United States of 50 cents per hour. The bulk of these employees now receive between 35 cents and 40 cents.

BROTHERHOOD OF RAILROAD SIGNALMEN OF AMERICA

An increase of approximately 10 cents per hour for each class of signal employees

THE BROTHERHOOD OF RAILROAD CLERKS

An increase in pay of at least 20 cents per hour, retroactive to January 1, 1920, and in addition thereto the re-establishment of differentials between certain classes of employees.

Also the immediate elimination of the 43 cents per hour maximum rate established by the present wage orders, for freight handlers and other labor in freight houses, storerooms, etc., and time and one-half for Sundays and holidays.

THE ORDER OF RAILROAD TELEGRAPHERS

That the rates received by telegraphers on the Southern Pacific—Pacific System—which was stated to be practically the highest in the United States, on any important railroad, shall be taken as a basis, the rates of all other telegraphers put on the same basis, and then an increase of 17 cents per hour added to rates so established. The equalization alone, leaving out the addition of the 17 cents per hour additional, would cost the railroads approximately $13,000,000 per annum, and the 17 cents per hour increase would mean $36,000,000 per annum additional.

SHOPMEN

Increase to approximately 85 cents per hour, for employees now generally receiving 67 cents and 72 cents per hour.

Most of these general requests were, however, held in suspense on account of the policy established in August, and instead claims were urged for smaller increases on the basis of inequalities.

As a further illustration of the difficult labor problems which confronted the Railroad Administration and which had to be handled during the period since last August, both by the board and by the divisions of operation and labor and the director general himself, I call attention to the following labor subjects of special importance which were disposed of during that period. Their disposition, in addition to taking much time of the board, had occupied the wage experts of the divisions of labor and operation, and to a considerable extent the heads of those divisions, in almost continuous conferences from the latter part of August to the end of January.

1. On September 20, 1919, and effective October 20, 1919, there was signed between the director general and the shop crafts a national agreement to remain in effect during federal control which standardized rules and working conditions for the employees working on the railroads and belonging to those organizations. It created machinery for the settlement of all disputes; made numerous other changes of importance to the employees, and provide that the agreement should not be ended except on 30 days' notice.

2. On November 22, 1919, and effective December 16, 1919, a national agreement was signed between the director general and the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers which for the first time standardized rules and working conditions for such employees, put into effect time and one-half for overtime after eight hours and established rules upon seniority, discipline, etc. The existing wage orders were incorporated in this agreement and were to be changed only as provided in the agreement, and the agreement was to be effective during federal control and provided that there would be no change in it until after 30 days' notice had been given by either party.

3. On January 13, 1920, effective January 1, 1920, a national agreement was made between the director general and the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, which standardized rules and working conditions for such employees, established time and one-half for overtime after eight hours and made various important changes in working conditions. This agreement was to remain in effect during federal control unless changed after 30 days' notice.

4. On January 22, 1920, effective February 1, 1920, a national agreement was signed between the director general and the employees represented by the Brotherhood of Railroad Signalmen of America which established time and one-half for overtime after eight hours and standardized rules and working conditions. This agreement was to be effective during federal control and was to remain in effect until abrogated on 30 days' notice by either side.

5. Effective January 16, 1920, a national agreement was signed between the director general and the International Brotherhood of Firemen and Oilers which standardized rules and working conditions for such employees and put into effect time and one-half for overtime after eight hours. This agreement was to remain in effect during federal control unless it should be changed on 30 days' notice by either side.

6. On December 15, 1919, and effective December 1, 1919, an order was made under which time and one-half for overtime was made effective for train and enginemen in slow freight service. Under this arrangement all arbitraries and special allowances formerly applicable between terminals were eliminated. Special allowances for switching and similar work at initial terminals were preserved but at the former rates. A standard held-away-from-home terminal rule was granted. This disposed of the problem which had been in dispute for many years between this class of employees and the railroad managements and which had been before the Railroad Administration in one form or another practically since its inception.

The important steps just enumerated have not only greatly improved and stabilized working conditions but have given various important classes of the employees, and especially train and enginemen and maintenance of way men, numerous benefits of substantial pecuniary value, largely in the way of additional pay for overtime aggregating perhaps from $50,000,000 to $65,000,000 per year, which they have only begun obtaining within the last one or two months.

The pending demands which I have enumerated were, as above stated, considered by the board so far as they were regarded as constituting claims of inequalities. But the claims were so extensive, rested upon such diverse and elaborate data, and were so far from consistent, that the board was not able to agree upon any recommendations whatever as to any of them and the various members were not able to submit even their individual views until the latter part of November and during the month of December. By reasons of the complexity and conflicting character of the claims, and of the diverse views of the members of the board, the matter called for elaborate analysis by the divisions of labor and of operation, and could not possibly be gotten ready for even my preliminary consideration until the end of January. By that time the employees had begun anew to insist that these matters ought to be considered not only on the basis of inequalities, but on the basis of needed general increases to meet the increased cost of living, the wages paid in other industries, provision of a reasonable minimum wage, etc. In such circumstances it became evident to me, and to all of my associates in the divisions of labor and of operation, that the matters were so inter-related that they could not be dealt with except by viewing the question as one of general adjustment of railroad wages, on consideration of the whole situation, and that it would be a physical impossibility for the Railroad Administration, prior to its loss of jurisdiction on February 29, to act with finality.

A conference was arranged with the chief executives of all of the principal railroad labor organizations to consider this situation and to discuss the question of an appropriate procedure for dealing justly with the matter. This conference began on February 3 and has continued up to this time in an effort to clarify the facts and reach a clear understanding. The conference has proved exceedingly valuable, and has paved the way, I believe, for a much more expeditious handling of the situation than would have otherwise been possible. At the same time I have become more convinced than ever that the subject cannot be intelligently and justly dealt with, except in a comprehensive way, which will include consideration of all pertinent factors, among these being the matter of average wages for analogous service in other industries throughout the country. The question of the cost of living, and the question of a reasonable minimum wage, as well as the claims as to inequalities. So far, the Railroad Administration has not been in position to consider any of these matters except the questions of inequality which have speedily become so far-reaching as to convert themselves into the more general questions.

The fact is that the problem in its present dimensions covers the entire field of railroad wages. The hopelessness of dealing with it through consideration of claims pressed by the employees on the ground of inequalities has been thoroughly demonstrated by the experience of the Railroad Administration. Practically every class of railroad employees has felt that some other class has received more favorable treatment and has complained accordingly, and has presented plausible arguments in support of its claim. The result is that the wage board, composed of experts representing both the managements and the employees, has been wholly unable to agree upon a single one of these cases. My

discussions of the past week have made it clear that even if there were time to reach conclusions which would call for readjustments as to particular classes, this would be wholly unsatisfactory as to the other classes and would make no progress toward a complete solution. These difficult conditions are the inevitable outgrowth of the radical changes which have taken place in wage levels both on the railroads and in all other industries as a result of the conditions created by the war, and nothing short of the comprehensive action which I recommend can be expected to compose the situation. Suggestion had been made that this matter should be temporarily dealt with by a uniform or flat increase of a certain number of cents per hour to all railroad employees. My study of the general situation has convinced me

From the Baltimore Sun

Woodrow Is Back On the Job

that no such action would be justified and it would merely accenuate the complaints as to the inequalities, and that the matter must be disposed of upon the broad general issues.

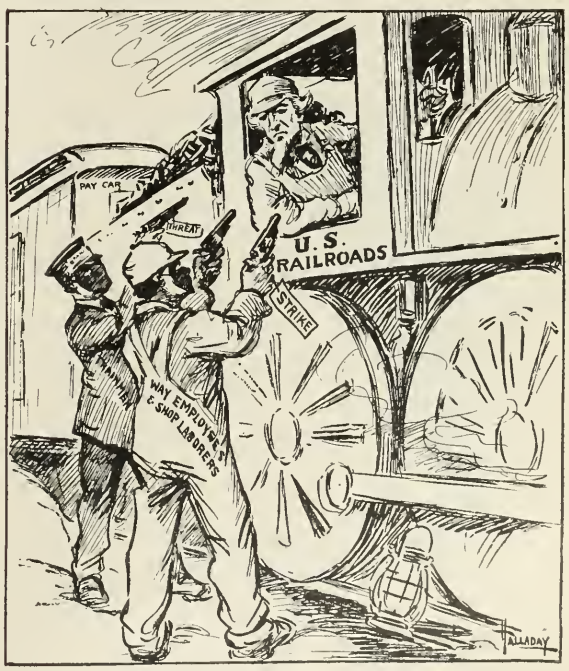
As to the three important general issues thus presented, the situation at the moment is as follows: There is no showing now before the Railroad Administration upon the basis of which a correct conclusion could be immediately drawn as to the average wages paid throughout the United States in private industries for service similar to those rendered by railroad employees or for measuring reasonably the degree and extent of similarity. There is no showing before the Railroad Administration from which could be immediately deducted a just conclusion as to what is a fair minimum wage to be used for application throughout the country. The showings as to the extent of the increase in the cost of living and as to the extent of the increase of wages of railroad employees are not entirely agreed upon and a just conclusion in regard to them cannot be immediately reached. I believe all these matters can be promptly cleared up by the adoption of the course which I recommend, but it is impossible to conduct such inquiries to the point of completion and final action in regard thereto prior to March 1.

It is impossible for the Railroad Administration to dispose of such comprehensive and far-reaching problems in the remaining 17 days in which it will have jurisdiction and with such an expiring jurisdiction the Railroad Administration could not justify itself to the country in settling permanently for the future a problem of this character which involves so much both to railroad employees and the public which in some form must bear the cost of railroad wages.

While I am not able, and ought not, to prejudge the questions when I am precluded from assuming jurisdiction to decide them, and while I feel that many classes of railroad employees are under misconceptions which will largely be removed as a result of a comprehensive disposition which alone can settle the matter, it is only fair to point out in behalf of the employees that they feel greatly concerned on account of existing conditions. Many employees feel that they are less well paid than workmen in other industries; many feel that other railroad employees have received more favorable treatment; many feel that they do not receive sufficient to enable them to maintain a fair standard of living. Each group of employees naturally thinks only of its own problems and does not appreciate how much more difficult that problem is made by the claims asserted by the other groups. The employees of course are unable to understand why these matters have not already been settled. They anticipate great delay on account of the transition to new methods of procedure.

I am convinced that it will be impossible to arrive at a satisfactory status in this matter until the pending problems can be passed upon by agencies appropriate to deal with them after the expiration of the present federal control, and I am equally convinced that it will not only be fair to the employees but distinctly in the public interest to take such steps at present as will insure the promptest possible disposition and the avoidance of delay which otherwise would be incident to the necessary termination of the jurisdiction of the Railroad Administration.

I therefore recommend that you indicate your purpose to cause the formation at the earliest possible date of a tribunal with power to carry these matters to a conclusion, such tribunal to be formed by voluntary action, if a tribunal is not created by law. I further advise that you promptly appoint a committee of wage experts to take available data and deduce therefrom as soon



From the Providence Journal

The Jesse James Game Over Again

as practicable the facts pertinent to this problem. The reports of such a committee will serve as a guide to you in carrying out the policy which you announced last summer to see that justice was done to the railroad employees and I believe will greatly expedite the disposition of the matter. I think an effort should be made to get the railroad corporations to co-operate in the formation of this committee.

The employees are apprehensive that there will be further delay which may be of an indefinite character merely to await future developments concerning the cost of living and it seems to me that they ought to be reassured on this point. My thought is that if the Railroad Administration were a continuing author-

ity, it should now take the position that these broad wages questions should, without being further held in suspense, be carried to a conclusion as soon as the available evidence on all the general matters so far held in abeyance could be duly considered. I believe the same policy will be reasonable under private control, and in fact, that it will be in the public interest to get these matters put at rest as soon as possible.

I am aware that some elements of the public may criticize the recommendations I make on the ground that the Railroad Administration ought to decide these matters finally and not leave them open to be dealt with after the railroad companies resume control. This criticism, however, would not be warranted by the conditions, because, first, it is physically impossible for the Railroad Administration to dispose of these matters; second, to the extent that the Railroad Administration might hurriedly dispose of them adversely to the employees, the disposition would not be final and they would immediately be presented under conditions of great discontent to the railroad corporations and would be pressed for early decision; and, third, to the extent that decision might hurriedly be rendered by the Railroad Administration in favor of the employees, such decision would be strongly resented by the public on the ground that a matter of such great importance, which involves exclusively the future of relations of railroad employees to railroad transportation, ought not to be settled with finality by a temporary governmental agency whose jurisdiction is on the point of terminating.

Statements by the Labor Organizations

There were also made public letters of February 9 and February 11 to Mr. Hines, signed by the executives of the labor organizations except the trainmen and the maintenance of way employees. The first letter outlined the demands of the organizations in part as follows:

In your memorandum read at these conferences, you state, in part:

"I wish to state my distinct conviction that the present cost of living cannot be regarded as permanent and that it is even more clear now than it was last summer that the cost of living will soon reach lower levels."

After a further extended summary of the situation, you state:

"I believe more than one leader of organized labor has frankly expressed the view that a general increase in wages will not effectively solve the problem."

Then, in conclusion, you suggest three methods of procedure, as follows:

(1) "One is for the railroad employees themselves to defer for a reasonable additional period the question of general increases in wages, awaiting further light as to the permanency of the present cost of living levels."

(2) "The second is to defer the matter at least until adoption of legislation which apparently will be adopted soon for the purpose of presenting it for consideration to the tribunals which will then probably be created in some form to deal with this problem."

(3) "The third is for me to co-operate with the railroad employees in finding a method at present to begin a careful study of the facts with a view to expediting to that extent the final consideration of the problem."

At the conclusion of reading this paper you requested full and frank discussion, and we pointed out the following facts:

(1) August 25, President Wilson requested that the government be given a reasonable time to establish success or failure in its efforts to reduce the cost of living, and if then failure resulted railroad employees' wages should be increased.

(2) Railroad labor felt the position taken by the President was wrong, in that he should have been willing to grant them immediate relief by increases in rates of pay, which would have placed them on an equal plane with labor in other industries where similar services are required and rendered, and established an equitable wage upon the true American standard of living and in keeping with the service required and hazards assumed.

(3) Then, after placing railroad labor upon this equal basis with other labor and in a position to live rather than merely exist, effective efforts to reduce the cost of living should be made.

(4) Notwithstanding this keen disappointment railroad labor has waited nearly six months, bearing the unequal burden, and now the government has failed to reduce the cost of living.

(5) Congress has failed to meet the emergency notwithstanding the fact that the President, in his message on August 8, dealt with the high cost of living quite thoroughly and made recommendations as to legislation.

In this same message he also outlined the immediate policy of the government in its efforts to deal with profiteering.

Again, on December 2, President Wilson addressed Congress on the cost of living, making further recommendations as to legislation, after forcefully calling attention to the failure to act upon his former message.

In considering the President's policy as announced August 25, railroad labor had carefully analyzed the President's message of August 8 and expected that Congress and the government would afford some immediate relief. With this in mind railroad labor willingly agreed to wait a reasonable time. However, Congress and other federal authorities have failed to afford the relief, and the cost of living has not been reduced, but, on the contrary, has advanced.

In reference to the conviction which you have expressed that the cost of living will reach lower levels, we are fully aware that the statistics or index numbers of prices at this season of the year customarily show a temporary reduction. This has been the case, as you know, even during the period of the war when the cost of living was constantly mounting. These reductions are but temporary, extending over a few weeks, and are due to market conditions during such periods and do not indicate any permanent tendency. Thus far in this year the acuteness of the present increase is emphasized by the fact that these temporary changes have not even been indicated, but if they should appear all students of prices realize they are but temporary.

Much prominence has been given to the activities of the Department of Justice in eliminating profiteering and reducing prices, but so far their efforts have been ineffective and the most authoritative sources of information in industry and commerce, instead of holding forth any hope of a reduction through these agencies in the future, claim that they will be a failure, and prices will be higher next year than this.

You have also made reference to the fact that the present demoralization of foreign exchange will react upon the markets of our own country by throwing some goods upon the market and reducing prices. Upon serious reflection, however, we feel sure that you will agree with us in concluding that the possibility of any price reduction in this connection is very remote and would afford no permanent benefit for two reasons: (1) Under our present system of arbitrary price control and profiteering it would require a much larger supply of goods than these foreign exports to demoralize the system, and (2) to assume that we would reduce prices permanently by this method would be equivalent to saying that we shall permanently refuse to fulfill our obligations to the impoverished people of Europe by failing to send them needed food and supplies. Undoubtedly our international obligations will soon lead to the adoption of proper measures for stabilization of exchange.

You suggest gathering data showing the basic rates for 1915 and 1919. This is not necessary, in our opinion. For at least two years agencies of the government created to deal with the railroad problem have been gathering this data and it is available. We also have all necessary data, much of which has been submitted to your Board of Railroad Wages and Working Conditions several months ago and is now a matter of record with the United States Railroad Administration.

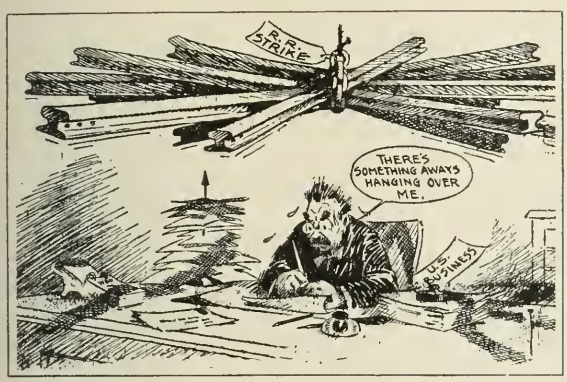
To all of our requests for immediate relief you answer by saying that it is a physical impossibility to comply on account of the apparent immediate end of government control. We do not desire to do anything which will interfere with continued operation of the systems of transportation and distribution, but we must have relief from the present unfair and impossible burdens of railroad labor. With this thought uppermost in our minds, may we ask that you promptly advise if you will join us in the following recommendations to the President:

(1) That railroad wages be promptly adjusted by the President (a) so as to equal the wages paid in other industries where similar or analogous service is rendered; (b) to meet the increased cost of living; (c) wherever the application of the two foregoing principles does not yield an adequate wage, to establish an equitable and living minimum wage based upon American standard of living, with proper differentials, having regard for skill, hazard and responsibility. (By the term "equitable and living

minimum wage" we do not mean a mere subsistence wage but a minimum wage sufficient to maintain a railroad man's average family on a standard of health and reasonable comfort and in addition enable him to set aside a sufficient amount for old age and disability.) And (d) all of the above adjustments by the President to be effective as of May 1, 1919, to those employees in service on that date and to those who entered since that date and remain in railroad service until February 29, 1920.

(2) That the President urge Congress promptly to pass necessary legislation to make possible, among other things, reduction in the cost of living, elimination of profiteering, excessive profits, interference with distribution by hoarding, speculation in futures, proper restriction of exports. This to be given precedence over any and all other legislation.

(3) The departments of the government to be organized in such a way as to secure the fullest co-operation in reducing cost



From the Chicago News

Business As Usual

of living as is permitted by present laws and in keeping with the powers of the government to meet an extreme emergency.

Your co-operation in this will be greatly appreciated.

The supplementary letter of February 11 was as follows:

Supplementing our letter presented to you on February 10, we wish most earnestly to submit for your consideration what we conceive to be the fundamental injustice in the present disposition of the railroad problem.

Under private operation the railroads were unable to meet the emergency arising out of the war and the President took charge of them to assist in winning the war. The government guaranteed to railroad capital a return based upon an average pre-war earning without any provisions for adequate treatment to railroad labor.

Preparations are now being made in legislative form by which the period of government control is to be terminated and the transportation industry returned to its private owners, with all its resources unimpaired and with careful provisions for protection of capital and no provisions for protection of labor.

The fundamental theory underlying the present action by the Congress is that the war was an emergency period in which the transportation facilities were to be used for the common good and were to be returned, unimpaired, at the termination of the war period.

On the other hand, while this action is being taken to rehabilitate the transportation industry and guarantee the integrity of invested capital, no measures are being put forward for the protection of railroad labor.

We feel sure that you will agree with us that the human element, from a broad standpoint, is of more importance than the corporate factors in the transportation industry. We believe, however, that if the corporate element is to be recognized the human element should receive like recognition and treatment. At the present time, however, when every provision is being made to recompense capital we find that railroad employees are not earning a sufficient wage to even maintain pre-war standards and that many of these employees are not earning an amount sufficient to maintain a standard of living above a mere subsistence level.

In the light of this deplorable situation, we earnestly appeal to you, as director general, and, through you, to the President, on the ground that it is your solemn duty to take such action before the termination of public control as will result in restoring the earning power of railroad employees and establish a basic minimum wage which will secure to all railroad employees at least the guarantee of a living wage sufficient to maintain their families on a basis of health and reasonable comfort.

Irrespective of the devotion and sacrifice of railway employees during the war, we cannot escape the conviction that you, as director general, should consider it a privilege to be the instrument for bringing about the same guarantee to railway labor, as a condition precedent to the return of the railroads, as are being extended to railway capital by legislation proposed in Congress.

The primary objects put forward in the pending railroad legislation are twofold: (1) To make financial provision by which the railroads that have been under government control since January 1, 1918, shall be returned to their private owners unimpaired; and (2) to enact financial arrangements by which even the roads that were financially weak or impoverished before the war shall be placed upon a financial basis guaranteeing to capital a minimum return.

We consider it your duty to see that the same principles which are to be applied by Congress to invested capital, or the mere physical elements in the transportation industry, be also applied by you to the employees, or the human element.

During the period of the war railroad employes, as you know, gave themselves without reservation to the service of their country. They did not consider the war a period for making excessive

From the St. Louis Post-Dispatch

A Menace to All

wages. Neither did they consider it a period for profiteering, but rather a time for patriotic service and sacrifice. They felt that when the emergency was passed and the public had time to consider the facts, any inequalities from which railroad employees suffered would be rectified. As a consequence they continued at their posts during the period of government control despite the fact (1) that their rates of pay had not been increased proportionately with the cost of living since 1914, and (2) without regard to the fact that employees in similar work in other industries had received much higher rates of pay than railroad workers; and we must now insist that the obligations of the Railroad Administration be promptly met.

In the third place, we would direct your attention to the fact that in the case of a great many classes of railroad employees the

purchasing power of their earnings before the war was not sufficient to maintain even a mere subsistence standard of living for their families, not to mention a level of living of health and comfort. To increase the rates of pay which these employees received before the war to correspond with the increase in prices since the beginning of the war would be merely equivalent to perpetrating inadequate and deplorable standards of living which prevailed prior to the outbreak of hostilities. These employees should, therefore, just as in the case of the railroads which were financially weak in 1914, be rehabilitated or placed on a sound and just basis of earnings.

Considerations of elementary economic justice absolutely require that these groups of railroad employees, irrespective of wage increases received during the war period, should now, when the war emergency is passed, have their rates of pay adjusted to the basis of a living wage as a preliminary to the return of the railroads to private ownership, or, in other words, that they should now be assured rates of pay which would enable them to support their families, both now and in the future on a basis of health and reasonable comfort.

Railroad companies, according to the plans of pending legislation, which were operated at a financial loss before the war, are now to be placed upon a financial basis which will guarantee substantial returns to capital whether earned or not. By a similar method of reasoning railroad employees who were inadequately paid before the war likewise should be placed by the United States government upon a proper wage which will enable them to meet all their legitimate and necessary obligations.

The Railroad Administration or the public cannot and should not wish to take the attitude of rehabilitating and guaranteeing returns to railroad capital without at the same time establishing adequate wages for all railroad employees. In other words, a guarantee by the public of a return to all forms of railway investments should carry the obligation of a fair return to railroad labor.

Director General Hines Warns of the Consequences of a Strike

Director General Hines on February 13 gave his reply to the maintenance of way employees in a letter to President A. E. Barker, which he delivered to the committee which had called on him. On Saturday he telegraphed the letter to Mr. Barker at Detroit asking that the delegates to his convention give it careful thought. Mr. Hines said in part:

Your letter, dated December 4, urging speedy action, was received on December 11 and was promptly taken up with the Wage Board. You were advised on December 23 that the board would report at an early date. On December 30 you called on me and again explained the importance of speedy action. On December 31 the members of the Wage Board submitted their divergent reports on your and other important matters, necessitating in the division of operation and labor careful analysis and comparison which was expedited as much as possible. By January 23 it had become apparent to me that your matter and the others pending were related to each other in so many ways that they must be considered as a whole and with reference to the early termination of federal control. I therefore telegraphed you and other chief executives of principal organizations requesting a conference on February 3. Your organization proceeded, however, to hold a convention which took action before our conference had been concluded, and necessarily without the full information as to conditions which your organization would have had if it had deferred action until the conference was concluded. Your organization never even attempted to give notice that you would discontinue performing the work contemplated by your national agreement until the 11th instant, the date your committee sought to see me, which was only six days before the strike was to become effective, and your strike order was not even announced through the newspapers until the 9th or 10th instant.

The national agreement clearly contemplates that your organization as such will continue to work thereunder in accordance with the hours and working conditions therein provided and in accordance with the wages specified in the director general's orders, until a change in policy shall be adopted on not less than 30 days' notice. The government regards your strike order on less than 30 days' notice as a repudiation of the national agreement which your organization sought and assumed. This mistaken action, if not corrected, will be regarded as conclusive evidence of the complete failure of the principle of collective bargaining on the part of your organization.

The strike, of course, will automatically terminate your national agreement and thereby you will completely destroy the status which you so earnestly sought such a short time ago, and at the expiration of federal control your organization will have no recognized and established working conditions, thus putting the railroad corporations in the best possible position to claim that there is no basis whatever for them to recognize or deal with your organization or to respect any working conditions or other advantages which you may have secured under this agreement. I believed that this national agreement constituted a great forward step for your organization and improved your status to a much greater relative extent than was the case of any other organization. I am, therefore, wholly unable to understand the policy which now proposes to end this valuable status on the 17th instant without the faintest hope of its being revived.

In conclusion I specifically advise that for the preservation of your organization and its present status under its national agreement, as well as for the urgent public reasons expressed by the President, you at once take steps to prevent the carrying out of the strike order on next Tuesday. I ask you to make it perfectly clear to every member of your convention that if at this stage the strike takes place it will be a strike solely because your organization is unwilling to co-operate in the procedure proposed by the President of the United States. The government cannot possibly recede from its position, so that the strike offers no hope of accomplishment for your membership and promises merely the loss of your existing status, and will merely delay rather than expedite the just solution which the President is seeking, and in which he asks your support. I take it you cannot refuse to comply with his request that his message and my report be sent to your individual members for their consideration and meanwhile it would seem to be out of the question for you to commit that membership to a strike fraught with so much disadvantage to it without the possibility of any advantage whatever.

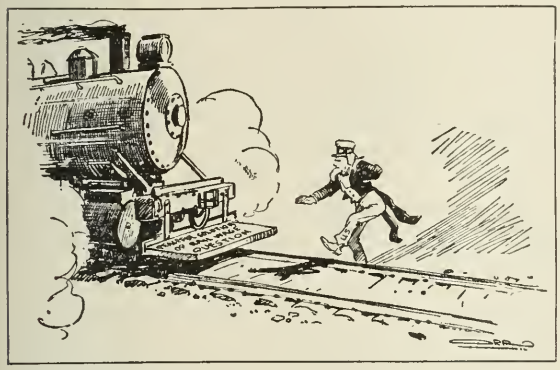
"I feel that on account of the undoubted pressure from your membership, your convention has been driven into a position which it would not have taken if it had first considered the full explanation of the inevitable and unalterable position of the government as explained in the President's statement and in my report to him, and that in the light of these new developments you will be enabled to modify your action and thus protect your interests and avoid getting into a false and untenable position which can never be sustained or justified.

The President also telegraphed to Mr. Barker saying that he noted with surprise and disappointment that the maintenance of way organization was the only one addressed which had not expressed its concurrence in the method which he had proposed and he asked that the necessary steps be taken at once to withdraw the strike order. "I feel sure," he said, "that you and your associates upon full consideration realize that you cannot in justice to your membership and the citizens generally of the United States persist in a course which is opposed to your obvious duty to the country, to the government and also to the attitude of all other railroad labor organizations, all for the purpose of objecting to the procedure which I have proposed, which is the only practicable method of obtaining a prompt and reasonable settlement of the important wage questions now pending."

In notifying Mr. Hines of the postponement of the strike Mr. Barker said: "It is evident our committee did not desire that the maintenance of way brotherhood should be driven into a position seemingly forgetful of the public interest due to unfriendly interests, including the avenues of information by which the people can be reached, the people being ignorant of actual conditions among these railway workers. I desire to impress upon you with all the force at my command the absolute necessity of relief for our members immediately if a most serious situation from which there will be no retreat is to be avoided." He said he was confirmed in his belief

that strike action would have been "eminently justified" to force favorable action on the wage demands.

In a public statement issued Saturday night the executives of the railroad labor organizations urged the necessity of early relief to meet "the intolerable burden of the high cost of living." They also said that "the American people need not fear that such wage increases as may in justice be granted us will prove a step in the so-called 'vicious cycle' of ever-increasing prices and resultant higher cost of living provided the forces of the government are alert and determined to prevent undue profiteering and that Congress will pass remedial and corrective measures recommended by the President." The public should be on guard, they said, against "the conscienceless pyramiding of profits" rather than the "increasing circles of costs incident to giving labor a living wage," because, "labor, assured of uniformly fair treatment,



From the Chicago Tribune

Don't Miss That Step

will always, through greater efficiency and a desire to return a square deal for a square deal, hold labor costs on a sound economic level by increasing production or service."

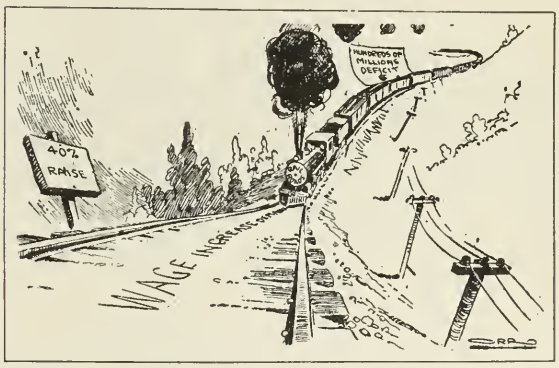
Conferees Seek to Protect Public Interest

Whether the passage of the Esch-Cummins bill, providing for a very different kind of wage tribunal from that proposed by the labor organizations, will arouse a new "crisis" or settlement, has not yet been made clear. One of the principal problems with which the Congressional committees and the conferees have struggled in the drafting of the railroad bill has been that of providing adequate machinery for dealing with just such a question as that now presented. The conferees had agreed upon a system of adjustment boards composed of equal numbers of representatives of employees and of the managements, who will not be government officials, to adjust controversies which the companies and their employees cannot adjust "at home," but also on a higher board of five members to be appointed by the President to render decisions on appeals from the adjustment boards and also to some extent to pass upon their decisions for the purpose of protecting the public interest.

The necessity for a tribunal to represent the public has seemed vital to the conferees, particularly since the bill requires the Interstate Commerce Commission in fixing rates to take into consideration the necessary elements of cost, including wages, and then to endeavor to produce an average return of 5½ per cent on the aggregate value. The railroad labor organizations have for several years been violently opposed to the idea of any referee, neutral member or ultimate representative of the public who would be placed in a decisive position on wage tribunals, partly because they have insisted that the neutral member did not fully understand the complicated wage schedules, and partly because they have objected to any power to force their acceptance of a decision not agreed to by their own representatives. Their reply to the President, therefore, contemplated only a bi-partisan commission which would give the public interest no voice in the decision and on which the railroad representatives, under the provisions of the Esch-Cummins bill, would hardly be expected to have the same selfish interest in holding down the general level of labor costs which was usually attributed to them under former conditions when there was great uncertainty as to the extent to which wage advances would be recognized by the rate-fixing tribunals. Under the plan of the new bill the question of wage increases becomes one of more direct concern to the public than to the railroads.

After receiving Mr. Hines' suggestions the conferees changed their plan considerably, increasing the membership of the board of labor appeals to be appointed by the President from 5 to 9 members and inserting a provision against a possible agreement of the railroad and labor representatives not assented to by at least one representative of the public. It was also decided to give the board original and final jurisdiction and to take from the adjustment boards the settlement of other than local disputes which might tend to cause a general interruption of interstate commerce and to avoid the possibility of different treatment of different classes of employees by different boards by placing jurisdiction over such general controversies as that now at issue in the hands of the higher board.

The standing committee of the Association of Railway



From the Chicago Tribune

Can They Make the Grade With That Load?

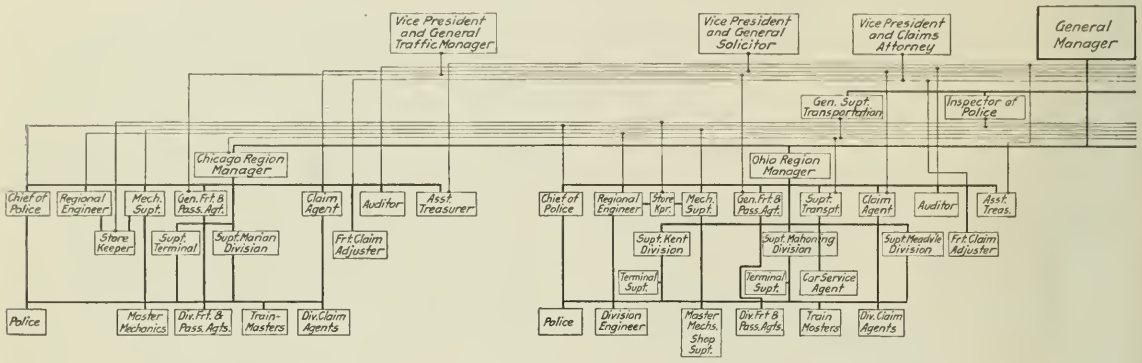
Executives was to confer with Mr. Hines and Railroad Administration officers at Washington on Thursday to discuss the various proposals, and it was understood that after a meeting with representatives of the labor organizations after their convention on February 23 the expert commission proposed by the President would be appointed to begin the investigation in order to save time, but to turn its findings and data over to the board created by the Esch-Cummins bill for a decision. As finally adopted, the language of the bill provides for compulsory arbitration of such controversies, but without a penalty.

Automobiles shipped by freight on railroads of the Eastern Region in the first ten months of 1919 filled 183,495 cars, or enough cars to make a train about 1,500 miles long. This figure is given here by way of correction of an erroneous statement printed in our issue of January 30, page 377, where the annual report of the regional director for the Eastern Region was quoted as giving the number of cars loaded with automobiles as 18,495. It is to be remembered that it is in the Eastern Region that the city of Detroit is situated; also several other automobile centers.

Radical Changes In Erie Railroad Organization

Designed to Permit Better Supervision and Co-operation with Employees and Public.

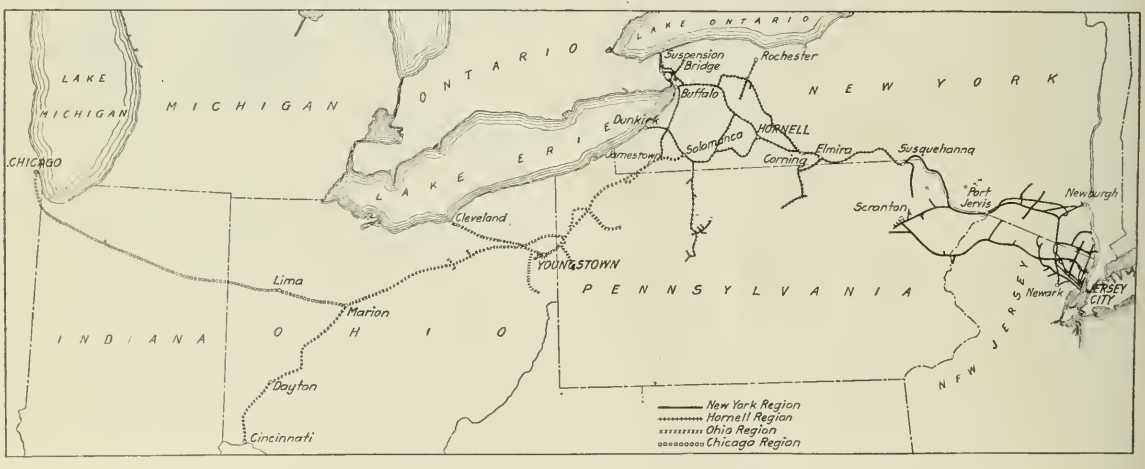
WITH A VIEW to securing more adequate supervision and in order to permit the officers to keep in closer touch with the public and the road's employees, the Erie, on its return to private control, will effect a rather radical organization of its official personnel. The outstanding feature of the new plan is the establishment of four regions, each, with one exception, consisting of three or more operating divisions. Each of these regions will be placed in charge of a manager who, reporting to the general manager, will be in practically entire charge of all phases of work done in his particular region. With this in mind each regional manager is to have a regional engineer, a mechanical superintendent, a general freight and passenger agent, a superintendent of transportation, a claim agent, an auditor, an assistant treasurer, a storekeeper and a chief of police. The former divisional organization is to be retained and the superintendents of the several divisions will each report to the manager of the region in which they are included.



The Erie's New Organization—This Section Shows the Chicago and Ohio Regions

The general manager's organization is to consist of a general superintendent of transportation, a general mechanical superintendent, a chief engineer, a general storekeeper and an inspector of police. The regional engineer, regional superintendent of transportation, regional general freight and passenger agent, etc., will each report directly to the regional manager but in order that their work may be properly co-ordinated they will also report indirectly to their respective officers on the general manager's staff or to the other officers at the head of the railroad organization as the case may be.

To take a case in point, each regional general freight and passenger agent will be in entire charge for his regional manager for freight traffic originating in his region. The traffic of the four regions will be co-ordinated through the office of the vice-president in charge of traffic, and in turn will also have under its supervision all off-line traffic matters. Similarly the regional engineers will be in entire charge of all construction and maintenance except in the case of more important developments which will be carried out under the supervision of the chief engineer. It will be noted that purchasing will be centralized. Each region will have a regional storekeeper but not a regional purchasing



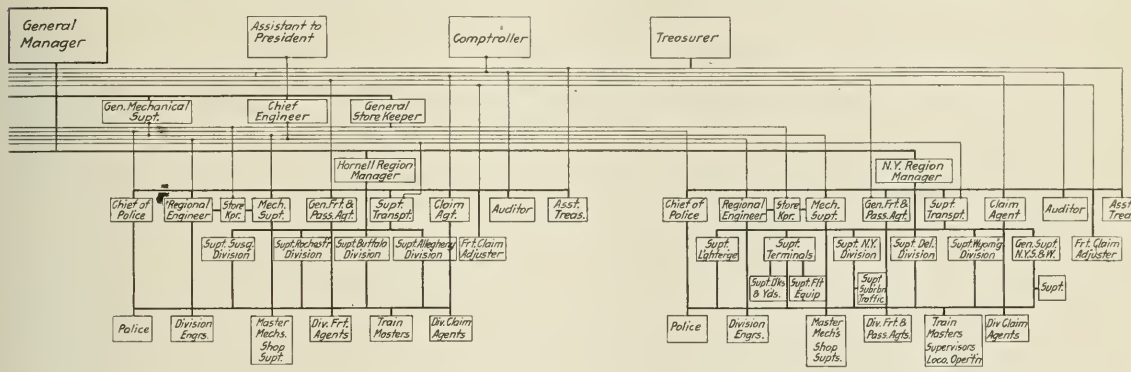
Map of the Erie Showing the Four Newly Created Regions

agent. Purchasing will be done by the office of the vice-president in charge of purchases.

It is understod that the changes in the Erie organization have been under consideration for some time. As already stated they are to be carried out as a result of a desire to bring about better supervision over operation and secure better co-operation with the public and employees. They are also made to avoid over-centralization.

The four regions which will be formed are shown on the diagram of the new organization and the map of the railroad. They are as follows:

New York Region. This will include the lines from Jersey City to Susquehanna and branches, or more specifically the New York, Delaware and Wyoming divisions; the New York, Susquehanna & Western, and the terminals and lighterage in New York harbor. The headquarters for the region are to be at Jersey City.



The Erie's New Organization—This Section Shows the Hornell and New York Regions

Hornell Region. This will include the lines from Susquehanna to Rochester, Buffalo, Dunkirk and Salamanca and branches, or the Susquehanna, Rochester, Buffalo and Allegheny divisions. Headquarters for this region are to be at Hornell.

Ohio Region. This will include the lines from Salamanca to Cleveland and Cincinnati and branches or the Kent, Mahoning and Meadville divisions. Headquarters are to be at Youngstown, Ohio.

Chicago Region. This will include the Chicago & Erie and branches from Chicago to Marion, or the Marion division and the terminals at Chicago. Headquarters are to be at Chicago.

The appointments that will be necessary to carry out the extensive reorganization in question are at the time this article is written only partly been made public. Those that have been announced are given below; it is hoped to have the remainder in an early issue of the *Railway Age.*

F. D. Underwood, president of the Erie at present, will on the termination of federal control remain as president and become also chairman of the executive committee.

George F. Brownell, prior to federal control vice-president and general solicitor and at present holding the same position for the corporation, will take the title of vice-president and general counsel, in charge of legal and financial matters.

George H. Minor, prior to federal control assistant general solicitor, and at present vice-president and secretary of the corporation will have the same title and will be in charge of real estate, taxes and insurance.

George N. Orcutt, prior to federal control vice-president in charge of purchases, real estate, taxes and federal valuation, and during federal control a vice-president of the corporation will have the same title on the resumption of private control, but will be in charge of federal valuation, contracts for material and supplies and freight claims.

T. C. Powell, as has already been announced in these columns, will be vice-president in charge of traffic. Prior to federal control Mr. Powell was a vice-president of the Southern Railway, lines west, in charge of traffic. More recently he has been director of the Division of Capital Expenditures and chairman of the claims committee of the Railroad Administration.

Robert S. Parsons takes the important position of general manager. Prior to federal control he served as assistant to president and chief engineer, later as assistant to president and general manager, and during federal control as chief engineer.

Robert C. Falconer becomes assistant to president and chief engineer. Prior to federal control Mr. Falconer was assistant chief engineer and more recently he has been chief engineer of the corporation.

August L. Sorenson becomes controller. At present he is general auditor for the corporation.

William J. Moody has been elected treasurer. At present Mr. Moody is serving as assistant treasurer of the corporation.

Orders of the Regional Directors

Vaccination Against Influenza.—Circular 301 of the Central Western regional director, states that the regional committee on health and medical relief has decided that the positive usefulness of any of the measures of vaccination against influenza so far proposed, has not been demonstrated and that it deems it unwise at the present time to recommend general vaccination for this purpose.

Bills of Lading.—Circular 300, cancelling Circular 282, of the Central Western regional director, contains instructions governing the issuance of through export bills of lading via North Atlantic ports, which supersede all previous instructions.

Damage to Eggs by Stoppage of Drain Pipes.—Circular 265 of the Southwestern regional director states that considerable damage has been done to eggs in transit by overflow from drip pans, due mainly to neglect to remove accumulations of dirt in the drip pans. The circular states further that instructions are generally in force requiring that bunkers, drain pipes and drip pans shall be inspected and cleaned thoroughly before loading a car which is to move under refrigeration. Suggesting further that floor racks should be used wherever available, the circular requests that these matters be brought to the attention of all concerned, to the end that avoidable damage may be reduced to a minimum.

Railroad Officers to "Return from the War"

One of the interesting phases of the big change that is to be made on March 1, when the railroads are returned to private management, is that of the shifting of personnel that will take place at that time when the Railroad Administration relinquishes its power and the corporation executives resume the direction of operation.

In general most of the executives who were not taken over by the government will be in charge after March 1, although naturally time has brought some changes. Also some of the men who have been in charge for the government are not to be taken back by their companies, or for some reason will not go back, but apparently the large majority will return to their former positions. In some cases they have formed new associations during their service for the government.

The demobilization of the Railroad Administration has been in progress for a sufficient length of time to indicate where most of the principal officers that have been directing its affairs are to take up their work on March 1. Director General Hines has announced that he intends to remain in charge of the winding up of the affairs of the Railroad Administration for about two months, after which he intends to have a good vacation and then he plans to resume the practice of law in New York. Announcements have now been made of the plans of most of the regional directors and of the directors of divisions of the Central Administration. A. H. Smith, the first regional director to resign, returned to the presidency of the New York Central system early in 1919. C. H. Markham also resigned some time ago as regional director of the Allegheny region, to resume his former office as president of the Illinois Central. More recently announcement has been made that Hale Holden, regional director for the Central Western region, would return to the presidency of the Chicago, Burlington & Quincy; B. F. Bush, regional director for the South Western region, to the presidency of the Missouri Pacific; N. D. Maher, regional director of the Pocahontas region, to the presidency of the Norfolk & Western, and L. W. Baldwin, who succeeded Mr. Markham as regional director of the Allegheny region, to his former position as vice-president of the Central of Georgia, effective on the termination of their connections with the Railroad Administration about March 1. Later Mr. Holden's resignation was made effective on February 15.

No announcement has been made as to R. H. Aishton, regional director of the North Western region, but it is understood he will not return to his former office as president of the Chicago & North Western. A. T. Hardin, who succeeded Mr. Smith as regional director of the Eastern region, it is understood, will return as vice-president of the New York Central. No announcement has yet been made as to B. L. Winchell, regional director of the Southern region, who was director of traffic of the Union Pacific system prior to federal control.

The first resignations as directors of divisions came in January, 1919, when R. S. Lovett and C. R. Gray resigned as directors of the divisions of capital expenditures and operation, respectively, to return to their companies, Judge Lovett as president of the Union Pacific and Mr. Gray as president of the Western Maryland. W. T. Tyler, who succeeded Mr. Gray in the division of operation, has now been elected vice-president in charge of operation of the Northern Pacific, a promotion from his former position of assistant to the vice-president. Edward Chambers, director of the division of traffic, is to return as vice-president of the Atchison, Topeka & Santa Fe. T. C. Powell, director of the division of capital expenditures, has already left to become vice-president of the Erie. Prior to federal control he was executive vice-president of the Queen & Crescent system.

Max Thelen, director of the division of public service, is to remain after March 1 as director of the division of liquidation claims, which has taken over the work of the division of capital expenditures, and it is reported that he will later succeed Mr. Hines as director general. C. A. Prouty, director of the division of accounting, has been appointed an advisory member of the director general's staff in accounting matters. He is also director of the Bureau of Valuation of the Interstate Commerce Commission. No announcement has been made as to H. B. Spencer, director of the division of purchases, who was vice-president in charge of purchases of the Southern, although it is understood he is to be president of a refrigerator car line, nor as to Swager Sherley, director of the division of accounting, although it is understood he plans to leave promptly after March 1. W. S. Carter, director of the division of labor, is to return to the presidency of the Brotherhood of Locomotive Firemen and Enginemen. E. M. Underwood, general counsel, is to remain after March 1 in charge of the division of law.

G. H. Parker, who was recently appointed controller of the Railroad Administration, after having been financial assistant to the director general, will be in charge of the work formerly handled by the Division of Accounting, and D. E. Brown, assistant director of accounting, has been appointed assistant controller. Ralph Blaisdell has been appointed treasurer, succeeding C. A. Lutz, resigned.

No announcement has yet been made as to most of the assistant directors of divisions, although it is known as to many of them that they expect to return to their former positions. Gerrit Fort, assistant director of traffic in charge of passenger matters, who was formerly passenger traffic manager of the Union Pacific, left on January 1 to become vice-president of the Boston & Maine, and R. C. Wright, assistant director in charge of freight matters, will return to the Pennsylvania as general traffic manager. It is understood that H. P. Anewalt will also return to the Santa Fe. The telegraph section of the Division of Operation was abolished on January 1 on account of the resignation of Martin H. Clapp, manager, to accept service elsewhere. W. C. Kendall, manager of the Car Service Section, is to be chairman of the Car Service Commission, which will be created by the railroads, and will remain at Washington in charge of per diem and car service matters and co-operate with the Interstate Commerce Commission; several of the present assistant managers of the section will remain with him, but the complete organization has not yet been decided. It is understood that S. Porcher, who was purchasing agent of the Pennsylvania, and G. G. Yeomans, general purchasing agent of the New York, New Haven & Hartford, both now assistant directors of the Division of Purchases, are to return to their former positions. E. E. Adams, engineering assistant to the director of capital expenditures, has already returned to the Union Pacific as consulting engineer, and F. W. Sercombe, accounting assistant, is also to return to the Union Pacific.

E. M. Dunham, assistant chief engineer of construction, has been appointed chief of the department of way and structures of the Division of Liquidation Claims and will take over the organization now under the maintenance of way department of the Division of Operations.

Reports have been published in our personal columns of the changes from time to time among the federal officers of various roads and of the positions that they will hold under the corporate managements, but many are still to be announced.

The regional and district offices of the Railroad Administration are to be abolished on March 1.

Safety of the Cotton Belt Lines is Questioned

Issue Raised by President Herbert Leads to Extended Controversy with Railroad Administration

THE CONTROVERSY between President J. M. Herbert of the St. Louis Southwestern and the Railroad Administration with regard to the physical condition of that property has attracted wide attention, but aside from the matter of popular interest, this case is one of no little importance to railway officers, because it presents in tangible form some of the problems which will arise with respect to other roads before the Railroad Administration will be able to close its accounts with them. The fact that Mr. Herbert deemed it necessary to appeal to the state commissions and through the press to the public naturally gave the controversy more color than will characterize the procedure in the great bulk of the cases that will come up, but this very publicity has no doubt served to bring out more facts than would have been brought to light under ordinary procedure. The St. Louis Southwestern case also holds no inconsiderable degree of interest because of the background of bitter competition which has prevailed for years between the St. Louis Southwestern and two of its nearest neighbors, the Missouri Pacific and the Texas & Pacific.

From the inception of government management until the creation of the Southwestern region in July, 1918 the St. Louis Southwestern was opened as an integral property under the supervision of its president, J. M. Herbert, who also served for some time as inter-regional director for the Railroad Administration at St. Louis. Upon the organization of the Southwestern region the Cotton Belt was divided at the Texas state line. The portion in Texas was placed in a group of roads under the direction of J. L. Lancaster, federal manager and formerly vice president of the Texas & Pacific, with A. G. Whittington as general manager. The portion of the line in Missouri, Arkansas and Louisiana was grouped with the Missouri Pacific under Federal Manager A. Robertson, who had been vice-president of the latter road, while W. N. Neff, who had been general manager of the entire Cotton Belt system for a short time prior to federal control, was retained as general manager of this portion. Thus the two sections of the Cotton Belt were linked up with and operated as units of its two strongest competitors, the Texas & Pacific and the Missouri Pacific, and in a manner which, according to the corporate management of the road, has effected a serious depreciation of the physical property. It is also a contention that this situation was not materially altered when in March, 1919, the road was again organized as an independent operating property under the direction of Mr. Neff, who had been promoted to federal manager of the entire Cotton Belt system.

In view of these circumstances the following review of this case is restricted largely to certain matters of record and the abstracts of public statements or reports issued by the parties to this controversy or the public authorities who have been called into the case from time to time. No attempt is made to analyze the facts presented or to draw any conclusions, this being left entirely to the reader.

Maintenance Expenditures Restricted in April, 1919

The difficulty as to maintenance of way work dates back to April 1, 1919, when the director of the Southwestern region issued instructions to Federal Manager Neff that maintenance of way expenditures would be limited to $2,000 per operated mile and that this total for the year would be made retroactive to January 1, 1919. The expenditures for January, February and March had totaled $714.37 per mile of line, or $238.12 per month, leaving of the $2,000 authorized only $1,285.63 for the remaining nine months, or an average of $142.79 per month, which is equal to a rate of expenditure for the year of $1,714.

Mr. Herbert objected to this limitation on expenditures, contending that the road could not be maintained in a safe condition for this amount. He made representations to the director of the division of operation, and, following a conference in Washington, two representatives of the Railroad Administration made an inspection of the St. Louis-Southwestern, leaving St. Louis on June 13 and completing their work at Big Sandy, Tex., on June 19. In a report based on this inspection, it was recommended that an additional sum be expended for maintenance of way and structures on this property during the remainder of the current year to the extent of $415,527. This was itemized as follows:

Roadway maintenance and tracklaying and surfacing	$132,077
Bridges, trestles and culverts	212,633
Ties	70,817
Total additional allowance recommended to maintain the railroad in safety for normal operation	$415,527

The report also recommended that this additional expenditure be approved by and charged to the corporation. President Herbert declined to take the responsibility for this expenditure on behalf of the corporation until September 3, when he wrote to the director of the Division of Operation, stating that he was

"willing, in the interest of the safety of the public and the employees, that the $415,527 recommended in addition to the unexpended portion of $2,000 per mile per annum be expended, leaving the question of whether the administration or the corporation should be charged with the above amount open for future determination and with the provision that work should begin immediately."

This expenditure was authorized by the Railroad Administration on September 11, 1919.

Later in the month of September Mr. Herbert made a detailed inspection of the company's property in company with J. W. Kendrick, consulting engineer; A. A. Matthews, federal chief engineer; W. H. Vance, federal engineer, maintenance of way, and others, and a detailed report was prepared by Mr. Kendrick containing itemized statements concerning each section of track inspected by the party. The following is a typical statement from this report relative to one of these track sections:

From point on Mile 451 to Bassetts (a distance of about ¼ mile):
50 joint ties skewed,
18 joints churning,
19 bolts missing at rail joints,
3 angle bars broken.
8 joint ties without spikes,
6 intermediate ties not spiked,
80 per cent of track centerbound and ties without end support and swinging from ¼ in. to 1 in.
About 35 per cent of ties rotten and about 45 per cent of ties skewed,
Ties not spaced and angle bars not slot-spiked,
13 soft-wood ties without tie plates,
Gage found to be 4 ft. 9¼ in. in two places,
Elevation of a 2-deg. curve very irregular,
Track found to be spreading just north of north switch at Bassetts in three different places on inside of curve,
Ties on Bassetts siding so rotten as to be unsafe for trains to use siding.

As a summary or conclusion as to condition of the property, the introduction to this report contains the following paragraphs:

"The inspection was made in order to ascertain the facts in relation to the condition of the tracks, President Herbert having taken the position that the property had not been properly maintained and that the tracks were in such poor condition as to make operation unsafe at the reasonable speeds for passenger

and freight trains specified by the time tables and followed in practice.

"In the light of the facts as developed by this inspection Mr. Herbert could take no other position and there was no dissent by any member of the inspecting party from his conclusions. . . ."

On September 29, during the course of this inspection, President Herbert addressed a telegram to the director general, in part as follows:

"I wish to record with you personally the very serious, even disgraceful physical condition into which St. Louis Southwestern System main tracks have been permitted to deteriorate during government control. Even at any reduced speed to which train service can be subjected, there are many unsafe places in track. I regret to have to say that the lives of the public and employees of the company are constantly at hazard, and I apprehend that this condition will continue throughout the coming winter unless drastic methods are immediately applied. I further regret to have to say that I think it is high time that someone who will give you a correct report of these conditions should be made to do so. I have data in detail which I shall be glad to give to anyone you may suggest."

Shortly after this he addressed a telegram to the Texas Railroad Commission calling attention to the condition of the road in the state of Texas, and intimating that it was the duty of the commission to make an immediate inspection with a view to having the conditions improved.

Director General Hines took direct issue with Mr. Herbert in a letter addressed to the Texas Railroad Commission on October 7. His main contentions were that the road was not unsafe and that maintenance during the test period was inadequate, so that the road was in "exceeding poor condition" at the beginning of federal control.

Mr. Hines wrote in part as follows:

"The Railroad Administration has recently made a very careful inspection of this railroad and has not found any such condition as is claimed by Mr. Herbert. The federal manager of the railroad reports that the property has been maintained in safe condition, although indicating that he would have preferred to spend a larger amount in maintenance.

"The fact is that the St. Louis Southwestern was maintained in exceedingly poor condition during the three-year test period, ending June 30, 1917, and was in exceedingly poor condition at December 31, 1917. The federal control act contemplates that the making of such expenditures upon a property as are necessary to return the property to the owners in the condition in which it was received by the government will constitute a full compliance with the government's obligation. Not only has this been done in the case of this railroad, but substantially more than this has been done. The best estimates which we are able to make up to the present time as to what would have constituted a full compliance with the principle of the federal control act, indicate that, after making allowance for the increased cost of material and labor, there had been an over-expenditure in the maintenance of way and structures on the St. Louis-Southwestern System of $1,103,000 from January 1, 1918, to August 31, 1919, of which an over expenditure of $247,000 was made on the St. Louis Southwestern of Texas.

"After taking into consideration such increase in business as has taken place on this railroad, we are satisfied that we have more than fulfilled any obligation which the government owes the railroad company and that we have done enough to keep the property in safe condition notwithstanding the exceedingly poor condition of the property at the beginning of federal control.

"During the first six months of federal control, Mr. Herbert, as president of the company, remained in charge of this railroad on behalf of the government. He mapped out and issued instructions for the carrying out of a very liberal program of maintenance, stating in a letter to one of his subordinate officials the view that there was practically no limit to which the officers on the railroad could go in building up the property. After the appointment of a federal manager directly representing the government, these instructions were modified because it was not the policy of the government to build up a property at the expense of the government to a much better condition than it was when the government took it over."

In reply to this Mr. Herbert issued a statement on October 12, saying in part:

"Following a conference at Washington at the end of May, 1919, in the office of the director of the Division of Operation, at which time I stated to the director of the division and other representatives of the administration that the appropriation for the maintenance of this property for the year 1919 could not possibly continue it in a safe condition for operation, the Railroad Administration sent out from Washington two men selected from the subordinate forces at Washington, with instructions to make an inspection and report of conditions.

"These men passed over the lines of the St. Louis Southwestern on a special train, running over much of the track at a rate of 35 to 40 miles per hour, viewing the property from an observation car. Just how they were expected to arrive at anything like an approximate estimate of the condition of the property as of January 1, 1918, in running over it on a special train during the month of June, 1919, is unexplained. Nevertheless, one of these experts arrives at very positive conclusions; and, in his report, states the Railroad Administration is performing its full obligation in the maintenance of this property. However, he slips to some extent on page 3 of his report, in summing up the situation, when he makes the following statement:

"The enforced war activity of 1918 affected the St. Louis-Southwestern as it did other railroads and while the federal officers had authority to increase largely their expenditures for maintenance in 1918, they did not and perhaps could not always use the abnormal labor and material conditions to the best advantage in maintaining the property.'

"He further states, 'The administration proceeded with the maintenance of way work in 1919 on the same program as in 1918 until approximately March 15, when they reduced the expenditure.' He says this disarranged the season's program and led to an unbalanced and unwise expenditure of the available funds prior to the reduction, and states, 'The result of these conditions is that, while on the whole the funds paid and appropriated for maintenance of way and structures to January 1, 1920, would be sufficient to maintain the property, it will not maintain it between the date of his report and the close of the year in safety for the operation of trains at usual speed.'

"He then sets up a recommendation that an amount of $415,500 be added to the appropriation for the maintenance of this property in order to maintain it in safety, but suggests it should be done with the approval and at the expense of the corporation. In the interest of the public and the employees of the company, I suggested this additional amount be expended, and the question of charge to the corporation, or the payment of it by the administration, be left for future determination. This was declined by the administration.

"After repeated wrecks, in which employees were killed and maimed, directly traceable to inadequate inspection and maintenance, I repeated this suggestion and it was accepted; but not until the period in which maintenance work on railroads should be accomplished was almost past. To be specific, the authority given by the Washington administration to its local managers was issued September 11; and as late as the last week in September, during which I made an inspection of the property, the additional forces had not yet been fully inaugurated.

"Accompanied by J. W. Kendrick and four other experienced officers in railway construction and maintenance, including the chief engineer and the engineer maintenance of way of this property for the Railroad Administration, I made a very minute and accurate inspection of more than 900 miles of the main line of this property during the last week of September, 1919.

"We found conditions of track absolutely unbelievable as to deterioration, resulting from neglect and inadequate maintenance; and more than 100 places at which the track was positively unsafe for operation of trains.

"The director-general states that the St. Louis-Southwestern road was in exceedingly poor condition at December 31, 1917. This statement is positively and wholly untrue. I have a condition record of the property at that date, from personal knowledge and inspection, accompanied by officers of the company.

"The truth is the Railroad Administration has not gotten and is not now getting more than a very small percentage of benefit in maintenance and construction in comparison with the amount of money it is expending. This is clearly evident in the plans and methods it is preparing to pursue in the expenditure of additional appropriation of funds upon this property at this late season."

With regard to Mr. Hines' reference to President Herbert's instructions regarding maintenance under federal control, Mr. Herbert makes the following statement:

"Much importance has been attached to my letter of January 5, 1918, addressed to General Manager Neff. In August, 1916, this company inaugurated a policy of maintenance which had for its object the expenditure of such amounts for maintenance and for additions and betterments as would enable it to be operated efficiently and economically. My letter of January 5, 1918, to General Manager Neff was simply to inform a comparatively new general manager of our policy in these matters. On February 24, 1917, a similar letter was written to W. T. Tyler, who had just before come to the property as general manager, and on June 4, 1917, I again wrote Mr. Tyler urging that the work of improving the standard of maintenance be given his attention. When James Russell came to this property as general manager, I wrote him on September 22, 1917, that the work of carrying out the bridge and building program for the calendar year 1917 be urged to completion. These letters, I believe, demonstrate clearly that there was no change in the maintenance policy of this company after the beginning of the period of federal control."

Findings of the Texas Commission

That the Cotton Belt Lines in Texas were not in a safe condition was the conclusion of the Texas Commission based on a report of its chief inspector, R. D. Parker. This is indicated by a letter addressed to the director general on October 22 and signed by Earle B. Mayfield and Clarence E. Gilmore, members of the commission, but not by Allison Mayfield, the chairman. The letter is abstracted below:

"This report is now before the commission and for your information a copy is being sent you herewith. From this report, we conclude that the lines of the Cotton Belt in Texas, east of the ninety-sixth meridian, are unsafe for normal operation, and in some districts, in part, are at the point of danger. This includes the major portion of the mileage of the St. Louis-Southwestern Railway Company in Texas, not including subsidiary lines.

"Briefly, the defections in track are attributed to broken, rotten or otherwise defective ties, as many as 10 to a rail length, 6 of which, laid consecutively, were found in main-line tracks; to deplorable conditions found at rail joints where ties were misplaced, joint churning on account of defective drainage, insecure spiking, poor or no adjustment of expansion between rail ends and loose and missing bolts; to broken angle bars; to defective drainage of track as a whole; to defective rail, and to otherwise neglected maintenance.

"It is believed that the Railway Administration, regardless of its obligation to the corporation, does not lend its approval to a situation which involves the safety of any railway property when its knowledge embraces actual conditions. While this report is at variance with information that has been given you, as indicated in your letter of October 7, we are disposed to rely upon the data contained in this report as being authentic and from an unbiased source."

Arkansas Commission Also Investigates

An inspection was made of the Cotton Belt lines in Arkansas under the auspices of the Arkansas Corporation Commission between October 20 and November 1, the inspection party consisting of Commissioners R. H. Wilson, Walter G. Brasher and T. E. Wood; L. W. Helmreich, engineer of the commission; W. H. Vance, engineer maintenance of way under the federal manager; and J. S. Berry. Other officers of the corporation and the Railroad Administration accompanied the party on various portions of the trip.

The opinion of the commission, as based on the inspection and the report of its chief engineer, is given in the following copy of a letter to Federal Manager Neff, dated November 26, signed by the three members of the commission, accompanying the report of the commission's engineer:

"The examination and inspection was made pursuant to complaint 'That the tracks in Arkansas had reached a point through failure and neglect of maintenance by the Railroad Administration of unsafe condition for normal operation as evidenced by derailments, killing and injuring employees and others.' The report speaks for itself and it is apparent that maintenance work should be vigorously prosecuted with a view to improving conditions.

"The commission does not deem the tracks unsafe for the trains as operated, but our investigation developed that schedules are not being maintained at all times by reason of slow orders. It is proper that speed should be sacrificed for safety of operation, but it is the opinion of the commission that track defects, as noted in the report, should be given very prompt attention so as to eliminate all causes of delay from this source.

"The commission would not undertake to say that the present condition of the track is due to failure and neglect of maintenance by the Railroad Administration. It seems to be rather the result of financial differences, economic and labor disturbances and unusual weather conditions.

"In an effort to arrive at a just conclusion as to the hazard of the tracks, reflected by passengers and employees killed and injured, the commission called for a statement covering a period of the last six months of 1917 and for the period from April 1 to October 16 of the present year. The report for the present year shows that no passengers or employees had been killed and there were no passengers injured and but three employees. The report for 1917 is not so good. It is nothing but just that we should say that train schedules are being maintained as well and better at the present time than for the latter period of 1917. This conclusion is formed from reports of train operation."

Another source of information concerning the condition of the Cotton Belt is obtained from the report of an inspection made by two representatives of the Interstate Commerce Commission in connection with a derailment. These men covered a considerable mileage on a motor car, and the following is an extract from a report made on October 27, 1919:

"After completing the investigation of the accident, a general investigation was made of track conditions, covering 503 miles of the more important part of the system. These examinations showed many broken ties, loose or missing spikes, and surface-bent rails. Lack of proper ballast was prevalent, and in territory where natural soil was used as ballast, comprising about 40 per cent of the total examined, the track was center-bound in many places and as a result there were many broken ties. Most of this natural-soil ballast consisted of heavy sand. On tangent track the rails were usually laid with even joints, and the operation of heavy power over these even joints, coupled with the general deficiency in ballast, has tended to create irregularities at joints. The records of the various subdivisions inspected showed that the tie renewals authorized for the year 1919 varied from 10 to 15 per cent of the total ties in the track, and that the renewals completed up to August 31 varied from 38 to 66 per cent of those authorized, leaving in the track from 3.37 to 7.7 per cent of the total still to be renewed by the end of the year. Taken as a whole, the drainage was fair and the gage good, the principal trouble being lack of adequate ballast and a general need of resurfacing."

Inspection by James Russell, General Manager of the Denver & Rio Grande

Acting upon instructions from W. T. Tyler, director of the Division of Operation, an inspection of the St. Louis-Southwestern System was made by James Russell, general manager of the Denver & Rio Grande, covering the same territory and making the same stops as were made by the officers of the two state commissions, Mr. Russell having been general manager of the Cotton Belt from September 1, 1917, to November 1, 1917, just prior to the advent of government control. After he received the report which Mr. Russell pre-

pared on his inspection, B. F. Bush, director of the Southwestern region, addressed a letter to the Texas Commission, under date of November 19, taking exception to the findings of the commission's engineer. Excerpts from this letter appear below:

"Inspection of this railroad by representatives of the Railroad Administration, making the same stops and walking over the same track on which report was made by your engineer, and where the track has not been reworked since the date of his report, discloses statements which are either deliberate misrepresentations of facts or show an entire lack of knowledge on the part of your engineer as to what constitutes a serviceable railroad crosstie and also as to what physical conditions constitute unsafe track.

"Throughout the entire report, some conditions, which may be undesirable, have been enlarged upon and made to appear in as bad light as possible, for many of which the Railroad Administration is in no way responsible.

"As to the general tie condition between Texarkana and Mt. Pleasant where particular attention is called to 'unsafe conditions' by your engineer, the track is well tied and nothing like the number of alleged defective ties are in the track structure. In many places the track is 'center-bound,' but this is the result of an accumulation of past years and one which the Railroad Administration representatives have been endeavoring to correct but which could not all be accomplished during the period of federal control and the condition has been aggravated by the excessive rainfall of the past few months.

"The recommendation of your engineer that at least eight inches of gravel be placed under the ties in this territory is doubtless desirable, but the application of this ballast is the direct obligation of the corporation, the cost of which they have been, and are now, unable to assume; therefore, the work has not been undertaken as it is not the obligation of the Railroad Administration. The same statement applies to the laying of new rail in this territory, the betterment charges in connection with which are the obligation of the corporation, and which they are unable to assume, and such new rail should not be laid in advance of application of additional ballast to this line.

"Between Tyler and Lufkin, at a point near mile post E-553, where your engineer reports from three to eight ties to the panel broken or otherwise failed, an inspection of the track covering a distance of seven telegraph poles from mile post E-553 south, discloses that the track is well tied, only two decayed and one broken tie in a wide spread having reached the removal stage. In this territory, there were several ties which had recently been removed from track that had from one to three years safe service life, and they have been ordered reinstalled in track.

"Statement is made on page 52 that 'Long stretch of track through bottoms west of Athens built practically on original ground surface and not well drained on mile 587 and part of mile 588. Condition of this track unsafe due to the condition.'

"It is a fact that the road bed is built practically on a level with the surrounding country and is ballasted with the immediately adjoining native material, and, under such moisture conditions as have recently obtained, the only way to correct this condition is to raise the track bed from three to four feet above the natural surface and ballast with a good quality of material. As now constructed, and for which the Railroad Administration is in no way responsible, it is an impossibility to have good track through this location until the road bed dries out, or the track is raised, the cost of which raising would be an obligation of the corporation.

"The Administration officers in charge of the maintenance of this railroad are taking proper steps to continue to keep the track in safe condition for operation at train speeds permitted. Taken as a whole, the report of your engineer clearly indicates to me a strong tendency to exaggerate minor defects to place the entire situation in as bad light as possible either by deliberate intent or lack of knowledge of what constitutes safe track under proper control of train movements, and I believe that your commission should give further consideration to this report to assure yourselves of whether or not it represents a true statement of facts."

This letter led to the making of a second inspection under the auspices of the Texas commission on December 5, 6 and 8. Earle B. Mayfield and R. D. Parker, a member of the commission and engineer, respectively, covered portions of the line in company with representatives of the Railroad Administration and the corporate interests of the road and S. H. Cox and H. J. Graeser, citizens of Tyler, Tex., of previous railroad or engineer experience. Mr. Bush objected to what he considered the superficial character of this second inspection, calling attention to the fact that the federal officers of the railroad had no voice in the selection of the ostensibly disinterested men accompanying the party, and wrote the commission on December 16 objecting to the basing of any judgment relative to the condition of the track of the St. Louis Southwestern Railroad of Texas on such an incomplete inspection. The reply of Commissioners Earle B. Mayfield and Clarence Gilmore appears in part below:

"It is a matter of very great regret that you saw proper in your letter of November 19 to call in question both the integrity and ability of the chief engineer of the railroad commission, Mr. R. D. Parker. Mr. Parker's long service with the commission has established so firmly both his integrity as a man and his ability as an engineer that neither of these need any defence whatever. The reinspection made by Commissioner Earle B. Mayfield was merely for the purpose of checking the situation to be sure that Mr. Parker had not fallen into error in some way, and that only by reason of your high position and your challenge of the report. Sufficient reinspection was made to fully satisfy the commission of the correctness of Mr. Parker's original report.

"The members of the commission have no bias in favor of or prejudice against either side of the controversy, nor does the Railroad Commission or its members pretend to say or have any knowledge whatever of the condition of the St. Louis-Southwestern Railway at the time it was taken over by the Government; our only purpose being to ascertain its present condition after we had been advised by the president of the corporation that the road was unsafe for public use.

"This being the situation so far as the commission is concerned, we suggest that further academic discussion of the matter would be useless and this closes our part of the controversy."

This letter was accompanied by a report of the inspection, and with regard to the conditions at Mile E-553 referred to in Mr. Bush's letter the following statement is made:

"The undisputable evidence submitted is conclusive beyond doubt that the defective tie situation at this point reported by Mr. Parker, as a result of his inspection of October 7, 1919,

Maintenance Statistics—Quantities Per Mile of All Tracks

	Year	Rails laid tons of new rail charged to operation	Ties placed in track	Net ton miles per mile of all tracks
Fiscal years	1908	0.33	479	430,992
	1909	0.97	645	424,460
	1910	0.81	566	469,063
	1911	0.52	367	474,929
	1912	0.42	325	452,289
	1913	1.50	418	444,635
	1914	0.13	295	386,228
	Average	0.67	435	438,902
Test period	1915	0.21	307	327,808
	1916	0.45	289	387,326
	1917	0.34	279	493,514
	Average	0.33	292	403,039
Calendar year	1917	1.37	251	548,024
	1918	1.57	263	552,101
	1919 to Sept. 1	1.73	150	.....
	1919 to Dec. 31	1.73	279	575,103

was true, verifies his findings of fact upon which he based his conclusions, and shows that repairs had been made and track conditions altered and corrected November 4 or 5, 1919, which was some eight or nine days prior to Mr. Russell's inspection. In his inspection of this point, Mr. Bush's inspector, Mr. Russell, reported the track well tied with only two decayed and one broken tie. Therefore, it will be seen that from the evidence above submitted, Mr. Bush's inspector made an erroneous report of defective ties still in the track following the renewals and repairs above referred to."

Maintenance Statistics

With a view to supplying further light on the physical condition of the St. Louis-Southwestern, we give herewith a table of quantities of rails and ties applied in the years 1908 to 1919, inclusive, this data being supplied by the office of the regional director of the Southwestern region.

President Herbert of the Cotton Belt deprecates the value of these figures, stating that "the obligation of the director general cannot be measured by statistics showing quantities of one or two items applied to the track. Obviously statistics do not reflect conditions brought about by material mis-applied, nor work performed at an inopportune time, and therefore wasted." He also calls attention to the fact that these figures are on a basis of the operated mileage of the Cotton Belt rather than the owned mileage to which the quantities were applied and that the quantities per mile are, therefore, smaller than they should be, although comparisons between federal and private control are on the same basis.

Pennsylvania System Organized Into Four Regions

Vice-Presidents in Charge of Each Region With Broad Local Powers and Complete Staff

The Pennsylvania System has been reorganized for operating purposes after March 1 with the following objects in view: (a) serving the public better; (b) increasing the efficiency of operation, and especially of doing away with the congestion which for many years has made the Pittsburgh gateway a source of expense and delay; and (c) decreasing the cost of operation and increasing the capacity of the plant without additional capital expenditures. The first of these purposes will be accomplished by the decentralization of authority, the second through the decentralization of authority combined with co-operation under the supervision of system officers, and the final object will automatically follow the accomplishment of the first two.

System officers have been grouped under an executive department having attached thereto a transportation department, a traffic department, a financial department, an accounting department, a purchasing department, a real estate department, a legal department, an insurance department, an employees' saving fund department, and a relief and pension department. Samuel Rea will, of course, be president, and reporting directly to him there will be a vice-president in charge of operation, W. W. Atterbury; a vice-president in charge of traffic, George W. Dixon; a vice-president in charge of accounting, A. J. County, a vice-president in charge of real estate, purchases and insurance, M. C. Kennedy; a vice-president in charge of corporate work at Pittsburgh, James J. Turner. There will be two secretaries, one at Philadelphia, Lewis Neilson, and one at Pittsburgh, S. H. Church. In addition, there will be a vice-president in charge of personnel, G. L. Peck, who will report to General Atterbury.

The combined lines east and west of Pittsburgh have been divided into four sections: The eastern, from New York to Altoona, Pa., and Washington, D. C.; the central, from Altoona to Buffalo, N. Y., Columbus, Ohio, and Mansfield; the northwestern, from Columbus and Mansfield to Chicago; and the southwestern, from Columbus and Cincinnati to St. Louis, Mo. Each of these will be in charge of a regional vice-president. The four regional vice-presidents are Elisha Lee at Philadelphia, R. L. O'Donnel at Pittsburgh, J. G. Rodgers at Chicago, and Benjamin McKeen at St. Louis.

Each regional vice-president will have on his staff a general manager, a general superintendent of transportation, a chief engineer of maintenance of way, a general superintendent of motive power, general superintendents, a traffic manager, a purchasing agent, a real estate agent, and an accountant. On the eastern and central regions there are assistants to the general manager, general superintendents of transportation, etc., commensurate with the amount of business to be handled by the region.*

The transportation department, headed by General Atterbury, will consist of a chief of transportation, C. M. Sheaffer, at Philadelphia, with assistants; a chief of motive power, J. T. Wallis, at Philadelphia; a chief mechanical engineer, A. W. Gibbs, at Philadelphia; an engineer of transportation, E. W. Smith, at Philadelphia, and a chief engineer, A. C. Shand, at Philadelphia, with a considerable staff of assistants. It will be remembered that G. L. Peck, in charge of personnel, also reports to General Atterbury.

If there were some other word than "vice" to modify "president" it would possibly be more appropriate as descriptive of the duties of the four men in charge of the regions. Their duties are really analogous to that of president in so far as the operation, maintenance and traffic relations of their territory are concerned. On the other hand it must be borne in mind that the complicated corporation structure of the Pennsylvania with the parent company, the Pennsylvania Railroad and its subsidiary and sub-subsidiary companies, is kept intact; the security holders of each company are fully protected by a corporate organization. This, of course, is explanation enough of why the title of "president" should not be given to the men in charge of the regions. The organization described in this article is an operating and traffic organization chiefly. There will be accounting officers in each region but corporate rights and relations are neither merged or disturbed.

The Pennsylvania System—about 12,000 miles of railroad—has for fifty years been divided at Pittsburgh. One general policy governed the development of the entire system, but from an operating and traffic standpoint the lines east were distinct from the lines west. There was a healthy rivalry between the two organizations and considerable differences in methods not affecting broad general questions of policy.

Pittsburgh was the center, geographically, of the system, and into this center poured traffic from Chicago and the Great Lakes, St. Louis and the Southwest, from the South and Southeast and the East. There was the problem of getting traffic into and out of Pittsburgh. There was also the problem of getting traffic through Pittsburgh. In many ways the division between lines east and west at Pittsburgh was admirable in getting traffic into or out of that gateway. The rub came in getting it through the gateway. Furthermore, the Pennsylvania organization built up during a period of a number of years, and formulated on military lines, tended more and more to become centralized. An attempt was made to offset this tendency by the appointment of resident vice-presidents at Detroit, Chicago, and St. Louis, but these were additions to the system rather than a reorganization of it.

For fifty years prior to the present reorganization the Pennsylvania has spent money for additions and betterments with an eye far to the future. Notwithstanding these expenditures traffic has outgrown facilities. In every period of unusually heavy traffic for the last twenty years the Pennsylvania has been hard pushed. In the unprecedented traffic

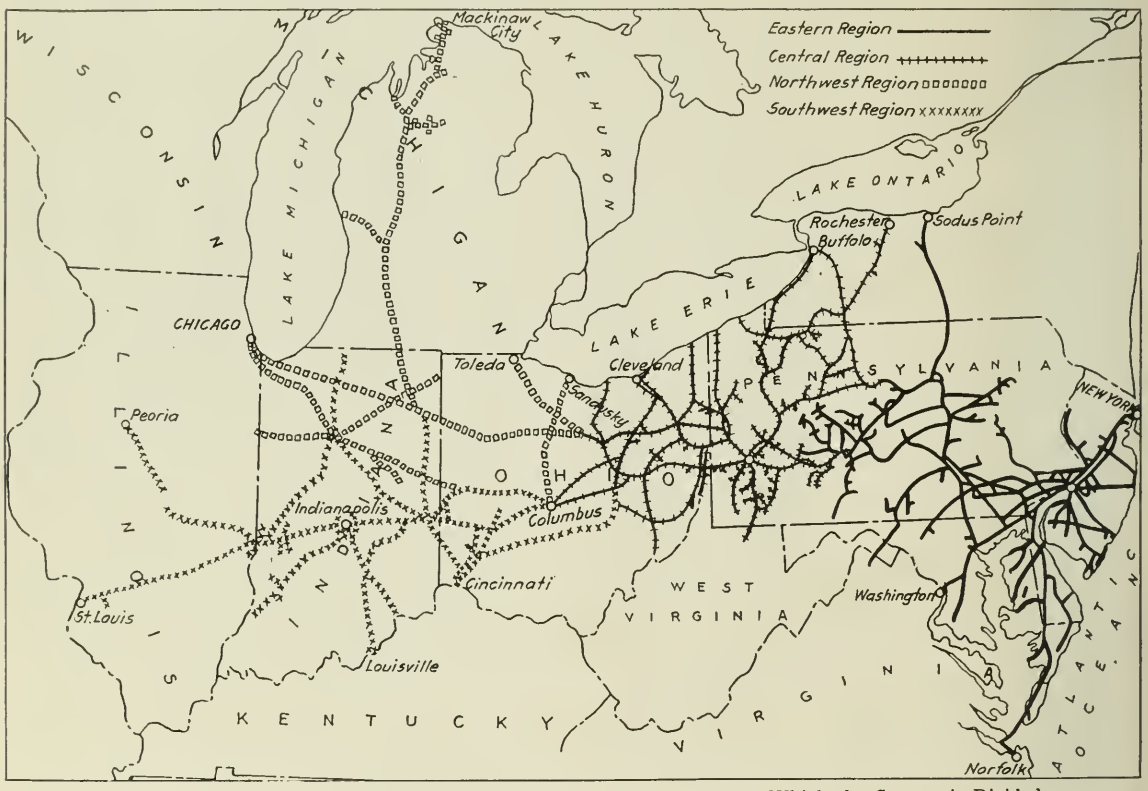
*The names of the regional and other officers will be found in the personal columns of this issue of the *Railway Age*.

beginning with the manufacture of war supplies for the Allies in 1915 the facilities of the Pennsylvania were strained to the breaking point. To add materially to the physical facilities of the main line from Pittsburgh to Philadelphia and New York would require the expenditure of many hundreds of millions of dollars, with no immediate prospect of additional revenue from which to pay additional fixed charges. During the past four years terminal facilities especially have been inadequate. The question now presents itself as to whether a part of this congestion can be eliminated through a more nearly one hundred per cent use of physical facilities by a perfection of personnel and organization. Pennsylvania officers realized as fully as shippers did that centralization had tended to develop a routine through which matters had to pass before they could be finally acted upon, which entailed long delays.

A vice-president in charge of the central district, with adequate authority and staff, should solve the problem of getting traffic through Pittsburgh. Vice-presidents at each of the three principal termini of the system should go far toward eliminating the delays heretofore caused by excessive centralization.

The relations between the central organization and the regional organizations is particularly interesting and constitutes an entirely new departure for the Pennsylvania, although some features of it were inherent in the Harriman system of roads, as this system was being developed at the time of E. H. Harriman's death. It will be remembered that Mr. Harriman had a director of operation for the entire Harriman system. W. W. Atterbury, with the title of vice-president in charge of operation, might well have been designated director of operation. While each regional vice-president is responsible for traffic, maintenance and operation in his territory, General Atterbury's duties consist of co-ordinating the work of these officers in regard to both operation and maintenance. His supervision will therefore be more comprehensive than a mere setting of system standards. This is true also of the executive vice-presidents in charge of traffic, finance, accounting and purchases. While the regional vice-presidents have on their staff traffic and purchasing officers they can also avail themselves of the vice-presidents at Philadelphia as consulting experts.

The traffic officer, the accounting officer and the purchasing officer of each region will report to his regional vice-president, and will also consult with and report to the vice-president in charge of his department at Philadelphia. Thus the divisional form of organization which has been the keystone of the Pennsylvania system will be preserved, but co-ordination will be achieved through a staff at Philadelphia. In regard to purchases, for instance, the regional purchasing officer can use his local position and knowledge to get the most advantageous arrangement possible for his company, but, on the other hand, where purchases made in one region can be distributed to other regions with advantage the vice-president at Philadelphia can effect necessary co-ordination.



The Pennsylvania System Showing the Four Operating Regions Into Which the System is Divided

Separate mention should be made of the Altoona shops, which will be in charge of a works manager, P. F. Smith, Jr., with a shop accountant, an assistant chief of motive power (car), an assistant chief of motive power (locomotive), and a motive power accountant. In other words, the Altoona shops will be organized in much the same way as is an industrial manufacturing plant.

In the same way that the vice-president in charge of purchases will coordinate the powers of the regional purchasing agents, so the vice-president in charge of accounting will co-ordinate the work of the regional accounting officers. These officers, however, report to the regional vice-president. They are his staff officers.

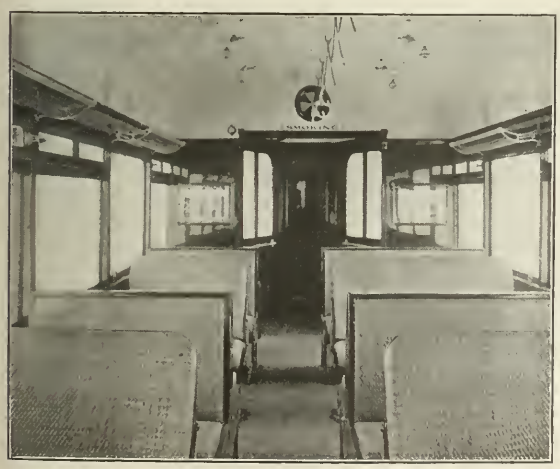
A Five Car Train on the Manchester-Bury Line

British All-Metal Electric Multiple Unit Cars

Interesting Equipment Built by the Lancashire & Yorkshire for Its Manchester-Bury Line

By Robert E. Thayer
European Editor of the *Railway Age*

The Lancashire & Yorkshire Railway was the first main line railway in Great Britain to adopt electric traction for its suburban steam service. Its first project was that of converting the Liverpool-Southport line, and later the line from Sandhills Junction to Ormskirk, the two projects involving 38 miles of track with an equivalent of 80 miles of single track, including sidings. The Liverpool-Southport line was opened to traffic in March, 1904. The multiple unit system of train control was adopted for this line with two 150 hp. motors on each truck, operating at 600 volts direct current, the power generated being 3-phase, 25 cycles alternating current at 7,500 volts.



Interior of Third Class Smoking Compartment

This electrification scheme has met with great success. Passenger business has been constantly on the increase ever since the line was put into operation. Whereas there were four lines required in certain parts of this electrified section for steam service, under electric service two lines are sufficient to handle the traffic, although the frequency of trains has been more than doubled. In this way the widening and laying of additional lines through an extensive territory, which would have been required had steam working been retained, has been eliminated.

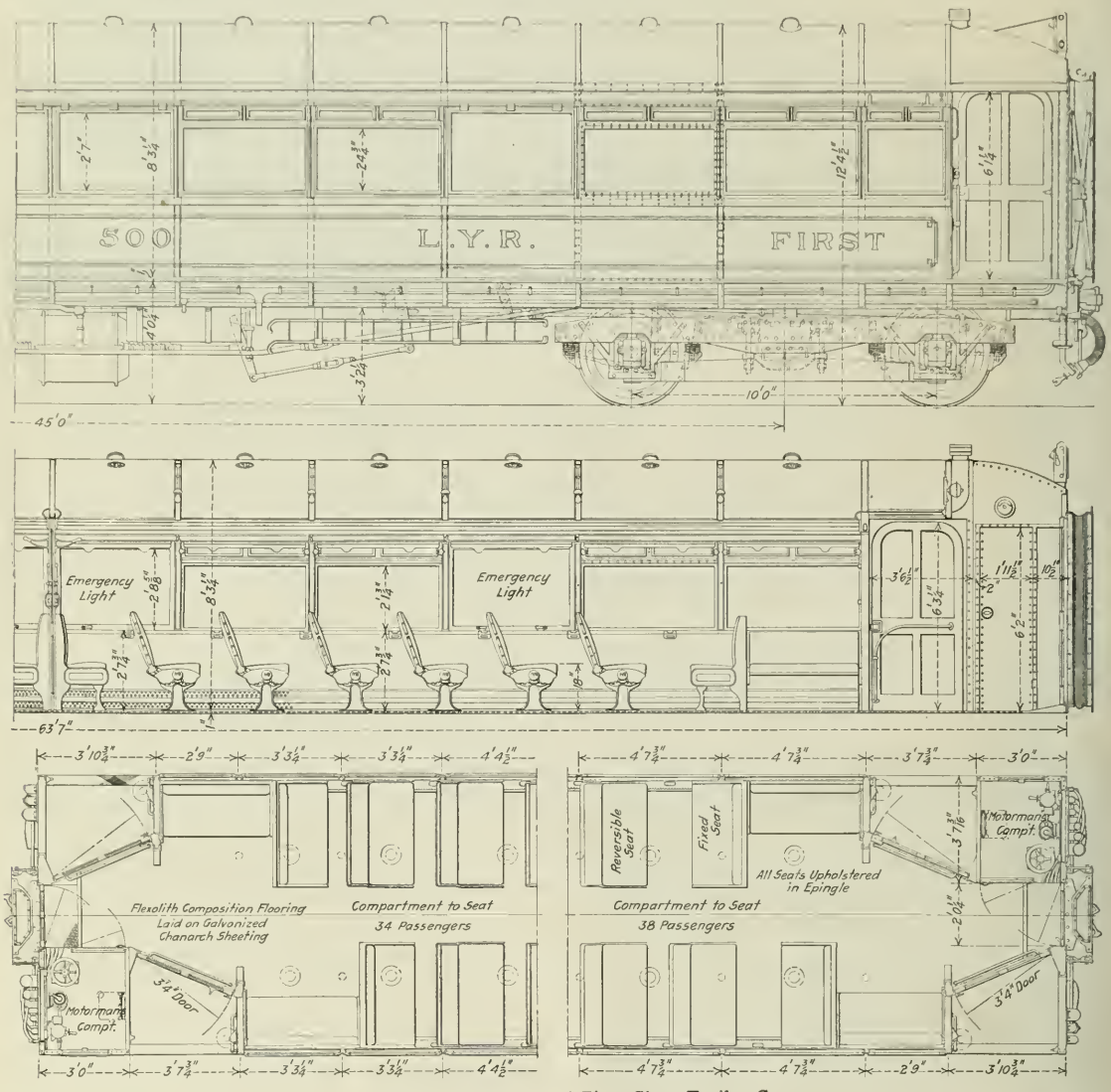
On the Liverpool-Southport line, which extends to Crossens, there are 14 intermediate stations which lie at an average distance of less than one mile apart on the southermost portion and are more widely separated on the northern portion. There were about 36 trains a day in each direction between Liverpool and Southport under steam operation. This number has been increased to 70 under electric operation. The total train mileage per day under steam operation was about 1,900. This has been increased to 3,500. The running time from Liverpool to Southport, which was 54 minutes under steam operation, has been decreased to 37 minutes. The express service between Liverpool and Southport has been increased from four trains per day to ten.

During the first year of the electrification of this line 14 per cent more people were carried, with a reduction of from

78,393 tons to 69,160 tons in the total weight of rolling stock moved per day.

It was the excellent results obtained from this service that lead to the electrification of the Manchester-Bury section of that same road, which was opened for service in February, 1916. This line runs from Manchester via Prestwich to Bury, and from thence to Holcombe Brook, which is 13¼ miles from Manchester. The line has rather heavy grades, with several grades over 1 per cent and three of 2 per cent or over. The heaviest grade is 2.4 per cent for a little less than a mile. There are 14 intermediate stations on this line between Manchester and Holcombe Brook. As in the case of the Liverpool-Southport line, this line uses the multiple unit train control system, but the driving current is 1,200 volts direct current instead of 600, and the cars are equipped with four 200 hp. motors, as the grades on the Manchester-Bury line are much heavier than on the Liverpool-Southport line. As in the case of the Liverpool-Southport line, the number of trains on this new line has been greatly increased.

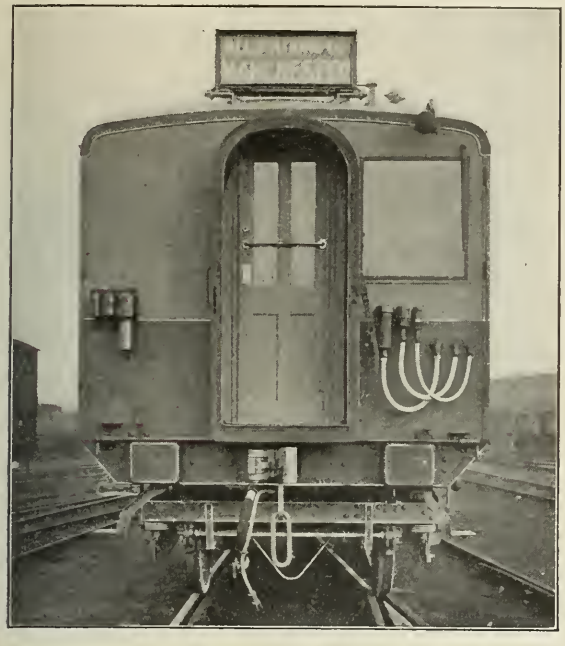
Profiting by the experience obtained on the Lancashire-Southport electrification, a new design of motor car and trailer was developed for this new project. On account of the heavy gradients, and further, to permit of as rapid acceleration as possible due to the large number of stations on the line, a careful study was made to make these cars as light as possible and still retain sufficient strength to meet all service conditions. Whereas the Liverpool-Southport cars are built of wood and metal, the new cars are built entirely of metal, alloy steels and aluminum being used to a considerable extent in an endeavor to keep the weight down. By using aluminum instead of steel plate, the weight of the cars has been reduced 1,623 lb. These cars are the first all-metal cars to be built for main-line service in Great Britain. Forty-six of them were built three years ago at the railway shops of the Lancashire & Yorkshire with the same force of men that had previously been used in the construction of the wooden cars, and no difficulty was experienced in adapting these men to the new materials involved in the construction of the all-metal cars. These cars are divided into three classes—the motor car, which is always third class



Plan and Side Elevations of First Class Trailer Car

and is provided with a baggage department, and first and third-class trailers.

Contrary to the usual British practice of compartment arrangement, these cars were built with the open aisle similar to American practice and in accordance with the design used on the Liverpool-Southport line. In commenting on



End View of Trailer Car

this arrangement Sir John A. F. Aspinall (general manager of the road at the time the electrification was adopted) stated in his presidential address before the Institution of Mechanical Engineers that with this arrangement the trains can be handled at stations much more quickly than with the compartment coaches having the side doors. "The most crowded cars are always emptied during rush hours in about 50 seconds at terminal stations, while intermediate stops only require 15 seconds to pick up and set down passengers." He also said, in favor of this arrangement, that greater strength can be obtained with such construction than where the side doors are used, and, in fact, in the design of these cars the side framing has been calculated in as a supporting structure.

Comparison of Car Weights

The motor cars weigh unloaded 120,960 lb. These cars carry third-class passengers and have a baggage compartment. They have a seating capacity for 74 passengers, which gives a total unloaded weight per passenger seat of 1,634 lb. This figure compares with 2,206 lb., the weight per passenger of similar sized motor cars of composite construction.

Interior of First Class Smoking Compartment

The third-class trailer cars, which are provided with motormen's compartments on each end, but which carry no baggage, have an unloaded weight of 64,960 lb. These have a seating capacity for 95 passengers, which gives an unloaded weight per passenger seat of 683.7 lb. The third-class cars are provided with seating space for five people across the

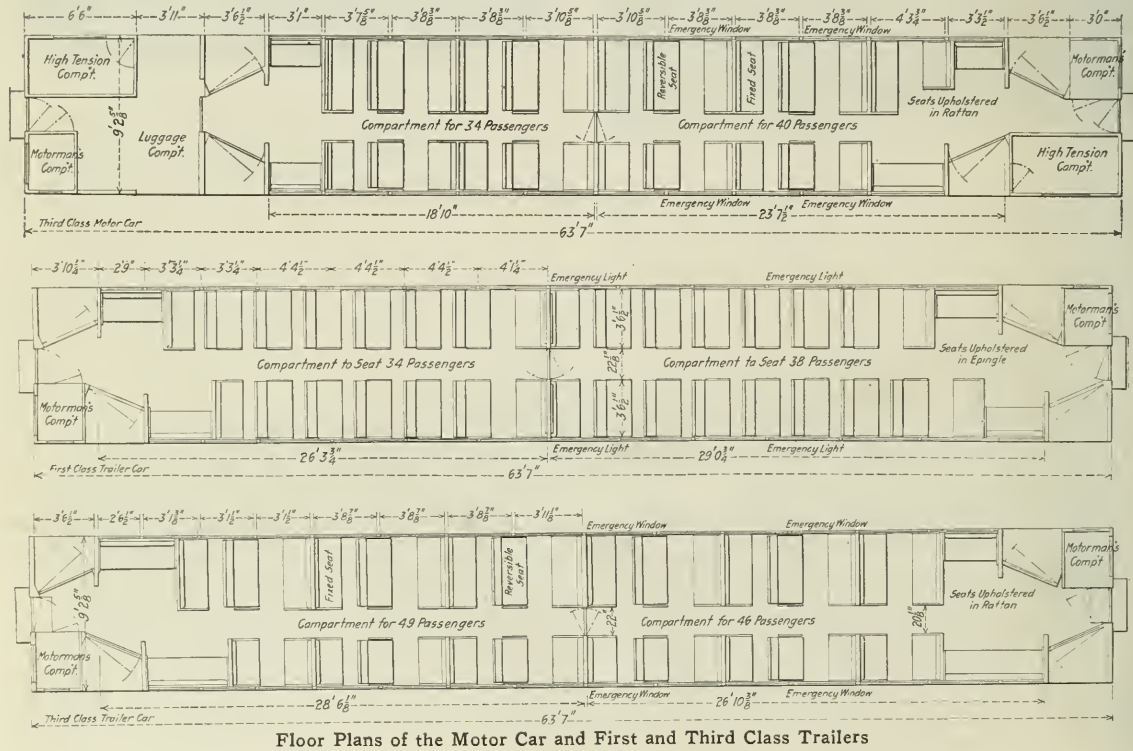
Lancashire & Yorkshire Motor Car

car—that is, three passengers on one large seat on one side of the aisle and two passengers on the other.

In the table is given a comparison of the principal dimensions of the all-metal cars with the composite cars in use on the Liverpool-Southport line and with the all-steel cars in use on the Long Island in the United States. Comparing these trailer cars with those in use on the Long Island Railway, it will be seen that, whereas the Long Island cars are practically the same length, they have a width inside the body of 9 ft. 4½ in. as compared with 8 ft. 11½ in. on the Lancashire & Yorkshire, and they have a seating capacity for 80 passengers as compared with 95 on the Lancashire & Yorkshire cars. The Long Island cars weight 63,100 lb. or 1,860 lb. less than the Lancashire & Yorkville cars, but on account of the seating capacity, due to the fact that the seats provide for only two passengers, the weight of the car per seat is higher, being 788 lb. as against 683.7 lb. for the Lancashire & Yorkshire. The width of the aisle in the third-class coaches with the three-passenger and two-passenger seats is 1 ft. 8⅛-in., and hile that appears to be rather narrow, no great difficulty is experienced in passing down the car. Furthermore, the interior arrangement has been carefully studied and practically every inch has been utilized for seating capacity. A study of the floor plans of the motor, the third-class and first-class trailers gives an indication of this. In comparing the all-metal trailer cars with those in use on the Liverpool-Southport line, it is to be mentioned that the latter cars have a motorman's compartment on one end only and that the Manchester-Bury all-metal trailer cars have underframes of sufficient strength to permit of motor trucks being used. In addition, more brake work is included on the all-metal cars. It has been calculated that these features account for 2,512 lb. of the total weight, which should be deducted when making a comparison. This would make the weight per passenger seat 643.7 lb. for the all-metal car, instead of 683 lb. as shown.

COMPARATIVE TABLE OF CAR DIMENSIONS

	Bury M. U. C.	Liverpool-Southport M. U. C.	Long Island Trailer	Manchester-Bury Trailer	Liverpool-Southport Trailer
Length over all	63 ft. 7 in.	60 ft.	62 ft. 9¾ in.	63 ft. 7 in.	63 ft. 7 in.
Width of body	9 ft. 4 in.	10 ft.	9 ft. 9¾ in.	9 ft. 4 in.	10 ft.
Height of car inside, floor to roof	8 ft. 3½ in.	8 ft. 0½ in.	.....	8 ft. 3½ in.	8 ft. 3½ in.
Height from rail to top of floor	4 ft. 1½ in.	4 ft. 4½ in.	4 ft. 4⅜ in.	4 ft. 1½ in.	4 ft. 4½ in.
Height from rail to top of roof	12 ft. 4½ in.	12 ft. 7⅜ in.	13 ft.	12 ft. 4½ in.	12 ft. 7⅜ in.
Center of trucks	45 ft.	40 ft. 6 in.	39 ft. 9 in.	45 ft.	45 ft.
Wheelbase of trucks	9 ft.	8 ft.	6 ft. 4 in.	10 ft.	10 ft.
Type of roof	Clerestory	Clerestory	.....	Elliptical	Elliptical
Number of passenger seats	74	68	80	95	97
Weight of two trucks complete	62,719 lb.	53,150 lb.	18.000 lb.	22,456 lb.	22,456 lb.
Weight of car unloaded	120,960 lb.	11.420 lb.	63,000 lb.	64,960 lb.	61,768 lb.
Weight per seat	1,634 lb.	1,680 lb.	887 lb.	683.7 lb.	636.7 lb.



Floor Plans of the Motor Car and First and Third Class Trailers

Underframes

The underframe for the three types of cars, that is, the motor, the first and third-class cars, are substantially the multiple unit control system consists of five cars, the leading, center and rear cars being third-class motor cars and the intermediate vehicles first and third-class trailer cars.

same, having a length over end sills of 36 ft. 7 in. The side sills are made up of 3½-in. by 10-in. by ⅜-in. channels. The side sills, however, are further reinforced at the ends by a ½-in. plate riveted to the side sill, which extends 17 ft. 5⅝ in. back of the end sill. The crossbearers are 3-in. by 8-in. alloy steel angles, and the intermediate floor sills are 3-in. by 6-in. by ⅜-in. angles. These are set flush with the top of the side sills and support the "Chanarch" flooring. The side sills are reinforced by 1½-in. truss rods which bear on 5-in. by 8-in. I-beams, located 5 ft. either side of the center of the car. The end sills are 10-in. by 3½-in. channels. The body bolsters are built up of four 3½-in. by 8-in. angles, with ½-in. side plates and cover plates. They are attached to the side sills by steel pressings, and are further reinforced by pressed steel gusset plates. The draft gear is anchored in a 9-in. by 4-in. I-beam extending across the car between the side sills and located about 2 ft. 6 in. back of the end sills. This end construction is further strengthened by four intermediate angles extending between the end sills and the I-beam, two of which are 3-in. by 3-in. and the other two 3-in. by 8-in. by ⅜-in. alloy steel angles. All of these angles have a side plate of ½-in. material.

Interior View of Motor Car During Construction

The intermediate sills and crossbearers on the motor car are cut short just over the trucks in order to provide proper space for the motors.

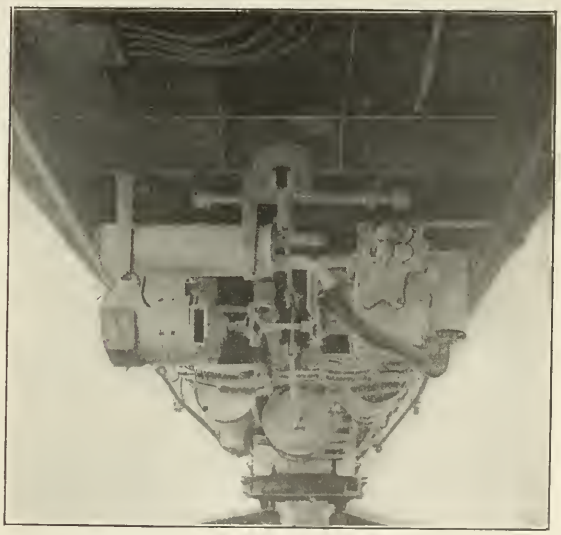
The underframe for the first and third-class trailer cars are practically the same and are only different from the underframe of the motor car in that they have an additional intermediate sill made up of a 2-in. by 3-in. by ¼-in. angles. They are also further strengthened over the trucks by cover plate strips and by two intermediate sills made up of 4-in. by 2½-in. by 5/16-in. angles.

Superstructure

The superstructure is designed to carry part of the load and acts as a continuous side girder to the underframe. It is made up of a bottom side 2-in. by 3-in. by ⅜-in. angle, which is riveted to pressed steel bracelets extending out from the side sill of the underframe to which they are riveted. The side posts and carlines extend in one piece from the side sill to the ridge pole. They are 2½-in. by 1¾-in. alloy-steel channels being bent and riveted to the side sill brackets at the bottom and united at the top by a plate riveted to the webs of the channel. They are equally spaced throughout the center of the car on 3-ft. 10⅞-in. centers. At the ends the spacing is a little closer together. They are braced by a belt rail of 2-in. by 1¾-in. by ¼-in. angles, located approximately 2 ft. 8 in. above the lower angle; by an upper belt rail of 1¼-in. by 1¼-in. by ¼-in. angle, and a side plate or cant rail of 2-in. by 1½-in. by ¼-in. angle. In addition to this there are diagonal braces of 1¼-in. by 1¼-in. by 3/16-in. angles extending from the juncture of the lower belt rail with the side posts to the 2-in. by 3-in. by ⅜-in. angle bottom side rails.

All the longitudinal rails are connected to the side posts by pressed steel knee plates. In addition to the longitudinal rails there extends along the lower part of the body structure a heater duct rail of 2-in. by 1½-in. tee. There are other longitudinal rails extending between the side posts, which give the structure additional strength. The side and roof plates are of aluminum. The roof sheets are made up of aluminum plates 12 ft. by 4 ft. 6¼ in. by No. 14 S. W. G. They are carried in one piece from side to side and are joined to the carlines with 2-in. by 1-in. strips of aluminum, which are well lagged and which are double riveted with ¼-in. aluminum rivets spaced at a 3-in. pitch. In as much as the climate in which these cars are to be run is neither excessively cold nor excessively hot, it was unnecessary to insulate the roof, and as the appearances do not require it no inner roof was used.

The sides of the cars below the windows are sheathed with No. 14 S. W. G. outside aluminum plates and No. 18 S. W. G. inside aluminum plates, with an air space of 1¾ in. between them. The inner sheathing was to improve the appearance of the car and also to serve as insulation. The side window frames are of aluminum and are riveted to the side posts and rails with ¼-in. aluminum rivets. The glass is embedded in felt and secured by a wrought iron frame secured to the main window frame.



Equipment Beneath the Car Underframe

As will be seen from the drawings showing the seating arrangements, some of the seats of third-class cars are placed back to back. The outside ends of these seats are supported on brackets riveted to the side posts.

Doors

The arrangement of the doors is rather unique. In keeping with the all-metal construction of the car, these doors Wakefield Co. (United States). They are hinged on the are of steel, having been furnished by Heywood Bros. & inner door posts and arranged to swing outward, which

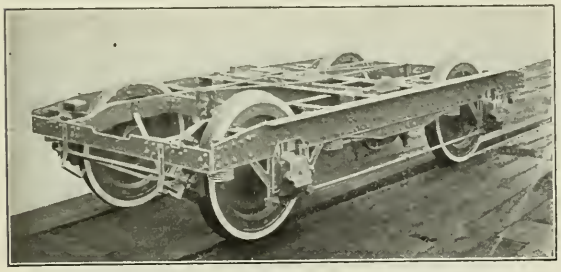
greatly expedites the unloading of the cars. They are fitted with an india-rubber welt in the door check to provide a water-tight joint and to eliminate any metallic sound when the door is closed. They weigh 141 lb. each, as compared to 114 lb. for oak doors.

Trucks

The trucks for the motor and trailer cars are of similar construction, those for the motor cars being built of heavier materials. Both are built up of structural steel, with box girder bolster having a lateral swing of 1½ in. in each direction. Four helical bolster springs are used, and semi-elliptical springs are used over each pedestal. The body framing of the motor truck is made up of 12-in. by 4-in. by ½-in. angles, being provided with heavy gusset plates at the top. The truck bolsters are made up of 8-in. by 3-in. by 1½-in. angles.

The trucks for the trailer cars have a body frame made up of 4-in. by 10-in. by ½-in. side angles and 3-in. by 6-in. by ½-in. end angles. The truck bolsters are built up of 9-in. by 3½-in. by ⅝-in. bulb angles, with 8-in. by 3½-in. by ½-in. angles for the transoms. The side bearers are located 5 ft. 11 9/16 in. between centers.

The motor trucks have a wheel base of 9 ft., which gives ample room for the two 200 hp. motors. The trailer trucks have a wheel base of 10 ft. In both cases the diameter of the wheels is 42 in. and the journals are 9 in. by 4¼ in. for the trailer trucks and 10 in. by 5 in. for the motor trucks. The driving gears for the motor trucks are pressed on to the



Trailer Car Truck

axle, and in addition are bolted to the truck wheels in order to relieve the axle of severe torsional strains.

A gearing ratio of 2.36 to 1 is provided. The clasp type of brake is used on both trucks. The brake shoe is solid and of sufficient hardness to give a mileage of 8,000 miles.

Maintenance

In a paper before the Institute of Civil Engineers a short time ago both George Hughes, chief mechanical engineer, and F. E. Gobey, assistant carriage and wagon superintendent of the Lancashire & Yorkshire, discussed the question of maintenance of these cars. There have been in service for three years 46 of these all-metal cars. They have averaged 250,000 miles per annum and have operated in temperatures varying between 20 deg. F. and 120 deg. F. There has been no weakening since they were first placed into service in any respect. The flooring composition has had no effect whatever on the floor sheets, but the original ⅜-in. thickness upon the top of the sheets is slightly worn in the aisles. It was found that aluminum oxidizes in contact with "Flexolith," and in this case aluminum was replaced with brass.

The removal of the inside panels does not show that any corrosion or sweating has taken place on either body, framing or the inside of the outer panels. The actual car repairs in traffic have been slightly less than for wooden cars during a similar period. The all-metal cars are overhauled every two years, and it is expected that less material and labor will be required on them than for wooden cars. The periodical overhauling of this equipment has already been described in an article published in the *Railage Age* issue of September 26, 1919, page 625. The average total number of faults per month for the 12 months ending July 31, 1919, was 72.4 and the faults per thousand motor-car miles was 0.78, of which the control equipment was responsible for 0.4 and the motor, motor trucks, cars and subsidiary equipment was responsible for 0.38, the largest of which was 0.13 for the subsidiary equipment. The reasons for the defects of the control equipment being so high was on account of the automatic control, which very largely increases the number of small parts.

In comparing the performance of the new all-metal cars with the cars of composite construction used on the Liverpool-Southport line, it is found that the faults per 1,000

Rear End of Car, Showing Damage to Door in Collision

motor-car miles was practically the same, being 0.76 on the Liverpool-Southport line as against 0.78 on the Manchester-Bury line. The greatest trouble in the Liverpool-Southport line was given by the motors, which average 0.26 faults per thousand motor-car miles.

The performance of the all-metal cars in collision has been demonstrated by three collisions that have taken place, in which it was found that the damage to the all-metal cars was confined to the ends of the cars. The doorways are the principal buckling points, which, being at the extreme ends of the cars and having vestibules, absorb the blow. The light car structure minimizes the force of impact and the effects of the collision where the metal framing is suitably disposed. There was no difficulty in carrying out the repairs in the car shops. The metal structure absorbs collision shocks in less space than the wooden cars, with the resultant effect that there is less liability of injury to passengers. The effect of collisions on these all-metal cars is shown in the illustration of the rear of a car.

Text of Railroad Bill as Revised by Conferees

Many Important Changes Adopted, Particularly in Rate-Making and Labor Provisions

Washington, D. C.

FOLLOWING is the complete text of the Esch-Cummins railroad bill as revised by the conference committee of the Senate and the House, submitted to the two houses on Wednesday, February 18. It was planned to allow four hours' debate and to pass it in the House on Saturday and to take it up immediately thereafter in the Senate:

An Act

To provide for the termination of Federal control of railroads and systems of transportation; to provide for the settlement of disputes between carriers and their employees; to further amend an Act entitled "An Act to regulate commerce," approved February 4, 1887, as amended, and for other purposes.

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled,

Title I—Definitions

SECTION 1. This Act may be cited as the "Transportation Act, 1920."

SEC. 2. When used in this Act the term "Interstate Commerce Act" means the Act entitled "An Act to regulate commerce," approved February 4, 1887, as amended;

The term "Commerce Court Act" means the Act entitled "An Act to create a commerce court, and to amend an Act entitled 'An Act to regulate commerce,' approved February 4, 1887, as heretofore amended, and for other purposes," approved June 18, 1910;

The term "Federal Control Act" means the Act entitled "An Act to provide for the operation of transportation systems while under Federal control, for the just compensation of their owners, and for other purposes," approved March 21, 1918, as amended;

The term "Federal control" means the possession, use, control, and operation of railroads and systems of transportation, taken over or assumed by the President under section 1 of the Act entitled "An Act making appropriations for the support of the Army for the fiscal year ending June 30, 1917, and for other purposes," approved August 29, 1916, or under the Federal Control Act; and

The term "Commission" means the Interstate Commerce Commission.

Title II—Termination of Federal Control

SEC. 200. (a) Federal control shall terminate at 12.01 a. m., March 1, 1920; and the President shall then relinquish possession and control of all railroads and systems of transportation then under federal control and cease the use and operation thereof.

(b) Thereafter the President shall not have or exercise any of the powers conferred upon him by the Federal Control Act relating—

(1) To the use or operation of railroads or systems of transportation;

(2) To the control or supervision of the carriers owning or operating them, or of the business or affairs of such carriers;

(3) To their rates, fares, charges, classifications, regulations, or practices;

(4) To the purchase, construction, or other acquisition of boats, barges, tugs, and other transportation facilities on the inland, canal, or coastwise waterways; or (except in pursuance of contracts or agreements entered into before the termination of federal control) of terminals, motive power, cars, or equipment, on or in connection with any railroad or system of transportation;

(5) To the utilization or operation of canals;

(6) To the purchase of securities of carriers, except in pursuance of contracts or agreements entered into before the termination of federal control, or as a necessary or proper incident to the adjustment, settlement, liquidation and winding up of matters arising out of federal control; or

(7) To the use for any of the purposes above stated (except in pursuance of contracts or agreements entered into before the termination of federal control, and except as a necessary or proper incident to the winding up or settling of matters arising out of federal control, and except as provided in section 202) of the revolving fund created by such Act, or of any of the additions thereto made under such Act, or by the Act entitled "An Act to supply a deficiency in the appropriation for carrying out the Act entitled 'An Act to provide for the operation of transportation systems while under federal control, for the just compensation of their owners, and for other purposes,' approved March 21, 1918," approved June 30, 1919.

(c) Nothing in this Act shall be construed as affecting or limiting the power of the President in time of war (under section 1 of the Act entitled "An Act making appropriations for the support of the army for the fiscal year ending June 30, 1917, and for other purposes," approved August 29, 1916) to take possession and assume control of any system of transportation and utilize the same.

Government-Owned Boats on Inland Waterways

SEC. 201. (a) On the termination of federal control, as provided in section 200, all boats, barges, tugs, and other transportation facilities, on the inland, canal, and coastwise waterways (hereinafter in this section called "transportation facilities") acquired by the United States in pursuance of the fourth paragraph of section 6 of the Federal Control Act (except the transportation facilities constituting parts of railroads or transportation systems over which federal control was assumed) are transferred to the secretary of war, who shall operate or cause to be operated such transportation facilities so that the lines of inland water transportation established by or through the President during federal control shall be continued, and assume and carry out all contracts and agreements in relation thereto entered into by or through the President in pursuance of such paragraph prior to the time above fixed for such transfer. All payments under the terms of such contracts, and for claims arising out of the operation of such transportation facilities by or through the President prior to the termination of federal control, shall be made out of moneys available under the provisions of this Act for adjusting, settling, liquidating, and winding up matters arising out of or incident to federal control. Moneys required for such payments shall, from time to time, be transferred to the secretary of war as required for payment under the terms of such contracts.

(b) All other payments after such transfer in connection with the construction, utilization, and operation of any such transportation facilities, whether completed or under construction, shall be made by the secretary of war out of funds now or hereafter made available for that purpose.

(c) The secretary of war is hereby authorized, out of any moneys hereafter made available therefor, to construct or contract for the construction of terminal facilities for the interchange of traffic between the transportation facilities operated by him under this section and other carriers whether by rail or water, and to make loans for such purposes under such terms and conditions as he may determine to any state whose constitution prohibits the ownership of such terminal facilities by other than the state or a political subdivision thereof.

(d) Any transportation facilities owned by the United States and included within any contract made by the United States for operation on the Mississippi river above Saint Louis, the possession of which reverts to the United States at or before the expiration of such contract, shall be operated by the secre-

tary of war so as to provide facilities for water carriage on the Mississippi river above Saint Louis.

(e) The operation of the transportation facilities referred to in this section shall be subject to the provisions of the Interstate Commerce Act as amended by this Act or by subsequent legislation, and to the provisions of the "Shipping Act, 1916," as now or hereafter amended, in the same manner and to the same extent as if such transportation facilities were privately owned and operated; and all such vessels while operated and employed solely as merchant vessels shall be subject to all other laws, regulations, and liabilities governing merchant vessels, whether the United States is interested therein as owner, in whole or in part, or holds any mortgage, lien, or interest therein. For the performance of the duties imposed by this section the secretary of war is authorized to appoint or employ such number of experts, clerks, and other employees as may be necessary for service in the District of Columbia or elsewhere, and as may be provided for by Congress.

Settlement of Matters Arising Out of Federal Control

SEC. 202. The President shall, as soon as practicable after the termination of federal control, adjust, settle, liquidate, and wind up all matters, including compensation, and all questions and disputes of whatsoever nature, arising out of or incident to federal control. For these purposes and for the purpose of making the payments specified in subdivision (a) of section 201, all unexpended balances in the revolving fund created by the Federal Control Act or of the moneys appropriated by the Act entitled "An Act to supply a deficiency in the appropriation for carrying out the Act entitled 'An Act to provide for the operation of transportation systems while under federal control, for the just compensation of their owners, and for other purposes,' approved March 21, 1918," approved June 30, 1919, are hereby reappropriated and made available until expended; and all moneys derived from the operation of the carriers or otherwise arising out of federal control, and all moneys that have been or may be received in payment of the indebtedness of any carrier to the United States arising out of federal control, shall be and remain available until expended for the aforesaid purposes; and there is hereby appropriated for the aforesaid purposes, out of any money in the treasury not otherwise appropriated, $200,000,000 in addition to the above, to be available until expended.

Compensation of Carriers with Which no Contract Has Been Made

SEC. 203. (a) Upon the request of any carrier entitled to just compensation under the Federal Control Act, but with which no contract fixing or waiving compensation has been made and which has made no waiver of compensation, the President: (1) shall pay to it so much of the amount he may determine to be just compensation as may be necessary to enable such carrier to have the sums required for interest, taxes, and other corporate charges and expenses referred to in paragraph (b) of section 7 of the standard contract between the United States and the carriers, accruing during the period for which such carrier is entitled to just compensation under the Federal Control Act, and also the sums required for dividends declared and paid during the same period, including, also, in addition, a sum equal to that proportion of such last dividend which the period between its payment and the termination of the period for which the carrier is entitled to just compensation under the Federal Control Act bears to the last dividend period; and (2) may, in his discretion, pay to such carrier the whole or any part of the remainder of such estimated amount of just compensation.

(b) The acceptance of any benefits by a carrier under this section—

(1) shall not deprive it of the right to claim additional compensation, which, unless agreed upon, shall be ascertained in the manner provided in section 3 of the Federal Control Act; but

(2) shall constitute an acceptance by the carrier of all the provisions of the Federal Control Act as modified by this Act, and obligate the carrier to pay to the United States, with interest at the rate of 6 per centum per annum from a date or dates fixed in proceedings under section 3 of the Federal Control Act, the amount by which the sums received on account of such compensation, under this section or otherwise, exceed the sum found due in such proceedings.

Reimbursement of Deficits During Federal Control

SEC. 204. (a) When used in this section—

The term "carrier" means a carrier by railroad which, during any part of the period of federal control, engaged as a common carrier in general transportation, and competed for traffic, or connected, with a railroad under federal control, and which sustained a deficit in its railway operating income for that portion (as a whole) of the period of federal control during which it operated its own railroad or system of transportation; but does not include any street or interurban electric railway which has as its principal source of operating revenue urban, suburban, or interurban passenger traffic or sale of power, heat, and light, or both; and the term "test period" means the three years ending June 30, 1917.

(b) For the purposes of this section—

Railway operating income or any deficit therein for the period of federal control shall be computed in a manner similar to that provided in section 209 with respect to such income or deficit for the guaranty period; and

Railway operating income or any deficit therein for the test period shall be computed in the manner provided in section 1 of the Federal Control Act.

(c) As soon as practicable after March 1, 1920, the Commission shall ascertain for every carrier, for every month of the period of federal control during which its railroad or system of transportation was not under federal operation, its deficit in railway operating income, if any, and its railway operating income, if any, (hereinafter called "federal control return"), and the average of its deficit in railway operating income, if any, and of its railway operating income, if any, for the three corresponding months of the test period taken together, (hereinafter called "test period return"): *Provided,* That "test period return," in the case of a carrier which operated its railroad or system of transportation for at least one year during, but not for the whole of, the test period, means its railway operating income, or the deficit therein, for the corresponding month during the test period, or the average thereof for the corresponding months during the test period taken together, during which the carrier operated its railroad or system of transportation.

(d) For every month of the period of federal control during which the railroad or system of transportation of the carrier was not under federal operation, the Commission shall then ascertain (1) the difference between its federal control return, if a deficit, and its test period return, if a smaller deficit, or (2) the difference between its test period return, if an income, and its federal control return, if a smaller income, or (3) the sum of its federal control return, if a deficit, plus its test period return, if an income. The sum of such amounts shall be credited to the carrier.

(e) For every such month the Commission shall then ascertain (1) the difference between the carrier's federal control return, if an income, and its test period return, if a smaller income, or (2) the difference between its test period return, if a deficit, and its federal control return, if a smaller deficit, or (3) the sum of its federal control return, if an income, plus its test period return, if a deficit. The sum of such amounts shall be credited to the United States.

(f) If the sum of the amounts so credited to the carrier under subdivision (d) exceeds the sum of the amounts so credited to the United States under subdivision (e), the difference shall be payable to the carrier. In the case of a carrier which operated its railroad or system of transportation for less than a year during, or for none of, the test period, the foregoing computations shall not be used, but there shall be payable to such carrier its deficit in railway operating income for that portion (as a whole) of the period of federal control during which it operated its own railroad or system of transportation.

(g) The Commission shall promptly certify to the secretary of the treasury the several amounts payable to carriers under paragraph (f). The secretary of the treasury is hereby authorized and directed thereupon to draw warrants in favor of each such carrier upon the treasury of the United States for the amount shown in such certificate as payable thereto. An

amount sufficient to pay such warrants is hereby appropriated out of any money in the treasury not otherwise appropriated.

Inspection of Carriers' Records

SEC. 205. The President shall have the right, at all reasonable times until the affairs of federal control are concluded, to inspect the property and records of all carriers whose railroads or systems of transportation were at any time under federal control, whenever such inspection is necessary or appropriate (1) to protect the interests of the United States, or (2) to supervise matters being handled for the United States by agents of the carriers, or (3) to secure information concerning matters arising during federal contol, and such carriers shall provide all reasonable facilities therefor, including the issuance of free transportation to all agents of the President while traveling on official business for these purposes.

Such carriers shall, at their expense, upon the request of the President, or those duly authorized by him, furnish all necessary and proper information and reports compiled from the records made or kept during the period of federal control affecting their respective lines, and shall keep and continue such records and furnish like information and reports compiled therefrom.

Any carrier which refuses or obstructs such inspection, or which willfully fails to provide reasonable facilities therefor, or to furnish such information or reports shall be liable to a penalty of $500 for each day of the continuance of such offense, which shall accrue to the United States and may be recovered in a civil action to be brought by the United States.

Causes of Action Arising Out of Federal Control

SEC. 206. **(a)** Actions at law, suits in equity and proceedings in admiralty, based on causes of action arising out of the possession, use, or operation by the President of the railroad or system of transportation of any carrier (under the provisions of the Federal Control Act, or of the Act of August 29, 1916) of such character as prior to federal control could have been brought against such carrier, may, after the termination of federal control, be brought against an agent designated by the President for such purpose, which agent shall be designated by the President within thirty days after the passage of this Act. Such actions, suits, or proceedings may, within the periods of limitation now prescribed by state or federal statutes but not later than two years from the date of the passage of this Act, be brought in any court which but for federal control would have had jurisdiction of the cause of action had it arisen against such carrier.

(b) Process may be served upon any agent or officer of the carrier operating such railroad or system of transportation, if such agent or officer is authorized by law to be served with process in proceedings brought against such carrier and if a contract has been made with such carrier by or through the President for the conduct of litigation arising out of operation during federal control. If no such contract has been made process may be served upon such agents or officers as may be designated by or through the President. The agent designated by the President under subdivision (a) shall cause to be filed, upon the termination of federal control, in the office of the clerk of each district court of the United States, a statement naming all carriers with whom he has contracted for the conduct of litigation arising out of operation during federal control, and a like statement designating the agents or officers upon whom process may be served in actions, suits, and proceedings arising in respect to railroads or systems of transportation with the owner of which no such contract has been made; and such statements shall be supplemented from time to time, if additional contracts are made or other agents appointed.

(c) Complaints praying for reparation on account of damage claimed to have been caused by reason of the collection or enforcement by or through the President during the period of federal control of rates, fares, charges, classifications, regulations, or practices (including those applicable to interstate, foreign, or intrastate traffic) which were unjust, unreasonable, unjustly discriminatory, or unduly or unreasonably prejudicial, or otherwise in violation of the Interstate Commerce Act, may be filed with the Commission, within one year after the termination of federal control, against the agent designated by the President under subdivision (a), naming in the petition the railroad or system of transportation against which such complaint would have been brought if such railroad or system had not been under federal control at the time the matter complained of took place. The Commission is hereby given jurisdiction to hear and decide such complaints in the manner provided in the Interstate Commerce Act, and all notices and orders in such proceedings shall be served upon the agent designated by the President under subdivision (a).

(d) Actions, suits, proceedings, and reparation claims, of the character above described pending at the termination of federal control shall not abate by reason of such termination, but may be prosecuted to final judgment, substituting the agent designated by the President under subdivision (a).

(e) Final judgments, decrees, and awards in actions, suits, proceedings, or reparation claims, of the character above described, rendered against the agent designated by the President under subdivision (a), shall be promptly paid out of the revolving fund created by section 210.

(f) The period of federal control shall not be computed as a part of the periods of limitation in actions against carriers or in claims for reparation to the Commission for causes of action arising prior to federal control.

(g) No execution or process, other than on a judgment recovered by the United States against a carrier, shall be levied upon the property of any carrier where the cause of action on account of which the judgment was obtained grew out of the possession, use, control, or operation of any railroad or system of transportation by the President under federal control.

Refunding of Carriers' Indebtedness to United States

SEC. 207. (a) As soon as practicable after the termination of federal control the President shall ascertain (1) the amount of the indebtedness of each carrier to the United States, which may exist at the termination of federal control, incurred for additions and betterments made during federal control and properly chargeable to capital account; (2) the amount of indebtedness of such carrier to the United States otherwise incurred; and (3) the amount of the indebtedness of the United States to such carrier arising out of federal control. The amount under clause (3) may be set off against either or both of the amounts under clauses (1) and (2), so far as deemed wise by the President, but only to the extent permitted under any contract now or hereafter made between such carrier and the United States in respect to the matters of federal control, or, where no such contract exists, to the extent permitted under paragraph (b) of section 7 of the standard contract between the United States and the carriers relative to deductions from compensation: *Provided,* That such right of set-off shall not be so exercised as to prevent such carrier from having the sums required for interest, taxes, and other corporate charges and expenses referred to in paragraph (b) of section 7 of such standard contract, accruing during federal control, and also the sums required for dividends declared and paid during federal control, including, also in addition, a sum equal to that proportion of such last dividend which the period between its payment and the termination of federal control bears to the last regular dividend period: *And provided further,* That such right of set-off shall not be exercised unless there shall have first been paid such sums in addition as may be necessary to provide the carrier with working capital in amount not less than one twenty-fourth of its operating expenses for the calendar year 1919.

(b) Any remaining indebtedness of the carrier to the United States in respect to such additions and betterments shall, at the request of the carrier, be funded for a period of ten years from the termination of federal control, or a shorter period at the option of the carrier, with interest at the rate of 6 per centum per annum, payable semi-annually, subject to the right of such carrier to pay, on any interest-payment day, the whole or any part of such indebtedness. Any carrier obtaining the funding of such indebtedness as aforesaid shall give, in the discretion of the President, such security, in such form and upon such terms, as he may prescribe.

(c) If the President and the various carriers, or any of them, shall enter into an agreement for funding, through the medium of car trust certificates, or otherwise, the indebtedness of any such carrier to the United States incurred for equipment ordered for the benefit of such carrier, such

indebtedness so funded shall not be refundable under the foregoing provisions.

(d) Any other indebtedness of any such carrier to the United States which may exist after the settlement of accounts between the United States and the carrier and is then due, shall be evidenced by notes payable in one year from the termination of federal control, or a shorter period at the option of the carrier, with interest at the rate of 6 per centum per annum, and secured by such collateral security as the President may deem it advisable to require.

(e) With respect to any bonds, notes, or other securities acquired, under the provisions of this section or of the Federal Control Act or of the Act entitled "An Act to provide for the reimbursement of the United States for motive power, cars and other equipment ordered for railroads and systems of transportation under federal control, and for other purposes," approved November 19, 1919, the President shall have the right to make such arrangements for extension of the time of payment or for the exchange of any of them for other securities, or partly for cash and partly for securities, as may be provided for in any agreement entered into by him or as may in his judgment seem desirable.

(f) Carriers may, by agreement with the President, issue notes or other evidences of indebtedness, secured by equipment trust agreements, for equipment purchased during federal control by or through the President under section 6 of the Federal Control Act, and allocated to such carriers respectively; and the filing of such equipment trust agreements with the Commission shall constitute notice thereof to all the world.

(g) A carrier may issue evidences of indebtedness pursuant to this section without the authorization or approval of any authority, state or federal, and without compliance with any requirement, state or federal, as to notification.

Existing Rates to Continue in Effect.

Sec. 208. (a) All rates, fares, and charges, and all classifications, regulations, and practices, in any wise changing, affecting, or determining, any part or the aggregate of rates, fares, or charges, or the value of the service rendered, which on February 29, 1920, are in effect on the lines of carriers subject to the Interstate Commerce Act, shall continue in force and effect until thereafter changed by state or federal authority, respectively, or pursuant to authority of law; but prior to September 1, 1920, no such rate, fare, or charge shall be reduced, and no such classification, regulation, or practice shall be changed in such manner as to reduce any such rate, fare, or charge, unless such reduction or change is approved by the Commission.

(b) All divisions of joint rates, fares, or charges, which on February 29, 1920, are in effect between the lines of carriers subject to the Interstate Commerce Act, shall continue in force and effect until thereafter changed by mutual agreement between the interested carriers or by state or federal authorities, respectively.

(c) Any land grant railroad organized under the Act of July 28, 1866 (chapter 300), shall receive the same compensation for transportation of property and troops of the United States as is paid to land grant railroads organized under the Land Grant Act of March 3, 1863, and the Act of July 27, 1866, chapter 278.

Guaranty to Carriers After Termination of Federal Control

Sec. 209. (a) When used in this section—the term "carrier" means (1) a carrier by railroad or partly by railroad and partly by water, whose railroad or system of transportation is under federal control at the time federal control terminates, or which has heretofore engaged as a common carrier in general transportation and competed for traffic, or connected, with a railroad at any time under federal control; and (2) a sleeping car company whose system of transportation is under federal control at the time federal control terminates; but does not include a street or interurban electric railway not under federal control at the time federal control terminates, which has as its principal source of operating revenue urban, suburban, or interurban passenger traffic or sale of power, heat, and light, or both;

The term "guaranty period" means the six months beginning March 1, 1920.

The term "test period" means the three years ending June 30, 1917; and

The term "railway operating income" and other references to accounts of carriers by railroad shall, in the case of a sleeping car company, be construed as indicating the appropriate corresponding accounts in the accounting system prescribed by the Commission.

(b) This section shall not be applicable to any carrier which does not on or before March 15, 1920, file with the Commission a written statement that it accepts all the provisions of this section.

(c) The United States hereby guarantees—

(1) With respect to any carrier with which a contract (exclusive of so-called co-operative contracts or waivers) has been made fixing the amount of just compensation under the Federal Control Act, that the railway operating income of such carrier for the guaranty period as a whole shall not be less than one-half the amount named in such contract as annual compensation, or, where the contract fixed a lump sum as compensation for the whole period of federal operation, that the railway operating income of such carrier for the guaranty period as a whole shall not be less than an amount which shall bear the same proportion to the lump sum so fixed as six months bears to the number of months during which such carrier was under federal operation, including in both cases the increases in such compensation provided for in section 4 of the Federal Control Act;

(2) With respect to any carrier entitled to just compensation under the Federal Control Act, with which such a contract has not been made, that the railway operating income of such carrier for the guaranty period as a whole shall not be less than one-half of the annual amount estimated by the President as just compensation for such carrier under the Federal Control Act, including the increases in such compensation provided for in section 4 of the Federal Control Act. If any such carrier does not accept the President's estimate respecting its just compensation, and if in proceedings under section 3 of the Federal Control Act it is determined that a larger or smaller annual amount is due as just compensation, the guaranty under this paragraph shall be increased or decreased accordingly;

(3) With respect to any carrier, whether or not entitled to just compensation under the Federal Control Act, with which such a contract has not been made, and for which no estimate of just compensation is made by the President, and which for the test period as a whole sustained a deficit in railway operating income, the guaranty shall be a sum equal to (a) the amount by which any deficit in its railway operating income for the guaranty period as a whole exceeds one-half of its average annual deficit in railway operating income for the test period, plus (b) an amount equal to one-half the annual sum fixed by the President under section 4 of the Federal Control Act.

(4) With respect to any carrier not entitled to just compensation under the Federal Control Act, which for the test period as a whole had an average annual railway operating income, that the railway operating income of such carrier for the guaranty period as a whole shall not be less than one-half the average annual railway operating income of such carrier during the test period.

(d) If for the guaranty period as a whole the railway operating income of any carrier entitled to a guaranty under paragraph (1), (2), or (4) of subdivision (c) is in excess of the minimum railway operating income guaranteed in such paragraph, such carrier shall forthwith pay the amount of such excess into the treasury of the United States. If for the guaranty period as a whole the railway operating income of any carrier entitled to a guaranty under paragraph (3) of subdivision (c) is in excess of one-half of the annual sum fixed by the President with respect to such carrier under section 4 of the Federal Control Act, such carrier shall forthwith pay the amount of such excess into the treasury of the United States. The amount so paid into the treasury

of the United States shall be added to the funds made available under section 202 for the purposes indicated in such section. Notwithstanding the provisions of this subdivision, any carrier may retain out of any such excess any amount necessary to enable it to pay its fixed charges accruing during the guaranty period.

(e) For the purposes of this section railway operating income, or any deficit therein, for the test period shall be computed in the manner provided for in section I of the Federal Control Act.

(f) In computing railway operating income, or any deficit therein, for the guaranty period for the purposes of this section—

(1) Debits and credits arising from the accounts, called in the monthly reports to the Commission equipment rents and joint facility rents, shall be included, but debits and credits arising from the operation of such street electric passenger railways, including railways commonly called interurbans, as are not under federal control at the time of termination thereof, shall be excluded;

(2) Proper adjustments shall be made (a) in case any lines which were, during any portion of the period of federal control, a part of the railroad or system of transportation of the carrier, and whose railway operating income was included in such income of the carrier for the test period, do not continue to be a part of such railroad or system of transportation during the entire guaranty period, and (b) in case of any lines acquired by, leased to, or consolidated with, the railroad or system of transportation of the carrier at any time since the end of the test period and prior to the expiration of the guaranty period, for which separate operating returns to the Commission are not made in respect to the entire portion of the guaranty period;

(3) There shall not be included in operating expenses, for maintenance of way and structures, or for maintenance of equipment, more than an amount fixed by the Commission. In fixing such amount the Commission shall so far as practicable apply the rule set forth in the proviso in paragraph (a) of section 5 of the "standard contract" between the United States and the carriers (whether or not such contract has been entered into with the carrier whose railway operating income is being computed);

(4) There shall not be included any taxes paid under Title I or II of the Revenue Act of 1917, or such portion of the taxes paid under Title II or III of the Revenue Act of 1918 as by the terms of such Act are to be treated as levied by an Act in amendment of Title I or II of the Revenue Act of 1917; and

(5) The Commission shall require the elimination and restatement of the operating expenses and revenues (other than for maintenance of way and structures, or maintenance of equipment) for the guaranty period, to the extent necessary to correct and exclude any disproportionate or unreasonable charge to such expenses or revenues for such period, or any charge to such expenses or revenues for such period which, under a proper system of accounting is attributable to another period.

(g) The Commission shall, as soon as practicable after the expiration of the guaranty period, ascertain and certify to the secretary of the treasury the several amounts necessary to make good the foregoing guaranty to each carrier. The secretary of the treasury is hereby authorized and directed thereupon to draw warrants in favor of each such carrier upon the treasury of the United States, for the amount shown in such certificate as necessary to make good such guaranty. An amount sufficient to pay such warrants is hereby appropriated out of any money in the treasury not otherwise appropriated.

(h) Upon application of any carrier to the Commission, asking that during the guaranty period there may be advanced to it from time to time such sums, not in excess of the estimated amount necessary to make good the guaranty, as are necessary to enable it to meet its fixed charges and operating expenses, the Commission may certify to the secretary of the treasury the amount of, and times at which, such advances, if any, shall be made. The secretary of the treasury, on receipt of such certificate, is authorized and directed to make the advances in the amounts and at the time, specified in the certificate, upon the execution by the carrier of a contract, secured in such manner as the secretary may determine, that upon final determination of the amount of the guaranty provided for by this section such carrier will repay to the United States any amounts which it has received from such advances in excess of the guaranty, with interest at the rate of 6 per centum per annum from the time such excess was paid. There is hereby appropriated, out of any money in the treasury not otherwise appropriated, a sum sufficient to enable the secretary of the treasury to make the advances referred to in this subdivision.

American Railway Express Company

(i) If the American Railway Express Company shall, on or before March 15, 1920, file with the Commission a written statement that it accepts all the provisions of this subdivision, the contract of June 26, 1918, between such company and the director general of railroads, as amended and continued by agreement dated November 21, 1918, shall remain in full force and effect during the guaranty period in so far as the same constitutes a guaranty on the part of the United States to such company against a deficit in operating income.

In computing operating income, and any deficit therein, for the guaranty period for the purposes of this subdivision, the Commission shall require the elimination and restatement of the operating expenses and revenues for the guaranty period, to the extent necessary to correct and exclude any abnormal or unreasonable charge to such expenses or revenues for such period, or any charge to such expenses or revenues for such period which under a proper system of accounting is attributable to another period, and to exclude from operating expenses so much of the charge for payment for express privileges to carriers on whose lines the express traffic is carried as is in excess of 50.25 per centum of gross express revenue.

For the guaranty period the American Railway Express Company shall pay to every carrier which accepts the provisions of this section, as provided in subdivision (b) hereof, 50.25 per centum of the gross revenue earned on the transportation of all its express traffic on the carrier's lines, and every such carrier shall accept from the American Railway Express Company such percentage of the gross revenue as its compensation. In arriving at the gross revenue on through or joint express traffic, the method of dividing the revenue between the carriers shall be that agreed upon between the carriers and such express company and approved by the Commission.

If for the guaranty period as a whole the American Railway Express Company does not have a deficit in operating income, it shall forthwith pay the amount of its operating income for such period into the treasury of the United States. The amount so paid shall be added to the funds made available under section 202 for the purposes indicated in such section.

The Commission shall, as soon as practicable after the expiration of the guaranty period, certify to the secretary of the treasury the amount necessary to make good the foregoing guaranty to the American Railway Express Company. The secretary of the treasury is hereby authorized and directed thereupon to draw warrants in favor of such company upon the treasury of the United States for the amount shown in such certificate as necessary to make good such guaranty. An amount sufficient to pay such warrants is hereby appropriated out of any money in the treasury not otherwise appropriated.

Upon application of the American Railway Express Company to the Commission, asking that during the guaranty period there may be advanced to it from time to time such sums, not in excess of the estimated amount necessary to make good the guaranty, as are necessary to enable it to meet its operating expenses, the Commission may certify to the secretary of the treasury the amount of, and times at which, such advances, if any, shall be made. The secretary of the treasury, on receipt of such certificate, is authorized and directed to make the advances in the amounts and at the times specified in the certificate, upon the execution by such company of a contract, secured in such manner as the secretary may determine, that upon final determination of the amount of the guaranty provided for by this subdivision such company will repay to the United States any amounts which it has received from such advances in excess of the guaranty, with interest at the rate of 6 per centum per annum from the time such excess was paid. There is hereby appropriated out of any money in the treasury not otherwise appropriated a sum sufficient to enable the secretary of the treasury to make the advances referred to in this subdivision.

New Loans to Railroads

Sec. 210. (a) For the purpose of enabling carriers by railroad subject to the Interstate Commerce Act properly to serve

the public during the transition period immediately following the termination of federal control, any such carrier may, at any time after the passage of this Act and before the expiration of two years after the termination of federal control, make application to the Commission for a loan from the United States, setting forth the amount of the loan and the term for which it is desired, the purpose of the loan and the uses to which it will be applied, the present and prospective ability of the applicant to repay the loan and meet the requirements of its obligations in that regard, the character and value of the security offered, and the extent to which the public convenience and necessity will be served. The application shall be accompanied by statements showing such facts and details as the Commission may require with respect to the physical situation, ownership, capitalization, indebtedness, contract obligations, operation, and earning power of the applicant, together with such other facts relating to the propriety and expediency of granting the loan applied for and the ability of the applicant to make good the obligation, as the Commission may deem pertinent to the inquiry.

(b) If the Commission, after such hearing and investigation, with or without notice, as it may direct, finds that the making, in whole or in part, of the proposed loan by the United States is necessary to enable the applicant properly to meet the transportation needs of the public, and that the prospective earning power of the applicant and the character and value of the security offered are such as to furnish reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor, and to meet its other obligations in connection with such loan, the Commission may certify to the secretary of the treasury its findings of fact and its recommendations as to: the amount of the loan which is to be made; the time, not exceeding five years from the making thereof, within which it is to be repaid; the character of the security which is to be offered therefor; and the terms and conditions of the loan.

(c) Upon receipt of such certificate from the Commission, the secretary of the treasury, at any time before the expiration of twenty-six months after the termination of federal control, is authorized to make a loan, not exceeding the maximum amount recommended in such certificate, out of any moneys in the revolving fund provided for in this section. All such loans shall bear interest at the rate of 6 per centum per annum, payable semi-annually to the secretary of the treasury and to be placed to the credit of the revolving fund provided for in this section. The time, not exceeding five years from the making thereof, within which such loan is to be repaid, the security which is to be taken therefor, which shall be adequate to secure the loan, the terms and conditions of the loan, and the form of the obligation to be entered into, shall be prescribed by the secretary of the treasury.

(d) The Commission or the secretary of the treasury may call upon the Federal Reserve Board for advice and assistance with respect to any such application or loan.

(e) There is hereby appropriated out of any moneys in the treasury not otherwise appropriated the sum of $300,000,000, which shall be used as a revolving fund for the purpose of making the loans provided for in this section, and for paying the judgments, decrees, and awards referred to in subdivision (e) of section 206.

(f) A carrier may issue evidences of indebtedness to the United States pursuant to this section without the authorization or approval of any authority, state or federal, and without compliance with any requirement, state or federal, as to notification.

Execution of Powers of President

Sec. 211. All powers and duties conferred or imposed upon the President by the preceding section of this Act, except the designation of the agent under section 206, may be executed by him through such agency or agencies as he may determine.

Title III—Disputes Between Carriers and Their Employees and Subordinate Officials

Sec. 300. When used in this title—

(1) The term "carrier" includes any express company, sleeping car company, and any carrier by railroad, subject to the Interstate Commerce Act, except a street, interurban, or suburban electric railway not operating as a part of a general steam railroad system of transportation;

(2) The term "Adjustment Board" means any Railway Board of Labor Adjustment established under section 302;

(3) The term "Labor Board" means the Railroad Labor Board;

(4) The term "commerce" means commerce among the several states or between any state, territory, or the District of Columbia and any foreign nation, or between any territory or the District of Columbia and any state, or between any territory and any other territory, or between any territory and the District of Columbia, or within any territory or the District of Columbia, or between points in the same state but through any other state or any territory or the District of Columbia or any foreign nation; and

(5) The term "subordinate official" includes officials of carriers of such class or rank as the Commission shall designate by regulation formulated and issued after such notice and hearing as the Commission may prescribe, to the carriers, and employees and subordinate officials of carriers, and organizations thereof, directly to be affected by such regulations.

Sec. 301. It shall be the duty of all carriers and their officers, employees, and agents to exert every reasonable effort and adopt every available means to avoid any interruption to the operation of any carrier growing out of any dispute between the carrier and the employees or subordinate officials thereof. All such disputes shall be considered and, if possible, decided in conference between representatives designated and authorized so to confer by the carriers, or the employees or subordinate officials thereof, directly interested in the dispute. If any dispute is not decided in such conference, it shall be referred by the parties thereto to the board which under the provisions of this title is authorized to hear and decide such dispute.

Sec. 302. Railroad Boards of Labor Adjustment may be established by agreement between any carrier, group of carriers, or the carriers as a whole, and any employees or subordinate officials of carriers, or organization or group of organizations thereof.

Sec. 303. Each such Adjustment Board shall, (1) upon the application of the chief executive of any carrier or organization of employees or subordinate officials whose members are directly interested in the dispute, (2) upon the written petition signed by 100 unorganized employees or subordinate officials directly interested in the dispute, (3) upon the Adjustment Board's own motion, or (4) upon the request of the Labor Board whenever such board is of the opinion that the dispute is likely substantially to interrupt commerce, receive for hearing, and as soon as practicable and with due diligence decide, any dispute involving only grievances, rules, or working conditions, not decided as provided in section 301, between the carrier and its employees or subordinate officials, who are, or any organization thereof which is, in accordance with the provisions of section 302, represented upon any such Adjustment Board.

Sec. 304. There is hereby established a board to be known as the "Railroad Labor Board" and to be composed of nine members as follows:

(1) Three members constituting the labor group, representing the employees and subordinate officials of the carriers, to be appointed by the President, by and with the advice and consent of the Senate, from not less than six nominees whose nominations shall be made and offered by such employees in such manner as the Commission shall by regulation prescribe;

(2) Three members, constituting the management group, representing the carriers, to be appointed by the President, by and with the advice and consent of the Senate, from not less than six nominees whose nominations shall be made and offered by the carriers in such manner as the Commission shall by regulation prescribe; and

(3) Three members, constituting the public group, representing the public, to be appointed directly by the President, by and with the advice and consent of the Senate.

Any vacancy on the Labor Board shall be filled in the same manner as the original appointment.

Sec. 305. If either the employees or the carriers fail to make nominations and offer nominees in accordance with the regulations of the Commission, as provided in paragraphs (1) and (2) of section 304, within thirty days after the passage of this Act in case of any original appointment to the office of member of the Labor Board, or in case of a vacancy in any such office within fifteen days after such vacancy occurs, the President shall thereupon directly make the appointment, by and with the advice and consent of the Senate. In making any such appointment the President shall, as far as he deems it

practicable, select an individual associated in interest with the carriers or employees thereof, whichever he is to represent.

Sec. 306. (a) Any member of the Labor Board who during his term of office is an active member or in the employ of or holds any office in any organization of employees or subordinate officials, or any carrier, or owns any stock or bond thereof, or is pecuniarily interested therein, shall at once become ineligible for further membership upon the Labor Board; but no such member is required to relinquish honorary membership in, or his rights in any insurance or pension or other benefit fund maintained by, any organization of employees or subordinate officials or by a carrier.

(b) Of the original members of the Labor Board, one from each group shall be appointed for a term of three years, one for two years, and one for one year. Their successors shall hold office for terms of five years, except that any member appointed to fill a vacancy shall be appointed only for the unexpired term of the member whom he succeeds. Each member shall receive from the United States an annual salary of $10,000. A member may be removed by the President for neglect of duty or malfeasance in office, but for no other cause.

Sec. 307. (a) The Labor Board shall hear, and as soon as practicable and with due diligence decide, any dispute involving grievances, rules, or working conditions, in respect to which any Adjustment Board certifies to the Labor Board that in its opinion the Adjustment Board has failed or will fail to reach a decision within a reasonable time, or in respect to which the Labor Board determines that any Adjustment Board has so failed or is not using due diligence in its consideration thereof. In case any Adjustment Board is not organized under the provisions of section 302, the Labor Board, (1) upon the application of the chief executive of any carrier or organization of employees or subordinate officials whose members are directly interested in the dispute, (2) upon a written petition signed by 100 unorganized employees or subordinate officials directly interested in the dispute, or (3) upon the Labor Board's own motion if it is of the opinion that the dispute is likely substantially to interrupt commerce, shall receive for hearing, and as soon as practicable and with due diligence decide, any dispute involving grievances, rules, or working conditions which is not decided as provided in section 301 and which such Adjustment Board would be required to receive for hearing and decision under the provisions of section 303.

(b) The Labor Board, (1) upon the application of the chief executive of any carrier or organization of employees or subordinate officials whose members are directly interested in the dispute, (2) upon a written petition signed by 100 unorganized employees or subordinate officials directly interested in the dispute, or (3) upon the Labor Board's own motion if it is of the opinion that the dispute is likely substantially to interrupt commerce, shall receive for hearing, and as soon as practicable and with due diligence decide, all disputes with respect to the wages or salaries of employees or subordinate officials of carriers, not decided as provided in section 301. The Labor Board may upon its own motion within ten days after the decision, in accordance with the provisions of section 301, of any dispute with respect to wages or salaries of employees or subdinate officials of carriers, suspend the operation of such decision if the Labor Board is of the opinion that the decision involves such an increase in wages or salaries as will be likely to necessitate a substantial readjustment of the rates of any carrier. The Labor Board shall hear any decision so suspended and as soon as practicable and with due diligence decide to affirm or modify such suspended decision.

(c) A decision by the Labor Board under the provisions of paragraphs (a) or (b) of this section shall require the concurrence therein of at least 5 of the 9 members of the Labor Board: *Provided*, That in case of any decision under paragraph (b), at least one of the representatives of the public shall concur in such decision. All decisions of the Labor Board shall be entered upon the records of the board and copies thereof, together with such statement of facts bearing thereon as the board may deem proper, shall be immediately communicated to the parties to the dispute, the President, each Adjustment Board, and the Commission, and shall be given further publicity in such manner as the Labor Board may determine.

(d) All the decisions of the Labor Board in respect to wages or salaries and of the Labor Board or an Adjustment Board in respect to working conditions of employees or subordinate officials of carriers shall establish rates of wages and salaries and standards of working conditions which in the opinion of the board are just and reasonable. In determining the justness and reasonableness of such wages and salaries or working conditions the board shall, so far as applicable, take into consideration among other relevant circumstances:

(1) The scales of wages paid for similar kinds of work in other industries;

(2) The relation between wages and the cost of living;

(3) The hazards of the employment;

(4) The training and skill required;

(5) The degree of responsibility;

(6) The character and regularity of the employment; and

(7) Inequalities of increases in wages or of treatment, the result of previous wage orders or adjustments.

Sec. 308. The Labor Board—

(1) Shall elect a chairman by majority vote of its members;

(2) Shall maintain central offices in Chicago, Illinois, but the Labor Board may, whenever it deems it necessary, meet at such other place as it may determine;

(3) Shall investigate and study the relations between carriers and their employees, particularly questions relating to wages, hours of labor, and oher conditions of employment and the respective privileges, rights, and duties of carriers and employees, and shall gather, compile, classify, digest, and publish, from time to time, data and information relating to such questions to the end that the Labor Board may be properly equipped to perform its duties under this title and that the members of the Adjustment Boards and the public may be properly informed;

(4) May make regulations necessary for the efficient execution of the functions vested in it by this title; and

(5) Shall at least annually collect and publish the decisions and regulations of the Labor Board and the Adjustment Boards and all court and administrative decisions and regulations of the Commission in respect to this title, together with a cumulative index-digest thereof.

Sec. 309. Any party to any dispute to be considered by an Adjustment Board or by the Labor Board shall be entitled to a hearing either in person or by counsel.

Sec. 310. (a) For the efficient administration of the functions vested in the Labor Board by this title, any member thereof may require, by subpœna issued and signed by himself, the attendance of any witness and the production of any book, paper, document, or other evidence from any place in the United States at any designated place of hearing, and the taking of a deposition before any designated person having power to administer oaths. In the case of a deposition the testimony shall be reduced to writing by the person taking the deposition or under his direction, and shall then be subscribed to by the deponent. Any member of the Labor Board may administer oaths and examine any witness. Any witness summoned before the board and any witness whose deposition is taken shall be paid the same fees and mileage as are paid witnesses in the courts of the United States.

(b) In case of failure to comply with any subpœna or in case of the contumacy of any witness appearing before the Labor Board, the board may invoke the aid of any United States district court. Such court may thereupon order the witness to comply with the requirements of such subpœna, or to give evidence touching the matter in question, as the case may be. Any failure to obey such order may be punished by such court as a contempt thereof.

(c) No person shall be excused from so attending and testifying or deposing, nor from so producing any book, paper, document, or other evidence on the ground that the testimony or evidence, documentary or otherwise, required of him may tend to incriminate him or subject him to a penalty or forfeiture; but no natural person shall be prosecuted or subjected to any penalty or forfeiture for or on account of any transaction, matter, or thing, as to which in obedience to a subpœna and under oath, he may so testify or produce evidence, documentary or otherwise. But no person shall be exempt from prosecution and punishment for perjury committed in so testifying.

Sec. 311. (a) When necessary to the efficient administration of the functions vested in the Labor Board by this title, any member, officer, employee, or agent thereof, duly authorized in writing by the board, shall at all reasonable times for the purpose of examination have access to and the right to copy any book, account, record, paper, or correspondence relating to any matter which the board is authorized to consider or investigate. Any person who upon demand refuses any duly authorized member, officer, employee, or agent of the Labor Board such right of access

or copying, or hinders, obstructs, or resists him in the exercise of such right, shall upon conviction thereof be liable to a penalty of $500 for each such offense. Each day during any part of which such offense continues shall constitute a separate offense. Such penalty shall be recoverable in a civil suit brought in the name of the United States, and shall be covered into the Treasury of the United States as miscellaneous receipts.

(b) Every officer or employee of the United States, whenever requested by any member of the Labor Board or an Adjustment Board duly authorized by the board for the purpose, shall supply to such board any data or information pertaining to the administration of the functions vested in it by this title, which may be contained in the records of his office.

(c) The President is authorized to transfer to the Labor Board any books, papers, or documents pertaining to the administration of the functions vested in the board by this title, which are in the possession of any agency, or railway board of adjustment in connection therewith, established for executing the powers granted the President under the Federal Control Act and which are no longer necessary to the administration of the affairs of such agency.

SEC. 312. Prior to September 1, 1920, each carrier shall pay to each employee or subordinate official thereof wages or salary at a rate not less than that fixed by the decision of any agency, or railway board of adjustment in connection therewith, established for executing the powers granted the President under the Federal Control Act, in effect in respect to such employe or subordinate official immediately preceding 12.01 a. m. March 1, 1920. Any carrier acting in violation of any provision of this section shall upon conviction thereof be liable to a penalty of $100 for each such offense. Each such action with respect to any such employee or subordinate official and each day or portion thereof during which the offense continues shall constitute a separate offense. Such penalty shall be recoverable in a civil suit brought in the name of the United States, and shall be covered into the treasury of the United States as miscellaneous receipts.

SEC. 313. The Labor Board, in case it has reason to believe that any decision of the Labor Board or of an Adjustment Board is violated by any carrier, or employee or subordinate official, or organization thereof, may upon its own motion after due notice and hearing to all persons directly interested in such violation, determine whether in its opinion such violation has occurred and make public its decision in such manner as it may determine.

SEC. 314. The Labor Board may (1) appoint a secretary, who shall receive from the United States an annual salary of $5,000; and (2) subject to the provisions of the civil service laws, appoint and remove such officers ,employees, and agents; and make such expenditures for rent, printing, telegrams, telephone, law books, books of reference, periodicals, furniture, stationery, office equipment, and other supplies and expenses, including salaries, traveling expenses of its members, secretary, officers, employees, and agents, and witness fees, as are necessary for the efficient execution of the functions vested in the board by this title and as may be provided for by Congress from time to time. All of the expenditures of the Labor Board shall be allowed and paid upon the presentation of itemized vouchers therefor approved by the chairman of the Labor Board.

SEC. 315. There is hereby appropriated for the fiscal year ending June 30, 1920, out of any money in the Treasury not otherwise appropriated, the sum of $50,000, or so much thereof as may be necessary, to be expended by the Labor Board, for defraying the expenses of the maintenance and establishment of the board, including the payment of salaries as provided in this title.

SEC. 316. The powers and duties of the Board of Mediation and Conciliation created by the Act approved July 15, 1913, shall not extend to any dispute which may be received for hearing and decision by any Adjustment Board or the Labor Board.

Title IV—Amendments to Interstate Commerce Act

SEC. 400. The first four paragraphs of section 1 of the Interstate Commerce Act, as such paragraphs appear in section 7 of the Commerce Court Act, are hereby amended to read as follows:

"(1) That the provisions of this Act shall apply to common carriers engaged in—

"(a) The transportation of passengers or property wholly by railroad, or partly by railroad and partly by water when both are used under a common control, management, or arrangement for a continuous carriage or shipment; or

"(b) The transportation of oil or other commodity, except water and except natural or artificial gas, by pipe line, or partly by pipe line and partly by railroad or by water; or

"(c) The transmission of intelligence by wire or wireless;— from one state or territory of the United States, or the District of Columbia, to any other state or territory of the United States, or the District of Columbia, or from one place in a territory to another place in the same territory, or from any place in the United States through a foreign country to any other place in the United States, or from or to any place in the United States to or from a foreign country, but only in so far as such transportation or transmission takes place within the United States.

"(2) The provisions of this Act shall also apply to such transportation of passengers and property and transmission of intelligence, but only in so far as such transportation or transmission takes place within the United States, but shall not apply—

"(a) To the transportation of passengers or property, or to the receiving, delivering, storage, or handling of property, wholly within one state and not shipped to or from a foreign country from or to any place in the United States as aforesaid;

"(b) To the transmission of intelligence by wire or wireless wholly within one state and not transmitted to or from a foreign country from or to any place in the United States as aforesaid; or

"(c) To the transportation of passengers or property by a carrier by water where such transportation would not be subject to the provisions of this Act except for the fact that such carrier absorbs, out of its port-to-port water rates or out of its proportional through rates, any switching, terminal, lighterage, car rental, trackage, handling, or other charges by a rail carrier for services within the switching, draying, lighterage, or corporate limits of a port terminal or district.

"(3) The term 'common carrier' as used in this Act shall include all pipe-line companies; telegraph, telephone, and cable companies operating by wire or wireless; express companies; sleeping-car companies; and all persons, natural or artificial, engaged in such transportation or transmission as aforesaid as common carriers for hire. Wherever the word 'carrier' is used in this Act it shall be held to mean 'common carrier.' The term 'railroad' as used in this Act shall include all bridges, car floats, lighters, and ferries used by or operated in connection with any railroad, and also all the road in use by any common carrier operating a railroad, whether owned or operated under a contract, agreement, or lease, and also all switches, spurs, tracks, terminals, and terminal facilities of every kind used or necessary in the transportation of the persons or property designated herein, including all freight depots, yards, and grounds, used or necessary in the transportation or delivery of any such property. The term 'transportation' as used in this Act shall include locomotives, cars, and other vehicles, vessels, and all instrumentalities and facilities of shipment or carriage, irrespective of ownership or of any contract, express of implied, for the use thereof, and all services in connection with the receipt, delivery, elevation, and transfer in transit, ventilation, refrigeration or icing, storage, and handling of property transported. The term 'transmission' as used in this Act shall include the transmission of intelligence through the application of electrical energy or other use of electricity, whether by means of wire, cable, radio apparatus, or other wire or wireless conductors or appliances, and all instrumentalities and facilities for and services in connection with the receipt, forwarding, and delivery of messages, communications, or other intelligence so transmitted, hereinafter also collectively called messages.

"(4) It shall be the duty of every common carrier subject to this Act engaged in the transportation of passengers or property to provide and furnish such transportation upon reasonable request therefor, and to establish through routes and just and reasonable rates, fares, and charges applicable thereto, and to provide reasonable facilities for operating through routes and to make reasonable rules and regulations with respect to the operation of through routes, and providing for reasonable compensation to those entitled thereto; and in case of joint rates, fares, or charges, to establish just, reasonable, and equitable divisions thereof as between the carriers subject to this Act

participating therein which shall not unduly prefer or prejudice any of such participating carriers.

"(5) All charges made for any service rendered or to be rendered in the transportation of passengers or property or in the transmission of intelligence by wire or wireless as aforesaid, or in connection therewith, shall be just and reasonable, and every unjust and unreasonable charge for such service or any part thereof is prohibited and declared to be unlawful: *Provided,* That messages by wire or wireless subject to the provisions of this Act may be classified into day, night, repeated, unrepeated, letter, commercial, press, government, and such other classes as are just and reasonable, and different rates may be charged for the different classes of messages: *And provided further,* That nothing in this Act shall be construed to prevent telephone, telegraph, and cable companies from entering into contracts with common carriers for the exchange of services.

"(6) It is hereby made the duty of all common carriers subject to the provisions of this Act to establish, observe, and enforce just and reasonable classifications of property for transportation, with reference to which rates, tariffs, regulations, or practices are or may be made or prescribed, and just and reasonable regulations and practices affecting classifications, rates, or tariffs, the issuance, form, and substance of tickets, receipts, and bills of lading, the manner and method of presenting, marking, packing, and delivering property for transportation, the facilities for transportation, the carrying of personal, sample, and excess baggage, and all other matters relating to or connected with the receiving, handling, transporting, storing, and delivery of property subject to the provisions of this Act which may be necessary or proper to secure the safe and prompt receipt, handling, transportation, and delivery of property subject to the provisions of this Act upon just and reasonable terms, and every unjust and unreasonable classification, regulation, and practice is prohibited and declared to be unlawful."

SEC. 401. The fifth, sixth, and seventh paragraphs of section 1 of the Interstate Commerce Act, as such paragraphs appear in section 7 of the Commerce Court Act, are hereby amended by inserting "(7)" at the beginning of such fifth paragraph, "(8)" at the beginning of such sixth paragraph, and "(9)" at the beginning of such seventh paragraph.

Car Service

SEC. 402. The paragraphs added to section 1 of the Interstate Commerce Act by the Act entitled "An Act to amend an Act entitled 'An Act to regulate commerce,' as amended, in respect of car service, and for other purposes," approved May 29, 1917 ,are hereby amended to read as follows:

"(10) The term 'car service' in this Act shall include the use, control, supply, movement, distribution, exchange, interchange, and return of locomotives, cars, and other vehicles used in the transportation of property, including special types of equipment, and the supply of trains, by any carrier by railroad subject to this Act.

"(11) It shall be the duty of every carrier by railroad subject to this Act to furnish safe and adequate car service and to establish, observe, and enforce just and reasonable rules, regulations, and practices with respect to car service; and every unjust and unreasonable rule, regulation, and practice with respect to car service is prohibited and declared to be unlawful.

"(12) It shall also be the duty of every carrier by railroad to make just and reasonable distribution of cars for transportation of coal among the coal mines served by it, whether located upon its line or lines or customarily dependent upon it for car supply. During any period when the supply of cars available for such service does not equal the requirements of such mines it shall be the duty of the carrier to maintain and apply just and reasonable ratings of such mines and to count each and every car furnished to or used by any such mine for transportation of coal against the mine. Failure or refusal so to do shall be unlawful, and in respect of each car not so counted shall be deemed a separate offense, and the carrier, receiver, or operating trustee so failing or refusing shall forfeit to the United States the sum of $100 for each offense, which may be recovered in a civil action brought by the United States.

"(13) The Commission is hereby authorized by general or special orders to require all carriers by railroad subject to this Act, or any of them, to file with it from time to time their rules and regulations with respect to car service, and the Commission may, in its discretion, direct that such rules and regulations shall be incorporated in their schedules showing rates, fares, and charges for transportation, and be subject to any or all of the provisions of this Act relating thereto.

"(14) The Commission may, after hearing, on a complaint or upon its own initiative without complaint, establish reasonable rules, regulations, and practices with respect to car service by carriers by railroad subject to this Act, including the compensation to be paid for the use of any locomotive, car, or other vehicle not owned by the carrier using it, and the penalties or other sanctions for nonobservance of such rules, regulations or practices.

"(15) Whenever the Commission is of opinion that shortage of equipment, congestion of traffic, or other emergency requiring immediate action exists in any section of the country, the Commission shall have, and it is hereby given, authority, either upon complaint or upon its own initiative without complaint, at once, if it so orders, without answer or other formal pleading by the interested carrier or carriers, and with or without notice, hearing, or the making or filing of a report, according as the Commission may determine: (a) to suspend the operation of any or all rules, regulations, or practices then established with respect to car service for such time as may be determined by the Commission; (b) to make such just and reasonable directions with respect to car service without regard to the ownership as between carriers of locomotives, cars, and other vehicles, during such emergency as in its opinion will best promote the service in the interest of the public and the commerce of the people, upon such terms of compensation as between the carriers as they may agree upon, or, in the event of their disagreement, as the Commission may after subsequent hearing find to be just and reasonable; (c) to require such joint or common use of terminals, including main-line track or tracks for a reasonable distance outside of such terminals, as in its opinion will best meet the emergency and serve the public interest, and upon such terms as between the carriers as they may agree upon, or, in the event of their disagreement, as the Commission may after subsequent hearing find to be just and reasonable; and (d) to give directions for preference or priority in transportation, embargoes, or movement of traffic under permits, at such time and for such periods as it may determine, and to modify, change, suspend, or annul them. In time of war or threatened war the President may certify to the Commission that it is essential to the national defense and security that certain traffic shall have preference or priority in transportation, and the Commission shall, under the power herein conferred, direct that such preference or priority be afforded.

"(16) Whenever the Commission is of opinion that any carrier by railroad subject to this Act is for any reason unable to transport the traffic offered it so as properly to serve the public, it may, upon the same procedure as provided in paragraph (15), make such just and reasonable directions with respect to the handling, routing, and movement of the traffic of such carrier and its distribution over other lines of roads, as in the opinion of the Commission will best promote the service in the interest of the public and the commerce of the people, and upon such terms as between the carriers as they may agree upon, or, in the event of their disagreement, as the Commission may after subsequent hearing find to be just and reasonable.

"(17) The directions of the Commission as to car service and to the matters referred to in paragraphs (15) and (16) may be made through and by such agents or agencies as the Commission shall designate and appoint for that purpose. It shall be the duty of all carriers by railroad subject to this Act, and of their officers, agents, and employees, to obey strictly and conform promptly to such orders or directions of the Commission, and in case of failure or refusal on the part of any carrier, receiver, or operating trustee to comply with any such order or direction such carrier, receiver, or trustee shall be liable to a penalty of not less than $100 nor more than $500 for each such offense and $50 for each and every day of the continuance of such offense, which shall accrue to the United States and may be recovered in a civil

action brought by the United States: Provided, however, That nothing in this Act shall impair or affect the right of a state, in the exercise of its police power, to require just and reasonable freight and passenger service for intrastate business, except in so far as such requirement is inconsistent with any lawful order of the Commission made under the provisions of this Act.

Extension or Construction of Railroads

"(18) After ninety days after this paragraph takes effect no carrier by railroad subject to this Act shall undertake the extension of its line of railroad, or the construction of a new line of railroad, or shall acquire or operate any line of railroad, or extension thereof, or shall engage in transportation under this Act over or by means of such additional or extended line of railroad, unless and until there shall first have been obtained from the Commission a certificate that the present or future public convenience and necessity require or will require the construction, or operation, or construction and operation, of such additional or extended line of railroad, and no carrier by railroad subject to this Act shall abandon all or any portion of a line of railroad, or the operation thereof, unless and until there shall first have been obtained from the Commission a certificate that the present or future public convenience and necessity permit of such abandonment.

"(19) The application for and issuance of any such certificate shall be under such rules and regulations as to hearings and other matters as the Commission may from time to time prescribe, and the provisions of this Act shall apply to all such proceedings. Upon receipt of any application for such certificate the Commission shall cause notice thereof to be given to and a copy filed with the governor of each state in which such additional or extended line of railroad is proposed to be constructed or operated, or all or any portion of a line of railroad, or the operation thereof, is proposed to be abandoned, with the right to be heard as hereinafter provided with respect to the hearing of complaints or the issuance of securities; and said notice shall also be published for three consecutive weeks in some newspaper of general circulation in each county in or through which said line of railroad is constructed or operates.

"(20) The Commission shall have power to issue such certificate as prayed for, or to refuse to issue it, or to issue it for a portion or portions of a line of railroad, or exetnsion thereof, described in the application, or for the partial exercise only of such right or privilege, and may attach to the issuance of the certificate such terms and conditions as in its judgment the public convenience and necessity may require. From and after issuance of such certificate, and not before, the carrier by railroad may, without securing approval other than such certificate, comply with the terms and conditions contained in or attached to the issuance of such certificate and proceed with the construction, operation, or abandonment covered thereby. Any construction, operation, or abandonment contrary to the provisions of this paragraph or of paragraph (18) or (19) of this section may be enjoined by any court of competent jurisdiction at the suit of the United States, the Commission, any commission or regulating body of the state or states affected, or any party in interest; and any carrier which, or any director, officer, receiver, operating trustee, lessee, agent, or person, acting for or employed by such carrier, who knowingly authorizes, consents to, or permits any violation of this paragraph or of paragraph (18) of this section, shall upon conviction thereof be punished by a fine of not more than $5,000 or by imprisonment for not more than three years, or both.

"(21) The Commission may, after hearing, in a proceeding upon complaint or upon its own initiative without complaint, authorize or require by order any carrier by railroad subject to this Act, party to such proceeding, to provide itself with safe and adequate facilities for performing as a common carrier its car service as that term is used in this Act, and to extend its line or lines: Provided, That no such authorization or order shall be made unless the Commission finds, as to such extension, that it is reasonably required in the interest of public convenience and necessity, or as to such extension or facilities that the expense involved therein will not impair the ability of the carrier to perform its duty to the public. Any carrier subject to this Act which refuses or neglects to comply with any order of the Commission made in pursuance of this paragraph shall be liable to a penalty of $100 for each day during which such refusal or neglect continues, which shall accrue to the United States and may be recovered in a civil action brought by the United States.

"(22) The authority of the Commission conferred by paragraphs (18) to (21), both inclusive, shall not extend to the construction or abandonment of spur, industrial, team, switching or side tracks, located or to be located wholly within one state, or of street, suburban, or interurban electric railways, which are not operated as a part or parts of a general steam railroad system of transportation."

SEC. 403. The fifteenth and sixteenth paragraphs of section 1 of the Interstate Commerce Act, added to such section by the Act entitled "An Act to amend the Act to regulate commerce, as amended, and for other purposes," approved August 10, 1917, are hereby amended by inserting "(23)" at the beginning of such fifteenth paragraph and "(24)" at the beginning of such sixteenth paragraph.

Rebates

SEC. 404. Section 2 of the Interstate Commerce Act is hereby amended to read as follows:

"SEC. 2. That if any common carrier subject to the provisions of this Act shall, directly or indirectly, by any special rate, rebate, drawback, or other device, charge, demand, collect, or receive from any person or persons a greater or less compensation for any service rendered, or to be rendered, in the transportation of passengers or property or the transmission of intelligence, subject to the provisions of this Act, than it charges, demands, collects, or receives from any other person or persons for doing for him or them a like and contemporaneous service in the transportation or transmission of a like kind of traffic or message, under substantially similar circumstances and conditions, such common carrier shall be deemed guilty of unjust discrimination, which is hereby prohibited and declared to be unlawful."

SEC. 405. The first paragraph of section 3 of the Interstate Commerce Act is hereby amended by inserting "(1)" after the section number at the beginning thereof.

Collection of Rates and Charges

Section 3 of the Interstate Commerce Act is hereby amended by adding after the first paragraph a new paragraph to read as follows:

"(2) From and after July 1, 1920, no carrier by railroad subject to the provisions of this Act shall deliver or relinquish possession at destination of any freight transported by it until all tariff rates and charges thereon have been paid, except under such rules and regulations as the Commission may from time to time prescribe to assure prompt payment of all such rates and charges and to prevent unjust discrimination: *Provided*, That the provisions of this paragraph shall not be construed to prohibit any carrier from extending credit in connection with rates and charges on freight transported for the United States, for any department, bureau, or agency thereof, or for any state or territory or political subdivision thereof, or for the District of Columbia."

Interchange of Traffic

The second paragraph of section 3 of the Interstate Commerce Act is hereby amended to read as follows:

"(3) All carriers, engaged in the transportation of passengers or property, subject to the provisions of this Act, shall, according to their respective powers, afford all reasonable, proper, and equal facilities for the interchange of traffic between their respective lines, and for the receiving, forwarding, and delivering of passengers or property to and from their several lines and those connecting therewith, and shall not discriminate in their rates, fares, and charges between such connecting lines, or unduly prejudice any such connecting line in the distribution of traffic that is not specifically routed by the shipper.

"(4) If the Commission finds it to be in the public interest and to be practicable, without substantially impairing the ability of a carrier owning or entitled to the enjoyment of terminal facilities to handle its own business, it shal lhave power to require the use of any such terminal facilities, including main-line track or

tracks for a reasonable distance outside of such terminal, of any carrier, by another carrier or other carriers, on such terms and for such compensation as the carriers affected may agree upon, or, in the event of a failure to agree, as the Commission may fix as just and reasonable for the use so required, to be ascertained on the principle controlling compensation in condemnation proceedings. Such compensation shall be paid or adequately secured before the enjoyment of the use may be commenced. If under this paragraph the use of such terminal facilities of any carrier is required to be given to another carrier or other carriers, and the carrier whose terminal facilities are required to be so used is not satisfied with the terms fixed for such use, or if the amount of compensation so fixed is not duly and promptly paid, the carrier whose terminal facilities have thus been required to be given to another carrier or other carriers shall be entitled to recover, by suit or action against such other carrier or carriers, proper damages for any injuries sustained by it as the result of compliance with such requirement, or just compensation for such use, or both, as the case may be."

Long and Short Haul

SEC. 406. Section 4 of the Interstate Commerce Act is hereby amended to read as follows:

"SEC. 4. (1) That it shall be unlawful for any common carrier subject to the provisions of this Act to charge or receive any greater compensation in the aggregate for the transportation of passengers, or of like kind of property, for a shorter than for a longer distance over the same line or route in the same direction, the shorter being included within the longer distance, or to charge any greater compensation as a through rate than the aggregate of the intermediate rates subject to the provisions of this Act, but this shall not be construed as authorizing any common carrier within the terms of this Act to charge or receive as great compensation for a shorter as for a longer distance; Provided, That upon application to the Commission such common carrier may in special cases, after investigation, be authorized by the Commission to charge less for longer than for shorter distances for the transportation of passengers or property; and the Commission may from time to time prescribe the extent to which such designated common carrier may be relieved from the operation of this section; but in exercising the authority conferred upon it in this proviso the Commission shall not permit the establishment of any charge to or from the more distant point that is not reasonably compensatory for the service performed; and if a circuitous rail line or route is, because of such circuity, granted authority to meet the charges of a more direct line or route to or from competitive points and to maintain higher charges to or from intermediate points on its line, the authority shall not include intermediate points as to which the haul of the petitioning line or route is not longer than that of the direct line or route between the competitive points; and no such authorization shall be granted on account of merely potential water competition not actually in existence: And provided further, That rates, fares, or charges existing at the time of the passage of this amendatory Act by virtue of orders of the Comimssion or as to which application has theretofore been filed with the Commission and not yet acted upon, shall not be required to be changed by reason of the provisions of this section until the further order of or a determination by the Commission.

"(2) Wherever a carrier by railroad shall in competition with a water route or routes reduce the rates on the carriage of any species of freight to or from competitive points it shall not be permitted to increase such rates unless after hearing by the Commission it shall be found that such proposed increased rests upon changed conditions other than the elimination of water competition."

Division of Traffic or Earnings

SEC. 407. The first paragraph of section 5 of the Interstate Commerce Act is hereby amended to read as follows:

"SEC. 5. (1) That, except upon specific approval by order of the Commission as in this section provided, and except as provided in paragraph (16) of section 1 of this Act, it shall be unlawful for any common carrier subject to this Act to enter into any contract, agreement, or combination with any other common carrier or carriers for the pooling of freights of different and competing railroads, or to divide between them the aggregate or net proceeds of the earnings of such railroads, or any portion thereof; and in any case of an agreement for the pooling of freights as aforesaid each day of its continuance shall be deemed a separate offense: Provided, That whenever the Commission is of opinion, after hearing upon application of any carrier or carriers engaged in the transportation of passengers or property subject to this Act, or upon its own initiative, that the division of their traffic or earnings, to the extent indicaed by the Commission, will be in the interest of better service to the public, or economy in operation, and will not unduly restrain competition, the Commission shall have authority by order to approve and authorize, if assented to by all the carriers involved, such division of traffic or earnings, under such rules and regulations, and for such consideration as between such carriers and upon such terms and conditions, as shall be found by the Commission to be just and reasonable in the premises.

Consolidation of Railway Properties

"(2) Whenever the Commission is of opinion, after hearing, upon application of any carrier or carriers engaged in the transportation of passengers or property subject to this Act, that the acquisition, to the extent indicated by the Commission, by one of such carriers of the control of any other such carrier or carriers either under a lease or by the purchase of stock or in any other manner not involving the consolidation of such carriers into a single system for ownership and operation, will be in the public interest, the Commission shall have authority by order to approve and authorize such acquisition, under such rules and regulations and for such consideration and on such terms and conditions as shall be found by the Commission to be just and reasonable in the premises.

"(3) The Commission may from time to time, for good cause shown, make such orders, supplemental to any order made under paagraph (1) or (2), as it may deem necessary or appropriate.

"(4) The Commission shall as soon as practicable prepare and adopt a plan for the consolidation of the railway properties of the continental United States into a limited number of systems. In the division of such railways into such systems under such plan, competition shall be preserved as fully as possible and wherever practicable the existing routes and channels of trade and commerce shall be maintained. Subject to the foregoing requirements, the several systems shall be so arranged that the cost of transportation as between competitive systems and as related to the values of the properties through which the service is rendered shall be the same, so far as practicable, so that these systems can employ uniform rates in the movement of competitive traffic and under efficient management earn substantially the same rate of return upon the value of their respective railway properties.

"(5) When the Commission has agreed upon a tentative plan, it shall give the same due publicity and upon reasonable notice, including notice to the governor of each state, shall hear all persons who may file or present objections thereto. The Commission is authorized to prescribe a procedure for such hearings and to fix a time for bringing them to a close. After the hearings are at an end, the Commission shall adopt a plan for such consolidation and publish the same, but it may at any time thereafter, upon its own motion or upon application, reopen the subject for such changes or modifications as in its judgment will promote the public interest. The consolidations herein provided for shall be in harmony with such plan.

"(6) It shall be lawful for two or more carriers by railroad, subject to this Act, to consolidate their properties or any part thereof, into one corporation for the ownership, management, and operation of the properties theretofore in separate ownership, management, and operation, under the following conditions:

"(a) The proposed consolidation must be in harmony with and in furtherance of the complete plan of consolidation mentioned in paragraph (5) and must be approved by the Commission;

"(b) The bonds at par of the corporation which is to become the owner of the consolidated properties, together with the outstanding capital stock at par of such corporation, shall not exceed the value of the consolidated properties as determined by the Commission. The value of the properties sought to be consolidated shall be ascertained by the Commission under section 19a of this Act, and it shall be the duty of the Commission to proceed immediately to the ascertainment of such value for the properties involved in a proposed consolidation upon the filing of the application for such consolidation.

"(c) Whenever two or more carriers propose a consolidation under this section, they shall present their application therefor to the Commission, and thereupon the Commission shall notify

the governor of each state in which any part of the properties sought to be consolidated is situated and the carriers involved in the proposed consolidation, of the time and place for a public hearing. If after such hearing the Commission finds that the public interest will be promoted by the consolidation and that the conditions of this section have been or will be fulfilled, it may enter an order approving and authorizing such consolidation, with such modifications and upon such terms and conditions as it may prescribe, and thereupon such consolidation may be effected, in accordance with such order, if all the carriers involved assent thereto, the law of any state or the decision or order of any state authority to the contrary notwithstanding.

"(7) The power and authority of the Commission to approve and authorize the consolidation of two or more carriers shall extend and apply to the consolidation of four express companies into the American Railway Express Company, a Delaware corporation, if application for such approval and authority is made to the Commission within thirty days after the passage of this amendatory Act; and pending the decision of the Commission such consolidation shall not be dissolved.

"(8) The carriers affected by any order made under the foregoing provisions of this section and any corporation organized to effect a consolidation approved and authorized in such order shall be, and they are hereby, relieved from the operation of the 'antitrust laws,' as designated in section 1 of the Act entitled 'An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes,' approved October 15, 1914, and of all other restraints or prohibitions by law, state or federal, in so far as may be necessary to enable them to do anything authorized or required by any order made under and pursuant to the foregoing provisions of this section."

SEC. 408. The paragraph of section 5 of the Interstate Commerce Act, added to such section by section 11 of the Act entitled "An Act to provide for the opening, maintenance, protection, and operation of the Panama Canal and the sanitation and government of the Canal Zone," approved August 24, 1912, is hereby amended by inserting "(9)" at the beginning thereof.

The two paragraphs of section 11 of such Act of August 24, 1912, which follow the paragraph added by such section to section 5 of the Interstate Commerce Act, are hereby made a part of section 5 of the Interstate Commerce Act. The first paragraph so made a part of section 5 of the Interstate Commerce Act is hereby amended by inserting "(10)" at the beginning thereof, and the second such paragraph is hereby amended by inserting "(11)" at the beginning thereof.

SEC. 409. Section 6 of the Interstate Commerce Act is hereby amended by inserting "(1)" after the section number at the beginning of the first paragraph, "(2)" at the beginning of the second paragraph, "(3)" at the beginning of the third paragraph, "(4)" at the beginning of the fourth paragraph, "(5)" at the beginning of the fifth paragraph, "(6)" at the beginning of the sixth paragraph, "(7)" at the beginning of the seventh paragraph, "(8)" at the beginning of the eighth paragraph, "(9)" at the beginning of the ninth paragraph, "(10)" at the beginning of the tenth paragraph, "(11)" at the beginning of the eleventh paragraph, "(12)" at the beginning of the twelfth paragraph, and "(13)" at the beginning of the thirteenth paragraph.

SEC. 410. The third paragraph of section 6 of the Interstate Commerce Act is hereby amended by striking out the period at the end thereof and inserting in lieu thereof a colon and the following: "Provided further, That the Commission is hereby authorized to make suitable rules and regulations for the simplification of schedules of rates, fares, charges, and classifications and to permit in such rules and regulations the filing of an amendment of or change in any rate, fare, charge, or classification without filing complete schedules covering rates, fares, charges or classifications not changed if, in its judgment, not inconsistent with the public interest."

Sec. 411. The seventh paragraph of section 6 of the Interstate Commerce Act is hereby amended by striking out the proviso at the end.

Sec. 412. The two paragraphs under (a) of the thirteenth paragraph of section 6 of the Interstate Commerce Act are hereby amended so as to be combined into one paragraph to read as follows:

"(a) To establish physical connection between the lines of the rail carrier and the dock at which interchange of passengers or property is to be made by directing the rail carrier to make suitable connection between its line and a track or tracks which have been constructed from the dock to the limits of the railroad right of way, or by directing either or both the rail and water carrier, individually or in connection with one another, to construct and connect with the lines of the rail carrier a track or tracks to the dock. The Commission shall have full authority to determine and prescribe the terms and conditions upon which these connecting tracks shall be operated, and it may, either in the construction or the operation of such tracks, determine what sum shall be paid to or by either carrier: Provided, That construction required by the Commission under the provisions of this paragraph shall be subject to the same restrictions as to findings of public convenience and necessity and other matters as is construction required under section 1 of this Act."

Sec. 413. Paragraph (c) of the thirteenth paragraph of section 6 of the Interstate Commerce Act is hereby amended to read as follows:

"(c) To establish proportional rates, or maximum, or minimum, or maximum and minimum proportional rates, by rail to and from the ports to which the traffic is brought, or from which it is taken by the water carrier, and to determine to what traffic and in connection with what vessels and upon what terms and conditions such rates shall apply. By proportional rates are meant those which differ from the corresponding local rates to and from the port and which apply only to traffic which has been brought to the port or is carried from the port by a common carrier by water."

Sec. 414. Section 10 of the Interstate Commerce Act is hereby amended by inserting "(1)" after the section number at the beginning of the first paragraph, "(2)" at the beginning of the second paragraph, "(3)" at the beginning of the third paragraph, and "(4)" at the beginning of the fourth paragraph, and by inserting after the words "transportation of passengers or property," in the proviso in the first paragraph thereof, the words "or the transmission of intelligence."

Sec. 415. Section 12 of the Interstate Commerce Act is hereby amended by inserting "(1)" after the section number at the beginning of the first paragraph, "(2)" at the beginning of the second paragraph, "(3)" at the beginning of the third paragraph, "(4)" at the beginning of the fourth paragraph, "(5)" at the beginning of the fifth paragraph, "(6)" at the beginning of the sixth paragraph, and "(7)" at the beginning of the seventh paragraph.

Sec. 416. Section 13 of the Interstate Commerce Act is hereby amended by inserting "(1)" after the section number at the beginning of the first paragraph and "(2)" at the beginning of the second paragraph, and by adding at the end thereof two new paragraphs to read as follows:

"(3) Whenever in any investigation under the provisions of this Act, or in any investigation instituted upon petition of the carrier concerned, which petition is hereby authorized to be filed, there shall be brought in issue any rate, fare, charge, classification, regulation, or practice, made or imposed by authority of any state, or initiated by the President during the period of federal control, the Commission, before proceeding to hear and dispose of such issue, shall cause the state or states interested to be notified of the proceeding. The Commission may confer with the authorities of any state having regulatory jurisdiction over the class of persons and corporations subject to this Act with respect to the relationship between rate structures and practices of carriers subject to the jurisdiction of such state bodies and of the Commission; and to that end is authorized and empowered, under rules to be prescribed by it, and which may be modified from time to time, to hold joint hearings with any such state regulating bodies or any matters wherein the Commission is empowered to act and where the rate-making authority of a state is or may be affected by the action taken by the Commission. The Commission is also authorized to avail itself of the cooperation, services, records, and facilities of such state authorities in the enforcement of any provision of this Act.

"(4) Whenever in any such investigation the Commission, after full hearing, finds that any such rate, fare, charge, classification, regulation, or practice causes any undue or unreasonable advantage, preference or prejudice as between persons or localities in intrastate commerce on the one hand and interstate or foreign commerce on the other hand or any undue, unreasonable, or unjust discrimination against interstate or foreign commerce, which is hereby forbidden and declared to be unlawful, it shall prescribe the rate, fare, or charge, or the maximum or minimum, or maximum and minimum,

thereafter to be charged, and the classification, regulation, or practice thereafter to be observed, in such manner as, in its judgment, will remove such advantage, preference, prejudice, or discrimination. Such rates, fares, charges, classifications, regulations, and practices shall be observed while in effect by the carriers parties to such proceeding affected thereby, the law of any state or the decision or order of any state authority to the contrary notwithstanding."

SEC. 417. Section 14 of the Interstate Commerce Act is hereby amended by inserting "(1)" after the section number at the beginning of the first paragraph, "(2)" at the beginning of the second paragraph, and "(3)" at the beginning of the third paragraph.

Regulation of Rates

SEC. 418. The first four paragraphs of section 15 of the Interstate Commerce Act are hereby amended to read as follows:

"SEC. 15. (1) That whenever, after full hearing, upon a complaint made as provided in section 13 of this Act, or after full hearing under an order for investigation and hearing made by the Commission on its own initiative, either in extension of any pending complaint or without any complaint whatever, the Commission shall be of opinion that any individual or joint rate, fare, or charge whatsoever demanded, charged, or collected by any common carrier or carriers subject to this Act for the transportation of persons or property or for the transmission of messages as defined in the first section of this Act, or that any individual or joint classification, regulation, or practice whatsoever of such carrier or carriers subject to the provisions of this Act, is or will be unjust or unreasonable or unjustly discriminatory or unduly preferential or prejudicial, or otherwise in violation of any of the provisions of this Act, the Commission is hereby authorized and empowered to determine and prescribe what will be the just and reasonable individual or joint rate, fare, or charge, or rates, fares, or charges, to be thereafter observed in such case, or the maximum or minimum, or maximum and minimum, to be charged (or, in the case of a through route where one of the carriers is a water line, the maximum rates, fares, and charges applicable thereto), and what individual or joint classification, regulation, or practice is or will be just, fair, and reasonable, to be thereafter followed, and to make an order that the carrier or carriers shall cease and desist from such violation to the extent to which the Commission finds that the same does or will exist, and shall not thereafter publish, demand, or collect any rate, fare, or charge for such transportation or transmission other than the rate, fare, or charge so prescribed, or in excess of the maximum or less than the minimum so prescribed, as the case may be, and shall adopt the classification and shall conform to and observe the regulation or practice so prescribed.

"(2) Except as otherwise provided in this Act, all orders of the Commission, other than orders for the payment of money, shall take effect within such reasonable time, not less than thirty days, and shall continue in force until its further order, or for a specified period of time, according as shall be prescribed in the order, unless the same shall be suspended or modified or set aside by the Commission, or be suspended or set aside by a court of competent jurisdiction.

"(3) The Commission may, and it shall whenever deemed by it to be necessary or desirable in the public interest, after full hearing upon complaint or upon its own initiative without a complaint, establish through routes, joint classifications, and joint rates, fares, or charges, applicable to the transportation of passengers or property, or the maxima or minima or maxima and minima, to be charged (or, in the case of a through route where one of the carriers is a water line, the maximum rates, fares, and charges applicable thereto), and the divisions of such rates, fares, or charges as hereinafter provided, and the terms and conditions under which such through routes shall be operated; and this provision, except as herein otherwise provided, shall apply when one of the carriers is a water line. The Commission shall not, however, establish any through route, classification, or practice, or any rate, fare, or charge, between street electric passenger railways not engaged in the general business of transporting freight in addition to their passenger and express business, and railroads of a different character; nor shall the Commission have the right to establish any route, classification, or practice, or any rate, fare, or charge when the transportation is wholly by water, and any transportation by water affected by this Act shall be subject to the laws and regulations applicable to transportation by water.

"(4) In establishing any such through route the Commission shall not (except as provided in section 3, and except where one of the carriers is a water line), require any carrier by railroad, without its consent, to embrace in such route substantially less than the entire length of its railroad and of any intermediate railroad operated in conjunction and under a common management or control therewith, which lies between the termini of such proposed through route, unless such inclusion of lines would make the through route unreasonably long as compared with another practicable through route which could otherwise be established: Provided, That in time of shortage of equipment, congestion of traffic, or other emergency declared by the Commission it may (either upon complaint or upon its own initiative without complaint, at once, if it so orders without answer or other formal pleadings by the interested carrier or carriers, and with or without notice, hearing, or the making or filing of a report, according as the Commission may determine) establish temporarily such through routes as in its opinion are necessary or desirable in the public interest.

"(5) Transportation wholly by railroad of ordinary livestock in car-load lots destined to or received at public stockyards shall include all necessary service of unloading and reloading en route, delivery at public stockyards of inbound shipments into suitable pens, and receipt and loading at such yards of outbound shipments, without extra charge therefor to the shipper, consignee or owner, except in cases where the unloading or reloading en route is at the request of the shipper, consignee or owner, or to try an intermediate market, or to comply with quarantine regulations. The Commission may prescribe or approve just and reasonable rules governing each of such excepted services. Nothing in this paragraph shall be construed to affect the duties and liabilities of the carriers now existing by virtue of law respecting the transportation of other than ordinary livestock, or the duty of performing service as to shipments other than those to or from public stockyards.

"(6) Whenever, after full hearing upon complaint or upon its own initiative, the Commission is of opinion that the divisions of joint rates, fares, or charges, applicable to the transportation of passengers or property, are or will be unjust, unreasonable, inequitable, or unduly preferential or prejudicial as between the carriers parties thereto (whether agreed upon by such carriers, or any of them, or otherwise established), the Commission shall by order prescribe the just, reasonable, and equitable divisions thereof to be received by the several carriers, and in cases where the joint rate, fare, or charge was established pursuant to a finding or order of the Commission and the divisions thereof are found by it to have been unjust, unreasonable, or inequitable, or unduly preferential or prejudicial, the Commission may also by order determine what (for the period subsequent to the filing of the complaint or petition or the making of the order of investigation) would have been the just, reasonable, and equitable divisions thereof to be received by the several carriers, and require adjustment to be made in accordance therewith. In so prescribing and determining the divisions of joint rates, fares and charges, the Commission shall give due consideration, among other things, to the efficiency with which the carriers concerned are operated, the amount of revenue required to pay their respective operating expenses, taxes, and a fair return on their railway property held for and used in the service of transportation, and the importance to the public of the transportation services of such carriers; and also whether any particular participating carrier is an originating, intermediate, or delivering line, and any other fact or circumstance which would ordinarily, without regard to the mileage haul, entitle one carrier to a greater or less proportion than another carrier of the joint rate, fare or charge.

"(7) Whenever there shall be filed with the Commission any schedule stating a new individual or joint rate, fare, or charge, or any new individual or joint classification, or any new individual or joint regulation or practice affecting any rate, fare, or charge, the Commission shall have, and it is hereby given, authority, either upon complaint or upon its own initiative without complaint, at once, and if it so orders without answer or other formal pleading by the interested carrier or carriers, but upon reasonable notice, to enter upon a hearing concerning the lawfulness of such rate, fare, charge, classification, regulation, or

practice; and pending such hearing and the decision thereon the Commission, upon filing with such schedule and delivering to the carrier or carriers affected thereby a statement in writing of its reasons for such suspension, may suspend the operation of such schedule and defer the use of such rate, fare, charge, classification, regulation, or practice, but not for a longer period than one hundred and twenty days beyond the time when it would otherwise go into effect; and after full hearing, whether completed before or after the rate, fare, charge, classification, regulation, or practice goes into effect, the Commission may make such order with reference thereto as would be proper in a proceeding initiated after it had become effective. If any such hearing can not be concluded within the period of suspension, as above stated, the Commission may extend the time of suspension for a further period not exceeding thirty days, and if the proceeding has not been concluded and an order made at the expiration of such thirty days, the proposed change of rate, fare, charge, classification, regulation, or practice shall go into effect at the end of such period, but, in case of a proposed increased rate or charge for or in respect to the transportation of property, the Commission may by order require the interested carrier or carriers to keep accurate account in detail of all amounts received by reason of such increase, specifying by whom and in whose behalf such amounts are paid, and upon completion of the hearing and decision may by further order require the interested carrier or carriers to refund, with interest, to the persons in whose behalf such amounts were paid such portion of such increased rates or charges as by its decision shall be found not justified. At any hearing involving a rate, fare, or charge increased after January 1, 1910, or of a rate, fare, or charge sought to be increased after the passage of this Act, the burden of proof to show that the increased rate, fare, or charge, or proposed increased rate, fare, or charge, is just and reasonable shall be upon the carrier, and the Commission shall give to the hearing and decision of such questions preference over all other questions pending before it and decide the same as speedily as possible."

SEC. 419. The fifth paragraph of section 15 of the Interstate Commerce Act is hereby amended by inserting "(8)" at the beginning of such paragraph.

SEC. 420. Section 15 of the Interstate Commerce Act is hereby amended by inserting after the fifth paragraph two new paragraphs, to read as follows:

"(9) Whenever property is diverted or delivered by one carrier to another carrier contrary to routing instructions in the bill of lading, unless such diversion or delivery is in compliance with a lawful order, rule, or regulation of the Commission, such carriers shall, in a suit or action in any court of competent jurisdiction, be jointly and severally liable to the carrier thus deprived of its right to participate in the haul of the property, for the total amount of the rate or charge it would have received had it participated in the haul of the property. The carrier to which the property is thus diverted shall not be liable in such suit or action if it can show, the burden of proof being upon it, that before carrying the property it had no notice, by bill of lading, waybill or otherwise, of the routing instructions. In any judgment which may be rendered the plaintiff shall be allowed to recover against the defendant a reasonable attorney's fee to be taxed in the case.

"(10) With respect to traffic not routed by the shipper, the Commission may, whenever the public interest and a fair distribution of the traffic require, direct the route which such traffic shall take after it arrives at the terminus of one carrier or at a junction point with another carrier, and is to be there delivered to another carrier."

SEC. 421. Section 15 of the Interstate Commerce Act is hereby further amended by inserting "(11)" at the beginning of the sixth paragraph, "(12)" at the beginning of the seventh paragraph, "(13)" at the beginning of the eighth paragraph, and "(14)" at the beginning of the ninth paragraph.

SEC. 422. The Interstate Commerce Act is further amended by inserting after section 15 a new section to be known as section 15a and to read as follows:

"SEC. 15a. (1) When used in this section the term "rates" mean rates, fares, and charges, and all classifications, regulations, and practices, relating thereto; the term "carrier" means a carrier by railroad or partly by railroad and partly by water, within the continental United States, subject to this Act, excluding (a) sleeping car companies and express companies (b) street or suburban electric railways unless operated as a part of a general steam railroad system of transportation, (c) interurban electric railways unless operated as a part of a general steam railroad system of transportation or engaged in the general transportation of freight, and (d) any belt-line railroad, terminal switching railroad, or other terminal facility, owned exclusively and maintained, operated, and controlled by any State or political subdivision thereof; and the term "net railway operating income" means railway operating income, including in the computation thereof debits and credits arising from equipment rents and joint facility rents.

"(2) In the exercise of its power to prescribe just and reasonable rates the Commission shall initiate, modify, establish or adjust such rates so that carriers as a whole (or as a whole in each of such rate groups or territories as the Commission may from time to time designate) will, under honest, efficient and economical management and reasonable expenditures for maintenance of way, structures and equipment, earn an aggregate annual net railway operating income equal, as nearly as may be, to a fair return upon the aggregate value of the railway property of such carriers held for and used in the service of transportation: Provided, That the Commission shall have reasonable latitude to modify or adjust any particular rate which it may find to be unjust or unreasonable, and to prescibe different rates for different sections of the country.

"(3) The Commission shall from time to time determine and make public what percentage of such aggregate property value constitutes a fair return thereon, and such percentage shall be uniform for all rate groups or territories which may be designated by the Commission. In making such determination it shall give due consideration, among other things, to the transportation needs of the country and the necessity (under honest, efficient and economical management of existing transportation facilities) of enlarging such facilities in order to provide the people of the United States with adequate transportation: Provided, That during the two years beginning March 1, 1920, the Commission shall take as such fair return a sum equal to 5½ per centum of such aggregate value, but may, in its discretion, add thereto a sum not exceeding one-half of one per centum of such aggregate value to make provision in whole or in part for improvements, betterments or equipment, which, according to the accounting system prescribed by the Commission, are chargeable to capital account.

"(4) For the purposes of this section, such aggregate value of the property of the carriers shall be determined by the Commission from time to time and as often as may be necessary. The Commission may utilize the results of its investigation under section 19a of this Act, in so far as deemed by it available, and shall give due consideration to all the elements of value recognized by the law of the land for rate-making purposes, and shall give to the property investment account of the carriers only that consideration which under such law it is entitled to in establishing values for rate-making purposes. Whenever pursuant to section 19a of this Act the value of the railway property of any carrier held for and used in the service of transportation has been finally ascertained, the value so ascertained shall be deemed by the Commission to be the value thereof for the purpose of determining such aggregate value.

"(5) Inasmuch as it is impossible (without regulation and control in the interest of the commerce of the United States considered as a whole) to establish uniform rates upon competitive traffic which will adequately sustain all the carriers which are engaged in such traffic and which are indispensable to the communities to which they render the service of transportation, without enabling some of such carriers to receive a net railway operating income substantially and unreasonably in excess of a fair return upon the value of their railway property held for and used in the service of transportation, it is hereby declared that any carrier which receives such an income so in excess of a fair return, shall hold such part of the excess, as hereinafter prescribed, as trustee for, and shall pay it to, the United States.

Disposal of Net Operating Income in Excess of 6 Per Cent

"(6) If, under the provisions of this section, any carrier receives for any year a net railway operating income in excess of 6 per centum of the value of the railway property held for and used by it in the service of transportation, one-half of such excess shall be placed in a reserve fund established and main-

tained by such carrier, and the remaining one-half thereof shall, within the first four months following the close of the period for which such computation is made, be recoverable by and paid to the Commission for the purpose of establishing and maintaining a general railroad contingent fund as hereinafter described. For the purpose of this paragraph the value of the railway property and the net railway operating income of a group of carriers, which the Commission finds are under common control and management and are operated as a single system, shall be computed for the system as a whole irrespective of the separate ownership and accounting returns of the various parts of such system. In the case of any carrier which has accepted the provisions of section 209 of this amendatory Act the provisions of this paragraph shall not be applicable to the income for any period prior to September 1, 1920. The value of such railway property shall be determined by the Commission in the manner provided in paragraph (4).

"(7) For the purpose of paying dividends or interest on its stocks, bonds or other securities, or rent for leased roads, a carrier may draw from the reserve fund established and maintained by it under the provisions of this section to the extent that its net railway operating income for any year is less than a sum equal to 6 per centum of the value of the railway property held for and used by it in the service of transportation, determined as provided in paragraph (6); but such fund shall not be drawn upon for any other purpose.

"(8) Such reserve fund need not be accumulated and maintained by any carrier beyond a sum equal to 5 per centum of the value of its railway property determined as herein provided, and when such fund is so accumulated and maintained the portion of its excess income which the carrier is permitted to retain under paragraph (6) may be used by it for any lawful purpose.

"(9) The Commission shall prescribe rules and regulations for the determination and recovery of the excess income payable to it under this section, and may require such security and prescribe such reasonable terms and conditions in connection therewith as it may find necessary. The Commission shall make proper adjustments to provide for the computation of excess income for a portion of a year, and for a year in which a change in the percentage constituting a fair return or in the value of a carrier's railway property becomes effective.

"(10) The general railroad contingent fund so to be recoverable by and paid to the Commission and all accretions thereof shall be a revolving fund and shall be administered by the Commission. It shall be used by the Commission in furtherance of the public interest in railway transportation either by making loans to carriers to meet expenditures for capital account or to refund maturing securities originally issued for capital account, or by purchasing transportation equipment and facilities and leasing the same to carriers, as hereinafter provided. Any moneys in the fund not so employed shall be invested in obligations of the United States or deposited in authorized depositaries of the United States subject to the rules promulgated from time to time by the secretary of the treasury relating to government deposits.

"(11) A carrier may at any time make application to the Commission for a loan from the general railroad contingent fund, setting forth the amount of the loan and the term for which it is desired, the purpose of the loan and the uses to which it will be applied, the present and prospective ability of the applicant to repay the loan and meet the requirements of its obligations in that regard, the character and value of the security offered, and the extent to which the public convenience and necessity will be served. The application shall be accompanied by statements showing such facts and details as the Commission may require with respect to the physical situation, ownership, capitalization, indebtedness, contract obligations, operation, and earning power of the applicant, together with such other facts relating to the propriety and expediency of granting the loan applied for and the ability of the applicant to make good the obligation, as the Commission may deem pertinent to the inquiry.

"(12) If the Commission, after such hearing and investigation, with or without notice, as it may direct, finds that the making, in whole or in part, of the proposed loan from the general railroad contingent fund is necessary to enable the applicant property to meet the transportation needs of the public, and that the prospective earning power of the applicant and the character and value of the security offered are such as to furnish reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor, and to meet its other obligations in connection with such loan, the Commission may make a loan to the applicant from such railroad contingent fund, in such amount, for such length of time, and under such terms and conditions as it may deem proper. The Commission shall also prescribe the security to be furnished, which shall be adequate to secure the loan. All such loans shall bear interest at the rate of 6 per centum per annum, payable semiannually to the Commission. Such loans when repaid, and all interest paid thereon, shall be placed in the general railroad contingent fund.

"(13) A carrier may at any time make application to the Commission for the lease to it of transportation equipment or facilities, purchased from the general railroad contingent fund, setting forth the kind and amount of such equipment or facilities and the term for which it is desired to be leased, the uses to which it is proposed to put such equipment or facilities, the present and prospective ability of the applicant to pay the rental charges thereon and to meet the requirements of its obligations under the lease, and the extent to which the public convenience and necessity will be served. The application shall be accompanied by statements showing such facts and details as the Commission may require with respect to the physical situation, ownership, capitalization, indebtedness, contract obligations, operation, and earning power of the applicant, together with such other facts relating to the propriety and expediency of leasing such equipment or facilities to the applicant as the Commission may deem pertinent to the inquiry.

"(14) If the Commission, after such hearing and investigation, with or without notice, as it may direct, finds that the leasing to the applicant of such equipment or facilities, in whole or in part, is necessary to enable the applicant properly to meet the transportation needs of the public, and that the prospective earning power of the applicant is such as to furnish reasonable assurance of the applicant's ability to pay promptly the rental charges and meet its other obligations under such lease, the Commission may lease such equipment or facilities purchased by it from the general railroad contingent fund, to the applicant for such length of time, and under such terms and conditions as it may deem proper. The rental charges provided in every such lease shall be at least sufficient to pay a return of 6 per centum per annum, plus allowance for depreciation determined as provided in paragraph (5) of section 20 of this Act, upon the value of the equipment or facilities leased thereunder. All rental charges and other payments received by the Commission in connection with such equipment and facilities, including amounts received under any sale thereof, shall be placed in the general railroad contingent fund.

"(15) The Commission may from time to time purchase, contract for the construction, repair and replacement of, and sell, equipment and facilities, and enter into and carry out contracts and other obligations in connection therewith, to the extent that moneys included in the general railroad contingent fund are available therefor, and in so far as necessary to enable it to secure and supply equipment and facilities to carriers whose applications therefor are approved under the provisions of this section, and to maintain and dispose of such equipment and facilities.

"(16) The Commission may from time to time prescribe such rules and regulations as it deems necessary to carry out the provisions of this section respecting the making of loans and the lease of equipment and facilities.

"(17) The provisions of this section shall not be construed as depriving shippers of their right to reparation in case of overcharges, unlawfully excessive or discriminatory rates, or rates excessive in their relation to other rates, but no shipper shall be entitled to recover upon the sole ground that any particular rate may reflect a proportion of excess earnings to be paid by the carrier to the Commission in the public interest under the provisions of this section.

"(18) Any carrier, or any corporation organized to construct and operate a railroad, proposing to undertake the construction and operation of a new line of railroad may apply to the Commission for permission to retain for a period not to exceed ten years all or any part of its earnings derived from such new construction in excess of the amount heretofore in this section provided, for such disposition as it may lawfully make of the same, and the Commission may, in its discretion, grant such permission; conditioned, however, upon the completion of the

work of construction within a period to be designated by the Commission in its order granting such permission."

SEC. 423. The first paragraph of section 16 of the Interstate Commerce Act is hereby amended by inserting "(1" after the section number at the beginning of such paragraph.

SEC. 424. The second paragraph of section 16 of the Interstate Commerce Act is hereby amended by inserting "(2)" at the beginning of such paragraph, and by striking out the last sentence thereof and inserting in lieu thereof the following as a new paragraph:

"(3) All actions at law by carriers subject to this Act for recovery of their charges, or any part thereof, shall be begun within three years from the time the cause of action accrues, and not after. All complaints for the recovery of damages shall be filed with the Commission within two years from the time the cause of action accrues, and not after, unless the carrier, after the expiration of such two years or within ninety days before such expiration, begins an action for recovery of charges in respect of the same service, in which case such period of two years shall be extended to and including ninety days from the time such action by the carrier is begun. In either case the cause of action in respect of a shipment of property shall, for the purposes of this section, be deemed to accrue upon delivery or tender of delivery thereof by the carrier, and not after. A petition for the enforcement of an order for the payment of money shall be filed in the district court or State court within one year from the date of the order, and not after."

SEC. 425. The third, fourth, fifth, and sixth paragraphs of section 16 of the Interstate Commerce Act are hereby amended by inserting "(4)" at the beginning of the third paragraph, "(5)" at the beginning of the fourth paragraph, "(6)" at the beginning of the fifth paragraph, and "(7)" at the beginning of the sixth paragraph.

SEC. 426. The seventh paragraph of section 16 of the Interstate Commerce Act is hereby amended to read as follows:

"(8) Any carrier, any officer, representative, or agent of a carrier, or any receiver, trustee, lessee, or agent of either of them, who knowingly fails or neglects to obey any order made under the provisions of sections 3, 13, or 15 of this Act shall forfeit to the United States the sum of $5,000 for each offense. Every distinct violation shall be a separate offense, and in case of a continuing violation each day shall be deemed a separate offense."

SEC. 427. The eighth and ninth paragraphs of section 16 of the Interstate Commerce Act are hereby amended by inserting "(9)" at the beginning of the eighth paragraph and "(10)" at the beginning of the ninth paragraph.

SEC. 438. The tenth paragraph of section 16 of the Interstate Commerce Act is hereby amended to read as follows:

"(11) The Commission may employ such attorneys as it finds necessary for proper legal aid and service of the Commission or its members in the conduct of their work, or for proper representation of the public interests in investigations made by it or cases or proceedings pending before it, whether at the Commission's own instance or upon complaint, or to appear for or represent the Commission in any case in court; and the expenses of such employment shall be paid out of the appropriation for the Commission."

Sec. 429. The eleventh and twelfth paragraphs of section 16 of the Interstate Commerce Act are hereby amended by inserting "(12)" at the beginning of the eleventh paragraph and "(13)" at the beginning of the twelfth paragraph.

Sec. 430. Section 17 of the Interstate Commerce Act is hereby amended by inserting "(1)" after the section number at the beginning of the first paragraph.

Sec. 431. The second paragraph of section 17 of the Interstate Commerce Act is hereby amended to read as follows:

"(2) The Commission is hereby authorized by its order to divide the members thereof into as many divisions (each to consist of not less than three members) as it may deem necessary, which may be changed from time to time. Such divisions shall be denominated, respectively, division one, division two, and so forth. Any commissioner may be assigned to and may serve upon such division or divisions as the Commission may direct, and the senior in service of the commissioners constituting any of said divisions shall act as chairman thereof. In case of vacancy in any division, or of absence or inability to serve thereon of any commissioner thereto assigned, the chairman of the Commission or any commissioner designated by him for that purpose, may temporarily serve on said division until the Commission shall otherwise order."

Sec. 432. The third and fourth paragraphs of section 17 of the Interstate Commerce Act are hereby amended by inserting "(3)" at the beginning of the third paragraph, and "(4)" at the beginning of the fourth paragraph.

The fifth and sixth paragraphs of such section are hereby repealed.

The seventh paragraph of such section is hereby amended by inserting "(5)" at the beginning of such paragraph.

Sec. 433. Section 18 of the Interstate Commerce Act is hereby amended by inserting "(1)" after the section number at the beginning of the first paragraph, and "(2)" at the beginning of the second paragraph.

Section 19a of the Interstate Commerce Act is hereby amended by inserting "(a)" after the section number at the beginning of the first paragraph, "(b)" at the beginning of the second paragraph, "(c)" at the beginning of the seventh paragraph, "(d)" at the beginning of the eighth paragraph, "(e)" at the beginning of the ninth paragraph, "(f)" at the beginning of the tenth paragraph, "(g)" at the beginning of the eleventh paragraph, "(h)" at the beginning of the twelfth paragraph, "(i)" at the beginning of the thirteenth paragraph, "(j)" at the beginning of the fourteenth paragraph, "(k)" at the beginning of the fifteenth paragraph, and "(l)" at the beginning of the sixteenth paragraph.

Sec. 434. Section 20 of the Interstate Commerce Act is hereby amended by inserting "(1)" after the section number at the beginning of the first paragraph, "(2)" at the beginning of the second paragraph, "(3)" at the beginning of the third paragraph, and "(4)" at the beginning of the fourth paragraph.

Carrier's Accounts and Records

Sec. 435. The fifth paragraph of section 20 of the Interstate Commerce Act is hereby amended to read as follows:

"(5) The Commission may, in its discretion, prescribe the forms of any and all accounts, records, and memoranda to be kept by carriers subject to the provisions of this Act, including the accounts, records, and memoranda of the movement of traffic, as well as of the receipts and expenditures of moneys. The Commission shall, as soon as practicable, prescribe, for carriers subject to this Act, the classes of property for which depreciation charges may properly be included under operating expenses, and the percentages of depreciation which shall be charged with respect to each of such classes of property, classifying the carriers as it may deem proper for this purpose. The Commission may, when it deems necessary, modify the classes and percentages so prescribed. The carriers subject to this Act shall not charge to operating expenses any depreciation charges on classes of property other than those prescribed by the Commission, or charge with respect to any class of property a percentage of depreciation other than that prescribed therefor by the Commission. No such carrier shall in any case include in any form under its operating or other expenses any depreciation or other charge or expenditure included elsewhere as a depreciation charge or otherwise under its operating or other expenses. The Commission shall at all times have access to all accounts, records, and memoranda, including all documents, papers, and correspondence now or hereafter existing, and kept or required to be kept by carriers subject to this Act, and the provisions of this section respecting the preservation and destruction of books, papers, and documents shall apply thereto, and it shall be unlawful for such carriers to keep any other accounts, records, or memoranda than those prescribed or approved by the Commission, and it may employ special agents or examiners, who shall have authority under the order of the Commission to inspect and examine any and all accounts, records, and memoranda, including all documents, papers, and correspondence now or hereafter existing, and kept or required to be kept by such carriers. This provision shall apply to receivers of carriers and operating trustees. The provisions of this section shall also apply to all accounts, records, and memoranda, including all documents, papers, and correspondence now or hereafter existing, kept during the period of Federal control, and

placed by the President in the custody of carriers subject to this Act."

Sec. 436. The sixth paragraph of section 20 of the Interstate Commerce Act is hereby amended by inserting "(6)" at the beginning of such paragraph.

The seventh paragraph of section 20 of the Interstate Commerce Act is hereby amended by striking out "Par. 7," at the beginning of such paragraph and inserting "(7)" in lieu thereof.

The eighth to twelfth paragraphs, inclusive, of section 20 of the Interstate Commerce Act are hereby amended by inserting "(8)" at the beginning of the eighth paragraph, "(9)" at the beginning of the ninth paragraph, "(10)" at the beginning of the tenth paragraph, "(11)" at the beginning of the eleventh paragraph, and "(12)" at the beginning of the twelfth paragraph.

Sec. 437. The eleventh paragraph of section 20 of the Interstate Commerce Act is hereby amended by inserting immediately before the first proviso thereof the following:

"Provided, That if the loss, damage, or injury occurs while the property is in the custody of a carrier by water the liability of such carrier shall be determined by and under the laws and regulations applicable to transportation by water, and the liability of the initial carrier shall be the same as that of such carrier by water."

Sec. 438. The third proviso of the eleventh paragraph of section 20 of the Interstate Commerce Act (not counting the proviso added by section 437 of this Act) is hereby amended to read as follows:

"Provided further, That it shall be unlawful for any such common carrier to provide by rule, contract, regulation, or otherwise a shorter period for giving notice of claims than ninety days, for the filing of claims than four months, and for the institution of suits than two years, such period for institution of suits to be computed from the day when notice in writing is given by the carrier to the claimant that the carrier has disallowed the claim or any part or parts thereof specified in the notice."

Regulation of Securities

Sec. 439. The Interstate Commerce Act is further amended by inserting therein a new section between section 20 and section 21, to be designated section 20a, and to read as follows:

"Sec. 20a. (1) That as used in this section the term 'carrier' means a common carrier by railroad (except a street, suburban, or interurban electric railway which is not operated as a part of a general steam railroad system of transportation) which is subject to this Act, or any corporation organized for the purpose of engaging in transportation by railroad subject to this Act.

"(2) From and after one hundred and twenty days after this section takes effect it shall be unlawful for any carrier to issue any share of capital stock or any bond or other evidence of interest in or indebtedness of the carrier (hereinafter in this section collectively termed 'securities') or to assume any obligation or liability as lessor, lessee, guarantor, indorser, surety, or otherwise, in respect of the securities of any other person, natural or artificial, even though permitted by the authority creating the carrier corporation, unless and until, and then only to the extent that, upon application by the carrier, and after investigation by the Commission of the purposes and uses of the proposed issue and the proceeds thereof, or of the proposed assumption of obligation or liability in respect of the securities of any other person, natural or artificial, the Commission by order authorizes such issue or assumption. The Commission shall make such order only if it finds that such issue or assumption: (a) is for some lawful object within its corporate purposes, and compatible with the public interest, which is necessary or appropriate for or consistent with the proper performance by the carrier of service to the public as a common carrier, and which will not impair its ability to perform that service, and (b) is reasonably necessary and appropriate for such purpose.

"(3) The Commission shall have power by its order to grant or deny the application as made, or to grant it in part and deny it in part, or to grant it with such modifications and upon such terms and conditions as the Commission may deem necessary, or appropriate in the premises, and may from time to time, for good cause shown, make such supplemental orders in the premises as it may deem necessary or appropriate, and may by any such supplemental order modify the provisions of any previous order as to the particular purposes, uses, and extent to which, or the conditions under which, any securities so theretofore authorized or the proceeds thereof may be applied, subject always to the requirements of the foregoing paragraph (2).

"(4) Every application for authority shall be made in such form and contain such matters as the Commission may prescribe. Every such application, as also every certificate of notification hereinafter provided for, shall be made under oath, signed and filed on behalf of the carrier by its president, a vice-president, auditor, comptroller, or other executive officer having knowledge of the matters therein set forth and duly designated for that purpose by the carrier.

"(5) Whenever any securities set forth and described in any application for authority or certificate of notification as pledged or held unencumbered in the treasury of the carrier shall, subsequent to the filing of such application or certificate, be sold, pledged, repledged, or otherwise disposed of by the carrier, such carrier shall, within ten days after such sale, pledge, repledge, or other disposition, file with the Commission a certificate of notification to that effect, setting forth therein all such facts as may be required by the Commission.

"(6) Upon receipt of any such application for authority the Commission shall cause notice thereof to be given to and a copy filed with the governor of each state in which the applicant carrier operates. The railroad commissions, public service or utilities commissions, or other appropriate state authorities of the state shall have the right to make before the Commission such representations as they may deem just and proper for preserving and conserving the rights and interests of their people and the states, respectively, involved in such proceeding. The Commission may hold hearings, if it sees fit, to enable it to determine its decision upon the application for authority.

"(7) The jurisdiction conferred upon the Commission by this section shall be exclusive and plenary, and a carrier may issue securities and assume obligations or liabilities in accordance with the provisions of this section without securing approval other than as specified herein.

"(8) Nothing herein shall be construed to imply any guaranty or obligation as to such securities on the part of the United States.

"(9) The foregoing provisions of this section shall not apply to notes to be issued by the carrier maturing not more than two years after the date thereof and aggregating (together with all other then outstanding notes of a maturity of two years or less) not more than 5 per centum of the par value of the securities of the carrier then outstanding. In the case of securities having no par value, the par value for the purposes of this paragraph shall be the fair market value as of the date of issue. Within ten days after the making of such notes the carrier issuing the same shall file with the Commission a certificate of notification, in such form as may from time to time be determined and prescribed by the Commission, setting forth as nearly as may be the same matters as those required in respect of applications for authority to issue other securities: *Provided*, That in any subsequent funding of such notes the provisions of this section respecting other securities shall apply.

"(10) The Commission shall require periodical or special reports from each carrier hereafter issuing any securities, including such notes, which shall show, in such detail as the Commission may require, the disposition made of such securities and the application of the proceeds thereof.

"(11) Any security issued or any obligation or liability assumed by a carrier, for which under the provisions of this section the authorization of the Commission is required, shall be void, if issued or assumed without such authorization therefor having first been obtained, or if issued or assumed contrary to any term or condition of such order of authorization as modified by any order supplemental thereto entered prior to such issuance or assumption; but no security issued or obligation or liability assumed in accordance with all the terms and conditions of such an order of authorization therefor as modified by any order supplemental thereto entered prior to such issuance or assumption, shall be rendered void because of failure to comply with any provision of this section relating to procedure and other matters preceding the entry of such order of authorization. If any security so made void or any security in respect to which the assumption of obligation or liability is so made void, is

acquired by any person for value and in good faith and without notice that the issue or assumption is void, such person may in a suit or action in any court of competent jurisdiction hold jointly and severally liable for the full amount of the damage sustained by him in respect thereof, the carrier which issued the security so made void, or assumed the obligation or liability so made void, and its directors, officers, attorneys, and other agents, who participated in any way in the authoizing, issuing, hypothecating, or selling of the security so made void or in the authorizing of the assumption of the obligation or liability so made void. In case any security so made void was directly acquired from the carrier issuing it the holder may at his option rescind the transaction and upon the surrender of the security recover the consideration given therefor. Any director, officer, attorney, or agent of the carrier who knowingly assents to or concurs in any issue of securities or assumptions of obligation or liability forbidden by this section, or any sale or other disposition of securities contrary to the provisions of the Commission's order or orders in the premises, or any application not authorized by the Commission of the funds derived by the carrier through such sale or other disposition of such securities, shall be guilty of a misdemeanor and upon conviction shall be punished by a fine of not less than $1,000 nor more than $10,000, or by imprisonment for not less than one year nor more than three years, or by both such fine and imprisonment, in the discretion of the court.

"(12) After December 31, 1921, it shall be unlawful for any person to hold the position of officer or director of more than one carrier, unless such holding shall have been authorized by order of the Commission, upon due showing, in form and manner prescribed by the Commission, that neither public nor private interests will be adversely affected thereby. After this section takes effect it shall be unlawful for any officer or director of any carrier to receive for his own benefit, directly or indirectly, any money or thing of value in respect of the negotiation, hypothecation, or sale of any securities issued or to be issued by such carrier, or to share in any of the proceeds thereof, or to participate in the making or paying of any dividends of an operating carrier from any funds properly included in capital account. Any violation of these provisions shall be a misdemeanor, and on conviction in any United States court having jurisdiction shall be punished by a fine of not less than $1,000 nor more than $10,000, or by imprisonment for not less than one year nor more than three years, or by both, such fine and imprisonment in the discretion of the court."

Interstate Commerce Commission Enlarged

SEC. 440. Section 24 of the Interstate Commerce Act is hereby amended to read as follows:

"SEC. 24. That the Commission is hereby enlarged so as to consist of eleven members, with terms of seven years, and each shall receive $12,000 compensation annually. The qualifications of the members and the manner of payment of their salaries shall be as already provided by law. Such enlargement of the Commission shall be accomplished through appointment by the President, by and with the advice and consent of the Senate, of two additional Interstate Commerce Commissioners, one for a term expiring December 31, 1923, and one for a term expiring December 31, 1924. The terms of the present commissioners, or of any successor appointed to fill a vacancy caused by the death or resignation of any of the present commissioners, shall expire as heretofore provided by law. Their successors and the successors of the additional commissioners herein provided for shall be appointed for the full term of seven years, except that any person appointed to fill a vacancy shall be appointed only for the unexpired term of the commissioner whom he shall succeed. Not more than six commissioners shall be appointed from the same political party. Hereafter the salary of the secretary of the Commission shall be $7,500 a year."

Relations Between Rail and Water Carriers

SEC. 441. The Interstate Commerce Act is hereby further amended by adding at the end thereof three new sections, to read as follows:

SEC. 25 (1) That every common carrier by water in foreign commerce, whose vessels are registered under the laws of the United States, shall file with the Commission, within thirty days after this section becomes effective and regularly thereafter as changes are made, a schedule or schedules showing for each of its steam vessels intended to load general cargo at ports in the United States for foreign destinations (a) the ports of loading, (b) the dates upon which such vessels will commence to receive freight and dates of sailing, (c) the route and itinerary such vessels will follow and the ports of call for which cargo will be carried.

"(2) Upon application of any shipper a carrier by railroad shall make request for, and the carrier by water shall upon receipt of such request name, a specific rate applying for such sailing, and upon such commodity as shall be embraced in the inquiry, and shall name in connection with such rate, port charges, if any, which accrue in addition to the vessel's rates and are not otherwise published by the railway as in addition to or absorbed in the railway rate. Vessel rates, if conditioned upon quantity of shipment, must be so stated and separate rates may be provided for carload and less than carload shipments. The carrier by water, upon advices from a carrier by railroad, stating that the quoted rate is firmly accepted as applying upon a specifically named quantity of any commodity, shall, subject to such conditions as the Commission by regulation may prescribe, make firm reservation from unsold space in such steam vessel as shall be required for its transportation and shall so advise the carrier by railroad, in which advices shall be included the latest available information as to prospective sailing date of such vessel.

"(3) As the matters so required to be stated in such schedule or schedules are changed or modified from time to time, the carrier shall file with the Commission such changes or modifications as early as practicable after such modification is ascertained. The Commission is authorized to make and publish regulations not inconsistent herewith governing the manner and form in which such carriers are to comply with the foregoing provisions. The Commission shall cause to be published in compact form, for the information of shippers of commodities throughout the country, the substance of such schedules, and furnish such publications to all railway carriers subject to this Act, in such quantities that railway carriers may supply to each of their agents who receive commodities for shipment in such cities and towns as may be specified by the Commission, a copy of said publication; the intent being that each shipping community sufficiently important, from the standpoint of the export trade, to be so specified by the Commission shall have opportunity to know the sailings and routes, and to ascertain the transportation charges of such vessels engaged in foreign commerce. Each railway carrier to which such publication is furnished by the Commission is hereby required to distribute the same as aforesaid and to maintain such publication as it is issued from time to time, in the hands of its agents. The Commission is authorized to make such rules and regulations not inconsistent herewith respecting the distribution and maintenance of such publications in the several communities so specified as will further the intent of this section.

"(4) When any consignor delivers a shipment of property to any of the places so specified by the Commission, to be delivered by a railway carrier to one of the vessels upon which space has been reserved at a specified rate previously ascertained, as provided herein, for the transportation by water from and for a port named in the aforesaid schedule, the railway carrier shall issue a through bill of lading to the point of destination. Such bill of lading shall name separately the charge to be paid for the railway transportation, water transportation, and port charges if any, not included in the rail or water transportation charge; but the carrier by railroad shall not be liable to the consignor, consignee, or other person interested in the shipment after its delivery to the vessel. The Commission shall, in such manner as will preserve for the carrier by water the protection of limited liability provided by law, make such rules and regulations not inconsistent herewith as will prescribe the form of such through bill of lading. In all such cases it shall be the duty of the carrier by railroad to deliver such shipment to the vessel as a part of its undertaking as a common carrier.

"(5) The issuance of a through bill of lading covering shipments provided for herein shall not be held to constitute 'an arrangement for continuous carriage or shipment' within the meaning of this Act.

Automatic Train Stops

"SEC. 26. That the Commission may, after investigation, order any carrier by railroad subject to this Act, within a time specified in the order, to install automatic train-stop or train-control

devices or other safety devices, which comply with specifications and requirements prescribed by the Commission, upon the whole or any part of its railroad, such order to be issued and published at least two years before the date specified for its fulfillment: *Provided,* That a carrier shall not be held to be negligent because of its failure to install such devices upon a portion of its railroad not included in the order; and any action arising because of an accident happening upon such portion of its railroad shall be determined without consideration of the use of such devices upon another portion of its railroad. Any common carrier which refuses or neglects to comply with any order of the Commission made under the authority conferred by this section shall be liable to a penalty of $100 for each day that such refusal or neglect continues, which shall accrue to the United States, and may be recovered in a civil action brought by the United States.

"SEC. 27. That this Act may be cited as the 'Interstate Commerce Act.'"

Title V.—Miscellaneous Provisions

SEC. 500. It is hereby declared to be the policy of Congress to promote, encourage, and develop water transportation, service, and facilities in connection with the commerce of the United States, and to foster and preserve in full vigor both rail and water transportation.

It shall be the duty of the secretary of war, with the object of promoting, encouraging, and developing inland waterway transportation facilities in connection with the commerce of the United States, to investigate the appropriate types of boats suitable for different classes of such waterways; to investigate the subject of water terminals, both for inland waterway traffic and for through traffic by water and rail, including the necessary docks, warehouses, apparatus, equipment, and appliances in connection therewith, and also railroad spurs and switches connecting with such terminals, with a view to devising the types most appropriate for different locations, and for the more expeditious and economical transfer or interchange of passengers or property between carriers by water and carriers by rail; to advise with communities, cities, and towns regarding the appropriate location of such terminals, and to cooperate with them in the preparation of plans for suitable terminal facilities; to investigate the existing status of water transportation upon the different inland waterways of the country, with a view to determining whether such waterways are being utilized to the extent of their capacity, and to what extent they are meeting the demands of traffic, and whether the water carriers utilizing such waterways are interchanging traffic with the railroads; and to investigate any other matter that may tend to promote and encourage inland water transportation. It shall also be the province and duty of the secretary of war to compile, publish, and distribute, from time to time, such useful statistics, data, and information concerning transportation on inland waterways as he may deem to be of value to the commercial interest of the country.

The words "inland waterway" as used in this section shall be construed to include the Great Lakes.

SEC. 501. The effective date on and after which the provisions of section 10 of the Act entitled "An Act to supplement existing laws against unlawful restraints and monopolies, and for other purposes," approved October 15, 1914, shall become and be effective is hereby deferred and extended to January 1, 1921: *Provided,* That such extension shall not apply in the case of any corporation organized after January 12, 1918.

SEC. 502. That if any clause, sentence, paragraph, or part of this Act shall for any reason to adjudged by any court of competent jurisdiction to be invalid, such judgment shall not affect, impair, or invalidate the remainder of the Act, but shall be confined in its operation to the clause, sentence, paragraph, or part thereof directly involved in the controversy in which such judgment has been rendered.

MORGANTOWN & KINGWOOD.—This railroad has been sold to the Bethlehem Steel Corporation and the Baltimore & Ohio Railroad. The road operates between Morgantown, W. Va., and Richard, 49 miles.

Weekly Traffic Report

ACCORDING TO A REPORT on traffic conditions for the week ended February 5, 1920, made to Director General Hines, revenue freight loaded and freight received from connections for the various regions as compared with the same week in 1919 were as follows:

Eastern region—Revenue freight loaded, 186,030, an increase of 11,306 cars; receipts from connections, 220,293, an increase of 16,927. Allegheny region—Revenue freight loaded, 179,725, an increase of 18,633 cars; receipts from connections, 142,567, an increase of 7,854 cars. Pocahontas region—Revenue freight loaded, 30,715, an increase of 2,257 cars; receipts from connections, 16,155, a decrease of 426 cars. Southern region—Revenue freight loaded, 123,951, an increase of 16,736 cars; receipts from connections, 72,799, an increase of 12,065 cars. Northwestern region—Revenue freight loaded, 115,372, an increase of 17,196 cars; receipts from connections, 78,354, an increase of 16,169 cars. Central Western region—Revenue freight loaded, 118,995, an increase of 20,412 cars; receipts from connections, 68,812, an increase of 10,562 cars. Southwestern region—Revenue freight loaded, 61,474, an increase of 7,682 cars; receipts from connections, 95,076, an increase of 8,198 cars over last year.

A summary of the report follows:

Eastern Region: (Week ended February 7). Freight traffic has been very much interfered with, particularly in the vicinity of New York, Boston and Portland, by the heavy storms which began on the night of February 4 and almost completely stopped the movement of freight. The worst congestion of freight is at and in the vicinity of Toledo where there were 8,664 carloads on hand February 7, compared with 6,385 aawaiting movement February 1. The only other congestions are at Detroit with the exception of those mentioned above. There was considerable reduction in the movement of passengers due to weather interference.

Allegheny Region: (Week ended February 6). Operating conditions are much affected by severe weather. Practically no floating was done in New York harbor for several days and barge movement between Norfolk and Cape Charles was entirely at a standstill for several days. Embargoes have been extended to cover the New York situation resulting therefrom. Anthracite coal loading protected and represents slight increase. Coal dumped at tidewater decreased 36,356 tons. Travel has been normal and conditions at ticket windows, parcel rooms and baggage rooms are very good.

Pocahontas Region: (Week ended February 6). With the exception of tidewater coal dumped, business as a whole shows some improvement over previous week.

Southern Region: (Week ended February 5). An increase in commercial activities throughout the region with encouraging prospects for the future is reported. Continued heavy movement of cotton to the ports largely in excess of last year. Principal lines report continued heavy travel throughout the region. No trouble being experienced in furnishing equipment to take care of travel.

Northwestern Region: (Week ended February 6). General business conditions continue good. All industries are very active with many plans in contemplation for future expansion. Wholesalers and manufacturers are unable to fill all orders received while dealers are willing to contract for supplies as far in the future as manufacturers are willing to accept. Total loading of lumber and forest products for the week was 19,522 cars, representing the best showing made in some time. Volume of passenger travel very satisfactory but local travel has suffered a slight decrease on account of influenza epidemic. Through travel slightly ahead of last year.

Central Western Region: (Week ended February 6). Coal production for the week was 30 per cent greater than

during same period last year and approximately same as previous week; however, mines are working more nearly on full time. Report of foreign trade through Los Angeles harbor for the year 1919 shows exports and imports to have been 100 per cent greater than any previous year. Passenger travel continues to show increases over corresponding period of last year, but several lines report that a recurrence of the influenza epidemic is having some effect on movement.

Southwestern Region: (Week ended February 5). Crop conditions; in Texas the season is backward and very little progress has been made in preparation for Spring crops. Wheat that has been sown is in fair condition only. Too much rain has interfered with all farm operations. North of Texas conditions are similar except that considerable winter plowing has been done in Oklahoma. Influenza epidemic affected regular passenger travel to some extent during the week, although the volume of traffic generally showed no decided fluctuation.

Annual Report of Regional Director Maher

Operation of railroads in the Pocahontas region during 1919 was adversely affected by the efforts of the roads to serve the public interest in handling the coal strike situation according to the annual report of Regional Director N. D. Maher submitted to Director General Walker D. Hines. The report set forth however that the coal output secured by the steps taken by the railroads compensated for the loss in economical operation involved.

"As in other regions" the report said, "The country-wide coal miners' strike has adversely affected our operation. Although the coal tonnage handled by the roads of this region since November 1, on the average has approximated that of October just prior to mine suspension, miscellaneous traffic has had to be severely sacrificed in order to devote the entire westbound freight capacity of the Norfolk & Western and Chesapeake & Ohio to the movement of coal to the west through Ohio gateways. The loss of this miscellaneous traffic will be added to; owing to the unusual routes traveled by emergency coal to connecting regions. Attendant difficulties in maintaining car supply at the mines, because of lack of road capacity for handling empties from the west through Cincinnati and Columbus, Ohio, sufficient to supply both the western and eastern mines of the two railroads, entail much special service in the eastern sections in order to move the mines promptly the empty cars made available there from unusual sources and over high cost operation routes. I am glad to say, however, that the accomplishment in production at the mine s in this region and the forwarding of coal to outlying territory in satisfying quantities may be regarded compensatory in the circumstances."

The causes of increased expenses as compared with revenues were outlined as follows:

"Increases in prices paid for material.

"Increase in wage costs.

"Progressive heavy decrease in traffic following January 1 and impracticability of immediately reducing forces in the same ratio.

"Maintenance of way and maintenance of equipment work deferred in 1918 on account of the shortage of materials and labor and performed in 1919.

"Disorganization and loss of revenue incident to the shopmens' strike in June and August, and similar losses due to coal miners' strike in November and December.

"Back pay earned in 1918 and paid in 1919, which was approximately $1,500,000.

"From the standpoint of earnings and relative expense of transportation, the tides of freight traffic in 1919 were not as favorable in 1919 as in 1918. This applies particularly to falling off of traffic destined to the seaboard."

The report gave in detail the figures showing the decrease in freight traffic on the Pocahontas region lines. These included;

Decrease of 142,721 cars of coal and coke loaded.

Decrease of 3,085 cars of ore reflecting depression in the iron and steel industry during the first half of the year particularly.

Decrease of 166,344 cars in loads received from connections.

"In connection with the fluctuation in the volume of coal traffic" the report said, "it should be stated that the roads of this region, which are particularly equipped for the handling of coal to tidewater, suffered a material decline in this traffic during the early part of the year, due to several causes, namely, (1) Coal requirements in New England hitherto drawn from Hampton Roads were taken care of to an unusual extent with coal moving all rail from more northern fields, because of the unfavorable differential in transportation charges resulting from high vessel rates applying from Hampton Roads and elsewhere, (2) Vessels for foreign tonnage were scarce and rates of freight practically prohibitive. With more plentiful vessel supply and active demand for foreign tonnage in recent months, the tidewater coal traffic increased immensely and was going along in heavy volume when suspended, or curtailed by reason of the strike of coal miners.

"Export freight through Hampton Roads ports decreased materially with the ending of the war, so that in 1919 the tonnage, other than coal, through these ports during the first ten months amounted to only approximately 700,000 tons, which was considerably less than one-half the tonnage of freight other than coal exported through Hampton Roads ports in 1918, when a large tonnage of war material and supplies for the United States army overseas was handled."

Passenger revenues on all lines in the region showed a material increase during the year, according to the report, which said:

"In 1918 after the armistice in November, and in 1919, passenger train service aggregating 197,113 miles per annum, formerly operated, and discontinued during the war, was restored. Also additional train service totalling 336,250 miles per annum has been inaugurated, and the train service now performed is reasonably sufficient for the needs of the public.—In August it was necessary to discontinue a number of main and branch line trains on the C. & O. railroad for some days owing to the shopmen's strike. Full service, however, was re-established as promptly as conditions permitted.

"There was also curtailment of passenger service for a few days in December in order to conserve coal."

The report indicated a general improvement in the reduction of the number of freight claims against roads in the Pocahontas region and set forth the progress made in safety work by the lines during the year.

Work on additions and betterments, the report said, was restricted by the inability of the railroads to finance these improvements.

"The railroads need three billions now and as much more within three years to prevent hardening of the arteries and inability to circulate the nation's commerce," Frank A. Vanderlip told a gathering of farmers at Cornell University on February 13. He maintains that unless the transportation systems can obtain the necessary capital from the people's savings they will have to be returned to government control. Shorter hours for labor," he continued, "might be viewed with equanimity if the leisure time were used by workers to study. If the leisure is to be used for pleasure and amusement then we shall have less of everything."

Railway Freight Rates Increased in Great Britain

Deficit of £50,000,000 to Be Met by Flat Rate Additions and Percentage Increases to Existing Rates

By Robert E. Thayer
European Editor of the *Railway Age.*

London.

In view of the many difficulties experienced in the past by the railways of the United States in obtaining an increase in railway rates to meet increased costs of operation, the manner in which the English railways have accomplished this end will not only be read with a great deal of interest but with a feeling somewhat akin to envy. As a matter of fact, there was nothing to it. There is no real story to tell how it was done—it was simply done—and that is all there is to it. The Minister of Transport, soon after he was given control of the railways and had appointed his Rate Advisory Committee, under the terms of the Ministry of Transport Act, told that committee to provide an increase in railway freight rates which would provide an additional revenue of £50,000,000 with which to meet the estimated deficit, stating that the need was urgent for an immediate rate adjustment.

The Rates Advisory Committee is composed of representatives of trade and agriculture, who were selected by the Board of Trade; a representative of labor, by the Minister of Labor; a representative of transportation, selected by the Minister of Transport; a man selected by the Lord Chancellor, and a railway economist selected by the Minister of Transport. Soon after it had been formed, the committee called into conference other representatives of the shippers, agricultural interests and labor. It conferred with representatives of the Mining Association appointed for the purpose, representatives from chambers of commerce of the important cities in Great Britain and of important commercial organizations, such as the British Federation of Industries and the Iron and Steel Federation, representatives from the Central Chamber of Agriculture, the National Association of Corn and Agricultural Merchants, National Farmers' Union, etc., and the representatives of the Coal industry, all of which were appointed for the specific purpose of conferring with and advising the committee. Although representatives of railway labor were invited for conference none attended. It will be observed that there were no state commissions involved, as Great Britain is not blessed with such organizations.

Inasmuch as the committee had conferences with these chosen representatives of the trade interests, it did not deem it necessary to hold public inquiry regarding the matter. In this regard it is to be stated that although some very large increases in the rates were adopted there has been practically no criticism, and the press has accepted these increases almost without a murmur. At a recent meeting of the associations of British Chambers of Commerce, however, some dissatisfaction was shown with the way the matter was handled, and motions were proposed that the government be asked to defer putting the rates into effect until they had been more thoroughly discussed by the shippers, but inasmuch as, as the president of the association said, such action was virtually calling into question the action of the association's representatives on the rate committee these motions were quashed.

The easy manner in which these increases in rates were put into effect is a fine commentary on the way in which the whole matter was handled. The entire public had been fully informed as to the extent of the losses of the government through the guaranteed dividends to the railroads, and they were quite ready to approve of anything that would make good this deficit. Furthermore, there is not nearly the antipathy to the railroads in Great Britain as in the United States. Perhaps the reason for this is that the railways' business in Great Britain has not been everybody's business anywhere near to the extent that it has in the United States. There never has been the publicity given to railway statistics and methods of operation here as in the states. The general public knows, comparatively speaking, nothing of the inner workings of the roads here. There has been no Brandeis to proclaim in such formidable language of "disgraceful inefficiency" in railway operation. Thus we see the income of Great Britain's railways increased by about £50,000,000, or approximately 25 per cent, with no more difficulty than the necessary work of putting the increase into effect.

Reasons for Percentage and Flat Rate Increases

The Rates Advisory Committee, realizing that the demand for increased revenue was urgent, had come to the conclusion that time would not be allowed for the detailed consideration of the very large number of spearate charges or the general revision of the classifications in effect. It, therefore, advised an interim revision based on certain flat rate and percentage increases, with the idea of giving more elaborate consideration to the general principles of governing railway rates later on, when a more constructive and scientific work could be done.

Appreciating the fact that the increases in the cost of railway operation falls more heavily on the short-distance traffic than upon long-distance traffic, and that the latter is more remunerative to the railway companies than the former, the committee decided that to adopt a percentage increase only would put upon the long-distance traffic a disproportionate share of the increased cost of shunting, handling and cartage, seeing that the long-distance traffic carries higher actual rates. It was decided that flat rates of small amount should be imposed in addition to a percentage increase (which will have the effect of increasing short-distance rates in a greater proportion than long-distance rates) and that in addition an extra charge should be made upon rates which include collection and delivery, deeming this right in consequence of the very great increase which has taken place in the expense of cartage.

It was the opinion of the committee that the higher classes of goods should in fairness bear both a higher flat rate and a higher percentage of increase than the lower classes of goods. As an instance, it was pointed out that the value of iron ore carried at Class A* rates often does not exceed 10s a ton, while the value of cotton carried at Class 1 rates is at present £200 per ton.

Increases Recommended

The increases recommended by the committee, and which were placed in effect on January 15, are as follows:

(1) The rates and charges in respect of merchandise com-

*The different classifications mentioned in this report are, in general, as folows:
Class A—Heavy raw materials, such as ore, coal, etc.
Class B—Raw materials of higher grade, such as bricks.
Class C—Semi-finish materials, such as iron and steel castings, girders, armor and boiler plate, all grain and certain vegetables.
Classes 1 to 5—Finished articles, groceries, machinery, cloth, hardware, etc.

prised in Class A as regards coal, coke and patent fuel, by 25 per cent, and as regards other goods and minerals in Class A by 30 per cent, together in each case with a flat rate addition of 3d per ton, irrespective of distance, but so that the minimum addition under both heads be not less than 6d per ton and the maximum addition be not more than 2s per ton.

(2) The rates and charges in respect of merchandise comprised in Class B by 40 per cent, together with a flat rate addition of 3d per ton, irrespective of distance, but so that the minimum addition under both heads be not less than 6d and the maximum addition be not more than 3s per ton, but with the further addition for cartage in case of collection and delivery hereinafter mentioned.

(3) The rates and charges in respect of merchandise comprised in Class C by 50 per cent, together with a flat rate addition of 6d per ton, irrespective of distance, and with the further addition for cartage in case of collection and delivery hereinafter mentioned.

(4) The rates and charges in respect of merchandise comprised in Classes 1 to 5 by 60 per cent, with a flat rate addition of 1s per ton, irrespective of distance, and with the further addition for cartage in case of collection and delivery hereinafter mentioned.

We also advise and recommend that where the rates and charges include collection and delivery or collection or delivery the respective percentage increases and flat rate additions should be made upon the whole of the rate or charge, but in addition thereto, there should be charged a further amount of 1s 6d in the case of collection only, or of delivery only, and of 3s per ton in the case of collection and delivery, but that the rebates allowed in cases where a rate includes collection and, or, delivery, but such collection or delivery is not in fact effected by the railway company should be equitably readjusted.

We further advise and recommend, in regard to the rates and charges at present in force.

(5) That the charge for rolling stock as set out in the General Railway Classification be increased by 60 per cent.

(6) That the rates and charges for live stock conveyed by goods train at rates "per truck" should be increased by 60 per cent, together with a flat rate addition of 1s per truck or part truck, irrespective of distance.

(7) That the rates and charges for live stock conveyed by goods train at "head" rates should be increased by 60 per cent in the case of horses, mules, asses, cattle, calves, sheep, lambs, pigs, goats and all other live animals.

(8) That the charges for the use of trucks provided by the railway companies for the conveyance of merchandise, when the provision of trucks is not included in the rate charged for conveyance, should be increased by 50 per cent, but so that the minimum total charge be not less than 9d per ton.

(9) That the rates and charges for the conveyance by goods train of carriages of every description included in the carriage class in the General Railway Classification (not being a carriage adapted and used for traveling on the railway) and for vans and caravans should be increased by 60 per cent, with a flat rate addition in the case of vans and caravans, irrespective of distance, 2s 6d per vehicle.

(10) That the rates and charges for the conveyance of "small parcels by merchandise train" (this corresponds to express service in the United States) as defined by Part VI of the Railway Rates and Charges Order Confirmation Acts, 1891 and 1892, be increased to such an extent that the rates chargeable shall be 100 per cent greater than the rates now charged under the general Railway Classification of Goods "Scale of Charges for Small Parcels by Merchandise Trains," but in other respects remain subject to the provisions of the said Part VI.

(11) That the rates and charges for the conveyance whether by goods train or passenger train of "returned empties" be increased by 100 per cent with the provision that where the "returned empties" are sent in consignments amounting to a truck load, the increase shall be only 50 per cent when consigned from one consignor to one consignee.

(12) That the present rates and charges for parcels and goods by passenger train, including perishable merchandise of the nature specified in Part V of the Railway Rates and Charges Order Confirmation Acts, 1891 and 1892, be increased by 50 per cent, subject to the exceptions and qualifications hereafter mentioned, and that the charges for cloak room services for parcels be increased so that the minimum charge be 2d.

(13) That the arrangements with the postmaster-general for the division of the receipts for goods sent by parcel post be so modified that the railway companies receive 55 per cent of the total of such receipts, including the increased receipts under the revised rates for parcel post adopted in 1915. If necessary, legislative authority should be obtained to modify the provisions of Section 2, Sub-section 2 of the Post Office and Telegraph Act, 1915, which excludes from the operation of the Post Office Parcel Act, 1882, any increase in the rates of postage for parcels made after the passing of the Act of 1915.

(14) That the contracts with the post office for the conveyance of mails should be revised so that the charges made by the railway companies should be increased by 60 per cent. The recommendations numbered 13 and 14 may no doubt make necessary certain readjustments of postal rates by the postmaster-general which may require parliamentary sanction, and it may be necessary to delay carrying them into effect until these are made.

(15) That any rates and charges for the conveyance of goods or merchandise whether by goods train or passenger train not included in the foregoing recommendations should be increased by 60 per cent.

(16) In regard to the rates and charges for the conveyance of the goods and merchandise hereinafter mentioned, notwithstanding anything contained in the foregoing recommendations, we advise:—

(*a*) That no increase be made on the rates and charges in respect of manure in bulk or packed manure, basic slag or lime for agricultural purposes.

(*b*) That the rates and charges for the conveyance by passenger train of fruit, vegetables, eggs, butter, cream, soft cheese and poultry, but not including hot house produce, be increased by 25 per cent only.

(*c*) That the rates and charges for the conveyance by goods train of potatoes in Class C, vegetables and roots in Class C, fruit, and hay and straw, in lots of two tons and upwards, be increased by 25 per cent only, plus the flat rate and cartage charges above recommended, the rates and charges for consignments of less than two tons being increased in the manner hereinbefore recommended for the respective classes in which they fall.

(*d*) That no increase be made in the rates and charges in respect of milk.

To give an idea of how these flat rate additions to the percentage increases affect the lower rate charges, and likewise the short-distance traffic, the following table has been prepared showing the percentage increases to existing rates of varying amounts, as given in the rate book:

Rates in Rate Book (Shillings)	Class A (Increased by 30 per cent plus a flat rate of 3d) (per cent)	Class B (Increased by 40 per cent plus a flat rate of 3d) (per cent)	Class C (Increased by 50 per cent plus a flat rate of 6d) (per cent)	Classes 1 to 5 (Increased by 60 per cent plus a flat rate of 1s) (per cent)
1.....	58	66	100	158
2.....	42	54	75	108
3.....	39	47	66	94
4.....	35	46	62	85
5.....	35	45	60	80
10.....	20	30	55	70
20.....	10	15	53	65
30.....	7	10	52	63
40.....	5	7.5	51	63
50.....	4	6	51	62
100.....	2	3	50.5	61

Note: In addition to the above increases there is an additional charge of 1s 6d per ton for collection or delivery.

The increase in revenue to be derived from the new rates is distributed roughly as follows: Class A, 2 per cent; Class B, 4 per cent; Class C, 18 per cent; Classes 1 to 15, 41 per cent; coal, coke and patent fuel (excluding locomotive coal), 17 per cent; freight by passenger train, 8.9 per cent; Irish traffic not previously considered, 3 per cent; small parcels not previously considered, 3 per cent; and mails, 1.5 per cent.

The attention of the committee was called to the importance of not making any recommendations which would prejudicially affect agriculture and the supply of home-grown food, and it gave careful attention to this problem, taking counsel with the representatives of that industry. The diffi-

culties of making recommendations on this point were great, seeing that very few articles are solely used by farmers and agriculturists, and that even agricultural produce at an early stage becomes an ordinary article of commerce in which the trader rather than the farmer is interested. The committee, however, made certain recommendations as to modification in regard to increase in the case of traffic in which the agriculturist is specially interested. One of the many difficulties by which it was faced was the fact that almost all forms of agricultural produce are imported as well as home grown, and that it is well nigh impossible to distinguish in the matter of rates on the ground of the place of origin of the goods carried.

During the war land under cultivation suffered heavily from the shortage of fertilizers and manures, and for that reason no increases were made on this material.

Goods by Passenger Train

The problem of the increases to be made in the rates for the carriage of goods by passenger train differs somewhat from that as to merchandise by goods train. Already in the years 1916, 1918 and 1919 increases had been made in some of the rates as follows:

	On an Average.
1. In the general parcels scale	20 per cent in 1918.
2. In the owner's risk scale of rates	24 per cent in 1918.
3. On sewing machines, bicycles, bath chairs, etc.	53 per cent in 1919.
4. On caravans	45 per cent in 1919.
5. On bullion and specie	80 per cent in 1919.
6. On carriages	80 per cent in 1919.
7. On motor cars	60 per cent in 1919.
8. On motor cycles, motor tricycles	33⅓ per cent in 1919.
9. On horses and mules	25 per cent in 1916.
10. On live stock in guard's van	20 per cent in 1919.
11. In cartage charges on S. to S traffic	33⅓ per cent in 1919.

Of the traffic by passenger train the great bulk falls under five heads:—

1 and 2. General parcels and owner's risk rates	55 per cent of total.
3. Milk	7½ per cent of total.
4. Perishable goods exceptional and special rates	27 per cent of total.
5. Newspapers	5 per cent of total.
	94½ per cent

The committee considered whether the increase in these rates should be based upon the existing rates (*i. e.*, after the increases made since the commencement of the war) or upon the rates in force before those increases were made. It found that those increases had removed many anomalies and that to return to pre-war rates as the basis of increase would restore such anomalies, and thus the committee recommended that the increases should be made upon the rates now in force, but should be at a lower rate than it would have recommended had the increase been based on pre-war rates.

Insofar as it can be determined, the increase in the rates for goods by passenger train will be sufficient to prevent the transfer of traffic from goods trains to passenger trains.

Sir Eric Geddes Comments on the Rates

Shortly after the rates were placed into effect Sir Eric Geddes, the Minister of Transport, commented on them at a dinner given at the Cambridge Chamber of Commerce. In speaking of the necessity for the increase, he stated that whereas the pre-war wage bill of the railways was £47,000,000, the new permanent adjustments which had recently been granted, together with other adjustments, including the increased wages and shorter hours that have been granted, increased the cost of the labor bill to £63,000,000, or 134 per cent. He said: "As the cost of living falls and economies (in railway operation) are effected and we get unified control and improved conditions, you may look for reduced rates and fares. If the railways are prudently managed and trade continues to improve, you may look to a reduction on the present high rates that have been imposed of necessity."

AMERICANIZATION CLASSES have been started at the Schenectady plant of the American Locomotive Works under the direction of George Buys.

Annual Report, Division of Purchases

MORE THAN A BILLION DOLLARS was spent through the Division of Purchases of the United States Railroad Administration during the first 10 months of 1919 in obtaining materials for the railroads under government control, according to the report of Director Henry B. Spencer of the division to Director General Hines. The report listed the value of material bought for the railroads as follows:

Fuel	$403,815,632
Rail	60,764,970
Cross ties	108,232,363
Other material	568,119,009
Total	$1,140,931,974

"The needs of various railroads for material to the value of nearly $19,000,000," the report continued, "have been supplied by the transfer of the material from other railroads having excessive stocks, and the money actually spent has been thereby reduced by that amount. Scrap material to the value of more than $47,000,000 has been disposed of during the 10 months. The excessive stocks of material held by the railroads as a result of war conditions have been reduced by about $54,000,000 during the six months following April 1, 1919, when the stocks had reached their highest point, and a still further decrease of approximately $35,000,000 is anticipated by the end of the year.

"Practically with the beginning of the year the War Industries Board and the Fuel Administration suspended their control of prices and the allocation of the various products, the result of which was an immediate increase in the cost of some commodities, notably forest products, and a moderate decrease in the cost of fuel and steel products.

"Entirely new and different problems were presented by the termination of hostilities late in the preceding year," the report said. "Efforts were directed to the curtailing of purchases wherever it could be done without working hardship or injury to the manufacturing interests whose war-time programs had been completely upset and to the reduction of the abnormally large stocks of material which had been accumulated by the railroads as a war-time necessity. No new equipment was purchased by the division during the year, but it has been busily engaged in seeing that the material required for building the cars and locomotives contracted for last year was furnished and the work pushed to completion as rapidly as the circumstances permitted.

"During the year (up to and including December 9, 1919) 1,103 locomotives have been completed and 75,235 freight cars of all types have been received and put in service. During the year 240,000 tons of new rails were contracted for at an approximate cost of $1,125,000 and 1,047,000 tons were delivered on contracts previously made."

Discussing the coal situation, the report recommended the continuance of government control of coal prices and distribution, and said:

"The reduced consumption of coal, due to the decreased demand for the manufacture of war materials, in the early months of the year led to a partial stagnation in the coal industry and a falling market, and contracts which expired generally on March 31 were renewed at prices which averaged about 13.5 per cent less than were paid during 1918. The competitive conditions which were restored by the suspension of price regulation by the Fuel Administration also resulted in a material shifting of the sources of the railroad supply, which was the subject of some discussion, but which gradually brought about a more normal distribution of the product.

"The policy of accumulating a storage supply during the summer as a stimulation to the industry and an insurance against an increased winter demand was generally inaugurated and carried out as well as conditions permitted.

"The equal car distribution rule acted to prevent the stor-

ing of some coal that would otherwise have been obtained, and some railroads found difficulty in regulating their supply on this account.

"More than 1,200 contracts for coal have been negotiated during the year, covering approximately 143,000,000 tons, 60 per cent of which expire on March 31, 1920, and 40 per cent at later dates, and all of which the railroad corporations have agreed to assume at the expiration of federal control.

"The general strike of the mine workers on November 1 resulted in the Fuel Administrator again taking charge of the situation and revoking the suspension of his previous orders regarding coal prices and priorities.

"At his request and acting by his authority, the Railroad Administration undertook the distribution of the available supply, and this work was placed in charge of the director of this division."

The report outlined the organization and work of the Central Coal Committee in handling the coal strike situation, and pointed out that special measures will probably be necessary to restore the railroad coal reserves depleted during the period of shortage due to the strike.

"In order to prevent a further depletion of the railroad stocks," the report said, "it will be necessary for the railroads to obtain larger shipments for current needs than would otherwise have been necessary.

"It would seem desirable that the Central Coal Committee should continue to exercise authoritative control of the distribution of all coal until this condition has been corrected and the production has reached a point adequate to supply all demands.

"It is also important, if the railroad fuel supply is to be adequately protected during the winter, that the establishment for a maximum price by governmental authority and the rules of the Fuel Administration with respect to priority of shipments in the distribution of the product should be continued for at least 60 days and longer if it should seem desirable at the expiration of that period. All present indications point to an excessive demand for both export and domestic consumption, due to the depletion of accumulated stocks as well as to possible shortage of the car supply, and unless the price is controlled and the shippers are obliged to recognize the priority of the railroad requirements it would appear that the current needs of the railroads could be met only with the greatest difficulty and at the expense of the diversion of commercial shipments in many cases."

The Forest Products section of the Division of Purchases reported that the Railroad Administration policy as to production and distribution of cross-ties inaugurated in 1918 has been successfully continued, but that uncertainty as to conditions which will prevail after the expiration of federal control had seriously retarded tie production during the past 60 days.

"The production during the first 10 months of the year," the report said, "has been 84,525,341 ties of all grades, as compared with 77,474,983 for the year 1918. The local production on railroads which have heretofore depended more or less on securing their supply from the territories of other lines has been stimulated to a remarkable extent. Some previously dependent railroads have been made wholly self-supporting, and the production on the average line of this class has been increased approximately 100 per cent, reducing their demands on the exporting roads and conserving transportation.

"The distribution of the supply has involved the transfer from one region to another during the 10 months of 21,978,556 ties.

"In sympathy with the increase in price of all grades of lumber, the prices of cross-ties advanced during the year from an average of 65 cents each to an average of 80 cents each, an increase of 23 per cent. The control of the inspection by this division, resulting in a uniform application of the standard specifications for all ties produced, has materially improved the quality of the ties received, so that the increase in the price paid for the ties has been partially compensated for in the better grade of ties which have been obtained. The stocks on hand have gradually increased during the year, and on November 1 there were about 14,600,000 more ties available than at the beginning of the year, which is fairly good evidence that the current necessities have been well cared for."

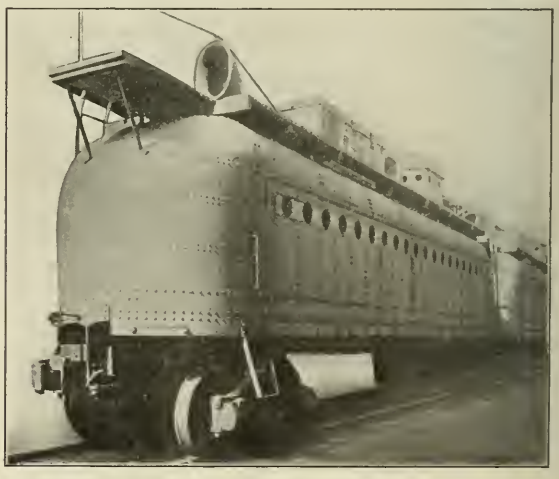
The Forest Products Section controlled practically the entire operation of timber-treating plants, the report said. The output of treated ties for the year was estimated at 35,000,000, as against 30,609,209 during 1918.

Discussing the work of the Stores Section of the Division of Purchases in caring for, distributing and accounting for the material carried in stock by the railroads the report reads as follows:

"Immediate attention was given to reducing so far as possible the abnormally large stocks of material on all railroads which had been accumulated during the war period, and arrangements were made for the transfer of surplus stocks of material from one railroad to another, so as to make the best use of all material on hand and avoid the purchase of additional quantities. During the first 10 months of the year the value of material transferred in this manner has been $18,739,597, and its use has prevented the necessity for additional purchases of that amount."

Anticipating the termination of the federal control of the roads, the report said:

"In anticipation of the termination of federal control, instructions have been sent to the regional directors outlining an arrangement under which the various railroad corporations will agree to assume liability for all material and supplies which may be shipped after the termination of federal control on outstanding current orders, the delivery of which has not been completed, and providing for the cancellation of the undelivered portion of such orders which the railroad corporations are not willing to assume liability for, thus relieving the director general from any responsibility for materials or supplies delivered after the termination of federal control."



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Steel Armored Cars Recently Built for the Mexican Railways for Use in Bandit Infested Country

General News Department

The annual compensation to be paid by the government to the Delaware & Hudson, including subsidiary companies, as fixed in the contract which has just been executed by the director general is $7,480,204; and that paid to the Pittsburgh, Cincinnati, Chicago & St. Louis is $11,334,023.

As a tribute to E. P. Ripley, president of the Atchison, Topeka & Santa Fe, who died at Santa Barbara, Cal., on February 4, activities on the entire Santa Fe system ceased on February 6 from 12 o'clock to 12:05 o'clock (Pacific time), the time at which Mr. Ripley's funeral services began.

Following the initial session of the annual convention of the American Concrete Pipe Association, which will be held at the Great Northern hotel and the rooms of the Western Society of Engineers, Chicago, on February 20 and 21, the convention will divide into two sections to consider drain tile and concrete pipe respectively. J. E. Moody, chief engineer of the Massey Concrete Products Corporation, Chicago, will be in charge of the meetings of the concrete pipe division.

The American Association of Engineers will hold its second annual railroad conference at the Congress hotel, Chicago, on March 15. W. W. K. Sparrow, chief engineer of the Chicago, Milwaukee & St. Paul Railway Company, will act as chairman of the morning session of the conference. Among the topics which will be discussed are: the Association's work in the railroad field during 1919; plans for future railroad work; the organization and function of railroad sections; and the Association's railroad salary schedule.

Sleeping car porters on the Canadian Pacific are to have their pay advanced five and ten dollars a month, the increases to date from December 16, in accordance with the recommendation of a board of conciliation which has just made a report. The rates are to be, for the first year $75; for the second year $80 and for the third year $85 a month. On observation cars, compartment cars and buffet cars the rates will be $92.50 a month. About 500 porters will receive the benefit of this advance.

Numerous reports have been circulated recently to the effect that the Canadian Pacific was contemplating the electrification of its lines. E. W. Beatty, president of the road, in speaking of the reports recently, said, "There is no foundation for the statement that the Canadian Pacific is considering the electrification of its system as a whole. The possibility of electrification of portions of the line, especially in the mountains, is always before us and it would seem to be both feasible and practicable when traffic conditions warrant it. No works of this kind are, however, in immediate contemplation."

The compensation board appointed by the Interstate Commerce Commission to adjust the dispute between the Midland Valley Railroad and the Railroad Administration as to the amount of the just compensation that should be paid to it for the use of its property during federal control has rendered a decision, in the form of a report to the President, that it is entitled to $765,679 per annum, or approximately the amount of its net railway operating income for the calendar year 1917, whereas the company claimed $1,050,000 and the Railroad Administration had offered $530,000. Its standard return as determined under the general rule would have been $446,797.

The Western Railway Club held its regular monthly meeting at the Hotel Sherman, Chicago, on February 16, at which a paper on electric arc welding, illustrated by lantern slides, was presented by W. M. Brady, commercial electrical engineer of the General Electric Company, Chicago. This paper was substituted for one on "The Railroad Administration Wage Agreement with the Railway Employees' Department of the American Federation of Labor," which was to have been presented by Frank McManamy, assistant director of the mechanical department of the Division of Operation of the United States Railroad Administration. Mr. McManamy was unavoidably detained in Washington and it is expected that he will present his paper at the April or the May meeting of the club.

Seven railroad systems and the entire Southwestern region of the United States Railroad Administration are now co-operating with the National Safety Council in securing the adoption of a system of safety instruction in public schools throughout the territory in which they operate. This system, the author of which is E. C. Payne, was described in the *Railway Age* of January 13, page 383. The roads which are now co-operating in the movement are the Chicago & North Western, the Pennsylvania (Eastern Lines), the Duluth, Missabe & Northern, the Maine Central, the Colorado & Southern, the Atchison, Topeka & Santa Fe and the Gulf, Colorado & Santa Fe. Representatives of these roads are placing copies of a booklet describing Payne's plan in the hands of school superintendents in each city in their respective territories.

Kansas will have no strike of railroad workers regardless of any disagreement that may arise as a result of the present controversy between the head of railroad employees' unions and the United States Railroad Administration, according to Governor Henry J. Allen of Kansas. In explaining the situation in that state recently, Governor Allen stated that the recently enacted state anti-strike and anti-lockout legislation in which is included a Court of Industrial Relations, will meet any emergency which may arise as a result of the present controversy and that this fact is appreciated by both employees and employers. Governor Allen added that union officers in Kansas realize the effectiveness of this legislation and that the chairman of the Kansas strike committee of the Brotherhood of Maintenance of Way Employees and Railway Shop laborers has asked the officers of the brotherhood to exclude Kansas from any strike order that may be promulgated.

The police department of the Wabash Railroad reports for the last calendar year 1,726 arrests, of which 116 were for car robberies, 36 for stolen property, 448 for train riding and 403 for trespassing. Of the persons arrested 87 per cent were convicted in court, a slightly higher percentage than in 1918, when the number of arrests was a little smaller. The total amount of fines paid in 1919 was $16,142 and sentences to the penitentiary aggregated 273 years. G. S. Ward, chief of the department, reports that the total value of lost or stolen property recovered was $148,276, and he names sixty different commodities or articles in a list of goods recovered. The chief is assisted by ten captains, twelve lieutenants, two sergeants and 67 regular patrolmen. There are, besides these, a number of extra watchmen, but it has been impossible to secure all of the watchmen needed, the large mills and factories along the road offering better salaries than the railroad pays. The cost of the force for the year was $183,686, or, deducting the value of goods recovered, as mentioned above, a net cost of $135,410.

American Railroad Association—Signal Division

The regular meeting of the Signal Division of the American Railroad Association will be held in the Congress Hotel, Chicago, on Monday and Tuesday, March 15 and 16. The pamphlet containing reports of committees to be considered at this meeting will be mailed by the secretary on February 28.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1919

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (Inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year
Alabama & Vicksburg	141	$157,993	$86,778	$263,757	$41,878	$43,374	$4,407	$113,259	$9,341	$215,113	81.55	$48,644	$13,028	$35,614	$16,176
Alabama Great Southern	312	691,405	215,636	970,250	156,669	185,849	14,636	299,644	21,584	685,109	70.61	285,140	36,934	248,181	108,590
Ann Arbor	301	400,758	63,662	483,707	53,103	100,381	5,798	229,661	10,572	399,559	82.60	84,148	16,700	67,421	18,552
Atchison, Topeka & Santa Fe	8,661	11,854,892	4,428,005	17,517,187	1,851,385	3,056,310	161,334	6,275,697	256,816	11,509,893	65.71	6,007,294	1,156,901	4,849,543	3,367,896
Atlanta & West Point	93	119,537	92,356	244,062	33,333	44,359	6,225	103,276	7,211	198,666	81.39	45,396	10,902	34,495	—54,898
Atlanta, Birmingham & Atlantic	639	305,739	95,241	430,413	81,883	140,227	13,993	223,752	13,433	473,392	109.98	—42,980	15,734	—58,671	20,727
Atlantic City	177	119,211	114,768	252,715	59,462	32,503	218	174,119	1,694	268,062	106.07	—15,347	22,086	—37,460	—76,987
Atlantic Coast Line	4,885	4,098,920	1,705,286	6,400,234	802,867	1,264,212	100,143	2,495,431	120,022	4,821,849	75.33	1,578,385	200,000	1,377,577	—270,679
Baltimore & Ohio Chicago Terminal	90	.....	.....	194,723	17,501	49,316	1,468	161,222	11,044	245,527	126.09	—50,803	26,542	—77,346	109,338
Baltimore & Ohio	5,151	11,933,998	2,414,938	15,745,813	1,692,353	4,840,943	158,776	7,865,374	303,750	14,970,139	95.07	775,674	690,909	77,893	72,771
Baltimore, Chesapeake & Atlantic	87	70,987	38,261	116,824	16,160	23,517	2,933	77,600	3,958	124,168	106.28	—7,344	4,072	—11,417	—18,475
Bangor & Aroostook	632	402,987	88,999	521,042	115,151	166,172	3,941	205,802	13,503	512,048	98.27	8,994	22,803	—13,820	—27,501
Beaumont, Sour Lake & Western	118	95,852	32,687	137,705	34,453	35,203	1,961	48,298	6,375	126,290	91.71	11,416	—4,527	15,933	8,202
Belt Ry. Co. of Chicago	31	.....	.....	346,346	31,196	56,318	292	226,393	7,737	321,936	92.95	24,410	15,536	8,875	15,014
Bessemer & Lake Erie	217	433,736	38,758	499,573	494,242	486,107	11,450	274,631	21,556	1,293,936	259.01	—794,363	44,140	—838,533	—989,195
Bingham & Garfield	37	146,942	2,342	155,840	33,140	45,137	1,432	37,689	5,087	124,695	80.01	31,145	11,549	19,596	—56,761
Birmingham Southern	29	32,587	.....	44,557	5,778	7,525	920	28,652	4,745	47,619	106.87	—3,062	6,564	—9,625	—32,640
Boston & Maine	2,258	3,929,495	1,725,042	6,441,185	974,121	2,061,627	45,240	3,604,381	188,371	6,906,031	107.22	—464,846	386,274	—851,253	1,239,278
Buffalo & Susquehanna	296	133,961	7,692	145,253	43,108	110,533	2,299	59,575	9,074	224,589	154.61	—79,335	5,400	—84,736	—54,969
Buffalo, Rochester & Pittsburgh	589	814,712	147,613	1,005,819	189,271	472,097	16,652	592,813	35,890	1,309,219	130.16	—303,400	.....	303,405	—339,165
Canadian Pacific Lines in Maine	233	268,365	89,645	369,739	51,619	85,980	2,543	238,132	3,336	381,609	103.21	—11,871	18,434	—30,304	30,191
Carolina, Clinchfield & Ohio	282	505,903	37,727	552,135	89,681	140,916	8,186	189,877	15,264	443,761	80.37	108,374	34,520	73,801	—24,885
Central New England	301	526,192	28,187	578,854	117,475	205,821	3,020	332,236	15,147	665,897	115.03	—87,043	37,677	—124,722	—162,644
Central of Georgia	1,918	1,255,630	625,056	2,104,875	413,685	408,330	47,163	848,399	60,535	1,785,088	84.81	319,787	92,840	224,609	—219,590
Central of New Jersey	685	2,758,365	663,794	3,910,766	552,555	1,018,484	35,259	2,103,890	87,469	3,817,635	97.62	93,131	481,244	—388,122	59,635
Central Vermont	411	371,937	85,321	513,886	53,945	129,337	10,875	322,705	17,960	539,370	104.95	—25,483	2,225	—23,482	260,448
Charleston & Western Carolina	342	248,197	62,859	323,621	53,428	54,292	8,020	153,166	5,754	274,661	84.87	48,960	11,683	37,277	—72,750
Chesapeake & Ohio	2,516	4,389,622	902,460	5,675,677	800,348	2,188,563	59,690	2,812,047	117,151	6,003,712	105.77	—328,035	346,239	—674,545	—2,643,089
Chicago & Alton	1,050	1,684,534	528,977	2,382,108	336,602	795,082	20,932	999,784	38,760	2,206,178	92.61	175,931	62,187	113,525	130,171
Chicago & Eastern Illinois	1,131	1,525,498	419,581	2,172,124	167,051	814,336	21,656	902,197	48,380	1,963,015	90.37	209,110	80,000	128,146	483,089
Chicago & Erie	269	722,715	73,306	896,546	71,058	133,804	9,530	558,553	27,607	803,916	89.66	92,630	47,118	44,802	—109,859
Chicago & North Western	8,000	6,773,052	2,944,721	11,094,114	1,683,209	2,908,114	73,953	6,502,376	266,527	11,541,479	104.03	—447,366	527,459	—975,849	676,936
Chicago, Burlington & Quincy	9,371	8,872,320	2,735,290	12,729,302	1,409,106	2,901,526	90,477	6,198,492	338,454	11,044,825	86.76	1,684,476	785,531	896,112	—1,167,143
Chicago Great Western	1,496	1,230,386	474,955	1,859,494	219,722	506,208	33,694	1,058,767	45,239	1,877,049	100.94	—17,554	59,352	—77,073	—71,303
Chicago, Indianapolis & Louisville	654	733,285	246,019	1,077,902	122,358	331,569	15,897	540,798	27,983	1,052,067	97.60	25,834	47,388	—21,643	—106,788
Chicago, Milwaukee & St. Paul	10,628	8,481,293	2,817,840	12,586,422	1,968,273	3,531,824	143,069	6,904,550	390,435	13,044,449	103.63	—458,027	439,772	—905,691	—143,110
Chicago Junction	12	.....	.....	321,063	1,964	60,508	94	275,869	5,885	344,320	107.24	—23,257	10,772	—34,029	31,707
Chicago, Peoria & St. Louis	247	127,848	24,259	161,302	46,329	82,359	5,323	128,136	18,594	280,700	174.02	—119,397	3,213	—122,613	30,234
Chicago, Rock Island & Gulf	463	371,493	108,496	509,594	63,775	76,033	6,779	227,727	12,477	387,998	76.13	121,596	.....	121,551	134,132
Chicago, Rock Island & Pacific	7,595	6,854,463	2,576,027	10,151,118	2,043,174	2,689,116	113,907	4,902,788	200,026	9,970,238	98.21	180,880	530,586	—351,347	336,283
Chicago, St. Paul, Minneapolis & Omaha	1,749	1,599,069	648,128	2,412,132	260,720	562,973	30,299	1,273,283	66,402	2,207,083	91.49	205,049	111,697	92,838	—100,663
Chicago, Terre Haute & Southeastern	374	326,039	22,717	358,495	48,066	144,177	2,748	146,977	11,349	354,658	98.92	3,836	21,301	—17,465	14,992
Cincinnati, Lebanon & Nor.	76	52,741	9,039	74,570	24,541	38,031	1,335	59,431	3,626	126,965	170.26	—52,395	8,344	—60,739	145,237
Cincinnati, Indianapolis & Western	321	262,238	55,368	343,338	77,127	115,757	5,548	178,272	13,904	391,634	114.07	—48,295	14,561	—62,865	—24,581
Cincinnati, New Orleans & Texas Pacific	337	972,355	308,154	1,383,521	340,205	295,381	24,123	734,230	38,522	1,440,269	104.10	—56,748	238,096	—294,950	—539,105
Cincinnati Northern	251	187,939	21,648	219,042	1,647	70,055	2,440	70,899	4,002	149,043	68.04	69,999	10,691	59,298	25,000
Cleveland, Cincinnati, Chic. & St. Louis	2,408	4,961,783	1,593,560	7,234,277	1,034,432	1,704,705	82,979	3,544,205	115,303	6,533,303	90.31	700,973	195,593	504,576	—631,300
Colorado & Southern	1,099	828,579	189,976	1,105,987	136,424	258,861	10,340	453,195	20,294	887,088	80.21	218,900	50,628	167,554	—148,977
Colorado & Wyoming	43	13,014	1,153	25,312	2,772	7,342	241	16,210	3,667	30,232	119.43	—4,920	4,000	—8,920	29,776
Cumberland Valley	163	322,364	80,293	441,091	77,252	82,247	6,681	177,692	14,557	358,594	81.29	82,497	27,927	54,569	—126,070
Delaware & Hudson	875	2,423,436	244,333	2,880,843	149,974	884,684	20,032	1,508,769	111,171	2,707,481	93.98	173,363	195,260	—22,954	156,333
Delaware, Lackawanna & Western	956	4,584,785	986,750	6,307,146	620,534	1,326,544	43,966	2,925,171	118,656	5,099,425	80.85	1,207,722	.....	1,207,523	389,567
Denver & Rio Grande	2,585	2,400,849	571,746	3,165,636	295,961	721,385	22,392	1,152,620	68,984	2,299,755	72.64	865,881	150,000	715,068	363,201
Denver & Salt Lake	255	218,954	25,119	252,835	64,307	172,448	1,377	158,384	5,287	401,802	158.91	—148,967	30,000	—179,053	—5,408
Detroit & Mackinac	381	98,532	39,395	149,057	26,105	56,078	1,889	108,657	7,296	199,727	133.90	—50,670	7,949	—58,620	—66,874
Detroit & Toledo Shore Line	61	202,750	.....	203,039	44,569	9,240	3,156	79,562	4,459	140,985	69.43	62,054	7,900	54,154	—52,886
Detroit, Toledo & Ironton	454	261,069	16,312	293,959	144,211	51,978	3,351	194,046	12,023	405,580	137.97	—111,621	9,041	—120,662	47,253
Duluth & Iron Range	292	84,499	25,469	128,418	53,863	106,729	722	115,742	17,632	295,729	230.28	—167,311	8,187	—175,549	24,763
Duluth, Missabe & Northern	407	175,484	49,428	260,051	185,297	144,115	2,471	187,089	18,967	539,626	207.51	—279,575	89,089	—368,678	—119,621
Duluth, South Shore & Atlantic	598	218,049	110,830	361,188	54,134	94,886	5,312	246,249	11,318	417,093	115.47	—55,905	46,242	—102,187	—61,252
Duluth, Winnipeg & Pacific	178	125,336	32,316	160,936	27,994	41,131	2,500	89,348	10,130	171,169	106.35	—10,233	7,993	—18,226	—29,107
East St. Louis Connecting	3	.....	.....	130,393	21,615	—1,888	273	111,870	3,427	135,240	103.71	—4,847	2,544	—7,391	—17,633
El Paso & Southwestern	1,027	876,776	200,735	1,051,050	232,511	224,243	12,288	315,596	29,503	822,777	78.28	228,273	98,008	129,949	—113,284
Elgin, Joliet & Eastern	832	1,223,699	1	1,995,302	110,180	404,244	5,552	683,273	25,730	1,228,951	61.59	766,351	48,967	716,477	61,974
Erie	1,989	6,172,739	1,049,712	8,120,384	697,799	2,372,722	70,416	4,348,371	203,740	7,750,952	95.45	369,432	320,434	45,682	315,638
Florida East Coast	764	607,449	292,086	996,520	155,069	163,050	9,039	347,509	17,287	700,491	70.29	296,029	21,490	274,498	180,034
Fonda, Johnstown & Gloversville { Steam / Elec. }	31.62 / 57.15	35,731	72,209	112,064	12,645	8,989	599	41,480	5,666	69,379	61.91	42,685	5,684	37,001	7,159
Fort Smith & Western	253	112,242	35,231	155,821	29,724	24,581	4,086	50,229	7,246	117,085	75.14	38,736	2,411	36,321	17,230

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Ft. Worth & Denver City	454	$621,697	$386,185	$1,052,636	$122,495	$212,919	$4,116	$449,012	$22,967	$815,129	77.43	$237,507	$34,379	$202,851	—64,314
Ft. Worth & Rio Grande	235	89,796	75,969	177,637	38,253	25,469	2,108	86,896	6,296	159,021	89.52	18,616	12,810	5,686	6,469
Great Northern	8,176	5,579,432	1,580,458	8,089,469	1,323,305	1,994,597	55,161	4,128,647	156,216	7,809,288	86.53	280,182	1,143,370	—864,896	—420,963
Galveston Wharf	13	.....	.....	133,933	38,882	721	182	39,464	2,131	97,441	72.75	36,492	18,023	18,469	—28,786
Georgia	328	314,780	168,527	521,632	61,072	110,651	12,485	273,864	21,548	479,796	91.97	41,836	10,763	31,041	—134,755
Georgia & Florida	348	58,281	27,238	90,368	47,428	25,326	2,608	63,372	5,457	144,191	159.55	—53,824	11,580	—65,403	—53,714
Georgia Southern & Florida	402	257,545	155,434	440,669	72,021	100,009	5,692	215,335	10,836	405,304	91.97	35,365	21,245	13,827	—60,583
Grand Rapids & Indiana	569	427,788	174,410	660,140	60,013	230,300	10,885	371,893	22,601	698,429	105.80	—38,289	34,951	—73,296	—4,783
Grand Trunk, Western	1,001	1,406,126	323,939	1,933,576	191,468	649,088	16,506	1,087,823	70,317	2,022,089	104.57	—88,463	62,665	—152,228	—1,115,734
Grand Trunk Lines in New England	172	414,596	32,946	497,176	—6,029	154,260	3,141	113,519	12,532	312,703	62.89	184,473	10,893	173,580	101,923
Galveston, Harrisburg & San Antonio	1,381	1,755,252	467,831	2,333,203	240,410	459,602	19,503	769,023	57,349	1,564,238	67.04	768,963	154,046	612,883	122,205
Green Bay & Western	252	55,414	19,347	83,094	16,570	31,381	1,017	45,459	1,776	96,218	115.79	—13,123	4,360	—17,483	17,657
Gulf & Ship Island	307	181,666	52,239	249,189	55,988	57,589	5,372	103,277	9,820	232,452	9,328	16,737	24,045	—7,483	33,799
Gulf, Colorado & Santa Fe	1,937	1,682,646	672,497	2,499,842	427,492	379,842	17,051	946,504	59,016	1,826,786	73.07	673,056	166,449	506,021	909,221
Gulf, Mobile & Northern	467	181.311	61,107	254,164	78,087	68,840	7,049	121,705	9,681	285,361	112.27	—31,198	25,169	—56,384	—20,512
Hocking Valley	350	706,994	111,741	856,710	104,102	401,274	6,596	394,033	20,786	926,711	108.17	—70,001	95,035	—165,035	—3,548
Houston & Texas Central	847	726,845	269,167	1,060,420	180,215	182,907	7,144	409,014	19,812	798,166	75.26	262,254	76,189	185,746	—90,234
Houston, East & West Texas	190	157,097	60,960	220,843	33,199	28,928	1,333	108,370	4,057	175,888	79.64	54,955	21,835	32,764	15,862
Illinois Central	4,799	6,747,875	2,207,366	9,752,375	1,774,643	2,722,119	93,714	4,806,475	244,035	9,610,712	98.54	141,663	546,487	—410,303	174,065
Indiana Harbor Belt	116	.....	.....	565,017	108,348	98,601	2,172	458,837	18,185	686,143	121.31	—120,527	5,220	—125,746	8,221
International & Great Northern	1,159	800,897	319,135	1,216,735	305,374	342,962	13,991	693,629	45,127	1,409,868	115.87	—193,133	16,003	—209,201	—124,716
Kanawha & Michigan	176	305,377	50,069	367,564	56,002	149,766	3,065	139,882	13,824	362,538	98.63	5,025	51,339	—46,314	—129,548
Kansas City, Mexico & Orient	272	124,006	18,055	149,359	43,261	37,941	2,980	106,892	7,385	198,459	132.87	—49,099	25,326	—74,425	1,606
Kansas City, Mexico & Orient of Texas	465	126,047	31,469	166,143	32,476	49,793	1,336	107,751	9,007	200,364	120.59	—34,220	20,054	—54,350	33,718
Kansas City Southern	774	1,097,914	262,873	1,468,745	170,854	327,473	39,149	458,283	41,194	1,034,088	70.41	434,656	61,256	373,084	345,221
Kansas City Terminal	27	.....	.....	119,713	16,750	21,788	.....	56,124	1,496	99,768	83.33	19,944	29,871	—9,948	12,910
Lake Erie & Western	902	748,923	80,778	869,616	181,600	244,084	10,957	463,069	26,352	926,047	106.48	—56,432	46,950	—103,402	2,715
Lehigh & Hudson River	96	201,080	3,898	213,098	25,187	—26,021	2,733	85,109	6,124	93,134	43.71	119,964	12,024	107,940	—63,987
Lehigh & New England	234	346,240	2,253	367,374	35,214	106,268	2,552	133,126	10,037	287,198	78.17	80,176	10,860	69,316	—54,088
Lehigh Valley	1,435	4,408,919	536,963	5,443,231	729,754	1,702,501	43,918	2,740,204	126,010	5,362,264	98.51	80,967	68,387	12,517	—241,416
Long Island	398	552,850	950,573	1,732,059	263,065	383,148	13,265	1,112,432	55,868	1,841,446	106.32	—109,388	47,016	—156,926	121,719
Los Angeles & Salt Lake	1,168	933,012	458,549	1,505,385	148,556	304,751	19,347	558,317	30,857	1,105,461	73.43	399,924	58,929	340,819	192,847
Louisiana & Arkansas	302	213,377	61,154	282,578	77,637	31,896	3,447	96,438	8,953	218,345	77.26	64,234	13,166	51,065	84,666
Louisiana Western	207	303,902	143,408	467,796	43,025	69,745	4,944	111,844	9,247	240,993	51.51	226,803	94,501	132,096	—890
Louisville & Nashville	5,013	6,843,033	2,149,151	9,645,628	758,439	2,161,297	145,081	4,245,431	192,644	7,528,001	78.04	2,117,628	181,650	1,935,597	405,078
Louisville, Henderson & St. Louis	199	176,870	63,174	253,219	45,842	32,532	5,799	100,282	7,906	192,359	75.96	60,860	18,000	42,859	3,929
Maine Central	1,216	1,051,360	393,163	1,583,313	193,613	378,289	11,529	885,101	39,652	1,509,776	95.35	73,537	82,165	—8,655	357,960
Maryland, Delaware & Virginia	82	67,356	33,205	104,368	12,299	19,634	855	74,558	2,483	109,829	105.23	—5,461	1,906	—7,396	—12,004
Michigan Central	1,861	4,413,786	1,899,720	7,106,154	684,273	1,610,528	64,894	2,945,397	113,577	5,514,103	77.59	1,592,051	255,000	1,336,852	—672,879
Midland Valley	388	232,163	103,398	349,341	101,666	69,825	4,628	175,239	15,789	367,146	105.09	—17,805	11,328	—29,851	—66,351
Mineral Range	101	53,724	347	48,704	29,112	27,557	391	31,203	1,063	89,326	183.41	—40,622	9,060	—49,683	—47,288
Minneapolis & St. Louis	1,646	811,317	227,810	1,101,725	191,180	441,869	11,069	776,270	29,117	1,449,988	131.61	—348,263	50,959	—399,261	—340,175
Minneapolis, St. Paul & Sault Ste. Marie	4,243	2,704,983	695,991	3,651,601	543,287	602,520	32,779	1,840,182	78,592	3,114,134	85.28	537,467	209,912	327,476	—825,496
Missouri & North Arkansas	365	94,683	42,250	148,559	57,093	46,743	2,257	76,867	8,260	191,219	128.71	—42,660	6,242	—48,922	40,570
Missouri, Kansas & Texas	1,713	2,181,104	613,645	3,011,374	444,507	809,923	39,443	1,217,624	84,786	2,614,638	86.82	396,736	129,861	266,049	—147,143
Missouri, Kansas & Texas of Texas	1,796	1,206,237	782,700	2,160,764	583,031	441,991	25,476	1,712,398	75,031	2,862,565	132.48	—701,801	97,474	—800,085	—910,526
Missouri, Oklahoma & Gulf	329	139,348	24,482	170,978	86,765	74,283	2,591	91,700	9,632	265,201	155.10	—94,223	8,500	—102,824	—8,539
Missouri Pacific	7,301	6,209,342	1,824,454	8,656,302	1,667,769	1,808,770	91,006	4,094,736	239,218	7,927,449	91.58	728,853	753,662	—25,945	—892,709
Mobile & Ohio	997	1,225,864	210,772	1,518,454	302,731	476,847	27,975	678,469	44,617	1,531,472	100.86	—13,019	45,000	—58,084	—98,160
Monongahela	108	275,198	22,536	303,689	49,776	33,540	496	122,625	8,265	214,703	70.69	88,986	11,840	77,144	53,700
Monongahela Connecting	6	.....	.....	192,988	20,224	43,939	511	72,716	1,930	139,321	72.19	53,668	2,471	51,197	102,212
Montour	56	41,129	1,508	42,101	22,247	15,816	1,208	23,440	6,993	70,371	167.14	—28,270	7,037	—35,307	42,985
Morgans, Louisiana & Texas	400	699,050	229,453	980,104	90,442	147,504	9,898	286,428	17,273	553,867	56.51	426,237	97,273	328,810	114,753
Nashville, Chattanooga & St. Louis	1,247	1,200,199	486,431	1,808,581	291,430	493,895	42,288	818,110	42,494	1,696,559	93.81	112,022	105,612	6,301	—254,354
New Orleans & Northeastern	Freight 195 / Pass. 203	358,494	122,249	549,256	110,136	85,896	8,991	295,003	18,136	522,821	95.18	26,435	185,086	—158,931	—236,629
New Orleans Great Northern	284	139,642	47,238	195,725	42,262	39,022	3,612	90,956	10,054	186,279	95.17	9,446	15,000	—5,582	76,076
New Orleans, Texas & Mexico	191	168,657	45,871	220,671	58,152	45,216	3,425	70,824	8,425	188,072	85.22	32,599	19,024	13,534	65,830
New York Central	6,075	16,081,340	7,120,237	26,856,203	2,599,144	5,678,907	271,620	12,219,071	658,682	21,842,115	81.32	5,014,088	997,834	4,013,572	—535,371
New York, Chicago & St. Louis	574	1,939,747	118,141	2,125,634	187,644	418,031	34,714	1,098,016	57,795	1,801,109	84.73	334,525	84,811	239,129	—391,727
New York, New Haven & Hartford	1,965	4,723,220	3,840,613	9,942,728	1,400,554	2,047,046	56,047	4,693,623	310,422	8,702,108	87.52	1,240,619	450,657	786,309	1,235,262
New York, Ontario & Western	569	579,913	115,954	841,992	143,996	243,152	12,353	501,650	23,651	924,802	109.83	—82,810	33,122	—115,932	87,050
New York, Philadelphia & Norfolk	121	434,257	91,524	618,799	75,730	240,528	9,580	337,362	13,140	685,905	110.84	—67,106	20,926	—88,187	—221,745
New York, Susquehanna & Western	135	252,668	64,059	351,035	31,671	73,095	4,505	330,467	9,352	449,089	127.93	—98,054	44,682	—142,741	—115,645
Newburgh & South Shore	7	.....	.....	176,151	19,511	22,160	.....	63,245	3,963	108,879	61.81	67,271	20,316	46,950	34,624
Norfolk & Western	2,088	5,452,874	861,878	6,570,897	973,602	2,250,388	45,181	2,653,453	95,752	6,051,218	92.09	519,679	260,000	259,263	—1,029,165
Norfolk Southern	906	493,623	186,680	714,152	119,852	85,661	11,920	315,574	20,992	554,136	76.19	160,015	16,000	143,919	191,272
Northern Pacific	6,642	5,746,561	1,573,037	8,082,602	1,001,658	1,614,312	71,175	3,644,269	194,256	6,619,522	81.89	1,463,079	512,051	945,845	—1,803,509
Lake Superior & Ishpeming	34	4,768	214	5,993	22,515	13,897	202	11,936	2,414	50,965	850.41	—44,972	3,872	—48,843	—243,873

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF DECEMBER, 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Northwestern Pacific	538	$354,233	$181,041	$596,045	$160,284	$70,942	$5,272	$260,363	$13,923	$512,496	85.98	$83,549	$25,981	$57,547	85,441
Northern Alabama	112	85,817	16,632	104,374	25,213	4,453	1,887	58,797	2,551	92,897	89.00	11,476	7,299	4,177	—21,692
Oregon Short Line	2,347	2,348,791	569,473	3,160,988	356,474	565,094	18,949	1,075,996	100,004	2,182,387	69.04	978,601	259,735	718,692	136,281
Oregon-Washington R. R. & Nav. Co.	2,070	1,396,848	564,595	2,166,961	398,075	410,008	35,341	1,115,630	112,515	2,092,359	96.55	74,602	346,553	—272,160	—705,720
Panhandle & Santa Fe	772	627,937	151,845	822,930	89,667	204,473	4,204	315,304	15,888	629,281	76.46	193,649	33,619	159,578	295,211
Pennsylvania, Western	1,754	6,083,254	1,807,278	8,707,716	1,390,495	3,610,502	86,731	4,149,838	209,790	9,534,446	109.49	—826,730	626,889	—1,453,753	1,431,431
Pennsylvania, Eastern	5,380	17,774,313	7,335,045	32,278,828	4,663,894	11,362,094	290,320	15,652,067	867,246	33,427,603	103.55	—1,148,775	1,140,462	—2,295,920	1,787,500
Peoria & Pekin Union	19	25,067	3,062	123,994	13,112	37,023	725	80,074	5,755	136,690	110.23	—12,696	—5,000	—7,696	61,495
Pere Marquette	2,230	2,235,037	556,721	3,072,670	202,233	778,354	25,025	1,602,262	77,731	2,693,856	87.67	378,815	60,204	318,576	—385,092
Perkiomen	41	93,412	8,043	107,006	9,078	4,042	17	32,558	335	46,051	43.04	60,955	1,427	59,528	2,127
Philadelphia & Reading	1,127	4,795,601	898,207	6,104,259	366,875	1,818,684	66,746	3,130,164	150,688	5,552,215	90.95	552,044	83,520	467,151	—541,604
Philadelphia, Bethlehem & Northeastern	71	.....	.....	76,015	—8,355	12,217	437	72,544	1,108	77,951	102.54	—1,935	—1,130	—806	—14,102
Pittsburgh & Lake Erie	224	2,030,731	240,412	2,459,908	249,046	844,433	16,608	1,018,232	52,197	2,181,333	88.67	278,574	8,826	269,716	—133,658
Pittsburgh & West Virginia	63	117,224	9,941	141,941	36,184	77,525	1,469	58,806	5,724	189,982	133.84	—48,042	21,174	—69,216	45,789
Pittsburgh & Shawmut	103	76,206	5,858	83,383	12,352	35,590	1,261	34,479	3,039	87,122	104.48	—3,739	100	—3,840	10,674
Pittsburgh, Cincinnati, Chic. & St. Louis	2,383	5,535,487	2,082,122	8,505,539	1,313,196	4,131,533	110,645	4,120,019	209,917	9,969,296	117.21	—1,463,757	789,242	—2,255,849	1,647,957
Pittsburgh, Shawmut & Northern	204	73,557	7,237	83,834	19,121	47,908	1,266	46,856	7,510	122,664	146.31	—38,830	1,476	—40,379	—18,102
Port Reading	21	18,349	.....	62,943	18,177	1,280	18	85,043	4,411	108,928	173.05	—45,985	18,229	—64,214	—183,013
Quincy, Omaha & Kansas City	255	64,380	23,827	95,741	21,032	17,218	339	70,184	1,277	109,962	114.85	—14,221	14,686	—28,907	26,618
Richmond, Fred. & Potomac	81	302,393	255,285	635,187	41,585	117,225	4,206	238,944	12,640	428,138	67.40	207,050	29,982	177,067	—175,344
Rutland	415	234,917	113,220	414,749	61,939	111,750	7,500	208,294	10,257	401,348	96.76	13,400	19,559	—6,178	81,688
St. Joseph & Grand Island	258	181,471	38,619	233,556	36,023	33,443	2,406	148,374	14,036	239,078	102.36	—5,521	18,580	—24,118	80,002
St. Louis, Brownsville & Mexico	548	344,508	160,932	541,293	134,652	104,384	6,260	154,654	21,505	421,456	77.86	119,837	—4,413	124,072	22,640
St. Louis, Merchants Bridge Terminal	9	.....	566	363,522	66,714	4,841	780	259,106	6,499	337,940	92.96	25,581	10,153	15,429	52,915
St. Louis-San Francisco	4,761	4,059,952	2,060,767	7,190,726	1,040,125	1,438,394	73,363	3,073,528	205,346	5,827,261	81.03	1,363,464	227,810	1,133,547	392,417
St. Louis Transfer	6	.....	.....	119,697	19,620	—1,255	186	61,081	2,252	81,885	68.41	37,812	823	36,988	21,162
St. Louis, San Francisco & Texas	134	98,357	20,633	131,163	25,876	24,293	1,814	72,193	5,388	129,565	98.78	1,598	6,570	—4,976	—2,731
St. Louis Southwestern	939	1,212,094	218,150	1,487,071	278,645	244,313	23,035	522,835	37,819	1,110,304	74.66	376,768	56,954	319,524	21,230
St. Louis Southwestern of Texas	814	556,284	173,913	770,322	224,852	202,395	11,676	499,973	31,750	970,062	125.92	—199,740	36,000	—235,986	2,428
San Antonio & Aransas Pass	736	297,504	113,370	448,305	127,365	125,442	5,219	265,337	14,427	537,749	119.95	—89,444	80,587	—170,031	—161,330
Seaboard Air Line	3,563	2,376,590	971,923	3,687,554	673,739	910,079	75,181	1,829,918	111,122	3,632,372	98.50	55,182	134,793	—80,666	—21,622
South Buffalo	11	23,220	.....	67,417	11,723	—3,026	564	77,523	7,669	94,453	140.10	—27,036	11,327	—15,709	—872
Southern	6,982	8,164,580	3,321,063	12,858,780	2,156,870	2,321,999	170,941	5,506,690	316,687	10,532,633	81.91	2,326,147	413,542	1,906,241	—226,429
Southern Ry. in Mississippi	278	119,932	81,015	213,801	44,992	25,500	2,268	87,084	3,689	163,532	76.48	50,269	9,000	41,259	—746
Southern Pacific	7,024	9,116,187	4,207,158	14,684,114	2,407,639	3,088,488	148,394	6,018,941	304,818	12,277,895	83.61	2,406,219	388,683	2,015,707	979,573
Spokane International	156	149,192	23,308	175,410	33,662	8,625	1,579	47,304	4,923	95,903	54.67	79,507	6,978	72,529	40,215
Spokane, Portland & Seattle	538	331,410	155,282	532,702	137,230	95,329	5,538	249,088	23,026	514,865	96.65	17,836	75,000	—57,267	—135,422
Staten Island Rapid Transit	23	79,310	69,993	162,861	20,228	39,437	1,317	107,912	9,803	178,697	109.72	—15,836	16,803	—32,646	—31,502
Tennessee Central	292	139,849	47,958	199,761	66,203	30,178	6,817	112,045	5,178	211,958	106.11	—12,196	7,000	—19,199	27,498
Terminal R. R. Assn. of St. Louis	36	.....	3,321	412,745	66,203	30,178	1,445	215,543	3,947	320,702	77.69	92,043	47,264	44,779	58,401
Texarkana & Fort Smith	87	43,598	25,032	81,036	25,110	20,749	1,168	55,766	2,965	105,609	130.32	—24,572	6,538	—31,132	—100,508
Texas & New Orleans	468	536,031	190,954	805,902	117,770	217,659	5,563	393,431	15,219	791,852	98.27	14,051	18,636	—5,786	31,850
Texas & Pacific	1,946	2,200,235	1,179,786	3,613,746	527,636	739,593	30,408	1,539,512	70,055	2,945,104	81.49	668,642	138,901	529,543	125,453
Toledo & Ohio Central	435	511,588	74,690	616,676	113,068	267,176	6,767	373,724	19,049	782,919	126.95	—166,243	87,809	—254,234	—496,725
Toledo, Peoria & Western	247	74,483	48,936	132,801	25,851	76,053	2,309	79,991	6,461	190,493	143.44	—57,693	8,500	—66,193	—52,935
Toledo, St. Louis & Western	454	784,882	25,531	844,063	108,763	195,492	6,657	352,167	8,885	671,965	79.61	172,098	26,000	146,095	—45,313
Trinity & Brazos Valley	368	150,661	30,577	187,660	30,258	52,728	2,136	82,226	5,922	173,271	92.33	14,390	11,254	3,128	37,780
Ulster & Delaware	128	45,993	18,926	90,237	19,011	22,127	3,805	72,821	—263	117,885	130.63	—27,648	4,800	—32,448	3
Union R. R.	40	.....	.....	593,797	118,557	210,140	818	415,793	10,840	756,149	127.34	—162,352	9,470	—171,832	—285,904
Union Pacific	3,614	6,060,255	1,675,788	8,603,326	1,302,737	2,087,950	46,575	3,201,139	266,502	7,146,107	83.06	1,457,219	443,387	1,013,312	—1,061,031
Utah	98	169,048	765	169,187	11,075	26,265	245	34,619	2,476	74,679	44.14	94,508	3,028	91,478	41,778
Vicksburg, Shreveport & Pacific	171	152,308	117,197	294,404	32,053	66,610	9,541	129,598	9,898	251,790	85.52	42,613	6,573	36,029	2,710
Virginian	523	940,055	69,474	1,082,469	139,017	269,466	4,264	479,913	17,157	909,244	84.00	173,226	70,000	103,221	280,762
Wabash Ry.	2,503	3,314,678	893,968	4,622,172	700,421	900,976	57,918	2,476,338	138,236	4,297,480	92.97	324,691	102,164	218,171	—495,332
Washington Southern	35	113,968	148,640	321,632	42,550	39,380	2,242	129,221	9,154	228,393	71.01	93,239	16,476	76,734	—157,701
West Jersey & Seashore	361	279,300	399,022	804,142	206,389	211,689	9,091	524,992	25,213	985,209	122.52	—181,068	50,427	—231,944	—118,475
Western Maryland	689	909,332	81,814	1,111,646	367,626	549,551	21,869	577,617	50,389	1,577,411	141.89	—465,766	43,200	—513,926	—757,052
Western Pacific	1,041	1,078,994	158,972	1,291,018	138,103	204,757	15,666	384,465	26,073	790,439	61.23	500,579	62,875	437,470	588,011
Western Ry. of Alabama	133	125,282	80,125	223,418	25,484	41,897	6,378	70,804	6,500	154,670	69.22	68,748	—1,064	69,811	15,982
Wheeling & Lake Erie	511	808,839	66,669	957,643	164,181	251,331	5,787	437,168	24,175	885,990	92.52	71,653	83,838	—13,383	97,141
Wichita Falls & Northwestern	328	138,635	50,028	202,371	64,377	69,997	2,165	153,571	8,040	298,071	147.28	—95,700	11,178	—106,937	—34,022
Yazoo & Mississippi Valley	1,381	1,509,093	698,166	2,315,908	443,086	560,566	17,922	992,387	51,978	2,055,444	88.75	260,464	99,583	160,441	—268,333
Mississippi Central	164	48,624	25,496	77,374	41,555	37,093	1,785	48,880	7,020	136,334	176.20	—58,960	—962	—58,112	—37,358
Minnesota & International	194	66,270	29,907	102,425	9,895	19,261	505	44,436	3,121	77,218	75.38	25,207	5,079	20,128	30,606

REVENUES AND EXPENSES OF RAILWAYS

TWELVE MONTHS OF CALENDAR YEAR 1919

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance of		Operating expenses				Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	141	$1,828,833	$774,485	$2,794,556	$505,792	$592,748	$27,063	$1,117,258	$107,761	$2,375,656	85.01	$418,900	$136,817	$281,746	—$5,538
Alabama Great Southern	312	7,470,847	2,476,753	10,529,739	1,513,344	2,587,465	160,372	3,906,049	223,988	8,463,777	80.38	2,065,963	285,014	1,779,530	—145,883
Ann Arbor	301	3,579,846	718,714	4,533,990	619,181	816,334	57,593	2,103,759	126,855	3,724,340	82.14	809,650	193,200	615,951	383,693
Atchison, Topeka & Santa Fe	8,650	124,211,105	45,628,938	179,904,498	23,158,350	40,017,505	1,723,290	63,140,910	3,017,592	130,502,244	72.53	49,402,254	7,811,543	41,557,139	848,804
Atlanta & West Point	93	1,338,206	1,141,569	2,778,564	346,182	503,399	40,533	1,055,581	84,525	2,067,912	74.42	710,651	89,403	621,138	—103,305
Atlanta, Birmingham & Atlantic	639	3,659,465	970,847	4,961,072	1,159,043	1,545,076	95,712	2,788,678	151,697	5,741,153	115.72	—780,081	191,734	—973,779	—442,884
Atlantic City	177	14,54,564	2,783,240	4,452,164	624,460	535,625	18,508	2,232,445	16,323	3,428,450	77.01	1,023,714	174,259	849,420	—357,349
Atlantic Coast Line	4,867	40,842,112	18,448,229	63,558,452	9,488,092	13,851,670	775,813	27,702,731	1,334,789	53,499,911	84.17	10,058,541	2,510,000	7,528,993	—4,298,104
Baltimore & Ohio Chicago Terminal	90	.....	3,050	2,058,947	397,987	540,262	13,915	1,556,631	102,648	2,669,578	129.65	—610,631	329,176	—940,535	357,332
Baltimore & Ohio	5,151	136,802,852	31,724,006	182,620,016	26,168,745	56,364,804	1,886,254	79,727,341	4,389,465	169,869,125	93.01	12,750,891	4,872,094	7,857,726	—937,566
Baltimore, Chesapeake & Atlantic	87	1,019,236	520,512	1,603,332	182,977	441,025	14,330	935,847	42,329	1,616,509	100.82	—13,176	42,247	—55,428	25,006
Bangor & Aroostook	632	4,063,169	953,917	5,287,300	1,177,240	1,506,244	45,871	2,040,865	147,796	4,993,373	94.44	293,927	257,688	34,314	—375,752
Beaumont, Sour Lake & Western	118	985,504	311,739	1,364,168	313,743	268,742	25,229	563,928	62,185	1,233,828	90.44	130,341	25,173	104,912	—317,472
Belt Ry. of Chicago	31	.....	.....	3,780,322	357,145	665,153	4,285	2,260,654	94,633	3,381,870	89.45	398,452	186,326	212,126	284,845
Bessemer & Lake Erie	217	11,701,708	493,611	12,508,700	1,860,356	4,199,162	126,271	4,025,269	234,436	10,452,120	83.55	2,056,579	210,640	1,845,748	—2,162,950
Bingham & Garfield	37	1,241,895	24,810	1,314,960	452,109	492,729	15,607	353,796	50,497	1,389,775	105.68	—74,815	101,540	—176,355	—1,644,245
Birmingham Southern	29	434,081	.....	567,350	52,767	72,442	8,682	295,160	40,528	469,579	82,76	97,771	26,864	69,944	—217,426
Boston & Maine	2,258	43,303,174	21,813,786	72,583,880	9,566,430	15,216,933	495,804	38,266,685	2,049,136	66,023,668	90.96	6,560,212	2,393,099	4,166,051	875,953
Buffalo & Susquehanna	296	1,975,391	81,847	2,157,830	536,944	1,157,831	24,126	757,767	97,750	2,574,417	119.30	—416,587	41,150	—457,741	—1,961,012
Buffalo, Rochester & Pittsburgh	589	11,787,447	1,591,470	13,955,592	2,366,024	5,264,848	175,927	6,800,538	394,037	15,028,727	107.68	—1,073,135	280,000	—1,353,707	—1,961,235
Canadian Pacific Lines in Maine	233	1,960,630	651,377	2,754,954	612,706	641,108	30,658	1,709,805	41,366	3,034,809	110.15	—279,855	146,734	—426,589	—738
Carolina, Clinchfield & Ohio	282	5,448,188	412,683	5,970,135	924,790	1,522,619	63,097	1,881,747	164,216	4,554,883	76.29	1,415,252	213,820	1,201,198	210,725
Central New England	301	6,155,606	299,815	6,757,409	1,531,219	1,322,946	35,221	3,081,493	174,473	6,144,172	90.92	613,237	213,677	398,430	—81,623
Central of Georgia	1,918	13,136,534	6,489,995	21,696,511	4,368,741	4,471,773	427,148	9,242,120	714,344	19,236,564	88.66	2,459,947	815,722	1,631,520	—2,248,485
Central of New Jersey	685	32,709,114	8,530,340	44,837,302	5,510,957	11,869,423	322,112	21,358,894	1,014,675	40,273,951	89.82	4,563,352	2,763,901	1,799,271	—4,717,254
Central Vermont	411	4,255,202	1,075,589	5,852,308	1,077,905	1,501,457	96,168	3,519,557	212,889	6,432,889	109.92	—580,581	189,175	—770,282	—186,083
Charleston & Western Carolina	342	2,343,332	630,765	3,121,637	576,785	596,317	61,317	1,523,534	64,801	2,822,753	90.42	298,884	100,066	198,768	—391,555
Chesapeake & Ohio	2,505	53,073,002	14,158,153	71,475,016	11,608,515	18,114,492	471,582	28,766,158	1,340,222	60,676,473	84.89	10,798,543	2,165,080	8,627,893	—9,027,101
Chicago & Alton	1,050	17,330,784	6,404,081	25,272,334	4,287,850	7,359,846	292,380	10,903,752	581,660	23,553,711	93.19	1,718,623	738,861	977,162	—1,988,461
Chicago & Eastern Illinois	1,131	18,019,273	4,883,307	24,795,181	3,663,392	8,974,253	254,553	10,438,988	571,306	23,996,050	96.77	799,131	885,592	—91,845	—1,814,974
Chicago & Erie	269	8,387,466	1,104,935	10,401,398	1,123,059	1,719,313	126,283	5,318,198	330,300	8,655,727	83.22	1,745,672	420,083	1,324,777	354,640
Chicago & North Western	8,090	92,084,614	35,213,607	139,589,915	20,696,215	29,687,410	879,110	64,202,498	3,033,420	119,579,387	85.66	20,010,528	5,752,459	14,245,619	1,972,662
Chicago, Burlington & Quincy	9,372	107,019,788	35,345,285	154,011,438	21,487,643	32,422,401	1,064,457	60,170,510	3,899,008	120,492,962	78.23	33,518,476	5,774,554	27,712,341	1,135,140
Chicago Great Western	1,496	14,555,496	5,979,146	22,128,189	3,525,827	5,010,519	320,950	9,745,333	545,427	19,305,163	87.24	2,823,026	682,590	2,139,587	1,482,016
Chicago, Indianapolis & Louisville	654	8,366,515	2,891,919	12,355,827	1,464,707	3,304,501	172,144	5,384,032	314,946	10,764,781	87.12	1,591,046	494,840	1,094,704	—236,416
Chicago, Milwaukee & St. Paul	10,647	106,288,453	30,391,921	150,370,394	23,144,811	40,422,005	1,107,107	69,288,819	3,924,476	138,561,705	92.14	11,808,689	6,306,997	5,362,271	635,063
Chicago Junction	12	.....	.....	3,712,479	738,908	613,539	1,194	2,789,214	81,355	4,224,210	113.78	—511,732	39,489	—551,304	—165,840
Chicago, Peoria & St. Louis	247	1,321,917	305,127	1,736,078	461,549	813,963	35,607	1,070,841	113,345	2,495,180	143.72	—759,101	78,079	—837,199	—352,698
Chicago, Rock Island & Gulf	463	3,638,606	1,101,045	5,046,028	776,508	880,147	83,811	2,202,973	144,101	4,099,716	81.24	946,313	158,121	787,726	—155,124
Chicago, Rock Island & Pacific	7,595	73,514,705	31,401,390	111,578,655	19,014,614	25,791,769	1,248,048	48,144,860	2,407,610	97,022,766	86.95	14,555,889	4,545,793	10,001,631	543,042
Chicago, St. Paul, Minneapolis & Omaha	1,749	18,335,828	7,589,482	27,732,019	3,838,174	5,230,102	265,362	13,079,740	734,410	23,316,465	84.07	4,415,554	1,309,002	3,101,079	449,166
Chicago, Terre Haute & Southeastern	374	3,721,650	261,565	4,094,195	670,522	1,826,985	36,739	1,603,769	108,602	4,265,223	104.18	—171,028	180,801	—351,848	—805,656
Cincinnati, Lebanon & Nor.	76	818,886	98,681	1,153,261	219,631	279,360	15,933	650,862	14,609	1,180,397	102.35	—27,136	61,732	—88,875	45,956
Cincinnati, Indianapolis & Western	321	2,276,907	644,485	3,204,570	637,806	1,053,006	65,240	1,662,660	160,231	3,589,654	112.01	—385,084	140,182	—525,354	—387,525
Cincinnati, New Orleans & Texas Pacific	337	11,871,984	3,598,768	16,313,686	2,610,342	5,188,286	275,589	6,922,979	413,699	15,499,095	95.00	814,591	652,310	155,595	—2,217,778
Cincinnati Northern	251	2,556,769	230,175	2,872,269	387,458	672,931	26,336	1,018,708	56,162	2,161,595	75.25	710,674	122,791	587,552	247,475
Cleveland, Cincinnati, Chic. & St. Louis.	2,397	50,700,076	17,267,397	73,856,456	9,222,574	14,675,763	917,766	30,735,156	1,311,001	57,427,452	77.75	16,429,005	2,252,592	14,165,664	—1,796,347
Colorado & Southern	1,100	9,701,857	2,510,935	12,976,644	2,086,269	3,108,389	104,019	4,855,575	418,221	10,661,265	82.15	2,315,378	567,628	1,743,158	—1,132,597
Colorado & Wyoming	43	253,772	14,218	915,651	114,610	176,177	1,811	413,167	45,206	750,971	82.01	164,679	48,000	116,679	—102,786
Cumberland Valley	163	4,361,827	882,917	5,633,361	994,869	1,248,524	77,847	2,120,513	140,904	4,589,923	81.47	1,043,437	121,991	921,037	—1,168,836
Delaware & Hudson	875	29,483,444	3,255,750	34,749,709	4,177,864	9,980,056	237,030	15,606,760	1,301,760	31,671,505	91.14	3,078,205	909,260	2,160,302	—424,822
Delaware, Lackawanna & Western	955	51,895,400	12,380,787	71,824,047	7,682,365	15,132,815	495,947	30,661,440	1,368,205	56,065,251	78.06	15,758,796	3,449,429	12,287,412	—3,566,494
Denver & Rio Grande	2,593	24,099,452	6,922,473	33,016,257	4,856,556	7,923,546	241,398	11,295,477	832,405	25,656,971	77.71	7,359,285	1,380,000	5,973,670	1,115,144
Denver & Salt Lake	255	2,382,875	438,995	2,911,041	858,857	1,192,255	11,601	1,583,502	62,391	3,708,606	127.39	—797,565	129,000	—927,235	14,828
Detroit & Mackinac	381	1,188,804	401,039	1,687,341	268,161	464,299	32,195	808,087	108,351	1,679,626	99.54	7,716	92,632	—84,918	—52,127
Detroit, Toledo & Shore Line	61	2,421,880	.....	2,458,395	275,735	213,963	15,675	738,630	55,443	1,298,858	52.83	1,159,537	107,996	1,051,534	278,862
Detroit, Toledo & Ironton	455	3,389,865	163,592	3,765,755	1,129,133	1,105,428	37,103	1,821,636	163,230	4,256,552	113.04	—490,796	109,352	—600,547	115,277
Duluth & Iron Range	292	7,114,957	271,884	7,961,606	1,050,529	1,195,559	5,811	2,141,178	175,893	4,573,155	57.44	3,388,451	403,430	2,983,816	—735,189
Duluth, Missabe & Northern	410	17,950,815	543,566	19,994,713	1,973,980	1,671,562	26,954	3,860,632	239,351	7,789,452	38.96	12,205,262	896,025	11,309,223	—938,850
Duluth, South Shore & Atlantic	599	3,201,976	1,235,685	4,758,601	925,069	874,679	65,518	2,368,609	112,700	4,405,567	92.58	353,034	269,244	83,494	—253,715
Duluth, Winnipeg & Pacific	178	1,546,567	311,029	1,913,689	384,414	381,094	30,701	853,921	99,841	1,756,699	91.79	156,991	102,228	54,760	—75,604
East St. Louis Connecting	3	.....	.....	1,229,439	178,758	233,129	3,269	906,180	40,290	1,361,220	110.72	—131,781	30,409	—162,190	—61,228
El Paso & Southwestern	1,027	9,983,206	2,196,839	12,761,391	2,290,443	2,528,666	120,726	3,542,638	309,643	8,886,443	69.64	5,874,948	724,181	3,149,989	—1,800,557
Elgin, Joliet & Eastern	829	16,095,221	103	19,310,380	1,865,497	4,967,559	80,818	7,532,885	307,913	14,752,523	76.39	4,557,858	640,088	3,916,881	—1,383,832
Erie	1,989	69,818,949	13,510,084	91,797,507	10,503,022	28,663,327	756,704	44,952,179	2,409,114	87,815,837	95.66	3,981,671	3,393,006	565,309	2,712,535
Florida East Coast	764	5,986,109	2,997,316	10,121,222	1,690,239	1,843,366	97,057	4,310,713	207,653	8,260,616	81.62	1,860,606	440,279	1,417,653	—258,591
Fonda, Johnstown & Gloversville { Steam / Elec..	31 / 57	405,848	796,041	1,251,651	143,976	106,560	7,422	483,783	61,657	803,399	64.19	448,252	64,584	383,668	12,942
Ft. Smith & Western	253	1,195,998	351,903	1,646,460	303,716	374,005	45,194	577,721	78,438	1,387,227	84.25	259,233	57,411	200,458	78,303

Equipment Trust Plan Agreed To

The Railroad Administration and the principal railroad companies have adopted the plan which has been reported from time to time as the negotiations have progressed for the financing of the equipment ordered by the Railroad Administration in 1918 by means of individual equipment trusts, payable in 15 annual installments, with the Guaranty Trust Company of New York as trustee.

Wood Preservers' Association Selects Officers

At the closing session of the American Wood Preservers' Association in Chicago on February 12, the following officers were chosen for the ensuing year: President, A. R. Joyce, Joyce-Watkins Company, Chicago; first vice-president, C. M. Taylor, superintendent, Port Reading Creosoting Plant (P. & R. and C. of N. J.), Port Reading, Pa.; second vice-president, V. K. Hendricks, assistant chief engineer, St. Louis-San Francisco, St. Louis, Mo.; secretary-treasurer, F. J. Angier, superintendent of timber preservation Baltimore & Ohio, Baltimore, Md.; members of executive committee, John Foley, forester, Pennsylvania Railroad, Philadelphia, Pa., and W. H. Grady, general superintendent, American Creosoting Company, Louisville, Ky. San Francisco was selected as the place for the next annual meeting.

Perils of Prohibition

According to the Springfield (Mass.) Republican, 20 employees of the Boston & Albany at its West Springfield yard had to be carried home in trucks last Sunday night because of a car of wine stopped there for repairs. It was a tank car, filled with 7,000 gallons of sherry, and the "party" held to celebrate its presence was participated in by about 40 men. The car was consigned to Louis K. Liggett, Roxbury, Mass. Some of the repairmen, with a judicious sense of smell, detected its cargo, and the party followed. The top was pried off and buckets and milk pails lowered into the wooden container inside the copper outside of the car, which was a regulation oil tank. Never before had a car been so welcome in the yards, and the word soon passed around to all departments.

A Wooden Railroad

The United States has a railroad, 15 miles long, laid with wooden rails. It is in Alaska and extends from the head of navigation on the Tolovana river up to some gold mines. The owner of the railroad, O. P. Gaustad, of Fairbanks, tells a reporter that his single locomotive, which is an automobile, made by Dodge Brothers in 1916, has done very profitable work throughout the last two seasons. The principal traffic of this railroad consists of logs which are carried from the river up to a swamill half way to the upper terminus of the line, and lumber from the sawmill to the mines. The automobile has flanged wheels and hauls three cars at a time. Under favorable circumstances this motor hauls six tons of lading. For ordinary supplies from the river to the mines the freight rate is $3 per 100 lb. During the past season the motor traveled six thousand miles, sometimes making eight trips a day.

Railway Revenues and Expenses for December and Year 1919

The Interstate Commerce Commission has issued the usual compilations, subject to revision, from reports of revenues and expenses of Class I roads and 17 switching and terminal companies. The gross revenues for the month amounted to $453,288,918 and for the year to $5,184,230,244. The details are shown in the large table:

RAILWAY GROSS AND NET EARNINGS DECEMBER AND YEAR 1919

Item	December				Calendar year			
	Amount		Per mile of road operated		Amount		Per mile, road oper.	
	1919	1918	1919	1918	1919	1918	1919	1918
Average number miles operated	234,138.53	234,028.98	.....	.....	233,991.80	234,305.14	.....	.....
Revenues—	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Freight	303,594,738	309,727,496	1,297	1,323	3,556,734,573	3,458,190,626	15,200	14,759
Passenger	99,897,295	92,965,315	427	397	1,178,119,954	1,032,671,429	5,035	4,407
Mail	9,712,615	4,608,339	41	20	57,441,223	53,563,162	246	229
Express	16,042,670	12,860,944	69	55	127,663,836	126,231,839	546	539
All other transportation	11,104,768	10,407,808	47	44	126,928,774	126,536,226	542	540
Incidental	12,098,144	10,469,191	52	45	132,206,661	125,148,669	565	534
Joint facility—Cr.	1,035,020	579,588	4	3	7,300,115	6,012,987	31	26
Joint facility—Dr.	196,332	164,049	1	1	2,164,892	1,760,981	9	8
Railway operating revenues	453,288,918	441,454,632	1,936	1,886	5,184,230,244	4,926,593,957	22,156	21,026
Expenses—								
Maintenance of way and structures	63,906,960	70,347,728	273	301	778,105,318	656,600,508	3,326	2,802
Maintenance of equipment	117,149,081	109,012,348	500	466	1,232,701,638	1,110,270,700	5,268	4,739
Traffic	4,631,776	3,324,247	20	14	47,537,552	48,740,756	203	208
Transportation	213,875,400	201,109,965	914	859	2,193,264,002	2,056,478,949	9,373	8,777
Miscellaneous operations	4,463,927	3,507,969	19	15	48,972,187	38,851,289	210	166
General	11,192,636	10,085,655	48	43	125,436,777	112,319,160	536	479
Transportation for investment—Cr.	604,024	919,047	3	4	6,028,724	6,060,861	26	26
Railway operating expenses	414,615,756	396,468,865,	1 771	1,694	4,419,988,750	4,017,209,501	18,890	17,145
Net revenue from railway operations	38,673,162	44,985,767	165	192	764,241,494	909,384,456	3,266	3,881
Railway tax accruals (excluding "War Taxes")	22,175,921	14,883,196	95	64	199,193,698	186,966,159	851	798
Uncollectible railway revenues	107,170	65,035	.....	.....	917,570	614,726	4	2
Railway operating income	16,390,071	30,037,536	70	128	564,130,226	721,803,571	22,411	3,081
Equipment rents (Dr. Balance)	1,752,198	2,028,266	7	9	32,598,295	15,118,119	140	65
Joint facility rent (Dr. Balance)	1,856,531	595,340	8	2	15,738,644	13,574,282	67	58
Net of items 22, 23 and 24	12,781,342	27,413,930	55	117	515,793,287	693,111,170	2,204	2,958
Ratio of operating expenses to operating revenues ..... per cent	91.47	89.81	.....	.....	85.2	81.54	.....	.....

Associated General Contractors of America

The annual meeting of the Associated General Contractors of America will be held at the Hotel Morrison, Chicago, on February 18 and 19, in conjunction with a national conference on construction. The sessions of the annual meeting will be held in the mornings and the sessions of the national conference on construction in the afternoons of these days. On February 19 three sessions of the conference will be held, one of which will be devoted to a discussion of "A National Department of Public Works," and "The Disposition of the Railroads." This meeting, which will be conducted by the Public Works and Railroad Contractors' Division of the National Conference, will be addressed by Samuel O. Dunn, editor of the *Railway Age*, W. H. Finley, president of the

Chicago & North Western Railway Company, and Richard Waterman, secretary of the Railroad Committee of the United States Chamber of Commerce. At this session also M. O. Leighton, chairman of the National Public Works Department Association, Washington, and Frank I. Bennett, director of the Illinois State Department of Public Works and Buildings, will talk on "A National Department of Public Works," and William B. King, of the firm of King & King, attorneys, Washington, will talk on "Washington Affairs." The annual dinner will be held on Thursday evening with Major-General Leonard Wood as the principal speaker.

Cape to Cairo

Cecil Rhodes's dream of a Cape-to-Cairo line is coming true in more ways than one. An air route from Egypt to Cape Town is now open. British surveyors and engineers have toiled for a year to explore and plan the route. Three parties of officers and men were assigned to as many section. They collected information, established aerodromes and landing places at intervals of 200 miles or less, and laid in gasolene and other stores. Some aerodromes had to be cut from dense jungle where thousands of trees required felling. Ant-hills reaching 25 feet in height had to be carried away in baskets. For one aerodrome in Northern Rhodesia 700 natives worked five months to remove 25,000 tons of soil.

The length of the route, measuring by the lines of railroad, steamer and ground transport is 6,223 miles, and at ordinary speed a journey would consume from 59 to 75 days. The distance by the aerial line is only 5,200 miles, and under favorable conditions an airplane should cover it in 52 hours' flying time. If the airman flew 8 hours a day, he could make the trip in a week. In a few years, realizing Cecil Rhodes's dream, complete rail and steamer connection will be established. The railway to Cape Town now runs up well into the Belgian Congo, about 2,000 miles, and there is uninterrupted rail and steamer communication from Cairo south to Rejaf, over 2,400 miles. But steam travel will always be slow compared with air. From Cairo to Rejaf now takes 18 days.

Perils cannot be disregarded. In the central zone especially, heavy jungles make landing at other than the prepared spots almost impossible; water is hard to find; tsetse flies and wild beasts abound. But the fact that the line should have been so quickly laid out and tested is a promise that difficulties will, literally, be surmounted.—*New York Evening Post.*

Record Coal Movement

In spite of the repeatedly unfavorable weather conditions in extended portions of the country and the serious dislocation of coal cars due to the necessity for moving coal all the way from the east to the west during the coal strike, reports show that more bituminous coal was produced and transported during the month of January, 1920, than during January in any of the preceding seven years.

The figures of production of bituminous coal, including coal coked, for January, from 1913 to 1920, follows:

January, 1913	42,276,000 tons
January, 1914	40,188,000 tons
January, 1915	37,190,000 tons
January, 1916	46,596,000 tons
January, 1917	47,967,000 tons
January, 1918	42,227,000 tons
January, 1919	41,487,000 tons
January, 1920	48,732,000 tons

The Geological Survey, in its last weekly report, says: "The causes underlying the shortage of cars east of the Mississippi, with the exception of Alabama and Michigan, were three. In the first place, a scarcity of cars is to be expected during the winter months in years of active demand. Such was the experience of the country in 1917 and 1918, and had it not been for the slump in demand, the experience would doubtless have been repeated in 1919. The second cause is found in the extraordinary dislocation of transportation necessitated by the strike. Pennsylvania coal was carried as far west as Montana. The double difficulty thus created was rendered acute by the most severe weather conditions that have occurred since the great storms of December, 1917, and January, 1918. Over much of the country from the Ohio and Tennessee valleys eastward to the coast, precipitation this year was in the form of sleet, and the heavy ice coating greatly interfered with traffic."

Traffic News

The Traffic Club of Cleveland, Ohio, will hold its annual banquet on February 25, at the Hotel Winton, Cleveland.

The Milwaukee (Wis.) Traffic Club, which discontinued two years ago, held a "revival" meeting on February 7, and re-elected the officers who were in office at the time of its dissolution.

The Interstate Commerce Commission has issued its decision containing specific conclusions as to the rules and regulations as well as rates proposed in Perishable Protective Tariff No. 1, issued by the Railroad Administration. It is understood that its changes are so extensive as to prevent the tariff being made effective before the expiration of federal control.

The Panama Canal, according to the report of the governor of the Canal Zone for the month of December, enjoyed in that month the largest traffic in its history, the number of vessels passing through being 260; net tonnage, 927,726 tons, which was 330,588 tons in excess of the movement in November, and 262,899 tons more than in May, 1918, which was the largest previous month's movement of commercial traffic. Of 89 ships bound for the west coast of Central and South America, 47 were in ballast.

The California Wholesale Potato Dealers' Association, in telegrams addressed to President Wilson and to California's representatives in Congress, has requested the appointment of Max Thelen, director of the Division of Public Service of the United States Railroad Administration, to the vacancy on the Interstate Commerce Commission. The telegrams state that since Franklin K. Lane left the Commission, California and the Southwest have been without representation.

The rule, recently announced in Washington, forbidding the acceptance of silk, raw, spun, or thrown, for transportation by freight, except in carloads, goes into effect on March 1. Replying to protests from large numbers of shippers the Administration says that shipments of silk have sometimes been valued at a higher rate per pound than some of the precious commodities, like jewelry, which have never been regarded as legitimate freight matter. The Administration holds that the only proper way to send the shipments under consideration is by express.

According to a report on overseas traffic for the week ended February 14, 1920, made to Director General Hines, there were 4,187 cars of commercial export freight received at North Atlantic ports, while for the corresponding period last year there were but 3,344 cars received. Receipts at these ports increased 843 cars or 22.2 per cent. Deliveries to ships increased 1,977 cars, or 73 per cent. At South Atlantic and Gulf ports there were 12,138 cars of export freight on hand on February 9, as against 11,760 cars on February 2, an increase of 378 cars. On February 14, 1920, there were 8,858,803 bushels of grain stored in elevators at North Atlantic ports. There were received during the week 2,393,110 bushels, while 2,289,558 were cleared. At Gulf ports on February 14, there were 5,370,482 bushels of grain stored in elevators, representing 52.5 per cent of the total elevator capacity.

The Houston (Texas) Traffic Club recently elected the following officers: President, F. L. Clements, traffic manager of the Gulf Pipe Line Co.; vice-president, John T. Bowe, general freight agent of the Trinity & Brazos Valley; second vice-president, I. R. Palmer, traffic manager of the Trinity River Lumber Co.; third vice-president, Joe McConnell, traffic manager of the Peden Iron & Steel Co.; secretary, R. V. Gillispie, assistant traffic manager of the Gulf Pipe Line Co.; treasurer, A. Kimball, traffic manager of the Houston Drug Company; directors, G. L. Thacker, traffic manager of the Southern Texas Grain Co.; J. F. Hennessey, Jr., Missouri, Kansas & Texas; Clint Hollady, traffic manager of the F. W. Heitmann & Co.; R. H. Carmichael, superintendent of the Direct Navigation Co.; S. J. Westheimer, president of the Westheimer Transfer Co. At a later date Mr. Gillispie resigned as secretary and

E. L. Williams, traffic manager of the Southern Drug Co., was elected in his place.

The five city ticket offices in New York City, conducted jointly under the United States Railroad Administration by a committee, since September, 1918, are to be continued in operation for the present, the same as hitherto. A meeting of representatives of the railroad corporations held on Tuesday of this week recommended that this joint operation be continued at least until October next. George A. Cullen, passenger traffic manager of the Delaware, Lackawanna & Western, chairman of the committee which has supervised the joint offices, calculates that the cost of running the offices has been about 40 per cent less than the cost of the individual offices as maintained by the separate railroads prior to the advent of federal control. The gross sales made at the joint offices have amounted to about $30,000,000 a year and the cost of running the offices has been 2.09 per cent of the gross sales.

The shipments of anthracite for January as reported to the Anthracite Bureau of Information at Philadelphia, amounted to 5,713,319 gross tons, as compared with 6,138,460 tons in the preceding month and with 5,934,241 in January of last year. Total shipments from April 1 have amounted to 58,823,700 gross tons, as compared with 63,856,917 tons from April 1, 1918, to January 31, 1919, the difference being due almost entirely to the large washery production of steam sizes in the earlier year:

	January, 1920	Coal Year, 1919-1920	Coal Year, 1916-1917
P. & R.	1,155,092	11,896,144	10,574,453
L. V.	1,011,116	10,700,403	10,024,566
C. of N. J.	513,434	5,312,165	5,327,872
D. L. & W.	935,242	9,044,409	8,875,516
D. & H.	614,375	6,682,934	6,035,595
Penna	404,213	4,151,589	4,573,286
Erie	636,430	6,437,593	6,292,728
N. Y. O. & W.	168,447	1,704,275	1,595,831
L. & N. E.	274,970	2,894,188	2,309,255
	5,713,319	58,823,700	55,609,082

"Ten Commandments"

The latest exhortation from the Railroad Commission of Texas for the benefit of shippers of freight in that state takes a scriptural form. Desiring to aid the railroads and the shippers in relieving the present shortage of freight cars, the Commission says:

1. Load cars to full carrying capacity.
2. Load cars properly and promptly.
3. Unload cars and release to carrier promptly.
4. Order cars only when and in number needed.
5. Order goods in quantities representing car capacity.
6. Order goods from nearest available source.
7. Pool orders, as to source, to obtain full carload.
8. Take no advantage of free time allowed under demurrage rule.
9. Do not use cars for storage.
10. Ship by truck for short hauls and intra-terminal service.

Cincinnati as a Railroad Center

John A. Morris, terminal manager of the Cincinnati, (Ohio) terminals, at the request of the Cincinnati Chamber of Commerce, has compiled a statement of Cincinnati's industrial activity as gaged by inbound and outbound freight tonnage. These figures call attention to the importance of the Cincinnati gateway as an interchange point and of Cincinnati as an industrial center. The figures as presented to the Chamber of Commerce which include both through and local traffic, are as follows:

	Inbound	Outbound	Total
Average daily tonnage	102,600 tons	97,400 tons	199,000 tons
Average daily freight trains	106	107	213
Average daily passenger trains	134	140	274

Industries	Inbound	371 cars	12,243 tons
Industries	Outbound	362 cars	11,946 tons
Freight houses	Inbound	394 cars	5,910 tons
Freight houses	Outbound	448 cars	4,480 tons
Total			34,579 tons

Total inbound ..... 18,153 tons
Total outbound ..... 16,426 tons

Commission and Court News

State Commissions

In a joint application filed with the California State Railroad Commission by the Atchison, Topeka & Santa Fe, and the San Diego & Arizona, the commissioners were asked to approve an agreement between these roads providing for the joint use of the Santa Fe tracks and station at San Diego, Cal. The agreement has the approval of the United States Railroad Administration.

Court News

Right of Town to Purchase Abandoned Railroad

A lumber company built a railroad for which a town subquently granted a franchise, which was assigned by the lumber company through incorporators to a railroad company. The latter met difficulties leading up to a mortgage foreclosure suit. The Michigan Supreme Court holds that the citizens of the town or others interested are entitled to an opportunity to purchase the railroad for its continuance as a carrier if so disposed, the railroad itself asking permission to abandon operations; and a receiver may be appointed to take charge of and conserve the property preparatory to its sale under the foreclosure decree.—Gasser v. Garden Bay R. Co. (Mich.) 171 N. W. 791.

Hauling Defective Car as Proximate Cause of Injury

A freight car with but one drawbar was coupled to the rear of the caboose at an intermediate station to be moved to be repaired; it was being used in interstate commerce. To remove the markers from the caboose to the car, the conductor attempting to board the caboose while in motion failed to obtain a hold upon the grabiron and fell so that one arm was run over. The Circuit Court of Appeals, Sixth Circuit, holds that such hauling of the crippled car being unlawful under the federal Safety Appliance Acts, and constituting negligence, the question in an action for damages under the federal Employers' Liability Act, of whether the transportation of the defective car was the proximate cause of the conductor's injury was for the jury, which found for the plaintiff.—Erie v. Schleenbaker, 257 Fed. 667.

Foreign Shipments and the Carmack Amendment

In an action to recover freight and storage charges on a shipment of moss over the line of the plaintiff, the Chicago, Milwaukee & St. Paul, from Mather, Wis., on a bill of lading stating that the property was consigned to Pickstone, "destination Cape Town, South Africa, via P. M. R. A. & Boat at N. Y., c/o Caldwell," and that the railroad agreed to transport only over its own line, it appeared that on arrival of the shipment at New York, payment of the freight to that point was refused by Caldwell, on account of lack of funds belonging to the consignee. The moss was sold to pay freight and storage charges. The trial court concluded that the contract of shipment was a through contract from Mather to Cape Town, and adjudged that the defendant shipper recover of the plaintiff the value of the moss as for a conversion, on the ground that before making the shipment the shipper had inquired of the railroad's agent at Sparta, Wis., the freight rate on a carload of moss from Mather to Cape Town, and was given a through rate. The Wisconsin Supreme Court reversed this judgment and directed judgment for the railroad for the following reasons: (1) The familiar principle that oral negotiations are merged in and supplanted by a written contract afterwards entered into between the parties covering the same subject applied to the present case; hence the oral quotation of a through rate to Cape Town is of no moment, because the written bill of lading became the contract between the parties. (2) This being a shipment to a foreign country, the Carmack Amendment did not apply, and it was competent for the parties to make a contract limiting the railroad's liability to its own line. (3) It followed

that there was no default on the plaintiff's part by reason of the fact that the shipment did not reach Cape Town, and that it was entitled to recover the freight charge to New York at the published rate, as well as storage charges, less the net amount realized by sale of the goods.—Chicago, M. & St. P. (Wis.) 171 N. W. 757.

Railroad's Right of Precedence Over Commercial Buyers of Coal

The federal district court for the Southern District of Ohio holds that a railroad which has a contract with a coal company to furnish coal for its engines, on which the coal company was delinquent, has the right, after notice of its intention, to refuse to accept for transportation cars of coal consigned to a commercial buyer, and to appropriate such coal to its own use, under the contract, where it was necessary to enable it to operate its trains. The court said that it would seem, in the nature of things, that it is the duty of the mine owner to supply the fuel coal before supplying the commercial coal * * * the contractor for commercial coal would seem to be bound by the implication that the mine owner would necessarily fill his contract with the railroad company first, at least to the extent of sufficient coal to enable it to carry commercial coal to the end of its line.—Springfield L., H. & Power Co. v. Norfolk & Western, 260 Fed. 254.

United States Supreme Court

Terminal Company Is a Common Carrier

The United States Supreme Court has sustained the decision of the United States Circuit Court of Appeals imposing a fine of $500 on the Atlanta Terminal Company, Atlanta, Ga., for violation of the hours of service act in keeping a telegrapher on duty, in March, 1917, beyond the number of hours allowed by the law. In the district court the company was acquitted, on the plea that it was not a common carrier; but this decision was reversed by the higher court, and is now sustained by the highest court, in its refusal of a writ of certiorari.

Right to Discontinue Railroad Operated at a Loss

A Louisiana lumber company sued to set aside an order of the State Railroad Commission requiring it either directly or through arrangements with the Kentwood & Eastern to operate its narrow gage railroad between Kentwood and Hackley on schedules and days to be approved by the Commission, alleging that the order could not be complied with except at a loss of more than $1,500 a month. The Commission asked for an injunction against the tearing up or abandoning of the road. The State Supreme Court, after saying that the two corporations were one, under different names, stated that the only question left for determination was whether the plaintiff could be compelled by the Commission to operate its railroad, and concluded that although the railroad showed a loss, the test of the plaintiff's rights was the net result of the whole enterprise—the entire business of the corporation—and on that ground made its decree upholding the order and granting the injunction.

The Supreme Court of the United States is of the opinion that the test applied was wrong under the decisions of that court. The opinion, by Mr. Justice Holmes, in part said: "A carrier cannot be compelled to carry on even a branch of business at a loss, much less the whole business of carriage. On this point it is enough to refer to Northern Pacific v. North Dakota, 236 U. S. 585, 595, 599, 600, 604, and Norfolk & Western v. West Virginia, 236 U. S. 605, 609, 614. It is true that if a railroad continues to exercise the power conferred upon it by a charter from a State, the State may require it to fulfil an obligation imposed by the charter even though fulfilment in that particular may cause a loss. Missouri Pacific v. Kansas, 216 U. S. 262, 276, 278. But that special rule is too far from throwing any doubt upon a general principle to need further argument here. The plaintiff may be making money from its sawmill and lumber business, but it no more can be compelled to spend that than it can be compelled to spend any other money to maintain a railroad for the benefit of others who do not care to pay for it. If the plaintiff be taken to have granted to the public an interest in the use of the railroad it may withdraw its grant by discontinuing the use when that use can be kept up only at a loss." The decree of the State Supreme Court was therefore reversed.—Brooks-Scanlon Co. v. Railroad Commission. Decided February 2, 1920.

Foreign Railway News

LONDON.

The German Government has recently surrendered 52 locomotives and 829 railway trucks to the Lettish government.

English Freight Cars for Belgium

The Belgian State railways have bought 13,000 wagons from the British Government.

Railway Extension in Finland

A railway line is planned from Sordavala to Salonis, writes Consul Parker W. Buhrman from Helsingfors, under date of December 17. This is an eastern extension of the Finnish railways by the north coast of Lake Ladoga to the Russian border, and will eventually connect with the Murman Line.

Federated Malay States Railways Reduce Fares

LONDON.

An abstract from the Engineer states that the Federated Malay States railways have reduced the increase of 50 per cent in passenger fares, which was made to curtail traffic, to 25 per cent. The high cost of labor and materials prevents a return to pre-war fares.

Colombian Railways Need Rolling Stock

LONDON.

An abstract from the Times' Trade Supplement states that the Colombian railways are at present in great need of new rolling stock. In the very near future extensions are to be made, and this will create a demand for locomotives, coaches and freight cars. There will also be a large demand for permanent way materials owing to the reconstruction of large sections of the Colombian railways.

Permanent Way Required for Siam Railways

LONDON.

The Siam States Railways are asking for tenders for some 30,000 metric tons of steel rails and permanent way material for their lines. This is owing to the lines being converted to metre gage.

French Railwaymen's Wages

LONDON.

The London Times of January 31, tells of a serious situation among the railwaymen in France. The Parisian workers are very much in favor of a strike although most of the members of the Union are against it. The men in the vicinity of Paris now receive a minimum wage of 2,400 francs ($480) a year, and in addition a war bonus of 720 francs ($144), a residence bonus of 600 francs ($140), and on the state system 1,080 francs ($216). They now demand a minimum wage of 3,800 francs ($760), the maintenance of the subsidies of 720 francs and 1,080 francs and an increase of the residence bonus from 600 francs to 1,200 francs, all of which amount to a minimum wage of 6,800 francs ($1,360). Behind the movement for increased wages, the railwaymen in general demand the nationalization of the roads.

Receipts and Expenditures on English Railways

LONDON.

The Ministry of Transport has recently issued a statement regarding the financial results of railway operation for the eight months ending November 30, 1919. The total revenue during this period was £126,725,010. The total expenditure was £115,746,459, giving a balance of revenue carned over expenditure of £10,978,551, or an operating ratio of 91.5 per cent. For this period the standard year proportion of net receipts under the government guarantee was £33,391,000 to which £699,400 is added for interest on capital works brought into use. Thus the net government liability for the eight months is £23,174,429. The total traffic revenue earned was distributed roughly as follows: Passenger train traffic 50.5 per cent, freight train traffic 38.5 per

cent, and government traffic 11 per cent. The report also shows a charge of £1,127,569 for arrears in maintenance and renewal in ways and works.

Electrification on the Midi of France

LONDON.

The Midi railway of France, is making preparations to electrify certain portions of its lines, obtaining power from the northern slopes of the Pyrenees. The 3,000-volt d. c. system will be used.

It is reported that the Midi railway will build all its electric locomotive equipment in its own shops and will make every endeavor to contract for all work involved in its electrification program with French concerns. It is expected that ultimately the entire line will be electrified.

Moroccan Railway Rates Increased

LONDON.

An abstract from the Times' Trade Supplement states that the railway rates in the French Protectorate of Morocco has been officially announced. These additional charges vary from a 200 per cent increase on baggage carried on passenger trains and on overweight luggage to a 50 per cent increase on goods of "first necessity," such as grain, building materials, flour, etc. Rates on other merchandise which does not fall in the category of "first necessities" are advanced by from 100 per cent to 150 per cent. There is also an advance in passenger fares.

Exports of Cars in December

The exports of freight cars in December numbered 2,087 valued at $3,368,260, representing a considerable decrease from November. The detailed figures as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

EXPORTS OF CARS FOR STEAM RAILWAYS IN DECEMBER

	89 Passenger		91 Freight and other	
Countries	Number	Dollars	Number	Dollars
Norway	1	4,300	.....	.....
Canada	1	6,500	31	74,400
Cuba	4	46,852	554	684,944
France	..	.....	267	613,789
Italy	..	.....	650	1,170,400
Mexico	..	.....	73	89,655
Dominican Republic	..	.....	2	2,880
Argentina	..	.....	10	9,597
Brazil	..	.....	200	242,595
Russia in Asia	..	.....	300	480,000
Total	6	57,652	2,087	3,368,260

Exports of Railway Material from the United Kingdom

LONDON.

According to the Board of Trade returns the exports of railway material during the twelve months ended December 31, 1919, were as follows:

	1919	1918
Locomotives	£1,781,234	£1,075,922
Rails	2,009,184	484,200
Carriages (passenger cars)	594,352	561,476
Wagons (freight cars)	2,374,142	328,811
Wheels and axles	821,575	344,468
Tires and axles	900,955	619,759
Rail chairs and metal ties	317,704	164,090
Miscellaneous permanent way	778,905	557,033
Total permanent way	3,143,142	1,221,095

The weight of rails exported was 125,216 tons as against 26,335 tons in 1918, and of rail chairs and metal ties 21,574 tons as against 10,173 tons in 1918. During December locomotives to the value of £381,711 were exported, which were distributed as follows: Argentine £22,295; other countries in South America £24 875; British South Africa £137,126; British India £55,658; and Australia £11,520.

Developments in South Manchuria

Marked industrial development is taking place in South Manchuria, organized, in large part, by the South Manchuria Railway, says a recent publication of the Guaranty Trust Company, New York. The railway's plans are reported to provide for expansion covering a period of ten years and affecting the railway itself, its shipping and harbors, its mines, iron works, gas and electrical enterprises. It is planned to replace the present 80-lb. rails by 100-lb. rails over the whole line from Changchun to Dairen. Shipments of 100-lb. rails, ordered from the United States, are arriving.

The doubling of the track from Mukden to Changchun is under way. Large orders for railway equipment have been placed in the United States. The ten year program calls for the improvement of the wharf facilities at Dairen by extending the quay line to 18,760 ft., the berthing capacity to 15,000,000 tons, the cargo handling capacity to 12,000,000 tons per annum, warehousing space to 640,000 square yards and open storage to 1,900,000 square yards. Coolie labor will be supplemented by mechanical appliances. It is proposed to purchase cranes and motor trucks for loading and shifting freight.

Exports of Steam Locomotives in December

The exports of locomotives in December numbering 96, valued at $2,892,082, were double those of November, but only slightly more than half those of October. The largest customer was Cuba, which took 36 locomotives valued at $945,569. Russia in Europe took 20 locomotives valued at $900,000 and shipments are reported of 12 locomotives valued at $550,280 to Germany.

The detailed figures as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, are as follows:

EXPORTS STEAM LOCOMOTIVES IN DECEMBER

Countries	Number	Dollars
Germany	12	550,280
Norway	2	79,360
Russia in Europe	20	900,000
British Honduras	1	13,000
Canada	12	159,406
Guatemala	1	10,100
Mexico	2	10,085
Jamaica	2	71,180
Cuba	36	945,569
Dominican Republic	3	75,130
Colombia	1	19,500
New Zealand	2	29,410
Philippine Islands	1	11,500
French Africa	1	17,562
Total	96	2,892,082

Alsace-Lorraine and the French Railways

A recent article in the Journal des Transports gives some interesting particulars of the extent to which railway and other transport facilities in France will benefit by the return of Alsace-Lorraine to the mother country. Excluding Alsace-Lorraine, the French railway system comprises 45,000 km. of standard gage and 15,000 km. of narrow gage line, to which are now added 2,040 km. of standard and 80 km. of narrow gage. Some 400 km. of canals are added to the previous French network of about 5,000 km., and the 300,000 odd km. of main roads are increased by 8,660 km. Alsace-Lorraine will also be able to supply France with an asset of greater immediate importance than an addition to its railway mileage, namely, locomotives and rolling stock. Prior to the war, the reconquered territory had an annual output of 6,150 tons of locomotives, 400 passenger vehicles and nearly 1,400 goods wagons, in addition to large quantities of trackwork. The engineering works in this district include the famous shops of the Societe Alsacienne de Constructions Mecaniques at Mulhouse and Grafenstaden, and the works at Martigny, Bischeim and Reichsofen. In addition, there are the coal deposits of the Saar Valley, and the oilfields which, in the near future, will help out the French petrol shortage. Incidentally, it is expected that the engineering facilities in Alsace-Lorraine will make France entirely self-supporting in the matter of rolling-stock.

Locomotive Building in Belgium

According to a recent report on the subject of locomotive production in Belgium, says the Railway Gazette, London, there were in that country prior to the war 20 factories in which the construction of railway engines was undertaken. The whole of these were damaged very considerably by the German army and most of the plant removed, one factory being completely destroyed. The work so far undertaken since the cessation of hostilities has been limited to the repair of the buildings and plant, and, as far as has been possible, replacement of the shop equipment. The shortage of engines and the poor condition of those available gives scope for immediate activity in this branch of activity, but the shortage of fuel, the difficulty of obtaining raw material, etc., want of capital and the exorbitant demands of the workmen, all stand in the way of progress. The total number of workmen at present employed is 4,542, or about 75 per

cent of the number employed in 1913, and these are engaged in repairing locomotives for the State and branch railways. The raw material for a few engines on order in 1914 was hidden and escaped the capacity of the invaders, and the completion of these engines, with a construction of a few others, form today all that the Belgium workshops are able to do in the matter of locomotive production.

Travel in Italy

Traveling in Italy is still far from being a pleasure, says a recent despatch from Rome to the Cleveland Plain Dealer. Trains are crowded and none too plentiful. The tourist in search of enjoyment is likely to arrive at his journey's end considerably dishevelled. A watchful eye must be kept on baggage. Nimble-fingered gentry have been known to lift all the portable possessions of a voyager during his brief absence in a dining car. Recently a British officer stepped out of his sleeping compartment at Rome minus all luggage and his tunic. They had been abstracted through the open window during a halt in the night. Tourists are still in the minority. Worried business men constitute the bulk of the traveling public. The Germans are creeping back slowly. The American "hustlers" are driven to despair. Those thus far met are making lightning trips to Italy and France for a rapid survey of the financial situation. They want to dart about as they do at home, but the slow trains madden them. The authorities make things as easy as possible. They are invariably courteous and helpful, but the regulations enforce slowness.

Travel by boat is an even greater trial. People wanting to go to Egypt find the fortnightly service from Taranto, Genoa and Naples inadequate to carry all who wish to cross. One company insists on half the passage money being forfeited if the ticket holders do not sail. Four British passengers, detained beyond sailing time by congestion on the railways, had to pay $480 for the experience.

Italy suffers even more than her neighbors from lack of goods wagons. Needed imports pile up near the frontier and at seaports; factories cannot get raw materials. Paper money is everywhere. You accumulate handfuls of 5-lire notes (worth today about 2s. instead of 4s) and of smaller scraps of tattered, greasy currency marked one lira, which divide themselves into fragments in a most malignant fashion.

Yet, in spite of the topsy turviness of things, there is an atmosphere of real optimism in the business world. Merchants and bankers are fully alive to the dangers and difficulties of Italy's present situation, but they are striving earnestly to surmount them. Some of them say quite frankly that they see no hope of salvation in a German indemnity.

Exports of Car Wheels and Axles in December

The exports of car wheels and axles in December valued at $452,781 were only slightly over half those of November and were the lowest for the year with one exception, January, 1919. France was the largest customer. The detailed figures compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

Exports of Car Wheels and Axles in December

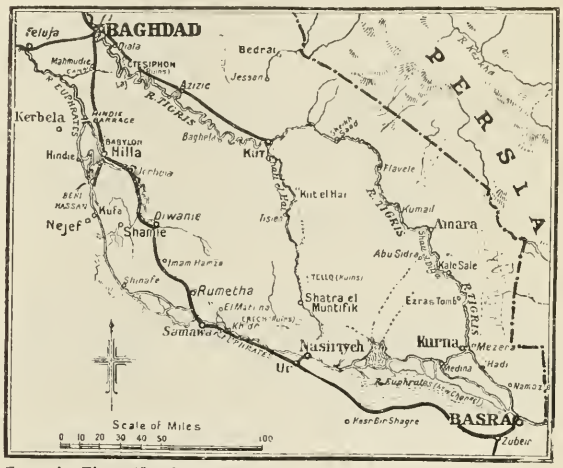
Countries	Dollars
France	164,537
Italy	69,230
Russia in Europe	2,399
England	50
Canada	16,668
Honduras	100
Mexico	4,393
Cuba	57,373
Dutch West Indies	18
Dominican Republic	1,556
Argentina	2,406
Bolivia	142
Brazil	29,963
Chile	4,826
Colombia	253
Peru	1,475
Venezuela	127
Japanese China	75,600
Dutch East Indies	5,308
Japan	12,461
Australia	511
Philippine Islands	64
British South Africa	3,260
Portuguese Africa	61
Total	452,781

Opening of Railroad from Persian Gulf to Bagdad

Press dispatches state that the first through train from Basra northwest to Bagdad, containing British military and civil officers and Arab sheiks left Basra at midnight on January 13 and arrived at Bagdad on the afternoon of January 15, where Lady Macmunn, in the presence of a large gathering, fixed the last fishbolt and declared the line open. The train then proceeded to Bagdad West Station. Basra is a river port 60 miles from the Persian Gulf.

In a speech, General Sir G. F. Macmunn stated that there were now 945 miles of railway in Mesopotamia, as compared with 1,113 miles during the war. This, he said, was due to the fact that operation on the unimportant lines had been abandoned and the track taken up.

The Times Engineering Supplement (London) states that construction has proceeded at the rate of a mile and a half a day on the section of railway between Ur Junction and Hilla, which forms the last link in this line. The route, which follows the Euphrates River, is made up of three sections: Basra westward to Ur Junction (130 miles), Ur Junction northwest to



From the Times (London)

The Railway from Basra to Bagdad

Hilla (164 miles), and Hilla north to Bagdad (58 miles). Of these three sections, the first and last were already in position.

The first section is of meter gage and is laid with 75-lb. rails on Indian broad-gage sleepers. The same construction was followed on the third section, which was built early in 1918. The line, however, is of standard gage. The Middle section (meter gage) is laid with 50-lb. rails and meter gage sleepers. The places on the line are Ur, Khidir, Samawa, Rumetha, Diwania, Jerboia, Milla. The largest bridge is at the crossing of the Euphrates about a mile above Samawa. It is a pile bridge with 13 spans of 30-ft. and a swing span of 40 ft. Other bridges include a 450 ft. pile bridge over the Suwair spill channel, a 56-ft. bridge with 18-ft. swing span over the Shuwait just below Rumetha, and a 120-ft. pile bridge with 38-ft. swing span across the Hilla Canal at Jerboia.

It is expected that a daily through passenger train each way will be put on, to run between Basra and Bagdad in 28 hours. Later as the roadbed consolidates there should be considerable improvement in the speed, but modern cars and engines will be needed, the purchase of which is now under consideration.

Nine Days' Railway Strike in Italy

London.

The Italian State Railways have, as in the case of Great Britain, been put to the test of a railway strike which lasted 9 days beginning at 6 o'clock on the morning of January 20. It was a strike for increased wages, recognition of the railwaymen's union and shorter hours. Unlike Great Britain the response of the workers to the strike called was comparatively weak. It has been officially stated that throughout the entire railway system the number of men striking never reached 35 per cent. The

majority of these were in the North, particularly in the vicinity of Genoa. In the South the strike was generally acknowledged to be a failure.

The reported wage demands involved an increase of 70,000,000 lire with a minimum wage of 1,000 lire ($200) a month.

From the first day of the strike, the number of trains operated increased, and the railway management was assisted by the work of volunteers and a number of men who remained loyal to the road. Difficulties were experienced, however, on account of the fact that of the strikers a large proportion of them were engineers and firemen. On the last day of the strike it was reported that 60 per cent of passenger traffic was being maintained and the amount of goods traffic was about 40 per cent of normal.

The settlement of the strike was, as reported from the Rome correspondent of the London Times, as follows:

(1). The strikers return to work in their former positions.

(2). The payments which would have been due to the railwaymen during the period of the strike will be paid into a housing fund for railwaymen.

(3). An eight-hour day is accepted in principle and will come into force for engineers and firemen on April 30, for the train staff on June 30, and for other employes at a date to be fixed after consultation.

(4). The railway board of management will settle the details of the eight-hour day in consultation with three representatives elected by each category of railwaymen.

(5). The board of management will revise the scale of wage, fixing a flat rate, and doing away with the complicated system of allowance, with the exception of the allowance for the high cost of living.

(6). The board of management will include five representatives elected by the railwaymen instead of three as heretofore.

The settlement may be considered a compromise. The men did not obtain all they asked for but they obtained a good deal. They failed, however, to force their demands for the recognition of the principal railwaymen's union.

Exports of Railway Track Material in December

Exports of railway track material in December included 2,061,818 lb. of spikes valued at $79,188; 34,149 tons of rails valued at $2,028,104, and switches, frogs, splice bars, etc., valued at $344,652. The figures in detail as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

EXPORTS OF RAILWAY TRACK MATERIAL IN DECEMBER

	Spikes		Steel rails		Switches, frogs, splice bars, etc.
Countries	Pounds	Dollars	Tons	Dollars	Dollars
Denmark	.....	.....	673	33,936	900
France	.....	.....	431	17,790	2,500
Greece	.....	.....	.....	.....	5,614
Italy	.....	.....	266	15,537	605
Netherlands	.....	.....	470	24,454	.....
Norway	5,200	202	60	3,613	116
Portugal	.....	.....	.....	.....	72
Russia in Europe	.....	.....	677	39,386	.....
Spain	.....	.....	.....	.....	1,800
England	.....	.....	290	18,202	6,962
Ireland	.....	.....	119	7,648	.....
British Honduras	.....	.....	.....	.....	4
Canada	11,553	724	144	7,735	24,591
Costa Rica	19,000	852	.....	.....	.....
Guatemala	5,550	297	.....	.....	44
Honduras	1,000	46	200	10,600	353
Nicaragua	400	39	30	1,600	.....
Panama	62,000	2,441	66	3,391	.....
Salvador	38,000	1,490	.....	.....	.....
Mexico	68,584	3,166	171	10,466	17,216
Jamaica	.....	.....	154	7,541	1,200
Cuba	768,780	31,695	4,638	250,400	87,233
Haiti	.....	.....	263	13,593	2,789
Dominican Republic	13,670	714	536	27,098	2,218
Argentina	50,264	1,980	838	52,462	7,078
Brazil	13,640	957	86	5,950	94,430
Chile	40,800	1,460	76	4,925	1,730
Colombia	22,348	615	235	14,056	2,085
Ecuador	13,100	581	.....	.....	.....
Paraguay	.....	.....	.....	.....	904
Peru	8,880	461	1,000	54,591	149
Venezuela	500	27	.....	.....	.....
China	572,740	11,349	469	20,904	8,761
Japanese China	4,100	336	92	6,494	159
British India	.....	.....	836	50,741	2,150
Dutch East Indies	.....	.....	2,329	127,346	14,398
Hongkong	2,800	158	.....	.....	.....
Japan	168,285	6,769	10,496	660,263	12,274
Russia in Asia	.....	.....	1,771	115,115	.....
Australia	.....	.....	23	1,300	5,824
New Zealand	.....	.....	.....	.....	222
Philippine Islands	13,214	405	653	31,913	3,876
British South Africa	152,770	12,056	3,927	261,345	36,067
Italian Africa	.....	.....	2,100	126,000	.....
Portuguese Africa	4,620	368	30	1,709	328
Total	2,061,818	79,188	34,149	2,028,104	344,652

Equipment and Supplies

Locomotive Deliveries, Week Ended January 31

The following new locomotives were shipped during the week ended January 31:

Works	Road	Number	Type
American	Ft. W. & D. C.	5	Pacific.
		5	
Lima	Mich. C.	3	USRA 8 W. Sw.
		3	
Total		8	

Locomotives

THE CUBA RAILROAD is in the market for 10 4-6-0 type locomotives.

THE CHARLOTTE HARBOR & NORTHERN is inquiring for 3 locomotives.

THE CAMBRIA & INDIANA is inquiring for 1 Mikado type locomotive.

THE CHICAGO, MILWAUKEE & ST. PAUL is inquiring for 100 Mikado locomotives.

THE MIDLAND VALLEY has ordered 1 locomotive from the Baldwin Locomotive Works.

THE LOUISIANA & ARKANSAS has ordered two locomotives from the Baldwin Locomotive Works.

THE PAULISTA RAILWAY (Brazil) has ordered 6 locomotives from the Baldwin Locomotive Works.

THE ATCHISON, TOPEKA & SANTA FE will be in the market shortly for a considerable number of locomotives.

THE AMERICAN RAILWAY EQUIPMENT COMPANY, Liberty building, Philadelphia, Pa., is in the market for one 50-ton saddle tank locomotive.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for one second-hand standard gage 18- to 22-ton Mogul type locomotive.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for one second-hand standard gage oil burning switching engine of about 40 tons.

THE SOUTH BRAZIL LUMBER & COLONIZATION COMPANY, Rodney D. Chipp, United States agent, 120 Liberty street, New York, is in the market for 1 Mikado type locomotive for export to Brazil.

THE LOUISVILLE & NASHVILLE reported in the *Railway Age* of February 13 as being in the market for 20 Mikado type locomotives, has ordered 15 of these locomotives from the American Locomotive Company.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 10 Mikado type locomotives from the American Locomotive Company. These locomotives will have 28 in. by 30 in. cylinders and a total weight in working order of 321,000 lb.

Freight Cars

THE ILLINOIS CENTRAL is inquiring for 1,000 gondola cars.

C. A. WORTHAN, San Antonio, Tex., is inquiring for six flat cars.

THE STANDARD OIL COMPANY OF INDIANA is inquiring for 6, 40-ton coal cars.

THE YUEH-HAN RAILWAY (China) is asking for prices on 1,000 freight cars.

The Marland Refining Company, Punca City, Okla., is inquiring for 200 tank cars.

The Erie has purchased 967, 50-ton hopper-car bodies from the Standard Steel Car Company.

The South Porto Rico Company, New York, is inquiring for one 3,000-gal. capacity tank car.

The Cuba Railroad is inquiring for 500 box cars of 40 tons capacity and 200 of 30 tons capacity.

The American Refrigerator Transit Company, St. Louis, Mo., is inquiring for 2,028 refrigerator cars.

The Carnegie Steel Company, Pittsburgh, Pa., has ordered 32, 50-ton, 12,500-gal. tank cars from the American Car & Foundry Company.

The Antonio Oller Company, 180 Broadway, New York, has ordered 15 tank cars of 6,000 gal. capacity from the General American Tank Car Corporation for export to Cuba.

W. R. Grace & Co., San Francisco, Cal., have ordered from the Pennsylvania Tank Car Company, 25, 8,050-gal. capacity tank cars with 50-ton trucks and equipped with steam heating coils.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for 6 second-hand 36-inch gage side dump cars for hauling ore, for Pacific coast delivery.

The Inland Steel Company, Chicago, reported in the *Railway Age* of January 16, as inquiring for 60 cars, has ordered 20, 70-ton gondola cars from the General American Tank Car Corporation.

The American Railway Equipment Company, Liberty building, Philadelphia, Pa., is in the market for some 50-ton steel hopper cars, some 40-ton flat cars, refrigerator beef cars, and 30-ton box cars.

The South Brazil Lumber & Colonization Company, Rodney D. Chipp, United States agent, 120 Liberty street, New York, is in the market for 15 logging cars of 60,000 lb. capacity for export to Brazil.

The Georgia Rosin & Products Company, Brunswick, Ga., has ordered from the Pennsylvania Tank Car Company 3, 8,050-gal. capacity tank cars with 40-ton trucks and equipped with steam heating coils.

The Baldwin Locomotive Works, Philadelphia, Pa., is inquiring for 50, 10-ton freight cars for export to East Belgium and 10, 20-ton and 10, 10-ton gondolas, 5, 10-ton-capacity box cars, 1 baggage and mail car and 4 freight cars for export to Spain.

The Great Northern, reported in the *Railway Age* of January 30, as being in the market for 1,000 ore cars of 75-ton capacity, has ordered 500 of these cars from the Haskell & Barker Car Company and 500 from the American Car & Foundry Company.

Passenger Cars

The Paulista Railway (Brazil) is inquiring for 12 coaches.

The Hudson & Manhattan is in the market for 25 subway cars.

The St. Louis, Brownsville & Mexico is inquiring for 50 passenger train cars.

The Boston Elevated is inquiring for 30 center entrance street cars, 40 cars for elevated service and 30 standard safety cars.

The New York Central is inquiring for 50 to 100 coaches, 50 to 100 baggage cars and 22 combination passenger and baggage cars.

The United Railways & Electric Company, Baltimore, Md., has ordered 30 safety cars and 100 trailers from the J. G. Brill Company.

The Baldwin Locomotive Works, Philadelphia, Pa, is inquiring for 10, first-, second- and third-class passenger coaches for export to Spain.

The Northern Ohio Traction & Light Company, Akron, Ohio, has ordered through the Hodentyl-Hardy Company, New York, 117 safety cars from the J. G. Brill Company.

Iron and Steel

The Mt. Vernon Car Manufacturing Company, Mt. Vernon, Ill., has purchased 1,000 tons of plates for repairing Baltimore & Ohio freight cars.

The Alaska Northern has awarded a contract to the American Bridge Company for 1,650 tons of structural material to be used in the erection of a bridge over the Susitna river, Alaska.

Rails for Siam.—The time limit for receiving bids for 31,977 metric tons of steel rails and permanent way accessories for the railways of Siam has been extended from January 31 to March 15. Tenders f. o. b. will be considered.

The United States Railroad Administration has awarded a contract to the American Bridge Company for 178 tons of through-plate, girder spans to be used in the reconstruction of an Illinois Central bridge at Center Grove, Iowa.

Mitsui & Co., New York, reported in the *Railway Age* of January 16 as being in the market for steel transmission towers have ordered 5,600 tons of the above from the U. S. Steel Products Company for the Nippon Electric Hydro-electric & Power Company.

Machinery and Tools

The Manitoba Bridge & Iron Works, Ltd., Winnipeg, Man., is inquiring for a 10-ton locomotive crane.

The Pennsylvania Equipment Company, 1420 Chestnut street, is in the market for from 3 to 4 second-hand 150-ton wheel presses.

Chicago, Indianapolis & Louisville.—A list of the requirements of machinery and tools for this company is being prepared and probably will be issued shortly.

The A Estrada de Ferro de Carlos Barbosa a. Alfredo Chaves, a state-owned railroad in Brazil, is inquiring for machine tools for railroad shops, such as lathes, drills, planers and hammers with electric drive; air compressors for painting and drilling, woodworking machinery, furnaces for melting iron, cranes, wrenches, centrifugal pumps, stationary steam engines, gasoline or kerosene engines, passenger coaches, railway motor cars, trucks, freight cars, box and flat cars, passenger and freight locomotives and other rolling stock.

Signaling

The Southern (Western Lines) has placed an order with the Union Switch & Signal Company, Swissvale, Pa., for the necessary material for addition to a mechanical interlocking plant at Robins, Tenn. The interlocking is to take several functions located at the farther end of a tunnel adjacent to the present mechanical plant of low voltage style "M" switch and lock movements being used. The control of the derail and switch operating mechanism will be controlled from a single mechanical lever in the existing machine. The work will be installed by railroad forces.

Miscellaneous

Sophus Berendsen, 15 Broad street, New York, is in the market for about 25 copper firebox plates, for export to Denmark.

"Transportation is a vital problem for New England because its industrial life depends upon it. The reason that the railroads find themselves in straitened circumstances today is partly because they have been regulated and re-regulated by those with no responsibility."—*Governor Coolidge of Massachusetts.*

Supply Trade News

The **Conley Car Company**, Pittsburgh, Pa., has changed its name to the Conley Tank Car Company.

E. G. Middleton has been appointed advertising manager of the **Colburn Machine Tool Company**, Franklin, Pa.

A. G. Pickett, whose appointment as manager of the newly-organized railroad sales department of the **Imperial Belting Company**, Chicago, with office in that city, was announced in the *Railway Age* of February 13 (page 513), was born at New London, Mo., on July 12, 1888. In 1911 he became connected with the sales department of the National Refining Company, Hannibal, Mo. Later in the same year he was appointed special power plant representative for the H. W. Johns-Manville Company at New York. On January 1, 1916, he was promoted to assistant manager of the power specialties department and, in 1917, was promoted to manager of that department, which position he retained until August, 1919, when he resigned to become connected with the sales department of the Imperial Belting Company.

A. G. Pickett

E. E. Griest, notice of whose appointment as general superintendent of the **Chicago Railway Equipment Company**, Chicago, with office at that city, appeared in the *Railway Age* of January 9 (page 214), was born at Zanesville, Ohio, on November 28, 1882. He entered railway service in 1899 as a clerk in the auditors' office of the Cleveland & Marietta at Cambridge, Ohio. This office was transferred to Pittsburgh in 1900 and he then entered the division freight agent's office at Cambridge as a clerk and messenger. Later in the same year he entered the employ of the Pittsburgh, Cincinnati, Chicago & St. Louis as an apprentice machinist in the Columbus (Ohio) shops, remaining in this capacity and later as a machinist until November, 1904, when he entered Purdue University, graduating in 1907. After some time spent in Alaska, he returned to the United States in 1907 as a designer in the engineering department of the Crucible Steel Company of America, Pittsburgh, Pa. In 1908 he was appointed foreman in the Hornell (N. Y.) shops of the Erie and later in the same year he was appointed assistant machine shop foreman in the Fort Wayne (Ind.) shops of the Pennsylvania, Lines West. On March 15, 1909, he was promoted to assistant master mechanic, with the same headquarters, and in January, 1915, he was promoted to master mechanic. He retained this position until 1918, when he resigned to become connected with the Chicago Railway Equipment Company, with headquarters at Chicago. In September, 1918, he was transferred to Detroit, Mich., remaining there until his recent promotion.

E. E. Griest

D. B. Wright, who has been a special representative with the **Lehon Company**, Chicago, for the past nine years, has severed his connection with that company, effective on March 1.

Harold McGill Davis, manager of the advertising department of the **Sprague Electric Works** of the General Electric Company, New York, since December, 1899, died on February 9 at his home in Brooklyn, N. Y.

J. A. McLennan, general superintendent of the Link-Belt Company, Philadelphia, Pa., has resigned to become general manager of the **McDonough Manufacturing Company**, Eau Claire, Wis., which has recently been reorganized and is now manufacturing machine tools.

Harry Z. Bixler, chief engineer of the **Brier Hill Steel Company**, Youngstown, Ohio, and **T. M. Phillips**, superintendent of the washed metals department of the same company, have resigned to enter the steel business as members of a new company now in the process of organization. **W. H. Ramage**, assistant chief engineer, has been promoted to succeed Mr. Bixler, and **E. J. Kauffman**, chief chemist, has been appointed to succeed Mr. Phillips.

The Blaw-Knox Company, Pittsburgh, Pa., has purchased the C. D. Pruden Company, Baltimore, Md., manufacturers of standardized steel buildings. **J. Grier Campbell**, purchasing agent of the Blaw-Knox Company, has become assistant treasurer of the C. D. Pruden Company, and **Wm. S. Boyd**, assistant purchasing agent of the Crucible Steel Company of America, Pittsburgh, Pa., and purchasing agent of the Page Steel & Wire Company, New York City, has been appointed purchasing agent of the Blaw-Knox Company, succeeding Mr. Campbell.

American Steel Foundries

The annual report of the American Steel Foundries for the year ending December 31, 1919, shows a surplus, after allowances were made for charges and federal taxes of $4,210,634. After allowing for a three and one-half per cent preferred dividend for six months, this stock being issued in June, 1919, the balance was equal to $7.55 a share ($33.33 par value) earned on the $17,184,000 of common stock, as compared with a surplus of $4,695,727, or $15.68 a share ($100 par value), earned on the $17,184,000 of capital stock in 1918. The income account for the year ended December 31, 1919, compares with past years, as follows:

	1919	1918	1917	1916
Operating earnings	*$6,107,825	$4,442,237	$8,718,296	$4,842,237
Depreciation	333,296	426,412	917,646	739,414
Balance	$5,774,529	$4,015,825	$7,800,650	$4,102,823
Other income	340,478	173,599	238,024	122,987
Total income	$6,115,007	$4,189,424	$8,038,674	$4,225,810
Reserve	.. ...	.....	.....	344,000
Subsidiary Company minority earnings	‡219,103	.....	.....	.....
Interest charges	58,181	136,497	219,235	†506,835
Federal tax reserve	1,627,089	1,357,200	2,287,600	.....
Surplus	$4,210,634	$2,695,727	$5,531,839	$3,374,975

*After deducting manufacturing, selling, administrative, head and district office expenses.
‡Consists of net earnings of subsidiary company appertaining to outstanding minority stockholders.
†Standing sinking fund.

The probability of a stock dividend on the common stock in the near future is intimated in a statement made by President R. T. Lamont. Mr. Lamont, in his announcement, says: "Through the payment, from earnings, of its bonds and most of its debentures, as well as from extensions and additions to plants, the company has accumulated a large surplus, which, since it represents money spent, cannot be distributed in cash without reducing the working capital to

less than the amount required for the conduct of the business. It may, however, very properly be capitalized through the issuance of stock, which, in turn, may be either distributed to the stockholders as a stock dividend or used for the acquisition of additional property. Personally, I believe, unless some good reason to the contrary should develop, that the new stock might well be distributed as a dividend, at say, five or ten per cent a year over the next few years, irrespective of any cash dividends that may be paid.

Westinghouse Air Brake Company

In addition to the appointments announced in the *Railway Age* of last week, the Westinghouse Air Brake Company, Pittsburgh, Pa., has also made the following change in its engineering staff: **F. H. Parke,** resident engineer, southeastern district, Pittsburgh, Pa., has been promoted to general engineer with headquarters at the same place; **T. W. Newburn,** assistant resident engineer, southern district, at Pittsburgh, has been promoted to district engineer of the same district with headquarters at Washington, D. C.; **J. H. Woods** of the commercial engineering department at Wilmerding, Pa., has been promoted to engineer of the export department with headquarters at Pittsburgh, and **J. C. McCune,** special engineer at Wilmerding, has been appointed assistant to district engineer, eastern district, with headquarters at New York.

F. H. Parke, who has been promoted to general engineer with office at Pittsburgh, Pa., was born in 1869 at Waterloo, N. Y.. He was educated in the public schools at Binghamton, N. Y., until eleven years of age, when he went to St. John's School, Manlius, for seven years, where he prepared for a course at Cornell University. He was graduated from Cornell in mechanical engineering in 1892. He immediately entered the service of the Westinghouse Machine Company at Pittsburgh, Pa., first as draftsman and afterwards as engineer of tests. In 1898 he took service with the Westinghouse Air Brake Company, spending the first four years in Petrograd, assisting in the installation of the Westinghouse Air Brake plant being erected there to handle the Russian railway business. Returning to the home office at Wilmerding, Pa., he was given charge of the publicity department and afterwards was made industrial engineer, in which capacity he served until 1911. He was then made resident engineer of the southeastern district.

T. W. Newburn, who becomes district engineer of the southeastern district with office at Washington, D. C., was born near Hoopston, Ill., and received his early education in the country schools and at Greer College. He was graduated from Purdue University with the 1902 class in mechanical engineering and immediately entered the service of the Cambria Steel Company, Johnstown, Pa. In August, 1902, he entered the employ of the Westinghouse Air Brake Company, being assigned duties in the mechanical and engineering departments of its Wilmerding factory. He was connected first with the Cleveland office, with duties connected with mechanical and commercial work, then with the Columbus office as mechanical expert in connection with electric railway brakes. In 1914 he was assigned to the Pittsburgh office as assistant resident engineer, where he leaves to take up his new duties.

Joseph H. Woods, who has been promoted to engineer of the newly arranged export department, was born in February, 1886, at Hamilton, Ont. After graduating from the public schools and Hamilton Collegiate, he was employed as an apprentice in a machine shop, where he served three years as apprentice-machinist and then entered the mechanical drawing room of the Canadian Westinghouse Company, Ltd. In 1908 he was transferred to the air brake department. The following year he entered the engineering test department and in 1911 was appointed assistant engineer of tests. In 1915 he was transferred temporarily to New Jersey as general foreman of the Air Brake Company's shrapnel loading plant, where war munitions were being manufactured. On completion of the shell loading work in 1916 he returned to Wilmerding to take up duties in the general office division of the engineering department.

Jos. C. McCune has been appointed assistant to district engineer with office in New York. He was born in Brilliant, Ohio, in 1890. He attended the high school at Steubenville, Ohio, and in 1906 entered Washington and Jefferson College, taking preparatory work for one year. He graduated from Cornell University with the class of 1911, receiving the degree of mechanical engineer. He was awarded the First Sibley Prize for having the highest scholastic standing of the students in Sibley College of Mechanical Engineering. After graduating, he entered the employ of the Cutler-Hammer Manufacturing Company, Milwaukee, Wis., and later served in the traffic department of the Pittsburgh Railway Company. In 1913 he joined the Westinghouse Air Brake Company as assistant to the chief engineer, Dr. Walter V. Turner. In 1915 he was transferred to the New York office as mechanical expert, charged with the development and satisfactory operation of the new air brake equipment then being applied to the subways of Greater New York. In 1916 he served for five months at the Mexican border with the 7th Regiment, N. Y. N. G. Returning from this service he was commissioned 1st Lieut. in the Engineer Officers' Reserve Corps and upon the outbreak of the war with Germany was ordered to active duty. He was an engineering instructor at the 1st, 2d and 3d Officers' Training Camps, and in May, 1918, was assigned to the 603d Engineers, going overseas with this organization and remaining abroad for ten months. Before the signing of the armistice, he participated in the Argonne offensive as a pontooneer with the First Army, being occupied in building pontoon bridges at Dun, Stenay and other places which have since become historic. Returning to this country, he re-entered the employ of the Westinghouse Air Brake Company as special engineer at Wilmerding.

F. H. Parke

T. W. Newburn

J. H. Woods

J. C. McCune

Annual Report of Baldwin Locomotive Works Shows Decreased Business

The fact that the railways of the United States purchased practically no new locomotives in 1919 is reflected in the decrease of gross sales of the Baldwin Locomotive Works from $123,179,252 for the fiscal year ended December 31, 1918, to $84,307,777 for the year 1919. This total of $84,307,777 for 1919 is greater than that of 1916 or any preceding year, but it is considerably below 1917 and 1918, when the company was able to depend upon war orders for a large share of its business.

The company's manufacturing profit of $8,842,242 in 1919 compared with $18,262,112 in 1918 and with $11,193,841 in 1917. There was other income amounting to $1,103,430 and the profit after the deduction of taxes, interest, etc., was $8,871,243. Deductions for reserves, namely reserve for depreciation, reserve for depreciation in accounts and reserve for federal taxes totaled $3,095,000, leaving a net profit available for dividends of $5,776,243. This compared with a similar figure for 1918 of $5,752,292, but in 1918 the total deductions for reserves totaled $15,009,817 as against the figure only one-fifth as large this year. One of the principal reductions in allowances for reserves was for taxes, $6,500,000 being set aside for this purpose in 1918 as against only $2,000,000 in 1919.

The usual dividends of 7 per cent amounting to $1,400,000, were paid on the preferred stock. No dividends on the common stock were paid in 1918, but in 1919 3½ per cent was paid, totaling $700,000. The surplus for the year 1919 totaled $3,676,243 as compared with $1,852,296 in 1918, or $6,905,722 in 1917. The total surplus on December 31, 1919, was $6,554,413, as against $1,907,642 at the close of 1918.

The general balance sheet for the Baldwin Locomotive Works as of December 31, 1919, is shown in brief as follows:

Assets	
Plant and equipment	$17,022,568
Machinery and fixtures	13,673,589
	$30,696,157
Less depreciation	3,650,000
	$27,046,157
Investments—	
Standard Steel Works	$4,041,501
Eddystone Munitions Company	484,736
Chicago plant	365,850
Dwelling houses	40,618
	$4,932,705
Current Assets—	
Inventories	$10,565,622
Accounts receivable	7,323,502
Bills receivable	1,799,633
Marketable securities	633,621
Liberty bonds	7,046,457
British bonds	962,500
Cash	3,441,020
	$31,772,355
Deferred charges—	
Engineers, etc.	$37,179
Advances to agents	58,992
	$96,171
Sinking fund—	
First mortgage bonds	1,141,900
	$64,989,288
Liabilities	
Capital stock—	
Preferred	$20,000,000
Common	20,000,000
	$40,000,000
First mortgage bonds	10,000,000
Current liabilities—	
Accounts payable	$2,085,118
Depositors saving fund	1,666,097
Special deposit	1,293,972
Russian deposit	250,000
Advances	109,897
	$5,405,084
Interest—	
Accrued interest on bonds	$83,334
Interest received in advance	66,557
Interest in sinking fund	129,900
	$279,791
Reserves—	
Income taxes, 1919	$2,000,000
Depreciation in accounts	750,000
	$2,750,000
Surplus—	
Balance, December 31, 1919	$6,554,413
	$64,989,288

Railway Officers

Railroad Administration

Regional

R. H. Aishton, regional director of the Northwestern region, has had his jurisdiction extended over the Central Western region, succeeding **Hale Holden,** resigned.

Federal and General Managers

H. A. Hinshaw, general freight agent of the Southern Pacific, with office at Portland, Ore., has also been appointed assistant to the federal manager, with the same headquarters.

Operating

G. T. Washington, superintendent of terminals of the Southern and the New Orleans Terminal at New Orleans, La., has been transferred to his former position as local freight agent of the Southern, with the same headquarters, succeeding E. R. Lockhart, who has been appointed assistant local freight agent at that point. C. C. Chambers, freight conductor on the New Orleans & Northeastern, has been promoted to superintendent of terminals to succeed Mr. Washington.

Special

Thomas M. Pierce, whose election to the acting presidency of the Terminal Railroad Association of St. Louis, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of February 6 (page 462), was born at Union City, Tenn., on July 18, 1877. He was educated at Georgetown University, Washington, D. C., and the Cumberland (Tenn.) University of Law. He entered railway service in 1905, when he was appointed general counsel for the St. Louis & Suburban. In 1907 he was appointed general counsel for the United Railways of St. Louis, continuing in that position until 1911, when he was appointed general counsel for the Terminal Railroad Association of St. Louis. He succeeds William S. McChesney, whose death on January 28 was noted in the *Railway Age* of February 6 (page 462).

Thos. M. Pierce

Traffic

W. C. Roth has been appointed general agent of the Chicago Great Western, with headquarters at Mason City, Ia., succeeding **R. M. Hatfield,** transferred.

T. R. Flanagan, property protector on the Chicago Great Western, with office at St. Paul, Minn., has been appointed general freight agent, with the same headquarters, succeeding **C. L. Smith,** deceased. The office of property protector has been abolished.

Samuel Strachan has been appointed division freight agent of the Baltimore & Ohio, the Baltimore & New York, the Staten

Island Rapid Transit, the Coal & Coke, the Dayton & Union, the Dayton Union and the Morgantown & Kingwood, with headquarters at Charleston, W. Va., succeeding **S. J. Lamoreux**, resigned.

Engineering and Rolling Stock

V. K. Hendricks, assistant chief engineer of the St. Louis-San Francisco, has resigned, effective on March 1. No successor has as yet been appointed.

An item appearing in the *Railway Age* of January 30 (page 396) was incorrect in that it stated that **E. G. Lane** was chief engineer of the Baltimore & Ohio, Eastern Lines. **H. A. Lane** is chief engineer of the Baltimore & Ohio, Eastern Lines, and he has had his jurisdiction extended over the Western Lines while retaining the same headquarters at Baltimore, Md. **E. G. Lane**, chief engineer of the Western Lines, has returned to his former position as engineer maintenance of the way of the Western Lines, with heaquarters at Cincinnati, Ohio.

Corporate

Executive, Financial, Legal and Accounting

G. W. Wickersham has been appointed counsel for the Louisville & Nashville Railroad Company, with headquarters at New York, effective March 1.

B. F. Bush, regional director of the Southwestern Region, will resume his former position as president of the Missouri Pacific Railroad Company on March 1.

Lawrence A. Downs, assistant general manager of the Illinois Central, the Yazoo & Mississippi Valley and the Chicago, Memphis & Gulf, with headquarters at Chicago, has been elected vice-president and general manager of the Central of Georgia, with headquarters at Savannah, Ga., succeeding to the position held by L. W. Baldwin prior to government control, which has since been vacant. Mr. Downs was born at Greencastle, Ind., on May 9, 1872, and graduated from Purdue University in 1894. In 1895 he began railway work with the Vandalia. From March, 1896, to 1898, he was a member of an engineering party of the Illinois Central. From 1898 to March, 1907, he served as roadmaster on the Amboy, the Louisville, the Louisiana, the Springfield and the Chicago divisions of the same road. In March, 1907, he was appointed assistant chief engineer, maintenance of way, remaining in that position until December 6, 1910, when he was promoted to superintendent of the Kentucky division. On November 1, 1915, he was promoted to general superintendent of all lines south of the Ohio river, with headquarters at New Orleans, La. On August 1, 1917, he was transferred to Chicago as general superintendent of the Northern lines. He continued in that position until January, 1919, when he was promoted to assistant general manager, in which capacity he served until his recent appointment.

L. A. Downs

A. J. Pharr, federal auditor of the Louisville & Nashville, has been appointed controller for the Louisville & Nashville Railroad Company, with headquarters at Louisville, Ky., effective March 1.

Leo C. Van Laan has been appointed auditor of the Detroit, Bay City & Western and the Port Huron Southern, with headquarters at Bay City, Mich.

Hale Holden, regional director of the Central Western region, has resigned, effective February 15, having been elected president of the Chicago, Burlington & Quincy and the Colorado & Southern, the positions he held prior to federal control.

A. R. Smith, traffic assistant of the Southern region for the Railroad Administration, has been elected vice-president in charge of traffic of the Louisville & Nashville, with headquarters at Louisville, Ky., effective March 1, the position he held prior to federal control.

Thomas C. Powell who has recently resigned as director of the Division of Capital Expenditures of the Railroad Administration, and has been elected vice-president in charge of traffic of the Erie Railroad Company, effective February 15, was born September 5, 1865 at Cincinnati, Ohio. He began railroad work in 1884 as traffic mail clerk of the Cincinnati, New Orleans & Texas Pacific and later became successively rate clerk, chief rate clerk and chief clerk to the traffic manager of the same road. On June 1, 1893, he was appointed assistant general freight agent, retaining the position until November 1, 1895, when he went to the Southern as chief clerk to the general freight agent, in charge of the rate and tariff department. Having served in that capacity for almost three years, he was appointed general freight agent of the same road and the Northern Alabama. Less than a year later he was promoted to assistant freight traffic manager of the same roads and on March 15, 1902, to freight traffic manager, a position he held until April 1, 1905, when he was elected vice-president in charge of traffic. On August 1, 1907, he was also elected vice-president in charge of all departments of the Cincinnati, New Orleans & Texas Pacific and the Alabama Great Southern, later holding the position of vice-president of the Southern Railway, Lines West, at Cincinnati, Ohio, in charge of traffic. Soon after war was declared with Germany he was appointed manager of inland traffic of the War Industries Board and in January, 1919, succeeded Judge Robert S. Lovett as director of the Division of Capital Expenditures of the Railroad Administration. He also served as chairman of the Claims Committee.

Thos. C. Powell

Frank B. Townsend, traffic manager of the Minneapolis & St. Louis and the Iowa Central, with office at Minneapolis, Minn., has been re-elected vice-president in charge of traffic of these roads, effective January 15. Mr. Townsend held this position prior to federal control.

A. G. Sam, president of the Live Stock National Bank, the Sioux City Cattle Loan Company, and treasurer of the Sioux City Stock Yards Company, with office at Sioux City, Ia., has been elected treasurer and a director of the Sioux City Terminal Railway Company, with the same headquarters.

B. L. Bugg, federal manager of the Atlanta, Birmingham & Atlantic, and, prior to federal control, general manager, has been elected president of the Atlanta, Birmingham & Atlantic Railroad Company; **J. L. Edwards**, manager of the Agricultural Section of the Railroad Administration, and prior to federal control, traffic manager of the Atlanta, Birmingham & Atlantic, has been elected vice-president; **W. E. Paschall** has been elected

treasurer, and **A. V. B. Gilbert,** secretary. These officers assume their new duties at the termination of federal management.

G. E. Evans, staff officer of the Louisville & Nashville for the Railroad Administration, has been elected vice-president in charge of operation of the Louisville & Nashville Railroad Company, with headquarters at Louisville, Ky., effective March 1, the position he held prior to federal control.

F. O. Barden, general manager of the Boyne City, Gaylord & Alpena, with office at Boyne City, Mich., has been elected third vice-president, with the same headquarters. **L. H. White,** general superintendent and car accountant, has been promoted to succeed Mr. Barden as general manager.

J. M. Gruber, prior to federal control vice-president in charge of operation of the Great Northern with headquarters at St. Paul, Minn., and now general manager of the same road, has resigned from the former position effective March 1. He will be succeeded by **C. O. Jenks,** assistant federal manager of the Great Northern.

The statement in last week's issue of the *Railway Age* to the effect that **L. W. Baldwin,** regional director of the Allegheny district, would return to his former position as vice-president and general manager of the Central of Georgia on the termination of federal control, was incorrect. Mr. Baldwin will become vice-president in charge of operation of the Illinois Central and the Yazoo & Mississippi Valley, as correctly stated in the following items

Lewis W. Baldwin, regional director of the Allegheny region of the United States Railroad Administration, has been elected vice-president in charge of operation of the Illinois Central and the Yazoo & Mississippi Valley, with office at Chicago, effective March 1. Mr. Baldwin was born at Waterbury, Md., in 1875 and was graduated from Lehigh University in 1896. He entered the service of the Illinois Central in that year and was soon promoted to assistant engineer. In 1900 he was appointed supervisor of track and for three years, from 1901 to 1904, he served in the capacity of roadmaster. Later he was promoted to trainmaster and in 1906 was made superintendent. In 1910 he was appointed engineer maintenance of way, with headquarters at Chicago Three years later he was appointed superintendent of the Kentucky division. In January, 1915, he was promoted to general superintendent of the Southern Lines of the Illinois Central, with headquarters at New Orleans, La. On November 15, 1915, he was made general manager of the Central of Georgia and one year later was elected vice-president of the same road. He entered the service of the Railroad Administration in February, 1918, as operating assistant to the director of the Southern region, with office at Atlanta, Ga., and was later transferred with C. H. Markham, then regional director, to the Allegheny region, continuing in that position until November, 1919, when, upon the resignation of Mr. Markham, he was promoted to the position which he held at the time of his recent appointment.

L. W. Baldwin

Charles O. Jenks, assistant federal manager of the Great Northern, with headquarters at St. Paul, Minn., has been elected vice-president in charge of operation of the Great Northern Railway Company, with the same headquarters, succeeding to the position held prior to federal control by J. M. Gruber, now general manager of the Great Northern, with headquarters at St. Paul, effective March 1. Mr. Jenks was born at St. Paul, Minn., on March 6, 1874. He was educated at the University of North Dakota and entered railway service on June 15, 1891, as a clerk in the superintendent's office of the Great Northern. He was subsequently, to October 1, 1906, chief clerk, trainmaster, assistant superintendent and superintendent on various divisions of the same road. On the latter date he became president and general manager of the Nelson-Jenks Coal Company, Great Falls, Mont. He returned to railway service on December 1, 1909, as superintendent of the Butte division of the Great Northern. On March 15, 1912, he was promoted to general superintendent of the Central district of the same road, with headquarters at Great Falls, and was transferred to the Lake district, with headquarters at Superior, Wis., on July 20, 1913. In January, 1915, he was appointed general manager of the Spokane, Portland & Seattle, with headquarters at Portland, Ore. ,and in May of the same year was elected a member of the board of directors, and vice-president and general manager of the Spokane & Inland Empire. At the same time he was elected vice-president and general manager of the Pacific & Eastern, with jurisdiction over the operating, mechanical and purchasing departments, and vice-president of the Oregon Electric. Mr. Jenks was later appointed assistant general manager of the Great Northern, with headquarters at St. Paul, and in October, 1917, he was transferred to Seattle, Wash., with jurisdiction over the lines west of Williston, N. D. He continued in this position until February, 1920, when he was promoted to assistant federal manager, with headquarters at St. Paul, in which position he will continue until March 1.

Operating

G. H. Greenaway has been appointed trainmaster of the Detroit, Bay City & Western and the Port Huron Southern at Port Huron, Mich.

Robert S. Parsons, chief engineer of the Erie, has been appointed general manager of the Erie, under the new plan of organization whereby there are created four regions, each with a regional manager reporting to the general manager. Mr. Parsons was born at Hohokus, N. J., and studied at Rutgers College. He began railroad work in 1895 as rodman for the Erie and the following year was made assistant engineer. In 1899 he was appointed division engineer of the New York, Susquehanna & Western. He returned to the Erie in 1903 as engineer maintenance of the way and three years later became assistant general superintendent of the same road. He was appointed superintendent of the Susquehanna division in 1907 and three years later was transferred to the New York division in the same capacity. On January 1, 1913, he was appointed assistant general manager of the lines east of Buffalo, N. Y., and Salamanca, with headquarters at New York. The following year he was appointed general manager of the Ohio Grand division, more recently known as the Erie Lines West, with office at Cleveland, Ohio, and in January, 1916, was appointed chief engineer. The following year he became assistant to the president and chief engineer and in November, 1917, became assistant to the president and general manager. Under the Railroad Administration he served as chief engineer, as noted above.

R. S. Parsons

A. C. McDannel, assistant to the president of the Detroit, Bay City & Western, with headquarters at Bay City, Mich.,

has been appointed general superintendent and traffic manager of that road and of the Port Huron Southern, with the same headquarters.

F. E. Pinkerton has been appointed superintendent of car service of the Detroit, Bay City & Western and the Port Huron Southern, with headquarters at Bay City, Mich.

F. J. Beals, assistant car accountant of the Boyne City, Gaylord & Alpena, with office at Boyne City, Mich., has been promoted to superintendent of car service, with the same headquarters, succeeding to part of the duties of L. H. White, promoted. The position of assistant car accountant has been abolished.

Traffic

F. D. Gouldburg has been appointed general freight and passenger agent of the Detroit, Bay City & Western and the Port Huron Southern, with headquarters at Bay City, Mich.

J. M. Cleaveland, general freight and passenger agent of the Pere Marquette Line Steamers, with headquarters at Milwaukee, Wis., has been elected vice-prsident and traffic managr.

D. M. Goodwyn, traffic manager of the Louisville & Nashville for the Railroad Administration, has been appointed freight traffic manager of the Louisville & Nashville Railroad Company, with headquarters at Louisville, Ky., effective March 1.

C. C. Ray, general freight and passenger agent of the De Queen & Eastern, and the Texas, Oklahoma & Eastern, with office at De Queen, Ark., has been appointed assistant general manager and traffic manager of these roads, with the same headquarters, succeeding to positions which have been vacant for some time.

Engineering and Rolling Stock

R. R. Herrick has been appointed master mechanic of the Detroit, Bay City & Western and the Port Huron Southern at Bay City, Mich.

William N. Boyd has been appointed chief engineer of the Detroit, Bay City & Western and the Port Huron Southern, with headquarters at Bay City, Mich.

C. D. Kinney, master mechanic on the Boyne City, Gaylord & Alpena, with office at Boyne City, Mich., has been promoted to superintendent of motive power, with the same headquarters.

General

The Louisville & Nashville Railroad Company announces that the following officers now serving the Louisville & Nashville under the Railroad Administration will retain the same positions and headquarters on the termination of federal control:

E. S. Jouett, general counsel, Louisville, Ky.
J. H. Ellis, (federal) treasurer, Louisville, Ky.
B. M. Starks, general manager, Louisville, Ky.
W. A. Russell, passenger traffic manager, Louisville, Ky.
H. T. Shanks, purchasing agent, Louisville, Ky.

Other appointments on this road, to take effect on the termination of federal control, are announced elsewhere in these columns.

THE PENNSYLVANIA RAILROAD CHANGES

The four newly-elected regional vice-presidents of the Pennsylvania system are **Elisha Lee, R. L. O'Donnel, J. G. Rodgers** and **Benjamin McKeen.**

Elisha Lee was born September 24, 1870, in Chicago. He is a graduate of the Massachusetts Institute of Technology, class of 1892, and began railroad work as soon as he finished college as rodman in the engineering department of the Tyrone division of the Pennsylvania. He was out of railroad service from 1895 to 1897. He then returned to the Pennsylvania and in April, 1899, was made an assistant supervisor. Two years later he was promoted to supervisor, and in August, 1902, was made assistant engineer of maintenance of way. In 1907 he was appointed principal assistant engineer of the Philadelphia, Baltimore & Washington, and two years later was made superintendent of the New York, Philadelphia & Norfolk. March 3, 1911, he was made assistant to the general manager of the Pennsylvania Lines East and during federal control has been federal manager of the Pennsylvania Lines East.

Richard Lincoln O'Donnel was born November 5, 1860, in Philadelphia He attended the Philadelphia High School and the Polytechnic College at Philadelphia, graduating in 1882 and at once beginning railroad work as rodman on the Cornwall & Lebanon, a part of the Pennsylvania. He worked as rodman, levelman and transitman and in 1884 went into the assistant engineer's office at Blairsville, Pa., as draftsman. Two years later he was made assistant engineer in the principal assistant engineer's office at Altoona, Pa., and in the following March was made assistant supervisor of the Altoona division. In February, 1888, he was transferred as assistant supervisor to the Philadelphia division and in August, 1889, was transferred to the Pittsburgh division. He worked as assistant supervisor at New Florence, Pa., until November, 1889, and then was promoted to supervisor at the Altoona yard. In April, 1891, he was appointed assistant engineer of the Tyrone division and in 1894 was transferred as assistant engineer to the Pittsburgh division. In 1897 he was appointed assistant superintendent of the Pittsburgh division and in 1902 was promoted to superintendent. In January, 1903, Mr. O'Donnel was made general superintendent of the Buffalo & Allegheny Valley division and in March, 1911, was appointed general superintendent of the Western Pennsylvania division. During federal control he has been general manager of the Pennsylvania Lines East with office at Philadelphia.

J. G. Rodgers was born in 1863 and attended the Lewistown

Elisha Lee

R. L. O'Donnel

J. G. Rodgers

B. McKeen

Academy. He began railroad work in 1882 as rodman on the Pennsylvania and was then appointed as assistant engineer of construction. He was made assistant to the chief engineer and later made assistant supervisor of the New York, Philadelphia & Norfolk. He was promoted to supervisor and then superintendent of this road, and in March, 1909, was made assistant to the general manager of the Pennsylvania Lines East. In 1911 he was made general superintendent of the Northern division of the Pennsylvania with office at Buffalo, and during federal control he has been assistant to the president of the corporation with office at Philadelphia.

Benjamin McKeen was born January 23, 1864, at Terre Haute, Ind. He is a graduate of the Rose Polytechnic Institute and in 1885 received the degree of M.E. He began railroad work as draftsman in the office of the superintendent of motive power of the Terre Haute & Indianapolis, part of the Vandalia, but in 1886 became rodman on the engineering corps of the Pennsylvania. Later in the same year he was made resident engineer in charge of construction work on the Terre Haute & Logansport, part of the Vandalia, and in the following January was made engineer of maintenance of way of the Logansport division. In 1889 he acted also as chief engineer of construction in the completion of the Indiana & Lake Michigan. In January, 1894, Mr. McKeen was made superintendent of the Peoria division of the Terre Haute & Indianapolis and was made superintendent of the main line division of that road in 1901. In the following year he was made superintendent of the Chicago Terminal division of the Pennsylvania Lines West and in December, 1903, was appointed general manager of the Terre Haute & Indianapolis, now the Vandalia. In January, 1913, he was made general manager of the Pennsylvania Lines West and during federal control he was vice-president and engineer of the corporation for the Pennsylvania Lines West.

Elsewhere in this issue will be found an article covering the changes in the Pennsylvania Railroad organization whereby there are created four regions each in charge of a vice-president. In the following list will be found the names of the officers who have been appointed to conduct the business of the railroad under the new plan of organization. The appointments were approved by the board of directors on February 11, and become effective March 1.

The list gives the names of the officers, their new titles and positions and their headquarters.

Executive Department

Name	Title	Headquarters
Samuel Rea	President	Philadelphia.
W. U. Moyer	Asst. to the pres.	Philadelphia.
James J. Turner	V.-p. (corp. wk., cos. w. of Pitts.)	Pittsburgh.
C. M. South	Asst. to the v.-p.	Pittsburgh.
B. B. Young	Asst. to the v.-p.	Pittsburgh.
W. W. Atterbury	V.-p. in charge of operation	Philadelphia.
George D. Dixon	V.-p. in charge of traffic	Philadelphia.
Henry Tatnall	V.-p. in charge of finance	Philadelphia.
A. J. County	V.-p. in charge of accounting	Philadelphia.
George J. Adams	Asst. to v.-p. in chge. accounting	Philadelphia.
M. C. Kennedy	V.-p. in chge. real est., pur. & ins.	Philadelphia.
G. L. Peck	V.-p. in charge of personnel	Philadelphia.
Lewis Neilson	Secretary	Philadelphia.
S. H. Church	Secretary	Pittsburgh.
J. W. Marshall	Asst. secretary	New York.
H. T. Wilkins	Asst. secretary	Philadelphia.
J. L. Mason	Asst. secretary	Pittsburgh.
E. H. Brown	Asst. to the secretary	Philadelphia.

Transportation Department

Under the supervision of W. W. Atterbury, vice-president in charge of operation.

System Officers

Name	Title	Headquarters
C. M. Sheaffer	Chief of transportation	Philadelphia.
J. F. Deasy	Asst. chief of trans.—freight	Philadelphia.
S. M. Rankin	Asst. chief of trans.—passenger	Philadelphia.
E. T. Kennan	Supt. of car service	Philadelphia.
G. A. Cellar	Gen. supt. of telegraph	Philadelphia.
J. T. Wallis	Chief of motive power	Philadelphia.
P. F. Smith	Works manager	Altoona.
I. R. Black	Shop accountant	Altoona.
R. L. Kleine	Asst. chief of mot. power—car	Altoona.
F. W. Hankins	Asst. chief of mot. power—loco.	Altoona.
G. M. Ellsworth	Motive power accountant	Altoona.
A. W. Gibbs	Chief mechanical engineer	Philadelphia.
E. W. Smith	Engineer of transportation	Philadelphia.
A. C. Shand	Chief engineer	Philadelphia.
E. B. Temple	Asst. chief engineer	Philadelphia.
R. Trimble	Asst. chief engineer	Pittsburgh.
J. F. Murray	Asst. chief engineer	Philadelphia.
S. A. Sloan	Asst. to the chief engineer	Philadelphia.
George Nauman	Asst. to the chief engineer	Philadelphia.
E. G. Ericson	Asst. to the chief engineer	Pittsburgh.
N. F. Brown	Asst. to the chief engineer	Philadelphia.
H. C. Crowell	Asst. to the chief engineer	Pittsburgh.
H. R. Leonard	Engineer bridges and buildings	Philadelphia.
J. C. Bland	Engineer bridges and buildings	Pittsburgh.
R. Farnham	Asst. engineer bridges and bldgs.	Philadelphia.
W. L. Smith	Asst. engineer of bridges	Pittsburgh.
J. F. Leonard	Asst. engineer of bridges	Pittsburgh.
W. W. Priest	Asst. engineer of bridges	Pittsburgh.
W. H. Cookman	Architect	Philadelphia.
G. W. Whiteman	Chief inspector	Philadelphia.
C. A. Preston	Valuation engineer	Philadelphia.
W. C. Cushing	Engineer standards and valuation	Philadelphia.
J. W. Stone	Asst. valuation engineer	Philadelphia.
A. H. Rudd	Chief signal engineer	Philadelphia.
F. H. Buchanan	Asst. chief signal engineer	Pittsburgh.
James Young	Asst. engineer	Philadelphia.
R. R. Nace	Asst. engineer	Philadelphia.
Percy D. Brown	Asst. engineer	Philadelphia.

Regional Officers

The operations of the Pennsylvania System will be conducted under organization units in four regions, viz.: Eastern, Central, Northwestern and Southwestern.

Eastern Region

Extending from New York on the east to Altoona, inclusive, on the west and Washington on the south.

Name	Title	Headquarters
Elisha Lee	Vice-president	Philadelphia.
C. S. Krick	General manager	Philadelphia.
R. V. Massey	Asst. gen. mgr.	Philadelphia.
Frank C. Hoff	Asst. to the gen. mgr.	Philadelphia.
J. C. Johnson	Gen. supt. of transportation	Philadelphia.
R. C. Morse, Jr.	Supt. of freight transportation	Philadelphia.
John E. Burrell	Supt. of passenger transportation	Philadelphia.
F. W. B. Hulmes	Supt. of stations and transfers	New York.
W. G. Coughlin	Chief engr., maintenance of way	Philadelphia.
J. M. Henry	Gen. supt. motive power	Philadelphia.
C. I. Leiper	Gen. supt., New Jersey div.	New York.
Eliot Sumner	Supt. motive power, N. J. div.	New York.
P. L. Grove	Supt., New York div.	Jersey City.
L. K. Marr	Asst. supt., New York div.	Jersey City.
A. B. Clark	Supt., Trenton div.	Trenton, N.J.
H. C. Bixler	Supt., Manhattan div.	New York.
A. G. Mitchell	Supt., W. Jersey & Seashore R. R.	Camden, N.J.
G. LeBoutillier	Gen. supt., Eastern Penn. div.	Harrisburg.
C. B. Keiser	Supt. mot. power, E. Penn. div.	Harrisburg.
E. J. Cleave	Supt., Philadelphia div.	Harrisburg.
I. B. Sinclair	Asst. supt., Philadelphia div.	Harrisburg.
Wm Elmer	Supt., Middle div.	Altoona.
G. C. Koons	Asst. supt., Middle div.	Altoona.
J. K. Johnston	Supt., Tyrone div.	Tyrone, Pa.
A. B. Cuthbert	Supt., Cresson div.	Cresson, Pa.
F. P. Abercrombie	Supt., Juniata div.	Bedford, Pa.
Thos. B. Kennedy	Supt., Cumberland Valley div.	Chamb'rsb'g, Pa.
Gamble Latrobe	Gen. supt., Southern div.	Wilm'ton, Del.
Amos Davis	Supt. motive power, South'n div.	Wilm'ton, Del.
James Buckelew	Supt., Maryland div.	Wilm'ton, Del.
W. L. Burt	Asst. supt., Maryland div.	Wilm'ton, Del.
G. R. Sinnickson	Supt., Baltimore div.	Baltimore.
G. M. Smith	Supt., Delaware div.	Wilm'ton, Del.
R. H. Pinkham	Supt., N. Y., Phila. & Norf. R.R.	CapeCh'les, Va.
H. M. Carson	Gen. supt., Central Penna. div.	Will'msport, Pa.
Robert Bennett	Supt. mot. power, Cent. Pa. div.	Will'msport, Pa.
H. H. Russell	Supt., Williamsport div.	Will'msport, Pa.
L. W. Allibone	Supt., Sunbury div.	Sunbury, Pa.
H. A. Jaggard	Supt., Elmira div.	Elmira, N.Y.
C. D. Young	Supt., Schuylkill div.	Reading, Pa.
A. M. Parker	Supt., Phila. terminal div.	Philadelphia.
J. M. Jones	Asst. supt., Phila. term. div.	Philadelphia.
J. L. Eysmans	Traffic manager	Philadelphia.
J. B. Large	Freight traffic manager	Philadelphia.
E. P. Bates	Asst. freight traffic manager	Philadelphia.
Guy S. McCabe	Gen. freight agent	Philadelphia.
R. R. Blydenburgh	Asst. gen. freight agent	Philadelphia.
Walter Thayer	Gen. coal freight agent	Philadelphia.
R. L. Franklin	Freight claim agent	Philadelphia.
J. H. Baer	Asst. freight claim agent	Philadelphia.
A. J. Ball	Foreign freight agent	Philadelphia.
D. N. Bell	Passenger traffic manager	Philadelphia.
O. T. Boyd	General passenger agent	Philadelphia.
R. J. DeLong	Asst. gen. pass. agent	Philadelphia.
E. Yungman	Asst. gen. pass. agent	Philadelphia.

W. F. McPhail	General baggage agent	Philadelphia.
A. A. Brown	Asst. gen. baggage agent	Philadelphia.
H. H. Baker	Supt. restaurant service	New York.
M. S. Brooks	Asst. supt. restaurant serv	New York.
L. A. Lyons	Asst. supt. restaurant serv	New York.
Montgom. Smith	Purchasing agent	Philadelphia.
H. A. Anderson	Asst. purchasing agent	Philadelphia.
B. P. Philippe	Asst. purchasing agent	Philadelphia.
D. T. Jones	Asst. to the purchasing agent	Philadelphia.
J. P. Gauff	Real estate agent	Philadelphia.
H. E. Tripler	Asst. real estate agent	Philadelphia.
T. F. McClain	Asst. real estate agent	Philadelphia.
I. A. Miller	Accountant	Philadelphia.

Central Region

Extending from Altoona on the east to Buffalo on the north and Columbus and Mansfield, Ohio, on the west.

Name	Title	Headquarters
R. L. O'Donnel	Vice-president	Pittsburgh.
R. E. McCarty	General manager	Pittsburgh.
N. W. Smith	Asst. general manager	Pittsburgh.
J. B. Fisher	Gen. supt. of transportation	Pittsburgh.
A. J. Dawson	Supt. of freight transportation	Pittsburgh.
G. M. Sixsmith	Supt. of passenger trans	Pittsburgh.
R. K. Stackhouse	Supt. of stations and transfers	Pittsburgh.
W. D. Wiggins	Chief engr., maintenance of way	Pittsburgh.
H. H. Maxfield	Gen. supt. motive power	Pittsburgh.
A. J. Whitney	Gen. supt., Northern div	Buffalo.
C. L. McIlvaine	Supt. motive power, Northern div.	Buffalo.
G. B. Beale	Supt., Buffalo div	Buffalo.
J. J. Rhoads	Supt., Allegheny div	Oil City, Pa.
E. B. John	Supt., Renovo div	Erie, Pa.
J. H. Gumbes	Gen. supt., Western Penna. div	Pittsburgh.
J. L. Cunningham	Supt. motive power, W. Pa. div.	Pittsburgh.
R. T. Morrow	Supt., Pittsburgh div	Pittsburgh.
W. L Ekin	Supt., Conemaugh div	Pittsburgh.
A. W. McClellan	Supt., Monongahela div	Uniontown, Pa.
J. C. McCullough	Gen. supt., Eastern Ohio div	Pittsburgh.
E. B. DeVilbiss	Supt. motive power, E. Ohio div.	Pittsburgh.
F. G. Grimshaw	Supt., Eastern div	Ft. Wayne, Ind.
E. B. Taylor, Jr.	Supt., Marietta div	Marietta, O.
O. Schroll	Supt., Panhandle div	Pittsburgh.
A. L. Morgan	Supt., Wheeling term. div	Wheeling.
M. W. Clement	Gen. supt., Lake div	Cleveland.
W. Y. Cherry	Supt. motive power, Lake div	Cleveland.
H. E. Newcomet	Supt., Cleveland & Pittsburgh div.	Cleveland.
Guy Scott	Supt., Akron div	Akron.
J. F. Patterson	Supt., Erie and Ashtabula div.	New Castle, Pa.
O. C. Schaad	Supt., Pittsburgh term. div	Pittsburgh.
Geo. D. Ogden	Traffic manager	Pittsburgh.
J. J. Koch	Freight traffic manager	Pittsburgh.
W. C. Glynn	Asst. freight traffic manager	Pittsburgh.
V. C. Williams	General freight agent	Pittsburgh.
R. E. Cook	Asst. gen. freight agent	Pittsburgh.
J. C. Venning	General coal freight agent	Pittsburgh.
H. C. Clevenger	Coal freight agent	Pittsburgh.
U. G. Couffer	Freight claim agent	Pittsburgh.
J. M. Chesbrough	Passenger traffic manager	Pittsburgh.
F. W. Conner	General passenger agent	Pittsburgh.
C. H. Mathews, Jr.	Asst. gen. passenger agent	Pittsburgh.
C. S. Shoemaker	General baggage agent	Pittsburgh.
W. G. Phelps	Purchasing agent	Pittsburgh.
C. E. Walsh	Asst. purchasing agent	Pittsburgh.
G. C. Urquhart	Real estate agent	Pittsburgh.
W. B. Blake	Asst. real estate agent	Pittsburgh.
W. P. deHart	Accountant	Pittsburgh.

Northwestern Region

Extending from Columbus and Mansfield, Ohio, inclusive, on the east to Chicago, Illinois, on the west.

Name	Title	Headquarters
J. D. Rodgers	Vice-president	Chicago.
T. B. Hamilton	General manager	Chicago.
J. W. Roberts	Gen. supt. of transportation	Chicago.
C. L. Hamilton	Supt. of passenger trans	Chicago.
T. J. Skillman	Chief engr., maintenance of way	Chicago.
T. W. Demarest	Gen. supt. motive power	Chicago.
W. B. Wood	Gen. supt., Illinois div	Chicago.
O. C. Wright	Supt. motive power, Ill. div	Ft. Wayne, Ind.
W. H. Scriven	Gen. agt. & supt., Chic. term. div.	Chicago.
B. H. Hudson	Supt., Fort Wayne div	Ft. Wayne, Ind.
C. B. Reynolds	Supt., Logansport div	L'g'nsport, Ind.
J.B.Hutchinson, Jr.	Gen. supt., Northern Ohio div	Toledo, O.
O. P. Reese	Supt. motive power, N. Ohio div.	Toledo, O.
Paul Jones	Supt., Toledo div	Toledo, O.
T. A. Roberts	Supt., Mansfield div	Mansfield, O.
W. M. Wardrop	Gen. supt., Michigan div	G. Rapids, Mich.
G. R. Barry	Supt., Grand Rapids div	Ft. Wayne, Ind.
R. E. Casey	Supt., Mackinaw div	G. Rapids, Mich.
Wm. Hodgdon	Traffic manager	Chicago.
J. E. Weller	Freight traffic manager	Chicago.
M. S. Connelly	Asst. freight traffic manager	Chicago.
W. H. Johnson	General freight agent	Chicago.
J. T. Johnston	Asst. general freight agent	Chicago.
R. W. Cooke	Freight claim agent	Chicago.
Geo. W. Smith	Foreign freight agent	Chicago.
J. P. Anderson	Passenger traffic manager	Chicago.
A. H. Shaw	General passenger agent	Chicago.
W. R. MacFarland	Asst. gen. passenger agent	Chicago.
R. B. Jones	General baggage agent	Chicago.
C. E. Milliron	Supt. restaurant service	Columbus, O.
D. Irving	Asst. supt. restaurant service	Columbus, O.
I. B. Thomas	Purchasing agent	Chicago.
Henry Sullivan	Asst. purchasing agent	Chicago.
S. G. Cramp	Real estate agent	Chicago.
B. F. Brandon	Accountant	Chicago.

Southwestern Region

Extending from Columbus and Cincinnati to St. Louis.

Name	Title	Headquarters
Benj. McKeen	Vice-president	St. Louis.
I. W. Geer	General manager	St. Louis.
F. J. Kron	Gen. supt. of transportation	St. Louis.
J. D. Fitzgerald	Supt. of passenger trans	St. Louis.
F. J. Stimson	Chief engr., maintenance of way	St. Louis.
W. C. A. Henry	Gen. supt. motive power	St. Louis.
W. C. Downing	Gen. supt., Indiana div	Indianapolis.
J. E. Mechling	Supt. motive power, Indiana div.	Indianapolis.
F. H. Worthington	Supt., St. Louis div	Terre Haute.
R. D. McKeon	Supt., Peoria div	Decatur, Ill.
D. Y. Geddes	Supt., South Bend div	L'g'nsport, Ind.
J. W. Coneys	Supt., Indianapolis div	Indianapolis.
Taber Hamilton	Supt., Louisville div	Louisville.
R. K. Rochester	Gen. supt., Central Ohio div	Columbus, O.
G. B. Fravel	Supt. mot. power, Cent. Ohio div.	Columbus, O.
P. W. Sullivan	Supt., Columbus div	Columbus, O.
R. C. Barnard	Supt., Cincinnati div	Cincinnati, O.
A. C. Watson	Supt., Richmond div	Richm'd, Ind.
C. L. Hamilton	Supt., Zanesville div	Zanesville, O.
C. B. Sudborough	Traffic manager	St. Louis.
J. D. Couffer	Freight traffic manager	St. Louis.
S. C. Matthews	Asst. freight traffic manager	St. Louis.
P. C. Sprague	General freight agent	St. Louis.
B. H. Dally	Asst. gen. freight agent	St. Louis.
A. C. Hickox	Freight claim agent	St. Louis.
W. T. Midlam	Foreign freight agent	St. Louis.
W. W. Richardson	Passenger traffic manager	St. Louis.
F. A. Bauchens	General passenger agent	St. Louis.
J. C. Millspaugh	Asst. gen. passenger agent	St. Louis.
W. Q. Ingamells	General baggage agent	St. Louis.
C. R. Peddle	Purchasing agent	St. Louis.
W. W. Mayer	Real estate agent	St. Louis.
S. W. Troutman	Accountant	St. Louis.

Traffic Department

Under the supervision of Geo. D. Dixon, vice-president in charge of traffic.

System Officers

Name	Title	Headquarters
R. C. Wright	General traffic manager	Philadelphia.
A. M. Schoyer	*Manager of through frt trffic	Philadelphia.
C. M. Sheafer	*Express traffic agent	Philadelphia.
V. J. Bradley	*Chief of mail service and traffic	Philadelphia.
S. C. Scott	*Asst. express and mail traf. agt.	Pittsburgh.
R. L. Spencer	*Warehouse supt	Pittsburgh.

*Joint officers of transportation and traffic departments.

For regional officers see above.

Financial Department

Under the supervision of Henry Tatnall, vice-president in charge of finance.

System Officers

Name	Title	Headquarters
Jas. F. Fahnestock	Treasurer	Philadelphia.
H. P. Conner	Asst. treasurer	Philadelphia.
Geo. A. Walker	Asst. treasurer	Philadelphia.
John M. Wood	Asst. treasurer	Philadelphia.
J. W. Marshall	Asst. treasurer	New York.
H. H. Lee	Asst. treasurer	Philadelphia.
J. S. Vanzandt	Asst. to the treasurer	Philadelphia.
J. C. Rogers	Chief paymaster	Philadelphia.
E. B. Broadaway	Cashier	Philadelphia.
H. C. Lawser	Asst. cashier	Philadelphia.
Charles Riddle	Asst. cashier	Philadelphia.
G. R. Worrell	Asst. cashier	Philadelphia.

G. B. Robinson	Registrar of bonds	Philadelphia.
L. C. Talcott	Asst. registrar of bonds	Philadelphia.
A. P. Thruelsen	Registrar of bonds	New York.
John A. Barry	Asst. registrar of bonds	New York.
T. H. B. McKnight	Treasurer	Pittsburgh.
R. R. Reed	Asst. treasurer	Pittsburgh.
R. W. Morrison	Asst. treasurer	Pittsburgh.
R. B. Thompson	Asst. treasurer	Pittsburgh.
C. P. Davidson	Asst. treasurer	Pittsburgh.
H. F. Scheiman	Asst. treasurer	Pittsburgh.
C. C. Blair	Asst. to the treasurer	Pittsburgh.
F. E. Jackson	Asst. to the treasurer	Pittsburgh.
C. S. Lillie	Cashier	Pittsburgh.
J. H. Fults	Asst. cashier	Pittsburgh.

ACCOUNTING DEPARTMENT

Under the supervision of A. J. County, vice-president in charge of accounting.

System Officers

Name	Title	Headquarters
E. A. Stockton	Controller	Philadelphia.
J. W. Orr	Controller	Pittsburgh.
J. S. Donaldson	Asst. controller	Philadelphia.
F. J. Fell, Jr.	Asst. controller	Philadelphia.
John Hurst	Asst. controller	Pittsburgh.
J. B. Brittain	Asst. controller	Pittsburgh.
J. N. Lyon	Asst. to the controller	Pittsburgh.
Geo. B. Rudduck	General accountant	Philadelphia.
W. B. Kraft	Auditor of revenues	Philadelphia.
W. L. Markley	Asst. auditor of revenues	Philadelphia.
H. J. Walker	Auditor of expenditures	Pittsburgh.
W. M. Kennedy	Asst. auditor of expenditures	Pittsburgh.
J. E. Merion	Auditor of through freight traffic	Philadelphia.
F. N. McIntyre	Asst. auditor of through frt traf.	Philadelphia.
W. J. Bingham	Auditor of through pass. traf.	Philadelphia.
C. E. Ward	Asst. aud. of through pass. traf.	Philadelphia.
J. B. Moffitt	Auditor of local freight traffic	Philadelphia.
E. T. Halter	Asst. auditor of local freight traf.	Philadelphia.
F. E. Atkins	Auditor of local pass traffic	Philadelphia.
H. W. Siegrist	Asst. auditor of local pass. traffic	Philadelphia.
A. S. Porter	Auditor of disbursements	Philadelphia.
U. G. Rowley	Asst. auditor of disbursements	Philadelphia.
F. E. Shallenberg'r	Auditor of local freight traffic	Pittsburgh.
R. S. Westerman	Asst. auidtor of local frt. traffic.	Pittsburgh.
C. S. Covert	Auditor of local passenger traffic.	Philadelphia.
H. M. Longworthy	Asst. auditor of local pass. traffic.	Pittsburgh.
J. J. Lyons	Auditor of disbursements	Pittsburgh.
J. M. Metheany	Asst. auditor of disbursements	Pittsburgh.

For regional officers see above.

PURCHASING DEPARTMENT

Under the supervision of M. C. Kennedy, vice-president in charge of purchases.

System Officers

Name	Title	Headquarters
Samuel Porcher	General purchasing agent	Philadelphia.

For regional officers see above.

REAL ESTATE DEPARTMENT

Under the supervision of M. C. Kennedy, vice-president in charge of real estate.

Name	Title	Headquarters
T. W. Hulme	General real estate agent	Philadelphia.

For regional officers see above.

LEGAL DEPARTMENT

Under the supervision of the president.

System Officers

Name	Title	Headquarters
F. I. Gowen	General counsel	Philadelphia.
Alan H. Strong	General solicitor	Philadelphia.
H. S. P. Nichols	Asst. general counsel	Philadelphia.
Stacy B. Lloyd	Asst. general counsel	Philadelphia.
H. W. Biklé	Asst. general counsel	Philadelphia.
G. R. Allen	Asst. general solicitor	Philadelphia.
Edwin A. Lucas	Asst. solicitor	Philadelphia.
Adams Dodson	Asst. solicitor	Philadelphia.
Harry Z. Maxwell	Asst. solicitor	Philadelphia.
J. C. Rose	Chief claim agent	Philadelphia.
C. B. Heiserman	General counsel	Pittsburgh.
E. H. Seneff	General solicitor	Pittsburgh.
James Stillwell	Asst. general solicitor	Pittsburgh.
Guernsey Orcutt	Asst. general solicitor	Pittsburgh.
E. L. Covert	Chief claim agent	Pittsburgh.
G. A. Boone	Special solicitor	Pittsburgh.

INSURANCE DEPARTMENT

Under the supervision of M. C. Kennedy, vice-president in charge of insurance.

System Officers

Name	Title	Headquarters
R. H. Newbern	Superintendent	Philadelphia.
F. A. Greene	Asst. superintendent	Philadelphia.
W. H. Sechrist	Asst. superintendent	Philadelphia.
W. C. Neely	Asst. to the superintendent	Philadelphia.

EMPLOYEE'S SAVING FUND

Under the supervision of Henry Tatnall, vice-president in charge of finance.

Name	Title	Headquarters
Lewis Neilson	Superintendent	Philadelphia.
J. L. Mason	Superintendent	Pittsburgh.

RELIEF AND PENSION DEPARTMENTS

Under the supervision of G. L. Peck, vice-president in charge of personnel.

Name	Title	Headquarters
E. B. Hunt	Supt. relf. dept. & agt. pens. dept.	Philadelphia.

Obituary

Louis P. Ecker, federal auditor of the Toledo & Ohio Central, died recently at his home in Columbus, Ohio.

Robert E. Ryan, assistant federal treasurer of the Louisville & Nashville, with headquarters at Louisville, Ky., died at his home in Louisville, February 17.

Walter Shepard, formerly consulting engineer of the Boston & Albany, with headquarters at Boston, Mass., died recently at his home at Dorchester, Mass.

Charles Lewers, a member of the legal staff of the Southern Pacific Railroad Company, with headquarters at San Francisco, Cal., died recently at his home in that city at the age of 46 years.

Le Grand Cannon, vice-president and general manager of the Nevada Northern, notice of whose death appeared in the *Railway Age* of February 13 (page 516), was born at Logansport, Ind., on April 16, 1847. He entered railway service in 1864 as a bill clerk and operator on the Chicago, Milwaukee & St. Paul. In 1865 he became connected with the Wabash in a similar position and, after a year's service on that road, entered the employ of the Indianapolis, Peru & Chicago, serving successfully as chief clerk in the general freight agent's office, paymaster, secretary, treasurer, and general passenger agent. From December, 1881, to November, 1882, he was general freight and passenger agent of the Chicago, Texas & Mexican. In 1883, he was appointed traveling auditor of the Denver & Rio Grande and the same year was also appointed auditor of the Transcontinental Association. In January, 1885, he was appointed general agent and later auditor of the Southwestern Passenger Association, continuing in this position until August, 1887, when he became assistant to the general manager of the Oregon Pacific. In May, 1889, he was appointed general agent and receiver for the Chicago & Atlantic, in which position he continued until May, 1895, when he was appointed general agent and receiver for the Colorado Midland. In October, 1898, he was appointed assistant to the president of the Colorado Midland, remaining in that position until May, 1901, when he resigned to become assistant traffic manager and assistant to the president of the American Smelting & Refining Company. In January, 1907, he was elected vice-president and general manager of the Nevada Northern, in which capacity he served until his death.

AUSTRALIAN STEEL WORKS PLANNED.—The establishment is proposed of a large steel works at West Guildford, Western Australia, by the Australian Steel Company, Limited, which has already made arrangements with the state government to supply electric power, and with the State Railways Department to furnish scrap material.

EDITORIAL

Railway Age

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Another Big Week

The *Railway Age* has already referred twice this month in its editorial columns to the quickening of the market for cars and locomotives, but in view of the manner in which orders and inquiries have been reported for the past week or ten days it is hoped that a third reference at so short an interval may be pardoned. In the Equipment and Supplies column in last week's issue orders were reported for 28 locomotives and 2,062 freight cars for domestic service and inquiries for over 100 locomotives, 3,240 freight cars for domestic service and 1,795 for export, as well as for 272 passenger train cars for domestic service (excluding 65 for elevated or subway service) and 22 for export. The full details for the present week are not complete as this is written, but enough information is in hand to show that it will be the largest since the buying movement began. Orders are already reported for no less than 207 locomotives for domestic service including 102 for the Union Pacific, 55 for the Canadian National and 50 for the Missouri, Kansas & Texas, and it is very likely that this total will be increased before the week is completed. It has been a long time since orders for 207 locomotives for domestic service were reported in a similarly short period of time. At the same time inquiries are also reported for no less than 50 locomotives for domestic service—those for the Santa Fe, which it is understood may increase this number—and 46 for export for the United Railways of Havana. It is very apparent that the far-seeing railroads are placing their orders now before the builders are contracted too far ahead. The unfortunate feature in the situation is, however, that the buying movement of locomotives has not applied to freight cars. If the country needs more than 800,000 freight cars within the next three years, as authorities agree, it is apparent that orders for them must soon appear in larger amounts than have thus far been placed.

How to Increase Efficiency

To infuse energy, industry and intelligence into the minds of men who lack these qualities requires "personal work" of the most intimate kind. The leader must exemplify the necessary elements of efficiency (including the spirit of cheerfulness which puts the final stamp of effectiveness on the best men's efforts), and must do this hour by hour, or even minute by minute, throughout the day. In other words, the education or improvement must be by example as well as by precept. A successful experiment of this kind, if it is to be used to spur the energies of other men at other places, must be described to those other men in complete detail. This is the answer to those who, when they listen to an address like that given by James H. Hustis at the New York Railroad Club last week, expect to hear a prescription which will tell them just how to carry out the principles laid down by the speaker. Their idea is an impossible one. The letter of one of these critics is printed in another column. One who wishes to acquire the art of giving to seven inefficient car inspectors the instruction, advice, rebuke or punishment necessary to teach them efficiency will find it necessary to learn his lessons on the ground. Mr. Hustis and the other speakers might have given a few examples of how to teach, but that would be only a drop in the bucket. The subject, if it is to be taught didactically, demands not a lecture but a course of lectures. The best of lectures, however, must lack one essential element: they cannot give an adequate picture of the personality of the man or men to be taught. Another difficulty in attempting to teach at long range on a railroad is that results can be measured only after a long time. R. S. Baker, a skilful writer on the relations of employer and employee, referring recently to improved conditions in clothing factories, said that an important test question was, "Does the plan increase production?" This is a test which, in much of the work on railroads, cannot be applied. The improvement must be in quality, not in quantity. Clothing makers have a test that is quick and simple; ours can be applied, oftentimes, only after months and by making comparisons of elements more or less obscure. All this is true whatever the kind of spirit actuating the employees. Intimate detail instruction by example as well as by precept is the key to the problem.

Keeping the 5:18 on Time

One of the most interesting points brought out by President J. H. Hustis of the Boston & Maine in his address before the New York Railroad Club last Friday evening was contained in his story about the railway economist who addressed an audience in a suburban community some 20 miles from the city. The economist in question spoke for about 20 minutes on the intricacies of the railway problem, and then invited discussion. There was a very lively discussion, but to his surprise it dealt not at all with the broad aspects of the railway situation but rather with the fact that the 5:18 had not been running on time as regularly as might be wished. Mr. Hustis emphasized the importance of this little incident as showing how public opinion is influenced by matters which may be considered as of little importance by those who operate the railroad. There are no railwaymen, let us hope, who do not realize that public opinion in these days is of prime importance to the future interests of the railways. Some are liable to forget, nevertheless, that passengers and shippers are also voters and the human embodiment of public opinion. This is not meant to imply that the importance of serving the public to the best degree possible is likely to be forgotten, but rather to bring out the fact that the railwaymen's viewpoint and that of the railway patron cannot in the very nature of things be the same. Private control will again be on trial beginning March 1, just as government control has been on trial for the past two years. Public opinion is now favorable to private control, but, as Mr. Hustis brought out, it may again swing back as it swung back from its early feeling in favor of government operation. That is why the railwayman must do his best to give the public the "breaks." He can be assisted in so doing in no better way, it would seem, than by realizing that all the effort spent to incur public favor might just as well be thrown away, like good money after bad, if the commuter is delayed a half hour getting to and from his work, or if the through passenger has to stand up for 50 or 100 miles, as has too often been the case under government control. In other words, the 5:18's and the 8:15's

must be run on schedule time. It is a matter not only of service but of public opinion and one of the most important tests the public is going to use to tell whether private control of railways proves successful or otherwise.

Appropriations for Export Trade

THE PRUNING KNIFE that the present session of Congress has been using to trim appropriations is proving a sharp and efficient implement. But in spite of the otherwise laudatory manner in which the committees have tried to overcome the government's war-time extravagance, it is evident that in some cases the trimming has been done too close for the best interests of the country. The latest case in point is the appropriation for foreign trade. The amount asked for by Secretary of Commerce Alexander was $1,658,000; this has been cut down more than two-thirds, so that only $490,000 has been allowed by the legislative, judicial and executive bill reported out by the appropriations committee on February 18. The severe character of this cut is best emphasized by noting that the amount is only one-half that used during the present year. The work which the Bureau of Foreign and Domestic Commerce has done for the railway supply field has been very great. It sent Frank Rhea to Australia and the Far East, and his two excellent and detailed reports on the markets for railway materials and equipment were practically the first attempt to give the exporter of railway supplies that particular detailed information needed on which to base a plan for export business. The Latin-American division has also helped the supply field by its reports on the railway situation in Mexico, Colombia, Peru, Argentina, etc. It is apparent, however, that if the cut of one-half from last year's appropriation is put through, this work will practically have to cease. It is most unfortunate that the appropriations committee should have been so short-sighted as to hinder in this manner the work of a bureau which American business men have lately come to regard as a most potent factor in the development of export trade.

Whom the Gods Would Destroy

WHOM THE GODS WOULD DESTROY they first make mad. They seem to intend to destroy the railroad labor organizations, or at least their leaders, for they certainly have made their leaders mad. Four years ago the great brotherhoods of railroad employees stood high in the respect and confidence of the people of the United States. They had great influence in the state capitals and in Washington. They seemed to be able to secure the passage of almost any legislation they desired or to defeat almost any legislation they opposed. In 1916, however, they refused arbitration in any form of their demand for a basic eight-hour day and forced Congress to pass the Adamson law to prevent a general railroad strike. This aroused public sentiment against them throughout the country. They threatened to strike again just before the United States entered the war because the Supreme Court did not decide the Adamson law case quickly enough to suit them, and further incensed the public. Under government operation they secured vast increases of wages, but there were constantly sporadic strikes and threats of general strikes which kept the country in an uproar. They came out in favor of the Plumb Plan, which everybody except the railway employees immediately regarded as a wholly selfish move on their part. Recently they have demanded further advances in wages backed by further threats of strikes. They have opposed all legislation to prevent strikes and have repeatedly threatened to disregard any such legislation if it were enacted. They have threatened to defeat for re-election members of Congress who voted for legislation providing for the return of the railways to private operation or for any method of settling labor disputes except methods approved by the labor unions. They have poured forth endless misrepresentations of private management which all members of Congress who have studied railway matters knew were misrepresentations.

And what is the final result? The labor organizations and their members have been brought into the greatest discredit with the public. In spite of their bitter opposition and their threatenings, the House of Representatives passed the Cummins-Esch bill by a vote of 249 to 150 and the Senate passed it by a vote of 47 to 17. If labor refuses to accept the labor provisions of the Cummins-Esch bill the result probably will be the passage of a law absolutely prohibiting strikes on railways under heavy penalties. The labor leaders could not have pursued a policy better adapted to help the cause of private management, to which they are opposed, although probably in the long run nothing could be better for railway employees than the return of the railroads to private operation. They have afforded the finest example ever seen of the use of methods intended to influence public opinion and Congress which were utterly unadapted to their purpose. However other people may feel about it, railway employees have no reason for being pleased with the kind of leadership which their organizations have had within recent years.

"The Old Order Changeth Yielding Place to New"

THE PASSAGE of the new transportation act and the return of the railways to private operation on March 1, will mark the beginning of a new epoch in the history of railroad transportation in the United States.

The most significant feature of the new legislation is that it expressly recognizes the fact that the regulation of railroads should be based upon considerations of public expediency and not upon the principle of allowing the railroad companies to earn only the smallest net return which will not involve confiscation of their property. The act provides that in determing the net return which the railways shall be allowed to earn, the Interstate Commerce Commission "shall give due consideration, among other things, to the transportation needs of the country and the necessity (under honest, efficient and economical management of existing transportation facilities) of enlarging such facilities in order to provide the people of the United States with adequate transportation." This instruction to the Commission immediately precedes the provision in which it is set forth "that during the two years beginning March 1, 1920, the Commission shall take as such fair return a sum equal to 5½ percentum of such aggregate value, but may in its discretion add thereto a sum not exceeding one-half of 1 percentum of said aggregate value (of the roads of each group) to make provision in whole or in part for improvements, betterments or equipment, which, according to the accounting system prescribed by the Commission, are chargeable to capital account."

The provisions quoted establish an entirely new precedent. In the past it has merely been required that the rates fixed must be just and reasonable. No legislative body has ever indicated before that just and reasonable rates are not only rates that are not excessive for the service rendered, but also rates which in the aggregate would be sufficient to yield a return which will render it practicable to render good and adequate service. Besides requiring the Interstate Commerce Commission to make the regulation of

rates a policy of expediency, the new legislation empowers it to prevent the states from fixing rates which will interfere with carrying out this policy. It also authorizes it to fix minimum rates in order that it may prevent any individual railway from making rates which will be unremunerative or unfairly discriminatory.

The policy established by this legislation is one which most students of transportation problems long have been advocating. The provisions which practically make 5½ per cent the minimum and 6 per cent the maximum which the Commission may allow any group of railways to earn and which provide for the appropriation by the government of one-half of any return earned in excess of 6 per cent, have been and will be the object of much criticism. They are criticised by many railway officers and business men on the ground that the return allowed is too small and that it will discourage the managements of individual lines to take from them one-half of the surplus over 6 per cent earned. They are roundly denounced by the leaders of organized labor, the advocates of government management and others who make a profession of opposing everything they regard as conducive to the success of private management, on the ground that they "validate" the "watered" stock of the railroads and will result in an advance in rates which will be burdensome to the public.

Just how these provisions will work, only experience will disclose. It will depend largely on how they are administered by the Interstate Commerce Commission. The *Railway Age's* opinion is that they are the result of much the ablest, most intelligent, most earnest and most constructive effort ever made to solve the railroad problem of the United States. We are frankly optimistic regarding the effects that will be produced upon the net return and credit of the companies as a whole and upon their ability, under efficient and public-spirited management, to provide the public in due time with good and adequate service. They do not exactly square with the views or wishes of any of the persons or organizations that submitted plans to Congress. They are the composite result of an effort on the part of the Conference Committee to draft a measure which would include all the good suggestions which have been made, and at the same time meet all the important objections made to both the Esch and the Cummins bills.

Flexibility is given by the provision which authorizes the Interstate Commerce Commission after two years, if it considers this in the public interest, to fix a new percentage or percentages of return which the railways shall be allowed to earn. General consolidations of railroads are authorized but not required. The Commission is given exclusive authority to regulate the issuance of securities. It is also given much authority to encourage and even enforce needed co-operation in operation between the various railroads. On the whole, the provisions referred to are better than any there seemed any reason to hope for a few months ago. Perhaps it is no exaggeration to say that if under them the railroad problem cannot be solved, then it cannot be solved at all under private ownership and management.

The most doubtful provisions are those relating to the settlement of labor controversies. They provide for the formation of boards of adjustment on which the railways and the employees shall be equally represented, and for the creation of a Railroad Labor Board which shall contain three representatives of the public, three representatives of the employees and three representatives of the companies. All controversies not settled by the boards of adjustment are required to be submitted to this board. The implication is that there shall be no lockouts or strikes, but they are not prohibited, nor are any penalties fixed for violations of the law. The leaders of the labor organizations are bitterly opposed to the representation of the public on the Railroad Labor Board, and especially to the provision that no award can be made by a majority of the Board in which at least one representative of the public does not concur.

Congress believed that since in case of an advance in wages the public would have to pay the piper, it ought to have a right to help call the tune. The railroad labor leaders do not agree to this. Their attitude may cause complete failure of the labor provisions. If it does, it seems not unlikely that labor controversies will be dealt with in separate legislation prohibiting strikes, providing for compulsory arbitration and fixing adequate penalties for violations. It is difficult to see how, the course being taken by the leaders of the labor organizations can be considered as being, from the standpoint of railway employees, otherwise than as very unwise and even dangerous.

Now that the legislation has been passed—we are assuming that it will be signed by President Wilson—the right thing for all concerned to do, it would seem, is to give it a full and fair trial, in accordance not only with its letter, but its spirit. It seems not at all improbable that if this shall be done for a considerable period of years, the railroad problem will be solved in a way that will be to the best interests of all directly concerned, in transportation, and especially those of the public.

"Prove All Things; Hold Fast That Which is Good"

THE SCRIPTURAL QUOTATION which is the heading of this editorial summarizes in nine words the policy with regard to operation which should be followed on the railways after they are returned to private operation next Monday, March 1.

There seems to be danger that it will not be followed. Within the last three years a large number of new methods have been tried. Many of these have been originated under government control. The railroads as a whole have suffered seriously from some of them. Some railways, as a result of them, have been benefited at the expense of others. Therefore, not a few railway officers have a strong prejudice against most or all of these methods. There are indications that some managements are strongly inclined to restore not merely all the operating and traffic policies they followed before government control was adopted, but all those they followed before the Railroads' War Board was created.

If this is correct, therein lies a serious danger to the success and perpetuation of private management.

The *Railway Age* has criticized many of the methods adopted under government operation. It has criticized the attempt to revolutionize the entire railroad system of the United States through the policy of absolute unification and excessive centralization of authority in Washington. This has largely destroyed the power of the managements of the individual lines to initiate and carry out policies necessary to the welfare of the stockholders, the employees and the territories served. But while absolute unification and such a high degree of centralization was undesirable, there existed long before even the Railroads' War Board was established a great need, from the standpoints of both the railroads as a whole and the public, for closer co-operation between the managements of the railroads and for more co-ordination of their operations.

If the railroads should revert to the highly competitive methods of soliciting and handling traffic which prevailed prior to 1917, the absence of the needed co-operation and co-ordination would be more keenly felt and would be more injurious to the railroads and the public than it ever was. This would be due to the fact that the inadequacy of railroad facilities to the demands of commerce is now and will

long continue to be much greater than it was in the past. The only way, it seems, in which the best and largest possible service can for a long time be rendered will be for the management of each road to operate its property as efficiently as it can and also for the managements of all the roads to co-operate closely.

Some of the respects in which there should be close co-operation may easily be mentioned. Provision is being made for continuing the maintenance of a Commission on Car Service with headquarters in Washington. Certain of the existing car pools are to be abolished. A higher rate of per diem is to be charged than formerly under private operation in order to cause freight cars to be returned more promptly to their owners. These things are desirable, because only by letting a railway have the use of its own cars most of the time can the railways be afforded the necessary incentive to buy enough equipment and properly maintain it. But a Commission on Car Service which shall have the outhority to distribute cars according to the requirements of different territories and whose orders the individual railroads will implicitly obey is needed to get the best results for both the railroads as a whole and the public.

The joint operation of terminals in most large centers of industry is desirable and even necessary to secure the maximum utilization of all of them and to keep congestions at a minimum. The policy of joint terminal operation was widely adopted under the Railroads' War Board. It has been extended under government operation. There are strong indications of a disposition to discontinue it at several important points. Nowhere has joint operation of terminals been more needed or done more good than in Chicago, but no plan has been adoptel for continuing it there. Wherever it is discontinued it is to be feared this will be due to the fact that the railways having the largest and best terminals believe they can promote their individual interests more by discontinuing than by continuing it. But in most cases the harm done to the railways as a whole and the public will largely exceed the benefits derived by individual roads.

Formerly under private operation competition in passenger train service between large cities was carried to such an extreme as to result in waste to the railroads without any compensating advantages to the public. Under the Railroads' War Board the policy was begun of reducing this competition in service. Under the Railroad Administration, the policy has been carried farther, and trains on parallel lines have been spaced in such a way as to reduce the number of trains run while rendering to the public about as good service as is practicable with existing equipment. Undoubtedly passenger service is at present unsatisfactory, but there is an enormous shortage of passenger cars which it will take a long time to make good. The service will be impaired and the cost to the railroads increased unless agreements are made by competing railroads to co-operate closely in the rendering of service.

The *Railway Age* was an advocate of consolidated city ticket offices before government control was adopted. Some mistakes have been made in connection with the establishment of these offices and their service has not been as good as it can be made, but on the whole the system of consolidated offices is preferable to the old system of maintaining numerous competing offices. It is more economical and results in better service to the public. And yet in some places important railways already are announcing their intention to withdraw from the consolidated offices and re-establish offices of their own. This practice once started may lead to the destruction of the consolidated offices, which, in our opinion, would be a mistake.

The Railroad Administration made a serious mistake when it completely abolished all the "off line" freight and passenger offices. Many of them ought to be restored, not merely to enable the individual railways to get all the traffic to which they are entitled, but to better serve the public. But the railroads would not be justified in incurring the expense of restoring anywhere near all the former "off line" agencies.

Probably the tendencies being manifested in some quarters would be arrested if all railway executive officers would carefully read the provisions of the railroad legislation recently enacted by Congress. This legislation repeals the Sherman anti-trust law as it applies to railways and also the anti-pooling section of the Interstate Commerce Act, thereby encouraging agreements and consolidations of competing lines. It goes much further, however. It gives the Interstate Commerce Commission power to regulate the distribution of cars. It authorizes the Commission "to require such joint or common use of terminals, including main line and track or tracks for a reasonable distance outside of such terminals, as in its opinion will best meet the emergency and serve the public interest and upon such terms between the carriers as they may agree upon, or, in the event of their disagreement, as the Commission may, after subsequent hearing, find to be just and reasonable." It also authorizes the Commission "to give directions for preference or priority in transportation and embargoes in the movement of traffic under permits at such time and for such periods as it may determine, and to modify, change, suspend or annul them." In other words, if the railroads do not voluntarily effect the co-ordination in the operation of their facilities which can be shown to be necessary in the public interest, the Commission may intervene and compel them to do it.

The railroads already voluntarily have agreed upon a plan for the handling of car service which, it is understood, will be satisfactory to the Interstate Commerce Commission if the individual lines carry it out in good faith. Let us hope that the railways serving the various large centers will voluntarily take equally common sense and public-spirited action regarding the operation of terminals. The future of private ownership and management may be determined as much by the way the railways co-operate with one another in future as by the initiative, ability and public spirit shown in the management of the individual lines. The period immediately following the return to private operation, will be an especially poor time for following policies designed to promote the selfish interests of individual railroads in disregard of the effects upon the country's transportation as a whole.

The Railroad Deficit in 1919

When all the data bearing upon the subject are available, we believe it will be found that the deficit incurred by the Railroad Administration in 1919 will be larger than any careful estimate of it which has yet been made. Statistics of the Interstate Commerce Commission which recently were made public, show that in the year 1919 the net operating income of large roads having a total mileage of 234,000 miles was less than $516,000,000. The net operating income of these roads in the three test years on which the guaranteed standard return to the companies is based was $905,000,000. This would indicate a deficit of $389,000,000.

But this is by no means the total deficit incurred by the Railroad Administration. In 1918, when the net operating income of these roads was $214,600,000 less than in the test years, there had to be added further losses due to a deficit from the operation of sleeping cars, to the expenses of the Railroad Administration, and to some other causes, making the total deficit in 1918 about $236,200,000. If the Railroad Administration's expenses, and its losses due to the operation of sleeping cars and to other causes prove to have been as great in 1919 as they were in 1918, then the

ficit in 1919, computed in the same way as that in 1918, ould be almost $411,000,000. As a matter of fact, the ex- nses of the Railroad Administration, and its losses due other causes, doubtless will be found to have been greater 1919 than in 1918.

There is another large item which must be taken into con- leration, but of which no account is being taken in most the estimates of the deficit. There has been made in the ilways since the government took them over a new invest- nt of approximately $1,000,000,000. The railway com- nies furnished part of the capital for this investment and e government furnished part of it. Regardless of who rnished it, the government has to pay interest on it, and e interest on it which has been, or must be, paid by the vernment probably will amount for the year 1919 to out $45,000,000. This would increase the government's ficit for 1919 to $456,000,000; and when all accounts are ade up the loss incurred by the government on its trans- rtation business last year, it would appear, will be found be close to $500,000,000.

In view of the estimates which recently have proceeded om official sources the RAILWAY AGE would hesitate to ake an estimate so large if it did not recall certain de- lopments which occurred about a year ago. The early icial estimates as to the deficit incurred in 1918 amounted about $175,000,000. The *Railway Age,* on the basis statistics of the Interstate Commerce Commission, ven- red at about the same time to estimate the deficit at more an $200,000,000. Our own estimate, it will be seen, oved to be too conservative, and the government's very ich too conservative.

An attempt is being made to show that the larger part the deficit of 1919, which was incurred in the first six nths of the year, was due to a heavy decline of business, d that there would have been practically no deficit in e last six months of the year but for the coal strike. The tistics of the Interstate Commerce Commission do not tend support this contention. Despite the coal strike, the rail- ys earned practically the same amount of money in the st six months of 1919 that they did in the last six months 1918, when the business handled was the largest ever own. The total earnings in the last six months of 1918 re $2,838,000,000, while in the last six months of 1919 ey were $2,827,000,000, and yet in these months the rail- ys failed by $150,000,000 to earn the standard return. ie coal strike caused only a small decline in freight earn- gs in November and December, when it was in effect. eantime, there was a very large increase in passenger, mail d express earnings, the result being that the total earnings November and December actually were $10,000,000 ger than they were in November and December, 1918. is true that there was a large increase of operating penses in November and December, but the increases in penses were not as large as they were in July and Sep- nber, and while the increase in expenses in November s larger than it was in October it was less in December an it was in October. There can be no doubt that if the lways had had a maximum business in the first six nths of 1919, the deficit incurred would have been aller. But no wise railroad management would ever cal- late its probable net operating income on the basis of a siness throughout the year which would fully utilize its ilities.

It is difficult to comprehend how anybody can study the tistics of earnings and expenses for the year 1919 with- t being convinced that the deficit incurred was chiefly e to large increases of operating expenses; that even with maximum business throughout the year a large deficit uld have been incurred; and that therefore under no stem of operation, however efficient, could the railways der existing rates earn a return that would be anywhere ar sufficient to meet their requirements.

Letters to the Editor

Train Control Committee Digressed From Its Subject

CHICAGO.

TO THE EDITOR:

In this day and age when the conservation of life and property occupies the attention of railroad men and the doctrine of "Safety First" is being everlastingly preached, it is remarkable that advantage has not been taken of the opportunity to avert railroad disasters such as bring horror and remorse not alone to those employees immediately concerned in such accidents, but also to those in responsible charge of operation. Railroad collisions, involving as they do loss of life of employees and travelers and causing large property losses, will continue to shock the public mind until some form of automatic control is installed that will operate at the critical moment to avert such disasters.

There seems to be some question as to the merit of automatic train control devices and their successful application to meet the demands of traffic. The question is also raised as to the effect of such devices upon the dependability of enginemen. It would seem, desirable, therefore, that we deal with the subject plainly from the viewpoint of experienced signal engineers directly interested in the manufacture and installation of such devices.

In the first place it would be well to note that the term "automatic train control" is somewhat of a misnomer. The control of the train is entirely in the hands of the engineman, both as to acceleration and retardation when he obeys signal indications, or when the train is operated safely. Automatic control is effective only when, for some reason, the engineman fails to function properly to control the train. To operate successfully and meet all conditions of traffic, such a device should be thoroughly reliable in action and embrace speed control in its application for the purpose of insuring proper speed as conditions may require; and an automatic stop to insure obedience to a stop signal indication or when a point of danger is reached. Insofar as the effect of automatic train control upon the dependability of the enginemen is concerned, it must be evident that such a device would insure safe operation, whereas under present conditions there is nothing to compel obedience to signal indications except surprise checks and other intermittent supervision.

The report of the Automatic Train Control Committee of the United States Railroad Administration, an abstract of which appeared on page 227 of the *Railway Age* for January 16, stated that automatic train control is desirable under certain conditions. This report indicates that no device is available for application which will successfully operate under all conditions. In answer to this report it is only fair to say that train control devices have passed the experimental stage insofar as perfection in speed control and automatic stop features are concerned and that such devices are ready for application to meet the requirements laid down by the committee.

Applying the rule of reason it is almost beyond belief that the Automatic Train Control Committee or any other committee or group should expect that installations of safety devices will continue to be made from time to time for an indefinite period before any such device is recommended for installation. Something more substantial than flowery language endorsing the use of block signals is to be expected from a committee appointed to investigate the subject of automatic train control. Some definite endorsement should be expected after the merits of such devices have been demon-

strated and proved. Certainly it would seem to be sufficient to prove the successful application and operation of such a device when there was submitted an actual test on a railroad with all necessary parts of a typical installation in service and available for inspection. Surely it cannot be expected that an entire railroad will be equipped before these devices may be approved.

The conclusions of the committee are not satisfactory. It has not taken into account developments which have demonstrated the practicability and reliability of automatic train control. In the printed abstract of the report we find the following:

"In general the purpose of a block system is to provide a proper space interval between trains," etc., etc.,

and the report goes on to say:

"On roads where track circuit control block signals are installed it is evident that if the rules are obeyed and the indications of the fixed signals along the roadway are at all times observed, understood and obeyed, accidents such as the signal system is designed to prevent, cannot occur except in the unusual event of a signal failing to indicate an unsafe condition when such a condition exists."

This puts one in mind of the tramp who attempted to satisfy his hunger by cogitating thus: "If I had some bread I would have some ham sandwiches if I had some ham." If the signal worked properly under all conditions; if the signal could always be properly observed; if the rules were obeyed in all cases; if the human mind was 100 per cent perfect, then we should not require automatic train control. The trouble is, however, that we do have signal failures; we do find that the view is often obscured by steam, fog, rain, snow, etc.; we do find that rules are disobeyed and, alas, we find that the human mind is subject to lapses which frequently—and far more frequently than the report would indicate—lead to accidents and collisions, usually with large property losses and untold suffering and anguish. The tramp would have been well fed if he had had what was lacking, just as the railroads of our country would be without unnecessary accidents and collisions if they had what was lacking.

In the light of what has been stated above, one has but to analyze the railway accidents as reported by the Interstate Commerce Commission from month to month to arrive at a conclusion as to the preventive. This conclusion will be strengthened from day to day by close observation of operation, which will disclose the many failures of man to do the right thing at the right time. "To err is human," and we are entirely too willing to overlook errors and to be lax in administering discipline when in our judgment the individual is at fault. We still hold to the old system of operating under signals depending upon the human eye and the proper functioning of the engineman in obedience to a silent indication located along the roadway, as a semaphore arm or a signal light, as the last line of defense. Thus our thoughts turn backward in retrospect, touching upon such disasters as occurred at Ivanhoe, Ind., South Byron, N. Y., and many other similar accidents; and the names of such men as Spencer, Melcher, Harahan, Cade and other martyrs to the old order of things.

It should be stated in unmistakable words that signals do not space trains, even in automatic block territory where all the adjuncts are applied which the mind of the signal engineer can devise. Thus, the cycle of safe operation is incomplete for the reason that there is no tangible connection between the signal and the train and between trains on the same track, either as protection against rear or butting collisions, misplaced switches or any other conditions which the signal system is intended to protect. Indeed, some of our most serious accidents have occurred on tracks fully protected by such a signal system, installed at a great cost. But after all, in effect, signals are simply sign posts indicating to the engineman the situation ahead, and this indication must be observed frequently under conditions tending to obscure the vision.

One of the peculiar angles presented in this discussion is the fact that on a first class railroad every other part of the system is made as safe as it is reasonably possible to make it, particularly insofar as the operation of passenger trains is concerned. The road bed is well ballasted; the rails, frogs and switches are of heavy steel; the locomotives and the cars are magnificent in their appearance of solidity and good workmanship; the passengers are of such type, many of them, as to be of great importance to the well-being of the nation; each individual passenger is carrying forward an assignment of importance; interlocking plants are established along the railroad at all important crossings, and block signals are provided along the roadway with their proper operation assured to the fullest possible degree. All of these things are done at great expense for the purpose of insuring safety and comfort to the fullest possible extent and then—the entire structure is suspended upon such a slender thread as the human eye in the sleepy hours of the early morning catching an indication from a signal along the roadside, and on the proper functioning of the human mind. A slim thread, indeed, when all of the existing conditions and possibilities are proper consideration.

The purpose of a block signal is to provide a proper interval between trains. As a matter of fact, however, block signals do not space trains. The spacing of trains may be accomplished only by providing a tangible connection between trains to keep them apart. This connection should operate to stop a train when a danger condition threatens its safety—to reduce the speed of a train to a safe point when the conditions necessitate caution and to remain inert when conditions are safe ahead. Such a system should not operate when the engineman properly performs his duty but should act automatically with reliability whenever the engineman fails and conditions require such action.

The report of the Automatic Train Control Committee would lead one to believe that no available scheme for the automatic control of trains has as yet been perfected. It must be evident, however, that inventive minds of many engineers have been seeking the solution of the problems involved and that immense expenditures have been made in the development of the many appliances as listed in the committee's report. The number of safety appliance companies shown and the interest which up-to-date railroad officers on progressive railroads are showing in this matter is proof of the necessity for such a device and surely some definite steps should be taken, and quickly, in the direction of installations.

It will be noted that W. P. Borland, chief of the Bureau of Safety, Interstate Commerce Commission, in his investigation of the Elwood collision some time ago, pointed out a preventive and stated that automatic train control was the means. It may be stated here without fear of contradiction that such devices have been perfected and are ready for installation, complying to the fullest practicable degree with the requisites laid down by the Signal Division of the American Railroad Association and by the Automatic Train Control Committee of the United States Railroad Administration.

It is hoped that the report of the Automatic Train Control Committee may not have an injurious effect upon railroad legislation or upon the minds of railroad officers in responsible charge of operation. It is hoped further that Congress will provide in the railroad bill for the installation of automatic train control and that revenues may be provided sufficient to cover such installations.

J. Beaumont,
General Superintendent, Casale Safety Device Company, Inc.

Why the Mysterious Silence?

New York.

To the Editor:

I came to New York the other day on a through train. All went well and we were right on time until we reached a certain station about 150 miles north of here. Here considerable switching was done and we left about 20 or 25 late.

I then went into the diner, was promptly seated by the steward, but courteously informed that I would have to have patience for a few minutes as the kitchen was not quite ready. This same excuse was given to all those who came after me and within a very short time the car was completely filled with hungry passengers, and others who could not be placed were likewise told that the kitchen was late and that there would be no seats for half an hour, whereupon they went back to their cars evidently not at all well pleased. One was heard saying that perhaps by trying the Plumb plan they might get better service. It was apparent that they blamed the delay in the kitchen to mismanagement.

But what were the facts? We learned from our waiter that the regular diner had to be taken off at Albany because of a broken spring and a new one was substituted which had been gotten ready in a hurry. Under the circumstances it seemed that the railroad had really done very well, but I wondered whether anyone except those at my table knew the facts.

Of course, the public kicks at delays, especially when hungry, but I am sure had that steward given the reason, which would have required no lengthy explanation, the passengers, instead of criticizing seeming mismanagement, would have appreciated that the railroad had done remarkably well under adverse circumstances. Why not inform the passengers—most of whom are reasonable—as to causes of delays, instead of observing such a mysterious silence and, as happened in this case, giving a wrong impression. Am quite sure that taking the public into confidence will make railroading a lot easier. Traveler.

To Cure Inefficient Car Inspectors

New York.

To the Editor:

The paper and discussion at the New York Railroad Club last Friday night afforded all classes of railroad men a good deal of food for thought. You will, no doubt, find yourself reporting the occasion as a great success. Surely, the size of the crowd that packed the hall full to overflowing, and their close attention, indicates that the committee is to be congratulated on bringing up a live topic; also on having a speaker who is a real leader.

Mr. Hustis, as all will agree, struck the essential note. If the men of the railroads, from the top down to the most humble employee, will do their duty, all will be well. With good men it is possible to get along with a deficient plant. It is much to be regretted that the speaker did not put his useful admonitions into more concrete form. As one of the mechanical men, who followed Mr. Hustis, was telling of his experience in trying to cure the inefficiency among car-inspectors, which resulted in too many hot boxes, I found myself wishing that the methods of curing such laziness or incompetence might be explained more in detail. Mr. Hustis must have a good many "exhibits" of the desired efficiency on his own road. From what is known of his past record, it is safe to conclude that he knows how to get good service out of good men, out of ordinary men and, very likely, out of low-grade men. He mentioned, in connection with what he said about recent snowstorms in New England, the good spirit which had been manifested by the men of his road. Now, of course, this spirit comes largely from headquarters. The president imparted some of it to his general manager, his superintendents, and to other officers. But how is this spirit carried along down the line to the yards, freight houses, and other local points?

The particular weakness that we hear of on all sides, no matter what department you are in contact with, is laziness; that is the term. It is an ugly word. Laziness, however, is often curable. Of those eight car-inspectors that the speaker mentioned, one single one manifested commendable industry, intelligence and good will. The problem is to utilize him—his personality—to infuse some of these qualities into the seven others. Mr. Hustis knows how to do this; but he did not tell us how he would go to work. More than that, he knows how to get shop foremen and trainmasters to do it. The men who heard his admirable address will go home with many useful ideas in their heads. Some of them will go home resolved to accomplish some improvement in some of their men.

But how can they withstand the constant thwarting activities of the grievance committees?

Montmorency MacGillicuddy.

Manufacturing Specialties in Railroad Shops

New York.

To the Editor:

The editorial in your issue of January 23 and the letter published on February 6 have brought out many of the disadvantages attending any attempt to manufacture specialties in railroad shops. However, the discussion has hardly touched on the objection which in my opinion is most important. The poor service which the railroads are now giving has been brought about in part by war conditions and in part by the policies of the Railroad Administration. In a large measure it is now due to the physicial limitations of the railroads—the lack of facilities, rather than lack of the proper spirit. The general public cannot appreciate this fact. In the public mind government operation is inextricably connected with poor service. Similarly the public, remembering the conditions existing prior to 1917, thinks of private operation as synonymous with satisfactory railroad service.

Freight cars, locomotives and terminals, however, will not spring up miraculously at midnight on February 29, and until adequate facilities are available the roads cannot give satisfactory service. Much will be expected of the roads after March 1—much more than they can accomplish. With cars and locomotives in poor condition, with all classes of labor dissatisfied, with rate advances inevitable, the roads will have to do their utmost to give the public service, if they are to keep the public goodwill. They will have their hands full conducting transportation and as long as the manufacturers give them a square deal it will be folly to try to encroach on the supply field by making patented devices in the shops.

Is it conceivable that the railroad shop can compete in the manufacture of parts with the industrial plant, with its piecework systems, special equipment and wide experience? Some shops *claim* to make parts cheaper than they can be bought. If adequate provision were made for accounting for overhead charges, the saving would disappear and in its stead there would be a large deficit.

Briefly then, the railroads will have a difficult task to make good after March 1. They will have to devote all their energies to handling the business or they will lose their most valuable asset, the goodwill which they now possess. Specialization is essential for success in railroading as in other industries. It will be far better if the roads will leave the supply manufacturer to handle the making of specialties. Capital, facilities and labor of employees will bring far larger returns if devoted wholly to keeping the supply of transportation up to the needs of the country. G. F. A.

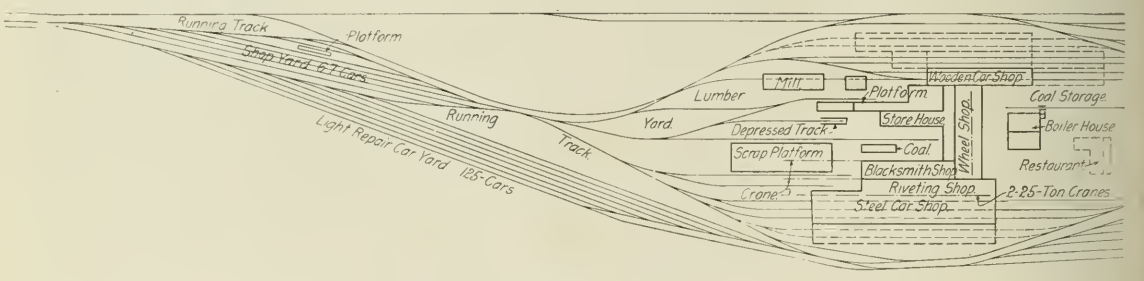
A Longitudinal Type of Repair Shop

Modernizing Freight Car Repair Facilities*

A Presentation of the Several Phases of This Subject and a Proposed Shop and Yard Layout

By Gustave E. Lemmerich
Layout Engineer, The Austin Company, Cleveland, Ohio

THE TREMENDOUS industrial growth of our country, its railroad traffic and its foreign commerce has created a need for a transportation machine which will not only meet these demands but also keep abreast of the times. It has been estimated that there is an urgent need for 700,000 new freight cars; but even if this is true, it will be practically impossible to obtain delivery of such a large number for several years, as there is at the present time an insufficient manufacturing capacity. The total existing freight car equipment consists roughly of about 2,500,000 cars. If facilities are provided for obtaining the maximum road service from these cars, quicker relief will be afforded



Main Group of Repair Shop Buildings

i. e., practically every car was sent in for light repairs once a month, and about 80 per cent of the total equipment underwent heavy repairs once a year. For the past four years the average cost of these repairs has more than doubled. The weighted average cost of freight car repairs, computed from an article on "Economies of Freight Car Maintenance" by L. W. Sillcox, on page 1227 of the December 26, 1919, issue of the *Railway Age*, was about $79 per car in 1916 and $170 in 1918. These costs were based on about 500,000 cars. This increase was due in general to the high cost of materials and labor, the construction and condition of the cars, and the lack of proper facilities for making efficient repairs. It does not appear that the first item will change much for some time, but it is probable that labor costs will decrease, due largely to increased efficiency. This combination of high costs and ever-increasing traffic calls for prompt improvements in handling all car repairs, and particularly affording a means of making light repairs independent of weather conditions.

perhaps than could be secured by waiting for the delivery of all the new cars needed. For instance, statistics recently compiled by competent operating officers show that the average car-miles per day on several important roads have varied from 25 to 37. Any improvements which will bring the low average nearer the high average of car-miles per day will produce more net revenue than the purchase of new cars. Undoubtedly, a combination of the two means of relief will be necessary to bring about the desired results.

In 1917 about twenty-nine million cars received light repairs and about two million cars received heavy repairs,

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Making Needed Improvements

There is an apparent tendency toward better and stronger rolling stock, designed to withstand the heavy strains of long train and yard operation. Old, weak equipment should be

reinforced or assigned to a class of service in which it may still be useful, or it should be scrapped. All underframes in heavy freight service should be of steel.

It does not appear that the seriousness of the car situation lies so very much in the present needs for a large number of new cars as in the immediate demand for proper facilities for repairing and modernizing the present equipment, and for the pushing of other improvements which will tend to better car movements at the terminals and on the line. Inasmuch as those facilities are so closely interwoven with the freight car situation, an outline of some of the important suggestions, which will tend to improve the car situation may not be amiss:

Car Equipment.

(a) Modernizing old equipment.

(b) Larger and stronger cars.

Car Repair Facilities.

(a) Better and more conveniently arranged shops, equipped with facilities for accelerating the return of the equipment to revenue service.

Traffic Improvements.

(1) *General.*

The continuation of the Railroad Administration Car Service Section revised to suit the new conditions.

(2) *Reduce Time at Terminals.*

(a) The continuation of the present policy of unification of terminals.

(b) The establishment of union freight stations in the larger cities.

(c) A more universal application of modern loading and unloading devices.

(d) Improvements of terminals, varying from some minor betterments costing only a few thousand dollars, to vast projects, such as detour lines around the great congested traffic centers.

(3) *On Line.*

Other improvements such as additional tracks, automatic block signaling, etc.

(b) Important changes resulting from the consolidation of railroads, creating new stem traffic lines.

All of these improvements would greatly facilitate car movements, and they would result in returning cars much quicker so as to increase their earning capacity. For example, if these additional betterments would result in only a 10 per cent earlier return, it would mean at least a reduction of about 8 per cent in the number of cars needed to relieve the present shortage.

A tentative estimate of the new freight cars required in the next three years calls for about 700,000, or about 230,000 cars per year. Eight per cent of the yearly requirements would be about 18,000 cars. At an average cost of $2,850 per car, this is equivalent to a total cost of $51,300,000. Capitalizing this sum at 10 per cent for interest, depreciation, etc., will provide a fund of $513,000,000 available for these improvements. This sum would go a long way toward paying for most of the improvements suggested.

General Freight Car Repair Shop Requirements

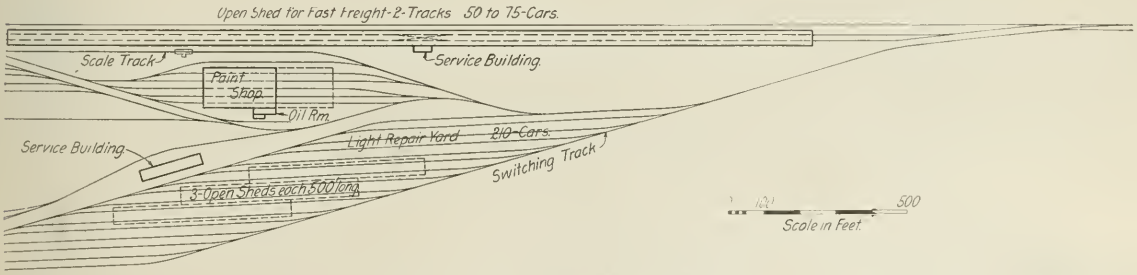
The question of the location of car repair shops is chiefly dependent on the dominating traffic characteristics and on the prevailing local conditions of the particular railroad considered, its size, the empty car movements, the available and suitable site, the labor conditions and the material market, etc. In former years, when the mills and the lumber yards were of greater importance in freight car repairing, the main car shops were, in many instances, located at the general repair shop plant of the system, only a few railroads selecting separate locations. The freight car repair shop organization is so different in its character and functions that there is no advantage in having it at the general repair site, except that both should possess all the particularly favorable points affecting construction and operation.

On the larger railroads the traffic conditions are often so greatly divergent in character that, in order to save empty car mileage and to return the cars quicker to their earning power, it might be advantageous to divide the car repairing between district shops. This division could be extended to provide separate repair shops for steel cars and for wooden cars, each located at the most suitable place for its respective class of work.

The layout should embody the principle of a continuous mill operation, the materials entering as much as possible at one end, and the building and organizations so grouped as to avoid any conflicting movements. Such an arrangement is indicated in the tentative layout accompanying this article. The principal buildings should be all under one roof, effecting a saving of a large amount of unnecessary travel and adding greatly to the efficiency of operation.

All buildings should be commensurate to the purpose they have to serve, i. e., they should be of a substantial character, void of all fads, but equipped with all modern facilities. Inasmuch as these structures require large areas, standard dimensions should be adopted wherever possible to reduce the cost and to shorten the time of construction. Such standards should cover the width of the buildings, the vertical clearances, and the column spacing, etc., due consideration being given to the local and operating requirements. The track centers should be such as to give a good workable aisle width, a feature which is of special importance in steel car shops on account of the space needed for the riveting furnaces. This applies to the tracks besides the building walls, as well as to the interior aisles. The buildings should be well lighted, heated and ventilated, and should be provided with cranes wherever they will result in better and more efficient operation.

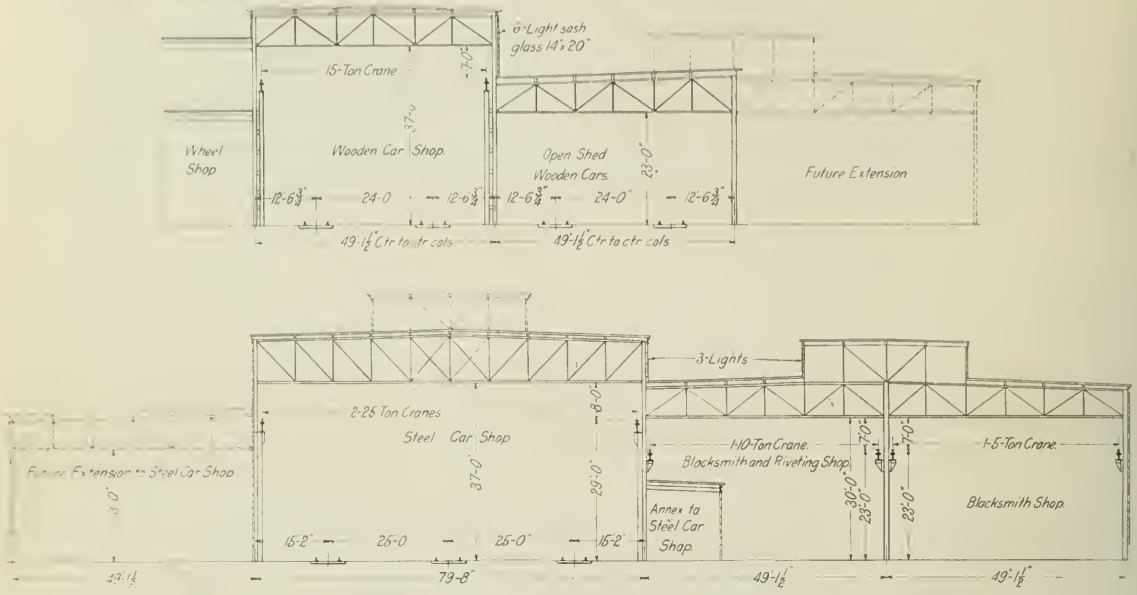
In general, car repair shops are located in or near large freight yards and, in most cases, on filled ground. These conditions, together with the fact that car repair plants are



Shed Group for Open Air Repair Work

frequently built outside of cities, render it advisable to make the buildings of steel frame construction with walls practically entirely of glass. Where the application of glass is not desirable, such as at the corners and below the windows, asbestos-covered corrugated metal or some other permanent wall substitute should be used. The use of brick should be limited as much as possible or eliminated entirely in order to simplify the construction. The roof can be built with wooden purlins and 2-in. dressed and matched roof boards, the under side being whitewashed to serve as a fire retardant.

A dirt floor appears to be all that is needed in the buildings used for the steel car departments; this can also be used for the wooden car shops in order to reduce the initial cost.

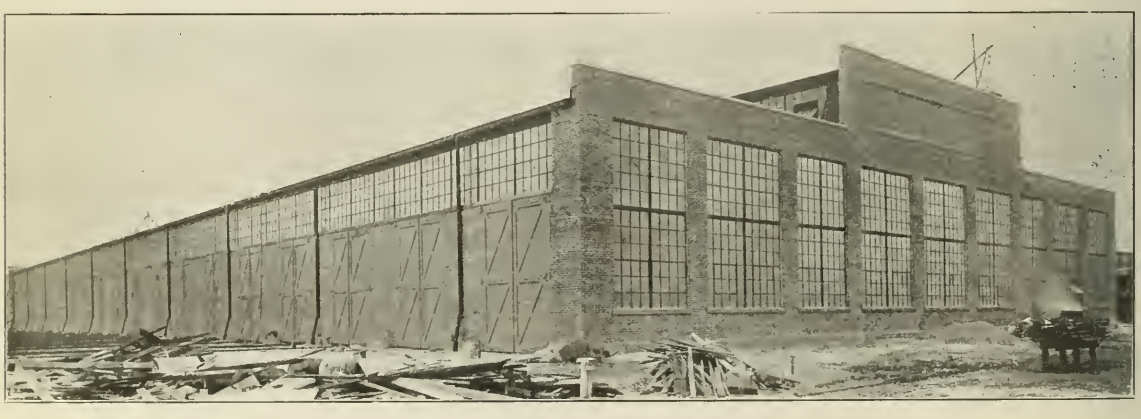


Cross Sections of Wood and Steel Car Shops

In former years the wood mill was one of the pivotal features in the layout, but now that wooden underframes are practically a thing of the past, so far as new work is concerned, this department has lost its importance, and a comparatively small building with a few tools is all that is required. The mill, however, should have as an auxiliary a finished lumber shed. The lumber yard has also shrunk to comparatively small proportions.

Auxiliary Building and Equipment

The storehouse with its platforms should be located centrally and conveniently. The building should be of reinforced concrete, provided with a full equipment of bins, an office, etc. The scrap platform in a freight car repair plant is of great importance and should be readily accessible for the delivery of scrap and for the forwarding of it to the blacksmith shop. This platform should also have facilities for the handling, cutting, sorting and storing of all grades of scrap, and a shed for housing some of these should be provided. The other auxiliaries to the storehouse should



A Transverse Type of Paint Shop

If, later, it should be found desirable to have a floor in the wooden car shop, old car sills can be used advantageously. In the mill, the wheel shop, and the tool room, the use of creosoted wood blocks laid on a concrete base will be found to be satisfactory, while floors made entirely of concrete are most frequently used in the storehouse, locker and toilet rooms.

include storage places for wheels, steel plates, angles, beams, castings, etc., and coal, coke and iron sheds for the blacksmith shop. The ground for these storages should be, above all, dry and well rammed with slag.

If this plant is isolated, it will require a fully-equipped power house. If, however, the plant is attached to or near an engine terminal or some other shop layout, the need for a power house is entirely dependent on the respective local conditions. A very important piece of equipment, usually installed in the power house, is the air compressor, which is generally of too low a capacity to meet the present increasing demands. The main shop buildings should have provisions for offices, lockers, wash rooms, toilets, etc., and other plant requirements, such as drainage and sewer system, a water supply and fire protection system, a lighting system, an air piping system, telephone and telegraph connections, if desirable, and finally the necessary yard tracks, etc.

Equipment and Tools

The shop should be fully equipped with modern tools and machines to do the work for which the plant is intended. The power equipment should be on liberal lines, especially the air compressors. In specifying them, it should be considered that some light repairing may have to be done outside of the regular working hours.

Crane service should be provided wherever it will be economical and the use of cranes should be extended outside of the building in order to facilitate the handling of material from the yard and to serve in repairing cars during that period of the year when the work can be done on the outside. Such an application will decrease the amount of the fixed charges per car repaired, resulting from the cost of the complete shop plant.

The cranes installed in the steel car shop should have a capacity of 25 tons. In any important layout two should be installed which, when working together, can manage a 150-ton capacity car. In the wooden car department, cranes of 15 tons capacity will be sufficient. The installation of cranes in the auxiliary departments depends, of course, entirely on their importance. A large locomotive crane is generally a good paying investment, because it combines the handling of material and the switching of cars in one unit. Of late a powerful tractor has been found to be a useful piece of equipment for transporting all classes of material about railroad shops and yards.

This article is confined to a repair shop with some rebuilding, so that the repairing functions, being in preponderance, govern the character of the layout, organization and equipment. The great importance to some roads of having most of its car equipment provided with steel underframes might make it advisable to enlarge the repair shop riveting department so that some or all the new steel underframe work of the system could be undertaken. Such an arrangement might stabilize the work and organization of this shop, and will only require a somewhat longer building and few additional tools. Local conditions might make it desirable to have a restaurant, reading rooms, etc., connected with this plant. These could be located in a service building back of the power house. Part of the ground surrounding this building could be treated in some pleasing way for recreation, etc.

Interior of the Longitudinal Type Shop

A plant serving a district was selected for the tentative layout because shops of this type are particularly suited to meet the present needs; moreover, they conform better to economical freight car operation because their location would result in a minimum empty car movement, yet they are large enough for economical operation.

The Tentative Layout

The plan represents a repair shop with a capacity of about 9,000 cars per year, and provides separate shops for wooden and steel cars, connected by a wheel shop with a crane that will transfer the material between the two shops. It is assumed that this plant is located in a terminal, with its entrance, the yards for the shop and the light repair work directly behind the cripple tracks near the hump on the main traffic yard, or beside one which would be a

starting point for the majority of empty car movements.

Of course, this layout must be arranged to conform with the existing local or other traffic conditions, but it must still retain certain vital principles. These include a departmental plan of the yard and buildings, so that the movements of the material are such that the entire plant is on the continuous mill principle and an interchangeability of the two yards for both the shop and the light repair yard. The buildings for fabricating the materials used in car repairs, such as the mill with its lumber shed, the blacksmith shop, the storehouse, etc., are entered first in the operating plan. With the exception of the mill, the power house and the paint shop, all buildings are under one roof, and this, taken in connection with the crane service, as outlined later should greatly facilitate the car repairing.

The wooden car shop proper is 50 ft. wide by 300 ft. long, with a capacity of 32 cars, assuming 50 ft. as the length required per car when undergoing repairs, and contains two tracks and one 15-ton crane. The crane runway extends outside of the building, bringing 8 cars under crane service. Adjoining this shop is a covered shed holding 12 cars. The steel car shop is 80 ft. by 520 ft. in area, and contains three tracks, holding a total of 27 cars, which are served by two 25-ton cranes. One track is cut to permit the placing of a large furnace and some tools in the bay so formed in order that the crane can carry large sections of damaged steel to the furnace, to the tools and back to the car proper.

In the car shops the distance from the top of the rails to the under side of the trusses is fixed at 37 ft., and to the top of the crane rail 29 ft. and 30 ft., respectively, for the steel car shop and the wooden car shop. This height will permit the handling of side plates, etc., of steel cars of considerably higher and greater capacity than are now in common service.

The blacksmith shop is located in two aisles, one adjoining the steel car shop at the furnace section, so as to bring it into the blacksmith shop organization. The riveting shop adjoins the steel car shop, but is at the finished car end of the building; its width also being 50 ft., with its length dependent on the amount of new steel underframe work assigned to it. Both of these auxiliary shops are equipped with cranes. The wheel shop proper is 50 ft. wide by 260 ft. long, with two side aisles, each 30 ft. wide, one containing the tool room, which is back of the storeroom and directly connected to it; the offices and some minor machine tools, etc., while the other aisle contains the fan rooms, lockers, wash room and toilets.

The paint shop is situated beyond the other shop buildings and is a well lighted building with posts between each track, with dirt floors, and with pits under two of the tracks. The size of this building is assumed to be about 100 ft. wide by 200 ft. long, with a fireproof oil storage room in the form of an addition to it. In case it should be preferred to paint some parts or all of the steel cars in the steel car shop, the paint shop could be greatly reduced or omitted entirely for the time being.

Interior View of the Transverse Shop

At the farthest end of this layout there are a few yard tracks to accommodate the cars from the other hump.

An approximate estimate of the cost of the freight car repair shop, as indicated in this layout, is as follows:

	Cost		Per cent of total
Grading and Track			
Grading and drainage	$44,000		3.5
Track	91,000		7.5
Total		$135,000	11.0
Buildings			
Wood car shop, covered shed and crane runway	$65,000		5.5
Mill and finished lumber shed	24,000		2.0
Wheel shop, tool room, etc.	68,000		6.0
Steel car shop, blacksmith and riveting shops, crane runways	220,000		18.5
Storehouse platform, scrap platform, etc.	40,000		3.0
Paint shop	35,000		3.0
Power house, including coal and ash handling, stack, etc.	72,000		6.0
Miscellaneous—Water supply, fire protection, sewerage, plumbing, walks, etc.	36,000		3.0
Total		560,000	47.0

Equipment			
Tools	$165,000		14.0
Power house	115,000		9.5
Cranes	105,000		8.5
Total		385,000	32.0
Miscellaneous			
Cost of land, interest during construction, engineering and contingencies		120,000	10.0
Grand Total		$1,200,000	100.0

The fixed charges on $1,200,000 at 12 per cent per year would amount to $144,000.

These improvements should result in a reduction in the cost of repairing per car, and in a reduction in the time consumed in having these repairs performed. Assuming a 10 per cent saving in the repair account which, at an average cost of $170 per car, would amount to $17, or, on 9,000 cars per year, would amount to $153,000, or more than enough to finance the improvements. In addition, the time saved by a plant of this kind in returning cars to their earning power more promptly, also represents a money saving which can be used for financing other improvements.

The Light Repair Yard

There appears to be a tendency in the development of light repair yards to cover a part of the tracks to protect the repairmen against inclement weather. If this is applied along reasonable lines, it will promote more efficient and quicker car repairing, and, at the present rate of wages, will also prove to be a paying investment. If this should run to the extreme, however, it might result in an entirely different type of layout for the light repair yard. Perhaps it might tend to enlarge the sphere of the repair plant and make it necessary to provide a series of open sheds beside the repair shop buildings.

In this layout the light repair yard consists of 14 tracks of 15 cars each, arranged in pairs on 22 ft. and 28 ft. centers, thus permitting an open shed, when so desired, for the storing of material, pipe lines, etc., which could be about 500 ft. long and cover 20 cars each. The material storage shop, a storeroom, an office and the locker, wash and toilet facilities, are located at the ladder track toward the main shops. The switching is done from the ladder on the other side of the yard, so that this ladder is only used in emergencies. The size of these facilities is dependent on their importance and the local conditions prevailing at the terminal. An approximate estimate, which includes three open sheds, each 500 ft. long, theoretically covering 60, but practically 75 cars, is as follows:

	Cost		Per cent of total
Grading and drainage	$40,000		
Track	85,000		
Total		$125,000	53.0
Service building, including plumbing	$15,000		
Equipment, fire protection, etc.	15,000		
Total		30,000	13.0
Three covered sheds, 500 feet long		45,000	19.0
Miscellaneous—Cost of land, interest during construction and contingencies		35,000	15.0
Grand Total		$235,000	100.0

Fixed charges on this investment at 12 per cent equals $28,200 on 80,000 cars a year, which is the average number such a yard should handle, and it will result in a cost of about 35 cents per car receiving light repairs. The open shed represents about 19 per cent of the total cost.

An Open Shed for Through Freight

The tentative layout also indicates an arrangement for an open shed for fast through freight trains, which will tend to facilitate inspection, the testing of air and some very light repairing under all weather conditions, thus decreasing the chances for delays at the terminals. However, local conditions might make it advisable to place these sheds at some other point. The layout is for two tracks, each holding 56 cars 42 ft. long. A diamond cross-over at about the middle of this shed permits a single track operation when required, and about two 22-car sections may be set for very light repairing. For this layout the size of the shed was assumed to be about 40 ft. by 2,260 ft., with posts set 20 ft. apart on center. The construction is of wood, and the shed should be provided with air pipes and a small shelter in the center for an office, a few tools and the toilets, etc. An approximate estimate of the cost is as follows:

Open shed and small service building annex	$56,000
Air piping, few tools and diamond cross-over	5,000
Miscellaneous	4,000
Total	$65,000

The fixed charges at 14 per cent per year would amount to $9,100. Assuming this shed will be used by 100,000 cars per year, the fixed charges per car will be 9 cents.

Railway Unions Form Alliance for "Concurrent Action"

An offensive and defensive alliance between the executives of thirteen of the principal organizations of railroad employees, providing that in case of a disturbance which may result in a strike, a vote of all the organizations parties to the agreement will be taken so that if the vote is carried and "extreme action" is decided upon all will strike at once, was entered into at the recent conference of railroad labor executives in Washington.

The agreement was not signed by Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, nor by A. E. Barker, president of the United Brotherhood of Maintenance of Way Employees, although they or their representatives attended some of the conferences held in Washington about the same time and signed various other statements and letters in connection with wage matters that were issued on behalf of the labor unions. The effective date of the agreement is given as February 10. It was made public in *Labor*, the newspaper published by the Plumb Plan League, of which Mr. Stone is president, and is described as having been "brought about by the existing railroad situation and the vacillating attitude of Congress in the consideration of labor problems." Nothing is said as to why Mr. Stone and Mr. Barker did not sign it. Provision is made for independent action by any organization upon proper notice.

Following is a copy of the memorandum of agreement and the signatories thereto:

We have for years recognized that in our economic relations with the railroads that the injury to one is the interest of all, hence, we, the Chief Executives of the bona fide railroad organizations of North America, parties to this agreement, hereby declare it our policy to co-operate in the addition of a plan of offensive and defensive procedure to cope with the unprecedented conditions confronting us at this time, and set forth as our covenant the following principles and rules to govern under the operation of this agreement:

First. Each organization signatory to this agreement shall be represented in all meetings of the affiliated organizations by the chief executive, or his personal representative, and the organization shall be bound by the action of either. The chief executive, or his representative, shall be expected to attend all sessions of the joint body. If a chief executive is unable to attend the meeting of this body his representative shall be vested with full authority of the chief executive.

Second. All meetings shall be at the call of the chairman or upon written request of five chief executives, or their duly authorized representatives. Time and place to be set by chairman, except when otherwise decided by the majority.

Third. All matters of policy and procedure effecting this general offensive and defensive program shall be presented to and acted upon by a regularly called meeting before any action is taken. Individual action taken by any organization, or group of organizations, except in compliance with the above, shall not

receive the support or co-operation of the several organizations parties to this agreement, except as they may decide.

FOURTH. All financial obligations incurred by the duly constituted authority in compliance with this agreement shall be prorated upon the per capita basis of the respective memberships in railroad service, and bills rendered to the respective organizations shall be payable within 30 days. Failure to remit amounts due within the specified time shall (except when extension of time is granted by the executive committee hereinafter created or by the majority of the duly authorized representatives of the organizations parties to this agreement) be cause for suspension from this body.

FIFTH. The officers of this body shall be composed of a chairman, secretary-treasurer and an executive committee of at least five members, two of whom shall be the chairman and secretary-treasurer. They shall hold office until their successors are elected and installed. They shall jointly have such authority and perform such duties as may from time to time be assigned or delegated to them by the majority of the duly authorized representatives of the organizations signatory to this agreement.

SIXTH. There shall be no authorized stoppage of work by any organization party to this agreement, except and until the requirements of the respective constitutions have been complied with by the duly authorized officers as to taking the required vote. In concerted action all ballots for such vote shall be jointly prepared and approved. Tabulated returns shall be forwarded to the chairman and secretary of this body by the respective organizations, who shall compile and announce results of same to all organizations parties to this agreement and a legal vote for an organization or group of organizations shall be as required by their respective constitutions, except as to the organizations affiliated with the Railway Employees Department of the American Federation of Labor, which shall be as per that Department Constitution.

SEVENTH. When parties to this agreement are working in co-operation thereunder and extreme action has been decided upon, said action will be taken concurrently by order of the chairman and secretary of this body.

EIGHTH. If any organization or organizations parties to this agreement find it necessary to act independently of this body, proper notice shall be given of such contemplated action, and information furnished to the body from time to time so as to avoid complications and misunderstandings.

This agreement shall be effective from February 10, 1920, and continue in full force and effect until matters in hand are completed.

(Signed) Timothy Shea, Acting President, Brotherhood of Locomotive Firemen and Enginemen; L. E. Sheppard, President, Order of Railway Conductors, J. W. Kline, General President, International Brotherhood of Blacksmiths, Drop Forgers and Helpers; W. H. Johnston, International President, International Association of Machinists; W. G. Lee, President, Brotherhood of Railway Trainmen; Louis Weyand, Acting International President, International Brotherhood of Boilermakers, Iron Ship Builders and Helpers of America; J. J. Hynes, International President, Amalgamated Sheet Metal Workers' International Alliance; James P. Noonan, International President, International Brotherhood of Electrical Workers; Martin F. Ryan, General President, Brotherhood Railway Carmen of America; S. E. Heberling, President, Switchmen's Union of North America; James J. Forrester, Grand President, Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees; E. J. Manion, President, Order of Railway Telegraphers; D. W. Helt, President, Brotherhood of Railway Signalmen of America; B. M. Jewell, Acting President, Railway Employees Department, American Federation of Labor.

In its news story regarding the recent wage conferences with the President and Director General Hines, *Labor* said: "The railway workers, however, have not agreed to surrender their right to strike if necessary to enforce adequate wages." It also said that "While apparently sympathetic with demands of the railroad workers for increased wages," the director general held that in view of the "probable" return of the railroads he could not agree to advance wages, but "intimated that demands for increases and readjustments were well grounded."

Regarding the new alliance the paper said: "The most important development during the 10-day meeting of railroad representatives in Washington was the reaching of an agreement for a close alliance of the 13 railroad unions, whereby they would stand together for offensive and defensive purposes in determining wage and working conditions in the future. This is the first time such an understanding or agreement has ever been entered into between these organizations. A solid phalanx is thus presented in event an attempt is made to reduce wages or disorganize unions formed during federal control, if the roads are returned to private ownership.

"Another organization was added to the original 14 during this conference. The Brotherhood of Railroad Signalmen of America, 75,000 members, joined forces with their fellow railroad workers and will hereafter co-operate in all matters affecting railroad employment."

Freight Locomotive and Freight Train Costs

THE TOTAL COST of freight train service, including locomotive service, per 1,000 gross ton miles, which had been decreasing each month of 1919 up to and including August, has shown an increase in September, October, November and December. In December, according to the monthly report of the Operating Statistics Section of the Railroad Administration, it was 139.7 cents, as compared with 124.4 cents in December, 1918, and as compared with 122 cents in November, 1919. In October it was less than for October, 1918. Per locomotive mile and per train mile in December the cost was also greater than in December, 1918. The cost of freight locomotive service per locomotive mile in December was 131 cents, as compared with 121.1 cents in December, 1918. In November it was 119.7 cents. The cost of freight train service per train mile in December was 185.2 cents, as compared with 171.3 cents in December, 1918. In November it was 170.3 cents. The combined figures for all regions and the comparative figures for 1918 are as follows: (Costs for 1918 have been readjusted for back pay, while the costs for 1919 apply to the month of November only, the back pay applicable to previous months having been eliminated.)

	December	
	1919	1918
Cost of locomotive service per locomotive mile....(cents)	130.0	121.1
Locomotive repairs	41.6	39.0
Enginehouse expenses	9.3	10.1
Train enginemen	22.3	19.3
Locomotive fuel	53.8	48.6
Other locomotive supplies	3.9	4.0
Cost of train service per train mile	185.2	171.3
Locomotive repairs, Enginehouse expenses	57.9	56.4
Locomotive fuel	61.2	55.8
Other locomotive supplies	4.4	4.6
Train enginemen	25.3	22.2
Trainmen	28.8	25.6
Train supplies and expenses	7.6	6.7
Cost of total train service per 1,000 gross ton-miles	....	....
Locomotive repairs, Enginehouse expenses	43.7	41.0
Locomotive fuel	46.2	40.5
Other locomotive supplies	3.3	3.4
Enginemen and trainmen	40.8	34.7
Train supplies and expenses	5.7	4.9

An extensive plot to defraud the United States Railroad Administration of thousands of dollars through the sale of counterfeit passes was recently revealed with the arrest of a passenger on one of the trans-continental trains of the Atchison, Topeka & Santa Fe, as it entered Chicago. At the same time, four others were arrested in connection with the plot, three at Los Angeles, Cal., and one, a former brakeman and the originator of the plot, at Portland, Ore. The plot is said to have originated last November, since which time it is said that hundreds have been sold and used, the majority for trans-continental trips.

Some of the "Failures" of Government Management

Railroad Administration Has Done Its Best, but Results Do Not Justify Any Predictions of Advocates

AT THE CLOSE OF TWO YEARS and two months of the government's operation of the railroads it is interesting to compare its actual performance in some respects with the claims and predictions made for it by government ownership advocates before the railroads were taken over or by some of its officers during the early period of federal control.

In doing so it will be well to bear in mind, of course, that the Railroad Administration itself should not be held responsible for all the claims of the most enthusiastic advocates of government operation and also that the administration itself may not have been entirely responsible for all that the government has done or failed to do, as the government includes Congress and the President.

Undoubtedly the fact that railroad development has been practically at a standstill during the past year, after the close of the war, is due largely to the failure of Congress to act with sufficient promptness in passing upon the appropriation asked by the Railroad Administration early in 1919 and its action in reducing the appropriation that was granted, and undoubtedly the Railroad Administration would have made a better record for itself had it not been for the uncertainty as to its tenure of office. However, reductions of appropriations and uncertainty are not new factors in the conduct of government affairs. Also, the government itself, rather than the Railroad Administration, was very largely responsible for the general increases in wages which had so much to do with increasing the cost of living and made necessary other increases in wages, and the passage of the Adamson law by Congress had much to do with the extension of the eight-hour day to other classes of employees which was largely the cause for the increased number of employees which the Railroad Administration required. However, any form of government ownership and operation of railroads would be subject both to a Congress and to a President, and probably to a far greater degree than has been the case under a plan of government operation under war powers.

Most advocates of government operation, including the first director general, have been loud in their predictions of the stupendous economies to result from unification of the railroads. For the year 1918, Mr. McAdoo was able to list such economies amounting to about $91,000,000, but during 1919 very little has been said about them and in June, 1919, testifying before the House sub-committee on appropriations, Director General Hines said:

"I think we have already gotten the benefit, both last year and the early part of this year, of the economies from unification."

Whatever saving has been made, is, of course, a net gain. but it has been so small when contrasted with the enormous increase in expenses caused by war conditions, that it would be very hard to prove that it has not been more than offset by the cost of inefficiencies resulting from too great centralization of management. There has also been claimed for the Railroad Administration a reduction in the salaries of general officers, due largely to the fact that it did not retain the executive officers of the corporations, but this has been more than offset by the expenses of the Railroad Administration's own organization, which for the central and regional administration, not charged to individual roads, has approximated $8,000,000 a year.

All claims that the government would reduce expenses by operating the railroads itself, have, of course, been destroyed by increases in the general level of wages and prices of materials so large as to exceed any possible economies that could be made by any management. Director General Hines in a public statement has estimated the loss for two years' of government operation of the railroads alone at $594,000,000, which does not include January and February, 1920, while other losses of the Railroad Administration, such as those from its operation of waterways and its deficit from the express business, are estimated to increase the total to $700,000,000. The $594,000,000 for two years was made up of $349,200,000 in 1919, and $245,000,000 in 1918.

Operating Expenses Increase 61 Per cent; Operating Income Decreases 68 Per cent.

For the two calendar years the total railway operating revenues have been $10,110,000, as compared with $7,672,000,000 for the preceding two years, 1917 and 1916, an increase of $2,438,000,000, or 31 per cent, while the operating expenses have been $8,437,000,000, as compared with $5,231,000,000 in 1917 and 1916, an increase of $3,206,000,000, or 61 per cent, and the net operating income for two years has been $1,205,000,000 as compared with $2,030,000,000 in 1917 and 1916, a decrease of $825,000,000, or about 68 per cent. The Railroad Administration in a public statement has said that if the increase in rates which became effective in June, 1918, had been made effective on January 1, 1918, the entire loss for the two years, after paying the rental to the railroad companies, would have been only about $104,000,000. As it would have been entirely impracticable to have put the rate increase into effect on January 1, 1918, before the wage increases which were its principal cause, had been put into effect, and as Mr. McAdoo in announcing his rate increase, clearly indicated his intention of making it cover the increased expenses, it is much more correct to say that the Railroad Administration's deficit was due to the fact that it underestimated its increase in expenses and did not advance rates sufficiently when it did raise them, than to say that the advance was not made soon enough.

This has an important bearing on the present situation of the railroads, because they will have the greatest difficulty in earning the amount of their guaranty from the government during the six months from March 1 to September 1, 1920, under the present scale of rates. This is indicated by the fact that if the Railroad Administration had had its increase in rates throughout 1918, as well as 1919, the additional revenue of $490,000,000 would have resulted in a surplus of about $255,000,000 for 1918, without changing the deficit of $349,000,000 for 1919, under the same scale of rates which is now in effect. It will be noted also that the $349,000,000 for 1919 is obtained by recasting the accounts to charge back into 1918 certain retroactive wage increases. This does not change the result for the two years when taken together, but on the basis of the accounts as they are reported by the Interstate Commerce Commission, the 1919 deficit was $390,000,000. (For Class I roads and 17 switching and terminal companies.)

That the underestimate was allowed to be continued is indicated also by a statement made by Mr. McAdoo before the Senate committee in June, 1919, in reply to a question as to whether there should be another increase in rates. He said: "On precisely the same basis as now exists as to rates, wages and cost of materials and operation, I think we should have a surplus of $100,000,000 for 1919." Some reduc-

tion in the volume of traffic was then anticipated, but further increases in expenses were not. There was a decrease in ton mileage in 1919 as compared with 1918 of 42,214,000,000, or 9.7 per cent. If this had all been revenue freight and had paid the average rate of .967 cents per ton mile, it would have added about $400,000,000 to the gross earnings, which would have just wiped out the deficit if it had cost nothing to handle it. About 85 per cent of the total revenues for the year were consumed in operating expenses, and while that amount of additional traffic should have been handled for a smaller proportionate cost, it is apparent that its addition made only a small impression on the final deficit.

Freight Handled Increased 2 Per Cent

So far as the volume of traffic is concerned, the railroads under federal control in 1919 handled 394,804,000,000 ton miles of revenue and non-revenue freight, and in 1918, 437,019,000,000 ton miles, a total for the two years of 831,823,267,000. In 1917, the railways under private operation handled 424,419,000,000 ton miles, and in 1916, 391,045,000,000, a total of 815,463,952,000. This represents an increase for the government in the two-year period of 16,359,000,000 ton miles, or 2 per cent.

The Railroad Administration did, however, handle an impressive increase in passenger traffic. The number of passengers carried one mile in 1919 is estimated at 46,202,827,000, and in 1918 it was 42,498,248,000, a total for the two years of 88,701,075,000. The number of passengers carried one mile in 1917 was 39,361,369,000, and 1916 it was 34,496,782,289, a total of 73,858,151,289. The increase in the two-year period was, therefore, 14,845,924,000, or 20 per cent. The increase in 1919 over 1916 was 33.6 per cent.

We thus have an increase in passenger business of 20 per cent, and an increase in freight business of 2 per cent to compare with an increase in expenses of 61 per cent.

One of the first instructions issued by the Railroad Administration in 1918 was that freight should be rerouted so as to use the most direct routes, and extensive studies were made with the purpose of developing new routes which should be not only shorter, but more efficient and economical than those previously in use. This was made possible by the fact that the Railroad Administration was free from the law that had required the railroads to observe the routing asked for by the shipper, and because there was no longer competition between railroads. The recently issued report of the Division of Traffic says "the continued observance of the short-routing policy has brought about a great saving in car miles and effected economies in the cost of operation," but these savings also fail to show in the statistical reports covering railway operations as a whole. Of course, whatever saving has been made in this way is so much to the good, but the Interstate Commerce reports for 1918 disclose that the average haul per ton for that year was the longest ever known, being 175.54 miles, as compared with 173.77 miles in 1917. This, of course, was not caused by, but resulted in spite of, the efforts of the Railroad Administration, being due to economic causes which affected the movement of traffic.

Labor Conditions Worse Than Ever

Railroad Administration officers have claimed much for themselves regarding an improvement in the relations with labor. To whatever extent this claim has been at all well-founded, it has been accomplished by widening the breach that existed between labor and the railroad companies, that had not the intimate connection with the United States treasury that enabled the Railroad Administration to be more liberal in its wage awards than the companies that were obliged to earn the amount of their payroll.

However, the present labor situation would seem to indicate that the Railroad Administration is leaving it very much as it found it, except for the higher wage level, while the developments of the past two years, whether or not they have been attributable to the government's methods of handling wage matters, have served merely to accentuate the spirit of unrest which existed to some extent in 1917. In his testimony before the Senate committee in January, 1919, Director General McAdoo said that "the labor troubles which were facing the railroads when they went under government control, were practically all eliminated, and, with a few exceptions there has been quiet in the railroad labor world during the last 12 months." Many additional wage increases were made during 1919, yet in the annual report of the Division of Labor there are listed 33 strikes of railroad and express employees that occurred during 1919, and 11 strikes of marine and waterfront employees, while in 1920 there have been some additional strikes and a general strike of 300,000 maintenance of way employees called for February 17, has only been "indefinitely postponed," and several strike votes are still in effect.

Demands for not only general increases in wages but also adjustments of alleged inequalities as between the wages of various classes of employees served on the Railroad Administration by 15 railroad unions, are still unadjusted and have been put over for settlement under a new tribunal to function after the return of the roads to private management, because neither the President nor the Director General felt it possible to settle the matter during federal control. The attitude of the labor organizations has been such that the Senate went so far as to pass a bill containing a strict prohibition against strikes, and although it was found impossible to get such a provision through the House, the bill was rewritten by the conferees at the last minute to include provisions for compulsory arbitration, but without a penalty to enforce it.

When the roads were taken over in December, 1917, as we have frequently been reminded by the Railroad Administration, the roads were confronted with demands from practically all classes of employees which it was estimated would add about one million dollars to the payroll. Much more than a billion dollars has since been awarded in increased wages, but new demands are still pending for over a billion dollars more, while the rates are still on a level which has been insufficient to pay the present wages, and the employees seem to be no better satisfied with their adjustment than before.

The extent of the improvement in the relations with labor that has resulted from government operation is indicated by the action of the heads of 13 railroad labor organizations at Washington on February 10, in forming an alliance for "offensive and defensive purposes in determining wage and working conditions in the future," and signing an agreement that if one organization decides to strike, a general vote will be taken upon it and all will strike at once. It is also indicated by the statement in the official journal of the Brotherhood of Locomotive Engineers that "the more successful the railroad, the more powerful an opponent has organized labor to contend against," as well as by the amount of mudslinging that has been indulged in by the officers of the railroad labor organizations in their efforts to defeat the Esch-Cummins bill, which is intended to restore the net operating income of the railways to about where it was before the war, merely as measured in the depreciated dollars of the present, whereas the employees are not satisfied with an increase of over 50 per cent in two years, and are demanding nearly as much more.

Failure Substantially to Increase Facilities

Government operation used to be advocated as a remedy for car shortage, back in the days when the railroads used

to have car shortages almost but not quite every fall. The Railroad Administration in two years has bought 100,000 freight cars and 2,000 locomotives—fewer than the railroads used to buy in one year, and while the centralized control of car distribution and other methods adopted by the Railroad Administration, have helped to make it possible to get along with an inadequate car supply, the car shortage on January 31, only a month before the date set for the return of the roads, was 88,000, or approximately the same as it was on January 1, 1918, and the accumulations of cars under load amounted to 117,000, as compared with 150,000 at the time when it was said that the railroads had "broken down."

These conditions show that even the government is not immune from the effects of weather conditions and of the wear and tear which requires the replacement of old cars with new ones at an annual rate about equal to the additions to the car supply made by the government in two years.

The Railroad Administration itself need not be blamed for the failure of Congress to give it an appropriation which would enable it to maintain the needed development of railroad facilities, or which would have enabled it to pay the railroads their rental and perhaps made it possible for them to finance additional facilities on their own account, but the fact that the government, while in control of the railroads, has failed to keep up their facilities, is at least of some significance as indicative of what kind of management we should expect of the government under other circumstances. It may also be noted in this connection that when the cars were ordered in April, 1918, it was announced that it was hoped the entire order would be completed in time for the fall and winter business of the railroads, whereas actually only 12,680 were delivered during that year, and some are yet to be completed, only 9,000 having been delivered by the end of 1919. Deliveries of the locomotives have just about been completed.

The statement of these facts need not imply criticism of the Railroad Administration, but it is well to bear them in mind in considering the problem now facing the railroads.

Orders of the Regional Directors

Circular No. 40, issued by the Southern regional director, says that effective March 1, by order of the director general of railroads, the following offices will be discontinued, and all officers and employees thereof will be released from service of the United States Railroad Administration: Regional director, federal managers, general manager (federal), general superintendents (federal), terminal managers (federal), Southern Freight Service Bureau, local operating committees, Southern Export Committee, car efficiency committees. The Railroad Administration will also relinquish control of the following: Southern Freight Traffic Committee, district freight traffic committees, Atlanta Freight Tariff Bureau, Louisville Freight Tariff Bureau, New Orleans Freight Tariff Bureau, Richmond Freight Tariff Bureau, Florida Perishable Service Bureau, Southern Freight Inspection Bureau, Southern Classification Committee, Southern Passenger Traffic Committee, consolidated ticket offices. Employees who will be released under this order who have been transferred from other cities and desire to return thereto, and who will not take service with railroads and so receive free transportation after March 1, were to be released on February 28, so that they might receive transportation to their home cities.

Export Bills of Lading.—Circular 266, cancelling Circular 252 and supplements thereto, of the Southwestern regional director, contains instructions governing the issuance of export bills of lading via North Atlantic ports, such instructions to supersede all previous instructions.

Annual Report, Division of Inland Waterways

Director General Hines, in making public the annual report for the year 1919 of G. A. Tomlinson, director, Division of Inland Waterways, of the Railroad Administration, issued a statement urging that there be a thoroughgoing experiment in the development of the inland waterways, and added that he would be surprised and disappointed "if that experiment does not show a complete economic justification for these methods of transportation."

"I wish to emphasize," he said, "that the results of operation on these waterways have all been during a period of merely partial initial development and hence the results cannot be taken as indicating what can reasonably be expected from these operations when the proposed facilities shall have been completely provided and a reasonable period of development shall have elapsed. The federal control act clearly indicated the policy of Congress that during the period of federal control of the railroads the development of actual operations upon inland waterways should be begun. This was a perfectly natural policy in view of the great expenditures which have been made in the past for the improvement of these waterways. In order to carry out this policy it was essential to make a beginning with the inadequate equipment available. The scarcity of material during the war greatly retarded the obtaining of the necessary new equipment, and the result has been that during the entire period of federal control these operations on the waterways have necessarily been conducted without adequate equipment, and of course without the possibility of having a developed traffic."

The report of Mr. Tomlinson summarized the operations under the Railroad Administration during the year 1919 on the New York Barge canal, the Delaware & Raritan canal, on the lower Mississippi between St. Louis and New Orleans, on the Warrior river and on the Chesapeake & Ohio canal, going into details as to the earnings, operating expenses, equipment added and operated and traffic moved.

Discussing operations on the New York Barge canal, Mr. Tomlinson pointed out that this waterway has never been in possession of or controlled by the director general of railroads, but has always remained in the possession of and under the control of the state of New York. The Railroad Administration has used the canal for the passage of its boats in common with other operators of canal craft.

The result of operations on the New York Barge canal for this season, according to the report, substantiates the assumption that as soon as modern power barges now under construction are placed in service, the operations of this waterway will become profitable. A large tonnage of grain owned by the government was shipped by rail to New York during the summer months. It appeared that, owing to favorable traffic conditions grain could be moved by rail from Buffalo to New York in some cases in as few as three days. With the unsatisfactory power on the canal it required ten days to move grain from Buffalo to New York. Mr. Tomlinson points out that the steam barges now building for the Railroad Administration will move a fleet of barges from Buffalo to New York in seven days or better. At the close of navigation season all tugs and barges under charter were released. When the 29 self-propelled barges now under construction are completed and in commission it will not be necessary to lease tugs to assist in moving the barges owned and operated by the Railroad Administration.

So far as the operation on the Delaware and Raritan canal

is concerned, Mr. Tomlinson, in his report, states that its use, while comparatively limited and not sufficient to make the tolls collected profitable to the possessor of the canal, is nevertheless substantial, and such use could not be discontinued without disregard of the reasonable interests of the users of the canal and of the legal obligations which, under private control, would rest, upon the owner of the canal. The number of loaded boats passing through the canal during the year 1919 was 1,358, both eastbound and westbound. The tonnage loaded boats numbered 248,640. The total revenue from operations on this canal up to November 30, 1919, amounted to $133,548.57, while the expenses for the same period were $221,587.33, making a deficit for the year of $108,036.76. This deficit is about $100,000 less than the deficit for last year, in spite of the fact of greatly increased cost of materials and supplies and an increase of approximately 23 per cent in wage of employees.

With respect to operations on the lower Mississippi river, the report states that in addition to the direct loss caused by the defective character of equipment and existing terminal facilities, an analysis of the financial statement shows that in maintenance and transportation costs this deficiency is likewise reflected in excessive sums expended for repairs and the high cost of handling freight at the respective terminals. From records furnished, the cost of repairs to this equipment from September 1, 1918, to June 30, 1919, amounted to more than $65,000, and the cost of handling freight from January 1 to October 31, 1919, at the ports of New Orleans and St. Louis, amounted to 96 cents and $1 a ton, respectively. Mr. Tomlinson declares that there was necessarily some delay in the creation of joint rates with the railroads, so that the early operation was restricted to such traffic as originates on the river bank and also because of war conditions considerable decrease in northbound tonnage resulted in the early period of operation on account of the zoning of sugar. No through traffics were in existence the first six months of operation, and consequently, the interline freight movement is comparatively small, the total amount from April 30 to September 30, 1919, being 12,893 tons, on which the earnings amounted to $60,647.08, or $4.70 per ton. The total local movement both northbound and southbound amounted to 96,325 tons, on which the average earnings per ton amounted to $3.54 per ton.

Operations on the Warrior river previous to the inauguration of service by the Railroad Administration was irregular. To provide an immediate service and stimulate water transportation from the coal fields of Alabama to Mobile and New Orleans, the administration, late in the year 1919, purchased 3 towboats, 21 wooden barges and 6 steel self-propelled barges. Service was begun in December, 1918. The total tonnage handled to October 31, 1919, amounted to 124,648 tons.

According to the report, the freight movement was almost entirely southbound, and the tonnage was almost entirely coal. To stimulate a northbound movement in order to neutralize the cost of the empty haul back to the mines, 20 steel cargo retainers of 10 tons capacity each were built and terminal derricks are now being installed at Cordova, Ala., and New Orleans. With the completion of four self-propelled barges and three tow boats building for Warrior river service, it will be possible to inaugurate a reliable and frequent service, and tonnage is expected to be developed to tax the capacity of the fleet.

Crane hooks, depending from large traveling cranes in machine shops, ought to be painted white, so as to be easily seen. With this improvement in visibility workmen will be less likely to run against a hook or to be struck by one which is moving. This point is brought out in "National Safety News" No. 318.

I. C. C. and Railroads Given Final Opportunity

S. Davies Warfield, president of the National Association of Owners of Railroad Securities, issued the following statement on the passage of the railroad bill:

"Congress in this legislation has recognized the necessity of averting a public calamity. It is probably the most important and comprehensive railroad legislation ever enacted by that body. Congress has done its part to preserve railroad transportation under private ownership. To those members of the Senate and House who in their support of this bill have held their duty to the public paramount over political expediency, the country is indebted for their statesmanship.

"The Interstate Commerce Commission has now an opportunity for constructive work rarely presented to a governmental body.

"The association I represent has contended from the outset that the difficulties underlying the successful regulation of the railroads arose from lack of legislative direction and from lack of power enabling the commission to properly function, and that there should be no interference with the commission through the establishment of another appointive regulatory body involving a division of responsibility.

"But the responsibilities of the commission are no greater than those resting upon the railroads themselves. The success of this law rests largely with the railroads, and their relations to it must not be prejudiced by a continuance of the hostile attitude of those representatives of railroads who committed themselves against this legislation and endeavored to accomplish its defeat in various stages through which it had to pass.

"This is not a time to revive antagonisms, but the administration of this law affects every industrial, commercial and agricultural enterprise of the country—the shipper and the public—as well as the owners. The public and Congress have the right to look for a different attitude than that which has heretofore been evidenced by many of those determining the relationship of the railroads to the public and to the regulatory authorities.

"Railroad management is on trial. The railroads are now given their final opportunity to prove that they serve the country as privately owned enterprises. Congress has done all it can. I believe the commission will carry out the purpose of the act. It remains to be seen whether those who are responsible for the conduct of the policy, as well as the operation, of the railroads, will do their part and give the public evidence that they will co-operate to the successful accomplishment of that which this act of Congress entitles every interest to receive.

"This association constitutes the largest representative body of owners of railroad securities, representing the individual investor and those who are dependent upon the stability of the investment held by investment institutions.

"The owners of railroad securities realized that the time had passed for speculative return. Through this association they came forward with the first proposition ever made by the owners of great enterprises to curtail their earnings above a reasonable return in the interest of definite legislation which would stabilize railroad securities.

"This association therefore feels under a peculiar responsibility to stand by and entertains an earnest desire to see the administration of the act worked out in the common interest of the public and of the railroads."

The Southern Pacific has recently announced that it will pay claims for loss and damage to freight in transit, regardless of the time limit (two years and a day) within which suits for such claim may be brought in the courts.

Esch-Cummins Bill Passed by Senate and House

Report on Measure for Return of Roads and Their Regulation Adopted by Large Majorities

WASHINGTON, D. C.

THE CONFERENCE REPORT on the Esch-Cummins bill, H. R. 10453, the complete text which was published in last week's issue of the *Railway Age,* was adopted ithout change by the House of Representatives on February and by the Senate on February 23, as had been con-lently expected, but by larger majorities and with less gorous opposition than had been anticipated. The bill ıs passed by a vote of 250 to 150 in the House after five ours of debate and in the Senate by a vote of 47 to 17 after similar period of discussion which was more in the nature an explanation of the reasons of some of the Senators for oting for or against the bill than a debate. It was an-ounced at the White House that the President upon receiv-g the bill would send it to the Department of Justice for examination before signing it.

Only five brief speeches were made against the bill in the nate and most of these were directed against individual ovisions. There was less drawing of party lines than in e House, although 14 of the 17 who voted against the bill ere Democrats, and the objections of the labor organiza-ons, that constituted a large part of the unsuccessful fight gainst the bill in the House, were not voiced in the Senate. n the other hand the attitude of the labor organizations ıs roundly criticised.

Senator McKellar of Tennessee and Senator Dial of South rolina opposed the so-called "guaranty," after Senator mmins had carefully and explicitly shown that the rate-king rule is far from being a guaranty. Senator Pittman Nevada based his only objection on the fact that the bill es not contain an absolute long and short haul clause. nator Overman of North Carolina explained that he had ted against the Senate bill because he considered the limi-tion of net income unconstitutional and because the bill ovides for consolidation notwithstanding state laws to the ntrary and refused to stultify himself by voting for the nference report containing similar provisions. Senator ronna of North Dakota said he could not vote for the bill cause it would raise the freight rates of the farmers.

Senator Cummins in opening the discussion disclaimed y party issue on the bill saying:

"It has been most gratifying to me and I am sure it will to you to know that throughout all our prolonged, intense, d comprehensive discussions there has never appeared even e slightest approach toward partisan feeling and whatever ere is in the bill worthy of commendation is due just as uch to the Democratic members as to the Republican mem-rs. All of them have labored with equal loyalty for the blic interest rigidly excluding all other considerations."

An abstract of Senator Cummins' speech follows: "A very rge part of the two bills, as they passed the Senate and ouse, had a common purpose and differed only in what ıy fairly be called details, although a large proportion of ese details were of great importance and required the most instaking consideration. All these things presented tre-ndous difficulties and imposed upon the committee an in-iry into every phase of government operation. Happily, owever, we have been able to reach a conclusion which is irly satisfactory to the conferees—a conclusion which lies mewhere between the position taken by the Senate and ouse with regard to these most important subjects. There ere tremendous controversies of a vital character with re-ect to the sections which may properly be called amend-ments to the act to regulate commerce, such as the car-service act, the regulation by federal authority of the issuance of railway securities, the power on the part of the Interstate Commerce Commission to deal with instances of congestion in transportation by diversion of traffic, the common use of terminals and other facilities, the division of earnings and of joint rates for the protection of short-time roads, the procedure in cases of conflict between interstate and state rates, and many other very much needed modifications of the present law.

"It is, I think, my duty to call your attention specifically to those parts of the two measures wherein the differences were fundamental and could not be settled by compromise, but, in the nature of things, had to be reconciled either by the Senate or House receding from the action it had taken.

"First. The bill, as it passed the Senate, proposed the organization of an additional tribunal, known as the transportation board, to which was to be committed certain very important functions in the administration of the law. I need not enlarge upon these functions nor further describe them, because the Senate conferees found it necessary to recede from this provision; and, in the future as in the past, the Interstate Commerce Commission, increased by two members, will exercise all the authority conferred by the law for the regulation and control of railways.

"Second. The Senate bill provided, under certain conditions, for federal incorporation of railway companies, either by reincorporation of existing companies or original organization under federal law. The House conferees were so inflexibly opposed to this principle that in order to reach any conclusion the Senate conferees were compelled to yield; and the bill as now reported contains no authority for federal incorporation in any form.

"Third. The Senate bill proceeded upon the declared theory that in order to make rate regulation completely successful and absolutely just as between the public and railway owners the railway properties of the United States should be divided for ownership and operation into not less than 20 nor more than 35 systems. It provided that the transportation board should make and publish a plan of consolidation; that for seven years consolidations in harmony with the plan so prescribed should be voluntary, and that thereafter necessary measures should be taken by the government to complete the execution of the plan.

"In so far as the Senate bill contemplated compulsory consolidations, the Senate conferees have found it necessary to recede, but the real principle embodied in the Senate bill has been preserved. The substitute provides that the commission shall, as soon as practicable, adopt and publish a plan for the consolidation of our railways into a limited number of systems, with the same requirements as to competitive service and the observance of existing routes of commerce as were laid down in the Senate bill. With the approval of the commission, guided solely by the public interest, consolidations are to be permitted, but they are to be voluntary and must be consistent with and in furtherance of the plan adopted by the commission.

"While I regret that the House conferees could not be brought to a complete acceptance of the Senate bill upon this subject. I feel that the provisions agreed upon are a tremendous advance toward the desired end; and will eventually result in such a readjustment of our railway systems that

it will be possible for the Interstate Commerce Commission to establish charges for the service of transportation that will fairly sustain all our railways without giving to any one of them an excessive return upon the value of the property rendering the service.

"Fourth. The part of the Senate bill known as section 6 was accepted by the House conferees with two principal modifications. The entire section was rewritten and now appears in the conference report as section 15a of the act to regulate commerce, but while its phraseology has been somewhat changed it is essentially the same, with two exceptions, namely, the period in which the 5½ per cent basis is to continue as a direction to the Interstate Commerce Commission has been reduced from five years to two years, and the division of excess earnings or income instead of being one-half between 6 and 7 per cent of the value of the property and one-quarter above 7 per cent is now one-half to the company and one-half to the government throughout.

No Guaranty of Income

"Inasmuch as this section has been the subject of the greatest misrepresentation on the part of some critics and the most mysterious misunderstanding, on the part of many sincere people I deem it my duty to submit a brief comment upon it. In order to prejudice it among the people it has been termed a guaranty of income. This is not true in any sense of that phrase. There is a guaranty in the bill of the standard return and against deficits, continuing for six months after the railways are returned to their owners, but this was in substance in both bills and apparently has not excited any considerable criticism, for in view of the circumstances its necessity is obvious.

"Section 6, now 15a, is however, not a guaranty, nor does it approach a guaranty even remotely. Not a dollar is to be paid from the treasury on account of its provisions, and no obligation whatever on the part of the government is created. It is a direction to an administrative tribunal that in so far as it may be practicable the commission shall make rates that will yield a net operating income of 5½ per cent upon the true value of the railway property held for and used in the service of transportation considered as a whole. The assumption of this basis by the commission does not promise to any given railway company any given net operating income, for the income depends wholly upon the location of the railway, the population it serves, the volume of its traffic, and the conditions under which it is operated. Under this basis some railways will earn 2 per cent upon the value of their property, some 4 per cent, some 6 per cent, some 8 per cent; a few more than 8 per cent and a few less than 2 per cent. This basis takes no account of either stocks or bonds, but it is concerned solely with the value of the property as a whole. It is a basis about $50,000,000 less in the aggregate than the basis of 1917 and about $50,000,000 more than the basis of the test period, as defined in the federal control act. To call it a guaranty is to be either maliciously false or supidly ignorant. Its value is found in its tendency to give stability to railway credit in the unsettled period through which we are passing. It is a legislative declaration of a rule by which we may assume the commission will be guided in the difficult duties which are to be immediately imposed upon it.

"It gives the investing world the assurance that the commission will, during these two years, make an honest effort to adjust rates upon this basis. There are enough uncertainties attending the administration of the law without adding to them an uncertain basis of rate making. For the sole purpose of showing how absurd it is to speak of the rule as a guaranty, I may be permitted to suggest that in applying it the commission must conjecture or estimate the volume of traffic which the railroads will carry in a future year, and, furthermore, it must conjecture or estimate the cost of maintaining and operating the railways during a time in the future.

"If this provision accomplishes its purpose it will not be accomplished because it gives to railway companies undue profit but because it establishes a measure of confidence in the minds of those who have money to invest, which is now, unfortunately, lacking. I take it for granted that the chief desire of the American people is that their commerce may be supplied with adequate facilities for transportation. The country has suffered more in the last year on account of the inability of producers to reach their markets freely and promptly than from any other one cause, and while they want transportation at the lowest practicable cost, their overwhelming demand is for transportation itself.

Without entering into the details of the situation, it is well known to every observer that we need from 100,000 to 200,000 additional cars, we need more main tracks, more sidetracks, more warehouses, and more terminal facilities of all kinds. If the railways are to succeed in giving to the people what they must have, if we are to prosper, these companies must borrow or secure in some way not less than $600,000,000 this year and $1,000,000,000 next year. In preparing the section about which I have been speaking, I was not thinking so much about the return upon capital already invested in the railway enterprise as about men who have money to loan or to invest and the conditions upon which they would be likely to make loans or investments in railway properties. It is my deliberate judgment that those members of Congress who fail to take into consideration this problem in all its aspects, and who use their influence either to delay or defeat this bill will in the end deeply disappoint the great body of the people intent upon marketing their products and in developing to the highest point our social and industrial systems.

"One word with reference to the much-maligned requirement that a railway company receiving in any year a net operating income of more than 6 per cent upon the value of its property used in the service of transportation shall pay to the government one-half of the excess.

"This regulation is founded upon one of the long-established prinicples in the regulation of public utilities. It has been in common use from the very beginning of public control. It is neither socialistic nor confiscatory in its character. Some lawyers, looking at the question from the standpoint of their clients, may doubt its constitutionality, but the great majority of the legal profession find no difficulty in defending its validity. If we are to look upon transportation as a national subject and accept it as our duty to sustain railway carriers in all communities which are rendering an indispensable service, we must impose some such limitation. I predict that this feature of the Senate bill, preserved in the conference report, will meet with almost universal approval and that the immediate future will vindicate its justice and efficiency.

The Labor Provisions

"Fifth. The Senate conferees discovered very early in the conference that the House would not accept that part of the Senate bill which undertook to create tribunals for the adjudication of disputes between railway employees and railway employers, and to make it unlawful, through combination or conspiracy on the part of either employees or employers, to punish the public in order to maintain their disputes.

"I confess that I yielded upon these provisions of the Senate bill with extreme reluctance. That there will come a time when railway workers will see that this principle protects more perfectly than they can ever hope to be protected through the strike, I have no more doubt than I have in the ultimate triumph of justice in all the fields of human en-

deavor. Is it not possible that in the progress of affairs we can discover some way in which to prevent these disputes ripening into an interruption of commerce which menaces the lives, the health and the peaceful, orderly development of society? To me the thought is abhorrent that the judgment of a governmental tribunal composed of fair, high-minded men—a tribunal which takes into consideration the rights of man and speaks for the public welfare — can be overthrown or disregarded by any class of our citizens. Whenever the public interest requires the government to assume jurisdiction over a dispute and to enter its decree expressing the very right of the matter, all of us, no matter how we work or where we work, ought to respect and abide the decision.

From the Detroit News.

Carrying All of Our Eggs in One Basket

The Senate conferees yielded simply to supreme necessity, for we all recognized that a railroad bill must be passed before March 1 or chaos would ensue.

"With respect to the labor provisions of the conference report, I am utterly unable to understand the opposition which they have aroused among labor leaders, for they leave all men free, whether employees or employers, to do whatsoever they please at any time, at any place, or under any circumstances. All that I can say of them is that they are the best we could devise under the conditions which confronted us.

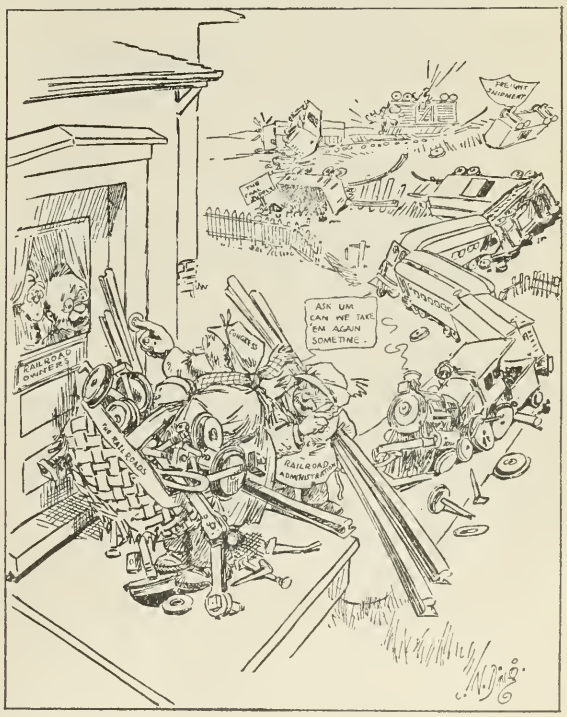
"The voluntary formation of boards of adjustment to consider and settle, if possible, all disputes except those relating to wages is authorized and encouraged.

"A governmental tribunal is established, composed of nine members, with a tenure of office of five years and an annual compensation of $10,000. It is to be known as the railroad labor board. All of the members are to be appointed by the President and confirmed by the Senate—three of its members upon the nomination of employees, three upon the nomination of the employers and three, without restriction, to represent the public. All controversies respecting wages or salaries are to be submitted to this board, and also all other disputes not decided by the boards of adjustment which seem likely to result in a substantial interruption of commerce. Decisions by the railroad labor board are to be made by a majority vote, but no decision can be made unless at least one of the members representing the public joins in the decision. It is my sincere hope that this board may command the confidence of railway wage workers, railway carriers and, above all, the public. I earnestly hope that through its intervention justice may be done, and especially that the wage workers shall receive that full measure of compensation which alone can make men happy, contented and progressive. Let us at least try the experiment with faith and courage in the abiding belief that whatever defects may be revealed in the plan as time passes on we will have the intelligence and patriotism to remove.

"Finally, inasmuch as the conference report carries an appropriation of $300,000,000 for loans by railway companies and $200,000,000 for immediate use in making settlements with railway companies, I submit a very brief statement of the results of the two years and two months of government operation of the railroads.

"I submit this statement, Mr. President, because from time to time the developments in the Railroad Administration—and I am not criticising that administration—have changed the financial conditions.

"We have heretofore appropriated for expenditure by the Railroad Administration $1,250,000,000. We are now in



From the Chicago Post.

Returning the Borrowed Railroads

this bill appropriating $500,000,000 more, and before the close of the present fiscal year we will be compelled to make another appropriation of not less than $400,000,000; in all, $2,150,000,000. Of this vast sum it is expected that the railways will at various times during the next decade—10 years is the limit of the credit extended by the government to the railroads—pay to the government of the advances so made sums which in the aggregate will reduce the government's expenditure to something like $850,000,000, and this will

represent the loss incurred in two years and two months of government operation.

"When I presented the railroad bill to the Senate this loss—I mean after the railroads pay everything due to the government and the government pays everything due to the railroads—was estimated at not more than $650,000,000.

"I remarked then that, in my judgment, when a final accounting was had it would appear that the loss would be much greater than $650,000,000. It now is estimated at $854,000,000. I said then that I believed it would be more, and I say now we will be fortunate if the loss does not increase to more than a billion dollars, for it will be remembered that the amounts I have given are estimates of the government and do not include a large number of claims asserted by the railroads and denied by the Railroad Administration.

"It would be unpatriotic to complain or criticise, and the deficit must be accepted as a part of the cost of the war. I have mentioned the subject only to remark that, grievous as the burden is, we must bear it, and promptly—cheerfully, if possible—discharge our honest obligations."

Other Senate Speeches

Speeches in favor of the bill were made by Senators Robinson of Arkansas, Myers of Montana, Lenroot of Wisconsin, Williams of Mississippi and Simmons of North Carolina.

Senator Robinson gave an extended analysis of the bill, with particular attention to the opposition to it on the part of the labor organizations. After referring to the propaganda for the Plumb plan he said: "This attitude of resistance to railroad legislation based on any other theory than the Plumb plan or something analagous thereto has been continued, and I am convinced is the principal motive and influence underlying the opposition to this bill both here and in the body at the other end of the Capitol. It is not so much the specific provision of the pending legislation which prompts the bitter opposition as recognition of the certainty that its enactment renders improbable further serious consideration in the early future of the principle of government ownership and of that somewhat indefinite theory known as the nationalization of industries."

He spoke of the financial provisions of the bill as necessary for the protection of the railroads during the transition period because of the disarrangement of the normal proportion between the earnings of railroads and their operating expenses. He defended the rule of rate-making, saying that throughout the prolonged and many-sided discussion of this question he had heard no one suggest that 5½ per cent of the value of the property is an unreasonable or excessive return. No one has suggested a lower rate than 5½ per cent. The claims against the bill have been based on the assertion that the effect of this provision is to validate watered stock and to require the public to pay transportation rates on the basis of railroad capitalization. "Whoever makes this statement," he said, "is either ignorant or deliberately falsifies."

In discussing the opposition of the labor unions, Senator Robinson said: "I have been astonished at the brazenness and arrogance which has marked criticism of the labor provisions of this bill because it does not outlaw the man who does not belong to a labor union. When any organization, however powerful, departs from its wholesome purpose and seeks to crush or oppress the helpless or the weak it enters upon a field of activity remote from its real usefulness and becomes to that extent an agency of injustice. This is not a government of labor organizations. Threats of industrial revolution, boasts of political vengeance to be wreaked on contemptible cowards who occasionally disgrace public office, vengeance through the manifest ill-temper of labor leaders who mistakenly regard themselves as the dictators of public policy, may secure temporary advantages detrimental to the general public interest for the organizations which they must represent, but in the end the public will know and understand."

Senator Myers said he was greatly disappointed that the anti-strike section of the Senate bill had to be eliminated in conference, because he thought it was very greatly needed, but he understood that the Senate conferees did all they could to retain it and that they had to drop it in order to get legislation. He approved the bill in general, and said that if hereafter Congress can get through one bill out of three that is opposed by Mr. Gompers the country will be doing remarkably well.

Senator Dial opposed the 5½ per cent rule of the bill, and declared that the limitation of excess earnings is unconstitutional.

Senator Lenroot said he had opposed the Senate bill particularly because he believed the labor provisions in that bill were very unfair, but that the objections had been removed in the conference report. He said that while he would need no further justification for his vote than the language of the representatives of organized labor in their attacks on the bill, he especially approved provisions relating to the control of the issuance of securities by railway carriers.

Senator McKellar said the bill had been greatly improved in conference, but he objected both to the so-called guaranty of 5½ per cent and to the limitation of earnings.

Senator Pittman opposed the bill principally for the reason that it does not contain an absolute long and short haul clause. He said it represented compromise legislation framed to meet a political expediency. Senator Poindexter, who had introduced a rigid long and short haul bill, pointed out that it had received only 25 votes, and that in order to get through any legislation on the subject it was necessary to modify his bill. He was in sympathy with the position of the Senator from Nevada regarding the rate structure to the intermountain country, but pointed out what he termed three improvements in the fourth section included in the bill, because it prohibits the Interstate Commerce Commission from taking into consideration potential water competition and provides that a lower rate for the long haul shall be reasonably compensatory, and it provides that in meeting rail competition a higher rate shall not be charged to any intermediate point that is a shorter distance than the length of the short haul to the competitive point.

Senator Williams said he was also in favor of a rigid long and short haul clause, but that that question should be postponed to some other time and that the pending bill should be passed.

The Debate in the House

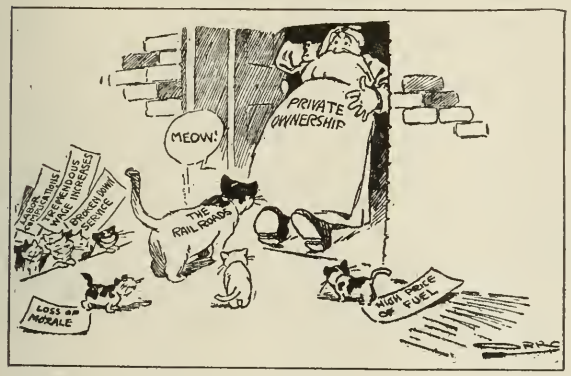
The conference report was adopted by the House after a motion to recommit the bill to conference had been defeated, 229 to 171. The opposition was led by Representatives Sims of Kentucky and Barkley of Tennessee, members of the conference committee who had refused to sign the report, and seemed rather weak and half-hearted as compared with what had been generally expected.

It was divided between the Democrats, who were not so anxious to defeat the bill as they were to knock out the provisions for the so-called "guaranty" of 5½ per cent to the railroads, and the recognized spokesmen for the labor organizations who attacked the bill as a whole and wanted a two-year extension of government operation, but who were particularly bitter against the plan for the settlement of wage disputes in any other way than by voluntary agreement, with a strike threat on one side.

A party issue was made of the bill by the party leaders who closed the debate, Representative Kitchin, the minority leader, who called on the Democrats to vote against the bill,

and Representative Mondell, the Republican leader, who declared that the question was "whether or not as a party we are qualified to legislate along constructive lines." The roll call showed that 205 Republicans and 45 Democrats voted for the bill and 125 Democrats and 23 Republicans voted against it, the latter being mainly labor representatives.

There was some surprise at the way the labor opposition flattened out after the bitter campaign that had been conducted by the organizations. It had been predicted that the majority for the bill might be rather close, but the cry of some of the Republican leaders that a vote against the bill was a vote for the Plumb plan apparently had some effect, and Representative Kitchin said that he knew of several who would like to oppose the bill but were afraid to do so



From the Chicago Tribune.

Returning

because they could not afford to be "held up in their districts as having been intimidated by the labor leaders."

A large number of railroad labor leaders sat in the gallery but left before the final vote after the roll call on Representative Barkley's motion to recommit had clearly foreshadowed the result.

The Democrats generally declined to make an issue on the question of government ownership or operation, accepting the statement of Representative Esch, who led the support for the bill, that the President's proclamation relinquishing the railroads on March 1 was irrevocable and that the roads would go back to private management regardless of legislation, but many of them agreed with the Republicans that a chaotic condition would ensue if the roads were returned without remedial legislation, and the question was practically narrowed down to whether the bill should be sent back to conference for amendment or elimination of the rate-making rule and the labor provisions.

Representative Garland of Pennsylvania said he would support the bill if it could be amended to strike out all reference to the public in the provisions for the composition of the labor board. He referred to the public as an "outside," "disinterested" "third party" which it was proposed to have interfere in the relations between the men and their employers that had been able to "settle their own differences" for 25 years. He said the roads should be returned under the same conditions as when they were taken over.

Except from the recognized representatives of labor, there was practically no opposition to the labor provisions of the bill. Representative Kitchin said if he could have his way he would make them stronger by creating a wage tribunal as strong as the Supreme Court, with a provision that no one who had ever been interested in a railroad company or a member of a union should be eligible, and with a prohibition against strikes. Several speakers declared that in their opinion the method of settling labor disputes was eminently fair. Many said they did not approve of all parts of the bill, but on the whole regarded it as constructive legislation.

Representative Sims, who had charge of the allotment of time to the opposition, had difficulty in assembling his orators. At one time he called several names in succession without response, and amid cries of "vote" from the Republican side he took the floor himself temporarily. He interrupted his own speech several times to see if anyone was ready to replace him.

Chairman John J. Esch of the House Committee on Interstate and Foreign Commerce opened the debate, which under a special rule agreed to unanimously was to be confined to five hours, with an outline of the provisions of the bill and an argument for its passage, after which he was greeted with cheers and congratulations from both sides. Mr. Esch showed specifically that the rate-making rule does not constitute a guarantee.

Railroad Administration Finances

Mr. Esch also read a letter from Director Sherley of the Railroad Administration Division of Finance explaining the need for the additional appropriation of $200,000,000 to the revolving fund provided in the bill, which he said would be needed by the Railroad Administration to meet demands

From the New York World.

After Him

upon it on March 1 and which would represent a part of the total loss of the government from the operation of the railways. Mr. Hines, he said, will appear before the committee on appropriations early in April to ask for an additional appropriation of about $436,000,000. Mr. Sherley explained that on March 1, after the payment of vouchers, the administration would have in its treasury approximately $100,000,000 and in the hands of federal treasurers $215,000,000 and in the hands of conductors and agents $95,000,000, but the last two items would be required for the payment of outstanding obligations for wages for the last half of February and materials and supplies and other current indebtedness. It would have to pay the carriers about March 1 $180,000,-

000 and one additional sums to enable them to meet interest charges.

Mr. Esch explained that the government's total expenditures for additions and betterments up to March 1 amount in even numbers to $1,152,000,000. The amount paid out for new equipment ordered and allocated to the several carriers amounts to $372,000,000. Of this sum $15,000,000 has already been paid in cash by some of the carriers, leaving, therefore, a balance for equipment of $357,000,000 which the government has expended. Under the terms of the bill offsets are allowed by way of placing against the indebtedness of the carriers to the government the government's indebtedness to the carriers resulting from compensation under the federal control act. There can be offset under the bill against the $780,000,000 for additions and betterments the sum of $461,000,000, leaving as the sum to be funded for a period of 10 years, with the option of the carrier to pay any time within the 10 years, $319,000,000.

The net excess of operating expenses and compensation to the carriers over the operating revenues for all the roads up to March 1 is $854,000,000, Mr. Esch said, and there is due the corporations for compensation, interest and open accounts $1,442,000,000, against which can be applied interest due on government notes and open accounts and additions and betterments and indebtedness amounting to $709,000,000, making the net sum that must be paid the roads under the terms of the bill $733,000,000.

After setoffs there will be owing the government on account of additions and betterments $319,000,000, on account of allocated equipment $357,000,000, and on account of other indebtedness, which will be represented in long-term notes or one-year notes, $239,000,000, a total of $915,000,000. The total amount which the government must appropriate to make up what may be considered a shortage is $636,000,000. If the $200,000,000 is appropriated by the bill, it would still leave $436,000,000 to be appropriated.

"In short," Mr. Esch said, "the government as a result of our experience under federal control will have appropriated $1,900,000,000. Of that sum $1,250,000,000 represents what already has been appropriated, and $200,000,000 will make it $1,450,000,000. The difference would be what I have already stated as the amount which the government must still appropriate. So that this, in a financial way, represents our experience with federal control. This additional sum of $363,000,000 will practically have to be charged off as a war cost. There may be those who will say that this is an expensive experiment. So it is. And yet it is worth the price, because without the railroads during the war period transportation would have failed and we would not have been able to supply our men across the seas with the necessities of life, with munitions and all war material. So that the war cost that we must charge off is what we pay for the railroads' part in the winning of the war."

Rule of Rate Making and Arbitration Provisions Opposed

Mr. Barkley declared that the provision for a limitation upon excess earnings would probably be declared unconstitutional and that the 5½ per cent "guaranty" would be left. He said Mr. Esch was correct in saying that there was no guaranty to be paid out of the treasury, but that it would have to be paid by the shippers, and he said he had a letter from a member of the Interstate Commerce Commission quoting figures prepared by Dr. M. O. Lorenz, the commission's statistician, to show that the rate-making rule of the bill would require an "increase" of rate amounting to $1,250,000,000. He said that if there is anything wrong with the credit of the railroads it is due to something else than the policy of the Interstate Commerce Commission, and to prove it he cited figures showing their growth. While the bill contains many good provisions, he said, they are "entirely overbalanced by the most vicious and insidious departure from established principles."

Representative Burke of Pennsylvania said that the bill would not prevent strikes but would destroy labor organizations for the benefit of the big interests and that the wage provisions are as bad as the anti-strike clause of the original Cummins bill, because the board would have the power to reduce wages. He advocated a two-year extension of federal control. "This bill," he said, "hurls insult and defiance in the face of 2,000,000 railroad men."

Representative Welty of Ohio objected to the bill because he said there was no appropriation in it for the continued operation of the waterways, whose operation is turned over to the Secretary of War, although he said an attempt to make such a provision had been made in Section 202.

Representative Meade of Pennsylvania, a former railroad employee, said the bill would drive labor and capital farther apart. He urged a continuation of government control.

Representative Sims opposed the labor provisions, and said he would prefer those contained in the House bill and would at least like to see an amendment to provide that a decision of the labor board to be binding should be participated in by at least one representative of each interest. He opposed the rate-making rule as providing a "minimum wage for the invested dollar," and while he did not urge the defeat of the bill he said the President would probably retain the roads for another month or so while the bill was being amended. He thought the Senate conferees would yield on the rate-making rule and enough on the labor provisions to make them "decent."

Representative Sanders of Indiana said the real question involved is whether we are to have government control, government ownership or the Plumb plan, and that "those who are opposed to government ownership and want private ownership and do not want to bring about chaos should vote for this conference report."

Mr. Hines Explains Revision of Labor Provisions

Mr. Sanders also read into the record a letter from Director General Hines to Representative Barkley explaining that he had not originated the labor provisions of the bill, but had merely suggested detail changes in the plan already agreed upon by the conferees. Mr. Barkley had not read the letter, but later said he had not received it until after his speech had been concluded. Mr. Hines said:

"I am told that the impression has been created, as the result of a remark made by you in a recent conference of members of Congress and others, that I originated the labor provisions in the railroad bill.

"If this impression has been drawn from what you said, I am sure what you said was misconstrued, because I am satisfied any statement you may have made on the subject was accurate.

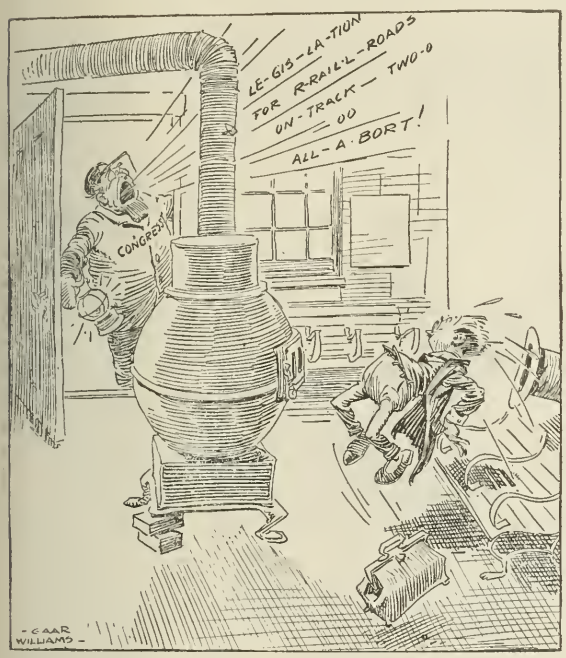
"In order to prevent the possibility of the situation being confused and of the idea prevailing in any quarter that the labor provisions represent a policy originated by me instead of by Congress, I shall appreciate it if you will be good enough to read this letter to the House.

"Through the courtesy of the conference committee, I received last Saturday a draft of the labor provisions showing that the conference committee had definitely adopted two leading principles. The first was that there ought to be a wage board upon which the public, the employees and the carriers would be represented. The other was that statutory provision ought to be made for boards of adjustment to deal with grievances.

"I took the action of the conference committee on these two leading principles as indicating its final conviction that these two principles should be incorporated in the legisla-

tion. Taking this as the foundation for my consideration in the matter, I addressed myself exclusively to the question whether the details of the provisions agreed upon by the conference would satisfactorily carry out these fundamental principles. In transmitting my suggestions to Senator Cummins I stated that this redraft is not designed to propose any independent view of my own on this subject but is designed simply to take the general scheme of the draft as already agreed upon and modify it so as to incorporate therein the suggestions made in my letter of the 14th instant.

"As to the wage board, I found that while the conference



From the Indianapolis News.

After Waiting You Get Quite a Start When She Does Show Up

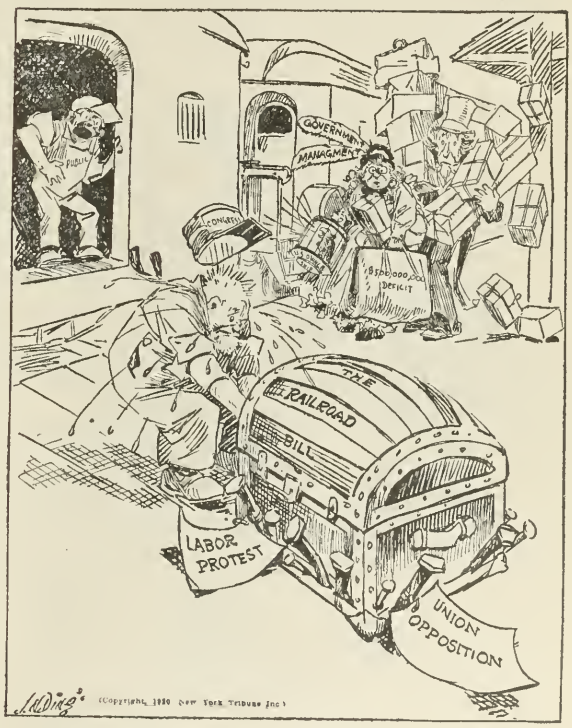
had adopted the three-party principle—that is, representation of the public, labor and carriers—it had provided for only one representative of labor and one of the carriers as against three of the public. I therefore advised that a more satisfactory and reasonable application of the principle of three-party representation would be to have three representatives of labor and of the carriers, as well as of the public, making a board of nine instead of five.

"As to the adjustment boards, I found that the provision agreed upon by the conference undertook to specify the organizations of employees which should be represented upon these boards and would result that the board of adjustment which would pass upon grievances would be dependent upon that particular organization to which the employees belonged, thus producing a great deal of confusion and endless jurisdictional conflicts between different organizations. I therefore advised that the entire matter of boards of adjustment be left to the agreement of the carriers and the employees instead of being made rigid and inelastic by statutory specifications.

"In the original draft which came to me I found that the boards of adjustment created thereunder were to handle not only the grievances but wage matters also. My experiences with the railway boards of adjustment and with wage matters in the Railroad Administration convince me that it will be impracticable for such boards to handle both grievances and wage matters because of the enormous amount of work involved, and I therefore suggested that the adjustment boards devote themselves solely to grievance matters.

"There were various minor features which I suggested. One was that a man ought not to be disqualified, as he was by the provision agreed on in conference, from being a public representative of the wage board because he might therefore have been an officer or a member of a labor organization or an officer of a carrier. I also advised that representatives of the employees on the wage board should not be required, as they were in effect by the provision agreed on in conference, to give up honorary membership in their labor organizations. I also advised that there be added to the standards provided in the provision which the conference had agreed to for testing the reasonableness of wages the further standard of correcting inequalities due to former wage orders and adjustments.

"I requested our division of law to take the provision as agreed on by the conference and to make such changes therein as would be necessary to express the changes in detail which I above suggested, and I submitted this revised draft of the



All Aboard

provision as agreed on in conference to the conference committee.

"I think I should add that the draft of these labor provisions as it came to me provided that a dispute could be taken up by the adjustment board under several alternative conditions, which included, among others, a written petition signed by 100 unorganized employees or subordinate officials directly interested in the dispute.

"I think it important thus to make it clear that the fundamental principles of the labor provisions are the principles agreed on by the conference committee, and that my action was simply to suggest changes in detail which, in my opinion, would make the principles already adopted by the conference

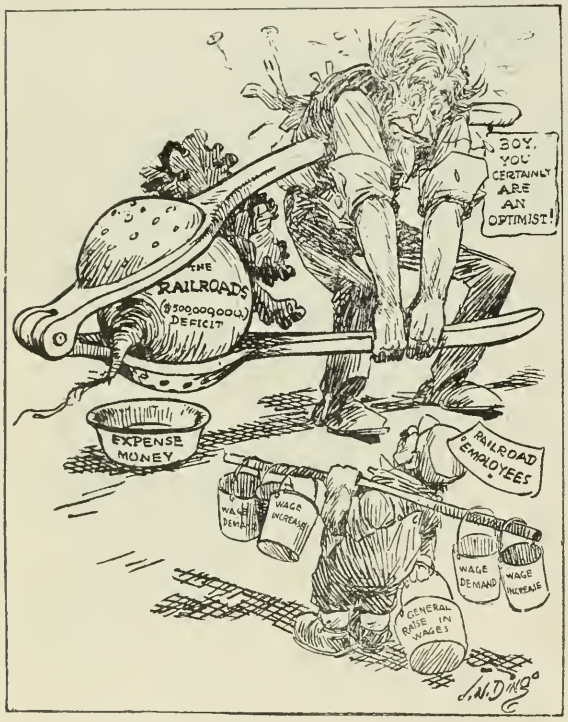
committee more workable than they would otherwise be. Copies of my letters on this subject to the representatives of the conference committee are attached."

Representative Carrs of Minnesota, a former railroad employee, asked the elimination of the labor provisions or the substitution of the House bill plan—the Anderson amendment. "All we railroad men want," he said, "is to meet with the employers and talk over our affairs in the old way as we did before the roads were taken over."

Representative Black of Texas said that he regarded the labor provisions as one of the most constructive features of the bill and that he thought labor would find that it would afford as much protection of its rights as those of capital and the public. He also favored the rate-making rule.

Representative Crisp of Georgia said he was opposed to government ownership and wanted the roads returned to private management. There is nothing unfair to labor in the bill, he said, and labor will oppose any legislation that provides for the return of the roads.

Representative Denison of Illinois said he was opposed to the Plumb plan and to government ownership, but he would vote against the bill because he was against any guaranty by the government of any particular return. He had voted against the federal control act because he was afraid of its



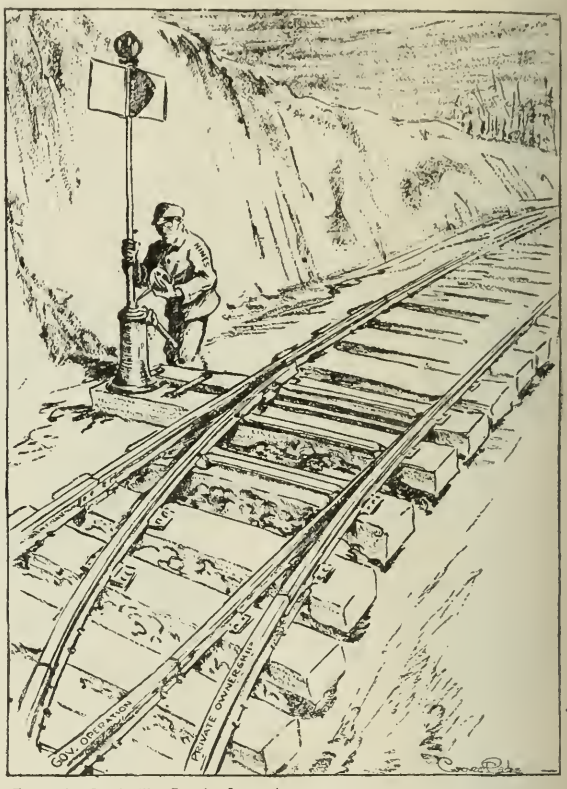
From the Chicago Post.

The National Turnip

tendency toward government ownership. He also opposed the labor provisions and the limitation of earnings.

Representative Pou of North Carolina declared that the country would see the greatest financial disaster of recent years if it gave up the roads without the enactment of a law which would give them a chance to earn a fair return. No fair-minded man, he said, ought to complain against a return of 5½ to 6 per cent, and "the condition of the transportation system of the nation for some years has been steadily growing from bad to worse. Passenger service is unsatisfactory, while freight transportation is nothing short of lamentable. Almost anything is preferable to government ownership and government operation of the railroads."

Representative Luhring of Indiana contributed a little more information regarding the "caucus" of Representatives and labor leaders on February 19. "To my surprise," he said, "Mr. Shea, who was spokesman for labor at this so-called caucus, absolutely failed to point out wherein Title III was unjust and unfair to the men he represented, and, while criticising certain minor provisions of the bill and indulging in misleading generalities, he wholly failed to



From the Louisville Courier-Journal.

Oiling the Switch

make any helpful suggestions or point out the way to a satisfactory solution. He concluded his statement with an appeal that the bill be defeated in its entirety. Practically the same position was assumed by Mr. Gompers, president of the American Federation of Labor. Mr. Gompers, however, denied that he was in favor of government ownership or that he had ever been impressed with that proposition. He, however, did urge that federal control be continued a little longer so that the government ownership proposition could be given a fair trial in time of peace. He, of course, lost sight of the fact that the railroads have been operating under federal control during peace times for over a year and that the results have been the same as when the country was at war. The main object or purpose of the meeting, as I gathered from the remarks of the representatives of labor, was to defeat this entire bill for the sole and only purpose of foisting upon the country government ownership or some such fantastic plan as is embodied in the so-called Plumb plan."

Representative Fess of Ohio said the House was presented with the alternatives of returning the roads to the owners

with ample protection to the public or continuing "the political management now in vogue, which has produced the present demoralization of transportation."

Representative Johnson of South Dakota said that "no one is satisfied with the conference report. The carriers do not like it, the employees are opposed to it, and the public doubtful of it. That fact alone, to my mind, does more to prove the fairness of the conference report than any other one thing."

Representative Kitchin, in urging the Democrats to oppose the bill, said his position was not in compliance with the demand of Mr. Gompers and declared that the question of government ownership is not involved, but he complained of the "insidious propaganda" which he said had been conducted by the railroads, and said they ought to "reach down in their pockets, take $500,000,000 of their $2,000,000,000 surplus and run themselves for a year."

Representative Mondell of Wyoming, in claiming the responsibility and credit for the legislation for the Republican

From the New York World.

"Good Luck, Bill"

party, said: "No man can vote against this conference report except the man—if any such there be—who is so enamored of public ownership that he is willing to invite nation-wide distress and disaster, beginning the first of March, in the vain hope that out of the wreck will come government ownership."

Several Representatives made speeches on the railroad bill in the House the day before it was taken up. Representative Blanton of Texas said he wanted to call attention of the country to the fact that "within the last few months there have been housed within the city of Washington two of the greatest, most dangerous and pernicious lobbies ever known in the history of the country—one the railroad lobby, the unprecedented lobby maintained here by the railroad corporate interests in their behalf, and the other the lobby, likewise unprecedented, maintained here in behalf of the railroad employees under the direction and manipulation of Samuel Gompers." He urged the passage of the bill, however, saying the railroads ought to be returned and that they ought to be "made whole" after the government has increased the wages.

Representative Huddleston of Alabama opposed the bill on the ground that it "guaranteed returns on watered stock and is unfair to labor," and he urged a two-year extension of federal control.

Representative Rayburn of Texas supported the bill, saying that while he did not like some features of it everyone knows that if the roads are returned without legislation within 90 days all except a few of the more prosperous would be in the hands of receivers.

Representative Barkley, who with Representative Sims refused to sign the conference report, filed a statement of his reasons, in which he attacked the rate-making rule of the bill as conferring "financial favors" on the carriers that would force a large increase in freight rates.

Representative Barkley has announced his intention of placing before the President before he takes action on the bill a comprehensive statement of the reasons why the majority of the Democrats in the House opposed the bill.

The bill was engrossed and signed by the Speaker of the House and by Senator Cummins, president pro tempore of the Senate, shortly after noon on Wednesday and promptly transmitted to the President, who was to receive reports on it both from the Department of Justice and Director General Hines.

James M. Kurn

JAMES M. KURN, formerly vice-president in charge of operation and construction of the St. Louis-San Francisco Railway Company, and since July 1, 1918, general manager of the property for the United States Railroad Administration with headquarters at St. Louis, Mo., has been elected president, succeeding E. N. Brown, who, however, will retain his position as chairman of the board of directors. Mr. Kurn will assume his new duties upon the termination of federal control.

As executive head of the St. Louis-San Francisco, with its 4,769 miles of line in a section of the southwest, which is undergoing a very rapid development industrially, Mr. Kurn will have an opportunity not only to greatly increase the efficiency and capacity of the existing system, but to expand its facilities commensurate with the development which is taking place in the territory which the system serves. A large portion of the Frisco system, lying in the states of Texas, Oklahoma, and Kansas traverses oil-producing territory, which a few years ago was used only for grazing purposes.

The discovery of oil has led to unprecedented developments throughout portions of the state of Texas, Oklahoma, and Kansas. The strategic location of the lines of the Frisco system in these fields has resulted in a large amount of traffic being offered for movement. With these facts in mind it can easily be seen that Mr. Kurn, as president of the Frisco, will be faced with the problem of meeting this development with adequate service and of developing and extending the system.

The story of Mr. Kurn's railway career, from the time he entered railway service in 1885 as a telegraph operator until his recent appointment as president of the Frisco, is one of promotions earned through hard work and ability. He also owes much to his early association with J. W. Kendrick, during the period from 1905 to 1911, when Mr. Kendrick was third vice-president in charge of operation of the Atchison, Topeka & Santa Fe and later vice-president in charge of operations. During this period Mr. Kurn was serving as superintendent of various divisions on the same road. In Mr. Kurn, Mr. Kendrick found one who was

ready to accept suggestions and new ideas and to put them into effect. Soon after Mr. Kendrick left the Santa Fe in 1911 to engage in private practice in railway valuation and consultation work, he was called upon to make a study of the Detroit, Toledo & Ironton. Upon the completion of this investigation, he was asked to recommend a general manager for the property. The willingness and ability with which Mr. Kurn had applied Mr. Kendrick's operating suggestions on the Santa Fe led him to recommend the former for the position and on January 1, 1914, Mr. Kurn assumed the duties of president and general manager of the Detroit, Toledo & Ironton.

Mr. Kurn was born at Mt. Clemens, Mich., on October 4, 1870, and began railway work in 1885 as a telegraph operator on the Michigan Central. On November 1, 1887, he accepted a similar position on the Atchison, Topeka & Santa Fe, and during the succeeding five years served as operator and agent at various stations on that system, being promoted to train despatcher in 1892. He was later appointed superintendent of the Rio Grande division and on December 20, 1905, was transferred to the New Mexico division, where he remained until October 1, 1910, on which date he was appointed general superintendent of the Western Lines, with headquarters at La Junta, Col. He resigned from this position on January 1, 1914, to become president and general manager of the Detroit, Toledo & Ironton, with office at Detroit, Mich., which position he held until March 1, 1918, when he was elected vice-president in charge of operation and construction of the St. Louis-San Francisco, with office at St. Louis, Mo. On July 1, 1918, he was appointed general manager of that road by the federal manager, which position he retained until his election to the presidency.

Mr. Kurn has always been noted among his associates for the energy and enthusiasm which he puts into his work, and it is these qualities that he will bring to the Frisco in a period of that system's history when they will undoubtedly produce the most good and enhance the development of that property commensurate with the development of the territories which it serves.

Delegates of Labor Unions Discuss Railroad Bill and Wage Demands

About 2,800 delegates and general chairmen of the 15 railroad labor organizations that have demanded general wage increases from the Railroad Administration began a series of meetings in Washington on February 23 to consider the President's proposal for a settlement by a tribunal to function after the return of the railroads, but apparently much of the time of the meetings has been devoted to a denunciation of the Esch-Cummins bill, and on Tuesday it was decided to send a memorial to the President asking him to veto the bill. The plan was to hold separate meetings of the various organizations and then hold a general meeting, but some difficulty has been experienced in finding a hall large enough to accommodate all the delegates. There was also some talk of a demonstration for the purpose of impressing Congress, but that body acted too quickly to enable any such plan to be carried out.

At the separate meetings on Monday and Tuesday the entire correspondence between the executives of the organizations and Director General Hines and the President, which was published in last week's issue, was read and discussed in detail, but slow progress was made.

The hiatus between the President's proposal and the tentative acceptance of it by the labor leaders manifestly created a delicate situation, particularly as Congress and the director general were proceeding on the theory that the Railroad Labor Board created by the bill should pass upon the demands. The President stated in his communication to the labor leaders that if a tribunal was created by law he would see that its members were promptly appointed and organized, and in order to save time that he would appoint a committee of experts to be investigating the subject meanwhile, but that if no tribunal were created by law he would endeavor to get the unions and the railroads to agree on a joint commission. In their reply the labor leaders objected to waiting for the legislative tribunal, but offered to place before their representatives a plan for a special joint commission composed of an equal number of representatives of the unions and of the carriers, with a condition that a binding decision should be reached within 60 days.

The passage of the Esch-Cummins bill apparently removed the alternative proposal made by the President, and at a conference on February 19 with the standing committee of the Association of Railway Executives, Director General Hines discussed the appointment of members of the committee of experts rather than of a tribunal to decide the case.

The Railroad Administration's statement regarding the conference with the railway executives was as follows:

"The director general had a conference this morning with a committee of railroad executives. He explained to them the situation as to the wage problems now pending. The executives expressed themselves as fully appreciating the desirability of expediting these matters so as to admit of their earliest practicable disposition. In response to an inqury from the director general they stated that upon request of the President or director general they would promptly suggest the names of experts as representatives of the corporations to serve on the committee of experts which the President in his letter of February 13 to the chief executives of the railroad labor organizations indicated it was his purpose to constitute.

"The President stated in that letter it would be his purpose to constitute such a committee to analyze available data so as to develop in the shortest possible time the facts bearing upon a just and reasonable basis of wages for the various classes of railroad employes with due regard to all factors reasonably bearing on the problem and specifically to the factors of the average wages for analogous labor in other industries, the cost of living and a fair living wage, so as to get the problems in shape for the earliest possible final disposition. The President's letter also indicated that such final disposition would be either through machinery created by law, or if no such provision should be made by law then through a tribunal to be created promptly by voluntary action.

"The time and method of constituting the committee on experts will be further considered by the director general with the chief executives of the labor organizations before making a specific recommendation to the President as to the actual constitution of that committee."

The labor unions are bitterly opposed to arbitration by the labor board created by the law which would include three representatives of the public. They prefer to deal directly with the representatives of the railroads, apparently realizing that under present conditions the public is far more interested in the level of wages than the railroad managers.

Land-grant Railroads, according to a bill passed by the Senate on February 18, may convey to any state, county or municipality any portion of its right of way through public lands, to be used as a public highway, street or park. It is provided that no such conveyance shall diminish the right of way to less than 50 feet on each side of the center of the main track. A similar bill applying only to the Union Pacific was passed in 1919.

The Problem of the Day—How to Please the Public*

To Elevate the Personnel the Management Must Take the Initiative—Follow Well-tried Rules

By James H. Hustis
President of the Boston & Maine.

WE ARE FACE TO FACE with the beginning of a new epoch in railroading. As to whether the railroads are the same railroads physically that they were at the beginning of the war will be answered by different interests in different ways, but that question need not seriously concern this membership just now. Whether they are the same railroads mentally—if the term mentally may be applied to indicate changes that may have been wrought in the personnel—is, however, of direct concern to us all. Service is the keynote of real success, and railroading is essentially service. The changes that have taken place in the past several years have caused some of us, especially those who served when the individual exercised greater power, and in consequence had a more potent influence in obtaining results, to wonder whether after all it is worth while. It is perhaps but natural that we should over-emphasize the advantages of the old and under-emphasize the advantages of the new order of things; for there is a new order, and we are shortsighted if we do not recognize that fact.

The men on whom we must depend to run our railroads have been working for the government. Their outlook has changed. The condition of their employment and their former relationships have been made over. Their organization leaders have said that those whom they represent are committed to the continued government operation of railroads. Many clear-thinking men believe such a step would be most unwise, and in the end would react on those who now favor it, and would imperil our institution of free government. Charles A. Prouty, for many years a member of the Interstate Commerce Commission, says:

"The only complete solution of the railroad problem is government ownership. The question is whether the government can operate these railroads efficiently, and that question can only be answered by an actual working test. When the war ended I urged that the railroads, being in control of the government, be retained for a sufficient time and under suitable conditions to make that test. I still think this should have been done; but an overwhelming public sentiment has decreed otherwise. On March 1 private operation enters upon its final test. If it makes good, it will become the permanent policy of this country. If it fails, public operation in some form must come. I believe it will fail, but I hope it will succeed and shall do everything in my power to make it succeed

"Whether it is to be a success or failure depends partly upon the carrier and partly upon the public. The carrier upon its side must get over the notion that it is to have an unlimited amount of money with which it can do anything it pleases and pay anything it pleases. The expenditure of every dollar must be watched. There must be the strictest economy, both at the top and at the bottom; and if there is extravagance at the top you are certain to find it at the bottom.

"The public upon its side must become thoroughly saturated with the idea that the carrier has no dollar except what is contributed by the public, and that no great business can be economically run without sufficient revenues. If we are to further try the experiment of private ownership, let us make that trial a fair one."

This is a sweeping statement, but it is one that we shall do well to heed. If the demand for transportation continues on its present scale the task of producing it satisfactorily will be a difficult one. The changed relationship with labor and the inadequacy of facilities combine to intensify the problems of management, and the public will be more exacting in holding the railroads to a higher standard of service.

There never has been a time when cheerful patience under difficulties will be more necessary, nor when a more attentive attitude will have to govern relations between the officials, high and low, and the public. During the war the public was invited to tell its troubles to Washington. Now these troubles must be met locally. There will be no "passing the buck." Whether the roads remain under private operation or not depends in the long run on the satisfaction of the public and its willingness to support private operation.

The public is apt to base its judgment on failures rather than accomplishments. There is an overwhelming public sentiment that the railroads be returned to private operation, but that sentiment is based on the expectation that the change will remedy most of the features concerning which the public has found fault; and we may expect the same critical attitude now toward private operation.

I have a friend who is frequently called upon to speak on the railroad problem. At present his addresses are prepared for the purpose of informing his audiences concerning the plans now under consideration for the future conduct of the railroads. Recently he came to me in disgust, saying that the night before, at considerable inconvenience, he had journeyed to a place 20 miles from town to speak before a Board of Trade. He used the 40 minutes allotted for the talk, which was listened to attentively and respectfully. But in the discussion which followed there was not one word about his paper. What his hearers wanted to know from him was why the railroad that served that town didn't get the "five eighteen in on time" and why the railroad wouldn't provide seats for all of the passengers. Nothing else was referred to. Not a word about the broad aspects of the relation of the railroads to the state; not a single reference to finance or to labor unrest. Not even a murmur on who is going to pay the freight. The life of that community, its household arrangements and its evening social engagements, parties, lodge meetings are all affected by the late arrival of that train. It matters little to that community who operates or owns the railroads as long as the "five eighteen" is operated on time. It does matter if the "five eighteen" is not run on time. Consequently the audience was not interested in whether the Senate or the House bill or the Plumb plan is a good thing for the country as a whole.

There are many "five eighteens" to consider. To the investor in railroad securities the "five eighteen" is the protection of his securities; to the shipper and the passenger it is safe, efficient and reliable service; to the railroad worker it is the maintaining of the best possible wages and working conditions. To the publicist, whatever he may be, it is the desire to try something new; and so we go. To all of these groups the first and strongest appeal is to what concerns their immediate advantage.

We cannot tonight discuss the fundamental difficulties of the railroads nor the advantages or disadvantages of unified control, except that we must see to it that none of the advantages are lost. We need not be concerned with the failures

*Abstract of an address delivered before the New York Railroad Club, New York City, February 20, 1920.

of practices instituted by governmental control except to avoid them. While the abnormal conditions incident to the war necessarily meant higher operating costs, we know that the introduction of central administration, with its many bureaus and its many employees, undoubtedly had an indirect effect not only in increasing the expense of operation, but what seemed even more important, from our standpoint, in widening the gap between men and management. To readjust that relationship is, as I see it, our special problem. As officers of the railroads our duty will be to furnish service—safe, reliable, expeditious. It will be our job to keep the "five eighteen" running on time, and let the people decide whether the railroads are eventually to be publicly or privately owned. We may fail from causes for which we are not responsible. We shall fail if we do not have the united and hearty support of the two million men who make up the railroad forces.

Many are wondering how the men will measure up and what will be their attitude. The recent severe snow storms in New England, with the effects of the influenza epidemic, have tried men's souls as well as their physical endurance. Railroad men were put to the test. There were slackers, of course, as there always have been; but on one road, at least, the men responded in the emergency, and they were not found wanting. This willingness to do was not confined to departments. Men did not consult their working agreements as to their obligations. The old spirit was there to overcome difficulties.

Of course, there is another spirit abroad with which we must reckon, and which is found in that minority who have been misled into the belief that the pay envelope is the only measure of loyalty. Their influence was felt during the war and has been felt since, and has been very potent in encouraging indifference and idleness. I believe, however, that this spirit is less in evidence on the steam railroads than elsewhere. I believe that the men generally may be relied on to respond to the spirit of service. It is that spirit of service which we must recognize and encourage if the private operation of railroads is to endure.

How may it be accomplished?

We can develop this spirit of loyalty and pride in work well performed by demonstrating to the men that we are all partners in a great public enterprise and that all our interests are interdependent; but mere statements are worthless unless substantiated in daily personal contact by square dealing, justice and real human interest. The men are from Missouri and will not respond to printed appeals to loyalty or to "Fourth of July" orations on the duties of citizenship. They must be "shown" by being taken into the confidence of the management. Regulations and policies should be explained, suggestions should be welcomed and given intelligent and sympathetic consideration, and the facts as to the relation of revenues and expenses should be made clear. There has been a mistaken idea about the whole railroad situation, and it is appalling how little even successful business men and those having large interests in their charge understand the fundamental difficulties of the railroads. It is not surprising, therefore, that the men themselves are more or less in the dark on the whole subject. A defensive attitude should not be adopted against grievances — certainly not until all the facts indicate that they are unfounded. Not all grievances merit relief, but a majority are based on a sense of having been wronged, and in many cases a full understanding of the circumstances will remove that feeling. Merit should be encouraged, and service beyond the requirements and performed under the stress of unusual conditions should be appreciated and commended just as strongly as lapses from duty are reproved.

The duty of creating proper relations rests on the men as well as on the managers, but the initiative in developing and broadening a relationship based on service and mutual respect rests with us; and I am sure that the men of the rank and file will co-operate and will have confidence in us to the extent that we have confidence in them.

For more than five years the individual has been submerged. In civil as in military life we have acted en masse, with the not unnatural result that we are all governed largely by what others say and do rather than by what experience has taught us is right. We have been flooded with words about, and frightened with predictions of the ills beyond. But, difficult as are the problems ahead, and they are many, if we will but have faith in ourselves and confidence that our neighbors and associates, when given the facts, are actuated by the same purposes and motives as ourselves, many of the things that now seem so complex and difficult will largely disappear. In any event I am certain that we shall make more real progress if we avail ourselves of the many every-day opportunities for the application of well-tried and sound principles of human relationships than by attempting to end the ills of the world by dangerous short-cuts.

Accident Bulletin No. 71

The Interstate Commerce Commission has issued Accident Bulletin No. 71, dated November 29, 1919, giving statistics of railroad accidents in the United States in the three months ending with March, 1919. In this quarter 51 passengers, 89 employees and 7 other persons were killed in train accidents, and 949 passengers and 658 employees and 18 other persons were injured; a total of 147 persons killed and 1,625 injured. These numbers, given in summary No. 1, compare with totals for the corresponding quarter of 1918 as follows: 61 passengers, 157 employees and 36 other persons killed and 1,233 passengers, 1,362 employees and 181 other persons injured, a total of 254 persons killed and 2,776 injured. Casualties in train service accidents, in the quarter under review, bring the total up to 1,601 persons killed and 11,844 persons injured. In the corresponding quarter for 1918 2,123 persons were killed and 17,197 injured.

Including non-train accidents the killed in the 1919 quarter numbered 1,735 and the injured 35,111.

The Bulletin calls attention to the fact that the change in the value of money has undoubtedly increased the number of accidents reported. Train accidents in which the damage to cars, engines and roadway is less than $150, and no person is injured, are not reported. In this quarter the total number of accidents not involving casualties numbered 4,696, of which 670 were classed, as regards damage, as between $150 and $200; those costing from $200 to $250 numbered 679, and those over $250 up to $300 numbered 504. Assuming that all accidents costing $300 or less during this quarter would in the year 1913 have cost less than $150, and therefore would not have appeared in the records, the tables for 1919 would thus be abnormally increased by 1,853 accidents as a result of the increased prices of material and labor. These accidents which did no injury to persons were largely derailments; and it is estimated that, except for the changing value of money, the derailments would have decreased by 5 per cent instead of increasing 49.5 per cent, as appears in the records. These and other illustrative statements are presented as a suggestion that comparisons should be made with caution.

The Bulletin contains reports, filling 20 pages, of investigations of accidents made by the Bureau of Safety in the quarter under review; 6 rear collisions, 5 butting collisions, 3 other collisions and 8 derailments; 22 accidents in all. Two of the derailments were on electric roads, but the statistical tables are for steam roads only.

Refrigeration Test Conducted with Fruit Laden Cars

Comparative Temperatures with Overhead and End Ice Bunkers—Electrical Thermometer Readings

A COMPARATIVE TEST of the refrigerating performance of a car equipped with overhead ice bunkers and one having collapsible end ice bunkers was conducted recently. Both of the cars used in the test were pre-iced and loaded with Tokay grapes and were handled under standard refrigeration requirements from Lodi, Cal., to Chicago, Ill.

The equipment used in the test consisted of Santa Fe refrigerator car SFRD 12646 and Chicago Great Western refrigerator car 30000. Car SFRD 12646, Class U, was built in the winter of 1917-18, and is equipped with Santa Fe standard collapsible bulkheads (Bohn Syphon) without floor racks. Car GGW 30000 was built in the fall of 1915, and in the spring of 1919 it was reinsulated to make the insulation two inches thick, the same thickness as in car SFRD 12646. During the summer of 1919 the ice tanks, baffle and drains of car CWG 30000 were reconstructed for experimental purposes. This car was taken for the test before final permanent construction of the hatches, tanks and baffle had been made in order that the test could be made last summer. The results of the test as regards temperature, air circulation and refrigeration would not be affected by this temporary installation. Car GGW 30000 is equipped with six overhead basket ice tanks of the Moore type and with floor racks.

The principal dimensions of the two cars under test are given in the table below.

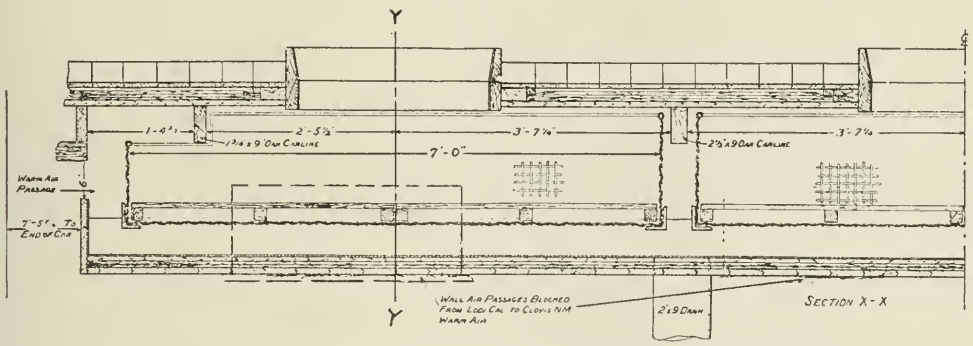


Fig. 1. Longitudinal Section Through Ice Tanks of Car C. G. W.-30000

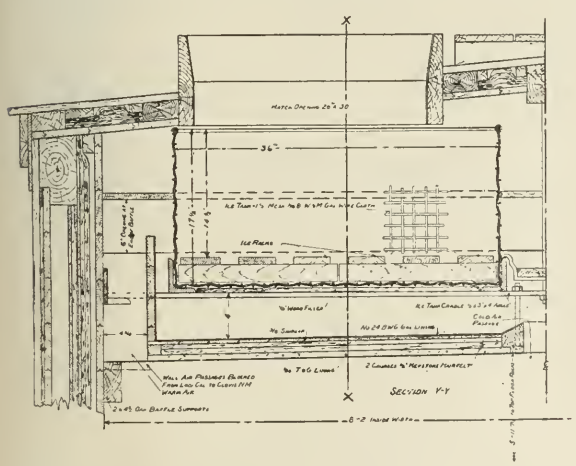


Fig. 2. Cross Section Through Overhead Tank of Car C. G. W.-30000

Apparatus

The temperature observations taken in the cars throughout the test were obtained by means of Leeds & Northrup, resistance type electrical thermometers obtained from the U. S. Department of Agriculture, Bureau of Markets, and were calibrated, previous to installing in the test cars, by means of an ice bath. The locations of the bulbs for recording the temperature of the lading are given in the footnotes to Table I. A balanced indicator was used for reading the car temperature from the outside, so that it was not necessary to open the doors en route to obtain the temperatures of the fruit.

The amount of ice used in each car during the test was estimated from full cakes of artificial ice in order to more accurately determine the amount. Outside temperatures throughout the test were obtained by means of mercury thermometers, read as often as practicable. The resistance bulbs were located in the head end of each car only. No temperature readings were taken in the rear half of the test cars.

	CGW 30000	SFRD 12646
Loading capacity	60,000	60,000
Outside length	40 ft.	41 ft. 3 in.
Inside dimensions—		
Length	37 ft. 10⅝ in.	33 ft. 2¼ in.
Width	8 ft. 2 in.	8 ft. 2¾ in.
Height floor to ceiling	7 ft. 8⅛ in.	7 ft. 3 in.
Height rack to ceiling	7 ft. 3⅜ in.	.....
Height racks to ice tank	5 ft. 11$\frac{11}{16}$ in.	.....
Ice tank—	Overhead	Basket end
Kind	6,300	Collapsible
Ice capacity	4¾ in	10,500
Bulkheads	False ends	Bohn syphon
Insulation thickness	2 in.	2 in.

Method of Testing

After the cars were selected at Calwa, Cal., they were forwarded dry to Stockton, Cal. At Stockton car CGW 30000 had the six warm air passages at the side walls, as shown in Fig. 1, blocked to see if greater uniformity of temperatures could be obtained than if they were left open. The passages remained blocked from the time the cars were loaded

at Lodi, Cal., until reaching Clovis, N. M., where they were all opened, thus permitting the air to circulate up the side wall passages into the ice tanks as well as through the air passage at the end of the baffle.

The cars were pre-iced at Stockton at 6 p. m. October 7 at the Santa Fe ice plant, where 10,500 lb. of ice were placed taken. Both test cars were billed to Chicago, Ill., under standard refrigeration; routed Lodi to Stockton, via Central California Traction Company, Stockton to destination, via Atchison, Topeka & Santa Fe.

The temperatures in various parts of both cars are shown in Table I. The following table gives the amounts of ice

TABLE I—Comparison of Temperatures of Grapes Under Refrigeration in Cars SFRD 12646 and CGW 30000

	Therm. No. 3		Therm. No. 4		Therm. No. 5		Therm. No. 6		Therm. No. 7		Therm. No. 8		Therm. No. 9		Therm. No. 11	
Location	CGW 30000	SFRD 12646	CGW 30000	SFRD 12646	CGW 30000	SFRD 12646	CGW 30000	SFRD 12646	CGW 30000	SFRD 12646	CGW 30000	SFRD 12646	CGW 30000	SFRD 12646	CGW 30000	SFRD 12646
Lodi, Cal.	58.7	61.3	56.?	54.?	57.3	60.2	57.2	59.3	59.0	59.0	56.4	53.7	57.1	58.6	56.6	60.8
Stockton, Cal.	53.4	59.8	54.4	48.0	56.3	59.5	55.7	56.8	57.5	66.2	54.2	42.6	57.0	58.7	54.1	53.4
Riverbank, Cal.	50.2	58.6	53.0	46.2	55.8	58.7	54.6	56.1	56.8	57.1	52.7	41.9	49.1	57.7	50.8	50.7
Calwa, Cal.	47.7	56.3	51.4	44.4	54.8	57.0	53.2	55.7	55.9	55.6	51.5	39.5	47.9	55.9	48.9	48.3
Bakersfield, Cal.	46.1	51.2	49.8	42.8	53.5	55.2	51.5	55.6	54.6	54.1	50.0	38.2	46.5	54.7	47.5	46.3
Barstow, Cal.	44.3	51.1	47.7	41.6	52.4	52.7	49.3	54.9	53.0	51.7	47.6	37.5	43.9	52.2	45.5	44.7
Needles, Cal.	43.1	49.0	45.9	41.2	50.5	50.7	47.5	53.4	51.2	51.9	45.1	36.8	42.9	50.6	44.4	43.3
Needles, Cal.	42.8	48.3	45.3	40.5	50.1	50.5	47.1	53.1	50.8	49.4	46.1	36.7	42.5	50.2	44.2	43.0
Needles, Cal.	42.6	48.0	45.2	40.5	49.7	50.3	47.1	53.2	50.5	49.3	46.0	36.6	42.3	49.9	44.0	42.9
Kingman, Ariz.	42.0	47.2	44.6	40.3	49.9	49.8	46.8	53.3	50.0	48.4	45.6	36.5	41.8	49.2	43.6	42.6
Cherokee, Ariz.	41.8	46.9	44.5	40.3	49.3	49.0	46.6	53.3	49.6	48.0	45.4	36.5	41.6	48.7	43.3	42.5
Seligman, Ariz.	41.5	46.6	44.2	40.2	48.5	48.9	46.4	53.4	49.4	47.9	45.4	36.7	41.6	48.7	43.3	42.5
Ash Fork, Ariz.	41.7	46.6	44.1	40.2	48.2	48.6	46.2	53.3	49.2	47.8	45.3	36.7	41.7	48.5	43.3	42.4
Wiliams, Ariz.	41.6	46.3	44.0	40.1	48.0	48.4	46.1	53.2	49.0	47.6	45.1	36.5	41.7	48.2	43.3	42.1
Winslow, Ariz.	41.6	45.9	43.9	40.2	47.9	48.0	45.7	53.2	48.8	47.0	45.0	36.5	41.8	47.8	43.1	42.0
Adamana, Ariz.	40.6	45.2	43.5	39.8	47.5	47.3	45.4	54.9	48.1	46.3	44.4	36.4	40.9	46.9	42.4	41.9
Gallup, N. M.	40.0	44.5	43.1	39.5	46.9	46.3	44.9	54.9	47.5	45.7	43.9	36.1	40.3	46.3	41.6	41.5
Belen, N. M.	39.4	43.7	42.3	39.2	45.9	45.8	44.1	54.8	46.7	45.1	43.1	35.8	39.8	45.8	41.2	40.9
Vaughn, N. M.	38.9	42.7	41.8	38.8	45.4	44.9	43.3	54.7	45.9	44.0	42.5	35.6	39.4	44.8	40.5	40.5
Clovis, N. M.	39.0	42.6	41.5	38.8	44.9	45.6	43.1	55.7	45.4	44.0	42.3	36.1	39.2	44.5	40.5	40.4
Amarillo, Tex.	39.1	43.1	40.9	39.2	44.3	44.9	42.7	55.8	45.0	44.3	41.9	36.2	38.9	44.8	40.3	40.5
Canadian, Tex.	38.9	43.2	40.6	39.4	44.0	44.8	42.6	55.8	44.7	44.2	41.8	36.6	38.8	44.8	40.2	40.9
Waynoka, Okla.	39.3	43.6	40.6	39.5	43.9	45.4	42.5	55.4	44.6	45.0	41.8	36.3	39.0	45.5	40.5	40.9
Wellington, Kan.	38.7	44.3	40.1	39.8	43.6	45.6	42.8	55.2	44.1	45.4	41.5	36.3	38.2	45.7	40.0	41.0
Wellington, Kan.	38.0	43.9	40.2	39.7	43.4	45.4	42.1	55.4	44.0	44.9	41.5	36.2	38.8	45.4	40.0	41.5
Emporia, Kan.	38.0	43.6	40.0	39.5	43.2	45.0	42.0	55.1	43.6	44.5	41.3	35.9	38.8	45.1	39.8	40.9
Argentine, Kan.	37.9	42.8	40.0	39.1	42.7	44.2	41.9	54.9	43.1	43.5	41.3	36.0	38.6	43.9	39.6	40.6
Argentine, Kan.	37.7	42.6	39.7	38.7	42.3	43.5	41.5	54.3	43.0	43.2	40.8	35.7	38.5	43.8	39.2	40.2
Lexington Jct., Mo.	37.4	42.3	39.5	38.6	42.3	43.7	41.2	54.3	42.7	43.3	40.6	35.4	38.3	43.9	39.2	40.1
Shopton, Iowa	37.0	41.7	39.2	37.7	42.0	42.9	40.3	54.2	42.3	42.5	40.0	34.8	37.8	42.8	38.1	39.5
Chillicothe, Ill.	36.4	41.6	38.8	37.3	41.7	42.4	39.8	54.0	41.8	42.0	39.4	34.5	37.4	42.3	37.7	39.0
Corwith Yards, Chicago	36.0	40.7	38.2	37.2	41.2	42.0	39.4	53.9	41.4	41.7	39.2	34.2	37.1	42.2	37.4	38.7
Average	41.6	48.2	43.9	40.7	47.7	48.4	44.1	55.3	46.8	47.6	44.7	37.2	41.9	48.1	42.9	43.0

Car CGW 30000
Location

Bulb No.
3. Fruit temperature top box grapes, 1st stock next end of car, center row.
4. Fruit temperature of bottom box grapes, 8th stack, center row.
5. Fruit temperature top box grapes, 4th stack, center row.
6. Fruit temperature top box grapes, 1st stack next end of car, center row.
7. Fruit temperature top box grapes, 1st stack next end car, center row.
8. Fruit temperature bottom box grapes, 4th stack, center row.
9. Fruit temperature top box grapes, 8th stack, center row.
11. Fruit temperature bottom box grapes, 12th stack, center row.

Car SFRD 12646
Location

Bulb No.
3. Fruit temperature top box grapes, 11th stack, center row.
4. Fruit temperature bottom box grapes, 7th stack, center row.
5. Fruit temperature top box grapes, 4th stack, center row.
6. Fruit temperature bottom box grapes, 1st stack, next bulkhead, center row.
7. Fruit temperature top box grapes, 1st stack next bulkhead, center row.
8. Fruit temperature bottom box grapes, 4th stack, center row.
9. Fruit temperature top box grapes, 7th stack, center row.
11. Fruit temperature bottom box grapes, 11th stack, center row.

in the bunkers of SFRD 12646 and 4,275 lb. of ice in the tanks of CGW 30000. The small amount of ice furnished CGW 30000 as compared to the total ice tank capacity (6,300 lb.) was due to the poor manner in which this car was iced at that point. No salt was used in either car at any time during the test. After the initial icing both cars were forwarded to the warehouse of the T. H. Peppers Company at Lodi, Cal., via the Central California Traction Company, where they were loaded on October 8.

The loading of the cars commenced at 8 a. m. and was completed at 2:30 p. m. The ends of both test cars in which the electrical thermometers were located were loaded first.

Temperature readings by means of mercury thermometers during the loading period showed that the grapes were at a temperature of 59 deg. F. in both cars.

Car SFRD 12646 was loaded with 1,050 standard crates of grapes, weight 29,400 lb., 10 layers high, 5 rows wide and 11 stacks long in the end in which the electrical thermometers were located, and 10 stacks long in the opposite end. Car CGW 30000 was loaded with 1,072 standard crates of grapes, weight 30,016 lb., 9 layers high, 5 rows wide and 12 stacks long in the end in which the thermometers were located, and 11 and 12 stacks long in the opposite end. In both test cars the regulation center bracing for grape cars was used to prevent the load shifting in transit.

Both cars were sealed at 2:30 p. m., at which time initial temperature readings of the electrical thermometers were furnished at each icing station en route, as well as the total amounts furnished:

Location	Date	CGW 30000 amount, lb.	CGW 30000 Total amount, lb.	SFRD 12646 amount, lb.	SFRD 12646 Total amount, lb.
Stockton, Cal.	Oct. 7, 1919	4,275	4,275	10,500	10,500
Stockton, Cal.	Oct. 8, 1919	1,710	5,985	1,995	13,495
Bakersfield, Cal.	Oct. 9, 1919	2,550	8,535	1,950	14,445
Needles, Cal.	Oct. 10, 1919	1,300	9,835	1,750	16,195
Winslow, Ariz.	Oct. 12, 1919	1,100	10,935	1,100	17,295
Belen, N. M.	Oct. 13, 1919	400	11,335	700	17,995
Clovis, N. M.	Oct. 13, 1919	800	12,135	550	18,545
Waynoka, Okla.	Oct. 14, 1919	1,250	13,385	1,000	19,545
Argentine, Kans.	Oct. 16, 1919	2,000	15,385	1,700	21,245
Corwith Yards, Chicago, Ill.	Oct. 18, 1919	500	15,885	1,100	22,345

The cars left Lodi, Cal., at 3:15 p. m. October 8 and arrived at Corwith Yards, Chicago, at 1:15 a. m. October 18, thus making the total time for the 2,470 mile trip, 9 days, 9 hrs. and 55 min., or an average speed of 11.0 miles per hour.

After the cars arrived at Corwith Yards on the morning of October 18 no further temperature observations were taken. Cars were moved to the Twenty-first street yards of the Santa Fe, where the electrical thermometer equipment was removed. The cars were held at the yards for consignee's order and for inspection of the fruit by the consignee's inspectors, Santa Fe inspectors and inspectors of the Inspection Service, U. S. Department of Agriculture, Bureau of Markets.

General Results

As shown by the table, the total amount of ice furnished for SFRD 12646 was 22,345 lb. and for CGW 30,000 was 15,885 lb., a difference of 6,420 lb., or 28.8 per cent in favor of CGW 30000. Both cars had the ice tanks filled to the same capacity at the final re-icing at Corwith Yards, as at the initial icing at Stockton. The total amount of ice melted in each is the difference between the total amount of ice furnished in transit and the initial icing. This gives 11,845 lb. melted in SFRD 12646 and 11,610 lb. melted in CGW 30000, or an ice rate of 47.2 lb. per hr. for SFRD 12646 and 46.3 lb. per hr. for CGW 30000.

In the end ice tank car it was necessary to keep the bunkers full of ice in order to secure proper refrigeration, as the ice in the lower portion of the bunkers afforded very little, if any, effective refrigeration; the car equipped with overhead ice tanks had all of the ice located so as to create refrigera-

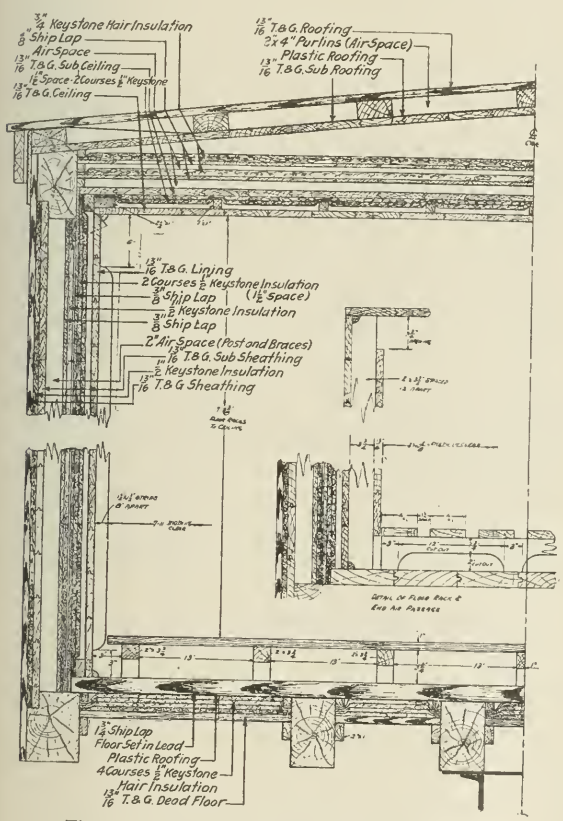


Fig. 3. Cross Section of Car C. G. W.-30000

tion, thus making it possible to carry less ice and yet obtain the same temperature.

The chart in Fig. 5 is plotted from the average of fruit temperatures taken at the bottom and top layers of fruit. Bulbs number 3, 5, 7 and 9 were averaged to show the fruit temperatures of the top layer; bulbs number 4, 6, 8 and 11 were used for averaging the fruit temperatures in the bottom layer. This chart and the data in Table I, giving the temperature comparisons in both cars, show that at times there was no difference in the temperature of the fruit in the bottom and top layers of car CGW 30,000; that the maximum difference was 1.4 deg. F., and the average difference was 0.4 deg. F.

The minimum difference in the temperatures of the fruit in the bottom and top layers of car SFRD 12646 was 5.6 deg. F. The maximum difference was 14.3 deg. F., and the average difference was 8.6 deg. F. The maximum difference occurred early in the test while the temperature of the fruit was being reduced.

The marked uniformity in the temperature of the fruit in car CGW 30000 demonstrated a uniform circulation of refrigerated aid throughout the entire load. The temperature of bulb No. 2 (not given in Table I) in SFRD 12646, located six inches below the ceiling at the geometric center of the car, fluctuated considerably and was affected more by the outside air temperatures than any other thermometer. This fluctuation was due to the heat, passing through the roof of the car, affecting the air furthest from the ice tanks. Due to the location of the ice in the car equipped with the overhead refrigeration system, any heat passing through the roof of the car must have been prevented from reaching the load by its immediate absorption by the ice in the overhead tanks.

At the time the fruit was loaded its temperature was 59 deg. F. At the time the car was sealed the average temperature of the fruit in the top layer of CGW 30000 was 58.0 deg. F. and in the bottom layer 56.6 deg. F. The tempera-

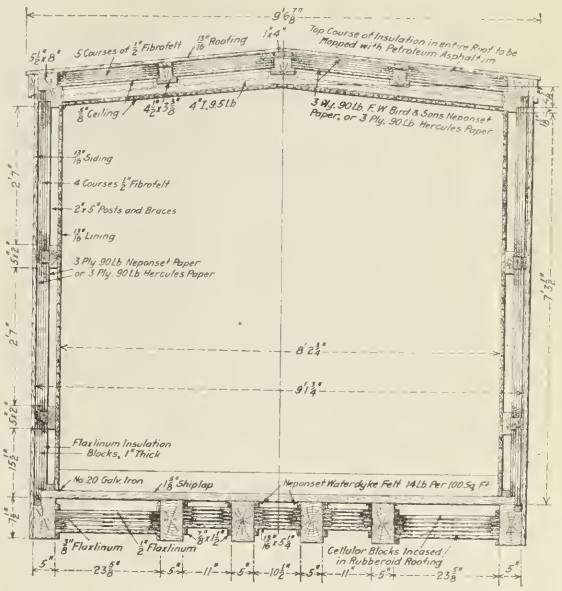


Fig. 4. Cross Section of Car A. T. & S. F.-12646

ture in the top layer of SFRD 12646 was 59.8 deg. F. and in the bottom layer 52.0 deg. F. This shows that the fruit in the bottom layer of the latter car had cooled 7.0 deg. F.; while the fruit in the top layer had increased 0.8 deg., that the fruit in the top and bottom layers of CGW 30000 was cooled 1.0 deg. and 2.4 deg., respectively. At destination the average fruit temperature of the top layer in CGW 30000 was 38.9 deg. F. and the bottom layer 38.5 deg. F., a difference of 0.4 deg. In SFRD 12646 the average temperature at destination in the top layer was 41.6 deg. F. and in the bottom layer 36.0 deg. F., a difference of 5.6 deg.

The top layer of fruit throughout the test averaged 47.7 deg. F. for SFRD 12646 and 44.7 deg. F. for CGW 30000, or 3.0 deg. lower in car CGW 30000 than SFRD 12646. The temperature at the lower layer in SFRD 12646 is affected by the cold air coming directly off the ice, which accounts for the lower temperatures of this layer.

The bottom layer of fruit throughout the test averaged 44.3 deg. F. for CGW 30000 and 39.1 deg. F. in SFRD

12646, or 5.2 deg. lower in SFRD 12646 than CGW 30000. No effect was noticed in the temperatures throughout the load in CGW 30000 when the side wall air passages were either blocked or left open.

Icing in Transit

In constructing car CGW 30,000 with the improved overhead icing system several changes were made in order to secure maximum refrigeration and uniform circulation throughout the car. The car had previously been equipped with six hatches, and they were not altered to instal the six overhead ice tanks. The hatches were not originally designed to be used with the ice tanks, as finally installed in the car, and difficulty was encountered during the test in icing the car; considerable more time was required to properly ice this ca rthan the other test car equipped with end ice tanks.

The objectionable feature in icing this car can be overcome by using tanks setting transversely and lengthening the hatchways, so that each tank can be iced from two hatchways. The construction and insulation of CGW 30000 with the overhead ice tanks are shown in Figs. 1, 2 and 3.

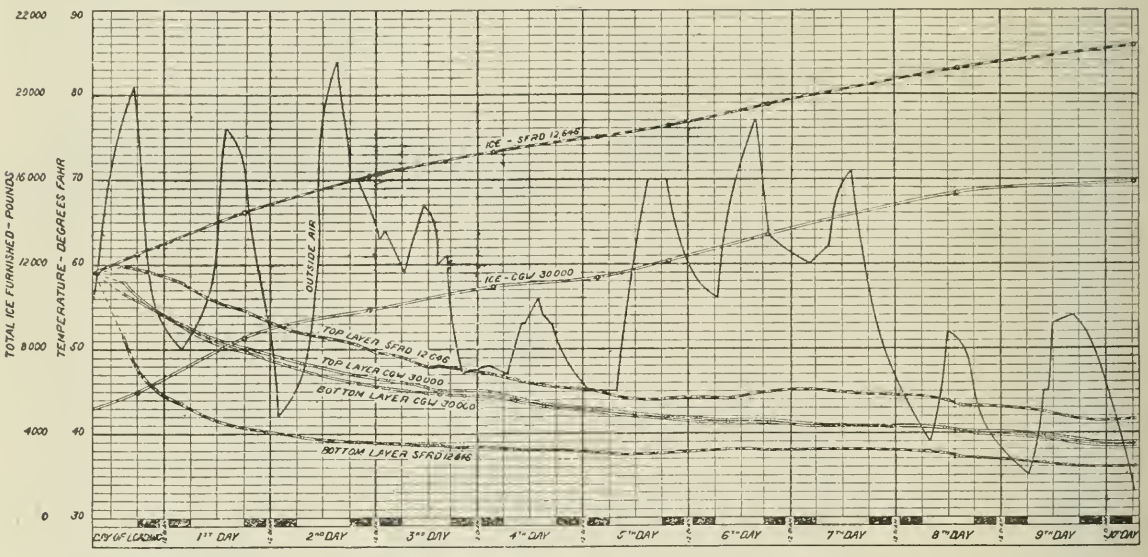


Fig. 5. Range of Temperature and Ice Furnished During Refrigeration Test

Inspection at Chicago

Three separate inspections of the grapes in the two test cars were made at the yards of the Santa Fe by consignee's inspectors, by Santa Fe inspectors and by government inspectors of the Inspection Service, Bureau of Markets, U. S. Department of Agriculture.

The consignee's inspection report showed that the grapes in SFRD 12646 were decayed and moulded much more than those in CGW 30000, the difference in the quality of the grapes in the two cars being great enough to cause the consignee to unload those in SFRD 12646 at Chicago and to divert CGW 30000 on to the New York market.

The Santa Fe's inspection report showed "slight decay and mould in CGW 30000 some decay and mould in SFRD 12646, four crates in top layer near doorway slightly wet, apparently caused by leak from roof." These statements indicate that the grapes in CGW 30000 were in better condition than those in SFRD 12646 and corresponds to the condition found by the consignee's inspectors.

The reports from the Inspection Service of the Bureau of Markets, U. S. Department of Agriculture, are as follows:

SFRD 12646—Stock well packed, highly colored, and presents attractive appearance; a few mouldy berries scattered through top half of load, as noted above (top five layers crates, balance of load practically no decay). Impossible to inspect entire car without unloading; certificate restricted to one stack crates next bracing, each end of car. Temperature top of door 46 deg. F., bottom 42 deg. F.

CGW 30000—Decay in this car slightly in excess of that in car SFRD 12,646. Stock well packed, highly colored, a few scattered mouldy berries, showing very good appearance. Impossible to inspect entire car without unloading; certificate restricted to one stack crates next bracing, each end of car. A few mouldy berries scattered throughout most crates, also many berries showing slight mould at stems. Temperature at top of door 42 deg. F., bottom 40 deg. F.

It does not seem that the consignee would have diverted CGW 30,000 to New York and unloaded SFRD 12,646 if the inspection as shown by government inspectors had been true. The temperatures shown by the government inspection report at the door was 4 deg. lower at the top in CGW 30,000 than in SFRD 12,646 and 2 deg. lower at the floor of the car, notwithstanding their claim of there being less decay in SFRD 12,646.

The four crates, "slightly wet," referred to in the Santa Fe inspection report, resulted from condensed moisture dripping from four baffle supporting bolts which were not properly protected.

Conclusion

1. Car CGW 30,000, equipped with overhead ice tanks, was furnished with 28.8 per cent less ice than car SFRD 12,646, equipped with end ice tanks.

2. At times there was no difference in the temperature of the fruit in the top and bottom layers of car CGW 30,000; the maximum temperature difference was 1.4 deg.; the average temperature difference was 0.4 deg.

3. The minimum temperature difference of the fruit in the top and bottom layers of car SFRD 12,646 was 5.6 deg.; the maximum temperature difference was 14.3 deg.; the average temperature difference was 8.6 deg.

4. The fruit in the top layer of CGW 30,000 through-

out the test averaged 44.7 deg. F. and that in SFRD 12,646 averaged 47.7 deg. F., or 3.0 deg. higher than in the same layer of CGW 30,000.

5. The fruit in the bottom layer of CGW 30000 throughout the test averaged 44.3 deg. F. and that in SFRD 12,646 averaged 39.1 deg. F., or 5.2 deg. lower than in the same layer of CGW 30,000.

6. The temperatures in test car CGW 30,000 showed that the air circulation was practically uniform throughout the entire load, giving substantially uniform temperatures in all the crates of grapes.

7. The temperature in test car SFRD 12,646 showed that the air circulation was not uniform throughout the load, causing an extremely wide variation of temperatures in the grapes in the bottom and top layers.

8. The time required for icing CGW 30,000 was considerably greater than SFRD 12,646, but by changing the design of the ice tanks and hatches practically the same time would be required for icing both cars.

9. The condition of the grapes in CGW 30,000 was much better than in SFRD 12,646, the percentage of decayed grapes running much higher in SFRD 12,646 than in CGW 30,000.

10. Consignee's inspection reports on the condition of the grapes in the two test cars upon arrival in Chicago warranted them forwarding CGW 30,000 on to the New York market and in unloading those in SFRD 12,646 on the Chicago market.

11. The inspection report on the condition of the grapes in the test cars upon arrival in Chicago, as made by the Inspection Service of the Bureau of Markets, U. S. Department of Agriculture, was superficial, since only one stack of crates in each end of car was inspected, and was contradictory to the other reports, both of which showed less decay in CGW 30,000 than in SFRD 12,646.

12. On the whole, the test showed the performance of CGW 30,000 to be superior to SFRD 12,646, since it used less ice, gave a substantially uniform temperature throughout the entire car and carried the load in better condition than the other car.

The amount of this saving attributable to the overhead ice bunker and the amount due to other differences in the construction of the cars could not be determined. The insulation in both cars was practically the same, but car CGW 30,000 was equipped with floor racks, which permitted a free circulation of air, resulting in a more uniform temperature throughout the car than is possible without the floor racks. Additional tests with both cars identical in construction, except for the ice bunkers, would doubtless give very valuable data and lead to greater economy in refrigeration in railroad cars.

This test was made by G. J. Congdon, supervisor fuel and refrigeration, Chicago Great Western, and witnessed by Lester W. Collins, mechanical engineer, Refrigerator Heater & Ventilator Car Company, St. Paul, Minn. The test was made possible through the co-operation of the shippers, T. H. Peppers Co.; consignee, Crutchfield, Woolfolk & Clore; the officials and employees of the Santa Fe Refrigerator Despatch Co., and the Santa Fe Railroad. The Bureau of Markets, U. S. Department of Agriculture, Washington, D. C., loaned sufficient electrical thermometer equipment for conducting the test.

A Distinguished Service Medal has been conferred on Max Thelen, now director of the Division of Liquidation Claims of the Railroad Administration, for his services in the War Department from June 14, 1918, to January 15, 1919, in connection with the supervision of war contracts. He was appointed as surveyor of contracts and later held various other offices in the department in connection with contracts.

Freight Traffic Conditions in the West

The present condition of freight traffic in the West is one entirely dependent upon the ability of carriers east of Chicago to accept and move commodities. The congested condition of practically every important terminal between New York City and Chicago has necessitated the application of stringent orders and embargoes which, however, have afforded only temporary relief in that, as soon as they have been lifted or modified, the congestion has again become acute.

The Chicago Terminal Situation

A description of the situation existing at each of the terminals lying between New York City and Chicago would necessarily be merely a repetition of facts and figures, the cause for which would, in all cases be similar, i.e., the inability of connections to accept and move accumulated tonnage. In addition, it is probably true that the condition at each of these terminals is analogous to the situation existing at Chicago, where a large part of the interchange between western and eastern carriers is made. In turn, a description of the situation existing at Chicago gives the reasons for such freight congestion as now prevails on roads west of that point.

The daily interchange capacity of the Chicago terminal is approximately 50,000 cars a day. During the month of January, 1920, the number of cars interchanged daily through this terminal varied between 30,500 and 50,000, depending largely upon weather conditions. As compared with January, 1919, the daily record for the same month of this year shows that, with few exceptions, the number of cars interchanged daily has consistently exceeded last year's record by from 6,000 to 10,000 cars. During February, 1920, the total daily interchange in the Chicago terminal has mounted until it has at times exceeded the total capacity of the terminal, and at no time during the present month has the total number of cars interchanged dropped below 42,500 each day. When compared with the high daily record of 41,000 cars interchanged in the Chicago terminal during the month of February, 1919, this record is clearly indicative of the situation existing at the present time.

Other records recently compiled, showing the number of cars on hand in the Chicago terminal for eastbound movement, are even more indicative of the existing situation, due entirely to the inability of eastern carriers to accept and move traffic. On February 16, 1920, there were 12,936 cars in the Chicago terminal awaiting eastbound movement. Since February 1, the average accumulation of cars at this point awaiting movement east, has been between 12,000 and 14,000. This accumulation would require at least 48 hours to move if all incoming freight was to be stopped, inasmuch as the average number of cars handled eastound from Chicago daily is approximately 6,000.

The westbound movement in the Chicago terminal is being moved currently, but to capacity, both in movement and car supply, according to Chicago traffic officers.

The Northwestern Region

In general there is at present no acute congestion in the Northwestern region, with the exception of that existing in the Chicago terminal. The situation at other terminals in this region is, however, analogous to, and dependent upon, the situation at Chicago, and varies in common with the amount of accumulation at the latter point. Indicative of the condition in general are the figures compiled by Northwestern regional officers for February 14. On that date there were 6,469 cars delayed over 48 hours on account of the inability of carriers to receive and move this tonnage. This is approximately the daily average which has existed for the

past six weeks. To this number of cars should also be added 7,040 cars delayed on account of formal embargoes, and 2,550 cars delayed over 48 hours on account of the inability of connections to accept and move them.

Other terminals in the Northwestern region, such as St. Paul, Minn., Minneapolis and Duluth, which have experienced more or less congestion during the period of government control, are now reporting that practically all traffic is being handled currently, but that any further congestion in connecting lines will undoubtedly result in a serious tie-up at these points.

It can readily be seen that the entire freight situation in the Northwestern region is dependent upon the condition existing at terminals further east, the condition of which varies with the freight traffic situation in the Chicago terminal, which in turn depends upon the ability or inability of eastern carriers to accept and move the traffic offered.

The Central Western Region

Unfortunately no compilations have been made for the Central Western region such as have been prepared for the Northwestern region. Traffic officers of the region, however, state that, in general, there has been little serious accumulation of freight, and such accumulation as has been noticed has been due, as in the case of the Northwestern region, to the inability of eastern roads to accept and move traffic. The terminal situation at Kansas City, Mo., and at St. Louis has been watched very closely, and although no serious accumulations have resulted, more or less congestion has been prevalent for some time. At Kansas City the situation has been exceptionally tense for approximately two months, and at St. Louis the inability of the Wabash to accept additional tonnage has resulted in a similar condition. Embargoes on through traffic routed via the Ft. Worth & Denver City, have been in effect since December, 1919. These embargoes were placed because of the congested condition of the West Texas lines, in turn the result entirely of the extraordinary development of the Western Texas oil fields. The placing of embargoes on through traffic routed via the Gulf, Colorado & Santa Fe, and the Texas & Pacific through Sweetwater, Tex., has also resulted in a certain amount of accumulation on lines in the Central Western region, these embargoes likewise being due to the rapid extension of oil operations in Texas and the resultant heavy traffic in oil and oil-well supplies. Practically all of the transcontinental lines in the Central Western region have reported exceptionally heavy traffic although they have been able to handle this traffic without serious terminal congestion.

The Southwestern Region

Terminal congestion in the Southwestern region has been principally confined to roads operating in and tributary to the newly developed Texas oil fields. This condition has necessitated the placing of embargoes on many of the roads in Texas, and as a result, has caused accumulations of freight to occur at many of the smaller terminals. The exceptionally heavy cotton crop produced in Texas during the past year has also resulted in a certain amount of congestion, but this is being rapidly cleared owing to energetic steps taken by both Railroad Administration officers and shippers.

Causes of Congestion

The fundamental reason for this situation has been, and will continue to be the enormous increase in the tonnoge of commodities offered to the railroads for movement. In the Northwestern region alone, the number of cars loaded daily has increased 3,000 over the records established for last year, and the total number of cars handled daily has increased approximately 20,000. This cause has been abetted by periods of extremely bad weather, especially in the Southwestern region, where heavy rains have seriously damaged road-beds and greatly reduced the efficiency of the existing carriers. Throughout all of these regions, every effort has been made to use the existing facilities to the greatest extent possible, and the latitude in diversions and joint arrangements existing under unified control have been employed to the utmost. However, with all of these aids, the accumulations at various points have not been dispelled, although they have been reduced. It is undoubtedly true that without the co-operative machinery existting at present, it will be harder to eliminate congestion at many points.

The situation throughout the West in general is tense. Practically every railroad and terminal is now operating to its maximum capacity, and many have exceeded all previous records for the amount of tonnage handled. It can readily be seen that the conditions existing at all terminals in the West will immediately become critical if any further congestion arises at Chicago or east of that point.

Brown's Discipline on the Canadian Pacific

ONE OF THE ROADS on which the regulations for the administration of discipline without suspension are carried out in a very systematic way is the Canadian Pacific; and the monthly "Educational bulletin" contains much instructive matter. Usually, as, indeed, is inevitable, in the nature of the case, the notes concerning demerits are much more numerous than those of the opposite character; but the bulletin, for December last, issued by J. J. Scully, general superintendent of the Algoma district, starts off with nine commendatory items. Some of these we quote:

L. Kennedy, conductor; B. F. Daniels, engineer; W. J. Miller, fireman; M. McCnaig, trainman; E. B. Tremblay, 10 merit marks for good services rendered in getting tire off engine and getting engine and train into clear at Hurkett, for Trans-Canada train, thereby reducing delay.

C. Currie, conductor; W. Connaughton, engineer, twenty merit marks: At washout at ..... while pinned in engine in water of Lake Ramsay, told men around them to leave them alone until they had flagged a westbound freight train.

L. Fournier, fireman, 20. After going down with engine in washout rendered very valuable first aid assistance to men pinned in engine.

William Bain, trainman; A. R. Edwards, trainman, ten, for firing engine on freight train over greater portion of sub-division, when fireman owing to fatigue was unable to do so.

M. Sonliers, trainman, 20, for extraordinary promptness and energy displayed in going to flag train after he had been thrown out of engine going into washout.

G. Tapping, Trainman, 15, for prompt and efficient action in getting Coolies out of damaged coach and directing their movements to shelter; temperature 47 below.

William Smith, trainman, 10, for refusing reward offered by passenger—circumstances being—trainman found purse containing large amount of money and had it returned to passenger.

Some of the demerits are of interest; for example:

Car inspector, five, for placing soft coal, instead of hard coal, in sleeping car on passenger train, resulting in discomfort to passengers.

Call boy, 20, for improper delivery of commercial telegram, after being instructed how to deliver it.

Conductor, 30, for not getting new clearance, knowing the one he had was incorrect as to next train ahead, also exceeding speed limit and allowing front end brakeman to ride in van.

Fireman, five, for failing to read clearance and orders when on freight train.

Engineer, 40 marks and reduced to fireman for one year; violation of Rule 93, resulting in rear collision.

Operator, five, for allowing freight train to leave his station without ascertaining if train ahead had reached next station.

Trainman, ten, for riding in van instead of engine, when front end brakeman on freight train.

Trainman, 20, for taking passenger back to the observation car on passenger train,, when said passenger had no right to be there

One incident made the subject of a special paragraph, was as follows:

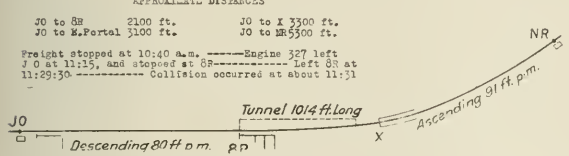
While whistle on locomotive of a passenger train was being sounded for highway crossing, valve stuck open and could not be closed. Train Baggageman V. Lanthier, having a whistle in baggage car being shipped under value label, immediately produced it and engineer S. E. Kennedy dumped portion of his fire, banked remaining part, cooled engine and removed the defective whistle and applied the whistle from the baggage car. He was given valuable assistance in this effort by engineer S. Adams, who was travelling as passenger on train. As a result of the good judgment and commendable effort made by these men the engine was able to take train through to terminal with only twenty-four minutes delay.

Calling-On Signals, Telephones, and Track-Circuit Control

THE LAST ACCIDENT BULLETIN of the Interstate Commerce Commission Bulletin 71, dated November 29, (noticed in the *Railway Age,* February (?) contains a report on a rear collision of eastbound trains which occurred on the Pennsylvania Railroad at West Philadelphia on January 18, 1919, giving details of the cause of the collision not before made public; and we print below a synopsis of the report, embracing numerous facts of interest to signal engineers and operating officers.

In this collision a freight train ran into a passenger train and it resulted in the death of one employee and the injury of six employees and four passengers.

"This accident was caused by a calling-on signal, which had been displayed at caution for a previous engine, being left in the caution position; by the failure of the engineman of the passenger train to operate his train under absolute control as required by the rules and dictated by good judgment under the exceptional circumstances which existed at the time; and by failure to provide adequate flag protection. . . . Some of the automatic block signals are semiautomatic, operated from interlocking, plants. JO and NR signal stations are located a mile apart, west and east, respectively, of the New York & Pittsburgh subway (an under passage for eastbound crossing the route of southbound trains). The western approach to the subway is a



Collision of January 18, 1919

tunnel, and the point of accident was in the subway about 200 ft. east of the eastern portal of the tunnel on an increasing curve to the left, the maximum curvature of which is six degrees. At the point of collision the grade is 1.72 per cent ascending for eastbound trains. The weather at the time was cloudy.

"The trains involved were eastbound freight extra 928, engine, 46 loaded cars and two helper engines, and eastbound passenger No. 20, engine and five cars. The freight train had left Enola, Pa., at 9 o'clock the night before and had been on the road about 14 hours. It passed JO at 10:40 A. M. with helper engine 1965 at the rear. It parted and had to have help; and engine 327, running with tender ahead, passed JO at 11:15 a. m., and stopped for the signal west of the tunnel. On getting the calling-on signal, the engineman called in his flagman and proceeded cautiously to find the rear of extra 928. When the rear of engine 1965 was seen and a coupling made, the flagman went back into the tunnel with a red flag and a red light. He did not have torpedoes or fusees with him and stated that there were none on the engine. The tunnel was filled with steam and smoke and he could not see. When he heard a train coming through the tunnel he ran toward it, signaling and calling, and threw his lantern at the engine, but failed to attract attention.

"Passenger No. 20 passed JO at 11:29½ a. m., and passed the flagman of engine 327 a short time later. The engineman of No. 20 was not aware of the train ahead until he emerged from the tunnel, when he heard a shout and immediately applied the brakes in emergency, but too late to avert the collision, which occurred at about 11:31 or 11:32 a. m. Employees said that the speed of No. 20 was not more than 10 miles an hour but it was probably in excess of that rate. The three engines were considerably damaged, and the caboose was practically destroyed.

"The signals on this line are of the 3-position, upper quadrant, semaphore type. NR signal station is a modern plant, well installed and maintained. The interlocking machine is of the electric type. All functions are straight electric except signal 8-R, which is electropneumatic. This signal is located at the west end of the subway about 3,070 feet west of NR signal station and out of sight of signalmen. The bottom arm of this signal, 8-Rb, is known as a hanger or 'calling-on' signal; normally it is operated as a semi automatic signal, being controlled by track, line, and local circuits. A push-button arrangement is provided whereby the track-circuit control feature may be eliminated; when the block is occupied, signal 8-Rb can be placed in the caution position by the signalman by moving lever 8 to the right and pressing a push button, which is then uncovered. Signal 8-Rb remains in the 45-degree position, irrespective of the condition of the block, until lever 8 is restored to normal position.

"A train approaching signal 8-R and finding it in stop position is required under the rule to ascertain the cause by telephone and fill out a clearance card by direction of the signalman if necessary. In order to avoid making out these cards, it has been customary for the signalman, when notified of a train west of or at signal 8-R, to place signal 8-Rb in the caution position by means of the push-button device. This action has the effect of nullifying the track circuit control over the signal and authorizes a train to proceed at low speed and enter the block, though already occupied. Operating in connection with signal 8-Rb are several light indicators; one of these, located in front of the director, is extinguished when an approaching train reaches the home signal at JO; a red light on the machine is displayed when signal 8-Rb has moved from the horizontal position; and when a train enters the block controlled by signal 8-Rb a white light on the machine is extinguished; when a train has passed or cleared signal 8-R, the indicator in front of the director is illuminated.

"When JO reported No. 20, NR asked where it was, and, on being told 'down here,' which indicated that it was near the west portal of the tunnel, he put lever 8 back so as to restore signal 8-Rb to the stop position; but No. 20 had already passed that signal. The passenger train received a caution indication at the signal near JO.

Discussion

"It is apparent from the investigation of this accident that several factors were involved, and that it might have been averted by any one of several employees. In the following statement of cause and discussion, these features are considered in sequence and not necessarily in the order of relative importance.

"The investigation disclosed that the calling-on signal was left in the caution position for about 10 minutes after engine 327 passed it. This engine passed JO at 11:15 a. m., was delayed about five minutes at signal 8-R, and had passed through the tunnel and stood coupled to the rear of extra 928 some seven or eight minutes before the collision occurred. The signalman at NR block station was familiar with the schedule of train No. 20 and means were available for him to ascertain whether that train was on time. Under the circumstances no indication could be received that engine 327 had passed signal 8-R, but under the rules, it was the duty of the signalman to restore signal 8-Rb to normal or stop position after allowing a reasonable time for the movement of the light engine which had been authorized, and in any event it was imperative that he should do so before the arrival of No. 20. His failure to

restore that signal to normal before No. 20 passed it resulted in that train accepting a signal which was not intended to be displayed for it. Had this signalman properly performed his duty in this instance, the accident would undoubtedly have been averted.

"In view of the signal indication received, as well as the fact that the view in the tunnel was totally obscured by steam and smoke, the engineman of train No. 20 should have reduced the speed of his train to a very low rate and should have proceeded only when he was certain that his train was absolutely under control. Had the speed of his train upon emerging from the tunnel been as low as was claimed, the distance of 150 or 200 feet to the point of collision would probably have been sufficient to bring the train to a stop. It is evident that the speed of train No. 20 exceeded that authorized by the signal and rules as well as that permitted by good judgment of an experienced engineman, and it is believed for that reason that the direct responsibility for this accident rests primarily upon the engineman, Had he fully complied with the signal and the rule, and exercised good judgment under the circumstances, the accident would not have occurred, notwithstanding the failure of the signalman promptly to restore the signal to normal position.

"The conductor and engineman of engine 327 are also at fault for failing to see that adequate flag protection was afforded their engine. Under the circumstances, the conductor should have instructed his flagman to remain at the western portal of the tunnel and hold all trains until recalled. The rules also require that the engineman and conductor must know that their locomotive is supplied with all signals necessary. The investigation developed that engine 327 was not supplied with all materials required to provide necessary flag protection.

"The flagman, being an experienced employee, should have remained at the western portal of the tunnel without instructions; and he is also at fault for not knowing that the proper flagging materials were at hand.

"As is evidenced by the occurrence of this accident, the push-button feature of signal 8-Rb introduced a source of possible danger. The direct lever control of a signal in that location is considered by no means good practice, and this was one of the controlling conditions which rendered this accident possible. It is noted that since the accident, measures have been taken to eliminate the unsafe condition disclosed; the push-button arrangement has been discontinued, thereby eliminating the calling-on feature of that signal."

Railroads Assert Post Office Department Evades Mail Pay Order

Fred H. Wood and other attorneys for the Railway Mail Pay Committee, representing the railroads, have filed with the Interstate Commerce Commission a petition alleging that instructions and rulings with reference to the transportation of mail by railroads, issued by the second assistant postmaster general to become effective on March 1, are in conflict with the order issued by the commission recently in the railway mail pay case, and the commission is asked to issue a ruling. It is stated that on or about February 11 the second assistant postmaster general issued a book of instructions and rulings for the application of the space system of authorization and payment for the transportation of mails purporting to give effect to the newly established rules of the commission and superseding previous instructions and rulings.

The carriers allege that these rulings are in certain respects, set forth in detail in the petition, in conflict with the order, and also that in certain respects new rulings have been established enlarging the duties or affecting the pay of the carriers without authority of the order of the commission. The carriers are of the opinion that the instructions are plainly in conflict with the order, but the ruling is asked in order that the matter may be determined in an orderly and seemly way. The principal point complained of is that the department's order in effect provides for changes in the space authorizations en route without regard to the ability of the railroad to reduce the consist of the train, whereas it is contended that the commission's order is plainly intended only to permit the discontinuance of authorizations after the department has no further use for the car, and that this is accomplished by discontinuing the authorization for a certain amount of space and immediately substituting an authorization for a lesser amount of space.

The commission said in its decision that when a full car needed over part of a run and less space is needed over the remaining part of the run it is not just that the railroad company should receive no pay for the wasted space involved in the extra service. As an example there is cited a case testified to at the hearing before the commission. On Boston & Maine train No. 53, running from Boston to Groveton, N. H. a 60-foot R. P. O. car is authorized from Boston to Plymouth, 124 miles, where the authorization is reduced to a 30-foot apartment car as far as Wells River, 43 miles further. There it is again reduced to a 15-foot apartment car from Wells River Junction to Whitefield Junction. "To make the change and perform the transfer," the petition says, "would delay the train 40 minutes, miss the connections at junction points further on, and thereby delay passengers and mail for connecting trains, 6½ hours for one connection, 5 hours for another. and 9 for a third connection. The resulting delay to the mail would be so serious that the railroad company was informed that if it made the changes in equipment theoretically contemplated by the authorization its mail would be diverted."

It is stated that the rule proposed by the department would have prevented the second change from a 30-foot apartment car to a 15-foot apartment car, but would have preserved the first change at Plymouth from a 60-foot R. P. O. car to a 30-foot apartment, Plymouth being the point at which the delay specified would be encountered. The rule established by the commission, it is contended, would give the railroad company pay for the full round trip of the car run for the 60-foot car actually set apart and devoted to the mail for the whole run, and this is the pay the railroad company should in justice receive.

"As long as such practices are possible," the petition says, "the space basis can never be an equitable basis of pay. It is a mere quibble to say that a change from a 60-foot R. P. O. car to a 30-foot apartment car, or from a 30-foot to a 15-foot apartment car is a discontinuance of an R. P. O. or apartment car authorization and the substitution of another."

It is also alleged that the postmaster general has ruled that the order of the commission providing for separate pay for side and terminal service is not applicable for the period between November 1, 1916, and March 1, 1920, which, it is charged, is a misinterpretation of the commission's decision.

A number of tests were made recently on the Southern Pacific for the purpose of determining whether superheater locomotives, equipped with 10,000-gal. tenders, can handle full-tonnage trains between Mecca, Cal., and Niland (a distance of 47 miles), and between Niland and Yuma, Ariz., (adistance of 59 mlies), without the use of water-cars. The hauling of water-cars over this stretch of desert is continued at a large yearly expense and notwithstanding the many attempts made to locate water and establish water stations, no satisfactory supply has yet been discovered. The results of the tests have not yet been made public.

Labor Leaders Fight the Esch-Cummins Bill

Congressmen Resent Apparent Attempt to Dictate to Them. Subordinate Officials Go on Record

THE campaign of the railroad labor organizations and the American Federation of Labor to defeat the Esch-Cummins bill by threatening the political future of Congressmen who vote for it, in the hope that a failure of the bill might prevent the return of the railroads on March 1, was given a new impetus when they learned of the new labor provisions of the bill, providing for practically compulsory arbitration, although without penalties, by a board on which the public would have a one-third representation.

A conference with members of Congress for the purpose of planning the final fight against the bill was in progress when they learned of the new provisions for the settlement of wage disputes. The railroad labor leaders then went into conference with the officers of the American Federation of Labor, and on February 19 another meeting was held in the office building of the House of Representatives at the call of Representative Nolan of California, which was attended by most of the recognized spokesmen for labor among the Representatives. The call for the meeting was so worded, however, as to bring out a number of Congressmen who could not be so classed, and led to a lively controversy. The meeting was held in the caucus room, and Representative Sanders of Indiana charged that members of Congress had been called into caucus by organized labor to be dictated to on the railroad bill "in order to foist government ownership upon the country." When it was explained there had been some misunderstanding, and the chairman of the meeting asked how many had attended with the understanding that a caucus was to be held, about twenty of the Representatives rose. President Gompers of the American Federation of Labor replied to Mr. Sanders, saying: "Samuel Gompers has not been very much an advocate of government ownership. Turn back the railroads, but leave the railroad men unfettered."

According to press reports of the meeting, Mr. Gompers read an abstract of a telegram which, he said, according to information conveyed to him, had been sent out by Alfred P. Thom, counsel for the Association of Railway Executives, saying that the only difference between the anti-strike clause of the Cummins bill and the new provisions adopted by the conferees, was that in the former a penalty could be imposed by a jury, while in the latter an injunction method would be followed and a penalty fixed and assessed by a court in contempt proceedings.

On the following day Mr. Thom issued a statement denying he had sent any such telegram or had said anything that could be construed into the slightest foundation for Mr. Gompers' statement.

A memorial to Congress was read at the meeting, which contained an argument against the railroad bill, but particularly against the new labor provisions, which were attacked bitterly. Individual members of Congress also have been deluged with telegrams and letters protesting against the bill.

Memorial to Congress

In the memorial objection was made to the provisions of the bill giving the "subordinate officials" the same recognition as employees and particularly to the provision which authorizes the labor adjustment boards to consider disputes on petition of 100 unorganized employees, as well as upon the application of any organization of employees or subordinate officials. An abstract of the memorial is as follows:

"Railroad employes never have and do not now seek to be treated as a privileged class, but we ask and expect just and equitable treatment and the continuation of our unalienable right to have an equal voice, representation, and vote in any tribunal created by law or mutual agreement which is to establish by its decisions the compensation we are to receive for our efforts and the working conditions under which our services must be rendered. One-tenth of the population of the United States is represented by the railway employees. We render the service on which the life of the nation depends. We have a dual interest to conserve, interest as citizens, and our interest as the great human force that makes possible this essential service. As citizens and railway employees, we protest against the adoption of the pending railroad bill, and as ground for our protest we show:

"First.—That the pending bill violates in its provisions the fundamental principles of American government. The people of the United States have retained to themselves certain elements of sovereignty of which they may not be deprived by the act of any legislative body.

"These powers reserved to the people in the various Bills of Rights were by the framers of the Constitution held to be inviolate and against federal invasion. The proposed railroad bill, by guaranteeing to investors in railways a minimum return of 6 per cent, thus conferring upon railway corporations and the holders of railway securities particular and exclusive privileges 'distinct from those of the community' were privileges not based upon the 'consideration of services rendered to the public.'

"It has been the policy of our government to regulate charges for public services by prescribing maximum rates above which no demand could be made of the public for the services rendered. Such are the constitutional provisions of most of the states under whose sovereignty railway charters are now held.

"Competition was relied upon to keep rates down, upon regulation to prevent their becoming extortionate. It is proposed that we now abandon that theory. This act denies to the public the benefit of competition, the public to pay 6 per cent, not as the compensation for services rendered the public, but upon a value of their properties as determined by an administrative body. Heretofore, it has always been held that the basis upon which compensation was to be received must be judicially determined. The rate of compensation to be allowed was the subject of legislative determination. By this act we would abandon these established procedures and make both the rate and base questions of administration beyond the power of judicial review and beyond the control of legislative sanction.

"By this bill the government which we have instituted for the common good is prostituted to establish the private interests of holders of railway securities as a class, giving to them a first lien upon the property of the country at the expense of all other citizens, investors, producers, and consumers. This is an intolerable subversion of the principles of American government, an abandonment of government for the common good, the establishment of government for private interest, special privileges, and class benefits.

"Under the provisions of paragraph 1, Section 304, the labor group representing the employees and subordinate officials are to nominate not less than six nominees, but under the provisions of paragraph 5, Section 300, no nominations can be made until after the commission has held hearings and promulgated the method of procedure for making such nominations. Under the provisions of Section 305, nominees must be selected within 30 days after the passage of this act. No provision is made that will require the commission to promulgate regulations in sufficient time to permit the employees to comply with Section 305.

"Paragraph 5, Section 300, also proposes that the commission shall be required to define (within the meaning of the act) the class or rank of 'subordinate officials' who shall come under the provisions of the act. This provision in conjunction with paragraph 1, Section 304, and Section 305, grants special consideration and recognition to a class of employees, now eligible to the respective organizations, on an equal footing with the recognized

standard organizations, yet they comprise less than 5 per cent of the total railroad employees. This special consideration also permits a situation to arise that could result in the appointment of three 'subordinate officials,' three representatives of the carriers likewise 'subordinate officials,' and three members constituting the public group, as the constituent members of the Railroad Labor Board—a labor board without a representative of the 1,900,000 organized railroad workers on it.

"Sections 301 and 303 establish a method of procedure which, if followed, will destroy all discipline and lead to chaos, for the following reasons:

"(1) It permits and encourages the employees to disregard existing agreements and long established orderly methods of procedure.

"(2) It provides that any group of employees in excess of 100 may initiate a movement within one recognized class, in each of the respective recognized classes, on any one railroad, or on all of the railroads, and this may be duplicated by dividing the respective classes by 100, multiplying the total number of railroads, carried to a logical conclusion, it could be possible to have approximately 20,000 groups of not less than 100 employees presenting requests, on say, 165 trunk lines, no two of the requests being the same.

"(3) Failure to designate and treat with the standard recognized organizations representing approximately 95 per cent of all the employees, can be construed to mean nothing less than that the provisions of this Act are primarily based upon a determination to annul existing agreements and destroy the organizations which negotiated them.

"Sec. 302: 'Railroad Boards of Labor Adjustment may be established by agreement between any carrier, group of carriers, or the carriers as a whole, and any employees or subordinate officials of carriers, or organization or group of organizations thereof.'

"This section confirms the analysis of Sections 301 and 303, in that it permits and encourages the formation of Labor Adjustment Boards for groups of employees by units of not less than 100.

"With the above in mind it is well to note Section 306 (a) and (b). Section (b) provides that the original members of the labor board for each group shall be appointed for three, two and one year terms, respectively. Section (a) provides that an appointee must give up his rights as a member of the organization of his craft except insurance, pension or other benefit fund. Men in the organized labor movement competent, by their long years of experience and training, to deal with the questions evolving upon a board of the character contemplated, cannot be expected to relinquish an association representing their life's work, to accept a position, under the provisions above cited.

"Paragraphs (a) and (b), Section 306, in conjunction with other citations made, but reinforce an already justified conclusion, that the provisions of this act were never intended to serve as an instrument to preserve or promote harmonious relations between railroad labor and the carriers. These provisions practically insure the nomination and appointment of nine members, six of whom can be fairly said to represent interests other than labor, and three representing the employers.

"We direct special attention to paragraph (b) Section 307. By a careful analysis it will be seen that the labor board may, upon its own initiation, set aside any agreement entered into between carriers and its employees, if in its opinion the agreement involves increases in wages or salaries which would necessitate increase in freight and passenger rates. It is possible under such proceedings to prevent any increases in pay for railroad employees regardless of what the circumstance may be.

"We also direct particular attention to Section 312. While railroad labor is guaranteed against a reduction of wages under this act prior to September 1, 1920, yet neither the interests of the public or labor are safeguarded after that date. On the other hand, capital is guaranteed a minimum return of 5½ per cent, leaving both the public and labor at the mercy of capital after September 1, 1920.

"As railway employees, we submit that the pending bill in the particulars above enumerated is destructive of our constitutional privileges and liberties.

"The pending bill in its provisions under Title 3, deprives citizens employed upon railways of this inviolate right to enjoy gains of their own industry. The returns to capital are fixed upon an arbitrary basis, the rate which the public must pay and wages which labor must receive must accommodate themselves to this basis fixed for capital. This act makes Congress predominant. It makes the public and labor subservient to capital. For these reasons herein setforth and many others, we request and respectfully urge that the bill be defeated in its entirety."

Congressmen Object to Threats of Labor Leaders

Apparently the threatening attitude of the labor leaders and the character of the statements they used in their final desperate efforts to attack the bill reacted against them and caused them to lose some support during the last few days, as men heretofore inclined to be friendly to labor were forced by the spectacular character of labor's drive against the bill to take a position antagonistic to the unions, lest it be said they were being dictated to. The conference Thursday evening, which many attended under an apprehension that it was to be a party caucus, aroused considerable resentment at the Capitol, and many were willing to believe that a trick had been played for the purpose of getting out as many Congressmen as possible to hear the threats against those who should vote for the bill.

An account of the meeting was given in the House on the following day by Representative Blanton of Texas, as follows:

"In the past Congress and Washington have seen some remarkable Republican caucuses. We have had in Congress during its past history some very remarkable Democratic caucuses, if you please. But never until last night, in the whole history of this Congress and the Nation, have we ever had before what is known strictly as a Gompers caucus of Congressmen, if you please. Why, yesterday every Congressman, Republican or Democrat, who voted for what is known as the Anderson amendment had his office rung up, and his secretary was told that the Congressman should appear that night in the House caucus room, as Mr. Gompers was going to address the members—not the ones who voted against the Anderson amendment; they were not so honored. Yesterday's newspapers told us that Mr. Gompers would give us his ultimatum on the railroad bill. But not a single Democrat and not a single Republican who voted against the Anderson amendment, now commonly called "the organized-labor amendment," was invited to this caucus. Blood was put on his door and he was skipped.

"And the most remarkable thing about this Gompers-congressional caucus was that when telephoning the summons to members yesterday, if they happened to be Republicans, they were then told that the affair was going to be a Republican caucus, while if they happened to be Democrats they were told—at least a number of them—that it was to be a Democratic caucus, because when that question was raised last night in the caucus—I was not there, but some of my Gompers friends told me—several Congressmen stood up who are Democrats and said that they had been informed it was to be a Democratic caucus, and a number of Republican Congressmen stood up and said that they were told it was to be a Republican caucus. A caucus for what? To hear Mr. Gompers deliver his final orders and tell Congressmen what they should do in respect to the railroad bill when it is voted on Saturday."

"Subordinate Officials" Protest

The statements made in the labor memorial regarding "subordinate officials" brought an immediate response in the form of another memorial from the officers of the American Train Despatchers' Association, the International Association of Railroad Supervisors of Mechanics, International Association of Railroad Storekeepers, National Order of Railroad Claim Men, Railway Traveling Auditors' Association, Roadmasters' and Supervisors' Association, and the Railroad Yardmasters of America, in which they took particular exception to the statement that their representatives would be representatives of the companies.

"This is a charge," says the memorial, "that cannot be supported by them, and one which, if they had taken any trouble to inform themselves, and had wanted to act in any spirit of fairness and honesty, would not have been made. It is a charge that we, the accredited representatives of the so-called subordinate officials, wish most emphatically to deny, and we will assert that the constituents of these representatives of the 'standard organizations' will aid us in the denial.

"The very suggestion that the labor board even might be so constituted as to exclude the 95 per cent of railroad labor is an insult to the one man who has the personnel of the board in charge, namely the President of the United States, and an insult to every member of the Senate, by implying that they would indorse the personnel of a board selected in such a discriminatory manner. It reveals a suspicion of organized government worthy of the soviet system of Russia, but having no place in the affairs of this government of ours."

These organizations, or some of them, had inspired and supported the amendment to the Cummins bill introduced by Senator Spencer to provide a special adjustment board for subordinate officials. This was vigorously opposed by the Grand Order of Supervisors of Railroads, which objected to being treated as a labor union. As redrafted, the labor provisions of the bill do not create any boards of adjustment, but authorize their creation by voluntary agreement between railroads and other organized or unorganized employees or subordinate officials.

The representatives of the railroad unions that had called on the President regarding their wage demands went to the White House again on Saturday, before the bill was passed, and left a letter, signed by Timothy Shea, B. M. Jewell and E. V. Manion, protesting against the plan for the settlement of wage disputes proposed by the bill as unsatisfactory, and also a copy of the memorial addressed to Congress. The letter said in part:

"At a meeting of the chief executive officers of all the railroad labor organizations, to whom you addressed your letter of February 13, held Wednesday evening, February 18, to discuss the labor section of the railroad bill, the undersigned committee was appointed and duly authorized to prepare and submit our criticisms, resulting from a thorough analysis of the labor provisions of the act, and to protest against the provisions of the act wherein it provides for a minimum guaranteed return of 5½ per cent based on the aggregate value of the property of the carriers.

"We respectfully submit and urge that you give careful consideration to the attached copy of a memorial presented to the members of Congress yesterday setting forth in detail our criticisms and protests thereof.

"In our analysis of the labor provisions of the act we have set forth reasons, coupled with our years of practical application and experience in negotiating wage adjustments which to us seem sufficient to warrant the definite conclusion that the Congress has not proposed a method of procedure acceptable at any time and entirely inadequate to meet the present situation.

"We feel sure that you can agree with us to the extent that there is little likelihood that Congress will be able to reach an agreement that will insure a prompt disposition of the question. By order of the chief executives."

The passage of the bill aroused a storm of resentment among the labor leaders in Washington. In addition to the large number that have been in the city in connection with the wage conferences and for the purpose of lobbying against the bill about 2,800 delegates of the 15 railroad labor organizations began a series of meetings on Monday to consider the President's proposal for the settlement of their wage demands, and it was decided on Tuesday to submit a memorial to the President asking him to veto the bill. The memorial was to be drafted by Timothy Shea, E. J. Manion and B. M. Jewell, who constituted the committee that called on the President regarding the wage question.

The passage of the bill over the protest of labor also gave a new purpose to the political campaign instituted by the American Federation of Labor to defeat for re-election every member of Congress who has voted in opposition to the wishes of labor, and the first official communication sent out on the new campaign stationery of the "American Federation of Labor Non-Partisan Political Campaign Committee" was issued on Tuesday in the form of a call for simultaneous meetings of all central labor bodies on March 22 for the appointment of committees of five "able and devoted members" to "manage the local non-partisan political campaign in each district in accord with the national committee." By this means it is expected to create an organization that will be able to carry the fight into every district, and the railroad question is to be made a predominant issue. Glenn E. Plumb also announced that the Plumb Plan League would participate in the campaign and "work to elect a government ownership Congress."

More Work for the Interstate Commerce Commission

WASHINGTON, D. C.

WHEN the Esch-Cummins bill becomes a law, which under its terms will be at midnight, February 29, unless the President should postpone or withhold his signature, the Interstate Commerce Commission will enter upon another stage of its history, with a new program of powers, duties and responsibilities before it which not only promise plenty of new work for the commissioners and their organization but a new series of problems which will test the co-operative ability of the railroads and the commission and doubtless will also open up new fields of controversy and litigation.

Whereas during the process of working out the legislative program which has just been brought to completion by the passage of the bill there has appeared at times some likelihood that the commission might to some extent at least become overshadowed by a new transportation board, the persistence with which the House Committee on Interstate Commerce has stood by the commission has not only resulted in an enormous increase in its authority and responsibility, but has left it practically supreme in the important field of rate-making, as to which the provisions commonly regarded as constituting the most important feature of the bill are intended to give it legislative instructions.

The bill establishes for two years a percentage standard of net return which the commission is to observe, "as nearly as may be," in its decisions as to rates, but by the latest revision of the language of the bill the percentage is stated merely as a proviso to be effective for two years. The substantive declaration of the bill is that the commission shall fix the percentage, and while the declaration that a percentage standard of fair return upon value is fundamental and represents a new policy in rate regulation, the fact remains that the commission is still the judge of the reasonableness of rates. It is not only to determine the value on which the percentage is to be calculated, but the percentage itself after two years, and it is also for the commission to estimate as to the volume of traffic, the trend of expenses and the other factors which determine whether a given rate structure will produce the intended percentage of return, fall short of it, or exceed it.

One of the first important manifestations of the new tasks

imposed upon the commission will doubtless be another general rate case, the nature of which is already causing much speculation. The language of the bill states that the commission may "initiate" as well as modify, establish or adjust rates, and it is assumed that this fact as well as the percentage standard provided in the bill will somewhat change the aspect of the impending effort to bring the rates of the carriers into a closer relation with their expenses from that of a controversy between the carriers and the shippers with the commission sitting as a judge.

The question has already been raised as to whether it will even be necessary for the railroads to file the application for a general increse in rates which their committee has been working on for some time, and while it is assumed that the carriers will wish to make, and the commission will be glad to receive, suggestions as to what rates should be advanced and how much in order to produce the desired result, it is also believed that the commission will exercise a much greater freedom than in the past in indicating the method of procedure to be followed as the case progresses instead of reserving its judgment largely for a final decision. One of the most important points of interest being discussed in connection with the new regime is as to how the commission will determine the value on which it is to try to make rates produce 5½ per cent.

Under the terms of the law the commission is expected to increase rates to the level it shall decide is necessary to make 5½ per cent within the six months' period during which the railroads are to receive the present guaranteed standard return. The provisions relating to a division of any net income above 6 per cent, which would require the ascertainment of the value of each system whose returns appear to be such as to bring it under the terms of the bill, do not become effective until a year after the close of the guaranty period, and computations are to be made four months after the close of that year. Before that time arrives a court will probably have passed on the constitutionality of that part of the law.

Before the commission makes much progress with its new work it is expected to be enlarged by the appointment of three new commissioners—two new ones provided for in the bill and one to fill the present vacancy—and it will doubtless also go through some reorganization, such as the creation of new divisions to handle the work of security regulation, etc. It is understood that the commission has already tentatively decided to re-establish a car service bureau with a skeleton organization to co-operate with the Car Service Commission organized by the American Railway Association.

One of the most immediate duties imposed on the commission is to prescribe a method for the nomination of members of the Railroad Labor Board to be appointed by the President so that they may be nominated within 30 days. It is also to define the term "subordinate officials" if occasion requires.

Its accounting forces will have a complicated task to perform in figuring the amount of the deficits sustained during the federal control period by the short lines and the guaranty to all roads during the six months transition period.

While it is not expected that many applications for permission to consolidate will be presented to the commission very shortly, the American Railway Express Company is expected to file such an application at once, and applications for loans from the $300,000,000 fund placed in the commission's hands are to be expected about as soon as the commission is prepared to handle them, particularly as this fund is specifically stated as for the purpose of enabling carriers to serve the public during the transition period.

The commission already has a large accumulation of cases on hand involving complaints against the rates put into effect during federal control and claims for reparation, and as the new bill provides that no reduction in rates or change in divisions (except by mutual consent of the interested carriers) may be made without its consent, it will undoubtedly receive many applications for such changes from state authorities and the short lines.

The amendments to the Interstate Commerce Act contained in Title IV of the new bill also contain a multitude of new problems of various degrees of importance for the commission. These include the rate-making rules already referred to, and regulation of security issues and of car service, as well as many other changes in the existing law which will affect the character of the complaints filed with the commission and its decisions as well as matters which it is to institute of its own motion.

Alfred P. Thom, counsel for the Association of Railway Executives, called on Chairman Aitchison of the commission on Tuesday to offer the co-operation of the railroads.

Illinois Central's Chicago Terminal Negotiations Completed

With the issuing on February 20 of a government permit by Secretary of War Baker authorizing the Chicago Lake-Front improvement project and the acceptance by the Illinois Central and the Michigan Central of the Illinois Central Terminal project ordinance, negotiations, which have been in progress ten years, were brought to a close. Work on the new terminal, it is expected, will begin early this spring. The railroads have filed a $1,000,000 bond with the city to insure the carrying out of its part of the plan which involves an expenditure of between $90,000,000 and $110,000,000. Charles H. Markham, president of the Illinois Central, has issued the following statement:

"We are prepared to begin at once. As soon as Congress returns the railroads to private control, we will make application to public authorities for authority to issue bonds. We want to complete our part of the plan as soon as possible."

The railroads' portion of the plan comprises a new terminal at Roosevelt road and Indiana avenue; electrification of the suburban service within seven years; electrification of the freight service north of Roosevelt road in ten years and of freight service south of Roosevelt road in five years; a new suburban station at Randolph street and a complete rehabilitation of the present equipment used in suburban service. The railroads have six months from February 21 to begin work.

The signing of the bond by the railroads was considered of such importance to Chicagoans, that elaborate ceremonies were held in the City Hall on February 18, the date of the signing. The signatures of C. H. Markham, president, and of B. A. Beck, assistant secretary, were attached to the bond of the Illinois Central, while that of the Michigan Central was signed by A. H. Smith as president. At the conclusion of the negotiation President Markham issued the following statement:

"The magnitude of the work involved in carrying on the improvements covered by the lake front ordinance, approved by the secretary of war, will require a separate organization. The work will be in charge of A. S. Baldwin, vice-president, who is already developing plans, estimates, etc., for an early commencement of the different stages of the work as required by the ordinance. The ordinance gives us two years for the development of plans and establishment of the roadbed and tracks in permanent positions for electrification, the actual work of electrifying the tracks and the construction of new passenger stations to be entered upon at the close of that period.

"The first piece of construction required is a subway under Michigan avenue at Randolph street, for the benefit of pedestrians crossing Michigan avenue to reach the Randolph street suburban station. Plans for this subway are now in preparation, a permit for its construction will be obtained from the commissioner of public works, and, as soon as the weather permits thereafter, the actual construction will be started. This will be of material benefit to the public pending the reconstruction of the suburban passenger facilities in connection with the electrification of that service.

"There is immediate need for additional passenger cars to take care of increased suburban service, and the requirements will be met by ordering a type of steel car which can be used in electrical service. Appearance of these cars within a few months will be the first tangible evidence to the public of the real beginning of this great work."

Railroad Administration Ready to Let Go

THE RAILROADS that for 26 months have been administered by the government will be relinquished to corporate management at midnight Sunday, February 29. By way of making assurance doubly sure this important step will be taken under the authority both of the proclamation issued by the President on Christmas eve, and of the Esch-Cummins bill passed by Congress, in which the dates fixed in the bills as originally passed by the Senate and the House were changed to correspond to that fixed by the President.

For several weeks the Railroad Administration has been making its preparations for letting go on that date—in fact, it had attempted to be in readiness for a relinquishment on December 31, and various orders have been issued as to the organization which is to be retained under the authority of the new bill to liquidate its affairs and wind up unfinished work. Director General Hines has stated that the title of director general of railroads will be a misnomer after March 1 but no announcement has yet been made as to whether it will be changed. It is understood that Mr. Hines has recommended to the President the appointment of Max Thelen, already appointed director of the Division of Liquidation Claims, to succeed him after about May 1.

Director General Hines on February 23 sent the following instructions for the transfer of authority in a telegram to the regional directors:

"To facilitate the return of the railroads to their corporate owners at 12.01 a. m March 1, in accordance with the President's proclamation, please ascertain immediately by wire from the proper corporate officers of all railroads in your region the corporate officers to whom they desire the heads of departments to report on and after March 1, and upon receipt of this information issue proper instructions advising such heads of departments that effective at that time government operation will cease and that thereafter they will report to the corporate officers designated until otherwise instructed by the corporations."

More detailed instructions for the disbanding of the regional organizations have been sent out by the regional directors in compliance with telegraphic orders sent out by Mr. Hines last week. The files of the regional officers are to be maintained intact, and such personnel will be retained as is necessary for that purpose, and some members of the regional engineering and purchasing organizations are to be moved to Washington to assist in the winding up process.

Beginning next Monday the center of railroad authority in Washington will be transferred to the Interstate Commerce Commission, which has been somewhat in the background for two years, but which is given a multitude of new duties and powers by the new legislation. As a sign of the change the central offices of the Railroad Administration, of which the principal ones are now located in the Interstate Commerce building, will be concentrated in the Hurley-Wright building, across the street, and its space in several other buildings will be given up.

Director General Hines has issued a circular by which the divisions of operation and labor as such are discontinued effective March 1, 1920. W. T. Tyler, director of the Division of Operation, has been elected vice-president of the Northern Pacific, and W. S. Carter, director of the Division of Labor, has arranged to resume his duties as president of the Brotherhood of Locomotive Firemen and Enginemen.

Questions now pending involving the interpretation of national agreements between the director general and railroad labor organizations and involving the interpretations of the various supplements to General Order 27, will be handled to a conclusion between representatives of the director general and of the railroad labor organizations affected.

In view of the necessity for making continuing provision for the disposition of labor matters other than those involving wages arising prior to March 1, 1920, C. S. Lake and J. A. Franklin were appointed assistants to the director general to supervise the disposition of all such matters after March 1 subject to the approval of the director general.

Railway Boards of Adjustment Numbers 1, 2 and 3 will continue to receive and hear questions which would ordinarily come to them for settlement under existing wage agreements, and in accordance with the provisions of General Orders 13, 29 and 53, as to matters arising during Federal control.

In addition, Railway Boards of Adjustment Numbers 1, 2 and 3 will consider and recommend to the director general for final disposition matters referred to them by him through Messrs. Lake and Franklin affecting classes of employees coming under the general orders establishing such boards of adjustment even though such matters are not referred in the method contemplated by such general orders.

Labor matters not affecting employees covered by the agreements creating such boards of adjustment but arising prior to March 1 will be considered by Messrs. Lake and Franklin and recommendations thereon will be made to the director general for final decision.

The process of "unscrambling" the railroads in preparation for their return has in fact been under way since shortly after the armistice. The first steps taken consisted of the transfer of parts of railroad systems that had been cut in two by regional boundaries to the regions in which their principal lines were located, and this has been followed from time to time by the appointment of separate managers for lines that had been grouped under one manager. On October 1 the per diem accounting was restored in an effort to get cars returned to their home roads as much as practicable, and while many coal cars were scattered again by the coal strike it is understood that the percentage of home cars on home lines is now somewhat near normal. Steps were also taken before the end of the year to return locomotives to their home roads or systems, and practically all have been returned except a few that are located on roads that need them badly because of an unusual amount of traffic and that probably are entirely willing to pay the rental for them. Preparations have been under way for some time for the closing of accounts, and an order will be issued to close the federal books as of February 29.

Some of the "scrambling" done by the Railroad Administration, such as is evidenced by the consolidated ticket offices

and the unification of terminals probably will not be undone, or, as least, that question will be left for decision later.

The abolition of the regional offices will release some 1,400 officers and employees who are now on the Railroad Administration payroll, and the personnel left in charge of the files, etc., will soon be transferred to Washington. The Washington organization will be reduced by about one-half on March 1, leaving 600 or 700 employees and officers, and this number will be gradually reduced.

The heads of divisions who are to remain after March 1 are Max Thelen, of the Division of Liquidation Claims, to which will be transferred the hold-over of the Division of Purchases; E. M. Underwood, general counsel; G. H. Parker, comptroller, in charge of the work of the Division of Accounting, and Swagar Sherley, who has decided to remain for a time as director of the Division of Finance. H. B. Spencer, director of the Division of Purchases, will leave on March 1.

In last week's issue a list was given showing the new or old positions to which many of the principal members of the Railroad Administration staff are going. Announcement has since been made that C. E. Spens, assistant director, Division of Traffic, has been elected vice-president in charge of traffic of the Chicago, Burlington & Quincy. B. L. Winchell, regional director for the Southern region, is to move to Chicago and spend some time looking after some personal affairs.

Interest on Overcharge Claims

G. H. Parker, controller of the Railroad Administration, has issued Accounting Circular No. 41-B, a revision of Circulars No. 41 and 41-A, giving new instructions for the payment of interest on overcharge claims in accordance with a recent conference ruling of the Interstate Commerce Commission.

P. S. & A. Circular No. 41 and Accounting Circular No. 41-A, referring to the payment of interest on overcharge claims, are amended to read as follows:

1. All valid claims for overcharge, if not paid within 30 days after the collection of the overcharge, shall bear interest at the rate of 6 per cent per annum from date of collection, according to Interstate Commerce Commission Conference Ruling 489, reading as follows:

489. *Interest upon overcharge claims.*—A Conference Ruling 464 amended and restated

Interest on an overcharge (by which is meant the amount collected on a shipment in excess of the legally published rate) accrues from the date of its collection by the carrier whether arising from an error in rate, weight or classification.

The commission does not regard it as unlawful for a claimant to accept in satisfaction of his claim the ascertained amount of an overcharge without interest; and the commission is of the opinion that when such a refund is made by the carrier within 30 days after the improper collection of the overcharge, it may be regarded, in accordance with a well established usage, as a cash transaction, upon which interest does not accrue.

The views expressed in this ruling shall be understood as applying to all pending and unsettled overcharge claims and to those arising in the future, but not as authorizing or requiring the reopening of any claim which has been settled and closed by the acceptance by a claimant of the amount of an overcharge without interest.

2. If settlement has been made during federal control upon a different basis, overcharge claims shall, upon demand, be readjusted as to interest upon the basis herein prescribed, provided that written request for such readjustment be filed at the general office of the carrier or at any agency on the line of its railroad on or before June 30, 1920.

3. Overcharge claims paid to claimants by federal-controlled lines which are due in part from lines not under federal control (if interest accrues thereon) shall include interest o nthe entire overcharge, unless the noncontrolled line declines to pay interest on its proportion, in which event interest on such claims shall be computed and paid on the amount of the overcharge chargeable to the federal-controlled lines.

4. That portion of an overcharge claim paid by lines not under federal control which is due from a federal-controlled line shall, if payment of the claim is delayed 30 days or over as aforesaid, be interest bearing at the rate of 6 per cent per annum.

This interest shall be paid to the line settling with the claimant, provided such line has paid the interest to the claimant.

5. All interest paid on delayed payments of overcharge claims shall be charged to a ledger account entitled "Interest paid on overcharge claims," which amount shall be closed monthly to the income account "interest on unfunded debt."

6. The provisions of this circular apply to overcharge claims only. None of the provisions hereof apply to loss and damage or to other claims.

7. General Order No. 25 requires shippers and consignees to promptly pay transportation charges. In the event that an overpayment is made by a shipper or consignee, due to an error in weight, rate, extension, or classification, it is the duty of the carrier to promptly adjust the error; therefore accounting officers of lines under federal control shall immediately inaugurate appropriate methods of accounting such as will result in the payment to claimants of overcharge claims within the prescribed free time of 30 days after collection or with a minimum delay beyond that period.

Photo from Underwood & Underwood, N. Y.

The Railway Station at Narva, Esthonia, Destroyed in a Bolshevik Campaign

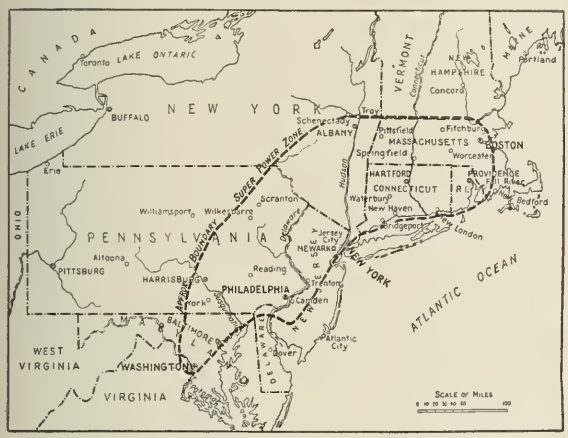
Photo from Underwood & Underwood, N. Y.

Esthonians Guarding Railway Bridge Destroyed by Bolsheviki

Proposed Super-Power Zone

At the recent mid-winter convention of the American Institute of Electrical Engineers held in New York, the entire morning session of February 19 was devoted to a discussion of the proposed super-power zone shown in the illustration. The scheme anticipates as closely as can be estimated, conditions as they will be ten or fifteen years hence, and although it may appear as a tremendous undertaking, it has received careful thought from many of the biggest industrial men in the section affected. Not only is an economical supply of electric power planned for the industries of the northeast Atlantic seaboard, but for the railroads which traverse this territory as well.

Briefly summarized, the super-power plant provides a means by which a present estimated machine capacity of 17,000,000 hp.—divided 10,000,000 for industrial purposes and 7,000,000 for the railroads—in a region between Boston and Washington and inland from the coast 100 to 150 miles, now operating with a load factor not exceeding 15



Map Showing Approximate Super Power Zone

per cent, can be lifted to a load factor of greater than 50 per cent, and possibly to 60 per cent, and a means by which, conservatively speaking, one ton of coal will do the work of two; the railroads within the above zone, and those carrying coal into that zone, will be relieved of transporting one-half the amount of coal required for power and lighting purposes.

It is estimated that a present plant capacity of 17,000,000 hp. can be replaced by one of not greater than 5,500,000 hp., and that not less than 30,000,000 tons of coal per annum can be saved, which at $5 a ton, represents a saving of $150,000,000 a year.

The plan offers immediate relief from the present intolerable congestion by automatically increasing rail capacity without increasing track mileage, and reducing power equipment investment to a minimum. It is estimated that by the creation of an overhead common carrier system of power, the present cargo space now required for industrial coal will be cut in half; train equipment in all classes will have its service factor doubled, and the present steam power equipment, replaced by electrical equipment, can be transferred to other divisions where it is so badly needed.

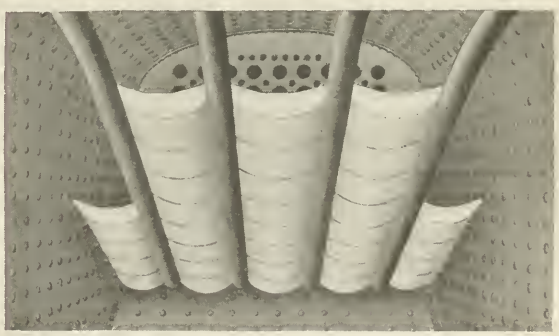
The important facts in connection with the plant are as follows:

First, the plant has the unanimous endorsement of Engineering Council, representing the American Institute of Electrical, Mechanical, Civil and Mining Engineers. Second, it has been presented and unanimously endorsed by (a) Western-Massachusetts Engineering Association, (b) Bridgeport Chamber of Commerce, and (c) Connecticut Chamber of Commerce. Third, it is now in committee with the United States Chamber of Commerce, and so far has found only favor in their consideration. Fourth, among the many prominent men who have discussed the matter are included United States Senators, Representatives, engineers, central station operators, railroad officials and financiers, all of whom have expressed the keenest interest in it. Fifth, an appropriation of $250,000 forms a part of the sundry civil bill to provide the money necessary to an investigation under the Department of the Interior.

Suspension Baffle Walls for Locomotives

A type of firebrick baffle wall, which differs in several important respects from the designs now in general use, has been originated by Kefauver & Kenney, Baltimore, Md., and is being introduced by Railway & Industrial Engineers, New York. A typical installation of the new design, which is known as the suspension baffle wall, is shown in the illustration. The bricks are supported as usual by water tubes, but are concave in form, so that they extend down between the tubes. This form is said to insure greater strength and to place more of the material at the point where the maximum wear occurs. There are no pockets in the bricks, recesses having been eliminated to reduce chipping off of portions of the brick under the action of the extreme heat to which they are subjected.

The depending surfaces between the tubes tend to cause the molten ash to flow away from the supports and avoid the



Typical Installation of Suspension Baffle Wall

fluxing action which often bridges over the space between the bricks. This form of arch also causes the flames to be concentrated along the water tubes, thus increasing the evaporation from that source.

Among the benefits secured by this device is the possibility of using a longer arch without restricting the gas area between the arch and the crown sheet. The increased space above the arch also facilitates reaching the tube sheet without removal of the arch. It will be noted that the side bricks are carried on supports welded to the side sheets and the side rows are shorter than those between the arch tubes. This arrangement is designed to provide a better distribution of heat and to eliminate the overheating and consequent failure of the sheets and staybolts at the rear of the firebox. It is stated that baffle walls of this type have been used in the fireboxes of locomotives burning pulverized coal and have given unusually long life under these severe conditions.

General News Department

The accounting department of the Georgia, Southern & Florida is to be moved on April 1 from Macon, Ga., to Washington, D. C. This is understood to be one preliminary step in the absorption of the Georgia Southern & Florida by the Southern Railway.

Glenn E. Plumb, author of the "Plumb Plan," presided recently at a debate in Sanders Theatre, Cambridge, between students of Harvard and of Dartmouth, on a resolution that the Plumb Plan ought to be adopted by the United States, and the decision in the negative was unanimous. The students had another debate on the same question at Hanover, where the decision of the judges against Mr. Plumb was not unanimous; it was two to one.

The Colorado State Railroad Commission is preparing a bill to be introduced in the state legislature authorizing the issue of bonds to raise money to pay for the tunnels and other railroad improvements which were recommended by the commission in its annual report. These tunnels, one of which would be six miles long, and another a little longer, were the subject of an illustrated article in the *Railway Age* of January 30, page 371. The plan is to have the question of issuing bonds submitted to the voters of the state at the elections next autumn.

The Kentucky State Senate recently adopted resolutions calling on Kentucky senators and representatives in Congress to assist in the elimination of "discriminatory freight rates" and in alleviating a shortage of coal cars which has necessitated the closing of many coal mines for four or five days out of each week. It is declared that the Ohio river is treated by railroad rate makers as a barrier to commerce moving north from Kentucky, a charge being added on all such commerce, although no added charge is made on southbound traffic into Kentucky or the South.

The Railway Engineering Section of the Western Society of Engineers, Chicago, held its initial meeting at the rooms of the society on Monday evening, February 23. Samuel O. Dunn, editor of the *Railway Age*, presented a discussion of the present railway problem and of the legislation which has just been enacted. The officers of this section elected for the ensuing year are as follows: Chairman, C. F. W. Felt, chief engineer, A. T. & S. F. System, Chicago; vice-chairman, H. G. Clark, assistant to federal manager, C. R. I. & P., Chicago; members of executive committee, L. J. Putnam, chief engineer, C. & N. W., Chicago; A. G. Shaver, consulting signal engineer, Chicago; and G. P. Palmer, engineer maintenance and construction, B. & O. Chicago Terminal, Chicago.

The delay of three weeks in getting a train over the Reid Newfoundland railway, reported in our issue of February 20, was only a part of the story. A later press despatch says that the road was unable to run any trains for a month, and that all railway traffic will be abandoned until spring. The intense frost, reaching 38 degrees below zero, has made matters serious. Every bay is frozen over sufficiently to drive horses from side to side, a condition unknown for 100 years. A serious coal shortage aggravates the situation. The railway problem is the most serious the new government must face. It is declared that the railway has become unsafe. It lacks cars and engines and only the expenditure of many millions can remedy the situation.

Seven employees of the New York, New Haven & Hartford were arrested at Framingham, Mass., on February 17 charged with thefts of freight; one yardmaster, one freight conductor, two brakemen and three others. One of the seven committed suicide by shooting himself at his home on the morning after he was arrested. In Brooklyn, N. Y., on February 18, seven men were arrested charged with robberies of cars in yards of the New Haven road at Providence, R. I. A case of cotton goods, shipped by boat from Providence to New York and found in the possession of the men arrested, is said to be a clue to the operations of these men, who are believed to have stolen property worth $200,000. In the Brooklyn cases the Federal Court held two of the accused in $25,000 each, and one in $10,000, releasing the others on bail of $1,000 each.

Samuel Wood is one of the firemen who *did not* fail in his monitorship when, on a fast train, his engineman failed to slacken speed on passing a caution signal. The story is told in the New York Sun, which says that the incident happened one night last month on train No. 620, of the Central of New Jersey, an express from Philadelphia, which leaves Elizabeth, N. J., for New York at 6:35 p. m. While crossing the two-mile trestle across Newark Bay, and while there was considerable snow blowing, the engineman, with his head outside the cab window, was hit by something that stunned him, and he fell to the floor unconscious. The engine was one having a Wootten firebox and the fireman was about 15 or 20 feet back from the engineman's cab; but the fireman was "on the job" and did not fail to notice that full speed was kept up after passing the caution signal; and he stopped the train. According to the Sun, he avoided striking the train ahead by only 400 ft. What had disabled the engineman was not discovered.

The All-American Farmer Labor Co-operative Congress, organized by the four big railway brotherhoods and the affiliated shop crafts to devise a way to escape the profits of the middleman by a system of co-operative buying, production and distribution of necessities, was held at Chicago from February 12 to 15 inclusive. The steps which have already been taken towards co-operative dealing between groups were explained, especially the action taken by the Brotherhood of Maintenance of Way Employees & Railway Shop Laborers in purchasing clothing factories and the action taken by several groups of farmers in handling the sale and distribution of their products. Among those who addressed the sessions of the Congress were: Glenn E. Plumb, author of the Plumb plan; Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers; Allen E. Barker, grand president of the Brotherhood of Maintenance of Way Employees & Railway Shop Laborers, and O. C. Trask, assistant president of the same organization.

Director-General Gives Farewell Talk

Director-General Hines gave a farewell talk to about 200 members of the Railroad Administration staff at the final dinner of the Railroad Administration Lunch Club, of which W. C. Kendall, manager of car service section, has been president, at Washington, Wednesday evening. Mr. Hines paid high tribute to his associates, saying that they had been the hardest working organization he had ever known and that the team work and lack of friction in an organization brought together under such circumstances was remarkable. He discussed briefly some of the outstanding developments of federal control, saying that large increases in expenses were in no way attributable to federal control, but that the roads would have been subject to them if they had remained under private management and they would not have had the benefit of economies resulting from unification. He pointed out that the Esch-Cummins bill expressly recognizes some of the advantages of unification and said that while the pendulum will probably swing the other way for a time it will also swing back again and experiences of federal control will have pointed the way.

Associated General Contractors' Annual Meeting

The annual meeting of the Associated General Contractors was held at the Hotel Morrison, Chicago, on February 18 and 19, in conjunction with a National Conference on Construction. The sessions of the annual meeting were held on the mornings of the two days, and the sessions of the National Conference on Construction in the afternoons. Among those who addressed the Thursday afternoon session of the Conference on the general subject of "The Disposition of the Railroads" were Samuel O. Dunn, editor of the *Railway Age*, and Richard Waterman, secretary of the Railroad committee of the United States Chamber of Commerce.

Resolutions were adopted at the annual meeting advocating the return of railroads to private ownership on March 1.

The election of officers of the Associated General Contractors was held on the second day of the annual meeting and the following were elected for the periods indicated: President (to hold office for one year), W. A. Rogers, president, Bates & Rogers Construction Company, Chicago; vice-president (to hold office until 1923), W. O. Winston, president, Winston Brothers Company, Minneapolis, Minn.; treasurer (to hold office for one year), C. M. Mullen, secretary and treasurer, Masters & Mullen Construction Company, Cleveland, Ohio. The following were elected members of the executive board to hold office until 1923; R. G. Collins, Jr., Cumberland, Md.; Walter Cahill, vice-president, Great Lakes Dredge & Dock Company, Chicago; Arthur Bent, Bent Brothers, Los Angeles, Cal., and George Watson, president, Watson Company, Dallas, Tex.

M. J. Gormley to Head New Transportation Bureau

The American Petroleum Institute of New York has formed a Division of Transportation, the primary purpose of which is to afford a point of contact between the oil industry as a whole and the railroads. The new division will ,
Gormley, now assistant regional director of the Northwestern region, of the Railroad Administration, as director, with headquarters at Chicago.

M. J. Gormley

As a pronounced step forward in the development of the idea of co-operation between industries and railroads, the formation of this division, its purposes and opportunities should be explained. The primary purpose, as stated before, is to afford a point of contact between the oil industry as a whole and the railroads. It is intended, through the Division of Transportation, to insure the wholehearted cooperation and support of the entire oil industry to the railroads under private operation. It is recognized that there will be new and peculiar problems with which to contend when the roads are returned to their owners and it is felt that an organization of this kind, operated by practical railroad men who have been conversant with the changes brought about by federal operation, will not only prove of benefit to the oil industry, but will be welcomed by the railroads.

Speaking of the problems facing petroleum producers and their probable solution through the efforts of the Division of Transportation, Mr. Gormley stated recently that, "One of the chief problems before the petroleum producers today is to secure prompt and adequate transportation of their products, and in no way can this condition be improved more effectively and satisfactorily to both the railroads and to the petroleum producers than by improving the average mileage of tank cars. It will be necessary to make substantial additions to the tank car equipment of the country to meet the great demands of this business, but the necessary additions will be substantially less and the burdens upon the railroads relatively smaller if the average miles per car per day can be materially increased. Such a result is beneficial to the railroad to a degree hardly second to the owner of the tank car since it involves fewer cars on line to handle, greater amount of revenue collected per car and greatly improved transportation conditions."

Mr. Gormley, director of the new division, first entered railroad service with the Chicago & North Western, at Eagle Grove, Ia., in 1893. He was subsequently employed in various capacities in the track and building departments of that road for the following four years.

In 1897 he became stenographer to R. H. Aishton, at the present time regional director of the Northwestern region, who was then division superintendent on the North Western at Boone, Ia. When Mr. Aishton was appointed general superintendent on November 1, 1899, Mr. Gormley accompanied him to Chicago.

The following year he served as chief clerk and trainmaster on the North Western, later becoming chief clerk to Mr. Aishton, who had been promoted to general manager. He subsequently served under the latter as chief clerk and assistant to the vice-president, and assistant to the president, when Mr. Aishton was appointed to these positions. During 1917, while Mr. Aishton was chairman of the central department committee of the Railroads' War Board, Mr. Gormley acted as general agent of the American Railway Association at military headquarters, Chicago, where he was responsible for the proper handling of troops and military supplies in that territory. When the railroads were taken over by the government in 1917 and Mr. Aishton was placed in charge of the Western Region as regional director, Mr. Gormley was appointed operating assistant. Later, when the Western Region was divided into three parts and Mr. Aishton was given charge of the Northwestern Region, Mr. Gormley was formally given the title of assistant regional director.

Mine Owners Threaten to Sue Railroad Administration

Charging discrimination in the distribution of coal cars, mine operators along the Louisville & Nashville in the Tennessee-Kentucky coal field are threatening to sue the United States Railroad Administration for redress. The operators in this field claim that repeated appeals to the Railroad Administration for relief have proved unavailing. During the latter part of January, a statement of conditions prevailing in this district was filed with the Railroad Administration by a committee representing coal operators in Eastern and Southeastern Kentucky and Tennessee in which railroad figures, regarding the comparative distribution of coal cars in this field and in other fields in the south and southeast, were included. Soon after, J. E. McCoy, secretary-treasurer of the Southern Appalachian Coal Operators' Association, Knoxville, Tenn., together with several of the leading mine operators of the Tennessee-Kentucky field, held several conferences with Railroad Administration officers in Washington and orders were subsequently issued for the more equitable distribution of coal cars in this district. More recently Mr. McCoy has called attention to the fact that the report of the Louisville & Nashville, covering coal car distribution for the month of January, shows that the percentage of cars furnished the mines on the various divisions of this system varies from 83.38 per cent to 44.90 per cent of the demand. The mines on the Cumberland Valley division of the Louisville & Nashville were furnished with 48.75 per cent of the number of cars ordered and the mines on the Knoxville division were furnished with 58.92 per cent, whereas the mines in the Birmingham, Ala., field were furnished with 83.38 per cent of the number of cars ordered. The mine operators assert that because of this discrimination they have suffered losses amounting from $8,000,000 to $10,000,000.

American Railroad Association—Signal Division

The regular meeting of the Signal Division of the American Railroad Association will be held at Congress Hotel, Chicago, on Monday and Tuesday, March 15 and 16, as heretofore announced. The first committee report to be presented will be that of Committee 15 on Valuation. The other reports scheduled for the first day are as follows:

Committee No. 11: Batteries. A specification will be presented for lead type portable storage battery; one for type A,

REVENUES AND EXPENSES OF RAILWAYS

Twelve Months of Calendar Year 1919—Continued

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Operating revenues: Passenger.	Operating revenues: Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Operating expenses: Maintenance of Equipment.	Operating expenses: Traffic.	Operating expenses: Transportation.	Operating expenses: General.	Operating expenses: Total.	Operating ratio.	Net from railway operation	Railway tax accruals.	Operating income (or loss)	[illegible] last [illegible]
Fort Worth & Kan. City	454	$7,112,886	$3,615,778	$11,162,302	$1,100,557	$2,188,479	$54,669	$4,068,432	$298,832	$7,749,234	69.42	$3,413,068	[illegible]	[illegible]	[illegible]
F. Worth & R. Grande	235	863,676	687,284	1,665,482	351,972	276,085	17,249	807,123	73,894	1,526,324	91.64	139,1[illegible]	46,212	[illegible]	[illegible]
Great Nor.	8,218	77,351,472	19,623,859	106,533,739	18,150,394	20,194,705	678,088	44,457,166	1,845,918	86,728,017	81.42	19,805,721	7,099,645	12,696,5[illegible]	[illegible]
Galv. Wharf	13	......	......	988,814	355,246	10,994	351	343,315	19,667	871,913	88.17	116,90[illegible]	155,523	—3[illegible]	[illegible]
Georgia	328	4,129,029	1,815,544	6,389,988	676,588	1,086,382	102,172	2,989,572	207,184	5,064,006	79.24	1,325,981	[illegible]	[illegible]	[illegible]
Georgia & Fla.	348	579,074	257,132	998,346	407,893	244,858	23,539	643,032	67,511	1,386,834	138.91	388,488	57,799	447,[illegible]	[illegible]
Georgia Southern & Fla.	402	2,783,070	1,226,272	4,374,501	740,901	1,051,681	72,889	2,099,221	129,814	4,121,924	94.22	252,577	188,553	63,05[illegible]	—209,8[illegible]9
Grand Rapids & Que.	569	5,453,117	2,159,961	8,238,636	1,009,092	1,946,196	126,484	3,943,834	282,639	7,341,516	89.11	897,120	319,[illegible]57	577,7[illegible]	1[illegible]1,140
Grand Trunk West	1,001	16,823,695	3,635,950	22,342,065	2,777,832	4,024,821	201,131	10,336,837	629,438	18,029,405	80.69	4,312,661	633,635	3,674,10[illegible]	2,143,91[illegible]
Grand Trunk Lines in N. E.	172	2,645,294	461,408	3,634,153	1,099,431	658,292	34,550	1,972,447	145,165	4,309,395	118.58	—675,242	152,393	—827,635	—154,194
Galv., Harris & San Ant.	1,131	15,449,482	5,468,208	21,957,495	3,005,164	4,849,732	210,307	7,968,687	647,231	16,863,756	76.80	5,093,739	735,864	4,350,50[illegible]	1,309,071
Green Bay & West	252	932,377	203,062	1,213,613	251,518	311,771	12,961	510,703	22,679	1,109,591	91.42	104,022	52,712	51,311	—28,089
Gulf & Ship Island	307	1,758,749	552,944	2,496,260	650,074	605,342	50,547	1,043,350	110,628	2,464,709	98.73	31,551	155,116	—124,6[illegible]	—50[illegible],939
Gulf, Colo. & S. Fe	1,935	15,232,812	5,737,771	22,184,340	4,766,138	3,774,017	201,917	9,024,490	593,756	18,300,459	82.49	3,883,882	1,041,[illegible]9	[illegible],835,5[illegible]	—[illegible]
Gulf, Mobile & Nor.	438	2,112,677	567,466	2,823,506	637,502	686,546	71,060	1,298,091	122,487	2,803,551	99.29	19,956	149,547	—130,271	—2[illegible]7,974
Hocking Valley	350	9,703,938	1,228,282	11,654,517	1,329,868	3,935,248	72,203	4,109,051	248,771	9,692,605	83.17	1,961,912	614,[illegible]53	1,343,595	—72[illegible],517
Houston & Texas Central	847	6,503,063	2,648,701	9,720,533	1,757,962	1,797,852	80,031	3,905,529	237,941	7,777,321	80.01	1,943,213	455,495	1,483,86[illegible]	752,305
Houston, E. & W. Texas	190	1,716,695	566,553	2,396,164	417,799	310,970	12,127	1,105,820	50,145	1,896,862	79.16	499,302	91,[illegible]71	406,5[illegible]	—[illegible]1,717
Ill. Cent.	4,793	75,831,459	24,300,756	107,886,835	19,595,657	29,897,946	947,429	45,384,834	2,692,923	98,911,080	91.68	8,975,756	5,204,668	3,737,23[illegible]	—[illegible],347,833
Ind. Harbor Belt	116	......	......	6,562,912	1,172,264	1,253,640	21,501	4,456,542	206,261	7,110,208	108.33	—547,296	116,1[illegible]	—663,435	265,[illegible]11
Int. & Great Nor.	1,159	10,061,736	3,413,972	14,410,300	3,314,864	3,859,166	160,018	7,263,432	506,470	15,189,587	105.41	—779,287	319,354	—1,099,95[illegible]	—[illegible],541,7[illegible]6
Kanawha & Mich.	176	3,521,721	660,741	4,324,755	660,980	1,619,205	30,489	1,594,379	157,288	4,062,355	93.93	262,400	[illegible]54,138	8,[illegible]	1,45[illegible]
Kans. City, Mex. & O.	272	1,231,699	213,662	1,511,840	527,647	518,192	23,830	842,465	93,682	2,005,822	132.67	—493,981	94,1[illegible]6	—588,2[illegible]	—17[illegible],1[illegible]5
Kans. City, Mex. & O. of Texas	465	1,037,914	216,498	1,322,210	408,109	538,903	23,438	858,839	97,402	1,926,690	145.71	—604,480	74,900	—679,6[illegible]	[illegible]
Kansas City Southern	774	11,432,862	2,502,510	15,111,997	2,297,667	3,347,836	216,581	5,829,506	471,044	12,145,954	80.37	2,966,043	767,39[illegible]	2,192,955	—[illegible]35,712
Kansas City Term.	26	......	......	1,388,293	236,729	297,827	......	598,506	17,561	1,168,402	84.16	219,691	307,988	—88,395	—8,538
Lake Erie & W.	902	8,518,048	805,534	9,784,826	1,735,725	2,729,739	146,261	4,346,856	288,333	9,242,394	94.45	542,432	441,750	99,356	—462,954
Lake Superior & Ishpheming	34	888,828	2,747	1,003,153	231,336	302,171	2,469	225,574	30,230	691,779	68.96	311,373	42,569	[illegible]68,80[illegible]	—211,434
Lehigh & Hudson River	96	2,545,342	49,259	2,687,526	323,186	503,321	20,053	1,125,756	70,277	2,042,593	76.00	644,933	76,724	567,594	115,481
Lehigh & N. England	232	3,761,804	20,649	3,981,318	573,850	863,067	31,772	1,372,666	116,353	2,956,117	74.24	1,025,201	101,671	923,53[illegible]	—1[illegible]8,835
Lehigh Valley	1,435	52,096,567	6,827,897	64,528,899	9,822,782	18,086,251	480,733	29,301,332	1,288,914	59,202,302	91.74	5,326,589	1,822,987	3,501,539	—[illegible],86[illegible],843
Long Island	398	6,298,393	15,629,125	24,381,974	3,163,138	4,334,035	156,877	12,167,013	591,929	20,586,850	84.43	3,795,1[illegible]4	1,063,277	2,726,535	1,70[illegible],380
Los Angeles & Salt Lake	1,168	11,777,100	4,380,129	17,209,932	2,312,035	3,468,768	218,953	5,852,953	363,082	12,685,315	73.71	4,524,617	798,788	3,723,5[illegible]	[illegible]7,463
Louisiana & Arkansas	302	1,638,905	503,372	2,220,760	662,497	478,545	39,206	931,746	78,694	2,190,172	98.62	30,588	15[illegible],564	—12[illegible],[illegible]68	—189,[illegible]46
Louisiana West.	207	2,684,731	1,357,107	4,234,597	569,942	765,435	50,373	1,145,502	126,746	2,683,304	63.37	1,551,293	194,396	1,356,371	—473,6[illegible]
Louisiana & Nashville	5,013	76,828,467	24,842,674	107,514,966	16,098,488	27,828,959	1,454,564	44,455,752	2,280,793	92,544,138	86.08	14,970,8[illegible]8	3,008,064	11,954,[illegible]00	—6,546,465
Louisiana, Henderson & St. Louis	199	2,004,761	773,753	2,914,103	584,688	393,486	65,511	1,117,391	91,818	2,252,894	77.30	661,209	6[illegible]	598,394	—18[illegible]
Maine Central	1,216	11,286,883	4,936,430	17,525,178	3,086,323	4,143,196	146,411	9,668,354	434,138	17,520,064	99.97	5,114	924,133	—919,521	—500,747
Md., Delaware & Va.	82	847,484	473,663	1,356,188	128,360	339,855	9,892	882,537	26,014	1,386,657	102.25	—30,470	21,628	52,146	—8,088
Michigan Central	1,861	51,653,910	20,070,337	78,844,386	9,617,080	15,674,511	780,810	29,506,855	1,347,849	57,841,814	73.36	21,002,572	2,650,0[illegible]0	18,347,075	2,804,314
Midland Valley	388	2,782,290	1,023,001	3,952,822	920,897	741,161	44,905	1,539,306	167,375	3,413,646	86.35	539,176	86,961	450,059	—347,411
Mineral Range	101	724,214	4,490	753,226	165,420	256,233	4,786	406,358	11,825	844,62[illegible]	112.14	—91,396	48,060	—139,45[illegible]	—141,729
Minn. & St. Louis	1,646	10,002,843	2,734,724	13,384,871	2,347,588	3,462,604	129,849	6,716,287	356,012	13,004,521	97.15	380,351	604,574	—[illegible]28,774	—233,947
Minn., St. Paul & S. Ste. Marie	4,243	31,621,078	8,287,987	42,661,595	6,347,096	8,468,016	304,098	18,156,570	923,423	34,406,785	80.65	8,[illegible]54,811	2,472,470	5,780,04[illegible]	1,660,950
Minn. & International	194	693,598	316,905	1,073,849	241,630	205,202	6,006	551,195	40,705	1,044,739	97.28	29,110	56,70[illegible]	—27,[illegible]	[illegible]
Missouri & North Arkansas	365	983,417	504,413	1,587,827	712,471	469,350	27,285	782,501	109,018	2,099,561	132.22	—511,734	75,835	—588,898	—499,344
M. K. & Texas	1,713	24,335,819	7,968,611	34,272,092	5,990,205	9,710,172	355,241	12,032,259	953,871	29,190,162	85.17	5,0[illegible]	1,155,5[illegible]1	3,9[illegible]	—1,[illegible]47,[illegible]59
M. K. & Texas of Texas	1,796	25,251,430	8,234,735	25,244,515	5,440,016	4,735,392	283,069	13,554,330	929,544	25,162,041	99.67	82,474	732,126	—656,468	—1,[illegible]31,669
Missouri, Oklahoma & Gulf	329	1,201,663	231,190	1,517,856	744,493	663,426	23,855	873,982	87,610	2,396,292	157.87	—878,436	102,039	—981,694	—549,8[illegible]6
Missouri Pacific	7,204	66,559,805	20,689,218	93,577,081	18,940,384	20,781,384	1,015,199	39,689,848	2,536,626	83,357,624	89.08	10,219,457	3,700,523	6,488,017	—6,730,368
Mobile & Ohio	996	12,527,835	2,226,122	15,636,715	2,815,764	5,041,699	295,419	7,372,566	507,413	16,043,045	102.59	—406,331	588,022	995,911	—1,178,157
Monongahela	108	3,357,062	253,219	3,652,667	722,873	439,663	10,803	1,131,907	88,024	2,393,270	65.52	1,259,397	56,840	1,2[illegible]2,529	327,832
Monongahela Connecting	6	......	......	1,954,320	294,968	620,038	6,252	900,170	79,697	1,901,126	97.27	53,194	24,573	28,622	—198,922
Montana	56	1,126,686	16,780	1,199,496	338,805	680,515	14,837	326,088	79,684	1,439,816	120.04	—240,32[illegible]	30,8[illegible]	—271,1[illegible]6	—240,198
Morgan's Louis. & Tex. R. R.	400	5,469,544	2,129,633	8,065,807	1,250,723	1,628,665	98,446	3,120,635	235,461	6,358,060	78.82	1,707,747	431,582	1,[illegible]74,208	—1,149,289
Nashville, Chatt. & St. L.	1,247	13,392,295	5,381,541	20,044,134	3,503,397	5,196,458	423,281	8,735,173	523,352	18,483,627	92.21	1,560,506	69[illegible],612	866,439	—2,866,131
N. O. & N. E.	203	4,181,370	1,481,530	6,446,802	1,189,612	1,416,892	98,137	2,984,737	175,749	5,925,27[illegible]	91.91	521,5[illegible]	483,753	36,300	—935,802
New Orleans Great Northern	284	1,656,354	540,152	2,294,550	460,355	510,997	30,656	1,001,324	108,188	2,116,336	92.23	178,213	124,914	50,293	—343,295
New Orleans, Texas & Mex.	191	1,513,930	451,493	2,063,689	513,404	479,581	37,103	645,467	76,360	1,778,73[illegible]	86.19	284,957	1[illegible]9,024	155,634	—131,872
New York Central	6,075	188,197,778	85,288,197	310,715,576	38,034,864	67,037,642	2,747,176	128,747,572	7,640,930	248,940,634	80.11	61,774,942	11,630,827	50,124,374	—293,024
N. Y., Chicago & St. Louis	574	20,923,745	1,847,179	23,475,553	2,848,047	4,427,398	316,448	10,037,821	640,453	18,317,863	78.02	5,157,750	629,811	4,526,352	7,415
New York, New Haven & Hartford	1,965	49,236,962	44,774,218	106,545,120	14,280,055	21,377,447	541,089	51,147,509	3,292,635	92,473,381	86.79	14,071,738	3,7[illegible]0,657	1[illegible],[illegible]73,265	—1,042,05[illegible]
New York, Ontario & Western	569	6,468,580	2,697,357	10,909,515	1,748,084	2,658,789	108,687	5,016,228	272,258	9,804,045	89.86	1,105,470	329,922	775,523	153,616
New York, Phila. & Norfolk	121	6,241,798	1,352,770	8,208,367	707,765	2,226,468	106,576	3,794,602	137,557	7,188,976	87.58	1,019,391	222,881	796,041	—296,901
New York, Susq. & Western	135	2,746,880	700,901	3,915,640	462,023	665,643	27,831	2,526,652	99,188	3,781,459	96.57	134,182	415,048	—281,614	—665,500
Newburgh & South Shore	7	......	......	1,328,299	217,637	324,870	......	692,244	46,577	1,281,328	96.46	46,971	97,069	—50,103	—261,476
Norfolk Southern	906	4,318,945	1,872,066	6,591,227	1,353,541	1,228,255	101,005	3,259,052	251,190	6,197,546	94.03	393,681	211,850	180,766	—105,184
Norfolk & Western	2,088	62,681,028	10,824,463	76,925,599	10,660,872	23,089,001	445,585	28,323,932	1,274,624	64,021,285	83.22	12,904,314	3,120,000	9,781,256	—7,729,583
Northern Pacific	6,593	72,934,723	20,331,317	100,739,354	16,223,655	17,610,480	765,310	38,274,463	2,243,500	76,179,715	75.62	24,559,639	7,482,649	17,053,051	—7,833,578

REVENUES AND EXPENSES OF RAILWAYS

TWELVE MONTHS OF CALENDAR YEAR 1919—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or dec.) comp. with last year.
Northwestern Pacific	530	$3,615,941	$2,400,374	$6,682,459	$1,328,393	$859,482	$61,060	$2,821,925	$157,268	$5,250,272	78.56	$1,432,187	$285,858	$1,144,874	—$320,245
Northern Alabama	112	986,242	165,218	1,183,932	263,082	68,208	16,933	687,200	22,156	1,057,415	89.31	126,517	45,799	80,710	—296,641
Oregon Short Line	2,347	28,800,808	7,051,624	38,260,580	5,525,608	6,224,899	201,297	11,315,661	1,116,156	25,098,364	65.59	13,162,216	2,171,468	10,988,187	492,067
Ore.-Wash. RR. & Nav	2,070	19,413,130	6,770,652	28,367,603	5,016,132	4,443,018	357,753	11,478,440	1,152,659	22,737,662	80.15	5,629,941	1,598,137	4,027,798	—991,346
Panhandle & Santa Fe	772	5,076,605	1,325,236	6,708,470	1,098,971	2,125,554	48,141	2,908,480	178,401	6,346,728	94.61	361,742	234,259	125,843	—135,839
Penn. R.R. Western	1,754	76,484,116	21,032,543	106,342,509	15,547,722	30,479,459	913,537	45,408,270	2,304,758	95,479,271	89.78	10,863,238	4,271,685	6,586,002	1,087,350
Penn R.R. Eastern	5,380	238,852,641	102,047,147	378,091,499	56,004,008	112,445,087	3,148,319	168,470,630	9,000,267	356,018,468	94.16	22,073,031	11,035,761	11,003,494	—12,897,162
Peoria & Pekin Union	19	331,281	43,318	1,243,748	210,249	485,325	9,292	905,957	64,131	1,674,953	134.66	—431,205	99,500	—530,705	—208,489
Pere Marquette	2,232	26,504,204	6,127,460	35,443,137	3,495,488	7,132,499	337,974	14,764,362	877,318	26,723,825	75.39	8,719,311	670,865	8,046,078	3,105,255
Perkiomen	41	981,568	99,005	1,121,837	75,006	51,917	237	431,088	3,915	562,411	50.13	559,426	20,481	538,945	31,540
Phila. & Reading	1,127	57,850,183	10,854,210	72,871,823	7,490,427	19,296,540	482,181	35,476,881	1,646,549	64,608,174	88.66	8,263,649	1,659,029	6,602,723	—6,558,403
Phila. Beth. & N. E.	71	.....	.....	835,464	83,924	146,198	4,368	580,732	12,975	828,196	99.13	7,268	12,733	—5,465	—209,173
Pitts. & Lake Erie	224	23,158,642	2,669,148	28,034,188	4,278,253	8,828,670	179,484	10,159,320	541,678	24,001,843	85.61	4,032,345	825,326	3,206,749	—6,536,017
Pitts. & W. V.	63	1,181,428	118,459	1,452,608	589,078	569,632	15,458	654,790	69,504	1,995,218	137.35	542,609	149,071	—691,818	—395,659
Pittsburgh & Shawmut	103	1,046,664	52,056	1,115,125	358,407	468,687	17,895	420,372	36,269	1,301,632	116.72	—186,506	2,367	—188,874	—215,107
Pitts., Cinc., Chig. & St. L.	2,383	62,536,683	22,235,351	93,606,303	13,373,786	31,476,584	1,104,988	42,081,196	2,170,564	91,091,637	97.31	2,514,666	3,686,113	—1,177,889	6,389,099
Pitts., Shaw. & Northern	204	1,015,459	73,202	1,125,756	296,369	582,364	12,351	489,958	84,763	1,460,852	129.76	—335,096	21,831	—357,017	154,827
Port Reading	21	1,520,862	.....	2,377,412	232,125	157,429	200	1,165,479	16,538	1,571,770	66.11	805,642	135,688	669,933	—62,151
Quincy, Omaha & Kansas City	255	732,311	308,833	1,117,415	409,702	211,458	2,673	596,123	16,733	1,233,753	110.41	—116,338	48,176	—164,603	134,792
Rich., Pt. Frd. & Potomac	81	3,702,999	3,331,912	7,743,234	607,854	1,103,480	52,187	2,625,389	162,771	4,670,737	60.32	3,072,498	186,021	2,886,389	—289,173
Rutland	415	2,610,670	1,395,874	4,838,534	807,493	1,179,444	75,949	2,263,692	136,546	4,475,206	92.49	363,328	231,359	131,569	200,059
St. Joseph & Grand Island	258	2,271,927	504,880	2,932,823	607,364	474,822	24,485	1,578,101	147,182	2,844,434	96.98	88,389	130,704	—42,430	40,711
St. L., Brownsville & Mexico	548	3,575,473	1,641,823	5,540,631	1,134,287	939,450	74,171	1,596,433	195,900	3,940,241	71.11	1,600,390	105,587	1,493,403	199,167
St. L. Merchants' Bridge Terminal	9	.....	7,525	3,217,134	662,672	441,954	9,017	2,356,158	73,618	3,543,420	110.14	—326,286	100,050	—426,346	—475,001
St. Louis-San Francisco	4,761	51,243,803	22,542,067	78,552,125	12,288,308	15,469,785	672,108	30,022,281	2,131,568	60,428,103	76.92	18,124,023	2,690,518	15,407,832	3,605,950
St. Louis Transfer	6	.....	.....	1,144,253	150,802	115,409	20,381	819,207	69,247	1,439,532	93.61	98,108	237,726	74,167	—93,079
St. Louis, San Fran. & Tex.	134	1,207,912	223,554	1,537,641	276,569	254,129	2,228	545,196	26,164	839,798	73.39	304,455	2,039	302,415	130,671
St. L. S. W.	939	10,948,108	2,219,128	13,750,285	2,266,390	2,924,448	207,760	4,228,274	451,455	10,143,756	73.77	3,606,529	513,063	3,090,930	—532,268
St. L. S. W. of Texas	814	4,873,210	1,600,635	6,910,878	1,861,125	2,295,715	106,354	3,652,558	286,248	8,188,827	118.49	—1,277,949	267,000	—1,546,596	—899,179
San Antonio & Arkansas Pass	736	2,953,328	1,280,224	4,516,591	1,385,255	1,349,166	71,051	2,425,218	199,234	5,425,555	120.12	—908,965	245,587	—1,156,157	—932,880
Seaboard Air Line	3,563	25,211,829	12,423,851	41,183,532	6,574,714	8,982,486	761,440	19,549,264	1,274,095	37,465,817	90.97	3,717,715	1,619,793	2,091,409	—2,005,550
South Buffalo	11	375,222	.....	949,683	74,310	168,068	4,663	598,098	26,400	871,538	91.77	78,145	29,007	49,138	—228,753
Southern	6,982	81,811,428	36,839,805	129,787,812	24,169,452	27,467,881	1,554,890	56,335,718	3,285,091	113,744,813	87.63	16,042,999	4,042,116	11,926,598	—19,050,026
Southern Ry. in Miss.	278	1,119,616	621,899	1,864,983	469,126	245,779	29,466	950,142	49,767	1,744,276	93.52	120,708	106,500	13,695	—47,563
Southern Pacific	7,047	112,953,839	43,809,587	169,728,932	25,171,877	33,037,724	1,468,441	63,599,732	2,984,593	129,448,485	76.27	40,280,447	40,280,447	6,815,960	3,343,490
Spokane, Portland & Seattle	538	4,923,534	1,841,588	7,275,264	1,235,183	1,006,708	73,685	2,514,917	243,219	5,104,440	70.16	2,170,824	742,000	1,428,221	—1,061,787
Spokane International	156	1,008,041	209,188	1,248,090	249,183	101,566	21,554	403,883	53,998	827,480	66.30	420,610	58,216	362,394	58,701
Staten Island Rapid Transit	23	1,026,268	939,465	2,234,671	300,973	339,310	12,828	1,198,623	110,501	1,962,235	87.81	272,436	177,803	93,960	1,434
Tennessee Central	292	1,775,940	576,101	2,489,538	847,992	616,480	40,260	1,246,550	75,965	2,826,466	113.53	—336,929	65,350	—402,499	—622,891
Terminal R. Assn of St. Louis	36	.....	40,055	4,002,717	898,095	607,310	10,310	1,877,714	61,022	3,495,235	87.32	507,481	370,830	136,362	—152,018
Texarkanna & Fort Smith	87	1,143,568	220,843	1,495,014	229,582	260,366	12,964	648,366	37,944	1,183,133	79.13	311,881	79,047	232,712	—116,992
Texas & N. O.	469	5,374,160	2,048,873	8,140,178	1,455,442	2,276,385	55,837	2,950,768	170,809	7,268,357	89.28	871,821	253,548	612,669	—420,824
Texas & Pacific	1,946	23,575,837	10,676,693	36,212,438	5,118,022	7,716,051	305,174	15,827,619	865,945	30,137,573	83.22	6,074,865	1,222,478	4,844,840	543,588
Tol. & Ohio Central	435	7,771,846	817,155	9,078,910	1,545,851	2,824,786	79,039	3,957,136	203,402	8,642,801	95.19	436,109	438,773	—2,917	—817,855
Toledo, Peoria & Western	247	961,829	592,599	1,645,768	335,955	517,549	25,131	857,896	65,621	1,799,407	109.34	—153,639	102,000	—255,639	—114,131
Toledo, St. Louis & Western	454	7,419,636	452,877	8,267,878	1,475,281	1,821,103	72,625	3,440,980	137,569	6,944,945	83.99	1,322,932	315,000	1,007,801	—599,819
Trinity & Brazos Valley	368	1,121,669	268,259	1,454,329	504,200	540,940	22,152	748,497	86,482	1,902,271	130.80	—447,942	83,409	—531,464	—42,727
Ulster & Del.	128	659,783	321,370	1,215,809	200,693	230,877	18,588	794,873	53,699	1,304,324	107.28	—88,515	54,600	—143,193	—79,454
Union R. R.	40	.....	.....	7,710,276	1,050,544	2,357,532	3,626	4,246,851	92,200	7,749,697	100.51	—39,422	91,452	—130,882	—766,067
Union Pacific	3,614	80,761,292	21,944,240	110,819,514	15,177,308	20,793,022	550,813	32,023,215	2,864,860	73,936,679	66.71	36,882,836	3,303,238	33,570,037	—1,544,343
Utah	98	1,301,109	6,785	1,309,865	164,664	263,894	2,475	263,270	26,233	720,536	55.01	589,329	48,561	540,766	—124,231
Vicksburg, Shreveport & Pac.	171	2,075,838	998,788	3,323,329	542,331	722,051	54,681	1,223,696	118,091	2,693,383	81.04	629,946	149,127	480,318	147,480
Virginian	522	10,268,428	722,911	12,075,305	1,838,773	2,662,387	56,343	4,421,506	201,214	9,175,000	75.98	2,900,304	433,200	2,466,869	307,417
Wabash Ry.	2,503	35,255,548	10,143,356	48,847,086	8,086,880	9,358,676	657,109	24,610,615	1,402,277	44,391,737	90.87	4,455,348	1,303,123	3,143,048	—3,642,349
Washington Southern	35	1,479,675	2,286,255	4,532,783	425,555	491,754	28,730	1,433,015	73,794	2,505,019	55.26	2,027,764	98,074	1,929,594	53,483
West Jersey & Seashore	361	3,543,800	7,538,322	11,971,021	2,314,978	2,443,484	98,811	5,961,368	260,164	11,145,020	93.09	826,001	578,875	245,968	238,826
West Maryland	698	12,219,513	1,077,210	14,610,410	2,809,338	5,055,827	216,873	5,811,004	554,538	14,591,768	99.87	18,642	518,400	—504,718	138,211
Western Pacific	1,041	11,227,664	1,912,823	13,657,297	2,524,159	2,256,687	153,852	4,075,387	304,213	9,545,285	69.89	4,112,012	595,265	3,515,497	943,887
Western Ry. of Ala.	133	1,402,227	954,421	2,546,171	314,120	518,549	40,192	922,831	76,960	1,915,587	75.23	630,583	72,436	558,141	—71,501
Wheeling & Lake Erie	511	10,682,086	677,876	12,600,840	2,357,255	2,999,711	75,176	5,100,797	302,303	10,869,538	86.26	1,731,301	719,263	1,009,752	—653,911
Wichita Falls & N. W.	328	1,695,832	506,364	2,308,745	670,857	366,050	16,998	1,289,840	81,894	2,425,562	105.05	—116,817	117,625	—235,186	195,428
Yazoo & Miss. Valley	1,381	18,255,197	5,605,017	24,952,130	4,073,203	5,506,601	191,512	9,114,324	578,241	19,285,123	77.28	5,667,007	799,381	4,864,409	—66,310
Mississippi Central	164	630,598	332,359	1,011,409	313,783	381,414	15,630	435,835	72,164	1,218,827	120.51	—207,418	33,513	—241,350	—476,615

caustic soda primary cells; one for a concrete battery box; also drawings of round and rectangular jars.

Committee No. 7: A specification for tractive armature direct current relays.

Committee No. 2: Specification for mechanical interlocking machine, style A, and for mechanical machine lever locking.

Committee No. 9: Wires and Cables. Specification for wire joints and for copper bond wires.

Committee No. 13: Electrical Testing. Table of standard ranges for a. c. voltmeters; table of standard ranges for single range a. c. ammeters; drawing of scale ranges for d. c. volt-ammeters.

Committee No. 16: Oils. Specification for zero and for 45 deg. below zero lubricating oils.

Committee No. 3: Power Interlocking. Specification for electric lock for mechanical interlocking machine; for renewable cartridge fuses; and for universal electric motor switch operating and locking mechanism.

The first report to be presented on the second day is that of Committee No. 6, standard designs. This committee presents 13 drawings covering semaphore bearings, pipe carriers, low target stand, switch lamps, lens hoods, oil fount for switch lamp, lamp hanger for highway crossing gate and highway crossing gate lamp.

The next report is that of Committee No. 8 on a. c. automatic block signaling; general specifications will be presented, also one for air-cooled reactors, one for resistors and one for switchboards.

Committee No. 12, contracts, will present a form of contract for block signal and interlocking work.

Committee No. 5 will report some questions and answers for signal maintainers.

Committee No. 4, d. c. automatic block signaling, will present a specification for a high signal mechanism, first range voltage.

Program for the A. R. E. A. Convention

The following is the program for the twenty-first annual convention of the American Railway Engineering Association which will be held at the Congress Hotel, Chicago, on March 16, 17 and 18:

Tuesday, March 16.

President's Address.
Reports of Secretary and Treasurer.
Reports of Standing and Special Committees on—
- Water Service
- Masonry
- Buildings
- Uniform General Contract Forms
- Track
- Electricity
- Conservation of Natural Resources
- Economics of Railway Location

Wednesday, March 17

Committee reports on—
- Wood Preservation
- Ballast
- Iron and Steel Structures
- Stresses in Railroad Track
- Ties
- Roadway
- Rules and Organization
- Economics of Railway Labor

Annual dinner at 6:30 *p. m.*

Thursday, March 18

Committee reports on—
- Signals and Interlocking
- Yards and Terminals
- Rail
- Records and Accounts
- Signs, Fences and Crossings
- Wooden Bridges and Trestles
- Economies of Railway Operation.
- Standardization

New Business
Election and installation of officers
Adjournment.

Traffic News

H. N. Proebstel, recently examiner for the Portland (Oregon) district freight traffic committee of the United States Railroad Administration, has been appointed traffic manager of the West Coast Lumbermen's Association, to succeed L. S. McIntyre, resigned.

Twenty-five students from Brown University were employed for a week by the American Railway Express Company at its office in Providence, R. I., on the occasion of the recent series of blockades because of snow and rain. The express company had to put embargoes on traffic in many different directions. Besides having to accept many shipments which ordinarily would be sent by freight, the express company found its business largely increased by goods from the textile and other factories in Rhode Island which ordinarily would have been sent (short distances) by automobile truck. The express company's depots at Providence were piled full for many days with merchandise which could not be delivered. After two weeks, the agent saw signs of relief from the congestion.

Perishable Protective Tariff No. 1

The Railroad Administration has issued, through J. E. Fairbanks, agent (Chicago), effective February 28, "Perishable Protective Tariff No. 1," governing protective service for perishable freight of all kinds, that service including refrigerating, icing, reicing and heater car service. The tariff is published also for account of carriers not under federal control and on one day's notice.

This tariff has been under consideration for more than a year. In May, 1919, under Section 8 of the federal control act, it was submitted by the director general to the Interstate Commerce Commission for review and advice. The Interstate Commerce Commission entered upon what is known as "Perishable Freight Investigation," under the commission's Docket No. 10664, and conducted hearings throughout the country. The report of the commission was made on February 12. The tariff is made in substantial compliance with the commission's recommendations.

The most important matters covered by the new tariff are stated refrigeration charges on carload shipments of fruits, vegetables, berries and melons, and the establishment of the stated per car charge on those commodities in official classification territory, but with modifications recommended by the Interstate Commerce Commission.

In Official Classification territory this character of traffic is now handled on the so-called "cost-of-ice" basis. Replenishment charges will be published from the so-called Missouri River territory to the so-called trans-continental territory. The tariff will contain charges per ton for ice and salt, also charges for heater car service in the territory west of the Indiana-Illinois state line. Rules and regulations are included governing the various phases of protective service, including rules governing protective service on l.c.l. shipments.

Weekly Traffic Report

According to a report on traffic conditions for the week ended February 12, 1920, made to Director-General Hines, revenue freight loaded and receipts from connections for this period as compared to the corresponding week of last year for the various regions were as follows:

Eastern region—Revenue freight loaded, 167,113 cars, a decrease of 70 cars; receipts from connections, 215,728 cars, an increase of 24,895 cars; Allegheny region—revenue freight loaded, 159,898 cars, an increase of 5,977 cars; receipts from connections, 135,343 cars, an increase of 4,487 cars; Pocahontas region—revenue freight loaded, 33,065 cars, an increase of 7,917 cars; receipts from connections, 14,921 cars, a decrease of 1,669 cars; Southern region—revenue freight loaded, 122,676 cars, an increase of 15,711 cars; receipts from connections, 79,191 cars, an increase of 12,414 cars; Northwestern region—revenue freight loaded, 118,699 cars, an increase of 19,801 cars; receipts from connections, 84,082

cars, an increase of 24,232 cars; Central Western region—revenue freight loaded, 116,945 cars, an increase of 18,642 cars; receipts from connections, 71,568 cars, an increase of 14,566 cars; Southwestern region—revenue freight loaded, 64,065 cars, an increase of 12,537 cars; receipts from connections, 58,091 cars, an increase of 13,833 cars.

A summary of the report follows:

Eastern Region: (Week ended February 14)—The congestion and interference with the movement of traffic following the storms of last week, particularly in the vicinity of New York and in Eastern New England has now been somewhat relieved, but movement is not yet on normal basis. All roads except the New Haven report that they are in better shape than at the end of last week. Passenger traffic has been somewhat interfered with by weather conditions causing delay to trains and the general situation has tended to reduce the amount of travel.

Allegheny Region: (Week ended February 13)—Weather conditions much improved, but those of last week resulted in considerable accumulation of traffic for movement via New York and all Eastern gateways leading into New England. These accumulations only show signs of loosening up at this time. Roads continue to hold a large number of cars for movement through Toledo. Embargoes have been extended in every instance to prevent further accumulations. Coal car supply practically same as last week, very little increase being noted in the number of available empties.. Bituminous loading decreased 1,150 cars, which is attirbuted to slow movement account weather conditions. Anthracite loading fully protected, but cars loaded decreased 2,800. Mill gondola situation in Pittsburgh district still further improved and conditions with respect to piled tonnage are practically normal Box cars still short. Considering severe weather conditions passenger trains have been making fairly good schedules. Volume of travel about normal for this season of the year.

Pocahontas Region: (Week ended February 13)—With the exception of loaded cars received from connections, business of the region shows material improvement over last week. No congestion or interruption to traffic during the week and good weather resulted in traffic moving freely. General travel continues lighter than for some time past, due largely to health and weather conditions.

Southern Region: (Week ended February 12)—Reports indicate that the exchange market is seriously affecting the sale of cotton and lumber to foreign countries. Recent break in the exchange has practically put cotton and other exporters out of business. Passenger traffic generally shows an increase, although inclement weather has interfered slightly with local traffic on a few lines.

Northwestern Region: (Week ended February 14)—General business continues active and all industries are receiving a large volume of orders while many reports come in of additions and improvements to present industries as well as contracts for new manufacturing plants. Coal loading shows an increase of almost 100 per cent compared with last year, but should be nearer 200 per cent to meet the active demand and build up depleted stocks. Lumber and forest product loading amounted to 20,092 cars, showing an increase of 570 cars over the previous week and 2,712 cars over same week of last year. Passenger travel as a whole shows a moderate increase over last year, notwithstanding local travel has been greatly reduced on account of the influenza epidemic.

Central Western Region: (Week ended February 13)—Coal production for the week was 41 per cent greater than during corresponding period of last year and approximately the same as the previous week. Mines working only 55 per cent of full time due to insufficient car supply . The loading of ore and livestock showed decreases under last year, but all other commodities showed good increases. Passenger travel generally has shown slight decrease as compared with corresponding period last year. Movement to California, however, has been considerably heavier.

Southwestern Region: (Week ended February 12)—Continued activity reported in practically all lines of business. Rapid development of oil fields in Louisiana has resulted in marked increase in traffic both to and from that territory.

Passenger travel continued good for the week with adequate equipment provided. Travel to Hot Springs, Ark., has not been as heavy as last year, but is increasing. Travel from and through Memphis gateway continues heavy and California business through El Paso gateway is very good.

Foreign Railway News

Increased Rates in Germany

Increased railway rates for both passenger and goods traffic throughout Germany are reported as effective on March 3. The increase is expected to be over 50 per cent.

Spanish Railways Manufacturing Syndicate

A scheme is on foot, says the Semana Financiera, a Madrid weekly, as quoted by the Railway Gazette, London, to form a powerful syndicate, backed by several of the most important Spanish banks and industrial concerns, to undertake the manufacture of rolling-stock on a very large scale, with the object of hiring the same to the Spanish railway companies.

May Convert 600 Miles to Narrow Gage

The Siamese Government has decided, says a correspondent in the Daily Mail, London, to bridge the Bangkok River (the Menam), linking up the Peninsula and the Northern Railway systems. This would involve converting more than 600 miles of track, mainly built by German engineers, from broad to narrow gage.

A New Sudan Railway

A Cairo correspondent of the Times, London, is authority for the statement that it is proposed to extend the railway from Suakin to Tokar. thus tapping an important cotton growing district. Tokar lies about 50 miles south of Suakin, a few miles from the Red Sea, its port being Trinkatat. The region was the scene of much fighting during the campaigns against the Mahdi.

Japanese Railway Expenditure

In the Japanese railway budget provision is made at a cost of 6,000,000 yen for the installation of automatic signalling on all double track sections between Tokyo and Shimonoseki, says an item in the Railway Gazette, London. The government will begin the work next year on the section between Tokyo and Numazu where traffic is heaviest. This first piece of work will be finished in about two years, and the estimate for the expense is 1,500,000 yen. The work of doubling the track is to be continued on the North Eastern and Joban lines.

French Imports and Exports

LONDON.

The American Chamber of Commerce of France in its January 15 bulletin gives a list of the articles imported into France from the United States and exported from France to the United States for the first ten months of 1919, 1918 and 1913. In this list among the imports are mentioned:

	1919 Francs	1918 Francs	1913 Francs
Machines and machinery	529,415,000	316,627,000	50,895,000
Tools and hardware	233,680,000	199,495,000	4,421,000

Corresponding to these are the figures for the exports to the United States from France for the same period, which are as follows:

	1919 Francs	1918 Francs	1913 Francs
Machines and mechanical appliances	1,029,000	439,000	776,000
Tools and manufactures of metal	935,000	721,000	2,274,000

Railway Competition in England

LONDON.

In commenting on the wrong kind of railway competition, Sir Eric Geddes, the Minister of Transport, in a speech before the Cambridge Chamber of Commerce recently stated that wholesale competition between rialway companies for the same traffic without any creative interest between the different roads was wrong. He believed that the railways should compete in developing the district they served and not in trying to filch traffic from each other. He believes in amalgamation of roads by territories, but said that amalgamation for inter-system competition was wrong as it leads to favoritism, discrimination,

costly operation, unremunerative rates and capital expenditures, and while the favored shippers gained, the others paid. On the other hand he said such amalgamations might become oppressive and the absence of competition must not be used unduly to curtail facilities, without a reviewing authority with power to order adequate and reasonable service and convenience.

Balkan Railway Finance

The Railway Gazette, London, quotes a Geneva correspondent of the Times (London) as saying that after the Balkan Wars of 1913 a controlling interest in the network of railways in Serbia, Bulgaria and Greece was acquired by the Wiener Bankverein, a consortium of Austrian banks. The purchase was not completed owing to the war, and the Austrian combination is now in negotiation with a leading Paris concern for the sale of the shares. As the railways are operated by the Balkan States, with the single exception of the trunk line from Adrianople to Constantinople, the proprietorship of the shares means a strong influence on the finance, commerce and industry of the Balkan States. The Vienna banks and their Swiss creditors are not resisting the French attempt to obtain control.

Speeds of English Railways in 1919

London, England.

An article in the Engineer states that the conditions arising from the war have played havoc with the celerity, frequency and general facilities afforded with the railway services of Great Britain. Below is given a few of the fastest start-to-stop runs performed by some of the principal railroad companies before the war and the schedule on which they now run:

Company	Run	Distance (miles)	Pre-war journey speed Time h.	min.	m.p.h.	Present day journey speed Time h.	min.	m.p.h.
Great Western	Paddington to Bristol via Bath.	118¼	2	0	59.1	2	19	51.0
Great Northern	Gratham to Kings Cross.	105½	1	50	57.5	2	6	50.2

Below is given the fastest start-to-stop runs performed by some of the principal companies at the present day and showing the speed at which the runs were performed during the war:

Company	Run	Distance (miles)	Pre-war journey speed Time h.	min.	m.p.h.	Present day journey speed Time h.	min.	m.p.h.
Great Western	Paddington to Taunton.	143	..	..	....	2	38	54.3
London & North Western	Willesden to Rugby.	77½	1	24	55.3	1	31	51.0
Caledonian	Aberdeen to Perth.	89¾	1	55	46.8	1	55	46.8
London & South Western	Waterloo to Salisbury.	83¾	1	55	55.3	1	43	48.7

Below is given the longest non-stop runs, beginning at 50 miles, accomplished by each company, the pre-war and present day speeds being compared, but excluding runs of a special or seasonal character:

Company	Run	Distance (miles)	Pre-war journey speed Time h.	min.	m.p.h.	Present day journey speed Time h.	min.	m.p.h.
Great Western	London to Plymouth (North road).	225¾	4	7	54.8	4	22	51.6
London & North Western	London to Liverpool (Edge Hill).	192	3	28	55.3	..	..	....
London & North Western	London to Crewe	158	2	51	55.5	3	14	48.8
Great Northern	Wakefield to London.	175¾	3	9	55.7	..	..	....
Great Northern	London to Grantham.	105½	1	50	57.5	2	4	51.0
Midland	Rotherham (Masborough) to London.	162	2	57	55.0	..	..	....
Midland	Leicester to London	99	1	45	56.5	1	59	49.9
Great Central	London to Sheffield	164¾	2	57	55.8	..	..	....
Great Central	London to Leicester	103	1	50	56.2	1	56	53.2
Caledonian	Carlisle to Perth	150¾	3	0	50.2	..	..	....
Caledonian	Carlisle to Stirling	117¾	2	17	51.5	3	7	37.7
North Eastern	Newcastle to Edinburgh	124½	2	18	54.1	2	25	51.5

Equipment and Supplies

Locomotives

The Argentine State Railways have ordered 25 locomotives from the Baldwin Locomotive Works.

The New York Central is inquiring for 100 eight wheel switching locomotives.

The United Railways of Havana are in the market for 32 Consolidation type, 10 Pacific type and 4 switching locomotives. These locomotives will all use oil for fuel.

The Great Northern, reported in the *Railway Age* of January 30, as being in the market for 45 2-8-2 type locomotives is reported having placed an order for 50 of these locomotives.

The Kelly Island Lime & Cement Company, Cleveland, Ohio, has ordered one 70-ton Shay locomotive from the Lima Locomotive Works. This engine will be equipped with a superheater.

The Atchison, Topeka & Santa Fe, reported in the *Railway Age* of February 20, as about to inquire for locomotives, is inquiring for 50 locomotives including Mikado type, Santa Fe type and Mountain type.

The Missouri, Kansas & Texas, reported in the *Railway Age* of January 16 as being in the market for 40 locomotives has ordered 10 Pacific type, 20 Mikado type and 20 eight-wheel type locomotives from the Lima Locomotive Works.

The Canadian National Railways have ordered 30 Pacific type locomotives and 25, 2-10-2 type locomotives from the American Locomotive Company. Ten of the Pacific locomotives will have 24 x 28 in. cylinders, a total weight in working order of 268,000 lb., and 69 in. drivers, and 20 will have 23½ by 28 in. cylinders, a total weight in working order of 256,000 lb., and 69 in. drivers; the 2-10-2 type engines will have 26 by 32 in. cylinders, a total weight in working order of 320,000 lb. and 57 in. drivers.

The Union Pacific, reported in the *Railway Age* of January 16, as being in the market for 100 locomotives, has ordered 19 Mallet and 16 Mikado locomotives from the American Locomotive Company. The Mallet type locomotives will have 26 by 41 by 32 in. cylinders and a total weight in working order of 490,000 lb. The Mikado locomotives will have 26 by 28 in. cylinders and a total weight in working order of 285,000 lb. This company has also ordered 27, 2-10-2 type, and 10 Pacific type locomotives from the Baldwin Locomotive Works, and 30 switchers from the Lima Locomotive Works.

Locomotive Deliveries

During the week ended February 7 two U. S. R. A. standard locomotives were delivered to the Michigan Central by the Lima Locomotive Corporation.

Freight Cars

The Eastern Car Company, New Glasgow, Nova Scotia, is figuring on 5,000 12-ton coal cars for export to Belgium.

The Chicago, Rock Island & Pacific is inquiring for 3,250 freight cars, including 2,000 box and 500 stock cars of 40 tons' capacity, 500 general service cars and 250 flat cars of 55-ton capacity.

The Tennessee Coal, Iron & Railroad Company, reported in the *Railway Age* of January 23 as inquiring for 20 coke cars, has ordered 30, 50-ton capacity coke cars from the Pressed Steel Car Company.

The New York Central is inquiring for 13,200 freight cars, including 5,800 steel box cars, 4,600 hopper cars of 55 tons' capacity, 1,700 flat cars of 50 tons' capacity and 1,100 gondolas of 50 tons' capacity.

Supply Trade News

E. B. Badger & Sons Company, Boston, Mass., has acquired the business of the American Spray Company, including its essential engineering personnel.

F. M. Nourse, engineer in the advertising department of the Cutler-Hammer Manufacturing Company, Milwaukee, Wis., has resigned to become associated with the Charles L. Benjamin organization, advertising agents, Chicago.

Franklin Murphy, former governor of New Jersey and chairman of the board of directors of the Murphy Varnish Company, Newark, N. J., died on February 24, at Palm Beach, Fla. He was born in Jersey City, on January 3, 1846, and was educated in the Hudson county schools and at Newark Academy. In 1901 he received the degree of doctor of laws from Lafayette College and the following year the same degree from Princeton University. Mr. Murphy served in the United States army during the Civil War, part of the time as a lieutenant; at the close of hostilities he began the manufacture of varnish at Newark, N. J. In 1891 the Murphy Varnish Company was incorporated, with Mr. Murphy as president. He had been prominent in Republican politics since 1892, and in 1901 was elected to the governorship of New Jersey, which office he held for three years. He was chosen chairman of the Republican state committee in 1892, and was a member of the Republican national executive committee for nine years, 1900 to 1908. His son, Franklin Murphy, Jr., is now chairman of the executive committee of the Murphy Varnish Company.

Franklin Murphy

The Westinghouse Electric & Manufacturing Company has filed plans for the erection of a machine shop, 1,000 ft. long by 100 ft. wide, on Page boulevard, Springfield, Mass., to cost $250,000. The building will be of brick, concrete and steel, of the saw-tooth type.

L. R. Mann, signal inspector on the Missouri Pacific, with headquarters at St. Louis, Mo., has resigned to become sales engineer in the railroad department of the Central Electric Company, Chicago, effective on March 1. Mr. Mann's headquarters will be at St. Louis, Mo.

The Electrolabs Company, New York, announces that in order to obtain closer co-operation between the factory and the sales department, it has decided to consolidate all its offices at 2635 Penn avenue, Pittsburgh, Pa., and a branch office will be maintained in New York at room 313, 30 Church street.

M. Wm. Ehrlich is the New Jersey manager, with headquarters at Newark, N. J., and a sub-office at Lyndhurst, N. J., of the **Plant Engineering & Equipment Company, Inc.,** New York, manufacturers of the Corliss valve steam trap, Mason condensation meter and other power and heating specialties.

We are officially advised that the statement published in our issue of January 16, page 276, to the effect that the **Fairbanks Company** of New York had purchased practically the entire capital stock of the **H. Channon Company,** Chicago, and will enlarge the business of the latter company to include several new lines, was incorrect. While negotiations for such a consolidation were pending, nothing came of them.

The American Chain Company, Bridgeport, Conn., has purchased the control of the Page Steel & Wire Company, with mills at Monessen, Pa., and Adrian, Mich. The business will be continued as heretofore. The new officers elected under the reorganization of the company are: Walter B. Lashar, president; William T. Morris, vice-president; Wilmot F. Wheeler, treasurer; John E. Carr, assistant treasurer, and William M. Wheeler, secretary. E. C. Sattley, general manager of the Page Steel & Wire Company, will continue in that capacity with office in Pittsburgh, Pa.

The Allegheny Steel Tank Car Company, Warren, Pa., was bought by the Allegheny Tank Car Company on February 2. The new corporation recently formed and the transfer constituted an entire change of management. The officers of the new company are as follows: **C. W. Hardy,** formerly of the Warren Oil Company, Warren, Pa., president: **H. W. Conarro,** general manager, Struthers Wells Company, Warren, vice-president; **Jas. P. Rogers,** formerly general manager of the Rogers Shear Company, Warren, treasurer: **H. R. McClure,** of the firm McClure & Smith, Warren and Sunbury, Pa., secretary. The policy of the new company includes general enlargement of the facilities of the plant both in the manufacturing of new cars and in its repair department. One feature of the new company will be its leasing department, which it will conduct for the benefit of its patrons.

Joseph M. Flannery, pioneer in the vanadium industry and one of the organizers of the Flannery Bolt Company, Pittsburgh, Pa., also the American Vanadium Company, and president of the Standard Chemical Company, died on February 18, in Pittsburgh, Pa., at the age of 52, after an illness of seven months. He was born in Pittsburgh and attended public and parochial schools there. In 1904, with his brother, he began a tour of the world seeking to discover a process whereby unbreakable bolts might be made; an analysis of the metal composing the fencing foils used in Sweden resulted in the discovery of vanadium. To Mr. Flannery is due the introduction of vanadium in the steel industry, marking an epoch in the advance of steel making. Mr. Flannery, convinced of the value of vanadium for this purpose, went to South America, where he secured the world's largest vanadium deposit. Through his interest in vanadium, his attention was called to an ore in Colorado, which contained also radium. Having heard of the possible use of radium in the treatment of cancer, he determined to undertake the production of radium. In 1911, he organized the Standard Chemical Company, the world's largest producer of radium. At the time of his death Mr. Flannery was also working to develop the commercial use of another ore, uranium, in steel and other metals.

Jos. M. Flannery

The Chicago Fuse Manufacturing Company has purchased a two-story factory building with a four-story office section in Chicago. The building will be remodeled and, with the addition of buildings and equipment contemplated, will represent an investment of $500,000. The company expects to obtain possession on May 1.

James Gayley, a former vice-president of the United States Steel Corporation, died on February 25 at his home in New York, at the age of 65. As a metallurgist he was a recognized authority on raw material. His invention of the dry blast

process, which bears his name, increased production of blast furnaces about 20 per cent. He was born in West Nottingham, Md., and in 1876 graduated from Lafayette College, with the degree of mining engineer. In 1885 he took charge of the blast furnace of the Edgar Thomson Steel Works, later serving first as general manager of the plant, and then as managing director of the Carnegie Steel Company. When the United States Steel Corporation bought out the Carnegie Company in 1901, Mr. Gayley was appointed first vice president in charge of raw materials and transportation. He resigned from the steel corporation in 1908, and had since been president of the American Ore Reclamation Company and the Sheffield Iron Corporation, with office at New York.

W. W. Frazier has recently been appointed assistant superintendent of the tube works of the **Reading Iron Company**, Reading, Pa. He began work as a draftsman and for four years served at the Loraine plant of the National Tube Company, both in the construction of its pipe mills and in the operating department. Later he served in an engineering capacity in the rearrangement of the pipe mills of the La Belle Iron Works and then went with the Youngstown Sheet & Tube Company, where for seven years he was first in the engineering department and later was general foreman of its tube mills. He was chief engineer of the A. M. Byers Company for one year, leaving that company to become assistant chief engineer at the government plant that was being built for the Ordnance Department by the U. S. Steel Corporation at Neville Island. When the armistice stopped work on this plant he went with the Bethlehem Steel Company, at Sparrows Point, as assistant chief engineer and now goes to the Reading Iron Company as assistant superintendent of its tube works.

Howard M. Smith, general passenger agent of the Long Island Railroad, who has been associated with that road for fifty-one consecutive years, died Wednesday at his home in Brooklyn, following a prolonged illness. Mr. Smith was born at Great Neck, Long Island, N. Y., on August 19, 1848. After completing his education in the grammar schools of New York City, he entered the service of the Long Island in 1869, as a clerk in the Long Island City terminal freight office, and served as such for one year, when he was promoted to freight agent. Nine years later he was appointed general agent, serving in that capacity until October, 1879. From that year until 1881 he was general freight agent; from 1881 to 1887 he served as chief clerk to the traffic manager, and from 1887 to 1888 held the position of assistant traffic manager. On April 2, 1888, Mr. Smith was appointed traffic manager, in charge of the passenger, freight and express departments. On January 15, 1901, the office of traffic manager was abolished, the freight and passenger departments being separated, and Mr. Smith was made general passenger agent, which position he occupied at the time of his decease, as noted above.

New York Air Brake Company

The New York Air Brake Company's gross sales in 1919, amounting to $3,551,667, were only one-third those of 1918. The company earned $6.24 a share on its common stock, compared with $20.53 in 1918. The earnings were $3.76 a share less than the dividends paid on the common stock.

President C. A. Starbuck, in explaining the shrinkage of business to stockholders in his annual report, says that the decreased business was due to the failure of the railroad administration to buy equipment. "The policy of the railroad administration," he says, "due to the uncertainty of its tenure of office, has been to keep all purchases at the lowest possible point, and the effect of such policy is reflected in the reduction of the gross sales of the company for the last year."

Gross sales of the company in 1919 amounted to $3,551,667, compared with $10,380,584 in 1918, and manufacturing profits were $741,160, against $3,243,267 the previous year. The gross profit, including income from investments and partial adjustment of government contracts, was $1,655,003, which was reduced by deducting administration expenses and taxes and interest payment to $624,289, compared with $2,052,553 in 1918. The total surplus in 1919 was $6,054,167, compared with $6,595,667 in 1918.

At the end of last year the inventory was placed at $5,937,763; expenditures for the account of government contracts at $3,610,582; and factories, patents, water power, land and machinery at $14,199,626, and securities at $1,510,058.

Pressed Steel Car Company

The earnings for operations of the Pressed Steel Car Company for the year ended December 31, 1919, were, according to the annual report issued recently, $4,923,783. Dividends on stocks, etc., brought the gross earnings up to $5,338,640 for the year. From this there were deductions of $1,073,408 for depreciation, obsolescence, amortization, renewals, etc., leaving a net of $4,265,231. The regular dividends of 7½ per cent were paid on the preferred stock and 8 per cent on the common, amounting together to $1,875,000, and there was also an additional charge of $630,456 for obsolescence and amortization for the year 1918, leaving a surplus for the year of $2,505,456.

Vice-president N. S. Reeder, who signs the report in the absence in Europe of President F. N. Hoffstat, says:

"Domestic orders for new freight cars have been exceedingly small during the year 1919. We feel reasonably confident, however, that a considerable volume of new business will necessarily develop as soon as the railroads are returned to private ownership, and the necessary legislation enacted to give them the credit required to purchase needed equipment. Figures based on past requirements and taking into consideration the actual ton mileage, increased capacity of cars, etc., show that the railroads will require about 850,000 cars within the next three years to fully meet their demands.

"We have been active in the export field and taken some orders, but the situation as regards foreign exchange and the peace treaty have prevented any large development of this business."

Canadian Mead-Morrison Co., Ltd.

The Canadian Mead-Morrison Company, Ltd., has been organized under Canadian laws, and has bought the manufacturing plant of M. Beatty & Sons at Welland, Ontario, and has also bought the Canadian business of the Mead-Morrison Manufacturing Company, of Boston, New York and Chicago. Steps have already been taken to enlarge and improve the Welland plant, and the new company will manufacture the extensive line of well-known "Mead-Morrison" products as well as the Beatty line of dredges, derricks, hoists, pumps, etc.

D. W. Coe

The new company has acquired from the United States company the rights to use its engineering data, plans, patents and to make use of past and future development work.

The Canadian Mead-Morrison Company, Ltd., already has a large specially trained engineering staff, and a well organized contracting department.

In addition to covering the Dominion of Canada, the Canadian company will also manufacture for export to the British possessions.

The new company will have a local board of directors, and its general officers will be **W. S. Martin**, managing director; **D. W. Coe**, general sales manager; **J. R. Story**, chief engineer, and **J. A. Johnson**, secretary. The general sales offices are located in the Guarantee Building, 285 Beaver Hall Hill, Montreal. This office will have entire control of the sales of "Mead-Morrison" products in the Dominion of Canada and British possessions. The sales are divided into two classes—engineering contracting, which covers the installation of coal, ore and material handling plants, and merchandise sales, under which heading are included the standard

lines of steam and electric hoists, contractors' equipment, grab buckets, derricks, winches, etc.

The engineering contracting department is under the direction of R. C. Smith, Montreal.

D. W. Coe, general sales manager of the new company, has been connected with the Mead-Morrison Manufacturing Company for a number of years and is well known in Canada; many of the large "Mead-Morrison" installations in Canada were made under his direction as manager of the Boston contract department.

Railroad Insurance Association

Charles N. Rambo, formerly secretary and superintendent of The Mutual Fire, Marine and Inland Insurance Company of Philadelphia, associated with railroad interests, and lately manager of the Insurance and Fire Protection Section of the United States Railroad Administration, has been appointed manager of the Railroad Insurance Association of New York. The temporary office of this association is at 80 Maiden Lane, New York City. From May 1 it will be at 95 William street.

The association is a centralized organization for facilitating the handling of railroad insurances. It is composed of twelve leading fire insurance companies, with a combined capital and surplus of over $100,000,000. It succeeds what was formerly known as the railroad insurance syndicate. It will promote a community of interest with the railroad companies in the protection of their properties against loss by fire through an inspection service.

Members of the Railroad Insurance Association are the Home Insurance Co., New York; Royal Insurance Co., Liverpool; Insurance Co. of N. A., Philadelphia; Western Assurance Co. of Toronto; London & Liverpool & Globe, Liverpool; Hartford Fire Insurance Co., Hartford; Globe & Rutgers Fire Insurance Co., New York; Firemen's Fund Insurance Co., San Francisco; Commercial Union Assurance Co., London; Continental Insurance Co., New York; Fidelity-Phoenix Fire Insurance Co., New York, and American Eagle Fire Insurance Co., New York.

Trade Publications

CHAINS.—A 20-page, illustrated booklet has been recently issued by the Columbus McKinnon Chain Company, Columbus, Ohio, which is devoted to information regarding the various types and sizes of chains manufactured by this company. It also includes tables on weights, sizes and strength of chains.

W. S. M. CAR DUMPERS.—Bulletin No. 49, 16 pages, illustrated, has been issued recently by the Wellman, Seaver, Morgan Company, Cleveland, Ohio. This bulletin describes the various types of car dumpers manufactured by this company, accompanied by full page photographs of the types in question and reproductions of working blueprints.

TRACK.—The Railroad Supply Company, Chicago, has recently issued the second edition of "Track," an illustrated pocket handbook of 220 pages for trackmen, which is devoted particularly to tie plates, their use, manufacture and methods of application, together with other track devices. It also contains tables and other miscellaneous data pertaining to track construction and maintenance.

HOISTING MACHINERY.—The Mead-Morrison Manufacturing Company, East Boston, Mass., has recently issued catalogue Number 21, of 165 pages, which covers the line of hoisting machinery manufactured by that company. The catalogue is divided into four sections: Section 1 treats of steam hoists and swingers; section 2 of electric hoists and swingers; section 3 of gasoline and belt hoists, and section 4 of clamshell and orange peel grab buckets. The catalogue is more than usually well gotten up and is profusely illustrated.

CHAPEL CARS will be built for every railroad out of Chicago "as money is available," according to a recent announcement by the Northern Baptist Church. The Baptist denomination now owns 7 such cars.

Railway Officers

Executive

J. P. Beckwith, at present federal manager of the Florida East Coast, has been elected vice-president in charge of operation, effective March 1.

J. G. Thomas has been appointed assistant to the president of the Cincinnati, Indianapolis & Western, effective at the termination of federal control.

Horace P. Smart has been elected vice-president of the Wadley Southern Railway Company, with headquarters at Savannah, Ga., effective at the termination of federal control.

J. S. Pyeatt, federal manager of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., has been re-elected president of the Gulf Coast Lines, with office at Houston, Tex., effective March 1.

Alexander R. Lawton has been elected vice-president of the Louisville & Wadley Railway Company and the Sylvania Central Railway Company, with headquarters at Savannah, Ga., effective at the termination of federal control.

Alexander Hilton, traffic manager of the St. Louis-San Francisco, the Fort Worth & Rio Grande, the St. Louis-San Francisco & Texas, the Kansas City, Clinton & Springfield, the Paris & Great Northern, the West Tulsa Belt and the Rock Island-Frisco Terminal, and a member of the passenger traffic committee of the Southern region of the United States Railroad Administration, with headquarters at St. Louis, Mo., has been elected third vice-president of the St. Louis-San Francisco, effective on the return of the roads to private control. Mr. Hilton was born at Hamilton, Ont. He entered railway service in 1878 as a clerk on the Great Western of Canada, now a part of the Grand Trunk. From 1880 to December, 1884, he was a clerk in the passenger department of the Chicago & Alton and subsequently, until 1889, he was city passenger and ticket agent on the same road at Kansas City, Mo. In 1887 he acted as Pacific Coast agent of the same road at San Francisco, Cal., and from 1889 to March 1, 1901, he was general agent in the passenger department of the same road at Kansas City. On the latter date he was appointed assistant general passenger agent of the Kansas City, Fort Scott & Memphis, and the following August he was made general passenger agent of the St. Louis-San Francisco. In October, 1913, he was appointed passenger traffic manager of the same road. In 1918 he was promoted to assistant traffic manager of the St. Louis-San Francisco and the Missouri, Kansas & Texas, which positions he retained until March 1, 1919, the date of the regrouping of the Southwestern region lines. Incident to the regrouping, he was appointed to the positions he held prior to his recent promotion.

A. Hilton

Charles Molony has been elected president; **Charles F. Groves,** secretary; **D. R. Thomas,** assistant secretary; **W. B. McKinstry,** auditor; **W. C. Askew,** treasurer, and **H. V. Jenkins,** assistant treasurer of the Wrightsville & Tennille, the

Sylvania Central and the Wadley Southern railroad companies, effective at the termination of federal control. The headquarters of Mr. Molony and Mr. Thomas will be at Tennille, Ga., and that of the others at Savannah, Ga. With the exception of Mr. Thomas, these men will each hold the same position with the Louisville & Wadley also.

Joseph L. Edwards, whose election to the vice-presidency of the Atlanta, Birmingham & Atlantic, was announced in the *Railway Age* of February 20 (page 595), was born at Cuthbert, Ga., and graduated from the high school at Marshallville, Ga. He began railroad work in 1892 with the Richmond & Danville, now part of the Southern, serving as a clerk in the operating, passenger and freight departments at Atlanta, Ga., and Washington, D. C. In 1904 he was appointed general agent of the Southern at Havana, Cuba, which position he held until the following year, when he was appointed chief clerk to the vice-president in charge of traffic of the same road at Washington. In 1908 he became commercial agent at Birmingham, Ala., and about four years later temporarily left railroad service to accept the managership of the Atlanta office of the Bonnyman-Norman Coal & Iron Company. Shortly after he resigned that position to go to the Atlanta, Birmingham & Atlantic as traffic manager. During part of 1918 he served as traffic manager of this road, the Atlanta & West Point, the Georgia Railroad and other lines under the jurisdiction of E. T. Lamb, federal manager, and on July 10 of that year was appointed manager of the Agricultural Section, Division of Traffic of the Railroad Administration, with headquarters at Washington, D. C., which position he held at the time of his recent election.

J. L. Edwards

Financial, Legal and Accounting

A. P. Disbrow, auditor of disbursements of the Erie, has resigned, effective March 1, to engage in other business.

C. E. Hildum, manager of the Carriers' Account Section of the Railroad Administration, has been appointed controller of the Lehigh Valley Railroad Company.

W. N. Rockwell, corporate auditor of the Chicago, Terre Haute & Southeastern, with headquarters at Chicago, has also been appointed federal auditor, succeeding W. E. Bacon, resigned.

A. P. Little has been appointed assistant secretary of the Louisville & Wadley Railroad Company, with headquarters at Louisville, Ga., effective at the termination of federal control.

T. V. Pomar, at present federal auditor of the Florida East Coast, has been elected assistant treasurer and controller, effective March 1. This is the position he held prior to federal control.

H. W. Johnson has been appointed assistant general counsel and Alexander R. Lawton, Jr., solicitor of the Wadley Southern Railway Company, with headquarters at Savannah, Ga., effective at the termination of federal control.

G. S. Ross, prior to federal control assistant secretary and assistant treasurer and now federal treasurer of the Toledo, St. Louis & Western, with headquarters at Toledo, Ohio, has been appointed secretary and treasurer, with the same headquarters, effective at the termination of federal control.

T. M. Cunningham, Jr., has been elected general counsel of the Wrightsville & Tennille and the Wadley Southern railroad companies, effective at the termination of federal control. R. M. Daley has been elected general solicitor of the Wrightsville & Tennille, with headquarters at Dublin, Ga.

Fred T. Dickerson, assistant to the president and assistant secretary and assistant treasurer of the Central of New Jersey Railroad Company, has been elected secretary and treasurer of the company effective at the termination of federal control. Mr. Dickerson was born in 1867 at Ramapo, N. Y., and educated in the public school of that city. He also took a course in a New Jersey business school. In 1883 he studied telegraphy while serving as a telegraph messenger for the Delaware, Lackawanna & Western at Newark, N. J., and in April of the following year entered the service of the Central of New Jersey as operator and assistant agent at Lake Hopatcong. Subsequently he was appointed agent and operator at that station and later had charge of other and larger stations. He served also in the trainmaster's office for two years. In 1891 he was transferred to the general offices of the same company at New York as clerk. Five years later he was appointed chief clerk to the controller, and later promoted to chief clerk to the vice-president and general manager. In 1907 he was elected assistant secretary, continuing also to perform the duties of chief clerk. In 1914 he was appointed assistant to the president, continuing also as assistant secretary. In 1918 he became also assistant treasurer. In addition to being elected secretary and treasurer of the Central of New Jersey Mr. Dickerson has also been elected to a similar position with the New York & Long Branch, the Lehigh & Wilkes-Barre Coal Company, and other companies affiliated with the Central of New Jersey.

F. T. Dickerson

Operating

V. A. Cooper has been appointed trainmaster of the Detroit & Toledo Short Line, effective at the termination of federal control.

C. H. Sauls, chief train despatcher of the Seaboard Air Line at Charleston, S. C., has been appointed trainmaster with the same headquarters, succeeding F. F. Laird, resigned, effective February 15; C. D. Boyd has been appointed to succeed Mr. Sauls.

W. F. Cooper, trainmaster of the Southern, Lines East, at Toccoa, Ga., has been appointed superintendent of terminals with headquarters at Columbia, S. C.; J. F. Gaffney, terminal trainmaster at Columbia, has been transferred to succeed Mr. Cooper, and the position of terminal trainmaster has been abolished.

C. L. Hinkle, prior to and during federal control general superintendent of the Toledo, St. Louis & Western, with headquarters at Frankfort, Ind., has been appointed to the same position, effective at the termination of federal control. D. F. Milne, prior to federal control superintendent of transportation of the same road, with the same headquarters, and now superintendent, has been appointed assistant superintendent, with the same headquarters.

Robert H. Allison, notice of whose promotion to assistant general manager of the Achison, Topeka & Santa Fe, with headquarters at Topeka, Kan., appeared in the *Railway Age* of January 30 (page 396), was born at Glade Spring, Va., on August 8, 1871. He entered railway service in 1887 as a warehouseman on the Norfolk & Western at Meadowview, Va. In 1888 he was promoted to telegraph operator and in May, 1892, to train despatcher. He was appointed train despatcher on the Chicago & Alton in 1897, remaining in that position until 1898. In October of that year, he was appointed train despatcher on the Chicago & North Western, with headquarters at Belle Plaine, Ia., and later at Boone. In 1899 he was promoted to chief despatcher, which position he retained until 1902, when he was appointed a despatcher on the Atchison, Topeka & Santa Fe. He was promoted to chief despatcher in 1903, retaining that position until 1905 when he was appointed trainmaster. He was appointed superintendent in 1914, which position he occupied at the time of his recent promotion.

Traffic

J. A. Fitzpatrick has been appointed assistant general freight agent of the Toledo, St. Louis & Western, with headquarters at Toledo, Ohio.

Engineering, Maintenance and Signaling

P. H. McFadden, roadmaster on the Northern Pacific, with headquarters at Livingston, Mont., has been promoted to general roadmaster of the Montana division, with the same headquarters.

J. C. Finch, signal inspector on the Missouri Pacific, with headquarters at Little Rock, Ark., has been transferred to St. Louis, Mo., succeeding **L. R. Mann**, who has resigned. **L. D. Woods**, signal supervisor at Little Rock, Ark., has been promoted to signal inspector, succeeding Mr. Finch.

Purchasing and Stores

C. S. Marshall has been appointed general storekeeper of the St. Louis Southwestern, with headquarters at Tyler, Tex., effective at the termination of federal control.

Special

Dr. F. L. Truitt has been appointed chief surgeon of the Cincinnati, Indianapolis & Western, effective at the termination of federal control.

C. A. Duvall has been appointed chief of the employment and record bureau of the Baltimore & Ohio and other roads under the direction of C. W. Galloway, federal manager, with headquarters at Baltimore, Md., succeeding **E. J. Jones**, resigned.

General

The Lehigh & New England has announced that the following will be its organization at the termination of federal control:

S. D. Warriner, president.
R. H. Wilbur, vice-president and general manager.
W. J. Turner, vice-president and general counsel.
A. S. Reanyd, assistant to president.
H. H. Pease, secretary and treasurer.
E. M. Reynolds, controller.

The Belt Railroad of Chicago and the Chicago & Western Indiana announce that the following officers have been re-elected to the positions they held prior to government control:

H. G. Hetzler, now general manager, president.
E. H. Lee, now president, vice-president and chief engineer.
C. G. Austin, Jr., now vice-president and general counsel, general counsel.
J. E. Murphy, now federal treasurer, treasurer.
R. L. Porter, now federal auditor, secretary and auditor.

NEW YORK, NEW HAVEN & HARTFORD

The organization of The New York, New Haven & Hartford Railroad Company, effective at the termination of federal control, was announced Wednesday by its board of directors as follows; President, E. J. Pearson; vice-president and general counsel, E. G. Buckland; vice-president in charge of traffic, B. Campbell; vice-president, with headquarters at Boston, A. P. Russell; secretary, Arthur E. Clark; treasurer, A. S. May; controller, H. S. Palmer; assistant to the controller, T. M. Prentice. The other officers serving under federal control will resume similar positions.

TOLEDO, ST. LOUIS & WESTERN

The Toledo, St. Louis & Western Railroad Company has announced that the following officers will resume on March 1, the positions they held prior to federal control:

Name	Title	Headquarters
A. L. Angewitter.	Ass't to receiver & pas. ag't	Toledo, Ohio
J. W. Graham....	Gen. freight agent	Toledo, Ohio
R. Larmer	Controller	Toledo, Ohio
C. E. Rose	Gen. pass. agent	Toledo, Ohio
D. W. Cross	Supt. mot. power & eqpmt..	Frankfort, Ind.
F. R. Ramsey....	Chief engineer	Frankfort, Ind.

DETROIT & TOLEDO SHORE LINE

The Detroit & Toledo Shore Line Railroad Company has announced that on the termination of federal control the following officers will resume the positions they held prior to that time:

Name	Title	Headquarters
J. P. Main.....	General manager	Detroit, Mich.
W. C. Tompkins..	Secretary and treasurer.....	Detroit, Mich.
F. S. Ross.....	General freight agent.....	Detroit, Mich.
J. R. Mann.....	Sup't transportation.....	Detroit, Mich.
J. F. Hazel.....	Superintendent	Toledo, Ohio

INTERNATIONAL AND GREAT NORTHERN

The International & Great Northern has made the following changes in its personnel effective with the return of the road to private control:

Thornewell Fay, prior to federal control, assistant to the receiver and now chairman of the Valuation Committee, has been appointed executive officer at Houston, Tex.

A. G. Whittington, general manager prior to and during federal control, has been reappointed, with office at Palestine, Tex.

Horace Booth, prior to government control traffic manager and now general freight agent, has been appointed traffic manager, with office at Houston.

D. J. Price, general passenger agent prior to and during federal control, has been reappointed, with office at Palestine.

W. J. Werner, auditor during and prior to federal control, has been reappointed, with office at Palestine.

A. R. Howard, prior to federal control treasurer for the receiver and now local treasurer, has been appointed treasurer.

PITTSBURGH & WEST VIRGINIA

The following will be the organization of the Pittsburgh & West Virginia on the return to private control:

Name	Title	Headquarters
W. H. Coverdale..	Chmn. of the bd. and v.-pres...	New York
H. E. Farrell....	President	Pittsburgh
A. H. Van Brunt..	General counsel.....	New York
John S. Wendt..	General attorney.....	Pittsburgh
F. H. Harvey....	General auditor.....	Pittsburgh
H. C. Moore....	Secretary and treasurer.....	Pittsburgh
John J. O'Brien..	Assistant secretary.....	New York
J. E. Fairhead...	General superintendent.....	Pittsburgh
H. H. Temple..	Chief engineer.....	Pittsburgh
G. G. Early.....	General freight and pass. agt..	Pittsburgh
D. W. Summerfield.	Purchasing agent.....	Pittsburgh
W. R. Prickman..	Real estate and claim agent...	Pittsburgh

The West Side Belt organization will be similar to that for the Pittsburgh & West Virginia, with the exception of the two following officers:

Name	Title	Headquarters
W. H. Coverdale..	President	New York
H. E. Farrell....	Vice-president	Pittsburgh

NORFOLK SOUTHERN

The following will be the organization of the Norfolk Southern following the termination of federal control:

Name	Title	Headquarters
M. J. Perry	Chairman of the Board	New York
R. H. Swartwout	Vice-chairman of the board	New York
Jos. H. Young	President	Norfolk, Va.
C. I. Millard	Vice-president	Norfolk, Va.
E. D. Kyle	V.-pres. in charge of traffic	Norfolk, Va.
Capt. M. Manly	Treasurer	Norfolk, Va.
M. S. Hawkins	Secretary	Norfolk, Va.
G. E. Christie	Asst. sec. and treas.	New York
J. C. Nelms Jr.	Auditor	Norfolk, Va.

MISSOURI PACIFIC RAILROAD COMPANY

The Missouri Pacific has announced that the following will be its organization at the termination of federal control:

Harry Bronner...Chairman, board of directors & exec. com.
B. F. Bush.....President, St. Louis, Mo.
J. G. Drew.....Vice-president
F. J. Shepard....Vice-president
A. Robertson ...Vice-president, in charge of operation
E. J. White.....Vice-president and general solicitor
C. E. Perkins....Vice-president, in charge of traffic
F. P. Johnson....General auditor
H. L. Utter.....Secretary and treasurer
O. B. Huntsman.Vice-president, assist. sec. and assist. treas.
F. W. Irland.....Assistant secretary
F. M. Hickman..Local treasurer

ANN ARBOR

The Ann Arbor has announced that the following will be its officers on the return to private control:

Name	Title	Headquarters
Nerwman Erb	President	New York
W. M. Wadden	Vice-president and treasurer	New York
E. F. Blomeyer	Vice-president and gen. mgr.	Toledo, Ohio
J. S. Bache	Vice-president	New York
Jos. Goldbaum	Auditor and assist. sec.	Toledo, Ohio
J. F. Cress	Assistant auditor	Toledo, Ohio
F. K. Curtis	General counsel	Toledo, Ohio
H. S. Bradley	Traffic manager	Toledo, Ohio
H. B. Blanchard	Secretary	New York

Newman Erb will also be president and E. F. Blomeyer vice-president and general manager of the Manistique & Lake Superior, and H. B. Blanchard will be secretary and treasurer of that road.

KENTUCKY & INDIANA TERMINAL

The Kentucky & Indiana Railroad Company has announced that the following will be its organization, effective at the termination of federal control:

Name	Title	Headquarters
Geo. H. Campbell	President	Baltimore, Md.
W. S. Campbell	Mgr. & chief engr	Louisville, Ky.
A. P. Humphrey	Vice-pres. & genl counsel	Louisville, Ky.
H. D. Ormsby	Treasurer	Louisville, Ky.
E. K. Scott	Secretary	Louisville, Ky.
H. F. Sutherland	Superintendent	Louisville, Ky.
J. A. Howison	General freight agt.	Louisville, Ky.
G. H. Whitesides	Trainmaster	Louisville, Ky.
P. J. Welsh	Trainmaster	Louisville, Ky.
W. P. McDevitt	Master mechanic	Louisville, Ky.
C. F. Burrell	Engineer m. of w.	Louisville, Ky.
Jas. McDonald	Roadmaster	Louisville, Ky.
B. Y. Heazlitt	Purchasing agent	Louisville, Ky.
R. V. Caldwell	Car accountant,	Louisville, Ky.

ST. LOUIS-SAN FRANCISCO

At a meeting of the Board of Directors of St. Louis-San Francisco Railway Company, held in New York February 11, the following changes were made effective at the termination of federal control:

E. N. Brown resigned as president, retaining the office of chairman of the board of directors.

J. M. Kurn, general manager under federal control, was elected president, with office at St. Louis, Mo.

C. W. Hillard resigned as treasurer, retaining the office of second vice-president in charge of finances.

S. J. Fortune resigned as secretary and assistant treasurer. The following additional officers were elected:

A. Hilton, fourth vice-president, in charge of traffic.

B. T. Wood, fifth vice-president and chief purchasing officer.

W. F. Evans, general solicitor.

F. H. Hamilton, secretary and treasurer, all with offices at St. Louis, Mo.

ALABAMA & VICKSBURG

The Alabama & Vicksburg Railway Company and the Vicksburg, Shreveport & Pacific Railway Company have announced that the following will be their organization, effective at the termination of federal control:

Name	Title	Headquarters
Larz A. Jones	Pres. & gen. mgr.	New Orleans, La.
E. Ford	Pres., in charge operation	New Orleans, La.
H. H. Le Roy	Auditor	New Orleans, La.
J. E. Schenck	Assistant auditor	New Orleans, La.
Udolpho Wolfe	Treasurer	New Orleans, La.
A. J. Chapman	Freight traffic mgr.	New Orleans, La.
C. F. Woods	General pass agt.	Vicksburg, Miss.
H. B. Sargent	Supt. of transportation	Vicksburg, Miss.
J. C. Stamm	Superintendent	Vicksburg, Miss.
H. J. Rhodes	Engineer of maintenance	Vicksburg, Miss.
F. A. C. Ferguson	Trainmaster	Vicksburg, Miss.
J. Blanc Monroe	General counsel	New Orleans, La.
T. H. Ryan	Purchasing agent	New Orleans, La.
F. M. Tutwiler, Jr.	Land commissioner	Birmingham, Ala.
L. B. Ferguson	Superintendent	Monroe, La.

CHESAPEAKE & OHIO

The Chesapeake & Ohio Railroad Company, the Chesapeake & Ohio Railway Company of Indiana and the Chesapeake & Ohio Northern Railway Company, have announced that the following will be their organization at the termination of federal control:

Name	Title	Headquarters
H. E. Huntington.	Chairman of the board	New York
Geo. W. Stevens.	President	Richmond, Va.
C. E. Graham	Senior vice-president	New York
F. H. Davis	Vice-president	New York
G. B. Wall	Vice-president	Richmond, Va.
H. T. Wickham.	Vice-pres. & gen. counsel	Richmond, Va.
F. M. Whitaker.	V.-pres. in charge of traffic	Richmond, Va.
A. Trevvett	Secretary and treasurer	New York
H. F. Lohmeyer.	Assistant secretary	New York
C. C. Michie	Assistant secretary	Richmond, Va.
J. A. Hancock	Assistant treasurer	Richmond, Va.
E. M. Thomas	Comptroller	Richmond, Va.
A. C. Rearick	Counsel	New York
H. Taylor, Jr.	General solicitor	Richmond, Va.
W. S. Bronson	General attorney	Richmond, Va.
H. Frazier	Consulting engineer	Richmond, Va.
H. C. Starr	Assistant general counsel (C. & O. Ry. Co. of Ind.).	Richmond, Ind.

SEABOARD AIR LINE

The Seaboard Air Line Railway Company has announced that the following will be its organization, effective at the termination of federal control:

Name	Title	Headquarters
S. D. Warfield	Chairman of board & pres.	Baltimore, Md.
Chas. R. Capps	1st vice-pres in ch. traffic.	Norfolk, Va.
M. J. Caples	Vice-pres in ch. operation.	Norfolk, Va.
W. R. Bonsal	Vice-president	Charleston, S. C.
W. L. Seddon	Vice-pres. in ch. of sub. rail lines & cons. engr.	Norfolk, Va.
Robt. L. Nutt	Secretary & treas.	New York
L. R. Powell, Jr.	Controller	Baltimore, Md.
B. H. I. Brown	Advisory counsel	New York
J. F. Wright	General solicitor	Norfolk, Va.
M. H. Cahill	General manager	Norfolk, Va.
B. C. Prince	Freight traf. mgr.	Norfolk, Va.
C. B. Ryan	Passenger traffic mgr.	Norfolk, Va.
H. B. Grimshaw.	General super.	Savannah, Ga.
P. G. Walton	General super.	Hamlet, N. C.
H. W. Mackenzie.	General auditor	Portsmouth, Va.
T. W. Mathews.	Asst. treas & asst. sec.	Portsmouth, Va.
W. D. Faucette.	Chief engineer	Norfolk, Va.
C. S. Patton	Supt. motive power	Portsmouth, Va.
J. L. Kirby	Engineer maint. of way	Norfolk, Va.
H. C. Pearce	Gen purc. agent	Norfolk, Va.

ATLANTIC COAST LINE

The officers of the Atlantic Coast Line Railroad Company at the termination of federal control will be as follows:

Name	Title	Headquarters
H. Walters	Chmn. of the board	New York
J. R. Kenly	President	Wilmington, N. C.
Lyman Delano	Executive vice-pres.	Wilmington, N. C.
R. A. Brand	V.-pres., traffic	Wilmington, N. C.
Geo. B. Elliott	V.-pres. and gen counsel.	Wilmington, N. C.
H. L. Borden	V.-pres. and secretary	New York
Homer G. Day	Asst to the chairman	New York
John T. Reid	Treasurer	Wilmington, N. C.
W. C. Yarborough	Assistant treasurer	Wilmington, N. C.
J. J. Nelligan	Assistant treasurer	Baltimore, Md.
J. B. Kirby	Assistant treasurer	Baltimore, Md.
R. D. Cronly	Assistant secretary	Wilmington, N. C.
T. F. Darden	Assistant secretary	Wilmington, N. C.
J. F. Post, Jr.	Assistant secretary	Wilmington, N. C.
F. D. Lemmon	Assistant secretary	New York
P. R. Albright	General manager	Wilmington, N. C.
W. J. Craig	Pass. traffic manager	Wilmington, N. C.
Jas. Menzies	Freight traffic manager	Wilmington, N. C.
H. C. Prince	Controller	Wilmington, N. C.

THE WESTERN PACIFIC

The Western Pacific Railroad Company has announced that the following will be its organization at the termination of federal control:

Name	Title	Headquarters
A. W. Krech	Chairman of the board	New York
C. M. Levey	President	San Francisco
A. R. Baldwin	Vice-pres. & gen. counsel	San Francisco
John F. Bowie	Counsel to the board	New York

Operating

Name	Title	Headquarters
E. W. Mason	General manager	San Francisco
C. F. Craig	Asst. to general manager	San Francisco
T. J. Wyche	Chief engineer	San Francisco
J. P. Quigley	Supt. transt'n. & tele	San Francisco
W. T. Jacobs	Purchasing agent	San Francisco

Traffic

Name	Title	Headquarters
H. K. Faye	Traffic manager	San Francisco
Bode K. Smith	General passgr. agent	San Francisco
Archibald Gray	General freight agent	San Francisco
Lee H. Landis	Industrial commissioner	San Francisco

Treasury and Accounting

Name	Title	Headquarters
Charles Elsey	Secretary & treasurer	San Francisco
Lyman Rhoades	Asst. sec. & asst. treas	New York
J. F. Evans	General auditor	San Francisco

BESSEMER & LAKE ERIE

The Bessemer & Lake Erie Railroad Company has announced that the following officers have been elected, effective March 1:

Name	Title	Headquarters
E. H. Utley	Vice-president	Pittsburgh, Pa.
G. W. Kepler	Secretary and treas	Pittsburgh, Pa.
R. H. Keyser	Asst. sec. and treas	Pittsburgh, Pa.

The following officers have been reappointed to perform the duties as assigned to them prior to federal control:

Name	Title	Headquarters
E. H. Utley	General manager	Pittsburgh
J. S. Matson	General superintendent	Greenville, Pa.
Wm. M. Johnson	Superintendent	Greenville, Pa.
C. L. Pasho	Assistant superintendent	Greenville, Pa.
F. W. Smith	Supt. of telegraph	Greenville, Pa.
A. D. Chittenden	Supt. of transportation	Pittsburgh
H. T. Porter	Chief engineer	Greenville, Pa.
Guy M. Gray	Supt. motive power	Greenville, Pa.
F. C. Baird	Freight traffic manager	Pittsburgh
J. V. Styers	General freight agent	Pittsburgh
E. D. Comstock	General passenger agent	Pittsburgh
J. C. McKalip	General auditor	Pittsburgh
L. W. McCoy	Asst. general auditor	Pittsburgh
T. C. Whiteman	Claim agent	Greenville, Pa.
R. W. Brown	Chief surgeon	Greenville, Pa.
Wm. A. Parker	Purchasing agent	Pittsburgh
C. S. Leet	Land agt. & engrng. asst	Pittsburgh
F. I. Snyder	Office assistant	Pittsburgh
Reed, Smith, Shaw & Beal	General counsels	Pittsburgh
E. S. Templeton	Assistant general counsel	Greenville, Pa.

DELAWARE & HUDSON COMPANY

The following will be the organization of the Delaware & Hudson, effective on its return to private control:

Name	Title	Headquarters
L. F. Loree	President	New York
W. H. Williams	Vice-president	New York
F. P. Gutelius	Vice-president	Albany, N. Y.
C. A. Peabody	Vice-president	New York
C. S. Sims	Resident vice-president	Montreal, P Q.
J. T. Loree	General manager	Albany, N. Y.
W. B. Schofield	Asst. to pres. and asst. sec	New York
R. C. Kann	Assistant to vice-president	New York
F. M. Olyphant	Secretary	New York
W. H. Davies	Treasurer	New York
C. H. Booth	Local treasurer	Albany, N. Y.
W. E. Eppler	Controller	New York
L. K. Luff	Assistant controller	Albany, N. Y.
H. D. Chamberlain	Auditor	Albany, N. Y.
Walter C. Noyes	General counsel	New York
Lewis E. Carr	Counsel	Albany, N. Y.
W. L. Lawrence	Rl. est. agt. (non-car. props)	Scranton, Pa.
Geo. H. Burgess	Chmn. valuation com. & real estate agt (non-car. props.)	Albany, N. Y.
W. H. Mansfield	Valuation engineer	Albany, N. Y.
J. B. Dickson	Genl. supt. of transportation	Albany, N. Y.
J. E. Roberts	Supt. of car service	Albany, N. Y.
J. H. Manning	Supt. of motive power	Albany, N. Y.
Jas. MacMartin	Chief engineer	Albany, N. Y.
M. L. Byers	Consulting engineer	New York
W. J. Mullin	General traffic manager	Albany, N. Y.
W. G. Story	General freight agent	Albany, N. Y.
M. J. Powers	General passenger agent	Albany, N. Y.
G. W. Ditmore	Master car builder	Albany, N. Y.
J. White Sprong	Purchasing agent	Albany, N. Y.

NEW YORK CENTRAL LINES

Reappointments which re-establish the organization of the New York Central Lines as it existed prior to Federal control were announced Wednesday.

The reappointments re-establish the policy of local autonomy, each railroad having its own vice-president or general manager in local charge of the property, embracing all departments, with local traffic manager, auditor, treasurer, etc.

A. H. Smith is president of each of the constituent companies, and the staff officers of the system, all with headquarters in New York, are as follows:

A. T. Hardin....Vice-president, operation
Ira A. Place.....Vice-president, law
A. H. Harris....Vice-pres., finance and corporate relations
G. H. Ingalls....Vice-president, traffic
J. Carstensen ....Vice-president
H. L. Ingersoll..Assistant to the president
G. A. Harwood..Assistant to the president
M. J. Alger.....Executive assistant to the president
S. B. Wight.....Manager, purchases and stores
M. S. Barger....General treasurer
W. C. Wishart...Controller
E. F. Stephenson..Secretary

Vice-presidents and general managers in local charge of the several properties have been re-elected or reappointd as follows:

P. E. Crowley, at present federal manager, has been re-elected vice-president in local charge of the New York Central and Ottawa & New York, all departments with headquarters at New York. Prior to federal control Mr. Crowley was vice-president in charge of operation.

H. M. Biscoe, present federal manager of the Boston & Albany, is re-elected vice-president in local charge of that property, all departments with headquarters at Boston, Mass., the position he held prior to federal control.

H. A. Worcester, at present district director of the Ohio-Indiana district, has been re-elected vice-president of the Cleveland, Cincinnati, Chicago & St. Louis; the Peoria & Eastern and the Cincinnati Northern, in local charge of these properties, all departments with headquarters at Cincinnati, Ohio. Prior to

federal control, Mr. Worcester was vice-president and general manager of these properties.

E. D. Bronner, federal manager of the Michigan Central, has been re-elected vice-president in local charge of the property, all departments with headquarters at Detroit, Mich. Prior to federal control he was vice-president and general manager of this road, the position he held prior to federal control.

J. B. Yohe, federal manager of the Pittsburgh & Lake Erie, has been reappointed general manager in local charge of the property, all departments, with headquarters at Pittsburgh, Pa., the position he held prior to federal control.

H. A. Boomer, at present federal manager of the Lake Erie & Western, has been reappointed general manager in local charge of the property, all departments, with headquarters at Indianapolis, Ind., the position he held prior to federal control.

F. B. Sheldon, at present federal manager of the Toledo & Ohio Central, the Zanesville & Western, the Kanawha & Michigan and the Kanawha & West Virginia has been re-elected vice-president in local charge of these properties, all departments, with headquarters at Columbus, Ohio, the position he held prior to federal control.

George Hannauer, federal manager of the Indiana Harbor Belt, has been reappointed general manager in local charge of the property, all departments, with headquarters at Gibson, Ind., the position he held prior to federal control.

NEW YORK, ONTARIO & WESTERN

The New York, Ontario & Western Railway Company has announced that the following will be its organization, effective at the termination of federal control:

Name	Title	Headquarters
R. D. Rickard	Vice-pres., sec. & treas.	New York
C. L. Andrus	General counsel	New York
J. H. Nuelle	General manager	Middletown, N. Y.
A. L. Parmelee	Assistant treasurer	New York
J. M. Fleming	Asst. sec. & transf. agt.	New York
Wm. F. Mathieson	General auditor	New York
T. C. Cameron	Auditor revs. & disbts.	New York
Wm. C. Startup	Auditor fgt & passgr accts.	New York
J. B. Stewart	Traffic manager	New York
G. L. Robinson	General passenger agt.	New York
C. B. McManus	General freight agt.	New York
Fred Bergheim	General eastern agt.	New York
Wm. Mullock	Freight claim agt.	New York
C. L. Hoffman	Milk & industrial agt.	New York
C. A. Draper	Purchasing agent	New York
A. Riley	Assistant purchasing agt.	New York
F. W. Elliott	Paymaster	New York
W. C. Heidenthal	Engineer maint. of way	Middletown, N. Y.
F. X. Socte	Valuation engineer	Middletown, N. Y.
B. P. Flory	Supt. motive power	Middletown, N. Y.
W. D. McQueen	Superintendent	Middletown, N. Y.
W. C. Hartigan	Superintendent	Norwich, N. Y.
W. S. Badger	Assistant superintendent	Childs, Pa.
A. C. Reynolds	Supt. car service	Middletown, N. Y.
George Marsden	Tax & claim agent	Middletown, N. Y.
George Hankins	Traveling auditor	Middletown, N. Y.
H. J. Cox	Chief tariff inspector	Middletown, N. Y.
W. M. Tiel	Gen. bag. & div. frt. & pas. agt.	Middletown, N. Y.
J. E. Powers	Div. fgt & pass. agt.	Oneida, N. Y.
J. E. Welsh	Div. fgt & pass. agt.	Scranton, Pa.

VIRGINIAN RAILWAY COMPANY

The Virginian Railway Company has announced that the following will be its organization, effective at the termination of federal control:

Name	Title	Headquarters
C. W. Huntington	President	New York
A. H. Larkin	Vice-president	New York
Chas. H. Hix	Vice-president	Norfolk, Va.
W. D. Baker	Asst. to Vice-pres.	Norfolk, Va.
Geo. H. Church	Treasurer	New York
L. A. Browne	Assistant Treasurer	New York
F. W. Russell	Assistant Treasurer	Norfolk, Va.
James Clarke	Secretary	New York
H. Fernstrom	Chief Engineer	Norfolk, Va.
A. M. Traugott	Asst. Chief Engineer	Norfolk, Va.
E. W. Knight	General counsel	Charleston, W. Va.
Williams, Loyall & Tunstall	General attorneys	Norfolk, Va.
Tom Moore	Purchasing agent	Norfolk, Va.
S. M. Adsit	Genl. frt. & pass. agt.	Norfolk, Va.
W. S. Saunders	Asst. genl. frt. agt.	Norfolk, Va.
W. C. Everett	Auditor	Norfolk, Va.
M. A. Hartigan	General claim agent	Norfolk, Va.
C. E. Reynolds	Car accountant	Norfolk, Va.
R. E. Jackson	Supt. motive power	Princeton, W. Va.
W. A. Gore	Superintendent	Victoria, Va.
L. R. Taylor	Superintendent	Princeton, W. Va.
		Headquarters

THE PHILADELPHIA & READING

The Philadelphia & Reading Railway Company has announced that the following will be its organization, effective at the termination of federal control:

John F. Auch.....Assistant to the president
Charles H. Ewing.Vice-president, in charge operation & maint.
E. B. Crosley.....Vice-president in charge of traffic
William L. Kinter.General solicitor
A. B. Bierck.....Controller
J. D. Landis.....Purchasing agent

CHICAGO, BURLINGTON & QUINCY

Following a meeting of the board of directors of the Chicago, Burlington & Quincy and the Chicago & Southern, Hale Holden, whose election as president was announced in the *Railway Age* of February 20 (page 595), announced the following as personnel of the executive staff that will govern these roads at the termination of federal control:

C. G. Burnham, formerly federal manager, and now vice-president, will continue in that position.

C. E. Perkins, president during the period of federal control, will become vice-president.

T. S. Howland, vice-president and treasurer during the period of federal control will continue in that capacity.

E. P. Bracken, federal manager, will become vice-president in charge of operation.

C. E. Spens, United States wheat director, inland traffic department, division of traffic of the Railroad Administration, will become vice-president in charge of traffic.

E. A. Howard, vice-president of the Iowa Transfer Service, will become vice-president in charge of land and industrial departments.

W. W. Baldwin, federal treasurer, will become vice-president in charge of tax, mail and express departments.

H. R. Safford, chief engineer of the Grand Trunk prior to federal control, and during the period of federal control engineering assistant to the regional director of the Central Western Region, will become assistant to the president.

C. M. Spencer, general counsel, will continue in the same capacity.

R. B. Scott, general solicitor, will continue in the same capacity.

C. I. Sturgiss, general auditor under federal control, will become controller.

L. B. Allen and C. W. Holdredge, general managers of Lines East and West respectively, will continue in the same capacities.

A. W. Newton, corporate chief engineer, will become chief engineer and chairman of the valuation committee, succeeding to the position held prior to federal control by W. L. Breckenridge, now federal chief engineer.

L. N. Hopkins, federal purchasing agent, will continue in the same position.

P. S. Eustis, passenger traffic manager, will continue in the same position.

H. H. Holcomb, assistant freight traffic manager, will be promoted to freight traffic manager, succeeding G. H. Crosby, who has been assigned special duties as assistant to the vice-president in charge of traffic.

Simultaneously announcement was made of the organization of the Colorado & Southern, effective at the termination of federal control. Messrs. Holden, Burnham, Safford and Spencer will hold positions on the staff of this road similar to those to which they have been elected on the Burlington.

The other officers will be:

Robert Rice, prior to federal control vice-president of the Iowa & St. Louis, and now general manager of the Colorado & Southern, has been promoted to vice-president and general manager.

E. E. Whitted, federal general solicitor, will become general solicitor for the corporation.

J. H. Bradbury, federal controller and vice-president, will become corporate controller.

B. F. Jones, federal treasurer, will become secretary and treasurer.

H. A. Johnson, now traffic manager, will continue in that capacity.

CENTRAL OF NEW JERSEY

The Central of New Jersey has announced that the following will be its organization at the termination of federal control:

EXECUTIVE DEPARTMENT

Name	Title	Headquarters
Geo. F. Baker	Chairman of the board	New York
W. G. Besler	Pres. and gen. mgr.	New York
R. W. de Forest	V.-p. and gen. counsel	New York
F. T. Dickerson	Sec. and Treas.	New York
C. H. Stein	Assistant to president	New York

LEGAL DEPARTMENT

Name	Title	Headquarters
R. W. de Forest	V.-p. and gen. counsel	New York
George Holmes	General attorney	New York
A. H. Elder	General solicitor	New York
W. A. Barkalow	Asst. gen. counsel	New York
C. E. Miller	Asst. gen. counsel	New York
W. H. Failing	Claims attorney	Jersey City, N. J.

FINANCE DEPARTMENT

Name	Title	Headquarters
F. T. Dickerson	Secretary and treasurer	New York
W. E. West	Asst. sec. & asst. treas.	New York
C. W. Kinsman	Paymaster	New York

ACCOUNTING DEPARTMENT

Name	Title	Headquarters
J. A. Taylor	Controller	Jersey City, N. J.
J. E. Brokaw	Assistant controller	Jersey City, N. J.
F. M. Snyder	Auditor freight traffic	Jersey City, N. J.
W. C. Smyth	Auditor passenger traf.	Jersey City, N. J.
P. L. Anderson	Asst. aud. pass. traf.	Jersey City, N. J.
H. L. Peeples	Auditor disbursements	Jersey City N. J.
M. A. Koons	Coal traffic accountant	Mauch Chunk, Pa.

FREIGHT TRAFFIC DEPARTMENT

Name	Title	Headquarters
T. B. Koons	V.-p. & freight traf. mgr.	New York
A. Hamilton	General freight agent	New York
C. L. Ewing	Asst. gen. freight agent.	New York
E. M. Snyder	Asst. gen. freight agent.	New York
W. E. Pugh	Div. fr. agt. L. & S. div.	Mauch Chunk, Pa.
A. B. Craig	Div. fr. agt. N. J. Sou. div.	New York
T. C. Smith	Freight claim agent	New York

PASSENGER TRAFFIC DEPARTMENT

Name	Title	Headquarters
W. C. Hope	Pass. traffic mgr.	New York
D. B. Branch	Asst. gen. pass. agent	New York
H. E. Ruhe	General baggage agent	Jersey City, N. J.

OPERATING DEPARTMENT

Name	Title	Headquarters
J. W. Meredith	General superintendent	Jersey City, N. J.
A. D. Edgar	Supt. Cent. & L. & S. div.	Jersey City, N. J.
C. H. English	Asst. Supt. Central div.	Jersey City, N. J.
Wm. Sweeney	Asst. Supt. L. & S. div.	Mauch Chunk, Pa.
S. B. Zartman	Supt. N. J. So. div.	E. Long Br., N. J.
R. V. Reamer	Engr. mnt. way Ctrl. div.	Jersey City, N. J.
Wm. Twining	Engr. mnt. way L. & S. div	Mauch Chunk, Pa.
F. G. Sherman	Supt. telegraph	Jersey City, N. J.
A. G. Adams	Supt. car service	Jersey City, N. J.
J. B. Gray	Chief of police	Jersey City, N. J.
F. W. Bender	Signal engineer	Elizabeth, N. J.
S. W. Derr	Supt. dining car service	Philadelphia, Pa.
A. E. Case	Manager of restaurants	Jersey City, N. J.

MECHANICAL DEPARTMENT

Name	Title	Headquarters
C. E. Chambers	Supt. mot. pr. & eqpmt.	Jersey City, N. J.
G. W. Rink	Asst. supt. motive pr.	Jersey City, N. J.

ENGINEERING DEPARTMENT

Name	Title	Headquarters
A. E. Owen	Chief engineer	New York
A. M. Zabriskie	Principal asst. engineer	New York

REAL ESTATE DEPARTMENT

Name	Title	Headquarters
L. W. Newcomb	Real est and tax agent	New York
A. A. Hesser	Asst. real est. & tax agt.	New York

SUPPLY DEPARTMENT

Name	Title	Headquarters
C. B. Williams	Purchasing agent	New York
LeRoy Cooley	General storekeeper	Elizabethport, N. J.
J. L. Meredith	Stationer	Jersey City, N. J.

VALUATION DEPARTMENT

Name	Title	Headquarters
Chas. Hansel	Consltg. valuation engr.	New York
E. Y. Allen	Valuation engineer	New York

MARINE DEPARTMENT

Name	Title	Headquarters
H. L. Joyce	Mgr. marine dept.	New York
C. L. Hollis	Supt. marine dept.	New York

NEW YORK & LONG BRANCH

The New York & Long Branch has announced that the following will be its organization at the termination of federal control:

Name	Title	Headquarters
Geo. F. Baker	President	New York
R. W. de Forest	Vice-president	New York
F. T. Dickerson	Secretary and treasurer	New York
G. O. Waterman	Auditor	Long Branch, N. J.
L. W. Berry	Superintendent	Long Branch, N. J.
C. O. McFaddin	Gen. pass. & freight agt.	Long Branch, N. J.

ERIE RAILROAD

In last week's issue, page 540, an article was given outlining the new plan of organization which will be put in effect on the Erie at the termination of federal control and giving the names of the higher officers. The remainder of the new personnel is given as follows:

General Manager's Staff

Name	Title	Headquarters
Aug. E. Ruffer	Transportation manager	New York
Wm. Schlafge	Mechanical manager	New York
Jason C. Tucker	Special representative	New York
W. R. Collins	Purchasing agent	New York
Hosea S. Burr	Gen. supt. of stores	Meadville, Pa.
I. A. Canning	Supt. of dining cars	Jersey City, N. J.
Edw. P. Griffith	Supt. of telegraph	Jersey City, N. J.
Arthur B. Hoff	Com. of police & emplymt.	New York

New York Region

Name	Title	Headquarters
J. J. Mantell	Manager	Jersey City, N. J.
H. C. Snyder	General frt. & passgr. agt.	Jersey City, N. J.
C. P. Eckles	Supt. of transportation	Jersey City, N. J.
W. S. Jackson	Mechanical supt.	Jersey City, N. J.
J. C. Patterson	Regional engineer	Jersey City, N. J.
P. J. O'Rourke	Frt. claim adjuster	Jersey City, N. J.
C. D. Ward	Auditor	Jersey City, N. J.
L. McGuill	Chief of police	Jersey City, N. J.
A. K. Stone	Safety engineer	Jersey City, N. J.
A. C. Elston	Genl. supt. N. Y. S. & W.	
W. J. English	Supt. N. Y. div. & side lines	
J. M. Condon	Supt. terminals	Jersey City, N. J.
A. D. Parsons	Supt. Wyoming div.	
E. J. Bauer	Supt. light. & for. frt. depts.	Jersey City, N. J.
*P. M. Coyne	Supt. floating equipment	Jersey City, N. J.
*R. H. Boykin	Supt. freight service	Jersey City, N. J.

*Reporting to superintendent of terminals.

Hornell Region

Name	Title	Headquarters
R. E. Woodruff	Manager	Hornell, N. Y.
L. B. Burford	General fgt. & passgr. agt.	Hornell, N. Y.
E. H. Buhlman	Supt. of transportation	Hornell, N. Y.
Chas. James	Mechanical superintendent	Hornell, N. Y.
Wm. J. Foster	Regional engineer	Hornell, N. Y.
M. J. Callahan	Freight claim adjuster	Hornell, N. Y.
C. V. Ziegler	Auditor	Hornell, N. Y.
Jos. H. Mayer	Chief of police	Hornell, N. Y.
H. C. Minning	Claim agent	Hornell, N. Y.
Geo. H. Smith	Assistant treasurer	Hornell, N. Y.
Jesse G. June	Superintendent, Buffalo division	
Ed. J. Edmunds	Superintendent, Allegheny & Bradford divisions	

J. D. Rahaley... Superintendent, Susquehanna & Tioga divisions
A. B. Caldwell... Superintendent, Rochester division

Ohio Region

Name	Title	Headquarters
Wm. A. Baldwin	Manager	Youngstown, Ohio
Geo. C. Manning	Gen. freight & passgr. agt.	Youngstown, Ohio
Herman J. Klein	Supt. of transportation	Youngstown, Ohio
A. G. Trumbull	Mechanical supt.	Youngstown, Ohio
Harold Knight	Regional engineer	Youngstown, Ohio
Wm. E. Black	Freight claim adjuster	Youngstown, Ohio
T. M. Jackson	Auditor	Youngstown, Ohio
Geo. F. Collette	Claim agent	Youngstown, Ohio
W. J. Redman	Chief of police	Youngstown, Ohio
S. Z. Earle	Assistant treasurer	Youngstown, Ohio
A. L. Kline	Superintendent, Meadville division	
Carl Bucholtz	Superintendent Mahoning division	
Harry R. Adams	Superintendent, Kent division	
Chas. G. Johnson	Superintendent, station service	

Chicago Region

Name	Title	Headquarters
A. E. Wallace	Manager	Chicago
Wm. V. Kennedy	General freight & passenger agent	Chicago
G. T. Depue	Mechanical superintendent	Chicago
John R. Sexton	Regional engineer	Chicago
A. N. Breland	Freight claim adjuster	Chicago
J. E. Leverton	Chief of police	Chicago
H. W. Trumpler	Assistant treasurer	Chicago
F. W. Rosser	Supt., Chicago and Hammond Terminals	
E. I. Bowen	Superintendent, Marion division	

ST. LOUIS SOUTHWESTERN RAILWAY LINES

The following is the organization of the St. Louis Southwestern effective with the return to private control:

Name	Title	Headquarters
Edwin Gould	Chairman of the board	New York
J. M. Herbert	President	St. Louis, Mo.
F. W. Green	Vice-president	St. Louis, Mo.
Dave H. Morris	Vice-president	New York
Nelson B. Burr	Vice-preside	New York
Arthur J. Trussell	Secretary	New York
G. K. Warner	Treasurer and ass't sec'y	St. Louis
Paul J. Longua	Assistant secretary	New York

Legal Department

Name	Title	Headquarters
Pierce & Greer	General counsel	New York
Dan. Upthegrove	General Solicitor	St. Louis
J. W. Wise	Freight claim agent	St. Louis
S. G. Seabrook	Claim agent	Pine Bluff, Ark.

Operating Department

Name	Title	Headquarters
W. J. Miller	Supt. motive power	Pine Bluff
W. J. Williams	Superintendent telegraph	Tyler, Tex.
M. J. Kennelly	Superintendent	Pine Bluff, Ark.

Freight

Name	Title	Headquarters
J. P. Park	General freight agent	St. Louis, Mo.
G. S. Trowbridge	Ass't general freight agent	St. Louis, Mo.
H. D. Landry	Ass't general freight agent	St. Louis, Mo.

Passenger

Name	Title	Headquarters
E. W. LaBeaume	General passenger agent	St. Louis, Mo.
R. H. Laing	Ass't general passenger agt.	St. Louis, Mo.
F. H. Jones	General baggage agent	Texarkana, Tex.

Accounting Department

Name	Title	Headquarters
C. Messick	Ass't general auditor	St. Louis, Mo.
S. W. Greaves	Fr. and pass. accountant	St. Louis, Mo.

Purchasing and Supply Department

Name	Title	Headquarters
E. O. Griffin	Assistant to president	St. Louis, Mo.
J. L. Duncan	General storekeeper	Pine Bluff, Ark.

Miscellaneous

Name	Title	Headquarters
H. E. Mack	Manager mail traffic	St. Louis, Mo.

At the same time the personnel of the St. Louis Southwestern Railway Company of Texas was announced as follows:

Executive Department

Name	Title	Headquarters
J. M. Herbert	President	St. Louis, Mo.
F. W. Green	Vice-president	St. Louis, Mo.
J. W. Hogan	Treasurer	Tyler, Tex.

Legal Department

Name	Title	Headquarters
E. B. Perkins	General attorney	Dallas, Tex.
R. C. Hancock	Freight claim agent	Tyler, Tex.
B. F. Yowell	Claim agent	Tyler, Tex.

Operating Department

Name	Title	Headquarters
W. J. Williams	Superintendent telegraph	Tyler, Tex.

Traffic Department

Name	Title	Headquarters
F. H. Jones	General baggage agent	Texarkana, Ark.

Purchasing and Supply Department

Name	Title	Headquarters
E. O. Griffin	Assistant to president	St. Louis, Mo.

Miscellaneous

Name	Title	Headquarters
H. E. Mack	Manager mail traffic	St. Louis, Mo.

Eastern Texas

Simultaneously the personnel of the Eastern Texas Railroad Company was announced as follows:

Name	Title	Headquarters
J. M. Herbert	President	St. Louis, Mo
F. W. Green	Vice-president	St. Louis, Mo
J. Munday	Vice-president	Lufkin, Tex.
E. J. Mantooth	Secretary	Lufkin, Tex.
W. R. McMullings	Treasurer	Lufkin, Tex.
G. K. Warner	Ass't Sec. and ass't treas.	St. Louis, Mo.
K. C. Marshall	Superintendent	Tyler, Tex.

Traffic Representatives

The traffic representatives of these lines were announced as follows:

Atlanta, Ga., S. C. Yeaman, commercial agent,
Cairo, Ill., T. R. Challenor, commercial agent,
Chicago, Ill., F. W. Christopher, commercial agent,
Cincinnati, Ohio, R. W. Byrne, commercial agent,
Dallas, Tex., J. R. Mockbee, division freight agent,
Detroit, Mich., George L. Leitner, commercial agent,
Fort Worth, Tex., R. C. Hatfield, division freight agent,
Houston, Tex., J. R. Bodenhamer, commercial agent,
Kansas City, Mo., F. E. Rownd, commercial agent,
Little Rock, Ark., Edwin Stewart, division freight agent,
Los Angeles, Cal., A. W. Reese, Pacific Coast agent,
Memphis, Tenn., W. D. May, commercial agent,
W. C. Peeler, division passenger agent,
H. H. Sutton, traveling passenger agent,
Nashville, Tenn., W. G. Adams, soliciting freight and passenger agent,
New Orleans, La., S. C. Yeaman, commercial agent,
New York City, W. H. Townsend, general eastern freight and passenger agent,
San Antonio, Tex., L. J. Hausman, commercial agent,
Shreveport, La., J. T. Ferguson, commercial agent,
St. Louis, J. K. James, commercial agent,
Clark Kretschmar, general traveling agent,
O. M. Burkholder, traveling passenger agent.

Other changes in the personnel of the St. Louis Southeastern and the St. Louis Southeastern & Texas are given elsewhere in these columns.

Obituary

G. R. Anderson, assistant secretary of the Southern Railway, died at Saranac, N. Y., on February 22.

G. B. Minshull, superintendent of transportation of the Lehigh Valley, died January 28 at his home in Bethlehem, Pa.

Henry Russell, vice-president and general counsel of the Michigan Central, died of pneumonia in New York, February 25.

J. F. Graham, superintendent of motive power of the Oregon, Washington Railroad & Navigation Company, with headquarters at Portland, Ore., died recently at his home in that city at the age of 71 years.

F. A. Johann, who, prior to his retirement five years ago, was president of the F. A. Johann Railroad Supply Company, St. Louis, Mo., and founder of the St. Louis Railway Club, died at his home in St. Louis on February 10, at the age of 75 years.

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

The roads are now back in the hands of their owners. In a number of respects they are somewhat the worse for the wear and the deferred maintenance of the last two years. However, the problem now is to restore them to their proper condition at the earliest possible date. The settlement of claims for this deferred maintenance may be a problem for the legal department, the restoration of the properties is a very real problem for the maintenance officer. The season of planning is well advanced—the period of active execution is at hand. The outlook at the present time is not the most favorable. A large amount of work is to be done; a shortage of the principal materials is probable—at least deliveries will be delayed—the present shortage of labor is a forecast of the more acute shortage to come this summer. The net result of these observations leads to but one admonition—start work early. This means the inauguration of plans for the ordering of materials, for the organization of forces, and for the formulation of the season's program of work. An early start contributes to economy in maintenance any year—it is doubly important this year.

It's Time To Get Busy

Now that the Railroad Administration is no longer in control of the railroads it is quite probable that many of the shop employees will start an agitation for returning to the piece-work basis of wage payment. Good workers have been penalized by the elimination of piece work and the leveling of all wages to a standard basis, regardless of skill and ability. Many of them objected to this attempt to submerge their individualities, but the action of the Railroad Administration was final. What the attitude of the railroad managements will be toward an attempt to reintroduce piece work is more or less of a question. It will take time to build up the morale of the workers, and every step which is taken by the managements must be carefully studied and thought out, with special regard to future developments on the railroads and particularly with reference to their relations with the public and the employees. An *esprit de corps* must be built up in the different organizations that will raise the efficiency and the standard of service and yet maintain a spirit of good will throughout each organization. It will be remembered that the Railroad Administration cut out piece work in a more or less drastic fashion, the main argument being that there was dishonesty in some shops in the wage accounting; there was also some question as to the comparative quality of the work under piece work and day work wage systems. We do not look to Germany for good examples, but it is rather significant to note that the labor-democratic coalition government, which owns the railroads, became so disgusted recently with the steadily decreasing volume of output from the railway employees, caused largely by the influence of communistic agitators, that it locked out the men in a number of the railway shops and announced that when the shops were reopened only those would be re-employed who were deemed desirable and who agreed to the reintroduction of the piece-work system. The high cost of living and its relation to production has been so thoroughly discussed in this country that the average citizen is now familiar with some of the elemental principles of economics and is beginning to realize the absolute necessity of increased production. It will be noteworthy if the demand for piece work in this country should come not from the railroads but from the workers themselves.

Piece Work in Railroad Shops

There are probably few things that will go farther towards encouraging the present favorable feeling for the railroads than the advertisements which some of the railway systems began running in the daily press on Monday. This kind of advertising is of value not only because it advises the shippers and travelers that the railway is prepared to do business "at the same old stand," but because it leads rather than follows. Advertising men will always emphasize that advertising to prove of best use must do just that. The public is slow to make up its collective mind and, having made up its mind, it is equally slow to change. It is the old story of an ounce of prevention being worth a pound of cure. The public is always ready to meet a public utility more than half way. At present it is favorable to the railroads and has a tendency to regard them as starting out on March 1 with a clean slate and a big opportunity before them. The carriers who are running these advertisements have that idea in mind, and they realize that if they take the public into their confidence and show what steps they are planning to take to keep that confidence and to supply the service that merits confidence their way will be that much easier in the long run. Of course, it must always be borne in mind that advertising does not get very far without service that merits advertising. In other words, as was brought out in these columns last week in speaking of J. H. Hustis' remarks before the New York Railroad Club, the railway men must keep the 5:18's and the 8:15's on time if they want to get results.

Advertising and Service

When President Wilson on February 28 affixed his signature to the Esch-Cummins bill, thereby making it a law as of March 1, he did not merely write "finis" at the end of the chapter of railroad history devoted to 26 months of government operation. He also recorded a large degree of fulfilment of a program which he outlined in a message to Congress at the time of the passage of the Adamson law in 1916, urging the supplementing of that act by the enactment of further legislation providing for a plan of compulsory arbitration and a full public investigation before a strike or lockout may lawfully be attempted. Before recommending the passage of the Adamson law providing for the introduction of the eight-hour basic day in train service the President required the brotherhoods to waive for the time being their demand for time and one-half for overtime. That demand also was subsequently granted by Director General Hines in December, 1919, but Congress failed to act on the President's recommendation for supplemental legislation for three years. In a larger sense the adoption of

Fulfils Four-Year-Old Program

the Esch-Cummins bill (or transportation act) also marks the completion of a program started by the President on December 7, 1915, which was based in part, at least, on representations made to him by the Railway Executives' Advisory Committee, when in a special message to Congress he said that "the transportation problem is an exceedingly serious and pressing one in this country. There has from time to time of late been reason to fear that our railroads would not much longer be able to cope with it successfully, as at present equipped and co-ordinated." The President urged the creation of a commission of inquiry to "ascertain by a thorough canvass of the whole question whether our laws as at present framed and administered are as serviceable as they might be in the solution of the problem," and "whether there is anything else we can do that would supply us with effective means, in the intricate process of regulation, for bettering the conditions under which the railroads are operated and for making them more useful servants of the country."

This resulted in the appointment of the Joint Committee on Interstate Commerce, known as the Newlands committee, which began an exhaustive inquiry in November, 1916, which was interrupted by the events resulting from the war before it had completed its work or made a report. The railroads were taken over by the government but the investigation undertaken by the Newlands committee was in a way continued during the hearings in 1918 preceding the enactment of the federal control law by the Senate and House committees on interstate commerce, whose leading members had been members of the Newlands committee, and resumed by the same committees in 1919 at the hearings undertaken for the purpose of determining what disposition should be made of the railroads after the expiration of the emergency for which they had been taken over by the government. Curiously enough, the record of the hearings before the Senate committee was officially entitled "Extension of Tenure of Government Control of Railroads" while the House committee hearings were entitled "Return of the Railroads to Private Ownership," but both committees agreed upon bills which provided for the return of the roads and also for putting into effect reforms in the system of railroad legislation intended to carry out the purpose of the President's message of 1916.

The two bills varied sufficiently to require a conference on them and the resulting delay was such that the President felt it necessary to take the situation into his own hands to the extent of issuing his proclamation of relinquishment on Christmas eve, under which the roads were to be returned regardless of legislation on March 1. The President, therefore, is entitled to the credit for returning the railroads and while Congress, or rather the two committees, are entitled to the credit for the bill itself, which was prepared without much in the way of suggestion from the President, his message of 1915 may be said to represent the beginning of the program now being completed.

The Esch-Cummins bill has been handled throughout largely on non-partisan lines and although politics was injected into it by the fact that a party issue was made for and against its passage by the Republican and Democratic leaders, always on the look-out for campaign material, and it was passed mainly by Republican votes, the part that a Democratic President has played throughout in connection with it is by no means negligible.

A more important question than that of the responsibility for the bill, however, is as to whether the measure is adequate to promote successful railroad operation or whether the reforms it seeks to accomplish have arrived too late. During the hearings before the Newlands committee the railroad officers emphasized the point that restrictive and conflicting legislation was preventing the adequate development of railroad facilities because railroad securities were no longer sufficiently attractive as investments to enlist the needed new capital, and much stress was laid upon the urgency of preparedness of transportation facilities for a possible war emergency, but before the government could be brought to a realization of the condition the emergency had arrived and the government found it necessary to take over the railroads on the ground that they had "broken down."

Now that two years of government operation have left the railroads still further behind the demands upon them, a sincere effort has been made to accomplish by legislation some of the things which the railroad officers for years have declared were necessary. Whether the legislation is adequate for that purpose or whether it has come too late is a question to be answered by the developments of the future.

The "Impossible" Has Happened

IT IS AMUSING now to recall many things that were said about two years ago regarding the future of the railways. Director General McAdoo was engaged in trying to revolutionize not only the organizations, but also the operation and the physical properties of the railways, in the interest of unification. He seemed to be making such progress that it became a commonplace of conversation for people to predict that the railways would never be returned to private operation. Many of them based their prediction, not upon the ground that this would be undesirable, but that it would be "impossible." Everything would be so changed that the railroads not only would not, but could not, be returned. Nevertheless, they have been returned. At 12 o'clock midnight on February 29, 1920, they were being operated by the government. At 12.01 A. M., March 1, they were being operated by the companies. The transfer was accomplished without a hitch.

The thing was done with so little trouble and friction as to have a tendency to deepen the impression in the minds of many persons that the railroad problem has been solved and easily solved. Unfortunately, that impression is erroneous. The passage of the new railroad legislation and the return of the railways to their owners is but a commencement of the solution of the problem. The railways are still just as short of facilities as they were when the government turned them back, and it will take years of work and billions of new capital to make their facilities adequate. Former Director General Hines has stated that the properties have been returned to the companies in as good condition as they were received by the government. This is certainly not correct as to passenger equipment, because the government never in more than two years of government operation bought a single passenger car. It can hardly be true as to locomotives and freight cars, because in two years of government operation the government bought only as many locomotives and freight cars as were required to replace the number ordinarily retired in one year. The equipment may be in as good condition in so far as repairs can make it so, as it was two years ago, but the amount of it is much more inadequate than it was then, and no repairs can make an old car as good as a new one. With regard to track, the government has not laid anywhere near as many new rails and ties as the companies normally did under private operation.

Government operation has caused numerous changes in the official personnel of the railways. It will be a long time before the roads will recover from the effects of the ruthless disruption of their official organizations which occurred under government control. The advocates and defenders of government operation said that it had solved the labor problem, but from the first to the last moment of government operation it was conducted in such a manner as to tend to alienate railway employes from private operation as a policy. It resulted in wholesale diversions of traffic from normal channels, and it will be months and years before it is restored to those channels. It resulted in enormous increases of operating expenses. Mr. Hines in a recent statement maintained that government operation had been as economical as, or more economical than, private management

would have been. That is a matter of opinion. Under government operation, railway expenses increased $1,600,000,000 a year. The *Railway Age* doesn't believe that an equal increase in expenses would have occurred under private operation. At any rate, government operation has left to the companies a legacy of enormously increased expenses. Only experience will show to what extent economies can be made under private management.

At any rate, both government operation and the new railroad legislation together will not solve the railroad problem. Under the new legislation the Interstate Commerce Commission and the railway managements may solve it, but they will not solve it unless there is the closest and most intelligent and friendly co-operation between the commission, the railroad managements, and the shipping and traveling public. Some people are disposed to say that the railroads have been returned, not to their owners, but to the Interstate Commerce Commission. We do not believe that is true in the sense in which it is meant. The commission has been given greatly increased power, but we believe that the future attitude of the commission, railway employes and the public toward the railways can be and will be determined chiefly by the railroad managements themselves. We believe that the railroad managements can cause private management to fail. We also believe that they can cause private management to succeed, and that by the exercise of diplomacy, public spirit and efficiency they will make it succeed.

The Law Requiring Safety Devices

WHAT IS A "DEVICE?" The new transportation act, section 26, empowers the Interstate Commerce Commission to order any railroad "to install automatic train stop or other safety devices . . ." That is a pretty comprehensive power to be granted in a single sentence. What did the legislators have in mind?* Quite likely the writer of the sentence contemplated chiefly, perhaps exclusively, the placing of some material thing on or near the track, as, for example, a signal post, a derailing switch, a magnet or an electric battery. That may be too narrow a construction.

In the minds of many people—probably most or all those who are familiar with patent-office procedure or who examine mechanical inventions—the meaning of "device" is limited to machines, implements, tools and instruments, or perhaps is occasionally extended to include chemical processes or manual operations which are most nearly analogous to processes carried on by means of machines or tools. But the dictionaries do not thus limit the word. Webster says: "That which is devised or formed by design; a contrivance; an invention; project; scheme; a stratagem." The definition of the verb "devise" includes "new applications of principles; to formulate by thought; as to devise a plan of defense or an argument." A device, according to the Century dictionary, is "an invention or a contrivance; especially something of a simple character or of little complexity; as a device for checking motion (example: A bale-tie is a device for fastening the ends of hoops by which bales of cotton are held in compact form); a scheme or plan; something devised or studied out for promoting an end." That not all devices are material things has been made familiar by the English Bible for 300 years. They that hate knowledge and do not choose to fear God "shall be filled with their own [wicked] devices." The "devices of the devil" are familiar to many who are not very familiar with the Scriptures.

What is it to "install" a device? To install, according to the Century dictionary, may be (1) to place in a seat; (2) to place or instate in an office, rank or order; to invest with any charge, office or rank with the customary ceremonies; (3) to place in position for service or use. This last definition is termed a Gallicism.

These speculations in language are suggested by the sweeping terms of the section of the law referred to, evidencing an intention to make it all-inclusive; and by the declaration of the late Train Control Committee of the Railroad Administration that in this field the first need of the railroads, speaking generally, is not automatic train control, but the block system. In this the train-control board follows the ideas of the Interstate Commerce Commission. For 17 years that body has been recommending the introduction of the block system. Now it has the power to enforce its recommendation. It has always been careful to propose "the block system," expressing no preference for or against automatic signals. Taking into its view the whole vast system of passenger-carrying railroads, it could not take any other position, for on thousands of miles of lines of very light traffic the introduction of automatic block signals would be out of the question; the cost would mean bankruptcy. But in the use of the manual block system, as operated on lines of light traffic, the employment of "devices" is not very important, unless the term is construed to mean something besides appliances and machinery; and a narrower definition of that word might, conceivably, nullify this feature of the law. The two essentials of the manual block system are (1) a telegraph or telephone line, (2) a person competent (a) to operate the line and (b) to give stop and proceed signals to trains. The wire line is already installed on every railroad in the country, and that feature therefore requires no law. The only material devices required are a flag and a lantern, and these also are already provided, no doubt, at every railroad station worth mentioning.

The thing, therefore, that the commission will have to do, if it is to extend the use of the block system, will be to order the installation of a non-material "device"—a device to cause the telegraph line and the station operator to function; in other words, to order the adoption (installation) of block signal rules. A code of rules is a "device," as we have seen from the definitions quoted above; it can be called a plan or scheme.

The foregoing discussion is not so wholly speculative as it may seem. It reminds us that the value of the block system is in its application, not in its installation. The history of governmental regulation of this matter in England illustrates this. When the British Board of Trade first received authority to order the block system used, automatic signals were hardly thought of in that country, and all that the government was able to do was to require the installation of the appliances and the rules. It could not, or at least did not, compel the invariable enforcement of the rules. The problem was to secure the use of the absolute space interval in place of permissive blocking (the same problem that presents itself today in this country on many roads), and this was accomplished, not by statute, but by persuasion.

The Interstate Commerce Commission, therefore, may be expected to pursue a course modeled somewhat after its course in other safety matters, as for example, concerning the compulsory use of air brakes. The letter of the power brake law could have been made to impair safety instead of promoting it, but the commission wisely refrained from taking extreme measures. It can be equally conservative in the matter of

*Transportation Act, 1920, Sec. 26.—That the Commission may, after investigation, order any carrier by railroad subject to this Act, within a time specified in the order, to install automatic train-stop or train-control devices or other safety devices, which comply with specifications and requirements prescribed by the Commission, upon the whole or any part of its railroad, such order to be issued and published at least two years before the date specified for its fulfillment: *Provided*, That a carrier shall not be held to be negligent because of its failure to install such devices upon a portion of its railroad not included in the order; and any action arising because of an accident happening upon such portion of its railroad shall be determined without consideration of the use of such devices upon another portion of its railroad. Any common carrier which refuses or neglects to comply with any order of the Commission made under the authority conferred by this section shall be liable to a penalty of $100 for each day that such refusal or neglect continues, which shall accrue to the United States, and may be recovered in a civil action brought by the United States.

the space interval; but it has now a definite responsibility to see to the proper adoption of block signal rules, where they are needed, and to keep itself well posted concerning the way in which such rules are carried out. This last feature of the commission's duty applies on some roads where block signal rules are already in force, ostensibly, as has been shown in numerous investigations of collisions.

Again, the Engineer in Railroad Service

THE RAILROADS offered the first great field for the employment of engineers. Since the very beginning of railroad construction and operation in this country, the railway engineers have stood high in their profession and not a few engineers have risen to great railway executives. Railway location and construction, in fact, all engineering work related to railway transportation, has always had a fascination for the young engineer, and for years the railways were enabled to recruit their engineering organizations from the best material of the technical schools.

This condition no longer prevails. Commencing some ten years ago, the civil engineering graduates of the American technical schools have come to look with increasing disfavor on employment on the railroads until, as pointed out in these columns a year or two ago, the roads have had difficulty in obtaining enough first class men to maintain a high grade personnel. This diminishing interest in railway employment has gone even further so that now many of the technical schools report frankly that they are giving little attention to railway subjects for the very good reason that almost no students express any desire to follow railroad work. Replies to inquiries on this subject received from the professors of railway engineering and others in leading universities appearing elsewhere in this issue are most emphatic in this regard and there is no hesitancy in expressing opinions as to the causes.

Inadequate compensation appears to be the chief difficulty. "The graduates are offered more money by other industries" is the oft-repeated phrase in these discussions. This conclusion, however, is subject to some qualification. The tradition in this regard among the engineering students is, no doubt, based largely on conditions prior to the advent of government control. The scale of salaries now being paid by the railroads, barring certain exceptions, are approaching those prevailing in the industries, and if the railroads that raised their scale of salaries to engineers during the last two years will maintain these and if the others will bring theirs up to correspond, there should be no serious difficulty on this score.

The problem is deeper seated than the mere question of salary. An even greater source of dissatisfaction than the low pay has been the insecurity of employment. This factor has been virtually a dead issue since the summer of 1915, but previous to that time the engineering department of the railways, more than any other, was subject to an ebb and flow with each cycle of prosperity and depression. The men worked faithfully during the periods of easy money only to be laid off at the first sign of a stringency. Being forced of necessity to look for employment in lines offering a more secure tenure of service, they soon concluded that it was better to stay away from railroad work permanently.

This phenomenon points to the basic fault of the employment of engineers by the railroads, which in a sense applies equally well in regard to all classes of employees. The tendency is to consider brains as well as brawn purely as a commodity to be purchased for some transitory object with little consideration of the development of the individual as a permanent part of the organization. For instance, in the conduct of a given piece of construction work, it is required to employ, say, 20 rodmen, 10 transitmen, 4 resident engineers, 4 engineer draftsmen, 2 map draftsmen, etc. They are considered largely as a temporary adjunct to this work, like so many wheeled scrapers, rock drills or steam shovels.

While these men have before them a promise of advancement to the next grade above, in case a vacancy occurs, they are too conscious of a wide gap between the individual and the real head of the department, a condition that introduces a considerable hazard in the recognition of merit. To overcome this, the railroads must follow the lead of other large industries in perfecting arrangements that will overcome these handicaps of the ponderous commercial organizations of these times. When this is done and the prospective employee, be he technical graduate or high school boy, can see a clear line of advancement that insures recognition of ability, compensation will cease to the formidable problem that it is today.

Canadian Government Railways Now Total 22,000 Miles

LAST WEEK in London the stockholders of the Grand Trunk voted to accept the offer of the Canadian government by which the Grand Trunk is to be taken over and operated as part of the Canadian National Railways. The government originally built and owned the Intercolonial, 1,592 miles, and the Prince Edward Island, 279 miles, and had taken over the Canadian Northern system, 9,479 miles; the Grand Trunk Pacific, 3,579 miles; the Grand Trunk Pacific Branch Lines, 1,794 miles, and had built and been unable to dispose of, and was therefore operating, the National Transcontinental, 2,003 miles, not to mention other short lines and uncompleted projects, such as the Hudson Bay Railway. The acquisition of the Grand Trunk adds 3,579 miles to this system. In the Drayton-Acworth report made in 1917, some such arrangement as has now been carried out was recommended. The report, however, went on to say that "We think if the state took over and undertook to operate the Grand Trunk, the Grand Trunk Pacific and the Canadian Northern it would be morally bound to offer to purchase the Canadian Pacific also." No such proposal, however, as this has been made, nor is it likely to be made in the near future so far as one may judge from the tone of political discussion of the Canadian railway situation. Neither does the Canadian Pacific desire it.

Canada is entering upon the most extensive experiment in government ownership and operation ever undertaken by a democracy. Furthermore, it will carry out this experiment in competition with one of the best managed and most soundly financed private railroads in the world. It is undertaking this experiment unwillingly, accepting it as the less undesirable of two horns of a dilemma. Few thinking people in public life in Canada wanted to take over even the National Transcontinental, which the government had previously built. Neither did they want to take over the Canadian Northern or the Grand Trunk Pacific. On the other hand, having these three systems, some sort of new arrangement had to be made with the Grand Trunk. To make this perfectly clear, a very brief review of the situation is helpful.

The Canadian government built the Intercolonial and the Prince Edward Island Railway for political and military reasons and has operated them at a financial loss, if interest on the investment is charged for, but not entirely unsatisfactorily to the public served. The Canadian Northern system grew out of the extension of a line owned by William MacKenzie and Donald Mann, which originally ran from Port Arthur to Edmonton, and which was being operated at a profit. The pressure for new railways in Canada has been irresistible. MacKenzie and Mann, acting both as contrac-

tors and as the controlling interests in the Canadian Northern, were willing to build as much additional mileage as could be financed. The provinces and the Dominion government endorsed notes of the Canadian Northern system.

To what lengths the people were willing to go is shown by the case of British Columbia, which has guaranteed about $51,000,000 of railway bonds and has a population of less than 500,000; in other words, men, women, children and Indians have assumed an obligation of over $100 each for railways. When the Canadian Northern system had demonstrated that it could not earn its fixed charges, so that the provinces and the Dominion government were called upon to make good their guarantees, besides facing the prospect of advancing an unlimited amount of additional money for capital and other expenditures, there arose a demand for government ownership of this property, not because the principle of government ownership of railways was accepted as sound, but because there was a popular refusal to make any further loans to MacKenzie and Mann.

The history of the Grand Trunk Pacific was in some respects similar. The Grand Trunk undertook the extension of its system to the Pacific coast and guaranteed securities of the subsidiary company, the Grand Trunk Pacific, but also obtained from the Dominion and the provinces guarantees of Grand Trunk Pacific securities and loans to the company from the Dominion government. When the Grand Trunk Pacific failed to earn its interest charges the Grand Trunk refused to assume the entire burden of making good the guarantees, and as a matter of fact could not have carried this burden and remained solvent. Again the provinces and the Dominion government were called upon to make good their guarantees, with the result that the Grand Trunk Pacific was added to the national system. In assuming this burden, however, the government had a claim against the Grand Trunk, represented by its endorsement of Grand Trunk Pacific securities.

The Grand Trunk Pacific scheme contemplated an all-Canadian transcontinental system, of which the eastern end was formed by the Grand Trunk, the middle section by a line built by the Canadian government and known as the National Transcontinental, and the western section by the Grand Trunk Pacific. The Grand Trunk gets connection with its western system via United States lines, but for political reasons the Canadian people desired the building of the National Transcontinental, which connected up the eastern and western parts of the system by a road on Canadian soil. Having been forced to take the western and middle section of this system, it is natural that the Canadian government should desire also to control the one profitable part of the system, the eastern end. The agreement now entered into, the substance of which is printed elsewhere in this issue, gives the government the entire transcontinental system. Thus with the Canadian Northern, it has two transcontinental lines, both competing with the privately owned transcontinental, the Canadian Pacific.

Whether or not the solution of the problem adopted by Canada was the best that could be adopted need no longer be discussed, since it is now an accomplished fact; interest lies in the test which it will afford of the efficiency of government operated railways on a large scale.

It is the avowed intention of all Canadian politicians, and probably the earnest wish of most of them, to keep the operation of the national railways entirely out of politics. It would appear, however, unlikely that such a wish can be carried out. Plans for the operation of the government system have not been fully worked out. Opinion seems to favor the formation of a separate company which shall operate the national railways under the direction of a president who shall exercise all of the authority accorded by a board of directors to a chief executive in whom the board has every confidence. Who will be made president has not been decided. It is just conceivable that if the right man were selected for this position he might be able for a certain period to carry on the operation of the Canadian National Railways in much the same way that he would carry out the general policies of a board of directors.

Public sentiment will possibly demand the appointment of a Canadian to this position if it is created. The best railroad man that either the United States or Canada has produced would be none too large for the work. Much of the success of the Canadian Pacific has been attributable to the three strong men who have guided its destinies, Lord Mount Stevens, Sir William Van Horn and Lord Shaughnessy, and their work is now being carried on, apparently with great success, by E. W. Beatty. The Grand Trunk produced Charles M. Hays, a railroad man of the first rank, but unfortunately for Canada he was drowned in the sinking of the "Titanic." Sir George Bury, who was operating vice-president of the Canadian Pacific during and before the war, made a reputation as an operating man of great ability and left the Canadian Pacific service when Lord Shaughnessy retired to the chairmanship of the board. The Grand Trunk has been managed from London rather than from Montreal, and this has not been conducive to developing a strong individual initiative among its executive officers. MacKenzie and Mann are railroad builders, not railroad operating men, and furthermore, the Canadian people might hesitate to turn over to these men the National Railways after having paid their price to take the Canadian Northern away from them.

The problem of organization facing the man who undertakes the management of this 22,000-mile system is a particularly difficult one. The Intercolonial, which has practically all of its existence been more or less in politics, has an organization which of necessity cannot be free from political traditions. The Grand Trunk has a well-seasoned organization which possibly has suffered from absentee and lordism but which has well-developed traditions and standards. The Grand Trunk Pacific and the National Transcontinental have so lately begun operation that their organizations are in the first stages of development. The Canadian Northern's organization was completely dominated by the policies of MacKenzie and Mann, which policies have little or no relation to the present problems of operation and of consolidation with such entirely different organizations as those of the Intercolonial and Grand Trunk. Since this national system will have to compete with the Canadian Pacific, and since the Canadian Pacific is managed from Montreal, the logical place for the headquarters of the National Railways would also be Montreal. Ottawa, under the shadow of government buildings, is the least desirable place that could be found.

The most optimistic believers in the scheme which has been adopted hope and expect that with a 40 per cent increase in freight rates the National Railways will in a few years be able to pay their way. If charges for full interest on the entire capital cost of the system are fairly made, such a view seems rather founded on faith than on judgment based on the past. One thing, however, appears certain—any system of freight rates which will permit of earning full interest charges on the capital cost of the National Railway system will permit of very profitable operation by the Canadian Pacific. Canada has been compelled to follow wage increases granted in the United States, and the Canadian Pacific has increased its wage scales as greatly as have the other Canadian roads, but a 40 per cent increase in freight rates would more than offset these wage increases.

If the government plays fair and if the Canadian National Railways are run on a basis of paying their operating expenses and interest charges without recourse to the taxpayer, the Canadian Pacific can adhere to its traditions, both in the way of service to the public, betterment of its property and faith with its security holders. It would seem rather difficult for the Canadian government to so confuse its book-

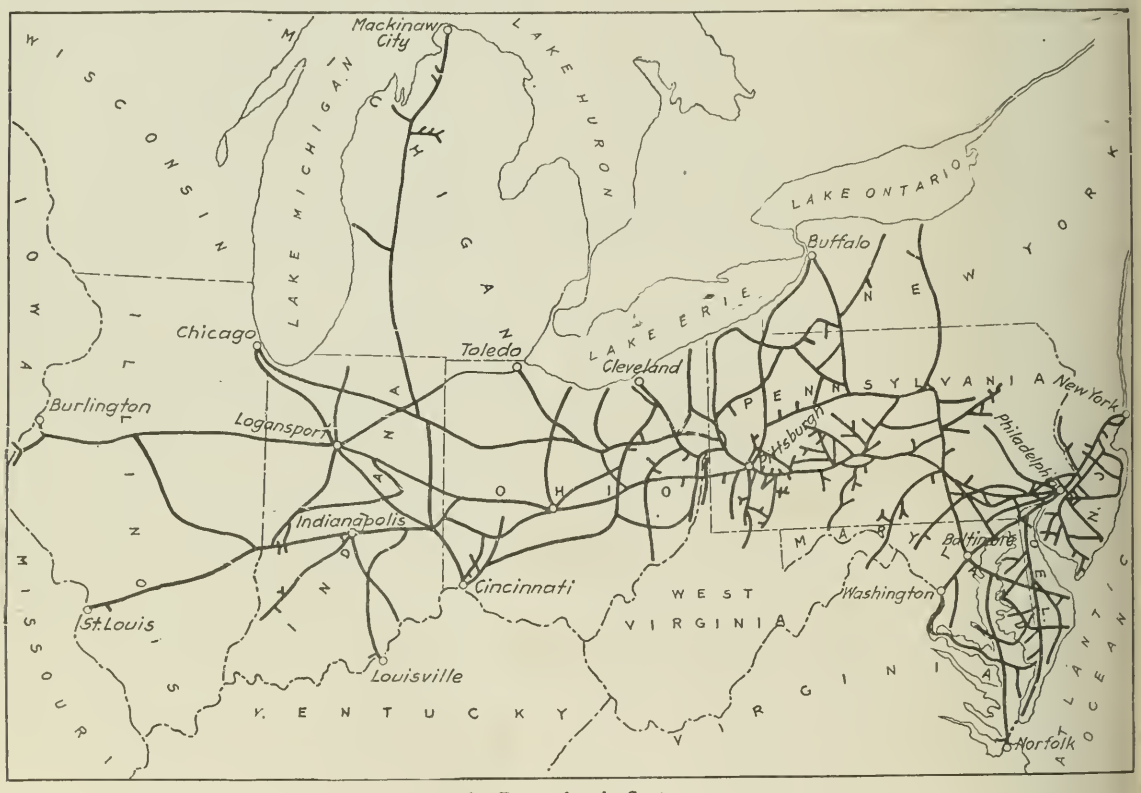
keeping as to make the present generation of Canadians forget the interest charges which the government has assumed in taking over the Canadian Northern, the Grand Trunk-Grand Trunk Pacific and in building the National Transcontinental. If politics are kept out of the management of the National Railways an able management could count on the development of Canada's almost untouched natural resources to make future operation of this great railway successful. Competition with the Canadian Pacific, if carried on fairly, will be healthy rather than otherwise.

Pennsylvania Railroad

THE MAGNITUDE of the business of the Pennsylvania Railroad, the complexity of this business, the number of men engaged in handling it, and the part it plays in the industrial life of the country would possibly be easier adequately to visualize if the system were spread across the entire continent. The great distances in this country have broadened the imaginations of Americans and especially of railroad men in this respect, and a 27,000-mile railroad system extending from Chicago and New Orleans to Los Angeles, Cal., and Portland, Ore., such as the system which the late E. H. Harriman put together, can be studied on a large scale map and a conception had of its magnitude.

The Pennsylvania system, which on March 1 was returned to the owning corporation, the Pennsylvania Railroad Company covers comparatively a small extent of territory. There are only 7,323 miles of road in the Pennsylvania Railroad proper, but this does not take into account the double track and four track lines, nor give any idea of the density of traffic. The system as a whole represents an investment of over two billion dollars and the track mileage, including second, third and fourth track, etc., totals 27,000 miles. The total tonnage of freight carried one mile in 1919 was 45,000,000,000 and the number of passengers carried one mile 7,000,000,000. In other words, in passenger business alone the Pennsylvania system did the equivalent of moving about sixty times the entire population of the United States one mile. The increase in business in the last few years is no greater, measured in percentage, than the increases in many other great industries, but when measured against the increases in facilities it probably ranks far ahead of any other great industry. In the past 10 years the freight business increased 55 per cent and the passenger business 95 per cent. The employees of the Pennsylvania total 286,150, or the equivalent of 10 divisions of the army at war strength.

It is quite impossible to draw any adequate picture of the relations of a transportation machine such as this to the industries of the country. If a man could spend two or three days riding about the Pittsburgh district he might from some faint conception of the part played by this railroad in the steel industry. If he could watch hour after hour the hundred-car trains of coal following each other as near as safety will permit over the low grade line from Harrisburg to the outskirts of Philadelphia, a double track line built exclusively for the movement of coal eastbound, he might in the light of the discussion of the coal situation during this last winter get a fairly good idea of the part that the Pennsylvania plays in supplying the eastern seaboard with fuel. Figures may be piled on figures, but unless the facts represented by the figures are realized in their full importance, the reader is liable to stumble along over billions as easily and unconcernedly as over millions. It is, however, of paramount importance in the present state of economic developments



The Pennsylvania System

this country to try to keep in mind comparative values ven when dealing with figures that run up into billions.

The Pennsylvania Railroad, following the practice adopted st year, has issued a report to stockholders containing only ie income account of the corporation, the balance sheet and ther financial statements, without appending thereto the atements of operation of the road under the Railroad Adinistration. Since, however, the corporation during 1919 ceived a fixed rental for the use of its property, based on ie net operating income for the three years ended June 30, 917, security holders will have to wait for a full knowledge the operating conditions of their property until such time the corporation receives and publishes the Railroad Adinistration's detailed figures. The report to stockholders, owever, now issued, contains the following paragraph:

"In 1919 the total operating revenues were $487,885,014; perating expenses and taxes $469,486.659; and net railway perating income $13,821,701. In 1918 the total operating evenues were $468,113,646; operating expenses and taxes 437,209,403, and net railway operating income $24,337,004. n 1919 your lines earned 20.6 per cent of the standard ompensation fixed by the federal control contract with your ompany and in 1918 they earned 36.3 per cent of that ompensation."

While it is true that the bill just passed guarantees a ntinuance of rentals in the immediate future regardless net earnings, a security holder would be short-sighted ideed who failed to give due weight to the tremendous gnificance of the paragraph quoted above. The annual port gives financial statements for 7,323 miles now operated the Pennsylvania Railroad. The rental of this property nounted to $67,126,000 for the calendar year 1919. Other rporate income, which includes interest on bonds, dividends n stock, etc., added $25,234,000, making a total available r interest charges, rentals and dividends of $92,360,000. nterest and rentals consumed $49,492,000 and dividends nd sinking funds $32,367,000, leaving a surplus of but 0,500,000—too little by far, if measured by the Pennlvania's tradition of putting a dollar back into the property r every dollar paid out in dividends. But this statement income has nothing to do with the earnings and expenses the operation of the property as a railroad. The only gures that are available are the totals in the monthly reports the Railroad Administration to the Interstate Commerce ommission and these are only for 5,380 miles, included in hat the Commission classifies as Eastern Lines, the figures r the 1,754 miles of the Western Lines being shown parately. For comparisons with previous years, however, is the Eastern Lines only that we can deal with, since revious annual reports did not include the Western Lines. he table at the end of these comments shows the principal gures for operation for the Eastern Lines in 1917, the last ar of private operation, and 1918 and 1919, during governent operation. The increases in expenses are appalling, en in the face of the great increases in revenues that have ken place.

President Rea in his report to the stockholders says: n the resumption of the operation and management of its ilroad lines and property under the new legislation on arch 1, 1920, your management looks forward to efficiently rve the public and advance the interest of the nation at rge. As a result of war conditions and the crisis through hich the nation has passed, your property is being returned its own management, with its roadbed and equipment be- w its usual standard and the earning capacity of the sysm materially reduced. Nevertheless, your directors confintly rely upon the officers and employees by their united efrts and active supervision to restore the Pennsylvania Sysm and its standards of roadbed, equipment, stations, and ublic service at the earliest possible date, so that owners may be assured of a fair return upon their investment."

In 1919 there was an investment of $9,336,000 for improvements to roadway and structures and $7,981,000 in new equipment, in addition to the new equipment consisting of 16,150 freight cars and 165 locomotives which was placed upon the road by the Railroad Administration. This Railroad Administration equipment cost $62,000,000 and will be financed by the issue of equipment trust certificates to be taken by the government.

Even if the new railroad law is applied in the broadest spirit of fairness, the Pennsylvania will still face a very difficult problem in the next few years. Any one who has followed the valuation of the property, which is now about 90 per cent complete, will have no fear of the valuation showing a smaller total than the total face value of bonds and par value of stock, and since it is on the valuation of the roads in the regions served by the Pennsylvania that adequate rates will be based, the Pennsylvania security holders have nothing to fear on this score. Where the Pennsylvania, however, has an almost unique problem is in the difficulties of expanding its facilities. The main line between Pittsburgh and Philadelphia and New York is being worked to capacity now. It is hard to see how anything can be done toward adding greatly to the trackage of this line. Take the one element of land values; to buy additional right-of-way through this section of the United States would necessitate the expenditure of a sum so great that freight rates could not hope to be adjusted, without a dislocation of the commercial life of the country, so as to provide interest.

The hope of the Pennsylvania, therefore, lies in improving its motive power and rolling stock and, above all, improving the use of its plant, both main line, terminal facilities and rolling stock. Engineering skill and new scientific discoveries alone cannot solve this problem; the human element enters into it inevitably.

The Pennsylvania has drastically changed its form of organization. A brief description of the change was published two weeks ago in the *Railway Age* and a more detailed description will be published in the near future. The success of the Pennsylvania in the 71 years prior to government assumption of operation was due in very considerable measure to the organization which was developed, and the loyalty which Pennsylvania employees and officers acquired as a part of their training and which was a continuing influence in their work and earned its final reward in liberal pensions.

This organization now, after having been disrupted by two years of war conditions, general labor upheaval and government operation, is to be changed to meet the new conditions which have arisen. An important element in the future prosperity of the company, in the integrity of the two billion dollar investment, in the welfare of the 286,000 employees, and, finally, in the prosperity of the vast industry dependent on the Pennsylvania, will be the successful working out of this organiaztion and the building up of a corps of officers and men who will get the most out of the plant that it is capable of producing.

The following table shows the principal figures of the railroad operation (Eastern Lines) (this has nothing to do with the corporate income account), based on returns to the Interstate Commerce Commission for 1917, 1918 and 1919:

	1919	1918	1917
Average mileage operated	5,380	5,428	5,376
Freight revenue	$238,852,641	$239,484,059	$194,455,317
Passenger revenue	102,047,147	95,325,078	67,387,665
Total operating revenues	378,091,499	367,414,695	290,234,093
Maintenance of way and structures	56,004,608	51,683,998	33 508,588
Maintenance of equipment	112,445,087	99,145,128	58,790,210
Traffic	3,148,319	2,922,867	3,237,437
Transportation expenses	168,470,630	166,437,063	118,816,257
General expenses	9,000,267	8,146,648	7,150,474
Total operating expenses	356,018,468	333,624,524	225,649,257
Net operating income	22,073,031	33,790,171	64,584,837
Taxes	11,038,761	10,611,131	9,946,978
Railway operating income	11,003,494	23,149,178	54,596,230

A Scientific Study of Railway Track Under Load

Second Progress Report Covering Extensive Field and Laboratory Tests Begun in June, 1914

THE SPECIAL JOINT COMMITTEE of the American Society of Civil Engineers and the American Railway Engineering Association, organized six years ago to investigate and report on stresses in railroad track, has presented its second progress report to the two societies. This report, which supplements the first progress report, an abstract of which was published in the *Railway Age* for February 22, 1918, page 403, covers 172 pages and includes the results of tests with one type of freight locomotive and one type of passenger locomotive on the St. Louis-San Francisco to determine stresses in rail in relation to speed and

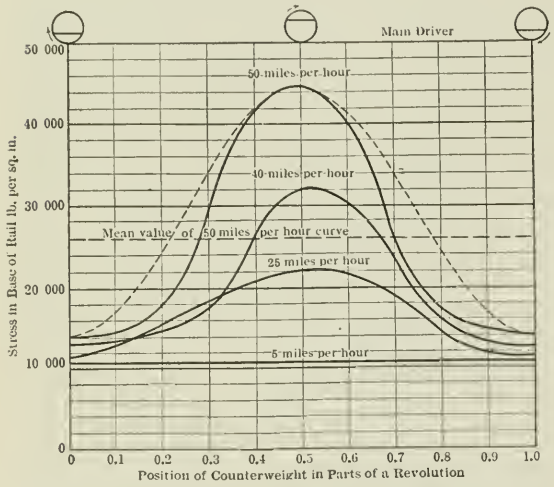


Fig. 1. Stress in Rail at Main Driver of Santa Fe Type Locomotive Throughout a Revolution.

counterbalance effect, and also the results of similar tests with one type of freight locomotive on the Illinois Central. The report gives the results of tests on the Illinois Central and the Chicago, Milwaukee and St. Paul to determine the depression of track under given loads and to find the depression and flexure of ties and their action under load for a variety of conditions found in track. The tests conducted in the laboratory of applied mechanics of the University of Illinois with a view of finding the methods and principles involved in the transmission of pressure from one or more ties downward and laterally through ballast materials are reported and an analytical consideration of the transmission of pressure is given. The report is presented under the following headings: Tests to Determine the Effect of Speed and Counterbalance on Stresses in Rail; Track Depression; Depression, Flexure and Bearing Pressure of Cross-Ties, and Transmission of Pressure in Ballast.

Effect of Speed and Counterbalance on Stresses in Rail

In the first progress report it was stated that analysis alone can give little real information on the important subject of the effect of speed of locomotive and train in increasing the stresses in track, and that reliance must be placed upon experimental data to determine the influence which speed exerts in this matter. Tests have now been made to find the variation in stress in rail throughout the revolution of the drivers and to attempt to separate in some measure the effect of counterbalance from that of speed alone.

An abstract of the report follows:

The tests on the St. Louis-San Francisco were conducted on a section of single track about three miles west of Springfield, Mo. The rail was 85-lb. C. E. section, rolled in October, 1906. The ties were 6 in. by 8 in. by 8 ft., of oak, spaced about 20 in. apart center to center, 20 to a 33-ft. rail length. There were 15 in. of chats ballast of good quality. The track was in fair surface and alinement, and was used as it was found. It had not been tamped recently, but as freight trains are not run over this stretch of track the effect of traffic is not great.

The tests on the Illinois Central were conducted two miles north of Champaign, Ill., on the southbound track. The rail was 85-lb. A. S. C. E. section, laid in 1902. The ties were the 6-in. by 8-in. by 8-ft. oak ties which had been specially prepared for this stretch of track. They were spaced approximately 20 in. apart, 20 ties to a 33-ft. rail. On the section used in the test there was 12 in. of stone ballast. The track had not been tamped for some time and was not in the best condition of line and surface, but it was used in the condition found.

In the tests on the St. Louis-San Francisco two types of

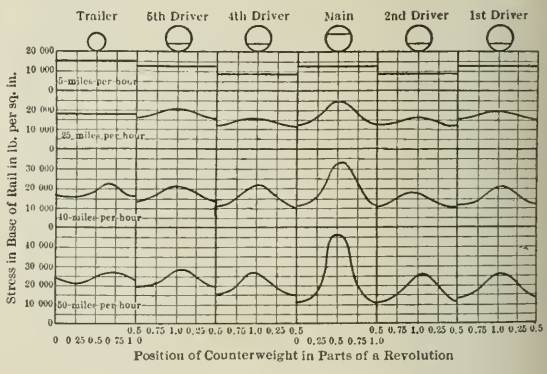


Fig. 2. Curves of Average Stress in Rail Throughout Revolution of Driver.

locomotives were used, the Santa Fe type freight locomotive and the Pacific 1060 type of passenger locomotive. The Santa Fe type locomotives were new, having been in service less than a year. The Pacific type locomotives had been in service about two years. The tests on the Illinois Central were made with Mikado locomotive.

The typical effect of the combination of speed and counterbalance upon stresses in rail for Series 1 of the tests with the Santa Fe type locomotive is shown in Fig 1, which gives sample curves for the main driver taken from the plotted results of the tests with the Santa Fe type locomotive from the data of the instruments on the rail on the right side of the locomotive only. The ordinates of the diagram represent stresses at the base of the rail in pounds per square inch. The abscissas represent the position of the counterweight at the time the wheel passed over the instrument with respect to its down position, the scale being in fractions of a complete revolution of the wheel. The

curves represent the average of the results of the several runs at each speed. For a speed of 5 mi. per hr. the valves are represented by a straight line, since the variation from it is small. As the driver is underbalanced, in general the greatest stress in the rail is developed when the counterweight is at its high position. At a speed of 50 mi. per hr., it is noted that the maximum value of the curve is 44,700 lb. per sq. in. and the minimum value 14,000 lb. per sq. in. The line marked "mean value of 50 mi. per hr. curve" is the average ordinate of the curve. The variation above and below this line may be considered to be due largely to the lack of balance of the rotating parts.

The difference between the mean value of the stress found from the curve for 50 mi. per hr. and the stress at 5 mi. per hr. may be considered to be largely the effect of speed without reference to effect of rotating parts (quite frequently called impact effect or speed effect), though part may be due to lack of balance of rotating parts. The dotted line of the figure was obtained by the use of the common formula for the vertical pressure of a rotating part, the calculation here being modified to touch the curve for 50 mi. per hr. at its high and low points. It will be noted that the form of the observed curves is more pointed than is the curve calculated by analytical methods, and also that the mean value of the curve is generally below the median point of the curve. These differences are characteristic of many of the tests, though it appears that there are as many cases where the observed curve is less pointed than the analytical curve as for more pointed curves.

Fig. 2 gives the stress in the base of rail throughout a revolution of a driver for all the drivers and the trailer for Series 1. These curves represent the average stress for any given position of counterweight.

In Table 1 are given the numerical values of the stress in rail under the several wheels. The mean values given are the mean values taken from the curves of Fig. 2 for an entire revolution.

In Table 2 are given ratios calculated from the data of Table 1 S is the average stress in rail at 5 mi. per hr. S_{25}, S_{40}, and S_{50} are the stresses in rail at the high point of curve for 25, 40 and 50 miles per hour, respectively. S_m is the stress found by taking the mean ordinate of the curve for the speed used. $\frac{S_{50}}{S_5}$ (called total ratio), may be considered to represent the total effect of change in speed from 5 to 50 mi. per hr., including the speed or impact effect and the effect of counterbalance. $\frac{S_m}{S_5}$ (the speed effect ratio) may be considered to represent the effect of speed as distinguished from effect of counterbalance. $\frac{S_{50} - S_m}{S_5}$ (the counterbalance effect) may be considered to represent the effect (increase or decrease) which may be attributed to counterbalance. The division into speed effect and counterbalance effect in this way is quite imperfect, but may be of service in helping to judge of these two effects.

In the first progress report it was shown that lateral bending of the rail occurred to a considerable extent; that most frequently the rail was bent outwardly at a point under a wheel and inwardly at a point between wheels, though a flexure opposite to this also was frequent; that the change in gage of track accompanying this bending was measurable; that the bending occurs with the locomotive at rest at low speeds as well as at higher speeds; and that the stress at the outer edge of the base of rail may occasionally reach three or more times that at the inner edge.

From an examination of the data of some of the tests described in this report it was found that the average stress from all the observations for the outer edge was greater than that for the inner edge. This conclusion applies at all speeds and at all positions of the counterweight for all the drivers and to the higher stresses found as well as to the lower. It also applies to the trailer and to the tender wheels. The average of the stresses at the outer edge for the several wheels ranges from, say, 20 to 50 per cent greater than the average at the inner edge; that is, the average stress at the outer edge is from 9 to 20 per cent greater than the mean stress in base of rail, which is the stress heretofore used.

This indicates that a general condition exists tending to give outward lateral bending in rail. No further investigation has been made to determine what that condition is. It may be noted that the difference in stress at the two sides of the rail was as great, or greater, under the main driver as under the other drivers. While the number of observations giving the higher stress at the outer edge was considerably greater than that at the inner edge, the number having the opposite relation was by no means small, showing that the swaying of the locomotive laterally is a factor in the problem.

A similar relation exists at points between wheels in the region of negative bending moment, though here the lateral bending is generally in the opposite direction from that at the wheel and the average stress at the inner edge is greater than that at the outer edge.

More important than the average value at the edges of the base of rail are the relative values of the individual observations. The ratios of the stress at edge to the mean stress in base of rail were plotted. A study of these shows that

Speed, in miles per hour.	Position of counterweight.	Trailer.	Driver Number.					Front truck wheel.
			5	4	Main.	2	1	
5	Mean value...	15 200	12 700	9 600	12 500	9 800	12 500	7 900
25	Up	.....	15 600	11 400	24 500	12 000	15 600	
	Down.....	.....	20 300	15 600	12 000	15 600	18 700	
	Mean value...	18 000	17 700	14 300	17 300	13 500	17 300	11 900
40	Up	22 400	13 000	10 400	32 200	10 400	11 500	
	Down.....	15 600	20 800	21 300	10 900	17 700	20 800	
	Mean value...	18 000	17 200	16 100	18 700	13 500	15 300	11 400
50	Up	27 000	19 300	15 100	46 800	11 400	13 500	
	Down.....	20 800	28 600	26 500	11 400	25 500	26 000	
	Mean value...	23 900	23 100	18 900	23 900	17 900	19 100	15 600
Calculated additional stress due to counterbalance at 50 miles per hour.....		600	8 100	11 400	24 200	11 800	8 100	700

Table 1. Stresses in Rail with Santa Fe Type Locomotive. Stress Given in Pounds per sq. in. at Base of Rail.

in 15 to 20 per cent of the observations, the stress at the outer edge is 33 per cent or more greater than the mean stress in base of rail, in a few cases reaching an excess of 50 per cent or more, and that this holds good throughout the revolution of the driver. An excess of 20 per cent is quite common. A stress at inner edge 33 per cent greater than the mean stress was found in, say, 5 to 8 per cent of the observations. As an example of a large difference in stresses at the two edges, though not of a high ratio of stresses, values for the main driver of the Santa Fe type at a speed of 50 mi. per hr. may be cited, 36,400 lb. per s.. in. at the inner edge, and 55,000 lb. per sq. in. at the outer.

The lateral bending in rail has some bearing on the design of rail section and on the design of tie plates. It will be seen that for the rail sections used, a ratio of stress at outer edge to mean stress in base of rail having a value of 1.33 means that the lateral bending moment in the rail is about 8 per cent of the vertical bending moment required to develop the mean stress. It should be noted that the results

herein presented were obtained with track which may be said to be in ordinarily good condition; the results given in the first progress report for track in poorer condition and for track with decayed ties show that the amount of lateral bending may be materially greater and that therefore the condition of the track is an important element in the problem. The ratios for total effect, speed effect and counterbalance effect show the relation between the stress in rail at the several higher speeds and the stress in rail existing at a speed of 5 mi. per hr. In all the series the total effect ratios are concordant and show a marked increase of stress with speed, the increase being faster than the first power of the speeds. The method used in making a division of this total effect ratio into effect of speed alone and effect of counterbalance is of course not accurate, and it may be motive 100 per cent; and Mikado locomotive, 75 per cent. The ratios found for the drivers are in general less than those for the tender wheels (the ratios do not include the effect of counterbalance), and the increase at the tender wheels varies considerably for the different types of locomotives.

The counterbalance effect at the low and high position of the counterweight, with both underbalance and overbalance, is also brought out. With the main driver underbalanced and the other drivers overbalanced there is some transfer of pressure through the equalizer bars, tending to reduce somewhat the stresses due to counterbalance, but the effect is not very definite and seems to be uncertain. The stress due to counterbalance increases much faster than the increase in speed, though not always as fast as the square of the

Position of counterweight.	Trailer.		Driver Number.										Truck Wheel.	
			5		4		Main.		2		1			
	Up.	Down.	Up.	Down.	Up.	Down.	Up.	Down.	Up.	Down.	Up.	Down.	Up.	Down
Average stress at 5 miles per hour, as basis of comparison.	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
25 Miles per Hour.														
Total effect $\frac{S_{25}}{S_5}$	1.18	1.18	1.23	1.60	1.20	1.63	1.96	0.96	1.22	1.60	1.25	1.54	1.50	1.50
Effect of speed $\frac{S_m}{S_5}$	1.18	1.18	1.42	1.42	1.50	1.50	1.38	1.38	1.38	1.38	1.38	1.38		
Effect of counterbalance (increase or decrease). $\frac{S_{25} - S_m}{S_5}$	0	0	− 0.19	+ 0.18	− 0.30	+ 0.13	+ 0.58	− 0.42	− 0.16	+ 0.22	− 0.13	+ 0.16		
Calculated effect of counterbalance	+ 0.01	− 0.01	− 0.13	+ 0.13	− 0.23	+ 0.23	+ 0.43	− 0.43	− 0.25	+ 0.25	− 0.12	+ 0.12	+ 0.02	− 0.02
40 Miles per Hour.														
Total effect S_{40}	1.47	1.03	1.03	1.61	1.09	2.23	2.58	0.88	1.06	1.81	0.92	1.67	1.45	1.45
Effect of speed $\frac{S_m}{S_5}$	1.18	1.18	1.33	1.33	1.69	1.69	1.54	1.54	1.38	1.38	1.23	1.23		
Effect of counterbalance (increase or decrease). $\frac{S_{40} - S_m}{S_5}$	+ 0.29	− 0.15	− 0.30	+ 0.31	− 0.60	+ 0.54	+ 1.04	− 0.66	− 0.32	+ 0.43	− 0.31	+ 0.41		
Calculated effect of counterbalance	+ 0.02	− 0.02	− 0.33	+ 0.33	− 0.59	+ 0.59	+ 1.10	− 1.10	− 0.65	+ 0.65	− 0.31	+ 0.31	+ 0.05	− 0.05
50 Miles per Hour.														
Total effect $\frac{S_{50}}{S_5}$	1.78	1.38	1.52	2.25	1.58	2.77	3.75	0.92	1.17	2.60	1.08	2.08	1.97	1.97
Effect of speed $\frac{S_m}{S_5}$	1.58	1.58	1.82	1.82	1.98	1.98	1.92	1.92	1.83	1.83	1.53	1.53		
Effect of counterbalance (increase or decrease). $\frac{S_{50} - S_m}{S_5}$	+ 0.20	− 0.20	− 0.30	+ 0.43	− 0.40	+ 0.79	+ 1.83	− 1.00	− 0.66	+ 0.77	− 0.45	+ 0.55		
Calculated effect of counterbalance	+ 0.03	− 0.03	− 0.51	+ 0.51	− 0.91	+ 0.91	+ 1.74	− 1.74	− 1.01	+ 1.01	− 0.48	+ 0.48	+ 0.08	− 0.03

Table 2. Ratios of Maximum Stress, Mean Stress and Additional Stress to Stress at 5 mi. per hr. Santa Fe Type Locomotive.

expected that a large counterbalance effect will result in an increased speed effect as well.

The increase in stress in rail at drivers and trainlers beyond 5 mi. per hr. due to speed alone, varies almost directly as the increase in speed, though in a few instances it is at a somewhat faster rate. Averaging the values of the ratios at the drivers and trailer and for comparison using a speed of 50 mi. per hr. in all cases, it is seen that for this speed the increase in stress in rail due to speed alone over that at 5 mi. per hr. will be about 60 per cent for the Santa Fe type locomotive used, about 35 per cent for the Pacific type locomotive, and about 50 per cent for the Mikado type locomotive. At the tender wheels, the stresses in rail increase almost directly as the increase in speed. The increase in the stresses at 50 mi. per hr. over those at 5 mi. per hr. at the tender wheels is approximately as follows: An average of 75 per cent for the Santa Fe type locomotive; Pacific locospeed. The average increase in stress at the several drivers due to counterbalance effect, for a common speed of 50 mi. per hr. over the stress at 5 mi. per hr. is about 85 per cent for the Santa Fe type locomotives used; 30 per cent for the Pacific type; and 60 per cent for the Mikado type. The increase in stress at the main driver in each case is greater than this average, and with the Santa Fe type very much greater.

The following general observations are made:

It is evident that there is a decided advantage to the track in making the counterbalance of the several drivers differ but little from each other and from that condition which will give the best results, even though opposing conditions of counterbalance in the main drive and the adjoining drivers may have some neutralizing effect. An underbalance on one driver and an overbalance on an adjoining one will give a very undesirable cumulative effect.

Considering the stresses developed in the tests it is not strange that great injury to track is done by poorly balanced locomotives run at high speed. Even at lower speeds, where kinking of rail does not result, the punishment of the track is much greater than will be caused by well-balanced locomotives. The effect of counterbalance and speed is to add greatly to the load to be carried by rail, tie and ballast.

Effort may well be made to reduce the counterbalance effect on stress in track by use of the best methods of design of locomotive and by the use of material which will permit a minimum of counterbalance effect in both rotating and reciprocating parts.

It is important that care be taken to determine the actual weights and position of counterweights and the actual properties of the side rods and connecting rods. Care should be taken to learn whether the assumed division of load among the drivers in the completed locomotives is obtained.

Locomotives will give very different stresses in rail at the different wheels according to the wheel spacing, the division of load, and the effect of adjoining wheels.

It is apparent from analysis that for the spacing of wheels in the three types of locomotives the stress at the trailer under static load or at low speeds will be relatively large if the weight on the trailer is greater than, say, 75 per cent of the average weight on drivers; and the tests would indicate that for locomotives with even fairly good counterbalancing a discrepancy at low speeds between the stress at the trailer and the stress at a driver, due to a relatively heavy load on the trailer, may be expected to exist also at higher speeds.

It was found that the wheels of the tenders of the different types of locomotives gave quite different effects of speed on the stress in rail.

Attention may well be called to the method herein used in calculating the stress in rail for a combination of driver loads. The method ordinarily adopted in taking into account the counterbalance effect uses the dynamic augment for the given driver only. In getting the stress-producing bending moment in the rail, however, it is necessary to take into account the dynamic augment also of the adjoining drivers. With the main driver underbalanced and the adjoining drivers overbalanced the pressures given by the adjacent drivers are especially influential and the effect of the combinder loads should not be overlooked. It should be added, too, that the effect of counterbalancing upon bending moment in rail is different from the effect upon rail depression and pressure on rail—these must be calculated separately.

In the discussion of counterbalance, and the calculation of the stress produced in the rail, no attempt has been made to go into the complications of the problem involved in the yielding of the locomotive springs and of the track acting as a spring, the effect of the rotating parts not being in the same plane, and other disturbing elements.

The tests were made on 85-lb. rail. It is felt that the effect of speed and counterbalance in producing stress in rails of other weight will follow in general the results found with the 85-lb. section. The increase in stress at a given speed over the stress at 5 mi. per hr. may be considered to be produced by additional loads at the drivers, due to speed and the counterbalance, and the amount of these additional loads may be calculated by the use of analytical methods. The loads thus found for speed and counterbalance effect may be used in judging of the effect of speed and counterbalance with rails of other sections. The calculations for stress in a section may be made on the basis of the analysis for bending moments given in the first progress report, the section modulus of the given rail being used in calculating the stress developed by the bending moment found.

It is evident that wheel spacing, distribution of load among drivers and trailer, and counterbalancing have a marked influence upon the stresses developed in rail and also in the track structure below the rail. Adequate consideration therefore should be given to these elements in designing locomotives if the track is not to be called upon unduly to carry loads and to resist stresses which are unnecessary or excessive. The uncertainty which may exist concerning exact conditions of counterbalance is a matter which warrants greater attention.

Fuel Control Continued

Because of doubts as to whether Director General Hines and his representatives could continue after March 1 to exercise the authority over the distribution of coal delegated to him by the former fuel administrator, H. A Garfield, who has since resigned, President Wilson on February 28 issued two executive orders providing for a continuation of Mr. Hines' authority over the "delivery, use, consumption, distribution and apportionment" of coal, and reinstating until April 30, the order of the fuel administrator of November 6, 1917, relative to tidewater trans-shipment of coal at Hampton Roads, Baltimore, Philadelphia and New York, and for the employment of and co-operation with the Tidewater Coal Exchange, as a common agency to facilitate trans-shipment and to reduce delays in the use of coal cars and coal carrying vessels, which was suspended on February 20, 1919.

J. W. Howe, commissioner of the Tidewater Coal Exchange, Rembrandt Peale, F. M. Whitaker and J. F. Fisher were designated as representatives of the President to carry out the provisions of the order, to exercise the powers of the fuel administrator and also after March 1 the authority vested in the director general of railroads relative to the export of coal from the United States, until April 30.

Director General Hines, Secretary Tumulty and Attorney General Palmer had held a conference to consider whether it was necessary to continue the control over coal distribution and it was decided that the above orders were all that the situation required. The orders stated that the action was taken "because of the present emergency and in order to insure an adequate supply and equitable distribution, and to facilitate the movement and to prevent, locally or generally, scarcity of coal."

Director General Hines on February 27 sent to the Senate a report in reply to a Senate resolution as to the source and extent of his authority to take charge of fuel distribution which was delegated to him at the beginning of the coal strike by Dr. Garfield, because at that time the Fuel Administration had neither funds nor organization available. He said in part:

"Unfortunately, during the strike period and down to the present time there has been a succession of severe storms and cold spells coupled with depletion of train and yard employees on account of the influenza epidemic, which have further seriously interfered with the handling of coal and all other commodities. Notwithstanding all of these difficulties and the abnormal demand for transportation of every character, the amount of coal produced per week greatly exceeds the weekly production during the winter in the past.

"On account of the strike and these extraordinary conditions, it has been impossible since the strike to supply coal in sufficiently large quantities to meet the extraordinary demands growing out of the depletion of stocks during the strike. This is true despite the fact that the total bituminous coal produced in January has been considerably above normal for that period.

"It has, therefore, been found necessary up to the present

time to continue in slight measure the control over distribution which was exercised by the Fuel Administrator during the strike. Every effort has been made to reduce to a minimum this interference with the normal distribution by shippers, and the Railroad Administration has constantly followed the policy of caring only for emergency needs and those essential consumers in the higher priority classes. While the railroads made contracts for enough fuel for their operation, the coal operators have insisted that the policy adopted at their instance by the Railroad Administration not to place cars preferentially for railroad fuel be adhered to. The result is that in times of car shortage the railroads have not been able to get their contracts completely supplied, and hence another reason for the continued necessity of diversion has been the need of caring for the fuel supply of the railroads to the extent that the railroad contracts were not fulfilled.

"I might also point out that upon the earnest insistence of the operators that their contracts made prior to October 30, 1919, be protected, the Fuel Administrator's order of November 12, 1919, was issued with the result that in many parts of the country operators have shipped only on such contracts, hence people who had no such contracts were unable to buy coal, particularly in the East, where under the government price program a higher price was permitted for export coal than for coal sold domestically. In other words, a condition was reached where there was practically no spot coal available, and in consequence a number of essential consumers have been unable to get coal except as the result of diversion. These factors have contributed materially to the necessity for continuing the exercise of the power of diversion, despite the fact that the policy of the Central Coal Committee has been to cut the exports of coal to a minimum.

"An present an embargo on the movement of all coal for shipment overseas is being maintained at all Atlantic Coast ports and no coal is permitted to be exported except on application by shippers, recommended by the Regional Coal Committee having jurisdiction and approved by the Central Coal Committee and representatives of the Shipping Board and State Department who are sitting with it. On account of the present serious shortage of coal in the Northeastern section of the country, no export permits are being issued for coal from ports north of Norfolk and only such coal is permitted to be exported through Norfolk as is not required for consumption in this country or cannot be transported to destination in this country by available boats in the coastwise trade. Export permits for such coal are issued in order that the coal may be promptly unloaded and the cars returned to the mines for further loading. Care is exercised in the issue of export permits to insure an equitable distribution of them among applicants.

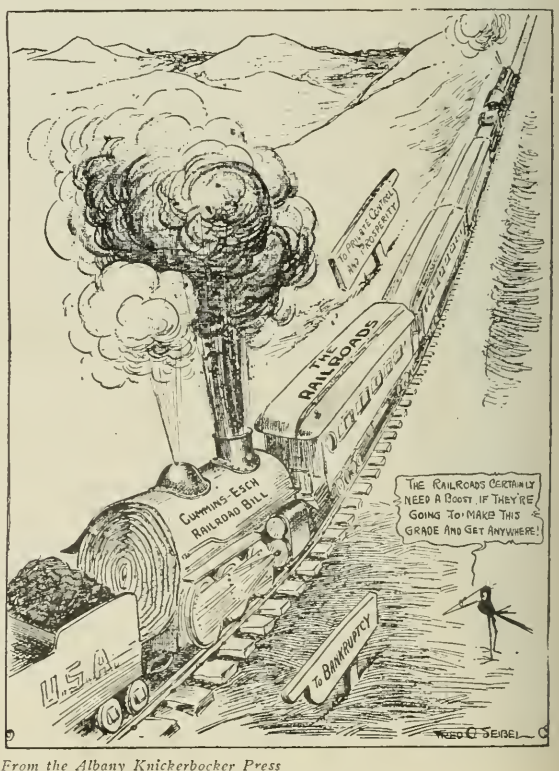
"With the exception of the embargo on export coal, all restrictions placed on the distribution of coal in the United States and Canada during the strike by the various coal committees, have been removed, and the normal distribution of coal is interfered with only where emergencies arise which necessitate diverting to railroads, government and state departments and institutions, public utilities and other essential consumers. In making such diversions, the coal committees having jurisdiction select as far as practicable, coal moving to consumers of less essential character and occupying a lower position on the Fuel Administrator's preference list. Such diversions are necessitated by the inability of some essential consumers to secure, by purchase, the additional coal they require, there being practically no coal available for sale in the Northeastern section of the country at the price fixed by the Fuel Administrator. Such diversions are made only after the committee having jurisdiction is assured by the applicant of his actual necessity, as required by the regulations established at the beginning of the strike.

"For the purpose of continuing this present control over the distribution of bituminous coal, the Central Coal Committee continues to function, and with respect to the export situation, operates through a sub-committee, on which the State Department and the Shipping Board have representation. In so far as diversion of coal is necessary for the protection of consumers within the United States, the Central Coal Committee relies upon the regional organizations which, for this purpose, have maintained in part the Regional Coal Committee."

Meanwhile all the acts of Director General Hines since he took over the functions of Dr. Garfield have been challenged by Rush C. Butler, general counsel of the National Coal Association, who in a legal opinion submitted to the association holds that the Railroad Administration's authority to divert coal under the order of October 31, 1919, expired when Dr. Garfield resigned on December 13 and that every ton of coal thus diverted since that time has been without authority of law.

The attorney further holds that confiscation of coal by the railroads is "unlawful conversion" and that the owners of the coal are entitled to damages. His opinion states that where the Railroad Administration has confiscated coal moving on contracts at less than the government price the owners of the coal can recover the difference between the contract price and the government price.

Not only are the carriers responsible for such losses, but Mr. Butler has informed the association, in his opinion, "that the officials of the Railroad Administration concerned are personally liable for the amount of damages and may be sued therefor."



From the Albany Knickerbocker Press

Now We're Going Somewhere

Railroad Bill Signed by President Wilson

Railroad Administration Relinquishes Control and Reorganizes Its Greatly Reduced Forces

WASHINGTON, D. C.

PRESIDENT WILSON on February 28 signed the Esch-Cummins bill, which by its terms became effective on March 1, and at the same time issued a proclamation vesting in Director General Hines, who relinquishes his authority over railroad operations, or his successor in office, the powers conferred on the President by the bill, to "adjust, settle, liquidate, and wind up all matters, including compensation, and all questions and disputes of whatsoever nature, arising out of or incident to federal control," except the designation of the agent against whom suits are to be brought arising out of federal control.

On receiving the bill from Congress on Wednesday the President had transmitted it to the Department of Justice for an examination from the legal standpoint. Attorney General Palmer returned it on Friday with an opinion that it contained nothing unconstitutional, and it was then sent to Mr. Hines for a report. Mr. Hines had previously given the President a digest of its provisions, and he returned the bill with his opinion and presumably a recommendation that it be approved.

The transfer of the railroads from the management of the Railroad Administration at 12:01 a. m., March 1, was accomplished without particular incident as far as the Washington headquarters was concerned. The "stroke of the pen" relinquishing the roads corresponding to that by which they were taken over on December 26, 1917, was made on Christmas eve, unless that description more properly applies to the telegram sent by Director General Hines on February 23 to the regional directors giving instructions for notifying the various railroad officers that government operation would cease February 29 and for ascertaining the proper corporate officers to whom they should report after that time. The government did not discharge the railroad officers that have been working under its jurisdiction but proceeded on the assumption that they would be taken back by the corporations unless notice was given to the contrary. In most cases that has been the case although on several railroads some of the men who have been working for the government have been required to look for other positions. In a large number of cases announcements had already been made by the railroad companies of the organization that would take charge on March 1.

On account of the inability to issue annual passes promptly, Director Tyler of the Division of Operation had issued a circular saying that on the return of the roads certain roads would extend the use of the passes issued by authority of the director general until March 31 to enable officers and employees to travel to their new positions, with the understanding that they would not be used by persons not entitled to the use of free transportation. Certain roads, however, refused to honor Railroad Administration passes after March 1.

One of the first things done by Director General Hines on March 1 was to purchase a mileage book, because while the officers of the Railroad Administration left in charge of the liquidation are entitled to free transportation when traveling on official business, they are not authorized to have regular passes.

A considerable number of the Railroad Administration officers who are returning to their former positions or receiving promotions or taking other service had left Washington on Saturday, or earlier, without waiting for the actual transfer of authority or for the announcement that the President had signed the Esch-Cummins bill, which was made Saturday evening. While apparently there was considerable speculation throughout the country as to what the President would do the members of the Railroad Administration staff were left in no uncertainty as to whether the roads would be relinquished in any event. The arrangements for the cessation of federal control had all been made, and Director General Hines bade farewell to those of his organization whom he was not accustomed to see regularly at the dinner given by officers and employees of the administration on Wednesday, February 25. He had also given out on Saturday his report to the President covering the period to March 1 which described some of the work to be done in winding up the affairs of the administration.

On Saturday night and Sunday the remaining offices of the Railroad Administration were moved from the Interstate Commerce building across the street to the Hurley-Wright building.

A large part of the organization of the Car Service Section has been retained by the Car Service Commission of the American Railway Association, of which W. C. Kendall, who has been manager of the section, is chairman.

In Circular No. 99, issued by the director general, the divisions of Traffic and Public Service, as such, were discontinued, effective March 1. Edward Chambers, director of the Division of Traffic, has been elected vice-president of the Atchison, Topeka & Santa Fe, and Max Thelen, director of the Division of Public Service, had been appointed director of the Division of Liquidation Claims. Such portions of the work of the divisions of Traffic and Public Service as remain to be completed after March 1 will be under the direction of the Division of Liquidation Claims.

Max Thelen, director of the Division of Liquidation Claims, announced the following appointments:

Frank McManamy, heretofore assistant director of the Division of Operation, was appointed manager, Department of Equipment. Cyrus B. Stafford was appointed manager, Department of Traffic.

The Committee on Claims will be known as the Advisory Committee on Claims, the Sub-Committee on Claims will be known as the Committee on Claims, and the membership of the Committee on Claims will be as follows: George M. Huss, Division of Liquidation Claims, chairman; E. M. Durham, Jr., manager, Department of Way and Structures, Division of Liquidation Claims; Frank McManamy, manager, Department of Equipment, Division of Liquidation Claims; E. M. Alvord, Division of Liquidation Claims; P. E. Wooley, office of comptroller, and a representative to be appointed by the director, Division of Law.

G. A. Tomlinson, director of the Division of Inland Waterways, has returned to the shipbuilding and grain business at New York.

Joseph T. Young, assistant director of the Division of Operation, has returned to his former position as president of the Norfolk Southern. F. C. Wright, assistant director of the Division of Operation, in charge of the marine department, has taken other service in New York, but will continue to devote some time to the Railroad Administration in connection with the liquidation of steamship property.

W. S. Basinger, assistant director of the Division of Traffic, has been appointed passenger traffic manager of the Union Pacific.

The office of the general assistant to the director general

has been discontinued effective on March 15. H. A. Taylor, general assistant to the director general, has been appointed general solicitor of the Erie. Any duties of the character now performed by the general assistant to the director general which will remain to be performed thereafter will be performed by the assistant to the director general, Brice Clagett.

Thomas H. MacRae, who has been special assistant to the director general of railroads, has returned to Chicago to his former position as managing editor of the Santa Fe magazine and also vice-president of MacRae's Blue Book.

V. P. Turnburke, manager of the Operating Statistics Section of the Railroad Administration, returned on March 1 to his former position as statistician of the Great Northern with office at St. Paul, Minn.

M. E. Towner, manager of the Forest Products Section, has returned to his former position as general purchasing agent of the Western Maryland, and Dr. D. Z. Dunott, chairman of the Committee on Health and Medical Relief, has returned to his former position as chief surgeon of the same road.

Contracts Executed

Director General Hines on March 1 announced the execution of 18 standard compensation contracts, in addition to the 147 that had been previously signed, as follows: Missouri Pacific, $14,312,343; Southern Railway, $19,165,362; Pacific Coast, $114,080; Philadelphia & Reading, $17,094,334; York Harbor & Beach, $5,880; Cincinnati, New Orleans & Texas Pacific, $3,596,924; West Jersey & Seashore, $952,681; Marquette Bessemer Dock & Navigation Company, $19,407; Louisiana & Arkansas, $359,362; Florida East Coast, $2,408,170; New York Connecting, $850,000; Chesapeake & Ohio, $13,888,418; Duluth, South Shore & Atlantic, $562,348; Bath & Hammondsport, $7,221; Central Union Depot & Railway Company of Cincinnati, $114,842; International & Great Northern, $1,596,945; New Orleans & Northeastern, $1,204,992, and Mineral Range Railroad Company, $144,000.

Mr. Hines also signed cooperative contracts with the Trinity Valley Southern and the East Berlin.

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The Colors of the 14th Railway Engineers Are Presented to Governor Calvin Coolidge for Preservation in the Massachusetts State House

Continued Severe Weather

THE RAILROADS OF NEW ENGLAND were blocked by ice and snow the last part of last week—from February 25 to March 1—as badly as in the storms of the earlier part of the month, and the delays and difficulties were in some cases worse. The snow banks and the ice of the former storms were still in existence and their volume was increased; and on many miles of railroad, including important main lines, the tracks were obstructed by drifts caused by long continued high winds. Very low temperatures prevailed; Woonsocket, R. I., for example, reporting on Saturday 19 deg. below zero, the coldest morning of the year.

In general, the most important main lines were kept open and passenger trains were delayed hours, not days; but branch lines were closed for days and one main line, that of the Central of New England between Hartford, Conn., and Canaan, was blocked for 48 hours. On this line, near Norfolk, 125 men had to shovel snow and pick ice for about two miles, the snow being from two to six feet deep. In eastern Massachusetts the Boston & Maine has short branches too numerous to mention; and on Saturday thirteen of these (including one or two in New Hampshire and Maine) were running no trains whatever. No attempt was made in that region to run freight trains on any lines, main or branch, for 24 hours and about half the passenger trains were omitted. Difficulties with snow were in many cases complicated by derailment putting main tracks out of business for long sections. Officers of the Boston & Maine said that in some respects the blockade was the worst in their experience.

Shortage of coal in some towns and at many important industries was a serious feature of the freight blockade. The president of the Boston Chamber of Commerce sent out a general call to industries located near the congested railroads to furnish men to help clear side tracks and yards, 3,500 men being asked for. The conditions were threatening, said the call, to stifle the industrial life of the state. The Chamber arranged to furnish shovels and picks for men not provided with them.

The congestion of freight in the freight houses and piers at Boston hampered the discharge of freight from vessels, and five large steamships were compelled to wait several days.

On the New York, New Haven & Hartford in southeastern Massachusetts large areas in yards were cleared of snow by men from neighboring industries, as in the earlier storm. At Providence, R. I., on Saturday, 300 cars, mostly loaded with outgoing freight, were frozen in, the ice being many inches thick. Of 30 tracks in one yard only three were open for service. Through the Providence Chamber of Commerce appeals for help were telephoned to hundreds of industries in and near the city.

At Brockton, Mass., the mayor of the city sent city laborers to dig out coal cars, at the same time assigning 40 teams belonging to the city to assist local coal dealers in making deliveries. On the Winchendon branch of the Boston & Albany the through train leaving Palmer on Monday did not get back until Saturday.

By Monday the Boston & Maine reported great progress toward the restoration of normal movement, about 7,000 men having been engaged in shoveling on Saturday and Sunday, 1,000 of these being employed in the Boston terminal yards, but thousands of freight cars were still frozen in.

On Tuesday, March 2, the Boston & Maine and the New Haven road removed embargoes on freight which had been in effect about four days.

Central New York experienced much difficulty from the same storm that prevailed in New England; and in Syracuse on Friday, February 27, the railroads were reported as "again paralyzed." The Chenango branch of the West Shore was completely tied up.

Postmaster General Objects to New Mail Rates

Asks for Rehearing on Commission's Decision and Postpones Request for Appropriation for Back Pay

The railroads and the Railroad Administration apparently are destined to be obliged to wait for some time for the benefit of the large increases in rates for the transportation of mail recently ordered by the Interstate Commerce Commission, to be retroactive to November 1, 1916. Some time after March 4, 1921, at which time it is possible that there will be a new postmaster general, is perhaps the best estimate that can be made as to when the money will be available.

The increase has been estimated as amounting to about $22,000,000 for the railroad companies for the service they performed during the 14 months ending December 31, 1917, about $73,000,000 for the Railroad Administration for the period of its operation of the railroads, and about $35,000,000 a year for the railroads for the future. Second Assistant Postmaster General Otto Praeger has placed the amount at $30,000,000 to $40,000,000 a year.

These figures represent the effect of the rates found by the commission to be proper in place of the tentative rates stated in the law of July 28, 1916, and include an increase of 25 per cent specifically to take care of increased operating expenses since January 1, 1918. However, Postmaster General Burleson, or his assistants, have figured out a way to beat the increased cost of operation which might commend itself to many others who are struggling with the high cost of living, were it practicable for them to adopt some of the expedients possible to government business management.

The method proposed by the postoffice department is to ignore the increase in rates, and in the operating expenses of mail transportation on which they were based, until a more convenient time, and meanwhile to ask the Interstate Commerce Commission for a rehearing in the hope that the increase may be reduced. Even if the commission declines to change the decision which it reached after about three years of investigation and which it announced in an opinion of 120 pages, the day of reckoning may be postponed until such time as another Postmaster General may have to be the one to ask Congress for the necessary appropriation. For the time being the department is sparing a Republican Congress the pain of passing so large an appropriation as would be required by the commission's order, while the Democratic Postmaster General is allowed to stand on the record which he made for himself by showing a slight surplus in his last annual report. One difficulty about the arrangement, however, is that a postponement of the settlement may require the Railroad Administration to ask for a slightly larger appropriation to cover its deficit than it would if the readjustment had been made, because the bulk of the back pay is owed by one department of the government to another.

On January 15, the day on which the commission announced its decision (reported in the *Railway Age* of January 23, page 309), the House had passed the postoffice appropriation bill for the fiscal year ending June 30, 1921, which carried an item of $60,000,000 for "inland transportation by railroad routes." As the payment to the railroads for carrying the mail for 1919 was about $54,000,000, it was expected that when the bill went to the Senate the department would have to increase the amount to cover the $35,000,000 increase and also that the $95,000,000 back pay would have to be either included or covered by a supplemental appropriation bill. When no explosion was heard from the room where the subcommittee of the Senate committee on postoffices and post roads was hearing officials of the postoffice department testify in explanation of the various items in the bill, some curiosity was aroused. The hearings were in executive session, but printed reports of the testimony since made public reveal the cause for the absence of the expected commotion. The department made no change in its figures.

Otto Praeger, second assistant postmaster general, in charge of the railway mail service, appeared before the subcommittee on February 9 and when pressed by senators as to why he could not trim the $60,000,000 to perhaps $59,000,000, he said, according to the printed record:

"That does not take into consideration the increase in rates that the commission *may fix.*"

Mr. Praeger is not responsible for the italics. They are used because the commission's decision was issued on January 15.

"Have you estimated what that increase would cost you on the basis of the business done this year?" asked Senator Townsend, chairman of the subcommittee.

"Between $30,000,000 and $40,000,000 a year," replied Mr. Praeger. "The postmaster general is preparing a motion for a rehearing on those rates, and until that is determined, and until the commission determines whether or not they will grant a rehearing and go into certain phases of the case that the department will point out, we are not getting ready to make payment to the railroads of the increases. We do not accept the rates as definitely settled until the commission disposes of the motion for rehearing. Then we will get into the work of restating the service on the new rates. Naturally when that is done we will have to come to Congress and ask for a deficiency appropriation to pay the railroads." He added that the estimate of appropriation was made on the basis of the present rates and a slightly increased service.

The commission's order, except as to the retroactive payments, was made effective, as of March 1, 1920, and the department has issued a booklet of orders and instructions purporting to put it into effect, which the attorneys for the Railway Mail Pay Committee have contended, in a petition to the Interstate Commerce Commission, are in conflict with the order. According to the petition, which was noted in last week's issue, the department's instructions continue the former practice, which the commission held was unjust, of saving money at the expense of the railroads by reducing the authorization of mail space in a train as it progresses and as mails are thrown off, regardless of the inability of the railroad to reduce the number or size of the mail cars. The booklet also includes a table of the rates prescribed by the commission. If the commission should render an adverse decision on the motion for a rehearing, which was filed on March 1 by Joseph Stewart, special assistant to the attorney general for the postmaster general, the department will have another move to make in the way of "restating the service," as mentioned by Mr. Praeger.

Something like the tactics employed by the department seems to have been anticipated by counsel for the short-line railroads while the case was before the commission. The commission's report says that they contended that it had power to direct the postmaster general to pay reparation to certain railroads, but the commission said: "When we have made finding, any questions with respect to readjustment of payment rest, under the law, with the postmaster general. We have no jurisdiction in this proceeding to award reparation to any railroad as the result of our findings."

Mr. Stewart on behalf of the postmaster general petitioned

for a re-hearing and for a revised finding as to the fair and reasonable rates for the transportation of the mail and submitted the following points on which it is contended the Interstate Commerce Commission has decided erroneously:

First. That in charging to the mail service a proportion of the unauthorized, excess, and unused space and operation in full railway post-office cars and full storage mail cars the commission assigned to the mails the entire number of car-foot-miles involved, 32,000,000; whereas if the original assignment of the department be not followed, the amount should be divided between the passenger service and the mail service on the ratios of 87.84 per cent and 12.16 per cent, respectively.

Second. That in charging to the mail service a proportion of the unauthorized, excess, and unused space in combination and mixed cars, the commission divided the whole of such space and operation between the passenger, express, and mail services according to the ratios shown by the used space in the other than full cars (the authorized space being counted as the used space in the case of the mail); whereas such space should be divided between the three services named according to the ratios shown by the used space in the baggage end alone of the mixed cars (the apartments being excluded from consideration here).

Third. That in reaching the basic amount of estimated cost and return chargeable to the mails the commission computed a specific rate per cent of return on the unchecked and unproved value of investment in road and equipment reported by the railroads; whereas such reported value should be used only for comparing the estimated rates of net returns from the several services.

Fourth. That in dividing investment in road and equipment between the passenger, express, and mail services, the commission divided the value assigned to the passenger service, as a whole, between the passenger, express, and mail services on general car-foot-mile ratios; whereas the division of road value should be made on the basis of various operating-expense ratios, and the division of equipment value on the basis of allocations where reported by the railroads, and various car-foot-mile ratios for the residue.

Fifth. That in computing the amount of return allowed on investment charged to the mails the commission allowed 6 per cent; whereas—

(*a*) On the commission's basis applied to passenger service on the theory of dividing all passenger value of road and equipment on car-foot-mile ratios and charging 78.06 per cent of all space to the passenger service and 8.29 per cent to the mail service, the railroads realized only 5.738 per cent return on passenger service; and

(*b*) On the commission's basis applied to passenger service on the theory of dividing all passenger value of road and equipment on car-foot-mile ratios and charging 77.96 per cent of all space to the passenger service and 7.46 per cent to the mail service, the railroads realized only 5.745 per cent net return on passenger service; and

(*c*) On the commission's basis applied to passenger service on the theory of dividing all passenger value of road and equipment on car-foot-mile ratios and charging 78.11 per cent of all space to the passenger service and 7.31 per cent to the mail service, the railroads realized only 5.734 per cent net return on passenger service; and

(*d*) On the department's basis applied to the passenger and mail services on the theory of dividing all passenger value of road on various operating-expense ratios and passenger value of equipment according to direct allocations where reported by the railroads and on various car-foot-mile ratios for the residue, the railroads realized only 5.484 per cent net return on passenger service; and

(*e*) On the commission's basis applied to express and mail services on the theory of dividing all passenger value of road and equipment on car-foot-mile ratios and charging 13.65 per cent of all the space to the express service and 8.29 per cent to the mail service, the railroads realized only 2.524 per cent net return from the express service; and

(*f*) On the department's basis applied to the express and mail services on the theory of dividing all passenger value of road on various operating-expense ratios and passenger equipment according to direct allocations where reported by the railroads and on various car-foot-mile ratios for the residue, the railroads realized only 2.941 per cent net return from the express service.

Sixth. In reaching the basic aggregate amount of pay which was considered warranted as of March 27, 1917, the commission evidently determined upon a basis of $80,450,302 for the entire service reduced to $75,191,065, being the amount produced by the application of the specific rates provided for; whereas—

(*a*) If the mails were charged with the same rate of return on estimated value of investment as the railroads received as net return from passenger service on the same theory of division of value as the commission used, and the cost estimate be based on the same division of space as the commission allowed (78.06 per cent to passenger and 8.29 per cent to mail) the amount would have been $74,413,426.

(*b*) If the mails were charged with the same rate of return on estimated value of investment as the railroads received as net return from the passenger service, on the same theory of division of value as the commission used and the cost estimate be based on a division of space (77.96 per cent to passenger and 7.46 per cent to mail) the amount would have been $67,247,864.

(*c*) If the mails were charged with the same rate of return on estimated value of investment as the railroads received as net return from the passenger service, on the same theory of division of value as the commission used, and the cost estimate be based on a division of space (78.11 per cent to passenger and 7.31 per cent to mail) the amount would have been $65,904,320.

(*d*) If the mails were charged with the same rate of return on estimated value of investment as the railroads received as net return from passenger service, on the theory of a division of value by direct allocation and the use of operating-expense and car-foot-mile ratios as used by the department, and the cost estimate be based on the division of space used by the commission (78.06 per cent to passenger and 8.29 per cent to mail) the amount would have been $69,220,750.

(*e*) If the mails were charged with the same rate of return on estimated value of investment as the railroads received as net return from passenger service, on the theory of a division of value by direct allocation and the use of operating-expense and car-foot-mile ratios as used by the department, and the cost estimate be based on a division of space, 77.96 per cent to passenger and 7.46 per cent to mail, the amount would have been $64,266,141.

(*f*) If the mails were charged with the same rate of return on estimated value of investment as the railroads received as net return from passenger service, on the theory of a division of value by direct allocation and the use of operating-expense and car-foot-mile ratios as used by the department, and the cost estimate be based on a division of space, 78.11 per cent to passenger and 7.31 per cent to mail, the amount would have been $63,377,517.

(*g*) If the mails were charged with the same rate of return on estimated value of investment as the railroads received as net return from the express service, on the same theory of division of value as the commission used, and the cost estimate be based on the same division of space as the commission used, 13.65 per cent to express and 8.29 per cent to mail, the amount would have been $63,995,075.

(*h*) If the mails were charged with the same rate of return on estimated value of investment as the railroads received as net return from the express service, on the same theory of

division of value as the commission used, and the cost estimate be based on a division of space, 14.58 per cent to express and 7.46 per cent to mail, the amount would have been $57,819,491.

(*i*) If the mails were charged with the same rate of return on estimated value of investment as the railroads received as net return from the express service, on the same theory of division of value as the commission used, and the cost estimate be based on a division of space, 14.58 per cent to express and 7.31 per cent to mail, the amount would have been $56,711,657.

(*j*) If the mails were charged with the same rate of return on estimated value of investment as the railroads received as net return from the express service, on the theory of a division of value by direct allocations and the use of operating-expense and car-foot-mile ratios as used by the department, and the cost estimate be based on the division of space used by the commission, 13.55 per cent to express and 8.29 per cent to mail, the amount would have been $65,362,189.

(*k*) If the mails were charged with the same rate of return on estimated value of investment as the railroads received as net return from the express service, on the theory of a division of value by direct allocations and the use of operating-expense and car-foot-mile ratios as used by the department, and the cost estimate be based on a division of space, 14.58 per cent to express and 7.46 per cent to mail, the amount would have been $58,945,180.

(*l*) If the mails were charged with the same rate of return on estimated value of investment as the railroads received as net return from the express service, on the theory of a division of value by direct allocations and the use of operating-expense and car-foot-mile ratios as used by the department, and the cost be based on a division of space, 14.58 per cent to express and 7.31 per cent to mail, the amount would have been $57,913.775.

Seventh. In distributing the average or general unit rate to the several units of service the commission has unduly increased the rates for the lesser units and has not maintained their true relations.

Eighth. In allowing differentials to the short-line railroads the commission has defined them as "separately operated" instead of "separately owned and operated."

The petition also includes an elaborate brief regarding these contentions presented to the commission "in the belief that they warrant careful consideration and favorable action to the end that a more equitable adjustment of the basic rate may be reached and the space basis system further perfected." It is contended that in the matter of rates between the railroads and the post office department the mails should not be made to pay more per unit of service than the railroads voluntarily contract with the express companies to receive from them for a like service, and that on this basis the gross amount would not exceed $57,913,775 for the service as of March 27, 1917, based on all the mail service.

Trotsky's Train de Luxe.—The following account of Trotsky's special train is given by a Russian refugee who has reached Finland: The special train consists of 14 cars and two powerful engines. It is supplied with a wireless installation capable of receiving communications from Nauheim, Lyons, and London. As soon as the train arrives at a station it is at once connected with the telephone system. The wireless telegraph works night and day. One of the most interesting fittings of the train is a printing office which prints Trotsky's paper *On the Way*. The greatest curiosity, however, is the car of the Imperial garage, which contains six motor-cars, one of them a French car which belonged to the Tsar. The escort on the train consists of 250, i. e., a whole company of machine gunners, as Trotsky, with his train, has often been near the front. The train also contains a library and a dining car.—Times (London).

Short Lines Approve Railroad Bill

The American Short Line Bulletin, issued by the American Short Line Railroad Association, Washington, publishes the following regarding the Esch-Cummins bill which became a law on March 1, under the head "A Great Victory. The Stone Which the Builders Rejected Has Become the Head of the Corner":

"The bill contains many provisions for the benefit of short lines and weak railroads, which were prepared and advocated by the American Short Line Railroad Association.

"Congress has thus again acted in a way to do justice to that class of railroads that originate and transport a very substantial per cent of the raw material and agricultural products of the country.

"This action of Congress is not only a vindication of the legislative branch of the government but it a very great victory for the short line railroads that were illegally and unfairly rejected by the Railroad Administration and deprived of the rights conferred upon them in Section 1 of the federal control act of March 21, 1918.

"Notwithstanding the law thus enacted, the Railroad Administration refused to recognize the rights of the short line railroads; refused to include the great majority of them in federal control, and announced its intention of relinquishing them. Thereupon, Congress at the end of June, 1918, responded to the urgent request made in behalf of such excluded short line railroads by the American Short Line Railroad Association, and passed a joint resolution specifically providing that the class of roads described in the foregoing quotation, should be included as a part of the railway system under government control. While Congress was acting upon the joint resolution, the general counsel of the Railroad Administration was frantically engaged in issuing orders of relinquishment. President Wilson vetoed that joint resolution and made promises of fair and just treatment to the short line railroads that had been relinquished, which have never been fulfilled except to a limited extent.

"The American Short Line Railroad Association fought vigorously in its attempt to have the Railroad Administration do justice to the short and weak railroads, and comparatively speaking, accomplished a great deal for such roads. The campaign was so conducted as to finally overcome the prejudice and antagonism of the Railroad Administration to the extent that during the past year the director general and the great majority of his principal assistants have become warm friends and have desired to do justice to the short lines so far as it was within their power.

"The American Short Line Railroad Association has conducted a most vigorous campaign in behalf of the short lines before the present Congress. It has prepared and Congress has adopted a number of important amendments which will aid greatly in stabilizing short line railroads throughout the country in the future. The Association has demonstrated to Congress that very great injustice was done short lines as a result of their exclusion from federal control. It has shown that the actual losses of the 171 short lines whose operating losses, including taxes, were greater in the year 1918, showed an increase of 474 per cent as compared with their average losses during the standard test period.

"The American Short Line Railroad Association has not only won a great victory for the short lines but it has been very helpful in obtaining legislation that is necessary and beneficial for the entire railroad transportation system of the country. The association has recognized that the short lines could not be prosperous unless the main lines were placed in a healthy condition.

"Owners of short line railroads will find much cause for congratulation in the provisions of this new law.

Congress has shown a high appreciation of the needs of the short and weak roads, and has courageously incorporated all

of the important provisions requested by the American Short Line Railroad Association.

"One of the most important features and at the same time one as to which we have some doubt is Section 422, which requires the commission to establish the rate level for the first two years after federal control, so that the revenues of the railroads as a whole shall be a sum equal to 5½ percentum of the aggregate value of all the roads. We cannot bring ourselves to believe that a rate level fixed on this basis, and the strong roads left to get all they can in excess of the percentage fixed, will leave enough to safeguard the weak and short roads. We hope the commission as well as the public will see the necessity of making such a change in the rate level from time to time, and such a change in the law with regard to the distribution of the general volume of traffic as that each and every railroad necessary to be continued in the public interest, will be regenerated and made an efficient unit in the general transportation machine.

"The problem of sustaining the weak roads through a rate level which will not allow the strong roads too much, must find its ultimate solution in the consolidation of the railroads of the continental United States into a number of systems as provided for in Section 407 of the Bill, which requires the commission as soon as practicable to prepare and adopt the plan for such consolidation. This feature of the new law is one of paramount importance and the largest possibility to the short line roads. The short lines, through this association, must and will urge the Interstate Commerce Commission to create, at the very earliest date practicable, a department or division for the special consideration of a plan for consolidation, and that representatives of the short line railroads as a whole would be permitted to co-operate with the commission in working out this matter of such tremendous moment to the railroads and the commerce and industry of our common country. This is one of the big things which may be accomplished for the short line railroads through continued co-operation.

"We feel that private operation of the railroads is on final trial. The Interstate Commerce Commission is vested with responsibility and burdened with duty such as was never laid upon any set of men in the history of the world. We feel that members of the commission will realize this responsibility and will welcome co-operation on the part of railroad organizations and managements. Our hope is that the people of the United States, who are certainly opposed to government ownership, will be patient until the constructive features of the new law shall have been put into practice and such imperfections as may exist completely demonstrated and ultimately cured by additional legislation. The public should be taken constantly into the confidence of railroad managements. The public should be given to understand the difficulties that confront the roads and the commission, and which will continue to disturb and distress commerce and industry until normal conditions shall have been restored.

"Considered as a whole, the Cummins-Esch railroad bill is, in our opinion, one of the most excellent pieces of constructive legislation yet passed by the American Congress. What has been written into this law for the protection of short line railroads is due entirely to organized effort. The needs of these properties have been forcefully and persistently presented to Congress. As we have heretofore said, we again repeat, the troubles of the railroads are not yet ended. This new law must be construed and put into practice. Amendment will probably be required in order to perfect it. Labor has vigorously opposed its passage and may be expected to earnestly attempt to repeal or emasculate it. The need for continued co-operation on the part of the railroads will be greater in the immediate future than it has been in all the past.

"We cannot close this article without again calling this fact to the attention of our readers and urging every short line railroad to unite with us in the work we are doing for the protection and preservation of all of the railroads of our country."

The bulletin also publishes the following:

It has turned out as we had expected,
That the short lines John Barton rejected,
Have come back to stay,
In a definite way,
And by wise legislation protected.

Material Handling Machinery Manufacturers' Association

THE ANNUAL MEETING and convention of the Material Handling Machinery Manufacturers' Association was held in the Waldorf-Astoria, New York, February 26 and 27, 1920. The program provided for a business session on the morning of the first day, followed by a luncheon and the presentation and discussion of papers in the afternoon. On Friday morning the advertising managers of the manufacturers of mechanical handling machinery held an advertising council assembly at which A. J. Barnes of the Shepard Electric Crane & Hoist Co., Montour Falls, N. Y., presented data covering a recent survey of the field made to ascertain the potential and actual demand for industrial units in the industrial field for industrial trucks, tractors, lift trucks, industrial locomotives, portable conveyors and detached electric hoists.

Another paper by E. R. Davis, advertising manager, General Electric Company, Schenectady, N. Y., outlined the need for an encyclopedia correlating material handling machinery, and the information was disclosed that arrangements had been made by the Simmons-Boardman Publishing Company, New York, to produce such a volume to cover the field of cranes, conveyors, elevators, escalators, stacking machines, industrial trucks, motor trucks, transfer tables, turntables, industrial locomotives, and combinations of these units as well as steam, electric and gasoline power units as applied to the industry.

The afternoon session on Friday was devoted to the presentation and discussion of papers of general interest to the industry. A paper of special interest to railroad men was presented by B. E. Fitch, president of the Motor Terminals Company of New York and Cleveland. It discussed the application at Cincinnati, O., of electric overhead traveling cranes and electrically operated hoists in combination with demountable truck bodies or containers, used with motor trucks for handling interline l. c. l. freight interchange between all the railroads of that city and sub-stations of each road. An abstract of Mr. Fitch's paper is published elsewhere in this issue.

Following is the list of the board of governors elected for the year 1920-21. (At a meeting during March this board will formally elect a president, vice-president and treasurer, and secretary to serve for the coming year): F. W. Hall, Sprague Electric Works, New York; H. W. Standart, Northern Engineering Works, Detroit, Mich.; J. C. Walter, Alvey Ferguson Company, New York; W. F. Merrill, The Lamson Company, Boston, Mass.; R. W. Scott, Otis Elevator Company, New York; D. V. Jenkins, Watson Elevator Company, New York; L. C. Brown, Elwell Parker Electric Company, New York; R. Owens, Lakewood Engineering Company, Cleveland, Ohio; F. Stadelman, Wellman, Seaver, Morgan Company, New York; T. Robins, Robins Conveying Belt Company, New York; G. O. Helmstaedter, Hyatt Roller Bearing Company, New York, and G. W. Miller, Jeffrey Manufacturing Company, Columbus, Ohio.

Employing Motor Trucks in Trap Car Service*

Use of Street-Going Vans at Cincinnati Effects Reduction in Rail Terminal Congestion

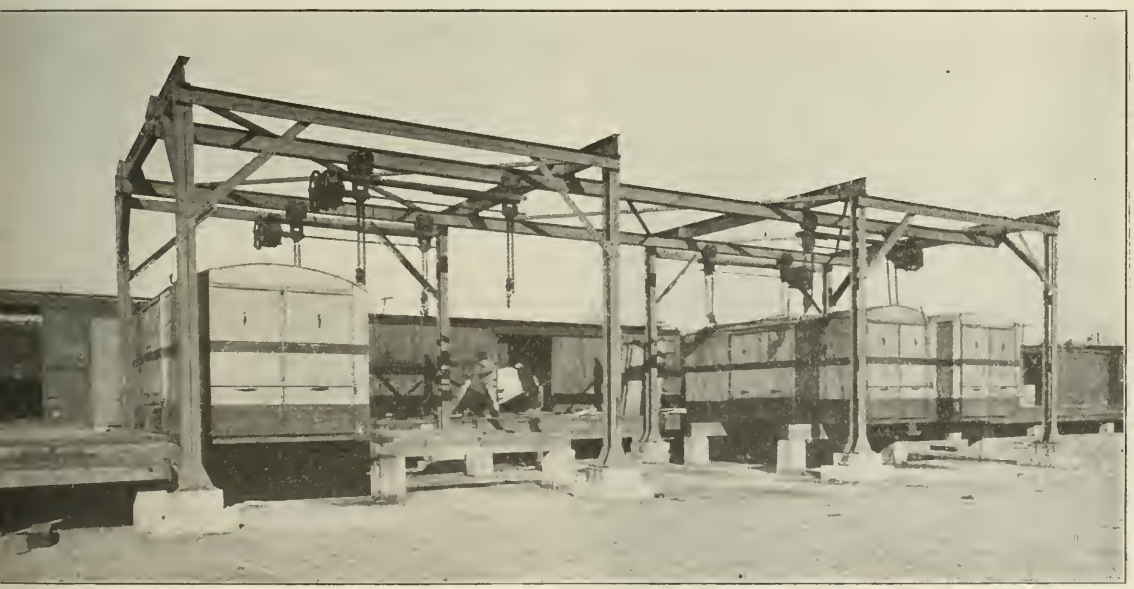
By B. F. Fitch
President, Motor Terminals Company, New York.

THERE IS PRACTICALLY no limit to what the rails will carry, if cars, when consolidated in trains, are at once started and kept continuously moving; therefore, it is ogical to charge inadequate terminal facilities with the ıajor portion of the box car's tonnage deficiencies. Inade- uate terminals alone are not responsible for this nor can ither the railroads or the public be censored for using box ars illegitimately in lieu of other facilities for short-term torage. The prime trouble is that, as an operating neces- ity, in absence of other facilities, box cars have been assigned ɔ a service for which they were never intended, and this ıakeshift usage has complicated switching interchanges at ll terminal points to the detriment of high mileage efficiency f all cars.

Our national transportation practice and trade influences f the traffic do not permit of any radical terminal changes. a maximum cost of 6 mills per ton mile, suggests a transportation cost of 60 cents versus terminal costs of $6.

With unlimited financial resources the engineering talent of the country can quickly solve the problem. Ideal joint terminals at a cost of $50,000,000 to $500,000,000 are possible in all of our principal centers, but who will assume the responsibility of such abnormal financing? Each present terminal layout must be continued substantially as at present. Conservatism recommends no radical changes, but demands evolutionary changes to bring about better conditions.

Despite opportunity for improvements, the industrial trap car and the intro-terminal trap car will apparently always complicate terminal interchanges to the detriment of switching refinements. Terminal operating economies will be in direct ratio with the decrease in the number of interchange switching combinations. So apparently new freight stations



General View of Baltimore & Ohio Norwood Sub-station

ıny revolutionary attempts along this line might embarrass ur production resources as greatly as a change in the mone- ıry basis. Therefore, evolutionary improvements only can e considered. To demonstrate the fact that railroad trans- ortation has outgrown railroad terminals, it is interesting ɔ note that from outer classification yards to pier station elivery at New York the cost to carrier is not less than $3.50 er ton and, similarly, at Philadelphia, not less than $2.50 er ton, or a joint terminal cost of $6 per ton. Whereas, the ıain line haul between these two terminals, if estimated at at huge investment are no guarantee of great reductions in terminal expense, because freight station labor cost is but a small item as compared with total terminal expense.

In any city with seven non-competing railroads radiating to different sections, each line receives daily some freight for each of the six connections. Numerically, this means 42 cars in transit to and 42 cars in transit from, a total of 84 cars. But due to yard interchange delays these cars average a third day arrival instead of a second day arrival; hence, 252 cars are assigned daily to such service. Thus 75,600 car days are required annually.

Industrial expansion at any city with seven initial lines, has, as a rule, outgrown station facilities and railroads for economy's sake have strategically established sub-stations

*Abstract of a paper read at a meeting of the Material Handling Ma- ıinery Manufacturers' Association, Waldorf-Astoria, New York, February 5, 1920. A brief description of this installation was also given by enas W. Carter, secretary of the Material Handling Machinery Manufac- ırers Association, at the November meeting of the New York Railway lub. (See *Railway Age*, November 7, 1919, page 922.)

along their rights-of-way as traffic influences for shipments from outlying districts. Since all the freight from these outlying districts has to be brought to the main stations to be consolidated in cars for despatch from such main stations to destination points, and since all of the freight for these sub-stations comes out of main station cars on arrival, trap cars are necessary in this main sub-station service of each line. The number of cars so used is a multiple of the number of stations. If each of the seven lines has three stations, 42 cars are required, the movement delays to which are as great as connecting line cars; therefore, the wasting of an additional 37,800-car days.

This explains one of the reasons for car shortage and an operating abuse which has been obsoleted by the success of a motor terminals installation at Cincinnati, Ohio. Briefly, this installation consists of overhead rails, electric cranes, electric hoists, motor trucks and a plurality of interchangeable motor truck bodies. The system of operation requires an empty body for each station movement demand of railroad on its inbound main station platform. At the larger stations there are several locations for such body settings, thereby decreasing the trucking distance for freight. As the freight comes from the cars, it is trucked to the nearest location containing a body carded for any connection or any sub-station.

When loaded, these bodies are sealed and under telephone order of a joint despatcher, employed by the railroads, mechanically loaded onto trucks and thus rested over the city streets to a connection. On arrival at the outbound

Chesapeake & Ohio Inbound Station at Fourth Street

platform of the connecting line, the body is mechanically removed and an empty body, previously unloaded, is put onto the motor truck chassis for delivery to the inbound platform of that house, where the operation is repeated and another loaded body is forwarded in the same manner to some other freight house.

If the load happens to be to a sub-station, it remains on the platform until the despatcher is advised by the agent at the sub-station that a return load is available. Then the loaded body of inbound freight to that sub-station is forwarded and the motor truck exchanges it for the previously reported load of outbound freight to be delivered at the main station, where it is consolidated with other city freight in line cars made up daily to other destination points.

It is evident that all freight, except possibly the portion arriving during the last hour of the station operating day, whether between main and sub-stations or between main stations of the various railroads, is currently loaded and hauled out of the terminal. Previously, the movement of this freight by trap cars suffered an average of three days delay and the shuttle movement of these individual cars over

C. C. C. & St. L. Central Avenue Outbound Station

terminal rails interfered with the group movement of complete cuts of station cars. Hence, the congestion which previously made Cincinnati notorious as a check-valve in rail routings.

In May, 1917, the Cleveland, Cincinnati, Chicago and St. Louis permitted a test installation between its five main and sub-stations. The innovation was an early success, but the other roads were skeptical of its enduring efficiency. In the early months of 1918 a special committee was appointed to analyze the entire terminal and, based upon Big Four accomplishments, recommend what economies and benefits could be anticipated from completely motorizing Cincinnati's terminal. The summary of this comparative report prophesied the following:

Annual economy, $61,653.
Advance in movement of freight, 52.4 hours.
Increase in inbound platform floor area, 14.8 per cent.
Increase in outbound platform floor area in ratio with station operation.
Increase in main station trackage, 21.4 per cent.
Increase in main station realty, 122,660 sq. ft.
Release of 66,862 cars for line service, per annum.
Extension of present labor, 30.4 per cent.
Eliminating the rehandling of 86,976 tons of freight, lessens railroads liability of loss and damage.

In 1919 equipment orders were entered and railroads commenced station changes and superstructure construction, but the terminal is not yet fully equipped, because of delays. However, in recent analysis of accomplishments it is proven that, due to increased operating costs of railroads, the prophesied 17.1 cents per ton economy is in practice actually a saving of 35.2 cents per ton and, therefore, the annual economies will be $126,508 instead of $61,653.

This service has proven that all widely distributed station facilities can be laced up as a unit without investment cost

to the railroads, thereby giving to each and every terminal the benefits of a union freight station. The rates paid for the service are less than what interest charges alone would be on the cost of constructing a consolidated terminal. The operating program of railroads and the established perquisities of shoppers are in nowise disturbed, but the railroads at large through the influence of this current versus their past interrupted movements enjoy an increase of terminal rail, station rail and station platform facilities. This increase can be perpetually extended at minimum investment, in ratio with increasing tonnage demands, which naturally will accrue at any industrial city enjoying better shipping facilities.

Extensions are now possible in the form of rail sub-stations or off-track warehouse sub-stations by this system, and can be gradually provided as the tonnage demands warrant.

Louisville & Nashville East End Freight House Outbound Side

There is no necessity to finance elaborate facilities to take care of accruing demands which may not develop for 50 years.

What has been done at Cincinnati can be adapted to the varying demands of al principal terminal cities. The flexible possibilities of trucks are now clearly defined for industries having transportation facilities dependent upon rail extensions. Opportunity at each point are limited only to intelligent installations following detail analysis to establish the greatest terminal deficiencies of a carrier to meet the shipping demands of the public.

The accomplishments at Cincinnati warrant a study of the system as applied to the greatest terminal problem in the world, New York. At present the railroads monopolize approximately 30 per cent of Manhattan's piers for freight stations. Where not individually owned, the rental value of piers is out of all proportion with freight tariff returns, but a few blocks inland, realty enjoys but a fraction of bulkhead rental values. If inland joint stations, in say 12 zones, were constructed on this otherwise comparatively non-productive realty, the railroad piers could be released for shipping and station facilities could be attained by the railroads at practically no cost, because of increased rentals possible for warehouses and industrial floors above joint freight terminals.

If all roads contributing this terminal had transfer stations at their rail bulkheads or a few blocks back from the valuable waterfront of Jersey City, Staten Island and Bronx, carload and less than carload package freight could be immediately transferred from cars to motor truck bodies, which would be designated for each of these inland stations, and the freight cars thereby released for immediate reloading of outbound freight. These bodies, when loaded on trucks, would be routed over streets to the nearest available Staten Island or Jersey slip for ferrying to the Manhattan slip nearest the inland station destination, and vice versa on the return movement.

The inland station investment is a realty venture requiring no financing on the part of the railroads, because assured rental returns from upper stories will invite outside capital to furnish the station facilities in ever increasing numbers as fast as the railroads desire to contract for the use of such. In short, the motor truck, reinforced by this system, offers an opportunity to convert present transportation losses into profits for both carriers and shippers, and this opportunity does not suffer the handicap of engineering problems and long construction delays.

It is an immediately available asset, the adoption of which is not entirely dependent on concerted action by the railroads. The initial installation at Cincinnati has demonstrated the possibility of capitalizing existing economic terminal losses to the mutual benefit of all interests.

Interstate Commerce Commission Interprets Transportation Act

The Interstate Commerce Commission on March 1 issued the following notice to carriers giving an interpretation of that section of the new transportation act designed to continue in effect until changed by proper authority the rates in existence at the expiration of federal control:

Section 208(a) of the transportation act, 1920, just enacted, provides that all rates, fares and charges and all classifications, regulations and practices which in any wise change, affect or determine any part of the aggregate of rates, fares or charges or the value of service rendered, which on February 29, 1920, are in effect on the lines of carriers subject to the interstate commerce act, shall continue in force and effect until thereafter changed by law, but that prior to September 1, 1920, no such rate, fare or charge shall be reduced, and no such classification, regulation or practice shall be changed in such manner as to reduce any such rate, fare or charge unless such reduction or change is approved by the Interstate Commerce Commission. The prohibition against reduction of such rates, fares or charges, or effecting such reduction by change in classification, regulation or practice prior to September 1, 1920, without approval of the Interstate Commerce Commission is mandatory and unqualified. The interpretation or effect of the provision for other charges "pursuant to authority of law" is open to interpretation and differences of opinion might arise relative thereto.

If the commission has entered an order in a formal case effective on a date subsequent to February 29, 1920, it is the duty of the defendants in that case to comply with that order; and changes made and filed responsive to that order will be "pursuant to authority of law."

If a schedule has been filed providing for a change or changes in interstate rates, fares, charges, classifications, regulations or practices, effective on a date subsequent to February 29, such changes, if not suspended by the commission, will become effective "pursuant to authority of law," except such as may reduce the charges for the service and as to which the commission's approval has not been secured.

If any proposed reductions which have not been approved by the commission have been filed to become effective subsequent to February 29, 1920, the law above referred to renders them unlawful. It will, therefore, be necessary to eliminate them from the schedules or secure the commission's approval

prior to the effective date. Elimination of them — a schedule should be effected by prompt issuance of a supplement to, or reissue of, the schedule, and this wherever possible should be done before the effective date of the schedule. If it is impossible to do this before the schedule takes effect it should be done as promptly as possible thereafter, and in consideration of the unusual situation created by the law referred to the restoration of the rate or charge that was in effect on February 29 should be made retroactively effective as of February 29 or as of the effective date of the reduction if that date is later than February 29. Supplements to or reissues of schedules for the purpose of so restoring the rates or charges that were in effect on February 29 and containing no other change may be made effective without notice, because they simply correct in an orderly way that which was proposed in accordance with the law as it existed when the change was filed but which has by subsequent legislation been made unlawful. Such a supplement to or reissue of a schedule must bear an effective date which, as before stated, may be made retroactive and should bear on its title page a notation, "Effective ———— and filed on less than statutory notice in order to bring the tariff into conformity with section 208 (a) of the transportation act, 1920."

Changes in intrastate rates, fares, charges, classifications, regulations or practices filed with the commission and not effective on or before February 29 are not "pursuant to authority of law." The jurisdiction over intrastate rates, etc., passed to the state regulating authorities at 12:01 a. m. March 1, 1920, with the limitation above referred to that such rates, etc., shall not be reduced prior to September 1, 1920, without the approval of the Interstate Commerce Commission, and subject further to the provisions of section 13 of the act to regulate commerce as amended by section 416 of the transportation act, 1920.

Changes in fares for the purpose of establishing round-trip excursion fares for specific limited periods of time and between specified points are hereby approved if filed in accordance with the provision of tariff circular 18a.

Reductions in rates, fares or charges made for the purpose of bringing them into conformity with the requirements of the fourth section of the act, and filed on lawful notice, are hereby approved.

Section 208(a) of the transportation act, 1920, prohibits the reduction of a rate or charge prior to September 1, 1920, unless such reduction is approved by the commission. Section 418(5) of the same bill places upon carriers the duty of unloading live stock into suitable pens at public stock yards and, with certain exceptions, en route, without extra charge therefor to the shipper, consignee or owner. The provision in section 208(a) appears to be fundamental and controlling, but it is clearly the duty of carriers to bring their tariffs of charges applicable to shipments of live stock into conformity with the provisions of section 418(5) at the earliest possible date.

Reductions in rates or charges for the purpose and to the extent necessary to bring the tariffs into conformity with section 418(5) are hereby approved.

The commission has also issued fourth section orders authorizing the carriers to continue until September 1, 1920, all rates, fares and charges established by the Railroad Administration which without having been authorized by the commission will be in violation of the fourth section of the act to regulate commerce, provided that in instances in which applications for authority to continue any of the rates are filed with the commission on or before June 30 the rates covered by such application may be continued until they have been passed upon by the commission. Applications for authority to continue the aforesaid rates shall state when and in what tariffs they were established, to what extent they are in contravention of the fourth section and similar information.

This order is said to be necessary, because while the railroads were under federal control certain rates were established in contravention of the provisions of the fourth section as it is applicable to the carriers under private ownership, and the commission considers that a reasonable time should be allowed to bring them into conformity with the fourth section or to make applications to the commission for relief. In another order the commission directs that rates in existence prior to the effective date of General Order No. 28 of the director general of railroads which were not in accord with the provisions of the fourth section but were at that time or are now authorized by specific orders of the commission or protected by applications not yet passed on, may be continued as increased by the director general's order without observing the provisions of the amended fourth section.

No Honey Until the Bees Go to Work

W. G. Besler, president and general manager of the Central of New Jersey, resumes charge of the operation of the road with a greeting to officers and employees, reading in substance as follows:

For the past 20 years we have lived and worked together, shared our joys and sorrows, practically as one family. Mere money paid in compensation for a day's service rendered is not, indeed, all that is to be desired in connection with one's employment. The happiness that comes with the knowledge of permanency in the matter of position, of stability and regularity of employment, and upon which may be based a confidence and dependence in one's ability to meet the necessary family expenditures, as well as the practice of thrift, is of equal or greater importance. And even above these are the elements of existence which make life worth while living; a spirit of confidence and co-operation, of mutual respect and sympathy between employer and employee, a realization by the employee of the interest of the employer, and the real joy, which comes to every rightly constituted person, of work well performed.

These relationships between employer and employee are of really greater concern in our every-day life than the measure of dollars and cents in our pockets. The practice of them is an assurance and guarantee of "a fair day's pay for a fair day's work," and a square deal.

The spirit of unrest is with us. The situation as I see it is like a swarm of bees that has left its hive and is buzzing around without apparent order or accomplishment until it is finally gathered once more into its hive, where each bee knows its individual place, and instinctively it starts to work in orderly and constructive fashion in the matter of production—sufficient for its own needs and a surplus for the use and enjoyment of mankind. There are drones among the bees, but the workers drive them forth and sting them to death.

There is no honey until the bees go to work!

As your president and general manager, and as the head of this great family, I call upon each and every member thereof to assume his or her place in the organization, with the certain knowledge that your interests and welfare shall be scrupulously safeguarded and your efforts justly rewarded, and I call upon you from past experience to bear witness to the mutually beneficial results that have accrued during the many years of our association.

With this assurance, let us dismiss unrest and its accompanying confusion, and once more come together and recreate that *esprit de corps* which has always been so characteristic of the service of the Central Railroad of New Jersey.

Railroad Administration Staff at Farewell Dinner. New Ebbitt Hotel. Washington, D. C., February 25, 1920.

Director General Hines Reports to President

Government's Loss of $854,000,000 Attributed to Policy of Not Increasing Rates

WALKER D. HINES on February 28 submitted a report of his administration as director general of railroads from his appointment, as successor to W. G. McAdoo, on January 11, 1919, until the expiration of federal operation on February 29, 1920. Following is an abstract of the report:

The federal control of the railroads has been, in point of the magnitude and scope of the industry involved, probably the greatest transfer from private management to public management that has ever taken place. It therefore seems to deserve a detailed statement of what has been done as it affects the public service, labor, the owners of the railroads and the financial results; as to the conditions which will exist upon the return of the properties to private management, and as to the features of unified control, which ought to continue, even under private control.

This report necessarily refers to a considerable extent to policies established by my predecessor. Many of the additional steps taken during 1919 were then taken because the radical change in conditions brought about by the armistice called for changes in method which would have been inadmissible during the period of hostilities.

The Public Service

Passenger Service

The passenger service performed in 1919 exceeded all former records. The number of passengers carried one mile on Class I railroads (operating approximately 230,000 miles of read) for the past five years compared with 1919 was as follows:

Year ended June 30:	
1914	34,496,782,289
1915	31,789,928,187
Calendar year:	
1916	34,585,952,026
1917	39,361,369,062
1918	42,498,248,256
1919 (partly estimated)	46,200,000,000

During the first eight months of the year an important part of the passenger transportation was the movement of troops in process of demobilization. The troop movement had largely disappeared in the last four months of the year, and by January 1, 1920, practically all of four million men called to the colors to serve in the world war had been released from service and returned to their homes, but the passenger travel continued in unprecedented volume. There have been virtually no additions to the passenger or sleeping car equipment in the last two years, so that the trains were frequently more crowded and less comfortable than if the volume of traffic had had a more normal relation to the amount of equipment.

Earnest efforts were made to reduce the proportion of delayed trains, and despite the fact that heavier trains had to be hauled in order to accommodate the travel the records indicate that on the average the percentage of trains on time and making up time was as good as in the past when travel was more normal, and as to numerous important lines was considerably better.

During the war numerous passenger trains were removed, largely because of the necessity for making passenger train equipment available for the movement of troops, but promptly on the signing of the armistice, and throughout the year 1919, much of the passenger service so curtailed has been re-established. Some passenger trains were reinstated, even though it was reasonably certain that they would be operated at a loss, for the reason it was clear the existing service did not reach the minimum to which the public was reasonably entitled. In the western part of the country passenger train mileage added has been in excess of the passenger train mileage canceled during the war. In addition, some of the limited trains have been restored to their former schedules, a number of observation cars which were canceled during the war put back into service and some new sleeping-car lines inaugurated. A constant and successful effort has also been made to improve connections between passenger trains at interior junctions.

Early in the year the war plan of table d'hote meals in the dining cars was discontinued and a la carte service was re-established in response to urgent popular demand. The a la carte service reduced the number of passengers who could be served per hour, and this fact, together with the enormous increase in travel without any increase in the number of dining

cars, made it exceedingly difficult to meet the demands. But the persistent effort has been to give the best dining-car service possible under the conditions. In recent months the number of complaints as to this service has been reduced to a minimum. It was also the policy to maintain moderate dining-car prices, and it is believed that this policy was successful in comparison with hotel and restaurant prices generally.

Freight Service

The year 1919 presented unprecedented fluctuations in the demand for freight service. At the beginning of the year the relapse in industrial activity following the armistice had fully set in, and for the first six months the slump in freight business was most pronounced. During February, 1919, the average daily surplus of freight cars was 451,026, the highest number on record. The demand for coal in the first six months was extraordinary small, due to the large stocks on hand at the signing of the armistice and to the subsequent slowing down of industry. The average daily surplus of coal cars in February, 1919, was 181,755, and increased in March to 183,993, which was the largest number of surplus coal cars on record, with one exception. Building activity, including road building, had been almost suspended during the war and had not been substantially resumed with a consequent low demand for lumber, structural steel, cement, crushed rock and other building materials. Export business was also extremely low.

By July and August all these arrested activities began to reassert themselves and all the more intensely by reason of the period of inactivity. The less than carload movement of merchandise had been steadily mounting in response to the enormous retail demand, and became an exceedingly difficult factor in the car supply. Practically at the same time the crops began to move. The demand for every sort of equipment for virtually every form of traffic became insistent.

In August the situation throughout the country was greatly complicated by a series of unauthorized strikes on the part of about 200,000 shopmen and enginehouse laborers, with the result that for over two weeks the maintenance of equipment and also the handling of engines and consequently the movement of trains was seriously interfered with, and on some roads freight traffic was almost suspended.

By October the momentum of business revival had gained still further headway, and the demand for the immediate furnishing of an abnormal quantity of transportation had become even more insistent. The coal strike then came in prospect, and by the middle of October the railroads on that account had to begin giving preference to coal movement.

Beginning with November, the railroads had to interfere still further with the handling of the tremendous general business in order to haul coal from the 40 per cent of the mining capacity which still remained in operation to practically all the rest of the country. The railroads thus had to move coal for hauls of 500 to 1,000 and 1,500 miles to meet the emergency demands which normally were supplied by hauls of 100 to 200 miles, or frequently less. Other traffic had to be discontinued to whatever extent was necessary to handle the emergency coal movement. Railroad operation was seriously hampered because to a large extent the railroads had to use sorts of coal to which the engines were not adapted and with which the firemen were not acquainted.

This coal strike, the first nation-wide strike of bituminous miners that had ever been experienced, was perhaps the most destructive episode in the industrial history of the country, and it will probably never be possible to approximate the needless loss to which the country was subjected.

On Sunday, November 9, a storm of extraordinary intensity struck the Northwest, with a 50-mile wind blowing and a heavy snowfall. Early in November the weather became extremely cold in the Central West, the temperature in some instances falling to 50 degrees below zero. This extraordinary winter weather at this early date in the midst of the difficulties of the coal strike almost tied up for several days the principal trunk lines between points on and west of the Missouri river and Chicago. About the same time bad weather began to manifest itself in the Southwest, being marked by excessive rains and washouts on the railroads. During the last week in November extremely heavy rains began in Ohio and Indiana, and rains resulted in high water and landslides in Kentucky and Tennessee. About the middle of December unusually heavy rainstorms caused numerous washouts in the Southern and Pocahontas region, and the blizzard weather also continued throughout the Northwest. During December low temperatures prevailed throughout most of the Eastern region, zero weather registering around Cleveland, and the temperature falling below zero in the Chicago district. In December also there was exceptionally severe weather along the Great Lakes and in the central states. In January, 1920, the severe weather continued in the Eastern region and became manifest in the Allegheny region, and heavy rains, snow and sleet storms were marked throughout the Southwest region. During the third week in January New York harbor was reported blocked with ice, and extremely low temperatures prevailed throughout the Eastern and Allegheny regions. Early in February, 1920, there were severe storms along the entire North Atlantic coast, seriously interfering with the shipping operations at Hampton Roads, New York harbor and in New England. Throughout New England and at some points on the Great Lakes, including Buffalo, these February storms were the most severe on record. These unusually unfavorable weather conditions seriously interfered with railroad operations.

In such conditions the railroads had to begin, at the end of the coal strike, to relocate the coal equipment, which had become widely scattered, a great deal of eastern equipment being west of Chicago and the Mississippi river and loaded with coal frozen in the cars, and again endeavor to the best of their ability to meet the demands of general business which had become more insistent than ever by reason of the conditions referred to.

The railroads in October, 1919, performed a greater volume of transportation service than in October, 1918, 1917 or 1916. In October, 1918, the situation was aided by the war spirit, by the resulting heavier loading of equipment, by the zoning of coal distribution and by compulsory pools of coal tonnage at tidewater and the lower lake ports, which war measures greatly increased the efficiency of coal cars. The freight movement, measured in ton-miles per mile of road per day for the months of September and October in 1916, 1917, 1918 and 1919, was as follows:

	1916	1917	1918	1919
September	5,166	5,217	5,731	5,625
October	5,148	5,385	5,584	5,651

The freight service performed in October, 1919, was materially in excess of that performed in October, 1917. The average car shortage during the month of October, 1919, was 59,510 cars, as compared with an average car shortage of 141,466 cars during the month of October, 1917.

In September it became apparent that the greatly delayed purchasing of coal, combined with interruptions to coal transportation on account of the August strikes, made it advisable to set a minimum of 11,000,000 tons of bituminous coal per week as the amount to be moved during the remainder of the year. This mark was consistently exceeded every week until the strike on November 1. The record for the entire history of the country was reached in the week of October 25, 1919, when 13,200,000 tons were transported. In the month of October, 1919, the movement approximated 56,243,000 tons, as compared with 51,000,000 tons in the

war month of October, 1918, and 45,000,000 tons in October, 1917. The next highest movement was in the war month of August, 1918, when 55,114,000 tons were moved.

Ton-miles per mile of road per day by monthly averages are here given for the only entire years for which they are available:

	1919	1918	1917
January	4,275	3,878	4,770
February	4,002	4,591	4,511
March	4,059	5,273	5,192
April	4,124	5,471	5,257
May	4,524	5,226	5,617
June	4,615	5,423	5,694
July	4,878	5,487	5,441
August	5,075	5,691	5,351
September	5,625	5,731	5,217
October	5,651	5,584	5,385
November	4,711	5,155	5,298
December	4,688	5,184	5,121

The average trainload, carload and percentage of loaded to total car-miles during the three years 1919, 1918 and 1917 were as follows:

	1919	1918	1917
Average trainload in tons of revenue and non-revenue freight	688	681	653
Average carload in tons of revenue and non-revenue freight	27.8	29.2	27.0
Per cent of loaded to total car miles	68.7	67.8	70.2

The ability of the Railroad Administration to perform so large a public service in the transportation of freight in the busy months of 1919, in spite of the extraordinary difficulties, was due to its ability to unify the control of locomotives and cars and to avoid congestion in terminals and on railroads by diverting freight and by pursuing a policy in the common interest in the matter of embargoing freight in

From the New York World.

Home Again.

time to prevent congestion and in the matter of establishing and enforcing the permit system as to traffic requiring that method.

The conditions under which traffic must be handled in the autumn months tend to cause congestion in the large terminals, especially at the North Atlantic seaboard and extending west as far as Chicago and St. Louis. At times prior to federal control this congestion was so serious that much traffic destined for the East had to be held on tracks west of Chicago and St. Louis. The unified control, the power to divert freight and particularly the use of the permit system made it practicable to eliminate nearly all of this congestion during the fall months both in 1918 and 1919.

As indicating what was accomplished in unified control of terminals the Chicago terminal district, embracing approximately 2,500 square miles and served by 32 railroads under the jurisdiction of six regional directors, was placed under the immediate supervision of one regional director, and the results were a marked example of successful terminal unification. In the larger terminals terminal managers were appointed, with jurisdiction over the facilities of all lines.

The Railroad Administration established a Refrigerator Car Department, with headquarters at Chicago, through which a unified control was maintained of all refrigerator cars controlled by the railroads and a close co-ordination was obtained with the privately owned refrigerator cars, with the result that an extraordinarily large volume of perishable traffic was moved, although there had been no increase in refrigerator car equipment for several years. One of the most pressing needs of the country is the construction of a large additional number of refrigerator cars.

A like policy was pursued in the control of tank cars, and a correspondingly successful result was obtained.

Earnest consideration has been given through 1919 to the speeding up of the movement of freight in the terminals. It is believed that the greatest opportunity for increasing the efficiency of the cars lies in the avoidance of terminal delays. Special terminal committees were appointed at 73 of the larger terminals, with instructions to make a careful study of the situation at these terminals and to do everything practicable to improve the movement of freight in and through them. The result of the work of these committees has been highly satisfactory.

One of the greatest losses in railroad efficiency is the insufficient loading of freight cars. During the war the Food Administration's rules and regulations required grain and other foodstuffs to be moved in the maximum carload units, and heavy car loading was greatly promoted thereby. In addition, the spirit of patriotism was invoked in all lines of business to aid transportation by heavy loading. These influences were largely lacking in 1919, and the loading was by no means as good, and the ability to perform the transportation service was correspondingly reduced. Continuous efforts have been made throughout the year, however, to counteract these conditions and maintain the heavy car-loading of the war period. For example, in October, 1919, the tariff minimum weights on grain and grain products were increased to the trade units formerly effective under Food Administration rules, and this has resulted in improvement on that particular traffic. Important progress has been made toward securing a heavier loading of tobacco by obtaining the co-operation of the Tobacco Association looking to a standard tobacco hogshead 46 by 48 inches, which will admit of double-deck loading, where the former standard hogshead admitted only a floor-space loading. By efforts of the Railroad Administration and co-operation of shippers, the loading of paper from the largest shipping territory in the United States has been substantially increased, i. e., from 40,000 pounds to 55,000 pounds per car; improvement has also been made in the loading of automobiles, trucks and trailers, and also in the loading of watermelons as well as steel products, fruits, lumber and other commodities. There are great opportunities and great need for additional improvement in these matters.

Handling of Claims for Overcharge and for Loss and Damage

The director general has felt that one highly important service to be rendered to the public was to secure substantial improvement in the prevention of overcharge and loss and

damage claims and the prompt and fair disposition of such claims. Early in 1919, the relief from the stress of war conditions making the step then practicable, a committee under the chairmanship of the director of the Division of Public Service was appointed to deal with this matter. The regional directors also took an active interest in the subject.

The results of the efforts thus made have been most gratifying. The total number of loss and damage claims on hand unsettled was reduced from 888,197 on March 1 to 465,722 on November 1, being a reduction of 48 per cent. The number of loss and damage claims on hand unsettled over four months fell from 366,476 on April 1 to 148,683 on November 1, a reduction of 59 per cent. The number of unsettled overcharge claims more than 90 days old fell from 72,043 on January 31 to 11,102 on September 30, a reduction of 85 per cent.

Relations with the Public

It has been the policy of the Railroad Administration to obtain, and as far as reasonably practicable comply, with the views of the public in the matters of rates and service. To this end, at the beginning of the Railroad Administration, this aspect of the subject was put in charge of the Division of Public Service and Accounts. In January, 1919, it was deemed advisable to create a separate division devoted exclusively to this work, and the Division of Public Service was created. It has endeavored to keep in the closest practicable touch with the state railroad commissions, shipping organizations and individual shippers and producers, and has co-operated with the divisions of operation and of traffic.

Early in 1919, with a view to securing the closest co-operation with the state railroad commissions, the director general and the director of the Division of Public Service held a conference with a large committee of the National Association of Railway and Public Utility Commissioners, and invited, and were fortunate enough to secure, the cordial co-operation of the state commissioners generally.

Another policy established during 1918 was to have a minority representation of shippers upon the 33 freight traffic committees established by the Railroad Administration to handle rate problems. Early in 1919 this minority representation of shippers was increased to an equal representation with that of the railroad managements. The result of this policy has been exceedingly satisfactory, and it is earnestly hoped that for the future the public will thus be given an opportunity to participate at the outset in the consideration of these rate problems.

Another instance of this same policy has been to put a representative of the shipping public upon each of the 73 terminal committees created by the Railroad Administration, so that in studying the practices and conditions in each terminal as to the handling of equipment the Railroad Administration could have the point of view and active assistance of the shippers as well as of the railroad operating officials. Here also (as is true in practically every human activity) the increased opportunity for a common understanding has been productive of favorable results.

The Public Aspect of Rate Matters

In June, 1918, general increases were made in freight and passenger rates, averaging about 18 per cent as to passenger fares, excluding the extra charge in Pullman cars which was discontinued in December, 1918, and about 28 per cent as to freight rates.

The average rate per passenger-mile, as reported by the Interstate Commerce Commission for Class I roads for the year ended June 30, 1914, was 1.976 cents, and it is estimated that the average rate per passenger-mile for the year 1919 was 2.538 cents, an increase of 28.4 per cent over 1914.

The average rate per ton-mile, as reported by the Interstate Commerce Commission for Class I roads for the year ended June 30, 1914, was 0.723 cents, and it is estimated that the average rate per ton-mile for the calendar year 1919 was 0.972 cents, which comparison indicates that the result of all the increases made in freight rates between 1914 and 1919 averaged for the country as a whole an increase of 34.4 per cent. It is appreciated that this comparison is not conclusive, because it would be affected by any changes in the character of the traffic or the length of haul, but no other data are available for a general comparison, and it is believed to be fairly suggestive of the extent of the increase in all freight rates on the average since the beginning of the war in 1914.

During 1919 every effort was made by the directors of traffic and public service to eliminate delays in the procedure of the freight traffic committees. As a result there has been a substantial reduction in the length of time intervening between the date of docketing the request for a rate change and the issue of the freight rate authority. Analysis of the freight rate authorities issued during July to November, inclusive, 1919, shows that the average length of time between the date of docketing the request and the issue of the freight rate authority has been two months or less in 71 per cent of the cases, between two and three months in 14 per cent of the cases, with somewhat longer time as to the remaining 15 per cent; only 6 per cent, however, being in excess of five months.

It has been the policy of the Railroad Administration to have these matters considered both by the Division of Public Service and the Division of Traffic.

The Railroad Administration has sought the advice of the Interstate Commerce Commission with reference to proposed changes in rates and fares of substantial importance and has also sought the advice of the state railroad commissioners in a large number of cases of proposed rate adjustments of substantial local importance since February 20, 1919.

Control of Coal Distribution

The Railroad Administration was suddenly called upon to render an important and difficult public service growing out of the coal strike. This was the service of carrying out the distribution of coal under a delegation of power from the fuel administrator. It was necessary to protect the public against exorbitant prices by the restoration of the government maximum prices for coal, and it was also necessary to distribute the limited amount of coal available to those consumers and industries whose needs were most urgent from the standpoint of the general public interest. The Fuel Administration had disbanded its organization, and therefore had no machinery with which to carry out this difficult work of distribution. The Railroad Administration had an organization throughout the country and also had physical possession of all coal in transit. Hence there was devolved upon the Railroad Administration the work of making this distribution. Coal committees were organized and ready to function on November 1, 1919. Throughout the strike period and the subsequent period of coal scarcity (continuing in some parts of the country up to the present time), these coal committees have handled the coal distribution when there was not enough for all consumers. The coal strike came so suddenly and the needs for diversion of coal to users other than the consignees were so imperative that the emergency had to be met by making the necessary allocations, and subsequent arrangements had to be made for payment of the coal. In various instances substantial delays in payment arose, which caused inconvenience to coal operators and dealers. The constant effort, however, has been to clear up these problems and deal with them as expeditiously as practicable. The coal committees of the Railroad Administration, with the hearty co-operation of the Fuel Administration,

the United States Shipping Board and the other divisions of the Railroad Administration performed an indispensable and highly valuable public service in this critical period.

Relations with Labor

The director general has felt a keen sense of responsibility to railroad employees. He has felt that the employee is entitled to be safeguarded from favoritism and arbitrary action in the matter of discipline and working conditions and to have a reasonable wage. He believes that those who do not earn their living by their daily labor generally fail to appreciate adequately the importance which the laboring man justly attaches to protection from favoritism and arbitrary action, so that he may reasonably be assured a self-respecting career in the work in which his lot has fallen. The rights of property seem to be susceptible of much more clear-cut definition and protection than the rights of labor,

From the New York Tribune.

"Whew!"

and yet the former, though highly important, certainly cannot exceed the importance of the latter.

The policy of the Railroad Administration has been to secure the participation of the representatives of labor in matters affecting its interests, and to endeavor to act with justice toward labor and with appreciation of the perfectly natural and proper point of view of labor.

One of the early steps taken, and an exceedingly important step, was the creation of certain bipartisan boards of adjustment to deal with grievances of employees which could not be settled on the railroads between the local managements and the representatives of the employees. The principle of collective bargaining was frankly recognized in the creation of these boards, because they were created by agreement between the representatives of the railroad labor organizations on the one hand and the regional directors of the United States Railroad Administration on the other hand. The work of these boards of adjustment has been eminently satisfactory. Each has been composed of an equal number of expert representatives of the management and expert representatives of the employees. With a full practical knowledge of the problems, the members have approached their work with the desire to do justice and with the recognition of the importance of reaching an agreement. The result is that in the several thousand cases which have come before the three boards which have been created there has been an agreement in practically every case.

Various orders of the director general have established reasonable rules and working conditions, which were applicable in the very numerous cases where no rules and working conditions had been established prior to federal control, and in some cases the rules and working conditions established by the director general have, by agreement, become a substitute for those which prevailed by agreement prior to federal control.

As a result of these defined working conditions and these boards of adjustment, the employees generally have felt that they were much better protected than formerly against arbitrary action.

Naturally such a system requires time for it to be fully understood and successfully carried out by the vast number of local officials who are responsible for discipline and by the local labor representatives who with the local officials deal with grievances. Inevitably at first the new system had the effect in many instances of raising a question as to the authority of the local officials and caused some discouragement on the part of some of them and some misconception of the situation on the part of some employees. Nevertheless, the system has fully justified itself, and it is only a question of time and mutual understanding when local incidents of a discouraging character will disappear.

It is an interesting commentary that on some of the largest railroads in the country, with the strongest and most effective managements, not a single case has come to one or more of these boards of adjustment. The local managements have dealt with the classes of employees represented on such board or boards so reasonably as to obviate the necessity for appealing thereto any grievances at all, and the committees representing the employees have adopted a reasonable attitude and avoided appeals to the boards of adjustment. Eventually this same successful treatment should be manifest on all the railroads and as to all classes of employees, if the system shall be maintained in some proper form.

The director general has sought to encourage the development of local consultation and co-operation between the local managements and the local representatives of the employees, but has not undertaken to issue positive orders in a matter so dependent upon local personal conditions. He specifically advised that wherever the local conditions were reasonably favorable to such a course efforts be made to establish a regular method of conference and co-operation between the shop committees of the employees and the local shop managements. Naturally the progress of efforts of this character has been affected by the early prospect of a return to private control because a matter of such fundamental policy could not be adopted with confidence by a management having only a few months to live. Nevertheless, decided interest has been manifested in these policies by numerous federal managers.

The principle of collective bargaining has been further recognized in the making of national agreements between the director general and certain organizations of railroad employees, such agreements to remain operative during federal control, subject to modification as provided in the agreements. These agreements have defined the working conditions with more particularity than the general orders did, have provided against strikes or lockouts except after re-

sorting to the machinery prescribed in the agreements, and generally have sought to have a definiteness and stability to the status of the employees to which they seem properly entitled.

Early in the Railroad Administration it was declared by General Order No. 8 that "no discrimination will be made in the employment, retention, or conditions of employment of employees because of membership or non-membership in labor organizations." This policy has been consistently adhered to. No employee is required to join an organization or is prohibited from joining an organization. The employees who are not members of organizations have the benefit of the same working conditions as those who are members. Non-members have the right to representation by the officers of the organization just as members have in matters before the boards of adjustment.

The policy thus carried out has been in accordance with the policy which the railroads generally adhered to long prior to federal control with respect to the trainmen and enginemen and yardmen. Practically every railroad had agreements with the four organizations of trainmen and enginemen or "brotherhoods." These agreements did not establish the "closed shop," and the companies were free to and did employ new men without any reference to membership in the organizations.

The Railroad Administration has pursued the policy of endeavoring to explain to the chief executives of the labor organizations any important general developments affecting the employees, such for example as the discontinuance in a general way of overtime, or the reestablishment in a general way of overtime. In this matter the Railroad Administration has proceeded upon the view that when the employees understood the reasons for a policy they would co-operate much more fully in carrying out the policy than if they were ignorant of the reasons therefor, and were therefore left free to assign erroneous motives for the action. This method has been eminently satisfactory and it is the same method which the director general hopes will be applied with more frequency in local as well as general matters.

Plans for vocational training of railroad employees in connection with the Federal Board of Vocational Education have been completed and all railroads have been authorized to co-operate with the Federal Board of of Vocational Education in the establishment of schools for apprentices. The railroads have also been granted authority to require the attendances of apprentices at these schools not less than 208 hours per year and to incur necessary expenses to fit up suitable class rooms in which such classes may be held. The Railroad Administration has also co-operated with the Board of Vocational Education in the matter of training disabled soldiers and sailors for such work in the railroad service as their physical condition will permit them to undertake.

When the Railroad Administration began in 1918, railroad wages were admittedly below those paid in other lines of industry and a great many skilled railroad employees were being lost on this account to other industries. The Railroad Administration promptly created a Railway Wage Commission, which made a report upon the basis of which General Order No. 27 was issued in May, 1918. It was evident that the work of the commission would not fully dispose of the wage problems because of their complicated character and because the proposals of the commission dealt principally with the cost of living and did not undertake to meet the competition of other industries which were paying higher wages. Therefore a Board of Railroad Wages and Working Conditions was created composed of three representatives of railroad labor and three representatives of the railroad managements. This board then took up the special claims of the various classes of railroad employees and made recommendations, upon the basis of which supplements were issued to General Order No. 27, these supplements making various increases in wages and various changes in working conditions.

Early in 1919 the last of these general recommendations of the Board of Wages and Working Conditions by way of supplement to General Order No. 27 was made and acted upon, and it was then announced that this action completed the "war cycle" of wage increases and that any further increases would have to be considered in the light of new conditions.

The employees in many instances felt that the adjustments which had been made fell seriously short of putting them on a parity with employees in other lines of industry or of giving them an increase in wage reasonably proportionate to the increase in the cost of living. Therefore practically all classes of employees urged additional increases in wages. This matter came first to a head with respect to the demands of the shopmen in the month of August, 1919. In this connection there were various strikes unauthorized by the organizations of which the employees were members, and the shopmen were notified that their demands would not be considered until these strikes were terminated. Upon the termination of the strikes the demands were taken under consideration with the result that the President, being advised that the demands were general in character and that similar demands were pending for practically all classes of railroad employees, and that all the demands contemplated permanent increases in wages, took the position that such demands ought not to be granted pending an opportunity to form a more reliable conclusion as to whether the then level of the cost of living could be regarded as reasonably permanent. Some readjustments, however, were made for the shopmen in order to correct certain inequalities of treatment. Other readjustments were subsequently made, particularly with respect to the matter of the rate of payment for overtime in order to correct inequalities of treatment for certain other classes of employees and for certain parts of the classes of trainmen and enginemen.

The employees recently have strongly urged that sufficient time has elapsed to result in the conclusion that the level of the cost of living is not of a temporary character and hence that their general demands for increases in wages should be promptly granted. The President has taken the position that the matters can not possibly be completed in the brief remaining period of federal control, but that in accordance with the assurance he gave in August, 1919, in contemplation of such a contingency, he will use his influence to expedite their consideration as much as possible immediately after the expiration of federal control.

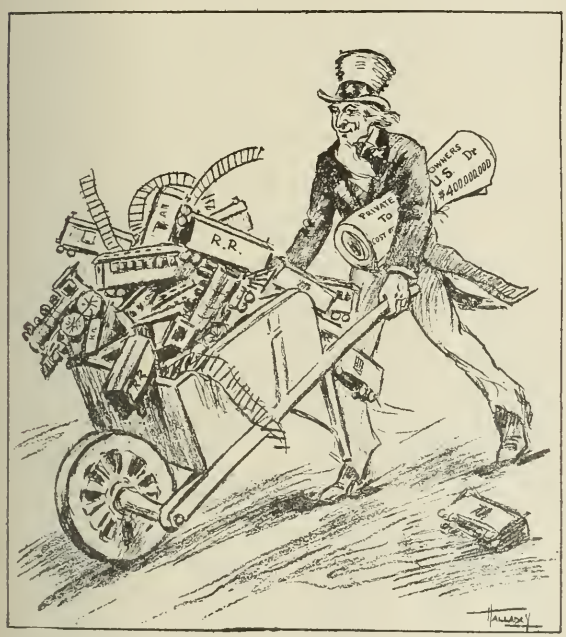
There has been a great deal of misconception and some misrepresentation as to the extent of the wage increases made by the Railroad Administration. The fact is that the average of the increases made, when measured by the increases in the rate per hour, is about 100 per cent or slightly over, as compared with the years 1913 and 1914. It is believed that this is by no means out of line with the increases made in other industries. In fact the reports of the Department of Labor show that the increases in the steel and iron industry in the pay per hour have been about 120 per cent in the same period. Of course the employees have not received an average increase of 100 per cent in earnings, because their work day has been shortened, generally speaking, to eight hours; so manifestly an increase of 100 per cent per hour in pay is partly offset when the hours are reduced from 10 to 8.

While the government was operating all the railroads, it was natural that there should be a considerable extension of the policy of standardizing wages, this being the policy which has made important and in recent years rapid progress on many of the railroads under private control, particularly as to trainmen and enginemen. Such standardization has in-

evitably produced numerous individual cases of especially large increases much in excess of the average. These exceptional and abnormal cases have been seized upon for criticism and have been the source of much misconception as to the general situation. Standardization also resulted in some employees receiving inconsiderable increases.

The Number of Employees

Perhaps the most persistent misconception as to the Railroad Administration's policy toward labor has been the idea that there have been anywhere from 100,000 to 300,000 unnecessary employees put on the railroads simply because of an assumed political policy on the part of any governmental agency to multiply "jobs." The apparent predisposition on the part of a large portion of the public to attribute this



From the Providence Journal

Getting Rid of Them

policy to a governmental agency has led various speakers and newspapers into a wholly incorrect estimate of the situation.

Before pointing out the detailed facts as to the number of employees, it is important to emphasize that in the formation of the Railroad Administration and throughout its life, there has been consistent adherence to the policy of making appointments to office without regard to political considerations. The Railroad Administration is an interesting illustration of an organization which has never contained any officials who sought their positions. The selection of employees on the railroads has been in charge of local railroad officers who, generally speaking, are the same who operated the railroads prior to federal control and will continue to operate them after federal control. No such officer was under any compulsion or influence to employ or retain any employee unless that employee was necessary to the performance of the work to be done. And the Central Administration has steadily used its authority and influence to prevent the employment of unnecessary labor.

The controlling fact in this matter of the number of employees is that the number is determined by the number of hours they work per day. The 8-hour day has been established as a general policy of the Railroad Administration. It was in effect only as to some classes of employees on some railroads prior to federal control and the average workday prior to federal control was considerably in excess of 8 hours. This change in policy has undoubtedly brought about an increase in the number of employees, but it has not brought about an increase in the number of hours of work paid for, which is the significant thing with respect to operating expenses.

The fact is that the number of hours of work paid for by the Railroad Administration in 1919 was less than in 1916 (the first year the statistics are reasonably complete), 1917, or 1918.

The figures are as follows:

	Calendar years			
	1916	1917	1918	1919, Partly estimated
Number of employees ..	1,647,097	1,723,734	1,820,660	1,891,607
Equated hours worked ...	5,189,790,716	5,406,878,384	5,641,820,405	5,126,142,664
Revenue ton-miles	362,444,397,129	392,547,347,886	403,070,816,694	363,240,000,000
Passenger miles	34,585,952,026	39,361,369,062	42,498,248,256	46,200,000,000
PER CENT OF YEAR 1916				
Equated hours worked, p. ct.	100	104.2	108.7	98.8
Revenue ton-miles, p. ct.	100	108.3	111.2	100.2
Passenger miles, p. ct.	100	113.8	122.9	133.6
Average hours per employee month	263	261	258	226

Note.—The time worked for about 11 per cent of the employees is reported on a daily basis and in order to equate these days to hours, it has been estimated that these employees have worked on the average 10 hours per day for each of the years covered by the table. As a matter of fact the hours per day of some of these employees reported on a daily basis were less in 1919 than in previous years on account of the establishment of the 8-hour day, but, in the absence of accurate statistics, all have been assumed to work 10 hours per day in 1919 as well as in the previous years, thus making the showing slightly less favorable to 1919 than it would be if the exact hours worked by daily employees were available.

Thus, despite the extraordinary difficulties of 1919, the hours of work paid for are actually less than in 1916 and are also less in proportion to the business done. This is true notwithstanding the further fact that is recognized in every line of industry, and is the subject of frequent comment by business men, that by reason of the far-reaching changes and the widespread unrest which are the results of the war, labor is often less experienced, attentive, and effective than it was before the war.

Notwithstanding this exceedingly favorable showing on the basis of the hours of work, it is of course true that there has been an increase in the number of employees which is explained by the simple fact that in 1916 the employees worked much longer hours than the employees working at present on the basis of the eight-hour day.

Women's Service Section

Especial attention has been paid to the working conditions of women employees on the railroads. These employees increased rapidly on account of war conditions. The number rose from 31,400 January 1, 1918, to 101,785 October 1, 1918, and then fell to 81,803 October 1, 1919. To some extent during the war, women were employed in occupations calling for labor of a heavy and unsuitable character; but special attention has been paid to this matter and these conditions have been corrected. Substantial progress has been made in providing health and comfort facilities. The labor laws regulating the employment of women have been observed almost without exception. The Railroad Administration took, in 1918, the important step of providing that women's pay, when they do the same class of work as men, shall be the same as that of men. Undoubtedly these policies, connected with recognition of senority rights, have done much to give women a better position and a better outlook in railroad work than they have ever had before.

Strikes

There has not been an authorized strike of railroad employees during federal control, although there have been a few authorized strikes of organizations of longshoremen, dock laborers, etc., whose work is not primarily railroad work and whose policies have been largely influenced by conditions outside of railroad employment. There have been various unauthorized strikes, the three principal ones being the clerks' strike on several railroads in the Southeast in March, 1919, and, in the following August, the strikes of shopmen and enginehouse laborers on numerous railroads, and the strike of the train and engine men in California, Arizona, and Nevada. In each of these cases, as well as in various minor unauthorized strikes, the trouble has been due to the failure on the part of the employees to pursue the agreed-upon methods of dealing with disputes. This was due in part to the failure of the employees to understand the methods which had been adopted for the orderly handling of these matters, but it is believed that the strikes were also largely due to the efforts of agitators who were endeavoring to make capital out of the general spirit of unrest and who were hoping to "start trouble." In all these cases the Railroad Administration has taken the position that it would not deal with the strikers at all while on strike and that they must first return to work before their grievances would be considered and this position has been maintained. In all these cases the Railroad Administration has had the support of the general officers of the railroad labor organizations.

When it is considered how widespread has been the spirit of unrest, how burdensome the cost of living has been, and how active have been some agitators desiring to make trouble and to develop conditions favorable to disorder, the railroad employees as a whole are entitled to be highly commended for the steadiness and loyalty with which they have stuck to their work in the face of all sorts of misrepresentations and appeals to strike.

The Cost to the Public of Conducting Operations During Federal Control

The Cost of Federal Control

There is a popular and misleading catch phrase to the effect that "federal control has cost" anywhere from $700,000,000 to $1,900,000,000, according to the bent and fervor of the person making the statement. As the result of my continuous contact with this subject and repeated discussions concerning it with railroad operating people throughout the country, my deliberate judgment is that federal control has not cost a cent more than private control would have cost in the same difficult period, but on the contrary has cost considerably less. I believe that the private control which existed in December, 1917, if it had continued during the increasing war stress of 1918, till the armistice, and during the even more difficult period of reconstruction since that time, would have encountered in the aggregate substantially as great increases in cost as the government has encountered and would have been wholly unable to realize many important economies which have been accomplished through unification and which have helped to offset partly the aggregate increases in cost.

The easy allegation of heavy loss of federal control, as distinguished from private control, has rested upon the fallacious notion that "there is no loss unless you see it," i. e., that there would have been no loss to the public if the public had paid rates high enough to cover the cost, including the rental, and that there is a loss to the public to whatever extent the public has not paid high enough rates to pay such entire cost

The fact is that the cost which is paid by the public would certainly not be diminished through increasing the rates. This cost may be paid in full by transportation rates which are in substance a form of special taxation, or may be paid in part out of general taxation; but the public should realize that it does not escape paying the full cost merely because the cost is made less obtrusive through rates being high enough to avoid a deficit to be made good through general taxation. The public has to pay the cost in full in either event.

Railroad rates are perhaps as all-pervasive in their incidence as general taxes themselves, so the general public would have paid just as fully for the operating costs if rates had been raised so as to avoid the deficit as under the policy which was adopted. Indeed, an additional general readjustment in railroad rates during federal control would have brought about, in view of the strong general upward trend of prices, so many disproportionate increases in prices that the public would have paid much more on account of railroad costs than it did in fact pay. The methods of raising moneys for the Treasury were not fundamentally changed on account of meeting the railroad deficit, and hence did not involve the innumerable special readjustments of prices which would have been made on the pretext of an additional general readjustment of transportation rates.

Private Control Would Have Cost More

Therefore the question "what federal control has cost" as compared with what private control would have cost is dependent not upon the methods used for raising the money to pay the cost, not upon the question whether the cost is obtrusive as a deficit or unobtrusive because covered by increased rates, but is dependent upon the cost itself.

As to actual costs the railroads under government control have been subjected to the same character of influences which have greatly increased costs in all other industries during the war. The total operating costs of the Steel Corporation were 150 per cent more in 1918 than they were in 1914, whereas the operating costs of the Class I railroads were 102 per cent more in 1919 than in 1914. The increased cost per ton of finished product of the Steel Corporation in 1918 was 61 per cent as compared with 1914, whereas the increased cost per unit of service on the railroads in 1919 was not more than 60 per cent as compared with 1914. The figures of the Steel Corporation for 1918 are taken because they are the latest available, and thus the comparison made is unfavorable to the Railroad Administration if, as is believed, the unit costs of the Steel Corporation were higher in 1919 than they were in 1918.

It would be surprising if complete analysis did not indicate a more favorable showing as to operating costs by this large private enterprise with unbroken continuity of management and policy extending over a period of nearly 20 years and its ability to plan with confidence for the future, than by the Railroad Administration. The latter was created almost overnight as a war emergency and avowedly as a purely temporary expedient; was unable to create a really permanent organization or to hold throughout even its temporary life some of its experienced members; and was without opportunity to carry out comprehensive policies of a reasonably permanent character either as to capital expenditures or as to operation.

This illustration of the largest private enterprise is made simply to emphasize the fact that the railroads like other industries were subject to the conditions growing out of the war and the purchasing power of the dollars expended by the railroads for operating expenses was affected as in other industries. Undoubtedly the same condition would have been experienced if the railroads had been in private control. They would have had to pay the increased cost for materials and

supplies and the average increases in wages by the Railroad Administration were in line with those in private industry and there is no reason to believe that the railroads under private control would have avoided corresponding aggregate increases.

The resulting favorable showing made by the Railroad Administration has been influenced in part by the economies which have been possible as a result of the unification of terminals and ticket offices, elimination of circuitous routes, pooling of repair facilities, common use of parallel main tracks, etc.

A further element of cost which would have been incurred under private control and which was saved under federal control would have been the heavy cost either (a) of giving the railroads high enough rates to enable them to maintain their independent credit during a period of great financial difficulty, so as to borrow the money necessary to make about $1,200,000,000 of indispensable improvements made during government control, or (b) the heavy cost of not having that

From the Brooklyn Eagle.

The Old Story

credit and hence of not having the improvements. This item of the greatest public importance was saved through federal control because without any such abnormal increase in rates the government through its own credit temporarily provided the necessary funds for the indispensable improvements.

Results of and Reasons for Policy of Not Making Rate Increases Sufficient to Cover Entire Cost

Since the cost of railroad operations during federal control was in no sense out of line with the necessities, and since those necessities would have produced even more unfavorable results under private control, it is appropriate to explain why rates were not increased enough to pay these costs. To begin with, the increases in operating costs took effect to a large extent on January 1, 1918, and yet it was impracticable to make the general rate increases effective until a late average date in June, 1918. If these increased rates could, instead, have been made effective January 1, 1918, *there would have been no deficit or "loss" whatever up to and including the end of October,* 1919. The entire "loss" on the Class I railroads and large terminal companies for that period of 22 months of federal control of $480,200,000 would have been more than wiped out if the rate increases had been effective January 1, 1918. The "loss" for the two months of November and December, 1919, was due almost entirely to the effects of the coal strike.

During the first six months of 1919 the operating results were so unfavorable as to cause many suggestions in favor of then making a substantial general increase in freight rates, but it was apparent that the results for those months were to a very large extent due to the abnormal slump in business. Hence it was believed that the showing of inadequacy of the revenues was too fragmentary and unreliable to justify the serious consequences incident to an additional reconstruction of rates.

The following four months of 1919, July to October, showed considerably more favorable results and indicated, even after allowing for the naturally more favorable results for that season of the year, that a very slight rate increase would be required under unified control in order to cover the operating expenses and rental. These months clearly showed that it would have been incorrect to predicate a general rate advance upon the results from the exceedingly small freight business in the first six months of the year. The months of November and December were exceedingly unfavorable on account of the coal strike, but again no general rate increase could properly have been predicted upon such abnormal results even if there had been time.

There is a very natural inability on the part of the general public to appreciate the complexity of the rate structures of the country. Therefore many people have assumed that it is a simple and a desirable matter to make general rate readjustments from time to time to conform promptly to the increasing operating expenses which the Railroad Administration has been no more able to escape than have other lines of business.

When the increases in freight rates were made in 1918 earnest efforts were made to avoid as far as possible disturbance of existing rate and business relationships. It is obvious that no general increase in rates can entirely escape such disturbance. No method, no matter how carefully planned, can do more than minimize such disturbances; it can not eliminate them. As illustrating the magnitude and difficulty of the problem, the result of the general increase in freight rates made in 1918, despite the careful effort to minimize disturbance of prior relationships, brought about so many requests for revisions that 33 traffic committees sitting in various parts of the country have been occupied nearly all the time for about a year and a half dealing with these matters, and over 20,000 freight-rate authorities have been issued to make changes to eliminate or improve unsatisfactory adjustments. About 79 per cent of these changes in rates have been reductions. In addition to this work these traffic committees were engaged simultaneously in handling the general freight-rate problems of the country.

Considering the wholly abnormal character of results during most of 1919, the consequent unreliability of these results as a basis for the general rate increase, and the great business embarrassments which would result from an unnecessary additional general rate adjustment, it was clearly in the public interest to avoid such a disturbing influence in a period already filled with disturbing influences, even though it was necessary in consequence to draw temporarily on the Treasury for a portion of the cost of operation. This course was adopted because clearly in the public interest and notwithstanding the fact it was appreciated that the resulting deficit in railroad operations would be mistakenly regarded

as a "loss" to a much greater extent than if exactly the same total cost had been paid for through increased rates instead of through appropriations from the Treasury.

At one time the railroad corporations urged that these general rate increases ought to be made so that the properties would be self-sustaining at the time they were turned back to private control. But the federal control act contemplated the initiation of increased rates by the President for the purpose of paying the expenses and rental of the railroads "under a unified and co-ordinated national control and not in competition." It was believed by the director general that any increase necessary to meet the expenses and rental during unified control would have been much less than would be necessary to give adequate earning capacity to the various railroads and the necessary credit to the various railroad companies when operating on their own responsibility and in competition. Hence if increases in rates had been made during 1919 in an effort to cover the rental and the entire operating expenses, this would not have obviated the necessity for a still further general rate adjustment upon the expiration of federal control. Clearly it was much more in the public interest to have one general rate adjustment for the purposes of private control than to have, in addition, an intermediate one for the purposes of federal control.

The foregoing reasons caused the Railroad Administration to adhere to the view that there ought not to be a second increase in rates during the brief period of federal control and the failure to make this second increase in rates is the reason for what has been so generally described as the "loss" and as the cost of federal control as compared with private control.

Financial Situation

There is attached as Appendix I, a financial statement which shows the estimated net disbursements made for capital expenditures and other advances by the government and for operations during the 26 months' period (January 1, 1918-March 1, 1920) of federal control of Class I railroads and other properties, including the express companies, and appropriations made and required. Such exhibits also show the excess of operating expenses and rentals over operating revenues for the different properties operated.

It will be observed that this excess of operating expenses and rentals over operating revenues for Class I railroads for the 26 months' period was $715,500,000. In considering this figure the following analysis is worthy of attention:

If the general rate increase had been effective January 1, 1918, instead of in June, 1918, this amount would have been reduced by	$494,000,000
If for the months of January and February, 1920, the railroads could be paid a rental proportionate to the normal earning capacity of January and February as shown by the test period, instead of receiving the full two-twelfths of a year's rental, this amount would have been further reduced by approximately	49,000,000
If the coal strike had not taken place, this amount would have been further reduced by most, if not all, of the actual deficit shown in these two months, aggregating	114,000,000
Undoubtedly a very large part of the deficit in the first six months of 1919 was due to the extraordinary slump in freight business in those months. The total deficit in these months (included in the $715,500,000) was	292,500,000

These considerations emphasize that the figure which is taken as representing "loss due to federal control" is in no sense chargeable to federal control as against private control.

The explanation of the above item of $49,000,000 is that if under the federal control act the railroad companies could have been paid a rental for the months of January and February, 1920, proportionate to the normal earning capacity of those two months (which are always unfavorable), as tested by the average results in those two months of the three-year test period, the rental pay for Class I railroads and large terminal companies would have been $101,000,000, instead of $150,000,000, which is two-twelfths of the annual rental, and which the Railroad Administration in fact has to pay for those two months.

It will be observed that the grand total for which appropriations have been made and will have to be made will approximate $1,886,322,885; that of this amount $1,031,899,451 represents items of indebtedness and investment which will eventually be repaid to the government, with the possible exception of relatively small amounts of "bad debts" or investments which may not be realized upon.

Of course, it is not possible at this time to state with completeness the final result, because the government will have various claims against the railroad companies and the railroad companies will have various claims against the government, and these matters will not be liquidated for a considerable period, and, indeed, the claims have not yet taken definite shape on either side to any considerable extent.

There have been various suggestions to the effect that there would be valid claims against the government that would increase the amounts above indicated by several hundred thousand dollars on account of undermaintenance of the properties. But as will be pointed out below, the government will be able to show that it has approximately maintained the properties in accordance with the requirements of the contracts, although undoubtedly there will be substantial readjustments that will have to be made in the case of particular companies both for overmaintenance and for undermaintenance. While the net result can not now be forecast, it is reasonably clear that any balance against the government will be a relatively small amount and it will fall far short of the assumptions which have been indulged in.

Contract and Compensation Features

The making of standard contracts with railroad corporations has progressed steadily throughout the year and up to the present time. At present 147 contracts have been executed and 83 are still under consideration. Of these 49 have agreed with the director general as to compensation, while 15 have declined to accept compensation offered and have filed applications with referee boards to fix compensation. Six roads have declined to make contracts and seven have never made application therefor. These 13 roads, with 2 others, making a total of 15, probably will not make a standard contract.

The federal control act contemplates that in cases where the "standard return," that is, the average annual net operating income as defined in the statute for the three-year test period ending June 30, 1917, is plainly inequitable, an agreement may be made for such amount of compensation as may be found to be just. Under this provision applications for additional allowance of compensation aggregating $92,318,789.39 have been made and additional compensation to the amount of $7,493,618.53 has been allowed and agreed upon. The claims of several carriers upon which no agreement could be reached are pending before referees appointed by the Interstate Commerce Commission as provided in the act.

In addition to the railroad systems of the country, there were various shorter railroads generally spoken of as "short lines." The Railroad Administration took the position that these were not included in the President's proclamation taking possession and control of the railroads, because such short lines were not regarded as "systems of transportation." The federal control act, which became effective March 21, 1918, announced that certain classes of these "short lines" were to be deemed in federal control, but gave the President the right to relinquish any railroads under federal control prior to July 1, 1918. In pursuance of this power, the President relinquished the "short lines" whose further federal control was not deemed needful or desirable. Generally

speaking, no actual control was asserted over these "short lines" in the period between March 21 and July 1, 1918.

Subsequently a form of "co-operative contract" was agreed upon with the representatives of these relinquished "short lines" whereby they might be taken back into federal control so as to be under the jurisdiction of the President to whatever extent might appear to be expedient, but at the same time to be operated at the sole risk and expense of the short-line companies themselves, the Railroad Administration, however, agreeing to accord them certain protection in the matter of a proportion of competitive traffic, and certain advantages in the matter of free per diem allowance for cars of the Railroad Administration, while on the "short lines." In pursuance of this policy 132 "co-operative contracts" have been executed. The Railroad Administration also indicated that it would accord similar advantages to short-line companies not making the "cooperative contracts," provided such companies executed waivers of any claims against the government, and such arrangements have been made with 64 companies.

Expenditures for Additions and Betterments

One of the important reasons for assumption of control of the railroads by the government was that the government might make the improvements to these properties essential to the handling of the traffic and therefore which were indispensable for war purposes and which the railroad corporations

Financial Statement of Railroad Administation After 26 Months of Federal Control

Statement showing estimated net disbursements made for capital expenditures and other advances by the government and for operations during the 26 months' period (Jan. 1, 1918—Mar. 1, 1920) of federal control of Class I railroads and other properties, including American Railway Express Company and appropriations made and required.

1. Total advances by the Government for additions and betterments to roadway and structures and equipment (except allocated equipment)	$780,405,512	
2. Amount that may be deducted therefrom on account of compensation, depreciation, open account, etc., due companies	461,480,839	
3. Net amount of additions and betterments to roadway and structures and equipment (except allocated equipment) to be funded for 10 years (see note 1)		$318,924,673
4. Allocated equipment funded through equipment trusts, principally payable in 15 annual installments		357,011,454
5. Other indebtedness due Government to be evidenced by one-year notes (see note 1)		194,680,562
6. Long-term notes payable to Government		44,433,664
7. Stocks, bonds and receivers' certificates of railroad companies owned by Government		23,565,198
8. Total representing indebtedness of railroads and other properties, including express companies		$938,615,551
9. Other investments of Railroad Administration:		
Additions and betterments to inland waterways	$10,029,496	
Miscellaneous investments (chiefly Liberty bonds)	83,254,404	
		93,283,900
Total of items of indebtedness and investment		$1,031,899,451
10. Estimated excess of operating expenses and rentals over operating revenues:		
Class I railroads	$715,500,000	
Other privately owned properties (smaller railroads, sleeping and refrigerator car lines, and steamship lines)	29,170,000	
Inland waterways	2,570,000	
Expense of central and regional organizations	14,080,000	
American Railway Express Co.	57,000,000	
Adjustment of materials and supplies in settlement with railroad companies on account of increasing prices	74,003,434	
	$872,323,434	
Less net credits on account of interest on (*a*) open accounts, (*b*) compensation, and (*c*) expenditures for additions and betterments	17,900,000	
		854,423,434
11. Grand total		$1,886,322,885
Original appropriation, Federal control act	$500,000,000	
Deficiency appropriation	750,000,000	
Appropriation carried in pending railroad bill	200,000,000	
		1,450,000,000
Additional appropriation that will be required		$436,322,885

NOTE.—The net amount of $318,924,673, representing cost of additions and betterments to roadway and structures to be funded for 10 years, is reached by making such offsets as are permissible under the terms of pending railroad bill, in the first instance, against indebtedness growing out of additions and betterments. It is quite likely that in the actual settlement with many roads offsets will be used in the first instance to wipe out indebtedness represented by demand notes or by open account instead of against additions and betterments to roadway and structures. The result of this would be to increase the net amount of additions and betterments to roadway and structures to be funded and correspondingly to decrease the amount stated in item No. 5, of $194,680,562, as representing other indebtedness due the Government to be evidenced by one-year notes. The total of indebtedness to the Government would, of course, not be affected.

200,000,000 has been expended in the period of federal control by the government for improvements of this character. Of this amount about $140,000,000 has been paid through funds raised by the corporations and about $180,000,000 has been or will be paid through application by the government to that purpose of portions of the compensation due the corporations for the use of their properties but available for application for this purpose.

During the year 1918 the policy of the Railroad Administration was to limit improvement to war necessities because the demand for materials and labor for other war purposes was so imperative that no material or labor was available for railroad expenditures except when they themselves could be regarded as urgent war needs.

The Railroad Administration gave careful consideration to the question as to the amount of equipment for which materials and supplies could be obtained. As a result there were ordered 1,930 locomotives and 100,000 freight cars of the types believed to be the most urgently needed for war purposes. These freight cars consisted of various types of box cars and open-top cars, but did not embrace any refrigerator cars, tank cars, stock cars, or flat cars. No passenger train cars of any sort were purchased by the Railroad Administration. The total deliveries of equipment during the period of federal control, including equipment purchased by the railroads or constructed in railroad shops, were as follows:

	Purchased by railroads	Constructed in railroad shops	Purchased by Railroad Administration	Total
Locomotives	1,910	393	12,114	4,417
Freight cars	25,600	12,909	95,704	134,213
Passenger-train cars	700	107	.....	807

[1]Includes 200 Russian locomotives leased from the War Department.

The equipment ordered by the Railroad Administration was allocated to the various railroads according to its judgment as to their needs. The locomotives were accepted as a rule and without much protest. The allocation of the cars, however, raised great protest. Emphatic claim was made that the cars ought to be regarded as a war burden and paid for by the government, also claims were made that the cars were not needed in the number or of the character allocated. Upon receipt of any such protest each case was considered on its merits and such modifications made in the allocation as seemed to be just. When it became clear that the prices of equipment at the end of federal control promised to be higher than the government paid for the equipment in question, the objections to the allocations disappeared in many cases, and, in fact, some companies which had objected to the allocations because too large sought and received additional equipment out of amounts not allocated.

In 1919 it had become apparent that Congress was anxious to see the railroads returned to private control at the earliest practicable date and was not favorably inclined toward making any appropriations for any expenditures by the Railroad Administration which could be avoided. It therefore became necessary to cut down authorizations for expenditures in 1919 to those which were regarded as unavoidable. As a result of this policy, no new equipment was ordered by the Railroad Administration (although about $40,000,000 was authorized for betterments to existing equipment and for a small amount of new equipment which was ordered directly by some of the companies), and the expenditures for additions and betterments to way and structures were restricted to those which were regarded as imperative. This policy was accentuated and had to be followed with the greatest possible strictness because of the adjournment of Congress on March 4, 1919, without the passage by the Senate of the $750,000,000 appropriation for the Railroad Administration which had been passed by the House.

During a considerable period immediately preceding federal control, the railroad companies had cut down the amount of their expenditures for additions and betterments and equipment because of the high prices, difficulty in obtaining deliveries, absence of funds, etc. The Railroad Administration was, of course, not able to make any plans whatever with respect to a program of capital expenditures for either way and structures or equipment for the calendar year 1920, and it is understood that comparatively little has been done in that direction by the railroad companies.

The result is that at this time very large expenditures are called for on the railroads in the public interest to increase their efficiency and enable them to meet the growing demands for transportation. Unless the railroad companies shall be able to adopt and enforce the important unifications of facilities and equipment and control in the common interest of the handling of business in times of stress, the available facilities and equipment will turn out to be wholly unequal to the requirements of the public. Even with substantial continuance of all the important methods of unification and common control, the necessity for very large capital expenditures, both of way and structures and for new equipment, will be very great.

The capital expenditures during federal control were as follows:

	Calendar year 1918	1919	Total, 2 years
Roadway and tracks	$294,000,000	$247,000,000	$541,000,000
Improvements to existing equipment	19,000,000	21,000,000	40,000,000
New equipment purchased by railroads	161,000,000	64,000,000	225,000,000
New equipment purchased by Railroad Administration	113,000,000	239,000,000	357,000,000
Total	$592,000,000	$571,000,000	$1,163,000,000
Estimated expenditures in January and February, 1920	.....	.....	37,000,000
Total for period of Federal control	.....	.....	$1,200,000,000

Inland Waterways

Pursuant to the general policy and authority established by the federal control act, the director general has acquired and operated towboats and barges on the lower Mississippi river between St. Louis and New Orleans and on the Warrior river between the Alabama coal fields and Mobile and upon the Mississippi Sound and connecting waters between Mobile and New Orleans, and has operated towboats and barges on the New York Barge Canal. All of these waterways are public highways and have in no sense been in possession or control of the director general of railroads. This statement is made particularly because a confused notion seems to have existed to some extent in the state of New York that the director general of railroads had assumed possession and control of the New York Barge Canal. That canal is a public highway, owned and maintained by the state of New York, and is equally free to all. The director general has simply operated boats on that canal, as all other persons have continued to have the right to do.

The director general has also had possession and control over the Delaware & Raritan Canal (connecting the Delaware river with the Raritan river) as an incident to his possession and control of the Pennsylvania Railroad system.

All of these operations on the New York Barge Canal, the Lower Mississippi and Warrior river and connecting waters represented mere beginnings; suitable equipment was not in existence, and the construction of suitable equipment was greatly hampered by the demand for materials for other purposes during the war. The result has been that these operations have not yet proceeded beyond the incipient stage, which is inevitable in the development of new enterprises. Consequently the operations so far have resulted in deficits. But these deficits should not be regarded in any sense as tending to show that such operations are not economically justifiable. The operations represent important experiments

which in the public interest ought to be made, and they should be carried forward in an effective and sympathetic spirit.

During the year 1919 the construction of the necessary equipment for use on these waterways has progressed as rapidly as was practicable, and it is expected that by midsummer, 1920, all this equipment will be completed and each of these operations will then be in a position to function effectively and economically. Very important progress has been made during federal control in developing rail and water rates which would offer inducements to the utilization of these waterways.

I am a firm believer in the policy of continuing these operations under government control for at least a reasonable period to give an adequate opportunity for their proper development in order that a satisfactory test may be made of the practicability of utilizing the inland waterways of the United States. I anticipate that that test will demonstrate that for at least certain classes of traffic the water transportation is practicable and economical and highly in the public interest.

The Work of the Various Divisions and of the Regional Offices

Earnest and effective work has been done by the various divisions of the Central Administration and also by the regional directors and their associates. The annual reports of the directors of the divisions and of the regional directors give a most enlightening account of the varied and useful activities of these officers.

The Division of Operation has had the largest task. It has had to supervise the maintenance of equipment, the maintenance of way and structures, and transportation. It has thus had to deal from the managerial standpoint with all the labor problems of the Railroad Administration, acting in conjunction with the Division of Labor, which dealt with these problems from the labor point of view.

The Division of Operation has given persistent attention to the subject of securing the greatest possible use of locomotives with the least delay in terminals, the elimination of unnecessary forces of employees in roundhouses and shops, and the consolidation of terminals.

The car-service section of the Division of Operation has had charge of the highly important matter of car distribution and has also had charge of the administration of the permit system and the placing of embargoes, all these matters being handled largely through the regional directors' organizations.

The Division of Operation has also maintained a safety section which has made a wonderful record, a fuel conservation section, which has brought about marked economies through the use of more suitable qualities of coal in more efficient methods, and an operating statistics section which has collected and compiled statistics of the operations of the Class I railroads on standard forms prescribed by it.

The Division of Operation has also had charge of the coastwise steamship lines which were under federal control and also of the Pullman lines.

The Division of Traffic has had charge, from the railroad management standpoint, of all rate adjustments, acting concurrently with the Division of Public Service, has had charge of the issuing of tariffs and has greatly simplified that work, has had charge of the supervision of inspection bureaus to detect and prevent the misdescription of shipments, improper packing, marking and stowing, securing accurate weights and the elimination of unnecessary weighing, and has established an inspection bureau in official classification territory similar to those in southern and western territories. The Traffic Division, in connection with the Division of Public Service, has supervised the freight traffic committees. The Traffic Division has had charge of the rerouting of traffic so as to avoid circuitous hauls and has also had charge, with the active assistance of the Division of Public Service, of the campaign for heavier loading, and has also had charge of the dining-car service.

The Division of Law has had charge of the claims for special compensation, the making of special contracts, the making of short-line co-operative contracts, the supervision of matters of legislation affecting railroad operation, matters of taxation, has advised the Division of Capital Expenditures in connection with the allocation of equipment and the Division of Purchases in connection with questions arising under the contract for the construction of equipment. The Division of Law has handled formal matters before the Interstate Commerce Commission and the state commissions and has had charge of the claims property protection section, designed to prevent loss and damage to freight and to promote more prompt settlement of claims.

The Division of Purchases has left to the purchasing agents of the various railroads the purchase of ordinary supplies, but has handled, in part through central committees and in part through regional purchasing committees, the purchases of coal and crossties and has directly handled the purchases of steel rail. The Division of Purchases has had charge of the stores organizations on the railroads and of the materials and supplies in general. It was through the Division of Purchases that the coal committees were organized, which handled coal distribution during and since the coal strike.

The Division of Accounts has had the highly important problem of bringing about the statement of accounts so as to show the relation between the government and the railroad companies. The Railroad Administration in this respect has had to perform a dual function one was to operate the railroads and record the current transactions so as to bring out the facts as to the results of operations, and the other was to keep proper records and accounts to bring out the result of the mutual obligations of the government and the railroad companies growing out of the possession and control of railroad property.

The Division of Finance has had charge of the payments of money to the railroad companies on account of compensation and on account of advances, and also the furnishing of money to the federal treasurers on the various railroads when needed for current operations. The Division of Finance has also had to concern itself with the question of character of securities which railroad companies could give for advances made, both for equipment and for other capital expenditures as well as for other purposes, as to the extent to which deductions could properly be made from compensation on account of advances made, as to the methods to be adopted to reimburse the government for advances not yet reimbursed, etc.

The Further Duties of the Railroad Administration

The Railroad Administration has been charged with two distinct functions. The first has been the rendition of the public transportation service and the administration of the duties connected therewith related to transportation and maintenance, labor problems, rate and other traffic and public service problems, control of current capital expenditures, etc. This function ends with the return of the railroads to private control.

The second function has been to fix and administer the contract relations between the government and the railroad companies and to settle the innumerable questions that grow out of these contract relations. This function will continue until final settlement shall be completed or until other provisions shall be made for winding up such settlements.

This function, connected with the contract relationships

and the settlements involved therein, constitutes in itself an exceptionally important responsibility and administrative task. Involved in this unprecedented transaction are 240,000 miles of main line of railroad, which with its equipment is variously estimated as being worth from $15,000,000,000 to $20,000,000,000, for which an annual rental of about $917,000,000 is paid.

Agreement upon a standard form of contract to be made with each railroad company, the adaptation of that form to the particular conditions of each company, agreement upon the rental, consideration of the materials and supplies received and of the corresponding amounts to be returned at the end of federal control, attention to the payments by the government on bills due by the corporations and collections by the government on bills due the corporations, determination of the extent to which the corporations would be charged for capital expenditures made for additions and betterments and equipment and the manner in which payment therefor should be made, determination of the mutual rights of the parties as to overmaintenance or undermaintenance of the properties, and consideration of countless other problems, of which the foregoing are mere suggestive illustrations, have presented a task of stupendous proportions, entirely apart from all the problems of public service, operation, labor relations, etc.

The final adjustment of all these matters will call for attention for a considerable period in the future. While all the activities incident to the public service and operation side of the Railroad Administration will be discontinued as of March 1, except as to small forces temporarily retained to receive the final reports and consolidate the records and dispose of the incidental matters which cannot be completed by the end of this month, it will be necessary, on the other hand, to continue and in some instances temporarily enlarge the branches of the organization dealing with these matters related to settlement with the corporations. The accounting branch of the organization will, of course, continue to be of the highest importance. The newly organized Division of Liquidation Claims is developing its organization to consider and dispose of claims which may be presented on account of alleged undermaintenance of way and structures and equipment and also claims to the effect that corporations ought not to be charged with improvements alleged to have been merely for war purposes and not for the traffic of the railroads in question. This division will handle claims of other sorts, including supervision of claims presented to the Interstate Commerce Commission for reparation on account of alleged excessive rates.

The Division of Finance will, of course, have to function actively for a considerable period, and the Division of Law will necessarily have to continue until final settlement or until the eventual transfer of the remaining legal problems to some other governmental agency.

In carrying forward the administrative work incident to these heavy responsibilities, the Railroad Administration is being confronted and will continue to be confronted with the great difficulty of securing and keeping the highly trained experts who ought to deal with this work. The temporary character of the work and the urgent bidding of other enterprises for experts in these matters will make it especially difficult for the Railroad Administration to retain the necessary forces.

Methods Developed Under Federal Control Which Are Worthy of Continuance

The railroads of this country are by necessity a single great system for many purposes, and in the comomn interest ought to be, and I believe by force of circumstances will continue to be, developed more and more to that end.

The rate structures already apply equally to the different railroads; freight cars are already universally interchangeable; railroad labor is largely organized on a nation-wide basis and to a substantial extent working conditions are standardized throughout the country. I believe all these elements of national scope must be accepted, and others must be developed, in order to promote the greatest degree of public convenience.

The methods developed during federal control to regulate the flow of traffic in times of heavy business through diversions of traffic and by means of the application of the permit system, and to regulate the distribution of cars so as to meet the general public need to the best advantage, ought, it seems to me, to be continued. The consolidation of terminals in the common interest is likewise an important element of public convenience and economy which ought to be maintained. I believe the consolidated ticket offices also have not only been economical but have in the main been in the public interest. The transfer of locomotives from one road to another in emergencies, and the use of the shops on one road when available for the work of another road are also measures in the common interest.

The work of establishing uniformity in rules governing car distribution for the various important commodities, such as coal and grain, to avoid unjust discrimination as between shippers has been greatly developed during federal control, and I believe should be continued by the railroads in the public interest. It also seems highly important that every effort be made to continue and extend the pooling of lake and tidewater coal. As to export traffic, it is believed to be highly important that the machinery be available to control this movement to and via ports when conditions make such control necessary through the placing of embargoes and issuing of permits. There are many cases in which it is believed, even under private control, the use of single-track parallel lines as double-track roads which have been developed during federal control can, and properly should, be continued. It also would be distinctly in the public interest if the roads would continue the use of the common time tables between the important centers, and avoid the "bunching" of trains between important centers.

In the mechanical departments of the railroads numerous important practices have been inaugurated during federal control which should be continued after federal control. This is particularly true of the standard classification of repairs to locomotives and tenders set up during federal control, because it affords a reasonably accurate basis of comparison of the work of the different shops and the cost of locomotive maintenance and thereby promotes efficiency.

Naturally the consolidated freight classifications adopted during federal control, many of the simplifications of tariffs and other changes of similar character will be of permanent benefit to the country.

I believe it highly desirable to continue to give the shipping public a participation at the outset in the consideration of rate matters, as is now done on the rate committees, and a participation in the consideration of local operating problems, at least in times of congestion, as is now done on the terminal committees.

I believe it highly important to continue to provide in a systematic way for bipartisan boards of equal representation of the managements and employees to consider grievances of the employees. I earnestly hope for a rapid development of the plan of participation by the employees in the consideration of matters both general and local affecting labor.

The railroad companies have derived important advantages from federal control. In a period when it was difficult in the highest degree to raise money for capital expenditures the companies have been relieved to a very large extent of the necessity for raising any money by reason of the fact that

during federal control the government itself employed its own money for capital expenditure on the railroads and advanced funds to the railroad companies to an aggregate amount in excess of $900,000,000.

Results of Federal Control to Railroad Corporations; Their Status on Resuming Control

During a period when the operating costs of all public utilities were going up much more rapidly than rates were permitted to go up and therefore when all other public utilities were in a state of extreme uncertainty as to their ability to pay established dividends or in many cases pay their regular fixed charges, the railroad companies have been protected by the government's guaranty and, generally speaking, have been able to meet their fixed charges and also their dividends, at least to the full extent that they did so during the three-year test period ending June 30, 1917. In a few cases, railroad companies have suspended or reduced their dividends, but this has been by reason of other conditions than federal control and has been in spite of rather than on acount of the fact that they were guaranteed their income by the government.

As to additions and betterments, including equipment, the situation is that more has been done than would have been practicable under private control in the period of financial difficulty existing during and since the war, and as much has been done as could have been done with the capital available. About $1,200,000,000 has been expended for these purposes.

Congress was unwilling to supply any further capital for these purposes pending decision as to railroad legislation. The railroad companies supplied only about $140,000,000 through funds raised by them and about $180,000,000 through deductions from their compensation. As above pointed out, a most serious need from the standpoint of the public and of the railroad corporations is the expenditure of very large amounts of additional capital for new equipment and additions and betterments to roadway and structures, and especially to shops and terminals.

There has been a somewhat general impression that the railroads during government control have been "scrambled" to such an extent that the resumption of private operation would be difficult. This is not the case. During government control, generally speaking, each railroad has been under separate management and under the immediate direction of a manager identified with its management prior to government control, and from an operating standpoint it will be a simple process on March 1 for such managers to begin reporting to the corporate executives who will then resume active direction. These managers have heretofore reported to the regional directors.

During 1918 there were some instances where different railroads were grouped under a single management, but from time to time during 1919 these railroads have, generally speaking, been segregated by way of preparation for return to private control. Likewise in some instances in 1918 different parts of the same system were put in different regions, but in 1919 most of these cases have been dealt with by putting the entire system under a single regional director. For example, during 1918 the Pennsylvania Lines West and the Baltimore & Ohio Lines West were kept in the Eastern region, with headquarters in New York, but in December, 1918, these lines were put under the jurisdiction of the Allegheny region, with headquarters at Philadelphia, whose jurisdiction also covered the Pennsylvania Lines East. For more than a year, therefore, practically the entire Pennsylvania and Baltimore & Ohio systems respectively have been operating as a whole about as they were prior to federal control.

The corporations have had adequate notice of the return of their railroads on March 1, and as a result most of them have been at work for several months making plans, deciding on the positions to be filled by the various officers, perfecting their soliciting forces, etc. The Railroad Administration has actively co-operated in getting the corporation officers in touch with the conditions on the properties and with the men who are to be employees of the corporations after March 1, and has permitted officers on the federal payrolls to co-operate in building up the organizations to be effective March 1.

In regard to the condition of existing equipment, the locomotives are in relatively good condition, considering that they have just gone through from three to four months of winter weather, much of it severe.

As of February 7, 1920, 11,359 locomotives, or 17.4 per cent, of the total of 65,081 locomotives on the line were in or awaiting shop, and of this number 6,929, or 10.6 per cent, of the total locomotives on the line were in or awaiting shop for classified repairs. Strictly comparable figures of the condition of all the locomotives at the beginning of federal control are not available, but as of January 4, 1918, four days after federal control began, reports covering 49,204 locomotives indicate that 9,105, or 18.5 per cent, were in or awaiting shop. Figures as to the number in or awaiting shop for classified repairs on that date are not available.

Passenger cars are in good and safe condition, although the inability to obtain new equipment for the reasons above explained results in the equipment being on an average practically two years older than at the beginning of federal control, and there has perhaps been some loss in appearance.

The condition of the freight equipment will compare favorably with the condition at the beginning of federal control. As of February 21, 1920, the total number of bad-order cars was 156,150, or 6.1 per cent of the total cars on the line. Included in this number of bad-order cars, however, are 14,275 cars which are held out of service waiting authority from the corporation to retire, as the Railroad Administration does not consider these cars worth repairing. Excluding these cars, the percentage of bad-order cars to total cars on the line is 5.6 per cent, which compares favorably with the number of bad-order cars on hand January 4, 1918, viz., 127,081, or 5.2 per cent of the number of cars on the line.

As to maintenance of way and structures, it is believed that, on the general average, the government has closely approximated compliance with its contract obligation to return the properties in substantially as good condition as when received. On some railroads there has been, especially in 1918, a shortage in the amount of rail, ties or ballast applied in maintenance of the property, this being due to shortage of material and labor, and in various instances it was not practicable in 1919 to make up entirely the shortage which occurred in 1918. But when the proposition is viewed as a whole and consideration is given to the amounts of other kinds of maintenance, it is believed the general statement of approximate compliance with the contracts of the railroads as a whole is correct. Undoubtedly there will be cases where claims for undermaintenance will be allowed and in other cases claims for overmaintenance can be sustained.

From the standpoint of the condition for current operation the roadway and structures are in good working condition, have carried a large traffic for many months and are capable of continuing to do so.

As to the labor situation, railroad employees have become organized to a much greater extent during federal control than prior thereto, although the movement in the direction of additional organization was steadily progressing prior to that time. The train and engine men were organized on practically all railroads for many years prior to federal control. The shopmen and telegraphers were organized on

many railroads, the clerks and station agents on several, and the maintenance of way men on a few. The movement was steadily in the direction of additional organization. I believe the way is open, through frank co-operation with the organizations and the development of appropriate boards of adjustment, for dealing with grievances and the development of increased contact between the management and the employees in other matters of common interest, for establishing better relations between the corporations and the employees than existed between them prior to federal control.

The railroads will go back to private control on March 1 with important wage demands pending. A similar condition, however, existed when the railroads came under government control on January 1, 1918. Formidable demands were then being urged by the principal classes of railroad employees. Moreover, it was generally recognized that wages of many classes of railroad employees at that time were so low that the efficient employees were being lost to a large extent to other industries paying higher wages. The railroad corporations claimed that under the rates then being charged they were not able to pay the necessary wages. It is, of course, understood at present that the entire question of rates is to be shortly reviewed in the light of existing conditions, including the just needs of the railroad employees.

The claims that have been made to the effect that the railroads will be turned back in a broken-down condition are wholly without foundation. As already pointed out, the physical condition of the railroads is good. The fact that some railroads may be able to show a shortage as above mentioned in some of the principal maintenance materials does not keep the railroads from being in effective operating condition. The railroads have been functioning successfully during the present winter, despite its abnormally severe character, and despite the persisting disadvantages growing out of the coal strike.

Complete figures of freight traffic movement for all Class I railroads in January, 1920, are not yet available. However, reports already received from roads which in December, 1919, moved 92 per cent of the total ton-miles indicate that these roads in January, 1920, moved 13.8 per cent more ton-miles than in January, 1919, 26.6 per cent more than in January, 1918, and 7.8 per cent more than in January, 1917.

While complete figures are not available of freight traffic movement in February, 1920, the number of revenue cars loaded on all Class I railroads for the first two weeks of February, 1920, 1919 and 1918, follow:

	1920	1919	1918
Revenue cars loaded	1,590,123	1,392,476	1,450,115
Per cent of increase compared with 1919 and 1918	.....	14.27	9.77

In spite of the bad weather conditions the average trainload was 663 tons, which was 3.1 per cent higher than last January (when unusually favorable weather conditions prevailed), 13.5 per cent higher than in January, 1918, and 8.2 per cent higher than in January, 1917. These preliminary figures indicate that the transportation machine has been functioning satisfactorily under unfavorable conditions.

Since the railroads have been able to function in such a favorable way during the difficult period of January and February, 1920, there is no reason why they should not rapidly make a progressively better showing with improving weather and generally more favorable conditions which are in prospect.

The railroad corporations will resume control at a time when conditions are working distinctly in favor of satisfactory operation. The war resulted in the loss of many experienced employees to other industries, to the general military service and to the railway military service in France. The unrest during and since the war, coupled with changing industrial conditions, led to an abnormal "turnover" of railroad labor and resulted in the same sort of interferences with normal efficiency which have existed and have been commented on in practically every line of industry. The Railroad Administration has felt that these unfavorable influences were gradually disappearing, and there ought to be a gradual continuance of improvement in these respects. The railroad corporations will take the railroads at a time of the year when adverse winter conditions are disappearing and when the physical conditions of operation will rapidly become far more satisfactory, when much heavier trainloads can be moved by the same power, and when difficulties due to ice and snow will be disappearing. The railroads are just emerging from an extraordinarily difficult winter, with a larger aggregate demand for transportation than was ever before experienced in the winter, and during this period they have had to recover as far as possible from the far-reaching dislocations of equipment and also of railroad fuel caused by the coal strike.

A highly important advantage which the railroad corporations will have will be that they are able to plan and put into effect permanent organizations and to make plans accordingly for the future. This is an advantage which the Railroad Administration has not had at any time, and the lack of which has been conspicuously and progressively embarrassing as the end of federal control has approached.

The railroad corporations will also start upon their work with a highly important psychological asset. The public holds to a rigid responsibility any agency performing a public service, regardless of the difficulties of the situation. This responsibility has had to be met during the unparalleled difficulties since January 1, 1918, exclusively by the Railroad Administration, and the railroad corporations have been entirely free from it. They will therefore resume control under the most favorable possible conditions of public sentiment.

Conclusion

These I regard as the results of federal control:

It made practicable a war transportation service that could not have been otherwise obtained; its unification practices have increased the utilization of the inadequate supply of equipment so that an exceptionally large transportation service has been performed in the busy periods of 1919 with a minimum of congestion; it met the emergency of the unprecedented coal strike in a way which private control could not have done and absorbed a heavy financial loss on that account which would have proved highly disturbing to private control; it provided more additions and betterments and equipment than private control could have provided during the difficult financial period of 1918 and 1919; it dealt fairly with labor and gave it the benefit of improved and stabilized working conditions which were clearly right; it not only did not cost more than private control would have cost during the same period but cost considerably less on account of the economies growing out of unifications, and the total burden put upon the public (through rates and taxes) on account of railroad costs was substantially less than would have been necessary if the railroads had remained in private control and rates had been raised enough to preserve their credit; it protected the investment in railroad properties, whereas without federal control those investments would have been endangered; and it turns the railroads back to private control functioning effectively, with a record of exceptional performance in an exceptionally difficult winter, despite the disruption caused by the coal strike, and in condition to function still more effectively with the normal improvement to be expected in the weather and in other conditions.

A final word of appreciation is due to the loyal and steady support of the officers and the great bulk of the employees and their organizations. The times have been exceedingly difficult for officers and employees, and these difficulties have been faced and dealt with in admirable spirit and temper.

Operating Economy of Stoker Fired Locomotives*

A Discussion of the Effect of Stokers on Locomotive Development and Operating Methods

By D. F. Crawford

Vice-President, Locomotive Stoker Company

As there are approximately 5,000 mechanically fired locomotives in the United States, it will be of interest to consider three questions: First, what led to the introduction and continued application of locomotive stokers? Second, what has the experience gained during their development and use indicated? Third, what are the questions brought about by their introduction, which must be considered by the railway officers?

My statement to the convention of the Master Mechanics Association in 1913, contains an answer to the first question. "The development of the locomotive stoker on the

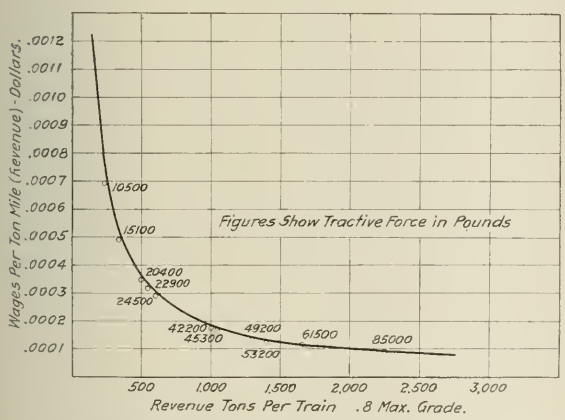


Fig. 1. Relation of Tractive Effort and Tons Per Train to Wages Per Ton Mile (1914 Rates Applied to Various Classes of Locomotives)

Pennsylvania Lines was brought about by a desire to get more tons per train over the road. I had observed in the annual reports of many of the railroads, the tons of train hauled per pound of tractive power for decreasing as the engines grew large. I found that locomotives that were 20 per cent larger than other locomotives were hauling the same trains as the smaller ones and were not realizing the full 20 per cent additional tractive power that the locomotives had. The stoker problem to me was one of decreasing operating expenses by increasing the train load for each unit on which we had to pay interest and maintenance charges."

C. D. Young, after consideration of certain locomotive tests, stated: "If we use 6,000 lb. of coal, and this locomotive is capable of burning 10,000 lb. per hour, or say, if a fireman will fire 6,000 lb. per hour, and the locomotive is capable of burning 10,000 lb. with a stoker, it is then possible for you to obtain the maximum of that locomotive with the stoker, whereas you do not come to 60 per cent of the maximum output with the fireman."

These statements, made in 1913, are of equal value and importance in 1919, and after all are the fundamental reasons for the existence of the locomotive stoker. While what we regard as large locomotives were in limited use before the advent of the stoker, its development and application has and will permit more full utilization of the capital invested both in the locomotive and permanent way.

Stokers Reduce Transportation Costs

The expense of moving freight does not increase in proportion to the weight of the train, and therefore the larger the train the lower the cost per ton mile. Among the items which may be considered as decreasing in cost per ton mile in some proportion to the increase in tons per train are fuel costs (which amount to 9.85 per cent of the total expenses), crew's wages, equipment, track structure and signal maintenance, as well as certain other fixed and operating charges.

The effect of the introduction of large locomotives on a given division operated to their capacity (which the mechanical stoker makes possible) is shown by the curve in Fig. 1, in which the crew's wages per ton mile are shown in comparison with the revenue tons per train. This indicates what may be expected of locomotives of various capacities.

That there is a definite relation between the coal used per ton mile and the revenue tons per train, is clearly shown by the diagram in Fig. 2, which shows the coal used per ton mile for the various weights of train for nineteen railroads in various parts of the United States, this information

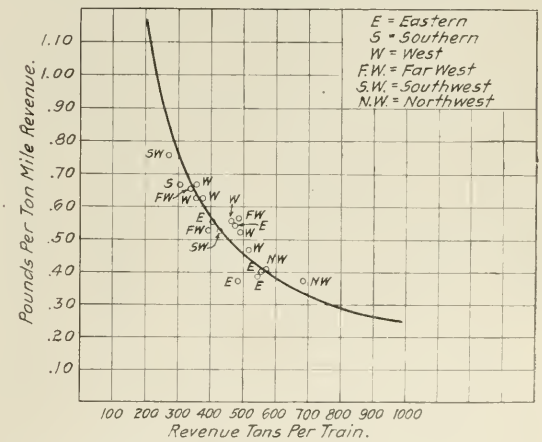


Fig. 2. Relation Between Coal Per Ton Mile and Tons Per Train on Nineteen Typical Roads

being obtained from the annual reports of the railroads included. Notwithstanding the wide variation in traffic, operating, grade and equipment conditions and the quality of the fuels used, the fact that increased train loading brings a decrease in fuel per ton mile is substantiated.

It is, of course, difficult to state in a few words just what the use of locomotives of large capacity has meant to those making use of the transportation facilities of the country, but, by their use the average revenue tons per train in the United States was increased from 176 tons in 1888 to 357 tons in 1907, and 620 tons in 1917.

*Abstract of a paper presented before the Railway Club of Pittsburgh.

This increase in the amount of traffic moved by a train unit permitted the results disclosed below:

Year	Revenue tons per train	Receipts per ton mile	Receipts per train mile	Cost of fuel per train mile	Cost of fuel per ton mile: Actual price	Cost of fuel per ton mile: Equated price	Price of coal per ton
1888	176	$0.01061	$1.76	....	.....	.....	....
1907	357	0.00759	2.71	$0.21	$0.0006	$0.0006	$1.14*
1917	620	0.00728	4.51	0.43	0.0007	0.0004	2.20†

Notwithstanding the fact that in 1917 the price of coal is shown as nearly double that in 1907, the cost of coal per ton mile was practically the same, and when the price is equated to that of 1907, the decreased cost per ton mile given shows conclusively that a smaller amount was used.

Heavy Train Loading Increases Track Capacity

Another important reason for the use of locomotives of the capacity made available by mechanical firing is the reduction of the number of units required to handle traffic.

About five years ago query was made as to what would have been the effect if the traffic of a given railway system in the year 1912 had been moved in equipment of the capacity that had been used in 1903. Of course, in making the calculations for the reply, some factors had to be assumed; the conclusions at least indicate the propriety of the increase in capacity of both locomotives and cars.

While a larger number of the smaller locomotives and cars would be required, the fact that the number of units or trains needed so increased the traffic density that, to make the movement with the same degree of promptness as existed in the latter year, the cost of providing additional track facilities far outweighed the cost of the additional equipment. As it is only by the use of a mechanical stoker remember the concern of those responsible on account of the large turnover and its effect on the operations. As the size of the locomotives continued to increase, the difficulties and complaints grew apace, and it may be said that the climax occurred in 1912, when the firemen in the Eastern Wage Application demanded two firemen on locomotives weighing over 200,000 lb. on the driving wheels.

During the period mentioned, several types of mechanical stokers had been built and put in service, but were regarded by both the railway officers and employees as rather more than less in the experimental stage. Nevertheless, such was the confidence of some railway officers in the stoker that what may be regarded as the first commercial application of the device was made in 1910. Since that time the number applied per year has gradually increased to the total of 5,000 in use on the locomotives of at least 71 of the railroads of the United States.

Assuming that 120 lb. of coal per sq. ft. of grate per hour is required to obtain the capacity of the locomotives, the average coal rate for typical stoker-fired engines would be as follows:

Mikado	Grate 70.5 sq. ft.	Coal per hour 8,460 lb.
Santa Fe	Grate 83.0 sq. ft.	Coal per hour 9,960 lb.
Mallets	Grate 89.2 sq. ft.	Coal per hour 10,704 lb.

Evidently some locomotives of these dimensions are worked below the capacity suggested by the builders' formula of 120 lb. of coal per square foot of grate area per hour, or certainly there would be more stokers in use.

Even if half the amounts of coal per hour given above were to be fired by hand for any considerable length of time, it is probable that the limit of endurance of the men, especially during the warm seasons, would be approached and therefore the stoker will afford the required relief and will be accepted as a substitute for the second fireman so frequently requested. In fact, I am inclined to believe that in

RESULTS OBTAINED WITH EXPERIENCED AND INEXPERIENCED FIREMEN (HAND-FIRING)

Trial of Coal—Chicago District

All Tests at 80 r. p. m.,—14.66 m. p. h.—25 per cent cut-off. Length of each test, two hours

	Average boiler pressure		Total cost		Total water		Steam lost at safety valve		Average smoke per cent		Brick arch
	Ex	Inex.	Ex,	Inex.	Ex.	Inex.	Ex.	Inex.	Ex.	Inex.	
Macoupin	199.5	198.7	6,526	7,737	19,145	38,571	0	144	30	42	None
Williamson	205.8	205.4	5,762	5,568	39,727	41,482	174	678	24	20	"
Williamson	204.5	204.8	5,970	6,284	42,874	43,457	504	2,992	14	16	Arch
Sangamon	205.1	14.26	5,897	*2,887	40,007	*16,436	0	0	18	52	"
Green	206.0	204.3	5,264	6,442	41,052	41,042	154	1,344	8	25	"
Vermillion, Ill.	204.2	204.5	5,764	7,455	40,557	44,519	304	4,504	22	34	"
Vigo	204.5	203.8	5,480	6,057	39,782	40,807	532	318	20	22	"
Vermillion, Ind.	205.4	203.2	5,445	6,676	40,874	42,534	78	288	16	28	"
Sullivan	203.2	203.2	5,557	8,192	39,514	42,734	0	2,238	28	52	"
Saline	205.0	204.3	4,908	7,263	40,232	42,826	556	3,132	24	64	"
Marion	205.0	184.1	6.146	7,632	40,005	35,393	240	652	14	30	"
Total	2.044.1	2,016.3	56,824	69,306	403,762	413,365	2,542	16,390	200	334	....
Average	204.4	201.6	5,682	6,391	40,376	41,337	254	1,639	20	33.4	....
Present excess	....	....	....	22.0	....	....	....	541.3	....	67.0	....

Ex.—Experienced fireman. Inex.—Inexperienced fireman. *One hour test.

In the total and averages, the figures for Sangamon coal have intentionally been omitted, as two inexperienced firemen failed to maintain the boiler pressure on a one-hour test.

that the possibilities of large locomotives may be realized, the information given above becomes the reason not only for their development but for their more general application.

Stokers Eliminate Necessity for Two Firemen on Large Engines

In 1903, with locomotives of about 40,000 lb. tractive force and 50 sq ft of grate area, from time to time complaints were received from the firemen regarding their arduous work, and frequently men left the railroad service, preferring to seek a more congenial occupation. This, of course, embarrassed the service, as at times it was difficult to obtain sufficient men to supply the demands, and I well time the stoker will be preferred, as by the use of the stoker the period elapsing from employment to promotion to engineman will not be increased, which would be the case were a second fireman employed on all locomotives.

Fuel Economy and Stoker Firing

As it is evident that only the furnace efficiency is affected, whether a boiler is fired manually or mechanically, many of the tests of stoker-fired locomotives which has been made must be disregarded, as the results obtained clearly indicate failure to differentiate between furnace, boiler and engine efficiency.

Indeed, I can only conceive of one reason why under equivalent draft, structural and adjustment conditions a

manually fired furnace should show a better performance than a mechanically fired furnace. That is, that firemen might be able to more accurately distribute the fuel, supplying the fresh coal exactly to the points on the grate required, as indicated by the color of the fire, and I can only think of one reason why the mechanically fired furnace should give the better results, namely, it is unnecessary to so frequenly open and close the furnace door, permitting a more uniform fire-box temperature to be maintained.

It is probable that in locomotive practice each of these theoretical advantages offsets the other, especially at combustion rates approaching the limits of manual firing, beyond which the mechanical device is superior, due to the fact that accurate distribution can no longer be made.

The equivalent evaporation per pound of coal depends on the amount of coal burned per square foot of grate per hour rather than whether the furnace is fed manually or by a mechanical device. As the stoker is applied for the sole purpose of amplifying the output of the locomotive by

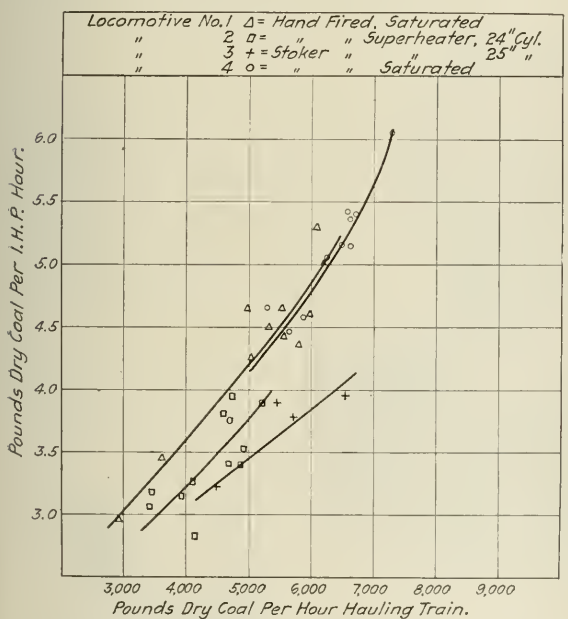


Fig. 3. Coal Used Per Indicated Horsepower Hour, Hand and Stoker Firing

causing more coal to give up the power contained therein, it follows that the evaporation rate will decrease in proportion to the combustion rate obtained.

The coal consumed per gross ton mile cannot be considered in accurate measure of the distance between mechanical and manual firing, as not only are the efficiencies of the boiler and engine variable factors, but the resistance of the train as determined by the number and weight of the cars must be given consideration.

The unit ton miles, while sufficient for rough comparisons, should not be depended upon when the definite information is required.

Although it is true that the pounds of coal per indicator horsepower hour, also involves the performance of the cylinder, by careful selection of the locomotives, as to similarity in engine conditions, this unit may be regarded as fairly valuable in making comparisons.

The diagram in Fig. 3, shows the results of some tests where the information obtained is compared on the last mentioned basis. It will be noted that for the higher rates of combustion, and consequently lower boiler efficiency, the curves indicate that the coal consumption per indicated horsepower hour favors the stoker-fired locomotive, also that when superheated steam is used there is a marked difference in favor of the mechanically fired locomotive. In the latter case, however, the excellent results shown were obtained by increasing the diameter of the cylinder equal to about 10 per cent, as it was found that with the stoker this could be done on account of the ample steam supply. Indeed further experiments justified further increasing the diameter of the cylinders equal to about 17 per cent, with a proportionate gain in hauling capacity.

A possible increase of 17 per cent in the earnings per train mile is surely sufficient to be attractive to those responsible for the financial results of railway operations and to justify the application of a device which permits such conditions.

Fuel Economy Depends on the Fireman

How many of us have taken the trouble to ascertain the effect of coal consumption by inexperienced firemen?

The tabulation gives the results obtained on some tests made to develop the facts. It will be observed that the difference when the locomotive is doing the same work is 22 per cent.

Did it ever occur to you that there are really very few experienced stoker firemen? Why should you expect the same results from inexperienced stoker firemen that you obtained from experience hand firemen? When tests with firemen of equal skill handling the stoker and the shovel show that more coal is being used on the mechanically fired locomotives, you may rest assured that you are getting a return for it either in increased tonnage or increased speed.

Steam Jets Increase Boiler Efficiency

Four of the six types of stokers for locomotives now in service use steam jets to project the coal into the fire-box. It has been stated that the introduction of steam into the fire-box for this purpose results in decreased evaporative efficiency. Just what has led to these statements, I am at a loss to understand, as very early in my railroad experience

Effect of Steam Jets on Evaporation

Without brick arch

Test No.	Coal fired per hour: Total	Coal fired per hour: Sq. ft. grate	Steam through pets, lb.: Per minute	Steam through pets, lb.: Per hour	Equiv. evap. lb.	Per cent lb. steam to lb. coal
79	2,025	69.5	7.56	453.6	8.7	22.3
80	1,786	61.3	12.97	778.2	9.8	43.5
81	827	62.7	0	0	9.3	0.0
82	1,961	67.3	13.78	826.8	8.9	42.0
83	1,961	67.3	17.64	1,058.4	9.1	54.0

With brick arch

Test No.	Coal fired per hour: Total	Coal fired per hour: Sq. ft. grate	Steam through jets, lb.: Per minute	Steam through jets, lb.: Per hour	Equiv. evap. lb.	Per cent lb. steam to lb. coal
84	1,820	62.4	17.64	1,058.4	9.7	58.5
85	1,692	58.0	7.56	456.6	10.4	26.6
86	1,784	62.1	0	0	9.5	0.0
87	1,784	61.2	13.78	826.8	9.5	46.2

Speed—12 M. R. H.—Full throttle—25 per cent cut-off.

I was informed as to the desirabilty of wettng the coal to improve the combustion, and we are all familiar with the wide use of steam jets in stationary boilers, especially those equipped with certain types of mechanical stokers.

In 1912 and 1913 tests were made under the direction of the General Managers' Association of Chicago to determine the effect of steam jets on the amount of smoke emitted from a locomotive, and of course one of the factors was the effect on fuel economy.

From the results of these tests published in the American Railway Master Mechanics Association, the data shown in

the tabulation was obtained. The data is supplemented by the following statement: "The tabulated results of the efficiency tests with Pennsylvania Gas Coal (Tests Nos. 2500-79 to 2500-87) with and without the jets are plotted. The curves show that a reduction of smoke results in an increased equivalent evaporation, and a corresponding increase in efficiency and economy with or without the brick arch, showing that the steam jet tubes make for improved combustion and economy rather than simply to "whitewash the smoke."

With this evidence before us, I do not think for the present at least we need be concerned as to the deleterious effect of using steam jets for projecting the fuel into the firebox, for if the use of as much as 1,000 lb. of steam per hour with 2,000 lb. of coal per hour does not result in reduced economy, certainly the introduction of from 300 to 500 lb. of steam per hour into a fire of 5,000 to 7,000 lb. of coal per hour will not adversely affect either the evaporation or the annual balance sheet of the railways using this arrangement.

Slack Coal Not Economical

We all appreciate that one of the arrangements for the introduction of the locomotive stoker was the possibility of using the less expensive grade of coal known as screenings

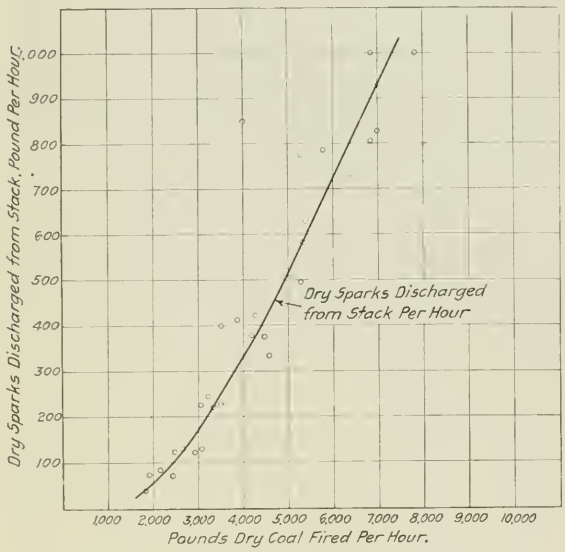


Fig. 4. Relation Between Rate of Firing and Stack Loss, Hand Firing

or slack coal, and consequently a number of stokers especially adapted for its use were installed.

Of course it was expected that the decreased cost per ton would offset the increased consumption, but the practical difficulty not only of supplying the special coal, but the necessity of carrying two kinds of coal at coaling stations, one for hand and one for stoker-fired locomotives, indicated the advantage of a stoker so arranged that it would handle run of mine or even lumps by breaking it to a suitable size on the locomotive.

There is, however, a much more important reason for avoiding the use of screenings or coal of small size than the inconvenience of providing it prepared or crushing it at the coaling stations. That is, the question of quantity used.

Some comparative tests were recently made on stoker-fired locomotives. On one series of tests, coal which would pass through a two-inch screen was used, and the other series made with coal which would pass through a 6-in., but over a 2-inch screen, in the latter case the larger lumps being reduced by the breaker in the stoker conveying mechanism. The advantage obtained in using the larger coal is apparent and amounted to over 15 per cent.

The principal cause, no doubt, of the decreased efficiency of the finer coal is the loss due to the unburned coal being thrown out of the stack. The amount of this loss of course depends upon the rate of firing and the relative fineness of the coal. The diagram in Fig. 4 shows only the relation between the stack losses and the rate of firing.

The stack losses, which run as high as 15 to 20 per cent of the coal fired, have no other relation to the method of firing except that it is the usual practice to fire at higher rates mechanically and manually.

It should be borne in mind that the stoker is a mechanical device; that it will only do what a human being makes it do; that it cannot tolerate neglect. If it is properly inspected, lubricated, maintained and operated, it will add to the earnings of the railroads, the comfort of the employees and banish troubles due to engines not steaming.

Fifty-six clerks and other employees of the Pennsylvania Railroad at Harrisburg, Pa., are sleeping at night in Pullman cars and taking their meals at the restaurant in the railroad station. These clerks constitute the office force of the general superintendent of the Eastern Pennsylvania Grand Division, which office was moved on March 1 from Altoona to Harrisburg. Disposing of houses in Altoona and finding living quarters in Harrisburg are both exceedingly difficult propositions, and it is not known how soon the men can abandon their Pullman lodgings.

From the Milwaukee Sentinel

A Solemn Swearing Off

R. H. Aishton Remains President of the A. R. A.

Will Help to Coordinate Operation of Roads During Transition Period. Reorganization of Car Service Commission

For the first time in its history, so far as the *Railway Age* knows, the American Railroad Association has a president who is not an officer of any individual railroad or group of railroads. R. H. Aishton was elected president of the association on its reorganization under government control one year ago. With the termination of government control Mr. Aishton was freed from his duties as regional director of the Northwestern region. The American Railroad Association at the same time passed back into the control of the railroad companies. The advisory committee which was appointed by the Association of Railway Executives to effect the transfer of the American Railroad Association back to corporate control, made a report to the Association of Railway Executives last week in which it recommended that Mr. Aishton be asked to retain the presidency of the American Railroad Association. This was done, and Mr. Aishton has consented to stay. General W. W. Atterbury, vice-president of the Pennsylvania Railroad, is chairman of the advisory committee.

By R. H. Aishton

During the period when arrangements have been under way for the transfer of the railways to private operation, it has been necessary to consider many problems raised by the question as to what policies and organizations established under government control should be continued under private control. The Interstate Commerce Commission, under the new railroad legislation, is given large powers over the distribution of freight cars and other features of operation, and it is necessary to ascertain the wishes of the commission with respect to these matters. Mr. Aishton, as a regional director, became thoroughly familiar with the organization and workings of the Railroad Administration, and as president of the American Railroad Association he is in a good position to make recommendations as to what functions which have been performed by the Railroad Administration should be performed in future by the American Railroad Association. For example, at the request of all parties concerned, he has taken the lead in reorganizing the Commission on Car Service, and having it transferred from the Railroad Administration to the American Railroad Association.

It is recognized by all executive officers of railroads that there will be many other important operating problems to be solved for whose proper solution both the railroad corporations and the Interstate Commerce Commission will have a large responsibility, and that the part of the railroad companies in solving these problems should be placed in the hands of a railway man of sufficient rank, experience, prestige and ability to deal with all the problems involved. It is understood that the arrangement for Mr. Aishton to devote his energies almost exclusively to the work of the American Railroad Association has been made, at his request, only temporary. How long it will be continued doubtless will depend upon future conditions and upon Mr. Aishton's willingness to continue in his present position.

No man better equipped for the work which Mr. Aishton has undertaken could possibly have been found. He originally entered railroad service in the engineering department of the Chicago & Northwestern. After seventeen years' experience in the engineering department he became an assistant superintendent and was thereafter successively division superintendent, general superintendent, assistant general manager, general manager, and vice-president in charge of operation and maintenance of that road. In May, 1916, he was elected president of the Northwestern. When the Railroads' War Board was organized in April, 1917, it divided the railways of the country into departments corresponding to the various divisions of the War Department. A committee of railway executive officers was appointed to direct and coordinate the operation of the railways in each of these departments, and Mr. Aishton was made chairman of the executives' committee for the Central department. No railway officer did more able or effective work than he did, while the Railroads' War Board was in charge, to bring about needed co-operation between the railways themselves and to secure the support of the public for the railways in their efforts to handle the maximum amount of business.

When the Railroad Administration originally was organized it divided the country into three regions—Eastern, Southern and Western—and Mr. Aishton accepted the regional directorship of the Western region. Subsequently, when the Western region was divided into three regions he became regional director of the Northwestern region, which included the terminals in Chicago. Here again he made a record for loyal, able and effective work, which was unsurpassed by any man who went into the service of the government. His administration of the affairs of the Northwestern region won for him the praise, not only of the railway officers in his region and of the Central department at Washington, but also to a very unusual degree that of the shipping public.

During the weeks, or even the months, immediately following the resumption of private operation there will be many prob-

lems to solve rising out of the relations between the railways and the regulating authorities, and also between more or less conflicting interests of the railroads themselves. Mr. Aishton's personality, as well as his great experience and ability as an operating officer, and will enable him to render service of great importance in solving these problems.

A. R. A. Establishes Car Service Commission

The work of the Car Service Section of the Railroad Administration, which was in a general way a continuation of that of the Commission on Car Service maintained by the American Railway Association in Washington before federal control, is to be continued under a plan adopted by the Advisory Committee, Association of Railway Executives, and the Executive Committee of the American Railroad Association, by the establishment for a 60-day period, or until such time as a permanent organization may be determined upon by the association, of a Commission on Car Service at Washington, under the chairmanship of W. C. Kendall, who has been manager of the Car Service Section and who was also a member of the former commission. He was formerly superintendent of transportation of the Boston & Maine.

A large part of the organization of the section has also been retained and the commission was prepared to begin functioning on March 1. The other members of the commission are: A. G. Gutheim, commissioner at large; W. J. McGarry, commissioner representing the territory comprising the original eastern region; W. L. Barnes, commissioner representing the original Western region, and J. T. King, commissioner representing the territory comprising the original Southern region. Because of Mr. King's illness, H. J. German will take his place temporarily. Mr. Gutheim, Mr. McGarry, Mr. Barnes and Mr. German have all been assistant managers of the Car Service Section. Mr. Gutheim was formerly attorney examiner for the Interstate Commerce Commission and was one of the commission's representatives selected to sit in with the A. R. A. Commission on Car Service before federal control. Mr. McGarry was formerly superintendent of transportation of the Lehigh Valley. Mr. King was general superintendent of transportation of the Atlantic Coast Line, a member of the former commission on Car Service and later operating assistant to the Southern regional director. Mr. Barnes was formerly superintendent of transportation of the Chicago, Burlington & Quincy, was a member of the former Commission on Car Service, and has been in charge of the Car Service Section's refrigerator and tank car office at Chicago.

The duties of the commission will include the administration of the car service and per diem agreement adopted by the American Railroad Association, the relocation of equipment between railroads, and the maintaining of relations with the Interstate Commerce Commission with respect to car service. Its authority is derived from its appointment by the executive committee of the American Railroad Association in acordance with Per Diem Rule 19, and from the following car service and per diem agreement subscribed to by the railroad companies:

Car Service and Per Diem Agreement.

"The subscribing railroad company promises and agrees with each railroad company severally which subscribes and files a counterpart hereof with the general secretary of the American Railroad Association, that the subscriber will abide by and enforce the rules prescribed for the handling of and settlement for freight cars and included in the Codes of Car Service and Per Diem rules, promulgated by the association.

"Further, that the subscribing railroad company agrees to the creation of a Commission on Car Service with plenary powers as provided in Per Diem Rule 19, and which commission shall be established and maintained at Washington, and shall co-operate with the Interstate Commerce Commission in all car service matters on and between all railroads, and generally to act for the subscriber as its agent in all such car service matters as fully and as effectually as could the subscriber.

"Further, that the said Commission on Car Service is hereby designated and appointed as the agent of the subscribing railroad company, upon which service of all orders and directions with respect to car service, in accordance with the provisions as to car service of the act to regulate commerce in force at the time, may be made by the Interstate Commerce Commission for and in the subscriber's behalf; a duplicate original of this agreement being filed by the subscriber with the Interstate Commerce Commission to evidence such designation.

"This agreement to continue until withdrawn by three months' previous notice in writing to the general secretary of the association."

A careful survey has been made of the necessities of the case and a reduction has been made in the expense of handling the commission at the rate of $174,830 per annum.

The Car Hire Bureau at Buffalo, the Eastern and Western coal car pool and the Refrigerator Car Pool, all maintained by the Railroad Administration, have been discontinued as of February 29 by notification to the individual railroads. The Railroad Administration is to carry on such organization as is necessary to close up their work.

The organization of the Commission on Car Service has been made temporary because of the prospective reorganization of the American Railroad Association. The Troop Movement Section of the Railroad Administration is also to be continued temporarily as the Troop Movement Bureau.

R. H. Aishton, president of the American Railroad Association, and J. E. Fairbanks, general secretary and treasurer, have been in Washington for several days this week holding conferences regarding the work of the new commission and the plans for handling car service matters were taken up by Mr. Aishton and Mr. Kendall at a conference with members of the Interstate Commerce Commission, at which the details of the arrangement were discussed in detail.

For the present the Car Service Commission will retain the offices of the Car Service Section in the Premier building, on Eighteenth street, across the street from the Interstate Commerce building.

A meeting of the representatives of the Telegraph and Telephone division of the American Railroad Association was also held for the purpose of arranging telegraph facilities for the commission.

The new arrangement contemplates an important change in the character of the work of the car service organization by placing as few restrictions as are necessary on the individual distribution of equipment by railroads and by removing the activities of the commission from relation to the service on any particular railroad. The elimination of the refrigerator and coal car pools is intended to place upon the individual railroads the responsibility of furnishing refrigerator and coal car equipment to meet their necessities on the theory that the maintenance of such pools, as they have been administered under the direction of the Car Service Section, would have a tendency to absolve individual roads from responsibility for addition to their equipment. It is the understanding with the Interstate Commerce Commission that the Car Service Commission will not be expected to handle complaints from individual shippers as to service or a shortage of equipment at any particular point on any particular railroad. It is said that the Car Service Section had developed into a complaint bureau, because any individual shipper complaining to the Car Service Section usually had his complaint referred back to the individual railroad for a reply that could just as well have been made to him direct in the

first instance if he had carried his complaint through to a conclusion with the officers of the individual railroad. It is desired to leave the Commission on Car Service free for the larger problems of car distribution.

It is understood that the Interstate Commerce Commission is to organize a car service bureau but that for the present it will have only a skeleton organization and will confine its activities largely to co-operating with the railroad commission in the same way as its bureau did in 1917.

The codes of car service and per diem rules promulgated by the American Railroad Association which went into effect on March 1 are as follows (footnotes and interpretations omitted):

1. The rate for the use of freight cars shall be 90 cents per car per day, which shall be paid for every calendar day, and shall be known as the per diem rate, except that where per diem is not reported to car owner within four (4) months from the last day of the month in which it is earned, the rate shall be increased fifteen (15) cents per car per day.

2. Days shall be reckoned by subtracting the date of receipt from the date of delivery. The day of receipt shall be disregarded, and payment made for day of delivery.

A road receiving and delivering a car on the same date shall not pay the per diem for that day.

Records of receipt and delivery under this rule shall be those obtained from the reports provided for in Rule 9.

3. Freight cars must be handled as prescribed by Rules 1 to 5, inclusive, of the Code of Car Service Rules of the American Railroad Association.

4. Each railroad, including ferry lines, shall be responsible to the car owner for amounts accruing for the use of a car at the established per diem rate, whether such car is in road or switching service.

5. An arbitrary amount for each car in switching service may be reclaimed by each individual switching line from the roads for which the service was performed. This amount shall be based upon the average number of days, not to exceed five, actually required in such switching service, to be determined annually by an examination of the records of each individual switching line by the roads directly interested for each local territory.

No reclaim shall be allowed for an intermediate switching movement.

No reclaim shall be allowed under this rule to a non-subscriber.

6. In case a subscriber delivers a car of another subscriber to a non-subscriber it shall pay to the owner an amount equal to the per diem accruing on the car while on such non-subscriber road. The owner will accept settlement for the use of the car only from the delivering subscriber which shall make settlement with the non-subscriber.

7. When a car has been destroyed and reported under Section III—Mechanical (M. C. B.) Rules the per diem shall cease from the date of notice to owner.

8. (a) When a car is detained awaiting the receipt of repair material, which under Section III—Mechanical (M. C. B.) Rules must be obtained from the owner, the per diem shall cease from the date the necessary material is ordered from the owner until the date on which it is shipped in the manner prescribed by Section III—Mechanical (M. C. B.) Rule 122, as evidenced by carrier's shipping receipt.

(b) When a car is reported to its owner under Section III—Mechanical (M. C. B.) Rule 120 Per Diem shall cease from date of such report.

If owner authorizes the repair of such car, and no repair material is required from owner, per diem shall begin after repairs are completed, but in no case to exceed 60 days from the date such authority is given. If repair material must be obtained from the owner under Section III—Mechanical (M. C. B.) Rules, per diem shall begin after repairs are completed, but in no case to exceed 60 days from date such authority is given, plus the number of days intervening between the date necessary material is ordered and the date on which material is shipped in the manner provided by Section III—Mechanical (M. C. B.) Rule 122, as evidenced by carrier's shipping receipt.

(c) Under paragraphs (a) and (b), if more than one order for material is made, the first order only shall stop the per diem.

9. (a) The Interchange reports shall be made for each calendar day on the prescribed form (B-1) Columns 2, 3, 4, 5 and 9 shall be filled. They shall close as of midnight and shall include all cars delivered on the date for which made.

(b) Corrections to Interchange reports shall be made on the prescribed form (Q) immediately upon the discovery of errors in reports which have already been forwarded to Car Service Officers; otherwise corrections to be made on all copies of Interchange Reports before forwarding.

(c) Both Interchange and correction reports shall be made in quadruplicate by the use of carbon paper, two copies for each road involved, and shall be numbered consecutively for each connecting line, commencing with the first of each month; a separate series of numbers to be used for each form of report.

(d) The report shall be signed by the proper representative of the delivering road and certified to by the proper representative of the receiving road after checking. The original with one copy shall be returned to the road making the report.

(e) Car Service Rule 6 governs the delivery of cars. The date and time of delivery of cars upon interchange tracks of connecting line shall, *prima facie*, be the date and time given the delivering road. In cases where there are different standards of time at a junction, the time of the more easterly reckoning shall govern.

10. The Junction Report for each day shall be made to car owners on the prescribed form (40) or on the cut-up interchange slips, as promptly as possible after the receipt of the Interchange Report for that day, but not later than the close of the second working day following the receipt of the Interchange Report.

11. (a) Within forty days after the end of each calendar month, car owners shall be furnished with a Per Diem Report for that month, on the prescribed form (G), showing the number of days each car has been in service upon the road making the report.

(b) Claim covering errors or omissions in Per Diem Reports shall be presented after four months and within seven months from the last day of the month in which the Per Diem was earned. This will not prevent the continuance of any case after the period named, if it has been previously opened, even though the claim should eventually rest upon some road other than the one originally addressed, except that the privilege of continuance shall cease when claimant fails to return claim or present it to another road within a period of two months from the date such claim is last returned to claimant.

(c) Each claim shall be adjusted or handled in accordance with the provisions of O.M. 30 within 30 days after its receipt from the claimant or another road. If not so adjusted or handled the claimant shall send to the delinquent road with its first or second Per Diem Report issued after expiration of the time limit of 30 days, a copy of each claim not so adjusted or handled, and shall show on the summary of the Per Diem Report the number of such claims enclosed and the total number of days covered thereby. If claimant fails to send such copy in accordance with the provisions of this paragraph the privilege of continuance of claim shall cease.

(d) The delinquent road shall adjust or handle each claim in accordance with the provisions of O.M. 30 within 30 days after receipt of the copy of claim referred to in paragraph (c). If it fails to do so, it shall allow the claim in full in the Per Diem Report next issue, following the expiration of the time limit of 30 days, otherwise the claimant may take credit for the full amount of such claim in its next Per Diem Report to the delinquent road.

(e) When Per Diem has been reported to other than car owner, which fact is developed in the investigation of a claim for short Per Diem, the reporting road shall be responsible to car owner for Per Diem earned and shall have the privilege of continuing such claim for refund of Per Diem from the road to which it was thus incorrectly reported. When the Per Diem has been reported car owner under incorrect initial or number, which fact is developed in the investigation of a claim for short Per Diem, the reporting road shall have the right to transfer the allowance from the incorrect to the correct initial or number as an offset to the claim.

(f) Six months after the effective date of this rule it shall

become applicable to all unadjusted claims for Per Diem earned prior to (insert effective date of these rules).

12. The settlement of amounts accruing for the use of cars shall be made monthly without regard to reclaims pending.

13. (a) Switching reclaim under Rule 5 shall be presented within three months from the last day of the month in which the Per Diem accrued, and shall be allowed as presented within 30 days after receipt.

The road paying the reclaim may present a counter reclaim to adjust errors in the original reclaim statement, provided such counter reclaim is presented within two months from the last day of the month in which the original was received.

The privilege of continuance of the counter reclaim shall cease when either road interested fails to return it to the other road within two months from the last day of the month in which it was last received, the delinquent road to be responsible for the unadjusted amount.

(b) Reclaim under Rule 15 shall be presented within six months from the last day of the month in which cars were delivered by the holding road. The road receiving reclaim shall check and present exceptions to the claimant within four months from the last day of the month in which the reclaim was received and shall allow in the next Per Diem Report the amount not covered by exceptions.

The privilege of continuance of reclaim thereafter shall cease when either road interested fails to return it to the other within two months from the last day of the month in which it was last received, the delinquent road to be responsible for the unadjusted amount.

(c) Special reclaim shall be presented within twelve months from the last day of the month in which the Per Diem accrued. The road receiving reclaim shall check and present exceptions to the claimant within four months from the last day of the month in which the reclaim was received, and shall allow in the next open Per Diem Report the amount not covered by exceptions.

The privilege of continuance of reclaim thereafter shall cease when either road interested fails to return it to the other within two months from the last day of the month in which it was last received, the delinquent road to be responsible for the unadjusted amount.

(d) The provisions of paragraphs (a), (b) or (c) will not prevent the continuance of any reclaim after the period named if it has been previously opened when the reclaim eventually rests upon some road other than the one originally addressed, except that the reclaim shall be presented to such other road within two months from the last day of the month, in which it was last received by claimant. Further handling shall be subject to the provisions of paragraphs (a), (b) and (c).

(e) If a road fails to adjust or handle a reclaim in accordance with this rule the claimant shall give notice thereof sufficient to establish its identity on the summary of its next Per Diem Report to the delinquent road, and if not adjusted or handled within thirty days thereafter may take credit for the unadjusted amount of such reclaim in its next Per Diem Report to the delinquent road.

(f) Reclaims shall be made by the designated officer of the road which pays the Per Diem to the designated officer of the road from which the allowance is reclaimed, unless specifically agreed by the interested roads to permit the presentation and acceptance of such reclaims by local representatives.

14. When a freight car is detained by reason of a railroad error, which prevents proper tender or delivery, prompt notice must be given and action taken by the holding road to secure the release of car, and the erring road will pay to the holding road an amount equal to the established Per Diem rate for the time such car is held. Claims under this rule to be made on the erring road within twelve months from the date succeeding that on which car is received. (See Rule 13, Paragraph (c)).

NOTE.—This rule applies to cars of railroad ownership, including owner's cars on owner's tracks, but it does not apply to cars bunched in transit, nor cars detained account of weather interference.

15. (a) A road failing to receive promptly from a connection, cars on which it has laid no embargo, shall be responsible to the connection for the Per Diem on cars so held for delivery, including the home cars of such connection.

(b) If such failure to receive shall continue for more than three days, the delinquent line shall thereafter in addition be responsible for the Per Diem on all cars wherever in transit which are thus held back for delivery.

(c) It shall be the duty of the connection intending to reclaim to notify the delinquent line daily, prior to midnight, through the designated transportation officer or in such manner as may be agreed upon locally, of the total number of cars so held for it, and on the following day furnish the initials and numbers of the cars.

(d) When the hour at which the receiving road clears the interchange track is so late that the delivering road cannot place on interchange track before midnight, cars which it is holding for delivery, the receiving road shall be responsible for the Per Diem on such cars for the following day, subject to local agreement as to time required to make delivery.

16. (a) When a road gives notice that for any reason it cannot accept cars in any specified traffic, thereby laying an embargo, it should receive cars already loaded with such traffic on the date such notice is issued, and cars loaded within twenty-four (24) hours thereafter. If it does not receive such cars the road laying the embargo for the number of days such cars are held, not exceeding the duration of the embargo.

(b) Embargoes must be issued by the embargoing road in accordance with the provisions of the Embargo Regulations as approved by the American Railroad Association.

(c) Twenty-four hours after 11.59 P. M. of the date of the embargo a road must not load or reconsign cars in such traffic to the embargoing road.

(d) An embargo may not be laid on empty cars returning home in accordance with the Car Service Rules.

17. To interpret these rules and to settle disputes arising under them an arbitration committee of five members shall be appointed by the general Committee, Section V—Transportation. Three members of the arbitration committee shall be a quorum. In case any question or dispute arises under these rules it may be submitted to the arbitration committee through the general secretary of the association in abstract. The abstracts shall briefly set forth the points at issue and each party's interpretation of the rules upon which its claim is based. The arbitration committee shall base its decision upon the rules and the abstract submitted, and its decision shall be final. Should one of the parties refuse to furnish the necessary information, the arbitration committee shall use its judgment as to whether it can properly decide. All decisions shall be reported to the association through the General Committee, Section V—Transportation.

In case a question shall arise not covered by the rules the roads disagreeing may by mutual consent submit such questions to the arbitration committee.

The General Committee, Section V—Transportation, may appoint a secretary for the arbitration committee, who shall be paid by the association. The other expenses of the arbitration committee shall be divided equally between each of the parties to the dispute and the association. The minimum charge to each road shall be $10, payable in advance. The expenses shall be first paid by the association, and then billed to the parties concerned by the treasurer of the association.

18. These rules shall not apply to private cars or to cars of non-subscribers.

19. The executive committee of the American Railroad Association shall appoint a commission on car service composed of a chairman and the requisite number of members, territorially representative, invested with plenary power to—

(a) Supervise the application of car service and per diem rules.

(b) Suspend or permit departures from Car Service Rules 1 to 5, inclusive, except as provided in Rule 20.

(c) Exempt when necessary, cars of any type, from the provisions of Car Service Rule 1 to 5, inclusive, and provide other regulations under which such cars shall be handled.

(d) Transfer cars from one railroad or territory to another when necessary to meet traffic conditions, with due regard to car ownership and requirements.*

*This provides an adjustment of surplusages and shortages, and is intended to suggest an equalization of service so far as practicable and consistent with car ownerships. By the latter is meant that if one railroad has in its good judgment provided amply for its coal-loading patrons, for example, while another has not, and the demand is generally equal to supply, the mines of the first will not necessarily be depleted in order that the mines on the improvident road may be the better served. Generally as between the provident and improvident roads it must be recognized that if

(e) Conduct investigations, including examination of car records, as may be necessary to insure the observance of Car Service and Per Diem rules and of any orders issued by the Commission Car Service, and in the event that they are unable to adjust such matters with the individual railroads, report all the facts with a recommendation to the executive committee.

(f) Obtain car location statements and other car performance statistics as deemed necessary.

(g) Take necessary action to bring about uniformity of practice among railroads, by the standardization of car distribution rules, including record and report forms.

(h) Make recommendation to the executive committee when in their opinion a change in the per diem rate is necessary or desirable.

(i) To perform such other duties as may be assigned by the executive committee.

The headquarters of the commission provided for by this rule shall be Washington, D. C.

20. Departure from Car Service Rules 1 to 5, inclusive, affecting Canadian railway cars on United States Railroads, or United States railroad cars on Canadian railways, shall be only by agreement as between the American Railroad Association and the Railway Association of Canada.

American Railroad Association

Code of Car Service Rules

1. Home cars shall not be used for the movement of traffic beyond the limits of the home road when the use of other suitable cars under these rules is practicable.

2. Foreign cars at home on a direct connection must be forwarded to the home road, loaded or empty, or may be returned empty to the road from which last received loaded, if such road is a direct connection of the home road. Under this rule cars may be—

(a) Loaded via any route so that the home road will participate in the freight rate, or

(b) Moved locally in the direction of the home road, or

(c) Moved locally in an opposite direction from the home road, or delivered to a short line or a switching road, if to be loaded for delivery on or via the home road.

3. Foreign cars at home on other than direct connections must be forwarded to the home road loaded or empty. Under this rule cars may be—

(a) Loaded via any route so that the home road will participate in the freight rate, or

(b) Loaded in the direction of the home road, or

(c) Moved locally in an opposite direction from the home road, or delivered to a short line or a switching road, if to be loaded for delivery on or via the home road, or to a point in the direction of the home road beyond the road on which the cars are located, or

(d) Delivered empty to the road from which last received loaded if such road forms a part of a direct route to the home road, or

(e) Delivered empty to a road forming a part of a direct route to the home road, but subject to equalization of interchange balances monthly, by classes, at each junction point. In computing cars to determine the interchange balances, all cars interchanged during the preceding two months shall be counted, classified as open top or closed cars.

NOTE—Under this rule a road shall not be privileged to deliver to another road, empty cars to avoid its responsibility in connection with return movement via a direct route of which it may form a part.

4. Empty cars may be short routed at a reciprocal rate of 5 cents per mile, plus bridge and terminal arbitraries, with a minimum of 100 miles for each road handling the car, the road requesting the service to pay the charges.

5. If a movement of traffic requires return of empties via a junction at which cars were delivered loaded, the delivering road may demand return of empty cars at such junction, except that cars offered to a home road for repairs, in accordance with Section III—Mechanical (M. C. B.) Rules, must be accepted by owners at any junction point.

6. Cars shall be considered as having been delivered to a connecting railroad when placed upon the track agreed upon and designated as the interchange track for such deliveries, accompanied or preceded by proper data for forwarding and to insure delivery, and accepted by the car inspector of the receiving road.

Unless otherwise arranged between the roads concerned the receiving road shall be responsible for the cars, contents and per diem after receipt of the proper data for forwarding and to insure delivery, and until they have been accepted by its inspector or returned to the delivering road.

7. When trains of one railroad use the tracks of another in avoiding washouts or other obstructions, unless other arrangements exist between the roads concerned, the detour shall be made under the terms of the Detour Contract approved by the association, which terms are made part of this rule.

The road for which the train is detoured shall pay the regular per diem (or mileage) to the owners of the cars in the train, including the road owning the track, if any of its cars shall be in the detoured train. All mileage charges shall be at actual distance over the route used.

8. The following rates for the use of passenger equipment shall be in force unless otherwise arranged between the roads concerned:

SECTION A.

JOINT SERVICE RATES.

These rates are to apply when the owners of the cars participate in the business and not when the cars are hired to other lines:

Class of cars	Basis of rate: Seating capacity	Basis of rate: Length of car	Basis of rate: All capacities	Rate per mile of actual distance
Coaches	Under 70			
Chair cars	70 to 86			$0.03
	Over 86			.04
Tourist				.05
Colonist				
Dining			All	.03
Cafe				
Club				
Parlor			All	.05
Combined — passenger and baggage, or passenger, baggage and mail		Under 60 ft.		.03
		60 ft. and under 70 ft.		.04
Postal		70 ft. and over.		.05
Baggage		Under 60 ft.		.01½
Express		60 ft. and under 70 ft.		.02
Baggage—express		70 ft. and over.		.02½
Mail storage		Under 60 ft.		.02
Baggage—mail		60 ft. and under 70 ft.		.03
Baggage — mail — express		70 ft. and over.		.04

SECTION B.

PER DIEM RATES.

These rates are to apply when cars are hired at other than mileage rates and when the owners of the cars do not participate in the business; but are subject, however, to agreement between the parties interested.

Class of cars	Basis of rate: Seating capacity	Basis of rate: Length of car	Basis of rate: All capacities	Per diem rate
Coaches	Under 70			$5.00
Chair cars	70 to 86			7.00
	Over 86			8.00
Tourist				
Colonist			All	5.00
Dining				
Cafe				
Club			All	8.00
Parlor				
Combined —passenger and baggage, or passenger, baggage and mail		Under 60 ft.		5.00
		60 ft. and under 70 ft.		7.00
		70 ft. and over.		8.00
Postal		Under 60 ft.		3.00
Baggage		60 ft. and under 70 ft.		4.00
Express		70 ft. and over.		5.00
Baggage—express		Under 60 ft.		4.00
Mail storage		60 ft. and under 70 ft.		6.00
Baggage—mail		70 ft. and over.		7.00
Baggage—mail—express				

9. When a per diem rate is charged for the use of passenger equipment, as provided for in Rule 8, the total number of hours of all cars of the same class shall be calculated on a basis of 24 hours for each day and the charge made accordingly; any fraction of a day over the aggregate number of days of 24 hours

in the time of great car demand the latter has to be assisted for the benefit of its patrons and its territory at the expense of the former, there must necessarily be set up some method of compensation for the former, and this of necessity, may go beyond mere car hire. In treatment of "short lines," or "feeders," without any appreciable car ownership, such lines must be given a measure of car supply from "trunk lines" consistent with current distribution percentages on such trunk lines; in other words, they must be treated as industries on the trunk line connection.

each to be counted as one day; it being understood that the minimum charge shall be one day for each car.

When necessary to haul a car empty over the road owning it, or intermediate roads for delivery to a borrowing road, unless otherwise arranged between the roads concerned, the borrowing road shall pay a reciprocal rate of 10 cents per mile for hauling the car, plus bridge and terminal arbitraries, to the point of connection with the borrowing road and return; the charge for the empty haul to be named to the borrowing road at the time the agreement to loan the car is made.

10. Each railroad shall adopt the "National Car Demurrage Rules," as approved by the American Railroad Association.

11. (a) All freight cars shall be light-weighted as follows, and shall be marked in accordance with Section III—Mechanical (M. C. B.) Rules with the following marks:

(1) The light weight, which shall be the multiple of 100 pounds nearest the scale weight, except that when the scale weight indicates an even 50 pounds the lower multiple shall be used.

(2) Capacity in pounds. Cubical capacity except for flat and tank cars.

(3) Station symbol.

(4) Date of weighing, month and year.

(b) Each new car must be weighted separately and marked at the car works, under the supervision of the owner's inspector. The accuracy of the scales used must be certified to by a railroad scale inspector appointed by the car owner.

These provisions to be incorporated in the contract covering the purchase of the equipment.

(c) Wooden and steel underframe cars (except refrigerator cars) should be re-weighed and re-marked each year during the first two years the car is in service, and thereafter once every two years. All-steel cars and all refrigerator cars should be re-weighed and re-marked at least once every three years. This weighing should be done at any favorable time during the year in which the car is due to be weighed, regardless of the month in which the previous weight was obtained. This paragraph does not apply to tank cars.

(d) When a car is materially changed by repairs, alterations or re-painting, it should be re-weighed and re-marked. (See paragraph (f) (8).)

(e) Any car without marking should be immediately weighed and marked. Any car (except tank cars) which has not been re-weighed and re-marked within the prescribed period should be immediately re-weighed and re-marked. If a car (except tank cars) is re-weighed at any time and is found to have a variation of 300 pounds or more (for refrigerator cars, 500 pounds or more) between the marked and actual weight, it should be immediately re-marked.

(f) (1.) When empty cars are received in yards for inspection for defects or while empty cars are on shop tracks for repairs, there should be selected the cars whose condition and whose date of last weighing, etc., indicate that they should be re-weighed and re-marked. The number of cars selected will be regulated in accordance with the facilities and traffic conditions.

(2.) The initials and numbers of cars selected, also old light-weight marks, shall be reported to the weighmaster on the prescribed blank.

(3.) Cars should then be cleaned and swept out under the supervision of the yardmaster or some one especially designated.

Cars should be dry and free from snow, ice, false floors, removable stakes, posts, or anything else affecting the weight.

(4.) Missing parts, such as side or end doors, or parts peculiar to certain types of cars should be replaced and included in the marked weight.

(5.) Temporary double decks in stock cars should be removed before cars are weighed.

(6.) The old light-weight stencil marks should be entirely painted out with quick-drying paint.

(7.) Before cars are weighed the accuracy of the scale must be regularly certified by the scale department, scale must be properly balanced and free from interference and the weighmaster must know that cars are clean.

(8.) Cars should not be light-weighed during rain, snow, sleet or heavy winds; except that when cars have been materially changed by repairs, alterations or repainting they must be weighed, even if it is necessary to do so under unfavorable weather conditions.

(9.) Cars should be light-weighed at rest, uncoupled and free at both ends.

(10.) The weights of the cars so obtained should be furnished immediately on the prescribed blank to the car maker, who will mark the cars as provided in Paragraph (a). When desired, any portion of the marks which will not be changed may be marked on the car before re-weighing.

(11.) Complete reports of such re-weighing and re-marking should be forwarded on prescribed form (A)† to the designated transportation and mechanical officers and a copy retained by the weighmaster.

(g) When a car is re-marked the car owner should be notified of the old and of the new weights, with place and date. The proper officer to whom these reports should be made will be designated in *The Official Railway Equipment Register.*

(h) Whenever a weighmaster at a point not equipped for marking freight cars, as provided in paragraph (e) ascertains, as per paragraph (f), the light weight of a car which is not marked in accordance with this rule, he shall attach to the car the prescribed "Light Weight Card" with the light weight and send two copies of the card to the designated officer of the railroad on which the scale is located, one copy to be sent to the owner of the car. The presence of the Light Weight Card on the car shall be authority for re-marking the car at the first available station.

(12.) The placing of advertisements or placards of any kind by shippers upon freight cars is prohibited.

(13.) When private tank cars are unloaded, the owner will issue instructions for empty movement to the agent at point of unloading either direct or through consignee. The agent will bill (†) each car to final destination, showing name of the consignee and full route, using standard form of Revenue Way Bill. The word "consignee" in this connection signifies the party to whom the empty tank car is forwarded. (See Notes 1 and 2.)

(14.) Unless otherwise agreed, the cost of transferring the lading of freight cars or rearrangement of lading at junction points shall be settled as follows:

First—The delivering road shall pay cost of transfer or rearrangement—

(a) When transfer is due to defective equipment that is not safe to run according to Section III.—Mechanical (M. C. B.) Rules, except where the repairs can be made under load as per Section III.—Mechanical (M. C. B.) Rule 2.

(b) When transfer or rearrangement of load is due to contents being improperly loaded or overloaded, according to Section III.—Mechanical (M. C. B.) Rules, or the Interstate Commerce Commission Regulations for the Transportation of Explosives and Other Dangerous Articles by Freight and by Express, or when dimensions of the lading of open cars are in excess of the published clearances of any of the roads covered by the routing.

(c) When transfer is due to delivering line not desiring its equipment to go beyond junction points.

(d) When cars cannot pass the approved clearances of the American Railroad Association.

Second—The receiving road shall pay cost of transfer or rearrangement—

(e) When cars cannot pass clearances (except as provided in Paragraph (d)) or when cars and lading exceed load limit or cannot be moved through on account of any other disability of receiving line.

NOTE.—The word "cars" covers both closed and open cars, but not lading on open cars. The words "load limit" refer to the limits placed on bridges, tracks, etc., and not to car capacity.

(f) When receiving road desires transfer to save cost of mileage or per diem.

15. Private freight cars must be marked with the full name of the owner and proper reporting symbol, or initials and with the number of the car. Mileage settlements must be made with the owner as indicated by the marks on the car, and in accordance with the provisions of published tariffs.

16. Empty cars containing refuse must not be offered in interchange.

Embargo Regulations

The following circular was issued on February 28, by the Transportation Section of the American Railroad Association.

Rule 16, Paragraph B, of the Code of Per Diem Rules, ffective March 1, 1920, provides: "Embargoes must be is-ued by the embargoing road in accordance with the pro-isions of the Embargo Regulations as approved by the American Railroad Association." In accordance therewith he following embargo regulations have been prepared and uly approved to become effective March 1, 1920:

The embargo is a measure intended to temporarily stop cceptance of freight from shippers at points of origin, in rder to avoid congestion.

Embargoes should be placed against consignees who fail o unload or otherwise dispose of freight promptly upon ar-ival, thereby causing an accumulation, or when an accumu-ation appears imminent.

Embargoes must not be placed at request of consignees.

Embargoes are not intended to restrict the movement of ars already loaded or in transit except in emergencies, such s strikes, washouts, or similar occurrences, and in such cases ney must plainly state that cars in transit will not be ac-epted.

For the purpose of uniformity and to expedite the trans-nission of embargoes, the railroads of the United States and Canada will be divided into districts. Each railroad will be ssigned to a district by the Commission on Car Service. Each district will be under the jurisdiction of a railroad rep-esentative who will be designated by the Commission on ar Service. Interchange of embargoes between railroads ill be handled in accordance with instructions issued by the ommission on Car Service. In dealing with embargoes a ailroad will be within the jurisdiction of but one district.

A railroad laying an embargo will notify its own agents nd shall be responsible for issuing it to the designated repre-ntative of each district giving all necessary particulars ecifying what, if any, exceptions are to be made. The rep-esentative of each district receiving an embargo shall be harged with the duty of transmitting it to all roads assigned his district on which the embargoed freight may originate.

The form of the embargo must not be changed in trans-ission. An embargo when transmitted to the district repre-ntative, then becomes the embargo of all roads in his dis-ict.

NOTE: These regulations do not cancel or modify existing nbargoes.

Pursuant to these regulations, the Commission on Car ervice has issued the necessary detailed instructions to make is plan operative.

Troop Movement Bureau to Be Continued

The executive committee, of the association with the con-urrence of the advisory members, has also arranged for he continuation, for a period of 60 days, of the Troop Move-ent Section Railroad Administration, which was originally reated by the association in 1917.

The action of the committee provided for the discontinu-ance on March 1 of all departmental general agents, and their forces, but it is proposed to retain a small working force, in charge of C. F. Stewart, who has been manager of the ection, in Washington, consisting of one statistical and rec-rd clerk, one stenographer and clerk and one mailing, imeograph and file clerk.

A reduction has been made in the expenses of the section at the rate of $168,000 per annum.

It is understood that the routing representatives of the estern, eastern and southern lines now assigned to the roop Movement Section in Washington will be taken over by the respective passenger associations in the territories named and if maintained at Washington they will be paid by and work under the jurisdiction of the passenger associations in conjunction with the manager of the Troop Movement ureau.

The executive committee is of the opinion that the con-tinuation of the proposed arrangement for 60 days will enable full consideration of the matter with the War Depart-ment and a definite determination to be reached as to the future of the organization after March 1. The present activi-ties of the bureau consist of co-operating with the War De-partment in all troop movements of parties of 25 or more, and the representatives of the various passenger associations now assigned to the Troop Movement Section are there for the purpose of handling division of business between the various lines. The plan which was made by the military traffic committee of the passenger association with the War Department, prior to government control, provided for an equitable division of the military traffic on a basis of a five per cent reduction from the established tariff rate. This plan handled in conjunction with the organization estab-lished by the association for handling operating features of the arrangement has been a desirable one from the stand-point of both the War Department and the railroads and should not, in the opinion of the executive committee, be dispensed with until it has had their complete and careful consideration, and the 60-day period after March 1 should be sufficient to reach a definite determination as to the future of the bureau.

Expressions of Opinion from Railway Officers

THE DAILY NEWSPAPERS of Chicago, New York and other cities have printed comments of a large number of rail-way officers on the return of the roads to their owners. Extracts from some of these comments follow:

Roberts Walker, President, Chicago & Alton

The new railroad law will assure temporary financial se-renity, but not buoyant credit. Credit has a chance of being somewhat improved, should borrowing rates fall. But, tak-ing the roads as a whole, they must produce results, pending further legislation and bettered conditions, with their plants as they stand, with small prospect of obtaining funds for the larger sorts of improvement (double track, grade reduc-tion, enlarged terminals, etc.) for which there is already crying need. As many a manager has said to many a super-intendent in the past, "We must do the best we can with what we've got."

Herein are both a threat and a challenge. If private oper-ation be unsatisfactory, the threat of retaking by the govern-ment, this time for good and all, will hang overhead. The challenge is for the ablest railroad minds and courageous financiers, under adverse conditions, to render such good service that government ownership talk will not be tolerated.

Carriers must function so well that the public will swear by them, not at them. Results, not excuses, are what the public will rightfully demand. American individual initi-ative must prove its prowess—or forever hold its peace.

L. F. Loree, President, Delaware & Hudson

I think the railroad men of the country have their work cut out for them, but the return of the roads was the only thing that would have saved the situation. Officials of the Dela-ware & Hudson are very optimistic over the outlook, and we expect a great improvement in service. This, however, will require time, and the public must have patience.

Under federal control the roads were more or less man-handled and the return did not come a bit too soon. The properties were demoralized, and it will take work to put them in shape. The question of passenger rates is a question of the future, and no one can say just what will happen at this time.

I do not consider labor a serious question. We feel confi-

dent that the differences between the employees and employers can be settled satisfactorily.

Hale Holden, President, Chicago, Burlington & Quincy

The railroad did their little bit—yes, they did a big little bit during the war. It was done at a great sacrifice to the roads. It will take years to bring about a general good fellowship between patron and owner.

Marvin Hughitt, Chairman of the Board, Chicago & North Western

The return of the railroads to their private owners is a good thing for everybody concerned. It will take millions to rehabilitate the properties. Transportation doubles values and extensions that were planned years ago with other improvements that have lain dormant because of the war must be started at once. But it takes money to do these things.

E. E. Loomis, President, Lehigh Valley

There is good reason, in my judgment, for optimism regarding the future of the railroads under the Cummins-Esch bill as reported by the conferees. It is constructive legislation, and I believe the Interstate Commerce Commission will handle the problem now put up to it in a big way. I think the commission will sense the country-wide demand that our transportation lines be placed on a solid foundation of credit which will enable them to grow and expand and at the same time meet the service demands of the public.

A. H. Smith, President, New York Central

After a war that has stressed the entire world, the American railroads will come back to their owners weakened by the vicissitudes through which they have passed.

There is a big task ahead. I believe that the lessons of the last 26 months will bear fruit in the constructive application of laws affecting the railroads and in the amendment of any statutes which are found still to be defective.

The greatest difficult that confronts us at the moment is the lack of equipment. Without sufficient equipment the railroads cannot properly function; and the farmer, the merchant, the manufacturer and the citizen will be adversely affected until this weakness is remedied. Poor goods are costly at any price, and poor railroad service, or the lack of equipment to meet the peak requirements of the country, is most expensive.

What are required is equipment and facilities to supply the maximum requirements of the people and recognition by those who use or regulate the railroads that good transportation service is necessary to the prosperity and well-being of the country.

F. D. Underwood, President, Erie

Portraying the plight of the railroads is as redundant as calling gold yellow. War conditions were the last shot given them, under which their good will was vaporized, their staffs demobilized, their traffic diverted and their maintenance deferred.

To give the public acceptable service, and in the meanwhile evolve plans to finance and execute the necessary procedure, will require constant and intelligent effort. The public will need to adopt the axiom that transportation must be paid for in rates commensurate with cost.

A FIRE at Griffin, Ga., on February 23, doing damage to the amount of $125,000, was started by gasoline which was released on the opening of a tank car in which pressure had accumulated.

Grand Trunk Agreement

LAST WEEK in London the stockholders of the Grand Trunk approved an agreement by which the control of the Grand Trunk and its subsidiary companies is to pass from the present stockholders to the government of Canada.

The agreement in substance is as follows:

Holders of the present guaranteed stock of the Grand Trunk of £12,500,000 ($62,500,000) are to turn over to the government their stock and are to receive a guarantee of four per cent annually on the par value of this stock—in other words, the same income which they now receive; but this income to be a liability of the Canadian government instead of the Grand Trunk Railway Company.

Holders of the £3,420,000 ($17,100,000) first preference five per cent stock and of the £2,530,000 ($12,650,000) second preference five per cent stock; holders of the £7,168,055 ($35,840,275) third preference four per cent stock, and of the £23,955,437 ($119,777,185) ordinary or common stock are to receive new guaranteed stock to an amount to be determined by a board of arbitration. This new stock will bear four per cent interest and have no voting power. Holders of the £4,270,375 ($21,351,875) five per cent Grand Trunk debenture stocks, £2,723,080 ($13,615,400) five per cent Great Western debenture stocks, £24,624,455 ($123,122,275) four per cent Grand Trunk debenture stocks, and £308,215 ($1,541,075) four per cent Northern debenture stocks are to receive a guarantee of their present rate of interest and to surrender all voting rights. The value of the preference and the common stocks is to be fixed by a board of three arbitrators, one to be appointed by the government, one by the Grand Trunk and the third to be Sir Walter Cassels, judge of the Exchequer Court of Canada, who is to be chairman of the board. Should Sir Walter Cassels be unable to serve, a third arbitrator is to be agreed upon, who shall be a judge of the Exchequer Court or of the Supreme Court of Canada.

During the interval between the ratification of the agreement and the deposit of preference and common stocks with the government, a committee of management is to manage the affairs of the Grand Trunk "to insure the operation of the Grand Trunk system (insofar as it is possible to do so) in harmony with the Canadian National Railways, the two systems being treated in the public interest, as nearly as possible, as one system." After the preference and common stocks have been deposited with the government, this committee of management is to be discharged. The committee is to consist of five persons, two to be appointed by the Grand Trunk, two by the government and the fifth to be named by the four so appointed.

The limit of the award of value to the common and preference stocks is to be £64,167,667 ($320,838,355) [comparing with a par value of these stocks outstanding of £185,367,460 ($926,837,300)].

The board of directors of the Grand Trunk are to resign and nominees of the government are to be appointed in their places. The pension fund is to be continued and all liabilities thereunder are to be assumed by the government, and all liabilities in regard to the Grand Trunk Pacific shall be taken into consideration by the arbitrators in making a valuation of the common and preference stocks. The Grand Trunk and the government are each to pay the arbitrators selected by them, and the third arbitrator and other common expenses are to be shared equally. The arbitrators are to make their award within nine months from the time of their appointment, and if the award is unanimous it shall be final, but if not unanimous, appeal may be taken by either party on any question of law to the Supreme Court of Canada or to the judicial committee of the Privy Council.

Why Do Engineer Graduates Shun Railway Jobs?

University Professors Say That Other Employment Pays Better and Offers Greater Opportunities

WHAT ARE THE OPPORTUNITIES for the engineer in railway service? One answer to this question will be found in a review of the personal news appearing in current issues of the *Railway Age*. An entirely different one will be obtained through an intimate contact with the undergraduates of the technical schools. On the one hand, we find that definite recognition is being extended to the engineer by his selection for important positions in operating, executive and advisory capacities. On the other hand, we find that railway employment in the minor engineering positions is very much in disfavor. It has been said that railroads are recruiting their men from the poorest of the engineering graduates, in other words, from those who could not secure more attractive employment elsewhere. The contradiction implied by these statements is purely superficial; basicly there is no contradiction at all. The engineers who are now receiving well merited recognition of their value to the roads are men who entered the service some 20 years ago when economic relationships were such that the railways attracted the best of the technical graduates, when the heyday of rapid railway extension cast a glamour about railway employment that compensated in a large measure for low pay.

Railway employment for the young engineer today is in an entirely different status. Whatever the reason, it is a cold fact that the railway position is not as near as attractive to the university graduate as it used to be and the technical schools are not giving the same amount of attention to the courses of study in railway engineering subjects as they did formerly. With a large amount of improvement work in prospect, and with a large competing field for the employment of engineers in highway construction and other lines, the railroads are confronted with a very serious problem.

Obviously there are some basic reasons for this lack of interest in railway work and if the roads are to blame they should make haste to correct whatever objectionable conditions are at fault. As the officers of technical schools are in closer touch with the thoughts, ambitions, and prejudices (if we may call them such), of the embryo engineer, it is believed that the following discussions by professors of engineering will throw considerable light on the present shortcomings of railway employment. While these are presented in critical language the criticisms are constructive and, in nearly all cases, based on personal experience.

The Engineer's Importance Is Discounted

By M. E. Cooley
Dean of the College of Engineering and Architecture, University of Michigan, Ann Arbor, Mich.

The railroad's attitude towards its engineering staff appears to be one of indifference. This is not literally true of course, but because the engineer does his work quietly and effectively and apart from constant contact with the general officers, he is comparatively unthought of. Who for instance gives a thought to the engineering staff charged with the responsibility of making travel perfectly safe on "The Twentieth Century" and "The Detroiter"? In no other branch of the engineering profession is a greater degree of technical skill required, nor a greater responsibility.

The engineer is a money spender of course. It is his business to construct and maintain, and both cost money. It is the money he spends which makes earnings possible. He is like the roots of a tree, which no one sees or thinks about when admiring its beautiful top, and out of the hole of which comes the timber so necessary in many ways. Who thinks of the engineering skill required to construct some of our lighthouses? Yet they make safe the transport of human beings and untold wealth in ships and merchandise. And who thinks of the skill required in the construction of our great tunnels which have shortened the world's distances? Has any man done more to advance the material side of our civilization? Has any man who has done truly great things been less recognized and less recompensed? Well may we inquire *Why?*

Lack of Attention to Personnel

By Wm. G. Raymond
Dean of the College of Applied Science, State University of Iowa, Iowa City, Iowa

Why do so few college graduates in engineering go into railroad work? Because there has been so little to look forward to as compared with future prospects in other branches of the profession.

A few men, Mr. Rea, Mr. Story, Mr. Baldwin, Mr. Wilgus, and some others are evidence of the fact that there is not wanting some worth-while opportunity for the very few master minds among engineers in railroad service; but the progress is slow, and for the much larger group of men of more than average ability there is little opportunity for just reasonably early advancement. As to maintenance of way work!! —there is little of the romance of location in these days. Can anyone with a mind capable of dealing with question in the large be satisfied with its mass of petty details and ready to wear formulas? Other industrial enterprises have seemed to appreciate better than the railroads, the value of trained minds in subordinate positions and have made it worth while for college men to seek employment with them, paying these men well while teaching them particular lines of business, and holding out encouragement for the future to those who have ability and who develop aptitude for some line of activity in the business.

No effort is made by the railroads to train young men for general railroad service; no effort is made to find out what they are good for and to place them in the lines for which they are to be fitted. If they prove to be ill adapted to the particular job assigned when they enter employment, they are dropped. But most of those who quit, if my experience with graduates is a fair indication, quit of their own accord because they see ahead of them much older men of mediocre or even apparently excellent ability, of long years' experience, working along at fussy details on small salaries, with little expectation of a better future, with little disposition to advance the men under them or to report excellent work to superior officers. They find a sad lack of *esprit de corps* —it is every fellow for himself.

This is a general indictment—there are exceptions.

The young college graduate in engineering is a person whose training should have taught him to reason from cause to effect, to think—and not to jump at conclusions from insufficient or inconclusive data. He is a very variable product, to be sure, but if of equal ability with others in other directions he is the man who should make the best operating officer. He is the man who should be under observation; who should be trained in the business of railroading. I suspect

that a fundamental difficulty is that this fact has not been realized by responsible management. Until it is realized and acted upon will it be strange that college professors, even those whose specialty is railroad engineering, advise students to look elsewhere than to the railroads for employment?

Remuneration Not Commensurate With Services

By Fred Asa Barnes,
Professor Railroad Engineering, Cornell University, Ithaca, N. Y.

Some years ago, one of my colleagues introduced a lecture on his field of engineering with the statement that it was remarkable for the opportunities it offered for useful and altruistic service to one's fellow men but, less injurious inferences might be drawn from the well known experiences of teachers and other "altruistic" workers, added that the financial rewards were moreover quite satisfactory. A most cursory review of the benefits to humanity brought about by and daily dependent upon our railways will convince anyone that the first statement applies rigorously to the field of railway engineering but a decent respect for truth would prevent one from adding that the rewards are commensurate with the importance of the service.

And this is why many young men have for years gone into the railroad field only because they found it impossible to secure work in other lines and why, now that work in other fields is available, both young and old are leaving the railways. During the past week alone, I have learned of two of our graduates with some years of successful railroad experience, who are quitting the field.

In my opinion, the blame for this situation rests squarely upon the roads, since they have, with astonishing lack of foresight, persisted in the policy of paying engineers less than the service was worth. Loss of many of their best men and the shortage of engineers are the natural results of that policy just as excessively representative legislation naturally followed similar shortsightedness on the part of railway owners and managers of two or three decades ago.

There is no use in crying over spilt milk, however, and the crying need now is to find a solution of the problem which will give the best results from the millions which must be expended in the next few years if our railroads are to continue to serve the transportation needs of the country at all adequately, for there is danger that the control of much of this outlay will be in competent hands.

The primary need is, of course, for legislation which will thoroughly rehabilitate railroad credit, for the roads must successfully compete for capital with other projects before they can compete for materials, labor and engineering services to carry out the extensive improvements now needed. The competition for all these things will be keen and the fact that the successful rehabilitation of the railroads is essential to the economical execution of much of the rest of the program of construction is not likely to lead to action giving them the first call on anything.

The competition for engineers will be particularly keen because many have gone into other lines and competent ones can not be trained in a day, or a year, for that matter. I believe the railways should immediately adopt a salary scale somewhat higher than those in other fields and should permanently follow a policy of paying a larger percentage of their total outlay for maintenance and construction to the men who supervise its expenditure.

It is well enough to talk of altruism but to apply it to one class of employees alone is as dangerous as to apply the policy of disarmament to one nation alone. "Might makes right" is pretty much the policy of the organized employees and justice requires that the roads look after the interests of the unorganized ones and see that they get a square deal.

Knowing that "railroading" makes a strong appeal to the imagination of many young engineers, I feel sure that reasonable compensation as compared with other fields will attract able men to railway work and increases commensurate with the increased value of their services as they acquire experience will hold them in it. Furthermore, I believe this policy will result in placing the expenditure of funds in more and more competent hands so that it will really prove the most economical one for the roads to pursue.

In my opinion, there is no real lack of interest in railroad work and I, for one, shall be glad if the time comes when I am not compelled to discourage entrance into that field by owning up that there is "nothing in it" financially. The situation is critical, but the first move is up to the roads. As soon as that move is made, I believe the colleges will co-operate to the best of their ability.

It Is Not Solely a Matter of Wages

By L. F. Van Hagen,
Associate Professor of Railway Engineering, University of Wisconsin, Madison, Wis.

Railway engineering is not popular among Wisconsin students,—practically none of them specializes along railway lines or plans to make it his life work. As a faculty we make no effort to influence students in this matter, because our experience has taught us that, although we can persuade men to try railroading, we cannot make them stick to it. The conditions they meet drive them out of that line of work in short order. Last spring one of the best men we trained at Wisconsin took a railroad job. He had not specialized along railway lines, but, when the time came to select a job, the railway offer seemed to be one of the best. I talked matters over with him carefully, told him frankly that he would be tempted to quit, but explained that transportation is a big business and offers many opportunities for the man who makes good. He stayed with the job about a month. It may be argued that the trouble was with the man and not with the job; but I know the man and I do not think that is the explanation. Besides, his case is but one of several that I could mention; we can place men with the railways, but the railways cannot hold them after they get them.

The causes underlying this aversion to railroading are complicated; and I hesitate to attempt a discussion of them within the limits set for this paper. They fall into two general classes,—those without and those within the power of railway officers to control and modify. In the first class we have, for example, the fact that railroading, which at one time absorbed the bulk of the civil engineers of the country, now shares the field with, and must meet the competition of many other lines of work. Another item of major importance is the antagonistic attitude of public, press, and government toward, and the uncertainties which that attitude has created. No young man wants to go into a business that is not making money, or one in which he will be unduly hampered by outside agencies. We cannot discuss the first class here for lack of space. But we are interested in the second class,—those things over which railway men have control. What can be done to make the railway business attractive to intelligent young men.

As a comprehensive answer to the question just stated, I would say, *"Build up an esprit de corps."* If those railway officers who are responsible for creating and maintaining the organization, will agree that *esprit de corps* is essential to any organization and will then search out ways to develop the spirit of loyalty and service, the deed will be done. The faults that exist will be discovered and removed. What those faults are is immaterial. In my opinion they all arise from

a failure of railway officers to adopt modern methods of handling men and will disappear when more intelligent methods prevail.

And if any among them holds to the theory that salary is the crux of the whole matter, let him hasten to abandon that theory. A good standard of pay will attract men, but, of itself, it will not hold them. I have talked with enough young men about their future plans to realize that although the size of the pay check is a big factor in choosing the first job, it is not the only one that receives attention. After men have been attracted, the conditions surrounding their employment must be such as to hold them.

Transportation is a big and fascinating business that appeals to young engineers. The railways can have the pick of the engineering schools whenever they want our men badly enough. And when our students begin to show an interest in railway matters and a desire for special instruction, this college, and other colleges as well, will quickly meet the demand.

A Prejudice Not Easily Removed

By Clement C. William,
Professor of Civil Engineering, University of Kansas, Lawrence, Kans.

Owing to the discouraging conditions and prospects that have prevailed in the engineering organizations of our railways, graduates of technical schools are not attracted to this service. These conditions have existed so long, moreover, that, notwithstanding many railways have materially increased their salary scales so that, indeed, of all the requests for graduates as assistants that have come to us within the past six months, the railways are among the highest in wage scale, most students still shun the thought of preparing for railway service. Engineering instructors very generally advise students against selecting railway work, for most of these instructors have served unprofitable apprenticeships in railway service under the niggardly conditions that have existed heretofore. These circumstances have become an established tradition, in the minds of the students and several years of optimum conditions will be required to remove this prejudice. By their shortsighted policy, the railways have cut off their supply of technically trained assistants from whom they might naturally expect to select their engineers for higher positions as well as a certain quota of operating officers.

About six years ago, the writer addressed a circular letter of inquiry to the chief engineers and the superintendents of motive power of most of the larger railways of the country asking about the arrangements under which technical graduates were taken into the railway service and about the opportunities for advancement. Some of the motive power departments had definite schemes of apprenticeships, but none of the engineering departments had in operation any definite plan whatever for taking young graduates into their employ. The chief engineer of one extensive system stated that in a few cases, "as occasion offered," they employed technical graduates at $1 per month and transportation (!)—a wonderfully roseate prospect for a graduate who had been led to believe that he had received a training which had an economic value.

Three major complaints are lodged against railway service: (1) low pay, (2) long working hours including Sunday and holiday work without extra pay, and (3) small chance of advancement, particularly into administrative and executive offices. Other industries are not subject to these criticisms and even other lines of civil engineering have offered more favorable opportunities. Railways in employing chainmen or rodmen have secured on a competitive equality college graduate, high school graduate, an ignoramus—anyone who could drag a chain, hold a rod, run a planimeter and add quantities. Apparently there has been no thought of the responsibility of providing the assistant engineers, division engineers or superintendents for the future. The result is now a dearth of technical men in railway service and a deep-rooted prejudice against entering it.

Although recognizing these conditions, we at the University of Kansas have not seen fit to remove railway engineering courses from our curriculum nor radically to diminish the amount of time devoted to them. Railway survey methods are typical of all construction line surveys, viz., railway, highway, irrigation, drainage and other canals, etc. Moreover, the more general courses in the economics of railway engineering are applicable in method of attack to highway and other transportation engineering.

While we have not made any marked reduction in the time devoted to railway engineering subjects, we have shifted the emphasis somewhat. It is the writer's opinion that the railway engineering problems of the future are perhaps more complex and more important than any that have arisen in the past, but that they will be largely economic rather than physical, although fundamentally engineering in their scope. For this reason, therefore, it is the writer's opinion that a civil engineering curriculum should devote some attention to the economics of railway improvement, even at the expense of training in curves and structures. It is our opinion that the young engineer in railway work who sees nothing in his vocation but the alining curves, setting of grade stakes and the calculation of earthwork and other estimates will no more find it a satisfactory field of endeavor than will the structural engineer find his field whose vision is limited to the calculating of stresses and the proportioning of parts.

That an industry of the magnitude of the railways can be successfully and efficiently carried on without technically trained men is incredible. If wages are increased and the hours of working equitably adjusted, youthful technical graduates will again seek employment there, and if provision is made for fair advancement, they will remain in the service. If, however, these three conditions are not made satisfactory, capable young men will not remain in the engineering departments of the railways because other industries have come to an appreciation of the value of the technically trained man and will offer more attractive opportunities. In that case, we may expect to see the more intricate and important railway engineering work done by consulting engineers of vision and capacity, and the regular engineering staffs, inevitably under these circumstances composed of mediocre men, occupied in alining curves, setting construction stakes, making estimates and collecting information on which more expert men will base their designs.

Railroads Have Not Co-operated with the Schools in Selecting Men

By Henry E. Riggs,
Professor of Civil Engineering, University of Michigan, Ann Arbor, Mich.

It is an undeniable fact that the compensation in the railroad service is much less than in other fields of work. There are hundreds of good engineers who have spent from 10 to 25 or more years in faithful, loyal and intelligent service of railroads in positions of large responsibility whose compensation ranges from $2,500 to $3,500 or $4,000 per year at the present time. There are relatively few who are receiving $5,000 or more.

Contrast this with the fact that many graduates, with from 3 or 4 to 10 years' experience, are in positions with industrial concerns and with builders which pay from $3,600 to $6,000 or more. Since the Christmas holidays one of our

alumni with five years' experience left a railroad position at $150 per month to take on at $500, while another, a mechanical engineer with seven years' experience, secured a position with a large rubber manufacturing company, in strictly engineering work, at $4,800 per year. This certainly justified leaving railroad service at $175 per month.

Very much of the expressed dissatisfaction with engineering as a profession comes from railroad men. Twenty-five years ago my old general manager said to me that the engineering department of a railroad is the spending department, and the management has no measure of value as in the case of the traffic department, where a man's worth is measured by the business he gets. This view, which is unfortunately shared by too many people, led me to get out of railroad service. While I have never found any work which was more attractive or enjoyable than railroad work, I have never been so poorly paid as I was when doing the work I liked best of all. I have had the satisfaction of serving my old company at rates many times as much as I received as chief engineer. The compensation paid to consulting engineers by railroads, the much higher rates paid by industrial and manufacturing corporations for similar service in the same communities, and the much greater ultimate earnings of men in these other lines of work, inevitably leads to dissatisfaction and complaint from many men in service whose ability and character is of the highest, and this complaint has a marked effect on college men.

Another fact which we men who are in the position of advisors to young men are bound to take cognizance of is that railway service gives but little opportunity for a man to grow and develop outside of the line of his duties. His friendships are largely limited to the circle of employees of his own road. His work demands so much of his time that he has very little left for recreation or for taking an active part in the duties of citizenship. How many railroad engineers are members of country clubs? of leading clubs in the cities in which they reside? How many are active in chambers of commerce or in civic affairs? Very few, indeed, as compared with those in other lines of work. I have attempted to gather no statistics, but I will venture the assertion that the percentage of railroad engineers who have formed such connections in our cities is very small as compared with the percentage of engineers in other lines of work.

Since December 15, 1919, just two months, the civil engineering department of the University of Michigan has had openings for more than 150 young men, or over ten times as many as completed their work this month. Most of these stated salaries as from $125 to $200 per month, and in case of men with two or three years' experience some offered as much as $250. Two railroad calls offered $90 to $125. Of about one hundred members of the senor class, only two are taking the railroad design and advanced courses, and both of these men are Chinese! No one regrets more than the writer the fact that our college men are not attracted to railway service in the same proportion that they were in the eighties and earlier. Yet they cannot be blamed, as the service does not offer the rewards that it did then.

It is not possible always to pick the winners at the time of graduation, but certainly the universities with carefully kept records covering four years of a young man's life ought to be in a position to furnish information of great value to a prospective employer in the selection of men. The railroads, less than any other industry, avail themselves of this information. When, on the other hand, steel companies, manufacturers, contractors, consulting engineers and men in all lines of activities are seeking men for certain work, or with certain qualifications and lines of experience, and are either asking the university to recommend or are sending their representatives to look over the men, is it any wonder that the railroads get the worst of it?

The railroads should be able to co-operate with the universities exactly as the bridge companies have. If the rail roads will give preference in employment to high-class men who have spent two or three years in preparation for railroad service, and not place them on exactly the same plane as high school graduates, they can get these men. If the roads can get into a position where they can pay adequate salaries, not only to the younger but the older men, and give some reasonable prospect that railway service does not bar a man from taking a real place in his community, they can draw from the best of the college men, but until then nothing can be done to change the present attitude of the student body.

When the writer graduated from college in the early eighties, by far the largest percentage of engineering graduates were entering the railway service, and a large number of the most prominent chief engineers of the country were graduates of the different institutions and actively interesting themselves in securing college men. At that time the greatest era of railroad building that the country has ever seen was at its height. Today the tremendous expansion of manufacturing, the development of fireproofing and building of numerous tremendous office buildings, hotels and mercantile buildings, the present development of good roads and numerous other activities create a demand that is so much greater than the railroad demand and offer opportunities that are so much more alluring than any railway positions that the young graduate is inevitably drawn to some other field.

This condition can only be remedied by better compensation for men in all ranks of railway service and better prospects of advancement than are now apparent. I think that the colleges and universities cannot be accused of lack of interest in transportation. It is, next to agriculture, our largest industry, and above all others it is most important as our prosperity necessarily depends upon the transportation systems of the country. The officers of the railroads will find no lack of co-operation from the universities whenever the universities can be assured of a thorough desire for that co-operation.

The Pay Is Insufficient

By Winter L. Wilson,
Professor of Civil Engineering, Lehigh University, South Bethlehem, Pa.

The railroads do not pay sufficient money to justify the graduate engineer in taking up this line of work. The writer's practical experience has been principally in railway engineering and later in teaching the subject — more than thirty years in all. On account of a great liking for railway work, he has been noting the decreasing proportion of the graduates that take up this work. At least 10 years ago, when railway engineers asked why they did not get the men they wanted from the graduating class, the answer was that they did not offer enough money to compete with other offers the graduates received.

Our university catalog states that the purpose of the civil engineering course "is to give a broad education in those general and scientific subjects which form the foundation of all branches of technology and special training in those subjects comprised under the term of civil engineering." No undue emphasis is laid on any one of the subjects, and the same amount of care and effort is spent in improving and keeping each of them up to date. Therefore, the same amount of attention is given to the preparation of students as railway engineers as formerly.

The greater proportion of our civil engineering students work during the summer vacations, which helps them to form their own ideas of the line of work they wish to follow upon graduation, and very few ask advice. Since railway engineering is a part of the civil engineering course and half

of our instructing force have followed railway engineering before taking up teaching, it is a fair inference that neither the university nor the faculty try to discourage the boys from going into railway work.

Civil engineering students, practically to a man, like the surveying and open air work, but the trouble is that the pay of a graduate entering railway engineering is disproportionately small. A few days ago a track foreman, when asked about his laborers, said, "No dama good, don't knowa the diff betweena de pick and de shob; New York bum." The track laborer is paid 40 cents per hour for eight hours and time and half time for overtime. If he works full time he receives over $80 per month without overtime. A student must spend a large sum of money each year for necessary college expenses and study four years to get his degree, and recently an offer of $90 per month was made for this year's graduates to go into railway engineering.

Practically every engineer who has been in railway work has pleasant recollections of the work itself, regardless of hardships incident thereto. The writer's experience varied from maintenance of way and construction in this country to the inter-continental railway survey through Ecuador and Peru, and he does not regret a day of it, and it hurts to see the young engineers pass it up. When a student about to graduate asks about railway engineering as a life work, all questions can be answered satisfactorily until he asks about the pay. Many students have borrowed money in order to complete their college course, and there is a legitimate reason for seeking pay rather than pleasant work.

The reason why our graduates do not go into railway engineering is because they can get more pay in other lines of civil engineering. This is the question for the railroads to settle and is one item in connection with the unscrambling of the uncooked omelet that has been handed over to them.

Some Encouragement in the Present Situation

By W. K. Hatt,
Professor of Civil Engineering, Purdue University, Lafayette, Ind.

I commented upon this situation in your columns some two or three years ago and there has been no change of sentiment on the part of our students toward railroad work since that time. We have diminished the number of courses in railroad engineering in our curriculum in civil engineering by throwing the railroad field work in the summer camp, and we have diminished also the time given to such work as computation on frogs and switches and yard layouts. This has been necessary because of the insistence of the public upon a broader course of training for engineers, and also to give some consideration to the technology of highway construction and electrical engineering.

I have been impressed with a marked change of attitude on the part of our students toward strictly engineering activities, such as service in the drafting rooms of bridge companies and the maintenance of way organizations of the railroads. Their thoughts are reaching out to sales engineering, so-called, and foreign service and business management. I regret this because it may lead a student to attempt to dodge the thought-developing courses of mathematics and mechanics.

We constantly urge upon the students that there is no better and broader training for general engineering service than one or two years experience on the maintenance of way organizations of our railroads. A recent study of the returns from our alumni have shown us also that, under the government scale of pay, the engineers are doing fairly well in respect to compensation. In my opinion if the operation of the railroads becomes stabilized and the present scale of pay is not diminished so that a man may look ahead to a permanent position with enough pay to support his family, the great attractiveness of service in a large organization like a railway will bring the boys back into line.

It appears to me that the railroad officers must not take a too exalted position with reference to this matter,. If they wish to secure the best brains of our graduating classes they will have to compete for them with other organizations that know the value of a highly developed mental organization. Personally I regret to see so many of these first class men being attracted to the industries, which sell their products to the railroads, rather than to the professional organization of railway engineers.

As I said some two or three years ago, it is up to the railroads to attract the leading men among the graduating classes. It has appeared to me in the past that some of our chief engineers of the railway systems were not imbued with the spirit of sympathy and helpfulness toward their younger colleagues, and that the true interests of the railway organizations would be promoted by a higher sense of responsibility for the interests of the profession.

Final Accounting Instructions of the Railroad Administration

Director General Hines issued on February 24 General Orders No. 66 and 67, the first named prescribing the form and procedure for dealing with the accounts of the Railroad Administration after the return of the roads to private operation on March 1, and the latter dealing with similar matters in relation to water carriers.

These orders contain technical detailed instructions with regard to accounting procedure. Under their provisions creditors of the Railroad Administration for supplies furnished to the railroads during federal control for overcharge claims and loss and damage claims are expected to render their accounts against the railroad companies in the same manner (and against the same line) as they have heretofore filed them with the federally operated railroads. The disposition of these matters by the railroad corporations acting for the director general will be closely supervised by the central administration at Washington, as the liquidation of these matters progresses, but the arrangement will facilitate the handling of the accounts of the Railroad Administration's creditors and will not entail upon them the establishment of new relations or new procedure to secure the settlement of their accounts. This will be true as to the great bulk of items that are unsettled at the end of federal control, though it was stated that, of course, exceptional matters may require special treatment. General Order No. 68 was also issued including instructions regarding the disposition of federal cash and securities on hand.

General Order No. 66 includes the following: To provide accounting procedure incident to the termination of federal control and to re-establish as of the end of federal control the instructions relative to allocation of revenues and expenses as between the United States Railroad Administration and the corporations, applied as of the beginning of federal control, it is ordered that the following regulations be observed in accounting for transactions relating to the federal control of transportation systems:

The separate books of account upon which are recorded transactions incident to federal control shall be continued in use after February 29, 1920, for the purpose of recording federal control transactions after the period of federal operation ceases and until further ordered. Transactions arising out of operations subsequent to February 29 shall not be entered on the federal books, but on the corporate books; likewise all transactions not previously accounted for either on the federal or corporate books relating to the period prior

to federal control should be entered on the corporate books and shall be omitted from the federal books.

(*a*) The federal treasurer's cash book shall be continued in use until further ordered, and all federal control cash transactions arising after the end of federal control shall be entered in such cash book.

(*b*) The total cash, if any, transferred to the corporation from the cash in the hands of the federal treasurer in accordance with General Order No. 68 shall be charged on the federal books to a deferred asset account styled "(Name of corporation)—federal cash, February 29, 1920." The amount of such cash transferred should be entered in the corporate cash book, and on the corporate general books should be debited to the appropriate account or accounts and credited to a deferred liability styled "U. S. Government—Federal cash, February 29, 1920."

(*c*) The balance representing cash in transit applicable to accounts for the period prior to March 1, 1920, shall be charged on such books to a current asset account styled "(Name of corporation)—Federal cash in transit, February 29, 1920." On the corporate books corresponding entry should be made, debiting the appropriate account or accounts and crediting a current liability account styled "U. S. Government—Federal cash in transit, February 29, 1920."

(*d*) When cash is realized from assets of the director general the amount thereof shall be credited through the federal cash book to the proper accounts. This refers to assets recorded as of February 29, 1920, and those subsequently recorded on the federal books.

(*e*) All authorized payments of liabilities of the director general made out of federal cash shall be charged on the federal cash book to the proper accounts.

(*f*) On and after March 1, 1920, all remittances (except those deposited in the federal cash and accounted for as applicable to the agents' and conductors' accounts for February, 1920) received from agents and conductors shall, in the first instance be entered in the corporate cash book and credited to the appropriate accounts on the corporate general books. To the extent that items standing in the account "Agents' and conductors' balances" as of February 29, 1920, are included in such remittances, the amount shall be reported to the accounting department and the aggregate paid over daily into the federal cash. Such payments should be charged on the corporate books to the account "U. S. Government—Agents' and conductors' balances, federal, February 29, 1920." On the federal books the payments shall be charged to "Cash" and credited to the account "(Name of corporation)—Agents' and conductors' balances, federal, February 29, 1920." This method of daily settlements shall apply to agents' and conductors' unremitted cash on hand at midnight February 29, 1920, and to all collections made by agents and conductors during the month of March, 1920, applicable to balances of February 29, 1920.

(*a*) The total of the accounts representing amounts carried as due from agents and conductors appearing on the federal books as of February 29 shall be transferred to the corporate books and debited on the federal books to an account styled "(Name of corporation)—Agents' and conductors' balances, Federal, February 29, 1920." On the corporate books the amount of such balances should be debited to the appropriate account or accounts and credited to a deferred liability account styled "U. S. Government—Agents' and conductors' balances, Federal, February 29, 1920."

(*a*) The total of the account "Material and supplies" appearing on the federal books as of February 29, 1920, shall be transferred to the corporate books and debited to a deferred asset account on the federal books styled "(Name of corporation)—Federal material and supplies, February 29, 1920." On the corporate books the amount of such balance should be charged to the appropriate account and credited to a deferred liability account styled "U. S. Government—Federal material and supplies, February 29, 1920."

(*b*) All material and supplies received prior to March 1, 1920, shall be accounted for in the federal books. All invoices for such material and supplies referred to in the previous sentence as are vouchered after the close of the accounts for the month of February, 1920, shall be covered by federal form of vouchers and the cost of all such material and supplies shall be added to the account "(Name of corporation)—Federal material and supplies, February 29, 1920." On the corporate books the amount of such vouchers should be charged to appropriate account for material and supplies and credited to the account "U. S. Government—Federal material and supplies, February 29, 1920."

(*a*) Railway operating revenues and taxes shall be allocated to the period of federal and corporate operations in accordance with the provisions of the standard agreement.

(*b*) Railway operating expenses, reparation and other claims, hire of equipment and joint facility rents, and any other accounts (except as provided in par. (*a*)), which constitute the basis of the standard return, shall be allocated with reference to the time when incurred as between the period of federal control and the period prior and subsequent thereto.

(*a*) There shall be entered currently after February 29, 1920, upon the federal books referred to in section 1 hereof, a record of all transactions arising out of federal control of railroads.

(*b*) Bills for accounts collectible and vouchers for accounts payable covering all transactions arising out of federal operations shall be prepared, respectively, on United States Railroad Administration bill and voucher forms, recorded in the appropriate federal bill and voucher registers, and charged or credited on the federal books to the appropriate accounts.

January Deficit $64,000,000.

Director General Hines on March 2, authorized the following statement regarding the January earnings:

"Although the railroads are no longer under federal operation, the director general has thought it advisable to keep the public fully informed as to the result of the January operations by the government as soon as the figures became available.

"The preliminary reports of the operating results for practically all of the Class I railroads and large terminal companies in federal operation indicate that the net operating income for the month of January, 1920, from the operation of these properties, will be about $64,000,000.

"Included in this amount, however, is approximately $53,000,000, representing an estimate of the back mail pay for 1918 and 1919 accruing to the Railroad Administration in connection with the decision of the Interstate Commerce Commission of the 23rd of December, 1919, on railway mail pay. Deducting this amount from the net operating income of 64,000,000 reported, leaves a net operating income arising from January operations of $11,000,000.

"If the rental for January could be based on the net operating income earned in the average January of the test period the rental would be $55,000,000, and the excess of expenses and rentals over revenues would be $44,000,000, but since the statute requires in effect that the railroad companies shall be paid for each month of federal operation one-twelfth of the annual compensation the rental payable to the railroad companies will be approximately $75,000,000 and therefore the excess of expenses and rentals over revenues will be about $64,000,000. This amount (without diminution for the increase in mail pay), has been included in the excess of expenses over revenues given in the director gen-

ral's report to the President for the 14 months ending February 29, 1920.

"The operations in January were affected by the unusually

	For the month of January			
	1920	1919	1918	1917
evenue and non-revenue ton-miles per mile of road per day	4,866	4,258	3,878	4,770
r cent of increase 1920 compared with 1919, 1918 and 1917	.....	14.3%	25.5%	2.0%
verage train load	646.	625.	577.	598.
r cent of increase 1920 compared with 1919, 1918 and 1917	.....	3.4%	11.9%	8.0%

vere weather during the month and to an important extent the adverse influences of the coal strike, such as the dislocation of cars and traffic, the high prices and abnormal transportation costs included in the cost of locomotive fuel, and the unsatisfactory quality of much of the fuel that was obtainable.

"Notwithstanding these adverse conditions, an unusually heavy tonnage was handled during the month as compared with previous years and the average train load showed a gratifying increase over January, 1919, 1918, 1917, as indicated by the table.

The total amount of the retroactive mail pay due to the Railroad Administration has been estimated at $73,000,000, but it is understood that a part of it was credited by some of the railroads into their December accounts, while others have not yet included it.

Answer to Labor Leaders on Wage Demands

Bi-Partisan Board to Be Selected for Preliminary Conferences. Labor Unions Accept Plan Under Protest

WASHINGTON, D. C.

AFTER SIGNING the railroad bill on February 28 President Wilson sent to the executives of the 15 railroad organizations a letter replying to their objections to provisions for the settlement of wage disputes and announcing that the pending wage demands will be handled through the machinery thus created. The President thus disposes of the counter-proposal made to him by the labor leaders in their so-called "tentative acceptance" of his proposals of February 13 in which they promised to submit to their constituencies a plan for the creation of a joint special commission composed of an equal number of representatives of the railroads and of the unions to render a decision in 0 days.

The President's letter continues to place his own interpretations upon the various proposals, rather than the interpretation of the labor leaders and their "suggestion" for the creation of a bi-partisan board is accepted to the extent that it complies with the provision in Section 301 of the bill for the consideration and, if possible, the decision of disputes in conference between representatives of the carriers and employees. This section of the bill makes it the duty of all carriers and their officers, employees and agents "to exert every reasonable effort and adopt every available means to avoid any interruption to the operation of any carrier growing out of any dispute," and provides that if the dispute is not decided by the conference it shall be referred by the parties to the Railroad Labor Board created by the law. This conference between representatives of the two parties provided for in the bill, the President says, "appears to be an appropriate substitute" for the committee of experts which he had suggested and for which the railroad executives in their conference with Mr. Hines had already agreed to select representatives.

The President seems to have retained his command of the situation throughout by calmly proceeding along the lines of his original proposal and ignoring the interpretation placed upon it by the labor leaders when they called their meetings, which were attended by about 2,800 delegates, in Washington last week and which resulted only in the adoption of resolutions urging the President to veto the bill.

President Wilson's Letter

The President's letter was as follows:

"Your letter of the 14th instant and the subsequent arguments presented on your behalf with reference to the subject of pending claims for wage increases have had my careful consideration. The passage of the railroad bill by the House of Representatives on the 21st instant and by the Senate on the 23d instant has made it evident that I could not act upon your suggestions until it should be determined whether the bill would become a law or not. It was manifest that if the bill should become a law the negotiation and consideration of the wage matter ought to proceed in harmony therewith.

"The bill having now become a law, the way is open for immediate action on the wage matter in accordance with the terms of the bill. Section 301 of the bill evidently contemplates that the carriers and employees should, as suggested by you, select representatives who will thus constitute a bi-partisan board for the purpose of attempting by conference to agree upon a solution of this wage problem. In accordance with the assurance I gave last August and repeated in substance in my letter of the 13th instant, I shall at once request the carriers and the employees to join in this action. I believe such a step will go far toward clarifying and maturing the subject for final disposition. In fact, the sort of board thus contemplated by section 301 appears to be an appropriate substitute for the committee of experts which I have heretofore suggested, and indeed such a board will be authorized to go further than such a committee could have gone.

"While it is true that the provisions of section 307 of the railroad bill relating to the labor board will probably also come into operation as to this wage matter, nevertheless the bi-partisan board can make a great deal of progress which will materially diminish the time to be consumed by the labor board; and while the bi-partisan board is functioning, the appointment and organization of the labor board can be expedited.

"I cannot share the apprehension of yourselves and your constituents as to the provisions of the law concerning the labor board. I believe those provisions are not only appropriate in the interest of the public, which after all is principally composed of workers and their families, but will be found to be particularly in the interest of railroad employees as a class.

"The argument that the public representatives on the labor board will be prejudiced against labor because drawn from classes of society antagonistic to labor can and ought to be overcome by selecting such public representatives as cannot be charged with any such prejudices. Nor do I anticipate that the public representatives will be against wage increases because they involve rate increases. Not only must public

representatives be selected who can be relied upon to do justice, but the bill itself provides that the labor board shall establish rates and wages and salaries which in the opinion of the board are 'just and reasonable'; and it is further provided that the entire labor board shall be guided by the very important standards which are provided in the law, those standards including the wages paid for similar kinds of work in other industries, the relation between wages and the cost of living, the hazards of the employment, the training and skill required, the degree of responsibility, the character and irregularity of the employment, and the correction of inequalities as the result of previous adjustments. Coupled with the direction to the labor board to take into consideration these important standards is the highly important direction to the commission to prescribe rates sufficient to admit of the payment of the reasonable operating expenses including, of course, fair rates of wages.

"My hopes are that the putting into effect of these provisions with a carefully selected labor board whose public representatives can be relied upon to be fair to labor and to appreciate the point of view of labor that it is not longer to be considered as a mere commodity will mark the beginning of a new era of better understanding between the railroad managements and their employees, and will furnish additional safeguards to the just interests of railroad labor.

"I am sure that every agency which will be involved in the creation of the labor board and in the conduct of negotiations fully appreciates that the wage demands are entitled to the earliest possible consideration and disposition, and therefore I do not anticipate delay in the appointment and organization of the labor board or in the other necessary steps."

President Wilson was urged to veto the railroad bill by the chief executives of the "standard recognized railroad labor organizations," as they call themselves, who were parties to the recent wage negotiations with the director general and the President, who called on Secretary Tumulty on February 26 "by unanimous instruction of the duly authorized representatives of the respective organizations" that had been holding meetings to consider the President's proposals for settlement of the wage question, and presented resolutions setting forth the reasons why "the more than two million railroad employees believe the President should veto the railroad bill and return it to Congress."

On March 2 the President addressed letters to Chairman Cuyler of the Association of Railway Executives and to executives of the railroad labor organizations, asking them to select such number of representatives as may seem appropriate to them to conduct the conference and negotiations contemplated by Section 301 of the act, and thus initiate the necessary proceedings and to advise Director General Hines of the representatives selected. In the letter to Mr. Cuyler he reviewed the negotiations which had led up to this stage and added:

"Since the railroad companies have now resumed the operation of their properties, and since the transportation act has become a law, the way is open for the immediate handling of the wage matter in accordance with the procedure contemplated by that law.

"I believe all will agree that the matter calls for the earliest disposition and for the most active and earnest cooperation to avoid any delay whatever in bringing it to a conclusion. Section 301 of the transportation act contemplates that the carriers and employees may and ought to select representatives who will in effect constitute a bipartisan board for the purpose of attempting by conference to agree upon a solution of wage problems subject to other provisions of the law.

"In view of the generality of these demands, affecting the railroad employees on all the railroads which have been under federal control, and in view of the manifest desirability and justice of the earliest possible disposition of the demands, I request that the railroad companies select such number of representatives as may seem appropriate to them to conduct the conference and negotiation contemplated by Section 301 to the end that such representatives may promptly meet in conference with representatives selected by the employees in accordance with the request I am making of them and may thus initiate the necessary proceedings.

"I shall be obliged if you will advise the director general of railroads as to the representatives selected as here requested. As soon as he receives such advice, and advice as to representatives selected by the employees, he will arrange for all such representatives to begin their conferences and at such conferences questions of procedure can be settled and any question that may be raised as to whether the number of representatives of either the carriers or employees is sufficient can also be dealt with.

"I understand that your association represents almost all the principal railroad companies in the country, and I am proceeding on the assumption that whatever is done by the railroad companies included in your association will for practical purposes serve as an effective and adequate dealing with the problem, and that other railroad companies so far as they may be interested will speedily associate themselves with the companies of your association in carrying the matter forward. I am therefore not undertaking to address individually all the railroad companies in the country."

Resolutions from Labor Leaders

The resolutions presented by the labor committee, prepared after several conferences in which Glenn E. Plumb participated, expressed vigorous opposition to the provisions for the creation of the Railroad Labor Board, which were said to represent an attempt to deprive the railroad employees of their former "inherent right" to determine their wages by negotiation between employee and employer.

The resolutions submitted by the railroad labor leaders follow:

"Whereas, The Congress of the U. S. has passed a bill known as the Transportation Act, 1920, now before you for your consideration; and,

"Whereas, This bill violates in its provisions the fundamental principles of American government in that it guarantees to the owners of railroad securities a right to charge for the service which railroads afford the public such rates as will produce a minimum net return of 5½ per cent upon that uncertain and intangible thing described in said bill as the 'aggregate value of the railroad properties of such carriers;' and,

"Whereas, This is a grant of a particular exclusive and special privilege distinct from those enjoyed by investors in other securities in other industries; and,

"Whereas, This grant of privilege is not based upon a consideration of services rendered to the public or upon the value rendered by any particular carrier but is an exercise of governmental power for the private interest of a paticular class of men, viz., those who own railroad securities; and,

"Whereas, This bill establishes a tribunal authorized to fix prices to be paid for labor in the operation of such railroads so privately owned, thereby attempting to deprive the employees of railroads of their former inherent right to determine the amount of wages they should receive by negotiation between employer and employee; and,

"Whereas, Such provisions create an invidious class distinction against labor employed upon railroads in contrast with the beneficial class distinction conferred upon investors in railroad securities; and,

"Whereas, Said bill singles out from the broad field of labor employed in other industries labor employed on railroads being subjected to this method of governmental price fixing; and,

"Whereas, We as American citizens believe that this

marks a departure from the principles of American democracy as established in our constitution; and,

"Whereas, We are advised that in order to settle the pending wage questions now undetermined we might, under the provisions of this bill be compelled to submit to an indefinite and unreasonable delay in that we may be required to originate anew with each one of the more than two thousand privately owned railroads the wage questions now under consideration and only after it had been determined in each of such negotiations that an agreement could not be reached could we present such issues to the labor board created by said bill. It is apparent that if the adjustment of these questions is long delayed it will result in great numbers of railway employees leaving the service of the railroads and obtaining employment in other industries under more satisfactory conditions and that such results will seriously hamper the efficient operation of the railroads; and,

"Whereas, The provisions of said bill creating the Labor Board permit indefinite delays in the creation of the Board in that:

1. The Interstate Commerce Commission must first prescribe the regulations under which nominations shall be made and before they can prescribe such regulations they must give notice and hold hearings for the purpose of determining the rank and class of subordinate officials and employees who come within the provisions of this bill; and,

2. Thereafter, appointments must be made by the President; and,

3. Such appointments must be ratified by the Senate, thereby affording further possibility of delay; and,

4. The board then created must establish offices in Chicago, complete its organization and prepare for the beginning of hearings before the solution of any questions can be entertained; and,

5. It is further provided that in case an agreement is reached between officials and employes, or a decision rendered by the adjustment board, should such adjustment boards be mutually agreed to and established, the said Labor Board shall have the power to suspend such agreements or decisions if in the opinion of the Labor Board such agreements or decisions involve such an increase in wages or salaries as will be likely to necessitate a substantial readjustment in the rates of the carrier; and,

6. The bill provides that any decision of the Labor Board affecting increased wages or salaries or improved working conditions cannot become effective unless such decision is concurred in by at least one of the public representatives on said board, thereby conferring upon the representative of the public the arbitrary power to annul any decision that may be unanimously agreed upon by the representatives of the officials and employees; and,

"Whereas, We further believe that the inequities, uncertainties, delays and ambiguities of this bill will promote unrest and intensify existing causes of disagreements and prevent the orderly adjustment of grievances between labor employed upon raidroads; and,

"Whereas, The provisions of this bill abrogate the right and freedom of collective bargaining and substitute therefor an indefinite and uncertain method of compulsory adjustment or arbitration of disputes; now, therefore,

"Be It Resolved, That we, the organized body of employees, making possible the operation of the railway systems of the United States, with a full sense of our responsibility to ourselves, our families and the people of our country, and wholly desirous of assisting in a definite and orderly manner consistent with American constitutions and principles, the reaching of an equitable solution of this problem, do now request that you veto this bill and return it to the Congress of the United States without your approval, firmly believing that only by such a course can an orderly solution of the problem now confronting the American people be achieved, and we respectfully request that you consider this resolution in connection with the memorial addressed to Congress, a copy of which was placed in your hands on February 21."

The executive officers of the railroad labor organizations remained in Washington for several days in conferences and, after apparently reaching the conclusion that the only course remaining to them was to "go along" with the plan presented to them by the President and the new law, for most of the officers have been most reluctant to press the issue to a strike, it was announced on Tuesday that 13 of the organizations had decided to accept the plan. The United Brotherhood of Maintenance of Way Employees and Railroad Shop Laborers did not participate in this decision but announced that it would hold a meeting in Chicago on March 4 to decide on its course of action.

While it is said the preliminary conferences of the bipartisan commission may be held in Washington, Congress has arranged for a general decampment of labor leaders from Washington by deciding upon Chicago as the headquarters of the Railroad Labor Board.

The announcement of the executive committee of the affiliated railroad organizations was as follows:

"A meeting of the duly authorized executives of the standard recognized railroad labor organizations was held March 1 to canvass the action of the representative groups of representatives who have been in conference in this city beginning February 23 to consider the President's letter of February 13, the enactment of the railroad bill and the President's letter of February 28.

"The result of this canvass showed all organizations except the United Brotherhood of Maintenance of War Employees and Railroad Shop Laborers were authorized to make the following announcement as to their policy and attitude:

"Notwithstanding the fact that labor in general and railroad labor in particular, with the full support and co-operation of other bodies representing American citizens, urged the Congress not to pass the railroad bill, and the President to veto the same and return it to Congress, we are now officially advised the President has signed the bill and it is a law.

"Labor's criticisms and protests against the legislation are matters of record and were presented to the Congress, the President and the public.

"We have not changed our views in regard to this legislation and therefore do not endorse the law; however, as American citizens we feel that in the interests of railroad labor there is nothing left for us to do at present except to cooperate with each other in the prompt creation of the machinery provided for in this law.

"In the case of the United Brotherhood of Maintenance of Way Employees and Shop Laborers, this organization has not had duly authorized representatives in conference in this city. Therefore, in compliance with their law it is necessary to convene such representatives. This meeting is to be held in Chicago, Ill., Thursday, March 4, when definite action will be taken."

No further action will be taken by the American Federation of Labor in regard to the bill signed by the President over the protest of organized labor, according to a statement by Samuel Gompers, president of the federation, at Miami, Fla. "What's the use?" Mr. Gompers was quoted as saying.

The Plumb Plan League, through which much of the opposition to the railroad bill was voiced, signalized the taking effect of the bill by removing its offices from the Munsey Building, in Washington, to larger quarters from which to conduct its proposed political campaign for the purpose of defeating all Congressmen who voted for the bill and bringing about the control of the railroads under the Plumb plan. The new offices occupy an entire floor of the new building erected by the machinists' union, which is not only nearer the Capitol than the former offices, but is also located across the street from the American Federation of Labor building in such a way that the league may be able to conduct what is by many deemed a most necessary part of its propaganda by flaunting the gold plate lettering on its windows in the face of Mr. Gompers as he sits in his office.

Train Accidents in January*

The following is a list of the most notable train accidents that occurred on the railways of the United States in the month of January, 1920:

COLLISIONS

Date	Road	Place	Kind of accident	Kind of train	Killed	Injured
1	Texas & Pacific	Aledo, Tex.	hc	P. & F.	0	23
†11	Oregon Short L.	Chalk	xc	P. & F.	2	0
*16	Detroit, T. & I.	Hamler	rc	F. & F.	2	6

DERAILMENTS

Date	Road	Place	Cause of derailment	Kind of train	Killed	Injured
1	Southern	Clinton, Tenn.	d. switch	P.	0	0
1	Missouri, K. & T.	Huntsdale, Mo.	acc. obst.	P.	1	1
†3	Chicago G. W.	Wyeth, Mo.	b. rail	P.	1	89
3	Pennsylvania	Shawkin	acc. obst.	P.	0	2
6	Louisi. & W.	Newhope, Ky.	b. rail	P.	0	38
7	Chi., Mil. & St. P.	Watauga	d. bridge	P.	0	18
17	Texas & Pacific	Colorado	d. track	P.	0	5
20	New York Cen.	Wesleyville, Pa.	ice	P.	0	0
†20	Pennsylvania	New Waterford.	unx.	P.	1	16
23	Illinois Central	Stoy	acc. obst.	L.	0	2
26	Erie	Pottersburg	unx.	P.	0	4
27	Atlantic C. L.	Dillon, S. C.	b. rail	P.	0	0
29	Louisville & N.	Sulphur, Ky.	—	P.	0	1
31	Rutland	Grand Isle, Vt.	b. rail	P.	0	15

OTHER ACCIDENTS

Date	Road	Place	Cause of accident	Kind of train	Killed	Injured
1	West. Maryland.	Clear Sps., Md.	Boiler	F.	3	3

The trains in collision on the Texas & Pacific near Aledo, Texas, on the first of January, about 4 a. m., were an eastbound passenger and a westbound freight. Both locomotives, one baggage car and four freight cars were damaged. Twenty-two passengers and one employee were injured, one of the passengers being a man on the freight train in charge of an emigrant car.

The trains involved in the collision on the Oregon Short Line near Chalk, Idaho, on the 11th of January, about 1 a. m. were a westbound freight and a following passenger train, No. 17. The freight train had to be divided into two parts to ascend a grade, and 32 cars at the rear eluded control and ran back into the head of the passenger train. The passenger train was flagging through the block, and the flagman, having seen the approaching freight cars, succeeded in having the passenger train stopped, and it was moving backward, about eight miles an hour, when struck. The engine of the passenger train, and 15 cars and the caboose of the freight were badly damaged. Two drovers in the caboose of the freight train were killed.

The trains in collision on the Detroit, Toledo & Ironton at Hamler, Ohio, on the 16th, were a northbound wrecking train and a local freight. The wrecking train, having right of road only to the south switch, ran beyond its limit and collided with the freight, which was switching in the yard. The caboose of the wrecking train was at the front end, and this was wrecked. The caboose stove was overturned and the wreck took fire; and of the men in the car, two were burned to death and six others were injured.

The train derailed near Clinton, Tenn., on the first of January, was the southbound "Carolina Special." The engine and tender were thrown off the track while running at 15 miles an hour, and were overturned; but the engineman and fireman escaped injury, and no cars were derailed. The cause of the derailment was a loose switch rail.

The train derailed near Huntsdale, Mo., on the first of January, was eastbound passenger No. 10. The locomotive was thrown off the track, while moving at about 35 miles an hour, by striking a bowlder which had fallen from a high cliff, and, with three cars, was ditched. The fireman was killed, and the engineman injured.

The train derailed near Wyeth, Mo., on the 3d, was westbound passenger No. 3. Running at 40 miles an hour, the engine was thrown off the track by a broken rail, and five coaches fell down a bank. One passenger was killed and four seriously and 85 slightly injured. The broken rail was one of 85 lb. section, laid in 1904. The breakage started in a small transverse fissure.

The train derailed on the Pennsylvania Railroad near Shamokin, Pa., on the night of the third, was eastbound express No. 510. The locomotive was knocked off the track and overturned by a freight car which had been derailed on a side track and fell against the passenger engine, the derailment of the car happening at the moment the passenger train was passing. The engineman and fireman were injured. The freight car which made the trouble had been part of a train left standing on the main track at Scott Colliery, on a branch, some distance from the main line, and had run at high speed down a steep grade to a passing track adjacent to the main line. The car ran some distance on the passing track and was derailed at a derailing switch, which was intended to protect trains on the main line from an accident of this kind; but the car was running so fast that its body was separated from its trucks and fell against the locomotive, as before stated.

The train derailed on the Louisville & Nashville at Newhope, Ky., on the 6th was northbound passenger No. 22. Twenty-five passengers, 10 employees and three other persons were injured. The cause of the derailment was a broken rail.

The train derailed near Watauga, S. D., on the 7th was the westbound Columbian express. The third and fourth cars in the train, day coaches, broke through a bridge which had been weakened by fire and fell to the creek, about nine feet below. Of the 18 injuries to persons, only one was classed as serious.

The train derailed near Colorado, Tex., on the 17th was eastbound passenger No. 2. Running at 18 miles an hour the engine and three coaches were overturned. Five passengers were injured. The derailment was due to a loose rail.

The train derailed at Wesleyville, Pa., on the 20th was westbound passenger No. 21. Running at about 30 miles an hour as it passed a coal chute the locomotive was thrown off the rails by striking a mass of ice. After running several hundred feet to a switch, it was ditched.

The train derailed near New Waterford, Ohio, on the 20th was westbound express passenger No. 1007. The train consisted of two locomotives and 11 cars; nine of the cars went off the track, and some of them fell down a bank about ten feet. One passenger was killed and 13 passengers, two employees and an express messenger were injured. The cause of the derailment was diligently sought for, but was not discovered. The roadway was in excellent condition.

The train involved in the accident on the Illinois Central near Stoy, Ill., on the night of the 23d was a westbound passenger. The engine was lifted and thrown off the track by an explosion of nitro-glycerin. The track was damaged and the engine was separated from its tender, but the only injuries reported were those of the engineman and fireman, who were slightly cut by flying glass. The nitro-glycerin had been placed or dropped by some person or persons unknown.

The train derailed near Pottersburg, Ohio, on the 26th was eastbound passenger No. 16. Running at about 40 miles an hour the tender was thrown off the track by some cause unknown. After running about 200 feet to a switch the whole train was derailed and two cars were overturned; but no passengers were seriously injured. The engineman, the fireman, the baggageman and one mail clerk were injured.

The train derailed near Dillon, S. C., on the 27th was northbound passenger No. 86. Running at about 25 miles

*Abbreviations and marks used in Accident List:
rc, Rear collision——hc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc, obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

an hour the engine and six cars were thrown off the track in a cut, and the engine was overturned. All of the passengers and trainmen escaped without serious injury. The cause of the derailment was a broken rail.

The train derailed near Sulphur, Ky., on the 29th was eastbound passenger No. 4, second section. Running at about 30 miles an hour, the locomotive and first five cars were derailed, and the engine and three coaches were overturned. The baggageman sustained slight scratches, but the passengers and all the rest of the trainmen escaped serious injuries.

The trail derailed on the Rutland Railroad near Grand Isle, Vt., on the 31st of January was northbound passenger No. 51, consisting of two locomotives and eight cars, all of steel or with steel underframes. Moving at moderate speed the second locomotive was thrown off the track by a broken rail and was followed by six cars, though one baggage car was found on the rails after the train stopped. One sleeping car fell to the ice of Lake Champlain and broke through, and some of the passengers were thoroughly wet in freezing water. The temperature of the atmosphere was reported 38 deg. below zero. Fifteen passengers in the overturned car were somewhat cut and bruised, and some of them were frost-bitten. This accident was reported in the *Railway Age* February 6, page 434.

The train involved in the accident on the Western Maryland at Clear Spring, Md., on the 1st of January was an eastbound freight. One of the two locomotives drawing the train was wrecked by the explosion of its boiler, and three employees on it were killed. Part of the wreck fell on the other locomotive and three men on that engine were injured.

Canada.—A collision on the Canadian Pacific near Corbeil, Ont., on the 25th resulted in the death of nine persons and the injury of 25. This collision was reported in the *Railway Age* of January 30 and February 6. Westbound passenger No. 1 stopped because of failure of steam in extremely cold weather, was run into at the rear by the second section of the same train, torpedoes placed by the flagman of the standing train having failed to attract the attention of the engineman of the second section. The principal derailments reported in Canada in January were those at Mackay's Siding, N. S., on the 10th; at Marbleton, Que., on the 12th and at Campbellford, Ont., on the 21st. In the last mentioned case eight persons were reported injured; the others resulted in no very serious injuries.

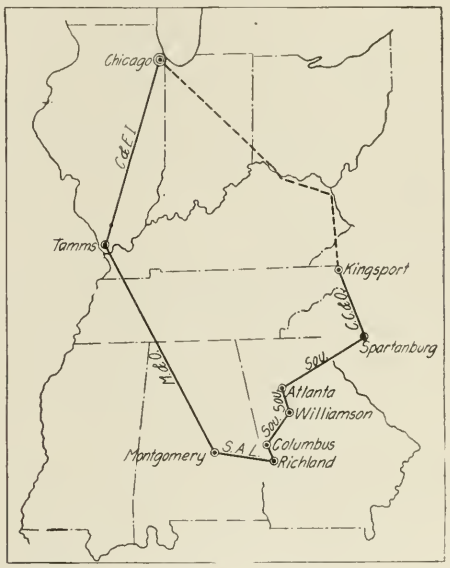
Electric Car Accidents.—Of the five electric car accidents reported in the newspapers of the United States as occurring in the month of January only one appears to have been attended with fatal results. This was the derailment at Prince Crossing, Ill., near Elgin, on the night of the second, when a passenger car struck a freight car which had fallen on the track from a train of the Chicago Great Western, which crosses above the electric line. One motorman and one passenger were killed and eight passengers were injured. The freight car had been derailed and been thrown out of a freight train without doing damage to the rest of the train; and the two parts of it were afterward coupled together by the trainmen without the loss of a car being discovered. The other accidents were at Allen, Tex., Richmond, Ind., Freemont, Ohio, and Fort Worth, Tex. In the last named case a locomotive struck, at the same time, two electric cars on a crossing, one moving east and the other moving west. Nine persons were reported injured.

New enterprises were incorporated under the laws of the principal states in February, with an authorized capital of $1,158,861,000, involving 945 concerns, as compared with a total of $323,635,000 in the same period last year, when less than 500 companies were organized.

Large Boilers Present Routing Problem

TWO HIGH-POWER BOILERS, each 11 ft. square, purchased by J. F. Davis & Co., Chicago, from the DuPont Company, Barksdale, Wis., and sold by the former on the basis of delivery to the Tennessee Pulp Corporation, Kingsport, Tenn., recently presented a routing problem which has required over two months for solution. Soon after the purchase was made the boilers were loaded on flat cars, and subsequently it was discovered that the cars and their cargo measured 11 ft. and 4 in. from the top of the rails to the top of the boilers and 11 ft. wide at the top. These measurements are greater than the clearances on the majority of central western railways, and it seemed impossible to move the shipment to its destination.

For approximately three months after the boilers were loaded and ready to move the shipment was detained at the point of origin, while central western traffic experts endeavored to route the shipment over lines on which the height and width of the loaded cars would not interfere with their



Map Showing Boilers' Roundabout Journey

movement. It was decided at last to present the problem to the freight traffic department of the Chicago Association of Commerce, and in turn to J. F. Morton, who is in charge of the association's "Way to Ship" publication.

The solution presented by Mr. Morton and the association's freight traffic department is best explained by reference to the map. The shipment is now on a journey of approximately 1,467 miles to Kingsport, whereas the usual shipping distance between these points is 647 miles. It was necessary in solving this problem to find a route for the shipment that afforded the necessary clearances both in height and width. The following table gives the routing, mileage and clearances in height and width:

	Miles	Height	Width
C. & E. I., Chicago to Tamms, Ill.	362	17′	11′
M. & O., Tamms to Montgomery, Ala.	483	18′	11′
S. A. L., Montgomery to Richland, Ga.	110	18′ 3″	11′
S. A. L., Richland to Columbus, Ga.	39	18′ 6″	11′ 4″
Southern, Columbus to Williamson, Ga.	71	17′	11′
Southern, Williamson to Atlanta, Ga.	26	17′ 7″	11′
Southern, Atlanta to Spartanburg, S. C.	192	18′ 1″	11′
C., C. & O., Spartanburg to Kingsport, Tenn.	184	17′ 6″	11′

The dotted line on the map shows the route that would be taken by an ordinary shipment, and the solid lines show the route as outlined by Mr. Morton and over which the shipment is now moving.

General News Department

The Railway Association of Canada has announced an embargo on the sending of Canadian freight cars into the United States. Because of the shortage of cars in the United States American railroads are not returning a sufficient number of Canadian cars, according to the Association, and the embargo is considered necessary in order to relieve the lumber famine in Canada.

The Farmers' National Council, which claims to represent 750,000 farmers in 18 states, recently adopted resolutions urging a two-year extension of government control of the railroads and endorsing the enactment by Congress of a law embodying the principles of the Plumb Plan. These resolutions were adopted in support of the general principles proclaimed by the National Farmer-Labor Co-operative Conference held at Chicago from February 12 to 14.

The threatened strike of the 300,000 members of the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers, has not been cancelled but has been merely postponed, according to a recent announcement of Allen C. Barker, president of the brotherhood. The announcement was accompanied by statements intimating that the strike will be called if relief is not granted speedily to the members of the brotherhood in the form of wage advances.

Reports of the merger of the Northern Pacific, the Great Northern, and the Chicago, Burlington & Quincy, which have been widely circulated throughout the country, have been emphatically denied by executive officers of the three railroads involved. The story of the merger as announced in the daily press is absolutely without foundation, according to these officers, and is probably due to that feature of the railroad bill permitting consolidation of railroads in accordance with the general consolidation plan to be prepared by the Interstate Commerce Commission.

The Executive Committee of the Steam Railroad section of the National Safety Council, at a recent meeting held at Chicago, planned the work of that section for 1920. Improvements were planned in the section's bulletin service, the program for the 1920 Safety Congress was discussed and Dr. Payne's plan for safety education, a description of which appeared in the *Railway Age* of January 30 (page 383), was endorsed. The work of the Bulletin Committee of the section, as outlined at this meeting, includes the preparation of a weekly illustrated bulletin on some hazard peculiar to steam railroad operation, the issuance monthly of a mimeographed letter and safe practices pamphlets.

The mechanical and electrical features of the new Westinghouse electric passenger locomotives for the Chicago, Milwaukee & St. Paul were explained by N. W. Storer, of the Westinghouse Electric & Manufacturing Company, in an illustrated talk given before the Railway Club of Pittsburgh, on February 26. As the slides were thrown on the screen, Mr. Storer told how each part of the locomotive was constructed and the reason for the adoption of that particular feature. The construction of the wheel trucks, the method of supporting the cab, the drawbar connection and the method of drive were points of particular interest to the railway men present. A description of the details of this locomotive will appear in an early issue of the *Railway Age*, together with a similar description of the electric locomotive built for the St. Paul by the General Electric Company.

The joint ticket offices participated in by the Pennsylvania Railroad number 26, in 23 different cities; and George D. Dixon, vice-president, announces that the company deems it to the advantage both of itself and the public that these offices be continued permanently. The other roads which share these offices hold the same view, at least to the extent that it has been agreed to maintain all of the offices for the present. These offices are in the following cities: Atlantic City, N. J.; Baltimore, Md.; Brooklyn, N. Y.; Buffalo, N. Y.; Chicago, Ill.; Cincinnati, O.; Dayton, O.; Grand Rapids, Mich.; Indianapolis, Ind.; New York city, N. Y.; Newark, N. J.; Norfolk, Va.; Philadelphia, Pa.; Peoria, Ill.; Old Point Comfort, Va.; Pittsburgh, Pa.; Reading, Pa.; Rochester, N. Y.; St. Louis, Mo.; Toledo, O.; Washington, D. C.; Williamsport, Pa.; Wilmington, Del. It is the intention to rearrange the offices so that each road will have its own separate employees, at a designated part of the counter, so that there may be no misunderstanding as to responsibility for efficient service.

Correction

In the article on "Freight Traffic Movement and Car Performance," published in the *Railway Age* of February 6, 1920, page 418, there was included the following statement taken from a foot-note to the report: "Because of a change in the reports, however, this report covers 31 days, while that for December, 1918, covered only 30 days." This foot-note applied to only one road included in the report and not to the total figures used in the article.

Castleton Bridge

The New York State Court of Appeals on March 2 handed down a decision in favor of the New York Central in its suit to annul the New York statute forbidding the construction of a bridge of two spans across the Hudson river at Castleton, N. Y., nine miles south of Albany. The court holds that the federal government, which has authorized the construction of a bridge of two spans, has authority concerning the use of lands under water superior to the authority of the state. It is understood that the railroad company will now proceed with its arrangements for beginning the construction of the bridge.

The city of Albany had been back of the restrictive legislation, the plea of the city being that the construction of a freight line around the city was inimical to its interest. Albany's objection was based on the claim that a pier in the river would be an unreasonable obstacle to navigation, but this plea was rejected by the secretary of war, and it was shown that a single span bridge would require 18,000 tons of steel more than a bridge of two spans. The design prepared by the railroad provides for a span over the main channel 600 ft. long which allows for a channel wider than that in many parts of the river below the bridge. A single span would have to be 1,000 ft. long.

The plans for the bridge were the subject of articles in the *Railway Age* of February 2, 1917, page 192, and July 12, 1918, page 46.

Map Making Bureaus Co-ordinated

The United States Board of Surveys and Maps, created on December 30, 1919, by an executive order of the President, has perfected a permanent organization and will hold its first public meeting on March 9. The object of this board, as outlined in the President's order, is to co-ordinate the activities of the various map-making agencies of the executive departments of the government and avoid the unnecessary duplication of work which may come about very readily when maps and surveys are being made by independent branches of the government. Under the by-laws of this board, which were adopted on January 16, the board will hold meetings on the second Tuesday of January, March, May, September and November of each year, and solicits representation by various interested activities at these meetings. The board proposes to establish at an early date a map information office in the Interior Department building where it will

ollect and catalogue as rapidly as possible information concern-ng the maps, surveys, etc., prepared under the direction of the ederal government or other governmental and private agencies. The board is composed of one representative each of the Corps f Engineers, the Coast and Geodetic Surveys, the Geological Survey, the General Land Office, the Topography Branch of the Post Office Department, the Bureau of Soils of the Department f Agriculture, the Reclamation Service, the Bureau of Public Roads, the Bureau of Indian Affairs, the Mississippi River Com-nission, the United States Lake Surveys, the International Boundary Commission, the Forest Service, and the Hydrographic Office of the Navy.

Cleaning Up for Private Operation

"Labor," the Plumb Plan newspaper, says that one of its read-rs employed on a southern railroad has sent it a copy of a cir-ular issued by the general manager to all stationmasters, agents, nd other officers in charge of buildings, in which he directs that ll windows in passenger stations be cleaned by March 1, 1920. Of course," the paper says, "the cleaning will be done at govern-nent expense, and will effect just that much of a saving for the wners of the road."

A. I. E. E. to Hold Electric Traction Meeting

The 358th meeting of the American Institute of Electrical En-ineers will be held in Pittsburgh on Friday, March 12, under ie auspices of the Pittsburgh Section and the Traction and Transportation Committee. All of the meetings and the dinner ill be held at the William Penn Hotel.

The morning will be devoted to an inspection trip through the ast Pittsburgh plant of the Westinghouse Electric & Manufac-iring Company, where the visitors will be given an opportunity o inspect the electric passenger locomotives which this company now building for the Chicago, Milwaukee & St. Paul. Imme-iately after the inspection the visitors will be given a luncheon t the new lunch club of the Westinghouse company.

The afternoon session will begin at 2:30 o'clock in the ballroom f the William Penn Hotel. The following papers will be pre-nted:

1. Short Circuit Protection for Direct-Current Sub-stations—J. Linebaugh.
2. Flashing of 60-Cycle Synchronous Converters and Some uggested Remedies—Marvin W. Smith.
3. Automatic Railway Sub-stations—Frank W. Peters.
4. Automatic Sub-stations for Heavy City Service—R. J. Vensley.

The authors of papers numbers 1 and 3 are from the General lectric Company, and the authors of numbers 2 and 4 are from ie Westinghouse Electric Company.

A subscription dinner will be held at 6:30 o'clock at which the embers and delegates will be welcomed by H. D. Shute, vice-resident of the Westinghouse Electric & Manufacturing Com-any, and some prominent official of one of the operating com-anies in the Pittsburgh district.

At the evening meeting the design of the new type of electric ocomotive now being furnished the Chicago, Milwaukee & St. aul will be presented by representatives of both of the large lectric companies, N. W. Storer presenting the Westinghous de-gn, and O. W. Batchelder presenting the General Electric design. Calvert Townley, president of the institute, will preside at the eetings.

Farmers Approve Railroad Bill

President Wilson was asked by farmers to approve, and by her farmers to disapprove, the Transportation Act. W. I. rummond, chairman of the board of governors of the Inter-ational Farm Congress, and T. C. Atkeson, Washington repre-entative of the National Grange, approved the law. They spoke r representatives of the International Farm Congress, the merican Farm Bureau Federation, the National Grange, the ational Farmers' Union, the Farmers' National Congress, the ational Milk Producers' Federation, the American Cotton As-ociation, the Dairymen's League of New York and several state rmers' unions. They called for the safeguarding and protec-on of every right of private property and declared against gov-rnment ownership or continued operation of the railroads by e government. They urged the necessity for settled condi-tions in transportation before the next season for crop move-ments.

George P. Hampton, managing director of the Farmers' National Council; H. A. Bissonnette, president of the Iowa State Branch of the American Society of Equity; and E. C. Lassater, live stock raiser, presented arguments for a veto.

"The Southern Serves the South"

Fairfax Harrison, president of the Southern Railway, in announcing the resumption of direct operation of the company's lines, addresses officers and employees "with hearty greetings of affectionate friendship and good-will." He says: "I expect to renew with you that measure of alert service to the public and individual success which distinguished our operations prior to Federal control. Remember that you are again at home, that you are working 'on your own,' as part of an organization in which loyalty, initiative and results are recognized. Remember, also, that now once more 'The Southern Serves the South.'"

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

Air Brake Association.—F. M. Nellis, 165 Broadway, New York City. Next convention, May 5-7, 1920, Chicago.

American Association of Demurrage Officers.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

American Association of Dining Car Superintendents.—S. W. Derr, C. R. R. of N. J., Philadelphia, Pa.

American Association of Freight Agents.—R. O. Wells, Illinois Central, Chicago. Next annual meeting, June, 1920.

American Association of General Baggage Agents.—E. R. Reynolds, C. G. W. R. R., Chicago.

American Association of Passenger Traffic Officers.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—J. Rothschild, Union Station, St. Louis, Mo.

American Electric Railway Association.—E. B. Burritt, 8 W. 40th St., New York.

American Electric Railway Manufacturers' Association.—C. F. J. Dell, 50 E. 42nd St., New York.

American Railroad Master Tinners', Coppersmiths' and Pipe Fitters' Association.—Otto E. Schlinck, 185 W. 5th St., Peru, Ind.

American Railroad Association.—J. E. Fairbanks, 75 Church St., New York:

Section I, Operating (including former activities of Association of Railway Telegraph Superintendents).—W. J. Fripp (chairman), N. Y. C. R. R., New York, N. Y.

Telegraph and Telephone Division.—J. F. Caskey (chairman), Supt. of Telegraph, Lehigh Valley.

Section II, Engineering.—E. H. Fritch, 431 South Dearborn St., Chicago.

Signal Division.—H. S. Balliet, 75 Church St., New York. Next meeting, March 15-16, Congress Hotel, Chicago.

Section III, Mechanical (including former activities of Master Car Builders' and Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago. Next convention, June 9-16, 1920, Atlantic City, N. J.

Section IV, Traffic.—Robert C. Wright (chairman), Assistant Director, Division of Traffic, U. S. R. A., Washington, D. C.

Section V, Transportation (including former activities of Association of Transportation and Car Accounting Officials).—E. J. Pearson (chairman), Federal Manager, N. Y., N. H. & H. R. R., New Haven, Conn.

Section VI, Purchases and Stores (including former activities of Railway Storekeepers' Association).—J. P. Murphy, N. Y. C. R. R., Collinwood, Ohio.

Section VII, Freight Claims (including former activities of the Freight Claim Association).—Lewis Pilcher, 431 South Dearborn St., Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention, October 19-21, 1920, Atlanta, Ga.

American Railway Engineering Association.—(Works in co-operation with the American Railroad Association, Section II.) E. H. Fritch, 431 South Dearborn St., Chicago. Next convention, March 16-18, 1920, Congress Hotel, Chicago.

American Railway Master Mechanics' Association.—(See American Railroad Association, Section III, Mechanical.)

American Railway Perishable Freight Association.—E. F. McPike, 135 E. 11th Place, Chicago. Regular meetings, 2nd Wednesday in March and September.

American Railway Tool Foremen's Association.—R. D. Fletcher, 1145 East Marquette Road, Chicago.

American Society for Testing Materials.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 21, 1920, New Monterey Hotel, Asbury Park, N. J.

American Society of Civil Engineers.—Col. H. S. Cracker (acting secretary), Engineering Societies Building, 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 33 W. 39th St., New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Steel Treaters' Society.—W. H. Eisenman, 154 East Erie St., Chicago.

American Train Despatchers' Association.—D. L. Darling, Northern Pacific Ry., Spokane, Wash.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next annual meeting, February, 1921, San Francisco.

Association of Railway Claim Agents.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J. Next meeting, May, 1920, Atlantic City.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago.

Association of Railway Executives.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

Association of Railway Telegraph Superintendents.—(See American Railroad Association, Section I, Operating.)

Association of Transportation and Car Accounting Officers. (See American Railroad Association, Section V, Transportation.)

Bridge and Building Supply Men's Association. M. J. Trees, Chicago Bridge & Iron Works, Chicago.

Canadian Railway Club.—W. A. Booth, 131 Charron St., Montreal, Que.

Car Foremen's Association of Chicago. Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

Car Foremen's Association of St. Louis.—Thomas B. Koencke, Federal Reserve Bank Bldg., St. Louis, Mo.

Central Railway Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

Chief Interchange Car Inspectors' and Car Foremen's Association.—J. C. Keene, General Car Inspector, Wabash R. R., Decatur, Ill.

Chief Interchange Car Inspectors' and Car Foremen's Supply Men's Association.—D. B. Wright, Lehon Company, 45th and Oakley Sts., Chicago.

Eastern Railroad Association.—D. G. Stuart, Washington, D. C.

Freight Claim Association.—(See American Railroad Association, Section VII, Freight Claims.)

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, B. & O., Lima, Ohio.

International Railway Fuel Association.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May, 1920, Hotel Sherman, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn.

Maintenance of Way Master Painters' Association.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention, October 5-7, 1920, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 25-28, Curtis Hotel, Minneapolis, Minn.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass.

Master Car Builders' Association.—(See American Railroad Association, Section III, Mechanical.)

National Association of Railway and Utilities Commissioners.—James B. Walker, 49 Lafayette St., New York. Next convention, November, 1920, Washington, D. C.

National Foreign Trade Council.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 12-15, 1920, San Francisco.

National Railway Appliances Association.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago. Annual exhibition, March 15-18, Coliseum and Annex, Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Pacific Railway Club.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting 2d Thursday in month, alternately in San Francisco and Oakland.

Railway Accounting Officers' Association.—E. R. Woodson, 1116 Woodward Bldg., Washington, D. C. Next convention, May 12, 1920, Hotel Traymore, Atlantic City, N. J.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York. Next annual dinner, March 31, 1920, Waldorf-Astoria Hotel, New York.

Railway Club of Pittsburgh.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Americus Club House, Pittsburgh, Pa.

Railway Development Association.—D. C. Welty, Missouri Pacific R. R., Little Rock, Ark.

Railway Electric Supply Manufacturers' Association.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

Railway Equipment Manufacturers' Association.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va.

Railway Fire Protection Association.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

Railway Real Estate Association.—R. H. Morrison, C. & O., Richmond, Va.

Railway Signal Association.—(See American Railroad Association, Section II, Signal Division.)

Railway Storekeepers' Association.—(See American Railroad Association, Section VI, Purchases and Stores.)

Railway Supply Manufacturers' Association.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Next convention, June 9-16, Atlantic City, N. J.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

Roadmasters' and Maintenance of Way Association.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

Signal Appliance Association.—F. W. Edmunds, West Nyack, Rockland County, New York.

Society of Railway Financial Officers.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

Southern and Southwestern Railway Club.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

Southern Association of Car Service Officers.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

Supply Association of American Railway Tool Foremen's Association.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. R. R., Cleveland, O.

Western Association of Short Line Railroads.—Clarence M. Oddie, Mills Bldg., San Francisco.

Western Railway Club.—J. M. Byrne, 916 W. 78th St., Chicago. Regular meetings, 3d Monday in month, except June, July and August.

Traffic News

The Canadian National and the Canadian Pacific intend to apply to the board of railroad commissioners for authority to increase both passenger and freight rates; and their proposal is expected to be about 40 per cent above present tariffs.

The sending of Canadian freight cars into the United States has been embargoed by the Railway Association of Canada. This action has been made necessary by delays in the return of cars which have been sent to the United States and also by an urgent demand for cars to carry lumber between points in Canada.

The Central of New Jersey and the Philadelphia & Reading, which before the war ran express trains "every hour, on the hour," all day, between New York and Philadelphia—which service has been greatly reduced under Federal operation—has already restored three of the trains which were taken off—those at 7 and 10 a. m. and 5 p. m. Trains now leave New York at 7, 8, 10 a. m., noon, 2, 4, 5, 6, and 10 p. m., and 12:15 a. m.

The Department of Agriculture has issued an amendment to its regulations governing the entry of railway cars and other vehicles and express packages, baggage or other materials from Mexico, to include the state of Sonora. This move has been taken because of the appearance of the pink bollworm in cotton seed being shipped from Sonora by way of Nogales, Mex, and Douglas, Ariz. The regulations require inspection and disinfection. Lower California is the only remaining state in Mexico now exempt from the regulation.

The silk clause in the new freight classification, forbidding the acceptance of silk for transportation by freight, except in carloads, because of the excessive value of many shipments, has been made the subject of a court injunction at Philadelphia, Judge Thompson, of the federal court, having granted a preliminary injunction on the application of the Viscose Company, maker of artificial silk. At New York City Judge J. M. Mayer refused to grant an injunction in a similar case. The Railroad Administration, arguing against the injunction, said that the new clause in the tariff (not applicable to manufactured silks) was deemed necessary because of wholesale robberies.

The Pennsylvania Railroad announces that the "shipping day plan" of handling less than carload freight in through cars from its numerous Philadelphia stations will be continued. The value of this method of handling l. c. l. merchandise is declared to have been fully demonstrated. It has eliminated a large amount of delay incident to the rehandling of freight through transfer stations, and during the year 1919 it saved 10,000 cars in the Philadelphia district alone. There has been a reduction of congestion of teams at the freight stations. Shipping Day Guides have been prepared for all the principal cities on the Pennsylvania system, and with the aid of these the patrons of the road, through their co-operation, have aided materially in saving cars.

The Hudson & Manhattan Railroad, operating subways between Manhattan (New York) and Jersey City, N. J., and Hoboken, N. J., announces that beginning April 4 the uniform fare across the river—that is, between New York state and New Jersey, will be eight cents. To and from Hudson Terminal, the downtown New York terminus, this is an increase of three cents, while to and from the uptown stations, those on Sixth avenue, the increase is one cent. For rides wholly in New York or wholly in New Jersey the rate remains five cents. The city authorities and business organizations in Hoboken and in Jersey City are preparing to send a protest to the Interstate Commerce Commission. The City Commission of Jersey City declares that the city has a contract with the railroad company restricting the fare to five cents between points in New Jersey and the downtown New York terminal.

Commission and Court News

Interstate Commerce Commission

The Commission has issued a decision declining to modify its regulations for the transportation of phosgene, but revising the regulations for the transportation of other dangerous chemicals and gases.

Personnel of Commissions

W. P. Geary, rate expert for the Railroad Commission of California, has been appointed an examiner for that body.

Wilbur LaRoe, Jr., has been appointed chief examiner of the Interstate Commerce Commission succeeding Henry W. Thurtell, resigned to become commerce counsel of the Southern Railway.

George N. Brown, attorney examiner of the Interstate Commerce Commission, has resigned to become associated with George L. Boyle in the practice of law, with office at Washington.

State Commissions

The Northwestern Pacific has applied to the Railroad Commission of California for an order approving an agreement between the company and the United States Railroad Administration under which the Railroad Administration is to finance the purchase of 100 double-sheathed box cars. A series of notes to bear interest at the rate of six per cent, the last of which is due in 1935, is provided for in the agreement.

Locomotive engines should not be operated at so high a rate of speed as to cause such a degree of discomfort to enginemen and firemen as to endanger their health or to impair their efficiency. This is the decision of the New York State Public Service Commission, second district, on a complaint of the brotherhoods that consolidation engines used on the milk trains of the New York, Ontario & Western were unsuitable for the speeds required of those trains. After hearing a good deal of conflicting evidence the commission decided that the engines in question should not be run faster than 30 miles an hour, except under emergencies or unexpected delays, when temporarily the rate might be increased to 35 miles an hour. These speeds must not be permitted except when the engines are in first class condition.

Court News

Duty of Warning and Assisting Passengers

The Michigan Supreme Court holds that where a train stops before reaching a station platform and the distance from the last step to the ground is 20 inches, the ground being so slippery, that a stool cannot be kept in place, the carrier owes to a passenger attempting to alight the duty of warning and assistance.—Chalker vs. D. G. H. & M. (Mich.), 173 N. W. 532.

Water Mains on Right of Way Over City Streets

Where a city has granted to a railroad company the right to cross its streets with its tracks and to carry on its business as a railroad across the streets, the Kentucky Court of Appeals holds that the grant carries with it the incidental power of constructing and maintaining telephone or telegraph wires along the right of way and of laying and maintaining water mains for carrying water for its engines and other purposes essential to its business.—L. & N. vs. Covington (Ky.), 213 S. W. 568.

Effect of Cummins Act on Notice of Loss

The interpretation of the Arkansas Supreme Court of the Cummins Amendment of 1916 is that it prevents carriers of interstate shipments from contracting for notice of claims in less than 90 days, or for filing claims in a shorter period than 4 months, or for the institution of suits on claims for a shorter period than 2 years.—Missouri Pacific vs. Martindale (Ark.), 213 S. W. 777.

Crossing Accident—Last Clear Chance

In a crossing accident case, it appeared that the speed of the train prevented stopping in less than 400 feet, the automobile struck could not be seen until the train was but 200 feet from the crossing, and the automobile was then 40 feet from the track and running only 6 miles an hour, so that it could have been stopped in time if the occupants had been looking. The Missouri Supreme Court held the railroad was not liable under the humanitarian doctrine.—Tannehill vs. Kansas City, C & S. (Mo.), 213 S. W. 818.

Special Agreement as to Reconsignment Unlawful

The St. Louis Court of Appeals holds that a special contract entered into at St. Louis, Mo., between a shipper and a carrier, whereby the carrier was to divert or reconsign a shipment of potatoes at Pittsburgh to Chicago by wire, so as to have it go by a particular train, arriving at Chicago on a particular date, was an agreement for special services prohibited by the Interstate Commerce Act as amended by the Elkins Act, for breach of which no recovery could be had by the shipper.—Cicardi Bros. Fruit, etc., Co. vs. Pennsylvania (Mo.), 213 S. W. 531.

Duty to Collect Undercharge

When the tariff for coal, as filed with the Indiana Public Service Commission, was 65 cents a ton, the agent of a carrier by mistake collected only 60 cents. In a suit for the difference the Indiana Appellate Court holds that as the Indiana statute provides for uniform freight rates, the filing of tariffs, and makes it unlawful to charge any other rate, the rate charged must be in harmony with the tariff, and it cannot be varied by contract or by mistake, for such rate, until changed by the Commission, is a part of the law. It was therefore not only the right but the duty of the railroad to collect the additional five cents a ton.—Cleveland C. C. & St. L. vs. Alexandria Paper Co., (Ind.) 124 N. E. 402.

Dedication of Track—Use of Terminal Facilities by Competing Line

The Louisiana Railway & Navigation Company has a rule that it will not accept, over its connection, carload shipments to be switched for delivery on its recognized public or team track, or to its freight warehouse, or to other sidings or switchings within the yard limits, where a warehouse or receiving depot of the consignee has no facilities for unloading freight direct from car to the warehouse, without the use of drays. This rule seems to be general among common carriers, and, according to the Louisiana Supreme Court, clearly shows that the railroad did not hold its team and industrial track open to the indiscriminate use of the general public, but reserved it for its own use and the service of the industries located thereon. In the face of this rule and of the testimony of officers and agents of an engineering company desiring to use the track, it could not be contended, in mandamus proceedings, that a few exceptional cases of emergency or mistake could constitute in any legitimate sense, a dedication of the track to public use. It is also held that the engineering company could not ship rock over another railroad and decline to use its ample terminal facilities because it was more convenient to use those of the defendant, a competing railroad, at destination, and when refused such use of terminal facilities by the defendant, compel the defendant's surrender of such facilities by mandamus. —Miller Eng. Co. vs. La. Ry. & Nav. Co. (La.) 81 So. 314.

Foreign Railway News

New Railway to Moscow

LONDON.

Under the terms of the peace treaty between Soviet Russia and Esthonia, the latter country is to receive a concession for the construction of a railway between Moscow and the Esthonian frontier.

Electrification on Orleans Railroad

LONDON.

The Orleans Railway of France, says the Times (London) Trade Supplement, is contemplating the electrification of about one-third of its entire system, and a concession for the necessary water power has been applied for. Twenty years will possibly be necessary for the completion of the project.

English Freight Cars

LONDON.

Replying to a question asked in the British Parliament, a representative of the government said recently that the number of railway-owned wagons returned from France in December and January was 2,279. The number of wagons for the building of which arrangements had been made by the railway companies was about 32,000, of which 15,000 were orders placed with outside firms.

Cost of England's Railway Strike

LONDON.

What the general railway strike last year cost the companies or the British Government, says the Engineer (London), may be gaged by the fact that the Ministry of Transport statement shows that while September had a balance of £1,096,410 in revenue over expenditure, October had a balance of £924,987 in expenditure over revenue. These figures suggest that the loss was at last £2,000,000. Strike pay cost the National Union of Railwaymen £206,955, and war loan stock to the value of £260,000 had to be sold.

Ministry of Transport Library

LONDON.

The Ministry of Transport is intending to form a library, which it is hoped to make as representative as possible of all branches of transportation and their developments, as well as of power, trade, industry, agriculture, and other subjects which have an important bearing upon or are affected by transport. Transport in other countries will be fully represented in the collection. The library will form part of the intelligence service of the Ministry, which is now in course of organization under the director general of development, and whose function it will be to keep the ministry informed of all developments in connection with transport, both at home and in other countries.

The Italian Transport Problem

LONDON.

The Times Trade Supplement says that in order to relieve the serious traffic congestion which is having a disastrous effect upon industry in Italy, the Minister of Transport has authorized the employment of additional labor, so that freight trains may be unloaded by continuous shifts working the whole 24 hours. There has also been granted a substantial bonus for the rapid handling of merchandise and shipment of military stores by rail has been suspended. Eleven cargo boats have been allotted by the government for the coastwise trade, and large quantities of bulky products will be carried by them as long as the present difficulties of rail transport continue.

The annual deficit of the railways is estimated at £32,000,000, and to grant the demands now put forward by the railway workers would involve an annual deficit of £80,000,000, which would have to be met by additional taxation, since the freight and passenger rates are now so high, that they cannot be raised without detriment to the country's productive activities.

British Railway Wagon Detention

LONDON.

The Ministry of Transport has published the freight car detention statistics for the month of December, which after allowing for the free periods, was 365,533, as against 340,787 in September. Converted into a tonnage basis the figures are stated to represent a loss in carrying capacity of nearly 500,000 tons in one month. There was a slight improvement in the release of cars at private sidings, but detentions elsewhere rose by 20 per cent. It may be pointed out that the increase takes no account, as far as can be ascertained, of the increased number of cars which it is assumed were in service in December. It is hoped, however, that the increased charges now in operation will put some check upon undue detention.

Report on Electrification of Jamaican Railway

LONDON.

The Times Trade Supplement is authority for the statement that an exhaustive report has been received by the Government of Jamaica from an expert of the Westinghouse Electrical International Company on the proposal to electrify the railways, and to provide current for other industrial purposes. The estimated cost of electrifying the railway, including the required power station, equipment and transmission lines to supply other proposed plants and industries, is as follows:

Power-plants	$849,320
Sub-stations	333,320
Motive power—electric locomotives and motorcars—net (cost of new less sale of old motive power)	357,650
Total	$3,393,590

The saving in the cost of operation would be approximately $265,600 a year, which is 7.82 per cent of the cost of electrification.

Railway Construction in China

LONDON.

An abstract from the Times Trade Supplement states that since the outbreak of war in 1914, practically all railway construction work in China has been suspended. The railway problem is very much mixed up with finance, because the only system in vogue has been to advance certain loans to the Chinese Government for the construction of railways under definite stipulations, one of which was the nomination of the engineer-in-chief. The proposal at present is for the international consortium (which includes British, Americans, French and Japanese, and divides all loans advanced to the Chinese Government in equal shares), to deal with the Chinese railways. The Japanese, however, appear to desire to exclude Manchuria from this arrangement. If the Japanese had agreed that all railway construction in Chinese territory should be done by the Chinese Government and financed in equal proportions by the four powers, there would have been a great deal of work carried out by this time.

Dr. Sun Yet, in 1912, resigned his position as president of the new republic in order to prepare a scheme for the nationalization of the railways, but he has never got much beyond the paper stage. He has been advocating recently the international development of China and less than a year ago he wrote, "all the commercial nations are looking for the future market of China as the only dumping ground for their over-production." At that time he advocated the development of a communication system, including 100,000 miles of railways, and new roads, canals, harbors, etc.

The construction of the lines now projected in China will mean great imports in the shape of materials. If the rate of construction runs into 600 miles per year, it has been estimated that the annual expenditure would be over $35,000,000.

To give some idea of the success of Chinese railways, it can be said that in 1915 the Peking-Mukden railway paid 17 per cent, on the capital cost of the line, and taking together all the railways of China in 1915, 8 per cent on total capital expenditure was paid. These figures are still more remarkable when the peculiar methods of Chinese administration and "friend pidgin" are remembered, and there can be no doubt at all that a most profitable way of investing capital in China is by building railways. At present the whole business is hung up, apparently for political reasons, and it does not seem remarkable that the Japanese should take up their present attitude and be able to suspend all construction in China.

Equipment and Supplies

200 Russian Locomotives For Sale

The director of sales of the War Department announces that the 200 decapod locomotives originally built for the Russian government, which have been leased by the Railroad Administration, are to be sold by informal bids and negotiations. Bids are to be received at the office of the chief of engineers, Room 2707, Munitions building, Washington, until 3:00 p. m., March 10.

Locomotives

THE CENTRAL ZAZA (Cuba) has ordered 1 2-8-0 type locomotive from the Baldwin Locomotive Works.

THE CENTRAL ESTRELLA (Cuba) has ordered 1 2-6-2 locomotive from the Baldwin Locomotive Works.

THE FORT SMITH & WESTERN has ordered 2 Mikado type locomotives from the Baldwin Locomotive Works.

THE CANADIAN NATIONAL RAILWAYS have ordered 20 0-6-0 type locomotives from the Canadian Locomotive Works.

THE CHICAGO, MILWAUKEE & ST. PAUL is having repairs made to 10 locomotives at the shops of the Baldwin Locomotive Works.

THE ATLANTIC COAST LINE is having repairs made to 30 4-6-0 type locomotives at the shops of the Baldwin Locomotive Works.

THE LONG ISLAND is having repairs made to 1 4-4-2 type and 3 4-6-0 type locomotives at the shops of the Baldwin Locomotive Works.

THE UNITED FRUIT COMPANY has ordered 5 four-wheel general utility locomotives from the Bell Locomotive Works for use on its lines in Honduras.

THE PAMPANGA SUGAR DEVELOPMENT COMPANY, San Fernando, Philippine Islands, has ordered 2 four-wheel general utility locomotives from the Bell Locomotive Works.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for one standard gage, 36-ton Heisler geared locomotive for southern delivery.

THE EUREKA NEVADA is inquiring for 2 36-in. gage Consolidation type locomotives with 15 by 18 in. cylinders. One locomotive of this type has been ordered from the Porter Locomotive Company.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for 1 six-wheel 70-ton switching engine having boiler with butt joint or butt strapped construction.

THE CHICAGO, ROCK ISLAND & PACIFIC reported in the *Railway Age* of January 23 as about to inquire for a number of locomotives, is inquiring for 10 Mountain type, 10 Pacific type and 15 Santa Fe type locomotives.

THE NEW YORK CENTRAL is inquiring for 50 Mountain type and 10 Pacific type locomotives. This company is also having repairs made to 3 2-8-0 type locomotives at the Brooks Works of the American Locomotive Company.

THE ALLEGHENY RIVER MINING COMPANY has ordered 2 Atlantic type locomotives from the American Locomotive Company. These locomotives will have 19 by 26 in. cylinders and a total weight in working order of 173,000 lb.

THE SOLVAY PROCESS COMPANY, Syracuse, N. Y., has ordered 2 eight-wheel switching locomotives from the American Locomotive Company. These locomotives will have 22 by 28 in. cylinders and a total weight in working order of 208,000 lb.

THE U. S. RAILROAD ADMINISTRATION has ordered 20 Santa Fe type locomotives for the Boston & Maine from the American Locomotive Company. These locomotives will have 29 by 32 in. cylinders and a total weight in working order of 360,000 lb.

Standard Locomotive Deliveries—Week Ended February 21

Three U. S. R. A. 8-wheel switching locomotives were delivered by the Lima Locomotive Works during the week ended February 21 to the Michigan Central.

Freight Cars

JOHN H. HEALD & CO., Lynchburg, Va., is inquiring for 5, 8,000-gal. tank cars.

THE CLARK CAR COMPANY is having 250 extension side dump cars built by the Cambria Steel Company.

THE KOPPERS COMPANY, Pittsburgh, Pa., is inquiring for four, 40-ton hopper gondolas and one, 40-ton flat car.

THE GRASELLI COMPANY, Cleveland, Ohio, is inquiring for from 25 to 50 acid tank cars of 7,000-gal. capacity.

THE A. B. C. TRANSIT REFRIGERATION COMPANY, Chicago, is inquiring for four refrigerator cars for export to Peru.

THE UNION PACIFIC has ordered 45 eight-wheel caboose cars from the Pacific Car & Foundry Company. These cars will be equipped with Bettendorf steel underframes.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for 2, second-hand, double truck standard gage steel underframe caboose cars.

THE GRAND TRUNK, reported in the *Railway Age* of February 6, as being in the market for 3,000 automobile cars and 1,000 flat cars, is now asking for an additional 1,000 50-ton flat cars.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for 2 second-hand side dump, all steel cars, capable of dumping contents either side of track, of 30 to 40 ft. in length.

THE CANADIAN NATIONAL RAILWAYS has placed orders for stock, refrigerator and box cars. The National Steel Car Corporation has been given orders for 1,500 40-ton box cars, the Canadian Car & Foundry Company for 1,000 cars and the Eastern Car Company for 500 cars.

Passenger Cars

THE UNION PACIFIC is inquiring for 65 chair and baggage cars.

THE NEW YORK MUNICIPAL RAILWAY is in the market for 100 subway cars.

THE MAINE CENTRAL is inquiring for 8 baggage and 2 baggage and mail cars.

THE INTERSTATE RAILROAD COMPANY, Philadelphia, Pa., is inquiring for one steel passenger car.

THE CHICAGO, ROCK ISLAND & PACIFIC is inquiring for 10 chair cars, 30 coaches and 22 baggage cars.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for 3 second-hand standard gage parlor cars.

THE NEW YORK CENTRAL is inquiring for 30 electric multiple unit motor cars for suburban service. This inquiry is in addition to other inquiries for through line passenger equipment.

THE ERIE RAILROAD, reported in the *Railway Age* of January 16, as inquiring for 40 passenger train cars, has ordered 42 steel suburban coaches and 6 steel suburban combination cars from the Standard Steel Car Company.

Miscellaneous

JOSE CAMPRUBI, 111 Broadway, New York, has ordered 20,000 boiler tubes from the United States Steel Corporation and is inquiring for 150,000 additional boiler tubes, also for 150 tons of saturated oil and 600 tons of Mazout lubricating oil for export to Spain.

Supply Trade News

R. D. Eves, assistant to the signal engineer of the Nashville, Chattanooga & St. Louis, with headquarters at Nashville, Tenn., has resigned to become railroad sales manager of the Cincinnati (Ohio) office of the **Western Electric Company,** New York.

L. G. Stowell, an assistant engineer in the engineering department of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has resigned to become sales engineer of the **Carter Bloxonend Flooring Company,** Kansas City, Mo., and the March & Truman Lumber Company, Chicago, with headquarters at the latter city.

Duncan W. Fraser, managing director of the Montreal Locomotive Works, Ltd., has been elected vice-president in charge of sales of the **American Locomotive Company** and the **Montreal Locomotive Works, Ltd.,** with headquarters at New York, succeeding **J. D. Sawyer,** who has resigned to become vice-president of the banking firm of **Morton & Co., Inc.**

P. G. Pendorf, salesman for the Buda Company, Harvey, Ill., with headquarters at Chicago, has been appointed service engineer for the **National Carbon Company, Inc.,** Cleveland, O., with office at Chicago. Mr. Pendorf was born at State Bridge, N. Y., on September 19, 1881, and began signal work with the Hall Signal Company as a laborer, installing signals. In October, 1898, he was appointed a wireman on a block signal installation on the Illinois Central, and in 1903 he was promoted to block-signal maintainer, with office at Wickliffe, Ky. In April, 1904, he was transferred to Gilman, Ill., and was later appointed a repair man on electric interlocking plants. In May, 1910, he was appointed a signal construction foreman with the General Railway Switch & Signal Company. He remained in this position until 1911, when he was appointed signal supervisor on the Illinois Central, with headquarters at Carbondale, Ill. He has been associated with the Buda Company as a salesman since 1918.

P. G. Pendorf

H. G. Cook, formerly general storekeeper of the Southern Pacific Company, San Francisco, has entered the railway supply business and opened offices in San Francisco, Cal., representing the following companies on the Pacific Coast: Union Asbestos & Rubber Manufacturing Company, Dearborn Chemical Company, Chicago Railway Equipment Company, Bradford Draft Gear Company, Pyle National Headlight Company, National Waste Company.

The leather belting plant and business of the **Edward R. Ladew Company, Inc.,** Glen Cove, N. Y., has been bought by the **Graton & Knight Manufacturing Company,** Worcester, Mass., oak leather tanners and makers of leather belting. The operations of the Ladew organization will be continued as heretofore by the new owners. The plant of the Ladew Company comprises 10 modern buildings, with a floor area of 14 acres, and employs more than 600 persons. The company has branches in Boston, New York, Newark, Philadelphia, Charlotte, Pittsburgh, Cleveland and Chicago and distributors in all principal cities.

At the annual meeting of the **Pratt & Letchworth Company,** Buffalo, N. Y., on March 2, changes were made in the officers of the company as follows: **John C. Bradley,** who for a number of years has been president of the company, was elected chairman of the board of directors; **John H. Bradley,** general manager, was elected president and general manager; **Franklin D. Locke,** vice-president, was elected first vice-president; **John P. Williams,** who has been manager of sales, was elected second vice-president in charge of sales, and **Willis M. Edwards** was re-elected secretary and treasurer.

Government Loses Suit Against Steel Corporation

The United States Supreme Court in a decision handed down on Monday, March 1, dismissed the government's suit for the dissolution of the United States Steel Corporation, affirming the previous action of the lower court. The vote of the court was 4 to 3. Chief Justice White and Justices McKenna, Holmes and Vandevanter concurred in the majority opinion. Justices Pitney, Day and Clarke dissented and Justices McReynolds and Brandeis took no part in the decision. The majority opinion read by Justice McKenna held in effect that the Steel Corporation had committed no overt act violative of the Sherman Anti-Trust law since the government's suit was filed, that, although by its size and its control of equipment and resources in the steel business the corporation was in a dominating position, it had not been able to nor had attempted to prevent competition, and also that to order the dissolution of the corporation would involve the risk of great disturbance in the financial, commercial and economic structure and thus would menace the public interest. The court also dismissed proceedings against individual officers and directors of the company that had been made defendants.

"We are unable to see," said the majority decision, "that the public interest will be served by yielding to the contention of the government respecting the dissolution of the company or the separation from it of some of its subsidiaries, and we do see in a contrary conclusion a risk of injury to the public interest including a material disturbance of, and it may be a serious detriment to, the foreign trade. And in submission to the policy of the law and its fortifying prohibitions the public interest is of paramount regard."

The government's suit was filed against the Steel Corporation and certain other companies which it directs and controls by reason of the ownership of their stock, it and they being separately and collectively charged as violators of the Sherman Anti-Trust act, and it was prayed that it and they be dissolved because engaged in illegal restraint of trade and the exercise of monopoly. In the majority opinion Justice McKenna points out that the judges of the district court unanimously concurred in the view that the corporation did not achieve monopoly and said that such was the deduction of the Supreme Court, and it is against monopoly that the statute is directed; not against the expectation of it, but against its realization, and it is certain that it was not realized. The opposing conditions, the opinion said, were underestimated. The power attained was much greater than that possessed by any one competitor; it was not greater than that possessed by all of them. Monopoly, therefore, was not achieved and competitors had to be persuaded by pools, associations, trade meetings and through the social forms of dinners, all of them, it may be, violations of the law, but transient in their purposes and effect. They were scattered through the years from 1901 until 1911, but after instances of success and failure, were abandoned nine months before the suit was brought. There was no evidence that the abandonment was in prophecy of or dread of suit and the illegal practices have not been resumed nor is there any evidence of an intention to resume them. It is the conclusion of the court, as it was of the judges below, that the practices were abandoned from a conviction of their futility, from the operation of forces that were not understood or

were underestimated, and the government need not fear their resumption. There was some testimony tending to show that the corporation has some monopolistic power because it is greater in size and productive power than any of its competitors, but its power over prices was not and is not commensurate with its power to produce. There was also testimony tending to show that the corporation had not monopolistic power and the conflict was unanimously resolved by the judges of the district court against the existence of that power.

"It is certain," the court says, "that no such power was exerted. On the contrary, the only attempt at fixation of prices was through an appeal to a confederation with competitors and the record shows besides that when competition occurred it was not in pretence and the corporation declined in productive powers. If against the competition we have an instance of movement against what the government insists was an irresistible force, if in consequence of competition we have an illustration of the adage that competition is the life of trade and is not easily repressed, the power of monopoly in the corporation under either is an untenable accusation."

The minority opinion of Justice Day, concurred in by Justices Pitney and Clarke, said that it inevitably follows that the corporation violated the law in its formation and by its immediate practices. "The power thus obtained from the combination of resources almost unlimited in the aggregation of competing organizations had within its control the domination of the trade and the ability to fix prices and restraining the free flow of commerce upon a scale heretofore unapproached in the history of corporate organization in this country. These facts established, it follows that if the Sherman act is to be given efficacy there must be a decree undoing so far as possible that which has been achieved in open, notorious and continued violation of the provisions."

W. A. Trubee

L. J. Drake

W. J. Walsh

Galena Signal Oil Elects New Officers

At the annual meeting of the **Galena Signal Oil Company**, Franklin, Pa., on February 24, a stockholders' advisory committee was created. **J. S. Cullinan**, who was president, **John B. Dennis** and **Frederick Strauss**, become members of the new committee. The directors re-elected are: **L. J. Drake, L. F. Jordan, J. French Miller, E. V. Sedgwick**, and in addition **J. E. Linahen**, vice-president at Franklin, Pa., **W. A. Trubee**, vice-president at New York and **H. S. Skinner**, manager of the export department at New York, have been also elected directors. The changes among the officers include the election of **L. J. Drake** as president, to succeed Mr. Cullinan, **W. A. Trubee**, who was district manager at New York, has been elected vice-president, and **W. J. Walsh**, district manager at Chicago, has been elected vice-president, all with the same headquarters as formerly. **L. F. Jordon** remains as vice-president at New York and **J. E. Linahen** as vice-president at Franklin; **J. French Miller** as secretary-treasurer at Franklin, **L. E. Stull** assistant secretary and assistant treasurer at Franklin, and **C. W. Hochette** assistant secretary and assistant treasurer at New York.

Lauren J. Drake, the new president, with headquarters at New York, was born on August 27, 1880, at Keokuk, Iowa. He was educated in the public schools of Omaha and Chicago, and in 1899 graduated from Shattuck Military School, Faribault, Minn. After leaving school he entered the oil business and acquired a general knowledge of it in all departments during his service of five years with several companies. In 1905 he went to the Galena Signal Oil Company and remained as a representative of that company in the Middle West, until 1916, when he came to New York as vice-president of the same company, and now succeeds **J. S. Cullinan** as president.

W. A. Trubee, who has been elected a vice-president and director, with headquarters at New York, was born in Bridgeport, Conn., on March 22, 1867. He received his early education in Bridgeport private schools, and later attended Greylock Institute at South Williamstown, Mass. He entered the service of the Galena-Signal Oil Company on February 1, 1898, as sales representative at Bridgeport, Conn. On May 1, 1912, he was transferred from Bridgeport to the New York office, and on March 1, 1919, was appointed district manager at New York, which position he held until his recent election as vice-president and director of the same company.

American Locomotive Company

The lack of orders for locomotives for the railroads of this country and the difficulties of the foreign exchange situation are clearly reflected in a decrease of over 50 per cent in the gross earnings of the American Locomotive Company for the six months ended December 31, 1919, as compared with the first six months of 1919. Gross earnings for the second half of the year totaled $20,630,084, as compared with $49,443,498 in the first half. The manufacturing profit for the second six months totaled $3,097,896, as compared with $8,859,867 in the earlier half of the year, while the available profit of $2,577,170 for the six months ended December 31 compared with a similar figure of $5,417,099 in the first half year. The profit earned on the common stock after payment of the preferred dividends figured out at $1,702,171 or $6.81 a share in the period ended December 31, as compared with $6,042,099 or $24.17 a share in the period ended June 30.

The reason for the report's covering only a six month's period is explained as being due to a decision by the board of directors in May, 1919, to make the company's fiscal year conform with the calendar year, instead of ending at June 30 as heretofore.

Andrew Fletcher, president of the company, in explaining the operations of the company for the six months period,

shows how the business of the company was kept at a low figure for lack of domestic business. He strikes a very optimistic note, however, as to the outlook. Although the company operated at only 29.2 per cent of capacity during the six months period and at only 12.5 per cent in November, it had received between December 31 and February 28 $12,800,000 of new business, of which about 84 per cent was for domestic roads.

Mr. Fletcher's remarks follow in part.

"The business of the company for the six months ended December 31, 1919, as was anticipated by the management, was of low volume, due to practically a complete absence of orders from our domestic railways. The orders taken were largely from foreign railways and were both on a cash and deferred credit payment basis. A larger volume of foreign orders on a deferred credit basis could have been taken, but the securitise offered were of a character that in our opinion represented unusual commercial risks and were therefore declined.

"The plants averaged for the six months' period but 20.2 per cent tonnage production of their rated capacity and for the month of November, 1919, but 12.5 per cent of capacity.

"The amount of inventories of materials and supplies on hand and work in progress December 31, 1919, was $7,170,805, as compared with $10,860,483 on June 30, 1919.

"The excess of current assets over current liabilities on December 31, 1919, was $35,686,011. Of this amount approximately $6,000,000 was invested in United States and Canadian Government Bonds and $25,800,000 was invested in United States Treasury Certificates. The company thereby received an income on its inactive working capital and was in a position to convert the securities promptly into cash if acceptable business requiring extension of credit was offered.

"The unfilled orders on December 31, 1919, amounted to $7,862,157, of which about 27 per cent was domestic business and 73 per cent was foreign business, as compared with unfilled orders on June 30, 1919, of $16,034,678, of which about 50 per cent was domestic business and 50 per cent foreign business. Since December 31, 1919, approximately $12,800,000 of new business has been obtained, of which about 84 per cent is for domestic roads and 16 per cent is for foreign trade.

"We have been receiving a fair amount of business from the Far East and the Pan-American countries and believe they will continue to order.

"A large share of our inquiries are from European countries undergoing reconstruction because of the war and whose present financial resources are such as to necessitate deferred credit payments. In some cases the inquiries have been based on an exchange and barter basis. Until those governments and their finances have become more stabilized the business accepted from them, absorbing, as it would, considerable of our working capital, should be restricted to conservative financial risks, for in all probability a very large proportion of our working capital will be required in the near future for our domestic business. A much greater proportion of working capital to unit production of locomotives, we have found, is absolutely necessary now in comparison with the requirements existing before the world war, because of the great increase in costs of labor and materials and in fact everything pertaining to the operation of our plants.

"The prospects for immediate domestic business are being assured by recent orders received and inquiries for prices. The unquestioned shortage and lack of effective motive power of some of the railroads of the country have been known for months, and while some of the rumored requirements are no doubt exaggerated, we are optimistic at least for a fair volume of orders for new locomotives and for the reconditioning of old ones for the year 1920.

"The return of the railroads to corporate control and operation, the adjustment of their financial affairs and the competition for business, will no doubt stimulate the efficiency and progressiveness of this country's railroad executives and operators, and in the refining of operating costs we anticipate there will be a greater demand for well built, effective and economical operating locomotives."

The condensed income account of the American Locomotive Company, Montreal Locomotive Works, Limited, and American Locomotive Sales Corporation, combined, follows:

	6 mos. ended Dec. 31, 1919	6 mos. ended June 30, 1919	12 mos. ended Dec. 31, 1919
Gross earnings	$20,630,084	$49,443,498	$70,073,582
Mnfg., maint. and adm. exp. and dep.	17,582,188	40,583,631	58,115,820
Mnfg. profit	$3,097,896	$8,859,867	$11,957,762
Interest, etc.	59,326	168,863	228,189
	$3,038,570	$8,691,004	$11,729,573
Deduct for U. S. and Can. taxes	461,399	1,773,905	2,235,304
Available profit	$2,577,170	$6,917,099	$9,494,269
Divs. on pref. stock	875,000	875,000	1,750,000
Divs. on com. stock	750,000	625,000	1,375,000
Surplus	$952,170	$5,417,099	$6,369,269
Reserve for add. and bet.		4,000,000	4,000,000
Net credit to p. & l.	$952,170	$1,417,099	$2,369,269

Obituary

Houston Lowe, president of the **Lowe Brothers Company**, Dayton, Ohio, died at Miami, Fla., on February 13.

Nathaniel French, manager of the **French & Hecht Company**, Davenport, Ia., and formerly a member of board of trustees of the Chicago, Rock Island & Pacific, died recently at Tuscon, Ariz., at the age of 65 years.

William White, formerly president of and, since his retirement from active business about one year ago, chairman of the board of directors of the National Boiler Washing Company, Chicago, died at his home in Niles, Mich., February 28 at the age of 57 years.

Trade Publications

Power Hammers.—A belt-driven and a motor-driven power hammer are described in a 16-page booklet published by Beaudry & Co., Inc., Boston, Mass. Both types are manufactured in various sizes and are described in detail, with tables showing sizes and dimensions. All the individual parts are illustrated and numbered for convenience when ordering.

Vise for Pneumatic Drills.—A four-page circular has been issued by the Independent Pneumatic Tool Company, Chicago, describing a new universal vise for pneumatic drills, the purpose of which is to firmly clamp and hold the drill in accessible positions while repairs, assembling and testing are done. Illustrations show the detail parts of the vise and how to use it.

The Pratt Ballast Cleaner.—The Link Belt Company, Chicago, has recently issued a four-page illustrated folder containing a description of the Pratt ballast cleaner. The illustrations show the ballast cleaner in operation and the text of the bulletin describes the principle of the machine and its operation, including some statistical data on its capacity.

Constitution of the United States.—The Clark Equipment Company, Buchanan, Mich., has published an attractive booklet containing a reproduction of the Constitution of the United States and all amendments. It is illustrated with pen portraits of notable American Presidents, by W. M. Young. This is a booklet which every American would be glad to have and will be mailed on request.

Furnace Burners.—Bulletin No. 119 of the Hauck Manufacturing Company, Brooklyn, N. Y., describes in detail the many different types of oil burners manufactured by this company and illustrates practical applications of the burners to various types of furnaces. In addition, a number of sketches are included suggesting other ways of applying Hauck burners and throughout the book are given results of tests, prices and service data.

Portable Machine Tools.—The Pedrick Tool & Machine Company, Philadelphia, Pa., has issued a comprehensive, well-illustrated catalogue of 96 pages, describing the special machine tools manufactured by the company for use in railway shops, shipyards and general machine shops. Among the tools of special interest to railroad men may be mentioned the portable cylinder boring bar, column boring bar, duplex horizontal boring machine, portable crank pin turning machine, locomotive pedestal jaw facer and pipe bending machine.

Financial and Construction

Railway Financial News

CHICAGO & EASTERN ILLINOIS.—This company has sold its central Illinois coal properties to the Illinois & Indiana Coal Corporation for approximately $2,935,000.

NEW YORK CENTRAL.—The New York Public Service Commission, Second District, has authorized an issue of $14,848,100 6 per cent equipment notes to reimburse the government for equipment purchased.

GRAND TRUNK.—At a meeting in London on February 19, the shareholders agreed to turn over the property, including the line in the United States, to the Canadian government. The terms of the agreement are given in an article elsewhere in this issue.

NEW YORK, PHILADELPHIA & NORFOLK.—W. W. Atterbury has been elected a director to succeed W. Heyward Myers, retired.

NORFOLK & WESTERN.—Childs Frick and E. H. Alden have been elected directors to succeed William G. Macdowell, retired, and Henry C. Frick, deceased.

PALATINE, LAKE ZURICH & WAUCONDA.—This railroad is not in the hands of receivers and should not have been included in the list of receiverships published in the *Railway Age* of January 2, 1920. The company was incorporated in June, 1918, and on July 13, 1918, purchased the property of the Waukegan, Rockford & Elgin Traction Company, at a court sale.

PENNSYLVANIA.—Andrew W. Mellon, of Pittsburgh, has been elected a director to succeed Henry C. Frick, deceased.

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.—W. W. Atterbury, George D. Dixon and Henry Tatnall have been elected directors to succeed Edward B. Taylor, D. T. McCabe and Benjamin M. Keen, retired.

WEST JERSEY & SEASHORE.—M. C Kennedy has been elected a director to succeed W. Heyward Myers, retired.

PHILADELPHIA'S BUSINESS.—It is Philadelphia's business to see that her railroads are protected and encouraged to fully develop their facilities in this district. Our needs are pressing and our congressmen should be instructed to see that the railroads are not only given protection, but sufficient revenue to care for our requirements. Today, on the Pennsylvania alone, 3,000 cars averaging loads of 40 tons move in and out of Philadelphia. The products of Philadelphia industry are received through 89 freight handling points of the Pennsylvania, 62 on the Philadelphia & Reading and eight on the Baltimore & Ohio. Through the Penn carried 28,000,000 more. Philadelphia's commercial development sylvania's 32 passenger stations in Philadelphia 46,919,000 passengers travelled last year. The Reading and the Baltimore & Ohio is dependent on the condition of its railroads. In Overbrook (six miles out) there is a freight yard project that will increase the handling capacity of the Pennsylvania by 3,500 cars. In South Philadelphia a projected rearrangement of the freight lines will give quicker access to the piers and foreign trade. Both projects are held up by lack of funds. The tax on business as a result of railroad congestion and embargoes cannot be computed. New capital is needed now and public confidence in the future earning power of the railroads is necessary to attract this capital. This bank has no railroad account, but we have the accounts of many business houses that need modern railroad service. Help the railroads to help Philadelphia.—From an appeal published in the daily press by the Corn Exchange National Bank of Philadelphia.

Railway Officers

Executive

M. C. Byers, prior to federal control assistant to president of the Western Maryland and more recently federal manager, has been elected president and federal manager.

H. W. Stanley, general superintendent of the Tennessee Central under federal control, has been appointed receiver for the company, with headquarters at Nashville, Tenn.

Thomas F. Brennan, during the period of government control federal manager of the Buffalo, Rochester & Pittsburgh, has been reelected vice-president of the same road with headquarters at Rochester, N. Y., effective March 1.

W. R. Scott, prior to federal control vice-president and general manager of the Southern Pacific and vice-president of the Northwestern Pacific, with headquarters at San Francisco, Cal., has been elected president of the Southern Pacific, Louisiana & Texas lines, succeeding W. B. Scott.

W. J. Jackson, prior to federal control receiver for the Chicago & Eastern Illinois, with headquarters at Chicago, and now federal manager, has been reappointed receiver with the same headquarters, effective on March 1, succeeding **T. D. Heed,** now receiver and president, who becomes financial assistant to the former.

Charles H. Stein, whose appointment as assistant to the president of the Central of New Jersey, effective at the termination of federal control, was announced in the *Railway Age* of February 27 (page 661), was born in 1871 at Baltimore, Md., and educated in the Baltimore City College. He began railroad work in December 7, 1889, as rodman with the Western Maryland, and from that time until 1893 was respectively transitman and assistant engineer on preliminary surveys and construction. From 1893 until May, 1903, he was assistant road-master of the same road and from then until June, 1905, was assistant supervisor of the Philadelphia & Reading at Reading, Pa., becoming supervisor in June, 1905. He entered the service of the Central of New Jersey about two years later, as engineer of maintenance of way, and held that position until appointed superintendent of that road in February, 1914. In 1918 he became assistant general manager of the same road and of the Philadelphia & Reading, with headquarters at Philadelphia, which positions he held at the time of his recent appointment.

C. H. Stein

Financial, Legal and Accounting

Thornwell Fay, assistant to the receiver of the International & Great Northern, has been given the new title of executive officer for receiver.

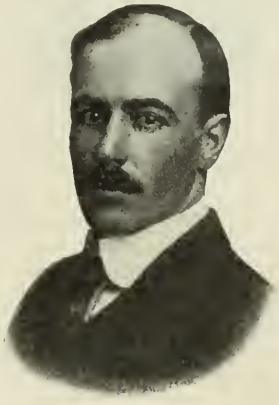
J. A. Edson, federal manager of the Kansas City Southern, with headquarters at Kansas City, Mo., has been elected president, with the same headquarters, succeeding **L. F.**

Loree, who has resigned. Mr. Edson was president prior to government control.

Benjamin T. Wood, assistant to the federal manager of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., who has been elected fifth vice-president and chief purchasing officer of the St. Louis San Francisco, was born at Springfield, Mo., on December 31, 1878. He entered railway service in 1897 as a stenographer in the division superintendent's office of the Kansas City, Ft. Scott & Memphis. In January, 1899, he was appointed secretary to the general superintendent of the same road, and in 1902 was made secretary to the vice-president and general manager. In 1904 he was appointed secretary to the third vice-president of the Chicago, Rock Island & Pacific and later became secretary to the president of the same road. From January, 1905, to December, 1909, he was chief clerk to the president of the same road and from the latter date until May, 1911, he was chief clerk to the president of the Chicago & Eastern Illinois. In May, 1911, he was appointed assistant to the vice-president of the St. Louis-San Francisco, remaining in that position until November, 1913, when he was appointed assistant to the vice-president in charge of operation. In 1916 he was appointed assistant to the president of the same road. The following year he was also elected vice-president of the Birmingham Belt, and in July, 1918, he was appointed assistant to the federal manager of the Missouri, Kansas & Texas and the St. Louis-San Francisco, which position he held until the reorganizing of these roads in the Southwestern region, after which he retained jurisdiction over the latter road.

B. T. Wood

George W. Hand, corporate chief engineer of the Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha, with office at Chicago, has been promoted to assistant to the president of the Chicago & North Western, with the same headquarters, effective March 1. Mr. Hand was born at Huntertown, Ind., in 1882, and was educated at Purdue University, Lafayette, Ind. He entered railway service in March, 1903, with the Chicago & North Western, as a tapeman and continued in the employ of that road up to the time of his recent appointment. During the first four years of his railroad service, he was employed as a tapeman, rodman and instrument man on location and construction work, and on surveys. From 1907 to 1910 he was assistant engineer on track elevation work, following which he was transferred to the chief engineer's office and assigned to special duties, which included making specific investigations, studying standards and conducting state valuation work. When the federal valuation law was passed he was assigned exclusively to valuation work and was subsequently appointed valuation engineer and a member of the valuation committee of the North Western and of the Chicago, St. Paul, Minneapolis & Omaha. He continued in these capacities until November, 1918, when he was appointed corporate chief engineer of the Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at Chicago. Mr. Hand continued in these positions until his recent appointment.



G. W. Hand

A. D. Chambers, secretary and treasurer of the Delaware, Lackawanna & Western and **J. G. Enderlin,** assistant secretray and assistant treasurer of the same road, have retired. Mr. Chambers has been in the employ of the company continuously for 51 years and Mr. Scofield continuously for 48 years.

William B. Bancker and **Benjamin A. Van Tassel,** assistant treasurers of the Erie under the Railroad Administration, will continue in the same positions under private control. Other assistant treasurers of the Erie have been appointed as follows: **Sylvester Z. Earle, George H. Smith** and **Harry W. Trumpler.**

Bryan Thomas, prior to federal control secretary and auditor of the Toledo Terminal, with headquarters at Toledo, and now secretary and auditor of the same road and auditor and assistant secretary of the Detroit & Toledo Short Line, has been appointed auditor of the latter road with headquarters at Detroit, Mich.

Operating

C. B. Sexton has been appointed assistant general manager of the Eureka Nevada, with headquarters at Palisade, Nev.

Lysle H. White, whose appointment as general manager of the Boyne City, Gaylord & Alpena, with headquarters at Boyne City, Mich., was announced in the *Railway Age* of February 13, (page 516), was born at Boyne City, Mich., on January 19, 1887. He received his education at the University of Michigan, Ann Arbor, Mich., and entered railway service in 1910 with the Boyne City, Gaylord & Alpena as a car distributor. The following year he was promoted to assistant superintendent and after serving in this capacity for two years he was appointed superintendent. In 1918 he was appointed general superintendent of the same road, which position he held until his recent promotion. As general manager he succeeds **F. O. Barden,** who was elected vice-president, as announced in the *Railway Age* of February 13, (page 516).

L. H. White

J. T. Waddell, trainmaster of the Tennessee Central at Nashville, Tenn., has been appointed superintendent, with the same headquarters.

F. W. Brown has been appointed assistant to the general manager of the Atlantic Coast Line, with headquarters at Wilmington, N. C., effective March 1.

M. Nicholson, assistant general manager on the Chicago, Milwaukee & St. Paul, Lines East, with office at Chicago, has been promoted to general manager of the Lines West, with headquarters at Seattle, Wash., a newly created position. **C. O. Bradshaw,** general superintendent, with office at

Milwaukee, Wis., has been promoted to succeed **M. Nicholson**, and **W. J. Thiele**, superintendent of the River and the Iowa and Minnesota divisions, with headquarters at Minneapolis, Minn., has been promoted to succeed Mr. Bradshaw at Milwaukee. **D. E. Rossiter**, superintendent of the La Crosse division, with headquarters at Portage, Wis., had been transferred to the River and the Iowa and Minnesota divisions, succeeding Mr. Thiele. **D. W. Kelly**, trainmaster at Green Bay, Wis., has been promoted to succeed Mr. Rossiter at Portage.

J. L. Wilkes, superintendent of Washington, D. C., Terminals during the period of federal control, with headquarters at Washington, has been appointed general manager of the Jacksonville Terminal, with headquarters at Jacksonville, Fla., effective March 1. Mr. Wilkes was born on a farm near Columbia, Maury County, Ill., on October 3, 1880. He began railroad work in 1896 as a telegraph operator on the Nashville division of the Louisville & Nashville, later being promoted to train despatcher. In 1905 he entered the employ of the Illinois Central as a despatcher and later as chief train despatcher of the Louisville division, until 1917, when he temporarily left railroad service to become general manager of the Bell-Union Coal & Mining Company, with mines in Union County, Ky. Shortly after he resumed railroad work as assistant superintendent of the Atlanta division of the Nashville, Chattanooga & St. Louis, with headquarters in Atlanta, Ga. He filled that position until August 1, 1918, when he was appointed to the staff of the regional director of the Allegheny region as supervisor, operating division at Philadelphia. On February 1 of the following year he was transferred to Washington, D. C., as superintendent of Washington Terminals, which included the freight facilities of the Baltimore & Ohio and the Pennsylvania and the Union Station Terminal properties within the District of Columbia.

J. L. Wilkes

The headquarters of **W. M. Weidenhamer**, general superintendent of the Southern district of the Chicago, Milwaukee & St. Paul, have been transferred from Chicago to Savanna, Ill.

D. F. Kirkland, general manager of the Georgia & Florida under the Railroad Administration, has been appointed general manager for the receivers, with headquarters at Augusta, Ga., effective March 1.

Mott Sawyer, assistant general superintendent on the Chicago, Milwaukee & St. Paul, with headquarters at Seattle, Wash., has been transferred to the Northern district, with headquarters at Minneapolis, Minn.

W. D. Trump, terminal manager at Detroit, Mich., for the Eastern region of the United States Railroad Administration, has been appointed general manager of the Detroit Terminal, the position he held prior to government control.

Elliott E. Nash, assistant to the federal manager of the Chicago & North Western, with headquarters at Chicago, has been appointed general manager of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., effective March 1. Mr. Nash was born at Hudson, Wis., on March 28, 1870. He entered railway service in June, 1886, with the Chicago, St. Paul, Minneapolis & Omaha, and served in various capacities with this road until 1888, when he became a clerk in the Hudson (Wis.), station of the same road. Subsequently he served consecutively as a clerk in the auditor's office at St. Paul, Minn., from 1889 to 1891; as traveling auditor, with the same headquarters, during 1891; as agent at Ashland, Wis., from 1892 to 1898; as agent at St. Paul, during 1898; as agent at Minneapolis, Minn., from 1899 to 1905, and as assistant superintendent at Itasca, Wis., and Eau Claire, from 1905 to 1910. In the latter years he was assigned to special work in the president's office of the Chicago & North Western at Chicago. In 1911 he was appointed superintendent of the Minnesota division of the North Western, with headquarters at Winona, Minn., serving in this capacity until April, 1912, when he was transferred to the Madison division, with headquarters at Baraboo, Wis. In November, 1913, he was promoted to assistant general superintendent of the lines east of the Missouri river, excepting the Iowa, Minnesota and Dakota divisions, with headquarters at Chicago. Mr. Nash continued in this capacity until October, 1917, when he was transferred to Boone, Ia. Soon after the organization of the United States Railroad Administration he was appointed assistant to the federal manager of the Chicago & North Western, which position he held until his recent appointment.

C. S. Krick, assistant general manager of the Pennsylvania Railroad, who has been promoted to general manager of the Eastern region, with headquarters at Philadelphia, as announced in the *Railway Age* of February 20 (page 598), was born at Reading, Pa., on March 16, 1866, and graduated from Lafayette College in 1887. Shortly after graduating he entered railway service as a rodman on the Pennsylvania, since which he has been consecutively rodman, assistant supervisor and supervisor, until January 1, 1903, when he was promoted to assistant engineer. In 1906 he was promoted to principal assistant engineer and in 1907 to division superintendent, remaining in that capacity until May, 1916, when he was promoted to general superintendent of the New Jersey division. In 1918 he was promoted to assistant general manager, which position he held until his recent appointment.

C. S. Krick

Traffic

R. Van Ummersen, general freight agent of the Boston & Albany, has been promoted to freight traffic manager, with headquarters at Boston, Mass., effective March 1.

J. G. Simmons, prior to federal control general traffic manager of the Cincinnati, Indianapolis & Western, has been reappointed to that position, effective March 1.

Lester R. Knapp has been appointed division freight agent of the New York division of the Erie, effective March 1; **Frank D. Hartnett** has been appointed division freight agent of the side lines, and **Frank A. Waldron**, division passenger agent.

S. M. Adsit, general freight and passenger agent of the Virginian, has been promoted to traffic manager, and **W. S. Saunders**, assistant general freight agent, to general freight agent. **L. W. Woody** has been appointed assistant general passenger agent. The headquarters of all are at Norfolk, Va. **H. C. Mitchell** has been appointed general agent of the Virginian, with headquarters at Pittsburgh, Pa.; **R. A. Yelton**

has been appointed general agent, with headquarters at Cincinnati, Ohio.

Peter H. Woodward, secretary to the federal manager of the Long Island, who has been appointed general passenger agent with headquarters at New York succeeding H. M. Smith, deceased, was born at Allegan, Mich., on November 28, 1873, and educated in the public schools of Alma, Mich. He began railroad work in 1890 as stenographer and clerk in the car record office of the Flint & Pere Marquette, now the Pere Marquette. The following year he was transferred to the office of the general superintendent of the same road, acting in various clerical capacities until March 20, 1897. About that time, shortly after W. H. Baldwin, Jr., and W. F. Potter left the Pere Marquette to go to the Long Island, the former as president and the latter as general superintendent, Mr. Woodward came east to become clerk to the general superintendent. Later he was promoted to chief clerk and served in that capacity until May 1, 1903, when he was appointed superintendent of express. About two years later, when Mr. Potter became president of the Long Island, Mr. Woodward was promoted to secretary to the president, retaining the same position when Ralph Peters succeeded Mr. Potter as president. During federal control Mr. Woodward held the title of secretary to the federal manager.

Peter H. Woodward

Engineering, Maintenance of Way and Signaling

William J. Foster, who has been appointed regional engineer of the Hornell region of the Erie Railroad, with headquarters at Hornell, N. Y., as announced in the *Railway Age* of February 27 (page 661), was born in July, 1876, at Honesdale, Pa., and is a graduate of the Middletown (N. Y.) Academy. Mr. Foster entered the service of the Erie Railroad in July, 1893, and with the exception of one year has served on that road continuously. From 1893 to 1898 he served as chainman, rodman, transitman, track supervisor's and master carpenter's clerk on the Buffalo division, being appointed engineer in charge in the construction department under C. W. Buckholz, chief engineer, in 1898. In 1904, he became assistant division engineer of the Susquehanna division and the following year he left the Erie Railroad to become superintendent of the John H. Parker Company, general building contractors in New York City. In 1906, he returned to the Erie as assistant to engineer of grade crossings upon the establishment of that office. From 1908 to 1912 he was resident engineer in charge of construction in the grade crossing department and for the following four years was district engineer in charge of second track and grade reduction work on the Chicago & Erie division. In 1916 he was appointed engineer of grade crossings, with headquarters at New York, and two years later was appointed assistant superintendent of construction, also at New York, from which position he was promoted to regional engineer, as noted above.

W. J. Foster

W. C. Cushing, chief engineer maintenance of way of the Pennsylvania Lines West, who has been appointed engineer of standards and valuation of the system, with headquarters at Philadelphia, Pa., as announced in the *Railway Age* of February 20 (page 598), was born at St. John, New Brunswick, on March 18, 1863. After graduating from the University of New Brunswick and the Massachusetts Institute of Technology, he entered railway service in 1887 with the Pennsylvania as a rodman in the engineering corps. On January 27, 1889, he was promoted to engineer maintenance of way of the Cincinnati & Muskingum Valley, where he remained a year before becoming division engineer of the Indianapolis division in 1890. On June 1, 1894, he was transferred to the Pittsburgh division as division engineer, being promoted to superintendent of this division in 1901. He was later transferred to the Eastern division in 1902, and on January 1, 1903, was made chief engineer maintenance of way of the Southwest system, remaining in this position until he was appointed chief engineer maintenance of way of the Lines West in July, 1918.

W. C. Cushing

James M. Coble has been appointed shop superintendent of the Buffalo, Rochester & Pittsburgh at Rikers, Pa., succeeding **W. W. Scott**, resigned.

J. C. Patterson, principal assistant engineer of the Erie, who has been promoted to regional engineer, New York region, with headquarters at Jersey City, N. J., as announced in the *Railway Age* of February 27 (page 660), was born at Carmichaels, Pa., in 1882 and graduated from Pennsylvania State College in 1905. He entered railway service with the Pennsylvania Railroad in the same year, where he served until August, 1906, when he entered the employ of the New York Central. He remained with that road until April, 1907, when he went with the Cleveland, Cincinnati, Chicago & St. Louis. From October, 1907, to April, 1909, he was employed by John C. O'Bryan, consulting engineer, returning to railway service with the Northern Pacific on the latter date, where he remained until October, 1909, when he entered the employ of the Chicago Great Western. In July, 1913, he became chief draftsman on the Erie and in May, 1916, was promoted to assistant valuation engineer. He was made office engineer in February, 1917, remaining

J. C. Patterson

n that position until July, 1918, when he was promoted to principal assistant engineer, which position he held until receiving his recent appointment.

Walter J. Towne, during the period of federal control assistant general manager of the Chicago & North Western, with headquarters at Chicago, has been appointed engineer maintenance of way, with the same headquarters, effective March 1. Mr. Towne was born at Leavenworth, Kan., on November 28, 1867, and entered railway service in 1886 as a rodman in an engineering party on the Atchison, Topeka & Santa Fe. He was subsequently instrument man and assistant engineer on the same road. He left railway service in 1891 to attend Rensselaer Polytechnic Institute, Troy, N. Y., from which he was graduated in 1896. He then became assistant engineer on the New York State Canals, which position he held until February 14, 1899, when he returned to railway service as an assistant engineer of construction on the Chicago & North Western, with headquarters at Boone, Iowa. He served in this capacity until 1900 when he was promoted to assistant engineer at Kaukauna, Wis., and in 1901 he was transferred to Escanaba, Mich. In 1902 he was promoted to division engineer, with headquarters at Baraboo, Wis., and served in the same capacity from July to October, 1904, at Escanaba, and from October, 1904 to 1906, at Chicago. From March, 1906, to July of the same year, he served as engineer of permanent improvements. On the latter date he was appointed engineer maintenance of way, in which position he continued until April, 1912, when he was appointed general superintendent, with headquarters at Chicago. On May 3, 1914, he was promoted to assistant general manager with the same headquarters, and remained in that position until his recent appointment as engineer maintenance of way.

E. A. Hadley, who during government control, was engineering assistant to the director of the Southwestern region of the United States Railroad Administration, with office at St. Louis, Mo., has been appointed chief engineer of the Missouri Pacific, with the same headquarters, the position he held prior to government control. **H. R. Carpenter,** who during Mr. Hadley's service with the government has been chief engineer, has resumed the position he held prior to government control as assistant chief engineer in charge of construction. **R. C. White,** who during government control has been assistant chief engineer, has been appointed assistant chief engineer in charge of maintenance.

General

ANN ARBOR

The following officers have been appointed on the Ann Arbor, in addition to the appointments noted in the *Railway Age* of February 27, page 658:

C. H. Cox	Assistant treasurer	Toledo, Ohio
A. L. Smith	General solicitor	" "
H. S. Bradley	Traffic manager	" "
C. Z. Hughes	Purchasing agent	" "
T. H. Hervey	Supt. car service	" "
C. L. Shepard	Freight claim agent	" "
C. S. Reifsnider	Chief of police	" "
A. Syverson	Superintendent	Owosso, Mich.
C. I. Allen	Chief engineer	" "
J. E. Osmer	Supt. mot. power & car dept.	" "
M. B. Nesmith	General claim agent	" "
R. H. Reynolds	Marine superintendent	Frankfort, Mich.

ATCHISON, TOPEKA & SANTA FE

The following officers have been appointed on the Atchison, Topeka & Santa Fe, effective on March 1:

Executive and Financial Departments

W. B. Storey	President	Chicago.
Edw. Chambers	Vice-pres. charge traffic	"
A. G. Wells	Vice-pres. charge operation	"
W. E. Hodges	Vice-president	Los Angeles, Cal.
E. J. Engel	Vice-president	Chicago.
E. L. Copeland	Secretary and treasurer	Topeka, Kan.
L. C Deming	Assistant secretary	New York
C. W. Cooper	Treasurer	" "
G. Holterhoff, Jr.	Asst. treas. and asst. sec.	Los Angeles, Cal.

Legal Department

S. T. Bledsoe	General counsel	Chicago.
Gardiner Lathrop	General solicitor	"

Accounting Department

D. L. Gallup	Controller	New York
W. E. Bailey	General auditor	Chicago.

Purchasing Department

M. J. Collins	General purchasing agent	Chicago.

Engineering Department

C. F. W. Felt	Chief engineer	Chicago.

Simultaneously it was announced that other officers who have been in the service of the United States Railroad Administration will resume their former positions.

BALTIMORE & OHIO

The organization of the Baltimore & Ohio, effective on its return to private control is as follows:

Executive Department

Daniel Willard	President	Baltimore
Geo. M. Shriver	Vice-pres., acct., treasury, claim and relief depts.	"
F. C. Batchelder	Vice-pres., exec. rep.	Chicago
C. W. Galloway	V.-pres., op'ration & maint.	Baltimore
Archibald Fries	Vice-president, traffic	"
J. S. Murray	Assistant to president	"
Geo. H. Campbell	" "	"

Financial, Legal and Accounting Departments

C. W. Woolford	Secretary	Baltimore
Geo. F. May	Assistant secretary	"
H. L. Bond, Jr.	General counsel	"
H. R. Preston	General solicitor	"
Morison R. Waite	" "	Cincinnati, O.
C. W. Egan	General claim agent	Baltimore
F. J. Griffith	Tax agent	"
J. J. Ekin	Controller	"
W. D. Owens	Assistant controller	"
F. A. Deverell	" "	"
J. P. O'Malley	" "	"
C. C. Glessner	Freight claim agent	"
E. M. Devereux	Treasurer	"
R. B. Luckey	Asst. treas. & transfer agt.	New York
T. H. Schultz	Assistant treasurer	Baltimore
J. Q. McComas	" "	"
W. J. Dudley	Supt., relief department	"
W. M. Kennedy	Asst. supt., relief dept.	"
C. H. Moran	Real estate agent	"

Engineering Department

A. O. Cunn'gham	Chief engineer	St. Louis, Mo.
R. H. Howard	Chief engr., main. of way	" "
E. F. Needham	Supt. of motive power	Decatur, Ill.
T. J. Frier	Purchasing agent	St. Louis, Mo.

Purchasing and Stores Department

W. S. Galloway	Purchasing agent	Baltimore
E. A. Foos	Fuel agent	"
H. P. McQuilkin	General storekeeper	"

Engineering Department

L. G. Curtis	Chief engineer, adjust. div.	"
Jenks B. Jenkins	Valuation engineer	"
H. A. Lane	Chief engr. of construction	"
Earl Stimson	Chief engr. of maintenance	"
F. P. Patenall	Signal engineer	"

Mechanical Department

Geo. H. Emerson	Chief of mot. pow. & equip.	"
J. T. Carroll	General supt., mot. power	"
J. J. Tatum	Supt., car department	"
J. R. Onderdonk	Engineer of tests	"

Operating Department

W. G. Curran	Gen'l supt., transportation	Baltimore
G. F. Malone	Supt. of car service	"
C. A. Plumly	Superintendent, telegraph	"
J. H. Clark	Supt., floating equipment	New York
S. Ennes	Gen'l manager, east'n lines	Baltimore
R. N. Begien	Gen'l manager, west'n lines	Cincinnati, O.
H. B. Voorhees	Gen. mgr., N. Y. term. lines	New York
E. W. Scheer	Gen'l supt., Maryland dist.	Baltimore
J. F. Keegan	Gen'l supt., Penna. dist.	Pittsburgh
J. M. Scott	Gen'l supt., W. Va. dist.	Wheeling W. Va.
E. A. Peck	Gen'l supt., N'thwest dist.	Cleveland, O.
F. B. Mitchell	Gen'l supt., S'thwest dist.	Cincinnati, O.

TRAFFIC DEPARTMENT

Colder Shumate..Freight traf mgr., east. reg.Baltimore
O. A. Constans...Frt. traf mgr., n'thwest reg.Chicago
H. R. Lewis.....Frt. traf. mgr., s'thwest reg.Cincinnati, O.
Stuart A. Allen..Asst. freight traffic mgr....New York
C. S. Wight.....Gen'l freight representative. "
H. O. Hartzell...Mgr., commercial dev'l'pm't. "
H. M. Matthews..Coal traffic manager..... "
H. A. Cochran...Asst. coal traffic manager.. "
T. J. Walters....Gen'l coal freight agent.... "
F. J. Couse.....Foreign freight agent..... "
R. A. Ebe.....General live stock agent.... "
W. F. Richardson.General freight agent.....Baltimore
O. S. Lewis..... " " " .....Pittsburgh, Pa.
H. H. Marsh..... " " " .....Wheeling, W. Va.
P. D. Freer..... " " " .....Cincinnati, O.
Geo. M. Kridler . " " " .....Chicago
Edward Hart.. " " " .....St. Louis, Mo.
W. B. Calloway..Passenger traffic manager..Baltimore
O. P. McCarty...Asst. to pass. traf. manager. "
W. E. Lowes.....General passenger agent.... "
G. W. Squiggins.. " " " ....Cincinnati, O.
W. G. Brown.... " " " ....Chicago
B. N. Austin.....Western pass. repr'sentative. "
E. V. Baugh.....Superintendent, dining cars.Baltimore
J. C. McCahan, Jr.Mgr., mail and expr. traffic. "

BANGOR & AROOSTOOK

The following is the organization of the Bangor & Aroostook, effective upon its return to private control:

J. H. Hammond..Chairman executive committee.
Percy R. Todd...President.
Frank C. Wright.Vice-president.
Wingate F. Cram.Treas and clerk, also in charge of real estate, insurance and taxes.
F. A. W. Field...Assistant treasurer.
M. S. C. Baker....Assistant clerk.
H. P. Burns..... Acting general auditor.
C. D. Baldwin....Purchasing agent.
R. H. MacCready..Assistant to president.
W. K. Hallett....General manager.
Henry J. Hart....General counsel.
M. Burpee .....Chief engineer.
P. C. Newbegin...Maintenance engineer.
H. Shoemaker....Mechanical superintendent.
J. P. Darling.....Superintendent Northern Division.
J. B. McMann....Superintendent Southern Division.
F. H. Daggett....Superintendent car service.
G. E. Wicks.....General freight agent.
G. M. Houghton..General passenger agent.
E. W. Peterson...General storekeeper.
E. F. Curtis.....Freight claim agent.

The executive offices of the Bangor & Aroostook are at Bangor, Me.

BOSTON & ALBANY

The staff organization of the New York Central Lines was given in last week's issue, page 659. The following is the organization of the Boston & Albany, as announced by H. M. Biscoe, vice-president in charge of that property:

G. H. Fernald, Jr..Counsel .....Boston
E. L. Rossiter....Treasurer .....New York
Adam Haug .....Auditor .....Boston
J. L. Truden.....General superintendent ... "
F. B. Freeman....Chief engineer ..... "
R. D. Smith.....Supt. mot. pwr. & roll. st... "
W. E. Adams....Special asst. to vice-pres... "
R. Van Ummersen.Freight traffic mgr..... "
W. A. Barrows...General passenger agent... "
F. A. Ryer.....Purchasing agent ..... "
F. S. Austin.....General storekeeper ..... "

CAROLINA, CLINCHFIELD & OHIO

The following is the organization of Carolina, Clinchfield & Ohio on its return to private control:

John B. Dennis...Chairman of the board....New York
Mark W. Potter..President ..... "
J. J. Campion....Vice-president, traffic.....Johns'n City, Tenn.
I. McQuilkin.....Vice-pres., finances & accts. " "
Edward C. Bailly.Secretary .....New York
John W. Sanders.Treasurer .....Johns'n City, Tenn.
H. G. Morrison..General solicitor..... " "
L. H. Phetteplace.General manager.....Erwin, Tenn.
O. K. Morgan....Chief engineer.....Johns'n City, Tenn.
W. A. Starritt....Purchasing agent..... " "
D. C. Boy.....Industrial representative... " "

CENTRAL OF GEORGIA

The following is a portion of the organization of the Central of Georgia, effective with its return to private control.

Wm. A. Winburn.President .....Savannah, Ga.
Alex. R. Lawton..Vice-president ..... "
L. A. Downs.....Vice-pres. & genl. mgr.... "
T. Cunningham Jr.General counsel ..... "
H. Wiley Johnson.Asst. genl. counsel..... "
John D. Little.... " " " .....Atlanta, Ga.
A. R. Lawton, Jr.Solicitor .....Savannah, Ga.
W. B. McKinstry.Controller ..... "
W. C. Askew....Treasurer ..... "
H. V. Jenkins....Asst. treasurer ..... "

Charles T. Airey, vice-president and general manager of the Central of Georgia, announces the following as the new organization of the traffic department of that road:

N. B. Wright.....Asst. freight traffic mgr....Savannah, Ga.
F. D. McConnell.General freight agent..... " "
W. McN. Knapp..Asst. general freight agent. " "
T. L. Collings...Asst. general freight agent.Macon, Ga.
F. E. Ellis.....Division freight agent.....Atlanta, Ga.
W. C. Kilgore...Div. freight and pass. agent.Augusta, Ga.
W. E. Stewart...Div. freight and pass. agent.C'ttanooga, Tenn.
R. C. Brookes...Division freight agent.....Savannah, Ga.
K. M. Mallory...Industrial agent ..... " "
J. F. Jackson...Agricultural agent ..... " "

Traffic Representatives

J. S. Harris.....Commercial agent.....Albany, Ga.
B. R. Bloodworth.Commercial agent.....Athens, Ga.
A. S. Thompson..Commercial agent.....Atlanta, Ga.
F. F. Powers.....Commercial agent.....Augusta, Ga.
——— .....Commercial agent.....Baltimore, Md.
E. F. Stovall.....General agent .....Birmingham, Ala.
E. B. Lewis.....Commercial agent..... " "
B. H. DaCosta...New England agent.....Boston, Mass.
D.W.Vaughan, Jr.Commercial agent.....Chicago.
J. W. Jones.....Commercial agent.....Cincinnati, Ohio.
T. P. Wade.....Commercial agent.....Columbus, Ga.
F. L. Corwin....Florida freight agent.....Jacksonville, Fla.
J. R. Randolph...Commercial agent..... " "
H. A. Fletcher...Commercial agent.....Kansas City, Mo.
F. M. Tuttle.....Commercial agent.....Macon, Ga.
S. L. Peeples.....Commercial agent.....Memphis, Tenn.
M. C. Stokes.....General agent.....Montgomery, Ala.
Redin Bryan, Jr..Contracting freight agent.. " "
C. H. Stringe....Commercial agent.....Nashville, Tenn.
Henry R. McLean.Eastern traffic agent.....New York, N. Y.
F. D. Robinson...Commercial agent.....Okla. City, Okla.
Alan Browning...Commercial agent.....Philadelphia, Pa.
W. J. Siegel.....Commercial agent.....St. Louis, Mo.
W. A. Winburn, Jr.Commercial agent.....Savannah, Ga.
B. L. Abberger...Commercial agent.....Tampa, Fla.

CHARLESTON & WESTERN CAROLINA

The organization of the Charleston & Western Carolina, effective on its return to private control, is announced as follows:

H. Walters.....Chairman of the board....New York
Geo. B. Elliott....Chairman, executive com...Wilmington, N. C.
F. B. Grier.....President .....Greenwood, S. C.
J. R. Kenly.....First vice-president.....Wilmington, N. C.
A. W. Anderson..2nd vice-pres. & gen'l mgr..Augusta, Ga.
John T. Reid.....Treasurer .....Wilmington, N. C.
W. C. Yarbor'gh.Assistant treasurer..... " "
R. D. Cronly.....Secretary ..... " "
R. A. Brand.....Freight traffic manager..... " "
W. J. Craig.....Passenger traffic manager.. " "
H. C. Prince.....General auditor..... " "
F. M. Doar.....General superintendent.....Augusta, Ga.
W. F. Kuhlke....Supt., motive power..... " "
A. H. Porter.....Engineer of roadway..... " "
W. L. Humphrey.Supt., car service..... " "

CHESAPEAKE & OHIO

A portion of the organization of the Chesapeake & Ohio was given in last week's issue, page 658. Other appointments are as follows:

E. P. Goodwin...Asst. to general manager..Richmond, Va.
E. W. Grice.....Mgr., pur., stores & safety.. "
W. L. Booth.....Supt. transportation ..... "

(Chesapeake & Ohio, Continued)

A. T. Lowmaster. Asst. supt. transportation..Richmond, Va.
J. R. Gould..... Supt. motive power..... "
C. H. Terrell.... Asst. supt. motive power.. "
F. I. Cabell..... Chief engineer ..... "
L. B. Allen..... Supt. maintenance of way..Huntington, W.Va.
C. W. Bradley.... Supt. telegraph .....Richmond, Va.
J. R. Cary..... Genl. Supt., East. Genl. div.Clifton Forge, Va.
E. L. Bock..... Genl. Supt., West. Genl. div.Huntington, W.Va.
G. J. Derbyshire.. Genl. Supt., C. & O. Ry. Co.Peru, Ind
B. T. Jellison..... Genl. purchasing agent.....Richmond, Va.
R. M. Nelson.... Purchasing agent ..... "
M. S. McDonald. Superintendent, stores.....Huntington, W.Va.
R. L. Morris..... General storekeeper..... "
W. T. Oppenhimer. Chief surgeon .....Richmond, Va.
J. W. King..... Chief special agent..... "
J. R. Evans..... Chief fuel supervisor..... "
C. E. Bolton..... Statistician ..... "

CHICAGO, INDIANAPOLIS & LOUISVILLE

The following officers have been appointed on the Chicago, Indianapolis & Louisville, effective on March 1:

Executive and Financial Departments

H. R. Kurrie..... President .....Chicago.
Fred Zimmerman. Vice-president ..... "
F. S. Wynn..... Secretary .....New York
Byron Cassell .... Treasurer .....Chicago.

Operating Department

H. C. May..... General manager.....Lafayette, Ind.
W. H. Fogg..... General superintendent..... " "
F. E. Lewis..... Superintendent ..... " "
J. R. Stemm..... Superintendent .....

Accounting Department

H. T. Evans..... Auditor .....Chicago.

Purchasing Department

J. H. Libenthal... Purchasing agent .....Chicago.

Traffic Department

E. P. Veronia.... General freight agent.....Chicago.
E. P. Cockrell.... General passenger agent... "

Engineering Department

A. S. Kent..... Chief engineer .....Chicago.
Anton Anderson.. Engr. maintenance of way..Lafayette, Ind.

CHICAGO, MILWAUKEE & ST. PAUL

The executive personnel of the Chicago, Milwaukee & St. Paul has been announced as follows:

H. E. Byram..... President .....Chicago
B. B. Greer..... Vice-pres., charge op'ration. "
R. M. Calkins.... Vice-pres., charge traffic... "
H. B. Earling.... Vice-president .....Seattle, Wash.
E. D. Sewall..... Vice-president .....Chicago
C. B. Ferry..... Vice-pres. and asst. sec'y...New York
G. J. Bunting..... Controller .....Chicago
Burton Hanson... General counsel..... "
H. H. Field..... General solicitor..... "
A. G. Loomis..... Treasurer ..... "
John Dickie..... Assistant treasurer..... "
J. McNab..... " " ..... "
F. B. Simpson.... Asst. treas., asst. sec., tr. agt.New York
R. J. Marony..... " " " "
E. W. Adams..... Secretary .....Milwaukee, Wis.
H. M. Sloane..... Asst. to the president.....Chicago
J. W. Taylor..... " " " ..... "
D. L. Bush..... Asst. to the vice-president.. "
G. F. Loweth..... Chief engineer..... "
W. W. K. Sparrow. Assistant chief engineer.... "
A. G. Hagensick.. Assistant secretary.....Milwaukee, Wis.
F. Lethenstrom... Auditor .....Chicago

CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA

Following a meeting of the board of directors of the Chicago, St. Paul, Minneapolis & Omaha held recently, the official organization of the road, effective on March 1, was announced as follows:

Executive and Financial Departments

Marvin Hughitt..Chairman, board of dir.....Chicago
James T. Clark...President .....St. Paul, Minn.
Samuel A. Lynde. Vice-president .....New York
A. W. Trenholm. Vice-president .....St. Paul, Minn.
John D. Caldwell. Secretary .....Chicago
Arthur S. Pierce. Treasurer .....New York
Charles P. Nash.. Local treasurer .....St. Paul, Minn.
T. W. Arundel.. Asst. treas. and asst. sec...New York
Harry W. Rush.. Asst. treas. and asst. sec... " "
Charles A. Leggo. Assistant secretary .....St. Paul, Minn.

Legal Department

James B. Sheean. General counsel .....Chicago
R. L. Kennedy.... General solicitor .....St. Paul, Minn.
Donald Evans.... Attorney ..... " " "
Fred G. Wright.. Attorney ..... " " "
Frank Wenter.... General claim agent..... " " "
H. R. Grochau... Freight claim agent..... " " "

Operating Department

J. J. O'Neill..... Manager .....St. Paul, Minn.
F. R. Pechin..... General superintendent ... " " "
Geo. L. Ossmann. Car service agent..... " " "
Geo. Boyce..... Supt. telegraph and signals. " " "
H. L. McClure... Supt. dining cars.....Minneapolis, Minn.

Traffic Department

Hiram M. Pearce. General traffic manager....St. Paul, Minn.

Freight

A. M. Fenton.... General freight agent.....St. Paul, Minn.
L. A. Mizener.... Asst. general freight agent. Minneapolis, Minn.
G. C. Wright..... Asst. general freight agent. St. Paul, Minn.

Passenger

G. H. MacRae... General passenger agent... St. Paul, Minn.
E. L. Pardee..... Asst. general passenger agt. " " "
E. F. Woode..... General baggage agent..... " " "

Accounting Department

Charles Jensch... Controller .....St. Paul, Minn.

Engineering Department

H. E. Barlow.... Chief engineer .....St. Paul, Minn.
H. P. Padley.... Assistant chief engineer... " " "

Land, Right of Way and Tax Departments

G. W. Bell..... Land commissioner .....Hudson, Wis.
H. P. Barlow..... R. of way commissioner... St. Paul, Minn.
T. A. Polleys.... Tax commissioner ..... Chicago
Wm. Mueller..... Asst. tax commissioner.... St. Paul, Minn.

Mechanical Department

J. O. Enockson... Supt. mot. power & mach.. St. Paul, Minn.
W. H. Thorn..... Master car builder..... Hudson, Wis.
G. M. Davidson.. Chemist & engr. of tests... Chicago

CHICACO & NORTH WESTERN

The board of directors of the Chicago & North Western Railway Company recently announced the official organization of the company, effective on March 1, as follows:

Executive and Financial Departments

Marvin Hughitt.. Chairman, board of dir....Chicago.
Wm. H. Finley... President ..... "
Samuel A. Lynde. Vice-pres. and asst. sec....New York City.
M. Hughitt, Jr.... V.-P. Charge of operation. Chicago.
H. R. McCullough. V.-P. Charge of traffic.... "
Edw. M. Hyzer.. Vice-president ..... "
John D. Caldwell. Secretary and assist. treas. "
Arthur S. Pierce. Treasurer and asst. sec....New York City.
T. W. Arundel... Asst. treas. and assist sec.. " " "
H. W. Rush..... Asst. treas. and assist sec.. " " "
Barret Conway... Assistant secretary.....Chicago.

Legal Department

Jas. B. Sheean... General counsel .....Chicago.
A. A. McLaughlin. Asst. general solicitor..... "
Nelson J. Wilcox. Asst. general solicitor..... "
R. H. Widdicombe. Commerce attorney..... "
R. C. Richards... General claim agent..... "
H. C. Howe..... Freight claim agent..... "

Operating Department

M. Hughitt, Jr.. Vice-president .....Chicago.
Frank Walters ... General manager ..... "
F. H. Hamill..... Asst. G. M. (eastern lines). "
Wm. Walliser ... Asst. G. M. (eastern lines). "

(Chicago & North-Western, Continued)

C. F. Dike.....Asst. G. M. (west. lines)..Omaha, Neb.
G. B. Vilas.....Gen. Supt (eastern lines).Chicago.
H. E. Dickinson..Gen. Supt. (west. lines)...Omaha, Neb.
Robert Quayle ...Gen. Supt. M. P. & Mach.Chicago.
H. T. Bentley....Supt. of m. p. & mach..... "
T. H. Goodnow...Supt car department..... "
Geo. M. Davidson.Chemist and engr. of tests. "
F. J. Berck.....General purchasing agent.. "
O. E. Hallberg...Car service agent..... "
Wm. Bennett ....Supt. of Telegraph..... "
C. H. Shircliffe..Sup. dining and parlor cars. "

TRAFFIC DEPARTMENT

H. R. McCullough.Vice-president .....Chicago.
A. C. Johnson....General traffic manager.... "

Freight

H. W. Beyers....Freight traffic manager....Chicago
E. D. Brigham...Asst. freight traffic mgr.... "
A. F. Cleveland...Asst. freight traffic mgr.... "
S. F. Miller.....General freight agent..... "
S. G. Nethercot...Asst. general freight agent. "
S. H. Gillette....Asst. general freight agent. "

Passenger

C. A. Cairns.....Passenger traffic manager..Chicago.
J. L. Ferguson...General passenger agent.... "
M. R. Leahy.....Asst. gen. passenger agent. "
Robert Thomson..Asst. gen. passenger agent. "
C. R. Custer.....Asst. gen. passenger agent. "
H. G. Graves.....General baggage agent..... "

ACCOUNTING DEPARTMENT

L. A. Robinson...Comptroller .....Chicago.
C. D. Brandriff...General auditor ..... "
A. B. Jones.....Local treasurer ..... "
C. L. Lowe.....Auditor of expenditures... "

ENGINEERING DEPARTMENT

L. J. Putnam.....Chief engineer..... Chicago.
F. C. Huffman....Principal asst. engineer.... "
W. J. Towne.....Engineer of maintenance... "
O. F. Dalstrom...Engineer of bridges..... "
J. A. Peabody.....Signal engineer ..... "

LAND AND TAX DEPARTMENTS

J. F. Cleveland...Land commissioner .....Chicago.
T. A. Polleys....Tax commissioner..... "

SURGICAL DEPARTMENT

J. E. Owens, M.D.Consulting surgeon.....Chicago.
C. W. Hopkins...Chief surgeon..... "

CINCINNATI, INDIANAPOLIS & WESTERN

The executive staff which now controls the Cincinnati, Indianapolis & Western has been announced, in part, as follows:

F. J. Goebel.....Sec. and assist. counsel....Indianapolis, Ind.
D. J. Curran.....Treasurer ..... " "
L. E. Smith.....Freight claim agent..... " "
F. B. Brown.....Freight claim agent..... " "
M. V. Hynes.....General superintendent..... " "
J. L. Powell.....Supt. of car service..... " "
W. H. Bettcher...Master car builder..... " "
H. F. Passel.....Chief engineer ..... " "
C. F. Shadle.....Efficiency engineer ..... " "
C. G. Slagle.....Acting supt. motive power. " "
J. A. Simmons....General traffic manager.... " "

CUMBERLAND & PENNSYLVANIA

The following is the organization of the Cumberland & Pennsylvania, effective with the return of the property to private control:

C. W. Watson....President .....New York.
Arthur Hale.....Vice-president .....Baltimore, Md.
S. D. Camden....Vice-president .....New York.
A. K. Bowles....Assistant-General Auditor..Baltimore, Md.
T. K. Stuart.....Secretary and treasurer... " "
H. H. Warfield...Asst. sec. and asst. treas.... " "
E. T. Dixon.....Auditor .....Cumberland, Md.
J. H. Patten.....General attorney .....Washington, D. C.
A. Taylor Smith..Attorney .....Cumberland, Md.
J. T. Robertson...General manager ..... " "
Wm. Ewald.....Supt. motive power.....Mt. Savage, Md.
W. Claus .....Engr. maintenance of way.Cumberland, Md.
A. T. Watson....General purchasing agent..Fairmont, W. Va.

DULUTH, MISSABE & NORTHERN

The following officers have been appointed on the Duluth, Missabe & Northern, effective on March 1.

EXECUTIVE AND FINANCIAL DEPARTMENTS

W. A. McGonagle.President .....Duluth, Minn.
W. J. Olcott.....First vice-president .. .. .. " "
Pentecost Mitchell.Second vice-president... .. " "
C. E. Carlson....Secretary ..... " "
J. M. Sias.....Assistant secretary ..... " "
J. W. Kempton...Treasurer ..... " "
Thomas Murray..Assistant treasurer .....New York
G. A. Flinn.....Railway and tax agent.....Duluth, Minn.

LEGAL DEPARTMENT

F. D. Adams.....General solicitor .....Duluth, Minn.
E. F. Blu.....Asst. general solicitor..... " "

ACCOUNTING DEPARTMENT

Joseph Seifert ...Auditor .....Duluth, Minn.

ENGINEERING DEPARTMENT

W. H. Hoyt.....Chief engineer .....Duluth, Minn.

TRAFFIC DEPARTMENT

C. W. Kieswetter.Traffic manager .....Duluth, Minn.

PURCHASING DEPARTMENT

H. Greenfield.....Purchasing agent .....Duluth, Minn.

OPERATING DEPARTMENT

J. W. Kreitter....Superintendent .....Proctor, Minn.

MECHANICAL DEPARTMENT

C. W. Seddon....Supt. motive power & cars..Proctor, Minn.

DELAWARE, LACKAWANNA & WESTERN

The following gives the details of the organization of the Delaware, Lackawanna & Western, effective on its return to private control:

EXECUTIVE DEPARTMENT

W. H. Truesdale. President .....New York
W. S. Jenney....Vice-pres. & gen. coun.... "
E. M. Rine .....Vice-pres. & general man.. "
J. J. Flynn.....Vice-president; traffic .... "
W. W. Inglis.....V.pres. & man.; min op....Scranton, Pa.
W. Van DeWater.Secretary and treasurer....New York
G. E. Hustis.....Controller ..... "
G. J. Ray.....Chief engineer .....Hoboken, N. J.

LEGAL DEPARTMENT

W. S. Jenney.....V.-pres. & gen. coun.....New York
J. L. Seager .....Assistant gen. counsel.... "
D. Swift .....Gen.. Attorney for N. Y... "
D. R. Reese .....Gen. attorney for Penn....Scranton, Pa.
E. T. Lukens.....Real Estate & Tax Agent..Hoboken, N. J.

OPERATING DEPARTMENT

E. M. Rine .....V.-pres. & general man...New York
H. H. Shepard...General superintendent....Scranton, Pa.
E. B. Moffatt....Asst. to V.-p. & gen. man..New York
R. M. White.....Supt. Morris & Essex div.Hoboken, N. J.
J. J. Pierce.....Asst. supt. M. & E. div... "
F. J. Lawrence...Supt., Scranton div. .....Scranton, Pa.
H. E. Griffith.....Supt. Bangor & Port'nd div.Bangor, Pa.
A. E. Staub.....Supt., Buffalo div.....Buffalo, N. Y.
Frank Cizek .....Supt., Syracuse & Utica div.Binghamton, N.Y.
G. C. Ferris.....Asst. supt., Syr. & Utica div.Syracuse, N. Y.
A. J. Miller.....Supt., car service.....Scranton, Pa.
V. D. Thayer....Car accountant..... "
C. C. Hubbell....Purchasing agent .....New York
I. H. Lance.....Storekeeper .....Scranton, Pa.
J. M. Emery.....Mgr., marine dept.....Hoboken, N. J.

MECHANICAL DEPARTMENT

H. C. Manchester Supt., mot. pwr. & equip...Scranton, Pa.
J. C. Fritts.....Master car builder..... .. "
S. S. Riegel.....Mechanical engineer ..... "
T. F. Barton.....Master mechanic .....Kingsland, N. J.
B. H. Davis..... " " .....Scranton, Pa.
F. C. Pickard.... " " .....Buffalo, N. Y.
B. E. Miller.....Master Painter .....Kingsland, N. J.
H. J. Force.....Chemist and eng. of tests...Scranton, Pa.

MAINTENANCE OF WAY AND STRUCTURES

G. J. Ray.....Chief engineer .....Hoboken, N. J.
A. J. Neafie.....Principal assist. engineer... "
M. H. Doughty..Division engineer..... "

(Delaware, Lackawanna & Western, Continued)

L. L. Tallyn....Division Engineer.....Scranton, Pa.
G. E. Boyd..... " " .....Buffalo, N. Y.
F. L. Wheaton... " " .....Binghamton, N.Y.
M. E. Smith.....Signal engineer .....Hoboken, N. J.
H. M. Warren...Electrical engineer .....Scranton, Pa.

TRAFFIC DEPARTMENT

Freight Traffic

P. J. Flynn.....Vice-president .....New York
Nat Duke.....Freight traffic mgr..... "
J. J. Byrne.....Asst. freight traffic mgr.... "
D. T. Lawrence..General freight agent..... "
A. B. Wallace...Asst. general freight agent.. "
C. F. McTague.. " " " " ..Buffalo, N. Y.
Maurice Williams " " " " ..New York
E. S. Giles.....Coal freight agent..... "

Passenger Traffic

G. A. Cullen.....Passenger traffic mgr.....New York
W. F. Griffiths....General passenger agent.... "
E. J. Quackenbush..Asst. genl. passenger agent..Buffalo, N. Y.
G. E. Zippel.....Gen. bag. & milk traf. agt..Hoboken, N. J.
C. P. Barrett.....General w. pass agent....Chicago, Ill.
J. L. Homer.....General e. pass. agent....New York
F. A. Stine.....Supt. din. car & rest service.Hoboken, N. J.
J. G. Bray.....Division passenger agent...Newark, N. J.
M. L. Smith.....Division passenger agent...Scranton, Pa.
J. L. Smith.....Division passenger agent...Binghamton, N. Y.

Industrial

J. F. Muller.....Industrial agent .....New York

TREASURY DEPARTMENT

W. Van De Water.Secretary and treasurer....New York
J. E. Enderlin....Asst. sec. & asst. treas..... "
W. S. Dunloy....Cashier ..... "
F. N. Hallstead..General paymaster .....Scranton, Pa.
G. N. England...Asst. general paymaster.... "

ACCOUNTING DEPARTMENT

G. E. Hustis.....Comptroller .....New York
R. B. Ferguson..General auditor ..... "
R. O. Collins.....Auditor disbursements .... "
Frank Wildey....Asst. auditor disbursements. "
J. F. Jeckel.....Auditor miscel. accounts... "
Miss M. I. Dailey.Registrar of contracts..... "
P. D. Jonas.....Statistician ..... "
Henry Foulkes...Mail traffic agent..... "
Bertram Young ...Auditor frt. & ticket accts..Scranton Pa.
J. M. Coddington..Asst. aud. frt. & ticket accts. "
A. B. Thompson..Freight claim agt..... "
W. H. Gaskill....Asst. freight claim agent... "
Frank Hildebrand.Auditor. coal department... "

COAL MINING DEPARTMENT

W. W. Inglis.....Vice-president & manager..Scranton, Pa.
S. D. Dimmick...General superintendent .... "
H. M. Warren...Electrical engineer ..... "
N. N. Nichols....chief engineer ..... "
J. N. Shaw.....Assistant purchasing agent. "
Thos. Bevan.....Storekeeper ..... "

ELGIN, JOLIET & EASTERN

The organization which will control the Elgin, Joliet & Eastern henceforth has been announced as follows:

S. M. Rogers.....Vice-president .....Chicago
F. L. Koontz.....Secretary and treasurer.... "
E. J. Fay.....Assistant secretary..... "
Edward Beecroft. " treasurer ..... "
K. K. Knapp.....General counsel..... "
R. W. Campbell..General attorney..... "
W. L. Louis.....Traffic manager..... "
P. L. Fisher.....General auditor..... "
C. H. Kenzel.....Purchasing agent..... "
H. M. De Gette...Freight claim agent..... "
P. F. McManus...General superintendent....Joliet, Ill.
A. Montzheimer..Chief engineer..... " "
J. Horrigan.....Supt. motive power..... " "
R. F. Beaudry....Supt. Joliet division..... " "
C. H. Doorley....Supt. Gary division.....Gary, Ind.
A. L. Christiansen.Supt. car service.....Joliet, Ill.
T. E. Bond.....Asst. traffic manager.....Chicago
G. W. Williams...Assistant general auditor.. "
G. G. Davis, M.D.Chief surgeon..... "

EL PASO & SOUTHWESTERN SYSTEM

The following is the organization of the El Paso & Southwestern System, as recently announced:

EXECUTIVE DEPARTMENT

T. M. Schumacher.President .....New York
A. C. James.....Vice-president ..... "
M. J. Curry.....Asst. to president..... "
George Notman...Controller and secretary... "
C. W. Parsons....Asst. secy. and treas..... "

OPERATING DEPARTMENT

A. E. Sweet.....General manager .....El Paso, Tex.
L. U. Morris.....General superintendent .... " "
H. S. Fairbank...Supt., Western div.....Douglas, Ariz.
C. D. Beeth.....Supt., Eastern div.....Tucumcari, N. M.

TRAFFIC DEPARTMENT

Eugene Fox.....General traffic manager....El Paso, Tex.
W. C. Barnes.....General freight agent..... " "
C. E. Hilsabeck...Asst. general freight agent. " "
Garnett King.....General passenger agent... " "
R. S. Trumbull...Agricultural agent ..... " "
H. J. Simmons....General agent ..... " "

LEGAL DEPARTMENT

Wm. C. Osborn..General counsel .....New York
W. A. Hawkins..General attorney .....El Paso, Tex.
W. M. Peticolas..General solicitor ..... " "
D. W. Harrington.Asst. general solicitor..... " "
W. S. Dawson....General claim agent..... " "

ACCOUNTING DEPARTMENT

A. L. Hawley....General auditor .....El Paso, Tex.
H. C. Brown.....Asst. general auditor..... " "
Batelle White ....General cashier ..... " "
B. H. Bower.....Car accountant ..... " "

ENGINEERING AND MECHANICAL DEPARTMENTS

Thomas Paxton ..Supt., motive power.....El Paso, Tex.
J. L. Campbell....Chief engineer ..... " "

PURCHASING DEPARTMENT

E. L. Hunter.....Purchasing agent .....El Paso, Tex.

GRAND TRUNK

Howard G. Kelley, president of the Grand Trunk Railway System, announced on February 28 that upon the release of the Grand Trunk Lines in the United States, west of the Detroit and St. Clair rivers and east of Norton's Mills, Vt., from federal control, the jurisdiction of the executive officers of the system would be extended over such lines. In addition, the following appointments have been made:

GRAND TRUNK LINES IN NEW ENGLAND

J. H. Edward.....Local treasurer.....Portland, Me.
A. E. Plant.....Local auditor..... " "
A. B. McNaught'n.Supt., Portland div..... " "
H. L. Nelson.....Division freight agent..... " "

LINES WEST OF THE DETROIT AND ST. CLAIR RIVERS

Wm. C. Tomkins.Local treasurer.....Detroit, Mich.
Fred Norton.....Auditor ..... " "
H. E. Whittenb'g'r.General manager..... " "
W. H. Sample....Cons. eng., m. p. & car depts. " "

Freight Traffic Department

R. L. Burnap.....Freight traffic manager.....Chicago
E. F. Flinn.....General freight agent..... "
W. H. Spicer.....Asst. gen'l freight agent...Detroit
C. A. Gormaly....Division freight agent.....Chicago
Jas. Cameron.....Chief of tariff bureau..... "
A. Z. Mullins.....Division freight agent.....Grand Rapids
H. W. Ploss.....Commercial agent.....Milwaukee
H. H. Hamill.....General agent.....Detroit

Passenger Traffic Department

J. D. McDonald...General passenger agent....Chicago
C. G. Orttenb'ger.General agent..... "
J. H. Burgis..... " " .....Detroit

GREAT NORTHERN

The following officers have been appointed on the Great Northern, effective on March 1:

EXECUTIVE DEPARTMENT

L. W. Hill.....Chairman of the board.....St. Paul, Minn.
Ralph Budd.....President ..... " " "
G. R. Martin.....V.-p., executive dept. " " "

(Great Northern, Continued)

E. T. Nichols....V. p. & asst. secretary.....New York
E. C. Lindley.....V.-p. & general counsel.....St. Paul, Minn.
W. P. Kenney....V.-p. & director of traffic.. " " "
C. O. Jenks.....V. p., operating dept..... " " "
F. L. Paetzold....Secretary & treasurer..... " " "
G. H. Hess, Jr....Controller ..... " " "

FINANCIAL DEPARTMENT

N. Terhune.....Asst. sec. & asst. treas.....New York
R. C. Patterson...Cashier & asst. secretary...St. Paul, Minn.
W. G. Smith.....Paymaster ..... " " "

LEGAL DEPARTMENT

M. L. Countryman,Gen. solicitor—lines east..St. Paul, Minn.
John F. Finerty...Asst. general counsel..... " " "
F. G. Dorety.....Asst. general counsel..... " " "
A. L. Janes.....Asst. general solicitor..... " " "
J. A. Murphy.....Attorney for Wisconsin....Superior, Wis.
C. J. Murphy.....Attorney for N. Dakota....Grand Forks, N. D.
I. P. Veazey, Jr...Attorney for Montana.....Great Falls, Mont.
Aikens & Judge...Attorneys for S. Dakota...Sioux Falls, S. D.
Jepson & Struble..Attorneys for Iowa.....Sioux City, Ia.
Andrew Haydon...Attorney .....Ottawa, Ont.
James Fisher.....Attorney for Manitoba.....Winnipeg, Man.
F. V. Brown.....Gen. solicitor—lines west..Seattle, Wash.
A. H. MacNeill..Atty. for British Columbia.Vancouver, B. C.
C. S. Albert.....Atty. for Idaho & E. Wash..Spokane, Wash.
Thomas Balmer...Atty. for Ore. & W. Wash.Seattle, Wash.
James T. Maher..R. of way, land & tax com.St. Paul, Minn.
John L. Snapp...Right of way & tax agent..Seattle, Wash.
D. H. Kimball....Claims attorney .....St. Paul, Minn.

TRAFFIC DEPARTMENT

G. H. Smitton....Traffic manager .....St. Paul, Minn.
M. J. Costello....Asst. traffic manager.....Seattle, Wash.
C. E. Stone.....General passenger agent...St. Paul, Minn.
E. H. Wilde.....Asst. gen. passenger agent. " " "
A. J. Dickinson...Asst. gen. passenger agent. " " "
H. A. Noble.....Asst. gen. passenger agent. " " "
C. W. Meldrum...Asst. gen. passenger agent.Seattle, Wash.
E. C. Leedy.....Supervisor of agriculture..St. Paul, Minn.
Fred A. Hills....General baggage agent.....St. Paul, Minn.
W. S. Baskerville. Gen. agent, mail traffic....St. Paul, Minn.
F. W. Graham....Agricultural agent.....Seattle, Wash.
H. H. Brown.....Assistant traffic manager...St. Paul, Minn.
P. H. Burnham...General freight agent..... " " "
F. H. Parker.....Asst. general freight agent. " " "
P. B. Beidelman...Asst. general freight agent. " " "
W. J. Power.....Asst. general freight agent. " " "
James Robinson...Asst. general freight agent. " " "
S. A. Volkman....Gen. agt., refrigerator serv. " " "

OPERATING DEPARTMENT

C. O. Jenks.....Vice-president .....St. Paul, Minn.
J. A. Cochrane...Asst. to vice-president..... " " "
F. Bell.....Gen. manager—lines east... " " "
J. H. O'Neill.....Gen. manager—lines west..Seattle, Wash.
F. J. Gavin.....Gen. supt. Lake district....Superior, Wis.
P. F. Keating.....Gen. supt. Eastern district.St. Paul, Minn.
W. R. Smith.....Gen. supt. Central district..Great Falls, Mont.
F. S. Elliott.....Gen. supt. Western district.Spokane, Wash.
A. L. Bergfeld....Gen. supt. of transportation.St. Paul, Minn.
F. L. Hay.....Supt. dining & sleeping cars. " " "
J. C. Rankine.....Supt. of telegraph..... " " "
T. F. Dixon.....Supt. Marcus division.....Marcus, Wash.

MECHANICAL DEPARTMENT

William Kelly....Gen. supt. motive power....St. Paul, Minn.
Henry Yoerg.....Supt. mot. power—lines east " " "
J. J. Dowling....Supt. mot. power—lines westSpokane, Wash.
W. R. Wood.....Mechanical engineer .....St. Paul, Minn.
T. E. Cannon.....Gen. mas. mech., Lake dist.Superior, Wis.
M. Flanagan.....Gen. mas. mech., East. dist.St. Paul, Minn.
T. J. Clark.....Gen. mas. mech., West. dist.Spokane, Wash.
A. B. Ford.....Gen. mas. mech., Cent. dist.Great Falls, Mont.

ENGINEERING DEPARTMENT

A. H. Hogeland..Chief engineer .....St. Paul, Minn.
C. M. Nye.....Assistant chief engineer.... " " "
O. S. Bowen.....Assistant chief engineer....Seattle, Wash.
J. R. W. Davis..Engr. maintenance of way..St. Paul, Minn.
H. S. Freeman...Office engineer ..... " " "
J. A. Bohland....Bridge engineer ..... " " "
C. A. Dunham....Signal engineer ..... " " "
G. D. Eddy.....Valuation engineer ..... " " "

PURCHASING DEPARTMENT

F. A. Bushnell....Purchasing agent .....St. Paul, Minn.
F. I. Plechner....Assistant purchasing agent. " " "
A. H. Lillengren..Assistant purchasing agent. " " "
O. H. Wood.....Assistant purchasing agent.Seattle, Wash.
J. F. Pratt.....General storekeeper .....St. Paul, Minn.
Howard Hayes....Asst. general storekeeper.. " " "

ACCOUNTING DEPARTMENT

G. H. Hess, Jr....Controller .....St. Paul, Minn.
J. A. Sandberg....Deputy controller ..... " " "
F. A. Barnes.....Assistant controller ..... " " "
W. Montgomery...Assistant controller ..... " " "
J. H. Boyd.....Assistant controller ..... " " "
V. P. Turnburke..Statistician ..... " " "
J. U. Haley.....Valuation accountant..... " " "
P. Rodenberg.....Tax accountant..... " " "
J. C. Seiberlich...General accountant..... " " "
J. H. Kaufmann...Auditor misc. companies... " " "
J. A. Nelson.....Chief freight claim agent.. " " "
E. C. Lewis.....Freight claim agent..... " " "
W. D. McNamara..Freight claim agent..... " " "
G. L. Seibert.....Freight claim agent.....Seattle, Wash.
W. H. Fortier....Freight claim agent.....Spokane, Wash.
A. B. Fisher.....General auditor.....St. Paul, Minn.
C. W. Tilton.....Assistant general auditor... " " "
G. V. Malmgren..Auditor disbursements..... " " "
E. J. Willis.....Auditor freight receipts.... " " "
L. R. Smith.....Auditor station accounts... " " "
L. A. Malmgren...Auditor passenger receipts. " " "
R. L. Knebel.....Auditor car records..... " " "
H. F. Bayer.....Auditor capital expenditures " " "
F. G. Sprain.....Auditor overcharge claims. " " "
H. J. Sturner.....Accountant train statistics.. " " "
A. R. Simon.....Joint facility accountant... " " "
H. E. Kongsvik...Commissary accountant.... " " "
R. A. Nichols.....Accountant .....Seattle, Wash.

SPECIAL

D. W. Morison...Supt. employment bureau..St. Paul, Minn.
C. L. La FountaineGeneral safety supervisor.. " " "

HOCKING VALLEY

The Hocking Valley announces that the following is its organization, effective with the return to private control:

H. E. Huntington.Chairman of the board....New York.
Geo. W. Stevens..President .....Richmond, Va.
C. E. Graham....Senior vice-president.....New York.
F. H. Davis.....Vice-president ..... "
G. B. Wall.....Vice-president .....Richmond, Va.
H. T. Wickham...Vice-pres. and gen. counsel. " "
F. M. Whitaker..Vice-pres. charge of traffic. " "
A. Trevvett.....Secretary and treasurer....New York.
H. F. Lohmeyer..Assistant secretary ..... "
W. N. Cott.....Asst. sec. and asst. treas...Columbus, Ohio.
F. D. Hodgson...Controller ..... " "
A. C. Rearick....Counsel .....New York.
Wilson & Rector.Solicitors .....Columbus, Ohio.
W. S. Bronson...General attorney .....Richmond, Va.
H. Frazer .....Consulting engineer..... " "

HUDSON & MANHATTAN

The Hudson & Manhattan announces that the following is its organization, effective with the return to private control:

W. C. Fisk.....Chairman of the board....New York
Oren Root .....President ..... " "
J. Vipond Davies.Chief engineer..... " "
Fletcher H. Sillick.Controller ..... " "
James S. O'Neale.Treasurer ..... " "
Robert B. Kay....Sec. and assistant treas.... " "
P. C. Miller.....Real estate agent..... " "
Carl S. Klumpp..General superintendent..... " "
Harry W. Webber.Purchasing agent..... " "

ILLINOIS CENTRAL

The general officers of the Illinois Central and the Yazoo & Mississippi Valley have been announced as follows:

C. H. Markham...President .....Chicago.
C. M. Kittle.....Senior vice-president ..... "
L. W. Baldwin...V.-p. in charge of operation. "
F. B. Bowes.....V.-p. in charge of traffic... "
M. P. Blauvelt....V.-p. in charge of account. "
W. S. Horton....General counsel ..... "
A. S. Baldwin....V.-p. in charge Chi. ter. im. "
W. Summerhays..Purchasing agent ..... "
D. R. Burbank....Secretary .....New York.
R. E. Connolly....Treasurer ..... " "

The following officers have been appointed by D. W. Longstreet, traffic manager of the Illinois Central and the Yazoo & Mississippi Valley:

FREIGHT

V. D. Fort.....Assistant traffic mgr.....New Orleans, La.
B. J. Rowe.....Coal traffic manager.....Chicago, Ill.
V. M. Rhett.....General foreign agent..... " "
Donald Rose.....European traffic manager..London, Eng.
H. J. Schweitert..General develop. agent....Chicago, Ill.
V. Haywood.....Asst. to Traffic mgr.....Chicago, Ill.

Northern and Western Lines

C. C. Cameron....General freight agt.....Chicago, Ill.
. H. Cherry.....Asst. gen. freight agent.... " "
F. H. Law.....Asst. gen. freight agent.... " "
F. C. Furry.....Asst. gen. freight agent.... " "
G. W. Becker....Asst. gen. freight agent.... " "
H. G. Powell.....Asst. gen. freight agent.... " "
Wm. Smith, Jr....Asst. gen. freight agent....St. Louis, Mo.

Southern Lines

. Hattendorf.....General freight agent.....Memphis, Tenn.
E. K. Bryan.....Asst. gen. freight agent.... " "
. L. Sheppard....Asst. gen. freight agent.... " "
W. B. Ryan.....Asst. gen. freight agent.... " "
M. L. Costley.....General freight agent.....New Orleans, La.
B. T. Breckenridge.Asst. gen. freight agent....Louisville, Ky.

PASSENGER

Northern and Western Lines

H. J. Phelps.....General passenger agent...Chicago, Ill.
. V. Lanigan....Asst. gen. passenger agt.... " "
F. D. Miller.....Asst. gen. passenger agt....St. Louis, Mo.

Southern Lines

W. H. Brill.....General passenger agent...New Orleans, La.
A. C. Linton.....Asst. gen. passenger agt... " " "
R. J. Carmichael.Asst. gen. passenger agt....Memphis, Tenn.

KANSAS CITY SOUTHERN LINES

The following officers and agents of the Traffic department of lines indicated have been appointed, effective on March 1:

KANSAS CITY SOUTHERN, ARKANSAS WESTERN, AND POTEAU VALLEY

Freight Traffic Department

H. A. Weaver...General freight agent.....Kansas City, Mo.
. R. Mills.....Asst. gen. freight agent... " " "
. V. Beatty.....Asst. gen. freight agent... " " "
. O. Hamilton...Asst. gen. freight agent...Texarkana, Tex.

Passenger Traffic Department

S. G. Warner....Gen. pass. & ticket agent..Kansas City, Mo.
S. G. Hopkins....Asst. gen. pass. agent....Texarkana, Tex.
F. D. Downie....General baggage agent....Kansas City, Mo.
. A. McManus..Traveling passenger agent. " " "

TEXARKANA & FORT SMITH

Freight Traffic Department

. O. Hamilton...General freight agent.....Texarkana, Tex.

Passenger Traffic Department

S. G. Hopkins....General passenger agent..Texarkana, Tex.

KANSAS CITY SOUTHERN, ARKANSAS WESTERN, TEXARKANA & FORT SMITH, AND POTEAU VALLEY

POTEAU VALLEY

Agricultural and Industrial Department

F. K. Woodruff..Agr. & industrial agent...Kansas City, Mo.
J. F. Newsom....Agriculturist ..... " " "

Traffic Agents

C. H. Stevens....General agent .....Beaumont, Tex.
E. A. Rouse.....Traveling freight agent.... " "
Henry Brown ....General agent.....Chicago.
E. C. Worthley..Traveling freight agent... " "
G. H. Dougherty.General agent.....Dallas, Tex.
. M. McDermott.Traveling freight agent... " "
C. J. Koepsell....General agent.....Detroit, Mich.
H N. Hall.....General agent.....Ft. Smith, Ark.
Guy Lord .....Traveling freight agent... " " "
G. M. Riley.....General agent.....Houston, Tex.
J. B. Gibson.....Traveling freight agent... " "
E. G. Spencer....General agent.....Joplin, Mo.
L. O. Scoville....Traveling freight agent... " "
P A. Dudley.....General agent.....Kansas City, Mo.
F. E. Brown.....Traveling freight agent.... " " "
F. M. Seymour, Jr. Traveling freight agent... " " "
F. E. Haskell.....General agent.....Lake Charles, La.
H. J. Snyder....General agent.....Los Angeles, Cal.
C. P. Hoch.....General agent.....New York City.
J. M. Carriere...General agent.....New Orleans, La.
J. de Trava Carter.Traveling freight agent... " "
G. J. Wadlinger..General agent.....Pittsburgh, Pa.
H. J. O'Connor..Traveling freight agent... " "
B. A. Rogers.....General agent.....St. Louis, Mo.
C. S. Cox.....Traveling freight agent... " "
C. M. Wilkinson..General agent.....San Antonio, Tex.
H J. Snyder.....General agent.....San Francisco, Cal.
I. W. Dudley.....General agent.....Seattle, Wash.
J. C. Walker.....General agent.....Shreveport, La.
C. I. Martin.....Traveling freight agent... " "
George Helme ...General agent.....Texarkana, Tex.
J. B. Blanton.....General agent.....Tulsa, Okla.

LEHIGH VALLEY

The organization of the Lehigh Valley effective with its return to private control is announced as follows:

EXECUTIVE DEPARTMENT

E. E. Loomis....President .....New York & Phila.
J. A. Middleton..Vice-president .....New York
F. L. Blendinger.. " ..... "
E. H. Boles.....Vice-pres. & genl. counsel.. "
C. E. Hildum....Comptroller .....New York & Phila.
D. G. Baird.....Secretary .....Philadelphia
E. C. Mann.....Treasurer ..... "
J. Wm. Robbins..Assistant secretary ..... "
E. A. Albright.... " " .....New York
H. R. German.... " " ..... "
H. J. McQuade...Purchasing agent ..... "
R. D. Van Duzer.General land and tax agent. "
John Duffy .....Assistant to president..... "

OPERATING AND MAINTENANCE

F. L. Blendinger..Vice-president .....New York
G. H. Foster.....Assistant to vice-president. "
J. F. Maguire....General manager .....Bethlehem, Pa.
G. T. Hand.....Chief engineer .....New York
J. N. Haines.....Supt. transportation .....Bethlehem, Pa.
G. L. Moore.....Engineer mainten. of way.. "
F. N. Hibbits.....Supt. of motive power..... "
F. Hartenstien...Asst. to general manager.. "
A. M. McGill....Asst. supt. of motive power. "
W. L. Tracy.....Shop superintendent.....Sayre, Pa.
J. E. Brong..... " " .....Packerton, Pa.
M. J. Booth.....Chief of police.....New York
J. F. Caskey.....Supt. of telegraph .....Bethlehem, Pa.
H. B. Brown.....Supt. fuel department..... "
J. M. Heath.....Freight claim agent.....Philadelphia, Pa.
F. H. Elmore....Chief of insurance bureau..New York
C. F. Fenwick....Supt. floating equipt.....Jersey City, N. J.
T. J. Clarken....Mgr. Ltge. & frgn. frt. dept. New York
A. Ross.....Supt., New York div.....Jersey City, N. J.
M. A. Mulligan...Supt., N. J. & Lehigh div..Easton, Pa.
F. M. Barker.....Supt., Wyoming div.....Wilkes-Barre, Pa.
P. T. Reilly.....Supt., Mahon. & Haz'n div. Hazleton, Pa.
W. W. Abbott...Supt., Seneca div.....Sayre, Pa.
R. L. Gebhardt...Supt., Auburn div.....Auburn, N. Y.
P. J. Flynn.....Supt., Buffalo div.....Buffalo, N. Y.
M. D. Young.....Supt., Lake div..... "
W. I. Powers....Supt., Morris Canal div ...Phillipsburg, N. J.
F. X. Baur.....Supervisor, transportation..Bethlehem, Pa.
P. A. Ellerman...Supt., dining car service...Easton, Pa.

TRAFFIC

J. A. Middleton..Vice-president .....New York
C. A. Blood.....Traffic manager ..... "

Freight

F. J. Woulfe.....Asst. traffic manager.....New York
E. J. Henry.....Western traffic manager...Chicago, Ill.
H. C. Hamilton..General freight agent.....New York
H. C. Burnett....Asst. genl. freight agent.... "
W. L. Donaldson. " " " " ....Buffalo, N. Y.
F. H. Moser.....Coal freight agent.....New York
B. F. Dewey.....Milk agent..... "
T. Clem Beck....Chief of Tariff Bureau.... "
O. F. Johnson....Asst. to traffic mgr..... "
M. J. Ormond....Foreigt frt. and ltge. agent. "
A. C. McIntyre..City freight agent..... "
P. H. Burnett....Industrial agent ..... "

Passenger

N. W. Pringle...Gen. passenger agent.....New York
P. S. Millspaugh.Asst. genl. passenger agent.Philadelphia
J. F. Andrews.... " " " " ..New York

Lehigh Valley (continued)

A. B. Hu...	Western passenger agent	Chicago, Ill.
F. E. Hamma...	Genl. bag. agt. & man., M. T.	New York
D. G. Roesch	Asst. to genl. pass. agent	"

Lehigh Valley Passenger Department Representatives

G. F. Taylor	Division freight agent	Bethlehem, Pa.
S. K. Weaver	Division passenger agent	"
R. G. McDowell	Division freight agent	Wilkes-Barre, Pa.
C. E. Chapman	Division passenger agent	"
I. F. Kurtz	Division freight agent	Sayre, Pa.
C. A. Barber	Division passenger agent	Ithaca, N. Y.
A. J. Whitney	Division freight agent	Auburn, N. Y.
M. P. Howell	General agent	Rochester, N. Y.
D. F. Lindsley	Division passenger agent	Buffalo, N. Y.
G. B. Peterson	Commercial agent	Newark, N. J.
Henry Martens, Jr.	Division passenger agent	"
F. W. Lyons	Commercial agent	Hazleton, Pa.
Frank Erdman	" "	Geneva, N. Y.
W. T. Moore	Foreign freight agent	Philadelphia, Pa
Ira S. Auch	District freight agent	"
W. H. Morrison	General agent	Boston, Mass.
J. F. Sullivan	" "	New Haven, Conn.
E. F. Neagle	" "	Detroit, Mich.
H. H. Roberts	District passenger agent	"
B. B. Harris	General agent	Cleveland, Ohio
G. A. Gamble	" "	St. Louis, Mo.
J. P. Brazill	" "	Minneapolis, Minn.
F. H. Briggs	" "	Kansas City, Mo.
E. R. Thorpe	" "	Toronto, Ont.
H. Higginbottom	Canadian passenger agent	"
M. Wolf	General agent	Indianapolis, Ind.
N. A. Rahte	" "	Milwaukee, Wis.
J. F. James, Jr.	" "	Toledo, Ohio
W. B. Lindsay	Eastern passenger agent	New York

LEGAL AND VALUATION

E. H. Boles	Vice-pres. and genl. coun.	New York
R. W. Barrett	General solicitor	"
E. H. Burgess	Asst. general solicitor	"
C. A. Major	Asst. to general solicitor	"
H. W. Smith	" " " "	"
C. D. O'Connell	" " " "	"
W. F. Gleeson	Claims attorney	"
M. C. Cleveland	Valuation engineer	"

ACCOUNTING AND TREASURY

C. E. Hildum	Comptroller	New York & Phila.
A. F. Bayfield	Assistant comptroller	Philadelphia
J. I. Morrison	General auditor	"
E. Laughton	Auditor of traffic	"
C. H. Radcliffe	Auditor of disbursements	"
E. C. Mann	Treasurer	"
G. W. Wiley	Assistant treasurer	"
J. Wm. Robbins	" "	"

LEHIGH & NEW ENGLAND

A portion of the new Lehigh & New England organization was given in last week's issue, page 657. Other appointments are announced as follows:

Chas. W. Brown	Superintendent	Bethlehem, Pa.
E. H. Shipman	Chief engineer	" "
T. J. Fretz	Gen. freight and pass agt.	" "
E. Hughes	Purchasing agent	Philadelphia.
J. L. Stone	Real estate agent	"
E. W. Drinker	Freight claim agent	Bethlehem, Pa.

LONG ISLAND

The organization of the Long Island, effective with the return of the property to private control, is announced as follows:

EXECUTIVE DEPARTMENT

Ralph Peters	President	New York.
Henry Tatnall	Vice-president	Philadelphia.
A. J. County	Vice-president	"
Frank E. Haff	Secretary	New York.
C. L. Addison	Asst. sec., asst. to pres.	"

TREASURY DEPARTMENT

J. F. Fahnestock	Treasurer	Philadelphia.
John M. Wood	Assistant treasurer	"
Frank E. Haff	Assistant treasurer	New York.
H. C. Lawser	Cashier	Philadelphia.
A. V. Johnson	Paymaster	Jamaica, N. Y.

ACCOUNTING DEPARTMENT

E. A. Stockton	Controller	Philadelphia.
T. J. Ludlam	Auditor	New York.
F. W. Nichols	Auditor of revenue	"

TRAFFIC DEPARTMENT

P. H. Woodward	General passenger agent	New York.
Donald Wilson	General freight agent	"
G. F. Stump	Asst. general freight agent.	"
H. B. Fullerton	Director agri'c't'l dvpmnt.	Medford, N. Y.

LEGAL DEPARTMENT

F. J. Gowen	General counsel	Philadelphia.
J. F. Keany	General solicitor	New York
W. H. Mahler	Claim agent	"

TRANSPORTATION DEPARTMENT

J. R. Savage	General superintendent	New York.
C. D. Baker	Asst. general supt.	Jamaica, N. Y.
W. E. Canning	Superintendent—freight	" "
Ralph Peters, Jr.	Superintendent—passenger	" "
G. C. Bishop	Supt. of motive power	Rich. Hill, N. Y.
E. M. Weaver	Engineer main. of way	Jamaica, N. Y.
H. L. Des Anges	Marine superintendent	L. I. City, N. Y.
L. S. Wells	Supt. telegraph and elec.	New York.
George Mammen	Superintendent of police	Jamaica, N. Y.
R. W. Farrell	Supt. of station service; General baggage agent	" "

ENGINEERING AND VALUATION DEPARTMENTS

L. V. Morris	Chief engineer	Jamaica, N. Y.
George Gibbs	Chief engr. elec. traction	New York.

PURCHASING DEPARTMENT

H. B. Hodges	Purchasing agent	Jamaica, N. Y.
Eugene Wright	General storekeeper	" "

REAL ESTATE, TAX AND INSURANCE DEPARTMENT

H. A. Howarth	Real estate agent	New York.
R. H. Newbern	Supt. of insurance	Philadelphia.

LOUISVILLE, HENDERSON & ST. LOUIS

The following officers of the Louisville, Henderson & St. Louis have been appointed, effective on March 1:

R. N. Hudson	Prest. and gen. manager	Louisville, Ky.
W. L. Mapother	Vice-president	" "
Ridgely Cayce	Secretary	" "
L. W. Botts	Treasurer	" "
J. R. Skillman	General counsel	" "
G. H. Lamkin	Auditor	" "
J. C. Willcox	Assistant auditor	" "
E. V. Riggs	Paymaster	" "
F. D. Ferry	Purchasing agent	" "
W. E. Chambers	General freight agent	" "
E. M. Womack	General passenger agent	" "
W. S. Moore	Engr. maintenance of way	" "
F. C. Ferry	Master mechanic	" "
Sam Stites	Insp. of transportation	" "
W. R. Hensley	Trainmaster	" "
J. S. Moorman	Asst. trainmaster & car ac.	" "

MAINE CENTRAL

The organization of the Maine Central, effective with the return of the railway to private control, is announced as follows:

Morris McDonald	President	Portland, Me.
D. C. Douglass	Vice-pres. and gen. mgr.	" "
G. S. Hobbs	Vice-president traffic	" "
L. M. Patterson	Treasurer	" "
Frank W. York	Assistant treasurer	" "
Arthur P. Foss	Controller	" "
Albert J. Raynes	Assistant controller	" "
Walter P. Reeves	Assist. to assist. controller	" "
Edward C. Paine	Auditor disbursements	" "
N. L. Woodbury	Auditor freight accounts	" "
William E. Lucey	Auditor passenger accounts	" "
Wm. H. Collins	Freight claim agent	" "
S. R. McTaggart	Auditor agencies	" "
H. T. Leighton	Auditor mechanical accts.	" "
Harold J. Cole	Paymaster	" "
Geo. E. Raynes	Assistant paymaster	" "
M. L. Harris	General passenger agent	" "
F. V. Berry	General freight agent	" "
Lucien Snow	Chief of tariff bureau	" "
W. G. Hunton	Industrial agent	" "

MINNEAPOLIS & ST. LOUIS

The following has been announced as the organization which will control the Minneapolis & St. Louis:

Charles Hayden	Chairman of the board	New York
W. H. Bremner	President	Minneapolis, Minn.
F. H. Davis	Vice-president and treas.	New York
F. B. Townsend	Vice-president, traffic	Minneapolis, Minn.
L. C. Fritch	Vice-president	Chicago.
J. S. Bache	Vice-president	New York.
E. E. Nash	General manager	Minneapolis, Minn.
M. L. Bell	General counsel	New York.
R. G. Kenly	Asst. to pres. & chief eng.	Minneapolis, Minn.
A. E. Smith	Comptroller & asst. sec.	" "
W. B. Davids	Secretary & Asst. treas.	New York.
W. W. Cole	Asst. treasurer	Minneapolis, Minn.
M. M. Joyce	General solicitor	" "
D. C. Edwards	General attorney	" "
D. M. Denison	Freight traffic manager	" "
A. B. Cutts	Passenger traffic manager	" "
B. F. Moffatt	General freight agent	" "
C. A. Werlich	Asst. gen. freight agent	" "
R. N. Golden	Asst. gen. freight agent	" "
C. A. Hodgman	Superintendent trans.	" "
R. E. Ryan	Superintendent	" "
J. P. Houston	Superintendent	Minneapolis, Minn.
Wm. Gemlo	Super. of motive power	Oskaloosa, Iowa.
W. G. Manchester	Purchasing agent	" "
S. J. Beardslee	Claims attorney	" "
S. W. Patton	Freight claim agent	" "
G. F. Henry	Asst. secty. & asst. treas.	Des Moines, Iowa.

Freight and Passenger Representatives

J. R. Shannon	General agent	Chicago.
J. B. Helwig	General agent	Cincinnati, Ohio.
G. C. Houk	Commercial agent	Des Moines, Iowa.
J. T. Graffis	General agent	Indianapolis, Ind.
J. W. Hannum	General agent	Kansas City, Mo.
J. C. Glenn	General agent	Minneapolis, Minn.
W. K. Adams	Division passenger agent	" "
E. Harris	General agent	New York, N. Y.
J. T. Redmon	General agent	Peoria, Ill.
H. M. Corbett	General agent	Pittsburg, Pa.
H. W. Koch	General agent	St. Louis, Mo.
E. L. Jones	General agent	San Francisco, Cal.
E. C. Davis	General agent	St. Paul, Minn.
A. C. Herron	General agent	Seattle, Wash.

MISSOURI, KANSAS & TEXAS LINES

The following officers have been appointed on the Missouri, Kansas & Texas Lines, effective on March 1:

C. N. Whitehead	Asst. to rec'r & chf. opr of.	St. Louis, Mo.
E. W. Peabody	Assistant to receiver	"
C. Haile	Chief traffic officer	"
J. M. Bryson	General counsel	"
J. G. Livengood	General auditor	"
F. Johnson	General treasurer	"
G. E. Scott	Purchasing agent	"
C. S. Sherwin	Land and tax commr.	Dallas, Tex.
W. M. Whittenton	Asst. chief oper. officer	"
W. E. Williams	Asst. to chief oper. officer	"
H. P. Anderson	" " " " "	St. Louis, Mo.
Z. G. Hopkins	" " " " "	"
C. R. McDonald	" " " " "	"
A. S. Johnson	General manager	Parsons, Kan.
H. E. McGee	" "	Dallas, Tex.
W. M. Fenwick	General passenger agent	St. Louis, Mo.
W. W. Miller	General freight agent	"
J. F. Garvin	" " "	Dallas, Tex.
C. C. Huff	General solicitor	"
Geo. T. Atkins, Jr.	Freight traffic manager	"
W. G. Crush	Passenger traffic manager	"
O. H. Bower	Auditor	"
A. Eichenberger	Treasurer	Wichita Falls, Tex.
E. T. Nelson	"	Dallas, Tex.

MISSOURI PACIFIC

In addition to the officers appointed on the Missouri Pacific and announced in the *Railway Age* of February 27, page 658, the following have been assigned to positions on that road:

J. Cannon	Asst. gen. manager	St. Louis, Mo.
G. W. Briece	Supt. transportation	"
E. A. Hadley	Chief engineer	"
H. R. Carpenter	Asst. ch. eng. construction	"
R. C. White	Asst ch. eng. maintenance	"

MOBILE & OHIO

The names of the general officers of the Mobile & Ohio and the Southern Railway in Mississippi are given in the list of officers of the Southern Railway system which appears elsewhere in this issue. The officers in local charge of the system are as follows:

E. E. Norris	Vice-president operation	St. Louis, Mo.
C. B. Hayes	V-p. ex. offic. at corp. hqrs.	Mobile, Ala.
W. W. Middleton	Auditor	" "
L. A. DeOrnellas	Assistant auditor	" "
E. T. Jervey	Auditor of disbursements	" "
A. R. Cameron	Auditor of receipts	" "
Carl Fox	General solicitor	St. Louis, Mo.
C. E. Ervin	General superintendent	
E. C. Rendell	Gen'l supt., transporation	Mobile, Ala.
J. J. Thomas, Jr.	Supt. mot. pow. & car equip.	" "
B. A. Wood	Chief engineer	" "
J. A. Turner	Purchasing agent	" "
W. J. Diehl	General storekeeper	" "
J. B. Murphy	Supt. telegraph	Jackson, Tenn.
Dr. Harry T. Inge	Chief surgeon	Mobile, Ala.
C. A. Pigford	Supt., Mobile division	Meridian, Miss.
B. B. Tolson	Supt., St. Louis division	Murph'boro, Tenn.
A. L. Pollard	Supt. of terminals	St. Louis, Mo.
F. E. Patton	Supt., Southern Ry. in Miss.	Columbus, Miss.
H. L. Wright	General inspector	St. Louis, Mo.
V. J. Thompson	Supervisor of safety	" "
Walter Shipley	Traffic manager	" "
R. L. McKellar	Foreign freight traf. mgr.	Louisville, Ky.

NEW YORK CENTRAL.

The staff organization of the New York Central Lines was given in last week's issue, page 659. The following appointments have been made by P. E. Crowley, vice-president of the New York Central Railroad:

R. D. Starbuck	Assistant vice-president	New York
R. J. Cary	General counsel	" "
W. C. Bower	General purchasing agent	" "
L. F. Vosburgh	Traffic manager	" "
G. M. Glazier	Auditor	" "
E. L. Rossiter	Treasurer	" "
D. L. Gray	Assistant traffic manager	" "
James Webster	Assistant traffic manager	Chicago, Ill.
L. A. Robinson	Passenger traffic manager	New York
W. A. Terry	Freight traffic manager	Chicago, Ill.
G. C. Woodruff	General freight agent, T. T.	New York
D. E. Gelatt	General freight agent, L. T.	" "
W. J. Moore	Asst. general freight agent	" "
Harry Parry	General passenger agent	" "
W. B. Pollock	Mgr., marine department	" "
W. O. Thompson	Gen. supt. rolling stock	Buffalo, N. Y.
F. W. Brazier	Asst. to gen. supt. rol. st.	New York
F. H. Hardin	Cf. engr. mot. power & r. s.	" "

NEW YORK, CHICAGO & ST. LOUIS

The organization of the New York, Chicago & St. Louis has been announced as follows:

O. Van Sweringen	Chairman of the board	Cleveland, Ohio
J. J. Bernet	President	" "
C. C. Denney	Vice-pres. & genl. mgr.	" "
M. Van Sweringen	Vice-president	" "
W. S. Hayden	"	" "
J. R. Nutt	"	" "
C. L. Bradley	"	" "
H. D. Howe	Vice-pres. & genl. counsel	" "
W. D. Turner	Secretary	" "
L. B. Williams	Treasurer	" "
A. M. Spencer	Assistant treasurer	" "
L. R. Deevers	Comptroller	" "
W. J. Bergen	Consult. & valuation engr.	" "
B. E. Morgan	Traffic manager	" "

NEW YORK, NEW HAVEN & HARTFORD

The executive organization of the New York, New Haven & Hartford was given in last week's issue, page 657. The following is the new organization of the accounting department of the road:

H. S. Palmer	Controller	New Haven, Conn.
T. M. Prentice	Assistant to controller	" " "
A. R. Down	General accountant	" " "
J. E. Murphy	Statistician	" " "
G. T. Carmichael	Assistant to controller	" " "
A. Mackrille	Auditor of revenue	" " "
C. E. Hendrickson	Auditor of freight receipts	" " "
G. H. Nero	Aud. of passenger receipts	" " "

(New Haven & Hartford, Continued)

W. L. Spicer	Auditor of disbursement	New Haven, Conn.
J. J. Ward, Jr.	Asst. Aud. Disbursements	" " "
F. H. Palmer	Auditor of Miscel. Accts.	" " "
G. H. Staehle	Car accountant	" " "
G. L. Winlock	Aud. of overcharge claims	Boston, Mass.

NORFOLK & WESTERN

The organization of the Lehigh Valley, effective with its return to private control, is announced as follows.

EXECUTIVE DEPARTMENT

N. D. Maher	President	Roanoke, Va.
A. C. Needles	Vice-president, operation	"
T. S. Durant	Vice-president, traffic	"
F. H. Alden	Vice-president, finances	"
Chas. S. Churchill	V.-p., real est., purch., val.	"

PURCHASES, REAL ESTATE AND VALUATION DEPARTMENTS

F. T. Burnett	Genl. purchasing agt.	Roanoke, Va.
V. A. Riton	Real estate agent	"
C. F. Losh	Valuation engineer	"
J. H. Clemmitt	Purchasing agent	"
J. W. Wade	General storekeeper	"

OPERATING DEPARTMENT

W. J. Jenks	General manager	"
J. M. Rodgers	Statistician	"
W. S. Battle, Jr.	General claim agent	"
J. B. Baskerville	Asst. general claim agent	"
W. R. Dawson	Asst. to general manager	"
G. Dunglinson, Jr.	" " " "	Bluefield, W. Va.
D. E. Spangler	Genl. supt. of transp.	Roanoke, Va.
E. A. Blake	Genl. supt. East. genl. div.	"
J. T. Carey	Genl. supt. West. Gen. div.	Bluefield, W. Va.
J. E. Crawford	Chief engineer	Roanoke, Va.
A. Kearney	Supt. motive power	"
G. W. Jett	Supt. telegraph	"
D. W. Richards	Signal engineer	"
E. M. Graham	General agent	Norfolk, Va.
C. H. Blakemore	Chairman, Safety Com.	Roanoke, Va.
S. S. Gale	Chief surgeon	"
E. S. Moore	Supt. of transportation	"
J. R. Talbott	Supt. car service	"
W. H. Johnson	Supt. terminals	Norfolk, Va.
D. F. Peters	Supt., Norfolk div.	Crewe, Va.
J. D. Hester	Supt., Shenandoah div.	Roanoke, Va.
J. W. Cook	Supt., Radford div.	"
A. S. Payne	Supt. terminals	"
W. O. Franklin	Supt., Pocahontas div.	Bluefield, W. Va.
H. C. Weller	Supt., Scioto div.	Portsmouth, Ohio

NORTHERN PACIFIC

The officers named below have been appointed to the positions named on the Northern Pacific, effective on March 1:

Howard Elliott	Chairman	New York City.
F. L. Stetson	General counsel	" "
Edw. A. Gay	Sec. & asst. treas.	" "
E. M. Willis	Asst. sec. and asst. treas.	
J. M. Hannaford	President	St. Paul, Minn.
Charles Donnelly	Exec. vice-pres.	" " "
C. W. Bunn	Vice-pres.; gen. coun.	" " "
W. T. Tyler	Vice-pres.; main't, oper'n	" " "
J. G. Woodworth	Vice-pres.; traffic	" " "
F. W. Sweney	Controller	" " "
C. A. Clark	Treasurer	" " "
R. H. Relf	Assistant secretary	" " "
H. E. Stevens	Chief Engineer	" " "
J. M. Hughes	Land Commissioner	" " "
George T. Reid	Asst. to the president	Tacoma, Wash.

PERE MARQUETTE

The Pere Marquette announces the following changes in its personnel, effective with the return of the railroad to private control:

E. N. Brown	Chairman board of direc's.	Detroit, Mich.
Frank H. Alfred	Pres. & gen. manager	" "
W. E. Martin	Assistant treasurer	New York
J. L. Cramer	Vice-pres., treas. & asst. sec.	Detroit, Mich.
S. L. Merriam	General counsel	" "

All these officers return to the positions they held prior to federal control with the exception of J. L. Cramer, who prior to federal control was secretary and treasurer and during federal control, federal treasurer.

PHILADELPHIA & READING

A portion of the new organization of the Philadelphia & Reading was given in the *Railway Age* of February 27, page 660. The following will give the details of the new organization complete:

EXECUTIVE DEPARTMENT

Ed. T. Stotesbury	Chairman of the board	Read. Ter.,	Phila.
Agnew T. Dice	President	Read. Ter.,	Phila.
John F. Auch	Assistant to the president	Read. Ter.,	Phila.
Charles H. Ewing	Vice-pres., oper. & maint.	Read. Ter.,	Phila.
Ed. B. Crosley	Vice-president, traffic	Read. Ter.,	Phila.
George Ziegler	Secretary	Read. Ter.,	Phila.
Jay V. Hare	Assistant secretary	Read. Ter.,	Phila.
Harry E. Paisley	Treasurer	Read. Ter.,	Phila.
John S. Sneyd	Assistant treasurer	Read. Ter.,	Phila.
Charles Heebner	General counsel	Read. Ter.,	Phila.
William L. Kinter	General solicitor	Read. Ter.,	Phila.
Albert B. Bierck	Controller	Read. Ter.,	Phila.
John D. Landis	Purchasing agent	Read. Ter.,	Phila.

OPERATING AND MAINTENANCE DEPARTMENT

Chas. H. Ewing	Vice-president	Read. Ter.,	Phila.
Fred. M. Falck	General manager	Read. Ter.,	Phila.
James M. Gilland	Transportation assistant	Read. Ter.,	Phila.
Wm. H. Keffer	General superintendent	Read. Ter.,	Phila.
R. Boone Abbott	Ass't gen. superintendent	Reading,	Pa.
Frank S. Stevens	Engineer maint. of way	Reading,	Pa.
Alday H. Yocum	Signal engineer	Sp. Gar. St.,	Phila.
Joseph C. Peters	Supt. Phila. division	Read. Ter.,	Phila.
Charles A. Beach	Supt. New York division	Read. Ter.,	Phila.
Nat. W. Jones	Ass't supt. N. Y. division	Read. Ter.,	Phila.
Isaac T. Tyson	Supt. R. & H. divisions	Reading,	Pa.
C. E. Chamberlin	Ass't supt. Harrisburg div.	Harrisburg,	Pa.
W. Frank. Eckert	Supt. W. & C. division	Reading,	Pa.
Victor B. Fisher	Supt. Shamokin division	Tamaqua,	Pa.
James E. Turk	Supt. Atlantic City R.R. / Supt. Dela. R. Ferry Co.	Camden,	N. J.
Nathan Francis	Ass't supt. Del. Riv. F. Co.	Camden,	N. J.
Irwin A. Seiders	Supt. M. P. & Roll. Equip.	Reading,	Pa.
Rob B. Rasbridge	Supt. car department	Reading,	Pa.
William L. Rice	Supt. Reading shops	Reading,	Pa.
Oscar W. Stager	Supt. transportation	Read. Ter.,	Phila.
Lle. D. Shearer	Supt. telegraph	Reading,	Pa.
John Miller	Supt. time service	Sp. Gar. St.,	Phila.
John P. Connolly	Supervisor mail traffic	Jersey City,	N. J.
Clarence K. Klink	Real estate agent	Read. Ter.,	Phila.
Gordon Chambers	Ass't real estate agent	Read. Ter.,	Phila.
C. E. Dilkes, Jr.	Tax agent	Read. Ter.,	Phila.
Sam. T. Wagner	Chief engineer	Read. Ter.,	Phila.
Clark Dillenbeck	Ass't chief engineer	Read. Ter.,	Phila.
Fred. Jaspersen	Ass't chief engineer	Read. Ter.,	Phila.
O. M. Thomson	Special agent	Read. Ter.,	Phila.
O. H. Hagerman	Manager marine dep't	Pt. Richm'd	Phila.
William Brown	Shipping and freight agent	Pt. Reading,	N. J.

TRAFFIC DEPARTMENT

Edw. B. Crosley	Vice-president	Read. Ter.,	Phila.
Robert L. Russell	Freight traffic manager	Read. Ter.,	Phila.
Edgar D. Hilleary	General freight agent	" "	"
Benj. R. Boggs	Ass't general freight agent.	" "	"
John W. Hewitt	Division freight agent	" "	"
Wm. D. Corfield	Division freight agent	" "	"
Wm. B. Gheen	Division freight agent	" "	"
Chris. H. Morgan	Division freight agent	Harrisburg,	Pa.
Harry C. Stauffer	General coal freight agent	Read. Ter.,	Phila.
Charles C. Rambo	Coal freight agent	" "	"
Edson J. Weeks	Passenger traffic manager	" "	"
Edwin L. Lewis	General passenger agent	" "	"
Ed. D. Osterhout	Ass't gen. passenger agent	" "	"
Harry W. Souders	Gen. baggage agent	" "	"
Samuel W. Derr	Supt. dining cars	" "	"
George F. Ingram	District passenger agent	" "	"
J. Sidman Selby	District passenger agent	Atlantic City,	N. J.
D. Lorah Mauger	District passenger agent	Reading,	Pa.
George O. Roper	District passenger agent	Williamsport,	Pa.

LEGAL DEPARTMENT

Charles Heebner	General counsel	Read. Ter.,	Phila.
Wm. L. Kinter	General solicitor	" "	"
Wm. C. Brister	General claim agent	" "	"
Thos. W. Fister	Asst. general claim agent	" "	"
Geo. K. Powell	Chief of police	Sp. Gar. St.,	Phila.
Wm. J. Wilson	Freight claim agent	Read. Ter.,	Phila.

ACCOUNTING DEPARTMENT

A. B. Bierck	Controller	Read. Ter.,	Phila.
H. R. McCormack	Auditor of disbursements	" "	"
Philip J. Kelly	Auditor freight traffic	" "	"
Thos. S. Neale	Asst. auditor freight traffic	" "	"

(Philadelphia & Reading, Continued)

Henry Forster ...Asst. auditor freight traffic.Read. Ter., Phila.
Alf. A. Johnson..Auditor traffic receipts.... " " "
Wm. E. Murphy..Auditor passenger traffic..Sp. Gar. St., Phila.

PURCHASING DEPARTMENT

John D. Landis..Purchasing agent.....Read. Ter., Phila.
Wesley A. Clem..Assistant passenger agent.. " " "
Louis F. Beneke..Stationer ..... Sp. Gar. St., Phila.
R. J. Stackhouse..General storekeeper.....Reading, Pa.

PHILADELPHIA & READING RELIEF ASSOCIATION

George Ziegler....Chairman advis'y com.....Sp. Gar. St., Phila.
Walter Hoffman..Superintendent ..... " " "
Dr. Caspar Morris.Chief Med. Exam..... " " " "

VALUATION DEPARTMENT

Advisory Committee

Chas. H. Ewing..Vice-president .....Read. Ter., Phila.
Chas. Heebner ...General counsel ..... " " "
Sam'l T. Wagner.Chief engineer ..... " " "

Valuation Committee

Chas. Hansel.....Consulting Valuation Engr.New York.
E. Y. Allen.....Valuation Engineer .....Term. Bldg., Phila.
Henry L. Laning..Asst. Valuation Engineer.. " " "
Clarence K. Klink.Real estate agent.....Read. Ter., Phila.
Edw. F. Sterner..Civil engineer ..... " " "
Wm. L. Kinter...General solicitor ..... " " "
Albert B. Bierck..Controller ..... " " "

PITTSBURG & SHAWMUT

Officers of the Pittsburg & Shawmut have been announced as follows:

A. C. Griffith.....Auditor and treasurer.....Kittanning, Pa.
J. T. Colbert.....General superintendent..... " "
R. E. Ball.....General freight & pass. agt. " "
W. W. Morrison.Engr. maintenance of way.Brookville, Pa.
A. H. Ream.....Supt. of m. p. and equip... " "
D. C. Morgan....Purchasing agent .....Kittanning, Pa.
C. B. Reed.....General storekeeper..... " "
C. J. Best.....Special agent ..... " "

RICHMOND, FREDERICKSBURG & POTOMAC

The following is the new organization of the Richmond, Fredericksburg & Potomac, and of the Washington Southern, which was merged into the former on February 14:

Wm. H. White...President .....Richmond, Va.
Norman Call ....Vice-pres. & secretary..... "
Eppa Hunton, Jr..General counsel ..... "
D. K. Kellogg....Treasurer ..... "
W. P. Terry.....Assistant secretary ..... "
W. C. Carrick....General auditor ..... "
J. E. Cox.....Auditor of revenue..... "
J. B. Mordecai...Traffic manager..... "
W. D. Duke.....General superintendent..... "
C. W. Culp.....Supt. transportation..... "
E. K. Grady.....Trainmaster ..... "
T. R. Goech.....Supt. of telegraph..... "
S. B. Rice.....Engineer, maint. of way.... "
E. M. Hastings..Principal asst. engineer.... "
H. J. Warthen....Supt. motive power..... "
W. T. Bryant....Road foreman of engines.. "
R. J. Rouse.....Purchasing agent ..... "
T. B. McDowell..Car accountant ..... "
Douglas Call.....Paymaster & asst. treas... "
R. M. Colvin.....Superintendent .....Potomac Yard, Va.

ST. LOUIS-SAN FRANCISCO SYSTEM

In addition to the appointments on the St. Louis-San Francisco, announced in the *Railway Age* of February 27, page 658, the following officers have been assigned to duties on that road:

EXECUTIVE AND FINANCIAL DEPARTMENTS

T. A. Hamilton....Vice-pres. & asst. to pres...St. Louis, Mo.
A. H. Jones.....Supervisor of wages..... " "

OPERATING DEPARTMENT

J. E. Hutchison...General manager.....Springfield, Mo.
C. J. Stephenson..Asst. to general manager.. " "
H. H. Brown.....General superintendent.... " "
F. H. Shaffer.....Supt., Eastern division.... " "
C. H. Claiborne...Supt., Northern division...Fort Scott, Kans.
F. G. Faulkner....Supt., River and Cape div..Chaffee, Mo.
J. T. L. Brooks...Supt., terminals.....Springfield, Mo.

ACCOUNTING DEPARTMENT

S. J. Fortune.....Assistant general auditor..St. Louis, Mo.
G. B. Perkins..... " " " " " "
H. W. Press.....Asst. gen. aud. chg. st'tist'cs. " "
C. T. Davis.....Valuation accountant..... " "
G. B. Davis.....Auditor of disbursements.. " "
F. C. Freiburg....Auditor, freight accounts.. " "
Conrad Goehausen.Asst. auditor, frt. accts., in chg. frt. overch'ge claims. " "
J. C. Briggs.....Auditor, passenger accts... " "
J. C. Starkey.....Auditor, station accounts... " "
H. W. Johnson...Car accountant.....Springfield, Mo.

ENGINEERING DEPARTMENT

C. B. Spencer.....Valuation engineer.....St. Louis, Mo.
H. B. Barry.....Principal asst. engineer.... " "
J. M. Sills.....District engineer.....Springfield, Mo.
D. E. Gelwix.....Div. engr., Eastern div..... " "
R. Owen.....Acting div. engr., S. W. div.Sapulpa, Okla.
E. T. Bond.....Div. engr., Western div....Enid, Okla.
H. F. Busch.....Div. engr., Northern div...Ft. Scott, Kan.
J. G. Taylor.....Div. engr., Southern div...Memphis, Tenn.
L. L. Kerns.....Div. eng., Riv'r & Cape div.Chaffee, Mo.
Perry Topping....Div. engr., Central div.....Ft. Smith, Ark.

The office of assistant chief engineer has been abolished and the district engineer will report to the general superintendent on maintenance of way matters and to the chief engineer on engineering matters. Division engineers will report directly to the division superintendents in charge of their respective territories on maintenance of way matters and to the district engineer on engineering matters.

MECHANICAL DEPARTMENT

C. C. Higgins.....Supt. of motive power.....Springfield, Mo.

LEGAL DEPARTMENT

J. L. McCormack.Supt. frt. loss & dam. claims.Springfield, Mo.

The following will be in part the organization which will govern the four lines of this system, the St. Louis, San Francisco & Texas, the Ft. Worth & Rio Grande, and the Brownwood North & South:

G. H. Schleyer...Vice-pres. and gen'l mgr...Ft. Worth, Tex.
T. A. Hamilton..Vice-president .....St. Louis, Mo.
A. Hilton..... " " ..... " "
F. H. Hamilton...Asst. sec'y and asst. treas.. " "
C. W. Michel....Assistant secretary.....New York
W. A. McAuliffe.Assistant treasurer..... "
W. F. Evans.....General solicitor.....St. Louis, Mo.
A. H. Jones.....Supervisor of wages..... " "
R. B. Cochran....Asst. to v.-pres. & gen. mgr.Ft. Worth, Tex.
J. F. Simms.....Superintendent ..... " "
F. P. Swartz.....District engineer..... " "
T. E. Bliss.....Division engineer..... " "
C. O. Jackson....General passenger agent.... " "
W. B. Wells.....General freight agent..... " "

St. Louis, San Francisco & Texas

In addition to the officers named above, the following have been appointed on the St. Louis, San Francisco & Texas:

L. C. Wilds.....Secretary and treasurer....Ft. Worth, Tex.
E. B. Findlow....Auditor ..... " "
E. H. Bunnell....Assistant auditor.....St. Louis, Mo.

Fort Worth & Rio Grande

In addition to the officers named above, the following have been appointed on the Fort Worth & Rio Grande:

C. W. Hillard....Vice-president .....New York
L. C. Wilds.....Secretary and treasurer....Ft. Worth, Tex.
E. B. Findlow....Auditor ..... " "
E. H. Bunnell....Assistant auditor.....St. Louis, Mo.

Brownwood North & South

In addition to those named above, the following officers have been appointed on the Brownwood North & South:

Lee Watson.....Vice-pres., secr'y & auditor.Brownwood, Tex.
Brooke Smith....Treasurer ..... " "
L. C. Wilds.....Asst. sec'y and asst. treas..Ft. Worth, Tex.
E. B. Findlow....Assistant auditor..... " "

Paris & Great Northern

The following is the organization as announced for the Paris & Great Northern:

J. F. McReynolds.V.-pres., sec., aud. & treas.Paris, Tex.
T. A. Hamilton...Vice-president .....St. Louis, Mo.
A. Hilton..... " " ..... " "

(Paris & Great Northern, Continued)

F. H. Hamilton...Asst. sec'y and asst. treas..St. Louis, Mo.
C. W. Michel.....Assistant secretary .....New York
W. A. McAuliffe..Assistant treasurer..... "
W. F. Evans.....General solicitor.....St. Louis, Mo.
E. H. Bunnell.....Assistant auditor..... " "
A. H. Jones.....Supervisor of wages..... " "

ST. LOUIS SOUTHWESTERN LINES.

In addition to the appointments announced in the *Railway Age* of February 27, page 662, the following officers have been appointed on the St. Louis Southwestern and the St. Louis Southwestern of Texas:

OPERATING DEPARTMENT

W. A. Webb.....Vice-pres. & genl. mgr.....Tyler, Tex.
W. Masby.....Supt. transportation ..... " "
C. H. Jennings..Supt. dining cars.....Texarkana, Tex.

LEGAL DEPARTMENT

W. A. Conaway..Tax agent .....St. Louis, Mo.

ENGINEERING DEPARTMENT

A. A. Matthews..Chief engineer .....Tyler, Tex.
H. Von Hovenberg.Sanitary engineer .....Texarkana, Tex.
C. D. Purdon....Consulting and val. eng....St. Louis, Mo.

PURCHASING STORES DEPARTMENTS

E. T. Irving.....Tie and timber agent.....Texarkana, Tex.
D. V. Atkinson..Traveling storekeeper .... " "

ACCOUNTING DEPARTMENT

H. R. Hurst.....Special acct., president's of.St. Louis, Mo.

TRAFFIC DEPARTMENT

P. T. Cole.....Agricultural commissioner.St. Louis, Mo.

SPECIAL

E. Richards.....Superintendent safety.....Mt. Pleasant, Tex.
F. R. Campbell...Chief special agent.....Tyler, Tex.
A. E. Chace.....Chief surgeon .....Texarkana, Tex.

St. Louis Southwestern

In addition to the above officers and those noted in a previous issue of *Railway Age*, the following have been appointed on the St. Louis Southwestern:

J. R. Turney.....Asst. general solicitor.....St. Louis, Mo.
J. D. Watson.....Genl. traffic mgr..... " " "
A. J. Lehmann....Asst. genl. freight agent... " " "
R. D. Cobb.....General auditor ..... " " "
J. H. Pahlmann...Auditor of disbursements.. " " "
H. H. Berry.....Superintendent .....Illmo, Mo.

St. Louis Southwestern of Texas

The following have been appointed on the St. Louis Southwestern of Texas:

TRAFFIC DEPARTMENT

J. F. Lehane.....Vice-pres., charge traffic...Tyler, Tex.
W. F. Murray....General freight agent..... " "
T. H. Lawrence..Genl. passenger agent..... " "
W. J. Doyle.....Industrial agent .....Dallas, Tex.
C. C. Rockenback.Asst. industrial agent..... " "
S. F. Baker.....Genl. agent, freight dept..Tyler, Tex.
A. Hoover.....Genl. agent, passenger dept. " "

ACCOUNTING DEPARTMENT

A. R. Wood.....Auditor .....Tyler, Tex.
H. P. Taylor.....Assistant auditor ..... " "
T. I. Boyette.....Auditor frt. receipts..... " "
M. B. Grimes.....Auditor, pass. receipts..... " "

STORES DEPARTMENT

C. C. Marshall...General storekeeper .....Tyler, Tex.

OPERATING DEPARTMENT

H. H. Hooper...Superintendent .....Mt. Pleasant, Tex.
K. C. Marshall... " .....Tyler, Tex.

MECHANICAL DEPARTMENT

B. J. Peasley....Supt. motive power.....Tyler, Tex.

In addition to these appointments the following traffic appointments have been made:

F. E. Rownd.....Commercial agent.....Kansas City, Mo.
Clark Kretschmar.General traveling agt.....St. Louis, Mo.
C. E. Scott.....Commercial agent.....Pittsburgh, Pa.
W. D. May..... " " .....Memphis, Tenn.
R. W. Byrne..... " " .....Cincinnati, O.
W. G. Adams.....Soliciting frt. & pass. agt...Nashville, Tenn.
A. W. Reese.....Pacific Coast agent.....Los Angeles, Cal.
T. R. Challenor...Commercial agent..... Cairo, Ill.
S. C. Yeaman..... " " .....New Orleans, La.
F. W. Christopher. " " .....Chicago
H. J. Flynnt.....Soliicting freight agent....Louisville, Ky.
Geo. L. Leitner...Commercial agent.....Detroit, Mich.
J. T. Ferguson... " " .....Shreveport, La.
Edwin Stewart...Division freight agent.....Little Rock, Ark.
W. H. Townsend.Gen. east. frt. & pass. agt..New York City
W. G. Adams.....Soliciting frt. & pass. agt...Nashville, Tenn.

SAN ANTONIO & ARANSAS PASS

The following appointments have been announced on the San Antonio & Aransas Pass, effective March 1:

G. B. Goodloe....Assistant general manager. San Antonio, Tex.
Boyle, Ezell & Grover } General attorneys..... " " "
J. W. Terry.....Auditor ..... " " "
H. F. Smith.....Treasurer ..... " " "
J. C. Mangham...General freight agent..... " " "
G. F. Lupton.....General passenger agent... " " "
G. E. Chamberlain.Land and tax agent..... " " "
F. L. Carson.....Mechanical superintendent. Yoakum, Tex.
L. Andrews.....Chief engineer.....San Antonio, Tex.
J. L. Cowan.....Purchasing agent..... " " "
L. W. Earnest....General claim agent..... " " "
F. E. Jones.....Freight claim agent..... " " "
A. J. Dimaline....Supt. car service..... " " "
H. M. Madison...Farm and immigration agt. " " "
H. Dickson.....Supt. of telegraph.....Yoakum, Tex.

SEABOARD AIR LINE

A portion of the new organization of the Seaboard Air Line was announced in last week's issue, page 658. B. C. Prince, freight traffic manager, has since announced the following as the organization of the freight traffic department:

E. T. Wilcox....Asst. freight traffic mgr...Norfolk, Va.
G. S. Rains.....Asst. freight traffic mgr... " "
J. H. Ketner.....General freight agent..... " "
J. H. Toomer.....Asst. general freight agent. " "
R. H. Eberly.....Asst. general freight agent. " "
T. T. Masengill...Asst. general freight agent. " "
S. P. Springfellow.Asst freight traffic mgr...Atlanta, Ga.
R. W. Daniel.....Asst. general freight agent.Birmingham, Ala.
C. E. Muller.....Asst. general freight agent.Jacksonville, Fla.
H. M. Boykin....Asst. general freight agent.Richmond, Va.
C. C. Graves.....Asst. general freight agent.Charleston, S. C.
E. J. Parrish.....Asst. general freight agent Savannah, Ga.
J. G. Cantrell.....General western agent.....Chicago.
E. E. Hunter.....Division freight agent.....Wilmington, N. C.
G. C. Poole.....Division freight agent.....Raleigh, N. C.

SOUTHERN PACIFIC

The following is the new organization of the Southern Pacific insofar as it was available at the time of going to press. The remainder will appear in next week's issue.

J. Kruttschnitt...Chairman exec. committee..New York
Lewis J. Spence..Director of traffic..... " "
William Sproule..President ..... " "
H. W. de Forest..Vice-president ..... " "
J. P. Blair.....General counsel..... " "
A. D. McDonald..Vice-pres. & controller.... " "
W. A. Worthington Vice-pres. & asst. to chm... " "
F. H. Plaisted....Asst. dir. of traffic..... " "
Gordon M. Buck..Asst. counsel..... " "
F. H. Wood.....Atty. & com. counsel..... " "
J. D. Isaacs.....Consulting engineer..... " "
A. K. Van Deventer Treasurer ..... " "
F. W. Mahl.....Director of purchases..... " "
Hugh Neil.....Clerk and secretary ..... " "
H. B. Johnson...Assistant controller..... " "
W. F. Bull.....Asst. clerk & asst. sec'ty.... " "
G. M. Thornton..Asst. treasurer..... " "
J. A. Simpson....Transfer agent..... " "
John B. Weaver..Asst. clerk.....Anchorage, Ky.
J. H. R. Parsons..Agent .....New Orleans, La.

PACIFIC LINES

Wm. Sproule.....President .....San Francisco, Cal.
Wm. F. Herrin...Vice-pres. & Chief counsel.. " " "
Paul Shoup.....Vice-pres. & asst. to pres... " " "
E. O. McCormick.Vice-pres., pro. & develop... " " "
G. L. King.....Assistant secretary..... " " "
J. H. Dyer.....Gen. mgr. chge. oper. & mte. " " "
F. L. Burckhalter.Asst. gen. mgr, No. dist.. " " "

(Southern Pacific—Pacific Lines, Continued)

T. H. Williams	Asst. gen. mgr, So. dist.	San Francisco, Cal.
Wm. Hood	Chief engineer	Los Angeles, Cal.
F. K. Ainsworth	Chief surgeon	San Francisco, Cal.
F. W. Taylor	Purchasing agent	" " "
A. S. McKelligon	General storekeeper	" " "
R. McIntyre	Asst. to gen. manager	" " "
R. J. Clancy	Asst. to gen. manager	" " "
Geo. McCormick	Gen. supt. motive power	" " "
G. F. Richardson	Supt. of transportation	" " "
R. L. Ruby	Asst. supt. of transpor	" " "
W. H. Kirkbride	Eng. of m. of w. & str.	" " "
Wm. Jaekle	Asst. eng. of m. of w. & str.	" " "
A. H. Babcock	Electrical engineer	" " "
E. L. King	Supt. of telegraph	" " "
S. M. Estabrook	Mgr. of d. cars, h. & res.	" " "
D. O'Connel	Chief special agent	" " "
T. F. Rowlands	Supt., western division	Oakland Pier, Cal.
J. D. Brennan	Supt., Sacramento div.	Sacramento, Cal.
J. W. Fitzgerald	Supt., Shasta division	Dunsmuir, Cal.
A. T. Mercier	Supt., Portland division	Portland, Ore.
B. A. Campbell	Supt. Salt Lake division	Ogden, Utah
G. E. Gaylord	Supt. Stockton. division	Stockton, Cal.
T. A. Hern	Supt., Coast division	San Francisco, Cal.
F. K. Worthington	Supt., San Joaquin div.	Bakersfield, Cal.
W. H. Whalen	Supt., Los Angeles div.	Los Angeles, Cal.
Wm. Wilson	Supt., Tucson division	Tucson, Ariz.
Guy V. Shoup	general attorney	San Francisco, Cal.
D. R. Sessions	Claims attorney	" " "
D. V. Cowden	Tax attorney	" " "
B. A. McAllaster	Land commissioner	" " "
T. O. Edwards	Auditor	" " "
R. Adams	Assistant auditor	" " "
F. L. McCaffery	Assistant auditor	" " "
F. W. Pope	Auditor of Freight acc.	" " "
C. E. Fellows	Asst. auditor of fr. acc.	" " "
O. F. Giffin	Auditor of passenger acc.	" " "
J. Kenedy	Auditor of disb. acc.	" " "
E. Hickman	Auditor of mis. acc.	" " "
W. H. Dewey	Aud. of Equip. Serv. Acc.	" " "
W. F. Ingram	Assistant treasurer	" " "
H. P. Thrall	Mail traf. mgr. & serv. in.	" " "
G. L. King	Secretary leased lines	" " "
E. B. Leavitt	Lease agent	" " "
G. W. Luce	Freight traffic mgr.	" " "
T. A. Graham	Asst. Freight traf. mgr.	" " "
E. W. Clapp	General freight agent	" " "
H. C. Hallmark	General freight agent	Los Angeles, Cal.
H. A. Hinshaw	General freight agent	Portland, Ore.

SOUTHERN RAILWAY SYSTEM

Fairfax Harrison, president of the Southern Railway System, in announcing the organization of that system, effective on its return to private control, says that for purposes of administration the lines of the system will be grouped as follows:

Lines West.—The Cincinnati, New Orleans & Texas Pacific, Alabama Great Southern, New Orleans & Northeastern, Harriman & Northeastern, Cincinnati, Burnside & Cumberland River, Northern Alabama, Georgia Southern & Florida, and the following operating divisions of the Southern Railway, viz.: St. Louis division, Louisville division, Memphis division, Atlanta division, Columbus division. Birmingham division, and Mobile division.

Lines East.—The following operating divisions of the Southern Railway, viz.: Washington division, Danville division, Charlotte division, Richmond division, Norfolk division, Winston-Salem division, Columbia division, Charleston division, Spartanburg division, Knoxville division, Coster division, Appalachia division, Asheville division, Murphy division, Transylvania division.

The organization is as follows:

Executive Department

L. E. Jeffries	Vice-pres. & gen. counsel	Washington
H. W. Miller	V.-pres., con., pur.	"
E. H. Coapman	Vice-president, operation	"
Lincoln Green	Vice-president, traffic	"
J. B. Munson	Vice-pres., res. ex. of., west.	Cincinnati, Ohio
R. B. Pegram	V.-p., res. ex. of., Atlanta	Atlanta
T. F. Steele	Vice-pres., N. O. & N. E.	New Orleans
A. H. Plant	Assistant to president	Washington
F. S. Wynn	Secretary and treasurer	New York
E. H. Kemper	Controller	Washington
J. H. McCue	Exec. general agent	Bristol, Va.-Tenn.
E. C. Gatewood	"	Rectortown, Va.
D. S. Abernethy	Exec. general agent	Chattanooga, Tenn.
T. F. Steele	"	New Orleans, La.
C. L. Candler	"	Norfolk, Va.

Construction, Purchases, Real Estate, Etc.

H. W. Miller	Vice-president	Washington
T. H. Gatlin	Chief engineer of con.	"
Pearce Horne	Supt. r. e. and conv. dept.	"
E. B. Berry	Supt. of insurance	"
W. F. H. Finke	Tie and timber agent	"
C. R. Craig	Gen. purchasing agent	"
A. Telford	Asst. gen. pur. agent	"
L. H. Skinner	Purchasing agent	"
E. E. Hanson	Asst. purchasing agent	"

Legal Department

L. E. Jeffries	Vice-pres. & gen. counsel	Washington
Al. P. Humphrey	Gen. solicitor, west. dist.	Louisville, Ky.
Edward Colston	Gen. sol. C. N. O. & T. P.	Cincinnati, Ohio
S. R. Prince	General solicitor	Washington
Charles J. Rixey	Commerce counsel	Washington
H. O'B. Cooper	Gen. atty. per. inj. claims	Washington
Charles Clark	Solicitor, frt. claims	Washington
F. G. Tompkins	Div. counsel (S. C.)	Columbia, S. C.
J. E. Hall	Div. counsel (Ga. So. & Fla., in Ga. and So. Ry in Fla.)	Macon, Ga.
C. B. Northrop	Commerce counsel	Washington
Henry Thurtell	Commerce counsel	"
H. L. Walker	Commerce counsel	"
I. W. Haun	Chief claim agent	"
L. Baumgardner	Asst. chief claim agent	"
J. L. Hatch	"	Salisbury, N. C.
G. T. Dallas	"	Columbia, S. C.
P. L. Ward	"	Atlanta, Ga.
W. A. Fitton	"	Birmingham, Ala.
C. C. Sudduth	"	Chattanooga, Ten.
T. B. Haynes	"	Knoxville, Tenn.
Ernest Simon	"	Cincinnati, Ohio
Dr. W. Applegate	Chief surgeon	Washington

Financial Department

E. H. Kemper	Controller	Washington
J. B. Duke	General auditor	"
H. W. Oliver	Asst. general auditor	"
A. H. Oliver	Assistant to controller	"
J. Aitcheson	General accountant	"
W. T. Pollard	Auditor of construction	"
Leon Strauss	Asst. auditor of con.	"
J. S. Tassin	Auditor of valuation	"
W. W. Hanson	Auditor of misc. rents	"

The following appointments apply to the Southern Railway; Georgia Southern & Florida; Northern Alabama; Atlantic & Yadkin; High Point; Randleman, Asheboro & Southern; Yadkin; Carolina & Tennessee Southern, and Asheville & Craggy Mountain.

A. E. Fowler	Auditor	Washington
T. L. Shelton	Assistant auditor	"
W. H. Luckett	Assistant auditor	"
F. D. Pollard	Auditor of disbursements	"
T. H. Seay	Auditor of freight accounts	"
F. A. Truan	Asst. auditor of freight acc.	"
W. P. Rose	Auditor of passenger acc.	"
A. T. Martin	Auditor of station accounts	"

The following appointments apply to the Cincinnati, New Orleans & Texas Pacific; Alabama Great Southern; New Orleans & Northeastern; Harriman & Northeastern, and Cincinnati, Burnside & Cumberland River.

J. A. Robinson	Auditor	Cincinnati, Ohio
W. G. Casteel	Assistant auditor	"
F. X. Fleming	General accountant	"
K. Kemper	Auditor of disbursements	"
D. E. Driscoll	Auditor of freight accounts	"
J. G. Rumpler	Auditor passenger accounts	"

The following appointment is on the Carolina & Northwestern:

W. K. Kearsley	Auditor	Chester, S. C.

The following is on the Cumberland:

J. R. Campbell	Auditor	Artemus, Ky.

The following appointments are on the Blue Ridge, Danville & Western; Hartwell; Hawkinsville & Florida Southern and Tallulah Falls:

J. M. Forney	Auditor	Atlanta, Ga.

(*Southern Railway, Continued*) OPERATING DEPARTMENT

E. H. Coapman	Vice-president	Washington
G. R. Loyall	Asst. vice president	"
G. W. Taylor	Asst. to vice president	"
J. Hainen	"	Headquarters
B. Herman	"	not given in
H. H. Laughton	"	announcement
W. H. Gatchell	"	"
Alex. Grant	"	"
W. N. Forecare	Gen. manager, Lines East	Charlotte, N. C.
J. H. Stantiel	Gen. manager, Lines West	Cincinnati, O.
J. W. Connelly	Ch. sp. agt., System Lines	Washington

The following list of appointments is not complete. The appointments are each given as promotions, effective March 1:

Lines East

J. S. Lemond	Ch. eng. maint. of way & st.	Charlotte, N. C.
S. J. Mulvaney	Supt. Asheville div.	Asheville, N. C.
W. C. Hudson	Supt. Charlotte div.	Greenville, S. C.

Lines West

J. W. Wassum	Gen. supt. Southern dist.	Birmingham, Ala.
F. P. Pelter	Gen. supt. S. E. dist.	Macon, Ga.
J. C. Austin	Supt. Mobile div. (So. dis.)	Selma, Ala.
M. E. Madden	Supt. Ga. S. & F., S. E. dist.	Macon, Ga.
C. Chandler	Supt. Atlanta div., S. E. dist.	Atlanta, Ga.

TRAFFIC DEPARTMENT

Lincoln Green	Vice-president	Washington
W. H. Tayloe	Passenger traffic manager	"
E. H. Shaw	Freight traffic manager	"
R. L. McKellar	Foreign frt. traffic manager	Louisville, Ky.
G. P. Biles	Frt. traffic manager, L. W.	Cincinnati, Ohio
W. A. Beckler	Pass. traffic manager, L. W.	"
J. J. Hooper	Gen. claim agt., overcharge	Washington
J. C. Williams	Manager, develop. service	"
W. H. McGuffey	Asst. to vice-president	Cincinnati
J. M. Woodruff	Asst. to vice-president	Washington

Freight Traffic Service

R. L. Simpson	Asst. freight traffic manager	Birmingham, Ala.
C. A. Russell	" "	Memphis, Tenn.
G. K. Caldwell	" "	Washington
G. H. Wilcox	Asst. to fr. traffic manager	"
F. D. Claggett	General freight agent	Atlanta, Ga.
E. R. Oliver	" " "	Cincinnati, Ohio
J. H. Drake	" " "	Richmond, Va.
R. A. Campbell	" " "	St. Louis, Mo.
G. H. Kerr	Asst. general freight agent	Atlanta, Ga.
H. M. Cobb	" "	" "
R. J. Brown	" "	" "
L. L. McCleskey	" "	" "
C. H. Pearson	" "	Cincinnati
F. S. Reigel	" "	"
W. M. Orr	" "	"
D. Cardwell	" "	Columbia, S. C.
J. L. Cox	" "	Columbus, Miss.
I. L. Graves	" "	Knoxville, Tenn.
J. W. Hunter	" "	Mobile, Ala.
Wins F. Wilson	" "	Richmond, Va.
K. B. Hannigan	" "	St. Louis, Mo.
B. G. Brown	" "	Washington
E. M. Lane	Asst. to gen. freight agent	Cincinnati, Ohio
C. E. Bell	Commerce agent	Washington
F. H. Behring	" "	"
Hamilton Baxter	" "	"
W. C. Harrison	New Eng. freight agent	Boston
R. H. Morris	Northwestern fr. agt.	Chicago
J. E. Fitzwilson	General eastern fr. agt.	New York
F. W. Parsons	Manager—East. fr. traf. ser.	Philadelphia

Division freight agents, district freight agents and commercial agents have been appointed as follows:

A. K. Orr	Division freight agent	Asheville, N. C.
A. O. Dawson	" " "	Augusta, Ga.
E. T. Steele	" " "	Birmingham, Ala.
W. E. Allen	" " "	Bristol, Va.-Tenn.
H. D. Luckett	" " "	Charlotte, N. C.
W. C. Stephens	" " "	Chattanooga, Tenn.
Ralph Shropshire	" " "	Columbia, S. C.
T. B. Dixon	" " "	Columbus, Ga.
J. W. Bray	" " "	Greensboro, N. C.
J. P. Tocher	" " "	Lexington, Ky.
Wm. Humphreys	" " "	Louisville, Ky.
F. J. Davis	" " "	Lynchburg, Va.
J. M. Cutler	" " "	Macon, Ga.
J. B. Bannon	" " "	New Orleans, La.
W. T. Turner	Division freight agent	Norfolk, Va.
J. H. Andrews	" " "	Raleigh, N. C.
W. H. Bennett	" " "	Rome, Ga.
C. M. Tyler	Florida freight agent	Jacksonville, Fla.
P. A. Wright	District freight agent	Atlanta, Ga.
W. B. McGroarty	" " "	Baltimore, Md.
G. W. Benus	" " "	Cincinnati, Ohio
J. A. Werne	" " "	Evansville, Ind.
F. M. Dunham	" " "	Philadelphia, Pa.
E. C. Morgan	" " "	Pittsburgh, Pa.
C. C. Elder	" " "	Savannah, Ga.
R. D. Miller	Commercial agent	Anniston, Ala.
A. B. Hammond	"	Athens, Ga.
R. B. Arthur	"	Augusta, Ga.
J. N. Templeton	"	Birmingham, Ala.
F. M. Kitchell	"	" "
S. M. Howard	"	Charlotte, N. C.
W. T. Keating	"	Chattanooga, Tenn.
U. G. Soule	"	Chicago
C. C. Woodworth	"	Cincinnati, Ohio
W. E. Hurley	"	Cleveland, Ohio
R. H. McDonald	"	Columbia, S. C.
C. M. Agnew	"	Dallas, Texas
E. W. Mihm	"	Detroit, Mich.
C. V. Manker	"	East St. Louis, Ill.
Alex. McBee	"	Greenville, S. C.
W. N. Pendleton	"	" "
J. G. Hill	"	Indianapolis, Ind.
D. E. Cook	"	Jacksonville, Fla.
C. F. Cowell	"	Johnson City, Tenn.
J. R. L. Wulff	"	Kansas City, Mo.
T. J. T. Hayes	"	Knoxville, Tenn.
L. W. Sanderson	"	Little Rock, Ark.
G. H. Perry	"	Louisville, Ky.
H. J. Herron	"	Macon, Ga.
H. S. Lemmon	"	Memphis, Tenn.
C. S. Shawhan	"	Mobile, Ala.
L. P. Tschopik	"	Montgomery, Ala.
J. T. Mudd	"	Nashville, Tenn.
W. F. Rogers	"	New Orleans, La.
C. A. Egly	"	New York, N. Y.
F. E. R. Sawin	"	" "
W. A. Wright	"	Norfolk, Va.
E. M. Jones	"	Peoria, Ill.
Robert Mayo	"	Philadelphia, Pa.
W. M. Israel	"	Rochester, N. Y.
R. M. Kendrick	"	Selma, Ala.
J. G. Kitchell	"	Sheffield, Ala.
B. Z. Ruff	"	Spartanburg, S. C.
C. F. Lauer	"	St. Louis, Mo.
H. F. Phipps	"	Tampa, Fla.
Howell Peeples	"	Washington, D. C.
G. N. Lawson	"	Wins.-Salem, N. C.

PASSENGER TRAFFIC SERVICE

H. F. Cary	General passenger agent	Washington
E. N. Aiken	" " "	Cincinnati, Ohio
C. A. Benscoter	Asst. gen'l pass. agent	Knoxville, Tenn.
J. L. Meek	" " " "	Chattan'ga, Tenn.
J. C. Beam	" " " "	Atlanta, Ga.
C. A. Kline	" " " "	Washington
F. N. Westerman	" " " "	Cincinnati, Ohio
J. C. Conn	General baggage agent	Chattanooka, Tenn.

Division and district passenger agents, etc., have been appointed as follows:

J. H. Woods	Division passenger agent	Asheville, N. C.
James Freeman	" " "	Birmingham, Ala.
W. E. Allen	" " "	Bristol, Va.-Tenn.
R. H. Graham	" " "	Charlotte, N. C.
G. C. Blackburn	" " "	Chattanooga, Tenn.
W. E. McGee	" " "	Columbia, S. C.
W. H. Caffey	" " "	Knoxville, Tenn.
C. B. Rhodes	" " "	Macon, Ga.
C. A. DeSaussure	" " "	Memphis, Tenn.
J. R. Wells	" " "	New Orleans, La.
C. W. Westbury	" " "	Richmond, Va.
Stanton Curtis	" " "	St. Louis, Mo.
S. E. Burgess	" " "	Washington
R. H. DeButts	Eastern passenger agent	New York
Geo. C. Daniels	New England pass. agent	Boston
C. C. Stewart	Northern passenger agent	Chicago
V. L. Estes	District passenger agent	Atlanta, Ga.
G. W. Carter	" " "	Augusta, Ga.
L. H. Burgess	" " "	Baltimore, Md.
C. N. Smith	" " "	Birmingham, Ala.
R. W. Hunt	" " "	Charleston, S. C.
J. R. Martin	" " "	Chattan'ga, Tenn.

(Passenger Traffic Service Continued)

C. Volz	District passenger agent		Cleveland, O.
S. H. McLean	"	"	Columbia, S. C.
A. Whitworth	"	"	Dallas, Tex.
A. Edwards	"	"	Detroit, Mich.
E. E. Barry	"	"	Houston, Tex.
F. Bigelow	"	"	Indianapolis, Ind.
R. Pettit	"	"	Jacksonville, Fla.
Mitchell Coxwell	"	"	Kansas City, Mo.
H. C. King	"	"	Lexington, Ky.
B. H. Todd	"	"	Louisville, Ky.
C. Bland	"	"	Macon, Ga.
A. M. Crawford	"	"	Memphis, Tenn.
F. F. Forth	"	"	Nashville, Tenn.
W. C. Spencer	"	"	New Orleans, La.
F. L. Jenkins	"	"	Philadelphia, Pa.
T. B. Martin	"	"	Pittsburgh, Pa.
O. Jones	"	"	Raleigh, N. C.
R. B. Creagh	"	"	Selma, Ala.
R. C. Cotner	"	"	Spartanburg, S. C.
T. J. Connell	"	"	St. Louis, Mo.
W. Jamison	"	"	Tampa, Fla.

TERMINAL RAILROAD ASSOCIATION OF ST. LOUIS

The following officers of the Terminal Railroad Association of St. Louis have been elected, or appointed, effective on March 1:

Executive and Financial Departments

T. M. Pierce	Acting pres. & gen. counsel.	St. Louis,	Mo.
T. E. Anderson	Assistant to president	"	"
C. A. Vinnedge	Secretary and auditor	"	"
H. D. Heuer	Asst. sec. & assist. auditor	"	"
G. H. Steinberg	Treasurer	"	"

Operating Department

J. L. Burlingame	General manager	St. Louis,	Mo.
A. S. Johnson	Asst. general manager	"	"
W. E. McGarry	Asst. to general manager	"	"
Chas. Burlingame	Superintendent	"	"
J. A. Mathewson	Superintendent	"	"
E. H. Harman	Superintendent	"	"
E. Clemens	Supt. of car service	"	"

Legal Department

T. L. Howell	General attorney	St. Louis,	Mo.
W. M. Hezel	Attorney	"	"
S. P. McChesney	Attorney	"	"
T. D. Fauser	Claim agent	"	"
Hy. Schmittgens, Jr.	Freight claim agent	"	"

Traffic Department

W. C. Stith	Traffic manager	St. Louis,	Mo.
T. L. Penney	Division freight agent	"	"
L. W. Putnam	Commercial agent	"	"
B. B. Hickman	General agent freight dept.	"	"
A. C. Barnett	Gen. pass. and ticket agent.	"	"

Accounting Department

E. J. Coady	Assistant to auditor	St. Louis,	Mo.
T. E. Sawyer	Freight auditor	"	"

Engineering and Mechanical Departments

H. J. Pfeifer	Chief engineer	St. Louis,	Mo.
Wm. Bawden	Supt. mot. power and equip.	"	"

Special

T. E. Bentley	Supt. of telegraph	St. Louis,	Mo.
E. R. Hines	Chief special agent	"	"
H. W. Cox	Real estate agent	"	"

Purchasing Department

W. G. O'Fallon	Purchasing agent	St. Louis,	Mo.

TEXAS & PACIFIC

The Texas & Pacific's executive staff has been announced, as follows:

L. Lancaster	Receiver	Dallas, Tex.
C. L. Wallace	"	New Orleans, La.
J. J. Freeman	General counsel	" "
M. D. Cloyd	Treasurer	" "
A. J. Biard	Auditor	Dallas, Tex.
T. J. Burke	Land and tax agent	" "
C. S. Pennebaker	Chief engineer	" "
C. M. Sullivan	Purchasing agent	" "

UNION PACIFIC SYSTEM

Executive and general officers of the Union Pacific System have been announced as follows:

Executive, Financial, Legal and Accounting Departments

Robert S. Lovett	Chairman of executive com.	New York.
Carl R. Gray	President	Omaha, Neb.
E. E. Calvin	V.-p. charge operation	" "
H. M. Adams	V.-p. charge traffic	" "
W. A. Harriman	Vice-president	New York.
J. D. Farrell	Vice-president	Seattle, Wash.
H. W. Clark	Gen. counsel (O.W.R.&N.)	New York.
Thomas Price	Secretary counsel	" "
F. W. Charske	Comptroller, counsel	" "
F. V. S. Crosby	Treasurer	" "
G. E. Bissonnet	General auditor	Omaha, Neb.
H. J. Stirling	Auditor (Union Pacific)	" "
F. W. Meyer	Auditor (Oregon Short L.)	Salt Lake C., Utah.
F. W. Sercombe	Auditor (O.W.R.&N.)	Portland, Ore.
W. H. Sanford	Asst. treasurer (U. Pac.)	Omaha, Neb.
C. H. Jenkinson	Asst. treasurer (Ore. S. L.)	Salt Lake C., Utah.
J. F. Meyer	Asst. treas. (O.W.R.&N.)	Portland, Ore.
N. H. Loomis	Gen. solicitor (U. Pac.)	Omaha, Neb.
Geo. H. Smith	Gen. attorney (Ore. S. L.)	Salt Lake C., Utah.
A. C. Spencer	Gen. Atty. (O.W.R.&N.)	Portland, Ore.
H. A. Scandrett	Val. C'sel & Com. Counsel	Chicago.
H. J. Plumhof	Asst. to the vice-president	Omaha, Neb.
J. L. Haugh	Assistant to president	" "

Operating and Engineering Departments

R. L. Huntley	Chief engineer	Omaha, Neb.
G. L. Hickey	Supt. transportation	" "
F. E. Lewis	Mgr. dining car & hotel dept.	Ogden, Utah.
E. E. Adams	Consulting engineer	New York.

Traffic Department

F. W. Robinson	Freight traffic manager	Omaha, Neb.
R. R. Mitchell	Asst. freight traffic mgr.	" "
W. S. Basinger	Asst. passenger traffic mgr.	" "
J. L. Amos	Assistant traffic manager	San Francisco, Cal.
R. B. Robertson	Asst. freight traffic mgr.	Chicago.
J.W.McClymonds	Gen. agt. refrigeration ser.	Omaha, Neb.

Unless otherwise noted all of the above officers will have jurisdiction over the Union Pacific System.

Simultaneously the organization on the various lines comprising the Union Pacific System was announced as follows:

Union Pacific

W. M. Jeffers	General manager	Omaha, Neb.
A. W. Woodruff	Gen. supt. northern district.	" "
E. Stenger	Gen. supt southern district.	Kansas City, Mo.
C. E. Fuller	Supt. mot. power and mach.	Omaha, Neb.
R. B. Robinson	Engr. maintenance of way.	" "
J. P. Carey	Supt. Nebraska division	" "
A. W. McDuffie	Supt. Wyoming division	Cheyenne, Wyo.
N. A. Williams	Supt. Western division	Green River, Wyo.
A. F. Vick Roy	Supt. Colorado division	Denver, Colo.
G. O. Brophy	Supt. Kansas division	Kansas City, Mo.
C. E. Hedrix	Supt. Central division	Marysville, Kan.
G. C. Smith	Purchasing agent	Omaha, Neb.
U. K. Hall	General storekeeper	" "
A. B. Rutherford	Stationer	" "
P. F. Frenzer	Supt. of telegraph	" "
H. A. Hansen	Supt. dining cars & hotels.	" "
W. D. Lincoln	Car service agent	" "
A. F. Jonas, M.D.	Chief surgeon	" "
A. R McNitt	Freight claim agent	" "

Oregon Short Line

H. V. Platt	General manager	Salt Lake C., Utah.
F. Knickerbocker	General superintendent	Pocatello, Idaho.
A. C. Hinckley	Supt. mot. power and mach.	" "
W. R. Armstrong	Assistant chief engineer	Salt Lake C., Utah.
B. H. Prater	Engr. maintenance of way	Pocatello, Idaho.
E. C. Manson	Supt. Idaho division	" "
R. A. Pierce	Supt. Utah division	" "
C. E. Brooks	Supt. Montana division	" "
G. H. Robison	Purchasing agent	Salt Lake C., Utah.
R. F. Miller	General storekeeper	Pocatello, Idaho.
M. H. Brown	Supt. of telegraph	Salt Lake C., Utah.
F. W. Gentsch	Supt. dining cars and hotels.	Ogden, Utah.
T. S. Kinnersley	Car service agent	Salt Lake C., Utah.
S. H. Pinkerton	Chief surgeon	" " " "
Howard Bruner	Freight claim agent	" " " "

Oregon-Washington Railroad & Navigation Company

J. P. O'Brien	General manager	Portland, Ore.
M. J. Buckley	General superintendent	" "
F. N. Finch	Assistant general supt.	" "
C. E. Peck	Supt. mot. power and mach.	" "
S. Murray	Assistant chief engineer	" "
B. E. Palmer	Supt. First division	" "

(Oregon-Washington R.R. & Nav. Co., Continued)

W. Bollons	Supt. Second division	La Grande, Ore.
A. G. Kamm	Supt. Third division	Walla Walla, Wh.
Wm. Connolly	Supt. Fourth division	Spokane, Wash.
E. R. Budd	Supt. Fifth division	Hwaco, Wash.
G. W. Saul	Purchasing agent	Portland, Ore.
J. I. Irish	General storekeeper	" "
E. A. Klippel	Supt. of telegraph	" "
J. T. Jarvis	Supt. dining cars and hotels	" "
S. A. Hering	Car service agent	" "
K. A. Mackenzie	Chief surgeon	" "
James Copeland	Freight claim agent	" "

St. Joseph & Grand Island

W. M. Jeffers	General manager	Omaha, Neb.
R. L. Huntley	Chief engineer	" "
G. L. Hickey	Supt. transportation	" "
E. Stenger	General superintendent	Kansas City, Mo.
C. E. Fuller	Supt. mot. power and mach.	Omaha, Neb.
R. B. Robinson	Engr. maintenance of way	" "
C. E. Hedrix	Superintendent	Marysville, Kan.
Geo. C. Smith	Purchasing agent	Omaha, Neb.
U. K. Hall	General storekeeper	" "
A. B. Rutherford	Stationer	" "
P. F. Frenzer	Supt. of telegraph	" "
W. D. Lincoln	Car service agent	" "
A. F. Jonas, M. D.	Chief surgeon	" "
A. R. McNitt	Freight claim agent	" "

The organization of the law department of the Union Pacific was subsequently announced by Mr. Loomis, general solicitor, as follows:

Edson Rich	Assistant general solicitor	Omaha, Neb.
C. A. Magaw	Gen. atty. (Neb. & Iowa)	" "
R. W. Blair	Gen. atty. (Kan. & Mo.)	Topeka, Kan.
C. C. Dorsey	General attorney (Colo.)	Denver, Colo.
John W. Lacey	General attorney (Wyo.)	Cheyenne, Wyo.
George H. Smith	General attorney (Utah)	Salt Lake C., Utah
S. J. Peterson	General claim agent	Omaha, Neb.
A. W. Scribner	Tax commissioner	" "

Simultaneously the traffic department organization on the various lines comprising the Union Pacific System was announced as follows:

Union Pacific

C. J. Lane	General freight agent	Omaha, Neb.
H. G. Kaill	General freight agent	Kansas City, Mo.
W. H. Garratt	Asst. general freight agent.	Omaha, Neb.
C. W. Axtell	Asst. general freight agent.	" "
G. W. Hamilton	Asst. general freight agent.	" "
F. B. Choate	Asst. general freight agent.	Denver, Colo.
A. L. Craig	General passenger agent	Omaha, Neb.
W. H. Murray	Asst. general passenger agt.	" "
W. K. Cundiff	Asst. general passenger agt.	Denver, Colo.
J. O. Goodsell	Asst. general passenger agt.	Kansas City, Mo.
G. L. Alley	General baggage agent	Omaha, Neb.
R. A. Smith	Supervisor of agriculture	" "

Oregon Short Line

J. A. Reeves	General freight agent	Salt Lake C., Utah.
D. R. Gray	Asst. general freight agent.	" " " "
H. E. Godwin	Asst. general freight agent.	" " " "
D. S. Spencer	General passenger agent	" " " "
J. B. Durham	Asst. general passenger agt.	" " " "
G. L. Alley	General baggage agent	Omaha, Neb.
R. A. Smith	Supervisor of agriculture	" "

Oregon-Washington Railroad & Navigation Company

H. E. Lounsbury	General freight agent	Portland, Ore.
A. Kelling	Asst. general freight agent.	" "
J. W. Mount	Asst. general freight agent.	" "
Wm. McMurray	General passenger agent	" "
A. C. Martin	Asst. general passenger agt.	" "
J. H. Regal	General baggage agent	" "
C. L. Smith	Agriculturist	" "
W. H. Olin	Asst. gen. freight & pass. agt.	Seattle, Wash.

St. Joseph & Grand Island

C. J. Lane	General freight agent	Omaha, Neb.
S. E. Stohr	Gen. freight & pass. agt.	St. Joseph, Mo.
A. L. Craig	General passenger agent	Omaha, Neb.
G. L. Alley	General baggage agent	" "

Traffic Agents

Traffic department agents were established on March 1, as follows:

W. J. Leonard	Dis. freight & pass. agent	Aberdeen, Wash.
G. W. Roberts	Dis. freight & pass. agent	Astoria, Ore.
R. A. Dennis	General agent	Atlanta, Ga.
Joel L. Priest	General agent	Boise, Idaho.
W. Massey	General agent	Boston, Mass.
A. V. Kipp	General agent	Butte, Mont.
L. J. Canfield	General agent	Calgary, Alta.
R. B. Robertson	Asst. freight traffic mgr.	Chicago.
Geo. R. Bierman	Gen. agent passenger dept.	
W. H. Connor	General agent	Cincinnati, Ohio.
W. H. Benham	General agent	Cleveland, Ohio.
C. B. Fox	General agent	Dallas, Tex.
D. M. Shrenk	General agent	Des Moines, Ia.
A. R. Malcolm	General agent	Detroit, Mich.
A. D. Grant	General agent	Lincoln, Neb.
E. A. Coons	General agent	Los Angeles, Cal
E. G. Clay	General agent	Milwaukee, Wis.
E. H. Hawley	General agent	Min'eapolis, Minn.
J. B. DeFriest	General agent	New York.
James Warrack	General agent	Oakland, Cal.
W. H. Chevers	General agent	Ogden, Utah.
F. L. Feakins	General agent	Philadelphia, Pa.
John D. Carter	General agent	Pittsburgh, Pa.
C. H. Dexter	Gen. agent freight dept.	Portland, Ore.
J. L. Carney	General agent	St. Louis, Mo.
E. J. Hanson	Gen. agent freight dept.	Salt Lake C., Utah.
E. A. Shewe	Gen. agent passenger dept.	
John L. Amos	Assistant traffic manager	San Francisco, Cal.
W. H. Olin	Asst. gen. freight & pass. agt.	Seattle, Wash.
W. S. Elliott	Dist. freight & pass. agent	
W. R. Skey	Dist. freight & pass. agent.	Spokane, Wash.
Wm. Carruthers	Dist. freight & pass. agent.	Tacoma, Wash.
J. H. Cunningham	General agent	Vancouver, B. C.
G. Van de Water	Dist. freight & pass. agent.	Walla Walla, Wsh.
H. M. West	Dist. freight & pass. agent.	Yakima, Wash.

WABASH

The personnel of the organization formed for the Wabash upon the termination of federal control has been announced as follows:

EXECUTIVE DEPARTMENT

Wm. H. Williams	Chairman of board	New York
J. E. Taussig	President	St. Louis, Mo.
W. C. Maxwell	Vice-pres. in charge traffic.	" "
S. E. Cotter	Vice-pres. and gen'l mgr.	" "
N. S. Brown	Vice-pres. & gen'l solicitor.	" "
L. G. Scott	Vice-pres. and controller	" "
H. R. Winthrop	Vice-president	New York
J. C. Otteson	Vice-pres., sec'y & treas.	"
T. J. Tobin	Assistant secretary	St. Louis, Mo.
W. F. Bender	" "	" "
Orton Brewer	" "	New York
Hamilton Convey	Transfer agent	"

FINANCIAL DEPARTMENT

E. R. Francisco	Local treasurer	St. Louis, Mo.
P. E. Purcell	Assistant to comptroller	" "
F. L. O'Leary	" "	" "

LEGAL DEPARTMENT

Winslow S. Pierce	General counsel	New York
L. H. Strasser	Assistant gen'l solicitor	St. Louis, Mo.

TRAFFIC DEPARTMENT

C. H. Stinson	Freight traffic manager	St. Louis, Mo.
H. E. Watts	Pass. traffic manager	" "
H. G. Holden	General freight agent	" "
T. R. Farrell	Asst. gen'l freight agent	" "
W. A. Hopkins	" " " "	" "
F. H. Tristram	Asst. gen'l passenger agent.	" "

OPERATING DEPARTMENT

M. B. Casey	Supt. of transportation	St. Louis, Mo.
T. J. Jones	General superintendent	" "

ACCOUNTING DEPARTMENT

R. E. Berger	Auditor	

Obituary

W. R. Shoop, manager of purchasing and stores of the Buffalo, Rochester & Pittsburgh, with headquarters in Rochester, N. Y., died recently at his home in Rochester.

Alexander M. Lupfer, chief engineer of the Spokane, Portland & Seattle, died at his home in Portland, Ore., on February 3 of pneumonia.

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

At least one of the practices of the government in its operation of the railroads has met with public approval—the consolidated ticket office. While perhaps not so advantageous to smaller roads in large cities, it represents a saving to the roads and a convenience to the public. That this is true is evidenced in Galveston, Houston and Dallas, Texas; New Orleans, La.; Minneapolis, Minn., and St. Paul; San Francisco, Cal., and Los Angeles, and at various points throughout the West, the Middle West and the Central Eastern States, where the consolidated offices have been retained following the termination of government control. At Chicago the consolidated ticket office has been retained, at least temporarily, only two roads, the Chicago & North Western, and the Minneapolis, St. Paul & Sault Ste. Marie, withdrawing. In some cities, as San Francisco, New Orleans and Galveston, one or two roads have withdrawn from the consolidated office, but the larger number have remained. It is probably true that the consolidated ticket office works a hardship upon smaller roads entering a large terminal for, as has been pointed out in the *Railway Age* in the past, the public is prone to purchase its transportation from the largest and best known routes when at the counter of the consolidated ticket office. The offices, however, have met with public approval, and other things being equal, they should be continued, at least in cities of such size that the practice will not work a hardship on the smaller roads, since they make for greater efficiency and increase the output of the individual employee.

The Consolidated Ticket Office

An engineman of a first-class passenger train who runs past a distant and a home block signal, both set against him, and collides with a passenger train standing in the block-section ahead, is chargeable with wilful and wanton negligence, making the railroad company liable in damages to injured persons, even though they be tresspassers; and all the more liable, of course, to a passenger. This radical doctrine is approved by the Supreme Court of the United States in a decision handed down on March 1 and reported in another column of this issue. Enginemen who desire to keep both their record and their conscience clear will do well to ponder this decision soberly. So far as can be judged by the records of innumerable instances, enginemen who thus run past signals without heeding them are in many cases chargeable, in the judgment of the ordinary critic, with nothing worse than forgetfulness, or unsystematic habits, or some other kind of pardonable negligence. The critic feels that he, himself, might have been guilty of the same lapse, and he takes a lenient view. If the engineman is a person of good moral character and known for years to have been one of upright purposes, it seems hard to adopt any other conclusion. The superintendent has to dismiss him from the service, but at the same time he sympathizes with him; he forces himself to dismiss, because he feels that only thus can he do his duty to the company. It is a familiar legal axiom that a man must be held responsible for knowing enough to realize the inevitable consequences of his negligent acts. If one points a loaded pistol at his child he is presumed by the law to know that it may go off and kill the child. We do not often enough reflect on the parallel doctrine that running past a block signal may mean the death of innocent persons in the cars of a train which is standing in the next block.

Wantonness in the Engine Cab

The United States Supreme Court has ruled this week, in a decision elsewhere reported, that the Interstate Commerce Commission, in making a valuation of a railroad, must accept present value instead of original cost. Since freight and passenger rates are to be based on a valuation, this ruling of the court is of great importance. The tendency of the Valuation Section of the Interstate Commerce Commission has been to take full account of depreciation but to neglect to take into its accounts appreciation. L. F. Loree, chairman of the board of the Kansas City Southern, has persistently opposed this theory of the valuation engineers, and the present ruling of the court is in a suit which was brought by the Kansas City Southern. The road claimed that on the basis of present values the total valuation of the property would be increased by from $5,000,000 to $10,000,000. It is hard to overestimate the importance of the decision, both on account of the large sum involved directly and on account of the indirect bearing of the decision. There is a constant tendency on the part of public service commissioners and legislators to let the private investor run the risks of bad judgment, catastrophe, and depreciation and success of competitors while at the same time refusing him permission to realize to the full the profits of good judgment, fortunate circumstances, increment in value and success against competitors. Until the full text of the present decision is available it is not possible to say what effect it will have on that provision of the transportation act which deprives a successful road of part of its earnings above six per cent; but it is interesting as showing that the court will not accept an analogous theory in the valuation of a railroad's physical property.

Kansas City Southern Wins Valuation Suit

One of the most remarkable illustrations of what can be done with or to statistics of railroad earnings was the statement regarding the January earnings issued last week by the Railroad Administration. From this statement various newspapers produced headlines indicating that the government had earned a net operating income of $64,000,000; that it had earned a deficit of $64,000,000; that it had a net operating income of $11,000,000, and that it had a deficit of $11,000,000 for the month, and all of them, with some qualifications such as are not usually expressed in headlines, were approximately correct. The statement showed that the net operating income for January as shown by the accounts was $64,000,000, but that this included about $53,000,000 of the estimated back pay for the carriage of the mails which the post office department owes the Railroad Administration for 1919 and 1918 under the recent decision of the Interstate Commerce Commission in the mail pay case. However, none of this was earned in January, so the real net operating income for the

A Statistical Paradox

month was $11,000,000, which also happens to be just $64,000,000 less than the $75,000,000 which the government guarantees to the railroads for a month as rental. So the real deficit was $64,000,000. But if the net operating income be taken as $64,000,000, as stated in the accounts, the deficit was only $11,000,000, so we have a verification for all four of the contradictory headlines. One paper, however, used a headline that no possible construction could confirm. This stated that the government had shown a "profit" for January. It might also be added that the average net operating income for January during the test period, on which the standard return is based, was $55,000,000, and as compared with this the Railroad Administration had a deficiency of $44,000,000.

How Much Coal Can Be Saved by Electrification

SEVERAL PROMINENT ELECTRICAL ENGINEERS have stated recently that electrification would save two-thirds of the coal now burned by steam locomotives. This statement was contained in a paper presented before the Schenectady sections of the American Institute of Electrical Engineers by A. H. Armstrong and published in the February 20 issue of the *Railway Age*. Mr. Armstrong endeavored to prove his statement on the basis of coal consumed in electric power houses as compared with coal burned in steam locomotives, and did not include the saving of cost by the use of water power.

Ten-mile cost is the unit on which the railroad operator bases most of his calculations. Mr. Armstrong says freight can be hauled with a power consumption of 40 watts per gross ton-mile and that one kw.-hr. of electrical energy can be produced in a power house from 2½ pounds of coal. Ten

$$\text{pounds of coal per 1,000 gross ton miles} = \frac{40 \times 1{,}000 \times 2\frac{1}{2}}{1{,}000} = 100.$$

According to the report compiled by the Fuel Conservation Section of the Railroad Administration, the pounds of coal per 1,000-gross ton miles used for freight service on all regions during the first nine months of 1919 was 186.1 lb. Mr. Armstrong bases his value of 7 pounds of coal per kilowatt hour developed by steam locomotives on a series of eight tests made on Chicago, Milwaukee & St. Paul locomotives in 1910 and checks this value for 1918 as follows: He multiplies the ton miles hauled during 1918 by the value of 40 watts per ton mile and by 7 pounds of coal per kilowatt hour and arrives at a value of 170,000,000 tons. This he compares with the coal used by the railroads during that year, namely 176,000,000 tons, this last mentioned value apparently being the total amount of coal used by railroads, which includes coal for heat, power and light in railroad buildings and yards.

If electric and steam locomotives are to be compared, the electric should be compared with modernized steam motive power for that is what they must compete with in the future. Results obtained from tests of only comparatively modern steam locomotives for complete locomotive cycles, from one terminal to another and return, which include firing up and standby losses, show a coal consumption in pounds per 1,000 gross ton miles as follows: 139.07, 177.80, 150.65, 144.95, 175.79, 172.50, 185.83, 157.80, 178.04, 159.94, 204.53, 156.66, 204.48, 176.98, 198.19.

These tests were made in 1914, and several of them include delays of from 10 to 13 hours on the road because of the 16-hour law. The purpose of most of the tests was not to determine the maximum efficiency of steam locomotives, but to compare the relative merits of Mikado and Consolidation locomotives; the result of 139.07 was obtained with a Mountain type locomotive in passenger service. More modern locomotives can show better results than these, and it is not at all out of reason to presume that they can haul trains at something less than 150 pounds of coal per 1,000 gross ton miles.

Mr. Armstrong maintains that electric locomotives will eliminate non-revenue tonnage to the extent of 12 per cent of the total tonnage. This is very possibly true, but even accepting all his claims for the electric locomotive, it would appear that the estimate of a two-thirds savings is considerably larger than is actually obtained.

The Report on Stresses in Track

THE SECOND INSTALLMENT of a progress report by the Joint Committee on Stresses in Railroad Track is presented on another page of this issue. This treatise, together with the first report issued a year ago, comprises one of the most valuable contributions to railway engineering literature that has appeared in many years. It is unfortunate that the committee has not seen fit to summarize the results of its work in a brief statement expressed in non-technical terms, so that the non-engineer railway officers could gain a better conception of the purport of this valuable investigation. That an appreciation of the importance of this study by the laymen is not entirely lacking is attested by the contributions which this committee has received from the American Railroad Association as well as from the individual railroads and manufacturers for the conduct of its work.

Since the building of the first railroad, nearly a century ago, the engineer of track has been groping more or less in the dark. Confronted with a complex structure that defies accurate mathematical analysis, he has been compelled to rely on the cut-and-try processes of experience in his endeavors for improvement. It is too much to expect that the mechanics of track will ever be reduced to the simple analytical processes available to the structural engineer. Progress more likely will follow the methods of hydraulic engineering, whereby experimental work will result in the evolving of constants for use with semi-empirical formulae.

The immediate gain from these investigations, as obtained from the report of the studies made thus far, will be in the formulation of general principles, many of which will constitute a confirmation in definite form of ideas that have prevailed in the past as the result of every-day experience with track maintenance. We may also expect to learn soon whether the greatest need is for stronger rails, for heavier ties, or for deeper and better ballast; whether ties ought to be longer or broader and closer togther; whether we should tamp the ties for only a few inches on each side of the rail or for nearly the entire length, etc. One point that has been especially emphasized in the tests is the extent to which the effectiveness of the track is dependent on continued and thorough tamping. In other words, the tests are eloquent in demonstrating the extreme lack of permanence in the present day track structure. Perhaps this may afford the necessary incentive toward the expenditure of more money for track construction, and therefore less in the perpetual restoration of the damage done by the traffic. In this connection it is well to bear in mind that the work thus far has been limited to the accepted form of track. There is opportunity for much future work in experimental designs with rails, ties and ballast subjected to one modification or another, with the object of determining what improvements over present practice may be desirable.

Had the present report accomplished no other result, all of the expense and trouble it has entailed would be fully justified by the emphatic manner in which it has directed

attention to the need of a closer co-ordination between the mechanical and track departments. The results of the tests point to some serious conditions of overstress in the track resulting from certain unsatisfactory conditions, such as wheel concentrations and counterbalancing. On a few roads locomotive design is subject to some measure of control by those responsible for bridges and tracks (primarily the former), but on the vast majority of properties such supervision is perfunctory at best. There is a great need for improvement here. The locomotive must be designed not alone for efficiency as a mechanical device, but with proper regard to the effect it exerts on the track. The report of the Committee on Stresses in Track goes a long way toward pointing to the solution of this problem.

Labor's Share of Railroad Earnings

MANY RAILWAY EMPLOYEES have opposed the return of the railways to private operation from fear that this would be followed by reductions of wages. Reductions of the wages fixed under government control are, however, prohibited by the new railroad legislation until September 1, 1920. Meantime, in accordance with President Wilson's promise to the representatives of the labor organizations, the entire subject of railroad wages is to be reopened. The letter sent by the President to the heads of the railroad brotherhoods at the time he signed the railroad bill indicated that the matter should first be taken up by some kind of board composed equally of representatives of the companies and of the employees. If they cannot agree it would appear that the matters in controversy must be submitted to the Railroad Labor Board provided for by the new legislation.

This Board, which must contain equal numbers of representatives of the employees, the companies and the public, must, in determining the wages to be paid in future, take into consideration, among other things, the wages paid for similar work in other industries, the relation between wages and the cost of living, the hazards of the employment, the degree of responsibility involved, the character and regularity of the employment, and inequalities of increases in wages or treatment which are the result of previous wage orders or adjustments.

It is difficult to conceive of a method which would have been fairer to all parties concerned. Nobody, however, can tell how the new system of dealing with labor controversies will work. Upon how it works may largely depend the success of the new policy of railroad management and regulation which has been provided for by Congress and the President. Opinions, of course, differ as to whether the employees as a whole, or any particular classes of them, are entitled to have their wages advanced. While the law prohibits reductions of wages within the next six months, it does not prohibit advances, and there are reasons for believing that the railway companies will have to make advances to some classes in a short time in order to get as much labor as they need for certain kinds of work.

While the entire question of wages is pending, it is worth while to consider what part of the earnings of the railways labor has received in the past, and what part it is likely to receive in future. A tremendous propaganda is being carried on to make the employees believe that they have in the past received, and under private operation in future will receive, a much smaller part of the total earnings than they are entitled to, while the companies have received, or will receive, a much larger part of the total earnings than they are entitled to. When the earnings and operating expenses of the railroads are analyzed the facts disclosed as to the relative amounts of the total earnings which go to the employees and to the companies tell a story strikingly different from that told to the employees in the propaganda being carried on.

It is difficult to present these facts in a way which will make them readily understandable to those who are not used to dealing in large statistics. Perhaps as good a way as any is to show just how the railway earnings of an average month of 30 days are divided. In 1919 the railways were operated by the people of the United States through their government. The public leased the properties from the companies and put at the disposal of the management and the emloyees approximately $19,500,000,000 worth of property. The people assumed all the risk of loss in operation. The employees contributed to the service the manual labor necessary to the operation of the properties. Now, what became of the money earned in each month of 30 days?

The earnings of 17½ days of each month were paid to labor in wages.

The earnings of 3 days were paid for fuel.

The earnings of 5 days were paid out for materials and supplies.

The earnings of 1½ days were paid out for taxes and equipment and facility rents.

This consumed the earnings of 27 days of each month.

The earnings of the remaining 3 days went to net operating income, which belonged to the public, and was used by the government to pay the guaranteed standard return to the companies. The net operating income was insufficient for this purpose and in consequence there was incurred a deficit which had to be met from taxes.

It is hardly necessary to say that most of the money paid for fuel ultimately found its way into the pockets of the miners, and that most of the money spent for materials and supplies ultimately was paid by the manufacturers to their employees.

The statistics on which the foregoing statements regarding the division of earnings of the railroads are based, are the statistics of earnings and expenses in 1919, which are approximately as follows:

		Per cent of total earnings
Total operating revenues	$5,200,000,000	100
Operating expenses	4,420,000,000	85
Wages	3,020,000,000	58
Fuel	500,000,000	10
Materials and supplies	900,000,000	17½
Taxes, equipment, rent, etc.	248,000,000	4½
Net operating income	516,000,000	10

Under the new legislation the Interstate Commerce Commission is authorized to allow the railways to earn an average of 6 per cent. If the Commission should take the book cost of road and equipment as a basis and allow 6 per cent to be earned on it, the net operating income would be $1,170,000,000, or about $650,000,000 greater than in 1919. Assuming that the Interstate Commerce Commission should establish rates which would yield this amount of net operating income, and that all the items of operating expenses and also taxes should remain unchanged, the earnings of each average month of 30 days would thereafter be divided as follows:

	Days
Wages	15½
Fuel	2½
Materials and supplies	4⅔
Taxes, etc.	1⅔
Net operating income	6

What about the "fancy" salaries of the officers, of which so much is said? The salaries of all general and division officers amount to only about 1 per cent of the total earnings of the railways, which means that they are paid from the earnings of between 7 and 8 hours of each month.

It will be seen that even when the rates of the railways are so readjusted as to enable them to earn an average of 6 per cent the employees will continue to get more than one-half of the total earnings, while the companies and their officers together will get only one-fifth of them. As a matter of fact, the companies under the new legislation probably will not keep one-fifth, as one-half of the surplus earnings

over 6 per cent earned by each road will have to be paid to the government. It may be asked, however, why the companies should be allowed to receive and keep almost one-fifth of the earnings? They are entitled to receive this share of the earnings because they furnish the right of way, the tracks, the locomotives, the cars, and all the other facilities which go to make up the physical plant of the railways without which the employees could not earn anywhere near as much wages as they do, or the public receive anywhere near as much service as it does. These facilities have been provided by the savings of the generations of persons who have invested their savings in railway bonds and stocks.

But, says the socialist and Bolshevist propaganda, labor creates all wealth and therefore should have it all. But certainly the labor of the present generation of railroad employees has not created the enormous railroad plant of the United States. Therefore, certainly those now rendering the service of labor to the railroads are not entitled to all the earnings produced by the railroads.

As a matter of fact, the existing railroad plant has been brought into existence by the labor and the savings of several generations of workers and savers, and if the present generation of railroad workers is entitled to benefit, as it does benefit, by the contributions of past generations of workers to the creation of the present railroad system, as well as by its own work, then the present generation of owners of stocks and bonds is equally entitled to benefit by the contribution made by the savings of past generations to the creation of our present railroad system as well as by its own invested savings.

The propaganda of misrepresentation to prejudice and inflame railway employees against private ownership and management doubtless will be continued. If, however, railway employees will study the facts they will find that they are receiving a much larger part of the earnings of the railroads than the propagandists would have them believe; that they stand to benefit even more by efficient operation of the roads than do the owners; and that, since private management is almost sure in the long run to be more efficient than any other kind of management, it is to the interest of the employees themselves to defend and not to participate in attacks upon it, and to help the managers all they can to increase efficiency.

Taxation Without Representation

THE AGREEMENT recently entered into between the director general of railroads and the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees is not meeting with universal favor among the clerks whom it purports to benefit. This is not surprising when it is remembered that in the general offices of a large number of the railroads fully 85 per cent of the clerks are not members of the brotherhood and yet are required to submit to the schedules arranged by that organization. The main objection on the part of the clerks to the schedule prepared by the brotherhood, and by which they must abide, is that they must now work overtime, become immune from sickness and take but one week's vacation a year in order to obtain as much remuneration as heretofore.

The situation of a clerk who received $102 a month under the old rules is an exemplification. The agreement calls for hourly and daily bases of pay and sets forth the method by which the present monthly and weekly pay bases may be changed to hourly and daily. This, briefly, is "multiply the monthly rate by 12 and divide the result by 306." By this method the clerk determines that his $102 a month means $4 a day. The schedule requires a six-day week, each day to consist of eight hours with the possible exception that, where it has been customary to grant a half-holiday once a week, that usage shall not be rescinded. Consequently, should the clerk work 50 weeks a year, as he has done, his pay would amount to $1,200 per annum, provided he had not lost time because of sickness. While under the old rate of pay, the clerk would have received $1,224 for the year's work and would have had two weeks' vacation on salary. Furthermore, if he should have been ill at any time for a short period it is probable that his pay-check under the old system would not have been smaller because of the time lost.

The $24 difference is small, of course, but the employees fail to see what has been gained by the change to the new plan. Employees at higher monthly and weekly salaries will lose correspondingly larger sums by the year's work under the new rates. The schedule further includes many rules which are good reading, but unproductive of particular benefit to the clerks and others similarly employed. The clerks are asking why they are forced to work under a schedule, in the making of which many did not have a voice and which does not increase their yearly income, forces them to work overtime if the "envelope" is to equal pre-schedule ones (even that possibility being dependent on the will of the employer, as the clerk cannot work overtime unless authorized to do so) dampens initiative and ambition and obviates the necessity of exercising brain-power except in the hope of obtaining, as a reward, a position beyond the reach of the brotherhood's schedule.

New Books

Proceedings of the Traveling Engineers' Association. Edited by W. O. Thompson, secretary. 366 pages, 5¾ in. by 8½ in., illustrated, bound in leather. Published by the Association.

This volume contains the proceedings of the twenty-seventh annual convention of the association held at Chicago, Ill., September 16-19, 1919. Committee reports and individual papers are given in full with the discussion by the members. Among the subjects considered are: Methods for handling air brakes; adjusting tonnage of slow freight trains; advantages of the application of stokers to modern locomotives; locomotive efficiency and fuel economy; and caring for locomotives at terminals.

Proceedings of the American Society for Testing Materials.—Two volumes. Part 1, 799 pages; Part 2, 802 pages. Illustrated, 6 in. by 9 in. Bound in cloth. Published by the American Society for Testing Materials, C. L. Warwick, Secretary, University of Pennsylvania, Philadelphia, Pa.

These two volumes contain the proceedings of the twenty-second annual meeting of this society, held at the Hotel Traymore, Atlantic City, N. J., June 24-27, 1919. About 40 pages of Part 1 are devoted to the Edgar Marburg Memorial session, while the balance of the first half of the book covers the reports of the committees on ferrous and non-ferrous metals, on cement, lime, gypsum and clay products and other miscellaneous materials such as paints, lubricants, etc. The remainder of the volume contains the tentative standard specifications for ferrous metals, including such products as steel tie plates, boiler and firebox steel, carbon tool steel, track bolts and wrought-iron bars, etc.; for non-ferrous metals, including bronze bearing metals for turntables and bridges, and white metal alloys, etc.; for cement, lime and other miscellaneous products and materials. Part 2 contains the technical papers and includes monographs on the magnetic analysis as a criterion of the quality of steel and steel products and other papers on the same question of magnetic analysis; some tests of light aluminum casting alloys; the modulus of elasticity of concrete, paint as a plastic material and various testing apparatus and methods of testing.

Letters to the Editor

More Comment on Opportunities for Engineers

Berkeley, Cal.

To the Editor:

Our civil engineering college maintains a four years' course of instruction in civil engineering. Our announcements advise the student of proper sequences best adapted to particular lines of study. For example, we have outlined for student guidance a four years' course in railroad engineering, another in sanitary and a third in irrigation engineering. It is plain, therefore, that our university does give attention to the preparation of students for railway work.

In recent years a number of our students have indicated a desire to study especially railway subjects. A number of these men have entered railway employ, but most of them have promptly left these railway positions because of meager pay. The few who have remained have shunted from engineering employment to contracting in connection with railway construction, or have left the purely technical work of the railway staff for positions in the administrative, operating, freight departments, etc. When those in authority who employ young men for technical work in the railway engineering departments increase the wages of young engineers, and more particularly give them an opportunity to learn something beside mere routine in surveying and track-laying, then there will be a change, but not until then.

C. Derleth, Jr.,
Dean, College of Civil Engineering, University of California.

Encourage the Younger Men

Chicago.

To the Editor:

I was very much interested in the editorial in your issue of February 13, entitled "Bringing the Younger Men Into the Large Railway Associations." The ideas expressed therein are most timely and I heartily concur in them. Why is it that the railway companies and the railway associations do not give more thought and attention to the training of the young men who enter railway service? Why do they not encourage young men to learn the business of railroading by affording them every opportunity to learn? What better method could be devised for combating the evil in organized labor, that evil which makes no distinction between the learned and unlearned, the efficient and the inefficient, and what better practice could be followed to attract a better type of employee?

In these days we are apt to conclude that about all the ambition a young man has is to get as big a pay check as possible for as little work as possible. The unions welcome him into their organizations with open arms, and instead of imbibing that finer spirit of unionism, that spirit of a square deal of which unionism was conceived, he imbibes the apparently more modern spirit of "get all you can for as little as possible," and as a valuable employee he is nil. There are, however, a few young men, a remnant, who are not of that sort. They are the young men who are conscientious and industrious, anxious to learn and to fit themselves for greater responsibilities and service and they are the ones who do not measure success by their pay check, but rather by their service and the opportunities for service afforded them. These men deserve consideration, for they are to be the leaders of tomorrow. They ought not to be obliged to wait until they have obtained official positions before being permitted to enjoy the benefits of membership in railway associations. Surely the progressive spirit of youth, plus the conservative spirit of maturity, equals a combination that ought to produce worthwhile results.

The plan of the Railway Signal Association, described in your editorial, is a splendid beginning and a step in the right direction and I, for one, would like to see other associations take similar steps.

Arthur J. Gabosch,
Clerk, Chicago, Rock Island & Pacific.

Curve Superelevation and Excessive Speeds

Chicago.

To the Editor:

I have read with concern, as well as with interest, the comments of the Chief of the Bureau of Safety in reference to the derailment on the Southern Pacific near Vincent, Cal., published in your issue of February 13, page 489. I have no intention of discussing the wisdom or unwisdom of authorizing a speed of 40 m.p.h. on an 8-deg. 10-min. curve, carrying 4-in. superelevation. Personally, I should have preferred a limit of 35 m.p.h. for such a condition, but from long experience in handling curve problems in actual practice, I am convinced that a speed of 44 m.p.h. would not have been unsafe, and this is 10 per cent above that authorized by the rule in the case in point.

My view as to the maximum safe speed is confirmed by the curve superelevation table of a prominent Eastern road, wherein it is indicated that the maximum safe speed for an 8-deg. curve with 4-in. superelevation is 45 m.p.h. (Interpolation was necessary to meet the case cited, and this was made on the basis of the squares of the speeds shown.) Incidentally, a margin of 10 per cent for allowance of error on the part of the engineman is estimating the speed being used is, I believe, generally regarded as conservative. A stricter application of the rule would require that in no case should the permitted speed be exceeded.

The suggestion of the Chief of the Bureau that a large variation in estimating speed shall be provided for is not only subversive of efficient locomotive running, but it vitiates the whole purpose of speed limitation. A rule is only effective when it has but one interpretation. It is not safe to have it known that a speed limit has been made low purposely to provide that in the event of bad judgment a much higher speed will still be safe. To say nothing of the erratic operation that would follow the variable construction of the limitation, it would utterly defeat its object as a safety measure. On the other hand, to apply an excessive elevation for the speed normally used would induce increased maintenance and discomfort to the railway passenger; and it must not be overlooked that a high superelevation, when moved over at low speed, has its own elements of danger.

In recommending absolute compliance with the American Railway Engineering Association rule, the chief of the bureau is taking debatable ground. It is not denied that most roads regard with favor the rule referred to as a theoretical basis for superelevation. In the Manual it is only claimed that the rule gives an "essentially correct theoretical elevation for ordinary practice."

Many men who travel are familiar with the 4-deg. 20-min. curve just east of North Philadelphia. They have noted that this curve is frequently traversed at 60 m.p.h. It rides more comfortably at 57 miles per hour than at either lower or higher speeds. For 57 m.p.h. a superelevation of 9 in. is theoretically required, while the elevation carefully maintained, is 6 in., or 3 in. under the theoretical figure. It has been distinctly recognized by the A. R. E. A. that

a theoretically unbalanced elevation of 3 in. involves no element of danger.

The writer has offered as a safe empirical rule for curves of 2 deg. and over a modification of the theoretical formula in the substitution of the decimal 0.0004 for the factor 0.00066, with an increasing restriction in speed for higher degrees, so that in no circumstance will the modified superelevation thus obtained be more than 3 in., and for branch lines preferably 2½ in., less than that obtained by the A. R. E. A. formula. Numberless data can be offered to show that the modified formula represents accurately the practice on many of the safely-operated lines in the Eastern section of the country.

Further, in reference to the recommendation of the Chief of the Bureau of Safety that the A. R. E. A. rule for superelevation be rigidly adhered to, it seems to me this will require trains to come to a stop at crossovers or other diverging turnouts and remain so, since no elevation at all is practicable. But who questions that 40 m.p.h. is frequently used on the 1-deg. 40-min. curve of a No. 20 turnout, requiring by the rule 1¾ in. superelevation, and that 30 m.p.h. is regularly authorized for such turnouts?

W. F. Rench.

The Universities Are Willing to Serve

Urbana, Ill.

To the Editor:

In 1907 when the railroads were in their prime there were many more positions open in railway civil engineering than there are at the present time. Since then, for one reason or another, the railways have been obliged to curtail expenses, until at present they are doing only that which is absolutely necessary for the operation of the roads. Location and construction have been almost entirely eliminated, leaving maintenance of way as the field of activity. The duties of the present-day young maintenance engineer involve the making of estimates and station surveys and the doing of other routine work more or less monotonous in its nature. While the salaries have increased to a certain extent, they have not kept pace with those paid in other lines of industry. The engineers in authority are not responsible for this condition of affairs, for certainly the engineer, above all others, is interested in seeing his business expanded. Since the opportunities offered by these other fields are gone, promotion is necessarily slow. There are enough old men in service to more than fill the places higher up. Many young men recognize this condition and leave to take positions elsewhere; others go because their services are no longer needed. Many of the men interested in the kind of work that the railroad naturally offers have turned to highway engineering, where the field is new, work interesting, and opportunities for promotion good.

A few of the students that have registered in the University of Illinois have come directly from railroad service, where they have been employed as assistant foremen or possibly foremen on extra gangs, rodmen and chainmen on maintenance parties. They have come with the idea of studying railway civil engineering and returning to the road to practice it when they have finished their college education. During their school work they naturally hear from their fellow students about openings in highway, structural and other lines of engineering; and seldom does this class of men return to the railroad after graduation.

Our instructors do encourage the young man, especially interested in railway work, to take up studies that will prepare him for that line of service; but they are not all quite so enthusiastic in their solicitations as they would be if they knew that the young man would enter railway work upon graduation, or even continue in it once he began it. The following statement by Professor A. N. Talbot illustrates the point very appropriately: "The records show that of the graduates of the University of Illinois in civil engineering from 1900 to 1915, only about 10 per cent were engaged in railroad work at the beginning of the war. Of the members of a student society composed principally of civil engineering students, less than five per cent are now employed in railroad work, the data covering membership from 1908 to 1919. Formerly a very large proportion of the graduates were engaged in railroad engineering work."

A few years ago many young men did enter railway engineering practice after they had finished their course at the university. These men continued with the roads a part of a year, a full year, two or three, or possibly as many as eight or ten years. Then for some reason they quit or were let out, and in many cases they came back to the university to tell the instructor their experiences and incidentally to tell their student friends; so the tradition has spread that railroad work does not pay well and does not offer the opportunities for promotion that exist in other lines of engineering.

There is no line of industry that needs a better grade of engineering than the railroads. The University of Illinois long ago recognized this, and in 1907 established a department of railway engineering given up entirely to teaching and experimentation in railway work. The instruction offered to students covers railway civil engineering, railway electrical engineering and railway mechanical engineering.

The university has sent out from time to time bulletins and circulars describing the work and equipment of the railway engineering department and the opportunities it offers to students that register in its courses. This literature has been sent to railway officers and prospective students with the idea of creating an interest and encouraging young men to enter this particular field of engineering. The time will come, and possibly is already here, when this unfortunate tradition that seems to prevail among our college men can be reversed. The University of Illinois believes it will be reversed, and is showing its good faith in its belief by establishing additional courses to train men for railway service. The university is just now preparing four and five-year combination courses in railway engineering, economics and transportation, with the idea of giving some technical training to the man who is preparing for an administrative position or some administrative training to the man who is preparing for a technical position. The intention is to turn out men that have a broader vision of railway service. These men get a fundamental training in both the engineering and transportation phases of the subject and should be better equipped than those who have not had such an opportunity for study.

The University of Illinois realizes the need of the railroad for better men and is making an extra effort to supply them. It has from time to time solicited suggestions for a better cooperation with the railroads and the public, for it realizes the only function a university has is to serve the people and their industries. The university would be more than willing to meet any group of men who are seriously interested in the problem to discuss the matter on a common ground; and no doubt such effort would result in a substantial benefit to all concerned.

E. E. King,
Professor of Railway Civil Engineering, University of Illinois.

Shortsighted Policy.—Those who oppose the proposals for increased rates are shortsighted. It is generally conceded that there must be provision made for more railway revenue and for assured profits. The railway companies cannot hope to serve the public as it should be served unless they are permitted to develop with other industries. They must raise large sums for replacements and for expansion, and that cannot be had unless investors see hope of satisfactory return, not only now, but in the future.—*Muncie (Ind.) Star.*

Railroad Mechanical Department Activities in 1919*

Equipment Conditions; Distribution of Labor and Power; Safety Appliances; Standard Practices

In general, the work of the Mechanical Department has been similar to that performed during 1918, except that it has been more extensive. The organization has not been substantially changed, but has been somewhat increased over that at the close of 1918. At present it consists of Frank McManamy, assistant director, in charge of the department; George N. DeGuire, general supervisor of equipment, and George E. Dougherty, assistant general supervisor of equipment, whose duties are to supervise in a general way the condition of and repairs to locomotives and cars in railroad shops and to check up shop practices and expenditures with a view to promoting both efficiency and economy in the maintenance and operation of equipment; F. P. Pfahler, chief mechanical engineer, whose duties are to supervise the design and construction of new locomotives and cars, pass on disputed points in connection therewith, check bills for alterations or changes, handle locomotive assignments, and such other duties as may be assigned to him; J. J. Tatum, general supervisor of car repairs, whose duties are to supervise the general condition of and repairs to freight and passenger cars, see that repairs are promptly and efficiently made, and arrange for the distribution of cars as between different shops, so that the greatest efficiency may be obtained; J. R. Jackson, mechanical engineer, who in addition to the usual duties of a mechanical engineer is also in direct charge of the investigation of new inventions and appliances. In addition there is a field force of 24 men, whose duties are to make special investigations, check up methods of handling and repairing locomotives and cars, promote shop efficiency and such other special work as may be assigned; and the necessary office force consisting of 52 persons who perform the usual duties in connection with the handling of correspondence and records.

The field force has been a potent factor in promoting efficiency and controlling the cost of maintenance of equipment, and the part performed by the force in the matter of assisting the work of both the locomotive and car departments on the different railroads and the consolidation of the work as between different railroads, has been of real value.

No additional orders for new locomotives or cars have been placed during the year 1919, but work has been pushed on the completion and assignment of the cars and locomotives built to standardized designs which were ordered during the year 1918.

Maintenance of Equipment

During 1919 the railroads in federal operation operated 65,100 locomotives, 54,193 passenger train cars, and an average of 2,430,719 revenue freight train cars.

There has been no shortage of locomotives during 1919; in fact, the increased efficiency in locomotive maintenance and operation effected by the more general use of locomotive repair facilities and by increased efficiency in handling at terminal points has resulted in a surplus of locomotives during the entire year.

Owing to the increased capacity of the locomotive repair shops there were on January 1, 1919, 1,384 locomotives in good condition in storage. On April 1 this number had increased to 4,486. This early period of 1919 was one of light business, which rapidly changed to brisk traffic about the middle of the year. At present there are 2,395 locomotives stored in first-class condition, which is something that has never before existed during periods of heavy traffic.

During the period from November 1, 1918, to September 30, 1919, 43,608 locomotives were given classified repairs and 298,183 locomotives were given repairs requiring over 24 hours. Ordinarily running repairs which are required after each trip and which consume less than 24 hours are not included.

The classified repairs were in accordance with the United States standard classification, which requires certain essential repairs to be made and locomotives placed in condition to perform a specified term of service before they can receive credit for class repairs.

On January 1, 1919, there were 138,722 freight cars, which is 5.8 per cent of the total revenue cars in service at that time, in bad order. This number decreased so that on March 1, 1919, only 127,336, or 5.2 per cent cars were in bad order.

The adjournment of Congress on March 4, 1919, without providing the appropriation requested by the Railroad Administration made it necessary to exercise the most rigid economy in maintenance of equipment expenditures; therefore car-repair forces were reduced on practically all railroads under federal control. This reduction in car-repair forces resulted in an increase in the number of bad-order cars. On June 20 instructions were issued to restore car-repair forces, but before this order could be made effective on all railroads the number of bad-order cars had still further increased. The strike of the shopmen on August 1, which, although unauthorized by the employees' organizations, resulted in large numbers of car repairers leaving their work for a period of approximately 10 days, still further increased the number of bad-order cars, until on August 16 there were 228,549 bad-order cars, which is 9.2 per cent of the total number of revenue cars.

Since that time, however, the work of conditioning freight cars has been vigorously pushed until at present there are but 127,182, or 5.1 per cent revenue cars in bad order that will be repaired. This does not include 19,300 cars set aside under the provisions of Circular 20, issued by the Division of Operation, which are in effect condemned cars which will not be repaired by the administration and are being held because the owning corporations have not agreed to their dismantling on the basis given in the master car builders' rules.

During the period from November 1, 1918, to September 27, 1919, a total of 21,080,127 freight-train cars were repaired in the shops of railroads in federal operation. During the same period 14,119 cars were repaired in contract shops, and 20 new contracts were made covering 17,600 cars to be repaired by such concerns. This illustrates the diligent efforts which were made to condition freight cars to meet the demands of the traffic.

During the period from November 1, 1918, to September 1, 1919, 417,320 passenger-train cars were given either running or classified repairs.

Immediately following the signing of the armistice instructions were issued to eliminate where practicable the overtime worked in repair shops, and employees in all shops and car-repair plants were reduced to the regular day's work of eight hours. While this of necessity resulted in a decrease in the number of cars repaired, it was only fair to employees who for many months had been faithfully working whatever hours were required of them by the administration, and the restora-

*Extract from the report of the director of the Division of Operation of United States Railroad Administration. Other parts of the report will appear in subsequent issues of this publication.

tion of the established eight-hour day was a deserved recognition of the co-operation and faithful service rendered.

The difficulty in securing necessary material for repairs to both locomotives and cars continued for a considerable portion of 1919. Where shortages of material were found to be delaying equipment, necessary action was taken to obtain either from the manufacturers or from some other railroad the material needed to complete the work and avoid delay to equipment. This has been one of the most valuable activities of the central administration.

The work of modernizing existing equipment has not been overlooked, and in line with plans which were partially completed when the roads were taken under federal control 1,123 locomotives have been equipped with superheater since November 1, 1918, preference in all cases being given to the heavier power.

Other devices such as stokers, power-reverse gears, power-grate shakers, and similar appliances which make for efficiency and economy in locomotive operation have been applied to the extent that the conditions under which the railroads are operated would permit.

The work of applying headlights to locomotives in accordance with the orders of the Interstate Commerce Commission has been diligently followed with the result that substantial progress has been made, and the indications all point to the fact that this work will be completed well within the time provided.

Control of Maintenance of Equipment Expenditures

From the beginning the Mechanical Department has diligently endeavored to maintain the equipment without any idea that economies should or could be realized by reducing maintenance which the equipment ought to receive. With this thought in mind, we began immediately after the roads were placed under federal control to check locomotive shop output and roundhouse and shop costs so that all unnecessary expenditures might be eliminated and greater efficiency in shop and roundhouse operation obtained. Where improper practices were found to exist, action was taken through the regional directors to have more efficient methods adopted.

In order that expenditures for maintenance of equipment might be measurably controlled, federal managers were required to prepare and submit on suitable forms information regarding maintenance of equipment during the test period, during the seven years prior to the test period, as well as during the calendar year of 1918. This information was collected on the basis of the miles of roads operated, the units of equipment, and the locomotive and car miles, together with averages showing the cost of locomotive repairs separately on the basis of miles run, tractive power miles, and per locomotive owned.

Freight-car repairs were reported on the basis of 10,000 freight-car miles and freight cars owned, and the passenger-train car repairs were reported on the same basis.

From these reports studies of the maintenance of equipment costs were made and furnished to the regional directors, to keep them in touch with the actual conditions and aid them in the control of maintenance of equipment expenses.

In this work we have constantly kept before us the thought that the ability of the railroads to move present and prospective business was the first consideration, and after this requirement had been fully met reductions in maintenance expenditures which could properly be made should be made on railroads which were clearly overexpended in the matter of maintenance of equipment in comparison with the test period, but in no case has the fact that a railroad has been overexpended for maintenance of equipment been permitted to reduce maintenance to a point where it would interfere with the handling of traffic.

Analyzing and tabulating the information received from the different railroads in connection with the maintenance of equipment expenditures is going forward, so that all available data may be in shape for proper consideration when needed. This also includes the establishment of equation factors for increased costs of labor and material to enable comparisons to be made as between the test period and the period of federal control.

Damage to Cars in Yards and in Trains

During the first year of federal control it was noted that the number of freight cars damaged in yards and in trains was excessive. A careful study was made to locate the cause, and it was decided that the number of cars so damaged could be materially reduced by more careful inspection and maintenance of hand-brake equipment, and by more careful supervision over switching in yards and the operation of trains.

A comparison of the last 7 months of 1918 with the first 10 months of 1919 will show the effect of the work which was done to reduce this damage. We are able to show this information for only 7 months of 1918 because prior to federal operation such information was not generally kept, and it was not until June, 1919, that reports were obtainable from all railroads.

During the 7 months for which this information was available in 1918 there were 179,145 cars damaged in yards and 401,670 damaged in trains, a total of 580,815 cars. During the period from January to October, inclusive, 1919, there were 179,921 cars damaged in yards and 335,798 damaged in trains, a total of 515,719 damaged, which is a decrease over the previous year of 37 per cent.

The average cost per month to repair the cars damaged in 1918 was $1,779,240, which was reduced to $1,366,555 in 1919, or at the rate of an annual saving of $4,952,225.

Reducing the damage to equipment also reduces the damage to lading and permits the cars to remain in service. The reduction in freight claims and the value of cars in service can only be estimated, and therefore are not included in the above saving.

It would be exceedingly profitable for the railroads, after their return to private control, to continue a careful check of the damage to cars in yards and in trains and to establish a closer supervision over switching and train handling.

Committee on Standards

The present committee on standards was created as of July 1, 1918, for the purpose of carrying forward and completing the work of the original committee which designed the locomotives and cars, and which on account of other important duties of many of the members of that committee could not be continued.

In addition to completing the work started by the original committee this committee has been called on to pass on various devices and methods used on locomotives and cars, as well as methods or devices intended to facilitate repairs and improve operation which were submitted under Circular 18. The committee has also been called on to act in an advisory capacity in the general activities of the mechanical department, including the preparation of specifications for new equipment, tests of material, and maintenance of equipment, as well as in connection with the use of numerous patented articles submitted for the use of the Railroad Administration.

The work of this committee in establishing standards for maintenance as well as for new equipment has been extremely valuable, and has made possible economies in the maintenance of equipment and has reduced the delay to cars on repair tracks by providing a standard which could always be used without waiting to send to the home road for necessary material to make repairs in kind. This committee has also been called on to investigate and pass on various methods or appliances essential for the promotion of safety in locomotive or train operation.

In order to handle the large number of inventions and

devices to be used on or in connection with locomotives and cars, a committee on appliances, which is really a sub-committee of the committee on standards, was created. The work of this committee consists of investigating all inventions or devices submitted to the Railroad Administration in accordance with Circular 18 for use or for test; eliminating those that were clearly impracticable or unsuitable; making investigations of the results of the tests conducted by the various railroads of the different appliances, and submitting to the committee on standards those which appear to have sufficient merit to justify further investigation.

So that all matters submitted might have uniform treatment, the rules provided in Circular 18 have been strictly followed. These rules specifically provide that arrangements for tests of any device will not be made until an examination of the plans discloses the necessity or desirability of conducting such tests under service conditions. In case such test is to be made, the appliance must be furnished, installed, and operated without expense to the Railroad Administration. This work has covered a very wide field.

A classification of the invention files as of October 1, 1919, under 12 headings shows a total of 1,160 devices and appliances. The investigations and reports on 225 of these devices have been completed with the exception of 14 which were recommended for service tests. Reports on 245 devices are being delayed waiting for additional information from the inventor or railroads which have used the device.

Safety-Appliance Laws

The enforcement of the safety-appliance laws, which has been handled by the Railroad Administration since the railroads have been under federal control, has been under the direction of the Mechanical Department. During that period 3,295 specific violations have been filed by the Interstate Commerce Commission, all of which have been handled for correction.

As provided in General Order No. 46, reports of all violations were submitted to the Mechanical Department. The greatest number of such violations submitted was during the month of February, 1919, when 1,970 were submitted. Since that time the number of such violations has steadily decreased, only 731 having been filed in September, which indicates that the action taken has been effective.

During this period a number of matters which have been in dispute between individual railroads and the commission for several years have been satisfactorily settled. Among these is the matter of controlling the speed of freight trains on grades without the use of hand brakes. Failure to control trains with air brakes has resulted in numerous suits being filed by the Interstate Commerce Commission. For instance, this question was taken up with the Baltimore & Ohio Railroad in 1908, since which time it has repeatedly been before the courts without a definite conclusion.

It is believed that the matter has now been settled by conference and joint investigation arranged by the Mechanical Department between the Bureau of Safety of the Interstate Commerce Commission and the railroad officials. At this conference an agreement was reached as to a practical method of handling trains on the various grades as required by law, and instructions were issued by the Railroad Administration putting this arrangement into effect.

Similar conferences have been arranged in connection with other matters, and by working in close co-operation with the representatives of the commission on these matters it is believed that much permanent good has been accomplished.

Action Taken to Promote Safety

In addition to the enforcement of the safety-appliance laws, an understanding was reached with the employees who in the past have been urging safety legislation, both state and national, that before such action was taken their demands would be presented to the Division of Operation for consideration, with a view to providing all necessary safety devices for the protection of the employees without the necessity of additional legislation, either state or national. Pursuant to this understanding arrangements have been made by the Mechanical Department to equip locomotives with the following devices for the promotion of safety or efficiency, in addition to those required by federal laws:

Mechanical fire doors, lagging on steam pipes in cabs, standardization of location of air-brake cut-out valves in cabs; relocating air compressors so they will not obstruct the view of enginemen; applying handholds and suitable steps on sides of cabs; providing sanitary drinking water on locomotives; locating water glasses so they can be easily read by engineer and fireman or applying second water glass if needed; applying electric marker and classification lamps; closing openings in cabs around boiler heads, injector pipes, reverse levers, etc.; providing cab heaters; equipping locomotives in cold climates with suitable cab curtains.

While these appliances are primarily in the interests of safety, they also promote efficiency and economy in locomotive operation.

Extension of Time for Applying Safety Appliances to Freight Cars

Due to the war and other causes the application of safety appliances as required by federal laws and orders of the Interstate Commerce Commission had been delayed so that this important work could not possibly be completed within the time provided, although repeated extensions had been granted by the commission, the last one expiring on September 1, 1919.

Although it was suggested that an extension of time until January 1, 1921, be asked for, upon investigation made by the Railroad Administration, it was concluded that if vigorously pushed, the necessary work could be completed in much less time. Therefore, a request was made to the Interstate Commerce Commission to extend this period, and after a hearing at which the situation was presented to the commission, an extension was granted until March 1, 1920, to complete the work of equipping freight cars with safety appliances.

In order to force this work to a speedy conclusion instructions were issued that empty cars should not be accepted in interchange unless equipped with United States safety appliance standards.

This work is being closely followed so that there may be no possibility of a further extension being needed. With the progress now being made it will be entirely practicable to withhold from service all cars not equipped prior to March 1, 1920.

Vocational Training for Railroad Employees

The plans for vocational training for railroad employees in connection with the Federal Board for Vocational Education, which were referred to in our 1918 report, have been completed, and all railroads under federal control have been authorized to co-operate with the Federal Board of Vocational Education in the establishment of training schools for apprentices.

The railroads have also been granted authority to require the attendance of apprentices at these schools not less than 208 hours per year, and to incur necessary expense to fit up suitable classrooms in which such classes may be held.

The Railroad Administration is also co-operating with the Federal Board for Vocational Education in the matter of training disabled soldiers and sailors for such work in the railway service as their physical condition will permit them to perform. Under the arrangements made with the Federal Board for Vocational Education such men may be taken into railway shops and fitted for positions in mechani-

cal work under a plan for special training and be paid by the railroad for their services approximately the wages of an apprentice. An additional allowance is made to such men by the Federal Board for Vocational Education which will bring their pay somewhat higher than that of the average railway employee.

An understanding has also been reached with the employees' organizations that when these men have completed their course of training they may be employed as journeymen either in the shop where they have been trained or at any other point.

National Agreement

One of the inevitable results of federal operation of the railroads was the establishment of uniform rates of pay and working conditions for railway employees.

Under the arrangements in force when the railroads were taken over, each of the various railroad lines had its own shop rules or working agreement with the shopmen. This resulted in not only differences of rates, but in working conditions on different railroads which caused dissatisfaction and unrest among the employees and resulted in a movement of shopmen from road to road to take advantage of certain improved conditions. During the latter part of 1918 the shopmen requested consideration of a national agreement covering all railroads in federal operation, and such a proposition was submitted early in January, 1919. After consideration by various boards and committees the matter was turned over to the Mechanical Department on September 11 and the negotiations with the shopmen's committee were completed on September 17; the agreement approved and signed by the director general and the executive officers of the employees' organizations on September 20 to become effective on October 20, 1919.

This agreement is in line with the labor policy of the Railroad Administration, and is an important step forward in dealing with the labor situation. It has already been demonstrated that putting the agreement into effect in a harmonious and co-operative manner has materially improved the labor situation by allaying the unrest among the shop employees which prevailed and insuring them uniform treatment and proper consideration, and improvement has already been noted in the operation of shops, engine houses, and repair yards due to the more stable conditions brought about by this agreement.

An important fact developed in connection with the national agreement is that adequate provision was not being made to insure a future supply of mechanics by proper development of the apprenticeship system. At the ratio provided by the national agreement 64,159 apprentices could be employed, while a check of actual conditions shows that but 17,218 are employed. If we are to provide a future supply of skilled mechanics, more attention must be given to maintaining the full ratio of apprentices and giving them proper training.

Method of Handling Labor Disputes

During the year 163 labor disputes with shop crafts, some of them of an extremely difficult character, have been successfully handled by the Mechanical Department without serious inconvenience to transportation and without the necessity of referring them to the Division of Labor. We have uniformly followed the policy of absolutely fair treatment of employees, exerting every reasonable means to correct any abuses found to exist and impressing upon all concerned the necessity of handling grievances in an orderly manner and in accordance with existing agreements.

In the cases where this failed and the employees stopped work, they have been plainly told that grievances would not be considered after the employees had left the service; therefore the only way to obtain action was to return to work and present their grievances in an orderly manner.

The success of this policy has been proven by the fact that since the railroads have been in federal operation there has not been a single strike authorized by the executive officers of the various shopmen's organizations, and we have had their co-operation to the fullest extent to promote harmony and efficiency in shopwork.

One of the provisions of the national agreement is that "prior to the assertion of grievances as herein provided and while questions of grievances are pending, there will neither be a shutdown by the employer nor a suspension of work by the employees." This is an important concession by both sides which, if fairly observed, will go far toward eliminating disputes between the railroads and their employees.

Distribution of Labor

The distribution of shop labor to meet the demands in different sections of the country under varying business conditions has received careful attention.

We have considered that each skilled mechanic trained in railroad work represents a certain definite investment which is lost to the railroads if, on account of a temporary period of dull business, the man leaves railroad service to enter the employ of a private industry, because in many instances he never returns to railroad service. To avoid this loss of skilled workmen, as well as to provide employment during periods of dull business, arrangements have been made through the regional directors to provide employment within their region as far as practical for men who are laid off owing to dull business on the different railroads.

Where employment can not be provided within their own region, arrangements have been made to advise this office of all cases where there is a shortage or a surplus of skilled workmen when arrangements have been made for transfer. In this way we have been able to fill many vacancies as well as to provide employment for deserving workmen, and have thus retained to the Railroad Administration men who are skilled in mechanical work. In this we have had the close and sympathetic co-operation of the Railway Employees' Department of the American Federation of Labor, who furnish us with names of workmen seeking employment, and carefully follow up the cases where on their request workmen are sent to the different railroads to see that they accept the employment offered and for which they were furnished transportation.

It is believed that this work could be advantageously continued under private control and that it would be of decided benefit to both the railroad companies and to the workmen.

Activities of Field Men and the Saving Effected by Their Work

The work of the field forces has consisted of making special investigations of improper conditions reported, checking up conditions in shops, engine houses and repair yards for the purpose of promoting efficiency and economy in operation and handling labor matters that had not reached the stage where they should be referred to the Division of Labor.

During the war the forces at practically all terminals had been built up to such an extent that they were out of proportion to the business handled. A check on the Erie Railroad in 1918 showed the need for a thorough investigation of shop and engine-house conditions on all railroads; therefore this work was extended and developed into a comprehensive system of reporting conditions of shop and engine-house operation monthly through the regional directors.

On account of the changed values due to increased labor and material costs a comparison on a money basis was worthless; therefore all comparisons of shop and engine-house operation were made on a man-hour basis.

To illustrate the improvement in conditions, a check of 2,921 engine houses in January, 1919, showed an average

of 30.58 man-hours per locomotive handled, while a check of the same engine houses in July, 1919, showed 25.77 man-hours per locomotive handled, or a decrease of 7,013,036 in the number of man-hours in handling approximately 54,000 locomotives. This represents a saving per month of $4,263,541, which is at the rate of approximately $50,000,000 per annum.

Other matters which have been investigated by the field forces include disputes between officials and the employees, losses due to good material finding its way into the scrap bins, shop practices and the efficient use of machine tools, storage of material to see that it is properly protected, condition of shops and shop grounds, condition of roundhouses, turntables, cinder pits and other terminal facilities to see that they were sufficient and were efficiently operated, checking up car-repair forces and facilities, and in many instances reorganizing forces at division points or on an entire railroad, seeing that shops and repair yards were properly supplied with material and tools so that the work could proceed without delay.

Distribution of Power

Through reports made each week by each railroad the Mechanical Department is kept informed as to the exact condition on each road with respect to motive power. This information enables us to promptly transfer locomotives from one road or section of the country to other roads or points where an actual or anticipated shortage of power develops.

In order to meet any contingency that might arise and avoid such congestion as existed in the latter part of 1917 and the beginning of 1918, 150 new Mikado and Santa Fe type locomotives were held in reserve in emergency pools at Albany, Buffalo, Cleveland, Columbus and Potomac yards. These locomotives were under the control of the mechanical department and were held for assignment to any road where, due to either adverse weather conditions or to increased volume of business, the need for additional power became apparent. From time to time locomotives as needed to tide over temporary emergencies were taken from these reserve pools and despatched to the roads or points where they were most needed. This reserve supply of locomotives was maintained until it became clearly apparent from the condition of power as well as from the demands that they would no longer be needed, when the locomotives comprising the reserve were forwarded to the owning roads.

In addition to the locomotives in this reserve, 200 locomotives originally constructed for the Russian government are under the control of the administration to be used as a power reserve which can be promptly and easily transferred as the needs of the service demand.

The rapid development of the oil fields in the Southwest created an acute shortage of power on the roads traversing that territory, which was promptly met by the immediate transfer of power from the East, care being taken to provide locomotives to meet the clearances and restricted bridge loading in that territory.

In order to meet the increased demand for locomotives to move coal traffic a large number of locomotives were transferred to the coal-carrying roads in the Lake region during the early fall.

Approximately 750 locomotives have been constantly in service on other than owning lines. Their location has been changed from time to time to meet traffic conditions, which has enabled us to at all times furnish a sufficient supply of motive power to meet traffic conditions in the various sections of the country.

Since January 1, 1919, 2,307 locomotives have been given repairs in other than owning line shops.

A number of practices and methods established by the Railroad Administration should be permanently established and made standard because they are in the interest of economy, efficiency and uniformity.

Practices Which Should Be Continued and Made Standard

Among these is the standard classification of repairs to locomotives and tenders, because it forms a reasonably accurate basis of comparison of the work of the different shops and the cost of locomotive maintainence. It also promotes efficiency by establishing a certain definite standard for locomotive repairs, thus preventing the practice which is altogether too common of shopping locomotives at frequent intervals and doing only a portion of the work needed in order to increase the mileage between class repairs.

The standards for repairs to freight cars provided for in these circulars were established to avoid delays to freight cars when on other lines waiting for material to make repairs in kind.

On December 31, 1917, 52 per cent of the total number of freight cars were on their home lines, and at the present time less than 25 per cent of cars are on home lines, and it is extremely doubtful if this percentage will ever be materially increased, because no matter how diligent the efforts to send cars to home lines the first period of heavy business scatters them to all parts of the country, and it is months before they can again be returned to their home lines. For this reason the standardization not only of construction, but of repair parts, is a necessity if we are to properly maintain equipment at a reasonable cost.

In the interest of efficiency and economy individual standards of freight-car construction or repairs should never again be permitted, as there is not a logical argument that can be advanced in opposition to the standardization of freight cars.

For the above reasons the standards for repairs established by circulars 7 and 8 should be continued subject to necessary revision from time to time, and should be added to wherever it may be found practical to do so.

The inspection of stationary boilers by the railroads should be continued under their own supervision, thus insuring the very best possible character of inspection, and that inspections will be made at times when it will cause the least inconvenience.

This method of inspection will also promote efficiency and bring about uniformity in the different requirements, so that railroads operating through several states will not have a number of different standards of inspection for their stationary boilers.

Complete records of the standardized equipment constructed by the Railroad Administration, including drawings and prints, cost of maintenance as developed by special investigations or otherwise, and all other matters covered by this report or handled by the Mechanical Department, are available in our files for use when needed.

The Cologne Railway Station

"Why Should the Public Sit In?"*

By William N. Vaile
Member of Congress from Colorado

MR. SPEAKER, my distinguished friend from Pennsylvania (Mr. Garland), whom we all love and admire, has made a most shocking disclosure to us concerning the iniquities of the railroad bill regarding the settlement of labor disputes.

He says: "You have in this bill a provision that the public shall sit in all cases, and the public shall be one of the board making the decision."

He contends that this is grossly unfair to organized labor.

Until I heard my distinguished friend I had a lingering impression that I was here to protect the public, that I was to be an advocate of the public. Now he tells me that this is all wrong. As a member of the House of Representatives, the body which is supposed to be the palladium of our liberties, close to the people and directly responsible to their will, he stands here and tells us that the bill is wrong, because it permits the public to "interfere between the men who work on the railroads and their employers."

The horror of this situation is increased, not diminished, by the fact that the only force behind such a decision is the force of public opinion. He reminds us that the decision, to which the consent of the public must be secured, "is not compulsory, but everyone knows that where a finding is made by a board of the character provided for, in which the railroads and the public agree, the majority of the board, it would be practically compulsory upon the men who work on the roads. There is no question about that. Everyone will agree to that."

Public opinion elected the gentleman from Pennsylvania to this House. He and I are answerable to it for our conduct here. But labor, according to the gentleman's argument, shall not be answerable to it. The gentleman from Alabama (Mr. Huddleston) says that the compulsion of public opinion will drive me out of Congress, but, of course, it is to have no binding effect upon labor.

And if Congress should be misguided enough to give some voice to the public, that voice must not be heard in agreement with the employers but only in agreement with the employees. The only award which should be binding, even by moral suasion, is the award which labor may agree to. If the public agrees to it, the public shows a proper submissive spirit. If the public does not agree to it, then the public is simply out of luck.

Now, Mr. Speaker, it is only human nature for all of us to consider principally our own individual interests. Capital does it and labor does it. For months the Washington hotels have swarmed with representatives of organized labor. They have been very active in visiting and interviewing Congressmen and they fill the galleries of the House whenever there is a discussion or a vote on matters affecting labor. It is just as legitimate for the railroad brotherhoods to keep a lobby here to advocate legislation which they desire, or to oppose legislation which they deem unfavorable to their best interests, as it is for the United States Chamber of Commerce to maintain its offices and agents here. It is perfectly proper for either a railroad attorney or a railroad brotherhood delegate to appear before congressional committees or to visit individual Congressmen for the purpose of arguing the cause of his clients.

But the great brotherhood of the general public does not maintain any lobby at Washington. I am, however, a member of it, and while I remain in Congress I shall represent it to the extent of my ability upon this floor. I am in favor of this bill, but not for the reason that it is opposed by organized labor. I hope the time will never come when my judgment shall be so obscured as to be in favor of any bill merely because it is opposed by somebody else. When I vote for a bill, as I vote for this one, it is because I am convinced of its merits. If Mr. Gompers were in favor of it I would welcome his support, but it would not increase my advocacy of this bill any more than his opposition shall drive me away.

Now, we are all members of the brotherhood of the general public, even though we may also be members of some other brotherhoods, and I believe that this brotherhood of the general public has been somewhat neglected in the past in controversies between labor and capital. The time is coming—in fact, the time has arrived—when this old good-natured, long-suffering brotherhood of the general public, which has been so much of an easy mark in the past, is going to be heard. When, for example, a railroad strike is threatened which would keep the coal from our factories, and the milk from our babies in the cities, and bring some measure of inconvenience and suffering to every man, woman, and child in the United States, and people of the United States are going henceforth to take a hand in the settlement of that dispute.

Ah, my friends of the railroad brotherhoods, it ought to be easy for you to see that your cause is so just that it need not fear the voice of public opinion. I concede that the Brotherhood of Railway Conductors and the Brotherhood of Locomotive Engineers, and the Brotherhood of Railway Trainmen, and the International Brotherhood of Boiler Makers, and any other organization or group of employees should be represented in the settlement of a dispute between them and their employers, and this bill provides that they shall be. But I demand that the brotherhood of the general public should also "sit in." And it seems to me not unreasonable to insist that the decision which is made should be equitable enough and fair enough to be concurred in by at least one out of the public's three representatives.

That is all that this bill provides. There is no interference in it with "free speech" or "free assembly" or "collective bargaining." There is no attachment of union funds or of any property of a union or of any of its members. There is no judgment, civil or criminal, against an union or any union man. There is no penalty whatever for going on strike—that is, no penalty except the condemnation of public opinion. That is absolutely all there is to the so-called "antistrike" provisions of this bill.

A strike may be the only means of obtaining a worthy end. The same thing may be said of war. A war causes great suffering and loss, not only to the combatants but to noncombatants. The same thing is true of a strike. He who proposes either a war or a strike may have overwhelmingly the merits of the case. He also has the burden of proof. You should expect to be able to prove the justice of your strike, but if it is just you need not fear public opinion. If it is unjust you ought to fear it.

*From an Extension of Remarks on the Railroad Bill, in the Congressional Record of February 28, 1920

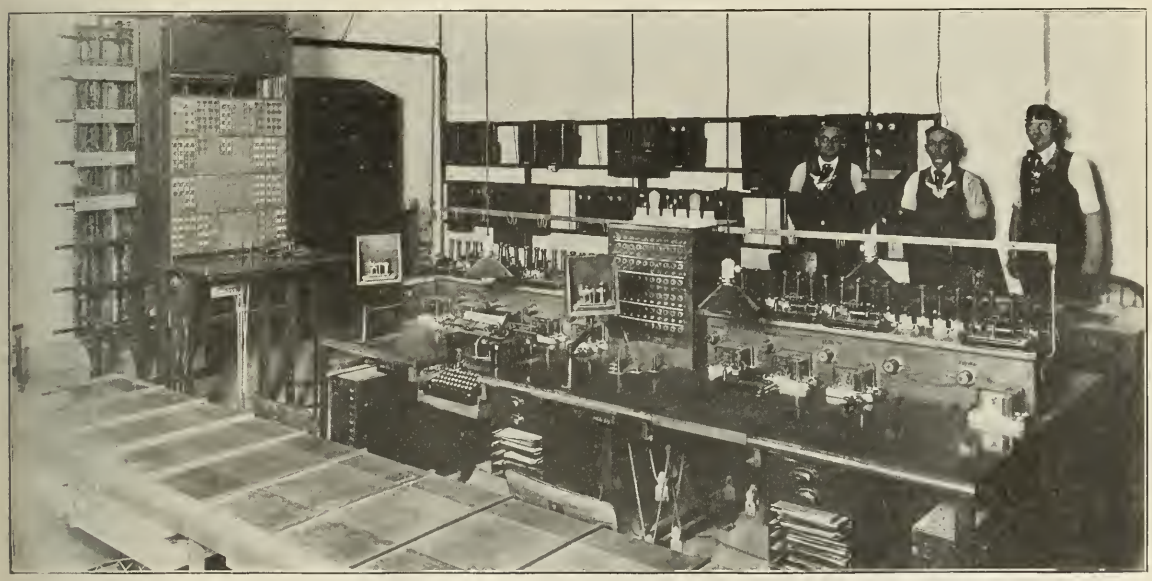
THE MOST DANGEROUS STRIKE.—At present the most dangerous strike threatening our railroads is the strike of the investing public, and it cannot and will not be broken until encouragement is afforded it in the shape of substantial dividends.—*The Street, New York.*

MUST GET ON THEIR FEET.—The pressing necessity is to straighten out the so-called railroad tangle as soon as possible, in a way to permit the transportation companies again to get on their feet and meet the needs of public service. Not only has new construction been at a comparative standstill, but equipment has sadly deteriorated and the service rendered has been a source of constant complaint and criticism. And this condition will continue to grow worse until a wise and liberal policy toward the transportation companies is adopted and becomes effective, giving the roads a chance to get their share of general prosperity and thus encouraging them to resume new construction and put their equipment in shape to handle the rapidly increasing volume of traffic.—*Oshkosh (Wis.) Northwestern.*

New Telegraph Office in Indianapolis Union Station

Modern Plant Equipment Installed to Increase Efficiency in Handling Business of Eight Roads

A NEW TELEGRAPH OFFICE was recently installed in the new Union station, which is being built at Indianapolis, Ind. The apparatus installed consists of modern up-to-date equipment, making a complete and efficient working unit. From one to three men are employed on each trick. The operators in this office handle train orders and railroad message traffic for the Indianapolis Union; the Pittsburgh, Cincinnati, Chicago & St. Louis; the Cleveland, Cincinnati, Chicago & St. Louis; the Cincinnati, Indianapolis & Western; the Chicago, Indianapolis & Louisville; the Illinois Central and the Lake Erie & Western. Some idea of the number of messages coming into this office may be gained from the fact that wires from six divisions of the Pennsylvania Lines and from four divisions of the Big Four enter the office in addition to those of the other roads mentioned above.



General View of Office, Showing Operator's Table, Distributing Frame, Test Board and Selectors

The Location of the Office

The office is located in a room 49 ft. long by 24 ft. 5 in. wide, underneath the train shed tracks, making it easy of access for the conductors and trainmen entering the Union station. The room is longest north and south. A portion 23 ft. 6 in. long on the south end is reserved for the telegraph office and equipment and the remainder is for the use of conductors and trainmen, a large counter separating the two parts of the room. The location of the office is such that it is necessary to make provision for artificial light and ventilation.

The Office Equipment

In the operating room is located the quartette operating table, in the center of which is the jack box with the pilot signals on top. The telegraph selectors are mounted along the center and immediately above them are located the line telegraph relays. The distributing frame and the test board are located at the south end of the room, while the telephone selectors are located on the west wall. On each side of the quartette operating table and immediately back of the operators is located a train order table with the top divided and marked with the names of the various roads. These tables are provided so that all orders or clearances which have not been delivered are in plain sight, eliminating the chance of their being overlooked.

A total of 22 telephone and 18 telegraph circuits were transferred from the old to the new location. Of these, the Big Four has 12 telephone and four telegraph circuits; the Pennsylvania has 5 telephone and 6 telegraph circuits; the Lake Erie & Western 1 telephone and 2 telegraph circuits; the Monon 2 telegraph circuits; the Illinois Central 1 telephone and 1 telegraph circuit; the Indianapolis Union 2 telephone circuits and the C. I. & W. 1 telephone and 3 telegraph circuits.

The wires for the new "UN" telegraph office were brought from the terminal frames in the underground terminal room through a tunnel to a point directly beneath the distributing frame in the telegraph office, in a 62 pair cable. All telegraph wires loop from the underground terminal room board to the distributing frame in the office and back to the underground terminal room, while all telephone wires are bridged across the circuits entering the underground terminal room. The conduit system for the adjacent track elevation work terminates in this room and circuits are carried from there to the Western Union uptown office.

The distributing frame in the telegraph office consists of a double-sided frame of 5 units accommodating 480 cable strands and 200 protectors on the vertical side and 480 switch board terminals on the horizontal side. The incoming cable is terminated on the vertical units numbered 1 to 100, the

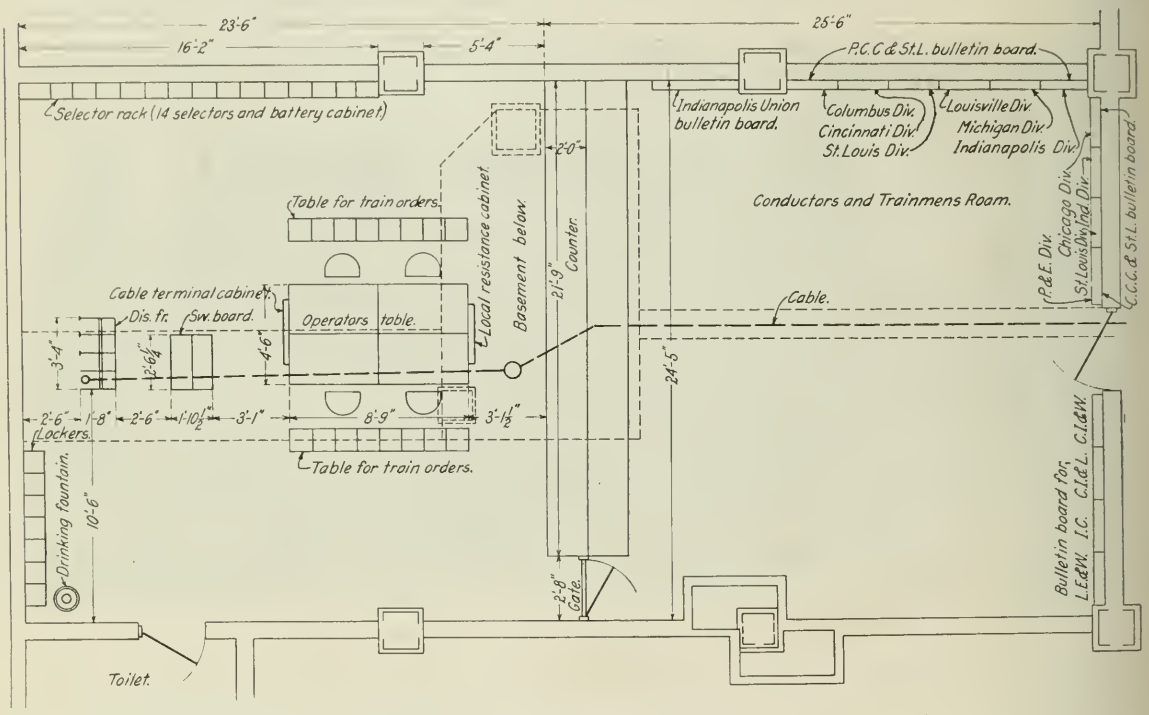
conductor assignment conforming to a list as previously prepared.

Space was provided on the quartette contralization table for 40 telephone and 20 telegraph line jacks. Each jack and filler button is provided with two line conductors. The telephone conductors are carried in a 40-pair office cable which is carried under the floor to the distributing frame. Each space for a telephone jack has an associated lamp space for signaling. The lamps are connected to the corresponding selectors through the distributing frame and, to accommodate the lamp signals, a second 40-pair lead office cable was installed. For the accommodation of miscellaneous wires such as buzzers, circuits, battery leads to master sets, etc., a 20-pair lead office cable was provided between the terminal cabinet on the telegraph table and the distributing frames.

To provide testing facilities, a reduced section of standard Western Union pin jack switchboard was provided; all telephone circuits were grouped on the left of the board and all telegraph circuits on the right. Different colored designa-

causes the pilot lamp to light, are in series with this circuit relay and are lighted when this relay is picked up by the 12-ohm relay mentioned above. The pilot light for the telephone is red and is mounted on top of the jack board on the operating table. When the operator plugs in to answer a call, the circuit is opened and is restored to normal, thus putting out the red pilot light and the two lights on the jack board. To indicate to the operator when any failure of the power supply occurs, a 16-ohm relay was bridged across the office side of the fuses, protecting the power circuit which is normally energized. Should a fuse be blown, this circuit is broken and a circuit is established through an indicating fuse, a 2000-ohm resistance unit, the back contact of this relay and a 50-mile fuse-indicating lamp, causing this to light up. The fuse-indicating lamp is green and is also mounted on top of the jack box with the pilot equipment.

The telegraph circuits were wired with a 100-ohm Morse line relay so arranged that its armature operates the Gill selector, and the selector contact closes another relay which



Floor Plan of Office Showing Location of Equipment, Bulletin Boards and General Arrangement

tion cards were used for the different railroads. One Morse testing set circuit and one telephone test were installed on the switchboard. Each jack was provided with a designation cord conforming to a typical one. In addition the following color scheme was used to designate the various railroads: Big Four, white; Pennsylvania, red; C. I. & W., blue; L. E. & W., yellow; I. U., green; Monon, salmon; I. C., slate; I. V. brown.

Telephone and Telegraph Circuits

The telephone circuits were wired up with a 12-ohm relay connected in multiple with the selector bell which picks up when the bell rings. A contact on this relay completes the circuit for another relay which is in turn kept energized through a front contact on it so that it remains closed when the contact of the 12-ohm relay opens a little later. The two line signal lamps in the jack board and the pilot relay, which

then remains closed through its front contact as in the case of the telephone circuit. This operates the signal lamps and the pilot relay, the lamps in this case being white. The closing of the selector contact also causes the operation of the answer back. This is so arranged that the upper contacts close, shunting the relay contact before the line is opened an instant later by the lower contact. The opening of these line contacts causes a signal to be sent back over the line telling the calling operator that the call has gone in. As in the case of the telephone when the operator plugs his master set in series with the line, the lower contacts open, breaking the circuit and restoring it to normal. Two magnetic wall telephones were installed in the conductors and trainmen's office and wired to plugs in the front of the jack box so that calls could be made on any circuit.

The cable terminal box and the local resistance cabinet are located at each end of the operator's table, these boxes

being bolted to the angles at the ends of the tables. The cable from the distributing frame is brought to the cable terminal box and determined with the conductors bearing the same number they had in the distributing frame. The incoming power is brought to the local resistance cabinet in metal conduit and the live side is terminated on six fuse blocks fused with one ampere fuses. Two fuse blocks are used to feed the telephone locals and two additional fuse blocks are used to feed the telegraph locals. The leads from each fuse block for the telephone locals first pass through a 250-ohm resistance unit, then a 16-ohm signal relay to the protective resistances in the receptacles. The circuits going through the contacts of these relays pass through another fuse block and through 500-ohm resistances which close the circuit of the pilot equipment. Across the office side of the telephone fuse blocks, the telephone fuse indicating relays are bridged, protected by 1,000-ohm resistance units. From the back contacts of these relays, the fuse-indicating lamp is bridged to ground while the armatures are connected through a 250-ohm resistance to the 110-volt lead. The telegraph local equipment is wired in a similar manner except that the limiting resistances are mounted on top of the table near the Morse line relays located above the telegraph selectors. The four master telegraph sets are supplied with power from a local generator through a fuse in the local resistance cabinet. The telegraph cords are shortened to such a length as to prevent their being used in telephone jack.

The preparation of the plans and the installation were carried out under the jurisdiction of C. S. Rhoads, superintendent of telegraph of the Big Four. The installation was made under the direct supervision of J. G. Gilgrist, assistant superintendent of telegraph, and John L. Niesse, telegraph and telephone engineer of the Big Four. R. D. Meredith, chief installer of the Big Four handled the installation work.

The Liquidation Staff of the Railroad Administration

THE STAFF RETAINED by the Railroad Administration after the return of the railroads on March 1 to liquidate its affairs includes approximately 1,223 officers and employees, according to a statement issued by Director General Hines to indicate more definitely than was possible in his annual report the steps taken and in contemplation to include the matters arising out of government operation of the railroads. Because so many pepole continued after March 1 to take to the Railroad Administration requests for information, appeals for the expedition of shipments, complaints, etc., such as they had been used to take up with its organization, Mr. Hines also took occasion to state that he is no longer in charge of railroad operation. Many Congressmen particularly, who had found the Railroad Administration a convenient place to refer communications from their constituents regarding railroad service, failed to note the transition in management, but the Railroad Administration has continued to refer them to the proper office.

"As far as I have been able to ascertain," Mr. Hines says, "the actual return of the railroads to their corporate owners at 12:01 a. m. March 1, and the taking over of the properties by their corporate owners was accomplished without any dislocation whatever of the transportation systems which had been under federal control. Arrangements having been made in advance both by the government and by the corporations, no public inconvenience resulted anywhere.

"In accordance with the transportation act and with the President's proclamation, the director general ceased to have any control over the operation of the railroads on March 1, and coincidentally the regional and district offices and terminal organizations of the Railroad Administration and the divisions of operation, traffic, public service, inland waterways and labor ceased to function as such. Following out notices which have been given in advance, approximately 891 officers and employees of the regional and terminal district organizations ended their employment with the Railroad Administration on March 1, and at the same time approximately 529 officers and employees of the central administration ended their connection with the Railroad Administration, making a total of 1,420 officers and employees who were taken off the Government payroll on March 1. A large proportion of the officers and employees released have resumed employment with railroads.

"In addition to the 1,420 officers and employees of the regional and central offices of the Railroad Administration released on March 1, a considerable additional number will be released in the near future, it having been necessary to retain some employees of the regional offices and of the central divisions which have been abolished for a comparatively brief time to complete the records of federal control and wind up the work of those offices.

"Under the proclamations of the President dated February 26, in accordance with the terms of the transportation act, the director general was authorized to liquidate the affairs of the government control of railroads. The annual gross revenues of the railroads under government control in 1919 were in excess of $5,000,000,000 and under government control as under private control the railroad operation accounts involving such large amounts are not available day by day, but are always from 30 to 90 days behind. For 26 months, properties, privately owned, including approximately 240,000 miles of main line of railroad which, with its equipment are variously estimated as being worth from $15,000,000,000 to $20,000,000,000, have been under the control of the government on a rental basis of about $917,000,000 per annum. In addition to the actual operation of these properties during federal control, the Railroad Administration has been engaged in agreeing upon the standard form of contract to be made with each railroad company, the adoption of that form to the particular condition of each company, in agreeing upon the rental to be paid each company, consideration of the materials and supplies received and of the corresponding amounts to be returned at the end of federal control, determination of the extent to which the corporations would be charged for capital expenditures made for additions and betterments and equipment and manner in which payment there for should be made, determination of the mutual rights of the parties as to over maintenance or under maintenance of the properties and consideration of many other problems which considered together have presented a task of very considerable proportions.

"The final adjustment of questions growing out of these large transactions will call for attention for a considerable period in the future. There will be involved a large number of claims of the railroad corporations against the Government and of the government against railroad corporations relating to capital expenditures made during the federal control, maintenance questions and other problems. Numerous financial, accounting and legal questions must be disposed of and in addition the government will have to supervise payments of claims from shippers on account of loss and damage and overcharge claims and also personal injury claims arising during the period of federal control, such claims of course being claims against the government. These activities will necessitate a very large number of detailed inquiries, calling for investigation and adjustment of railroad records throughout the country and for the present will require a very substantial force.

"It will be necessary for the director general's office, the divisions of finance, liquidation claims, law and accounting to continue to function for the protection of the interests of

the government in the very large sums involved in the liquidation of the affairs of government control of railroads. The division of purchases will also continue to function temporarily in connection with inventories of materials and supplies. Numerous labor questions remain for final winding up and for the time being will require a considerable force.

"As of March 1 and after eliminating the 1,420 officers and employees mentioned the central administration included approximately 1,072 officers and employees and the regional offices of the Railroad Administration included approximately 151 officers and employees or a total of approximately 1,223 officers and employees. The employees who have been retained in the regional offices represent primarily employees who have been retained as field agents and office clerks of the central organization of the Railroad Administration to assist in the liquidation of the claims mentioned above."

Frank McManamy, manager of the Department of Equipment of the Division of Liquidation Claims, has issued a circular announcing the following appointments in the Department of Equipment:

George N. DeGuire, heretofore general supervisor of Equipment of the Division of Operation, is appointed assistant manager; F. P. Pfahler, chief mechanical engineer of the Division of Operation, is appointed chief mechanical engineer; George E. Dougherty is appointed chief examiner.

E. M. Durham, Jr., newly appointed manager of the Department of Ways and Structures of the Division of Liquidation Claims, has appointed regional engineers for each of the regions maintained by the Railroad Administration, as follows: C. E. Knickerbocker, senior assistant to the engineering assistant of the Eastern region, has been appointed regional engineer for the Eastern region, with headquarters at the Grand Central Terminal, New York City. David Meriwether, Jr., assistant to the chief engineer of construction of the Southern Railway, has been appointed regional engineer for the Allegheny region, with headquarters in the Broad Street Station, Philadelphia. H. M. Rodenbaugh, engineering assistant to the Southern regional director, has been appointed regional engineer for the Southern and Pocahontas regions, with headquarters in the Hurley-Wright building, Washington, D. C. Horace Stringfellow, district engineer of construction of the Southern Railway, has been appointed regional engineer for the Southwestern region, with headquarters in the Railway Exchange building, St. Louis. F. H. McGuigan, Jr., assistant engineer in the office of the engineering assistant of the Central Western region, has been appointed acting regional engineer for that region, with headquarters at 547 West Jackson boulevard, Chicago. C. K. Smith, acting engienering assistant for the Southwestern region, has been appointed acting regional engineer for that region, with headquarters at 547 West Jackson Boulevard, Chicago.

THE NEW RAILROAD PERSONNEL.—The men who are to handle the railroads after they are released from government operation have specialized in this business, many of them, all their lives. They will know how to bring about the most economical operation of these properties, and they are entitled to the support of the public while they are doing their best to bring about a readjustment.—*Macon (Ga.) News.*

INCREASED RATES OR HIGHER TAXES.—If the roads stayed in the hands of the government the colossal deficits they are now piling up would burst even the United States Treasury unless Congress resorted to new taxation. This country is done with higher taxes. So it must be higher traffic rates. Government operation or private operation, there is no getting away from the higher rates if the national transportation system is to be saved.—*New York Sun.*

Demurrage Rates Increased in England

LONDON, England.

ONE OF THE PROBLEMS of the Rate Advisory Committee to the Ministry of Transport of Great Britain was to increase the demurrage rates to such an extent that it would be unprofitable for shippers and consignees to use cars for storage purposes. Under the existing rates the use of cars for storage has become an abuse, with the result that there has been a severe shortage.

The committee has taken the existing schedules and increased them, as shown in the accompanying tables. In view of the effect of the eight-hour day, which is now pretty generally in vogue throughout Great Britain, consignees have found it more difficult to unload and clear their cars, and for that reason the advisory committee has recommended that the free time remain as it stands, which in England and Wales is as follows:

Wagons supplied empty for loading:	
At stations	One day[1]
At private sidings, docks, wharves, etc.	One day[1]
Loaded wagons after conveyance:	
At stations	Two days[2]
At private sidings and docks	Two days[2]
At the port (shipment traffic)	Three days[2]
Same, if reloaded	Three days[2]
Refrigerator and insulated vans	Treated the same as wagons

[1]Exclusive of the day upon which the wagons are placed at the trader's disposal.
[2]Exclusive of the day of receipt by the trader of notice of arrival.
[3]Exclusive of the day of arrival.

In Scotland the free time allowed is as follows:

Wagons supplied empty for loading with merchandise at stations, private sidings, docks, etc.	One day[a]
Wagons for loading with coal, coke or patent fuel at private sidings	Two days[a]
Loaded wagons after conveyance—	
At stations:	
Traffic other than coal, coke or patent fuel	Two days[b]
Coal, coke or patent fuel	Three days[b]
At private sidings, docks, etc.:	
Traffic other than coal, coke or patent fuel	Two days[a]
Same, if reloaded	Three days[a]
Coal, coke or patent fuel	Three days[a]
Same, if reloaded	Four days[a]
At ports (shipment traffic only):	
Traffic other than coal, coke or patent fuel	Four days[c]
Coal, coke or patent fuel	Four days[c]

[a]Exclusive of the day on which wagons are placed at the trader's disposal.
[b]Exclusive of the day of receipt by the trader of notice of arrival.
[c]Exclusive of the day of arrival.

The demurrage charge, after free time, was formerly at a low rate per day, with no increase for a prolonged holding of the car. The committee now, as shown in the table below, has made the demurrage rates in most cases 100 per cent higher for each of the first two days charged for and 200 per cent higher for each subsequent day.

Charges made for the "internal use" for freight cars and tarpaulins in works, private sidings and docks have been the same as those charged for demurrage, but no free period is allowed.

COMPARISON OF OLD DEMURRAGE RATES AND THE NEW

	Old rates		New rates (for both England and Scotland)	
	Scotland	England and Wales.	For each of first two days	For each subsequent days
Ordinary freight cars	.....	1s. 6d.	3s.	5s.
Tarpaulins*	3d.	3d.	6d.	1s.
Freight cars not exceeding 16 tons capacity	1s. 6d.	2s.	4s.	6s.
Freight cars from 16 tons to 20 tons capacity	2s. 0d.			
Freight cars from 20 tons to 30 tons capacity	3s.	3s.	6s.	9s.
Freight cars above 30 tons capacity	5s.	5s.	10s.	15s.
Specially constructed freight cars:				
Above 15 and under 20 tons capacity	.....	3s.	6s.	9s.
20 tons and under 30 tons capacity	.....	6s.	12s.	18s.
30 tons and above	.....	10s.	20s.	30s.
Refrigerator and insulated cars.	.....	6s.	12s.	18s.

Note: Shillings (s) = 24 cents. Pence (d) = 2 cents.
*Tarpaulins are largely used in England to protect loads in open top cars from the weather.

134 Roads Earned Less Than Standard Return

Twenty-nine Helped Make Up Deficiency of Others—Must Elect Whether to Accept Six Months' Guaranty

WASHINGTON, D. C.

BEFORE MARCH 15 it is incumbent upon the railroad companies to decide whether they can earn more than the amount of the standard return which has been guaranteed by the government during federal control as rental for the use of the properties, or whether they shall accept a continuance of the guaranty for six months from March 1 as provided in the new transportation act. Roads which desire the guaranty are required to file with the Interstate Commerce Commission by that time a written acceptance of the provisions of Section 209 of the act, which stipulate among other things that if a railroad earns more than the guaranty it shall turn the excess into the treasury to be used in making up the deficiencies of roads that fail to earn the amount of the guaranty for the six months' period. A road may, however, retain enough to pay necessary fixed charges. If a railroad is confident it can earn more than the amount of the standard return for the next six months, and there are several roads that have done better than that during the past two years, it naturally will not file an acceptance but if it is doubtful it may want to do so in order to play safe and because the law provides for advances of part of the amount of the guaranty to meet fixed charges and operating expenses.

For the calendar year 1919, according to the condensed income account compiled by the Operating Statistics Section of the Railroad Administration, while the Class I roads under federal operation earned only 57.8 per cent of the standard return, as compared with 76.8 per cent in 1918, there were 29 roads that earned 100 per cent or more of the amount of their guaranty, while 134 roads earned less. In 1918 there were 54 roads that earned 100 per cent or more of their guaranty, while 109 roads earned less. The roads that earned more than the guaranty in 1919 were: Ann Arbor, 109.2 per cent; Detroit & Toledo Shore Line, 200.8; Grand Trunk Western Lines, 214.6; Michigan Central, 210.7;—Monongahela, 178.6; New York, Chicago & St. Louis, 182.5; Pere Marquette, 179.2; Cincinnati Northern, 155.41; Cleveland, Cincinnati, Chicago & St. Louis, 130.6; Atlanta & West Point, 213.3; Georgia, 154.5; Louisville, Henderson & St. Louis, 145.9; Richmond, Fredericksburg & Potomac, 243.1; Vicksburg, Shreveport & Pacific, 134.5; Washington Southern, 401.3; Western of Alabama, 197.5; Yazoo & Mississippi Valley, 115.9; Duluth & Iron Range, 130.9; Duluth, Missabe & Northern, 222.6; Elgin, Joliet & Eastern, 116.1; Atchison, Topeka & Santa Fe, 100.5; Fort Worth & Denver City, 154; Oregon Short Line, 105.4; Union Pacific, 138.9; Western Pacific, 188.2; Fort Worth & Rio Grande, 1576.8; Gulf Coast Lines, 111.4; St. Louis-San Francisco, 107.3; Sunset Lines, 108.3.

A table comparing the net operating income with the standard return for 1918 was published in the *Railway Age* of March 31, 1919, page 771. It showed 65 roads that earned more than the guaranty and 119 that earned less. The compilation for 1919, with comparative figures for 1918, issued by the Operating Statistics Section, from which the accompanying table is taken, covers only 163 roads.

According to this compilation the 29 companies that earned more than 100 per cent of their guaranty in 1919 contributed $46,072,389 toward making up the deficiency in meeting the standard return of the other roads, although the net result was a deficiency for the 163 roads as a whole of $377,037,000, as compared with the standard return of $892,855,395. A total of 46 roads in 1919 had operating deficits, as compared with 28 that had deficits in 1918. None of the regions of the Railroad Administration as a whole earned the standard return for the region as a whole. The highest percentage was that of the Central Western region, which earned 88.6 per cent of the guaranty. The Allegheny region earned only 19.4 per cent. In 1918 the Pocahontas and Southern regions earned more than 100 per cent.

An examination of the accompanying table, taken from the compilation of the Operating Statistics Section, indicates some interesting facts regarding the effect on the net operating income of the changes in the character or channels of traffic that were brought about during the two years of federal control as compared with the conditions of the test period on which the standard return is based. In some cases the fact that a road earned more or less than its standard return is due to diversion of traffic made by the Railroad Administration, in others to an abnormal increase or decrease in the volume of traffic in the territory served by a road, brought about by conditions resulting from the war, and in others it is due to changes in the proportion of expenses, particularly in the maintenance accounts. Some roads also were affected very differently from others by the changes in 1919 as compared with 1918.

For the 163 roads included in the table the operating revenues increased in 1919 as compared with 1918 by $259,591,792, or 5.3 per cent; the operating expenses increased $397,377,135, or 10.1 per cent; the net operating revenue decreased $137,785,343, and the net federal income decreased $169,461,738. The total operating ratio was 85, as compared with 81.4 in 1918. For maintenance of way and structures it was 15, as compared with 13.3 in 1918, for maintenance of equipment it was 23.8, as compared with 22.5; for transportation it was 42.1, as compared with 41.6. The ratio of maintenance of way and structures to operating revenues, however, ranged as high as 49 per cent for one road, as compared with 23.3, the year before, and the maintenance of equipment ratio was as high as 53.7 for one road as compared with 37.3 the year before.

The Erie, whose standard return is $15,729,068, earned only 6.6 per cent of that amount in 1919 and had a deficit in 1918. The Baltimore & Ohio earned only 18.1 per cent of its guaranty in 1919 as compared with 25.7 in 1918; the Pennsylvania lines east only 15.6 per cent as compared with 38.8 in 1918; the Illinois Central only 27.5 as compared with 79.7 in 1918; the Southern, that earned 158.2 per cent in 1918, earned only 57.1 per cent of its guaranty in 1919; the Chicago, Milwaukee & St. Paul earned only 11.6 per cent in 1919 and 14.1 in 1918. The largest percentage of the standard return earned by any road was 1576 for the Fort Worth & Rio Grande. This road of 235 miles, has a standard return of $1,301. In 1918 it had a deficit of $61,994, but in 1919 its revenues increased 44.7 per cent, while its expenses increased only 38.4 per cent and its federal income was $20,514.

The Interstate Commerce Commission on March 4 issued a notice to the carriers suggesting a form in which they shall file acceptances of the provisions of the guaranty section of the law to be signed by the president or other appropriate executive of the company and also the form of a resolution to be adopted by the board of directors authorizing the president to execute the document. The notice says the commis-

sion in receiving such acceptances does not pass upon the authenticity or authorization of the document as a valid act by the corporation but instructions are given for the proper certification of the statement of acceptance.

NET FEDERAL INCOME COMPARED WITH STANDARD RETURN. CLASS I RAILROADS UNDER FEDERAL OPERATION

TWELVE MONTHS ENDED DECEMBER 31, 1919, COMPARED WITH SAME PERIOD OF PREVIOUS YEAR

Railroad	Net federal income (See notes)			Standard return (See notes)	Per cent net federal income to standard return for entire year (See notes)	
	This year	Last year	Increase or decrease	For entire year	This year	Last year
Total, New England District	$9,775,418	$10,227,504	d $452,086	$38,901,093	25.1	26.3
Total, Central District	103,611,503	109,099,456	d 5,487,953	142,739,083	72.6	76.4
Total, Ohio-Indiana District	15,909,487	22,820,109	d 6,910,622	21,809,702	72.9	104.6
Total, Eastern Region	129,296,408	142,147,069	d 12,850,661	203,449,878	63.6	69.9
Total, Allegheny Region	28,772,799	63,634,490	d 34,861,691	148,254,966	19.4	42.9
Total, Pocahontas Region	20,212,246	37,818,305	d 17,606,059	37,108,728	54.5	101.9
Total, Southern Region	53,937,173	110,740,325	d 56,803,152	102,020,396	52.9	108.5
Total, Northwestern Region	78,422,402	92,540,188	d 14,117,786	148,454,277	52.8	62.3
Total, Central Western Region	170,121,574	182,426,498	d 12,304,924	191,978,682	86.6	95.0
Total, Southwestern Region	35,055,171	55,972,636	d 20,917,465	61,588,468	56.9	90.9
Grand total, all regions	515,817,773	685,279,511	d 169,461,738	892,855,395	57.8	76.8
EASTERN REGION						
New England District						
Bangor & Aroostook	107,731	607,177	d 499,446	1,555,775	6.9	39.0
Boston & Albany	1,951,199	2,232,916	d 281,717	4,063,131	48.0	55.0
Boston & Maine	3,577,108	1,895,400	1,681,708	9,832,491	36.4	19.3
Central New England	D 163,138	57,768	d 220,906	1,468,124	b	3.9
Central Vermont	D 871,205	D 689,469	d 181,736	828,625	b	b
Grand Trunk in New England	D 766,514	D 1,105,677	339,163	D 4,271	b c	b c
Maine Central	D 1,212,203	D 581,781	d 630,422	2,955,697	b	b
New York, New Haven & Hartford	6,929,382	7,769,005	d 839,623	17,173,367	40.3	45.2
Rutland	223,058	42,165	180,893	1,023,883	21.8	4.1
Total, New England District	9,775,418	10,227,504	d 452,086	38,901,093	25.1	26.3
Central District						
Ann Arbor	575,137	175,013	400,124	526,883	109.2	33.2
Buffalo, Rochester & Pittsburgh	D 1,075,870	1,086,378	d 2,162,248	3,276,410	b	33.2
Delaware & Hudson	2,054,575	2,451,695	d 397,120	7,409,600	27.7	32.1
Delaware, Lackawanna & Western	11,809,921	15,973,193	d 4,163,272	15,749,477	75.0	101.4
Detroit & Mackinac	D 89,596	34,304	d 123,900	310,664	b	11.0
Detroit & Toledo Shore Line	916,852	467,806	449,046	456,512	200.8	102.5
Erie (Inc. Chicago & Erie)	1,036,370	D 2,246,652	3,283,022	15,729,068	6.6	b
Grand Trunk Western Lines	2,309,600	203,930	2,105,670	1,076,017	214.6	19.0
Lehigh & Hudson River	395,718	363,664	32,054	519,371	76.2	70.0
Lehigh & New England	927,354	1,197,761	d 270,407	1,135,761	81.7	105.5
Lehigh Valley	3,776,291	6,821,131	d 3,044,840	11,318,714	33.4	60.3
Michigan Central	16,969,157	13,692,236	3,276,921	8,052,127	210.7	170.0
Monongahela	1,041,104	650,615	390,489	583,086	178.6	111.6
New York Central	48,201,701	46,035,695	2,166,006	51,739,500	93.2	89.0
New York, Chicago & St. Louis	4,004,631	3,893,167	155,464	2,218,857	182.5	175.5
New York, Ontario & Western	795,047	576,100	218,947	2,103,589	37.8	27.4
New York, Susquehanna & Western (Inc. W. H. & E.)	D 185,671	524,551	d 710,222	999,942	b	52.5
Pere Marquette	6,717,880	3,851,485	2,866,395	3,748,196	179.2	102.8
Pittsburgh & Lake Erie	3,501,821	9,880,183	d 6,378,362	8,980,219	39.0	110.0
Pittsburgh & Shawmut	D 177,302	130,435	d 307,737	613,261	b	21.3
Pittsburgh & West Virginia	D 648,908	D 319,631	d 329,277	237,010	b	b
Ulster & Delaware	D 152,754	D 57,775	d 94,979	128,000	b	b
Wabash	864,445	3,714,172	d 2,849,727	5,826,810	14.8	63.7
Total, Central District	103,611,503	109,099,456	d 5,487,953	142,739,083	72.6	76.4
Ohio-Indiana District						
Cbicago, Indianapolis & Louisville	415,931	747,799	d 331,868	1,620,259	25.7	46.2
Cincinnati, Indianapolis & Western	D 590,797	D 158,387	d 432,410	422,213	b	b
Cincinnati Northern	493,591	257,750	235,841	317,628	155.4	81.1
Cleveland, Cincinnati, Chicago & St. Louis	12,981,513	14,751,312	d 1,769,799	9,938,597	130.6	148.4
Detroit, Toledo & Ironton	D 710,545	D 717,087	6,542	225,895	b	b
Hocking Valley	1,444,287	2,614,670	d 1,170,383	2,637,167	54.8	99.1
Kanawha & Michigan	171,233	1,658,827	d 1,487,594	1,295,141	13.2	128.1
Lake Erie & Western	D 39,034	397,292	d 436,326	1,548,542	b	25.7
Toledo & Ohio Central	D 117,097	826,951	d 944,048	1,086,651	b	76.1
Toledo, St. Louis & Western	760,549	1,248,218	d 487,669	994,294	76.5	125.5
Wheeling & Lake Erie (Inc. L. & W. V.)	1,099,856	1,192,764	d 92,908	1,723,315	63.8	69.2
Total, Ohio-Indiana District	15,909,487	22,820,109	d 6,910,622	21,809,702	72.9	104.6
Grand total, Eastern Region	129,296,408	142,147,069	d 12,850,661	203,449,878	63.6	69.9
ALLEGHENY REGION						
Baltimore & Ohio (Inc. Coal & Coke)	5,066,914	7,193,131	d 2,126,217	28,031,146	18.1	25.7
Bessemer & Lake Erie	2,005,600	4,940,006	d 2,934,406	4,713,564	42.5	104.8
Buffalo & Susquehanna	D 409,326	113,043	d 522,369	591,613	b	19.1
Central of New Jersey	1,408,865	6,375,183	d 4,966,318	9,352,301	15.1	68.2
Cumberland Valley	447,030	1,848,302	d 1,401,272	1,228,967	36.4	150.4
Grand Rapids & Indiana	455,093	254,425	200,668	929,385	49.0	27.4
Long Island	2,445,212	3,915,059	d 1,469,847	3,221,949	75.9	121.5
New York, Philadelphia & Norfolk	648,692	990,008	d 341,316	996,051	65.1	99.4
Pennsylvania East	8,042,568	19,952,680	d 11,910,112	51,416,782	15.6	38.8
Pennsylvania West	5,786,456	4,464,444	1,322,012	14,992,785	38.6	29.8
Philadelphia & Reading	5,431,888	11,298,842	d 5,866,954	17,057,230	31.8	66.2
Pittsburgh, Cincinnati, Chicago & St. Louis	D 2,505,510	2,878,717	d 5,384,227	11,334,094	b	25.4
Staten Island Rapid Transit	68,655	33,941	34,714	356,824	19.2	9.5
Western Maryland	D 131,265	D 479,293	348,028	3,079,593	b	b
West Jersey & Seashore	11,927	D 143,098	155,925	952,682	1.3	b
Total, Allegheny Region	28,772,799	63,634,490	d 34,861,691	148,254,966	19.4	42.9
POCAHONTAS REGION						
Chesapeake & Ohio (Inc. C. & O. of Ind.)	7,523,378	17,060,651	d 9,537,273	13,226,983	56.9	129.0
Norfolk & Western	10,133,638	18,804,782	d 8,671,144	20,634,142	49.1	91.1
Virginian	2,555,230	1,952,872	602,358	3,247,603	78.7	60.1
Total, Pocahontas Region	20,212,246	37,818,305	d 17,606,059	37,108,728	54.5	101.9

"Net Federal Income" represents Net Operating Revenue, minus Railway Tax Accruals and Uncollectible Railway Revenue, plus or minus the net balances for Equipment Rents, Joint Facility Rents, and Miscellaneous Federal Income items (if any). Item of Prior Revenue or Expense, commonly called "lapovers," have been excluded.

Southern Region						
Alabama & Vicksburg	$264,097	$345,074	d $80,977	$322,854	81.8	106.9
Alabama Great Southern	1,498,327	2,062,786	d 564,459	1,703,180	88.0	121.1
Atlanta & West Point	539,640	660,606	d 120,966	252,995	213.3	261.1
Atlanta, Birmingham & Atlantic	D 946,458	D 572,922	d 373,536	480,000	b	b
Atlantic Coast Line	7,213,015	11,685,220	d 4,472,205	10,180,915	70.8	114.8
Carolina, Clinchfield & Ohio	1,497,762	1,162,282	335,480	1,627,963	92.0	71.4
Central of Georgia	1,583,969	3,917,977	d 2,334,008	3,408,809	46.5	114.9
Charleston & Western Carolina	171,233	549,209	d 377,976	466,921	36.7	117.6
Cincinnati, New Orleans & Texas Pacific	525,956	3,092,962	d 2,567,006	3,541,040	14.9	87.3
Florida East Coast	1,444,349	1,633,983	d 189,634	2,842,842	50.8	57.5
Georgia	1,326,143	2,256,504	d 930,361	858,622	154.5	262.8
Georgia & Florida	D 441,538	D 104,538	d 337,000	88,000	b	b
Georgia, Southern & Florida	62,593	351,763	d 289,170	511,457	12.2	68.8
Gulf & Ship Island	D 81,384	364,779	d 446,163	595,883	h	61.2
Gulf, Mobile & Northern	D 98,977	200,289	d 299,266	558,338	b	35.9
Illinois Central	4,479,526	12,981,324	d 8,501,798	16,282,374	27.5	79.7
Louisville & Nashville	11,884,568	19,568,935	d 7,684,367	17,310,495	68.7	113.0
Louisville, Henderson & St. Louis	510,724	648,071	d 137,347	343,916	145.9	188.4
Mississippi Central	D 184,901	310,921	d 495,822	308,525	b	100.8
Mobile & Ohio	D 1,025,823	244,315	d 1,270,138	2,597,478	b	9.4
Nashville, Chattanooga & St. Louis	1,242,397	4,145,298	d 2,902,901	3,182,089	39.0	130.3
New Orleans & North Eastern	187,064	990,248	d 803,184	1,204,992	15.5	82.2
New Orleans Great Northern	14,593	407,939	d 393,346	519,904	2.8	78.5
Norfolk Southern	163,670	291,453	d 127,783	1,266,871	12.9	23.0
Northern Alabama	64,343	192,542	d 128,199	150,583	42.7	127.9
Richmond, Fredericksburg & Potomac	2,763,900	3,025,529	d 261,629	1,136,974	243.1	266.1
Seaboard Air Line	1,867,961	3,658,391	d 1,790,430	6,497,025	28.8	56.3
Southern	10,642,549	29,512,202	d 18,869,657	18,653,893	57.1	158.2
Southern Railroad in Mississippi	D 70,887	D 40,397	d 30,490	6,990	b	b
Tennessee Central	D 536,168	D 2,468	d 533,700	162,734	b	b
Vicksburg, Shreveport & Pacific	454,510	342,116	112,394	337,948	134.5	101.2
Washington Southern	1,875,153	1,736,088	139,065	467,230	401.3	371.6
Western of Alabama	569,354	621,916	d 52,562	288,238	197.5	215.8
Yazoo & Mississippi Valley	4,475,913	4,499,924	d 24,011	3,862,318	115.9	116.5
Total, Southern Region	53,937,173	110,740,325	d 56,803,152	102,020,396	52.9	108.5
Northwestern Region						
Chicago & North Western	12,771,197	12,498,939	272,258	23,201,016	55.0	53.9
Chicago Great Western	1,126,605	61,009	1,065,596	2,953,450	38.1	2.1
Chicago, Milwaukee & St. Paul	3,250,867	3,933,874	d 683,007	27,945,819	11.6	14.1
Chicago, St. Paul, Minneapolis & Omaha	2,698,776	2,631,520	67,256	4,934,790	54.7	53.3
Duluth & Iron Range	3,082,978	3,824,716	d 741,738	2,355,242	130.9	162.4
Duluth, Missabe & Northern	11,401,721	12,495,342	d 1,093,621	5,122,051	222.6	244.0
Duluth, South Shore & Atlantic	D 22,517	267,704	d 290,221	562,348	b	47.6
Elgin, Joliet & Eastern	3,322,507	4,781,037	d 1,458,530	2,862,177	116.1	167.0
Great Northern	12,827,280	12,368,069	459,211	28,666,681	44.7	43.1
Mineral Range	D 107,154	10,827	d 117,981	144,006	b	7.5
Minneapolis & St. Louis	D 314,698	238,577	d 553,275	2,706,994	b	8.8
Minneapolis, St. Paul & S. S. Marie	5,057,635	3,925,862	1,131,773	10,578,977	47.8	37.1
Northern Pacific	18,450,790	28,317,433	d 9,866,643	30,057,760	61.4	94.2
Oregon-Washington R. R. & Nav	3,224,299	4,490,859	d 1,266,560	4,491,883	71.8	100.0
Spokane, Portland & Seattle	1,652,116	2,694,420	d 1,042,304	1,871,083	88.3	144.0
Total, Northwestern Region	78,422,402	92,540,188	d 14,117,786	148,454,277	52.8	62.3
Central Western Region						
Arizona Eastern	588,433	1,479,821	d 891,388	1,242,475	47.4	119.1
Atchison, Topeka & Santa Fe	40,060,757	41,709,460	d 1,648,703	39,867,072	100.5	104.6
Chicago & Alton	D 244,395	1,817,094	d 2,061,489	3,178,315	b	57.2
Chicago & Eastern Illinois	D 423,466	1,560,806	d 1,984,272	2,946,001	b	53.0
Chicago, Burlington & Quincy (Inc. Q. O. & K. C.)	25,428,088	25,089,199	338,889	33,390,080	76.2	75.1
Chicago, Peoria & St. Louis	D 868,051	D 528,860	d 339,191	127,540	b	b
Chicago, Rock Island & Pacific (Inc. C. R. I. & G.)	9,067,411	9,217,002	d 149,591	15,880,681	57.1	58.0
Chicago, Terre Haute & Southeastern	D 277,560	769,487	d 1,047,047	922,785	b	83.4
Colorado & Southern	1,644,897	2,868,352	d 1,223,455	2,481,212	66.3	115.6
Denver & Rio Grande	6,113,737	5,492,884	620,853	8,319,377	73.5	66.0
Denver & Salt Lake	D 945,793	D 961,458	15,665	353,290	b	b
El Paso & Southwestern	2,993,415	4,945,206	d 1,951,791	4,145,102	72.2	119.3
Fort Worth & Denver City	2,912,058	1,824,785	1,087,273	1,891,386	154.0	96.5
Los Angeles & Salt Lake	3,353,127	2,791,315	561,812	3,414,751	98.2	81.7
Northwestern Pacific	1,103,594	1,485,017	d 381,423	1,338,000	82.5	111.0
Oregon Short Line	10,754,273	10,723,916	30,357	10,204,619	105.4	105.1
St. Joseph & Grand Island	D 48,318	D 103,787	55,469	373,811	h	b
Southern Pacific (Pacific System)	32,677,799	34,016,787	d 1,338,988	36,171,354	90.3	94.0
Toledo, Peoria & Western	D 217,656	D 4,377	d 213,279	159,740	b	b
Union Pacific	32,873,256	35,629,321	d 2,756,065	23,670,741	138.9	150.5
Western Pacific	3,575,968	2,604,528	971,440	1,900,350	188.2	137.1
Total, Central Western Region	170,121,574	182,426,498	d 12,304,924	191,978,682	88.6	95.0
Southwestern Region						
Fort Worth & Rio Grande	20,514	D 61,994	82,508	1,301	1576.8	b
Gulf Coast Line	1,270,855	1,928,596	d 657,741	1,140,676	111.4	169.1
Gulf, Colorado & Santa Fe	2,466,881	2,854,270	d 387,389	2,828,218	87.2	100.9
International & Great Northern	D 1,404,787	1,378,645	d 2,783,432	1,394,946	b	98.8
Kansas City, Mexico & Orient System	D 1,244,673	D 692,245	d 552,428	150,000	b	b
Kansas City Southern (Inc. T. & F. E.)	2,189,359	3,128,053	d 938,694	3,535,427	61.9	88.5
Louisiana & Arkansas	D 146,634	96,232	d 232,866	359,362	b	24.0
Midland Valley	343,136	766,580	d 423,444	444,346	77.2	172.5
Missouri & North Arkansas	D 664,377	D 115,861	d 548,516	175,000	b	b
Missouri, Kansas & Texas	4,562,769	5,215,538	d 652,769	5,853,831	77.9	89.1
Missouri, Kansas & Texas of Texas	D2,413,445	D 790,996	d 1,622,449	621,773	b	b
Missouri, Oklahoma & Gulf	D 1,041,628	D 529,613	d 512,015	D 83,603	h c	b c
Missouri Pacific	4,363,698	11,821,976	d 7,458,278	14,206,814	30.7	83.2
St. Louis-San Francisco	14,695,141	11,247,194	3,447,947	13,690,213	107.3	82.2
St. Louis-San Francisco & Texas	D 179,720	D 117,899	d 61,821	D 332,953	b c	b c
S. Louis Southwestern	3,070,880	3,681,615	d 610,735	3,355,749	91.5	109.7
St. Louis Southwestern of Texas	D 1,508,721	D 338,255	d 1,170,466	555,165	h	h
San Antonio & Aransas Pass	D 1,141,723	D 126,023	d 1,015,700	456,684	h	h
Sunset Lines (Inc. H. & T. C. and H. E. & W. T.)	9,208,659	13,836,811	d 4,628,152	8,503,128	108.3	162.7
Texas & Pacific	3,621,573	3,719,146	d 97,573	4,107,432	88.2	90.5
Trinity & Brazos Valley	D 612,360	D 430,238	d 182,122	63,158	b	2
Wichita Falls & Northwestern	D 440,226	D 488,896	88,670	145,245	b	b
Total, Southwestern Region	35,055,171	55,972,636	d 20,917,465	61,588,468	56.9	90.9
Grand total, all regions	515,817,773	685,279,511	d 169,461,738	892,855,395	57.8	76.8

Operating expenses of 1918 do not include those month's proportion of retroactive wage payments made and accrued in subsequent months and are, therefore, understated by $30,125,313. Operating expenses of 1919 contain retroactive wage payments applicable to prior months and are, therefore, overstated by $30,193,602.

"a"—Less than one-tenth of one per cent.

"b"—Per cent not computed as Net Federal Income this year is a deficit.

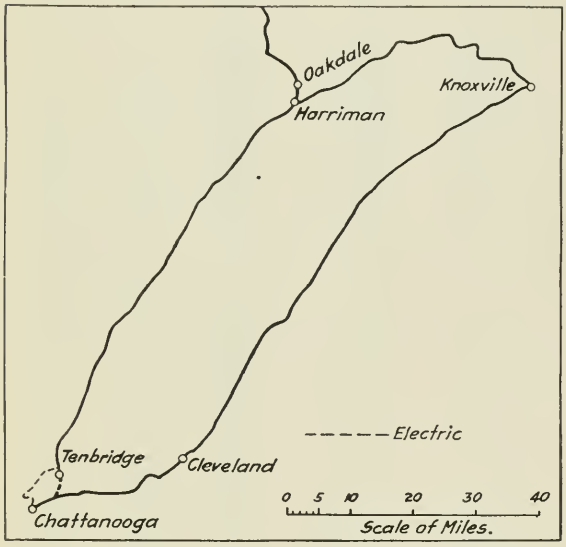
"c"—Per cent not computed as Standard Return is a deficit.

"d"—Decrease.

"D"—Deficit.

Detouring for Five Months

BECAUSE OF THE CONDEMNATION of the bridge over the Tennessee river, five miles north of Chattanooga, the trains of the Cincinnati, New Orleans & Texas Pacific (Southern Railway System) had to be sent around by way of Knoxville every day from August 9, 1919, to January 19, 1920; and the officers of the road think that the operation of the Coster and the Knoxville divisions, single track, during that period has set a new and high record for the movement of trains over a single-track line. The nearest convenient point for diverting southbound trains was at Oakdale, four miles north of the junction of the C. N. O. & T. P. with the Coster division. The lines over which trains were detoured were called upon to handle almost double the normal number of trains. In the period named there were moved between Oakdale and Knoxville 6,539 trains, an average of over 40 a day; and between Knoxville and Chattanooga 7,318 trains, an average of over 45 a day. The heaviest movement on any one day between Knoxville and Chattanooga was 62 trains, and between Oakdale and Knoxville 52 trains, in addition to 20 movements of helper engines. between Knoxville and Chatanooga was 55.6 per day.



Map Showing Route Taken by Cincinnati, New Orleans & Texas Pacific Trains Detoured Through Knoxville

During the period there were handled between Oakdale and Knoxville 2,369 passenger trains (739 C. N. O. & T. P. and 1,630 Southern) and 4,240 freight trains (1,748 C. N. O. & T. P. and 2,492 Southern); between Knoxville and Chattanooga 2,695 passenger trains (739 C. N. O. & T. P. and 1,956 Southern) and 4,623 freight trains (1,748 C. N. O. & T. P. and 2,875 Southern). In addition, there were 3,000 helper movements between Oakdale and Knoxville.

All of this train service throughout the five months was accomplished without serious accident or delay, and the management has congratulated the men in all departments, transportation, mechanical and roadway, on a very creditable record; and the men are told that they have rendered loyal and efficient service throughout the entire movement.

Way-station passengers between Oakdale and Chattanooga over the direct line were carried by trains, drawn by light locomotives, which were run from Tenbridge over a local electric line, with a terminus on Market street, Chattanooga, about one mile from the Southern Railway station. The normal passenger traffic of the C. N. O. & T. P. between Oakdale and Chattanooga is five through and two local trains each way daily.

The relative situations of the different places are shown in the sketch. By the direct line from Oakdale to Chattanooga the distance is 84 miles. That portion of the road south of the bridge is shown in a broken line. The light broken line at the left is the electric road over which the Southern ran its local passenger trains. The length of the detour was 166 miles; Oakdale to Knoxville, 56 miles, and Knoxville to Chattanooga, 110 miles. Between Oakdale and Knoxville there are seven passing tracks. The heavy trains were each drawn by two engines with 22-in. cylinders, taking 2,000 tons eastward and 1,500 tons westward. The eastbound trains had to have helpers over a two per cent grade for 16 miles. The line between Knoxville and Chattanooga has lap sidings at most of the stations. On this line Mikado locomotives were used, hauling 2,000 tons westward and 1,600 tons eastward. There are several grades of one per cent. The manual block system is in effect throughout these lines.

I. C. C. Prepares for Rate Advance

WASHINGTON, D. C

THE INTERSTATE COMMERCE COMMISSION has itself taken the initiative in opening the prospective general rate advance case, which will be necessary to put the railroads on a self-sustaining basis after the expiration of the six months' guaranty period provided by the new transportation act, by announcing a hearing at Washington on March 22 for the purpose of considering the procedure to be adopted to comply with the rate-making section of the law which requires a return of 5½ or 6 per cent upon the aggregate value. This answers numerous queries as to whether it would be necessary for the railroads to start the procedure by filing with the commission the application for a general advance in freight rates on which a committee of the Association of Railway Executives has been at work for several months. The commission's announcement was made in the form of a notice "to all interested parties" on March 4, in which, after quoting from the provisions of the rate-making section, the commission says:

"On March 22, 1920, at 10:30 a. m., the Interstate Commerce Commission will hear in its hearing room at Washington, D. C., those who desire to be heard with respect to matters required to be done by the commission, pursuant to the above statutory provisions, and who make seasonable application for time as provided below.

"The subjects for discussion are:

"1. Whether for the purpose of said section 15(a) the rate adjustment shall be made for the carriers as a whole or by rate groups or territories to be designated by the commission, and if the latter, what rate groups or territories should be so designated.

"2. What methods should now be employed under section 15(a) for determining the aggregate value of the railway property of the carriers as a whole, or of the carriers as a whole in each of such rate groups or territories.

"All persons desiring to be heard should so notify the chief, Bureau of Dockets, Interstate Commerce Commission, Washington, D. C., on or before March 20, 1920, preferably by telegram, stating the amount of time sought and naming any carriers, shippers, organizations, state commissions or other bodies on whose behalf they may appear."

LET US HAVE DONE with the thumb plans, and the Plumb plans, and all the other fool plans, and get out and Americanize the railroads.—*Labor and Industrial Journal, Seattle, Wash.*

E. E. Clark Elected Chairman of Interstate Commerce Commission

WASHINGTON, D. C.

EDGAR E. CLARK, the senior member of the Interstate Commerce Commission, was elected chairman of the commission on March 8, succeeding Clyde B. Aitchison, after Robert W. Woolley and Joseph B. Eastman had in turn been elected, in pursuance of the commission's policy of rotating the office in the order of seniority, and had each declined. A delicate problem which has caused some agitation about the commission's offices for some time was thus solved gracefully and harmoniously.

Commissioners Woolley and Eastman explained that they had declined the honor of presiding over the commission and being its spokesman in public for a year because they had both opposed the legislation under which the commission is now acting and while they now intend to do everything in their power to make the administration of the new law a success they felt it might have a bad psychological public effect to have the first chairmanship after the enactment of the law held by a man who had opposed the termination of federal control. They also expressed a feeling that with the manifold new duties and responsibilities created for the commission by the transportation act the chairmanship ought to go to the most experienced instead of the least experienced of the commissioners and also that it was particularly fitting that the office should be held by Commissioner Clark because he had stood forth as the proponent of the legislation in representing the commission as chairman of its legislative committee at the hearings before the Congressional committees.

Edgar E. Clark

Commissioner Woolley has been a member of the commission for two and a half years and was next in line for the chairmanship because all of the other members had served as chairman in turn except Commissioner Eastman, who has been a member for only about a year, although he had had previous experience, as a member of the Massachusetts Public Utilities Commission, in dealing with affairs such as come within the commission's jurisdiction. Commissioner Clark has been a member since 1906.

The commission announced the result of the election in the following statement:

"The Interstate Commerce Commission, in pursuance of the policy adopted by it January 13, 1911, for rotating the office of chairman annually in the order of seniority of the members of the commission, today elected Commissioner Robert W. Woolley as chairman in succession to Clyde B. Aitchison, whose year of service in that capacity will expire March 16. Commisioner Woolley declined: whereupon the commission elected Commissioner Joseph B. Eastman its chairman. As Commissioner Eastman likewise declined, the commission elected Commissioner Edgar E. Clark, its senior member, as chairman. His term, which commences March 17, was made to run until June 30, 1921, to make the term of chairman coterminous with the government's fiscal year. The action of the commission indicated was unanimous, in all regards."

The plan of electing the chairman each year in rotation was adopted by the commission after the resignation of Martin A. Knapp, who had served as chairman for several years, had raised a question as to whether any of the commissioners should be made permanent chairman. At that time President Taft suggested the selection of Mr. Clark but the rotation rule was adopted and Commissioner Clements was elected. The succeeding chairmen have been Commissioners Prouty, Clark, Harlan, McChord, Meyer, Hall, Daniels, and Aitchison.

Mr. Clark was born February 18, 1856, at Lima, N. Y., and was in railway service from 1874 to 1889 as a brakeman and conductor. From 1889 to 1890 he was vice-president of the Order of Railway Conductors and from 1890 to 1906 he was president of the order. While in this position he was appointed a member of the Anthracite Coal Strike Commission in 1902. He was appointed a member of the Interstate Commerce Commission in 1906 by President Roosevelt as a representative of the labor interests and during the first two years of his connection with the commission he was on several occasions chosen as the representative of labor organizations in wage arbitration proceedings.

For several years, however, perhaps because of his increasing responsibilities as one of the most experienced of the commissioners in its all around activities, he has been less closely identified with labor matters and has not been regarded as in any sense a representative of the labor organizations. Commissioner McChord has been more directly identified with those phases of the commission's work in which the labor organizations are particularly interested, through his supervision of the work of the safety and locomotive inspection bureaus in connection with accidents and safety appliances. Commissioner Clark has been more closely identified with transportation matters, although for several years he was particularly in charge of tariff matters and did much valuable work along the line of simplification of tariffs.

In 1917 he was made an ex-officio member of the Railroads' War Board.

When Mr. Clark was reappointed a member of the commission on December 31, 1912, by President Taft, the confirmation was delayed by the Senate, along with other appointments, until after March 4, when he was reappointed by President Wilson. He was then elected chairman of the commission. In addition to his long experience with the commission and the high reputation he enjoys among all classes interested in its work, Mr. Clark also has the distinction of being the only practical railroad man among the commissioners and he is one of three of the present commissioners who has not been a state railroad commissioner.

With Chairman Aitchison and Commissioner McChord,

Mr. Clark has recently been serving on a special committee appointed by the commission to study the new railroad law in relation to the new duties and authority it imposes upon the commission and to plan for its administration.

Systematizing the Handling of Labor Conference Boards

By W. I. Finch

A METHOD OF HANDLING the proceedings of conferences with labor unions, which is equally adaptable to other conferences, has been put into practice with very beneficial results by a prominent Eastern road. The advantages gained are (a) Full information and preparation as to what is to be discussed. (b) Limited meetings and quick disposition of cases. (c) Prompt issuance of proceedings, in fact issuing them before adjournment, if desired, to those in attendance at the conference. (d) Positive carrying out of each decision or agreement rendered. (e) Proper disposition of the various decisions, agreements and conclusions so they may be individually located in the future without delay and with all related papers.

The underlying principles are simply treating each case separately in the record and making sufficient copies to keep all files supplied. Assuming that the conference is between the head of the mechanical department and the system shop labor committee, for example, when the committee requests the conference it is asked to submit a list of subjects to be discussed. Any subjects to be introduced by the railroad officers are also listed. These two lists are combined, the subjects or cases consecutively numbered and issued to all who are to be in attendance at the conference representing either side.

Incidentally and preferably, it may occur that regular conferences are held monthly. In such event the cases are numbered consecutively from one upward commencing on the first of the year. A case always bears the same number throughout the year regardless of the number of conferences at which discussed. If further designation is desired initials representing the month and figures representing the year may be suffixed to the case number, as 5-FB-AG-19, meaning that case 5 was discussed in February and August, 1919. This number scheme has been found to be advantageous in some cases.

It is required of the labor union committee that no matters be brought into the conference that have not previously been taken up with local officers. When the local officers who are to attend the conference receive their lists they further investigate and write up separately each case, mentioning any cases not previously taken up with them by the local committees.

Simultaneously with the completion of the lists, each case as briefly presented (in five or six lines) is written up on a separate sheet of paper of letter size. The summary appears at the top and this sheet is used for taking notes during the conference on this case. It is attached to all previous papers on the subject and filed in the correspondence file, a record of the file number having previously been made on the master copy of the list of cases for that conference. Data collected between the time the lists are issued and the conference is treated as correspondence and attached to each individual file but under this note sheet.

On the day prior to the conference all of these individual cases with all papers in each are taken from the correspondence file and reviewed in a preliminary meeting of the railroad officers who will attend the conference. The cases are arranged in numerical order. If old cases are re-opened they are placed in their proper numerical order and thereby disposed of before the new cases; for example, the cases in the December, 1919, conference may comprise:

Shop Federation case 4-FH-AP-19—Classification and rate for . . . . . (old case discussed in conference of February and April, 1919, and now re-opened).
Shop Federation case 25-MA-19—Claim of . . . . . (old case originally discussed in conference May, 1919, and now re-opened).
Shop Federation case 98-DC-19—Claim of . . . . . (new case first discussion).
Shop Federation case 99-DC-19—Jurisdiction of work . . . . . (new case first discussion).
Shop Federation case 100-DC-19—Protection of men at . . . . . (new case first discussed).

On the day of the conference the cases are handled in the order of the list, which is the numerical order. Cases not previously announced as above stated are not admitted. As each case comes up, complete data, separate from the data on any other case, is available in a concise form. On top of each of the files of papers is the conference note sheet with the case numbered and briefly stated as originally presented at the top, also with necessary temporary notes and references at the side. As the discussion of the case proceeds additional points, if any, that develop are briefly noted under the description of the original case and the decision is stated about half way down the sheet.

When a decision is made a notation is entered on the note sheet of the files in which such excerpts are desired. The object of this is to prepare for thoroughly spreading the case in the files as later described. The order of cases and the exclusion of any not previously settled must be strictly adhered to. As each case is closed the papers with the note sheet are passed to the typist for writing up, or held for review by the railroad officers at recess. When the typist receives the cases they are written on stencils in consecutive numerical order and checked and as each page is completed it is run off on a duplicating machine a sufficient number of copies being made for all requirements, as previously determined. The cover sheet, containing the names of those attending the conference and the hours at which the conference is opened and closed, is made up complete except the closing hour, run off, and the closing hour inserted when known by a rubber stamp or pen. When the last case is completed and run off all the sheets are combined, and are then ready for distribution if desired during the few minutes of idle conversation that usually follows such a conference. If the hours of conference are set between rigid limits it also aids in the prompt issuance of the proceedings.

After the conference, to the individual file of papers on each case a copy of the page of the proceedings containing that case is attached and the papers returned to the proper correspondence file complete in all details and ready quickly for future reference when information on any particular subject is sought, without the need for gathering papers from several sources including what transpired at the conference. A master file copy of the proceedings with proper correspondence file numbers for each case noted thereon is filed with the proceedings of other conferences. A subject card index for all cases is a valuable adjunct for quickly finding cases that are months or years old.

Each decision or agreement not completed at the time of the conference may be carried along by this method to a conclusion concisely and independently of any other case, the same as any matter of uncompleted correspondence. If all papers on subjects discussed at a conference are kept with the complete conference proceedings and so filed, it is invariably true that they cannot be located a month hence if the subject happens to come up in another way. This is avoided by the method described.

VALDOSTA, GA., NEEDS A UNION STATION, according to the Chamber of Commerce and business interests of Valdosta. A campaign has already been started to push the proposition.

A Scientific Study of Railway Track Under Load*

Second Progress Report, Covering Extensive Field and Laboratory Tests, Begun in June, 1914

In Two Parts: Part II. Track Depressions

In the first progress report of the committee the general question of the depression of track under load was considered and the effect of the make-up and condition of the track structure upon stresses in rail and distribution of load among the ties was discussed. In connection with the tests to determine the flexural action of ties in track tests have been made to obtain the depression of the track under the conditions which obtained when these tests of ties were made.

In the tests of track depression made in 1918 the load was furnished by cars loaded in such a way as to give the desired weight on the track at one end of the car. The end of the car to be used in the test was weighed on track scales. In the use of the data of the tests it is assumed that each wheel of the car truck carried one-fourth of the weight so found. In the tests on the Illinois Central three loads were used, 100,000, 53,000, and 18,000 lb. on a single truck; that is, 25,000, 13,250 and 4,500 lb. on each of the four wheels of the truck. The smallest load was taken as being sufficiently heavy to bring the tie to a full bearing on its bed and to eliminate any play which may exist between rail and tie and tie and ballast. The wheel base of the truck was 5 ft. 6 in. The distance between trucks (31 ft. center to center for the car giving loads of 100,000 and 53,000 lb. and 29 ft. for the one giving 18,000 lb.) was such that the load on the trucks at the farther end of the car did not have a large effect upon the track depression at the middle of the length of the rail, except on Section *K* and on cylinder ballast (alternate joints) where the load was placed at the quarter points of the rail.

The tests were made on the main line of the Illinois Central on sections of track marked *B*, *C*, and *K*. The ties were 6-in. by 8-in. by 8-ft. sawed oak. The rails on Sections *B* and *C* was 85-lb. rail of A. S. C. E. section, and on Section *K* was 125-lb. rail. The main track had not been tamped for some time, and although only passenger trains used it ordinarily, the track was not in good surface condition. The track depressions found and the flexural action of the ties go to show looseness and play between tie and ballast.

On Section *B* tests were made at two locations (adjoining rails) designed *B*-1 and *B*-2. This section has 12 in. of stone ballast. On Section *C* the two locations (also on adjoining rails) were designated *C*-1 and *C*-2. This section has 6 in. of stone ballast. At Section *K* the ballast is 24 in. deep.

As would be expected, the stiffer rail (125-lb.) gives a wider distribution of load and a smaller maximum tie reaction. By the analysis for the conditions of the test, the reaction of the tie at a wheel is calculated to be 13 per cent of the load on the truck. The depression profiles are regular, and nearly the same for the two rails, as might be expected with the stiffer track.

The amount of the play between rail and tie and tie and ballast shown by the load-depression diagrams ranged from 0.06 to 0.18 in. (untamped track). On some of the sections the amount varied considerably throughout the length carrying the load, say, 0 to 0.10 in., showing a great diversity in the bearing of the several ties. The condition of the bearing at the two sides of the track also differed considerably. These facts will be found to be significant when the discussion of the flexure of ties is made. It is true, of course, that in places away from the test sections, which had ties of uniform dimension and spacing, the track play was greater and more variable, as could be observed at the time trains were passing.

The values of *u*, the modulus of elasticity of rail-support, obtained from the test data for locations *B* and *C*, range from 900 to 1,300 lb. per in. per in., with an average value of 1,100. The value at location *B*-2, after the track had been tamped slightly, was about 1,200. The value at location *K* (24 in. of ballast not recently tamped) was about 1,200. The value for the test on cinder ballast was 1,000, although it must be borne in mind here again that this track was not in good surface.

Tests for track depression were also made on the Chicago, Milwaukee & St. Paul. The loads on the truck at one end of a car were 100,000, 68,000 and 37,000 lb., which were assumed to be equally divided among the four wheels of the truck. The wheel base of the truck was 5 ft. 6 in., and the distance center to center of trucks was 28 ft. 10 in., 29 ft., and 25 ft. 11 in., respectively, for the cars giving the loads named above. As the rails were laid with alternate joints, the center of the trucks was placed at the quarter points of the rail.

On the main-line track at Deerfield, Ill. (called by the railroad company Class A track), the rail was 100-lb. A. S. C. E. section. The ties were mostly hewn red oak ties, zinc-chloride treated, though perhaps 20 per cent were sawed ties which had replaced old ties. The hewn ties were variable in width, ranging from 8 to 11 in.; the sawed ties were 8 in. wide. Part were 7 in. thick and 8 ft. 6 in. long, and part 6 in. thick and 8 ft. long. The ties were spaced about 20 in. center to center. The spacing was fairly uniform. The ballast was bank-run gravel, 45 per cent of which passes a ¼-in. sieve. The depth of ballast was about 36 in. In all cases the shoulder was adequate to give full support at the end of the tie. The track surface was in good condition, but it had not been tamped for some months.

On the branch-line track at Libertyville (called by the railroad company class B track) the rail was 75-lb. A. S. C. E. section. The ties were mostly hewn soft wood ties, quite irregular in shape, but 20 per cent were sawed ties, both oak and soft wood. The sawed ties were 6 in. by 8 in. by 8 ft., and the hewn ties were somewhat wider. The ties were spaced 20 to a rail length of 33 feet. The ballast was gravel about 36 in. deep. Due to the existence of the passing track, there was little slope on one side of the track. On the other the ballast sloped from 3 in. below the top of tie at its end at a 1 to 2 slope, forming a less effective support than was found on the other side. The track surface was in indifferent condition, the track not having been tamped for some time. At places this track had been built over soft spots, which at times had given trouble by subsidence.

The value of *u*, the modulus of elasticity of rail-support obtained from the track depression profiles, is about 2,000 lb. per in. per in. for class A track, and 900 for class B track. The value for class A track is materially higher than that found in the Illinois Central tests. Several factors may contribute to this—longer ties, broader ties (more bearing area in a rail length), gravel ballast instead of limestone ballast,

*In two parts. See the *Railway Age* for March 5, page 670 for part I.

greater depth of ballast, or better supporting conditions at ends of ties.

Depression, Flexure and Bearing Pressure of Cross Ties

In railroad track of ordinary construction the cross-tie performs many important functions—it bears the load transmitted from the rails, makes a definite connection and spacing between the two lines of rails, transmits the pressure to the bed of ballast and by its properties as a beam distributes this pressure along its length. Thus, it is subject to compression under and in the vicinity of the rail, to tension or compression as a structural connection between rails, and to beam action in giving distribution to bearing pressures along its bed. Of these the last bears the most important relation to the problems here considered; the others will not be treated at this time.

The cross-tie has many features which make it an acceptable part of ordinary track construction. It has great flexibility in meeting the varied and diverse requirements of both ordinary and unexpected track and load conditions. It gives facility in providing, maintaining or shifting the gage, line and surface of track and in tie renewals and other changes in track, and is accepted as an economical and reliable element of ordinary track construction. It is known to be effective under very imperfect track conditions, being used where great variation of size and quality of tie, depth and quality of ballast, and condition of tamping of track may be expected to cause marked differences in the requirements put upon it. Quantitative data on the flexural action of the tie and the way its loads are distributed along its bed, as well as of its depressions under load, therefore should be of considerable value.

The use of pressure-measuring devices between tie and ballast gave general information and served fairly well in the laboratory investigation; but the number required in the length of one tie to give the needed information and the large number of ties required to determine the run of conditions, the disturbance of the track through inserting the instruments with the uncertainty as to whether the resulting condition of track was representative of normal track, and the chance for instruments becoming deranged in the interval elapsing until the track would seem to have reached normal conditions, all combined to make the direct measurement of bearing pressure impracticable as a method of getting the information desired on this subject.

Of indirect methods the measurement of the strains or deformations along the length of the tie as produced by its bending was considered, but variations in the properties of the wood, especially under field conditions, as well as uncertainties of other kinds, rendered this method impracticable.

A trial was then made of a method of measuring the curve of flexure of the tie as it bends under the applied lead in the track and making use of the relations between flexure, bending moment, and load as derived by mechanics of materials for a beam having the properties of the timber tie used. The measurements made included also the depression of the tie below its original position, as produced by the compression of the ballast and roadway or other conditions. This method is manifestly imperfect, having a number of limitations and uncertainties, but it is not difficult to use, the track conditions may be taken as they are found, and the number of tests may be chosen to cover a variety of conditions of ties and track. The measurement of tie depressions also gives information of value in the study of stresses in track. The method was used therefore as being the best known method applicable to the conditions of the track tests. It has given data of value, although certain uncertainties and inconsistencies are discernible in the results, especially those resulting from the local bearing compression in the vicinity of the rail. The details of the method will be described in the following article. The consideration of the bending moments will be given in a succeeding article. Here it is only necessary to note that the curvature of the curve of flexure of the beam at any point is proportional to the corresponding moment and stress—the sharper the curve the greater the moment and the stress.

In measuring the depression and flexure of the ties a stiff wooden reference bar was placed under the rails between ties and close to the one on which measurements were taken. At each end of this bar was attached an iron cross-bar about 2 ft. long, the ends of which rested on two substantial stakes well driven into the ground, giving a firm support to the apparatus. These stakes were 7 ft. or more from the center of the track. Attached to the main bar were iron brackets which projected over the tie. To each bracket was attached a piece of small angle iron; on this was bolted an Ames dial gage which reacted against a tack driven at the mid-point of the width of the tie and served to measure the depression of the time at that point. The arrangement of the attachment permitted adjustments vertically and horizontally.

Before applying a load the dials were adjusted to read zero. For each load applied the dials were read to the nearest half-thousandth of an inch. When the load was removed a small depression was indicated by the dials and they were again set at zero. The same load was again applied, the process being continued until three consistent sets of readings were obtained. The average of these sets of readings was used.

In the tests on the Illinois Central nine dial gages were used—five between rails and two on the outer side of each rail. This number of points was found not to determine the curve of flexure as accurately as was desired, and in the later tests made on the Chicago, Milwaukee & St. Paul the number of dials was increased to 13, 7 between rails and 3 on the outer side of each rail; this improved the character of the data very much. In each case the dials next the rails were 1 in. to 2 in. away from the base.

The loads were given by means of loaded cars, as already described for the tests of track depression. The leading wheels of the truck carrying the load were placed directly over the tie under test. The amount of the load considered to bear on the tie under test was taken from the results of the track-depression tests at the given location. The smallest load used was generally more than sufficient to overcome the play between tie and ballast, though of course this should not be taken to mean that under this condition the pressure on the bed of ballast is distributed uniformly along the length of the tie. The largest load used gave a tie reaction considerably less than that which would be caused at and between drivers by an ordinary Mikado or Santa Fe type locomotive. In the study of the data the largest load was generally used, though the smaller loads have given valuable information on the action of the tie.

The readings in all the tests checked very closely and the results are concordant. The effect of the rail bearing in compressing the fibers adjacent to the rail is unknown, but the reading of the dials next to the rail must include the general depression and bending of the time and also a third element—the influence of the local downward compression of the tie due to the bearing pressure of the rail; the latter will have to be taken into account in interpreting the curves of flexure as related to bending moments and stresses.

The ties in the main line of the Illinois Central test track were sawed oak ties 5 in. by 8 in. by 8 ft. The tests on the freight lead were made on two hewn oak ties about 8¾ in. by 6¼ in. by 8 ft. and a sawed oak tie 6 in. by 8 in. by 8 ft. The location of the tests on the Chicago, Milwaukee & St. Paul has already been described. Sawed ties were selected for test because of their uniformity of cross-section.

The ties on class A track were 7 in. by 8 in. by 8 ft. 6 in.; those on class B track, 6 in. by 8 in. by 8 ft. Tie plates 8 in. by 9 in. were on all ties in the class B track.

In some of the sections on the Illinois Central there is a scant amount of ballast above the bottom of the tie near its ends, particularly on the outer side of the track. On the Chicago, Milwaukee & St. Paul, as has already been pointed out, the sections are such that there was opportunity for full support at the end of the tie. The condition of the track surface has been described under "Track Depressions"; it may be well again to call attention to the fact that the track in all the test locations had not received a general tamping for some time and that in some locations it was apparent that the track was in indifferent condition as to surface and tamping, and thus furnished opportunity to determine depressions and flexure under other than best conditions, and really under conditions frequently found in practice.

The load on a single tie, as determined by the track-depression profiles, ranged from 11,000 to 18,000 lb.; perhaps averaging 15,000 lb. The tie depression under this load varies from 0.35 in. to 0.5 in.

An examination of the diagrams of depression and flexure brings out a variety of conditions. There is bending of tie in every case, though the form of the curve varies greatly. It is evident that there must be great differences in the way in which the bearing pressure varies along the length of the tie under the conditions to which ties are subjected. In many ties there is play between the tie and its bed at one point or another, or even over a considerable portion of its length, which not only gives unevenness of track depression but increases the intensity of bearing pressure at some point along the tie and gives added bending stresses in the tie. There is a great variety of the distribution of bending moments along the tie—the bending moment at a section at the middle of the tie may be positive in one tie and negative in another tie.

The conditions just referred to are ordinarily termed endbound and centerbound. The latter condition is very common; in fact, the upward curvature at the middle and a large negative moment accompanying it may be expected in most track after traffic has had its effect upon track condition. Change in position of the ballast under traffic conditions will soon modify the distribution of bearing pressure. Even though the tamping is restricted to a space adjacent to the two rails, the depression of the track under load may be expected to bring some bearing pressure at the middle of the tie length, and the action of a repetition of applications of pressures of high intensity over the tamped portion will cause a movement of the ballast and a redistribution of bearing pressures.

The condition of the ballast section at and beyond the end of the tie seems to have a modifying influence upon bearing conditions. The scantness of the shoulder in Section *B* of the Illinois Central evidently contributed to the loose ends and play of many of these ties, especially those whose looseness was noticeable by inspection; the effect of this probably becoming apparent only after traffic had produced appreciable changes in the position of the particles of ballast. The more complete support at the end of the tie in the ballast section on the Chicago, Milwaukee & St. Paul gives conditions which are quite different.

As the amount of depression affects the modulus of elasticity of rail support, u, it may be expected that the condition of tie and ballast will be influential factors. In determining u, the play in track depression was omitted from the values, though of course it enters into the development of stresses in the rail and is known to produce higher stresses than would otherwise occur, especially if the play varies from tie to tie. The bending of the ties, however, and especially that under the rail, tends to make low values of u.

Attention is called to the fact that the deflections in the flexure curve of the 7 by 9-in. ties are much smaller than those in the 6 in. by 8-in. ties; for the same loading the deflections may be expected to vary inversely as the moment of inertia of the section and the moment of inertia of the 7 in. by 9-in. tie is nearly 70 per cent greater than that of the 6 in. by 8-in .tie. It may be added that the greater stiffness of tie should help in making more uniform pressures along the length of the tie.

The composite diagram for the ties on cinder ballast gives a good appearance, symmetrical and with apparent good end bearing. The individual ties give markedly different curves, tilting first to one side of the track and then to the other. This is due not only to the ballast and condition of tamping, but to the fact that the ties were unevenly spaced and did not always lie at right angles to the rails. The change from the greatest depression occurring at the end of a tie at one side of the track to the greatest depression at the other side of the track within a short distance was not confined to the freight tracks and cinder ballast. The tilting of the tie to one side of the track, however, was more common where the shoulder of ballast was scant.

If the intensity of the tie reaction were directly proportional to the measured tie depression it would be easy to find the distribution of the tie reaction along the length of the tie by the use of the diagrams of tie depressions. Two variations from this law of distribution of pressure are known to exist; (*a*) due to the condition of ballast bed under the tie, the unloaded tie may not touch its bed at all points, and (*b*) the ballast may be more compact and more stiff at one point than at another.

A centerbound condition gives a bending moment at the middle of the tie when it is brought to a full bearing and increases the bending moment at all loads and also results in an increase of intensity of bearing pressure at the middle. A permanently formed depression at the rail acts to relieve the intensity of tie reaction there, but increases the bending moment at this point when a load is applied, which brings the tie down to full bearing. The second condition, that not giving direct proportionality between depression and intensity of bearing pressure, is particularly evident in freshly placed ballast. In well compacted ballast the variation from proportionality may be expected to be slight. Immediately after tamping, the bed may be somewhat stiffer at the point of tamping; as the effect of tamping disappears through the movement of the particles of ballast, the yieldability of the ballast under that load, that is, the modulus of elasticity of the mass, tends to become more uniform along the length of the tie.

A study of the flexure curves of the ties tested in track show that a variety of conditions of tie bearing may exist. Even in well-tamped track uniform distribution of bearing pressure cannot occur. The intensity of bearing pressure will be greater near the rail than at the middle or end of the tie, since the bending of the tie will result in larger depressions at that point. The more flexible the tie the greater the variation in intensity; likewise, the stiffer the ballast the greater the variation—all resulting in increased intensity of bearing pressure at the rail. Such a condition gives a smaller value of the bending moment at the middle of the tie than would be found for uniform bearing pressure. If the ballast at the middle of the track is less compact than elsewhere the difference becomes more pronounced. The bending moment at the rail for this condition is less than for the endbound condition. With a concentration of pressures near the rails it may be expected that a permanent depression will soon be formed under the rail, a greater depression all along the tie will then occur upon the application of the heavy loads, and the bearing pressures will be distributed more uniformly along the tie. A permanently formed depression under the

rail will increase the bending moment in the tie at the section under the rail.

In centerbound track, for the smaller loads, the tie reactions are carried mostly in a short space at the middle of the tie. These small loads act to bend the tie downward at its middle to fit the shape of the bed; only a small load is needed to give this bending, particularly as the bed at the middle of the tie will be depressed under the action of the bearing pressure. Under the conditions of the tests with centerbound track, the load required to bring the tie to a bearing under the rail was probably not greater than 10 per cent of the 100,000-lb. load used. The negative moment produced by this small load is, of course, relatively large. The loads used in the test give full bearing along the tie, the depressions from the original position of the bed not differing greatly from what would be found in well-tamped track.

For an endbound tie the bending moments developed with the small loads are all positive, and for unusual conditions they may remain positive at the higher loads. A more usual condition for what is commonly included as an endbound condition develops positive moments at the middle of the tie for the smaller loads and negative moments for the larger loads.

The curves of flexure of the ties give information on the distribution of bending moments. Since the curvature of the curve of flexure of the tie varies as the bending moment developed, the distribution of bending moment along the tie may be determined if the curvature at various points is known.

If R is the radius of curvature of the curve of flexure at a given point, in accordance with beam theory, the expression $\frac{1}{R}$ for the curvature at that point is $\frac{M}{EI}$ and the bending moment M will be $\frac{EI}{R}$, where E is the modulus of elasticity of the wood and I is the moment of inertia of the cross-section of the tie. It had been expected that the data of the flexure would be of such nature as to give fairly accurate means of determining the moments developed in the ties and their distribution. It has been found that the local vertical compression of the wood at and near the rail, due to the bearing pressure of the rail, affects the depressions of the points near the rail (the amount was small, but the flexure of the tie was also small) to such an extent as to modify the form of the curve of flexure and thus throw some uncertainty on the radii of curvature derived therefrom, even at the middle of the tie. The values found for sections at the middle of the tie are fairly accurate; those at the rail are somewhat less reliable. The average of the values found will be useful for comparison. It seems probable that measurements made at the middle of the edges of the tie would give data of more value.

The bearing pressure under the time of course will vary in intensity along its length. A study of the data of the tie flexture tests indicates that the maximum bearing pressure per unit of length of tie, under static loading, will not ordinarily exceed twice the average bearing pressure over the length of the tie, and that for track in good condition the maximum will be less than one and one-half times the average. These values relate to bearing pressures per unit of length of tie; as will be shown in the next chapter of the report, the variation in intensity of pressure from the edge to the middle point of the width of the tie is considerable and the maximum intensity at the middle of the width may be much greater than the average.

It may be noted that the heaviest load on a tie generally occurs under the closely spaced drivers of a heavy freight locomotive, and the static load on one tie may be found approximately by dividing the weight on a driving axle by the number of ties which come within a driver spacing. It should be noted that the present discussion relates to static loading—no allowance has been made for the effect of speed, counterweight, and impact in increasing the loads on the tie; these should be considered in finding the bending moments, stresses and bearing pressures which may develop in track service.

Transmission of Pressures in Ballast

Crushed rock, gravel, cinders, burnt clay, slag, and sand are the materials commonly used for ballast. These materials are practically devoid of cohesion, at least when first placed. Earth and clay possess cohesive properties in some degree. Non-cohesive materials consist of separate pieces which will be hereafter referred to as grains. The grains are of irregular size and shape, and when first placed form a loose mass which cannot carry load without considerable readjustments of their relative positions. Under repeated applications of load, or other working, the grains are rearranged so that the mass becomes quite compact.

By reason of its structure, a load is transmitted through a non-cohesive granular mass from grain to grain by contact pressures. The distribution of pressure is made through chains of grains in contact which lie between the load and a point in the ballast.

The following observations summarizes some of the results of the tests and analysis and bring out in part the phenomena attending the transmission of pressure from the tie through the ballast:

The bearing pressure of the tie varies in intensity from its edge to its middle line; the maximum intensity is dependent upon the intensity of pressure developed at the edge. A variation in intensity exists also along the length of the tie.

The pressures which react from the lower face of the tie act in other than vertical lines, the greatest variation from the vertical direction being at the edge of the tie.

There is a concentration of pressure a short distance below the tie, say, at 3 in. to 4 in., and the intensity of pressure in the ballast at such a depth is greater than exists at the bottom of the tie.

For the tie of ordinary width the intensity of pressure at a depth of 6 in. and the distribution of vertical pressure over a horizontal plane at this depth do not differ greatly from those existing immediately under the tie. The directions of the pressures are not the same. At or below this depth the distribution of pressure laterally begins, with a consequent decrease in maximum intensity of pressure, and the change becomes more apparent as the depth increases.

The foregoing relates to the transmission of pressure from a single tie. For a number of ties with the ordinary tie spacing, the effect of the combination of pressures transmitted is readily found by superposing the values of the pressures from the several ties as obtained for a plane at the same depth. For the ordinary width of tie, the effect of the pressure transmitted from the adjacent tie to points midway between ties (overlapping lines of pressure) is noticeable at a depth equal to about half of the usual tie spacing. At a depth of three-fourths of the ordinary tie spacing the pressure immediately under the center of the tie is about one and one-half times that resulting from a uniform distribution over the horizontal plane. At a depth equal to the ordinary tie spacing the lateral distribution has become such that the variation in intensity of pressure from tie to tie is small.

The variation in intensity of pressure in the ballast lengthwise of the tie, which is dependent upon size and stiffness of tie equality of tamping, and condition of the bed on which the tie rests) becomes less and less with increase in depth, and it may be expected that the variations will be smoothed out at a depth equal to the ordinary tie spacing, or a few inches below, where there will be a fairly uniform pressure over the horizontal plane.

The tests were made on a rigid base and the results may be expected to apply to a firm roadbed capable of carrying the loads transmitted. A depth of ballast greater than that named would be found useful when the roadbed is of uneven character or yields under the load or is subjected to unusually heavy load.

The tests show that for quiescent loading there is little difference in the manner and rate of transmission and distribution of pressure for broken stone, pebble and sand ballasts; that is, at a given depth the intensities of pressure will be approximately the same, provided of course the ultimate carrying capacity of the ballast is not exceeded, and this conclusion may properly be extended to other non-cohesive materials. It will require less load to force the tie into sand ballast than into broken stone; the ultimate carrying capacity of the broken stone ballast under tie pressure is much greater than that of the sand ballast—the particles of sand ballast are more easily moved and rearrange themselves under lighter loads. For the different kinds of ballast there are great differences in the ultimate load which can be carried on a tie before ballast movement begins. The ultimate carrying capacity depends upon size of particle, smoothness of surface, and degree of angularity. A material whose mobility under pressure is increased by the addition of water or by mixture with other materials may thereby have its carrying capacity decreased. For heavy loading the ultimate carrying capacity of a ballast material is especially important.

It is evident that a principal function of the ballast immediately under the tie and for some distance down, aside from such functions as drainage, is to carry the load without material lateral movement of the ballast to that depth at which lateral distribution becomes effective. An advantage of the coarser, rougher kinds of ballast is that they will carry a greater ultimate load—which is of special importance in the upper part of the ballast. This is especially true under the jarring, vibrating loads of track service for which the ultimate carrying capacity naturally will be less than that found under the quiescent loads used in the tests.

The tests in the laboratory indicate, as would be expected also from analytical considerations, that the presence of ballast above the level of the bottom of the tie may have little influence on the quiescent load which will be carried before the ballast will work out from under the tie and allow it to settle, but that under repeated applications of load and particularly under jarring and vibratory loads the ultimate carrying capacity of the ballast is considerably increased by raising the level of the ballast surface to the top of the tie. This advantage is particularly apparent at the end of the tie, where under the whipping action of the tie under repeated deflections the particles of ballast will more readily be pushed away, since beyond the end of the tie there is no part of the track structure available for resisting the lateral pressure as is the case in the direction of the track, where another tie is always near at hand.

It seems probable that the effect of the jarring action of train loads will be to decrease the lateral distribution of pressure. It seems possible also that this tendency is counteracted in some degree by the cohesion which develops in ballast after it has been in place for some time.

It should be added that the "lines of pressure" used in the discussion are presented as being of service as an illustrative and suggestive conception which will help to explain some of the phenomena of transmission of pressure, rather than as a rigidly scientific hypothesis.

The Interstate Commerce Commission has announced a hearing on March 24 on the question of whether a further extension of time shall be granted to complete the work of equipping freight cars with safety appliances.

New Orders Regarding Coal Diversion

Director General Hines on March 5 issued new instructions governing coal distribution under the authority of the President's executive order dated February 28, which was intended to continue his powers over coal distribution after the termination of his control over the railroads, and another order dated March 5, specifically conferring upon him authority to make diversions of coal, which wast not mentioned in the previous order. For the purpose of maintaining the necessary machinery for the exercise of this authority, Mr. Hines is retaining for the present the Central Coal Committee, of which H. B. Spencer, director of the Division of Purchases, is chairman, although it had previously stated that Mr. Spencer would leave on March 1, and he is also retaining, with some changes in personnel, the regional coal committees in the eastern part of the country as his representatives. In explanation of the new instructions, Mr. Hines said in a statement issued on March 5:

"I am advised that in the eastern section of the country, and in New England particularly, the severe weather conditions continue to interfere to a large extent with railroad operations, which is materially affecting the movement of coal from the producing sections to the consumers. The coal strike in November and December resulted in a shortage of approximately 50,000,000 tons of bituminous coal. Although during the week ended February 28, 1920, 10,250,000 tons of bituminous coal was produced and transported, and although the production and movement of bituminous coal so far in 1920 has considerably exceeded the production and movement in the same period in the three preceding years, it is a fact that demand is still considerably in excess of the supply.

"As a result the director general has received representations from a number of public utilities, schools, domestic consumers and industries that they are unable to purchase coal to meet their urgent needs and that they will have to cease operations unless they promptly secure coal. To assist the New England situation and because weather conditions have made it impossible to move much coal to New England by rail, a large amount of coal has been diverted to New England by water. This movement will be continued.

"In executive orders dated February 28 and March 5 the President in order to meet this situation has continued in the director general of railroads authority to direct the distribution of coal to the extent necessary to meet the urgent needs of public utilities, railroads and other domestic consumers. Acting on the authority thus continued, the director general has today sent out instructions to regional coal committees under his authority in the eastern section of the country for the purpose of affecting the absolute necessary diversions of coal. These committees have been instructed that diversions of coal under this authority be kept at an absolute minimum and cease entirely as soon as possible. All applicants for coal should exhaust all possible means for securing coal through the normal channels, since the power to divert will only be exercised to meet emergencies. The instructions of the director general places authority in the hands of the designated committees to make the necessary diversions. While the regional committees will continue to work under the general directions of the Central Coal Committee, Railroad Administration, Washington, D. C., applications for diversions of coal will not be forwarded to the Central Coal Committee but will be dealt with directly by the regional coal committees."

The executive order of the President of March 5 provides in part as follows:

"The director general of railroads, his successor in office, and his representatives, in addition to and in continuation of all powers and authority granted him and them in execu-

tive order of February 28, 1920, and the orders of the United States fuel administrator dated October 31, 1919, and December 8, 1919, are hereby authorized and empowered to make diversions of coal in the possession, as common carriers, of railroads operating in the United States, to the extent that it is necessary in the present emergency to provide for the requirements of the country in order of priority set out in the preference list included in the order of the United States fuel administrator of May 25, 1918; and are hereby further authorized and empowered to establish rules for the regulation of and to regulate the method of production, shipment, distribution, apportionment or storage thereof among dealers and consumers within the United States; provided, however, that this order shall not be construed as applicable to the export of coal from the United States, power over which was conferred upon J. W. Howe, Rembrandt Peals, F. M. Whitaker and J. F. Fisher by the executive order dated February 28, 1920, reinstating the order issued by the United States fuel administrator dated November 6, 1917, relating to the Tidewater Coal Exchange."

The instructions issued by the director general, in order to reduce to a minimum the diversion of coal necessary to supply the actual needs of essential consumers, include the following:

1. That all producers and shippers of bituminous coal now or hereafter under contract to furnish such coal to consumers and dealers within the United States give preference in the shipment of such coal to such consumers and dealers, to the extent necessary to supply their actual current needs, in the order prescribed in the preference list included in the order of the United States Fuel Administrator of May 25, 1918.

2. That the following committees be and hereby are designated the representatives of the director general to carry into effect the foregoing provision of this order, and be and hereby are further empowered as his representatives to make such diversions of coal in possession, as common carriers, of railroads operating in the United States, to the extent that it is necessary in the present emergency to provide for the emergency needs of consumers and dealers in the first five classes of the United States fuel administrator's preference list herein referred to, which diversions shall be made in accordance with the rules heretofore governing the activities of these committees or such modifications of these rules as may be hereafter made:

Eastern Regional Coal Committee, with headquarters in New York, with jurisdiction on the lines of the railroads which comprised the Eastern region of the United States Railroad Administration. G. N. Snider, chairman.

New England District Coal Committee, with headquarters in Boston, Mass., with jurisdiction on the lines of the railroads which comprised the New England district of the Eastern region of the United States Railroad Administration. W. T. Lamoure, chairman; James J. Storrow vice-chairman.

Ohio and Indiana District Coal Committee, with headquarters at Cincinnati, Ohio, with jurisdiction on the lines of the railroads which comprised the Ohio and Indiana district of the Eastern region of the United States Railroad Administration. H. A. Worcester, chairman.

Detroit Committee, with headquarters at Detroit, Mich., with jurisdiction over Detroit & Toledo Terminals and in the state of Michigan. P. G. Findlay, chairman.

Cleveland Committee, with headquarters at Cleveland, Ohio, with jurisdiction over Cleveland terminals. E. R. Bissell, chairman.

Allegheny Regional Coal Committee, with headquarters at Philadelphia, Pa., with jurisdiction on the railroads which comprised the Allegheny region of the United States Railroad Administration. Samuel Porcher, chairman.

Pocahontas Regional Coal Committee, with headquarters at Roanoke, Va., with jurisdiction on the railroads which comprised the Pocahontas region of the United States Railroad Administration. D. E. Spangler, chairman.

The Central Coal Committee at Washington will continue its general supervision.

Shortly before the new executive order was issued the American Wholesale Coal Association filed suit in the Supreme Court of the District of Columbia asking that the director general be restrained from continuing "to interfere in an illegal way with the orderly distribution of coal," and asserting that the President's powers over the handling of coal, as granted by the Lever act, have been delegated and redelegated so many times that the coal industry is no longer regulated in the public interest. The court was asked to establish a commission to settle claims between the owners of coal and those to whom it has been diverted.

The Supreme Court of the District of Columbia has issued a rule directing Director General Hines to show cause on March 12 why the injunction asked by the American Wholesale Coal Association to restrain Mr. Hines from diverting coal in transit should not be granted.

Executives Offer to Co-operate with Interstate Commerce Commission

WASHINGTON, D. C.

BOTH THE INTERSTATE COMMERCE COMMISSION and the railroad executives apparently are making earnest efforts to establish a basis of co-operation for the purpose of making successful the operation of the new transportation act in view of the many difficulties facing the railroads in seeking to re-establish themselves after over two years of government operation and those with which the commission is confronted in administering the law. As the Esch-Cummins bill was passed it contained many things that the railroads, the commission, or both, have recommended for years, although it also includes some things that neither of them wanted, and while both sides, during the process of getting the bill through Congress had occasion to point out from time to time some of what they called the shortcomings of the other, there is now manifest a disposition to forget some of the bygones and join hands in a common effort to demonstrate the advantages of private management under government regulation over the plan of government management without much regulation. Possibly both the executives and the commissioners feel a bond of sympathy as a result of having been treated in some degree at least as outsiders during the past two years, but at any rate they both have reason to feel that they are now equally on trial before the court of public opinion and are to that extent at least in the same boat.

Railroad executives have been rather frequent callers of late at the Interstate Commerce building, where they were formerly seldom seen in large groups except during general rate cases, and the commission has consulted with them on several points in connection with the administration of the new legislation.

Officers of the American Railroad Association have discussed car service matters with members of the commission and on Saturday, March 6, Commissioners Clark, McChord and Daniels conferred with Thomas DeWitt Cuyler, chairman, and Alfred P. Thom, general counsel of the Association of Railway Executives, W. W. Atterbury, vice-president of the Pennsylvania, W. B. Storey, president of the Atchison, Topeka & Santa Fe, and B. M. Robinson, president of the American Association of Short Line Railroads, regarding the regulations which the commission was to prescribe covering nominations for the Railroad Labor Board. Later in the day the standing committee of the Association of Railway Executives called on the full membership of the commission

and a general get-acquainted meeting was held, during which Mr. Cuyler, Mr. Thom and President Rea of the Pennsylvania spoke briefly expressing the desire of the railroad officers to co-operate with the members of the commission in any helpful way.

It is understood that no effort was made to discuss any particular question in detail. The executives had planned to inquire as to the wishes of the commission regarding the initiation of the rate case but the commission had made it unnecessary by issuing its notice on the day before announcing a general hearing on March 22 to consider its procedure under the rate-making section of the act.

The presentation to be made by the railroads at the hearing was to be discussed at a meeting of the executives' association in New York on Thursday of this week.

Southern Shippers Propose Plan of Co-operation on Rates

WASHINGTON, D. C.

A PLAN OF CO-OPERATION between the railroads and the shippers in the adjustment of rates to produce the 5½ per cent return made standard by the new law was proposed by a committee representing the Southern Traffic League at a conference on Wednesday, March 10, with Commissioners Clark, Daniels, Meyer, Hall and Eastman. The plan, which has been proposed in resolutions adopted by the league as explained to the commissioners by Charles E. Cotterill, general counsel for the league, contemplates in brief that the carriers and the shippers of the Southeastern territory shall get together and work jointly in the preparation of new tariffs designed to meet the standard set up by the law, to be presented to the commission, instead of the former plan by which the carriers would present tariffs to the commission which most of the shippers then would see for the first time and usually would consequently oppose as a whole because of certain objectionable features. Mr. Cotterill said that the shippers now realize that the general level of rates is largely fixed by the statute and that their particular interest lies in the proper adjustment and relationship and that they feel that this could be worked out jointly to much better advantage than in the form of a proceeding before the commission. He said the plan had the approval of many subordinate traffic officials of the southern railroads, although it had not been discussed to any great extent with the executive traffic officials. He said that it has been heartily approved by S. Davies Warfield, president of the National Association of Owners of Railroad Securities and also of the Seaboard Air Line, but that "unfortunately Mr. Warfield was not able to control the will of all the other executives" and the shippers felt that the executives would be more inclined to accept the plan if it were to be suggested to them by the commission.

Commissioner Daniels said that the plan appealed to him and that he had been particularly impressed with Director General Hines' recommendation in his annual report to the President for a continuation of something like the policy established by the Railroad Administration for giving the shippers an opportunity to participate at the outset in the consideration of rate problems by giving the shippers equal representation with the railroad managements on freight traffic committees. He raised the question, however, as to whether the state commissions might not be inclined to regard approval of such a plan by the interstate commission as showing a lack of consideration for the state authorities and asked whether it would not be possible for the shippers to obtain an expression from the southern state commissions. Mr. Cotterill said he thought there would be no difficulty on that score for the reason that instances of conflict between state and federal authority as to rates in the past have often resulted from the pressure of shippers and that the Southern Traffic League, at least, had come to a realization that state and intrastate rates in general should be on the same basis. It was agreed that members of the committee should undertake to take the matter up with the southern state commissions with a view to having more definite information available at the hearing before the Interstate Commerce Commission on March 22.

Commissioner Clark expressed the heartiest approval of the plan proposed by the league and particularly of the spirit which prompted it, and Commissioner Hall remarked that he thought the same thing could be said for the commission. Mr. Clark said that the past had been a period of sharp conflict between individual railroads, individual shippers, and railroads and shippers and that under the new legislation we are coming into what he thought would be a new era. The foundation stone of this legislation, he said, is the public interest and it represents the last trial of private operation. If it fails there is no alternative but government ownership. The times, he said, are not most propitious for the new experiment because business is heavy and railroad facilities are limited because required additions have not been made on account of the war and because of government control and a new basis is fixed for the making of rates. He was confident that the degree of success that will attend the operation of the law will be in direct proportion to the extent to which it is possible to have co-operation between representatives of the railroads, the shippers, the state commissions and the interstate commission. He was very much pleased to note the spirit which had prompted the suggestion of the league, which, he said, apparently was not trying to get the lowest possible scale of rates, but one that would be right, and that the commission would welcome the co-operation of the representatives of the shippers as well as that of the railroads and it has for some time been trying to develop a plan of co-operation with the state commissions. While it would not be possible to give a definite answer for the commission regarding the proposal he thought it would be wise to take it up with the state commissions, and that personally he felt that if the shippers wanted to adopt such a plan it would be his duty to say to the representatives of the carriers that it was their duty to co-operate, because if the carriers and shippers cannot work out something and it becomes necessary for the commission to initiate rates it would be very likely to initiate something that neither side would like.

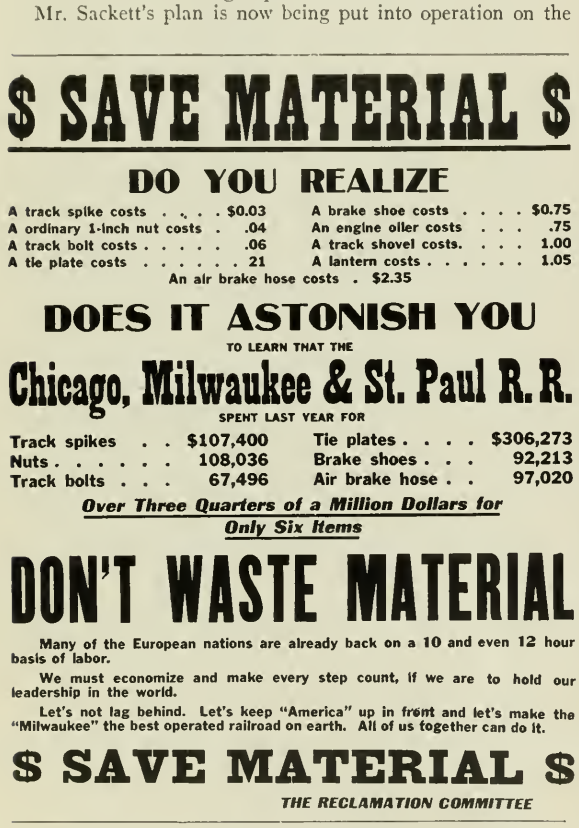
Commissioner Clark also said that he had frequently remarked to representatives of the railroads during the consideration of the law which has just been passed that it was fundamental and important that the railroads adopt a different policy in the future and take the shippers to a greater extent into their confidence. He hoped never to see again the spectacle of a tariff filed by carriers without telling any one about it, thereby arousing a storm of indignation which resulted in its suspension and in its withdrawal by the carriers because it was too hard to defend. Railroads should have a defense ready for each tariff before they file it and do their thinking and conferring with shippers beforehand. He thought the commission would be glad to do all in its power to induce the carriers to acquiesce in the proposal and that it would at least go as far as consistency and propriety would permit. He also expressed appreciation that the proposal had been brought forward promptly.

Representatives of the National Association of Railroad and Utilities Commissioners are to have a meeting in Chicago on Monday, March 15, to discuss the position to be taken by state commissions at the hearing before the Interstate Commerce Commission on March 22.

New Reclamation Campaign Instituted on the St. Paul

H. S. Sackett, assistant purchasing agent of the Chicago, Milwaukee & St. Paul, is the author of a new plan being put into effect on the lines of that road, by means of which it is hoped to place reclamation work on a more satisfactory, efficient and economical basis. Mr. Sackett's plan comprises briefly the creation of a system reclamation committee at the road's general headquarters and the establishment of subordinate committees, composed largely of general and division officers, at each of the road's principal shops. The subordinate committees, aided by educational posters such as the one accompanying this article, are to supervise local reclamation work, assist in the conduct of educational reclamation campaigns and make studies of the reclamation of various groups of materials.

Mr. Sackett's plan is now being put into operation on the



New Reclamation Campaign Instituted on the St. Paul

lines of the St. Paul. In the near future it is proposed to hold conferences at Chicago to discuss and develop this reclamation work, and it is proposed thereafter to hold these conferences from time to time and take up the subject of the reclamation of various groups of materials.

The organization as now constituted is as follows:

Main Committee.—H. S. Sackett, chairman, assistant purchasing agent; Macy Nicholson, assistant general manager; W. B. Foster, general superintendent, Lines West; H. R. Warnock, general superintendent motive power; A. G. Holt, assistant chief engineer; W. H. Penfield, engineer of track maintenance.

Traveling Representatives.—S. J. O'Gar, special inspector of locomotive materials; T. R. Morris, special inspector of car materials; Jas. Garrett, chief lumber inspector; H. W. Newlin, special inspector of signal materials; P. H. Madden, special inspector of roadway materials.

Milwaukee Shops Committee.—F. J. O'Connor, chairman, general storekeeper; L. K. Silleox, master car builder; E. J. Brennan, superintendent motive power, Lines East.

Dubuque Shops Committee.—J. E. Dexter, chairman, district storekeeper; A. Young, assistant superintendent motive power, Lines East; M. Parkinson, district general car foreman.

Minneapolis Shops Committee.—J. T. Kelly, chairman, district storekeeper; J. E. Bjorkholm, assistant superintendent motive power, Lines East; F. A. Staples, district general car foreman.

Savanna-Tomah Shops Committee.—G. B. Woodworth, chairman, inspector of rails; J. Reinehr, superintendent frog and switch shops; G. T. Richards, bridge and building material storekeeper; B. C. Johnson, foreman, rail mill.

Miles City Shops Committee.—D. B. Rivers, chairman, district storekeeper; C. E. Brook, division master mechanic; E. S. Palmer, general car foreman.

Deer Lodge Shops Committee.—J. V. Miller, chairman, district storekeeper; E. Sears, division master mechanic; A. Strand, general car foreman.

Tacoma Shops Committee.—A. J. Kroha, chairman, assistant general storekeeper; F. Rusch, superintendent motive power, Lines West; F. D. Campbell, assistant master car builder.

Commission on Car Service

The Commission on Car Service, which was organized by the American Railroad Association on March 1 to succeed the Car Service Section of the Railroad Administration, has spent a considerable part of its time since in conferences regarding its work under the new conditions.

The commission has issued a circular calling for the furnishing as heretofore of the principal reports of statistical information, including the weekly report of accumulations, the monthly statement of foreign freight cars on line, the semi-monthly statement of revenue freight car location, the semi-monthly report of cars containing company material, the report four times a month of average daily revenue freight car surpluses and deferred car requisitions, and the weekly report of coal mine operations and car requirements.

In reply to inquiries as to arrangements to be made for the interchange of empty coal cars between connections for return railroad fuel loading the commission suggested in a circular that all lines revert to the practice prevailing before federal control, which was that negotiations between lines for equipment for railroad fuel loading should be arranged by the interested lines directly with each other, but it was stated that it will be well to bear in mind the recent suggestions of the Interstate Commerce Commission, which were also sent out in another circular, that the uniform mine rating and coal car distribution rules promulgated by the Car Service Section be maintained in effect. Another circular stated that to facilitate the exchange of embargo information between all roads and the Commission on Car Service it seems advisable to establish a district system similar to that previously in effect under a general order of the Commission on Car Service. Such a plan contemplates the assignment of each road to a district, each district to be under the jurisdiction of a designated railroad representative and a road in each district has already been requested, as a temporary measure, to appoint a representative who, for the time being will receive and distribute information respecting embargoes. A road placing, extending, modifying or cancelling an embargo should, in addition to notifying its own agents and non-subscriber connections, promptly transmit by wire an exact copy of the notice to the designated district representative, who will notify the proper officer of each road in the district, the Commission on Car Service and the district representative of each other district. These district representatives will in turn notify all roads in their respective districts.

New Wage Conferences Begin at Washington

Railroad and Labor Representatives Meet to Handle Matter According to Transportation Act

WASHINGTON, D. C.

PRELIMINARY CONFERENCES between representatives of the railroad companies and of the railroad labor organizations regarding the pending wage demands which the President has insisted shall be handled in accordance with the provisions of the new transportation act, were begun at Washington on Wednesday, March 10.

At the request of the President, the arrangements for the conference were made by Director General Hines, to whom the labor organizations submitted a list of 17 representatives, the executives of the organizations that have been working in concert during the recent negotiations and one or two others.

The labor representatives were: W. S. Stone, for the engineers; Timothy Shea, for the firemen; L. E. Sheppard, for the conductors; N. G. Doak, for the trainmen; E. J. Manion, for the telegraphers; J. J. Forester, for the clerks; S. E. Heberling, for the switchmen; B. M. Jewell, of the Railway Employees' Department of the American Federation of Labor; M. F. Ryan, for the carmen; J. M. Burns, for the sheet metal workers; W. H. Johnston, for the machinists; J. F. McNulty, for the electrical workers; J. W. Kline, for the blacksmiths; Louis Weyand, for the boilermakers; A. E. Barker, for the maintenance of way employees; D. W. Helt, for the signalmen, and Timothy Healy, for the stationary firemen.

The representatives of the railroads were selected by the Association of Railway Executives after a meeting in New York on March 5 and their names were forwarded to Mr. Hines, as follows: E. T. Whiter of the Pennsylvania Railroad, chairman; G. E. Bates of the Delaware & Hudson; F. E. Blase, assistant general manager of the Baltimore & Ohio; J. W. Higgins of Railway Board of Adjustment No. 1; C. E. Lindsay of the New York Central; C. P. Neill, chairman of the Bureau of Information of the Southeastern Railroads; S. G. Strickland, recently federal manager of the Chicago & North Western; A. W. Trenholm, vice-president of the Chicago, St. Paul, Minneapolis & Omaha; and J. G. Walker of the Bureau of Information of the Eastern Railroads.

The director general formally opened the meeting by reading the President's letters to the executives and to the employees dated March 1 and by reading Section 301 of the transportation act, which provides that it shall be the duty of the carriers and their officers, employees and agents to exert every reasonable effort to avoid any interruption to the operation of any carrier growing out of any dispute between the carrier and its employees and further provides that all such disputes shall be considered and, if possible, decided in conference between representatives designated and authorized so to confer by the carriers or the employees or subordinate officials directly interested in the dispute.

He said that questions of procedure to be followed at the conferences were entirely between the representatives of the carriers and of the employees and he took it for granted that the conferees would decide themselves upon the place where their future meetings would be held. He added that the act made no appropriation available to defray the expenses of such conferences but he took it for granted that they would be borne just as they were in similar conferences prior to federal control of railroads by the interested parties themselves. He stated that until the wage records of the Railroad Administration were taken over by the Railroad Labor Board created by the transportation act as provided for in that act, the Railroad Administration would place them at the disposal of the conferees.

The director general also stated that the wage questions involved were of very great scope and magnitude. He added that the President sincerely hoped that every practicable effort would be made to expedite consideration of these problems so that a final settlement would be reached as speedily as possible.

In conclusion, the director general explained that it was his view of the conference that it was in no sense an arbitration but that under the act the duty was laid upon the representatives of the carriers and of the employees themselves through conference and negotiation to make every possible effort to reach a settlement. He urged that if possible the conferees should agree themselves upon a disposition of the wage questions involved so that it would be unnecessary to refer the matter to the Railroad Labor Board, although under the transportation act it was to be understood that notwithstanding any such agreement the Railroad Labor Board was empowered on its own initiative under certain conditions to take jurisdiction over any wage matter.

"We are starting on a first experiment with a new plan," said Mr. Hines. "It is to the interest of both the carriers and the employees to make this experiment successful. I very earnestly hope that every possible effort will be made to reach a fair and just conclusion."

After hearing Mr. Hines at the morning session the conference committees held another meeting in the afternoon but adjourned subject to call pending the collection of certain desired information.

A meeting of the officers and chairmen of the brotherhood of maintenance of way employees was held at Chicago last week to consider its course of action in view of the decision of the other organizations to accept the plan of settlement proposed by the President and provided by the new law, but according to reports reaching here the deliberations were interrupted rather suddenly upon receipt of a telegram from J. B. Malloy, its vice-president, from Washington, stating in effect that any plan for an independent strike on the part of the maintenance of way organizations not only would not receive any support from the other organizations but would be repudiated by them and would be regarded as "throwing a monkey-wrench" into the entire plan for an adjustment of the pending wage demands.

Later the name of A. E. Barker, president of the brotherhood, was included in the list of the committee to meet the railroad representatives. The threatened strike of the maintenance organization set for February 17 and then postponed has been regarded here not only by the Railroad Administration but by other labor leaders as being in violation of the national agreement executed with the Railroad Administration, as the stipulated 30-day notice was not given, and considerable pressure was brought to bear on Mr. Barker to postpone his strike pending the negotiations with the President.

The Interstate Commerce Commission, after conferring with representatives of the railroads and of the labor organizations, on March 8 issued regulations governing the making and offering of nominations for the appointment by the President of members of the permanent Railroad Labor Board, which is to have headquarters at Chicago and which is expected ultimately to take jurisdiction of the wage matter. Under these regulations nominations will be made by groups

of the 16 principal railroad labor organizations and by the Association of Railway Executives. The regulations were promulgated in the following notice issued by the commission:

"Section 304 of the transportation act, 1920, provides for the creation of a Railroad Labor Board to be composed of nine members. Of these nine, three are to constitute the labor group representing the employees and subordinate officials of the carriers, and three are to constitute the management group representing the carriers, to be appointed by the President by and with the advice and consent of the Senate from not less than six nominees whose nominations shall be made and offered by such employees, and not less than six nominees whose nominations shall be made and offered by the carriers, in such manner as the commission shall by regulation prescribe.

"Section 305 of the same act provides that if either the employees or the carriers fail to make nominations and offer nominees in accordance with the regulations of the commission within 30 days after the passage of the act, the President shall thereupon directly make the appointment by and with the advice and consent of the Senate.

"The commission is required by regulation, formulated and issued after such notice and hearing as the commission may prescribe to the carriers and employees and subordinate officials of carriers, and organizations thereof, directly to be affected by such regulations, to determine the classes that shall be considered as coming within the term subordinate official.

"Inasmuch as the nominations must be made within 30 days after the passage of the act, it is obviously impossible to attempt to get expression from each employee or from the employees of each individual carrier. The only practical way in which effect can be given to the obvious purpose and intent of the law is to prescribe regulations under which the great mass of the employees of the carriers will be afforded opportunity to make and offer their nomination within the prescribed time.

"Inasmuch as the classes of officials that are to be included within the term subordinate official must be determined by the commission after notice to and hearing of the interested parties, it is impracticable in the short time within which the nominations must be made to hold such hearings and reach conclusions thereon. There can be no question as to the right of those who clearly come within the term employees to be represented upon and heard by the labor board. The uncertainty as to whether or not a class of so-called subordinate officials will be included within the term subordinate official as that term is used in the act warrants withholding at this time at least provision for nominations on behalf of so-called subordinate officials, because if such nominations were made and such an one were appointed it might later develop that the class from which he was chosen is in fact a class of officials and not of subordinate officials.

"The overwhelming majority, stated by those who are in a position to speak with confidence and authority to be more than 90 per cent of the railroad employees and subordinate officials, are members of or represented through certain organizations of employees. These organizations and their representatives have been recognized as authorized to speak for and represent the several classes of employees, by the railroad companies prior to federal control, by the Railroad Administration during federal control, and by the President in conference and negotiations conducted by him.

"Inasmuch as but three appointments can be made for the labor group it is deemed advisable to classify these representative organizations into groups with respect to the more or less analogous character of the services performed, aiming to have the nominees as nearly as possible representative of and conversant with the interests of all of the classes of employees and employment.

"For the purpose of making and offering nominations for original appointment as members of the labor group on the labor board the commission prescribes that the organizations of employees shall be grouped as follows:

Group 1:
- Brotherhood of Locomotive Engineers,
- Brotherhood of Locomotive Firemen and Enginemen,
- Order of Railway Conductors,
- Brotherhood of Railroad Trainmen,
- Switchmen's Union of North America

Group 2:
- International Association of Machinists,
- International Brotherhood of Boilermakers, Iron Ship Builders and Helpers of America,
- International Brotherhood of Blacksmiths, Drop Forgers and Helpers,
- Amalgamated Sheet Metal Workers, International Alliance,
- Brotherhood Railway Carmen of America,
- International Brotherhood of Electrical Workers,

Group 3:
- Order of Railroad Telegraphers,
- United Brotherhood of Maintenance of Way Employees, and Railroad Shop Laborers,
- Brotherhood of Railway Signalmen of America,
- Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees,
- International Brotherhood of Stationary Firemen and Oilers.

"The accredited representatives of the organizations embraced in each group and duly authorized so to act shall agree among themselves upon nominees representative of the group, but the three groups must present a total of not less than six nominees.

"The nominations agreed upon by each group shall be signed by the representatives of the several organizations in the group or by some one authorized by them so to act and shall be transmitted direct to the President accompanied by a certificate that the nominations have been made in accordance with these regulations.

"The Association of Railway Executives is representative of approximately 95 per cent of the railroad mileage of the country and is authorized by the carriers members thereof to speak for and represent them in matters of this kind. The officers of that association have consulted with most of the carriers not members of the association and secured their assent to the presentation of nominees by the association.

"For the purpose of presenting nominees for original appointment on the labor board to represent the management group the commission prescribes that such nominations, not less than six in number, shall be made and offered by the Association of Railway Executives.

"The nominations so made shall be transmitted to the President, accompanied by a certificate that they have been made in accordance with these regulations.

"The act provides, in section 304, that any vacancy on the labor board shall be filled in the same manner as the original appointment. There is no specific provision for modification of the regulations prescribed by the commission, but the authority to prescribe regulations is believed in the absence of provision to the contrary, to also confer authority to modify them if and as occasion or necessity for such modification should arise."

Representatives of some of the organizations of so-called "subordinate officials" have been making very vigorous representations as to their right to be represented in some way on the labor board, although it has not been made clear as to whether they have expected to have one of the three members of the board assigned to labor selected by organizations representing a number of men so small in proportion to the number of employees. The situation is also complicated somewhat by the fact that the Railroad Administration did not employ the classification of "subordinate officials" used in the law, but designated men either as officers or as employees. The Train Despatchers' Association and the Order of Railroad Station Agents have been active in pressing the case of the "subordinate officials."

A similar question arose as to whether the short line rail-

roads were entitled to representation and President Robinson of the American Short Line Railroad Association when consulted by the commission said that the short lines were perfectly willing to have the railroads represented by the Association of Railway Executives.

The Interstate Commerce Commission on March 9 announced a hearing at Washington on March 15 for the purpose of its investigation as to what classes of officials shall be included within the term "subordinate official" and at the same time hearing will be had upon the question whether or not the regulations governing the making and offering of nominations for appointments as members of the labor group on the Railroad Labor Board shall be modified or supplemented. The commission ordered copies of its order sent to carriers, to "organizations of railroad employees and subordinate officials whose addresses are known" and to the public press.

The railroad labor organizations held a rather stormy meeting at Washington on Tuesday for the purpose of making their nominations.

President Barker of the maintenance of way employees announced in Washington on Tuesday that his organization had decided not to strike.

Small Change In Signal System Makes Material Saving

By R. M. Phinney
Assistant Signal Engineer, Chicago & Northwestern, Chicago.

A saving of at least $4,300 per year has been made as a result of removing a small interlocking plant at Boone bridge on the Chicago & North Western and the substitution of automatic features without eliminating any of the safety factors or changing the operating conditions. This work was done at an estimated cost of $900. The bridge is located west of Boone, Iowa, where the C. & N. W. crosses the Des Moines river and its valley. It is ½ mile long and at its highest point is about 180 ft. above the water.

Even though this bridge is double tracked, only one train is allowed on it at one time, simply as a safety measure. Since its installation, the use of the bridge has been governed by stop signals located at each end. These signals were originally controlled by dwarf interlocking machines located in cabins, with suitable check-locking between them. When automatic signals were installed about 10 years ago the machine at the west end was removed and the signals at that end were then controlled electrically from the interlocking at the east end. Bridge watchmen were still retained at the west end. With the advent of the eight-hour day this arrangement required six men; three operators and three watchmen.

Recently the arrangement was changed in order to reduce operating expenses. The dwarf interlocking machine was removed and the home signals were made automatic, standing normally at stop, clearing upon the approach of a train, while the distant signals were made fixed. The clearing circuit operates on the principle of "first come, first served" as a train passes the distant signals. Only one signal can be cleared at a time. This is assured by controlling each signal through the opposing control relay. The circuits also break through the opposing signals at stop to give greater safety in case of improper operation. The signals are controlled through the track circuits on both tracks across the bridge. With this arrangement alone, a number of trains in one direction might hold up an important train in the other direction, or an important train might be held up by an unimportant one. To obviate this difficulty a control circuit was run to the despatcher's office at Boone, four miles away. This circuit is designed to control direction when desired, but normally the trains operate the signals automatically. If the despatcher desires to give one train preference over another he operates a direction key, east or west as the case may be, and also pushes a button. This opens the control circuit of one signal and closes the other. The signal, however, does not clear until the train reaches the clearing track section.

An indicator is provided on the despatcher's desk which indicates when selection has been completed. This indicator when energized remains so through its own contact and is de-energized automatically when the engine passes the signal onto the bridge; or the despatcher may de-energize these

East End of Boone Bridge Showing Old Layout, Mechanical Home Signal Later Changed to Power Operated Signal

relays by opening the direction key in case he desires to cancel the selection.

It is impossible to effect selection while a train is on the bridge. Also, after either signal has been cleared by a train, the selection circuit cannot be operated as its circuit depends upon both signals being at "stop" at the time when the selection is made. Therefore, selection cannot be made by the despatcher after a train has done so; the despatcher is informed of such a situation when the indicator will not pick up.

If a following move is desired in one direction ahead of a

The Boone Bridge from the East Abutment

train in the opposing direction, the despatcher must, after the indicator drops for the first train, hold the push button down until the indicator picks up, when the selection is effected.

There is a minimum time limit of two minutes for a train to cross the bridge. The despatcher can check this time limit for a train by pressing the button as would be done for a following train and timing the interval between the dropping of the indicator, caused by the engine passing the signal, and the picking up of the indicator when the rear of train passes

out of the section. Of course allowance must be made for the length of the train.

The direction key and push button are standard telephone apparatus mounted on the despatcher's table. A dry battery is used since the selecting circuit is required infrequently and also because there was no convenient place to locate a soda battery. Telephone communication is provided in the cabins at each end of the bridge for trainmen so that they can get permission from the despatcher to pass the signal at stop in case of necessity.

These changes have made it possible to eliminate the three operators at the interlocking, thus saving an average of $360 per month. It was necessary, however, to retain the three watchmen to patrol the bridge.

Cost of Acquisition of Lands Must Be Included in Valuation

WASHINGTON, D. C.

THE UNITED STATES SUPREME COURT on March 8 rendered an important decision affecting the railroad valuation proceedings by reversing decrees of the court of appeals and of the supreme court of the District of Columbia which had in effect dismissed the petition of the Kansas City Southern for a writ of mandamus to require the Interstate Commerce Commission to find the present cost of acquisition of its carrier lands. The case is of importance because it will require the commission to take into consideration the cost of acquisition of lands in the other cases. In the Texas Midland case the commission said that present value of lands is stated by ascertaining the number of acres and multiplying this by a market value determined from the present fair average market value of similar adjacent and adjoining lands, making due allowance for any special value by reason of the peculiar adaptability of the lands for railroad use, but adding nothing additional for the expense of acquisition, for severance damages, for engineering or interest during construction. The same method was also employed in valuing the lands of the Kansas City Southern.

The carrier introduced evidence to show land values in one county along its lines which did not vary in essential particulars from testimony of a like character which had been introduced in the Texas Midland case. After receiving this testimony the commission declined to permit the introduction of evidence of the same kind for other lands of the carrier.

At the final hearing in the Kansas City Southern case counsel for the railroad filed an affidavit and motion asking leave to present the further evidence, which motion was denied by the commission. Thereafter a mandamus proceeding was brought in the Supreme Court of the District of Columbia to compel the commission to receive evidence to enable it to ascertain and report separately the "present cost of condemnation and damages or of the purchases in excess of original cost or present value" of the lands included in the rights of way, yards and terminals of such carriers. The railroad rested its case upon the provision of Section 19-A of the valuation act, which provides that the commission's investigation and report shall state in detail and separately, present improvements, original cost of all lands, rights of way and terminals owned or used for the purpose of a common carrier, ascertained as to the time of dedication to public use and the present value of the same, and "separately the original and present cost of condemnation and damages or of purchase in excess of such original cost or present value."

The Supreme Court of the District of Columbia dismissed the proceedings and an appeal was taken to the Court of Appeals. The case was argued before the Supreme Court on December 10 by counsel for the Kansas City Southern and the chief counsel for the Interstate Commerce Commission and a brief *amici curiae* was filed for the Presidents' Conference Committee on behalf of all the railroads.

The lower court was directed to issue the writ of mandamus asked for.

The court said in part:

"It is true that the commission held that its non-action was caused by the fact that the command of the statute involved a consideration by it of matters 'beyond the possibility of rational determination,' and called for inadmissible assumptions,' and the indulging in 'impossible hypotheses' as to subjects 'incapable of rational ascertainment,' and that such conclusions were the necessary consequence of the Minnesota rate cases.

"We are of the opinion, however, that, considering the face of the statute and the reasoning of the commission, it results that the conclusion of the commission was erroneous — an error which was exclusively caused by a mistaken conception of the commission of its relation to the subject, resulting in an unconscious disregard on its part of the power of Congress and an unwitting assumption by the commision of authority which it did not possess. And the significance which the commission attributed to the ruling in the Minnesota rate cases, even upon the assumption that its view of the ruling in those cases was not a mistaken one, but illustrates in a different form the disregard of the power of Congress which we have just pointed out, since, as Congress indisputably had the authority to impose upon the commission the duty in question, it is impossible to conceive how the Minnesota rate ruling could furnish ground for refusing to carry out the commands of Congress, the cogency of which consideration is made particularly manifest when it is borne in mind that the Minnesota rate cases were decided prior to the passage of the act in question."

Wire Capacity Increased by Modern Brevity Methods

BY THE EMPLOYMENT of modern brevity methods of coding the Grand Trunk has been enabled to handle a greater message traffic with a smaller force and in less time than was formerly the case. In one relay office there has been a decrease of two operators and a further decrease of one hour a day per operator, with an average increase of nine messages handled hourly by each operator. The saving represented is $425 monthly, or $5.000 yearly in this one office.

Many railroad men have been more or less opposed to coding, due very largely to the conditions in vogue under the old coding methods in use in the old rate-cutting days—when messages were codified more for secrecy than for economy, little attention then being paid to the time taken in coding in order to disguise thoroughly the meaning intended. Economy in tolls was then a secondary consideration. At that time it was not considered practicable to codify a message transmitted over railroad wires unless secrecy was desired.

That the old theory no longer holds true is well illustrated by what has been accomplished on the Grand Trunk, as shown by the figures below, which represent one day's performance by the car-tracing clerk in the office of the superintendent of transportation at Toronto, Ont.:

June 10, 1919.

Number of	
Messages sent	130
Perfect messages	117
Other messages	13
Characters in all messages	*5,091
Characters saved by coding	1,576
Could have saved by further coding	65
Could have been saved by elimination	122
Messages that could not have been coded	48
Messages that could be coded	82
Messages coded, per cent	78 or 96

*A character is a letter or a figure.

The figures shown represent outgoing messages only. It will be noted that code words were used in 78 out of a possible 82 messages, or 96 per cent. It will also be noted that while there were 48 messages in which code words could not be employed, there were only 122 characters in all these messages that could be termed unnecessary. This performance is a true representation of the daily work accomplished by one clerk, the number of messages sent increasing or decreasing daily according to the number of cars being traced.

In refutation of the argument that operators cannot send messages in code as quickly as in plain English, it is interesting to study the results accomplished in one relay office of the Grand Trunk for the month of June, 1919, as compared with June, 1918. The comparative figures are contained in the following table:

	Month of June			
	1918	1919	Increase	Decrease
Operators employed	10	8	....	2
Hours worked per operator per day	9	8	....	1
Hours worked per operator per month	225	200	....	....
Hours worked, all operators, per month	2,250	1,600	....	650
Days worked per operator per month	25	25	....	....
Days worked, all operators, per month	250	200	....	50
Messages handled per operator per hour	22	31	9	....
Messages handled per operator per day	198	250	52	....
Messages handled per operator per month	4,965	6,257	1,292	....
Total increase for 8 operators per month			10,336	

It will be noted that there was a decrease of two operators and that there was a further decrease of one hour a day per operator. As there were eight operators employed, this decrease is equal to eight hours a day, or the full time of one operator per day, which makes the total decrease in this relay office equal to the full time of three men. Notwithstanding this reduction in help and in working hours, this office shows an average increase of 9 messages handled by an operator per hour, making the total increase for the 8 operators for the month 10,336 messages. In percentage the figures are:

	Per cent
Decrease in help	20
Decrease in working hours	11
Increase in messages transmitted	26

The importance of this showing is augmented by the fact that it represents a saving of $425 a month, or $5,100 a year, in this one office.

Of all the messages transmitted over 35 per cent contained code words, showing that instead of slowing up the service they assisted in speeding up action on the wires. The analysis shows that to accomplish this only one-half of the maximum efficiency of the coding system was employed.

The Dempsey code, the one referred to in the foregoing, which has been in use on the Grand Trunk for two years past, provides for the needs of all departments of the road and is used by all departments. Certain of these departments have those portions of the code which are most frequently used in their work printed on loose leaves, in large type, so as to be easily read when posted on or near the user's desk. All departments are instructed to make the fullest practicable use of the code. The code is used in messages to and from agents at points off the line, where telegrams have to be paid for, and in this way the cost of transmission has been considerably reduced.

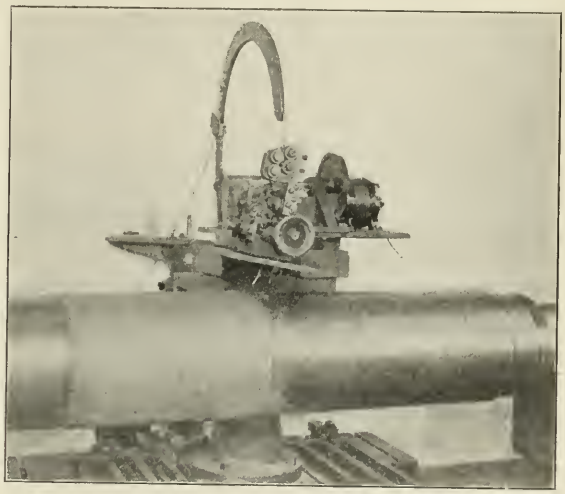
The compiler of the code makes an educational tour over the Grand Trunk lines once a year with a view to educating officers, agents, clerks and others in the use of the code, and giving advice where necessary to clear up difficulties. This work supplements the supervision of the traffic bureau of the telegraph department, thus promoting the most intelligent and convenient use of the abbreviations. While the code was prepared originally for the purpose of maintaining secrecy in the transmission of telegrams, it is now used so extensively in non-secret communications that the original purpose has become a secondary one.

Automatic Arc Welding Machine

AUTOMATIC ARC WELDING is now accomplished by a device, perfected by the General Electric Company, which will soon be put on the market. The welder is for use with the regular welding set, and is designed to take the place of a hand controlled electrode. It consists of a pair of rollers called feed rolls driven by a small direct current motor, which draw in and deliver to the arc a steady supply of wire, maintaining automatically the best working distance. The machine is controlled from a small panel.

The welding head is held by a suitable support with a certain amount of hand-regulated adjustments and consists of a steel body, carrying feed rolls and straightening rolls, both of which are adjustable for various sizes of wire. The arm is supported on a gear box, together with the motor. This box contains gears which give three gear ratios, thus extending the range of the device while allowing the motor to operate at its most favorable speed.

The control panel carries an ammeter and voltmeter for the welding circuit as well as rheostats, a control relay, and the contractors and switches for the feed motor. It is possible to start and stop the equipment from the work by a pendent push button, but adjustment of the speed conditions must be made from the panel.



Machine In Position for Building Up a 14-in. Shaft. The Shaft Diameter Was Increased 3/8 in.

The adjustment for arc conditions by regulation of the speed of the feed motor as the arc voltage varies is taken care of by the panel equipment. The result is a steady arc and more uniform and faster work than is possible with a hand-controlled arc.

The whole apparatus is mounted on a base which can be bolted to any form of support. Thus a great variety of working conditions can be met. Provision must be made for carrying the arc at uniform speed along the weld. For straight seams a lathe or planer bed may be used, and for circular ones a lathe or boring mill, local conditions, of course, dictating the methods to be followed.

The device should be especially valuable where a large amount of routine welding is to be done, as it is claimed that it will operate with from two to six times the speed which can be obtained by skilled welding operators. It is adaptable to welding seams of tanks and plates, rebuilding worn or inaccurately turned shafts, rebuilding worn treads and flanges of wheels and many other kinds of work.

General News Department

The Atchison, Topeka & Santa Fe has discontinued the operation of the Port Boliver & Iron Ore Railroad, extending from Long View, Tex., to Iron City, a distance of about 30 miles.

The Interstate Commerce Commission has announced a hearing at Washington on March 24, before Commissioner McChord, on the application of the American Railroad Association for an extension of time in which to complete the work of equipping freight cars with safety appliances.

The Western Pacific has notified the Southern Pacific that the arrangement made by the United States Railroad Administration, under which the two roads used the Western Pacific tracks between Wells, Nev., and Winnemucca, a distance of 200 miles, is now void, and that the practice must be discontinued.

A meeting at Detroit, Mich., between city and railroad officers has been called for March 13 for the purpose of considering the city's request that numerous grade crossings and grade separation projects, which are expected to cost $75,000,000, be undertaken. A meeting was held on February 17 but no action was taken.

The Western Pacific has established its own freight and ferry service at San Francisco, Cal., and has discontinued its use of the Oakland terminals. Whether the Atchison, Topeka & Santa Fe will continue to handle its passenger business through the Oakland mole is a subject of negotiation between the managers of the respective lines.

The Castleton bridge project is still subject to delay. The act of Congress providing for the construction of the bridge required it to be completed this present month; and the railroad company has now applied to Congress for an extension of time; but at Washington it has met people from Albany, Troy and Schenectady, who are asking the government to refuse the extension.

The International Brotherhood of Firemen and Oilers has filed a petition at Topeka, Kan., asking the Kansas Industrial Relations court to investigate the working conditions and wages of the members of the brotherhood in Kansas. All the railroads operating in Kansas have been made defendants. While no wage demand is made in the petition it is understood that an increase in the present rate will be asked.

The Mechanical Section of the American Railroad Association has announced in Circular S-III-101 that supplement No. 1 to the Rules of Interchange, effective March 1, 1920, will soon be ready for distribution. This includes changes covered by letter ballots and the modifications recommended by the Committee on Tank Cars and by the Arbitration Committee. The circular also announces that the effective date of section *G* of Rule 3 has been extended to October 1, 1920.

The first trains to carry passengers on the new Wichita Falls, Ranger & Fort Worth were operated on March 1 between Ranger, Tex., and Edhobby, a distance of 12 miles. The usual boom in the sale of town-lots at the terminal of a newly-opened line took place in Edhobby, 30 per cent of the town-lots being sold. It is expected that the Wichita Falls, Ranger & Fort Worth will be completed to Jakehamon, 20 miles south of Ranger, by March 10.

W. R. Wortham, an attorney at Paris, Tex., has been appointed receiver for the Paris & Mt. Pleasant. This line, which was built in 1910, extends from Paris, Tex., to Mt. Pleasant, a distance of 50 miles. The road's indebtedness is about $750,000, including $600,000 in bonds issued for its construction. The property was valued at $1,000,000 when constructed. The receiver announces that receiver's certificates will be issued at once to raise money to put the road in good operating condition.

The Senate on March 8 adopted a resolution proposed by Senator Jones of Washington, calling on the Secretary of the Interior to advise the Senate what steps have been or are being taken to develop and settle the country traversed by and tributary to the government railroad in Alaska, what steps have been or are being taken to develop traffic over the road, whether any organization has been created for these purposes, and if not, why not.

The first annual meeting of the National Federation of Construction Industries will be held at Chicago, on March 24 and 25. Among the subjects which will be discussed at the meeting are: freight traffic as affecting construction industry, freight rates, economical purchasing and handling, standardization of the construction industry, foreign trade, financial relation, jurisdictional award, housing and Americanization. John C. Frazee is executive secretary, with office in the Drexel building, Philadelphia, Pa.

A temporary injunction to prevent Louis L. Emmerson, secretary of state, and Attorney-general E. J. Brundage, both of Illinois, from attempting to collect the annual franchise fee, provided for in the law of 1919, from the Illinois Central, was granted in the Sangamon Circuit Court on February 26. Attorneys for the railroad contend that the law, which was passed by the last legislature, is not applicable to the road inasmuch as the road pays the state a seven per cent fee on its gross earnings under its articles of incorporation.

The strike of seamen at the Straits of Mackinaw, which has been in effect for several weeks and which affects the car ferries of the Michigan Central, the Grand Rapids & Indiana and the Duluth, South Shore & Atlantic, is assuming serious proportions. The seamen went on strike for increased wages which their employers do not feel are reasonable. Freight is piling up on the wharves and unless the strike is settled soon, traffic will become seriously congested. The railroads involved have undertaken extensive re-routing measures to avoid ruining perishable freight.

Railroad taxes amounting to approximately $1,255,500, have been received by the state treasurer of Minnesota. These amounts are 5 per cent of the gross earnings of the reporting railroads in Minnesota for the six months ending December 31, 1919. The roads which have completed payments on their taxes for the last six months of 1919, are: the Duluth & Iron Range, $230,962; the Chicago, Rock Island & Pacific, $89,769; the Minneapolis & St. Louis, $133,097; the Chicago, Burlington & Quincy, $21,023, and the Duluth, Missabe & Northern, $580,647.

A British Columbia sub-committee of the Canadian Railway Association was organized at a meeting attended by representatives of the nine railways operating in British Columbia, Can., held at Vancouver, B. C., recently. F. W. Peters, general superintendent on the Canadian Pacific at Vancouver, was elected chairman of the sub-committee, and Albert Davidson, commercial agent of the Grand Trunk Pacific at Vancouver, was elected secretary. The new British Columbia committee is a sub-committee of the Western Operating and Transportation Committee of the Canadian Railway Association, but reports to the main association at Montreal, Que.

Bids have been requested for the renewal of the superstructure of the Cincinnati, New Orleans & Texas Pacific bridge over the Ohio river at Cincinnati. The old single-track superstructure is

to be replaced by a new superstructure for double track and the grade of the track is to be raised four feet. No change is to be made in the substructure except as is necessary to accommodate the new trusses and the change in grade. The new superstructure will consist of simple spans of varying lengths up to a maximum of 514 ft., but the cantilever method of erection will be used as the plan of reconstruction does not permit of the use of falsework in the river. About 14,000 tons of steel will be required. The bids will be received by Ralph Modjeski, consulting engineer, Chicago, on April 1.

Senator Ransdall of Louisiana has introduced in the Senate a bill directing the Interstate Commerce Commission to establish preferential rates on shipments of cotton based on the cubic contents of the bale and providing that in reaching its decision the commission shall take into consideration the density of the bale, the amount of space it occupies, its uniformity in size, character of its covering as a safeguard against damage by fire and other points that seem fairly to entitle it to favorable discrimination. The Senator said that the object of the bill was to secure fair treatment fo rinterstate shipments of high density, gin-compressed cotton, both round and square bales.

American Railway Express Company officers at Chicago, basing their remarks on the deficit incurred by the company during January, assert that the government will be called upon to pay the company approximately $10,000,000 as reimbursement, authorized by the new Transportation Act. The American Railway Express Company is a consolidation of the American, the Wells Fargo, the Adams and the Southern Express companies, and Chicago officers say that there will be no dissolution of this consolidation if it can be avoided. The consolidation has cut down the overhead expenses greatly, according to W. J. McGreevy, secretary to the vice-president of the Central department, and the express company wishes to continue this economical program. The company's business is approximately $28,000,000 a year, conducted at an annual loss under present rates of $10,000,000.

C. F. Richardson, president of the American Federation of Railroad Workers, an independent organization, with headquarters at Chicago, in a recent statement addressed to members of Congress, made a series of charges against officers of the United States Railroad Administration, intimating that there was a conspiracy between the officers of the American Federation of Labor and those of the Railroad Administration. Mr. Richardson's statement alleges that from 65 to 95 per cent of the members of the American Federation of Labor were literally "handed over" to those organizations by a form of conscription exercised by the Railroad Administration. It is alleged in the statement that official letters and communications addressed to the Railroad Administration from the Federation of Railroad Workers were turned over to rival organizations of the American Federation of Labor for propaganda purposes.

New York Railroad Club

"The automatic train control problem" will be the subject of the March meeting of the New York Railroad Club to be held at the Engineering Societies' Building, 29 West 39th street, New York, on Friday evening, March 19. A paper will be presented by H. S. Balliet, assistant terminal manager, Grand Central Terminal, New York city. Mr. Balliet was a member of the Railroad Administration's committee on this subject.

Steam Railroad Electrification

S. T. Dodd, engineer of electrification of the General Electric Company, Schenectady, N. Y., presented a paper on "The Present Status of Steam Railroad Electrification," at a joint meeting of the Chicago Section of the American Institute of Electrical Engineers, the Electrical and Mechanical sections of the Western Society of Engineers, and the Western Railway Club at Chicago, on March 4. Mr. Dodd based his remarks largely on data obtained from various installations and from papers presented by authorities on the subject at previous meetings of various engineering societies.

Railway Business Association Annual Dinner

The theme of the dinner of the Railway Business Association to be held at the Waldorf-Astoria Hotel, New York, on March 31, will be "The Resoration of Our Railways."

The speakers for the evening have been announced as follows:

Introductory; Alba B. Johnson, president of the Railway Business Association.

American Destiny; Frederick J. Koster, president of the California Barrel Company.

A Continent Marking Time; George W. Simmons, vice-president of the Simmons Hardware Company, St. Louis.

Partners in Prosperity: Joseph S. Frelinghuysen, United States Senator from New Jersey.

Two Cent a Mile Fares in Illinois

A suit to restore the two-cent-a-mile basis of computing railroad fares in Illinois was filed with the Public Utilities Commission of that state at Springfield, Ill., on March 2, by Attorney Meyer J. Stein, of Chicago. Attorney Stein contends that with the return of the railroads to private control, the state rate of two cents a mile—set aside during federal control—is automatically restored. His suit is to recover $2.30 excess fare paid by him between Chicago and Springfield, on March 1. Attorney Stein declares that the Supreme Court of the United States has proclaimed the validity of the Illinois state rates in a test case heard prior to the war. No action was taken by the commission for the reason that the Transportation Act recently passed by Congress provides that present rates shall remain in effect without change until September 1.

The N. Y. & N. S. Traction Co.

A railroad buried so deep in ice that the owners are ready to give it away, believing that course to be more practicable than to try to uncover the rails, is one of the curiosities of the modern business world as illustrated in the New York City newspapers last week. This line is the New York & North Shore Traction Company, operating trolley lines from Flushing to Whitestone, and to Hicksville in Nassau County (Long Island), N Y. George A. Stanley, president of the company, has offered his line to the City of New York as a gift if the city will operate the road at a five-cent fare. He made this proffer at a hearing before the Public Service Commission for the First District called to investigate the action of the company in discontinuing service over all its lines. He said that at many points the company's tracks were buried beneath several inches, and in some cases several feet of ice, and that the company had no money with which to remove the encumbrances. He is willing, however, to resume service immediately after the ice shall have melted.

George A. Cullen Elected Vice-President of North American Fruit Exchange

George A. Cullen, passenger traffic manager and director of agricultural development of the Delaware, Lackawanna & Western, has been elected vice-president of the North American Fruit Exchange, Inc., 90 West street, New York, effective April 1.

The North American Fruit Exchange is now in its tenth year of operation. It maintains 119 sales offices in the United States and foreign countries and is engaged in the distribution and sale of fruits and vegetables in carload shipments, handling approximately 25,000 carloads of produce annually. It furnishes to its clients, consisting of various organizations of growers and individual producers in all parts of the country, a service consisting of day to day advice on market conditions, protection against irregular practices, supervision in the matter of grading, packing and shipping, assistance in securing suitable cars, etc. In its offices it maintains a salaried and bonded sales force and secures for the growers confirmed f. o. b. orders for car lots of fruits and vegetables daily. In short, it seeks to work out a scientific system of distribution for the commodities mentioned.

Besides being passenger traffic manager and director of agricultural development of the Lackawanna, Mr. Cullen was one of the originators and founders of the county farm

bureau system in America. During the war he served in Washington as the chief of a section of the United States Food Administration and was for a time in charge for the Railroad Administration of establishing and operating consolidated ticket offices

He will devote his entire attention to the North American Fruit Exchange and its affiliated companies.

Unification of Terminals at Chicago

The extent to which the various measures tending towards the unification of terminals in the larger cities, inaugurated during federal control, shall be continued following the return of the roads to private competitive operation has been receiving the attention of railway officers, particularly with reference to the situation at Chicago. Following a recent meeting of the Association of Railway Executives in New York City at which this subject came up for informal discussion, the Chicago situation has received special attention. While some of the measures inaugurated under federal control in Chicago may not be entirely desirable under private ownership, it is the general opinion, in view of the many advantages, unified operation should be continued for a time. While officers of a few roads have indicated a desire to put into effect more or less radical changes, it is probable that no definite steps of importance will be taken until opportunity has been afforded to ascertain the results which will follow the working out of the present system under the new form of control.

Standard Cars and Engines Allocated and Financed

Director General Hines announced on March 3 that all the equipment that was purchased by the Railroad Administration for the various railroads, consisting of 100,000 freight cars and approximately 1,930 locomotives, has been finally allocated and accepted by the various roads. The Division of Finance advises that where railroads were able and willing to pay for the cost of such equipment in cash, this has been done; that in the other instances the government has accepted the equipment trust obligations of the individual carriers whereby the cost is to be repaid in 15 annual installments at 6 per cent interest. Equipment trust obligations have been accepted from 74 of the railroad companies.

These are the obligations of the individual carriers, aggregate about $360,000,000, and are in such form as to enable the government, should it so desire, to carry out the plan for the creation of a National Equipment Corporation that would issue its own obligations and through the sale of such obligations the government be reimbursed. If it should be deemed desirable, however, for the government to sell the individual obligations of the carriers, it is in a position to do so; or if it prefers it can hold them, receiving the annual payments.

The condition of the money market in the past several months has not been such as to warrant the carrying through of the National Equipment plan. Just the method that the government may pursue in the sale of these obligations, should it decide not to carry the indebtedness itself, will of necessity be dependent on market conditions.

Valedictory of the Safety Section

Bulletin No. 13 of the Safety Section, Division of Operation, United States Railroad Administration, reports that for the month of December the number of employees killed on railroads operated by the government was 249, as compared with 242 in December, 1918, and of injured 11,903, ac compared with 11,776. With the bulletin are the usual supplementary statistics, together with summaries showing killed and injured, employees and other persons, for each month for the two calendar years 1918 and 1919.

A. F. Duffy, manager of the Safety Section, calling attention to the great accomplishments in safety during 1919, when the safety organizations were fully functioning, as compared with the slower progress in 1918, calls attention to the less favorable records made in December, 1919, and says:

"At the beginning of that month the realization that the dissolution of the Railroad Administration was probably a matter of days began to exert a baneful influence on the employees. In fact, the status of the safety departments of some of the roads practically reverted to that of the early months of 1918. There was everywhere a noticeable falling off in committee attendance, a lack of interest in turning in recommendations, and, in the discharge of duties a lessening of that vigilance which, inspired by safety precepts and constant exhortation on the part of the safety representatives, had, up to that time, saved so many lives and prevented so many injuries."

Mr. Duffy thanks the men who have co-operated with him, declaring their efforts and accomplishments remarkable. "The work in which we have been engaged is in its infancy. I look forward to the time when SAFETY, having reached a ripened maturity will be recognized as one of the most important factors in industrialism; when safety experts will be acclaimed as men of high profession, honored by their countrymen as benefactors."

Plans for the Atlantic City Conventions

The American Railroad Association and the Railway Supply Manufacturers' Association have announced plans for the annual convention to be held in Atlantic City, June 9 to 16, inclusive. The reports of committees of Section III—Mechanical—investigating locomotive matters will be received and discussed on Wednesday, Thursday and Friday, June 9, 10 and 11, and reports of committees on car matters will be taken up on Monday, Tuesday and Wednesday of the next week. The sessions of the Mechanical Section will be held in the morning to give time for viewing the exhibits. The Purchases and Stores Section of the American Railroad Association will hold its annual meeting on June 14, 15 and 16, in the Hippodrome.

The Railway Supply Manufacturers' Association has arranged to have exhibits in the balcony over the main building on Young's pier, which will make the total exhibit space approximately 100,000 sq. ft., an increase of 6,500 sq. ft. over 1919. Applications have already been made for practically all the available booths and a large number of new companies will be represented. All entertainment features will be held on the pier, as was done in 1919.

Further Troubles with Snow

The storm of March 5, 6 and 7, consisting of heavy rain, followed by snow, very low temperatures and high winds, made trouble for the railroads in northern New England, eastern New York, Massachusetts and Connecticut, and to some extent in New Jersey and Pennsylvania. In many places in New England the experiences were declared the worst of the Winter. The heavy masses of snow and ice which resulted from the earlier storms (noted in the *Railway Age* of February 20, page 527, and March 5, page 676), had melted but little and the difficulties of dealing with the new snow were, therefore, greater than those of the preceding weeks.

At Boston the storm changed from rain to snow on Saturday morning, and by Saturday evening blockades were reported in all directions; and many telegraph lines failed. Many important passenger trains were omitted and others were sent out with a minimum number of cars. On Monday more than 100 towns and villages in New Hampshire and Maine were reported as cut off, some of them being also without telegraph facilities. Through traffic between Boston and Portland was suspended for 36 hours or more. In the White Mountains tracks were covered in some places 25 ft. deep, and even deeper. Trains from the Central Vermont were sent to Boston by way of Greenfield, Mass., a detour of 50 miles or more. Boston reporters who called on receivers of produce got reports of "hundreds of carloads" of fruits and vegetables being frost-bitten. The Boston Chamber of Commerce reported that 2,500 volunteer shovelers were aiding the railroads in the region north of that city. At Concord, N. H., the employees of the railroad shops suspended work and went out to help the shovelers. The mayor of that city proclaimed a holiday and called on all citizens to help in clearing the streets. A similar course was followed in Pittsfield, Mass., and other places.

Passenger trains which could not make progress were, in most cases, held at stations where the passengers could be made comfortable; but in some cases sleeping cars (and their occupants) remained in one place all night. On a branch of the Delaware, Lackawanna & Western near Montrose, Pa., food was carried to the passengers on a snowbound

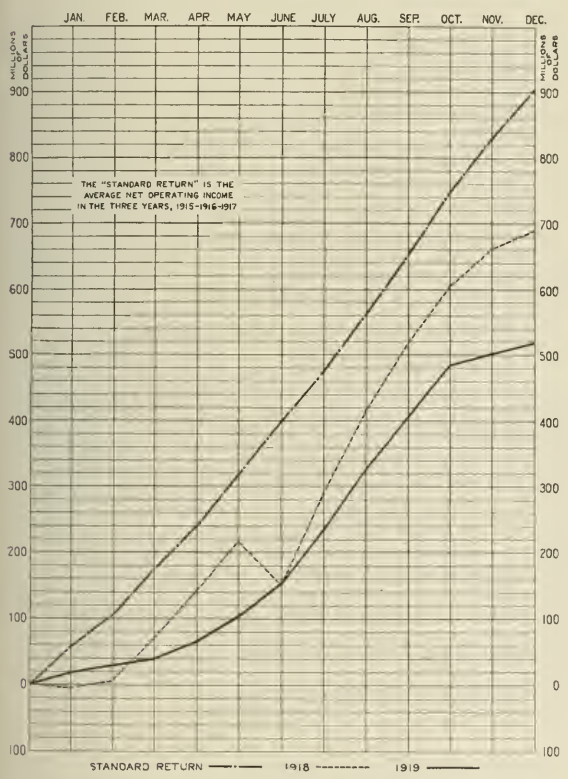
train by men on snowshoes. In eastern Pennsylvania floods caused much delay to trains.

At New Haven, Conn., the storm came on earlier and there was a general suspension of business on Saturday afternoon. The velocity of the wind was 50 miles an hour. In New York City there was considerable snow and the wind rose to 72 miles an hour.

On Wednesday, the 11th, the Boston & Maine and the Maine Central announced the full resumption of passenger service on all lines after "a storm-siege lasting, intermittently, for two months."

Net Operating Income in 1919

The chart made by the Bureau of Railway Economics shows the net operating income of the Class I roads in 1919, compared with the average in the test period (1915-1916-1917) on which



Net Operating Income, Cumulated by Months, 1918 and 1919, Compared with Standard Return, Class I Railways of United States.

governmental rental is based. The table gives the figures on which the chart is based:

NET OPERATING INCOME OF RAILROADS (CLASS I) IN 1919, COMPARED WITH TEST PERIOD (JUNE 30, 1914-JUNE 30, 1917)

Month	Standard return	Earnings in 1919
January	$56,613,000	$18,783,702
February	47,934,000	10,106,268
March	68,251,000	10,842,608
April	67,289,000	26,115,214
May	77,385,000	39,462,367
June	82,550,000	52,270,702
July	75,341,000	77,176,933
August	86,860,000	92,396,636
September	91,273,000	77,763,023
October	94,333,000	76,397,213
November	83,536,000	21,966,992
December	73,282,000	12,781,342
Total	$904,647,000	$515,793,287

The Square Deal; Team Work; Harmony

E. E. Loomis, president of the Lehigh Valley, in his circular to employees on the resumption of direct operation of the road, March 1, says:

"The co-operation and friendship between the management and those who work for it has been one of the happiest traditions of this company. It is my purpose to do everything possible to foster and continue this relationship. . . . To meet the nation-wide demand for increased production we must spare no effort to give the best that is in us in order to maintain the Lehigh Valley's excellent record. Every employee is assured a square deal, but there must be teamwork and harmony if we are to enjoy the satisfaction that goes only with work well done. We are going to count on you."

In a letter to officers, Mr. Loomis goes more into detail. This letter, which was sent to all officers exercising supervision, including yardmasters, roundhouse foremen, road foremen of engines, roadway supervisors, chief clerks, agents at important stations, says:

"It is reported that some roads at the end of Federal control propose to make drastic changes in the personnel of their organizations. This is not to be the case on the Lehigh Valley.

"We want all of our employees, however, to work earnestly while on duty to produce the highest degree of efficiency, and it is urged that you give your best efforts to obtain this result. In this connection, you should remember that a man directing others must be able to anticipate their grievances and meet them in a spirit of justice and fair play. He should first be sure he is right, then firmness must be one of his strongest characteristics. A weak and vacillating policy never wins respect from subordinates and no supervisory officers can achieve results without their respect.

"The management expects you to do your part towards maintaining a spirit of good-fellowship with its employees and at the same time be prepared to handle their problems without allowing them to develop into controversies."

Wireless Telephone Experiments on the New York Central

Major General George O. Squier, chief signal officer of the United States Army, well-known electrical inventor, has been making experiments on the Harlem and Putnam divisions of the New York Central with a radio telephone, in which the direction of the waves is guided by the telegraph or telephone wires strung along the line of railroad on poles, and by utilizing this aid of the wires he is able to send a number of communications along the line simultaneously, and he speaks to and from moving train. An account, in considerable detail, is given in the New York Central Magazine for February.

General Squier calls his system "wired wireless" and successful experiments were made between Elmsford, N. Y., and Millerton, 78 miles. The wire circuit which was made use of was at the same time being used for sending Morse messages (on two wires) and long distance telephone conversations.

Major General Squier began his researches ten years ago and received his basic patent January 3, 1911. He has renounced his rights in the invention, dedicating it to free use by the public. Tests have been made for a number of years, but the most important ones were those held early last month on the New York Central's long distance telephone wires. The tests are believed to have proved the feasibility of superimposing a number of additional telephone circuits on one pair of wires by using a different frequency of current. The wired wireless talk in this test was carried on for one hour without interruption and the transmission was excellent. The tests were made from a government experimental car stationed at Millerton, under the direction of Lieut. R. D. Duncan.

"Wired wireless" is a system of guiding radio currents by means of a wire. The currents do not travel through the wire, but travel alongside it; it guides them to their destination. The wave currents stay close to the wire, thus insuring not only reliability, but also secrecy. Thus the high frequency current which General Squier uses passes through the ether as do radio waves, with the difference that instead of being diffused it travels in a path of which the wire is the center. The apparatus is the ground set of the standard ground aeroplane radio telephone equipment. It consists of two three-electrode vacuum tubes of

the transmitting type, a powerful oscillator and a modulator, a connecting circuit and a two-stage audio frequency amplifier.

General Squier obtains his results by the use of electro magnetic waves or oscillation of high frequency. In his investigations he found that there was a range of frequencies which had hitherto been ignored and this range he utilized. The oscillations in this range are so delicate they cannot be detected by the unassisted ear and they have to be strengthened to bring them within the perception of our sensory apparatus.

General Squier has produced frequencies which reached 600,000 a second. These currents do no harm to ordinary telephone apparatus. General Squier in effect has taken the vibrations of wireless and used them on the telephone. He says:

"Since a plurality of high frequency waves of different frequencies can be impressed upon the same line and since these may be selectively separated from each other by suitably tuned circuits, it is obvious that multiplex telephony may be accomplished. These high frequency waves may exist on the same line with ordinary battery telephone circuits without in any way affecting them, and thus this system of multiplex telephony may be applied to the usual telephonic circuits without the presence of harmful effects, such as cross talk or other disturbances."

Expressmen Strike at Chicago

An unauthorized strike at Chicago, affecting approximately 65 per cent of the 2,500 employees of the American Railway Express Company, was called on March 6. The strike was called to enforce the demands of the employees, other than the teamsters and chauffeurs, for an increase in wages of $35 a month. After three days of idleness many of the striking employees made application to return to work, and it is thought that the strike will prove a fiasco.

As a result of the strike, an embargo was placed on all in and out business at depots and other affected points. Grover E. Simpson, general manager of the company, posted a notice on the bulletin boards of the various stations and depots informing the workers that the strike was unauthorized by the Brotherhood of Railway Clerks and its international officers. The Brotherhood has an agreement with the American Railway Express Company which, it is asserted by officers of the company, makes it illegal for the employees to strike without first having submitted their grievances to a board of arbitration.

J. A. Abbott, grand vice-president of the Brotherhood, who came to Chicago to reorganize the local union, made the statement that I. W. W. sympathizers among express handlers were responsible for the strike. "We have a unique situation in Chicago," Mr. Abbott said, "where a union leader, Chairman Shepherd, called an illegal strike, knowing that the nation-wide organization favors obeying the law. His action is not only a violation of every principle of union labor, but has resulted in throwing hundreds of men and women out of work and left them walking the streets penniless because they were afraid not to strike in face of this order. Allied with the move are a number of I. W. W.'s, that I know of, and their following is radical and of the Bolshevist type."

It is rumored that another cause of dissatisfaction among the strikers is that wagon dispatchers, general foremen and others, numbering over 400, were recently granted an increase in wages of $35 a month. The express company officers assert that these men were granted the increase because subordinates to them were making more money because of overtime.

The situation at Chicago is serious at some points and unaffected at others. The embargo on in and out business will be enforced until the strike is settled.

A New Joint Committee on Concrete and Reinforced Concrete

A new Joint Committee on Standard Specifications for Concrete and Reinforced Concrete has just been organized to consist of five representatives each from the American Society of Civil Engineers, the American Society for Testing Materials, the American Railway Engineering Association, the Portland Cement Association and the American Concrete Institute.

The purpose of the committee is to make a thorough study of all available data on the subject of concrete, concrete materials and reinforced concrete and to incorporpate the most modern information and experience into a general specification which may serve as a pattern for detailed specifications covering specific types of concrete construction. The new "joint committee" may be considered as the successor of the "Joint Committee on Concrete and Reinforced Concrete," which was organized in 1904, through the co-operation of the same engineering and technical societies. The original joint committee presented its final report to the parent organizations in 1916.

The membership of the present "joint committee" is given below:

American Society of Civil Engineers:
- R. P. Miller (chairman), consulting engineer, New York.
- W. K. Hatt, Purdue University, La Fayette, Ind.
- A. E. Lindau, Corrugated Bar Company, Buffalo, N. Y.
- W. A. Slater, Bureau of Standards, Washington, D. C.
- S. E. Thompson, consulting engineer, Boston, Mass.

American Railway Engineering Association:
- J. J. Yates (chairman), bridge engineer, Central of New Jersey, New York.
- G. E. Boyd, division engineer, Delaware, Lackawanna & Western, Buffalo, N. Y.
- F. E. Schall, bridge engineer, Lehigh Valley, Bethlehem, Pa.
- C. C. Westfall, engineer of bridges, Illinois Central, Chicago.
- H. T. Welty, engineer of structures, New York Central, New York City.

American Concrete Institute:
- S. C. Hollister (chairman), consulting engineer, Philadelphia, Pa.
- R. W. Lesley, Philadelphia, Pa.
- A. R. Lord, Lord Engineering Company, Chicago.
- E. J. Moore, Turner Construction Company, New York.
- L. C. Wason, Aberthaw Construction Company, Boston, Mass.

Portland Cement Association:
- F. W. Kelley (chairman), Helderberg Cement Company, Albany, N. Y.
- Ernest Ashton, Lehigh Portland Cement Company, Allentown, Pa.
- J. H. Libberton, Universal Portland Cement Company, Chicago.
- E. D. Boyer, Atlas Portland Cement Company, New York.
- D. A. Abrams, Lewis Institute, Chicago.

American Society for Testing Materials:
- R. L. Humphrey (chairman), consulting engineer, Philadelphia, Pa.
- L. S. Moisseiff, consulting engineer, New York.
- H. H. Quimby, department of city transit, Philadelphia, Pa.
- A. T. Goldbeck, U. S. Bureau of Public Works, Washington, D. C.
- E. E. Hughes, Franklin Steel Company, Franklin, Pa.

At the organization meeting of the committee held at the Engineers' Club, Philadelphia, on February 11, 1920, the following officers were elected: R. L. Humphrey, chairman; J. J. Yates, vice-chairman; D. A. Abrams, secretary-treasurer. Committees consisting of five to seven members each were organized to take up the following subjects: (1) Concrete materials. (2) metal reinforcing. (3) proportioning and mixing. (4) forms and placing. (5) design. (6) details of construction. (7) waterproofing and protective treatment. (8) surface finish. (9) form of specification. A number of the committees have organized and are actively engaged in the preparation of their preliminary reports. The next meeting of the committee will probably be held at Asbury Park, N. J., about June 22, during the annual convention of the American Society for Testing Materials.

Assistant Directors Named in New Transportation Bureau

The Division of Transportation recently established under the direction of the American Petroleum Institute, as announced in these columns on February 27, will have its headquarters in the National Life Insurance Building, Chicago, with M. J. Gormley director; L. M. Betts, formerly transportation assistant in the regional director's office of the Northwestern region, and prior to federal control superintendent of car service of the Belt Railway of Chicago; D. B. McIntyre, formerly transportation assistant in the regional director's office, Northwestern region, and later assistant traffic manager of the Simmons Company, Kenosha, Wis., and Colonel E. H. Shaughnessy, trainmaster of the Chicago & North Western and formerly general manager and acting director-general of the Advance Section, transportation department of the A. E. F., have been named as assistant directors.

The American Petroleum Institute, which occupies the same relative position in the oil industry as the American Railroad Association does in connection with the railroads, represents practically the entire ownership of petroleum service tank cars in the United States. According to the institute, it is anticipated that during the present year there will be a greater demand for petroleum and its products than

has ever been known before. It is hoped that the formation of this Division of Transportation, working along the following lines, will greatly assist in alleviating the traffic congestion which will arise from this increased demand.

L. M. Betts entered railway service with the Chicago & Western Indiana in 1900 as a stenographer in the operating department, shortly afterward becoming chief clerk to the superintendent, then serving as chief clerk to the general superintendent and general manager of the Chicago & Western Indiana and the Belt Railways of Chicago. In 1911 Mr. Betts was appointed superintendent of car service for the Belt Railway, holding this position until the railways passed to government control, at which time he was appointed supervisor of car service for the Western region, United States Railroad Administration, continuing in the same capacity with the Northwestern region when it was formed. Mr. Betts was later appointed transportation assistant in the regional director's office of the Northwestern region, leaving that position to take up his new work.

D. B. McIntyre entered railway service in 1898 as a telegraph operator on the Wisconsin division of the Chicago & North Western, serving subsequently as train despatcher in Chicago from 1902 to 1913, chief despatcher from 1913 to 1916 and as train master from 1916 to 1918, or until the railways passed to government control. Mr. McIntyre was then appointed one of the transportation assistants in the regional directors' office of the Northwestern region, remaining there until June, 1919, when he resigned to become assistant traffic manager of the Simmons Company, Kenosha, Wis., with which company he remained until called to his new work.

Colonel E. H. Shaughnessy has been trainmaster on the Chicago & North Western, at Sterling, Ill., since his return from service overseas. His sketch and photograph were published in the *Railway Age* of November 29, 1919.

The Second Railroad Conference of the American Association of Engineers to Be Held at Chicago

The program has been announced for the second railroad conference of the American Association of Engineers which will take place at the Congress Hotel, Chicago, on March 15. With a total membership of 4,000 in the 52 railroad sections of the association, a large attendance is anticipated. The program for the three sessions of the meeting is presented below:

9 A. M.

Chairman, W. W. K. Sparrow, assistant chief engineer, Chicago, Milwaukee & St. Paul. This session will be devoted to registration, reports of railroad sections, etc.

2 P. M.

Chairman J. R. Leighty, corporate engineer, Missouri Pacific. Plans for Future Railroad Work for the A. A. E., George W. Hand, assistant to the president, Chicago & North Western. Discussion led by J. B. Jenkins, valuation engineer, Baltimore & Ohio, and F. E. Morrow, chief engineer, Chicago & Western Indiana.

Railroad Sections, Their Organization and Functions (speaker to be announced later).

Railroad Sections, Their Relation to the Railroad Management, F. C. Huffman, principal assistant engineer, Chicago & North Western.

Railroad Sections, Their Relation to the Chapters, by Paul Augustinus. Discussion led by W. B. Crenshaw, principal assistant engineer, Southern Railway; F. P. Patenall, signal engineer, Baltimore & Ohio, and William J. H. Strong.

The A. A. E. Railroad Salary Schedule, by W. C. Bolin. Discussion led by R. W. Barnes, C. F. Bower, A. M. Knowles, assistant engineer, B. & O., and O. R. West, assistant division engineer, Atchison, Topeka & Santa Fe Coast Lines.

8 P. M.

Chairman, W. H. Hoyt, chief engineer, Duluth, Missabe & Northern. The Classification and Compensation of Engineers, to be discussed by members of Engineering Council's committee on this subject, Arthur S. Tuttle, Bion J. Arnold and Oscar C. Merrill.

Problems of the Railroads Since Their Return to Private Control, by S. M. Felton, president, Chicago Great Western.

The American Association of Engineers—Its Aims and Ideals, by F. H. Newell, president of the association.

Traffic News

The Mexico Northwestern has increased all passenger and freight rates 20 per cent. effective March 4.

G. A. Rautenberg, assistant traffic manager of Anderson & Gustafson, Inc., Chicago, has been appointed traffic agent for Guggenheim Brothers, meat packers, Chicago.

The Philadelphia & Reading announces the restoration of the former custom of accepting local tickets in either direction, and also the abolition of the rule restricting season tickets to an even calendar month.

Jesse J. Robinette, chief clerk in the special service department of the Traffic Service Corporation, with headquarters at Washington, D. C., has resigned to become traffic manager for the Jonesboro (Ark.) Chamber of Commerce.

William J. Young, assistant to the regional director of the Northwestern region, with headquarters at Chicago, has been appointed office manager in charge of the distributing department of the Goodyear Tire & Rubber Company, Akron, Ohio, with office at Chicago.

Work at the docks of the Southern Pacific Company at Galveston, Tex., was resumed on February 20, after an unsuccessful strike which had lasted 14 days. The 900 workmen were all taken back and they began at once unloading five steamships which had been tied up two weeks. The men receive 60 cents an hour; they struck for 90.

After a conference with representatives of the governors of the Mexican states of Sonora and Sinaloa, Epes Randolph, president of the Southern Pacific of Mexico, recently announced that through Pullman service will be inaugurated from Los Angeles, Cal., and Arizona points to Mazatlan, Mex., in the near future.

The Cape Cod Canal, which was surrendered by the government on the night of February 29, was closed to traffic for three days because of uncertainty in the minds of the owners as to whether or not they could resume operation pending the settlement of the question as to the amount which the government is to pay for the canal. Traffic was resumed on March 4.

The consolidated ticket office at Denver, Col., has been given up by the roads which used it during the period of government control. The Union Pacific, the Missouri Pacific and the Southern Pacific have moved their offices to the Denham building. The Atchison, Topeka & Santa Fe, the Chicago, Burlington & Quincy, and the Chicago, Rock Island & Pacific will continue their offices in the Union station.

The embargo placed by B. Bush, regional director of the southwestern region, on October 23, 1918, against all c. l. and l. c. l, freight at Burkburnett, Tex., and Wichita Falls on the Missouri, Kansas & Texas of Texas and the Wichita Falls & Northwestern, was cancelled by the Katy on March 1. The slowing up of oil production and the clearance of accumulation are the reasons given for lifting the embargo.

Suits for losses on damaged cotton, aggregating more than $1,000,000 were filed in the Superior Court of Glynn county, by cotton brokers at Brunswick, Ga., in February, against Walker D. Hines, director general of railroads. The plaintiffs are said to be among the largest cotton brokers in the country and they say that thousands of bales of cotton have been damaged while in the storehouses of the Atlanta, Birmingham & Atlantic and the Southern Railway. Most or all of the cotton was in freight houses in Brunswick, awaiting shipment to Europe.

The New York State Barge Canal (which, to be of use in the transportation of grain and other commodities, needs better terminal facilities than are now available), was the subject of a report and discussion before the Chamber of Commerce of

the state of New York, in New York City, on March 4, and resolutions were adopted favoring the submission to the voters of the state of a proposal to issue bonds for the sums necessary to build the necessary grain elevators and other terminal structures. It is estimated that the needed facilities will cost $25,000,000.

Brig. Gen. Hines Superintendent of Inland & Water Transportation

The Secretary of War has delegated to Brig. Gen. Frank T. Hines, chief of the transportation service, control of the inland waterways transportation system which were transferred to the jurisdiction of the War Department under the Transportation Act. Gen. Hines says that the same service will be maintained for the present and that he will utilize the existing organization and personnel in administering the work. A delegation of Senators and Representatives from the Mississippi valley and other sections interested in waterway traffic called on Secretary Baker to request that present facilities be maintained and extended and that railway corporations be prevented from strangling water competition.

I. C. C. Recommends Continued Use of Uniform Coal Car Distribution Rules

The Interstate Commerce Commission on March 2 issued the following notice to carriers and shippers, recommending the continued use of the Railroad Administration's uniform mine rating and car distribution rules:

"The supply of cars available for the transportation of coal is insufficient to meet the demand. Unusual movements incident upon the strike of coal miners have brought about an abnormal location of cars. It is desirable that the proper relocation of cars shall be brought about as rapidly and with as little confusion as is possible. Critical situations still exist in which fuel for essential industries and purposes must be provided. The railroads and the coal operators have all been working under the uniform mine-rating and car-distribution rules established by the Railroad Administration and those rules seem to be generally satisfactory and to meet with general approval.

"To the end that conflicting and contradictory rules on different roads and in different fields may be avoided, the commission recommends that until experiences and careful study demonstrate that other rules will be more effective and beneficial and especially during the remainder of the early spring the uniform rules as contained in the Railroad Administration's Car Service Section Circular CS-31 (Revised) be continued in effect."

These rules were published in the *Railway Age* of January 16, page 258.

New Canadian Live Stock Contracts

The Board of Railway Commissioners of Canada is engaged in the drafting of a new contract affecting the transportation of livestock by rail in the Dominion. A hearing was held before the board at Ottawa, Ont., on February 10, at which representatives of the Canadian Pacific, the Canadian National, the Grand Trunk and the Michigan Central and representatives of the shippers and various public bodies were represented. The disputed provisions of the proposed contract concerned to limitation of liability for loss or damage to livestock and the release of responsibility for accident to attendants.

The shippers contended that all care of the animals while in transit should devolve upon the railway. They base their suggestions upon the lack of accommodations for attendants and because the average price obtainable for livestock makes it imperative that the railway companies assume responsibility for safe delivery.

The railway companies pointed out the essential difference between the conditions relating to the transportation of livestock and those appertaining to dead freight and urged that, owing to the inherent nature of the livestock traffic and its susceptibility to damage, it is essential that the carriers should be permitted to limit their responsibility in respect to it. The low basis of rates applicable to livestock, as compared with certain classes of dead freight not susceptible to injury, was also brought forward as an argument against the proposed complete liability of the railroad

Commission and Court News

Interstate Commerce Commission

The Commission has issued revised rules of practice in proceedings before the commission under the act to regulate commerce, as amended, which were adopted on March 2.

The Commission has issued an order authorizing carriers to make tariff changes, upon not less than one day's notice, in conformity with the provisions of Section 418 (5) of the transportation act, which requires that charges for carload lots of livestock destined to or received at public stock yards shall include all necessary service of unloading, reloading, delivery, etc.

The Commission has issued an order authorizing carriers until September 1, 1920, unless otherwise ordered, to make changes designated in its order in tariff publications which contain lists of stations, landings or express offices and information regarding station conditions and facilities and lists of restricted and prohibited articles in so far as said changes result in reduced rates, fares or charges. The new transportation act prohibits tariff changes resulting in reductions in rates during the six months' guaranty period, unless approved by the commission.

Court News

"First Instance Tariff"—Effect of Changes

The Minnesota Supreme Court holds that a tariff providing for the absorption by the carrier of the switching charges of connecting carriers at destination, where, under the tariff theretofore published the shipper was required to pay such charges, is a change in an existing tariff, and not a "first-instance tariff," within the meaning of the Minnesota statute of 1905. A change of tariff voluntarily made, reducing rates to all shippers on all commodities, at all stations in the state, becomes effective without obtaining the consent of the state Railroad Commission, as provided by the act. After such a change has been made, the original rate cannot be restored without the consent of the Commission.—National Elevator Co. vs. Chicago, M. & St. P. (Minn.), 173 N. W. 418.

Easement for Years for Right of Way —Rights on Expiration

A railroad may accept a conveyance of land upon any condition that may lawfully be annexed to an ordinary grant; and such a contract may create an estate less than a fee in land taken for a right of way. A contract between a railroad and a landowner provided for an easement for years for a right of way to the railroad. The California Court of Appeal, First District, holds that if at the expiration of the estate granted, the land was necessary for the railroad for railroad purposes, and the corporation or its successor elected to continue its use for a right of way, it could do so by compensating the reversioner. Otherwise it must abandon this portion of its right of way and surrender possession to the owner of the estate in reversion.—Conlin vs. Southern Pacific (Cal.), 182 Pac. 67.

United States Supreme Court

Employee and Employer Railroad Cannot Be Sued in One Count

An injured employee brought an action in a state court of Georgia jointly against a railroad and its engineman, and sought in a single count, which alleged concurring negligence, to recover damages from the company under the Federal Employers' Liability Act and from the individual defendant under the common law. Each defendant filed a special demurrer on the

ground of misjoinder of causes of action and misjoinder of parties defendant. The trial court overruled the demurrers, but the State Supreme Court, on a certified question, held that such joinder was not permissible, and this judgment (147 Ga. 428) has been affirmed by the Supreme Court of the United States. To deny to a plaintiff the right to join in one count a cause against another employee with one against the employer in no way abridged any substantive right of the plaintiff against the employer. The argument that the plaintiff had been discriminated against because he was an interstate employee was held answered, if answer was necessary, by the fact that the Supreme Court of Georgia had applied the same rule in Western & Atlantic v. Smith, 144 Ga., 737 (22 Ga. App. 437); Lee v. Central of Georgia. Decided March 1, 1920.

Mail Carrying Contracts—Deductions for Delay

The Kansas City Southern sued the government in the Court of Claims, alleging that in June, 1906, it entered into contracts with the Post Office Department to transport the mails over three designated routes "upon the conditions prescribed by law and the regulations of the Department applicable to railroad mail service;" that during the fiscal year 1907 (the petition was not filed until December 19, 1912) the Department withheld from its stipulated pay $3,355.48, "as a penalty imposed on account of late arrivals of trains, and failure to perform service on the mail routes," and that such deuctions were "unlawfully withheld." The prayer was for the full amount of the deductions. The petition was dismissed by the Court of Claims.

On appeal to the Supreme Court of the United States, the railroad argued that when the contracts were made, long departmental construction had limited the failure to perform service, described in Revised Statutes, Sec. 3962, giving the power to make the disputed deductions, to 24 hours of delay in the arrival of trains, and that failure, from 1872, when the section was enacted, to 1907, to impose fines or deductions for shorter delays, amounted to a construction by the Department that authority to impose fines upon contractors for delinquencies did not warrant deductions for failure to maintain train schedules when the delay was less than 24 hours.

Rejecting the contention, and affirming the judgment of the Court of Claims, the Supreme Court said, per Mr. Justice Clarke:

"Failure, within moderate limits, to maintain train schedules may well have been regarded by the Postmaster General as a necessary evil to be tolerated and not to call for the exercise of his power to impose fines under the statute, when more flagrant neglect to maintain such schedules might very justly require him to exercise such authority in order to prevent intolerable public inconvenience. We cannot doubt that the contracts of the appellant, and the law which was a part of them, furnished ample authority for the action of the Department in this case and that omission to exercise such power did not make against the prper use of it when, in the judgment of the Postmaster General, adequate occasion for its use should arise."—K. C. S. v. U. S. Decided March 1, 1920.

Stock Dividends Not Income

Stock dividends declared by a corporation representing its own surplus are not taxable as income, the United States Supreme Court held in a decision rendered on March 8, declaring unconstitutional the provisions of the income tax law of 1916 applying the tax to stock dividends declared on earnings and profits accruing after March 1, 1913. The case, which involved a stock dividend of the Standard Oil Company of California, was decided five to four, Justices Holmes and Day joining in one dissenting opinion, and Justices Clark and Brandeis in another. In the majority opinion, sustaining the decree of the lower court, Justice Piney said:

"The stock dividend is no more than a book adjustment, in essence not a dividend, but rather the opposite. No part of the assets of the company is separated from the common fund . . . nothing distributed except paper certificates that evidence an antecedent increase in the value of the stockholders' capital interest resulting from an accumulation of profits by the company, but profits so far absorbed in the business as to render it impracticable to separate them for withdrawal and distribution.

"Far from being a realization of profits of the stockholder, it tends rather to postpone such realization, in that the fund represented by the new stock has been transferred from surplus to capital, and no longer is available for actual distribution.

"The essential and controlling fact is that the stockholder has received nothing out of the company's assets for his separate use and benefit; on the contrary, every dollar of his original investment, together with whatever accretions and accumulations have resulted from employment of his money and that of the other stockholders in the business of the company, still remains the property of the company, and subject to business risks which may result in wiping out the entire investment.

"Having regard to the very truth of the matter, to substance and not to form, he has received nothing that answers the definition of income in the meaning of the sixteenth amendment.

"We are clear that not only does a stock dividend really take nothing from the property of the corporation and add nothing to that of the shareholder, but that the antecedent accumulation of profits evidenced thereby, while indicating that the shareholder is the richer because of an increase of his capital, at the same time shows he has not realized or received any income in the transaction."

Deductions from Mail Contract Pay to Land-Aided Companies

For forty-one years after the completion of the 60-mile railroad from Port Huron to Flint, Mich., the mails were carried over it by the successive owners under the usual postal contracts. In 1912 the Postmaster General, concluding that this was a land-aided railroad within the provisions of section 13 of the act of 1876, and entitled only to 80 per cent of the ordinary compensation restated the account for the twelve full years during which the road had been operated by the Grand Trunk Western, since it acquired the road in 1900. Twenty per cent of the mail pay for that period was found to be $50,359.70, and this amount he deducted from sums accruing to the company under the current mail contract, and also reduced the amount under the current contract by 20 per cent. The road had in fact been built without any aid through grant of public lands. None had passed to the Grand Trunk Western when it acquired the road, and, so far as appeared, that company had no actual knowledge that any of its predecessors in title had acquired any public land because of its construction. It brought suit in the Court of Claims to recover the amount deducted. Its petition was dismissed and it appealed.

By an act of June 3, 1856, Congress granted to the State of Michigan certain public lands to aid in the construction of certain lines of railroad, a part extending easterly of Flint to Port Huron—another part westerly of Flint to Grand Haven. The act contained the usual mail provision. It contemplated a grant of six sections (3,840 acres) per mile of road. That would have been 230,400 acres for the sixty miles. The company which built the road and those claiming under it received at most 6,428 acres, the title to a great part of the land granted having proved to be invalid. The case was one of apparent hardship. The Supreme Court of the United States has affirmed the judgment of the Court of Claims for the following reasons: If the railroad was land-aided, payment of more than 80 per cent of the full rates otherwise provided by law was unauthorized, and it was the Postmaster General's duty to seek to recover the overpayment. If it was land-aided, it was immaterial that the company which later carried the mail over it received none of the land and obtained no benefit from the grant. The obligation to carry mails at 80 per cent of rates otherwise payable attached to the road like an easement or charge, and it affected every carrier who might thereafter use the railroad whatever the nature of the tenure. Chicago, St. Pa. & M. v. U. S. 217 U. S. 180. The railroad expressly disclaimed any contention that the mail clause should not apply because the quantity of land covered by the grant was small as compared with that contemplated by the Act of June 3, 1856, and with the cost of the road. The contention that the railroad was no land-aided because it had, in fact, been completed without the aid either of funds or of credit derived from these public lands was not sustained. The successor railroad was in no better position than the acceptor of the grant to question the charge imposed by such acceptance.—Grand Trunk Western v. U. S. Decided March 1, 1920.

Equipment and Supplies

Locomotives

THE VIRGINIAN RAILWAY is inquiring for 10 Pacific type locomotives.

THE GRAND TRUNK has ordered 25 switching locomotives from the Lima Locomotive Works.

THE CAMBRIA & INDIANA has ordered 2 Consolidation locomotives from the Baldwin Locomotive Works.

THE SUMPTER VALLEY has ordered 2 Mikado type locomotives from the American Locomotive Company. These locomotives will have 19 by 20 in. cylinders and a total weight in working order of 128,000 lb.

THE GREAT NORTHERN order for 50 locomotives reported in the *Railway Age* of February 27 included 45 Mikado type locomotives placed with the Baldwin Locomotive Works, 14 to use oil for fuel and 31 to use coal.

THE OREGON LUMBER COMPANY, Portland, Ore., has ordered 3 Mikado type locomotives from the American Locomotive Company. These locomotives will have 20 by 28 in. cylinders and a total weight in working order of 174,000 lb.

THE CANADIAN NATIONAL RAILWAYS, reported in the *Railway Age* of February 27 as having ordered 55 locomotives, from the American Locomotive Company, have ordered 12 additional Pacific type locomotives from the same company.

THE AKRON, CANTON & YOUNGSTOWN has ordered 2 eight-wheel switching locomotives from the American Locomotive Company. These locomotives will have 25 by 28 in. cylinders and a total weight in working order of 214,000 lb.

THE RIVERSIDE PORTLAND CEMENT COMPANY, Riverside, Cal., has ordered one six-wheel switching locomotive from the American Locomotive Company. This locomotive will have 18 by 24 in. cylinders and a total weight in working order of 128,000 lb.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for a second-hand, 36 in. gage Mogul type locomotive, with 9 by 14 in. or 10 by 14 in. cylinders, weighing about 18 to 20 tons, for Pacific coast delivery.

Freight Cars

THE CHARLOTTE HARBOR & NORTHERN has ordered 100, 50-ton phosphate cars from the Pressed Steel Car Company.

THE UNITED FRUIT COMPANY has ordered 50 steel underframe flat cars of 50,000 lb. capacity from the Magor Car Company. These cars are for use on its railroads in Honduras.

NEW YORK CENTRAL.—The time for opening bids has been extended from March 10 to March 15 for the 5,800 steel box cars, 4,600 hopper cars of 55 tons capacity and 1,100 gondolas of 50 tons capacity, reported in the *Railway Age* of February 27.

CANADIAN PACIFIC.—A press despatch from Montreal, Que., dated March 8, reports that this road has given out equipment orders totalling about $15,000,000, including 2,500 60-ton box cars, 500 refrigerators, 500 automobile cars, 67 ore cars. A part of this order will be built at the works of the company, and the Canadian Car & Foundry Company will build a part of the cars.

Passenger Cars

CANADIAN PACIFIC.—The equipment orders reported in a despatch from Montreal, noted above under freight cars, include: 12 dining cars, 53 sleepers, 13 compartment cars and 24 baggage cars.

Iron and Steel

THE UNITED FRUIT COMPANY has ordered 1,400 tons of 60-lb. rails for export to Cuba.

Supply Trade News

A. G. Williams, manager export department of the **American Steel Foundries,** Chicago, Ill., sailed from Seattle, Wash., on March 1 for China and Japan, to develop new business in those countries.

The Tacony Steel Company, Philadelphia, Pa., has opened a new office in the Marquette building, Chicago, in charge of **Frank B. Hillwick,** district sales manager. Mr. Hillwick was formerly in the sales department of the Crucible Steel Company of America, Pittsburgh, Pa., and prior to that with the Bethlehem Steel Company, Bethlehem, Pa.

The Algoma Steel Corporation, Sault Ste. Marie, Ont., is purchasing equipment for its new combined rail and structural mill, which it is erecting at Sault Ste. Marie. The principal buildings will be of structural steel construction with corrugated iron covering.

Duncan W. Fraser, who has been elected a vice-president of the **American Locomotive Company,** as was announced in the *Railway Age* of March 5, was born in Pictou county, Nova Scotia, Canada, in 1875, of Scotch ancestors. He was educated in Nova Scotia public schools and at the age of 18 went to Providence, R. I., where he served a four-year apprenticeship course in the shops of the Rhode Island Locomotive Works, later the Providence plant of the American Locomotive Company. With the exception of three years in the service of the Brown & Sharpe Manufacturing Company, Providence, R. I., he continued in the service of the locomotive works until 1904.

D. W. Fraser

In that year the Montreal Locomotive & Machine Company, of Montreal, was bought by the American Locomotive Company and Mr. Fraser was transferred to that plant, serving consecutively as gang boss, sub-foreman and assistant foreman, until 1906, when he was appointed general foreman of the machine departments. In 1908, he was appointed assistant superintendent and later served as superintendent, until December, 1910, when he was made works manager. On February 15, 1917, he was appointed general manager of the Montreal Locomotive Works, Limited, in charge of sales and manufacturing, and in November, 1919, he was appointed managing director of that company. On March 1, 1920, he was appointed vice-president in charge of sales of the American Locomotive Company and vice-president in charge of domestic sales of the Montreal Locomotive Works, Limited, with headquarters at New York, to succeed James D. Sawyer, resigned.

At a recent meeting of the stockholders of the **Buffalo Forge Company,** Buffalo, N. Y., new officers were elected as follows: **Henry W. Wendt,** president; **Edgar F. Wendt,** vice-president and treasurer; **Henry W. Wendt, Jr.,** vice-president and secretary; **C. A. Booth,** vice-president and sales manager. The new directors include the above named officers and in addition **H. S. Whiting.**

The **American Steam Conveyor Corporation,** Chicago, announces that arrangements have been made with the **Wellman Bibby Company, Ltd.,** 36 Kingsway, London, W. C. 2,

England, to act as its representative in Great Britain and Ireland for the sale of the American steam ash conveyor. The Wellman Bibby Company intends to manufacture the American steam ash conveyor in England. This company is well known in the British Isles and handles the sale of a number of American engineering products there.

James Denison Sawyer, who resigned as vice-president of the **American Locomotive Company,** as was announced in the *Railway Age* of March 5, was born in 1875, at Buffalo, N. Y., and graduated from Yale University in 1896. He entered the service of the Brooks Locomotive Works, Dunkirk, N. Y., in May, 1898, and served in various departments of the works until the formation of the American Locomotive Company in June, 1901. He then became assistant to the second vice-president, who was at that time R. J. Gross, in charge of the sales department. In July, 1904, he was transferred to the New York office in the same capacity, and in 1907 became manager of sales, which position he held until February 1, 1917, when he became vice-president of the company in charge of the sales department. Mr. Sawyer resigned on March 1 to become vice-president of the banking firm of Morton & Co., Inc., New York.

A. T. Shurick, a mining engineer on the business staff of the Coal Trade Journal, has been elected a vice-president of **F. C. Thornley & Co., Inc.,** with offices at 31 West Forty-third street, New York. This company designs, constructs and organizes for operation installations for the mechanical handling of any material on a large or small scale. It also acts in a consultnig capacity in the valuation and appraisal of properties, preparation of engineering reports, etc. Mr. Shurick has had a long and varied experience in the development and operation of mining properties. In addition to his other duties he will be in direct charge of the mining operations of the company. He received his engineering training at the Virginia Polytechnic Institute and was engaged in active practice for ten years with the Rock Island Coal Company, the Mexican Coal & Coke Company, and as engineer of coal properties for the Anaconda Copper Mining Company. He joined the editorial staff of the Coal Age when that journal was started in 1911, and at the beginning of the World War, he entered the army and served as a capitain with the 209th Engineers. For the past year he has been, first, technical editor, and later business manager of the Coal Trade Journal. The official personnel of F. C. Thornley & Co. has been identified with the construction of some of the largest material handling installations in the country, including the Curtis Bay coal loading pier and pier No. 5, at Locust Point for the Baltimore & Ohio, at Baltimore, Md., the locomotive coaling station with storage for the Erie at Bailey avenue roundhouse, East Buffalo, N. Y., the New Jersey avenue fuel yard of the Bureau of Mines at Washington, D. C. Mr. Thornley, personally, has been retained as consulting engineer, dealing with large handling projects at various times by the Baltimore & Ohio, the New York, New Haven & Hartford, the Inland Steel Company, the Solvay Process Company and others.

A. T. Shurick

Erie's Hornell Shops Leased to Private Firm

The Hornell Repair & Construction Company, a concern newly organized for that purpose, on March 6 assume control of the Erie Railroad shops, roundhouse and car repair yards at Hornell, N. Y. By a contract made on March 1 the new company has leased the shops and will henceforth manage and operate them as a private plant. The officers and employes have been continued in the same positions, the prevailing wage scales, the working conditions and transportation privileges maintained.

The new concern is headed by Hornell business men and its officers consist of Martin F. Woodbury, president; Justin B. Bradley, vice-president; Robert W. Bull, secretary; John F. Nugent, treasurer. Burr L. Smith is a director and Francis M. Cameron attorney.

In the announcements of the step statements are made that it is hoped that the more direct control of operations will prove more efficient and economical than the former method to control. It is understood that the shops will be improved and enlarged.

Railway Steel-Spring Company

The annual report of the Railway Steel-Spring Company for the year ended December 31, 1919, shows net earnings of $4,394,354 after deducting expenses for manufacturing, depreciation, etc. Dividends of 7 per cent on the preferred stock totaled $945,000 and of 8 per cent on the common stock, $1,080,000. There was also $1,200,000 reserved for taxes, leaving a surplus for the year of $1,169,354.

President F. F. Fitzpatrick, speaking in his report concerning the work for the year, says in part: "Taking into consideration the period of adjustment from a war to a peace time basis, the results from operations during the year were satisfactory. During the early part of the year 1919 the production of the company was large, due mainly to orders for material for export received during the latter part of the previous year. There was a falling off in new business during this period, which was reflected in a reduced production for the last half of the year. Before the end of the year 1919 there was a marked improvement in domestic and some improvement in foreign business, which still continues. Furthermore, there is every indication that large orders for locomotives, passenger cars and freight cars will be placed during the present year, in which business your company will participate. With the substantial orders now on our books and the favorable outlook, it would appear that the results from operations for 1920 will be very good."

American Steel Foundries

The American Steel Foundries' annual report for the year ended December 31, 1919, shows earnings from operations of $6,107,825. This included earnings of the Griffin Wheel Company for the six months since its acquisition and also amounts received in settlement of war contracts and was after deducting expenses of manufacturing, selling and administration. From the earnings $333,296 was deducted for depreciation, leaving a net profit from operations of $5,774,529, which was brought up to $6,115,007 by miscellaneous income of $340,478. The net profits for the year after the deduction of interest and reserve for taxes, etc., was $4,210,634. After providing for the preferred dividends of $296,846 the earnings for the year were equivalent to about $7.50 a share on the common stock ($33.33 par value). Common stock dividends totaled $1,503,600 and the company retired during the year $344,000 par value 4 per cent debentures. President R. P. Lamont in his report speaks of the broadening out of the company's activities in the purchase of the Griffin Wheel Company and through the establishment of the American Autoparts Company at Detroit to manufacture automobile springs. In speaking of the outlook for the coming year, he says:

"It is difficult to forecast the results for the present year. If we judge our prospects by the known necessities of the railroads we should have a good year. . . . If the railroads go back to their owners under any sort of a fair plan there will undoubtedly be heavy buying of equipment as soon as the necessary details can be worked out. . . .

"Any considerable amount of railroad business added to the present volume of general business will still further add to the scarcity of labor, increase our costs and make operating conditions generally just that much more difficult. The effect of these unfavorable operating conditions may be reflected in the earnings, but your plants and organization are in position to handle their share of whatever business offers and we are hopeful of a good year."

A stockholders' meeting of the company will be held in Jersey City, N. J., on March 18, to consider authorizing an increase in the common stock from 515,520 to 750,000 shares.

Railway Financial News

GUARANTEE OF FEDERAL COMPENSATION.—The directors of the following roads have accepted the six months' guarantee of federal compensation:

Atchison, Topeka & Santa Fe.
Chicago, Kalamazoo & Saginaw.
Chicago, Rock Island & Pacific.
Fulton Chain.
Kankakee & Seneca.
Lake Erie & Pittsburgh.
Muncie Belt.
Minneapolis & St. Louis.
Missouri Pacific.
New York Central.
Pittsburgh & West Virginia.
Raquette Lake.
Rutland.
Southern Pacific.
St. Louis-San Francisco.
Troy Union.

ATLANTA, BIRMINGHAM & ATLANTIC.—The Railroad Commission of Georgia has authorized the issuance of $1,014,000 serial equipment notes.

HAKINSVILLE & WESTERN.—This road will be offered for sale for the second time on April 6.

THE CHICAGO & ALTON.—This company has applied to the Public Utilities Commission of Illinois for an order authorizing the issue of $1,988,000 of equipment notes.

HAWKINSVILLE & FLORIDA SOUTHERN.—See Southern.

INTERNATIONAL & GREAT NORTHERN.—An additional allowance of $202,000 per year has been granted to the International & Great Northern by the director general of railroads, for the use of its lines during the period of government control. The action was taken as the result of a protest made by James A. Baker, receiver for the road, who maintained that the railroad company was entitled to more than $1,394,945, the original award. Authority to make the contract with the director general covering the additional compensation was granted by the district court at Houston, Tex.

LAWRENCE BRANCH.—See Southern.

NEW YORK, NEW HAVEN & HARTFORD.—This company has asked the Public Utilities Commission of Connecticut to approve an issue of short-term notes to the amount of $4,813,930.

PENNSYLVANIA.—The Pennsylvania Railroad and the Pennsylvania Company have made an offer to the holders of the 20 per cent minority stock of the Pittsburgh, Cincinnati, Chicago & St. Louis, which is outstanding and not owned by the Pennsylvania Company, to exchange their shares for Pittsburgh, Cincinnati, Chicago & St. Louis 5 per cent bonds, to be guaranteed either by the Pennsylvania Railroad or the Pennsylvania Company. Details of the offer will be made later.

PERE MARQUETTE.—The directors have decided not to accept Section 209 of the Esch-Cummins law which provides for the continuation of the government guarantee for six months. This is the first so-called creditor road, which earned more than the standard return during federal control, to refuse the government's offer.

PITTSBURGH, CINCINNATI, CHICAGO & ST. LOUIS.—See Pennsylvania.

ROSWELL RAILROAD.—See Southern.

SOUTHERN.—Three short branch lines, operated by this system, may have to suspend owing to failure to pay expenses, according to Henry W. Miller, vice-president of the Southern. These are the Roswell Railroad, 13 miles; the Lawrenceville Branch Railroad, 10 miles, and the Hawkinsville & Florida Southern, 95 miles long. Mr. Miller said that these roads had been run at serious loss by the Railroad Administration and he did not believe that they could continue operations after September 1, 1920, up to which date the government has agreed to guarantee expenses.

Railway Officers

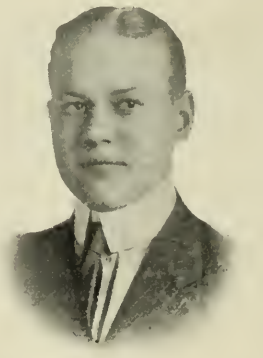
Executive

H. R. Safford, notice of whose appointment as assistant to the president of the Chicago, Burlington & Quincy, with headquarters at Chicago, was announced in the *Railway Age* of February 27, page 660, was born at Madison, Ind. After graduating from Purdue University, he began railway service in 1895 as a rodman on the Illinois Central. From 1897 to 1900, he was resident engineer, in charge of construction work on the same road, and in the latter year was appointed roadmaster. From May, 1903, to March, 1905, he was principal assistant engineer and on the latter date was promoted to assistant chief engineer. In July, 1906, he was promoted to chief engineer maintenance of way, which position he retained until May, 1910, when he left that road to become assistant to the president of the Edgar Allen Manganese Steel Company. The following year he was appointed chief engineer of the Grand Trunk, which position he retained until 1918, when he was appointed engineering assistant to the regional director of the Central Western region. This position he held until his recent appointment.

H. R. Safford

Financial, Legal and Accounting

George S. Ross, notice of whose appointment as secretary and treasurer of the Toledo, St. Louis & Western, with headquarters at Toledo, Ohio, appeared in the *Railway Age* of February 27 (page 656) was born at Streator, Ill., on December 21, 1894. He entered railway service in 1914 as a clerk in the treasury department of the Toledo, St. Louis & Western. A year later he was appointed private secretary to Brand Whitlock, United States Ambassador to Belgium, and was in Belgium during the stay of the minister there. In 1917, after having returned from abroad, Mr. Ross was appointed assistant secretary and assistant treasurer of the Toledo, St. Louis & Western. In 1918 he was promoted to federal treasurer and in May, 1919, his jurisdiction was extended to include the Detroit & Toledo Shore Line. This position he held until his present appointment.



G. S. Ross

R. W. Barrett, general solicitor for the Lehigh Valley under the Railroad Administration, with headquarters in New York, will continue in the same position under private ownership. **E. H. Burgess** has been appointed assistant general solicitor.

Paul C. Hamlin, general solicitor of the Lehigh & New England under the Railroad Administration, will continue in that position under private control.

R. B. Scofield, assistant secretary and assistant treasurer for the Delaware, Lackawanna & Western, has retired, after a service of forty-eight years, effective March 1. This will correct an item in the *Railway Age* of March 5 (page 734), which stated that **J. G. Enderlin** had retired from this position, whereas Mr. Enderlin is Mr. Scofield's successor.

H. W. Johnson, prior to and during federal control, auditor of expenditures of the Chicago, Burlington & Quincy, with headquarters at Chicago, has been appointed assistant to the comptroller, with the same headquarters. **F. L. Porter,** prior to and during government control, assistant auditor of expenditures, has been promoted to auditor of expenditures, succeeding Mr. Johnson.

Operating

F. G. Minnick, during federal control assistant federal manager of the Pittsburgh & Lake Erie, has been appointed assistant general manager, with headquarters at Pittsburgh, Pa., effective March 1.

W. H. Edmondson, during federal control assistant to the federal manager of the Grand Trunk Western Lines, with office at Detroit, Mich., has been appointed assistant to the general manager, with the same headquarters.

Robert V. Massey, general superintendent of the Pennsylvania, Eastern Lines, during the period of federal control, who has recently been appointed assistant general manager of the Eastern region of the same road, with headquarters at Philadelphia, was born in Dover, Kent county, Del., on September 29, 1871. He prepared for college at the Hill School, at Pottstown, Pa., and graduated from Sheffield Scientific School, Yale University, in 1892. He began railroad work in the construction department of the Pennsylvania on September 1, 1892, and remained in that department until August, 1895, when he was transferred to the maintenance of way department, in the office of the principal assistant engineer at Altoona, Pa. In November of the same year he was appointed assistant supervisor at Freeport, Pa., and on April 1, 1897, was transferred to Baltimore, Md., as assistant supervisor of the Baltimore division of the Northern Central. He was transferred to Mifflin, Pa., as assistant supervisor of the Middle division of the Pennsylvania on April 1, 1899, and in 1890 was promoted to supervisor of the Schuylkill division. While holding the position of supervisor he left the service of the Pennsylvania to become affiliated with the Philadelphia, Baltimore & Washington, now part of the Baltimore & Ohio, in the same capacity; but returned in 1905 to act as supervisor at the Pittsburgh yard. On April 1, 1907, he was promoted to division engineer of the Schuylkill division and transferred to the New York division on January 1, 1909. In 1909 he was appointed superintendent of the New York, Philadelphia & Norfolk and the Cape Charles, with headquarters at Cape Charles, Va. On February 11, 1914, he returned to the Pennsylvania as superintendent of the Manhattan division with headquarters in New York, and on May 1, 1916, when the Manhattan and New York divisions were consolidated, his title was changed to superintendent of the New York division. He was appointed general superintendent of the Eastern Pennsylvania division, with headquarters at Altoona, Pa., in June, 1917. On July 1, 1918, he was transferred to the New Jersey grand division in the same capacity.

R. V. Massey

W. R. Davidson, general superintendent of the Grand Trunk, East Lines, with headquarters at Montreal, Que., has been transferred to the Western Lines, with headquarters at Chicago, succeeding **J. J. Corcoran,** who has resigned.

H. R. Arthur, formerly trainmaster of the Canadian National at Saskatoon, has been appointed trainmaster of the First division, Pacific district, with headquarters at Lucerne, B. C., succeeding **H. W. Culver,** resigned, effective February 18.

O. M. Barlow, roadmaster of the Hazen district of the Salt Lake division, of the Southern Pacific, Pacific System, has also been appointed trainmaster, with jurisdiction from Westwood, Cal., to Fernley, Nev., and from Hazen, Nev., to Fallon, with headquarters at Susanville, Cal.

J. H. Tonge, heretofore general superintendent of the Baltimore & Ohio and the Western Maryland, with office at Hagerstown, Md., has been appointed superintendent of the Washington Terminal Company, Washington, D. C., succeeding **J. L. Wilkes.**

R. H. Fish, superintendent of the Stratford division of the Grand Trunk, with headquarters at Stratford, Ont., has been appointed general superintendent of the Eastern Lines, with headquarters at Montreal, Que., succeeding **W. R. Davidson,** transferred to the Western Lines, effective March 1. **W. J. Piggott,** trainmaster at Allandale, Ont., succeeds Mr. Fish, effective March 4.

John B. Warrington, during the period of federal control terminal manager of the Washington, D. C., Terminals, with headquarters at Washington, has been appointed manager of through freight and passenger service of the New York and Washington lines of the Baltimore & Ohio, the Philadelphia & Reading and the Central of New Jersey, with headquarters at Philadelphia, effective March 1. Prior to government control, Mr. Warrington was division superintendent of the Philadelphia & Reading, with headquarters at Philadelphia.

Traffic

A. H. Stevens has been appointed general agent of the St. Louis-San Francisco at Denver, Col.

H. J. Steeple, formerly general agent of the Erie at Seattle, Wash., has been appointed commercial agent, with the same headquarters.

J. E. Courteney has been appointed general agent in charge of the Chicago office of the Denver & Rio Grande and the Western Pacific.

W. M. Price has been appointed general agent of the Wabash at San Francisco, Cal., the position he held prior to government control.

E. S. Blair, division freight agent of the Denver & Rio Grande, with headquarters at Salt Lake City, Utah, has been appointed general agent at Los Angeles, Cal.

L. B. Sheppard, formerly southwestern passenger agent for the Chicago & Alton, with office at Dallas, Tex., has been appented general agent of the Missouri Pacific, with the same headquarters.

L. B. Banks has been appointed general agent of Southern Pacific Lines, at Denver, Colo., succeeding **L. C. Zimmerman,** who has been appointed division freight agent, with headquarters at Los Angeles, Cal.

James W. Daley, associate member of the Southern export committee of the United States Railroad Administration, with supervision over all Texas ports and with headquarters at Galveston, Tex., has been appointed assistant to the

traffic manager of the International & Great Northern, with the same headquarters.

D. T. Murray, assistant general superintendent of the third district of the New York Central, Lines West of Buffalo, with headquarters at Youngstown, Ohio, has been appointed general agent of the transportation and traffic departments, with the same headquarters.

Charles C. Clark, assistant general passenger agent on the Michigan Central, with office at Chicago, and during federal control manager of the consolidated ticket offices for the Eastern and Southern railroads at Chicago, has resigned the latter position, having been promoted to general passenger agent of the Michigan Central, with the same headquarters.

S. S. Butler, general freight agent of the St. Louis-San Francisco, with office at St. Louis, Mo., has been promoted to freight traffic manager, with the same headquarters. Mr. Butler began railroad service in 1890, as a clerk in the auditor's office of the Texas & Pacific at Dallas, Tex. In 1897 he was appointed relief agent and in 1898 traveling auditor for that road. In 1900 he entered the service of the St. Louis & San Francisco as chief clerk to the commercial agent at Dallas. He was consecutively to 1906, soliciting freight agent, traveling freight agent and commercial agent. On the latter date he was appointed general agent at Ft. Smith, Ark. The following year he was appointed general eastern agent, with headquarters at New York. In 1912 he was appointed traffic manager of the South Texas Lines, and in 1915 general southwestern agent, with office at Houston, Tex. In 1916 he was transferred to Pittsburgh, Pa., as general agent, which position he held until 1917, when he was promoted to assistant general freight agent, with headquarters at St. Louis. On December 1, 1919, he was promoted to general freight agent, which position he held until his recent promotion.

Mechanical

George C. Jones has been appointed general road foreman of engines of the Atlantic Coast Line, with headquarters at Florence, S. C.

B. J. Farr, superintendent of the motive power and car department of the Grand Trunk Western Lines, has moved his headquarters from Detroit, Mich., to Battle Creek.

Engineering, Maintenance of Way and Signaling

W. D. Wiggins, valuation engineer of the Pennsylvania, Lines West, who has been promoted to chief engineer maintenance of way of the Central region, with headquarters at Pittsburgh, Pa., as announced in the *Railway Age* of February 20 (page 599), was born at Richmond, Ind., April 28, 1873, and graduated from the Rose Polytechnic Institute at Terre Haute, Ind., in 1885. He began railroad work the same year with the Pennsylvania, Lines West, as an assistant in the engineering corps, being later promoted to assistant engineer on the Pittsburgh division. In June, 1901, he was promoted to division engineer maintenance of way, serving in this capacity on several different divisions until November, 1912, when he was promoted to superintendent of the Peoria division of the Vandalia. In July, 1913, he was appointed valuation engineer of the Lines West, remaining in that position until his recent appointment.

Special

George Bradshaw, supervisor of safety on the Grand Trunk, Western Lines, with headquarters at Detroit, Mich., has resigned and the position has been abolished. Safety-first work will be handled through the safety committees of the road.

R. S. Mitchell, during federal control chief of the secret service and police section of the Division of Operation of the United States Railroad Administration, has been reappointed chief special agent of the Missouri Pacific, with headquarters at St. Louis, Mo., the position he held prior to government control.

General

The general offices of the Houston & Brazos Valley, now at Houston, Tex., have been relocated at Freeport, Tex.

ANN ARBOR

In addition to the officers of the Ann Arbor announced in the *Railway Age* of February 27 (page 658) and of March 5 (page 737), the following traffic appointments have been made:

A. Allison	General agent	Minneapolis, Minn.
T. M. Bell	" "	Toledo, Ohio
C. H. Jackson	" "	Pittsburgh, Pa.
A. B. Sell	" "	Menominee, Mich.
I. W. Dudley	" "	Seattle, Wash.

ARKANSAS & LOUISIANA MIDLAND

H. B. Hearn and H. R. Speed, receivers of the Arkansas & Louisiana Midland have announced the following appointments, effective March 1:

John W. Meehan	General manager	Monroe, La.
W. G. Gladney	Aud'r & gen. frt. & pass. agt.	" "

ATLANTA, BIRMINGHAM & ATLANTIC

The organization of the Atlanta, Birmingham & Atlantic has been announced as follows:

B. L. Bugg	President	Atlanta, Ga.
J. L. Edwards	Vice president	" "
A. V. B. Gilbert	Secretary	" "
W. E. Paschall	Treasurer	" "
C. E. Brower	General supt. trans.	" "
L. L. Beall	Chief engineer	" "
J. F. Sheahan	Supt. motive power	" "
E. L. Greene	Auditor	" "
W. W. Croxton	Passenger traffic manager	" "
C. B. Kealhofer	Freight traffic manager	" "
J. E. Tilford	General freight agent	" "
A. D. Daniel	Purchasing agent	" "
H. W. Colson	General claim agent	" "
G. B. Matthews, Jr.	Car accountant	" "
Brandon & Hynds	General counsel	" "
Dr. W. S. Elkins	Chief surgeon	" "
W. S. Goldsmith	Ast. chief surgeon	" "
V. E. Whitaker	Superintendent	Birmingham, Ala.
R. H. McKay	"	Fitzgerald, Ga.
Fred Astin	Asst. superintendent	" "
Harry Huddleston	" "	Manchester, Ga.

Traffic Representatives

P. L. Graves	General agent	Atlanta, Ga.
J. W. Brown	Commercial agent	" "
G. A. Smith	District passenger agent	" "
L. G. Scarboro	Commercial agent	Birmingham, Ala.
H. J. Hansen	" "	Chicago
J. J. McCarty	" "	Cincinnati
C. D. Bercaw	General agent	Cordele, Ga.
F. H. Hill	Comm. agt. (frt. & pass.)	Fitzgerald, Ga.
C. I. Allen	General agent	Jacksonville, Fla.
Jas. F. Carlton	Commercial agent	Memphis, Tenn.
J. D. Boylston	" "	Nashville, Tenn.
H. G. Benedict	Gen'l eastern agent	New York
Leo S. Siddons	Gen'l western agent	St. Louis
H. H. Luther	Commercial agent	Talladega, Ala.
R. G. Parks	" "	Tampa, Fla.
E. H. Fleming	Comm. agt. (frt. & pass.)	Thomasville, Ga.

Agricultural and Industrial Representatives

H. S. Young	Industrial agent	Atlanta, Ga.
W. R. Tucker	Agric. dev. & imm. agt.	" "
G. B. Eunice	Agric. dev. agent	Fitzgerald, Ga.
J. W. Firor	Horticulturist	Montezuma, Ga.
H. L. Alsobrook	Agric. dev. agent	Talladega, Ga.

ATLANTA & WEST POINT

The following appointments on the Atlanta & West Point, the Western Railway of Alabama and the Georgia Railroad have been announced by Charles A Wickersham, president-general manager of these properties, with headquarters at Atlanta, Ga. The appointments apply to all three lines unless otherwise noted:

EXECUTIVE DEPARTMENT

W. H. Bruce	Sec., trs., A.&W.P.; W.ofA.	Atlanta, Ga.
W. S. Morris	Treas., Ga. R. R.	Augusta, Ga.

LEGAL DEPARTMENT

Brewster, Howell and Heyman...Gen'l counsel, A.&W.P.R.R. Atlanta, Ga.
Steiner, Crum and Weil .....Gen'l counsel, W. of A.....Montgomery, Ala.
Geo. P. Harrison..Advisory counsel, W. of A..Opelika, Ala.
Cumming & Harper .....General counsel, Ga. R. R..Augusta, Ga.
F. R. Yarbrough..Chief law and special agt...Atlanta, Ga.
Dr. J. R. Garner..Chief surgeon..... " "

ACCOUNTING DEPARTMENT

W. H. Smith.....Comptroller .....Atlanta, Ga.
F. E. Winburn....Auditor and frt. cl. agt., A. & W. P.; W. of A..... " "
W. H. Vincent...Auditor, Georgia R. R.....Augusta, Ga.
W. W. Hewitt....Frt. cl. agt., Georgia R. R.. " "
L. J. Marbry.....Chief traveling auditor....Atlanta, Ga.
J. S. Moss.....Stationer & agt. uncl. frt... " "

TRANSPORTATION DEPARTMENT

A. Moritz.....Supt. of transportation....Atlanta, Ga.
L. L. McDonald..Asst. to supt. of trans..... " "
D. E. McGee.....Trnmstr., A.&W.P.;W.of A.Montgomery, Ala.
W. H. Cooper....Chf. trn. disp. " " " "
John Laird.....Trainmaster, Georgia R. R..Augusta, Ga.
R. B. Heath.....Chf. train disp., Ga. R. R....Athens, Ga.
R. C. Campbell....Terminal manager..... " "
E. W. Sandwich..Supt. car service.....Atlanta, Ga.

MECHANICAL DEPARTMENT

F. O. Walsh.....Supt. motive power.....Atlanta, Ga.
R. P. Smith.....Mechanical engineer.....Augusta, Ga.
W. H. Eager, Jr..Electrical engineer.....Montgomery, Ala.
J. H. Gaston.....Mr. mech., A.&W.P.;W.of A. " "
John Sheen.....Mr. car bldr., " " " "
O. H. Attridge....Master mech., Ga. R. R....Augusta, Ga.

ENGINEERING DEPARTMENT

O. T. Nelson.....Chief engineer.....Atlanta, Ga.
S. R. Young.....Asst. chief engineer..... " "
H. W. Seib.....Consulting engineer..... " "

PURCHASING AND STORES DEPARTMENT

R. T. Pace.....Purchasing agent.....Atlanta, Ga.
G. K. Williams...Fuel agent..... " "

TRAFFIC DEPARTMENT

F. G. Bennett.....General agent, W. of A.....Montgomery, Ala.
A. G. Jackson....General agent, Ga. R. R....Augusta, Ga.
G. E. Boulineau...General freight agent.....Atlanta, Ga.
F. G. Browder, Jr. Asst. gen'l freight agent.... " "
C. E. Rodenberg.. " " " " .... " "
J. P. Billups.....General passenger agent.... " "
J. A. Higgins.....Asst. gen'l passenger agt.... " "
E. S. Center.....Industrial agent..... " "

BALTIMORE & OHIO

C. W. Galloway, vice-president in charge of operation and maintenance of the Baltimore & Ohio, has announced the following appointments, which are in addition to those given in the Baltimore & Ohio's list of officers on page 737 of the *Railway Age* of March 5:

F. E. Blaser.....Asst. to vice president.....Baltimore, Md.
In charge of Bureau of Wages Working Conditions and Bureau of Employment and Discipline.
J. R. Kearney....Asst. to vice president.....Baltimore, Md.
In charge of Executive Relations American Railway Association and Car Service matters.
L. C. Sauerham'er.Asst. to vice president.....Baltimore, Md.
In charge of Improvement Authorities, Contracts and Agreements, Budget Allotments and Operating Statistics.
C. Selden.....Gen'l insp. of trans.....Baltimore, Md.

In the announcement in last week's issue, page 737, through an inadvertance, the engineering department appointments of the Wabash were included with the Baltimore & Ohio. The Wabash appointments are headed by A. O. Cunningham, chief engineer, with headquarters at St. Louis, Mo. The Baltimore & Ohio engineering appointments are correctly given further down in the column, and are the five names, the first of which is L. G. Curtis, chief engineer, adjustment division, with headquarters at Baltimore

There was also an error in the inclusion of J. R. Onderdonk, engineer of tests, Baltimore, under the head "Mechanical Department." The engineer of tests reports to the vice-president in charge of operation and maintenance and his work covers all departments of the railroad.

BALTIMORE & OHIO CHICAGO TERMINAL

The personnel of the Baltimore & Ohio Chicago Terminal, as effective on its return to private control, is in part as follows:

F. C. Batchelder..President .....Chicago
E. M. Devereux..Treasurer .....Baltimore
H. H. Hall.....Asst. sec. and asst. treas...Chicago
T. H. Schultz....Asst. treasurer.....Baltimore
J. J. Ekin.....Comptroller ..... "
F. B. Huntington.General auditor..... "
H. A. Lane.....Chief engineer..... "
L. G. Curtis.....Asst. chief engineer..... "
C. H. Moran.....Real estate agent.....Chicago

BOSTON & MAINE

The organization of the Boston & Maine and of its subsidiaries, the St Johnsbury & Lake Champlain, the Montpelier & Wells River. the Barre & Chelsea, the Vermont Valley, the Sullivan County, and the York Harbor & Beach, have been announced as follows:

EXECUTIVE DEPARTMENT

Jas. H. Hustis....President .....Boston
W. Hudson.....V. pres., gen. coun.; law, real est. and taxes..... "
William J. Hobbs.V. p., finance and acct..... "
Benj. R. Pollock..V. p., gen. mgr., op. & main. "
Gerrit Fort.....V. p., traffic..... "
H. R. Wheeler....Treasurer ..... "
A. B. Corthell....Chief engineer..... "
A. W. Munster...Purchasing agent..... "
G. H. Bavier.....Asst. to president..... "
D. S. Brigham.... " " " ..... "
W. J. Cunningham.Consulting assistant..... "

TREASURY DEPARTMENT

H. R. Wheeler...Treasurer .....Boston
C. N. Marland...Asst. treasurer..... "
F. S. Heath..... " " .....Concord, N. H.
N. G. Hill.....Paymaster .....Boston

LEGAL DEPARTMENT

W. Hudson.....V. p. and gen. counsel.....Boston
A. P. Mackinnon.General solicitor..... "
R. T. Damon.....General claim agent..... "
C. M. Macdonald.Acting freight claim agent. "
E. A. Ryder.....Real estate agent..... "

ACCOUNTING DEPARTMENT

Wm. J. Hobbs....Vice president.....Boston
W. S. Trowbridge.Comptroller ..... "
M. C. Bradley....Asst. comptr., disbursem... "
J. F. Turner.....Asst. compt., revenues..... "
H. G. Etheridge...Auditor of disbursements.. "
N. H. Ricker.....Auditor freight receipts.... "
W. H. Young.....Auditor passengers recpts.. "
W. C. Cruwys....Auditor miscel. accounts... "
G. F. Glacy.....Asst. to aud., miscel. accts. "
W. J. Harrod.....Special agent..... "
A. M. Phillips....Accountant ..... "
J. J. Demeritt.....Auditor agencies..... "

OPERATING DEPARTMENT

Benj. R. Pollock..V. pres. and gen. mgr.....Boston
L. G. Coleman....Asst. gen. mgr., main., equip. "
A. H. Slader..... Asst. to v. p. & gen. mgr... "

Transportation—First District

W. R. Mooney....Act. gen. supt.....Boston
G. H. Folger.....Asst. gen. supt..... "
J. P. Quilty.....Supt., Terminal div..... "
G. H. Foote.....Pass. trmstr., Terminal div. "
F. C. Choate.....Asst. pass. trainmaster..... "
W. J. Wright.....Frt. trnmstr., Terminal div. "
J. M. Sullivan....Asst. trnmr., Terminal div. "
J. Rourke.....Supt., Portland div..... "
A. P. Milliken....Asst. supt., Portland div... "
W. S. Keay.....Trainmaster, Portland div..Lawrence, Mass.
A. S. Twombly.... " " " ..Dover, N. H.
J. E. Mahoney.... " " " ..Boston
A. P. Little.....Act. trnmstr., Portland div.Salem, Mass.
H. C. Robinson...Act. supt., Southern div...Concord, N. H.
A. F. Garey.....Trainmaster, Southern div. " "
F. P. Fosgate..... " " " " "
M. Durfee..... " " " .Lowell, Mass.
A. B. Schute..... " " " .Boston
T. W. Sutherland. " " " " "
F. H. Flynn.....Supt., Fitchburg div.....Greenfield, Mass.

Boston & Maine (Continued)

R. A. Murray....Trainmaster, Fitchburg div. E. Deerfield, Mass.
A. A. McCarthy.. " " " .No. Sta., Boston
E. C. Goodnow... " " " .Fitchburg, Mass.
C. F. Wherren.... " " " .Boston
J. D. Bourne.....Supt., Berkshire div.....No. Adams, Mass.
R. O'Bryan.....Trainmaster, Berkshire div. Greenfield, Mass.
J. P. Sullivan..... " " " .Mechanicville,N.Y.
W. H. Ford.....Supt., W. N. & P. div.....Nashua, N. H.
B. Thomas.....Asst. supt., W. N. & P. div.. " "
F. C. Pelletier....Trainmaster, W.N.&P. div..Worcester, Mass.

Transportation—Second District

H. E. Folsom.....General superintendent.....Lyndonville, Vt.
F. C. Mayo.....Supt., White Mountains div.Woodsville, N. H.
G. H. Kidder.....Asst. supt., White Mns. div. " "
F. L. Sargent.....Trainmaster, White M. div. " "
J. A. Ahern.....Supt., Passumpsic div.....Lyndonville, Vt.
C. M. Woodward. Supt., Connecticut Riv. div. Springfield, Mass.
A. P. Abbott.....Trainm'ster, Conn. Riv. div. " "
S. E. Miller.....Supt. transportation.....Boston
F. A. Hortter.....Car accountant ..... "
W. H. Kimball....Demurrage adjuster..... "

Mechanical

C. H. Wiggin....Supt. motive power.....Boston
C. B. Smith.....Mechanical engineer..... "
D. A. Smith.....Master mechanic.....E. S'm'rville, Mass.
C. S. Hall..... " " .....E. C'mbr'ge, Mass.
L. C. Todd..... " " .....Charlestown, Mass.
W. H. Rieckman.. " " .....Mech'cville, N.Y.
W. W. Hodgkins. " " .....Worcester, Mass.
G. A. Wyman.... " " .....Concord, N. H.
J. A. Locher..... " " .....Springfield, Mass.
H. F. Wood..... " " .....Lyndonville, Vt.
J. Wahlen..... " " .....Montpelier, Vt.
T. Jennings.....Superintendent shop.....Billerica, Mass.
D. E. Davis..... " " .....Somerville, Mass.
F. H. Eddy..... " " .....E. Fitchb'rg, Mass.
R. W. Band.....General shop inspector.....Boston
J. Craig..... " " ..... "
H. A. Bliss.....Gen'l air brake inspector... "
E. T. Millar.....General car inspector..... "
A. Craig.....General foreman.....Charlestown, Mass.

Maintenance of Way and Structures

F. A. Merrill.....Engineer, maint. of way....Boston
G. K. Thornton...Div. engr., Portland div...Salem, Mass.
R. W. Osborne...Asst. div. engr., Port. div.. " "
A. C. Stickney....Div. engr., Southern div...Concord, N. H.
O. J. Chase.....Asst. engr., Southern div.. " "
J. L. Shanks.....Div. engr., Fitchburg div..Fitchburg, Mass.
R. H. Parke.....Asst. div. engr., Fitch. div.. " "
J. P. Canty.....Div. engr., Berkshire div...No. Adams, Mass.
J. F. Whitney....Asst. engr., Berkshire div.. " "
R. Burroughs....Div. engr., W. N. & P. div.Nashua, N. H.
A. W. Gardner...Asst. engr., W. N. & P. div. " "
G. H. Watson....Div. engr., White Mns. div.Woodsville, N. H.
L. N. Wheelock...Asst. engr., White Mns. div. " "
F. E. Sampson....D. engr., Conn. R. & P. div.St. Johnsbury, Vt.
R. W. Hamilton..Asst. engr., C. R. & P. div.. " "
J. J. Rourke.....Div. engr., Terminal div...Boston
B. F. Pickering...S'p'rvis'r, B. & B., Port. div.Salem, Mass.
A. I. Gauthier....Spvsr., B. & B., South. div.Concord, N. H.
J. E. Buckley.....Spvsr., B. & B., Fitch. div..Fitchburg, Mass.
E. B. Piper.....Spvsr., B. & B., Berk. div..No. Adams, Mass.
T. W. Sughrue...Spvsr., B. & B., W.N.&P.dv.Nashua, N. H.
J. H. Fullerton...Spvsr., B. & B., Wh. M. div.Woodsville, N. H.
L. M. Blake.....Spvsr.,B.&B.,C.R.&Pass.div. St. Johnsbury, Vt.
S. P. Coffin.....Spvsr., B. & B., Term. div..Boston

Stores

J. E. Byron.....General storekeeper.....Boston

W. Y. Scott.....Signal engineer.....Boston
R. R. Stackpole...Supt. of telegraph..... "
C. G. Jaycock....Supt. of dining cars..... "
H. W. Davis.....Inspector, pass. train serv.. "
R. Bradley.....Inspector of fuel service... "
M. O. Sargent....Chief of police..... "
S. G. Watkins....Gen'l sec'y, safety dept..... "

ENGINEERING DEPARTMENT

A. B. Corthell....Chief engineer.....Boston
F. C. Shepherd...Prin. asst. engineer..... "
L. L. Huckins....Cons., engr., eastern..... "
C. J. Griffin.....Cons. engr., western..... "
R. J. Hammond..Office engineer..... "
B. W. Guppy.....Engineer of structures..... "
Pusey Jones.....Bridge engineer.....Boston
H. B. Fletcher....Architect ..... "
F. D. Hall.....Electrical engineer..... "
H. J. Sargent.....Asst. ch. engr., val. & r. est. "
F. B. Rowell.....Research engineer..... "
J. B. Russell.....Real estate engineer..... "
W. F. Cummings.Asst. val. engineer..... "

PURCHASING DEPARTMENT

A. W. Munster...Purchasing agent.....Boston
H. J. Saabye.....Asst. purchasing agent..... "
J. R. Rooks.....Fuel agent..... "
J. J. Callahan....Chemist .....Billerica shops

TRAFFIC DEPARTMENT

Gerrit Fort.....Vice president.....Boston

Freight

W. T. LaMoure..Freight traffic manager....Boston
G. H. Eaton.....Asst. freight traffic mgr.... "
E. W. Abbott....General freight agent..... "
A. E. Prescott....Asst. gen'l freight agent... "
J. W. Rimmer.... " " " " ... "
F. F. Farrar.....General agent..... "
J. R. MacAnanny. Chief of tariff bureau..... "
C. E. Leavitt.....Division freight agent.....Concord, N. H.
E. F. Smallwood. " " " .....Springfield, Mass.
E. C. Otis..... " " " .....Troy, N. Y.

Passenger

F. T. Grant.....General passenger agent...Boston
F. A. McCormick..Asst. gen. pass. agent..... "
W. H. Shepherd..District passenger agent...Springfield, Mass.
F. D. Gourley.... " " " ...Boston
L. J. McNamara.. " " " ... "
G. V. Worthen...General baggage agent.... "

Milk, Mail and Express

W. C. Harriman..Manager .....Boston

CHICAGO, BURLINGTON & QUINCY

In addition to the appointments on the Chicago, Burlington & Quincy noted in the *Railway Age* of February 27, page 660, the following officers have been appointed:

H. E. Jarvis.....Assistant secretary.....Chicago
C. J. Ernst.....Asst. secy. and asst. treas..Omaha, Neb.
C. M. Carter.....Assistant treasurer.....St. Joseph, Mo.
H. D. Foster.....General auditor.....Chicago
E. T. Nichols....Fiscal agent.....New York City
N. Terhune..... " " ..... " " "
M. H. Niles.....Transfer agent..... " " "
N. Stockhammer.. " " ..... " " "

The following appointments have been made in the traffic department of the Chicago, Burlington & Quincy:

Geo. H. Crosby..Asst. to vice president.....

Freight

H. H. Holcomb..Freight traffic manager....Chicago
E. R. Puffer.....Asst. freight traffic mgr.... "
George Morton .. " " " " .... "
W. G. Wagner...General freight agent..... "
H. E. Heller..... " " " ..... St. Louis, Mo.
F. Montmorency.. " " " .....Omaha, Neb.
L. C. Mahoney...Asst. gen. freight agent....Chicago
R. B. Battey..... " " " " "
W. W. Johnston.. " " " " Omaha, Neb.
J. B. Driggs..... " " " " " "
J. F. Vallery..... " " " " Denver, Colo.
F. A. Hart..... " " " " Kansas City, Mo.
Geo. P. Lyman... " " " " St. Paul, Minn.
F. E. Hollingshead. " " " " St. Joseph, Mo.

Passenger

P. S. Eustis.....Passenger traffic manager..Chicago
J. Francis.. .....General passenger agent.... "
F. E. Bell.....Asst. gen. pass. agent..... "
A. Cotsworth, Jr.. " " " " ..... "
L. W. Wakeley...General passenger agent....Omaha, Neb.
W. A. Lalor..... " " " ....St. Louis, Mo.
J. E. Buckingham.Gen. bag., mail & ex. agt....Chicago
L. H. Stebbins....Asst. gen. baggage agent... "

CHICAGO GREAT WESTERN

All officers and employees of the Chicago Great Western during federal control continue in their respective positions, with the same titles, from March 1, with the exception of the following new appointments:

W. L. Park.....Vice president, operation...Chicago
C. F. Krebs.....General auditor..... "
J. F. Coykendale.Treasurer ..... "
W. L. Sullivan...Asst. to pres., adj. of accts.. "

CHICAGO, MILWAUKEE & GARY

The following officers have been appointed on the Chicago, Milwaukee & Gary:

C. G. Nelson.....Sec., treas. & auditor.....Rockford, Ill.
F. A. Winkler....Assistant auditor..... " "
C. E. Swenson....Pur. agent & storekeeper.. " "
A. D. Early.....General attorney..... " "
I. W. Troxel.....Chief engineer.....Chicago
R. E. Owen.....Asst. gen. frt. & Pass. agt.. "
H. W. Person.....General agent.....Rockford, Ill.
W. E. Becker.....Superintendent ..... " "
Thos. Hickson....Master mechanic..... " "
J. I. McConnell...Foreman car department.. " "
Gust Swanson....Roadmaster ..... " "
C. S. Andrus.....Chief surgeon ..... " "

CHICAGO, ROCK ISLAND & PACIFIC

The executive organization of the Chicago, Rock Island & Pacific has been announced as follows:

Charles Hayden..Chairman of the board....New York
James E. Gorman.President .....Chicago
M. L. Bell.....Vice pres. & gen. counsel..Chicago & N. Y.
L. C. Fritch.....V. P. con., maint., & cap. ex.Chicago
F. Nay .....Vice pres. and controller.. "
T. H. Beacom....Vice pres. and gen. mgr.... "
S. H. Johnson....Vice pres. and frt. traf. mgr. "
L. M. Allen.....V. P. and pass. traf. mgr.. "
F. D. Reed.....Vice pres. and pur. agt..... "
Carl Nyquist ....Secretary and treasurer.... "

Other appointments have been announced as follows:

F. A. Adams.....Asst. gen. frt. agent.....Chicago
C. R. Maier..... " " " " ..... "

COLORADO & SOUTHERN

In addition to the appointments on the Colorado & Southern noted in the *Railway Age* of February 27, page 660, the following officers have been appointed:

R. C. Gowdy.....Chief engineer.....Denver, Colo.
W. H. Hess.....Valuation engineer..... " "
W. C. Weldon....Purchasing agent..... " "

DENVER AND SALT LAKE

The following appointments have been made on the Denver & Salt Lake:

Milton Smith.....General solicitor.....Denver, Colo.
E. W. Meyer.....Assistant to receiver..... " "
F. J. Toner.....Gen. frt. and pass. agent... " "
S. S. Meyer.....Auditor ..... " "
A. F. Dodd.....Treasurer ..... " "
M. L. Phelps.....General superintendent.... " "
M. B. McPartland.Supt. of motive power..... " "
L. D. Blauvelt....Consulting engineer..... " "
V. B. Wagner....Chief engineer..... " "
A. L. Cochrane...Purchasing agent..... " "

DETROIT, TOLEDO & IRONTON

The following officers of the Detroit, Toledo & Ironton have been elected, or appointed:

J. A. Gordon....President .....Detroit, Mich.
G. W. Eckerle....Asst. to pres. & pur. agt.... " "
H. A. Fidler.....General traffic mgr..... " "
E. B. Dudley.....General auditor..... " "
Leo M. Butzel...General counsel..... " "
Sam R. Williams.General attorney..... " "
F. E. Remsburg..General claim agent..... " "
L. L. Syman.....Supt. medical dept.....Springfield, Ohio
C. J. Kavanagh...Gen. superintendent..... " "
H. B. Watters....Chief engineer..... " "
C. P. Burgman..Supt. m. p. & equip.....Jackson, Ohio
K. Chorley.....Supt. car service.....Springfield, Ohio
G. V. Booth.....General storekeeper .....Jackson, Ohio

DULUTH & IRON RANGE

The following now constitutes the official organization of the Duluth & Iron Range:

F. E. House.....President .....Duluth, Minn.
J. H. McLean....First vice president..... " "
J. H. Harding....Second vice president..... " "
Thos. Owens.....Superintendent .....Two Harbors, Mn.
H. Johnson.....Sec., aud., gen. frt.-pass. agt.Duluth, Minn.
Thomas Murray..Asst. sec. & asst. treas.....New York
F. D. Adams.....General solicitor.....Duluth, Minn.
E. F. Blu.....Asst. gen. solicitor..... " "
E. H. Windom...General claim agent..... " "
B. R. Moore.....Supt. motive power & cars.Two Harbors, Mn.
F. C. Marshall....Treasurer .....Duluth, Minn.
R. P. Moore.....Purhcasing agent..... " "
W. A. Clark.....Chief engineer..... " "

FORT WORTH & DENVER CITY—WICHITA VALLEY

The officers of the Fort Worth & Denver City and the Wichita Valley have been announced as follows:

Hale Holden.....Pres. and ch. ex. comm....Chicago
C. G. Burnham...Ex. vice pres..... "
H. R. Safford.....Asst. to the pres..... "
F. E. Clarity.....Vice pres. and gen. mgr...Fort Worth, Tex.
W. O. Hamilton..Sec. and treas..... " "
J. H. Barwise, Jr..General attorney..... " "
J. H. Bradbury...Comptroller .....Denver, Col.
W. C. Logan.....General auditor .....Fort Worth, Tex.
R. C. Gowdy.....Chief engineer.....Denver, Col.
W. H. Hess.....Valuation engineer..... " "
J. A. Hulen.....Traffic manager.....Fort Worth, Tex.
W. F. Sterley.....Gen. freight & Pass. agt.... " "
S. A. Covington...Acting gen. supt..... " "
M. A. Stainer....Engineer M. of W..... " "
W. C. Weldon....Purchasing agent.....Denver, Col.

GALVESTON, HOUSTON & HENDERSON

Officers of the Galveston, Houston & Henderson have been announced as follows:

G. W. Davisson..President .....New York
J. H. Hill.....Vice pres., sec. & treas....Galveston, Tex.
G. G. Moore.....Gen. mgr. & asst. treas..... " "
M. M. Murray....Auditor ..... " "

GULF COAST LINES

The following appointments have been made on the Gulf Coast Lines:

J. E. Anderson...Asst. to pres.....Houston, Tex.
C. S. Kirkpatrick.Chief engineer..... " "
J. W. Wood.....Supt. of telegraph..... " "
J. L. Lavallee....Mechanical superintendent.Kingsville, Tex.

The following appointments have been made in the traffic department of these lines:

Passenger

F. M. McClure...Asst. gen. pass. agt.....Houston, Tex.
E. A. Farr.....Div. pass. agent..... " "
Mark Anthony.... " " " .....New Orleans, La.
Randall E. Knight.Trav. pass. agent..... " " "
A. J. Ball.....Southeastern pass. agent....Atlanta, Ga.

Freight

J. W. Hailey....General agent .....New Orleans, La.
J. B. Graham....Export & import agent.... " " "
W. M. McMillan..Commercial agent..... " " "
W. J. Cousins....Soliciting frt. agent..... " " "
B. H. Taylor.....General agent .....Houston, Tex.
H. A. Vallas.....Soliciting frt. agent..... " "
J. W. Williams....General agent .....Beaumont, Tex.
W. B. Craig.....General agent .....Corpus Christi, Tx.
I. D. Gowin..... " " .....Chicago
R. C. Foote.....Commercial agent ..... "
W. W. Stine.....General agent .....Birmingham, Ala.
C. W. Adams.....Commercial agent ..... " "
C. N. Gray.....General agent .....Dallas, Tex.
E. G. Waring....Commercial agent..... " "

GULF, MOBILE & NORTHERN

The following is the organization of the Gulf, Mobile & Northern and of the Meridian & Memphis, effective on its return to private control:

I. B. Tigrett.....President .....Mobile, Ala.
E. D. Hogan.....Vice pres. & gen. mgr..... " "
J. C. Rich.....General solicitor ..... " "
T. D. Geoghegan.Traffic manager ..... " "
F. M. Hicks.....Comptroller ..... " "

Gulf, Mobile & Northern (Continued)

J. J. McEwen	Treasurer	Mobile, Ala.
H. G. Reiser	Purchasing agent	" "
H. F. Ricker	Asst. to gen. mgr.	" "
A. F. Church	Supt. Mobile-Louisville div.	Laurel, Miss.
J. B. Hobbs	Supt. N. Albany-Jack. div.	New Albany, Miss.
D. W. Davis	Supt. of car service	Laurel, Miss.
B. H. Gray	Supt. of motive power	Mobile, Ala.
Jas O'Neal	Foreman car dept.	" "
L. W. Duffee	Chief engineer	Laurel, Miss.
P. L. Stacker	Valuation and spec. engr.	Mobile, Ala.
W. F. McDade	Gen. foreman B. & B.	Laurel, Miss.
G. H. Greer	Storekeeper	Mobile, Ala.
J. J. Henry	General agent	Laurel, Miss.
W. Blount, M.D.	Chief surgeon	" "

HOCKING VALLEY

The following appointments have been made on the Hocking Valley, effective March 1: These are additional to those given in the *Railway Age* of March 5, page 742.

H. Q. Wasson	Gen. frt. agt.	Columbus, Ohio
W. H. Fisher	Gen. pass. agt.	" "

HOUSTON & BRAZOS VALLEY

The following appointments, effective March 1, have been announced by George C. Morris, receiver of the Houston & Brazos Valley, with headquarters at Freeport, Tex.:

C. J. Rogan	Superintendent	Freeport, Tex.
J. R. Johnson	Auditor	" "
J. E. Reed	Traffic manager	" "
W. C. McLendon	Treasurer	" "
A. E. Masterson	General attorney	" "

LAKE ERIE & WESTERN

The following officers have been appointed on the Lake Erie & Western:

A. D. Thomas	Treasurer	Indianapolis, Ind.
W. H. Elmendorf	Auditor	" "

LOS ANGELES & SALT LAKE

The organization of the Los Angeles & Salt Lake has been announced, in part, as follows:

W. A. Clark	President	New York
Carl R. Gray	First vice president	Omaha, Neb.
J. Ross Clark	Second vice president	Los Angeles, Cal.
C. P. Smith	Secretary	" "
F. C. Loofbourow	Asst. secretary	Salt Lake C., Utah
J. H. Anderson	" "	New York
W. H. Comstock	General manager	Los Angeles, Cal.
W. H. Leete	Treasurer	" "
A. S. Halsted	General counsel	" "
A. S. Edmonds	General traffic manager	" "
C. C. Barry	Auditor	" "
Arthur Maguire	Chief engineer	" "

LOUISIANA & ARKANSAS

The following appointments have been announced in the traffic department of the Louisiana & Arkansas:

B. S. Atkinson	Traffic manager	Texarkana, Ark.
J. R. McClurken	Asst. gen. frt. & pass. agt.	" "
H. R. Whiting	General agent	Alexandria, La.
F. A. Key, Jr.	" "	Shreveport, La.

MISSISSIPPI CENTRAL

The following is the organization of the Mississippi Central:

F. L. Peck	President	Scranton, Pa.
M. D. Fohey	Gen. mgr. (on lve of ab.)	Hattiesburg, Miss.
Chas. Ehlers	Act. gen. mgr.	" "
T. Brady, Jr.	General counsel	Brookhaven, Miss.
H. R. Wilson	Traffic manager	Hattiesburg, Miss.
H. O. Hoffman	Purchasing agent	" "

MISSOURI, KANSAS & TEXAS LINES

In addition to the officers appointed on the Missouri, Kansas & Texas Lines, and announced in the *Railway Age* of March 5, page 745, the following has been announced as the personnel of the Missouri, Kansas & Texas:

F. Ringer	Chief engineer	St. Louis, Mo.
E. L. Martin	Asst. chief engineer	Dallas, Tex.
B. J. Dalton	Valuation engineer	Parsons, Kan.
F. K. Tutt	Mechanical supt.	Denison, Tex.
W. H. Maddocks	Mechanical engineer	Parsons, Kan.
W. A. Mitchell	Supt. car department	Denison, Tex.
H. H. Johntz	Engr., maintenance of way	Parsons, Kan.
J. F. Hickey	Superintendent	Sedalia, Mo.
S. B. Moore	"	Parsons, Kan.
D. S. Murphy	"	Muskogee, Okla.
J. H. Little	"	Oklahoma City
A. E. Boughner	Terminal superintendent	St. Louis, Mo.
O. C. Smith	Supt. car service	Dallas, Tex.
W. H. Hall	Gen. supt. telegraph	Denison, Tex.
D. C. Hudspeth	Supt. telegraph	Parsons, Kan.
J. A. Johnson	Signal engineer	Denison, Tex.
J. L. Walsh	Supt. of safety	Dallas, Tex.
E. F. Yancey	Chief surgeon	Sedalia, Mo.
W. F. Hayes	Supt. time service	St. Louis, Mo.

In addition to those mentioned above, the following officers have been appointed on the Missouri, Kansas & Texas of Texas:

E. M. Moursund	Engr., maint. of way	Dallas, Tex.
E. E. Hanna	Superintendent	Denison, Tex.
R. R. Farmer	"	Greenville, Tex.
J. W. Evens	"	Waco, Tex.
O. W. Campbell	"	Smithville, Tex.
A. M. Acheson	"	Trinity, Tex.
F. W. Grace	"	Wichita Falls, Tex.
J. A. Johnson	Signal engineer	Denison, Tex.
Drs. Webb & Lott	Chief surgeons	Dallas, Tex.
E. H. Coombs	Special representative	Houston, Tex.

MISSOURI PACIFIC

In addition to the appointments on the Missouri Pacific noted in the *Railway Age* of February 27, page 658, and of March 5, page 745, the following officers have been appointed in the traffic department of this company:

C. L. Stone	Pass. traffic manager	St. Louis, Mo.
A. D. Bell	Asst. pass. traffic manager	" "
J. G. Hollenbeck	Gen. pass. agent	" "
H. H. Butler	Asst. gen. pass. agent	" "
H. H. Muchall	Asst. gen. pass. agent	" "
C. K. Bothwell	Asst. gen. pass. agent	Little Rock, Ark.
L. M. Hill	Supt. parlor & dining cars	St. Louis, Mo.
W. H. Bissland	General baggage agent	" "
M. L. Fuller	Colonization & advt. agt.	" "
W. A. Rambach	Freight traffic manager	" "
D. R. Lincoln	Asst. frt. traffic manager	" "
O. G. Parsley	" " " "	" "
C. C. P. Rausch	" " " "	" "
W. I. Jones	" " " "	" "
R. M. Dozier	" " " "	Chicago
G. H. Hamilton	General freight agent	Kansas City, Mo.
R. McWilliams	" " "	Little Rock, Ark.
O. C. Olsen	Foreign freight agent	St. Louis, Mo.
E. Mock	Asst. gen. frt. agent	" "
W. H. Thompson	" " "	" "
P. J. McCarthy	" " " "	" "
W. B. Shirk	Gen. live stock agent	Kansas City, Mo.

Traffic department agencies have been established as follows:

Passenger

Garland Tobin	General agent	Atlanta, Ga.
T. D. Moss	" "	Birmingham, Ala.
J. A. Russell	Traveling pass. agt.	Chicago
J. A. Steltenkamp	General agent	Cincinnati, Ohio
L. B. Shepherd	" "	Dallas, Tex.
L. M. White	" "	Detroit, Mich.
Ellis Farnsworth	Division pass. agent	Kansas City, Mo.
H. R. Bingham	General agent	Los Angeles, Cal.
H. D. Wilson	Division pass. agent	Memphis, Tenn.
W. H. Donny	General agent	New York.
T. F. Godfrey	Division pass. agent	Omaha, Neb.
W. H. Richmond	General agent	Pittsburgh, Pa.
J. J. McQueen	" "	Salt Lake City, U.
C. M. Fowler	" "	Seattle, Wash.
J. M. Griffin	Division pass. agent	St. Louis, Mo.

Freight

Dan Jacobs	Asst. gen. freight agent	Alexandria, La.
C. C. Cloutman	Division freight agent	Atchison, Kan.
F. J. Kemper	General agent	Atlanta, Ga.
Paul Escott	" "	Birmingham, Ala.
H. V. Gregory	Division freight agent	Cairo, Ill.
W. C. Staley	General agent	Chicago
R. Meyer	" "	Cincinnati, Ohio
Guy A. Deuel	" "	Dallas, Tex.
W. H. Fraser	" "	Denver, Colo.

L. M. White	General agent	Detroit, Mich.
J. J. Eddy	Division freight agent	East St. Louis, Ill.
C. E. Carstarphen	" " "	Ft. Smith, Ark.
H. G. Brower	General agent	Ft. Worth, Tex.
C. H. Pugh	" "	Houston, Tex.
C. M. Davis	Division freight agent	Hutchinson, Kan.
Clyde Hogsett	" " "	Joplin, Mo.
J. D. Yates	" " "	Kansas City, Mo.
E. E. Gibson	" " "	Lake Charles, La.
H. T. Guinn	" " "	Lincoln, Neb.
W. W. Trimble	" " "	Little Rock, Ark.
W. C. Dibblee	General agent	Los Angeles, Cal.
C. Bourne, Jr.	Asst. gen. freight agent	Memphis, Tenn.
F. H. Donahue	General agent	Milwaukee, Wis.
R. B. Wilson	" "	Minneapolis, Minn.
Norton England	Asst. gen. freight agent	New Orleans, La.
J. B. Trimble	General agent	New York
J. R. Duckworth	Asst. gen. freight agent	Omaha, Neb.
W. B. Wier	Division freight agent	Pine Bluff, Ark.
C. C. McCarthy	General agent	Pittsburgh, Pa.
P. E. Watson	Division freight agent	Pueblo, Colo.
J. J. Kavanaugh	General agent	Salt Lake City, U.
W. D. Young	" "	San Antonio, Tex.
W. M. Cook	" "	San Francisco, Cal.
C. M. Fowler	" "	Seattle, Wash.
V. J. Kaiser	Division freight agent	Sedalia, Mo.
N. A. Beach	" " "	St. Joseph, Mo.
George Kassling	" " "	St. Louis, Mo.
L. D. Nicholson	" " "	Texarkana, Ark.
R. R. Trimble	General agent	Tulsa, Okla.
F. E. Walling	Division freight agent	Wichita, Kan.

NEW YORK CENTRAL

A portion of the New York Central organization was given in the *Railway Age* of March 5, page 745. Additional appointments, effective March 1, have been made as follows:

A. E. Calkins	Supt. rolling stock—East	New York
J. W. Senger	Supt. rolling stock—West	Buffalo
Geo. Thomson	M. C. B., 3d Dist. (West)	Collinwood, Ohio
James Reed	M. C. B., 4th Dist. (West)	Englewood, Ill.
Alfred Herbster	Asst. M.C.B., 4th Dist. (W.)	" "

NEW YORK, CHICAGO & ST. LOUIS

In addition to the officers on the New York, Chicago & St. Louis announced in the *Railway Age* of March 5 (page 745), the following appointments have been made:

H. J. Holden	Auditor	Cleveland, Ohio
J. G. Alexander	Assistant treasurer	" "

NEW YORK, NEW HAVEN & HARTFORD

The executive department organization of the New York, New Haven & Hartford was given in the *Railway Age* of February 27, page 657, and that of the accounting department in the issue of March 5, page 745. The remainder of the organization is announced as follows:

C. L. Bardo	General manager	New Haven, Conn.
E. Gagel	Chief engineer	" " "
H. L. Ripley	Corp. and val. engr.	Boston
G. G. Yeomans	General purchasing agent	New Haven, Conn.
G. W. Hayden	Asst. pur. agt. & gen. st. kp.	" " "
E. G. Riggs	Executive assistant	New York
W. S. Rathbun	General assistant	" "
Richard Hackett	Asst. V. P. in chrg. traffic	New Haven, Conn.
A. B. Smith	General pass. agent	" " "
G. M. Wood	General freight agent	" " "

NORFOLK SOUTHERN

A portion of the new organization of the Norfolk Southern was given in the *Railway Age* of February 27, page 658. The following gives the new appointments complete:

M. J. Perry	Chairman bd. of directors	New York
R. H. Swartwout	Vice chair., board	"
J. H. Young	President	Norfolk, Va.
M. S. Hawkins	Asst. to pres. and sec.	" "
C. I. Millard	Vice president	" "
E. D. Kyle	Vice president, traffic	" "
J. F. Dalton	Gen. freight and pass. agt.	" "
W. B. Rodman	General solicitor	" "
Matthias Manly	Treasurer	" "
J. F. George	Asst. treasurer	" "
G. E. Christie	Asst. secretary	New York
J. C. Nelms, Jr.	General auditor	Norfolk, Va.
A. Winslow	Auditor of receipts	" "
C. W. Akers	Gen. supt. steam lines	" "
L. B. Wickersham	G. supt.-elec. engr. elec. lns.	" "
F. L. Nicholson	Chief engineer	" "
L. M. Jones	Purchasing agent	" "
Dr. R. L. Payne	Chief surgeon	" "
C. P. Dugan	Supt. transportation	" "
J. W. Sasser	Supt. of motive power	" "
John Dwyer	Supt. maint. of way	" "
J. H. Barrett	General claim agent	" "
J. L. Pettus	Chief of police	" "
J. M. Shea	Supt. Northern div.	" "
J. C. Lewis	Supt. Central div.	Newbern, N. C.
J. S. Cox	Supt. Western div.	Raleigh, N. C.

NORFOLK & WESTERN

The organization of the Norfolk & Western was given in the *Railway Age* of March 5, page 746. Additional appointments have been announced as follows:

I. W. Booth	Secretary	Philadelphia
J. B. Lacy	Treasurer	Roanoke, Va.
T. S. Davant	Vice pres.; traffic	" "
J. R. Ruffin	Freight traffic manager	" "
W. B. Bevill	Pass. traffic mgr.	" "
B. W. Herrman	General freight agent	" "
T. D. Hobart	Gen. coal freight agent	" "
T. G. Wood	Agricultural agent	" "

In last week's issue, Mr. Davant's name was incorrectly given as T. S. Durant.

PENNSYLVANIA RAILROAD

In addition to the officers on the Pennsylvania, announced in the *Railway Age* of February 30 (pages 597 to 600), the following appointments have been made in the signalling department:

Eastern Region

J. C. Jones	Supt. telegraph and signals	Philadelphia
W. N. Spangler	Asst. supt. tel. and sig.	"

Central Region

W. M. Post	Supt. tel. and sig.	Pittsburgh
L. Behner	Asst. supt. tel. and sig.	"

Northwestern Region

C. W. Hixson	Supt. tel. and sig.	Chicago

Southwestern Region

E. B. Pry	Supt. tel. and sig.	St. Louis

PERE MARQUETTE

A portion of the new organization of the Pere Marquette was given in the *Railway Age* of March 5, page 746. Additional appointments are announced as follows:

E. E. Cain	General superintendent	Detroit
H. O. Halsted	Supt. car service	"
A. E. Badger	Asst. to general manager	"
C. M. Booth	Freight traffic manager	"
W. L. Mercereau	Supt. steamships	Ludington, Mich.
R. P. Patterson	General freight agent	Detroit

PIEDMONT & NORTHERN

Officers of the Piedmont & Northern have been announced as follows:

E. Thomason	Vice pres. and gen. mgr.	Charlotte, N. C.
Bond Anderson	Auditor	" "
J. S. Cureton	Gen. freight and pass. agt.	Greenville, S. C.
W. T. Gill	Freight claim agent	Charlotte, N. C.
C. W. Crosby	Transportation supt.	Greenville, S. C.
W. L. Hogan	" "	Charlotte, N. C.
A. D. Frye	Supt. motive power	Greenville, S. C.
D. G. Smith	Acting roadmaster	" "

PULLMAN CAR LINES

The following appointments have been made in the personnel of the Pullman Car Lines, effective with its return to private control:

L. S. Taylor	Vice pres. & comptroller	Chicago
L. S. Hungerford	Vice pres. and gen. mgr.	"

ST. LOUIS-SAN FRANCISCO

Appointments in the traffic department of the St. Louis-San Francisco have been announced as shown in the following list: Other appointments in the St. Louis-San Francisco organization were given in the *Railway Age* of February 27, page 658, and in the issue of March 5, page 747.

S. S. Butler.....Freight traffic manager....St. Louis
J. N. Cornatzar...Pass. traffic manager..... "
C. A. Forrest.....Gen. agent, freight dept....Atlanta
R. C. Gentry.....Gen, agent, pass. dept..... "
W. S. Merchant..General agent.....Chicago
C. S. Hall..... " " .....Cincinnati
A. H. Stevens.... " " .....Denver
W. C. Preston....General eastern agent.....New York
O. M. Conley.....General agent.....Pittsburgh

ST. LOUIS SOUTHWESTERN

In addition to appointments on the St. Louis Southwestern, announced in the *Railway Age* of February 27, page 667, the following have been announced:

J. K. James.....Commercial agent.....St. Louis
E. A. Senneff..... " " .....San Francisco

SEABOARD AIR LINE

The following appointments on the Seaboard Air Line are also additional to those given in the *Railway Age* of February 27, page 658, and in the issue of March 5, page 748.

B. H. I. Brown...General counsel.....New York

Mr. Brown was incorrectly given in the company's original circular dated February 14 as "advisory counsel."

W. L. Stanley....General attorney.....Atlanta, Ga.

Operating Department

M. Welsh.....Chief special agent.....Norfolk, Va.
M. L. Byers.....Chairman, val. dept..... " "
C. V. Fleming....Office asst. to vice pres.... " "
W. H. King, Jr..Asst. to vice pres..... " "
D. N. Bacot.....Asst. to gen. mgr..... " "
C. E. Hix.....Supt. transportation..... " "
W. F. Williams..Supt. telegraph..... " "
W. W. Fuller....Safety supervisor..... " "
H. S. Heard.....Supervis'r pass. operations. " "

Engineering Department

W. D. Faucette...Chief engineer.....Norfolk, Va.
E. A. Frink.....Principal asst. engineer.... " "
E. W. Smith.....Asst. to chief engineer..... " "
H. S. Thomas....Engineer of construction.. " "
W. L. Darden....Engineer of buildings..... " "
J. B. McClain....Engineer of bridges..... " "
D. M. McKey....Locating engineer.....Plant City, Fla.
H. R. Artman....District engineer.....Atlanta, Ga.
L. A. Murr..... " " .....Portsmouth, Va.
H. B. Cartwright. " " .....Jacksonville, Fla.
D. A. Leard.....Right of way engineer.....Norfolk, Va.
E. L. Cannon.....Office engineer..... " "

SOUTHERN PACIFIC COMPANY

The following list of officers of the Southern Pacific Company is a continuation of the list which was given in the *Railway Age* of March 5, pages 748 and 749:

PACIFIC LINES

Freight Traffic Department (Continued)

S. N. Bostwick...Asst. gen. freight agent....San Francisco
J. H. Mulcahy.... " " " " .... "
M. A. Cummings. " " " " .... "
J. T. Saunders.... " " " " .... "
G. J. Blech..... " " " " ....Los Angeles
W. F. Miller..... " " " " ....Portland, Ore.
J. M. Fulton..... " " " " ....Reno, Nev.
E. J. Fenchurch.. " " " " ....Tucson, Ariz.
Wm. C. Fitch....Freight claim agent.....San Francisco
T. H. Griffin.....Customs attorney..... "

Passenger Traffic Department

Charles S. Fee....Pass. traffic manager.....San Francisco
F. E. Batturs.....Asst. pass. traffic mgr..... "
F. S. McGinnis...General pass. agent.....Los Angeles
John M. Scott....General pass. agent.....Portland, Ore.
E. E. Wade.....Asst. gen. pass. agent.....San Francisco
F. C. Lathrop.... " " " " ..... "
N. Kinell..... " " " " ..... "
F. E. Watson..... " " " " .....Los Angeles
J. A. Normandy.. " " " " .....Portland, Ore.
J. M. Fulton..... " " " " .....Reno, Nev.
E. J. Fenchurch.. " " " " .....Tucson, Ariz.
E. B. Carson.....General baggage agent.....San Francisco
H. P. Thrall.....Mail traffic manager..... "

ATLANTIC STEAMSHIP LINES

C. W. Jungen....Manager .....Pier 49, N.R., N.Y.
S. Ira Cooper....Asst. manager..... " " "
A. S. Hebble.....Supt. engineer..... " " "
B. C. Barthol'mew.Treasurer ..... " " "
M. Kerr.....Auditor ..... " " "
G. W. von Osthoff.Purchasing agent..... " " "
H. Heinze.....Commissary .....Pier 48, N.R., N.Y.
E. H. Patton.....Agent .....Pier 49, N.R., N.Y.
G. A. Swain.....Terminal supt.....Pier 51, N.R., N.Y.
E. E. Lamberton..Asst. manager.....New Orleans, La.
H. M. Wilkins....General agent.....Galveston
A. E. Woodell.... " " .....Havana, Cuba

Traffic Department

New York-New Orleans-Galveston Lines

Wm. Simmons....Gen. freight and pass. agt..New York
C. M. Evans.....Asst. freight and pass. agt.. "

New Orleans-Havana Line

Charles S. Fay....General freight agent.....New Orleans
J. T. Monroe.....General pass. agent..... "

SOUTHERN PACIFIC LINES IN TEXAS

These lines include the Galveston, Harrisburg & San Antonio; the Texas & New Orleans; the Houston & Texas Central; the Houston East & West Texas; the Houston & Shreveport; the Direct Navigation Co., and the Southern Pacific Terminal Co.

J. Kruttschnitt....Chairman exec. committee..New York
Lewis J. Spence, Director of traffic; W. R. Scott, president
A.K. Van Deventer.Asst. treasurer .....New York
Hugh Neill.....Asst. secretary ..... "
W. R. Scott.....President .....Houston, Tex.
G. S. Waid.....Vice pres. and gen. mgr.... " "

Operating Department

G. S. Waid.....Vice pres. and gen. mgr....Houston, Tex.
J. A. Power.....Supt. mot. power & equip.. " "
E. B. Cushing....Engineer of maintenance... " "
F. M. Lucore.....Supt. transportation..... " "

Superintendents

H. J. Micksh.....G., H. & S. A.—T. & N. O..Houston, Tex.
L. B. McDonald..G., H. & S. A., Houston div.San Antonio, Tex.
C. R. Morrill.....G., H. & S. A., El Paso div.El Paso, Tex.
A. D. Mims.....G., H. & S. A., Victoria div.Victoria, Tex.
W. E. Costello...H. & T. C., First div.....Ennis, Tex.
T. T. Player.....H. & T. C., Austin div.....Austin, Tex.
R. T. Walker.....H., E. & W. T.—H. & S....Houston, Tex.

Traffic Department

C. K. Dunlap....Traffic manager.....Houston, Tex.
C. W. Owen.....Asst. traffic manager..... " "
T. G. Beard.....General freight agent..... " "
S. G. Reed.....Asst. gen. freight agent.... " "
W. E. Briggs..... " " " " .... " "
J. C. Brasher..... " " " " .... " "
R. H. Carmichael. " " " " .... " "
W. C. McCormick.Asst. gen. frt. & pass. agt..El Paso, Tex.
A. R. Atkinson... " " " ..Dallas, Tex.
Joseph Hellen....Gen. passenger agent.....Houston, Tex.
J. F. Sullivan.....Asst. " " ..... " "
R. L. McKibbin...Gen. baggage & mail agent. " "
T. J. Anderson...Gen. agent, pass. dept..... " "
Nat Parks.....Live stock agent.....San Antonio, Tex.

Law Department

Baker, Botts, Parker & Garwood, general attys., Houston, Tex.

Treasury and Accounting Departments

G. R. Cottingham.Auditor and secretary.....Houston, Tex.
H. S. Walker.....Assistant auditor..... " "
G. E. McDuffie...Auditor freight accts..... " "
H. E. Buse.....Auditor of disbursements.. " "
C. P. Coleman....Auditor of pass. accts..... " "
C. B. Udell.....Treas. (except T. & N. O.). " "
E. Dargan.....Treas., T. & N. O. R.R. Co. " "
O. M. Longnecker.Asst. treasurer..... " "
J. W. Comiskey..Car accountant..... " "

PURCHASING AND STORE DEPARTMENTS

N. P. Randolph..Purchasing agent.....Houston, Tex.
L. B. Wood.....General storekeeper..... " "

SOUTHERN PACIFIC LINES IN LOUISIANA

These include Morgan's Louisiana & Texas Railroad & Steamship Co. and the Louisiana Western:

J. Kruttschnitt....Chairman exec. committee. New York
Lewis J. Spence, Director of traffic; W. R. Scott, president
A.K. Van Deventer.Assistant treasurer.....New York
W. A. Worthington.Vice pres., L. W. R. R. Co. "
Hugh Neill.....Asst. sec. ML&T; sec. LW. "
W. R. Scott.....President .....New Orleans, La.
J. H. R. Parsons..Vice pres. and gen. mgr... " "

OPERATING DEPARTMENT

J. H. R. Parsons..Vice pres. and gen. mgr...New Orleans, La.
P. B. Torian.....Supt. terminals..... " "
R. M. Glover.....Superintendent .....Lafayette, La.

TRAFFIC DEPARTMENT

Charles S. Fay....Traffic manager.....New Orleans, La.
Jos. Lallande.....General freight agent..... " "
W. H. Stakelum..Asst. gen. freight agent.... " "
John T. Monroe..General pass. agent..... " "
H. M. Moors....Freight claim agent..... " "
W. H. Wynne....Commercial agent..... " "
R. L. McKibbin...Gen. bagg. & mail agent....Houston, Tex.

LAW DEPARTMENT

Denegre, Leovy & Chase..General attys.....Houston, Tex.

PURCHASING DEPARTMENT

N. P. Randolph...Purchasing agent.....Houston, Tex.

TREASURY AND ACCOUNTING DEPARTMENTS

G. B. Herbert.....Auditor .....New Orleans, La.
G. B. Herbert.....Sec. ML&T; asst. sec. LW. " "
St. D. J. de Blanc.Treasurer ..... " "
John McGraw....General agent..... " "

ARIZONA EASTERN

J. Kruttschnitt... Chairman exec. committee. New York
Lewis J. Spence, Director of traffic; Epes Randolph, president
A. D. McDonald..Vice pres. & comptroller...New York
Hugh Neill.....Assistant secretary..... "
A.K. Van Deventer.Assistant treasurer..... "
Epes Randolph...President .....Tucson, Ariz.
L. H. Long.....Vice president..... " "
J. C. McClure....Asst. to president..... " "
T. A. Duff.....Auditor ..... " "
John E. White....Treasurer ..... " "
E. J. Fenchurch..Gen. freight & pass. agent.. " "
C. J. Hellerstedt..Secretary ..... " "
C. M. Scott.....General manager.....Phoenix, Ariz.
H. Weitzel.....Superintendent ..... " "
Max Fiedler..... " .....Globe, Ariz.

SOUTHERN PACIFIC OF MEXICO

J. Kruttschnitt....Chairman exec. committee. New York
Lewis J. Spence.. Director of traffic; Epes Randolph, president
J. P. Blair.....General counsel.....New York
A. D. McDonald..Vice pres. & controller..... "
L. H. Long.....Vice president.....Tucson, Ariz.
C. J. Hellerstedt..Asst. secretary..... " "
A.K. Van Deventer.Treasurer .....New York
Hugh Neill.....Secretary ..... "
Epes Randolph....President .....Tucson, Ariz.
J. C. McClure....Asst. to president..... " "
John E. White....Asst. treasurer.....

TRAFFIC DEPARTMENT

H. Lawton.....Gen. freight & pass. agent..Guaymas, Sonora
W. H. Francis....Asst. gen. frt. & pass agent. " "

MAINTENANCE AND OPERATING DEPARTMENTS

H. J. Temple.....General supt.....Empalme, Sonora
J. B. Finley.....Asst. gen. supt..... " "
J. D. Mathews...Engineer maint. of way.... " "
M. J. Kingsbury..Superintendent ..... " "
J. A. Small..... " .....Naco, Sonora
R. Castaneda..... " .....Guadalajara, Jalis.
V. W. Bennett.... " .....Mazatlan, Sinaloa
Dr. E. C. Houle..Chief surgeon.....Empalme, Sonora

TOLEDO TERMINAL

The following is the organization of the Toledo Terminal, effective with its return to private control:

A. B. Newell.... President and gen. mgr....Toledo, Ohio
D. C. Follas.....Secretary and auditor..... " "
W. L. Schulte....Treasurer ..... " "
E. J. Marshall...General solicitor..... " "
H. W. Fraser....General attorney..... " "
J. F. Withrow...Superintendent ..... " "
C. H. McKeand..Purchasing agent..... " "
J. Wanbecq.....Engineer ..... " "

TOLEDO & OHIO CENTRAL

The re-election of F. B. Sheldon as vice-president of the Toledo & Ohio Central, the Zanesville & Western, the Kanawha & Michigan and the Kanawha & West Virginia, with headquarters at Columbus, was noted in the *Railway Age* of February 27 (page 659), under the head of New York Central Lines. Other appointments on the Toledo & Ohio Central and the three other roads mentioned have since been announced as follows:

J. B. Wagner....Auditor .....Columbus, Ohio
E. N. Bennett....Treasurer ..... " "
H. E. Sparks....General manager..... " "

WABASH

Through an inadvertence the names of several officers of the Wabash were incorrectly included in the *Railway Age* of last week under the head Baltimore & Ohio, on page 737. These names should have been included with the remainder of the Wabash appointments on page 752, and are as follows:

A. O. Cun'ngham.Chief engineer.....St. Louis
R. H. Howard...Chief engr. maint. of way.. "
E. F. Needham...Supt. of motive power....Decatur, Ill.
T. J. Frier.....Purchasing agent.....St. Louis

WESTERN MARYLAND

The following is the new organization of the Western Maryland, insofar as it was available at the time of going to press:

Lawrence Greer..Chairman of the board....New York
M. C. Byers.....President .....Baltimore
L. F. Timmerman. Secretary and treasurer....New York

PURCHASING DEPARTMENT

M. E. Towner....General purchasing agent..Baltimore
E. Jones.....Asst. to gen. purch. agent.. "
J. M. Cain.....Tie and timber agent..... "
J. L. Gorsuch....Stationer ..... "
R. R. Kane.....General storekeeper.....Hagerstown, Md.

TRAFFIC DEPARTMENT

D. G. Gray..... Vice pres., traffic.....Baltimore

Freight

J. W. Allison.....Freight traffic manager.....Baltimore
T. H. Fee.....Asst. gen. freight agent.... "
M. H. Jacobs.....Asst. gen. freight agent....Pittsburgh
W. S. Burton.....Freight tariff agent.....Baltimore
W. A. Shropshire.Division freight agent.....Cumberland, Md.
L. A. McAbee.... " " " .....Hagerstown, Md.
S. J. Lamoreux...Gen. eastern freight agent..New York
C. B. Oakley.....Commercial freight agent..Baltimore
George J. Davis.. " " " ..Philadelphia
J. A. S. Wallace.. " " " ..Pittsburgh
H. A. Gebelein... " " " ..New York
C. E. Edwards.... " " " ..York, Pa.
J. E. Hutchinson. " " " ..Minneapolis, Minn.

WESTERN PACIFIC

The following appointments on the Western Pacific are additional to those announced in the *Railway Age* of February 27, page 659:

W. G. Bruen.....Statistician .....San Francisco
F. W. Hodges....Asst. gen. pass. agent..... "
W. J. Shotwell...Asst. gen. frt. agent..... "
Theodore Harte.. " " " " ..... "
B. F. Nevins.....Gen. live stock agent..... "
T. Noel.....Foreign freight agent..... "
W. F. Whiteman.Freight claim agent..... "
L. J. Kerrigan....Claim agent..... "
T. W. Huntington.Chief surgeon..... "
W. R. Groom....Chief special agent..... "
J. L. Smith.....Tax agent..... "
F. K. Kergan.....Lease agent..... "
C. E. Benton.....Supt. d. c. and hotels.....Oakland, Cal.
J. T. Gardner....General storekeeper.....Sacramento, Cal.
J. S. Spelman....Supt. Western div..... " "

Western Pacific (Continued)

M. O'Connor	Supt. Eastern div.	Elko, Nev.
A. H. Powell	General master mechanic	Sacramento, Cal.
T. R. Miller	Master mech., West. div.	" "
W. T. Abington	Master mech., East. div.	Elko, Nev.
T. L. Phillips	Div. engr., West. div.	Sacramento, Cal.
G. H. Ballantyne	Div. engr., East div.	Elko, Nev.
D. N. Neal	Bridge engineer	San Francisco

Obituary

E. N. Leamaster, who, prior to his retirement in June, 1919, was district superintendent of the Pullman Company, with office at El Paso, Tex., died on February 29 at his home in that city.

Colonel Carroll M. Bunting, comptroller of the Pennsylvania, died in Philadelphia on March 4. Colonel Bunting was born September 15th, 1871, at Darby, Pa. He was graduated from the Darby Friends School, Philadelphia Public School and Bryant and Stratton's Business College. He began his railroad career in 1887 as bill-of-lading clerk and stenographer to D. W. Farrow, freight agent at Philadelphia for the Chicago, Rock Island and Pacific Railroad Company. He then became employed in the office of the through freight agent of the Philadelphia and Reading Railway and afterwards entered the service of the Northern Pacific and Wisconsin Central in their Philadelphia freight agency. On May 1st, 1890, he entered the service of the Pennsylvania as secretary to Captain John P. Green, then third vice-president of the company. He was made chief clerk to the first vice-president May 1st, 1897, and assistant to the first vice-president June 1st, 1906. On March 24th, 1909, he was appointed assistant comptroller, and on June 1st, 1910, comptroller of the Pennsylvania. Shortly after the United States declared war on Germany Colonel Bunting secured a leave of absence to serve as business manager of the Transportation Corps, American Expeditionary Forces. He was also a member of the staff of Brigadier General W. W. Atterbury, director general of transportation. He returned from France in January, 1919, and had been in poor health since his return.

C. M. Bunting

Alexander M. Lupfer, chief engineer of the Spokane, Portland & Seattle, who died in Portland, Ore., on February 3, as noted in the *Railway Age* of March 5, (page 572), was born in Blaine, Pa., in 1855. He graduated from Lafayette College, Easton, Pa., in 1880 and shortly after entered railway service on the New York, West Shore & Buffalo, now the West Shore. He later became connected with the Denver & Rio Grande, on which he served until 1883. In 1884 he was appointed assistant engineer of the Oregon Railroad & Navigation Company, with headquarters at Portland, Ore., and later in the same year entered the employ of the Northern Pacific in the same capacity. In June, 1885, he returned to Portland to engage in private engineering practice. Soon after, however, he was appointed resident engineer of the Chicago, St. Paul & Kansas City, (now the Chicago Great Western); also of the Illinois Central, the Denver & Rio Grande and the Union Pacific, and served in that capacity until 1890, from which time until 1905 he was reconnaisance and location engineer of the Great Northern. From 1905 until 1911, Mr. Lupfer was chief engineer of the Spokane & Inland Empire, with headquarters at Spokane, Wash. In 1911 he went to Brazil in the interest of mining properties and proposed railroads. During part of 1912 he was associated with John Stevens, who had been engaged to undertake the reconstruction of the railway system in Spain. Returning to America later in the same year, he again became affiliated with the Great Northern. On January 1, 1913, he returned to the Spokane, Portland & Seattle as chief engineer and also served in the same capacity for the Portland & Seattle, the Spokane & Inland Empire and the Oregon Trunk.

John A. Atwood, chief engineer of the Pittsburgh & Lake Erie and the Monongahela, with headquarters at Pittsburgh, Pa., died at his home in that city on February 29. Mr. Atwood was born at Chatham, Mass., on February 8, 1857. He graduated from New York University in 1878 and entered railway service in the same year as a transit man on the New York Elevated. In March, 1879, he was appointed a rodman and later a leveler of the Elizabeth City & Norfolk. In 1880 he was appointed a draftsman on the New York, Lake Shore & Buffalo, serving in that position until 1883, when he was appointed assistant to the chief engineer of the Tenth Avenue Cable Railway in New York City. From 1885 to 1887 he was resident engineer of the Chautauqua Lake, and, from the latter date until 1889, assistant engineer on the Lake Shore & Michigan Southern. In 1889 he was appointed engineer of construction on the Pittsburgh & Lake Erie, retaining that position until 1896, when he was appointed chief engineer. Mr. Atwood was also second vice-president of the American Railway Engineering Association.

J. A. Atwood

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Scenes from Foreign Ports—Batavia, Java

Railway Age

EDITORIAL

DAILY EDITION

The Signal Division Attendance

The attendance at the fifth meeting of the Signal division surpassed the expectations of those in charge. That such a large number were in attendance may have been due to a desire on the part of the members to learn first hand what action was to be taken concerning the status of the division since the termination of federal control and the natural desire of the members to exchange views on the subject. Whatever the cause, the fact remains that signal men of all classes are taking a very active interest in the work being done by the division. Definitely the registration yesterday showed a total of 248 railroad men and 98 supply men, or a total of 346 present as compared with a total of 319 members of all classes present last year.

Remove the Cause for Dissatisfaction

Many members of the Signal division were opposed to the amalgamation of the Railway Signal Association with the American Railroad Association. The dissatisfaction which now exists is apparently caused by the fact that it is necessary to submit all specifications and recommended practices, after their adoption, to a general committee on which a large majority of the members are only in part a part of the American Railroad Association. The feeling exists that the division has lost control over its own functions, as such recommended practices may lay dormant until the general committee may see fit to act. After this committee acts, the practices passed by it are referred to a sub-committee on standards of the American Railroad Association, which may not act on them for some time. Consequently, recommendations made by the Signal division may not be approved until a year, or perhaps longer, after their adoption. This delays their publication in the Manual. A large part of the criticism directed towards the amalgamation in the past may be removed if proper consideration is given to remedying these conditions by the Association of Railway Executives in connection with the reorganization of the A. R. A.

Education for Increased Production

The American people generally are awakening to the relationship between production and the cost of living. The railroads, even though they may be considered only a single tooth in the cog that aids in grinding out the finished products, are important enough to offer a tremendous hindrance if they do not function properly. Indeed, because of inadequate facilities they are today the limiting factor in the production of many things. The signal department, because of its relationship to the safety and despatch of trains, must bear a distinct share of the responsibility of the railroads for their part in increasing production. Improved apparatus is important, but for immediate results it will be necessary in most cases to increase the efficiency of the present equipment. How can the Signal division best help in this emergency? Does it not offer a special opportunity for the Sectional committees? These committees command the attention of the entire rank and file of those engaged in railway signaling and if the matter of increased production through efficiency and better maintenance is presented properly before their meetings, the results will undoubtedly prove productive.

Solve Your Problems at the Exhibit

A vital need of the railroads today is the installation of labor-saving and other devices that will increase efficiency, improve transportation and solve some of the operating problems with which the roads are confronted. Railroad officers in attendance at the convention have an excellent opportunity to discuss and inspect carefully the improved and new equipment and devices on exhibit at the Coliseum. The supply companies spend liberally of money and time to present their products in an interesting and instructive manner. Their representatives are on hand to explain in detail the good features of the equipment. It is logical to assume that if those who inspect the exhibits are prepared to study them with the view of determining whether the particular devices will solve their problems in a more economical and less expensive way, then they will gain much by such an inspection. Most roads are preparing or have prepared programs for new work to be carried out during the next year. The signal men who are directly responsible for carrying out such programs should examine the signal exhibit carefully and should be prepared to ask all the questions that will enable them to determine how the various signal devices, particularly the new ones, will fit into the proposed new work, keeping in mind the factors that involve first cost, cost of maintenance and operation, efficiency and service.

The Signal Division and Its Future

Twenty-five years ago, on the eleventh of March, the Railway Signaling Club was organized, and 17 years ago its name was changed to the Railway Signal Association, which name it retained for 16 years. During the first 24 years it grew in strength and influence, until a year ago it became the Signal division, Engineering Section, American Railroad Association. Because of its sturdy nature it was able to carry the weight of so long a name with dignity and with honor to itself and to the association of which it is now a part. Its friends—and there are many—familiarly nicknamed it the Signal division. As such it is now celebrating its first birthday as a part of the parent organization, and during the past year it has run true to form in accomplishing much good work. At the time of its amalgamation some members were bitterly opposed to its change in status, others were neutral in feeling, and still others were favorably disposed to the change. Good arguments were advanced by those both for or against the change as to why its status should remain the same or why the amalgamation would be of benefit. A marked difference of opinion still exists. The fact remains that

much good work has been accomplished in the past and that regardless of its name or affiliation much more good work will be accomplished in the future. There is an old Chinese proverb saying that "there is a time to fish and a time to dry nets." "The time to fish" has passed, while "the time to dry nets" is here. Consequently, irrespective of what the future may hold, it should be the aim of all to co-operate in anything that is best for the common good of the organization so that it may continue to increase in prestige and be a power in increasing efficiency in signal work.

State Road Building and the Railroads

THE ROAD BUILDING PROGRAMS planned by various states throughout the country in 1919 for completion during this year were extremely ambitious and called for a surprisingly large total mileage. These plans are now being curtailed for several very good reasons. The lack of means of transportation of materials, an insufficient number of responsible contractors to undertake the work, the high cost of and the difficulties encountered in securing both labor and materials in adequate amounts are some of the factors that have led to the conclusion that the programs, as originally contemplated, must be modified.

The first of these, the lack of transportation facilities, is particularly significant. The railways are now emerging from an extended period marked by restricted construction activities. As a result they truthfully may be said to have reached or passed the point of saturation in so far as their capacity for handling business is concerned. This is a condition which is hampering not only the carrying out of road building programs, but is, as well, acting as a deterrent to the industrial expansion of the country as a whole. It seems, therefore, that the restoring of the railroads to a position where they will welcome and be able to take good care of additional business is a prime necessity.

To do this will tax all our resources. The rehabilitation of the railways is largely a question of man-power. To go ahead with the construction of highways in the ambitious way originally planned will also require the employment of unskilled labor in large quantities. If these projects are carried out simultaneously the result will be disastrous competition for man-power between state authorities and the railroads, a situation which will be unfortunate for both parties. The states will find themselves possessed of highways constructed at extremely high costs and burdened with needless debts and the time when the railways will be able to perform their functions properly will be uselessly deferred. In the light of these facts the decision of Illinois and some other states to defer highway work for this year seems to be the part of wisdom and it is to be expected and hoped that other states will adopt like policies.

Oil for Signal Mechanisms

THE VALUE OF OIL AS A lubricating medium is based on its adhesive and cohesive qualities. By adhesive quality is meant its ability to adhere to the parts to be lubricated, while the cohesive quality enables it to maintain a film of lubricant on the surfaces that require lubrication. Under these conditions the moving apparatus floats without touching the stationary parts, which results in a film of lubricant being divided into two layers, the one movable; the other stationary. As the internal fluid frictional resistance of the lubricating oil is small, the resistance of the bearing parts is reduced.

The moving and adjacent parts of signal mechanisms necessarily must be free-running and subjected to as little frictional resistance as possible. Any tendency on the part of the oil which is used for lubricating such apparatus to gum, freeze or evaporate may be the cause of signal failures. It is not uncommon for the temperature to fall to 40 or 50 deg. below zero in some sections of the country. This is particularly true in the regions traversed by some of the northern roads, and unless a satisfactory oil is used for lubricating the signal mechanisms on certain sections of these roads trouble is liable to develop. The most serious failure which can develop is, of course, a false clear signal indication. A few cases of this nature have been known to occur because the lubricating oil did not flow satisfactorily at low temperatures. On the other hand, there are roads in other parts of the country where the other extreme of temperature prevails, and this brings about a condition wherein the oil may be subject to evaporation because of the extreme heat. This condition has also been known to have caused signals to operate improperly. It is evident, therefore, that the proper lubrication of signal mechanisms is a complicated and difficult problem. This is indicated by the fact that the Signal division Committee on Oils submitted two specifications on lubricating oil for signal mechanisms which appear elsewhere in this issue. One specification is for zero deg. F. and the other for 45 deg. below zero F.

As a matter of fact, the source of supply of lubricating oil for signal mechanisms that will satisfy a single specification designed to meet the requirements in both warm and cold climates is limited to a few oil fields. On the other hand, a large number of fields can supply oil that will work satisfactorily for lubricating purposes where the climatic conditions are such that the various factors involved, such as evaporation, viscosity, cold, etc., are workable within the range of temperature changes which prevail in certain sections of the country throughout the year. As such oils will not work satisfactorily in all sections of the country it would appear advisable in order to provide a broader field of supply to have the specifications drawn up in such a manner as to permit the roads to base their requirements on the exact conditions which have to be met, even though it may be necessary for some roads to use two grades of oil, one for warm and the other for cold weather.

Valuation and Depreciation

GREATER IMPORTANCE will be attached to valuation now and in the future than in the past. This is because of the provisions contained in the new transportation law. A part of the law bearing on the regulation of rates with reference to valuation says "whenever pursuant to section 19a (pertaining to valuation) of this Act the value of the railway property of any carrier held for and used in the service of transportation has been finally ascertained, the value so ascertained shall be deemed by the Commission to be the value thereof for the purpose of determining such aggregate value" (for rate making purposes).

While signal valuation is but a small part of the total railroad valuation, still it is an important part. Consequently the Committee on Valuation appointed by the Signal division should become one of the most important committees of the association. The work undertaken by this committee cannot be accomplished in a day or in a year, and to function properly it will be necessary to have the co-operation of all railway signal departments.

In attempting to tabulate information pertaining to the average service life in years of the important units of the different types of signal installations the commit-

tee stated that it had sent out a list of approximately 100 major units to 152 railroads for opinions of the maximum life of these units, separating the physical from functional depreciation. The committee proceeds to say that "up to January 10, 33 replies had been received representing approximately 61 railroads, 7 of which gave no informaton, and a large percentage of the balance gave only opinions which differed widely." That such a condition exists is because few, if any, signal department organizations have attempted to determine in the past the average length of life of the various classes of signal material.

It is important and essential that some definite method be employed in the future to determine the average service life of materials, and the committee could do no better work at the present time than to suggest a method or scheme which may be employed by the various signal departments for keeping a record of the various major units from the time of their installation to their retirement. It is recognized that with certain materials having a relatively long life, the average length of life for the present will have to be based on past performance, but this should not prevent the establishment of a scheme of uniform records for this purpose. Authoritative information upon the actual physical depreciation of materials can only be obtained in such a manner.

With reference to depreciation an interesting question is raised by the passage of the new railroad legislation in that the law instructs the commission to prescribe for the carriers subject to the Act, the classes of property on which depreciation charges may be made. Under the Valuation Act the carriers felt it to be to their advantage to claim a very low rate of depreciation in order to obtain a higher valuation on their properties, some carriers contending that no depreciation existed. Now under the provision of the new law it will be to the advantage of the carriers to charge off under operating expenses as heavy a depreciation percentage as possible. It would appear that some carriers are placed in a position where they cannot consistently advocate to the Commission that a higher percentage should be allowed on various classes of property than the Commission may see fit to allow. It will be interesting to see what stand the Commission will take in this matter.

Today's Program of the Signal Division

The following reports are scheduled for presentation before the meeting in the Gold room today:

Committee XI—Batteries.

Committee VIII—Alternating Current Automatic Block Signaling.

Committee XII—Contracts.

Committee V—Maintenance Rules and Instructions.

Committee IV—Direct Current Automatic Block Signaling.

In addition to the above, the following reports that were scheduled for yesterday were carried over for consideration at today's meeting:

Committee VII—Direct Current Relays.

Committee IX—Wires and Cables.

Committee XIII—Electrical Testing.

Committee III—Power Interlocking.

A. R. E. A. Joins Engineering Council

At a meeting of the Board of Direction of the American Railway Engineering Association yesterday, it was decided to affiliate with Engineering Council.

American Railway Engineering Association Convention Program

The following is the program for the American Railway Engineering convention opening this morning. Morning sessions will extend from 9:30 to 12:30 and afternoon sessions from 2 to 5.

Tuesday, March 16

President's Address.
Reports of Secretary and Treasurer.
Reports of Standing and Special Committees.

Water Service	Bulletin 220
Masonry	Bulletin 220
Buildings	Bulletin 220
Uniform General Contract Forms	Bulletin 220
Track	Bulletin 221
Electricity	Bulletin 221
Conservation of Natural Resources	Bulletin 221
Economics of Railway Location	Bulletin 221

Wednesday, March 17

Wood Preservation	Bulletin 222
Ballast	Bulletin 222
Iron and Steel Structures	Bulletin 223
Special Stresses in Railroad Track	Bulletin 224
Ties	Bulletin 223
Roadway	Bulletin 224
Rules and Organization	Bulletin 222
Economics of Railway Labor	Bulletin 223

Annual Dinner at 6:30 p. m.

Thursday, March 18

Signals and Interlocking	Bulletin 224
Yards and Terminals	Bulletin 225
Rail	Bulletin 225
Records and Accounts	Bulletin 222
Signs, Fences and Crossings	Bulletin 223
Wooden Bridges and Trestles	Bulletin 225
Economics of Railway Operation	Bulletin 225
Special Standardization	Bulletin 223

New Business.
Election and Installation of Officers.
Adjournment.

Who Are Subordinate Officials?

WASHINGTON, D. C., March 15, 1920.

The Interstate Commerce Commission held a meeting at Washington on Monday for the purpose of determining what classes of railway officers should be included within the term subordinate official as used in the Transportation Act and also to ascertain whether its regulations regarding the making of nominations for appointments as members of the Railroad Labor Board should be modified. L. K. Sherman appeared in behalf of the American Association of Engineers to ask that all engineers below the rank of chief engineer, engineer maintenance of way and division engineer be classified as subordinate officials. The hearing developed into a spirited jurisdictional controversy; several of those present representing minor officials demanded recognition as subordinate officers; representatives of the labor unions demanded the right of their organizations to represent many of these junior officers, while the railway executives asked that those having confidential relations with the managements, or dealing with employment, discipline or wages be classified as officials.

Roads Accepting Guarantee

WASHINGTON, D. C., March 15, 1920.

The Interstate Commerce Commission kept its offices open until midnight Monday for the purpose of receiving acceptances from railroad companies of the six months' guarantee provided in the new Transportation Act. Many of the companies have accepted this guarantee and agreed to turn over to the government any excess earned over the guarantee. The Pere Marquette has decided not to accept the guarantee.

Signal Division in Session

The Signal Division Holds Its Fifth Meeting

Membership at Opening Session Votes to Return to Former Status, But This Action Is Withdrawn in Afternoon

ACTION OF VITAL IMPORTANCE to the Signal division was taken at the morning session yesterday when its return to the former status of the Railway Signal Association came up for consideration. Immediately after the morning session was called to order by Chairman C. J. Kelloway, superintendent of signals, Atlantic Coast Line, at 10 a. m., he outlined the action taken by the Committee of Direction at its meeting on Sunday, March 14. A very spirited discussion arose over the action taken by the Committee of Direction and a resolution offered by W. J. Eck, signal and electrical superintendent, Southern, some members feeling that the Signal division should remain as part of the A. R. A., while others thought that it should return to its former status. Still other members present felt that no action was necessary, and that the Signal division had returned automatically to its former status as the R. S. A. at the time federal control ceased to exist. When Mr. Eck's resolution, indorsing the action of the Committee of Direction, was put to a vote, it was carried by a large majority, 201 voting for the adoption.

Abstract of Chairman Kelloway's Statement

Effective midnight, February 28, 1919, the activities of the Railway Signal Association were transferred to the American Railroad Association. Order No. 70, issued by the director general of railroads on January 10, 1919, having been complied with by this association, and as this order was only effective during the period of federal control, the action of the board in arranging for the amalgamation was an emergency measure similar to that taken by many associations, not only those of railroad men but by many other organizations, during the war period, suspending constitutions, ignoring by-laws, etc. In fact, it was very much in line with the action taken in regard to the railroads themselves, where the corporate officers ceased to function as operatives of their property, the government assuming control, rearranging the roads and consolidating them into regions, and for the emergency of the war and until March 1, 1920, took control of the properties.

Therefore, as the Board of Direction of the Railway Signal Association suspended the constitution of the Railway Signal Association as an emergency measure, which suspension was endorsed by the membership at a states meeting held in Chicago, Ill., on March 17, 1919, the Committee of Direction of the Signal Division, Section II —Engineering, American Railroad Association, has voted that, as the railroads have returned to corporate control and as the office of the director general of railroads has been abolished and his instructions have lapsed with the expiration of his office, the emergency for the suspension of the constitution and by-laws of the Railway Signal Association has passed, and, subject to the approval of the Signal division, assembled in meeting March 15, 1920, effective March 18, 1920, the constitution of the Railway Signal Association will be again in force and the association will be, therefore, operated as an independent association and the Committee of Direction of the Signal division will assume the duties of president, vice-presidents, secretary-treasurer and Board of Direction of the Railway Signal Association and will arrange with the American Railroad Association for the restoration in all ways of the status which prevailed prior to the formation of the Signal Division of the American Railroad Association.

It is recommended that the Board of Direction be instructed to enter into negotiations with the officers of the American Railway Association to the end that an affiliation with it and the voluntary associations be entered into, if the American Railway Association so desires, this being an expansion of the present Section 5 of Article 7 of the constitution of the Railway Signal Association, which reads as follows:

"Section 5. The Board of Direction shall bring to the attention of the American Railway Association any and all findings, conclusions, specifications, or standards, especially those relating

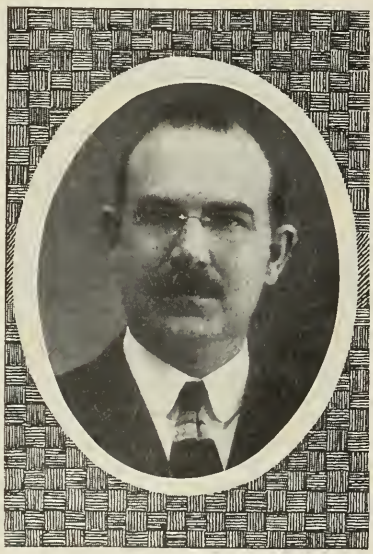
to railway operation, which are, in its opinion, of sufficient merit and importance and which have been, or in the future may be, adopted by letter ballot, with the request that they receive such approval of the American Railway Association as may be consistent with the nature of the subjects."

The result of such negotiations shall be submitted to letter ballot of the Railway Signal Association as provided in the constitution.

During the morning a message was received from T. De Witt Cuyler, chairman of the Association of Railway Executives, requesting that the division take no action with reference to withdrawing from the American Railroad Association until after the reorganization of the A. R. A. was effected. This telegram was brought before the meeting during the afternoon session and the action taken at the morning session was then reversed, the association voting unanimously to table the action until after the reorganization of the A. R. A.

Resolution Offered by Mr. Eck

Resolved, That the action of the Committee of Direction, as set forth in the report of the chairman, namely: the making operative of the Railway Signal Association constitution and the assumption by the Committee of Direction of the Signal Division, Section II—Engineering, American Railroad Association, of the duties of president, vice-presidents, secretary-treasurer and board of direction of the Railway Signal Association, effective March 18, 1920, be approved and that the president be and hereby is instructed to advise the proper officers of the American Railroad Association that the Railway Signal Association is desirous of affiliating with the A. R. A. and the voluntary associations if requested so to do, under such terms as may be mutually decided upon subject to letter ballot of the Railway Signal Association.



C. J. Kelloway
Chairman, Signal Division, A. R. A.

C. H. Morrison (N. Y. N. H. & H.): The adoption of this resolution would be unwise. Perhaps our standing with the American Railroad Association has not been such as we desire, but I understand the American Railroad Association is being reorganized into the American Railway Association. There are no other associations that are separating from the American Railroad Association up to this time, and I understand that it is the desire of the American Railroad Association that we retain our membership in the association after it is reorganized.

I do not believe that we should be hasty in passing the resolution. It could be handled at our next meeting in July just as satisfactorily.

F. P. Patenall (B. & O.): It seems to me that the first part of the resolution suggests that we sever our connection with the American Railroad Association, and the last part intimates that we would like to remain with the association. I cannot see how the resolution can be put over in that shape. I believe we are making a grave mistake in attempting to pass this matter today. We all know that since the Signal division became a part of the American Railroad Association, the latitude extended to all its members has been much greater than under the old Railway Signal Association.

The American Railway Association as reorganized will be the biggest organization in the world, and we ought to be proud to be affiliated with it. Until we know what action the American Railway Association expects to take in reference to the Signal division, this matter ought to be tabled.

C. A. Dunham (G. N.): I hope this meeting will see fit to support the resolution. I have many good reasons for expressing that wish.

When the Railway Signal Association ceased to function, and became the Signal division of the American Railroad Association, it was strictly a war measure. We were commanded by the general director of railroads to take such action; we had no alternative. Now that order has terminated, our old association against comes into life.

I am sure every man in this room will be glad to see the Signal division or the Railway Signal Association affiliated with the American Railway Association, but we want to affiliate in a proper way. The Signal division as it now exists has lost control practically of its own function. We are not in right. As a matter of fact we are distinctly in wrong, and we will not receive the recognition and the treatment which is our just due until we do establish an affiliation on a right and proper basis.

J. V. Hanna (K. C. Term.): I think it might clear the situation if we could have some explanation of the nature of this reorganization of the American Railway Association. Are we to understand that the American Railroad Association is dissolved as the result of the termination of federal control?

The Chairman: I don't think anybody knows. The American Railroad Association was formed by the director general of railroads, whose office has been abolished.

Mr. Smith: Since I have been working on committees I have felt that we have been able to do better work in the Signal division of the A. R. A. That association has lifted considerable work from the shoulders of various committees by furnishing secretaries, and doing a great deal of the work which we formerly had to do ourselves.

Why should we question what the American Railway Association is going to do? I think we would profit in the end by giving that association a chance to tell us whether it wants us or not.

Mr. Dunham: There may be a feeling in the meeting that in some way the action contemplated might prejudice our case with the American Railway Association, or with our own executive officers. I do not believe there is any occasion to anticipate that we will cease to receive the recognition and support and confidence that the Railway Signal Association earned in all the years past. We are able to stand on our own feet. The work of the R. S. A. has been carried out in a most exceptional and careful way. The findings of the association have been given very definite recognition, and I know of no voluntary railway association which has performed a relatively more useful work. It is true that the findings of the Signal division of the A. R. A. are referred to another and separate organization which is not affiliated with the American Railway Association, and until this separate and independent organization sees fit to do something

about the things that we recommend to them, they just lie there in a dormant state. Now, that is certainly not a satisfactory condition. Our work has been well performed, and recorded and put in due and proper form by this other association and there it ends. Heretofore, the findings of the R. S. A. have been carefully made, submitted to letter ballot, and official action taken; and the majority of the votes taken on such letter ballots were cast by the railroads. The representative membership in the R. S. A. had sufficient votes to carry or reject any problem before it. That was a truly representative association and it is something that we want to go back to in a proper and orderly manner. It is also desirable to retain a proper affiliation, as we have always had, with the American Railway Association.

J. A. Peabody (C. & N. W.): It is questionable whether any action is required on the part of this association at this time on the question, other than the recording of the fact that the matter was not submitted to the membership of the association for letter ballot as required by the constitution of the R.S.A. I will not criticize the action that was taken, because we were in a condition which controlled it largely. That condition, however, has passed, and it was only taken for the period of federal control. Therefore, no action really is required on this matter, but we would automatically become again the R.S.A.

As to an affiliation with the American Railway Association I believe that almost without question we must have such an affiliation. I do not know but that the members of the Board of Direction will desire to become actively affiliated with the American Railway Association, and will wish to make such recommendations. That can be accomplished better under our own rules and regulations than it can by leaving things to come out without any action on our part or without our being brought into consultation.

Someone said other associations were not going out. We have no facts on that. That is simply someone's opinion. We have not had time to investigate.

Mr. Hanna: If, as a matter of fact, the A. R. A. goes out of existence with the termination of federal control, there would seem to be no necessity for a resolution which dissolves the present relationship. If the director general's action in forming the A. R. A. did of itself terminate with the period of federal authority, we ought to know it. It seems that before the resolution is acted on we ought to have accurate and positive information on that point.

The Chairman: Order No. 70 did practically order this association to become part of the A. R. A. and says very definitely that it shall continue during the period of federal control; but federal control has ceased.

W. M. Camp: I think this association has some right of self-determination, and we all know that the changing of the R. S. A. over into the Signal division of the A. R. A. was done as a war emergency. It was not done by any letter ballot of this association. Inasmuch as the A. R. A. automatically went out of existence with federal control, in other words, has already gone out of existence, we automatically ceased to be the Signal division of the A. R. A. Undoubtedly it is a fact that some of the officers of the A. R. A. would like to retain this association in affiliation with that organization.

The latter part of the resolution, about which Mr. Patenall is in doubt, does not state that we go in again as a division, but that some working arrangement shall be made, and that working arrangement should be a matter carefully thought out and properly voted on, so that there is no question as to whether it is right and proper for this association to become again a division of the A. R. A. It is time that this association should know under what rules it is working, and the best way to know that is to restore the constitution of the R. S. A.

J. C. Mock (Mich. Cent.): It would seem that this resolution is proper, because after getting back to our old organization we can then begin to negotiate. As it is now we have no method, no machinery, to do business with the A. R. A. in case they desire to have us affiliated with them. We are in a measure affiliated with them whether we wish it or not—the railroad organizations are all engaged in the same business.

A. H. Rudd (P. R. R.): I do not think that the statement that the A. R. A. has automatically ceased to function is correct. If so, where do we go from here, and who is going to pay the bills for this meeting that was called by the A. R. A.?

The R. S. A., as I understand it, still exists, and has existed throughout all this combination with the A. R. A. The Board of Direction terminated the affairs of the association by resolution and turned them over to the A. R. A. It had no authority to take that action, because, in order to amend or change the constitution, which was wiped out, a two-thirds letter ballot must be taken. It was the only action that could have been taken in the emergency, and the board was right in making the merger as an emergency measure and in suspending the constitution.

Since yesterday I have heard some men express the opinion if we took this action it might be considered discourteous to the officers and members of the A. R. A., the men for whom we work. Tactically we might be in better shape if we asked their opinion before we took any action.

Another way which might solve the proposition would be to appoint a committee to wait on the committee of the A. R. A. and ask advice. Let us put our cards on the table, with the proviso at this meeting that any action which they advise us to take would be by authority of this meeting submitted to a letter ballot. This is worth deciding and deciding right if it takes all day today and all day tomorrow.

Mr. Patenall: I wish to offer an amendment to the resolution to the effect that the Committee of Direction appoint a sub-committee to confer with the proper subcommittee of the A. R. A. and arrange for the future activities of the Signal division.

(Motion seconded.)

T. S. Stephens (A. T. & S. F.): I have always thought that some association like the American Railway Association should be formed, which would take in all the voluntary associations, co-ordinate and direct their action, and give them more authority than they could have as a separate organization. We want to have the executive officers of the American railroads understand things that we try to do, and I think in some way the R. S. A. should try to devise some orderly plan which will permit it to negotiate with the American Railway Association.

A. R. Fugina (L. & N.): Ever since the R. S. A. was absorbed by the A. R. A., I have never been able to get away from the idea that we were taken over in a sort of an illegal manner—we were in a measure confiscated. It was a war measure and now that war has ceased, it seems to me the only way to get at this thing is to get back on the original basis. We don't know whether the American Railroad Association wants the Railway Signal Association to join it. The affiliation was a war measure as far as it was concerned, and an order from the railroad administration. I don't think we need fear the A. R. A. and I don't think it will impugn our motives or question our honesty in the matter.

H. M. Sperry (representative of signal companies): It

seems that the big question is whether the R. S. A. wants to go into the American Railway Association or the American Railroad Association. The next question will be, how to do it. You have two courses to pursue, one, to restore the R. S. A. and the other to continue your present course, giving the A. R. A. a little time to find out where they stand and to find out what can be done.

Mr. Dunham: It is simply a question of correct procedure. The fact that this action of a year ago was taken as an emergency measure by order of the director general of railroads, and the further fact that this order has now terminated by reason of the suspended functioning of the director general, our constitution again becomes in force automatically, and this resolution before this meeting, if carried, is simply a statement of fact.

We do want to re-establish the R. S. A. and if the action taken today sustains the resolution offered by Mr. Eck, then we are in a good position to negotiate and go forward any time with our work. If the amendment were to carry I can readily see that developments may take place in the next two or three months wherein it would be nearly impossible for this association to re-establish its true and proper function.

Mr. Patenall: I offered this amendment for the reason that if we expect to get anywhere in the future we must confer with the people who dictate the policies of the railroads in this country. There is nothing that I have said or thought, so far as I know, which would lead you to believe that there was no R. S. A. Nothing has transpired which has wiped that out of existence. I cannot agree to statements that our activities have been restricted.

A. B. Du Bray (I. C. C.): It has been stated that since we have been members of the A. R. A. we have gotten better results with our work. Probably we have done better committee work, but I think we are after final results. Since we have been members of the A. R. A., nothing has been published in our Manual; and as it stands now, nobody knows whether we ever will.

R. B. Elsworth (N. Y. C.): Will the Secretary please explain in what way the A. R. A. has prevented the printing of our approved specifications and standards in the Manual?

The Secretary: The regulations under which we are operating, as the Signal division of the A. R. A., gives us the privilege to place before the members of the Signal division the standards that we desire to adopt. Those standards which were adopted in September and December, 1919, were submitted to you by letter ballot, and they passed with a satisfactory vote. They are now, so far as the division is concerned, the standards as recommended by the membership of the Signal division. Before these standards can be placed in the Manual, the General committee, Section II, Engineering, A. R. A., must pass upon them. That body is our executive committee, so to speak. I anticipate that that committee, which will meet Tuesday evening, March 16, will accept those standards. If the General Committee approves the standards, they will be passed to the Executive comcittee of the A. R. A., for it to declare that they will become the authoritative document of the A. R. A. I anticipate until that action has been taken that we will not get permission to publish them.

Mr. Eck: Will the secretary please say what will become of those standards under present conditions if the Executive committee decides not to approve them?

The Secretary: The General committee, made up of representatives of various sections of the A. R. A., would have a voice in this matter. If they disapprove of our work, it is my opinion that we are still in a position to use the literature which appears in the Manual as recommended practice. However, in that case, it does not become an obligation on the part of the railroads to use it. We have nothing in our literature today that indicates that the matter now published in the Manual is obligatory any more than what has appeared in the recommendations of the R. S. A.

Mr. Rudd: If these standards, approved by the Signal division, are passed on by the various committees of the A. R. A. and also by the Executive committees of that association, are they, in that case, obligatory on the railroads to use them? As I understand it the A. R. A. is recommendatory, the same as the R. S. A. was recommendatory, but the A. R. A. recommendations, of course, have a great deal more force than the recommendations of the R. S. A.

The Secretary: The A. R. A. does not make it obligatory on the part of the railroads to use the standards I am talking about. The recommendations of the A. R. A. have been, and probably will be, on the same basis as those of the R. S. A.

The Chairman: The Chair thinks the amendment is out of order at this time, and that the original motion should be voted upon. (This was done and carried.)

Mr. Patenall: I will offer my amendment as an independent motion.

Mr. Dunham: I propose to amend the motion to the effect that the committee, if appointed as contemplated by the motion, shall be authorized to express a hearty and cordial willingness to co-operate with the A. R. A. in such way as they may desire.

Mr. Patenall: I do not think it is necessary to express our desire to co-operate, for we will probably be told to do so.

F. W. Bender (C. of N. J.): I move that the motion made by Mr. Patenall be laid on the table.

(Motion seconded and carried.)

Later in the day, during the afternoon, the question was reopened by A. H. Rudd, who read the following telegram addressed to H. S. Balliet, secretary Signal Division A. R. A., from Thomas DeWitt Cuyler, chairman of the Association of Railway Executives:

"The Association of Railway Executives have under consideration plans for carrying on the work of the American Railroad Association. Until these have been matured the executives earnestly advise against dissolving the consolidation of railroad activities brought about during the war through the American Railroad Association and deprecate any increase at this time in the number of separately maintained railroad organizations. Sincerely hope you will postpone proposed action."

In the face of that message, I move the reconsideration of the motion passed at the morning session.

(The motion was duly seconded, and carried.)

Mr. Rudd: I offer the following resolution:

Resolved, That the action taken authorizing the refunctioning of the Railway Signal Association, effective as of March 18, 1920, be rescinded; that at the request of the Association of Railway Executives action be postponed, and that the Committee of Direction be, and hereby is, instructed to appoint a committee to confer with the proper committee of the Association of Railway Executives or the American Railroad Association as to future procedure, having in view the previous action, hereby rescinded, which expresses the views of the members of the division.

Mr. Dunham: Will it be in order for this meeting to indicate something as to the personnel of this proposed committee? I am entirely agreeable provided we can have the right kind of committee. Otherwise I am wholly opposed to it.

Mr. Mann: I have rather lost confidence in the com-

mittee. I am like Mr. Dunham—if we know who is put on the committee, then we will know what is going to happen.

Mr. Dunham: The American Railroad Association has taken it upon itself to appoint men on very important committees to this division without the knowledge or approval of the Board of Direction of the division, and without the knowledge of the chairman of the division, if I am correctly informed. Now, then, if that be true, I think on behalf of the parent body, if they want to have a committee that will agree with them perfectly, that I could name two or three men here who would straighten the whole thing out to their entire satisfaction, but that would not be satisfactory to this division.

C. E. Denny (N. Y. C. & St. L.): This telegram asks that no action be taken pending the reorganization of the American Railroad Association. There is no bigger body, from the railroad standpoint, in the country today, than the Association of Railway Executives. They are handling everything of importance. I believe that they will attempt to correct any matter of organization that has been ineffective or obnoxious to the Signal division and that they will put it in the proper place in their organization if all the facts are laid before them. It appears entirely reasonable to say, when requested by them, that we will withhold taking any action at this time.

B. H. Mann: What we want is a little more democracy. We should have it known that as far as this association is concerned, we feel confident to run the signal business as far as the designs go. Of course, we do not undertake to control policies. Anything that is handled in this association should be put up to a representative body before it is finally executed.

Mr. Fugina: The Board of Direction represents the association. I do not know of a more representative committee we could have than the Board of Direction. We are practically turning it down when we insinuate that their motives are not proper.

Mr. Dunham: The parent body has placed certain men in certain positions for us. That has been done before, and if it is done again, I can see where this signal association gets off.

Mr. Stephens: I believe when DeWitt Cuyler asks us to do something he will see that we are not thrown down.

The Chairman: Will Mr. Rudd read the resolution as he now desires to offer it?

Mr. Rudd: The resolution as now presented is as follows:

"Resolved, That the action taken authorizing the re functioning of the Railway Signal Association effective as of March 18, 1920, be rescinded; that at the request of the Association of Railroad Executives action be postponed, and that the Committee of Direction be and hereby is authorized to confer with the proper committee of the Association of Railway Executives or the American Railroad Association as to future procedure, having in view the previous action, hereby rescinded, which expresses the views of the members of the Signal division."

(The motion adopting the resolution was unanimously carried.)

Mr. Rudd: I move that the secretary be authorized to advise Thomas DeWitt Cuyler, chairman of the Association of Railway Executives, of the action which was taken this morning, and also the action taken this afternoon.

(The motion was duly seconded and carried.)

Report of Committee XV—Valuation

The committee submitted for consideration at the meeting a report on the average life in years of the important units of the different types of signal installations and on the study of the Joint Signal Committee of the President's Conference Committee and the Bureau of Valuation of the Interstate Commerce Commission as to labor costs to establish percentage to be added to material to arrive at total cost of installation.

Progress Report on Table of Average Service Life

A list of approximately 100 major units of signal installations was prepared and sent about November 20 as an inquiry (form Inquiry SD 1) to 152 railroads for records and opinions as to the maximum life of these units, separating physical from functional depreciation.

Up to January 10, 33 replies had been received, representing approximately 61 railroads, 7 of which gave no information, and a large percentage of the balance gave only opinions which differed widely. The committee feels that until more information is obtained, a report would be unwise.

Relation of the Cost of Labor and Material for Installation of Crossing Bells

The committee obtained cost data for the installation of crossing bells to the amount of approximately $40,000 for 77 different installations and recommended as an extension of the study by the Joint Committee of Signal Engineers and representatives of the Interstate Commerce Commission the following:

As a guide for estimating the cost of "reproduction new," supplementing the table of schedules shown on page 36, Vol. 3, of the report of the Joint Committee on Signaling and Interlocking, a percentage of from 45 to 65 shall be added to the cost of material f. o. b. shipping point, to cover the labor of installation of crossing bells.

The committee asked that the data presented be accepted as information.

Committee: J. M. Carley (B. & A.), chairman; P. M. Gault (I. C.), vice-chairman; R. B. Arnold (C. & N. W.), F. H. Bagley (L. & N.), G. E. Beck (N. Y. C.), P. F. Canfield (N. Y. N. H. & H.), J. C. Finch (Mo. Pac.), C. O. Glenwright (P. L. W.), W. H. Harland (I. C. C.), C. Homewood (P. R. R.), W. Hudson (N. Y. C.), J. C. Irwin (B. & A.), Geo. W. Kydd (B. & O.), F. A. Leonard (I. C. C.), J. W. MacCormack (K. C. T.) J. P. Robinson (S. P.), C. H. Wiegand (A. C. L.), E. E. Worthing (S. P.), J. P. Zahnen (C. R. I. & P.).

Discussion

P. M. Gault (Vice-Chairman) presented the report of the committee.

A. B. Du Bray (I. C. C.): I ask whether the committee means by crossing bells to include all highway crossing protection, such as wig-wags and any other visible as well as audible signals?

Mr. Gault: The committee will include wig-wags or any other signals.

Mr. Du Bray: It seems to me that in many cases the percentage of 45 is considerably too high.

Mr. Gault: In the percentages as shown, 45 is the lowest. It was found by the committee that the cheapest installation would cost 45 or more, and a range of 20 per cent was given, 45 to 65.

Mr. Du Bray: I have found installations where 30 per cent fully covered it, and I think the percentage should

start lower. The high range is proper, but we should be able to get a lower range if the facts show that there is a need for it.

Mr. Gault: As I understand it, in the joint report, covering mechanical interlocking, a range of 40 to 50 per cent is allowed. No doubt many installations cost less than 40 per cent, and others cost more than 50 per cent. This range will cover the great majority of installations.

On motion, the report was accepted as information and the committee dismissed with the thanks of the association.

Report of Committee VI—Standard Designs

The committee presented 13 drawings; 5 of which are revisions of drawings previously presented and 8 are new designs.

The following revised and new drawings were submitted and the committee recommended their approval as standard, for submission to letter ballot for inclusion in the Manual:

1082—Mechanical Semaphore Bearing and Details. Revised.
1084—Pipe Carrier Side. Revised.
1085—Pipe Carrier Details. Revised.
1194—Mechanical Semaphore—Detail and Assembly. Revised.
1399—Low Target Stand. Revised.
1440—Switch Lamp (Spherical Type). New.
1441—Switch Lamp (Spherical Type) Base Socket. New.
1442—Lens Hoods and Couplings for Switch and Semaphore Lamps. New.
1443—Oil Fount for Spherical Type Lamp. New.
1496—Highway Crossing Gate and Slow Track Sign—Lamp Hanger. New.
1497—Highway Crossing Gate Lamp Fount and Lens Hoods. New.
1498—Highway Crossing Lamp Handle and Alignment Clamp. New.
1499—Highway Crossing Gate Lamp. New.

Committee: F. P. Patenall (B. & O.), chairman; J. C. Mock (M. C.), vice-chairman; W. A. Hanert (N. Y. C.), C. J. Kelloway (A. C. L.), B. H. Mann (Mo. Pac.), F. W. Pfleging (U. P.), W. N. Spangler (P. R. R.), M. E. Smith (D. L. & W.), T. S. Stevens (A. T. & S. F.).

Manufacturers' Representatives: R. W. Hewes (Fed. Sig. Co.), W. P. Neubert (U. S. & S. Co.), C. G. Harwig (Hall S. & S. Co.), S. N. Wight (G. R. S. Co.).

Discussion

F. P. Patenall (chairman) presented the report.

On motion, plan 1082 was approved for submission to letter ballot to be included in the Manual.

Mr. Patenall: I move similar action with regard to plans 1084 and 1085.

C. F. Stoltz (C. C. C. & St. L.): Has the committee considered any other method of holding the top roller in; has it considered the number of carriers in use in adopting a standard top roller, and has it considered the cost of these as against some other method of holding the top roller?

Mr. Patenall: I do not know that the committee went very deeply into the question of the number of carriers in service with this type or any other type. The method of securing the top roller may be fairly good; in fact, better than quite a number of others we have had to do with, and if Mr. Stoltz has any other design in mind the committee will be glad to consider it if it is any better.

Mr. Stoltz: The design I have in mind is of the top strap type, that can be used where it is necessary to add another unit. A unit of the type presented cannot be added to a line using the top staff. Would the committee be adverse to specifying both, so that we can attach them to the existing lines?

Mr. Patenall: It is an additional part, and for that reason would mean greater cost. It is difficult to make a standard that will admit of all types of apparatus being applied to it.

Mr. Patenall: Plan 1194, Mechanical Semaphore. This plan shows an addition to the oil cup. I move that the details and assembly of the mechanical semaphore bearing be submitted to letter ballot and if adopted be included in the Manual.

C. A. Christofferson (N. P.): I think the committee should add to the description of the oil cup, that the cap for it should be designed in such a manner it cannot be easily taken off.

Mr. Carter: It is a difficult proposition to take any of these commercial oil cups and use them out of doors and have them absolutely water tight.

Mr. Patenall: I think we must leave it to the signal engineers to decide on what type of oil cup he will use and simply describe the means of closing the oil hole.

(The motion with regard to plan No. 1194 was carried.)

Mr. Patenall: The committee asks the approval of plan 1399 on Low Target Stands.

Mr. Dunham: I think the stand shown on the plan will work out all right if used on oak ties, but in certain sections of the country oak ties are no longer available and for that reason I think that the ¾-in. by 4-in. lag screw is all right.

(Motion to approve plan 1399 carried.)

Mr. Patenall: The committee moves the approval of drawing No. 1440, Switch Lamp, spherical type, for submission by letter ballot, to be included in the Manual.

(Motion seconded.)

Mr. Dunham: The drawing shows 5⅜-in. lenses on all four sides of the lamp. I am sure there are a number of men in this room who hold that different colored lenses should not be of one size. The manufacturers will tell you that it is wrong to make the lenses all the same size. A mistake of a man in placing a lens might easily result in a bad accident on your railroad. If the lenses are made of different sizes that imposes a mechanical check, wherein it will not be possible to transpose the lenses, and thereby produce a wrong signal indication.

Mr. Hobson: Any tramp can change the lenses in this proposed standard switch lamp; all he has to have is a screw driver or a broken-bladed knife. A switch lamp with two different size lenses make this an impossibility.

Mr. Ralph: At some previous meeting I brought up the point of allowing for the ordering of different designs of lenses, and I think the chairman of the committee said that would be taken care of.

Mr. Christofferson: We should stick to the old practice of different sizes for red and green, and I certainly would not like to see this go to a vote and be put in the Manual.

Mr. Dunham: A 5⅜-in. lens is the desirable red lens; perhaps a larger one would be better, but certainly a smaller one will not be equally satisfactory. If we wish to retain different sizes for different colors, perhaps 5 in. for the green is the next available size. I move an amendment to the motion that this meeting vote against the

adoption of the plan as it is now drawn, providing for one size of lens in all four openings of the lamp.

(Motion seconded.)

Mr. Patenall: It does not seem that this association should put itself on record as being in favor of a switch lamp which will require lenses of different sizes, and I hope the association will vote down that amendment.

T. S. Stevens (A. T. & S. F.): I don't believe we should assume that the color of the lens which is being used for a certain purpose on a railroad is not going to be checked up. We should assume that that is going to be done. I assume the only way to get a change in the diameter would be to make the green lens smaller than the red.

Mr. Dunham: We can retain, if it is necessary, the 5⅜-in. green and use a larger red lens. There are thousands of men employed on the railroads today who are not able to read the printed instructions issued for their guidance, and it is perfectly easy to introduce a mechanical safeguard that will take care of this vital consideration.

W. K. Saunders (R. F. & P.): On our road we use only one size lens, and we never have any trouble from men getting the wrong glasses in the wrong place. Our men are mostly colored men. I am in favor of the committee's recommendation.

(Amendment lost.)

(The original motion on drawing 1440 carried.)

Mr. Patenall then presented Drawing 1442, lens hoods and couplings, and moved its adoption.

Mr. Ralph: I believe this hood is wider than called for at the last meeting. It is shown in drawing 1440 as projecting over the lamp the full face of the lens.

Mr. Patenall: It is not the intention of the committee to have any different hood. The committee feels that ⅞ in. is a reasonable width to make the lens hood, and unless you can make the hood very much wider the assumed protection is negligible.

Mr. Hobson: My suggestion would be that we do away with the hood entirely, as it is not needed.

Mr. Dunham: If the hood is used as the drawing shows it provides a lodgment for snow and will frequently reduce the amount of light possible to get through the lens.

Mr. Dunham: I move that there is no necessity for hoods over the lenses used in such lamps as semaphore lamps, marker lamps, classification lamps, and platform lamps, if used.

(Motion to adopt Drawing 1442 lost.)

Mr. Patenall: The committee recommends that Plan 1443, covering oil founts, designed to meet Drawing 1442, be submitted to letter ballot for inclusion in the Manual.

Mr. Dunham: What is the oil capacity of the fount as shown in Plan 1443, and what difference is there in oil capacity from the fount we are now using?

Mr. Patenall: The founts are practically the same as to capacity, 31 ounces.

(Motion regarding Plan 1443 carried.)

Mr. Patenall: Drawings 1496, 1497, 1498 and 1499.—The first plan, 1496, shows the hanger for a highway crossing gate and slow track sign lamp. It was moved that the plan be approved for submission to letter ballot for inclusion in the Manual.

(Motion seconded.)

Mr. Jacobs: On plan 1499, I assume that you include the hood on the lamp.

Mr. Patenall: Mr. Dunham in his remarks asked that hoods be discontinued, but did not include crossing gate lamps. There seems to be every reason why the crossing gate lamp should have a hood. One of our purposes in the past has been to prevent the red rays displayed to the roadway being so displayed as to come within the line of the engineer's vision.

Mr. Ralph: The committee has called for lenses on Drawing 1499. It is a mistake not to allow for the use of roundels, for they are higher, which is quite an item on long gates, and they are cheaper.

Mr. Peabody: I notice that this lamp is to be fastened on with a cotter. Now, ordinarily, lamps are removed by the gateman every day for cleaning, and that means that the cotter will be removed and put back in place twice each day. This is something that has to be done practically with a pair of pliers, with which we do not care to equip our gatemen, and we would also have to give them a supply of cotters.

Mr. Patenall: The committee has already agreed that that was the most practical way to do it. It is possible to have a long cotter, with a reasonable amount of spring to it, that anyone could, without the use of tools, pull out and put back.

(Motion regarding No. 1496 approved.)

Mr. Patenall: Plan 1497 shows a highway crossing gate lamp fount and lens hood. Our attention was called to the fact that the fount was really of 9-oz. capacity. We discussed the necessity of having lights burn for longer than 12 hr., and came to the conclusion that even with that comparatively small capacity fount there is sufficient oil to last at least 16 hr. The committee recommends the 9-oz. fount.

Mr. Peabody: The discussion about this fount was entirely with reference to the use of this lamp as a gate lamp, and as such that fount is sufficient, but as a lamp for slow speed signs, it is not.

Mr. Patenall: If a fount will hold sufficient oil, and burn a long enough time on a gate, then that fount also will fulfill the requirements of a slow track lamp.

Mr. Peabody: A gate lamp is taken care of by a gate man who can take care of it daily, while a slow speed lamp is taken care of by a lamp man, who is also taking care of switch lights and signal lights. These founts should have a capacity so that the lamps will burn practically the same length of time.

Mr. Smith: The design of a fount, and also burners, may depend upon the specifications for illuminating oil, relative to sizes, and to how long before the oil burns out. I would like to know if the committee has had that under consideration.

Mr. Patenall: The committee did not consider anything in reference to the quality of oil, that is, whether a longer burning time can be secured out of the oil than we have in the past.

Mr. Mock: Thirty-one ounces of oil will burn 120 hr. in a common oil burner. With 9 oz. you would naturally expect about that proportion, and under those conditions you would get at least 31 hr., which is a sufficient margin for one day.

(Motion regarding No. 1497 approved.)

Mr. Patenall: Plan 1498—Highway Crossing, Lamp Handle and Alignment Clamp. The committee asks approval, for submission to letter ballot, and inclusion in the Manual.

(Motion was duly seconded and carried.)

Mr. Patenall: The committee presents No. 1499, Highway Crossing Gate Lamp, and recommends submission to letter ballot and inclusion in the Manual.

(Motion seconded.)

Mr. Stoltz: The matter of the use of roundels instead of lenses was brought up earlier in the discussion. I understand the committee will take that under consideration, although the plan does not show that they have given it consideration. I recommend the elimination of

the peep-hole in the crossing gate lamp. It is not necessary.

Mr. Peabody: I make an amendment to the motion to be changed to read: lenses, roundels, one red four inch.

(Amendment seconded.)

The Chairman: The committee will agree to show the alternative.

Mr. Peabody: I do not wish it as an alternative. I wish it there as a parallel proposition, with lenses.

Mr. Patenall: I don't understand, Mr. Peabody. You don't want to insist that roundels be shown on this drawing as a standard, but rather as an alternative standard, so that you can use a roundel and I can use a lens.

Mr. Peabody: I am satisfied with that idea, but if you put it as lenses primarily, alternative, roundels, it means that the roundels are on the weak side of the proposition.

Mr. Patenall: I do not know whether this committee would be willing to simply put them both on the same basis.

(Mr. Peabody's amendment was adopted.)

Mr. Peabody: I make a motion that the note at the bottom of the drawing reading: "This lamp may be used to indicate 'slow track,' lenses of proper color being used," shall be eliminated.

(Motion seconded, but on being put was lost.)

(Plan 1499 was approved, to be submitted to letter ballot, for adoption and inclusion in the Manual.)

Mr. Mann: We have adopted a motion that we shall not put any shields on the lenses. Mr. Ralph says that practically a railroad has anywhere from a one-degree curve to a 14-deg. curve. What would the committee do if I should put a switch lamp on the end of a 14-degree curve?

Mr. Patenall: I want to make a motion that will rescind the action taken in reference to lens hoods, and if that carries I want to make another motion which will require that lens hoods be furnished with such lamps. I move that we reconsider and rescind our previous action in the matter of lens hoods.

Mr. Dunham: The main reason for putting a hood over a lens was to protect it against damage while being carried. Such lamps are not carried around as they have been in the past. They are generally fitted with long time burners and stand on the switches all the time. Then, too, we have solid-colored lenses, so that in the case of a little chipping on the lens, there is no special objection to it.

Mr. Ralph: I consider the hood of more value in stopping any side view of the lens than it offers in preventing chipping of the lens. They are of great value on semaphore lamps, as well as switch lamps, on a junction.

(Motion to reconsider carried.)

Mr. Patenall: I move that lens hoods be provided for all switch lamps and crossing gate lamps.

(Motion, after being seconded, carried.)

Mr. Du Bray: Are we to understand by the last vote that we have adopted the hood shown on drawing 1442?

Mr. Patenall: That plan was eliminated by popular vote, and in view of the last action I move that that action be reconsidered.

(The motion carried.)

Mr. Patenall: I recommend for approval drawing No. 1442, Lens Hoods and Couplings for Switch and Semaphore Lamps, for submission to letter ballot and inclusion in the Manual.

(Motion, after being seconded, was carried.)

Report of Committee II—Mechanical Interlocking

The committee presented reports on specification for mechanical interlocking machine, style "A" locking, and mechanical machine lever locking.

The committee recommended that the specifications for mechanical interlocking machine, style "A" locking, be accepted for presentation at the annual meeting for submission to letter ballot and inclusion in the Manual and that the same action be taken with the specification for mechanical machine lever locking.

The specification for mechanical interlocking machine, style "A" locking, follows:

1. Requisite Sheet

(b) Where blanks have not been filled in, or where an option is permitted and no preference stated, the Contractor's recommended practice shall be followed. (S.S. 4-b.) 1919.

(c) Requisite sheet for mechanical interlocking machine attached to this specification, shall form a part thereof. 1920.

2. General

(a) Levers shall be numbered from left to right. 1916.

(b) Machine legs, extension legs, bottom girders, front and back girders, lever shoes, quadrants, locking plates, rocker links and counterweights shall be made of cast iron. Quadrants and rocker links shall not provide for tredle, unless otherwise specified. 1920.

(c) Latch shoes, latch handles, tappet jaws, bottom girder caps and combined lever number and foot plates shall be made of malleable iron. 1920.

(d) Levers, tail levers, lath rods and locking plate strips shall be made of open hearth steel. 1920.

(e) Front guides, latch lock rollers and studs, locking tappets, longitudinal locking bars, tappet connecting links, rocker guides, locking dogs and all pins, shall be made of cold drawn steel.

(f) Swing dogs shall be made of {hard brass. / steel.} 1920.

(g) Latch springs shall be made of spring steel wire. 1919.

(h) Latch blocks shall be made of {cast steel. / forged steel.} 1920.

(i) Machine shall consist of one, four and eight-lever sections. 1919.

(j) On machines having four-lever section, the four-lever section shall be placed on the right hand end of machine, one-lever section may be placed on either end of the machine. 1919.

(k) Levers shall be spaced five inches center to center. 1919.

(l) Height of machine from bottom of leg to top of front and back girders shall be 4 ft. 9⅞ in. 1920.

(m) Like parts of same manufacturer's machine shall be interchangeable. 1919.

(n) Spare levers shall be complete with rockers, tappet links and tappets. 1920.

(o) Each spare space shall be equipped with quadrant, cap and pin for lever shoe. 1920.

(p) Bolts and screws shall have U. S. standard threads, unless otherwise specified. 1919.

(q) Nuts, bolts and cap screw heads shall be hexagonal, unless otherwise specified. 1919.

(r) Bolts and cap screws, except for locking caps, shall be provided with spring lock washers where practicable. 1919.

(s) Taper dowel pins shall be No. 8 standard Morse 2 in. in length and No. 6 standard Morse 1¼ in. in length. 1920.

(t) Straight dowel pins shall be No. 12 drill rod. 1920.

(u) When necessary to hold parts in fixed relation to each other, dowel pins or body bound bolts shall be used. 1919.

(v) Moving parts of machine shall work freely without lost motion. 1919.

(w) All parts of machines shipped knocked-down shall be marked with steel figures on a finished surface and given the numbers they take in the assembled machine. Numbers shall be visible in the assembled machine where practicable. 1920.

(x) Locking tappets, tappet jaws, tappet connecting links and rockers shall have their lever numbers marked on the front. Longitudinal locking bars shall have their lever and space numbers marked on front at end of bars. 1920.

(y) Machine shall be painted in accordance with R.S.A. specification for shop painting. 1919.

3. Machine Legs

(a) Machine legs shall be in accordance with drawing No. ..... 1920.

(b) Extension legs shall be 2 ft. 3 in. in height and provided with 8 holes for ¾-in. bolts and shall be fastened to machine legs with four ¾-in. bolts and two No. 8 dowel pins. 1920.

4. Girders

(a) Bottom girders shall be fastened to machine legs with two ¾-in. body bound bolts. 1920.

(b) Caps shall be fastened to bottom girders with two ⅝-in. square head bolts. 1920.

(c) Front and back girders shall be fastened to machine leg with two ⅝-in. bolts and one No. 8 dowel pin at each end. 1920.

5. Quadrants

(a) Quadrants shall be provided with lug drilled for 1-in. diameter pin for the support of rocking links and shall be fastened to back and front girders with two ⅝-in. tap bolts. 1920.

(b) Quadrant plates shall have a 1-in. by 1½-in. opening back of each lever to clear connecting rod for electric lock or circuit controller. 1920.

6. Levers

(a) Levers shall be 5 ft. 10⅞ in. from center of fulcrum to end of handle. 1920.

(b) Levers shall have equal and uniform throw and shall be in true alignment when in normal position. 1919.

(c) Tail levers shall be ¾-in. by 2½-in., drilled to provide 8¾-in. stroke, 9¾-in. stroke, 10¾-in. stroke and shall be interchangeable as front or back tail levers. 1919.

(d) Lever shoes shall provide equal stroke above and below horizontal and so arranged that connections can be made to front or back tail levers. 1920.

(e) Levers shall latch in normal and reverse positions, also in the center position when specified. 1920.

(f) Levers and tail levers shall fit snugly into lever shoes and each shall be fastened thereto with two ¾-in. c.s.k. featherhead bolts and one No. 8 dowel pin in lever only. 1920.

(g) Lever shoe pins shall be 1½-in. diameter. End pins shall be held in place by one ⅜-in. square head cup point set screw through girder cap. 1920.

(h) Latch shoes shall be in accordance with drawing No. ....., and shall be fastened to lever with two ⅝-in. tap bolts and one No. 8 dowel pin. The hole for dowel pin to be located below the hole for the lower tap bolt. 1920.

(i) Rocker links shall be in accordance with drawing No. ....., and shall be fastened to quadrant with one 1-in. diameter grooved pin. The pin to be held in place with one No. 14 fillister head screw through quadrant. 1920.

(j) Rocker links shall be designed to give tappet one-half stroke for full movement of latch block from normal or reverse position to top of quadrant; and no movement of the tappet when lever is moved between normal and reverse position. 1920.

(k) Rocker link guide shall be fastened to the lever with two ⅜-in. by 1⅝-in. rivets. Holes for rivets to be drilled in a vertical plane in the center of lever. 1920.

(l) Rocker guide shall be in accordance with drawing No. ..... 1920.

(m) Latch rods shall be ⅝-in. by 25-in. from center of eye to end of thread, thread to be ⅝-in. S.A.E. standard 18 threads to the inch, 2½-in. long. 1920.

(n) Latch springs shall be 11/16-in. inside diameter and shall be of proper strength to operate the locking tappets in compression by the adjustable bushing when the lever is at either end of the quadrant and the latch is free to drop. 1920.

(o) Latch handles shall be 10-in. from center of hole to end of handle and shall be connected to lever and latch rod with two ½-in. round cheese head pins. 1920.

(p) Combined foot and number plates shall be fastened to levers with ½-in. round cheese head pin. 1919.

7. Locking

(a) Machine shall be provided with mechanical locking of the preliminary type. 1911.

(b) Locking bed shall be made up of not less than two 4-space locking plates providing nine spaces for locking, unless otherwise specified. 1920.

(c) Locking plates shall be designed to accommodate front and back locking and shall be fastened to machine legs with four ⅜-in. cap screws and four No. 6 dowel pins 1920.

(d) Locking shall be placed on the {front / back} of machines. 1920.

(e) Locking shall be distributed as uniformly as possible without crowding. 1919.

(f) Tappet jaws shall have 1 7/16-in. offset and shall be fastened to tappets with two ⅜-in. cap screws. 1920.

(g) Tappet connecting links shall be 22⅞-in. from center to center of holes and shall be connected to tappet jaws and rocker links with two ¾-in. round cheese head pins. 1920.

(h) Tappets shall be ½-in. by 2-in. and shall have 1 1/16-in. stroke. 1920.

(i) Front locking guides shall be fastened to locking plates with two No. 14-24 round head screws. 1920.

(j) Locking plate strips shall be fastened to locking plates with two No. 14-24 round head screws. Sufficient strips shall be furnished to properly support front locking. 1920.

(k) Swing dogs shall be fastened to tappets with one ⅜-in.-30 special steel screw U.S.F. thread. 1920.

(l) Front and back locking dogs and carriers shall be fastened to locking bars with two No. 10-32 A.S.M.E. special steel {screw / stud} and sufficient carriers shall be put in to support longitudinal locking and shall be so placed that the drilling will be interchangeable with standard dogs. Splicing couplings shall be fastened with four screws or screw studs, as mentioned above. 1920.

(m) Tappet pieces shall be fastened to tappets with two No. 14-24 fillister head screws and two No. 12 by 15/16-in. drill rod dowel pins. 1920.

(n) Splicing in longitudinal bars shall be made with splicing couplings. Splicing in longitudinal bars shall be avoided as far as practicable. 1920.

(o) Latch rods in locked combination shall not have a lift of more than 3/16-in. 1919.

8. Material and Workmanship

Material and workmanship shall be first class in every respect. (G.P. 8-a.) 1911.

9. Inspection

(a) Purchaser may inspect the material at all stages of manufacture. (S.S. 6-a.) 1919.

(b) Purchaser may inspect the completed product to determine that the requirements of this specification have been met. (S.S. 6-b.) 1919.

(c) If the material has not been accepted at point of production and if, upon arrival at destination, it does not meet the requirements of this specification, it may be rejected and the Contractor, upon request, shall advise the Purchaser what disposition is to be made of the defective material. The Contractor shall pay all freight charges. (S.S. 6-c.) 1919.

(d) If Purchaser is to make inspection at point of production, it shall be so stated. (S.S. 6-d.) 1919.

10. Tests

(b) Contractor shall give the Purchaser sufficient notice of time when material will be ready for testing. (S.S. 7-b) 1919.

(c) Contractor shall provide at point of production, apparatus and labor for making the required tests under supervision of the Purchaser. (S.S. 7-c,) 1919.

(d) A force of not more than 200 lb. may be applied to ends of latch handles when testing for lift of latch rods of locked combinations. 1920.

(e) Locking may be tested at point of production or at destination. 1920.

11. Packing

(a) Material shall be so prepared as to permit convenient handling and to protect against loss or damage during shipment. (S.S. 8-a.) 1919.

12, Marking, and 13, Warranty, consist of standard sections applicable to various specifications.

Mechanical Machine Lever Locking

1. Derails

(a) Locking shall be provided between derail levers in conflicting routes. Each derail lever shall lock all trailing point switch levers in the route, except those held by switch locking, unless otherwise specified. 1920.

2. Switches

(a) Locking shall be provided between switch levers when additional protection may be secured. 1920.

(b) Movable and wing frogs shall function the same as switches. 1920.

3. Facing Point Locks

(a) Levers operating facing point locks that lock switches only, shall lock the switch levers in both normal and reversed positions. 1920.

(b) Levers operating facing point locks that lock switches and derails in combination shall lock the switch and derail in both normal and reverse positions. 1920.

(c) Levers operating facing point locks that lock derails only, shall lock the derail levers in the reverse position only, unless otherwise specified. 1920.

4. Signals

Each signal lever for the route or routes to be governed shall lock facing point lock levers reversed; derail levers reversed (except those locked reversed only by facing point locks), switch levers in proper position (except those locked by switch or derail locking), and conflicting derail and signal levers not otherwise locked. 1920.

5. Check Levers

Check lock levers shall be locked by signal levers routing to the section of track for which check locking is provided. Check lock levers shall be locked in the normal position by signals routing in the preferred direction of traffic and in the reverse position by signals routing against the preferred direction of traffic. 1920.

6. Special Locking

(a) Special locking { shall / shall not } be required on account of section or route locking as follows:

1. Signals on the same track { shall / shall not } be locked so as to permit traffic to approach from both directions simultaneously to opposing signals. 1920.

2. Signals { shall / shall not } be locked in reverse position by signals leading up to them.

(b) Signals at cabin door lock interlockings and interlockings which are unattended a part or all of the time shall be arranged for normally at proceed for opposing movements on one route at a time. 1920.

7. Restrictions

(a) Direct locking shall be used wherever possible. 1920.

(b) Butt locking shall be avoided as far as possible. When used with style "A" machine, butting dogs should be used where practicable. 1920.

8. Approval

(a) Locking sheet and dog chart shall be approved by the Purchaser. 1920.

Committee: Samuel Miskelly (C., R. I. & P.), chairman; E. K. Post (P. R. R.), vice-chairman; T. S. Adams (N. Y. C.), Larsen Brown (A., T. & S. F.), W. F. Cook (D. & H.), W. A. Dawson (N. Y. C.), O. H. Eichblatt (S. P. Atl. System), Oswald Frantzen (N. Y., N. H. & H.), William Hiles (C., C., C. & St. L.), F. E. Jacobs (C. & W. I.), C. J. Kelloway (A. C. L.), H. F. Lomas (I. C.), J. W. McClelland (P. & R.), E. E. Mack (C. & E. I.), W. B. Morrison (D., L. & W.), E. J. Relph (N. P.), C. Smith (C. P.), J. G. Stoll (L. V.), M. E. Sutherland (M. C.), R. W. Taylor (B.& O.), J. I. Vernon (N. Y., N. H. & H.), W. F. Zane (C., B. & Q.).

Discussion

Samuel Miskelly (chairman) presented the report of the committee and said: Since the report of the committee was submitted to the secretary for publication a number of suggestions were given to the committee and the committee has held several meetings since that time. A few corrections have been made, which we submit, and paragraph (b) under "General" has been amended by eliminating the words "unless otherwise specified" at the end of the line. We have also amended paragraph (f) under "General" by inserting after brass "85 per cent copper, 15 per cent tin," making that read "hard brass, 85 per cent copper, 15 per cent tin and steel."

The committee got hold of a dog of an old machine, which had been in service for 20 yr., and also a dog that had been produced recently, and had them analyzed by one of the large bearing concerns. They reported that the old dog was composed of 85 per cent copper and 15 per cent tin, the new dog being composed of about 80 per cent copper, 15 per cent tin and 5 per cent lead.

J. E. Stephenson (Gen. Ry. Signal Co.): I think the term "bronze" instead of brass should be used in that section.

F. P. Patenall (B. & O.): I hope the committee will not accept the suggestion.

The one thing which was not mentioned by the chairman was the analysis of the wear. I think a swing dog having been in service 20 yr. must have developed certain wear, and if it were possible it would be interesting to know what the comparison was.

Mr. Miskelly: Mr. Lomas of the committee has made such an analysis, and finds that the wear is about 0.001 of a per cent.

F. P. Patenall: Just a word on this plan of proposed machine leg for Style A machine. Will the chairman tell us whether this design is such as to admit of interchangeability with machines now in service made by either of the manufacturing companies?

Mr. Miskelly: It is interchangeable with certain legs, but only with legs of that height. Legs that are in service now are of a height less than the height of this leg. This leg is of the height of the present leg, plus one of the extensions.

The committee eliminates (i), paragraph 6, the words, "shall be in accordance with drawing No. —— and," and takes out the words "tappets in" in section (n), paragraph 6, and substitutes the word "without" in place thereof.

The committee also recommends that clause (e) of paragraph 10, Tests, be eliminated.

The committee recommends that the specification for mechanical interlocking machine, Style "A" locking, be accepted for presentation at the annual meeting for submission to letter ballot for inclusion in the Manual.

(Motion, after being seconded, carried.)

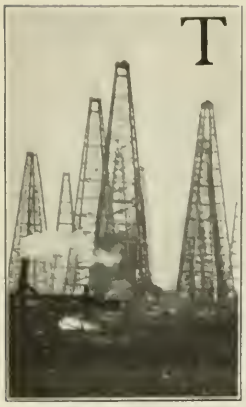
Mr. Miskelly then presented the matter under Mechanical Machine Lever Locking, 1920, and moved that the specification for Mechanical Machine Lever Locking be accepted for presentation at the annual meeting for submission to letter ballot for inclusion in the Manual.

(Motion seconded, and carried.)

The committee was dismissed with the thanks of the association.

The convention adjourned until 10 o'clock Tuesday morning.

Report of Committee XVI—Specifications for Oils



THE FOLLOWING outline of work was assigned this committee:

(1) Outline of methods of testing. (2) Review specifications for illuminating oil, with the view of raising the standard requirements. (3) Prepare specifications for: (a) Motor gasoline. (b) Lubricating oil. (c) Transformer oil.

The committee submitted specifications on the following subjects:

(1) Specification for zero F. lubricating oil, No. .....
(2) Specification for 45 degrees below zero F. lubricating oil, No. ....

Specification for Zero Fahrenheit Lubricating Oil No. .....

Purpose

(a) The purpose of this specification is to provide for a lubricating oil for signal mechanisms and crossing protection apparatus in territories where the temperature does not fall below zero degrees F. This oil shall not be used on relays or in oil dash pots. (S.S. 1-a.) 1919.

Material

(a) Oil shall be pale in color, neutral and free from vegetable or animal oils or fats, alkali or foreign matter. 1920.
(b) Oil shall conform to the following requirements:
(1) Flash. Minimum 305 degrees F. (151.7 degrees C.).
(2) Fire. Minimum 345 degrees F. (173.9 degrees C.).
(3) Viscosity. 100 sec. minimum to 135 sec. maximum at 100 degrees F. (37.8 degrees C.) on the universal Saybolt viscosimeter.
(4) Cold. Pour 0 degrees F. (17.8 degrees C.).
(5) Moisture. None.
(6) Sulphur. Free sulphur—none.
(7) Acid. Not more than .03 per cent, calculated as SO^3. 1920.

3. Inspection, and 4. Tests are standard sections, except 4-(d) and (e).

(d) Sample for test shall be taken from the bottom of the oil through an opening in the container or by use of a thief. 1920.

*(e) Tests shall be made in accordance with the following methods:

Flash Test

(a) The flash test shall be made in the Cleveland open cup, consisting of two parts, one the cup, the other a brass metal plate 5 in. in diameter by ¼ in. thick, slightly recessed in its upper face to receive the base of the cup. The metal plate and oil holder are usually mounted on a tripod to which a wire is attached for supporting the thermometer. The latter may be supported by a clamp on a ring stand or by a chain. The thermometer used shall be of the engraved chemical stem "bulb immersion" type, corrected for 1 in. immersion and reading to approximately 700 degrees F. (371 degrees C.). The bulb shall be about three-eighths inch long, not exceeding ½ in. The thermometer shall be suspended in the center of the cup, and free from the bottom by ⅛ in. Fill cup to within ½ in. from the top. Avoid overheating locally by wiping the flange free of oil and not allowing oil to be spattered up the sides of the cup. 1920.

(b) The oil shall be heated at a uniform rate of 10 degrees F. (5.6 degrees C.) per min. and at approximately 25 degrees F. (14 degrees C.) below the expected flash, the test shall be applied at every rise of 5 degrees F. (2.8 degrees C.) by resting the gas tube on the edge of the cup and searching for the flash in the semicircle around the thermometer, midway between it and the inside of the cup, carrying the flame level with the top of the cup. The temperature at which flashes occur on the surface of the oil at two points or one that covers at least half of the surface and immediately goes out shall be recorded as the flash test. 1920.

(c) The testing flame is provided by using a slender tube tapered at one end to an opening approximately 1/16 in. diameter. The flame should be in the form of a bead and not more than ⅛ in. diameter. 1920.

Fire Test

(a) The fire test shall be made by continuing the flash test, the operation being the same except in the application of the test flame. The flame in the fire test shall be quickly brought to 1/16 in. above the surface of the oil near the center of the cup and as quickly removed. The fire test is usually from 40 degrees F. (4.4 degrees C.) to 80 degrees F. (27 degrees C.) higher than the flash test, the temperature to which the oil must be heated to cause it to give off gases which will burn continuously when a flame is applied above the surface of the oil, shall be the fire test. 1920.

Viscosity Test

(a) The viscosity test shall be made by using the Saybolt universal viscosimeter. The oil tube shall be swabbed with the plunger accompanying the instrument by using oil from sample, making sure the outflow tube is not obstructed. Strain the oil into the oil tube at a temperature not above that of the bath, stir until the oil is of the test temperature throughout, remove the thermometer, remove excess oil from the overflow chamber with the pipette and proceed with the test. The elapsed time in seconds required for the oil to fill the flask to the 60 cu. cm. mark on the neck shall be the viscosity of the oil. 1920.

Cold Test

(a) The cold test shall be made by using a glass jar approximately 1¼ in. in diameter and 4 to 5 in. high, provided with a tightly fitting cork. The glass jar shall be incased in a closely fitting metal jacket, which shall be provided at the bottom with a disk of cork or felt ¼ in. thick. 1920.

(b) A bulb immersion type mercury thermometer having a bulb ¼ in. to ⅜ in. long shall be fitted securely in the cork so that the shaft will be held centrally in the jar with the tip of the bulb ½ in. from the bottom. A Toluol thermometer shall be used for temperatures lower than —20 degrees F. (—20.9 degrees C.).

(c-1) Material used in the freezing mixture varies with the temperature required to cause the oil to solidify. Use cracked ice for a temperature above 35 degrees F. (1.7 degrees C.). From 15 degrees F. (—9.4 degrees C.) to minus 5 degrees F. (—20.6 degrees C.) use ice and salt in proportion of one to two. The salt shall be dry and fine enough to pass through a 20 mesh screen. For temperature lower than minus 5 degrees F. (—20.6 degrees C.) use a mixture of solid carbon dioxide and acetone.

(c-2) The carbon dioxide-acetone mixture may be made as follows:

Place a sufficient amount of dry acetone in a covered copper or nickel beaker. Place the beaker in an ice-salt mixture and when the acetone reaches 10 degrees F. or less, add solid carbon dioxide gently until the desired temperature is reached. To obtain the solid carbon dioxide, invert an ordinary liquefied carbon dioxide cylinder, open the valve carefully and let the gas flow into a chamois skin bag. Rapid evaporation will cause the carbon dioxide to solidify. 1920.

(d) The oil shall be placed in a jar, to a depth of about one and one-fourth inch, or to a sufficient depth to reach about one-fourth inch above bulb of thermometer. Fit the cork tightly into the jar, put the thermometer in cork, making sure that bottom of bulb is about one-half inch from the bottom of the jar. Place jar in metal jacket and place jacket in freezing mixture. 1920.

(e) **Pour.** When near the expected pour point, at every drop in temperature of five degrees F., remove the jar from the jacket and chill just enough to make it flow, and five per cent higher than the temperature of the oil which has been cooled so that it will not flow when the jar is tipped to a horizontal position, shall be the pour test. 1920.

Moisture Test

(a) The moisture test shall be made by taking a sample from the bottom of the container, which, when placed in

*Tests are based on A. S. T. M. standard methods (D-47-18).

clean and dry glass or porcelain beaker and stirred without touching the sides or bottom with ¼-in. brass or iron rod heated to a cherry red, shall not cause a snapping sound. 1920.

ACID TEST

(a) The acid test shall be made by agitating thoroughly a solution at a boiling point of 5 grams of the oil with 25 cu. cm. of distilled water and 25 cu. cm. of 95 per cent neutralized alcohol. A few drops of phenolthalein shall be added as an indicator and the result, if colorless (indicating acid present) shall be titrated with 1/10 normal alkali, free from carbonate until permanently pink when agitated. The percentage of acid shall be calculated from reading the burette and shown in percentage of SO^3 or as an acid number (milligrams of potassium hydroxide required to saturate the free acid in one gram of oil). 1 cu. cm. of 1/10 alkali 4 m.g. SO^3. 1920.

(b) A strip of planished copper shall not tarnish when placed in a sample of oil at 212 degrees F. (100 degrees C.) for 8 hrs. 1920.

MARKING

(b) Detail list of loose pieces, containers and their contents shall be furnished for each shipment. Where carload shipments are made, routing and car identification shall be shown. (S.S. 9-b.) 1919.

(d) Each quart container shall be marked with label as follows:

Zero Lubricating Oil A. R. A. Specification No. ....

This oil must not be used for lubricating signal mechanisms or crossing protection aparatus in territories where temperature falls below zero degrees F. This oil must not be used on relays or in oil dash pots.

Furnished by .....

1920.

(e) Purchaser's order, requisition and A.R.A. oil specification number, name of consignor and name and address of consignee shall be plainly marked on outside of each case or drum. 1920.

(f) Where carload shipments are made, each case or drum shall be marked with contents, order number and address may be omitted. 1920.

PACKING

(b) The oil shall be put up in clean, dry containers of one quart size, provided with a screw top and air-tight gasket, or in steel drums of approximately 50-gal. capacity and shall be protected so as to permit convenient handling and to prevent loss or damage during shipment. 1920.

The committee recommended that specification for zero Fahrenheit lubricating oil, No. ...., be accepted for presentation at the annual meeting for submission to letter ballot for inclusion in the Manual.

Specification for Forty-five Degrees Below Zero Fahrenheit Lubricating Oil No. ....

PURPOSE

(a) The purpose of this specification is to provide for a lubricating oil for signal mechanisms. This oil shall not be used in oil dash pots. (S.S. 1-a.) 1919.

MATERIAL

(a) The oil shall be pale in color, neutral and free from vegetable or animal oils or fats, alkali or foreign matter. 1920.

(b) The oil shall conform to the following requirements:

1. Flash. Minimum 290 degrees F. (143.3 degrees C.).
2. Fire. Minimum 325 degrees F. (162.8 degrees C.).
3. Viscosity. Minimum 80 sec. at 100 degrees F. (37.8 degrees C.) on the universal Salbolt viscosimeter.
4. Cold. Pour at —45 degrees F. (—42.8 degrees C.).
5. Moisture. None.
6. Sulphur. Free sulphur—None.
7. Acid. Not more than .03 per cent calculated as SO^3. 1920.

3. Inspection and 4. Tests are standard sections, except 4(d) and (e), which are the same as "Specification for Zero Fahrenheit Oil No. ....."

This specification covers the same method of conducting (1) the flash test, (2) the fire test, (3) the viscosity test, (4) the cold test, (5) the moisture test and (6) the acid test, as included in the "Specification for Zero Fahrenheit Oil No..."

MARKING

(b) Detail list of loose pieces, containers and their contents shall be furnished for each shipment. Where carload shipments are made, routing and car identification shall be shown. (S.S. 9-b.) 1919.

(d) Each quart container shall be marked with label as follows:

Forty-five Degrees Below Zero Lubricating Oil. A. R. A. Specification No. ....

This oil must not be used in oil dash pots.

Furnished by .....

1920.

The paragraphs (e) and (f) under 5. **Marking,** and paragraph (b) under 6. **Packing,** are the same as "Specification for Zero Fahrenheit Oil No....."

The committee recommended that specification for 45 degrees below zero Fahrenheit lubricating oil, No. ...., be accepted for presentation at the annual meeting for submission to letter ballot for inclusion in the Manual.

Committee: I. S. Raymer (P. & L. E.), chairman; C. H. Burnette (Monongahela), C. F. Jones (Sou. Lines West), L. E. Kinch (P. R. R.), S. W. Law (N. P.), E. B. Fry (P. R. R.), D. S. Rice (L. V.), B. H. Richards, E. B. Smith (N. Y. C.), W. S. Storm (Erie), Guy Toft (P. R. R.).

Discussion

I. S. Raymer (chairman) presented the report.

G. R. Stephenson: In connection with the specification for Zero Fahrenheit Lubricating Oil, I would ask if this oil is easily obtainable, and whether it has been definitely determined that an oil somewhat lower in flash and fire point, and somewhat lower in viscosity, would not meet all the requirements to which this oil is to be put?

I. S. Raymer (P. & L. E.): The oil can be procured from practically every refinery in the United States. The matter of procuring an oil with a lower viscosity is merely a question as to whether you want to give up some of the lubricating qualities in the oil for something else that you may desire. Personally I think the viscosity should not be sacrificed.

Mr. Stephenson: It is a question in my mind if it would be sacrificed if it was a trifle lower than shown.

F. B. Wiegand (N. Y. C.): In reading over the specification it occurred to me that we had gone into too much detail in the flash test and in the fire test. With that in mind I wrote to our Assistant Engineer of Tests, asking his opinion. He says on account of the simplicity of the Cleveland open cup tester, the Cleveland open cup is specified in the majority of oil specifications, and is a part of the equipment in every well-equipped laboratory where oils are tested. He makes the following suggestion with reference to the flash test:

"Flashing point will be determined in a Cleveland open tester. The oil will be heated quickly to a point 100 deg. below the expected flash point. The heating will then be continued at 10 deg. per min. At every fifth degree a test flame, not over ⅛ in. long, will be passed over the oil for two seconds on a plane halfway between the surface of the oil and the top of the cup. When the flashing point is reached the oil shall be ¼ in. to ⅜ in. below the top of the cup."

With reference to the fire test, he suggests: "After the flash point is obtained, the oil shall be heated at the same rate (10 deg. per min.) test flame applied every fifth degree, after the flash point has been obtained." The flash and fire tests are made daily in all laboratories testing oils, and are a mere matter of routine.

I would like the committee to consider this matter, and determine if we could not eliminate some of the details in the proposed specification, stating just how the matter should be handled.

Mr. Raymer: The committee has made an endeavor to get away from the personal factor as far as possible. It is desirable that the test shall be made by a man who has not seen it made before.

P. H. Conradson (Galena Signal Oil Co.): As regards the flash point part of the specification, the Cleveland open cup is generally used by the manufacturers and oil dealers. However, of late years, the sand bath has been taken away and in many refineries and laboratories they are simply applying the flame direct under the bottom of the cup, or else having a steel plate about ¼ in. or ⅛ in. thick between the flame and the bottom of the cup.

There should be some modifications in regard to the proposed specifications in taking the flash point. In the first place, you are using only ⅛ in. from the end of the thermometer bulb to the inside diameter of the cup. That should be ⅜ in. Then the specifications propose that the cup shall be filled to ¼ in. from the top of the cup. If you have an oil that flashes at 300 deg. the effect of the explosion on the oil will be such that it will overflow. Therefore that distance should be modified to ⅜ in. or more.

As regards applying the test flame, you say put the flame across the top near the surface. That should be provided for more definitely. If you apply it at ⅛ in. you are apt to get a flash you really should not have, on account of the heat from the test flame.

I think perhaps the committee might consider using the Cleveland cup with sand bath or without sand bath, because the Committee on Lubricants of the American Society for Testing Materials will hold a meeting the latter part of this month, at which specifications for flash test will be adopted, and presented to the society next July, and it would be a useful thing if our committee could express itself in that connection.

I think it would be a good idea to describe the flame tube a little different from what is done here. If you let the oil get too close to the top of the cup you get very indifferent results. If the oil has a high flashing point of 300 or 350 deg., that is too close to the flame.

Mr. Raymer: I move that the specifications for Zero Fahrenheit Lubricating Oil be accepted for presentation at the annual meeting for submission for letter ballot for inclusion in the Manual.

Mr. Raymer then presented the specification for 45 deg. below zero Fahrenheit lubricating oil.

(Motion carried.)

The committee was dismissed with the thanks of the association.

Frank McManamy on Shopmen's Agreement

A lively meeting was held by the Western Railway Club at the Hotel Sherman, Chicago, on Monday evening. Frank McManamy, former assistant director, Division of Operation, United States Railroad Administration, and now manager of the Department of Equipment, Division of Liquidation Claims of the Railroad Administration, spoke on the national agreement with shopmen. He outlined fully the way in which this agreement had been reached and its application, speaking, of course, from the standpoint of the Railroad Administration. Naturally his address was followed with a spirited discussion of the various details of the application of the terms of the agreement.

Restaurant Facilities in Coliseum

The National Railway Appliances Association has arranged for the operation under its direction of the restaurant in the basement of the Coliseum for the convenience of exhibitors and others. It offers both lunch-counter and dining room facilities. The officers of the association assure that the food is of the best and urge patronage for it.

Signal Division Registration

THE REGISTRATION AT THE meeting of the Signal division of the American Railroad Association yesterday totaled 248 active and 98 affiliate members, a total of 346. This is 28 in excess of registration of last year and compared with 198 for 1918.

Active Members

Ackerman, F. J., Sig. Engr., K. C. T. Ry., Kansas City, Mo.
Adams, T. S., Asst. Supr. Sigs., N. Y. C. R. R., Watertown, N. Y.
Alexander, A. F., Sig. Supt., C. M. & St. P.
Allee, E. J., Sig. Supr., B. & O. S. W. R. R., Chillicothe, Ohio.
Ambach, E. T., Engr. of Sigs., B. & O. R. R., Western Lines, Cincinnati, Ohio.
Anderson, A. J., Sig. Supvr., D. L. & W.
Anderson, B. T., Asst. Sig. Engr., D. L. & W. R. R., Hoboken, N. J.
Appleton, H. H., Supr. Sigs., N. Y. P. & N., Harrisburg, Pa.
Arnold, R. B., Asst. Sig. Engr., C. & N. W. Ry., Chicago, Ill.
Ashley, Robin D., Sig. Inspr., I. C. R. R., Chicago, Ill.
Bagley, F. H., Asst. Sig. Engr., L. & N. R. R., Louisville, Ky.
Baird, M. A., Sig. Engr., Erie R. R., New York, N. Y.
Ball, Frank L., Supr. Sigs., D. L. & W., R. R., Maplewood, N. J.
Balliet, H. S., Secretary-Treasurer, Asst. Term. Mgr., Grand Central Terminal, New York, N. Y.
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Bates, Arthur P., Supr. Sigs., B. & A. R. R., Allston, Mass.
Baxter, H. H., Supt. Constr., Sig. Dept., C. & N. W. Ry., Chicago, Ill.
Bears, A. M., Supr. Sigs., C. P. R.
Beck, Frank A., Sig. Insptr., P. R. R.
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Bender, F. W., Asst. Sig. Engr., C. R. R. of N. J., Elizabeth, N. J.
Bennett, C. H., Sig. Supr., L. & H. Ry. Co., Warwick, N. Y.
Bentley, R. S., Sig. Insptr., C. M. & St. P.
Beoddy, J. A., Gen. Sig. Inspr., N. & W. Ry., Roanoke, Va.
Berry, E. S., Asst. Ckt. Engr., N. Y. C. R. R., East of Buffalo, Albany, N. Y.
Berry, H. H., Sig. Supr., Mo. Pac.
Beutler, F. E., Asst. Sig. Engr., C. & W. I., Chicago.
Black, E. A., Sig. Supr., N. Y. C. R. R., West of Buffalo, Ashtabula, Ohio.
Boland, W. E., Sig. Engr., Sou. Pac. Co., San Francisco, Cal.
Bortle, Rexford, Sig. Insptr., N. Y. C. East.
Broadbent, J. H., Sig. Supr., P. R. R., Baltimore, Md.
Brown, Chas. W., Supt., L. & N. E. R. R., Bethlehem, Pa.
Brown, Larsen, Senior Asst. Sig. Engr., A. T. & S. F. Ry., Topeka, Kan.
Burgur, J. A., Sig. Supvr., Erie R. R.
Burns, Wm. G., Chief Insp. of Sigs., N. Y. C. R. R., East of Buffalo, Albany, N. Y.
Bush, F. E., Sig. Foreman, Elmira Div., P. R. R.
Butridge, J. H., Chf. Sig. Inspr., I. C. R. R., 12th St. Station, Chicago, Ill.
Caley, Glenn H., Elec. and Sig. Engr., N. Y. O. & W. Ry., Middletown, N. Y.
Champlain, E. F., Sig. Supr., Erie R. R., Elmira, N. Y.
Childs, W. L., Chief Sig. Mtr., Memphis Union Sta.
Christofferson, C. A., Sig. Engr., Nor. Pac. Ry., St. Paul, Minn.
Constable, F. W., Asst. Sig. Supvr., N. Y. C. R. R.
Combs, Harry, Supr. Sigs., L. E. & W. R. R., Tipton, Ind.
Cook, Wm. F., Supr. Intkg., D. & H. Co., Green Island, N. Y.
Cooper, S. F., Sig. Supr., Erie R. R., Jersey City, N. J.
Cormick, James H., Director, Sig. Engr., Can. Nor. Ry., Union Sta., Winnipeg, Man.
Cotton, Chas. A., Div. Sig. For., A., T. & S. F. Ry., Chillicothe, Ill.
Cowherd, G. R., Sig. Engr., E. P. & S. W. Ry., El Paso, Texas
Cronk, C. D., Asst. Sig. Engr.,N. Y. C. R. R., West of Buffalo, Cleveland, Ohio.
Dahlstrom, A. H., Supr. Sigs., U. P. R. R.,, Room 19, Union Depot, Denver, Colo.
Darron, A. J., Sig. Supvr., B. R. & P. Ry.
Davies, Arthur, Sig. Supr., Can. Pac. Ry., Calgary, Alberta, Can.
Dawson, W. A., Supr. Sigs., N. Y. C. R. R., West of Buffalo, Ashtabula, Ohio.
De Meritt, E. B., Signal Engr., Central of Georgia Ry., Savannah, Ga.
Deming, J. H., Sig. Supvr., C. of Ga. R. R.
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Dewey, Stuart J., Asst. Sig. Eng., C. C. C. & St. L. Ry., Cincinnati, Ohio.
Dickinson, B. F., Supr. Sigs., P. R. R., Harrisburg, Pa.
Drake, Caleb, Gen. Sig. Inspr., C. & N. W. Ry., Chicago, Ill.

Drew, H., Sig. Supvr., G. T. R. R.
Dryden, G. H., Prin. Asst. Sig. Engr., B. & O. R. R., Baltimore, Md.
Dryden, W. L., Sig. Supr., S. I. R. T. Ry., St. George, S. I., N. Y.
Du Bray, A. B., Sen. Sig. Engr., I. C. C., Kansas City, Mo.
Duffy, C. M., Asst. Sig. Engr., C., R. I. & P. Ry., Des Moines, Ia.
Dunham, Chas. A., Past President., Sig. Engr., Great Northern Ry., St. Paul, Minn.
Dunn, J. H., Sig. Inspr., C. M. & St. P. Ry., Milwaukee, Wis.
Eiesele, R., Sig. Supvr., Erie R. R.
Elsworth, R. B., Engr. Maint. of Sigs., N. Y. C. R. R., East of Buffalo, Albany, N. Y.
Eukes, F. L., Sig. Inspr., Nor. Pac. Ry., Livingston, Mont.
Falk, C. E., Sig. Foreman Wabash R. R.
Falkenstein, Oscar, Supr. Sigs., T. & O. C. Ry., Grandview, Columbia, Ohio.
Finch, J. C., Inspr. Sigs., Mo. Pac. Ry., St. Louis, Mo.
Foale, H. J., Sig. Engr., Wabash Ry., Decatur, Ill.
Folley, E., Sig. Supr., C. & E. I. R. R., Danville, Ill.
Foster, Franklin C., Sig. Supr., L. & N. R. R., Evansville, Ind.
Frank, C. O., Asst. Engr. of Sigs., Val. Dept., M. C. R. R., Detroit, Mich.
Frazee, A. M., Elec. Engr., D., M. & N. Ry., Duluth, Minn.
French, E. E., Engr. Sig. Val., C. & N. W. Ry., So. Madison, Wis.
Fugina, A. R., Sig. Engr., L. & N. R. R., Louisville, Ky.
Gallagher, E. B., Sig. Inspr., Ill. Cent. R. R., Chicago, Ill.
Gault, Paul M., Asst. Engr., Sig. Dept., Ill. Cent. R. R., Chicago, Ill.
Gensheimer, J. S., Supr. Sigs., N. Y., P. & N. R. R., Pocomoke, Md.
Gilbert, A. M., Sig. Supr., C. C. C. & St. L. R. R., Mattoon, Ill.
Gillan, I. F., Sig. Supr., C., M. & St. P. Ry., Milwaukee, Wis.
Gillespies, G. S., Sig. Supvr., D. & I. R. R.
Grant, E. C., Sig. Supvr., Union Pac.
Green, R. E., Asst. Sig. Engr., M. C. R. R., Detroit, Mich.
Griffiths, Owen H., Sig. Div., I. C. R. R.
Guthrie, L. A., Sig. Inspr., Can. Nor. R. R., Winnipeg, Man.
Haigh, A. S., Chief Draughtsman, N. Y. C. R. R.
Hallstein, W. P., Supr. Sigs., Penna. Lines West, Fort Wayne, Ind.
Hancock, H. P., Chf. Draftsman, Sig. Dept., N. & W. Ry., Roanoke, Va.
Hanna, John V., Chf. Engr., K. C. Term. Ry., Kansas City, Mo.
Hansen, T. C., Sig. Supvr., N. P. R. R.
Harland, W. H., Sr. Elec. Engr., I. C. C., Washington, D. C.
Harmstead, J. L., Supr. Sigs., P. R. R., Wilmington, Del.
Hartvig, C. E., Asst. Sig. Engr., C., R. I. & P. Ry., El Reno, Okla.
Hatton, Edwin M., Supr. Sigs., P. R. R., Reading, Pa.
Hiles, Wm., Inspr. of Sigs., C., C. C. & St. L. Ry., Cincinnati, Ohio.
Hill, A. C., Sig. Supr., B. & A. R. R., Springfield, Mass.
Himes, A. B., Asst. Engr. Sigs., B. & O. R. R., Western Lines, Cincinnati, Ohio.
Hinton, K. A., Sig. Supr., C. I. & W. R. R., Indianapolis, Ind.
Hix, A. P., Director, Sig. Engr., T. R. R. Assn. of St. L. and St. L. M. B. T. Ry. Co., St. Louis, Mo.
Hixson, C. W., Supt. Tel. & Sig., P. R. R.
Hobson, Harry, Sig. Supr., A., T. & S. F. Ry., Topeka, Kans.
Hodgdon, C. R., Sig. Engr., Can. Pac. Ry., Winnipeg, Man.
Hoffman, S. C., Sig. Inspr., I. C. R. R. Co., Memphis, Tenn.
Holt, Thomas, Sig. Engr., Chgo. Union Sta. Co.
Hyatt, T. G., Sig. Supr., Wabash R. R.
Inwood, T. G., Sig. Supvr., N. Y. C. R. R.
Jacobs, F. E., Sig. Engr., C. & W. I. R. R., Chicago, Ill.
Jewell, J. E., Chief Draughtsman, B. & L. E. R. R.
Johnson, E. C., Sig. Supvr., L. V. R. R.
Johnson, H. E., Sig. Inspr., C. & O. Ry. Co., Richmond, Va.
Johnson, J. A., Sig. Engr., M., K. & T. Ry., Denison, Tex.
Johnson, R. C., Sig. Engr., B. R. T. System, Brooklyn, N. Y.
Johnson, T. L., Supr. Sigs., D., L. & W. R. R., Binghamton, N. Y.
Keane, T. P., Engr. on Val., C. & N. W. Ry.
Kellenberger, K. E., Editor, The Railway Signal Engineer, Chicago, Ill.
Kelloway, C. J., Chairman, Supt. of Signals, Atlantic Coast Line, Wilmington, N. C.
Kiehm, Louis, Asst. Sig. Supr., U. P. R. R., Laramie, Wyo.
Kilian, H. L., Supr. Sigs., N. Y. C. R. R., West of Buffalo, Toledo, Ohio.
Kirley, Geo. A., Sig. Eng., B. & A. R. R., Boston, Mass.
Kolb, E. W., Sig. Engr., B., R. & P. Ry., Rochester, N. Y.
Kroft, M. V., Sig. Inspt., P. R. R.
Kydd, Geo. W., Sig. Pilot Engr., B. & O. R. R., Baltimore, Md.
Lambert, P. E., Sig. Supr., C. & N. R. R.
Lantz, C. J., Supr. Sigs., G. R. & I. Ry., Grand Rapids, Mich.
Latimer, J. B., Sig. Engr., C., B. & Q. R. R., Chicago, Ill.
Lehman, E. H., Supt. Material, Sig.-Tel. Dept., T. & O. C. Ry., Columbus, Ohio.
Leisenring, John, Sig. Engr., Illinois Traction Co., Springfield, Ill.
Lindsey, E. R., Asst. Engr., C. & E. I.
Logue, H. A.
Lomas, H. F., Asst. Sig. Engr., I. C. R. R., Chicago, Ill.
Lorenzen, H. C., Sig. Insp., P. M. R. R., Detroit, Mich.
Lynch, N. S., Supr. Sigs., Mo. Pac. Ry., Kansas City, Mo.
Mac Leod, Leod, Sig. Supr., B. & M. R. R., Boston, Mass.
Mann, B. H., Sig. Engr., Mo. Pac. Ry., St. Louis, Mo.
Mayer, F. G., Supr. Sigs., P. R. R., Tyrone, Pa.
McDonald, J. E., Sig. Inspt., D. W. & P.
Metcalf, J. W., Div. Sig. Foreman, A. T. & S. F. Ry.
Mills, S. N.
Miskelly, Samuel, Sig. Const. Engr., C., R. I. & P. Ry., Chicago, Ill.
Mock, J. C., Sig. & Elec. Engr., M. C. R. R., Detroit, Mich.
Morehart, Forrest D., Draftsman, C. M. & St. P. Ry., Milwaukee, Wis.
Morgan, H. G., Office Engr., I. C. R. R., Chicago, Ill.
Morrison, C. H., Sig, Engr. N. Y., N. H. & H. R. R., New Haven, Conn.
Mossie, J. S., Sig. Supvr., Louisville & Nashville.
Newman, W. H., Supr. Sigs., N. Y. C. R. R., East of Buffalo, Buffalo, N. Y.
Nutting, A. G., Sig. Supvr, No. Pac.
O'Laughlin, W. M., Sen. Sig. Engr., I. C. C., Chicago, Ill.
O'Meara, T. J., Asst. Sig. Engr., N. Y. C. R. R., East of Buffalo, Albany, N. Y.
Palmer, F. H., Sig. Supvr., C. N. E. R. R.
Parnell, Loy, Sig. Supr., Wabash Ry., Montpelier, O.
Patenall, F. P., Sig. Engr., B. & O. R. R., Baltimore, Md.
Peabody, J. A., Sig. Engr., C. & N. W. Ry., Chicago, Ill.
Peck, J. W., Asst. Sig. Engr., C. G. W. R. R.
Perkins, G. O., Supt. Tel. & Sigs., C. G. W. R.R., Chicago, Ill.
Person, G. H., Sig. Supr., B. R. & P. Ry., Dubois, Pa.
Peterson, G. A., Office Engr., Wabash R. R.
Pflasterer, G. S., Sig. Engr., N. C. & St. L. Ry., North Nashville, Tenn.
Pfleging, F. W., Vice-President, Sig. Engr., U. P. R. R., Omaha, Neb.
Phinney, R. M., Asst. Sig. Engr., C. & N. W., Chicago.
Porter, L. B., Asst. Sig. Engr., C. M. & St. P. Ry., Milwaukee, Wis.
Post, E. K., Supr. Sigs., P. R. R., Altoona, Pa.
Post, Welles M., Supt. Telegraph & Signals, P. R. R., Cresson, Pa.
Price, H. C., Gen. Sig. Inspr., Erie R. R., Bayonne, N. J.
Prinn, B. H., Sig. Supr., B. & O. S. W. R. R., Norwood, O.
Rainey, P. A., Supr. Sigs., P. R. R., West Philadelphia, Pa.
Rapelye, E. F. D., Chief Draftsman, Ill. Cent. R. R., Chicago, Ill.
Rapp, Fred, Asst. Sig. Supr., N. Y. C. R. R., East of Buffalo, Albany, N. Y.
Raymer, I. S., Asst. Sig. Engr., P. & L. E. R. R., Pittsburgh, Pa.
Relph, E. J., Mech. Sig. Engr., Nor. Pac. Ry., St. Paul, Minn.
Rice, A. H., Director, Supt. Telegraph & Sig. Engr., D. & H. Co., Albany, N. Y.
Richards, D. W., Sig. Engr., N. & W. Ry., Roanoke, Va.
Robinson, Harry O., Sig. Supr., Mo. Pac. Ry., Osawatomie, Kan.
Rohner, J. P., Asst. Sig. Supr., Nor. Pac. Ry., St. Paul, Minn.
Ross, J. H., Sig. Supvr., Big Four.
Rudd, A. H., Chief Sig. Engr., P. R. R., Philadelphia, Pa.
Saunders, W. K., Supr. Sigs., R. F. & P. R. R., Ashland, Va.
Schultz, E. E., Asst. Engr., C. & N. W.
Schwendt, B. J., Supt. Tel. & Sig., T. & O. C. Ry., Columbus, O.
Scott, T. W., Sig. Supvr., B. & O. R. R.
Seeburger, Francis F., Sig. Inspr., C. M. & St. P. Ry., care of Asst. Sig. Engr., Tacoma, Wash.
Seemuth, W. F., Sig. Val. Engr., C. M. & St. P. Ry., Milwaukee Shops, Wis.
Seifert, C. O., Sig. Supr., B. & O. C. T., Chicago.
Seifert, T. C., Sig. Inspr., C. B. & Q. R. R., 547 W. Jackson Blvd., Chicago, Ill.
Sharpley, H. F., Jr., Prin. Asst. Engr., Central of Georgia Ry., Savannah, Ga.
Shatwell, E. V., Sig. Supvr., C. & N. W. R. R.
Sheets, R. A., Asst. Sig. Supvr., C. & N. W.
Sheffield, E., Sig. Supr., H. & T. C. R. R.
Sicht, J. C., Sig. Supr., Mo. Pac. Ry., Falls City, Neb.
Smith, Chas., Gen. Sig. Foreman, C. P. R. R.
Smith, Earl B., Supr. Sigs., N. Y. C. R. R., East of Buffalo, New York, N. Y.
Soper, Charles, Supr. Sigs., L. I. R. R., Jamaica, L. I., New York.
Spangler, D. E., Supr. Sigs., P. R. R., Williamsport, Pa.
Spangler, W. N., Asst. Supt. Telegraph & Sigs., P. R. R., Philadelphia, Pa.

Starkweather, Frank E., Asst. Sig. Engr., Pere Marquette R. R., Detroit, Mich.
Stecher, C. G., Sig. Instr., C. & N. W. Ry., Oak Park, Ill.
Stemmetz, C. W., Sig. Insptr., Big Four.
Stephens, Chas., Sig. Engr., C. & O. Ry., Richmond, Va.
Stilwell, W. H., Sig. Supr., L. & N. R. R., Paris, Ky.
Stolicker, J. W.
Stoltz, C. F., Sig. Engr., C. C. C. & St. L. Ry., Cincinnati, Ohio.
Storms, W. S., Chief Sig. Inspr., Erie R. R., Jersey City, N. J.
Stow, F. F., Supt., Delray Connecting R. R.
Stradling, E. G., Sig. Engr., C. I. & L. R. R.
Stuart, F. C., Sig. Engr., E. J. & E.
Stump, Harry N., Supr. Sigs., P. R. R., Jersey City, N. J.
Sutherland, M., Sig. Engr., Maine Central R. R., Brunswick, Me.
Taylor, R. W., Asst. Sig. Engr., B. & O. R. R., Baltimore, Md.
Thomas, Geo. K., Asst. Sig. Engr., A. T. & S. F. Ry., Topeka, Kan.
Thompson, S. R., Sig. Supr., C. & O. Ry., Huntington, W. Va.
Tillett, C. H., Sig. Engr., Grand Trunk Ry., Montreal, Que.
Toft, Guy, Supr. Sigs. P. R. R., East Liberty, Pa.
Tomlinson, A. Y., Div. Operator, P. R. R.
Turner, Robt., S., Sig. Supr., U. P. R. R., Evanston, Wyo.
Uhr, I. A., Sig. Engr. St. L. & S. F. R. R., Springfield, Mo.
Van Etten, L. H., Supt. of Tel. & Signals, C. T. H. & S. E.
Vandershnis, W. M., Sig. Engr., I. C. R. R.
Vernon, J. I., Sig. Supr., N. Y. N. H. & H. R. R., Providence, R. I.
Vieillard, L. F., Gen. Elec. Sig. Inspr., L. I. R. R. Jamaica, N. Y.
Wass, F. E., Supr. of Sigs., Grand Central Terminal, New York, N. Y.
Weatherby, E. P., Sig. Engr., T. & P. R. R., Dallas, Texas.
Weigel, J. B., Gen. Sig. Inspr., L. & N. R. R., Louisville, Ky.
Wells, F. L., Sig. Supvr., C. & N. W.
Wendt, Edwin F., Engineering Board I. C. C., Washington, D. C.
Werthmuller, L. S., Sig. Supvr., Mo. Pac.
Whitcomb, L. L., Supr. Sigs., N. Y. C. R. R., West of Buffalo Elyria, Ohio.
Whitehorn, A. R., Sig. Inspt., I. C. R. R., Chicago, Ill.
Wiegand, F. B., Sig. Engr., N. Y. C. R. R., West of Buffalo, Cleveland, Ohio.
Williams, J. F., Sig. Supvr., Big Four.
Woodling, Ray L., Div. Sig. For., A. T. & S. F. Ry., Valley Div. Fresno, Cal.
Worthing, E. E., Director, Sig. Engr., Sou. Pac. Lines, Atlantic System, Houston, Tex.
Wyant, Leroy, Prin. Asst. Sig. Engr., C. R. I. & P. Ry.
Yocum, A. H., Sig. Engr., P. & R. Ry., Philadelphia, Pa.
Zane, Wm. F., Asst. Sig. Engr., C. B. & Q. R. R., Lincoln, Neb

Supply

Bunn, J. W., Galena Signal Oil Co.
Conradson, P. H., Galena Signal Oil Co., Franklin, Pa.
Gubbins, J. F., Bryant Zinc Co.
Hough, S. J., Waterbury Battery Co., N. Y.
Jacobs, Henry M., Gen. Elec. Co., Schenectady.

Junior Members

Crawford, D. K., Chief Draftsman, A. T. & S. F.
Parrell, E. E., Sig. Draftsman, C. C. C. & St. L. R. R., Cincinnati, Ohio.
Ryan, F. J., Computer, I. C. R. R., Central Sta., Chicago.
Schindler, Geo. C., Draftsman, Sig. Engr. Office, I. C. R. R., Downers Grove, Ill.

Annual Exhibit of the N. R. A. A. at the Coliseum

Large Number of New Exhibitors and New Decorative Scheme Feature This Year's Show

WITHOUT OSTENTATION THE RAILROADS of the United States were returned to their owners on March 1. Up to the present time there has been little opportunity for the manufacturers and distributors of appliances used in steam and electric railway operation, maintenance and construction to do other than to follow railroad reorganizations during this transition period and to quietly heave a sigh of relief. It has remained therefore for the National Railway Appliances Association to appropriately commemorate the beginning of a new era in railroad history. Partly because of optimism and partly because of the energetic efforts of C. W. Kelley, secretary, and the officers of the Association, the annual exhibition at the Coliseum which opened yesterday morning at 8:00 a. m. has been heralded as and is the "biggest ever."

In the light of these developments it was deemed advisable to decorate the interior of the Coliseum in a more elaborate manner than has been the practice heretofore. The new decorative scheme is featured by the arrangement of a false ceiling composed of three festoons of alternate apple green and white. This ceiling will form a canopy for the entire exhibiting space. Against it will be silhouetted the old-bronze partitions and signs, making an exceptionally pleasing and effective arrangement. Added to this effect will be a uniformity in the style, color and type of furniture and other decorative features placed in the respective booths of the exhibitors. This uniformity has been brought about through the handling by the Association of all furniture, electrical fixtures and decorative effects instead of allowing this work to be handled by outside agencies as has been done in the past.

There were 1,152 members of the National Railway Appliances Association who enrolled yesterday, while the total attendance up to 5 o'clock last night was 1,953.

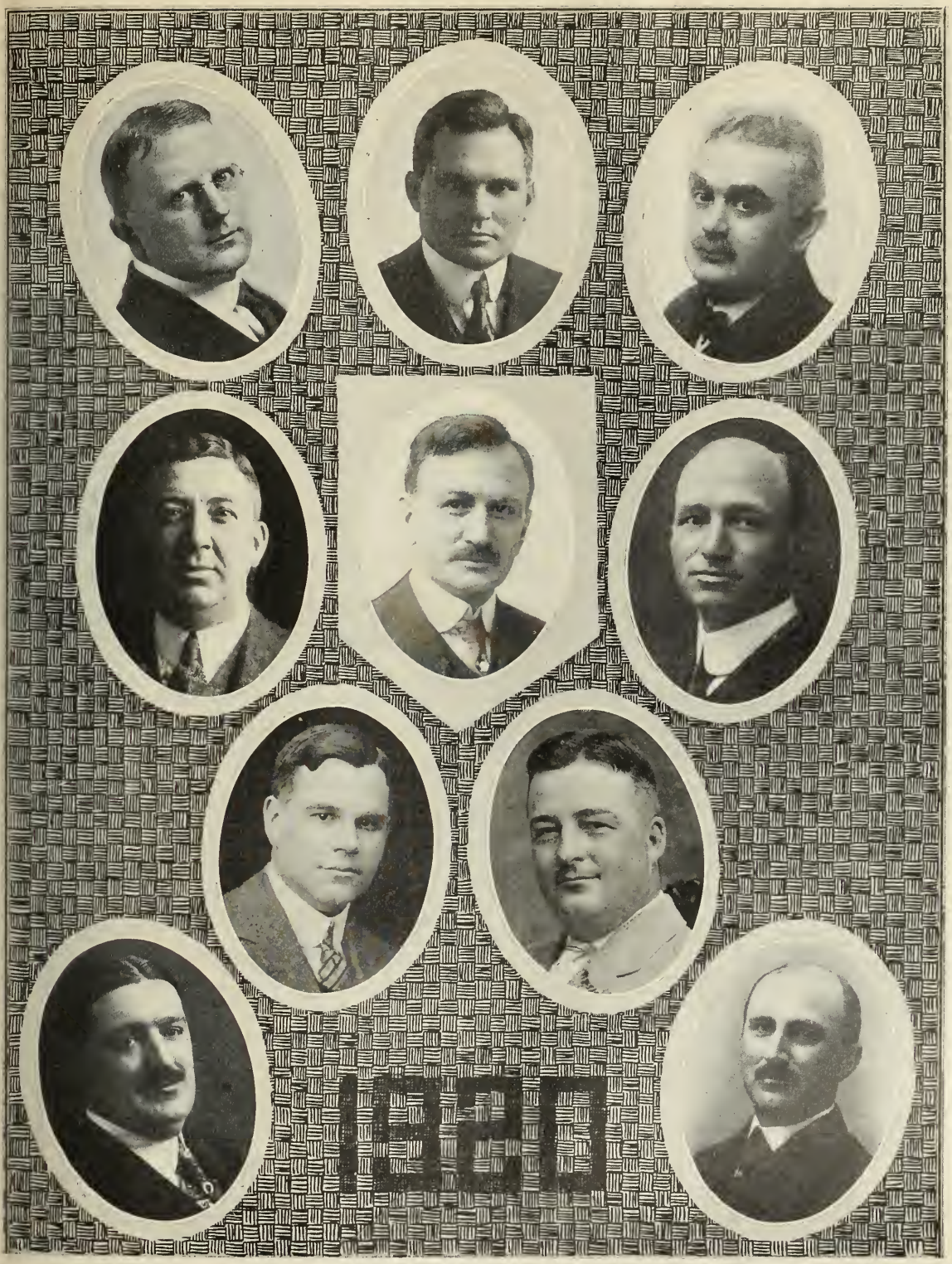
In arranging the floor plan of the Coliseum for the present exhibition the officers of the Association were confronted with the problem of allotting space to 32 new exhibitors in addition to those who have been exhibiting in the past. The problem was made still more difficult by the fact that the regular exhibitors were asking for 20 per cent more space than was available. The problem was successfully solved by assigning the usual amount of space to all of the old exhibitors and subsequently curtailing the amount of space allotted in several cases.

The practice adopted several years ago of having the main entrance to the show through the Annex, which in turn is an integral part of the exhibit, has been continued this year. In general the floor plan of the Coliseum is substantially the same as in previous years, with many firms occupying practically the same space as last year.

The exhibits themselves have been arranged throughout with a view of presenting to the railroad men the salient points of each product with emphasis upon the educational rather than upon the showy.

Contrary to the usual custom, the Coliseum is to be opened each day this year at 8:00 a. m. and closed at 6:30 p. m., except on the second day of the convention, Tuesday, March 16, when the exhibition will close at 11:00 p. m. This arrangement has been made, according to Secretary Kelly, in order to give both the men who will be connected with the exhibits and the visitors an opportunity to get together and renew old friendships.

Approximately 10,600 tickets have been sent to railroad men, members of engineering societies, to colleges, and to members of the N. R. A. A. The plan of distribution is substantially that which was followed last year and which is intended to confine the attendance to those who are really interested in the exhibits or who are in any way connected with the railway or railway supply business.



J. B. Strong
G. C. Isbester
M. J. Trees
P. C. Jacobs
C. W. Kelly
E. E. Hudson
L. W. Shugg
T. W. Aishton
E. A. Johnson
A. A. Taylor

Officers and Directors of the National Railway Appliances Association

The officers and members of the board of directors of the National Railway Appliances Association for the past year were: President, P. C. Jacobs, H. W. Johns-Manville Company, Chicago; vice-president, J. B. Strong, Ramapo Iron Works, Hillburn, N. Y.; secretary-treasurer, C. W. Kelly, Kelly-Derby Company, Chicago; honorary director, M. J. Trees, Chicago Bridge & Iron Works, Chicago. Directors, E. E. Hudson, Waterbury Battery Company, New York; L. W. Shugg, General Electrical Company, Schenectady, N. Y.; A. A. Taylor, Fairbanks, Morse Company, Chicago; T. W. Ashton, National Malleable Castings Company, Chicago; G. C. Ibester, American Chain Company, Chicago, and E. A. Johnson, Duff Manufacturing Company, Pittsburgh, Pa.

Mr. Taylor was elected at the November meeting of the Association to succeed A. P. Van Schaick, now associated with the American Chain Company.

List of Exhibitors

The following is a list of firms presenting exhibits, with the devices on display and the names of the representatives present at their booths:

A.G.A. Railway Light & Signal Company, Elizabeth, N. J.—Railway grade crossing signal; highway danger signal; color light signal; cutting and welding torches. Represented by J. K. Howard, E. R. Boots, A. G. Stractz, A. G. Shaver and H. S. Goldman. Spaces 39 and 40.

The Adams & Westlake Company, Chicago.—Signal lamps; lanterns; long-time burners; switch locks. Represented by Chas. B. Carson, H. G. Turner, A. S. Anderson, W. J. Piersen, J. F. Stender, F. W. Fochringer and G. L. Walters. Spaces 87, 88, 106, 107.

Adams Motor & Manufacturing Company, Chicago.—Railway gasoline-operated motor cars. Represented by W. E. Adams, R. A. Harris, A. P. Grenier and L. Gerhardt. Spaces 218 and 218½.

Air Reduction Sales Company, New York City.—Generator; oxygen and acetylene cylinders; welding and cutting apparatus. Represented by E. L. Mills, H. H. Melville, R. T. Peabody and G. E. Phelps. Spaces 167½ and 168.

Alexander Milburn Company, Baltimore, Md.—Portable carbide lights and oxy-acetylene welding and cutting equipment; acetylene generators; accessories. Represented by David Bartlett, W. J. Foster and P. J. Dalie. Spaces 165 and 166.

Alexander Railroad Crossing & Equipment Company, Chicago.—Continuous rail crossing. Represented by Jake L. Eggleston. Space 171½.

American Abrasive Metals Company, New York City.—Feralun and Vulcalun anti-slip materials for walkway surfaces. Represented by C. A. Barker, H. W. Mowery and L. A. Hale. Space 167.

American Chain Company, Inc., Bridgeport, Conn.—Chain products. Represented by W. T. Morris, W. M. Taussig, G. C. Isbester, A. P. Van Schaick, J. E. Pumphrey, J. W. Cole, R. B. Stauffer, W. D. Kirkpatrick, T. A. Cotter, W. R. Dawson and E. O. Johnstone. Space 70.

American Hoist & Derrick Company, St. Paul, Minn.—Railroad ditcher. Represented by F. J. Johnson, J. L. Hickey, W. L. Manson, Edward Coleman and W. B. Maurer. Space 88½.

American Kron Scale Company, New York City.—Express type, springless-dial scale; l. c. l. freight scale. Represented by E. Ohnell, W. W. Camp, J. Kirk Rowell, E. M. Abramson, E. M. Franklin and C. F. Larson. Space 125.

American Malleable Castings Association, McKees Rocks, Pa.—Malleable iron castings. Represented by A. O. Buckins, A. M. Fulton, V. H. Meissner and Scott MacKay. Spaces 221, 222 and 223.

American Rail Joint Company, New York City.—Wedge joints; Peerless and Champion steel ties; Goddin rail joints. Represented by J. A. Hyle and H. T. Goddin. Space 161½.

American Railway Bridges and Building Association, Chicago. Spaces 226-227.

American Railway Signal Association, Chicago.—Spaces 226-227.

American Spike Company, New York City.—Sessler grip-spikes; tie exhibits showing wood structure. Represented by Geo. D. MacKay, Jr., S. M. Strasburger, E. M. Davidson and Marcel K. Sessler. Space 6.

American Steel and Wire Company, New York City.—Railroad fence; steel fence posts; fence gates; electrical wires and cables; wire rope; rail bonds; signal wire. Represented by J. W. Meaker, Jr., L. P. Shanahan, J. W. Collins, J. F. Alexander, A. W. Evans, W. Mackley, C. S. Knight, Jr., C. F. Wiley, B. H. Ryder and W. F. Pfundt. Spaces 51¼, 52, 70½ and 71.

American Valve & Meter Company, Cincinnati, Ohio.—Automatic water columns; telescopic spouts; automatic float valves and tank fixtures; yardmaster switch stands; switch stands; interlocking switch stands; safety switch locks. Represented by J. T. McGarry, D. J. Higgins, F. C. Anderson. Spaces 130, 131 and 132.

American Vulcanized Fibre Company, Pittsburgh, Pa.—Fibre for rail joint, steel tie insulation, mechanical and electrical uses. Represented by C. W. Sutton, C. C. Bell, H. C. Hackett, Wm Maxwell and John Barron. Space 126.

Anchor Company, New York City.—Rail anchors. Represented by Geo. H. Chadwell and Orlando Metcalf. Space 192½.

Armco Iron Culvert & Flume Manufacturers' Association, Middletown, Ohio.—Split ingots of steel and iron showing the low gas content of the American ingot iron as compared with the steel; polished sheets for locomotive jackets; American ingot iron alloy coated sheets for passenger car and locomotive cab roofs; galvanized American ingot iron sheets for general building purposes and Armco culverts. Represented by T. W. Jenkins, J. S. Roney, Arno B. Rainke, F. B. Milhoan, D. E. Foley and Carl Schulz. Spaces 99 and 100.

Austin Company, Cleveland, Ohio.—Layout, engineering construction and equipment service. Represented by G. A. Bryant, G. E. Lemmerich, C. F. Chard, W. L. Bailey, A. S. Low, R. F. Bell, L. O. Stocker, W. J. Austin and E. M. Haas. Spaces 158 and 158½.

Balkwill Manganese Crossing Company, Cleveland, Ohio.—Articulated cast manganese railway crossing. Represented by S. Balkwill. Space 115.

Barrett Company, New York City.—Barrett specification roofing; waterproofing; flooring; roof connections; boiler covering compound; slate surface roofing and shingles and prepared roofing. Represented by G. R. McVay, O. R. Aleshire, W. T. Kelley, C. H. Walsh, Geo. L. Wilson, J. De Berg, F. W. Freeman, K. C. Barth, Walter Buchler, W. S. Babcock and J. J. Ross. Spaces 107½ and 108.

Bay City Foundry & Machine Company, Bay City, Mich.—Automatic hoist; shallow pit bucket; car puller. Represented by L. G. Howlett, W. E. Howlett and C. B. Curtiss. Space 3.

Benjamin Electric Manufacturing Company, Chicago.—Industrial lighting equipment; railway crossing fixtures; angle reflectors and roundhouse fixtures; water-tight electrical devices and lighting fixtures; electric signals; panel boards. Represented by Mr. Snell. Space 334.

Bethlehem Steel Company, Bethlehem, Pa.—Parallel throw switch stand with target, mast, and lamp top; switch stands; railbound manganese frog. Represented by R. W. Gillespie, H. E. Stoll, F. A. Weymouth, N. E. Salsich, K. C. Banks, G. H. Riddle, E. E. Goodwillie, E. D. Campbell, W. W. Philler, L. F. Green, J. S. Hegeman, S. H. Smith, E. S. Illig, E. B. C. Goyne, E. H. Gumbart, J. F. Hennessy, C. A. Alden and G. S. Vickery. Spaces 199 and 216.

Blaw-Knox Company, Pittsburgh, Pa.—Clamshell buckets; buildings; garages; contractors' bunk houses; steel form for concrete construction. Represented by R. B. Randall, O. B. Pullis, R. D. Allrich, J. K. Bissell, L. R. Grannis and I. A. Pfeil. Space 136.

Boss Nut Company, Chicago.—Lock nuts. Represented by J. W. Fogg, W. C. Irwin and A. W. MacLean. Spaces 1 and 2.

Bryant Zinc Company, Chicago.—Highway crossing protection devices; Auto flags; crossing bells; rectifiers; lightning arresters; testing instruments and relays. Represented by S. C. Bryant, W. P. Graves, J. F. Gubbins, J. Hensel, A. Muller and T. H. Cole. Spaces 154-155.

Buda Company, Chicago.—Electric truck; track drill with chuck; bonding drill with clamp; car replacers; journal jack; ratchet jacks; grinders with complete attachments; switch stand; electric crossing gate post; electro pneumatic crossing gate; motor section cars; velocipede; motor velocipede; bumping post; Balkwill crossing; headlight. Represented by J. L. Artmaier, Harry P. Bayley, H. C. Beebe, Vaughn Y. Bell, Wolcott Blair, A. L. Bliss, C. N. Bradley, G. E. Bryar, C. H. Bull, E. Conant, Jno. Conant, M. A. Evans, R. B. Fisher, Sydney Francks, J. J. Gard, L. R. Griffin, Gerald Hale, H. J. Harkless, G. W. Hoover, Wm. P. Hunt, Jr., F. W. Marvel, John R. Mayeskie, H. L. Miller, F. E. Place, M. A. Ross, L. M. Viles, L. J. Wilkinson, P. W. Wood. Spaces 61, 62, 63, 64 and 65.

Buffalo Forge Company, Buffalo, N. Y.—Slitting shear, punch and bar cutter; forges; drills; blowers. Represented by H. W. Wendt, Jr., E. G. Leonard and H. O. MacDougall. Spaces 228, 229 and 230.

Cambria Steel Company, Philadelphia, Pa.—See Midvale Steel & Ordnance Company. Spaces 71½-72.

Carbic Manufacturing Company, Duluth, Minn.—Portable lights; portable acetylene generators; oxyacetylene welding and

cutting equipment. Represented by A. D. Guthrie, H. Bolinder and J. S. Strate. Space 14.

Carter Bloxonend Flooring Company, Kansas City, Mo.—Flooring for freight houses, machine shops, baggage, mail and express cars, baggage and express rooms. Represented by M. G. Truman, R. G. Stowell and Frank Bronez. Space 225.

Chicago Bridge & Iron Works, Chicago.—Railroad water tanks; railroad fuel oil tanks; elevated tanks for fire protection. Represented by M. J. Trees, K. I. Small, H. B. Murphy, H. C. Brown, C. S. Scheman, G. T. Horton, H. B. Horton, H. E. Horton, C. M. Ladd, R. Green, F. L. Cook, R. Campbell and C. D. Pillsbury. Spaces 52½ and 53.

Chicago Flag & Decorating Company, Chicago.—Railway signal flags. Represented by Geo. L. Glendon, Gus Magnussen and Thos. Glendon. Space 87.

Chicago Malleable Castings Company, West Pullman, Ill.—Rail anchor tie plates. Represented by J. S. Llewellyn, Warren Moore Osborn, Alan Rogers and G. W. Robb. Space 142.

Chicago Pneumatic Tool Company, Chicago.—Pneumatic hammers; pneumatic and electric drills and grinders; air compressors; oil and gas engines; hammer rock drills; air hose; hose couplers; accessories. Represented by W. P. Pressinger, C. W. Cross, H. G. Barbee, J. L. Canby and A. C. Anderesen. Spaces 133 and 134.

Chicago Railway Signal & Supply Company, Chicago.—Railway signal relays; lightning arrester; signal forgings; rail joint

Detroit Graphite Company, Detroit, Mich.—Paint for the interior of railroad buildings and graphite paint for bridges and other metal structures; locomotive and car paints. Represented by T. R. Wyles, L. D. Mitchell, W. D. Waugh, J. J. Hogan, A. B. Edge, E. Booth, A. B. Miller and E. L. Warner. Space 108½.

Diamond State Fibre Company, Bridgeport, Pa.—Fibre insulation for insulated rail joints. Represented by Gerald Swallow. Space 13.

Paul Dickinson, Inc., Chicago.—Smoke jacks; chimneys and building ventilators. Represented by A. J. Filkins and D. B. Wright. Space 98.

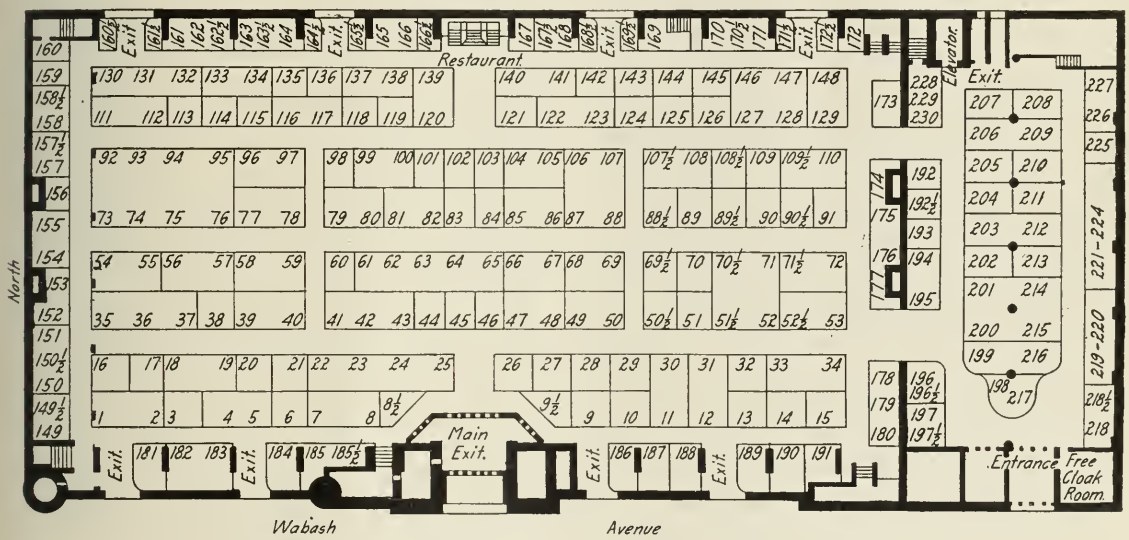
Dilworth, Porter & Co., Inc., Pittsburgh, Pa.—Spikes and tie plates. Represented by W. F. Schleiter, Joseph Dilworth and A. Morrison. Space 27.

Duff Manufacturing Company, Pittsburgh, Pa.—Track jack; high-speed ball-bearing screw jacks; car jacks; journal jacks. Represented by E. A. Johnson, C. N. Thulin, C. A. Methfessel and G. E. Anderson. Space 84.

Edison Storage Battery Company, Orange, N. J.—Alkaline storage batteries. Represented by John Kelly, W. F. Bauer and D. C. Wilson. Space 20.

Thomas A. Edison, Inc., Bloomfield, N. J.—Edison primary batteries; Edison outfits for lighting signals by electricity. Represented by L. W. McChesney, R. J. Frost, P. A. Garrity and A. J. Loughren. Space 20.

Electric Storage Battery Company, Philadelphia, Pa.—Port-



Floor Plan of the Coliseum and Annex Showing the Space Assignments

expander, etc. Represented by A. C. Danne, E. K. Brashears, D. J. McCarthy, C. R. Akrens, T. T. O'Fallow, R. F. Jehse, Wm. McClintock, W. C. Martin, A. L. Warner and E. W. Vogel. Spaces 77 and 78.

Chipman Chemical Engineering Company, Incorporated, New York City.—Atlas A method of weed killing; a miniature model train showing method of application. Represented by Ralph N. Chipman, R. B. Davis and E. D. Jackson. Space 89½.

Clark Car Company, Pittsburgh, Pa.—Extension side dump cars, air operated. Represented by H. E. Chilcoat, R. L. Mason and H. G. Doran. Space 135.

Cleveland Frog & Crossing Company, Cleveland, Ohio.—Frogs, crossings, etc. Represented by G. C. Lucas, Geo. Stanton, G. A. Peabody, L. G. Parker and J. A. Donahey. Space 90½.

Copper Clad Steel Company, Rankin, Pa.—Machine in operation drawing wire; samples of copper clad steel; samples showing the process of reducing copper clad steel to the finest wire. Represented by C. B. Semple, Marshall Page, R. A. Paterson and Geo. T. Bain. Space 213.

Crerar, Adams & Company, Chicago.—Track drills; bonding drills; jacks of different kinds; tool grinders; oil cans; journal jacks; self lowering jacks. Represented by R. Wallace, W. I. Clock, G. D. Bassett, J. A. Martin, E. C. Poehler, C. W. Gregory, R. M. Bullard, C. D. Derby and E. W. Coon. Space 28.

able signal batteries; interlocking signal battery; semaphore signal operated by 5-cell battery; car lighting; alloy cover assembly; compound jar; double flange alloy cover. Represented by G. H. Atkin, J. Lester Woodbridge, T. Milton, H. B. Crantford, H. M. Beck and H. E. Hunt. Space 60.

Engineering News-Record, New York City.—Engineering News-Record. Represented by Wm. Buxman, J. S. Halbrook, F. G. Hudson, H. H. French, E. E. R. Tratman and A. E. Haberton. Space 8½.

Equipment Corporation of America.—See W. F. Hebard. Space 181.

Eymon Crossing Company, Marion, Ohio.—Continuous-rail crossing. Represented by Byron E. Wilson, J. H. Eymon and A. C. Queen. Space 169½.

Fairbanks Company, New York City.—Gas engines; electric motors; power transmission appliances; machine tools; pumps; valves; unions; trucks; baggage wagons; railroad shop supplies. Represented by N. Lansing DeLong, F. H. Kilberry, A. J. Richardson, David Hamilton, S. N. Connally, W. A. Richards, F. E. Baumann and W. J. McDowell. Spaces 137 and 138.

Fairbanks, Morse & Co., Chicago.—Oil engines; motors and generators; pumps; motor cars; scales and locomotive water cranes. Represented by E. Lang, H. E. Vogel, G. J. Akers, J. C. Ferguson, M. J. Kochendorfer, E. J. Coverdale, F. M. Gardner, F. M. Condit, A. A. Taylor, Stephen Smith, J. L. Jones, E. E. Pendray, F. P. Drinker, J. C. Flanagan, E. C. Golladay, L. H. Matthews, D. K. Lee, B. S. Spaulding, C. B.

Skelton, C. H. Wilson, J. T. Frame, G. Howard and F. J. Lee. Spaces 73, 74, 75, 76, 92, 93, 94 and 95.

Fairmont Gas Engine and Railway Motor Car Company, Fairmont, Minn. Model motor; roadmaster's inspection car; section motor cars; power decks complete with ball-bearing motors; motor car outfits. Represented by H. E. Wade, W. F. Kasper, H. M. Starrett, H. D. Fitz and John P. Dunning. Spaces 41, 42 and 43.

Federal Signal Company, Albany, N. Y.—Electric interlocking machine; electric switch machine; alternating current signals; direct current signals; alternating current and direct current relays and indicators; interlocked circuit controller unit for attaching to mechanical machines; switch circuit controllers with and without self-centering devices. Represented by Paul Renshaw, M. R. Briney, C. N. Beckner, A. T. Carter, Carl Henze, D. R. Morris, W. H. Reichard, S. J. Turreff, F. E. Whitcome and H. E. Ware. Spaces 47 and 48.

Federal Sign System (Electric), Chicago.—Electric railway lanterns; electric sirens; removable fuses. Represented by H. W. Neal, O. S. Burke and F. T. Baird. Space 169.

Frog, Switch & Manufacturing Company, Carlisle, Pa.—Manganese insert frogs. Represented by R. S. Hays, L. E. Weidman, W. H. Dotter and W. L. Jackson. Space 190.

General Electric Company, Schenectady, N. Y.—Automatic arc welding equipment; portable arc welding set; turbo generator headlight sets; rivet heating machine; battery charging switchboard; lead burning transformer. Represented by John Roberts, H. W. Stewart, H. M. Jacobs, C. C. Bailey, B. C. Tracy, P. O. Noble, L. W. Shugg, F. P. Jones, F. L. Hughes, C. Dorticos, W. M. B. Brady, W. T. Wagner and G. R. Bunn. Spaces 35, 36 and 37.

General Railway Signal Company, Rochester, N. Y.—Signal mechanism; position light signal; switch machine; direct current and alternating current relays and indicators; universal clockwork time contractor; mechanical time lock; adjustable track impedance; transformers; circuit controllers; lightning arresters. Represented by S. M. Day, A. C. Holden, F. W. Moffett, H. W. Lucia, F. L. Dodgson, W. K. Howe, J. E. Stephenson, W. R. Young, W. S. Henry, S. G. Johnson, S. N. Wight, M. Wuerpel and L. Thomas. Spaces 49 and 50.

Gilbert & Barker Manufacturing Company, Springfield, Mass.—Gasoline and oil storage systems; self-measuring and non-measuring hand pumps and power pumps; underground tanks and first-floor outfits. Represented by J. E. Ham. Space 144.

Gosso Company, Chicago.—Beds and camp outfits. Represented by A. E. Gosso, L. Jensen and T. B. Harned, Jr. Space 188.

Gould Storage Battery Company, Chicago.—Batteries for various uses; submarine cell; turbo generator for locomotive headlight service. Represented by Geo. R. Berger, M. R. Shedd and M. E. Pipkin. Spaces 157 and 157½.

Graver Corporation, East Chicago, Ind.—Water softeners, filters and steel tanks. Represented by W. R. Toppan, John J. Felsecker. Spaces 96 and 97.

W. & L. E. Gurley, Troy, N. Y.—Engineering and surveying instruments; hydraulic engineering instruments; standard precision weights and measures. Represented by H. M. Dibert and C. H. Smart. Space 69½.

Hall Switch & Signal Company, Garwood, N. J.—Automatic electric signals; relays; switch controllers. Represented by W. J. Gillingham, H. W. Wolff, J. A. Ritter, H. L. Hollister, C. G. Harwig, O. S. Field and O. B. Frink. Spaces 85 and 86.

Hatfield Rail Joint Manufacturing Company, Macon, Ga.—Rail joints and joint and crossing fastenings. Represented by Walter T. Johnson and Roswell A. Merritt. Space 166½.

Hayes Track Appliance Company, Richmond, Ind.—Derails. Represented by S. W. Hayes, R. W. Slautterback, W. Harding Davis, F. C. Stowell, H. G. Hersh, H. D. McCafferty, H. J. Mayer, P. I. Harris, O. M. Kendall, R. H. Gausepohl and S. E. Eikenberry. Spaces 140 and 141.

Hazard Manufacturing Company, Wilkes-Barre, Pa.—Rubber insulated signal wire; cables; steel tape armored cables; wire rope. Represented by Wm. S. Hart, Harry B. Pflasterer, Geo. P. Cady, J. E. Pickering, Thos. A. Keefe, Leroy W. Allen and Carl P. Brodhun. Spaces 18 and 19.

W. F. Hebard & Co., Chicago.—Electric industrial trucks; dumping hopper bodies; freight house and shop trailer; battery charging equipment. Represented by W. F. Hebard, E. A. Thiele, E. W. Geisler, A. C. Sloss, E. M. Abramson, A. W. Evans, W. R. Englehart, J. J. Tuite, L. D. Stocking, Chas. Gordon, B. C. Hooper, E. W. Winter, M. A. Wallace, W. C. Dyer, A. R. Dyer, C. H. Conrad, H. K. Hutton, C. W. Judd, A. F. Aird, W. V. Lewis, R. H. Dempcy, E. E. Johnson, Chas. A. Dunn, C. E. Drury, A. D. Renner, C. G. Landes, S. W. R. Dally and Wm. Oliver. Spaces 181, 182 and 183.

Hubbard & Company, Pittsburgh, Pa.—Track tools and shovels. Represented by J. V. Smith, S. W. White, W. H. Remmel, S. F. Remmel and O. W. Youngquist. Space 143.

Hyatt Roller Bearing Company, New York City.—Large bearing model; sample bearings; Hyatt equipped test cars; oiling models. Represented by M. F. Lawrence. Space 118.

Imperial Belting Company, Chicago.—Conveyor and elevator belting; transmission belting. Represented by A. G. Pickett, D. La Jennings, B. C. Hooper, E. H. Willard, E. A. Woodworth, W. G. Willcoxson and W. D. Otter. Space 189.

Ingersoll-Rand Company, New York City.—Portable pneumatic tie tamping outfits and other air appliances applicable to track work. Represented by W. H. Armstrong, Chas. Dougherty, J. N. Thorp, Jr., C. Stanley Kulp and C. W. Melcher. Spaces 206 and 209.

H. W. Johns-Manville Company, New York City.—Expander rings; air-brake cylinder packing cups; molded cup for power reverse gear; molded brake cylinder gaskets; magnesia lagging; pipe coverings; mastic flooring; asbestos shingles; built-up and ready-to-lay roofings; asbestos wood; asbestos sheet millboard; flexible pipe covering; high temperature cement; boiler wall coating; fibre conduit; insulating cements; fuses; fire extinguishers; friction tapes and splicing compounds; insulation; hair felt; brake blocks and brake band lining; steam traps; miscellaneous packing materials. Represented by J. E. Meek, G. A. Nicol, J. C. Younglove, H. Flannagan, F. W. Doty, C. D. Biggerstaff, R. A. Hamaker, W. J. Hennessy, F. J. Horne, H. L. Leach, C. E. Murphy, H. G. Newman, H. B. Sewell, J. H. Trent. Spaces 174, 175, 176 and 177.

Jones & Laughlin Steel Company, Pittsburgh, Pa.—Reception booth. Represented by R. J. Stayman, E. D. Batchelor, J. T. Reiplinger, Robert Geddes, R. M. Kilgore and M. A. Blessing. Space 51.

O. F. Jordan Company, East Chicago, Ind.—Ballast spreader and attachments. Represented by Walter J. Riley, R. E. Bressler and Joseph A. Adley. Spaces 56 and 57.

Kaustine Company, Inc., Buffalo, N. Y.—Standard toilet equipment. Space 29.

Kalamazoo Railway Supply Company, Kalamazoo, Mich.—Gas motor cars; Moore drills; Jackson electric tampers; electric rock drills; Jackson electric valve grinders. Represented by J. McKinnon, D. A. Stewart, T. E. McAllister, H. R. Miller, C. E. Jackson, N. C. Study, W. N. Sidnam, W. E. Winterle, E. L. Shepherd and T. L. Mason. Spaces 22-23-24-25.

Kelly-Derby Company, Inc., Chicago.—Kaustine waterless toilets; septic tanks; warehouse trucks. Represented by C. W. Kelly, Chas. F. Smale, Jr., O. K. Fischer, W. B. Holcomb, David Evans, R. S. Bunzey, J. H. Fotheringham and F. B. Shalters. Spaces 11, 29 and 30.

Kerite Insulated Wire & Cable Company, Inc., New York City.—Insulated wire and cable. Represented by Azel Ames, P. W. Miller, J. W. Young, J. A. Renton, B. L. Winchell, Jr., G. A. Graber, J. A. Hamilton, W. H. Fenley and C. A. Reeb. Spaces 68 and 69.

Keystone Grinder and Manufacturing Company, Pittsburgh, Pa.—Tool grinder and attachments. Represented by S. S. Newman and John Wincrantz. Space 193.

Kilbourne & Jacobs Manufacturing Company, Columbus, Ohio.—All steel, automatic, air-dump car. Represented by Jess Mossgrove and S. T. Scofield. Space 145.

Lackawanna Steel Company, Lackawanna, N. Y.—Rail joint plates; safety head angle bars; deseamed rail; hook shoulder tie plates; steel sheet piling; track bolts and nuts. Represented by G. O. Benson, F. E. Abbott, E. J. Wetter, Jay L. Hench, C. H. Hobbs, G. A. Hagar, C. M. Cuthbert, Wm. Breeden, D. S. Wright and W. M. Petrie. Spaces 33 and 34.

Lehon Company, Chicago.—Car roofing; coach roofing; built-up roofing; asphalt shingles and roll roofing. Represented by Chas. V. Eades, Tom Lehon and H. M. Voss. Space 109.

Liberty Steel Products Company, Inc., New York City.—Lift trucks; pulsometer pumps; solid truss brakebeams; sectional steel buildings. Represented by J. M. Borrowdale, A. W. Preikschat, F. A. Mote, C. D. Flood, W. E. Fowler, Jr., W. P. Behen, T. L. Lawry, S. W. Midgley and J. W. Weinland. Spaces 201, 202, 203 and 204.

Chas. R. Long, Jr., Company, Louisville, Ky.—Paint, paint films and test panels. Represented by Chas. R. Long, Jr., Harry Vissering, Samuel W. Russell, G. S. Turner, J. M. Monroe, W. H. Heckman and F. G. Zimmerman. Space 89½.

Lundie Engineering Corporation, New York City.—Tie plates. Represented by John E. Lundie, C. Z. Moore, W. Brooke Moore and Eugene Brandeis. Space 145.

Lufkin Rule Company, New York City.—Measuring tapes and rules. Represented by G. C. McBeth, Theodore Young and Fred Hollingworth. Space 121.

Luther Grinder Manufacturing Company, Milwaukee, Wis.—Hand and foot power grinders; bonding, flat and twist drills;

sharpening attachments. Represented by K. D. Begeman. Space 208.

M. W. Supply Company, Philadelphia, Pa.—Switch heaters; rail benders; guard rail clamps and tie plate guard rail fasteners. Represented by David L. Vaughan and Chas. Z. Vaughan. Space 101.

Macomber & Whyte Rope Company, Kenosha, Wis.—Wire rope. Represented by George S. Whyte, Jessel S. Whyte, M. H. Needham, H. F. Gerling. Space 90.

McRae's Blue Book Company, Chicago.—McRae's Blue Book. Represented by Thomas H. MacRae, Leroy Rollins, Lloyd Simonson, Clyde Hill, Francis O. Rice and Jos. A. Walsh. Space 9½.

Madden Company, Chicago.—Three-men rail laying machine; derrick truck car; ballast screen; switch point straightener; blue flag derail; tie spacer; steel fence post; unloading hooks; rail brace. Spaces 194 and 195.

Magnetic Signal Company, Los Angeles, Cal.—Highway crossing signal. Represented by M. S. Morse. Space 7.

Massey Concrete Products Corporation, Chicago.—Battery box; culvert pipe; hollow concrete poles; concrete crossing planks; battery cellar. Represented by F. V. Shannon, C. E. Gilman, B. F. Landers, J. E. Moody, Paul Kircher, J. A. Higgs, Jr., C. H. Hunsaker, P. E. Longstreet, G. H. Redding, H. W. Wilder, E. C. Alexander and D. B. Hanna. Spaces 54 and 55.

Mercury Manufacturing Company, Chicago.—Storage battery industrial tractors; freight house trailers. Represented by John R. Bensley and L. R. Millar. Spaces 115 and 116.

Midvale Steel & Ordnance Company—Cambria Steel Company, Philadelphia, Pa.—New form of truck and a miscellaneous showing of hollow and solid axles, crank pins, piston rods, tie plates, steel ties and tool steels. Represented by John C. Neale, J. C. C. Holding, George E. Thackray, G. A. Richardson and Ralph V. Sage. Spaces 71½ and 72.

Miller Train Control Corporation, Danville, Ill.—Full size instrument and equipment attached to engineer's air valve, working under air pressure, also full size instrument and shoe milled out in sections. Represented by H. B. Miller, W. A. Nininger, E. Murray and W. B. Murray. Spaces 197 and 197½.

Monroe Calculating Machine Company, New York City.—Calculating machines. Represented by Henry H. Doty and R. W. Peck. Space 9.

Mudge & Company, Chicago.—Motor cars. Represented by Burton Mudge, Robert Sinclair, Karl Eklund, Sherman Amsden, Albert Force, Arthur Pearson, Clyde Benning, Jean Vanatta, Frank De Brun, Fay Posson, William Ross, Lloyd Stratton, Wallace Baker, John Mulholand, Karl Leedom, Roy Borden, Loren Buchanan, Charles Mudge, William Behlke, V. Pagett. Space 127.

National Boiler Washing Company, Chicago.—Hot water locomotive boiler washing and refilling systems. Represented by Spencer Otis, Frederick A. Gale, H. L. Hilleary, F. S. Wichman, J. S. Maurer and F. W. Gale. Space 8.

National Carbon Company, Inc., Cleveland, Ohio.—Signal cells; dry cells; carbon brushes; flash lights; carbon specialties. Represented by W. H. Arkenburgh, R. J. Cox, R. W. Erwin, D. H. Green, I. J. Kelly, C. S. Pflasterer, W. R. Pflasterer, P. G. Pendorf, A. E. Pratt, L. R. Rhoads, M. D. Rees, W. A. Sisler, J. M. Spangler, W. G. Waitte. Spaces 150, 150½ and 151.

National Indicator Company, Inc., Long Island City, N. Y.—Train indicators. Represented by M. E. Penso. Space 156.

National Lead Company, New York City.—Red and white lead in oil. Represented by F. M. Hartley, A. H. Sabin and A. L. Laraque. Space 113.

National Lock Washer Company, Newark, N. J.—Lock washers. Represented by J. Howard Horn, F. B. Archibald, A. T. Thompson and R. L. Cairncross. Space 192.

National Malleable Castings Company, Cleveland, Ohio.—Malleable iron rail braces; tie plates; rail anchors; washers and budge-pin nuts and wrecking hook. Represented by T. W. Aishton, R. T. Hatch, C. H. Krakan and L. S. Wright. Space 102.

National Surface Guard Company, Chicago.—Cattle guards; rail saws; tie tongs. Represented by C. C. Zimmerman, C. F. Hately and F. C. Worth. Space 211.

National Water Main Cleaning Company, New York City.—Sections of incrusted water mains before cleaning. Represented by Burt B. Hodgman. Space 172.

Geo. P. Nichols & Bro., Chicago.—Electric turntable tractor; model of electric transfer table. Represented by Geo. P. Nichols, and S. F. Nichols. Space 173.

North American Engine Company, Algona, Ia.—Inspection car; general duty car; cutaway engine; post hole digger. Represented by J. Edward Murphy, H. C. Adams, E. A. Adams, C. H. Cretzmeyer, C. W. Nicoulin and Geo. W. Wilson. Spaces 196 and 196½.

Ogle Construction Company, Chicago.—Models and photographs of coaling stations and coaling station machinery. Represented by R. A. Ogle, M. W. Powell, J. G. Forster and C. F. Bledsoe. Spaces 12 and 31.

The Ohio Brass Company, Mansfield, Ohio.—Gas weld rail bonds. Represented by W. P. Bovard. Space near 186 and 191.

Okonite Company, Passaic, N. J.—Insulated signal wires and cables. Represented by J. D. Underhill, J. W. Hackett, W. R. Van Steenburgh, J. L. Phillips, F. J. White, Albert McNeil, R. N. Baker and J. N. Lorenz. Space 16.

O'Malley-Beare Valve Company, Chicago.—Globe, angle and check valves; gauge cocks; blow-off cocks; Perfection boiler checks; drain cocks and special locomotive valves. Represented by Thomas O'Malley, Edward O'Malley, J. E. Brown, J. N. Gallagher and J. M. Pigott. Space 114.

Oxweld Railroad Service Company, Chicago.—Welding and cutting equipment; rail cutting device; sample welded reclaimed frogs; sample welded reclaimed switch points; sample welded reclaimed parts of switch stands. Represented by G. M. Crownover, Wm. Leighton, J. P. Furbeck, H. W. Schulze, A. N. Lucas, L. C. Ryan, W. H. Kofmehl and I. Allison. Space 10.

P. & M. Company, Chicago.—Rail anti-creepers; bond wire protectors. Represented by F. A. Poor, P. W. Moore, F. A. Preston, F. N. Baylies, D. T. Hallberg, S. M. Clancey, P. H. Hamilton, G. E. Johnson, J. E. Mahoney, John Reagan, W. H. Reaues, L. S. Walker and John Ritchie. Spaces 122 and 123.

Page Steel & Wire Company, New York City.—Line wire; bond wires; strand, fence, welding wire. Represented by W. T. Kyle, W. H. Bleecker, C. A. McCune, Chas. L. Bennett and E. J. Flood. Spaces 81 and 82.

Peyton Safety Rail Joint Company, Centralia, Ill.—Rail joint. Represented by W. Perry, C. W. Witwer, L. H. Jonas, Wm. Cox and J. H. Melteberger. Space 172½.

Pittsburgh-Des Moines Steel Company, Pittsburgh, Pa.—Steel railway water tanks. Space 83.

Pocket List of Railroad Officials, New York City.—Pocket list of railroad officials. Represented by J. Alexander Brown, Harold A. Brown, Charles L. Dinsmore. Space 26.

Positive Rail Anchor Company, Marion, Ind.—Rail anchors; switches; girder guard rail, rail braces; guard rail braces; plates; tie plates. Represented by A. H. Told, L. C. Ferguson, E. A. LeBeau and B. B. Betts. Spaces 178, 179 and 180.

Protective Signal Manufacturing Company, Denver, Colo.—Approach lighting devices; wig-wags; crossing bells; oscillators; relays; time units; annunciators; solenoid switches, etc., for railway crossing protection. Represented by W. E. Wegner and A. E. Bacon. Space 17.

Pyrene Manufacturing Company, Chicago.—Fire extinguishers; wheeled chemical engines; safety devices. Represented by Jirah D. Cole. Space 186.

Pyro-Non Paint Company, Inc., New York City.—Fire-retardent paint for warehouses, station buildings, etc. Represented by G. F. Johnston. Space 160½.

Q. and C. Company, New York City.—Rolled steel step joints, rail joints; derails; guard rail clamps; snow melter; car and engine replacers and clamps; rail benders. Represented by F. F. Kister, R. J. McComb, E. M. Smith, L. T. Burwell, J. L. Terry and E. R. Packer. Spaces 120 and 139.

Rail Joint Company, New York City.—Standard joints; step joints; insulated joints; frog and switch joints; girder joints. Represented by V. C. Armstrong, W. P. Thomson, B. Wolhaupter, E. A. Condit, Jr., J. A. Greer, McLeod Thomson, E. L. Van Dresar, F. C. Webb, Alex Chapman, R. W. Payne, E. F. Schermerhorn, W. S. Boyce, R. R. Seward, C. B. Griffin, H. C. Hickey, C. Jenkinson, G. T. Willard, J. N. Meade and G. H. Larson. Spaces 79 and 80.

Railroad Herald, Atlanta, Ga.—Copies of the Railroad Herald. Represented by E. C. Laird. Space 165½.

Railroad Supply Company, Chicago.—Tie plates; derailers; wig-wag signals; crossing bells; relays; lightning arresters; annunciators; relay boxes; signs; electric measuring instruments. Represented by E. H. Bell, H. M. Buck, Paul W. Kohnen, H. G. Van Nostrand, M. J. Fox, A. H. Smith, E. P. Gowing, Geo. W. Nibbe, T. W. Nicholson, Geo. J. Schmitt, Jr., and F. M. Hill. Spaces 104 and 105.

Railway Review, Chicago.—Railway publications. Represented by Willard A. Smith, Harold A. Smith, A. E. Hooven, Chas. L. Bates, L. H. Lozier and J. T. Forbes. Space 44.

Ramapo Iron Works, Hillburn, N. Y.—Complete manganese reinforced switch with double locking switch stand; automatic safety switch stands; guard rail clamps; adjustable guard rail tie plate clamp; double shoulder solid bottom switch riser plates; adjustable rail brace. Represented by Thomas E. Akers, J. Edgar Davidson, R. J. Davidson, Jr., W. C. Kidd, William Wait Snow and James B. Strong. Spaces 109½ and 110.

Reade Manufacturing Company, Hoboken, N. J.—Herbicides and equipment for their application. An auxiliary exhibit in the form of a moving picture showing at The Play House, 1410

Michigan Boul. Represented by R. A. Bogle and A. W. Barnard. Space 191.

Reading Specialties Company, Reading Pa.—Car replacer; guard rail clamp; rail benders; compromise or step joint. Represented by J. Turner Moore, M. G. Moore, J. J. O'Connell and W. J. Zimmerman. Space 91.

Revert Sectional Tie Company, Reno, Nev.—Model and blue prints of a sectional tie. Represented by C. F. Stevens. Space between 186 and 191.

Richards-Wilcox Manufacturing Company, Aurora, Ill.—Engine house door; freight house door; lift doors, etc. Represented by A. J. Eggleston, J. H. Wise and T. G. Perry. Spaces 170, 170½ and 171.

Roadmasters and Maintenance of Way Association, Sterling, Ill. Spaces 222-227.

Roberts & Schaefer Company, Chicago.—Locomotive coaling plants; gravity sand plants; railroad cinder handling plants. Represented by Clyde P. Ross, Edward E. Barrett, H. S. Shimizu and John J. Roberts. Space 89.

Safe Lock Switch Machine Company, Lexington, Ky.—Switch machine. Represented by C. F. Jones, D. M. Case and A. W. Wilson. Space 168½.

Sellers Manufacturing Company, Chicago,—Wrought iron tie plates. Represented by J. M. Sellers, R. A. Van Houten, G. M. Hogan, T. D. Crowley and R. J. Platt. Space 124.

Signal Accessories Company, New York City.—Signal material. Represented by F. C. Lavarack, O. S. Flath and J. R. Creegan. Space 119.

Simmons-Boardman Publishing Company, New York City.—Railway publications, Railway Age, Railway Maintenance Engineer, Railway Signal Engineer, Railway Mechanical Engineer, Railway Electrical Engineer, Car Builders' Dictionary, Locomotive Dictionary. Represented by R. V. Wright, E. T. Howson, J. G. Little, F. W. Lane, T. E. Crossman, W. S. Lacher, C. B. Peck, K. E. Kellenberger, C. H. Parkes, E. R. Lewis, L. B. Sherman, F. H. Thompson, C. R. Mills, R. H. Smith, H. H. Marsh, F. S. Dinsmore, F. C. Koch, M. Moore, H. H. Skewes, L. R. Wolff, E. A. Lundy, B. J. Wilson, J. C. Marsh, C. H. Gabriel, Jr., B. W. Meisel, W. F. Rench, J. M. Rutherford and A. E. Aveyard. Space 46.

T. W. Snow Construction Company, Chicago.—Water and oil cranes. Represented by T. W. Snow and Barton Snow. Space 50½.

Southern Pine Association, New Orleans, La.—Southern pine trusses; southern pine creosoted tank; lumber density charts; slide machine; Southern pine literature. Represented by T. P. Johnston. Space 204.

Southern Railway Supply & Equipment Company, St. Louis, Mo.—Car stopper. Represented by Laurance Boswell. Spaces 161, 162 and 162½.

Squire-Cogswell Company, Chicago.—Non-freezing hydrants for coach yards, cinder pits, stock yards and station grounds; freight house fire hydrants; kerosene track thawing outfits. Represented by W. S. Squire and C. P. Cogswell. Space 159.

Standard Asphalt and Refining Company, Chicago.—Mineral rubber asphalts; mineral rubber floors. Represented by R. F. Trumbull, Chas. Muller, E. L. Hedrick, E. K. Carter, C. L. Gauthier, E. P. Shipley, G. A. Thornton, H. C. Riehle and E. W. Krueger. Spaces 163, 163½ and 164.

Steel Sales Corporation, Chicago.—Copper clad steel wire; monel metal. Represented by C. B. Semple, W. S. Krenz, H. B. Dickinson and W. J. Kirk. Space 202.

Sullivan Machinery Company, Chicago.—Air lift pumps and booster; air compressors; hammer drill; angle compound compressor. Represented by Jos. H. Brown, John Oliphant, R. E. C. Martin and J. A. Pikulski. Spaces 203 and 213.

Templeton, Kenly & Company, Inc., Chicago.—Square and round socket track jacks; square and round socket car jacks; locomotive jacks; emergency and pole pulling jacks; industrial and general service jacks. Represented by W. B. Templeton, H. B. Burlow and R. S. McLeod. Space 32.

Thompson Signal Company, Los Angeles, Cal.—Automatic flagman. Represented by A. F. Hannaford and E. J. Pace. Space 184.

Toledo Scale Company, Toledo, Ohio.—Automatic scales. Represented by H. O. Hem, C. H. Hapgood and F. V. Waltz. Spaces 4 and 5.

Track Specialties Company, New York City.—Guard rail clamp; anchor plate; compromise rail joint guard rail brace; derailer; rail joint; rail bender; tie plates; rail braces. Represented by W. B. Lee. Space 205.

Train Control Appliance Company, El Paso, Tex.—Train control machine. Represented by M. B. Bulla. Space 164½.

Torchweld Equipment Company, Chicago.—Oxy-acetylene welding and cutting apparatus. Represented by C. J. Nyquist and W. A. Slack. Space 149.

Union Switch and Signal Company, Swissvale, Pa.—Switch valve and circuit controller, with motion plate; semaphore and light signals; relays; switch circuit controller; crossing bell; clockwork time release; resistor; switch and lock movement. Represented by W. P. Allen, C. R. Beall, G. A. Blackmore, W. H. Cadwallader, R. Clayburn, J. P. Coleman, J. J. Cozzens, Aaron Dean, S. E. Gillespie, H. W. Griffin, J. S. Hobson, L. F. Howard, A. L. Humphrey, J. L. Loucks, Geo. Marloff, H. McCready, W. P. Neubert, J. D. Roett, J. E. Saunders, H. R. Sheene, C. S. Snavely, V. K. Spicer and W. W. Talbert. Spaces 66 and 67.

U. S. Wind Engine & Pump Company, Batavia, Ill.—Water columns and accessories; water supply devices; valves; model of railroad water tank; steel sub-structure, and tank spout, valve and fixtures; switch stands and switch-stand semaphores, double acting railway pumps. Represented by L. E. Wolcott, C. E. Ward, J. P. Prindle, E. B. LaSalle and F. E. Pearson. Spaces 111 and 112.

U. S. Light & Heat Corporation, Niagara Falls, N. Y.—Electric arc welders; portable, stationary and gas-driven car-lighting equipment; signal batteries. Represented by H. A. Mathews, Ed C. Wilson and H. A. Morrison. Spaces 185 and 185½.

Verona Tool Works, Chicago.—Track tools; nut locks; rail joint springs and bonding strips; portable milling machine Represented by H. S. Paul, E. Woodings, H. C. Mull, E. L. Ruby, W. B. Lewis and A. T. Palmer. Spaces 129 and 148.

Volkhardt Company, Inc., Stapleton, N. Y.—Water hydrants. Represented by Wm. Volkhardt. Space 160.

Walls Frogless Switch & Manufacturing Company, Kansas City, Mo.—Continuous rail frog. Represented by C. E. Ennis, G. W. Humphrey and O. Leamon. Spaces 219, 219½ and 220.

Waterbury Battery Company, Waterbury, Conn.—Primary batteries. Represented by E. E. Hudson, G. A. Nelson, S. J. Hough and G. S. Gannt. Space 38.

Wayne Oil Tank & Pump Company, Fort Wayne, Ind.—Oil storage systems; oil burning systems; oil filtration systems; metal forging; metal melting and metal heat treating systems. Represented by S. D. Rickard, Carver Wood, R. E. Langston, F. J. Panot, Stephen Malatesta and Edwin Arnold. Space 15.

Western Electric Company, Inc., New York City.—Telephone train dispatching equipment; floodlights; train lighting lamps; heavy duty plugs and receptacles; miscellaneous supplies. Represented by George Hull Porter, E. V. Adams, O. C. Danielson, E. B. Elliott, T. J. Rider, Bob Evans, W. O. Turtle, Walter S. Shawvan, Oscar Lepper, R. D. Eves, A. L. Frankenberger, J. P. Casey, Wm. Lancaster, E. Kearns, H. C. Olmstead, R. M. Campbell and A. L. Crater. Spaces 58 and 59.

Wm. Wharton, Jr., & Company, Inc., Easton, Pa.—A.R.E.A. stiff frog; solid manganese steel frogs; manganese track society standard railbound manganese frog; manganese tipped switch points; insulated and adjustable switch rods; guard rail clamps; miscellaneous switch fittings. Represented by Victor Angerer, Charles M. Griffith, H. F. McDermott, S. G. Llewellyn and J. H. Hock. Spaces 200 and 215.

Wheaton & Probasco, Ionia, Mich.—Metal railroad tie. Represented by V. B. Wheaton and C. R. Probasco. Space 207.

Woolery Machine Company, Minneapolis, Minn.—Light-weight engines and railway motor cars. Represented by H. E. Woolery. Space 210.

The Wyoming Shovel Works, Wyoming, Pa.—Track shovels. Represented by H. T. Potter, G. E. Geer, H. C. Emery, C. H. Broward, Wm. H. Ziegler and J. W. Foyle. Space 103.

Coliseum Open This Evening

The Coliseum will be open until 11 o'clock this evening, this being the only evening during the exhibit of the National Railway Appliances Association that it will not close at 6:30. No program is scheduled at the Congress by either the American Railway Engineering Association or the Signal division of the American Railroad Association, so that many railway men will make it a point to make a thorough study of the exhibit without neglecting the sessions of the conventions.

Large Bridge Contract

The Philadelphia & Reading has awarded a contract to the Smith McCormick Company, Easton, Pa., for the construction of a double track concrete arch bridge across the Susquehanna river at Harrisburg. This bridge will be 3,500 ft. long and will consist of 46 arches. It will replace an existing single track bridge.

New Signal Division Committee Chairmen

The Assignment of New Work and Changes in Personnel Result in Appointment of Five New Men

FIVE MEMBERS appear as new chairmen of committees in the 1920 Signal division committee assignments. Samuel Miskelly, signal construction engineer, Chicago, Rock Island & Pacific, was appointed chairman of Committee No. 2—Mechanical Interlocking; J. C. Mill, signal engineer, Chicago, Milwaukee & St. Paul, was appointed chairman of Committee No. 14—Lightning Protection; J. M. Carley, signal estimator, valuation department, Boston & Albany, was appointed chairman of Committee No. 15—Valuation; I. S. Raymer, assistant signal engineer, Pittsburgh & Lake Erie, was appointed chairman of Committee No. 16—Oils; and John Leisenring, signal engineer, Illinois Traction System, was appointed chairman of Committee No. 17—Pole Lines.

Some changes were made in committee numbering in 1920. In 1919, Committee No. 15—Signaling Requirements for Electric Railways, was dropped and this number was assigned to the new Valuation Committee which was appointed subsequent to the amalgamation of the Railway Signal Association with the American Railroad Association. Committee No. 16—Harmonizing, was consolidated in 1919 with Committee No. 1—Editing, and No. 16 was assigned to the Committee on Oils. Committee No. 17—Nominations, was dropped in 1919, and this number was assigned to the new committee on Pole Lines. With the above exceptions the committee numbering remains the same as during 1919.

I. S. Raymer — Samuel Miskelly — J. Leisenring

J. C. Mill — J. M. Carley

New Signal Division Committee Chairmen

Samuel Miskelly

Samuel Miskelly, the new chairman of Committee No. 2—Interlocking, has been an active member of the Railway Signal Association and the Signal division of

the American Railroad Association for a number of years. He succeeded C. J. Kelloway, superintendent of signals, Atlantic Coast Line, who was elected chairman of the Signal division for this year. Mr. Miskelly is well qualified to head Committee No. 2, since he has served continuously on this committee for the past nine years, and since 1916 as vice-chairman. Besides his work on this committee he also served as a member of the special committee on Storage Batteries in 1910. Mr. Miskelly brings with him as chairman of Committee No. 2 an extensive experience in signal work. He began his career in November, 1899, with the Union Switch & Signal Company. About two years later he resigned to enter the service of the Chicago & Western Indiana, but only remained with that company until November of the following year, when he was appointed signal foreman on the Chicago, Rock Island & Pacific. Since that time he has worked up through the various positions in the signal department to that of signal construction engineer for the system, which is the position he now holds.

As chairman of Committee No. 2, it will be the duty of Mr. Miskelly to direct the preparation of important specifications for adoption by the Signal division, among which are the specifications for mechanical interlocking machines of the improved Saxby & Farmer and the Stevens type, also specifications for electro-mechanical interlocking machines having improved Saxby & Farmer and Stevens locking. It is also the duty of the committee to prepare specifications covering different classes of work which would ordinarily be assigned to such a committee, such as those for mechanical connections and for various classes of concrete work as concrete foundations; concrete trunking; concrete bell posts and concrete relay posts.

J. C. Mill

J. C. Mill, as chairman of Committee No. 14—Lightning Protection, brings to the committee an extensive knowledge extending over a number of years covering investigations of this character. He has served continuously as vice-chairman on this committee since 1914, when it was appointed as a special committee to investigate lightning protection. In 1918 this special committee was assigned the number by which it is now identified. In addition to his work on this committee, Mr. Mill was a member of Committee No. 4—Automatic Block Signaling, in 1913, and in 1916 and 1917 he served as a member on the Board of Direction of the Railway Signal Association. Besides being made chairman of Committee No. 14, he was also appointed a member of Committee No. 8—Alternating Current Automatic Block Signaling.

It is the duty of this committee to prepare a report on methods of protecting signal apparatus against lightning and to also draw up specifications for lightning arrester grounds, considered an important part in any scheme of lightning protection adopted for signals. Mr. Mill's qualifications to handle such work is based on his experience in signal engineering. He was chief draftsman in the signal department of the Chicago, Milwaukee & St. Paul from 1901 to 1909, when he was appointed signal inspector; in 1912 he was promoted to assistant signal engineer, from which position he advanced to that of signal engineer of the system, on August 1, 1913.

J. M. Carley

Committee No. 15—Valuation is headed by J. M. Carley, who has had extensive experience in valuation work, dating from 1910. That the Valuation Committee is destined to be one of the most important committees of the Signal division is evident from the important bearing placed upon valuation in the transportation act approved February 28, returning the railroads to their owners. Mr. Carley's experience in various branches of railroad work since 1892 fit him for directing the work of this committee, of which he was appointed chairman in December, 1918. Mr. Carley entered railway service on the Lehigh Valley 28 years ago, as a helper and telegraph operator, resigning on November 1, 1899, to enter the service of the Buffalo, Rochester & Pittsburgh as relief agent and station agent. About two years later he went with the New York Central & Hudson River at Buffalo, N. Y., as relief signalman. Subsequently he served as draftsman and signal maintainer, and in 1911 he was transferred to the signal engineer's office at Albany, N. Y. During the previous year, however, he served as one of the seven inspectors who assisted in making a tentative physical valuation on the New York Central taken that year. Later Mr. Carley was employed successively as draftsman, circuit draftsman, office inspector and field inspector in connection with signal improvements on the New York Central from 1913 to 1917. In May of the latter year he was transferred to his present position as signal estimator on the Boston & Albany, with headquarters at Boston.

As chairman of the Valuation Committee it will be the duty of Mr. Carley to direct the preparation of a report on the federal Bureau of Valuation's method of applying depreciation and report on the average service life in years of the important units of the different types of signal installations. In addition to this work the committee is instructed to prepare a table for the different types of signal installations which will show the percentage of materials to be added to cover miscellaneous materials not inventoried and loss and waste in construction. Another duty of this committee is to prepare a typical construction program which will include the various types of interlocking and automatic signals and other signal apparatus for single track, double track, three track, and four track railroads; and also continue the study of the work of the Joint Signal Committee of the President's Conference Committee and the Bureau of Valuation of the Interstate Commerce Commission regarding labor costs to establish a percentage to be added to materials in order to arrive at the total cost of an installation.

I. S. Raymer

In the past, too little attention has been paid to the importance of oils in signal department work, and I. S. Raymer as the new chairman of Committee No. 16—Oils, is charged with the preparation of methods for testing oils and the review of specifications for illuminating oils with a view to raising the standard requirements. In addition to this work Mr. Raymer, as head of the committee, will also direct the preparation of specifications for motor gasoline, lubricating oil and transformer oil.

Mr. Raymer began work with the Union Switch and Signal Company in 1898. The following year he resigned to enter the service of the Pittsburgh & Lake Erie, with which road he has since been continuously employed, and is now assistant signal engineer. In 1900, he became a member of the Railway Signaling Club, later the Railway Signal Association and now the Signal division of the American Railroad Association. Mr. Raymer has been actively connected with committee work in the Railway Signal Association and Signal division, having been identified with committee activities since 1907, when he was appointed a member of Committee No. 4—Storage Batteries. The following year he was transferred to Committee No. 3—Power Interlocking, on which he has since served continuously.

Four years ago he was appointed vice-chairman of Committee No. 3, serving in that capacity until he withdrew to become chairman of Committee No. 16—Oils. In 1917 and 1918 he served as a member of the Board of Direction of the Railway Signal Association, and since 1915 he has been chairman of the Pittsburgh Sectional Committee.

John Leisenring

As chairman of the new Committee No. 17—Pole Lines, Mr. Leisenring is well fitted to handle its work, because of his experience on other important committees of the Railway Signal Association and the Signal division which required an understanding of pole line requirements under conditions that would provide adequate service for the efficient operation of apparatus used in signaling. Mr. Leisenring first became active in signal associtaion matters in 1910, when he served as a member on a committee whose work involved the study of signaling for electric railroads. Two years later he became identified with a similar committee whose work involved electric railway and alternating current signaling, and from 1913, to and including 1919, he served on the special committee on signaling requirements for electric railways. In 1918 this special committee was designated as Committee No. 15, then in 1919 its work was discontinued. In 1917 he also became a member of Committee No. 1 (now Committee No. 10)—Signaling Practice, of which committee he is still a member. Last year he was also appointed on Committee No. 12—Contracts.

Mr. Leisenring's experience in the field of railway signaling began on January 1, 1903, when he entered the service of the Baltimore & Ohio. Shortly after, however, he severed his connection with railway work for a period of two years, during which time he was employed in the designing department of a manufacturing concern. He then returned to railway service in the engineering department of the Lehigh Valley, where he remained for about two years, following which he became assistant engineer of tracks and signals in connection with the construction of the Hudson River tunnels. Later he was promoted to signal engineer in charge of the design and installation of all signal work within the tunnel zone, which position he held until December, 1910, when he became signal engineer of the Illinois Traction system.

As chairman of the new committee 17—Pole Lines, it will be Mr. Leisenring's duty to supervise the preparation of specifications, in co-operation with the Telegraph and Telephone division of the A. R. A., and in conference with the committee of the A. E. R. A. on standard threads for pins and insulators.

Change in Office Location

The pre-emption of the rooms along the north side of the second floor of the hotel by the Wood campaign headquarters made necessary the removal of the offices of the secretary of the American Railway Engineering Association and the *Daily Railway Age* to the south or rear of the Florentine Room. The secretary's office is located in room 1120, while the *Daily Railway Age* has 1124 and 1128.

Track Committee Meets

The Track Committee of the American Railway Engineering Association met at the office of the secretary, 431 South Dearborn street, at 10 o'clock yesterday morning to consider unfinished work of the committee.

Mr. Hooley on the Railroads' Return

"ANNYTHING NEW?" inquired Mr. Dennissey, as he strolled into Mr. Hooley's place, more from the force of habit than in the expectation of any physical comfort the visit might afford.

"It's arl new, 'nd I can't git anny av it at that," replied Mr. Hooley, dryly. "If ye won't dhrink me long-distance from beer 'nd ye can't get annything else, what is it ye have on ye'er mind?"

"I was comin' along the sthreet," replied Mr. Dennissey, "whin I heard some min talkin' about the convintion av th' injineers ye towld me about last year, 'nd how that they'd be betwixt th' divil 'nd th' deep blue say, what wit' th' gov'mint toornin' th' roads back to thim 'nd wit' th' Amerycan Relrod Association thryin' t' adopt thim, 'nd all that. What d'ye think about it?"

"I think so," replied Mr. Hooley.

"Think what?" inquired Mr. Dennissey, thirsty as ever for information, among other things.

"How kin I till?" rejoined Mr. Hooley. "How do I know what I think? Here's th' Association av Relrod Injineers, 'tis now twinty-wan years old, I mind, 'nd it has gone along f'r thim twinty-wan years wit'out anny hilp fr'm th' gov'mint in th' way av littin' thim have spindin' money f'r th' wor-rk they had to do to kape th' relrods in wor-rkin' condition. Ye see, 'tis this way, Dinnissey," continued Mr. Hooley, warming up to his subject, but without his former artificial stimulant to lubricate the gearing of inspiration. "'Tis this way. Th' Intershtate Commerce Commission has control over th' rates th' relrods 's allowed to charge f'r haulin' freight 'nd passengers, 'nd wudn't lit thim raise their rates whin 'nd before th' Bawlshivviky in Yurrup 'nd this gellorious country shtarted up th' ruckus that brought owld H. C. L. among us as a perminint resident. T' make a long shtory short," continued Mr. Dooley, after a pause long enough to get his pipe drawing sonorously, "th' relrods was in a way like me father was 'n th' owld days, whin he was huntin' a big gray wolf, 'nd found th' wolf had choosed the same day f'r huntin' him. Th' wolf looked hungrier 'n me father thought he was at just that time, 'nd cud run faster.

"Will, all there was to it f'r me father was t' t'row away his gun, 'nd thin his Bennycoat, 'nd iverythin' he cud cut loose fr'm, 'nd run like th' divil was afther him, 'nd indade, he was."

"'Tis a good shtory," interrupted Mr. Dennissey, "but whativer's th' wolf shtory got to do wit' th' relrods 'nd th' gov'mint?"

"Ye're mind's wor-rkin' on its usual high gear," replied Mr. Hooley, with a touch of sarcasm. "Th' relrods has bin runnin' t' kape away fr'm th' high cost av runnin' thrains, 'nd has thrown away ivery chance t' spind a cint on kapin' th' thracks 'nd things in good condition, 'nd now th' gov'mint has turned th' rodes back t' their lawful owners, jist as th' wolf turned back fr'm chasin' me father whin he was shtripped fr'm ivery thing loose that was on him, 'nd then lift him where he was."

"Where was ye'er father," inquired Mr. Dennissey, with a revival of interest, "'nd where'd the injineers come in?"

"He was up a three, 'nd the injineers, shpeakin' paregorically, is in much th' same condition as to gittin' money to spind, or, 's ye'll be whin ye ask me f'r a dhrink."

"What'll I get?" inquired Dennissey, eagerly.

"Grape juice," replied Mr. Hooley, briefly, as he prepared to close the place. "I may have somethin' on me hip tomorrow."

Meeting of the American Association of Engineers

Second Railroad Conference Held Yesterday in the Florentine Room at the Congress Hotel

THE SECOND ANNUAL RAILROAD CONFERENCE under the auspices of the American Association of Engineers was held yesterday in the Congress Hotel, Chicago. The program for the day provided for morning, afternoon and evening sessions, with the morning devoted chiefly to the presentation and discussion of the reports of the various railroad sections and a review of association activities in the railroad field during 1919. The afternoon session provided the opportunity for the presentation and discussion of papers and reports relating to the future railroad work of the association, and the evening session for the presentation of several papers of timely interest.

G. W. Hand, assistant to the president, Chicago & North Western, and chairman of the Railroad committee of the Association, opened the afternoon session by outlining plans for future activities of the association in the railroad field. Mr. Hand drew attention to the opportunities presented in the present situation of the railroads for engineers to extend the scope of their activities. He mentioned particularly the problems which will arise by reason of the legislation under which the railroads were returned to private control on March 1, and the engineer's responsibility in their solution.

In the discussion which followed Mr. Hand's remarks, the vital importance of loyalty on the part of engineers to employers was stressed and it was suggested that disloyalty proven should bar individuals from membership in the association. J. R. Leighty, of the Missouri Pacific, summed up the discussion of this topic substantially as follows: That it seemed to be the sense of the meeting that plans for future activities of the association in the railroad field must contemplate ways to make the services of engineers more comprehensive and valuable, to sell this more valuable service at a price fair to both the engineer and the employer and to accompany the sale of this service with a guarantee to employers that value would be received for the increased compensation granted.

Railroad sections of the association and their relation to the railroad management and to the chapters of the association were also outlined and discussed in the afternoon session. Their function was outlined to be to promote good feeling between the management and the engineers; to encourage the interchange of ideas and to promote the economic welfare of engineers.

This session was brought to a close by the presentation and discussion of proposed amendments to the schedule of salaries for railroad professional engineers which was adopted at the first conference held last March in Chicago and published in the *Daily Railway Age* of March 18, 1919. These amendments were presented in an endeavor to more clearly define the duties and scope intended to be included under particular titles.

Evening Session

The evening session was devoted to papers read by Arthur S. Tuttle, chief engineer, Board of Estimate and Apportionment, New York; Oscar C. Merrill, chief engineer, U. S. Forest Service, Washington, D. C., and Col. Bion J. Arnold, consulting engineer, Chicago, on the classification and compensation of engineers. These papers were based on data collected by the committee representing Engineering Council, whose report on the salaries of technical men was published in part in the *Railway Age* for February 6, page 440.

Mr. Tuthill outlined and explained in detail the principles underlying the work of the committee in so far as the matter of classification is concerned and called attention to some of the advantages which must accrue from such a classification. In carrying out this work the responsible heads of 191 services, federal, state and municipal, were approached by the committee for information, 101 of whom replied in full and in ample time to be considered in the deliberations.

Mr. Merrill devoted his remarks to the compensation activities of the committee and outlined the general principles which underlie this portion of the committee work. He drew particular attention to the fact that investigation had disclosed the fact that salaries in the classified Federal, State and Municipal services were in many cases below the minimum of $2,200 per annum, which is generally accepted as the least amount on which a family can be maintained in comfort and decency. This fact was emphasized to draw attention to the importance of the compensation angle of the committee's work.

Col. Arnold briefly summarized both phases of the question and pointed out the advantages which would accrue from co-operation between the committees of the Association and Engineering Council which are concerned with these matters.

Problems confronting the railroads on their return to private control was the topic discussed by S. M. Felton, president of the Chicago Great Western. Mr. Felton outlined briefly the conditions of the roads when returned to their owners on March 1, drawing particular attention to their inadequacy to care for the traffic offered, due to the fact that during the war period expansion of facilities ceased almost entirely. He pointed out also the deficiencies which exist in equipment, basing his conclusions on statistics covering a period of 15 years.

He also drew attention to policies adopted or perfected during the period of federal control which have resulted in increased efficiency in operation. Prominent among these were joint operation of terminals and activities to promote limit loading of cars. The advantages of retaining these and other similar measures under private control were urged.

Mr. Felton also discussed the labor problem confronting the roads and gave a brief review of the legislation designed to meet this situation.

D. A. Tomlinson (Portland Cement Association) talked on the work done by A. A. E. to bring about adjustments of engineers' salaries during the period of government control of the railways. The policy pursued in conducting this campaign was one of education—to point out the value of engineering services and direct attention to inequalities in compensation. It was Mr. Tomlinson's idea that the same general principle properly applied to all activities of the association in this direction. Whereas in the case he referred to the educational work was directed at the engineering and executive offices of the railroads and the Railroad Administration, it could be applied in general to the public as a whole.

F. H. Newell, professor of civil engineering, University of Illinois, and president of the Association, concluded the program with an address treating of the aims and ideals of the Association.

W. W. Salmon Sees Improved Business Outlook

"In consequence of the adoption of the new policy towards the railways, it seems to be quite certain that credit will greatly improve; that needed capital will hereafter be obtainable by railways on reasonable terms; that the most progressive and aggressive railway managements, in their natural desire to obtain for themselves the largest possible share of the aggregate net operating income of the rate-making group to which they belong, will procure additional and improved devices designed to reduce operating expenses; and that manufacturers of railway equipment, devices and material will in the not distant future find their facilities taxed to the utmost." This was the optimistic statement of W. W. Salmon, President, General Railway Signal Company, to a representative of the Daily *Railway Age*.

Mr. Salmon, as a member of the National Transportation Conference Committee of the United States Chamber of Commerce, has been closely in touch with the railway program developed by the United States Chamber of Commerce, and with the framing of the legislation in Congress. Mr. Salmon said, further, that "it was the opinion of the National Transportation Conference, composed of representatives of commercial, industrial, agricultural, financial, labor, governmental, transportation, economic, civic and social interests, that railway credit would be greatly strengthened if Congress would enact a law 'requiring that railway rates and fares, to be established by public authorities, shall be designed to yield the railway companies in each traffic section of the United States, aggregate revenue sufficient to produce, after proper provision has been made for renewals and depreciation, a net return (which shall be available for interest and dividends) of not less than 6 per cent per annum upon the aggregate fair value of the property of the railroads devoted to the public service in each of the several sections, the items of renewal and depreciation to include unproductive improvements not properly chargeable to investment account and against which no capital or capital obligations shall be issued."

In comparing the rate provisions of the Transportation Act as passed with the recommendations made by the National Transportation Conference, Mr. Salmon said that, "while the rate provisions of the Transportation Act do not conform in every detail with the recommendations of the National Transportation Conference, they appear to me to accord with them as closely as could have been reasonably expected, and it is my belief that in view of the more enlightened and liberal policy of the government and the people toward railway rates, so strongly indicated by the passage of the Transportation Act and its approval by the President, the Interstate Commerce Commission will honestly and earnestly seek to give full effect to the law which provides that 'it shall give due consideration to the transportation needs of the country and the necessity (under honest, efficient and economical management of existing transportation facilities) of enlarging such facilities in order to provide the people of the United States with adequate transportation.'"

Presidential Aspirations

With "Lowden for President" and "Wood for President," signs on all sides of the Florentine Room at the Congress Hotel are taking on much the appearance of a presidential campaign headquarters. Not the least significant development along political lines is the prominence of women's organizations in anticipation of the adoption of the 19th amendment.

Oh! Gosh Darn It All

"Hey! You fellers, com'on over here, 'n get Tom, 'n Dick, 'n Harry, 'n all the rest of the bunch, too." It was Jimmy talking, a regular feller, and pretty wise, too. "Say, let's get together and have a sure-enuff talk. I've got sumthin' you'll be wantin' to hear. Lissen! Now ain't we done pretty good work for —for—oh! a long time, an' ain't we old enuff to wear long pants and know what's right and what's wrong? You betcha we are. Now, I ain't kickin' on workin' like the deuce during the big scrap and lettin' Ma boss the whole works, but gee! that's all over now and I wanta be my own boss. Whatcha say, Dick?"

"Gosh, Jimmie! Ain't you 'fraid that Ma'll raise the dickens?"

"Naw! We can say how we're goin' to tell her everything we do."

"All we do?"

"Well-ll, nearly all—mebbe."

"But she ain't said we could git away on our own hook."

"Yeah! I know all that, but we c'n slip away and she won't know a thing until we're gone. Whacha think, fellers?"

"Sure!"

"I'm on!"

"Let's go!"

"Some kid!"

"That's the stuff!"

A whole chorus greeted him. There were a couple that didn't enthuse much, but nobody seemed to care about them. And so they made their plans, called it a day and started out to do something else. But! But!—

"Oh, Jimmie!" It was Jimmie's little sister who came running up, her cheeks a "Rudd-y" glow. "Just you wait a minute—think you're smart—dontcha. Tee hee! Ma knew all the time what you boys were a-doing. And you'd better come on home, and you too, Dick and Tom, and—and all the rest of you fellers."

"Naw! We won't, either!" said Jimmie, getting red. "We know what we're doin'."

"Oh, you do, do you," screamed the little sister. "Oh, you do! Well you'd better come on like I'm tellin' you, cause if you don't Ma'll sure fix you."

"Yeah, run along Jimmie," said one of the rest, "and grab onto yer Ma's apron strings."

"Aw, believe me, if I gotta grab any apron strings," said Jimmie, "I ain't goin' to be alone, cause I know my Ma, and I'll bet she's told your Ma and all the rest of your Ma's. Yeah, and I'll bet their all a-waitin' for us now."

"Gee! Fellers, ain't it hell, and it was regular sure-enuff plans, too. Oh! Oh! Oh! Gosh darn it all!"

Mr. Jacobs Did Not Know It, But—

The "ordered calm" of the editorial rooms of the Chicago office of the *Railway Age* was broken. The March Dailies were only three days away and the annual concentration was at its height. Copy must be prepared in abundance and the smallest detail must be attended to that the task of issuing four magazines in as many days might be accomplished without a hitch—and incident thereto was the securing of a photograph and sketch of P. C. Jacobs, president of the National Railway Appliances Association.

A telephone call to the offices of the concern boasting Mr. Jacobs' name on its list of officers elicited the information that "Mr. Jacobs is out of town." A telegram to the absentee brought the reply, "Take the keys to my

house from ————, get the photo from the house and let them use it."

Now enters the hero. Mr. ————, of the aforementioned concern, obligingly sacrificed the noon hour to follow the behest contained in Mr. Jacobs' telegram.

With considerable aplomb, not to mention fearlessness, Mr. ———— arrived at the Jacobs' mansion, mounted the steps, inserted the key—and the house engulfed him.

Some time later Mr. ———— might have been seen to emerge from the home with a package under his arm. In fact, several persons did see him. Two burly gentlemen with suspiciously large and heavily shod feet approached cautiously. One tapped Mr. ———— on the shoulder.

"You're pinched, me fine burglar," the burly, flat-footed one declared.

"But ——," stammered the bewildered Mr. ————.

"Never mind. Tell it t' the judge," was the reply, as Mr. ———— was gently yet forcibly propelled toward the police station.

But, why go on?

A neighbor, knowing the Jacobs were away, noted the entrance of Mr. ————, and became suspicious; telephoned the "Bulls"—you've read the rest.

Oh, yes. Some hours later an irate gentleman might have been seen to emerge again, this time from a police station. He still wildly clutched a package.

But you would never have guessed it when the meek and lowly office boy appeared in the aforementioned editorial rooms of the Chicago office of the *Railway Age*, whose "ordered calm" was broken, and said:

"Here's a futtygraft of Mister Jacobs."

Mr. Jacobs doesn't look as if he knew this story as he gazes at you from page 827.

The Manufacturers Are Ready

That the supply manufacturers are prepared to handle a large business in 1920, is the opinion of A. A. Taylor, manager of the railroad department of Fairbanks, Morse & Co., Chicago. "I am an optimist," said Mr. Taylor. "In fact, all salesmen are optimists; they are born that way and I believe that most manufacturers of railway equipment and supplies are inclined to feel the same as I do. Based on this conclusion, our own company has arranged for large stocks in anticipation of demands from the railroads and I know that other concerns have done the same."

In voicing this opinion, Mr. Taylor made no claim of an ability to forecast. He said no one can say just what will happen to the railroads, but from all indications he can see but one thing—that the railroads must go ahead. The country at large is in a prosperous condition. America has lots of money, in fact, everything that is necessary for achievement and the railroads are absolutely essential to this. An industrial concern like Fairbanks, Morse & Co. serves a large number of people and it would be a serious matter if this company should cease to function. However, this would be a minor matter as compared with the inability of the railroads to serve the shippers properly.

"If the present high labor costs are to continue," said Mr. Taylor, "it is a 'ground-hog' case that the railroads must have greater compensation for work performed. My understanding is that the railroads are to be allowed to combine properties, subject to the approval of the Interstate Commerce Commission, and this being the case, such combinations are very likely to take place to a considerable extent to the end of reducing expense of operation.

"Furthermore, if the railroads are allowed to function according to most efficient practices, without continual interference by unjust and uncalled-for legislation, it will be a wonderful incentive to railway officers in their work of bringing the various properties back to a good financial and physical basis.

"The railway supply industries as a whole are in position to take care of a large amount of business from the railroads, particularly those having the foresight to start stock accumulations considerably before the time the roads were turned back by the government."

With regard to the business immediately in sight, Mr. Taylor said that orders now in hand prove that 1920 will be a better year than 1919. As well known, the United States Railroad Administration made only such purchases as were absolutely necessary last year, but in spite of this, 1919 was a bigger year than 1918, which in itself was considered a year of excellent business. "Taking all things into consideration," said Mr. Taylor, "including such information as we learn regarding the budgets that have been prepared, 1920 will be a good year."

Dedicated to the N. R. A. A.

If you can show your goods when all your rivals
Are showing theirs, and keep your head raised high
When you see your choice designs belittled,
And not yourself your rival's goods belie.
If you can treat the flickle god of fortune
The same how'er the tide of luck may go,
The chances are you'll more than come out even,
And, what is more, add morale to the Show.

If you can meet with old-time friends and workers,
Competitors, and p'raps old friends no more,
And give to all a courteous explanation
Of what your goods are like and what they're for;
If you can give to all a hearty welcome
Regardless of their power or lack of pelf,
That stray into your booth for information,
You're an asset to the Show and to yourself.

With apologies to R. K.—Charles MacGregor.

Inland Waterways

The Railway Engineering section of the Western Society of Engineers will hold a meeting at the rooms of the society in the Monadnock block at 7 o'clock, Tuesday evening, March 16, at which Theodore Brent, assistant chief of the Division of Inland Waterways of the United States Railroad Administration, will present a general discussion of The Present Status of Inland Waterways in the United States. The members of the American Railway Engineering Association and the Railway Signal Association and other engineers visiting the city are especially invited to attend this meeting and to participate in the discussion of this live subject.

New York Central Contracts for Large Building

The New York Central has awarded a contract for the building of 13 additional stories on its mail and express building on Lexington avenue between Forty-fifth and Forty-sixth streets, New York City. Contracts for the fabrication of the steel have been granted to the Phœnix Bridge Company and for its erection to Terry & Tench Company, Inc., New York City. The contract for the general construction of the building, exclusive of steel, has been awarded to James Stewart & Company, New York City. It is planned to start construction in June of this year and complete it early in 1921.

Reunion of Santa Fe Signal Supervisors' Committee

A reunion unpretentious but no less interesting to those in attendance was held for the sixth time in the English Room of the Congress Hotel at luncheon yesterday noon, by the past and present members of the Santa Fe Signal Supervisors' Committee. This affair has come to be as regular as the March meeting of the Signal Division A. R. A. Those present were T. S. Stevens, signal engineer; L. Brown and G. K. Thomas, assistant signal engineers; H. Hobson, signal supervisor of the Santa Fe; E. Hanson, signal engineer, G. C. & S. F.; G. R. Cowherd, signal engineer, E. P. & S. W.; B. T. Anderson, assistant signal engineer, D. L. & W.; P. B. Hyde of the Hyde Battery Company; and J. S. Hobson and J. E. Saunders of the Union Switch & Signal Company.

Committee on Batteries Meets

Committee XI, Batteries, will hold a meeting in the Congress Hotel at 9:30 o'clock Wednesday morning and Thursday morning, March 17 and 18. The representatives of the primary battery manufacturers will be asked to take part in the meeting during the Thursday morning session.

Committee of Direction Signal Division Meeting

An all-day session of the Committee of Direction of the Signal Division was held in the English room at the Congress Hotel on Sunday, March 14. At this meeting the question as to whether the Signal division should withdraw from the American Railroad Association and assume its former status as the Railway Signal Association was considered. All members of the Committee of Direction were in attendance at this meeting. The action taken by this committee is covered in the report of the Signal division published elsewhere.

Foreign Representative Visits Exhibit

E. H. Broman, representing railway interests in Scandinavia, was a visitor at the Coliseum yesterday.

Meeting of Mechanical Interlocking Committee

A meeting of Committee II—Mechanical Interlocking was held on Saturday, March 13, to consider suggestions which the committee had received on the specification for style A interlocking machines after this specification had been forwarded for printing in the Journal. In addition to considering these suggestions, the committee discussed the report prepared by a sub-committee on concrete cable and relay posts.

Calculator for Applying Ohm's Law to Track Relays

The National Carbon Company, Inc., Cleveland, Ohio, is exhibiting a handy calculator for determining the value of various electrical factors involved in track circuits and also for solving problems involving Ohm's law. R. J. Cox, service engineer in the railroad department of the National Carbon Company, invented this calculator, in such a manner that by turning two of the disks, which in such a manner that by turning two of the disks which are smaller than the third, the two known factors may be read direct from the calculator.

Railway Grade Crossing Signal

THE RAILWAY GRADE CROSSING SIGNAL shown in the illustration is manufactured by the A. G. A. Railway Light & Signal Co., Elizabeth, N. J. This signal is conspicuously painted in white and black diagonal stripes to conform with the prevailing standard painting of crossing gates. It consists essentially of a cast iron lamp or signal head 30 in. in diameter, which is mounted on the top of a cast iron compartment for housing the acetylene cylinder, the pressure gage, the pressure regulator and necessary piping. The lamp box contains the electro-gas valve and burner. Around the top and bottom of the circular signal head appear the word and letters "DANGER, R. R." These are open letters backed up with white frosted glass. In the center of the signal head is an 8¾-in. red lens with a 30-deg. spread. This lens is mounted in a hinged ring so that it may be used as a door. The arrangement also permits the signal to be made double or single-faced as desired, with the center of the lens about 6¾ ft. from the foundation base. It is claimed that the red flashes of this signal can be seen distinctly in broad daylight for a distance of 600 ft. and after dark the light illuminates the lettering on the face of the signal head.

A Light Signal for Crossing Protection

This signal is equipped with a ⅜-ft. burner with the flash set for a ¼ light period. It is claimed that if it flashes continuously, 2½ cu. ft. of gas would be consumed per 24 hr. and would include 3/10 cu. ft. of gas consumed by the pilot. In service, however, the gas consumption is controlled by the electro-gas valve and the signal operates only during the time the electro-gas valve is released. With track circuit control this release would be during the period a train occupies the track circuits that control the electro-gas valve.

The acetylene gas cylinder is charged under a pressure of 150 lb. per sq. in. at 60 deg. F. The gas passes from the cylinder through the piping of the high-pressure equipment to the regulator, where the pressure is reduced to less than 1 lb. per sq. in. It then passes to the flasher, which proceeds to operate and pump the gas up to the electro-gas valve, where it is checked, until the electro-gas valve is released by external controlling features such as track circuits. The electro-gas valve is wound for 40 ohms and will operate on 2 volts.

An Extension for Wood Poles

A DEVICE THAT HAS BEEN designed for the purpose of increasing the heights of poles in existing pole lines is shown in the illustrtaion. It consists of two main compression members of steel angles, reinforced by steel lace bars. The lower portion of these members open or close to fit the top of any size wood pole, and the method of fastening requires the use of three through-bolts, which are applied in a similar man-

Extension Frame Applied to Top of Pole

ner to those employed for holding cross-arms to wood poles, except that the former are inserted through holes in the pole, drilled at right angles to the cross-arm through-bolts.

This steel frame may be used where it is necessary to extend the pole height so as to include additional cross-arms for the purpose of adding a number of new circuits. It may also be used where it becomes necessary to cut off and reset poles because of decayed butts. Still another use may be found, by applying this steel extension frame to the top of poles when it becomes necessary to carry wires over crossings, obstructions, etc. With this device a number of cross-arm heights are possible; that is, a cross-arm can be bolted at the intersection of every lace bar. This steel frame extension is being marketed by S. W. Hull & Co., Cleveland, Ohio.

A New Automatic Highway Crossing Flagman

The illustration shows a new highway crossing signal of the "wig-wag" type, manufactured by the Thompson Signal Company, Los Angeles, Cal. This automatic flagman consists of a motor-operated aluminum disk 26 in. in diameter, from which a 46-in. aluminum arrow extends in a radial direction. In the center of the arrowhead appears the light for night indication.

This equipment is designed for high or low voltage direct current and may be procured for alternating current if desired. It will operate in either the upper or lower quadrant, and through any arc from 10 deg. to 360 deg., or it may be arranged to rotate continuously in either direction by changing circuit connections.

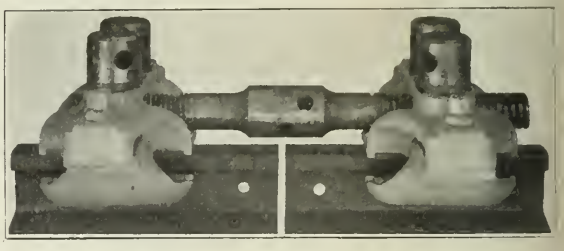
The motor is contained in an aluminum housing and consists of a four-pole external armature design, which is direct connected to the signal member. Ball bearings are used throughout, and lubrication is necessary at only two points. This equipment is usually wound for 10 volts, and while operating it consumes about 1.8 amperes for a 106-deg. swing. It will start operating from any angle or position at a minimum of 6 volts. Energy is constantly applied during performance and there are no springs or rubber buffers. It has been designed sufficiently out of balance to provide for its return to a fixed place of rest when operation ceases.

This equipment can be provided with or without the compartment of the base of the supporting pole. When it is included, it may be used for housing the operating battery or control relays, thus avoiding the necessity of providing separate equipment for the purpose.

Protecting a California Highway Railroad Crossing with an Automatic Flagman

An Improved Rail Joint Expander

The device shown in the illustration is an improved rail joint expander, manufactured by the Chicago Railway Signal and Supply Company, Chicago. It is used to separate adjacent rails in insulated rail joints for the purpose of inserting fibre end posts and insulations and also to bring the rail bolt holes into line with those of the angle bars and switch fittings. This expander is adjustable and will fit any size rail between the limits of 60 and 130 lb. The separating or drawing together of the rail ends is accomplished through a differential expanding screw, which enables one man with a track bar to apply enormous force to the rails. It is claimed the rails are thus pushed apart or pulled together without any injury to the rail ends, such as is the case when using chisels, rams or sledges for the same purpose.



Chicago Style B Rail Joint Expander

This rail joint expander, known as "Chicago Style B," was developed to overcome some of the weaknesses of the older design of the Chicago rail joint expander. It is claimed the new arrangement gives a greater holding power and by means of the differential screw is enabled to exert an enormous force upon the rails. The device weighs approximately 300 lb. It can be applied by 2 men and operated by one. It is quickly removed from the rail by loosening the four screws at the top, which, when only slightly loosened, permit the dogs to be moved out of the way sufficiently to remove the expander. This device is furnished with screws of various lengths, so that it may be applied over angle bars without removing them. The entire apparatus is made of steel, the jaws of which are provided with tempered steel inserts. These are reversible and replaceable without special tools.

EDITORIAL
Railway Age

DAILY EDITION

Continue Work of Sectional Committees

The work being accomplished by the sectional committees of the Signal division is of benefit to the entire signal fraternity. Through such meetings the Signal division has an exceptional opportunity for obtaining first-hand information of conditions affecting the operation and maintenance of signal systems, since the men attending such meetings are those who are in direct contact with and have to solve the everyday problems. Not only are these meetings of benefit to the division as a whole, but they are of a distinctly educational character to the men fortunate enough to attend them. Increased efficiency is being promoted by the meetings and the railroad officers throughout the country can well afford to encourage such gatherings. As was indicated at the Monday session of the Signal division, the future status of the division is uncertain, but this should in no way tend to discourage sectional committee meetings, which should be carried on as they have been in the past year.

Busy Year Ahead of M. of W. Departments

On March 1 the roads were returned to their owners, and it is now possible to plan for the future with some degree of assurance that such plans as may be approved will be carried to a conclusion. Generally speaking, however, improvement programs of any magnitude are planned years in advance. The railroads, owing to the period of uncertainty through which they have just passed and for other reasons, such as high cost of materials and labor and difficulties encountered in securing them, have not in the main planned to carry out ambitious improvement programs this year. While there is no dodging the fact that the roads are sadly in need of additional facilities to handle the business offered, there are crumbs of satisfaction in this situation. It will permit of the concentration of efforts on restoring existing facilities to a more adequate basis. Probably this is the most important work which could be attempted at this time under any circumstances, and it may be confidently expected that maintenance of way engineers will make the most of the situation. In other words, 1920 promises to be an extremely busy year for the men of the maintenance departments.

An Advance in the Right Direction

One of the most noticeable of the recent developments in the railway appliance field is the introduction of higher grade and more expensive types of devices and equipment. This is indicative of the progress that may be expected during the next two or three years. These improvements, however, should not be attributed entirely to recent advances in engineering design or to improvements in manufacturing facilities, for a large part of them are not in themselves new; in fact, many of them are relatively old in other industries and are new only when considered from the point of view of the railways. This tendency is primarily a result of the recognition by the railways of the need for equipment and for accessories that will effect improvements, which are on a higher plane than have been used heretofore. Apparently this would indicate that the railways are entering the markets this year with progressive and advanced ideas as to their needs and with a thorough realization of the savings that may be made through the adoption and use of high-grade, up-to-the-minute equipment.

Wire Line Crossings

The crossing of wire lines over tracks may not seem to be of much importance when compared to other matters requiring the consideration of the Signal division. It is, however, of enough importance to the division to require careful consideration and action. Committee No. XVII—Pole Lines—submitted an oral report asking that the division support the stand taken by the Telegraph and Telephone division against the contemplated action of the Bureau of Standards in lowering the specification in the proposed revised rules and regulations of the National Electric Code. The Telephone and Telegraph division feels that in some instances the revised code, in so far as signal line wire crossings are concerned, does not meet exactly with its views; particularly in the case of such wires crossing over spur tracks, as under the revised code grade E construction is recommended for wires crossing over spurs not exceeding two tracks in the same span. Grade E construction is equivalent to two-thirds the strength of the grade D construction, which is required for wire lines crossing main line tracks. The revised code also states that signal lines crossing branch tracks, on which no regular schedule of operation is maintained, shall conform to grade E construction. However, there are many branch lines that are considered just as important as main line tracks. Such tracks in reality should receive thorough consideration on the part of those who must pass on the type of construction to be adopted. The hazard to life is the most important factor involved. A large number of deaths and injuries occur to railroad employees on the so-called minor tracks, and it is, therefore, advisable that extra care should be taken to avoid scant lateral and vertical clearances between such crossings and standard freight cars and to provide ample strength in the conductors, their attachments and supports at crossings over such tracks. The term "signal line" crossings should not be confused with railway signal department lines, but it refers to that general class of wire lines operating below a certain stated voltage, used mainly for some form of communication. It was the feeling of the Signal division that more information should be obtained than was presented briefly by the committee, and that careful consideration should be given to the subject before taking action. Under the circumstances the Signal division took proper action, but it is to be regretted that the members present were not given the opportunity to learn more in detail of the proposed code of the Bureau

of Standards from some of the members present who are also superintendents of telegraph, as this is a subject which must be considered in connection with signal pole line construction work.

Units of Measure

THE MEASURE OF MAINTENANCE of way labor is a subject which for several years has been under consideration by the association. During the last year of government control the director general drew attention to the universal need for some unit or units of maintenance comparable with units for transportation. More recently the American Railway Association made a request on Section 11, Engineering, for a report on "measures toward obtaining higher efficiency and economy in the maintenance of way and structures department, and a plan presented to the executive committee which will effect the greatest economy and efficiency in the maintenance of way and structures department, both as to handling of labor and material; and, further, that suggestions be made as to the units by which the maintenance of way and structures work may be gaged, the recommendations to include suggestions as to improvements in supervisory methods and especially in the direction of educating the supervisory forces to the importance of the subject."

The study of units of measure in general will early convince the investigator that they by no means always measure. The train-miles, freight and passenger, have been objects of our tender solicitude in a business and professional way for many years. They have served us through weary hours of office compilations on which were based reports whose number is legion and which are now neatly folded and in process of crinkling with the dust of ages in pigeonholes of cabinets in offices of railway managers, presidents, chairmen of boards of directors and public commissions galore. The ton-mile has gone the traffic route to much the same destinations, and is greatly reverenced. Yet all these old acquaintances have at times been haled into court and been irreverently examined and cross-examined and pulled about and stretched on the rack of inquiry or pinched in the inquisition chancery Jarndyces until skeptical judges with cool judgment, and company lawyers with cool footing on thin ice, were forced by a scornful opposition to mental reservations as to whether these units of measure really measured minutely, or approximately, or, indeed, at all; whether they might, mayhap, be not quite rigid, whether they were not at times quite elastic, or were even non-elastic or even flaccid in certain pitiless atmospheres.

But what would you? These heavy ton-miles and weary train-miles have to traverse steep grades and wheel-grinding curves and sojourn on sidings and herd amongst their kind in congested yards. They suffer delays on account of shortages of coal and water and ships and shippers and what not, until they are as dissimilar as our very dollars that look alike yet are so variable that they will not serve as a basis of quotation for a salesman ten hours away from headquarters! Still we strive to exist in a dollar world, a shrinking world, a 50-cent United States, a 40-cent Europe, a 25-cent Mexico, and utterly worthless Russia. And yet man needs dollars and ton-miles and ouija boards—and moreover units of maintenance as means to measure and forecast the serious things of life, the necessities, the extravagances, the expectations, and now the work!

As the cost of hauling one ton of freight one mile is a unit of transportation, so the natural measure of maintenance would seem to be the cost of the work of one man in one hour. There is no doubt nor difficulty about it whatever—we have merely to say what work and what man and what hour, and the thing is done. For there are many kinds of work, as company work and union work and Sunday work, just as there are divers kinds of men, and school boys, and whole families who labor in times of emergency at track maintenance, at different—oh, widely different hours—many of them time and a half or even double time hours, to say nothing of those composed of killed minutes that cannot be recorded in earthly time books.

But the average man in an average hour at an average rate performs an average service. No, this is not necessarily an organized unit; it is a perfectly sound, even a chesty theory. The average of work thus done by a laborer in one hour is then a fair measure of maintenance. The whole trouble lies and always has lain at the door of the civil engineer. He is a creature of fact. He has no imagination, no horizon of the fourth dimension, as it were. He cannot let well enough alone, but must needs query and poke about and utterly discredit quite well-built theories and units and other like fancies. He objects that no two men are alike, that they do not move in unison, nor adopt the same methods of using tools, or handling dirt, or tamping ties; their foremen have ideas and give dissimilar instructions unless the supervisors who have still different methods insist on every one doing their way, or the roadmasters get new implements to be used or the engineer or the general manager, or the president or the chairman of the board—but why continue when it is all so evident that units of measure of maintenance must first be established by virtue of the highest authorities in the railway world regulating the way of doing the work just as the government established the way of minting a dollar before it could be coined and actually made a measure of value.

What is needed first of all in maintenance of way is organization from the tip top among all railways to insure that all lines adopt standard ways of performing labor. It may then be possible to gather data on which to base statistics showing what one laborer in one hour should accomplish at each kind of work assigned him. Until this authority is available we will carry on in the good old way, or ways, doing our best with what we have and without that which we have not.

The Wearing of the Green

WEDNESDAY, THE 17TH, THE BIG day of the A. R. E. A. convention, assumes added importance as St. Patrick's Day, the holiday most dear to those who love the "ould sod" and the Irish. The very name of it thrills the blood of the real men of all climes, and particularly the American railway officer. We, of all men, have reason to love the Irish who long ago proved their worth as real railroaders when the thousands of miles of transcontinental tracks were laid which traverse the country from the Atlantic to the Pacific. This construction was done largely by the thousands of Irish workmen who were landed at Eastern ports—all they loved behind them in Erin, and the future before them a sealed book into which they looked with fearless blue eyes and with undaunted spirits. "From Kilkenny to Cork and from Cork to New York" was only half a trip to Pat, who, stopping only long enough to find his bearings and take the bundle from his shoulder, shipped overland and "westward ho!" to the end of the track. He had never a care for the future, but was filled with the warm-hearted, whole-souled, devil-may-care freedom of spirit which marks the Son of Erin, who is at soul an adventurer, with the rugged physique, the red blood and the clear eye that bespeak the love of conquest, the spirit of the conqueror, and the restlessness of push and of progress that have made of the American

railroad the pathway to a great civilization and the United States a world power.

Of all the men of all the nations of earth who have landed on our shores there were and are none to touch Pat as a trackman. Our memories go back to the days when the steam shovel was not, when the Irish made railroading a joy, when the eight-man iron gang tossed rails from leather-aproned loins with unprotected hands, when the "boss" was king, when spikers were spikers, when a meal was as free as a fight to any and all who dared the slogan "Come out and scrap the Dutch." Gone are the days, gone are the "byes." But sweet are the memories of deed and of word, of duty done with brain and brawn, of their zest in the work we depended on—and still in revery we watch them toil, these brawny giants, and we hear their lusty chorus: "Saturday morning at 7 o'clock, 13 terriers stood on a rock. Drill, ye terriers, drill."

Oh, for a million such trackmen, oh, for a hundred such section foremen, or even just one! All honor to Pat and his memory. Three cheers for the Irish, the greatest trackmen of them all.

Today's Program

The program for today, Wednesday, March 17, is as follows:

Economics of Railway Location	Bulletin 221
Wood Preservation	Bulletin 222
Ballast	Bulletin 222
Iron and Steel Structures	Bulletin 223
Stresses on Railroad Track	Bulletin 224
Ties	Bulletin 223
Roadway	Bulletin 224
Rules and Organization	Bulletin 222
Economics of Railway Labor	Bulletin 223

Construction Work on A. B. & A.

Signal construction work has been authorized on the Atlanta, Birmingham & Atlantic, covering the installation or changes in a number of interlocking plants and the installation of automatic block signals over certain sections of the line. Work on this program will be started about June 1.

Anyway, They Tried Hard

The executive committee of the Railroad section, Western Society of Engineers, played in hard luck in its efforts to provide a program for a meeting during the course of this week's conventions. As a consequence, those who went to the society's rooms last night were turned away with the notice that the speaker of the evening could not appear.

This was the culminating disappointment in Chairman C. F. W. Felt's endeavors to arrange a meeting. Several weeks ago Mr. Felt invited G. A. Tomlinson, until recently director of inland waterways, United States Railroad Administration, to talk on the present status of the inland waterways, but Mr. Tomlinson was unable to come, and after trying unsuccessfully to get someone else from Washington, Theodore Brent of St. Louis, formerly assistant chief of the division, agreed to talk. Announcements to this effect were printed and Mr. Brent was in Chicago Monday, but was called out of town. After another canvass, Prof. Harold G. Moulton of the University of Chicago was prevailed upon to fill the gap, but was unable to appear on account of illness at the last minute.

Mr. Hooley on Coming of Age

"DID YE SAY THIM INJINEERS was only twinty-wan years owld?" inquired Mr. Dennissey, as he strolled into Mr. Hooley's place a full hour earlier than his usual time, on account of his interest in the subject of their conversation of the evening before. "I saw siveral av thim at th' Congriss Hotel th' day that was, 'nd iv they're only twinty-wan, 'tis a hard life they've been leadin', I'm thinkin'."

"'Tis a har-rd life they've been leadin' arl right," replied Mr. Hooley. "But, Dinnissey, 's I've so often towld ye, iv ye got annything straight th' first time, 't wud lead ye'er neighbors to some suspicion as to the sobriety av ye'er habits. 'T was th' Association I was a-shpakin' av, 'nd not th' injineers individooally or by name."

"I mind now," continued Mr. Hooley, reminiscently, "'t was in 1898, th' year we begun to forget to remimber th' Maine 'nd what Admirable Jewey'd done at Manilla—'t was spilled wit' two l's, Dinnissey, til Jewey knocked wan av thim out—'t was that year a handful av min mit at th' Aujitorium 'nd laid th' foundations av th' great 'nd inflooential Association that's been holdin' convintions in Shecawgo ivery year since. 'Twas only th' nixt year th' christenin' tuk place at Buffalo, but that is ancient history, f'r t' connect ye up wit' what I'm goin' t' tell ye.

"Twinty-wan years 'nd goin' sthrong," reminisced Mr. Hooley, "till inst'd av givin' thim their time 'nd a freedom suit th' crool uncle they'd been livin' wit' th' lasht few years turned thim loose on a cowld wor-rld wit' nothin' but th' owld clothes they had on whin they came t' live wit' him 'nd wit' some extra wear, forby they'd had har-rd wor-rk to do f'r five years on account av th' great war-r.

"'Tis in th' way av a parrabul I'm shpeakin', Dinnissey," continued Mr. Hooley. "Th' injineers thimselves is arl right, but their wor-rkin' tools 'nd their clothes 'nd th' property they're to work on is badly run down. 'Tis th' work av th' injineers t' kape up th' thracks, 'nd th' buildin's, 'nd th' wather stations. But I've another shtory t' till ye tomorrer 'nd that's why I'm tillin' ye so much about th' Association bein' twinty-wan years owld. Ye wudn't think they'd hav anny use f'r a wit noorse, wud ye, Dinnissey?"

"I wud not," replied Dennissey.

"They don't," asserted Mr. Hooley, "but since th' crool uncle lit thim go their own way th' female rilitives av th' family wud like t' continue gettin' th' benefits av their wor-rk 'nd don't seem willin' t' give them th' credit f'r havin' grown up."

Electrical Testing Committee to Meet

A meeting of Committee 13, electrical testing, of the Signal division of the American Railroad Association, will be held in the English Room of the Congress Hotel at 9 a. m. today.

Annual Dinner Tonight

The annual dinner of the American Railway Engineering Association will be held in the Gold room of the Congress hotel at 6:30 this evening. The speakers include the Hon. and Rev. Henry J. Cody, M.A., D.D., LL.D., former minister of education, Ontario Government, and Winthrop E. Stone, Esq., president, Purdue University, La Fayette, Ind. Tickets for the dinner are on sale in the lobby outside the Florentine room, W. A. Wallace of the Arrangements committee in charge.

A. R. E. A. in Session Tuesday Afternoon

Railway Engineering Association Proceedings

Report of Tuesday's Sessions, Including President's Address and Abstracts of Several Committee Reports and Discussion

SHORTLY BEFORE 10 O'CLOCK yesterday morning the Florentine Room of the Congress Hotel again witnessed the opening of the convention of the American Railway Engineering Association, this being the twenty-first annual meeting. President Earl Stimson, general superintendent of maintenance of way and structures of the Baltimore & Ohio, was in the chair. The attendance at this session was fully as large as for the first session last year, thereby promising a very successful convention. As the minutes of last year's meeting had been printed and distributed, their reading was dispensed with and the convention passed immediately to the president's address. Following this the reports of the secretary and treasurer were presented, after which the association began the consideration of the reports of committees.

Address of President Stimson

DURING THE YEARS 1917 AND 1918 this association shared with all other enterprises the handicaps imposed by our country's participation in the great war. The past year has seen the return to more normal conditions, releasing us from the exacting war time duties and allowing more time and thought to be given the work of this association. Our finances, as shown by the statement for the year ending December 31, 1919, are in a healthy condition.

For a time the membership situation gave us some concern, as applications for new membership were coming in slowly. There were appreciable losses, through resignations, death and other causes. It appeared that the net gain for the year would be small. At a meeting of the Board of Direction in November it was decided to increase the membership and a committee, with Mr. Downes as chairman, was appointed to conduct a membership campaign. This was undertaken in a systematic manner—each railroad being called upon to produce a given number of new members and a member from that road was appointed chief producer. In proof of the success of the efforts of Mr. Downes and his committee since January 27, 1920, when this campaign was launched, 180 new members have been added, making a total of 270 since the last convention, a net gain of 190. Our total membership now is 1,639.

Since our last meeting I regret to report that we have lost 11 of our members by death. Four of this number were charter members of the association, namely:

Curtis Dougherty, chief engineer of the Western lines of the Southern Railway. He was very active in the association's affairs. He was a member of the committee appointed at the preliminary organization meeting to propose a name for the association. He took part in committee work as chairman of a committee and a member of other committees. He also served as a director.

William Archer, at one time division engineer and principal assistant engineer of the Baltimore & Ohio, was an active member of a committee in the days when the association was young.

J. A. Atwood, chief engineer, Pittsburgh & Lake Erie, and second vice-president of the association. Mr. Atwood was from its organization one of the live members of the association, serving as chairman of the rail committee and of the yards and terminal committee. He was a member of the Board of Direction and at the time of his death was second vice-president. We will ever remember Mr. Atwood for his sterling worth as a gentleman and as an engineer. We will miss him from this meeting.

C. N. Kalk, chief engineer, Soo Line, also a charter member and an active worker on a committee.

Other members who have been taken from us are A. J. Himes, valuation engineer, New York, Chicago & St. Louis; E. Raymond, general superintendent, Santa Fe; S. P. Brown; H. T. Ruhl, engineer maintenance of way, Delaware & Hudson; J. D. Mason, Great Northern; W. A. Casker, formerly with the Chicago & Western Indi-

ana, and N. Tani, Imperial Government Railways of Japan.

Five years have passed since the last issue of the Manual. It has been decided that the number of additions and changes to the 1915 issue justify a republication this year. The volume of matter presented in the form of committee reports exceeds that of any previous year. In quality it is fully up to the high standard of the association and reflects great credit on the chairmen and members of their committees.

It has been the policy of this association to co-operate with other associations in the advancement of the common interests. In this manner the resources of the several associations are combined and produce the best results as well as tend towards uniformity and standardization. During the past year this policy of co-operation has expanded to the extent that the association has through its committees acted as the construction and maintenance division of the engineering section of the American Railroad Association. This action was forecast by President Morse in his address at the opening of the convention last year. The general plan then outlined has been carried on in detail as follows:

Under the reorganization of the American Railroad Association by the United States Railroad Administration, an engineering section was included. In order to avoid a duplication of work and to utilize the efficient working organization of the American Railway Engineering Association, some arrangement to that end was sought. At first it was proposed that the organization of this association be taken over by the American Railroad Association to become a part of its engineering section. This proposition was voted down by this association by a large majority. The offer of this association to act as a division of the engineering section was finally accepted. The engineering section is presided over by a general committee of 11 members, 6 from the construction and maintenance division, 3 from the signal division and 2 from the electrical division. This gives this association a majority membership on the general committee. The president of this association is chairman of the general committee and of the section, and the secretary acts for both of these organizations.

Earl Stimson
President, American Railway Engineering Association

By action of the general committee the members of the standing and special committees of the American Railway Engineering Association were appointed members of like committees of the engineering section of the American Railroad Association and the outline of work assigned to the committees by the Board of Direction of the American Railway Engineering Association was approved and accepted by the general committee of the engineering section of the American Railroad Association. The committee members thus virtually became members of both associations and the one set of committees carried on the same work for both. From time to time requests for special reports have been made by the American Railroad Association through the general committee, which the committee has through the secretary assigned to the proper committee for handling. Several important requests of this nature have been handled, notably, "The Specifications for Railroad Track Scales," "Rules for the Prevention of the Spread of Forest and Field Fires," "A Special Report by the Tie Committee on Metal Versus Wooden Ties," and the subject now under consideration, "Measures to Obtain Higher Efficiency and Economy" in the maintenance of way and structure department, both as to the handling of labor and material; and to make suggestions as to the units by which the maintenance of way and structure work may be gaged.

At the annual meeting of the American Railroad Association last November, the engineering section included in its report for approval such subjects as were adopted as recommended practices by this association at the convention a year ago. These were approved at that meeting and now bear the endorsement of the American Railroad Association. What better way is there for the recommended practices of this association to come into general use on the railroads of this country than to bear such endorsement?

The American Railway Engineering Association during the past year has been performing the functions of the construction and maintenance division of the American Railroad Association, the contact between the two being maintained through the general committee of the engineering section, the majority of whose members are officers and members of this association.

This relationship has in other ways also been of advantage. The consolidation of the offices of the two associations and the secretary and his office force acting for both, have divided the expense, and in addition the American Railroad Association has been generous in financing committee work of a special character. The sum of $9,000 per year for two years was provided for the continuance of the work of the committee on "Stresses in Railroad Track" and $7,500 was given for the Rail committee to carry on its work for the year. The expense was paid of the inspection trip of the Committee on Electricity over the electrified division of the Chicago, Milwaukee & St. Paul and also of the trip of a sub-committee of the Yards and Terminals committee for the purpose of studying the unit operation of terminals.

There were some among us who viewed with alarm this arrangement, and stood by terrified, evidently expecting to see the lamb devoured by the lion. But how groundless their fears! They must now realize, as they sit here in this convention, that the American Railway Engineering Association is as strong and as independent as ever.

The problems immediately ahead of us are those of maintenance rather than those of construction. I quote from that god-father of many young engineers, the revered Wellington, who in defining engineering says, "It is the art of doing that well with one dollar, which any bungler can do with two after a fashion." The definition applies quite as aptly to maintenance engineering as to construction engineering.

The item of labor is greater than all the other items of maintenance expense combined. What a chance there is here for the practice of engineering—the engineering of men. How much more can be done with one dollar's worth of well-directed effort than with two dollars' worth of bungling.

It is now the duty of the engineer to seek to make the work attractive to the worker by attention to his living and working conditions. Pay him an adequate wage. Put the man under a foreman who knows proper methods and who can direct him in the use of those methods. Furnish a standard of performance as a measure of his creative power which will stimulate his interest towards increasing that creative power. Respect his rights, treat him fair. Then watch the one dollar do the work of two.

The increased costs of both labor and material have so swelled the expense of maintenance that more accurate cost accounting and unit measures of performance are needed. It is sought to reduce maintenance costs to a single unit of measure so that a uniform gage of maintenance may be had. It is difficult to correct unless we know wherein we are wrong. Our committee on Economics of Labor is now working on this problem.

The shunning of railroad service by the young engineer is a matter of concern. I noticed a short time ago in a technical publication a series of letters written by the professors of engineering of a number of universities, on why the graduate engineer is not entering railroad service. The chief reason given was that they found more attractive service elsewhere—the more attractive features being better pay, less exacting working conditions and better prospects of advancement. I cannot believe this to be a permanent or even a general condition. The young engineer graduate has only to look at the long list of prominent railroad officers who started on the engineering corps and attained to positions comparable in compensation with the high positions in the industries.

This association is dependent upon the young railroad engineer for its perpetuation. It is therefore the mission of the members of this association to present to the young engineer the advantages and possibilities of railroad service, and when they have entered that service to help them in every possible way toward the realization of those possibilities.

Report of the Secretary and Treasurer

The twenty-first annual convention of the association marks another onward and upward step in its continued progress. Financially, in the growth of membership, and in enhanced prestige the results obtained in the year just closed have been most gratifying.

By reference to the financial statement it will be noted that the receipts from all sources were $31,187.24; the expenditures, $24,702.03, leaving a surplus for the year of $6,485.21.

The volume of committee reports submitted for consideration at this convention exceeds that of any former year. The additions made to the Manual since its last publication have warranted the Board of Direction in deciding on reprinting the volume during the current year.

As pointed out in the address of the president, a systematic effort has recently been inaugurated to increase the membership. The results thus far secured have been exceedingly gratifying and encourage the hope that even greater gains will be obtained during the coming year.

Membership at the last annual meeting		1,449
Admitted during the year	270	
Deceased during year	12	
Resignations	39	
Dropped	30	
	81	
Net gain	189	189
Total membership		1,638

With deep regret we record the loss by death of the following members: John A. Atwood, second vice-president of the association; Curtis Dougherty, at one time a director of the association; Albert Himes, formerly chairman of the Committee on Iron and Steel Structures; Stephen Pearson Brown, Williams Archer, N. Tani, E. Raymond, J. D. Mason, C. N. Kalk, H. T. Ruhl, W. A. Casler, F. T. Hatch.

Respectfully submitted,

E. H. Fritch, Secretary.

Financial Statement for Calendar Year Ending December 31, 1919

Balance on hand January 1, 1919		$37,259.19
RECEIPTS		
Membership Account		
Entrance fees	$ 1,470.00	
Dues	6,726.75	
Subscription to Bulletin	6,726.75	
Binding Proceedings and Manual	682.35	
Badges	31.00	
Sale of Publications		
Proceedings	2,056.22	
Bulletins	866.66	
Manual	408.97	
Specifications	111.25	
Leaflets	27.60	
General Index	81.00	
Advertising		
Publications	2,040.20	
Interest Account		
Investments	1,783.67	
Bank balance	73.97	
Annual Meeting		
Sales of dinner tickets	1,291.50	
Miscellaneous	56.02	
American Railroad Association		
Rail Committee	6,753.93	
Total	$31,187.24	
DISBURSEMENTS		
Salaries	$ 5,850.00	
Proceedings	1,018.00	
Bulletins	5,237.09	
Manual	4.55	
Stationery and printing	731.39	
Rents and light	868.11	
Telegrams and telephone	68.06	
Equipment	27.45	
Supplies	326.78	
Expressage	318.31	
Postage	806.65	
Exchange	53.10	
Taxes	29.25	
Committee expenses	133.50	
Officers' expenses	16.00	
Annual meeting expenses	1,977.67	
Refund dues account duplicate payments, etc.	32.00	
Audit	100.00	
Miscellaneous	245.20	
Rail Committee	6,858.92	
Total	$24,702.03	
Excess of receipts over disbursements		$ 6,485.21
Balance on hand December 31, 1919		$43,744.40
Consisting of:		
Bonds	$40,565.65	
Cash in S. T. & S. Bank	2,977.83	
Cash in Secretary's office	175.92	
Petty cash in Secretary's office	25.00	
	$43,744.40	

Stresses in Track Fund

Balance on hand January 1, 1919		$ 1,461.35
Received from interest during 1919		39.51
		$ 1,500.86
DISBURSEMENTS		
Salaries	$ 134.14	
Transportation	36.14	
Hotel and meals	42.90	
Telephone and telegrams	1.71	
Supplies	219.68	
Postage	30.00	$ 464.57
Balance on hand in Standard Trust and Savings Bank, December 31, 1919		$ 1,036.29

Respectfully submitted,

Board of Direction.

Report of the Treasurer

Balance on hand January 1, 1919		$37,259.19
Receipts during 1919	$31,187.24	
Paid out on audited vouchers during 1919	24,702.03	
Excess of receipts over disbursements		$ 6,485.21
Balance on hand December 31, 1919		$43,744.40
Consisting of:		
Bonds	$40,565.65	
Cash in S. T. & S. Bank	2,977.83	
Cash in Secretary's office	175.92	
Petty cash in Secretary's office	25.00	
	$43,744.40	

Stresses in Track Fund

Balance on hand January 1, 1919	$ 1,461.35
Received from interest during 1919	39.51
Total	$ 1,500.86
Paid out on audited vouchers during 1919	464.57
Balance on hand December 31, 1919	$ 1,036.29

The securities listed above are in a safety deposit box of the Merchants' Loan & Trust Safe Deposit Company, Chicago.

Respectfully submitted,
Geo. H. Bremner, Treasurer.

General Balance Sheet, December 31, 1919

ASSETS

	1919	1918
Due from members	$ 3,142.00	$ 2,495.35
Due from sales of publications	542.27	1,823.94
Due from advertising	985.00	400.00
Due from Amer. R. R. Assn. (Rail Committee)	575.97	470.98
Due from Amer. Express Co. for lost shipment	250.00	
Furniture and fixtures (cost)	997.40	997.40
Gold badges	73.50	51.00
Publications on hand (estimated)	6,000.00	6,000.00
Extensometers	500.00	500.00
Investments (cost)	40,565.65	35,065.65
Interest on investments (accrued)	739.99	711.96
Cash in Standard Trust & Savings Bank	2,977.83	2,168.54
Cash in Secretary's office	175.92	
Petty cash fund	25.00	25.00
Total	$57,550.53	$50,709.82

LIABILITIES

Members' dues paid in advance	$ 2,272.50	$ 2,053.50
Impact test fund on electrified railways	285.46	285.46
Advertising paid in advance		120.00
Due for printing Proceedings	1,845.00	
Due for expressage	183.67	
Due for miscellaneous bills	39.00	
Surplus	52,924.90	48,250.86
Total	$57,550.53	$50,709.82

Metric System of Measures

The question of legalizing the metric system of measures in this country was brought before the Tuesday morning session of the Association and after an address by W. C. Wilson, representing the American Institute of Weights and Measures, W. H. Courtenay (L. & N.) offered the following resolution, which was adopted: The American Railway Engineering Association, in convention assembled, expresses its opposition to the adoption of the metric system of weights and measures to the exclusion of the English system or the American system at present in general use.

Report of Committee on Buildings

Under the head of revision of the Manual, the committee offered some revised definitions and also submitted the following:

On page 18, in the supplement to the Manual, it was proposed to change the recommendation for high platforms at passenger stations to read as follows: "It is recommended that high platforms be provided only in connection with tracks devoted exclusively to passenger business on account of clearances."

On page 218 there is a subject in the Manual entitled, "Sanitary Provisions for Medium Sized Stations." The committee recommended that the first three paragraphs referring to water closets and chemical toilets be eliminated and that the last paragraph only be reprinted in the Manual. The committee also recommended that the two words "Medium Sized" be left out, as the recommendations would apply to all stations.

Subject (2). Coaling Stations

The committee recommended the publishing as a matter of information in the proceedings, an article on fuel conservation prepared by the United States Railroad Administration, as covered by its Circular No. 17, dated Washington, April 20, 1918.

Ash Pits

The committee recommended publishing an illustration of a steam conveyor ash pit as a type, without recommendation as to its preference. A number of railroads have provided protection for the water type of ash pits, consisting of wood floats, floats made out of boiler tubes on angle iron frame, but the result from the use of these has been questionable, as the operator does not always replace the protection in proper manner and it is easily broken. In the tube type of float the sulphuric acid in the water soon causes deterioration. The committee, therefore, recommended that on deep water ash pits a walkaway be provided on the water side of the running track, so that hostlers can work on the engine on this side without danger of falling into the pit.

In addition to this protection, ¾-in. rods spaced 1 inch apart have been installed in the running track. Some roads place these rods in a frame approximately 10 ft. long, placing them between the rails so that they can be removed when necessary. It is considered preferable to fasten the rods so that they cannot be removed.

Subject (7). Efficient and Economical Methods of Electric Lighting for Passenger Station

Lighting in and around passenger stations is provided in order to add to the safety and convenience of the public and employees, and adequate lighting is well recognized as one of the most effective police measures against crimes and invaluable as a sanitary precaution, but any illumination that does not directly contribute to security and convenience should be avoided.

Passenger Station Interiors

There are three types of electric lighting which can be used for passenger station illumination: Direct, semi-direct and enclosed units and indirect.

Direct lighting is the most commonly used for station illumination and is recommended as the installation for stations where economy in first cost, operation and effi-

ciency of lighting is desirable. Semi-indirect lighting is used frequently, but is more expensive as to first cost and is about 60 per cent as efficient as direct lighting on a new installation, decreasing in efficiency on account of dust covering the reflecting surfaces. The totally enclosed type of fixture is the better of the two, as approximately the same results can be obtained and the maintenance cost is a trifle lower in so far as cleaning is concerned. Indirect lighting is not recommended for station lighting because of the expense of installation and maintenance, also for the low efficiency due to the light being absorbed by the ceiling or reflecting surfaces.

In waiting rooms the installation of the approximate average of one watt per sq. ft. of floor area will give good illumination, but there are many details to be considered, such as the difference in ceiling heights, color of wall and style of architecture. For ticket offices a minimum of 3.5 foot candles is recommended, for toilet rooms about 2 foot candles and for baggage rooms from 1 to 2 foot candles. Average conditions warrant an installation ranging from 0.5 to 1 watt per square foot.

Passenger Station Surroundings

Driveways and walks leading to and from passenger stations can be lighted most economically by using high efficiency gas filled lamps, inclosed in frosted bowls or some other suitable fixture and spaced along the driveway and walks on posts at sufficient distance to give illumination intensity of 1. to 1.5 foot candles. Platform lighting should be so arranged that the lamps are not visible to enginemen on approaching trains. A minimum illumination intensity of 0.03 foot candles is desired for uncovered platforms. This value may be increased where conditions demand higher illumination. Shallow bowl porcelain enameled steel reflectors are recommended, the spacing of the units to be determined by the condition existing at the particular platform. Flood lighting of platforms is not recommended except in a few instances where an economical installation is absolutely necessary.

Lights for platforms with coversheds are necessarily limited to direct lights hung from the roof of the shed.

The most satisfactory arrangement of lighting units in subways is to place them on the ceiling along the center of subway, spacing them at intervals large enough to give an illumination intensity of about one foot candle.

Subway stair lights should preferably be placed in recesses on the side walls, the fixtures to be placed approximately six inches above the level of the treads, so arranged that the light will not shine in the eyes of pedestrians going up the stair. Approximately 0.5 foot candles would be sufficient to illuminate a stair.

The following tabulation gives some general figures showing the approximate amount of light required at various locations in and around passenger stations:

First Class—Important City and Suburban Stations

Waiting room	Direct	3 to 3.5	foot candles
Ticket office	Direct	3.5 to 4.5	" "
Ticket windows	Direct, 1 drop	4 to 4.5	" "
Baggage room	General illumination	1 to 2	" "
	With local drop over desk and window.		
News stand	Direct illumination	5	foot candles
Toilet rooms	Direct general illumination	1.5 to 2	foot candles
	With one drop over each two stalls.		
Coversheds and main platforms	Direct	1.5	foot candles
Outlying platforms	Direct	1	" "
Station approaches	Direct	1 to 1.5	" "

Second Class—Unimportant Country Stations

Waiting room	Direct general illumination	.3	foot candles
Ticket office	Direct general illumination	.3.5	" "
Ticket window	One 25-watt lamp	4	" "
Baggage room	Direct illumination (1 or more drop)		
Toilet room	Direct (generally 1 drop is sufficient)		
Platforms adjacent to station	Direct	0.1 to 1.5	foot candles
Outlying platforms	Direct	0.25 to 5	" "

Subject (8). Modern Types of Toilet Facilities at Small Stations Where Water Supply and Sewers Are Lacking

Within the past five or six years, a number of waterless closets have come on the market and some of them are proving a very satisfactory substitute for the privies, doing away with the odor and pollution, and they can be installed in any building at a cost no greater than for a single or double privy. In a great many instances they will answer the purposes that water fixtures are designed for, and are more economical to install and operate, being practically non-freezing, free from the usual plumbing charges, and do not waste water. They are easily cleaned, swabs being furnished for the purpose.

This system consists of a receiving receptacle containing chemicals, which destroy any disease germs and liquefy the fecal matter. This container can be pumped or drained on the ground, as there is no odor and all germs are destroyed. If fixtures are installed in proper proportion to the number of people served it will only be necessary to drain the receptacle approximately once every three months. One fixture will serve approximately 20 persons per day.

On account of the chemicals necessary in this system, special attention should be given to the quality of material used. In no case should less than 14 gage metal be considered and pure iron should be used. The tank and tubes should also be coated with asphaltic enamel, which adheres to metal under bending and will be unaffected by acids, alkalis, electrolytic or atmospheric conditions.

Another type obtainable is a portable container with seat and lid, agitator, and an anti-splash board which takes position when the seat is raised, which assists in agitation.

In regard to the experience of the railroads with these fixtures, a questionnaire was sent out and the 50 odd replies received show that 24 roads have no installations. Others show installations of from 1 to 354 with only a few renewals, mostly from corrosion of tank, but in one case from lack of attention. The installations cover a period of from 1913 to 1919.

The opinion, therefore, seems to be that with proper installation and attention chemical toilets are satisfactory.

Conclusions

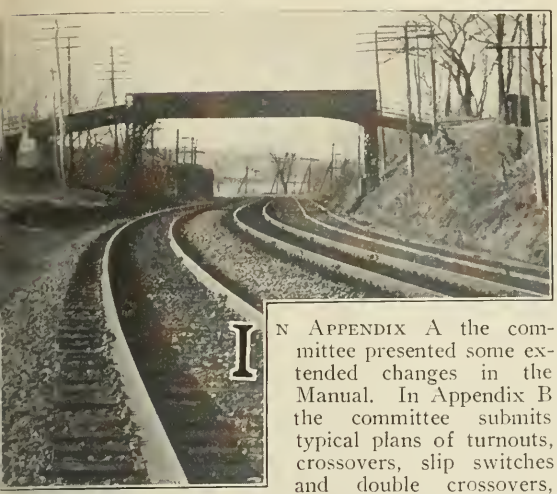
It is recommended that in locations where water supply and sewers are available, the usual system of water closets and urinals be installed. Where these are not available permanent or portable types of chemical closets and urinals should be installed; proper supervision of installation, care in inspection, handling, charging and draining should be maintained.

Committee: M. A. Long (architect), chairman; C. W. Richey (P. R. R.), vice-chairman; G. W. Andrews (B. & O), D. R. Collin (architect), W. H. Cookman (P. R. R.), C. G. Delo (C. G. W.), W. T. Dorrance (N. Y., N. H. & H.), K. B. Duncan (A. T. & S. F.), G. H. Gilbert (Sou.), Walter Goldstraw (G. T.), A. T. Hawk (C. R. I. & P.), F. F. Harrington (U. S. R. A.), E. A. Harrison (A. T. & S. F.), A. Larsen (Miami Conservatory), J. W. Orrock (C. P. R.), R. V. Reamer (C. R. R. of N. J.), John Schofield (C. N.).

Discussion

In the absence of Chairman Long, A. T. Hawk (C. R. I. & P.) presented the report, and moved that the revisions of the Manual as proposed by the committee be approved. The motion was seconded and carried. Mr. Hawk read the conclusions at the end of the report on Subject 7, and made a motion that these conclusions, including the tables, be published in the Manual. This was seconded and carried. He then read the matter relating to Subject 8 and the conclusions at the end of the report, which were adopted. The committee was then excused.

Report of the Committee on Track



In Appendix A the committee presented some extended changes in the Manual. In Appendix B the committee submits typical plans of turnouts, crossovers, slip switches and double crossovers, recommending certain of them for adoption and others to be received as information. These plans were the result of the study and co-operation of the committee and the frog and switch manufacturers of the Manganese Track Society. In Appendix C the committee presented a specification for relayer rail, which classifies the rail according to wear and grades it according to the use intended.

The committee reported progress on: Subject 3—"Report on reduction of taper of tread of wheel to 1 in 38, and on canting the rail inward"; Subject 4 (a)—"Report on test of tie plates subject to brine drippings," and on Subject 6—"Continue efforts to induce railroad operating officials to study and collect data relating to effect of flat spots on track structure."

Conclusions

1. The committee recommended that the changes in the Manual in Appendix A be approved and the revised matter be substituted for the present subject-matter in the Manual.

2. The committee recommended 41 "Typical Plans for Frogs, Switches, Turnouts, Crossovers," etc., for approval and publication in the Manual as listed in Appendix B; also Specifications for the Design and Dimensions of Manganese Steel Pointed Switches, printed in Vol. 18, A. R. E. A. Proceedings of 1917, page 407.

The committee also recommended that 13 plans, dated September 15, 1919, be accepted as information as listed in Appendix B; also 8 plans giving preferred names of parts, as listed in Appendix B.

The committee recommended the reassignment of Subject 2—"Report on typical plans of turnouts, crossovers, slip-switches and double crossovers, and prepare details for such work"; Subject 3—"Report on reduction of taper of tread of wheel to 1 in 38, and on canting the rail inward"; Subject 4 (a)—"Report on test of tie plates subject to brine drippings"; and 4 (b)—"Report on the effect of brine drippings on track appliances." It recommended the discontinuance of Subject 6—"Continue efforts to induce railroad operating officials to study and collect data relating to effect of flat spots on track structure," and that an investigation of the effect of flat spots on track structure be made by the Committee on Stresses in Track.

Committee: W. P. Wiltsee (N. & W.), chairman; J. R. Leighty (M. P.), vice-chairman; R. A. Baldwin (C. N. R.), Geo. H. Bremner (I. C. C.), G. W. Hegel (C. J), T. H. Hickey (M. C.), E. T. Howson (Railway Age), T. T. Irving (G. T.), J. B. Jenkins (B. & O.), H. A. Lloyd (Erie), J. de N. Macomb (A. T. & S. F.), F. H. McGuigan, Jr. (U. S. R. A.), J. V. Neubert (N. Y. C.), F. L. Nicholson (N. S.), C. H. Niemeyer (P. R. R.), R. M. Pearce (P. & L. E.), H. T. Porter (B. & L. E.), J. H. Reinholdt (M. & St. L.), G. J. Slibeck (Pettibone Mullikin Co.), J. B. Strong (Ramapo Iron Works), J. R. Watt (L. & N.).

Appendix A—Revision of Manual

The committee recommended that the following changes in the Manual be made:

Specifications

For Specifications for Steel Tie Plates, Specifications for Wrought-Iron Tie Plates, Specifications for Malleable Iron Tie Plates, Specifications for Ordinary Track Spikes and Specifications for Screw Spikes, substitute the following specifications: The Specifications for Track Bolts on page 123 of the Manual should be withdrawn, as the Rail committee is now handling this subject. The committee is of the opinion that the Specifications for Spiral Spring Nut Locks should be withdrawn and the subject handled by the Rail committee in connection with joints and bolts.

The committee recommends that the design of the cut track spike shown on page 22 of the 1918 Supplement to the Manual be withdrawn, and the design submitted herewith be substituted therefor, as the present design in the Manual does not correctly show the slope of the under-

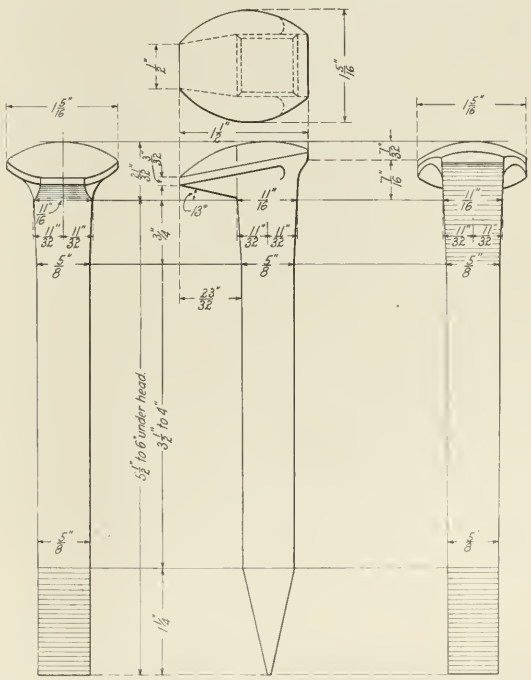


Fig. 1—Recommended Design of a Cut Track Spike

side of the head of the spike to agree with the slope of the top of the rail base.

Frogs, Switches, Etc.

It is recommended that the plans shown on pages 169, 170 and 171 of the Manual, and that paragraphs on Frog

Blocking and the Specifications for Frogs, Crossings and Switches and Turnouts, Crossovers, etc., shown in the 1915 Manual on pages 172 to 186, inclusive, be withdrawn from the Manual until new specifications can be provided to agree with the recommended plans of frogs and switches. These plans in themselves contain sufficient specifications for temporary purposes.

Specifications for Steel Cut Track Spikes

I. Material

Process. 1. The steel may be made by Bessemer or open-hearth process.

II. Physical Requirements

Tension Tests. 2. The full-size finished spikes, or the full-size bars from which the spikes are made, shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.....55,000
Yield point, lb. per sq. in.....0.5 tensile strength
Elongation in 2 in., per cent.....25.

Bend Tests. 3. (a) The body of the full-size finished spikes shall bend cold through 180 deg. flat on itself, without cracking on the outside of the bent portion.

(b) The head of the full-size finished spikes shall bend backward to the line of the face of the spike, without cracking on the outside of the bent portion.

Number of Tests. 4. (a) One tension and one bend test of each kind shall be made from each lot of 10 tons or fraction thereof.

(b) If any test specimen develops flaws, it may be discarded and another specimen substituted.

Retests. 5. If any tension test specimen breaks more than ¾ in. from the center of the gage length, a retest shall be allowed.

III. Design

Workmanship. 6. The spikes shall conform to the dimensions specified by the purchaser. A variation of 1/64 in. under the specified dimension of the body of the spike, measured from the face to the back, and a variation of 1/32 in. over the specified dimensions of the body of the spike, measured across the face, will be permitted. A variation of 3/32 in. over and 1/32 in. under the specified dimensions of the head of the spike will be permitted. A variation of ⅛ in. from the specified length of the spike, measured from the under side of the head to the point, will be permitted. A variation of 1 deg. in the specified angle of the under side of the head of the spike will be permitted.

IV. Manufacture

Finish. 7. The finished spikes shall be free from injurious defects and shall have a workmanlike finish.

V. Inspection

Inspection. 8. The inspector representing the purchaser shall have free entry, at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's work which concern the manufacturer of the spikes ordered. The manufacturer shall afford the inspector, free of cost, all reasonable facilities to satisfy him that the spikes are being furnished in accordance with these specifications. All tests and inspection shall be made at the place of manufacture prior to shipment, unless otherwise specified, and shall be so conducted as not to interfere unnecessarily with the operation of the works.

Rejection. 9. Spikes which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

VI. Shipment

Packing. 10. When spikes are shipped they shall be packed in good, serviceable packages. All packages must be plainly marked as to material, size of spike and name of manufacturer.

Specifications for Steel Tie Plates

1. These Specifications cover two grades of steel tie plates, namely, Soft and Medium. The soft grade steel shall be used, unless otherwise specified.

I. Material

Process. 2. Steel may be made by the Bessemer or open-hearth process.

II. Chemical Requirements

Phosphorus. 3. (a) The steel shall conform to the following requirements as to chemical composition:

Phosphorus..... { Bessemer—not over 0.10 per cent.
{ Open-hearth—not over 0.05 per cent.

Carbon. (b) Unless otherwise specified, the material will be furnished according to chemical composition only, in which case the minimum carbon shall be as follows:

Bessemer Carbon	Soft Grade Not under 0.08 per cent.	Medium Grade Not under 0.12 per cent
Open-hearth Carbon	Soft Grade Not under 0.15 per cent.	Medium Grade Not under 0.20 per cent.

Ladle Analysis. 4. (a) A carbon determination shall be made of each melt of Bessemer steel, and two analyses every 24 hours representing the average of the elements, carbon, manganese, phosphorus and sulphur, contained in the steel, one for each day and night turn, respectively. These analyses shall be made from drillings taken at least ⅛ in. beneath the surface of a test ingot obtained during the pouring of the melts. The chemical composition thus determined shall be reported to the purchaser or his representative, and shall conform to the requirements specified in Section 3.

(b) An analysis of each melt of open-hearth steel shall be made by the manufacturer to determine the percentages of carbon, manganese, prosphorus and sulphur. This analysis shall be made from drillings taken at least ⅛ in. beneath the surface of a test ingot obtained during the pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative, and shall conform to the requirements specified in Section 3.

Check Analysis. 5. An analysis may be made by the purchaser from a finished tie plate representing each melt of open-hearth steel, and each melt or lot of 10 tons of Bessemer steel. The carbon content thus determined shall not be less than that specified in Section 3, and the phosphorus content shall not exceed that specified in Section 3 by more than 25 per cent.

III. Physical Requirements

Bend Test. 6. The bend test specimens specified in Section 7 shall bend cold through 180 deg. around a pin the diameter of which is equal to the thickness of the specimen for the soft grade, and to twice the thickness of the specimen for the medium grade, without cracking on the outside of the bent portion.

Test Specimens. 7. Bend test specimens shall be taken from the finished tie plates, or from the rolled bars, and longitudinally with the rolling. They shall be rectangular in section, not less than ½ in. in width between the planed sides, and shall have two parallel faces as rolled. They shall be free from ribs or projections. Where the design of the tie plates is such that the specimen cannot be taken between the ribs or projections, these ribs or projections shall, in preparing the specimen, be planed off even with the main surface of the tie plate.

Optional Bend Test. 8. If preferred by the manufacturer and approved by the purchaser, the following bend test may be substituted for that described in Section 6.

A piece of the rolled bar shall bend cold through 90 deg. around a pin the diameter of which is equal to the thickness of the section, where bent for the soft grade, and to twice the thickness of the section where bent for the medium grade, without cracking on the outside of the bent portion.

Number of Tests. 9. (a) One bend test shall be made from each melt of open-hearth steel, or from each melt or lot of 10 tons of Bessemer steel.

(b) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

Tension Tests. 10. (a) If desired by the purchaser or for the reason that the manufacturer does not make his own steel bars and is not able to make the chemical analysis of the steel, the material may be purchased to conform to the following minimum requirements as to tensile properties:

	Soft Grade	Medium Grade
Tensile strength, lb. per sq. in.	55,000	64,000
Yield point, lb. per sq. in.	0.5 tens. str.	0.5 tens. str.
Elongation in 2-in., per cent	1,500,000 Tensile St.	1,500,000 Tensile Str.
But in no case less than	20 per cent.	18 per cent.
Elongation in 8-in., per cent	1,400,000 Tensile St.	1,400,000 Tensile Str.
But in no case less than	18 per cent.	16 per cent.
Reduction of area, per cent	30 per cent.	25 per cent.

Test Specimens. (b) The tension test specimens shall be taken from the finished tie plates, or from the rolled bar. They shall be cut so that the sides of the specimens are parallel to the direction in which the tie plates have been rolled.

(c) Tension test specimens may conform to the essen-

tial dimensions shown in Fig. 2 or Fig. 3. The 2-in. specimen (Fig. 1) shall have filleted shoulders, or threaded ones, to fit into the holders on the testing machine in such a way that the line of action of the force exerted by the testing machine shall coincide with the axis of the specimen.

Note:—The gage length, parallel portions and fillets shall be as shown, but the ends may be of any form which will fit the holders of the testing machine.

(d) Or, tension test specimens may be rectangular in section, in which case they shall be not less than ½ in. in width between the planed sides, and shall have two parallel faces as rolled. When the tie plates are of such a design that the rectangular specimens cannot be obtained without projecting ribs, these shall be planed off before the tests are made.

Number of Tests. 11. (a) One tension test shall be made from each melt of open-hearth steel, and from each melt or lot of 10 tons of Bessemer steel.

(b) If any test specimen shows defective machining, or

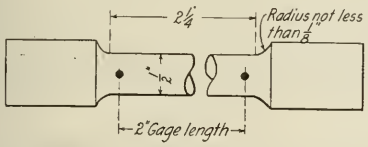


Fig. 2

develops flaws, or if it breaks outside the gage length, it may be discarded and another specimen substituted.

Retests. 12. If the percentage of elongation of any tension test specimen is less than that specified in Section 5, or if any part of the fracture is more than ¾ in. from the center of the gage length of a 2-in. specimen or is outside the middle third of the gage length of an 8-in. specimen, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

IV. Design

Plan. 13. The tie plates shall conform to the drawings submitted to the manufacturer, with the following permissible variations:

Tolerance. (a) For plates with shoulders parallel to the direction of rolling, a variation of 1/32 in. in thickness, ⅛ in. in rolled width, and 3/16-in. in sheared length will be permitted.

(b) For plates with shoulders perpendicular to the direction of rolling, a variation of 1/32-in. in thickness, ⅛-in. in rolled width, and ¼ in. in sheared length will be permitted. The distance from the face of shoulder to the outside end of the plate shall not vary more than ¼ in., and from the face of shoulder to the inside end not more than ½ in.

V. Manufacture

Workmanship. 14. The tie plate shall be smoothly rolled, true to templet, and shall be straight and out of wind on the surface which will form the bearings for the rail.

Finish. 15. The finished tie plates shall be free from burrs and other surface deformations caused by the shearing and punching; they shall also be free from other injurious defects and shall have a workmanlike finish.

Marking. 16. The name or brand of the manufacturer the section and the year of manufacture shall be rolled in raised letters and figures on the outside of the shoulder of the plates, and a portion of this marking shall appear on each finished tie plate.

VI. Inspection

Inspection. 17. (Same as for track spikes.)

Rejection. 18. (a) Unless otherwise specified, any rejection based on tests made in accordance with Section 5 shall be reported within five working days from the receipt of samples.

(b) Tie plates which show injurious defects subsequent to their acceptance at the manufacturer's works will be rejected, and the manufacturer shall be notified.

Rehearing. 19. Samples tested in accordance with Section 5, which represent rejected tie plates, shall be preserved for two weeks from the date of the test report. In case of dissatisfaction with the results of the tests, the manufacturer may make claim for a rehearing within that time.

VII. Shipment

Packing. 20. Tie plates shall be wired together in bundles of uniform number, weighing not to exceed 100 lb., unless otherwise specified.

Specifications for Steel Screw Track Spikes

I. Material

Process. 1. (Same as for cut spikes.)

Finishing. 2. The heads of the spikes shall be formed and the threads rolled at a temperature not less than 750 deg. C.

II. Physical Requirements

Tension Tests. 3. The full-sized finished spikes shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	60,000
Yield point, lb. per sq. in.	0.5 tensile strength
Elongation in 2 in., per cent.	20

Bend Tests. 4. The full-size finished spikes shall bend cold through 90 deg. around a pin the diameter of which is equal to three times the diameter of the spike, without cracking on the outside of the bent portion.

Number of Tests. 5. (a) One tension and one bend test shall be made from each lot of 100 kegs or fraction thereof.

(b) If any spike tested develops flaws, it may be discarded and another spike substituted.

Retests. 6. (a) If the percentage of elongation of any tension test spike is less than that specified in Section 3, a retest shall be allowed.

(b) If any tension test spike breaks more than ¾ in. from the center of the gage length, a retest shall be allowed.

III. Design

Workmanship. 7. The spikes shall conform to the dimensions specified by the purchaser. The head shall be concentric with, and firmly joined to the body of the spike. The threads shall be sharp and true to gage and of the pattern specified by the purchaser. A variation of 1/32 in. over the specified diameter of the unthreaded portion of the body of the spike will be permitted. A variation of 1/32 in. over the specified diameter of the threaded portion of the spike will be permitted. A variation of 1/16 in. under and ⅛ in. over in the reach of the head of the spike will be permitted. A variation of ⅛ in. from the specified length of the spike will be permitted.

IV. Manufacture

Finish. 8. (Same as cut spike.)

Marking. 9. A letter or brand indicating the manufacturer shall be pressed on the head of the spike while it is being formed.

V. Inspection

Inspection. 10. (Same as for cut spike.)

Rejection. 11. (Same as cut spike.)

VI. Shipment

Packing. 12. When spikes are shipped they shall be properly oiled to prevent rusting and shall be packed in good, serviceable packages. All packages shall be plainly marked

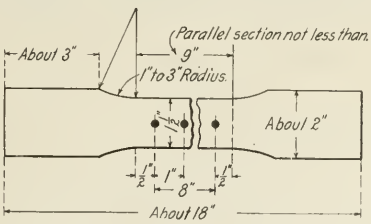


Fig. 3

as to material, size of spike and name of manufacturer, unless otherwise specified.

Specifications for Wrought-Iron Tie Plates

I. Material

1. Plates shall be made of all-pig puddled iron.

II. Physical Requirements

2. The material shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	48,000
Yield point, lb. per sq. in.	0.6 tensile strength
Elongation in 2-in., per cent.	28
Elongation in 8-in., per cent.	25
Reduction of area, per cent.	37

Bend Tests. 3. The bend test specimen shall bend cold through 180 deg. without fracture around a pin the diameter of which is equal to the thickness of the specimen.

Test Specimens. 4. (Same as for steel tie plate.)

Number of Tests. 5. (a) One tension test and one bend test shall be made from each lot of 1,000 tie plates.

(b) If any test specimen from either of the bars originally selected to represent a lot of material contains surface defects not visible before testing, but visible after testing, or if a tension test specimen breaks outside the middle third of the gage length, the individual bar shall be rejected and one retest from a different bar will be allowed.

III. Design

Plan. 6. (Same as for steel tie plate.)

Variations. (Same as for steel tie plate.)

IV. Manufacture

Workmanship. 7. (Same as for steel tie plate.)

Finish. 8. The finished tie plates shall be free from burrs and other surface deformations caused by the shearing and punching; they shall also be free from slivers, depressions, seams, crop ends and evidences of being burnt.

Marking. 9. (Same as for steel tie plate.)

V. Inspection

Inspection. 10. (Same as for steel tie plate.)

Rejection. 11. If either of the test bars selected to represent a lot does not conform to the requirements specified in Sections 2, 3, 4 and 5, the lot will be rejected.

VI. Shipment

Packing. 12. (Same as steel tie plate.)

Specifications for Malleable Iron Tie Plates

I. Material

1. Plates shall me made from furnace malleable iron.

II. Physical Requirements

Tension Tests. 2. The tension test specimens specified in Section 4 shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lbs. per sq. in.	45,000
Elongation in 2 in., per cent.	7.5

Special Tests. 3. (a) All tie plates shall have cast thereon test lugs of a size proportional to the thickness of the tie plate, but not exceeding ⅝ by ¾ in. in cross-section. These lugs shall be attached to the tie plate at such a point that they will not interfere with the assembling of the tie plates, and may be broken off by the inspector.

(b) If the purchaser or his representative so desires, a

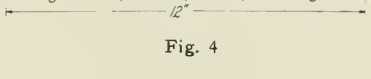


Fig. 4

tie plate may be tested to destruction. Such a tie plate shall show good, tough, malleable iron.

Tension Test Specimens. 4. (a) Tension test specimens shall be of the form and dimensions shown in Fig. 4. Specimens whose mean diameter at the smallest section is less than 19/32 in. will not be accepted for test.

(b) A set of three tension test specimens shall be cast from each melt, without chills, using risers of sufficient height to secure sound bars.

The specimens shall be suitably marked for identification with the melt. Each set of specimens so cast shall be placed in some one oven containing tie plates to be annealed.

Number of Tests. 5. (a) After annealing, three tension test specimens shall be selected by the inspector as representing the tie plates in the oven from which these specimens are taken.

(b) If the first specimen conforms to the specified requirements, or if, in the event of failure of the first specimen, the second and third specimens conform to the requirements, the tie plates in that oven shall be accepted, except that any tie plate may be rejected if its test lug shows that it has not been properly annealed. If either the second or third specimen fails to conform to the requirements, the entire contents of that oven shall be rejected.

Re-annealing. 6. Any tie plates rejected for insufficient annealing may be re-annealed once. The re-annealed tie plates shall be inspected and if the remaining test lugs, or tie plates broken as specimens, show the tie plates to be thoroughly annealed, they shall be accepted; if not, they shall be finally rejected.

III. Design

Plan. 7. Tie plates shall conform to the drawing submitted to the manufacturer, with the following permissible variations:

Variation. (a) The length and width shall not vary more than ⅛ in. from the dimensions shown.

(b) The thickness shall not vary more than 1/32 in. from the dimensions shown.

IV. Manufacture

Workmanship. 8. The plates shall be straight and out of wind on the surface which forms the bearings for the rail, and shall be made in workmanlike manner.

Finish. 9. The finished tie plate shall be well cleaned and free from warping, shrinkage, cracks, blow-holes, fins, and other imperfections.

Marking. 10. The manufacturer's identification mark and the pattern numbers assigned by the purchaser shall be cast on all tie plates in such positions that they will not interfere with the service of the tie plate.

V. Inspection

Inspection. 11. (Same as for steel tie plates.)

(b) The manufacturer shall be required to keep a record of each melt from which tie plates are produced, showing tensile strength and elongation of test specimens cast from such melts. These records shall be available and shown to the inspector whenever required.

Rejection. 12. Tie plates which show injurious defects subsequent to their acceptance at the manufacturer's works may be rejected, and, if rejected, shall be replaced by the manufacturer free of cost to the purchaser.

VI. Shipment

Packing. 13. (Same as for steel tie plates.)

Tie plates shall be wired together in bundles of uniform number, weighing not to exceed 100 pounds, for shipment, unless otherwise specified.

Appendix B—Typical Plans of Turnouts, Crossovers, Etc., with Detail Plans for Such Work, Including Tie Plates, Rail Braces, Etc.

The committee submitted detail plans with recommendations for adoption as follows:

Plans Dated September 15, 1919.

Plans 101 to 108, inclusive	Details of Switches.
Plans 201 to 204, inclusive	Details of Switch Fixtures.
Plans 210 and 211	Illustration Bills of Material for Switches.
Plans 301, 302, 303, 304, 306 and 307	Bolted Rigid Frogs.
Plans 305 and 308	Details of Plates for Bolted Rigid Frogs.
Plans 401, 402 and 403	Spring Rail Frogs.
Plan 501	Details of Guard Rails.
Plan 502	Details of Guard Rail Fixtures.
Plans 601 to 607, inclusive	Railbound Manganese Steel Frogs.
Plans 651 to 655, inclusive	Solid Manganese Steel Frogs.

Also the specifications for the Design and Dimensions of Manganese Steel Pointed Switches, as printed in Vol. 18, A. R. E. A., Proceedings of 1917, on page 407.

Plans of Frogs, Switches, Etc.

These plans will be found complete for 11 ft. 0 in., 16 ft. 6 in., 22 ft. 0 in. and 30 ft. 0 in. split switches, also with Specifications for the Design and Dimensions of Manganese Steel Pointed Switches of these lengths: for bolted rigid frogs Nos. 6, 7, 8, 10, 11 and 16; for spring rail frogs Nos. 8, 10 and 11; for guard rails 8 ft. 3 in., 11 ft. 0 in. and 16 ft. 6 in. long; for railbound manganese steel frogs Nos. 6, 7, 8, 10, 11, 16 and 20, and for solid manganese steel frogs Nos. 6, 7, 8, 10 and 11.

It is recognized it would not be economical for some of the railroad systems to adopt this set of standards throughout on account of local or other conditions, but this set of standards will form a guide in making up new plans, especially when a change in rail section is contemplated. The fittings as detailed could then be largely adopted, which would prove of considerable economy, as the manufacturers could afford to carry material of

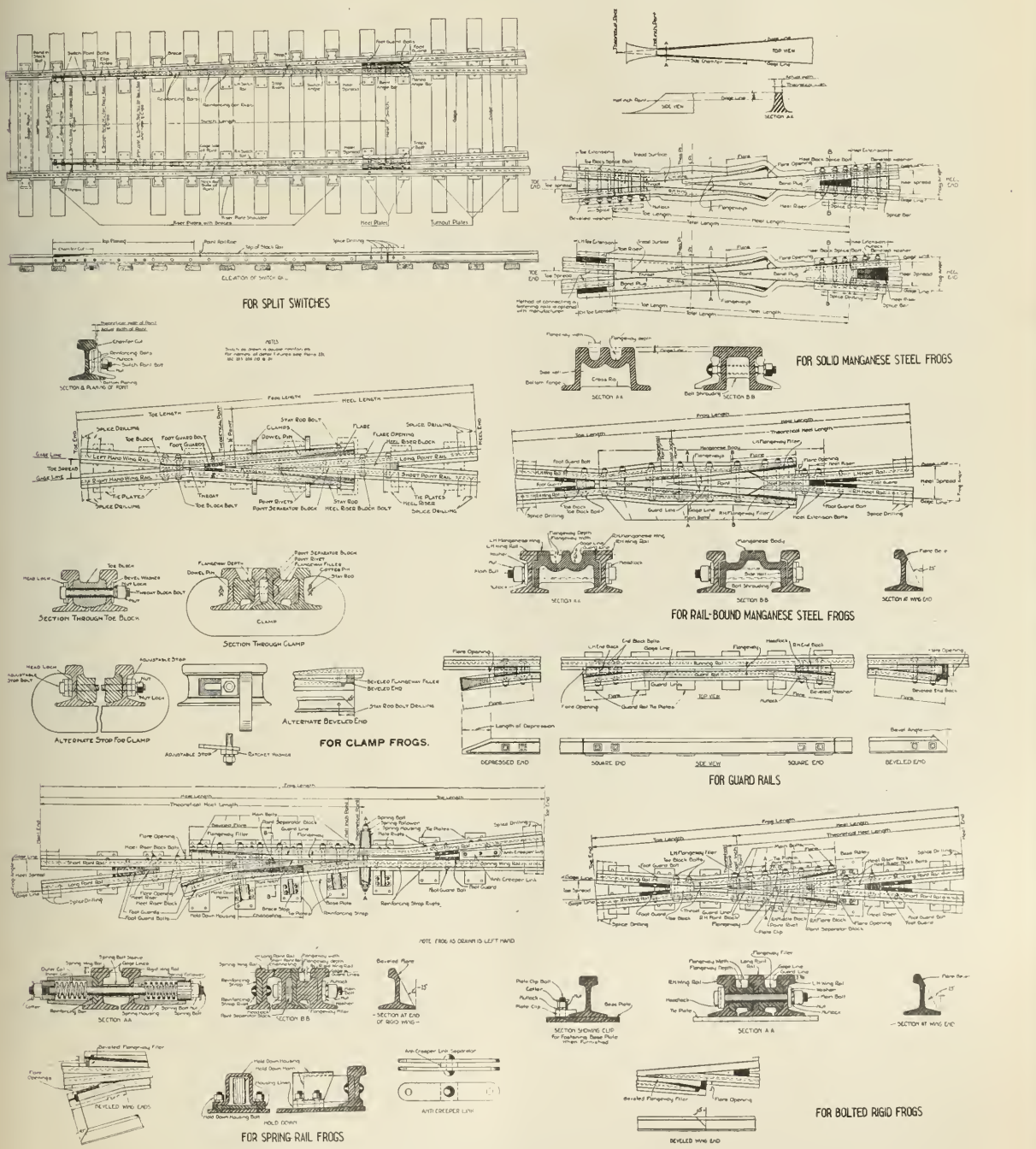
standard sizes and to make up the standard fittings in quantity and carry them in stock.

The committee also submitted as information plans dated September 1, 1919, as follows:

Plans 331 to 334, inclusive..Clamp frogs.
Plan 335 .....Details of plates for clamp frogs.
Plans 901 to 908, inclusive..Layout plans of turnouts and crossovers.
Plan 190—Split switch with uniform risers.
Plan 191—Split switch with graduated risers.
Plan 390—Bolted rigid frog.
Plan 391—Clamp frog.
Plan 490—Spring rail frog.
Plan 590—Guard rail.
Plan 690—Railbound manganese steel frog.
Plan 691 Solid manganese steel frog.

The committee also submitted a report from a questionnaire sent out on July 25, 1919, "Subject—Design and Use of Clamp Type of Frog," to the members of this association, reading as follows:

1. Do you use the clamp type of frog?



Plans for Frogs and Switches Submitted by Track Committee

2. Have you ever used the clamp type of frog? If so, and you are not using it, why was its use discontinued?

3. With what weight of rail and what frog angles was this type of frog used?

4. In your opinion, how does this frog compare with the bolted rigid type of frog?

5. Please give mileage of track and number of switches using this type of frog and approximate percentage of the total number of frogs used that are of the clamp type.

Summarizing the reports from the 62 roads replying, comprising 193,561 miles of road operated, the report is as follows:

1. Six roads representing 15,620 miles of road reported a "Yes," one of which reported very few used.

2. Thirty-two railroads comprising 106,869 miles of road reported having used them.

Eight railroads, comprising 12,547 miles, did not state.

3. Very few roads gave the weight and frog angle and what type of frog used, but those that did state claim the majority of them were all weights of rail, 80 lb. and under, and frog angles from No. 7 to No. 10, inclusive.

4. Twenty-nine railroads comprising 80,810 miles of road reported the clamp frog is inferior to the bolted rigid frog.

Four railroads, comprising 12,946 miles of road, reported the clamp frog as superior to the bolted rigid frog.

Five railroads, comprising 8,288 miles of road, reported the clamp frog as comparing favorably to the bolted rigid frog.

Twenty-four railroads, comprising 91,517 miles of road, reported not having used clamp frogs and gave no opinion.

5. The roads reporting did not give sufficient information to work up this data, but the majority of them said where they are being used they are used in yards and sidings only.

Appendix C—Report on Specifications for Relayer Rails for Various Uses

The committee submitted specifications for relayer rails for various uses:

Definition. Worn rails suitable for use in track are known as relayer rails.

Classification. Relayer rails shall be classified according to the wear on the side and top of the head:

(1) Side wear shall be represented by figures, 0 representing no side wear, 1, 2, 3, etc., representing the number of sixteenths of an inch wear on the side of the head at the gage point 5/8 in. below the original top of the rail.

(2) Top wear shall be represented by capital letters, O representing no top wear, A representing 1/32 in., B, 2/32 in., C, 3/32 in., etc., wear, measured at the center of the rail.

(3) If the rail head is worn on both sides the first figure shall represent the side showing the greater wear, the letter the top wear, and the figure following the lesser side wear.

(4) The maximum wear allowed in each case shall be specified by the user or the purchaser.

Process and Section. The process, as Bessemer, open-hearth, special alloy or process steel, the section, the original weight per yard and the splice drilling shall be specified.

Main Track Relayer Rails. *Grade* 1. Used rails suitable for main track on main or branch lines. They must be free from all physical defects and shall pass the A. R. E. A. Specifications for Steel Rail in all respects except wear. The surface of the rails of this grade must be fairly smooth and must not have flat spots or wheel burns. They must be sawed at the ends, not cut with a chisel. Drilling must be uniform. Chemical analysis or the specifications under which the rails were originally purchased shall be furnished when requested by the purchaser. There shall be full length pieces, 30 or 33 ft. long, and not over 10 per cent of shorts varying in lengths by 1 ft. with a minimum length of 22 ft.

Resawing Rails. *Grade* 2. All rails with battered or otherwise defective ends, which if resawed would meet Grade 1 requirements, shall be graded as Resawed Main Track Relayer Rails. In this case 90 per cent of the rails must be of uniform length, 27 ft. or more.

Side Track Relayer Rails. *Grade* 3. All used rails suitable for side tracks shall be included in this grade. They must be not less than 15 ft. long. Rails too badly out of line or surface to be included in Grade 1, but straight enough to be easily spiked to line and gage shall be accepted. Drilling must be uniform. Base must be full or uniform width.

Any physical defects, such as broken lower flange, corroded, curved ends, burnt, ends battered, ends down, flat spots, head flow, line bent, piped, pitted, short, split end, split head, surface bent, twisted worn under head, shall be specified where they occur and the extent of the defect shall be represented by the use of the term "slight," "moderate" or "bad."

Scrap Rails (Rolling Mill Rails). *Grade* 4. Rails of standard section not suitable for use as relayer rails. They shall be not less than 6 ft. long and must be free from pipes, split heads and similar defects. Badly twisted rails or bent rails, frogs, switches and guard rails shall not be accepted.

Scrap Rails. *Grade* 5. All used rails of any length or condition not meeting the above specifications shall be designated as Grade 5.

Marking and Shipping. Rails when classified shall be marked with white paint on the web about 3 ft. from the end. The figure and letter representing the side and top wear shall be painted first, followed by a dash (—) and the grade number, except scrap rails shall be marked by the grade number only. No two grades of rails shall be loaded in the same car.

Examples. (1) Main track relayer rails having 3/16 in. side wear and 3/32 in. top wear would be classified and marked 3 C—1.

(2) Resawed main track relayer rails having 1/4 in. side wear and 3/32 in. top wear would be classified and marked 4 C—2.

(3) Side track relayer rails having 1/2 in. side wear and 1/8 in. top wear would be classified and marked 8 D—3. If there are any physical defects, as curved ends, line bent, pitted, etc., they should be so classified and the extent of the defects specified as "slight," "moderate" or "bad."

(4) Side track relayer rails having 1/2 in. side wear on one side and 3/8 in. side wear on the other side, 1/8 in. top wear, would be classified and marked 8 D 6—3. If there are any physical defects, as curved ends, line bent, pitted, etc., they should be so classified and the extent of the defects specified as "slight," "moderate" or "bad."

Discussion

W. P. Wiltsee (Chairman): I move that the design of the track spike as shown in the report be adopted and printed in the Manual.

W. C. Cushing (P. R. R.): I have had some correspondence with some manufacturers on this design of spike, and two of them have written to me that it requires special machines for its manufacture, which adds to its cost. The trouble is it must be a hand-made spike instead of a machine-made spike. I therefore would move as an amendment that this question be taken up further before it is presented to the association for adoption.

(The amendment was seconded.)

Chairman Wiltsee: That question was up before this spike was accepted. Two years ago I took it up with manufacturers, and it was proved to me that they could manufacture this spike as economically as any other spike on automatic machines. The Canadian Pacific has been using this spike for a long time. I was told that the Central Railroad of New Jersey had recently purchased some of these spikes, and I think the matter has been fully investigated, and that there isn't any doubt but what it can be manufactured.

Mr. Cushing: There is doubt on the question. I have these letters and will be pleased to submit them if desired. It seems to me if there is any doubt it had better be looked into further.

F. E. Abbott (Lackawanna Steel Company): The Lackawanna Steel Company's criticism of this spike was, first, that there is an enlargement of the entire outside under the head, and it is 1/16 in. larger at the top and the enlargement is put on all sides of the spike. That will be the most difficult part to make in an automatic machine, the enlargement on top of the spike.

Clark Dillenbeck (P. & R.): Our spikes were ordered a couple of months ago in accordance with the standard from Davis Bros. & Co. of Philadelphia, and they came in and said it was impossible to make them in their machines and we changed the design to satisfy them.

(Mr. Cushing's amendment was put and carried.)

Chairman Wiltsee: I move that the specification for steel cut track spike appearing on page 153 be adopted and printed in the Manual.

(The motion was seconded and carried.)

Chairman Wiltsee: The next specification is that for steel tie plates. I move that this specification be adopted and printed in the Manual.

(Motion seconded.)

Mr. Abbott: I would like to know definitely whether it is the intention that both the chemical and the physical tests shall be applied. It is not quite clear as the specification reads that it is left optional with the purchaser. If it is optional with the purchaser, he can require it at all times, and on all material specifications. That is an unfortunate situation in a sense. The manufacturers favor a grade of steel that will make an outlet for the soft grade; that is, they need it for the sake of economy as much as for anything else, and there are a great many tie plates used in which the soft grade is particularly satisfactory.

Now, to get over that difficulty it would seem fair that there might be named in the specification a soft grade, without any minimum limit on the carbon. You do not necessarily get poor steel because it is soft steel. You simply get soft steel. If you have a pattern of tie plate that is so thick that you cannot punch it until you get the carbon away down, you have got to make an agreement with the buyer to do something different from what the specification calls for.

We are frequently called on to punch a plate that has a greater thickness than the diameter of the hole, and the mechanical department will always back up on it. If this Association puts up a specification that runs up the cost on the manufacturer, or is so exacting in the specifications as to make it more expesive for the manufacturer, you are going to lose the benefit of what you might get by opening the way for the consumption of steel that is fit for a greater part of the tie plates that are required.

Chairman Wiltsee: I think the tendency is to go to higher grade steel in tie plates rather than to allow the manufacturers to use soft steel. The tie plate is becoming a more and more important article and requires more attention than it has had heretofore.

C. W. Baldridge (A. T. & S. F.): I notice the committee permits a tolerance in the dimensions of the plate, but do not provide for any tolerance in the punching. I think there should be some tolerance in size, at least, if not in location. It is important there should not be very great tolerance in location.

(The motion on the adoption of the specifications was carried.)

Chairman Wiltsee: The next item is the specifications for screw track spikes. I move the adoption of the specification.

(Motion seconded and carried.)

Chairman Wiltsee: The next item is the specifications for wrought iron tie plates. I move the adoption of this specification.

(The motion was seconded and carried.)

Chairman Wiltsee: The next item is the specifications for malleable iron tie plates. I move the adoption of this specification for publication in the Manual.

(Motion seconded and carried.)

Chairman Wiltsee: We refer to specifications for the design and dimensions of manganese steel pointed switches. These specifications were printed in Vol. 18 of the proceedings for 1917. I move the adoption of these specifications for publication in the Manual.

(The motion was seconded and carried.)

Chairman Wiltsee: The next item which we wish to present are the plans submitted for adoption by subcommittee 2. These were printed in a separate folder.

(He then in turn moved the adoption of plans 101 to 108 inclusive covering switches, plans 201 to 204 inclusive for switch fixtures, and plans 210 and 211 for switch material, and they were all accepted.)

Chairman Wiltsee: The next plans, 301, 302, 303, 304, 306 and 307 are for bolted rigid frogs. I move the adoption of these plans for publication in the Manual.

H. H. Harsh (B. & O.) In these plans for frogs the length of the arms are all the same, and I notice that in the plans prepared by the committee for typical layouts, which are being submitted at this convention as a matter of information, they suggest layouts which will require the use of rails in leading up, that vary from 2.5 to 3 in. shorter than the full length material we receive from the mills. Nearly all the rails we receive are even lengths, and the leading up plans show 32.9 and 32.10, etc., and I think it would be wise to modify the length of the arm of the frogs and use even foot rails in the leading up rails.

The President: That matter will be left in the hands of the committee.

(Mr. Wiltsee then offered plans 305 to 308 on rigid bolted frogs, plans 401, 402 and 403 for spring rail frogs, plans 501 and 502 for guard rails, plans 601 to 607 inclusive for rail bound manganese frogs and plans 651 to 655 inclusive for solid manganese steel frogs and they were all accepted.)

Chairman Wiltsee: The committee submits plans 331 to 334, inclusive, and 335, clamped frogs and details of plates for clamped frogs. I move that the matter be accepted as information.

A. H. Mulliken (Pettibone Mulliken Co.): I move as an amendment that plans 331 to 334, inclusive, and 335 be approved for publication in the Manual.

Mr. Baldridge: Inasmuch as we have adopted a dozen or 15 plans which perhaps only a half dozen members have seen, I do not see any reason why we should hesitate to adopt this. By vote of this convention last year, this committee was instructed to bring in plans this year for clamped frogs, and apparently very few of us saw what they brought in.

Mr. Mulliken: The clamp frogs were turned down by the committee by a vote of two. I think it is largely a matter of unfounded prejudice against the clamped frog. This particular type of clamp frog which is to be published for information has been in use for more than 30 years, and I see no reason why it should not be approved and published in the Manual.

Chairman Wiltsee: If you will let us take our time we will put this matter in shape.

C. W. F. Felt (Santa Fe). The clamped frog is used on the Santa Fe wherever we use a rigid frog, with the exception of manganese. I would like to ask whether the committee has this still under consideration?

Chairman Wiltsee: It has.

Fred Lavis (American Int. Corporation): As some of us were not closely in touch with actual practice on the railroads, have been in the habit for a long time of taking the Manual as a sort of bible, and I happen to be one of those, and I should very much dislike to see things go into the Manual which do not even have the approval of the committee.

The President: The chair would take the opportunity of saying that these plans will be received as information and will be published in the proceedings and will be available to all. The committee has acknowledged, as far as some of these plans are concerned, they are not complete.

Mr. Mulliken: This is simply putting into the Manual something that has been so thoroughly tested in the last 30 years. It seems unfortunate there should be any question about it at all. I do not see why it should not go

into the Manual, as an alternate, as so many other alternates go in, on frogs and switches and other standards.

Mr. Campbell: I would like to see this clamp frog go into the Manual along with the older frogs and such other frogs as the association may see proper to place there.

C. A. Morse (C. R. I. & P.): Mr. President, I have been familiar with clamp frogs for the last 20 years. The committee a year ago ignored the clamp frog entirely. They have been forced by the association to take it up, and they have had it in their hands for several months. We are going to get out a manual this coming year, and I think it should go in the Manual.

(Mr. Mulliken's amendment was put and defeated.)

Chairman Wiltsee: I submit the specification for relayer rails, and move that it be adopted and printed in the Manual.

(The motion was seconded and carried.)

Chairman Wiltsee: I offer the following resolution:

Whereas, the American Railway Engineering Association realizes the importance of the preparation of standards in frog and switch design; and

Whereas, the frog and switch manufacturers of the Manganese Track Society have co-operated heartily with the Track committee of this association to produce plans that will meet the requirements of the railroads and be in accordance with the best current mill practice; therefore be it

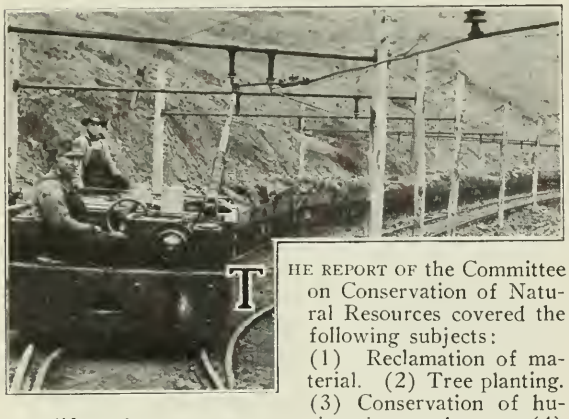
Resolved, That the members of the American Railway Engineering Association desire to show their appreciation of this co-operation and of the immense amount of work done by these manufacturers to accomplish this end, and hereby extend a vote of thanks to the members of this organization.

(The motion was carried.)

Victor Angerer (Wm. Wharton, Jr., & Co.): On behalf of the Manganese Track Society I want to thank the association for the vote, and to say that we appreciate it very much and are always glad to co-operate with you.

(The committee was discharged with the thanks of the association.)

Report on Conservation of Natural Resources



THE REPORT OF the Committee on Conservation of Natural Resources covered the following subjects: (1) Reclamation of material. (2) Tree planting. (3) Conservation of human life and energy among engineering employees. (4) Rules for the prevention of the spread of forest and field fires. (5) Progress of conservation in Canada.

"Rules for the Prevention of the Spread of Forest and Field Fires" were formulated at the request of the United States Railroad Administration and have been approved by the American Railroad Association.*

Conclusions

1. That the reports on reclamation of material, tree planting, conservation of human life and energy, and progress in conservation in Canada, be received as information.

2. That the "Rules for the Prevention of the Spread of Forest and Field Fires" be approved and published in the Manual.

Committee: R. C. Young (L. S. & I.), chairman; S. N. Williams, vice-chairman; R. H. Aishton (A. R. A.), W. K. Barnard, C. B. Brown (C. G. R.), Moses Burpee (C. N. R.), C. H. Fisk, E. E. King (U. of Ill.), William McNab (G. T.), W. F. Ogle (C. R. I. & P.), J. L. Pickles (D. W. & P.).

Appendix A—Reclamation of Material

Many roads have taken up the subject of reclamation of material to such an extent as to erect shops equipped with special appliances for working over at small cost much of the worn and damaged material that formerly went into the scrap pile. They have found that rails with split and battered ends can be sawed into shorter lengths and used again on the main line; that worn and broken frogs and crossings, switch points and rail ends can be built up and welded, many of them in place, by means of the oxy-acetylene welding torch; that worn and bent angle bars, heated in an oil furnace, and placed in a die, can be swedged into their original sections by means of a drop-hammer. Some roads have found that oiling track bolts at regular intervals is an effective means for the conservation of labor and material.

Many roads are finding the sawmill a useful agency in the conservation of timber. Old stringers that formerly were used for platforms, runways, sidewalks, culverts, foundations, retaining walls and back walls in pile and frame trestle bridges can be sawed so as to recover a great deal of valuable lumber.

Much of the lumber that is being used for signs and crossings might be conserved by substituting other materials more permanent and in many cases no more expensive than wood. Public crossings could be made very satisfactorily out of reinforced concrete slabs or out of crushed stone or other ballast materials held in position by a bituminous binder.

Old buildings along the line that cannot serve any useful purpose in their present location or elsewhere should be torn down and all of the material reclaimed and used where they can be made to serve some useful purpose. In many cases the old ties removed from the track can be utilized. Pile-heads that in many cases were thrown away can now be made to serve a useful purpose. The elm and maple pile-heads can be sawed and turned into jack and cant-hook handles; oak pile-heads can be sawed into center and ballast stakes; while cedar pile-heads can be sawed into shingles.

Appendix C—Conservation of Human Life and Energy

Conservation of health is one of the greatest subjects before the public to-day. To assist, health laws and regulations should be rigidly enforced on all citizens. Too much care cannot be taken in public or private about proper disposition of the sputum, as this is decidedly dangerous. Ventilation of both public and private buildings

*Published in the Railway Maintenance Engineer for January, 1920, page 30.

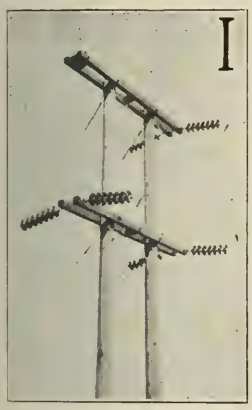
is of the utmost importance in prevention of tuberculosis and pneumonia. Sanitation consists of about 99 per cent cleanliness and 1 per cent science. Sunshine, sleep, fresh air, cleanliness, moderation in work, proper food, rest and exercise are nature's great panaceas; also good teeth, proper clothing, avoidance of all excesses or abuses, with prompt removal of all refuse.

The U. S. Commission of Labor Statistics finds that the average annual number of disability days for 40,000 wage earners in 42 occupations is 6.4 for all disability, but is 8.4 for railway employees, and 9.6 for freight handlers, increasing rapidly with age from 45 to 59, indicating necessity for special care in this class and ages, as also the necessity for limiting sickness to the minimum and prolonging life to the maximum by reducing the unnecessary death rate of modern times. About 20 per cent of all workers suffer from disabling sickness lasting more than seven days each year and 700,000, or nearly 25 per cent, of all workers are suffering from a disabling sickness every working day, while another one-half per cent are away from work each day on account of trivial disabilities. The losses to sick men are very serious and as 6,000,000 workers are annually disabled, a saving of merely 25 per cent of the loss would bulk large in the nation's wealth.

Discussion

In the absence of the chairman the report was submitted by the vice-chairman, S. N. Williams, who discussed the work of the committee and its report at some length. His motion that the matter referred to in Conclusion 1 of the committee be accepted as information was carried, as was a second motion that the Rules for the prevention of the Spread of Forest and Field Fires be approved and published in the Manual.

Report of the Committee on Electricity



In Appendix A of its report the committee submitted revisions of the record tables, which had been brought up to date, regarding third rail clearances and overhead clearances.

In Appendix B of its report the committee submitted "Specifications for Electric Light, Power Supply and Trolley Lines Crossing Steam and Electric Railways," prepared by the Joint Committee appointed by the American Railroad Association, the American Electric Railway Engineering Association and our own Association, these specifications to supersede similar specifications now contained in the Manual.

In Appendix C the committee reported on the subject of Electrolysis and Its Effect on Reinforced Concrete, and its recommendations are given under the conclusions.

In Appendix D the committee reported on the subject of Water Power for Electric Railway Operation, and its recommendations are given under the conclusions.

In Appendix E the committee reported on the subject of Electrical Interference, and its recommendations are given under the conclusions.

In Appendix F of its report the committee reported the result of its work in collaboration with the United States Bureau of Standards in the revisions of the proposed National Electrical Safety Code.

Conclusions

1. The committee recommended that no changes be made in the electrical definitions in the Manual.

2. The committee recommended that its Statements 1 and 2, giving revised Data for Third Rail and Overhead Clearances, be accepted as information and published in the Proceedings.

3. The committee recommended that the "Specifications for Electric Light, Power Supply and Trolley Lines Crossing Steam and Electric Railways," being Appendix B, be approved and printed in the Manual.

4. The committee recommended that the report on Electrolysis and Insulation, being Appendix C, be accepted as information, published in the Proceedings, the subject continued and the committee be authorized to continue its representation on the American Committee on Electrolysis.

5. The committee recommended that the subject of Maintenance Organization and Relation to Track Structures be continued.

6. The following general statements are made regarding the utilization of water power for the electric operation of steam railroads:

(1) That 110,000 volts transmission of electric power, with 3,000 volts on the trolley wire, are practical and reliable voltages for electric railroad service for 100 miles or more of single track.

(2) That such a system of electric operation will increase the capacity of a railroad from 25 to 35 per cent.

(3) That such a system of electrification will probably prove economical as compared with steam operation, when the cost of reliable electric power and coal bear the relation one to the other that they do in the table (Appendix D) as shown above the diagonal line, provided the railroad traffic is favorable for electric operation.

(4) The introduction of electric locomotives equipped with electric brakes has made possible the haulage of heavier trains at higher speeds on mountain divisions with greater safety and reliability, under all climatic conditions.

The committee recommended that the Report on Water Power, being Appendix D, be accepted as information, published in the Proceedings and the subject continued.

7. The committee recommended that the Report on Electrical Interference, being Appendix E, be accepted as information and the subject continued.

8. The committee recommended that the Report on National Safety Codes, being Appendix F, be accepted as information and that the committee be instructed to continue its co-operation with the United States Bureau of Standards.

Committee: Edwin B. Katte (N. Y. C.), chairman; D. J. Brumley (I. C.), vice-chairman; A. H. Armstrong (Gen. Elec.), H. M. Bassett (N. Y. C.), R. D. Coombs (Cons. Engr.), Walt Dennis (Wabash), R. H. Ford (C. R. I. & P.), G. W. Kittredge (N. Y. C.), J. G. Leisenring (Ill. Traction), C. E. Lindsay (U. S. R. A.), H. K. Lowry (C. R. I. & P.), W. L. Morse (N. Y. C.), J. R. Savage (L. I.), M. Schreiber (P. S. R. of N. J.), F. E. Wynne (Westinghouse Elec. & Mfg. Co.).

Appendix C—Electrolysis and Insulation

This committee reported in 1918 in detail and its conclusion was that the disintegration of concrete may be laid at the door of electrolytic action to a certain extent,

but that it is possible to design concrete work and install it so as to reduce this disintegration to almost a negligible amount. Since the last report the committee has been in close touch with some investigations that are being carried on by Dr. Gellert Alleman at the laboratories at Swarthmore College, and from these investigations the committee would suggest consideration along the following lines:

(1) The use of copper-plated reinforcing bars. The copper on the outside of the bars forms an oxide that is insoluble in salt water and does not permit the formation of iron oxide. It should be noted that the formation of iron oxide increases the volume of the iron oxidized about 1.7 times and exerts a pressure that will rupture any concrete.

(2) The introduction of reinforcing bars made of a copper alloy. Here the oxide is formed similar to that on the plated bars, and the action is the same.

(3) Reinforcing bars may be surrounded with a rough enamel that is not only impervious to salt water or any moisture, but also forms such a non-conductor that it will eliminate any electrolytic trouble.

(4) In case of ordinary structures in salt water, such as bridge piers and foundations, it has been proposed to install a waterproofing structure around it; this waterproofing to consist of a plastic layer of material with petroleum asphalt as a basis, or some established waterproofing material free from electrolytes. The plastic casing should then be finally protected with another layer of concrete or masonry material.

Appendix D—Water Power

In the preparation of the report on Water Power for the generation of electricity for the operation of trains, it was considered necessary to inspect an installation of importance and magnitude in actual service. The installation selected was that of the Chicago, Milwaukee & St. Paul, and that portion of its electrified division was inspected by the committee between Harlowtown and Deer Lodge. The electric power for this installation is obtained from the Montana Power Company, and several of its more important water power developments were inspected by the committee.

The Montana Power Company has developed and now owns 12 hydro-electric plants and four steam plants. It develops 29,000 hp. and has about 1,900 mi. of high-tension lines, with 75 sub-stations. From five of the more important hydro-electric plants, high-tension power lines, approximately 250 mi. in length, radiate to and connect with five sub-stations of the Chicago, Milwaukee & St. Paul.

To compute the actual cost of current delivered to the railroad sub-stations it is necessary to obtain the first cost of the installation in order to ascertain the fixed charges. It should be understood in the cost figures given below that it would hardly be possible to get the cost so low in an isolated railroad plant. Generally speaking, the first cost of the hydro-electric plants was approximately $100 per kw.

Buildings and Apparatus

There are fourteen sub-stations on the 440 mi. of road comprising the present electric zone of the St. Paul. The power transformers in the sub-stations are three phase transformers, stepping the voltage of the 110,000-volt transmission down to 2,300 volts for the synchronous motors forming part of the motor generator sets. There is a three phase transformer for each motor generator unit.

The motor generator sets consist of three units, a synchronous motor in the middle directly connected to and driving two direct current generators, one on each side of the synchronous motor. Each generator is designed to give 1,500 volt direct current and the two generators are connected in series to give 3,000 volts for the trolley.

Catenary Suspension for the Working Conductor

The messenger is ½ in. dia. galvanized high strength steel seven strand cable supported on bracket type of construction by means of a porcelain insulator mounted on a metal pin attached to the upper side of the bracket. In span construction the messenger is attached to the span wires, which are insulated from the poles. The working conductors are normally continuous from one sub-station to another. The positive conductors consist of one 500,000 cir. mils copper feeder cable, two 4/0 trolley wires and one ½-in. steel messenger cable above described. On heavy mountain grades, or about 15 per cent of the line, an additional 500,000 cir. mils or 700,000 cir. mils cable is used. The supplement feeder is tapped to the trolley wires at intervals of 1,000 ft.

The return circuit consists of 85 or 90-lb. track rails with joints bonded in the usual manner and an auxiliary 4/0 A.W.G. copper strand cable attached to the poles above the other wires and serving also as a ground wire.

Locomotives

The electric locomotives for passenger and freight service in the electric zone are of identical design, except that the passenger locomotives are equipped with oil fired flash boilers, oil and water tanks, etc., for heating coaches and are geared for higher speed than the freight locomotives. The complete locomotive is composed of two half units, each unit consisting of a cab mounted on two driving trucks. The frame of one truck is extended and carries the center pin for the guiding truck and the draft rigging.

C. M. & ST. P. RY.—ELECTRIC LOCOMOTIVES

Type	Passenger	Freight	Switching
Classification	444444	444444	404
Total weight	602,000	576,000	143,000
Weight mechanical equipment	354,000	328,000	85,000
Weight electrical equipment	248,000	248,000	57,500
Weight on guiding wheels	.....	.....	.....
Weight on drivers	475,500	450,000	143,000
Tractive effort for starting	136,000	136,000	42,000
Tractive effort, 1 hr. rating	45,200	85,000	18,400
Tractive effort, continuous	38,000	71,000	13,500
Miles per hour, 1 hr. rating	28.5	15.25	12.0
Miles per hour, continuous rating	29.6	15.75	13.2
No. of motors	8	8	4
Type of motors	GE–253–A	GE–253–A	GE–255
Voltage	1500/3000	1500/3000	1500/3000
Gearing	82/18	71/29	64/17
Length over all	112′ 0″	112′ 0″	41′ 5″
Total wheel base	102′ 8″	102′ 8″	30′ 4″
Rigid wheel base	10′ 6″	10′ 6″	8′ 0″
Diameter of guiding wheels	36″	36″	.....
Diameter of drivers	52″	52″	40″

There were furnished for this electrification of 440 mi. between Harlowtown and Avery, 30 electric freight locomotives, 12 electric passenger locomotives and two electric switches. Two more electric switchers of the same design as originally furnished have recently been delivered.

Signal System

A complete description of this signal system will be found in the Railway Signal Engineer of September, 1917, page 256.

There has been no marked interference in the talking system by the propulsion system. The engineers of the A. T. & T. Company have made some study on the ground and found slight interference from so-called tooth-ripples of some thirteen hundred cycles.

No particular changes were necessary on account of the introduction of electrification in the arrangement of buildings or tracks, but the fact that two electric locomotives could handle a 2,800-ton train necessitated the lengthening of all the passing tracks to 1,000 ft. each.

New Duties of the Train Dispatcher

In order to obtain a favorable contract for electric power the maximum demand for power must be kept as

low as it is practical to make it. For this reason a power indicating and limiting equipment is required for the purpose of indicating to the dispatcher the amount of power taken, and also for limiting the power to a predetermined amount. By the aid of this equipment the dispatcher regulates the dispatching of trains so as to avoid exceeding the predetermined amount of power agreed upon by the railway company and the power company. That is, the dispatcher sees to it that trains are not dispatched in a way that two or more trains are ascending the heavy grades at the same time, but will endeavor to dispatch them in a manner that permits one train to ascend the heavy grades while another is going down. Thus it becomes the duty of the train dispatcher to keep in mind not only the train movements, but also to regulate movements so that the power costs and overtime of crews will be a minimum. With a little study of train operations and a little practice the dispatchers are able to adjust the train movements to the needs of the service.

Capital Cost

The table below gives a condensed grouping of items which are included in the capital cost of the electrification:

Items Included in Capital Cost of Electrification

440 miles first track electrification on wood poles.
147 miles other tracks, passing sidings, yards and spurs.
587 miles track bonding.
371 miles single conductor in three phase 100,000 volt transmission line.
14 sub-stations aggregate capacity 59,500 kw.
Engineering, signals, miscellaneous, etc.
Total (approximately) $7,250,000
12—300-ton electric passenger locomotives.
30—288-ton electric freight locomotives.
*3— 70-ton electric switching locomotives.
*45 Total electric locomotives (approximately)...$5,500,000
Less value of steam equipment replaced (est.) 2,500,000

Additional capital cost, account electrification $10,250,000

The above capital cost covers a plant which is handling a greater tonnage than was previously handled by steam locomotives and the indications are that there is margin in the equipment supplied to handle a still greater tonnage.

The value of steam equipment replaced represents approximately the cost of 112 steam locomotives which were assigned to the Rocky Mountain and Missoula divisions prior to electrification taken at 9 cents per lb. (wt. of engine). This is hardly a fair comparison between steam and electric for the reason an additional investment would have had to be made in any event, in order to handle the increase in tonnage since electrification was begun. To attempt a comparison on this basis and estimate the additional equipment and track facilities required for steam operation would necessitate a very careful study of previous steam operation.

Comparative Operating Results

B. Beeuwkes, electrical engineer of the Chicago, Milwaukee & St. Paul, in his paper before the New York Railroad Club, March, 1917,† compares three months' steam operation with three months' electric operation before the power limiting and indicating device was installed. Tables given in this paper showed that for the same tonnage hauled over the Rocky Mountain division, electric operation has effected a reduction of 22.5 per cent in the number of trains, 24.5 per cent in the average time per train and has improved operating conditions so that nearly 30 per cent more tonnage can be handled by electric operation in about 80 per cent of the time it formerly took to handle the lesser tonnage by steam operation. This means a valuable increase in the single track capacity of the line.

As a result of changed conditions any comparison of present electric operating costs with steam prior to January 1, 1917, is subject to considerable corrections to bring the steam expense to the same basis of costs as the electric. It is possible, however, to obtain from the annual operating statements certain operating costs which in many cases may serve as a guide in forecasting what economies may be obtained by the substitution of electric operation for steam. For this purpose the following table was compiled:

ELECTRICAL OPERATING COSTS

	1917 12 Months	1918 12 Months	Averages Per Year 1917 and 1918
Maintenance of Way and Structures—			
Power Substation buildings .....$	468.64	$ 622.38	$39.00 per substation.
Power transmission systems	1,000.68	4,265.44	$7.10 per mi. trans. line.
Power distribution systems	81,944.74	73,277.70	$134.00 per mi. track.
Power lines, poles and fixtures.....	14,572.92	20,810.72	$40.20 per route mi. (440).
Maintenance of Equipment—			
Power Substation Apparatus .....$	10,034.37	$ 25,914.23	$1,284. per substation.
Other locomotive repairs	220,525.76	236,906.35	0.1023 per loco. mile.
Other locomotive depreciation	77,134.23	85,208.51	0.0363 per loco. mile.
Transportation—			
*Yard switching power produced.....$	233.83	.....	.....
*Train power produced	49,402.15	$ 94,580.46	$5,151. per substation.
Yard switching power purchased.....	8,321.86	12,230.88	.....
Train power purchased	544,224.25	683.997.96	.....
Yard motormen.....$	16,007.63	$ 23,084.87	.....
Train motormen.....	262,177.75	346,260.32	.....

*Sum of these two items represents mainly substation attendance.

The consensus of opinion of the roadmasters and superintendents on the electrified zone is that there is no more slipping of the locomotive wheels on the rail and consequently no more damage to the top of the rail under electric operation than there is with steam locomotives. It has not been found that there is any greater tendency for the rails to creep on account of regenerative braking on descending grades than there was under the braking action of steam locomotives. No case has been found where electric locomotives moving at a high rate of speed have tended to displace the rail on the ties or the ties in the ballast. Roadmasters agree that the electric locomotive is easier on the track than steam locomotives because of the less rigid construction. It is stated that the flange wear on curves under electric operation is actually less than under steam operation for the reason that the elec-

Ratio Electric Power Expense to Fuel Expense for Various Prices of Coal and Electric Power Based on 1 Kwh Substation Input being Equivalent to 7 Pounds Coal on Tender of Steam Locomotives

Price of Coal 2000 lb	Price of Power Cents per Kwh														
$ 8.50	525	700	875	1.050	1225	1.400	1575	1.750	1925	2.100	2.275	2450	2625	2.800	2.975
8.50	176	235	294	353	412	471	529	588	647	706	765	824	882	941	
8.00	188	250	313	375	438	500	563	625	688	750	813	875	938		1.063
7.50	200	267	333	400	467	533	600	667	733	800	867	933		1.067	1.133
7.00	214	286	357	429	500	571	643	714	786	857	929		1.071	1.143	1.214
6.50	231	308	385	462	538	615	692	769	846	923		1.077	1.154	1.231	1.308
6.00	250	333	417	500	583	667	750	833	917		1.083	1.167	1.250	1.333	1.417
5.50	273	364	455	546	636	727	818	909		1.092	1.182	1.273	1.364	1.455	1.545
5.00	300	400	500	600	700	800	900		1.100	1.200	1.300	1.400	1.500	1.600	1.700
4.50	333	444	556	667	778	889		1.111	1.222	1.333	1.444	1.556	1.667	1.778	1.889
4.00	375	500	625	750	875		1.125	1.250	1.375	1.500	1.625	1.750	1.875	2.000	2.125
3.50	429	571	714	857		1.143	1.286	1.429	1.571	1.714	1.857	2.000	2.143	2.286	2.429
3.00	500	667	833		1.167	1.333	1.500	1.667	1.867	2.000	2.167	2.333	2.500	2.667	2.833
2.50	600	800		1.200	1.400	1.600	1.800	2.000	2.200	2.400	2.600	2.800	3.000	3.200	3.400
2.00	750		1.250	1.500	1.750	2.000	2.250	2.500	2.750	3.000	3.250	3.500	3.750	4.000	4.250
1.50		1.333	1.667	2.000	2.333	2.667	3.000	3.333	3.667	4.000	4.333	4.667	5.000	5.333	5.667

Note Diagonal Line Indicates for what Prices of Coal and Electric Power the Expense is Identical

Table for Comparing Steam and Electric Power

*Includes one 50-ton, 1500-volt locomotive at Great Falls not part of main line electrification.

†Abstracted in the *Railway Age Gazette* for March 23, 1917, page 642.

tric locomotives are less rigid in their wheel arrangement than the steam locomotive. On curves the outer rails are elevated for 30 m.p.h. on mountain grades and for 45 m.p.h. for valley territories. On the Rocky Mountain and Missoula divisions the mountain grade superelevation is ½ in. to one degree of curvature with a maximum of 3 in. On other curves the superelevation is 1 in. per degree with a maximum of 3½ in.

Relation of Electric Power Consumption to Coal Consumed

From figures obtained from Mr. Beeuwkes' paper, the results indicate that one kw. hr. measured at the low tension side of the transformers in the sub-stations is equivalent to seven pounds of coal on the tender of a steam locomotive.

On the basis of the above relationship the ratios of power expense to coal expense for various prices of power and coal have been computed and are given in the table.

Discussion

Edwin B. Katte (chairman) summarized the instructions to the committee, and moved that the Specifications for Electric Light, Power Supply and Trolley Lines Crossing Steam and Electric Railways, be approved and printed in the Manual.

(The motion was seconded.)

F. B. Hall (B. & M.): My understanding in reading that specification is, that there has been a very material increase in the requirements, amounting to substantially 50 per cent over the old specifications. It seems to me in one or two cases that the construction required under these new specifications will be difficult with material of ordinary construction. For example, the working load allowed on a 0000 wire, I believe is about 5,000 pounds. The new specification requires a factor of safety of 3. I would like to have the committee explain just how that specification could be applied.

The Chairman: You will note that these are specifications for electric light, power, supply and trolley line crossings. With regard to the factor of safety, the committee referred all the factors of safety to the structural engineers, and also to the committee on steel and iron structures. The factors of safety are somewhat higher than required by the Bureau of Standards, but no higher than usually required in railroad structures.

Mr. Hall: I have not made my point clear in regard to the 0000 wire. I haven't in mind any construction which will permit of a greater strength than about 9,000 lb. If a factor of safety of 3 is required, a disc insulator must be found which will support 15,000 lb.

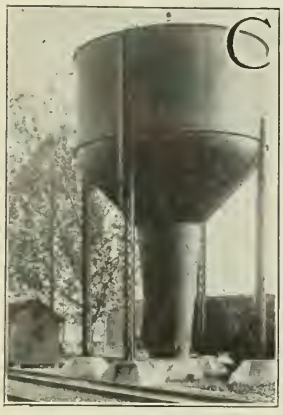
The Chairman: I can only explain that at the time this was being considered we had several insulator manufacturers in with us, and they sat in the committee meeting and agreed that the specification as written was entirely permissible and satisfactory to the disc insulator or standard insulator manufacturers.

(The question was put and carried.)

The chairman then summarized the balance of the report, and recommended its adoption as a whole.

(The motion was carried and the committee was excused with thanks.)

Report of Committee on Water Service



Changes in the 1915 edition of the Manual are suggested under the head of conclusions below.

A progress report on the supply of drinking water on trains and premises of railroads appears in Appendix "B," in the form of an item for insertion in the Manual. A final report on water service organization is submitted in Appendix "C" for adoption and publication in the Manual.

A final report on impounding reservoirs and conditions under which they are economical is submitted in Appendix "D" for adoption and publication in the Manual.

A final report on meters for railroad water service is submitted in Appendix "E" for adoption and publication in the Manual.

A list of terms common to use in railroad water service was submitted in Appendix "F" of the committee's report with definitions for publication in the Manual.

A progress report on plans and specifications for typical water station layouts was submitted in Appendix "G."

Tentative specifications for wooden water tanks of 50,000 and 100,000 gal. capacity were submitted in Appendix "H."

Conclusions

The committee requested the following action on its report:

(1) It is suggested that all subject matter on pages 446, 447 and 448 in the 1915 Manual and also the 10th and 11th lines from the bottom of page 445 be eliminated, as the information is not generally applicable to present types of softening plants and should be considered rather as reference matter in the proceedings.

It is suggested that page 463, Typical Layout for Surface Pipe Wells, be omitted as proposing a rather detailed plan which is not of general application.

(2) That the three paragraphs containing general statements of facts on regulations affecting drinking water furnished by railroads be adopted for insertion in the Manual.

(3) That the final report on "Water Service Organization" be adopted for publication in the Manual.

(4) That the final report on "Impounding Reservoirs" be adopted and inserted in the Manual.

(5) That the report on "Water Meters for Railroad Use" be adopted for publication in the Manual.

(6) That list of definitions for railroad water service terms be adopted and included in water service section of the Manual.

Committee: A. F. Dorley (M. P.), chairman; J. L. Campbell (E. P. & S. W.), vice-chairman; R. C. Bardwell (M. P.), J. M. Brown (C. R. I. & P.), E. M. Grime (N. P.), W. C. Harvey (C. G. W.), R. L. Holmes (T. & P.), H. H. Johntz (M. K. & T.), C. R. Knowles (I. C.), E. G. Lane (B. & O.), Thomas Lees (C. P. R.), W. M. Neptune (M. P.), E. H. Olson (A. T. & S. F.), W. A. Parker (U. P.), A. B. Pierce (Sou.), C. P. Richardson (C. R. I. & P.).

Appendix B—Regulations of Federal or State Authorities Relating to Supply of Drinking Water on Trains and Premises of Railroads

The following three paragraphs are recommened for insertion in the Manual as subject matter under Railroad Water Service:

1. Federal Interstate Quarantine Regulations, Section 13 to Amendment No. 8, as amended July 14, 1919, and issued by the Public Health Service, provide that water for drinking purposes furnished by railroads on cars in interstate traffic shall be pure and incapable of conveying disease, and shall be from source not exposed to possible contamination.

2. It is preferable, where available at reasonable cost, that drinking water furnished by railroads should be secured from municipal supplies, as these, as a rule, secure close supervision from local and state health authorities.

3. Where impossible or impracticable to secure potable water from municipal source, precautions should be taken to provide against possible contamination. If supply is secured from wells, local drainage conditions should receive consideration and protection provided against this entering the wells. Surface supplies are particularly susceptible to contamination, and when used should receive standard treatment with bacteriacides such as calcium hypochlorite, chlorine, or ultra violet ray. All such supplies should be tested regularly and if found unfit should be posted with warning—"UNFIT TO DRINK."

Appendix C—Water Service Organization

The superintendent or engineer of water service shall have direct charge of chemist, inspectors and construction forces, and acts in an advisory capacity to the division forces. A monthly report of the operation of water stations, form MW 1302, shall be forwarded to the superintendent or engineer of water service, together with all other reports relating to water facilities.

The chemist shall report to the superintendent or engineer water service, and shall have supervision of water treatment and the analysis and examination of water.

The inspector shall periodically inspect water stations, reporting to the superintendent or engineer water service on proper form the conditions in detail and the repairs and renewals required, together with the estimated cost.

The supervisor water service shall report to the division maintenance office, and shall have charge of gang foremen, repairmen and pumpers.

The construction foreman shall report to the superintendent or engineer water service and shall have charge of construction forces and perform such other work as may be assigned to him.

Appendix D—Impounding Reservoirs for Railroad Purposes

Introduction.—The most desirable site is one from which water can be delivered by gravity or involves the least pumping head. The impounding area should be sufficient to maintain an adequate supply throughout the longest dry period, which may extend over two consecutive years. Impounding reservoirs are justified at places where the cost of water delivered does not exceed that of other equally usable dependable supply. Reservoirs should be located where the topographic and climatic conditions are most favorable.

Drainage Area.—This should be favorable to a considerable surface runoff. An excessive area increases amount of silt and size of spillway. The ratio of drainage area to spillway contour should be not less than 35 or 40, and the reservoir should have a water depth approximating 25 feet.

Water Requirements.—The maximum demands for present or the near future use should be determined. The growth of traffic should be studied for a guide in forecasting the probable ultimate needs.

Land Evaporation.—This is principally influenced by temperature and wind and usually varies from about one-fourth to two-thirds of the yearly rainfall.

Transpiration.—This is mainly influenced by temperature and moisture and generally varies from 4 to 10 in. during the growing season for areas having mixed vegetation, the water requirements for plants varying from 300 to 1,000 times the weight of the dry matter produced.

Interception.—This is the portion of the precipitation intercepted and evaporated without reaching the ground, and is in a measure constant for each rain and probably amounts to 0.10 in. per rain, or something like 15 to 40 per cent of the annual precipitation.

Runoff—Surface and Sub-Surface.—This is the residual precipitation after land evaporation, transpiration, interception and deep seepage losses have been deducted, and varies generally from 5 to 50 per cent of the annual precipitation.

Method of Determining Runoff.—All rainfall records near site and in storm path should be carefully studied and platted, likewise the daily rainfall, temperature, wind and humidity records for the period for which the calculations are made. Runoff computations should be made for the year preceding a drought for the duration of the dry period, while the computations for the spillway should be based on the heaviest precipitations.

Water Evaporation.—This depends chiefly on temperature, but is largely influenced by the wind and humidity. In the more arid regions evaporation from reservoir surface is the greatest loss.

Appendix E—Water Meters

Reading Meters

1. The straight reading indicator consists of revolving discs with figures around their periphery revolving on a common shaft, the figures denoting the meter reading are exposed through a slot in the dial face. The standard indicator consists of a train of clock gears and pinions, with points indicating on numbered circles or indices the figures which form the meter reading. The standard indicator is in almost general use, as it is much simpler in mechanism and is less liable to get out of order than the straight reading indicator.

Testing Meters

The correct method of testing water meters is by weighing the water, and this method should be followed whenever possible. To determine the percentage of error in registration, multiply the error in pounds per cubic foot by 16 and divide by 10. It is necessary to run at least one complete revolution of the hand of the first indice of the meter dial in all tests as the graduations of the indice may not be exact.

When necessary to make several runs to complete one revolution of the first indice, the total weight of water delivered in the several runs should be added, and in no case should a sub-division of the circle be used to calculate the accuracy of the meter. When testing a meter, a valve should be placed on the outlet side of the meter and a pressure maintained, making the conditions of test similar to that of actual service. When the test by weight is impractical meters may be tested in place by using a hose or pipe from the outlet of meter to a test meter of known accuracy.

Maintenance of Meters

The maintenance of water meters is largely a matter of inspection, testing and cleaning. The total cost of repair parts usually represents but a very small proportion of the expense of maintaining meters. Where water is furnished through a meter, the meter is generally maintained by the parties furnishing the water, regardless of ownership of meter. Whenever practical a railroad

should standardize its water meters, as this enables employees to so familiarize and perfect themselves in the knowledge of the mechanical construction as to maintain a system of meters at least expense and greatest efficiency.

Hot Water Meters

A hot water meter is similar in construction to a cold water meter except that bronze or similar metal is used for discs, etc., instead of vulcanized rubber, as the hard rubber used in cold water meters becomes pliable at about 120 deg. F. A hot water meter should not be used in continuous service for either hot or cold water, as the metal working parts wear much more rapidly than in the cold water meter where dissimilar substances come in contact.

Types of Meters Suitable for Railway Service

While all types of meters are used successfully in railway water service, their use may be well confined to two types for general service, namely, the disc and current type of meter. The disc type of meter is very satisfactory in the smaller sizes and for fairly uniform flow up to three inches. The area of the disc is so great in the larger sizes that they are easily damaged through water hammer; therefore, a current meter should be used for services larger than three inches.

The current or velocity type of meter is designed for the rapid delivery of a large quantity of water, and is a very durable type of meter under heavy duty. The water areas are large as compared to the wearing surfaces and the wear is not as great as with other types of meters even when handling muddy or gritty water.

Discussion

The President: In the absence of Mr. Dorley (chairman), J. L. Campbell (vice-chairman) will present the report.

J. L. Campbell (E. P. & S. W.): In submitting this report the committee will have a number of changes to propose in the matter contained in the report as printed. Taking up the first subject, revision of the Manual, it is suggested that subject matter noted above under Conclusions (1) be eliminated from the Manual. The committee moves the elimination of this matter in the reprint of the Manual. (Motion carried.)

Mr. Campbell: Referring to the "Supply of Drinking Water on Trains and Premises of Railroads," the committee proposes that in the last two lines of No. 1, under Appendix B, the words "and incapable of conveying disease," and the words "exposed to possible contamination," be eliminated, and that this section read as follows: "Federal Interstate Quarantine Regulations, Sec. 13 to Amendment No. 8, as amended July 14, 1919, and issued by the Public Health Service, provided that water for drinking purposes furnished by railroads on cars in interstate traffic shall be pure and from a source which is approved as producing a water of satisfactory sanitary quality and safety."

The committee moves that sections 1, 2 and 3, Appendix B, as read, be adopted for publication in the Manual. (Motion carried.)

Mr. Campbell: The committee moves that the water service organization as appearing above be adopted for publication in the Manual.

C. F. Ford (R. I.): Do I understand the committee to advocate that as an ironclad organization or a suggested form of organization?

Mr. Campbell: It is the intention of the committee that this simply be in the form of a recommended organization suggested to you for inclusion in the Manual.

The President: Does this suggested layout exist on any railroads at the present time?

C. R. Knowles (I. C.): The chart as submitted represents an organization as existing on a number of roads, or rather a combination of several organizations—this organization would necessarily have to be modified to suit the conditions for a larger or smaller road.

(The motion was seconded and carried.)

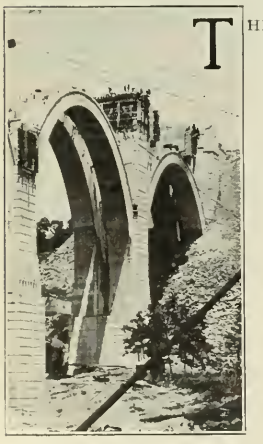
Mr. Campbell. The committee moves that Section 4 and Appendix D be adopted for publication in the Manual. (Motion seconded and carried.)

Mr. Campbell then presented Section 5 and Appendix E, and moved that this part of the report be adopted for publication in the Manual. (The motion was seconded and carried.)

Mr. Campbell then presented Sec. No. 8, specifications for wood water tanks, in Appendix H of its report, which, after considerable discussion, were accepted for inclusion in the Manual.

(The committee was dismissed with thanks.)

Report of Committee on Masonry



The committee recommended the following action be taken on its report:

1. That certain revision of the Manual as to definitions be approved.

2. That the "Specifications for Plain and Reinforced Concrete and Steel Reinforcement" be withdrawn from the Manual, and the "Specifications for Concrete, Plain and Reinforced," given in Appendix B, substituted.

3. That the "Specifications for Billet-Steel Concrete Reinforcement Bars," given in Appendix B, be adopted and published in the Manual.

4. That the matter headed "Methods of Depositing Concrete Under Water" be withdrawn from the Manual and the recommendations given in Appendix C under a similar heading substituted.

Committee: J. J. Yates (C. R. R. of N. J.), chairman; Job Tuthill (P. M.), vice-chairman; J. T. Andrews (B. & O.), R. Armour (G. T.), G. E. Boyd (D. L. & W.), T. L. Condron (Cons. Engr.), L. N. Edwards (Bur. of Pub. Roads), W. K. Hatt (Purdue Univ.), L. J. Hotchkiss (Foundation Co.), Richard L. Humphrey (Cons. Engr.), Noah Johnson (Wabash), M. S. Ketchum (Univ. of Penn.), W. M. Kinney (Port. Cem. Asso.), W. S. Lacher (*Railway Age*), A. E. Owen (C. R. R. of N. J.), W. M. Ray (B. & O.), F. E. Schall (L. V.), Z. H. Sikes (N. Y. C.), C. C. Westfall (I. C.).

Appendix B—Specifications for Concrete—Plain and Reinforced

Materials

Cement.—1. The cement shall meet the requirements of the American Railway Engineering Association's "Specifications for Portland Cement." It shall be stored in a weather-tight structure with the floor raised not less than one foot from the ground in such manner as to permit easy access for proper inspection and identification of each shipment. Cement that has hardened or partially set shall not be used.

Fine Aggregate.—2. (a) The fine aggregate shall consist of sand, crushed stone or gravel screenings, graded from fine to coarse, and passing when dry, a screen having holes ¼ in. in diameter. Not more than 25 per cent by weight shall pass a No. 50 sieve, and not more than 6 per cent a No. 100 sieve when screened dry, nor more than 10 per

cent dry weight shall pass a No. 100 sieve when washed on the sieve with a stream of water. It shall be clean and free from soft particles, mica, lumps of clay, loam or organic matter.

(b) The fine aggregate shall be of such quality that mortar briquettes made of one part of Portland Cement and three parts of the fine aggregate by weight shall show a tensile strength, after an age of seven days, not less than the strength of briquettes of the same age, made of mortar of the same consistency in the proportion of one part of the same cement to three parts of standard Ottawa Sand.

Coarse Aggregate.—3. The coarse aggregate shall consist of gravel or crushed stone, which, unless otherwise specified or called for on the plans, shall, for plain mass concrete, pass a screen having holes 2¼ in. in diameter, and for reinforced concrete a screen having holes 1¼ in. in diameter; and be retained on a screen having holes ¼ in. diameter, and shall be graded in size from the smallest to the largest particles. It shall be clean, hard, durable and free from all deleterious matter; coarse aggregate containing dust, soft or elongated particles shall not be used.

Stone for Rubble or Cyclopean Concrete.—4. These stones shall be of good quality, clean, dense and hard, without seams and having sharp edges. They shall not be smaller than of a size known as "one man stone."

Slag.—5. Provided the contract specifically permits the use of crushed slag as a coarse aggregate, it shall be air cooled, blast furnace slag, conforming to all the requirements for coarse aggregate specified in Paragraph 3. The crushed slag shall weigh not less than 70 lb. per cu. ft., and shall be obtained only from such banks as have the approval of the engineer. All slag used shall have seasoned in the bank for a period not less than one year, unless in the opinion of the engineer a shorter period is sufficient.

Water.—6. The water shall be free from oil, acid and injurious amounts of vegetable matter, alkalies or other salts.

Steel Reinforcement.—7. (a) All structural steel shapes used for reinforcing shall conform to the requirements of the American Railway Engineering Association's "Specifications for Steel Railroad Bridges."

(b) All steel rods or bars used for reinforcing shall conform to the requirements of the American Railway Engineering Association's "Specifications for Billet-Steel Concrete Reinforcement Bars."

Proportioning

Unit of Measure.—8. The unit of measure shall be the cubic foot. Ninety-four pounds (one sack or one-fourth barrel) of cement shall be assumed as one cubic foot.

Proportions.—9. (a) The proportions of the materials shall be in accordance with the plans, or detailed specifications, or schedule governing the work. When not otherwise specified, the proportions by volume shall be as follows: (See 8, 10.)

Class.	Use.	Cement.	Fine Aggregate.	Coarse Aggregate.
A	Reinforced concrete—Concrete deposited under water	1	2	4
B	Mass concrete in forms.	1	2½	5
C	Foundation	1	3	6

(b) Rubble or cyclopean concrete, when permitted by the contract, shall be either Class "B" or Class "C" concrete, having embedded in it large stones.

(c) For any given class of concrete, the relative proportion of cement to fine aggregate shall not be modified. The relative proportion of fine to coarse aggregate shall be modified, if necessary, during the progress of the work, so as to obtain the maximum density. (See 9a.)

Measuring Proportions.—10. The various ingredients, including the water, shall be measured separately, and the methods of measurement shall be such as to invariably secure the proper proportions. The fine and coarse aggregate shall be measured loosely as thrown into the measuring receptacle. (See 8, 9a.)

Consistency.—11. The quantity of water used in mixing shall be the least amount that will produce a plastic or workable mixture which can be worked into the forms and around the reinforcement. Under no circumstances shall the consistency of the concrete be such as to permit a separation of the coarse aggregate from the mortar in handling. An excess of water will not be permitted, as it seriously affects the strength of the concrete, and any batch containing such an excess will be rejected.

Premixed Aggregate.—12. (a) Provided the contract specifically permits, premixed aggregate may be used instead of separate fine and coarse aggregates. Frequent tests shall be made to determine the relative proportions of fine and coarse aggregates, and if these proportions are unsatisfactory to the engineer, or so irregular as to make it impracticable to secure a properly proportioned concrete, he may reject the material, or require that it be screened and used as separate fine and coarse aggregates.

(b) The proportion of the cement to the fine aggregate shall at no time be less than that specified for the classes of concrete where separate aggregates are used. (See 9a.)

Forms

Materials.—13. (a) The forms shall be of wood or metal, and shall conform to the shape, lines and dimensions of the concrete as called for on the plans. Form lumber used against the concrete shall be dressed on one side and both edges, to a uniform thickness and width, and shall be sound and free of loose knots.

(b) For all exposed edges, corners or other projections of the concrete, suitable moldings or bevels shall be placed in the angles of the forms to round or bevel the edges of the concrete.

Workmanship.—14. (a) The forms shall be well built, substantial and unyielding, and made sufficiently tight to prevent leakage of mortar and voids in the concrete. They shall be properly braced or tied together by rods, bolts or wires. Metal braces or ties shall be so arranged that when the forms are removed, no metal shall be within one inch of the face of the finished work.

(b) The face forms shall be securely fastened to the studding or uprights in horizontal lines.

(c) Any irregularities in the forms which may mar the exposed surface of the concrete shall be removed or filled.

Inspection.—15. Where necessary, temporary openings shall be provided at the base of the forms to facilitate cleaning and inspection directly before placing concrete. (See 23b.)

Oiling.—16. The inside of the forms shall generally be coated with raw paraffin or other non-staining mineral oil; or thoroughly wet with water, except in freezing weather. (See 23b.)

Removal of Forms.—17. The forms shall not be removed until authorized by the engineer.

Reinforcement

Placing Reinforcement.—18. Reinforcement steel shall be cleaned of all mill and rust scales before being placed in the forms. All reinforcement shall be placed in its proper position as required by the plans and securely wired or fastened in place, well in advance of the concreting, and shall be inspected and approved by the engineer before any concrete is deposited. (See 23b.)

Splicing Reinforcement.—19. Wherever it is necessary to splice the reinforcement otherwise than as shown on the plans, the character of the splice shall be decided by the engineer on the basis of safe bond stress and the stress in the reinforcement at the point of splice. Splices shall not be made at points of maximum stress.

Mixing

Machine Mixing.—20. (a) All concrete shall be mixed by machine (except when under special conditions the engineer permits otherwise), in a batch mixer of an approved type, equipped with suitable charging hopper, water storage and a water measuring device which can be locked.

(b) The ingredients of the concrete shall be mixed to the required consistency and the mixing continued not less than 1½ min. after all the materials are in the mixer, and before any part of the batch is discharged. The mixer shall be completely emptied before receiving materials for the succeeding batch. The volume of the mixed material used per batch shall not exceed the manufacturers' rated capacity of the drum. (See 11.)

Hand Mixing.—21. When it is permitted to mix by hand, the mixing shall be done on a watertight platform of sufficient size to accommodate men and materials for the progressive and rapid mixing of at least two batches of concrete at the same time. The batches shall not exceed ½ cu. yd. each. The materials shall be mixed dry until the mixture is of a uniform color, the required amount of water added, and the mixture continued until the batch is of a uniform consistency and character throughout. Hand mixing will not be permitted for concrete deposited under water. (See 11.)

Retempering.—22. The retempering of mortar or concrete which has partially hardened; that is, remixing with or without additional materials or water, will not be permitted.

Depositing

General.—23. (a) Before beginning a run of concrete, all hardened concrete or foreign materials shall be completely

removed from the inner surfaces of all conveying equipment.

(b) Before depositing any concrete, all debris shall be removed from the space to be occupied by the concrete, all steel reinforcing shall be secured in its proper location, all forms shall be thoroughly wetted except in freezing weather unless they have been previously oiled, and all form work and steel reinforcing shall be inspected and approved by the engineer. (See 15, 16 and 18.)

Handling.—24. Concrete shall be handled from the mixer to the place of final deposit as rapidly as possible, and by methods of transporting which shall prevent the separation of the ingredients. The concrete shall be deposited directly into the forms as nearly as possible in its final position so as to avoid rehandling. The piling up of concrete material in the forms in such manner as to permit the escape of mortar from the coarse aggregates will not be permitted. Under no circumstances shall concrete that has partially set be deposited in the work. (See 22.)

Compacting.—25. During and after depositing, the concrete shall be compacted by means of a shovel or other suitable tool moved up and down continuously in the concrete until it has all settled into place and water has flushed to the surface. The concrete shall be thoroughly worked around all reinforcing material so as to completely surround and embed the same.

Cold Weather.—26. During cold weather, the concrete at the time it is mixed and deposited in the work shall have a temperature not lower than 50 deg. F., and suitable means shall be provided to maintain this temperature for at least 72 hr. thereafter, and until the concrete has thoroughly set. The methods of heating materials and protecting the concrete shall be approved by the engineer. The use of any salt or chemical to prevent freezing will not be permitted.

Depositing on or Against Set Concrete.—27. Before depositing new concrete on or against concrete which has set, the forms shall be retightened against the face of the latter, the surface of the set concrete shall be roughened and thoroughly cleaned of foreign matter and laitance, and drenched with water. The new concrete placed in contact with set or partially set concrete shall contain an excess of mortar to insure bond. To insure this excess of mortar at the juncture of the set and newly deposited concrete on vertical or inclined surfaces, the cleaned and drenched surface of the set concrete shall first be slushed with a coating of mortar, not less than one inch thick, composed of one part cement to two parts fine aggregate, against which the new concrete shall be deposited before this mortar has had time to attain its initial set.

Rubble or Cyclopean Concrete.—28. After each layer of concrete is placed, and before it has taken its initial set, the stones are to be thoroughly bedded in the soft concrete. No stone shall be placed nearer than one foot to any finished surface; nor nearer than six inches to any adjacent stone. After the stones are in place another layer of concrete shall be placed sufficient to cover the stones to a depth of at least six inches.

When stratified stones are used, they shall be laid upon their natural bed. (See 4, 9b.)

Depositing Concrete Under Water

General.—29. Concrete shall not be deposited in water without the written consent of the engineer. A written statement of the methods and plans of equipment to be used shall be submitted to and approved by the engineer before the work is started. (See 9a, 11, 21.)

Cofferdams.—30. Cofferdams shall be sufficiently tight to prevent any current through the space in which the concrete is to be deposited. Pumping will not be permitted while the concrete is being deposited, nor until it has fully set.

Method.—31. The concrete shall be deposited by such method as will prevent the washing of the cement from the mixture. In no case shall the concrete be allowed to fall through the water.

Tremie.—32. The tremie, where used, shall be about 14 to 16 in. in diameter, and made flanged and put together with gaskets. The initial filling of the tremie shall be done in such manner as not to permit the concrete to drop through the water. It shall be kept filled at all times, and the discharge end raised a few inches at a time as the filling progresses. The greatest care shall be used to prevent the charge being lost in moving the tremie about on the surface of the deposited concrete. In case the charge is lost, the tremie must be withdrawn and refilled.

Drop Bottom Bucket.—33. (a) The bucket, where used, shall be of such a type that it cannot be dumped until it rests on the surface upon which the concrete is to be deposited. The frame shall extend below the closed bottom doors so they may open freely downward and outward when tripped. The ends of the bucket shall extend without openings to the bottom of the frame. The top of the bucket shall be open.

(b) The bucket shall be completely filled, and slowly lowered to avoid unnecessary back wash. When discharged the bucket shall be withdrawn slowly until clear of the concrete.

Bagging.—34. The bags, when used, shall be of jute or other coarse cloth. They shall be about two-thirds filled with concrete, and shall be carefully placed by hand in a header and stretcher system so the whole mass is interlocked.

Continuous Operation.—35. Where possible, the concrete shall be deposited continuously from the time the work is started until it is brought above water level or to the finished surface. The work shall be carried on with sufficient rapidity to insure bonding of the successive layers. The surface of the deposited concrete shall be kept as nearly level as possible.

Laitance.—36. Great care shall be exercised to disturb the concrete as little as possible while it is being deposited, to avoid the formation of laitance. On completing a section of concrete, the laitance shall be entirely removed after the concrete has thoroughly set and before the work is resumed.

Joints

General.—37. (a) Instructions given on the plans, in the detailed specifications or schedule governing the work as to location and construction of joints, shall be strictly followed.

(b) When the structures or portions of the structures are designed to be monolithic, they shall be cast integrally, except as hereinafter modified. (See 38a, b, c, d.)

Construction Joints.—38. (a) When necessary to provide construction joints not indicated, or specified, such joints shall be located and formed so as to least impair the strength and appearance of the structure. Where conditions require, the joints shall be reinforced as directed by the engineer, in order to secure the necessary bond strength.

(b) Horizontal construction joints shall be prepared at the time the work is interrupted by thoroughly roughening the surface and providing keys by embedding stones which project above the surface, or mortises by embedding timbers which shall be removed before the work of placing concrete is resumed.

(c) At all horizontal or vertical construction joints, the previously deposited surface shall always be roughened and cleaned of all laitance and foreign material before depositing new concrete. (See 27.)

(d) Where girders, beams and slabs are designed to be monolithic with walls and columns, they shall not be cast until four hours after the completion of the walls or columns in order to permit of shrinkage or settlement. In case the columns are structural steel, encased in concrete or concrete columns having flaring heads, the lapse of time to allow for shrinkage or settlement need not be observed. (See 37b.)

Watertight Joints.—39. When it is not possible to finish a complete section in one continuous operation, and a watertight joint is required, sheet lead or other metal, not less than six inches wide, and extending the full length of the joint, shall be embedded equally in the two deposits of concrete.

Sliding Joints.—40. Where sliding joints are to be provided, the seat shall be finished with a smooth trowel surface and shall not have the superimposed concrete placed upon it until the previously deposited concrete has thoroughly set. Unless otherwise indicated on the plans, or specified, two thicknesses of building paper shall be placed over the bearing before the superimposed concrete is deposited, in order to make a defined sliding joint.

Expansion Joints.—41. (a) At all expansion joints, the bond between the two sections shall be complete, and shall be insured by the application of petroleum oil, hot coal tar pitch, or similar material over the entire joint surface of the first deposited concrete.

(b) No reinforcement shall extend across an expansion joint.

(c) Triangular shaped grooves shall be formed in the exposed surface of the concrete at all expansion joints in walls or abutments.

(d) Where expansion joints are formed between two distinct concrete members, and said joint is exposed, it shall be filled with an elastic joint filler of approved quality.

Surfacing and Finishing

General.—42. Except where a special surface or finish is required, the surfacing and finishing shall be done in accordance with the requirements specified for a "Spaded Surface." (See 43a, b, c.)

Spaded Surface.—43. (a) The coarse aggregate shall be carefully worked back from the forms into the mass of the

concrete with spades, fine stone forks, bars or other suitable tools, so as to bring a surface of mortar against the form. Care shall be taken to remove all air pockets and to prevent voids in the surface.

(b) Except where otherwise directed by the engineer, face forms shall be removed as soon as the setting of the concrete will permit. (See 17.)

(c) After the removal of the forms, any holes or voids in the surface of the concrete shall be filled with a mortar made of the same proportions of sand and cement as those of the concrete and rubbed smooth and even with the surface with a wooden float. A trowel shall not be used for this purpose. (See 42.)

Top Surfaces.—44. (a) Top surfaces shall generally be "struck" with a straight edge or "floated" after the coarse aggregates have been forced below the surface.

(b) Where "sidewalk finish" is called for on the plans, it shall be made by the spreading of a 1 :2 mortar at least ¾ in. thick, and floating this to a smooth surface. This finishing cast shall be put on before the concrete has taken its initial set. For a walk, the surface shall be slightly roughened with a special tool or by sweeping with a coarse broom.

Wetting Surfaces.—45. The surfaces of concrete exposed to premature drying shall be kept thoroughly and constantly wetted for a period of at least three days. For wearing surfaces, this period shall be at least ten days.

SPECIAL FINISHES

(Detailed specifications for various special finishes followed.)

Appendix B—Continued—Specifications for Billet-Steel Concrete Reinforcement Bars

(The specifications submitted by the committee are the same as those of the American Society for Testing Materials for billet-steel concrete reinforcement bars adopted in 1911 and revised in 1912, 1913 and 1914, except as to provisions of clauses given in full below and as to provision for twisted bars and Bessemer steel, which was excluded as noted in paragraphs 1(c) and 3(a), respectively.)

Material Covered.—1. (a) These specifications cover two classes of billet-steel concrete reinforcement bars, namely: plain and deformed.

(b) Plain and deformed bars are of three grades, namely: structural-steel, intermediate and hard.

(c) Twisted bars will not be accepted under these specifications.

Basis of Purchase.—2. The structural-steel grade shall be used unless otherwise specified.

MANUFACTURE

Process.—3. (a) The steel shall be made by the open-hearth process.

(b) The bars shall be rolled from new billets. No re-rolled material will be accepted.

Test Specimens.—10. Tension and bend test specimens for plain and deformed bars shall be taken from the finished bars, and shall be of the full thickness or diameter of bars as rolled.

(Note.—This clause as appearing in the A.S.T.M. specification contains the following qualification which is omitted from the A.R.E.A specification: "except that the specimen for deformed bars may be machined for a length of at least nine inches if deemed necessary by the manufacturer to obtain uniform cross-section.")

Appendix C—Methods of Depositing Concrete Under Water

1. In general, where possible, the depositing of concrete under water should be avoided, even if such action results in additional expense and possible delay to the work. There is always considerable uncertainty as to the results obtained, and, where conditions will permit, the additional expense and delay of avoiding it is well warranted.

2. In view of this uncertainty, the need of close supervision by men competent to handle this class of work is of the utmost importance, and concrete should never be deposited under water without experienced supervision. Many failures which have occurred, especially where the structure is located in sea water, can be directly traced to ignorance or lack of supervision.

3. It is desirable that the concrete be deposited continuously from the time the work is started until it is brought above the water level, or to the finished surface, which can later be cleaned of laitance in the air after the concrete has hardened.

Of the methods used, the following give the best results:

1. The concrete is lowered in large buckets having a hinged bottom which sets sufficiently far above the lower edge of the bucket that it may open freely downward and outward when the bucket reaches the surface upon which the concrete is to be deposited. The top of the bucket is left open, and care is taken to see that the bucket is completely filled before lowering. Efforts made to use a closed top bucket have not been successful, due to the disturbance of the deposited concrete by inrush of water as the bucket is withdrawn.

2. The concrete may be passed through a vertical tube or tremie reaching down to the surface upon which the concrete is to be deposited. In this case the tremie should be kept filled with concrete at all times, and the flow should be as nearly continuous as practicable. When the operation starts, the tremie should be filled in such manner that the concrete is not permitted to drop through the water. This is accomplished in several ways: One is to place the bottom of the tremie in a box, partially filling it with concrete so as to seal the bottom, then lowering the tremie into the position in which it is to be used. Another method is to plug the tremie with cement sacks or other material, which will be forced down as the tube is filled with concrete. A third method is to plug the end of the tremie with a cloth sack filled with cement. In case the charge is lost, the tremie should again be filled as at first.

3. Jute or cloth bags, from two-thirds to three-fourths filled with concrete, have been used successfully. These are placed in a header and stretcher system so that the whole mass is interlocked.

4. Where it is difficult to construct a cofferdam or monolithic work is not required, premolded concrete blocks of large dimensions have been used successfully.

5. A concrete depositing bag made of canvas or other suitable material is a variation of the bucket system. This is filled with concrete and the mouth of the bag closed by one turn of a line so looped that a pull on the line will release it. The bag is lowered mouth down to the surface upon which the concrete is to be deposited, and a pull on the line opens the bag and permits the concrete to be deposited. This method does not have the disadvantage of the closed top bucket, since the bag will collapse as the concrete flows out.

Methods to be avoided:

1. There are a number of other methods that have been used, such as depositing directly through the water; depositing a portion of the concrete by one of the above methods in the corner of the form and the balance progressively from wheelbarrows or buckets on the sloping surface, thus gradually filling the form; allowing the concrete to partially set in air and then depositing it in a plastic condition; depositing the concrete dry without the use of water; attempting to grout a foundation composed of rip-rap or coarse gravel by means of pipes sunk at intervals into the foundation. Although occasionally fair results have been obtained, all of these methods are dangerous, as they almost uniformly result in segregation of the materials or the washing out of the cement.

Precautions.—Concrete to be deposited in water should be of a richer mixture than when deposited in air, and a leaner mixture than 1-2-4 should not be used.

The aggregate should be free from loam or other material, and it is preferable that washed aggregates be used where possible to obtain them. Washed gravel of somewhat smaller size than used in open air concrete will give the best results.

In depositing concrete under water it is imperative that the water be still and that the concrete shall not be exposed to current until it is fully set. This requires that a cofferdam be constructed in such manner as to insure quiet water within the cofferdam. One of the essentials of depositing concrete by any of the above methods is that the concrete be disturbed as little as practicable during the depositing, thus avoiding the formation of laitance. It is impracticable in depositing concrete in water by any method to entirely avoid laitance, and it is therefore necessary on completing a section of concrete to see that the laitance is entirely removed after the concrete has thoroughly set and before the work is resumed. For this reason when a job is started the concrete should be deposited continuously until the finished surface is reached or the concrete brought above the water level so that the laitance may be removed in the air, as it is difficult, if not impracticable, to entirely remove it under water. The formation of construction joints under water should be avoided.

The ordinary precautions used in depositing concrete in the air are not sufficient when depositing concrete in water, and additional care must be observed in the latter case to prevent segregation of the materials, the formation of laitance, and to insure proper setting of the mass. Because of the fact that cold retards setting, the concrete should not be deposited in water the temperature of which is low enough to cause serious retardation. Concrete should be thoroughly mixed before it is deposited in water and, therefore, hand mixing should never be permitted, but a batch mixer used.

Discussion

J. J. Yates (chairman): The first subject is the revision of the Manual, given in Appendix A, and the committee recommends that it be approved.

(Mr. Yates then read the detailed omissions, revisions and additions as presented in the report and moved their adoption, as given in the committee report.)

J. L. Campbell (E. P. & S. W.): I ask the committee why it limited the definition of crushed slag to blast slag?

Mr. Yates: That is the only kind of slag provided for in the specifications.

Mr. Campbell: Blast furnace slag is a very inferior material, as I understand it, compared to slag that is made in the western part of the United States in the smelting of the precious metals. I move that the definition be general so as to include all slags.

W. S. Lacher (*Railway Age*): I believe the reasons for that restriction in the definition is a consequence of the restriction to the use of the words "blast furnace" in the specifications as we have drawn them. The reason for that is that the committee did not receive a sufficient amount of information concerning the smelter slags to warrant it, in its opinion, to include the term smelter slag in the specifications for material in the new specifications it is now submitting. It may be that some additional work of the committee will bring out sufficient information to warrant that addition at some later date.

Mr. Campbell: I am not insistent at all that this change be made at this time, but I do make the suggestion that I think the Association ought to get right on the slag proposition.

(Mr. Yates' motion was carried.)

Chairman Yates: The next subject is Specifications for Plain and Reinforced Concrete and for Steel Reinforcement, and the committee recommends that they be accepted and printed in the Manual, in place of the present specifications.

S. T. Wagner (P. & R.): The second paragraph relating to "Fine Aggregate" requires a strength in briquettes, which in eastern Pennsylvania and New Jersey makes it difficult to get. In other words, the tests the speaker has been familiar with in the last five or six years will show that a large proportion of the ordinary sands in that location do not comply with the specification of 100 per cent of the strength of the standard.

Chairman Yates: This same criticism has again been considered by the committee recently and it is the general impression of the committee that the proposed requirement can be usually met, and it is not thought advisable to reduce the specification due to the inability to get sand that will meet the conditions locally. I move the acceptance and printing in the Manual of the specifications for concrete, plain and reinforced.

(The motion was seconded and carried.)

Chairman Yates then presented the Specifications for Billet-Steel, Concrete Reinforcement Bars.

W. H. Courtenay (L. & N.): May I inquire of the chairman, what is the objection to cold twisted bars in the specification?

Chairman Yates: The cold twisted bar did not seem to find favor. The reasons given were the insufficiency of bond stress, and the general effect of cold twisting on the metal. The great majority of answers we got from railroads had it excluded, so the specifications have excluded it.

I. L. Simmons (C. R. I. & P.): Do I understand it is the intention of the Committee to reject cold twisted bars entirely? There are a great many cold twisted bars used by railroads.

T. L. Condron: I think the reason the committee has excluded cold twisted bars from the specification is because of the result of the tests made by several of the universities, showing that the bond of a twisted bar was really less than the bond of a plain bar. If a twisted bar does not give a greater bond value in concrete, the reason for its use is that much less.

Mr. Simmons: It would be practically impossible to get deformed bars any time you wish to use them, and it would become necessary to get cold twisted bars. I am not opposed myself to the cold twisted bar. I have used it for 15 or 20 years. I cannot see any reason why the committee should reject this specication for cold twisted bars. We have to use it, and as long as we have to use it, why not have a specification to guide us in our work?

Prof. A. N. Talbot (U. of Ill.): Mr. President, I am glad to see the committee make an attempt to exclude the cold twisted bar. As stated by Mr. Condon, the bond given by the cold twisted bar is not better, or perhaps not as good as that of the plain bar. It is quite clear, I think, from the tests that have been made that the twisted bar is not effective in giving a bond such as a deformed bar will give, so its use is really being given under a misapprehension of what happens. The second point referred to of the increased yield point of the twisted bar over the plain bar is also due to a misapprehension. When a bar is twisted, the increase in its strength is not given over the whole section. The outer portion of it, or certain parts of the outer portion of it are stressed beyond the elastic limit as its yield point raises. There is, however, in the interior, a considerable portion which has not been stressed beyond the yield point, and has not had the yield point attained.

We have then the anomaly of a bar which has not the same yield point throughout. It then has a certain modulus of elasticity before it has reached the yield point, and beyond that a decreased modulus of elasticity. I am glad to know that engineers generally are coming to recognize that there is no advantage in using twisted bars.

Chairman Yates: I move the adoption of the specifications for billet-steel concrete reinforcement bars as they apear and their printing in the Manual. (The motion was seconded.)

E. A. Frink (S. A. L.): Our specifications are getting a little bit too diverse. We will have presented here this afternoon, if we go through with the program, specifications for material for track spikes, steel tie plates of two grades and screw spikes. We now have reinforcing bars, bridge steel and electric transmitting towers. Now, if you compare the specifications that have been submitted for the material for those various things, you will find that there is absolutely no harmony whatsoever between any two of them, except in a few isolated cases. It seems to me to be unnecessary to have so many different units of strength from which to make these several articles. I cannot see any reason why the material for track spikes should not conform with the material for screw spikes. Neither can I see why the material for reinforcing bars for concrete should not conform to the strength of the material used in steel bridges. There has been a long discussion going on for a number of years as to the merits and demerits of round bars and deformed bars. I have yet to see the necessity, or possibly I might say the advantage of the deformed bar except in special cases.

One of the things that the railroads, as well as everybody else, are suffering from today is high prices. Every time you ask for an additional type or kind of material you increase the cost of your material.

I move that the following matter at the end of the specification on par. I be omitted and replaced by the following: "The material for concrete reinforcement shall conform strictly to the structural material as specified for steel bridges in the specification of the committee on iron and steel structures."

(The motion was seconded.)

Chairman Yates: I think one of the reasons for providing specifications for steel used for different purposes is to meet market conditions as far as practicable. There are a number of other reasons, I might say. For instance, some materials require different working conditions, require different steel.

I hope this motion will not prevail. We all realize the trouble we have had in getting material under the present specifications. We must meet to some extent market conditions. The committee has taken it up with the manufacturers, with the intent of changing some of the conditions, and it feels that it has gone about as far as it can, and still have a specification that will meet market conditions.

A. C. Irwin (Portland Cement Assoc.): The cold twisted bar is really subjected to an automatic test, so that in addition to the specific test you have practically an automatic test of the bar. In a twisted bar you have one in which the bond strength is practically equivalent to a plain bar. At the same time you have a bar that has been automatically tested, because it was twisted, and if it is not a good bar it will break in the twisting.

Mr. Condron: Mr. President, your committee has given a great deal of study to this matter, and these specifications seem to cover what Mr. Frink wants. If Mr. Frink wants to use in his work structural steel, he has a specification for it. Some other engineers will want to use the hard grade. It is on the market, they can purchase it, it is not being made to order, but they want a proper specification for ordering it under. Now it seems to me that this specification which has been in existence for at least five years—it is not anything new—the American Society of Testing Materials has threshed this all out and this is that specification and this material, and this is to be purchased in every city in the United States.

There has been a reference made to the twisting of bars testing them. That is salesmen's talk. There isn't any virtue to it in the matter of reinforcing bars. I haven't any objection to square twisted bars in bridges or anything else, but it costs a lot of money to have them twisted, and they do not do you any good. We want to bring to your attention the fact that you are paying $5 a ton for a mechanical operation from which you are getting no benefit. If you gentlemen are wise enough to know whether you have a hot or a cold twisted bar when you see it, all right.

(Mr. Frink's motion was put and defeated.)

Mr. Campbell: Mr. President, I now move that specification (c) under "Material Covered" be amended to read as follows: "Hot twisted bars will not be accepted under these specifications." If I understand correctly, at the opening of this discussion, these specifications as they stand differ from other specifications in that they do not include twisted bars, and if we could now align ourselves with those specifications so that we would not be in conflict with them altogether, I believe it would really be a step in advance.

(Mr. Campbell's motion was put and defeated.)

(The original motion was then approved.)

Chairman Yates: I move the adoption of the committee's report on "Methods of Depositing Concrete Under Water," and its printing in the Manual.

(The motion was carried and the committee dismissed with thanks.)

Report on Uniform General Contract Forms

THE COMMITTEE DEVOTED most of its attention during the year to a form of lease agreement for industrial sites and obtained specimen forms from various railroads. As a result of this work, a form of lease agreement was drawn up but not all of the members of the committee were in accord as to all of the articles incorporated. In view of the fact, however, that co-operation with a committee of another association was believed to be desirable before final action is taken, and that the committee is in agreement as to the larger number of the articles incorporated in the submitted form, it was considered best under all the conditions to incorporate the form of lease agreement for industrial site in the report.

Committee: E. H. Lee (C. & W. I.), chairman; C. A. Wilson (Cons. Engr.), vice-chairman; C. Frank Allen (M. I. T.), A. O. Cunningham (U. S. R. A.), W. D. Faucette (C. C. C. & St. L.), G. E. Gifford (Brg. Builders' Soc.), J. C. Irwin (B. & A.), A. S. Kent (C. I. & L.), H. A. Palmer (G. T.), C. J. Parker (N. Y. C.).

Discussion

This subject was considered in committee meeting, but for the reasons set forth in the report we were unable to deal with it conclusively. It seems to the committee better to present the report as it has been presented to this association as information. Before making a mo-

tion to that effect I wish to say that the committee, if the motion is adopted, will welcome criticisms and suggestions. I move that the report on form of lease agreement, for industrial site, be received as information. (The motion was seconded and carried, and the committee was excused with the thanks of the association.)

Five New A. R. E. A. Committee Chairmen

Are Leaders in the Work on Roadway, Signs and Crossings, Masonry, Ballast and Standards

FIVE NEW CHAIRMEN APPEAR among the personnel of the committees of the American Railway Engineering Association this year, four replacing others on standing committees and one leading a new committee. On the basis of the 22 standing and 1 special committee in existence a year ago, this indicates a turnover of chairmen about once every six years, which is slow to say the least.

J. J. Yates A. Crumpton E. A. Frink

H. L. Ripley J. R. W. Ambrose

New Chairmen of A. R. E. A. Committees

Those heading new committees this year are J. R. W. Ambrose, chief engineer of the Toronto Terminals Company, Toronto, Can., who is in charge of the Roadway committee; H. L. Ripley, valuation engineer of the New York, New Haven & Hartford, Boston, Mass., who is chairman of the Ballast committee; J. J. Yates, bridge engineer of the Central Railroad of New Jersey, New York City, who is directing the Masonry committee; Arthur Crumpton, valuation engineer of the Grand Trunk, Detroit, Mich., who is chairman of the Committee on Signs, Fences and Crossings, and E. A. Frink, principal assistant engineer of the Seaboard Air Line, with headquarters at Norfolk, Va., who heads the committee on Standardization which was organized late in 1918.

The selection of Mr. Ambrose to direct the Roadway committee is a recognition of his long membership on this committee and his extended experience in the type of railway construction problems presented to this com-

mittee for consideration. As chief engineer of the Toronto Terminals, where he is in charge of the new Toronto Union Station, which is being built jointly by the roads entering that city, and previously engaged in construction on other railways in Canada, Mr. Ambrose is familiar with roadway building under difficult conditions. He has been a member of the Roadway committee for 10 years, having first been appointed to this committee in 1910. He was chairman of a sub-committee for the three years from 1915 to 1917, inclusive.

While the subjects assigned to the Ballast committee for consideration during the past year are somewhat remote from the work which has engaged the attention of its chairman, Mr. Ripley, recently, he has been a member of this committee since 1916, was a chairman of a subcommittee in 1917, and again in 1919. He has been active in the work of this committee and has contributed materially to its reports during the last two or three years.

Arthur Crumpton's appointment as chairman of the Committee on Signs, Fences and Crossings was a natural promotion from the position of vice-chairman, which he has held for three years. Mr. Crumpton has been a member of this committee continuously since 1913.

The selection of J. J. Yates as chairman of the Masonry committee is also a recognition of extended service on a committee, as he has been a member of this committee since 1912. Mr. Yates was chairman of a sub-committee of this committee in 1916 and has been vice-chairman of the committee for the last three years. He has also been a representative of the association on the Joint Committee on Cement Specifications and has recently been elected vice-chairman of the new joint committee on Concrete and Reinforced Concrete. As assistant chief engineer of the Central Railroad of New Jersey and for a number of years bridge engineer of that road, his experience has been directly in line with the work of this committee.

E. A. Frink, who was appointed chairman of the recently-created Committee on Standardization, has long been an advocate of such a committee. His appointment in charge of the work of harmonizing the specifications of the association with trade practices and with those of the individual roads offers a wide field for service on the part of the association.

D. B. Wright Changes Position

D. B. Wright, for several years sales representative with the Lehon Co., has been appointed sales representative for the Paul Dickinson Company, with headquarters at 34th St. and S. Artesian Ave., Chicago.

Missouri Pacific Men Here

A delegation of 20 of the officers of the engineering and maintenance of way departments of the Missouri Pacific are in attendance at the convention and are also inspecting the exhibits at the Coliseum.

Kansas City Sectional Committee Meeting

A meeting of the Kansas City Sectional Committee of the Signal division will be held in the general assembly room of the Kansas City Union Terminal Building on March 29, beginning at 10 a. m. H. F. Roach of the Reinforced Rail Joint Company, St. Louis, Mo., will give a lecture on fibre for track installation and a representative of the Thos. A. Edison Company, Inc., Primary Battery Division, will talk on the chemistry in handling primary batteries.

A. R. E. A. Registration

THE REGISTRATION OF American Railway Engineering Association members yesterday totaled 411, in addition to 123 guests, a grand total of 534. This is 41 in excess of the registration on the first day last year, which was a record up to that time.

Members

Abbott, F. E., Insp. Engr., Lackawanna Steel Co., Buffalo, N. Y.
Albright, C. C., Asso. Prof. C. E., Purdue Univ., LaFayette, Ind.
Alfred, F. H., Pres. and Gen. Man., P. M. R. R., Detroit, Mich.
Ambrose, J. R. W., Chief Eng., Toronto Term. Ry., Toronto, Ont., Canada.
Ames, Azel, Kerite Insulated Wire & Cable Co., New York City.
Amoss, F. X., Can. Gov. Rys., Winnipeg, Can.
Anderson, Arthur, Instrumentman, N. Y. C. R. R., Chicago, Ill.
Andrews, Geo. W., Asst. to Ch. Eng. Maint., B. & O. R. R., Baltimore, Md.
Andrews, J. T., Asst. Eng., B. & O. R. R., Baltimore, Md.
Angerer, Victor, Vice-Pres., Wm. Wharton, Jr. & Co., Easton, Pa.
Angier, F. J., Supt. Tim. Pres., B. & O. R. R., Baltimore.
Armour, Robert, Masonry Eng., Grand Trunk Ry., Montreal, Can.
Armstrong, H. J., Asso. Prof. C. E., Armour Inst., Chicago, Ill.
Arn, W. G., Asst. Eng. M. W., I. C. R. R., Chicago.
Atwill, A. Lee, Asst. Eng., Chicago & Western Indiana R. R., Chicago.
Auryansen, F., Bridge Eng., Long Island R. R., Jamaica, N. Y.
Baird, F. A., Div. Eng., A. T. & S. F. R. R., Slaton, Texas.
Baird, R. C., Asst. Eng., C. R. I. & P. R. R., Chicago, Ill.
Baldridge, C. W., Asst. Eng., A. T. & S. F. Ry., Chicago.
Baldwin, A. S. (Past-President), Vice-President, I. C. R. R., Chicago.
Baldwin, R. A., Prin. Asst. Engineer, C. N. R., Toronto, Canada.
Baldwin, Springfield, Ch. Eng., Georgia & Florida R. R. Augusta, Ga.
Balliet, H. S., Asst. Terminal Manager, Gr. Cen. Ter., and Sig. Eng., N. Y. C. R. R., New York.
Baluss, F. C., Eng. B. and B., D. M. & N. Ry., Duluth, Minn.
Bardwell, R. C., Chief Chemist, M. P. R. R., St. Louis, Mo.
Barnhart, E. H., Asst. Engineer, B. & O. R. R., Baltimore, Md.
Barrett, W. C., Div. Engineer, Lehigh Valley R. R., Sayre, Pa.
Bassett, J. S., Asst. Eng., M. P. R. R., Nevada, Mo.
Batchellor, F. D., Div. Engineer, B. & O. R. R., Chicago, Ill.
Bates, Onward, Con. Eng., Chicago.
Beckett, F. T., Eng. M. of W., C. R. I. & P. Ry., El Reno, Okla.
Beye, John C., Bureau of Val., I. C. C., Chicago.
Bissell, F. E., Cleveland, Ohio.
Black, G. F., Eng. M. of Way, Maine Cen. R. R., Portland, Me.
Blackie, G. F., Asst. Ch. Eng., N. C. & St. L. Ry., Nashville, Tenn.
Blaiklock, M. S., Eng. M. of W., Grand Trunk Ry., Montreal, Can.
Blanchard, A. M., Office Engr., Grand Trunk Ry., Detroit, Mich.
Blum, Bernard, Eng. M. W., N. P. R. R., St. Paul, Minn.
Boardman, H. E., Asst. Eng., Val. Dept., N. Y. C. Lines, New York, N. Y.
Bond, F. L. C., Chief Engineer, G. T. Ry., Montreal, Can.
Breckinridge, W. L., Asst. Chief Eng., C. B. & Q. R. R., Chicago. Ill.
Bremner, Geo. H. (Treasurer), District Engineer, Bureau of Valuation, Interstate Commerce Commission, Chicago.
Brewer, W. A., Chicago.
Briggs, Z. M., Asst. Eng., Penna. Lines, Pittsburgh, Pa.
Brown, A. V., Eng. M. W., Lake Shore Electric Ry., Sandusky, Ohio.
Brown, C. B., Asst. Gen. Man. & Chf. Eng., Can. National Rys., Moncton, Can.
Brown, H. C., Jr., Chicago.
Brown, J. M., Eng. C., C. R. I. & P. Ry., Chicago.
Brumley, D. J., Chief Corp. Eng., I. C. R. R., Chicago.
Bryan, C. G., Asst. Eng., I. C. R. R., Chicago, Ill.
Bryan, Hardy, Asst. Eng., N. P. R. R., St. Paul, Minn.
Buck, C. M., Div. Eng., A. T. & S. F. Ry., Topeka, Kan.
Buehler, Walter, Cons. Eng., The Barrett Company, Chicago.
Burke, M. J., Asst. Eng., Big Four Ry., Indianapolis, Ind.
Burns, J. F., Asst. Eng., M. W., L. & N. R. R., Louisville, Ky.
Burpee, Moses, Ch. Eng., B. & A. R. R., Houlton, Me.
Burrage, W. H., Pilot, Val. Dept., N. Y. C. & St. L. R. R., East Cleveland, Ohio.
Burt, J. W., Eng., M. W., C. C. C. & St. L., Indianapolis, Ind.
Burton, W. J., Asst. Val. Eng., Mo. Pac. R. R., St. Louis, Mo.
Bush, Lincoln, East Orange, N. J.
Butterworth, A. S., Ch. Eng., G. F. & A. Ry., Pensacola, Fla.

Campbell, J. L. (Director), Ch. Eng., E. P. & S. W. R. R., El Paso, Texas.
Carroll, G. A., Div. Eng., C. R. I. & P. R. R., Eldon, Mo.
Chamberlain, O. P., Prest., C. & I. W. R. R., Chicago.
Carpenter, A. W., Asst. Val. Eng., N. Y. C. R. R., New York.
Chandler, Charles, Asst. Bridge Eng., I. C. R. R., Chicago, Ill.
Christian, W. A., Senior Civil Engineer in charge of Track and Roadway, I. C. C., Chicago, Ill.
Church, S. R., Man. Research Dept., The Barrett Co., New York City.
Clark, M. B., Div. Eng., A. T. & S. F. Ry., Needles, Calif.
Clark, W. A., Chief Engineer, D. & I. R. R. R., Duluth, Minn.
Clements, M. F., Bridge Eng., Nor. Pac. Ry, St. Paul, Minn.
Cleveland, G. C., Chief Eng., N. Y. C. R. R., West of Buffalo, Cleveland, O.
Coburn, Maurice, Eng. M. of W., Penna. Lines, Indianapolis.
Collette, E. L., Asst. Eng. M. W., St. L.-S. F. R. R., Springfield, Mo.
Condron, T. L., Consulting Engineer, Monadnock Block, Chicago.
Conner, J. K., Chief Eng., L. E. & W. R. R., Indianapolis.
Cook, C. C., Maintenance Eng. (Corp.), B. & O. R. R., Baltimore, Md.
Cook, O. U., Met. Eng., Tenn. Coal, Iron & R. R. Co., Birmingham, Ala.
Coon, C. J., Track Eng., Gr. Cen. Terminal, N. Y. C. R. R., New York.
Corrigan, G. W., Division Engineer, Southern Pacific Company, Los Angeles, Cal.
Courtenay, W. H. (Director), Chief Engineer, L. & N. R. R., Louisville, Ky.
Cox, J. B., Consulting Engineer, Chicago, Ill.
Crugar, E. L., Dist. Eng., I. C. R. R., New Orleans, La.
Crumpton, Arthur, Val. Eng., Grand Trunk R. R., Montreal, Can.
Cunningham, C. C., Insp. Roadway & Str., C. R. I. & P. R. R., Chicago.
Curd, W. C., Con. Eng., Chicago.
Curtis, L. G., Chief Engineer, Adj. Division, B. & O. R. R., Baltimore.
Curtiss, L. B., Asst. Eng., Nor. Pac. Ry., St. Paul, Minn.
Cushing, W. C. (Past-President), Eng. of Standards and Valuation, Pennsylvania Railroad System, Philadelphia, Pa.
Dare, C. E., Res. Eng., W. S. Ry., Alexandria, Va.
Davidson, Geo. M., Chemist & Eng. Tests, C. & N. W. Ry., Chicago.
Davis, A. L., Prin. Asst. Eng., I. C. R. R., Chicago, Ill.
Delamere, C. T., Eng. Const., C. P. R., Montreal, Canada.
Dennis, Walt, Division Eng., Wabash R. R., Moberly, Mo.
Dewey, S. J., Asst. Signal Engineer, Big Four Ry., Cincinnati, O.
Dillenbeck, Clark, Asst. Ch. Eng., P. & R. Ry., Philadelphia, Pa.
Dixon, H. A., Chf. Eng., Canadian Nat. Rys., Western Lines, Winnipeg, Can.
Dixon, J. M., St. Paul, Minn.
Donahey, J. A., Cleveland, Ohio.
Douglas, H. T., Jr., Chief Eng., C. & A. R. R., Chicago.
Downs, J. L., Roadmaster, I. C. R. R., Champaign, Ill.
Duffy, C. M., Asst. Sig. Eng., C. R. I. & P. R. R., Des Moines, Ia.
Earle, T. E., Res. Eng., C. C. C. & St. L. R. R., Union City, Ind.
Eck, W. J., Sig. and Elec. Supt., Sou. Ry., Washington, D. C.
Edgerton, H. H., Asst. Eng., C. G. W. R. R., Chicago, Ill.
Elder, J. D., Div. Eng., M. C. R. R., Niles, Mich.
Eliott, Leigh B., Act. Eng. M. W., Big Four Ry., Indianapolis, Ind.
Elliott, W. H., Signal Eng., N. Y. C. R. R., Albany, N. Y.
Ellis, G. E., Fairhaven, Mass.
Entwisle, E. D., Ch. Eng., J. & S. C. R. R., Johnstown, Pa.
Evans, John, Div. Eng., M. C. R. R., Detroit, Mich.
Evans, W. T., Asst. Eng., Chicago & Alton R. R., Chicago.
Fair, J. M., Asst. Supr., Penna. R. R., Philadelphia, Pa.
Fairbairn, J. M. R., Ch. Eng., Can. Pacific Ry., Montreal, Canada.
Faucette, W. D., Chief Engineer, S. A. L. Ry., Norfolk, Va.
Felt, C. W. F., Chief Engineer, Santa Fe Railway System, Chicago.
Fisher, S. B., Con. Eng. M. K. & T. Ry., Parsons, Kan.
Fisk, C. H., St. Louis, Mo.
Foley, John, Forester, Penn. R. R. Co., Broad St. Station, Philadelphia.
Ford, C. F., Supr. of T. & T. Dept., C. R. I & P. Ry., Chicago, Ill.
Ford, R. H., Asst. Ch. Eng., C. R. I. & P. Ry., Chicago, Ill.
Fowler, W. E., Ch. Eng., Montour Railroad Co., Coraopolis, Pa.
Fox, J. W., Val. Eng., Cen. of Georgia Ry. Co., Savannah, Ga.
Freeman, J. E., Eng., Technical Bureau, Portland Cement Assn., Chicago.
Frick, O. H., Dist. Eng., C. M. & St. P. R. R., Chicago.
Frink, E. A. (Director), Principal Asst. Eng., S. A. L. Ry., Norfolk, Va.
Fritch, E. H. (Secretary), Chicago, Ill.
Fulks, E. B., Vice-Pres., Amer. Tar Products Co., Chicago, Ill.
Gardner, W. H., Jr., Ch. Eng., G. & S. I. R. R., Gulfport, Miss.
Gennet, C. W., Jr., Eng., R. W. Hunt & Co., Chicago, Ill.
Godlove, Geo. W., Jr., Office Eng., A. T. & S. F. R. R., Marceline, Mo.
Going, A. S., Eng. Const., Grand Trunk Ry., Montreal, Can.
Goodrich, C. M., Eng., Canadian Br. Co., Walkerville, Ont.
Goos, J. H., Ins. Eng., G. N. R. R., St. Paul, Minn.
Grant, J. M., Pilot Eng., C. & A. R. R., Chicago.
Greenabaum, A. L., Asst. Eng., C. R. I. & P., Chicago.
Griggs, A. B., Val. Eng., A. T. & S. F. Ry., Eastern Lines, Topeka.
Grime, E. M., Supv. B. & B., Nor. Pac. Ry., Dilworth, Minn.
Griswold, H. C., Louisville, Ky.
Gwyn, J. G., Ch. Eng., D. & R. G. R. R., Denver, Colo.
Haas, E. M., Railroad Specialist, The Austin Co., Cleveland, Ohio.
Hadwen, T. L. D., Eng. of Masonry Const., C. M. & St. P. R. R., Chicago.
Haggander, G. A., Bridge Engr., C. B. & Q. R. R., Chicago, Ill.
Hall, F. D., Elec. Eng., B. & M. R. R., Somerville, Mass.
Hamilton, Paul, Eng. Tr. & Roadway, Big Four Ry., Cincinnati, Ohio.
Hammond, R. J., Office Eng., B. & M. R. R., Boston, Mass.
Hanna, John V., Ch. Eng., G. C. Ter. Ry., Kansas City, Mo.
Harrington, C. J., Roadmaster, Y. & M. V. R. R., Memphis, Tenn.
Harris, G. W., Staff of President, Ch. Eng., A. T. & S. F. Ry., Chicago.
Harsh, H. H., Div. Eng., B. & O. R. R., Pittsburgh, Pa.
Hartley, L. C., Chief Eng., C. & E. I. R. R., Chicago.
Harvey, A. E., Ch. Eng. Metr. St. Ry. Co., Kansas City, Mo.
Harvey, W. C., Val. Eng., Chicago G. W. R. R., Chicago, Ill.
Hastings, E. M., Prin. Asst. Eng., R. F. & P. R. R., Richmond, Va.
Hatt, W. K., Prof. C. E., Purdue Univ., LaFayette, Ind.
Hawk, A. T., Eng. Bldgs., C. R. I. & P. R. R., Chicago.
Hayes, H. C., Asst. Eng., I. C. R. R., Champaign, Ill.
Hayes, Reuben, Str. Eng., Southern Ry., Washington, D. C.
Hegel, G. W., Ch. Eng., Chicago Junction Ry., Chicago, Ill.
Heggie, W. G., Office Engineer, Grand Trunk Ry., Western Lines, Detroit, Mich.
Hench, N. M., Eng. Tr. Appl., Carnegie St. Co., Pittsburgh, Pa.
Hendricks, V. K., St. Louis, Mo.
Hewes, C. A., Asst. Eng., M. P. R. R., Kansas City, Mo.
Hewes, F. S., Pilot Eng., A. T. & S. F. Ry., Amarillo, Tex.
Hewes, John, Jr., Division Engineer, B. & O. R. R., Flora, Ill.
Hewson, E. G., Div. Eng., G. T. Ry., Toronto, Ont., Can.
Hickey, T. H., Insp. Maint. of Way, M. C. R. R., Detroit, Mich.
Hillegass, E. B., Eng. Maint. of Way, A. C. L., Savannah, Ga.
Hoagland, J. R., Ch. Pilot Eng., C. & A. R. R., Chicago.
Hobbs, W. H., Asst. Eng., Mo. Pac. R. R., Kansas City, Mo.
Hockman, H. M., Asst. Eng., Toledo, St. L. & W. R. R., Frankfort, Ind.
Hogue, C. J., Eng. Forest Products, West Coast Lumbermen's Assn., New York.
Hood, J. M., Supt., A. C. & Y. Ry., Akron, Ohio.
Howard, C. P., Senior Civil Eng., Bureau of Val., I. C. C., Chicago.
Howes, C. P., Bridge Eng., T. & P. R. R., Dallas, Texas.
Howson, E. T., Western Editor, *Railway Age*, Chicago, Ill.
Hoyt, W. H., Ch. Engineer, D. M. & N. R. R., Duluth, Minn.
Hudson, H. W., Man. R. R. Dept., Day & Zimmerman, Inc., New York City.
Hughes, L. J. F., Asst. Eng., C. R. I. & P. R. R., Chicago.
Hunley, John B., Engineer Bridges and Str., Big Four Ry., Cincinnati, O.
Ibsen, Hans, Bridge Engineer, M. C. R. R., Detroit, Mich.
Irving, T. T., Ch. Eng., Grand Trunk Ry., Western Lines, Detroit.
Irwin, A. Chas., LaGrange, Ill.
Jackson, C. T., Dist. Eng., C. M. & St. P. R. R., Chicago.
James, C. M., Eng. Const., A. C. Line, Wilmington, N. C.
Jenkins, J. B., Val. Eng., B. & O. R. R., Baltimore, Md.
Johnson, E. A., Asst. Eng. Can. Nat. Rys., Winnipeg, Can.
Johnson, Maro, Asst. Eng. Dept., I. C. R. R., Chicago.
Johnson, Noah, Val. Eng., Wabash R. R., St. Louis, Mo.
Jones, Pusey, Br. Eng., B. & M. R. R., Boston.
Judd, F. R., Eng. of Buildings, I. C. R. R., Chicago.
Katte, Edwin B., Ch. Eng. Elec. Trac., N. Y. C. R. R., New York.
Kegler, W. C., Eng. M. W., C. C. C. & St. L. Ry., Galion, Ohio.
Ketchum, M. S., Prof. in Charge C. E., University of Penn., Philadelphia, Pa.
Khuen, Richard, Gen. Man. Erect., Am. Bridge Co., Pittsburgh, Pa.
Kimball, L. P., Eng. of Bldgs., B. & O. R. R., Baltimore, Md.

King, E. E., Prof. of Ry. Civil Eng., Univ. of Ill., Urbana, Ill.
King, H. J., Jr., Asst. Eng., C. C. C. & St. L., Indianapolis, Ind.
Kirby, J. L., Eng. M. of W., Seaboard Air Line, Norfolk, Va.
Kircher, Paul, Res. Man., C. F. Massey Co., New York City.
Kissell, J. E., Eng. M. of Way, Big Four Ry., Mt. Carmel, Ill.
Knowles, C. R., Supt. Water Service, Ill. Cen. R. R., Chicago, Ill.
Korsell, A. E., Asst. Eng., C. R. I. & P. R. R., Chicago.
Krause, L. G., Asst. Eng., Pub Ser. Com., Harrisburg, Pa.
Kuehn, A. L., V. P. & Genl. Supt., American Creosoting Co., Chicago.
Kuntz, G. T., Asst. Eng., U. P. R. R., Junction City, Kansas.
LaBach, Paul M., Eng. Water Service, C. R. I. & P., Chicago.
Lacher, W. S., Asst. Eng. Editor, Railway Age, Chicago.
Lahmer, J. A., Prin. Asst. Eng., M. P. R. R., St. Louis, Mo.
Laird, H. G., M. of W., Eng., A. C. Line, Jacksonville, Fla.
Larsen, Albert, Div. Eng., Miami Con. Dist., Dayton, Ohio.
Larsson, C. G. E., Asst. Chief Eng., Am. Bridge Co., New York.
Latham, R. L., Chief Eng., H. & B. Ry., Hamilton, Ont., Canada.
& W. I. R. R. Co., and Belt Ry. of Chicago, Chicago.
Lavis, Fred, Con. Eng., New York City.
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Lee, Frank, Eng. M. W., Western Lines, C. P. R., Winnipeg, Can.
Lees, Thos., Eng. W. S., C. P. Ry., Winnipeg, Man., Can.
Leffler, B. R., Eng. Bridges, N. Y. C. R. R., Cleveland, Ohio.
Leisenring, J. G. M., Sig. Eng., Ill. Trac. System, Springfield, Ill.
Lewis, E. R., Editor, Maintenance Cyc., Chicago.
Libberton, J. H., Mgr. Service Bureau, Universal Portland Cement Co., Chicago.
Lienhard, L. V., Ch. Draftsman, A. T. & S. F. R. R., Amarillo, Texas.
Little, J. G., Asst. Eng. Editor, Railway Age, New York City.
Loweth, C. F., Ch. Eng., C. M. & St. P. R. R., Chicago, Ill.
Lowther, W. H., Div. Eng., Central Div., U. P. R. R., Marysville, Kan.
MacFarland, H. B., Eng. of Tests, A. T. & S. F. Ry., Chicago, Ill.
Mackenzie, A. C., Eng. M. Way, C. P. R. R., Winnipeg, Man., Canada.
Macomb, J. de N., Office Eng., Santa Fe Ry., Chicago.
Maddock, J. B., Eng. Bridges & Bldgs., Central of Ga. R. R., Savannah, Ga.
Maischaider, A. F., Eng. M. of Way, Big Four Ry., Mattoon, Ill.
Mann, B. H., Signal Eng., Mo. Pac. R. R., St. Louis, Mo.
Manson, E. F., Asst. Engr., C. R. I. & P., Chicago.
Markley, A. S., Master Carpenter, C. & E. I. R. R., Danville, Ill.
Marshall, W. B., Track Supervisor, Sou. Ry. Lines, High Point, N. C.
Martius, F. T., Eng., National Boiler Washing Co., Chicago.
Masters, F. H., Asst. Ch. Eng., E. J. & E. Ry., Joliet, Ill.
McBride, J. S., Prin. Asst. Engr., C. & E. I. R. R., Chicago, Ill.
McClain, J. B., Bridge Eng., Seaboard Air Line, Norfolk, Va.
McClanahan, S. L., Div. Eng., C. R. I. & P. R. R., Colorado Springs, Colo.
McComb, R. J., Asst. to Pres., Q. & C. Company, Peoples Gas Bldg., Chicago.
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McGuigan, Francis H., Jr., Acting Regional Engr.'s Off., U. S. R. A., Chicago.
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McVay, C. M., Div. Eng., Kanawha & Mich. R. R., Charleston, W. Va.
Michel, Wm., Ch. Eng., Hocking Valley R. R., Columbus, Ohio.
Milburn, J. H., Chief Draftsman, B. & O. R. R., Baltimore, Md.
Mitchell, L. A., E. of M. of W., Union Tr. Co. of Ind., Anderson, Ind.
Mock, J. C., Sig. Elec. Eng., M. C. R. R., Detroit, Mich.
Modjeski, R., Con. Engineer, Chicago, Ill.
Montzheimer, A., Ch. Eng., E. J. & E. Ry., Joliet, Ill.
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Morrison, W. W., Ch. Eng., P. S. & N. Ry., Kittanning, Pa.
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Motley, P. B., Eng. Bridges, C. P. R., Montreal, Can.
Mountain, G. A., Ch. Eng., Can. Ry. Commission, Ottawa, Can.
Mulliken, A. H., Pres., Pettibone-Mulliken Co., Chicago.
Nagel, John R., Gen. Roadmaster, Mo. Pac. R. R., Nevada, Mo.
Neubert, John V., Eng. Track, N. Y. C. R. R., New York.
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Newhouse, C. E., Asst. Div. Eng., B. & O. S. W. R. R., Seymour, Ind.
Nicholson, F. L., Ch. Eng., N. & S., Norfolk, Va.
Noble, J. A., Div. Eng., A. T. & S. F. R. R. Co., La Junta, Colo.
Olson, E. H., Asst. Eng., A. T. & S. F. Ry., Chicago, Ill.
Orrock, J. W., Prin. Asst. Eng., C. P. R., Montreal, Can.
Nusz, W. G., Asst. Eng., I. C. R. R., Chicago.
Ogle, W. F., Chief Draftsman, C. R. I. & P. Ry., Chicago, Ill.
Oyler, E. C., Div. Eng., Cumberland Val. R. R., Chambersburg, Pa.
Parker, W. A., Asst. Eng. M. W., U. P. R. R., Omaha, Neb.
Patenall, F. P., Signal Eng., B. & O. R. R., Baltimore, Md.
Patterson, F. M., Interstate Commerce Commission, Chicago, Ill.
Paul, C. E., Prof. of Mechanics, Armour Institute of Technology, Chicago.
Peabody, G. A., Ch. Eng., Cleveland Frog & Crossing Co., Cleveland, Ohio.
Peabody, J. A., Sig. Eng., C. & N. W. Ry., Chicago, Ill.
Pearce, R. M., Res. Eng., P. & L. E. R. R., Pittsburgh, Pa.
Pearson, R. L., Div. Eng., N. Y. N. H. & H. R. R., New Haven, Conn.
Pence, W. D. (Editor of Publications), Member Eng. Board, I. C. C., Chicago.
Pendelton, D. E., Asst. Eng., C. & W. I. R. R., Chicago.
Perkins, C. D., Asst. to E. M. W., N. Y. N. H. & H. R. R., New Haven.
Peters, J. F., Asst. Eng., T. R. R. Assn., St. Louis, Mo.
Petersen, W. H., Eng. M. W., C. R. I. & P. Ry., Des Moines, Ia.
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Pickles, J. L., Ch. Eng., D. W. & P. Ry., West Duluth, Minn.
Pierce, A. B., Eng. Water Supply, Southern R. R., Washington, D. C.
Pifer, C. W., Interstate Commerce Commission, Chicago, Ill.
Pittman, T. M., Jr., Asst. Eng., Ill. Cent R. R., McComb, Miss.
Puder, F. R., Asst. Eng., U. S. R. A., Chicago.
Quigley, C. N., Ch. Eng., Boyne City, Gaylord & Alpena R. R., Boyne City, Mich.
Reichmann, Albert, Div. Eng., Am. Bridge Co., Chicago.
Reinholdt, J. H., Ch. Eng., M. & St. L. R. R., Minneapolis, Minn.
Reisner, W. C., Pilot Eng., C. & A. R. R., Chicago, Ill.
Rench, W. F., Civil Eng., Simmons-Boardman Pub. Co., Chicago, Ill.
Rice, S. B., Eng. M. W., R. F. & P. R. R., Richmond, Va.
Richardson, C. P., Div. Eng., C. R. I. & P. Ry., Chicago.
Rickert, O., Gen. Roadmaster, Mo. Pac. R. R., Monroe, La.
Ridgway, A. O., Asst. Ch. Eng., Denver & Rio Grande R. R., Denver.
Riley, D. A., Eng. Dept., B. & O. R. R., Baltimore, Md.
Ripley, H. L., Corp. & Val. Eng., N. Y. N. H. & H. R. R., Boston, Mass.
Robbins, O. B., Senior Str. Eng., Bureau of Val., I. C. C., Chicago.
Roberts, S. S., Louisville, Ky.
Robinson, A. F., Bridge Eng., Sante Fe Ry. System, Chicago, Ill.
Rockfeller, R. P., Office Eng., C. M. & St. P. Ry. Co., Chicago.
Rodenbaugh, H. N., Regional Engr., U. S. R. A., Washington, D. C.
Rogan, J. E., Roadmaster, I. C. R. R., New Orleans, La.
Rose, L. S., Asst. to Gen. Man., Big Four Ry., Cincinnati, Ohio.
Rossiter, L. P., Div. Eng., L. V. R. R., Buffalo, N. Y.
Rote, R. O., Asst. Ch. Eng., N. Y. C. R. R., Cleveland, Ohio.
Rudd, A. H., Ch. Sig. Eng., P. R. R., Philadelphia, Pa.
Rust, T. E., Ch. Eng., W. C. F. & N. R. R., Waterloo, Iowa.
Rys, C. F. W., Met. Eng., Carnegie Steel Co., Pittsburgh, Pa.
Safford, H. R. (First Vice-President), Asst. to President, C. B. & Q. R. R., Chicago.
Sattley, R. C., Val. Eng., C. R. I. & P. Ry., Chicago.
Saunders, J. E., Asst. Ch. Eng., U. S. & S. Co., Swissvale, Pa.
Schall, F. E., Bridge Engineer, L. V. R. R., So. Bethlehem, Pa.
Schnacke, A. D., Asst. Eng., A. T. & S. F. Ry., Topeka, Kan.
Schofield, J., Architect, Kan. Nor. Ry., Winnipeg, Man., Canada.
Schwaab, J. E., Asst. Eng., C. & A. R. R., Chicago.
Seely, S. A., Asst. Div. Eng., N. Y. C. R. R., Utica, N. Y.
Selby, O. E., Prin. Asst. Eng., C. C. C. & St. L. Ry., Cincinnati, Ohio.
Sharpley, H. F., Prin. Asst. Eng., Central of Georgia Ry., Savannah, Ga.
Shaver, A. G., Con. Elec. and Sig. Eng., Chicago.
Shepard, R. B., Jr., Val. Eng., A. C. Line, Wilmington, N. C.
Shields, A. C., Div. Eng., C. R. I. & P. Ry., Trenton, Mo.
Shurtleff, A. K. (Assistant Secretary), Chicago.
Silliman, Charles, Group Eng., Pres. Conf. Com., Washington, D. C.
Simmons, I. L., Bridge Engineer, C. R. I. & P. Ry., Chicago, Ill. St. Louis, Mo.
Simons, P. T., Senior Drainage Eng., Bureau of Public Works, Washington, D. C.
Simpson, W. D., Ch. Draftsman, S. A. L. R. R., Norfolk, Va.
Sisson, F. P., Div. Eng., Grand Trunk W. Lines, Detroit, Mich.
Slibeck, G. J., Ch. Eng., Pettibone, Mulliken Co., Chicago, Ill.
Sloggett, L. O., Val. Dept., Ill. Cent. R. R., Chicago.

Smith, D. W., Val. Eng., Hocking Valley Ry., Columbus, Ohio.
Smith, G. L. G., Rail & Track. Insp., Nor. Pac. Ry., St. Paul, Minn.
Smith, Huntington, Div. Eng., N. Y. C. & St. L. R. R., Cleveland, Ohio.
Smith, Lowry, Asst. Dis. Eng., Nor. Pac. Ry., Brainerd, Minn.
Smock, C. E., Res. Eng., Erie Railroad, Hornell, N. Y.
Snyder, H. G., Asst. Div. Eng., B. & O. R. R., Garrett, Ind.
Sparrow, L. L., Prin. Asst. Eng., A. C. L., Wilmington, N. C.
Spell, W. A., Prin. Asst. Eng., A. B. & A. Ry., Atlanta, Ga.
Sperry, H. M., Director Bureau of Ry. Signaling Economics, New York.
Spielmann, J. A., Asst. to Gen. Supt., B. & O. R. R., Pittsburgh, Pa.
Stainer, M. A., Eng. M. of W., F. W. & D. C. Ry., Fort Worth, Texas.
Stelle, C. A., Res. Engr., C. & A. R. R., Chicago.
Sterling, Paul, Maint. Eng., Lines West, N. Y. N. H. & H. R. R., New Haven, Conn.
Stevens, Thos. S., Signal Eng., Santa Fe System, Topeka, Kan.
Stimson, Earl (President), Chief Engineer Maintenance, Baltimore & Ohio Railroad, Baltimore, Md.
Stocker, J. A., Ch. Eng., Toledo & Ohio Cen. Ry., Columbus, O.
Storey, W. B. (Past-President), Prest., A. T. & S. F. R. R., Chicago.
Stout, H. M., Rec. Eng., Nor. Pac. Ry., St. Paul, Minn.
Stradling, D. W., Asst. Val. Eng., D. T. & I. R. R., Springfield, O.
Strauss, J. B., Ch. Eng., Strauss Bascule Bridge Co., Chicago.
Strong, J. B., Vice-Pres., Ramapo Iron Works, Hillburn, N. Y.
Stuart, H. B., Struct. Eng., Grand Trunk Ry., Montreal, Can.
Sullivan, Earl, Asst. Eng., Mo. Pac. R. R., St. Louis, Mo.
Swartout, W. C., Asst. Eng., Mo. Pac. R. R., St. Louis, Mo.
Sykes, Vance, Div. Eng., S. A. L. Ry., Hamlet, N. C.
Talbot, A. N., Prof. Mun. & San. Eng., U. of Ill., Urbana, Ill.
Taylor, C. M., Supt. Creos. Plant, Philadelphia & Reading Railway, Central Railroad of New Jersey, Port Reading, N. J.
Taylor, F. J., Div. Eng., Nor. Pac. Ry., Livingston, Mont.
Teal, J. E., Special Eng., B. & O. R. R., Baltimore, Md.
Tebbetts, G. E., Stone & Webster.
Temple, E. B. (Director), Asst. Ch. Eng., Penn. R. R., Philadelphia, Pa.
Thompson, F. L., Chief Engineer, Illinois Central Railroad, Chicago.
Thrower, D. W., Val. Eng., I. C. R. R., Chicago.
Tillett, C. H., Signal Eng., Grand Trunk Ry., Montreal, Can.
Tinker, G. H., Br. Eng., N. Y. C. & St. L. R. R., Cleveland, O.
Tratman, E. E. R., Wheaton, Ill.
Tuthill, Job, Ch. Eng., P. M. R. R., Detroit, Mich.
Unger, J. S., Man., Cen. Research Bureau, Carnegie Steel Co., Pittsburgh, Pa.
Van Auken, A. M., Asst. Engr., C. I. & L. R. R., Chicago.
Vent, F. G., Asst. Eng., I. C. R. R., Chicago.
von Schrenk, Hermann, Dr., Con. Timber Eng., N. Y. C. R. R.,
Wagner, S. T., Ch. Eng., P. & R. Ry., Philadelphia, Pa.
Walker, John, Asst. Eng., G. T. Ry., Barrie, Ont., Can.
Wallace, W. A., Div. Eng., C. R. I. & P. Ry., Fairbury, Neb.
Walling, V. R., Prin. Asst. Eng., C. & W. I. R. R., Chicago, Ill.
Waterman, J. H., Supt. Timber Pres., C. B. & Q. R. R., Galesburg, Ill.
Watkins, R. C., Corp. Eng. M. of W., S. P. Lines, Houston, Tex.
Watt, J. R., Gen. Roadmaster, L. & N. R. R., Louisville, Ky.
Weaver, C. E., Eng. M. of Way, C. of Ga. Ry., Savannah, Ga.
Weeks, Otis, Div. Eng., S. P. R. R., Ogden, Utah.
Welty, H. T., Eng. of Struct., N. Y. C. R. R., New York, N. Y.
Wendt, Edwin F. (Past-President), Member Eng. Board, Bureau of Valuation, Interstate Commerce Commission, Washington, D. C.
Westfall, C. C., Eng. of Bridges, I. C. R. R., Chicago, Ill.
Wherry, B. T., Asst. Insp. Eng., Ill. Steel Co., Chicago.
Whyman, R. G., Div. Eng., A. T. & S. F. Ry., Amarillo, Texas.
Wickhorst, M. H., Eng. of Tests, Rail Committee, Chicago, Ill.
Williams, A. P., Div. Eng., B. & O. R. R., Connellsville, Pa.
Williams, C. C., Prof. C. E., University of Kansas, Lawrence, Kan.
Williams, G. P., Asst. Eng. M. W., L. I. R. R., Jamaica, N. Y.
Williams, S. N., Professor-Emeritus of Civil Engineering (Cornell College, Iowa), Oak Park, Ill.
Wilson, A. O., Div. Eng., S. A. L., Charleston, S. C.
Wilson, G. L., Eng. M. W., Twin City Rapid Transit Co., Minneapolis.
Wiltsee, W. P., Asst. Eng., Norfolk & Western Ry., Roanoke, Va.
Winchester, P. H., Div. Eng., N. Y. C. R. R., Watertown, N. Y.
Wirth, A. A., Asst. Eng., Penna. Lines, Pittsburgh, Pa.
Wishart, J. G., Office Eng., C. R. I. & P. Ry., Chicago.
Wonson, S. L., Bridge Eng., M. P. R. R., St. Louis, Mo.
Worthing, E. E., Signal Engineer, Sou. Pac. Co., Houston, Texas.
Wrenshall, J. C., Jr., Div. Eng., P. & R. Ry., Philadelphia, Pa.
Yager, Louis, St. Paul, Minn.
Yates, J. J., Bridge Eng., Central R. R. of N. J., New York, N. Y.
Yewell, J. E., Ch. Draftsman, Bessemer & Lake Erie R. R., Greenville, Pa.
Young, J. B., Ch. Chemist, P. & R. R. R., Reading, Pa.
Young, S. R., Asst. Chief, West Point Station, Georgia Railroad, West Point, Ga.
Ziegweid, A. B., Senior Civil Eng., Bureau of Val., I. C. C., Chicago.
Zinn, A. S., Care Ch. Eng., Office, M. P. R. R. Co., St. Louis, Mo.
Zook, M. A., Res. Eng., Bureau of Val., I. C. C., Washington, D. C.

Guests

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Anderson, I., Div. Engr., A. T. & S. F. Ry., Marceline, Mo.
Armstrong, W. R., Ch. Engr., A. S. L. R. R., Salt Lake City, Utah.
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Baber, S. A., Cleveland, O.
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Baldwin, P. G., Contractor, Warren, Ohio.
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Biezick, J. W., Couley Frog & Switch Co., Memphis, Tenn.
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Bowler, R. W. E., Supr. of Track., P. R. R., Washington, D. C.
Briggs, E. L., Asst. Engr., A. T. & S. F., Chicago.
Brink, E. B., Supt., B. & O., Tipton, Ind.
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Cox, R. J., National Carbon Co., Louisville, Ky.
Dailey, E. B., Southern Pacific Co., Houston, Tex.
Davenport, G. L., Asst Engr., A. T. & S. F., Los Angeles, Calif.
Davis, J. H., Electrical Engr., B. & O., Baltimore, O.
Davis, T. H., Prin., Asst., Engr., Indianapolis St. Ry., Indianapolis, Ind.
De Von, James L., Mgr., Eastern Central Dept. Am. Bridge Co., Pittsburgh.
Draver, Franklin, Div., Engr., P. R. R., Baltimore, Md.
Edwards, W. H., Pilot Engr., B. & O., Wheeling, W. Va.
Espenshode, Trav. Val. Agt., C. & N. W., Chicago.
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Fairle, T. M., Railway Engineer, Hydra Electric Power Co., Ontario.
Fenley, W. H., Kerite Insulated Wire & Cable Co., Chicago.
Flint, C., Asst. Engr., C. P., Winnipeg.
French, H. H., Engineering News Record, Chicago.
Freygang, A. H., Div. Engr., B. & O., Grafton, W. Va.
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Gemmill, W. A., Master Carpenter, P. R. R., Willamsford, Pa.
Gibson, H. R., Div. Engr., B. & O., Dayton, O.
Gibson, P. H., Supt. Track, C. & O., Chicago.
Gilman, A. F., Asst. Engr., C. St. P., M. & O. Ry.
Green, D. H., National Carbon Co., Cleveland, O.
Griffin, A. M., Architect. A. C. G., Wilmington, N. C.
Groff Jr., W. B., Supr., P. R. R., Watsontown, Pa.
Goltra, P. P., Secy. Treas., The Goltra Tie Co., Cleveland, O.
Hand, Chas. E., G. F. W. S., A. T. & S. F., Amarillo, Tex.
Harris, B. B., Supr., P. R. R., Philadelphia, Pa.
Harrison, F. O., Secy. to Engr., M. of W., El Reno, Okla.
Haupt, Edw., Pres. Strobel Steel Const. Co., Chicago.
Hawley, Wm. E., Asst Engr., D. M. & N., Duluth, Minn.
Henkel, C. C., Asst. Supr., N. Y. C., Buffalo, N. Y.
Hill, Walter A., Asst. Engr., C. B. & Q., Val Dept., La Grange, Ill.
Hovey, O. E., Engr. American Bridge Co., N. Y. City.
Holtman, D. F., Assoc. Editor, The American Contractor, Chicago.
Hunter, I. W., Div. Engr., C. & E. I., Danville, Ill.

Hurst, C. M., The Hurst Automatic Switch & Signal Co., St. Louis, Mo.
Jeffords, L. S., Asst. Engr., A. C. L., Savannah, Ga.
Jefferies, G. C., Div. Engr., A. T. & S. F., Clovis, N. M.
Jone, F. A., Asst. Engr., B. & O., Needham, Mass.
Kaufman, R. L., Contracting Engr., Chicago.
Keen, Willard, Roadmaster, A. T. & S. F., Carlsbad, N. M.
Kingsland, E. B., Pilot Engr., Nickel Plate, Cleveland, Ohio.
King, Coleman, Supr. Long Island, Jamaica, N. Y.
Kronsburg, A. V., Chicago.
Kulp, C. Stanley, Ingersoll Rand Co., Los Angeles, Calif.
Laird, A. N., Ch. Draughtsman, G. T., Detroit.
Lechty, C. A., C. & N. W., Chicago.
Long, Gery, Wheeling, W. Va.
Mabely, J. B., Asst. to Engr., M. of W., R. I. R. R., El Reno, Okla.
Mann, J. H., Supr. Track, C. & O., St. Alborn, W. Va.
Marsh, C. P., Acting Engr. of Structures, N. Y. C., N. Y. City.
McClurg, J. G., Draftsman, A. T. & S. F., Chicago.
McCue, G. C., Gen. Supr., B. & B., G. T., Ottawa, Ont. Kan.
McDonald, B. M., Div. Engr., N. Y. C. R. R., Chicago.
McKibben, T. H., Pilot Engr., A. T. & S. F. Ry., Topeka.
Michel, C. F., Contractor, Erie R. R.
Morse, F. T., A. T. & S. F., Topeka, Kans.
Morton, L. L., Asst. Engr., L. & N., Louisville, Ky.
Mumford, R. W., C. & O., Ashland, Ky.
Nelson, Wilbur O., B. & O. R. R., Pittsburgh.
Osborne, A. J., Roadmaster, A. T. & S. F., Clovis, N. M.
Palloch, A. L., A. T. & S. F., Belen, N. M.
Pank, W. C., Asst. Engr., I. C., Chicago.
Pemsten, J. O., Supt. of Power, Dist. of Ind., Union Traction, Anderson, Ind.
Penrod, Jr., A. J., Signal Supr., B. & O., Wheeling, W. Va.
Redding, A. H., President Engr., Erie, Chicago.
Regan, M., Supvr. Track, C. & O., Covington, Ky.
Redmond, A. U., Dist. Engr., National Ry., Winnipeg.
Robson, T. B., Roadmaster, L. & N., Evansville, Ind.
Rockwood, N. C., Editor of Rock Products, Chicago.
Rohler, J. A., Road Master, Winslow, Ariz.
Rohod, E., Asst. Engr., Wabash, St. Louis, Mo.
Rice, R. H., Prin. Asst. Engr., Board of Supervising Engineers Chicago Traction, Chicago.
Roby, J. A., A. T. & S. F., Marceline, Mo.
Sheffield, Ed., Sig. Supr., H. & T. C., Ennis, Tex.
Shiley, Wm., L. & N., Evansville, Ind.
Smith, Chester K., Regional Engr., N. W. Region, U. S. R. A., Chicago.
Smith, G. S., Asst. Engr., Mo. Pac., St. Louis, Mo.
Soans, J. H., Div. Engr., C. P., Nelson, British Columbia.
Stanley, C. A., Supvr., C. & O., Richmond, Va.
Stark, P. W., Roadmaster, L. & N., Evansville, Ind.
Stoll, H. E., Sales, Bethlehem Steel Co., Bethlehem, Pa.
Strachan, G. M., Asst. Engr., A. T. & S. F., Chicago.
Suesserolt, J. L., Asst. Engr., B. & O. R. R., Pittsburgh.
Swartz, W. G., Asst. Engr., G. T., Montreal.
Thackray, Geo. E., Cambria Steel Co., Johnstown, Pa.
Vincent, J. I., Strauss Bascule Bridge Co., New York City.
Walter, F. J., Engr. Fuel & Water Supply, N. C. & St. L., Nashville, Tenn.
Walters, H. N., Div. Engr., C. & O., Covington, Ky.
Wardle, J. D., Ch. Engr., Ia. Ry. & Lt. Co., Cedar Rapids, Ia.
Webster, I. W., Asst. Engr., E. J. & E., Joliet, Ill.
Weymouth, F. A., Sales Metallurgist, Bethlehem Steel, Bethlehem, Pa.
White, W. O., Div. Engr., C. & E. I. R. R., Salem, Ill.
Wilbur, R. H., V. P. & G. M., L. & N. E., Philadelphia, Pa.
Woemer, Albert H., Wheeling, W. Va.
Zimmerling, R. O., Field Engr., Universal Portland Cement Co., Chicago.

St. Paul Sectional Committee Meeting

The next meeting of the St. Paul Sectional Committee of the Signal division will be held in the Railroad Building, St. Paul, Minn., on Saturday, March 20, beginning at 9 a. m. The subjects to be presented before the meeting include The Use and Misuse of Roundels and Lenses, with stereopticon views, by Dr. Gage of the Corning Glass Company; A Close-up Study of Primary Batteries, by L. S. Dunham of Thos. A. Edison, Inc.; Mixing and Handling of Concrete, by E. M. Hatheway of the Massey Concrete Products Corporation, and Insulated Wire and Cable in Signal Service, by Major Axel Ames of the Kerite Insulated Wire & Cable Company.

The Railways Will Receive Preference

THE MANUFACTURERS REALIZE fully the vital necessity for a thoroughly effective railway transportation system in this country and are, therefore, more than willing to give the roads preference in orders for the materials and supplies which they require. This was the opinion expressed by F. A. Poor, president of the P. & M. Co., when interviewed at his office yesterday afternoon. "I also believe," he added, "that the railway supply companies will be able to provide production to meet the heavy demands which are expected, although deliveries will be slow and prices high. I think it will be found that the large steel companies and the large malleable iron foundries will be glad to give orders for railway equipment precedence over other orders they may have on hand, even against great pressure from their old customers."

When asked as to the effect of diverting many of the plants to war work and later to other lines of manufacture, he said that he did not believe that this would seriously affect the ability of the manufacturers to meet all demands made on them. "Some of the companies," he said, "were obliged to take up other lines because of the failure of the roads to keep them busy. The manufacturers are ready to take up railway work as fast as the roads offer it."

The production of railway supplies naturally divides itself into two groups, that concerned with equipment and that engaged in the production of rails and track accessories. Mr. Poor is of the opinion that there is ample plant capacity in this country to fill all orders for the production of rails in whatever quantity the railroads are able to finance or they are able to organize their forces to use. Some question arises, of course, as to the supply of basic materials in the lines requiring materials in large quantities. The railroads, however, are sure to obtain a preference for whatever supplies are available. In the field of track accessories, the problem of raw material is much simpler and the manufacturers are well able to take care of the roads. Foreign business as developed thus far or in prospect for the immediate future will have little or no influence on the situation. There is no occasion for any concern on this score.

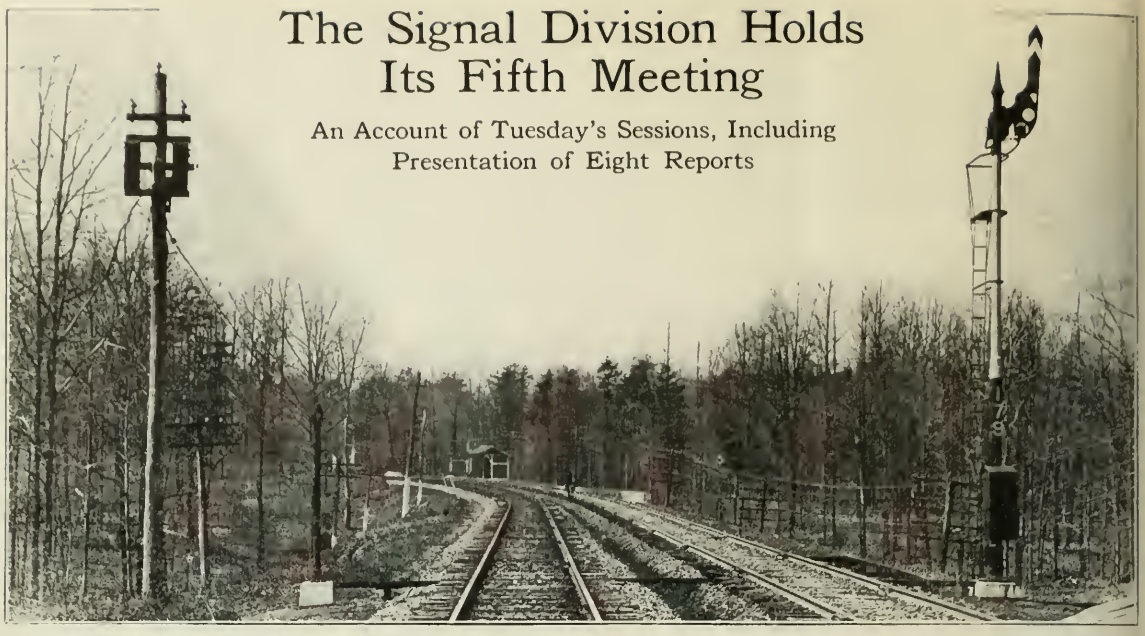
"Naturally, the sooner the railways come into the market the earlier their wants will be filled. If the railways could make up a definite program of their requirements for a term of years so that the manufacturers could plan ahead their production program, there is no doubt but that more definite promises of delivery could be made and prices would undoubtedly be lower."

Pennsylvania Lines Signalmen Have Banquet

A dinner of the signal department officers of the Pennsylvania Railroad was held in the Green Room, Congress Hotel, on Monday evening. Among those present were A. H. Rudd, chief signal engineer; F. H. Buchanan, assistant chief signal engineer; G. A. Cellar, superintendent telegraph; C. W. Hixson, superintendent telegraph and signals, Northwestern region, Pennsylvania Railroad; W. N. Spangler, superintendent of telegraph and signals, Eastern district; W. M. Post, superintendent telegraph and signals, Central district; Thomas Holt, signal engineer, Chicago Union Depot Company, and signal supervisors and inspectors from various parts of the system. Approximately 50 were in attendance at the meeting, Mr. Rudd acting as toastmaster. Among those speaking were Mr. Cellar, Mr. Holt, Mr. Buchanan and Mr. Hixson. This meeting was a get-together meeting in order that the various signal officers of the reorganized system could become better acquainted.

The Signal Division Holds Its Fifth Meeting

An Account of Tuesday's Sessions, Including Presentation of Eight Reports



THE SECOND DAY'S SESSION of the stated meeting of the Signal division was called to order at 9:45 a. m. by Chairman C. J. Kelloway. The room was well filled throughout the day, considering the fact that the opening meeting of the A. R. E. A. and a meeting of the American Railroad Signal Supervisory Association drew some of the members of the Signal division to either one or the other of these meetings. Reports were presented by the committees on Batteries, Electrical Testing, Direct Current Relays, Power Interlocking, Wires and Cables, A. C. Automatic Block Signaling, D. C. Automatic Block Signaling and Contacts. Committee V—Maintenance Rules and Instructions did not submit its report to the division, as the work which had been accomplished since the last meeting was to be presented for discussion only. Due to the amount of time consumed on Monday in the discussion of its future status, but four committees out of the eight on the program for Monday's session were able to submit reports. As a consequence, four of the committee reports scheduled for Monday had to be presented at yesterday's meeting. As Committee V was next to the last on the program yesterday and as the report was to be submitted for discussion only, it was the sense of the committee that it would prefer to continue its work with a view of presenting the entire subject at the annual meeting at the Thousand Island Hotel, Alexandria Bay, N. Y., July 14, 15 and 16, and thus conserve the time of the division.

In addition to the reports mentioned, a verbal report was presented by Committee No. 17, Pole Lines, in which Chairman John Leisenring said:

"A matter has come up somewhat unexpectedly that warrants the attention and action of this committee. As you all know, the Bureau of Standards about two or three years ago issued a proposed Safety Code governing the construction and maintenance of outside plant and electrical apparatus. During the past two years the Bureau has been revising that original code, weakening the original specifications to some extent, and considerable criticism has been raised by the railways on that account. The Committee on Electricity of the American Railway Engineering Association has dealt with the Bureau on the question of high tension wire crossings over railways.

"The particular matter we wish to bring before the meeting is the proposed revision by the Bureau of the specifications for signal line crossings over steam railways.

"I want to point out that the use of the word 'signal lines' refers primarily to communication circuits. The matter is not of vital importance to this association, but is to the railroads as a whole. The Telegraph and Telephone division of the A. R. A. has considered this subject in detail and has made certain recommendations.

"The two most vital points that the Bureau intends to revise downward are the questions of wire crossings over side tracks and reducing their previous specifications materially, and the question of transverse loading. On account of the necessity for quick action we wish to have this association go on record as supporting the Telegraph and Telephone division in their report to the Bureau of Standards on this particular subject."

The committee made a motion that the association support the recommendations of the Telegraph and Telepone division of the A. R. A.

In this connection T. S. Stevens (A. T. & S. F.) said that "we are not an association, but a division of Engineering Section No. 2. I read over the specifications which are being submitted by the Engineering Section, the old A. R. E. A., and don't know whether they comply with the specifications of the Telephone and Telegraph division, but I don't believe we can take any action on this matter at this time."

A. H. Rudd (P. R. R.) felt that the division could not endorse it unless the matter was considered more carefully, as he understood that there is some difference of opinion in the other divisions in regard to the matter under discussion. He then moved that the motion be laid on the table. (Motion carried.)

Before adjournment T. S. Stevens (A. T. & S. F.) made a motion which was seconded and carried unanimously that the division send a message of congratulation to all of the Sectional committees, thanking them for the good work being accomplished by them.

Report of Committee VII—Direct Current Relays

THE OUTLINE OF work assigned to the committee was as follows: (1) Prepare specifications for relays. (2) Prepare resistance table for relays. (3) Recommend minimum drop-away for relays listed in resistance table. (4) Prepare specification for relay parts providing for interchangeability.

The committee submitted for consideration specification for tractive armature direct current relays as follows:

1. Design

(a) Relays shall be of a design approved by the purchaser. 1920.

(b) All moving parts shall be inclosed in a dust-proof case, the sides of which shall be of glass of such transparency that the parts within the case shall be visible for inspection. 1920.

(c) A screened breather opening, in base of case, adaptable for closing, shall be provided. 1920.

(d) All nuts and screws shall be securely locked. 1920.

(e) Unless otherwise specified, the outside dimensions of completed relay shall not exceed the following:

	2 to 4 Fingers	6 Fingers	8 Fingers
Height,	9½-in.	9½-in.	9½-in.
Length,*	7½-in.	10 -in.	12½-in.
Width,*	7½-in.	7½-in.	7½-in.

1920.

2. Mounting

(a) Parts shall be mounted on a top plate. 1920.

(b) This top plate shall be of non-conductive, non-carbonizing material. 1920.

(c) The cores and armature supports shall be mounted in such a manner that the position of the cores relative to each other, to the armature supports and to the fixed part of the contracts shall be maintained. 1920.

3. Armature Supports

(a) The end play of the armature shall be not less than .010 in. and not more than .020 in. 1920.

(b) Trunnions and bearings for armature shall fit rigidly in their supports and be suitably secured and so constructed that they cannot exert pressure on the armature. 1920.

(c) Armature trunnions shall be hard-drawn phosphor bronze. They shall be cylindrical, not less than 1/16 in. in diameter and 3/32 in. long. 1920.

(d) The armature bearings shall be of different material than the trunnion, either hard brass or nickel-silver, not less than 18 per cent. nickel, or of material equivalent in wearing and non-corrosive qualities. They shall be cylindrical, not less than ⅛ in. long and not less than .002 in. nor more than .004 in. larger in diameter than the trunnion. 1920.

4. Air Gap

(a) A minimum working magnetic air gap of .020 in. for a relay of one or two points, and of .015 in. for a relay of three or more points shall be maintained by an adjustable hard phosphor bronze stop pin so placed that its position relative to the cores shall be fixed and so that when the armature is picked up it will strike against the stop near the edge farthest from the bearing and midway between the cores. The physical working air gap shall be not less than .018 in. for a one or two point relay and .013 in. for a three or more point relay. 1920.

(b) A non-adjustable stop-pin of phosphor bronze shall be placed under each core near the edge farthest from the bearing protruding .010 in. from the under side of the core or the upper side of the armature for safety purposes. 1920.

*The length is the dimension parallel with the armature, and width is the dimension parallel with the contact fingers.

5. Coils

(a) Coils shall be so made that they may be removed and replaced without changing the magnetic and mechanical adjustment of the relay. When in place the coils shall be fixed to prevent their movement by vibration with respect to the cores. 1920.

(b Coils shall be so insulated that they will withstand the insulation test provided in Section 9. This test shall be made by making coil on a snugly fit metal mandrel and making break-down test between mandrel and winding; also, by standing coil on each end in turn on a metal plate and testing between plate and winding. 1920.

(c) Wire for coils shall be soft drawn copper, covered with good quality silk or cotton insulation, or with equally good insulation. 1920.

(d) Coils shall be impregnated or otherwise treated so as to satisfactorily protect the wire from moisture under all service conditions. Impregnation shall be in accordance with R.S.A. specifications for "Impregnation Treatment of Coils and Windings." 1920.

(e) Connecting terminals of coils shall be joined by R.S.A. binding post. The terminal leads of coils shall be composed of a number of strands of tinned copper, no strand to be larger than .012 in. There shall be enough strands to aggregate the cross section of No. 18 A.W.G. wire. Leads shall be insulated to withstand ground test as provided in Section 9. 1920.

(f) Coils shall be protected in a suitable manner from mechanical injury. 1920.

(g) At 20 degrees C. (68 degrees F.) the percentage variation in the resistance of individual coils shall be as follows:

For 5 ohms or less, plus or minus, 5 per cent.
Above five ohms, plus or minus, 10 per cent. 1920.

(h) Each coil shall be plainly and permanently marked, showing the nominal resistance, number of turns, size of wire and kind of wire insulation on a tag located under the outside lead. 1920.

(i) All coils must be full wound and the turns must not be permitted to vary more than five per cent, plus or minus, for any given coil. If a resistance is specified which cannot be obtained with standard A.W.G. wire, using full wound coils, the Manufacturer may furnish the nearest resistance to this value, using full wound coils with standard A.W.G. wire. 1920.

6. Contacts

(a) For contacts of the carbon to metal type, a front contact shall be comprised of two elements so designed and of such materials that the contact surfaces cannot be fused together nor mechanically locked by lightning, or by an abnormal flow of current in the service for which the contact is designed. Elements shall be secured so that they will not shift or become loose in service. Any materials used in affixing contact elements must not cause corrosion. The metal support of the non-flexible contact element shall not come within 1/16 in. of the contact surface. 1920.

(b) For contacts of the carbon to metal type, the front contacts shall not in 100,000 operations (when operating 10 times per min.) average more than .3 ohm per contact when the relay is energized at "operating volts," and when not breaking current or when current broken by the contacts does not exceed 20 milamperes through an inductance of the equivalent to a 500 ohm slow acting slot coil. The contact resistance shall be determined by taking at least 20 readings on each contact of the relay at intervals of 5,000 operations during the test. The contact resistance shall be the average of all readings. The initial cleaned contact resistance shall not exceed .18 ohms per contact when relay is energized at "operation volts." Each contact shall be designed to carry 3 amperes continuously and 5 amperes for 30 sec. without injurious heating. 1920.

(c) For contacts of the carbon to carbon type, the front contacts shall not in 100,000 operations (when operating 10 times per min.) average more than 3 ohms per contact when relay is energized at "operating volts" and when not breaking current or when current broken by the contact does not exceed 30 milamperes through an inductance of the equivalent to a 3500 ohms slow acting slot coil. The initial cleaned

contact resistance shall not exceed 4 ohms per contact when the relay is energized at "operating volts." Each contact shall be designed to carry 3 amperes continuously without injurious heating. 1920.

(d) For contacts of the metal to metal type, the initial cleaned contact resistance shall not exceed 3 ohms per contact. Each contact shall be designed to carry not more than 3 amperes continuously and 5 amperes for 30 sec. without injurious heating. 1920.

(e) Contact fingers shall be made of such material and so proportioned that they will not flex appreciably under operating conditions. 1920.

(f) A device shall be provided to lock the armature rigid with all contacts open during shipment. 1920.

Sections:—7. Flexible connections; 8. Bending posts; 9. De-electric requirements; 10. Magnetic iron test; and 11. Armature torque. Each of these sections are the same as 1912 specification.

12. Adjustment

(a) Relays shall be adjusted so that when tested in the manner given below the operating current values and contact opening shall be as follows:

1. For relays with four ohm coils and contacts carrying first range voltage:

	Relays With Two Fingers	Relays With Four Fingers
Minimum drop-away with contact pressure	0.35 amp.	.037 amp.
Maximum pick up	.072 amp.	.078 amp.
Maximum working current	.078 amp.	.092 amp.
Front contact opening	.050 in.	.050 in.
Back contact opening	.020 in.	.020 in.

1920.

(b) Tests; (c) Drop-away with contact pressure; (d) Maximum pick up; and (e) Working current, are 1912 specification.

13. Finish

(a) Metal parts shall be protected against corrosion, except when such protection will interfere with the proper operation of the relay. 1920.

(b) Material used for protection against corrosion shall neither melt nor flake under ordinary conditions between temperatures of 40 degrees C. (40 degrees F.) below zero, and 85 degrees C. (185 degrees F.) above zero. 1920.

Sections:—14. Material and workmanship, 1911 specification. 15. Inspection; 16. Tests; and 17. Packing are standard sections. 1919.

18. Marking

(a) Purchaser's order, requisition and package number, name of consignor, and name and address of consignee, shall be plainly marked on outside of package. 1920.

The committee recommended the acceptance of this specification for submission to letter ballot at the annual meeting for inclusion in the Manual.

Committee: E. G. Stradling (C. I. & L.), chairman; C. D. Cronk (N. Y. C.), vice-chairman; C. M. Acker (D. & H.), E. T. Ambach (B. & O.), B. H. Ayers (L. & N.), C. W. Burrows, D. M. Case (Sou. Lines West), E. F. Champlin (Erie), J. J. Corcoran (N. Y. C.), A. R. Fugina (L. & N.), E. W. Kolb (B. R. & P.), H. W. Lewis (L. V.), C. F. Smith (U. P.), C. F. Stoltz (C. C. C. & St. L.), Guy Toft (P. R. R.), C. A. Veale (S. P.), W. B. Weatherbee (D. L. & W.).

Discussion

B. T. Anderson (D. L. & W.): I believe the title of this specification should be changed to refer to the four ohm relay, because the specification only covers that.

E. G. S. Stradling (Chairman): So far we have only the figures for the four ohm relay, but at the annual meeting we hope to have a table showing the characteristics of the various relays in general use.

E. B. Smith (N. Y. C.): As I understand it, No. 2 (b) does not permit the use of the Bakolite top or the metal top, and I would like to know why the committee barred those.

Mr. Stradling: The committee feels that the top should be of non-conductive material, which would bar the metal top and I understand the Bakolite will carbonize under lightning strain.

H. G. Morgan (I. C.): The Illinois Central has in service between 8,000 and 10,000 relays with Bakolite tops, and has not had any trouble.

J. A. Peabody (C. & N. W.): I think the committee should cut out "non-conductive." We have a good many thousand metal top relays, and I much prefer them to the other types. In order to get this before the meeting I move that the words "non-conductive" be cut out.

(Motion seconded and lost.)

W. H. Elliott (N. Y. C.): Under 5 (e) I suggest that the second and third sentences be reworded so as to read: The terminal leads of coils shall be of strands of tinned copper, not larger than 0.012 in. The aggregate cross-section of the strands shall equal that of No. 18 A.W.G. wire.

C. S. Snavely (U. S. & S. Co.): I suggest paragraph 5 (b) be changed, as follows: Coils shall be so insulated that under conditions equivalent to being placed on the relay, they shall withstand an insulation test of 3,000 volts for a period of 2 sec.

Mr. Elliott: I suggest the following modification of the first sentence of 6 (a): Contacts of the carbon to metal type shall be so designed and of such material that the contact surfaces cannot be fused together by lightning or an abnormal flow of current or mechanically.

Mr. Snavely: In 6 (b) the contact resistance was agreed to under the assumption that a higher contact pressure should be provided than is the general practice. In order to provide this a higher recommended working value is necessary. That means that the contact resistance, the calibration value and the recommended working value do not check up.

P. E. Carter (G. R. S. Co.): At the various meetings of the committee the manufacturers went into considerable detail as to what they felt they were able to do in the way of guaranteeing contact resistance. If we run around these critical applications of pressure, with a good grade of contact material, the resistance of the contact can be kept fairly uniform over a very long number of operations. We also find we can keep the value of the resistance practically the same whether the contact is breaking current or not. Paragraph 6 (b) was outlined from that stand.

E. W. Kolb (B. R. & P.): If enough pressure is put on the contact a satisfactory resistance will be obtained. On the other hand, a low pressure will give an erratic resistance. Where the committee and the manufacturers did not agree was on what contact pressure we could allow them. When the contact pressure is decided, the resistance, the working current and a great many other values in the specifications for the relays will be settled.

R. M. Phinney (C. & N. W.): Recently in making tests I have found that our result was entirely different from the manufacturer's. In testing, we reduce the current to a certain minimum, but do not open the circuit; they open the circuit.

B. T. Anderson (D. L. & W.): The committee has left out the standard clause on warranty.

Mr. Stradling: It will be incorporated in the report for the annual meeting. I move that this be submitted at the annual meeting for approval and ballot. (Motion seconded.)

C. H. Morrison (N. Y. N. H. & H.): Do I understand the motion is putting this specification up as a four ohm relay specification, or is it the intention of the committee to submit completed specification covering other than four ohm relays at the annual meeting?

Mr. Stradling: It is the intention of the committee to submit to the annual meeting this specification with a table covering the relays which we find generally used.

(Motion carried.)

The committee was dismissed with the thanks of the association.

Report of Committee IV—D. C. Automatic Block Signaling

THE FOLLOWING outline of work was assigned this committee:

(1) Prepare specification for:

(a) Motor-operated signal mechanism for first range voltage, including:

(1) Allowable variations in energy to operate and hold signal. (2) Allowable variation of torque in foot pounds to restore mechanism with spectacle to stop position. (3) Allowable variation of torque in foot pounds to restore mechanism with spectacle and arm to stop position.

(b) Signal installations.

(c) Rail bonding and track circuits.

(d) Resistance units.

(e) Switch circuit controllers for automatic signaling.

(2) Prepare instructions for making torque tests of power-operated signals.

(3) Revise specifications for channel pins.

(4) Report on the effect of the use of zinc-treated ties upon the efficient operation of the track circuit.

The committee submitted specification for motor-operated high signal mechanism for first range voltages.

Specification for Direct Current Motor-Operated First Range Voltage High Signal Mechanism

Sections 1, the **requisite sheet**, and 2, the **tender**, cover standard sections (S. S. 4-a), (S. S. 4-b) and (S. S. 3-a), 1919.

3. General Requirements

(a) Mechanism cases shall be provided with openings for ventilation. Each opening shall be provided with a screen and protected with a hood. Opening shall be provided with a cover for adjustment of ventilation. 1920.

(b) Mechanism shall be designed so that the failure of any part to properly perform its function shall cause semaphore to assume its most restrictive indication. 1920.

(c) Mechanism shall be so arranged that all parts are readily accessible for inspection or removal. 1920.

(d) Like parts of mechanisms of the same type and manufacture shall be interchangeable. 1920.

(e) Side clamp mechanism and mechanism cases shall be so designed that when clamped in place on signal mast they will not interfere with the indication of semaphore arm or lights as viewed from approaching trains. 1920.

(f) Spectacle clearances between lamp or other rigid parts shall be in accordance with R. S. A. 1093. 1920.

(g) Movement of semaphore arm shall be so controlled as to prevent any undue shock upon mechanism. Semaphore arm shall travel through full arc to the restrictive position in not more than six seconds. 1920.

(h) The torque applied at semaphore shaft, with spectacle removed, necessary to start that part of mechanism connected thereto from any position in its arc of travel, shall not exceed maximum mechanism friction shown on R.S.A. 1064. 1920.

(i) With the mechanism complete and the semaphore in place, the difference between the torque required to hold the semaphore arm in any position of its arc of travel and the torque of the semaphore and blade shall not be more than two foot pounds greater than the maximum mechanism friction torque shown on R.S.A. 1064. 1920.

(j) With a counter-torque of 20½ ft. lb. applied at semaphore shaft and with spectacle and blade in place, the signal shall start toward the stop position from any point of its arc of travel. 1920.

(k) The torque in foot pounds of all signal blades shall be in accordance with R.S.A. 1064. 1920.

(l) Semaphore spectacle shall be in accordance with R.S.A. 1040 and 1041. 1920.

(m) Means shall be provided for attaching testing apparatus for making torque test of semaphore shaft in the field. 1920.

(n) The adjustment of contracts, and arrangement of circuits governing signal motors and holding coils shall be such as to cause the semaphore to display true indications corresponding with the position of the controlling relays or levers. 1920.

(o) Mechanism shall be equipped with counters of approved type reading to five digits to record movement of 45 degree and 90 degree positions of signal as specified on requisite sheet. 1920.

4. Mechanism Case

(a) Mechanism case shall be of iron, weather-proof, and of ample size to properly house, without crowding, the apparatus and wiring contained therein. Doors shall be snitably arranged for convenient and ready access to mechanism. 1920.

(b) Convenient means shall be provided for bringing electrical connection from pole to mechanism case, and for making a good mechanical connection where wires enter case. 1920.

(c) Housing for base of mast mechanism shall have doors as specified on requisite sheet. 1920.

(d) Hasp with staple shall be provided for rigidly securing and locking doors of mechanism case. 1920.

(e) Side clamp mechanism case shall be provided with an eye bolt in top of case for convenience in handling. 1920.

(f) Conduit of flexible type shall be provided for protection of wires entering mechanism case of the side clamp type. Conduit shall be not less than two inches inside diameter, and furnished with means for making connection to mast and case. Wire entrance shall be readily accessible for sealing and have edges rounded to prevent fracture of wire. 1920.

(g) An opening of eight square inches area shall be provided in base of mast mechanism case for entrance of wires. 1920.

(h) Spacing of bolt holes for fastening base of mast mechanism case to foundation shall be in accordance with R.S.A. 1259. 1920.

(i) Two openings in top of case, one on each side of mast for 1½-in. inside diameter pipe, shall be provided in base of mast mechanism case. Openings shall be equipped with pipe plugs. Condulet for cable outlet with pipe shall be furnished when specified on requisite sheet. 1920.

(j) Each section of base of mast mechanism case shall have four openings for ventilation, two in each end of the case. Openings shall have an area of not less than 10 sq. in. and be covered with a screen of number 31 gage brass or copper wire, 40 wires per in. The hood shall extend at least one inch below the lower edge of the opening into the mechanism case, and the area of the opening at the lower side of the hood shall be at least 60 per cent of the area of the opening into the case. 1920.

(k) Side clamp mechanism cases shall have two openings for ventilation, one near the top and one at the bottom. Openings shall have an area of not less than 1½ sq. in. Openings shall be covered with a screen of number 31 A.W.G. brass or copper wire, 40 wires per in. 1920.

(l) Cases for base of mast mechanism shall be of sufficient mechanical strength to support signal mast specified on requisite sheet and shall have four ⅞-in. stud bolts, with nuts and washers on both ends, properly centered for fastening signal mast to mechanism case. 1920.

5. Operating Connection—Mechanism at Base of Mast

(a) Operating connection of the pull clear type shall have a tensile strength of not less than 1,500 lb. Material shall be such as will not be injuriously affected by atmospheric conditions. Suitable connections shall be provided at each end, the lower one of which shall have means of adjustment. 1920.

(b) Operating connection of push clear type shall be ¾-in. iron pipe or its equivalent in mechanical strength; material used shall be such as will not be injuriously affected by atmospheric conditions. Connectors shall be provided at each end, the lower one of which shall have means for adjustment. Guides, when specified on requisite sheet, shall be securely fastened to mast by three set screws. 1920.

6. Bearings

(a) Bearings shall be of ample dimensions, and of such material and design as will insure reasonable durability and the reduction of friction to a minimum. 1920.

(b) Accessible means shall be provided for lubrication of bearing surfaces. 1920.

(c) Semaphore bearings shall be so constructed as to prevent entrance of water. 1920.

(d) Exposed oil holes shall be provided with weather-proof oil cups or covers. 1920.

(e) The diameter of outer end of boss of semaphore bearings shall be not more than 1¾ in. larger than outside diameter of bearing. 1920.

(f) Hand hole with weather-proof cover shall be provided in housing of semaphore bearings for base of mast mechanism. Cover shall be secured to pole by a chain or other means to prevent dropping. 1920.

7. Semaphore Shaft

(a) Semaphore shaft shall be made of steel, not less than 1 in. sq. or 1¼ in. diameter round, except the outer end, which shall take spectacle R.S.A. 1040 unless otherwise specified on requisite sheet. 1920.

(b) The operating means shall be mounted on a square portion of the shaft or otherwise rigidly connected thereto. 1920.

8. Gears

(a) Gears shall be of such material and design as to insure against undue wear or breakage and have ample clearance to prevent sticking or jamming. 1920.

(b) Gears shall be so protected as to minimize the likelihood of foreign matter interfering with them. 1920.

(c) Means shall be provided in signals of drive back type, to prevent undue strain being transmitted to gears or motor. 1920.

9. Mechanism Frame

(a) Mechanism frame shall be of ample dimensions and of such material as will insure reasonable durability. 1920.

10. Terminal Board

(a) Terminal board shall be made of suitable material, not affected by ordinary temperature or changes of atmospheric conditions, not less than ½ in. thick or as specified on requisite sheet. 1920.

(b) Terminal board shall be located so as to be easily accessible. 1920.

11. Wiring

(a) Wiring shall be neatly arranged and securely fastened. 1920.

(b) Flexible insulated copper wire not smaller than No. 16 A.W.G. and not less than 19 strands shall be used for interior wiring of signal case. 1920.

(c) Wires shall be provided with eyelets at each end. 1920.

(d) Diagram showing the wiring of mechanism shall be pasted on the inner side of door of mechanism case. 1920.

12. Motor

(a) Motor shall operate at the rated voltage specified on requisite sheet. 1920.

(b) Motor shall start the semaphore from any point in its arc of travel with 60-ft. lb. torque, and rated voltage at the motor terminals. 1920.

(c) With a torque on semaphore shaft, as shown by curve "A," R.S.A. 1064, and with normal rated voltage applied at the motor terminals, the maximum energy required to move the semaphore arm from the zero degree position to the ninety degree position shall be not more than 300 watt sec. 1920.

(d) Motor shall start the semaphore with 45-ft. lb. torque from any point in its arc of travel, when a voltage of 40 per cent under normal is impressed on the motor terminals. 1920.

(e) Motor and mechanism of drive back type shall start toward the restrictive position when voltage impressed on motor terminals is reduced to 50 per cent of the minimum required to start it toward the proceed position, when semaphore torque is 45-ft. lb. 1920.

(f) Motor cover shall be so designed that when closed foreign matter cannot enter. 1920.

(g) All moving parts except bearings and contacts in the assembled motor of the drive back type of mechanism shall be separated by not less than .025 in. The minimum end play of moving parts shall be .010 in. 1920.

(h) Brush holder shall be designed to maintain practically constant brush pressure on commutator during life of brush. In signals of drive back type, brush holder support shall be non-adjustable and shall prevent brush holder from coming in contact with motor commutator. 1920.

(i) Means shall be provided to insure the proper setting of motor mechanism of drive back type to prevent binding. 1920.

13. Hold Clear Device

(a) With a torque on a semaphore shaft as shown by curve "A," R.S.A. 1064, the hold clear device shall hold mechanism in the 45 or 90 degree position when a voltage of 40 per cent under normal is applied at its terminals. 1920.

(b) The hold clear device shall be so constructed that it will release and allow the mechanism to assume its restrictive position when a voltage of 25 per cent of rated is impressed upon the terminals of quick acting hold clear windings, or when a voltage of 18 per cent of rated is impressed upon the terminals of slow acting hold clear windings, the semaphore torque in either case being as shown by curve "A," R.S.A. 1064. 1920.

(c) Hold clear device of the magnet type shall have an air gap between armature and magnet cores, of not less than .015 in., maintained by positive and durable stops. The construction shall be such that there will be no undue accumulation of lubricating oil, dirt, or rust in the air gap. Magnet coils shall be so applied and connected that they can be easily replaced. 1920.

(d) With the semaphore and blade in place and the electro-magnet coils of the hold clear device deenergized, it shall require a force of not less than 1½ lb. applied at the center of the armature to hold mechanism in any position above zero when the air gap is .015 in. The force required with other air gaps may vary inversely as the square of the air gap. 1920.

(e) Wire leads to magnet coils shall be insulated flexible copper not smaller than No. 18 A.W.G. and not less than 19 strands. 1920.

(f) To prevent mechanical injury to wire, magnet coils shall be suitably protected by tape or other covering. 1920.

(g) Hold clear coils shall be form or spool wound and securely fastened in place to prevent vibration. 1920.

(h) A suitable label shall be securely fastened to the surface of each magnet coil, on which shall be legibly and indelibly stamped the resistance, size of wire with which the coil is wound and manufacturer's reference number. 1920.

(i) With a torque on semaphore shaft as shown by curve "A," R.S.A. 1064, and with rated voltage, the power required to hold mechanism in the 45 or 90 degree position, shall not exceed .2 watts when the air gap is .015 in. For greater air gap a corresponding increase in power is permissible. 1920.

14. Circuit Controller

(a) Connection between semaphore shaft and circuit controller shall be positive and of such design as to prevent binding or undue friction in the operation of parts. 1920.

(b) Contacts shall be applied in a manner which will preclude the possibility of their jamming, butting against moving parts, or causing undue friction. 1920.

(c) Contacts shall be of non-corrosive material, of high conductivity, easily accessible, and separately adjustable. They shall be self-cleaning and mechanically forced to the required position by the movement of shaft. 1920.

(d) Pole changer and other contacts for the control of track circuits shall be silver to silver. 1920.

(e) In addition to the regular contacts for controlling the signal motor and hold clear device, the circuit controller shall be equipped with contacts for controlling external circuits, as specified on requisite sheet. 1918.

15. Binding Posts

(a) Binding posts shall be in accordance with R.S.A. 1070. 1920.

16. Insulation

Paragraphs (a) and (b) refer to general electrical requirements (G.E.R. 32a), 1919, and (G.E.R. 32-b), 1917.

(a) Coils and windings shall be of cotton or silk-covered wire impregnated; of enameled wire, or as shown on requisite sheet. Enameling or impregnation shall be in accordance with R.S.A. specifications. (G.E.R. 32-a.) 1919.

(b) Material used for insulation shall be such as will not be seriously affected by atmospheric conditions. (G.E.R. 32-b.) 1917.

(c) Insulating material used as a base or support or where subjected to mechanical strain, shall have sufficient strength to properly perform its function, and shall not easily carbonize when subjected to an arc over. 1920.

17. Finish

(a) Metal parts shall be protected against corrosion, except where such protection will interfere with the proper functioning of that part. 1920.

(b) Material used for protection against corrosion shall neither melt nor flake off under ordinary conditions between temperatures of forty (40) degrees Centigrade below zero

(40° F.) and eighty-five (85°) degrees Centigrade above zero (185° F.). 1920.

Sections on the dielectric requirements, tests, inspection, packing, marking and warranty are covered in general electrical requirements and standard sections, 1919.

Committee: C. F. Stoltz (C. C. C. & St. L.), chairman; G. H. Dryden (B. & O.), vice-chairman; R. B. Arnold (C. & N. W.), F. H. Bagley (L. & N.), M. A. Baird (Erie), H. L. Black (G. T.), E. E. Bradley (W. M.), J. H. Butridge (I. C.), T. N. Charles (Sou. Lines West), A. H. Dahlstrom (U. P.), R. E. Green (M. C.), E. Hanson (G. C. & S. F.), C. E. Hartvig (C. R. I. & P.), T. A. Jones (P. R. R.), G. A Kirley (B & A.), B. A. Lundy, H. H. Orr (C. & E. I.), E. B. Pry (P. L. W.), A. Reilly (D. L. & W.), G. W. Trout (P. M.), E. P. Weatherby (T. & P.), E. E. Worthing (S. P.).

Discussion

J. E. Stephenson (G. R. S. Co.): Paragraph 3 (b) is a physical impossibility.

Mr. Stoltz: The committee had "when practical" or "when possible," or a few other such phrases; these meant nothing to the committee, so it left 3 (b) as written. In the last line of (g) the time has been changed to read eight seconds.

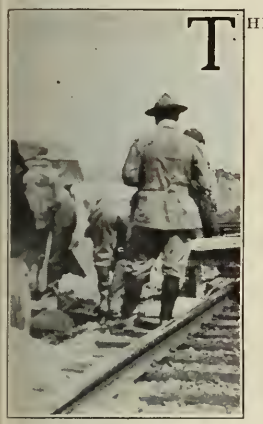
Paragraph 11 (b) has been changed to read "Not less than 16 strands" instead of 19 strands as printed. We find that a satisfactory wire is being furnished in 16 strands. 13 (e). Here also, the number of strands has been changed from 19 to 16.

I move the approval of the report for submission to the annual meeting for submission to letter ballot for inclusion in the Manual.

(Motion seconded and carried.)

The committee was dismissed with the thanks of the association.

Report of Committee XII—Contracts



THE FOLLOWING outline of work was assigned to this committee:

1. Prepare standard form of contract for installation of interlocking plans and block signaling.

The committee submitted for consideration a report on this assignment.

Form of Contract for Block Signal and Interlocking Work

THIS AGREEMENT, made this ..... day of .....in the year ..... by and between ....., party of the first part, hereinafter called the Contractor, and ....., party of the second part, hereinafter called the "Company":

WITNESSETH, That, in consideration of the covenants and agreements hereinafter mentioned, to be performed by the parties hereto, and of the payments hereinafter agreed to be made, it is mutually agreed as follows:

The Contractor shall furnish all materials, superintendence, labor, equipment and transportation, except as hereinafter specified, and shall execute, construct and finish in an expeditious, substantial and workmanlike manner, to the satisfaction and acceptance of the Signal Engineer of the company, hereinafter called the "Engineer" .....

.....

.....

The work covered by this contract shall be commenced within ..... days after the execution of this contract and shall be completed on or befort the ..... day of ....., 19....

And in consideration of the completion of the work described herein, and the fulfillment of all stipulations of this agreement to the satisfaction and acceptance of the Engineer of the Company, the said Company shall pay, or cause to be paid, to said Contractor, the amount due to the Contractor, based on the following prices:

.....

1. Bond

At the option of the Company, the Contractor agrees, at the time of the execution and delivery of this contract and before the taking effect of the same, to furnish and deliver to the Company a good and sufficient bond of indemnity to the amount of ..... dollars, as security for the faithful performance, by the Contractor, of all covenants and agreements on the part of the Contractor contained in this contract. The security in such bond of indemnity must be satisfactory and acceptable to the Company.

2. Understanding of Contract and Plans and Specifications

The Contractor hereby distinctly and expressly declares and acknowledges that, before the signing of this contract, he has carefully read the same, and the whole thereof, together with and in connection with said plans and specifications, and that he has made such examination of this contract and of said plans and specifications, and such investigation of the work required to be done, and in regard to the material required to be furnished, as to enable him to thoroughly understand the intention of the same, and the requirements, covenants, agreements, stipulations and restrictions contained in this contract and in said plans and specifications, and distinctly agrees that he will not hereafter make any claim or demand upon the Company, based upon or arising out of any alleged misunderstanding or misconception on his part of the said requirements, as covered by said contract and plans and specifications. 1920.

3. Plans and Specifications

The work to be done is more fully described in the specifications dated ..... and the following plans:

.....

.....

.....

which specifications and plans are hereto attached and are hereby declared to be, and are accepted, as a part of this contract.

Work that may be called for in the specifications but not shown on the plans, or shown on the plans and not called for in the specifications, or which is obviously necessary to properly comply with the plans and specifications, shall be furnished and performed the same as if specifically shown or mentioned in both. 1920.

4. Rights of Various Interests

Wherever work being done by Company forces or by other contractors is contiguous to the work covered by the contract, the respective rights of the various interests involved shall be established by the Engineer, to secure the completion of the various portions of the work in general harmony. 1920.

5. Consent to Transfer

The Contractor shall not transfer this contract, nor sublet any part of the work except as to the purchase of material, without the written consent of the Engineer, and such consent shall not relieve the Contractor of his liabilities under this contract. 1920.

6. Inspection

All work and material shall be at all times open to inspection, acceptance or rejection of the Engineer or his

duly authorized representative. The Contractor shall provide reasonable and necessary facilities for such inspection. 1920.

7. Defective Work or Material

Any omissions or failures on the part of the Engineer to disapprove or reject any work or material shall not be construed as an acceptance of any defective work or material. The Contractor shall remove, at his own expense, any of his work or material condemned by the Engineer during the progress of the work, and shall rebuild and replace the same without extra charge, and in default thereof the same may be done by the Company at the Contractor's expense, or, in case the Engineer should not consider the defect of sufficient importance to require the Contractor to rebuild or replace any imperfect work or material, then an amount to be agreed upon by the Company and the Contractor shall be deducted from the contract price. 1920.

8. Indemnity

(a) The Company reserves the right during the prosecution of the work under this contract to run its trains and cars on such schedules and at such rates of speed as it may see fit to do over that portion of the track, along and upon which the Contractor may be working. It therefore assumes entire responsibility for all such traffic, except as otherwise provided in paragraphs (b) to (l), inclusive. 1920.

(b) The Contractor agrees to assume the liability imposed by law (including all liability under the so-called Workmen's Compensation Laws for which it may be or become bound) for personal injuries to the employees of the Contractor due to the negligence of the Contractor or his employees. 1920.

(c) The Contractor agrees to indemnify and hold harmless the Company from all claims for personal injury made against it by employees of the Contractor and due solely to the Contractor's negligence. 1920.

(d) The Contractor agrees to indemnify and hold harmless the Company from all claims for personal injury made against it by an employee of the Company where the injury is sustained while such employee is assisting directly in the performance of the work under this contract and the accident is due solely to the negligence of the Contractor. 1920.

(e) The Contractor agrees to indemnify and hold harmless the Company from all claims for damage to persons or property made against it by persons other than employees, either of the Contractor or of the Company, where such injury does not arise out of or in connection with the operation of cars or locomotives and where such injury is due solely to the negligence of the Contractor. 1920.

(f) Where injury to persons or property is caused by the negligence of the Contractor and the Company jointly, each party agrees to bear all losses to its employees, its own property, or persons or property in its charge or control, and the Contractor and the Company agree to bear jointly, and equally, the losses of all other persons, if any, injured under such conditions. 1920.

(g) The Contractor assumes no other liability for damages either to persons or property and the Company agrees to indemnify and hold harmless the Contractor from all claims for such damages. 1920.

(h) Prior to the delivery of tools and materials by the Contractor to the Company at the latter's receiving station for shipment over its lines to the work, the Contractor assumes the entire risk, without claim or recourse therefor in any event upon the Company. 1920.

(i) After said delivery specified in section (h) and while in the possession of the Company, the Company assumes not only liability for any and all loss or damage to such tools or materials imposed by law upon a common carrier of goods for hire but also such liability until the tracks and structures of the Company are in condition to permit the Contractor to prosecute the work of installation without delay and until delivery is made to the Contractor. 1920.

(j) After the delivery of tools and materials by the Company to the Contractor at the point of installation and prior to the attaching and fixing of materials in place upon the tracks or property of the Company the Contractor assumes the liability for any and all loss or damage to its tools or materials not due to the negligence or fault of the Company or its employees. 1920.

(k) After materials have been attached and fixed in place upon the tracks or property of the Company, the Company assumes the liability for any and all loss or damage thereto not due to the negligence or fault of the Contractor or his employees. 1920.

(l) The Contractor assumes all liability for loss or damage to the Company's property used in the construction of the work covered by this contract due to the negligence of the Contractor, where such loss or damage does not arise out of or in connection with the operation of cars or locomotives. 1920.

9. Settlement for Wages

Whenever, in the opinion of the Engineer, it may be necessary for the progress of the work to secure to any of the employees engaged on the work under this contract any wages which may then be due them, the Company is hereby authorized to pay said employees the amount due them or any lesser amount, and the amount so paid them, as shown by their receipts, shall be deducted from any moneys that may be or become payable to said Contractor. 1920.

10. Liens

If at any time there shall be evidence of any lien or claim for which the Company might become liable, and which is chargeable to the Contractor, the Company shall have the right to retain out of any payment then due or thereafter to become due, an amount sufficient to completely indemnify the Company against such lien or claim, and if such lien or claim be valid, the Company may pay and discharge the same and deduct the amount so paid from any moneys which may be or become due and payable to the Contractor. 1920.

11. Order and Discipline

The Contractor shall at all times enforce strict discipline and good order among his employees, and any employee of the Contractor who shall appear to be incompetent, disorderly or intemperate, or in any other way disqualified for or unfaithful to the work entrusted to him, shall be removed immediately on the request of the Engineer, and he shall not again be employed on the work without the Engineer's written consent. 1920.

12. Power of Engineer

The Engineer shall make all necessary explanations as to the meaning and intent of the plans and specifications, shall give all orders and directions contemplated therein or thereby, and shall decide controversies arising between the parties hereto as to the meaning or intent of the plans or specifications and such explanations, orders, directions or decisions of the Engineer shall be final and binding upon both parties hereto, except as otherwise provided in Article 23 of this contract. 1920.

13. Order of Completion. Use of Completed Portion

The Contractor shall complete any portion or portions of the work in such order of time as the Engineer may require. The Company shall have the right to take possession of and use any completed or partially completed portions of the work, notwithstanding the time for completing the entire work or such portions may not have expired; but such taking possession and use shall not be deemed an acceptance of the work so taken or used or any part thereof. 1920.

14. Changes

(a) The Company shall have the right to make alterations in, addition to, or deductions from, the work without in any manner affecting or making void this contract. 1920.

(b) No changes, additions or deductions shall be made except upon written order of the Engineer and the value of the work so changed, added or deducted shall be agreed upon and added to or deducted from the contract price. 1920.

15. Unavoidable Delays

If either the Contractor or the Company shall be delayed in the performance of its covenants and agreements by reason of fire, flood, strikes or other causes beyond its control, the time for completion of the work may be extended, as may be agreed upon, without in any way affecting the conditions of this contract or the liability of sureties on the bond. 1920.

16. Suspension of Work

(a) The Company may at any time stop the work, or any part thereof, by giving ..... days' notice to the Contractor in writing. The work shall be resumed by the Contractor in ..... days after the date fixed in the written notice from the Company to the Contractor so to do, and the expense, if any, incurred by the Contractor on account of such suspension or delay of the work, or any part thereof, and the method and date of payments to the

Contractor by the Company shall be agreed upon between the Engineer and the Contractor. 1920.

(b) If shipment of the materials, or any part thereof, is delayed by the Company, the date of completion or such materials by the Contractor and upon verification by the Engineer, shall be regarded as the date of shipment. 1920.

(c) Should the Contractor stop or delay the work, or any part thereof, for reasons other than those mentioned in Article 15 but satisfactory to the Company, the expenses, if any, incurred by the Company on account of such delays or suspension and method and date of payment by the Contractor to the Company shall be agreed upon between the Engineer and the Contractor. 1920.

17. Failure to Prosecute the Work

If at any time the work is not progressing to the satisfaction of the Company, the Engineer may notify the Contractor in writing, and if the progress of the work fails to show an improvement, the Engineer may, at his discretion, provide the necessary forces, equipment and materials to properly carry on the work, and cost for so doing shall be deducted from the contract price. 1920.

18. Forfeiture

(a) If the Contractor shall fail or refuse to comply with any of the covenants and requirements in this agreement, the Engineer shall notify the Contractor in writing of such failure or refusal and after the expiration of ..... days after such notice has been served, the Engineer may at his discretion declare the contract forfeited and the Company shall have the right to terminate the contract, and the Company may take possession for the purpose of completing the work to be done under the contract, of all the materials, tools and appliances, and to employ any other person or persons to complete the work and to provide the materials therefor. 1920.

(b) In case of such discontinuance of the employment of the Contractor, he shall not be entitled to receive any further payment under this contract until the whole work shall be finished, at which time, if the unpaid amount due the Contractor shall exceed the expense incurred by the Company, the balance shall be paid to the Contractor; but if such expense shall exceed such amount due the Contractor, the Contractor shall pay the difference to the Company. 1920.

19. Replacement of Defective Parts

The Contractor shall furnish promptly for replacement, at his own expense, any part or parts of the apparatus and material furnished by him under this contract which within a period of one year after the date of final acceptance of the work shall fail to properly perform its function because of any defect in design, construction or workmanship of said apparatus or material. 1920.

20. Patents

(a) The Contractor hereby covenants and agrees to indemnify and save harmless the Company of and from all damage, claims, suits, recoveries or judgments which may arise or be made, had, brought or recovered by reason of or on account of the apparatus, material or systems, or anything used in or about the work to be performed under the contract being infringements or being claimed to be infringements of Letters Patent issued by the United States or any other foreign country, provided the Contractor shall first have prompt written notice of such claim, suit or action and be allowed an opportunity to defend same. 1920.

(b) The Company hereby covenants and agrees not to violate or infringe any of the patents relating to any of the apparatus, materials or systems furnished under this contract, which are controlled by the Contractor or under which the Contractor has manufacturing or selling rights. 1920.

21. Payments

Payments for work covered by this contract shall be made in the following manner .....
..... 1920.

22. Final Payment

Upon the completion of the work, the Engineer shall certify that all of the work to be done under this contract has been completed and accepted by him under the terms and conditions thereof, whereupon the entire amount found to be due the Contractor shall be paid to the Contractor at ..... within ..... days after date of said certificate, provided, however, that before final payment is made, the Contractor shall submit evidence satisfactory to the Engineer that all payrolls, material bills, and outstanding indebtedness in connection with this work, have been paid. 1920.

23. Arbitration

If any difference or dispute shall arise between the parties hereto concerning the performance of this agreement or their respective rights and obligations thereunder, such differences or disputes which cannot be settled between the Engineer and the Contractor shall in all cases be submitted to arbitration, as follows:

In case either party shall seek the appointment of arbitrators, such party shall state in writing to the other party hereto the point or points of difference to be submitted to arbitration and within 10 days thereafter shall notify the other party in writing of the selection of an arbitrator in its behalf and thereupon and within 10 days after such notice said other party shall select an arbitrator and shall give to the party demanding arbitration written notice thereof. Within 5 days thereafter, the two arbitrators thus chosen shall meet, and may adjourn from time to time, and after hearing the evidence of the parties and within 10 days of the last hearing before them shall render their decision and award in writing, and such decision and award shall thereupon be binding and conclusive upon the parties.

If the arbitrators so chosen shall not agree upon the decision or award to be made, they shall select a third arbitrator within 15 days of the last hearing before them, to whom all the evidence theretofore taken shall be submitted, but either party may submit additional evidence, and after such further hearing as the arbitrators or a majority of them may permit, the decision and award of a majority of the three shall be binding and conclusive upon the parties.

If the two arbitrators first chosen shall not agree upon the selection of a third arbitrator, then such third arbitrator may be appointed by any person selected by the parties to the arbitration to make such appointment.

If upon due notice either party shall fail to select an arbitrator within the time allowed for that purpose, the arbitrator appointed by the other party or parties shall have the right to proceed with the arbitration as sole arbitrator, and his written decision and award shall be binding and conclusive upon the parties hereto.

Any party against whom a decision and award may be made, shall have 60 days after service of notice thereof in writing within which to comply therewith, provided the arbitrators, or if there be only one, then the arbitrator shall have power, for good cause shown from time to time, to extend the time for such compliance for a further period not to exceed 30 days in all.

The fees, disbursements and expenses of the arbitrators, or, if there be only one, then the arbitrator shall be borne or paid according to the award of the arbitrators or arbitrator. The counsel fees, disbursements and expenses of each party shall be borne exclusively by such party. 1920.

The committee recommended that the form of contract for block signal and interlocking work be accepted for presentation at the annual meeting for submission to letter ballot for inclusion in the Manual.

Committee: R. C. Johnson (B. R. T.), chairman; H. F. Haag (K. C. S.), vice-chairman; F. H. Buchanan (P. R. R.), J. B. Latimer (C. B. & Q.), John Leisenring (I. T. S.), H. F. Lomas (I. C.), J. C. Mock (M. C.), A. H. Rudd (P. R. R.), J. M. Woldran (I. R. T.).

Discussion

R. C. Johnson (chairman) presented the report and continued as follows: Since the report was submitted to the secretary for publication the committee has decided to make certain further changes. 8 (g) (Indemnity), the committee wishes to eliminate the last part. This paragraph will then read, "The contractor assumes no other liability for damages, either to persons or property."

Mr. Stevens: Is it possible to so word this clause that it would protect other companies interested in the contract as well as the company letting the contract?

Mr. Johnson: The committee will be glad to consider that. The committee wishes to make a change in Section 23, substituting the words "This agreement" for the words "the arbitration," making the paragraph read:

"If the two arbitrators first chosen shall not agree upon the selection of a third arbitrator, then such third arbitrator may be appointed by any person selected by the parties to this agreement to make such appointment."

The committee moves that the form of contract for block signal and interlocking work be accepted for presentation at the annual meeting for submission to letter ballot for inclusion in the Manual.

W. H. Elliott (N. Y. C.): Has the committee considered anything with reference to a guaranty or warranty clause?

Mr. Johnson: The ordinary guaranties are taken care of in the specification which is part of this contract; there is also a clause covering the replacement of defective parts.

(Motion seconded and carried.)

The committee was dismissed with the thanks of the association.

Report of Committee IX—Wires and Cables

The committee submitted for consideration at the stated meeting reports on specification for wire joints and specification for copper bond wires.

It recommended that the resolution regarding type of wire insulating machine and preference in the placing of orders, adopted and placed in the Manual in 1912, be withdrawn as not being of such importance as to warrant it being retained in the Manual.

Specification for Wire Joints

1. General

(a) Joints between copper line wires, in tension, shall be made with a copper sleeve, which shall be given 3½ turns in accordance with drawing 1407. 1920.

(b) Joints between iron line wires, in tension, shall be made in accordance with drawing 1405. 1920.

(c) Joints between copper or iron line wires and copper branch wires shall be made, soldered and arranged in accordance with drawings 1403, 1404 or 1411. 1920.

(d) Joints between rubber insulated wires shall be made in accordance with drawings 1406 or 1408. 1920.

2. Tinning

(a) Where an iron wire is to be soldered in the form of a joint, it must first be tinned before the wires are twisted together. 1920.

3. Soldering

(a) Joints shall be soldered by dipping the wires in, or pouring on, the melted solder until there is a metallic union of the wires for the length of the joint. The flux used shall be non-corrosive. After soldering, the joint shall be wiped clean with a piece of dry and clean cloth or waste. Joints shall be soldered the day made. 1920.

4. Insulation and Covering

(a) Joints shall be insulated and covered in accordance with drawings 1403, 1404, 1405, 1406, 1407, 1408 and 1411. 1920.

(b) Joints shall be dry when insulated and covered. 1920.

(c) Joints shall be thickly coated with a rubber cement, made of a solution of pure Para rubber dissolved in benzine, having the consistency of mucilage, which shall be allowed to dry for not less than one minute. Rubber tape of quality prescribed by A.R.A. specification, shall be wound tightly over the joint in successive layers, overlapping one-half its width. The tape so applied shall be warmed to between 120 degrees F. and 250 degrees F. by a blow torch, care being used not to burn the insulation. After heating, the insulation shall be firmly pressed together. 1920.

(d) The joint so insulated shall be tightly wrapped with friction tape, of quality prescribed by A.R.A. specification overlapping one-half its width and extending over ends of braiding of wires forming joint the distance specified on drawing, two layers of the tape being applied. Two coats of black asphaltum paint shall be applied over the tape, the first being allowed to dry thoroughly before the second is applied. 1920.

5. Crossarm Support

One crossarm in accordance with drawing 1403 shall be used where there is one dead ended wire and seven or more through wires, or seven or more through wires and two dead ended wires pulling in the same direction but located on opposite sides of the pole. In all other cases two crossarms in accordance with drawing 1404 or drawing 1411 shall be used for all dead ended wires. 1920.

Specification for Copper Bond Wires

1. Wire

(a) The wire shall be No. 6 A.W.G. soft drawn, annealed copper having a conductivity of not less than 98 per cent of that of pure copper, Matthiessen's standard. The wire shall be cylindrical in form, free from flaws, scales and other imperfections. 1920.

(b) The wires shall be cut and straightened to the length specified. The ends shall be square and free from burrs. 1920.

2. Properties

(a) The mechanical and electrical properties of the finished wire shall be in accordance with the following requirements:

A. W. G.	Diameter in Mils.	Per Cent Elongation in 10 Inches	
6	162	27	1920.

(b) The wire shall not vary more than one mil. from the normal diameter. 1920.

3. Inspection and Tests

(a) The manufacturer shall provide, at the mill, all apparatus and labor for making the required tests under supervision of the purchaser. 1920.

(b) Tests shall be made at the mill, and, or at destination. 1920.

(c) If, upon arrival at destination, the wires do not meet the requirements of these specifications, they will be rejected and returned to the manufacturer, who shall pay all freight charges. 1920.

4. Packing for Shipment

(a) The wires shall be put up in bundles of 200, well burlapped at ends and securely fastened in not less than 3 places. 1920.

5. Tagging

(a) A tag shall be securely fastened to each bundle, having plainly and indelibly marked thereon the length, the purchaser's order, requisition and inspection number and the shipping address. 1920.

The committee recommended that the specification for wire joints and the specification for copper bond wires be approved for acceptance at the annual meeting for submission to letter ballot for inclusion in the Manual.

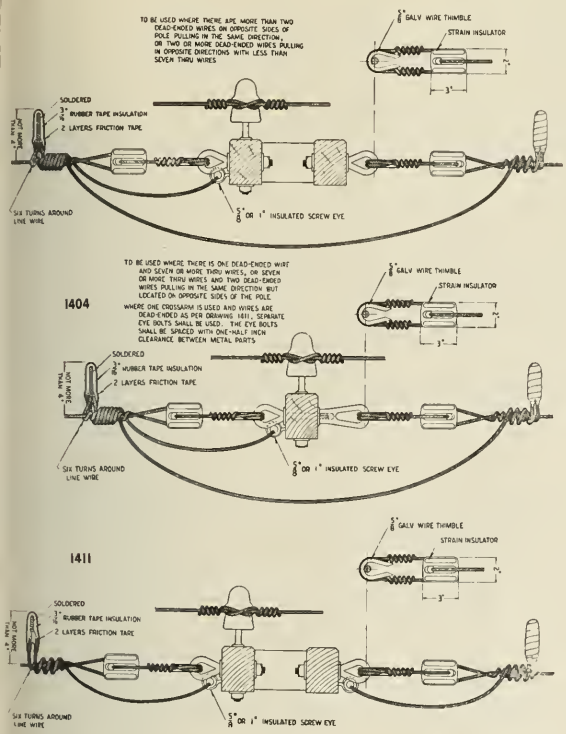
Committee: W. H. Elliott (N. Y. C.), chairman; H. K. Lowry (C. R. I. & P.), vice-chairman; E. L. Adams, F. W. Bender (C. R. R. of N. J.), F. H. Buchanan (P. R. R.), G. W. Chappell (N. Y. N. H. & H.), C. A. Dunham (G. N.), G. A. Kirley (B. & A.), H. W. Lewis (L. V.), B. F. Oler (P. R. R.), A. H. Rice (D. & H.), D. W. Richards (N. & W.), W. Y.

Scott (B. & M.), M. E. Smith (D. L. & W.), Chas Stephens (C. & O.), T. S. Stevens (A. T. & S. F.).

Discussion

W. H. Elliott (chairman) presented the report.

Mr. Dryden: Regarding 1 (c) in my experience, a line wire under tension, connecting with a branch wire should never be soldered because of the weakening ef-



Iron wires shall be tinned before being twisted into a joint and soldered.

Soldering shall be done by dipping the wires in or pouring on the melted solder. After soldering, the joint shall be wiped clean.

Joints shall be dry when insulated and covered.

Joints, before rubber tape is applied, shall be thickly coated with a rubber cement and allowed to dry for not less than one minute.

Rubber tape shall be wound in successive layers over joint to the thickness specified. The tape so applied shall be warmed to between 120 deg. and 250 deg. F.

Friction tape shall be wrapped over rubber insulation and extend over ends of braiding of wires forming the joint. Two layers shall be applied. Two coats of black asphaltum paint shall be applied over the tape.

1403—Branch Connection to Line Wire Double Cross-Arm Support

1404—Branch Connection to Line Wire Single Cross-Arm Support

1411—Branch Connection to Dead-Ended Line Wire Double Cross-Arm Support

fect on the wire. There are too many breaks in that kind of construction.

Mr. Elliott: The specification does not provide for the construction which Mr. Dryden has criticized. The committee believes that the practice prescribed by these drawings is the best that has yet been devised, and will be safe and satisfactory.

J. A. Peabody (C. & N. W.): As to the cost of this method in comparison with other methods, I might state that the materials recommended by the committee will cost about 10 cents less, and the labor will be more about an equal amount.

Mr. Elliott: I move that drawing 1403 be accepted, to take the usual course. (Motion seconded and carried.)

Mr. Elliott: I move that drawing 1404 be accepted, to take the usual course. (Motion seconded and carried.)

Mr. Elliott: I move that drawing 1405 be accepted, and take the usual course.

(Motion seconded.)

T. C. Seifert (C. B. & Q.): At the New York meeting we had considerable discussion regarding this joint. It was the sense of the association that this joint was not a good one, and was to be eliminated.

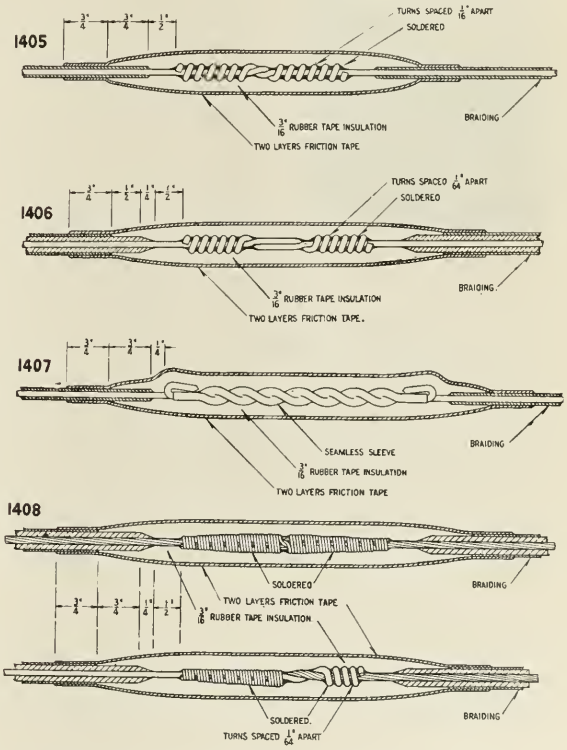
Mr. Elliott: That was with reference to copper line wire. This is iron line wire.

Mr. Seifert: At present we use tin sleeves for iron line wire and have no trouble. We find that this joint, in process of soldering, becomes brittle and breaks.

(Motion carried.)

Motions were next made and carried for the acceptance of drawings Nos. 1406, 1407, 1408, 1411.

Mr. Elliott: The committee moves that specification for copper bond wires be accepted, and take the usual



Soldering shall be done by dipping the wires in or pouring on the melted solder. After soldering, the joint shall be wiped clean.

Joints shall be dry when insulated and covered.

Joints, before rubber tape is applied, shall be thickly coated with a rubber cement and allowed to dry for not less than one minute.

Rubber tape shall be wound in successive layers over joint to the thickness specified. The tape so applied shall be warmed to between 120 deg. and 250 deg. F.

Friction tape shall be wrapped over rubber insulation and extend over ends of braiding of wires forming the joint. Two layers shall be applied. Two coats of black asphaltum paint shall be applied over the tape.

1405—Weatherproof Insulated Iron Line Wire Joint

1406—Rubber Insulated Solid Copper Wire Joint

1407—Weatherproof Copper Line Wire Sleeve Type Joint

1408—Stranded Wire Joint

course. This specification is along the lines of the specification for the iron bond wire already in the Manual.

B. T. Anderson (D., L. & W.): Is it possible to get wire with the variation of one mill?

Mr. Elliott: The leeway permitted in iron wire is

three mills, but copper wire is drawn much closer, and this was changed to one mill on the statement of the manufacturers.

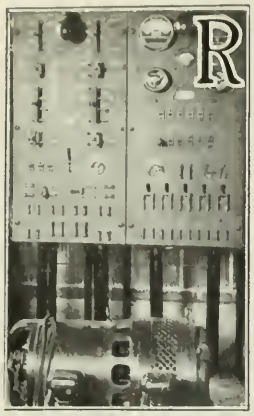
(Motion seconded and carried.)

Mr. Elliott: The committee recommends that the resolution regarding type of wire insulating machine and preference in placing orders, adopted and placed in the Manual in 1912, be withdrawn. I move its withdrawal from the Manual be accepted for presentation to the annual meeting, and for submission to letter ballot.

(Motion seconded and carried.)

The committee was dismissed with the thanks of the association.

Report of Committee III—Power Interlocking



REPORTS WERE submitted by the committee on the following subjects:

Specification for electric lock for mechanical interlocking machine.

Specification for renewable cartridge fuses.

Specification for universal electric motor switch operating and locking mechanism.

The report on specification for electric lock for power interlocking machines was submitted at the 1919 annual meeting, and also at the stated meeting in New York, December 2 and 3, 1919.

At the December meeting it was suggested that the committee consider a specification for electric lock for mechanical interlocking machines to determine whether such a specification could be combined with the specification for electric lock for power interlocking machines.

The committee was of the opinion that the two specifications could be combined and with this thought in mind it presented only such additional sections as seemed desirable to have the specification applicable for both power and mechanical interlocking machines. The additional sections were submitted for discussion with the thought that after this meeting, and before the specification is submitted at the annual meeting, that a joint meeting would be held with Committee II to obtain its views and recommendations.

It was suggested at the December meeting that coils and windings of enameled wire as well as of cotton or silk-covered wire be impregnated. On investigation the committee reported that the impregnating compound may be used at a temperature as high as 328 degrees F., while 212 degrees F. is the maximum specified temperature to which enameled wire is subjected and 86 degrees F. is the maximum subsequent temperature at which it is supposed not to crack when the wire is bent. The data is now in the Manual under specification for "Impregnation Treatment of Coils and Windings" and for "Enameled Copper Magnet Wire."

Further investigation developed that impregnation of coils wound with enameled wire was impracticable. Experience has shown that the process of impregnating enamel wire softens the enamel. For this reason the committee recommended no change in section 7-a, reading:

Coils and windings shall be of cotton or silk-covered wire impregnated; of enameled wire, or as shown on requisite sheet. Enameling or impregnation shall be in accordance with R. S. A. specifications. (G.E.R. 32-a) 1919.

The following are the additional sections which the committee considered desirable to have for the specifications on electric locks applicable to power and mechanical interlocking machines:

4. Design

(c) Locks shall be enclosed in a substantial metallic case, the doors and coverings of which may be locked or sealed, as specified on requisite sheet. 1920.

(h) Locks shall be designed for application to the machine as specified on requisite sheet. 1920.

(i) Operating connection between the rocker and the lock shall be so constructed that it cannot be disconnected without removing the lock cover. 1920.

(j) Wire leads to magnet coils shall be insulated flexible copper and not smaller than No. 18 A.W.G. 1919.

6. Contacts

(a) Contacts shall:

1. Make a wiping contact. 1919.
2. Be so adjusted that in their open position there shall be not less than .050 in. between contact points. 1919.
3. Be of material specified on requisite sheet. 1919.
4. Be designed to carry continuously and break the current specified on requisite sheet. 1919.
5. Open and close as specified on requisite sheet. 1919.

(b) The number of contacts shall be as specified on requisite sheet. 1919.

9. Operation

(a) Lock armature shall be mechanically forced to the locked position by the manipulation of the lever. 1920.

The greater portion of the sections in the specification for renewable cartridge fuses have been taken from the 1918 National Electric Code, A. R. A. standard sections, where they were applicable. This specification was submitted for discussion.

Specification for Universal Electric Motor Switch Operating and Locking Mechanism (First and Second Range Voltage)

A report on specification for electric motor switch operating and locking mechanism was submitted at the June, 1918, meeting; at the June, 1919, meeting, and at the annual meeting in September, 1919. It was again submitted with what additional data has been collected since the September, 1919, meeting.

For reference only Fig. 2 and Table 1 were submitted, showing prony brake test on G.R.S. model 2 switch machine, 110 volt, d.c. These tests were made to determine the average thrust on switch operating rods in terms of the operating motor and gear train, prony brake test on model 2, 110 volt d.c. switch machines was made, applying brake to the gear wheel which drives the operating cam. The motor was run with fields in series and again with fields in multiple. Torque and r.p.m. of brake wheel and volts and amperes input to the motor were read. This test was made by running 5 sec. and then standing 5 min., alternately. The temperature of the test was about 75 degrees F. and temperature rise of motor windings during test was 9 degrees F. Commutation was entirely satisfactory through entire current range. The data on Table I is the result and an input-output curve was

plotted from this data. Fig. 2, which is not shown, was made up from the data on Table I.

TABLE I. PRONY BRAKE TEST ON MODEL 2 G. R. S. 110 VOLT, D.C. SWITCH MACHINE

Brake Ft.-Lb. Torque	Output R.P.M.	Energy Amperes	Input Volts	Output B.H.P.	Input H.P.	Efficiency Per Cent
			I			
			Fields in Series			
22	48	7.5	112	.201	1.13	18
30	42	10	111	.24	1.49	16
38	36	11.5	110	....	1.70	....
46	30	12.5	110	.263	1.84	14.3
54	24	13	110	....	1.92	....
62	24	14	110	.284	2.06	13.6
70	24	15	110	....	2.21	....
78	24	16	110	.356	2.36	15
86	24	16.5	110	....	2.44	....
94	24	16.75	110	.428	2.47	17½
102	18	17.5	110	....	2.58	....
110	18	17.75	110	.377	2.62	14½
118	18	18.25	110	....	2.69	....
126	15	19	109.5	.360	2.79	13
134	15	19.5	109	....	2.85	....
142	15	20	109	.407	2.92	13.7
150	15	20.5	109	.428	3.00	14.3
			Fields in Multiple			
16	60	4½	118	.183	.713	25.6
32	(40)	5.6	118	.244	.885	27.6
48	36	6.5	118	.329	1.02	32.2
64	30	7.0	116.5	.365	1.09	33.5
80	(27)	7.5	116	.411	1.17	35.1
96	24	8.0	116	.44	1.24	35.5

Five second runs: T = Torque foot-pounds.

$$BHP = \frac{2\pi \times T \times \text{r.p.m.}}{33000}$$

From the curve the output (h.p. applied to switch) may be read for any h.p. input.

B.h.p.— output, from input — output curve = h.p.

$$\text{Power applied to the switch} = \frac{F \times D}{550} \quad (1)$$

where F = force pounds (average thrust)
and D = throw in ft. per sec. of switch.

$$\text{Therefore } F = \frac{550 \times \text{h.p.}}{D} \quad (2)$$

t = time (sec.) per operation of switch,
i = inches throw of switch,
i/12 = feet throw of switch and ft. per sec. of switch $= \frac{\text{feet}}{\text{sec.}} = \frac{i/12}{t} = i/12t = D.$ (3)

Substituting (3) in (2)

$$F = \frac{550 \times \text{h.p.}}{i/12t} \text{ and clearing,}$$

$$\text{Average thrust-pounds} = F = \frac{500 \times \text{h.p.} \times 12t}{i} \quad (4)$$

Discussion at the September, 1919, meeting indicated that some of the manufacturers felt that requirements 3-g (old 3-f) and 3-h (old 3-g) were too severe and desired more time to make tests to satisfy themselves regarding what loads their present type of switch machine would handle in the required time.

The committee does not recognize that tests on existing apparatus have anything to do with the specification, any more than to bring out as a matter of information what such existing apparatus will do. To support the committee's contention, tests on various switch, movable point frogs and detector bars were made. There is no assurance that the tests made show the most severe cases and they should be considered averages of the kinds presented.

The average pounds thrust through the three stages of stroke in one test are less than 700 lb.; however, the committee recommended the 700-lb. requirement, as it is felt that this is not too high and will allow only nominal margin of thrust for future growth of loads to be handled.

Some manufacturers have objected to the loading for the low voltage machine, as given in section 3-g. The committee desired to explain its recommendation for the average thrust of 700 lb. in both sections 3-g and 3-h.

The committee finds that first range voltage machines are being used interchangeably under the loads encountered in interlocking plants of second range voltage, and therefore, of necessity, should be capable of handling the same loads as the second range voltage machines.

The above explanatory statements were made by the committee with the expectation of there being opposition arguments presented by the manufacturers with the view of making the specification apply to existing apparatus instead of making their apparatus fit the specification.

The committee feels no progress can be made if a specification is drawn which will admit all apparatus in the market whether or not such apparatus is satisfactory or capable of measuring up to the requirements recommended by it which in its opinion is necessary.

Certain parts of the specification as revised and submitted for discussion are given below:

3. Operating Requirements

(a) Mechanism shall perform its normal operation in the following sequence:
1. Operate detector bar to the full upward position and unlock switch. 2. Throw switch. 3. Lock switch and operate detector bar (in the same direction) to full downward position. 4. Indicate.

(d) Mechanism shall be so constructed that locking device cannot complete its movement nor indication take place unless the lock rod (or rods) has moved to the normal or full reversed position and the position of the mechanism corresponds thereto. 1920.

(e) Circuit controlling devices shall be so constructed that they will, for proper operation, be dependent upon the movement of the lock rod. 1920.

(f) Switch circuit controller for proper operation shall be dependent upon the movement of the switch points. 1920.

(g) (Old f) Normal operating voltage for first range mechanism shall be 20; the time of operation with this voltage at the motor terminals with an average operating thrust of 700 lb. shall not exceed 30 sec., nor shall it exceed 40 sec. at a voltage of 20 per cent below normal. 1919.

(h) (Old g) Normal operating voltage for second range mechanism shall be 110; the time of operation with this voltage at the motor terminals with an average operating thrust of 700 lb. shall not exceed 4 sec., nor shall it exceed 5 sec. at a voltage of 10 per cent below normal. 1919.

(i) (Old h) Mechanism shall be capable of withstanding stress equivalent to a thrust of 10,000 lb. on any operating connection. 1920.

4. General Design

(a) Internal wiring.

All internal wiring, neatly arranged, shall be placed in ducts or chases of ample capacity and shall form an integral part of the apparatus, flexible rubber insulated wire, not less than No. 14 A.W.G., provided with eyelets at each end, shall be used. Terminals for external wiring shall be located immediately adjacent to wire inlet and sufficient duct space provided to accommodate such conductors. Terminals shall be in accordance with R.S.A. 1070. A wiring or connecting diagram shall be located in a conspicuous place in the mechanism case. 1920.

(b) Mechanism.

1. Circuit controlling devices shall be housed in a separate compartment of the mechanism case, and shall, so far as possible, be non-sweating and dirtproof and have separate metallic cover. 1920.

2. Contact space for four independent circuits shall be provided, in addition to those necessary for control of the mechanism; the contacts shall be so designed that they will be positive in action and each can be adjusted to open or close as specified on requisite sheet. 1920.

(d) Bearings.

(a) Bearings shall be of ample dimensions to insure reasonable durability. 1919.

(b) Motor bearings shall be so designed as to prevent oil from them getting on the brushes, commutator or windings. 1920.

(c) Means shall be provided for necessary lubrication of bearings surfaces. 1919.

(d) Exposed oil holes shall be provided with weather-proof oil cups or covers. 1920.

(e) Clearance.

(a) Mechanism case and motor assembled, shall be designed for two tie supports and when applied shall extend not more than 2-in. above the top of rail (assuming 60 lb., 4½-in. A.S.C.E. rail), and at points of support, not more than 4¼-in. below base of rail. 1920.

Committee: E. B. Wiegand (N. Y. C.), chairman; F. W. Pfleging (U. P.), vice-chairman.

Sub-Committee "A": A. B. DuBray (I. C. C.), chairman; F. J. Ackerman (K. C. T.), N. S. Lynch (Mo. Pac.), J. W. McCormack (K. C. T.), O. R. Unger (Mo. Pac.), G. A. Ziehlke (U. P.).

Sub-Committee "B": B. J. Schwendt (T. & O. C.), chairman; E. T. Ambach (B. & O.), J. S. Dewey (C. C. C. & St. L.), J. H. Oppelt (N. Y. C. & St. L.), T. C. Seifert (C. B. & Q.), W. C. Sibila (N. Y. C.).

Sub-Committee "C": L. E. Carpenter (P. R. R.), chairman; E. N. Fox (B. & M.), F. L. Ball (D. L. & W.), Charles Soper (L. I.), Walter Tyler (L. I.), G. C. Whitney (N. Y. M. Ry.).

Discussion

R. M. Phinney: I suggest that the following paragraph be added. "The proper operation of the locking features must be electrically or mechanically checked during each operation."

Mr. Wiegand: The committee will consider that.

J. E. Stephenson: (G. R. S. Co.) In 4 (h) and 4 (c), is it intended that neither end of the operating connection shall be disconnectable without removing the lock cover?

Mr. Wiegand: This only refers to the connection at the lock end.

T. J. O'Meara (N. Y. C.): In 4 (j), it states that the magnet coils shall be insulated. I have noticed on a good many insulated wires that the insulation was destroyed. It might be well to state what is the best insulation.

Mr. Wiegand: The committee will look into that. The committee desires to know whether it is the sense of the meeting that the specification for power interlocking machines and mechanical interlocking machines should be combined in one specification?

T. S. Stevens (A. T. & S. F.): I move they be combined.

(Motion seconded and carried.)

Mr. Wiegand: The committee moves the acceptance of this report for submission at the annual meeting for approval and ballot.

(Motion seconded and carried.)

Mr. Stoltz: In the specification for renewable cartridge fuse it states that the fusible link shall be packed in a non-combustible powder. The manufacturers of a renewable fuse are not at present using the powder, and I understand that the Underwriters Laboratories have approved those without the powder.

A. B. DuBray (I. C. C.): There are fuses on the market that do use it, and are passed by the Underwriters Laboratories.

Mr. Stoltz: I move the elimination of powder.

(Motion seconded and carried.)

A motion was made and carried that the screw contact fuses be eliminated from the specification.

Mr. Stoltz: Do I understand that the fusible link must extend out of the case where the rating will be visible? Would a case having a hole in the top, with the link turned over and the capacity of the fuse stamped on it, meet the specification?

Mr. DuBray: That would come within the specification. The committee recommends that this specification with the corrections, be presented at the annual meeting for letter ballot and inclusion in the Manual.

(Motion seconded and carried.)

Mr. Schwendt, Chairman of the sub-committee, presented the report on Specifications for Universal Electric Motor Switch Operating and Locking Mechanism. (First and Second Range Voltage.)

J. E. Stephenson (G. R. S. Co.): In regard to 3 (a) 3, I would like to see the words that are included in the parentheses struck out. That is contrary to a number of well known designs which will undoubtedly be continued in the future. I also suggest that the wording in (d) be changed, as follows: "Mechanism shall be so constructed that indication cannot take place unless lock rod has moved to the normal or reverse position, and the locking device has completed its stroke, the position of the mechanism corresponding thereto."

Mr. Schwendt: Since the advance notice went to print, the committee had another meeting, and conducted a number of tests. If the specification is permitted to stand as it is, existing types of motors for the first range machines are not generally capable of performing the load specified in the time specified, as given in 3 (g).

C. H. Morrison (N. Y. N. H. & H.): We have quite a number of low voltage machines in service, operating on 20-volt storage battery. It requires 20 sec. to move the switch only, that is without bar or derail. We are receiving satisfactory service.

J. B. Latimer (C. B. & Q.): About 31 sec. is our average, with low voltage switch machines operating on primary battery. We do not find any operating difficulties.

Mr. Schwendt: In order to conform to present practice, it will require changing 3 (g) so that 30 becomes 40, and 40 becomes 50.

P. E. Carter (G. R. S. Co.): We suggest a figure of 350 lb., which is above the ordinary switch, for the actual requirement, to couple up with the time, etc., as the means of showing the ability of the switch machines.

Mr. Elliott: We have made some very extensive tests on switches, using 105-lb. rail, and, owing to the tightening up of the angle-bars which the maintenance of way department requires, our average throw on the switch connection is in excess of 500 lb. I believe a thrust of 350 would be entirely below our requirements, and that 30 sec. is the proper time in which a switch of low voltage should operate.

J. Latimer: It is not my practice to use low voltage switch machines in important places, nor do the switches have to be thrown very often. Our heaviest rails are 100 lb., and tests show that 350 lb. will do the work.

Mr. Fugina: There is a considerable difference of opinion here. The manufacturers say that 350 lb. is the proper specification, and the committee says 700 lb. They should be able to get together on an average. I believe that 350 lb. is too low, and I am inclined to the opinion that 700 lb. is too high.

Mr. Schwendt: The committee moves that 3 (g) be accepted as printed.

(Motion seconded and carried.)

Mr. Schwendt: The committee moves the approval of 3 (h) as printed.

(Motion seconded and carried.)

Mr. Schwendt: The committee would like to change 3 (i) to read: "Mechanism in locked position shall be capable of withstanding maximum stress equivalent to a thrust of 20,000 lb. on any operating connection." I so move.

(Motion seconded.)

Mr. Stephenson: I would not like to see the matter closed until we have sufficient time to determine whether we can conscientiously submit to that test.

Mr. Schwendt: In raising the requirement to 20,000

lb. the committee has in mind confining the breakage in case the switch is run through, not to the machine, but perhaps to a buckling of the connections.

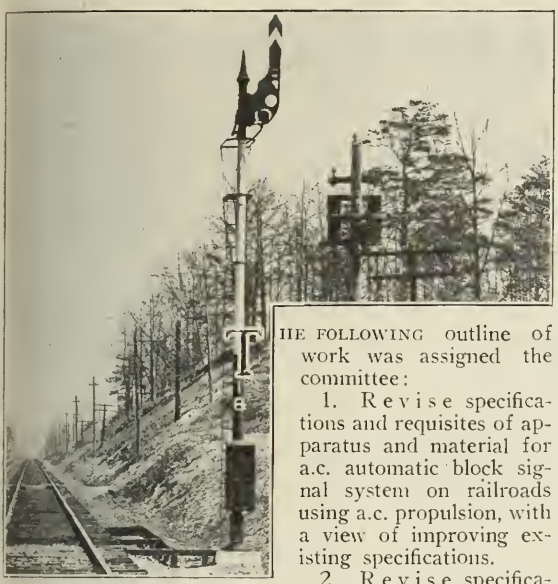
Mr. Elliott: The committee's point that this load should be 20,000 lb. is a good one. However, if they change the last four words, "on any operating connection," to "on the switch connecting rod," it would answer the purpose. A future requirement will take care of the detector bar connection.

Mr. Schwendt: The committee will accept that, and withdraw our motion. I move that the Specification for Universal Electric Motor Switch Operating and Locking Mechanism be accepted for presentation to the annual meeting, for submission to letter ballot and inclusion in the Manual.

(Motion seconded and carried.)

The Committee was dismissed with the thanks of the association.

Committee VIII—A. C. Automatic Block Signaling



THE FOLLOWING outline of work was assigned the committee:

1. Revise specifications and requisites of apparatus and material for a.c. automatic block signal system on railroads using a.c. propulsion, with a view of improving existing specifications.

2. Revise specifications and requisites for apparatus and material for a.c. block signal system on railroads using d.c. propulsion, with the view of improving existing specifications.

3. Revise specifications and requisites for apparatus and material for a.c. automatic block signal system on railroads using other than a.c. or d.c. propulsion, with the view of improving existing specifications.

4. Prepare specification for: (a) Air-cooled reactors. (b) Choke coils. (c) Indicators. (d) Power supply. (e) Relays. (f) Repeaters. (g) Track circuits.

5. Review characteristics of a.c. apparatus for interlocking plants.

6. Prepare data relating to a.c. track circuit characteristics.

7. Review subject matter for switchboards, a.c. power, harmonizing same with specifications for switchboards, d.c. power.

8. Prepare instructions for installation of switchboards.

The committee submitted for consideration at the stated meeting the following specifications:

Specification for a.c. automatic block signal system; specification for air-cooled reactor for line and track circuits; specification for resistor for line and track circuits and a specification for switchboards. The committee recommended that the above specifications be accepted for presentation at the annual meeting for submission to letter ballot and inclusion in the Manual.

In the following specification for a.c. automatic block signal system only the sections bearing the 1920 date are given; the general provisions, the standard sections and the general electrical requirements sections are omitted. The 1920 sections follow:

4. Drawings

(e) Purchaser's drawings listed on requisite sheet and forming an essential part of the specifications, are as follows:

1. Station maps drawn to scale showing track arrangement and surroundings. 2. Profile. 3. Location plan:

(a) A location plan drawn to scale, showing the arrangement of tracks, the location of interlocking stations, power stations, location, numbering, type, arm travel, and control (R.S.A. symbols) of existing and proposed signals, steam and electric railway crossings, highway crossings, highway crossing alarms, track circuit limits, trestles, stations, pole line or other supports for line wires or aerial cables, approximate number of poles per mile, average distance of nearest pole from each signal or relay box to which line wire connections are required, notations showing the sections of rail and drilling of rail joints, and such other information as is desirable.

4. Circuit plans for all existing installations in the territory to be signaled.

5. Typical circuit plans:

(a) Plans showing typical circuits for the control of power-operated signals, switch indicators, protection for facing and trailing switches, main-line and siding crossovers, highway crossing alarms, train order signals and other devices.

6. Standard and other plans:

(a) Such standards and other drawings as the purchaser desires.

(f) Contractor's drawings:

3. Not more than the number of days called for on requisite sheet after award of the contract, and before work is begun, the contractor shall furnish, for the approval of the purchaser, the drawings specified on requisite sheet.

4. Not more than the number of days called for on requisite sheet after the receipt of these drawings, the purchaser will indicate any corrections that may be necessary, or signify his approval.

5. The contractor shall be responsible for the correctness of all drawings furnished by him, although the drawings may have been approved by the purchaser.

6. Any work done prior to the approval of the contractor's drawings will be done at the contractor's risk.

(g) No change shall be made in any approved drawing without the written consent of the purchaser.

6. Contract

(b) As soon as practicable, after the award is made, copies of the contract in accordance with the accompanying form, will be presented to the contractor for signature, after which all copies will be signed by the purchaser and two will be returned to the contractor. The number of copies shall be as specified on requisite sheet.

9. Furnished by the Purchaser

(d) The purchaser will furnish material or labor, or both, on items indicated on requisite sheet subject to the inspection of the contractor, who shall state any objections thereto before starting his part of the work. After rectification by the purchaser of any defects reported, the contractor shall assume full responsibility for the proper functioning of the installation. The intent of this section is to bar any claim by the contractor that the work done by the purchaser has not been performed in such manner as to enable him to fulfill all of the provisions of the contract.

11. Shipment of Material

(b) Shipment of material shall be made as specified on requisite sheet.

12. Transportation

(c) Transportation shall be furnished as specified on requisite sheet

14. Inspection of Installation

(b) The contractor shall advise the purchaser the number of days specified on requisite sheet, in advance of the time the installation will be completed and ready for final inspection. The purchaser will make inspection and tests, within the number of days specified on requisite sheet, after the completion of the work.

16. Use of Hand and Other Cars

(c) The use of cars specified on requisite sheet will be permitted and when used, contractor shall comply with purchaser's rules.

18. Placing in Service

(d) After receipt of written authority from the purchaser, the contractor shall place the installation in service under the supervision of the purchaser and shall leave competent men on duty for a period thereafter as specified on requisite sheet.

(e) The purchaser will place the installation in service, in the event that he does not authorize the contractor to do so within the time specified on requisite sheet after the completion of the work to the purchaser's satisfaction.

Detail Provisions

50. Power Supply

(b) Apparatus shall be so located as to be easily accessible for operation, attention to bearings, adjusting and cleaning.

(c) When internal combustion engines are used, contractor shall install muffler outside of building as approved by purchaser.

(d) The following power plant equipment shall conform to R.S.A. or A.R.A. specifications:

1. Gasoline engines. 2. Alternators. 3. Motors. 4. Motor generators. 5. Switchboards.

78. Power Distribution

(a) The drop in voltage supply under normal conditions between the source of power supply and the far end of any feeder shall not exceed 10 per cent, and shall not interfere with proper operation of the signals when power is restored to the line.

(b) Power for track circuits shall be obtained from individual track transformers or independent track transformers with a separate secondary winding for each track circuit as specified on requisite sheet..

(c) Power for circuits other than track shall be obtained direct from secondary of line transformer or by the use of additional transformers, as specified on requisite sheet.

(d) A voltage at the terminals of all operated units shall be within five per cent of their rated voltage at full load with normal voltage at the source of supply. A track circuit shall be considered as an operated unit and measurement of voltage is to be made at secondary of track transformer.

(e) Power lines shall be sectionalized as specified on requisite sheet.

270. Foundations

(c) Dimensions and elevations of concrete foundations shall conform to drawings as specified on requisite sheet.

271. Foundation Bolts

(a) Foundation bolts shall be as specified on requisite sheet.

280. Concrete

(a) Concrete shall conform to R. S. A. specification.

400. Signals

(a) Signals shall conform to A. R. A. specifications.

500. Circuits

(a) Circuits shall conform to the contractor's recommended practice, unless otherwise specified on requisite sheet.

502. Track Circuits

(a) Track circuits shall be continuous on all main tracks and extend the full length of crossovers and to the fouling point of turnouts, unless otherwise specified on requisite sheet.

520. Wire

(a) Wire and cables shall conform to R. S. A. specifications, unless otherwise specified on requisite sheet.

521. Size of Conductors

(a) Wires shall be of sufficient size to permit operation of apparatus, in accordance with R.S.A. specifications.

(b) Single conductor wire smaller than No. 14 A.W.G. shall not be used for exterior wiring.

(c) No wire smaller than No. 16 A.W.G. shall be used for exterior or interior wiring.

(d) No line wire smaller than No. 12 A.W.G. shall be used.

526. Wiring

(a) Wires in trunking chases or conduits shall be laid loosely, without stretching or crowding, not more than 75 per cent of the space being used.

(e) Eyelet terminals shall be used on flexible wire. Tips of eyelets shall be dipped in solder.

527. Common Return

(a) Where common return is used it shall be cut at locations where possible without overlapping or use of additional instruments.

(b) Length of common return shall not exceed six miles, unless otherwise specified on requisite sheet.

(c) Where common return is used, it shall be available for test at locations of all apparatus.

528. Joints in Wires

(a) Joints or breaks shall not be made in wires other than open line wires except by permission of the purchaser.

(b) Joints shall be located where accessible for inspection.

(c) Method of making joints shall conform to A.R.A. specification.

531. Wire Terminals

(a) Terminals for wire and cable conductors shall be in accordance with R.S.A. 1056 and shall be installed in an accessible position and neatly arranged on terminal boards in housings.

540. Bonding Wires for Other Than Propulsion Bonding

(a) Bonding wires shall conform to R.S.A. specification.

(b) Bonding wires shall be of material specified on requisite sheet.

(c) Bonding shall be in accordance with drawing specified on requisite sheet. Rail joints, except as below, shall be bonded with two bonding wires; when located in platforms or road crossings, whether of plank, brick, or ballast filling, four wires must be used at each joint, two being placed on either side of rail and outside of the angle bar.

542. Channel Pins

(a) Channel pins shall conform to R.S.A. specifications, unless otherwise specified on requisite sheet.

(b) Channel pins shall be driven on same day holes are drilled and in same direction.

(c) Bond wires shall be free and move with channel pins as they are being driven.

610. Circuit Controllers

(a) Switch circuit controllers shall conform to A.R.A. specification.

(b) Switch circuit controller connections shall be in accordance with R.S.A. 1223.

(c) Non-interlocked single main line switches, both ends of crossover switches and siding derails, when not directly connected to the switch, shall be equipped with switch circuit controllers.

(d) Switch circuit controllers shall be connected to the normally closed point.

(g) Plunger lock, drawbridge, lever latch circuit controllers and circuit controllers for mechanically interlocked signals shall be used as specified on requisite sheet.

705. Supports for Wood Trunking

(c) When trunking exceeds a width of seven inches, additional support shall be provided as specified on requisite sheet.

(e) A piece of capping eight inches long and the width of trunking shall be placed between the trunking and each support.

(f) Each joint in the bottom of the trunking shall have a support.

(g) When trunking is extended across ditch or other depression necessitating a span of more than 5 ft., it shall be reinforced by a piece of rough yellow pine or oak 4 in. by 6 in. in size, laid horizontally and with suitable supports under end of reinforcing piece.

(h) Exposed trunking crossing under tracks containing other than track circuit wires shall be protected by metal covering between rails.

The specification for air-cooled reactors for line and track circuits as presented at the meeting for approval for submission to the annual meeting to be acted upon by letter ballot for inclusion in the Manual consisted of 15 sections. The sections covering the requisite sheet, tender, tests, inspection, packing, marking and warranty are standard sections; those pertaining to insulation and dielectric requirements are general electrical requirements sections. The section or design was presented in 1917, as were those covering capacity, adjustment, name plate and temperature rise. The following paragraphs were added to the requisite sheet:

(e) Inspection and tests.

1. Inspection and tests { shall / shall not } be made at the point of production under supervision of purchaser.

2. Purchaser requests ..... days' notice before apparatus will be ready for inspection and tests.

3. Inspection and tests { shall / shall not } be made at destination by purchaser.

4. Inspection and tests as made by contractor { shall / shall not } be acceptable.

Specification for Resistor for Line and Track Circuits

Under this specification, section 1, requisite sheet; section 3, tender; section 11, tests; section 12, inspection; section 13, packing; section 14, marking, and section 15, warranty, are standard sections, while sections 9 and 10 on insulation and dielectric requirements are general electrical requirements sections.

4. Rating

(a) The rating of the resistor shall be as specified on requisite sheet.

(b) Rating shall cover the total resistance of the resistor and taps as required, also the total capacity of the resistor in watts.

5. Name-Plate

(a) Each resistor shall have a tag, paster or name-plate showing: (a) Manufacturer's name. (b) Drawing or other reference number. (c) Resistance in ohms. (d) Continuous capacity in watts.

6. Temperature Rise

(a) The temperature rise of the resistor by the thermometer shall not exceed 75 degrees C. (167 degrees F.) based on a room temperature of 20 degrees C. (68 degrees F.) for continuous radiation of the wattage specified on requisite sheet.

(b) When the resistor is to be used for intermittent service, the permissible wattage radiation may vary, depending upon the operation of the intermittent current. The temperature rise corresponding thereto shall not exceed 100 degrees C. (180 degrees F.) based on a room temperature of 20 degrees C. (68 degrees F.).

8. Terminal Board

(a) Terminal board shall be as specified on requisite sheet and marked to show the resistance between taps.

The following paragraphs were added under section 16, requisites:

(d) Material:

Resistors shall be furnished in accordance with following drawings:

....

....

(e) Inspection and tests:

1. Inspection and tests { shall / shall not } be made at point of production under supervision of purchaser.

2. Purchaser requests ..... days' notice before apparatus will be ready for inspection and tests.

3. Inspection and tests { shall / shall not } be made at destination by purchaser.

4. Inspection and tests as made by contractor { shall / shall not } be acceptable.

5. Connection diagram.

(a) Connection diagram { shall / shall not } be furnished.

(b) Resistance between terminals.....

(c) Total resistance.....

Specification for Switchboard

Under this specification the following sections are standard sections: Purpose, tender, requisite sheet, inspection, packing, material and workmanship, marking and warranty. The sections on identification and insulation are general electrical requirement sections. The following were the 1920 sections submitted to the meeting:

4. Design

(a) Switchboard shall be of a design approved by the purchaser.

5. Panels

(a) Panels must be of oil-finished natural black slate, free from metallic veins and flaws or as specified on requisite sheet.

(b) Marble panels, if specified, shall be polished on front and edges, and varnished on the back.

(c) Panels shall be arranged as specified on requisite sheet.

(d) Panels shall be 1½ in. thick for all sizes up to and including 48 in. in height and 32 in. in width and 2 in. if either dimension is exceeded, or as specified on requisite sheet.

(e) Bevel of edges shall be as specified on requisite sheet.

6. Supporting Framework

(a) Supports shall be pipe or angle irons with fittings for wall, floor or ceiling braces. The dimensions of the supports shall be as specified on requisite sheet.

(b) Fittings for wall, floor or ceiling braces to be furnished as specified on requisite sheet.

9. Dielectric Requirements

(c) Panels shall be capable of standing a potential stress to be applied between live terminals and between live terminals and frame in accordance with A.I.E.E. standards.

10. Finish

(a) Metal parts of instruments and trimmings on front of switchboard shall be as specified on requisite sheet.

(d) Handles shall be stained black with insulating paint or varnish.

11. Card Holders

(a) Card holders shall be furnished for switches, circuit breakers and rheostats, as specified on requisite sheet.

(b) Card holders shall be mounted where they will best indicate the circuits controlled, and shall be securely fastened with escutcheon pins or screws of non-corrosive metal.

(c) Card holders shall be of non-corrosive metal.

12. Copper Connections and Terminals

(b) Unless continuously supported, main current carrying connections shall not be smaller than No. 6 A.W.G. and shall be of sufficient mechanical strength to withstand bending between supports.

(d) Separate terminal lugs shall be provided for each wire or cable connection leading from the switchboard.

13. Instruments

(a) Electrical measuring instruments shall be so damped that indicating device will come quickly to rest with each change in the indicated value.

(b) Indicating electrical measuring devices and their transformers shall be calibrated with careful consideration of possible electrical interference from circuits and other apparatus. The error expressed in terms of percentage of full scale shall not exceed 1 per cent, when used without current or potential transformers; 1½ per cent, with either one or the other; and 2 per cent, when used with both potential and current transformer.*

*The values expressed in 13-b are exclusive of the error in the instrument transformers.

14. Instrument Transformers

(a) Transformers shall be capable of carrying their regular full secondary load continuously in accordance with A.I.E.E. standards.

(b) They shall withstand without injury a temperature of 95 degrees C., 203 degrees F.

(c) Windings of instrument transformers shall be insulated to withstand without injury alternating current voltages in accordance with A.I.E.E. standards.

(d) Current transformers:

1. Current transformers shall withstand double full rated current for 5 min. without injury.

2. They shall have such ratios as to obtain 5 amp. in the secondary circuits when carrying full rated current.

(e) Potential transformers shall have such ratios as to obtain approximately 110 volts on secondary at rated normal voltage.

15. Fuses

(a) Fuses shall be furnished in circuits and of the capacity shown on purchaser's wiring diagram, or as specified on requisite sheet.

(b) They shall be in accordance with drawing 1309.

16. Knife Switches

(b) They shall be so constructed that the temperature rise at contacts or on any part when carrying full rated current shall not exceed 30 degrees C., 86 degrees F., above the surrounding air, based on a room temperature of 40 degrees C., 104 degrees F.

(c) Knife switches shall be in accordance with manufacturers' standard or as specified on requisite sheet.

17. Circuit-Breakers

(a) The maximum observable temperature rise of the various parts of the circuit-breakers shall not exceed the following limits when the ambient temperature of reference is 40 degrees C., 104 degrees F., contacts in air when clean and bright, 30 degrees C., 86 degrees F., contacts in oil, 30 degrees C., 86 degrees F., oil, 40 degrees C., 104 degrees F.; potential coils unimpregnated or not immersed in oil, 35 degrees C., 95 degrees F.; series coils unimpregnated or not immersed in oil, 50 degrees C., 122 degrees F.; series of potential coils impregnated or immersed in oil, 50 degrees C., 122 degrees F.; coils, if bare or if insulation is of asbestos, mica or similar heat resisting material, 70 degrees C., 158 degrees F. All other parts, 70 degrees C., 158 degrees F.

(b) The operating mechanism of remote electrically controlled circuit-breakers shall operate at any voltage between 70 and 140 volts d.c. for 125-volt solenoids, and between 140 and 280 volts for 250-volt d.c. solenoids, and shall be provided with auxiliary attachment for hand operation.

(c) Air circuit-breakers:

1. Air circuit-breakers shall be of carbon break type.

2. The trip coils of overload and underload circuit-breakers shall be provided with a calibrating device which can be easily adjusted; the calibrating scale shall be plainly visible.

(d) Oil circuit-breakers.

1. Breakers shall be capable of opening twice in succession, with two minute intervals, any circuit within its guaranteed rupturing capacity and still be in condition to be closed and carry its rated current continuously as a non-automatic breaker.

2. Oil circuit breakers shall either have their phases in separate compartments or separated by insulating barriers so as to give protection against cross-arcing.

3. Cell mounted oil breakers designed for 11,000 volts or over shall be furnished with slate or soapstone slab if required.

4. Tank type oil breakers designed for 22,000 volts or over shall be furnished with boiler iron tanks and all live parts so insulated therefrom that no protecting structure is necessary.

18. Disconnecting Switches

(a) Disconnecting switches shall be of knife type, equipped with suitable terminals, with hole or ring in blade so as to permit of operation by means of insulated rod with hook.

(b) For circuits up to and including 2500 volts they shall be mounted on marble bases; for higher voltage circuits they shall be mounted on wet process porcelain insulators, suitable for the voltage, the insulation in turn to be mounted on metal bases or framework as may be required.

(c) They shall have such current carrying capacity as to carry the rated current continuously without the temperature of any part rising more than 30 degrees C., 86 degrees F., above the surrounding air, based on a room temperature of 40 degrees C., 104 degrees F.

19. Lightning Arresters

(a) Lightning arresters, if required, shall be designed to protect apparatus connected to the circuit from the destructive effects of lightning disturbances. Type, location and number to be shown on requisite sheet.

20. Name-Plates

(a) A name-plate showing manufacturer's name and serial number shall be furnished on each panel.

(b) Name-plate shall be of non-corrosive metal and securely fastened with screws or pins of non-corrosive metal.

Committee: C. H. Morrison (N. Y. N. H. & H.), chairman; W. M. Vandersluis (I. C.), vice-chairman; F. J. Ackerman (K. C. T.), B. T. Anderson (D. L. & W.), J. A. Beoddy (N. & W.), G. S. Davis (P. & R.), W. F. Follett (N. Y. N. H. & H.), C. E. Goings (P. R. R.), E. C. Grant (U. P.), J. C. Mill (C. M. & St. P.), W. Morrison (N. Y. C.), R. M. Phinney (C. & N. W.), F. C. Stuart (E. J. & E.), G. K. Thomas (A. T. & S. F.), L. F. Vieillard (L. I.), L. C. Walters (Southern), F. E. Wass (N. Y. C.), Edgar Winans (A. T. & S. F.), Leroy Wyant (C. R. I. & P.).

Discussion

C. H. Morrison (chairman): The specification submitted is a revision of that already in the Manual, bringing the details up to date, and having the specification comply with unit specifications passed by the association and included in the Manual. Therefore I would like to dispense with calling each paragraph, and after calling attention to several corrections in the specification, would move that it be submitted to the annual meeting, to be voted on by letter ballot, and included in the Manual.

In Section 4, Drawings, after the words "purchaser desires" add the words "to furnish." The committee recommends that the specifications for alternating current, automatic block signal system, be approved and submitted at the annual meeting for submission to letter ballot and inclusion in the Manual, eliminating the following specifications: Revised specifications and requisites for apparatus and material for a. c. block signal system on railroads using a. c. propulsion, with specifications and requisites; for apparatus and material for a. c. block signal system on roads using d. c. propulsion, and specifications and requisites for apparatus and material for a. c. block signal system on railroads using other than a. c. or d. c. propulsion.

(Motion seconded and carried.)

Mr. Morrison: The committee recommends that the specification for air cooled reactors for line and track circuit as provided, be approved, and take the usual course.

(Motion seconded and carried.)

Mr. Morrison: The committee submits the following change in the specification for resisters for line and track service. In 5, Name-Plate: "Each resister shall bear a metal name-plate, and paster or tag, showing" the various items are lettered. They should be numbered. Part (2) should read "Manufacturers' drawing and other reference number." The committee recommends that the specification as revised be approved and take the usual course.

(Motion seconded and carried.)

Mr. Morrison: The following change should be made in section 15. Fuses. (b) "They shall be in accordance with R. S. A. 1309, or as specified on requisite sheet."

The committee recommends that the specification be accepted and take the usual course.

(Motion seconded and carried.)

The committee was dismissed with the thanks of the association.

Report of Committee XIII—Electrical Testing

UNDER THE ASSIGNMENT to prepare tables of standard ranges and scales for electrical testing instruments the committee revised drawing 1378 and prepared tables of standard ranges and scales for portable a.c. voltmeters and ammeters. The title on drawing 1378 was changed to read "Scale ranges for d.c. Volt-Ammeters" and the committee recommended its approval for submission to letter ballot for inclusion in the Manual.

TABLES OF STANDARD RANGES AND SCALES FOR ALTERNATING CURRENT VOLTMETERS

Combination No.	Ranges Volts	Scale: Min. Length of Upper Arc	Divs.	No. of Blocks	Div. per Block	Range of Reading, Volts
1. (a)	0— 0.5	4½″	100	10	10	0.1 to 20.0
	0— 2.0					
	0— 5.0					
	0— 20.0					1920.
(b)	0— 0.5	2½″	50	5	10	0.1 to 20.0
	0— 2.0					
	0— 5.0					
	0— 20.0					1920.
2. (a)	0— 60.					
	0—120.	4½″	120	12	10	12.0 to 240
	0—240.					1920.
(b)	0— 60.					
	0—120.	2½″	60	6	10	12.0 to 240
	0—240.					**1920.**
3. (a)	0— 1.					
	0— 5.	2½″	50	5	10	0.2 to 125
	0— 25.					
	0—125.					1920.

The committee recommended that the table of Standard Ranges and Scales for Alternating Current Voltmeters be accepted for submission to letter ballot for inclusion in the Manual.

TABLE OF STANDARD RANGES AND SCALES FOR SINGLE RANGE ALTERNATING CURRENT AMMETERS

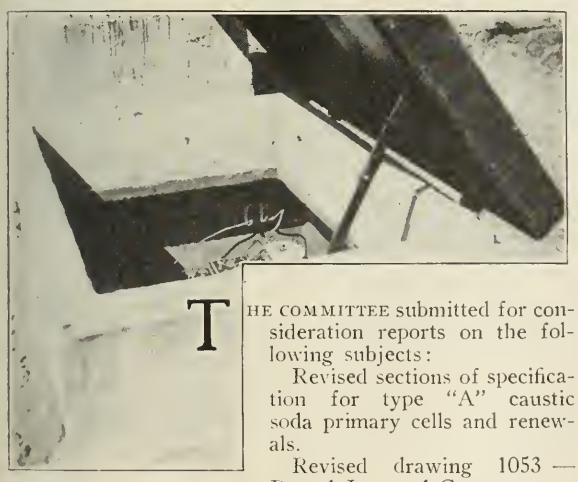
No.	Ranges Amperes	Scale: Min. Length of Upper Arc	Divs.	No. of Blocks	Div. per Block	Range of Reading, Amperes
1. (a)	0— .150	5″	150	15	10	.040 to .150
(b)	0— .150	2½″	75	7½″	10	.040 to .150
						1920.
2. (a)	0— .500	5″	100	10	10	.100 to .500
(b)	0— .500	2½″	50	5	10	.100 to .500
						1920.
3. (a)	0— 2.00	5″	100	10	10	.400 to 2.00
(b)	0— 2.00	2½″	50	5	10	.400 to 2.00
						1920.
4. (a)	0— 5.00	5″	100	10	10	1.00 to 5.00
(b)	0— 5.00	2½″	50	5	10	1.00 to 5.00
						1920.
5. (a)	0— 15.00	5″	150	15	10	4.00 to 15.00
(b)	0— 15.00	2½″	75	7½″	10	4.00 to 15.00
						1920.
6. (a)	0— 50.00	5″	100	10	10	10.00 to 50.00
(b)	0— 50.00	2½″	50	5	10	10.00 to 50.00
						1920.
7. (a)	0—100.00	5″	100	10	10	20.00 to 100.00
(b)	0—100.00	2½″	50	5	10	20.00 to 100.00
						1920.

The committee recommended that the Table of Standard Ranges and Scales for Single Range Alternating Current Ammeters be accepted for submission to letter ballot for inclusion in the Manual.

Committee: P. M. Gault (I. C.), chairman; J. S. Gensheimer (N. Y. P. & N.), vice-chairman; Harry Coombs (L. E. & W.), C. E. Earhart (A. & V.), Thos. Holt (C. U. D. Co.), E. E. Ireland (C. I. & L.), Malcolm McIntyre (M. C.), F. D. Morehart (C. M. & St. P.), J. P. Muller (Southern), T. J. O'Meara (N. Y. C.), D. W. Rosenweig (Sunset Lines), C. O. Seifert (B. & O. C. T.), E. B. Smith (N. Y. C.), L. L. Whitcomb (N. Y. C.).

(These tables were accepted after brief discussion.)

Report of Committee XI—Batteries



THE COMMITTEE submitted for consideration reports on the following subjects:

Revised sections of specification for type "A" caustic soda primary cells and renewals.

Revised drawing 1053 — Round Jars and Covers.

New drawing 1419—Rectangular Jars and Covers.

Revised specification for concrete battery box.

Revised specification for lead type portable storage battery for signaling.

Drawings 1053 and 1419 were prepared in conference with the jar manufacturers and the requirements in some places are a trifle more severe than is recommended by them. Certain limitations are necessary in order to make the jars sufficiently uniform to meet the criticisms of the battery manufacturers and to make them serviceable for the railroads. The rectangular jars have been particularly objected to by the manufacturers, due to the difficulty in getting heat resisting glass into this shape. The drawings were submitted for discussion.

Certain sections of the primary cell specification were revised in line with the discussion at the December meeting and were tentatively submitted for further discussion.

In accordance with instructions, the committee submitted a revised specification for a concrete battery box. The requirements of this specification are similar to those of the earlier specification which has been in successful commercial use for several years. Sections were added to provide for wood lining for primary battery use. Standard clauses have been revised. This specification was submitted for discussion.

The specification for portable lead type storage battery for signaling was revised by the committee working in conjunction with the representatives of the manufacturers and in conference with the representatives of the majority of roads using this type of battery.

The committee recommended that the specifications for lead type portable storage battery for signaling be submitted to letter ballot at the annual meeting for inclusion in the Manual.

Specifications for Lead Type Portable Storage Battery for Signaling

1. DESIGNATION

(a) In ordering cells or parts, the capacity required shall be designated as "50 ampere hour," "75 ampere hour," or "100 ampere hour." 1920.

(b) These terms shall signify the ampere hour capacity on a 72-hr. test of cells to be furnished under these specifications. 1920.

2. DIMENSIONS

(a) General dimensions shall be as follows:

Capacity	Number of Cells	Inside Length of Case in Inches	Inside Length of Jar in Inches	Approx. Weight in Lb.
50	1	2 3/4	2 7/16	12
	2	5 1/16	"	27
	3	8 5/8	"	40
	4	11 5/8	"	53
75	1	3 7/8	3 9/16	20
	2	7 15/16	"	40
	3	12	"	60
	4	12 1/8	"	80
100	1	5	4 11/16	27
	2	10 3/16	"	24
	3	15 3/8	"	81

1920.

(b) Jars shall be 5 15 16-in. wide and 7⅛ in. high. 1920.

3. Elements

(a) The plates shall be connected into positive and negative groups by burning to lead alloy pillar straps. 1916.

(b) The positive and negative plates shall be of pasted type approximately 5-in. high by 5¾-in. wide. Positive grids shall be made of six to eight per cent antimony alloy; negative grids shall be made of four to eight per cent antimony alloy. 1920.

(c) Positive plates shall be not less than ¼-in. thick. Intermediate negative plates shall be not less than 3/16-in. thick. End negative plates shall be not less than 3/32-in. thick. 1920.

(d) Positive and negative groups, when furnished separately, shall be ready for service after an initial charge of one ampere per positive plate continued for 100 hrs. 1920.

(e) Plates shall be burned to pillar straps not less than ¼-in. thick on 1⅛-in. centers. Pillar post shall be so constructed as to prevent creeping of electrolyte. 1920.

(f) Plates shall be so supported by pillar strap and so surfaced on bottom that all plates shall rest on all supporting ribs. 1920.

(g) Plate lugs shall be not less than ¾-in. wide and of same thickness as the plate. 1920.

4. Separators

(a) Adjacent plates shall be separated by a sheet of hard rubber and a sheet of treated wood. 1916.

(b) The wood sheet shall be at least 9/32 in. thick and grooved on one side. The web shall be not over 1/16 in. thick. The rubber sheet shall be perforated and shall be at least 1/64 in. thick. 1920.

(c) The flat side of wood sheet shall be placed against the negative plate. The rubber sheet shall be placed against the positive plate. 1920.

5. Electrolyte

(a) Electrolyte shall be of 1,220 specific gravity, unless otherwise specified, and shall be in accordance with R. S. A. specification for "Electrolyte for Lead Type Storage Battery." 1920.

6. Jars

(a) The jars shall be of hard rubber compound, free from metallic substances, soft spots or flaws. 1920.

(b) The wall of the jar shall be of a uniform thickness not less than 7/64 in. and shall have 1/64 in. draft in each wall, between the top of the jar and the top of the ribs. The variation in outside dimensions shall be not greater than 1/64 in. The corners shall be uniform and as sharp as consistent with strength. The top shall be ground evenly and parallel with bottom of jar. 1920.

(c) The bottom of the jar shall be reinforced around edges and with at least one intermediate reinforcement. The ribs for support of plates shall be ¾ in. high, not less than 7/64 in. thick at the top and shall be of a harder compound than the jar walls. 1920.

(d) The jars when supported in the case shall withstand an increase in temperature of the electrolyte to 150 degrees F. without distortion. 1916.

(e) Compound from which jars are made shall, when tested at 70 degrees F., have a tensile strength of not less than 4000 lb. per sq. in. and an elongation of not less than 5 per cent. In all cases the product of the tensile strength in pounds and the elongation in percentage shall be not less than 30,000. 1920.

7. Jar Covers

(a) Rubber compound from which covers are made shall have a tensile strength of not less than 2400 lb. 1920.

(b) Holes for pillar posts shall be 3¼-in. center to center. 1920.

8. Vents

The vent hole in cover shall be at least ⅞ in. in diameter and shall be provided with a removable screw or bayonet catch cap, so vented that gas will readily escape without carrying entrained electrolyte. 1920.

9. Terminals and Connections

(a) Unless otherwise specified, end cells of battery shall be equipped with lead alloy terminal posts, with a detachable non-turning binding post in accordance with R. S. A. 1070. 1920.

(b) Unless otherwise specified, cell connections shall be of lead alloy burned to pillar posts. 1920.

(c) When wire connections are specified they shall be of No. 6 A.W.G. soft drawn bare tinned copper, securely cast in pillar post, and extending 3½ in. above post. The top of pillar post shall be rounded. 1920.

10. Case

(a) The case shall be made of well-seasoned oak, maple, beech, birch or ash and shall be 6¼ in. wide inside. 1920.

(b) The sides and ends shall be at least ⅝ in. thick with horizontal grain and shall be fastened together by dovetail or lock corners. The sides shall be fastened to the bottom with 1¼-in. No. 8 flat head screws. 1920.

(c) The bottom shall be at least ⅝ in. thick and top of case shall be even with top of jar. 1920.

(d) A band iron strap 1-in. by 3/32-in. shall extend down the ends and across the bottom. The strap shall be flush with the bottom only, fastened to the ends with flat head wood screws and drilled near top to receive the hooked end of bail. 1920.

(e) Cases for 4 cells shall be provided with 3/16-in. bolt to hold sides together. Bolt head and nut shall be countersunk flush with outside surface of case. 1920.

11. Case Covers

(a) The top of case cover shall be at least ½ in. thick and shall be fastened to the cover sides and ends, with 1¼-in. No. 8 flat head screws. The sides and ends of the case cover shall be ⅝ in. thick. 1920.

(b) The case cover shall have disconnecting hinge and be provided with clasps to hold the cover in place. 1920.

(c) The case cover shall be provided with ½-in. notch, for wire connection, located on front side, opposite terminal. 1920.

12. Case Handle

(a) Case shall be provided with a handle which shall consist of a forged, mild steel bail, 5/16 in. in diameter, and a handle of well-seasoned maple, ash, oak or beech 1¼ in. in diameter, extending the full length of the case, with a ferrule on each end. 1920.

13. Painting

(a) Case, case cover, handle, and packing boards shall be protected with two coats of acid-proof paint applied by dipping. 1920.

14. Sealing Compound

(a) The sealing compound shall be of such composition as not to have an injurious effect on the battery. 1916.

(b) The sealing compound shall not be brittle at 25 degrees F. below zero, and shall not run at 150 degrees F. 1920.

15. Assembly

(a) Unless otherwise specified, the cells shall be assembled in wood carrying cases and shall be given the full initial charge before shipment. 1920.

(b) Jars shall be placed in case with wood packing boards at least ¼-in. thick between adjacent jars. 1920.

16. Inspection

The four paragraphs, a, b, c and d, consist of standard sections.

17. Tests

The first three paragraphs, a, b and c, consist of standard sections. Paragraph d follows:

(d) Cells when tested shall be fully charged and then discharged as follows:

1. Starting at noon, with a room and solution temperature of 80 degrees F., and maintaining a room temperature of 80 degrees F. throughout test, battery shall be discharged at 1/25 of the rated ampere hour capacity for 5 hrs., followed by a rest of 16 hr., then discharged at same rate for 8 hr. with another rest of 16 hr., then discharged 8 hr. at same rate, rested 16 hr. and then discharged at same rate, until 95 per cent of the rated capacity has been discharged, when voltage shall be not less than 1.75 volts per cell. 1920.

18. Packing

(a) Material shall be so prepared as to permit convenient handling and to protect against loss or damage during shipment. (S. S. 8-a.) 1919.

(b) When ordered unassembled, wood separators shall be packed in air-tight metal containers holding 200 each. Rubber separators shall be packed 200 in a package. The positive and negative groups shall be packed separately, as fol-

lows: 20—50 a.h. groups; 16—75 a.h. groups or 10—100 a.h. groups in a package. 1920.

19. Marking

This consists of three paragraphs, a, b and c, which are standard sections.

Committee: R. B. Ellsworth (N. Y. C.), chairman; A. B. Himes (B. & O.), vice-chairman; A. R. Fugina (L. & N.), J. G. Bartell (L. V.), P. A. Bliss (S. P.), W. E. Boland (S. P.), J. F. Jacobs (C. R. R. of N. J.), T. L. Johnson (D. L. & W.), A. H. McKeen (O. W. R. R. & N.), H. G. Morgan (I. C.), S. U. Rhymer (C. & A.), J. C. Seaman (N. Y. C.), Warren Y. Scott (B. & M.), F. C. Timmons (D. & H.), E. L. Watson (P. R. R.), A. H. Yocum (P. & R.).

Discussion

F. P. Patenall (B. & O.): In preparing the new clauses of specification for type "A" caustic soda primary cells and renewals, were the manufacturers in conference with the committee?

R. B. Elsworth (Chairman): The committee has been working closely with the manufacturers, and since the December meeting it has discussed the specifications in conference with various representatives, but it did not hold a formal meeting.

R. W. Erwin (National Carbon Company): An intermittent test of some sort is a great improvement over other tests. The function of the intermittent test is to give an idea of what the minimum voltage will be in operating a signal motor. It is a question whether the test as now conducted will accomplish the results desired. The main criticism of this test is making a complicated intermittent one without getting exactly the conditions wanted. The result desired is to find out what the voltage will be in actual service. That voltage is bound to be higher than it would be at a three ampere continuous discharge.

E. B. Smith (N. Y. C.).: Did the committee in the last part of paragraph (a) refer to Fahrenheit or Centigrade temperature?

Mr. Elsworth: We have tried to make the test intermittent to meet objections to the continuous test, and the three ampere discharge for the 10 periods of 30 sec. each was particularly designed for those who wish to use this type of battery to operate a low voltage switch machine.

Following the discussion on Specification for Type "A" Caustic Soda Primary Cells and Renewals, the committee submitted Specification for Concrete Battery Box.

T. S. Stevens (A. T. & S. F.): Has the committee considered the actual necessity of specifying steel rods for concrete battery boxes? We are doing all our work with netting.

Mr. Elsworth: Mr. Stevens, have any of these boxes been submitted to the test, as outlined in the specification?

R. L. Woodling (A. T. & S. F.): I have filled 60 cell boxes reinforced with chicken wire, with crushed rock or sand, and picked them up with the crane without any chain under them, with channel iron across the top, and swung them out and unloaded them without breaking.

Larsen Brown (A. T. & S. F.): I wonder if the committee considered using pressed steel covers? They are cheaper and easier to handle.

A. B. Du Bray (I. C. C.): The hinges on wooden covers are frequently out of order, and the covers also; whereas the sheet metal covers do not need hinges and are easily handled and stand up very much better in use.

H. G. Morgan (I. C.): A hinge would be necessary on a large cover even using pressed steel.

Mr. Elsworth: The committee will take this question up with the manufacturers and report in July.

Mr. Patenall: Can the chairman of the committee tell us as to the cost of the rectangular jar compared with the cylindrical jar of smaller capacity?

Mr. Elsworth: The barrel-shaped jar costs $12.

A. B. Himes (Vice-Chairman): Presented specification for Lead Type Portable Storage Battery for Signaling. There are some typographical errors in 2, which will be corrected.

G. W. Vinal (Bureau of Standards): In 5, Electrolyte shall be of 1220 specific gravity. That, of course, is an ideal figure which is not always realized in practice. Would it not be well to say: The electrolyte shall be of not more than 1220 specific gravity? I would also suggest that the temperature at which this specific gravity should be measured should be specified.

Mr. Himes: There are locations where we cannot adhere to the 1220, as in the extreme north. We do not want to set a maximum, but wish to allow leeway for errors in cold territory.

Mr. Wiegand: I would like to suggest a revision of 3 (a) to read: "The plates shall be connected into positive and negative groups by burning to pillar straps on 1⅛-in. centers, and 3 (e) to read: Pillar straps shall be of lead alloy not less than ¼ in. thick. Pillar post shall be so constructed as to prevent creeping of electrolyte."

Mr. Vinal: Would it not be well to insert in 14 that the sealing compound should adhere firmly to both rubber and wood surfaces?

Mr. Elsworth: The committee will consider that.

The committee was dismissed with the thanks of the association.

Committee of Direction Meets

The Committee of Direction of the Signal division will hold a meeting in the French Room of the Congress Hotel at 8:30 p. m. The purpose of this meeting is to finish such uncompleted business as it was unable to complete at the all-day meeting held on Sunday, March 14.

A Bolivian Visitor

Colonel T. P. Ledwidge, chief engineer of the Ferro Carril de Bolivia, with headquarters at Potosi, Bolivia, is a visitor at the convention of the American Railway Engineering Association. He was present at the sessions yesterday and was much impressed with the contrast between American railway practices and those in his country. Colonel Ledwidge is a graduate of Cornell University who went to Bolivia with Grace & Co. 21 years ago. As an executive officer of a government-owned road, he is an officer in the army with all the privileges and rights of that position. Colonel Ledwidge is in this country to interest American financiers in railway opportunities in Bolivia and also to secure new equipment.

Prior to the war the railway materials used in Bolivia were imported primarily from Europe, but that country is now dependent on the United States for its supplies. Those American materials which have been delivered are meeting with much favor, and America is now looked on as the logical field for railway equipment because of its accessibility and the favor with which American designs are received. At the present time American representatives are calling at the railway centers in western South America at intervals, although most of the purchases are made through the medium of representatives in the United States. Colonel Ledwidge is advocating a joint purchasing commission for the railways on the west coast of South America, believing that such an arrangement will not only result in economy to the roads, but will promote standardization, a thing much needed in those countries.

Signal Division Registration

THE REGISTRATION AT THE TUESDAY or second day sessions of the Signal Division of the American Railroad Association are given below. Including the registration of yesterday, a total of 290 active and 125 affiliate members, or a grand total of 415, registered. This compares with a total registration of 318 last year and 198 in 1918.

Active Members

Annear, R. F., Sig. Supvr., C. R. I. & P. Ry.
Baines, W. H., Sig. Supvr., Mo. Pac. R. R.
Boyce, Geo., Supt. Tele. & Sigs., C. St. P., M. & O. Ry.
Buchanen, F. H., Sig. Engr., Penn. Lines, Pittsburgh, Pa.
Case, D. M., Sig. & Elec. Eng., Lines West, Southern Ry.
Cooper, H. H., Sig. Insptr., N. Y. C. Lines, Buffalo.
Diffenbaugh, F. R., Sig. Dept., A. T. & S. F. Ry.
Eck, W. J., Supt. Sig. & Elec. Dept., Sou. Ry. System.
Elliott, W. H., Sig. Engr., N. Y. C. Line, Albany, N. Y.
Ellis, G. E., Consultg. Engr.
Ferguson, J. G., Supvr. Signals, N. & W. Ry.
Galleher, J. M., Sig. Supvr., Erie R. R.
Gollos, Anstol, Elec. Engr., Chicago Un. Sta. Co.
Hanson, E., Sig. Engr., G. C. & S. F. Ry.
Hanson, L. J., Supvr. Sigs., G. T. R. R.
Hickman, J. Sig. Supvr., M. K. & T. Ry.
Hoag, H. F., Sig. Engr., K. C. S. Ry.
Hovey, J. P., Sig. Engr., I. C. C., Chicago.
Huber, G. W., Tele. & Sig. Dept., C. G. W. Ry.
Hutchinson, F. V., Office Engr., M. K. & T. Ry.
Inland, E. E., Sig. Insptr., C. I. & L.
Kelly, Arthur J., Supvr. Sigls., C. C. C. & St. L. R. R.
Marcum, J. L., Sig. Supvr., Mo. Pac.
Martin, W. P., Sig. Insptr., I. C. Ry.
Mill, J. C., Sig. Engr., C. M. & St. P. Ry.
Muller, J. P., Sig. & Elec. Supvr., Sou. Ry.
Oppelt, J. H., Supvr. Sigs., N. Y. C. & St. L. R. R.
Penrod, A. J., Jr., Sig. Supvr., B. & O. R. R.
Pollack, O. A., Roadmaster, A. T. & S. F., Coast Line.
Punter, W. M., Sig. Engr., C. N. Ry., Toronto.
Rice, D. S., Supvr. Sigs., L. V. R. R.
Scott, H. S., Supvr. Sigs., I. C. R. R.
Sova, H. M., Asst. Sig. Supvr., N. P.
Stevens, Thos. S., Sig. Engr., A. T. & S. F. Ry.
Swenson, T. W., Supvr., P. R. R.
Unger, O. R., Sig. Insptr., Mo. Pac. Ry.
Van Hagan, Prof. Leslie F., University of Wisconsin.
Vinal, Geo. W., Bureau of Standards, Washington, D. C.
Wright, John T., Asst. Supvr. Sigs., G. T. R. R.
Wyley, E., Sig. Supvr., C. B. & Q. R. R.
Zahnen, J. P., Asst. Sig. Supvr., C. R. I. & P. Ry.
Zoetman, C. E., Div. Engr., P. R. R., Wilmington, Del.

Affiliate Members

Ahrens, C. R., Act. Eastern Rep., Chicago Ry. Sig. & Supply Co., New York.
Allen, L. W., Salesman, Hazard Mfg. Co., New York.
Ames, Azel, Kerite Insulated Wire Co.
Anderson, Alex. S., Rep., Adams & Westlake Co., Chicago.
Arkenburgh, W. H., Salesman, Canadian National Carbon Co., Ltd., Schenectady, N. Y.
Baker, Ray N., Rep., Central Electric Co., Chicago.
Beall, Charles R., Elec. Engr., Union Switch & Signal Co., Swissvale, Pa.
Beck, H. M., Engr., Electric Storage Battery Co., Chicago.
Bennett, C. L., Page Steel & Wire Co.
Bleecker, Wm. H., Page Steel & Wire.
Brashears, E. K., Chicago Ry. Sig. & Supply Co.
Brodhun, Carl P., Hazard Mfg. Co., Wilkes-Barre, Pa.
Brown, E. W., Salesman, Thos. A. Edison, Inc., Primary Battery Div., East Orange, N. J.
Bunn, J. W., Galena Sig. Oil Co., Kansas City, Mo.
Cameron, F. C., Rep., Corning Glass Works, Corning, N. Y.
Camp, W. M., Railway Review, Chicago.
Carradson, P. H., Galena Sig. Oil Co., Franklin, Pa.
Carter, A. T., Chief Engr., Federal Signal Co.
Carter, E. Kemper, Standard Asphalt & Rfg. Co.
Cobb, E. B., Chemist, Standard Oil Co., New York, N. Y.
Coleman, J. P., Cons. Engr., Union Switch & Sig. Co., Swissvale, Pa.
Coleman, W. W., Coleman Ry. Supply Co., New York, N. Y.
Condit, E. A., Jr., Gen. Sales Agt., The Rail Joint Co., New York, N. Y.
Cox, R. J., Rep., Ry. Sig. and Tel. Depts., National Carbon Co., Louisville, Ky.
Creegan, Jr., James R., Signal Accessories, New York.
Day, S. M., Gen. Ry. Signal Co., Rochester, N. Y.
Dean, A., Jr., Spec. Rep., Union Switch & Signal Co., New York, N. Y.
Dodgson, F. L., Cons. Engr., General Railway Signal Co., Rochester, N. Y.
Downs, Loren N., Pres., United Electric Apparatus Co., Boston, Mass.
Dressel, F. W., Pres., Dressel Railway Lamp Works, New York, N. Y.
Edmunds, F. W., Sunbeam Elec. Mfg. Co., New York.
Erwin, R. W., National Carbon Co.
Fitz Gerald, J. M., the Gerald Co.
Flood, E. J., Page Steel & Wire Co.
Fox, M. J., Rep., Railroad Supply Co., Chicago.
Garrity, P. A., Salesman, Thos. A. Edison, Inc., Primary Battery Div., Chicago.
Geneser, J. A., Office Engr., General Railway Supply Co., Chicago.
Gillingham, W. J., Jr., Vice-Pres., Hall Switch & Signal Co., Garwood, N. J.
Gilman, Chas., East. Mgr., C. F. Massey Co., New York.
Gort, Godfrey, Rep., L. S. Brach Supply Co., Newark, N. J.
Graber, Geo. A., Rep., Kerite Ins. Wire & Cable Co., Chicago.
Graves, C. B., Sales Mgr., Federal Elec. Co., Chicago.
Grebbins, J. F., Bryant Zinc Co.
Green, D. H., Natl. Carbon Co., Cleveland, Ohio.
Griffin, H. W., Engr., Union Switch & Signal Co., New York.
Hackett, J. W., The Okonite Co.
Henry, W. S., Service Engr., General Railway Signal Co., Rochester, N. Y.
Henze, C. D. A., Res., Mgr., Federal Signal Co., Chicago.
Hobson, J. S., Western Mgr., Union Switch & Signal Co., Chicago.
Holden, A. C., Guest General Ry. Sig. Co.
Hollister, H. L., Sig. Engr., Hall Switch & Signal Co., Garwood, N. J.
Hoskinson, H. S., Sec., Dressel Ry. Lamp Works, New York.
Hough, S. J., Rep., Waterbury Battery Co., New York, N. Y.
Howard, L. Frederic, Chief Engr., Union Switch & Signal Co., Swissvale, Pa.
Howe, W. K., Chief Engr., General Railway Signal Co., Rochester, N. Y.
Hudson, E. E., Vice-Pres. & Gen. Mgr., Waterbury Battery Co., New York, N. Y.
Hunt, H. E., Engr., Electric Storage Battery Co., Philadelphia, Pa.
Hyde, P. B., Hyde Battery Co., Chicago.
Jacobs, Harry M., Sig. Accessory Dept., General Electric Co., Schenectady, N. Y.
Johnson, Sidney, Vice-Pres., General Ry. Sig. Co., New York, N. Y.
Jones, Fred H., Hyde Battery Co., Chicago.
Keefe, T. A., Salesman, Hazard Mfg. Co., Pittsburgh, Pa.
Keenan, W. J., Vice-Pres., Pittingell Andrews Co., Boston, Mass.
Kellenberger, K. E., Editor Railway Signal Engineer, Chicago.
Kircher, Paul, Massey Concrete Products Corp., Chicago.
Kyle, W. T., Sales Agt., Page Steel & Wire Co., New York, N. Y.
La Barge, H. S., Handlan-Buck Mfg. Co., St. Louis, Mo.
Lepreau, F. S., Macbeth Evans Glass Co.
Lorenz, J. M., Salesman, Central Electric Co., Chicago, Ill.
Lundy, E. A., Rep. Simmonds-Boardman, Pub. Co., Chicago.
McCarthy, D. J., Ch. Engr., Chicago Ry. Sig. & Supply Co., Carpentersville, Ill.
McChesney, Leonard, Asst. Gen. Mgr., Thos. A. Edison, Inc., Orange, N. J.
McCready, Harold, Office Mgr., Union Switch & Signal Co., New York, N. Y.
McCune, C. A., Page Steel & Wire Co.
McNeal, A. L., Central Elec. Co., Chicago.
Mann, L. R., Central Elec. Co., St. Louis.
Manson, W. L., American Hoist & Derrick Co., St. Paul, Minn.
Manuel, W. N., Rep., Corning Glass Works, Corning, N. Y.
Meisel, B. W., Asst. Editor, Railway Signal Engr., Chicago.
Miller, P. W., Rep., Kerite Ins. Wire & Cable Co., New York, N. Y.
Morris, D. R., Sales Engr., Federal Signal Co., New York, N. Y.
Moscrip, A. L., France Stone Co., Toledo, Ohio.
Nelson, G. A., Spec. Rep., Waterbury Battery Co., New York, N. Y.
Neubert, Walter P., Mech. Engr., Union Switch & Signal Co., Swissvale, Pa.
Newcomb, E. W., Pacific Coast Rep., Thos. A. Edison, Inc., Primary Battery Div., San Francisco, Cal.
Newman, H. G., Johns-Manville Co.

Ogle, E. L., Federal Elec. Co., Chicago.
Pendorf, P. G., National Carbon Co.
Pflasterer, C. S., Ry. Signal & Tel. Depts., National Carbon Co., Cleveland, Ohio.
Pratt, Alfred E., Sales Dept., National Carbon Co., Cleveland, Ohio.
Reichard, W. H., Asst. Gen. Mgr., Federal Signal Co., Albany, N.Y.
Renton, Jos. A., Kerite Ins. Wire & Cable Co., New York, N. Y.
Rhoades, L. R., National Carbon Co.
Saunders, J. E., Asst. Chief Engr., Union Switch & Signal Co., Swissvale, Pa.
Scheman, C. H., Canadian-Chicago Bridge & Iron Co., Montreal.
Schermerhorn, E. F., Sales Engr., The Rail Joint Co., New York, N. Y.
Semple, C. B., Steel Sales Corp., Chicago, Ill.
Shaver, A. G., Cons. Elec. & Sig. Engr., Chicago, Ill.
Sheene, Henry R., Res. Mgr., Union Switch & Signal Co., St. Louis, Mo.
Simmen, P. J., Pres., Simmen Automatic Ry. Sig. Co., Buffalo, N. Y.
Skewes, H. H., Simmons-Boardman Pub. Co., New York.
Snavely, C. S., Engr. Dept., Union Switch & Signal Co., Swissvale, Pa.
Sparks, H. A., Rep., Sig. Dept., Libby Glass Co., Toledo, Ohio.
Sperry, H. M., Pub. Rep., U. S. & S. Co., Gen. Ry. Sig. Co., Fed. Sig. Co., Hall S. & S. Co., New York, N. Y.
Stephenson, James E., Mech. Engr., General Ry. Sig. Co., Rochester, N. Y.
Talbert, W. W., Resident Mgr., Union Switch & Signal Co., Chicago, Ill.
Thomas, L., Res. Mgr., General Railway Signal Co., Chicago, Ill.
Trout, R. E., Thos. A. Edison, Inc.
Tureff, S. J., Office Engr., Federal Signal Co., New York, N. Y.
Underhill, J. Delmar, Salesman, the Okonite Co., New York, N. Y.
Van Steenburgh, W. R., care of the Okonite Co., New York, N. Y.
Vogel, E. W., Pres., Chicago Railway Signal & Supply Co., Chicago, Ill.
Waitt, Walter G., Asst. Factory Mgr., National Carbon Co., Cleveland, O.
Walker, L. S., P. & M. Co., Chicago.
Wallace, H. A., Sig. Engr., Union Switch & Signal Co., Swissvale, Pa.
Whall, F. R., Gen. Mgr., C. H. Whall Co., Boston, Mass.
White, Jas. W., Page Steel & Wire Co.
Wight, S. N., Commercial Engr., General Railway Signal Co., Rochester, N. Y.
Wills, J. R., Sales Engr., General Railway Signal Co., Chicago, Ill.
Wilson, D. O., Thos. Edison, Inc.
Winchell, B. L., Jr., Western Sales Mgr., Kerite Ins. Wire & Cable Co., Chicago, Ill.
Woodbridge, J. L., Chief Engr., Elec. Stor. Bat. Co., Philadelphia, Pa.
Young, J. W., Rep. Kerite Ins. Wire & Cable Co., New York, N. Y.

Annual Meeting of Appliances Association

J. B. Strong Elected President; Remarkable Exhibit in Spite of Unusual Difficulties

THE TWELFTH ANNUAL MEETING of the National Railway Appliances Association was held in the Coliseum restaurant yesterday morning at 11 o'clock. In the absence of President P. C. Jacobs, who was detained in the west, the meeting was presided over by Vice-President J. B. Strong.

President Jacobs' Report

In a report, which was read by Secretary Kelly, President Jacobs stated that all of the exhibit spaces are filled and paid for and "we had at the time of opening 169 members exhibiting and 3 associate members, while we have had many requests and telephone calls for space. We have no one who has paid the membership fee who has not been assigned exhibit space.

"Our exhibition building with annex and restaurant is in a much changed attire, due to the change of color scheme, as well as in the use of the ceiling top in place of our usual flag decoration. The change incurred a very small addition to the expense of former years. There was no change in the floor diagram, but a slight advance in membership and price of floor space was deemed advisable on account of the general trend of the advanced cost of labor and material.

"Registration on Monday was 1,152; attendance Monday, counting from 10:00 a. m. to 6:30 p. m., 2,079, against 3,612 of last year on the same day."

Vice-President Strong Reports

In supplementing President Jacobs' report Vice-President Strong said in part:

"The space applied for for this exhibit by old members was about 20 per cent more than available. Before allotting space at our directors' meeting on November 24 it was agreed that no member be allotted more space than at last time of exhibiting; also, that preference be given to members who had paid their membership dues. In this way we were able to give space to all members who had paid their membership dues and who had applied for it. There were, however, about 70 applications or inquiries for space from companies who had not paid membership dues and to whom we could offer no space. We could have disposed of considerable additional space if it had been available.

"At our meeting of November 24 the following directors were elected for the balance of our fiscal year: George C. Isbester of the American Chain Company to succeed himself on account of vacancy due to his change of position from the Rail Joint Company; A. A. Taylor of Fairbanks, Morse & Company to succeed A. P. Van Schaick, formerly of the Lackawanna Steel Company, who resigned because of change of position to the American Chain Company.

"The by-laws have been reprinted to include the revision at the March, 1919, meeting, confining voting privileges to acting exhibiting members. Copies of these by-laws may be obtained on application to Secretary Kelly.

"The financial report shows an estimated deficit of about $1,500 for this year's work, leaving a substantial surplus on hand. It is, of course, necessary to carry a surplus over each year to maintain our good standing in prompt payment of expense incurred before receipts commence to come in and also for any emergency that might arise. It is due to the care and judgment of our secretary and treasurer, Mr. Kelly, in carrying out the details that we have been able to show as favorable a report.

"The restaurant facilities have been improved; you can save time and money by patronizing our National Appliances restaurant."

Report of Secretary-Treasurer Kelly

Secretary-Treasurer Kelly made a brief report as follows:

"During the period in which I have tried to serve you in my present capacity I have never before been called upon to face the difficulties such as we have had during the preparation of this exhibition. The congestion at

the railroad terminal and express offices has been one which is, I think, without a parallel. There was, perhaps, some confusion occasioned from the turning of the railroads back to their owners; this, however, was much aggravated by the storms which we had both east and west of Chicago. The placing of embargoes on express at a time just before the opening of the exhibition did not help the condition much, and while the Coliseum could have been ready for the exhibits on February 3, we were only in possession of less than 50 per cent of the exhibition materials at Saturday noon.

"There has been very little opportunity to prepare, with the information at hand, a financial report. However, the finance committee and treasurer have estimated that we will, with all the uncertainties, be able to make the entire exhibition expense at not to exceed a deficit of $1,500. At the last annual meeting we estimated we were going to have a deficit of about $5,000, when in reality we finally showed a profit of about $400, so we may have some hope of better than we expect this year."

Other Business

By unanimous vote the actions and transactions of the Board of Directors for the past year were approved.

The suggestion was made that next year a ladies' rest room be arranged for at the Coliseum for the comfort and convenience of visiting ladies as well as for those in attendance at the exhibit booths.

The secretary was empowered to send a telegram to President Jacobs expressing regret at the necessity for his absence from the city at this time.

A vote of appreciation was extended to the retiring officers for their part in making the exhibit a record-breaking success.

Election of Officers

The report of the nominating committee, composed of **Merle J. Trees, chairman; J. W. Fogg, E. T. McGarry, Tom R. Wyles and W. B. Murray**, recommended the following officers to serve during the coming year, two directors to serve three years, one director to serve two years and one director to serve one year:

President, J. B. Strong, Ramapo Iron Works, Hillburn, N. Y.

Vice-President, George C. Isbester, American Chain Company, Chicago.

Secretary-Treasurer, C. W. Kelly, Kelly-Derby Company, Chicago.

Directors for three years, L. W. Shugg, General Electric Company, Schenectady, N. Y.; A. J. Filkins, Paul Dickinson, Inc., Chicago.

Director for two years, W. J. Gillingham, Hall Switch & Signal Company, New York.

Director for one year, A. A. Taylor, Fairbanks, Morse & Company, Chicago.

The report was adopted by the unanimous election of the men named.

J. B. Strong, who was elected president, is vice-president and general manager of the Ramapo Iron Works, Hillburn, N. Y., and the Canadian Ramapo Iron Works, Limited, Niagara Falls, Ont. He has also recently been appointed consulting engineer of the Manganese Steel Rail Company. In addition to his activity in the National Railway Appliances Association, Mr. Strong has been prominent in the work of the Manganese Track Society since its organization and is at present its chairman. During the war he was chairman of a technical committee of this association, in which capacity he acted as the representative of the manufacturers in advising the director general of military railways on standards for track work. Mr. Strong is also a member of the Track committee of the American Railway Engineering Association and of a sub-committee of that committee which has been engaged for the past two years in the preparation of standards for special track work.

Mr. Strong is a graduate of Sheffield Scientific School, Yale University, class of 1896. After leaving college he entered the employ of Wm. Wharton, Jr., & Company as a draftsman on frog and switch work. Later in the same year he was an assistant engineer on the relocation and construction of the line of the Nova Scotia Southern Railroad from Shelburne, N. S., to Halifax, N. S. In 1897 he returned to engineering work in the states. On January 1, 1901, he became assistant engineer on the Metropolitan Street Railway of New York City, and in 1902 was appointed an assistant engineer in the chief engineer's office of the New York Central, New York City. In 1903 he was made chief engineer of the McPherson Switch & Frog Company, Niagara Falls, N. Y., which concern was consolidated with the Ramapo Iron Works a few months later. Mr. Strong remained at Niagara Falls for two years, during which period he had charge of the construction of a new plant. He was then transferred to the headquarters of this company at Hillburn, where he served for a time as special engineer on estimates and designs of frog and switch equipment. He was later made assistant general manager and chief engineer, and then vice-president and general manager, his present position. As his record in the Appliances Association shows, Mr. Strong is an indefatigable worker, with the faculty of enlisting the loyalty and co-operation of his associates.

J. A. Atwood Passes Away

For the first time in a number of years the American Railway Engineering Association has lost one of its active officers by death, J. A. Atwood, second vice-president, having passed away on February 29, following an attack of influenza.

Mr. Atwood was a charter member of the association.

J. A. Atwood

Although of a retiring disposition and seldom taking part in the discussion on the floor of the convention, he was active in the work of the organization and had its interest much at heart. He was chairman of the Rail Committee in 1913, 1914 and 1915, and had also been chairman

of the Yards and Terminals Committee a number of years ago. Mr. Atwood was elected a member of the Board of Direction at the 1917 convention, and was elected second vice-president a year ago. Under the rules of the association he would have moved up to first vice-president automotically at this convention and would have been the logical candidate for president next year. It will now be the duty of the Board of Direction to select his successor from among its members.

Mr. Atwood was born at Chatham, Mass., on February 8, 1857, and graduated from New York University in 1878. He entered railway service the same year as a transitman on the New York Elevated Railroad. After being engaged in engineering work on a number of roads for nine years, he first became connected with the New York Central System in 1887, when he was appointed an assistant engineer on the Lake Shore & Michigan Southern. Two years later he was transferred to the Pittsburgh & Lake Erie as engineer of construction and in 1896 was appointed chief engineer, which position he held at the time of his death.

At the time Mr. Atwood became connected with the Pittsburgh & Lake Erie it was contemplating an extensive improvement program, including the construction of second, third and fourth tracks and the rebuilding of its terminals and other facilities to enable it to handle the large and rapidly increasing traffic offered to it. It was Mr. Atwood's problem to carry on this construction work in the face of serious engineering and operating difficulties. That he was successful is indicated by his promotion to the position of chief engineer. In this latter position Mr. Atwood exerted an important influence on the development of high grade standards of maintenance, for it has been under his direction that the Pittsburgh & Lake Erie has been and is today pioneering in a number of developments among which are a special tie plate construction and the development of experimental ties.

Mr. Atwood was buried at his home in Beaver, Pa., on March 3. A. R. Raymer, assistant chief engineer of the Pittsburgh & Lake Erie, and other members of the association represented it at that service. A committee, consisting of A. R. Raymer, R. A. Pearce and W. C. Cushing, has been appointed from the association to prepare suitable resolutions for presentation at this convention.

Purdue Alumni Meeting

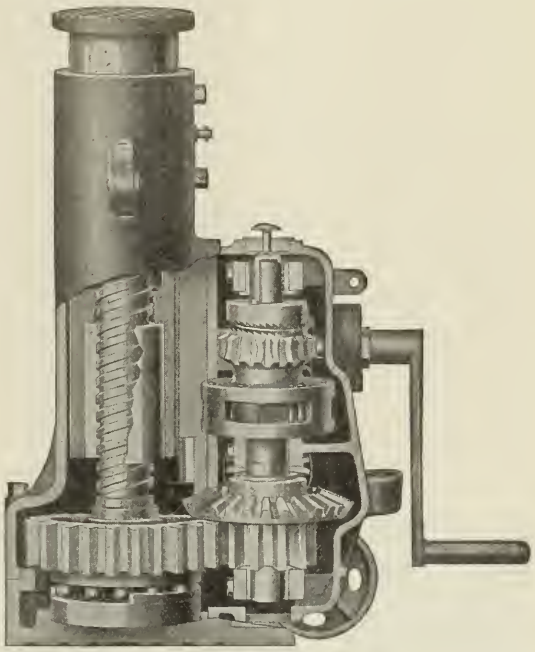
The Chicago Alumni Association of Purdue University will hold a special luncheon at the University Club, 76 East Monroe street (northeast corner of Michigan boulevard and Monroe street), at 12:30, Wednesday noon, to which all Purdue men in attendance at the engineering and signal conventions are invited. It is expected that several members of the university faculty will be present. The alumni have taken a special interest in this luncheon in view of the fact that the A. R. E. A. president-elect, H. R. Safford, and the vice-president-elect, L. A. Downs, are both alumni of that institution.

A High Speed Ball-Bearing Screw Jack

A HIGH-SPEED, BALL-BEARING screw jack of 75 tons rated capacity has recently been placed on the market by the Duff Manufacturing Company, Pittsburgh, Pa., which is especially adapted for use in lifting bridges, for which service ball-bearing screw jacks are coming into considerable use because of their lower maintenance cost and the fact that they can be operated by unskilled labor.

The feature which distinguishes this jack from other high-speed screw jacks is the location of the operating mechanism in the base instead of in the head. The greater weight is thus placed at the bottom instead of at the top. This offers the advantages that the jack is not top-heavy and that the point at which the operating lever is pivoted does not rise with the load. The power of the stroke is thus unaffected by the changing position of the operating lever as the load is raised. The concentration of the weight in the base of the jack also facilitates moving it about. The base is fitted with a pair of small wheels of sturdy design on which it may be propelled by inserting the operating lever in a socket especially provided for that purpose and tipping it over to an angle at which it may conveniently be pushed about by means of the operating lever.

The steel operating lever is six feet long and operates the jack through a ratchet socket and gearing. The



Construction of the Duff High-Speed, Ball-Bearing Jack

screw has a double tread of exceptionally deep pitch, making the action very rapid for a jack of this capacity, and the load is carried on a ball thrust bearing below the main gear in the base. The screw is made of special machinery steel, heat treated, and turns in a bronze nut of special composition, a combination which materially reduces friction. For lowering, a crank handle operating through a worm gear is used. The action is rapid and only a few turns are required to release the jack.

Safety is assured by a positive clutch which holds the load at all times, keeping it from sinking or lowering. The fact that the holding clutch does not permit any appreciable sink-back assures a maximum lift for all of the pressure applied to the elevating lever. In lowering, the load may be stopped with absolute safety at any point desired regardless of the speed at which it may be descending. The action is said to be positive, so that there is no possibility of sticking. Another safety measure which has been incorporated in the design of this jack is a signal provided to indicate when the jack has reached its maximum height.

This jack has been tested under severe operating conditions and its service has demonstrated that the rating

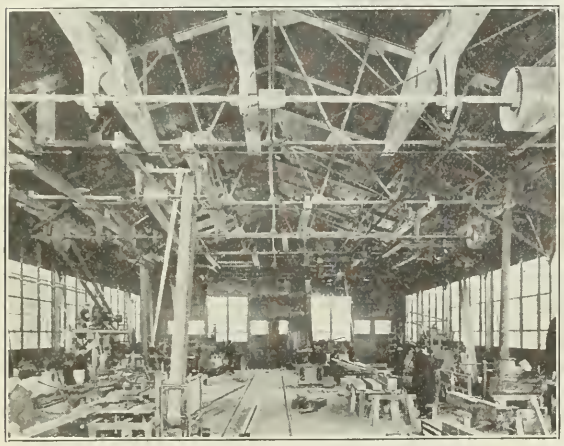
of 75 tons is conservative. Among the tests to which it has been subjected was the raising of the rear end of a locomotive, weighing 215 tons, so that the rear wheels were off the track. In this test it was estimated that the jack supported a weight of over 95 tons.

The jack is built in three sizes, with heights of 20 in., 24 in. and 26 in., respectively. The 20 in. jack has a maximum lift of 6 in., the 24-in. jack 10 in. and the 26-in. jack 12 in.

A Large Size Portable Steel Building

AMONG THE VARIOUS BUILDINGS constructed during the fall of 1919 by the Atchison, Topeka & Santa Fe was a planing mill for the Chicago car shops which is of special interest because of its portability and adaptability for a wide variety of purposes. The new structure is a Truscon standard steel building of unit construction with a clear span 50 ft. wide and 126 ft. long, to which has been added a lean-to 16 ft wide and 66 ft. long. The material was shipped complete from the Truscon Steel Company, Youngstown, Ohio, in five carloads and was erected by the railroad in a little over 14 days.

The foundations for the new building were of concrete with a total height of three feet. Standard framing was used throughout with the exception of the roof trusses, which were of a heavier pattern than those generally furnished because of the increased strength made necessary by the installation of a large amount of line shafting. The main roof supports or columns were spaced 16 ft. apart and the main roof trusses were fastened directly to them, the intermediate steel rafters being supported by light steel beams running longitudinally between the main trusses. The outside walls were assembled from the standard 4-ft. by 11-ft. 6-in. panels made of 18-gage steel, each panel with the exception of the door panels and a few solid panels being equipped with window sash, three



Interior View, Showing Clear Span and Lighting Arrangements

lights wide and five lights deep of 14-in. by 20-in. glass. The third and fourth rows from the top of each panel were arranged as a mechanically-operated section for the purpose of ventilation. These four-foot panel sections are held by light specially-formed steel uprights spaced on four-foot centers, each upright or mullion, as it is called, having a square ridge on both sides running the entire length of the piece with a series of rectangular holes on each side of the ridges. The edges of the metal panels are turned back at right angles, pressed to a shape to correspond with the mullion and punched with holes at the proper distances apart to align with those in the upright. They are then locked in position by inserting a T-shaped slotted bolt through the two panels with the mullion in between, after which a wedge is driven into the slot of the bolt, thus drawing the section tightly together. This method eliminates the possible beating-in of rain, etc., for it provides four right-angles which must be passed before that could occur.

The roofing consists of long, narrow steel plates which are made in an interlocking form by folding over the edges, the lower edge or edge nearest the eaves being

Exterior View, Showing Panel Construction

turned back in such a way as to form a "step" in the roofing at each joint between the ridge and the eaves. In assembling the roof the long edges of each section are engaged with the turned edges of the adjacent section to form an interlocked joint which is held firmly together by special clips. These are driven over the joints and at the same time over the rafters or trusses, thus making the roof trusses and rafters a well tied together unit. The joints between the end of the roof plates are connected and at the same time made water-tight by the use of special clips which are driven on, interlocking with the turned over edges of the roof and extending over and under the step.

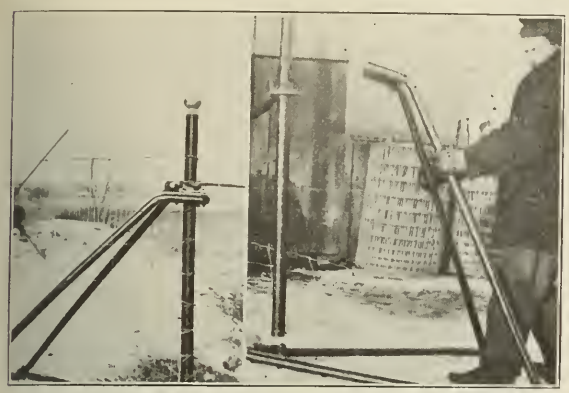
Other parts of the building, including doors of various types, etc., are assembled in a similar manner by the use of bolts, combination of slotted bolts and wedges, and by special clips. All joints are made water-tight by making it necessary for the water to pass at least three right angles before it can reach the interior of the building. The entire assembly is such that the building can be enlarged at any time or dismantled and reassembled at another location with no loss due to damage or salvage of the structural parts.

A Fence-Tightening End and Corner Post

A FENCE POST CONSTRUCTED either of concrete or iron and recently introduced by the Daisy Fence & Post Co., Dayton, Ohio, contains a fence-tightening feature which permits a right-of-way fence to be kept in good condition for an indefinite period. The iron post consists primarily of a large size metal pipe standard supported by a triangular metal plate, to which are securely fastened the ends of a bar of metal formed in the shape of a triangle. The triangular bar represents the supporting base of the entire post and has two heavy circular reinforcing rods running from its remaining two corners up to a ratchet and bearing mounted at a height of about two-thirds the length of the post. The fence wire is attached to the post by slipping their ends through small holes drilled in the upright or pipe standard, and fastened by

bending the ends back around the post and looping them over the fencing itself. The fence can then be tightened by means of the ratchet and a special open-end wrench, a few turns making it as tight as desired. In case the fence stretches and sags in a year or two the slack can be taken up by applying the wrench and turning the ratchet until the fence is brought to the required tension.

The concrete fence-tightening post is similar in prin-

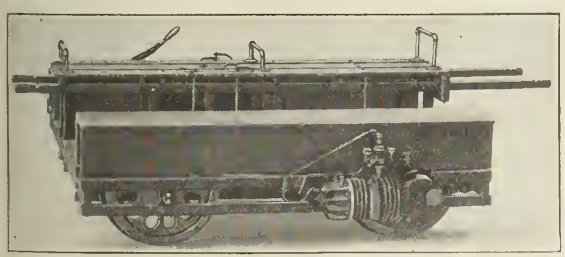


The Method of Assembling and the Post Installed

ciple, the construction differing only in that a heavy concrete post is used as the backing or brace for the revolving standard to which the wires are attached. These posts are designed to stretch and tighten from 80 to 100 rods of fence and are customarily installed about 80 rods apart on line fences with ordinary wood, concrete or iron intermediate posts spaced 20 ft. apart. Where they are used in this manner the fence wire straddles the base, which has a maximum width of 28½ in.

A New Motor Car for One-Man Operation

ONE OF THE NEW MOTOR CARS manufactured by Mudge & Company, Chicago, is a side-mounted car which differs from other models in that the motor is mounted on the right front wheel. The engine consists of a two-cylinder, two-cycle motor of eight



The New One-Man Motor Car

horsepower and weighs 590 lb. This power plant is direct connected to the wheel, the crank shaft of the motor acting also as the axle of the wheel. This arrangement dispenses with all driving gears or separate driving axles and permits the use of independent or free running wheels throughout. The tool boxes, which also serve as wheel guards, have been mounted on each side of the car and run the full length of it. The rear end, that is, the end opposite the motor, is the lift end of the car and, because of this feature, one man can handle it easily where it is required to lift the car on or off the track at road crossings, etc.

A New Gas for Cutting Metals

CUTTING STEEL BY RAPID oxidation has become so important a factor in the repair and manufacture of metal parts that any improvement in the process is certain to be of interest. The first torches for the cutting of metals depended on the use of oxygen and hydrogen, a mixed stream of the two gases at low pressure producing a flame which was used to heat to a bright red a small part of the surface of the metal to be cut. Then a high pressure jet of oxygen from the same torch was snapped on and allowed to project itself through the preheating flame so as to strike against the hot metal and cutting it by instantaneous oxidation or burning. The successful commercial manufacture of calcium carbide soon made acetylene an active competitor of hydrogen for cutting metals. This condition brought about a careful study of the merits of an ignition gas for metal cutting, and, as a result, many special cutting gases have entered the field.

A common fallacy is that the efficiency of a cutting gas depends entirely on its thermal contents in B.t.u. This is not the case, as may be shown by a simple comparison of Blau gas and acetylene, for the former has a heat value of 1800 B.t.u. per cu. ft. and the latter 1400 B.t.u. Yet the highest temperature obtainable from Blau gas is about 5000 deg. F. as compared with 6300 deg. F. for acetylene. The high temperature of the acetylene flame is partly due to its endothermic property, but chiefly to the characteristic action of the gas in releasing its heat units at a rate faster than the absorption by and the conduction of the heat through the metal being cut, as well as the ability of the flame to maintain its initial temperature. Carbon is the chemical element in a gas which probably will produce the most rapid rate of combustion, provided it is not retarded by some other element.

Calorene, a new cutting gas manufactured by the Air Reduction Sales Company, New York City, possesses some interesting characteristics which were described in a paper presented by Professor Alfred S. Kinsey of Stevens Institute of Technology, Hoboken, N. J., before the American Foundrymen's Association at Philadelpia, Pa., on September 29 to October 3, 1919. Calorene is an unsaturated gas, an analysis showing it to contain 86 per cent carbon and 14 per cent hydrogen, with a heat value of 1580 B.t.u. per cu. ft. The following data obtained in tests recently made by Professor Kinsey shows the comparative cutting qualities of the new gas in thin and thick metal:

TO CUT BY HAND TORCH 100 SQ. IN. OF STEEL WITH CALORENE

			Consumption			Cost			
Material	Thickness inches	Time min.	Oxygen cu. ft.	Calorene cu. ft.	Labor 68c	Oxygen $1.25	Calorene $2.00	Total	Lineal ft. cut per hr.
Steel plate	0.41	12.04	10.66	4.73	$0.14	$0.13	$0.10	$0.37	101.5
Steel forging	2.25	6.93	22.60	2.04	.08	.28	.04	.40	32.0
Steel casting	9.00	3.5	24.55	1.66	.04	.31	.03	.38	16.0

It will be seen that while the consumption of oxygen per cu. ft. increases with the thickness of the metal being cut, both the labor and consumption of calorene decrease, resulting in a low figure for the total cost per sq. in. of metal cut.

Another feature of calorene is its portability, for a full cylinder of calorene containing 210 cu. ft. weighs only 85 lb., as compared with 145 lb. for another well known cutting gas which is called "Gas No. 3" in Table 2, and 206 lb. for acetylene. The following table gives the figures showing the total weight of the cylinders and gas re-

quired to be handled to cut one million lineal feet of ⅜-in. boiler plate.

Kind of gas	Cylinder Pressure lb. sq. in.	Capacity cu. ft.	Gross weight lb.	Total weight in lb.	Relative weight to be carried
Calorene	1,250	210	85	9,000	1.0
Acetylene	250	275	206	29,000	3.2
Gas No. 3	1,800	200	145	69,000	7.7

The kerf scale produced by calorene in cutting is about 0.008 in. thick on a 4-in. cut and is always noticeably thin and fragile, the under surface being undisturbed in relative hardness as determined by the scleroscope and file. The explosibility of the new gas is of interest for its explosive range is from about 4 of calorene and 96 of air to 14 of calorene and 86 of air, as compared with a range of 3 of acetylene and 97 of air to 70 of acetylene and 30 of air. It may be brought in contact with oil and grease without danger. Calorene may be compressed safely to a pressure of 3500 lb. per sq. in. and stored as a free gas, no filler being required in the cylinders, which partly accounts for the lightness of a commercial cylinder. It will work freely at zero temperature, and its point of combustion is about that of illuminating gas. It has a pleasant odor, and its products of combustion are unnoticeable and harmless. The valuable cone of the oxy-acetylene flame is as plainly outlined in the oxy-calorene flame.

A Tie Plate Fastener for Guard Rails

The Vaughn tie plate guard rail fastener recently introduced by the M. W. Supply Company, Philadelphia, Pa., is a one-piece fastener to be used in tracks carrying heavy traffic. The device consists of a heavy plate having a strong casting with two shoulders extending back to the end, the entire raised portion being so formed as to make a substantial rail brace.

In the manufacture of this device a ⅝-in. rolled steel plate measuring 7 in. wide by 18⅞ in. long is punched and formed by presses so as to have a slight step or raise of ⅜ in. about 5 or 6 in. from one end. At the same time six holes approximately 1½ in. in diameter and three spike holes or slots are punched through the raised ends, while about midway of the plate there is formed a long slot running longitudinally, the end opposite the raised portion having a large adjustable slot opening in steps.

After this preliminary work of forming the plate, it is placed in a mold and the brace cast on it, the hot metal

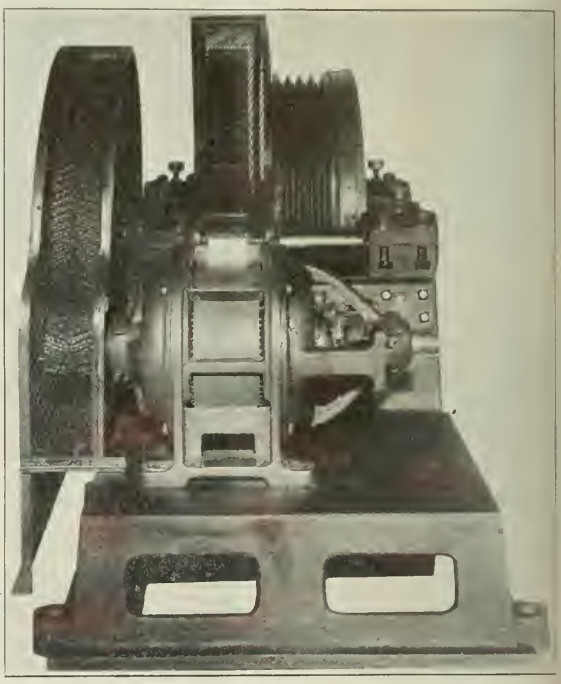
The Vaughn One-Piece Fastener

running through the 1½-in. holes and forming a plate under the raised portion and the brace proper on the upper side. This manner of forming a casting, not only on but through and under the rolled steel plate, makes a one-piece fastener of strength and rigidity. The face in contact with the rail is shaped in the casting for the rail section with which it is to be used.

In applying the fastener to the track it is only necessary to slide the plate under the guard rail and the main rail until the desired throat is obtained. The plate can then be spiked down, the locking spike being placed in the proper step of the large opening at the end opposite the brace.

The New Ross Traction Hoist

A new hoist recently developed by the Roberts & Schaefer Company, Chicago, for use in coaling plants contains several new features which are of general interest. In the Ross hoist, a heavy duty motor is mounted on one end of a cast iron base and is connected to the hoisting countershaft by means of a Falk herringbone pinion and gear and from the countershaft to the cable drum by a straight cut pinion and gear. This manner of construction forms a self-contained unit which can be lined up in advance at the shop and shipped on skids, thus obviat-



The Complete Unit Ready for Installation

ing the necessity for lining up the hoist when making the final installation. All gears are enclosed by wire guards which extend over both the sides and the tops of each gear unit and in the case of the outside gear, the guard extends downward to within a few inches of the bottom of the cast iron base.

One of the main features of the hoist is the installation or arrangement of the cable drum rim in segments which can be removed, a segment at a time when they become worn and require replacing, without dismantling the coaling plant or loosening the hoisting cable. The traction principle employed is that of the "deep V groove," which, it is claimed, will prevent any overwinding of the elevating bucket. Should the balancing counterweight or the balanced bucket overwind slightly, the corresponding bucket or counterweight will strike the bumper in the bottom of the pit and cause a slack in the cable, thus preventing a continuance of the traction effort and consequently avoiding the wrecking of the elevator equipment.

This type of hoist will be part of the equipment of the coaling plants now being built by the Roberts & Schaefer Company for the Pere Marquette at Plymouth, Mich., and also for the Union Railroad of Pittsburgh at Clairton, Pa.

Railway Age

EDITORIAL

DAILY EDITION

Getting the Most Out of the Exhibit

While the individual exhibits at the Coliseum this year are more than usually interesting and instructive, there is more to learn from a visit to the exhibit than the merits of the various devices on display and how they may be applied to special problems. There is a big lesson to be learned from the exhibition as a whole, as will be evidenced to the careful observer if he will study the distribution of the visitors and the character of the exhibits under study. Almost invariably the larger groups of individuals will be found surrounding exhibits of labor-saving devices. This is a sign of the times and should start every visitor on a careful introspection to make sure that he is doing his part towards conserving the man-power of the nation.

Subsidence and Shrinkage in Embankments

Subsidence and shrinkage of embankments are often confused, one with the other. There is, however, a complete distinction between the two, as is brought out clearly in this year's report of the Committee on Roadway. The committee defines subsidence as that portion of an embankment which has settled below the original surface of the ground. Shrinkage, on the other hand, is the quantitative relation between materials measured in excavation and embankment and is a variable, depending on the character of the material used, becoming swell in the case of rock, which occupies more space in embankment than in excavation. Subsidence may be present and an important factor for consideration in embankments constructed from materials of any character. In its investigation during the past year the committee has accumulated a large amount of data on these topics and the information set forth in its report should prove of great value, particularly to engineers concerned with valuation matters. These investigations should be continued and carried out to definite conclusions for presentation to the association at a subsequent convention.

Some Tangible Results

Appendix D to the report of the Roadway Committee embodies the first specific use to be made of the work of the Special Committee on Stresses in Railroad Track. The subcommittee on unit pressures allowable on roadbeds offers a method for determining the maximum pressures transmitted to the roadbed through various depths of ballast. While this still leaves much to conjecture, it represents definite progress. With the growing density of traffic and the increasing cost of maintenance, all conditions point to the use of heavier—much heavier—tracks in the future. Even under present practice track has become very expensive, while future construction unquestionably will cost much more. Consequently, it will no longer suffice simply to make arbitrary increases in the weight of rail, the number and size of ties, the depth of ballast, or the width of the roadbed. It is necessary to know which feature or detail of the structure is most in need of strengthening. It is only in this way that the increase in strength and permanence may be made at the least cost. There is no economy in making any component part disproportionately weak or disproportionately strong as compared to any other part. Herein lies one of the greatest fields for the application of the scientific conclusions to be derived from the study of stresses in track.

A Comprehensive Work Well Done

The Committee on Iron and Steel Structures has just completed a monumental work in the new Specification for Iron and Steel Structures, which will be a fitting successor for the earlier specification of the American Railway Engineering Association for steel bridges, which is now generally used in this country, while serving also as a model in many other parts of the world. That the members in attendance at the meeting yesterday morning fully appreciated the painstaking care and extended effort which the committee bestowed on its task is evidenced by the reluctance displayed in approving any of the numerous amendments offered in the course of the discussion. The new specification represents progress. It differs from its predecessors in the introduction of modifications based on the results of scientific investigation and the incorporation of refinements in design founded on structures in service. As pointed out by Chairman Selby, the specification is designed to take advantage of these refinements in obtaining greater economy of design. "It is not the intention," he said, "to cover up any fictitious margin for overloading—the margin of overloading is only a proper one"; the gain therefore is in economy as well as in excellence. This is an important point to keep in mind in any thought of shaving down live loadings in connection with the use of the new specifications.

Retain the Tie Specifications

The American Railway Engineering Association acted wisely yesterday afternoon in approving the recommendation of the tie committee to the effect that the present tie specifications of the United States Railroad Administration shall be continued. While the discussion of this subject was interesting, it brought out little information which was new to those who have been in close touch with the subject. It did, however, bring in contrast the conflicting interests of the different railroads. This was brought out specifically by the statement of one chief engineer that his road would not adopt these specifications, even though the association approved them. The specifications have been a source of contention ever since their issuance 18 months ago. Without question, they contain defects. At the same time they are the specifications under which all of the railroads have purchased ties and under which all of the manufacturers have produced them for over a

year, and are the first specifications which have ever been followed with any degree of uniformity by any considerable number of roads. The absence of or the ignoring of specifications in the past has resulted only in confusion and disorganization to contractor and railroad alike until there has been no standard sized tie and no uniformity in inspection. It is to be hoped that the roads will not return to the earlier practices, but that they will retain these specifications, amended where necessary to improve them. One of the objects of the American Railway Engineering Association is the promotion of standard practices among the railways. There is no place where it can serve to better advantage than here.

Larger Opportunities for the A. R. E. A.

One feature of President Stimson's address which was of special interest was the comment on the increase in membership as a consequence of a special campaign undertaken to that specific end. Nearly 200 new names were added to the roster between January 27 and March 10, a period of only six weeks, with the net result that the increase in membership for the last year was the greatest since the first 12 months in the life of the association. This is but a beginning. Commendable as is this record, it represents but a small fraction of the addition that could be made if a thoroughly concerted effort were made with the entire membership behind it.

Some idea of the possibilities may be had from the record of the Western Society of Engineers last fall, when, as the result of a two weeks' intensive drive, 2,000 new members were obtained within a radius of 50 miles of Chicago. This did not imply reduced vigilance on the part of the membership committee in demanding strict compliance with the professional requirements for admission. Likewise, in the case of the A. R. E. A., no lowering of the bars is implied in any of the suggestions which we offer here as to the possibilities for increasing membership.

The first requisite for the success in any membership drive is publicity. To recruit the efforts of all the old members, it is necessary that they be thoroughly alive to the fact that a drive is in progress. Doubtless many of the members present at Tuesday's meeting were entirely unaware that there had been any thought of a campaign for members until they heard the president's address. The publicity should go even further. The prospective members should also be aware of the association's plans. Personal solicitation is made far more simple if the candidate is properly prepared; otherwise the solicitor must himself provide all the momentum to carry the spirit of the drive home to the men he approaches.

In this same connection President Stimson also called attention to a field in which the association can increase its usefulness and which has a direct bearing on the possibility for increased membership. He referred to the recent tendency of engineering graduates to favor lines of engineering outside of the railways as offering greater opportunities and declared it was the duty of the engineering officers of the railways to combat this idea by doing everything within their power to encourage the young men in their organizations.

Membership of the younger men in the A. R. E. A. would afford them opportunity for contact with the leaders in the profession and give them a broader view of the possibilities of railway employment. It will be advisable for the association to offer the younger members encouragement in the way of increased activities in committee work, possibly through the organization of regional divisions of the association. No other phase of the society's activities deserves more serious consideration at this time.

Pay More Attention to Ties

Some eight or nine years ago an epidemic of rail failures was visited upon the roads of this country, the effects of which were so far-reaching and in some cases so severe that railway officers of all ranks were given a shock from which they recovered but slowly. With the object lesson of this disastrous experience, steps were taken to promote an improvement in rail technology in which the American Railway Engineering Association has played a very important part and these efforts have been well repaid by the improved results secured from the subsequent rollings. Commendable as have been the efforts of the railways to obtain better practice as to rail manufacture, and use, it must be remembered that a very sinister incentive has always been present. Defective rails imply more than the expense of premature renewals—the possibility of a rail failure with its sequel of train accidents is an ever present potentiality.

Not so with ties. Except under exceedingly careless maintenance, inadequate life of the ties does not involve danger to train operation. Instead it is purely a case of wasting the stockholders' money. Possibly it is this absence of the element of danger that is responsible for the seeming attitude of indifference assumed by some roads toward the tie problem. The Committee on Ties is alive to this and strongly recommends the collecting of tie renewal data under the auspices of the American Railroad Association in a manner similar to that followed with rail statistics.

A new object lesson is now at hand. The railroads are confronted with a condition that will point to the need of making each tie last just as long as present knowledge of the timber treater will insure. We refer to the great increase in the cost of ties. Perhaps the present prices are not warranted by actual relationships as to the demand and the available supply of tie timber, but if the abnormal quotations serve to spur the roads to a greater regard for the value of a tie, some measure of compensation shall have been realized.

The present need is not so much for further scientific investigations as for the universal application of the knowledge now at hand. The advantages of timber treatment and protection against mechanical destruction are thoroughly established. Why not put them into general use?

Where Do You Stand?

The American Railway Engineering Association was organized primarily to investigate engineering problems, to disseminate engineering knowledge and to increase the efficiency of its members, whose stock in trade in the business world consists essentially of their personal professional service. The railways are now more than ever in need of competent engineers, and they are fast absorbing those who are favorably known and readily available. The younger man meets a slower market. A young engineer who "looks good" and who starts well sometimes falls suddenly behind in the race for preferment. An analysis of the reasons for his failure to progress almost invariably uncovers some negligence of interest in matters outside his routine railway duties. No man can compete successfully with professional men unless he acquires a favorable standing among them. The esteem in which an engineer is held by his professional acquaintances is among the best measures of his true worth.

One of the most valuable assets of membership in the A.R.E.A. to the young engineer is not the speaking acquaintances he may make among its members, but the

recognition he merits from them for the part he takes in engineering work. His active interest as a member of a standing committee of this association, for instance, is a double personal asset drawing compound interest. The value he gets out of it is measured by his unselfish efforts to solve the problems assigned him; but in this faithful performance he builds up for himself unconsciously a character and a place of value in the minds of his fellow engineers. There are degrees of activity in association affairs as in all other matters of life. The man who would receive the most must give most freely.

The association is a powerful and growing factor in railway circles. Its already large membership is steadily increasing and the younger men who become members need scope for their energies and covet places on the standing committees. In order to preserve an even balance of returns from those committees, a thorough system of grading the results obtained from the individual committee members, supplemented by a suitable program of annual rotation of the membership, has been suggested. There are many reasons why some association members are less active than others, but there seems no sufficient reason why one member's activities should be held in leash by reason of other members being allowed to retain passive committee memberships year after year. A person who accepts the office and shirks the work is not worthy of consideration. Until the best possible committeemen have been selected justice will not have been accomplished. The most direct method would seem to be the individual test of committee members by systematic grading during actual trial. In the last analysis the most valuable results are obtained from subcommittees whose memberships are well balanced and whose chairmen are selected first with a view to their ability as organizers.

It lies within the power of the association to insist that all subcommittees measure up to this standard. In justice to the organization and to those who annually contribute their time and their talents to its problems and its ideals, only those members who are earnest in living up to the responsibilities they accept are worthy of the recognition indicated by committee appointments.

Today's Program

The program for the American Railway Engineering Association for the meeting today will be as follows:

Economics of Railway Labor	Bulletin 223
Signals and Interlocking	Bulletin 224
Yards and Terminals	Bulletin 225
Rail	Bulletin 225
Records and Accounts	Bulletin 222
Signs, Fences and Crossings	Bulletin 223
Economics of Railway Operation	Bulletin 225
Special—Standardization	Bulletin 223

New Business.
Election and Installation of Officers.
Adjournment.

Roadmasters' Committee Meets

The executive committee of the Roadmasters' and Maintenance of Way Association met at the Auditorium Hotel yesterday in all-day session to consider a number of problems confronting the association. The movement to transfer the next convention from St. Louis to Chicago was dropped after extended consideration, while P. J. McAndrews, secretary of the association, withdrew his resignation and agreed to serve the remainder of his term. A committee was appointed to consider increasing the dues and the employment of a permanent secretary.

Mr. Hooley on Nurses

"WHAT WAS IT YE SHTARTED t' say about wit noorses f'r th' Injineering Association?" inquired Mr. Dennissey, making his usual evening call upon his friend Hooley, for the lack of any other convenient and congenial companionship.

"'Tis this way," replied Mr. Hooley, settling himself comfortably in the assurance that he would not be interrupted as formerly by frequent calls for service. "Before th' gov'mint tuk over the relrods on account av th' exiggencies av th' war, there was a lot of associations that had grown up in th' different branches av the relrod service. There was th' Emseebees, 'nd th' McHannicks, 'nd th' Signal min, that I've towld ye about before, 'nd a lot av others, besides th' injineers that I've been discoursin' t' ye about f'r the last two av'nins. Thin there was th' big, gin'ral association av executive offi-cers, which ricomminded t' th' relrods whither they should follow th' ricommindations av their subordinate officers or t'row thim in th' waste basket 'nd go on th' same owld way.

"Whin th' gov'mint tuk over th' roads, th' gin'ral association became a part of th' Administhration 'nd thried t' take over arl th' little associations, like a hin carls th' chicks undher her wings whin there is any sign av danger. Th' injineers didn't go, 'nd th' owld hin's been cluckin' f'r thim iver since.

"T' dhrop me parrabul," continued Mr. Hooley, "'nd come down to brass tacks, I'll till ye wan instance. Th' Thrack Comity av th' injineers had a meeting scheduled f'r th' Choosday, it was, in Pittsboorg. Th' gin'ral Association got wind av it, 'nd thot t'wud be good t' get th' shtart av it, 'nd carled a meeting av th' Thrack Comity in Noo York on the Saturday before, f'r th' purpose, I mind me th' words as wan av me frinds towld me, av making immagit raypoort on th' quistion affectin' practices after Federal Conthrol—Shud or shud not th' prisint thrack shtandards be raytained? This mint th' shtandards that had bin adopted be th' Relrod Administhration undher gov'mint conthrol.

"Will 'nd good. Th' Comity mit in Noo York, 'nd raypoorted that 's far 's cud be ascertained th' Relrod Administhration had nayther adopted nor putt into use jurin' Federal Conthrol any shtandards 's ricomminded by th' Thrack Comity, each relrod havin' kipt to its own shtandards 'nd practices. 'Nd there ye are."

"I don't say," murmured Mr. Dennissey blankly, "where th' wit noorse comes in."

"Nayther do I," replied Mr. Hooley, preparing to close up. "She didn't git in. Th' b'y wuz twinty-wan years owld 'nd didn't rayquire her services."

Suffering From Floods

A number of the roads in southern Michigan have been contending with unusual high water and with ice gorges during the last few days incident to the spring break-up. This has served to keep a number of men away from the meetings, while others arrived yesterday after several days' vigil.

F. T. Hatch Dies

Frederick T. Hatch, consulting engineer in charge of valuation matters on the Pennsylvania Railroad, with headquarters at St. Louis, Mo., and formerly chief engineer maintenance of way of the St. Louis System, died in that city on March 9, at the age of 64 years. Mr. Hatch was a pioneer member of the American Society of Civil Engineers, his membership number being 182.

Railway Engineering Association Proceedings

An Account of Wednesday's Sessions, Including Presentation of Eight Committee Reports with Discussions

THE SECOND DAY'S SESSION of the convention of the American Railway Engineering Association yesterday morning was called to order promptly at 10 o'clock by President Stimson. As was the case during the two sessions on Tuesday, the convention hall filled up very rapidly and held a capacity crowd practically the entire day. Owing to inability to complete the entire program for the first day, the report of the Committee on Economics of Railway Location was held over from the Tuesday session. The report of this committee, which was the first one to be called, and those presented subsequently appear below.

Report on Economics of Railway Location

THE COMMITTEE referred to a monograph on the effect of curvature on the cost of maintenance of way and equipment entitled "A Study of the Mechanics of Curve Resistance," Bulletin 207, July, 1918.* In Appendix A certain matter taken therefrom with conclusions and diagrams were recommended for insertion in the Manual.

In Appendix B of its report the committee submitted the results of its study of the effect of train resistance on amount of fuel consumed in connection with data heretofore submitted and published in the Manual. Monographs on the economics of location—electric locomotives—are given in Appendices C and D.

CONCLUSIONS

1. The committee recommended that the matter given in Appendix A, beginning with the words, "Curve Resistance—Freight Cars," and ending with "Tests did not include engine driving wheels," be adopted and printed in the Manual.

Committee: R. N. Begien (B. & O.), chairman; C. P. Howard (I. C. C.), vice-chairman; F. H. Alfred (P. M.), Willard Beahan (N. Y. C.), E. J. Beugler (West. Church Kerr), W. J. Cunningham (U. S. R. A.), C. F. W. Felt (A. T. & S. F.), R. D. Garner (Sou. N. E.), A. S. Going (G. T.), *A. J. Himes, H. C. Ives (Wor. Ply. Ins.), W. A. James (C. P. R.), Fred Lavis (Cons. Engr.), G. A. Mountain (Can. Ry. Com.), Edward C. Schmidt (U. S. A.), A. K. Shurtleff (Asst. Sec.), C. H. Splitstone (Erie), M. F. Steinberger (B. & O.), L. L. Tallyn (D. L. & W.), R. Trimble (P. L. W.), W. F. Tye (Cons. Engr.), W L. Webb (Cons. Engr.), H. C. Williams (L. & N.), M. A. Zook (I. C. C.).

*Published in abstract in the *Railway Age* of October 11, 1918, page 665.

*Died November 3, 1919.

Recommended for Insertion in the Manual

(To come after matter headed "Curvature," page 538 of the Manual)

CURVE RESISTANCE—FREIGHT CARS

Tests made on the Canadian Pacific at Winnipeg on wheels of freight cars running on curved and straight track demonstrate:

(1) All outer wheels of railway cars exert a pressure against the outer rail when rounding a curve.

(2) The cause of this pressure is the tendency of a cylindrical body to rotate in a straight line at right angles to the axis of rotation.

(3) That there is never any skidding of either wheel of the leading axle of a truck unless it is a forward skidding of both wheels caused by the resistance to rotation being great enough to cause a slight retardation to rotation which results in an apparent forward skidding.

(4) That there is no skidding of the outer wheel of a rear axle, that in general any skidding that does take place is on the inner wheel of the rear axle.

These tests also suggest that as the flange is pressed against the rail, the concave curve at the base of flange increases the effective diameter of the outer wheel so as to prevent skidding of the wheels of front axle and to min-

imize, if not entirely prevent, skidding of either wheel in the rear axle.

Appendix C—Economics of Location as Affected by the Introduction of Electric Locomotives

By E. H. McHenry

In general the governing factors affecting the economics of location of steam-operated railroads are also fundamentally applicable to electrically operated railroads, but are more or less modified by the introduction of some new elements and conditions which are not common to both methods of operation and the study of the subject assigned to this committee will be greatly facilitated by a clear perception of the inherent characteristics of an electric locomotive as distinguished from those of a steam engine.

The effect of the new elements introduced by electric traction upon economic values indicates that the values heretofore assumed under classified heads of Distance, Rise and Fall, Curvature and Rate of Grade will be much affected, but little more than a brief mention of the most salient features can be given here, as follows:

Distance

Train wages, fuel and repairs are the largest single items of expense, which vary most directly with distance, of which the first is but little affected by the change from steam to electric power, but a new and additional charge is created of large amount for the operation and maintenance of power stations and of transmission and distributing systems.

The cost of fuel is most fundamentally affected, as net savings of 50 per cent, 60 per cent and 67 per cent, respectively, may be expected in passenger, freight and switching service. These high percentages in combination with the large amounts expended for fuel are the chief elements in the economy of electric operation and the amount of the reduction in such charges is usually the determining factor.

Engine repairs are also much reduced, perhaps in a ratio of 50 per cent or more of the equivalent charges in steam operation, but the saving is partially offset by the cost of maintenance and repairs of power stations and sub-stations.

Conditions are simplified and expenditures reduced at engine terminals by the elimination of water tanks, coaling stations, ash pits and turn tables and opportunities are often presented for further reductions in the cost of maintaining such facilities by extending the length of engine runs between district terminals; also all intermediate water and fuel stations may often be abandoned.

The cost of track maintenance will, under present conditions, be generally increased not only by the additional charges for the maintenance of overhead or third rail contact and distributing systems, but also by the destructive effect upon rails and fastenings, of the greater impacts, due to the imperfect cushioning of the heavy weights of the electric motors. With electric operation it is both practical and economical to keep within the critical limits by spreading the necessary weights over a greater number of driving axles, with maximum loads preferably not exceeding 50,000 lb. per axle.

Rise and Fall

The unit values of the several minor classifications under this head, will be determined as before with modified factors of cost, but at least two new elements must be considered and included in the final results, viz.: the time and temperature limitations of the electric motor and the possibilities of regeneration of power on descending inclines.

The cost of Rise and Fall will, of course, be reduced if advantage is taken of opportunities for the regeneration of power by trains on descending grades. The value of such regeneration is usually underestimated, but nevertheless is very considerable under proper conditions. Theoretically the amount of power generated in the descent should equal that consumed on the rise, but deductions for rolling friction and the doubled efficiency losses in motors will reduce the available power to a possible maximum approximating 50 per cent. The actual percentage which can be utilized will depend upon the length and steepness of inclines, the total length of the electrified section and the number and distribution of daily trains.

Electric braking (with or without regeneration) in its effect upon the wear of brake shoes and rails, and upon the comparative ease and safety of operation, are also elements entering into the final values to be established.

Curvature

The effect of a change to electric operation as effected by curvature will be in degree rather than in kind, with one possible exception, as the shorter rigid wheel base of some types of electric locomotives will result in reduced resistance and wear of wheels and rails. Such resistance and wear probably varies inversely as the square of the length of rigid wheel base and accordingly even small differences in length may have relatively high economic values.

Rate of Grade

The effects of rate of grade and of rise and fall are more closely inter-related in electric than in steam operation and must be so studied. In general it can be safely stated that the train tonnage ratings in steam service is much more often determined by the average resistance of the division and the boiler horsepower of the engine than by the resistance of the maximum grades, or, in other words, the time schedule rather than the maximum resistance fixes the tonnage rating of each type of engine in service, and when such conditions exist all considerations of maximum grades are merged into that of rise and fall only. If, however, the inherent characteristic of the electric motor permit the development of higher speed and horsepower, within its nominal rating, then the resistance of the maximum grade may become the limiting factor instead of the time schedule and its rate becomes economically important.

In heavy service, and more particularly on mountain inclines, the economic value of electric operation may be quite high, as it is possible to add engine units without adding engine crews, which in combination with their comparative independence of local engine facilities makes this feature peculiarly valuable under conditions requiring assistant engine service.

Appendix D—Economies of Location as Effected by the Introduction of Electric Locomotives

By A. S. Going

(1) Fuel expense both as regards reduced cost of electric power, elimination of coal tonnage and coal facilities required for steam engine.

(2) Reduced cost of engine maintenance, both direct shop expense and engine house expense, which latter is practically eliminated.

(3) Greater capacity as regards speed on heavy grades.

(4) Longer engine districts.

(5) Full tonnage trains can be handled at speeds as high as permitted by the alinement of the road with no restriction due to the profile.

The expediency of electrification may be summed up as desirable from two standpoints.

(1) Increased track tonnage capacity provided by reason of heavier trains, higher speed and reduction in the number of daily train movements.

(2) The cost of electrification in many cases is found to be considerably less than the cost of corresponding improvements with continued steam engine operation, and there is also a return upon the additional capital charge incurred for electrification of from 15 to 20 per cent resulting from the savings in operating expense over steam operation.

One of the many advantages incident to the electric locomotive is the fact that it is possible to use its entire weight for traction purposes and thus effect a saving in the total weight. It is also possible to construct the running gear so that it can operate around curves of very short radius without the use of special guiding trucks not supplied with power.

To make electricity a commercial competitor of steam, it is necessary for two favorable conditions to apply:

(1) Sufficient tonnage.

(2) Available power facilities.

Regarding tonnage, a very approximate minimum limit may be set on roads with heavy grades amounting to 15,000 tons daily in one direction.

Repairs constitute another very important item, these frequently exceeding 20 cents per mile for a steam engine having only about 60 per cent of the tonnage moving capacity of the electric machine and making 35,000 miles per annum under the most favorable conditions.

Regarding opportunities for profitable electrification other than mountain grade installation there should be mentioned the possibilities inherent in low grade freight lines and in large switching yards. Electric yard service should have everything in its favor from an operating standpoint, and should show excellent returns, provided that fixed charges are not made prohibitive by having to equip tracks that are used comparatively seldom. With regard to low grade freight lines, there are equally great benefits to be secured, without encountering the disadvantage of infrequently used tracks. The physical need for electric operation is not so great on level routes, even though the traffic may be heavy and the load factor high.

The great cost of reducing grades emphasize the advantage of electrification of the heavy grades instead of lengthening the line to reduce them. The electric locomotive is particularly adapted to steep grades, especially if part of the energy consumed in climbing the grades can be restored to the line in descending it. The advantages of electrification are greater the steeper the grade, not only on account of the larger possible saving from regeneration, but also because with a given resistance the amount of energy required to climb the grade is less than proportioned to the grade.

The efficiency of regeneration may be taken at 80 per cent at the locomotive, so that after deducting from the tractive effort due to the grade, the tractive effort lost in friction, 80 per cent of the balance will be available for restoring power to the line. The cost of high speed in freight service is principally due to the fact that the steam locomotive can rarely generate sufficient horsepower to utilize its tractive rating at speed higher than 10 or 15 m. p. h. and only attains higher speeds at a sacrifice of train tonnage. In the operation of engine districts of relatively low resistance with local sections of high resistance, the motors will be too heavy and too slow on the level sections; or alternately too light to meet the tractive requirements on the section with heavy grades. Under these conditions the electric motor is at a disadvantage when compared with the steam locomotive which can always develop its full "adhesion rating" at lower speeds and constant horsepower without regard to the time or distance over which the maximum effort is exerted. This disability has already been overcome in some measure by special types of induction and series motors.

The actual cost to the railroad company of the fuel consumed on the steam engines presents an interesting study from the standpoint of electric operation. The cost of hauling company coal from mines to several coaling stations is readily determined, as is also the expense incurred at these stations. What is not so apparent, however, is that this coal retraces its journey this time on the engine tender, and that the annual ton miles movement of company coal in cars and on tender may readily reach 10 per cent of the total gross ton miles carried over the rail.

With regenerative braking, the strain on drawbars and couplings is reduced to a minimum, since the entire train is bunched behind the locomotive, and held to a uniform speed. The electric braking mechanism automatically controls the speed by regulating the amount of energy fed back to the line. Regenerative electric braking adds materially to the safety of operation by supplying a second braking system in addition to the air brakes. It provides increased economy of operation, by reducing wheel, track and brakeshoe wear. It permits faster speeds down grades, due to the better ability of definitely controlling the locomotive, which is difficult at best with air brakes.

Minority Report

In its recommendations for future work, the committee advanced certain opinions on subjects to be investigated.

These subjects are of far-reaching importance and by all means should be considered in assigning future work to the Committee on Economics, but have not yet been fully considered by this committee.

The paragraphs in question are:

"The recent award of time-and-a-half for overtime in slow freight service will undoubtedly call for a revision of operating methods. It has been stated by some that shorter divisions will be the rule; in fact, some railroads are considering the advisability of putting terminals between the present terminals, but trainload will be less of a feature than formerly. It is not unlikely that a careful study will disclose that lengthening the distance between terminals and increasing the speed and providing running tracks and devices for taking water on the run, and perhaps other devices to avoid stopping the train, will prove far more economical than increasing the number of terminals and maintaining the trainload.

"The location of passing tracks will undoubtedly be affected. The value of light grades as compared with heavy grades will decrease, and the electrification of railroads will take on new value.

"Under present operating conditions it is probable that it will become more economical to provide additional running tracks than to revise the grades and decrease the number of trains with the faster movement which will be called for by the new conditions.

"It has been repeatedly demonstrated in railroad operation that it is more valuable to provide facilities for keeping the trains moving than it is to provide low grades and light curvature."

Any change in economic conditions which affects operation will affect the economics of location more or less, but we are not prepared to indorse these opinions to the extent that they magnify the importance of speed and minimize the importance of tonnage and grades. It must be remembered that three years ago it was the emphatic and practically unanimous contention of the railroads that even with an eight-hour day and time and a half for overtime it would be more economical to continue present methods of operation rather than to increase

speed by cutting tonnage, increasing facilities, increasing power or any combination of these expedients.

C. P. Howard (Vice-Chairman).

Discussion

C. P. Howard (vice-chairman) presented the report and continued as follows:

The committee has no recommendation to make at this time as to revision of the Manual. Some recommendations follow for future work which contain some decided expressions of opinion on certain subjects of importance, and a minority report is submitted dissenting from those opinions. They are taken from a review of the subject by Mr. Sullivan, who has conducted some very extensive tests on the Canadian Pacific as to curve resistance on freight car wheels.

The committee has no other conclusions to present, and I move that these conclusions be adopted for insertion in the Manual.

(Motion seconded and carried.)

Fred Lavis (Am. Int. Corp.): I have been firmly convinced for a long time that unless some money is appropriated to carry on the necessary experiments to provide data for this committee, we shall not reach any conclusions on the subject. Many do not think that the economics of railway location is of much importance today, because there is very little money available for new lines, but these questions go beyond this, for they affect improvements on old lines.

(The committee was dismissed with the thanks of the association.)

Report of the Committee on Ties

REPORT ON THE revision of the manual is given in Appendix A. A report on the effect of the design of tie plates and spikes on the durability of ties is given in Appendix B. Methods for controlling tie renewals are discussed in Appendix C. A report on changes in Forms M. W. 301, 302, 303, 304 is given in Appendix D. The committee also submitted its annual progress report on substitute ties.

The committee was requested to recommend whether the use of A. R. E. A. "Specifications for Cross-Ties" is preferable to that of the United States Railroad Administration "Specification for Cross-Ties," after the period of federal control, and at a meeting of the committee at Buffalo, N. Y., December 5, 1919, the following resolution was adopted:

"Resolved, That under the existing conditions it is recommended by the Committee on Ties that the use of the specifictaion for cross-ties of the United States Railroad Administration, dated June 11, 1918, be continued."

Conclusions

The committee recommended:

Approval of the revision of the Manual.

That subjects 2, 3 and 6 be received as progress reports and as information.

That Form "A," shown in Appendix D, be approved and that Forms 301, 302, 303 and 304 be withdrawn from the Manual.

Committee: F. R. Layng (B. & L. E.), chairman; H. S. Wilgus, vice-chairman; W. C. Baisinger (A. T. & S. F.), F. T. Beckett (C. R. I. & P.), M. S. Blaiklock, F. Boardman (N. Y. C.), W. J. Burton (M. P.), W. A. Clark (D. & I. R.), S. B. Clement (T. & N. O.), E. L. Crugar (I. C.), L. A. Downs (C. of Ga.), G. F. Hand (N. Y. N. H. & H.), A. J. Neafie (D. & L. W.), G. P. Palmer (B. & O. C. T.), L. J. Riegler (P. L. W.), Louis Yager (N. P.).

Appendix A—(1) Revision of Manual

Conservation of Timber Supply for Railroad Ties

(3) *Present Form*—Tie specifications should be rigidly enforced with particular reference to the exclusion of small ties.

Proposed Form—Omit.

(4) *Present Form*—There should be co-operation among the railways in any given territory with a view to the adoption of standard tie specifications, with particular reference to making it impossible for contractors to furnish ties cut from small trees which would naturally form sources for future tie supplies.

Proposed Form—Tie specifications should be so drawn and enforced that only such small ties as result from conservative methods of lumbering would be accepted, thus discouraging the cutting of small trees.

(9) (*Additional paragraph*)—Experiments with substitute ties should be encouraged.

Appendix B—Effect of Design of Tie Plates and Spikes on Durability of Ties

The committee endeavored to study especially the effect of the screw spike on the durability of the tie and investigated some 230 mi. of screw spike installation, stopping at frequent intervals to make detail inspections of the ties and fastenings. They have found varying conditions of installations and results. Some screw spike installations, made in 1908 in good treated ties, were found to be still in thoroughly good condition and capable of many more years' life. Some other installations, made at various times since, have not been so effective. The defects found which seem to the committee to cause over-strain of the wooden threads of the tie which holds the screw spike may be described as follows:

Improper Design of Fastenings

The threads in the wood were found injured where the screw spike did not have an accurate and uniform pitch and diameter of core. Where that condition existed the first installation of the spike injured a portion of the fiber, and where the screw spike had been changed, in connection with replacing a rail or tie plate, further damage was done. The wood fibers at the top of the hole in the tie were found destroyed where the screw spike used had no pilot or small point on the end to permit its being screwed into place after being set in with a light tap of the hammer.

Improper Kind of Wood in Ties

Some soft wood ties were found which were not strong enough to hold the thread under the stress produced by the heavy traffic and axle loads carried.

Improper Method of Installation

The most common cause of destruction of the threads in the tie was found to be due to the screw spike having been partly driven with a hammer in starting.

Decay was found in ties where spike holes were bored after the tie was treated and no preservative put in the holes before applying the spike. Where the hole in the

tie had not been bored deep enough to permit setting spikes down as the tie plate embeds itself, the wood threads were stripped in an attempt to tighten the spike.

Standard of Maintenance

The condition of line, surface and the stability of the roadbed were found to have an important effect on the holding power of the spike, the over-straining apparently beginning when there was more movement of the rail on the tie than freeway space could be allowed for.

From the varying methods and results seen, the committee stated the conditions it believes necessary for the protection of the tie in connection with a screw spike installation:

(1) The timber of the tie should be adequate in strength for the tonnage and maximum axle loads carried.

(2) The ties should be bored and adzed, and where the timber used is to be treated, that treatment should be applied after the boring and adzing is done.

(3) The holes for the screw spikes should be bored completely through the ties, except that special consideration should be given this question where there is a heavy electric current in the track rail which might become grounded by this means. These holes should have the same diameter as the shank of the screw spike.

(4) A shoulder tie plate should be used of proper design, correct dimensions, width, length and thickness, to properly protect the tie, so designed that the spike does not in itself maintain gage, but holds the plate securely to the tie, thereby enabling the shoulder to maintain a proper track gage without a spike-rail base contact, reducing to a minimum spike cutting and mechanical tie destruction.

(5) When the screw spikes are placed in slots of the angle bars care must be taken to see there is not an undue stress on the screw spikes from creeping rail. The rail should be anchored so as to prevent its running on the ties, to permit the full use and value of the screw spike when the spikes are placed in the slots of the angle bars.

(6) The screw spike should have an exactly uniform pitch and size of core. The diameter of the lower part of the screw spike should be decreased so that the beginning of the thread is slightly less than the diameter of the hole bored in the tie. It is considered essential that the spike be screwed in the wood without the fiber of the wood being destroyed. In order to accomplish this, the spike must be started with a very light tap—just sufficient to get holding power in the threads to permit its being turned in the tie. For this purpose the use of the screw spike adopted by this Association is considered essential. The present injurious practice of starting by driving the spike should be discontinued.

The following is suggested as good practice to get economic results:

(1) At least four holes should be bored in each plate bearing area even if only two screw spikes are used at each rail. This is an advantage in helping quick repair in case of damage to track. It would also have some effect in treatment by allowing the preservative to get where it is of the greatest value.

(2) The materials used for connecting the rail to the tie should be of such character and strength as to equal the expected life of the tie. The renewal or changing of these fastenings has a tendency to weaken the tie, and the cost of making these renewals should justify a reasonable expense to make these materials of full strength and to protect them against corrosion.

(3) It is believed that the full benefit of a screw spike installation cannot be obtained unless the standard of maintenance of line and surface is fairly high as compared with the tonnage and character of traffic passing over the track; that the roadbed should have good drainage, well tamped track, fair line and surface, and a foundation which is not too yielding.

Conclusion

It is the opinion of the committee that screw spike installations should be made in conformity with the above recommended practice in order to properly protect the tie. It is difficult to measure accurately the damage done to a tie by a screw spike until some of the modern installations have been in longer, so that a definite and economic statement can be made from the records. Each year adds to the information available, but it is probable that conclusive figures will not be made until the life of the present modern installations can be determined.

Appendix C—Report on Best Methods in Use for Controlling Tie Renewals

A questionnaire was submitted to the members of the association for the purpose of obtaining the personal opinion of the members, regardless of the existing practice. Replies were received from 92 railroads with an aggregate mileage of 149,552. It was evident from the replies that in most cases the recommendations were probably based on a personal opinion corresponding to the existing practice of the member. A summary of the replies is given below:

	Mileage of Roads
Advocating field inspection by section foremen or others directly responsible	138,169
Against this method	10,591
In favor of method, provided foremen are accompanied by inspectors or superiors	23,301
Advocating field inspection by independent tie inspectors	11,512
Against this method	93,042
In favor of method, provided inspector is accompanied by section foreman	23,674
In favor of method as a check of the other method only	24,492
Advocating use of statistics as a check on other methods	91,263
Against the use of statistics	39,552
Advocating the spotting of ties	99,291
Against the spotting of ties	8,576
Recording ties spotted by miles	36,751
Recording ties spotted by sections	19,177
Recording ties spotted by sub-divisions	8,319

The committee desires to point out that the method in most general use is not necessarily the best. It would seem that there are two general methods which should necessarily be given consideration:

(1) Yearly field inspection by section foremen or their immediate superiors, or others directly in charge of and responsible for the safety of the track.

(2) Yearly field inspection by special inspectors chosen for their experience and knowledge of the requirements of their territory and not generally connected with or responsible for the track or territory inspected.

The use of the first method has a tendency to provide adequate renewals, thereby assuring safety within the limits of available resources. It also provides a basic knowledge of local conditions which no other method can cover. However, there will be undoubtedly a lack of uniformity under similar conditions on various territories, with the possibility of excessive and uneconomical renewals.

The second method provides for training a smaller number of selected men more uniformly to a predetermined system standard of tie renewals than is possible otherwise, and tends to a greater uniformity of practice and consequent conservation of ties. It does, however, present difficulties, such as possible inadequate renewals.

at certain points, inability to obtain sufficient proper talent, and finding employment for them outside of the renewal season.

Whatever method is used, the spotting of each tie is considered advisable. The section foremen, however, to be allowed a limited latitude for removing such ties (at variance with the spotting done) which are broken or damaged or otherwise injured so as to destroy their usefulness.

The use of statistics for approximate determination of tie requirements in advance of field inspection will be found desirable, and where the ties available are less than the final inspection requirements indicate, then the supply should be prorated, making due allowance for local conditions of traffic, curvature, grade and roadbed.

Conclusion

The committee considers that the following two methods, when properly organized and supervised, using competent men, will each bring about safe and economical control of tie renewals:

(1) Yearly field inspection by section foremen or their immediate superiors, or others directly in charge of and responsible for the safety of the track.

(2) Yearly field inspection by special inspectors chosen for their experience and knowledge of the requirements of their territory and not generally connected with or responsible for the track or territory inspected.

Appendix D—Changes in Forms M. W. 301, 302, 303, 304

A canvass made by the Tie committee in 1917-18 proved that the forms in the Manual were not in use by any road. Sentiment at the 1919 convention, however, was opposed to elimination of these forms without something in their place. A questionnaire was therefore prepared and sent to all the principal railroads. Replies were received from 58 roads, representing a mileage of 156,510.

These replies were tabulated and a summary indicates:

(a) 39 roads with a mileage of 87,460 keep no detailed data on life of ties.

(b) 5 roads with a mileage of 12,878 keep data on life of all ties in track.

(c) 21 roads with a mileage of 88,861 keep tie data by use of test sections.

(d) 24 roads with a mileage of 92,292 prefer method of test sections.

(e) 5 roads with a mileage of 12,526 prefer method of keeping data on life of all ties.

(f) 9 roads with a mileage of 27,556 consider information called for on forms 301, 302, 303 and 304 sufficiently valuable to justify its collection.

(g) 32 roads with a mileage of 108,080 do not consider this information sufficiently valuable or reliable to justify use of the forms.

(h) 20 roads with a mileage of 84,352 test section has superseded use of dating nail.

(i) 5 roads with a mileage of 8,388 test section has not superseded use of dating nail.

(j) 18 roads with a mileage of 80,858 use dating nail on test sections.

(k) 13 roads with a mileage of 24,569 do not use dating nail on test sections.

(l) 12 roads with a mileage of 26,352 recommend discontinuance of use of dating nail.

(m) 12 roads with a mileage of 54,101 recommend discontinuance of use of dating nail except on test sections.

(n) 14 roads with a mileage of 42,833 do not recommend discontinuance of use of dating nail.

The great majority of replies favor the method of test sections for securing data on the life of ties. The American Wood Preservers' Association in 1914 went on record as favoring the test section method. This committee is in hearty accord with that conclusion and feels justified in recommending to the association that the test section method be endorsed as giving more accurate and reliable data on the life of ties in track than can be obtained by attempting to keep a record of the life of all ties.

A few roads report satisfactory results from the method of keeping data on the life of all ties, but the replies indicate and the committee believes that in the majority of cases the test section method is preferable. That conclusion is based on test sections that are carefully arranged for and properly inspected, and the committee recommends study of the methods that are essential to the successful use of the test section as a part of next year's work. The development of forms for use with the test sections should be a part of that assignment and cannot well be done in advance of it.

The committee believes that forms M. W. 301, 302, 303 and 304 call for a large amount of information that it is not practicable for most roads to assemble, and that it is not advisable to retain them in the Manual considering the small number of roads that are in a position to use them and that even they have not done so.

The committee is strongly of the opinion that this association should be collecting such data as is available and it recommends the adoption of Form "A." Most of the information called for by this form is already required by the Interstate Commerce Commission and it is believed the form could be sent out annually by the American Railroad Association.

Form A

A. B. & C. R. R.

Summary of Ties Used in Renewals During the Year 19—.

Mileage .....
Main Tracks .....
Side Tracks .....
Total.....

Kind of Wood	Treated or Untreated	Main Tracks	Side Tracks	Total Track	
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....
.....	.....	.....	.....	.....	.....

Discussion

(F. R. Layng, the chairman, presented the report and moved the adoption of the recommended changes in the Manual. Being sustained in this, he read the conclusions on the effect of design of tie plates and spikes on durability of ties and moved their acceptance as information. His motion was carried. He also read the conclusions on the best methods in use for controlling tie renewals and his motion to receive this as information was carried. He also moved that Form A proposed for the collection of tie statistics be adopted and that the member roads be asked to compile the necessary information. After some discussion of this motion it was carried. Chairman Layng also submitted the report on substitute ties as information and it was accepted by the convention.)

The Chairman: This committee was given a special assignment by the A. R. A., asking whether it would be preferable that the United States Railroad Administration specification for ties be continued after the period of federal control. At a meeting in Buffalo the committee passed the resolutions appearing in the report.

The committee feels that it is desirable that these specifications be continued probably until such time as this committee can submit a new set of specifications, which will probably be prepared this year. I move the association approve the committee's action.

(Motion seconded.)

W. H. Courtenay (L. & N.): Those who have had to deal with tie production during the last two years are thoroughly aware that all of the large tie producers are

bitterly opposed to the government specification. Before the government specification was written, I personally used all of my influence to have it written otherwise. I knew it was not going to be satisfactory to the producers, and it has not been satisfactory to them. I am constrained to say that the Louisville & Nashville will not adopt that classification. It has already made its own specification, which follows the government specification in a way, but not literally. The specification that we have adopted will, I think, enable us to get more ties than we could get under the government specification, yet equally good in quality, though at a less average price. I have not yet seen a practical man engaged in getting out cross-ties who has thoroughly approved of that specification. In a meeting held in Atlanta for the purpose of formulating the specification, there was not a member of the southeastern lines that approved this specification. The chairman of the Regional purchasing committee in the southeastern district went to Washington and exercised his greatest influence in trying to get this specification changed, and he was unable to do so. Some of the roads have not been enforcing it, and there has been a great deal of difference in the way the specification has been construed by different roads.

As a matter of fact, the L. & N. has rejected ties because they did not conform to the specification, and then some of its competitive roads have accepted the rejections, so that I for one do not endorse the specification, although I do not intend to oppose it, for I think it is a matter for each individual road to make its own cross-tie specification.

Dr. von Schrenk: It must be recognized that the outstanding factor in the government specification is the fact that we have found a recognition of ties of different dimensions as to thickness and width. If you look at the specification in the Manual you will find that it is almost impossible to distinguish it in principle from the specification that we have had in the past two years. I do not care what any railroad in this country does in the way of adopting this specification or any other. I want to tell you one thing, that the character of ties depends on whether they are plentiful or scarce. I think the association cannot afford to vote other than in favor of this report.

That disparity in value that we have been accustomed to in this country has gone by for all times. The tendency to buy ties on lineal measurement is that you will pay for what you can get. This question must be considered from the standpoint of the interest of the road buying the ties.

Hunter McDonald (N. C. & St. L.): Speaking of a section that has been the tie producing region for many years, I want to state that this is a question of a new specification. As Mr. Courtenay pointed out, it is a question of inspection, no matter what the specifications are for buying the ties. If we all pledge ourselves here to support this specification, and go away with a mental reservation that we are going to cut the inspections, we might as well keep quiet.

F. H. Alfred (P. M.): If you are going to adhere to this resolution, then it seems to me you must fix the price as Dr. von Schrenk says—if a man goes to a grocer for 10 lb. of sugar, he should not accept 9 lb. and pay for 10 lb. That is true, of course, but if he can get along with 9 lb. there is no reason why he should not take 9 lb. and pay for 9 lb. There are many places where we can use a smaller tie than the standard tie on side lines, and there is no reason why those ties should not be used.

It seems to me that we should not go on record beyond saying that it is our desire to follow as nearly as possible this resolution, or the administration specifications. I am sure that many of us will, if we have not already done it, break away from these specifications if we cannot get what we want under the specifications.

John Foley (P. R. R.): The discussion that has proceeded so far is very similar to the discussion that has gone on for the past two years. Practically none of it is relative to the specification for cross ties whatsoever. The specification, as such, is not responsible for the kind of ties anybody got. The specification is designed simply as a method of grading cross ties, and cross ties were in the past made in a certain way and will probably continue to be made the same way hereafter. The fact that the railroads did not receive as many cross ties as their estimates called for was not influenced in any way, in my judgment, by the specifications. The specification which has been promulgated during the past two years is based strictly on the A. R. E. A. specification and does not differ from it in any essential manner, except in putting the ties with rounded sides in the same class with ties of rectangular form. The specification was designed as an engineering matter entirely. It does not seem to me that the A. R. E. A. when drafting its specifications has to concern itself with price when establishing a standard. There are trees in the United States that will produce whatever size ties the railroads may have need for. When 10,000 ties are produced, that lot will yield a certain amount of money, no matter what price is paid for ties of different grades.

The allegation the contractors are upholding the administration specification is a statement that is not altogether in accordance with the fact. The contractors will supply any kind of ties the railroads desire. All that the specification did was to grade the ties in breaks of 1 in. in width and 1 in. in thickness. If a railroad wished a tie smaller than those provided in the grading, all they had to do was to ask for them. In the case of railroads that felt they could accept ties smaller than those specified, there has been no objection from the U. S. R. A. to permit such ties to be used under certain conditions, and the only difference was they are expected to call them ties other than Grade 1. The great variety in the specifications issued by the railroads in the past, with practically non-adherence to the A. R. E. A. specification has caused a great deal of trouble in the cross tie industry. It was that lack of uniformity which disturbed the industry that justified the attempt of the association to have a standard specification, and certainly the first effort of the U. S. R. A. to have one, and the endeavor to enforce it.

It seems this committee has done the right thing to get the engineers to insist that a tie shall be of a given grade, no matter where you may find it, and if there is any competition involved in the getting of the tie, let them fight it out on the price basis. If you do not want grades 4 and 5, do not ask for them; if grades 1, 2 and 3 are too small for you, do not buy them. Now, it will be possible for everybody to keep in his mind there is only one subject under discussion, and that is the standardization of sizes for cross ties, so that the engineers who desire cross ties will get what they want, and when they get it, they will know what it is, and whether it is called 1, or 6, or 90, makes absolutely no difference. Whether you lump three or four grades in your provision makes no difference. It is all settled in the matter of price, and from contact with the cross tie industry, I think I can speak in the name of the contractors also that the industry will be very much stabilized, production increased, the quality of ties improved, and the whole situation bettered, if the competition that there must be among the railroads was confined exclusively to price.

(Mr. Layng's motion was put to vote and carried, and the committee was excused with the thanks of the association.)

Report on Iron and Steel Structures

APPENDIX A of the committee's report contained revised specifications for steel railway bridges. These specifications are designed to supersede those now in the Manual and a preliminary draft of them was submitted to the association in 1919, being published in part in the *Railway Age* of March 21, page 805. As a consequence of oral discussion at the last convention and written discussion received by the committee subsequently, these specifications have been subject to considerable revision and the specifications as presented in Appendix A represented the results of these revisions. The form of the specifications is substantially the same as given last year.

As the result of a letter addressed to the American Society of Civil Engineers by Chas. E. Fowler, J. E. Grenier and Geo. H. Pegram, the committee was instructed to appoint a sub-committee for conference with a committee from the American Society of Civil Engineers to study all the column data available for the purpose of developing a column formula. At a joint meeting in October a column formula was adopted and the committees composing the conference agreed to recommend it for adoption by their respective societies. The formula also is incorporated in the specifications. Appendix B contains the report of the sub-committee on the work done.

Appendix C contains a report of the sub-committee on ballasted floor bridges and waterproofing and principles for detailed design of flashing, drainage, reinforcement and protection for waterproofing purposes, which was printed as information.

Appendix D contains reasons supporting the adoption of the form of live loading recommended in the specifications.

Conclusions

1. The committee recommended that the Specifications for Steel Railway Bridges be approved and substituted for the specifications in the Manual, pages 482 to 505, inclusive.

2. The committee recommended that the following column formula be approved and published in the Manual:

Column formula for use with ordinary structural steel for which the basic unit tensile stress is 16,000, and for ratios of $\frac{l}{r}$ not greater than 200:

$$p = 15000 - 50\frac{l}{r}, \text{ but not to exceed } 12500.$$

Committee: O. E. Selby (C. C. C. & St. L.), chairman; F. E. Turneaure, vice-chairman; F. Auryansen (L. I.), J. A. Bohland (G. N.), W. S. Bouton (B. & O.), A. W. Carpenter (N. Y. C.), J. E. Crawford (N. & W.), F. O. Dufour (Stone & Webster), W. R. Edwards (I. C. C.), R. L. Huntley (U. P.), A. C. Irwin (Port. Cem. Assoc.), B. R. Leffler (N. Y. C.), W. H. Moore (N. Y. N. H. & H.), P. B. Motley (C. P. R.), C. D. Purdon (St. L. S. W.), Albert Reichmann (Am. Brg. Co.), A. F. Robinson (A. T. & S. F.), H. N. Rodenbaugh (U. S. R. A.), C. E. Smith (Cons. Engr.), I. F. Stern (Cons. Engr.), H. B. Stuart (G. T.), G. E. Tebbetts (York River Shipbldg. Corp.), J. A. L. Waddell (Cons. Engr.), H. T. Welty (N. Y. C.).

Appendix B—Column Formulas

In the revised specifications presented last year (1919) by the committee the column formula proposed was of the parabolic form, namely, $p = 13000 - \frac{1}{4}\left(\frac{r}{l}\right)^2$. Inasmuch as the proposed revision was published only a short time prior to the annual meeting, and in consideration of various criticisms and suggestions the whole matter was referred back to the committee for further study. In proceeding with this work the question of column formula was assigned to a sub-committee. This sub-committee has restudied the whole matter and at the request of the main committee presented a report of its study and conclusions.

The proposed parabolic formula above mentioned was based on a careful analysis of all available data, and is still believed to be the most consistent single formula for ordinary ratios of l/r, but in the interest of simplicity and to provide a formula applicable to higher values of l/r, a straight line formula with maximum limits has been substituted in the report of the present year. It will be found that this proposed formula differs but little from the parabolic formula for values of l/r below 150, but that it has the advantage of being applicable for much higher values of l/r, a matter of considerable importance in dealing with old structures and in designing various types of construction encountered in the practice of bridge departments.

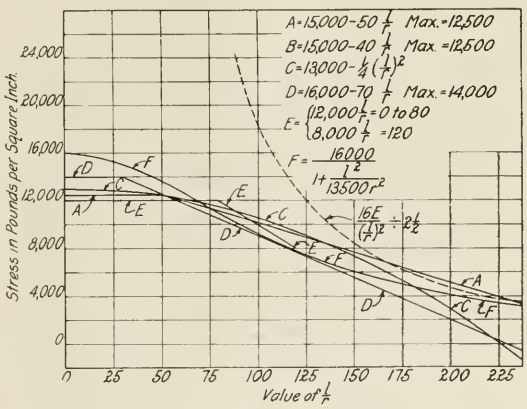


Fig. 1—A Comparison of Column Formulas

The proposed formula is $p = 15000 - 50\ l/r$; maximum value 12500. It is applicable for values of l/r up to 250. Limiting values of l/r for bridge design are given elsewhere in the specifications.

The data upon which the conclusions have been based cover all the available data of tests of pin and flat ended built-up columns and columns composed of single shapes of larger than about four square inches in cross-section. A number of tests were not included owing to the fact that pins were eccentric or to failure in end details. Tests of the A. R. E. A. series where tie plates were used were not included, as these columns failed at values much below those having proper lacing. Several tests of large columns reported in Bulletin No. 101 of the U. S. Bureau of Standards were not included as these were all rela-

tively short and all failed at about the yield point of the material or in end details.

Appendix C—Principles for the Detailed Design of Flashing, Drainage, Reinforcement and Protection for Waterproofing Purposes

General

1. The following applies only to membrane waterproofing, as the "integral method" is not recommended for waterproofing railroad bridge floors.

2. The structure should be designed so that it can be waterproofed and it should be adaptable to waterproofing by ordinary methods.

3. Strength and stiffness are desirable features in a structure which is to be waterproofed.

4. The structure and its construction and expansion joints, drainage and waterproofing, should be designed together, considering their separate and combined functions, so that each will help to secure a waterproof structure.

5. Due regard should be had for the available methods and materials of construction. Traffic conditions, climate and prevailing markets or supplies, might thus control the design. Wherever possible, waterproofing under traffic should be avoided.

6. All waterproofed surfaces should be easily accessible, and as simple and smooth as possible; hence features should be avoided which would increase the difficulty of securing waterproof construction, such as open spaces, joints, holes, seams or projections.

7. Concrete bridge floors should be of ample strength and thickness and of dense non-porous construction.

8. Where contraflexure would injure the waterproofing, special details should be provided, such as elastic joints.

9. Minimize the number of construction joints in the structure, provided an ample number of workable expansion joints can be introduced. Concrete bridge floors should, where practicable, be built in one continuous operation for each track.

Drainage

10. Adequate drainage should be provided by means of suitable grades which will shed water by the easiest or most direct route. One per cent is a minimum desirable grade, but the grades away from points which are difficult to waterproof, should be correspondingly increased.

11. Avoid pockets which cannot be easily drained. Water with only a slight head may find an outlet through the waterproofing, which otherwise might be tight. Standing water is undesirable on a waterproofed bridge floor, from its destructive effect both as a solvent and also on account of frost action.

12. Where gutters or pipes are necessary, they should be of durable material, of ample size, easy of access to install and maintain, and protected against clogging or damage. The grades should be enough to secure quick and entire escape of the water. Corrugated metal pipes are satisfactory where exposed to alternate freezing and thawing. Where sudden considerable variations in temperature occur, it is not desirable to encase drain pipes in concrete. Cleanouts and manholes should be provided where pipes cannot otherwise be cleaned.

13. Provide free exits for the harmless escape of drainage. Such drainage should not be allowed to disfigure the structure nor to injure persons or property. Icicles may be prevented by a basket of rock salt inserted in the top of the drain pipe.

14. Avoid features which would induce or permit capillary action. For example, where the waterproofing extends up under the top flange, or beneath a flashing angle, it is very desirable to make the water drip off the edge, rather than to allow it to follow the under surface and be drawn into the crack.

15. Where possible, locate edges and joints above the highest probable water level.

Reinforcement

16. Reinforcement of the structure should be suitably disposed, and ample in strength to prevent cracks or distortion which would injure the waterproofing.

17. Cloths, felts or fibers should be capable of holding the waterproofing pitch where placed and should be durable, strong and flexible.

18. Wire mesh or sheet metal reinforcement for the membrane should be of durable material, flexible where necessary, and intimately bonded or introduced so that the waterproofing and reinforcement act together.

19. Necessary breaks in the surface of waterproofing or flashing, such as for drain pipes, should be reinforced with extra flashing material.

Flashing

20. Flashing should be of durable material, sufficiently elastic and strong for the particular duty to be performed, and effective in the position where used.

21. Flashing should be of material which can be readily applied, and should retain the position in which it is placed when subjected to actual conditions of service and temperature.

22. Flashing should be firmly attached in its proper position, so that it cannot be easily displaced or removed.

23. The edges of waterproofing and flashing should be protected against drip, percolation and capillary action.

Protection

24. Waterproofing and flashing should be protected against mechanical injury, excessive temperature, chemical action, or the deterioration caused by exposure to light and air.

25. The protecting covering should be dense, hard, durable and easy to apply.

It is recommended to use on flat surfaces either: (a) Brick laid in cement mortar or served with hot pitch, (b) plain or reinforced cement mortar, (c) plain or reinforced concrete, (d) bituminous mastic.

For surfaces with considerable slope, mastic is not satisfactory, being difficult to apply and also to retain in place.

Appendix D—Specification Loading for the Design of Steel Railroad Bridges

Discussion of the revision of Specifications for Steel Railway Bridges, presented by the committee at the convention in March, 1919, developed differences of opinion regarding the advisability of continuing to design our structures for Cooper's E series of loading, which the committee recommended.

The objections to this type of loading were based on the assumption that, as the Copper engine does not conform very closely to the more modern types of locomotives, such as the Santa Fe or Mallet types, the stresses produced by the Cooper's loading do not reasonably correspond to the stresses produced by engines in actual operation, and the following loadings were suggested as substitutes for the Cooper's E series:

(1) A uniform load.

(2) A uniform load with a series of axle concentrations.

(3) A typical locomotive, more nearly representing modern locomotive construction, both as to axle concentrations and wheel spacing.

Any specification loading must necessarily be based not

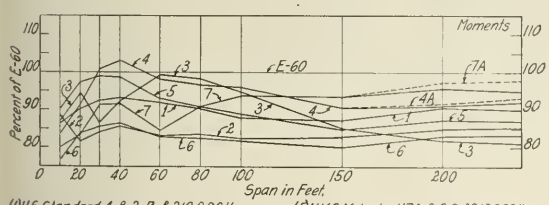
only on loadings which are in actual operation, but should likewise reflect and provide for future development of locomotive and car design. That is, if it is to be reasonably expected that the future development in locomotive design will increase the loading per foot on long spans more rapidly than on short spans, the specification loading should provide for such development.

A system of uniform loading must be determined from some assumed system of wheel loads or from wheel loads actually in operation, and should be so established as to provide for some future increase in loading.

As the effect of the concentrated loads, due to the axle concentration of engines in operation, is, on short spans, radically different from the effects of a uniform load which would correspond to the equivalent uniform load for the longer spans, no system of uniform loading without concentration would give the same results on short spans for moments and shears as that produced by actual loadings now in use, and it, therefore, becomes necessary to consider a uniform load with a series of axle concentrations, in order to provide proper stresses for the shorter spans.

No system of uniform loading with concentrations has been found which will more nearly correspond either with the actual loadings now in operation or with the actual loadings now in operation plus a reasonable future development in locomotive and car design. Furthermore, the adoption of a loading of this kind would involve the use of previously determined tables of moments and shears, such as have been established for the Cooper's E series of loadings, and would not result in any economy of effort in determining stresses in bridge structures.

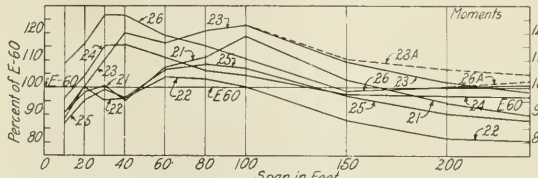
There appears, therefore, to be no logical reason for the abandonment of the Cooper type of loading for a system of uniform loads or uniform loads plus concentrations, as the change would offer no advantages, but would be the source of a great many positive disadvantages. The question involved, therefore, is the adoption of a specification loading, either Cooper's E series or some other system of typical engine and car loading, which produces stresses reasonably proportionate to engine and car loadings actually in service, plus future developments of such loadings.



(1) U.S. Standard 4-8-2-B & 210,000 lb. cars.
(2) U.S. Standard 4-6-2-B & " " "
(3) U.S. Standard 2-6-6-2-B & " " "
(4) U.S. Standard 2-10-2-B & " " "
(4A) U.S. Standard 2-10-2-B & 6000 lb. per lin. ft.
(7A) Santa Fe' Type 2-10-2 & 6000 lb. per lin. ft.
(5) N.Y.C. Mikado-H7A-2-8-2 & 210,000 lb. cars.
(6) U.S. Std. 2-8-2 & 210,000 lb. cars.
(7) Santa Fe Type 2-10-2 & 210,000 lb. cars.
Engines 1, 2, 4, 4A, 5, 6, 7, & 7A double-headed; Engine 3, single-headed.

Fig. 2—Moment Curves (Per Cents of E-60 Loading) for Seven Heavy Road Locomotives

By reference to Fig. 3 covering the heavy locomotives, it will be noted that the Santa Fe type of engine has the greatest effect, when compared with Cooper's E-60 loading, on spans up to approximately 60 ft. in length, and that the Mallet type has the greatest effect on spans from about 60 to 150 ft. in length. In other words, these two types of locomotives do not similarly affect all spans, and, if a specification loading of the Santa Fe type were adopted, it would not increase the stresses in bridge structures for spans from 60 to 150 ft. in which stresses are highest for the Mallet type of locomotive. Similarly, if the Mallet type of engine were adopted as the specification loading, while it would take care of spans from 60 to 150 ft., it would produce lighter structures than the Santa Fe type for spans shorter than 60 ft.



(1) The Virginian Ry. 2-8-8-2 & 210,000 lb. cars.
(2) L.S. & M.S. Mallet 0-8-8-0 & 210,000 lb. cars.
(3) The Virginian Ry. 2-10-10-2 & 210,000 lb. cars.
(4) Erie Engine 2-10-2 & 210,000 lb. cars.
(23A) The Virginian Ry. 2-10-10-2 & 6000 lb. per lin. ft.
(26A) Pennsylvania N.S. 2-10-2 & 6000 lb. per lin. ft.
(25) U.S. Std. 2-8-8-2-B & 210,000 lb. cars
(26) Pennsylvania R.R. N.S. 2-10-2 and 210,000 lb. cars. Engines 21, 22, 23, 23A & 25, single-headed; engines 24 & 26, double-headed

Fig. 3—Moment Curves (Per Cents of E-60 Loading) for Heaviest Locomotives

The substance of the foregoing is that, to produce stresses corresponding to both the Santa Fe and the Mallet types of engine for spans from 10 to 150 ft., a combination of the two engines would be required. This is accomplished by the use of the Cooper's E series of loadings. It will be noted that the peaks of the curves for the Santa Fe and Mallet types of heavy locomotives practically correspond to a line equivalent to Cooper's E-75 loading.

The effect of the engines now in operation, on the short span lengths, is greater when compared with the Cooper's E-60 loading than on longer span lengths, and this is as it should be, for the following reasons:

(1) Bridges with span lengths from 10 to 100 ft. are of the plate girder type, which is the best type of bridge to have from a maintenance standpoint. Such bridges may be more highly stressed than bridges of the truss type.

(2) Future developments in engine and car loading will increase the loading on the longer spans more rapidly than on the shorter spans, due to the lengthening out of the engine and the increasing of the car loads. With this development, the engine curves, if plotted in percentages of Cooper's series, would more nearly approach the 100 per cent line for spans in excess of 100 ft. This is shown by the dotted lines on Figs. 2 and 3 showing the effects of a car loading of 6,000 lb. per ft.

In addition to the foregoing, the fact should not be overlooked that the Cooper's E series of loadings has been in use for a great many years, and generally adopted by most roads, not only for the design of new structures, but in the re-calculation of old structures. Engines in operation have been rated in terms of Cooper's E loading and bridges have been similarly rated. Operating officers have become conversant with what the Cooper's loadings mean, and a change from the Cooper system should not be made, unless the Cooper series of loadings is inadequate.

In the light of the foregoing it has been concluded that

the Cooper's E series of loadings are the most practicable loadings for the design of railroad bridges.

Discussion

O. E. Selby (chairman) presented the report and continued as follows: On behalf of the committee I move the adoption of conclusion 2 of the report relating to columns.

(Motion seconded and carried.)

Mr. Selby: The committee considers it of the greatest importance to the association that the specifications in Appendix A be acted upon at this convention. They have been referred back once, and they should not be subjected to that treatment again, for the reason that there is a very great demand for the specifications in their revised form in this country and abroad.

C. W. Baldridge (A. T. & S. F.): As Article 3, "Drawings to Govern," is now written, it provides that the specifications are always wrong, and the drawings are always right, which may not be the case, and inasmuch as the chief engineer is supposed to have the deciding voice, I think this one specification should be altered to read: "Where the drawings and the specifications differ, the chief engineer of the company shall decide which shall govern."

The Chairman: In other clauses in the specification, the chief engineer is given the power of deciding any question which may arise, and it would be a repetition to insert it here.

Mr. Baldridge: It is my idea that it would be better to have a repetition than a conflict. I move that the suggested change be adopted. (Motion seconded, and after considerable discussion was put and lost.)

The Chairman: To forestall some discussion on the subject of clearances, I want to say that the clearance diagram is for the construction of new railway bridges only. It is not intended for general clearance diagrams for the railways or to apply to old bridges. The width of 16 ft. is based on safety and contemplates the use of equipment 11 ft. wide.

W. H. Courtenay (L. & N.): I move that this article be modified to read 15 ft. instead of 16 ft., making other changes to correspond.

(Motion seconded.)

H. T. Welty (N. Y. C.): It seems to me it is inexpedient, at least for this association, to go on record as stating that a lateral clearance of 16 ft. is necessary for safety considering the clearance we get from passing trains and cars on sidings. It immediately puts the roads with bridges having a clearance of 14 and 15 ft. in the position of having structures that are unsafe.

A. W. Carpenter (N. Y. C.): It is permissible to go to greater widths if it is desirable, but instead of having the specification call for 15 ft., have it 15 ft. minimum.

Mr. Courtenay: I will accept that.

Mr. Hunter McDonald (N. C. & St. L.): If I remember correctly, our adopted standard for clearance is 15 ft. It seems to me we are inviting the legislatures to take the position that 16 ft. is necessary, if we enlarge the present clearance. I believe that opinion is crystallizing now on a clearance of 15 ft., and I do not believe we should throw out anything now that would suggest the thought on our part that it is not enough.

(There was further discussion along this same general trend, participated in by A. F. Robinson (A. T. & S. F.), J. L. Campbell (E. P. & S. W.), P. C. Newbegin (B & A.), F. E. Schall (L. V.), G. H. Tinker (N. Y. C. & St. L.), and Chairman Selby, after which the president put Mr. Courtenay's motion and it was lost.)

Mr. Schall: I suggest that the committee explain this matter in the Foreword.

The Chairman: The committee will accept that suggestion.

(The chairman then read the section "Live Load" and called attention the Appendix D, which gives reasons for the adoptoin of the E-60 live loading.)

E. A. Frink (S. A. L.): This specification takes the place of the specification we now have in the Manual, which prescribes Cooper's E-40 loading as the span loading for bridges, and this specifies Cooper's E-60 loading, an increase of 50 per cent in the loading.

There are many points covered in this specification that make a structure designed for certain unit load and designed for certain live load, much stronger than it would have been if it had been built without our load specification, because the changes that have been introduced in the way of refinements and shop practice increase the efficiency of the structure; that is to say, even if the committee did not increase the load, the effect of their specifications would be to produce a stronger structure. In addition to that, they have increased the load.

I move to amend Par. 20 by adding a diagram showing Cooper's E-50 loading and then change the first sentence of Par. 20 to read as follows: The minimum live load for each track shall be as shown in the figures except as provided in Article 21.

The Chairman: I call attention to the fact that Article 21 provides for the use of lighter loadings, including E-50 or anything necessary, down to E-45. In Article 20 the loading given is described as the minimum. This gives the range of loading to be selected by the engineer anywhere from E-45 up to E-90.

B. R. Leffler (N. Y. C.): My idea is that any prediction as to future possible locomotive loadings today is subject to considerable doubt. Another important feature that we should remember is the increase of actual loads on ordinary equipment. The actual loads in freight cars are now as high as 50 tons or even more. We cannot limit the travel of heavy cars. They go on the branches of all the roads in the country. The loadings in the last 15 or 20 years have increased over 50 per cent, and this increase should also be considered, as well as the severe requirement of the specification. Cooper's E-60 should be the minimum for first-class railroads.

A. O. Cunningham (Wabash): I don't believe that we should specify anything higher than E-50 at this time. There are roads that will not require engines much heavier than that for some time to come. There are lots of roads that need much heavier engines. It all depends upon what grades railroads have. You cannot build an engine of E-70 within the limits of the specifications of the distances that you have provided for Cooper's type engines.

Mr. Leffler: Referring to Mr. Cunningham's argument about grades affecting the type or weight of locomotives, I remember a few years ago the opinion was held that the heavy locomotives would be used principally on roads having heavy mountain grades, but we know that low-grade roads in this country will put a locomotive on as heavy as they can so as to pull just as big a tonnage as possible.

Mr. Robinson: Mr. Chairman, I would note that we are using engines which for ordinary length spans give moment and shears better than the E-60 loading. These engines are used on our 0.5 and 0.6 per cent grades.

Mr. Frink: My own idea is this: to put those two loadings on a parity. It is quite true, as Mr. Leffler says, that some of the lowest grade roads in the country are using some of the heavy engines. It is quite true that 10 or 15 years ago no one would have predicted the loading that is being used on certain roads today; but it is also true that there are roads in the country which have built bridges that do not use that loading. Give us a chance to

show that we don't know what we are doing. You infer if we build anything less than an E-60 bridge, that we are not building to good practice. In my judgment it is good practice to build an E-50 bridge, and to build an E-60 bridge when an E-50 bridge will do your work is wasteful, and it is not in accordance with the definition of an engineer which our president quoted yesterday.

Mr. Cunningham: The strength of a bridge depends not so much on the loading as on the specification. The bridges that are being built now under the E-50 loading will take care of any engine that you can put on them, and I would like to go on record as saying that it is impossible to build under these specifications a bridge with E-50 loading that you will break down.

The Chairman: We have tried to get away from the practice of concealing in the specification a provision for increased loading. The live loading shown here, the impact formula and all the other features which affect that part of the design are intended to be honest and truthful. Nobody expects that a bridge built to these specifications to a particular loading would break down with any excess over that loading, but the margin for overloading is only a proper one. It is not the intention to cover up any fictitious margin for overloading by juggling with united stresses or the other features of the specification, so that a bridge designed for particular live loading in these specifications would not have the same margin for overloading as some of the bridges mentioned by Mr. Cunningham, which were designed to unusually low loading, coupled with fictitiously low unit stresses.

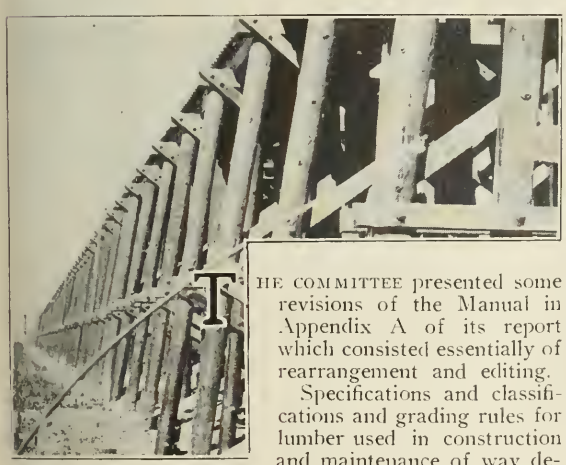
(Mr. Frink's motion was put to a vote and defeated.)

Mr. Welty: The old specification contained an impact formula that covered besides impact other unknown factors, and one of these was the improbability of getting full loads on multiple track bridges. The present impact formula is supposed to take care of the impact question, and in order to cover the improbability of getting full loading on multiple track bridges, a percentage of live loading including impact lower than 100 per cent was adopted. That is perfectly correct in principle, but it seems to me that the percentage given for structures getting their full load from three and four tracks loaded is too low.

F. E. Turneaure (U. of Wis.): If there were no impact whatever and your loadings were absolutely along the roads, there certainly should be a reduction of total loads when you consider the improbability of getting the absolute maximum load on each one of four tracks. The impact percentage in the formula is that which you will get by running a train with a maximum load at just the right speed on a single track. Now, how can you get anything like that impact percentage on a 4-track structure? The percentage of impact should certainly be reduced very greatly, and greater allowance should probably be made in the impact percentage than in the static load itself.

(At this point a number of minor suggestions for changes in the specifications were made, most of which were not approved.) The committee was dismissed with the thanks of the association.

Report on Wooden Bridges and Trestles



THE COMMITTEE presented some revisions of the Manual in Appendix A of its report which consisted essentially of rearrangement and editing.

Specifications and classifications and grading rules for lumber used in construction and maintenance of way departments of railroads were submitted by the committee as a progress report. The committee, however, felt that it should have at least another year to bring together the various opinions and suggestions that have been made by interested parties. In Appendix B are presented density rules and specifications for structural timbers.

Committee: W. H. Hoyt (D. M. & N.), chairman; A. O. Ridgway (D. & R. G.), vice-chairman; H. Austill (M. & O.), F. C. Baluss (D. M. & N.), W. L. Darden (S. A. L.), E. A. Frink (S. A. L.), E. A. Hadley (M. P.), G. A. Haggander (C. B. & Q.), H. T. Hazen (C. N. R.), C. S. Heritage (Wash. Term.), F. S. Schwinn (I. G. N.), I. L. Simmons (C. R. I. & P.), D. W. Smith (H. V.), A. M. Van Auken, D. R. Young (D. L. & W.).

Appendix B—Southern Yellow Pine and Douglas Fir Specifications—Structural Grades for Bridge and Trestle Timbers

Density Requirements

Density Requirements shall contain only southern yellow pine or Douglas fir timbers, graded in two grades by the following density rules:

Density Rule for Southern Yellow Pine. Dense southern yellow pine shall show on either one end or the other an average of at least 6 annual rings per inch or 18 rings in 3 inches as measured over the third, fourth and fifth inches of a radial line from the pith, and at least one-third summerwood for girders not exceeding 20 in. in height, and for columns 16 in. square or less. For larger timbers the inspection shall be made over the central 3 in. on the longest radial line from the pith to the corner of the piece. Wide ringed material excluded by the above will be accepted, provided the amount of summerwood, as above measured, shall be at least 50 per cent.

The contrast in color between summerwood and springwood shall be sharp, and the summerwood shall be dark in color, except in pieces having considerably above the minimum requirement for summerwood.

In cases where timbers do not contain the pith, and it is impossible to locate it with any degree of accuracy, the same inspection shall be made over three inches of an approximate radial line beginning at the edge nearest the pith in timbers over three inches in thickness and on the second inch (on the piece) nearest to the pith in timbers three inches or less in thickness.

In dimension material containing the pith but not a five-inch radial line, which is less than two by eight inches in section or less than eight inches on the cross-section, the inspection shall apply to the second inch from the pith. In larger material which does not show a five-inch radial line, the inspection shall apply to the three inches farthest from the pith.

The radial line chosen shall be representative. In case of a disagreement between purchaser and seller as to what is a representative radial line, the average summerwood and

number of rings shall be the average of the two radial lines chosen.

Density Rule for Douglas Fir. Dense Douglas fir shall show, on either one end or the other, an average of at least six annual rings per inch and at least one-third summerwood measured over three inches on a line located as described hereinafter. Coarse-grained material excluded by this rule shall be acceptable provided the amount of summerwood measured as described shall be at least one-half. Material in which the proportion of summerwood is not clearly discernible shall not be accepted.

Any timber whose least dimensions is less than five inches shall not show the pith (heart) on the inspection end; pieces whose least dimension is five inches or more may contain the pith.

When the least dimension is five inches or more, the pith being present, the line over which the rate of growth and per cent of summerwood measurements shall be made shall run from the pith to the corner farthest from the pith. To find the beginning of the three-inch line, measure a distance of one-half the least dimension of the piece, less two inches, from the pith. This distance may be expressed as follows:

$$a = \tfrac{1}{2} d - 2,$$

where a = distance in inches from pith to beginning of three-inch line.

d = least dimension of piece in inches.

When the rings are very irregular it may be necessary to shift the line somewhat around the piece to get a fair average for inspection, but the distance from the pith to the beginning of the three-inch line must not be changed.

For all pieces where the pith is not present the center of the three-inch line shall be at the center of the end of the piece, and the direction of the three-inch line shall be at right angles to the annual rings.

General Requirements. (a) Shall consist of lumber well manufactured, square edges and sawed standard size with only occasional variation in sawing not to exceed ¼ in. scant at time of manufacture allowed.

When the timbers 4 in. by 4 in. and larger are ordered

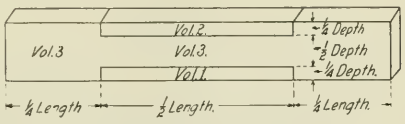


Fig. 1

sized, they will be ½ in. less than nominal size, either S1S1E or S4S, unless otherwise specified.

(b) Structural timbers shall be sound and free from rotten or unsound knots, knots in clusters, decay, round or ring shakes occupying more than one-fourth the least dimension on either end of a timber (a round or ring shake shall be measured on its vertical projection), injurious diagonal grain or other defects that will materially impair its strength.

Knots limited in size and position as hereinafter provided will be permitted if so fixed by growth or position that they will retain their place in the piece as at time of manufacture.

For the limitation of knots in beams in size and location, a beam shall be considered as divided into three volumes as shown in the drawing.

Measurement of Knots. In beams, the diameter of a knot on the narrow or horizontal face shall be taken as its projection on a line perpendicular to the edge of the timber. On the wide or vertical face, the smallest dimension of a knot is to be taken as its diameter.

In columns, the diameter of a knot or any face shall be taken as its projection on a line perpendicular to the edge of the timber.

Beams shall not have diagonal or spiral grain in Volumes 1 and 2 with slope greater than 1 in 20; in posts the angle shall not be greater than 1 in 15.

Posts and beams have different restrictions as to knots and angle of grain and must be listed accordingly in bills of material.

No. 1 Structural

No. 1 Structural timbers shall be of dense southern yellow pine or dense Douglas fir, and shall meet the general requirements for structural grades.

This grade shall not have tight pitch pockets over 6 in. long or over ⅜ in. wide or wane exceeding 1 in. on one corner or over one-sixth the length of the piece.

Loose knots larger than ½ in. shall not be permitted.

Beams, Stringers, Girders and Deep Joists. Beams, stringers, girders and deep joists shall show not less than 85 per cent of heart on each side of the four sides measured across the sides anywhere in the length of the piece.

Beams, stringers, girders and deep joists shall not have knots in Volumes 1 and 2 larger in diameter than one-fourth the width of the face of the beam in which they occur, up to and including 6 in., nor larger than 1½ in. in a face over 6 in. Knots within the center half of the length of a beam shall not exceed in the aggregate the width of the surface of the beam in which they occur.

Beams shall not have knots in Volume 3 larger in diameter than one-third the width of the face in which they occur, with a maximum for any one knot of three inches in diameter.

When beams are of two spans length and so marked in bill of materials, Volumes 1 and 2 on inspection shall be considered as extending between points located one-eighth the length of the beam from each end.

The inspector shall place his stamp on the edge of the beam or stringer to be placed up in service.

Caps and Sills. Caps and sills shall show 85 per cent of heart on each of the four sides, measured across the face anywhere in the length of the piece.

Caps and sills shall be free from knots larger than one-fourth the width of the face in which they occur with maximum for any one knot of three inches in diameter. Knots shall not be in groups.

Posts. Posts shall show not less than 85 per cent of heart on each of the four sides, measured across the face anywhere in the length of the piece.

Posts shall not have knots larger than one-fourth the least dimension of the posts nor larger than three inches. Knots shall not be in groups.

Longitudinal Struts or Girts. Longitudinal struts or girts shall show all heart on one face; the other face and two sides shall show not less than 85 per cent of heart, measured across the face or side anywhere in the length of the piece.

Longitudinal struts or girts shall be free from knots over two inches in diameter.

Longitudinal Cross Braces, Sash Braces and Sway Braces. Longitudinal cross braces, sash braces and sway braces shall show not less than 85 per cent heart on two faces.

Longitudinal cross braces, sash braces and sway braces shall be free from knots larger than one-third the width of the face in which they occur, with a maximum of 2 in. in diameter.

Ties and Guard Rails. Ties and guard rails shall show one side all heart; the other side and two edges shall show not less than 75 per cent heart, measured across the surface anywhere in the length of the piece.

Ties and guard rails shall be free from any large knots or other defects which will materially injure their strength; and where surfaced the remaining rough face shall show all heart.

No 2 Structural

No. 2 structural timbers shall meet the General Requirements for Structural Grades, and shall include timbers not passing the No. 1 Grade because of having less density than is required or greater defects than are permitted.

This grade shall not have pitch pockets longer than 12 in. or over ⅜ in. wide or wane exceeding 2 in. on one corner or the equivalent on two or more corners of 10 in. by 10 in. timbers, with wane in proportion on small or large sizes.

Beams, Stringers, Girders and Deep Joists. Beams, stringers, girders and deep joists shall not have knots in Volumes 1 and 2 larger than as follows:

If of dense southern yellow pine or dense Douglas fir, one-third the width of the face of the beam in which they occur, up to and including nine inches, nor larger than three inches in a face over nine inches.

If not of dense southern yellow pine or dense Douglas fir, one-fourth the width of the face of the beam in which they occur, up to and including 6 in., nor larger than 1½ in., in a face over 6 in.

Knots in the center half of the length of a beam shall not exceed in the aggregate twice the width of the surface of the beam in which they occur.

Beams shall not have knots in Volume 3 larger in diameter than one-third the width of the face in which they occur.

Loose knots larger than one-half the size of knots allowed above shall not be permitted; beams shall not have loose knots, in Volume 3, larger than 1½ in.

Caps and Sills. Caps and sills shall be free from knots

larger than one-half the width of the face in which they occur with a maximum for any one knot of three inches in diameter. Knots shall not be in groups.

Posts. Posts shall not have knots, if of dense southern yellow pine or dense Douglas fir, larger than one-third the least dimension of the post, nor larger than four inches; if not of dense southern yellow pine or dense Douglas fir, larger than one-fourth the least dimension of the post, nor larger than three inches.

Longitudinal Struts or Girts. Longitudinal struts or girts shall be free from knots over two inches in diameter.

Longitudinal Cross Braces, Sash Braces and Sway Braces. Longitudinal cross braces, sash braces and sway braces shall be free from knots larger than one-third the width of the face in which they occur, with a maximum of two inches in diameter.

Specifications for Timber to Be Treated

Specifications for timber to be treated are the same as for untreated timber, except that no restriction is to be placed upon the amount of sap wood allowed in the timber which is to be treated.

Many varieties of timber can be used, if treated, that would not be satisfactory to use in the untreated state on account of being subject to rapid decay if they are not treated.

Discussion

W. H. Hoyt (chairman) presented the report and continued as follows: I desire to offer for approval the revision of the Manual as included in Appendix A.

(Motion seconded and carrried.)

(Chairman Hoyt submitted Appendix B specifications for yellow pine and Douglas fir.)

The Chairman: At the present time we simply present Appendix B as a progress report. The committee desires to submit an additional recommendation to those presented in the report, making a total of four suggested pieces of work for next year's consideration.

(The committee was dismissed with the thanks of the association.)

Report of Committee on Ballast

Proposed changes in the Manual are shown in Appendix A.

The committee recommended that the paragraph on depth of ballast be rewritten without changing its force or meaning as shown in Appendix 2-A of its report.

A report on the standardization of ballast tools in connection with the work requested by the Standardization committee relative to standardizing ballast tools was shown in Appendix B of the committee's report. It was found from replies to circulars that many carriers have no standards of their own for ballast tools but buy in the open market. The committee had no recommendations to make until further study is given to the subject.

The committee presented a set of "Instructions to Govern Ballasting on an Operated Line" to cover the preparation of the roadbed, skeletonizing the track, renewing ties, providing cross drainage, unloading ballast and lifting track, surfacing and lining track. The committee did not ask for the adoption of these instructions at this time, but proposes to present them again in amended form for final action next year.

The report of the sub-committee is attached as Appendix C.

The committee called attention to the desirability of obtaining data relating to time and cost studies, and particular attention was called to the request of the committee that the cost be expressed in terms of payroll hours per unit of work for the different subdivisions of the work. The committee would like to have the information appear expressed in tabular form and requested that such a record be kept for the coming year by member roads and that the data compiled be filled out in the form suggested and sent to the chairman to be used in compiling the report for the ensuing year.

The committee presented specifications for stone ballast in Appendix E for the consideration and criticism of the membership and asked for written comments and suggestions.

The membership was circularized relative to gravel washing and stone crushing plants and it developed that but few roads owned such plants. The great majority, as indicated by the replies, buy their heavy ballast, such as crushed stone, washed gravel and slag, from privately operated plants, and consider that it is expedient and economical to do so.

The membership was circularized relative to concrete slabs or other devices to assist the ballast and the committee is satisfied that the use of reinforced concrete slabs laid on the roadbed and under the ballast will solve the difficulty experienced over "soft spots." The expense is considerable but not unduly high where the traffic is heavy and the cost of upkeep is reduced to very small proportions.

Conclusions

That the definitions should be rearranged in alphabetical order.

That the depth of ballast should be restated.

That concrete slabs placed under the ballast on soft roadbed where traffic is heavy, and at times under other exceptional circumstances, indicate that a considerable degree of success may be expected from their use, and at reasonable expense.

Committee: H. L. Ripley (N. Y. N. H. & H.), chairman; J. M. Meade (A. T. & S. F), vice-chairman; C. W. Baldridge (A. T. & S. F.), J. S. Bassett, W. J. Bergen (N. Y. C. & St. L.), F. W. Bettle (T. & P.), Theodore Bloecher (B. & O.), H. E. Boardman (N. Y. C.), C. J. Coon (N. Y. C.), T. W. Fatherson (C. G. W.), H. E. Hale (Pres. Conf. Com.), G. H. Harris (M. C.), F. A. Jones (M. P.), J. S. McBride (C. & E. I.), S. B. Rice (R. F. & P.), D. L. Sommerville (N. Y. C.), Paul Sterling (N. Y. N. H. & H.), F. J. Stimson (P. R. R.), D. W. Thrower (I. C.), W. K. Walker (Wabash), R. C. White (M. P.), W. D. Williams (C. N.).

Appendix C—Instructions to Govern Ballasting on an Operated Line

Authority.—Decision of the kind and amount of ballast to be applied having been made by the proper officials, the work should be handled as follows:

Plans.—The division engineer or roadmaster, whichever is to have responsible charge, shall lay his plans for work train movements and service before the trainmaster and chief dispatcher, in order that they may have a clear understanding of what is desired to be done, and that they may be able to assist the movements to be made with as little delay as possible.

Ballast Supply.—If the ballast is to be furnished by the company or from a pit for which the company is responsible, a careful inspection of the pit tracks and appurtenances shall be made and everything put into serviceable condition.

Equipment.—All equipment, such as steam shovel, mechanical unloader, unloading plows, material spreader, ballast plow, or spreader, etc., shall be gone over and put into working order.

Protection.—Speed restrictions shall be arranged for in accordance with operating rules before the track is disturbed, and shall be maintained until the track is in safe condition for schedule speed.

Preparation of Roadbed.—Preparatory to placing ballast, the roadbed shall be widened, if necessary, to bring it to the A. R. E. A. standard width, by dumping material alongside of the track and spreading it to the required width and slope, preferably by the use of a material spreader. Where necessary to raise the roadbed level, porous material must be used to avoid the forming of water pockets by burying in of old ballast. All bank widening shall be done far enough in advance of the ballasting work so that there will be no interference between work-trains or gangs.

Skeletonizing.—After the banks have been widened, and not to exceed two days' work ahead of where new ballast is being dumped, the track shall be skeletonized. Where the material is suitable for sub-ballast and the grade will permit, the track shall be raised and the old material spread under and between the ties, and to the proper width, as uniformly as is practicable.

Where conditions do not permit raising the track, the old material shall be removed to the required depth and disposed of as directed.

Where not suitable for sub-ballast, the old material shall be removed to the plane of the bottom of the ties, or deeper, if necessary, to preserve grade line, and shall be placed on the outer shoulder of the roadbed, preferably at such points as will tend to even up the line of the shoulder.

Use of Jacks. In using jacks, they must be placed close enough together to prevent undue bending of the rail or over-strain of the joints. Where the roadbed material is heavy or holds to the ties tenaciously, it is sometimes necessary to place three or more jacks per rail length. Jacks should be worked in pairs directly opposite each other, and a sufficient number should be used simultaneously, so that no jack will raise the rail more than four inches above its level at the next succeeding jack or place of support.

Tie Renewals. Following the skeletonizing of the track, the tie renewal gang shall take out all old ties which are not fit for more than one year in track, where gravel or cinder ballast is to be used; or for more than three years in track, where stone or hard slag is to be used; and insert new ties in their places. All ties must be properly straightened and spaced.

The track must be fully regaged as the new ties are being spiked up. Old ties must be disposed of, as directed.

Grade Stakes. Ballast grade stakes shall preferably be set after the bank widening, skeletonizing and re-tieing have been done, and before the ballast material has been dumped and spread.

This is desirable to avoid, as far as possible, interference with the stakes, yet to have them available as a guide for the unloading of ballast.

Drains. All tile, box or other drains required to take care of water from between tracks, shall be placed before the ballast material is unloaded.

Unloading of Ballast. Ballast shall be unloaded by dumping or plowing, as the means provided permit.

If the ballast be in center dump cars, it shall be unloaded by having one or more cars opened a little at a time and allowing the required or desired amount of ballast material to flow out as the train is slowly moved along. If the material be on flat or open-side cars, it shall be plowed off by means of an unloading machine while the train is standing or moving at such a rate of speed as to provide the desired amount of material as uniformly distributed as possible.

The unloaded material shall be leveled down by means of a ballast plow, or of a spreader, consisting of a heavy timber with wheel skids attached to it, and placed in front of the leading pair of wheels of the rear truck. Care must be taken not to destroy or disturb the grade stakes.

Parallel Tracks. Where a new track is being built parallel to an existing track, ballast material can be advantageously handled in body dump cars which dump the entire load to the side desired, after which the ballast material may be spread to the required width and depth by the use of a material spreader, and the track laid after the ballast is in place.

Preliminary Surfacing. The first lift shall be a filling lift. The filling, or preliminary surfacing gang, shall follow the unloading as closely as the regularity of the ballast supply will permit.

The amount which the track should be raised at one lift will depend upon the depth of ballast to be applied. Usually, track should not be raised more than 6 in. at a lift, but if the total lift of the track is to be not more than 10 in., a first lift of 7 to 8 in. may be made, if traffic conditions will permit, leaving the remainder of the raise for the finishing lift. A sufficient number of jacks must be used simultaneously to avoid damage to rails. The raise on any one jack shall not be greater than 4 in. above the next jack, or point of support. Both rails must be raised at one time, and as nearly uniformly as is practicable.

The "filling lift" shall be made by jacking the track up to the required height, and the ballast material then forked or shoveled in and worked to as uniform a surface as possible by the use of spades. It shall then be left to be compacted by traffic, but a small "lookout" gang shall go over it after a few trains have passed, and pick up any spots that show too great an inequality of settlement.

After a few days, depending upon the amount of traffic over the track, another lift shall be made—either another filling lift or a finishing lift, according to the depth to which the track is to be ballasted. If another filling lift, it shall be made in the same manner as the first one.

Finishing Lift. When the track has been raised to within two or three inches of the final grade and properly compacted, a finishing lift shall be made by jacking up the track to the exact height provided for by the grade stakes (all allowance for settlement shall be taken care of in the setting of the stakes) and the necessary ballast forked or shoveled in and then driven to place by tamping machines, tamping picks or bars, if rock or heavy ballast is used. Shovel tamping should be used with gumbo, cinder or light sandy gravel ballast. In making the finishing lift, the spot board and level board must be used with care, and the track brought to as true a surface as possible.

Alinement. The track shall be placed in good alinement before the finishing lift is made, but a lining gang shall follow one or two days' work behind the finishing lift and shall spot up all places found not to be holding up to proper surface and shall line the track to as accurate alinement as possible.

Center stakes shall be set for the alinement before the finishing lift is made and the final alinement must conform to the center stakes.

Dressing. Following as closely as possible behind the lining gang, the dress-up gang shall finish the work by filling the track center to the required fullness and then dressing it toward the toe of ballast, preserving the proper clearance under the rail and proper curve and slope of the shoulder. The toe of ballast shall be made a true line, parallel to the center line of track, and any surplus material shall be raked far enough from the toe line to permit of its being forked or shoveled up without fouling or disturbing the finished ballast.

No ballast material or refuse out of the ballast or roadbed material which would interfere with a mowing machine when cutting grass and weeds shall be cast off of the roadbed or be left where it will interfere with the use of mowing machines or scythes.

Clean-Up. When the dress-up gang leaves any part of the track as completed, it shall be in first-class line and surface. The ballast shall conform to the ballast sections as adopted by the A. R. E. A. All surplus ballast shall have been loaded, and all refuse and rubbish shall have been removed, loaded or destroyed, so as to leave the right-of-way and shoulders of roadbed in condition to be mowed without interference.

Appendix E—Specifications for Stone Ballast

General

Stone for use in the manufacture of ballast shall break into angular fragments which range with fair uniformity between the maximum and the minimum size specified herein; it shall test high in weight, hardness, strength and durability, but low in absorption, solubility and cementing qualities.

Tests

Tests shall be made as follows:

Weight. Not less than ½ cu. ft. of the stone accurately measured, and dried for not less than 12 hr. in dry air at a temperature of between 125 and 140 deg. F. shall be weighed. The weight shall not be less than ..... lb. per cu. ft.

Note.—Of the stone available, that having the maximum should be used; a high quality stone for ballast will weigh 168 lb. per cu. ft.

Strength. Two-inch cubes of the stone shall be sawed to

reasonably accurate dimensions and the top and bottom faces made accurately parallel. For the primary tests, the test specimens shall be dried for two hours in dry air at a temperature of between 120 and 140 deg. F. and at the time of test the temperature of the specimen shall be not less than 50 deg. Tests shall be made in a testing machine of standard form and the stone shall have a compressive strength of ..... lb. per sq. in.

Note.—Of the stone available, that having the maximum compressive strength should be used; a high quality stone for ballast will have a strength of 10,000 lb. per sq. in.

A secondary test shall be made on specimens the same in all respects as for the primary test except that the blocks shall have been completely immersed in clean water, of a temperature between 35 and 40 deg. F. for 96 hr., the test to be made within 30 min. of removal from the water.

If the compressive strength shall have decreased more than ..... per cent. from the primary tests, the rock shall be deemed unsuitable for ballast purposes.

Note.—Of the stone available, that showing the least difference between the results of the primary and secondary test should be used; a high quality stone for ballast should show not over one per cent. difference.

Solubility. One-fourth cubic foot of the rock shall be crushed and thoroughly washed. The particles shall then be placed in a glass vessel and covered with clear water. The vessel shall be thoroughly shaken for five-minute periods at 12-hr. intervals for 48 hr. If any discoloration of the water occurs, the rock shall be deemed soluble and undesirable for use as ballast.

Test No. 1

Wear or Durability. One-half a cubic yard of washed stone, which will pass through the maximum and be retained on the minimum screen, shall be spread over a wire mesh or iron surface to a depth of not more than three inches, and exposed to a dry heat of from 125 to 140 deg. F. for a period of two hours. After the dried stone is carefully weighed it shall be given 10,000 revolutions in a tumbler approximately four feet in diameter, of not less than two cubic yards capacity, and operating at 25 r.p.m.

The sample shall then be passed over a screen of the minimum dimension provided for sizing the ballast, again washed and dried in the same manner as before the test, and again carefully weighed.

If the decrease in weight shall be more than ..... per cent. of the original weight of the sample, the stone shall be deemed unfit for use as ballast.

Outside of the breakage, which is exhibited by the small particles which will pass through a minimum screen but will not pass a sieve of 20 meshes to the inch, the wear should not exceed ..... per cent.

Note.—Of the stone available, that showing the smallest loss in weight should be used; a high quality stone for ballast will show a loss of not more than 1 per cent in fragments which will pass a screen of 20 meshes to the inch, and not more than 3 per cent in those passing the minimum sizing screen.

Test No. 2 (Quick Weathering Test)

One-half a cubic yard of stone shall be dried and weighed as for Test No. 1. It shall then be immersed in water for six hours and then while still wet, be placed in a refrigerating plant and subjected to a temperature of approximately zero Fahrenheit for two hours. It shall then be removed and the temperature gradually raised in two hours to 100 degrees and that heat continued for two hours, when it shall be immersed as before and again subjected to approximately zero temperature.

The freezing and thawing shall be repeated to a total of 10 exposures. If any tendency to disintegrate is observable the stone should be considered unsuitable for ballast. Otherwise the material shall again be subjected to a wear test as provided under Test No. 1. If in this wear test the maximum decrease in weight shall be in excess of ..... per cent, it shall be deemed unsuitable for use as ballast.

Note.—Of the stone available, that showing the minimum average decrease in weight should be used; a high quality stone for ballast will not show a decrease in fragments which will pass the minimum sizing screen of more than 4 per cent.

Absorption

One-half a cubic yard of washed stone, which will pass through the maximum and be retained on the minimum screen, shall be spread over a wire mesh or iron surface to a depth of not more than three inches, and exposed to a dry heat of from 125 to 140 deg. F. for a period of six hours. After the dried stone is carefully weighed it shall be submerged in clean water for a period of 96 hr. It shall then be removed from water and exposed to a normal air in the shade and at a temperature between 40 and 80 deg., and allowed to drip for 30 min., when it shall again be weighed and the difference in weight shall be used to determine the rate of absorption. Stone showing an absorption of more than ..... lb. per cu. ft. is unsuitable for ballast.

Note.—Of the stone available, that showing the minimum absorption should be used; a high quality stone for ballast will have an absorption of not more than 0.50 lb. per cu. ft.

Cementing Quality

A five-pound sample of the rock thoroughly washed and dried shall be crushed until it will pass through a screen of ¼ in. mesh. This material shall be placed in a bill mill which contains two steel shot weighing 20 lb. each, and the mill revolved at the rate of 30 r.p.m., until it has made 2,000 revolutions for each pound of sample in the mill.

Sufficient clean water shall be added to make a consistent mortar, which shall then be molded into one inch cubical briquettes, formed under 10 lb. pressure. All of the briquettes shall then be allowed to dry 20 hr. in air, when one-third of them shall be tested for compressive strength.

One-third shall be kept for four hours in a steam bath, and the remainder shall be immersed for four hours in clean water at a temperature between 50 and 60 deg. F. and then tested for compressive strength.

If in any of these tests a compressive strength greater than ..... lb. per square inch is developed, the material shall be deemed unsuitable for ballast.

Note.—Of the stone available, that from which the briquettes show the minimum strength should be used; a high quality stone will show not to exceed 4 lb. per sq. in.

Breaking

Stone for ballast shall be broken into fragments which range with fair uniformity between the size which will in any position pass through a 2½-in. ring and the size which will not pass through a ½-in. ring.

Test for Size

Maximum. A sample weighing not less than 150 lb. shall be taken from the ballast as loaded in the cars and placed in or on a screen having round holes 2¾ in. in diameter. If a thorough agitation of the screen fails to pass through the screen 95 per cent of the fragments, as determined by weight, the output from the plant shall be rejected until the fault has been corrected.

Minimum. A sample weighing not less than 150 lb. shall be taken from the ballast as loaded in the cars; weighed carefully and placed in or on a suitable screen having round holes ½ in. in diameter. The screen shall then be agitated until all fragments which will pass through the screen have been eliminated. The fragments retained in the screen shall then be weighed and if the weight is less than 95 per cent of the original weight of the sample, the output of the plant shall be rejected until the fault is corrected.

Handling

Broken stone for ballast must be delivered from the screens directly to the cars or to clean bins provided for the storage of the output of the crusher. Ballast must be loaded into cars which are in good order and tight enough to prevent leakage and waste of material and are clean and free from sand, dirt, rubbish or any other substance which would foul or damage the ballast material.

Inspection

Inspectors representing the purchaser shall have free entry to the works of the manufacturer at all times while the contract is being executed, and shall have all reasonable facilities afforded them by the manufacturer to satisfy them that the ballast material is prepared and loaded in accordance with the specifications and contract.

In case the inspection develops that the material which has been or is being loaded is not according to specifications, the inspector shall notify the manufacturer to stop further loading and to dispose of all cars under load with the defective material.

As the quarry deepens or is enlarged, further tests shall be made of the material wherever conditions indicate a change in the quality of the stone, or where in the judgment of the engineer for the company, a further test is advisable. Should such tests show that the stone fails to meet the pro-

visions of these specifications, it shall not be used for the manufacture of ballast

Measurement

Ballast material may be reckoned in cubic yards or by tons as expedient. Where ballast material is handled in cars, the yardage may be determined by weight, after ascertaining the weight per cubic yard of the particular stone in question by careful measurement and weighing of not less than five cars filled with the material, or the tonnage may be determined for subsequent cars by measurement and converting the yardage into tonnage by use of the weight per yard as determined above.

Discussion

H. L. Ripley (chairman) presented the report.

R. H. Ford (C. R. I. & P.): I would like to ask the committee if they would be willing to consider an addition to the definition of ballast by inserting the words "improving drainage and," making it read: "Selected matter placed on the roadbed for the purpose of improving drainage and holding the track in line and surface."

The Chairman: I don't know what the other members of the committee will say, but I think that definition needs a more extensive revision than just the insertion of that language.

Mr. Ford: I would like to suggest one of two things. One is that the committee agree to take that addition, or else that they consider it in reviewing it prior to insertion in the Manual. I believe that ballast is something for some other purpose than merely holding the track in line and surface.

The Chairman: I would like Mr. Ford or other members to give us constructive criticism of these definitions and suggestions to other definitions.

The President: These definitions presented involve no changes at all from those that are now in the Manual. It is merely a rearrangement in alphabetical order, and to undertake now to revise these definitions would consume too much time.

The Chairman: I move that the paragraphs as they are in the Manual, under "depth of ballast," be rearranged under the caption, "Proper depth of ballast," as it appears at the top of Appendix A-2, and that the paragraphs recommended by the committee be substituted for the language that follows the original caption.

The President: Do I understand that all the paragraphs you have enumerated replace the same paragraphs in the Manual?

The Chairman: It replaces the paragraphs that come under proper depth of ballast, and covers the subject-matter contained in this rearrangement and restatement of that material.

(Motion seconded and carried.)

The Chairman: I move the adoption of the portion of the committee's report under the caption: "Gravel washing and stone crushing plants," commencing "The desirable points to be considered," to be inserted in the Manual.

(Motion seconded.)

C. J. Coon (N. Y. C.): Most of the committee was over the Richmond, Fredericksburg & Potomac in the fall and made a critical examination of the conditions there, washed gravel ballast having been used for many years. The indications were that that road was getting a very much better wear out of the rail, owing to the fact that it had splendid drainage from the washed gravel ballast. A great many roads are increasing the weight of their rails, and this does not take care of the situation, for you cannot do it all with the rail. You must take care of some of it with the tie, the increased depth of ballast and a better class of ballast. Temporarily, in a territory where you cannot get good stone, the next best thing, in the opinion of the committee, is to wash the ballast.

Hunter McDonald (N. Y. C. & St. L.): I have heard it stated, not on this floor, but lately, that gravel ballast was unsuitable for the very high class and high speed traffic that we have nowadays. In fact, I note a tendency to condemn the use of gravel, whether washed or not, in favor of limestone ballast.

(Motion carried.)

The Chairman: The committee would recommend that the Conclusion in Appendix G, stating: "Concrete slabs placed under the ballast on soft roadbeds where traffic is heavy, and at times under other exceptional circumstances, indicate that a reasonable degree of success may be expected from their use and at a reasonable expense," be inserted in the Manual.

H. E. Boardman (N. Y. C.): It was a little difficult to get the information on concrete slabs, but enough information has been assembled to show a decided opportunity for the use of the reinforced concrete slab on soft ground in locations where excessive cost of maintenance has taken place.

The Chairman: Regarding Appendix C, "Instructions to Govern Ballasting on an Operated Line," the committee suggests that, during the next few weeks, the members read this method of procedure, or rules to handle the ballast gang, and suggest criticisms to the committee so that at the next meeting they can then be presented for adoption. In connection with Appendix D, "Time and Cost Study in Connection with Ballast Work," Mr. Baldridge is sending out a circular letter asking the members to keep a record of the ballast work which they will do during the coming summer. This study is to be expressed in terms of units of work and units of time rather than in dollars.

Mr. Ford: I wonder if the committee realizes how difficult it is to go out and get any information that is really susceptible of analysis through time, study and cost data report, and I cannot see that it will be of very much value when they get it. It is too analytical. We are not ready for it. We do need cost data work, but we need something that will enable the ordinary track gang to report the information with reasonable accuracy. The report of cost data should be prepared in such manner that it will reflect what it does cost as a practical matter to handle ballast.

C. W. Baldridge (A. T. & S. F.): The reason the committee is asked for information in the detail we have shown here is because if we ask for a figure for the completed cost of ballast, each person reporting will include different items, and we do not get comparable results.

The Chairman: Through inadvertence, the name of F. J. Stimson did not appear as the chairman of the subcommittee on Appendix E, "Specifications for Stone Ballast." At the present time many of the figures in the specifications simply rest on the opinion of the members of the committee. It is hoped that some of the universities will consider this matter of sufficient interest to take it up in their laboratories and make the tests.

F. J. Stimson (P. R. R.): There has been no attempt to draw a specification that will describe what are ideal ballasts, and for that reason you will find running through the specification, notes calling attention to the limits of various qualities which are named as being desirable. In these limits we have used figures which are largely empirical. They are merely the best opinions we could gather.

(The committee was dismissed with the thanks of the association.)

Report on Stresses in Railroad Track

THE SPECIAL COMMITTEE on Stresses in Railroad Track (a joint committee of the American Railway Engineering Association and the American Society of Civil Engineers) presented its second progress report. The committee divided its report between (1) tests to determine the effect of speed and counterbalance on stresses in rail; (2) track depressions; (3) depression, flexure and bearing pressure of cross ties; and (4) transmission of pressures in ballast. This report, which had also been presented before the annual meeting of the American Society of Civil Engineers in New York in January, was published in the *Railway Age* of March 5 and 12.

Committee: A. N. Talbot (Univ. of Ill.), chairman; W. M. Dawley (Erie), vice-chairman; A. S. Baldwin (I. C.), G. H. Bremner (I. C. C.), John Brunner (Ill. Steel Co.), W. J. Burton (M. P.), Charles S. Churchill (N. & W.), W. C. Cushing (P. R. R.), Dr. P. H. Dudley (N. Y. C.), H. E. Hale (Pres. Conf. Com.), Robert W. Hunt, J. B. Jenkins (B. & O.), George W. Kittredge (N. Y. C.), Paul M. LaBach, C. G. E. Larsson (Am. Pr. Co.), G. J. Ray (D. L. & W.), Albert Reichmann (Am. Pr. Co.), H. R. Safford (C. B. & Q.), Earl Stimson (B. & O.), F. E. Turneaure (Univ. of Wis.), J. E. Willoughby (A. C. L.).

Discussion

(A. N. Talbot (chairman) presented the report and read various abstracts from it, giving some informal explanations.)

John R. Leighty (M. P.): I would like to ask if you have found that stress in the rail at any given speed follows directly the weight of the load. What I am trying to get at is something to explain in my own mind if you can find a different per cent of increase for different types of locomotives and different types of tenders.

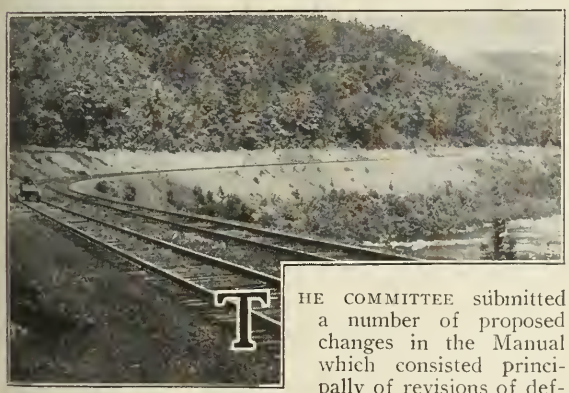
The Chairman: We do not know, of course, what the weight on these tenders was. They were taken rather as material which we thought would be of value. It is evident that a tender, and perhaps that applies also to loaded cars, has a higher effect of speed that the heavier loaded axles do.

Mr. Leighty: In examining some data, which was crudely obtained, which had to do with the depression of rail under moving loads, it was quite apparent that the depression was not in direct ratio to the load.

The Chairman: So far as depression is concerned, we have not been able to make any measurements. The question comes up how far this impact effect, due to speed, goes, how far down into the ballast it gets, how much of it is taken up by the tie and by the bending of the tie throughout the length. I feel that there must be an increased track depression. I hope that this season we shall be able to make some tests which will determine rather definitely to what extent it exists.

(The committee was excused, with the thanks of the association.)

Report of the Committee on Roadway



THE COMMITTEE submitted a number of proposed changes in the Manual which consisted principally of revisions of definitions and the addition of a few new definitions.

The committee also presented the results of its consideration of subsidence under embankments in Appendix B; of the shrinkage of embankments in Appendix C; and the unit pressure allowable on roadbeds of different materials in Appendix D.

Committee: J. R. W. Ambrose (Tor. Term.), chairman; J. A. Spielmann (B. & O.), vice-chairman; C. W. Brown (L. & N. E.), B. M. Cheney (C. B. & Q.), C. W. Cochran (Northwestern Univ.), W. C. Curd (Cons. Engr.), W. M. Dawley (Erie), Paul Didier (B. & O.), S. B. Fisher (M. K. & T.), W. C. Kegler (C. C. C. & St. L.), J. A. Lahmer (M. P.), J. G. Little (Ry. Age), H. W. McLeod (C. P. R.), C. M. McVay (K. & M.), F. M. Patterson (I. C. C.), W. H. Petersen (C. R. I. & P.), P. Petri (B. & O.), R. A. Rutledge (A. T. & S. F.), W. H. Sellew (M. C.), J. M. Sills (St. L. S. F.).

Appendix B—Subsidence Under Embankments

Subsidence, or hidden quantities, as one road calls it, is that portion of the embankment that lies below the original surface of the ground. There is apparently more subsidence than has been generally supposed, and until recently it has only been supposed to occur in places where the foundation was known to be of an unstable nature. However, the study made by the committee, covering reports made upon some hundreds of miles of line, indicates that subsidence exists to a greater or less extent under all embankments; not only was grading material found, but the investigation disclosed quantities of cribbing, mattress work and timber of all kinds, of which no definite record is kept.

The methods usually employed to determine the amount of subsidence are: trenching, auger borings and wash borings.

Trenching is used only through light embankments and at the toe of larger ones. Auger borings are made in fills where the material is of such a character that the earth auger will penetrate and bring up the material. Usually a protecting pipe casing is driven through the loose material and the auger operated through this pipe. Wash borings are made when the depth is too great or when the material will not permit the use of the earth auger.

In determining the amount of subsidence, cross-sections are taken at such intervals as is thought necessary by reason of the character of the surface over which the embankment is constructed, i. e., usually a test hole is made at the shoulder, on the slope and possibly in the center of the embankment; from these tests the surface of the original ground is located, and from the notes taken a cross-section is platted and the yardage calculated in the usual manner.

After the subsidence is calculated in order to determine the equivalent amount of excavation, a percentage (depending on the material) should be added for shrinkage; the committee has found shrinkage in embankments to average approximately ten per cent.

The costs per foot of hole bored, as indicated by the

reports received, varied from 33 cents to 55 cents; the cost per cubic yard of subsidence from 0.2 cents to 1.2 cents.

The committee studied the effect of different subsoils on subsidence with the object of establishing a relation of subsidence to height of fill; while the individual cases spread over a wide range, it is interesting to note that the average seems to be 1 per cent subsidence per foot of fill height, thus a ten-foot fill would give 10 per cent subsidence, i. e., 10 per cent of the original embankment.

In order to find out whether subsidence occurred to any extent under all embankments, one of the roads made an investigation in localities where there was no indication of or reason to believe that there was subsidence, with the surprising result shown in the following table:

	Embankment in Cubic Yards			Subsidence in Cubic Yards			
Length in Feet	10 Ft. and Under	Over 10 Ft. Under 20 Ft.	20 Ft. and Over	10 Ft. and Under	Over 10 Ft. Under 20 Ft.	20 Ft. and Over	Per cent of Increase
1,350	.....	29,399	.....	.....	6,138	.....	20.8
1,570	.....	27,355	.....	.....	8,117	.....	29.7
3,270	.....	93,695	.....	.....	29,669	.....	31.8
1,600	5,161	.....	.....	2,018	.....	.....	38.7
800	7,550	.....	.....	2,752	.....	.....	36.5
9,450	.....	154,031	.....	.....	38,355	.....	24.8
1,225	18,039	.....	.....	13,723	.....	.....	72.5
1,725	.....	37,586	.....	.....	12,062	.....	32.1
2,200	24,224	.....	.....	4,309	.....	.....	17.7
370	3,105	.....	.....	1,382	.....	.....	44.5
4,250	24,098	.....	.....	16,083	.....	.....	66.5
2,010	6,032	.....	.....	5,774	.....	.....	96.0
3,450	30,204	.....	.....	16,073	.....	.....	53.2
3,660	12,415	.....	.....	9,303	.....	.....	74.9
9,500	74,452	.....	.....	38,538	.....	.....	51.6
3,570	.....	77,522	.....	.....	23,450	.....	30.2
1,900	9,608	.....	.....	5,525	.....	.....	57.5
510	9,401	.....	.....	2,169	.....	.....	23.0
3,870	39,790	.....	.....	11,141	.....	.....	27.9
1,380	10,359	.....	.....	2,984	.....	.....	28.7
3,050	.....	55,772	.....	.....	12,021	.....	21.5
1,350	.....	27,611	.....	.....	8,086	.....	21.4
1,260	8,671	.....	.....	2,601	.....	.....	30.0
390	1,271	.....	.....	1,044	.....	.....	82.1
600	2,369	.....	.....	1,558	.....	.....	65.6
840	3,949	.....	.....	2,295	.....	.....	58.0
7,190	.....	.....	284,272	13,602	4,951	32,365	17.8
1,450	.....	12,355	.....	.....	3,813	.....	30.8
1,900	30,195	.....	.....	8,016	.....	.....	26.6
670	755	.....	.....	704	.....	.....	93.3
1,700	5,563	.....	.....	1,009	.....	.....	18.0
1,940	.....	25,796	.....	.....	4,793	.....	18.5
740	.....	17,803	.....	.....	3,441	.....	19.3
1,350	.....	11,869	.....	.....	3,900	.....	32.8
650	1,384	.....	.....	1,156	.....	.....	83.5
620	3,405	.....	.....	616	.....	.....	18.0
750	967	.....	.....	316	.....	.....	32.7
640	.....	7,057	.....	.....	1,919	.....	27.2
425	.....	10,718	.....	.....	5,210	.....	48.6
315	1,935	.....	.....	606	.....	.....	31.3
370	1,633	.....	.....	255	.....	.....	15.8
650	1,741	.....	.....	528	.....	.....	30.3
7,310	34,930	.....	.....	16,284	.....	.....	46.5
170 Miles	373,206	588,569	284,272	181,764	165,931	32,365	....
				48.5%	28.2%	11.4%	

The land upon which these embankments were constructed was originally marshy and covered with very heavy loam, but now has been thoroughly drained and the casual observer would have no reason to suspect that subsidence had occurred.

When one considers the conditions resulting from operation and the maintenance of track structure, it is apparent that there must be subsidence under all embankments, varying from an infinitesimal amount when founded on solid rock to a very great quantity in certain sinks. The committee found one instance of an almost unlimited subsidence in a cut. Although they have not been asked to make a recommendation, the committee wish to emphasize the importance of due consideration being given to the matter of subsidence when revaluation surveys are being made.

Appendix C—Shrinkage of Embankments

At the convention in 1917 the Roadway committee made a report on the width which it was advisable to construct new roadbed on embankments 50 feet or more in height. In the above report it was recommended that no allowance be made in height, and a rule was given for the widening of such embankments, taking into account anticipated shrinkage.

Reliable information received from the Interstate Commerce Commission and from various railroads furnishing information to the Valuation Department of the Interstate Commerce Commission show many and vastly different results in the shrinkage of embankment and swelling of excavation. Cases are cited showing the swell of rock excavation ranging from 6 per cent to 48 per cent.

The following statement summarizes the information received:

AVERAGE SWELL AFTER PLACED IN EMBANKMENTS

17 cases	solid Rock	excavation	taken from	South and West	25.2%
15 cases	90% Rock	10% Earth	taken from	South and West	31.5%
7 cases	80% Rock	20% Earth	taken from	South and West	17.1%
17 cases	70% Rock	30% Earth	taken from	South and West	18.9%
8 cases	60% Rock	40% Earth	taken from	South and West	13.9%
7 cases	50% Rock	50% Earth	taken from	South and West	16.6%
9 cases	40% Rock	60% Earth	taken from	South and West	5.5%
7 cases	30% Rock	70% Earth	taken from	South and West	*3.0%
7 cases	20% Rock	80% Earth	taken from	South and West	*0.1%

*Decrease.

These figures are substantiated by figures on granite excavation by the Central Vermont in Massachusetts, showing this granite to swell when placed in an embankment 31.86 per cent to 35.8 per cent. The same road also shows a shrinkage of 12.27 per cent with stiff blue clay and 7.76 per cent on fine, dry sand when placed in embankment. The sections on this work were taken immediately on completion of the grading and before track had been laid. All the above work had been done by dumping from temporary trestle.

In 21 cases, covering the country generally and representing a number of localities, we get an average shrinkage of 10.4 per cent. In round numbers, three million cubic yards are represented in these figures. The height and weather conditions are not of record and the fills were constructed in various manners, such as dumping from trestle, teams and scrapers, steam shovel and dump wagons.

Practically all the material represented is clay mixed with sand in various quantities. As quite a number of fills were constructed by several different methods on the same fill, it is not possible to establish a reliable percentage of shrinkage for the different methods of construction, but the individual cases vary from 15.1 per cent shrinkage in an instance where construction was performed by cars and stationmen to a 1.8 per cent shrinkage in a fill built by teams and scrapers.

It would seem from the figures submitted that an estimated shrinkage of 10 per cent is the best that can be done when handling roadway construction of earth composed of clay and sand, common to nearly all localities.

Shrinkage or settlement, of course, will start at once after the material is placed in embankment, but will be much more rapid after traffic is turned over the fill. The investigations of this committee substantiate the rule that earth occupies less space when placed in embankment than before excavated and rock swells when excavated and occupies more space.

The general conclusions reached from the investigation of the subject assigned to this sub-committee are as follows:

(1) Figure a swell of at least 25 per cent for solid rock removed from excavation to embankment.

(2) Figure a shrinkage of 10 per cent on earth removed from excavation and placed in embankment.

(3) Excavation and embankment composed of both rock and earth in mixed quantities should be estimated proportionately, using above rules.

These rules should be used with care and judgment, as there is no way of evading the fact that shrinkage

does not always occur to this extent or that more shrinkage may take place than anticipated. It is, however, well enough established by observation that it is fair and safe to anticipate these results in preliminary estimates.

Appendix D—Unit Pressures Allowable on Roadbed of Different Materials

Before any conclusion could be drawn by the committee on this subject it was necessary to know the extent, distribution and amount of pressure on the subgrade developed by the traffic passing over the same. The attempts at measurement of these pressures developed under traffic, and of the depression of the subgrade under load, made by the Joint Committee on Stresses in Track, were not successful enough to warrant the use of the results obtained or even to encourage further work in that direction.

A large amount of laboratory work has been done by the Joint Committee on Stresses in Railroad Track in the investigation of the distribution of pressures for different depths of ballast, and after conferring with A. N. Talbot, chairman of that committee, the following is submitted for your consideration:

Variation in Pressure Over Roadbed for Different Depths of Ballast

"(a) For a depth of 12 in. of ballast the maximum pressure on the roadbed may be said to be as much as 2.75 times the pressure obtained by considering the load to be uniformly distributed along the roadbed for a width equal to the length of the tie.

"(b) For a depth of 18 in. of ballast the maximum pressure on the roadbed may be said to be at least 1.6 times the average pressure on the area above referred to.

"(c) For a depth of 24 in. of ballast the pressure on the roadbed may be considered to be not far from the average pressure over an area of roadbed having a width 6 in. wider than the length of a tie."

The foregoing is based upon a tie spacing of, say, 21 in. center to center, and ties 8 ft. or 8 ft. 6 in. long. It is intended to represent results on well-kept track in good condition. The pressures considered are static pressures; the effect of vibration and impact will need to be taken into account in determining the load which any roadway will carry satisfactorily.

As an illustration, consider a locomotive having axle loads of 60,000 lb. spaced 5 ft. 6 in. apart. The average pressure on a width of roadbed of 8 ft. 6 in. would be 1,280 lb. per sq. ft. A maximum of 2.75 times this is 3,520 lb. per sq. ft. If the impact effect increases the effect of the load 50 per cent the pressure would be 5,280 lb. per sq. ft. Allowance for additional pressure due to counterbalance might give a large further increase. It is seen that the pressure on the roadbed may be very high under some conditions.

Allowable Pressure on Roadbed

The pressure which a roadway can carry will, of course, depend upon the nature and properties of the material of which it is composed, and upon its condition with respect to moisture, frost, etc. No tests have been made by the committee on complicated and difficult questions.

No definite results have been obtained on what pressures are developed on roadbed in practice, or on the deformations due to load or whether full recovery is generally obtained. In fact, it seems likely that little more can be found by tests on the roadway itself than to check up in a general way the deductions obtained from the laboratory tests and from analysis. The pressures which different materials will carry must also be got at in another manner.

The pressures above mentioned are averages of the individual readings taken at many points on the subgrade under the ties. The current report of the Joint Committee on Stresses in Track shows the variation in pressure both longitudinally and transversely of the tie for 12 in. depth of sand ballast and for loads of from 21,000 to 40,000 lb. on the tie. It also shows lines of equal vertical pressure under three ties spaced 21 in. center to center and demonstrates that at a depth equal to or slightly in excess of the tie spacing the pressure becomes practically uniform, at 38 per cent of the average pressure of the tie or not far from the average pressure over an area of roadbed having a width 6 in. wider than the length of a tie.

If the pressure on the roadbed be computed by taking the load uniformly distributed along the roadbed for a width equal to the length of the tie and this be increased by from 50 to 75 per cent for impace, vibration and effect of counterbalance and this result multiplied by 2.75 for 12 in. of ballast, 1.6 for 18 in. or by 1.0 for 24 in. of ballast, maximum pressures will be obtained which the roadbed will be called upon to sustain without undue deformation or settling. There is a dearth of information as to what pressure various soils will sustain at such shallow depth as from 1 to 2 ft. Such materials, if available, should be chosen for the roadbed as modern building practice has demonstrated will carry the loads computed as above.

Discussion

J. R. W. Ambrose, chairman, presented the report and moved the acceptance of matter on revision of the Manual.

(Motion carried.)

The Chairman: The next subject is "Subsidence Under Embankments." This is submitted for information only.

W. H. Courtenay (L. & N.): I do not want to dispute the committee's finding, but that result in the seventh paragraph of Appendix B looked to me rather startling, to have a 50-ft. embankment with 50 per cent of the earth under the natural ground surface.

The Chairman: I do not believe that is intended to cover any limited height. We have a number of cases cited where the subsidence was far in excess of 50 per cent, up to 75 per cent, and over 100 per cent. It is the result of a number of cases, which probably covered 100 miles.

Mr. Courtenay: In marshes we have cases, shown by borings, where there is more embankment below the marsh than above, and strange to say it was green matter, put there when the road was constructed in 1869, and still green. I know certain cases where the amount of material has been enormous that has gone through the swamps, but in ordinary ground I do not think the subsidence is so great.

The Chairman: I am glad you took exception to that, because the committee was startled to find the comparative indifference of the majority of engineers regarding this subject.

Hadley Baldwin (C. C. C. & St. L.): The percentages in Appendix C are averages, as I understand, of all the data that was submitted to the committee. The average of the country at large might be entirely misleading as to a particular locality or particular railroad.

H. L. Ripley (N. Y. N. H. & H.): The average percentages are very likely to be misleading if you do not differentiate between the soft rocks, shales and soft sandstones, and the hard traps and granites. From the investigations we have made, we feel sure that the swell in the softer rocks will not exceed 15 per cent. We feel

equally sure that the New England granites will swell approximately 10 per cent.

C. M. McVay (K. & M.): In measuring swell rock, there were examples which ran from 3 or 4 per cent up to 60 per cent or more. In earth the variance was not so large, but showed a shrinkage all the way up from 1 or 2 per cent to 18 and 20 per cent.

Mr. Ripley: I think if you will make a study of it, you will find that a variation does follow roughly the degree of hardness of the rock. It is influenced by many things, the way you shoot it, and the way it is put into the fill. No degree of precision can be reached, but it seems that the fact is pretty well established from the studies we have made that perhaps an average swell for a soft rock—I do not mean paper shell, but a rock, real rock—which is soft and breaks up finely and much of it disintegrates until it becomes of an earthy consistency, will show approximately 15 per cent. I think it is equally true that rock of the character of granite will swell approximately 40 per cent.

J. L. Campbell (E. P. & S. W.): This is a case in which averages are dangerous things to use. If it is a problem of laying the grade line so as to balance the quantities, it will be necessary to consider the individual excavation in connection with the embankments affected and the specific character of that material.

E. F. Wendt (I. C. C.): I ask the committee what is represented by the 10 per cent which they suggest for shrinkage?

Mr. McVay: I think that is the 10 per cent additional yardage required in the construction of the embankment over the amount taken out of the excavation; in other words, approximately 100,000 yd. of earth in excavation would shrink to approximately 90,000 yd. when placed in the embankment.

G. H. Bremner (I. C. C.): May I ask if the committee eliminated all the subsidence from this shrinkage?

The Chairman: The shrinkage in this case has nothing at all to do with subsidence, because we are figuring shrinkage here before you actually get it.

Mr. Wendt: Are you following the definition in the Manual when you say that the average amount of shrinkage is 10 per cent?

The Chairman: I would say we are, in the case of the example cited, 100,000 yd. of excavation, we have not this amount exactly, but we know we will get that much from the cross sections, and we also know, by calculating 10 per cent shrinkage, we are only actually going to have a corresponding embankment of 90,000 yd.

Mr. Wendt: What we understand generally from engineers is that the percentage represents, not exactly the contraction of material, but the difference between the amount in the first instance and the amount which remains some years after the embankments have settled and they have reached their natural slopes. If that is the case, the difference is not the contraction only, but something else has taken place.

R. H. Ford (C. R. I. & P.): I am familiar with one case that may be of value. We constructed on the Rock Island a few years ago a track elevation embankment from 20 to 40 ft. high, enclosed by concrete walls, so that there was no possibility of material getting out on either side. We undertook in building to immediately shrink the material by turning water on the embankment for 10 days.

The shrinkage, as near as we could calculate, was 10 per cent. In investigating the matter, to ascertain whether it was really 10 per cent. or 12 per cent. or 8 per cent., I regret to say we were not able to confirm our conclusions of 10 per cent.

Mr. Alfred: I wonder if there is any objection on the part of the gentlemen representing the Interstate Commerce Commission to let us know what formula they have used in determining shrinkage and what formula they have used in determining subsidence.

Mr. Wendt: So far as subsidence is concerned, there is no formula. That is a matter of estimate. So far as shrinkage is concerned, engineers do not seem to know what the amount of shrinkage is. A rule which is being followed is that the maximum amount is 10 per cent., and furthermore, it is not considered that this is a contraction of the material but that it is the difference between the original amount in its natural condition, and that same amount in the embankment after it has reached its settled condition after the slopes have become natural and after there has been some loss due to the washing and wasting caused by the weather.

The Chairman: I move that Sections (b), (c) and (d) be accepted as information for incorporation in the proceedings.

(Motion seconded and carried.)

The committee was dismissed with the thanks of the association.

Report of Committee on Wood Preservation

In Appendix A the committee submitted changes in the Manual. In Appendix B it submitted the record of the results of the preservative treatment of cross-ties on the Delaware, Lackawanna & Western.*

The committee has never submitted a specification for water gas tar for use by itself, but in this year's report covering the preservative treatment with zinc chloride and creosote oil, two specifications, one for water gas tar solution and the other for water gas tar distillate, are submitted, in view of the fact that the use of these oils has become recognized as good practice.

In Appendix D of its report the committee presented a brief statement on the progress made with the process for perforating timbers to increase penetration with preservatives.

In Appendix E the committee submitted as information a new indicator for determining the penetration of zinc chloride in ties and timbers treated by the Burnettizing process, the directions covering which were recommended for adoption as standard practice under the heading of "Conclusions."

In Appendix F the committee reported on the availability of sodium fluoride and recommended its trial by those railroads interested in water soluble preservatives.

In Appendix G the committee gave what it feels is the present knowledge of the values of the different creosote oils.

Appendix I gives certain observations concerning plant operation made by various members of the committee during the year.

The committee also submitted a map showing a tentative line which can be considered an indication of what

*Abstracted in the *Railway Age* of February 13, 1920, page 491, under the report of the American Wood Preservers' Association.

present practices warrant for the division between the use of creosote and zinc treatment for cross-ties. This is a north and south line through the states of North and South Dakota and Nebraska, along the west line of Kansas to Oklahoma, and thence southeasterly to Corpus Christi, Tex.

Conclusions

The committee makes the following recommendations:

For Adoption and Publication in the Manual

(a) Revised Heading for standard specification for creosote oil.

(b) Revised Heading for specifications for tie treatment.

(c) Revised general requirements.

(d) Revised specification for treatment of ties by the Burnettizing process.

(e) Revision of the specification for zinc chloride in the zinc-tannin treatment.

(f) Revised specification for plain creosoting.

(g) Revised specification for zinc-creosote emulsion treatment.

(h) Elimination of the two-injection zinc-creosote treatment.

(i) New specification covering preservative treatment of wood with creosote oil (empty cell process with final vacuum).

(j) New specification covering preservative treatment of wood with creosote oil (empty cell process with initial air and final vacuum).

(k) Directions for the use of the iodine-potassium ferricyanide-starch color reaction test for determining zinc chloride penetration.

Accept as Information

Report on water gas tar.

Report on preservative treatment for Douglas fir.

Paper on the new process for determining the penetration of zinc chloride in wood.

Availability of sodium fluoride.

Committee: C. M. Taylor (P. & R.), chairman; Dr. Hermann von Schrenk (con. engr.), vice-chairman; F. J. Angier (B. & O.), E. H. Bowser (I. C.), Z. M. Briggs (P. L. W.), C. B. Brown (C. N. R), A. S. Butterworth (G. F. & A.), I. A. Cottingham (G. C. L.), W. H. Gardner, Jr., T. H. Gatlin (Sou.), R. H. Howard, W. H. Kirkbride (S. P.), H. Knight (Erie), W. W. Lawson (S. P.), G. E. Rex (A. T. & S. F.), Lowry Smith (N. P.), E. A. Sterling, T. G. Townsend (U. S. R. A.), J. H. Waterman (C. B. & Q.).

Appendix A—Revision of Manual

The committee has revised the specifications covering recommended practices for the different preservative treatments of wood as now appearing in the Manual. The preliminary part of each proposed specification is identical and they are very nearly those specifications as used by all the railroads while under federal control.

The specification which was adopted at the annual meeting in March, 1919, covering preservative treatment of wood with zinc chloride, is changed to have it agree in make-up and procedure with the specifications for use with other preservatives.

The heading "Standard Specification for Creosote Oil," as appearing on page 541 of the Manual, is changed to "Specifications for Grade 1 Creosote Oil." This will provide for three grades of distillate creosote oil, namely, 1, 2 and 3. There are no changes in the specifications for creosote oil this year.

The title "Specifications for Tie Treatment," as now appearing on page 540 of the Manual, is changed to "Specifications for Preservative Treatments."

The General Requirements have been revised, and are as follows:

General Requirements: The General Requirements apply to each of the treatments.

If used in specifications for the purchase of treated material, these General Requirements should be followed by the specification for the particular treatment desired.

Material should not be treated until seasoned. If it arrives at the treating plant in a seasoned condition ready to treat, it may be loaded direct from the cars to the trams; otherwise, it shall be stacked. If ties, they shall be stacked in layers of 1 or 2 and 7 to 10, depending on the width of the ties; if piles or lumber, they shall be stacked to insure even and proper seasoning—with alleys at least three feet wide between rows of stacks extending between tracks, and at least six inches off the ground on treated sills. The space under and between the rows of stacks at all times should be kept free of rotting wood, weeds or rubbish. The yard should be so drained that no water can stand under the stacks, or in their immediate vicinity.

Since the seasoning varies with the latitude, time of year, the exposure and peculiarities of the season, it is essential to establish by experiment the seasoning period usually required to enable each class of timber to best receive treatment. Material piled for seasoning should be closely watched, and not allowed to overseason or to deteriorate. No material should be treated which does not conform to the requirements of the specifications as to shakes, checks, soundness, etc. Material which shows signs of checking should be provided with "S" irons, bolts or other devices, in order to prevent, during or after treatment, further checking that would be liable to render it worthless.

Where ties are to be adzed or bored for subsequent insertion of spikes, or application of tie plates, such adzing and boring should in all cases be done before treatment.

The balance of the General Requirements as given on page 550 of the Manual is eliminated, as the treatment is varied under each specification.

Specification for the Preservative Treatment of Wood with Zinc Chloride

(Substantially the same as U. S. R. A. specification appearing in *Railway Age* for February 21, 1919, page 446.)

This takes the place of "Specifications for the Treatment of Ties by the Burnettizing Process," shown on page 711 in the *Railway Age* for March 20, 1919, and adopted at the March, 1919, meeting of the Association as recommended practice.

Zinc Tannin Treatment: This, as appearing on pages 551 and 552 of the Manual, should stand with the exception that the last paragraph on page 552 down to this quotation—

"The zinc chloride used shall be as free from all impurities of any kind as is practicable, being slightly basic, free from acid, containing not more than 0.25 per cent iron."

is changed to read as follows:

"The zinc chloride used shall be acid-free and shall not contain more than 0.1 per cent iron; fused or solid zinc chloride shall contain 94 per cent soluble zinc chloride; concentrated solution shall contain at least 50 per cent soluble zinc chloride."

The above specification for zinc chloride is the one adopted as recommended practice at the March, 1919, meeting.

On page 552 of the Manual the words "plain creosoting" are changed to read:

Specification for the Preservative Treatment of Wood with Creosote Oil (Full Cell Process)

(Substantially the same as U. S. R. A. specification appearing on page 445 of the *Railway Age* for February 21, 1919.)

On page 553 in the Manual the heading "Zinc Creosote Emulsion Treatment" is changed to—

Specification for the Preservative Treatment of Wood with Zinc Chloride and Creosote Oil

Except when ordered otherwise by the railroad's representative, the material to be treated shall be air-seasoned until in his judgment any moisture in it will not prevent injection of the specified amount of preservative; shall be restricted in any charge to woods into which approximately equal quantities of preserving fluid can be injected; and shall consist of

pieces approximately equal in size and sapwood content, on which all framing, boring, or adzing shall have been done, so separated as to insure contact of steam and preservative with all surfaces.

The zinc chloride used shall be acid-free and shall not contain more than 0.1 per cent iron. Dry zinc chloride shall contain at least 94 per cent soluble zinc chloride, and in any solution purchased the percentage of zinc chloride specified shall be the quantity of zinc chloride required.

The creosote oil shall meet the standard for Grade 3 Creosote oil.

The material shall retain an average of 0.5 pound of dry zinc chloride and 3 pounds of creosote oil per cubic foot, which shall permeate all of the sapwood and as much of the heartwood as practicable, and no charge shall retain less than 90 per cent nor more than 110 per cent of these quantities per cubic foot.

The preserving mixture shall be composed of the volumetric proportions of creosote oil and of zinc chloride solution of the necessary strength which are required to obtain the specified retention of the preservatives with the largest volumetric injection that is practicable, and shall be agitated in the working tank and cylinder so as to insure thorough mixing before and while the cylinder is being filled with preservative and while the preservative is being injected into the material. The strength of the zinc chloride solution shall not exceed 5 per cent and shall be determined by analysis. Chemical titration —using a silver-nitrate solution with potassium-chromate indicator, before the zinc chloride solution is mixed with the creosote oil will usually be satisfactory. For example: With red oak the proportions shall be not less than 77 per cent of 5 per cent zinc-chloride solution and not more than 23 per cent of creosote oil, and the volume injected shall be not less than 20 per cent while with pine having a large percentage of sapwood they shall be not less than 88 per cent of 2.5 per cent zinc-chloride and not more than 12 per cent of creosote oil, and the volume injected shall not be less than 40 per cent. The quantities of preservatives retained shall be calculated from readings of working tank gages or scales and from weights of at least one-tenth of the material on a suitable track scale before and after treatment, checked as may be desired by the railroad's representative.

Air-seasoned material shall be steamed in the cylinder for not less than one hour nor more than two hours, at a pressure of not more than 20 lb. per sq. in., the cylinder being provided with vents to relieve it of stagnant air and insure proper circulation of the steam and being drained to prevent condensate from accumulating in sufficient quantity to reach the material. After steaming is completed, a vacuum of at least 22 inches shall be maintained until the wood is as dry and as free from air as practicable. Before the preservative is introduced the cylinder shall be drained of condensate, and if the vacuum is broken a second one as high as the first shall be created. The preserving mixtures shall be introduced without breaking the vacuum until the cylinder is filled. The pressure shall be gradually raised, and maintained at a minimum of 125 lb. per sq. in. until the required amount of preservatives is injected into the material, or until less than 5 per cent of the total quantity required has been injected during the latter half of one hour throughout which the rate of injection has persistently decreased while the pressure has been held continuously at 165 or more lb. per sq. in. The temperature of the preservative during the pressure period shall be not less than 170 deg. F., nor more than 200 deg. F., and shall average at least 180 deg. F. After the cylinder is emptied of preserving mixture, a vacuum shall be maintained until the material can be removed from the cylinder free of dripping preservative.

At least once each day the railroad's representative shall determine penetration by analysis. The "Iodine-Potassium Ferricyanide Starch" color reaction test to determine the penetration by its visibility will generally be satisfactory. From ties, samples shall be taken at middle and rail sections; from other material samples shall be taken as desired. Any holes that may be bored shall be filled with tight-fitting creosoted plugs.

The treating plant shall be equipped with the thermometers and gages necessary to indicate and record accurately the conditions at all stages during the treatment, and all equipment shall be maintained in condition satisfactory to the railroad. The owner of the treating plant shall also provide and keep in condition for use at all times the apparatus and chemicals necessary for making the analyses and tests required in this specification.

When water gas tar solution instead of creosote is used, it shall meet the following requirements:

The oil shall be a water gas tar product, of which at least 60 per cent shall be distillate of water gas tar and the remainder shall be refined or filtered water gas tar. It shall comply with the following requirements:

1. It shall not contain more than 3 per cent water.
2. It shall not contain more than 2 per cent of matter insoluble in benzol.
3. The specific gravity of the oil at 38/15.5 deg. C. shall not be less than 1.03 nor more than 1.07.
4. The distillate, based on water-free oil, shall be within the following limits:
   Up to 210 deg. C., not more than 8 per cent.
   Up to 235 deg. C., not more than 20 per cent.
   Up to 355 deg. C., not less than 60 per cent.
5. The specific gravity of the fractions between 235 deg. C. and 315 deg. C. shall not be less than 0.98 nor more than 1.02 at 38/15.5 deg. C.
6. The residue above 355 deg. C., if it exceeds 5 per cent, shall have a float test of not more than 50 seconds at 70 deg. C.
7. The oil shall not yield more than 10 per cent coke residue.
8. The foregoing test shall be made in accordance with the standard methods of the American Railway Engineering Association.

When a distillate of water gas tar is used, it shall meet the following requirements:

The oil shall be a distillate of water gas tar. It shall comply with the following requirements:

1. It shall not contain more than 3 per cent of water.
2. It shall not contain more than 0.5 per cent of matter insoluble in benzol.
3. The specific gravity of the oil at 38/15.5 deg. C. shall be not less than 1.02.
4. The distillate, based on water-free oil, shall be within the following limits:
   Up to 210 deg. C., not more than 5 per cent.
   Up to 235 deg. C., not more than 25 per cent.
   Up to 355 deg. C., not less than 80 per cent.
5. The specific gravity of the fractions between 255 deg. C. and 315 deg. C. shall not be less than 0.98 nor more than 1.02 at 38/15.5 deg. C.
6. The residue above 355 deg. C., if it exceeds 5 per cent, shall have a float test of not more than 50 sec. at 70 deg. C.
7. The oil shall not yield more than 2 per cent coke residue.
8. The foregoing tests shall be made in accordance with the standard methods of the American Railway Engineering Association.

On page 554 of the Manual the "Two-Injection Zinc Creosote" heading and the subsequent specification is eliminated and the following processes substituted:

Specification for the Preservative Treatment of Wood with Creosote Oil (Empty-Cell Process with Final Vacuum)

(Substantially the same as U. S. R. A. specification appearing in the *Railway Age* for February 21 1919, page 445.)

Specification for the Preservative Treatment of Wood with Creosote Oil (Empty Cell Process With Initial Air and Final Vacuum)

(Substantially the same as U. S. R. A. specification appearing in the *Railway Age* for February 21, 1919, page 446.)

Appendix E—Indicators for Determining the Burnettizing of Ties and Timbers

The committee presented a report on a new indicator for determining the penetration of zinc chloride solutions developed by Galen Wood, chemist of the Port Reading Creosoting Plant, and described in his paper to the American Wood Preservers' Association. A brief synopsis of this appeared in the *Railway Age* for February 13, 1920, page 495.

Directions for the Use of the Iodine-Potassium Ferricyanide Starch Color Reaction Test For Determining Zinc Chloride Penetration

This method requires the following chemicals and apparatus:

1. Potassium ferricyanide.
2. Potassium iodide.
3. Soluble starch.
4. Atomizer.

The chemicals should be purchased chemically pure and half pound each should be enough for any plant at one time. De Vilbiss Atomizer No. 30 is very satisfactory.

For stock solutions of the three chemicals make 200 cc each to be kept separately until used:

1. 1 per cent potassium ferricyanide. (2 gm. dissolved in 200 cc water.)
2. 1 per cent potassium iodide. (2 gm. dissolved in 200 cc water.)
3. 5 per cent soluble starch. (10 gm. dissolved in 200 cc water.)

Mix the weighed starch with a little of the measured cold water and then pour into the remaining water boiling hot and continue to boil until the starch is in solution. Starch solution will not keep for many days and must not be used when it begins to sour.

To make a test for zinc chloride penetration, simply pour 10 cc each (or equal amounts) of the three stock solutions into atomizer and spray the cross section of the tie evenly all over; if zinc chloride is present a deep blue stain will result showing clearly the depth of penetration.

Appendix F—Availability and Use of Sodium Fluoride as a Preservative for Cross-ties

Sodium fluoride as a preservative for cross-ties could be made available in large quantities if an assured market could be had for the product. It may be prepared as a direct product, or it may be had from discarded by-products of fertilizer plants using phosphate rock.

The committee had nothing new to report in connection with this preservative. On account of the increasing cost of creosote oil, the merits of sodium fluoride, as well as those of other preservatives, should be investigated further with the view of obtaining an ample supply of satisfactory wood preservatives at a moderate cost.

Appendix G—Creosote Treatment to Be Used in the Protection of Piles and Timbers in Teredo-infested Water, Specifying Amount of Creosote to Be Used

The committee has investigated generally the conditions and present practices of the various railroads having terminals in marine waters, and the results of these investigations have shown the matter to be so complex that the committee is not able to report on a recommended treatment. The investigations to date, however, indicate that a borer known as "Sphaeroma" has become better known and whose damage is less often mistaken for that of the teredo. It seems to work in brackish and salt waters, and while its action is slow the results are certain, and those railroads which have bridges or structures in waters adjacent to salt water should investigate to determine whether this form of wood-boring organism is present.

Appendix H—Comparative Values of Grades 1, 2 and 3 Creosote Oil and Creosote-Coal-Tar Solutions as Preservative Agencies

Grade 1 is considered to give us the best grade of creosote oil in so far as we are able to judge it at the present time.

Grades 2 and 3 are more volatile and their use is not expected to insure the factor of safety to be had from the use of grade 1, except that a larger quantity of grades 2 or 3 would probably give the same results as a smaller quantity of grade 1.

The preservative treatment of ties in recent years has developed that they should not only be treated to prevent decay, but also that there should be a component in the oil that will aid in preventing the surface checking and subsequent minor splitting of the tie, and the committee feels that the creosote-coal-tar solution, if in strict accordance with the specification of this Association, will both preserve the tie from decay and will in a large measure help in the prevention of this surface checking.

Appendix I—Notes on Existing Conditions at Some Treating Plants

We find that the handling of the preservative treatment and the direct operation of the wood-preserving plants of the various railroads is supervised in many cases by departments that have small conception of the engineering features of wood preservation, or the importance of properly treating the material.

There are treating plants now operated whose main object is quantity production. Some plants are even operating their treating cylinders on a time table basis. Furthermore, there seems to be a decided lack of knowledge as to when the material is fit for treatment or as to when it is decayed and consequently should never be treated.

Furthermore, the committee has found treating plants that keep no records of the treatment which the material receives; that have no gages to record the varying temperatures that exist in the treating cylinders; where those in charge have slight conception of the actual treatment which the material is receiving because they never weigh a charge; nor do they even take the trouble of making cross sections, or taking increment borings of any material after treatment; nor do they apparently attempt to improve the treating equipment.

Discussion

C. M. Taylor (chairman): There has been a constant demand for several years for standard specifications for material to be treated. We have had them in the Manual, and they should have been revised some years ago. This last year seemed an opportune time to get all of our revisions properly made, and the committee in charge of revision of the Manual has given a report.

The first point brought out is that the heading "Standard Specifications for Creosote Oil" be changed to "Specifications for Grade 1 Creosote Oil," the idea being that we have practically four different kinds of creosote oil and that we should have them graded so that they can be easily understood. There is no change in the specifications other than the heading. I move that the heading of the specifications be changed to read "Specifications for Grade 1 Creosote Oil."

(Motion seconded and carried.)

The chairman: Practically all timber has to be in the same condition to be treated by the different processes, so that the question of general requirements for all treatments is and should be approximately the same. The committee therefore offers a revision of the general requirements. I move that the revision covered under "General Requirements" be adopted as recommended practice.

(Motion seconded and carried.)

The chairman: I have overlooked one item, "Specifications for Preservative Treatments." We have always had specifications for tie treatment. As I said before, the specifications for all preserving treatments cover ties and other materials. I should like to have the title "Specifications for Tie Treatment" changed to "Specifications for Preservative Treatments." I make that as a motion.

(Motion seconded and carried.)

The chairman: The next is "Specification for the Preservative Treatment of Wood with Zinc Chloride," and starting out on this revision of specifications for different treatments we have lined them up all in the same rotation as to procedure. That is in line with the fact that all timber has to be in the same general condition for all the different treatments. The specification for the pre-

servative treatment of wood with zinc chloride is one that has been in use for a considerable length of time.

I move that the specification be inserted in the Manual as recommended practice.

(Motion seconded and carried.)

The chairman: The next item is the "Specification for the Preservative Treatment of Wood with Zinc Chloride and Creosote Oil." That is the combined process which is being used considerably by several of the railroads. In view of the fact that to use this process it is generally necesary to have the consent of the patentee, it will be necessary to so show it. The specification as given should be used in conjunction with one or two patents, namely, U. S. patent 815404, granted in 1896, and another patent granted in April, 1916, No. 1,178,132, so as to make it absolutely clear that the process covered here is possibly covered by a patent.

The next is "Specification for the Preservative Treatment of Wood with Creosote Oil." That is also covered —not covered possibly, but it is used in conjunction with the patent issued in September, 1906, No. 831450. The next is the empty cell process with initial air and final vacuum. This was covered by patent No. 707789, but that expired last September, and it is now free to everyone. I move the adoption of these specifications for recommended practice.

(Motion was seconded and carried.)

The chairman: The question of service records is one that is becoming more and more important in connection with timber preservation. Each year we have further examples of the good work and the financial saving that have come through timber preservation, and this year we have a report that was gotten out in connection with the tie committee of this association and the Wood Preservers' Association, covering work on the Delaware, Lackawanna & Western and the results.

Dr. Herman von Schrenk (vice-chairman): In the past we have given tabulated statements in a rather condensed form taken from the records of various lines. This year we are establishing a system of giving more detail in available records on an individual railroad, and we started out with the Lackawanna, because of the very excellent type of record which it has kept from the very start of its tie treating. One of the great difficulties in the history of treated ties has been the lack of definite information concerning what may be reasonably expected from their use.

Fred Lavis (Am. Int. Co.): I would like to ask one question about the Lackawanna record. The decreased number of ties renewed seems to be very marked since 1915. Does the committee know whether this is due entirely to the use of treated ties, or whether it may be due to other causes, such as the war, increased cost and action of the Railroad Administration?

The chairman: I feel that we are not in a position to say, but my understanding is that the decrease is largely due to the good work that the road has done in preservation, so that it does not therefore have to put in as many ties as it did previously.

Hunter McDonald (N. C. & St. L.): I would like to ask Dr. von Schrenk if he has any information which would explain the results gotten from untreated ties which seem to be remarkable.

Dr. von Schrenk: Most of the untreated ties are chestnut.

Mr. McDonald: They must have had very heavy tie plates.

Dr. von Schrenk: Yes, most of them were on the side lines and side tracks. You see, all tracks are included in this report.

The chairman: Appendix C, Water Gas Tar, is submitted for information. Referring to Appendix D, the preservative treatment of Douglas fir is one that is not so clear, but we hope during the coming year to be able to work up a treatment that will give excellent results.

The next is Appendix E, "Indicators for Determining the Burnettizing of Ties and Timbers." This is a paper borrowed from the Wood Preservers' Association, showing a new method for determining the penetration of zinc chloride. I move that the directions given be placed in our Manual as recommended practice for determining zinc chloride penetration.

(Motion seconded and carried.)

The chairman: Appendix F. With the increasing prices, due to the scarcity of creosote oil, and the rise in price of zinc chloride, other preservatives are being pushed for the same class of work as these two preservatives have filled in the past. Sodium chloride, which is new to the majority of you, is coming before you as a new preservative. The indications are that it will rival zinc chloride, and perhaps be a better preservative in places where zinc chloride has been used in the past. The Philadelphia & Reading Coal & Iron Co. are using it exclusively in the treatment of their mine props and are getting excellent results. There is a question whether it does not have less effect on the track circuits than zinc chloride that will undoubtedly be handled this coming year. Appendix F is submitted as information.

Last on the program is Appendix G, presenting a new subject started last year. We are fortunate in having on our committee several men who are located along the coast line, and the territory was divided into three divisions, Pacific, Atlantic and Gulf territories. This work was in charge of Dr. von Schrenk, the vice-chairman, who will present it.

Dr. von Schrenk then briefly discussed the work of the territorial subcommittees, after which Lowry Smith (N. P.) presented some lantern slides showing the destructive effect of the marine borers. Following a short discussion of these slides, the committee was dismissed with thanks.

Request Made for Formation of New Sectional Committee

A request has been made of the Signal division by signalmen located around and near Livingston, Mont., for the formation of a new sectional committee to be known as the Livingston Sectional Committee. The formation of such a committee would permit more signalmen to attend these meetings than can do so at present, when it is necessary for them to either attend the St. Paul Sectional Committee meetings or the Tacoma Sectional Committee meetings. By forming a sectional committee at Livingston, the mileage between St. Paul and Tacoma would thus be divided, as this place is approximately midway between these two cities.

The Committee on Direction approved the application for the formation of this new sectional committee at its meeting yesterday.

J. B. Jenkins Promoted to Lieut.-Colonel

J. B. Jenkins, valuation engineer of the Baltimore & Ohio and for a number of years chairman of the Track committee of the American Railway Engineering Association, was promoted from major to lieutenant-colonel in the Engineering Reserve Corps on January 3, 1920. Mr. Jenkins was recommended for this promotion before the signing of the armistice, but its confirmation was delayed in common with all other similar recommendations.

Banquet of the American Railway Engineering Association Last Evening

The Dinner of the Engineering Association

Abstracts of Two Addresses Presented at the Twenty-First Annual Banquet Held Last Evening

THE TWENTY-FIRST ANNUAL DINNER of the American Railway Engineering Association was held last evening in the Gold Room of the Congress Hotel. President Earl Stimson presided, as he did last year, in the absence of President C. A. Morse. The speakers of the evening were Dr. Winthrop Ellsworth Stone, president of Purdue University, LaFayette, Ind., and Hon. and Rev. Henry J. Cody, M.A., D.D., LL.D., member of the Ontario legislature and former minister of education of Ontario, Toronto, Ont.

"The College and the Industries"

Dr. Stone, in speaking on this subject, said in part:

The college man is a useful man. When he is assigned to a task he acquits himself like a man. If you are to take the young college graduate, put him into industry, and compare him with the type of young man who in early life has been thrown out on his own resources, and has made his way in practical affairs, and taken the hard knocks of life, the comparison will be to the disadvantage of the young college graduate. But while this other boy has been getting hard knocks, the college boy has been getting training, and he, too, will come in for his share of the hard knocks; and when he has combined that double treatment of training and experience, he becomes a man who, other things being equal, will, I think, surpass the merely practical man.

The college graduate rather reflects the general social condition and public sentiment. The college is not responsible for his birth and his bringing up, and his inherited qualities. About all the college can do is to take him for a brief time, try to train him in some specific things, and try to develop in him a kind of character.

When industry takes hold of this young man it expects a great deal of him. Industry needs trained men more than ever before in the history of the world. Industry as it advances becomes more and more complicated, competition becomes greater, and depends more and more upon the technically trained man and the scientist.

And the source of these trained men, these scientific men, who are to assist industry, must be in the colleges and in the universities. In the railway field particularly the suspension of development and construction work on the railroads has taken away from many of our engineering graduates the opportunities for employment, and they, recognizing this, are going into other fields, and particularly the civil engineers, who might otherwise expect to go into railway work, do not find there now the openings they used to find, and through force of circumstances they are going off into other fields.

Engineering graduates in general we find are less and less attracted to real engineering work, and are more inclined to go into the sales departments of engineering, for the very obvious reason that it offers them larger compensation.

Now, that is true not only of engineers, but it is true of every class of young men who are training themselves for scientific and technical engineering pursuits. They find that the rewards of these pursuits are less than the rewards for many other things, and the result is, that while we have a good many students coming in for training in engineering when they get through they do not persist in the engineering field, and that is bad for industry and bad for engineering, because we need them in all capacities and all branches, and I venture to say that there is not much danger of our having too many trained men in any industry.

America potentially has a great future before it. That is even greater now than ever before. I think we feel that the things that have come out of this war and the position in which America finds itself, opens up before it a limitless vision of greatness, and yet at the same time America stands today probably in greater danger

than ever before, and one of the things that threatens it is the habit which is forming among our men of giving their best energies to the making and spending of money.

Education in Reconstruction

Henry J. Cody, the second speaker, referred briefly to the recent period of government control in this country and the return of the roads to private control and then took up the case of the Canadian roads, saying in part:

"We in Canada are engaged in a somewhat similar experiment. Some of our great railways are being put under government control, but the railroads will be managed by a non-political, non-partisan commission. We hope the result of their operation will be successful. Over against them stands another great railway system under private control, a system that has been very successful in the past and very enterprising. I imagine that the competition of the state system and the privately owned system will possibly be good for both, and I trust that both will be good for the country. I trust they will not charge all that the traffic will stand. That seems to be one of the sublime secrets of railway administration. Evidently it is necessary, if you are to keep your rolling stock and road-beds in good condition.

"In Canada at the present time we are, with you, facing some of the most serious problems of reconstruction, and I thought I might venture to say something to you tonight upon one of those problems common to you and to ourselves."

Following this, Rev. Cody took up the problems of reconstruction with special reference to the factor of education. This was solved in large part, he said, by appealing to qualities of courage, unselfishness, loyalty and responsibility developed in the trials of the war. He closed with an appeal for united action to make future wars impossible through support of the League of Nations.

Further Comment on the Dinner

The profound success of the association's banquet cannot be ascribed entirely to the flood of eloquence, logic, wit and harmony which characterized the program following the repast. The dinner of itself was no mere detail of the arrangement for an evening's enjoyment. In fact, we dare say it played an even more important part than the spiritual and mental feast which followed. The menu was notable for its excellence, variety and abundance. In fact, the dinner was such a complete gastronomic success in every way that we feel impelled to make a permanent record of the menu by reproducing it in full below:

MENU

Blue Points — Celery

Sherry

Consomme Royal

Radishes — Pim-olas

Salted Almonds

Filet of Sole, Normande

Cucumbers — Persillade Potatoes

Sauterne

Ballotine of Chicken — Maryland Sauce

Asparagus Tips

Tenderloin of Beef, Larded, Marechale — Green Peas

Claret

Punch Cardinal

Roast Golden Plover, on Toast — Lettuce Salad

Neapolitan Ice Cream — Assorted Cakes

Camembert — Coffee

Cigars

To avoid any possibility of confusion on the part of those who attended last evening's dinner, it suffices to say that the remarks and tabular matter presented above concern an entirely different affair, namely, the *first* annual banquet of the American Railway Engineering and Maintenance of Way Association, held in the main dining room of the Victoria Hotel, Van Buren street and Michigan avenue, Chicago, on March 15, 1900, when 200 members and friends of the association spent a pleasant evening under the able direction of President John F. Wallace. Shades of John Barleycorn and the full dinner pail. "Them was happy days!"

Memories

DEDICATED TO E. H. F.

1.

I remember, I remember,
In the days of long ago,
When there was no 'Sociation,
Such as today we know.
Augustus Torrey and L. C. Fritch,
Were present at its birth.
One was guilty, I don't know which,
Each was of equal worth.

2.

I remember, I remember,
When discussion was not barred,
Whether "Cluster" was a proper
Designation for a yard,
Was discussed for one whole session,
By such men as Sullivan,
Wilson, Hatch, Torrey, Mountain,
And the "Mac's" of every clan.

3.

Cheney, Church, Dickson and Bremner,
Dougherty, Kinnear and Duane,
Paradis, Curtis, Rodd and Taylor,
Memories that will not wane;
Lum, Carrothers, Berg and Trimble,
Hudson, Bates and Peterson,
Wallace, Mordecai and Churchill,
All donated to the fun.

4.

Rockwell, Berry, Montfort, Breckenridge,
Whittlesey, Whittemore and Handy,
Garrett, Darling, Dun and Kittredge,
On the railroads made their way.
Willard, Kruttschnitt, Harahan, Felton,
Elliott, Delano and Beeler,
Kelley, Underwood and Johnson,
Filled the presidential chair.

5.

Isaacs, Modjeski and Morison,
In the field of specialists,
Schneider, Bontscou, Bouscaren,
Are the names that head the lists,
Pence and Allen, Prout and Tratman,
Camp and Crandall, Swain, Turneaure,
Were the editors and teachers,
Who were faithful every year.

6.

See the list of Charter Members,
Scan it closely, mark it well.
Gone are many each remembers,
Where? No mortal man can tell;
Note the jobs those still among us
Had, the places they now fill,
And take heart, renew your purpose.
To like them fulfill the bill.

C. E. L.

The A. R. E. A. Elects New Officers

Results of Annual Election Announced Yesterday; Sketch of President-Elect H. R. Safford

SHORTLY BEFORE THE CLOSE of the afternoon session yesterday, Secretary Fritch announced the results of the balloting for officers for the ensuing year. The election resulted as follows:

President, H. R. Safford, assistant to president, Chicago, Burlington & Quincy, Chicago.

Vice-president, L. A. Downs, vice-president and general manager, Central Railroad of Georgia, Savannah, Ga.

Treasurer, G. H. Bremner, district engineer, Interstate Commerce Commission, Chicago.

Secretary, E. H. Fritch, Chicago.

Directors: Edwin B. Katte, chief engineer electric traction, New York Central, New York City; J. M. R. Fairbairn, chief engineer, Canadian Pacific, Montreal, Que.; F. E. Turneaure, dean, College of Engineering, University of Wisconsin, Madison, Wis.

Members Nominating Committee: A. W. Newton, chief engineer, Chicago, Burlington & Quincy, Chicago; R. S. Parsons, general manager, Erie, New York City; H. T. Douglas, Jr., chief engineer, Chicago & Alton, Chicago; Maurice Coburn, supervising engineer, Pennsylvania Railroad, Indianapolis, Ind.; W. P. Wiltsee, principal assistant engineer, Norfolk & Western, Roanoke, Va.

J. A. Atwood
First Vice-President

H. R. Safford
President

L. A. Downs
Second Vice-President

Officers-Elect of the A. R. E. A.

H. R. Safford, President-Elect

When H. R. Safford was selected by the nominating committee as candidate for second vice-president of the American Railway Engineering Association, that well-meaning body undoubtedly intended that his elevation to the presiding office of the association would afford the Canadian members their periodic representation among the presidents. Circumstances, however, have defeated his laudable aim, since Mr. Safford subsequently returned to the United States as an officer of the United States Railroad Administration and is now permanently established in this country as assistant to the president of the Chicago, Burlington & Quincy. In spite of this unintentioned favor to the membership south of the international boundary, the many friends which Mr. Safford acquired during his eight years' residence in Montreal will still feel that he represents them in spite of his residence in Chicago and the fact that he is a native-born American. It is one of the odd coincidences of life that the responsibility for Mr. Safford's going to Canada falls on Howard G. Kelley, one of the early presidents of this association, who was at that time vice-president of the Grand Trunk.

Like a number of his predecessors, the newest president of the association has grown beyond the limitations of a chief engineership, for as assistant to the president of the Chicago, Burlington & Quincy, the Colorado & Southern and the Ft. Worth & Denver City, he occupies what is more than an engineering position. His ability to grasp the broader phases of railway transportation is partially the result of his natural makeup and partially the consequence of his training. He is a product of the Illinois Central engineering department, which has probably produced more operating and executive railway officers than that of any other strictly western roads. Another evidence of his general breadth of character is evidenced by his selection as one of seven members at large on the Development Committee of the American Society of Civil Engineers.

Mr. Safford possesses more than ordinary ability to inspire quickly confidence and respect. When in September, 1918, he joined the staff of the Central Western region of the United States Railroad Administration, he was virtually a stranger to Hale Holden, regional director. Consequently, the considerations which prompted Mr. Holden to select his engineering assistant for an important position in the Burlington organization were based entirely on the impressions gained during the time that Mr. Safford was with the Central Western region, a large part of which he spent away from headquarters.

Harry Robinson Safford was born at Madison, Indiana. Being a Hoosier, it was but natural that he should

attend Purdue University, from which he graduated in 1895, entering railway service the same year as a rodman with the Illinois Central. He was promoted to resident engineer in charge of construction in 1897 and to roadmaster in 1900. In May, 1903, he became principal assistant engineer and from 1905 to 1906 he was assistant chief engineer, being promoted in the latter year to chief engineer maintenance of way and remaining in this position until May, 1910, when he resigned to become assistant to the president of the Edgar Allen American Manganese Steel Company. He resigned this position in October, 1911, to become chief engineer of the Grand Trunk, which position he held until appointed engineering assistant under the United States Railroad Administration.

Mr. Safford has given freely of his time to association matters and has long been considered a source of strength in association affairs. While his acquaintances are unanimous in agreeing that his selection for president should accrue greatly to the advantage of the association, the fact that he is built on generous and well-proportioned lines leads his intimate friends to the conclusion that he should be an ornamental as well as useful leader of the association, although this idea is not readily reconciled with the reluctance with which he parts with photographs to be used for publication purposes.

Purdue Alumni Luncheon

The Chicago Alumni Association of Purdue University held a special luncheon at the University Club yesterday noon in honor of the new president-elect, H. R. Safford, and vice-president elect, L. A. Downs, of the American Railway Engineering Association, who are of the classes of '95 and '94 of Purdue University. It was voted at the luncheon to make this an annual affair to be held during the A. R. E. A. convention for the purpose of getting Purdue men better acquainted with each other and with the work being accomplished by the alumni in different fields of industry. Fifty-nine men were in attendance; among those present were: W. D. Pence, member Engineering Board, Interstate Commerce Commission, Bureau of Valuation; C. C. Albright of Purdue University; W. K. Howe, chief engineer, General Railway Signal Company; W. K. Hatt, head of the school of Civil Engineering, Purdue University; H. R. Safford, assistant to the president, Chicago, Burlington & Quincy; G. W. Hand, assistant to the president, Chicago & North Western; Dr. Stone, president, Purdue University; E. W. Kolb, signal engineer, Buffalo, Rochester & Pittsburgh; and C. H. Tillett, signal engineer, Grand Trunk.

Representative railroad men were present from the Chicago, Burlington & Quincy; the Pennsylvania; the Chicago & North Western; the Chicago, Milwaukee & St. Paul; the Grand Trunk; the Buffalo, Rochester & Pittsburgh; the Baltimore & Ohio; the Detroit, Toledo & Ironton, and the Central of Georgia.

Short addresses were made by Mr. Safford, Dr. Stone, Mr. Hatt, Mr. Howe, Mr. Pence, Mr. Albright and Mr. Brady of the Illinois Steel Company.

Dr. Stone spoke of the great problem faced by the university with reference to its activities in educational work and of the manner in which the ex-students have loyally stood by the university. Mr. Hatt spoke of the new education problems confronting engineers and of the necessity for a broader training for them in order to better fit them for handling the more complicated situations that are being presented to engineers for solution under the present industrial conditions. He also pointed out the enlarged opportunities for engineers in the new order which is coming to pass.

Signals Relieve Traffic Congestion

The extension of block signaling and of interlocking offers a natural and most ready solution of the problem of traffic congestion under which the roads are now struggling, in the opinion of J. C. Mock, signal engineer of the Michigan Central, expressed to a representative of the *Daily Railway Age* yesterday. The roads have been endeavoring to handle a traffic which has taxed their ability to the limit for several months and the demand for increased capacity is most urgent. Any considerable increase in facilities will require time and the expenditure of large funds which are not now available. Therefore it is the opinion of Mr. Mock that the near future will see a large extension of signaling. Those roads which were less thoroughly equipped with signals at the beginning of the period of federal control will undoubtedly be the first to come into the market. The changing of older signal systems to upper quadrants or light signals which was discontinued temporarily during the war will undoubtedly be undertaken with renewed speed.

Mr. Mock further went on to say that one of the first general objectives of signaling is the arrangement of sidings in such positions that the switches may be handled readily to avoid delays to traffic. If all trains can be kept moving, or, failing that, if some can be diverted onto sidings to keep the main tracks clear for more important traffic, the maximum efficiency will be secured.

The recent railway legislation contains much of optimism for the signal man. Not only will the more favorable legislation under which the roads will operate be reflected in the signal department in common with other branches of the service, but the reference which is made in the law to automatic train control will direct greatly increased interest to that important development.

There is work in the signal field which cannot be delayed. There are improvements which are awaiting only the authority of the budget. When all or any great portion of the signaling and interlocking in contemplation and of economic advantage to the railways is put in hand, the note of optimism will have swelled to a chorus.

He Got the Order

The resourcefulness of the American railway supply salesman is well illustrated by methods adopted by J. E. Bachelder, manager of the marine engine and pump department of Fairbanks, Morse & Company, Chicago, in landing an order in the West Indies recently. He was in New York when he learned that a large contract for engines and other equipment was about to be let by a firm in Nassau, British West Indies. He found that no boat was scheduled to sail in time for him to reach that city in advance of the letting. He went to Miami, Fla., and endeavored to catch a boat from that point, but learned that because of a strike there was again no prospect of his being able to secure steamer accommodations in time. He therefore, made the trip of 150 miles by hydroplane. He got the order.

Michigan Central Attendance

The Michigan Central engineering department is represented at the convention by Colonel George H. Webb, chief engineer; A. J. Deimling, assistant chief engineer; Hans Ibsen, bridge engineer, and other system officers, as well as 56 officers and foremen from various divisions east and north of Chicago. This large attendance is in line with the general policy of the company to encourage its men to obtain first-hand knowledge of the instructive exhibits of the National Railway Appliances Association.

A. R. E. A. Registration

A TOTAL OF 129 MEMBERS of the American Railway Engineering Association and 55 guests registered at the convention yesterday. Including the registration on Tuesday, this gives an aggregate of 540 members and 178 guests, the largest for the first two days in any year.

Members

Allen, Andrews, consulting engineer, Chicago.
Allen, L. B., Eng. M. W., C. & O., Huntington, W. Va.
Anderson, Anton, Eng. M. W., Chicago, Ind. & Louisville, Lafayette.
Austill, H., Bridge Engineer, M. & O., Mobile, Ala.
Bachelder, F. J., Consulting Engineer, Chicago, Ill.
Baldwin, Hadley (Director), Asst. Ch. Eng., C. C. C. & St. L., Cincinnati, O.
Banks, T. G., Dist. Eng. M. K. & T., Oklahoma City, Okla.
Bates, F. E., Asst. Bridge Eng., Mo. Pac., St. Louis, Mo.
Blaess, A. F., Engineer M. W., I. C., Chicago. Ill.
Bragg, R. R., Division Engineer, C. R. I. & P., Dalhart, Texas.
Boardman, Francis, Div. Eng., Elec. Div., N. Y. C., New York, N. Y.
Bowser, E. H., Supt., Timber Dept., I. C., Memphis, Tenn.
Brown, H. W., Div. Eng., Penn. Lines, Cleveland, Ohio.
Campbell, H. A., Engr. Auditor, C. M. & St. P., Chicago.
Carpenter, H. R., Asst. Chief Engineer, M. P., St. Louis, Mo.
Cassil, H. A., Eng. M. of Way, P. M., Detroit, Mich.
Cheney, B. M., Gen. Insp. Per. Way, C. B. & Q., Chicago.
Cronican, W. P., Chief Draughtsman, Illinois Central, Chicago.
Cunningham, A. O., Chief Engineer, Wabash, St. Louis, Mo.
Dalstrom, O. F., Eng. of Bridges, C. & N. W., Chicago.
Daniels, Arthur, Dist. Eng., C. M. & St. P., Minneapolis, Minn.
Dawley, W. M., Asst. Eng., Erie, New York.
Dawley, W. S., Consulting Engr., St. Louis, Mo.
Deimling, J. F., Asst. Ch. Eng., M. C., Detroit, Mich.
Desmond, J. J., Roadmaster, I. C., McComb, Miss.
Dewees, A. R., Div. Eng., P. M., Saginaw, Mich.
Edwards, J. H., Am. Bridge Co., New York City.
Edwards, W. R., Sen. St. Eng., I. C. C., Washington, D. C.
Ehrke, John, Supt. Grand Trunk, Battle Creek, Mich.
Fairchild, Dennison, Supvr. B. & B., Nor. Pac., Duluth, Minn.
Fatherson, T. W., Eng. M. W., C. G. W., Des Moines, Iowa.
Fitzpatrick, P. D., Ch. Eng., Central Vermont, St. Albans, Vt.
Flora, G., Insp. Track Val., Grand Trunk, Durand, Mich.
Garner, R. D., Eng. Const., S. N. E., Providence, R. I.
Glass, R. G., Asst. Insp. Eng., Ill. Steel Co., Chicago, Ill.
Graham, F. M., Eng. M. of W., Penna., Columbus, Ohio.
Hadley, E. A., Ch. Eng., Mo. Pac., St. Louis, Mo.
Hallsted, R. H., Gen. Roadmaster, Mo. Pac., Coffeyville, Kan.
Hamilton, H. F., Dist. Eng., G. N., St. Paul, Minn.
Hansen, H. J., Office Eng., C. M. & St. P., Chicago.
Harman, H. H., Eng. Bridges, B. & L. E., Greenville, Pa.
Harris, G. H., Special Eng., Mich. Cen., Detroit, Mich.
Harris, L. G., Div. Eng., A. T. & S. F., San Marcial, N. M.
Harting, O. F., Asst. Ch. Eng., St. L.-E. St. Louis Term. Dist., St. Louis, Mo.
Hayward, G. I., Asst. Dist. Eng., Northern Pac., St. Paul, Minn.
Heidenthal, W. C., Eng. M. W., N. Y. O. & W., Middletown, N. Y.
Heimerdinger, W. E., Asst. Eng., C. R. I. & P., Des Moines, Ia.
Herth, C. E., Div. Eng., B. & O., Seymour, Ind.
Hinman, Dean, Asst. Eng., C. & G. W., Chicago.
Hopkins, A. T., Asst. Val. Eng., M. C., Detroit, Mich.
Howard, R. H., Chief Eng. M. W., Wabash, St. Louis, Mo.
Huntsman, F. C., Asst. Eng., Wabash, Springfield, Ill.
Johnson, J. M., Con. Eng., Ill. Cent., Louisville, Ky.
Johnston, C. E., Gen. Man., K. C. S., Kansas City, Mo.
Johnston, D. B., Div. Eng., Pa. Lines, Louisville, Ky.
Johntz, H. H., Eng. M. W., M. K. & T., Parsons, Kan.
Keough, R. E., Asst. Eng. M. W., C. P., Montreal, Canada.
Kern, J. W., Jr., Roadmaster, I. C., Water Valley, Miss.
Kinney, W. M., Gen. Man., Portland Cement Assn., Chicago.
Kinsley, T. W., Asst. Eng., D. T. & Ironton, Springfield, Ill.
Knecht, H. D., Asst. Eng., Mo. Pac., St. Louis, Mo.
Knight, H., Regional Engineer, Erie, Youngstown, O.
Koyl, C. H., Eng. Water Service, C. M. & St. P., Chicago.
Lakin, F. D., Div. Eng., Erie, Meadville, Pa.
Lang, P. G., Jr., Asst. Eng. of Bridges, B. & O., Baltimore, Md.
Layng, F. R., Eng. Track, B. & L. E., Greenville, Pa.
Livingston, H. T., Div. Eng., C. R. I. & P., Manly, Ia.
Maher, John, Asst. Eng., B. & O., Cincinnati, Ohio.
McCooe, David, Supt. of Track, G. T., Toronto, Ont., Can.
Meigs, M. C., Asst. Eng., Y. & M. V., Memphis, Tenn.
Middleton, R. J., Asst. Chief Eng., C. M. & St. P., Seattle, Wash.
Miner, K. L., Supv. B. & B., N. Y. C., Ottawa, Ont., Canada.
Mitchell, W. M., Louisville Frog & Switch Co., Louisville, Ky.
Moore, J. W., Asst. Eng., Val. Dept., I. C., Chicago.
Morrow, F. E., Ch. Eng., C. & W. I., Chicago.
Mottier, C. H., Off. Eng., I. C., Chicago.
Mullen, Joseph, St. Louis, Mo.
Myers, J. B., Eng. M. W., B. & O., Baltimore, Md.
Newton, A. W., Chief Engineer, C. B. & Q. Chicago, Ill.
Nichols, J. A., Jr., Asst. Eng., C. C. C. & St. L., Mattoon, Ill.
O'Rourke, G. M., Roadmaster, I. C., Mattoon, Ill.
Oxnard, H. W., Pilot Engr., Santa Fe, Topeka, Kan.
Passel, H. S., Chief Eng., C. I. & W., Indianapolis, Ind.
Pfafflin, E. H., Ch. Eng., C. T. H. & S. E., Chicago, Ill.
Pfleging, F. W., Sig. Eng., U. P., Omaha, Neb.
Podmore, J. M., Div. Eng., N. Y. C., Toledo, Ohio.
Ramsey, F. R., Chief Eng., T. St. L. & W., Frankfort, Ind.
Ray, W. M., Asst. Eng., B. & O., Pittsburgh, Pa.
Raymond, W. G., Dean, Col. Appl. Sc., State Univ. Iowa, Iowa City, Iowa.
Rist, C. J., Div. Eng., P. M., Saginaw, Mich.
Rohbock, W. L., Chief Eng., W. & L. E., Cleveland, Ohio.
Roof, W. R., Bridge Eng., Chicago Great Western, Chicago.
Sessions, O. H., Div. Engr., G. T., Battle Creek, Mich.
Sexton, J. R., Reg. Eng., Erie, Chicago.
Shaw, B. B., Div. Eng., C. R. I. & P., Little Rock, Ark.
Shaw, W. J., Jr., Div. Eng., M. C., St. Thomas, Ont., Can.
Snyder, J. A., Roadmaster, M. C., Jackson, Mich.
Spencer, C. H., District Eng., Bureau Val., I. C. C., Washington, D. C.
Stevens, W. C., Asst. Eng., C. C. C. & St. L., Mattoon, Ill.
Stimson, F. J., Ch. Eng. Maint., S. W. System, Penna. Lines, St. Louis, Mo.
Swisher, H. H., Asst. Eng., C. M. & St. P., Chicago, Ill.
Thompson, W. S., Div. Eng., Penna., Sunbury, Pa.
Turneaure, F. E., Dean, Col. of Engr., Univ. of Wis., Madison, Wis.
Turner, W. G., Asst. Eng., Mo. Pac., St. Louis, Mo.
Tuthill, G. C., Br. Eng., M. C., Detroit, Mich.
Vandersluis, W. M., Sig. Eng., I. C., Chicago.
Van Hagan, L. F., Asso. Prof., U. of Wis., Madison, Wis.
Vaughan, G. W., Eng. M. W., N. Y. C., New York.
Wachter, R. E., Asst. Eng., Mo. Pac., St. Louis, Mo.
Wait, B. A., Div. Eng., C. R. I. & P., Cedar Rapids, Iowa.
Wallace, D. A., Chicago Ry. Terminal Commission, Chicago.
Walsh, G. R., Asst. Eng., Mo. Pac., St. Louis, Mo.
Walter, F. G., Jr., Asst. Eng., I. C., Chicago.
Warden, R. E., Asst. Eng., M. P., Little Rock, Ark.
Webb, G. H., Ch. Eng., M. C., Detroit, Mich.
Weir, John M., Ch. Eng., K. C. Sou., Kansas City, Mo.
Williams, W. D., Chief Engineer, C. N., Van Wert, O.
Wilson, C. A., Consulting Engineer, Cincinnati, O.
Woodbury, W. H., Val. Eng., D. & I. R. & D. M. & N., Duluth, Minn.
Wurzer, E. C., Div. Eng., M. C., Detroit, Mich.
Yeaton, F. D., Asst. Eng., C. M. & St. P., Chicago.

Guests

Anderson, Burt T., Asst. Sig. Engr., D. L. & W., Hoboken, N. J.
Ayers, L. C., Asst. Supt., N. & W., Crew, Va.
Bennett, W. R., Track Supvr., Wabash, Montpelier, Ohio.
Breswinger, S. J., Western Soc. Engrs, Chicago, Ill. A. C.
Brodison, R. J., Tie & Track Supt., Toledo, Ohio.
Cress, E. E., Asst. Engr., Joint Com. on Stress in R. R. Track, U. of I., Urbana, Ill.
Daugherty, J., Roadmaster, Frisco, Lebanon, Mo.
Doyle, P., Supvr., B. & B., G. T., Montreal.
Drew, H., Sig. Supt., G. T., Ottawa, Ont.
Dunn, J. A., Portland Cement Association, Chicago.
Eitzen, Arthur R., American Bridge Co., Chicago.
Galvin, P., Gen. Roadmaster, M. P., Kansas City.
Ganier, A. F., N. C. & St. L., Nashville, Tenn.
Gatewood, R. J., A. T. & S. F., Wellington, Kan.
Geyer, C. J., Asst. Div. Engr., C. & O., Richmond, Va.
Gibbons, J. J., Asst. Engr. Big 4, Cincinnati, Ohio.
Graham, J., C. R. R.
Greene, C. W., Timber Treating Engr., Toledo, Ohio.
Hallsted, R. H., Gen. Roadmaster, Coffeyville, Kan.
Hardy, B., Roadmaster, C. P., Ignace, Ont.
Harryman, J., Supt. of Track, St. Albans, W. Va.
Hayes, V. R., Asst. Engr. Wabash, Decatur, Ill.
Heuncke, J. A., Asst. Engr., C. C. C. & St. L., Cincinnati, Ohio.
Heywood, A. E., Asst. Engr., Battle Creek, Mich.
Houlihan, J. C., Sec. Engr. M. of W., I. C., Chicago.
Johnson, Paul K., Asst. Engr., C. I. & W., Chicago.
Leslie, R. D., Forest Products, New York City.
Lockhart, H. K., Asst. Supvr., Penn., Philadelphia, Pa.
Longstreet, P. E., Res. Mangr., Salt Lake City.

Longwill, M. F., Div. Engr., Wabash, Montpelier, Ohio.
Look, Richard, V.-Pres. Canada Creosoting Co., Toronto, Can.
Lorenz, H. C., Asst. Engr., Cincinnati, Ohio.
Marshall, H. L., Supt. Shops, Martinsburg.
Marshall, L. C., Asst. Engr., Mo. Pac., Little Rock, Ark
McGuigan, J. F., Roadmaster, Frisco, St. Louis.
Miner, K. L., Supvr. B. & B., N. Y. C., Ottawa, Ont.
Moss, Jerome A., Const. Engr., Chicago.
Newbir, J. A., In Charge Lumber Mechanics, Forest Products Lab., Madison, Wis.
Osborne, S. H., Div. Engr., M. P., Kansas City, Mo.
Perkins, H. M., Asst. Engr., N. P., Fargo, N. D.
Reeves, W. T., Robt. W. Hunter Engrs., Chicago.
Rayner, I. S., Asst. Sig. Engr., Pitt. L. E., Pittsburgh, Pa.
Reinert, W. A., Asst. Engr., C. & W. I., Chicago.
Riley, Frank L., Asst. Engr. of Buildings, B. & O., Baltimore.
Ring, J. E., Div. Engr., C. & O., Hinton, W. Va.
Small, E. A., Jr., A. M. Byers Co., Pittsburgh, Pa.
Smith, H. R., Pilot Engr., G. T., Detroit, Mich.
Smith, S. W., Prin. Asst. Engr., Wabash, Chicago.
Stephens, Chas., Sig. Engr., C. & O., Richmond, Va.
Talbot, K. H., Koehming Machine Co., Milwaukee.
Upson, S. C., Div. Engr., Erie, Pa.
Week, J. E., Instr. Man., G. T., Battle Creek, Mich.
Whaley, F. D., Master Carpenter, C. R. I. & P., Des Moines, Ia.
Wilk, Benj., Universal Portland Cement, Chicago.

Chilean Railway Man at Convention

Victor M. Navarette, a civil engineer of Santiago, Chile, is in attendance at the convention as a commissioner from the Chilean government and Chilean State Railways. He has been in the States three years, studying maintenance of way practices, principally on the Pennsylvania. He made his headquarters first at Trenton, and is now at New York, where he is in close touch with the operating and maintenance conditions in the congested zone between Philadelphia and New York.

He states that this study of American railways is made with a view to the ultimate establishment of uniform standards for both construction and maintenance on his home railways. A special point in question is the gage that will eventually be adopted—whether this shall be a continuation of the present predominating wide gage of 5 ft. 6 in., the less common meter gage, or a compromise of both to the standard gage of American railways. It is also intended to raise the degree of maintenance to accord with the best practice of this country with the object especially of increasing the speed in both passenger and freight service.

A large part of the purpose in the assignment of a representative to this country is to make known the wants of his government for standard materials for track construction and for equipment. The building of the present cordial relations existing between the two governments will, it is thought, be furthered by a broader interchange of trade.

It will be interesting to engineers to recall that the first railway constructed in Chile was built by an American named Wheelwright from Massachusetts as early as 1842, which beginning has expanded into a system traversing every part of this country. The line between Valparaiso and Santiago is laid with 110-lb. rail of nearly A. S. C. E. section, known as Chilean State Railways section, and carries a daily traffic of 100 trains. Mr. Navarette is in daily attendance at the convention and at the Coliseum, studying the exhibit of the National Railway Appliances Association, which has impressed him as remarkably complete and progressive.

An Important Change

Control of the Westinghouse, Church, Kerr & Company has been purchased by Dwight P. Robinson, formerly of Stone & Webster.

B. & B. Men Meet

The executive committee of the American Railway Bridge and Building Association met in room A-6 of the Congress Hotel at 5 o'clock yesterday afternoon to hear the report of the arrangements committee relative to the Atlanta convention. After extended discussion it was decided to postpone the convention one week to avoid conflicts. The annual meeting will therefore be held at Atlanta, Ga., on October 26-28. A committee was also appointed to draft amendments to the constitution for presentation at the annual meeting.

A. R. E. A. Attendance

During yesterday's afternoon session of the American Railway Engineering Association, the announcement was made by the chairman that 531 members were in attendance. This compares with a total attendance of 425 last year.

We Hope for 21 More

E. H. Fritch has just completed 21 years' continuous service as secretary of the A. R. E. A.

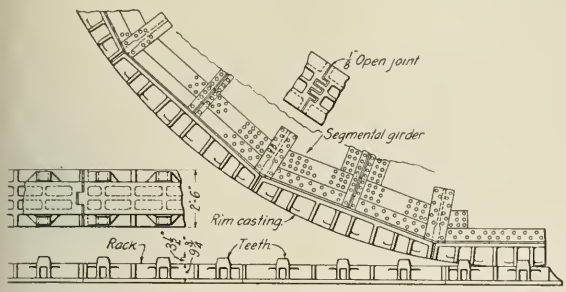
A Double-Leaf Bascule Span Designed as a Three-Hinged Arch

DOUBLE-LEAF CANTILEVER LIFT BRIDGES so commonly used for highway structures have not been generally adopted by the railroads on account of the greater deflection of the cantilever. One means of overcoming this objection is to introduce arch action by bringing the two leaves together at a considerable elevation above the points of support on the abutments or piers. Particular interest in this method is aroused at this time through the erection of a long-span structure of this type carrying electric railway and street traffic across the Tennessee river at Chattanooga, Tenn. This structure affords a clear channel width of 300 ft. and as seen in the photograph is a Scherzer rolling lift bridge which acts as a double cantilever for dead loads and as a three-hinged arch for live loads, the two leaves forming riveted arch trusses from which the floor is suspended.

A particularly notable feature in this design is the manner in which the counterweights have been treated to give a minimum of difficulty in the æsthetic proportioning of the structure which, to all intents and purposes, is an arch bridge when the spans is closed. The crown contact or hinge consists of 12-in. pins mounted in the truss ends of one leaf and brought to bearing in cast steel sockets in the other leaf. One pin is located midway between the top and bottom chords of each truss in a heavy web construction that unites them at the crown. The bridge is operated electrically with control from one side of the channel and in about 1½ min. To allow the electrical operating equipment sufficient latitude to enable these pin bearings at the crown to come in contact properly, a form of dovetail mechanism has been provided at the ends of the two leaves in the plane of the floor system. Since this portion of the structure comes in close proximity first when the span is being closed, this dovetail arrangement serves to guide the two leaves so that they are at sufficiently near the same elevation as the spans come together. This operation is entirely automatic, no locking machinery is necessary.

In a movable bridge of these proportions (each leaf

weighs 4,600,000 lb.) heavy construction is required in the rockers or segmental girders on which the bridge operates. The drawing illustrates this type of construction. Instead of building the girders to the curve of the rockers with a relatively thin rocker shoe, as was done in a large part of the earlier bridges of this type, the girders in this case are segmental, that is, with their flanges formed to the chords of the rocker curve while



The Segmental Girder with Its Cast Steel Rim and the Rack

the actual curve is formed by relatively thick cast steel tires. This form of construction not only affords a better distribution of the bearing pressures, but permits of much simpler construction in the structural steel girders which are built to straight lines rather than to the curve. It will be noted further that the joints between the ends of these tire sections are overlapped and that diaphragms are placed over these joints, as the rocker or girder to which these castings are attached is of structural steel plate girder construction supported at its ends and subject to deflection. The joints between the tire sections are open so as not to take flange stress. This same form of construction was used recently in the Petty Island bridge of the Pennsylvania railroad, a single-leaf bascule span in the Delaware river at Philadelphia.

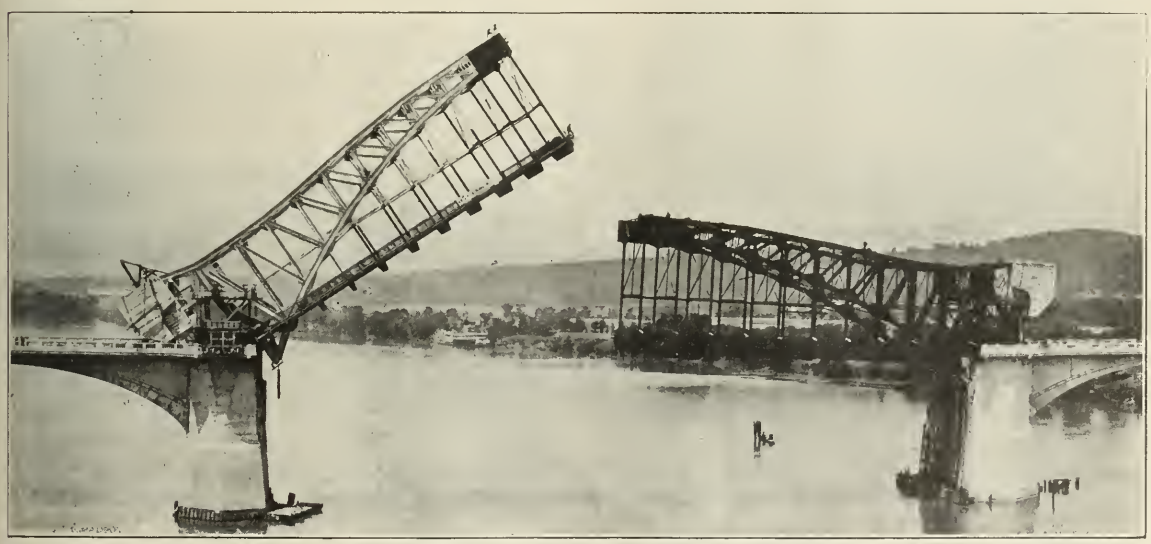
The design for the entire bridge was made by B. H. Davis, consulting engineer, New York City, with J. E. Greiner, Baltimore, as consulting engineer for the project. The lift span design was prepared by the Scherzer Rolling Lift Bridge Company of Chicago.

Improvements in Welding and Cutting Torches

Of interest to railroads using oxy-acetylene welding and cutting equipment is the improvement made during the year in the apparatus used for this process by the Air Reduction Sales Company, New York City, which has developed new apparatus consisting of four different models of torches adapted for general welding and cutting. These models are made up in various lengths and angles of head and the nature of these new torches will be understood from the description of two of them which follows.

In the Airco "A" torch, which is used for general welding, the oxygen and acetylene gases are mixed virtually at the theoretical ratio of one part acetylene and one part oxygen. The possibility of flashbacks or backfires has been avoided owing to the method of mixing the gases in the torch and to the design of the structure itself. The method involves the introduction of acetylene at a pressure higher than that of the oxygen behind the mixing point so that if the tip is obstructed in any manner the mixture within it is enriched in acetylene and the rate of flame propagation in the discharge passage is automatically reduced. As soon as the obstruction is removed the original ratio of aceylene to oxygen is restored. The gas pressures recommended for the Airco torch are sufficiently low for safety, but are high enough so that the operator is insured control over both the oxygen and acetylene pressures as well as the quantities of these gases used.

In this torch the acetylene passages are directed to a common point—the point of mixing of the oxygen and acetylene. The oxygen is conveyed to this point by a single passage. There is no mixing chamber or expansion chamber in the torch. The tip orifice or passage is a straight drilled hole. The gases mix at the entrance to this passage, co-mingle and emerge from the tip in this state. The aceylene passages vary both in number and size with the diameter of the discharge passage in the tip, and are proportioned to the size of this passage and of the oxygen passage in the torch head. When the operator changes tips for different classes of work it is



The Double Leaf Span of the Tennessee River Bridge at Chattanooga

necessary merely to adjust the regulators to the pressures plainly indicated on the handle of the torch.

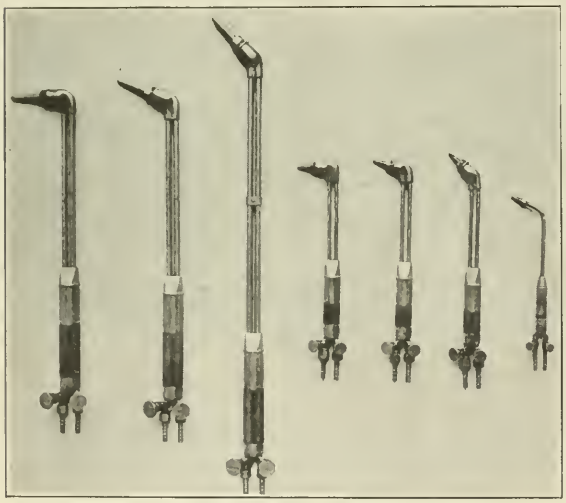
The approximate pressure in pounds per square inch, speed of welding in feet per hour, consumption of gases

Cutting a Rail with Calorene Gas

in cubic feet per hour and the thickness of metal that can be cut by each of the 10 tips furnished for the Airco "A" torch are indicated below:

Thickness of Metal	Size of Tip	Pressure, Lb. per Sq. In. Oxy.	Pressure, Lb. per Sq. In. Acety.	Speed of Weld in Ft. Per Hour Best Condition	Speed of Weld in Ft. Per Hour Shop Practice	Gas Consumption in Cu. Ft. Per Hour Oxy.	Gas Consumption in Cu. Ft. Per Hour Acety.
1/32 to 1/16 in.	1	2	2½	21	17	2.8	2.6
1/16 to 3/32 in.	2	2	2½	17	14	4.2	3.9
3/32 to 1/8 in.	3	2	2½	14	11½	7.2	6.7
1/8 to 1/4 in.	4	2½	3	9	7	12.5	11.5
1/4 to 3/8 in.	5	3¼	4	6	4½	18.2	17.0
3/8 to 1/2 in.	6	4	5	4½	3	25.9	24.4
1/2 to 5/8 in.	7	4¾	6	3	2	37.8	35.0
5/8 to 3/4 in.	8	5¾	7	2	1¼	53.6	50.0
3/4 to 1 in.	9	6½	8	1½	1	67.2	62.5
Heavy	10	7¼	9	..	..	79.1	73.8

The Airco "B" torch is designed to meet the demand for a light torch for use in work which requires opera-



New Airco Welding Torches

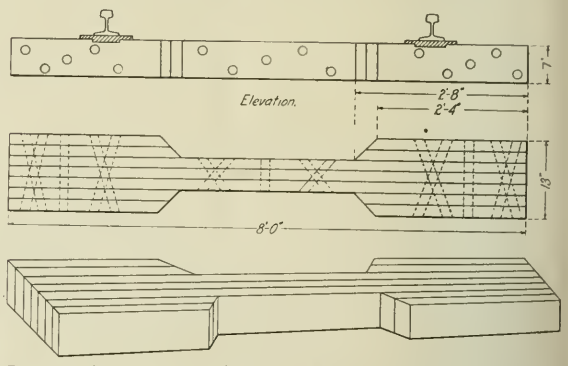
tors to weld continuously in one position and where a smaller flame than is furnished by the Airco "A" torch can be used. The approximate pressure in pounds per square inch, speed of welding in feet per hour and consumption of gases in cubic feet per hour and the thickness of metal that can be cut by each of the five tips for the Airco "B" torch are indicated below:

Thickness of Metal	Size of Tip	Pressure, Lb. per Sq. In. Oxy.	Pressure, Lb. per Sq. In. Acety.	Speed of Weld in Ft. Per Hour Best Condition	Speed of Weld in Ft. Per Hour Shop Practice	Gas Consumption in Cu. Ft. Per Hour Oxy.	Gas Consumption in Cu. Ft. Per Hour Acety.
Under 1/32 in.	1	2	2½	26	22	2.0	1.89
1/32 to 1/16 in.	2	2	2½	21	17	2.8	2.64
1/16 to 3/32 in.	3	2	2½	17	14	4.5	4.25
3/32 to 1/8 in.	4	2½	3	14	11½	6.3	5.90
1/8 to 1/4 in.	5	3	4	9	7	9.1	8.50

A Sectional or Laminated Cross-Tie

One of the recent developments in the railway cross-tie field is a new sectional or laminated tie manufactured by the Revert Sectional Tie Company, Reno, Nev., for use in main line or passing tracks. The Revert Sectional tie, as it is called, is composed of small pieces of sawn lumber assembled and fastened together so as to form a tie of the required size, thereby affording an outlet for material which otherwise would have little commercial value.

The main body of the tie is made up of three pieces of 2-in. by 8-in. surfaced lumber 8 ft. long, which are reinforced at each end by four pieces of similar material of the same width and thickness. These pieces are placed two on a side and are 28 in. and 32 in. long, respectively, the ends toward the center having a 1 to 1 mitre. The maximum width of the tie thus constructed from 2-in.



Construction Plan Showing Arrangement of Dowel Pins, Etc.

stock is approximately 13 in. and the minimum about 6 in., the mitred end pieces forming a tapered shoulder at each end and on both sides. After being cut to shape, each piece is treated with a preservative to insure a uniform penetration in the tie when it is completely assembled.

After the treatment, the parts of the tie are assembled, held in clamps under heavy pressure and 15 one-inch wooden dowels inserted to bind the pieces firmly together as a unit, 12 being driven on a diagonal and three straight across as shown in the illustration. A special tie-plate is used which overlaps the edges and further assists in holding the parts, besides furnishing a larger bearing surface for the rail.

A comparison of the lumber in the Revert tie with the amount in a 7-in. by 10-in. by 8-ft. one-piece tie shows a saving of approximately 5,000 b.m. ft. per mile of track and an increased rail bearing surface of about 333 lineal ft. per mile. The tie is now being tested by the Southern Pacific on a section of line near Reno, following its use over a number of years on the logging railroad of the Verdi Lumber Company, where it was subjected to heavy rains, snows and frosts with satisfactory results, and without any separation of the pieces composing the tie.

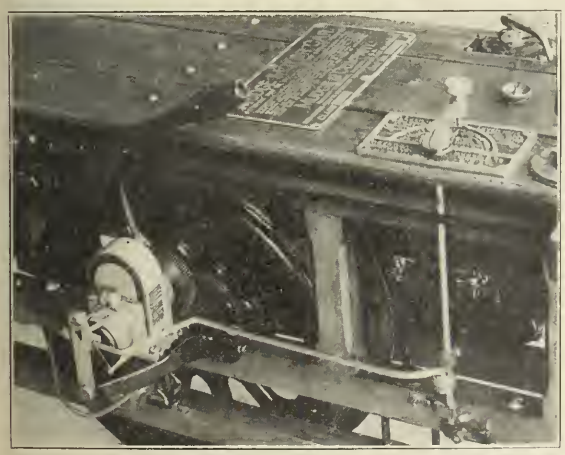
Spikes were found to hold equally as well in the new tie as in a one-piece tie, while greater life was obtained through the increased bearing surface under the rail, the increased penetration of the preservative and the

A Test Installation on the Southern Pacific

greater strength of the tie. It was found that the shoulders of the tie practically eliminated all lateral movement on tangents or curves.

Improved Ignition on Mudge Motor Cars

The new Mudge E-1 motor car manufactured by Mudge & Company, Chicago, is now being equipped with a magneto ignition. The magneto is a high-tension Berling magneto with weather and dustproof case and is mounted on a casting attached to the upper frame rail of the car, as shown in the illustration. The application of the magneto is such that the car can be run in either direction, the magneto timing lever on the seat board being turned to point in the direction in which the car is to run. The operation of the spark control is very simple, the timer being ad-



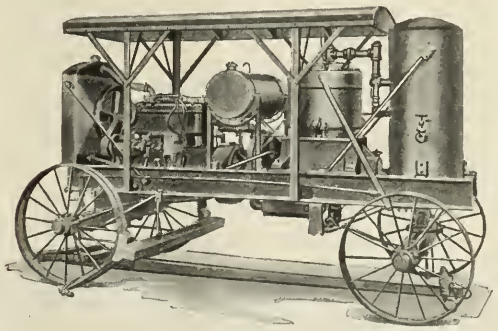
Photograph Showing the Improved Ignition

vanced and retarded the same as with the vibrating coil ignition system. By placing the magneto timing lever in a neutral position, that is, half way between the forward and reverse running positions, the ignition may be cut out without opening the coaster valve, thus causing the engine to act as a brake. This, however, does not interfere with the ignition cut-out controlled by the coaster valve-operating mechanism which is entirely independent of the other. The entire arrangement is simply and substantially mounted with controlling levers of large size.

A Portable Gasoline-Driven Air Compressor

The increasing popularity of the gasoline engine and other forms of internal combustion motors has led to their general adoption as a source of power, particularly where portability is desired. Such an installation has been developed by the Sullivan Machinery Company, Chicago, in the form of a portable air compressor, which consists of a two-cylinder air compressor with receiver tank driven by a four-cylinder gasoline motor. All parts of the unit are mounted on a steel frame supported by four steel wheels with a gage of 4 ft. 8 in., the total weight of the equipment being 4,500 lb. This permits it to be employed on numerous maintenance and construction jobs where the use of compressed air in comparatively large quantities would be advantageous, but otherwise either impractical or expensive on account of the attendant costs of making temporary compressor installations or of spurring out a compressor car.

The compressor, which is mounted near one end of the frame, is of the two-cylinder, single acting, single stage, vertical type and has a displacement capacity of 150 cu. ft. per min. of free air with a terminal pressure

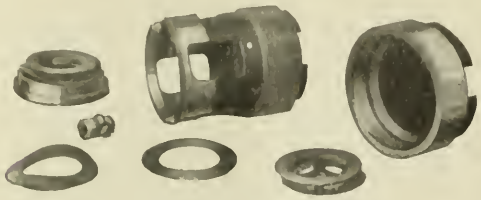


The Complete Unit Mounted on Wheels

of 100 lb. at 400 r.p.m. The cylinders measure 8 in. by 6½ in. and are water-cooled by hopper jackets, lubrication being secured by a force feed oil pump inclosed in the crank case and arranged to deliver oil under pressure to all bearings. Any oil thrown off by the crank pin is prevented from entering the cylinder by baffle plates and as a further protection, the lower ends of the piston are provided with "wiper" rings to prevent excess oil from accumulating on the cylinder walls. The air valves are of the wafer plate type and are located radially with respect to the axis of the cylinder, close to its head and held in place by flat circular leaf springs. Both valves and springs are made of high grade tempered spring steel. The valves open against guard plates, which are designed to give a wide port opening with the minimum clearance loss and without restricting the admission or discharge of the air to or from the cylinders, yet are easily accessible by the removal of screw plugs.

The power is applied to the compressor through an internal gear cut in the heavy square rim flywheel mounted on the compressor crank shaft which engages with a pinion on the shaft of the gasoline engine, the application of the power being controlled by an automobile type of disk clutch. The clutch shaft is supported at the flywheel end by a ball bearing and at the pinion end by a high

duty roller bearing. The motor is of the "en bloc" type with a removable cylinder head and provided with a three point suspension. Ignition is produced by a high tension magneto equipped with an impulse starter. The carburetor is of standard make and fitted with a governor to maintain constant speed. The radiator located at the rear end



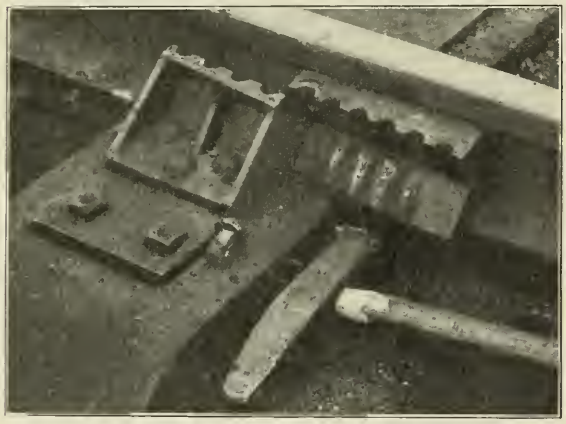
The Wafer Type Valve and Cage

of the frame is of large size and strongly braced. The entire unit is protected by a sheet metal canopy to which are attached canvas side curtains which can be lowered when the outfit is not in use.

A New Adjustable Rail Brace

The Coleman Railway Supply Company, New York City, has recently brought out a new design of rail brace which is adjustable in steps of $\frac{3}{32}$ in. for a total adjustment of $\frac{5}{8}$ in. and which is comprised of but three parts; a bracket, which is the fixed member, a wedge, which is the loose member, and a split pin for holding the bracket and wedge in place. These parts and the manner in which they are applied are shown in the photographs. The loose member is wedge-shaped and has a groove which is designed to fit a tongue provided in the fixed member. The wedge, when applied, is driven in until all play between the rail and the bracket is taken up.

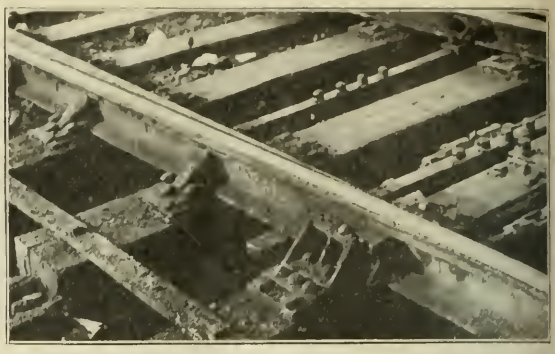
The adjustments are made by means of a series of one-half diameter holes provided in the wedge and in the



The Wedge Member in Position to Be Driven Home

bracket. These half holes are on different centers in each part of the device, but bear a certain relation to each other, so that, with the wedge driven to adjustment, a full diameter hole is formed of the half diameter holes in either part. Into this hole is placed a large split pin which, when spread, acts as a cotter and holds the two members in place.

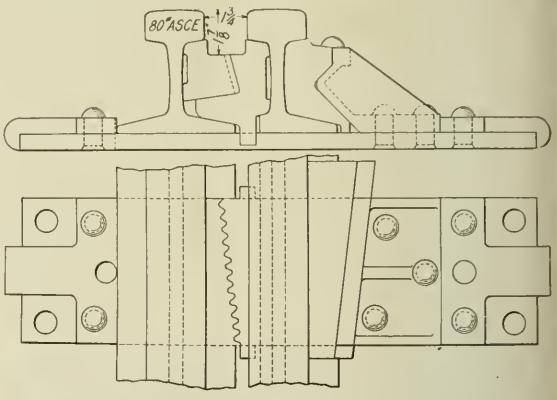
The pin, which is $\frac{7}{8}$ in. in diameter, is solid for about half its length, being slotted at the lower end. This gives a solid $\frac{7}{8}$-in. section of iron to hold the bracket and wedge together. The slot is of sufficient width to make spreading easy and it requires only a slight pull



The Adjustable Rail Brace in Service at a Switch Point

with a claw-bar to withdraw the pin from the hole when another adjustment is to be made.

The bracket and pin are of a standard size for all rails,



Combination Guard Rail Clamp and Tie Plate

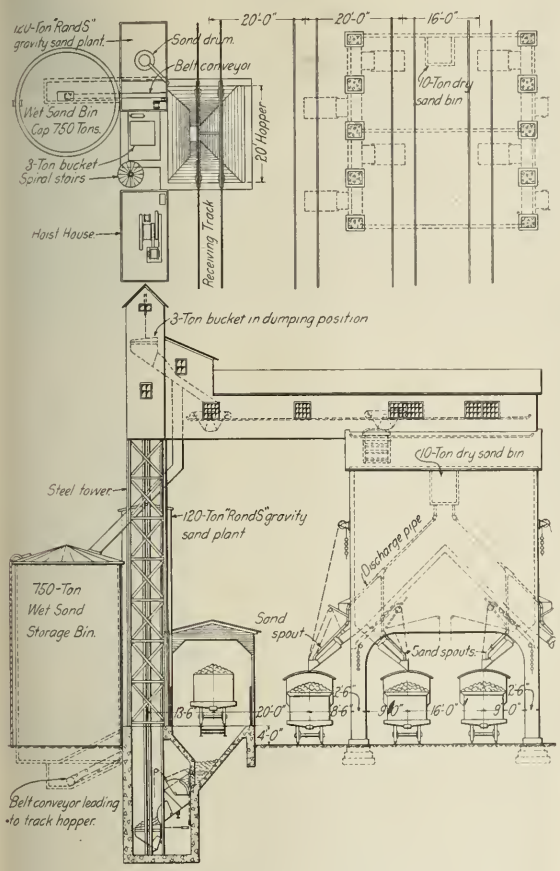
while the dimensions of the wedge are varied with the different rail sections. The device is used both on switch points and guard rails.

A Large Capacity Wet Sand Storage Plant

The Roberts & Schaefer Company, Chicago, is now completing a large new coaling and sanding station for the Lehigh Valley at Ashmore, Pa., which has for one of its main features the adoption of a wet sand storage arrangement which insures an adequate supply of sand for winter use and eliminates practically all manual labor incident to its handling. The sand itself is stored in a circular reinforced concrete tank with a storage capacity of 750 tons. While the design of the tank merits attention, the chief point of interest lies in the installation and operating methods of this new winter storage, fireproof, sand-handling and drying plant because the entire operation of storing, drying and handling of the sand is performed without shoveling or hand labor with the possible exception of unloading the cars.

The Ashmore plant consists of a 750-ton reinforced concrete coaling station serving four tracks, a 120-ton RandS gravity sand plant and the 750-ton wet sand stor-

age bin. An automatic electric hoist with a three-ton bucket is used for both the wet sand and the coal, which are unloaded into a track hopper, flowing by gravity through a three-ton Schraeder automatic measuring feeder to the hoisting bucket. The sand, after being elevated, is discharged automatically and falls by gravity down a steel spout leading to the storage bin, which is approximately 24 ft. 6 in. in diameter and 45 ft. high. In reclaiming sand from the wet storage bin a large gate is opened, allowing the sand to fall by gravity, aided by a revolving feeder operating at about 10 r.p.m. on a 16-in. belt conveyor traveling at a rate of about 350 ft. per min. This conveyor, which is driven by a 10 h.p. electric motor, has an over-all length of 27 ft. and carries the sand direct to the track hopper, whence it is again elevated by the



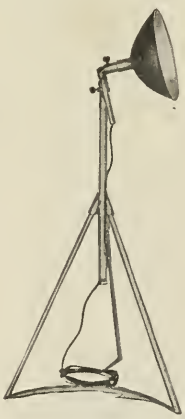
Sand Storage Bin and General Distribution System

three-ton bucket hoist. In this cycle, however, the sand is discharged into a steel chute leading to the 120-ton storage bin over the RandS gravity sand-drying plant. By this arrangement the sand can be elevated into this bin over the dryer, either from the cars or from storage.

From the 120-ton bin the sand flows by gravity through two large discharge spouts, controlled by gates, into two Beamer steam sand dryers which run without attention. After the sand has passed through the steam drying coils, it drops into a steel hopper, where it is cleaned by gravity, the clean, dry sand falling into automatic sand drums which require about two hours to fill. When the drums are completely filled the sand is blown by compressed air up into the 10-ton dry sand storage bin over the top of the coaling pocket, whence it flows by gravity through the moisture-proof undercut sand valves and telescoping spouts to the locomotives on the four tracks.

A Portable Electric Flood Light

WORKING AT NIGHT under overhead lights has always been a handicap to workmen and in many instances is the underlying cause of errors or inaccuracies. One of the latest devices introduced for the purpose of bettering such lighting conditions and to secure better illumination under the varied circumstances met with in railway shops and gravel pits, on construction work, at wrecks, etc., is a portable electric flood light manufactured by the Alexander Milburn Company, Baltimore, Md.

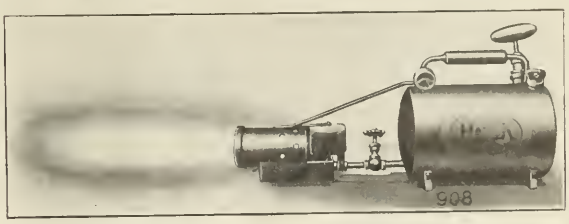


The New Light and Stand

This light consists of an enameled reflector 15 in. in diameter, mounted on a standard and supported by tripod legs, the total overall height being 68 in. The spread of the legs is 28 in. and the height of the device with the standard lowered is 38 in., the entire unit weighing about 20 lb. The upper end of the standard is adjustable, so that the reflector can be set at any desired angle or height from the level of the ground to a maximum of nearly 6 ft., the reflector being free to revolve in any desired direction. By using a 100-watt lamp a 60-ft. ray can be projected, making it adaptable for a wide variety of requirements.

A Reinforced Thawing Torch

DURING COLD WEATHER a thaw torch becomes an important and much-used appliance which is commonly subjected to rough usage. It may also be dropped or knocked against other objects while in use. While the burner may not break under such service the connection is eventually weakened, interfering with the efficiency of the burner. In recognition of the abuse which a torch receives, the Hauck Manufacturing Company, Brooklyn, N. Y., has added a strong bracket to its



The Bracket Protects the Burner

No. 55 thawing torch which forms a protection against knocking or dropping.

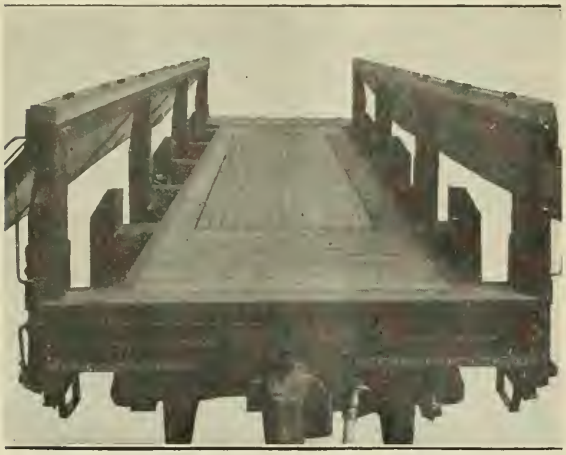
This bracket consists of a piece of heavy-gage band iron which is fastened at one end well out on the burner and extends back to the tank, where it is fastened at the point where the handle joins the tank proper, thus forming a brace that removes the major portion of any strain from the pipe connection. The complete thawing torch

has a 1½-gal. rust proof steel tank equipped with hand pump and pressure gage. The length of the flame which can be projected is 22 in. on a consumption of three quarts of kerosene an hour. The complete outfit weighs about 11 lb. and is recommended by its makers for such work as thawing out switchpoints, interlocking ashpan slides, air openings, injectors, links and other miscellaneous work.

The Improved Hart Convertible Car

The Rodger Ballast Car Company, Chicago, has added several important improvements to its ballast car which are of interest to railroad men handling ballasting and construction work. The improvements in general consists of the provision of edges sloping downward and outward along the sides of the floor, an increased length of the vertical side doors and opening, with a corresponding reduction in the number of supporting stakes, a new method of operating the side door mechanism and a new arrangement for the guidance and support of the unloading plow.

The floor of the improved car is horizontal to within eight inches of the sides when it slopes down and out, extending beyond the edge of the



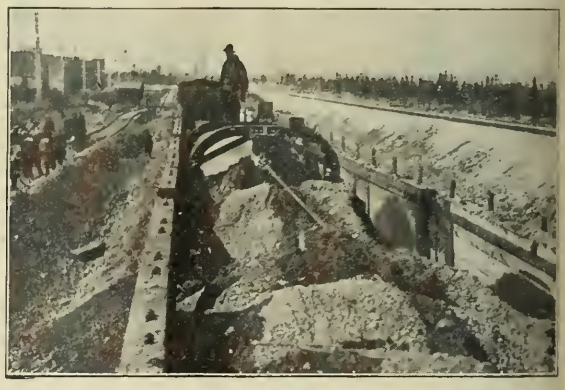
End View With Doors Open, Showing Sloping Edges, Etc.

floor so formed by this method of construction is reinforced and protected at the point of the change by a metal strip which also acts as a support for the plow. Double length doors are used, three on a side, which are of greater height than those formerly used. By installing the longer doors, the number of supporting stakes was decreased to four full length and three short ones, and this, in connection with the sloping floor and the higher doors, has resulted in a much larger discharge opening and a consequent quicker release of the pressure. The short side stakes act chiefly as guides for the plow in connection with the extension from the edge of the horizontal floor to each stake and with the reinforcing edge strip, the latter acting as the main support for the plow. The doors are held closed by a heavy bar on each side, which differs from the old arrangement in that it is straight between ends and is attached to the side doors, instead of to the underframe, by means of large hooks placed along the line of the greatest strain. In locking, the shaft is raised to engage with a series of inverted hooks supported on the side stakes, the shape of the tip on the lower hook forming a notch with the upper hook which tends to hold the shaft in position regardless of the pressure on the door. This arrangement makes it possible to unload the material on either side as desired or on both sides at the same time and has the additional advantage that the operating mechanism cannot be fouled by the material unloaded.

The main improvement in the car, however, lies in the type of floor construction, for in actual operation when the side doors are released, the bottom layer of the material for a distance of nearly 10 in. from the sides of the car is released and falls out naturally by gravity, causing a large amount of other material to cave and

Hart Convertible Cars Unloaded by Side Plow

follow it out. This quantity varies, of course, with the material being handled, but runs as high as 40 per cent of the total load in some instances, resulting in the release of the sides of the car from any pressure and an increase in the ease with which the unloading plow can be operated and the elimination of practically all liability of boulders, roots, stones or earth, jamming between the plow and the stake. Any material that might lodge on the plow runways or guides is swept into the pockets by the plow as it passes along, thus making it pos-



The Ballast Sliding Out by Gravity When Doors Are Released

sible to keep the plow on the floor at all times and to secure practically 100 per cent unloading.

This car is easily converted for use as a center dump car for the distribution of ballast, etc., along the center line of the track. When used in this manner the operating procedure is the same as with the earlier model, the only change being that the control of the flow from the bottom can be regulated more accurately.

EDITORIAL

Railway Age

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Railway Business Association Dinner

The Railway Business Association chooses wisely in planning a dinner at which to consider, not disappointments or apprehensions regarding the attitude of the government, but opportunities and responsibilities of the railroad managers and of the interests influential in shaping the policies of the railroads. Whatever the future holds forth, facing the future with confidence is the first requisite toward successfully grappling with it. The second requisite is the need for generous and wholehearted co-operation. Competition there will be between different railroad companies and between different railway supply companies, and struggle there will be between the buyer and the seller of railway supplies, but the essential fact remains that the best interests of the industry as a whole require the co-operative effort of all engaged in it. The annual dinner of the Railway Business Association affords a common ground on which competitors may meet and from which the broader aspects of the industry may be viewed. In attempting to arouse interest in the problems confronting the railroads, the Railway Business Association has performed a useful function. It was at a Railway Business Association dinner that the late James J. Hill made one of his most truly prophetic speeches. The problems of the reconstruction of individual railroad organizations is a pressing and immediate one; nevertheless, it would be short-sighted for a railroad executive to become so engrossed in his own immediate problems as to lose sight of the broader problems of the transportation business. Optimism and confidence apparently are to be the keynotes of the Railway Business Association's dinner this year, and optimism and confidence are certainly needed by railroad officers.

The Shoe on the Other Foot

An interesting illustration of the new order of conditions created by the return of the railroads to private management and adoption of the new transportation act is furnished by Reduced Rate Order No. 1 issued by the Interstate Commerce Commission on March 5. The new law provides that during the six months' period during which the government is to continue the present guaranteed standard return to the railways until rates can be adjusted to meet the increased expenses which have come about during the past two years, as well as to meet the 5½ per cent standard set by the new law, the present rates shall not be reduced without the approval of the Interstate Commerce Commission. This provision was inserted in the law not only to prevent action by state authorities to restore the rates in effect prior to federal control, but was also doubtless inspired in part by statements made by Commissioner Clark of the Interstate Commerce Commission in his testimony before the House Committee during the consideration of the proposed legislation that it might be well to do something to prevent rate-cutting by the railroads, or at least by some of them, upon the resumption of competition. The return of the railroads to private management was expected to result in an increase in competition particularly because it was made necessary for some of the railroads to recover traffic that had been diverted from them during the period of federal control, and Mr. Clark foresaw that some traffic managers would consider rate-cutting the easiest way of getting traffic back to their rails. Reduced Rate Order No. 1 prescribes in detail regulations under which carriers must apply to the commission for approval for a reduction in a rate prior to September 1, which applications, according to the order, must contain a complete and accurate statement of the reasons advanced by carriers and justification of the reduction sought to be established. The interesting feature of this order is that it is very similar in form to the fifteenth section order issued by the commission in 1917 after Congress had adopted the amendment to the fifteenth section proposed by Senator Hoke Smith of Georgia, which prohibited carriers from filing tariffs containing an increased rate without the approval of the Interstate Commerce Commission. The purpose of the Smith amendment was to make it more difficult for railroads to increase rates. Under present conditions the government, being sponsor for the earnings of the carriers for six months, finds it just as necessary to see that it is not too easy for a railroad to reduce a rate.

Are Labor Conditions Improving?

The outstanding feature of the March meeting of the Central Railway Club was the optimism that was manifested during the discussion of the labor situation. While most of the speakers treated the question from the mechanical department viewpoint, the conditions in the shops are probably not dissimilar to those in other departments. The developments during the period of the war and of government control have brought such basic changes in the shop organizations that the problem of keeping up production has been a serious one. The demand for mechanics for war work, the elimination of piecework, the introduction of the eight-hour day and the national agreement have all had a tendency to disrupt the established shop organization. The result in most cases has been a lowering of production—in fact, in some shops the man-hours per locomotive repaired in 1919 were twice as great as in 1917. With this in mind it is hard to find the basis for optimism. Nevertheless, there are encouraging signs. The labor organizations seem to have awakened to a realization of the fact that higher wages merely bring an increase in the cost of living. Recently serious strikes were threatened, but in the end sane counsel prevailed, and this in itself is the strongest kind of evidence that radical leaders will not be able to dictate the policy of American labor. The discussion of the problem of rising costs has given the laboring man a clearer conception of the fundamentals of economics. When the workers generally come to realize that the only way to permanently better their condition is to increase production, the days of the labor agitator are numbered. There are radicals in the ranks of labor, but they form a small minority. These agitators have attracted attention out of all proportion to their numbers and their influence has been overestimated. Perhaps this can be illustrated best by citing an example. At a certain shop there appeared to be strong opposition among the employees to an order which the officers considered by no means unreasonable. Finally a vote was taken on the question. Of the 750 men employed, only 107 were sufficiently interested to attend the meeting, and of these only 43 opposed the company's rule.

The Pennsylvania's New Organization

THE NEW SCHEME of organization of the Pennsylvania divides the system into four regions, each in charge of a vice-president. This is a radical change but even more radical is the breaking down of divisional walls and the establishment of a departmental system. The Pennsylvania, in contradistinction to the New York Central, had always adhered closely to a divisional organization. In the last five years prior to government operation, this divisional organization had been an obstacle in the process which was going on of greater and greater concentration of authority in the executive officers at Philadelphia. The present adoption of a departmental system was not wholly a question of standards, although standards in both maintenance of way and maintenance of equipment are considered essential in the smooth and economical operation of this vastly complicated transportation machine. Standards could be enforced even with a strictly divisional system, as has been proved conclusively on the Southern Pacific. The difficulty on the Pennsylvania appears to an outsider to have been the growing impossibility of getting anything done quickly.

Promotion on the Pennsylvania was in a great majority of cases necessarily very slow. A man got drilled into him respect for traditions and for authority long before he arrived at a position of authority and responsibility. Furthermore, the intricacies of operation of such a complicated machine as the Middle division of the Eastern Pennsylvania grand division were so great that a superintendent had little or no opportunity to get outside his work or to use individual ingenuity. Neither could he hope to get into the technicalities of the engineering and motive power departments, to say nothing of the traffic, accounting and purchasing departments.

Nevertheless, the superintendent and general superintendent were the officers with authority and responsibility for the entire management of the division and the grand division, respectively. Slowly, almost imperceptibly, there grew up walls about each division. Maintenance of responsibility and authority demanded that orders should go down from the executive department through a considerable series of officers before reaching the local man on the job.

Thus two opposite kinds of difficulties were developed. On the one hand it became increasingly difficult for the public and shippers to get immediate action when dealing with local officers, because of the excessive centralization of final power at Philadelphia and Pittsburgh. On the other hand, it became increasingly difficult for an officer of a department other than the operating department, to get at the member of the divisional staff who had local charge of the work of this department.

One of the most admirable features of the Pennsylvania organization was that promotions were exclusively from within the ranks and that a man who did faithful work was assured of a good job until old age and a generous pension when he retired. It is well understood that such a system as this of necessity means the accumulation of a certain amount of deadwood. The United States regular army in peace times had the same thing happen, and unless a ruthless system of cutting off the heads of older men to make way for the younger ones is adopted, it is hard to see how the accumulation of deadwood can be entirely avoided.

On the other hand, under this departmental system which the Pennsylvania has put into effect, deadwood will be called to the attention of the management more quickly. An accounting officer who is on the payroll of the accounting department, but is attached also to the staff of the general superintendent, will be less likely to be able to drift along year after year in a rut than he would be were he accepting general theories of practice from an accounting department which was quite impersonal to him and was doing his work in such a way as to be personally acceptable to a general superintendent whose personal thought was taken up with many other matters rather than accounting.

The establishment of regional vice-presidents should bring about quicker action on local matters. The organization of the local officers in each region under a department system should make the personnel more quickly responsive to the will and guidance of the executives in charge of each department. The very fact that such a drastic change has taken place will be conducive of new interest and new life.

"Everything Fixed But the Rates"

IT HAS BECOME a common joke among railroad officers to remark, after one of the conferences at which they are popularly supposed to agree so readily and harmoniously on a general rate advance, that "everything is fixed but the rates" and that they will require more conferences. The remark is particularly applicable to the present railroad situation, although there are several other things to fix besides rates. While the railroads are given a guaranty for the next six months based on the net operating income that they earned in the three years ending June 30, 1917, there are possibilities of many a slip before they can get the benefit of the 5½ per cent on their aggregate value which so many men who ought to know better persist in telling the people is a guaranty on railroad securities, and which many others who probably know no better, but have more regard for the truth, say is not even a promise.

We have the deepest sympathy these days for the man in the street (whether it be Wall Street or just any street) who is still trying to make up his mind whether to buy railroad stocks, and has not long ago passed them up for oil, movie, motor, candy or silk hosiery securities. The railroads badly need his investment, but in the face of the bewildering maze of contradictory statements which he reads in the public prints or hears from the political campaign or lecture platform there is little cause to wonder why this particular capital is timid. First he was told by such men as Senator LaFollette that if the railroad bill were passed railroad stocks would go kiting. The bill was passed, but the resulting movement in stocks amounted to scarcely more than a turning in the grave with surprise that Congress had done something to improve a bad situation instead of making it worse.

He reads in the papers every day that some one of national reputation, or at least some one whose views have been given nation-wide publicity, says that railroad securities are not only guaranteed against loss but assured of a 5½ or 6 per cent return. Yet stocks that used to be sold in the markets at par, when their companies were handling less business than they are now, are seen to rise perhaps from 28 to 36, as Baltimore & Ohio did. Time was when the railroads used to besiege the Interstate Commerce Commission for a year or two for a 5, 10 or 15 per cent increase in freight rates, yet when the commission on its own initiative announced a hearing on March 22 to consider what steps it shall take, without even waiting for the railroads to propose tariffs, most of the newspapers did not bother to mention it. Glenn E. Plumb had already assured the country that the increase will amount to from 25 to 50 per cent, so what's the use of using up print paper to discuss a mere hearing on it? Consequently, that bit of news caused no commotion in the stock market, or perhaps it was offset by the fact that nearly two weeks before the rate hearing the railroad managers went into conference with the executives of 17 railroad labor organizations who say it will take at least another billion dollars a year to settle with them.

Along comes a ticker bulletin saying the Supreme Court has decided that stock dividends are income and are taxable. The man who might like to buy some railroad stock has

hardly time to recall that a stock dividend and a cash dividend on stock are two different things, but that he has heard little of either in connection with railroads for some time, when another bulletin comes through saying that the Supreme Court mumbled its words, that the reporter at Washington had a mental aberration, that the wires were down, and that the court has finally stated in plain English that a stock dividend is only another piece of paper and not taxable until it is converted into cash at a profit. However, the time required to make the correction has been sufficient to give warning that railroads are not declaring stock dividends these days and that we are paying income and war taxes in part so that the government may guarantee the income from which they are paying such dividends as they do pay, while paying the wages they pay and waiting for the increase in rates that LaFollette and Plumb tell us is already guaranteed.

When the excitement over the various stock dividend decision by the news services and by the court dies down, the attention of the would-be railroad stockholder and special-privileged all-around plutocrat is drawn to another bulletin from Washington. This time the benevolent Supreme Court has done something for the railroads. It has decided in the Kansas City Southern case that the Interstate Commerce Commission must value the railroad lands at their present worth instead of their original cost. It sounds reasonable enough and should make quite a difference in the basis on which the Interstate Commerce Commission is to calculate the so-called guaranty of "as nearly as may be" 5½ per cent. It looks as if the court has really removed one of the flies from the guaranty ointment and railroad stocks begin to move. Incidentally, New York news editors begin querying their Washington offices: "Associated Press carries very little on important railroad valuation decision."

But by that time the court's proof of its decision had been sent to the printer, only one or two reporters remained in the court room after the stock decision, and two or three days are required for the fact to percolate into print that the court has merely directed a lower court to direct the Interstate Commerce Commission to obey that provision of the valuation act of 1913 which provides that it shall report the cost of acquisition and damages in connection with the condemnation purchase of land in addition to its orginal cost and present value. The commission is required to receive evidence on this point, and we understand also to take it under consideration, but what it is to do with the facts after it ascertains them is left as much in the dark as ever. In any event it will hardly have completed the process during the six months within which it is expected to readjust the rate level.

While some of the newspapers were prodding their Washington correspondents to find out what the court had actually decided, others were displaying their enterprise in a more direct manner by dilating on the stupendous importance of the original decision of the Associated Press and obtaining interviews from prominent railroad executives and engineers (not lawyers) as to how many millions or billions would be added to railroad values if the court had decided what it was reported to have decided. One leading financial paper printed on Tuesday that the court had upheld present value as against original cost; on Wednesday it showed what the court had decided, and said it was an important decision; on Thursday it said that the effect of the decision, while of far-reaching importance, had been greatly exaggerated, and on Friday it printed another story saying that, in the opinion of leading railroad officials, the decision was a favorable decision of great importance. We are not trying to criticize the newspapers; the *Railway Age* itself was so unfortunate as to have published an editorial based on the original incorrect version, although it gave the correct information in its news reports.

Meanwhile, the man in the street, if he has not already climbed a tree, is still trying to figure out why he shouldn't gather in some of the easy money that is sure to come from the boom in railroad stocks as soon as the full effect of the beneficent new railroad law is fully appreciated. But the anxious pauses between bulletins from Washington are sufficiently protracted to make him wonder what the valuation proceeding has to do with rates anyway. Haven't La Follette, Plumb, Bryan, and most of the Democratic members of Congress, to say nothing of Arthur Brisbane, already told him without the slightest fear of successful contradiction that the railroads have already been guaranteed 6 per cent on all their securities, water and all? What is a small matter like a decision of the Supreme Court of the United States, reversing that of the Court of Appeals, and also that of the Supreme Court of the District of Columbia, and commanding the latter to issue a writ of mandamus to compel the Interstate Commerce Commission to receive certain evidence which the Kansas City Southern will be glad to furnish as to the expenses incident to condemnation proceedings and rights of way agents, as well as the damages paid for building a railroad across the corner of a man's farm and thereby saving him a long wagon haul—what does all this amount to, even if it does save the other railroads the necessity of similar litigation, as compared with a 6 per cent guaranty on eight billion dollars of water, signed and sealed by Congress and approved by the President of the United States? Is it any wonder that our friend, the prospective investor, decides to go and buy a "flivver" or to give his money a short joy-ride in oil stock or a longer one in German marks?

Perhaps Senator LaFollette and Mr. Plumb, as well as the newspaper men who report the Supreme Court, sometimes make mistakes, and perhaps, just as thousands of newspaper readers now know the difference between a stock dividend and a cash dividend, which even the Bureau of Internal Revenue of the United States Treasury Department did not know before, some day they, too, will find out that the Esch-Cummins railroad law is a better law than we have had before, but that it does not give anybody something for nothing.

The application of the word "guaranty" to the rate-making rule of the transportation act recalls the experience of a man who bought a used automobile about the first of December, rebuilt by the agents of the manufacturers and accompanied by "the original guaranty." He used the car very little during the winter, but about March 1, on reading his "guaranty," he found it to be the standard "warranty" of the National Automobile Chamber of Commerce, which guarantees each new motor vehicle to be free from defects in material and workmanship "under normal use and service" for 90 days, but makes no warranty whatever in respect to tires, rims, ignition apparatus, horns or other signaling devices, starting devices, generators, batteries, speedometers and other such important equipment, inasmuch as they are usually warranted by their respective manufacturers.

The transportation act extends the guaranty which was agreed to be paid during federal control for the next six months, and after that time it provides in Section 422 that the commission shall initiate, modify, establish or adjust rates so that they either as a whole, or as a whole in each of such rate-making groups or territories as the commission may establish, will, "under honest, efficient and economical management, and reasonable expenditures for maintenance of way, structures and equipment," earn an aggregate annual net railway operating income equal "as nearly as may be" to a "fair return" upon the aggregate value, which the commission is also authorized to determine; provided that for two years the commission shall take as such fair return 5½ per cent and may add not exceeding another ½ per cent. In other words, the commission is to fix the rates and then the railroads will each endeavor to earn what it can from them. If any one earns more than 6 per cent it gives up

half of the excess. If it does not earn 6 per cent it may borrow from the government at 6 per cent. There is no guaranty in the absence of "honest, efficient and economical management and reasonable expenditures"; and freedom from floods, washouts, drouths, strikes or business depression is not separately warranted by the manufacturers thereof.

Some of the points of difference between a real guaranty and the standard of reasonableness set up by the law are illustrated by the fact that the Pere Marquette Railroad has just decided that it can do better without a guaranty than with one, and has not filed with the Interstate Commerce Commission its acceptance of the six months' guaranty which it could have by agreeing to give up anything it earned above that amount while the Union Pacific has applied for the guaranty and agreed to turn over any excess to the United States Treasury.

The Union Pacific during the year 1919 earned 138 per cent of its guaranty and the excess went to reduce the government's deficit from most of the roads, but it may not be able to retain all of the traffic it enjoyed in 1919. Moreover, if it did not accept the six months' guaranty it would at once come under the rule of Section 422 and have to give up to the treasury half of any excess which its guaranty may produce above 6 per cent on its value, for the year beginning March 1. If it accepts the temporary guaranty the division of excess earnings does not begin to apply until September 1.

In other words, the Union Pacific would rather have the amount of earnings which it made unaided in 1915, 1916 and 1917 than the new so-called guaranty of 5½ per cent on aggregate value with a string tied to it. The Pere Marquette, which in 1919 earned 179 per cent of its guaranty, prefers to take its chances without any guaranty of any kind.

Economical Use of Parlor-Car Space

The Merchants' Limited Express of the New York, New Haven & Hartford is now made up so as to accommodate smokers better than formerly, while yet the wasteful practice of running a whole car full of free seats is avoided. This train has ten cars, including two diners, and the problem of making all of its facilities convenient is rather complicated. It is not perhaps so large a problem, but must be fully as troublesome, as that of the English railroad in former years with local passenger trains, which had to accommodate six classes of passengers; first, second and third ordinary, and first, second and third smokers. The American parlor-car train must give all passengers opportunity to eat a full meal at leisure and in luxury, and must provide smoking and non-smoking space for most of the male passengers. (How soon the females will demand the same remains to be seen.) At the same time the economical-minded manager, having powerful locomotives, feels bound to deny himself the luxury of five-car trains if he has passengers enough at one time to fill ten cars; so the question how to give passengers what they want without requiring them to make long foot journeys from one car to another is not easily settled. The New Haven road's plan, explained in another column, is evidently an experiment; but it is a hopeful one. About two-thirds of the club car seats will be charged for. With part of the passengers in a car paying for their seats and part not paying, the conductors and porters may have occasion to exercise a little diplomacy now and then; but they will be equal to it, no doubt. War-time practice may be accorded the credit of having in this case brought out into a strong light one big leak—the movement of a 70-ton car 234 miles (several times a day) without a cent of revenue. There is still ample opportunity for enterprising managers to utilize other war lessons.

Letters to the Editor

Safe Speeds on Curves

Winnipeg, Man.

To the Editor:

My attention has been attracted to the report of the derailment of a passenger train on the Southern Pacific at Vincent, Cal., abstracted on page 489 of your issue of February 13. The reasoning of the engineer who made this report reminded me of the Swede who went into a liquor store (previous to July 1, 1919) and asked the clerk if he had any squirrel whiskey. The clerk said "No," but that he had some Old Crow, to which the Swede replied:

"Yumping yimminy, aye don't want to fly, aye yust want to yump around a leetle."

The reason that I am writing this letter is that to the non-technical man this report may seem plausible, and some of our railway presidents and managers may arbitrarily order that curves be elevated for the speed of the fastest trains, which would bring about disastrous results. The statement is made that "the speed of a train seldom reaches the point where it actually overturns; long before such a speed is reached the speed is sufficient to cause the equipment to rock back and forth until finally the wheel climbs the rail and results in derailing the train."

I know of one case where a young brainless freight engineer was in charge of an engine hauling an excursion train, and he ran down a hill at a speed of 60 to 65 miles per hour until he struck an 11 deg. curve elevated about 5 in. and the coaches actually turned over. This is not guessing. The section men who were working near the location saw the train coming and ran for their lives. It was also witnessed by a farmer and some of his family who lived close by. I have seen and heard of many derailments caused by wheels mounting the outer rail on account of the elevation being too great for the speed, but this is the first time that I have ever heard of the reverse. Some twenty years ago I was acting superintendent of a mountain section of newly built railway crossing two ranges of mountains. The grades were 2.2 per cent and the maximum degree of curvature 14 deg., with a maximum elevation of 4½ in. We had a schedule of 25 miles per hour, but as that speed could not be maintained on the up grade the result was that our passenger trains often ran 37 miles per hour down the hills. I was personally very often on these trains when such speeds were made, and I can assure you there was "no rocking back and forth." We later reduced the schedule speed, not so much for fear of derailments as for fear of breaking a rail or flange, as most of the equipment used was carried on cast iron wheels. Imagine this condition and decide for yourself which is the safer—riding 40 miles per hour over an 8 deg. 10 min. curve elevated 4¼ in. or riding 20 miles per hour over the same curve elevated 8½ in. The outer rail must be depended on to guide the equipment around the curve regardless of the speed and the greater the vertical pressure of the wheels on this rail the less the liability of the outer wheels mounting the rail.

For a further discussion of this last-mentioned feature see page 931, Volume 20, of the American Railway Engineering Association proceedings.

J. G. Sullivan,
Consulting Engineer.

Handling Freight Costs More.—With the cost of everything mounting, it is not reasonable that freight can be handled as cheaply as in pre-war times.—*Wilmington Dispatch.*

Flexible Rafts Protect River Banks from Cutting

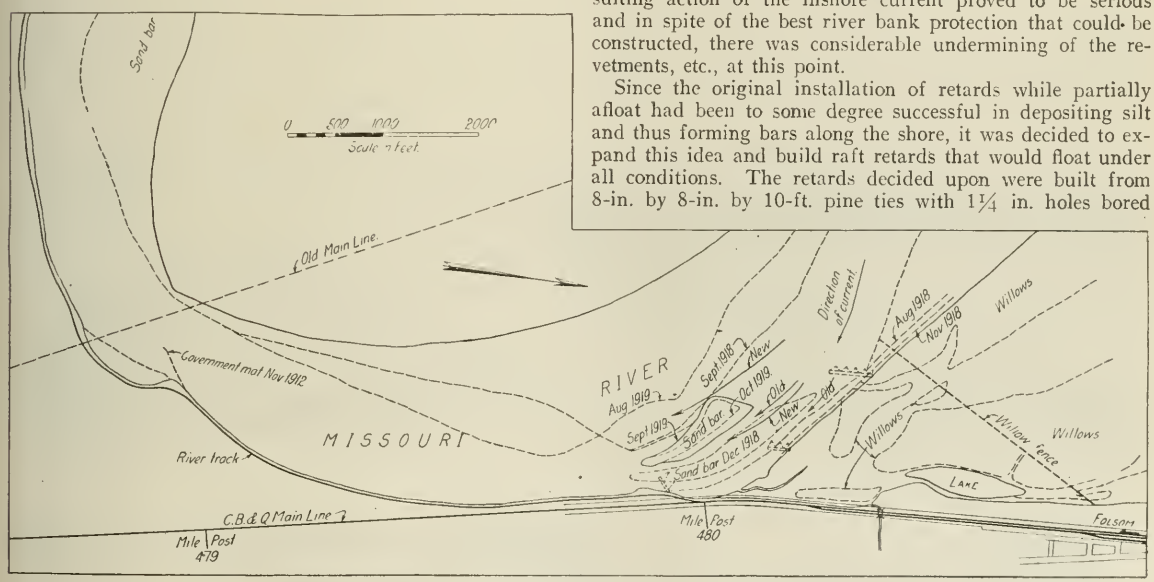
Chicago, Burlington & Quincy Installs Improved Type of Current Retards on the Missouri River

ONE OF THE LATEST DEVELOPMENTS in river bank protection is that of flexible rafts anchored in position but free to give with the rise and fall of the water which is now being tried out by the Chicago, Burlington & Quincy in the protection of the east bank of the Missouri river near Folsom, Iowa, about 14 miles south of Council Bluffs, Iowa, and on the main line between that point and Kansas City. It is expected that these rafts will take the place or at least render more permanent the far more expensive installations of mattresses, stone dykes and other forms of revetments, etc., used by the Burlington, having most of their advantage and few of their defects. It is believed that when the work is completed the expenditure will not run over a total of $14,000.

The old main line originally lay about one mile west of Folsom, the Missouri river being still farther to the west. In accordance with its well known property of changing course, etc., the river gradually cut its way east until in 1885 it became necessary for the railroad to construct a new line and abandon the old one through this section. The new right-of-way was thought at the time of the change to be far enough away to be free from further action of the river current, but the cutting continued until the Missouri river formed a loop, the eastern end of which reached the present location of the main line, paralleling it closely for a distance of approximately three-quarters of a mile.

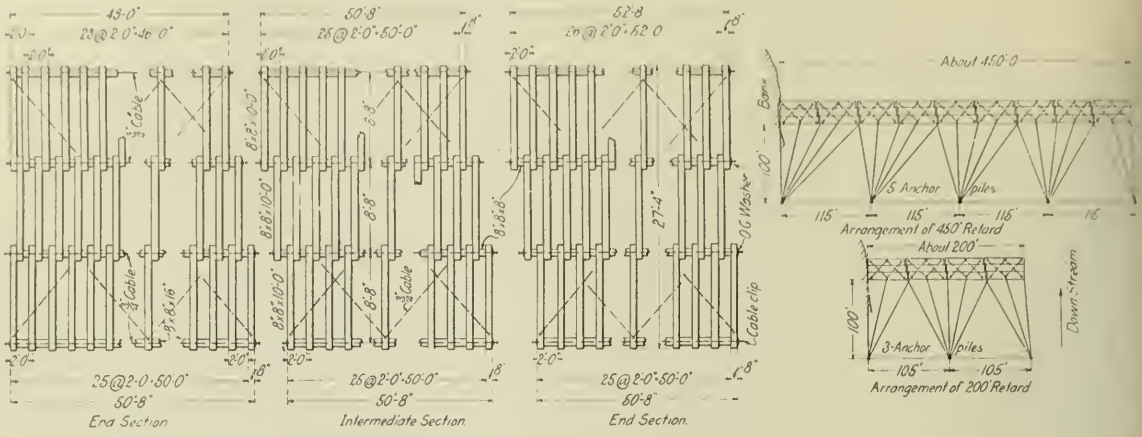
By an examination of the map it will be seen that the current entering the loop followed the west or far bank, but was deflected by it in such a way that it struck the eastern shore at a rather sharp angle, resulting in a severe cutting action at this point. Following this bank the current became narrower and more swift with resultant serious damage until it had reached a point where it became necessary to take strenuous measures to prevent its further encroachment. Log rafts were anchored in position at points along the bank above mile post 480 and the upstream edge sunk by unloading rock upon it, while the bank itself was reinforced and supported by brush mattresses, stone dykes, etc. This seemed for a time to be holding against the action of the current but on later examination it was found that the rafts and other types of retards had either sunk completely or so nearly so that they were doing but little good in deflecting the current. Along with this it was discovered that the center portions of the original retards had sunk, causing the current to split at a point about 1,600 ft. up river from mile post 480, one branch extending along the shore, rapidly cutting out the bar formed there and creating a narrow channel varying from 20 ft. to 30 ft. in depth and about 250 ft. wide at its widest point. The other branch turned to the west, a sandbar forming between the two branches which would have had a tendency to fix the two currents in their respective courses unless the river should be able to cut its way farther east in the future. The resulting action of the inshore current proved to be serious and in spite of the best river bank protection that could be constructed, there was considerable undermining of the revetments, etc., at this point.

Since the original installation of retards while partially afloat had been to some degree successful in depositing silt and thus forming bars along the shore, it was decided to expand this idea and build raft retards that would float under all conditions. The retards decided upon were built from 8-in. by 8-in. by 10-ft. pine ties with 1¼ in. holes bored in 8 in. from each end. These ties were threaded on ¾-in. cable of which four strands per section were used, thus giving a raft 27 ft. 4 in. or approximately three tie lengths wide, allowance being made for the distance from the ends for the holes. The ties were spaced 2 ft. center to center by using ties cut 16 in. long bored 1¼ in. the long way and placed between each tie on the two outside cables, with blocks 8 in. long of the same material on the two inner ones, the cable ends being pulled through heavy washers and held by strong clips at the ends of the section. The sections made were approximately 50 ft. 8 in. in length and braced by ¾-in. cables running from the corners to the opposite center on the long sides, and fastened where they crossed the ties by large staples, the ends being threaded through the corner ties and around the main cables where they are held securely in place by large steel clamps. In addition large timbers were made fast to the edges of the



Map of the Threatened Bank Showing Rafts, Sandbars, Etc.

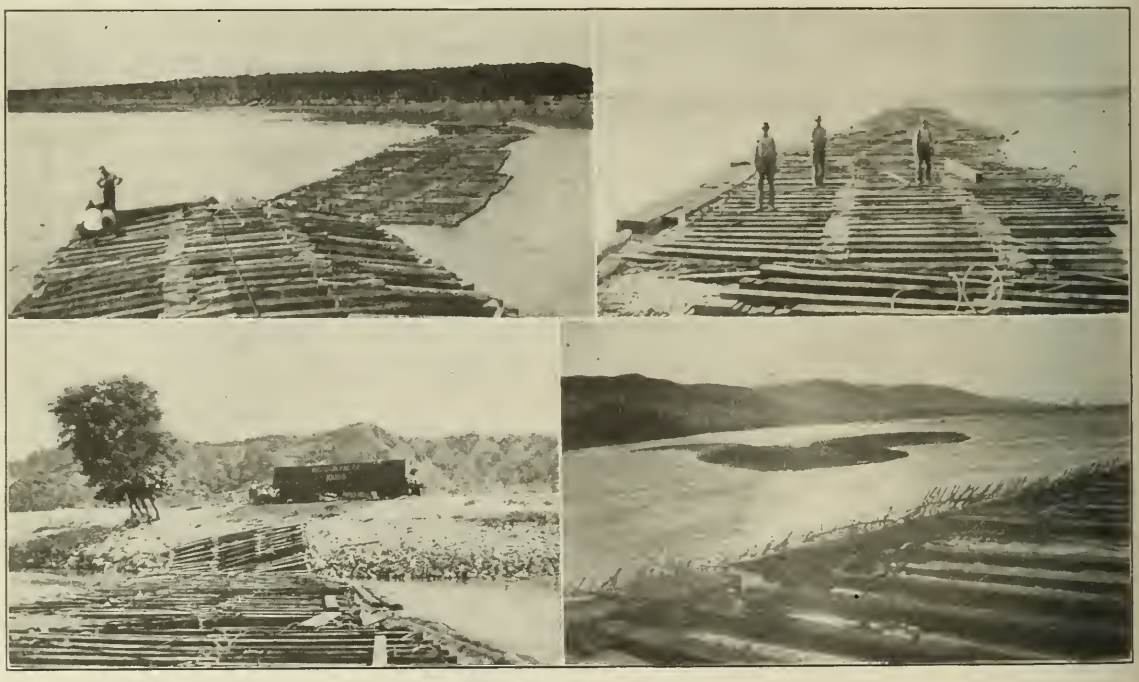
rafts to act as floaters in case a large amount of debris should come down on the raft. This was done only on the upstream raft. This method of construction gave a raft not only strong and durable but exceedingly flexible in every direction.



Detailed Plan of the Flexible Raft

The handling of the rafts was simplified by building them on barges which were towed to the location desired, where the rafts were made fast by ¾-in. cables running from the centers and joints to anchor piles, each pile holding two sections and the barges pulled out from under them, old boiler flues threaded on light cables being used as rollers. Bignell reinforced concrete piles were used for anchors, being jetted down until their tops were approximately 15 ft. below the river bottom. The piles were spaced opposite the joint between every other section and formed approximately a 45 deg. angle with the shore. A short section was also added to the shore end of each raft which was fastened both to the raft proper and to deadmen ashore by means of cables, the idea being to increase the length of the raft so that with the advent of high water there would always be one end of the raft resting on the bank. As a protection against the possible chance of current washing around the shore end, mattresses made from bundles of willows were sunk along the bank by unloading rip-rap on them.

The completed installation consisted of three separate retards spaced along the bank approximately 1,250 ft. apart.



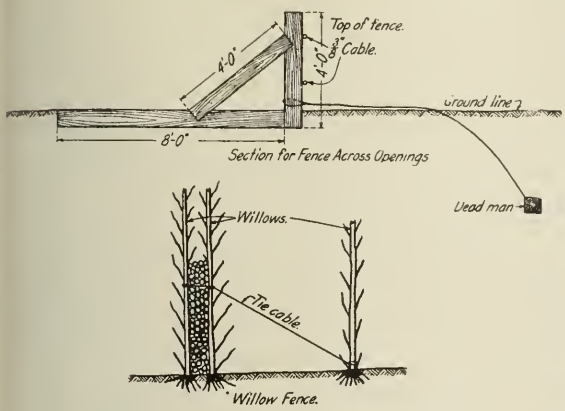
Four Views of a Raft Installation

Bringing Up a Section on Barges
The Shore End and Bank Protection

The Completed Raft in Position
A Sandbar Formed Downstream

The upstream raft or raft No. 1 which was 450 ft. long and consisted of nine sections was anchored to five piles, the shore end being about 2,200 ft. from mile post 480. Rafts No. 2 and 3 were each of four sections and about 200 ft. long, raft No. 2 being anchored slightly upstream from where the diverted or split current struck the bank and the cutting action was especially severe, while raft No. 3 was installed near a small point of land that was being rapidly undermined by the swift current of the river, the channel being narrowest at this particular spot.

The actual retarding of the current was not affected so much by the rafts themselves as by the installation of aprons on the downstream edge. These aprons consisted of panels constructed of willows from 12 to 14 ft. long set up and



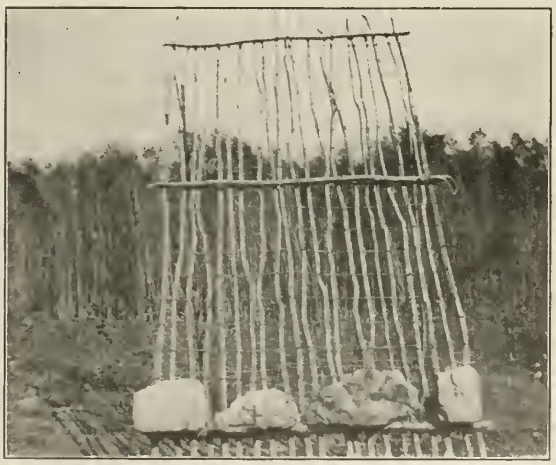
Cross Section of the Retarding Fence

down, well braced and interlaced with wire fencing, each panel being about 7 ft. wide with three cross pieces. The entire apron was weighted down by the addition of large stones held in position on the bottom brace by looping the fence wires around them. The completed aprons were then lowered over the downstream side of the raft and the upper part fastened by wire braces running back some 10 ft. from the edge of the raft and of such a length that the raft could have considerable movement without disturbing the apron. After the stones weighting the aprons have become embedded in the sand and deposited by the current silt and after enough has been deposited to hold the aprons in position the wire braces will be cut, leaving the rafts free to rise with the water. The shallow inshore sections were handled by working willows into the river bottom without the necessity of constructing panels, lacing them together at the top with wire and making them fast to the raft in a manner similar to that for the aprons. As in the case of the floaters, raft No. 1 was the only raft to be constructed with aprons, including the inshore sections though the ultimate intention is to construct all of them in the same manner.

In spite of the low water at the time of the installation (0.4 below government low water datum), the action of the retards was at once noticeable. Soundings taken on the downstream side of raft No. 1 showed the water to be 4 ft. deep which, in comparison with its previous depth of 10 ft., indicated a fill or deposit of silt approximating 6 ft. in depth. Photographs taken still later after a fall of about 2 ft. in the river showed the peak of a large sandbar formed in this location which would indicate an additional fill or deposit of about 3 ft. between the time of the soundings and the taking of the photographs. The current was also deflected further to the west and was again split as in the old installation of retards. In this case the western branch of the current is cutting a new channel through the large sandbar which in the past has been built up on the opposite shore, while through the deflecting action of rafts No. 2 and 3 the current is being forced across the long narrow bar that originally split the stream before the rafts were installed, resulting in the gradual disappearance of this bar and the rapid cutting away of a larger bar which lies just west of it.

While the installation to date has proved very successful in the handling of the Missouri river at this point during low water, it has yet to be tried out during high water. However, as it was designed pre-eminently to retard high waters and as its action up to now has been along the lines planned, considerable confidence is felt by the officers in charge that it will do all it was designed to do. The contemplated action during high water is similar to that which is now going on, i. e., the forming of bars both under the raft and on the downstream side, leaving the raft floating free or practically free at all times. Where a large amount of debris, etc., fouls the upstream edge only the upper third of the section in question will be sunk, the depth depending somewhat on the amount accumulated, the tendency being to float the debris over the surface of the raft, due to its flexibility and the action of the current, with no one section being completely sunk for its full width. With the receding of the waters the raft may be left either entirely or partially supported by the bar formed, in which case there will be some cutting along the midstream edge that will continue until the raft is again completely afloat when, with the resuming of the retarding action, it will necessarily cease.

The triangle between the railway and the river bank is chiefly low land which overflows regularly at high water and through the fact that it has in the past worked its way east, cutting into the right-of-way and entering into the river



A Typical Retarding Apron

near mile post 480, considerable damage has been done to the mattresses and revetments placed along the shore at or near this point. In order to eliminate this trouble which would, no doubt, undo much of the good brought about by the rafts, it was decided to construct a willow fence to retard the overflow current. By reference to the map it will be seen that the proposed fence which is about 2,600 ft. long runs from a point on the bank about 300 ft. upstream from raft No. 1 to the edge of a cornfield and on a direct line to Folsom. The two ends of this fence are both on high ground, the intermediate surface being broken in character and covered with thickly-grown patches of willows. The top of the fence will be on a predetermined grade, about seven feet above government low water, and will be similar in some respects to a dam in that there will be no low spots to concentrate the overflow into a definite current.

The actual construction will be of two types following the

retarding principle rather than the actual damming of the water, since it is desired to build up this low land. A path one foot wide will be cut through the heavy growth of willows, the cut pieces being thrown lengthwise in the path and piled up to the height required, the fence thus formed being carefully tied and laced together by wire and braced with tie cables fastened at intervals along the fence and running upstream to the base of growing willows. Open places will have built-up fences with supports made from two 8-ft. cross ties, one length being laid in the ground on the lower side and at right angles to the prescribed line, the other being cut into two pieces to form the upright and its brace. Two ⅜-in. cables running lengthwise of the fence and securely fastened to the uprights, support the actual retards which are constructed from willows and wire fencing in a manner similar to the aprons installed on the downstream side of the raft. To prevent the built-up type of fence from washing out, it is anchored to deadmen set opposite each post and sunk to a depth of four feet. The tendency of this combination fence will be toward the building up or gradual filling in of the land lying in the triangle formed by the fence, the main line and the bank, and by the elimination of any direct current will overcome one of the chief obstacles with which the Burlington has had to contend, i. e., the washing out or undermining of the revetments, etc., from the shore side.

The river bank protection work was planned by and constructed under the direction of C. L. Persons, assistant chief engineer, and G. A. Laubenfels, district engineer, the contract for the work being let to the Wood Brothers Construction Company of Lincoln, Nebr.

Inspection of Casale Train Control Installation

Officers of the Chicago, Rock Island & Pacific and of the Casale Safety Device Company, made an inspection and tests of the Casale automatic train control device which has been installed on the Rock Island between Blue Island, Ill., and Joliet, on Friday, March 12, a special train being used for this purpose. In the party were J. E. Gorman, president of the Rock Island, and other officers of the system representing the operating, mechanical, signal and engineering departments; James C. Regan, president of the Casale Safety Device Company, and other officers of this company.

An installation of this device has been completed and placed in service on the suburban district of the Rock Island between Blue Island, Ill., and Joliet, protecting about 25 miles of double-track. On the run to Joliet, tests were made with signals placed in the caution and stop positions, respectively. Speed control apparatus is installed on the engines so that when a caution indication is received the speed of the train is reduced automatically to a predetermined point, which in this case is 30 mi. an hr. When the speed control apparatus becomes effective the speed is reduced to approximately 22 mi. per hr. before a full release of the air brakes is obtained. On the first test a caution indication was received and an automatic application of the air took place, reducing the speed of the train to the predetermined rate. The engineman then attempted to increase the speed, but was checked automatically whenever it reached 30 mi. per hr. After having received the caution indication and while running at a speed of approximately 25 mi. an hr. a stop indication was received at the next ramp which automatically stopped the train in about 300 ft.

On the return trip from Joliet an eastbound passenger train was ahead of the special, and the special received caution indications at three signal locations just out of Joliet. Signal 336, located near New Lenox, Ill., gave a stop indication and the train control apparatus automatically stopped the train. After the stop was made the engineman released himself and proceeded under control to the next signal location, where a clear indicator was received which permitted the engineman to proceed at speed. The speed was increased to 74 mi. an hr., the apparatus functioning properly at every ramp location.

The nearest end of each ramp to a signal location is approximately 160 ft. from it, and the ramp is 120 ft. in length. Each ramp consists of two angle irons placed face to face with a copper strip placed between the angles in order to provide a better electrical contact between the ramp and the engine shoe. Every ramp opens the local engine circuit whenever the shoe is raised in passing over it. When the ramp is energized the transmission of current through the shoe maintains the local engine circuit, thus preventing an unauthorized stop being made. The circuits are so arranged that the signal repeats the indication of the ramp.

The engine apparatus may be briefly described as consisting of a shoe for making physical contact between the roadside and the moving train; a three-position relay; a storage battery set of approximately four cells of the automobile type, an automatic electro-pneumatic valve and the speed control apparatus. The shoe is located on the frame of the trailer wheels of the locomotive while the relay and release buttons are located in a receptacle placed in the channel of the I-beams supporting the tender. The storage battery set is located in a separate receptacle alongside the relay receptacle and in the same location. The air-hose connection between the engine and tender is carried through armored hose.

An automatic electro-pneumatic valve is located just below the running board and ahead of the cab about three inches from the boiler. The valve operates to close normally the exhaust from the brake pipe and normally operates to leave the passage open from the main reservoir to the engineman's brake valve. It operates in the reverse method to make an application in the reverse positions by closing the flow of air from the engineman's brake valve and venting the brake pipes, giving a service application. This operation does not prevent the engineman from making an emergency application if he desires to do so. The speed control apparatus is located on the journal of the front wheel of the truck and by means of the governor, contacts are caused to open or close electric circuits, depending upon the speed of the train.

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The German Government Has Permitted the Use of Sleeping Cars for Hotel Purposes

The Annual Report of the Car Service Section, U.S.R.A.

Difficult Conditions Contended with; The Coal Situation; Car Pools; The Autumn Rush

AN ABSTRACT OF THE ANNUAL REPORT of W. T. Tyler, director of the Division of Operation of the Railroad Administration, to Director General Hines for the year 1919, as given out by the Railroad Administration, was published in the *Railway Age* of February 13, page 481, and that part of his complete report devoted to the work of the Mechanical Department was given in the issue of March 12, page 759. This article in like manner deals with the Car Service Section; and other parts will appear in subsequent issues.

The prompt and marked decline in the demand for transportation which followed immediately upon the signing of the armistice affected in a very pronounced way the organization and the work of this section. This resulted, first, from the removal of the extreme stress of war necessity, which in many respects dictated the formation and guided the work of the organization, and, second, from the general falling off in business which took place in the first few months of this year. The primary problem of the Car Service Section, that of car shortage and how to meet it, was transposed very quickly in consequence into a problem of a car surplus and how to dispose of it. Activities of a strictly war nature were curtailed to a considerable degree, and the force of employees was correspondingly reduced, and this reduction was somewhat accentuated by the general decline in commerce and industry. The requirement for raw materials was at a low level, and construction of every sort, which all felt must soon start in considerable volume, was very slow getting under way. The inevitable result was that demands for transportation finally came with a rush, and the railroads had very soon to cope with an unprecedented volume of commodities awaiting shipment, and which was beyond their ability to handle in midsummer, and coincident with the beginning of this increase in industrial activity labor difficulties adversely affected the physical conditions of motive power and cars and further aggravated the situation. This is more particularly true with respect to cars, because of the larger number of units involved and the greater length of time necessary to recover lost ground. It has, under all circumstances, again been necessary to expand and revise the organization to meet the changed conditions and requirements, until today the Car Service Section has substantially as large a staff and is working along similar lines to those of a year ago, except that the stress is now entirely with respect to commercial business rather than primarily to meet the government's war requirements and, secondarily, commercial interests. Its function is to maintain a proper balance with respect to car distribution as between territories and between commodities and to meet such emergencies in car supply and transportation necessities as may arise from day to day.

In January last an important change was made in the method of freight-car relocation. Previously relocations were made by the Car Service Section as between railroads; thereafter the functions of the Car Service Section went only to relocation between regions, and each regional director controlled the relocation as between the roads under his jurisdiction. Throughout, however, the general distribution of equipment has been made under the direction of the Car Service Section. Under this central direction great freedom has been exercised in the movement of empty freight cars of various classes to meet emergency situations as well as the general requirements of the entire country. Reference to our report for 1918 will show that fully 850,000 empty-car movements were directed that year incident to car relocation. Figures comparative therewith for 1919 are not available, owing to the changed method of handling, but it is of interest to record that some 383,000 empty-car movements between regions have been accomplished upon orders of the Car Service Section.

Immediately following the signing of the armistice a surplus of all classes of cars developed. This reached its peak during the week ended February 23, when the surplus of cars totaled 506,569. It is worth while to note that this is the highest number of surplus cars ever recorded. The car supply remained constantly in excess of the requirements until in July. The increased movement of traffic which then commenced, and which has continued until the present time, except as interfered with by strike conditions, caused a very heavy demand for equipment. Much of this demand is to care for the movement of commodities which ordinarily would have moved during the spring months, and to that extent the present car shortage results from the endeavor of the shipping public to do in a period of six or eight months a business which under other circumstances would naturally have spread over an entire year. This increased movement of seasonal commodities, particularly for a very heavy grain crop, and unprecedentedly so in some sections, has greatly accentuated the car shortage.

The demand for cars for the loading of lumber and forest products and building and roadway materials, particularly lime and cement, has been extraordinarily heavy. The urgency of the cement movement practically ceased about December 1, and up to that time the volume moved within a given period was comparatively better than previous performance. It is a fact, however, that cars were not furnished at the large cement plants commensurate with daily orders. With respect to the lumber and forest products movement the situation is a little different. During the past few months the demand for equipment has been and still is in excess of the ability to provide, but if it were possible to provide, the railroads would then be unable to transport unless some other commodity were deprived of its transportation, so great is this demand, due undoubtedly to the generally low stocks locally and the sudden increase in construction deferred during and for some months after the war period. In the Puget Sound territory alone it is claimed the railroads are not meeting the requirements for lumber shipments by more than 35 per cent. This figure is capable of some adjustment, but at the best the car supply will probably not figure above 55 per cent of the demand. Notwithstanding this the principal railroads serving this territory show an increase in the number of cars of forest products loaded for the past four months of something like 20 per cent over the corresponding period last year, and at that time transportation and car supply for this commodity were given preference, due to war activities. The potential increase of the lumber industry has been remarkable, and it is not now within the capacity of the railroads to sustain this increase were it to continue indefinitely. Similarly there has been and still is difficulty in handling the lumber production of the South and Southwest, all of which, however, is receiving all practicable attention consistent with other demands.

Labor troubles in the phosphate fields of Florida interfered seriously with the production and movement of phosphate

rock from that section, in turn retarding the manufacture of fertilizer for the spring movement. This has produced a situation which it will only be possible to meet by preference in car supply, but even so it is likely that some demands for manufactured fertilizer may not be currently met. The difficulty will not, however, have been due to lack of transportation. Last season this situation was in much better shape, due to steadier labor conditions and continuous production and shipment through the slack period, so that as fall approached there were in stocks at the plants from 60 to 90 days' supply of rock.

In the Southeastern states a car condition has existed directly opposite to that of last year. Then there was a surplus of equipment in that territory, caused principally by the movement of supplies to the various Army cantonments; this year it has been necessary to provide a steady flow of empty cars into the South to protect the heavy outbound movement of lumber and other commodities. This indicates a reversion to pre-war conditions in this territory, for the Southeast has never been self-sustaining in car supply—that is, has never until last year made enough empties from loads received to care for its loading requirements.

The situation in eastern territory has also presented a marked change from conditions theretofore existing. By reason of the falling off in export traffic following the armistice and a heavy increase in merchandise traffic which finds its markets in the West, presumably due to curtailment of production during the war period, the westbound loaded movement for a time equaled or exceeded the eastbound loaded movement. This was something novel in American railroading and resulted in a shortage of cars in eastern territory. This tide has since turned and normal conditions again prevail.

Contemporaneously with the resumption of business activity within the United States came a heavy demand for United States owned equipment in Canada for loading to United States points. The movement of lumber and pulpwood has been particularly heavy and has required a constant flow of United States owned equipment empty to the Canadian roads. Very close to 100 per cent cars on line has been maintained on Canadian lines during periods of heavy shipping in the past two years, and this would not have been possible had not help been given in large measure by federal-controlled lines.

As box-car surplusages developed in the winter and early spring, advantage was taken of the prospective grain-car requirements of the summer and early autumn harvest season and storage for such cars was found in localities on or contiguous to the granger lines. Subsequently, or in April and May, definite steps were taken to specially condition these and other box cars for the movement of the 1919 grain crop, widely heralded as unprecedented. While the crop has not reached expectations, it has been very heavy and has imposed a heavy burden on the railroads. The movement has been protected generally to the ability of ports to handle and the primary markets to absorb, these being the real limiting factors in the situation. The latter is not true with respect to the primary markets of the Northwest, which were affected by the decreased spring wheat crop. Likewise Chicago has not been overcrowded. The conditions at primary markets were kept under control by the operation of the permit system, and it is but fair to add that conditions at Kansas City and Omaha have at times been affected by an inadequate car supply due to the great volume of traffic.

Another extremely heavy movement throughout the year has been that of live stock. Some difficulty has been met in providing transportation for the western sheep and cattle, due to early snows and lack of feed, and this has resulted in some delay in taking care of requirements as ordered. There have, too, been some local delays in car placements. Generally, however, the situation has been met in a satisfactory manner, and much better by a common use of stock cars than would otherwise have been possible.

Coal and Coke

The business depression affected the iron and steel trades particularly. This resulted in a considerably decreased consumption of all raw material used in these trades and a reduction in output of their mill products. Almost without exception furnaces and factories had large supplies of coal on hand, and this was quite generally the fact with all coal consumers throughout the country. The coal situation was made even more comfortable by the mild weather prevailing throughout the winter months, and the natural result was a progressive decrease in coal production, which finally reached the low point in April, 1919, when only 32,164,000 tons of bituminous coal came out of the ground. This was below the production of the corresponding month in the three previous years and only slightly exceeded the production of April, 1915, which amounted to 29,968,000 tons, and compares with 41,667,000 tons which must be produced each month on an average to reach an annual output of 500,000,000 tons, which coal operators estimate to be necessary.

During the first six months the railroads were constantly holding many thousands of idle coal and other open-top cars, but this surplus disappeared very rapidly after July 1. Following the month of April coal production gradually improved, and in July, under the stimulus of improved industrial demand, heavy increases began.

In September a goal of 11,000,000 tons production per week was set. From that time until the mine workers' strike on November 1 the production did not fall below this mark. In October the production reached approximately 55,000,000 tons, which may be compared with 51,000,000 tons produced in October, 1918, and 45,000,000 tons produced in October, 1917. The 1919 October figure sets a record as the greatest single month bituminous coal production in the history of the country.

Priority in car supply, which was a more or less regular necessity during the war period and applicable alike to coal cars as well as other classes of equipment, was discontinued promptly following the armistice, and during this year cars have been supplied for various commodities without discrimination.

The strike in the railroad shop crafts in August adversely affected the condition of equipment and for a time curtailed car supply. In September extraordinary efforts were made, and successfully, to recoup. A "drive" on coal production resulted in the weekly total being kept well over the figure which was claimed to be essential to the Nation's safety. Throughout, however, shippers of sand, gravel, crushed stone, forest products, and other miscellaneous materials were given their pro rata share of open-top cars based upon relative requirements. A temporary exception to this general rule became necessary in October, when developments indicated a strike of the miners on November 1, and prudence dictated a policy of preferred full-car supply for all coal mines in the two weeks immediately preceding the strike. The advent of the bituminous miners' strike on November 1 found extraordinary large coal stocks in the hands of railroads, dealers, and consumers. Incident to the drive for increased coal production an innovation was introduced with respect to securing prompt release of cars by consignees. Under existing demurrage tariffs the consignee is allowed 48 hours' free time in which to unload. A country-wide following up of consignees who took longer than this was undertaken with telegraphic reports of daily situations and free use of individual embargoes against consignees showing unreasonable delinquency. The statistics show a progressive decrease in the time held in excess of free time, and it is felt that this was

another contribution to the increased coal-car supply, and greater coal production in September and October.

The coal-zone plan established jointly by the Railroad and Fuel Administrations to so control the distribution of coal as to avoid the waste of transportation in unduly long hauls and cross hauls was abolished February 1. Another transportation economy of the war—the compulsory pooling of coal at tidewater and Lake ports—has also been discontinued. Under this plan shipments were made by the various consignors to "pools" of different classes of coal and consignments to each pool mixed upon arrival at Lake or tidewater points. This obviated the necessity of holding cars until a cargo of each consignee's coal was accumulated, and thus much car detention was eliminated while coal was being accumulated. Two years' experience has thoroughly demonstrated the efficacy of the plan. Some benefit is still being enjoyed by reason of voluntary pooling by shippers on a more liberal basis through the medium of organizations maintained by the Railroad Administration for that purpose. It is to be greatly regretted that the shippers of coal have deemed it inadvisable to continue the former arrangement, and every effort is being made to extend the scope of the existing methods of voluntary pooling.

In the Car Service Section annual report for 1918 mention was made of the establishment of uniform rules for the rating of coal mines for the purpose of equitably distributing empty coal cars during periods of shortage. A year's experience has amply demonstrated to both shippers and railroads that much good has been accomplished by such rules. The rules previously effective were made by individual railroads, varied considerably in their provisions, and were not infrequently unsatisfactory to railroads and shippers alike. The uniform rules agreed to by railroads and associations representing the mine operators have reduced disagreements to a minimum. Some revision of these rules has been made to care for changed conditions resulting from the war-to-peace transition and to embody the results of the year's experience and changes indicated thereby to be advisable. The rules as revised became effective January 10, 1920.

It seems desirable also that special emphasis should be given to the results of the second year's operation of what is known as the Eastern Railroads Car Pool. This pool was created in December, 1917, and included the open-top cars (except coke cars) of all railroads embraced in the Eastern, Allegheny, and Pocahontas regions, with the exception of the Virginian Railroad. Through a central office and a manager at Pittsburgh, Pa., it controls distribution as between railroads of approximately 650,000 open-top cars. It has been the means of eliminating a large amount of empty car haulage which follows the handling of open-top cars under ownership rules such as previously protected these cars for the owners' use. The cars are now used in common by the contributing roads in accordance with their relative requirements and other factors necessarily to be considered in connection with the transportation situation in the entire pool territory. The operation of the pool has resulted in an equalized supply of cars for each member line not possible to be brought about by any other method, and through the elimination of unnecessary empty car haulage maximum utilization is secured from the equipment. Particularly has this plan of operation been indispensable during the period of intensive coal production, and the "drives" would have fallen short of their attainment but for this agency. One difficulty with its operation is the matter of car maintenance; there are many different standards, hence different parts, and the matter of running repairs presents a real problem. There is so much merit in the common use of these cars within the limited areas, both in point of coal production and saving of transportation, that it is believed possible and practicable to work out a voluntary arrangement between the railroads concerned by which proper maintenance may be assured and benefit thereof retained. Arrangements for continuation of the Eastern Open Top Car Pool should by all means include proper provisions for maintenance of the cars by using lines whether owners' or others to the greatest practicable extent.

Refrigerator-Car Department

This department, with headquarters at Chicago, has charge of the distribution of the railroad-owned refrigerator equipment of the entire country and works in close co-operation with those in charge of privately owned refrigerators that maximum results for the perishable movement as a whole may be maintained. Its problem throughout 1919 has been to provide refrigerator transportation facilities for a heavily increased tonnage of perishable foodstuffs, with practically no increase in the particular type of equipment necessary for such transportation. Of fruits and vegetables alone this increase over the tonnage handled in 1918 was more than 20 per cent. Furthermore, this increased production was mostly in agricultural districts farthest removed from markets and involving in consequence an increased haulage of more than 20 per cent over 1919 in the aggregate.

The handicap of what would ordinarily have been considered a deficiency in equipment units has been overcome by more effective utilization of the equipment available, and this traffic, so essential in the nation's and world's food program, has been given such service as has been necessary to protect against loss account of insufficient car supply. A possible exception may have been the wine grapes in California, which, to the extent of approximately 30,000 carloads, and due to change in federal laws with respect to prohibition, were offered for transportation this year, whereas previously these had been absorbed by nearby wineries. These were, however, largely moved.

There were threatened losses in the early potato crop of Idaho, the peach crop of Arkansas, the cantaloupes and potatoes in Colorado, the melons and other fruits of California, and latterly the apples of Wenatchee and Yakima, but so far as known all have been given reasonable transportation, and in most cases there have been no actual failures to supply cars when and where wanted. Weather conditions and irregular coal movements and other difficulties growing out of the coal strike temporarily interfered somewhat with full car supply in California in December. This is being overcome. The Florida crop has been fully protected up to this time.

It may be well to point out, in view of our experience this past year, that there must be immediate provision for additional refrigerator cars to compensate for the decreases in the number of such cars during the past few years. Not only this, but many of the cars now in service should be made more efficient as refrigerator cars. Common use of all cars of this type to the greatest possible extent will make up for some deficiencies in ownership, but there are limits to the benefits thus obtainable. It seems desirable that such common use should continue at any rate in order to keep down to the safe minimum the number of refrigerator cars necessary to be kept in service.

Embargoes and Permits

Beginning in January, 1919, it was arranged that all except general embargoes should be authorized and supervised by the respective regional directors. Contemporaneously the zone system of transmission of embargoes through zone chairmen variously located throughout the country and in effect for the previous year was abolished and distribution thereafter made through regional directors. Otherwise the system has been maintained as originally inaugurated. The necessity for embargoes during the first half of the year was negligible as cmopared with 1918. The embargo was utilized freely to prevent congestion and delay to equipment at the time of the

shopmen's strike in August and the strike of the British railway employees in September. This latter seriously affected ocean shipping, and accumulation of export freight at seaports would have resulted had the movement not been properly restricted. Embargoes were also effective in controlling traffic and avoiding accumulations during the strike of steel workers at various points in October and again during the coal miners' strike.

The permit system of traffic control so successfully inaugurated two years ago, and operated since then as occasion has demanded, has further justified itself during the past year. Early in the year, due to the unprecedented oil well development at Burkburnett, Tex., and vicinity, oil-well supplies and traffic of every nature was rushed into that territory promiscuously and without limit. The "permit" system of control was brought into use and prevented what otherwise would undoubtedly have been an utterly chaotic condition. The control of export traffic has been maintained under the permit plan, and is recognized as the only effective means of preventing congestion at the ports. As the grain-shipping season approached, the permit plan, so successfully tried in 1918 to control the movement of grain to primary markets, was reinstated and maintained so long as necessary to prevent congestion. The permit system has so proven its value as to justify its retention as a permanent institution.

Accumulations

The term "accumulation" includes the cars, both loaded and empty which are in transit in excess of the number that can be handled currently. It represents the number of delayed cars which the railroads are behind, in the aggregate, in their daily performance. It also includes cars held account embargoes on connecting lines and those held for reconsignment. The number reported does not reflect directly any disability of the consignees. On January 1, 1919, there was reported by all lines a total accumulation of 46,950 cars. As a result of the shopmen's strike in August, however, the figure increased to 67,178 on August 15, and the rather general epidemic of strikes and unsettled labor conditions which have since prevailed has tended to keep the total accumulations high. Weekly reports give current advice on the subject, and a follow-up program is vigorously pursued in all cases where the figures appear unreasonable. The latest reports indicate total accumulations as of December 19, 1919, of 72,867 cars.

Company Material

On January 1, 1919, the total number of cars of company material awaiting unloading on all roads was 67,940, of which 50,034 represented coal and coke. At this time, as already explained, there was a surplus of cars and hence no need to expedite unloading. This material is reported weekly, reports being very carefully checked, and the matter handled with those lines showing unreasonable delay to cars or unnecessary stocks of fuel on hand. An instance in point which is of considerable present interest is with respect to the railroad fuel holdings in cars. The aggregate of this is of little importance to the shipping public while a car surplus exists—the contrary is emphatically true as soon as a car shortage develops. Appreciating this, a campaign to cut railroad fuel holdings in cars to the irreducible minimum was begun as soon as the coal-car supply showed signs of tightening. This was carried through with great vigor, the personal effort of the director general giving it further impetus, and in September the total company material holdings reached the low figure of 41,028 cars, of which only 26,216 were coal and coke. The results contributed much to the increased bituminous coal production in September and October.

Quite naturally, as a result of the coal strike and the extraordinary necessity for protecting railroad fuel during its pendency, company material increased in October and since. December 19, 1919, the coal and coke on hand was 40,489 cars; other commodities, 14,227 cars.

Car Conservation

The loading of freight cars has not been as good during 1919 as during 1918. The withdrawal of the Food Administration's rules and regulations December 11, 1918, contributed considerably to the decline in average car loading, as the trade units established therein on food and feed commodities were much larger than the ordinary peace-time trade units. Being no longer in a position to appeal to the patriotism of the shippers for "heavy loading" as a war measure, it was necessary to rely upon other appeals just as reasonable but less persuasive. Unfortunately many shippers overlook the fact that they are vitally interested in heavy loading and that by reducing the number of cars required to move a given tonnage they not only make cars available for other business which could not otherwise be promptly transported, but virtually increase the capacity of all transportation facilities and instrumentalities, including locomotives, industrial and team tracks, yards, platforms, etc. A large number of shippers have resumed the practice of loading equipment only to meet the requirements of the tariff minimum. As a result, the net ton-miles per loaded freight car fell off from an average of 29.2 tons in the first 11 months of 1918 to 27.8 tons in the same period of 1919, or a decrease of 4.8 per cent.

There are, however, some shippers who have been continuously favorable to maintaining the heavier loading practices which prevailed during 1918. On October 29, 1919, the director of traffic, upon solicitation of the car-service section, issued to the railroads freight-rate authority No. 16368, increasing the tariff minimum weights on grain and grain products to the trade units as formerly effective under Food Administration rules and regulations. This is bringing about much needed improvement and increasing car efficiency.

A campaign of education was carried on with consignees during the early part of 1919, in an endeavor to get orders for maximum carloads whenever possible, and where not possible, to induce several dealers in one vicinity to combine orders so that a maximum carload order could be placed. This campaign has been somewhat successful, especially since car shortage has again existed as a compelling influence. In a number of cases shippers have refused to allow minimum orders to go forward until such time as other minimum orders could be secured, so that equipment could be double loaded, thereby making one car do the work of two, thus releasing one of them for another shipper's use.

Throughout 1919 the subject of car conservation has been handled just as vigorously as during the war period, and will continue. Some of the results of these efforts have been as follows:

The co-operation extended by the Tobacco Association of the United States when they adopted a resolution July 1, 1919, approving of, as far and as soon as possible, a standard tobacco hogshead 46 by 48 in. in lieu of the hogshead previously used, which only permitted floor space loading. The so-called standard hogshead permits double-decking, resulting in an increase of 33⅓ per cent in the average loading, or an estimated saving of 20,000 cars per annum.

The paper loading from the largest shipping territory in the United States during the year just passed has averaged about 55,000 pounds per car, whereas previous to our campaign the average loading was about 44,000 pounds.

At the suggestion of the Car Service Section and after numerous conferences and demonstrations with the automobile manufacturers and the loading rules committee, section 3, mechanical, American Railroad Association, standard rules have been promulgated, effective January 1, 1920, showing how to secure maximum utilization of equipment by properly loading automobiles, trucks and trailers. This will have a

tendency to increase the loading, especially as heretofore there were no uniform methods of loading.

The Car Service Section has successfully demonstrated the practicability of loading watermelons five tiers high instead of four and less, and the National Melon Association at its annual convention held in Cincinnati in February, 1919, passed a resolution fixing the five-tier loading as a general practice. This means a saving of about 3,800 cars per annum.

During August, September and October, 1919, a very active campaign was carried on with the salt shippers throughout the United States with gratifying results, the average load in August of 57,260 pounds being increased to 63,180 pounds in October, an increase of 5,920 pounds per car.

In many cases where complaints of car shortage have been made, shippers' loading has been checked, and where light loading has been discovered this has been pointed out to them as contributing substantially to the car shortage.

Encouragement has been given to the adoption and use of mechanical devices as a means of securing heavier loading, especially in double and triple decking of heavy commodities at a reduced labor cost.

A very active campaign has been conducted for the proper loading of coal, both anthracite and bituminous, to the end that loads be so trimmed as to secure the maximum tonnage per car. The shippers and the railroads are both so vitally interested in the avoidance of the enormous transportation waste resulting from the light loading of cars that the co-operation of the shipping public is being and will be continuously sought in an effort to progressively decrease this evil.

Advanced Movements

In 1918 it was possible to make much progress with respect to advanced shipments of certain raw materials and getting them moved to stock piles through the season when transportation conditions are generally somewhat dull. As an example, pulp wood was moved from Canada to points in the states in a large volume during the early spring and summer; phosphate rock was moved from the mines in Florida and Tennessee during the summer, which helped to remove the forced transportation of such materials from the rails when the heavy fall movements of agricultural products began. No such plan was possible this year, due to the general slump in industrial activities and the element of doubt which appeared to exist in all lines of manufacture during the depression of the spring and early summer. The consequence was that the railroads in the late summer and early fall were not only faced with an abnormal business, but there were these movements, which had not previously been gotten out of the way, all to be crowded in at a time of the greatest activity.

Sailing-Day Plan

The "sailing-day" plan, or, as it should more properly be called, the "shipping-day" plan, which proved so efficacious in 1918 in relieving the congested conditions at various transfer points, met with some opposition in the early part of 1919, due to some errors of administration, which were not unnatural in the development of any transportation project of such magnitude. Complaints were received from various state commissions and trade organizations in such volume that a conference was held in April that a better understanding might be had. The main difficulties seem to have been that shippers felt they were denied the right to take freight to the freight houses for forwarding at any time of their choice. This was not the intent. Furthermore, because of the incomplete development of plans, the result of some of the schedules made had the effect of limiting free distribution of traffic from some centers while competitors at other centers were not so limited. This naturally resulted in friction which it was recognized must be overcome. However, new principles were drafted and agreed to which, with intensive following out on the part of all roads, will almost if not entirely eliminate the difficulty now experienced in congested transfers and will give the movement of less-than-carload freight a service far superior to anything which is possible under the old plan, both with respect to time and the avoidance of damage. This will take time, very much effort, and extreme patience, but the plan is sound and should be given enthusiastic support by all railroads.

Transportation Difficulties

While transportation difficulties ordinarily belong in a report of railroad operation rather than of car service, the effect on car supply in some instances is so important that it seems proper to briefly mention the subject here.

There has developed during the fall such an abnormal demand for transportation that certain roads have found extreme difficulty in moving "through" traffic offered to them, with the result that much difficulty has been experienced in giving proper service locally. This condition developed in the West at a time when most unusual weather conditions for that section and season prevailed. With heavy snows and extreme cold, difficulty was found in moving business currently, which had the effect of curtailing the car supply and materially affected the service given to local patrons generally. A further complication was the effect of the coal strike, which forced upon the railroads in that section a fuel different in quality from the normal supply and hence one with which some experiment was necessary before it could be used with any degree of success. Then, again, coal was being hauled out of its usual channels, which, with the consequent movement of the empty cars, upset the usual transportation conditions and had the effect of adding to congestions and other difficulties. By the close of the year, however, these conditions had been very largely overcome and the return to normal was apparent generally.

A competent corps of inspectors has been maintained in varying number, dependent upon the requirements throughout the year. It is the function of these men to keep in intimate touch with car supply and transportation conditions which are giving trouble, and take all practical measures to afford relief. The central administration is thus brought in direct contact with such conditions. This has been particularly helpful in the difficulties arising in the oil-boom territories of Texas and Oklahoma, where the sudden production of oil and the tremendous inrush of people and freight are of such great volume as to be beyond the ability of the railroads to immediately handle. Inspectors have been used extensively in the grain territory, in arranging better use of cars in the large terminals, and in assisting to specialize on distribution, also to circulate among the farmers and ascertain as to the actual conditions with respect to unshipped grain. Much work has been done by inspectors in specializing on coal production, not only in hurrying cars to the mines, but in assisting to get the coal cars back from the non-coal-producing roads to coal-loading roads. As outside agents, these men are of great value in helping to carry on the work of the Car Service Section.

Relocation of Cars by Ownership

Special attempts were made in the early part of this year and during the period of car surplus to relocate cars more in accordance with ownership, this with the idea of getting the cars to the home road so that extensive repairs and betterments might better be applied. At the beginning of federal control 44 per cent of the cars were on home lines. January 1, 1919, this figure stood at 26.6 per cent. An improvement was made so that by the 1st of July 31.7 per cent of the cars were on home lines. From that time on, however, due to steadily increasing demand for equipment with corresponding increase

in shortages, it has been necessary, in order to meet these demands more promptly, to place cars for loading largely without regard to ownership, and the number of cars on home lines has again declined to about the same point as January 1, 1919. The principal reason for this in the latter part of the year was the necessity, because of the coal strike, first, to use coal cars of any ownership to meet the demands for the highest possible production during the two or three weeks prior to the strike, and, second, to move the coal which was produced during the strike far beyond normal channels in order to meet emergencies. In consequence a serious dislocation of cars resulted. Any plan to quickly locate cars on the home road is expensive of operation and cannot be carried out at a time of car shortage without materially interfering with ability to meet the current demands of shippers for cars.

Grain and Grain-Car Supply

The principal grain producing region of the country is west of Chicago, and for convenience it may be divided into the southwestern section, comprising the states of Texas and Oklahoma, the central western section, comprising the states of Nebraska, Iowa, Illinois, Colorado, Kansas and Missouri, and the northwestern section, including Montana, North Dakota, South Dakota and Minnesota. It is in these three sections that the volume of the grain traffic affects the car supply to such an extent that a special effort is generally made in advance of the harvest to protect its movement. In the early part of the year, due to the general falling off in business and the consequent surplus of idle equipment in the East, large numbers of box cars were moved empty to the West in anticipation of an abnormal wheat crop.

In the early summer of 1919 the Interstate Commerce Commission in a formal decision on the subject of distribution of cars for grain loading indicated that it seemed to be advisable that uniform rules to govern car supply for this loading should be adopted by the railroads and enforced throughout the country. To meet this suggestion a conference was arranged by the Car Service Section with transportation representatives from most of the important grain-producing roads of the country, and on September 16, 1919, uniform rules for the distribution of cars available for grain loading at stations throughout the United States were promulgated. These rules have doubtless been helpful in making the distribution on a more equitable and uniform basis than heretofore.

Prior to July 1, 1919, preliminary arrangements had been made for control of the grain movement to the various ports and primary markets through committees, who authorized the loading of grain through individual permits on traffic destined to ports and on that moving between primary markets, as well as on all grain reconsigned, and blanket permits issued to the carriers serving primary markets and covering the movement of grain from country stations to primary markets.

The personnel of the various committees included in each case an official representing the Wheat Corporation of the United States government, railroad transportation department and railroad traffic department, the understanding being that the Wheat Corporation's representative should at all times have the controlling voice with respect to permits to be issued.

At the request of the manager of inland traffic for the Wheat Corporation, this prearranged plan was put into operation on August 1, 1919, at all points except at Gulf ports where the plan became effective on August 18, 1919.

Regardless of these precautions, however, accumulations occurred at Galveston, Baltimore, Newport News and Kansas City, it being more acute and more prolonged at Galveston than at the other points. Some difficulty was experienced in regulating the flow of grain under the blanket-permit method from country stations, and during the latter part of October this method was supplanted in a part of the western territory by the individual-permit plan until the elevator situation became easy enough to permit the grain to come in without restriction.

The wheat movement usually begins in the southwest about July 1, but was 10 days to two weeks later than usual this year, due to weather conditions. About two months before the wheat was due to move, instructions were issued to the western lines to overhaul and put in shape for grain traffic as many of the stored box cars as was practicable prior to the beginning of the grain movement.

Several factors have had an important bearing in delaying the movement of grain this season; especially is this true with regard to the wheat. Principal among these factors are:

1. The Wheat Corporation's difficulty in securing boats for export movement, Great Britain, France and Italy all insisting upon taking their grain in their own bottoms in order to reduce transportation charges.

2. Difficulties consignees of export wheat had in financing the matter of payment therefor.

3. Accumulation of grain in elevators at ports and primary markets, due to the above causes, finally resulting in closing the North Atlantic ports against the acceptance of cargo tonnage of wheat, forcing the available boat tonnage to Galveston to relieve that port and at the same time provide an outlet for a considerable amount of wheat from Oklahoma and Texas, some of which was stored on the ground.

4. A strike of the mechanical crafts during the month of August materially affected the "conditioning" of equipment for grain traffic and brought about congestions, the effects of which on some roads extended into the month of September.

5. In November the coal miners' strike necessitated the preferential handling of coal and increased length of haul; the use of coal from storage and the variations in kinds and grades produced a large number of engine failures and consequent delays to traffic.

6. In December the western roads were greatly hampered by reason of an unusually early and severe storm of snow, which, together with extremely cold weather, brought about congestions, and necessitated the issuance of numerous embargoes.

7. Substantial increase in volume of less than carload traffic, necessitating the greater use of box cars to keep freight houses open.

Vigorous complaints began to come in about the first of September indicating isolated instances of grain being placed on the ground account elevators being full and inadequate car supply.

Recommendations

The experience of the Car Service Section during the past two years has made it quite clear that there should be continued some uniformity of method of car control and distribution as between portions of the country, railroads, stations and shippers. The result of the two years' work has produced, among other things, uniform rules to govern the distribution of coal cars and grain cars, and this establishes practical uniformity with respect to the car supply for the two most important commodities handled by the railroads. There is, however, room for improvement along these lines with respect to others of the important tonnage-producing articles.

The Car Service Section is in direct charge of W. C. Kendall, manager, assisted by W. L. Barnes, A. G. Gutheim, H. J. German, W. J. McGarry, C. B. Phelps, G. F. Richardson, assistant managers, and N. D. Ballantine, special assistant.

Effect of Molybdenum in Chrome and Nickel Steels

Increased Toughness and Wide Hardening Range Characterize Steels Containing This Element

IN THE DEVELOPMENT of modern railroad equipment the excessive sizes of parts required to bear the high stresses is often a limiting factor. The use of alloy steels has been recognized as a possible method of overcoming these limitations, but the results secured with this material have not been wholly satisfactory.

The requirements of a steel for use in the running gear of a locomotive are (1) toughness and ability to resist sudden and repeated shocks, (2) ease of manipulation, to permit of handling it without installing special equipment. In addition, it is desirable that the steel have a high elastic limit and ultimate strength. The low carbon steels used in ordinary forgings meet the first requirements, but are deficient in strength. The majority of alloy steels have desirable physical properties, but require special care in working and cannot readily be handled in railroad shops. In view of these facts it is interesting to note that steels alloyed with molybdenum, which seem to combine in an unusual degree the properties that have been found desirable for steels used in locomotives, are now being introduced for railroad service.

The properties of molybdenum steels are set forth in a book recently issued by the Climax Molybdenum Company, New York, from which the information in this article has been secured. The data presented are stated to be the results of tests of the ordinary commercial steels taken from the records of the users of these alloys.

The use of molybdenum as an alloy agent in steel was developed commercially under the stress of war conditions. The properties which made molybdenum alloys especially valuable for use in liberty motors, tanks and other equipment subjected to severe stresses are the high tensile strength and high elastic limit, combined with unusually large reduction of area secured by its use. Other incidental advantages are well illustrated by the following results secured with a chrome molybdenum steel.

TENSILE TEST, PHYSICAL PROPERTIES, GRADE MO-2 CHROME-MOLYBDENUM STEEL

Water quench	Elastic limit	Tensile strength	Elongation, per cent	Reduction of area, per cent
1,500 deg. F.	149,600	162,900	16.0	57.2
1,550 deg. F.	151,000	163,400	16.5	57.3
1,600 deg. F.	148,800	163,600	17.0	57.3
1,650 deg. F.	148,500	161,400	16.5	58.9
1,700 deg. F.	149,500	162,400	16.5	56.8

Tests made on 1¼-in. round bars, all drawn at 1,000 deg. F. Analysis: Carbon, .23 to .30, mangarese .50 to .80, chromium .80 to 1.10, silicon .10 to .20, molybdenum .25 to .40.

This is further illustrated by the photomicrographs in Fig. 1. The uniformity of hardening throughout large sections is shown by Fig. 2, in which the Brinell readings on 3½-in. square sections of chrome-molybdenum and another similar alloy steel are compared.

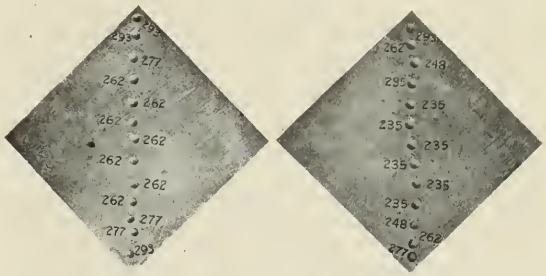


Fig. 2. Comparative Brinell Hardness of Chrome-Molybdenum Steel (Shown on the Left) and a Similar Alloy Steel

Drawn at 700 Deg. F. Drawn at 1,100 Deg. F. Drawn at 1,300 Deg. F.

Specimens quenched in oil from 1,600 deg. F. and drawn as shown. Magnification 400 diameters.

Fig. 1. Microphotographs of Chrome Molybdenum Steel, Showing Similarity of Microstructure at Various Drawing Temperatures.

the wide range of temperature within which the tempering and drawing operations can be performed without greatly altering the physical properties of the steel, the uniformity of hardening throughout large sections, the reduction of warpage during manufacture and the unusual toughening of the steel.

The relatively small variation in the physical properties which results from a change in the quenching temperature is

Molybdenum has been used for many years in the manufacture of high speed steel with six per cent of molybdenum and came into disuse with the tool steel trade because the composition was unfavorable to uniform results after redressing the tool, due to volatization. At the present molybdenum tool steels are being produced with cobalt as a stabilizer. All of the steels described in this article contain molybdenum in

amounts ranging from 3.0 to .8 per cent. In these steels there is no volatization in production or in use. However, the properties imparted by fractional percentages of the element were relatively little understood until recently. The alloys of molybdenum formerly used were often impure, and the results secured were therefore not uniform. Furthermore, molyb-

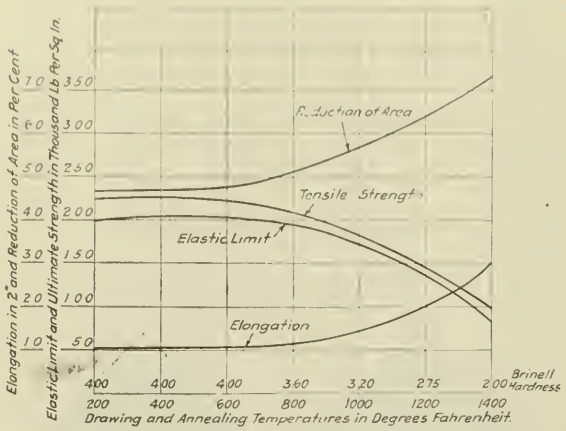


Fig. 3. Properties of Chrome-Molybdenum Steel Quenched in Water and Drawn at Various Temperatures

All tests made with 1¼-in. square bars quenched from 1,600 deg. F. Hardening range 1,500 to 1,700 deg. F. Bars heat treated in full size, then machined to .505 in. diameter. Approximate average analysis: carbon .32 per cent, manganese .55 per cent, silicon .15 per cent, chromium .90 per cent, molybdenum .37 per cent.

denum was classed as a rare element, not available in commercial quantities.

During the war large deposits of molybdenum were developed at Climax, Colo. From this ore ferro-molybdenum and calcium molybdate were produced in quantities and a large

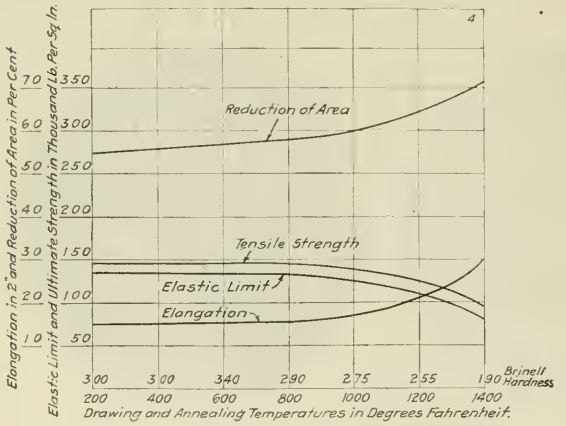


Fig. 4. Properties of Chrome-Molybdenum Steel Quenched in Oil and Drawn at Various Temperatures

Method of testing and average analysis same as given in Fig. 3, except quenching temperature, which was 1,700 deg. F.

tonnage of various types of molybdenum steel was manufactured. The molybdenum is introduced into the steel either in the bath or in the ladle, preferably in the bath, and can be used in steels produced by the open hearth, electric or crucible process.

The alloys which have been developed thus far are of four general types, chrome-molybdenum, chrome-nickel-molybdenum, nickel-molybdenum and chrome-vanadium-molybdenum steels. Each of these alloys is made in a number of grades with varying percentages of the metallic elements and varying molybdenum content. The chemical compositions are as follows:

Chrome Molybdenum Steels

Type MO	Per cent
Carbon	.15 to .40
Manganese	.40 to .80
Chromium	.70 to 1.10
Molybdenum	.25 to .40

Type MS	
Carbon	.40 to .50
Manganese	.60 to .90
Silicon	.10 to .20
Chromium	.80 to 1.10
Molybdenum	.25 to .40

Chrome Nickel-Molybdenum Steel

Type LM	
Carbon	.25 to .35
Manganese	.50 to .80
Silicon	.10 to .25
Chromium	.70 to 1.00
Nickel	2.75 to 3.25
Molybdenum	.30 to .50

Nickel-Molybdenum Steel

Type NM	
Carbon	.20 to .40
Manganese	.30 to .50
Nickel	3.00 to 5.00
Silicon	.10 to .20
Molybdenum	.30 to .70

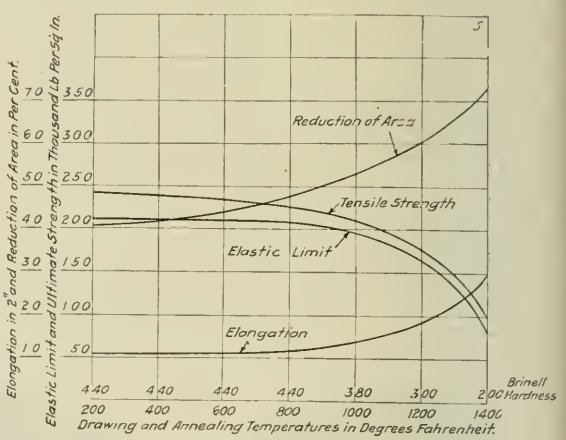


Fig. 5 Effect of Higher Molybdenum Content on Chrome-Molybdenum Steel, Water Quenched

Approximate average analysis: carbon .36 per cent, manganese .52 per cent, silicon .13 per cent, chromium 1.00 per cent, molybdenum .76 per cent. Method of testing same as given in Fig. 3. Hardening range 1,500 to 1,700 deg. F.

Chrome-Vanadium Molybdenum Steel

Type VM	
Carbon	.30 to .40
Manganese	.40 to .60
Chromium	.70 to 1.00
Vanadium	Trace to .17
Molybdenum	.35 to .85

Properties of Chrome-Molybdenum Steel

The stels of the chrome-molybdenum series are made in four grades of varying carbon content, the analyses being as follows:

Type MO
(Molybdenum .25 to .40 per cent)

	Grade MO-1	Grade MO-2	Grade MO-3
Carbon	.15 to .23	.23 to .30	.30 to .40
Manganese	.40 to .70	.50 to .80	.50 to .80
Chromium	.70 to 1.00	.80 to 1.10	.80 to 1.10
Silicon	.10 to .20	.10 to .20	.10 to .20

Sulphur and phosphorus each .04 maximum.

This type is suitable for general machinery parts subjected to high stresses. With low carbon content it makes an extremely tough casehardening steel, while the grades having higher carbon percentage are used principally for oil-quenched

gears and large forgings. The grade MO-3 is recommended for driving axles, main and side rods, piston rods and crank pins. The properties developed by water and oil quenching are shown by the diagrams reproduced in Figs. 3 and 4. The reduction of area, which is an index of the toughness and

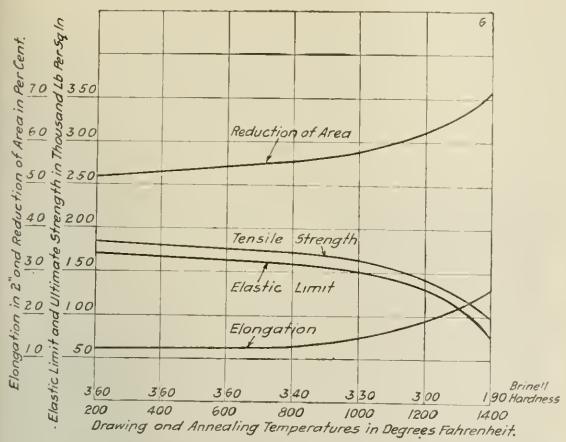


Fig. 6. Effect of Higher Molybdenum Content on Chrome-Molybdenum Steel, Oil Quenched

Approximate average analysis same as given in Fig. 5. Method of testing same as Fig. 4.

satisfactory machining qualities of the steel is unusually high. It will also be noted that the tensile strength and elastic limit decrease slowly as the drawing temperature is increased. This is a distinct advantage, as the high drawing temperature gives greater resistance to dynamic stresses or fatigue and

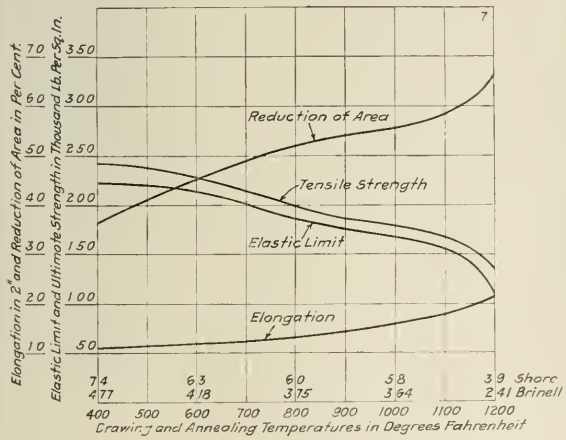


Fig. 7. Properties of Nickel Molybdenum Steel, Drawn at Various Temperatures

All tests made with 1/2-in. round bars quenched in oil from 1,500 deg. F. Hardening range 1,450 to 1,650 deg. F. Heat treated in full size and then machined to .505 diameter. Approximate average analysis: carbon .33 per cent, manganese .25 per cent, silicon .18 per cent, nickel 4.50 per cent, molybdenum .58 per cent.

the slow falling off of the physical properties gives greater permissible range in heat treatment.

The effect of an increase in the molybdenum content is shown by a comparison of the tests in Figs. 3 and 4 with Figs. 5 and 6, the curves in the latter charts representing tests of steel containing .76 per cent molybdenum, whereas Figs. 3 and 4 were plotted for steel with .37 per cent molybdenum.

Molybdenum Spring Steels

The type MS has a higher carbon content than the type MO and is designed especially for springs, rivet sets and forging dies. The analysis range is as follows:

Carbon	.35 to .60 per cent
Manganese	.60 to .90 per cent
Silicon	.10 to .20 per cent
Chromium	.80 to 1.10 per cent
Molybdenum	.25 to .40 per cent

The physical properties of this steel are:

Elastic limit	180,000 to 210,000 lb. per sq. in.
Tensile strength	200,000 to 230,000 lb. per sq. in.
Elongation, per cent	12 to 15
Reduction of area, per cent	37 to 45

The chrome-nickel-molybdenum and chrome-vanadium-molybdenum steels are not considered commercially applicable for railroad service. However, the nickel-molybdenum steels are applicable for practically the same service as the type MO-3.

Nickel-Molybdenum Steels

The addition of molybdenum to nickel steel increases the elastic limit and the toughness and ductility for given elastic limits. It also permits of heat treating the steels within a wider temperature range without a detrimental effect on the physical properties.

The grade recommended for axles and similar parts is the NM-2, which has the following chemical composition:

Carbon	.30 to .40 per cent
Manganese	.25 to .45 per cent
Nickel	3.00 to 5.00 per cent
Silicon	.10 to .20 per cent
Molybdenum	.30 to .70 per cent

The table below shows the slight variation in the properties caused by marked differences in the quenching temperatures:

TABLE I—PHYSICAL PROPERTIES

Oil quench	Elastic limit	Tensile strength	Elongation, per cent	Reduction of area, per cent
1,450 deg. F.	164,600	173,800	16.0	53.4
1,500 deg. F.	166,500	176,000	15.5	55.3
1,550 deg. F.	165,100	175,000	15.5	54.0
1,600 deg. F.	164,900	173,300	15.5	55.6
1,650 deg. F.	166,000	174,400	15.0	55.0

Analysis: Carbon .33 per cent, manganese .25 per cent, silicon .18 per cent, nickel 4.50 per cent, molybdenum .58 per cent.

The effect of a variation in the drawing temperature is illustrated in Fig. 7.

The data presented in the foregoing charts and tables have been taken from tests of material used in automobiles, aviation engines and tanks, the sections in all cases being relatively small. The difference in the service conditions encountered in railroad equipment and the larger sections used make it difficult to predict the behavior of molybdenum steels in locomotive parts. From the results already secured the types described above appear to have properties that would make them well adapted for use under severe service conditions, and the results of the introduction of this type of alloy steel will therefore be of great interest.

OPERATING METHODS AND FUEL ECONOMY.—If you would get out and get the slow orders off your railroad, and get trains made up so that every train doesn't have to stop and set out something at every cross road; if you would see that your dispatchers know what is going on and make them take the responsibility, which is justly chargeable to them, the engineers and firemen would be relieved of a big load that they have been carrying for years, and your fuel bill and other operating expenses would be reduced more than can ever be accomplished by further education of the engine crew.—*H. C. Woodbridge, before the Central Railway Club.*

The French Railway Strike

London

THE SUDDEN STRIKE of the railwaymen on the Paris-Lyons Mediterranean line on Wednesday, February 25, was caused by a dispute over a carpenter named Campanaud, a Syndicalist delegate, who went without leave to the labor congress at Dijon. The Paris Lyons-Mediterranean authorities have explained that permission for a sufficient number of representatives was given to attend the conference and that they would not have interference from the outside on a question of discipline. On his return from the conference Campanaud was suspended for 48 hours and was warned that another offense would mean instant dismissal.

With regard to the general causes of the strike it may be said that it was a movement of a revolutionary character. A representative of the London Times said that at several meetings a number of speakers declared that this strike was the beginning of a general Soviet movement. It was, therefore, something of a tribute to the general good sense of the railwaymen that the summons to "come out" was not generally responded to. The National Federation of Railwaymen announced that they intended to demand the satisfaction of their claims in their entirety—the establishment and application of new scales of pay and employees' regulations; the acceptance of the principle that women be paid equally with men for equal work; payment for extra time work during the war; the curtailment of the period before a man became a full employee and is thus entitled to special treatment; the fixing of the war bonus at 1,080 francs, and the nationalization of the railways.

Nationalization of the railways is the crux of the whole

Troops on Guard at the Gare de Lyon

matter. Organized labor thinks that to have the state as an employer is the supreme goal to be attained and that the state can be forced to give in to all its demands, however economically unsound and far-reaching these may be, for fear of losing votes.

On the second day of the strike the only other railway which responded to the call to "down tools" was the state system, and it was not until the fourth day of the strike that the Federal Council of the Railwaymen's Union ordered a general strike. However, the attempt to paralyze the transport and industry of the whole of France by a sudden blow appears to have failed. At any rate, the French railwaymen did not show anything of that automatic and clockwork precision in ceasing their labors, which, whatever one may think of the rights and wrongs of the conflict, spoke volumes for the discipline and organization of the British National Union of Railwaymen during its strike last September.

M. Millerand, the Prime Minister of France, presiding at a cabinet council on February 27, said, in addressing the chamber on the situation created by the strike, that arbitration on Campanaud's case had never been asked for, but once work were resumed the government would not refuse it. He further said, "We are not faced with a co-operative movement but with a political movement and frankly, to call it by its right name, a revolutionary movement." At the meeting a communique was issued authorizing partial mobilization of the railwaymen of the Paris-Lyons-Mediterranean system who were in the army reserve. It was also approved by the minister of commerce and supplies that a decree be issued provisionally establishing the restrictions already proclaimed during the war concerning the consumption of milk and the composition of meals in restaurants and public eating places.

An Overcrowded Suburban Train at Paris

It was also decreed that the minister of public works should ask for the discussion of a bill providing for the organization of motor vehicles in case of interruption of railway transport. These decrees, however, were not put into effect.

Unlike the English, the French did not show that spirit of civic service that was so well displayed during England's railway strike last September. There was no spontaneous rush of voluntary workers, no big movement to assist the government. People expected the army to do the work which in England was done by coal heaver and duke alike.

Various arrests were made and a warrant was issued for the arrest of M. Midol, secretary of the Paris-Lyons-Mediterranean branch of the Railwaymen's Federation. Only one case of sabotage was reported, which took place at Audbervilliers, near Paris.

Tuesday, March 2, saw the settlement of the strike. The terms represent a reasonable compromise between public and railway interests, and in them the government displayed a desire to listen to the men's point of view, which is worthy of praise. The terms of the settlement were as follows:

1. Trade union rights are to be defined and respected.
2. The scale of wages fixed by the Railway Federation is to be applied as soon as possible.
3. All points in dispute are to be referred to the already existing arbitration committee.
4. The claims are to be settled by the boards composed of men representatives of the railways.
5. An immediate inquiry into the future regime of the railways is to be held with the cooperation of the General Confederation of Labor, and in particular of its recently created Economic Council.
6. The strikers will not be paid for the time during which they were on strike.
7. Punishments for refusal to work are not to be maintained and other penalties are to be applied in a spirit of justice.
8. The arrests which have been made are to be maintained and left to the decision of the courts.

By far the most important point in this settlement is that in which the principle of the co-operation of labor in the discussion on the future of the railways is established.

The National Agreement with the Shopmen*

Securing Co-operation from the Workmen—Apprenticeship Stabilizing Working Conditions

By Frank McManamy
Manager, Department of Equipment, Division of Liquidation Claims, U. S. Railroad Administration

THE TWO REAL DIFFICULTIES in connection with private operation of railroads immediately prior to the time the railroads were taken over by the government were labor conditions and financial conditions which I have stated I believe in the order of their importance; because the government could at any time relieve the financial conditions, but it could not so readily relieve the labor conditions; and after all railroads or any other industry are operated by men.

It is simply restating an acknowledged fact to say that the labor situation was extremely serious in the latter part of 1917, due to a number of causes. Large numbers of men had been drawn from the railroads for military purposes, making a serious shortage of skilled men in the railroad business. Because of the failure of the railroads themselves during a long period of years to take necessary steps to train mechanics by maintaining a full quota of apprentices, there was no available source of supply and no large number of apprentices which could in an emergency be drawn on to do mechanics' work. There was also a widespread distrust on the part of railroad labor of the motives behind any attempt to increase working hours or in any other way to modify the working agreements which had been obtained by railroad employees after years of negotiation and the expenditure of vast sums of money, as well as by numerous strikes which were disastrous alike to employer and employees. The organizations looked with a suspicion on any request to waive any of the privileges thus gained and feared that the national emergency would be taken advantage of to take away from them some of the privileges which they enjoyed as a result of the efforts of their organizations.

There was no supply of men to draw from to meet this emergency and the situation could only be met by co-operating with labor in a fair and open manner and by obtaining their consent to the temporary waiving of some of the provisions of their agreements. This could never have been accomplished by individual carriers, because there could be no assurance given which would be satisfactory to the employees that once these privileges were given up they would ever be restored. Therefore, it appears to be conclusive that at this period no other agency except the United States Government could have effectually handled the labor situation as it existed at that time.

The first national agreement covering all railroad shopmen is represented by Director General McAdoo's letter of February 14, 1918, to A. O. Wharton, president of the Railway Employees' Department of the American Federation of Labor, in which an understanding with shopmen was reached whereby certain privileges long enjoyed by them and covered by many agreements with railroads were temporarily waived on the assurance of the Railroad Administration that the agreements in full would be restored and observed as soon as the condition of locomotives and cars would justify it; and it is but fair to the representatives of the shopmen to state that when this matter was presented to them an understanding was promptly reached by which they waived privileges obtained through years of negotiation, on the assurance of the Railroad Administration that their agreements would be protected; and that letter constituted the working basis between the Railroad Administration and the shop employees from the day it was issued up to the date of the signing of the National Agreement; and from that moment that letter became effective and the working conditions were regulated in accordance therewith, a constant improvement in the condition of motive power and cars became apparent.

Many changes have been brought about by the war, none of which are more far-reaching or important than the changes in the condition of and the method of dealing with labor, and in my opinion the employer in the future who expects harmony, efficiency and co-operation from his employees must devote at least as much thought to the selection, training and treatment of his employees as he gives to the erection of his shops or factories and the installation of the equipment. In other words, if we are to have a complete, smooth-working, efficient machine, which includes employees as well as machinery, as much time and thought must be given to the study of what might be termed "humanics" in connection with the treatment of employees as we give to the study of mechanics in connection with the erection or operation of the plant.

Suggestions by Workmen

It is a recognized fact that in practically every human activity, increased opportunity for a common understanding has been productive of favorable results; therefore, it is difficult to understand just why the average railroad shop is behind industrial establishments in the matter of having a method for obtaining from their employees co-operation and advice relating to shop methods and conditions.

The director general observed and recognized the advantages to be derived from having sympathetic understanding and co-operation between the employees and the officials, and tried to work out and have put in effect a system which would insure a greater degree of co-operation and give to the management the full benefit of the knowledge and experience of the workmen and their suggestions as to improvements in methods to bring about increased efficiency. Several months ago he suggested to the regional directors the advisability of arranging for employees through their regular organizations to select a committee for the purpose of considering with the local officials, questions affecting matters relating to shop operation and output.

The plan under which this suggestion was to be carried out was by regular meetings between the local officials and the committee selected from the shopmen to discuss with the utmost frankness all questions involving the planning and the carrying on of the work, inviting suggestions from the committee and endeavoring to give full weight to all of these suggestions that might be meritorious. It, of course, must be clearly understood that these meetings were not to be for the purpose of adjusting grievances, either directly or indirectly, and that such matters must not even be discussed. The following illustrations were given of subjects which were considered as probably suitable for such discussions:

1. Co-operation between departments.
2. Proper storage and care of material.
3. Distribution of material.
4. Tool equipment and distribution of hand tools.

*Part of an address before the Western Railway Club, Chicago, March 15, 1920.

5. Grouping of machine tools.
6. Machine operation and crane service.
7. Scheduling work through shops.
8. Better classification of freight car repairs and whether certain work can be more economically done.
9. Improved methods of making repairs.
10. Method of handling and disposition of scrap.
11. Inspection of scrap and reclamation of usable material.
12. Condition of shops and shop grounds.

The above was not given as a complete list of the subjects which might properly be discussed, but simply as a general outline of matters on which a discussion would no doubt prove beneficial. The plan contemplated one representative from each of the crafts, except in the larger shops where the representation could be increased as might be found desirable. The ranking mechanical department official at the shop in question should preside, all others attending the meeting to be on exactly the same basis so far as the discussion of the matters presented was concerned. In order to have a free discussion it would, of course, be necessary to have the representatives of the employees and the junior officials express their opinions first. Otherwise a free discussion would not be possible, because in some instances men might hesitate to express opinions contrary to those of the ranking officials.

Owing to lack of time this plan was never put into complete operation, but was submitted to the federal managers, and many expressions of approval were received. Similar plans are now in operation in many industrial establishments and have proven to be very beneficial.

Advantages of National Agreement

National agreements cannot be made in all lines of industry, but the transportation industry is essentially a national one. The work of conducting it is substantially the same in Maine and California, in Montana and Texas.

Equipment to a large extent has been standardized, partly by the different associations of railroad officials, partly by law, and partly by the Railroad Administration. Standard transportation rules have been adopted by practically every railroad in the country. The interchange of freight cars is complete. Tickets and bills of lading are practically uniform; and with the consolidation of ticket offices throughout the country, which was adopted by the Railroad Administration, the practices in this respect became almost as nearly standard as in United States post offices. Under such conditions it is not only idle but illogical to think of keeping the man-power which operates the railroads separate and working for different rates of pay on different railroads and under different working conditions.

Among the principal benefits to be derived from the national agreement is the stabilization of shop organizations and the elimination of what had become almost an institution in connection with railroad shop labor; that is, the "boomer" mechanic, who was continually moving from place to place in search of conditions more to his liking. Everyone will admit that the ideal shop organization is a force of what has by the boomer been termed "home guards," who select railroad shop work as their permanent occupation and who wish to establish themselves permanently at the point where they are employed, own their homes, take a part in the general affairs of the community, cultivate a circle of friends, educate their children, and in general enjoy the privileges and exercise the duties which are supposed to fall to the lot of the average American citizen. Under such conditions men become familiar with the work required of them, study the details of the particular equipment which they are required to handle and the peculiar conditions which they are required to meet, take an interest in the general operation of the railroad and become a part of the permanent organization which is necessary for the successful operation of any property.

A national agreement insuring equal privileges to men at all points on all lines will help to bring about this desirable condition. On the other hand, if we are to have on one railroad certain favorable conditions of employment which do not exist on other railroads it will necessarily cause men on a large number of railroads to be dissatisfied with their working conditions and to constantly, and we may as well say properly, strive for an improvement of their own conditions to compare with those on the neighboring line. This affects efficiency in many ways. It not only results in a constantly changing force of mechanics, which is hurtful, but it is also fatal to that spirit of loyalty to the employer's interest without which no railroad can be efficiently operated.

A national agreement with railroad shopmen brings stability to the railroad organization, and by virtue of the large number of men covered by it acts as an insurance against local disputes in the same way that life insurance or fire insurance protects the individual by distributing the losses over a large number of those participating in it.

It is entirely possible for the individual at a local point to become so dissatisfied with certain working conditions, which are in no way general and which can be readily remedied by a reasonable application of the agreement, that they will go on strike to remedy conditions which could be much better handled in another way. As a matter of fact, however, such local strikes are not desired by the organizations of the employees any more than they are by the railroads, and while we have, during the period of federal control, had more than 200 of such local strikes, not a single one of them has been sanctioned by the national organizations, and these organizations have always been helpful in restoring normal conditions.

The Apprenticeship Question

One of the conditions which we developed as a result of the national agreement is illustrative of the fact that the arguments which are used by one side or the other to any controversy are often based on the wildest kind of a guess, for the reason that no one has ever developed the facts. I refer to the apprenticeship rules in the national agreement. The employees have for years favored regulating the number of mechanics by regulating the number of apprentices, with the purpose in mind of avoiding an over-supply of mechanics with its resultant effect upon the rates of pay. The employers have opposed this plan of the employees because they believed it was unfairly restricting the number of mechanics which were being trained and was reducing the supply of mechanics to an extent which made successful shop operation difficult.

The ratio which had been agreed to by the employees and the officials on many railroads of five to one was held by the employers to be too low, and it was urged that this ratio would not provide a sufficient supply of mechanics. In negotiating the national agreement we felt justified in accepting the fact that such agreements were satisfactorily meeting conditions on a large percentage of the railroads of the country as evidence that the ratio was reasonable; therefore, the ratio of one apprentice to five mechanics was incorporated in the national agreement.

In order to bring out as nearly as possible just what this would mean, I immediately started in to develop the actual conditions which existed and to see how nearly we were in fact working to the ratio which was set forth as the proper one. A complete check of all the railroads in federal operation showed that we had in service 17,268 apprentices, while under the ratio provided in the national agreement we were entitled to 64,182.

In the Eastern region the ratio of mechanics to apprentices was 21.40; in the Allegheny region, 30.95; in the Pocahontas region, 14.18; in the Southern region, 13.48; in the Central Western region, 12.75; in the Northwestern, 22.44; and

in the Southwestern, 11.89, making an average for the country of 18.58 mechanics for each apprentice.

It will thus be seen that the opposition to this rule was due almost entirely to the absence of complete and accurate information concerning existing conditions. We were informed by many railroads that the reason the number of apprentices was so extremely small was because they were unable to obtain more. If that is true it would certainly seem to be illogical to dispute with the employees over the proper ratio and to blame the shortage of mechanics on the restrictions contained in the working agreements. Our investigations, I think, show without doubt that the ratio of apprentices provided for in the national agreement is reasonable and fair, and that it will provide a sufficient number of skilled mechanics if it is consistently followed.

Based on Former Agreements

There is nothing freakish about the present national agreement with shopmen, and it was not, as some have assumed, adopted without the most careful and thorough discussion and consideration. It is based on the agreements which were in effect on a large percentage of the railroads of the country and which had proved to be practicable and workable. It was discussed for approximately four months by a joint committee representing the different regional directors and a committee representing the various national or international shopmen's organizations. The rules which were agreed to at these conferences and those on which no agreement could be reached were then referred to the Board of Railroad Wages and Working Conditions, where both sides presented arguments, and the matter was in the hands of this board for approximately four months. The wage board failing to agree upon the terms of the national agreement, it was then turned over to the mechanical department of the Division of Operation, where, with the assistance of the Division of Labor, the agreement in its present form was negotiated and submitted to the director general, who approved it on September 20, to become effective October 20, 1919.

It is true this agreement does not cover every difference of opinion which may arise between local officials and local committees or between general officials and general committees, and it was not expected to. It does, however, provide a sound basis upon which to handle such differences if it is accepted by both sides with a sympathetic purpose to carry out the very obvious intent of the different rules.

It is true that we have received in the nieghborhood of 2,500 requests for information concerning the application of the various rules, which has practically all been furnished. Some of the questions presented are of a character which cannot possibly be covered by any national agreement or by any interpretation of an agreement, but are local matters which can only be handled with a complete knowledge of the facts at the particular point.

Rules 35 and 36 are worthy of special mention because they provide means for settling all grievances which may arise. Rule 36 also contains the following provision for avoiding strikes which were never before contained in a working agreement: "Prior to the assertion of grievances as herein provided, and while questions of grievances are pending, there will neither be a shut down by the employer nor a suspension of work by the employee."

It is not to be expected that this provision will entirely prevent either of the evils it is aimed at any more than the command, "Thou shalt not steal," has made all men honest, but it points the way to a better method of handling disputes and provides a working basis on which to adjust them.

The special rules of each craft which set forth the qualifications of mechanics will provide a better organization than the plan of training specialists who can do but one thing, which perhaps through necessity was followed in many shops, as it is generally admitted that the supply of all-around mechanics was invariably less than the demand.

The agreement properly applied will stabilize working conditions, remove causes for disputes and provide means for settling them, enable you to build up permanent forces, and provide through the apprenticeship system for an adequate supply of mechanics to successfully and efficiently operate railroad shops, and this is all it was intended to do.

Discussion

The discussion of Mr. McManamy's address was something of a disappointment, considering the large attendance at the meeting. Summed up, there seemed to be a feeling that the men were working at a low rate of efficiency and that there was not the incentive that there should be to encourage them to put forth their best efforts. An instance was cited where the man-hours per engine for general repairs had increased from an average of about 6,200 in 1917 to about 8,000 in 1919.

Several speakers commented on the difficulties caused by the classification of men of little or no training or ability as full mechanics. Something must be done to develop able all-around mechanics.

Stabilizing the working conditions should do much to prevent the shifting of men from one road to another, although this has thus far not been entirely eliminated.

The routing or schedule system has helped to offset the loss in efficiency caused by the cutting out of piecework.

The roads generally are not doing what they should in connection with the training of apprentices.

Seams in the Base of Rails

A REPORT has just been issued by the Bureau of Safety of the Interstate Commerce Commission, which contains an extended discussion of "half-moon" fractures in the base of rail. This investigation was undertaken as a result of a derailment of a Chicago & North Western passenger train at Lebanon, Wis., on February 25, 1918, which was caused by a base failure and which was brought to the attention of the commission as a result of a large number of failures of this type on this road. James E. Howard, engineer physicist of the commission, has since made a detailed study of this type of failure, and has embodied his findings in this report, of which the following is an abstract.

Seaminess of the metal in the base of the rail has been responsible for all or nearly all half-moon fractures. Rails are affected by seaminess of the metal, both exterior and interior. Interior seams or streaks are contributory chiefly to fractures of the head of the rail; exterior seaminess to those of the base.

Interior streaks are believed to have their origin in the ingot. Upon this point most opinions are in accord. Divergent views are held in respect to the origin of exterior seaminess, some of which attach responsibility to the surface condition of the ingot; others attribute the cause to some stage in the process of manufacture.

Cracks are not infrequently of greater length than an inspection of the surface indicates. They may extend a number of inches without appreciable width of opening between their sides. Furthermore, incipient cracks on the underside of the base, due to position, remain unknown until they have reached an advanced stage, until a half-moon fragment is about to be detached or complete rupture of the rail has taken place.

A longitudinal crack usually begins at a surface seam. There are few, if any, exceptions to this rule. The seams in some rails may be obscure but nevertheless present. The central crack is diverted from its course, curves and extends

to the edge of the flange. The line of rupture travels from the central seam toward the edge of the flange, never in reverse direction. The distance the line of rupture may follow a base seam ranges from less than 1 in. to 2 ft. or more. Half-moon fragments may be detached from either flange of the base, from the gage side or from the outside of the rail.

Under normal conditions the incipient portion of a base fracture will form over a tie. Rails are unsymmetrically strained. The coning of the wheels throws the weight on the gage side of the head, which is transmitted to the inner flange of the base. On the other hand, flange thrusts from the wheels stress the outer flange of the rail. Each flange of the base curls up slightly when the rail is deflected. This local movement in the flanges is probably responsible for rails deflecting a little more under bending stresses than their section moduli call for.

It is not necessary that rails should rest unevenly on the ties in order to induce base fractures. The contention that a crescent-shaped break is prima facie evidence of uneven bearing on the tie is not well supported by observation. The bases of rails are exposed to repeated stresses in crosswise direction as well as longitudinally, tending to result in progressive fractures under stresses below the primitive strength of the flanges.

The presence of a seam of any degree on the surface of the base is a source of weakness, and follows the usual law of being more serious in hard steels than in the softer grades of metal. It is disquieting to note how slight a surface defect may culminate in a half-moon break in current grades of rail steel. The doubt is raised whether they are all of a remediable order. Prolonging the life of the rail by increased depth of metal in the base, a reinforcing measure, suggests itself from an engineering point of view. Metallurgical or fabricating requirements may be compensated for in some cases, but failures of recent occurrence show this would not be a satisfactory method of obscuring such defects. The elimination of surface seaminess should be accomplished, so far as it is practicable.

Base fractures of recent occurrence are numerous. In connection with the present investigation 748 rails were inspected which failed in this manner. Among this number was a group of 224, companion rails of the one which caused the present derailment. Surface seaminess on the base was a factor common to all which were critically examined. These failed rails represented the product of six mills, and had been in service on different divisions of seven railroads. Their weights ranged from 75 lb. per yard to 107 lb. The periods of time in the track were from 4 months to 13 years. The progressive character of the fractures was equally apparent on those which failed in four months' time as on those of the longest duration in the track.

According to the extent of the seaminess and also influenced by traffic conditions, half-moon breaks occur early or are deferred for a term of years. This also is the general history of progressive, fatigue, or repeated stress fractures, by whichever name they may be designated. Lowering the fiber stress invariably tends to prolong the life of steel, regardless of its manner of failure. Increase of section, previously referred to, although not a corrective measure metallurgically, has the advantage of being positive in its character. Still, without resorting to this expedient the variable extent of seaminess witnessed in different rails encourages the belief that substantial improvements in fabrication are attainable.

The cause or causes which lead to surface seaminess is a somewhat mooted affair. This defect has been variously ascribed to the original surface condition of the ingot, to the effects of breaking down passes of the blooming mill, to ragging of the rolls, and to an intermediate pass of the rail mill. Testimony has been to the effect that a modification in shape at one of the intermediate passes was attended with a favorable result. Laps in the base of the rail were traced to this particular pass and corrected by diminution of the depth of the concavity in the rolled shape, which in the finished rail had to be filled out to a flat surface.

The sides of seams are frequently blue-black in color, showing their formation occurred during brief exposure to the air when the steel was at an oxidizing temperature. Some seams present only slightly oxidized walls, but are lined with the micro-constituent ferrite, suggesting the explanation that the walls of the seam were a part of the periphery of the shape at an earlier stage. Pickling in hot acid has brought into view lines of ferrite which by further pickling were converted into open seams. This is not held to indicate necessarily a difference in the rate of solubility of the micro-constituents, but attributable to exposure of more area of surface at the seam upon which the acid acted.

The problem of the roll designer is directed to the production of definite finished shapes, the successive reductions from the ingot or bloom being arranged with the ultimate object of getting the metal into the exact cross section prescribed. In attaining this end the peripheral speed of different parts of the rolls vary from top to bottom of the grooves, affecting all shapes except flats, while the rate of travel of the rail as it emerges from a given pass is the same for all parts of its periphery. From this circumstance there is, necessarily, a difference in the action of the rolls on different parts of the rail, without mentioning variations in temperature in different portions of its cross section. Taking these matters into consideration, it would appear advantageous to inquire into the influence of the latter passes of the rail mill in quest of contributory causes to the formation of surface seaminess.

The formation of mill scale, magnetic oxide of tangible thickness, obscures seamy lines, which are revealed by the acid of the pickling bath. The rolled surface of the base furnishes evidence of seaminess in less degree than revealed by pickling. The usual inspection of rails for acceptance does not adequately guard against nor provide for the detection of this common defect. In consequence of this omission rails are inspected, meet the requirements of the specifications, are placed in the track, and promptly fail from seaminess of surface.

The pickling of steel is not a new nor untried requirement in the inspection and acceptance of materials for engineering purposes. In one of the most noted examples of modern engineering construction the pickling of the steel plates was a requirement. The pickling of a crop end of a rail, involving a minimum amount of labor, would reveal the condition of the surface obscured by the mill scale and show whether normal or unusual seaminess was present.

Improvements admit of being made, it is believed, which will prolong the life of the rail and in so doing provide an increased margin of safety which may be retained for a time. Whatever may be accomplished the fact will remain that the controlling feature in rails is found in the manner in which they are loaded. Motive power and equipment are carried on wheels the impinging pressures of which upon the head of the rail are the ultimate limiting factors.

Choice of chemical composition in the adoption of the grade of steel employed is optional, and improvements may be made in producing a rail structurally superior to other rails, but the super rail will nevertheless have its limitations in strength and durability measured by the intensity of the wheel pressures which it will sustain.

The fixing of wheel pressures is under control. They may be heavy or light, according to the will of the designer of the rolling stock, the establishing of which loads as such requires no special skill in the mechanical arts. The production of structurally sound steel and its conversion into commercial shapes presents a problem of quite another order, incomparably different from the former. Notwithstanding the great disparagement in size between a locomotive and

the rail which supports it, and the seeming inadequacy of the foundation on which the rail rests, very few rails fail by direct bending stresses. Failures, directly or indirectly, are chiefly connected with intensity of wheel presures. Limitation of wheel pressures and elimination of seaminess in the steel, interior and exterior, are chief factors in the steel rail problem.

The report concluded with a brief summary by W. P. Borland, chief of the Bureau of Safety, in which he stated that this type of fracture of the rail is a common one, and therefore possesses interest from both the point of view of safety and from its economic importance. The reported number of rail failures due to half-moon base breaks is large. As pointed out in the report of the engineer-physicist ambiguity attaches to many rail failures which are reported as square breaks. There is reason for believing that an explicit description and report upon those rails which are now classified as square breaks would reveal a larger number of crescent-shaped base breaks than are being reported as such.

All or nearly all base fractures have been found to exhibit an initial seam at the undersurface, along the middle of the base. It is clearly evident that the elimination of this initial seam should result in an improvement and prolong the life of the rail. Efforts should therefore be directed and maintained to accomplish this result.

In order to ascertain the cause of surface seaminess and the stage or stages in the process of manufacture at which seaminess makes its appearance, the pickling of the shapes affords a favorable method of inquiry. It has been found a serviceable method in other branches of engineering, and is no doubt applicable in the case of rails, using crop ends of same. There should be definite assurance that rails with seamy bases which promptly fail when they are put into service should not reach the track before the discovery of their condition is made.

Subordinate Officers Ask Recognition

WASHINGTON, D. C.

A HEARING before Commissioners Clark, Daniels and McChord of the Interstate Commerce Commission on March 15 and 16 on the question of what railroad men should be classified as "subordinate officials" as provided in the new transportation act, and as to whether the regulations promulgated by the commission on March 8 for the making of nominations for appointment to the Railroad Labor Board shall be modified or supplemented, brought out a lively jurisdictional contest as to what organizations are entitled to represent such men and also a vigorous fight on behalf of some of the smaller independent labor organizations that had been disregarded in the commission's regulations for the right to make nominations.

Organizations representing claim agents, civil engineers, traveling auditors, supervisors of mechanics, yardmasters, train despatchers, storekeepers and supervisory station agents demanded recognition for their members and others of the same class as "subordinate officials," while officers of the so-called "standard" organizations of employees insisted on the right to represent most of them as employees, and a committee representing the Association of Railway Executives headed by C. R. Gray, president of the Union Pacific, asked the commission to confine its classification of subordinate officials to those whose oversight over others is limited to supervision over a particular task, whose working conditions are similar to those of the men under them and who having nothing to do with the authorization of wages, discipline or the payment of money and who do not have confidential relations with the management. Mr. Gray said that the term subordinate officials had been loosely applied in the past and might include any official below the chief executives, that it would be highly prejudicial to discipline and efficiency to include those having confidential relations or authority over wages and discipline and because of the varying titles used on different roads for men having similar duties the commission should adopt some general definition such as the "yardstick" proposed by the committee because it would be wholly impracticable to classify according to title. Commissioner Clark said, however, that if the subordinate officials are to be designated in time to allow them to make nominations for the labor board it will probably be necessary for the commission to adopt some arbitrary rule. In reply to this Mr. Gray suggested that nominations might be made by the officers representing those held to be subordinate officials without exactly classifying them by organizations.

It was said that the Railroad Administration had not officially designated any class as subordinate officials, but had merely drawn the line between officials and employees for the purpose of determining whether or not questions as to their compensation should be passed upon by the wage board or by the operating officials. However, letters from Director General Hines and W. T. Tyler, director of the Division of Operation of the Railroad Administration, were read, in which despatchers and others were referred to as having a distinct status as "subordinate officials" and as being deprived of some of the advantages of both the official class and of the employees.

The various representatives of the organizations claiming to be subordinate officials presented their arguments in turn, the representatives of the labor organizations gave reasons why they claimed to represent them as employees, the usual reason given being that they had legislated for them in the past and had large numbers of them in their membership, and Mr. Gray applied his yardstick, usually declining to draw a line between classes by nomenclature. His yardstick, however, included as officials many whom the leaders of the organizations objected to regarding as having confidential relations with the management, while the representatives of the labor organizations usually drew the line simply as between officials and employees. Mr. Gray said he would like to do so, but that the law apparently "requires us to step into a shadow land and recognize distinctions we have never known before."

L. K. Sherman, of the American Association of Engineers, classed as subordinate officials those below the rank of chief engineer, engineer maintenance of way and division engineer, or 95 per cent of a total of 20,000 engineers. Mr. Gray said the classification should be based on the responsibility to the company, which varied in different positions on different roads, but that no one on a railroad has the responsibility for the expenditure of greater sums of money or bears a more trusted relation to the management than the engineers.

S. S. Haycock, president of the National Order of Railroad Claim Agents, said he represented 2,300 claim agents below the rank of district claim agents who have no authority to hire or discharge men and whose authority in the settlement of claims is limited. Mr. Gray said he was informed that all claim agents have authority to represent the company to a finality up to the limit of their authority and that a claim agent has more than most men a confidential relation with the management.

O. B. Kirkpatrick, of the Railroad Traveling Auditors' Association of America, said the train auditors do not hire or discharge men, and he referred to them as supervisory officials. Mr. Gray said there was a great difference between supervisory and subordinate officials, and that traveling auditors are in a position of trust and responsibility.

W. V. O'Neil, of the International Association of Railroad Supervisors of Mechanics, urged recognition of general foremen, foremen and assistant foremen as subordinate officials, while B. M. Jewell, acting president of the Railroad Employees Department of the American Federation of Labor,

representing six federated shop crafts, said that those below the rank of general foremen should be classed as employees. He said that if they are to be represented by anyone outside of "their own organizations" it will result in dissension. J. B. Malloy, vice-president of the United Brotherhood of Maintenance of Way Employees, claimed jurisdiction over the track and bridge and building foremen as employees, although he said they often employ and discharge men. The Brotherhood of Railway Signalmen claimed jurisdiction of all below the rank of assistant supervisor of signals.

Mr. Gray said that his committee did not consider that a foreman who employs or discharges men and decides as to whether they shall work overtime should be classed as a subordinate official, but that gang leaders and many assistant foremen would come under that heading.

J. L. Coan, representing the Railroad Yardmasters of America, claimed jurisdiction over yardmasters and assistant yardmasters as subordinate officials on the ground that they are not properly either officials or employees. He considered general yardmasters as officials. W. N. Doak, vice-president of the Brotherhood of Railroad Trainmen, who said he was also authorized to speak for the Switchmen's Union, said that the great majority of yardmasters and assistant yardmasters are members of those two organizations, 3,106 in his and 550 in the Switchmen's Union, and he pointed out that Mr. Coan had not said how many he represented. He insisted that they should be classed as employees and the general yardmasters as officials. Mr. Gray thought the assistant yardmasters might be called subordinate officials.

J. G. Luhrsen, president of the Train Despatchers' Association, said he represented 5,300 out of a possible 5,500 despatchers, who, he said, had been recognized as subordinate officials by former Director General McAdoo, who had also recognized the right of the association to represent them. They do not employ or discipline men, he said, and do not have confidential relations with the executive officials. L. J. Ross, of the Order of Railroad Telegraphers, said his organization had always represented the despatchers, and included 3,000 of them as members, and that they are not officials. He said his organization had contracts covering despatchers on seven roads, to which Mr. Luhrsen replied that that was evidence they need another organization to get them contracts with the other roads. He also said that E. J. Manion, president of the Order of Railroad Trainmen, had recently claimed only 20 per cent of the despatchers at a recent conference with the commissioners. Mr. Ross said that Mr. Manion had claimed that many because he didn't know but that he had looked the matter up since and found 3,000. Mr. Gray said he had always considered the despatchers as officials and had been instrumental in getting them more pay than they would have received otherwise.

E. H. Morton, president of the Order of Railroad Station Agents, claimed jurisdiction over the supervisory agents as subordinate officials, while Mr. Ross said all agents were employees.

The question as to whether the regulations governing the making of nominations for the Labor Board should be modified brought out a vigorous demand on the part of various organizations not included in the 16 organizations that call themselves the "standard recognized" organizations for recognition of their right to make nominations. These organizations said that they were in no way affiliated with the American Federation of Labor, and that their views would not be represented by nominees of the so-called standard organizations. The hearing at times developed into a heated exchange of compliments between the officers of rival organizations.

The representative of five organizations of colored employees, authorized to speak for 53,000 men and claiming to represent a total of 200,000, asked that they be included in a group of employees for the purpose of making nominations.

P. J. Coyle, president of the Brotherhood of Railroad Station Employees, said his organization wanted recognition, although the nominees of the other organizations might be entirely satisfactory to it.

B. F. Richardson, president of the National Federation of Railroad Workers, was particularly vigorous in his demand for recognition. He said he had called on Chairman Aitchison of the commission, who had suggested that he join with the other organizations in the selection of nominees, but that in view of the hostility between his organization and other organizations of shop employees he had not considered the plan advisable. He could not understand why his federation was denied the right to nominate a representative for the labor board because he represented 35,000 employees, whereas the Brotherhood of Stationery Firemen and Oilers had been included in a group, although he had never met one of their members in all his 29 years of railroad experience. He said that rules such as those proposed by the commission, like the Anderson amendment to the Esch bill, naming specific organizations, amounted to giving those organizations a patent by law to represent all employees. He said he did not know whether his organization wanted to make a nomination, but it wanted its rights recognized. When Mr. Jewell asserted that the federated shop crafts did not attempt to maintain a closed shop and did not discriminate against non-members, Mr. Richardson retorted that they had driven his members out of the shops in some cases and had influenced elections at which the men were allowed to vote as to which organization should represent them.

L. K. Sherman, of the American Association of Engineers, asked for representation on the Labor Board on behalf of the professional engineers, who, he said, have not had the prerogatives of officials nor the advantages of having a labor organization to represent them, and he asked a modification of the regulations to allow his organization to make a nomination. Mr. Luhrsen for the train despatchers, Mr. Morton for the station agents, and the other representatives of the so-called subordinate officials also asked for a similar modification, after which Chairman Clark of the commission explained that as a practical matter the commission was faced with the necessity of prompt action in order that the nominations might be made within the 30 days allowed by the law and that as all of the organizations recognized the will of the majority the commission thought it had reached a practical solution when it had selected the organizations representing the great majority of railroad employees. He said it would not be helpful to have nominations made to the President by all organizations or groups of employees that might have individual ideas as to the nominations.

The representatives of the labor organizations, Mr. Ross for the telegraph operators, Mr. Jewell for the federated shop crafts, and Mr. Doak for the trainmen, then asked that the commission decline to modify its regulations on the ground that their organizations properly represented the great majority both of employees and of subordinate officials. Mr. Jewell said it would be dangerous to let the subordinate officials select one-third of the labor group on the board when they constitute less than 5 per cent of the total number of railroad employees, whereas the 95 per cent had been for years represented by the standard recognized organization. He also said that if one of the labor group should be a subordinate official, then the official class would have four representatives on the board against two for labor. He said the bill does not now give railroad employees sufficient representation, but that they had proposed to let the machine make one revolution to see what kind of grist it turns out and then if it prove unsuccessful they would attempt to get the law changed by electing men to Congress who would change it.

The hearing was concluded on Tuesday noon, and Chairman Clark announced that a decision would be reached as speedily as possible.

The New Pennsylvania Regional Organization

The Four Regions Bound Together by a Departmental Organization Permitting Centralized Authority and Expert Supervision

A BRIEF DESCRIPTION of the new organization of the management of the Pennsylvania Railroad was published in the *Railway Age* of February 20, together with a map showing the four regions into which the system has been divided for operating purposes. The accompanying chart has been compiled by the *Railway Age* and is an attempt to show graphically the new organization. It will be seen that there is an executive department, consisting of the president and five department or executive vice-presidents. In addition there is a vice-president in charge of corporation affairs at Pittsburgh, a secretary and a legal department. The vice-presidency at Pittsburgh is rather outside of the general scheme of organization and is in the nature of a special establishment to wind up or straighten out the intricate intercorporation relations of the Lines West.

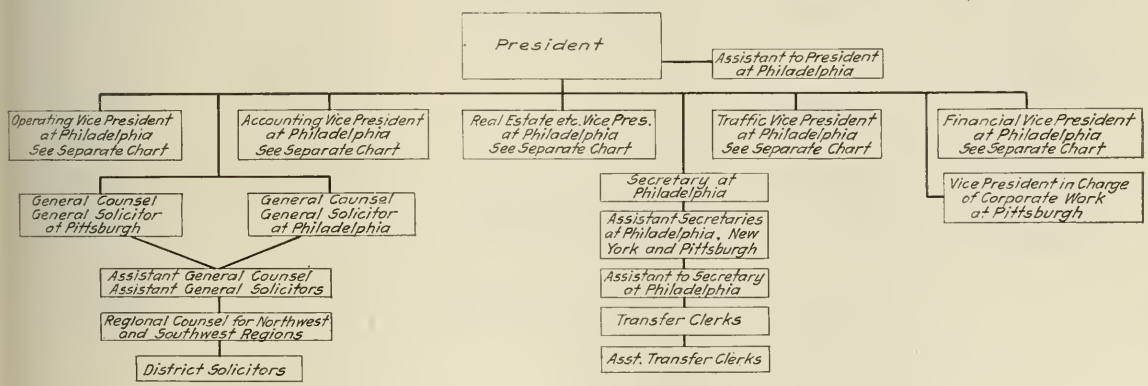
The five departments, each head by an executive vice-president, are the operating, the traffic, the accounting, the real estate and purchases and the finance. These departments are on a par and differences between them are for settlement by the president. Each department has a staff of its own, but on the staff of the operating vice-president are four regional vice-presidents and a vice-president in charge of personnel, and attached to the staff of the regional vice-presidents, but none of it, are members of the staff of the traffic department, the accounting department and the real estate and purchasing department. The legal department also has members of its staff attached to the Northwestern and Southwestern regions.

Before treating of the operating department, which is of course by far the most complicated, it is well to take up the other four departments.

The Traffic Department

The vice-president of the traffic department has his headquarters at Philadelphia and has as his second in command the general traffic manager. The vice-president, through the general traffic manager, appoints, transfers, etc., all members of the traffic department and has all members of this department on his payroll, including the regional traffic officers. Reporting to the general traffic manager at Philadelphia and through him to the vice-president, are a manager of through freight, a chief of mail service and traffic at Philadelphia and an express traffic agent at Philadelphia, and in addition there is a traffic manager for each of the four regions. Each of these regional traffic managers has a staff including a freight traffic manager and passenger traffic manager and their subordinates, the policies of all of whom are dictated by the regional traffic manager, who in turn reports to the general traffic manager and the vice-president in charge of traffic. When we come to the operating organization we will see that the regional traffic managers are attached to the staff of the regional vice-presidents, but these traffic men and their staff are on the payroll not of the regional vice-president, but of the executive traffic vice-president.

As shown on the chart, the staff of the freight traffic manager of each region consists of an assistant freight traffic manager, general freight agent, assistant general freight agent, division freight agents, a warehouse superintendent, foreign freight agent, a general coal freight agent and a coal freight agent at Pittsburgh, and a freight claim agent.



The Executive Department

At Chicago and St. Louis there are no general freight coal agents and at Pittsburgh no foreign freight agent. The warehouse superintendent is a system officer having his headquarters at Pittsburgh, and is jointly on the staff of the operating department and the traffic department.

The passenger traffic manager of each region has on his staff a general passenger agent, assistant general passenger agents, general baggage agent, assistant general baggage agent, divisional passenger agents, and a superintendent of restaurant service. The superintendent of restaurant service has his headquarters at New York and Columbus, Ohio, and has two assistants at New York and one assistant at Columbus.

The Accounting Department

The vice-president in charge of accounting has his office at Philadelphia and under him are two controllers, one at Philadelphia and one at Pittsburgh. Reporting to each of these controllers are two assistant controllers, one in charge of corporate accounting and one in charge of operating accounting. The two assistant controllers have general accountants reporting jointly to them. The staff of the controllers consists of an auditor of revenue, assistant auditor of revenue, an auditor of through freight traffic and an as-

sistant auditor of through freight traffic, an auditor of through passenger traffic and an assistant auditor of through passenger traffic, an auditor of local freight traffic and assistant auditors of local freight traffic, and an auditor of local passenger traffic and assistant auditors of local passenger traffic.

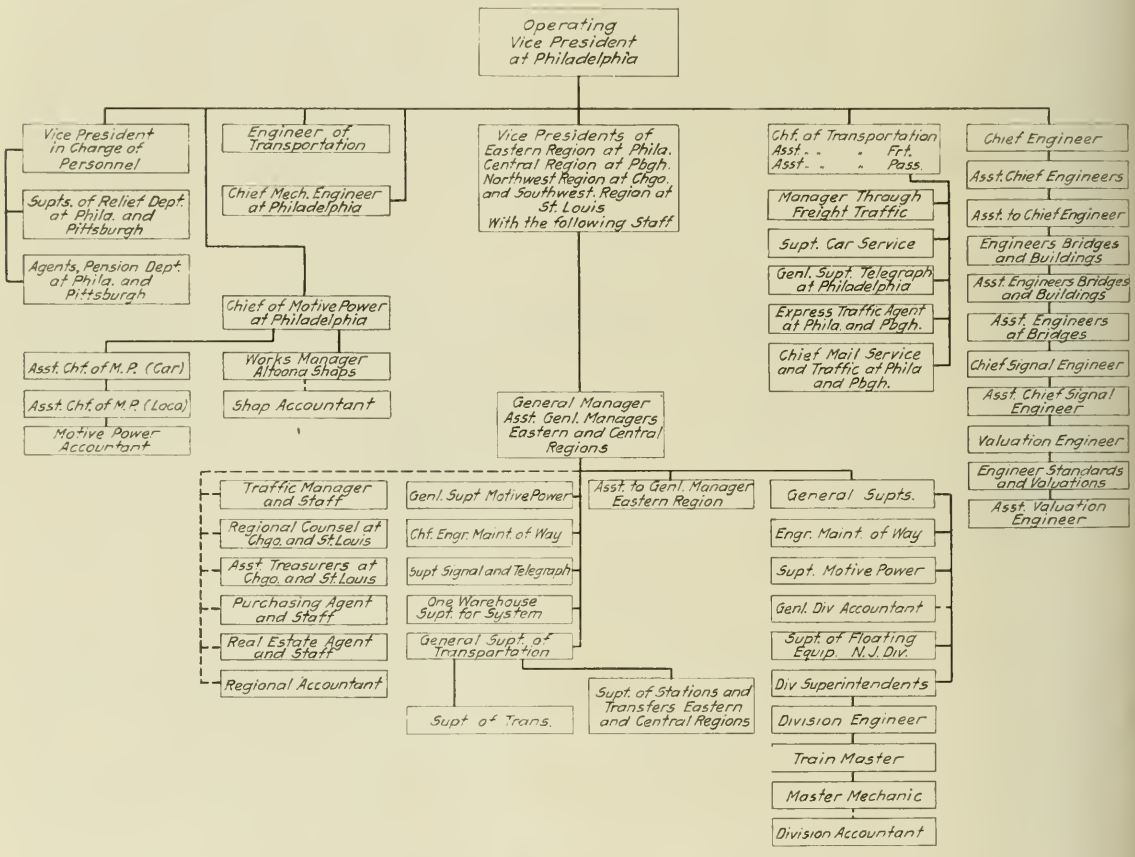
Ranking on a par with the auditor of revenue is an auditor of expenditures, with an assistant auditor of expenditures, auditors of disbursements at Philadelphia and Pittsburgh, assistant auditors' of disbursements at Philadelphia and Pittsburgh, a regional accountant for each region, a general division accountant for each grand division of each region and a divisional accountant for each division of each region. Reporting to each regional accountant is a shop and motive power accountant.

It will be seen from the chart of the operating organization that each general manager of a region has attached to his staff a regional accounting officer, who, however, is on the payroll and under the orders of the vice-president in charge of accounting. Likewise each general superintendent has attached to his staff a general division accountant, who is on the payroll and under the orders of the regional accountant and, through him, of the vice-president in charge of accounting; and also each division superintendent has attached to his staff a division accountant who is on the payroll of the accounting department. The auditor of revenues and his staff and the auditor of expenditures and his staff each report both to the assistant controller of corporate accounting and the assistant controller of operating accounting.

Real Estate and Purchasing Department

The vice-president in charge of real estate, purchases and insurance has his office at Philadelphia and has on his staff a general purchasing agent, with office at Philadelphia, a general superintendent of stores, a superintendent of insurance and a general real estate agent.

The general purchasing agent has on his staff a purchasing agent for each of the four regions, with assistant purchasing agents for the Eastern, Central and Northwestern regions, and also an assistant to the purchasing agent for the Eastern region. It will be seen that the general manager of each region has attached to his staff a purchasing agent and his staff, these officers, however, being on the payroll of the purchasing department and not of the operating department.

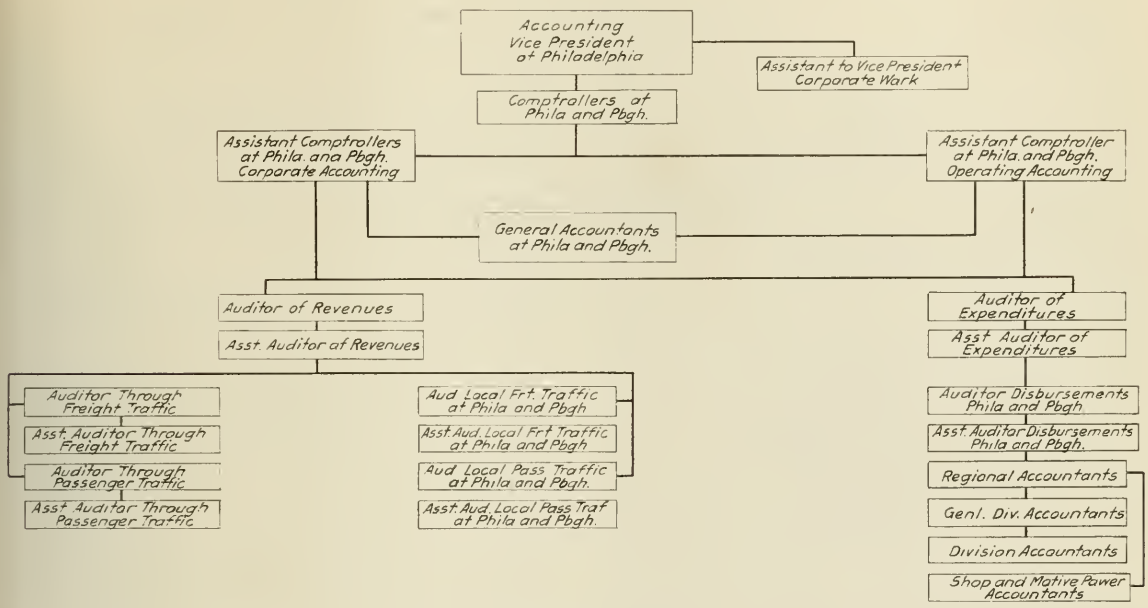


The Operating Department

The general superintendent of stores has on his staff a general storekeeper, a district storekeeper, a division storekeeper and a local storekeeper. The superintendent of insurance has on his staff assistant superintendents and assistants to the superintendent. The general real estate agent has on his staff a real estate agent for each of the four regions, with assistant real estate agents for the Eastern and Central regions. These regional real estate agents are attached to the staff of the general manager of each region, but are on the payroll of the purchasing department.

Finance Department

The vice-president in charge of finance is at Philadelphia and his staff is shown on the chart, except that attention should be called to the fact that the treasurer at Philadelphia will act as assistant treasurer for the Lines West and the treasurer at Pittsburgh as assistant treasurer for the Lines East.

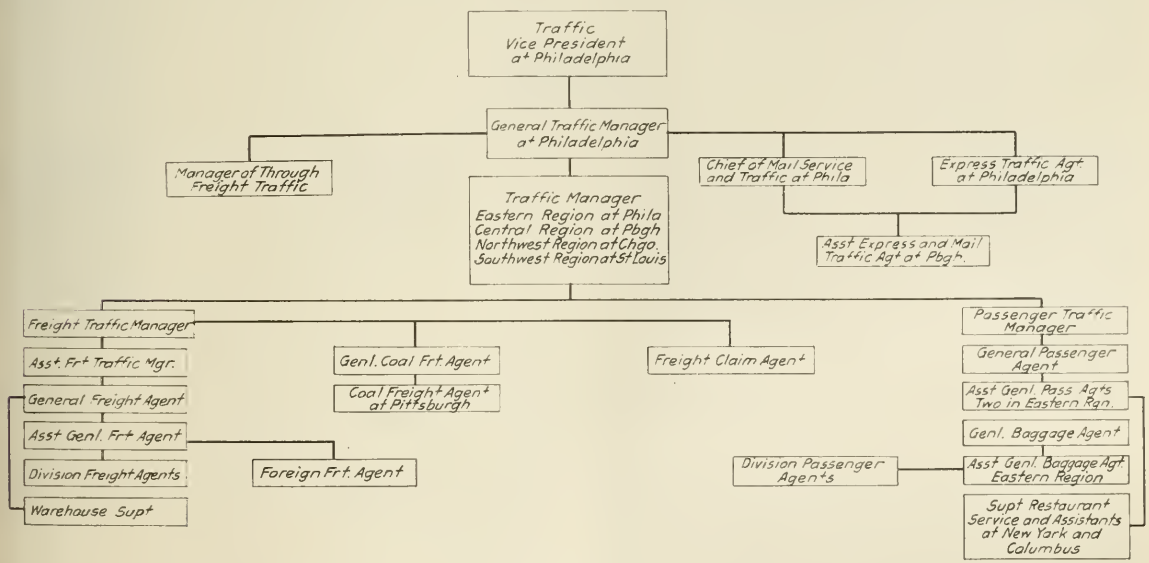


The Accounting Department

Operating Department

The vice-president in charge of operation acts in the absence of the president as president. The vice-president in charge of operation has on his staff a vice-president in charge of personnel, four regional vice-presidents, a chief engineer with his staff, a chief of motive power with his staff, a chief of transportation with his staff, a chief mechanical engineer and an engineer of transportation.*

The vice-president in charge of personnel has superintendents of relief at Philadelphia and at Pittsburgh, but these two relief departments are to be consolidated later;

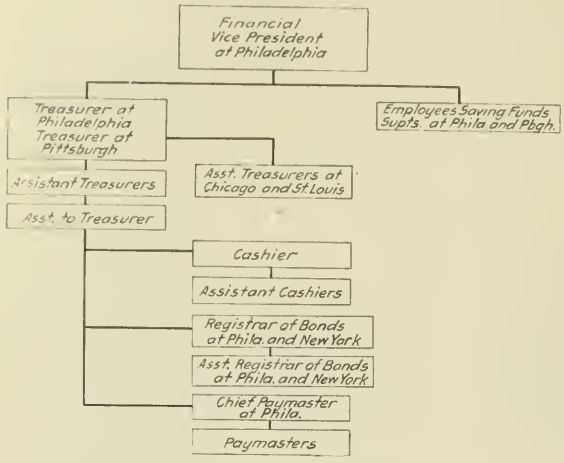


The Traffic Department

*The duties of the engineer of transportation, which has no exactly equivalent title in any former American railroad organization, will be described fully in a later issue of the *Railway Age*.

and agents of the pension department at Philadelphia and Pittsburgh, which offices are later to be consolidated.

The vice-president of each region has a general manager and an assistant general manager in the case of the Eastern and Central regions. On the staff of the general manager are general superintendents (one for each grand division of the region), and on the staff of each general superintendent are division superintendents for each division; and attached



The Financial Department

to the staff are an engineer of maintenance of way, a superintendent of motive power, a general divisional accountant mentioned under the accounting department, and in the case of the New Jersey division, a superintendent of floating equipment. Each superintendent has on his staff a division engineer, trainmaster, master mechanic and a division accountant, mentioned under the accounting department.

Attached to the staff of the general manager of each region is a traffic manager on the payroll of the traffic department, a regional counsel on the payroll of the legal department, assistant treasurer on the payroll of the pension department, a purchasing agent and a real estate agent, both on the payroll of the real estate and purchasing departments, and a regional accountant on the payroll of the accounting department.

Attached to the general manager's staff also is a general superintendent of motive power, chief engineer of maintenance of way, a superintendent of signals and telegraphs, a warehouse superintendent (there is only one warehouse superintendent, however, for the entire system and he is attached to the staff of each of the five regions), and a general superintendent of transportation, who has on his staff a superintendent of transportation and, for the Eastern and Central regions, superintendents of stations and transfers.

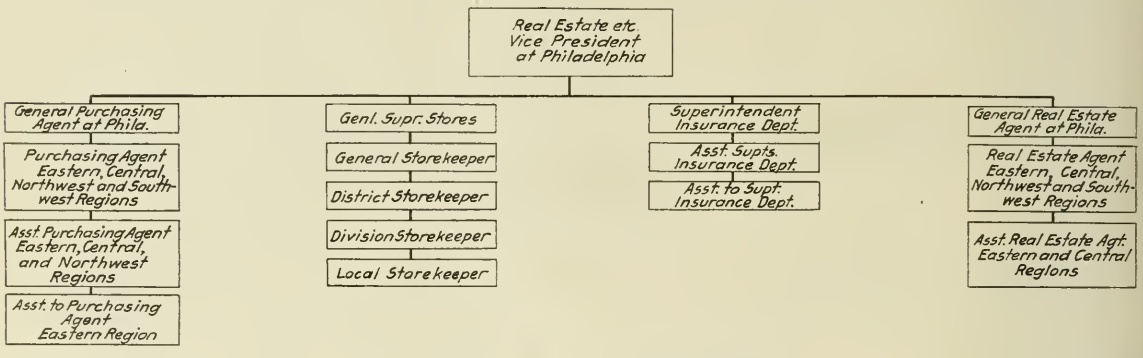
The general superintendent of motive power is on the payroll not of the general manager, but of the chief of motive power, who reports direct to the vice-president in charge of operation.

The chief engineer of maintenance of way, likewise, is attached to the staff of the general manager, but on the payroll of the chief engineer, who in turn reports direct to the vice-president in charge of operation; likewise, the general superintendent of transportation, attached to the general manager's staff, is on the payroll of the chief of transportation, who reports directly to the vice-president in charge of operation.

The staffs of the chief of motive power, chief engineer and chief of transportation are shown quite clearly on the chart, although attention should be called to the fact that the motive power accountant and the shop accountant are on the payroll of the accounting department, not of the motive power department; and attention should also be called to the works manager, reporting direct to the chief of motive power and in charge of the Altoona shops, with the authority and responsibilty that the manager of an industrial manufacturing plant would have.

THE CANADIAN PACIFIC, through the president, E. W. Beatty, announces that annual passes will be granted to officers and employees and their wives under the following classifications: employees on a general superintendent's district, who have had continuous service for a period of not less than 10 years, will be granted an annual pass good over the district on which they are employed; employees who have had continuous service for 20 years and over, will be allowed an annual pass good over either the Eastern or Western lines upon which they are employed; employees of any other department of the service will enjoy the same privilege as the above, over such territory as is desired; general office employees, who have had 15 years' service will receive annual passes over Eastern or Western lines where employed; women employees are to be treated the same as men in this connection.

A RED CROSS PRIZE of $50 has been awarded to Engineman John P. Kelly, Fireman Reger and Richard Laurie, telegrapher, employed on the Buffalo, Rochester & Pittsburgh, for quick action in "first aid," which saved the life of Patrick Murphy, whose leg had been run over after he had uncoupled a locomotive from its train.



The Purchasing and Real Estate Department

The Railway Labor Situation Today and Tomorrow*

Creation of an Incentive Will Stimulate Production—Conciliation and Optimism Needed

THE LABOR PROBLEM today is universal and there has been so much thought given it and so much said regarding it that it is difficult to do more than reiterate salient facts which have crystallized out of the general problem.

A situation confronts us today unlike any before experienced, and to counteract its effect it is essential that its significance be fully appreciated, as it will call for the full efforts of all who believe in democracy and the maintenance of democratic ideals. The influence which is now being brought to bear to undermine the social structure of the world is making itself felt through many other channels than labor, but it has undeniably had a tremendous effect on labor conditions.

During and following the crisis through which the world has just passed, the laboring man, forced by the high cost of living, sought to better his position, and, influenced by propaganda, he directed his efforts not only toward increased wages but on a reduction in working hours, and the results are fast leading to another and even greater crisis. When hours decreased, production decreased; the unit of production cost more to create and the employer was forced to increase his price to the consumer in order to maintain his income, with the result that the value of the dollar depreciated proportionately and the situation was relatively the same as prior to the initial change. This decrease in production, however, had another effect. It required that more labor be employed to obtain the same output, and the natural result is the present shortage of labor.

It is recognized that it is not possible to realize the same production in the eight as in the ten-hour day, but had this been possible it would not have been necessary to increase prices, the cost of living would not have increased, the value of the dollar would not have decreased, and the world in general, but the laboring man in particular, would have been greatly benefited. As long as wages are advanced and production decreases or even remains the same, the cost of living must necessarily increase and the circle becomes endless. It is absolutely impossible for the laboring man to make headway against the cost of living by the methods that are being followed today. The one and only relief is increased production. Germany has already realized this fact and her workingmen have voted for the eleven-hour day in order that production may meet the demands and again permit them to wage the fight for commercial supremacy. How this increased production is to be obtained in America, however, is the real problem of the present time.

It is apparently necessary first to stimulate production by creating an incentive to produce. We cannot today outline a method that may be pronounced "best," but some manufacturing concerns are now trying methods which will, no doubt, create an interest on the part of the employees in the success of the business. It will probably be very difficult to apply any plan that is being tried at the present time to the railroads on account of the diversity of work and the extent of the territory they cover, but out of the numerous plans that are being tried one should be evolved which will gain the desired results, and the mutual efforts of employers and employees along these lines can, without question, create a successful plan.

In connection with any campaign to increase production it will be necessary to undertake a thorough and systematic education, applied particularly to those who have come to us from foreign countries and who speak our language but poorly, and who do not understand our institutions and our ideals. Their very misunderstanding creates fertile soil for the growth of radical ideas that are the subject of a systematic and universal propaganda today.

If the evil is to be entirely overcome it will require the combined efforts of every loyal citizen of America, it will require that citizens exercise fully and properly their right of franchise; that responsible, reasonable men may be elected to offices in our city, state and national government. While it might be supposed that this is universally recognized, the fact remains that throughout the entire United States educators are being forced to leave their stations and accept more lucrative positions in order to meet the present increased cost of living, and our city governments are not taking steps to remedy this evil. Education is the best antidote for radicalism, though without doubt it will not be effective in all cases. Steps are under way now, however, to cope with the radical leaders through proper legislation, and such legislation will probably be made effective in the near future so that our immediate attention might be turned to the followers rather than to the leaders.

By education is meant the broad sense of the term, not merely class-room teachings of the English language, but instruction in American institutions, ideals and the spirit of fair play, and it is suggested that the man on the ground, that is, the supervisor who comes in closest contact with the working man, can accomplish far more in this respect than any one else. By keeping in close touch with his men; providing for their needs; listening patiently to their grievances; always applying discipline when necessary, but only when necessary, and then only after the man concerned has been given full opportunity to be heard and such discipline administered with the idea of saving instead of losing the man, he will gradually gain their full confidence and respect and his troubles from the labor standpoint will proportionately diminish.

There is a feeling on the part of a great many individuals that unionism alone is responsible for the present situation, and it is suggested that a more optimistic view of relationship with labor organizations and a co-operation with them along reasonable lines will be quite effective in removing some of the present difficulties and eliminating some of the present feelings. Conciliation will gain more than opposition. The real cause of this feeling is, no doubt, the influence being exerted by the radical elements that constitute a small minority of present-day labor organizations, just as this influence is also being exerted in our political life. It can be counteracted most effectively by the older and more reasonable members taking an active part in affairs and exerting their influence to counteract the ill effect, just as in our political life, the influence of the radical element may be eliminated by the full exercise of franchise on the part of the loyal citizens of the country.

When we are able to free ourselves of the radical elements, to properly educate others, to increase our production to meet or exceed present-day demands, to reach the point where the employer and employee will meet and discuss with reason their difficulties there will be little left of "the labor problem." This may appear to be an extremely optimistic view of the situation and may further appear to be so far in advance of present-day conditions as to be Utopian, but it is

*From a paper presented by Frank H. Hardin, before the Central Railway Club, March 12, 1920.

suggested that optimism is the prime requisite in the battle and that pessimism is always defeated before the fight begins.

D. R. MacBain (New York Central) offered some suggestions for supervising officers. He stated that although the task of the supervisors seems hopeless, optimism is needed. He ascribed much of the present difficulty to lack of personal contact and the tendency on the part of the local officers to evade their responsibilities. To show that socialistic rule made conditions worse for the workers he cited the fact that Russian workmen are compelled to labor 13 hours, seven days a week. The dissemination of such information was urged by Mr. MacBain as a means of combating the tendency toward bolshevism.

W. O. Thompson (New York Central) argued that the keynote to the situation was getting close to the men.

W. Flynn (Michigan Central) expressed the opinion that the labor problem is not insurmountable and that the solution lies in education and optimism.

F. C. Pickard (D. L. & W.) stated that the roads were now going through a transition period and the tendency is in the right direction. In his opinion, troubles could be minimized if an effort was made to adjust grievances promptly.

J. J. Rossiter (New York, Chicago & St. Louis) laid the blame for the present unrest on the radical element, whose slogan is higher wages and less work. As long as this propaganda is heeded it will be impossible to bring the cost of living down. Although strikes have recently been called off, it is doubtful whether the men are now giving fair production. Mr. Rossiter believed the remedy lay in the overcoming of the radicals by the conservatives in the labor organizations.

L. D. Gillet (Dominion Railway Commission of Canada) expressed the opinion that in the labor situation at present bolshevism of the worst type must be contended with, and inwardly many are viewing the problem with extreme pessimism. Labor has learned the strength of organization, and the situation is made worse by the fact that a small number of men who have been in the army have become agitators. One man of this type can have a bad influence on a hundred others.

W. A. Buchanan (D. L. & W.) submitted that if the principles brought out in the paper were applied every day a marked improvement would be effected. He suggested that the more general use of machinery would aid in increasing production.

F. W. Brazier (New York Central) expressed the opinion that production has now decreased to the danger point. The present labor organization discourages direct contact between the officers and the men, and the incentive for production has been removed under present rules. The big problem is to restore the morale. The only salvation is in more production, and conciliation is needed to bring results.

C. L. McIlvaine (Pennsylvania) cited some examples of high production under present conditions, and stated that it is a mistake to condemn men as a whole for the acts of a few. Labor has suffered because of poor leadership, but the tendency now was to break away from the radical element, and he thought that a great improvement could be effected if the management did not antagonize the men.

Automobile Traffic in California.—Proceedings before the Railroad Commission of California during the months of January and February, 1920, indicate the remarkable growth of the automobile transportation business in California. According to the records of the service department of the Commission, 52 applications for permits to carry freight and passengers were filed in the first two months of this year. There were also filed 25 requests for the Commission's approval of sales or transfers of existing lines. During the same period the Commission dismissed 17 applications for operating permits, denied 9 and granted 13. Seven transfers were approved.

Report on Walton Collision

The Interstate Commerce Commission has issued a report, dated January 6, and signed by W. P. Borland, chief of the Bureau of Safety, on the rear collision which occurred on the Norfolk & Western at Walton, Va., on December 18. In this collision, in which five passengers were killed, the leading train, which was at a standstill, consisted of eight steel cars and three wooden cars, the wooden cars being at the rear end; and the report calls attention to the probability that if all the cars had been steel the results would have been far less disastrous.

The trains were eastbound passenger No. 4, second section, and eastbound passenger No. 26. The leading train was standing at a water tank some 2,000 ft. east of the tower located at the junction where the trains had come on to this line, No. 4 coming from the Bluefield line, and No. 26 from the Bristol line. The time was about 6:44 p. m. (dark), and the weather was clear. No. 26 had passed signal 8L, about 1,287 ft. back of the point of collision, and was moving under a calling-on signal. The engineman claims to have passed through a cloud of steam or smoke, blowing from a standing locomotive, which impeded his view; but regardless of this feature of the case, which is not corroborated by other witnesses, he was bound to proceed under control. He had made, before this, only two trips with this train.

The fireman excused himself for not seeing signal 8L because he was looking out on the left side of the engine to see the position of the train-order signal. Between signal 8L and the point of collision the engineman worked steam for some little distance, and this also appears to have led the fireman to think that the engineman was in proper control of the movement of the train. Testimony concerning the speed of No. 26 a few hundred feet back from the point of collision varied from 15 miles an hour to 25 miles an hour, except that the operator at the tower and a road foreman of engines, who was nearby, put it much faster, the road foreman estimating the rate at 35 miles an hour.

The engineman had been in the service 41 years and a runner for 37 years. The flagman of the standing train, who is censured for not going back fast enough, has been in the service about four years. Both had good records.

The report censured the operator for exercising poor judgment in using the calling-on signal for a movement of this kind when a passenger train was standing in the block; a positive block should have been maintained; but it says that the practice had grown up at this place, apparently from lack of supervision. The legitimate use of the calling-on signal was that of facilitating the movement of pusher engines used on freight trains, and it should have been confined to this. A train receiving the permissive indication of the calling-on signal is not required to come to a stop; so, therefore, the arrangement is not so safe as ordinary automatic block signal practice.

The fireman, who had been accepted, seven years ago, as competent to act as engineman, was found to be faulty in his understanding of the indication of the permissive indication of the calling-on arm. He thought it was the same as the 45 deg. position of an automatic block signal, permitting the train to proceed, expecting to be stopped at the next block signal. And the conclusion that the report seems to reach was that the engineman's carelessness was probably due to this impression; that this signal, displaying a yellow light, was to be taken the same as an automatic block signal displaying a yellow light. Still, it appears that the line of road was straight, the weather clear, and the grade level or nearly level; so that the presence of the smoke or steam—a point which was disputed—was the only element which could have hindered the engineman from seeing the red tail lights of the standing train. The engineman said that he did not see the red light carried by the flagman, who had got back about 200 ft. to 400 ft.

Reply to Postmaster General in Mail Pay Case

Railway Mail Pay Committee Says if Rehearing Is Granted Case Should Be Reopened in Entirety

WASHINGTON, D. C.

THE COMMITTEE OF ATTORNEYS for the Railway Mail Pay Committee representing the railroads has filed with the Interstate Commerce Commission a reply to the petition of the postmaster general for a rehearing of the railway mail pay case decided by the commission in January, and the establishment of a new and reduced scale of rates in place of those put into effect under the order of the commission. The committee states that it may be questioned whether under the terms of the statute the re-examination of the rates established may be had until after the lapse of six months from the entry of the commission's order; that the petition of the postmaster general is not based upon any failure on the part of the commission to exercise its jurisdiction in accordance with the statute, upon any error of law or upon any misapprehension of the facts, but is directed solely to an attack upon the conclusions reached by the commission. All matters in issue between the trunk line carriers and the department were fully presented to the commission, the committee states, were thoroughly understood, carefully weighed and maturely decided in an opinion "which discloses on its face an intelligent grasp of all of the complicated questions involved, never excelled and scarcely equalled in judicial literature."

However, the conclusions reached by the commission are said to be unsatisfactory to the carriers as well as to the department and if there is to be a reexamination of the merits of the case then such reexamination should not be a one-sided one, involving a reconsideration of the contentions of the department only, but should cover the whole case and should embrace a reexamination of the contentions of the railroads as well as those of the department. If the case is to be reopened, therefore, it is contended that it should be reopened in its entirety and the carriers should be given an opportunity to show to the commission wherein it erred in the establishment of the space basis and likewise wherein the rates fixed, if the space basis should again prevail, are unreasonably low, and to direct to the attention of the commission all other particulars in which the carriers contend its conclusions are erroneous or in which its order should be revised.

In the opinion of the carriers, the commission erred in not adopting the combination weight and space basis proposed by the carriers in fixing rates which in their judgment are too low based upon the whole record, and the opinion as in other respects, set forth in detail, declared to be unduly prejudicial to the carriers. Independently of these facts, however, the carriers were of the opinion that the order of the commission should be given a fair trial for the six months' period named in the statute and have, therefore, hitherto filed no petition for a rehearing. Believing that the post office department in its instructions purporting to put the order of the commission into effect had issued instructions in conflict therewith, the carriers had filed a petition for a ruling to determine whether the instructions were or were not in conformity with the order. Upon this, it is stated, the commission has now ruled against the carriers.

The short lines had also filed a motion for further findings upon the part of the commission based upon a question of law. This motion has since been denied by the commission.

Department Proposes Lower Rates Than in Law

The railroad committee states that the final results of the criticisms of the postmaster general are embodied in a scale of rates proposed for application in lieu of those fixed by the commission and set forth in the petition for a rehearing, which is substantially lower even than the rates named in the act of July 28, 1916. The total annual revenue based on the rates proposed by the department is stated to be $57,913,755. The actual annual revenue of routes on space rates for the service as of March 27, 1917, including initial and terminal pay, was $59,753,679. Dividing the total estimated revenue under the rates proposed by the equated 60-foot car miles of service as of March 27, 1917, the new rates would yield an average rate per car mile of 23.03 cents, while the average car mile revenue under the old basis was 23.69 cents. The department's new proposals, as well as its original ones, therefore, contemplate a substantial reduction in mail rates and revenue. In view of the commission's finding that by every standard and test, the failure of the mail revenue to keep pace with the growth of freight and passenger revenue in the face of a substantial equivalent growth in volume of traffic handled, comparison with freight rates leading to the conclusion found by the commission that the mail rates were by that standard alone unreasonably low, as well as judged by the commission's careful examination of the statistical study itself, it is declared that the petition for a rehearing might well be dismissed on general grounds and without any elaborate investigation, because the petition resolves itself in the last analysis to a mere restatement of facts and arguments already fully presented to the commission.

Taking up in detail the points made by the department the reply of the carriers states in part:

The car mile rate for current application is substantially less than current passenger car mile earnings and takes into account none of the increases in expenses which have taken place since the hearing.

The commission's apportionment of space, instead of assigning too much to the mail as charged by the department, assigns too little.

In ascertaining the cost of the mail service and in establishing rates therefor the commission has failed to take into account the transportation of postal officials, which amounts to $1,504,742, or equivalent to 0.6 cents per car mile.

The total estimated revenue resulting from the application of the rates fixed to the service performed falls materially short of that to which the commission found the carriers to be entitled.

Based on the commission's own statistical study, the reply of the carriers states, they are entitled to an aggregate annual revenue of $81,222,050. According to the calculations of the post office department, the total actually payable under the commission's order is $75,191,065 at the space rates fixed, to which approximately $1,500,000 should be added for side and terminal service, making a total of $76,091,065. On the basis of the department's own calculations, therefore, it is contended, the unit rates for application to the service prior to January 1, 1918, should have been 6 per cent higher than those named in the order.

6 Per Cent Return on Property Investment

The attorneys for the carriers also deny the contention of the post office department that the commission erred in its division of the property investment as between different classes or service or in the adoption of 6 per cent as the fair rate of return thereon. In answer to the criticism of the department as to the use of the property investment accounts

of the carriers as representing their approximate value, the reply of the carriers says:

"In answer to this it should be said that such property investment accounts were used by the department itself in its own calculations. While their use was accompanied with certain reservations by the department concerning the integrity of such accounts, no other basis of value was suggested nor is any other practically possible. The whole case was tried by both parties with the use of the property investment accounts as the only practicable standard of value.

"Reference is made in the petition to certain decisions of the commission in which the unverified character of the property investment account is discussed. No reference is made in the petition to the decisions of the commission in which attention is called to the fact that since 1907 capital charges have been made in strict accordance with the accounting rules of the commission, during which period approximately one-third of the total property investment account has been created. As an offset to any questionable items in the earlier accounts attention is called to the following considerations: (a) Failure to include in such account large sums charged to income account and to operating expenses and now chargeable under the accounting rules of the commission to capital account; (b) The enormous increase in land values which has taken place both since the original entries and those made since 1907, which under the decision of the Supreme Court in the Minnesota rate case must be included at present value; (c) Increase in construction costs since date of original entries; (d) Failure of property investment account to reflect any element of going value, which under the decision in Denver v. Denver Union Water Company, must be included; (e) Non-inclusion in property investment account of materials and supplies and working capital, which are as much a part of the property devoted to the public use as that reflected in the property investment account itself.

"There is little doubt but that, of the foregoing, the increased value of lands alone more than offsets, for the carriers as a whole, any questionable items in the property investment account prior to 1907. Taking all of the foregoing considerations into account the commission is fully justified in using the property investment account as the basis of its calculations, as it has done.

"In the foregoing list of items no mention has been made of the effect of applying present cost of labor and material to a reproduction estimate made either as of today or as of April, 1917, when war prices prevailed. It has been stated by Director Prouty that there has been an advance of not less than 75 per cent in these unit prices since the pre-war period. The extent to which such prices are abnormal for the future is problematical. They represent the prices of today. It is doubtful if any one believes that there will be a recession to the old level of prices for many years to come. Whatever may be said as to the normality or abnormality of such prices, they can no more be ignored in considering the present value of railroad property than in considering the present value of other property. If the value were to be estimated upon the basis of present prices it would far outrun the property investment of the carriers. In constructing rates for application in 1917, for the period between 1917 and 1920, and for 1920 and thereafter, the commission is fully justified in using the property investment account of the carriers, could not conceivably assign a less value to the railroads of the country as a whole and might, with propriety, have assigned more.

"The commission is further criticised for using 6 per cent as the proper rate of return on property investment in its calculations. No less percentage of return has ever been used by any court in confiscation cases. On the contrary, as pointed out in the brief of the carriers, percentages as high as 7 and 7½ per cent have been employed under the confiscation test.

"Reference is made to the provisions of the transportation act, 1920, in which the commission is directed to readjust revenues so as to yield as near as may be 5½ per cent on the value of the property and under which it may, within its discretion, add an additional one-half per cent to take care of additions and betterments to be paid for out of earnings. It is said that no proof was offered in justification of the additional allowance of one-half of one per cent. It should be a sufficient answer to say that the act in question had not then been passed and no such proof was required. If the matter is to be considered in the light of present day conditions it is self-evident that the higher of the two percentages should be allowed. If a return of less than 6 per cent on public utilities was confiscatory when the Consolidated Gas Company v. New York, was decided, as court held it was, it cannot be successfully contended that a less rate of return may be allowed today when the cost of money so far exceeds that then being paid. Speaking generally it is respectfully urged that the return to the carriers should always permit the making of some capital expenditures out of income as contemplated by the discretion vested in the commission for the inclusion of an additional one-half of one per cent for this purpose.

"The preservation of the credit of the carriers is all-important. In the railroad business, as in every other business, sound financing requires that some capital expenditures should be made out of earnings. The credit of no industry can be maintained if it is entirely dependent on borrowed capital for the making of improvements. The point is ultimately reached where the company's borrowings represent so disproportionate a part of its value as to destroy the necessary margin of safety for further financing. The carriers are now confronted with the necessity for unprecedented capital expenditures at a time when all credit is strained to the utmost, interest rates are the highest on record, and capital difficult to secure at any rate of interest. It is inconceivable that, at this critical juncture, the commission would fail to include the discretionary one-half of one per cent in the allowable income. While the commission's calculations were apparently based on an assumed 6 per cent, the estimated revenue accruing under the rates will not yield such rate of return. The post office department's estimate of the annual revenue prior to January 1, 1918, at the basic rates fixed by the commission is $75,191,065. Add to this $1,500,000 for side and terminal service and the estimated gross revenue becomes $76,691,065. From this figure should be deducted $59,719,850 of expenses, leaving a net revenue of $16,971,215, hich is but 4.9 per cent of the property investment apportioned by the commission to the mail."

In reply to the assertion of the post office department that the rate of return on the mail service will exceed that on the passenger and express services, the attorneys for the carriers say that if these services do not pay enough they should pay more and the fact that they do not is no reason why the mail should be less. The inference that revenues from all other classes of traffic should be reduced to the level of express, which the department says pays but 2½ per cent on the property investment, is declared to be manifestly unsound. If the mail revenue is to be reduced so as to yield but 2½ per cent because that is the rate of return yielded by the express traffic then it is said freight rates should be reduced so as to yield no more than the rate of return on the competitive mail and express business. The basis of rates which the department proposed to the commission was predicated on this theory and the rates fixed by the commission after careful consideration of the cost of the service and the property devoted thereto is said to be a complete refutation of the argument.

Moreover, it is asserted, the alleged disadvantage to the mail in favor of the express does not exist. The service per-

formed for the mail is both more onerous and of a different character from that performed by the express.

Competition Between Mail, Express and Freight

"It is a matter of common knowledge," the reply continues, "that prior to 1913 mailable merchandise packages were limited to 4 pounds; that the weight limit has since been increased to 70 pounds and that articles of every description and size, which could previously move only by freight or express, have since moved by mail. The consequent enormous increase in the volume of merchandise now moving by mail is likewise of common knowledge. These facts would appear to prove on their face a substantial invasion of freight and express traffic by the postal service. We are not complaining and have not complained of the parcels post. We did think and still think that with its continued invasion into what was hitherto express and freight traffic the rates should be put on a somewhat comparable weight basis and that we should not be required to rent space to a competitor to be filled up at his pleasure without regard to the revenue which would accrue from the same traffic if moving by express or freight. With its advantage thus preserved at space rates, which afford less pay for a given package of merchandise carried in the mail pile in a baggage car, than that which would be received if carried in the express pile, the department is in no position to suggest that it has been unfairly treated, or placed at a disadvantage as compared with the express, under the mail rates fixed by the commission."

The decision of the commission is declared to be not satisfactory to the railroads in the following particulars:

(a) In the preservation of the space basis.

(b) In that the space apportionment assigns too little space to the mail and consequently results in rates which are inadequate.

(c) In that the commission misconceived the attitude of the carriers towards the performance of side and terminal service. The carriers have never said that they did not object to performing this service. They have said they were not required to perform it. In not so finding the commission erred.

(d) In holding that land grant deductions apply to pay for distributing space.

(e) In the establishment of a rate for storage service which which does not properly take into account the heavy loading in such cars.

(f) In failing to make provision in the rate for the carriage of postal officers and employees in passenger coaches.

(g) In the inadequacy of revenue to the New England group at the rates fixed.

(h) In that, under the rules of administration provided, the space basis is still impracticable of equitable application. "The previous attitude of the carriers in this regard is confirmed by the apparent attempt of the department to circumvent the effect of the commission's decision by new administrative practices. In so far as these practices have been directed to the attention of the commission the commission has ruled that they are not in conflict with its order. Some others have since come to light. Granting them to be in harmony with the order as written, the administrative practices now being made effective will have the effect of reducing the total pay of the carriers far below that to which the opinion of the commission shows they are entitled without any possibility of saving to them in service or expense. We say with all due respect to the commission that under the rules named in the order as interpreted by the post office department, which interpretation the commission has said was not in conflict with the order, the space basis is as unworkable and as subject to unjust manipulation as it was before the commision took hold of the subject. It does not require a six months' trial to show that the administrative practices permissible under the commission's rules and being put in practice by wholesale by the department, will have the effect of reducing the pay of the carriers far below that which it has apparently been assumed by the commission will be yielded by the rates fixed, and will have no effect upon the actual service performed by the carriers, or admit of any substantial reduction therein or the expense thereof.

"Judged by its new administrative policy in revising authorizations since the commission's decision, the department has begun a campaign for wholesale reductions in pay without any corresponding reductions whatsoever in the service performed."

Commission on Car Service

The Commission on Car Service has issued a circular to the railroads saying that the period of maximum requirements for automobile loading is at hand and shortage of automobile cars, particularly during the past few weeks, has resulted in a large accumulation of shipments in producing territories. Automobile cars at present are badly scattered and railroads are asked to particularize with respect to this equipment.

Local loading of foreign automobile cars with miscellaneous freight, it is stated, should be avoided were practicable, and generally, until existing shortages have been relieved, railroads should refrain from furnishing this equipment for loading other than that for which automobile cars were constructed. Loading of foreign automobile cars with miscellaneous freight, where necessary, should be in direct route to owners or to automobile manufacturing territory but not beyond. Otherwise, and in the absence of automobile loading to owning line, cars should be sent empty to the car owner under car service rules.

Another circular says that information reaching the Bureau of Public Roads of the U. S. Department of Agriculture, from various state highway commissions, and from producers of materials used in road construction, indicates that there will be an extraordinarily heavy movement of these materials during the coming season. It is estimated that the roadbuilding this year will not be less than three times that of the heaviest previous season. The transportation demand will be accentuated by reason of the fact that much of the road construction will be in territory where stone, sand and gravel deposits are so located as to require abnormally long hauls.

"It seems to be apparent, from what has already been brought to our attention," the commission says, "that the handling of this business will require some co-operative action between individual railroads and the Commission on Car Service in order that maximum use of equipment and adequate service for this traffic may be secured. It is suggested, therefore, that individual carriers should, as promptly as possible, ascertain the demands that will be made upon them, and in the event that relief seems necessary, the Commission on Car Service should be promptly advised of all the facts so that the necessary steps may be taken looking to such readjustment of car movement as is possible in individual cases."

In order that the Commission on Car Service may assist in formulating some definite program for prompt home movement of bad order cars now held on various railroads, and which must be sent home for repairs or betterments under Section III Mechanical (MCB) rule No. 120, all railroads are asked to send to the commission a list of any such cars the handling of which via home route would entail a long and circuitous haul.

General News Department

Three hundred employees of the Car Record Office of the Pennsylvania Lines West of Pittsburgh, have been notified that about May 1 they will have to move from Pittsburgh to Philadelphia, as the car records now being kept at Pittsburgh are to be consolidated with those of other parts of the Pennsylvania System, and will all be kept at Philadelphia.

The Louisville & Nashville has installed radio telegraph apparatus in its general office at Louisville and proposes to provide facilities for radio communication with its division headquarters. Quick communication with the United States Weather Service, with a view to getting forecasts of gulf storms, is one of the objects had in mind in establishing this service.

President Wilson on March 12 issued a proclamation appointing Director General Hines as the agent provided for in Section 206 of the transportation act against whom shall be brought actions at law, suits in equity and proceedings in admiralty, based on causes of action arising from federal control, of such character as prior to federal control could have been brought against individual carriers.

Thefts of whiskey from freight cars which, under present conditions are in many cases looked upon as venial offences, do not always turn out that way; at Fredericton, N. B., last week, nine employees of the Canadian National Railways were called up in court for taking some Kentucky whiskey out of a car on the Transcontinental division of the road, and were sentenced each to six months in jail.

D. B. Hanna, president of the Canadian National, is preparing to lay before the Canadian Parliament an extensive program for increased efficiency and betterment of equipment of the Canadian National. Complete details will not be made public until the matter is laid before the Parliament at the coming session. Beyond stating that there would be no curtailment of last year's appropriations, Mr. Hanna has declined to make any further statement.

The third annual meeting and an election of officers of the Pacific Railway Club was held at Oakland, Cal., on March 11, at which the following officers were elected: President, Dennistoun Wood, assistant mechanical engineer of tests, Southern Pacific; first vice-president, J. H. Harris, general superintendent of the San Francisco-Oakland Terminal; second vice-president, S. S. Foote, Jr., professor of railroad engineering, University of California; treasurer, G. H. Baker, chief rate clerk, Atchison, Topeka & Santa Fe.

The Wisconsin Railroad Commission has been asked by the city attorney of Milwaukee, Wis., to express its views as to the correct method of instituting proceedings immediately to bring about the prosecution and going forward of outstanding orders abolishing railroad grade crossings in Milwaukee. The crossings were ordered eliminated, at a cost of approximately $5,000,000, by the commission just prior to government control. The work was about to have been begun when the government took control of the roads.

The town of Wellesley, Mass., has officially thanked the Boston & Albany Railroad for its good service during the adverse weather conditions of the past winter. At the annual town meeting on March 8, which was largely attended, John Eastman, chairman of the Board of Selectmen proposed, and the meeting unanimously adopted, a resolution to the effect that in view of the serious conditions which have existed during the winter and the extraordinary services rendered by the railroad to its patrons "the Board of Selectmen be instructed to communicate to the officials of the company, and through them to the operating force, the appreciation of the citizens for the extreme efforts put forth; * * * said resolution to be recorded in the books of the town."

The Salvation Army, with its numerous local headquarters all over the United States, keeps watch, at many large railroad stations, for inexperienced travelers, and especially young girls who may need assistance; and the officers of the army estimate that during the past year 50,000 girls have been thus aided, often in circumstances of considerable distress. In the last ten years, say the officers, the Army has helped 2,000,000 girls to travel safely on American railroads. Calling attention to this record, the Army proposes, in its campaign for money, from May 10 to May 20, to appeal to railroad men as well as other people.

A damage suit brought by a discharged employee of the Great Northern against that company, A. B. Ford, master mechanic and Director General Hines, was thrown out of court on March 2, by the judge of the Butte (Mont.) court. The plaintiff asked for damages in the sum of $21,049 for a violation of contract in dismissing him from railway service for disobedience of orders. The contention of the defendants was to the effect that the director general of the United States government could not be held responsible for any alleged violation of contract prior to January 3, 1918, the time of the dismissal of the claimant.

The American Railway Express Company contemplates the regular transportation of merchandise by airplane, according to a statement made by R. E. M. Cowie, a vice-president of the company, speaking before the National Aircraft Show in New York City last week. Mr. Cowie tells the aircraft manufacturers that when they provide the service the express company will do the advertising and the pick-up service and make deliveries at destination. He would not pretend to estimate what volume of traffic would seek the high speed made by airplane, but thought that of the million shipments carried daily by the express company, there must be at least a small percentage which would seek expedited service.

Daylight saving schemes are still in a confused state, though the day when most of them were to go into effect is only nine days off. In New York City it seems to be settled that clocks will be set to the sixtieth Meridian standard (one hour ahead) on the 28th; and the railroads, being obliged by the Federal law to continue running by the 75th Meridian, will probably issue new time tables, with the heavy suburban trains scheduled one hour earlier than they now run. The New York, New Haven & Hartford has already decided to do so, but other lines have not as yet taken any action. The city of Philadelphia, which adopted a daylight saving ordinance sometime ago, with the intention of putting it into effect on March 28, finds that the act is illegal, being in conflict with a state law, in effect since 1887, which prescribes Eastern standard time for the whole state. Boston and Providence seem not as yet to have learned their own mind.

How Much Coal Can Be Saved by Electrification

The editorial with the above title which appeared on page 754 of the March 12, 1920, issue of the *Railway Age* contained typographical errors which made it difficult to understand. The second paragraph should have read as follows:

Ton-mile cost is the unit on which the railroad operator bases most of his calculations. Mr. Armstrong says freight can be hauled with a power consumption of 40 watts per gross ton-mile and that one kw.-hr. of electrical energy can be produced in a power house from 2½ lb. of coal. Then, pounds of coal per 1,000 gross ton-miles =

$$\frac{40 \times 1{,}000 \times 2\frac{1}{2}}{1{,}000} = 100.$$

Disastrous Collision at Bellows Falls

In a butting collision on the Rutland Railroad near Bellows Falls, Vt., on the 14th of March, between a northbound express and a southbound freight, four passengers and six trainmen were killed, and a number of persons were injured. Both engines, ten freight cars, two milk cars and a baggage car were wrecked.

25 Per Cent Rate Increase Predicted

Walker D. Hines, director general of railroads; Max Thelen, director of the Division of Liquidation Claims of the Railroad Administration, and C. A. Prouty, formerly director of the Bureau of Valuation of the Interstate Commerce Commission and now director of the Division of Accounting of the Railroad Administration, were the guests at a dinner of the University Club at Washington, D. C., on March 10, and gave addresses regarding the work of the Railroad Administration. Mr. Hines declared that greater increases in rates will be necessary under private operation of the railroads than under government operation. Judge Prouty expressed the opinion that a 25 per cent increase will probably be necessary for the railroads, whereas a 10 per cent increase would have been sufficient under government operation.

Coal Commission Submits Divided Report

The commission appointed by the President to investigate the question of wages of bituminous coal miners has failed to reach an agreement. Commissioners Henry M. Robinson, representing the public, and Rembrandt Peale, representing the operators, have submitted a report recommending a general wage increase of 25 to 26 per cent, including the 14 per cent already allowed, without change in hours or working conditions, and John P. White, representing the miners, has submitted a minority report recommending, it is reported, a 35 per cent increase in wages and a seven-hour day. The President asked the commissioners to confer with him before making any announcement. It is understood that the commission has attempted to devise a plan to induce railroads and other large consumers of coal to purchase and store the larger part of their coal supply during the dull season in order to even up the production during the year and to meet the problems of unemployment and congestion and shortage of transportation facilities which result from seasonal increases in production.

Wage Conference to Be Resumed

Conferences between the committee representing the railroads and the committee representing the railroad labor organizations that are transferring their general wage demands from the Railroad Administration to the railroad companies are expected to be resumed in Washington on March 22. An adjournment was taken after the first meeting on March 10 to enable the committees to obtain further information as to the extent of their authority and on other matters before proceeding further. At a meeting of the standing committee of the Association of Railway Executives in New York on March 11 the committee representing the railroads in the wage conference was enlarged by the appointment of C. H. Stein, of the Central of New Jersey; J. H. Dyers, of the Southern Pacific; E. C. Wills, of the Missouri Pacific; W. M. Jeffers, of the Union Pacific; J. H. Foster, of the Chicago, Milwaukee & St. Paul; J. R. Gould, of the Chesapeake & Ohio; G. R. Loyall, of the Southern, and B. M. Starks of the Louisville & Nashville. E. T. Whiter of the Pennsylvania was appointed chairman in place of C. B. Lardo, who retired from the committee on account of pressure of other work.

Plumb Plan League Has a Research Bureau

The Plumb Plan League has announced the establishment at its Washington office of a Research Bureau under the direction of O. S. Beyer, Jr. One of the important functions of the bureau will be the keeping of accurate records of all members of Congress for the benefit of their constituents. The speeches, attitudes and votes of Senators and Representatives will be carefully indexed and recorded so that a complete digest of the record of any member of Congress may be secured on short notice. From time to time the bureau will publish special pamphlets, documents, booklets, studies, periodicals and investigations on matters requiring particular illumination. These publications will deal, for instance, it is said, specifically with such subjects as the following: industrial democracy and the railroads; evidence of organized workers' ability to help manage industries under democratic control; economies accomplished in railway operation during Federal control; the co-operative movement and the railway worker; the cost of living and the wages of railway employees; a digest of the new railroad law; the wastes of private railroad ownership and operation. When legislation is pending, or when railroad rate and wage questions are under consideration, the Research Bureau will endeavor to be of help in compiling statistics, arguments and data "for the purpose of proving the justice and soundness of labor's contentions."

Storekeepers' Annual Meeting

Section VI American Railroad Association—Department of Purchases and Stores—will hold its first annual meeting at Atlantic City, N. J., on June 14, 15 and 16. Headquarters will be at the Marlborough-Blenheim Hotel and business sessions will be held in the Hippodrome on the Million Dollar Pier.

Members and all persons attending are asked to reach Atlantic City by Saturday, June 12, if possible, in order to see the exhibits and not be obliged to take time from business sessions for that purpose. Badges must be secured, on arrival, from the committee at the pier.

Seventeen subjects are on the program for discussion, as follows, the name of the chairman of the committee in charge being given with each subject:

1. Store department book of rules; J. G. Stuart (C. B. & Q.).
2. Classification of material; C. H. Rost (C. R. I. & P.).
3. Reclamation of material.
4. Material accounting; W. E. Brady (A. T. & S. F.).
5. Commissary; G. C. Smith (U. P.).
6. Cross ties; J. H. Waterman (C. B. & Q.).
7. Stationery; W. D. Stokes, supervisor of stores, United States Railroad Administration, Southern Region.
8. Distribution of material to users; W. D. Stokes.
9. Fuel—purchasing, storage and distribution; S. B. Wight (N. Y. C.).
10. Scrap; handling and sales; G. W. Hayden (N. Y. N. H. & H.).
11. Ice—purchasing, storage and distribution; T. J. Frier (Wabash).
12. Purchasing agent's office records; C. E. Walsh (P. W. P.).
13. Lumber; Wm. Beatty (P. R. R.).
14. Rails; A. A. Goodchild (C. P. R.).
15. Buildings and structures; U. K. Hall, associate manager, stores section, United States Railroad Administration.
16. Supply train operation; A. S. McKelligon (S. P.).
17. Standards; F. D. Reed (C. R. I. & P.).

The chairman of section VI is H. C. Pearce (S.A.L.), Norfolk, Va.; secretary, J. P. Murphy (N.Y.C.), Collinwood, Ohio.

St. Paul Opens New Electrified Section

The electrification of the Coast division of the St. Paul has just been completed in final details. It adds 207.4 miles to the 440 miles previously electrified in Montana on the Rocky Mountain and Missoula divisions, making a total of 647.4 miles of the St. Paul line now operated electrically. The operation of trains by electricity on the Coast division was formally started on March 5. This division extends from Othello, in central Washington, to the shops in Tacoma on the Puget sound end. The Rocky Mountain electrification extends from Harlowton, Mont., on the east, to Avery, Idaho, on the west. Between Avery and Othello is a stretch of 212 miles yet to be electrified.

All of the electric current used in the operation of the trains is generated from water power. The power furnished to the western electrified section is taken from the Snoqualmie plant of the Puget Sound Traction, Light & Power Company at the west end near Seattle, and from the Long Lake plant of the Washington Water Power Company on the Spokane river. Current is delivered to the railroad transmission lines along its right of way at 100,000 volts. There are eight sub-stations between Othello and Tacoma, which step the high tension alternating current down to 3,000 volts direct current for the overhead catenary system. Fifteen new electric locomotives for passenger train service have been added to the equipment of the electrified sections. Five of these, which are of the bi-polar, gearless type, were built by the General Electric Company. A description of them was published in the *Railway Age* of October 24, 1919 (page 819.) The remainder are Baldwin-Westinghouse electric locomotives, which were described in the *Railway Age* of Janu-

ary 16, 1920 (page 233). The gearless type of locomotive will be used in passenger service on the western electrified section. They are designed to haul a train consisting of 12 coaches up a 2.2 per cent grade without a helper at a speed of 25 miles an hour.

Railway Revenues and Expenses for January

The Interstate Commerce Commission's monthly summary of railroad returns for January, covering 189 Class I roads and 15 switching and terminal companies, shows gross receipts of $500,-860,649 and net operating income of $68,401,109. The details appear in the table:

REVENUES, CLASS I RAILROADS, JANUARY, 1920

		Amount		Per mile of road operated	
		1920	1919	1920	1919
1	Average number miles operated	235,039.61	234,656.22	.....	.....
REVENUES.		Dollars	Dollars	Dolls.	Dolls.
2.	Freight	312,020,723	278,375,866	1,328	1,186
3.	Passenger	91,886,422	87,055,662	391	371
4.	Mail*	60,041,439	4,353,090	255	19
5.	Express	13,915,942	6,349,831	59	27
6.	All other transportation	10,958,122	9,382,983	47	40
7.	Incidental	11,551,264	11,296,023	49	48
8.	Joint facility—Cr.	713,969	581,288	3	3
9.	Joint facility—Dr.	227,232	163,233	1	1
10.	Railway operating revenues*	500,860,649	397,231,510	2,131	1,693
EXPENSES:					
11.	Maintenance of way and structures	57,903,492	58,453,440	246	249
12.	Maintenance of equipment	117,613,057	99,692,016	500	425
13.	Traffic	4,912,908	3,499,458	21	15
14.	Transportation	219,135,677	186,055,639	932	793
15.	Miscellaneous operations	4,386,327	3,597,839	19	15
16.	General	11,174,207	10,247,055	48	44
17.	Transportation for investment—Cr.	336,686	400,782	1	2
18.	Railway operating expenses	414,788,982	361,144,665	1,765	1,539
19.	Net revenue from railway operations*	86,071,667	36,086,845	366	154
20.	Railway tax accruals (excluding "War Taxes")	17,556,667	15,415,549	75	66
21.	Uncollectible railway revenues	113,891	58,095	....	....
22.	Railway operating income*	68,401,109	20,613,201	291	88
23.	Equipment rents (Dr Bal.)	2,446,091	835,787	10	3
24.	Joint facility rent (Dr. Bal.)	1,807,471	1,335,312	8	6
25.	Net of items 22, 23 and 24*	64,147,547	18,442,102	273	79
26.	Per cent of expenses	82.82	90.92	....	....

§Credit item.

NOTE.—The average railway operating income corresponding to item 22 above for the month of January in the years 1915, 1916 and 1917, included in the "test" period of three years ended June 30, 1917, was $254 per mile of line for the United States.

*The figures for these items are affected by the inclusion of approximately $50,000,000, representing an estimate of back railway mail pay.

Short Lines to Meet

Several hundred officers of short line railroads from all parts of the United States will attend a special meeting called by Bird M. Robinson, president of the American Short Line Railroad Association, to be held at the New Willard Hotel on April 15 and 16, for the purpose of discussing the relation of the short lines to the new transportation act which became a law by the signature of the President on February 28. The act contains many provisions which vitally affect the short lines, including those for the establishment of rates which will produce a net return of 5½ per cent for the carriers as a whole or by groups, for the determination of divisions of joint rates as between carriers, for a guaranty against deficits incurred by railroads that were not under federal control, for a six months' guaranty to roads that accept the guaranty provisions of the act, for loans to carriers out of a $300,000,000 fund appropriated for that purpose, and for a plan of permissive consolidation of railroads into a limited number of competitive systems.

Edgar E. Clark, chairman of the Interstate Commerce Commission, will be the principal speaker at the meeting and addresses will also be made by Chairman Albert B. Cummins, of the Senate committee on interstate commerce, Senator Joe T. Robinson of Arkansas, and Chairman John J. Esch of the House committee on interstate and foreign commerce.

The Merchants' Limited

The Merchants' Limited express train of the New York, New Haven & Hartford, leaving New York and Boston at 5 p. m. and making the run in either direction in five hours ten minutes, is now made up of ten cars, so arranged that passengers desiring to reach either the dining car or the smoking car can do so with the minimum of travel; and the make-up of the train affords an unusual variety of accommodations. An officer of the road, describing this new arrangement, says:

"This train is heavily patronized by business men. It consists entirely of Pullman cars. The make-up of the train prior to the war was on the basis of a combination baggage and parlor car ahead, three parlor cars, one of which had a drawing room; two diners, three parlor cars, and an observation car, which also had a drawing room. The observation car was an open car available for the use of everybody in the train and smoking was permitted. It also contained two sections which were in constant demand by passengers desiring to enjoy a game of cards en route. Usually the car was filled, while at the same time the seats which were reserved for these men in the forward cars were empty.

"During the war all of the seats in this observation car were sold; smoking was allowed in the observation car and also in one parlor car. With that arrangement, however, a passenger, if he wished to smoke, had to obtain his reservation in one or the other of these two cars, and all of the other passengers—for instance, a man traveling with his wife—were deprived of any opportunity to enjoy an occasional smoke—except by going into the wash room or to the vestibule platform, or crowding into one of the two rear cars in which smoking was allowed but where the space was all reserved. Moreover, a passenger whose reservation was in one of the forward cars of the train could reach the smoker only by walking the entire length of the train and through the two dining cars.

"Under the new make-up the forward car contains the compartment for baggage, two sections which are reserved and sold in preference for parties of four who desire to play cards, about 25 or 30 club-car chairs which are reserved and sold for those who wish to travel in a car where smoking is permitted; and about 15 chairs that are not reserved. These last are available for the occasional smokers from the three parlor cars following. Two of these three parlor cars have drawing rooms. The two dining cars being in the middle of the train, passengers can reach them without traveling long distances. The three cars following the diners are standard parlor cars. The rear car is divided. The forward portion has 28 club-car seats where smoking is allowed, which are reserved. The rear portion has two sections which are also reserved and sold in preference for card parties of four. The remaining 16 chairs are not reserved and are available for the occasional smokers from the three parlor cars ahead. The club cars at the forward and the rear ends of the train both have small buffets from which cigars, cigarettes and soft drinks are served.

"The train is substantially a double-ender; that is, the forward half and the rear half are duplicates of each other. A passenger may select pretty nearly anything he wants: drawing rooms, regular parlor car accommodations, club car accommodations, sections for card playing, and a number of unreserved seats in both the forward and rear ends for the convenience of those traveling with ladies, or others, who wish to enjoy an occasional smoke. The train usually carries from 260 to 290 passengers."

MUST PAY THEIR WAY.—Inasmuch as in two years of government operation the taxpayers have paid $700,000,000 in deficits, the increase will undoubtedly be necessary. When the railroad are returned the economies which the government has instituted should and doubtless will be retained; but the economies private operation may introduce, mostly in the line of increased efficiency, will not be great. They certainly will not be sufficient to save $1,000,000 a day. But this will be accomplished because it must be; the railroads will be given enough revenue to pay their way. The people who ride on the railroads and ship by the railroads will pay the expenses of the railroads. They should pay these expenses. The general public should not be called upon to pay, in taxes, for maintenance of the national transportation system.—*Syracuse (N. Y.) Post-Standard.*

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1920

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	141	$162,994	$70,488	$296,302	$40,919	$48,225	$3,993	$105,940	$9,897	$212,164	71.61	$84,139	$12,319	$71,759	$52,015
Alabama Great Southern	312	579,043	175,047	919,017	105,637	203,473	21,090	283,936	20,414	640 889	69.73	278,129	22,136	255,955	95,585
Ann Arbor	301	340,193	53,614	455,984	39,522	86,746	5,474	216,579	11,400	359,720	78.88	96,264	16,700	79,552	36,918
Arizona Eastern	377	273,641	52,761	369,868	48,330	50,499	5,994	114,195	16,003	237,314	64.16	132,554	17,151	115,303	8,159
Atchison, Topeka & Santa Fe	8,663	11,791,631	4,424,039	20,177,970	1,678,004	4,094,190	181,825	5,826,925	261,244	12,015,529	59.54	8,162,441	689,498	7,470,548	5,732,285
Atlanta & West Point	93	126,603	86,758	277,527	41,170	36,572	5,570	101,796	7,514	197,186	71.05	80,341	7,450	72,890	29,333
Atlanta, Birmingham & Atlantic	639	335,676	72,343	523,804	87,736	146,293	13,804	221,814	12,504	483,275	92.07	41,529	16,000	25,314	170,334
Atlantic City	177	112,011	118,160	260,865	40,970	25,824	954	182,347	823	251,027	96.22	9,838	11,603	—1,770	38,940
Atlantic Coast Line	4,886	4,289,414	1,397,925	6,820,140	821,232	1,256,243	90,529	2,803,746	132,123	5,154,451	75.57	1,665,689	200,000	1,464,785	142,720
Baltimore & Ohio Chicago Terminal	90	.....	.....	214,879	13,405	36,247	1,258	163,652	8,022	226,639	105.47	—11,760	26,542	—38,303	120,701
Baltimore & Ohio	5,151	12,341,182	2,098,762	17,343,668	1,548,788	5,275,709	192,902	8,373,720	387,873	15,879,089	91.55	1,464,579	476,397	979,260	2,566,544
Baltimore, Ches. & Atlantic	87	30,980	12,223	60,009	8,676	33,133	898	52,501	3,579	98,787	164.62	38,778	3,700	—42,478	39,453
Bangor & Aroostook	632	417,614	79,899	591,175	69,154	143,859	3,405	210,608	11,755	445,296	75.32	145,883	24,599	121,284	89,173
Beaumont Sour Lake & Western	118	101,284	28,689	142,937	46,389	21,585	2,146	50,753	4,481	125,344	87.69	17,593	2,350	15,239	—3,505
Belt R. R. of Chicago	31	.....	.....	419,787	32,925	69,144	314	263,733	7,577	373,693	89.01	46,094	15,682	30,411	80,039
Bessemer & Lake Erie	217	555,020	34,742	639,349	65,242	327,431	10,968	296,190	25,933	731,773	114.45	—92,424	13,900	—106,337	—40,998
Bingham & Garfield	36	147,229	1,845	152,151	33,418	39,912	1,588	38,244	3,165	119,125	78.29	33,026	7,425	25,601	16,880
Birmingham Southern	26	23,885	.....	35,148	4,250	6,302	899	24,990	3,303	39,744	113.07	—4,596	1,754	—6,360	—27,769
Boston & Maine	2,258	4,102,181	1,631,876	6,778,276	623,231	1,575,772	50,963	3,916,462	192,250	6,368,579	93.95	409,697	214,036	192,436	345,207
Brooklyn Eastern District Terminal	10	84,079	.....	92,029	35,457	48,424	.....	59,817	3,761	147,459	160.23	—55,431	5,943	—61,374	—8,475
Buffalo & Susquehanna	296	210,405	6,914	226,498	29,206	108,136	2,865	91,140	7,968	239,314	105.66	—12,815	3,350	—16,165	2,627
Buffalo, Rochester & Pittsburgh	589	1,110,536	128,184	1,322,703	193,826	504,118	13,202	679,715	31,724	1,425,019	107.74	—102,316	25,000	—127,950	—47,849
Canadian Pacific Lines in Maine	233	279,806	65,956	357,395	26,975	75,521	2,877	258,950	3,680	368,004	102.96	—10,609	12,200	—22,809	41,587
Carolina Clinchfield & Ohio	282	551,472	32,278	616,786	80,426	197,146	4,460	190,205	14,980	486,963	78 95	129,823	13,500	116,282	18,491
Central New England	301	471,631	24,665	531,711	110,447	199,849	2,779	333,323	15,389	661,909	124.48	—130,198	17,800	—148,002	—117,788
Central of Georgia	1,918	1,296,970	539,050	2,411,343	360,798	429,572	51,597	895,826	63,824	1,808,202	74.98	603,140	70,223	532,786	529,522
Central Vermont	411	343,651	89,234	536,502	54,004	134,800	11,750	363,708	17,890	584,674	108.97	—48,173	—17,400	—65,589	27,064
Charleston & Western Carolina	342	211,886	54,652	278,921	58,062	86,181	571	141,022	262	286,097	102.57	—7,176	8,500	—15,676	—22,731
Chesapeake & Ohio	2,516	4,816,260	767,321	6,420,510	697,485	1,741,611	40,848	2,706,013	114,422	5,331,962	83.04	1,088,548	189,810	898,405	—17,042
Chicago & Alton	1,050	1,526,661	471,563	2,541,179	230,961	720,636	23,686	1,138 904	50,656	2,177,539	85.69	363,641	59,270	304,102	185,722
Chicago & Eastern Illinois	1,131	1,710,974	416,568	2,932,418	241,270	760,595	18,210	1,032,340	48,427	2,110,442	91.96	821,976	85,000	736,866	803,515
Chicago & Erie	269	752,189	60,738	998,352	66,081	175,249	13,866	573,534	26,842	858,652	86.00	139,699	35,000	104,640	27,414
Chicago & Northwestern	8,090	7,567,844	2,774,912	13,093,062	1,485,109	3,007,466	84,200	6,726,877	273,783	11,674,776	89.16	1,418,286	578,443	838,549	758,040
Chicago, Burlington & Quincy	9,371	10,076,088	2,708,816	16,570,348	1,189,627	2,847,866	90,399	6,301,552	337,673	10,898,246	65.76	5,672,102	545,361	5,124,227	3,202,261
Chicago Great Western	1,496	1,320,195	474,295	2,257,561	222,729	488,949	28,247	1,014,002	51,612	1,820,215	80.62	437,346	54,866	382,555	338,599
Chicago, Indianapolis & Louisville	654	799,898	224,159	1,312,817	120,747	342,868	20,843	502,841	27,449	1,027,493	78.26	285,324	47,477	237,826	173,775
Chicago Junction	12	.....	.....	348,065	36,923	54,362	323	293,018	6,536	391,161	112.38	—43,097	2,876	—45,973	61,179
Chicago, Milwaukee & St. Paul	10,628	8,794,030	2,267,079	14,533,591	1,629,568	3,337,190	94,806	6,933,011	373,130	12,441,383	85.60	2,092,208	480,240	1,590,363	2,127,905
Chicago, Peoria & St. Louis	247	148,514	25,859	201,953	31,791	79,072	1,238	95 269	2,420	209 762	103.86	—7,809	6,100	—13,909	53,851
Chicago, Rock Island & Gulf	463	428,117	111,625	661,043	88,001	107,032	7,337	212,308	12,407	428,045	64.75	232,998	14,017	218,903	237,477
Chicago, Rock Island & Pacific	7,595	7,166,629	2,532,999	12,344,566	1,736,307	2,371,613	110,312	5,097,074	209,391	9,535,259	51.97	2,809,308	382,032	2,426.348	2,724,263
Chicago, St. Paul, Minn. & Omaha	1,749	1,725,710	647,966	2,910,425	226,409	434,391	18,342	1,296,288	64,077	2,054,078	70.58	856,347	121,976	734,050	374 247
Chicago, Terre Haute & St. Eastern	374	388,999	22,651	437,160	40,294	131,784	3,670	208 388	9,764	396,089	90.61	41,072	18,000	23,072	63,071
Cincinnati, Lebanon & Northern	76	50,476	7,882	76,576	13,732	27,259	1,534	60,848	932	104,306	136.21	—27,729	6,486	—34,218	27,443
Cinc., Indianapolis & Western	321	232,759	49,314	376,156	47,534	123,812	5,857	172,256	14,719	365,122	97.06	11,034	11,010	18	75,708
Cinc., New Orleans & Texas Pacific	337	1,104,986	335,280	1,756,312	182,796	353,285	37,106	651,944	37,063	1,278.694	72.80	477.618	34,000	443,459	43.710
Cincinnati Northern	251	163,377	20.188	224,918	22,509	57,742	2,534	106,234	3,883	192,881	85.75	32,037	9,615	22,422	—9,423
Cleveland, Cincinnati, Chic. & St. Louis	2,408	4,421,736	1,341,211	7,377,259	496,253	1,479,839	88,571	2,990,658	116,187	5,227,343	70.85	2,149,917	150,308	1,998,541	1,445.138
Colorado & Southern	1,099	806,316	192,006	1,222,633	110,041	270,953	8,527	447,262	32,372	876,115	71.65	346,518	50,989	295,017	78,450
Colorado & Wyoming	43	11,425	671	47,877	7,569	12,448	326	24,367	3,842	48.553	99.33	323	5,000	—4,677	—17,485
Cumberland Valley	163	335,219	74,697	483,149	50,958	115,551	9,000	177,644	11,974	365,791	75.70	117,359	5,541	111,818	38,444
Delaware & Hudson	875	2,365,822	227,514	2,771,965	310,474	931,352	16,482	1,536,185	109,674	2,930,192	105.70	—158.227	78,000	—236,282	—94,778
Delaware, Lackawanna & Western	956	4,244,540	941,593	5,892,885	510 512	1,439,328	64,746	3,078,451	119,083	5,276,178	89.53	616,706	287,500	328,205	—650,070
Denver & Rio Grande	2,585	2,456,067	518,467	3,420,842	248,997	719,558	248,997	719,558	20.615	1,137,961	33.27	71,812	2,238,426	1,067,114	652,169
Denver & Salt Lake	255	210,982	26,864	245,671	74,194	125,901	969	153,352	5,506	359,922	146.50	114,251	10,583	—124,837	1.088
Detroit & Mackinac	376	69,223	37,618	118,313	26,341	40,553	2,642	77,330	6,936	153,773	129.97	—35,461	7,734	—43,194	15,172
Detroit & Toledo Shore Line	61	186,452	.....	186,360	12,669	23,023	1,548	79,875	5,555	122.670	65.82	63,690	7,900	55,659	51,914
Detroit, Toledo & Ironton	454	322,194	12,892	351,381	58,480	83,779	3,367	237,055	13,666	396,381	112.80	—45,000	9,041	—54,299	2,521
Duluth & Iron Range	292	72,328	23,748	127,723	51,225	98,094	427	132,297	11,960	294,737	230.76	—167,014	6,307	—173,383	3,080
Duluth, Missabe & Northern	407	61,490	41,966	144,692	102,826	173,147	2,076	182,931	16,571	479,177	331.17	—334.486	8,582	—343,067	—65,221
Duluth, South Shore & Atlantic	614	209,200	102,451	467,767	67,664	111,499	5,698	299,473	10,911	502,159	107.35	—34,392	20,500	—54,947	—31,428
Duluth, Winnipeg & Pacific	178	150,424	30,669	184,455	17,511	38,625	1,971	93,181	7,977	159,265	86.34	25,189	10,128	15,061	—4,963
East St. Louis Connecting	3	.....	.....	115,385	11,594	43,913	286	95,708	3,454	154,956	134.29	—39,571	2,000	—41,571	11,481
El Paso & Southwestern	1,027	918,089	237,908	1,350,835	216,133	234,578	9,756	324,258	28,169	822,721	60.90	528,114	60,415	467,583	168,692
Elgin, Joliet & Eastern	832	1,448,492	1	1,740,539	127,216	443,612	6,644	749,502	26,581	1,353,551	77.76	386,988	51,839	335,149	—158,825
Erie	1,989	5,917,668	962,248	8,193,917	880,760	2,813,615	70,668	4,433,176	218.612	8,473,756	103.42	—279,839	282,750	—575,300	104,302
Florida East Coast	764	633,238	443,479	1,189,954	121,844	171,615	12,432	430,747	21,929	768,828	64.60	421,126	39.184	381,839	223,542
Fonda, Johnstown & Gloversville	88	30,298	72,590	108,522	11,536	9,736	414	42,184	5,472	69,343	63.89	39,178	4,900	34,279	9,008

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation	Railway tax accruals.	Operating income (or loss)	Increase (or decr.) comp. with last year
					Maintenance of—										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total					
Ft. Smith Western	253	$112,850	$32,033	$154,496	$34,492	$36,146	$4,146	$69,969	$6,589	$152,817	98.91	$1,617	$5,000	—$3,394	—$9,327
Ft. Worth & Denver City	454	627,218	331,853	1,101,038	124,187	212,881	4,917	444,840	29,315	819,384	74.41	281,653	21,900	259,454	115,629
Ft. Worth & Rio Grande	235	98,769	66,313	185,532	36,809	25,126	2,318	88,213	6,934	159,399	85.91	26,133	3,785	22,349	48,924
Galveston, Harrisburg & San Antonio	1,381	1,407,454	442,986	2,125,560	301,264	447,384	24,211	780,089	42,754	1,625,470	76.47	500,090	61,324	436,937	67,478
Galveston Wharf	13	.....	.....	88,287	27,032	1,759	168	44,106	1,354	86,983	98.52	1,304	12,200	—10,896	—22,811
Georgia	328	299,761	141,966	484,604	70,277	129,011	7,204	298,048	14,314	519,088	107.11	—34,484	5,950	—40,442	—172,279
Georgia & Florida	405	62,412	22,722	114,133	61,291	21,968	2,357	78,765	6,535	170,917	149.75	—56,784	6,000	—62,784	—42,516
Georgia Southern & Florida	402	263,100	183,816	561,919	73,809	105,594	9,262	222,624	12,915	428,123	76.18	133,795	17,500	115,357	—72,918
Grand Rapids & Indiana	569	480,159	156,452	835,112	69,577	191,811	9,436	402,382	22,140	696,057	83.34	139,056	40,111	98,939	194,732
Grand Trunk Western	1,021	1,380,709	280,088	1,842,010	196,290	528,812	27,753	1,130,772	63,730	1,952,544	106.00	—110,534	52,803	—163,444	—255,149
Grand Trunk Lines in New England	172	266,021	29,310	343,166	62,938	52,973	2,635	173,625	19,198	336,828	98.15	6,338	12,699	—6,362	143,229
Great Northern	8,176	5,528,374	1,431,797	10,151,936	1,360,158	2,001,372	54,612	4,237,960	156,196	7,903,964	77.95	2,247,972	646,617	1,600,410	663,703
Gulf & Ship Island	307	179,047	44,096	273,119	64,413	52,242	7,131	102,338	9,739	236,319	86.52	36,801	11,861	24,903	41,388
Gulf, Colorado & Santa Fe	1,937	1,617,551	540,381	2,591,020	409,938	401,949	20,468	910,320	56,977	1,785,317	68.90	805,702	85,918	719,680	505,864
Gulf, Mobile & Northern	467	201,738	54,908	327,688	80,888	66,706	6,328	133,691	9,643	297,254	90.71	30,434	11,736	18,333	34,317
Hocking Valley	350	970,918	98,255	1,164,606	107,360	362,986	8,311	457,869	25,704	962,212	82.62	202,394	57,622	144,772	431,626
Houston & Texas Central	847	658,882	228,233	1,073,262	162,354	178,682	6,559	373,271	23,695	744,561	69.37	333,700	37,685	295,449	218,494
Houston, East & West Texas	190	131,220	46,759	217,179	44,708	39,943	2,976	98,500	6,749	192,875	88.80	24,303	7,570	16,234	—37,627
Illinois Central	4,800	7,790,181	2,135,428	12,255,892	1,669,533	2,776,269	79,114	4,667,352	229,106	9,507,261	77.57	2,748,631	503,670	2,243,036	2,365,470
Indiana Harbor Belt	120	.....	.....	654,496	127,854	127,410	1,935	519,528	17,208	793,935	121.30	—139,439	10,101	—149,543	—181,130
International & Great Northern	1,159	1,113,348	285,841	1,728,576	295,578	374,875	15,412	667,399	43,555	1,405,418	81.30	323,158	32,500	290,303	297,322
Kanawha & Michigan	176	282,158	47,842	339,985	53,513	153,784	2,876	144,715	13,557	368,445	108.37	—28,460	25,000	—53,461	55,471
Kansas City, Mexico & Orient	272	107,532	19,453	149,575	40,996	51,695	2,073	86,994	8,294	190,051	127.06	—40,476	7,715	—48,224	43,973
Kansas City, Mexico & Orient of Texas	465	99,440	26,465	159,499	37,058	54,716	1,431	81,367	9,052	183,623	115.12	—24,124	6,250	—30,475	54,382
Kansas City Southern	774	983,026	238,688	1,498,996	179,717	318,649	33,941	549,781	43,477	1,124,771	75.03	374,225	54,570	319,478	205,948
Kansas City Terminal	27	.....	.....	126,819	18,718	34,953	.....	79,734	1,866	138,807	109.40	—11,988	34,271	—46,259	—26,188
Lake Erie & Western	902	746,010	61,201	933,496	79,948	267,311	16,265	419,807	23,776	807,107	86.46	126,390	51,001	75,359	140,608
Lake Superior & Ishpening	34	5,932	271	7,418	19,267	17,329	171	10,528	2,297	49,592	668.53	—42,174	3,872	—46,046	—6,076
Lake Terminal	12	.....	87,006	89,792	14,759	19,517	.....	65,562	35	99,802	111.14	—10,010	5,767	—15,777	—26,678
Lehigh & Hudson River	96	181,037	3,763	197,500	25,001	48,635	2,033	106,449	6,233	188,351	95.36	9,149	8,562	586	1,053
Lehigh & New England	232	349,751	1,833	368,360	30,725	86,445	10,068	128,885	9,204	265,103	71.97	103,257	10,860	92,397	25,276
Lehigh Valley	1,435	4,320,458	503,254	5,487,477	759,992	1,729,318	39,384	3,075,012	101,587	5,725,639	104.34	—238,162	176,000	—414,790	—544,507
Long Island	398	524,721	889,303	1,656,572	226,779	374,733	13,309	1,100,455	50,801	1,779,208	107.40	—122,636	104,059	—226,748	—25,301
Los Angeles & Salt Lake	1,168	914,986	451,533	1,631,856	150,944	317,059	19,491	581,790	31,219	1,146,480	70.25	485,376	79,016	406,308	117,235
Louisiana & Arkansas	302	234,401	51,630	318,052	38,718	46,455	4,592	104,605	6,488	200,858	63.15	117,194	12,843	104,349	112,675
Louisiana Western	207	307,276	119,849	480,676	68,168	77,242	4,656	100,733	11,348	264,460	55.02	216,215	19,795	196,388	93,654
Louisville & Nashville	5,040	6,496,964	1,945,353	10,269,715	1,446,264	2,579,036	176,899	4,347,591	208,690	8,812,907	85.81	1,456,808	250,141	1,206,012	704,875
Louisville, Henderson & St. Louis	199	151,189	57,433	251,342	34,841	37,381	4,208	99,051	8,127	183,609	73.05	67,733	5,000	62,730	16,029
Maine Central	1,216	1,033,658	324,880	1,604,346	193,906	384,633	10,275	920,471	39,869	1,549,158	96.55	55,188	82,742	—27,682	156,902
Maryland, Delaware & Virginia	82	26,116	11,136	45,255	7,164	25,997	352	48,282	2,115	83,909	185.41	—38,654	2,000	—40,654	38,686
Michigan Central	1,862	4,394,727	1,264,394	6,979,258	662,213	1,559,517	79,163	3,085,175	122,512	5,613,704	80.43	1,365,554	250,000	1,115,055	—28,906
Midland Valley	388	248,784	97,294	385,988	75,076	67,190	3,748	166,938	13,600	326,551	84.60	59,436	7,183	52,067	24,658
Mineral Range	101	55,374	340	56,810	15,377	22,892	319	34,923	968	74,479	131.10	—17,668	3,600	—21,268	—31,478
Minneapolis & St. Louis	1,646	990,138	228,085	1,502,750	116,184	332,615	11,126	691,300	29,874	1,181,238	78.61	321,512	56,194	265,254	499,615
Minneapolis, St. Paul & Sault Ste Marie	4,243	2,465,657	634,815	3,492,202	519,765	744,704	29,003	1,795,185	77,785	3,182,942	91.14	309,260	358,743	—49,487	—427,430
Minnesota & International	194	62,387	30,321	97,327	8,954	17,757	533	51,815	3,542	82,600	84.86	14,727	4,862	9,847	15,972
Mississippi Central	164	36,420	21,766	75,815	32,134	34,652	2,243	49,148	7,585	125,762	165.88	—49,947	3,917	—53,976	—37,085
Missouri & North Arkansas	365	87,010	43,365	167,544	55,534	38,855	3,152	80,495	8,355	186,390	111.24	—18,846	6,242	—25,062	32,986
Missouri, Kansas & Texas	1,713	2,023,083	763,636	3,473,958	467,755	941,070	34,400	1,235,482	84,244	2,778,658	79.98	695,300	108,840	586,041	625,564
Missouri, Kansas & Texas, of Texas	1,796	1,257,492	800,529	2,584,698	522,133	570,860	29,299	1,550,118	75,082	2,770,887	107.20	—186,189	59,461	—246,498	—84,076
Missouri, Oklahoma & Gulf	329	135,777	22,589	174,085	55,340	79,792	1,784	113,506	10,772	261,428	150.17	—87,343	18,466	—105,931	—33,580
Missouri Pacific	7,299	6,533,073	1,686,757	10,495,227	1,512,321	2,161,254	104,393	3,945,930	229,659	7,988,087	76.11	2,507,140	333,291	2,170,781	2,531,194
Mobile & Ohio	997	1,137,191	188,977	1,590,718	267,719	470,900	35,219	729,129	44,909	1,548,896	97.37	41,822	50,000	—8,260	81,048
Monongahela	108	259,905	21,852	293,970	56,966	70,868	1,071	164,767	6,551	300,223	102.13	6,253	5,000	—11,253	—81,466
Monongahela Connecting	6	.....	.....	224,329	24,377	26,403	519	106,859	5,111	163,269	72.78	61,060	2,200	58,860	99,642
Montour R. R.	56	78,341	1,328	80,011	19,013	36,593	1,191	35,153	6,734	99,138	123.90	—19,127	2,431	—21,557	11,316
Morgan's, Louisiana & Texas	400	590,896	186,813	902,925	62,783	124,868	8,806	276,736	21,658	497,193	55.07	405,732	36,543	368,816	273,755
Nashville, Chattanooga & St. Louis	1,247	1,207,341	468,695	2,154,691	249,313	524,382	68,689	835,327	46,991	1,739,304	80.72	415,387	46,000	368,709	543,019
Nevada Northern	168	155,491	8,862	169,477	20,513	29,494	1,140	44,057	5,780	101,128	59.67	68,349	9,267	59,082	—5,047
New Jersey & New York	47	16,704	76,172	108,999	8,877	18,825	238	61,491	2,388	91,818	84.23	17,180	3,800	13,378	24,206
New Orleans & Northeastern	399	496,954	94,916	730,236	116,564	139,939	13,952	245,165	16,375	536,239	73.43	193,998	29,123	164,516	115,957
New Orleans, Great Northern	284	155,478	38,496	202,873	42,328	46,149	1,926	88,750	7,669	187,208	92.27	15,664	11,000	4,645	—8,739
New Orleans, Texas & Mexico	191	101,535	39,041	172,446	50,986	34,403	4,372	66,712	6,630	163,693	94.92	8,753	11,000	—2,274	44,336
New York Central	6,072	15,722,220	6,337,397	30,197,292	2,318,967	6,164,191	240,449	13,685,990	640,597	23,471,604	77.72	6,725,687	1,044,051	5,680,450	2,417,136
New York, Chicago & St. Louis	574	1,981,336	71,418	2,193,657	192,310	401,304	33,243	1,093,446	55,291	1,780,136	81.14	413,521	60,000	351,777	874
New York, New Haven & Hartford	1,965	4,330,255	3,679,779	10,313,075	1,133,552	2,277,817	41,654	5,129,244	302,040	9,045,396	87.70	1,267,679	315,000	951,233	1,534,459
N. Y., Ontario & Western	569	481,891	100,176	735,167	137,773	229,941	8,637	506,156	23,027	905,564	123.17	—170,397	27,500	—197,897	—128,865
New York, Philadelphia & Norfolk	121	429,256	96,400	580,493	54,340	175,684	14,278	345,713	12,729	618,926	106.62	—38,433	19,451	—57,894	—169,412
N. Y. Susquehanna & Western	135	212,916	60,670	331,178	43,003	89,968	1,324	267,841	8,013	410,149	123.84	—78,971	34,587	—116,530	—142,638
Newburgh & South Shore	7	.....	.....	127,269	14,221	27,584	.....	74,435	3,862	120,100	94.36	7,169	8,293	—1,124	—2,969
Norfolk & Western	2,203	5,456,844	690,859	6,835,195	747,339	2,276,604	50,681	2,787,690	118,226	6,016,855	88.03	818,340	285,000	533,198	—58,987

Traffic News

Protection of potatoes from cold is the subject of Farmers' Bulletin No. 1091, just issued by the United States Department of Agriculture. This is a pamphlet of 26 pages profusely illustrated with drawings to show the proper methods of packing potatoes, of fixing board linings in cars and of keeping cars warm by means of stoves in winter.

Passenger mileage—number of passengers carried one mile—on the railroads under federal control during 1919 was 46,145,070,641, as compared with 42,645,969,083 in 1918, an increase of 8.2 per cent, according to the report of the Operating Statistics Section of the Railroad Administration. For December the passenger mileage was 3,789,660,400, an increase of 4.7 per cent as compared with December, 1918.

The Five Ports Association, an organization of business men formed to promote the commercial interests of Wilmington, N. C.; Charleston, S. C.; Savannah, Ga.; Brunswick, Ga., and Jacksonville, Fla., is planning an excursion, to start on May 15 from Columbia, S. C., to advertise these southern cities in the middle west. A. V. Snell, president of the Association of Commercial Secretaries of South Carolina, Columbia, is planning the details of the trip. Enough men will go to fill a train of about eight or ten cars. The itinerary covers sixteen days and will take the party to Cincinnati, Cleveland, Toledo, Detroit, Chicago, Davenport, Rock Island, Moline, Kansas City, St. Louis, Indianapolis, Louisville, Nashville, Chattanooga and Atlanta.

"Shippers' Conference Committee of Greater New York" is the name adopted by representatives of 100 or more leading merchants and manufacturers who have formed an organization for the discussion of traffic matters, with the intention of holding meetings in the rooms of the Merchants' Association, in the Woolworth Building, on the second Tuesday of each month. Following are the officers of the committee: Chairman, T. T. Harkrader, traffic manager American Tobacco Company; vice-chairman, W. J. L. Benham, general traffic manager Otis Elevator Company; secretary and treasurer, P. W. Moore, traffic manager Queensboro Chamber of Commerce; board of governors, Paul Ripley, traffic manager American Sugar Refining Company; J. C. Lincoln, manager, traffic bureau Merchants' Association, and Philip Croxton, traffic manager P. Lorillard & Co.

The Southern Railway is encouraging the growing of live stock by assisting farmers in improving their herds (through the Live Stock Department) by giving special attention to the provision of loading and feeding facilities for cattle shipped to market. The Development Service has named H. C. Bates, C. W. Humphrey, J. D. Moore, and C. C. Prescott as agents to cover the entire Southern territory, working under the direction of General Agricultural Agent R. Turner, Atlanta, Ga. The Live Stock (transportation) Department now watches every detail of service carefully. Executive General Agent E. C. Gatewood has appointed N. Moore, assistant general agent, Rectortown, Va.; F. L. Word, general live stock agent, Atlanta, Ga.; V. A. Slaughter, live stock claim agent, Washington, D. C.; C. L. Shepherd, Alexandria, Va.; J. W. Houston, Birmingham, Ala.; and R. S. Taylor, Cincinnati, Ohio, live stock route agents; R. L. Humphrey, chief veterinary surgeon, Rectortown, Va.; F. R. Butz, assistant chief veterinary surgeon, Cincinnati, Ohio.

Freight Traffic Movement and Car Performance

Railroads under federal control during the month of January moved 34,769,722,000 ton miles of revenue and non-revenue freight, an increase of 14.5 per cent as compared with January, 1919, according to the monthly report of the Operating Statistics Section of the Railroad Administration. The net ton miles per mile of road per day averaged 48.66 as compared with 42.58. The train miles increased 10.9 per cent and the car miles 9.4 per cent, while the net ton miles per loaded car mile decreased from 28.9 to 28.3 and the car miles per car day increased from 21.4 to 22.8. The net ton miles per train mile increased from 625 to 646 and the net ton miles per car day from 409 to 457. Increases in total net ton mileage were shown in all regions. For the Southern region the increase was 31.3 per cent and for the Ohio-Indiana district is was 38.4 per cent.

Boston-Pittsburgh Expresses

The New York, New Haven & Hartford and the Pennsylvania are going to put on a new train between New England and the west by way of the Hellgate bridge and the Pennsylvania station, New York. Beginning March 28 the "Pittsburgh Express" will leave Boston at 1:30 p. m., and being combined at Philadelphia, at 10:25 p. m., with train No. 19, will arrive in Pittsburgh at 8:12 a. m. Eastbound, the "New England Express" will leave Pittsburgh at 3:10 p. m. (existing train No. 46) and will reach Boston at 9 a. m. Connections will be made at New Haven to and from Hartford and Springfield. Also, a new day express will be run from Philadelphia to New Haven, leaving at 8:30 a. m., and arriving at 1 p. m. A new night train from Boston to Philadelphia will leave at 11 p. m., taking the sleeping cars which at present go on the Federal express at 7:30 p. m. The new train will arrive at Philadelphia at 7:50 a. m. It will have sleeping care from Boston and from Providence.

A train between Boston and the west by this route was started in November, 1917; but in January, 1918, this train (with many others) was taken off because of war-time conditions.

Anthracite Shipments

The shipments of anthracite for February, 1920, as reported to the Anthracite Bureau of Information at Philadelphia were 4,913,664 tons, as compared with 5,713,319 tons in the preceding month, and with 3,871,932 tons shipped during February last year, which has the distinction of being the smallest monthly shipment of anthracite for the past eighteen years, with the exception of the strike period. Total shipments for eleven months ending February 29, were 63,737,213 tons, as compared with 67,728,849 tons in the eleven months ending February 28, 1919.

The shipments by carriers were as follows:

	February, 1920	February, 1919	Coal Year, 1919-1920	Coal Year, 1918-1919
P. & R.	1,038,303	725,809	12,934,447	13,339,828
L. V.	928,208	643,551	11,628,611	12,586,368
C. R. R. of N. J.	408,052	334,697	5,720,217	5,928,059
D. L. & W.	827,172	597,604	9,871,581	10,233,528
D. & H.	455,003	629,929	7,137,786	8,162,731
Penna.	394,366	273,031	4,545,955	4,755,812
Erie	491,608	371,033	6,929,201	7,588,336
N. Y. O. & W.	135,957	108,029	1,840,232	1,749,351
L. & N. E.	234,995	188,249	3,129,183	3,384,836
	4,913,664	3,871,932	63,737,213	67,728,849

Off Line Agencies in Chicago

Except for the Chicago & North Western and the Minneapolis, St. Paul & Sault Ste. Marie, the railroads which have united in the consolidated ticket offices at Chicago will continue to use the consolidated offices temporarily. The Chicago & North Western, on March 1, re-opened its offices at South Clark and West Adams streets which it occupied prior to the creation of the consolidated office. The Minneapolis, St. Paul & Sault Ste. Marie has re-opened its old offices at 140 South Clark street.

Among the roads not reaching Chicago directly, the Union Pacific has opened offices in the Garland building, with R. R. Robertson and George R. Bierman in charge respectively of the freight traffic and the passenger departments. The Delaware, Lackawanna & Western has opened a general western freight and passenger office at 111 West Jackson boulevard, with C. C. Barrett, passenger, and H. J. Graham, freight agent in charge. The Atlanta, Birmingham & Atlantic has re-established its Chicago office in the Harris Trust building in charge of H. J. Hanson, commercial agent. The Southern has relocated its commercial freight office at Chicago in the Southern Pacific building. Pending office improvements, temporary quarters have been established in the Majestic hotel. The St. Louis-Southwestern has re-opened its office in Chicago, with M. W. Christopher, general passenger agent in charge. Temporary offices will be in the Royal building until after May 1, when permanent offices will be in the National Life Insurance building.

National Industrial Traffic League

The Spring meeting of the National Industrial League will be held at St. Louis, Mo., on March 18 and 19. Two business sessions will be held. The following is the docket, in part, of the subjects to be discussed:

Report of Executive Committee:
- Report of executive secretary on railroad legislation.
- Cash settlement of freight charges under section 405 of transportation act.
- Provisions for changes in state and interstate rates and fares in effect February 29, 1920, under Section 208 (A) of transportation act.
- Inland waterway committee's report for annual meeting approved by executive committee with modifications.
- Reparation claims arising during period of Federal control.
- Appointment of standing committee on highway transportation.
- Resolutions.

Report of Freight Claims Committee:
- Liability of public warehouses on shipments damaged by fire
- Filing claims for loss or damage after expiration of six months' period provided in Section 3 of uniform bill of lading.

Report of Committee on Diversion and Reconsignment:
- Diversion and reconsignment rules 10, 11 and 12.
- Second reconsignment in case of bona fide refusal or of insolvency of consignee.
- Interpretations of diversion and reconsignment rules.

Report of Committee on Export and Import Traffic:
- Demurrage and storage charges at seaboard on export traffic.
- Three per cent war tax on transportation charges.
- Proposed storage charges on export freight at Philadelphia.
- Unification of terms used in export traffic.
- Traffic Circular No. 1 issued by United States Shipping Board.
- Export vs. domestic rates.
- H. R. 9823 relative to American merchant marine.
- Ship mortgage bill—H. R. 8873 and 9419.
- Through bills of lading.

Report of Express Committee:
- Consolidated express companies.
- Proposed advance in express rates.
- Failure of wagon service.
- Credit arrangements.
- Periods of limitation.
- Adams and Southern express companies' claims.
- Period for filing of claims.
- Proposed form for reporting concealed loss and damage express claims.
- Pro rata settlement of claims for partial loss.
- New system of express waybills and receipts.
- Parcel post.

Report of legislative committee:
- Liability of telegraph companies.
- Iten Biscuit Co. case involving question of reparation.
- Prohibiting issue of attachment, etc., for one year—House Bill No. 10,368.

Reduced Rate Order No. 1

The Interstate Commerce Commission has issued Reduced Rate Order No. 1 prescribing regulations under which carriers are to apply for the approval of the commission for changes in their tariffs which result in either a reduction of charges to shippers or of the revenues of the carriers. The new law prohibits such reductions without the approval of the commission during the six months guaranty period, and the regulations are somwhat similar to those formerly prescribed when carriers were prohibited from filing a tariff containing an increased rate without the approval of the commission.

Applications must show the rates, fares, charges and classification which it is proposed to reduce, including rules or regulations affecting charges, as well as the nature and extent of the reductions, the way in which they are to be effected, and the proposed rates, etc., of which approval is sought, and must also contain a complete and accurate statement of the reasons claimed to justify the reductions sought. If it is proposed to reduce a large number of rates, fares, etc., by a uniform specific amount or percentage, the application, instead of showing each specific change, may show the present and proposed rates, fares, etc., between typical points and state the amount or per cent.

Express Company Asks Increased Rates

The American Railway Express Company in a petition filed with the Interstate Commerce Commission on March 13 proposed an increase in express rates ranging from 10 to 75 per cent, the higher increase being proposed for Zone 1, which corresponds in a general way to Official Classification territory. To put the express rates on a proper basis, the petition said, would require an increase in the haulage charge of 75 per cent in Zone 1, 50 per cent in the other zones, 60 per cent in the inter-zone rates between Zone 1 and the other zones and 50 per cent in the inter-zone rates between the other zones; also an increase in the original combined terminal charge from 45 cents to 60 cents except in Zone 4; also an increase in commodity rates of 25 per cent over the present rates in Zone 1, 10 per cent in the other zones and 15 per cent between Zone 1 and the other zones. The 60 cent combined terminal charge, the petition said, should be divided 35 cents between the express terminal charge and 25 cents for the railway terminal charge.

Express rates have been increased since September, 1915, the petition said, by 19 or 20 per cent. The increase made by the director general of railroads in General Order No. 50 amounted to 8 per cent and the increase of 10 per cent allowed by the Interstate Commerce Commission in June, 1918, amounting to $10,000,000 or $12,000,000, had been more than absorbed by increased wages. For the calendar year 1919 the company had an operating deficit of $22,000,000 in spite of the economies resulting from unification, because of the large increases in wages and in the prices of materials and supplies. For the last six months of 1919 the deficit was $15,723,000 and for January and February, 1920, it was proportionately greater. A further increase was declared absolutely necessary to enable any company that might conduct the express business to earn expenses and something over for profit. As illustrating the effect of the introduction of the eight-hour day and the increased rate for overtime allowed by the Railroad Administration, it was stated that whereas before the company had paid less than $50,000 a month for overtime, in December, 1919, its overtime payments had amounted to $1,022,271.

Off-Line Traffic Offices in New York City

Twenty-five or more railroads not running trains to or from New York City have re-established their freight offices, and many of them their passenger offices, and are prepared to do business as before the advent of federal operation.

The Traffic Club Bulletin has issued a list of these offices including street addresses (many of which are temporary and to be abandoned May 1), from which we take the following:

Atchison, Topeka & Santa Fe; C. H. Morehouse, general agent; E. F. Burnett, district passenger agent.

Atlanta, Birmingham & Atlantic; H. G. Benedict, general eastern agent.

Atlanta & West Point, Western of Alabama, and Georgia Railroad; M. M. Ansley, general eastern agent.

Canadian Pacific, Soo Line and Duluth, South Shore & Atlantic; M. S. Throne, general agent, freight department, and F. R. Perry, general agent, passenger department.

Central of Georgia; H. R. McLean, eastern traffic agent.

Chicago, Burlington & Quincy; J. A. Martin, general agent, freight department.

Chicago, Rock Island & Pacific; S. L. Parrott, general agent, freight department.

Denver & Rio Grande; W. C. Connor, Jr., general eastern agent.

Detroit & Cleveland Navigation Company; E. H. MacCracken, acting general eastern agent.

El Paso & Southwestern; B. L. Birkholz, general agent.

Illinois Central; C. R. Phoenix, general eastern agent, and F. S. Bishop, general eastern passenger agent.

International & Great Northern; E. H. Harkrader, district freight and passenger agent.

Kansas City Southern; C. P. Hoch, general agent.

Louisville & Nashville; C. A. Swope, eastern freight agent; Ira F. Schwegel, eastern passenger agent.

Minneapolis & St. Louis; C. E. Harris, general eastern agent.

Missouri, Kansas & Texas; R. S. Fife, general eastern agent, and G. R. Chosbrough, eastern passenger agent.

Missouri Pacific; J. B. Trimble, general agent.

Norfolk & Western; S. M. Stevenson, general eastern agent.

Northern Pacific; T. B. Montgomery, general eastern agent.

Pere Marquette; E. B. Johns, general eastern agent.

St. Louis & San Francisco; W. C. Preston, general eastern agent.

Seaboard Air Line; H. M. Runyon, general eastern freight agent.

Southern Pacific; Wm. Simmons, general freight and passenger agent (Morgan Line); C. M. Evans, assistant general freight and passenger agent; S. C. Chiles, general agent, freight department; A. J. Poston, general agent, passenger department.

Southern Railway and Mobile & Ohio; J. E. Fitzwilson, general eastern freight agent.

Union Pacific; J. B. DeFriest, general agent; I. W. Carter, district passenger agent; H. L. Gardner, passenger agent, and F. N. Wells, freight traffic agent.

Wabash; H. B. McClellan, special traffic representative and L. C. Bostwick, general agent freight department.

Western Maryland; S. J. Lamareux, general eastern agent.

Commission and Court News

United States Supreme Court

United States Supreme Court on Free Passes

In an action for damages by a New York Central engineman for injuries sustained in a rear collision on his employer's railroad, which he averred was caused by the gross negligence of the engineman in failing to look for and heed danger signals, it appeared that the plaintiff had a run between Air Line Junction and Collingwood wholly within the state of Ohio, and he was travelling on a pass good between these two points which contained a release from liability for accidents. He was on his way to Pittsburgh, and intended to pay his fare from Cleveland to Youngstown over the Erie, and to obtain another pass to take him to Pittsburgh. The collision occurred between Toledo and Cleveland. The train had come to a stop at a station and the second section of the train ran past distant and home block signals set against it.

The Supreme Court of the United States affirms a judgment of the Ohio Court of Appeals finding for the plaintiff for the following reasons: The only contract between the New York Central and the plaintiff was the latter's annual pass. That, however, was good only between Air Line Junction and Collingwood, and the company was charged with notice when it issued the pass that the public policy of that state rendered the release upon it valueless. The plaintiff's purpose to continue his journey into Pennsylvania would have been of no avail in securing him transportation over the Erie line to Youngstown; for that he must pay the published fare, and the release on the pass to Collingwood would not have attached to the ticket to Youngstown. The contract between the railroad and the engineman was in writing and for an intrastate journey, and could not be modified by the engineman's purpose to continue his journey into another state, under a contract of carriage with another carrier, or by an intended second contract with the New York Central in terms which were not disclosed. On this point the court agreed with the judgment of the Ohio trial court and disagreed with the Court of Appeals, which latter court considered the journey was an interstate one.

But the Court of Appeals held that the negligence in the case, under the evidence, was wilful and wanton. The Supreme Court of the United States does not weigh the evidence in such cases as this, but it looked into it sufficiently to reject the argument that there was no evidence to support such a finding. "A carrier by rail is liable to a trespasser or to a mere licensee wilfully or wantonly injured by its servants in charge of its train . . . and a sound public policy forbids that a less onerous rule should be applied to passenger injured by like negligence when lawfully upon one of its trains. This much of protection was due the plaintiff as a human being who had intrusted his safety to defendant's keeping."

Mr. Justice Day and Mr. Justice Van Devanter concurred in the decision, although they held that plaintiff was using the pass in an interstate journey and that to such a use of the pass the Ohio law was inapplicable; but they thought that the releasing clause on the pass did not cover his injury, for it resulted from wilful or wanton negligence, as to which such a clause is of no force or effect.—New York Central v. Mahoney. Decided March 1, 1920.

Cannot Choke the Railroads.—We have to have railroads, we have to absorb railroad securities, and have to have good railroad service, and these things cannot be unless the spirit of fairness rules. You cannot choke the railroads and expect them to serve properly the people of the United States.—*Savannah News.*

Commodity Prices Again.—Compared with most articles and services an advance in price in the last six years of 60 per cent is relatively low. The actual railroad rate advance has averaged 33.8 per cent. This is less than the rise in price of probably any other commodity or service in the market.—*Topeka Capital.*

Foreign Railway News

The officers of the International Railway Association are planning for a general meeting of the association at Rome, Italy, in 1921.

London.

Route indicators have been provided on the signals at the entrance to Liverpool Street Station, Great Eastern Railway, London, whereby 65 arms and lamps have been dispensed with.

London.

Jamaica says a news item in the Times (London) Trade Supplement, owing to the high cost of railway construction, is giving attention to the possibility of utilizing road motor transport to provide feeder services to districts which badly need better transport facilities.

London.

Sir Francis H. Dent, general manager of the South Eastern & Chatham, will retire from that position on March 31, 1920, at his own request. He will be succeeded by Mr. Percy C. Tempest, the present chief engineer, who will hold the joint offices of general manager and chief engineer.

London.

The London, Brighton & South Coast, says the Engineer, carried in 1913, 80,000,000 passengers and in 1919, 106,000,000 or over 30 per cent more. The train mileage was however 27 per cent less. After allowing for the 50 per cent increase in passenger fares, there was an increase of 24 per cent in the London and Brighton passenger traffic and of 27 per cent in the London and Eastbourne passenger traffic.

London.

M. Le Trocquer, the new Minister of Public Works appointed by the French President of the Council, M. Millerand, was one of the most efficient of the collaborators of M. Claveille, the former Minister of Public Works. M. Le Trocquer had the reputation of being a "good listener" at the conferences, a small talker and a very hard worker. His great experience and ability will be tested to their utmost in solving one of the most difficult and serious problems in France today, the transportation crisis.

Deficit on English Railways for November, 1919

London.

The Ministry of Transport has issued a return in which it is stated that the financial results for railway operation in November, 1919, showed a loss of £1,347,835.

State to Take Over Control of German Railways

London.

The state, on April 1, will take over the entire German railway system and the whole of the transportation services including road and aerial traffic will be taken in hand and thoroughly reorganized.

Deficit on State Railways of Sweden

London.

Swedish Export states that there has been a loss on the working of the State railways of Sweden during the last few years owing to the high price of coal, and which it has not been possible to make good by a rapid succession of increases in rates. There was a large loss in 1919, but it is expected that there will be a surplus this year because of advances in rates.

Thefts on Prussian Railways

In the course of a statement in the Prussian Diet, Herr Deser, minister of public works, hinted at the necessity of reintroducing a piecework system in the state railway shops. He also stated that during the last year material and tools valued at 5,000,000 marks (about $1,000,000 at normal rates of exchange) were stolen and that during last December 1,700 railwaymen were arrested on charges of theft.

French Railway Rates to Be Raised

London

The Review of the American Chamber of Commerce in France says that the official committee reports rendered to the French Senate declare in favor of the proposed increase in railway rates. In face of the big deficit, the increases recommended are 45 per cent in third-class passenger fares, 50 per cent for second-class, 55 per cent for first-class and 115 per cent in freight rates. The total deficit of the railways has accumulated since the beginning of the war amounts to $700,000,000.

Present Cost Price of Rolling Stock in France

A French paper called the "Journee Industrielle" has recently made a study of the present cost of prices of rolling stock in France. The results of this investigation show that it costs from $4,050 to $5,400 for a box-car, $3,375 to $4,725 for a gondola car, and $2,025 to $2,700 for a flat car. The cost price of a modern passenger car, equipped with the latest improvements, is about $67,500 for a first-class, $43,875 for a second-class and $33,750 for a third-class carriage. The prices noted at given at present rates of exchange.

Railway Material for Roumania

The British Board of Trade Journal in a recent issue quotes the British commercial secretary at Bucharest as advising that firms desiring to sell any of the materials required by the Roumanian State Railways should place themselves in touch with La Direction des Ateliers, Chemins de fer Roumania, Bucharest.

The commercial secretary says that there is little likelihood of business being done by British firms who merely write on such matters, and it is suggested that capable agents should be sent out or local representatives should be employed for the purpose of putting forward their offers of materials to any department of the Roumanian Government.

Extension of the Uganda Railway Authorized

A cablegram to Commerce Reports from the American consul at Nairobi, British East Africa, says that the building of two extensions of the Uganda railway has been authorized by the British Government. The plan is as follows: One meter gage from Nakuru to Mumias, 200 miles, and one-meter gage from Thika to Nveri, 70 miles, sidings, etc., bridges spanning the Thika, Maragua Mathioye, and Moniley Rivers to be 200 feet each, Sergoit and Eldore, 100 feet each; Nzoia, 400, and a considerable number of small bridges averaging 50 feet. The contract has been taken by Griffiths & Co., 3 Central Buildings, Westminster, London, principals of Gailey & Roberts, the Nairobi agents, according to a statement by the latter.

Railway Construction in the Congo

The Belgian Minister for the colonies in a communication to the press, says Vice-Consul Harry Tuck Sherman, Antwerp, in Commerce Reports, included the following as among the projects of his department for the Congo:

About $6,200,000 is to be spent on the improvement of the Katanga Railroad. Bukama, on the Kongo River, the present terminus of the Katanga Railroad, not being accessible to the steamers in all seasons the railroad is to be extended to Kiabo. The first section of the Belgian railroad of Lobito, which will greatly shorten the journey to Katanga and Rhodesia, is about to be laid down. This section will connect Tshilongo (to the northwest of Kambove) with Ruwe, which latter place will be reached before January 1, 1923.

Loss and Damage on French Railways

London.

The Review of the Chamber of Commerce in France says in a recent issue that one of the French railroads reports that its disbursement for losses, delays and damages of merchandise in transit for October, 1919, amounted to $450,000, whereas these figures for the entire year of 1913 were $350,000, by way of comparison. The greatest proportion of the total is the loss from damages caused by rough handling on the quays or in the distributing stations.

The same paper says also that some of the French manufacturers and other persons interested in export trade protested against the new rise in freight rates, made on February 23, and asked to have a special and lower rate accorded on export shipments. Their request was not granted, however

Exports of Car Wheels and Axles in January

The exports of car wheels and axles in January totaled $652,251. This amount was greater than the exports for December but not as large as those for November. The detailed figures as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

Exports of Car Wheels and Axles

Countries		Countries	
France	$259,690	Brazil	5,771
Italy	169,200	Chile	179
England	908	Colombia	16
Canada	57,824	Ecuador	580
Honduras	716	British Guiana	34
Nicaragua	1,534	Peru	2,295
Panama	752	Venezuela	914
Salvador	1,097	China	840
Mexico	11,422	Kwangtung	81,800
Jamaica	383	Hongkong	28
Cuba	40,168	Japan	9,913
French West Indies	49	New Zealand	2,565
Haiti	264	Philippine Islands	1,487
Argentina	4,531		
		Total	$652,251

French Imports and Exports

London.

The American Chamber of Commerce of France in its February 15 bulletin gives a list of the articles imported into France from the United States and exported from France to the United States for the first eleven months of 1919, 1918 and 1913. In this list among the imports are mentioned the following, the values being translated into dollars at the ordinary rate of exchange.

	1919	1918	1913
Machines and machinery	115,800,000	69,654,000	10,786,000
Tools and hardware	50,120,000*	45,890,000	965,000

Corresponding to these are the figures for the exports to the United States from France for the same period, which are as follows:

	1919.	1918.	1913.
Machines and mechanical appliances	200,000	90,800	185,000
Tools and manufactures of metal	200,000	150,000	500,000

*Including the quantities imported to regularize the imports made in 1918 for the government.

Exports of Locomotives in January

The exports of steam locomotives in January numbered 146, valued at $4,159,214, representing a larger total than for any month in 1919 with the single exception of October. Italy, Cuba and Brazil were the largest customers for the month. The detailed figures as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

Exports of Steam Locomotives

Countries	Number	Dollars
Azores and Madeira Islands	3	75,300
Italy	60	2,280,000
Canada	7	16,341
Panama	1	2,085
Mexico	3	32,250
Cuba	36	912,425
Dominican Republic	1	2,216
Argentina	3	21,000
Brazil	24	596,200
Venezuela	1	15,600
China	2	20,000
Dutch East Indies	3	149,520
Philippine Islands	2	36,277
Total	146	4,159,214

Pipe Line for Fuel Oil from Havre to Paris

London.

The "Journee Industrielle," announces that a company called the Compagnie Francaise de Transport des Mazouts et Petroles" has just been organized by the Paris bankers, Dupont and Furland, to construct the proposed pipe line between Havre and Paris for carrying fuel oil. The rapid completion of the pipe line is of the greatest interest on account of the shortage of coal which occurs nearly every winter in Paris due to the fact that the railroads cannot carry all the coal needed and because the boat service on the Seine is almost always stopped by the floods for a long period. Many furnaces have already been transformed in Paris to enable them to use fuel oil for heating and manu-

facturing purposes and it is planned to do this on a very large scale with the advent of the new pipe line. This pipe line will also be able to furnish the Paris, Lyons, Mediterranean Railroad which has been carrying on a series of interesting and successful experiments in connection with equipping locomotives with the American system for burning fuel oil.

Catalogues for Mesoptamian Railways

LONDON.

The Department of Overseas Trade, 35, Old Queen Street, S. W. 1., advises that it has received information to the effect that the Superintendent of Stores, Mesopotamian Railways, in order to facilitate the preparation of demands and also for his general guidance, is desirous of obtaining copies of manufacturers' catalogues dealing with: Locomotives and rolling stock, standard, meter gage and narrow gage; steam and oil pumps of all descriptions; motor rail cars; permanent way material (rails, fastenings, etc.), sectional, wrought-iron, cast-iron and staging tanks, etc.; machinery—workshop, repair and manufactory; heavy and light tools as used on railways; instruments—surveying, mathematical and precision; lights—flare, high-power and ordinary; piping, wrought-iron and fittings; general hardware; cranes—hand and power, stationary and traveling, all purposes; general electrical plant and accessories; engines—stationary and portable, steam and oil; ropeways; conveyors, elevators, etc.; labor saving devices generally. The catalogues should be forwarded directly to the superintendent of stores, Mesoptamian Railways, Makinah, Mesopotamia.

Exports of Cars in January

The exports of freight cars in January numbered 1,724, valued at $3,032,309. Passenger cars exported numbered 16, valued at $205,811 and an item "parts of cars" is given, the total for which was $1,658,439. The detailed figures compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

EXPORTS OF CARS FOR RAILWAYS

	Passenger		Freight and other		For other railways		Parts of Cars.
Countries	Number	Dollars	Number	Dollars	Number	Dollars	Dollars
France			525	1,055,301			951,628
Italy			360	753,760			599,280
Portugal							10,500
Spain							244
England							3,240
Canada	1	1,360	18	26,849	25	41,955	51,228
Guatemala			1	1,079			630
Mexico	1	6,800	23	32,875	29	3,205	2,395
Jamaica							18,700
Other British West Indies			10	2,800			
Cuba	14	197,651	759	1,146,466	87	68,456	3,640
Dominican Republic					116	110,718	
Argentina							3,474
Bolivia					2	2,664	
Brazil					6	2,375	1,431
Peru			6	2,988	70	5,250	
China			12	10,200			
Kwantung							11,760
Philippine Islands					50	12,046	280
Total	16	205,811	1,724	3,032,309	385	246,669	1,658,439

Development of East Persian Railways

Consul E. Verne Richardson, Karachi, India, has sent to Commerce Reports the following extract from a local paper concerning railway development in Persia:

In the course of an interview with His Excellency Shaukat-ul-Mulk, governor of Seistan, who has been making a stay of a few days in Karachi en route for Kerbela, a representative of the Daily Gazette (Karachi) learned that the Quetta-Nushki railway has now been carried forward to Duzdab on the Persian frontier, about 30 miles south of the southwestern point of the Afghan frontier and about 120 miles south and slightly west of Nasratabad (or Seistan), the capital town of the governor's Province. His Excellency is also governor of the Province of Kainat, north of Seistan, and is thus in charge of the greater portion of the Afghan-Persian frontier. He is very optimistic as to the future of Persia and the effect of the Anglo-Persian agreement if the Persians themselves seize their opportunities. He is also convinced of the great possibilities of the extension of trade between India and East Persia as soon as the Nushki railway, which is at present used for purely military purposes, is made available for mercantile traffic. From the present terminus of the line there is a good motor road through Neh and Birjand to Meshed in the extreme north, and another road to Kerman, which is about 210 miles west-northwest of Duzdab.

Asked as to the possibilities of railway development in East Persia, he pointed out the advantages of a line from Duzdab northward near the frontier, which would tap the fertile districts around Herat the granary of Central Asia. Many schemes are being discussed and internal railway development is likely to receive early attention from the ministers.

At present Bombay is the chief entrepôt for trade with East Persia, but His Excellency could see no reason why Karachi merchants should not secure a substantial portion of the anticipiated greatly increased trade. He expressed his willingness at all times to afford any information within his power likely to be of service to merchants who contemplate opening up relations with East Persia by the overland route.

Exports of Railway Track Material in January

Exports of rails in January totaled 44,449 tons valued at $2,602,916; of spikes 1,653,569 lb. valued at $61,372, and of switches, frogs, splice bars, etc., valued at $237,178. The detailed figures compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

EXPORTS OF RAILWAY TRACK MATERIAL

	Spikes		Steel rails		Switches, frogs, splice bars, etc.
Countries	Pounds	Dollars	Pounds	Dollars	Dollars
France			3,114	273,119	325
Norway			157	10,228	882
Portugal					3,578
Spain					164
Sweden			25	1,585	1,375
England	1,564	110	51	3,950	10,553
Scotland			1,578	93,155	5,690
Ireland			278	17,619	396
British Honduras	2,400	122	231	14,226	104
Canada	38,640	1,146	369	20,204	14,452
Costa Rica	7,000	339			27
Guatemala	2,200	104			698
Honduras	43,000	1,740			11,833
Nicaragua	1,000	98			19
Panama					755
Mexico	64,546	2,862	691	32,971	15,192
Newfoundland and Labrador					15
Jamaica	13,300	645			
Trinidad and Tobago	400	18	523	25,923	
Other Brit. West Indies	12,400	660	117	5,333	835
Cuba	504,412	20,305	8,388	475,041	61,710
French West Indies	2,394	121	47	3,700	536
Haiti	64,200	1,496	650	38,082	
Dominican Republic	91,816	4,405	847	40,804	1,906
Argentina					7,058
Brazil	24,457	1,379	6,912	431,263	20,504
Chile	1,000	190	38	2,425	751
Colombia	16,000	690			830
Ecuador	4,000	170			168
Peru					719
Venezuela	5,600	140	168	4,200	140
China			1,573	78,133	
Straits Settlements			24	1,524	1,937
Dutch East Indies			580	29,867	12,741
Hongkong			74	2,060	
Japan	518,840	17,535	15,273	846,154	45,513
Australia			167	9,474	1,421
New Zealand			150	9,541	444
Philippine Islands	234,400	7,097	2,424	132,326	13,907
Total	1,653,569	61,372	44,449	2,602,916	237,178

Delivery of Polish Locomotives Delayed

The Polish Bureau at Washington has been informed that the delivery of 82 Baldwin locomotives, representing a little over half of a $7,000,000 order placed with the Baldwin Locomotive Works by the Government of Poland, is held up for two months by the enormous freight congestion at the port of Danzig. This report has just been made to the Polish Legation by Jan Drozdowski, of Warsaw and New York, who conducted the negotiations with Samuel L. Vauclain, president of the Baldwin Locomotive Works. Mr Drozdowski has just returned from Poland. The order was for 150 locomotives, 68 already having been delivered. The locomotives are standard gage consolidations. All railway lines east into Russia are 5-ft. gage, while all lines west into Germany are standard. The locomotives turned over to Poland by Germany under the terms of the armistice were of every type and in bad condition, so it was impossible to standardize them or to have suitable spare parts on hand for emergency repairs.

The tie up in rail communications makes it impossible for Poland to begin cutting and exporting timber and lumber, in which a large trade is expected. The situation reacts unfavorably against the Polish market exchange rate.

Railway cars are needed in large numbers, but can be built in Polish factories and steel rails can be made in the big plants at Ostrowiec and Warsaw. The situation affects Poland in another way by making it impossible to get sufficient coal for industry or domestic use. This was one reason the locomotives were ordered from the United States for quick delivery.

Great Central Railway Building New Cars

The Great Central Railway has now in hand the building of 1,500 standard freight cars. These cars are 19 ft. long, are of the open type and are rated to carry ten tons. In addition to these, orders have been placed for 850 cars with contracting firms, which are to be used for steel and timber traffic.

The company also has in hand some new passenger vehicles intended for use in London suburban service. There are four distinct types: third-class and brake cars with six passenger compartments; composite cars with four first-class and four third-class compartments; first-class coaches with eight compartments and third-class cars with nine compartments. Trains of four and five coaches will be made up from these vehicles, the former having a capacity of 64 first-class and 250 third-class passengers, and the latter giving accommodation for 96 first and 300 third-class passengers. These new coaches will be of a maximum transverse width permissible by the limitations of the load gage and the length of the vehicles will be 56 ft. A special feature of the construction will be the provision of anti-collision protective steel armoring, telescopic buffers and alinement preserving and shock absorbing buffers, safety locks of the Kaye type, and fire and accident appliances. The coaches will be mounted on steel underframes carried upon 4-wheeled bogies of 8-ft. wheel base. The electric light equipment will not only include supplementary control of individual reading lights but illuminated destination indications.—(*From the Times Trade Supplement, Feb.* 28, 1920.)

National Foreign Trade Convention

The theme of the Seventh National Foreign Trade Convention to be held in San Francisco on May 12 to 15 will be "The Effect of Being a Credit Nation." The convention will follow its usual method of having general and group sessions. Trade advisors will be present from both domestic and foreign firms and organizations. The program committee has also prepared plans for various side trips and excursions and other entertainment and it is hoped to have three special trains from the East to carry the delegates to the convention. The tentative program for the convention is announced by O. K. Davis, secretary, Hanover Square, New York, as follows:

First General Session, Wednesday, May 12.
10 a. m.

Convention called to order by James A. Farrell, Chairman, National Foreign Trade Council.
Organization of convention.
Session Topic: Fundamentals of Our Foreign Trade.
1. The relations of our productive capacity to foreign trade.
2. The financial situation.

Second General Session, Wednesday, May 12.
2.30 p. m.

Session Topic: Imports and Exports.
1. Function of imports in our foreign trade.
2. The future of our exports.
3. The part played by our new merchant marine.

Group Sessions, Wednesday, May 12.
8 p. m.

Group I.—Education for Foreign Trade.
Group II.—Credit Information.
(In cooperation with the National Association of Credit Men.)
Group III.—Financing Foreign Trade.

Third General Session, Thursday, May 13.
10 a. m.

Session Topic: Foreign Trade Policies.
1. The need for a bargaining tariff.
2. Reorganization of the foreign service of our Government.
3. The Value of American Chambers of Commerce abroad.
4. The machinery for foreign trade.

Luncheon, Thursday, May 13.
Palace Hotel, 1 p. m.

The American Manufacturers' Export Association will hold a luncheon, which will afterwards merge into the group session on direct selling.

Group Sessions, Thursday, May 13.
2:30 p. m.

Group IV.—Advertising for Foreign Trade.
Group V.—Practical Problems of Foreign Trade.
Group VI.—Direct Selling Abroad.
(In cooperation with the American Manufacturers' Export Association.)

Reception, Thursday, May 13.
Civic Auditorium, 8 p. m.

The National Foreign Trade Council will hold a reception for the visiting delegations of foreign business men and for convention delegates. This will be followed by an exhibition of industrial films.

Group Sessions, Friday, May 14.
10 a. m.

Group VII.—Importing.
Group VIII.—Inland Transportation for Foreign Trade.
Group IX.—Merchandising and Forwarding.

Luncheon, Friday, May 14.
St. Francis Hotel, 12:30 p. m.

The advisory Committee on International Parcel Post will give an informal luncheon for the discussion of the international parcel post service as an aid to foreign trade.

Group Sessions, Friday, May 14.
2:30 p. m.

Group X.—Banking Services for Foreign Trade.
(In cooperation with the American Bankers' Association.)
Group XI.—Foreign Trade Insurance.
Group XII.—Problems of the Export Manager.

Banquet, Friday, May 14.
Civic Auditorium, 7 p. m.

A most interesting entertainment is being arranged by the Local Committee for this occasion.

Fourth General Session, Saturday, May 15.
10 a. m.

Session Topic: A National Program for Foreign Trade.
1. Reports of Group Sessions.
2. The Final Declaration.
3. Miscellaneous.

Adjournment.

All sessions will be held at the Civic Auditorium, unless otherwise noted.

Car Building in Russia

Commerce Reports in a recent issue publishes an interesting letter from John P. Hurley, consul at Riga, relative to ship and car building facilities at Reval. The letter is dated January 26. Those portions of it relating to car building are given in part as follows:

The position of the Dwigatel car shops is especially favorable for supplying cars to the railroads of Russia. None of the machinery of this plant was evacuated on the approach of the Germans, owing to protests of the workmen; hence the plant is complete and the managing director believes a controlling interest could be bought. Judging by the condition of rolling stock in Latvia and Esthonia, the condition of rolling stock throughout Russia must be very poor. Prior to the war there were about 600,000 freight cars in Russia, whose railway system covered about 45,000 miles. The car census per mile of track would be 13 of about 14 short tons' capacity each.

There were in old Russia, in 1917, 11 car factories, as follows: In Reval, 1; Petrograd, 2; Tver, 1; Moscow, 1; Rybinsk, 1; Kolomna, 1; Sormovo, 1; Briansk, 1; Nicolaev, 1, and Ust-Katavsk, 1. Kerensky placed among these works orders for 200,000 cars of 20 tons each, shipment to begin in 1920 and extend over five years. The position of the Reval shops would afford an early start in car building not enjoyed by any other shops. The works are running at about 25 per cent capacity repairing locomotives and cars for the Esthonian Government. The plant is intersected throughout with railways and similarly connected with the town. Erecting shops in good condition would permit work on about 200 cars simultaneously. A supply of wheels and axles, sufficient for immediate needs, is on hand, but the factory is in urgent need of tires and spring steel. The power plant is complete and of about 1,500 horsepower. The machine shop is a two-story building of limestone (as are all other buildings) about 80 feet by 250 feet and completely equipped with requisite machinery. The forge shops are about 300 feet square and equipped with about five 3-ton drop hammers. As with every factory in this country, the greatest need is coal, coke, and lubricating oil.

The director of the car-building plant states that practically all of his skilled workmen still remain and that the shops have worked continuously. Both the shipbuilding yards and the Dwigatel car-building works deserve attention, and it is extremely probable that capital of other countries is interested. The belief here obtains that in the United States alone can requisite capital be obtained, and American prestige among business interests enjoys an enviable reputation.

Equipment and Supplies

Locomotives

THE CHESAPEAKE & OHIO is inquiring for 20 Mallet type locomotives.

THE NEW YORK CENTRAL is inquiring for 20 Mallet type locomotives.

THE WESTERN OF ALABAMA is inquiring for 2 Mikado type locomotives.

THE ATLANTIC COAST LINE is inquiring for 25 Pacific type locomotives.

THE SOUTH MANCHURIAN RAILWAY is in the market for 24 24 Pacific type locomotives.

THE MONONGAHELA CONNECTING RAILROAD is inquiring for one 8-wheel switching locomotive.

THE ST. LOUIS SOUTHWESTERN has ordered 10 locomotives from the Baldwin Locomotive Works.

THE UNITED FRUIT COMPANY has ordered 3 oil burning locomotives from the H. K. Porter Company.

THE DE QUEEN & EASTERN has ordered one 2-6-2 type locomotive from the Baldwin Locomotive Works.

THE SABANA RAILROAD (COLOMBIA) has ordered 2 passenger locomotives from the Baldwin Locomotive Works.

THE STEEL & TUBE COMPANY OF AMERICA has ordered one switching locomotive from the Baldwin Locomotive Works.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for a 60-ton six-wheel switching engine.

PETER P. BECK, 105 Chambers street, New York, is inquiring for 8 to 10 Mikado or Pacific type locomotives, of 120 tons or over on drivers.

THE CUBA RAILROAD, reported in the *Railway Age* of March 20, as being in the market for 10 locomotives, has ordered 10 10-wheel passenger locomotives from the American Locomotive Company.

THE CHICAGO, MILWAUKEE & ST. PAUL, reported in the *Railway Age* of February 20, as inquiring for 100 Mikado type locomotives, has ordered these engines from the Baldwin Locomotive Works.

THE EAST JORDAN & SOUTHERN has ordered 1 Mogul type locomotive from the American Locomotive Company. This locomotive will have 18 by 24 in. cylinders and a total weight in working order of 121,000 lb.

THE MISSOURI PACIFIC has ordered 5 six-wheel switching locomotives from the American Locomotive Company. These locomotives will have 21 by 28 in. cylinders and a total weight in working order of 165,000 lb.

THE ANN ARBOR has ordered 2 eight-wheel switching locomotives from the American Locomotive Company. These locomotives will have 22½ by 28 in. cylinders and a total weight in working order of 220,000 lb.

THE VIRGINIAN RAILWAY, reported in the *Railway Age* of March 12, as inquiring for 10 Pacific type locomotives, has ordered 6 of these locomotives from the American Locomotive Company. These locomotives will have 26 by 28 in. cylinders and a total weight in working order of 288,000 lb.

THE UNITED RAILWAYS OF HAVANA, reported in the *Railway Age* of February 27 as being in the market for locomotives, has ordered 28 Consolidation locomotives from the American Locomotive Company, and 10 Pacific and 8 switching locomotives from the Baldwin Locomotive Works.

Freight Cars

THE ERIE is having repairs made to 1,000 gondola cars, by the Pressed Steel Car Company.

PETER P. BECK, 105 Chambers street, New York, is in the market for 3 second-hand 40-ton box cars.

THE BALTIMORE & OHIO is having repairs made to 1,000 box cars, by the Pressed Steel Car Company.

THE J. G. WHITE ENGINEERING COMPANY, 43 Exchange place, New York, is inquiring for 5 second hand box cars, for export to Cuba.

THE PRUDENTIAL OIL COMPANY, New York, is inquiring for 50 40-ton 8,000 gal. and 50 50-ton 10,000 gal. capacity, steel underframe tank cars.

THE UNITED FRUIT COMPANY has ordered 210 tram cars from the Gregg Company, Ltd. These cars are for shipment to Colombia, Honduras and Guatemala.

THE NATIONAL STEEL CAR COMPANY is asking for prices on materials for 40 all steel high-side gondolas of 30-ton capacity, and for 40 of 40 tons capacity, for export to China.

THE UNION PACIFIC is inquiring for 2,000 all steel, full-drop bottom gondola cars of 100,000 lb. capacity; an order has been given to Kilbourne & Jacobs for 24 all-steel, automatic air, side dump cars, of 20 cu. yd. capacity.

THE CUBA RAILROAD, reported in the *Railway Age* of February 20 as inquiring for 500 box cars of 40 tons' capacity, has ordered this equipment from the American Car & Foundry Company. These cars will have steel underframes and steel superstructure framing.

Passenger Cars

THE SOUTHERN PACIFIC is inquiring for 98 one-man cars for its Pacific Electric division.

THE CHICAGO GREAT WESTERN is inquiring for 6 coaches, 6 baggage, 2 mail and 2 dining cars.

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 8 combination baggage and mail cars, and 10 baggage cars.

THE MISSOURI PACIFIC, reported in *Railway Age* of January 23 as being in the market for coaches and baggage cars, has ordered 10 coaches and 25 baggage cars from the American Car & Foundry Company.

Iron and Steel

THE BOSTON & MAINE is in the market for 1,100 tons of fabricated steel.

THE BOSTON & ALBANY is in the market for 225 tons of fabricated steel.

THE SOUTH MANCHURIAN RAILWAY is inquiring for 10,000 tons of 100 lb. rails.

THE DELAWARE, LACKAWANNA & WESTERN has ordered 1,000 tons of fabricated steel for bridge and station repairs and renewals.

Miscellaneous

THE UNION PACIFIC has ordered three American ditchers from the American Hoist & Derrick Company.

THE JAPANESE GOVERNMENT RAILWAYS are in the market for 8,000 steel tired wheels and 8,000 steel tires for wheels of 33-inch diameter.

Signaling

THE PENNSYLVANIA RAILROAD has ordered a Saxby & Farmer interlocking machine from the Union Switch & Signal Company, Swissvale, Pa., for installation at Dolton, Ill.; 162 working levers and 10 spare spaces. This will be the largest Saxby & Farmer interlocking machine in the United States.

Supply Trade News

The Bradford Draft Gear Company has removed its New York office from 30 Church street, to suite 1018, 23 West 43rd street

The Maher Engineering Company, Chicago, has opened a branch office at 708 Schofield Building, Cleveland, Ohio, in charge of **Lincoln D. Maher** as manager.

The **Pennsylvania Tank Car Company** and the **Pennsylvania Tank Line** have removed their New York office, from 50 Church street, to 25 West Forty-third street.

The Steel Sales Corporation, Chicago, has purchased 35 acres of land at South Crawford avenue and West Thirty-fifth street, Chicago, on which it plans to build a warehouse costing about $1,000,000.

J. C. Little, mechanical engineer of the Chicago & North Western, with headquarters at Chicago, has resigned to enter the service of **H. G. Doran & Co.,** Chicago representatives of the Schaefer Equipment Company, the Clark Car Company and the Mason Tanking Company, all of Pittsburgh, Pa.; Benson & Co., New York, and the Rivet Cutting Gun Company, Cincinnati, Ohio. Mr. Little was born at Dunkirk, N. Y., on August 20, 1871, and was educated at Stanford University, Palo Alto, Cal. He began railway work with the Brooks Locomotive Works, now a part of the American Locomotive Company. In March, 1903, he was appointed a draftsman on the Northern Pacific at St. Paul, Minn., and later was promoted to chief draftsman. In 1904, he was appointed chief draftsman on the Louisville & Nashville, with headquarters at Louisville, Ky., retaining that position until September, 1906, when he was appointed mechanical engineer of the Chicago & North Western.

J. C. Little

W. S. Atkinson, for many years purchasing agent for the Kansas City Southern, has been appointed manager of the railway sales department of the **Cook Paint & Varnish Company,** Kansas City, Mo.

J. F. Kroske, who served as a lieutenant with the Nineteenth Engineers during the war, has taken a position in the service department of the **Ingersoll-Rand Company,** New York, and is connected with its Pittsburgh office.

Leslie R. Pyle, supervisor of the Fuel Conservation section of the Division of Operation of the United States Railroad Administration, with office at Chicago, has been elected vice-president of the **Locomotive Firebox Company,** with the same headquarters.

The Pullman Company, which took on the building of automobile bodies for the Packard Motor Car Company, Detroit, Mich., several months ago, has decided to make this a permanent branch of its business and additions have been made to the plant to accommodate it.

The Mono Corporation of America, 48 Coal and Iron Exchange, Buffalo, N. Y., announces that it has bought the entire stock of Mono apparatus and accessories from the E. D. Harger Company, Buffalo, N. Y. This includes all rights for the manufacture and sale of various types of Mono apparatus for the automatic analysis of CO_2, CO, and other gases.

R. D. Eves, notice of whose appointment as manager of railroad sales at Cincinnati, Ohio, of the **Western Electric Company, Inc.,** Chicago, appeared in the *Railway Age* of March 5 (page 730), obtained his education at the Peabody College, Nashville, Tenn., and at the School of Railway Signaling, Utica, N. Y. On October 1, 1909, he began his business experience as a stenographer and general assistant to the sales manager of the Tennessee Milling Company, Estill Springs, Tenn. In 1911 he was a stenographer and general clerk in the local freight office of the Nashville, Chattanooga & St. Louis at Nashville, Tenn., and the following year, was appointed chief clerk. Later he was successively signal storekeeper and office assistant to the signal engineer of the same road, with the same headquarters, retaining the latter position until 1919, when he resigned to become connected with the railroad sales department of the Western Electric Company.

R. D. Eves

Frank C. Smink, formerly for 17 years president of the **Reading Iron Company,** Reading, Pa., died on March 3, of a complication of diseases, at his home in Reading, at the age of 74. After an early training with the Philadelphia & Reading Railway Company and in Reading banking circles, Mr. Smink, in 1878, entered the service of the Reading Iron Works, as business manager. He remained in that position until the organization of the Reading Iron Company in 1889, when he was made treasurer, and subsequently served as vice-president and general manaer under the presidency of the late George F. Baer, whom he succeeded in 1902. Mr. Smink was a director of the Reading Trust Company, also the Temple Iron Company, and for many years served as a member of the executive committee and a director of the Pennsylvania Steel Company, the Spanish-American Iron Company, the Maryland Steel Company, the Penn-Mary Coal Company, the Pure Oil Company, and other organizations.

F. C. Smink

W. W. Williams, general manager of the **Reading Iron Company,** Reading, Pa., has been elected vice-president in charge of sales and operation and **J. M. Callen,** second vice-president, has been elected vice-president in charge of purchases and distribution of materials. A portrait of Mr. Williams and a sketch of his career were published in the *Railway Age* of October 31, 1919, on page 899. The other officers re-elected at the annual meeting are: **L. E. Thomas,**

president; **G. W. Delaney**, secretary; **H. E. Yost**, treasurer; **R. J. Wenger**, assistant treasurer.

George H. Snyder has been appointed sales engineer, with headquarters at St. Paul, Minn., of the **American Steel Foundries**, Chicago. He entered the service of the store department of the Minneapolis, St. Paul & Sault Ste. Marie, as a clerk in 1905, and was promoted to chief clerk of the same department in 1909. He remained in that position until August 1, 1911, when he was transferred to the mechanical department and served as chief clerk under T. A. Fogue, general mechanical superintendent, until his new appointment with the American Steel Foundries.

B. G. Koether, who was appointed vice-president of the **Hyatt Roller Bearing Company**, Detroit, Mich., in entire charge of the company's sales and advertising departments, as was announced in the *Railway Age* of February 6, page 458, is at present located at Detroit, but will leave in a short time for Harrison, N. J., there to establish headquarters and take up his new duties. He entered the employ of the Hyatt Roller Bearing Company 18 years ago as accountant and in a short time was promoted to the position of purchasing agent. He was made assistant sales manager at Harrison, N. J., and in 1910 went to Detroit to assume the duties of sales manager. Later he became head of the motor bearings division and for several years has been a director of the company. Mr. Koether is a member of the Detroit Board of Commerce, Players Club, and the Detroit section of the Society of Automotive Engineers.

B. G. Koether

M. A. Buehler, formerly sales manager at the Omaha office of the **Western Electric Company**, New York, has been made sales manager at the Minneapolis office and **Eliot Lum** has been promoted to sales manager at the Omaha office, to succeed Mr. Buehler. Mr. Buehler joined the Western Electric Company's organization in the early part of 1915 and became sales manager at Omaha during the fall of 1917. Mr. Lum entered the employ of the Western Electric Company as a student in the educational courses in 1905, directly after his graduation from college. In 1907, he became a member of the telephone engineering department at Chicago, and in 1909, was transferred to the sales department of the Minneapolis house, joining the Omaha organization in the same capacity in the winter of 1912.

Colorado Fuel & Iron Company

The annual report of the Colorado Fuel & Iron Company for the year ended December 31, 1919, shows gross sales of $34,405,218, as compared with $48,233,575 in 1918. Operating expenses totaled $31,106,215 and net earnings were $3,299,003. There was income from other sources amounting to $426,053 and deductions were made of $2,686,915 for bond interest, taxes, real estate sinking funds, etc., and $1,615,786 for depreciation etc., leaving a debit balance to be carried to profit and loss of $577,646. Dividends on the common and preferred stock amounting to $1,186,993 were paid out of accumulated surplus.

J. F. Welborn, president of the company says in the report that "the outlook for the ensuing year is very encouraging. Contracts already made for rails will take practically the entire production of the rail mill for the ten months beginning March 1. The demands for other forms of steel are in excess of our output, with orders booked ahead for several months."

The Bucyrus Company

The annual report of the Bucyrus Company, South Milwaukee, Wis., for the year ending December 31, 1919, was made public on March 2, 1920. After deducting the amounts determined upon as necessary to pay all taxes, and after the usual charges, the net earnings of the company for the year were $982,563. During the early part of the year dividends on the preferred stock were continued at the rate of 1 per cent per quarter; but, beginning with the payment of October 1, the regular quarterly preferred dividends of 1¾ per cent were restored. Extensive additions to the machine tool equipment at the plant were made during the year and the entire program in this connection is about completed, the president announces. The general balance sheet follows in brief:

Assets.		Liabilities	
Cash	$249,483	Accounts payable	$355,403
Accts. and bills receivable	1,745,885	Advance payments rec'd.	53,342
Inventories	2,568,872	Pref. div. payable Jan. 2, 1920	70,000
Securities	235,237	Acc. taxes and sundry res.	606,693
Land, buildings, etc.	6,868,583	Capital stock—	
		Preferred	4,000,000
		Common	4,000,000
		Surplus	2,582,622
Total	$11,668,060	Total	$11,668,060

Automatic Straight Air Brake Company Starts Active Manufacturing

The Automatic Straight Air Brake Company announces that it has completed arrangements with Kidder, Peabody & Co., of New York and Boston, John F. Alvord, president of the Torrington Manufacturing Company and Hendee Manufacturing Company, and Geo. W. Goethals & Co., Inc., for the financing and manufacturing of its brakes. These three interests have purchased a controlling interest in the company and will immediately establish a plant for the manufacture of the brake.

S. G. Neal

John F. Alvord has been elected president. Harry I. Miller, who has been associated with the company from its inception will be vice-president in charge of sales Harry B. Hunt, formerly of the engineering department of the American Locomotive Company and more recently a colonel in the Production Department of the Ordnance Bureau, has been elected vice-president and treasurer in charge of manufacturing. A. M. Trueb is secretary and auditor. Spencer G. Neal, the inventor of the brake, is the chief engineer.

The directors are as follows: John F. Alvord, William L. Benedict of Kidder, Peabody & Co.; Carl R. Ganter, of Shattuck, Glenn, Huse & Ganter; Robert E. Graham of George W. Goethals & Co., Inc.; Edward D. Kenna of New York; Harry I. Miller; James D. Mortimer, president of the North American Company; Morgan J. O'Brien of O'Brien, Boardman, Parker & Fox, and Robert Winsor of Kidder, Peabody & Co.

With this new organization the company will be prepared to enter upon the production of the automatic straight air brake on a large scale.

Spencer G. Neal, who is chief engineer of the company under its new organization, is the inventor of the automatic straight air brake and the man who has been in charge of its testing

and development. He was born at Humboldt, Kan., in 1883. His family moved to southern California when he was two years of age and he was educated in the public schools there. He entered railway service in 1898 and served as a machinist apprentice in the San Bernardino, Cal., shops of the Atchison, Topeka & Santa Fe. He then became a machinist and was for a time engaged in the installation of stationary machinery. Having then worked out the idea of the new brake he spent from 1910 to 1912 on lines now part of the San Diego & Eastern, on which road the first tests of the brake were made. In 1913, he continued these tests on the Arizona Eastern, working out its development by means of passenger train tests between Globe, N. Mex., and Bowie, Ariz. He also continued these tests on a rack at Los Angeles. He went to New York in 1914 and has had his headquarters in that city since with the exception of time spent on tests of the air brake on the Atchison, Topeka & Santa Fe at La Junta, Colo., and those on the Virginian more recently.

Western Electric Company Extensions

The Western Electric Company, to make possible its 1920 output of automatic switching apparatus, at its Hawthorne, Ill., plant, last year put up five new buildings, costing $1,700,000, and installed new machinery, tools, patterns, furniture and fixtures at a cost of $1,600,000. The company has decided to increase further the facilities at Hawthorne at a cost of $3,500,000 for new buildings, and $1,500,000 for tools, machinery, furniture, etc. This work includes three new six-story buildings with a total floor space of 277,640 sq. ft. to be added to the telephone apparatus group; an increase in warehouse facilities to the extent of a four-story addition which will provide a gross floor area of 150,000 sq. ft., and a new packing material factory to have 30,000 sq. ft. of floor space. Plans are now also being made to put up a new building in New York City on the block bounded by Hudson, Houston, Clarkson and Greenwich streets, where a nine-story reinforced concrete building, 200 ft. by 240 ft. will be built at a cost of $2,000,000. A new building is also being built in Savannah, Ga.; it will contain 20,000 sq. ft. of floor space. At Atlanta, Ga., a modern five-story concrete building is now under construction; it will have 50,000 sq. ft. of floor space and is expected to be completed by July. Work is under way in Cleveland, Ohio, on a four-story brick and concrete building to be 100 ft. by 140 ft. on the first floor and 90 ft. by 100 ft. on the other three floors, providing about 41,000 sq. ft. of floor space; this work is also expected to be finished by July. At Nashville, Tenn., a new supply warehouse was established on January 1 and plans are being made for putting up a new building in Minneapolis. A new wing to be 145 ft. by 126 ft. of brick construction will be built at the Emeryville, Cal., plant. Extensions are also to be built to the plants of the foreign associated companies in Paris, France, London or Woolwich, England, and Tokio, Japan.

Trade Publications

THE JORDAN SPREADER.—The O. F. Jordan Company, East Chicago, Ind., has issued a 24-page bulletin arranged in the form of a series of photographs, showing the Jordan Spreader in different positions with the different features operating so that the various functions of the machine may be readily understood. A number of the photographs show the spreader in operation and indicate the varied character of the work that may be done with it.

CHARCOAL IRON BOILER TUBES.—"A History of the Boiler Tube of Greatest Ultimate Economy" is the title of a book of 32 pages, 7¾ inches by 10½ inches in size, recently issued by the Parkesburg Iron Company, Parkesburg, Pa. This book covers the development of the charcoal iron tube from 1812 to date, and seeks to bring out by many actual examples the ultimate economy of boiler tubes of charcoal iron in locomotives, marine and stationary boilers. Thirty-one illustrations are shown, and a description is given both of the manufacture of Parkesburg skelp and Parkesburg charcoal iron boiler tubes. This book is more than usually well gotten up, and contains seven useful tables.

STEAM TABLES FOR CONDENSER WORK. The Wheeler Condenser & Engineering Company, Carteret, N. J., has published the fifth edition of its handbook of steam tables. The booklet is of convenient size and is illustrated. It gives the properties of saturated steam from 29.8 in. vacuum to atmospheric pressure in increments of tenths of an inch, with pressures below atmosphere expressed in inches of mercury referred to a 30-in. barometer. A complete table is also given of the properties of saturated steam above atmospheric pressure, with constants and tables for correcting vacuum column and barometer readings, such as thermal expansion of mercury, relative expansion of mercury and brass scale, etc.

Obituary

Patrick Henry Ferguson, for the past 14 years manager of the New York office of the **Pittsburgh Steel Products Company,** Pittsburgh, Pa., died on February 11 while on a business trip to Richmond, Va. Mr. Ferguson was born at Ottawa, Ill., on March 12, 1876, and was educated in the public and high schools and afterward studied law in Ottawa. He traveled for the Shelby Steel Company for several years and later became manager of the tube department of Peter A. Frasee & Co., New York. He had served since 1906 as manager of the New York office of the Pittsburgh Steel Products Company.

James J. Flannery, widely known in industrial and financial circles, died suddenly at his home in Pittsburgh on March 6 at the age of 66. Mr. Flannery had been in poor health for over a year, but had been active in his business affairs up to the day of his death. He was the organizer and executive head of the Flannery Bolt Company, Pittsburgh, Pa., manufacturers of the Tate flexible staybolt. He also, with his brother, Joseph M. Flannery, who died on February 18 (see *Railway Age*, February 27, page 653), organized the American Vanadium Company, of which he was president from the beginning. At the time Mr. Flannery organized the American Vanadium Company, vanadium was a semi-rare and little known metal whose industrial application had received little consideration. Mr. Flannery and his brother obtained control of an enormous deposit of vanadium ore in the Andes of Peru, and successfully introduced its application in the manufacture of alloy steel, especially for automobile construction and certain locomotive parts, as frames, driving axles, connecting and piston rods and ordnance and armor. When Mr. Flannery, a few months ago, sold the American Vanadium Company to the Vanadium Corporation of America, controlled by Charles M. Schwab and J. Leonard Repogle, he controlled about 90 per cent of the world's supply of vanadium, principally through the Peruvian deposits originally purchased. Mr. Flannery was also interested in coal mining and was president of the Meadowlands Coal Company and the Montour & Lake Erie Coal Company. He was also a director in the Wharton Steel Company.

James J. Flannery

RAILROAD REVENUES as they stand are wholly inadequate to meet the new schedule of charges against them. To put this burden, largely of government origin, on the shoulders of private owners without making proper provision for relief would be shocking injustice to every holder of railroad securities and would invite nation-wide disaster.—*Chicago Journal.*

Financial and Construction

Railway Financial News

PENNSYLVANIA.—This railroad company, now the owner of over 77 per cent of the $84,860,111 outstanding capital stock of the Pittsburgh, Cincinnati, Chicago & St. Louis, offers to purchase the minority interest in the stock of the Pittsburgh, Cincinnati, Chicago & St. Louis. It will purchase the 192,929 minority shares and will pay for the same, par for par, in new 50-year 5 per cent mortgage bonds of the Pittsburgh, Cincinnati, Chicago & St. Louis Company. In other words, a $1,000 Pittsburgh, Cincinnati, Chicago & St. Louis bond will be given for each 10 shares of the company's minority stock now paying 4 per cent. Non-interest bearing scrip will be issued for from one to nine shares deposited, which scrip will be convertible into bonds when presented in sums of $1,000. The principal and interest of these bonds will be guaranteed by the Pennsylvania Railroad Company.

A circular issued to the stockholders says: "Owing to the general financial conditions and its narrow margin of profits, it has been impossible for the Pittsburgh, Cincinnati, Chicago & St. Louis to finance itself through satisfactory sale of its stock or securities, so that to meet its requirements for additions, extensions, equipment and other capital expenditures, the Pennsylvania company—wholly owned by the Pennsylvania Railroad Company—has in the past been obliged to purchase issues of capital stock to which the minority stockholders did not, except to a very limited amount, subscribe, and has also from time to time loaned the Pittsburgh, Cincinnati, Chicago & St. Louis necessary funds, taking as security therefor the temporary obligations of the borrowing company."

The dividend on the capital stock (only one class) of the Pittsburgh, Cincinnati, Chicago & St. Louis Company is now at the rate of 4 per cent per annum, and with the foregoing improvement program and its present debt, there is no promise of an increase unless its earnings and profits can be materially increased.

Holders of the Pittsburgh, Cincinnati, Chicago & St. Louis minority stock are asked to deposit their holdings under the proposed plan before May 1, with the treasurer of the Pennsylvania company. In the event of an exchange they will be entitled to the semi-annual dividend, payable in July, and the new bonds will bear interest from July 1, 1920.

SOUTHERN.—President Fairfax Harrison has announced that this system would not accept the government guarantee. This decision applies also to the subsidiary roads of the Southern system, the Cincinnati, New Orleans & Texas Pacific, the Alabama Great Southern, and the New Orleans & Northeastern.

Railway Construction

ERIE.—Plans and specifications are being prepared by the Strauss Bascule Bridge Company, Chicago, for a 180-ft, single-leaf, double-track bridge over the Passaic river at Newark, N. J.

J. W. WELLS LUMBER COMPANY.—As soon as the weather permits, the J. W. Wells Lumber Company, Menominee, Mich., will begin the construction of a logging railroad from a point on the main line of the Chicago, Milwaukee & St. Paul midway between Sagola, Mich., and Carey, and extending 11 miles toward Metropolitan, Mich. The company is dismantling its old logging railroad in Marinette County.

NEW YORK CENTRAL.—Contracts have been let for building 13 additional stories on the mail and express building, between Forty-fifth and Forty-sixth streets on Lexington avenue, New York, as follows: to the Phoenix Bridge Company for furnishing the steel; to the Terry & Tench Company, Inc., for erecting the steel, and to James Stewart & Co., Inc., for the general construction of the building exclusive of the steel. It is expected that the steel will arrive during June and that construction of the building will then be started; and that it will be completed early in 1921.

Railway Officers

Executive

Charles A. Phelan, recently appointed general manager for the receiver of the Missouri & North Arkansas, as announced in the *Railway Age* of February 13 (page 516), has since also been appointed receiver succeeding **Festus J. Wade,** resigned, effective March 6.

Financial, Legal and Accounting

D. F. Lyons, prior to federal control, assistant general counsel on the Northern Pacific, with headquarters at St. Paul, Minn., and during federal control general solicitor, has been reappointed to the latter position, effective March 1.

Operating

C. L. Hinkle, general superintendent of the Toledo, St. Louis & Western, with headquarters at Frankfort, Ind., has resigned.

L. F. Newton has been discharged from government service and has resumed his duties as assistant to the general superintendent on the Northern Pacific, with headquarters at Tacoma, Wash., succeeding **J. F. Alsit,** who has been assigned to other duties.

John E. Burrell, chief passenger clerk of the Western Pennsylvania division of the Pennsylvania during federal control, and prior to federal control chief clerk in the office of the general superintendent of the same division, who has been appointed superintendent of passenger transportation of the Eastern region of the same road, effective March 1, was born on August 21, 1874, at Port Washington, Ohio. He attended the public schools of Port Washington until the age of fifteen, when he began work as a telegraph operator for the Pittsburgh, Cincinnati, Chicago & St. Louis. He served as telegraph operator until January 11, 1902, when he was promoted to extra train despatcher, being later appointed in March of the same year chief clerk to the assistant trainmaster. On December 6, 1902, he was appointed interchange director of the Pittsburgh terminal and on June 1, 1903, became chief clerk to the general agent at Pittsburgh. He was made chief clerk to the general superintendent of the Western Pennsylvania division on April 1, 1907, and on January 16, 1918, was appointed chief passenger clerk of the same division.

John E. Burrell

J. F. Alsip, assistant to the general superintendent of the Northern Pacific, with headquarters at Tacoma, Wash., has been appointed trainmaster of the Tacoma division, with the same headquarters, succeeding **James A. Campbell,** transferred, effective March 1.

W. G. Brobeck, superintendent of terminals of the Chesapeake & Ohio, with headquarters at Ashland, Ky., has been appointed general superintendent in charge of operation of the Ashland Coal & Iron Railway, with the same headquarters, effective March 1.

P. L. McManus, operating assistant to the district director of the Ohio-Indiana district of the Eastern region of the United States Railroad Administration, with headquarters at Cincinnati, Ohio, has been appointed general superintendent of the Evansville & Indianapolis, with office at Terre Haute, Ind.

Robert E. Woodruff, general superintendent of the Erie, Lines West, with headquarters at Youngstown, Ohio, during federal control, and prior to federal control superintendent of transportation, who has been appointed manager of the Hornell region of the same road, with headquarters at Hornell, N. Y., was born in Green Bay, Wis. He graduated from Perdue University in civil engineering, in 1905. He began railroad work as a section laborer on the Erie at Warren, Ohio, and subsequently became track foreman, inspector of construction and assistant division engineer. From November, 1906, until December, 1908, he was division engineer at Meadville, Pa. Having been appointed trainmaster at Galion, Ohio, in December, 1908, he retained that position until March, 1909, when he became general agent of the Chicago Terminal division. He was appointed superintendent, with headquarters at Rochester, N. Y., in December, 1910, and on May 15, 1912, he was transferred in the same capacity to Marion, Ohio. In November, 1916, he was transferred to Youngstown. On November 1, 1917, he was appointed superintendent of transportation, with the same headquarters. He was promoted to general superintendent on June 15, 1918.

R. E. Woodruff

Edwin H. Buhlman, superintendent of the Meadville division of the Erie, with headquarters at Meadville, Pa., during federal control and trainmaster with the same headquarters prior to federal control, who has been appointed superintendent of transportation of the Hornell region of the same road, was born in Kingston, N. Y., on March 31, 1890. Having been graduated from high school and business college, he began railroad work on August 25, 1907, as timekeeper in the Susquehanna shops of the Erie. In September of the same year he became clerk and stenographer in the office of the trainmaster at the same place. He held that position until April 2, 1908, when he was transferred to Hornell, N. Y., in the same capacity. On January 1, 1909, he was appointed secretary to the general mechanical superintendent at New York. From April 1, 1909, until December 31, 1913, he filled various clerical positions in the office of the general superintendent at the same place. On January 1, 1914, he was appointed chief clerk to the general manager of the Lines West with headquarters at Cleveland, Ohio. He retained that position until December 1, 1915, when he was promoted to trainmaster of the Marion division, with headquarters at Huntington, Ind. On June 30, 1918, he was transferred to Meadville, Pa., and promoted to superintendent of the Meadville division in July, 1918.

E. H. Buhlman

C. E. Hair, prior to federal control, assistant general superintendent of the Chicago, Terre Haute & Southeastern, with office at Chicago, and more recently office manager for the regional director of the Central Western region, has been appointed general superintendent of the Chicago, Terre Haute & Southeastern, with the same headquarters, succeeding **O. S. Jackson,** resigned.

J. O. Hackenberg, principal assistant engineer of the Southern division of the Pennsylvania, Eastern Lines, who has been appointed superintendent of the Schuylkill division, with headquarters at Reading, Pa., was born in Milton, Pa., February 25, 1878. He graduated from Bucknell University. He entered the service of the Pennsylvania, May 21, 1900, as rodman on the Cambria and Clearfield division, at Cresson, Pa. The following year he was transferred to the chief engineer's department as levelman and was engaged on the South Side track elevation on the Monongahela division. On May 15, 1902, he was advanced to transitman in the office of the principal assistant engineer at Altoona, Pa. On March 1, 1903, Mr. Hackenberg was promoted to assistant supervisor at Millersburg, Pa., and on January 15, 1904, was transferred to the main line as assistant supervisor on the Middle division. He was promoted to supervisor on the Allegheny division September 1, 1905; transferred to supervisor on the Baltimore division December 1, 1908, and returned to the main line on June 16, 1913, as supervisor on the Pittsburgh division at East Liberty, Pa. He was made division engineer of the Allegheny division, with office at Oil City, Pa., on April 15, 1917. The following October he was transferred to the Maryland division in a similar capacity, and on October 20, 1919, was advanced to principal assistant engineer of the Southern division, with headquarters at Wilmington, Del.

J. O. Hackenberg

Traffic

R. R. Helstrom has been appointed general agent of the Carolina, Clinchfield & Ohio, with office at Chicago.

James A. Flanders, Jr., has been appointed general agent of the Delaware & Hudson, with headquarters at Chicago.

E. J. Brown has been appointed general freight agent of the Ocilla Southern with headquarters at Fitzgerald, Ga., effective March 1.

Benjamin F. Coons has been appointed general agent of the Chicago, Rock Island & Pacific, with headquarters at Los Angeles, Cal., effective March 5.

Matt Lucy, assistant engineer on the Missouri Pacific, with office at St. Louis, Mo., has been appointed industrial commissioner, with the same headquarters.

William Phillips has been appointed European manager of the Canadian National Railways and the Canadian Government Merchant Marine Limited with headquarters in London, Eng., effective March 1.

Theodore Harte, division freight and passenger agent of the Western Pacific, with headquarters at Salt Lake City, Utah,

has been appointed assistant general freight agent, with headquarters at San Francisco, Cal.

H. L. Traber, vice-president and general manager of the Okmulgee Northern, with office at Miami, Okla., has been appointed traffic manager of the Kansas, Oklahoma & Gulf, formerly the Missouri, Oklahoma & Gulf, with headquarters at Muskogee, Okla.

Henry W. Beyers, whose promotion to freight traffic manager of the Chicago & North Western, with headquarters at Chicago, was announced in the *Railway Age* of March 5, (page 740) was born at Toledo, Ohio, on March 26, 1870. After graduating from a local business college he entered railway service on August 1, 1883, as a clerk in the Chicago office of the Chicago & North Western. In 1891 he was appointed general agent at Cleveland, Ohio, being transferred in 1896 to Philadelphia, Pa., and in 1900 to Chicago. He was promoted to assistant general freight agent at Chicago in 1906, retaining that position until 1915, when he was appointed assistant traffic manager, retaining that position until March 1, 1920, when he was promoted to his present position.

Henry W. Beyers

J. S. Bock has been appointed general agent of the freight department of the Minneapolis & St. Louis, with headquarters at Spokane, Wash. **T. J. Pewters** has been appointed commercial agent at Minnesota Transfer, Minn. Both appointments became effective March 1.

John L. Ferguson, whose appointment as general passenger agent of the Chicago & North Western, with headquarters at Chicago, was announced in the *Railway Age* of March 5 (page 720), has been in the service of that road for 45 years. He was born in Henry County, Ky., on August 23, 1853, and after completing a common school education, entered railroad service in 1870, with the North Missouri, now part of the Wabash. He became connected with the Chicago & North Western in 1875 as a ticket clerk and has since been successively city passenger agent and city passenger agent and ticket agent at Milwaukee, Wis., and city passenger agent at Chicago. During government control he was assistant general passenger agent at Chicago. He succeeds C. A. Cairns, whose promotion to passenger traffic manager was announced in the *Railway Age* of March 5, (page 740).

John L. Ferguson

Coincident with the appointment of **W. A. Terry** as freight traffic manager on the New York Central, with office at Chicago, a notice of which appeared in the *Railway Age* of March 5, page 745, the position of assistant freight traffic manager at Chicago, held by Mr. Terry prior to his recent appointment, was abolished.

E. A. Niel, coal freight agent of the Buffalo, Rochester & Pittsburgh, with headquarters at Rochester, N. Y., has been appointed general freight agent with the same headquarters, and the office of coal freight agent has been consolidated with that of general freight agent. **H. C. Watson** and **G. A. Bowman** have been appointed assistant general freight agents, with headquarters at Pittsburgh, Pa., and Buffalo, N. Y., respectively. **J. F. Hamilton** has been appointed chief of tariff bureau at Rochester. These appointments became effective March 10.

George A. Cullen, whose resignation from the position of passenger traffic manager of the Delaware, Lackawanna & Western, and whose election to the vice-presidency of the North American Fruit Exchange was noted in last week's issue, has been with the Lackawanna since 1900. He was born at St. Louis, Mo., and began railway work with the Wabash. He later served as a rate clerk on the Missouri Pacific and in 1895 was appointed chief rate clerk and rate sheet compiler of the Southern Passenger Association at Atlanta, Ga. In 1896, he was appointed chief clerk in the passenger department of the Plant System at Savannah, Ga., and later in the same year chief clerk of the Western Passenger Association with headquarters at Chicago. In 1898, he was appointed general agent of the same association in charge of the immigration bureau at New York. He continued in this capacity until 1900 when he became associated with the Delaware, Lackawanna & Western as general western passenger agent at Chicago. He was appointed general passenger agent with headquarters at New York in 1906 and in 1911 was promoted to passenger traffic manager. Mr. Cullen has served as director of agricultural development of the Lackawanna, and in that capacity was one of the three co-founders of the Country Farm Bureau System in America which now has a membership of over one million farmers and is recognized as the most effective method ever devised for getting the farmers to work together under scientific direction and practical business management. Mr. Cullen served during the war as the chief of a section of the United States Food Administration in Washington and organized for the churches of America—Protestant, Catholic and Jewish as well as the fraternal and benevolent societies of the country for systematic food conservation. As United States Railroad Administration executive in charge of consolidated ticket offices, Mr. Cullen is chiefly responsible for the general plan on which they have been planned and operated in the larger cities of the country. Mr. Cullen takes up his new duties as vice-president of the North American Fruit Exchange on April 1 and will have his headquarters at 90 West street, New York.

Geo. A. Cullen

Engineering, Maintenance of Ways and Signaling

R. J. Gammie has been appointed assistant engineer, Fort Worth division of the Texas & Pacific, with headquarters at Fort Worth, Tex., succeeding **E. H. McIlheran,** resigned, effective March 1.

A. R. Raymer, assistant chief engineer of the Pittsburgh & Lake Erie, with headquarters at Pittsburgh, Pa., has been appointed chief engineer, with the same headquarters, succeeding **John A. Atwood,** deceased.

Pusey Jones, who has been appointed bridge engineer of the Boston & Maine, with headquarters at Boston, Mass., as noted in the *Railway Age* of March 12, page 801, was born at Wilmington, Del., in July, 1880. He graduated from the

Delaware State College in 1902 and entered the employ of the Philadelphia, Baltimore & Washington, where he remained until April, 1903, when he left railroad service to engage in industrial work for two years. In 1905 he went with the New York, Westchester & Boston as structural draftsman, and in 1910 he was made assistant structural engineer. From July, 1912, to April, 1914, he was with the Georgia Coast & Piedmont as principal assistant engineer at Brunswick, Ga., and later became chief engineer on design and construction of several bridges and buildings. In 1914 he engaged in private practice in Savannah and in 1916 went with the Boston & Maine as first chief draftsman. During the war he was appointed second acting engineer of structures, from which position he was appointed bridge engineer as mentioned above

George M. Huss, who has been assistant engineer of the Division of Capital Expenditures of the Railroad Administration, has been appointed chairman of the committee on claims, organized by the Division of Liquidation Claims, which is to have charge of the investigation of all claims under the sections of the contracts between the Railroad Administration and the carriers relating to upkeep and capital expenditures. These claims involve the questions as to whether or not the government owes the carrier for deferred maintenance, and the amount, whether expenditures are properly chargeable to maintenance or to capital account, whether capital expenditures are properly chargeable to the government as a war cost or to the carrier, or as to how they shall be divided between carriers in the case of expenditures in connection with unification. The membership of the committee was announced in last week's issue. Mr. Huss has acted as assistant engineer of the Division of Capital Expenditures since July 1, 1918, in charge of the physical progress of construction work during federal control. He was born at Tiffin, Ohio, in 1859, was educated at Cornell University, entered railroad construction service on the Wabash in 1880, and has continued as builder and engineer to the present time. He has had charge of the construction of many important lines in this country, including portions of the Atchison, Topeka & Santa Fe, Chicago & Eastern Illinois, Chicago & Grand Trunk, Northern Pacific, and Wisconsin Central. From 1890 to 1893 he was chief engineer and builder of the original line of the Deming, Sierra Madre & Pacific, now occupied partly by the Mexican Northwestern, and partly by the Kansas City, Mexico & Orient. From 1894 to 1896 he was chief engineer and builder of the Syria Ottoman Railway from Haifa on the Mediterranean coast to Damascus. This road was one of the German strategic lines in Palestine, and was the base railway of the Turko-German forces after General Allenby drove them north from Jerusalem. From 1908 to 1918 Mr. Huss was construction engineer of the Minneapolis, St. Paul & Sault Ste. Marie, locating over 1,200 miles for that company, and building 600 miles.

G. M. Huss

Mechanical

G. Dempster has been appointed master mechanic of the Southern Railway in Mississippi at Columbus, Miss., effective March 1.

Robert Collet, assistant manager of the Fuel Conservation section of the Railroad Administration, during federal control, has been appointed superintendent of fuel and locomotive performance of the New York Central.

P. F. Smith, Jr., who has been appointed works manager of the Pennsylvania Railroad at Altoona, Pa., under that railroads' new plan of organization, was formerly general superintendent of motive power of the Pennsylvania Lines West, with headquarters at Pittsburgh. Mr. Smith was born on August 1, 1870. After graduating from Warralls Technical Academy in June, 1887, he was employed by the Pennsylvania as an apprentice in the shops at Altoona, Pa. After several minor promotions he was appointed assistant road foreman of engines on the Pittsburgh division in February, 1892. On February 1, 1895, he was appointed assistant master mechanic at the Fort Wayne, Ind., shops and in November, 1896, was promoted to the position of master mechanic of the Crestline, Ohio, shops and the Toledo division. From January 1, 1900, to December 31, 1911, he was master mechanic at several shops of the Pittsburgh, Cincinnati, Chicago & St. Louis and on January 1, 1912, became superintendent of motive power of the Central system, Pennsylvania Lines West, which position he held until January, 1917, when he was appointed general superintendet of motive power of the Lines West. As works manager of the Altoona shops, Mr. Smith reports directly to the chief of motive power, with the authority and responsibility that the manager of an industrial manufacturing plant would have.

J. F. Smith, Jr.

Charles James, mechanical superintendent of the Erie, Lines West, with headquarters at Youngstown, Ohio, during and prior to federal control, who has been appointed mechanical superintendent of the Hornell region of the same road, with headquarters at Hornell, N. Y., effective March 1, was born in Elkhart, Ind., on October 7, 1866. He received a high school education and entered the employ of the Lake Shore & Michigan Southern, now part of the New York Central, on September 21, 1880, as machinist's apprentice, at Elkhart. He was made a machinist on May 1, 1886, and on December 18, 1890, became roundhouse and shop foreman of the Erie, at Huntington, Ind. In December, 1900, he was transferred to Chicago as general foreman. He remained there until 1902, when he returned to Huntington in the same capacity. In 1903, he was general foreman at Hornell, and from 1904 until 1906 at Port Jervis, N. Y. On October 1, 1906, he was appointed master mechanic of the Rochester division at Avon, N. Y., and was transferred in the same capacity to the Cincinnati division, with headquarters at Galion, Ohio, on December 1 of the same year. While serving as master mechanic he was transferred to the Delaware division in 1907, and to the New York division in 1910, where he remained until September 1, 1914. On the latter date he was appointed mechanical superintendent, with headquarters at Youngstown, Ohio.

Charles James

W. C. A. Henry, superintendent of motive power of the Southwest system of the Pennsylvania, Lines West, with headquarters at Columbus, Ohio, who has been appointed general superintendent of motive power of the Southwestern region of the same road, with headquarters at St. Louis, Mo., was born on October 13, 1873, at Stapleton, Staten Island, N. Y. He was educated at the Brooklyn Polytechnic Institute, and began railroad work as a special machinist's apprentice in the Altoona shops of the Pennsylvania on March 2, 1891. On June 1, 1897, he was appointed acting foreman of car inspectors of the Pittsburgh division, serving afterwards as assistant road foreman of engines, assistant general foreman of the car shops at Altoona, and assistant engineer of motive power, respectively, until July, 1903, when he was promoted to master mechanic at Wellsville, Ohio. He was transferred to Columbus, Ohio, on May 1, 1906, and became superintendent of motive power of the Southwest system in September, 1906.

W. C. A. Henry

J. M. Henry, assistant general superintendent of motive power of the Pennsylvania Railroad with headquarters at Altoona, Pa., who has been appointed general superintendent of motive power of the Eastern region of the same road with headquarters at Philadelphia, was born on October 10, 1873. He entered the service of the Pennsylvania as a special apprentice in the Altoona shops on May 5, 1889, and served as an apprentice until September 1, 1896, when he entered Purdue University, being furloughed from the shops during the school term each year. He was graduated in June, 1900, and then became a special apprentice in the office of the assistant engineer of motive power at Altoona. A year later he was promoted to motive power inspector at Altoona, and in February, 1902, was made assistant engineer of motive power of the Erie division of the Pennsylvania and of the Northern Central at Williamsport, Pa. From July 1, 1903, to December, 1913, he was master mechanic at various shops. On the latter date he was promoted to superintendent of motive power of the Western Pennsylvania division, and on May 1, 1916, was transferred to the operating department as assistant superintendent of the Pittsburgh division, being transferred on April 15, 1917, to the New York division. He was appointed assistant general superintendent of motive power at Altoona, in the latter part of 1917.

J. M. Henry

Special

T. T. Maxey, assistant in the division of public service of the United States Railroad Administration, with headquarters at Washington, D. C., has been appointed general advertising agent of the Chicago, Burlington & Quincy, with headquarters at Chicago, the position he held prior to federal control.

E. C. Conners, of the construction department of the Alaskan Engineering Commission, has been appointed assistant superintendent of construction in the telegraph and telephone department, with headquarters at Anchorage, Alaska.

General

BELT RAILWAY OF CHICAGO

A portion of the new organization of the Belt Railway of Chicago was given in the *Railway Age* of February 27, page 657. The new organization is given in complete form as follows:

H. G. Hetzler	President	Chicago.
E. H. Lee	Vice-pres. and gen. mgr.	"
C. G. Austin	General counsel	"
R. L. Porter	Auditor and secretary	"
F. A. Spink	Traffic manager	"
F. E. Morrow	Chief engineer	"
J. E. Murphy	Treasurer	"
C. W. Yeamans	Purchasing and supply agt.	"
J. H. Brinkerhoff	General superintendent	"
C. A. Inman	Real est. and ind. agent	"
J. R. Barse	General attorney	"
R. H. Johnson	Personal inj. claim agent	"
O. N. Goldsmith	Freight claim agent	"
E. D. Swift	Engineer, maint. of way	"
G. H. Shreeve	Superintendent	Clearing, Ill.
F. J. Wasson	Acting car accountant	"
E. F. Jones	Master mechanc	"
A. S. Sternburg	General car foreman	"
J. C. Fielding	Chief special agent	"
Dr. W. H. Bohart	Chief surgeon	Chicago.

BUFFALO & SUSQUEHANNA

The new organization of the Buffalo & Susquehanna is announced as follows:

E. R. Darlow	President	Buffalo, N. Y.
A. M. Darlow	General manager	Wellsville, N. Y.
F. E. Hall	Secretary and treasurer	Buffalo, N. Y.
T. J. Elmer	General auditor	"
W. L. McGuigan	Auditor	Wellsville, N. Y.
V. J. Estabrook	Assistant treasurer	"
E. M. Meagher	Gen. frt and pass. agent	"
E. J. Urtel	Purchasing agent	"
G. D. Reynard	Superintendent	Galeton, Pa.
G. A. Clark	Supt. of car service	"
T. H. Nanney	Master mechanic	"

CHICAGO, BURLINGTON & QUINCY

In addition to the elections and appointments on the Chicago, Burlington & Quincy announced in the *Railway Age* of February 27, page 660, the following appointments have been made, effective March 1:

W. J. Jarvis	Assistant secretary	Chicago.
W. J. Fabian	Assistant treasurer	"
F. S. Bagg	Transfer agent	"

E. A. Bernholz has been appointed transfer agent at New York in place of M. H. Niles. The State Street Trust Company, Boston, Mass., has been appointed fiscal agent and transfer agent.

CHICAGO, MILWAUKEE & ST. PAUL

In addition to appointments on the Chicago, Milwaukee & St. Paul, noted in the *Railway Age* of March 5, page 739, the following appointments have been made in the traffic department:

H. E. Pierpont	Traffic manager	Chicago.

Freight Department

J. R. Veitch	Assistant traffic manager	Seattle, Wash.
C. A. Lahey	General freight agent	Chicago.
T. W. Proctor	First asst. gen. freight agt.	"
E. B. Finegan	Assistant gen. freight agent.	"
A. A. Wilson	Assistant gen. freight agent.	"
E. W. Soergel	Assistant gen. freight agent.	"
J. M. Davis	Assistant gen. freight agent.	Milwaukee, Wis.
C. L. Kennedy	Assistant gen. freight agent.	Minneapolis, Minn.
R. C. Sanders	Chief of tariff bureau	Chicago.
G. E. Stolp	Oriental freight agent	"
F. J. Calkins	Export and import agent	Seattle, Wash.

Chicago, Milwaukee & St. Paul (Continued)

Passenger Department

Geo. B. Haynes	General passenger agent	Chicago.
W. B. Dixon	Asst. general passenger agt.	"
W. J. Cannon	Asst. general passenger agt.	"
A. P. Chapman, Jr.	Asst. general passenger agt.	Seattle, Wash.
Jos. Caldwell	Asst. general passenger agt.	Chicago.
F. W. Getty	Supt. sleeping & dining cars.	"
H. F. Hunter	Supervisor of agriculture	"
W. D. Carrick	General baggage agent	Milwaukee, Wis.

Traffic Department Agencies

O. F. Waller	Div. frt. and pass. agent	Aberdeen, S. Dak.
H. G. Selby	General agent	Bellingham, Wash.
A. L. Eidemiller	General agent	Boston, Mass.
P. J. Peckens	Div. frt. and pass. agent	Butte, Mont.
J. H. Skillen	General agent	Chicago.
F. N. Hicks	General agent pass. dept.	"
Grant Williams	Div. freight agent	"
B. O. Searles	General agent	Cincinnati, Ohio.
F. E. Clark	General agent	Cleveland, Ohio.
M. F. Smith	General agent	Dallas, Tex.
A. Mallum	General agent	Davenport, Iowa.
M. H. McEwen	General agent	Denver, Col.
C. E. Hilliker	Division frt. and pass agent.	Des Moines, Iowa.
H. W. Warren	District passenger agent	"
H. W. Steinhoff	General agent	Detroit, Mich.
O. T. Cull	Div. frt. and pass. agent	Dubuque, Iowa.
G. M. Bowman	General agent	Duluth, Minn.
H. R. Wahoske	Div. frt. and pass. agent	Great Falls, Mont.
H. E. Stewart	Div. frt. and pass. agent	Green Bay, Wis.
J. S. Adsit	General agent	Kansas City, Mo.
E. G. Woodward	General agent pass. dept.	"
H. W. Porter	General agent	Los Angeles, Cal.
W. W. Winton	District passenger agent	Madison, Wis.
W. F. Cody	Div. frt. and pass. agent	Mason City, Iowa.
J. J. Foley	Div. frt. and pass. agent	Miles City, Mont.
J. G. Love	General agent	Milwaukee, Wis.
W. J. Cavanaugh	Commercial agent	"
E. G. Hayden	Gen. agent pass. dept.	"
A. S. Willoughby	Division freight agent	Minneapolis, Minn.
J. W. Stevenson	Commercial agent	"
W. H. Rogers	General agent	New Orleans, La.
C. H. Mitchell	General agent	New York City.
G. L. Cobb	Gen. agent pass. dept.	"
E. Duvall	General agent	Omaha, Neb.
W. E. Bock	District passenger agent	"
Geo. J. Lincoln	General agent	Philadelphia, Pa.
T. P. Casey	General agent	Pittsburgh, Pa.
R. L. Ford	General agent	Portland, Ore.
C. J. Peterson	General agent	St. Louis, Mo.
L. M. Jones	Gen. agent pass. dept.	St. Paul, Minn.
D. M. McGeen	Commercial agent	"
C. S. Williams	General agent	S. Lake City, Utah
E. K. Garrison	General agent	San Francisco, Cal.
C. H. Miles	Gen. agent pass dept.	"
A. J. Hillman	General agent	Seattle, Wash.
R. F. Weeks	District freight agent	"
C. N. Curtis	Div. frt. and pass. agent	Sioux City, Iowa.
W. P. Warner	Div. frt. and pass. agent	Spokane, Wash.
E. A. Lalk	Div. frt. and pass. agent	Tacoma, Wash.
G. W. Hibbard	General agent	Vancouver, B. C.
F. O. Finn	General agent	Victoria, B. C.

CHICAGO & WESTERN INDIANA

A portion of the new organization of the Chicago & Western Indiana was given in the *Railway Age* of February 27, page 657. The new organization is given in complete form as follows:

H. G. Hetzler	President	Chicago.
E. H. Lee	Vice-pres. and gen. mgr.	"
C. G. Austin	General counsel	"
R. L. Porter	Auditor and secretary	"
F. A. Spink	Traffic manager	"
F. E. Morrow	Chief engineer	"
J. E. Murphy	Treasurer	"
C. W. Yeamans	Purchasing and sup. agent.	"
R. W. Stevens	General superintendent	"
C. A. Inman	Real est. and ind. agent	"
J. R. Barse	General attorney	"
R. H. Johnson	Personal injury claim agent.	"
O. N. Goldsmith	Freight claim agent	"
V. R. Walling	Principal asst. engineer	"
J. B. Middaugh	Superintendent	"
F. E. Jacob	Signal engineer	"
J. J. Carroll	General baggage agent	"
N. B. Whitsel	Master mechanic	"
G. N. Saum	General car foreman	Chicago
J. B. McDonald	Chief special agent	"
Dr. F. A. Lofton	Chief surgeon	"

CHICAGO, ROCK ISLAND & PACIFIC

The following appointments have been announced in the freight and passenger departments of the Chicago, Rock Island & Pacific, effective March 1:

G. F. Ramspacher	General agent	Philadelphia, Pa.
G. W. Williams	General agent, frt. dept.	Detroit, Mich.
S. L. Parrott	General agent, frt. dept.	New York.
L. C. Ivory	Asst. gen. agent, frt. dept.	"
J. G. Doolittle	General agent	S. Lake City, Utah

CINCINNATI, INDIANAPOLIS & WESTERN

The following officers have been elected or appointed on the Cincinnati, Indianapolis & Western in addition to those whose appointments were noted in the *Railway Age* of March 5, page 740:

B. A. Worthington	President	Indianapolis, Ind.
F. H. Ecker	Vice-president	New York.
H. F. Whitcomb	Member Executive Com.	Milwaukee, Wis.
John H. Hammond	Vice-president	New York.
Cadwalader, Wickersham & Taft	General counsel	"
J. G. Thomas	Assistant to president	Indianapolis, Ind.
H. Lewis	Manager, purchases & sup.	"
F. L. Truitt	Chief surgeon	"
R. B. Kinkaid	Asst. gen. freight agent	"
L. B. Jay	General passenger agent	"

In the item in the *Railway Age* of March 5, page 740, the title of F. B. Brown was incorrectly given as freight claim agent. Mr. Brown should have been given as general auditor. His headquarters are at Indianapolis, Ind.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS

The executive organization of the New York Central Lines was given in the *Railway Age* of February 27, page 659. The following will give the local organization of the Cleveland, Cincinnati, Chicago & St. Louis and also of the Cincinnati Northern and the Kankakee & Seneca:

H. A. Worcester	Vice-president	Cincinnati, O.
E. M. Costin	General manager	"
L. S. Rose	Asst. to general manager	"
H. McVeagh	Asst. to general manager	"
W. J. Hiner	Purchasing agent	"
L. J. Hackney	General counsel	"
M. S. Barger	General treasurer	New York.
Rush N. Harry	Treasurer	Cincinnati, O.
W. C. Wishart	Comptroller	New York.
J. C. Wallace	Auditor	Cincinnati, O.
R. F. Davies	Assistant auditor	"
W. T. Stevenson	Traffic manager	"
Geo. Krause, Jr.	General freight agent	"

DENVER & RIO GRANDE

The following will give the organization of the Denver & Rio Grande effective March 1:

A. R. Baldwin	Receiver	Denver, Colo.
J. Russell	General manager	"
W. E. Green	Assistant general manager.	"
Hy. McAllister, Jr.	General counsel	"
E. N. Clark	General solicitor	"
J. G. McMurry	Com. and val. counsel	"
F. A. Wadleigh	Pass. traffic manager	"
Fred Wild, Jr.	Freight traffic manager	"
W. M. Lampton	General freight agent	"
E. R. Dickenson	General auditor	"
R. F. Watkins	Treasurer	"
J. G. Gwyn	Chief engineer	"
Arthur Ridgway	Asst. chief engr. (valua.)	"
C. B. Hotchkiss	Assistant to receiver	"
D. C. DeGraff	Assistant to receiver	"

EL PASO & SOUTHWESTERN

The following appointments on the El Paso & Southwestern System are additional to those given in the *Railway Age* of March 5, page 741.

B. L. Birkholz	General agent	New York.
F. W. Pullen	General agent	Chicago.
J. F. Hogan	General agent	San Francisco.
L. H. Trimble	Div. frt. and pass. agent	Tucson, Ariz.

FLORIDA EAST COAST

The new organization of the Florida East Coast, effective March 1, is as follows:

W. H. Beardsley.	President	New York.
W. R. Kenan, Jr.	Vice-president	"
J. P. Beckwith	Vice-president	St. Augustine, Fla.
W. A. Blount	V-pres. and gen. counsel.	Pensacola, Fla.
J. E. Ingraham	Vice-president	St. Augustine, Fla.
F. W. Kirtland	Assistant to vice-president.	"
L. C. Haines	Treasurer	New York.
C. D. Boice	Secretary and purch agt	"
J. D. Rahner	General passenger agent	St. Augustine, Fla.
H. E. C. Hawkins.	General freight agent	"
T. V. Pomar	Comptroller	"
E. Ben Carter	Chief engineer	"
J. H. Owen	Gen. supt of trans	"
G. A. Miller	Supt. mot. pow. & mchy.	"
S. M. Loftin	General solicitor	Jacksonville, Fla.
A. V. S. Smith	General attorney	"

GEORGIA & FLORIDA

W. R. Sullivan, Langbonrne M. Williams and J. F. Lewis, receivers, have announced the following as the organization of the Georgia & Florida, effective March 1:

D. F. Kirkland	General manager	Augusta, Ga.
G. F. Dickson	Gen. Supt	"
S. Baldwin	Chief engineer	"
W. C. Griffin	Supt. car service	"
W. H. Dyer	Supt. motive power	Douglas, Ga.
J. S. Douglas	Trainmaster	Augusta, Ga.
T. E. Harris	Traffic manager	"
W. D. Cook	Gen. frt. agent, rates	"
J. H. Conley	Auditor	"
M. T. Lanigan	Assistant auditor	"
W. O. Wall	General claim agent	"
S. W. Saye	Purchasing agent	"
W. Blanchard	Treasurer	"
Barrett & Hull	General counsel	"
W. H. Doughty, Jr.	Chief surgeon	"

LEHIGH & HUDSON RIVER

The following is the organization of the Lehigh & Hudson River, effective with the return of the property to private control:

Lewis A. Riley	President	Philadelphia, Pa.
Morris Rutherfurd	Vice-pres. and gen. mgr.	Warwick, N. Y.
William H. Sayer.	Secretary and treasurer	"
S. H. Benny	Asst. secretary	Philadelphia, Pa.
B. J. Stidworthy.	Asst. treas. and paymaster.	Warwick, N. Y.
H. G. Pierson	Gen. frt. and pass. agent.	"
F. F. Wildrick	Auditor	"
C. F. Merrill	Superintendent	"
J. J. Beattie	General Counsel	"
C. S. Beattie	Claims attorney	"
A. M. Holmes	Purchasing agent	"
Sam'l Meyers, Jr.	General storekeeper	"
R. T. Jaynes	Master mechanic	"
W. C. Muth	Trainmaster	"
F. S. Work	Chief dispatcher	"
C. F. Richards	Chief car inspector	Phillipsburg, N. J.
L. B. Myers, Jr.	Road foreman of engines.	Warwick, N. Y.
J. E. Barrett	Engineer of maintenance	"
C. H. Bennett	Signal supervisor	"

MICHIGAN CENTRAL

The executive organization of the New York Central Lines was given in the *Railway Age* of February 27, page 659. The following will give the local organization of the Michigan Central:

H. D. Bronner	Vice-president	Detroit.
Henry Shearer	General manager	"
J. L. McKee	General supt	"
E. A. Wigren	Auditor	"
W. E. Hackett	Treasurer	"
P. G. Findlay	Freight traffic manager	"
O. R. Bromley	Gen. freight agent	"
F. R. Newman	Asst. gen. freight agent	"
N. D. Hoke	Asst. gen. freight agent	Buffalo.
R. Middleton	Dist. freight agent	St. Thomas.
L. W. Landman.	Pass. traffic manager	Chicago.
C. C. Clark	General pass. agent	"
R. B. Holmes	Asst. gen. agent	"
C. H. Cheyce	Asst. gen. pass. agent	Buffalo.
John C. Ranney.	Div. pass. agent	Grand Rapids.
H. C. Carson	Div. pass. agent	Saginaw.

MISSOURI, KANSAS & TEXAS

In addition to the appointments on the Missouri, Kansas & Texas announced in the *Railway Age* of March 5, page 745, the following have been appointed:

C. E. Spooner	General auditor	Parsons, Kan.
R. P. Roach	Treasurer and paymaster.	"

MISSOURI PACIFIC

The organization of the accounting department of the Missouri Pacific is announced as follows:

J. G. Drew	Vice-president	St. Louis.
F. P. Johnson	General auditor	"
T. M. Niven	Assistant general auditor.	"
W. J. Wright	Assistant auditor	"
E. H. Lycett	Assistant auditor	"
W. H. Malcolm	Auditor, freight receipts.	"
S. H. Bone	Asst. auditor freight rec.	"
H. H. McIntyre.	Auditor, passenger receipts.	"
D. Laughlin	Auditor, pass. rec	"
C. B. Moore	Auditor, disbursements	"
G. A. Rust	Asst. auditor disbursements.	"
H. C. Abbey	Auditor station accounts	"
C. B. Milsom	General accountant	"
E. G. Trobaugh.	Car accountant	"
C. E. Kammann.	Assistant car accountant.	"
H. C. Hale	Valuation accountant	"

NASHVILLE, CHATTANOOGA & ST. LOUIS

Passenger traffic appointments on the Nashville, Chattanooga & St. Louis are announced as follows:

W. I. Lightfoot.	General pass. agent	Nashville, Tenn.
J. F. Gaffney, Jr.	Asst. gen. pass. agent	"
J. C. Galloway	Div. pass. agent	Memphis, Tenn.
G. B. Harris	Div. pass. agent	Atlanta, Ga.
E. J. Walker	Div. pass. agent	Chattanooga, Tenn
J. A. Thomas	General agent, passenger.	Nashville, Tenn.
W. S. Snodell	Northern passenger agent.	Chicago, Ill.
A. Rice King	Florida passenger agent	Jacksonville, Fla.
F. C. Sweat	Western passenger agent	St. Louis, Mo.
W. F. Reed	Manager, dining cars	Nashville, Tenn.

NORTHERN PACIFIC

The executive department organization of the Northern Pacific was given in the *Railway Age* of March 5, page 746. Other appointments, effective March 1, have been announced as follows:

R. W. Clark	Assist. to president	St. Paul, Minn.
D. F. Lyons	General solicitor	"

ACCOUNTING DEPARTMENT

F. W. Sweney	Comptroller	"
E. T. Dakin	General auditor	"
L. A. Behler	Assistant general auditor.	"
G. J. Mayer	Assistant general auditor.	"
William Richards.	Assistant general auditor.	"
W. J. Stevenson.	Auditor, agencies	"
W. C. Pinger	Auditor, capital expendi	"
E. O. Parks	Auditor, disbursements	"
F. W. Stetekluh.	Asst. auditor disburse	"
R. V. Onslow	Aud. frt. overcharge claims.	"
W. S. Tayler	Auditor freight receipts	"
A. L. Wielde	Asst. auditor frt. receipts.	"
George Sherriff.	Auditor passenger receipts.	"
W. H. Rawlinson.	Assistant statistician	"
C. E. Billings	General accountant	"
C. S. Carter	Joint facility accountant	"
F. C. Sharood	Valuation accountant	"
M. P. Martin	Consulting auditor	Tacoma, Wash.
E. R. Wales	Western aud. and paymas.	"

PURCHASING DEPARTMENT

F. G. Prest	Purchasing agent	St. Paul, Minn.
R. J. Elliott	Asst. purchasing agent	"
L. Crassweller	Asst. purchasing agent	Tacoma, Wash.
O. C. Wakefield.	General storekeeper	St. Paul, Minn.
E. J. Myers	Asst. general storekeeper.	"
S. H. Robson	Asst. general storekeeper.	S. Tacoma, Wash.
F. V. Weisenburger.	Timber agent	St. Paul, Minn.

PENNSYLVANIA SYSTEM.

Northwestern Region

The following appointments have been made in the traffic department of the Pennsylvania System, Northwestern region, in addition to those announced in the *Railway Age* of February 20, pages 598 to 600:

C. F. Clapp	Division freight agent	Chicago
H. R. Griswold	" " "	G. Rapids, Mich.
J. M. Steenberg	" " "	Toledo, Ohio
F. T. Wood	" " "	Fort Wayne, Ind.
H. C. Oliver	" " "	Richmond, Ind.
Geo. W. Smith	Foreign freight agent	Chicago

PERE MARQUETTE

In addition to the appointments on the Pere Marquette announced in the *Railway Age* of March 5, page 746, the following is given as the organization of the accounting department:

C. S. Sikes	Vice-p. and general auditor.	Detroit, Mich.
J. O. Talbott	Assistant general auditor	"
A. C. Rhodes	Assistant auditor	"
K. A. Karlson	Assistant auditor	"
A. J. Anderson	Auditor, freight traffic	"
C. E. Connally	Asst. auditor frt. traffic	"
J. P. Doughty	Auditor disbursements	"
H. F. Brahany	Auditor, cap. expen.	"
E. L. Mitten	Auditor passenger traffic	"
H. F. Farrell	Auditor overcharge claims	"
Glenn Warner	Engineering accountant	"
D. L. Harwood	Car accountant	"

PITTSBURGH AND LAKE ERIE.

The executive officers of the New York Central Lines were given in the *Railway Age* of February 27, page 660. The following will give the new organization of the Pittsburgh & Lake Erie:

J. B. Yohe	General manager	Pittsburgh Pa.
G. G. Minnick	Asst. general mgr.	" "
A. R. Raymer	Chief engineer	" "
L. H. Turner	Supt. motive power	" "
D. J. Redding	Asst. Supt. motive power	McKees Rcks., Pa.
S. Lynn	Master car builder	" " "
F. M. Brown	Superintendent	Pittsburgh, Pa.
J. B. Yohe, Jr.	"	" "
J. B. Nessle	Freight traffic manager	" "
E. E. Smith	Gen. passnger agent	" "
L. A. Lee	Supt. telegraph	" "
J. L. O'Toole	Supt. freight trans.	" "
M. R. Clinton	Supt. car service	" "
E. H. Kennedy	Auditor	" "
E. B. Whisler	Freight claim agent	" "
C. M. Yohe	Acting Pur. agent	" "
J. C. Grooms	Real Estate & Claim Agt.	" "
W. M. Doulin	Treasurer	" "
C. W. Alleman	General storekeeper	McKees Rcks., Pa.

QUINCY, OMAHA & KANSAS CITY

The following appointments, effective March 1, have been announced by J. D. Farrington, superintendent of the Quincy, Omaha & Kansas City, with headquarters at Kansas City, Mo.:

A. J. Bandy	Gen. frt and pass. agent	Kansas City, Mo.
W. R. Shrodes	Office asst. and pur. agent	"
C. Woodcock	Auditor and cashier	"
J. C. Woods	Master mechanic	Milan, Mo.
W. R. Morelock	Train master	"
L. C. Wallace	Chief despatcher	"

TOLEDO & OHIO CENTRAL

The executive organization of the New York Central Lines was given in the *Railway Age* of February 27, page 659. The following appointments have been made on the Toledo & Ohio Central, the Zanesville & Western, the Kanawha & Michigan and the Kanawha & West Virginia:

F. B. Sheldon	Vice-president	Columbus, Ohio.
J. B. Wagner	Auditor	"
E. N. Bennett	Treasurer	"
H. E. Speaks	General manager	"

WESTERN MARYLAND

The following appointments on the Western Maryland, effective March 1, are additional to those given in the *Railway Age* of March 12, page 807:

M. K. Bostic	Spec. asst. to the pres.	Baltimore Md,
George P. Bagby	General solicitor	"
F. C. Uhlman	General auditor	"
H. R. Pratt	Chief engineer	"
D. Z. Dunott	Chief surgeon	"
J. E. Bond	Chief of police	"
K. E. Hamlin	Freight claim agent	"
H. A. Bruck	Real estate and tax agent	"
J. A. Peterson	Superintendent elevators	"
G. F. Wieseckel	Supt. maint. of equip.	Hagerstown, Md
E. R. Rouzer	Supt. trans.	"
C. A. Steiner	Supt. wage bureau	"

Obituary

Frederick T. Hatch, consulting engineer of the Pennsylvania Railroad in charge of valuation matters with headquarters at St. Louis, Mo., and formerly chief engineer maintenance of way, Lines West, St. Louis system, died suddenly at his home in St. Louis on March 9 at the age of 64.

Harry T. Ruhl, engineer maintenance of way and structures of the Delaware & Hudson, died at his home in Albany, N. Y., on February 18. Mr. Ruhl was born in Buffalo Cross Roads, Pa., September, 1882. He received his education in Bucknell University, graduating in 1905. He then entered the engineering department of the Canadian Pacific as transitman on the location and construction of the La Belle branch. In 1907 he was transferred to the Toronto-Sudbury branch of the Canadian Pacific, where he served as engineer in charge of construction until the completion of that branch. In 1909, he became interested in maintenance work and was appointed senior transitman, District No. 1, of the Lake Superior division. Six months later he was made resident engineer, District No. 2, Lake Superior, with headquarters at Sudbury, Ont. In 1911, he was appointed resident engineer, District No. 2, Eastern division, with headquarters at Farnham, Que. In 1914, he went to the Canadian Government Railways as resident engineer, located at New Glasgow, N. S. In 1916, he was promoted to division engineer, with headquarters at Moncton, N. B., which position he held until June, 1917, when he became engineer maintenance of way and structures for the Delaware & Hudson at Albany.

ANATOLE MALLET

Anatole Mallet, the inventor of the compound locomotive which bears his name, died in Nice, France, in October, 1919. Mr. Mallet was born in 1837 at Carouge and was graduated in 1858 from the Central School of Arts and Manufactures in Paris. He was engaged in civil engineering work for several years, working on the Suez canal and later as engineer for a company which undertook dredging operations in Italy. His first work in mechanical engineering was done in 1867, when he devoted his attention to double expansion steam engines. The first application of this system was made in 1876 on a two-cylinder compound locomotive which operated on the line from Bayonne to Biarritz. This design effected a saving of 20 per cent in fuel over the standard types and placed the inventor in the foremost ranks of locomotive designers.

The great success of the compound locomotive led to a material increase in the size of the units and to the development of three and four-cylinder compound locomotives. It became evident that the limit of size of locomotives of rigid construction, especially on lines with sharp curves, would soon be reached. In order to permit of the use of large motive power units on lines with sharp curves and light track, Mr. Mallet designed the articulated type of locomotive, which has since been adapted to use on American roads with such great success.

Among the honors conferred upon Mr. Mallet were the Schneider prize, awarded to him by the French Society of Civil Engineers in 1902 and the annual prizes of the society in 1909 and 1911. He was made a Knight of the Legion of Honor in 1885 and promoted to officer in 1905. The Institute of Mechanical Engineers of London awarded him a gold medal in 1915.

In addition to carrying on his engineering work, Mr. Mallet took active part in the work of the French Society of Civil Engineers as editor of the Chronicle of the Bulletin of the Society, for which he wrote numerous technical notes and important memoirs.

EDITORIAL

Railway Age

DAILY EDITION

Automatic Train Control

The Committee on Signals and Interlocking of the American Railway Engineering Association submitted as information a comparative statement of the definitions and requisites that have been adopted by different committees and associations for automatic train control devices. The importance placed on these devices by the passage of the transportation act makes it essential that serious consideration be given to this subject by all railway officers having charge of departments which may be affected by the installation of such safety devices. The departments affected by these installations will be the signal, mechanical, maintenance of way and operating departments. The maintenance of way department will be affected because of the location of roadside apparatus along the right-of-way which will affect the clearance. It is important that a careful study be made of the requisites shown as information by the committee, because installations which may be ordered by the Interstate Commerce Commission under the provisions of the new law will likely be based in a general way on those shown in the report submitted. The next five years will witness increased activities in this direction, which will make it necessary for the officers in all of the departments affected to make a careful study of the subject.

The Wheel That Makes the Noise Gets the Grease

The American Railway Engineering Association has established a most enviable reputation in professional circles the world over. Recognition has been repeatedly accorded its officers in this country through their selection for important public and corporate positions. From a review of the facts presented by President Stimson in his address, there is no question but that the American Railroad Association considers the American Railway Engineering Association one of its most valuable sources of help in effecting the unification and improvement of railway practices. But why keep all these things a secret from the public? Year after year the conventions have been held in Chicago with but the barest notice in the daily press, notwithstanding the fact that many organizations far less important have received extended publicity. Newspaper space is not a form of emolument granted for special merit in modesty; it is secured only by going after it—intelligently. That it is forthcoming in return for properly directed effort is witnessed by the publicity given to the one-day railroad meeting of the American Association of Engineers, a young organization that lays no claim at this time to the standing enjoyed by the American Railway Engineering Association after 21 years of useful life. Yet it is safe to say that ten persons have heard of the American Association of Engineers to one that knows of the American Railway Engineering Association. Nor is publicity a thing to be despised. Engineers owe it to themselves to improve their standing in the community. The general dissemination of facts concerning the fruits of their united efforts is one means of attaining that end. Publicity is a prime requisite to a healthy growth in membership. The American Railway Engineering Association must come out of its shell.

Get an Early Start

The advantage of organizing the committee work as promptly as possible after the closing of the convention has been touched upon editorially so often that it has become rather trite and we hesitate to refer to it again. However, the tardiness of this year's committee report bulletins recalls the subject so emphatically that it warrants further consideration. A number of the reports contained matter that could not be discussed intelligently without thorough study and the inability of the members to do this had an adverse effect on the discussion. This was notably the case in the comments on the new specifications for rails and several of the speakers expressed their regret at not being able to do the subject justice because of inadequate preparation. It is but fair to state that the delay in the issuance of the bulletins this year was not entirely the result of the tardy completion of the committee reports. The secretary was confronted with unusual conditions both in the printshop and in the mail service, which probably will not exist next year. However, the argument for the prompt prosecution of the committee work still holds. Most of the chairmen get their committees to work as soon as the names of the committeemen are announced, but they should not be handicapped by the delay in the completion of the personnel or in the assignment of the work.

The Difference in the Morning

Discussion at association conventions is not always the truest indication of the worth of a committee report. Although straws show which way the wind blows, there are various circumstances which may affect the consideration of committee work. The present convention has been no exception in this regard. The weather observer has noted all the atmospheric conditions at the sessions from absolute calm, gentle zephyr, variable wind, and hard straight storm to the real twister which has a definite storm center. Wednesday afternoon's session was prolonged to quick dressing time by the lively discussion of the report of the committee on rules and organization, especially that part of the recommendations which referred to instructions to bridge inspectors on testing rivets and the manner of reporting the conditions of steel structures. The session was ended only on decision to continue discussion Thursday morning.

When this committee was recalled Thursday morning, the recommendations, which were rather long, were read in their entirety by the chairman and an affirmative vote obtained on their adoption, with the dissent of only one member who had attended during the previous afternoon discussion.

One of the great privileges of the association is the opportunity for free discussion on the floor of the convention. All standing committees and their chairmen recognize and welcome constructive discussion of reports, for it serves as a guide to them in their work. Organization among the leaders on the floor is a heavy responsibility demanding intensive preliminary work, but it is well worth while to pick up a discussion where it has been dropped in case of such unavoidable interruptions, for the character of the matter placed in the Manual is the medium through which the worth of the association is made known to the world.

Members, Old and New

THE HIGH STANDING OF THE American Railway Engineering Association is due directly to the individual sacrifices continually made for the good of the profession by its many active members, to the excellence of its organization, and to its admirable system of handling reports. There are few professions whose members have less leisure time than the engineer officers of our railways, to whom each succeeding year of the past decade has left its legacy of added duties. Yet their devotion to association matters has never wavered and is quite as marked today as ever before.

The world has recently passed through its greatest war, which we are told was essentially an engineers' war, and is now, let us hope, entering upon its greatest era of peace, which bids fair to be an engineers' peace, for our industrial progress in competition with other nations is as intimately dependent on the engineer and his skill, as were the preparations for the great drives which changed the fortunes of nations and the map of Europe in the late unpleasantness overseas.

The world applauded with dawning astonishment the military achievements of the civilian volunteer railway engineer. It now beholds him with much the same regard assuming the new burdens of peace time, pyramided on all the old ones; adjusting himself to each succeeding emergency, and pursuing the even tenor of his way, carrying on as usual in peace as in war. Amid all the unrest of men the work of the American Railway Engineering Association has been continued, despite the enforced absence of those of its members who were chosen to help in winning the war, while those active members who remained in American railway employ redoubled their efforts for the association at an expense of personal sacrifice known only to themselves. The returned volunteers, again settling in railway engineering service, feel the need of the benefits of the association which are always greatest to those who are most active in its affairs. Their memberships are solicited because they have proved their worth as men of wisdom and action.

The secret of the success of engineers, where at times other men fail, appears to be their resourcefulness in emergencies, which is made possible by that practical knowledge of applied science which gives absolute confidence in personal ability. The engineer knows conditions and knows his own strength as he knows the strength of the materials with which he builds. With a membership composed of men of this stamp who annually choose as leaders a number of their most skilled organizers, there is every reason to believe that the A.R.E.A. is far from the zenith of its power for the good of the profession. No young engineer can afford to withhold his name from its membership, nor his attention from the activities which contribute to the solution of its problems.

Few engineers, fortunately, are orators; on the other hand, many of the younger men and some older ones are diffident before audiences, especially before those which include their superiors. This modesty keeps many a member in his seat and prevents much instructive oral discussion in the convention hall. In the course of a convention too few written discussions are presented; here is a valuable alternative available to the modest member, for a written discussion needs seek no parliamentary opportunity. It affords the author time for research, study and composition, and is appreciated on the floor of the convention as evidence of thoughtful application and well ordered presentation. The young engineer is by no means at the end of his resources if he cannot attend conventions or speak freely to engineering audiences. The avenue of written discussion is open to all and at present is by no means crowded.

Registration for the Convention

According to a statement by President Earl Stimson of the American Railway Engineering Association at the closing session, the registration of members and others attending the convention was 563, this total being 100 more than that reported in any previous year.

Record Attendance at the Coliseum

The attendance at the National Railway Appliances Exhibit up to noon yesterday totaled 3,200, which, considering the early adjournment of the A. R. E. A. convention, indicates a large total attendance for the day. The final totals for Monday, Tuesday and Wednesday, respectively, were 2,079, 8,553 and 8,129. The number attending on Tuesday is the record attendance in the history of the association. The maximum attendance previous to this occurred on Tuesday of the 1916 show, when 7,716 visitors passed through the gates.

Dress Up the Poor Kid!

Three years ago when Committee XXII submitted its initial report on Economics of Railway Labor, C. E. Lindsay christened the new committee as the twenty-second child of the family and a lusty infant. The compliment was received with due appreciation and the applause of the convention. But this committee never seems to be able to get its illustrations printed in the bulletins. There never is a chance to really give them the needed space for either plans or pictures.

Twenty-two is a large family. When Ma gets herself ready for the meeting after seeing to all the children, she has her work cut out to put the house in order before the bell rings, and she expects the children to sort o'help each other get buttoned up. That engraver girl next door helps sometimes, too. But this year, with getting the biggest girls dressed up in all their finery of new designs and frills, she entirely forgot the latest born—and when in despair she ran to Ma with the child in her arms, Ma threw up both hands and cried, "Laws, if there ain't that baby again without anything to put on. Well, cloes is cloes, and I spent too much on the oldest girls this year again. Young ladies when they come out just have to have the best and it does cost money these days.

"There ain't no money an' there ain't no time to tog out that baby. Wrap the poor kid up in th' same old blanket an' keep it from squallin' if you kin, but mind them pins today, or he'll yell right out in meetin'."

Isn't it about time that this kid had something to wear that we could call real clothes?

Railway Engineering Association Proceedings

An Account of Thursday's Sessions, Including a Presentation of Eight Committee Reports and Closing Business

THE TWENTY-FIRST ANNUAL CONVENTION of the American Railway Engineering Association drew to a close on Thursday at 3 p. m. The morning session was called to order at 10 o'clock by President Stimson. The report on Rules and Organization, which was carried over from the preceding day, was first disposed of, after which reports were presented on Rail; Records and Accounts; Yards and Terminals; Signals and Interlocking; Signs, Fences and Crossings; Economics of Railway Operation; Economics of Railway Labor, and Standardization. These were followed by routine business and the installation of the new president, H. R. Safford. Abstracts of the reports and the discussions are given below.

Report on Records and Accounts

PROPOSED CHANGES IN the Manual are given in Appendix A.

A report on cost-keeping methods and statistical records, and a report on forms for analyzing expenditures for assistance in controlling expenditures was given in Appendix B of the committee's report.

In Appendix C of its report the committee presented forms for maintenance of way and structures, for construction and for records; and recommended their approval for publication in the Manual.

Committee: W. A. Christian (I. C. C.), chairman; M. C. Byers (W. M.), vice-chairman; Lester Bernstein (Philadelphia Co.), H. Borton (Cons. Engr.), J. W. Fox (C. of Ga.), B. B. Harris (Cons. Engr.), G. T. Kuntz, Henry Lehn (N. Y. C.), J. H. Milburn (B. & O.), R. C. Sattley (C., R. I & P.), H. M. Stout (N. P.), W. D. Wiggins (P. L. W.).

Appendix A—Revision of Manual

The committee recommended that all forms, in so far as practicable, be made correspondence size—that is, 8½ in. by 11 in.

That all forms be printed in one color, black, and that on forms intended for office use to be filled in with typewriter, horizontal lines be omitted; forms intended for field use to have horizontal lines provided.

That bridge department forms now in the Manual be rearranged in logical order, and the descriptive matter placed immediately under the form to which it pertains.

That all forms relating to cost data or authority for expenditure be developed so as to comply with revised Federal Order No. 3, pertaining to extensions, improvements or changes in the physical property of common carriers.

Forms 701, 1100, *pp.* 345 *and* 346—The printing on the back of this form and instructions as to use to be shown as a footnote at bottom of form.

Forms 703 *and* 704, *pp.* 349 *and* 350—Form 703 to be withdrawn and combined with 704, making following changes in the latter: Omit "General" in title of form; omit "General" before the word "Condition" in fourth line and insert after the word "required" the words "action taken or."

Form 702, *page* 352—It was recommended that this form be issued in the form of a postal report, on manila cardboard, four inches by six inches in size, addressed on the reverse side to the proper official.

Form 1103, *pp.* 353 *to* 356—It was recommended that this form be changed to show "Time" and "Overtime"; that the form be printed in the Manual full size, that is, five inches by eight inches, including the printed instructions, as now shown in the Manual.

Form 2202, *page* 384—It was recommended that the following changes be made in this form: Size of form to be 11 in. by 24 in.; change "Sub-Section" to read

"Valuation Section"; in column 4, State and County to be reversed; in column 5, omit the word "School"; in columns 8 and 9, omit horizontal line under "AFC" and "Contract"; in column 11, substitute "length of service" for "Indicate Age"; in columns 12, 13 and 15, substitute "December 3" for "June 30."

Form 2001, *page* 388—Add paragraph reading "A receipt in full shall be required for each lease or contract removed from the files."

General—It was further recommended that the specifications and instructions for the use of the several forms be grouped at the end of each particular group, instead of placing the information with each form.

Form 2000, *pp.* 385, 386—Inasmuch as carriers are required by the Interstate Commerce Commission to file schedules on forms DV 107 and 108, as prescribed by Federal Order No. 7, and as these returns comprise practically all the data called for on form 2000, "Register of Title Deeds," it was considered unnecessary to retain this latter form, but in lieu thereof to keep up forms DV 107 and 108 to date. It was therefore recommended that form 2000 be withdrawn from the Manual.

Forms 1110 *and* 1111, *pp.* 396 *and* 379—It was recommended that form 1110, "Monthly Report of Expenditures," and form 1111, "Record Cost of Work," be made 8½ in. by 14 in. and changed to conform with forms designated as Exhibits B and C.

It is suggested that the forms in the Manual be shown without the initials "A. B. & C. R. R.," and in lieu thereof a blank line with the words "Name of Railroad" be inserted.

Forms 1107, 1108, 1109, *pp.* 391-394—After careful study of these forms, the committee recommended their withdrawal and that a form designated as Exhibit D be substituted.

Discussion

W. A. Christian (chairman) presented the report. After reading the matter contained under "Appendix A—Revision of Manual," he moved that the recommended changes be adopted for inclusion in the Manual.

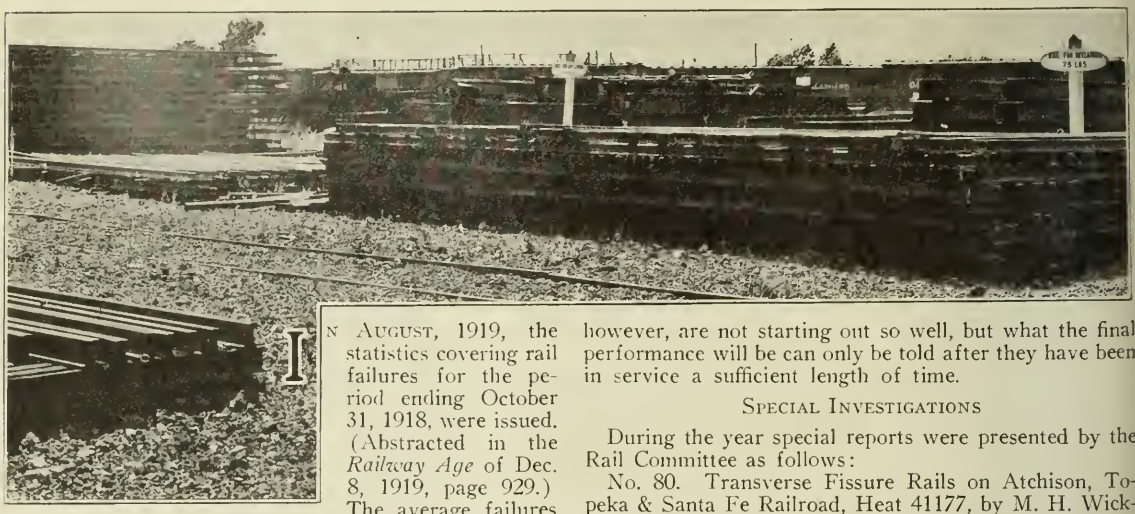
(Motion seconded and carried.)

That portion of the report on "Forms for Maintenance of Way and Structures" was presented by H. M. Stout (chairman of sub-committee), and after some explanation Mr. Christian moved that the matter as presented be approved for inclusion in the Manual.

(Motion seconded and carried.)

(The committee was excused with the thanks of the association.)

Report of the Committee on Rail



In August, 1919, the statistics covering rail failures for the period ending October 31, 1918, were issued. (Abstracted in the *Railway Age* of Dec. 8, 1919, page 929.) The average failures per 100 track miles of the rollings for the several years, including both Bessemer and open-hearth rails, are given herewith. This summary includes statistics from the reports for the years 1913 to 1918, inclusive:

Year Rolled	Years' Service 0	1	2	3	4	5
1908	...	....	....	.....	.....	398.1
1909	...	....	....	.....	224.1	277.8
1910	...	....	....	124.0	152.7	198.5
1911	...	....	77.0	104.4	133.3	176.3
1912	...	28.9	32.1	49.3	78.9	107.1
1913	2.0	12.5	25.8	44.8	69.5	91.9
1914	1.2	8.2	19.8	32.9	50.9	.....
1915	0.7	8.9	19.0	34.2	.....	.....
1916	1.6	11.8	29.2	.....	.....	.....
1917	5.3	21.6	....	.....	.....	.....
1918	1.6	....	....	.....	.....	.....

It will be noted that the 1908 to 1913 rollings show successively decreased numbers of failures compared on a basis of five years' service, and the 1914 rolling shows a further decrease when compared on a basis of four years' service. The more recent or "war-time" rollings, however, are not starting out so well, but what the final performance will be can only be told after they have been in service a sufficient length of time.

Special Investigations

During the year special reports were presented by the Rail Committee as follows:

No. 80. Transverse Fissure Rails on Atchison, Topeka & Santa Fe Railroad, Heat 41177, by M. H. Wickhorst. This paper gave the results of an examination of 52 rails all of one heat. The conclusion from this work was that transverse fissures are a development of small cracks existing in the interior of the rail head. Some of the rails of the heat were in a "shattered" condition in the interior, containing numerous small interior cracks, a few of which developed in service forming fissures.

No. 81. Rail Failure Statistics for 1918, by M. H. Wickhorst.

No. 82. Intensity of Pressure on Rails, by sub-committee, J. R. Onderdonk, chairman.

No. 83. Are the Nuclei of Fissures Cracks? by M. H. Wickhorst. This paper describes a few heat-treating experiments, the results of which support the idea that the nuclei are cracks from which fissures developed.

No. 84. Examination of Rails Long in Service for Relation Between Internal Stresses and Strains and Transverse Fissures, by W. C. Cushing. This paper gives the results of tests of some old Bessemer rails which

showed high internal stresses but in which no fissures were disclosed.

No. 85. The Nature of the Defects Revealed by the Deep Etching of Tranversely Fissured Rails, by Henry S. Rawdon. This paper describes some skillful work done by the Bureau of Standards at Washington, which showed that the "etching cracks" found in certain rail sections by deep etching with strong acid, result from pre-existent cracks (that is, previous to etching), the acid opening them up and rendering them visible.

No. 86. What Is Brittleness in Steel Rails? by M. H. Wickhorst. This paper is a discussion of the nature of brittleness in rails and the underlying causes for it.

No. 87. Review of Work on Interior Transverse Fissures, by Dr. P. H. Dudley.

Specifications for Steel Rails

Last year the committee submitted revised specifications for steel rails for consideration during the year. The committee has been in consultation with the rail manufacturers both by correspondence and in two joint meetings, and in this way has received their views and comments on the proposed specifications. In Appendix A were submitted Specifications for Carbon Steel Rails for adoption by the Association. A number of changes have been made from the specifications at present in the Manual, all of which should be given careful thought, but mention may be made of the following:

(a) For open-hearth rails 111 lb. per yard and over, the carbon is made 0.67 to 0.82 per cent, an increase of 0.05 per cent for the heaviest class of rails.

(b) For open-hearth rails the acceptance analysis is made on a sample from the finished rail instead of the ladle test ingot.

(c) For open-hearth rails the carbon range or spread is made 0.15 per cent instead of 0.13 per cent, it being felt slightly more allowance may be made when analyzing the finished rail.

(d) The bending of the rail in the physical testing may be accomplished by either the drop test or the quick bend test (hydraulic bender) as agreed upon in the contract.

(e) The elongation is required to be at least eight per cent in one inch of six inches.

(f) Three test pieces for bending are selected from each heat of open-hearth rails and all three must meet the requirements.

Intensity of Pressure

Two years ago the committee presented the results of tests made on the reciprocating wheel load machine at Sparrows Point, Md., dealing with the crushing effect on rail metal of various wheel loads. The rails so tested were later put into track and the observations continued. A final report of this work was given in Appendix D, which illustrates the displacement of the metal around the small test holes drilled through the rail head from side to side. Photographs of sections through the holes and microphotographs of etched sections were also given. These showed that while the vertical diameters of the holes had in all cases diminished more than the horizontal ones, the evidence of slip or flow was closely confined to the horizontal axes.

The results were given of New York Central experiments of area of contact between wheel and rail, which indicate that moderate unit pressures may be expected where rail and wheel conform, but where this is not the case, very severe kneading of the steel in the head of the rail may be expected.

Drilling of Rails

The Manual contains recommended spacing for bolt holes lengthwise of the rail. The committee submits the following recommendations for further standardizing the drilling:

1. That the distance of bolt holes above the base of the rail shall be such that the center line of the bolt holes shall be in the horizontal plane midway between the intersections of the vertical center line of the rail with the planes of the fishing surfaces of the head and base.

2. That the end clearance between adjacent rails, bolted in normal position, shall be $\frac{1}{8}$ in.

3. That for standard rails up to 120 lb. per yd., a one-inch bolt and a $1\frac{1}{16}$-in. bolt hole shall be used.

4. That for standard rails 120 lb. per yd. and over, a $1\frac{1}{8}$-in. bolt and a $1\frac{3}{16}$- bolt hole shall be used.

The following table shows the recommendations as applied to the four standard rails shown in the Manual and to three A. R. A. sections:

Weight of Rail, Lb.	Type of Rail.	Height of Bolt Hole Above Base of Rail, Inches.
100	RE	2 11/16
110	RE	2 13/16
120	RE	2 15/16
90	RA-A	2 19/32
90	ARA-B	2 11/32
100	ARA-A	2 3/4
100	ARA-B	2 1/2

Conclusions

The committee submitted the following recommendations:

1. That the specifications for carbon steel rails submitted with this report be adopted by the Association and included in the Manual.

2. That the recommendations for rail drilling submitted with this report be adopted by the Association and included in the Manual.

Committee: G. J. Ray (D. L. & W.), chairman; H. B. MacFarland (A. T. & S. F.), vice-chairman; E. E. Adams (U. P.), A. S. Baldwin (I. C.), W. C. Barnes (U. P.), W. C. Cushing (P. R. R.), G. M. Davidson (C. & N. W.), Dr. P. H. Dudley (N. Y. C.), J. M. R. Fairbairn (C. P. R.), L. C. Fritch (C. R. I. & P.), J. H. Gibboney (N. & W.), A. W. Gibbs (P. R. R.), John D. Isaacs (S. P.) Howard G. Kelley (G. T.), R. Montfort (L. & N.), A. W. Newton (C. B. & Q.), J. R. Onderdonk (B. & O.), H. R. Safford (C. B. & Q.), F. S. Stevens (P. & R.), R. Trimble (P. R. R.), F. M. Waring (P. R. R.), M. H. Wickhorst.

Appendix A—Specifications for Carbon Steel Rails

Inspection

1. **Access to Works.** No change.
2. **Place for Tests.** No change.

Material

3. **Material.** No change.

Chemical Requirements

4. **Chemical Composition.** The chemical composition of the steel, determined as prescribed in section 6, shall be within the following limits:

	Bessemer Process (Limits per cent)		Open-Hearth Process (Limits per cent)		
Constituent	Weight in lb. per yard		Weight in lb. per yard		
Elements	70-84	85 and over	70-84	85-110	111 and over
Carbon	0.40 to 0.50	0.45 to 0.55	0.53 to 0.68	0.62 to 0.77	0.67 to 0.82
Phosphorus, not to exceed	0.10	0.10	0.04	0.04	0.04
Manganese	0.80 to 1.10	0.80 to 1.10	0.60 to 0.90	0.60 to 0.90	0.60 to 0.90
Silicon, not less than	0.10	0.10	0.10	0.10	0.10

5. **Average Carbon.** No change.

6. **Analyses.** In order to ascertain whether the chemical composition is in accordance with the requirements, analyses shall be furnished as follows:

(A) Bessemer Process.—No change.

(B) Open-Hearth Process.—(a) Finished Rail Analysis. On each heat the manufacturer shall make an analysis of the elements, carbon, manganese, phosphorus, sulphur and silicon. A copy of the results shall be given to the inspector.

Drillings for these analyses shall be taken longitudinally of the rail with a one-half-inch drill, close to an upper corner of the head from any one of the three drop test pieces representing the top of the ingot, or from pieces cut adjacent to any one of these three drop test pieces.

(b) Ladle Analyses.—For the information of the inspector the manufacturer shall furnish a chemical analysis of the elements, carbon, manganese, silicon, phosphorus and sulphur, for each heat. These analyses shall be made on drillings taken from the ladle test ingots not less than one-eighth inch beneath the surface.

(C) Check Analysis.—On request of the inspector, the manufacturer shall furnish a portion of the ladle test ingot for the Bessemer process and a portion of the drillings from the finished rail for the open-hearth process for check analysis. When made a part of the contract the manufacturer shall furnish the necessary facilities at the mill for the purchaser's representative to make the check analysis.

(D) When the analyses for carbon by the mill chemists and by the railroad chemist do not agree, a tolerance of two points below the minimum and two points above the maximum will be allowed to cover such variation before condemnation.

Physical Requirements

7. **Physical Qualities.** No change.

8. **Method of Testing.** The physical qualities shall be determined by:

(a) The Drop Test, or

(b) The Quick Bend Test, if made a part of the contract.

9. **Drop Testing Machine.** The drop testing machine used shall be the standard of the American Railway Engineering Association, the essential points of which are:

(a) No change.

(b) No change.

(c) No change.

(d) The spacing of the supports between centers shall be: 3 ft. for rails weighing 110 lb. or less per yard, and 4 ft. for rails weighing from 111 to 140 lb. per yard, inclusive.

10. **Machine for Quick Bend Test.** The quick bend test shall be made with a hydraulic press of not less than 350 tons capacity, some of the details of which are as follows:

(a) The foundations for the supports of the test specimens shall be adequate to sustain rigidly the total load applied by the press.

(b) The supports shall be solid flat bearing surfaces with vertical faces 48 in. apart, with the inner edges rounded to a ⅛-in. radius.

(c) The head of the ram shall have a bearing face with a radius of five inches.

(d) The speed of the ram shall approximate 13 ft. per minute when allowed free travel.

(e) A hydraulic indicator shall be connected with the press so that the pressure on the head of the ram is registered by the pen arm on a vertical scale, and the distance rotated by the cylinder shall be proportional to the travel of the ram head.

11. **Test Specimens.** (a) Test specimens shall be one or two feet longer than the span between supports in the testing machine.

(b) Test specimens shall be cut from the crop of the top rail of the ingot, and marked on the center line of the top surface of the head with gage marks one inch apart for three inches each side of the center of the specimen, for measuring the ductility of the metal.

(c) Where it is necessary to test rails lower than the first rail, the bottom of the first rail, in lieu of the top of the second rail, and the bottom of the second rail, in lieu of the top of the third rail, will be accepted, if preferred by the manufacturer.

(d) The temperature of the test specimens shall be between 60 and 100 deg. F.

(e) Unless otherwise instructed by purchaser, the test specimens shall be tested with head in tension and with the center punch marks midway between supports.

12. **Height of Drop.** The test piece shall be subjected to impact of the tup falling free from the following heights:

For 70 to 79 lb. rail, incl.....16 ft.
For 80 to 90 lb. rail, incl.....17 ft.
For 91 to 110 lb. rail, incl.....18 ft.
For 111 to 140 lb. rail, incl.....20 ft.

13. **Elongation.** Under these impacts the rail under one or more blows shall show at least 8 per cent elongation for one inch of the six-inch scale, marked as described in Section 11 (b).

(b) If any test piece does not show the required elongation (Section 13), or if when broken shows interior defect, all of the top rails from that heat shall be rejected.

(c) Second tests shall then be made from three test pieces selected by the inspector from the top end of any second rails of the same heat, preferably of the same ingots. If all these test pieces show the required elongation (Section 13), all of the remainder of the rails of the heat shall be accepted, provided that no test piece, when broken, shows interior defect.

(d) If any test piece does not show the required elongation (Section 13), or if when broken shows interior defect, all of the second rails of the heat shall be rejected.

(e) Third tests shall then be made from three test pieces selected by the inspector from the top end of any third rails of the same heat, preferably of the same ingots. If all these test pieces show the required elongation (Section 13), all of the remainder of the rails of the heat shall be accepted, provided that no test piece, when broken, shows interior defect.

(f) If any test piece does not show the required elongation (Section 13), or if when broken shows interior defect, all of the remainder of the rails from the heat shall be rejected.

19. **No. 1 Rails.** No change.

20. **No. 2 Rails.** Rails which vary from specifications in a manner which does not impair their soundness and strength will be accepted as "No. 2 Rails." The rails to be so accepted are as follows:

(a) Rails arriving at the straightening process with sharp kinks or greater camber than that indicated by a middle ordinate of 4 in. in 33 ft. for the thick base sections, and 5 in. for the thin base sections.

(b) Rails which do not contain surface imperfections in such number or of such character as will, in the judgment of the inspector, render them unfit for recognized No. 2 uses.

Rails accepted as No. 2 rails shall have the ends painted white, and shall have two prick punch marks on the side of the web near the heat number, near the end of the rail, so placed at not to be covered by the joint bars.

No. 2 rails to the extent of five per cent of the whole order will be accepted.

Details of Manufacture

21. **Quality of Manufacture.** No change.

14. **Exhausted Ductility Test.** A sufficient number of blows shall be given to determine the complete elongation of the test piece of at least every fifth heat of Bessemer steel, and of one out of every three test pieces of a heat of open-hearth steel.

15. **Permanent Set.** For each specimen, a record shall be made of the permanent set, measured on a 3 ft. chord, after each blow under the drop test.

16. **Test to Destruction.** No change.

17. **Bessemer Process Physical Tests.** One piece shall be tested from each heat of Bessemer steel.

(a) If the test piece shows the required elongation (Section 13), all the rails of the heat shall be accepted, provided that the test piece when broken does not show interior defect.

(b) If the test piece does not show the required elongation (Section 13), or if when broken shows interior defect, all of the top rails from that heat shall be rejected.

(c) A second test shall then be made of a test piece selected by the inspector from the top end of any second rail of the same heat, preferably of the same ingot. If the test piece shows the required elongation (Section 13), all of the remainder of the rails of the heat shall be accepted, provided that the test piece when broken does not show interior defect.

(d) If the test piece does not show the required elongation (Section 13), or if when broken shows interior defect, all of the second rails from that heat shall be rejected.

(e) A third test shall then be made of a test piece selected by the inspector from the top end of any third rail of the same heat, preferably of the same ingot. If the test piece shows the required elongation (Section 13), all of the remainder of the rails of the heat shall be accepted, provided that the test piece when broken does not show interior defect.

(f) If the test piece does not show the required elongation (Section 13), or if when broken shows interior defect, all of the remainder of the rails from that heat shall be rejected.

18. **Open-Hearth Process Physical Tests.** Test pieces shall be selected from the second, middle and last full ingot of each open-hearth heat.

(a) If all of these test pieces show the required elongation (Section 13), all of the rails of the heat shall be accepted, provided that no test piece when broken shows interior defect.

22. **Record of Manufacture.** When made a part of the contract, the manufacturer shall furnish the inspector with a carbon copy of open-hearth or Bessemer charge sheets; records of melting, tapping, ladle and teeming conditions; soaking pit charge sheets, rolling mill operation; rail weight sheets; hot bed and straightening records, wherever such sheets or records are in regular use by the manufacturer.

23. **Bled Ingots.** Bled ingots, from the center of which the liquid steel has been permitted to escape, shall not be used.

24. **Discard.** No change.

25. **Lengths.** No change.

26. **Stool Cutting.** Care should be taken in teeming the ingots to prevent cutting out of the cast iron of the stools of ingot molds by the falling stream of hot metal from the ladle, and thus avoid a frequent cause of carbon streaks found in the finished rail.

27. **Mold Spattering.** Spattering the interior sides of the molds in pricking the heats or melts and teeming the ingots must be avoided as much as possible.

28. **Stopper Defects.** Excessive use of material thrown into the teeming ladle to set the stopper must be avoided.

29. **Aluminum.** The steel must be made to set quick by the chemical composition in the molds without the addition of aluminum, either in the ladle or molds.

30. **Time for Ingot Setting.** Time must be allowed for the tops of the ingots to set without spraying with water.

31. **Ingots Vertical.** Ingots shall be kept in a vertical position on the ingot cars and in the reheating furnaces until their heat is equalized ready to be rolled.

32. **Section.** No change.

33. **Weight.** No change.

34. **Hot Bed Work and Straightening.** (a) Care must be taken in cambering the rails and with the hot-bed work so that rails will cool with a small but uniform sweep, and therefore gagging under the presses will be reduced to a minimum.

(b) Rails while on the cooling beds shall be protected from snow, water and excessive gusts of cold wind.

(c) When delivered to the straightening presses rails shall not vary in any direction from a straight line throughout their entire length more than 4 in. for the "RE" and "RA" thick base sections, and not more than 5 in. for "ASCE" sections.

(d) The supports for rails in the straightening presses shall have flat surfaces and be out of wind, and shall be spaced not less than 42 in. The application of the gag shall be central between supports, and the overhang of either end of the rail during straightening should be supported.

(e) Rails heard to snap while being straightened shall be at once rejected.

35. **Drilling.** Circular holes for joint bolts shall be drilled to conform to the drawings and dimensions furnished by the Railroad Company. A variation of 1/32 in. in the size and location of bolt holes will be allowed.

36. **Finishing.** No change.

37. **Branding.** No change.

38. **Separate Classes.** No change.

39. **Loading.** Rails shall be carefully handled and loaded in such manner as not to injure them. When a part of the contract, all first quality rails of each heat shall be kept together in loading.

40. **Payment.** No change.

Matters Subject to Contract

Clause 3 —Steel may be Bessemer or open-hearth.
Clause 6c—Check analysis.
Facilities for analyses at the mill.
Clause 8b—The quick bend test.
Clause 22 —Record of manufacture.
Clause 40 —Loading.
Keeping rails of each heat together.

Notes on Manufacture Added as Information

(To be attached to the specification)

Note A: The selection of the ores, scrap, molten metal, fluxes and other furnace additions; regulation and quality of the port gases; condition of the slag, furnace bottom and lining; temperature of the bath, and time for refinement of each melt of steel require especial attention so that the molten steel when tapped will be refined and deoxidized.

Note B: The steel must be well deoxidized and the waste products eliminated before the ingots are teemed, and thus prevent minute portions of the deoxidation products from becoming entrained in the setting metal. Time is required for the deoxidation products and impurities to rise after the steel is tapped into the ladle.

Note C: Loose material and dirt should be removed from the ladle before tapping is commenced to prevent impurities from being incorporated in the molten metal. The ladle lining should be well set before tapping.

Attention should also be given to the proper coating of the ingot molds, and care should be taken to remove dirt or loose material from the tops of the ingot buggies before setting up the molds.

Note D: The ingots should be stripped as soon as the metal caps over on top; weighed and charged promptly into the soaking pits, and thus avoid cooling of the interior metal. This checks the shrinkage of the steel, which may be large, depending upon the volume, chemical composition and temperature of the ingot at the time it is charged. The interior shrinkage can be confined to 0.05 to 0.1 per cent per cubic foot of the metal, so that it is eliminated in the usual discard of the bloom, and helps to prevent piped rails due to cold ingots.

Note E: The ingots should be uniformly heated in the soaking pits and the port gases properly regulated to prevent overheating, and with protection from direct impingement against the vertical faces of the ingots. The large hot ingots should be soaked at least two hours before blooming.

Note F: Blooming the ingots and rolling the blooms into finished rails should all be done when the ranges of temperature for the ingots, blooms and rails are suitable for the metal to be cambered and then cooled so that the transformations and recalescence will be complete for the desired steel.

Note G: The hot rails from the saws and on the "hot-beds" should be spaced to allow the recalescence of the head to follow that of the base without being locked or blocked by adjacent rails on either side.

Note H: The effect of straightening may be materially reduced for the heavier and stiffer sections by spacing the supports in the press at 60-inch centers. Several mills have made the necessary changes with beneficial results.

Care should be taken to see that the supports of the presses are not worn hollow, and the gags used have rounded corners, and are in good condition.

Discussion

In the absence of G. J. Ray (chairman), H. B. MacFarland (vice-chairman) presented the report.

Vice-Chairman MacFarland: The work of the committee covered 13 subjects assigned for the past year. The rail failure statistics have been compiled as in the past, as has the work on special investigations. The specifications for steel rails were presented at the last meeting of the association. They will now be presented to you with the recommendation that they be inserted in the Manual.

Under rail sections, the committee desires to make a supplementary report, as it is now able to report on 150 lb. section of rail, which has been designed along the same lines as the 130 and 140 lb. rails shown in the 1915 proceedings. This rail section is submitted to the association for information only.

One of the concluding recommendations of the committee will involve the insertion of 130 and 140 lb. rails in the Manual. This will automatically cause the following insertion in the table on rail drillings: Weight of rail, 130 lb.; type of rail, R. E.; height of bolt hole above base of the hail, 3 1-16 in.; weight of the rail, 140 lb.; type of rail, R. E.; height of bolt hole above base of the rail, 3⅛ in.

I move the adoption of recommendation (1) under Conclusions. (The motion was seconded. C. G. Gennet, Jr., R. W. Hunt & Co., then read a prepared discussion, which is abstracted below.)

A common rail specification, fit for all railroads and all manufacturers, seems almost impossible of realization and the next best thing for this association is to create a high standard for the guidance of individual purchasers in their dealings with manufacturers. My principal objection to the proposed specification lies in the fact that it does not go far enough to merit the distinction intended. This specification provides no change or im-

provement of the method designed to restrict the production of split heads offered by the specification adopted in 1912. Likewise, broken rails and base failures combined, representing 41 per cent of all the failures, might be reduced by providing that certain test pieces be pickled in acid, so that opportunity for a more careful surface inspection for seams could be arranged for when conditions demanded.

Passing to the proposed specification, the first important change from present practice is with the chemical composition. My experience leads very strongly to the opinion that a few points of carbon may be greatly overshadowed by the later treatment that the steel receives. Many benefits would accrue from the adoption of a common standard for the carbon content, and as the specifications most used now vary from a minimum carbon of 0.58 per cent to a maximum of 0.76 per cent, it seems to me that the change made by this specification might be improved by making the limits, say 0.59 to 0.76 for rails of 85 lb. to 110 lb. per yard in weight. This would compose the chief differences now existing in the chemical requirements of a number of specifications, without apparent detriment to the various roads.

The most radical departure from present practice made by this specification is with respect to the physical tests. A careful reading of Sections 17 and 18 shows that rails are to be accepted on the basis of elongation only. That is (regardless of the number of test pieces that may be broken under the drop), if those pieces show 8 per cent of elongation in one inch, the rails represented may be accepted, subject, of course, to the appearance of interior defects as defined, without regard for segregation. Naturally, this annuls the test for brittleness per se that the impact of the drop has been considered to afford for many years past.

I submit to the principle that ductile rails are safe rails, but I do not believe that the danger point of ductility for rails has been sufficiently determined or that it can be properly measured, and I regard with much apprehension the acceptance of rails based on their elongation only.

Much has been written of recent years concerning the effects of cold straightening rails and section 34 will be helpful in obtaining better hot bed work. Section 36 still provides, however, that rails shall be straight in line and surface. I urge a modification of this clause to permit of accepting rails containing a uniform sweep of not over one inch in any direction, preferably, however, with the ends high.

Omission from this specification of the clause regulating the rolling temperature is, on the whole, warranted and justifiable by general mill conditions. The requirement in Section 37 (b) that the ingot numbers be stamped on rails is a distinct step forward.

A. L. Davis (I. C.): This specification has only been in the hands of the members of the association a few days, and I do not see how it is prepared to pass on it intelligently at this time.

Mr. Abbott: I would like to inquire whether or not it would be proper to ask for an explanation from the committee. There is a peculiarity embodied in this specification in regard to requirements and other matters subject to contract. There is a possibility of confusion in having that in the specification. It would seem that specifications for material should be as definite as possible; that after the committee has decided what is wanted and what they should have, it ought to be mandatory in the specification, so that anyone using it would simply have to place their order under that specification without any further question. Anyone buying rail to this specification, assuming it is adopted by the association, will immediately find themselves in an embarrassing position, because it will not be possible for them to know what the companies that are paying the most attention to rail-making require when they order, and for that reason it would seem that all this matter that is subject to agreement between buyer and manufacturer should be placed somewhere else. I think it is understood or inferred by the writers of this specification that when the statement is made and the wording is "when subject to order" or "when subject to agreement," it would be understood as operative if there was nothing of that kind in the contract. My understanding is, however, that if someone should take this or accept an order under this specification, there would be a liability of their being called on to perform everything that is mentioned, unless it was specifically mentioned in the contract that they would not do it. If this specification is approved for use, it will be necessary for the manufacturers, whenever they take an order under that specification, to specifically note in the contract the clauses and the notes, or give the part that is not supposed to be within the special agreement. My point is that it involves unnecessary work and unnecessary negotiation. If the specification should be brought down to the parts that are mandatory, that the men who have studied it and decided that those parts should be carried out, were written together, not involving any parts that are subject to contract, it would be more concise and more workable.

The chairman: So far as the subject of contract, which is the most important inclusion in the specification, this subject being referred to by Mr. Abbott, you will note that unless there was a particular agreement, that these subjects would not be taken care of by the manufacturer. If there is an agreement that you must specify in your order either Bessemer or open hearth, you may get either Bessemer or open hearth. If you want to send your own chemist to the mill, you have to make an agreement with that mill so that the chemist may go there and may have quarters. Most mills will be willing to allow this, because it would facilitate the shipment of the rail.

In reference to the quick bend test, you understand this will have to be a matter of contract. You would not get a quick bend test until you made a particular agreement for it.

Record of Manufacturer. Under that clause you would not get this record unless you made an agreement for it.

Loading: Keeping rails of each heat together. Some roads require this, but they would not get it unless they made a special agreement for it. I don't see but what this clause 40 takes care of the situation which Mr. Abbott has agitated.

Mr. Abbott: Mr. McFarland's explanation is entirely clear, and I think if the members of the committee were coming to the mills as individuals, they would find out about these things. I think all these men know what they are doing when they write those things in there, they know what they intend, but when this specification is written in full, or one or two changes made in the specification and attached to the contract, it becomes a part of the contract when the contract is signed, and the inspector coming to the mill with those specifications has instructions to see that they are complied with. My information is that he can demand what is in the specification. He may say: "I want the heats loaded separately, I want them all loaded separately on cars, so that they can be unloaded together." If the specification states that that is not to be done, the inspector is not in a position to require it to be done, and the same situation would exist in connection with other parts. There may be things in there that cannot be carried out, but it would

be part of the contract if attached to the contract. That was my reason for suggesting the possibility of separating these from the parts of the contract that are mandatory, that go along with the agreement, and that must be carried out, not leave the question open. My thought is that it would be better if all parts that are to be done as matter of contract could be arranged in the specification so that they would be absolutely cut off from the main requirements of the specification.

(The motion to adopt the specification was carried. The chairman submitted Conclusion 2 and it was accepted.)

Conclusion 3, which contained the sections RE-130 and RE-140 for 130 and 140-lb. rails, as shown on pages 401 and 402, respectively, of the Proceedings of the Association for 1915, was also accepted as recommended practice, and drawings included were adopted for publication in the Manual.

The Chairman: We also offer the following conclusion:

That all the present rail forms issued as recommended practice and as shown in the Manual for 1915, pages 93 to 112, inclusive, be omitted from the new Manual, and that a statement be entered in place thereof in the new Manual, stating where the old forms can be found, and further stating that these forms are in process of revision, and will be contained in a supplement to the Manual.

(A motion to adopt was carried and the committee was excused.)

Report on Yards and Terminals

THE COMMITTEE HAS given the subject of Unit Operation of Railroad Terminals in Large Cities due consideration and study during the year. A large volume of data has been obtained in reference to unit operation, but the committee is not prepared to make a final report thereon at this time. The committee therefore reports progress and recommends a continuance of the subject.

The results of unit operation of terminals, as reported by the regional directors, during the period of Federal control, were given in Appendix C, this data having formed the basis for an article on this subject which appeared in the *Railway Age* of Jan. 2, 1920, page 77.

On subjects 3, 4, 5 and 6, respectively, handling of freight in double-deck freight houses; typical plans for passenger stations; classification yards, and small sorting yards, the committee reported progress.

Committee: B. H. Mann (M. P.), chairman; A. Montzheimer (E. J. & E.), vice-chairman; W. G. Arn (I. C.), Hadley Baldwin (C. C. C. & St. L.), Miles Bronson (N. Y. C.), G. H. Burgess (D. & H.), A. E. Clift (I. C.), L. G. Curtis (B. & O.), H. T. Douglas Jr. (C. & A.), A. C. Everham, E. M. Hastings (R. F. & P.), Reuben Hayes (Southern), D. B. Johnston (P. L. W.), H. A. Lane (B. & O.), Lt.-Col. F. E. Lamphere, F. E. Morrow (C. & W. I.), H. J. Pfeifer (T. R. R. of St. L.), S. S. Roberts, C. H. Spencer (I. C. C.), E. B. Temple (P. R. R.), E. E. R. Tratman (Engr. News), J. G. Wishart (C. R. I. & P.).

Special Assignments

At the Twentieth Annual Convention the Committee on Yards and Terminals was instructed to co-operate with a joint committee appointed by the United States Railroad Administration for the purpose of drafting "Specifications for the Manufacture and Installation of Railroad Track Scales," the committee being given power by the Association to act for it in this matter. The committee submitted in Appendix A the results of the labors of the joint committee, and recommended that the specifications contained therein be approved and substituted for the "Specifications for Track Scales," now included in the Manual. These specifications were published in the *Railway Age* of Dec. 15, 1919, page 1098.

Anticipating the approval of these specifications, it was considered desirable to also revise the "Specifications for the Location, Maintenance, Operation and Testing," to conform to the new track scale specifications. Rules covering these subjects were therefore prepared and submitted in Appendix B for approval. Approval of these rules will automatically cancel similar rules now in the Manual.

The committee was instructed to collaborate with the Committee on Water Service upon plans and specifications for typical water station layouts. Conforming to that instruction, the Committee on Water Service submitted 15 plans, showing typical terminal, passenger station, junction and yard layouts, requesting the committee to locate proposed water facilities. This was done and the plans returned to the Water Service committee.

Conclusions

The committee recommends the following action on its report:

1. That the "Specifications for the Manufacture and Installation of Railroad Track Scales" be approved and substituted for the "Specifications for Track Scales" now in the Manual.

2. That the "Rules for the Location, Maintenance, Operation and Testing of Track Scales," and the several appendices accompanying same, be approved and substituted for similar matter now in the Manual. (Appendix B.)

3. That the remainder of the report be received as information and progress.

Appendix B—Rules for the Location, Maintenance, Operation and Testing of Railroad Track Scales

SECTION I—LOCATION

1. **General Conditions.** The proper location of track scales depends principally on the following conditions:

(a) The volume of traffic to be weighed in comparison with that switched over the scales and not to be weighed. The presence of the scale in a much used track is a source of increased cost of maintenance and difficulty in inspecting and testing as well as dangerous to trainmen. In general, in yards not operated by gravity, the scale should not be located in a main drilling lead unless the number of cars to be weighed exceeds 60 per cent of the total number of cars handled or unless the total number of movements over the main drilling lead is comparatively small.

(b) Whether the scale is to be equipped with dead rail or relieving gear. If practicable, scales should be located where dead rails may be used.

(c) Whether a run around track will be installed for

switching with a separate track for weighing. Where spot weighing is done the run around track is desirable. If cars are to be weighed as classified, the weighing track need be only long enough to clear the dead rail switches. If cars are to be weighed in solid cuts, the weighing track should be long enough to hold a cut of cars to be weighed, both before and after being weighed, in order not to block operation of other tracks while weighing is being done. The weighing track may be located alongside of the drilling track, alongside of the ladder track or on an outer yard track.

(d) Whether cars are to be weighed spotted or in motion. If cars are to be weighed in motion the scale must be on a grade in the drilling track at the head of the classification yard.

(e) The cost of extra switching when the scale is not located on the lead to the classification tracks. Ordinarily the cost of the extra switching may be ignored when the integrity of the weights would be affected.

(f) The cost of maintenance when the scale is located on the lead to the classification tracks and only a small proportion of the cars are to be weighed.

(g) The necessity for quick dispatch of cars that are weighed.

2. **Position of Live and Dead Rails:** Live rails should be on the offset line and the dead rails straight unless a large portion of the cars are to be weighed. For motion weighing the offset should be divided, unless the resistance is equalized by means of a spring switch.

3. **Grade for Motion Weighing:**

(a) Runoff Grade: When the scale is located on the lead to the classification tracks in a hump yard it shall be at such an elevation that the cars will run by gravity as far as desired into the classification yard with a maximum speed of four miles per hour over the scale.

(b) Approach Grade: The distance and grade from the apex of the hump to the scale should be such that the speed of free running cars will not exceed four miles per hour on the scale without brake application; and such that cars can be so spaced and controlled that the weighing period of three seconds will not be reduced.

(c) Grade of Live Rails: Scales to be used for motion weighing should be constructed with the scale rails on a gradient not greater than one per cent. The weighing mechanism must in all cases be installed on a level plane, with supports introduced to fix weighing rails on the desired gradient.

(d) Grade for Weighing Cuts of Cars: The grade of the track for at least one car length in each direction from the scale should be the same as the grade over the scale. Where it is the practice for one car rider to take several cars together into a classification track, the same grade as on the scale should be maintained for at least 100 and preferably 200 ft. beyond the scale so that cars may be stopped easily by the car rider and so that the following cars will not cause excessive impact when striking the cars ahead. This should occur not less than one car length from the scale.

4. **Runoff Grade for Spot Weighing:** When a scale is installed not in connection with a hump, it is desirable that it be high enough to permit cars to run away from the scale by gravity after being weighed.

Section II—Maintenance and Operation

1. **Numbering Scales:** No change.
2. **Scale Shop:** No change.
3. **Cleaning:** No change.
4. **Rust Preventive for Pivot and Bearing Steels:** The best rust preventive obtainable should be applied to pivot and bearing steels, but it should be so applied as not to interfere with the proper working of the scale.
5. **Removal of Ice:** No change.
6. **Standing of Equipment Prohibited:** No change.
7. **Restrictions to Use of Live Rails:** Engines or similar heavy equipment should not be passed over the live rails, except on authority of the department having supervision over the installation and maintenance of scales. The unnecessary passing of cars over the live rails should be prohibited. Weighed cars which have passed beyond the dead rail switch must not be returned over the live rails. The dead rail switches should be set for the dead rail track except when cars are being weighed.
8. **Cars Restricted to Live Rails or Dead Rails Only:** Cars on the live rails must not be moved by cars or engines on the dead rails or vice versa. Cars must not be moved over the scale with one truck on the live rails and another truck on the dead rails.
9. **Use of Sand and Injector by Enginemen Prohibited:** Enginemen must not apply sand or use the injector when on the scale. The slipping of engine drivers on either live or dead rails is injurious to the structure and should be avoided.
10. **Weigh-beam:** The weigh-beam should be balanced before the scale is used. When not in use it should be secured by the beam catch and with the poise set at the highest graduation.
11. **Stopping Cars on Scales:** No change.
12. **Automatic Weighing and Recording:** Where automatic weighing and recording devices are used it is absolutely necessary that both the scale and the automatic devices be in first-class condition, with properly maintained approach track, and cars must be run at a slow rate of speed with particular attention to steadiness of motion which is essential to obtaining best results.
13. **Locking Scale Houses:** Scale houses and beam boxes must be kept locked when not being used.
14. **Inspection by Weighmaster:** No change.
15. **Painting:** The scale mechanism and structural steel should be painted often enough to prevent corrosion.

Section III—Testing

Paragraph 5 has been added, as follows:

5. **Adjustment:** Track scales should be kept in the closest possible adjustment, and a scale should be considered inaccurate when it cannot be adjusted, and such adjustment maintained to within 2 lb. to 1000 lb., in excess or deficiency, when distributed test is made with two or more test loads. When only concentrated sectional tests are made, the maximum error for any position of the test load should not exceed 3 lb. to each 1000 lb. of test load used.

The sensibility reciprocal of a track scale should never be more than 100 lb.

Section IV—Equipment for Testing

1. **Standard of Mass:** No change.
2. **Even Arm Balance and Master Scales:** It is desirable for verifying or scaling test weights and test cars to have, in addition to standards of mass prescribed above:

(a) An accurate even arm balance of 100 lb. capacity in each pan, sensitive when loaded to two grains.

(b) A master scale.

Section VI—Scale Test Cars

1. For general track-scale testing test cars should weigh not less than a total of 30,000 lb., nor more than 80,000 lb. For making graduated tests and to simplify computations, cars weighing 80,000 lb. and 40,000 lb., respectively, are suggested. The maximum weight of 80,000 lb. is suggested principally in order to reduce the number of restricted movements due to weight limits on scales, bridges, etc.
2. Scale test cars of proper design should have the following characteristics:

(a) All-metal construction.

(b) Length of wheel-base not to exceed 7 feet.

(c) Load distributed uniformly on wheels.

(d) No unnecessary ledges or projections likely to catch and hold dirt.

(e) No unnecessary parts.

(f) Strength and durability so that frequent repairs will not be necessary.

(g) Surface area reduced as much as possible, to limit wind pressure.

(h) Accessibility of all parts for inspection.

(i) Roller or ball bearings reduce rolling resistance, thereby providing for ease of movement by scale inspector. They do not require sponging and repacking of journal boxes, which materially changes weight of test car between periods of verification and for these reasons are preferable to journal bearings.

3. Test cars may be of the self-contained type, having a body of solid castings with space provided for a small amount of test weights, or of the compartment type, having a body of structural and plate steel with space for test weights equal in weight to that of the car. The car of the self-contained type is preferable.
4. When supercargo (consisting of tools, overclothes, etc.) is carried in test car, it should be removed when the weight of car is being verified on master scale, also when testing track scales. To facilitate handling of supercargo, it should be contained in a removable steel box, properly stenciled to show that it is not a part of the test load. There should be stenciled on the outside of each of the doors of the compartment in which this box is carried the following note:

"This box contains supercargo, such as tools, etc., used

for adjusting track scales, and must be taken out of car when car is weighed on master scale and when testing track scales."

5. Scale test cars should be moved on the rear end of trains, just ahead of the caboose.

6. Scale test cars should not be kept on trains in yards while the latter are being switched, but should be so placed that rough handling will be avoided. In no case should these cars be subjected to impact at a speed greater than two miles per hour.

7. All excess weight, resulting from the accumulations of snow and ice, should be removed from scale test cars before they are placed on scales for the purpose of testing. To remove this, an engine with steam-hose connections may be used to thaw it, or hydro-carbon, where available, may be employed if used with care.

8. Oiling and repacking of test cars should be looked after while test car is at master scale for verification.

9. Scale test cars should be verified on master scale at least every three months, or after each general test trip.

10. In order to maintain the verified weight of the scale test cars at all times, no repairs of any nature should be made while in transit or boxes sponged without notifying the scale inspector in charge of the car, in order that he may be present to determine and arrange to take care of any differences between the weight of parts applied and those removed. To insure compliance with this rule, there should be located in a conspicuous place, so that it can be read from either side of the car, a badge-plate, with some such notice as: "Do not oil or repack boxes or make repairs to this car unless directed by scale inspector."

11. In case a scale test car is damaged so as to require extensive or heavy repairs, it should be returned to the master scale for verification after the repairs have been completed.

Discussion

(The report was presented by B. H. Mann, chairman, who moved the action recommended in the conclusions shown above. The motion was carried and the committee was dismissed with the thanks of the association.)

Report on Economics of Railway Operation

In Appendix A the committee submitted a formula for the assignment of certain operating expenses to determine the terminal costs of handling freight traffic. While this is now being modified to meet recent changes in accounting instructions, it is considered of value as a matter of information. This formula is a modification of the "Arkansas Formula." It is a detailed method for ascertaining terminal costs and is applicable to large and small stations. It was prepared in 1918 for collecting costs for use in connection with various rate cases in C.F.A. territory by E. F. Saur, special agent, Pennsylvania Lines, and H. E. Coverston, Special Agent, C. C. C. & St. L.

This formula covers about 85 per cent of the total charges to operating expenses and can be used with only a fraction of the cost of applying the complete Arkansas Formula. The costs omitted are not easily assignable and are in general those least liable to be affected by changes in methods. It is carefully worked out. It is now being modified to meet recent changes in accounting instructions. Further study will probably develop the need of some refinements, the ratio of 3 to 1 for sidetrack maintenance being one such.

The formula makes no attempt to consider anything but actual expense charges. The value of the facilities used does not enter into the results. While the formula was prepared for the purpose of rate cases, it is also adapted for use as a basis for studies of operation and for comparisons of costs under varying conditions. There are many items of expense not affected by changes in conditions and for any particular study the unaffected items can be omitted. A similar formula can be prepared for road costs.

Allocation of Maintenance of Way Expenses to Passenger and Freight Service

The Interstate Commerce Commission, by an order dated December 1, 1919, has prescribed, effective January 1, 1920, rules governing the separation of operating expenses between freight service and passenger service applicable to every carrier by steam railway whose operating revenues exceed $1,000,000 per annum. These rules cover not only the maintenance of way and structures group of accounts but all operating expense accounts.

It is the view of the committee that the separation of maintenance of way and structure expenses between freight and passenger service, while of the utmost importance as a basis for determining the reasonableness of a given rate or body of rates, is of but slight value otherwise. Inasmuch as the supreme rate-making body has prescribed a complete and definite method to which the carriers must strictly adhere in their cost accounting, the committee is of the opinion that the allocation of maintenance of way and structures expenses to freight and passenger services has, as a practical matter, been taken out of the field of controversy and nothing is to be gained for the present by study and discussion of this cost accounting problem which has led to such wide variations of opinion in past rate litigation. If at some future time the experience of the carriers develops obvious defects in the basis prescribed by the Interstate Commerce Commission and it appears that substantial injustice is done thereby, the subject of a proper method of separating these expenses might again become a practical and important question, but the committee think that, at least until the railroads have given a fair trial to the methods prescribed by the Commission, the subject of a freight-passenger separation of operating expenses is of theoretical value only.

Committee: F. W. Green (St. L. S. W.), chairman; V. K. Hendricks, vice-chairman; G. D. Brooke (B. & O.), Ralph Budd (G. N.), Maurice Coburn (P. L. W.), L. C. Fritch (C. R. I. & P.), C. M. Himmelberger (C. R. R. of N. J.), M. V. Hynes (C. I. & W.), Paul M. LaBach, Frank Lee (C. P. R.), Jos. Mullen, H. A. Osgood (Wabash), R. J. Parker (A. T. & S. F.), J. H. Prior (Cons. Engr.), W. G. Raymond (Univ. of Iowa), L. S. Rose (C. C. C. & St. L.), Mott Sawyer (C. M. & St. P.), Edward C. Schmidt, J. E. Teal (B. & O.), C. C. Williams (Univ. of Kan.).

Discussion

(In the absence of the chairman, G. C. Williams presented the report.)

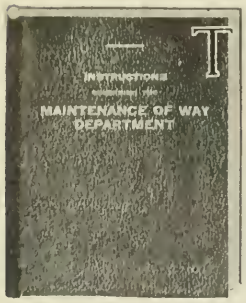
C. C. Williams (Univ. of Kan.): I would like to call attention to Appendix A, which gives the method of analyzing costs for the solution of special problems, relating particularly to the division of operating expenses between line and terminal. This is a formula that has been used on the Big Four and certain other lines with success and satisfaction. Several of the details of the

formula will need to be modified from time to time, but it is submitted as a workable method of undertaking this problem.

C. A. Morse (C. R. I. & P.): I want to say that I read part of the report of the committee, and was specially interested in the latter part, their suggestions as to matters of interest that were being effected under the new rules in regard to the payment of train crews. I think it is a subject that is of very great importance to the railroads, and that it ought to be discussed. One thing that struck me as very interesting in looking it over was their reference to the fact that possibly with a proper study of the conditions, instead of grade reductions and line improvements that we have looked at with a good deal of interest in past years, more running tracks was the thing that was going to be necessary; that we have got to get our trains over the road in shorter time and do away with time and a half for overtime on freight trains. I think it is a big subject for thought and careful consideration on the part of this committee and the association, in regard to that very thing. We are all up against the question of new working conditions, and if running tracks are what are necessary in order to reduce operating expenses, instead of some of the other things that we have thought for years were the proper things to do, we ought to know it.

(The committee was dismissed with the thanks of the association.)

Report on Rules and Organization



THE COMMITTEE in Appendix A presented rules for the inspection of bridges and culverts and recommended its approval and publication in the Manual.

Committee: W. H. Finley (C. & N. W.), chairman; F. D. Anthony (D. & H.), vice-chairman; O. F. Barnes (Erie), E. H. Barnhart (B. & O.), W. C. Barrett (L. V.), H. L. Browne (C. B. & Q.), J. B. Carothers (B. & O.), S. E. Coombs (N. Y. C.), H. H. Edgerton (C. G. W.), B. Herman (Sou.), *A. J. Himes, F. D. Lakin (Erie), Jos. Mullen, E. T. Reisler, W. H. Rupp, P. T. Simons, R. E. Warden (M. P.).

Appendix A—Rules for Inspection of Bridges, Trestles and Culverts

Wooden Structures

The inspection of foundations and masonry by the division bridge inspector shall include the following:

Examine each arch, abutment, pier and their foundations, bridge seats and pedestals. Report any new cracks, settlements or increase of old defects, scouring around foundations or change in channel of stream. Special attention should be given to all work of this character, where any defects have been previously found and no action taken to remedy same. The attention of track foremen shall be called to the importance of cleaning the bridge seats, the superstructure, channels, weeds and vines from the masonry and the removal of grass and weeds in and around the bents as well as all wooden trestles and structures. The division bridge inspector should note such conditions on his report, and show the action taken in order to correct same. The division bridge inspector must see that all bridge seats and cap stones of pedestals are properly set, reporting any movement or cracking of same.

The division bridge inspector should report and examine in detail the track approaches to through bridges and trestles to see that same are maintained in good line and surface, fully ballasted and that the rails on open deck structures are spiked in accordance with standard instructions, and that there is a full bearing on each tie. The division bridge inspector should inspect all joint fastenings and connections to see that they are in good condition, giving particular attention to see that standards are fully complied with where decks of ties are renewed out of face. He shall also see that the inside guard rail is placed on the structure in accordance with standards. He shall examine all ties and timber guard rails on open deck bridges for soundness. He shall see that the ties hold the spikes firmly; that all bolts are tight; that no guard rail or bolt ends in guard rail project above the level of the top of running rail a greater distance than 1 inch.

The division bridge inspector shall make inspection of all timber in wooden structures, trestles and timber trusses, boring in same where necessary in order to determine interior decay. He shall examine chords closely at splices and all stringers at bearing points. He shall examine diagonal and vertical posts and laterals to see that they are truly in place, straight and sound and shall pay particular attention to any crushing at the ends. He shall examine all angle blocks, main and laterals, reporting if broken or cracked. He shall examine gib plates, noting particularly their bearing on the timber. He shall examine all rods to see that they are in proper adjustment and pay particular attention to every other part of the structure in detail not mentioned above. When adjustment of any member is necessary it must be done under the personal supervision of the.....or his representative. The division bridge inspector must report any odd size timbers, or span lengths of timber stringers in wooden structures or trestles which are not according to the standards, and shall report if any new work is not done in accordance with standards. The division bridge inspector shall see that all timber bents are plumb and have transverse bracing, and in case of high trestles, particular attention must be paid to the longitudinal bracing and any deviation from the standard plan must be immediately reported.

Steel Structures

The division bridge inspector shall inspect all iron and steel work in metal structures and shall see that the steel is cleaned free from rust and that no water pockets are formed at the panel points. He shall examine every part to see that it is in true line, uninjured and in proper adjustment. He shall examine the line of girders to see it is correct and that the girders are setting plumb on the pedestals, masonry or bridge seat. He shall examine the bed plates, rollers and their frames to see that they are true and level and in proper working order. He shall see that all trusses and girders have a uniform bearing on the rollers, bed plates or pedestals. He shall examine by sounding with a hammer all rivets to see that none are loose, reporting all loose rivets, giving their location by bridge number and the number loose in each. It shall not be required that all rivets be tested more than ..... each year, except in certain members where the rivets are especially liable to become loose. Examinations of such members should be made at least once every ..... months. The division bridge inspector should give particular attention to any member which shows evidence of wear by becoming loose, rattling or rusting. To this end he shall give particular attention to all web members of trusses, lateral bracing, floor beams and stringer connections, yokes or hangers and connections at pins. He shall observe the action of the structure under trains operating over same at scheduled speed. He shall note any tension member which becomes slack, or any buckling which may occur in compression members. He shall note any perceptible yielding of the floor beams or stringers, or any perceptible side motion of the structure or any excessive deflection under traffic.

The division bridge inspector shall pay particular attention to the details of metal structures as outlined above when the alinement is a curve. He shall look for loose rivets in all angles, especially in floor beams and stringer connections. He shall examine the steel for cracks at the root of all angles and web plates of girders, floor beams and stringers. He shall examine top and bottom cover plates and angles, flange angles of deck girders and floor system of through girders and trusses for deterioration from rust and other causes. He shall carefully examine all bearings where girders rest on

*Died November 3, 1919.

pile, or frame bents, posts or towers, and shall see that the girders have a full and true bearing and are firmly anchored.

Masonry and Composite Structures

The division bridge inspector shall examine all masonry, concrete and composite structures for development of cracks or defects in abutments or piers. He shall examine deck for development of new cracks in masonry, pulling away of deck from piers or abutments. He shall examine underpart of ballast deck for cracking of concrete from reinforcement and shall report deterioration of reinforcement where exposed. He shall also report on failure of waterproofing of deck, causing a cracking of underconcrete protection of the steel structure.

Culverts and Pipes

The division bridge inspector shall examine all culvert and pipe openings to see that same are in good condition; that the sections of pipe are not pulling apart, and that they are kept cleaned at all times, so as to maintain full waterway and there is no undercutting at ends. He shall carefully examine walls and roof of masonry culverts, to see that no cracks are developing and roof is being properly maintained.

Records

The .... (Title) .... shall keep in his office an up to date cabinet and card filing system upon which shall be entered the reports of the division bridge inspectors. This card index system should have guide cards for each individual bridge, using separate color for bridges and structures requiring special attention. A particular designation may be used for any weak structures which must be carefully watched. Guide cards should contain the following information: Bridge number, mile post, first station east of bridge, total length of bridge, number of spans, length of each span, maximum height, base of rail to water or road, kind or style of structure, date built, clearance of bridge over railroad or highway.

Discussion

(In the absence of the chairman, W. C. Barrett presented the report and moved that rules for inspection of bridges, trestles and culverts given in Appendix A be approved by the association for printing in the Manual. The motion was carried and the committee was dismissed with the thanks of the association.)

Report on Economics of Railway Labor

In Appendix A the committee submits a number of suggestions on methods for training and educating engineering and maintenance department employees as information, and its recommendations are given under the heading of Conclusions.

Plans for buildings and boarding cars for maintenance of way employees were submitted in 1918, and in 1919 were referred to the Committee on Buildings, which was instructed to criticise the plans and furnish details. The Committee on Buildings has approved the plans as submitted and reports them in sufficient detail without revision. This committee therefore offered the plans submitted in 1919 for approval and publication in the Manual.

Conclusions

The committee recommended that the assignment to report on plans and methods for organizing to obtain labor for railways be reassigned.

The committee asked to be relieved from further consideration of methods of equating track sections and also of the manner of establishing proper relations between units of track expenditure and units per mile of line for different classes of track for the purpose of determining a normal maintenance expense.

The committee recommended that the information presented in Appendix A on methods for training and educating engineers and maintenance of way department employees be accepted as information, printed in the proceedings, and the subject reassigned.

Committee: E. R. Lewis (Railway Age), chairman; C. H. Stein (C. R. R. of N. J.), vice-chairman; W. J. Backes (N. Y. N. H. & H.), A. F. Blaess (I. C.), W. M. Camp (Ry. Review), W. R. Dawson (N. & A.), W. D. Faucette (S. A. L.), R. H. Ford (C. R. I. & P.), W. R. Hillary (P. R. R.), C. B. Hoyt (N. Y. C. & St. L.), W. A. James (A. C. L.), C. E. Johnston (K. C. S.), A. C. Mackenzie (C. P. R.), C. A. Paquette (C. C. C. & St. L.), J. W. Pfau (N. Y. C.), J. R. Sexton (Erie).

Appendix A

The sub-committee appointed to study and report upon methods for training and educating engineering and maintenance of way department employees feels that this subject naturally presents two separate divisions: (1) The training of the engineer, and (2) the training and educating of supervisors and foremen.

Training of the Engineer

Generally speaking, the newly-graduated engineer is a mathematician and the problem is to make him also an economist. This is usually a slow and exacting process. We feel it to be true that, on most railroads, the training and educating of engineers is unmethodical. The result has been that the development of the individual is almost wholly that which comes from his being thrown upon his own resources.

There should be at the command of the engineer such control of materials and primary accounting that he may at all times check up, in a thoroughgoing manner, the work under his direction and be made responsible for the economical performance of it. In addition to having a system by which men in charge of work may readily ascertain costs when they are incurred, it is the opinion of the committee that, on the roads where the size of the engineering forces will warrant, there should be attached to the department a man well equipped with practical experience and technical training who would be fitted to conduct a program of development. Such a man would collect statistics, make an analysis of work accomplished and direct a campaign involving regular meetings composed of the members of the engineering force from the various divisions as well as from the general office. Papers would be prepared on subjects assigned to individuals and reports made on matters referred to committees whose membership should include beginners as well as those advanced to higher positions in the service. At such meetings constructive criticism should be advanced as to work subject to comment, either as to methods of prosecution or economy.

In the training of young engineers the essential feature is to teach them to properly gage productive effort. Probably one of the best methods is to establish a system by which a certain percentage of the positions of supervisor may be filled from the engineer corps. This system affords the engineer an intimate detailed knowledge of the methods of applying material; it enables him to fairly gage the reasonable product of labor, and brings him in direct contact with the foremen and the men, a feature which, when he has been promoted to division engineer or some higher position, is of immense

advantage to him. One of the requirements for appointment to the position of division engineer, or engineer maintenance of way, should be at least two years' experience as supervisor.

Another step in the education of the young engineer should be a requirement that he have not less than one year's service in the office of the chief engineer. This will impress upon him the theories which have been acquired at school and give opportunity for applying them in practice. It is a fact to be deplored that there is a great lack of designing ability among maintenance engineers, that is to say, from the division engineer down. Too much attention is paid to the tamping of ties and the construction of sidetracks to the exclusion of the fundamentals of engineering design. Service in the general office will in a measure cure this condition, which is a shortcoming not because of faulty education but because of lack of opportunity to apply in practice the things learned at school.

To summarize as to engineering forces, we suggest:

(1) Employ in the engineering corps men of sufficient technical training to be useful in solving the ordinary engineering problems.

(2) Carry on an educational campaign through regular and periodical meetings, the members to exchange views through the media of papers, reports and discussion.

(3) Fill a certain percentage of the positions of supervisor of track, supervisor of bridges and buildings, supervisor of signals and inspector from the engineering corps on an equal footing with other applicants.

(4) Systematic rotation of service for the members of the engineering corps, to include surveying and field work, inspection, supervision of maintenance and construction and work in drafting and designing.

Training and Education of Supervisors and Foremen

In the training of supervisors and foremen not having the advantage of a technical education the problem is different from that of the engineer. As most railroad organizations are now constituted, efficiency in the work of the department depends largely upon the capability of this group.

Their schooling, generally, has been their practical experience, and this may have been long and profitable, or comparatively short and unprofitable. It is deplorable that in recent years on most lines of railroad the percentage of comparatively inexperienced men among supervisors and foremen, particularly the latter, has greatly increased. The resultant inefficiency is so serious that it may well cause earnest thought as to how to educate and develop these men.

It is noticeable that where there is an excellent supervisor, there will invariably be found foremen of far above average capabilities, and the reverse is true where the supervisor is not capable. This is merely a reflection of wise and efficient direction in the prosecution of work and emphasizes the fact that most men, particularly younger men, want to learn and especially will they do so if the instruction is imparted in a manner to incite interest and appeal to their pride.

The education of the supervisor and foreman must come from the instruction and guidance of their superiors. Standard methods of achievement should be developed and their purport fully understood by supervisors and foremen. After that has been done, full adherence thereto should be insisted upon through rigid and constant supervision.

Probably one of the best ways to induce development in this class of supervisors and foremen is to assemble a number of them at occasional meetings for the discussion of their common problems. This practice tends greatly to broaden the view and enlarge the interest of these men as well as to establish an *esprit de corps*, without which there can be no enthusiasm nor sustained interest in excelling in their particular line of activity.

In contemplation of the future, some plan for inducing men to qualify for the position of foreman, especially in track work, assumes great importance, judging from the immediate past. It seems to the committee that an arrangement for apprentice foremen should be established, either by creating such a position in each section gang, and paying rates sufficiently above the laborer's rate to make the position attractive, or by the forming of apprentice foremen gangs on each engineer's division. In either case the men to be carried as apprentice foremen should be recommended by the foreman and supervisor. It should not be necessary to have apprentice foremen on all sections of light traffic lines, but there should be enough apprentice foremen on the heavier lines and terminal sections to insure the training of candidates to fill vacancies in the ordinary course of events. These apprentice foremen should be closely observed by the supervisor to determine their fitness for the position of foreman. They should be under the direction of the most competent foreman on the supervisor's district.

One of the most important things in the education of foremen is to bring about their realization of the importance of correct records of working time and material used, and the knowledge of the right way to keep and distribute time. They cannot be made to realize too keenly that time and money are measures of efficiency as well as workmanship.

Some railroads have adopted a policy of furnishing track foremen with subscriptions to technical periodicals that are devoted particularly to track matters. Indicative of the interest taken by the men, and of their desire to enlarge their knowledge, is the fact that these track foremen frequently write letters to these magazines giving their experiences and raising questions as to the problems with which they have to cope. On one line of railroad where this policy has been carried out, it is the practice of the division engineer, when an article appears which is of especial interest to this class of employees, as the occasion presents, to discuss it with the supervisors and foremen, and invariably it is found that the men have read the article, which merely demonstrates "that men want to learn." The most effective results, however, are to be obtained through the medium of personal contact. The supervisor is, of course, in frequent conference with the engineer, and the supervisor should be required to call on each section foreman, spending at least an hour with him not less than once every two weeks.

Summarizing, therefore, we have to suggest with respect to supervisors and foremen:

(1) That they, from convenient stretches of territory, be occasionally brought into informal meetings with department officials for the purpose of discussing the various phases of work and for mutual acquaintance and full understanding.

(2) That in such meetings they be given full explanation of the objects and uses of their reports, so that a keener appreciation of accuracy on their part will be realized.

(3) That they be furnished with full information with respect to the maintenance of way standards and that these and the reasons therefor be explained to them.

(4) That a system of apprentice schooling be estab-

shed from which men can be drawn for the position of oreman.

Discussion

E. R. Lewis (chairman): In Appendix A is given a eport on training and educating engineering and main- enance department employes, and the committee asks iat the matter contained be accepted as information.

Plans for buildings and boarding cars for maintenance f way department employes were printed in the proceed- igs last year. They have not been reprinted, but, as I nderstand it, have been approved by the Committee on uildings, to which they were referred.

On behalf of the committee, I move that they be lopted and printed in the Manual.

The President: The Chair wishes to state that when is matter was brought up in connection with the re- ort of the Committee on Buildings they asked to with- raw the recommendation they had made, which was to e effect that the matter in question be made a subject reference in the Manual, that is, to the plans already ublished in the Proceedings. Therefore, it is not in rder for the Committee on Economics of Railway Labor move the approval and publication of this matter, in- much as the committee that had the handling of it has withdrawn its request for approval. The Chair suggests that this committee co-operate during the coming year with the other committee and get their approval and consent to have these plans published and inserted in the Manual next year.

Prof. S. N. Williams: I wish to express my high appreciation of the value of the report on "Methods for Training and Educating Engineering and Maintenance Department Employes." I having been concerned for 40 years in the training of young engineers, and this portion of the report appeals to me strongly. As a member of the association, I wish to express this appreciation in this public way.

Fred Lavor (American Int. Corp.): I do not know whether the committee had called to its attention a conference held in Washington last June on the training of engineers for foreign service. There is a good deal in the report of that committee, which can be obtained in Washington, which is of interest to engineers, and particularly railroad engineers.

The Chairman: That report has not been brought to the attention of the committee, and we are grateful to have it called to our attention at this time.

(The committee was dismissed with the thanks of the association.)

Report on Signs, Fences and Crossings

THE SUBJECT of signs is being studied by a sub-committee with a view to reducing the number of signs to a minimum and promoting uniformity of practice in their use. The committee recommended that the following paragraph be approved and published in the Manual at the foot of page 316:

ROADWAY AND INFORMATION SIGNS

"Signs for Dump Ashes, Blind Siding, Water Station, Fuel Station, Beginning of Double Track and End of Double Track to be similar to etch shown on page 318, 1915 Manual, for Trespass igns."

The committee recommended that the sketch of Approach Warning Sign be approved and published in the anual.

Committee: Arthur Crumpton (G. T.), chairman; Maro hnson (I. C.), vice-chairman; F. D. Batchellor (B. & O.), E. Billman (M. P.), C. G. Bryan (I. C.), G. F. Black le. C.), B. J. Dalton (M. K. & T.), F. T. Darrow (C. B. &), G. N. Edmondson (N. Y. C.), Paul Hamilton (C. C. C. St. L.), L. C. Lawton (A. T. & S. F.), S. L. McClanahan, A. Mitchell (Un. Tr.), T. E. Rust, W. F. Strouse, A. artz (Tol. & West), W. D. Warren (N. Y. N. H. & H.), G. Williams (Mem. Un.), B. A. Wood (M. & O.).

Appendix B—Fences and Stock Guards

Abstracts of the laws of all of the states and Canada ating to the providing of right-of-way fences and the stallation of stock guards were presented in 1917 and e same information was given in tabular form in 1918. ght states specified that fences should be 4 ft. high, others and Canada specified 4 ft. 6 in., while two ers called for 4 ft. 6 in. and 5 ft. Twenty-nine states not specify the height of fence required.

The Manual contains specifications for standard right-of-way fences of four classes. A recent inquiry as to the extent of the use of these standards elicited replies from 32 railroads showing their use by 11 roads, while they are not used by 21 of the roads replying. Various reasons were given; 6 use their "own standard," 2 use "better standard," 2 have "no standard," 2 "have to conform to state requirements," 2 say "not suitable," while 7 give no reason.

Appendix C—Over and Under-Grade Crossings

In recent years the subject of the elimination of railroad grade crossings in many of our larger cities has been given a great deal of attention by American engineers. This has been due to the rapid increase in both steam railway and street traffic, particularly automobile and motor truck traffic.

At the present time the improvement of street railway traffic is perhaps uppermost in the public mind. The need for more cars, more rapid movement of cars, relief from congestion in the downtown section, additional lines and the possibility of establishing some form of rapid transit are all matters of public discussion.

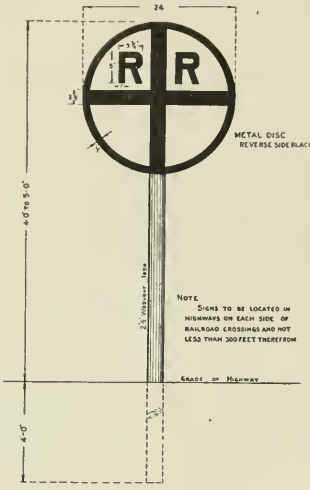
The development of the automobile in the past few years, which has resulted in the tremendous increase in the use of motor-driven vehicles, has introduced a new element in street traffic. Streets which a few years ago had only a few team movements per day are now traveled by hundreds of thousands of automobiles and teams per day. This increase in number of street movements tends to emphasize the importance of abolishing grade crossings, especially when it is considered that on many streets there has been a corresponding increase in pedestrian traffic. Certain streets are, and always will be, the principal arteries of travel to the outskirts of the city. Connecting these are other streets which are thoroughfares to certain factory districts or important connecting links in the street system. All these must be open to uninterrupted street traffic to properly meet the transportation problem.

Referring to the relations between the general public,

the manufacturers and the railroads, the following observations are made:

"The public demands an open and safe thoroughfare, with sufficient headroom to permit any usual street or street railway vehicle to pass freely. It must consider the future, and not limit, by present-day construction, the reasonable future use of the street. The public may very properly protest against going up or down a heavy grade or against narrowing any roadway or against closing any road which may in a few years be essential to guard against congestion. The public has a right to demand not only a safe but a clean, reasonably noiseless and sightly structure. In view of the fact that the public uses the crossings on important streets tens or hundreds of times to the railroad's once, the public interest may be considered paramount. However, we must not lose sight of the further fact that the railroad is a public transportation utility, and that the only reason for the existence of most of the railroad tracks is for the convenience of that same public which uses the streets.

"The railroad demands good grades, safe headroom, the opportunity to run its through trains at high speeds; the right to maintain, for the benefit of its patrons, all such facilities at stations and team tracks; the right to have ample yard facilities for switching, sorting and storing of cars and to have the yards so located that they will meet the requirements of the different parts of the city; and further, the



Approach Warning Sign

right to maintain all necessary track connections to industries adjacent to or within reasonable distance of its lines.

"The owners of industries must have such connections as will permit the receiving and shipping of freight; the use of adjacent streets and freedom from interruption to the movements of teams and employees to and from the industries. The fact that hundreds of industries are now in existence on tracks at the surface level; that they have built and adjusted their business to those tracks, greatly complicates matters, as a change in level of track or street or both is sure in most cases to require a readjustment or reconstruction to fit new conditions.

"In some cases the existing arrangement at manufacturing plants can be used without material change; in other cases a readjustment can be had by elevating the industrial spur and loading platform, or by an interior rearrangement; in still other cases, more especially very small industries, the cost of the construction to meet any condition that would be considered necessary would be such, perhaps, as to compel a removal of the business to some other location."

In the past, three general methods of grade separation have been employed, as follows:

(1) The railroad grades are left undisturbed and the streets are either depressed and taken under the tracks or elevated full height and taken over the tracks.

(2) The street grades are left undisturbed and the railroads depressed or elevated to the extent required.

(3) The grades of both railroads and streets ar changed as to best suit the requirements of a particula case or district.

Respecting the first method it may be said that earl work in grade separation has in general consisted in th elimination of a few isolated grade crossings in the cour try or small cities where the advantages to be gaine from a safe crossing overcame the disadvantages due t bad grades or unsightly structures. In most of thes cases the railroads have borne all, or a larger part, c the cost, and have only been benefited to the extent tha a source of danger was removed. Under such conditior the railroads have argued that if a community wanted grade crossing eliminated it would have to stand for som inconvenience. This procedure has frequently resulte in creating such conditions that no subsequent change i track grades could be made without destroying wor already done.

The advantages and disadvantages of this method ma be summarized as follows: The advantages to the rai roads are (a) undisturbed main tracks, (b) undisturbe grades, (c) undisturbed yards and industrial conne tions. The disadvantages to the cities are (a) heav property damages due to street grade changes, (b) in terference with sewers, drains, water mains, and oth sub-surface construction, (c) impediment to street traff due to the introduction of heavy grades, (d) unsight appearance of streets, and (e) inconvenience to adj cent industries.

The advantages and disadvantages of the secon method may be summed up as follows: The advantag to the city are: (a) streets are left on original grad (b) that it practically or wholly eliminates proper damages, (c) causes no disturbance of sewers, drain water mains, or other sub-surface construction. The di advantages to the railroads are: (a) introduction additional grades and rise and fall of 18 to 25 feet one or both ends of the district, (b) more or less serio interference with industrial tracks, sometimes necess tating removal of small industries to other location (c) necessitates reconstruction of stations and team trac yards, (d) may necessitate removal of yards.

Whether the cost of changing track grade will exce the cost of changing street grades will depend large upon the number of streets affected and the contour the adjacent ground. Obviously, elevating the track for two or three streets would be considered bad pra tice, and there are cases where the cost of elevating th railroad would exceed the cost of raising or lowerin the streets, but in the average level city where the chan of grade of a mile of track would involve 10 to 12 stree there is little difference in cost. The cost of permane bridges and carrying street traffic during constructio are substantially equal in either case, and the cost carrying street traffic where it must be maintained less in the case of railroad elevation than in the case street depression.

Respecting the third method, the committee feels sa in saying that few grade separation projects have be carried out under either of the above plans, but ge erally under this method, viz., elevating the railro tracks 8 to 10 ft. and depressing the streets 10 to 14 f In adopting this method it has been recognized that it to the best interests of all three parties to make such a justments as are really for the greatest good, hence n hard and fast rule can be adopted which is equally a plicable under all conditions. Perhaps the most impo tant consideration leading to a decision respecting d pressing streets is the matter of drainage.

The matter of clearance is one which should be giv more careful consideration. To provide for the increa

ize of rolling stock some very expensive work has necessary in the way of lowering grades, etc., and, re this could not be done, it was often necessary to se extra large shipments.

Discussion

rthur Crumpton (chairman) presented the report, after reading the matter contained under "Roadway Information Signs," he moved that it be approved for inclusion in the Manual.

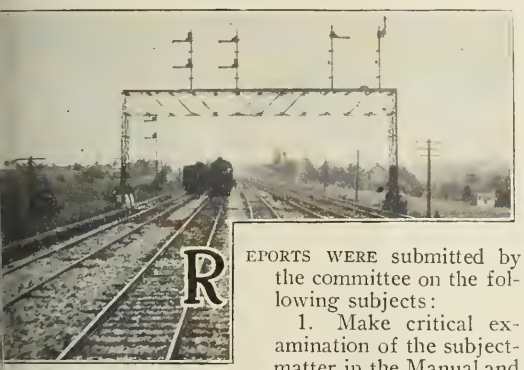
(Motion seconded and carried.)

The committee then moved that the approach warning sign be approved for inclusion in the Manual.

(Motion seconded and carried.)

(The committee was excused with the thanks of the association.)

Report of Committee X—Signals and Interlocking



EPORTS WERE submitted by the committee on the following subjects:

1. Make critical examination of the subject-matter in the Manual and nit definite recommendations for changes.

e corrections which the committee recommended for Manual were of a minor nature, and were not of character as to warrant printing in the report.

2. Report on the problem of signaling railroads with ence to the effect of signaling and proper location ssing sidings on the capacity of the line.

e committee felt that it had completed the work on subject so far as it relates to the proper location of ng tracks and reported fully on same and that the on of the subject relating to the location of signals ered by subject (7) and will be handled under that Recommendations relative to this subject are given the heading of Conclusions.

3. Report on the specifications adopted by the Signal ion of the Engineering Section of the American oad Association which warrant endorsement, con- g with Committees Nos. 5, 6 and 15 and other ap- iate committees on appliances affecting track or uures.

Appendix A the committee submitted list of matters e upon by the Signal division of the Engineering on of the American Railroad Association at its con- ion in 1919 and adopted by letter-ballot. Recom- ations on this subject are given under the heading of usions.

8. Report on automatic train control.

Appendix B the committee presented a comparative ent of the definitions and requisites for automatic control devices that have been adopted by various ittees and associations. Recommendations are made e the heading of Conclusions.

4. Investigate and report upon the effect of the use ti, treated with any solution which affects the length ack sections.

Appendix C the committee submitted a partial re- t. Recommendations on this subject are given under ding of Conclusions.

Conclusions

committee recommended that the following action aen on the reports submitted:

2. That the matter relative to this subject previously submitted by the committee and accepted by the Association as information be considered as complete reports relative to the effect of the proper location of passing tracks on the capacity of the line, that the remainder of the subject is involved with subject No. 7, should be combined with it and subject No. 2 withdrawn.

3. That the list of Signal division, Engineering Section of the American Railroad Association, specifications and standards submitted as Appendix A by the committee be published in the Manual as supplementary to the list of Railway Signal Association specifications and standards heretofore submitted for the information of the members.

8. That the report submitted in Appendix B be accepted as information.

14. That the report submitted in Appendix C be accepted as information.

Appendix C—Report on Use of Zinc-Treated Ties in Track Circuits

1. As the electrical condictivity of zinc-treated ties decreases with age during the first year, better results may be had by allowing the ties to season for a period of from two to six months before using in a circuited track, thus avoiding the use of the tie while its conductivity is greatest.

2. For good results, the number of zinc-treated ties installed per year in any track circuit should not be greater than 15 per cent of the total number of ties in that circuit.

3. (a) It is recommended that maximum rail resistance not to exceed 0.1 ohm per 1,000 ft. of track be maintained. Ordinarily it will be lower. This resistance can and should be reduced to a minimum by using bonding wires of high conductivity or increasing the number of bonding wires per joint.

(b) Rail and bonding resistance may be determined by the following formulas in which

E = Volts at rail — battery end.
e = Volts at rail — relay end.
I = Amperes flow from battery.
i = Amperes flow through relay.
R = Rail and bonding resistance total in ohms.
r = Rail and bonding resistance per 1,000 ft. of track in ohms.
L = Length of track circuit in feet.

$$R = \frac{2\,(E - e)}{(I + i)}$$

$$r = \frac{2000\,(E - e)}{L\,(I + i)}$$

4. (a) The length of track circuit should be determined by the ballast resistance or the resistance from rail to rail through ties, ballast, and track insulation.

(b) The following table expresses in ohms, per 1,000 ft. of track, ballast resistance on various kinds of ties:

Date 1917	Section 1	Section 2	Sec. tion 3	Sec. tion 4	Sec. tion 5	Sec. tion 6	Temperature	Humidity
April 12	4.27	5.36	48.02	44.55	24.87	13.37	40 deg. F.	40%
May 17	2.28	3.22	34.52	24.68	21.19	12.42	82 deg. F.	73%
June 8	1.91	2.76	15.66	15.72	9.50	5.82	58 deg. F.	50%
Aug. 6	3.48	6.42	32.82	26.99	12.65	16.05	78 deg. F.	46%
Sept. 14	2.56	3.15	14.64	14.27	9.67	6.55	77 deg. F.	56%
Oct. 25	4.85	6.06	28.92	28.92	15.96	7.77	41 deg. F.	75%
Average	3.23	4.49	29.09	25.85	15.64	10.33		

Key: Section 1—Zinc-treated red oak.
Section 2—Zinc-treated red oak soaked and scrubbed.
Section 3—Red oak treated with 25 per cent creosote, 75 per cent gas oil.
Section 4—Red oak treated with 10 per cent creosote, 90 per cent gas oil.
Section 5—White oak untreated.
Section 6—Various species—old ties in place for several years.

(c) Ballast resistance may be determined by the following formulas, in which

E = Volts at rail—battery end.
e = Volts at rail—relay end.
I = Amperes flow from battery.
i = Amperes flow through relay.
Y = Ballast resistance total in ohms.
y = Ballast resistance per 1,000 ft. of track.

$$Y = \frac{(E + e)}{2\,(I - i)}$$

$$y = \frac{L\,(E + e)}{2000\,(I - i)}$$

(d) Unless the ammeter with which the current readings are taken is of an extremely low resistance, such readings should be taken only for the purpose of determining the resistance of the unit and relay. The current flow should then be calculated from these resistances and the voltage drop across them, otherwise the error due to the resistance of the instrument will affect the results.

(e) When the rail resistance is equal to .1 ohm per 1,000 ft. of track, a 2-ohm relay used, and the ballast resistance per 1,000 ft. of track as determined by the above formulæ is as shown below, the track circuits should not exceed the lengths shown opposite the following resistances:

1 ohm—2200 ft.
2 ohm—3400 ft.
3 ohm—4400 ft.
4 ohm—5200 ft.

The lengths as above shown provide for the operation of the relay at 150 degrees F. (65 degrees C.), under which condition, with .6 volt at the battery, there will be 115 milamperes flowing through the relay.

5. Because of a low ballast resistance in track circuits where zinc-treated ties are used, a 2-ohm relay should be used, as it will operate satisfactorily when a relay of higher resistance will not.

Committee: J. A. Peabody (C. & N. W.), chairman; W. J Eck (Southern), vice-chairman; Azel Ames (Cons. Sig. Engr.), H. S. Balliet (N. Y. C.), A. M. Burt (N. P.), C. E Denney (N. Y. C. & St. L.), F. L. Dodgson (G. R. S. Co.), C. A. Dunham (G. N.), W. H. Elliott (N. Y. C.), G. E. Ellis (I. C. C.), J. G. M. Leisenring (I. T. S.), H. K. Lowry (C. R. I. & P.), J. C. Mock (M. C.), F. P. Patenall (B. & O.), A. H. Rudd (P. R. R.), Mott Sawyer (C. M. & St. P.), A. G. Shaver (Cons. Engr.), Thos. S. Stevens (A. T. & S. F.), W. M. Vandersluis (I. C.), B. Wheelwright (G. T.), W. P. Wiltsee (N. & W.).

Discussion

J. A. Peabody (chairman) presented the committee's report, and after reading each subject under the heading "Conclusions" he moved the acceptance of the recommendations contained therein.

(Motions seconded and carried.)

(The committee was excused with the thanks of the association.)

Report of Special Committee on Standardization

No subjects were assigned this committee for study and report, but the following instructions were approved by the Committee on Outline of Work of the Board of Direction:

1. Request appropriate committees to each select one or more articles for standardization, with instructions to harmonize the views of the railroads and manufacturers as much as practicable, and to prepare plans and specifications of as few sizes as will meet the needs of the railroads.

2. Secure the general use by the railroads of the standards and specifications, bringing about a realization of all possible economies of cost and time.

Subsequently the Board of Direction instructed the committee to confine its efforts to the general adoption by railroads of the standards and recommendations shown in the Manual, and to formulate suggestions for bringing about a realization of all possible economies of cost and time. In December, by request of the American Railroad Association, there was assigned to this committee the task of preparation of minimum specifications for as many items of standard railway materials as possible to serve as the basis for the purchase of such materials, and the committee is now actively engaged in this work.

The committee has no conclusions to present to the Association this year.

So far the work done by the committee has developed a large field of possible utility in which important results should be obtained. Many articles are used by railroads in a great diversity of sizes and types, a lesser number of which should fill every need of the roads, thus reducing the cost and the time for filling orders, due to increased possibility of carrying material in manufacturers' stocks. It is obvious that concentration of the demands of railroads on a lesser number of types and sizes will materially reduce the cost of producing the articles, which necessarily must work to the financial advantage of the roads. In spite of this self-evident fact, however, up to this time the adoption of the designs and specifications recommended by this Association has, with few exceptions, been far from general. A variety of reasons may be offered for this, such as minor details being unsatisfactory to manufacturers or to the purchasing or using officers of railroads, and quite largely to disinclination to change existing standards. Very largely, however, their lack of general adoption is due to lack of knowledge of their existence on the part of purchasing officers.

The committee feels that a concerted and determined effort should be made to cover, as far as may be desirable, the standardization of railroad requirements, and to this end it recommends that it be instructed to proceed with the development of this work along the lines indicated in the subsequent instructions by the Board of Direction, as indicated in the fore part of this report.

Committee: E. A. Frink (S. A. L.), chairman; J. R. W. Ambrose (Tol. Term.), vice-chairman; F. L. C. Bond (G. T.), W. A. Christian (I. C. C.), Arthur Crumpton (G. T.), A. F. Dorley (M. P.), J. M. R. Fairbairn (C. P. R.), W. H. Finley (C. & N. W.), W. H. Hoyt (D. M. & N.), Edwin B. Kattz (N. Y. C.), F. R. Layng (B. & L. E.), E. R. Lewis (Ry. Age), M. A. Long (B. & O.), B. H. Mann (M. P.), J. A. Peabody (C. & N. W.), G. J. Ray (D. L. & W.), H. L. Ripley (N. Y. N. H. & H.), O. E. Selby (C. C. C. & St. L.), C. M. Taylor (P. & R.), W. P. Wiltsee (N. & W.), J. J. Yates (C. R. R. of N. J.).

Discussion

The report was presented by E. A. Frink, chairman.

The Chairman: The committee has no recommendations this year as to conclusions. The utmost it has been able to do so far has been to start the work. With permission I would like to say a few words on the subject of standardization.

In the first place, standardization as applied to railroad materials is something that must be handled with the utmost care. There are a great many things used in railroad work that are not susceptible of standardization. For instance, you cannot standardize railroad paint. There are, however, a great many things that do admit of it—such as rails, tie plates, splice bars, bolts, etc.

The reason for that standardization is twofold: first, to reduce the cost; second, to increase the supply. Years ago the various mills in the country manufacturing structural steel used to make at least two grades of steel. Each mill used to have its own pattern of rolls. One mill rolled narrow flange beams narrower than any other mill. In those days engineers ordering material for railroad bridges used to order by weight., and they would order angles just the weight that would give the exact area required for the stresses. You can imagine what that meant to the rolling, constant change of rolls, parts of rollings left over, and put into stock with a grave question as to whether they could find anyone who wanted that size and weight.

That meant an increase in the cost of producing the materials, and the mills recognized it. They took measures to correct it, they standardized the types of material, and sizes of material, and you can now only get certain sizes of angles, and certain sizes of beams, and the result, I believe, has been a reduction in the cost. This also applies to other materials.

C. A. Morse (C. R. I. & P.): Mr. Frink's remarks suit my ideas exactly. There is one thought I have in connection with it that I am a little bit afraid of, and that is if all the railroads in the country had a standard, for instance, on tie plates, that it would be a question if we got the improvements in tie plates that we are getting now, with about forty different designs of tie plates being made by different manufacturers.

My hobby on this matter of standardization, the one thing I think we should attempt to do first, at any rate, is to try to standardize certain sections of rail. If we are successful in that one thing, we have made a big movement towards more extended standardization.

F. P. Patenall (B. & O.): I quite agree with the chairman in reference to standardization. Apparently it does stand forth as a misnomer, but standardization, as I look at the matter, means an incentive to make something better, and the fact that we standardize certain material does not mean that we are going to throw away everything we have in service, but it means that gradually, as that material wears out, we replace it with a standard article.

A. S. Baldwin (I. C.): One thing, I believe, that should come from this standardization is ability on the part of the association to bring about a more general use of its recommended practice in every respect. One weakness that we have had has been that the railroads are too slow to take up changes recommended by this association. Going over the standards, we are apt to think, this approximates what I have, or, I do not like this feature, or, something else is a little different from what we now have, and that leaves the standards that are adopted by the association to take their course and be adopted maybe by very few railroads. The new association that has been brought about between this organization and the American Railroad Association should enable us through this Standards committee to bring a great deal more force to bear upon the railroads in the adoption of the standards of the association. I think that is something that every member of this association should direct his efforts towards with his own particular company.

J. R. W. Ambrose (Toronto Term.): I think Mr. Baldwin has touched the key-note of the situation. First of all, I wish to remind you that this association has no standards. They do not believe in them up to the present time. Take the example of the Rail Committee. We railroaded through a specification today. Several members here who are interested in the subject said nothing. Apparently they approved that specification. They go right back to their executive officers and follow some other specification.

It seems to me that this committee might perhaps coordinate the work of all committees, but to do that, they must have more power than has been given to them at the present time. Taking the Rail Committee, for instance, I cannot conceive of any local conditions on this continent that would require any minute changes in the specifications for rail to suit those local conditions. Therefore, I see no reason why all of the railroads who are represented in this association should not approve some one specification, as well as sections. I think when a specification is passed up to this association, it should be endorsed by the executives of the railroads here represented, so that we might have some assurance that they are to be used.

Mr. Frink has pointed out the advantages. We all see the advantages of standardization. It comes down to economy. I care not what you call it, safety first, or good practice, or that it results in economy, and in these days economy is being pounded into us. It seems to me that this association has reached the stage where it can now have actual standards, and in some manner or other try to enforce those standards, if they are approved by the different roads in practice, and result in the economy that we desire.

Hadley Baldwin (C. C. C. & St. L.): I think that what this association has accomplished forms a sound basis for the greatest exultation. The adoption of our recommendations as standards might not add very many advantages. Probably we have had very few advantages, but the work of this association has been a great leveler, all across the whole field of railroad structures of every kind. Through the work of this Association we are very close to standards all over the country. If we adopt standards we believe that it would be more especially of economic benefit in getting a bigger supply, and perhaps a cheaper supply. As to getting very much better than we now have, in most cases I do not think we can look for very much improvement. I think the effect of this association has been that the quality of material used upon the railroads, is very nearly as good as any standard that we have adopted all across the field.

(Further remarks along these same lines followed, indicating considerable unanimity of opinion as to the prob-

lems involved without any tendency to designate specific methods at this time. A question arose as to the probable procedure in establishing a standard.)

The Chairman: It is the fixed purpose of the committee never to transmit to the Board of Direction any article or any specification until a sufficient mileage of the railroads of the country have acknowledged the correctness of the standard, and have said they would use it, and until a sufficient number of manufacturers of that particular article have said that they would make it, so that we may be sure of a supply. I cannot give you in percentage the mileage of railroads which we will require, because necessarily that will vary in different cases, but you can be sure that this committee will never recommend the adoption of any such standard until the mileage of railroads accepting it is sufficient.

(The committee was dismissed with the thanks of the association.)

President Stimson: The Chair appoints Past Presidents Morse and Baldwin as an escort of honor, to take President-elect Safford to the chair.

(Messrs. Morse and Baldwin escorted President-elect Safford to the platform.)

The President: Mr. Safford, I retire with the greatest confidence in your ability to fill the position, and I hand you herewith the symbol of authority of the office. That little hammer has driven home many good points and has never been used for knocking.

(At this point President Safford took the chair, and said): I want to thank you very cordially, Mr. Stimson, for your kind words, and to extend my congratulations to you for what I think has been the most successful year that the association has experienced. I know that I voice the sentiment of all when I say that for the membership at large, and it has been a great pleasure to me to serve under you.

G. A. Mountain (Can. Ry. Com.): I would like to say how much this pleases us—and I am speaking now, I think, for all of the Canadian members—to see Mr. Safford installed in the chair. He was with us in the north there for a great many years, and he endeared himself to us by his genial manner and his ability.

President Safford: Gentlemen, I appreciate more than I can express the honor which you have seen fit to confer upon me. Of course, it will be my desire to meet your expectations. The support which you have always given your presidents in the past, if continued, which, of course, it will, can result in greater success by your efforts alone even than has characterized past years. We are starting out today on another year, the twenty-second, I believe, with a great many new conditions and new problems to work out. Some of them grow out of the past two years of changed conditions in railroad service. Others grow out of the confusion and natural distortion of things that accompanied the war, and the special activity with which we are connected, the railroad business, is going to require a great deal more study than it ever required before. We have a number of problems of a technical nature, and a great deal to do in the direction of correcting those things which have disturbed the morale and contentment of labor. All these things call for new activities on the part of committees, and this in turn calls for greater study on the part of those standing committees of the Board of Direction which are in charge of the work and the personnel. As to the latter, we are increasing our membership, as you know, and that means new problems in this organization. I hope you feel that I am ready always to serve the association to the best of my ability, and I am quite sure that I will get that support from you. I thank you.

A. R. E. A. Registration

THE REGISTRATION AT THE closing session of the convention yesterday totaled 24 members and 18 guests, a total registration for the three days of 563 members and 196 guests, or a combined total of 759. This total of 563 members compares with a total attendance of members last year of 425.

Members

Ballard, E. E., Eng., M. K. & T., Dallas, Texas.
Bortin, H., Consulting Engineer, St. Louis, Mo.
Camp, W. M., Editor, Railway Review, Chicago, Ill.
Carothers, A. B., Assistant to General Manager, B. & O., Western Lines, Cincinnati, Ohio.
Clift, A. E., General Manager, I. C., Chicago.
Cook, R. A., Val. Eng., C. & A., Chicago.
Denney, C. E., Vice-Pres. & Gen. Man., N. Y. C. & St. L., Cleveland, Ohio.
Dodgson, F. L., Con. Eng., Gen. Ry. Sig. Co., Rochester, N. Y.
Farlow, G. B., Asst. Eng., B. & O., Cincinnati, Ohio.
Fenstermaker, D. C., Dist. Eng., C. M. & St. P. Ry., Chicago.
Giles, W. H., Asst. Eng., Mo. Pac., Poplar Bluff, Mo.
Gillen, U. E., Gen. Man., Toronto Term., Toronto, Ont., Can.
Hale, H. E., Group Eng., Pres. Conference Com., New York City.
Hayes, W. P., Asst. Eng., Mo. Pac., Monroe, La.
Holt, A. G., Asst. Ch. Eng., C. M. & St. P., Chicago.
Lane, E. G., Eng. M. Way, B. & O., Western Lines, Cincinnati, O.
Neptune, W. M., Prin. Asst. Eng., M. P., St. Louis, Mo.
Ringer, Frank, Chief Engr., M. K. & T., St. Louis, Mo.
Ritter, Adam, Arch., Sou., Western Lines, Cincinnati, Ohio.
Rogers, E. I., Roadmaster, I. C., Fort Dodge, Iowa.
Steinmayer, O. C., Supv. Timber Pres., St. L. & S. F., Springfield, Mo.
Thompson, F. W., Div. Eng., C. R. I. & P., Des Moines, Iowa.
Westcott, G. R., Asst. Eng., Mo. Pac., St. Louis, Mo.
White, R. C., Asst. Ch. Eng. Maint., M. P., St. Louis, Mo.

Guests

Burt, L. E., Motor Car Insp., R. I.
Clopton, Edw. J., Insp. M. of W., B. & O., Baltimore.
Elmore, P. W., Asst. Engr., B. & O., Seymour, Ind.
Hanson, L. J., Sig. Supr., G. T., Montreal.
Hoff, C. P., Asst. Eng., A. T. & S. F., St. Louis, Mo.
Horton, U. D., West. Ry. Rep., Murphy Varnish Co., Chicago.
Lawrence, H. D., Danville, Ill.
Loftis, J. L., Roadmaster, Sibley, Iowa.
Lynch, H. A., Asst. Engr., B. & O., Wheeling, W. Va.
Mainds, J. S., Asst. Engr., G. T., Detroit.
McKenna, G. P., Supvr. of Track, B. & A., Worcester, Mass.
Purdy, J. W., Asst. Engr., B. & O., Chillicothe, Ohio.
Rinehart, E., M. of W. Insp., B. & O., Baltimore.
Robinson, H. H., Transitman, Santa Fe, Marceline, Mo.
Roush, E. M., Gen. Foreman, B. & B., A. T. & S. F., Armadillo, Texas.
Rowland, C. E., Toledo.
Snider, L. J., Transitman, A. T. & S. F., Marceline, Mo.
Scowden, A. B., Asst. Engr., B. & B., B. & O., Cincinnati, Ohio.

Canadian Pacific Engineers at Convention

Twenty-five officers of the Canadian Pacific, including J. M. R. Fairbairn, chief engineer, J. W. Orrock, principal assistant engineer, and P. B. Motley, engineer of bridges, were in attendance at the convention.

Educational Work Among Thomas A. Edison, Inc., Employees

A school has been started among the employees of the Thos. A. Edison Company, Inc., Primary Battery Division, which has been running for the last four weeks. Lectures are given by the different officers of the company each Thursday night. On the first two Thursday nights L. S. Dunham, reserve engineer lectured on primary battery electro-chemistry. On the next two Thursday evenings, William Shakespeare, works manager, lectured on manufacturing methods and control process. Lectures on other subjects which will be of interest and educational value to the employees will be given each week.

Progress on Chicago's New Station Project

The city of chicago will soon have the distinction of participating in two passenger terminal projects of the first magnitude at one time. The first of these, the Union Station work, has been under way for several years, having been prosecuted actively during the season of 1919 and the present winter after having been virtually suspended for nearly two years during the war. The second project concerns the Illinois Central, which is about to launch an extensive reconstruction of its terminals, including an entirely new passenger station of monumental character and the eventual electrification of its operations within the city.

The Chicago Union Station

Work on the Chicago Union Station has now reached that period which comes in every large terminal project when superficial consideration conveys the impression that a large sum of money had been spent without making much progress. However, this impression is not justified by the actual facts. A large part of the preliminary work has been completed and while much of it is of a character that does not make an effective showing, it represents much real progress nevertheless.

Among the important features of the project coming under this classification is the work on the site of the station headhouse which comprises the entire block bounded by Canal, Clinton and Adams streets and Jackson boulevard. This entire block has been cleared of all the old buildings, and the basement excavation and all foundation work has been completed. The latter included the sinking of 250 open caissons (Chicago method) and the construction of a retaining wall around the entire site. The old Pennsylvania freight house which occupied a portion of the site of the proposed train concourse has been removed, making it possible to add two more tracks to the old passenger station layout, a measure which has done much to relieve congestion of traffic in the existing station. With the removal of these old buildings, it has also been possible to proceed with the construction of a concrete retaining wall along the river, a difficult and expensive piece of work which has been completed between Monroe and Adams streets and is now actively in progress between Adams street and Jackson boulevard.

South of the station practically all of the obstructions to the reconstruction of the south approach have been removed. This approach will be enlarged from four tracks to six tracks and placed on a new grade some three or four feet below the old one, for the entire distance between Van Buren street and Roosevelt Road (Twelfth street). This track work has been in progress for some time south of Harrison street and a considerable portion of the new track is now in place. The reconstruction of the street viaducts over the tracks is being carried on simultaneously with this work. The Taylor street structure which flanks the south end of the new Pennsylvania freight house has been completed and will be opened within a week. Work is now in progress on both the Polk street and Harrison street viaducts. The old structure at Harrison street, which consists of a series of through truss spans, has been shifted laterally so that it can continue to carry the street traffic while one half of the new structure is being erected.

North of the station where a four-track approach is to replace the now inadequate two-track main line, it is necessary to raze two large warehouses belonging to Butler Brothers. To accomplish this, the Union Station Company has been required to furnish this firm with a new 14-story building with ground dimensions of 151 ft. by 382 ft., or an area of about 58,000 sq. ft. This building, which faces on Canal street between Washington and Randolph streets, is now in process of construction. The structural steel frame is in place and work of the other trades is well along.

The Illinois Central Project

The long period of negotiations between the Illinois Central and the several governmental bodies involved in the approval of its plan for the reconstruction of its facilities was finally consummated in the approval by the United States War Department of an extensive Chicago lake front improvement project which is directly related to the work contemplated by the railroad. The relations between the railroad covering its terminal improvements, the South Park Board with respect to the proposed lake front park system and the City of Chicago in connection with a contemplated municipal harbor development entailed many complications, but an agreement between these three parties was reached satisfactorily in July, 1919. However, the United States War Department, having supervision over the submerged lands in the lake which the project contemplates filling, withheld its approval of the plan until February 20 of this year.

The completion of this project will do much to enhance the appearance of Chicago's front yard, including that portion to be seen from the Congress Hotel. The old Illinois Central station will be removed and replaced by a great new structure of classic outline on a new site to the south of the old one a sufficient distance to permit Roosevelt Road to pass in front of the building and across the tracks on a wide viaduct. The facilities of the Illinois Central south of this station will be virtually rebuilt, the principal change being an appreciable widening of the trackage space, which will also be depressed so that several viaducts may be carried across the tracks for direct communication between the city streets and the proposed lake front park.

One of the most important features of the project is the provision for electrification. Under the agreement the Illinois Central is required to start the construction of facilities necessary for electrification within two years, and to institute the electric operation of all of its suburban trains within seven years, of its freight operations north of Roosevelt Road within 10 years, all of its freight service within the city within 15 years, and of all passenger service within 20 years.

It is of no little interest to members of the American Railway Engineering Association that Past-president A. S. Baldwin has been placed in entire charge of the Illinois Central terminal improvements with the title of vice-president.

Maintenance Painters Confer

The Executive Committee of the Maintenance of Way Master Painters' Association held a meeting in Chicago Wednesday morning for the purpose of perfecting plans for the next convention of this association, which will be held at Detroit, Mich, October 5-7.

Changes on the A. & W. P. and A. B. & A.

The office of signal engineer on the Atlanta & West Point has been abolished and E. H. Pudney, former signal engineer, has been appointed electrical and signal engineer of the Atlanta, Birmingham & Atlantic, with office in Atlanta, Ga. Mr. Cassedy, signal supervisor on the Atlanta & West Point, with headquarters at Lagrange, Ga., will have charge of all signal work on the Atlanta & West Point, reporting to O. T. Nelson, chief engineer.

A Memoir—Albert J. Himes

The committee on Iron and Steel Structures tendered a fitting tribute to the memory of the late Albert J. Himes, long a member of that body and a most active participant in the association's affairs which we present below:

"The committee records with deep regret the death on November 1, 1919, of Albert J. Himes, who was for five years its chairman.

"The years of Mr. Himes' connection with the committee as member and as chairman were years of progress and accomplishment. He became a member in 1906, was made chairman in 1912, and resigned that position in 1917. He participated actively in the preparation of the General Specifications for Steel Railway Bridges which have been of wide usefulness throughout the world. The later work of the committee on the subjects of clearances, rating of existing bridges, specifications for erection, rules for inspection of steel bridges, and other important matters, bear the marks of his energy and clearness of mind.

"Mr. Himes' professional work was characterized by serious application and systematic thinking. His personal qualities were such as to endear him in a peculiarly intimate way to all those whose work threw them in contact with him. His fund of interesting happenings in engineering work was drawn on constantly to give point to the discussions, and this trait was made good use of in the committee proceedings."

Back to Our Owners Again

We are back with our overworked engines, our rolling stock battered and worn,
Our tracks somewhat out of alignment, our rights-of-way weedy and torn;
The management's all shot to pieces, the personnel gloomy or mad,
But in spite of our rocky condition much comfort is still to be had.

Back to our owners again, Uncle,
Back to our owners again,
Don't look so black, for it's good to be back,
Back to our owners again.

When the Kaiser ignored all his signals, the President said "Okeh,
You may henceforth manage the railroads in your most efficient way
As you did on the Tunnelville trolley (and you pleased the public too),
Then the world shall acclaim your greatness, dear William G. McAdoo."

Back to our owners again, Uncle,
Back to our owners again.
We were fond of dear Mac, but we'd rather be back,
Back to our owners again.

One man filling many positions thrust into the railroad game
With the wealth of the Nation behind him, he wasn't so much to blame
If he scrambled the roads unduly in his search for a great ideal,
Yet we carried the food and the fighters, delivered the fuel and steel.

Back to our owners again, Uncle,
Back to our owners again.
The foe has been licked and we have kicked
Back to our owners again.

The public asked no questions, it wanted to win the war,
It swallowed our standardized dinners, it grinned where it used to roar.
It cheerfully slept in an upper or sat in the coach all night,
And purchased our full-priced mileage to help us finance the fight.

Back to our owners again, Uncle,
Back to our owners again.
Those dinners *were* punk, and that upper bunk!
Back to our owners again.

The Senate tried to amend us, the House took a hand in the show.
The plumbers wanted to buy us (the public to furnish the dough),
Nine hundred and ninety committees, the Interstate Commerce and Hines,
The B. of L. E., Stone, Gompers and Lee reformed us on various lines.

Back to our owners again, Uncle,
Back to our owners again.
Ready to tackle the job, Uncle,
Eager the goal to attain.

What are you?

Some talents too good to be lost you
American Genius and Grit.
Two things that'll pay what they cost you
If you give them a chance to remit.
You have hampered the growth of the railroads,
Turn around now and help them regain
The strength that they should for America's good
Now they're back to their owners again.

With apologies to Rudyard Kipling—J. S. H.

A. M. Burt Returns to Northern Pacific

A. M. Burt, assistant director, division of operation, United States Railroad Administration, in charge of maintenance and engineering, and chairman of the automatic train control committee, has been appointed assistant to the operating vice-president of the Northern Pacific. Prior to federal control Mr. Burt was general manager of the Northern Pacific. In the reorganization incident to the taking over the roads by the government, he was made assistant general manager. His appointment as assistant director of the division of operation was dated June 1, 1919.

A. W. P. A. Meeting

The executive committee of the American Wood Preservers' Association met in all-day session at the Hotel Sherman, Thursday, March 18. Among other subjects which were considered was the selection of the personnel of committees for the ensuing year.

St. Paul Men Attend the Exhibit

Among the 90 officers and foremen of the Chicago, Milwaukee & St. Paul who, with Chief Engineer C. F. Loweth, attended the convention and exhibit, were a number of the 50 out-of-town members who came from far western divisions.

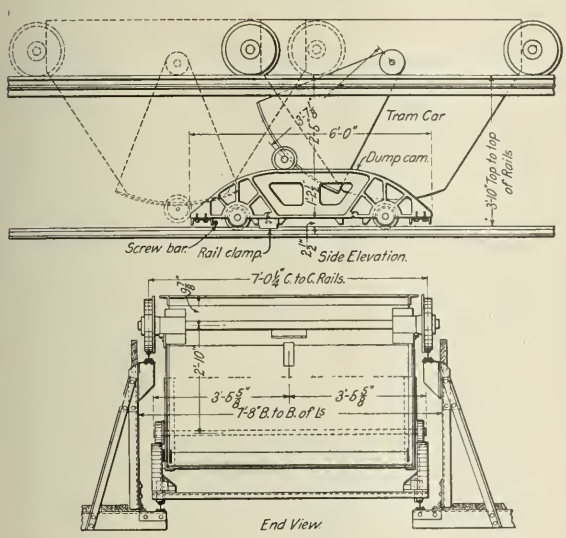
Organization Change on Southern

Effective on March 1, W. J. Eck, superintendent, signal and electrical department, Southern Railway System, will report direct to the assistant to the vice-president instead of to the chief engineer as heretofore.

An Improved Tram Car for Coaling Stations

Among the new devices brought out during the past month to facilitate coaling station operation is an automatic dumping tram car manufactured by the Roberts & Schaefer Company, Chicago, for use in locomotive coaling plants of 600 tons or more capacity. This type of car is now in use on the Pennsylvania Lines West at Columbus, Ohio, on the Norfolk & Western at Roanoke, Va., and on the Lehigh Valley at Ashmore, Pa.

The tram car which has a three-ton capacity is constructed of steel and is carried on four cast iron wheels 16 in. in diameter placed above the center of gravity of the car as an insurance against its jumping the track. The body of the car is 6 ft. wide and 6 ft. 6 in. long for a depth of approximately 14 in., after which the two ends



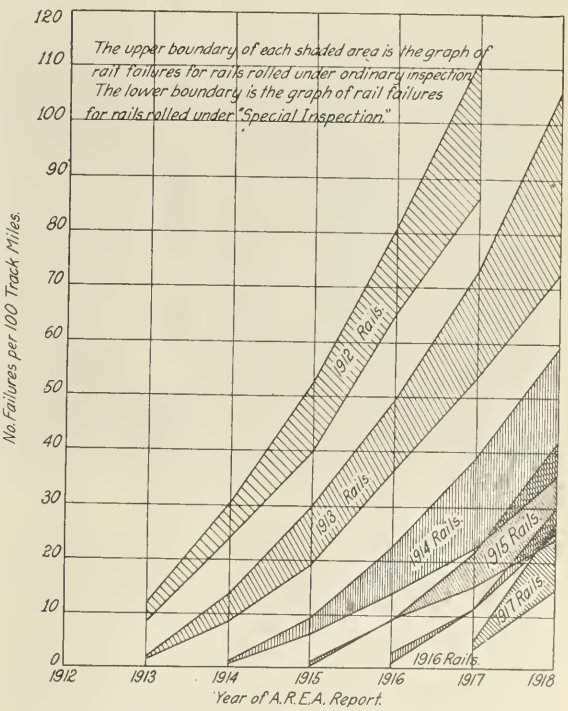
The Tram Car and Dumping Mechanism

slope in towards the discharge opening, which measures approximately 2½ ft. by 6 ft. This opening is closed by a pendulum swing gate with a radius of 3 ft. 5 in., which is of the undercut type carrying two 6-in. rollers. The car operates on a 6 ft. 10 in. gage track laid with 30-lb. rail extending across the top of the coaling pocket and is hauled horizontally over this track by a ½-in. cable which is connected to the same drum that hoists the elevating bucket. This synchronizing of the bucket and the tram car renders it certain that the car will always be under the discharge chute when the elevating bucket reaches the top. As the bucket descends the cars moves across the track, reaching the far side when the bucket is at its lower level and returning when it is elevated.

The coal is dumped at any desired point by means of a traveling cam which engages the rollers of the swing gate on the tram car. This cam consists of a skeleton frame casting, carried on four 6-in. rollers, running on 30-lb. rail with a gage of 6 ft. 5 in. at a distance of 3 ft. 10 in. below the tram car rails. At the start of the operation the tram car is allowed to push the cam casting along its track until the desired point is reached, when the entire operation is stopped and the casting clamped to the rails by means of a double clamp actuated by a long screw bar extending across the frame and a removable lever. After this is completed, the movement is again started and as the tram car meets the casting the rollers on the swing gate run up the inclined face of the casting, opening the door and discharging the coal. While the roller is traveling over the horizontal portion of the cam the door is held open and as the car continues, the rollers run down the other incline, silently closing it. On the return trip to the discharge chute, the gate is again opened and closed, the car receiving a second discharge over the same spot, an advantage where sticky coal is used, before returning for another load from the elevating bucket. This operation is continued until sufficient coal has been dumped in one place.

Rail Statistics Demonstrate Value of Special Inspection

The rail statistics compiled by the American Railway Engineering Association have previously afforded some definite data regarding the specific benefit to be derived from the manufacture of rail under the system of "special inspection" originated and conducted by Robert W. Hunt & Company, Chicago. A description of this inspection and some data on the results secured were published in the *Railway Age* of March 20, 1919, page 744. With the gradual accumulation of the rail statistics, especially those showing the influences of



How "Special Inspection" Has Reduced Rail Failures

the disturbing conditions of the war period, this demonstration can be carried even further, as is illustrated in the diagram which shows the relation of rail features to the "special inspection" graphically.

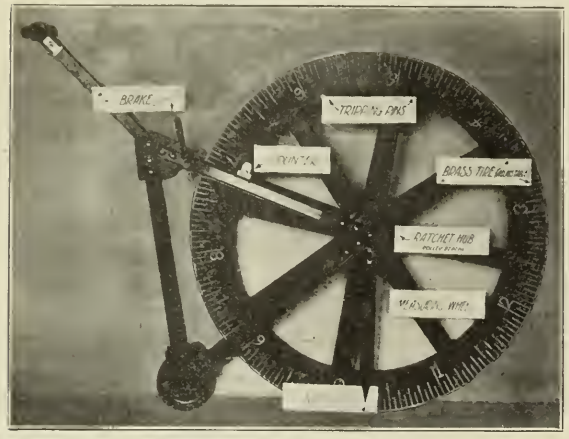
This chart shows the number of rail failures per 100 miles of track for all rail rollings reported to the American Railway Engineering Association as subdivided between those from rails that received the special inspection and those that were rolled without this supervision. The shaded area between the two curves for each year's

rolling gives a measure of reduction in failures per 100 miles of track each year. One fact brought out by a study of the diagram is that the proportionate benefit to be derived from this service has not decreased during the general improvement in the manufacture of rails taking place in the last six or seven years. In fact, the proportionate reduction in failures has been even greater for some of the more recent rollings than for those of earlier years.

A New Method for Making Track Measurements

The Warren-Knight Company, Philadelphia, Pa., has recently developed a device known as the Sterling trackometer for the purpose of measuring longitudinal distances, particularly along tracks. It consists essentially of a built-up hardwood measuring wheel equipped with roller bearings and an adjustable brass tire having a true circumference of 10 ft., which is calibrated in feet and tenths. A strip of rubber inserted between the tire and the wheel felloes furnishes the necessary resilience in adjusting the circumference.

The operating handle of the device is hinged in the frame in such a way that it is impossible to raise the measuring wheel off the rail head by bearing down on the



The Sterling Trackometer

handle while it is in use. A small cast-iron trailer wheel assists in guiding the instrument along the head of the rail. A positive hand brake is provided which, when locked, enables the trackometer to be removed from the rail quickly, a mark being first made on the rail at the point of the indicator as a guide for resetting when the measurements are to be continued. A counter mounted on the frame records the distance traveled in feet, the fractional parts of a foot being read off the measuring wheel by the aid of the indicator pointer.

The use of the trackometer, which is adaptable to track work, both tangent and special, chainage, pavement measurements, yardages and land measurements where the land is practically level, requires a two-man party where rapid movement is desired, one man operating the instrument and the other making and recording the readings.

Results of tests by valuation and roading engineers have shown that measurements obtained with the trackometer are as accurate as those obtained with the 100-ft. steel tape and that its use eliminates the danger of "dropping a station" or the errors introduced through reading the tape backwards, using a repaired tape, etc.

Improved Mercury Time Release

The Union Switch & Signal Company, Swissvale, Pa., has improved its mercury time release so that an increase in the upward pressure of the latch is obtained. This release is usually applied to signal levers of Union power interlocking machines, in the same manner as an ordinary indication magnet. The mercury actuated lock introduces a safe time interval before the indication of a signal lever may be taken up, thus preventing

The Mercury Slow Release

a quick change in the route should the engineer of a train fail to note that the signal has been returned to the stop position after it had been cleared. Some of the features of this release consist of an external adjustment of the time element between 5 and 45 sec.; all parts that come in contact with the mercury are immune to its effects; there is ample provision to prevent the mercury from leaking out around the threads and joints, and contacts may be provided for closing circuits in either or both positions of the plunger.

EDITORIAL Railway Age

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The Opportunities Are Many

An article in this issue describes the unusual features of an engine terminal and yard built by the Denver & Rio Grande at Soldier Summit, Utah, to meet the requirements of a disadvantageous site. Because the conditions did not permit of the use of a conventional layout, resort was had to some original designing with highly commendable results. One of the features, a rectangular engine house affording space for 24 locomotives, may be open to objections by some students of this subject in spite of the waste of space in roundhouses built long enough to accommodate Mallet locomotives and the difficulty of keeping turntables in operation in localities subject to extremely heavy snow fall. However, in view of the frequency with which the idea of a rectangular house has been raised, it is certain that this departure from the conventional shape will be watched with a great deal of interest. But these are matters of detail; the real story in the account of this new terminal lies in the facts that led to its construction. Ever since the four per cent grade on the west approach to Soldier Summit was eliminated, operating conditions have pointed to the advantages of a further improvement through the transfer of the engine terminal to the summit from Helper, 25 miles down the east slope. How much this change has facilitated the handling of traffic is described in the article. It affords an illuminating example of the possibilities for profitable improvements that do not in themselves increase tonnage ratings or track capacities, but which nevertheless exert an enormous influence on the traffic-handling capacity of a line. Unquestionably, there are many other opportunities for just such improvements on American railroads.

"Summer Time" in New York and Elsewhere

Daylight saving plans in New York, New England and New Jersey are in a very unsettled state, and nearly everybody (including most of the railroads) seems inclined to wait and see what is going to be done by others. As we go to press the legislatures of Massachusetts and New Jersey are still discussing various proposals, though all interests desire to make the change, if change is made, only three days hence. In New York (except in federal government establishments and the railroad stations) the question is settled, and the sixtieth degree standard will go into effect at 2 o'clock Sunday morning. As noted last week, the New York, New Haven & Hartford will issue new schedules for suburban trains, and the New York Central has decided to do the same. The other roads are still waiting to see if all the commuters really do set out for their offices an hour earlier than at present. So far as can be judged by the experience of Canada last year the willing and the unwilling will to a large extent adopt the same habits, and without much delay. For example, take the case of New York City. The city government has decreed for the summer the standard of the 60th meridian. A suburban resident working in the city leaving home at 8 a. m. will start at 7, but will call it 8. The railroads, being subject to the federal law, which now requires them to use normal time the year round, will not change clocks, but will change trains, issuing a new timetable and starting the eight o'clock train at seven; and calling it seven. The suburban passenger may call it eight, if he chooses, but it will be seven and the railroad will call it seven. The federal government offices and the railroad stations will keep their clocks at the 75th meridian, but if general business starts an hour earlier the post offices, the courts and the railroad offices will without doubt find it to the advantage of all concerned to start with them. In Eastern Canada "summer time" (60th meridian) was generally in vogue in 1919 in spite of the refusal of the government to adopt it by statute. The railroads, acting on their own responsibility, changed their clocks so as to avoid confusion at their connections with railroads in the States and the large cities made the change by ordinance; even the House of Parliament at Ottawa changed their clocks. The legislators had fixed the law to suit the farmers, but in arranging their own work-day they found it expedient to conform to the customs of their immediate neighbors. In New York, now, the railroads cannot change their clocks, but they can change their habits.

Purchase of Locomotives

The manner in which the purchases and inquiries for locomotives have kept up during the past few weeks is an encouraging indication for a good year for the railway supply manufacturers. The orders and inquiries are both being reported in considerable quantities and those who are following developments are getting no small encouragement from the fact that nearly all the inquiries are proving to result in orders. The sentiment thus expressed is borne out in an interesting way in the annual reports of the various railway equipment concerns, none of which fail to mention their opinion that 1920 is going to prove a good year because of the purchasing expected to accompany the return of the railroads to private control. The feeling on all sides is optimistic. In view of the fact that a great many of the roads—particularly some of the larger ones—have not yet been included in the list of locomotive purchasers, its is apparent that continuation of the orders is to be expected for a considerable period in the future. An interesting side-light on the matter may be obtained from a comparison of the locomotive purchases this year with those for 1917, 1916 and 1915. The comparative totals are given up to the third week in March as follows:

DOMESTIC

	1920	1917	1916	1915
January	32	157	231	31
February	383	623	272	36
March (three weeks)	220	268	423	107
Total to end of third week:	635	1,048	926	174

FOREIGN

	1920	1917	1916	1915
January	209	268	2	7
February	86	98	129	117
March (three weeks)	80	4	386	0
Total to end of third week	375	370	517	124

From this table it will be observed that the domestic orders thus far this year total 635 as compared with 1048 in 1917, 926 in 1916 and 174 in 1915. This means, of course, that the volume of business this year, from the standpoint of number of locomotives ordered, has not been as great as in 1917 or 1916. It can also be taken to mean, in view of the un-

derlying conditions, that the difference in volume as between this year and the two preceding years (1917 and 1916) has still to be made up and may eventually be added to the totals for the present year.

What the Short Lines Get Out of It

IT WAS PRETTY GENERALLY ADMITTED that the "short line" railroads, by being excluded from participation in government operation were subjected to hardship. The short lines claim that this hardship amounted to gross injustice. In the hearings before both the Senate and House committees representatives of the short lines individually and of the association representing these lines—the American Short Line Railroad Association—appeared and their testimony was listened to with respect. The efforts of the individual carriers, and especially of the American Short Line Railroad Association were quite successful.

The Transportation Act provides that the short lines not under government control in 1918 and 1919 shall receive for the six months' period subsequent to March 1, 1920, a rental similar to that received by the roads that were operated by the government in 1918 and 1919. The bill also deals with compensation for short lines not taken over, providing that there shall be retroactive compensation, but these provisions are not entirely clear. The Association claims that their provisions will entitle them to the same rental as roads taken over, and that therefore those companies which did not, in fact, succeed in earning as much, net, as they would have received as rental are now to be compensated for the difference.

Fully as important as the guarantee for the six months is the provision which empowers the Interstate Commerce Commission to fix divisions of joint through rates where the parties to the rate cannot agree on a proper division. Furthermore, the Commission is especially instructed to take into consideration the amount of revenues required to pay their respective operating expenses and the importance to the public of the transportation service of each, etc.

Short line railroads are generally originating roads. Where they connect with two or more competing large railroads they are in a position to drive a good bargain for a division of rates; but with only one, the short line is of necessity forced to accept the conditions imposed on it. The short lines have often been treated generously in regard to the loan of cars, etc., by their strong connections but undoubtedly there have been plenty of instances where the strong road drove a hard bargain in rate divisions. "Short line" section of the act is, therefore, a considerable victory gained by the American Short Line Railroad Association.

Another provision of the bill which may work out in the long run to great advantage for the owners of short line railroads is that dealing with consolidations. The history of the building of American railroads has pretty well established the fact that a 50-, 100- or 200-mile independent line, if it is successful, will be absorbed by one of the large systems. To provide against the building of lines simply to eventually sell them to a connecting railroad at a profit to the builder and a loss to the purchaser, the Transportation Act requires a certificate of necessity and convenience before a new line can be undertaken.

On the whole the Transportation Act treats the short lines very fairly—in some respects more generously, in proportion to earning capacity, than it treats the large railroad companies. The credit for this situation is, undoubtedly, due on the one hand to the weight which a local railroad owner has with his own Congressman and on the other hand to the admirable work of the American Short Line Railroad Association.

The Race Between Wages and Rates

ONE OF THE GREAT difficulties about the railroad situation in the past has been the fact that the causes for increases in their operating expenses have multiplied so rapidly that the rates from which the railroads earn revenue to pay their expenses have not kept pace with them. The provisions of the new transportation act seem to give some assurance for the future that increases in expenses shall be taken into consideration more promptly than they usually have in the past when rates are being determined, but it would be well for those who are planning now to object to the increases in rates that will result from the proceeding initiated by the Interstate Commerce Commission this week to remember to note that the increases in wages and in other items of the railroads' cost of living are still one or two jumps ahead of the rates.

The Interstate Commerce Commission on Monday began a hearing for the purpose of receiving the views of all interested parties as to its procedure in bringing rates up to a level calculated to produce the fair return which the new law promises, but on the same day there was also held in Washington the second meeting of the conference commitees representing the railroads and the organization of their employees that have transferred their demands for more than a billion dollars additional increase in wages from the Railroad Administration to the companies. Also, during the week before the hearing, the President had received the majority and minority reports of the coal commission recommending further increases in the wages of coal miners which will inevitably result in a higher price for the fuel which represents a large part of the railroads' expenses.

This is notwithstanding the fact that the Interstate Commerce Commission is already confronted with a wage scale that has been increased during the period of government control about twice as much as freight rates have been advanced and that all of the numerous wage orders of the Railroad Administration that have been made effective since its first order, that was made retroactive to January 1, 1918, are not yet reflected in the rate level.

It is true that the railroad companies are guaranteed for six months the same net operating income that they enjoyed or got along with, as the case may be, in the three years ending June 30, 1917, but the employees, by the same law, are guaranteed for the same six months' period the rates of pay which they had been allowed up to February 29, 1920.

In the latter part of 1917 and the early part of 1918 the eastern railroads got a 15 per cent increase, and the southern and western roads a much smaller one, to meet the advances in wages which resulted largely from the passage of the Adamson eight-hour law which went into effect on January 1, 1917. The rate increases were also intended to take care of some other increases in expenses, notably in fuel. On May 25, 1918, Director General McAdoo issued his General Order No. 27 increasing wages retroactive to January 1, and also his General Order No. 28, which was intended to advance the rates sufficiently to meet both the new increase in wages and the advances in other items of operating costs which had accrued while the Interstate Commerce Commission was considering the 15 per cent case. The rate order, however, was not made effective until June and while the wage order was later found insufficient to satisfy the employees and supplemental orders continued to be made up to the end of federal control the Railroad Administration continued to be optimistic for the future and refrained from raising rates.

The result was that while the government during its operation of the railroads increased freight rates about 28 per cent, it increased wages about 56 per cent and the resulting deficit was passed on to the taxpayers. Director General Hines has preferred to explain his deficit by saying that the

first rate case was not made soon enough, and that the failure to make a second increase was a matter of policy, although the increase in the deficit during 1919 as compared with 1918 demonstrates that the first increase was not made sufficiently high when it was made.

The fact therefore remains that wages have continued to increase throughout 1918 and 1919 while the rates have not been changed (except in the way of local or particular adjustments) since June, 1918, and yet the demand for new increases in wages has already got a start on the rate case.

The Space Interval on Railroads with Light Traffic

THE BUTTING COLLISION at Onawa, Maine, on December 20, 1919, killing 23 persons, afforded a striking illustration of the need of the block system on single track railroads of moderate or light traffic. Such roads carry fewer passengers and run trains less frequently; the fatalities of a year or a series of years not only are small absolutely but even may be small comparatively when considered with the records of busier roads, for the single track has elements of safety not enjoyed by the double-track and four-track lines. The thin line, however, aims to carry its passengers in as few trains as practicable, with economy, so that individual wrecks are likely to be as bad as those on larger roads. This lesson of the Onawa wreck, discussed in our issue of January 30, page 342, is reinforced by the additional details given in the report of the Interstate Commerce Commission on the case, which is abstracted in another column of this issue.

The subdivision of road on which the collision occurred is 117 miles long and has, in the 94 miles having no block system, nine telegraph offices, making the average distance between meeting points about nine miles. In 15 days in December the average train movement was 41 a day, or an average of 20½ trains each way. This makes the average time between trains following one another about one hour and ten minutes. Unless the traffic is distributed very evenly over the 24 hours the intervals between trains are often much shorter than this. On any such line, with such a traffic, they must be expected to be much shorter on very many occasions every week, probably every day. Therefore there are bound to be delays all the time; and where delays occur all the time the natural recourse is the general introduction of permissive blocking.

There is the crux of the problem. Permissive blocking is not blocking at all. With it the block sections are left long when they ought to be shortened, and that means the continued use of the time interval system and, for opposing movements, continued dependence on the despatcher and all the old methods. Shortening the block sections costs much money and the cautious manager, worried over ways of finding needed funds, lacks the courage to make the improvement. He can defer it and still, very likely, show as small a percentage of passengers killed as any other manager with whom he is likely to be compared. The universality of this perplexing burden on the individual manager, paralyzing his efforts at improvement, is the justification of the law designed to make block signaling compulsory. A compulsory law can be made to bear equally on all roads; and under it the public, which must finally bear the expense of safeguarding its steel highways, will know where to place responsibility for any dereliction.

It is right and desirable to get this question before the public as vividly as possible, and that is another justification for a compulsory law. It is desirable that the public shall realize that our railroads already accomplish a high degree of safety; and that in making travel still safer we are pursuing a very high ideal. We are paying a high price for the last inch of protection. For 75 years we have been satisfied with what may be called reasonable safety. We now aim at perfect safety, and there is no escape from paying what it costs. The fact that in calling for the general introduction of the space interval the government is demanding a high standard—is almost justifying the position of those who claim that it is a refinement too costly to be indulged in as a feature of every day life—was brought out significantly by Mr. Beaumont the other night at the New York Railroad Club (see report elsewhere in this issue), when he, a signal engineer and inspector of many years' experience, estimated that the cases, within his own knowledge, where enginemen had run past stop signals, *without any collision resulting,* would number *hundreds.* It is a plausible assumption that where the chances of disaster are so small the sin of postponing improvements cannot be classed as a very black one. This assumption is not often put into words, but the fact that it exitsts in the thoughts of innumerable railroad officers who are responsible for present conditions, is the explanation of a material portion of our disgraceful collision record.

The manager who thinks that the risks which he runs are small, should look oftener at the other side of the record. Another point made by Mr. Beaumont was that figures showing percentages of persons killed do not afford any instructive light on the collision problems. When a carload of passengers is killed in 20 seconds, the public (Congress) cannot be made to take an interest in percentages; the demand is for a way of preventing that particular kind of disaster. It is true that the startling disasters are infrequent, comparatively; but the conscientious manager aims at total abolition, and he must guard every point. The Interstate Commerce Commission, from its accident files, can show flagrant cases every month. The investigations published constitute only a fraction of the record.

On November 16, 1919, the investigation of a rear collision of freight trains on the Chicago Great Western at Harlan, Iowa, causing one fatality, showed that freight trains were run at night a distance of 83 miles over a line where there was only one intermediate telegraph office. The second train began its trip 50 minutes behind the first one, but after running 43 miles it was only ten minutes behind; the leading train stopped, and there the collision occurred. Obviously the time-interval rule is of very little value under such a condition, and to run permissively is equally out of the question except perhaps in clear weather, in daylight, where there are no curves.

On December 22, 1919, near Huntsville, Mo., on the Wabash Railroad, passenger train No. 12 ran into the rear of a local freight train, causing the death of an employee; the investigation showed that the passenger train, running under a caution card, about an hour after sundown, traveled six miles in about seven minutes. In this case, as in the one at Harlan, the trouble occurred in or near yard limits and the blame was not placed entirely on the following train; but, in both cases, the attempt to save time by suspending the space interval principle was an outstanding feature.

A conservative critic would say that a rule requiring trains to run under control through a block section six miles long, could not be expected to work out satisfactorily; but in this case the inspector found that the caution card issued to train No. 12 on December 22 was numbered 868 (over 40 cars a day), indicating that such movements were very numerous. Furthermore, he concluded from the evidence that the restrictions intended to be placed upon trains being operated under caution cards were not generally observed.

Thus we find two prominent roads on which the problem is the same as on the Canadian Pacific. Enforcing the block system with forty-mile block sections necessitates very long time intervals, which may mean costly delays. To enforce

it with six-mile blocks must in many cases appear to the trainmaster to be an intolerable restriction on his efforts to move trains economically. But that is the issue; and if the Interstate Commerce Commission exercises the powers which it now possesses, it will be an issue which must be met.

The Pan-American Railroad

A RAILROAD extending from Hudson Bay, Canada, to Patagonia, South America, serving as a link between the three Americas, may in the past have been considered visionary, but the progress in railroad building that has come about in Central and South America during the last 50 years lends something of a corporeal form to the ideal.

Conceived over 50 years ago by a former United States Consul in South America, Hinton R. Helper, the project has in the past received the support of Andrew Carnegie, James G. Blaine and other prominent Americans. As a result of the International American Conference held in Mexico City, Mex., in 1902 the project was given added strength, and a permanent "Pan-American Railway" committee, comprising diplomats of Latin America and the United States, was appointed. The recent Pan-American financial conference held at Washington, D. C., again brought up the matter.

The interest of South America in the Pan-American Railway, as it has sometimes been called, has seldom lagged. Chile has completed a railroad running south and north, adding a link to the nucleus of the projected line. Bolivia has closed up most of the gaps in her north and south lines, only slightly more than one hundred miles of track remaining to be laid. A railroad from Valparaiso, Chile, to Buenos Ayres, Argentina, has been completed. Branch lines of Brazilian railroads have been connected with Uruguayan and Argentinian lines. The Peruvian government is at present considering the construction of a railroad which is to reach the region of navigable rivers, affluent to the Amazon, in the north. This new line, starting at a point in the Cerro de Pasco region, would tap extensive virgin forests of valuable timber. The Peruvian Railway Construction Company, organized on February 5, 1919, considers constructing railroads in other parts of that republic.

The greatest difficulty to be overcome in a proposed construction of the Pan-American Railroad would be the crossing of Central America. There the population apparently is not deeply interested and the geological conditions to be met with are discouraging.

Whatever may come of the scheme, there is no doubt that it would prove of great commercial and social value. Trade relations between the countries of Latin America and the United States undoubtedly would be bettered. A journey by rail from the Arctic circle to the southern tip of South America would approximate 10,000 miles, and under good traffic conditions it is estimated that the trip could be made in from 10 to 12 days via the "Pan-American." At present 24 days are required for the 5,871 miles sea voyage from New York City to the capital of Argentina.

In the present confused condition of railroad matters in the United States the time is not propitious for active consideration of the Pan-American Railroad, but the time will come when it will not only be feasible but will actually be attempted. While capitalists of Great Britain have interests in South America estimated at $4,000,000,000, mostly in Argentina, and French and Belgian capital is invested heavily in South America railroads, the war has made it virtually impossible for European countries to continue financing such ventures. As a result, delegations from Colombia, Peru, Chile, Brazil, Ecuador, Uruguay, Paraguay and other South American states have visited the United States in recent years and are within our borders now attempting to awaken American investors to what they call "a big investment opportunity"—the Pan-American Railroad.

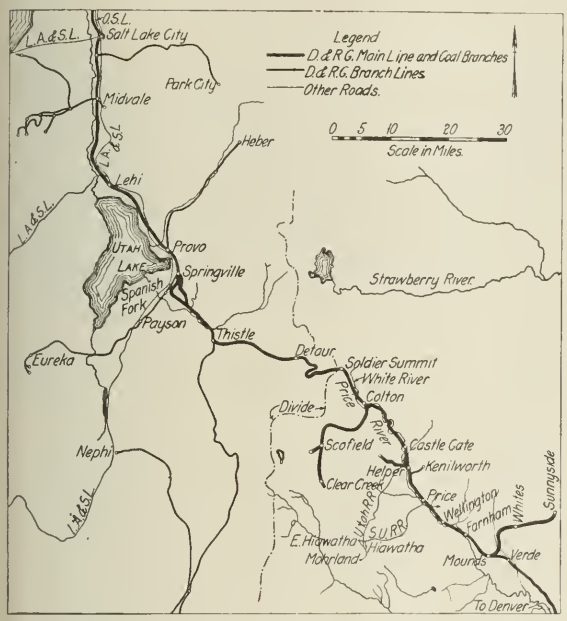
It's Been a Shocking Experiment

Out of the Desert

A Terminal Built for Special Operating Conditions

Physical Obstacles Are Also Responsible for Unusual Design of D. & R. G. Yard at Soldier Summit

OF THE OBSTACLES imposed on the Denver & Rio Grande in its efforts to afford adequate transportation for the valuable products of the rugged territory it serves, one of the most formidable is that imposed by the Wahsatch mountains to the coal traffic moving westward into the Great Basin from the Utah coal field. This field, because of the



Relation of the Coal Fields to the D. & R. G. Line Into Salt Lake City

competition of Colorado mines, has of necessity found its market in the Great Basin and areas to the west, southwest and northwest and since the field lies entirely on the east slope of the Wahsatch mountains, the crest of which forms the eastern rim of the Great Basin, all of the coal and coke produced in this region must be lifted over the range to reach its market. With the development of this coal field, the resultant traffic has imposed some interesting operating problems on the Denver & Rio Grande.

The first important step to expedite transportation on this line, subsequent to its construction in 1883, was the change from narrow to standard gage in 1890. Still more important was the Soldier Summit grade change in 1913 that eliminated the seven miles of four per cent grade which, although on the western or downhill slope, had long imposed a far greater obstacle to the traffic than the 2.4 per cent grade on the east or uphill slope. Experience subsequent to this change demonstrated that the existing operating arrangements did not permit of a full realization of the advantages accruing from this second improvement. As a consequence, a third betterment of this line was undertaken to accomplish a rearrangement of the terminals and engine districts that would best meet the physical conditions and the traffic requirements of the line.

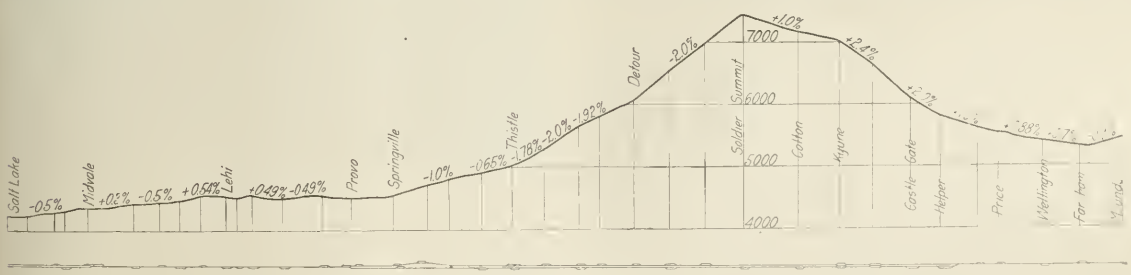
This improvement, which has just been completed, involves the shortening of the first engine district east of Salt Lake City, by moving the terminal from Helper 25 miles up the east slope to the crest of the Wahsatch range at Soldier Summit. This rearrangement of terminals embodies many points of interest not only because of the operating arrangements which made it desirable, but also because of the engineering problems imposed in the placing of an engine terminal and yard in an adverse location.

Physical Characteristics

The physical characteristics of the Utah division of the Denver & Rio Grande are shown in the accompanying map and profile. The mines are all located either on the main line or on branches leaving the main line, between Mounds and Colton. In other words, they are practically all located on the grade rising westward to Soldier Summit. The 13 miles of this line between Helper and Kyune varies from 2 to 2.4 per cent, while the 12 miles just east of the summit, has a maximum of one per cent. From Soldier Summit westward the grades are downhill practically all the way to Salt Lake City, the maximum grade against eastbound traffic being two per cent. There are some minor grades of not over 0.54 per cent against westbound traffic. The line is double tracked from Helper to Provo, 75 miles, and from Midvale to Salt Lake City, about 10 miles.

Some idea of the coal and coke traffic may be obtained from the tables giving the 1916 figures, the last year for which complete data are available. Owing to the increase in coal production since that time the totals cannot be said to be representative of the present conditions except as they indicate a general relative distribution of the output and the relation between eastbound and westbound traffic.

Of specific importance is the fact that the coal and coke



Profile of the Denver & Rio Grande Between Mounds and Salt Lake City

traffic passing westward through Soldier Summit represents about 85 per cent of the total westbound net tonnage and that the total net tonnage westbound is about four times as great as the revenue tonnage eastbound. However, a large part of

APPROXIMATE FREIGHT TONNAGE PASSING SOLDIER SUMMIT

Calendar Year—1916

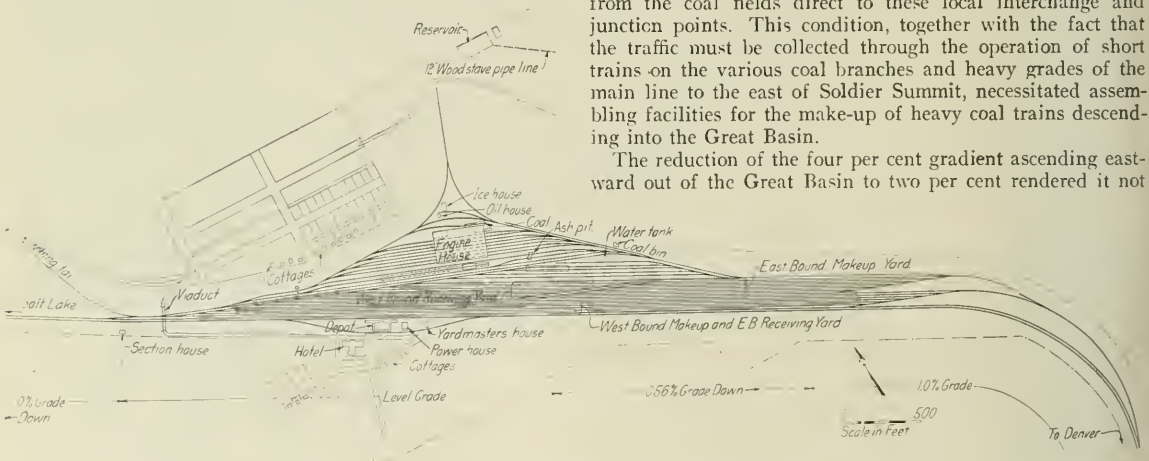
Destination	Westbound. Coal.	Coke	Total.
Company coal	400,000		400,000
Other railway locomotives	132,208		132,208
Utah points on other roads	455,957	57,120	513,077
Nevada	202,492	1,456	203,948
California	268,432	16,763	285,195
Idaho	284,441	22	284,463
Montana	19,491	179,098	198,589
Oregon	31,851		31,851
Washington	48,601	325	48,926
Wyoming	100		100
Local Utah points	829,419	153,143	982,562
Total coal and coke	2,672,992	407,927	3,080,919
Other traffic all points West			592,647
Total westbound traffic			3,673,566
*Total eastbound traffic			897,046
Total traffic passing Soldier Summit			4,570,612

* No coal or coke moves east through Soldier Summit.

the eastbound train movement into Soldier Summit consists of the empties returned to the mines, since there are no available empty cars from the east which can be loaded with coal or coke for further westbound movement.

Need for a Change in Operating Arrangements

Prior to the improvement work completed in 1913, the maximum descending grade west from Soldier Summit was four per cent and the length of trains was limited to the tonnage that could be safely handled by the locomotive of



Map of the Soldier Summit Terminal

given braking capacity. Thus, Mallet and consolidation engines equipped with 8½-in. cross-compound Westinghouse air brakes were rated at 1,150 tons and when equipped with 11-in. simple air pumps to 950 tons. Thus, this descending grade rather than the two per cent ascending grade approaching Soldier Summit from the east was the prime factor in determining the engine ratings, in making up trains from the mines for Salt Lake City.

This situation has been entirely changed by the elimination of the four per cent grade since, with a maximum grade of two per cent descending, the limit of tonnage per train is almost entirely removed. It is now practicable to run 65-car trains westward from Soldier Summit and this is a considerably greater train length than it is practicable to operate from the mines to the summit.

When the products of a group of mines is distributed to widely separated markets, economy and efficiency in transportation demand some central point of classification where the loaded cars from the individual mines are grouped according to destination and the empty cars may be equitably and effectively distributed to the mines. Since, as has been pointed out, all the coal and coke originating in this particular field moves to the west, it follows that a point of classification should be west of the most westerly mines. It is a rare coincidence that in this case, Soldier Summit, which is located at the apex of the eastbound and westbound grades, should be just beyond the west edge of the coal fields. Therefore, with the terminal at Soldier Summit, it is not only possible to make up trains of empty cars for destination to the various mines with return runs of loaded cars from these mines, but it is also entirely practicable to make up solid trains of coal destined for certain points of consumption on the tracks of the Denver & Rio Grande, or for certain interchange points with other roads.

The coal and coke from the Utah fields may be classified as follows: That destined for local Utah points in the Great Basin, Utah points on connecting lines, southwestern points on the Los Angeles & Salt Lake, western points in Nevada and California on the Western Pacific and the Southern Pacific and northwestern points in Idaho, Montana, Oregon and Washington, reached via the Oregon Short Line. Interchange of this traffic with connecting lines is effected at Provo, Salt Lake City and Ogden, while junctions with branches serving local Utah points off the main line occur at Thistle, Springville, Provo, Midvale and Salt Lake City. It will, therefore, be apparent that great facility of operation will be effected if solid trains of coal or coke can be moved from the coal fields direct to these local interchange and junction points. This condition, together with the fact that the traffic must be collected through the operation of short trains on the various coal branches and heavy grades of the main line to the east of Soldier Summit, necessitated assembling facilities for the make-up of heavy coal trains descending into the Great Basin.

The reduction of the four per cent gradient ascending eastward out of the Great Basin to two per cent rendered it not only possible, but practicable and economical to haul long trains of empties into the coal fields from the west. Perhaps no one mine in the field has a productive capacity sufficient to require, for one day's loading, all the empty cars which can be hauled in one train into the coal field. Consequently, a train of empties from the west must be distributed among several mines according to the respective productive capacity of each mine.

Just as in the case of the assembly of loads for westward movement, so Soldier Summit seemed to be the logical place for the distribution of empties to the various mines. This selection renders it practicable and economical for train and engine crews to serve the mines daily and return with loads to

the home terminal in the period prescribed by the Hours of Service act.

Coupled with the above-mentioned advantages of Soldier Summit as a site for a division terminal, is the very desirable equalization in length of operating districts. The old district, from Green River to Helper, was only 71.3 miles, while the adjoining district, from Helper to Salt Lake City, was 118.6 miles long, and all the mountain grades were on the longer of these two districts. By moving the terminal from Helper 25 miles westward to Soldier Summit the adjacent operating

Looking East from West End of Yard

districts are more nearly equalized as to length, the distance from Green River to Soldier Summit being 96.3 miles and the distance from Soldier Summit to Salt Lake City 93.6 miles.

Another important factor is to be found in the fact that a careful air brake and general train inspection and test must be made on all trains descending either way from the summit. It is decidedly more economical as well as conducive to the greatest efficiency to have such inspections and tests made by the thoroughly organized forces of inspectors with permanent facilities and appliances for the purpose. There is always

The Coal Chute Trestle

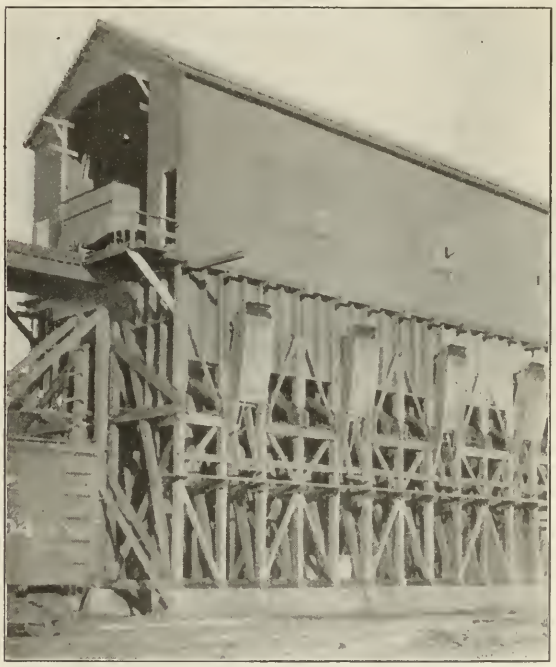
great difficulty in maintaining a competent force and adequate facilities for such purposes at outlying points. Consequently, a division terminal at points where rigid inspections must be made is a distinct advantage.

Requirements of the Terminal

From a consideration of the foregoing statement of the operating conditions, it is seen that the trackage requirements at the division terminal included a receiving yard for long trains of empty cars arriving from the west, a receiving yard for shorter trains of loaded cars arriving from the east, a classification and departure yard for trains of empties eastbound for coal loading and an assembly and departure yard for the long trains of loaded coal cars westbound. The requirements for this purpose under present traffic are for 10 coal trains westbound out of the terminal, 9 empty coal car trains eastbound into the terminal and a larger number of trains of 45 cars or under operating on turn-around runs between the terminal and the mines. A further idea of the requirements of this terminal is indicated by the fact that 31,351 cars were handled through the terminal in the month of December, 1919. Aside from the classification yard, the terminal must furnish complete accommodations for turning engines of which the daily output is 12 Mallet engines and 53 other engines.

Difficult Engineering Problems

The difficulty of locating a classification yard at the apex of grades descending in both directions in mountainous country can well be imagined. Not only was the alinement of



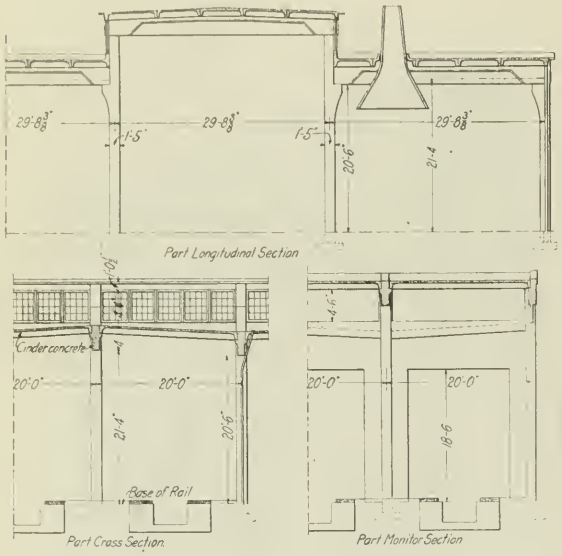
The Coal Chute

the main track, which conformed to the topography of the country, subject to considerable curvature but there was only 2,750 ft. of level track and 1,650 ft. of 0.56 per cent grade between the one-per cent grade descending eastward and a two-per cent grade descending westward. By going to rather extensive grading, it was possible to re-locate the main line so as to secure a tangent for the entire 4,150 ft. of distance between the ends of the two per cent and one per cent grades, but it was impossible to reduce the summit elevation so as to increase this distance. The length of the yard, therefore, was necessarily restricted to these limits which is not any more than the length required for a 100-car train. Under the circumstances, it was impossible to lay out the yard for the conduct of the classification by a progressive movement in the direction of the movement of the traffic. As a consequence, the various units of the yard had to be located in parallel groups within the fixed limits. To secure the desired length at the east end of the yard, the tangent of the yard tracks

was extended considerably beyond the point of curvature of the main track, necessitating main line connections at some distance beyond the end of the yard.

The location of the several yard units in groups side by side necessitated a shuttle movement for the operation of the yard and since this yard arrangement necessarily entailed switching movements beyond the end of the yard proper in either one direction or the other, and since it would have been impracticable to carry on this switching on the heavy main line grade at either end, a switching tail or drill track was constructed from the throat of the yard at the westerly end, supported on a one-per cent ascending grade.

As seen on the map, one grid of tracks is used for the westbound make-up and eastbound receiving yard, while the westbound receiving yard and the eastbound make-up yards comprise two shorted grids, placed end to end. Under the plan of operation short cuts of cars are taken from the receiving tracks and switched into the departure tracks with an eastbound movement which is either on the level or on the 0.56 per cent



Structural Details of the Engine House

down grade. All of the engine house facilities and car repair yards are located to the north of the classification yard.

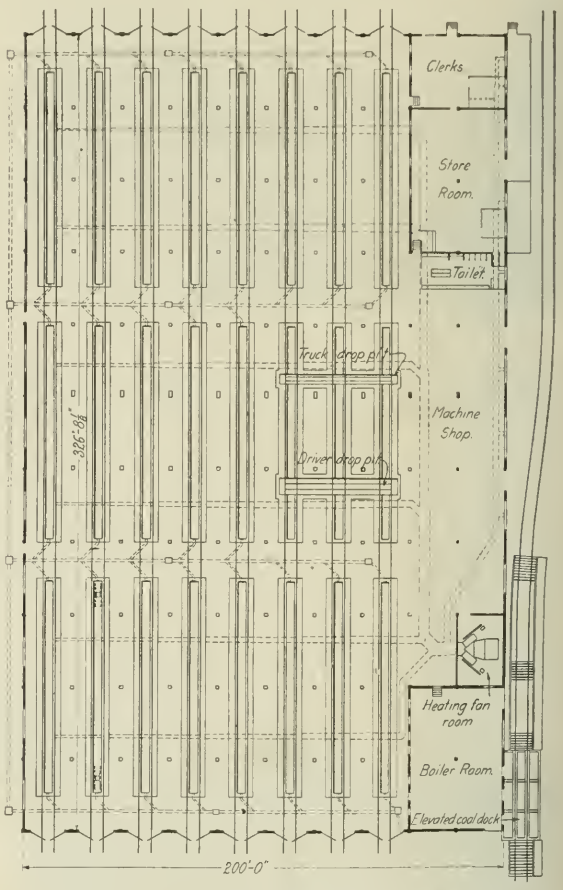
The whole plan of the yard layout was the subject of much study, owing to the heavy expense of grading and to the fact that lowering of summit elevation was out of the question. As finally designed and constructed, the grading quantities amounted to upwards of 460,000 cu. yd. of excavation practically all of which was solid rock.

The Engine Terminal

The distinctive feature of the engine terminal is a rectangular house, an innovation undertaken because of the considerable number of Mallet engines which must be accommodated at this terminal and the difficulty encountered as in all regions subject to heavy snowfall, in keeping the turntable pit clear for operation. The adoption of this type of house was obviously the most important factor in the design of the engine terminal yard. A turning wye was, of course, necessary, and in order to save distance traveled by locomotives in turning, entering and leaving the house, the layout of the house, serving tracks and wye necessarily demanded compactness as a distinguishing feature. The engine house is served by eight through tracks, each of which is equipped with three engine pits, making a total capacity of 24 locomotives. A powerhouse, heating plant and storehouse is also housed under the same roof and the whole is enclosed between the two legs of the wye. The location of the coaling station, the tracks, ash pits and the other auxiliary facilities are clearly indicated on the map.

The Engine House

The house is of the "Unit Bilt" reinforced concrete type, a total of 953 units being used in its construction. The framing consists of columns spaced 20 ft. center to center across the house and 29 ft. 8⅜ in. parallel with the tracks, and carrying longitudinal girders that support concrete slabs spanning transversely. All columns are 27 ft. high above



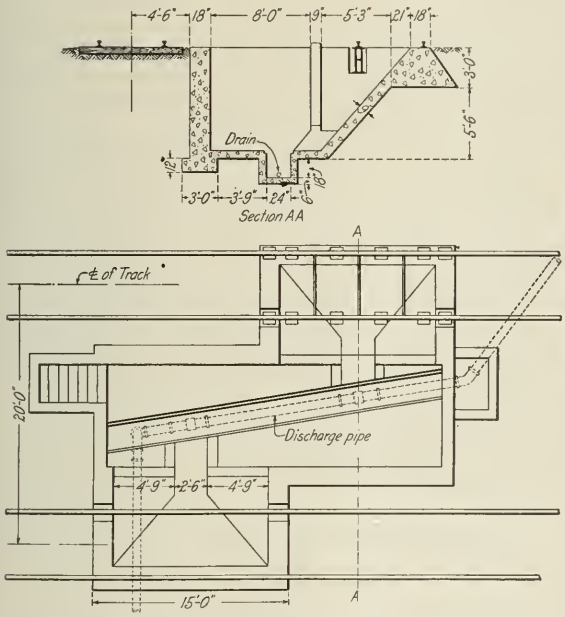
General Plan of the Engine House Showing Layout of Engine Pits

top of rail with corbels on one side 7 ft. from the top, thus providing alternate high and low girder seats and resulting in five high and six low transverse roof bays. The monitors thus formed are fitted with sash, 24 panels of which are pivoted and operated from the floor. The high girders are crowned slightly in the center to provide drainage. The low roof bays have alternate high and low supports, so that the drainage may be collected at low points and conducted by galvanized leader pipes to the engine pits. The entire roof area is covered with two layers of roofing paper and three moppings of hot asphalt pitch. The side walls are formed of slabs with openings for large triple-transom windows and track doors which are double side swing wooden doors affording an opening 14 ft. wide by 18 ft. high.

There are 24 engine pits in the house, three to each of the eight tracks. The pits are 88 ft. in length with walls of mass concrete 3 ft. wide and 3 ft. 10 in. deep, reinforced with heavy triangle wire mesh and provided with rail plates set 24 in., center to center. Screened sumps at the ends lead to vitrified tile drains with concrete manholes at convenient intervals. Concrete drop pits for both drivers and trucks cross three of the engine pits with swinging girder bridges to carry the track rails across the drop pits.

The north 40 ft. of the building is occupied by the master mechanic's office, a storeroom, a machine shop, the heating plant and a boiler room. The floors of the master mechanic's office and storeroom are elevated four feet above the engine house floor, while the fan room and boiler room floors are depressed a like distance. These rooms are enclosed by 13-in. brick walls carried to the under side of the roof girders.

The engine house proper is heated by hot air which is forced through a system of concrete and vitrified pipe ducts from the heating plant as shown on the plan. The air is heated by a group of 64 "Vento" steam radiators, and is then



Plan and Section of the Cinder Pit

forced through the ducts by two motor-driven multi-blade conoidal fans, each of which is of sufficient capacity to deliver 27,000 cu. ft. per min. Low pressure steam coils heat the office and storeroom. Steam for all purposes is furnished by two 200-hp. Murray horizontal water tube boilers. Ashes are discharged to a dump 150 ft. from the boilers through one of the American Steam Conveyor Corporation's special eight-inch cast iron pipe conveyors, operated by a steam jet. A 300-ton capacity coal bin is located in front of boilers and adjacent to the outside wall of building, convenient openings being provided for easy handling of coal.

Steam, air and water mains, with laterals for each tier of engine pits, are carried overhead on brackets attached to the concrete columns with drop lines and service connections to serve all pits. A complete boiler washout system equipped with blow-off, wash-out and re-fill pipes and connections was furnished and installed by the Miller Heating Company. Tanks and pressure pumps are located in a separate building just east of the boiler room.

The engine house is lighted by 200-watt lamps suspended from the girders, all vertical and overhead conduits being imbedded in the concrete units. Extension cord sockets are provided in alternate columns.

Auxiliary Facilities

The coal chute is a standard incline wooden structure, provided with 10 coaling pockets, five on each side, having a total capacity of 300 tons. The chute proper is 80 ft. long, supported by 12-in. by 12-in. posts and sills on concrete footings. The incline trestle approach is 528 ft. long, built on a six-per cent grade. A tail trestle extends 80 ft. beyond the chute and under this a wet sand bin was built and supported by the framework of the trestle. The sand drying facilities consist of steam coils, over which the sand passes by gravity to steel drums buried in the ground from which it is forced by air to overhead storage bins.

The layout also includes a double-track concrete cinder pit designed for use with a steam jet pipe conveyor system of disposal. The pit proper is 8 ft. wide, 8 ft. deep and 30 ft. long, built between tracks 20 ft., center to center. This main pit is connected on either side with concrete hoppers, one under each track, which receive the cinders from the locomotive ash pans. A depression in the bottom of the pit contains an eight-inch cast iron conveyor pipe, with intake tees opposite the hoppers. This is carried through one end of the pit and thence underground for a distance of 175 ft. to discharge into the open air. At the opposite end of the pit the con-

Depot, Hotel and Group of Cottages

veyor pipe terminates in an overhead line for depositing cinders in cars on an adjacent track. Steam, piped from the stationary boilers a distance of 500 ft. is used at a pressure of 80 to 120 lb. to operate the conveyor system.

Because of the prevalence of heavy snow in the winter, a portion of two repair tracks is covered by a frame and corrugated iron structure, 44 ft. wide by 273 ft. long. The oil house is of frame and concrete construction, 26 ft. by 38 ft., with an unloading platform on one side and one end. The superstructure and roof are covered with corrugated galvanized iron. Seven oil storage tanks are located in a concrete cellar 10 ft. deep, while a gasoline tank is buried under the platform outside of the building. A 4-ft. by 4-ft. conduit for oil and heating pipes connects the cellar with the storeroom in the engine house. A complete oil distributing system, consisting of eight automatic self-registering pumps, located in the storeroom, together with fill boxes for barrel and car service and all requisite piping was furnished and installed by the S. F. Bowser Company.

At the summit of heavy grades, the testing of air brakes is particularly necessary, and therefore a brake testing plant with its distributing pipe lines through the yard was installed Current for all power purposes and the lighting of the terminal is obtained from the Utah Light & Power Company, which has a nearby high voltage electric transmission line.

Water Supply

Another most important engineering problem was the securing of an adequate water supply at a summit location of this character. This requirement was met by the fact that the Denver & Rio Grande held water rights at points along

the Price river. By obtaining authority to transfer the rights to divert water to one of its tributaries, the White river, a normal flow of adequate quantity was secured with an intake of sufficient head above the summit to obtain a gravity flow. This plan necessitated about 3¾ miles of 12-in. wooden stave pipe and a storage reservoir on high ground at the terminal.

Housing Accommodations

Not the least among the features of this project was the provision it was necessary to make for housing the employees and their families, for the surrounding country at Soldier Summit is uninhabited. Ten new six-room and 10 new four-room frame cottages were built for the use of the company employees and in addition a number of cottages from the old terminal at Helper were moved to new locations at Soldier Summit. In addition, a two-story frame hotel building was built in the shape of a "T" 130 ft. across the front and 85 ft. deep. All of the second floor and a part of the first floor is devoted to sleeping rooms and the remainder of the first floor to a lunch room, lobby, kitchen, etc. The map layout of the terminal also shows the location of a two-story frame station building affording space on the second floor for division offices. The hotel and station are heated by a steam-heating plant located in the small structure adjacent to the station. All of the housing buildings, including the employees' cottages, are equipped with modern sanitation for which it was necessary to provide a sewerage disposal system.

The yard and engine terminal at Soldier Summit was designed and built under the direction of J. G. Gwyn and A. O. Ridgway, assistant chief engineer of the Denver & Rio Grande.

Roads That Did Not Accept Six Months Guaranty

Washington, D. C.

The list made public by the Interstate Commerce Commission on March 20 of the 864 companies, including railroads, steamship, bridge, terminal and depot companies, the Pullman Company and American Railway Express Company, that have filed with the commission an acceptance of the provisions of Section 209 of the transportation act, which entitles them to a six-months guaranty by the government but requires them to turn over any earnings in excess of the guaranty to the Treasury, shows that 41 Class I roads and large switching and terminal companies have decided to take their chances without a guaranty, hoping to earn more than the standard return based on the net operating income of the three years ending June 30, 1917. In addition about 100 of the smaller companies, out of the list of roads whose standard return has been certified to the President by the commision as shown by its last annual report, failed to file acceptances of the guaranty and a large number of other short line railroads are missing from the list, but in many cases it is understood that this resulted from a failure to act in time rather than from a deliberate intention to refuse the government's assistance.

According to the law, the acceptances were to be filed by March 15 and the commission on March 4 issued a notice, which was sent to 854 companies by telegraph, suggesting a form of acceptance and of a resolution to be adopted by the boards of directors authorizing the presidents of the various companies to execute the document.

The list of railroads that have accepted the guaranty includes several of the more prosperous companies that earned much more than their standard return in 1918 and 1919 and the list of those that did not accept also includes many that failed to earn their guaranty under federal control.

The Long Island on March 9 filed an acceptance and on March 15 revoked it. The principal companies that have indicated their intention of taking their own chances, together with the amount of the standard return which would have been guaranteed and the percentage of that amount which they earned in 1918 and 1919 is as follows:

	Standard Return	Percentage of Standard Return Earned in	
		1919.	1918.
Alabama Great Southern	$1,703,180	88	121.1
Atlantic & West Point	252,995	213.3	261.1
Atlantic City	222,066	136	458
Belt Railway of Chicago	869,442	186	181
Bessemer & Lake Erie	4,713,564	42.5	104.8
Birmingham Southern	138,815	16.8	223.0
Carolina, Clinchfield & Ohio	1,627,963	92	71.4
Cincinnati, New Orleans & Texas Pacific	3,541,040	14.9	87.3
Colorado & Wyoming	333,053	24.1	57 3
Cumberland Valley	1,228,967	36.4	150 4
Duluth & Iron Range	2,355,242	130.9	162.4
Duluth, Missabe & Northern	5,122,051	222.6	244
Duluth, Winnipeg & Pacific	357,136	39	60.9
Elgin, Joliet & Eastern	2,862,177	116.1	167
Fonda, Johnstown & Gloversville	359,583	105	89
Fort Smith & Western	80,499	300	232
Lake Superior & Ishpeming	150,880	187	331
Long Island	3,221,949	75.9	121.5
Louisiana & Arkansas	359,362	(def)	24
Monongahela Connecting	33,620	(def)	416
Montour	314,424	48.2	114
New Orleans & North Eastern	1,204,992	15.5	82.2
New York, Chicago & St. Louis	2,218,857	182.5	175.5
Newburgh & South Shore	75,831	(def)	286
Northwestern Pacific	1 338,000	82 5	111
Pere Marquette	3,748,196	179.2	10. 8
Perkiomen	339,691	154	142
Philadelphia, Bethlehem & New England	102,022	(def)	121
Port Reading	236,454	227	208
Richmond, Fredericksburg & Potomac	1,136,974	243.1	266.1
St. Louis Southwestern	3,355,749	91 5	109.7
St. Louis Southwestern of Texas	555,165	(def)	(def)
South Buffalo	141,160	(def)	83.7
Southern	18,653,893	57.1	158.2
Spokane International	190,909	169	140
Union Railroad (Pa.)	1,370,290	30.4	106
Utah	105,425	459	560
Washington Southern	467,230	401.3	371.6
West Jersey & Seashore	952,682	1.3	(def)
Western Pacific	1,900,350	188.2	137.1
Western of Alabama	288,338	197 5	215.8

Some of the roads that earned much more than their guaranty in 1919, yet accepted the six-months guaranty, are: Detroit & Toledo Shore Line, that earned 200.8 per cent of its guaranty; Grand Trunk Western Lines, 214.6 per cent; Michigan Central, 210.7 per cent; Louisville, Henderson & St. Louis, 145.9 per cent; Yazoo & Mississippi Valley, 115.9 per cent, and Union Pacific, 139.8 per cent. The Southern is the only one of the larger systems that did not accept the guaranty.

Out of a total of 203 Class I roads and large switching and terminal companies whose standard return and net operarting income for 1918 and 1919 are compared in a table compiled by the Bureau of Railway Economics, 52 companies earned more than the standard return for both years, while 151 companies earned less. The 52 companies earned 33.87 per cent more than their standard return, thereby contributing $110,825,671 toward making up the deficits of the 151 companies that earned 48.2 per cent or $718,676,092 less than their standard return. The 203 roads as a whole earned $607,850,421 or 33.4 per cent less than the standard return.

For 1919 there were 44 roads that earned more than their standard return by 35.8 per cent or $51,784,666, while 159 roads earned less than the standard return by $444,368.818 or 58.1 per cent.

For 1918 there were 76 roads that earned more than the standard return by $85,707,877, or 33.4 per cent, while 127 roads earned less than their standard return by $300,974,146, or 46.15 per cent.

Urges Alaska Land Development.—Legislation to stimulate development of land adjacent to the Alaskan Railroad has been urged by Acting Secretary of the Interior Vogelsang in a letter to the Senate. The department, he said, is without funds to advise farmers and other settlers of opportunities along the railroad, although 1,000,000 acres of agricultural land near the railroad have been surveyed and townsites laid out.

I. C. C. Holds Hearing on Rate-Making Procedure

Property Investment Accounts Suggested as Temporary Basis of Value—Three Rate Groups Proposed

WASHINGTON, D. C

THE FIRST RATE CASE under the new transportation act was initiated at a hearing before the Interstate Commerce Commission at Washington on Monday, March 22, and three days were devoted by the commission to hearing the views of the representatives of the railroad companies, the Association of Security Owners, shippers, state commissioners and organized employees as to the methods to be used by the commission in adjusting rates to produce the fair return required by the law.

The subjects for discussion at the hearing were: 1. Whether the rate adjustment shall be made for the carriers as a whole or by rate groups or territories, and if the latter, what rate groups should be designated by the commission. 2. What methods should now be employed for determining the aggregate value of the railway property of the carriers as a whole or in each of such rate groups or territories.

This was not the first hearing involving the prospect of a general increase in freight rates throughout the country, because the railroads had asked for such an increase in the 15 per cent case in 1917. Nor would the general increase expected be the first, because Director General McAdoo had made such an increase in 1918 without the formality of a hearing, but the proceeding was placed on a new plane both by the new conditions created by the transportation act and by the magnitude of the figures involved. While the prospective advance in rates on the basis of present figures may not be so large as that ordered by Director General McAdoo, the possibility that it might have to be enhanced before the matter is concluded was foreshadowed by the resumption of conferences on the same day between the committees representing the railroads and the employees whose wage demands are estimated at $1,100,000,000 a year. Moreover, the principal subject of discussion, the question of the value to be used as a basis for the 5½ or 6 per cent return allowed by the new law until the commission completes its valuation under the law of 1913, led the argument into the field of billions, whereas in previous rate cases most of the points of difference have been expressed in millions. On the question of the value of the railroads the extremes were represented by counsel for the employees' organizations that have adopted $12,000,000,000 as a maximum figure, although this figure was not mentioned at the hearing, and for the railroad executives, who contended that the full present value of the railroads would be at least 75 per cent above the book cost, which would produce a total somewhere around $35,000,000,000, although it was only asked that the book cost be taken as a minimum.

The attendance at the hearing was so great that even standing room was at a premium, and in order to limit the proceedings to the three days allotted it was necessary for the various groups of interests to pool their issues and select representatives to speak for them.

The representatives of the Association of Railway Executives and of the National Association of Owners of Railroad Securities suggested that the three present classification territories, eastern, western and southern, be designated as the rate groups and that the property investment accounts of the carriers be taken temporarily as the basis of value of the railway property, although the representatives of the executives referred to this as a minimum. The railroads in Southwestern territory asked that their lines be designated as a separate group, and a group of other lines asked that the Western roads be divided into three groups, one for Southwestern territory, one for what is known as Western Trunk Line territory, extending roughly to the Rocky Mountains, and one for transcontinental territory, including the lines from the Twin Cities to the Pacific Coast.

Donald R. Richberg, representing the railroad employees' organizations, took the position that the commission cannot comply with the requirement that it adjust rates to produce a return of 5½ to 6 per cent until it ascertains the actual value of the properties.

Representatives of the shippers and of the state railroad and utilities commissioners generally approved of the proposal that the three classification territories be taken, at least temporarily, as the rate groups, although there were several other suggestions, and most of the shippers' representatives who spoke regarded the temporary use of the property investment accounts, subject to modifications or corrections by the commission, as a fair, practicable basis. J. E. Benton, Washington representative of the National Association of Railway and Utilities Commissioners, however, attacked the investment accounts as worthless, unreliable and no evidence of either cost or value, and he insisted that the commission attempt to build up an aggregate value by the use of such data as is now available as the result of the work under the valuation act and by the consideration of all available information as the basis for an estimate.

In general, however, the atmosphere of the hearing was far less contentious than that of most of the former big rate cases and there was a more evident desire for co-operation on the part of all interests.

Railroad Credit Now Depends on Commission

S. Davies Warfield, president of the National Association of Owners of Railroad Securities, the first witness, said in part:

"Upon your decision in respect to the two fundamental questions arising in the administration of the transportation act rests the question as to whether the railroads of the country are to remain in private hands or through force of circumstances be acquired by the government. In your determination of these questions those owning the securities of the railroads have great concern. The act leaves to the commission two methods to be pursued in arriving at the aggregate fair value of the railroads upon which the percentage return shall be computed and rates made accordingly. This association advocated before the committees of Congress the grouping of the railroads that has been heretofore employed by the commission and that the present three classification territories, with perhaps some shifting of certain railroads from one territory to another, would be an equitable division, fair both to the shippers and the railroads. We can see no reason to change this position. When it comes to the ascertainment of the fair value of railroad property in the aggregate for rate-making, this reaches the root of railroad credit. We advocated before the committees of Congress the use of the only basis immediately available for computing the return from rates until replaced by actual valuations, and that is the property investment account of the railroads in the aggregate.

"It is not necessary to call to the attention of men of the great experience of those sitting on this commission the tremendous difficulties confronting the railroads in securing the funds upon which to continue their successful operation. We believe the public and the shippers fully appreciate these conditions, and we hope and believe they will co-operate to

relieve them. We will not go into the shortage of cars and engine power. This commission is conversant with the record. Nor will we enter into details with respect to the immense importance of the problem of financing at present through the sale of bonds or other railroad securities. The competition in the money market is too severe to admit of the present successful financing of the securities of any railroad. There has, therefore, been committed to this commission the greatest responsibility ever delegated to a governmental or regulatory body, for upon your decision and appreciation of the serious problems confronting the railroads depends their ability to move the products of the manufacturer and the field. The railroads cannot move them without credit, and credit will not be obtained without due regard for the requirements that give it."

Forney Johnston, counsel for the association, congratulated the commission and the transportation of the country on the added responsibility and authority conferred upon the Interstate Commerce Commission, "undiluted by any division of authority," and he expressed the utmost confidence that the purpose and object of Congress to sustain and make effective private ownership and avoid government ownership is to be carried out. "The battle of the Marne on the question of railway credit and government ownership has been fought and won," he said, "and the transportation act has been written around the necessity for greater revenue for credit and immediate stability." He also pointed out that the intensive survey resulting in the present act began with the President's message of December, 1915, urging a thorough survey to ascertain whether existing laws and their administration were as serviceable as they might be in enabling the railroads to perform the public service of transportation. The President's message led to the appointment of the Newlands committee, which continued its investigation until it was superseded by war and federal control, and by taking up its work the committees of Congress produced and Congress adopted the transportation act based on the necessity for increased and stabilized revenue.

Any standard of valuation less than the aggregate property investment accounts will be inadequate to restore credit, assure service and facilities and avoid government ownership, Mr. Johnston argued, and he laid much stress on the assertion that Congress had such a standard clearly in mind when it adopted the act. He asked that the uncorrected property investment account be used for what he called the interlocutory valuation, because it would be unfair to revise it downward because of conspicuous instances of overstatement without being able to revise it upward for the instances of understatement which are not so well known. If the commission should adopt an overcautious attitude the entire purpose of Congress would be thwarted, he said, because the property investment accounts and the fact that the standard return under the federal control act amounted to 5.22 per cent on that sum had been taken into consideration throughout the proceedings before the Congressional committees. Some members of the commission expressed some curiosity as to why Congress had not stated its intention to have the property accounts used if that had been its purpose instead of saying that they were to be given no more weight than they were entitled to, and when Mr. Johnston quoted a statement made by Commissioner Clark in reply to a question at the hearing before the House committee that he knew of no better available standard, Mr. Clark read the question to which he had replied, which referred to the use of these accounts "subject to review by the commission so it may eliminate improper items."

In reply to a question by Commissioner Aitchison as to whether the commission should not consider any other information, Mr. Johnston said that such results as the commission has already obtained from its valuation work must have demonstrated that the property investment account is not too high. Commissioner McChord asked what would happen if the commission should use a value of, say, $20,000,000,000 and the valuation should later show only $15,000,000,000. Mr. Johnston said that would be after the two-year period fixed by the law during which 5½ per cent is declared a fair return, and it would then be the duty of the commission to fix a rate of interest sufficient to sustain the credit of the carriers. He asked the commission to consider that there are many judicial questions yet to be settled which may affect the weight of the data gathered by the Bureau of Valuation, and that any doubt should now be resolved in favor of the public interest in adequate transportation facilities.

"I have a notion that neither the book value nor the valuation data are infallible," said Commissioner McChord, "but no one wants to do any harm. We recognize that the carriers must be financed and their credit maintained. I recognize that under the act of Congress there has been a complete reversal of ideas. The first thing to be done is to finance the carriers."

Commissioner Daniels asked why the capitalization of the standard return might not be an available standard. Mr. Johnston said that he had no doubt that the Senate had recognized the relation between the standard return and the property investment account and that Senator Cummins had stated that 5½ per cent upon the book value would represent an increase of about $50,000,000 above the standard return.

Basis of Value

The position of the Association of Railway Executives as to the basis of value to be used for the present was stated by Alfred P. Thom, counsel for the association, in a resolution adopted by the executives as follows:

"The problem before the commission is to determine in a summary way the aggregate value of all property held or used for the purpose of transportation in the several rate groups, the transportation act recognizing that the correct amount of such aggregate value cannot now be determined.

"In considering and determining the problem, the property investment accounts and the materials and supplies accounts in a given group are, in our judgment, admissible in evidence, and the carriers believe that these accounts for the several groups are the minimum conservative figures now susceptible of use, all other data and evidence being for the most part actually and in all cases legally incomplete and unfinished.

"In our judgment the property investment accounts should, under the law, be considered in connection with and supplemented by any other available evidence or data sufficiently complete and reasonably adequate for the purpose, but the basis of the value now arrived at should not be the incomplete data compiled in connection with the work of valuation now in progress under the federal valuation act, as it is important that the final valuation under that act should not be anticipated or prejudiced in this proceeding."

Benjamin Campbell, vice-president of the New York, New Haven & Hartford, expressed the view of the majority of the carriers in favor of the adoption of the three existing classification groupings at this time, so far as possible, in order that the groups and rates may be established as soon as possible. These territories have been recognized since 1887, he said, and represent comparatively little overlapping of railroads, whereas to subdivide them would require the breaking of lines of railroad and the separation of accounts.

Southwestern Lines Ask Separate Group

B. F. Bush, president of the Missouri Pacific, spoke as chairman of the Southwestern Railway Executives' Association formed at a recent conference of the Southwestern lines, at which it was decided that if practicable a further segregation should be made by putting the Southwestern lines into a statutory group for rate-making purposes, but that if this should be considered impracticable now the commission

should take into consideration the special needs of the Southwestern lines by granting them a higher level of rates than is accorded the western lines as a whole. The association includes the Missouri Pacific, Missouri, Kansas & Texas, St. Louis Southwestern, Kansas City Southern, Texas & Pacific, Gulf Coast Lines, San Antonio & Aransas Pass, San Antonio, Uvale & Gulf, Kansas City, Mexico & Orient, Louisiana & Arkansas, Missouri & North Arkansas, and Kansas, Oklahoma & Gulf.

Mr. Bush said he represented a group of carriers that are "attempting to realize a commercial profit from the sale of transportation in these days of the high cost of living," that it is the duty of the commission to assist in the financial rehabilitation of the systems of transportation and that this represents one of the most momentous tasks in the history of the country. Without the unlimited credit of the government, he said, the railroads would not have been able to meet the transportation needs of the country during the war. The new act gives the commission full power to allow adequate rates as well as to deal with such questions as those involved in discrimination and local conditions. Missouri, Arkansas, Oklahoma and Texas and that part of Louisiana west of the Mississippi river, because of their peculiar conditions, ought to be considered in a separate group. The railroads in this territory are mostly north and south lines and have varying operating and traffic conditions from the east and west lines to the north of them.

The southwestern lines form a natural group for the purpose of establishing a fair return, Mr. Bush said, and their distinct character had been recognized by the Railroad Administration when it created the Southwestern region. The rates in this territory have always been considered by themselves, and the shippers in the territory are not so much concerned with the measure of the rates as with the necessity for adequate transportation facilities. The territory is developing so rapidly in production that any increase in rates is inconsequential as compared with the loss suffered by inability to reach the markets, particularly in the case of food products, which are so badly needed. Mr. Bush also referred to the fact that 20,000 miles of railroad in the southwest have been in receiverships.

C. Haile, chief traffic officer of the Missouri, Kansas & Texas, testified regarding traffic conditions, saying that the southwestern lines had been treated as a separate group in the construction of rates for more than a generation. For the years 1915, 1916 and 1917, he said, 25 representative southwestern roads had earned an average of only 4.07 per cent.

Other Lines Propose Three Western Groups

Stanley H. Johnson, vice-president of the Chicago, Rock Island & Pacific, urged the division of the western lines into three groups, Southwestern territory, Western Trunk Line Committee territory and transcontinental or intermountain territory, which would include the Great Northern, Northern Pacific, and the Minneapolis, St. Paul & Sault Ste. Marie, except its Chicago line. He said he spoke on behalf of the Chicago & Northwestern; Chicago, Milwaukee & St. Paul; Chicago, Rock Island & Pacific; Illinois Central; Kansas City Southern; Missouri Pacific; St. Louis-San Francisco; Missouri, Kansas & Texas; Chicago & Alton; Minneapolis & St. Louis, and Elgin, Joliet & Eastern.

Mr. Johnson said that Western Trunk Line territory is just as distinct and well-recognized as the classification territories. If the country were to be divided into five rate-making groups, Official Classification territory would comprise about 61,000 miles of railroad, Southern Classification territory 42,000, Southwestern territory 37,000, Western Trunk Line territory 62,000, and the rest of the western territory, which might be called transcontinental and intermountain territory, 39,000. He said the proposed division of western territory corresponded to that accepted by the eastern and southern lines for a division of the territory east of the Mississippi river into eastern and southern territory. The majority of the western trunk lines, he said, believed it would be unfortunate and contrary to the spirit of the law to create one immense western group and make the far western lines earn more than they are entitled to, while withholding from the lines in the southwest and the trunk line group what they need. The spirit of the law is to make each railroad earn as near 5½ per cent as practicable. This is not practicable as to individual roads, but it would be practicable to apply it to the southwestern and western trunk line groups. The alleged difficulty of separating values, expense and earnings, he said, does not appear to be insurmountable. The Rock Island has many times met the same problem in proceedings before state commissions. If the plan should be adopted intra-territorial traffic would take the percentage of increase determined upon for the group and traffic between trunk line and transcontinental territory would take the percentage applied to the trunk lines.

Frank Lyon, appearing for the Northwestern Coal Dock Operators' Association, said his clients think the rates of the railroads serving the docks at Lake Superior are now fairly compensatory and that if they are not grouped with other roads the needs of the rest of the country can be taken care of without increasing their rates. Chairman Clark asked Mr. Lyon if he thought that was what the law contemplated. Mr. Lyon said he certainly thought it was the purpose of the commission under the law to decide how railroads should be grouped so as to require an approximately equal increase in rates, and he asked that no action be taken resulting in an increase in the rates of those roads beyond their needs.

S. T. Bledsoe, general counsel for the Atchison, Topeka & Santa Fe, said that the segregation of the western trunk lines and southwestern lines would present so many complications in the segregation of values, revenues and expenses as to make the plan impracticable of accomplishment in time to make the needed increase in rates, because it would cut practically every railroad of importance into two or three parts, and the commission has no records of the value, revenues or expenses of the several parts. The commission need not, however, he said, increase all rates in a group by the same percentage, but can take into consideration differences in the condition of carriers in parts of a group and could apply a separate percentage to the southwestern and western trunk line territories much more satisfactorily than it could establish them as separate groups. He agreed with what had been said regarding the needs of the southwest, in which the Santa Fe has 4,000 miles of line, and thought that territory needs an increase substantially greater than the average for the rest of the western territory.

Property Investment Account Called Conservative.

Alfred P. Thom, counsel for the Association of Railway Executives, referred to Chairman Clark's remark at the opening of the hearing that the owners and operators of the railroads were to be heard. He said that the executives "derive their authority from the stockholders and represent the stock ownership of the properties." He argued that the act lays upon the commission an imperative obligation to adjust rates to produce the fair return prescribed, that it is cautionary in saying the commission shall give the property investment account only such consideration as it is entitled to and is permissive in saying the commission may utilize the results of its valuation work so far as available. He believed it had been universally conceded that the property investment account is legal evidence and must be considered, and as to its probative force it is known that about 35 per cent of it had been constructed under the supervision and rules of the Interstate Commerce Commission since 1907.

Mr. Thom also pointed out that from 1892 to 1906 the

investment reported per mile had been reduced from $59,675 to $59,624 and in 1896 had reached its lowest point at about $54,000, whereas $12,086 per mile had been added from 1907 to 1917. From this, he said, the conclusion is justified that during the 14 years from 1892 to 1906, when many railroads were undergoing reorganization, was a period of elimination of amounts that might be criticized. Much of what is called "water" disappeared in the process of readjustment and large amounts were charged to operating expenses instead of to capital account. To the cost of road and equipment must be added the working capital, amounting to about $500,000,000, Mr. Thom said, and Director Prouty of the Bureau of Valuation has also said that about 7½ per cent should be added as going concern value. Moreover, if the commission had the time it would be its duty to find the present value of the railroad properties, as held by an unbroken line of decisions of the Supreme Court, and this would allow a margin of at least 75 per cent because of the greatly increased value of the railroad property at the present time.

"Rates are paid now in a depreciated dollar," said Mr. Thom, "and the number of dollars of revenue cannot be determined on the basis of the dollars of 1913 and 1914. The principal must be expressed in the same kind of dollars as the revenue.

"Your inquiry and your duty is to find what would be the cost of duplicating these properties and the fact that you must do it by a summary method does not affect your duty. Add that consideration to the property investment account and make allowance for the growth in value since the property accounts were written on the books and you will have more than enough to cover any errors of overstatement there may be. The property account represents only the cost of construction and the increase in value has more than absorbed every error and more than corrected every overstatement there may be in the accounts.

"The aggregate investment account therefore represents the minimum. If you had the time it would be your duty to look into the increase and add that."

Mr. Thom also said that the property accounts may be checked by the earning capacity of the roads, inasmuch as the commission had recommended to Congress that the existing rates be recognized by law as fair and reasonable and the earnings of the carriers during the test period were endorsed by Congress as the fair figure to be paid by the government as rental. Capitalizing the $935,000,000 of standard return at 5½ per cent, he said, gives $17,000,000,000 and $1,500,000,000 additional has been put into the properties since June 30, 1917, making a total of $18,500,000,000 as a check against the property account. If the commission should reduce the basis of value it would reverse the basis on which the financial structure is based. In reply to questions by the commissioners he said that if as to any property or group the valuation has been sufficiently advanced that it is in the opinion of the commission available for use how it may be used but the book value is complete and is sufficiently conservative to be used in the aggregate without correction, although the commission may take other things into consideration.

Donald R. Richberg, representing employees, said he spoke for a law-abiding and law-respecting class of citizens that want the law enforced just as it was written and that the property investment account can only be entitled to minor consideration. He said the employees are interested in rates being sufficient to pay living wages and to attract the men necessary to operate the railroads and are not interested in starving the roads, but objected to any excessive capital charge that will make it impossible to pay adequate wages. He said that railroad wages are now so insufficient that many men are leaving the service. He said it was a matter of common knowledge that the property investment account does not represent value, but has been built up in such a way as to represent liabilities rather than assets and it is the duty of the commission under the act to make a valuation prior to making rates.

State Commissions Object to Investment Accounts

J. E. Benton said that a large number of the state commissioners had held conferences and that most of them were in favor of using the three classification groups, but that they were in no contentious attitude. He read a telegram from the Nevada commission asking that no groups be established but that railroads be considered as a whole and asking that there be no horizontal increase in rates. Mr. Benton said that a valuation on the basis of the investment accounts as they appear in the books is explicitly forbidden by the law and that these accounts are utterly worthless as evidence of value or of investment. The commission should consider them as of weight only to the extent that they represent actual investment. The law, he said, has commanded the commission to do what it is impossible to do in any brief time but the commission must do the best it can by adopting some common sense method of considering all the elements of value of which it has information or can get information in a reasonable time. He suggested that the commission create a subordinate board to build up a valuation from such data as is in its possession, supplemented by estimates that can be made from the known facts. The purpose of Congress is reflected, Mr. Benton said, in what is said in the act rather than in what Mr. Johnson says that some committee or Senators had in mind and he had too much respect for the Senate to believe it was afraid to say in the law what it wanted to, but had sent Mr. Johnson to "the other end of the avenue" to tell the commission what it really meant.

Commissioner Aitchison read from a statement by the House conferees saying that the bill had been written in such a way as to direct the commission "not to give undue consideration" to the property accounts.

E. R. Stewart, of the Michigan Public Utilities Commission, said he might want to be heard later on the question of grouping because Michigan is now divided between Official and Western Classification territories and now has eight different bases of rate-making. "We are proud of the way we have treated the carriers," he said, "and of the showing that they have made, because 6 of the 14 roads in the eastern region that earned their guaranty last year served the state of Michigan."

Fred Putnam of the Minnesota Commission spoke for a group of states including Iowa, Minnesota and the Dakotas, suggesting that for the present the three classification groups be used. He said that it might give some advantage to the territory for which he was speaking if the Southwestern roads were grouped separately because the Northern roads are more prosperous and if the commission thinks it is necessary to segregate them in order to give them certain roads proper consideration there will be no objection. "We appreciate," he said, "that some roads need special consideration and we consider it important that the railroads be in good financial condition in order that they may be enabled to serve the public."

A. E. Helm, of the Kansas Commission, said that the groups should be arranged to make the commission's task as light as possible and although more than three might be desirable, the existing classification territories would maintain existing relations. Kansas and several other states, he said, would not object to a division of the West into three groups as suggested by Mr. Johnson, but they are more interested in the rate adjustment that shall be made within the districts.

Bird M. Robinson, president of the American Short Line Railroad Association, gave the results of the latest investigation as to the number and mileage of short line railroads. He said there are 605 standard gage roads of less than 100

miles, making a total of 16,343 miles; 55 roads over 100 miles with a total of 11,924 miles; 97 electric roads doing a substantial freight business with a total of 6,663 miles, and 47 narrow gage roads with a total of 1,499 miles, making a total of 804 roads classed as short lines, operating 36,429 miles. Mr. Robinson said that the short lines include many that are "short in revenue" rather than in mileage and range up to 450 miles in length. They represent an important part of the transportation system of the country and the law recognizes them as such. The commission is charged with the duty of looking after their welfare and should allow full value on all these properties as any one who tries to hold down the basis of value is tending to limit the facilities of transportation. Mr. Robinson described some experiences of his own in building short line railroads which immediately produced a very large increase in the value of the adjacent land, but which had invariably met complaints from the newly located shippers that the rates were too high to enable them to earn a fair return on their investment. As a result, he said, rates had frequently been reduced in spite of the fact that one road of 400 miles has never paid a cent on its stock and another road of 62 miles has never paid interest on its bonds, although it has increased the value of adjacent land from $1 to $200 an acre. Mr. Robinson said that he claimed the law allows a 5½ per cent return on each railroad because in fixing divisions the commission is directed to take into consideration all expenses plus a fair return and a fair return is defined in the act as 5½ per cent. If the commission cannot so adjust rates as to give this return, he said, it should give the railroad a certificate under which it can be abandoned. Mr. Robinson said he saw no other available basis of value except the book investment. A capitalization of the standard return would not be advisable because many railroads had no standard return, yet they had property. It is the commission's duty, Mr. Robinson urged, to allow the carriers such revenue as will make the transportation system of the United States the greatest and best in the world. If it attempts to limit value the result will be disastrous.

Testimony of Shippers

C. E. Elmquist, representing the Northern Pine Association, said that the railroads had insisted that private operation would be more economical than government operation and that they should be taken at their word. He believed they could produce economies but that the burden is upon the carriers and not upon the shippers to prove it. He suggested that the commission send a questionnaire to the railroads asking them to show by August 1 what economies they can put into effect, such as by reduction of the number of employees or by a readjustment of wages, and that the commission should consider the opportunities for economy before it considers a rate increase. On the question of value, he said $16,000,000 of the public money has been expended by the commission on valuation, that Director Prouty says that by the end of 1921 he will have all the information for railroads over 500 miles and that it is absurd to say that Congress should not have contemplated that the commission use this data.

G. M. Freer, executive secretary of the National Industrial Traffic League, said that at a meeting of the league in St. Louis last week it had been decided that for the present the commission should recognize the three classification groups and that if it is able to determine the value of any carrier from the data in its possession that should be used, but where it is not available the commission should use the property investment accounts, subject to such modification as the commission sees fit to make based on all data available to it, but eliminating all items that do not represent railway property held for the purpose of transportation. Several other representatives of shippers endorsed this position and said it would not be necessary to discuss the matter further.

Shippers Want Service

E. J. Rich, representing New England shippers, advocated the use of the three classification groups on the ground that the law recognizes that transportation is national and that each section of the country contributes to the support of railroads in other sections. "Some of us," he said, "have grave doubts as to whether the transportation problem can be solved on the valuation theory. If the valuation is in excess of the capitalization the people will be called on to pay more than is necessary and if the valuation is below the capitalization the railroads will not get enough." He did not see how the commission can do anything else than determine a value for each road and take the aggregate, but the commission in fixing the value should have in mind the supreme necessity of sustaining the credit of the railroads because the one thing the shippers want is service. He objected to what he termed the claim of the railroads that value should be based on the cost of reproduction, but he wanted the commission to take a liberal view of value so far as it can within the terms of the act.

J. Van Norman, representing the Southern Hardwood Traffic Association and Kentucky shippers, said that the commission should consider the railroads as a whole or divide them into a very few great divisions, such as the three that had been suggested. If there are any burdens to be borne they should be distributed along national lines. The shippers, he said, know very little about the state of the valuation proceedings and believe that it is incumbent upon the commission to make the best estimate possible.

C. E. Cotterill, representing the Southern Traffic League, said that the shippers in the South have come to the view that they should not adopt a cheese-paring policy with the railroads and that unless the railroads are deprived of the opportunity to "yell poverty" as they have in the last few years the only alternative is government ownership. He said the country should be divided into the three classification groups, but that it was "rather unbecoming" of the railroads not to include the Norfolk & Western and the Chesapeake & Ohio, two of the strongest lines, in the Southern group. Temporarily, he said, the property investment account probably affords the closest available basis of valuation.

W. S. Prickett, representing Salt Lake City and Utah shippers, spoke in favor the division of Western Classification territory into three groups.

F. A. Jones, of the Arizona Commission, also representing the New Mexico commission and the Intermediate Rate Association, objected to the use of the property investment accounts and said he did not object to three large rate groups, but thought that Western Classification territory might well be sub-divided. In that case, he said, it should be divided by a north and south line which would divide the United States into four approximately equal districts.

S. J. Wettrick, representing the Seattle Chamber of Commerce and the Seattle Commercial Club, suggested three rate groups and said that the people are more interested in service than in rates.

A. H. Brown, of the Cleveland Chamber of Commerce, suggested the retention of the Central Freight Association, Trunk Line and New England territories and said that if the book value were used it should be without prejudice and subject to all deductions the commission thinks proper.

George N. Brown, speaking for the Texas Industrial Traffic League, urged the necessity of dealing with the question in a broad way and promptly. He said that Congress had primarily directed the commission to give the railroads 5½ per cent, but had directed it to fix the rate groups from time to time. If groups are to be established, he said, the line of least resistance should be followed and it might be well to adopt the three groups for the present, but railroads are national and not local and there is no justification for the sep-

aration of the "goats from the sheep." Some railroads and shippers, he said, seem to want to group the needy railroads by themselves and the prosperous by themselves, but the commission should mingle the healthy and the weak.

S. H. Cowan, representing the Texas cattle raisers, said that if he were on the commission he would try to make interstate rates in such a way as to produce "about 5½ per cent if the states made their rates right." He would not state the value but would try to make the rates "about right" and "let the gentlemen help themselves to the mustard." He said that the railroads have more traffic than they can handle now and if they cannot make money out of it the commission is not required to take into consideration a railroad that is not honestly and efficiently managed. He said there was no reason for the creation of a Southwestern group unless it is because the Southwestern roads want a larger increase in rates.

Clifford Thorne made a characteristic attack on the arguments presented on behalf of the railroads and of the security owners, whom he persisted in confusing in his remarks. He said no one can question the fact that certain principles must be considered if the commission's conclusions are to have any standing and he attacked the property investment accounts as worthless. Mr. Thorne said the shippers do not oppose advances in rates, but it is their purpose to see that the foundation is not made for an excessive increase and he pointed out that the 25 per cent increase which it is currently stated the railroads expect would amount to more than $1,000,000,000 if applied to both freight and passenger traffic and to $889,000,000 if applied to the freight alone. Mr. Thorne had hardly begun his remarks when both Luther M. Walter and Alfred P. Thom insisted that he had misquoted them by attributing to the security owners the position taken by the railroad executives and to the carriers' statements made by counsel for the security owners. Mr. Thorne said he would substitute "counsel for the carriers" where he had used Mr. Thom's name, but Mr. Thom said that he was the only counsel for carriers that had yet spoken. Mr. Thorne then used the term "counsel for the security owners and carriers." Mr. Thorne said the railroads have never revised their property accounts downward for the period prior to 1907 when the commission began supervising them and he cited numerous notorious cases where overstatements of the property accounts have been brought out in various investigations. He also objected because these accounts include improvements made out of earnings. He also cited figures for 1917 to show that the property investment account then was "two thousand million dollars greater than the capitalization." Mr. Thorne also answered various "claims" which he said had been made by counsel for the carriers and the security owners, which they later said they had not made. He declared that the value should not be determined on the basis of the present abnormal prices and that the commission should not adopt any single factor but consider all the elements of value. He suggested the possibility of capitalizing the standard return and adding the additions and improvements made by the railroads since July 1, 1918.

E. V. Dabney, representing the International & Great Northern, said that every one knows that the property investment accounts include many discrepancies and some unjustifiable items, but he argued that such errors are much more than offset by understatements and the fact that the cost of reproducing the railroads greatly exceeds the property accounts.

Luther M. Walter presented a brief concluding argument for the association of security owners, saying it would be short-sighted to ask the commission to adopt any rule of thumb method in view of all the information it has gathered and that it should avail itself of any information which it considered available. He said the interests he represents are confident that the commission will rise to the occasion and give the carriers a fair return on a fair value. This could be done by using the property investment accounts supplemented by such other information as the commission might have and he pointed out that the excess earnings rule of the law would bring back part of the money that might be paid to the carriers.

E. G. Buckland, speaking in behalf of the New York, New Haven & Hartford, the Central of New England, the Rutland, the Maine Central and the Bangor & Aroostook, said that those roads would be willing to co-operate with the commission in using the data collected by the Bureau of Valuation. Commissioner Eastman asked if he thought the data already collected as to the New England roads would lead to a higher value than the property investment account. Mr. Buckland said he thought it would represent a truer value.

S. T. Bledsoe, speaking for the Association of Railway executives, said the association does not want to be put in the position of asking the commission to exclude anything that in its judgment fairly and reasonbly tends to indicate the value. He did not believe the commission can within the rules of evidence determine the value of these properties in the time allowed. It must approximate that value as nearly as it can. The investment accounts have their weaknesses and no one contends they are perfect, but he thought that if eliminations were made for the flagrant cases of overstatement they would not amount to more than 2 per cent of the total. He said the statute gives no evidentiary value to the valuation data until it is completed. He said the carriers did not wish to insist on that point but that he had made that statement in reply to Mr. Benton's argument. He said the Supreme Court had held repeatedly that the present value must be taken into consideration, but that the railroads have not at this time tried to stand on their constitutional rights and invoke the principle of present value, but had suggested the use of the book value, knowing that it was conservative as compared with the present value.

F. H. Wood of the Southern Pacific, also speaking for the Association of Railway Executives, pointed out that the determination of a temporary value is but the first step to be taken by the commission in the exercise of its new duty and that the most important step involves the adjustment of the rates. He said the statute contemplates that the rates shall be readjusted after the expiration of the six months' guaranty and that the sooner that is accomplished the sooner the carriers may begin to obtain new capital to make the necessary improvements. It is, therefore, necessary to act promptly in the public interest and to relieve the burden upon the Treasury as soon as possible. Additions and improvements cannot be financed until the rates are readjusted. He suggested that the commission arrive at a round sum which in its judgment represents a conservative figure which may be stated for the purpose of this proceeding and that the property investment account represents a minimum conservative figure. The carriers do not ask the commission to take this figure blindly and ignore any other information it has, nor to take it because it is the property investment account, but because it is now available and fairly conservative. To try to build up a value by taking such information as is available as to individual roads, he said, would be unfair and unjust. The commission must use its best judgment and he did not think that anything is conclusive on the commission in this matter. The cost of road and equipment accounts, Mr. Wood said, amount to less than the present value of the land alone.

RATES AND DEFICITS.—It is incomparably better, from the point of view of business ethics, to have high rates and to have the roads paying their own way, than to have low rates and to have the roads running behind and showing deficits every month. —*Harvey's Weekly.*

New Coaches for Metropolitan Railway of London

Conditions on a Congested Line Operating Forty Trains an Hour Demand Unique Type of Rolling Stock

By Frederick C. Coleman

The Metropolitan Railway owns or is responsible for the operation of about 88 miles of line in and around London. Of this mileage 36 miles are operated electrically and the remainder by steam. The lines comprise the major part of the inner circle, that is, from South Kensington to Aldgate, the lines from Baker street to Harrow, from Harrow to Uxbridge, from Harrow through Aylesbury to Verney Junction, the branch from Chalfont to Chesham, and the branch from Quainton Road to Brill; the city lines, which are owned jointly with the District Company, between Aldgate and Mansion House; the Hammersmith and City Line, which is owned jointly with the Great Western Company; the East London Railway, in which there are several other railway companies as partners; and the Great Northern and City Tube Railway, which is owned and operated by the Metropolitan Company.

The Metropolitan is at present working under British government control in the same way as the majority of other English, Scottish and Welsh railway companies. The company is entirely independent of the underground combine, but works in conjunction with that system and has a comprehensive arrangement for through bookings. It deals with heavy freight traffic on various parts of its system, and has junctions with the London & North Western, the Great Western, the Midland, the Great Northern, the Great Central, and the South Eastern & Chatham for the exchange of traffic.

A comparison of the rolling stock and the seating capacity during the years 1913-1918, and also during the past summer, shows that in 1913 there were 78 passenger vehicles, with a total seating capacity of 4,814, in service for steam operation; in 1918 and 1919, 76 passenger vehicles for steam operation, with a seating capacity of 4,544, were in service. In 1913 there were 453 passenger vehicles in service for electric operation, these having a total seating capacity of 23,498. In 1918 the number of these coaches was increased to 489 and the total seating capacity to 24,854, while last year there were in service for electric operation 509 passenger vehicles, with a total seating capacity of 25,734. The total number of passengers carried in 1913 was 121,593,861, the average number of passengers per vehicle being 228,990, and the average number of passengers per seat 4,295. In 1918 the total number of passengers carried was 159,272,202, the average number of passengers per vehicle being 281,900, and the average number of passengers per seat 5,418. In 1919 it is estimated that the total number of passengers carried by the Metropolitan Railway (London) was 181,734,800, giving an average number of pasengers per vehicle of 310,658, and an average number of passengers per seat of 6,002. As compared with 1913 there was a 49 per cent increase in the number of passengers carried during 1919, and a 36 per cent increase in the average number of passengers carried per vehicle, with a 40 per cent increase in the average number of passengers per seat.

First Class Driving Trailer Car

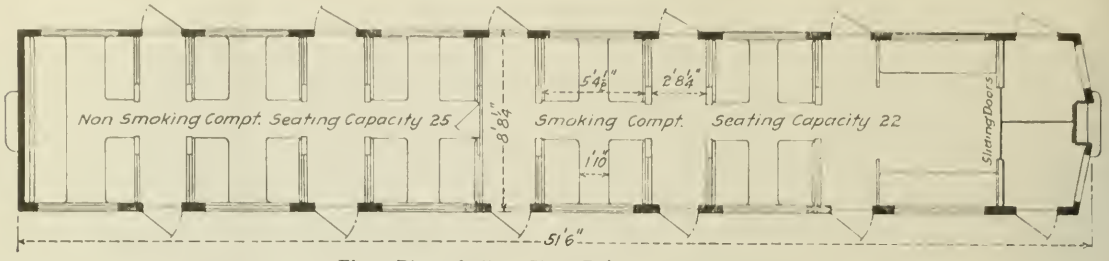
The train and car miles run during 1913 by steam trains was 961,629, and by electric trains 5,731,601. In 1918 the train and car miles by steam trains were 855,602, and by electric trains 4,923,253, while last year it is estimated that the train and car miles were 995,234, and by electric trains 5,471,315. The car and coach miles (electric traction) were 22,758,179 in 1913; 21,302,469 in 1918, and 22,657,432 in 1919.

Since 1913 the traffic over the whole of the Metropolitan system, particularly the electrified part of the line, has very largely increased, and this increase has been most marked since the signing of the armistice. It is not possible to give exact figures as to the passengers carried in recent years, as under the system of government control records of through passengers have not in all cases been kept, but very near

estimates have been prepared, and these show that compared with the passengers carried in 1913, which amounted to approximately 122,000,000, the number carried in 1918 was 160,000,000, and for 1919, based on the first three months, will be 182,000,000. It will thus be seen that the traffic at the present time shows an increase of 49 per cent over that of 1913, and this is without taking into account naval, mili-

considered essential for every train to have one day in every seven as a "shed day" for examination purposes, this schedule has recently had to be reduced to one "shed day" in ten, owing to the exigencies of traffic.

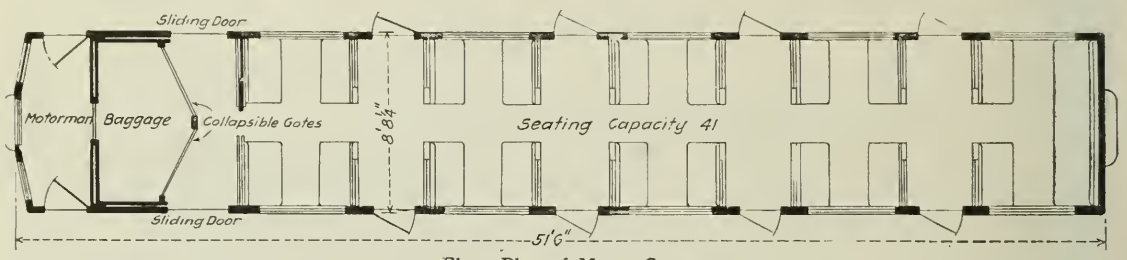
During recent months it has been necessary, in order to relieve the congestion of traffic, still further to reduce the schedule for "shed day" and emergency purposes and to bring



Floor Plan of First Class Driving Trailer Car

tary and other government traffic where the men do not take ordinary tickets. In normal times this large growth of traffic would have been met by an increase in the rolling stock, but during the war it has been impossible to get any such equipment constructed. The company was fortunate in being able to get delivery, in the early part of hostilities, of some new rolling stock that had been ordered previously, and has

into regular service as a temporary measure, and until new rolling stock can be obtained, several of these trains. It is being done at a distinct risk to the regularity of the service, but it appears to be necessitated by circumstances. When it is borne in mind that a train working on the Inner Circle service stops and restarts on an average of no fewer than 486 times in the course of its day's work, in addition to any signal

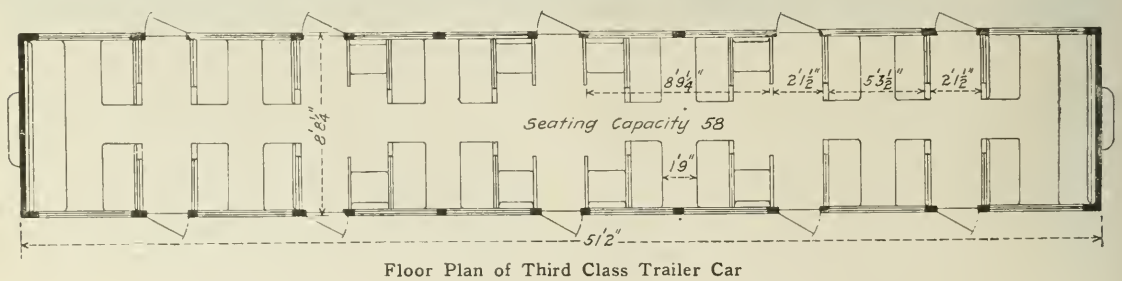


Floor Plan of Motor Car

recently further supplemented this by borrowing two trains from one of the main line companies, which increased the number of passenger vehicles from 531 in 1913 to 585 last summer, but the increase of 10 per cent thus obtained goes a very small way towards meeting the increase of 49 per cent in traffic. The average number of passengers carried per seat has increased from 4,295 in 1913 to 6,002 at the present time

stops there may be between stations, it will be realized how great is the strain both on the trains and on their electrical equipment, and how necessary it is that they should be subject to frequent examination and kept in thorough repair if failures are to be avoided.

Mention should be made here that the Metropolitan company is at a distinct disadvantage through having several



Floor Plan of Third Class Trailer Car

—an increase of 40 per cent. The whole of the company's rolling stock is in use, and it is only with the greatest difficulty that opportunity is found to take trains into the shop for necessary overhauling and repairs.

The schedule to which the Metropolitan company is working requires that every train be put through the shops once in every 3¼ years for complete overhauling, and while it is

types of electrical equipment. This was brought about, to some extent, by the working arrangements with other companies and by the Metropolitan having taken over another line, including its rolling stock. If the whole of the equipment were interchangeable it would be possible to reduce considerably the margin allowed for emergency purposes.

It is of interest to note that for the 28 days ending May 24

last, out of a total train mileage of 387,280 miles run on the electrified section of the line, the failures were only at the rate of 1.4 per day, equal to one for every 9,880 miles run. The small number of failures is attributed to the company having been able to keep up so nearly to the schedule of maintenance, and it is pointed out that in the case of a traffic as

Interior of Third Class Trailer Car

dense as that on the Metropolitan line the absence of failures and the consequent regularity of service are the principal features in the prevention of congestion and overcrowding.

Automatic signalling is in use on the Metropolitan system, and the sections have been cut down to the shortest limit in order to avoid congestion at the busiest hours and to get as many trains as possible over the line. The maximum number per hour over the busiest section, i. e., between Baker street and Moorgate street, is 39, and while it might be possible to increase this number under more favorable working conditions it is almost impossible to do so with the present type of trains. As to the length of the trains, this is varied at different times of the day and on different sections of the line, according to the traffic to be carried, and varies from seven cars to three, the standard unit being six cars.

The operation of a railway like the Metropolitan, carrying a service between Baker street and Aldgate in excess of a tube service, is much more difficult than on a single route line such as a tube owing to the numerous converging services. For instance, between Hammersmith and Aldgate there are eight junctions where trains either cross or are imposed on to the running lines.

The overcrowding in the trains during the rush hours, morning and evening, can only be met by running a number of additional trains and by increasing those at present scheduled.

The improvement of the facilities for entraining and detraining passengers is of equal importance to the provision of additional stock. It is necessary that the station stop at any point should not exceed 25 seconds if the maximum service, i. e., 40 trains per hour, is to be attained.

When the pressure of traffic causes the station stop at any point to exceed this figure the number of trains per hour falls in proportion thus:

25 seconds stop = 40 trains per hour, or 1 per 90 seconds.
40 seconds stop = 35 trains per hour, or 1 per 105 seconds.
55 seconds stop = 30 trains per hour, or 1 per 120 seconds.

The increase of the station stop from an average of 25 seconds to 55 seconds means 10 fewer trains per hour passing, or a reduction of 25 per cent, in carrying capacity.

The Metropolitan Railway has had this problem under careful consideration for some time past, with the result that a type of train has been evolved which it is anticipated—however congested the traffic may be—will complete its station work considerably under 25 seconds.

This new train, illustrated in the accompanying drawings and photographs, represents the first instalment of an order placed by the Metropolitan Railway Company with the Metropolitan Carriage, Wagon & Finance Co., Ltd., of Saltley, Birmingham, England. Each train consists of a motor car, 51 ft. 6 in. long over end posts, with a seating capacity of 41 passengers; a third-class trailer car, 50 ft. 6 in. long, with a seating capacity of 58 passengers, and a first-class driving trailer car, 51 ft. 6 in. in length, with a seating capa-

The Third Class Trailer Car

city for 47 passengers. The total seating capacity of these three coaches is 146, and when working as a six-vehicle train, as they frequently are, the seating capacity is 292, as against 268 seats in a train of the older types of electric rolling stock. The feature of the new vehicles is the provision of five swing doors on each side of the cars in place of the two or three sliding doors now most generally used on electric railway rolling stock, and it is confidently expected that there will be a considerable improvement in entraining and detraining facilities. The underframes and trucks are identical with the existing coaches of the Metropolitan railway, the wheels having a diameter of 3 ft. 2 in., while the truck wheel base is 7 ft. The new door and seating arrangements allow of improved circulation inside the cars; the inconvenience occasioned, with previous designs, to seated passengers by others entering and leaving is now eliminated, all gangways being entirely unimpeded. Attention has also been paid to the improvement of lighting and heating and the provision of ventilation without draughts. A graceful dome roof has been provided and a "softening" of the lights obtained by the use of frosted bulbs and opal reflectors. The new system of

Non-Smoking Compartment of First Class Trailer Car

switching enables the guard to control the lighting throughout the train, thus saving delays now inevitable owing to independent car-light switching.

A great point achieved in the new train is the elimination of straphanging, "steadying" rails being arranged to provide a hold for passengers, so that while some standing will still be inevitable during the rush hours, passengers, and especially those of short stature, will be in a normal position.

The side doors adopted are of the Metropolitan company's standard type as fitted to compartment cars, but by means of spring buffers and strengthening of the longitudinal framing, door-controlling straps have been eliminated, as also have window straps on the third-class coaches. A new form of lock has been fitted, which, while being very easily operated, is provided with a special catch, thus providing an additional safeguard.

To add to the facilities for quick entraining and detraining on the motor cars, arrangements have been made to allow passengers to use the luggage compartment doors. The actual luggage compartments are enclosed by Bostwick sliding lattice gates, which should also reduce pilfering of small articles, everything being within open view.

Although the end door has been dispensed with, special handles have been provided to enable guards to pass from one car to another in cases of emergency, while step-irons have also been provided for safely alighting on the track when necessary.

Various improvements have also been made for the safety and convenience of the traveling public by the provision of an improved device for controlling the "trip" for actuating the brakes in emergency, and automatic window wipers to enable the driver always to maintain a clear view. The improved buffing and draw gear should give smoother starting and stopping of the train. Route number indicators of a new and improved type have also been embodied.

While everything has been done to promote the comfort of the passenger, that of the staff has not been overlooked, and comfortable, well-upholstered seats have been provided for their use.

These new vehicles have been built by the Metropolitan Carriage, Wagon and Finance Co., Ltd., according to the designs and under the direction of C. Jones of Neasden, the chief electrical and locomotive engineer of the Metropolitan Railway Company, London.

Subordinate Officials and Independent Organizations Recognized

The Interstate Commerce Commission on March 23 issued supplemental regulations governing the making and offering of nominations for appointment of members of the Railroad Labor Board, placing various organizations of subordinate officials and of employees together in a special group for the making of nominations.

By reason of the fact that the law contemplated the making of nominations and offering of nominees in accordance with the regulations of the commission, within 30 days after the passage of the act, the commission had prescribed regulations with a view to the most expeditious making and offering to the President of nominations representative of the great bulk of those to be represented by the labor group. It is of opinion that the intent and purpose of the act is that the three members of the labor board representing the labor group shall be primarily representative of the rank and file of the employees. It was and is of the opinion that the overwhelming majority of those to be represented by the labor group are members of or represented through the organizations of employees named and grouped in its regulations of March 8, 1920.

Since the issuance of these regulations, however, representation as to their right to nominate members of the labor group has been made to the commission by certain organizations whose members are not, in certain cases, members of the organizations named in those regulations. These representations include certain employees of sleeping-car companies.

"It is to be observed," the commission says, "that the three members constituting the labor group are to represent the employees and subordinates officials of the carriers, and that from not less than six months these nominations are to be made and offered by such employees in such manner as the commission shall by regulation prescribe.

"According to the literal wording of the above paragraph, the three members constituting the labor group are to represent both the employees and subordinate officials, but the nominations are to be made and offered by such employees. It is urged that the expression 'such employees' entitled to make and offer nominations is to be interpreted as including both employees and subordinate officials. As the three members constituting the labor group are to represent both employees and subordinate officials, it seems not unreasonable to conclude that the expression 'such employees' entitles both

employees and subordinate officials to make and offer nominations. Inasmuch as the organizations named in our original regulations include or may include a small percentage of subordinate officials not so included as well as employees who may not be members of or represented through the organizations originally named by us, are entitled, under appropriate regulations prescribed by us, to make and offer nominations for members of the labor group.

"In coming to this conclusion it is appropriate to reaffirm our conviction that the great mass of the railroad employees and subordinate officials are members of or represented through the organizations named in our official regulations. It is also true that a percentage of the organizations and employees who now contend for their separate right of making and offering nominations for members of the labor group is included in the membership of the organizations named in our original regulations.

"In view of the above considerations we have determined to supplement the regulations originally put forth by adding a fourth group for the purpose of making and offering nominations for original appointment as members of the labor group on the labor board. Included in this group 4 are the following organizations which comprise all organizations from which we have received averments that their separate right to make nominations ought to be accorded under the transportation act, 1920, except the Railway Traveling Auditors' Association of America and the Supervisory Station Agents' Association, the membership of which we have held are not included in the term 'subordinate official.'

Group 4:

Railway Men's International Benevolent Industrial Association.
American Federation of Railroad Workers.
Order of Railroad Station Agents.
American Train Despatchers' Association.
The Roadmasters' & Supervisors' Association of America.
National Order of Railroad Claim Men.
Railroad Yardmasters of America.
International Association of Railroad Supervisors of Mechanics.
International Association of Railroad Storekeepers.
Colored Association of Railway Employees.
Brotherhood of Railroad Station Employees.
Order of Railroad Telegraphers, Despatchers, Agents and Signalmen.
Brotherhood of Railway Clerks.
American Association of Engineers.
Grand United Order of Locomotive Firemen of America.
Porters' Union.
Skilled and Unskilled Laborers (Railway).
Order of Railway Expressmen.

"The accredited representatives of the above organizations, duly authorized to act, shall agree among themselves upon nominees representative of each organization, or of nominees jointly representative of a number of such organizations, provided they agree among themselves upon nominees jointly representative of any of the organizations above named. The nominations agreed upon by each of the above-named organizations, or agreed upon as jointly representative of any of the above organizations, shall be transmitted direct to the President, accompanied by a certificate that the nominations have been made in accordance with these regulations, and should also include statements submitted by the duly authorized representatives of each of the organizations, or of such organizations voluntarily associated for the purpose of making joint nominations, setting forth their present total membership, exclusive of officials not embraced within the class of subordinate officials as defined by the commission's regulations of this date, distinguishing between subordinate officials and higher officials; the percentage of the membership of such organizations, exclusive of such higher officials, who are or may be members of the organizations named in our regulations of March 8, 1920; and the distribution of such membership as between employees and subordinate officials."

The commission has also issued its regulations designating the classes of employees that are to be included within the term subordinate official under Title III of the transportation act, 1920.

Public hearing having been had on March 15, 1920, "for the purpose of determining what classes of officials of carriers shall be included within the term 'subordinate official,' as that term is used in sections 300 to 313, both inclusive, of said transportation act, 1920," the commission prescribes that the term "subordinate official" as used in said portions of said act shall include the following:

Claim agents. This class shall include district claim agents and those lower in rank who are not vested with authority to settle claims, with or without limit, or to bind the company to pay claims, without securing such authority after reporting to a superior officer.

Engineers of mechanics. This class shall include civil engineers inferior in rank to engineers of maintenance of way, chief engineers and division engineers, draughtsmen, engineers of maintenance of way, and other engineers of mechanics who are not vested with authority to employ, discipline or dismiss subordinates.

Foremen. This class shall include foremen of mechanics, shops, tracks, bridges, etc., who are not vested with authority to employ, discipline or dismiss subordinates.

Supervisors of signals. This class shall include those who are employed as supervisors of signals with rank below the grade of assistant supervisor of signals.

Yardmasters. This class shall include yardmasters and assistant yardmasters who are not vested with authority to employ, discipline or dismiss employees. It does not include general yardmasters at large and important switching centers where of necessity such general yardmaster is vested with responsibilities and authority that stamp him as an official.

Train despatchers. This class shall include train despatchers who are not vested with the authority to employ, discipline or dismiss employees.

Storekeepers. This class shall include storekeepers or foremen of stores who are not vested with authority to employ, discipline or dismiss employees or to make purchases. It does not include general storekeepers or assistant general storekeepers.

"The above definitions," the commission says, "include all of the classes of employees whose claims to recognition as subordinate officials were presented at the hearing, except traveling auditors and supervisory station agents. The traveling auditors have a fiduciary relationship to the company. Their duties and responsibilities vary, but all partake of the same specific relationship of trust. The supervisory station agents are those who have supervision of the work of other station employees. They cover the range from the station where one employee other than the agent is employed to the agents at the largest and most important points. They are the official and responsible representatives of the company in its relationships with the public and frequently in a legal sense. Their compensation naturally varies with the responsibilities of their positions. It is not believed that either of these classes can be consistently included within the term subordinate official, as that term is used in Title III of the transportation act, 1920. The list of subordinate officials above prescribed may be enlarged or restricted after due notice and hearing, if and when occasion warrants."

WHAT IS REQUIRED is a market for railroad securities. This can be secured only by making railroad securities a paying and a secure investment.—*Minneapolis Journal.*

C. & E. I. Compensation Fixed

WASHINGTON, D. C.

THE BOARD OF REFEREES appointed by the Interstate Commerce Commission has issued a decision fixing the annual compensation of the Chicago & Eastern Illinois for the use of its property by the government during federal control at $4,450,000 per annum, which is approximately its net operating income for the year 1917, as compared with its average net operating income for the three years ending on June 30, 1917, of $2,946,000. The government had contended that the just compensation due the railroad did not exceed that amount and probably should be less. In their declaration as first filed with the board the railroad company and the receiver asked $6,196,760 as their annual just compensation, but the claim was amended during the proceeding and the final figures claimed were $9,943,178. The applicants also asserted that the minimum amount of their just compensation per annum would be $7,022,356, which was computed as being at the annual rate of 8 per cent on the investment in road and equipment as of December 31, 1917.

According to the report, the railroad maintained that during the control of the Chicago & Eastern Illinois by the Frisco System during the 11 years ending on May 27, 1913, it was undermaintained and that after termination of that control the receivers performed the deferred maintenance and also improved the railroad by extensive betterments so that when the government took it over it was a greatly improved and well equipped railroad and a going concern of large carrying capacity. The applicants, therefore, insisted that just compensation should not be measured by the income of any time prior to the year 1917 but by the net railway operating income for the calendar year 1917, which amounted to $4,048,030.

In addition, they asserted that in order to ascertain the full measure of their just compensation, $2,844,730 should be added to represent increased revenues from accomplished and expected increases in rates, $688,928 to represent car rentals collectible from foreign roads on a surplus of cars owned by the Chicago & Eastern Illinois, $1,765,022 to represent excessive and abnormal charges for equipment maintenance included in the receivers' operating expenses for 1917, which reduced its net operating income to that extent, and $236,468 to represent increases in revenue growing out of the recent decision by the Interstate Commerce Commission in the railway mail pay case. These additional sums brought the total claim up to $9,943,178. The report of the referees discusses each of these claims in detail and reaches the conclusion that no specific sum should be added on their account although they are said to be taken into consideration in fixing the final amount awarded.

Regarding the property investment, it is stated that the figure stated was not supported by detailed evidence on the ground that the present cost of reproduction new would be approximately 75 per cent higher. The government suggested, on the other hand, that if the value of the property should be based upon the market price of the securities on December 31, 1917, it would be only $46,916,744 instead of $81,756,217 as claimed. The report says the evidence does not show what the property could have been sold for or rented for on or about December 28, 1917, nor that the property had a market value, and that the record does not contain satisfactory evidence as to the various criteria of value generally recognized.

The applicants' claim that, despite the war conditions which created the extraordinary emergency for many railways, the Chicago & Eastern Illinois was at the time it was taken over in a peculiarly advantageous position and about to realize extraordinary profits much larger than its standard return, was subjected to a detailed analysis and the referees decided that the value of the use of the railroad subsequent to December 28, 1917, could not be accurately measured solely by its income prior to 1917, which was much smaller than its income during 1917, nor can it be accurately measured by giving greater weight to the earnings during federal control. The report says the tonnage of coal during 1918 was materially larger than the coal tonnage of 1917, but that the 1919 tonnage was substantially less than the 1917 tonnage and "while there is some indication in these figures that abnormal war profits may have accrued to the receiver during 1917 we are not convinced by the government's evidence that the receiver would have earned less than the operating income for the year 1917 had the receiver been permitted to operate the railroads throughout the 26 months of government control."

On the other hand, it is stated that the substantial increases in the costs of operation were a necessary incident of the times and probably would have increased the operating expenses of the receiver more or less had he operated the railroad during the 26 months and it has not been possible from the record to estimate or measure precisely the additional profits from increased rates which would have accrued to the receiver had he operated the railroad during the period of federal control and assumed the increased operating costs and had the benefit of increased rates.

The report says the evidence submitted on behalf of the railroad purported to indicate profits to the receiver to the whole extent of the increases in rates, but that the applicants have not recognized the fact that some profits from the increased rates would probably be absorbed by increased operating expenses. In reply to a suggestion of applicants that increased operating expenses would necessarily compel further rate increases, it is stated that the increases which were allowed by the interstate and state commissions during 1917 were, at least in part, granted for the purpose of meeting increased expenses. The evidence on this point is, therefore, dismissed as largely speculative. Regarding the claim on account of increased car repairs during 1917, the report says that the just compensation awarded recognizes the increased earning capacity resulting from the improvement and maintenance program, but that the evidence was insufficient to show that the applicants are entitled to any sum under this item of the claim.

In its claim on account of car rentals, the company used a rate of $1 per day as a reasonable per diem rate for its cars, but the report says that this rate was in excess of the actual per diem rates of 60 and 75 cents in force throughout 1917, and that the evidence does not show the number of cars needed to handle the local or interline traffic of the railroad during any particular period, nor that such needs remained at a fixed or constant number of cars during any particular period and, therefore, that the evidence does not warrant a finding that the car supply was greater at the time the road was taken under federal control than the car supply on a fully equipped or fairly well equipped coal carrying railroad. The referees held that the applicants have failed to establish that they were entitled to compensation on account of this claim, but stated that the facts shown had been taken into account in determining the just compensation for the use of the property as a whole.

The claim on account of back mail pay was dismissed on the ground of a total failure of proof in support of the amount which, it is said, was calculated by using an increase of 40 per cent to represent the effect of the commission's decision.

TO ATTRACT CAPITAL.—Given assurance of reasonable income to be derived from living rates by economical, efficient management, they would attract capital for improvement of existing lines, for construction of new lines and for purchase of cars and engines.—*Portland Oregonian.*

Bituminous Coal Commission Report Made Public

Majority Recommends New Wage Awards—Suggestions as to Transportation and Storage

WASHINGTON, D. C.

THE WHITE HOUSE on March 23 made public the report of the commission appointed by the President to adjust the wage controversy between the bituminous coal miners and operators, a majority of which awarded an increase of wages of 27 per cent, including the 14 per cent increase already allowed by Fuel Administrator Garfield, making an estimated increase in the wage cost as compared with that of October 31, 1919, of $200,000,000. The report, together with a minority report by Commissioner John P. White was transmitted to the representatives of the miners and of the operators by the President with a letter in which he said that they should make arrangements for convening the necessary joint conferences as soon as possible to put into effect the provisions of the award, as agreed by representatives of both sides. The President had agreed, if the commission reached a unanimous decision, to confer upon it the power to fix the price of coal, but as the decision was not unanimous and as he had concluded that it would not be expedient for the government to continue to exercise price control under its war powers after April 1 an executive order was issued suspending as of April 1 his order of October 30 restoring price control and also all other orders relating to the regulation of coal under which the President's powers have been delegated to Director General Hines. The order of February 25, relating to the regulation of coal exports by the Tidewater Coal Exchange, was, however, kept in force. This order re-establishes the status as it existed before the coal strike, except as to the order relating to the Tidewater Coal Exchange, as the orders of the Fuel Administration which had been suspended were reinstated at that time in order to deal with the strike situation, and the question as to how much the increase will add to the price of coal is therefore left to be determined by the operators and by commercial conditions.

The 14 per cent increase in wages already awarded was estimated to have added $96,000,000 to the wage cost. The additional increase now awarded adds another $104,000,000.

The majority report by Commissioners Henry M. Robinson and Rembrandt Peale contains important recommendations relating to the relations between the railroads and the coal business which have already been taken up with some of the railroad executives with a view to co-operation in putting them into effect.

Tonnage workers will have received, under this award, an average increase in wages since 1913 of 88 per cent, and day men, part of whose previous advance was based on existing inequalities in compensation rather than on increased living costs, will have received an average advance of 111 per cent. The other main point of the United Mine Workers' contention—a reduction in the working hours from eight to six hours a day, and five days a week—was not granted. The commissioners stated that they were convinced that a curtailment of productive energy would react not only against the whole population but against the miners themselves, because while it was declared essential that the miners shall have living wages, it was also declared to be likewise essential in the public interest that there shall be no let down in production. The commissioners expressed the opinion that had they shortened the day by one hour, it would be equivalent to an additional cost of over $100,000,000.

"We have sought and believe that we have found some of the principal reasons for the weakness in this uncertain and troubled industry, and we offer a method for remedying the most important of these conditions," the commissioners said in a letter to the President.

"A wage settlement for the moment is not a correct or adequate answer to the problem. The coal industry has been on an unsound basis for years, because of its seasonal character and the resulting car shortages and car service intermittencies. The heavy movement of bituminous coal comes in the fall and winter. Inevitably, with the buying and movement limited to one season, there is a great car shortage which limits production. When the market drops in the spring and summer there are idle men, idle mines, and idle cars. From the standpoint of employers and employees, the industry has yielded a hazardous return.

"The solution of the problem is to bring about evenness of production and distribution. This can be done by the co-operation of the railroads, public utilities and steel companies as consumers, on the one side; and of the operators, the Interstate Commerce Commission, the banks, and the Federal Reserve System, on the other side."

In addition to the awards the following specific recommendations are made:

(1) That an executive order be issued instructing all federal departments and other federal agencies to purchase, transport, and store at the point of consumption, where such action may be practicable, an estimated three months' winter supply of bituminous coal before July 1 of each year.

(2) That the Council of National Defense assume the duty of obtaining the support of the general public, particularly the large consumers, in the stabilization of the coal industry through the purchase, transportation, and storage at the point of ultimate consumption of its winter supply of coal—this to be done during the spring and summer months.

(3) That an executive memorandum be issued to the Interstate Commerce Commission transmitting to that body a copy of this report with the findings, awards, and recommendations, to the end that the Interstate Commerce Commission may aid in the solution of the problems herein outlined, and in the hope that the Interstate Commerce Commission will give particular attention to the questions of seasonal freight rates, car supply, and car distribution, as well as the problem of railway coal purchase for storage.

(4) That executive authority be issued permitting the transmission to the governors of the various states, to county and municipal authorities, and to the various state railway and public utility commissions copies of this report and of the specific reocmmendations made therein; and that the state railway and public utility commissions make use of their influence with the various public utility corporations looking toward the early purchase and storage of coal by these corporations reflecting, if necessary, the excess cost of such storage in authorized rates, and also to the end that instructions may issue from state, county, and municipal authorities directing the purchase and storage of three months' supply of coal on or before July 1, of each year, by and for the use of the states, counties, and municipalities, particularly on public works and in public buildings.

(5) That the Interstate Commerce Commission consider the possible effect of a graduated seasonal freight rate that is lowest in the spring and a monthly graduated increase in rates until the late fall.

(6) That copies of this report with its findings, awards, and recommendations be transmitted to the carriers to the

end that they may be enabled to co-operate, particularly in regard to car construction and distribution, coal storage, and the elimination of the practice of commandeering.

(7) That a copy of this report be transmitted to the Federal Reserve Board to the end that federal reserve banks be asked to favor as eligible for rediscount paper drawn against coal in storage.

(8) That the Interstate Commerce Commission, state railroad and public utility commissions, within their jurisdictions, issue, where lawful, rules controlling car distribution among mines, to the end that no particular mine or mines may be permitted to obtain through a practice of car assignment and guarantees, preferential car service.

(9) That carriers, and, if necessary, the Interstate Commerce Commission and the various state railway commissions, within their jurisdictions, issue the instructions necessary to abolish the practice whereby purchasing agents of carriers use the company's control over car supply to force down the price of railway fuel.

(10) That the operators in supplying their quota of fuel to the railroads avoid, except in emergencies, the use for that purpose of coal whose properties make it more valuable for other uses.

(11) That all data relating to the mining, distribution, and consumption of bituminous coal be co-ordinated and correlated periodically and regularly by some one federal agency such as the Interdepartmental Board of the Council of National Defense, in order that it may be available for any committee or commission hereafter called upon to investigate controversies between operators and miners in the bituminous coal industry.

In discussing the transportation questions relating to coal the report says in part:

"We believe that steps in the direction of standardizing the demand for coal should be taken by the principal consumers, and are in possession of evidence that many of the largest consumers of coal delay purchase and delivery until the late months of the year and that outside of that part of the central competitive field having Great Lakes shipments, the smallest movement of coal to consuming terminals is in the spring and early summer, at which time some mines are closed down while others operate irregularly.

"The seasonal nature of the demand for coal makes it necessary for the mining companies to maintain a capacity sufficient to meet the maximum demand in a comparatively short period of time. This excessive capacity involves the employment of a large labor reserve and is one of the main causes of the labor unrest prevailing in the industry. Nor does this fluctuation in production affect only the mine and the miners themselves, but spreads to the railroads and through the railroads to the entire productive machinery of the Nation.

"For many years the railroads, and especially the coal-carrying railroads, have to a great extent depended on a practice that has grown up of protecting themselves in the winter months by commandeering coal consigned to other consumers. In some degree the public utilities have counted on this form of a priority. The railroads are consumers of about 30 per cent of the total coal production of the country, and we have presented to certain of the executives of the larger systems a request that the railroads accept the principle that it is their duty to the public to move coal in the months that normally are months of low movements to consumption terminals, such movement to be in excess of their then needs, thereby gradually accumulating a three months' supply before the winter, the railroads to come out at the end of the winter with possibly 20 or 30 days' supply on hand. This movement would be more economical than the movement in the winter, and, from the standpoint of the coal railroads at least, the lower cost of movement would, to a great degree, offset any cost of storage.

"The acceptance of this principle by the railroad executive heads has been general. The Pennsylvania Railroad and the New York Central lines expressed their acceptance in an especially liberal spirit. We wish again to state that this is a duty of the railroads and that some method should be devised under which they will provide such storage.

"In the case of the public utilities we believe that they, too, have a duty to perform to the public and should not rely on any form of priority when the pressure comes in the winter, and to this end they should be called upon to move and store coal in the summer months in excess of their needs, going into the winter months with 60 days' supply in storage. We feel that these two groups owe this as a duty, and that in both cases, if there is an increased cost, it will be recognized by the rate-making authorities.

"The next largest group of coal consumers is the steel industry. We have presented the problem to certain of the heads of important steel concerns, including the United States Steel Corporation, and they express an intention of increasing storage of coal and movement of the same in the months of low movement along the lines of the plan here suggested.

"It is believed that the Federal Reserve Board and the several federal reserve banks will favor considering as eligible for rediscount paper drawn against coal in storage.

"In addition to these groups, we recommend strongly that all government institutions, national, state, municipal, and local, purchase, receive, and store coal during the spring and summer months in anticipation of the winter's requirements.

"We believe that if the various groups mentioned carry out the plan of storing from two or three months' requirements, beginning the winter with this supply on hand, the result will be a decided stabilization of the coal industry, a considerable measure of relief to the carriers, and a general economic saving to the public and the Nation, and, further, that the practice would result in the minimizing of the commandeering and confiscation of coal on the theory of priority. We feel, too, that unless some plan of this kind is adopted, we are bound to have recurring conditions of coal shortage in the winter months as in the past three years, and that no need for such a situation exists. In this connection, the question of the practicability of storing bituminous coal arises. We are fully aware of the difficulties involved, but feel, on the basis of expert opinion, that these difficulties are not insurmountable.

"It must be remembered that in large operations, such as the steel and the coal industries, the cost and facility of transportation is vital in keeping down the cost of the product, while to the ultimate consumer the costs which are added by the retailer and the middlemen are even greater factors.

"The Nation's total freight-car supply was inadequate even before the war, and many mines were shut down for longer or shorter periods, even without regard to seasonal movement, simply as a result of car shortage.

"We believe that it is urgently necessary for the railroad companies to construct an additional number of all types of freight cars, in order that they may be in a position to use the open-top cars exclusively for the purposes for which they were intended.

"The carriers of the country own nearly a million open-top cars and depend upon coal transportation for about 30 per cent of the total railroad traffic. On certain roads fuel transportation amounts to more thn 50 per cent of the freight moved. The idleness of coal cars during the summer months, coupled with the excessive activity during the fall months, forces the railroad themselves to employ a large number of men and to provide for a surplus amount of rolling stock for winter months and an excessive amount of storage yards during the summer period when the cars

are not in use. This in turn is an added burden upon the people of the United States through a general increase in traffic charges, as well as in the increased cost of coal.

"The recommendation is made that the Interstate Commerce Commission make the necessary provision, within its jurisdiction, to enable the railroads to provide a sufficient amount of rolling stock, motive power, and other facilities to meet the demands of industry. We feel that even if this additional construction should be reflected in rates it would be ultimately to the advantage of the consumer, as all industries suffer from intermittency in distribution, and the public bears the cost of this intermittency in the higher price of all commodities, particularly coal.

"This condition can only be rectified by the construction of sufficient freight cars of all types and of a sufficient number of locomotives to handle them.

"Conditions in this respect have become considerably worse during the last three years. Prior to the war freight-car construction of all types averaged about 125,000 cars per year. During the war period and since the armistice, although the need for cars increased, the total freight-car construction of all types has been but 250,000 cars. This means an average annual production during the past three years of only about two-thirds of the previous yearly car output.

"During the war the existing car equipment was more strenuously utilized and repairs were consequently delayed, so that car mortality has been very heavy. This has been aggravated by the fact that cars allocated to foreign lines have received even worse treatment and have suffered still greater deterioration.

The additional expansion of the coal industry during the war, by increasing the number of mines to be served by the railroads, has also aggravated the situation and has rendered the car equipment still more inadequate for the purpose of an effective coal distribution.

"The consequence is a serious shortage of all freight cars, resulting in many instances in the diversion of open-top cars to the movement of commodities of higher classification and rate—commodities which under ordinary conditions would move in box cars. The coal industry suffers from this diversion, as it diminishes still further the number of cars available for the transportation of coal.

"At the same time it is realized that the carriers cannot be expected to provide a sufficient number of coal cars to take care of the peak of the business during the months requiring maximum delivery, and to carry and store the extra equipment during the slack months. It is our belief that a more even distribution of the demand for coal throughout the year will be an important factor in overcoming this difficulty. The following suggestions have been made to the commission as to methods of overcoming car shortage, car irregularity, and seasonal operation:

1. A difference in railway freight rates on coal to be graduated through the summer months in districts other than those moving coal to the Great Lakes. This question, however, is properly within the province of the Interstate Commerce Commission to decide, and the commission has recommended that this subject be given due and careful consideration.

2. A difference between summer and winter prices of coal, such difference to be fixed by the operators, but, in view of the fact that there are in the neighborhood of 7,000 operators in the bituminous coal industry, the commission believes, without passing upon the legality of an agreement to reduce prices for the summer months, that this plan would be impracticable.

"Railroads have depended for a great many years and to a large extent on their accepted right to divert coal to their own use in case of shortage. This practice, by protecting the railroads against actual disaster, has resulted in a great injury to the coal industry and to the individual consumer of coal.

"In its investigation the commission requested of and received from the United States Railroad Administration a statement covering, in outline, the former and present rules with respect to the assignment of cars to mines. In transmitting this statement the Railroad Administration points out the prewar rules covering car assignments, which tended to irregularity in our distribution, while not universally relied upon by carriers, were quite generally prevalent in the East, and were based upon a line of decisions of the Interstate Commerce Commission, of which the leading case is that of Traer *v.* Chicago & Alton Railroad Co. et al.; decision confirmed in the Supreme Court of the United States. The statement follows:

> The common understanding of the prewar rule was this: If a carrier on contract purchased the entire output of a mine, it was entitled preferentially to assign cars to that mine for loading that coal day by day.
>
> If the carrier purchased only a part of the output of a mine, it was entitled preferentially to place cars for the protection of that loading at such a mine. In the working of this portion of the rule, if the number of cars of railroad fuel contracted for was in excess of the number of cars furnished that mine that day on the regular commercial distribution of coal cars, the mine was entitled to an arbitrary and preferential assignment of enough additional cars to enable it to load all the railroad fuel obligated to be shipped under the contract.
>
> If, on the other hand, the number of empty cars accruing to the mine on the regular commercial distribution was in excess of the number required to be shipped with the railroad fuel coal, then the mine was entitled to use the excess of empties above those necessary to load the railroad contract for the loading and shipment of commercial coal.

"During the investigations we found that the evils growing out of the preferential assignment of coal cars were fully recognized during the war and, as a result of a conference between the President, the Director General of Railroads, and the Fuel Administrator, the preferential assignment of cars was abolished. On May 24, 1918, the Fuel Administrator issued an order reducing the price of coal 10 cents per ton. The railroads, by the employment of assigned cars, had been frequently able to negotiate their fuel purchases at more favorable prices than the commercial trade, and because of relinquishing their right to assigned cars, the carriers faced the problem of having their fuel cost increased. As a concession to the railroads and in recognition of the loss that the deprivation of assigned cars entailed, Dr. Garfield issued his order of May 24, 1918. The principle of even car distribution was not effective, however, until approximately July 1, 1918. The delay was occasioned by the necessity for providing the necessary machinery by which the railroads' fuel needs could be complemented when the car supply was insufficient to give them their full orders, and this was done by the Fuel Administrator's requisitioning coal in quantities needed by the railroads.

"The statement of the Railroad Administration to this commission also states that:

> When the first uniform mine rating and car distribution rules were published September 10, 1918, the new rule abolishing the preferential assignment of cars for railroad fuel loading was carried in the uniform mine rating and car distribution rules by a provision that no such assignment for railroad fuel loading could be had except upon authority of the car-service section. This authority has never been granted since. The reason for this provision in the rule was to take care of emergencies if no other way of caring for the emergency could be found, whether to protect railroad fuel loading or other essential loading, the point kept in mind being particularly United States Navy coal.
>
> It should be borne in mind that private cars—that is, cars other than railroad owned, have been handled upon a somewhat similar rule as that which, under the prewar practice governed the placing of assigned cars for railroad fuel loading. That is to say: The private cars were arbitrarily placed for the owner's loading. If on any day the number of private cars so placed did not equal the number of empty cars to which the mine was entitled under the commercial distribution, the mine was entitled to additional railroad cars, to make up the deficiency.

"It is understood that Paragraph 402 of the Cummins-Esch bill, approved February 28, 1920, places control of coal car distribution and assignment within the jurisdiction of the Interstate Commerce Commission. On March 4, 1920, the Interstate Commerce Commission issued a recommendation to the carriers that they continue in effect the uniform rules of

car supply established by the Railroad Administration. The issuance of such a recommendation by the Interstate Commerce Commission raises an inferential question as to whether the maintenance of even car distribution is obligatory through the provisions in the Cummins-Esch bill, since the comment of the Interstate Commerce Commission is a recommendation only. Whether the Interstate Commerce Commission can make such a recommendation a mandate is a matter not within the province of the Bituminous Coal Commission to decide.

"It is, however, recommended to the Interstate Commerce Commission and to state railway commissions within their several jurisdictions that, wherever lawful, rules and regulations be issued governing and controlling car distribution between mines, to the end that no particular mine or mines may be permitted to obtain preferential car service through the use, by railway purchasing agents, of their power to obtain railway fuel at reduced prices through the guaranteeing of car supply to favored mines or to operators with whom the railway may have fuel contracts.

"We make this recommendation because we find that the practice and abuse of car guarantees has militated against the interests of the general public by contributing to the irregularity of operation of mines not having such preferential contracts. At the same time, this practice has resulted in an unfair competitive advantage to those mines that secured such contracts.

"The commission also believes that railroad coal should be furnished by the various mines in proportion to their productive capacity with due regard to the quality of the coal. In furnishing to the railroads by the various mines, their quota of coal, it is recommended that the railroads be not required to place at each mine each day a sufficient number of cars for its proportionate amount of railway fuel, but that a plan be worked out permitting the railroads to place at each mine a number of cars sufficient to keep the mine in operation all day. This practice would reduce the cost of assembling railway fuel. In supplying to the railroads their quota of fuel the mines should avoid, except in emergencies, the use for that purpose of coal the properties of which make it more valuable for other uses."

Development of the Territory by Alaskan Railroad

A. T. Vogelsang, acting secretary of the interior, has submitted the following in response to a Senate resolution requesting information as to the development of traffic and the settlement of the country traversed by the government railroad in Alaska:

"Under the direction of this department over 1,000,000 acres of agricultural lands in the territory of Alaska have been surveyed to the end that they may be available to entry and patent under the public land laws, particularly the homestead laws as applicable to Alaska. A considerable part of this surveyed territory is within country traversed by or tributary to the government railroad now being constructed in Alaska. Under the coal-land leasing law enacted October 20, 1914, coal lands in the Bering river, Cook inlet, Matanuska and Nenana coal fields have been divided into leasing blocks or units and offered for lease. The two fields last named are tributary to the government railroad in Alaska. Under the authority contained in the Alaska railroad act of March 12, 1914, town sites have been established upon public lands along the line of the government railroad and lots for business and residential uses disposed of through the land and industrial department of the Alaskan Engineering Commission under the supervision of this department. Such advice and assistance in finding markets has been given to farmers located in the territory tributary to the railroad as could be given without the expenditure of money therefor.

"Other than as stated in the last paragraph no direct steps have been or are being taken to develop traffic for the railroad.

"No organization has been created charged with the duty of settling the country and developing traffic for the railroad for the reason that this department does not deem itself authorized to expend money appropriated by Congress under the act of March 12, 1914, and acts supplementary thereto, for purposes other than those described in the law, the principal purpose of which is the construction and operation of the railroad and of telegraph and telephone lines. Careful consideration of the law fails to disclose authority to expend money appropriated thereunder for such purposes as publication of literature for the advice and information of settlers or for spending money for aiding settlers to locate themselves on the land or acquire stock and equipment or for the construction of roads or trails connecting tributary districts and settlements with the railroad.

"I am firmly convinced that some such work as is implied in resolution 329 should be authorized in order that Alaska may be developed and that the government railroad may be supplied with traffic. Unless some such steps are taken, it may well happen that the railroad will be a losing proposition and that the territory will remain in a comparatively undeveloped condition. In this connection I inclose a copy of letter addressed by former Secretary Lane to Hon. Wesley L. Jones, United States Senate, February 28, 1920."

Mr. Lane's letter says in part:

"Mr. J. L. McPherson of the Alaskan Engineering Commission has recently submitted to me a report covering the development of traffic for the government Alaskan railroad, in which he strikingly sets forth the need of necessary aid and encouragement in the creation of local industries and a growing population that will furnish traffic for the railroad. His report contains the following summarized recommendations:

Natural resources opened to development.

National affairs in Alaska administered by a board with office in Alaska.

Sale of live stock to settlers

The federal farm loan act extended to Alaska and modified to meet Alaskan conditions. To provide for loans to settlers for the purchasing of farm equipment and for improvements, and for loans to associations of farmers for the erection of creameries, dehydrating plants, storage, and other facilities.

Construction of roads and trails connecting tributary mining districts and settlements with the railroad.

Reindeer industry open to development by white population in regions tributary to the railroad.

Publications of illustrated literature briefly describing the country traversed by the railroad, its topography and climatic conditions, resources, and opportunities for settlement.

"The government railroad in Alaska will be a success only to the extent in which local industries are created in the region tributary to the railroad and the country peopled. If this railroad were privately owned, all possible aid and encouragement would be extended to such ends in the building up of traffic. Constructed and owned by the government in order to rationally develop Alaska, there is infinitely greater reason for such constructive work.

"The Alaskan Engineering Commission should be now empowered to do those things that will aid in the creation of local industries and the peopling of the country tributary to the railroad. Such measures of aid should also be extended where necessary to other sections of the territory. Only by such means can Alaska progress and traffic be created for the railroad.

"On the eve of my retirement I wish to express the hope that Congress will at an early date enact legislation providing for the measures above recommended that will permit Alaska, through the rational utilization of its rich natural resources, to become far richer in an increasing and prosperous citizenry."

Seasonal Differential Rates in Coal Proposed

Senate Committee Suggests 15 Per Cent Reduction in Summer to Promote Early Production

THREE BILLS affecting the relations between the railroads and the coal industry were introduced in the Senate on March 17 by Senator Frelinghuysen as chairman of a sub-committee of the Senate Committee on Interstate Commerce that has for some time been investigating the coal situation.

The first bill provides that during the period from April 1 to August 31 in each year railroads shall not charge for the transportation of coal and coke a rate higher than 85 per cent of the regular published rate in effect when the act takes effect and that the rates shall be increased to 115 per cent during the remainder of the year from August 31 to March 31, the purpose being to promote the production and shipment of coal during the spring and summer months. The Interstate Commerce Commission is authorized to change the rates, to remove discriminations and also to change the percentage of differential whenever it is of the opinion that the percentage named will cause shipments to be made in such disproportionate quantities at any period of the year as to prevent the carriers affected from handling their traffic properly, from using their equipment and facilities efficiently, or from receiving just and reasonable revenue from the coal traffic as a whole.

The second bill is designed to terminate federal control of the coal and coke industry by repealing the provisions of the Lever act, under which federal control is now exercised, and also contains a section to make it unlawful for a railroad to confiscate, seize or divert for its own use or for any other purpose, whether with intent to make proper compensation therefor or not, any coal or coke of which it is in possession solely by a common carrier.

The third bill provides for the appointment of a federal coal commissioner to investigate the organization, management and practices of coal dealers and operators, costs and profits in connection with the mining, sale and distribution of coal, prices for coal, the distribution, storage and sale of coal and the methods and practices employed therein, the consumption of coal and the transportation of coal in commerce, including the distribution of coal cars. It is proposed that the commissioner shall be appointed by the President, that he shall investigate also questions pertaining to wages and working conditions of miners and also methods and prices for the storage of coal. He would also be directed to co-operate with the Interstate Commerce Commission in promoting the proper distribution and most efficient use of coal cars in commerce and to co-operate with dealers, consumers and others to encourage the construction of facilities for the storage of coal. He would be directed to investigate the desirability and practicability of prescribing statutory standards for various kinds and grades of coal and the desirability and practicability of a statutory zoning system defining the distance from the mine within which coal may be transported in commerce, and to submit a report thereon to Congress before April 1, 1921, with his recommendations. He would be required each year to submit a report to Congress setting forth the activities of his office during the year, together with recommendations for further legislation relating to the mining, distribution, transportation or sale of coal. A provision in the bill makes it the duty of the Interstate Commerce Commission and the Federal Trade Commission to co-operate with the coal commissioner.

In connection with the introduction of these bills, Senator Frelinghuysen made a speech giving voice to various complaints regarding the exercise of the powers over coal distribution conferred upon Director General Hines by the President and the former fuel administrator, and the Senator declared that the several agencies controlling the coal industry at the present time are to some extent interfering with it. He said he and other Senators are inundated with complaints against the policy of the director general in diverting coal and that an abnormal situation is created by government agencies fixing prices, seizing coal and throwing the flow of this important commodity out of its normal channels. The sub-committee, he said, has come to the conclusion that the primary difficulty at the present time is the government interference in price-fixing and in distribution, and that the practical thing to do at present is to repeal the war powers. In order to wind up the various matters arising out of federal control of coal and coke, he said, his bill had provided for a period of 30 days, and it might be necessary to continue the present system longer than that period.

At another place in his speech he said that one of Mr. Hines' assistants had expressed the opinion that by the first of May the present conditions under which the director general has found it necessary to make diversions of coal to meet conditions of shortage would be relieved. He said the methods employed by Mr. Hines, in his opinion, had been "ruthless and illegal to the extent of usurping powers which he does not possess, but which have been necessary to compose the situation."

The Senator also devoted some attention to what he described as the abuse of confiscation by railroad companies of supplies of coal invoiced to private consumers, and for this reason a section of one of his bills proposed to make it a misdemeanor for a railroad company to confiscate coal.

Regarding the proposal to establish seasonal differentials in coal rates, the Senator referred to the complaint of the miners' union that during the summer months many of its members were idle and to their demand for shorter working hours in order to spread the production of coal more evenly over the year. He thought the summer differential also would tend to relieve the condition of car shortage and congestion. In reply to statements by some of the Senators that large numbers of coal cars sent to the West and Northwest during the coal strike have not yet been returned and in some cases are standing on the side tracks still loaded with coal which it is difficult to market since the production of Western coal has been resumed, Senator Frelinghuysen said that now the railroads are back in the hands of their private owners an effort is being made by all the railroads to get the cars back to the owning lines, and that undoubtedly that situation will automatically adjust itself. Senator Frelinghuysen also read a statement by Chairman Clark of the Interstate Commerce Commission pointing out advantages that would result from the system of seasonal differentials in coal rates, as follows:

Chairman Clark's Statement

"1. It would stabilize the price of coal. The capacity output of all the coal mines in the United States, assuming fairly constant operation, would far exceed the present consumption. The output of all these mines working, as at present, only intermittently during the spring and summer months, and working to capacity during the fall and winter months, is barely sufficient to supply the current needs and the greatly increased cold-weather demand for coal. During the winter the demand so nearly equals the currently available supply that scarcity

prices prevail. In addition to this, the actual cost of production per ton is unduly enhanced because the operator must, during the time his mine is closed down or working intermittently, keep together his organization and expend money for the upkeep and maintenance of the property, all of which must be added to the price of coal which he mines and sells during the rush season. If the demand for coal were reasonably constant throughout the year, many of these costs based on holding plant, capital and personnel idle for a large portion of the time would disappear, and the price of coal would more nearly represent only current costs of production plus a reasonable profit, leaving no opportunity for charging scarcity prices during the months when the greatest amount of coal is consumed.

"2. Such legislation would obviate very largely the pressing necessity for more coal cars. The present supply of coal cars, while totally insufficient to handle the fall and winter rush under existing conditions, would be fairly adequate to carry all the coal desired by consumers if this equipment could be kept moving with greater regularity throughout the year, as would be the case if the advantage of lower summer and spring freight rates could be held out to induce consumers to receive coal shipments in advance of their winter needs. Under the present system thousands of coal cars lie idle during the spring and summer, while the whole available supply of coal cars is entirely insufficient to handle the fall and winter emergency.

"3. Such legislation would remedy the present inadequacy of terminal facilities. The large amount of coal which must now be transported within a comparatively short time in each year tends to glut already overcrowded terminals. The increasing inability of existing terminal facilities to handle extraordinary seasonal demands without entailing serious delays and disproportionate terminal costs is one of the most glaring weaknesses in the present American railroad transportation system.

"4. Such a measure would promote regularity of employment in the mines, and would thus settle most of the outstanding grievances of the other miners. Increased compensation for miners, under the present régime. is demanded not so much as an actual wage for work performed but rather as a pension for periods of enforced idleness due to the seasonal demand for coal.

"An examination of some of the disadvantages which might appear to inhere in the requirement of lower spring and summer freight rates for coal shipments reveals that most of these objections are untenable:

"1. No confusion, either for carriers or shippers, would result from changing the rate on coal twice every year. The proposed legislation prescribes that the carriers shall file their tariff rates on coal in the same manner as at present, and, instead of requiring them to alter these tariffs semi-annually, provides an automatic statutory differential below the tariff rate for one portion of the year, and above the tariff rate for the remainder of the year, with discretion in the Interstate Commerce Commission to change the amount of the differential where it finds necessary.

"2. The revenues of the carriers would not be affected. A large amount of coal would still have to be mined and shipped in fall and winter to consumers who lacked the capital, credit, foresight or storage accommodations to enable them to secure their supply during the warmer months. If the 30 per cent differential in favor of the months between April and August, inclusive, should prove an unnecessarily large inducement, so that too great a proportion of coal were shipped during this period, the Interstate Commerce Commission is authorized to change the percentage so as to balance the summer and winter shipments properly.

"3. The transportation of coal in the spring and summer would not embarrass the railroads in handling other seasonal movements—for example, crops. In some localities cars carrying grain are loaded only in one direction, returning empty to the point of origin because of lack of shipments moving in that direction. If coal could be encouraged to move at the same time, this wasteful practice of hauling empty cars might be at least partially eliminated. Operating conditions during the clear weather of the spring and summer months are much more favorable, so that railroads can better withstand heavy demands for transportation at that period of the year than during the fall and winter months, when coal has heretofore moved in greatest volume. The cost to the railroads of transporting coal is also much less in warm weather, when locomotives can haul heavier trains, when they consume less fuel and when fewer employees can handle more traffic.

"4. The acquisition of more coal cars does not afford a practicable and complete remedy for existing difficulties. Under the transportation act recently approved the Interstate Commerce Commission is given the power to require carriers to provide themselves with sufficient cars. But most of the railroads have neither the money nor the credit with which to buy a supply of coal cars adequate for current needs under the present system of large seasonal shipments, so it would be useless for the commission to order them to purchase this equipment. On the other hand, most of the railroads which have enough money or credit to finance such purchases already possess an adequate number of coal cars to care for the needs of their own patrons, and they could not reasonably be required by the commission to purchase additional cars to take care of the traffic of other lines.

"The transportation act also appropriates $300,000,000 as a revolving fund from which loans may be made to the railroads. In view of the fact, however, that this money will very likely be used only in small part for new equipment, and that of the portion which is spent for equipment much will go for new locomotives, refrigerator cars and other types of urgently needed rolling stock, it is not probable that any considerable number of coal cars will be purchased out of this fund. It has been estimated that 100,000 new coal cars will be necessary to handle properly the usual seasonal demand. These alone would cost the entire amount of the appropriation mentioned above. The same statute also provides for creating a general railroad contingent fund, made up of a portion of the excess earnings of prosperous railroads, out of which loans may be made to the railroads, and out of which the commission may purchase equipment and facilities to be leased to the railroads. This fund will, however, be wholly an expectancy for many months to come, and at least one more winter, with its heavy demand on the present totally inadequate coal-car supply, would elapse before any relief could be had from this quarter. Even if funds were immediately available with which to purchase coal cars, and only coal cars were to be built, the car shops in the United States could not turn out sufficient cars between now and next fall to handle properly the coal shipments during the winter of 1920-21, assuming that the proposed legislation is not enacted in the meantime. Finally, even if this money were obtainable and cars would be turned out in sufficient quantity, the acquisition of cars which, under the present system of uniform freight rates on coal, would stand idle the greater part of the year would entail enormous depreciation and capital charges, all of which would have to be borne by the coal transported during the rush season.

"5. It may be urged that the interstate commerce act now contains ample provisions to permit the commission or the carriers to institute lower summer freight rates for coal. The conclusive answer to this contention is that during the many years that the same provisions have been law this practice has never been introduced. When the carriers have been asked to initiate such seasonal rates on coal, the request has usually been coupled with a demand that while rates might be lowered

in summer they should not be raised in winter; and the carriers, facing a consequent depletion of their revenues, have declined to co-operate on this basis. The shippers and consumers, motivated by their individual needs, have been by no means unanimous as to the amount of the difference in rates or the seasons in which lower lower or higher rates should prevail. In the very nature of the case, it is a subject for legislation, where Congress, representing all the people, may enact rules which will take into consideration the interests of all the people.

"The Interstate Commerce Commission, while it might feel justified in approving schedules initiated by the carriers instituting such seasonal rates, could not make such percentages of difference in rates permanent. The carriers, pressed by coal operators or consumers, might at any time file new schedules abandoning or modifying these seasonal rates. General confusion would result."

"It is understood," the Senator continued, "that the commission does not believe that it possesses the power to require the establishment of such seasonal rates on coal. It has never attempted to exercise this power, and it is known that it does not contemplate doing so in the future in the absence of further legislation. The commission assumes that in prescribing rates and practices it is not empowered to initiate new systems of rate making designed principally to remedy general economic situations. It feels that this should be the subject of specific legislative determination and authorization, rather than of mere administrative action.

"Even if the carriers, the shippers and the commission could and did institute such seasonal rate schedules, their action in this matter would be the subject of interminable litigation. It would be contended that no power had been delegated to the commission to approve or initiate such seasonal rates, and the action of the commission in this connection would most likely be enjoined until the matter had been decided by the United States Supreme Court. The result would be that two or three winters might elapse before this urgently needed practice could be put into effect. Definite legislation, such as that proposed, will remedy the situation at once. In view of the fact that the courts have upheld similar differences in rates, based on no less cogent economic reasons—e. g., under the so-called long and short haul clause—there should be no doubt as to the constitutionality of the measure proposed.

"Briefly stating the effect of this measure, it means that from the 1st of April to the 1st of September consumers of bituminous and anthracite coal, used by the industries of the country to the extent of 500,000,000 tons, heretofore purchased practically during the winter months, will have the opportunity of having 15 per cent reduction in their freight rates and a penalty of 15 per cent advance from the 1st of September for the following six months. It means that it will induce the purchase of coal in the summer and, according to Commissioner Clark, will release 250,000 coal cars, which are idle during that period, at a time when the railroads are not congested, and at a time when the coal may be moved more efficiently and effectively.

"I believe that this will solve the great problem in regard to the coal miner's in complaint that he is compelled during the summer months to remain idle a long period.

"Therefore, feeling that this measure will be beneficial to the coal industry, we have decided to present it to the Senate, and ask that the Committee on Interstate Commerce consider it carefully, hopeful that it will be enacted into law.

"A statement has been made by some one who has studied this question that it will save $1,000,000,000 a year to the country in the wastage that now exists."

A Freight Rate that is too low for the railroad is too low for the shipper.—*Chicago Tribune.*

Why Do Not College Men Go Into Railroading?*

By C. B. Breed

Professor of Railroad Engineering, Massachusetts Institute of Technology

Why do not college men go into railroading? A few of them do, but many who are well trained for such activities shy from this interesting life. Railroading should offer one of the most fascinating careers to be found. It should teem with interesting problems of the kind which will feed and satisfy the trained mind. The plain fact, however, is that it does not attract the young progressive college man.

Youth is as interested today as ever in the kinds of problems which are met and overcome daily on every well managed railroad. He is merely the grown up boy who would look forward to running a real transportation system with the same zest that he evinced only a few years ago with his toy railroad. The average college man has plenty of enthusiasm and ambition. He needs to be given an opportunity to continue the development of his judgment, his initiative and resourcefulness when he goes out into life.

During the four years of technical school he has been solving one new problem after another in quick succession. His mind has been crowded with new and interesting information at a rapid pace. He has been taught to lay aside the underlying principles of these various subjects in such a manner as to make them available for later use, but he has used them only to a limited extent because neither the school room nor the laboratory can imitate, except in a very limited degree, the real problems which he will meet in the life for which he is preparing. He therefore leaves college with a hunger to tackle life's problems and he expects to work and work hard. He expects these problems to be presented in as rapid succession as he has been accustomed to in the past four years, and if he does not meet them at the start and in numbers and degree such as will tax his mental strength, there is a slowing down of his mental process and a consequent lack of interest. It may be said, and with some force, that he should expect to serve his apprenticeship of drudgery as have many of the present leaders of industry; but to obtain from this product, the college graduate, the results which may properly be expected of him, this product must at the start be understood by his employer. Herein lies one of the faults often laid at the door of the college trained man, namely, that he cannot happily adapt himself to simple drudgery work. The plain fact is that his training has been quite the contrary. He has been running in high gear for four years and to throw his mind into low speed suddenly is too great a strain for most active minds. His work, then, should attract his interest from the start, it should tax his abilities, and if these conditions exist his character will overcome any prejudice he may have against the drudgery part of his service. He cannot be expected to be content if his physical self is employed while his mind remains idle.

This condition is recognized and well fulfilled by most progressive industries. As a rule, they appreciate that the technically trained man has already spent four years or more of intense training preparing himself for his industrial life. He is therefore assigned for a limited time the duty of studying the industry he has elected to follow. He is placed in the plant to study the process step by step and later the organization. It is not expected that he shall work productively in any one of the departments as he passes through them, but he is expected to observe and digest a great deal of information and to acquire the atmosphere of the business. In this probationary part of his service his interest is

*Other discussions of this subject appeared with *Railway Age* of March 5, page 713, and of March 2, pages 757 and 758.

kept alert. The incentive in the form of an assurance of rapid advancement is always before him, provided only that he makes good, that his employer is convinced that he is adapted to the activities of that particular industry. One other important attractive feature is not lost sight of. He is not paid for what he does; he is paid a living salary in anticipation of what he probably will do in the near future for the industry with which he is allied.

These opportunities are offered on all sides by the rubber, the shoe and other progressive industries, and many men at the close of a college training in engineering are entering these industries and are rapidly filling positions of great responsibility. The demand for these young men is so great and so attractive that any such industry as that devoted to transportation must meet this competition if it is to attract college men to it. This the railroads have not done. Only in rare instances do railroads offer interesting work at reasonable salaries to the man just out of college, and as rarely do they give him any definite assurance of a position of responsibility to which is attached a salary in any way commensurate with the ability it demands.

In the first place, railroad officers for the most part lose sight of the fact that the college man has spent four years of hard mental application and considerable money before he applies for his position. He is too frequently classed with the high school graduate in so far as the particular service that is offered to him is concerned. It is not so in other industries. If he is a graduate of civil engineering, he is usually offered the position of transitman in a surveying party, at a low salary, and kept in such position until some one above him dies or has courage enough to quit his job and accept a better one. His progress is so slow, his work so uninteresting because of its monotonous repetition that he usually quits the road in a year or two and finds employment where his training and abilities are recognized and his salary has some relation thereto.

Railroad officers must first understand this product, the technical graduate. It must be realized that if he is a graduate in civil, mechanical or electrical engineering it does not mean that he will never be adapted to the operating or financial end of railroading. His certificate of graduation merely means that he has undergone a systematic mental training in technical subjects, and in more general subjects than is usually appreciated, and has attained proficiency of mental action sufficient to satisfy the faculty of his college that he is entitled to his degree. It usually means that he is a pretty good analytical thinker who will acquire the information that practical experience brings at a very rapid rate and therefore needs only a short apprenticeship before he can be entrusted with responsibilities. The trained mind, not the name attached to the particular course of studies he pursued in developing his trained mind, is the fact to keep clearly before one. It is because of the condition of this trained mind that many graduates of mechanical engineering, for example, have made successful business men in innumerable industrial establishments. It is as absurd to assume that a graduate in civil engineering is not a proper candidate to develop into the presidency of a railroad as to say that a man who has spent four hard years of physical training in a gymnasium is unfit for any other kind of employment calling for physical strength. Engineering graduates are eminently fitted to become candidates for the operating or the traffic departments of railroads, and they should find attractive berths in these departments.

Colleges all over the country are turning out these trained men yearly. Industries everywhere are employing them and rapidly advancing them to attractive positions. The railroads are letting this opportunity pass by.

At the Massachusetts Institute of Technology alone at least a third of the three hundred odd graduates who go forth next June will be well trained to start on the job of manufacturing transportation at a profit. There will be at least ten in the graduating class who have made a specialty of railroading while at the Institute. Their studies have included as well as the usual subjects of civil engineering, railroad construction, maintenance of way, signalling, railway economics, accounting, contracting and operation. Probably not more than two or three of these ten men will go into railroading, even though they have made a special study of it. The majority will be found five years from now holding good industrial positions.

They have elected to specialize in railroading because they realize that the study of this great problem is excellent mental training, is broadening in its influence, and consequently well fits their minds to attack the diversified problems which will be presented in a wide field of industries.

It is doubtless true that the services of technical men are more seriously needed by industries which are competing in the manufacture of an article such as rubber goods. The product of the trained technical mind may have a great influence upon the success or failure of a particular corporation of this kind. It is not so clearly evident that his influence can be so great in the case of a railroad, for railroads are not so keenly competitive and they are hedged about physically and financially by more fixed conditions. But roads with steep grades and poor alignment certainly need the best technical ability to devise economies in operation to meet competition. Branch portions of some roads probably should be abandoned today and turned into highways and operated by automobiles and auto trucks.

Technical knowledge and analytical study of the losing portions of many of the railroads of this country may well be made, with the probable result of distinct modification or revolution in methods of operating them. The inertia of existing conditions has been a very prevalent disease among the railroads of this country. It has been the cause of failure of other industries. The fact that new competing railroads are not looked upon with favor by public utility commissions or by investors has given many railroads a monopoly of the transportation of their particular district. This condition does not tend to develop incentive for progressive methods. Such roads therefore do not attract progressive thinking men as do industries which are keenly competitive.

The attitude of railroads here outlined does not apply merely to the past 5 years. It has prevailed for the last 30 years, ever since technical college graduates have been a reality. Before the college graduate will be attracted in large numbers into this life he must be paid a good salary at the start, be given interesting work of diversified character and assured of rapid promotion if he is entitled to it, with the probability of occupying a position of heavy responsibilities and commensurate salary by the time he is 35 or 40 years of age.

If the railroads cannot do this, the technically trained man, who would do much toward developing and sustaining the seriously needed economies of railroad operation, will not give his life to transportation for the simple reason that other as interesting industrial life daily offers to him all of these attractions.

In closing I would add a word for the railroad officer who has been healthy enough to weather the abuse that has been heaped upon the railroads for the past ten years. It is little wonder that in some instances he is a discouraged man. His hopelessness is contagious, and it has its influence in keeping the young man away from railroading.

Let us hope that the public and its legislators have learned the vital lesson that encouragement of every sort is required to bring our transportation systems out of their present state. If this can become a reality, it is not improbable that the manufacture of transportation may be accomplished so intensively and interestingly as to attract the best young blood of the country.

St. Paul Passenger Train on the Western Electrified Section

The St. Paul Electric Passenger Locomotives*

Details of Design Are Described by Representatives of the Manufacturing Companies

THE TWO NEW TYPES of electric passenger locomotives built for the Chicago, Milwaukee & St. Paul were designed for the same class of service by different groups of engineers working independently; from an inspection of the finished locomotives it would appear that the two types could hardly be more different.

Roughly the requirements for both designs were as follows: The locomotives must collect 3,000 volt direct current power from an overhead catenary. They must be able to haul a 12-car passenger train weighing 950 tons over a two per cent grade, compensated for a distance of 20 miles, and over a 2.2 per cent grade compensated for a distance of 17.8 miles. They must maintain speeds of approximately 25 miles an hour up two per cent grades, 35 miles an hour up one per cent grades, 60 miles an hour on level tangent track and must hold trains on down grades by regenerative braking at speeds consistent with safe operation. The sharpest curve on the main line is 10 deg., but the locomotives must negotiate a 16-deg. curve in the yards satisfactorily. The locomotives must also supply current for lighting the trains and charging the train storage batteries at a voltage of from 60 to 85 and must be equipped with an oil-fired boiler, to be supplied by the railway company, to furnish steam for heating the train.

General descriptions of the two locomotives were published in the *Railway Age* of October 24, 1919 (page 819), and January 16, 1920 (page 233).

The General Electric Locomotive

By A. F. Batchelder and S. T. Dodd.

The running gear of the General Electric locomotive is composed of four individual trucks, two end trucks having three axles each, and two center trucks having four axles each. These trucks are connected together by special articulation joints. The motor armatures are mounted on the axles and the motor fields are carried on the truck frames.

The superstructure is made in two sections of similar design with a third section between them. The third or central section contains the train heating equipment, which consists of an oil fired steam generator, together with water and oil tanks. This unit is complete in itself, and is carried over supports attached to the two middle trucks. It can be readily removed for repairs without interfering with any other part of the locomotive. It is placed between the two operating cabs in order to be easy of access to the engineer's helper or fireman, from either location.

The two end sections are similar to each other in appearance. The operator's cab in either section is on the inner end next to the heater cab above described, in order that the operator can be convenient to the heater and in order to allow a maximum space for apparatus in the apparatus cab or outer end section. Another advantage of this arrangement of cabs is that the operator can have access to any section of the locomotive requiring his presence without passing through a section containing high-tension apparatus. The engineer's or operating cab contains a main or master controller, the air brake valves and handles, and an instrument panel, containing air gages, ammeters, and speed indicator. The engineer uses either of the two operating cabs according to the direction in which he is running.

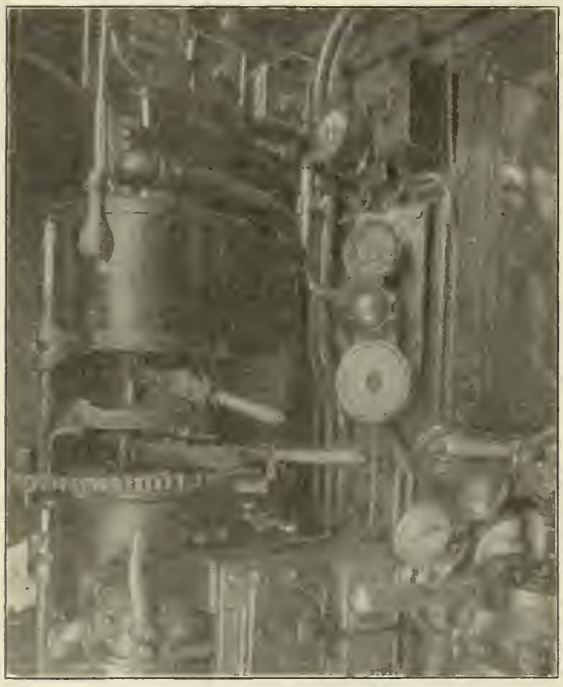
A door gives access from the operating cab to the apparatus section which extends with a cylindrical top to the extreme end of the locomotive. The cylindrical construction naturally adapts itself to the protection of the apparatus included and in addition to this it has the advantage of allowing a clear vision for the operator from his normal operating position. Contained in this apparatus section are the resistors and contactors to control the power circuits of the

*Abstracts of papers presented before the 358th meeting of the American Institute of Electrical Engineers at Pittsburgh, Pa., March 12, 1920.

locomotive. The starting resistors are placed in two rows on each side of the central passage just above the floor of the superstructure and are covered at the sides by removable covers which when opened will allow the separate resistor boxes to be slid out upon the longitudinal running board outside of the apparatus cab. The air compressor for the air brakes, the motor-generator set for train lighting, and the storage battery for marker lights and emergency control, stand upon the same level as the resistors, and can be removed or replaced in a similar manner. Above the resistors are located the contactors with their arc chutes facing a central aisle two feet wide. This allows ample arching space and room for inspection of contactors. Above the contactors is the cylindrical roof of the locomotive with trap doors for removing the contactors in case replacement is necessary.

Motors

The motors are of the bi-polar gearless design which were adopted by the New York Central 14 years ago for operating heavy passenger trains between Grand Central Station and Harmon, N. Y. To insure light weight per axle, flexibility in control, good truck arrangement for curving as well as for high-speed running, twelve motors are chosen, each of relatively small capacity. They are especially designed to withstand high temperature, being insulated with mica and asbestos. The continuous rating of each motor at 1,000 volts and with 120 deg. rise by resistance is 266 hp., corresponding to 3,500 tractive effort at the rim of the drivers at a speed of 28.4 mi. per hr. Forced ventilation is employed for cooling. The armature core is provided with holes for the passage of ventilating air. Ventilating blowers are located above each motor armature and deliver air at the commutator end of the motor where it divides, a part passing through the armature and a part back through and around the field coils where it escapes upwards and is afterwards used for ventilating the starting resistors.



Control Apparatus in Engineer's Cab of the General Electric Locomotive

This type of motor lends itself nicely to simple and compact locomotive design as the frame is made use of to furnish the entire path for the magnetic flux. The pole pieces and field coils are fastened to the cross transoms of the trucks and the magnetic flux passes horizontally in series through all twelve motors, finding a return path through the locomotive frame. The articulation joints between the trucks are made in such a manner that large surfaces are in contact to provide an easy path for the flux. The pole pieces are made flat in order to prevent the pole pieces from coming in contact with the armature during the vertical movement of the truck frame on its springs or when removing or assembling the armatures. A minimum clearance of $\frac{1}{8}$-in. on each side is allowed between the armature and the pole piece tips. The brushholders are bolted to the transom allowing the brushes to move up and down with the fields as the frame rides on the truck springs.

View from Engineer's Position on General Electric Locomotive

Control

In choosing the control apparatus special care has been taken to use individual pieces of apparatus best suited to the particular requirements. Where single independently operating switches are necessary as on the resistance notches, electro-magnetic control is used. Where several switches are required to operate at one time as in changing from series to parallel motor connections, banks of switches with electro-pneumatic cam control are used, thus insuring positive operation, eliminating interlocks, and simplifying the wiring.

The control for motoring is arranged for four motor combinations. The first combination has nine rheostatic steps, one full field step, and one tapped field step, with twelve motors in series across 3,000 volts. The second combination has six rheostatic steps, one full field step, and one tapped field step, with six motors in series and two sets in multiple. The third combination has eight rheostatic steps, one full field step, and one tapped field step, with four motors in series, and three sets in multiple. The fourth combination has eight rheostatic steps, one full field step, and one tapped

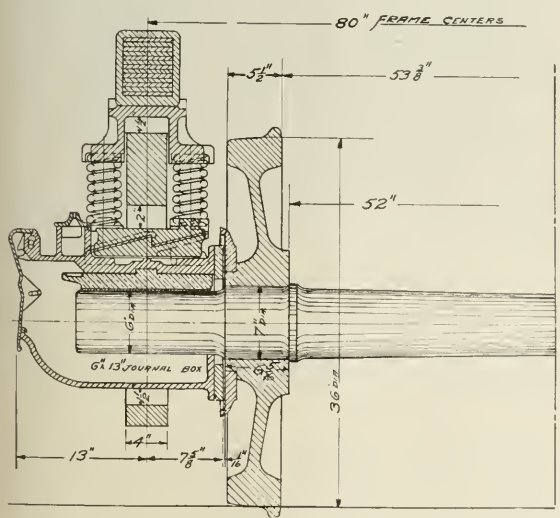
field step, with three motors in series, and four sets in multiple. This results in a total of 39 control steps with a choice of eight operating speeds, exclusive of the resistance steps.

The regeneration of power for braking is accomplished

Interior of No. 2 Apparatus Cab of the General Electric Locomotive with Roof Removed

by using some of the motors for exciting the fields of the others, which in turn are used as generators to return power to the line.

As a provision against short circuits, or extreme overloads,

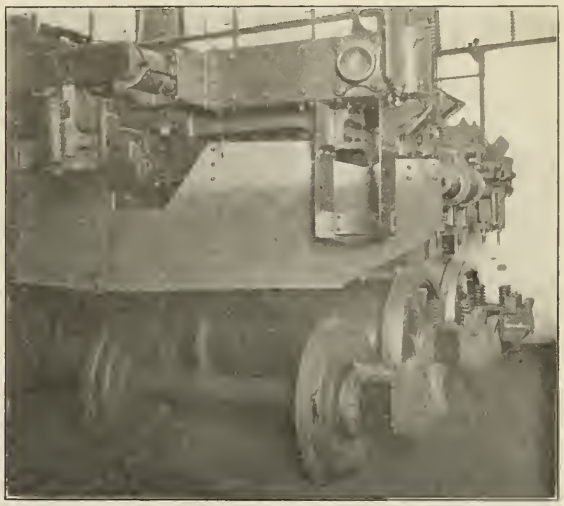


Cross Section of Journal Box, Showing Wedges Used to Give Resistance to Lateral Movement

a quick acting circuit breaker is provided in the apparatus cab which will protect the circuit in less than 1/100 of a second.

Mechanical Construction

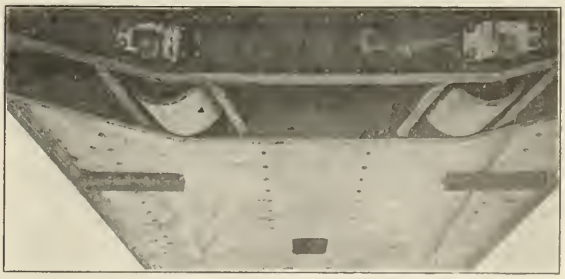
For flexibility in curving, the running gear is made up of four trucks, each of a relatively short wheel base. The two middle trucks have four driving axles each; and the two end trucks, two driving axles and one guiding axle each, making a total of 14 axles. The trucks are connected together with articulated joints which allow of no relative



Leading Truck Partly Assembled, Showing Wedges in Place on Journal of Guiding Axle

lateral movement between them, so that each truck positively leads the following truck.

To soften any lateral blow that may be given against the rail head, the leading and trailing axles are allowed a movement of one-half inch relative to the truck frame, either way from their central position. This movement takes place against a resistance introduced by wedges above the journal boxes which tend to hold the box in its central position and to give a dead beat action opposing the motion. To further protect the track from lateral displacement on the ties, the outer end of the superstructure is carried on rollers, bearing



Platform and Rollers Which Constitute Upper Half of Centering Device

on inclined planes upon the truck frames, while the inner end of the superstructure is rigidly bolted to one of the middle trucks. This construction tends to hold the leading and trailing trucks in their central position. When a blow is delivered by the leading or trailing truck against the rail head, the superstructure, which is rigidly bolted to the middle truck, is displaced laterally across the outer truck very much as a boiler of a Mallet locomotive swings across its leading truck. In such a sideways displacement, the weight of the

superstructure rolls up on the inclined plane on that side, and thus transfers weight to the rail that is affected, thereby increasing the adhesion of the rail to the tie. This action really has two results. It not only increases the holding power between rail and tie at that point, but it introduces a time lag and increases the time and distance during which the pressure is delivered to the rail head.

The Baldwin-Westinghouse Locomotive

By N. W. Storer.

The locomotive is built in a single unit, having one long cab, carried on running gear of the 4-6-2-2-6-4 type. The running gear consists essentially of two Pacific type running gears, coupled back to back.

The side frames are steel castings, joined over the four-wheel trucks by a heavy "A" frame casting; also by heavy cross-ties between the drivers which also support the motors, carry the center pin and carry the coupling between the two running gears. Each half running gear has six spring-supported plungers on which the cab rests. There are two supports at each end and two in line with the center pin. By the use of shims, the distribution of weight between the two ends of each running gear may be adjusted as desired.

The equalization is of the standard three-point type; the leading bogie being cross equalized with the leading pair of drivers and the pony axle being equalized with the two adjacent driving axles on the sides. Extra points are provided in the equalizing levers so that practically any distribution of weight that is desired can be attained.

The driving wheels are 68 in. in diameter; the journals 8½ in. by 14½ in., located outside of the wheels. The drawbars, with Miner friction draft gears, are carried in the "A" frame casting, previously mentioned.

The coupling between halves of the running gear consists of a long bar of a box section. The coupling pins are 10 in. in diameter and are located well inside the pony axles. The pins are hollow, filled with oil-soaked waste and have oil holes provided that keep the pins well lubricated.

The four-wheel trucks are of the "Woodard" type with outside journals; 36-in. rolled steel wheels and cast steel side frames. The journals are 6½ in. by 14 in. The two-wheel truck is of the well known "Rushton" side-bearing type, also with the outside journals and 36-in. wheels. The journals are 6½ in. by 14 in. Brake shoes are provided on all drivers. A modified form of the 14-EL Westinghouse Air-Brake Company equipment is used.

The cab is 78 ft. 0 in. long, 10 ft. 2 in. wide; is strong and rigid so that it can be lifted at the ends. The main strength lies in the two bridge girders extending from end to end The heavy cross-braces and the side members and top of the raised deck down the middle of the cab, form a construction that is light, but stiff. The cab is divided by cross partitions into compartments, one at each end for the engineer, and the others for the various parts of the cab equipment.

The total motor rating of the locomotive is 4,200 hp. on the one-hour basis. The continuous rating is 3,400 hp.

Driving Motors

The six driving motors are of the twin armature type. Both armatures are contained in a single frame, arranged to secure the maximum economy of weight. The fields are of the standard four-pole type with four salient poles and four interpoles for each armature. There are brush arms on each commutator which are easily accessible. Each armature is wound for 750 volts, but the two armatures and the two sets of field windings are connected permanently in series so that the rating of the complete motor is based on 1,500 volts. The motor is designed for field control by inductive shunts.

Quill Drive

The one hour rating is 700 h. p. The continuous rating is 567 h. p. with forced ventilation and 400 h. p. without blowers. The motors are mounted rigidly on the cross ties of the running gear, one being mounted directly above each driving axle. Each motor is geared to a quill centered in bearings in the motor frame and surrounding the driving axle with a clearance all around when axle and quill are concentric of 1¼ in.

The quill carries the gear and is connected to the drive wheels by long helical springs which are clamped rigidly at the ends in castings which are bolted one to the quill flange and the other to the drive wheel. There are seven springs at each end, worked in compression in one wheel, while those in the other are in tension. All springs with clamps are interchangeable.

They are easily accessible for inspection, and any spring may be removed without disturbing any other part of the running gear.

Main Motor Control

The six motors are arranged to be connected in three combinations:

1. All in series, giving one-third speed.
2. Three in series, two in parallel, giving two-thirds speed.
3. Two in series, three in parallel, giving full speed.

Inductive shunts are applied to the fields on all three of these positions. Shunt transition is used in passing from one combination to the next. When regenerating, the motors are separately excited from the two axle-driven genera-

Top View of Westinghouse Master Controller

tors which are carried on the inside axles of the two four-wheel trucks and geared to them like ordinary interurban railway motors These generators are separately excited and the field strength of the main motors is controlled by varying the fields of the exciters.

The scheme that is used for regeneration includes the use of stabilizing resistance, which is connected in series with the exciter armature, main motor field circuit, and also with the main motor armature circuit, so that the field excitation is dependent, to a certain extent, on the armature current.

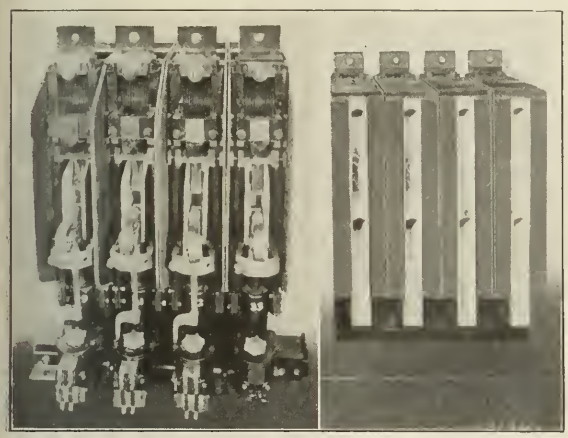
The master controller has four control drums and four operating handles.

1. The speed drum, which controls the resistance switches and line switches; field shunts during motoring and the exciter voltage during regeneration.

2. The reverser drum, which perform the usual function.
3. The motor combination drum, which has three positions, each corresponding to one of the three motor combinations.
4. The regenerative drum, which changes the connections from motoring to regenerating and vice-versa.

The master controller is arranged so that the controller may be thrown from the "off" position to the second or third speed combination, if desired, without passing through the lower combinations.

The engine-man is prevented from accidentally starting the locomotive from rest, in the second or third combination, by an interlock in the controller which prevents the line switches from closing when the motor combination lever is in the second or third position, unless he pushes a button in the top of the master controller. It is, therefore, necessary when applying current with the locomotive at speed, to press the button when it is desired to go immediately into the second or third combination.



Rear and Front Views of Four High Voltage Unit Switches

There are thirteen resistance steps, all of which are available in both first and second speed combinations. On the third combination, there are ten steps that are useful; making a total of thirty-six resistance steps and two field shunting notches in each combination, or a total of forty-two steps in the master controller.

The main resistance is arranged in three groups, each of which has five switches, each short-circuiting a section of resistance. These three groups are connected all in series for the first combination, and three in parallel for the second and third combinations. The sequence of closing the resistance switches is the same on all combinations. The resistances are always connected in series before the master controller reaches the "off" position. The overload trips are arranged to open the resistance switches and insert the entire resistance in series before the line switches are opened.

Switches

The unit switches are numbered from "1" to "33." Each switch is provided with a very powerful magnetic blowout with arc chutes of arc-resisting material, and an arc splitter. It is electro-pneumatically operated and is designed so that it is very thoroughly protected from insulation troubles and for ease of inspection and over-hauling.

The cam switches are designated by numbers and letters. The number corresponds to the group in which the switch is placed and the letter corresponds to the particular switch in the group.

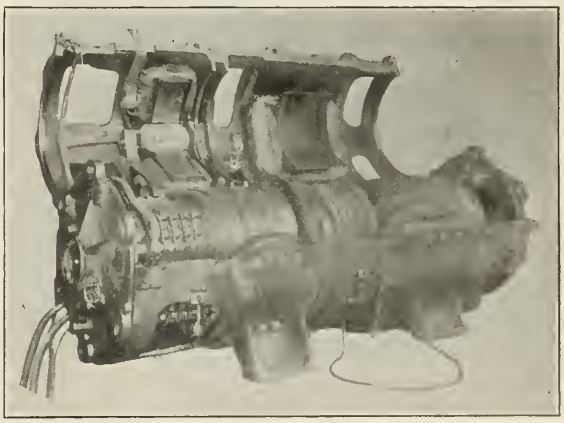
Those of Nos. 37 and 38, which are the groups operating the field shunts, also Nos. 39 and 40 which control the stabilizing resistance during regeneration, are provided with magnetic blowout; but the switches for the reverser, which never close or open the circuit with current on, have no arc chutes or blow-outs. Groups Nos. 34 and 35, which make the different motor combinations, have barriers placed between adjacent switches which have a large difference in potential, but no magnetic blow-out, since these switches are never used for opening the circuit under load. The groups are operated electro-pneumatically.

Auxiliaries

Power for the auxiliary motors, control circuits, train lighting, motor excitation, etc., is derived from three sources:

1. *Motor-Generator.* The motor of the set receives current from the line; the generator delivers current at a constant voltage of 85. This is required primarily for train lighting.
2. *Storage Battery.* This consists of MV-25 ironclad Exide type containing 38 cells. The battery has a capacity of 300 amperes for approximately one hour.
3. *Two Axle-driven Generators.* These generators are designed primarily to furnish current for exciting the main motors during regeneration.

The storage battery is always available to supply current for locomotive lights, control circuits, and the air-compressor motor for short periods. When the locomotive is in service, the generator of the motor-generator set is always in parallel with the battery, and from this dual source is always taken the power for lighting the locomotive and train. control circuits, cab floor-warmers, small blower motors for inductive field shunts, boiler blower and exciting current for the axle generators. In addition, the current for the air-compressor motor is supplied from this dual service whenever the locomotive is standing still or regenerating.



Westinghouse 3000-Volt, 85-Volt Motor Generator Set

The axle generators are, as stated, used primarily for exciting the main motors during regeneration. At other times, when the locomotive is in motion, the axle generators are automatically connected to the auxiliary circuits from which the compressor and main blower motors take power. At this time the voltage is automatically maintained at 90.

A two-stage compressor with inter-cooler, having a displacement of 150 cubic feet per minute, is provided. It is a double-acting, upright type, driven by an industrial type motor.

Two blowers are provided to supply forced ventilation to the driving motors. They are driven by motors that are duplicates of the compressor motor.

The axle generator circuits are shifted from one circuit

to another by a group of the same type of cam operated switches as are used in the main motor circuits. The field rheostats for the generator of the motor-generator set and the axle generators are operated by small motors. As the fields of the two axle generators are connected in series, only one rheostat is required for them.

The switches for controlling the blower and compressor motors and the high-voltage motor are magnetically operated.

The motor of the motor-generator set is protected from overload or short circuit by a small permanent resistance in series and a set of three expulsion type fuses which blow in series, the first two inserting additional resistance in the circuit, and the last opening only after a relatively high resistance has been inserted and the current consequently limited to a low value.

A Sangamo wattmeter is provided which has separate dials for integrating the motoring watts and regenerating watts. A full set of motor ammeters is provided, and also a voltmeter reading line volts. An ampere-hour meter is provided for the storage battery.

A boiler with a capacity for evaporating 4,000 lb. of water per hour is provided for heating the train and engine-man's cab. The boiler and water storage tanks are located in the middle of the cab and occupy a relatively large proportion of the space. The tank for fuel oil is located directly beneath

Air Compressor Driven Through Gears and Cranks by 30 HP. Motor

the boiler, and the water tanks, two in number, just fore and aft of the boiler.

Two pantagraphs of the double sliding shoe type are provided. These are raised by air and lowered by gravity.

All cable is in steel conduit, and all exposed connections are solid copper bar or strap.

Mechanical Design

This locomotive has been designed to possess certain mechanical features which have developed through years of experience with steam locomotives. The cab has the boiler, water and oil tanks, storage batteries, air-compressor, resistors, motor-generator set, and the heavier parts of the control equipment, concentrated between the center pins. The driving motors are mounted above the axles on the running gear, thus getting the weight well inside the wheel base, but placing it relatively high. The height of the center of gravity of the complete locomotive is 68 in., a value that corresponds well with that of a steam locomotive. The height of the center of gravity of trucks with motors mounted is 43¾ in.

The quill drive, which is a further development of the one used on the New Haven locomotives, gives each driving axle perfect freedom to move vertically the full distance permitted by pedestal jaws without affecting the motors or frames, except through springs. The only "dead" weight carried is the weight of the wheels, axles, journal boxes and spring clamps; a total of 7,032 lb. for the wheels, axles and spring clamps which are rigidly fastened together, and 770 lb. for the journal boxes. This weight with the large diameter of drivers (68 in.), and the total weight of 56,000 lb. per axle, gives a combination that is much better than has been considered very good practise on steam locomotives.

The cab rests on spring-supported plungers which are in series with the main semi-elliptic springs. The cab is protected against bumping strains by floating center pins, which, while held rigidly against lateral motion, are cushioned against longitudinal motion by heavy springs. It has been the practise heretofore with this general type of locomotive to have one center pin rigid in the running gear frame and allow the other one to move freely in a longitudinal direction. It is felt that it is much better to allow a slight relative motion between the two center pins, but to prevent the bumping shocks by spring cushioning.

Comparative Data for the Two Locomotives

	General Electric	Westinghouse
Total weight	521,200 lb.	550,000 lb.
Total weight on drivers	457,680 lb.	336,000 lb.
Non-spring-borne weight per driving axle	9,500 lb.	7,800 lb.
Length over-all	76 ft. 0 in.	88 ft. 7 in.
Height over cabs	14 ft. 11¾ in.	14 ft. 6 in.
Height over pantograph, locked down	16 ft. 8 in.	16 ft. 7⅞ in.
Total wheelbase	67 ft. 0 in.	79 ft. 10 in.
Maximum rigid wheelbase	13 ft. 9 in.	16 ft. 9 in.
Diameter of driving wheels	44 in.	68 in.
Diameter of idle wheels	36 in.	36 in.
Heater capacity	4,000 lb. steam. per hr.	4,000 lb.
Water capacity	30,000 lb.	25,500 lb.
Oil capacity	6,000 lb.	750 gal.
Compressor capacity	150 cu. ft. per min.	150 cu. ft. per min.
Number of motors	12	12
Type of motor	(Bi-polar) GE-100	(Twin) 4-pole

	General Electric		
	Tapped field	Full field	Westinghouse
Locomotive rating:			
Total horsepower, one-hour motor rating	3,480	3,380	4,200
Total tractive effort one-hour motor rating	36,000	46,000	66,000
Speed, miles per hour	36.2	27.5	23.8
Total horsepower continuous	3,200	3,200	3,360

Photo from International Film Service

The Cog Railway Making Its Way up the Pilatico, an Offset on the Alps on the Borders of the Cantons of Lucerne and Unterwalden

Automatic Train Control at New York Railroad Club

Address by H. S. Balliet—Comments by Messrs. Ames, Borland, Sprague and Others

THE REGULAR MEETING of the New York Railroad Club, held in New York on March 19, was devoted to a discussion of the automatic train stop, the principal paper being by Herbert S. Balliet, terminal manager, Grand Central Terminal, New York, who was a member of the United States Railroad Administration's recently disbanded committee on that subject. Mr. Balliet's paper, the first one abstracted below, was mainly a precis of the report of that committee. Other papers were presented by Major Azel Ames, of the Kerite Insulated Wire & Cable Company, formerly a member of the Block Signal and Train Control Board of the Interstate Commerce Commission; by W. P. Borland, chief of the bureau of safety of the Interstate Commerce Commission, and by Frank J. Sprague, the well-known electrical engineer of New York City, who has devised an automatic train control system and who some months since made arrangements—interrupted by the war—for testing his apparatus on the New York Central. His laboratory exhibit has been examined by the Railroad Administration committee.

Addresses and remarks less formal than the preceding were made by J. M. Waldron, signal engineer of the Interborough Rapid Transit Company, New York City; Charles Stephens, signal engineer of the Chesapeake & Ohio and one of the developers of the train control system of the American Automatic Train Control Company, now in use on the Chesapeake & Ohio; Calvin W. Hendricks, president of the American Automatic Train Control Company, and J. Beaumont, representing the Casale Safety Device Company, proprietor of an automatic stop now in use on the Chicago, Rock Island & Pacific, between Blue Island, Ill., and Joliet.

Mr. Balliet's Paper

To the average observer the distance from the air brake of a moving train to the roadway beneath is but a matter of feet and inches. To those persons interested in the art of automatic train control, however, it is a formidable interval of space that cannot be measured in ordinary units of magnitude. A few inventors have been fairly successful in establishing communication. They are the ones who have paid proper attention to laws of mechanics, electrics and pneumatics, and have brought the light of scientific research and practice to bear on the problem. The earliest record of an effort to undertake communication with or from moving trains is Pohl's patent, dated January 11, 1859, proposing a method of enabling moving railroad trains "to telegraph their own passings at certain stations." Wallwark, on January 29, 1867, was granted a patent "for applying to the track an adjustable incline plane, and applying a plunger and lever to the locomotive and connecting the lever to the throttle valve and alarm whistle in such a manner that when the incline plane on the track is adjusted in a certain position the plunger on the locomotive passes over the incline plane," is moved or actuated so as to cut off the steam and sound the whistle. . . . The first air brake was invented by Westinghouse in 1869 and other profitable use of automatic train control devices was not available until the brake was developed.

While there are in use in this and other countries stop and automatic train control systems, not one of them meets the specification contained in the presentation following. . . . The transmission of "information" for the control of the train and air brake, from the roadside, is the problem, and is difficult of solution. There are available, for test purposes, 17 devices. Actual road installations must be made to prove their usefulness. It is not difficult to apply devices on the roadside to stop the train. It is, however, very difficult to install automatic train control to meet the operating conditions. If you only stop your train, then you must sacrifice track. Automatic train control with speed control must maintain, in block signal territory, existing operating requirements, and if possible increase track capacity and provide greater safety.

[The speaker then went on to outline the requirements as laid down in the report of the Automatic Train Control Committee of the United States Railroad Administration, noticed in the *Railway Age* of January 16, page 227.]

The installation of automatic stops and automatic train control devices should be made with complete track circuit control and a [visual] signal system controlled by the same track circuit. Experimentation with or adaptation of some form of train control device without the signal system is inconsistent with good operating requirements. The practical development of automatic train control devices and their use to supplement existing automatic block signals for the purpose of compelling obedience to signal indications is highly desirable. . . . Failure to obey signal indications that are seen and understood are rare, and include only those cases where enginemen in their anxiety to make time take chances, or where they use poor judgment in the interpretation of rules which permit them to exercise some discretion. The problem comprises two main elements, one of which consists in reproducing upon a moving train, either by mechanical or electrical means, a correct indication of the condition of the track ahead; the other requires proper means for controlling the train in obedience to the indication given. Important factors entering into the problem are: (a) Reliability in operation, (b) inspection and maintenance. Proper inspection and maintenance will be more difficult than the inspection and maintenance of track circuit controlled signals, for the reason that part of the apparatus will be located on the roadside and another part upon the train. (c) Clearance. Clearances are materially affected by tunnels, bridges, station platforms, track pans, grade and highway crossings, etc. (d) Capacity; the effect upon the traffic handled over a given section of railroad: A properly operated automatic block signal system adds to the capacity of a railroad by increasing the freedom and flexibility of train movements over it. This condition should not be unduly interfered with by the use of an automatic train control device. It is apparent, however, that if such a device is to act to stop a train only in the occurrence of those emergencies caused by failure to obey signal indications, the automatic brake application must be made a sufficient distance away from the actual point of danger to bring the train to a stop before reaching the point, under the most unfavorable conditions. This involves the necessity of providing maximum braking distance for all trains equal to that required for *any train*. This cannot be done without decreasing the track capacity, and on congested railroads is therefore a matter for serious consideration. To overcome these difficulties permissive features have been installed to enable the engineman to nullify the brake application; and speed-control apparatus is being developed.

(e) Interchangeability as between different devices on track used by railroads jointly is essential in many cases to

economical operation. This practice, as well as the joint use of terminal facilities, has been extended during the past two years, and will, without doubt, become more general. It is necessary, therefore, that automatic train control devices shall be so designed that the engine equipment of the various lines will properly function with the roadside apparatus on tracks used jointly.

This requirement does not refer to detouring in case of accidents, making it necessary for the trains of one company to move over the tracks of another. Such movements are handled by a qualified employee of the owning road. . . . (f) Co-relation with track circuit controlled block signalling and air brake apparatus. It is essential that automatic train control apparatus shall be so designed that it may be superimposed upon the block signal system and not interfere with the performance of the signals.

The cost of an automatic train control system is an undetermined item which involves not only the original expense of installation but also the cost of maintenance and the effect of its operation upon the capacity of existing facilities. If a device materially reduces the capacity of a railroad, its installation where heavy traffic is handled may necessitate further expenditure for additional running tracks. . . .

The Reliable Machine Versus the Unreliable Man

Major Azel Ames, the well-known engineer, formerly in the service of the New York Central and a member of the government Block Signal and Train Control Board (1907-1912), presented a carefully prepared discussion of Mr. Balliet's paper, comparing the automatic stop problem with cognate problems in other lines of industry. An abstract of his address follows:

The automatic train-control problem, as I have observed its development for about fifteen years, seems to be divided into four parts. Railroading, as compared to many of our industrial arts, is relatively an old art, about a hundred years old in fact, and started in a time of less rapid development than some of the younger arts. Compare the control of railroad trains with the control of electric current for power and lighting and with one aspect of the fire protection problem. In electric light and power practice it would not be attempted to protect the apparatus and circuits by installing devices to indicate visually or audibly that an overload was occurring and expect the attendant to pull the switch and open the circuit when these devices indicated an overload. It is true that there is always a man on the job, and it is his business to watch his meters and to open the switches when occasion demands; but no one responsible for the operation of an electric power plant would omit the installation of automatic circuit breakers which would, if an overload occurred, open the circuits without the intervention of the attendant. He would not depend upon the human variable. At the same time the human factor is used in a supervisory capacity or in the performance of those acts which require judgment and variety in action to suit variety in conditions. . . . Consider the automatic sprinkler systems in our shops and storehouses. We might install hand-operated sprinklers with thermostats to give some visible or audible indication of fire, but the watchman might not see nor hear the alarm, or he might fall down stairs and break a leg while hastening to the fire. By all means let us have the watchman and, if possible, an alarm system that will wake him up and get him on the job, because he may, by the exercise of some of the God-given powers of the human mind which cannot be exercised by an automatic device, be able to save fire damage and water damage; but in the last analysis the thing that is really going to satisfy the underwriters and insure that the water gets on to the fire is making the sprinklers automatic.

If we consider the sequence of events that must take place between the obstruction of a track on a railroad and the stopping of a train because of this obstruction, we shall find that these events occur substantially as follows:

1. A metallic path is established between opposite rails of the track circuit.
2. A sufficient portion of the track current flows through this shunt to reduce the amount of current through the coils of the track relay below the minimum required to hold its armature attracted.
3. The control circuits of the signals open at the contacts of the de-energized track relay.
4. The line control circuits are de-energized.
5. The slot or holding clear magnets of the signal become de-energized.
6. The mechanical latch or other hold-clear mechanism of the signal releases.
7. The signal arm, under the action of the gravity, assumes the stop position, displaying the stop signal indication.
8. The engineman sees the signal.
9. The engineman senses and interprets its indication.
10. He decides to stop his train.
11. He shuts off the power.
12. He manipulates the air-brake valve handle.
13. An outlet for air-brake pressure to atmosphere is established.
14. The train line air pressure falls.
15. The triple valve operates.
16. Reservoir air is admitted to the brake cylinders.
17. The brake piston, rigging and beams operate to cause application of the brake shoes to the wheels.
18. The energy of motion of the train is converted into heat and the train retarded and finally stopped.

Of these 18 operations all but 5 are automatically performed by mechanical devices without human intervention. In this series of operations otherwise automatic and performed automatically millions of times each year without failure, there are introduced five (Nos. 8 to 12, inclusive) which are susceptible of vitiating the proper accomplishment of the series. It seems remarkable to many persons familiar with the great extent to which other sequential operations in industry are made continuously and completely automatic that the integrity of the sequence of operations required to stop a train, especially in view of the importance they may at times assume, has continued so long to remain subject in such a degree to the chances of human fallibility. (It speaks volumes for the dependability of human agency to perform automatic operations that the results of it in such a chain or sequence have been as reliable as we know them to have been.)

The mechanical events in the series can be depended upon to occur as a consequence of the operation of quite definite and well-known natural laws; but what about items 8 to 12? There is no natural law which will assure that the events to be brought about by the engineman will certainly occur.

When we consider other systems of control used in industry we see that here the *man,* to use the electrical analogy, is put in multiple rather than in series with the *machine.*

The natural division of the automatic train-control problem seems to be into its engineering, operating, legal and financial aspects. Much remains to be done in the engineering field in the way of practical adaptation of methods and devices. Mr. Balliet has well set forth in his paper the operating requirements. There is no reason to believe that they cannot be met with the same degree of success that other combined engineering and operating problems have been met when they become sufficiently pressing to demand the requisite degree of attention for their solution. The principal legal aspect of the problem has been met by the provisions of section 26 of the

transportation act, 1920, which embodies the recommendation of the Block Signal and Train Control Board to the Interstate Commerce Commission in its report to that body made November 22, 1910, to the effect that the partial installation of automatic train control by a carrier should not extend its liability under the use of such systems to portions of its road not so equipped.

This brings us to the most important phase of the whole problem — namely, the financial. We may admit that the installation of automatic train control systems on railroads would be a highly desirable thing. We are not willing to admit that American engineering and operating brains and skill cannot provide anything that American railroads must have to safeguard and facilitate their traffic, but all of these things cost money, and nowadays they cost a great deal of money. The railroad companies, facing today large expenditures for equipment and materials urgently needed, are very much like the Irishman who stood looking into the window of a trunk and bag store presided over by a gentleman of Hebrew extraction. The enterprising proprietor came out, and the following brief but pointed conversation took place:

"Mein frendt, you should py a trunk."

"Pfwat for?"

"Vy, to put your clothes in."

"And go naked?"

As much as we recognize the benefits to be had from the use of automatic train control, we must realize that there are a dozen pressing uses for every dollar that can be obtained. Certainly nothing is going to attract capital more than ability to earn a return. Automatic train-control systems may *save* money in the same way that insurance of other kinds will safeguard it against loss. They will have to be much more highly developed than the extent of their present use would indicate before they can really *earn* money.

Fortunately we have at hand and readily available a class of safety devices fully developed and tried in the fires of experience. While originally looked upon as luxuries and safety devices only, they have fully justified their claims to the title of revenue producers. I refer to the power interlocking plant and the automatic block signal. Steam locomotives and most other major railroad facilities have introduced few radically new problems. Development has been mostly along the lines of increased size and refinement of design.

The automatic block signal and the interlocking plant, however, were created almost "de novo" to meet definite demands and I believe have done more than any mechanical or electrical improvements that have been introduced on our railroads since the invention of the telegraph and the air-brake not only to save money but to earn money. The air-brake and the telegraph, or its complement, the telephone, are in use on practically every mile of railroad in the land. There are thousands of miles of line in this country today operating without any space interval block system whatever. On these lines money spent for good signalling will probably give as large a return in safety and increased earning power as any expenditure that can be made. It may even earn enough to buy automatic train-control systems, but we need clothes just now, much more than we need a trunk to put them in.

From the Government Viewpoint

By W. P. Borland

Mr. Balliet leaves little room for discussion. He has enumerated certain well-recognized features of the train-control problem without giving us any indication of the possibility of its solution. As secretary of the Block Signal and Train Control Board of the Interstate Commerce Commission, I began study of the automatic train-control problem in 1907 from the basis of a somewhat extended train-service experience in the cab of a locomotive, and since 1912 I have had charge of the investigations and tests that have been conducted by authority of the Interstate Commerce Commission, so I have naturally absorbed some information touching the practical aspects of the problem, and I have found no reason to disagree with certain propositions which were laid down by the Block Signal and Train Control Board in its fourth annual report, December 28, 1911.

[These propositions are to the effect that the art of automatic train control is far enough advanced to warrant further development; that railroad engineers have already manifested adequate ingenuity, and that if the railroads had been as energetic in this line as they have in interlocking and block signaling we should now find automatic train stops already in use; and that in particularly dangerous locations railroads would have no difficulty in complying with reasonable requirements for the use of train control.]

In its final report, June 29, 1912, the board concluded that "the development of the automatic stop has proceeded far enough to warrant the expectation that by its use greater safety can be assured in the operation of trains." The commission's Bureau of Safety has on numerous occasions recommended the installation of automatic train control devices for development.

Now, in 1919, the Automatic Train Control Committee of the Railroad Administration tells us that the devices available for use are still in the development stage. The only reasonable conclusion that can be reached, in view of the 13 years of progress thus briefly sketched, is that without the compulsion of positive law, which is now, fortunately, provided in the new railroad statute, train control devices would continue in the development stage indefinitely. . . . That there are problems in connection with the application of any automatic train control device anyone will readily concede. But this is true of any engineering project involving research work and the application of tried and tested apparatus for new purposes or in new fields. The tests conducted by the commission during the past 12 years of 16 or 18 different devices have resulted in the accumulation of a large amount of reliable data, notwithstanding many adverse conditions. The proprietors of some devices were men without extensive resources or backing, and others had no special engineering talent. In one instance a centrifugal governor employed to control electric circuits was mounted in a housing on a tender axle. The locomotive in this instance was assigned to local freight service, and frequently when the engine returned to the roundhouse essential parts of the device would be found disconnected or at the bottom of the box. In another instance a relay mounted in the locomotive cab was shaken to pieces when the locomotive had run less than a hundred miles. It manifestly would be improper for the engineers of the commission actively to assist in the development of any particular device, and a spirit of careless indifference or even of thingly-veiled antagonism too often characterises the attitude of railroad officers. . . . But the proprietors of several of these inventions are not signal engineers and have not consulted signal engineers. They are often more concerned about convenient locations and the accomplishment of certain specified functions of the devices than in conforming to recognized good signaling practice. Notwithstanding all difficulties, the results of a number of these tests have been encouraging. The tests have demonstrated that it is entirely possible to accomplish the intended functions of automatic train control devices under service conditions.

There are now two distinct steps which should be taken. The first is the construction of apparatus properly designed for the service and to accomplish the functions intended; the second is the application of these devices on a more comprehensive scale to varied railroad operating conditions. These are purely engineering problems, and it cannot be maintained that they are problems of sufficient magnitude to disconcert

the talent which has produced the reliable automatic block signal and intricate interlocking plants of today.

Mr. Sprague Describes His Proposed Train Control Scheme

Mr. Sprague's paper was an outline of the problem to be dealt with when providing complete automatic control for a railroad of heavy traffic and varied speeds and lengths of trains. He said that he agreed in the main with Mr. Bailliet's requisites except that interchangeability, as between one road and other, was not an essential. He did not describe his apparatus in detail but said that he and his company were prepared both professionally and financially to take up any proposition, in this line, presented by any railroad. He referred to the strength of public opinion and the futility of standing in its way. Commenting on the recently expressed opinion of a prominent railroad president that automatic stops were impracticable and unnecessary he characterized this as the view of a pessimist unacquainted with the details and with the psychology of the locomotive engineman.

Mr. Sprague declared that the subject should enlist the talent of the most competent civil, mechanical and electrical engineers, yet there should be co-operation with the operating men. He passed a mild criticism on the late automatic train control commitee for going too far afield; it was aside from the point for it to recommend the establishment of the space interval, with ordinary visual signals, while neglecting the more advanced improvement which was contemplated by the Congressional act. The declaration of the Train Control Committee, (also voiced by Major Ames) that, with a given amount of money, more useful results could be obtained by installing block signals than by using automatic stops was declared to be an untenable position. He questioned some of Mr. Balliet's statements and doubted whether he (Balliet) was as pessimistic as his statements would indicate.

Following his general observations, Mr. Sprague presented a diagram showing the way in which he intended to attack the problem of train control. Referring to the diagram, he said:

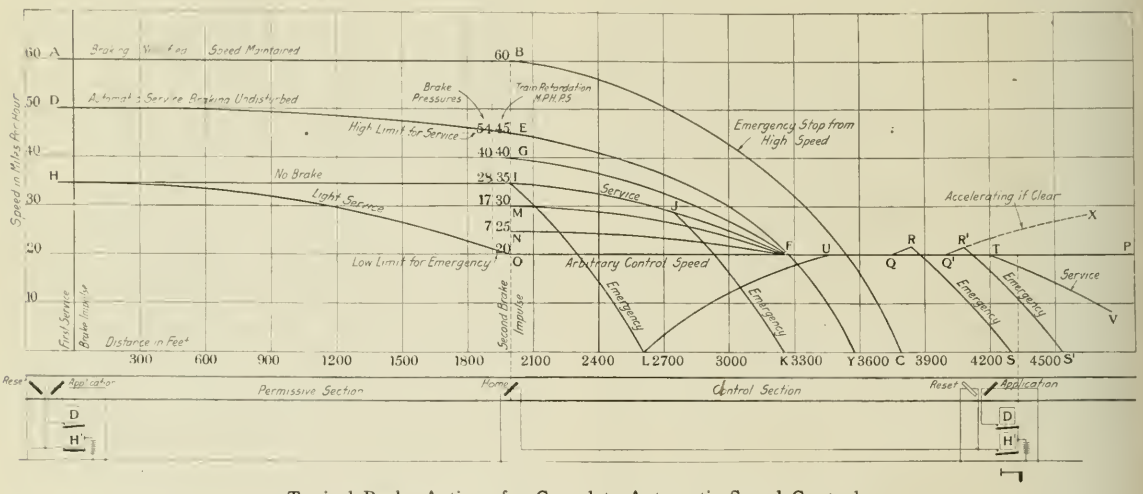
The block is divided into two sections, permissive and controlled, the latter being the section in advance, what we may term the danger zone. In the permissive section the train is left absolutely under the control of the engineer.

The abscissae indicate distance in feet and the ordinates the speed in miles per hour, also variations in service braking pressure, or train retardation from, say, 20 to 45 miles an hour.

The various full lines are the speed diagrams of a number of trains entering the block at various speeds and continuing through under a variety of typical operating conditions.

Along the roadbed, and clear of all equipment limitations, there are provided certain protected track magnets under the full or partial control of the track circuit relays. In each normal block is a brake application magnet just in rear of the entrance, called the "distant" magnet, another at the beginning of the controlled section, called the "home" magnet, these two being similarly positioned, and a third called "reset" magnet, differently positioned near the end of the block immediately in rear of the application magnet of the next advance block. The free fields of the home and the reset magnets, which are normally active, are controlled by the home relay, and the distant magnet by the distant relay, while the magnetic conditions of the home and reset are opposed.

The construction of the magnets is such that while normally active the magnetic field will be cancelled by movement of the relays when the advance block is clear.



Typical Brake Actions for Complete Automatic Speed Control

On the locomotive there are carried suitable receivers which register with the track magnets, but some distance above them, and the necessary relays, air valves and means for initiating both service and emergency braking.

First, let us consider a train entering the block against a distant signal indication, as say 60 miles an hour. It will receive, as would any train visible, audible and touch-responsive signals which will clearly indicate to the engineer the condition of the advance block. There will also be initiated through the engineer's valve a service brake application, which in rate and amount of air reduction, if undisturbed, is that suited to the particular class of train. Immediately, however, provided the engineer does not attempt to block the initial automatic action, the control of his valve is restored to him before any actual braking takes place; he can accept the automatic braking, or increase or diminish it at will; in short, he can approach the danger zone according to his own judgment, but with full knowledge of the conditions imposed. If he proceeds at undiminished speed, and the advance block is not cleared when he reaches the home magnet, the result will be an emergency brake application, with a minimum loss of air, but effective to bring his train to control speed or stop well within the limits of his

block, as indicated by line *A B C*. He will not be likely to repeat the practice. Having stopped, he is free to start again without leaving his cab, but is limited to control speed until cleared.

Let us consider another man, who comes in at a speed of, say, 50 miles an hour, receives his warnings and permits the automatic service brake to come on, or brakes his train down to a speed of, say, 45 miles an hour by the time he arrives at the home magnet, this being an arbitrary limit from which the train can be safely braked within the limit of distance remaining. If at that time the rate of braking is sufficient to pull his train down to control speed within a definite distance, as will be indicated by a proceed lamp in his cab, then there will be no emergency application of brakes, although a controlled initiation of service braking; and the train can be allowed to come to a stop, according to signal indications and the judgment of the engineer; or having arrived at the predetermined minimum controlled speed he can then proceed at, but not above, that speed, until arriving at the reset magnet near the end of the block. These two actions are illustrated by lines *D E F Y* and *D E F T*. Provision can be made for earlier clearance under certain limiting conditions.

Consider another train entering at about 34 miles an hour and with automatic braking nullified by the engineer. On arriving at the home magnet at this speed, if no manual brake application has been made the engineer will get an emergency brake as indicated by lines *H I L*, but having been brought to a stop he can then accelerate and proceed throughout the rest of the block; but only under control speed limit, as indicated by lines *L U T*.

If, however, the engineer manually applies his brakes prior to reaching the home magnet, his wayside signal indicating the necessity for so doing, and the braking is sufficient for that particular train speed to pull it down to control within a reasonable distance, then there will be no emergency brake application, as indicated by lines *J I F T;* but if he attempts to beat the operation while slowing down before reaching the control speed he will get an emergency, as indicated by the lines *J K*.

And so with any other train arriving at a live home magnet at any other speed below the maximum for manual braking. If the manual application made, its sufficiency being indicated by the appearance of a "proceed" lamp in the cab, is such as is necessary for that particular train speed, then, as indicated by the several lines *E F, G F, I F, M F* and *N F* there will be the normal slow down of the train under manual brake application, without any emergency application, and a possible release of brakes when reaching the low speed limit.

Suppose again that the man who comes in at about 34 miles an hour, or at any other speed, brakes his train down to, say, 20 miles an hour, and then continues under control speed, he will receive no emergency brake application at the home magnet even without further manual braking, but in any case if he attempts, before reaching the end of the block, to accelerate above the control speed he will get an emergency application, as indicated by lines *Q R S;* if the advance block is clear then as soon as a reset magnet has been reached he is free to accelerate.

What is thus accomplished and how? There has been established at the entrance and throughout the danger zone a condition in which the coming on of the emergency brake is determined by the co-ordinated action of the two devices, the only ones necessary but both vital. One of these responds to train speed and the other to train braking or retardation, no matter how affected and measured, whether by the pressure in certain parts of the locomotive air system, safeguarded by certain air connections, or by a mechanical element which functions as the integration of all forces affecting retardation. In addition there is provided a complete warning and protection for the train throughout the permissive section of the block—all without unnecessary track capacity handicap—in fact, with an augmentation of capacity.

Comments By Other Speakers.

Mr. Waldron presented a brief sketch of the use of automatic stops on the Interborough Rapid Transit Lines, New York City, where beginning in 1904, the tracks, signaling and other facilities have been expanded until today there are over 2,000 automatic stops in use.

Mr. Stephens described very briefly the installation on his road, which is on the line between Gordonsville, Va., and Charlottesville. He said:

"This installation covers the 21 miles of single track, main line, over which our most important passenger trains are operated. It is designed on the absolute-permissive principle, giving absolute protection for approaching trains, and permissive protection for following trains. The indications are given by three-position colored light automatic signals; and the 40 engines operating over this territory are fully equipped with the train control device. There are no speed control features, but we have met all the other requisites of the Railway Signal Association and Automatic Train Control Committee. We meet several other important requisites that have not as yet been required by these bodies.

"After five years of development we have a satisfactory and safe train control installation. This, of course, could not have been accomplished without considerable cost to the railway company.. We are, however, satisfied with the results, namely: The elimination of the manual block. A considerable increase in train movements and a large decrase in overtime for train crews. A four-minute interval with clear blocks for following movements. A positive check on the automatic block signal.

"The Automatic Train Control Committee and the former Train Control Board called for a more conciliatory spirit towards the development of automatic train control. The president of the Chesapeake & Ohio had the great moral courage to do this; and yet the late lamented Automatic Train Control Committee for some reason did not even give him favorable mention."

C. W. Hendricks, president of the American Train Control Company, spoke briefly of the long series of experiments which have been made in the development of his apparatus on the Chesapeake & Ohio. His concern had kept up courage in spite of disheartening circumstances and neglect by the public; but he congratulated himself and the public that at last Congress, which registers the will of the people, had seen the light, and passed a law (Section 26 of the Transportation Act.).

Mr. Beaumont sketched briefly the operation of the Casale device on the Rock Island road, emphasizing particularly the speed control arrangement which is an ordinary centrifugal governor fixed on the end of the axle of the pony truck of the locomotive. This governor works with great accuracy. The speaker questioned numerous statements made by Mr. Balliet declaring them far too conservative. He said that in his experience, covering 20 years in the signal department, he had found that the need of an automatic train control existed everywhere; all locomotive runners are subject to the human frailty which results in overlooking signals. Young runners, suddenly called upon to take an important train, are liable to have an uncontrollable ambition to beat the record of the regular man. The speaker had known hundreds of cases of enginemen running past stop signals *where no collision followed,* but this is a safety record due entirely to good luck; the true way to secure real safety is to provide mechanical means to prevent disastrous consequences from these incurable man failures.

Mr. Beaumont called attention to the deceptive nature of

the statement that less than six per cent of the fatalities to persons on American railroads (other than trespassers) were due to collisions. Instead of dealing with percentages we should fix our attention on the fact that in ten years 3,000 persons had been killed in the United States in rear and butting collisions; and that $25,000,000 worth of property had been destroyed in such collisions. Let us forget the six per cent and consider rather the shining names of the men whose lives have been snuffed out in notable collisions, such as Mr. Melcher, Samuel Spencer, and others.

Report of Industrial Conference

The Industrial Conference called by President Wilson, which since December 1 has been engaged in considering plans for the prevention and adjustment of industrial disputes between employers and employees, on March 21 issued its final report, which makes no recommendation of a plan to cover steam railroads and other carriers because of the recent legislation on that subject enacted by Congress in the Esch-Cummins law.

The conference now proposes joint organization of management and employees as a means of preventing misunderstanding and of securing co-operative effort. It has modified the tentative plan of adjustment issued on December 19, so as to diminish the field of arbitration and enlarge the scope of voluntary settlement by agreement. As modified the plan makes machinery available for collective bargaining, with only incidental and limited arbitration. The conference has extended the plan to cover disputes affecting public utilities other than steam railroads and it has enlarged it to cover the services of public employees.

"The causes of industrial unrest are many," the report says in part. "Among others they include the rise in the cost of living, unrestrained speculation, spectacular instances of excessive profits, excessive accumulation and misuse of wealth, inequality in readjustments of wage schedules, release of ideas and emotions by the war, social revolutionary theories imported from Europe, the belief that free speech is restricted, the intermittency of employment, fear of unemployment, excessive hours of work in certain industries, lack of adequate housing, unnecessarily high infant mortality in industrial centers, loss of personal contact in large industrial units and the culmination of a growing belief on the part of both employers and employees that a readjustment is necessary to a wholesome community of their united effort.

"For the most part causes of unrest are not the result of the war; they have been accentuated by it. Much investigation and public discussion have been devoted to these matters. The conference has made suggestions for dealing with some of the conditions enumerated, and it hopes that progress toward remedying them may be accelerated by the further development of employee representation and by the use of the suggested machinery for adjustment.

"There is, however, a feature of the present industrial unrest which differentiates it from that commonly existing before the war. It cannot be denied that unrest today is characterized more than ever before by purposes and desires which go beyond the mere demand for higher wages and shorter hours. Aspirations inherent in this form of restlessness are to a greater extent psychological and intangible. They are not for that reason any less significant. They reveal a desire on the part of workers to exert a larger and more organic influence upon the processes of industrial life. This impulse is not to be discouraged but made helpful and co-operative. With comprehending and sympathetic appreciation, it can be converted into a force working for a better spirit and understanding between capital and labor, and for more effective co-operation.

"The wisest suggestions for the prevention and relief of industrial unrest are to be found by interpreting the best thought and experience of those employers and employees who, within the area of their own activities, have most successfully dealt with the problem. The conference in making its final report has considered the interpreting of actual achievements its most useful function. It believes that practical experience is more useful than the views of extremists on either side. Such experience shows that no group of men can successfully undertake to deal with the interests of other groups without their co-operative participation in the methods of equitable adjustment.

"The guiding thought of the conference has been that the right relationship between employer and employee can best be promoted by the deliberate organization of that relationship. That organization should begin with the plant itself. Its object should be to organize unity of interest and thus to diminish the area of conflict, and supply by organized co-operation between employer and employees the advantages of that human relationship that existed between them when industries were smaller. Such organization should provide for the joint action of managers and employees in dealing with their common interests. It should emphasize the responsibility of managers to know men at least as intimately as they know materials, and the right and duty of employees to have a knowledge of the industry, its processes and policies. Employees need to understand their relation to the joint endeavor so that they may once more have a creative interest in their work.

"Industrial problems vary not only with each industry but in each establishment. Therefore, the strategic place to begin battle with misunderstanding is within the industrial plant itself. Primarily the settlement must come from the bottom, not from the top.

"The conference finds that joint organization of management and employees where undertaken with sincerity and good will has a record of success. The general principles governing such organization are dated at length under the title, 'Employee Representation.' It is not a field for legislation, because the form which employee representation should take may vary in every plant. The conference, therefore, does not direct this recommendation to legislators but to managers and employees.

"If the joint organization of management and employees in the plant or industry fails to reach a collective agreement, or if without such joint organization, disputes arise which are not settled by existing agencies, then the conference proposes a system of settlement close at hand and under governmental encouragement, and a minimum of regulation. The entrance of the government into these problems should be to stimulate further co-operation."

The system of settlement proposed consists of a plan, nation wide in scope, with a National Industrial Board, local Regional Conferences and Boards of Inquiry, as follows:

1. The parties to the dispute may voluntarily submit their differences for settlement to a board, known as a Regional Adjustment Conference. This board consists of four representatives selected by the parties, and four others in their industry chosen by them and familiar with their problems. The board is presided over by a trained government official, the regional chairman, who acts as a conciliator. If a unanimous agreement is reached, it results in collective bargain having the same effect as if reached by joint organization in the shop.

2. If the Regional Conference fails to agree unanimously, the matter, with certain restrictions, goes, under the agreement of submission, to the National Industrial Board, unless the parties prefer the decision of an umpire selected by them.

3. The voluntary submission to a Regional Adjustment Conference carries with it an agreement by both parties that

there shall be no interference with production pending the processes of adjustment.

4. If the parties, or either of them, refuse voluntarily to submit the dispute to the processes of the plan of adjustment, a Regional Board of Inquiry is formed by the regional chairman, of two employers and two employees of the industry, and not parties to the dispute. This Board has the right, under proper safeguards, to subpoena witnesses and records, and the duty to publish its findings as a guide to public opinion. Either of the parties at conflict may join the Board of Inquiry on giving an undertaking that, so far as its side is concerned, it will agree to submit its contention to a Regional Adjustment Conference, and, if both join, a Regional Adjustment Conference is automatically created.

5. The National Industrial Board in Washington has general oversight of the working of the plan.

6. The plan is applicable also to public utilities, but in such cases, the government agency, having power to regulate the service, has two representatives in the Adjustment Conference. Provision is made for prompt report of its findings to the rate regulating body.

7. The plan provides machinery for prompt and fair adjustment of wages and working conditions of government employees. It is especially necessary for this class of employees, who should not be permitted to strike.

8. The plan involves no penalties other than those imposed by public opinion. It does not impose compulsory arbitration. It does not deny the right to strike. It does not submit to arbitration the policy of the "closed" or "open" shop.

"The plan is national in scope and operation, yet it is decentralized. It is different from anything in operation elsewhere. It is based upon American experience and is designed to meet American conditions. It employs no legal authority except the right of inquiry. Its basic idea is stimulation to settlement of differences by the parties in conflict, and the enlistment of public opinion toward enforcing that method of settlement."

Report on Onawa Collision.

The Interstate Commerce Commission has issued a report, dated January 17, and signed by W. P. Borland, chief of the Bureau of Safety, on the butting collision which occurred on the Canadian Pacific near Onawa, Maine, on December 20, 1919, when 19 passengers and 4 employees were killed, and 59 passengers and 9 employees were injured.

This collision was reported in the *Railway Age* of December 26, page 1256; January 30, page 342, and February 13, page 496. The government report says nothing about injury by fire either to property or to persons, and in other particulars differs from the accounts published at the time of the collision.

Onawa is on the Moosehead subdivision of the Brownville division of the Canadian Pacific, and extends from Brownville Junction, Me., westward to Megantic, P. Q., 117 miles. For eight miles at the east end there is a "permissive staff block system" and the same for 15 miles at the west end, but for 94 miles the only block system is a rule forbidding a passenger train to follow another passenger train until the leading train has been reported at the succeeding station; but after twenty minutes this space of interval rule may be suspended. Communication from station to station is by telephone.

As already reported, the collision was due to disregard of an order by the men in charge of the eastbound freight which collided with westbound passenger No. 39, third section. The freight, No. 78, first section, had order No. 28 to the effect that third No. 39, westbound, would run five hours late. On reaching Morkill (about ten miles west of Onawa), where it should have waited for the passenger, it received another order, No. 47, to the effect that fourth No. 39 would run eight hours late, but this was mistakenly read as extending the time against the third section, from five hours to eight hours, and so the train proceeded, and the collision followed.

The engineman of the freight was killed but Brakeman Austin testified that he had remarked when he had taken the order "we have eight hours on third 39." Operator Kingdon (at Morkill) delivered the order to an engineman off duty who was on the front step of the caboose of the freight; this engineman handed it to the conductor, who read it carelessly and took it to mean that the third section was eight hours late. The conductor said that he went into the caboose, "glanced over the order" and read it as giving him eight hours against the third section. He so remarked to the flagman, but the flagman also seems to have read the order "getting the impression that the third section was eight hours late." This order read as follows:

> "Train order No. 47.—Third No. 39, eng. 783, late. Fourth No. 39, eng. unknown, run eight 8 hours late, Barnard to Megantic."

The trains met at about 20 to 25 miles an hour.

All of these operations in connection with the order were performed while the train was moving slowly through the side track at Morkill, and it did not make a full stop at the station.

Operator Valley, working days at Morkill, was riding on the freight, this apparently being his regular means of reaching his post of duty at 8 a. m. He thought it very strange that the freight should be given eight hours against third No. 39 when, about a half hour before that it had only five hours against it; and when he got into the office he kept saying to Operator Kingdon that he could not understand the situation; Kingdon, however, made no reply; and after the collision he told Valley that he had not understood what he was talking about.

The freight was reported to the train despatcher from Morkill about 7:02 a. m., having departed at 6:59 a. m., and the despatcher, if he had been following closely these two trains would have seen that a collision was impending and could have stopped third No. 39 at Onawa; and the report says that he was extremely negligent in the performance of his duties. He knew that first No. 78 had entered the side track at Morkill for third No. 39, expecting to meet it there, and then had proceeded without receiving additional time. The despatcher had, at this time, nine trains on his district, but the superintendent of the division is quoted as saying that the despatcher was not too busy to have kept a check upon the freight, so as to anticipate at what point it would or could meet the third section.

The report, in conclusion, attributes the collision to the failure of the conductor and the engineman of the freight. Under ordinary circumstances Operator Kingdon would be subject to censure for not holding the freight until the arrival of third 39; but because of a remark made to him over the telephone by the train despatcher, he is held excusable for believing that the freight conductor and engineman may have had information of which he was ignorant. The engineman on the front step of the caboose of the freight, who received the order from the operator as the train passed, is censored for meddling in a train movement in which he was not concerned, though he gave the order promptly to the conductor.

During the first 15 days of December the average number of trains on this subdivision was 41 daily, and, says the report, it is believed that conditions as a whole warrant the establishment of a block signal system.

The Bureau of Navigation reports 138 sailing, steam, gas and unrigged vessels of 261,959 gross tons built in the United States and officially numbered during the month of February.

General News Department

Frederick K. Bennett, principal assistant engineer of the Minneapolis & St. Louis, has resigned, effective March 15, having been appointed a representative of the American Association of Engineers.

Boatmen in New York harbor who work for railroad companies, about 900 of them, members of the National Association of Masters, Mates and Pilots, are reported to have made an offensive and defensive alliance with the "big four" brotherhoods of railroad trainmen.

The Southern Pacific has offered to enter the port of Houston, Tex. (La Porte), with steamship service if the city of Houston wishes it. The railroad is now building three vessels suitable for the trade at a cost of $4,500,000. One of the vessels will carry 4,000 tons of cargo and the others 6,000 tons.

High discount rates are said to be checking Canadian tourist travel to the United States. Canadians arriving in the United States with $1,000 in Canadian currency are, in many instances, forced to accept a discount rate of 20 per cent. As a result many Canadians who formerly wintered in California have abandoned their trips, traffic officers assert.

The Sacramento Northern has applied to the Railroad Commission of California for authority to operate an automobile freight service between Biggs, Cal., and East Biggs, and also for authority to carry freight by automobile truck between Gridley, Cal., and East Gridley. It is not proposed to carry local freight, but to transport through freight received from its rail line.

Solid trainloads of eggs are now being shipped from California to New York City. This is due to conditions which now permit of eggs being marketed to advantage in the East by large producers. The trains are made up of refrigerator cars and go as manifest fast freight via Ogden, Utah. There were over 3,000,000 eggs in one train of 14 cars that left San Francisco, Cal., on March 8, on the Southern Pacific.

The Southwestern Railroad Executives' Association was formed at St. Louis, Mo., on March 18, at a conference of officers representing the principal railroads in the southwestern group. The organization, it was announced, plans "to advance by co-operation the mutual benefit of all roads; to promote common interests and conserve the welfare of the general public in the southwest." The general headquarters of the association will be located at St. Louis. Officers are to be elected at a later meeting.

The control of the bituminous coal industry by the government is challenged in two suits filed in the United States District Court at Philadelphia on March 21 by the Powhatan Coal & Coke Company and other producers. The plaintiffs declare that it is an injustice to them and against the public interest that the Coal Committee should divert shipments without the consent of the owner, and that the wartime legislation, under which control is now maintained, is now out of date, the war having ended. The court granted a temporary restraining order and ordered a hearing on March 31.

The railway surgeons serving the Southern Pacific, the Western Pacific, the Northwestern Pacific, the Atchison, Topeka & Santa Fe, the Oregon & Washington Railroad & Navigation Company, the Oregon Short Line and the San Diego & Arizona, have addressed a communication to the chief surgeons of those roads asking more compensation for their services. Dr. F. K. Ainsworth, chief surgeon, and manager of the hospital department of the Southern Pacific, asserts that the demands are reasonable and that for the fiscal year 1919 Southern Pacific surgeons received for office, resident and hospital visits, major and minor surgical operations, an average fee of 37 cents.

The Railroad Commission of California recently refused to grant a transportation company a permit to operate an automobile stage line between Yreka, Cal., and Montague, holding that the use of private automobiles and rented cars in passenger and freight service has become so extensive and efficient in Northern California that three-fourths of the business of the Yreka Railroad, which operates between Yreka and Montague, has been lost by that company. In refusing to grant the permit the commission held that any further reduction in passenger traffic which would come about through the establishment of another automobile service in the vicinity would compel the railroad to cease operation.

A considerable number of applications have been made by the railroad companies to the Interstate Commerce Commission for loans from the $300,000,000 revolving fund placed at the disposal of the commission by the new transportation act. The commission has requested the Association of Railway Executives to assist it in apportioning the fund among the railroads, as it is inadequate to meet all the requests made, and Chairman Cuyler of the association has requested the various roads to submit schedules of their requirements, particularly in regard to equipment, so that a scheme of allotment may be drawn up and recommended to the commission in such a way that the fund may be used so as most quickly and effectively to meet the most pressing demands for additions to the country's transportation facilities.

The Public Utility Commissioners of the State of New Jersey have been complained of by the Commissioners of Jersey City (the governing body of that city), in a petition sent to the governor of the state, asking that the utility commissioners be dismissed. The petition fills 27 printed pages and contains 18 charges, among which are: Bias in favor of the Public Service Railway Company and other public service companies, the employment of experts prejudiced in favor of the companies, giving permission for companies to divert money from depreciation reserve fund to pay dividends, discrimination in rate fixing in favor of large and influential corporations against small and uninfluential ones, great delay in important cases, and general vacillation, to the detriment of the public interest in public utility cases.

Commission Modifies Map Order

The Interstate Commerce Commission has issued Valuation Order No. 23, modifying its map order, so-called, so that carriers are relieved from the requirement to file reproductions of maps and profiles with the commission at Washington. Carriers are required to preserve the original tracings in a safe receptacle subject to the inspection of the commission. The original tracings must not be in any way changed, added to, or subtracted from, for the purpose of showing changes in the property. Subsequent changes must be indicated by an independent map or profile, and the fact noted upon the original tracing. Each carrier must file with the commission a certificate showing what maps and profiles have been prepared, and that the same are in accordance with the order of the commission; and also make a similar certificate yearly until all the tracings required have been fully completed in accordance with the map order. Carriers must furnish the commission with blue print or white print copies of original tracings, showing subsequent changes, whenever so required.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF JANUARY, 1920

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of									
		Freight.	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Norfolk Southern	906	$484,371	$146,848	$743,611	$109,922	$128,494	$11,564	$288,024	$21,393	$559,540	75.24	$184,071	$16,000	$168,045	$209,422
Northern Pacific	6,642	6,119,113	1,503,411	9,451,063	1,087,576	1,592,120	61,062	3,568,261	197,532	6,630,852	70.16	2,820,210	721,177	2,097,753	653,105
Northwestern Pacific	538	303,004	171,004	580,690	126,203	77,372	6,988	248,714	14,020	475,133	81.82	105,557	25,590	79,640	114,376
Northern Alabama	112	102,505	14,530	148,847	39,135	5,102	1,802	57,621	1 487	105,148	70.64	43,699	3,830	39,860	55.193
Oregon Short Line	2,347	2,865,646	532,612	4,168,427	417.947	605.511	24,778	1,184,614	105,644	2,408,740	57.78	1,759,687	214,750	1,544,635	906,928
Oregon-Washington R. R. & Nav.	2,070	1,807,042	522,218	2,900,244	404,075	440,735	29,164	1,106,503	100,934	2,103,317	72.52	796,927	146,000	650,851	498,214
Panhandle & Santa Fe	772	503,198	140,700	768,770	100,252	203,154	4,930	284,661	18,541	610,010	79.34	158,761	20,438	138,306	290.819
Pennsylvania R. R.—Western Lines	1.754	5,232,101	1,838,533	9,506,992	983,235	2,747,617	92,636	4,381,394	221,543	8,507,264	89.48	999,728	347,720	651,823	1,269,991
Pennsylvania R. R.—Eastern Lines	5,372	19,648.534	7,182,727	30,039,973	4,059,612	10,515,252	522,012	16,000,505	825.779	32,531,005	108.29	—2,491,032	912,994	—3,411,681	—3,058,564
Peoria & Pekin Union	19	36,683	4,103	147,228	11,899	40,999	695	96,405	4.830	154.831	105.16	—7,602	9,500	—17,102	35,666
Pere Marquette	2,230	1,927,039	457,682	3,116,812	261,794	804,191	38,105	1,593,707	80,243	2,796,411	89.72	320,401	57,981	261,735	—16,883
Perkiomen	41	83,760	7,921	108,520	8,790	4,058	13	52,713	179	65,775	60.61	42,746	545	42,201	15,504
Philadelphia & Reading	1,127	5,505,035	822,811	6,931,822	593,499	2,033,288	37,319	3,567,541	152,628	6,404,329	92.39	527,493	66,014	461,008	513,725
Phila., Bethlehem & New England	71	.....	.....	83,197	7,204	12,623	406	74,626	1,301	96,161	115.58	—12,964	1,030	—13,994	—34,835
Pittsburgh & Lake Erie	224	2,266,041	230,169	2,784,241	489,369	928,673	20,734	1,022,557	53.668	2,516,885	90.39	267,356	75,000	192,144	—475,636
Pitts. & West Virginia	63	133,094	8,650	163,116	28,625	65,279	1,597	69,518	6,826	180.666	110.75	—17,550	10,782	—28,785	41.641
Pitts. & Shawmut	103	122,428	4,491	128,570	15,086	36,245	1,240	50,982	3.684	107 237	83.40	21,333	106	21,226	22,587
Pitts., Cinc., Chicago & St. Louis	2,383	5,307,205	1,823,600	10,580,512	950,508	2,897,812	113,508	4,448,229	197,937	8,691,075	82.14	1,889,437	301,063	1,588,208	1,570,438
Pitts., Shawmut & Northern	204	119,848	6,701	128,858	22,991	53,509	2,172	60,977	9,452	149,101	115.70	—20,243	1,903	—22,146	—842
Port Reading	21	141,414	.....	190,989	10,316	18,167	25	108,392	335	137,236	71.85	53,753	—1,249	55,003	39,924
Quincy, Omaha & Kansas City	255	60,504	24,028	123,105	17,178	31,103	118	72,558	1.458	122.423	99.44	682	3,647	—2,924	18,090
Richmond, Fredricksburg & Potomac	81	261,859	139,791	692,558	38,059	107,489	7,849	220,131	13.399	381,471	55.08	311,087	14,992	296,090	—82,997
Rutland	415	230,237	114,727	483,993	52,033	114,172	4.989	216,577	17,616	406,987	84.08	77,006	18,334	58,664	116,105
St. Joseph & Grand Island	258	199,042	40,109	291,407	53,172	46,898	2.434	130.151	12.630	245.287	84.17	46,119	10,907	35,177	46.788
St. Louis, Brownsville & Mexico	548	313,700	181,449	607,937	152,124	98,274	7,418	158.053	20,395	435,429	71.62	172,508	9,800	162,605	68,436
St. Louis Merchants Bridge Terminal	9	.....	662	333.848	39,062	77,461	830	254,142	5,737	377,232	112.99	—43,384	8,250	—51,634	—8,343
St. Louis-San Francisco	4,761	4,634,614	1,903,519	7,023,170	1,039,256	1,608,439	68.024	3,121,583	215.051	6,047,401	86.10	975,769	222,159	—751,763	408,630
St. Louis Transfer	6	.....	.....	146.069	10,239	26,705	203	85,365	2,185	124.698	85.36	21,371	110	21,261	490
St. Louis, San Francisco & Texas	134	106.041	17,750	134.476	37,723	23,672	2,015	78,541	6,003	147,953	110.02	—13,477	1,880	—15,362	—9.330
St. Louis Southwestern	939	1,235,580	164,462	1,569,740	200,471	268,222	23,355	487,498	37,239	1,021,416	65.07	548,324	42,984	505,265	362,026
St. Louis S. W. of Texas	807	474,713	137,670	762,378	205,009	222,945	9.666	492,284	23,342	953,240	125.03	—190,861	31,450	—222,521	—59.200
San Antonio & Aransas Pass	736	209,531	90,224	412,151	143,359	126,163	6,764	173,172	17,925	467,150	113.34	—54,999	15,000	—70,268	14,966
Seaboard Air Line	3.563	2,858,836	859,878	4,795,245	557.540	862 325	89,686	1,930.655	107.755	3,599.948	75.07	1,195,296	150.000	1,044,262	856.473
South Buffalo	11	26.667	.....	86,547	6,175	14,502	343	52,801	1,510	75,331	87.04	11,216	—3,667	7,549	—43,342
Southern	6,983	7,943,941	2,775,465	14,045,676	1,978,951	2,626,247	176.964	5,494,804	297,018	10,692,247	76.12	3,353,430	363,434	2,987,939	2,061,458
Southern Ry. in Mississippi	278	123,043	59,929	222,146	46,908	25,517	5.018	94,261	5,441	177,144	79.74	45,002	9,800	35,202	42,602
Southern Pacific	7,042	9,003,118	4,038,885	16,110,254	2,268,151	2,927,233	135,698	5,848,819	275,977	11,758,259	72.98	4,351,995	676,932	3,671,440	1,549,869
Spokane International	156	114,691	20,167	137,158	14,917	10,729	2,310	40,084	5,302	73,356	53.48	63,802	4,519	59,263	37,147
Spokane, Portland & Seattle	538	516,621	137,246	760,287	121,630	93,499	8,164	239.436	21,861	489,042	64.32	271,245	80,000	190,924	201.244
Staten Island Rapid Transit	23	88,920	66,559	168,175	19,320	27,548	1,141	102,717	8,787	159,513	94.84	8,662	15,000	—6,338	—29,570
Tennessee Central	292	196,370	45 287	288,760	49,383	56,430	4,729	118,056	6,808	235,405	81.52	53,355	5,687	47,666	63,106
Terminal R.R. Assn. of St. Louis	36	.....	3,372	364,507	47,445	75,208	1,156	178.247	4,560	311,280	85.39	53.227	27,139	26,087	94,344
Texas & Ft. Smith	87	109,142	21,684	157,772	20,081	19,717	867	49,734	2,517	92,613	58.70	65.159	15,780	49,378	51,899
Texas & New Orleans	469	545.211	160.309	837,320	131,138	213,451	5,745	266,733	16,987	673,568	80.44	163,751	21,129	140.632	175,088
Texas & Pacific	1,946	1,934,526	1,028,543	3,559,922	475,357	770,136	34,360	1,474,624	72,968	2,872,207	80.68	687,715	110,900	576,625	507.776
Toledo & Ohio Central	435	668,146	69,541	774,011	84,036	250,244	9.643	440,522	19,544	807,233	104.29	—33.222	38,136	—71,391	75.683
Toledo, Peoria & Western	247	121,618	48,932	180,591	17,288	47,149	2,192	91.699	5,445	163,774	90.68	16.817	8,500	8,317	—12,327
Toledo, St. Louis & Western	454	745,596	30.712	813,446	95,402	181,169	6,456	388.479	11,524	683.028	83.96	130.418	31,000	99,124	33.573
Trinity & Brazos Valley	368	137,751	21,717	174.013	59,416	53,187	2,278	92,395	7,203	214,480	123.25	—40,468	6,959	—47,521	—6,225
Ulster & Delaware	128	34,187	14,737	90,991	13,853	19,432	1,216	54,190	4,337	93.474	102.72	—2,484	5,000	—7,482	22,687
Union R.R. of Pennsylvania	40	.....	.....	587,658	42,129	211,522	219	404,929	6.732	665,531	113.25	—77.873	5,000	—82.873	—133,497
Union Pacific	3,614	7,192,044	1,547,833	11,726,008	1,114,988	1,923,708	42.845	3,280,673	253.697	6,842,126	58.35	4,883,882	285,000	4,598.080	2,009.554
Utah	98	168,314	592	169,314	12,627	29,437	232	36.201	2,275	80,773	47.71	88,541	4,022	84,519	53.699
Vicksburg, Shreveport & Pacific	171	234,293	98,839	390,283	36,696	73,929	6.847	179,595	10,590	311.797	79.88	78,486	12,417	66,015	42,014
Washington Southern	35	111,103	81,314	375,628	31,724	44,739	3.975	132,660	6,108	223,475	59.49	152,153	7,812	144,340	—95,937
Virginian	523	1.076,158	57,560	1,298,987	112,959	248,550	4 018	488,816	17,084	868,035	66.82	430,953	45,000	385,945	323,187
Wabash	2.503	3.306,046	801.624	5,113,915	563,500	1,196,797	52.893	2,410,120	129.978	4,376,519	85.58	737,396	112,970	623,552	562,694
West Jersey & Seashore	361	249,500	379,076	704,233	202,011	227,652	15,357	529,911	23,700	1,004,215	142.59	—299,982	48,992	—348,983	110,373
Western Maryland	689	1,179.097	75,833	1,417,549	187,475	452,836	19,413	558,021	43,395	1,272.204	89.72	145,345	43,200	102,145	291,696
Western Pacific	1,041	1,110,394	131,316	1,346,473	186,249	189,369	21,328	421,658	28,620	866.659	64.37	479,814	67,602	412,130	302,359
Western Ry. of Alabama	133	132,566	74,742	263,690	28,912	40,054	5,345	85,618	6,557	170,435	64.63	93,256	6,125	87,124	59,424
Wheeling & Lake Erie	511	886,519	58,646	1,034,542	107,835	316,042	5,565	537,046	25,890	993 368	96.21	39,173	62,000	—22,828	147.275
Wichita Falls & Northwestern	328	116,827	57,126	201,076	58,295	35,522	1,979	153,921	5,298	255.007	126.82	—53 930	11,178	—65,246	—53,988
Wichita Valley	256	106.422	50.958	182,571	23,364	10,402	274	77,845	3,451	115,335	63.17	67,236	5,064	62,169	79,878
Yazoo & Mississippi Valley	1,381	1,726,649	542,196	2,604,770	421,899	572,093	15,201	936,472	53,081	2,004,490	76.95	600,279	70,833	526,707	302.884

Western Railway Club

At the April 19, 1920, meeting of the Western Railway Club a paper will be presented by S. W. Mullinix, superintendent of shops of the Chicago, Rock Island & Pacific on Modern Methods of Reducing Cost of Locomotive Repairs.

Pacific Fruit Express to Spend $2,000,000

To cope with the increased output of California products, the Pacific Fruit Express plans to spend $2,000,000 this year in enlarging its icing facilities. C. M. Secrist, vice-president and general manager, stated that the Pacific Fruit Express used approximately 1,000,000 tons of ice in 1919, manufacturing 231,000 tons, harvesting 175,000 tons and contracting for the balance. The ice was almost all used to protect shipments moving over the Southern Pacific and the Union Pacific, the joint owners of the Pacific Fruit Express. The contemplated improvements will include:

The conversion of the plants to electric drive and the installation of additional electrically-driven units at Roseville, Cal., Colton and Los Angeles; the extension of icing platforms, the increasing of day storage facilities, the construction of new icing plants at Roseville, Colton and Los Angeles, Cal., and North Platte, Neb., Wallula, Wash., Carlin, Nev., and Laramie, Wyo., and the abandonment of the icing station at Truckee Nev., and the establishment of a regular icing station at Sparks, Nev., for all shipments moving over the Southern Pacific under refrigeration.

Wage Conferences Resumed

Conferences between the committee of 15 representing the railroad managements and the 17 representatives of the railroad labor organizations that are asking for general increases in wages were resumed at Washington on March 22, and E. T. Whiter, of the Pennsylvania, was elected as chairman of the conference. The conference began its work by discussing the extent to which it should use the data collected by the Railroad Administration in connection with the hearings held during the summer and fall of 1919 by the Board of Railroad Wages and Working Conditions and in negotiations since that time with the director general. An estimate of the amount of the demands of the various classes of employees made by application of the terms of their proposed schedules to the 1919 payroll shows a total proposed increase of $1,100,000,000, as follows:

	Present Payroll.	New Payroll.
Train crews	$708,000,000	$998,000,000
Shopmen	730,000,000	914,000,000
Maintenance of way	577,000,000	978,000,000
Telegraphers	115,000,000	165,000,000
Clerks	415,000,000	590,000,000
All others	225,000,000	225,000,000
Total	$2,770,000,000	$3,870,000,000

The increases granted to the principal classes of employees by the Railroad Administration during 1917 and 1920 were approximately as follows:

(The last three ciphers are omitted.)

	Payroll— 1917.	1920.	Increase.
Train crews	$508,000	$708,000	$200,000
Shopmen	378,000	730,000	352,000
Maintenance of way	349,000	577,000	228,000
Telegraphers	73,000	115,000	42,000
Clerks	259,000	415,000	156,000
All others	173,000	225,000	52,000
Total	$1,740,000	$2,770,000	$1,030,000

Nominations for members of the permanent Railroad Labor Board have been submitted to the President by both the employees and the railroads.

THERE WILL BE MUCH URGENT DEMAND for service; much hue and cry for improvement and much fault-finding—and the Plumb planning brotherhood propagandists are waiting all these as ammunition. What the railroads under private ownership get as a heritage in the way of undone work, impoverished treasuries and equipment, unsolved wage problems and all and sundry difficulties come from government control. Let this be remembered when the struggle of the roads to regain normal efficiency begins.—*Rochester (N. Y.) Democrat-Chronicle.*

Traffic News

The Farmers' National Grain Dealers' Association, at a meeting held at Chicago on March 17, instituted a movement to establish a national railroad claim department within the association to collect losses and damages incurred in transit of grain and live stock of the affiliated companies.

Cotton brought to Boston by water, largely from Egypt, and now held there because of congestion on New England railroads is said to amount to 100,000 bales; some of it piled on piers and some still lying in vessels because no place can be found to unload. Steamships have had to go from one pier to another to discharge their loads in small lots.

C. A. Butler, formerly assistant to the vice-president of the Chicago, Milwaukee & St. Paul, has been appointed eastern traffic manager of the Anaconda Copper Mining Company, 42 Broadway, New York City. During the period of federal control, Mr. Butler was assistant to J. G. Woodworth, in charge of traffic in the Northwestern Region. His railroad career covers seventeen years, all of which was spent in traffic work, principally with the St. Paul.

The embargo on express shipments caused by the strike of clerks and freight handlers employed by the American Railway Express Company was lifted in 14 states and the District of Columbia recently, according to officers of the company at Chicago. The states affected are North Dakota, Nevada, Utah, Arizona, New Mexico, Arkansas, Louisiana, Georgia, Delaware, Maryland, North Carolina, South Carolina, California and Florida.

The Board of Railway Commissioners for Canada recently refused the application of the Canadian Manufacturers' Association for the issuance of an order directing the extension of the Canadian Car Service Rules so as to provide for what is known as the "average demurrage plan" which now forms a part of the National Car Demurrage Rules in force in the United States with the approval of the Interstate Commerce Commission. The application set out that the demurrage on all cars held for loading or unloading shall be computed on the basis of the average time of detention to all cars released each calendar month. The method of computation outlined is that a credit of one day shall be allowed for each car released within the first 24 hours of free time, while a debit of one day shall be charged for each 24 hours or fraction thereof that a car is detained beyond the first 48 hours of free time. Not more than one day's credit is to be allowed on any one car and in no case is more than five days' credit to be applied in cancellation of debits accrued on any one car, thus making a maximum of seven days, including Sundays and holidays, that any car may be held free. At the end of the calendar month the total number of days credited will be deducted from the total number of days debited and the demurrage charge per day charged on the remainder. If the credits equal or exceed the debits no charge is to be made for the detention of the car and no payment is to be made to the consignor or consignee in respect of such excess of credit. Before the decision was made by the board extensive hearings were held on the principles involved in the proposed changes.

Spring Meeting of the N. I. T. League

The annual spring convention of the National Industrial Traffic League was held at St. Louis, Mo., on March 18 and 19. Soon after convening the League discussed several important matters arising under the new railroad legislation and adopted the following resolution, offered by the executive committee with respect to the hearing to be held by the Interstate Commerce Commission in Washington on March 22, to obtain views as to how it should proceed to adjust rates under Section 422 of the Transportation act:

"The executive committee recommends that at the hear-

ing in Washington, March 22, the League make the following recommendations to the Commission:

"1. That, for the purposes of this section, the rate adjustment be made for the carriers territorially, and not for the carriers as a whole.

"2. That, as a tentative plan, the division be made into three territories corresponding, approximately, with the three classification territories (Official, Southern and Western).

"3. That, if its investigation under section 19-A of the act enables it to determine definitely the value of the railway property of any of any carrier or carriers, such value might properly be used.

"Where such value is not available, we suggest the use of the property investment accounts of the carriers, subject to such modifications as the Commission deems justified, based on data available to it, and with the further provision that from such property investment accounts there shall be eliminated all items not representing investment in the railway property held for and used in the service of transportation."

The serious car shortage which exists throughout the United States and the report that large industries in many communities have been compelled to close down repeatedly for lengthy periods for want of cars, led the League to adopt resolutions demanding an immediate allocation of freight cars, so that there may be full utilization of the cars available. The resolution adopted called for the appointment of a special committee by the Industrial Traffic League to discuss with the American Railroad Association or the Car Service Commission, and, if necessary, with the Interstate Commerce Commission, the necessity of the immediate redistribution of freight cars. This committee will be appointed by W. H. Chandler, president of the League.

The League also adopted a resolution calling upon the Interstate Commerce Commission to speedily decide cases left over from the United States Railroad Administration, in which shippers were applying for reduction in rates, when such cases had been wholly or partially completed.

The disparity in rates of exchange between the United States and Canada, which has resulted, members of the League said, in a request from railroads for the prepayment of freight charges upon commodities shipped into Canada, led to the adoption of a resolution not to prepay freight charges upon Canadian shipments in the absence of any tariff regulation requiring such prepayment.

A committee headed by President W. H. Chandler, and composed of the officers of the League and the members of the executive committee, was appointed to represent the League before the Interstate Commerce Commission when it takes up for consideration the application of the American Express Railway Company for the approval of the wartime consolidation of the big express companies.

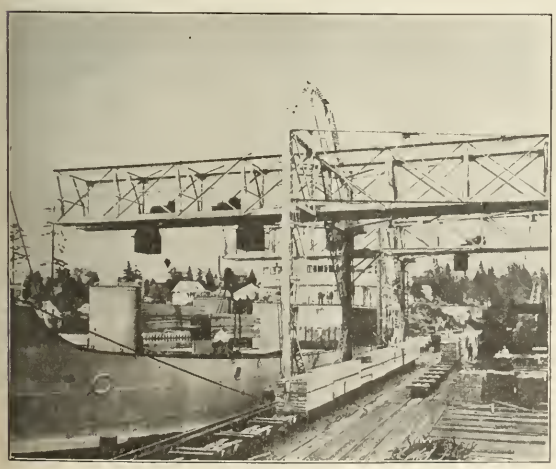


Photo from Underwood & Underwood, N. Y.

An Interesting Method of Loading Lumber—Portland, Oregon

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has announced a proceeding of investigation as to the propriety and reasonableness of the increases in express rates proposed by the American Railway Express Company.

The Commission has announced a hearing at Washington on March 29 on protests against the proposed increase in fares on the Hudson & Manhattan between New Jersey and New York, which it has been asked to suspend.

The commission has issued an order taking note of the fact that the President has designated Walker D. Hines, director general of railroads, as the agent provided for in the transportation act to be sued on behalf of the government for causes of action arising out of federal control and that Mr. Hines has consented to and requested the substitution of himself as such agent for himself as director general of railroads in reparation claims pending at the termination of federal control. The order provides for this substitution.

The Interstate Commerce Commission has issued a notice to carriers that the jurisdiction over intrastate rates, etc., passed to the state regulating authorities on March 1 with the limitation provided in the transportation act that they shall not be reduced prior to September 1 without approval of the Interstate Commerce Commission. It is stated that requests for approval of reductions in intrastate rates should be made by application to the commission, preferably through the state commissions, and that the state commission, in transmitting such application to the federal commission should express its approval or disapproval and furnish any information in its possession which it is believed might be helpful to the commission.

The new transportation act authorizes the Interstate Commerce Commission to prescribe the classes of property for which depreciation charges may properly be included under operating expenses. The commission has issued a circular stating that information received by it indicates doubt as to the propriety of carriers making any charges to operating expenses with respect to depreciation prior to such time as the commission shall prescribe the specific percentages of depreciation which shall be charged. Until the commission shall otherwise order, it says, all carriers subject to the act should continue to observe the requirements respecting the accounting for depreciation which are embodied in the effective accounting classifications.

20 Per Cent Increase in Pullman Rates Asked

The Interstate Commerce Commission has given permission to the Pullman Company to file tariffs providing for a 20 per cent increase in Pullman rates in a simple form and without the necessity of completely revising the tariffs. The application for the permission was made in a letter addressed to the commission on March 5 by J. S. Runnells, president of the Pullman Company. Pullman rates have not been increased during the period that railroad and express rates and wages and prices generally have been increasing, but were reduced by the commission eight or ten years ago.

Increased Grain Minimums Continued

The Commission has issued a special permission to the carriers, authorizing them to publish and file on one day's notice special supplements to their tariffs postponing from March 31 to August 31, the expiration date on minimum weights on grain and grain products. These increases in carload minimums were made by the Railroad Administration when the railroads were having great difficulty in furnishing an adequate supply of cars; and the commission finds that the emergency that justified the establishment of the increases still exists.

Foreign Railway News

Canada exported to Trinidad during January locomotives to the value of $89,000 and to the Argentine $255,000.

Paulista Railway of Brazil to Electrify

The Paulista Railway authorities have announced their purpose to proceed in the near future with the electrification of its line from Jundiahy to Campinas (about 25 miles), and eventually to San Carlos. This railway is a prosperous property owned by Brazilian capital. It is in the coffee growing district of Brazil and has been considering electrification for some time as a means of overcoming, by the use of hydro-electric power, the high cost and difficulty of securing coal.

Vanadium Corporation to Build Railroad in Peru

J. Leonard Replogle, president of the Vanadium Corporation of New York, on March 18, following a meting of the board of directors, made the following announcement:

"We have placed a contract with the Foundation Company for a railroad from the mines in Peru to Lake Pun Run, covering 12 miles of the most difficult section of our transportation. The railroad should be completed about July 1, after which we expect to double or triple our output. We have a large stock of ore mined and ready for shipment."

Colonel M. G. Baker, vice-president of the company, will sail for Peru in April to superintend the construction of the railroad.

England's Exports of Railway Material

According to the Board of Trade returns, the exports of railway material during January, 1920, were as follows, the corresponding figures for January, 1919, being also stated:

	January, 1920	January, 1919
Locomotives	£426,147	£48,601
Rails	106,953	52,906
Carriages	156,372	13,268
Wagons	540,267	43,167
Tires and axles	122,333	69,569
Wheels and axles	167,447	22,210
Chairs and metal sleepers	15,944	5,513
Miscellaneous permanent way	185,702	51,899
Total permanent way	600,939	115,394

The total weight of rails exported was 6,707 tons for January, 1920, as against 2,858 tons for January, 1919, and of chairs and metal sleepers 778 tons for January, 1920, as against 355 tons for January, 1919.

Construction Work on Swedish State Railways

The State Railways of Sweden showed a profit in September, 1919, of approximately $675,000 (taking the value of the crown at its normal value of $0.268), according to figures sent by Vice-Consul Orsen N. Nielsen, Stockholm. The earnings in October had risen to $1,050,000, thus seeming to indicate that the high freight and passenger rates will not be further increased. Press reports frequently demand lower rates, principally from the owners of mines and of timberlands.

The State Railways' Administration has asked the government for $11,500,000 for construction work and for new buildings in 1920. Included in the work contemplated by the administration are: Electrification of the railway from Kiruna to Svarton at a total cost of $5,550,000; relaying of the line Kallered-Lindome, and construction of houses for employees. For the latter purpose $1,050,000 are requested; $3,000,000 is requested for the purchase of land and $3,500,000 for the purchase of rolling stock. Further, the administration expects to expend $650,000 in equipping cars with airbrakes.

For the construction of new lines in 1920 and to enable work to be started on a new bridge over the Ume river, the directors of the Inland Railway have asked the government for $2,180,000; $430,000 to be used in 1920 and $1,750,000 to be available in 1921.

England's Railway Deficit

The Ministry of Transport has issued a return showing the financial results of the working of controlled railways for December, 1919, and on the month's operations there was a deficit of £3,511,412, or approximately $14,045,648. In respect of the government guarantee there is a liability for the month of £3,988,000, representing standard year proportion of net receipts, plus £87,200 for interest on capital works brought into use, making a total of £4,075,200. The net government liability for the month is therefore £7,839,153. For the nine months to December 31, 1919, there was an excess of revenue over expenditures of £7,152,018. The government guarantee in respect of standard year proportion of net receipts including £786,600 interest on capital works, was £36,165,600, leaving a net government liability for the nine months ended December 31, 1919, of £31,013,582.

Persian Railway to the Caspian Sea

Consul General Robert F. Skinner has written to Commerce Reports from London, under date of February 20, giving the following details as given to the British foreign office concerning the construction of a railway across Persia from Mesopotamia to the Caspian Sea:

"On January 10, the Persian government granted to the Persian Railway Syndicate (Ltd.), an option for the construction and equipment of a railway from Khanikin to Teheran via Kermanshah and Hamadan, with a branch to Enzeli on the Caspian Sea. The Persian government has reserved the right to decide later whether the railway is to be constructed as a Persian State line or whether a concession shall be granted to the syndicate to build the line with a Persian government guaranty on such terms as may be necessary and practicable. If the railway is built as a Persian state line, the capital necessary for the undertaking would be raised by the issue of Persian government bonds secured by the necessary guaranties."

Italy Looking to Germany for Locomotives

Italy, which during the past two or three years has placed large orders for locomotives in the United States, is now looking to Germany as a source of supply. The reason for this, as explained in Commerce Reports in a communication from Alfred P. Dennis, commercial attaché at Rome, is the low purchasing power of the Italian lira in the American market. "It is a question," says Mr. Dennis, "how soon Germany will be able to satisfy any foreign demands of this sort, however. At the conclusion of the war that country possessed between 12,000 and 13,000 locomotives, 4,000 of which the allies took under the terms of the peace settlement; so that today Germany stands in more acute need of locomotives than does Italy.

"With adequate facilities Italy has been able to turn out high-class locomotives, and such concerns as Ansaldo are engaging in their manufacture. But Italy occupies an inferior position in the matter of raw materials. Italy does not lack skilled workmen in this branch of industry, but the present labor situation is decidedly unfavorable, and these two hindrances of labor difficulty and the shortage and high cost of steel, which must be imported, combine to make it impossible for Italy to produce locomotives as cheaply as they can be supplied from abroad.

"The situation, therefore, is such that Italy, for the time, must continue to purchase from foreign sources, and until Germany is prepared to supply the demand the United States must be relied upon, in spite of unfavorable exchange, for whatever locomotives are imperatively needed."

A LITTLE MORE STUDY of the transportation question is enough to convince the man with a practical mind that poorly equipped railroads, unable to handle promptly and satisfactorily the traffic of the country, add more to the cost of doing business and cause more loss to shippers and producers than would equal the cost of permitting the roads to earn enough money to finance their improvement.—*St. Louis (Mo.) Globe-Democrat.*

Equipment and Supplies

87 Russian Locomotives Taken

The following railroads have ordered a total of 87 of the total of 200 Decapod locomotives originally built for the Russian government, which the War Department has been trying to sell: Western Maryland, 10; Detroit, Toledo & Ironton, 15; St. Louis-San Francisco, 10; Atlantic Coast Line, 10; Charleston & Western Carolina, 3; Norfolk Southern, 4; John Ringling, 5; Seaboard Air Line, 20; St. Louis, Brownsville & Mexico, 5, and Nashville, Chattanooga & St. Louis, 5. The remainder of the locomotives, together with a considerable amount of car equipment, have been advertised for sale by the War Department and bids are to be received by April 5.

Locomotives

THE BOSTON & MAINE is in the market for 40, six-wheel switching locomotives and 10 Pacific type locomotives.

THE INDUSTRIAL MATERIALS COMPANY, INC., 50 Pine street, New York, is inquiring for 10 each, of three types of Mallet locomotives, for export to Norway.

THE BATURITE RAILWAY (Brazil), has ordered 1 consolidation and 2 ten-wheel locomotives, of meter gage, from the American Locomotive Company.

THE KENTUCKY & INDIANA TERMINAL RAILROAD has ordered 3, eight-wheel superheater switching locomotives, for April delivery, from the Baldwin Locomotive Works.

THE BRAZILIAN GOVERNMENT is negotiating with the American Locomotive Company for 6 ten-wheel, 10 Consolidation and 18 other locomotives of meter gage, and for 6 ten-wheel locomotives of broad gage.

THE KOPPERS COMPANY, Pittsburgh, Pa., has ordered 2, 0-4-0 type locomotives from the American Locomotive Company. These locomotives will have 16 by 24 in. cylinders and a total weight in working order of 99,000 lb.

THE DONNER STEEL COMPANY, Buffalo, N. Y., has ordered one 0-6-0 type locomotive from the American Locomotive Company. This locomotive will have 21 by 26 in. cylinders and a total weight in working order of 144,000 lb.

THE PITTSBURGH LIMESTONE COMPANY, New Castle, Pa., has ordered one, 0-4-0 type locomotive from the American Locomotive Company. This locomotive will have 10 by 16 in. cylinders and a total weight in working order of 39,000 lb.

THE ATLANTIC COAST LINE, reported in the *Railway Age* of March 19, is inquiring for 25 Pacific type locomotives, has ordered this equipment from the American Locomotive Company. These locomotives will have 25 by 28 in. cylinders and a total weight in working order of 277,000 lb.

THE MAINE CENTRAL has ordered 4, 4-6-0 and 4, 0-6-0 type locomotives from the American Locomotive Company. The 4-6-0 type locomotives will have 22 by 28 in. cylinders, and a total weight in working order of 206,000 lb., and the 0-6-0 locomotives will have 21 by 28 in. cylinders and a total weight in working order of 166,000 lb.

Freight Cars

THE DONNER STEEL COMPANY, Buffalo, N. Y., is inquiring for from 500 to 750, 70-ton hopper cars.

THE CHILE EXPLORATION COMPANY, New York, is inquiring for 25 ore cars of 70 tons capacity.

THE CENTRAL MACAGUAY (Cuba) has ordered 10 cane cars, of 25 tons capacity, from the Magor Car Company.

THE CENTRAL CAMAGUEY (Cuba) has ordered 15 cane cars, of 25 tons capacity, from the Magor Car Company.

THE CENTRAL SAUTE MARIA (Cuba) has ordered 50 cane cars, of 25 tons capacity, from the Magor Car Company.

THE NEW YORK CENTRAL is inquiring for 1,800 40-ton stock cars and for 3,000 40-ton double sheathed box cars.

THE MERCHANTS DESPATCH TRANSPORTATION COMPANY, is building 250 refrigerator cars at its East Rochester, N. Y., plant.

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 500 box cars, of 40 tons capacity and 500 stock cars, of 30 tons capacity.

THE ATCHISON, TOPEKA & SANTA FE has ordered 500 gondola and 1,500 refrigerator cars from the American Car & Foundry Company.

THE VERDI LUMBER COMPANY, Reno, Nev., is inquiring for ten 34-ft. to 36-ft. 50,000-lb. to 60,000-lb. capacity flat cars for logging service.

THE VIRGINIAN, reported in the *Railway Age* of February 6 as having renewed its inquiries for 1,000 steel coal cars, has ordered this equipment from the Pressed Steel Car Company. These cars are to have a capacity of 120 tons each.

Passenger Cars

THE ILLINOIS CENTRAL is inquiring for 9 coaches.

THE LOUISVILLE & NASHVILLE is inquiring for 5 coaches.

THE CHICAGO, BURLINGTON & QUINCY is inquiring for 25 coaches.

THE WESTERN OF ALABAMA is inquiring for 10 steel coaches and two steel baggage cars.

THE ILLINOIS CENTRAL is preparing specifications for 30 all-steel suburban coaches for its new electrified suburban service.

THE UNION PACIFIC, reported in the *Railway Age* of March 5, as being in the market for 65 chair and baggage cars, has ordered 40, 70-ft. steel chair cars and 25, 60-ft. baggage cars from the Pullman Company. These cars will be equipped with six-wheel trucks and clasp brakes.

Iron and Steel

THE INDUSTRIAL MATERIALS COMPANY, INC., 50 Pine street, New York, is inquiring for 400 gross tons of 50 lb. rail and accessories.

THE NETHERLANDS GOVERNMENT has ordered from the United States Steel Corporation, 2,700 tons of steel beams and 692 tons of steel channels, for use in the Dutch East Indies.

Machinery and Tools

THE INGERSOLL-RAND COMPANY, New York, recently sold 252 of its Little David pneumatic drills and hammers to the Chickasaw Ship Building & Car Company, Birmingham, Ala., for use at its new plant at Chickasaw.

Signaling

THE BOSTON & ALBANY has ordered from the General Railway Signal Company a mechanical interlocking, 36 levers, for Webster Junction, Mass.; and also 19 electric locks, Model 2, form B.

THE BALTIMORE & OHIO has ordered from the General Railway Signal Company an electric interlocking machine, Model 2, with 29 working levers, to be installed by the railroad company's forces at Ohio Junction, Ohio.

THE BOSTON ELEVATED is preparing to reconstruct the signaling on that section of its rapid transit lines in the Washington street tunnel, involving 1.14 miles of double track in the tunnel in addition to the north and south approaches thereto. A total of 33 blocks will be equipped with three-position color-light signals and automatic stops, all operating on alternating current with the exception of the automatic stops, which will be of the pneumatic type controlled by a. c. valves. All apparatus is being furnished by the Union Switch & Signal Company, Swissvale, Pa., and the work will be done by railroad forces.

Supply Trade News

The Chambers Valve Company, New York, has removed its office from 30 Church street to room 1017, 23 West Forty-third street.

J. F. Griffin has been appointed chief draftsman of the **Locomotive Feed Water Heater Company,** 30 Church street, New York.

Western, Manning, Maxwell & Moore, Inc., on March 16, moved into its new store at 40-42 Fremont street, San Francisco, Cal. This is a subsidiary company of **Manning, Maxwell & Moore, Inc.,** New York.

George H. Snyder, chief clerk in the store department of the Minneapolis, St. Paul & Sault Ste. Marie at St. Paul, Minn., has been appointed sales engineer of the **American Steel Foundries,** with headquarters at St. Paul.

The Morse Chain Company, Ithaca, N. Y., has opened two additional branch offices, one at 1402 Lexington building, Baltimore, Md., in charge of **E. R. Morse,** and the other at 302 Harrison building, Philadelphia, Pa., with **M. H. Rodda** as manager.

The Curtain Supply Company, Chicago, has taken over the manufacture and sale of the steam and electric railway devices formerly made and sold by the Forsyth Brothers Company, Harvey, Ill., and is increasing the capacity of its plant to care for the additional business.

Leslie R. Pyle, whose election to the vice-presidency of the **Locomotive Firebox Company,** with headquarters at Chicago, was announced in the *Railway Age* of March 19, page 986, was born at Cleveland, Ohio, on June 7, 1880. He entered railway service on February 6, 1906, as a locomotive fireman on the Minneapolis, St. Paul & Sault Ste. Marie. On June 1, 1909, he became an engineman, and from 1912 to 1913 was traveling fireman. On May 1, 1913, he was appointed a fuel supervisor, which position he retained until July 1, 1918, when he was appointed supervisor of the Fuel Conservation Section of the Division of Operation of the United States Railroad Administration. This position he retained until March 1, 1920, when he was elected to the vice-presidency of the Locomotive Firebox Company.

L. R. Pyle

The Barrett Company, 17 Battery place, New York, is having plans made for putting up a 16-story office building at Rector and West streets. Warren & Wetmore, New York, are the architects. The general contract has been let to the George A. Fuller Company, New York.

The **Koppel Car Repair Company** has been organized recently as a subsidiary of the **Koppel Industrial Car & Equipment Company,** Koppel, Pa. The new company has a shop located on the property of the parent organization and is turning out four repaired cars a day and has capacity for the dismantling and preparing for repair of about 30 cars at one time.

C. H. Martin and **Gustav Schirmer,** of the **Whiting Foundry Equipment Company,** Harvey, Ill., after serving for several years in its estimating and sales department at the main office, have been respectively transferred to its Pittsburgh and Detroit offices, to take up the duties of sales engineers. Both men are experienced engineers and are thoroughly familiar with the design and construction of cranes and foundry equipment.

The George Cutter Company, South Bend, Ind., announces the acquisition by the Westinghouse Electric & Manufacturing Company of a financial interest in the company. The management and the commercial policies will remain unchanged, but advantage will be taken of the Westinghouse engineering and other facilities to expand the Cutter Company's activities. The Westinghouse Company will operate as sole distributors for the Cutter company's products.

Edward Wray has associated himself with **Railway Materials** as managing editor, with headquarters in Chicago. Mr. Wray was formerly managing editor and publisher of the Railway Electrical Engineer from its first issue in 1909 to 1916, when the magazine was purchased by the Simmons-Boardman Publishing Company, publishers of the *Railway Age*. Following the sale of the Railway Electrical Engineer, Mr. Wray continued his connection with the magazine as business manager, and later became associated with the Sangamo Electric Company, Springfield, Ill., as assistant general manager. In this capacity he had charge of the production, costs and stores departments of the company and the advertising and welfare departments. Mr. Wray received his education at the University of Wisconsin, graduating in 1905. He received the degree of electrical engineer in 1906, following a year of special work devoted exclusively to the investigation of all of the various systems of lighting steam railroad cars by electricity. In carrying out this work Mr. Wray had the assistance of 10 electrical students of the senior class at the university. Mr. Wray is a member of the American Institute of Electrical Engineers, associated member of the Railway Storekeepers' Association and the Association of Railway Electrical Engineers, and has been treasurer of the Railway Electrical Supply Manufacturers' Association since its organization in 1909. Railway Materials, the paper of which Mr. Wray is now managing editor, was until recently known as the Railway Storekeeper. It is published by the former Railway Storekeepers' Association, now known as Section VI Purchases and Stores, of the American Railroad Association.

E. Wray

The Metal & Thermit Corporation, New York, in order to take care of its increasing business in the New England states and in Canada, has appointed **James G. McCarty** manager of its Canadian branch, with headquarters at Toronto, Ont., and has transferred **Robert L. Browne** from its New York office to Boston, Mass., where he will have charge of all sales in the New England states. Mr. McCarty was graduated from Stevens Institute of Technology in 1906, and became affiliated with the Metal & Thermit Corporation in 1909. He has had a wide and varied experience with all phases of the Thermit process and has represented the company in many sections of the United States and Canada. Mr. Browne has been associated with the New York office since 1917.

G. E. Warren has resigned as assistant manager of the service bureau of the Universal Portland Cement Company, Chicago, effective April 1, to continue his duties as manager of the **American Concrete Pipe Association.** Mr. Warren has been with the service bureau of the Universal Company

for five years during the last year of which he has also acted as secretary-treasurer of the American Concrete Pipe Association. This association has recently been reorganized and will open an office in Chicago with sufficient help to carry on its broadened activities. **J. W. Lowell,** eastern manager of the service bureau of the Universal Portland Cement Company, beginning April 1, will assume the duties of assistant manager of the same department at its headquarters at Chicago.

Walter H. Lovekin, for the past two years assistant to the president of the **Locomotive Feed Water Heater Company,** New York, has been elected vice-president and treasurer.

W. A. Lovekin

He was born in Philadelphia, Pa., and received his education at the Haverford Preparatory School, Haverford, Pa., and Princeton University. After leaving Princeton he entered the service of the Logan Trust Company, Philadelphia, Pa., where he spent some time in each of its various departments. He then went to the Bell Telephone Company of Pennsylvania, as a traffic inspector, first with headquarters in Philadelphia and later at Camden, N. J., in charge of the South Jersey territory. He subsequently joined the Philadelphia Bureau of Municipal Research as a member of the staff, and served in this capacity for two and a half years. During this time he made detailed studies and surveys of various civic problems, especially those problems coming under the headings of public safety and municipal purchasing and the budget. After leaving municipal research work he went with the R. J. Crozier Company, Philadelphia, as a salesman, handling railway, mill and mine supplies. On June 1, 1916, when the Locomotive Feed Water Heater Company was but two and a half months old, he entered its service, a few months later being appointed assistant to the vice-president, and in December, 1917, he was appointed assistant to the president, which position he held until his recent election as vice-president and treasurer. For the past two and a half years Mr. Lovekin, in addition to his other duties, has been in charge of the company's activities in the marine field. This involved the manufacture and delivery of feed water heaters, evaporators, boiler feed pumps, distillers and oil coolers for more than 550 ships built or building for the U. S. Shipping Board, Emergency Fleet Corporation. As vice-president he will continue in charge of the marine department and will be in charge of all sales and sales matters for the company, in addition to his duties as treasurer.

W. G. Walsh, notice of whose election as vice-president of the **Galena Signal Oil Company,** Franklin, Pa., with headquarters at Chicago, was announced in the *Railway Age* of March 5 (page 731), began railway service as an apprentice in the machine shops of the old Cleveland, Cincinnati, Chicago & Indianapolis, at Cleveland, Ohio. On the completion of his apprenticeship, he became a machinist on the Cincinnati, New Orleans & Texas Pacific at Somerset, Ky., and prior to 1890 was successively locomotive fireman, engineman and general mechanical instructor. In 1890 he was promoted to master mechanic of the Louisville division, with headquarters at Louisville, Ky., which position he retained until 1900, when he resigned to become mechanical expert for the Galena Signal Oil Company. In 1910 he was promoted to resident manager, with headquarters at Chicago, which position he retained until his recent election to the vice-presidency.

The American Steam Conveyor Corporation, Chicago, announces the appointment of the **Kon-Wald Engineering Company,** Mutual Life building, Buffalo, N. Y., as its representative in Buffalo and western New York. **F. A. Konzelman** is manager of that company. **The Brooks-Fisher Company,** Chandler building, Atlanta, Ga., has been appointed southeastern representative. This company was organized early last summer to carry on a business of manufacturers, agents and contractors. **J. M. Fisher** was for 15 years in the erection department of the Babcock & Wilcox Company, the last six years as district superintendent for the Atlanta territory, and **E. A. Brooks,** the other member of the firm, was, up to the time of the organization of the firm, assistant sales manager for the Atlanta office of the Babcock & Wilcox Company.

George E. Rex, manager of treating plants of the Atchison, Topeka & Santa Fe, with headquarters at Topeka, Kan., has resigned, effective on April 1, to become vice-president of the **National Lumber & Creosoting Company,** Texarkana, Tex., with headquarters at Kansas City, Mo. Mr. Rex was born at Kahoka, Mo., on September 6, 1876. He graduated from Iowa Wesleyan College, Mt. Pleasant, Ia., in 1898, and entered railway service in the same year as a chainman on the Atchison, Topeka & Santa Fe. The following two years he was successively rodman and office engineer, and in 1900 was appointed transitman, retaining this position until 1901, when he was promoted to building supervisor at Topeka. From January, 1901, to May, 1903, he was division engineer of the Kansas City division, with headquarters at Kansas City, Mo., and, from the latter date until 1906, was an engineer of construction, with office at Chicago. On January 1, 1906, he was appointed assistant manager of the tie and timber department, with office at Topeka. In 1909, he was promoted to manager of treating plants, which position he retained until his recent election as vice-president of the National Lumber & Creosoting Company.

G. E. Rex

Lackawanna Steel Company

The gross sales and earnings of the Lackawanna Steel Co. for its fiscal year ended December 31, 1919, were $34,967,802. Manufacturing and producing costs and operating expenses totaled $30,422,284, leaving $4,545,518, to which was added dividends on investments, etc., amounting to $1,005,973, or a total of $5,551,491. The net earnings for the year after the deduction of administrative, selling and general expenses, ordinary taxes, commercial interest and discount totaled $3,060,663. From this deductions of interest on bonds, appropriations for depreciation, etc, were made of $2,703,800, leaving a profit for the year of $356,863. The company did not work at all to capacity during the year, its total shipments of 603,876 tons being half those of 1918, 1917 and 1916, and only two-thirds of those for 1915.

Western Electric Company

The annual report of the Western Electric Company, New York City, for the year ended December 31, 1919, shows net profits, after all charges and federal taxes, of $4,388,909, equivalent, after preferred dividends, to $17.25 a share on the 150,000 shares of common stock of no par value. Dividends of $10 a share were paid on the common stock, and the balance for that stock was $1,088,909. Due to the cessation of the war, sales to the government in 1919 were about $16,000,000 less than in 1918,

but the increase in other balances largely offset this loss, the report states, and total sales for 1919 were but $9,500,000 less than in 1918. The income account is as follows:

Sales	$135,732,489
Other Income	854,570
Less—	
Cost of Merchandise	118,420,440
Expenses	10,986,139
Taxes	1,578,399
Interest	1,263,180
Dividends	3,300,000
Balance for Common Stock	$1,088,909

General Electric Company Leases Remington Plant at Bridgeport, Conn.

On March 17, 1920, the General Electric Company leased, with option to purchase, the 40-acre war plant of the Remington Arms Company at Bridgeport, Conn. The contract involves about $7,000,000.

The plant was built in 1915-16, and is of the latest type of construction, being located in the industrial center of Bridgeport, in what is known as the East Side. The space covered by the buildings is about 9,000,000 sq. ft., and the floor area in them is 1,555,257 sq. ft., or over 36 acres.

The buildings are divided into four groups consisting of 13 five-story buildings and the drying kiln, five one-story buildings, guards' quarters, and two storage buildings. The buildings are all on the same level, and connected on each story with a corridor which runs through all of the 13 main buildings, much facilitating the delivery and movement of material.

The plant is expected to be in full operation by April 15, when the General Electric Company will employ many thousand people, all of whom can be easily housed, as the facilities already exist. It is not yet known just what products will be manufactured in the new plant.

Westinghouse, Church, Kerr & Co., Merged with Dwight P. Robinson & Co., Inc.

A plan for the merger of Westinghouse, Church, Kerr & Co., Inc., and Dwight P. Robinson & Co., recently submitted for the approval of stockholders, has been declared operative by the committee appointed to work out the plan.

Dwight P. Robinson has been elected president of Westinghouse, Church, Kerr & Co., pending final completion of the merger and organization of the new company. General Guy E. Tripp, now chairman of the board, remains chairman pending completion of the merger.

The idea which it is sought to work out has been explained by a circular issued to stockholders of Westinghouse, Church, Kerr & Co., by the committee of which Mr. Tripp was chairman and Homer Loring and John R. McGinley the other members. The following is abstracted from the circular in question:

Westinghouse, Church, Kerr & Co., Inc. (formerly Electric Properties Corporation), was organized, not only to do a construction and engineering business, but also for the purpose of engaging in the business of financing public utilities and was for a time active in the latter business. Of late years, however, it has gradually withdrawn from such financing business because that field has become more and more hazardous, and it is now engaged solely in the engineering and construction business.

Westinghouse Electric & Manufacturing Company is the largest stockholder of Westinghouse, Church, Kerr & Co., Inc., owning 9,599 shares of its preferred stock and 21,915 shares of its common stock, and the two companies have long been closely identified in the eyes of the public. It has seemed that Westinghouse, Church, Kerr & Co., Inc., has been handicapped in procuring business because of a belief on the part of prospective clients that if they employed it as their construction engineers they would be expected to purchase Westinghouse Electric equipment. On the other hand the Electric Company has felt that it should withdraw from any interest in the engineering and construction business, because it is a field foreign to its normal business activities and its interest therein has not been viewed with favor by contruction engineers competing with Westinghouse, Church, Kerr & Co., Inc. It has therefore appeared that it would be to the interest of both companies if the association could be terminated.

The Electric Company, however, has not desired to terminate its interest in your company unless such termination could be effected without embarrassment to the other stockholders, and indeed to their advantage. It has considered it essential that there should be associated with your company in its place, prominent interests of the highest standing and reputation, and with an established engineering and construction business. Dwight P. Robinson, president of Dwight P. Robinson & Co., Inc., has therefore recently been approached with a view of interesting him and his company in a union or merger with your company.

Mr. Robinson has been engaged in the engineering and construction business for the past twenty-five years, and formerly was a member of the firm of Stone & Webster. For many years he was president of the Stone & Webster Engineering Corporation. In 1918 he resigned from Stone & Webster and organized his own company, Dwight P. Robinson & Co., Inc., in which he interested prominent financial and business interests. The Electric Company and Guy E. Tripp, among others, became minority preferred and common stockholders, they having in view that such an interest might later tend to bring about a union or merger such as is now proposed.

The Robinson Company has built up a capable organization and now has on hand large and important construction contracts under which the uncompleted work amounts to approximately $14,000,000. Westinghouse, Church & Co. now has on hand contracts under which the uncompleted work amounts to approximately $8,000,000. The engineering and construction work of the two companies is largely supplemental, for the Robinson Company has been primarily engaged in power plant construction, while your company has been primarily engaged in railroad and industrial construction work. It is believed that the new company should become one of the largest and most successful in the construction and engineering business.

Under the plan a new corporation, probably under the Virginia law, will be formed or will result from a merger, which will be called Dwight P. Robinson & Co., Inc., or by a similar name. The new company will acquire, subject to their liabilities, the good-will, uncompleted contracts, business and all other assets of both Westinghouse, Church Kerr & Co., Inc., and the present Dwight P. Robinson & Co., Inc., except such assets as may be required to make any cash payments necessary to consummate the plan. It is estimated that upon consummation of the plan the new company will have initial net assets of approximately $2,500,000, exclusive of good-will, and no funded debt.

The plan provides for the retirement for cash of certain shares of both companies, the exchange of other shares for shares in the new company and the issuing of shares in the new company for these purposes.

Obituary

Charles A. Beider, assistant manager of sales of the **National Malleable Castings Company**, Cleveland, Ohio, died in that city on March 13, at the age of 35 years.

David Newlin Balderston, of Elizabeth, N. J., who was for about 22 years connected with the **Electro Dynamic Company**, Bayonne, N. J., in the capacity of engineer and superintendent of the axle light department, died on March 22, at Philadelphia, Pa.

Trade Publications

PNEUMATIC BRAKE EQUIPMENT. — The Westinghouse Air Brake Company, Pittsburgh, Pa., has issued catalogue 2021, which briefly describes and illustrates the standardized UC Westinghouse brake equipment for steam road passenger trains, which, with simple electric attachments, is said to represent the most improved form of electro-pneumatic train brake for both electric and steam road passenger trains.

BOILER MAKERS' TOOLS.—A new and attractive book which will interest boiler makers has just been published by J. Faessler Mfg. Company, Moberly, Mo. Its 68 pages include a recently developed line of roller expanding and flaring tools for locomotive superheater tubes, locomotive arch tubes, and stationary water tube and marine boiler tubes. Special types of expanders are included for Stirling, B. & W., and Heine boilers. These and other Faessler tools are fully described in detail and illustrated.

Financial and Construction

Railway Financial News

GUARANTEE OF FEDERAL COMPENSATION.—See article entitled "Roads That Did Not Accept Six Months' Guaranty," on a preceding page of this issue.

CANADIAN NORTHERN.—William A. Read & Co. have formed a syndicate to offer $12,000,000 5½ per cent three and five-year gold notes, due 1922 and 1924. The notes are being offered on a 6.90 per cent basis. The notes are unconditionally guaranteed by the Dominion of Canada. Each maturity is for $6,000,000. The three-year notes are being offered at 94.64 and interest, and the five-year maturity at 94.50 and interest.

CANADIAN PACIFIC.—A syndicate headed by the Guaranty Trust Company will offer $12,000,000 6 per cent gold certificates to be issued under the Philadelphia plan. These certificates will be dated April 1, 1920, and mature $500,000 semi-annually from October 1, 1920, to April 1, 1932. They will be offered to yield from 6¾ per cent to 6⅝ per cent. The issue will be secured by new equipment valued at $15,000,000, and title to this equipment will be vested in the Union Trust Company of Pittsburgh, as trustee, the equipment to be leased to the Canadian Pacific.

CHICAGO & WESTERN INDIANA.—This road has applied to the Public Utilities Commission of Illinois for an order authorizing the execution of the Equipment Trust Agreement and notes in the aggregate amount of $279,000 for a period of 15 years.

MISSOURI & NORTH ARKANSAS.—Festus J. Wade, of St. Louis, Mo., has resigned as receiver and has been succeeded by C. A. Phelan, general manager of the road.

NORFOLK & SOUTHERN.—This railroad asks an extension for two years at 7 per cent, of $1,000,000 6 per cent collateral trust notes which mature April 1.

PARIS & MOUNT PLEASANT.—R. W. Wortham, of Paris, Texas, has been appointed receiver. The road operates between Paris, Texas, and Mount Pleasant, 51 miles.

VIRGINIAN.—A syndicate consisting of the National City Company, Kissel, Kinnicutt & Co., and Lee, Higginson & Co., are offering $5,200,000 6 per cent equipment trust certificates in instalments of $260,000 each. The certificates mature in six months to ten years and are offered on a 7 per cent basis.

Railway Construction

ALASKAN ENGINEERING COMMISSION.—Between 1,000 and 2,000 men will be employed at Anchorage, Alaska, and be sent north in April to resume construction work on the southern and northern divisions of the Alaska Northern. It is expected that the laying of rails will be completed by the Fall of 1921. All track will be ballasted and in condition for operation by the Fall of 1922, it is estimated. There is now a gap of about 100 miles between the end of steel on the southern, or Seward division, and the end of steel on the northern, or Fairbanks division. A bridge with a span of 504 ft. will be built across the Susitna river, costing approximately $500,000. Bids have been received and the work is expected to begin in April. The entire program is under the direction of William Gerig, assistant chief engineer.

ILLINOIS CENTRAL.—Active construction work on the new Markham switching yards of the Illinois Central, between Harvey, Ill., and Homewood, began on March 21.

PHILADELPHIA & READING.—A contract has been given to the Smith-McCormick Company, Easton, Pa., for the construction of a new bridge over the Susquehanna river at Harrisburg, Pa., a double track concrete arch bridge about 3,500 ft. long, consisting of 46 arches. The new bridge is to replace the existing single track deck truss bridge.

Railway Officers

Executive

F. A. Lehman and **John Purcell,** assistants to the federal manager of the Atchison, Topeka & Santa Fe, have been appointed assistants to the vice-presidents, with headquarters at Chicago, the positions they occupied prior to government control.

Charles E. Denny, whose election as vice-president and general manager of the New York, Chicago & St. Louis, with headquarters at Cleveland, Ohio, was announced in the *Railway Age* of March 5, page 745, was born at Washington, D. C., in 1879 and received his education at the Pennsylvania State College. After six years' service with the Union Switch & Signal Company, he entered railway service on May 16, 1905, as assistant signal engineer on the Lake Shore & Michigan Southern. From May, 1906, to September, 1913, he was signal engineer, his jurisidiction being extended on May 16, 1912, to include the Lake Erie & Western. From 1913 until August, 1914, he was special engineer to the vice-president of the New York Central Lines, with headquarters at Chicago. In August, 1914, he was appointed assistant general sales manager of the Union Switch & Signal Company, and prior to November, 1916, was successively assistant general manager and assistant to the president. On the latter date he was appointed assistant to the president of the New York, Chicago & St. Louis, and was later promoted to assistant general manager and, finally, to assistant federal manager, retaining the latter position until March 1, 1920, when he was elected vice-president and general manager.

C. E. Denney

F. B. Miller, vice-president and general manager of the Colorado, Wyoming & Eastern, with office at Laramie, Wyo., has been elected president, with the same headquarters, succeeding **T. Callaway,** who has resumed the position of vice-president, with office at New York, which he held prior to federal control.

A. M. Burt, assistant director in charge of maintenance of the Division of Operation of the Railroad Administration, and chairman of the Automatic Train Council committee, and previous to federal control general manager of the Northern Pacific, has been appointed assistant to the vice-president in charge of operation of the same road.

E. W. Peabody, whose appointment as assistant to the receiver of the Missouri, Kansas & Texas Lines, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of March 5 (page 745), was born at St. Louis, on February 9, 1874. Graduating from the University of Chicago in 1896, he entered railway service in 1899 as a trainmaster on the Atchison, Topeka & Santa Fe. From 1903 to 1907, he was trainmaster on the Northwestern Pacific at Eureka, Cal. In 1907 he was appointed traffic and transportation manager of the American Railroad of Porto Rico, with headquarters at San Juan, Porto Rico, retaining that position for two years. In 1909 he returned to the United States and was employed as chief clerk to the general manager of the

Atchison, Topeka & Santa Fe, Western Lines, at Amarillo, Tex. From 1911 to 1913 he was traveling accountant on the Illinois Central and in 1913 he was employed as a statistician on the Missouri, Kansas & Texas, remaining in that position until 1918, when he was appointed treasurer for the receiver. He continued in this position until his present appointment as assistant to the receiver, which was effective March 1.

Financial, Legal and Accounting

Fred P. Johnson, whose appointment as general auditor of the Missouri Pacific, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of February 27 (page 658), was born in New York on January 27, 1874. He entered railway service on February 5, 1889, as a messenger boy in the general auditor's office of the Missouri Pacific. Prior to 1902 he occupied various clerical positions in the disbursement office and during the latter year he was placed in charge of the department handling special operating statistics. In 1907 he was given charge of rate litigation during the period when passenger rates were reduced from three cents to two cents a mile by Acts of various state legislatures. Two years later he was promoted to chief accountant of the operating department and, on June 1, 1911, was placed in charge of the annual and interstate reports. On August 1, 1912, he was appointed auditor of disbursements and retained that position until March 1, 1913, when he was promoted to assistant general auditor. During federal control he was federal auditor, which position he retained until his present promotion to general auditor, effective March 1, 1920.

Operating

John J. Mantell, during federal control terminal manager at Jersey City for the Eastern and Allegheny regions, and prior to federal control general superintendent of the Erie, Lines East, who has been appointed manager of the New York region of the same road, was born in Elmira, N. Y., and educated in the public schools and Elmira Academy. He began railroad work in June, 1899, as clerk and stenographer in the superintendent's office of the Erie. Later he served consecutively as yard clerk, chief yard clerk, yardmaster and general yardmaster at Croxton and Jersey City, N. J., and Susquehanna, Pa. He then became special agent in the office of the general superintendent at New York and afterwards served respectively as trainmaster of the Delaware and Jefferson divisions, terminal trainmaster at Jersey City and superintendent of the Wyoming division. In 1915 he was appointed superintendent of terminals at Jersey City and in May, 1917, became general superintendent, Lines East, as mentioned above.

J. J. Mantell

D. A. MacMillan has resumed his duties as trainmaster of the Montana division of the Northern Pacific, with headquarters at Livingston, Mont.

Benjamin F. Riggs, has been appointed trainmaster of the Dakota division of the Northern Pacific, with headquarters at Jamestown, N. D., succeding F. L. Birdsall, transferred.

George L. Hickey, superintendent of transportation of the Los Angeles & Salt Lake, the St. Joseph & Grand Island, the Union Pacific and the Oregon Short Line, has been appointed general manager of the Nevada Northern, with headquarters at San Francisco, Cal., succeeding to a position which has been vacant since the death of Le Grand Cannon, notice of which appeared in the *Railway Age* of February 20 (page 600).

Augustus E. Ruffer, transportation assistant of the Eastern region during federal control, who has been appointed general superintendent of transportation of the Erie, was born on July 23, 1875, at Port Jervis, N. Y. He began railroad work on October 19, 1889, as messenger for the Erie and served for two years in the despatcher's and superintendent's office. He then was appointed assistant clerk to the chief despatcher and from 1894 to 1896 was a clerk in the superintendent's office. From 1896 until 1905 he served in the office of the superintendent of transportation in various capacities. He left the Erie in 1905 to become special agent in the operating department of the Lehigh Valley, but returned in 1906 to serve the Erie in a similar capacity. On May 1, 1911, he was appointed trainmaster of the Susquehanna division and in May, 1912, was transferred to the New York division as assistant superintendent, with headquarters at Jersey City, N. J. On December 1, 1915, he was appointed superintendent of the Wyoming division at Scranton, Pa., and was promoted to the position of superintendent of transportation in 1917.

A. E. Ruffer

A. E. Wallace, assistant general superintendent of the Erie, Lines West, with headquarters at Youngstown, Ohio, who has been appointed manager of the Chicago region of the same road, with headquarters at Chicago, under the new plan of organization, was born on March 3, 1879, at Nashau, N. H. He was educated at Harvard University and began railroad work in November, 1902, as clerk for the Great Northern at Larimore, N. D. Later he became time keeper. In 1904 he entered the service of the Chicago, Rock Island & Pacific as yard clerk. Subsequently he served as time keeper and chief clerk to the superintendent of the same road at Cedar Rapids, Iowa. In January, 1907, he went to the Chicago, Burlington & Quincy as special inspector at Alliance, Neb. From September, 1909, until February, 1911, he was successively assistant extra gang foreman, assistant roadmaster, assistant trainmaster and trainmaster. In September, 1911, he became special inspector, with headquarters at Chicago. Later he served on the staff of the second vice-president at Chicago. He then was appointed assistant superintendent, with headquarters at St. Paul, Minn. In July, 1912, he returned to the Chicago, Rock Island & Pacific as superintendent, with headquarters at Cedar Rapids, Iowa. He was transferred to Manly, Iowa, in February, 1913. He entered the service of the Erie early in 1918 as general superintendent of the Chicago and Marion

A. E. Wallace

divisions, with headquarters at Chicago. Several months afterwards he was transferred to Youngstown, Ohio, as assistant general superintendent.

J. Cannon, whose appointment as assistant general manager of the Missouri Pacific, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of March 5 (page 745), was born at Cairo, Ill., on May 16, 1872. He entered railway service in 1886 as a clerk on the Illinois Central. From that date until 1903, he was employed as a clerk in the offices of the assistant superintendent, superintendent, general superintendent of transportation and the general manager, with the exception of one year during which he was employed as a brakeman. In October, 1905, he was appointed a superintendent on the Missouri Pacific, and prior to 1915 was employed on various divisions in that capacity. On October 1, 1915, he was promoted to general superintendent and four years later to general superintendent of transportation. This position he retained until his present promotion to assistant general manager, which was effective March 1.

Arthur C. McDannel, whose appointment as general superintendent and traffic manager of the Detroit, Bay City & Western, with headquarters at Bay City, Mich., was announced in the *Railway Age* of February 20 (page 596), was born at Bryan, Ohio, on February 3, 1879. He entered railway service in 1898 as a car checker on the Ann Arbor at Toledo, Ohio. The following year he was appointed an operator and ticket and freight clerk on the Grand Trunk at Owosso, Mich., and, later in that year, an operator for the Postal Telegraph Company in the same city. In 1900 he was appointed a clerk on the Copper Range at Houghton, Mich., and in August, 1900, returned to the service of the Postal Telegraph Company as an operator at Toledo, Ohio. Later in the same year he was appointed an operator on the Great Northern at Everett, Wash., and from August, 1901, to August, 1909, was successively operator, cashier, yardmaster and general agent on the Ann Arbor at Frankfort, Mich. From September, 1909, to September, 1910, he was traffic manager for the Buckley & Douglas Lumber Company, Manistee, Mich. On the latter date he was appointed auditor of the Detroit, Bay City & Western, with headquarters at Bay City, Mich., and later was promoted to auditor and superintendent. During federal control he was assistant to the president, which position he retained until his present appointment as general superintendent and traffic manager, in which position he succeeds **C. S. Ruttle,** who has retired.

A. C. McDannel

William M. Whitenton, whose appointment as assistant chief operating officer of the Missouri, Kansas & Texas, with headquarters at Dallas, Tex., was announced in the *Railway Age* of March 5 (page 745), was born in Texas in 1869. He entered railway service in 1884 as an operator on the Missouri, Kansas & Texas, and, prior to 1890, was successively station agent and train despatcher on the same road. From 1890 to 1898, he was successively train despatcher and chief train despatcher on the Texas & Pacific. In 1898 he was employed as a train despatcher on the Chicago, Rock Island & Pacific and, prior to 1914, was successively trainmaster, superintendent, general superintendent and general manager. From 1914 to 1915, he was operating expert with a special committee on smoke abatement in the Chicago terminals and in the latter half of 1915, he returned to the Texas & Pacific as operating assistant on the staff of the vice-president. On January 1, 1917, he re-entered the service of the Missouri, Kansas & Texas as a trainmaster and was subsequently promoted to superintendent and later to general superintendent, which position he retained until his recent promotion to assistant chief operating officer.

Henry Shearer, general superintendent of the Michigan Central and the Detroit Terminal, with headquarters at Detroit, Mich., has been promoted to general manager of the former road. Mr. Shearer was born at Galien, Mich., and entered railway service on June 5, 1892, as a clerk in the freight office of the Michigan Central at Matteson, Ill. A year later he was promoted to freight agent at Porter, Ind. In 1895, he was appointed agent at Chicago Heights, Ill., remaining in that position until 1899, when he was transferred to Michigan City, Ind. In November, 1899, he was promoted to traveling freight agent, with headquarters at Chicago, remaining in that position until 1900, when he was promoted to chief clerk in the general freight department. From August, 1902, to January, 1903, he was agent at Jackson, Mich., and in January, 1903, he was appointed chief clerk to the general manager, with office at Detroit. He retained this position until October, 1909, when he was promoted to division superintendent of the Canadian division, with office at St. Thomas, Ont. In December, 1912, he was promoted to assistant general manager at Detroit and, in September, 1916, he was promoted to general superintendent.

F. H. Hammill, general superintendent of the northern district of the Union Pacific, with headquarters at Omaha, Neb., has been appointed assistant general manager of the Eastern lines of the Chicago & North Western, with headquarters at Chicago, effective March 1. Mr. Hammill was born at Rockford, Ill., and entered railway service in 1886 as an operator on the Chicago & North Western. From this time until 1902 he was consecutively an operator and bill clerk on the Chicago, Milkaukee & St. Paul at Rockford, a freight brakeman for ten years and then chief train despatcher on the same road, after which he was chief train despatcher of the Galena division of the Chicago & North Western. From 1902 to July, 1905, he was trainmaster on the Iowa division of the Northwestern. On the latter date he was promoted to superintendent of the Madison division. On January 23, 1906, he was transferred to the Sioux City division and in November, 1906, he was transferred to the Northern Wisconsin division. In November, 1907, he was again transferred to the Iowa division, where he remained until May, 1911, when he was transferred to the Western Iowa division. In February, 1913, he was promoted to general superintendent on the North Western, which position he held until October, 1917, when he was appointed general superintendent of the newly-created Northern district of the Union Pacific, with headquarters at Omaha. Mr. Hammill remained in this position until his recent appointment as assistant general manager of the Chicago & North Western.

F. H. Hammill

Traffic

E. K. Bryan, assistant general freight agent on the Illinois Central, with headquarters at Memphis, Tenn., has been appointed traffic expert of the newly organized Southern Freight Rate Committee, with headquarters at Atlanta, Ga., effective April 1.

William E. Rosenbaum resigned, effective March 1, as secretary of the St. Louis (Mo.), Eastern District Freight Traffic Committee of the Divisions of Traffic and Public Service of the United States Railroad Administration to engage in private business as a consulting traffic manager, with headquarters at St. Louis.

C. J. McDonald, assistant to the regional director of the Central Western region of the United States Railroad Administration, with office at San Francisco, Cal., has been appointed general agent of refrigerator service of the Southern Pacific, with the same headquarters. This position has been created to handle the solicitation of traffic in fruit and perishable products.

B. F. Moffat, whose appointment as general freight agent of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., was announced in the *Railway Age* of March 5 (page 745), entered railway service on the Iowa Central at Marshalltown, Ia., in 1893. He remained with the Iowa Central in the auditing and traffic departments until 1912, when that line was taken over by the Minneapolis & St. Louis, since which time he has been in the service of the latter road in the traffic department. During the period of federal control he was assistant general freight agent, the position he held until his recent appointment, in which he succeeds **D. M. Denison**, whose promotion to freight traffic manager was announced in the *Railway Age* of March 5 (page 745).

Frank D. Gouldburg, whose appointment as general freight and passenger agent of the Detroit, Bay City & Western, with headquarters at Bay City, Mich., was announced in the *Railway Age* of February 20 (page 597), was born at Bailey, Mich., on August 30, 1882. He entered railway service in 1900 as an agent and operator on the Chicago & West Michigan, now part of the Pere Marquette. In 1903 he was employed as a relief agent on the Grand Rapids & Indiana, and the following year entered the employ of the Manistique, Marquette & Northern Railway & Car Ferry, as general agent at Manistique, Mich. In 1905 he entered the service of the Detroit & Mackinac as an agent and continued in that capacity until 1918, when he was appointed tariff inspector in the general traffic department. In 1911 he was promoted to chief of the tariff bureau, remaining in that position until the consolidation of the Detroit & Mackinac and the Pere Marquette on November 15, 1918, at which time he entered the service of the Michigan Central as chief clerk to the assistant general freight agent at Detroit, Mich. On December 15, 1919, he was appointed corporate traffic representative of the Detroit, Bay City & Western, and the Port Huron Southern, which position he retained until his present promotion to general freight and passenger agent, which was effective March 1.

F. D. Gouldburg

Augustus F. Cleveland, whose appointment as assistant freight traffic manager of the Chicago & North Western, with headquarters at Chicago, was announced in the *Railway Age* of March 5 (page 740), was born at Chicago on September 19, 1875. After completing his education at Yale University in 1898, he attended the Cleveland Law School and in 1912 was admitted to the Ohio bar. He entered railway service in 1898, as a general agent on the Chicago & North Western at Atlanta, Ga., being transferred later to Cincinnati, Ohio, and finally to Cleveland. In 1911 he was appointed general agent at Philadelphia, Pa., retaining that position until 1912, when he was appointed assistant general freight agent at Chicago, which position he held until his present promotion.

Loren F. Vosburgh, whose appointment as traffic manager of the New York Central, with headquarters at New York, was noted in the *Railway Age* of March 5 (page 745) was until March 1 passenger traffic manager of that road. Mr. Vosburgh was born at Fayette, Mich., on April 7, 1868. He began railroad work on February 16, 1892, as assistant ticket agent of the Lake Shore & Michigan Southern at Adrian, Mich. From April, 1895, until December, 1896, he was a ticket seller at the La Salle Street station, Chicago. On the latter date he became passenger agent at Chicago and in June, 1900, city passenger and ticket agent at the same place. In January, 1903, he was appointed general agent of the passenger department and in November, 1906, was transferred to New York as general eastern passenger agent of the New York Central Lines. He became assistant general passenger agent at New York in February, 1910, and the following September was promoted to general passenger agent. On August 1, 1917, he was promoted to passenger traffic manager, with the same headquarters.

L. F. Vosburgh

Mechanical

W. O. Thompson, superintendent of rolling stock of the New York Central Lines West of Buffalo, with headquarters at Cleveland, Ohio, who has been appointed general superintendent of rolling stock, with office at Buffalo, N. Y., was born in Clayton, Mich., in 1863, and graduated from Adrian (Mich.), High School. He began railroad work in 1882 on the Fort Wayne, Jackson & Saginaw, which later became a part of the Lake Shore & Michigan Southern. From 1884 to 1890 he served as a locomotive engineman and then was appointed traveling engineer, remaining in that position until August, 1893. He was then for some years an engine despatcher and in 1901 was appointed general locomotive inspector of the New York Central & Hudson River. The following year he was appointed superintendent of motive power of the Rome, Watertown & Ogdensburg division, and in 1907 became district master car builder at East Buffalo, N. Y. He was appointed superintendent of rolling stock of the New York Central Lines West of Buffalo during 1915, from which position he was promoted to general superintendent of rolling stock on March 1.

W. O. Thompson

L. P. Michael, chief draftsman in the motive power and car departments of the Chicago & North Western, has been

appointed mechanical engineer, with headquarters at Chicago, succeeding **J. C. Little**, resigned.

G. L. Lambeth, master mechanic of the Mobile division of the Mobile & Ohio at Whistler, Ala., has been appointed superintendent of motive power and car equipment, with headquarters at Mobile, Ala., effective March 20, succeeding **J. J. Thomas, Jr.,** resigned; **A. R. Teague** has been appointed to succeed Mr. Lambeth as master mechanic at Whistler.

R. Porter Smith, chief draftsman of the Georgia Railroad, who has been appointed mechanical engineer of that road, the Atlanta & West Point and the Western Railway of Alabama, with headquarters at Augusta, Ga., was born on January 3, 1875, in Olean, N. Y. He received his education in the public schols of Olean and began railway work in February, 1899, with the Western New York & Pennsylvania at that city. When that road became part of the Pennsylvania he remained with it until August, 1901, as an employee of the boiler, machine and erecting shops. He was then transferred to the drawing room, remaining there until October, 1903, when he was appointed roundhouse foreman. He resigned in February, 1906, to go with the Georgia Railroad as chief draftsman, in which capacity he acted continuously from April 2, 1906, until March 1, 1920, the date of his recent appointment as mechanical engineer.

Frank H. Hardin, assistant to the federal manager of the New York Central, who on March 1 was appointed chief engineer of motive power and rolling stock, with headquarters in New York, was born on June 14, 1886, in Gainsville, Ga. He graduated from the Georgia School of Technology in 1908 and then took a post graduate course at Columbia University. All his railroad service has been with the New York Central, he having begun on August 1, 1909, as a special apprentice at the West Albany shops. After several minor promotions he was made enginehouse foreman at Tupper Lake, N. Y., in June, 1913, and in November of that year was transferred to Utica, N. Y., as assistant foreman, where he remained for one year, or until November, 1914. At that time he was appointed special engineer in the office of the assistant to the president in New York. From March, 1917, to November, 1918, he was master mechanic of the Adirondack division, with headquarters in Utica. On the latter date he was appointed assistant to the federal manager of the New York Central at New York, holding that position until March 1, 1920.

Engineering, Maintenance of Way and Signaling

E. S. Pennebaker has been appointed corporate engineer of the Texas & Pacific, with headquarters at Dallas, Tex. This corrects an error in the *Railway Age* of March 5 (page 751), listing Mr. Pennybaker as chief engineer.

E. W. Hammond, acting engineer maintenance of way of the Buffalo, Rochester & Pittsburgh with headquarters at Rochester, N. Y., has been appointed engineer maintenance of way with the same headquarters; and **J. B. Oatman,** acting division engineer at Du Bois, Pa., has been appointed division engineer with the same headquarters, effective March 15.

F. S. Schwinn, engineer on the valuation committee of the International & Great Northern, with office at Houston, Tex., has been appointed chief engineer, with the same headquarters. Mr. Schwinn was born in 1889 and received his technical education at the Lewis and Armour Institutes of Technology, Chicago. He entered railway service in 1907 as a rodman on the Chicago & Alton, at Joliet, Ill. The following year he was appointed a rodman on the Southern Pacific, with headquarters at Sacramento, Cal., and consecutively to 1913 was draftsman, instrument man and assistant engineer. In the latter year he was transferred to the Louisiana lines, as assistant engineer, with headquarters at Lafayette, La. In 1914 he was appointed assistant superintendent in charge of maintenance of those lines and in 1917, was appointed assistant superintendent of the Gulf division of the International & Great Northern, with headquarters at Palestine, Tex. The following year he was appointed engineer on the valuation committee, which position he retained until his recent appointment.

Harry E. Barlow, whose appointment as chief engineer of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul, Minn., was announced in the *Railway Age* of March 5 (page 739), was born at Baraboo, Wis., on March 25, 1880, and graduated from the University of Minnesota in 1903. He entered railway service in June, 1896, as an office boy in the general freight department of the Chicago, St. Paul, Minneapolis & Omaha. From 1899 to September, 1900, he was a chainman, and, prior to 1901, was successively rodman and instrument man, on the same road. In June, 1902, he was appointed assistant engineer, which position he retained continuously until his present promotion to chief engineer, as mentioned above.

H. E. Barlow

William H. Hoyt, whose appointment as chief engineer of the Duluth, Missabe & Northern, with headquarters at Duluth, Minn., was announced in the *Railway Age* of March 5 (page 740), was born at Owatonna, Minn., on October 13, 1867. Graduating from the University of Minnesota in 1890, he entered railway service the following year as an assistant engineer on the Duluth, Missabe & Northern. In 1901, he was appointed principal assistant city engineer of Duluth, Minn., retaining that position for two years, when he was again appointed an assistant engineer on the Duluth, Missabe & Northern. In 1905, he was promoted to assistant chief engineer, which position he retained until his present promotion to chief engineer as above noted.

W. H. Hoyt

Harold Knight, assistant superintendent of maintenance of the Erie during and prior to federal control, with headquarters at New York, who has been appointed regional engineer of the Ohio region of the same road, with headquarters at Youngstown, Ohio, was born on October 28, 1881, at Stockport Station, Delaware County, N. Y. He was educated at Sheffield Scientific School, Yale University, and began railroad work in 1904 as rodman for the Erie at Elmira, N. Y. The following year he became transitman and shortly after was appointed assistant engineer at Hornell, N. Y. In 1908 he was promoted to division engineer of the Allegheny division at Salamanca. He was transferred in the same capacity to Jersey City, N. J., in 1912, and in 1914 was appointed signal engineer with the same headquarters. He was appointed assistant superintendent of maintenance of the Erie in May, 1917.

Herman Rettinghouse, chief engineer of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul, Minn., has retired after 30 years' service with the Northwestern system. Mr. Rettinghouse was born in Germany on July 30, 1861. He was educated in Germany and came to the United States in 1882, beginning railway service in 1883 as a rodman on construction work on the St. Paul extension of the Wisconsin Central. The following year he became connected with the Milwaukee, Lake Shore & Western, now a part of the Chicago & North Western, and was successively, leveler, instrument man and assistant engineer in charge of location, construction and maintenance. He was then engaged in general engineering practice at Ashland, Wis., from 1893 to 1897, including three years' service as city engineer of that city. He later returned to the North Western and was appointed assistant engineer in charge of construction and maintenance until May, 1900 From the latter date until February, 1905, he was superintendent of bridges and buildings of the Ashland division. He was later division engineer of the Southern division of the Wisconsin Central, resigning from that position in January, 1907, to become division engineer in charge of maintenance of the Chicago & North Western, with office at Boone, Ia. In April, 1912, he was promoted to superintendent of the Iowa & Minnesota division, with headquarters at Mason City, Ia., from which position he was promoted to chief engineer of the Chicago, St. Paul, Minneapolis & Omaha, on Nov. 1, 1913.

H. Rettinghouse

Purchasing and Stores

Leo M. Sullivan, whose appointment as purchasing agent of the Texas & Pacific, with headquarters at Dallas, Tex., was announced in the *Railway Age* of March 5, (page 751), was born at Denison, Tex., on August 29, 1891. After graduating from the Christian Brothers' College, St. Louis, Mo., he began railway service in 1907 on the Ohio River & Columbus, as a ticket agent at Ripley, Ohio. The same year he became bookkeeper for the American Coal Company at Ripley. On March 1, 1908, he again entered railway service as a yard clerk on the Chicago, Rock Island & Pacific and prior to 1908 was index clerk and bill clerk at Argenta, Ark. From December, 1908, to May, 1910, he was a stenographer in the chief dispatcher's office at El Reno, Okla., and later held various positions in the superintendent's office. In 1910 he was employed as a correspondence clerk in the engineering department of the Cincinnati, Hamilton and Dayton, and was later promoted to secretary to the general superintendent, and, finally to secretary to the assistant to the president at Cincinnati, Ohio. From April to June, 1911, he was trainmaster's clerk on the Missouri, Oklahoma & Gulf, at Calvin, Okla., and the same year entered the employ of the Missouri Pacific as a stenographer in the office of the superintendent of transportation. Later he served as a stenographer in the office of the first vice-president of the same road. From November, 1911, to March, 1915, he was secretary to the vice-president, resigning from that position in 1915, to become secretary to the first vice-president of the Texas & Pacific. From 1915, to October, 1916, he was chief clerk to the first vice-president, and, on the latter date, was transferred as chief clerk to the receiver and the president. This position he held until his recent promotion to purchasing agent.

L. M. Sullivan

Special

Albert H. Jones, whose appointment as supervisor of wages of the St. Louis-San Francisco, was announced in the *Railway Age* of March 5, page 747, was born on January 2, 1886. He entered railway service with the Atchison, Topeka & Santa Fe, as an office boy in the superintendent's office at Las Vegas, N. M. In April, 1905, he was transferred to the store department at Topeka, Kan., remaining there for a year, when he returned to the superintendent's office at Las Vegas as chief clerk. On March 1, 1911, he was appointed chief of the Loss and Damage bureau in the general superintendent's office at La Junta, Colo. Later in the same year he was appointed chief clerk, retaining this position until 1914, when he resigned to become trainmaster on the Detroit, Toledo & Ironton, and consecutively until 1918, was general storekeeper, purchasing agent and superintendent of that road. In June, 1918, he entered the service of the St. Louis-San Francisco, handling wage and schedule matters, which position he retained until the close of federal control, when he was appointed supervisor of wages of the St. Louis-San Francisco, with headquarters at St. Louis, Mo., a newly created position.

A. H. Jones

General

CHICAGO, BURLINGTON & QUINCY

The following appointments have been made in the traffic department of the Chicago, Burlington & Quincy, in addition to those announced in the *Railway Age* of February 27, page 160, and of March 12, page 802:

H. R. Todd	General	agent	Birmingham, Ala.
Alex. Stocks	"	"	Boston, Mass.
L. J. Doran	"	"	Butte, Mont.
H. K. Miles	"	"	Cincinnati, Ohio.
E. H. Smith	"	"	Cleveland, Ohio.
C. J. Rohwitz	"	"	Dallas, Tex.
T. P. Hinchcliff	"	"	Detroit, Mich.
W. W. Elliott	"	"	Los Angeles, Cal.
F. D. Hunter	"	"	Milwaukee, Wis.
G. B. Magruder	"	"	New Orleans, La.
J. A. Martin	"	"	New York City.
W. S. Dewey	"	"	Philadelphia, Pa.
W. V. Taffner	"	"	Pittsburgh, Pa.
R. W. Foster	"	"	Portland, Ore.
H. H. Van Swearingen	"	"	San Francisco, Cal.
G. B. Smith	"	"	Seattle, Wash.
H. A. Bradt	"	"	Spokane, Wash.
A. R. Brown	"	"	Winnipeg, M., Can.

CHICAGO, ROCK ISLAND & PACIFIC

The following officers have been appointed on the Chicago, Rock Island & Pacific, in addition to those announced in the

Railway Age of March 12, page 803, and of March 19, page 994:

Robert H. Ford..Assistant chief engineer....Chicago.
I. L. Simmons...Bridge engineer..... "
A. T. Hawk.....Engineer of buildings..... "
H. K. Lowry....Signal engineer..... "
R. C. Sattley.....Valuation engineer..... "
J. G. Wishart....Office engineer..... "
P. M. La Bach..Engineer of water service.. "
Garrett Davis....Construction engineer..... "
E. F. Manson....Assistant engineer..... "

CINCINNATI, INDIANAPOLIS & WESTERN

In addition to the elections and appointments on the Cincinnati, Indianapolis & Western, announced in the *Railway Age* of March 5 (page 740), the following appointments have been made in the traffic department:

P. M. Havens...Division freight agent.....Indianapolis, Ind.
S. C. Farrington.Commercial agent..... "
D. C. Odell.....Division freight agent.....Springfield, Ill.
F. E. Emery.....General western agent....St. Louis, Mo.
L. F. Root.....General agent.....Chicago.
C. H. Jackson... " " .....Pittsburgh, Pa.
W. Vandenburgh. " " .....Memphis, Tenn.
Edward Merchant.District passenger agent...Cincinnati, Ohio.
E. A. Doyle.....General agent..... "

ERIE

The following appointments on the Erie are additional to those given in the *Railway Age* of February 20, page 541, and February 27, page 661:

Executive Department

C. S. GoldboroughAssistant to president.....New York.
C. P. Crawford..General agent ..... "
J. G. Walsh.....Fin. asst. to pres. & gen. c'l. "
C. R Stewart....Consulting engineer..... "

Legal Department

H. A. Taylor.....Gen. solicitor (ef. Mar. 15).New York.
T. H. Burgess...General attorney..... "
D. F. Minard.... " " ..... "
M. B. Pierce....Asst. gen, council..... "
H H. Hull.....Asst. general solicitor..... "
H T. Whipple... " " ..... "
G. R. James.....Solicitor ..... "
C. T. Black..... " ..... "
W. S. Throop...Claims attorney..... "

Financial Department

W. B. Bancker..Assistant treasurer.....New York
S. Z. Earle..... " " .....Youngstown, Ohio.
G. H. Smith..... " " .....Hornell, N. Y.
H. W. Trumpler. " " .....Chicago.
B. A. VanTassel. " " .....New York.

Accounting Department

F. A. Clark.....General auditor.....New York.
A. S Moran.....Auditor freight accounts.. "
J. Prigge .....Asst. auditor frt. accounts. "
J. K. Thompson..Assist. to comptroller.... "
J. G. Austin.....Auditor of disbursements.. "
T. A. Quackenbush Asst. aud. of disbursements. "
P. J. Reilly.....Auditor pass. accounts.... "

Engineering Department

Frank A. Howard.Engineer of structures..... "
C. H. Splitstone..Sup of Cons. and surveys.. "
G. S. Fanning....Office engineer. ..... "
M. A. Baird.....Signal engineer..... "
Roland L. Turner.Engineer of grade crossings. "
Lee W. Walter...Inspecting engineer..... "
Henry F. King...Special engineer..... "

Mechanical Department

J. McMullen.....Supt. car dept.....Meadville, Pa.
T. F. Howley...Special agent..... "
F. M. Graff.....Supt. prod. & appren..... "
F. S. Brown.....Mechanical engineer..... "
W. A. Cotton....Mechanical accountant..... "
G. Eisenhauer ...Electrical engineer..... "
T. W. Dow.....Gen. air brake inspector.... "

Traffic Department

E. T. Campbell..Freight traffic manager....New York.
R. H. Wallace...Passenger traffic manager.. "
James B. Ford...Freight traffic manager....Chicago.
A. K. Morris....Coal traffic manager.....New York.
Harry E. Bell....For. freight traf. manager. "
A. L. Moorshead.Industrial commissioner.... "
Henry Adams.....General freight agent..... "
H. Wilson ..... " " " .....Chicago.
H. W. Forward.. " " " ..... "
F. G. Lantz..... " " " .....Cincinnati, Ohio.
C. P. Morse.....Gen. frt. and pass. agent..New York.
J. F. Shinn.....General passenger agent..Chicago.
H. C. Holabird... " " " ..New York.
H. M. Wade.....Bagg., mail & exp. agent.. "
J. Buckley.....Gen. ea. passenger agent..

New York Region

H. W. Andrus...Claim agent.....New York.
A. B. Shafer.....Supt. Del. & Jef. divs.....Susquehanna, Pa.
A. J. Davis.....Master mechanic.....Jersey City, N. J.
F. J. Dailey.....Asst. master mechanic....Dunmore, Pa.
Alonzo Ross.....Supt. of stores.....Jersey City, N. J.
S. J. Malloy.....Div. eng., N. Y. S. & W.; W. & E., G. L. div.....Jersey City, N. J.
J. P. Lowe.....Inspector suburban service. "
A. M. Kelly.....Chief trainmaster..... "
H. A Kelley.....Transportation inspector... "
F. H. Murray....Shop superintendent.....Susquehanna, Pa.

Hornell Region

E. M. Kain.....General agent, freight.....Buffalo, N. Y.
A. C. Hilton.....General agent, passenger.. "
A. W. Michelbach.Div. freight agent.....Elmira, N. Y.
T. R. Patton.....Div. passenger agent..... "
J. C. Moffatt....Div. freight agent.....Bradford, Pa.
B. C. Wedd.....Div. freight agent.....Rochester, N. Y.

Chicago Region

J. W. Cofer.....Auditor .....Chicago.

FT. DODGE, DES MOINES & SOUTHERN

The Ft. Dodge, Des Moines & Southern's executive staff has been announced as follows:

C. H. Crooks....President and gen. man...Boone, Ia.
F. M. Johnston..Sec., treas., and auditor.... "
S. R. Dyer.....General counsel..... "
Charles Shackell.Traffic manager..... "
F. M. Steele.....Gen. frt and pass. agent.. "
C. M. Kelly.....Superintendent ..... "
W. L. Harvey....Car accountant..... "
D. K. Lewis.....Electrical engineer..... "
L. E. Gagnon....Supt. M. of W. and S.... "
R. L. Cooper.....Chief engineer..... "
John Duncan.....Master mechanic..... "
G. E. Motz.....Purchasing agent..... "

GULF, COLORADO & SANTA FE

The following officers have been appointed on the Gulf, Colorado & Santa Fe, effective March 1:

Executive Department

F. G. Pettibone...Vice-president .....Galveston, Tex.

Financial Department

A. C. Torbert....Sec., treas. and trans. agent. "
L. C. Deming....Assistant secretary.....New York.
C. K. Cooper....Assistant treasurer..... "
D. L. Gallup.....Comptroller ..... "
G. N. Yard.....Paymaster .....Galveston, Tex.
D. W. McLeod...Auditor ..... "
H. J. Verion.....Assistant auditor..... "

Legal Department

S. T. Bledsoe....General counsel.....New York.
G. Lathrop.....General solicitor.....Chicago.

Operating Department

W. E. Maxson....Assistant gen. man.....Galveston, Tex.
V. C. James.....Asst. to gen. man..... "
S. C. Kirkpatrick. " " " ..... "

Mechanical Department

J. E. McQuillen..Mechanical supt..... "

Traffic Department

J. S. Hershey....Gen. freight agent..... "
F. R. Dalzell.....Asst. gen, freight agent.... "
W. S. Keenan...General pass agent. ..... "
E. F. Adams.....Asst. gen. pass. agent..... "
J. B. Moore.....General baggage agent..... "

Gulf, Colorado & Santa Fe, continued

ENGINEERING AND MAINTENANCE DEPARTMENT

F. Merritt	Chief engineer	Galveston, Tex.
M. F. Temple	Prin. asst. engineer	"
K. B. Duncan	District engineer	"
E. Hanson	Signal engineer	"
J. L. Starkie	Office engineer	"
W. J. Smith	Architect	"
W. A. Hudson	Right of way agent	"
Terry, Cavin & Mills	General attorneys	"
Jno. S. Douglass	General claim agent	"
S. R. Biering	Freight claim agent	"
O. L. Clarke	Land and tax comm.	"
H. M. Seaman	Asst. land and tax comm.	"

PURCHASING DEPARTMENT

T. O. Wood	Purchasing agent	Cleburne, Tex.
E. S. Newton	Storekeeper	"
F. A. Redmond	Man., fuel oil department	Ardmore, Okla.
J. Matthews	Telegraph manager	Galveston, Tex
W. L. Sheldon	Car accountant	"
T. J. Coggins	Supt. special service	"

NEW ORLEANS GREAT NORTHERN

The organization of the New Orleans Great Northern, effective with its return to private control, is announced as follows:

Walter P. Cooke	Chairman and gen. council	Buffalo, N. Y.
A. C. Goodyear	President	"
Chas. I. James	Vice-president	Baltimore, Md.
F. H. Goodyear	Vice-president	Buffalo, N. Y.
W. E. Farris	Vice-pres. and gen. mgr.	New Orleans, La.
F. A. Lehr	Sec. and treas.	Buffalo, N. Y.
D. T. Cushing	Assist treas.	Bogalusa, La.
Geo. M. Whitney	Asst. Sec.	Harrisburg, Pa.
Edw. A. Brandel	Transfer agent	Buffalo, N. Y.
M. J. McMahon	Traffic manager	New Orleans, La.
G. B. Auburtin	Asst. gen. frt. and pass. agt.	"
Wm. T. Boardman	Asst. gen. frt. and pass. agt.	"
Walter S. Ayres	Industrial commissioner	Chicago.
C. J. Wade	Aud., car acct. & frt. cl. agt.	Bogalusa, La.
C. S. Hanley	Superintendent	"
H. W. Heslin	Master mechanic	"
J. L. Gould	Trainmaster	"
E. R. Cassidy	Claim agent	"
E. E. Lafferty	Chief surgeon	"

NEW YORK CENTRAL

The following appointments on the New York Central, all effective March 1, are additional to those mentioned in the *Railway Age* of February 27, page 659; March 5, page 745, and March 12, page 805:

C. S. White	Purchasing agent	New York.
C. C. Warne	Asst. purchasing agent	"
C. M. Smith	Tie and timber agent	"
D. T. Murray	General agent	Youngstown, Ohio.
B. B. Milner	Engr. M. P. & rol stock	New York,
R. H. Sage	Assist. auditor	"
R. C. Brown	Asst. aud. pass. accts.	"
J. L. Snow	Asst. to aud. pass. accts.	"
L. Bender	Assist. treasurer	"
G. W. Porter	"	"
R. P. Ahrens	"	Cleveland, Ohio.

NORFOLK & WESTERN

J. R. Ruffin, freight traffic manager of the Norfolk & Western, on March 15 issued a circular giving the organization of the freight traffic department of that road, as shown in the following list. These appointments are additional to those given in the *Railway Age* of March 5, page 746, and of March 12, page 805:

B. W. Herrman	General freight agent	Roanoke, Va.
T. D. Hobart	Gen. coal freight agent	"
T. Gilbert Wood	Agricultural agent	"
S. S. Bridgers	Asst. gen. frt. agent	Columbus, Ohio.
G. F. Butler	Asst. gen. frt. agent	Roanoke, Va.
Samuel Claggett	Commerce agent	"
H. L. Daw	Div. freight agent	"
F. T. Brinkley	" "	Winston-Salem, N. C.
W. A. Huse	" "	Roanoke, Va.
J. H. Wilson	Foreign freight agent	Norfolk, Va.
S. M. Stevenson	Gen. ea. freight agent	New York.
C. A. Cowles	Gen. so. freight agent	Atlanta, Ga.
C. H. Kingsbury	General west freight agent.	Chicago.
F. W. Jones	General agent	Richmond, Va.
S. Ruffin	" "	Petersburg, Va.
R. M. Taliaferro	" "	Lynchburg, Va.
C. L. Baumgardner	" "	Bristol, Va.-Tenn.
G. C. Van Zandt	" "	Cincinnati, Ohio.
W. M. Macomber	New England agent	Boston, Mass.
T. S. Harwood	Commercial agent	Philadelphia, Pa.
T. E. Barrett	" "	Baltimore, Md.
J. F. McMahon	" "	Rochester, N. Y.
M. P. Williams	" "	Norfolk, Va.
H. D. Wilkerson	" "	Pittsburgh, Pa.
O. W. Cox	" "	Toledo, Ohio.
A. B. Brown	" "	Chicago.
D. W. Champlin	" "	St. Louis, Mo.
S. A. Campbell	" "	Louisville, Ky.
Theo. Doty	" "	Portsmouth, Ohio.
J. M. Brown	" "	Atlanta, Ga.
W. T. Cooper	" "	Birmingham, Ala
J. H. McAlister	" "	Chattanooga, Tenn
R. S. Cooley	" "	Knoxville, Tenn.
H. F. Daniels	" "	Memphis, Tenn.
L. D. Jones	Florida agent	Jacksonville, Fla.
J. S. Hoffman	Commercial agent	Charlotte, N. C.
S. E. Coldiron	" "	Wilmington, N. C.

SPOKANE, PORTLAND & SEATTLE

The following has been announced as the organization of the Spokane, Portland & Seattle, the Oregon Trunk, the Oregon Electric and the United Railways:

L. C. Gilman	President	Portland, Ore.
W. F. Turner	V. pres. and controller	"
Robt. Crosbie	Secretary	"
R. H. Relf	Asst. sec. S. P. & S.	St. Paul, Minn.
E. Pearson	Asst. secretary	Portland, Ore.
M. Barger	Treasurer	"

TEXAS & PACIFIC

The following is the official announcement of the executive staff of the Texas & Pacific and should supersede the roster appearing in the *Railway Age* of March 5, page 751, which is erroneous in several instances:

J. L. Lancaster	Receiver	Dallas, Tex.
C. L. Wallace	"	New Orleans, La.
T. J. Freeman	General counsel	"
J. B. Payne	Traffic manager	Dallas, Tex.
J. A. Somerville	General manager	"
A. J. Biard	Auditor	"
E. F. Mitchell	Chief engineer	"
L. M. Sullivan	Purchasing engineer	"
A. L. Ewing	Treasurer	"
W. L. Holder	Tax commissioner	"
F. J. Burke	Land and industrial agent.	"

Obituary

L. J. Bricker, agricultural development agent of the Northern Pacific, died at Brainerd, Minn., on March 7.

Harry Osborne, formerly works manager at the Angus shops of the Canadian Pacific, died on March 17, 1920, in Montreal. Mr. Osborne was 61 years old and retired from railroad work during 1919.

RAILROADS will never be managed well by those who will not have to share possible losses.—*Gloucester (Mass.) Times.*

THE RAILROAD EMPLOYEES SAY they object to the public passing on their decisions, because "the public would be hostile." Wouldn't it be just about as reasonable for a political candidate to object to the public passing on his candidacy, on the ground that it might vote against him?—*Elmira (N. Y.) Star.*

RAILROADS OF THIS COUNTRY, it is estimated, will need a billion dollars annually for a while, in order to meet requirements for extensions and betterments. Attempts to add heavy wage increases, and the government-ownership advocates might feel like the man who was charged $10 a week for the feed of his calf. He said, "Feed the animal a couple of days longer and you can keep it."—*Eau Claire (Wis.) Telegraph.*

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

Valuation and "Unearned Increment"

Professor Vanderblue's article, which we publish elsewhere in this issue, is a sweeping attack upon the entire current theory of railway and public utility valuation, with all its implications. That theory is that the valuation of a railway or public utility property should be based mainly upon the present cost of reproducing it and that the return allowed to be earned upon this valuation should be no larger than is necessary to enable it to escape condemnation by the courts as confiscatory. Mr. Vanderblue contends, in substance, that a valuation, if it is really value that it is desired to determine, should be based upon the "unimpaired investment to date," and that to this should be added allowances for all "intangibles" due to the development of the organization of the railway, and of its connections, traffic, etc. He repudiates the theory that railway profits should be subjected to special limitations, that the so-called "unearned increment" in railway land should be recaptured by the public. In other words, he apparently believes that since when railroads were being built and developed, investors in them were allowed to believe they would be treated much like other business concerns, there is no justification, at this late day, for adopting an entirely different policy in dealing with them, if their ownership is to be left in private hands. Whether the reader agrees with all Mr. Vanderblue's arguments and conditions, he will find his discussion interesting and forceful.

Reorganization for Efficiency

It is significant that while some railroad officers are complaining of the inefficiency of their forces, others are more or less enthusiastic about the loyalty of their subordinates and the work that is being done by them. With such conflicting reports, the question naturally arises as to the correctness of the observations or as to the nature of the local conditions which determine the quality and quantity of service rendered by the individuals. Napoleon had the rare talent of inspiring his men to a degree that made them almost superhuman in overcoming difficulties. To what extent are supervising officers deficient in the qualities of real leadership? Is it not possible that the lack of efficiency in many cases may be traced to the management rather than to the men? How many supervising officers have given any considerable amount of serious study to the art of handling men? A "boss" must possess important qualities other than the knowledge of the working details of the operations under his control; indeed officers have made good in a most decided fashion who have had very little knowledge of the details of the work of their departments, but who have had the rare ability of understanding human nature and of knowing how to inspire their men to put forth their best efforts. No matter how well fitted an executive may be with natural ability for the handling of men, he will find it necessary, if he is to secure the best results, to give much time and deep study to this question. Just as the skillful designing engineer utilizes the data that has been placed at his disposal by scientific research, so the executive must take advantage of all of the scientific investigations and studies that have been made in relation to the handling of the human element. Are you doing this?

Speed Up Car Building

The survey of the public attitude regarding the railroad question presented at the Railway Business Association dinner by George W. Simmons deserves the most careful study by all who are interested in the preservation of the present favorable sentiment toward the roads. Mr. Simmons emphasized the need for courtesy and frankness on the part of the railroad employees. The need for increased facilities for handling traffic, though not brought out so clearly, must not be overlooked. Railroad officers may well ask themselves whether they are doing all that is in their power to handle the traffic to the best advantage. The speaker illustrated forcefully the serious consequences of the present shortage of cars, yet at the present time some roads have nearly 50 per cent more cars on their line than they own and others are hampered by shortage of equipment. Would it not be advisable to use more extensive and drastic measures to secure a better distribution of the cars than is noted elsewhere in this issue, even though it would increase temporarily the mileage of empty cars handled? If the roads are to supply the equipment needed to handle in a satisfactory manner the traffic that is offered, the present deficiency in the supply of cars must be made up. It is estimated that over 700,000 new cars will be needed in the next three years. On this basis 240,000 cars should be built this year but the number ordered thus far is a very small portion of this total. The transportation needs of the country cannot be met if each road tries to shift the burden to its neighbors.

Encouragement from the Top

The recent convention of the American Railway Engineering Association was beyond question the most successful which this organization ever held. Not only was it the greatest in point of the attendance but, as stated in the address of the president, it represented the conclusion of a year of productive co-operation with the American Railroad Association through the agency of Section II—Engineering. The officers of the American Railroad Association have indicated their appreciation of the work done by the engineering association, and the latter has the satisfaction of knowing that its work is receiving the backing of the superior body. The success of the A. R. E. A. has been brought about through a correlation of the efforts of its individual members, but this has been obtained only through the co-operation of the railroads in encouraging their engineering officers to devote no inconsiderable portion of their time to association affairs. With the promise of even greater future returns from the work of this association, there is now more incentive than ever for assistance by the railroads. Some of the roads have been giving this aid unstintingly for years, while others have stood aloof. This is a matter which is strictly up to the individual managements. If they wish to have a part in this valuable work they must see to it that their officers are properly represented in the membership and on the committees. How many railway presidents have taken the trouble to ascertain whether their chief engineers and other engineering officers are members of this association? The A. R. E. A. is now making a concerted effort to increase its numbers, and the railway executives can do much to make it a success.

The Cost of Maintaining Grain Doors

One of the most difficult features in connection with the shipment of grain is to secure satisfactory grain door service. Unfortunately, the responsibility for the supplying and maintenance of satisfactory grain doors does not lie with the agencies most directly involved in their actual use. The doors are placed by the shipper and removed at the elevator, while the principal function of the carrier is to supply the doors and foot the bills. This inevitably leads to carelessness in the use of the doors and in seeing that they are returned when the cars are unloaded. Furthermore, it tends to encourage the use of inferior material in their construction, which results in increased liability of damage to the doors in removing them from the cars and greater probability of loss of grain in transit, thus completing the vicious circle.

One of the large grain shipping systems in the West spends from $300,000 to $500,000 a year in the maintenance of grain doors, which is equivalent approximately to a 50 per cent renewal each year. The breakage resulting from each unloading amounts to as high as 15 to 20 per cent. With the price of lumber used in grain door construction showing an increase from the pre-war price of $7 or $8 per 1,000 b. m. to $60, thus making a cost as high as $15 a car for complete equipment, the increased importance of economy in the use of grain doors is apparent.

The evils of the present situation were clearly brought out in a set of resolutions passed about a year ago by the Terminal Grain Weighmasters and a committee of the National Scalesmen's Association, in session at Milwaukee, Wis. These resolutions condemn practices of unloading which destroy the doors, when equally satisfactory results could be obtained by removing the standard sections from the top of the doorways section by section, as well as the practice of using 20-penny and larger nails to secure the doors to the door-posts. The resolutions recommend the use of not larger than 16-penny nails, and the least possible number of these. The resolutions further urge that the carriers revise their specifications for grain doors or take such steps as may be necessary to stop the growing practice of using poor, culled, rotten and other unsuitable lumber in the manufacture of the doors.

The grain shipping season is now past and the next season will not open for some months. During this time the carriers should take measures, acting through their local agents at shipping points, to secure the largest measure of co-operation from the shippers in properly fastening the doors so that they may be removed at the unloading point with the least possible damage. With the doors properly fastened, similar measures may be taken at unloading points with a reasonable hope of success in securing the careful removal and return of the doors.

Present Conditions Demand Modern Power

The effect of the increased capacity of locomotives on railroad operating cost was brought out forcefully in a recent railroad club paper. The author pointed out that from 1888 to 1917 the revenue tons per train increased from 176 to 620. During the same period the cost of coal per ton had advanced from $1.14 to $2.20, but the fuel consumption per ton-mile had been decreased one-third and the cost had increased only from $.0006 to $.0007 per ton-mile. The greatest single factor in bringing about these economies has been improved motive power. The increase in size has not been so important as the development of devices to save fuel and labor and secure increased capacity; in fact without these appliances the large modern locomotives are insufficient machines.

To some of our readers these facts may seem commonplace. The *Railway Age* has emphasized them many times in the past and the only reason for repeating them is that even today some railroad officers fail to realize their full significance. That such is the case is shown by the action of some roads in drawing up specifications for new power which specifically exclude some of the modern appliances now in general use. It is difficult to follow the reasoning of the men who consider the elimination of all special devices to be desirable. It is true that in this way a reduction in the first cost could be effected, but the first cost of a locomotive should be a secondary consideration. The costs of fuel and labor are constantly increasing and the only way to combat this increase is to increase locomotive capacity. If this is done by applying modern devices the gain in most cases is two-fold. Whatever saves fuel also increases the capacity of the power and whatever saves labor speeds up operation and increases the capacity of the road.

In 1905 there were in use locomotives which were essentially the same as those built today, except that they were not fitted with the modern appliances. These locomotives, burning 5,000 lb. of coal per hour, developed about 1,120 hp.; a modern engine at the same rate of combustion delivers 2,000 hp. Locomotives are constantly being made more efficient and the only way to take advantage of progress is to secure modern power. Some roads have ordered locomotives which are duplicates of designs built four or five years ago. Has nothing been learned in all that time that would make for improvement? Any road that overlooks the savings that can be effected by the application of modern devices is simply losing the earning power of these improvements for a time and will no doubt apply them later at an increased cost for their installation.

Progress in locomotive development is relative and the road that does not move forward is going backward. It behooves every road when buying power to capitalize the experience of the motive power department and to apply every up-to-date device that possesses real merit.

Electric Lighted Block Signals Contribute to Economical Operation

Although there are advantages in replacing oil by electricity for the lighting of railway signals, progress in that direction has been slow. Electric lighted signals are now used on about 19 per cent of the entire automatic block signal mileage in this country. Of the roads so equipped, 12 have over 100 miles and 3 have over 500 miles electrically lighted. These installations undoubtedly include position and color light signals as well as semaphores; and it is probably true that at least 85 per cent of the electric lighted signals are on lines along which power circuits have been established for other reasons, such as for electrification or because the signals are operated by alternating current. The remainder of the signal mileage in the country, which amounts to about 81 per cent, depends upon oil or gas to furnish the night indication, although oil is generally used, especially for low voltage signal installations. Even for that type of signaling there is an appreciable mileage upon which the signals are electrically lighted, and it is in this direction that the greatest progress may be made. Recent developments in the manufacture of electric lamps, specially adapted for this class of service, makes the solution of the problem more feasible when used in connection with low-voltage batteries.

Oil-burning lamps require the attention of either a signal maintainer or a lampman every few days, and the lamps must burn continuously. But with the electric lighted signal it is possible to provide an automatic means whereby the lighting of the lamp can be controlled by the approach of the train, if

desired. This feature can be installed at a nominal cost, depending upon the type of installation, and will result in an appreciable saving in battery consumption and in an increase in the life of the lamp, which at present is designed to burn approximately 1,200 hours; in other words, if the circuits for the lamp are arranged so that it will burn continuously, its life will be approximately 50 days. On the other hand, if an approach system is installed the lamp will burn only upon the approach of a train, and its life will depend upon the occupancy of the track sections; that is, assuming 30 train movements a day, each consuming four minutes, the total occupancy of track will be two hours. Upon that basis a 1,200-hour continuous burning lamp would last 600 days.

With an electric lighted system of signals the service of the lampman, or the time it requires a maintainer to take care of the oil lamps, can be dispensed with. Of course, the electric light system requires maintenance, but nothing compared with that required by the oil. In territories where maintainers take care of the oil lights, as well as the signals, a change to electric lighting may make it possible to lengthen their territories, thereby eliminating or transferring the service of one or more such maintainers. Now that the roads have gone back to their owners, the officers are free to inaugurate and work up new plans and methods which in their judgment will contribute to economical operation; because of the constantly increasing shortage of labor the question of signal lighting other than by means of oil may find favorable consideration.

Possibilities of Raising New Capital

THE TRANSPORTATION ACT has apparently put an end, for the time being, to any hopes of financing the requirements of the railroads by the issue of additional stock. The Lackawanna or the Union Pacific might sell stock at a price above par, but they are the exceptions. The form of the law is such that new railroad securities will almost of necessity bear a fixed rate of interest. Investors are hardly likely to be willing to take stock on which the rate of dividends must of necessity be limited while there is no assurance that in a time of unusual depression or because of the failure successfully to compete with other roads in the same group dividends may not be reduced or entirely suspended.

Take a strong road like the Atchison, Topeka & Santa Fe. Assume that it runs through three rate groups in two of which it competes with the Southern Pacific and in the third with a number of other roads. Valuation will quite surely show a larger investment and "final value" for the Santa Fe than the face value of all the bonds and the par value of the stock outstanding. The same, however, will be true of the Southern Pacific. In the rate groups through which the Santa Fe runs, the rates will be fixed to allow earnings of 5½ per cent on the aggregate value of the Santa Fe, Southern Pacific and other roads—the Rock Island, etc. Under these rates the Santa Fe could pay interest charges on its bonds and something more than 6 per cent on its stock; but even if the 5½ per cent on the average for the group would permit the Atchison to earn 10 per cent on its stock, would this be incentive sufficient to induce a man to invest in Atchison stock at par? It hardly seems likely. With a pencil and paper he can figure out the maximum that he can get on this stock—10 or 11 or some other per cent—but he can feel no assurance that in the next five or ten years the Southern Pacific would not compete so successfully as to leave the Santa Fe with only three or four per cent left, after interest charges, for its stock. Reverse the assumption and the same thing applies in regard to the sale of Southern Pacific stock at par.

This is all by way of saying that the investor can no longer hope to buy railroad stock and realize a handsome profit as compensation for the risk which he has assumed. Lacking the hope of profit, he will demand a fixed charge, which, if it is not paid, gives him the privilege of placing the railroad company in the hands of receivers.

It is interesting to see what effect the passage of the railroad bill has had on the market price of railroad stocks. Of course it must be borne in mind that the stock of a company may be traded in from day to day at, say, between 80 and 90, when if $20,000,000 in new shares of that stock were to be issued it might be quite impossible to sell the stock at 75. However, one thing may fairly be assumed with safety. New stock can not be sold at a higher price than the stock already issued is being quoted at in the day-to-day trading on the exchange. As far back as January 1 students of the situation began to base their estimates on their opinions concerning the probable form of the compromise between the Cummins and the Esch bills and it will be of interest to examine prices from that time. Let us take six railroad stocks that are actively traded in but which appeal to widely different classes of investors and speculators.

The Union Pacific, a stock paying 10 per cent, represents not only the earning power of one of America's most prosperous railroads, but also large values in the securities of other companies, most of them, however, railroads. On January 2, Union Pacific sold in the neighborhood of 124. During January quotations remained at almost the same figure, but on February 6 dropped below 120; and on February 13 it was quoted at 110. The following week it went to about 118 and remained around that price until the announcement of the two favorable Supreme Court decisions.

The Atchison, Topeka & Santa Fe and the Pennsylvania Railroad are standard investment stocks. There is almost no speculative element in either, and both have been considered sound investments for widows' trust funds. Pennsylvania has a par value of 50, but, taking it on the basis of 100, i. e., giving a quotation for two shares instead of one to make it easily comparable with other stocks having a par value of 100, it sold at about the same price as Atchison on January 2—in the neighborhood of 83. The price remained about the same through January, dropped slightly in the first two weeks of February, crossing 80 on February 18, but sold up the following week to above 85; it has remained at about that price since. Atchison, selling at about the same price as Pennsylvania on January 2, dropped off gradually to about 78 on February 13, and is now selling at about 81.

New York Central has not quite the long record as an investment stock that Pennsylvania has, and the capitalization of the company consists so largely of securities bearing fixed interest charges that the stock is more speculative in character. The New York Central, however, during the two years of government operation, showed up remarkably well. In fact, in the last five years the earning power of this property has increased rapidly and has been in marked contrast to the demonstrated earning power of its competitors. On January 2 New York Central was selling a little below 70, dropped off very gradually to a little below 65 on February 13, and is now selling around 76.

Baltimore & Ohio some years ago was considered a sound investment stock. It is probably still held by a large number of persons, including many women, who are dependent for their living on their income from their investments. The earning power of the property, however, has greatly declined under conditions beyond the remedy of the management. The company continued to pay dividends even during one year when the payment had to be made from surplus. It is one of the roads which, were there no guarantee of a continuation of rentals, would be in a rather bad way. The stock would not ordinarily now be recommended by a conservative banking house as anything but a speculation. On January 2 Baltimore & Ohio was selling at about 32 and continued almost

at this level, dropping down to about 28 on February 13, from which point, however, it recovered, selling on February 27 at over 35, and is now quoted at about 34.

Erie common may be classed as wholly speculative in value. A valuation of the property may show a considerably greater "final value" than the aggregate of the many series of bonds outstanding; but, in addition to a very heavy funded debt, there is first preferred and second preferred stock, both of which precede the common. On January 2 Erie was selling at about 13, dropped down to a little under 10 on February 13, and is now selling at about 15.

The drop in railroad stocks around February 13 was in part due to general market conditions, but also probably to a fear at that time that no compromise would be reached by Congress and that the roads would be turned back to their owners on March 1 without legislation or the continuance of rentals. Since then, as we see, there have been moderate advances, but the market has shown no enthusiasm whatever. The passage of the railroad bill brings various benefits, but it cannot be said to have given any decided increase of strength to the railroad share market. While, of course, the factors affecting the stock market are so many and varied that the course of six stocks proves nothing, yet the exhibit affords corroborative evidence to back up the assertion that most railroads will find it quite impossible to finance their capital needs in the near future by the sale of additional stock.

Effect of Locomotive Counterbalancing on Stresses in Rails

BECAUSE OF THE MANY more or less indefinite, if not intangible, influences entering into the loading and support of track, its design has been less scientific than that of almost any other engineering structure. Owing to the varying conditions of support on the one hand, and of loading on the other hand, it has not been possible for engineers to design the track structure with any degree of precision approaching that of a bridge. Rather, the track has been built almost entirely by rule of thumb methods, adding more or larger ties or increasing the weight of the rail from time to time as conditions *appeared* to make it necessary.

As a result there have been those who have been of the opinion in recent years that the loading has reached the limit of safe practice, if it has not already exceeded it, and that this has been a contributing if not the primary cause of many of the recent rail failures of certain types. Unfortunately neither the proponents of this idea nor those opposing it have been able to substantiate their arguments with conclusive data. It is for this reason that particular importance attaches to the second progress report of the Joint Committee on Stresses in Track of the American Railway Engineering Association and the American Society of Civil Engineers. This report, which was abstracted in the *Railway Age* of March 5 and March 12, contains a large amount of information which forms a definite contribution to that phase of this problem relating to the effect of speeds and the counterbalancing of locomotive drivers on the stresses in the rail. As such it warrants the serious consideration of engineering and mechanical department officers.

The counterbalancing of locomotives has been a source of contention for years, the discussion being renewed with each successive wave of kinked rails. The committee points out the fact pertinently in this connection that the frequency with which kinked rails are found is an indication of the punishment which the track receives even more often at speeds not sufficient to leave such visible indications of damage.

The tests were made on tracks of the St. Louis-San Francisco and the Illinois Central, which, the committee states, were in ordinarily good condition. Santa Fe and Pacific type locomotives, taken from regular service, were employed in the tests on the Frisco, and Mikado type locomotives on the Illinois Central. The rail was of 85-lb. A. S. C. E. section in both instances.

By means of special apparatus the stresses produced in the rails by these locomotives and by their individual driving wheels were determined for various speeds, and these stresses were differentiated between those resulting from speed and those caused by the counterbalancing of the drivers. The tests with the Santa Fe type locomotive showed the maximum stress in the rail under the main driver at a speed of 50 miles an hour to be 3.75 times that at 5 miles an hour. The increase due to speed was placed at 92 per cent and the remainder was attributed to the counterbalance. The total increase in stress for a speed of 40 miles per hour was found to be 2.58 times, and for a speed of 25 miles per hour nearly double. The increase due to counterbalance alone at the latter speed was 58 per cent.

Averaging all tests for all drivers, the average increase in stress in the rails at a speed of 50 miles an hour due to speed alone was 60 per cent for the Santa Fe type locomotive, 35 per cent for the Pacific type and 50 per cent for the Mikado type. The average increases in stresses in the rail at the several drivers, due to the effect of counterbalance at the same speed, was 85 per cent for the Santa Fe type, 30 per cent for the Pacific type and 60 per cent for the Mikado type locomotive. Further, the increase in stress at the main driver was greater in each case than the average just given and was much greater with the Santa Fe type, as indicated above.

Further studies were undertaken to determine whether the stresses set up in the two rails were the same, the experience on the Frisco having given some indication that injuries were more common to rails under the left side of a locomotive than on the opposite side. The investigation showed that the sum of the stresses in the rail at the five wheels on the left side was as much as 20 per cent greater than for the right side. This excess was found to hold true for both maximum and mean stresses and for all speeds.

Another feature developed in this study was the fact that the stress at the outer edge of the base of rail was uniformly greater than that at the inner edge for all speeds at all positions of the counterweights of all the drivers, and for the higher as well as the lower stresses. The average of the stresses at the outer edge for the several wheels ranged from 20 to 50 per cent greater than at the inner edge, or from 9 to 20 per cent greater than the mean stress in the base of the rail.

While these studies have not been pursued to a final conclusion and further tests may modify some of the data given below, they have gone sufficiently far to indicate, at least in a general way, what the final results will be in certain directions. There can be no disagreement with the statement that they indicate the necessity for the most careful study of the problem of counterbalancing locomotives. The fact that the *mean* stress in the base of rails was found to be as high as 52,000 lb. per sq. in. and 10 per cent higher than this in the head should be sufficient to demonstrate the need for action now when so many new locomotives are being ordered.

Although this study offers no excuse for lightening the demand for improvements in mill practice to better the quality of the rails, it does point out the necessity for the more scientific study of the service to which they are subjected in order to reduce to the practical minimum the burden placed on them. With data regarding the effect of improper counterbalancing now available for the first time, those charged with the design of locomotives are under obligation to use this information in such a way as to reduce to the minimum the stresses in the track. The figures quoted above indicate that there is still a long distance to go.

New Coaling Station Speeds up Engine Service

Pittsburgh & Lake Erie Constructs Plant with Modern Coal, Sand, Ash and Water Facilities

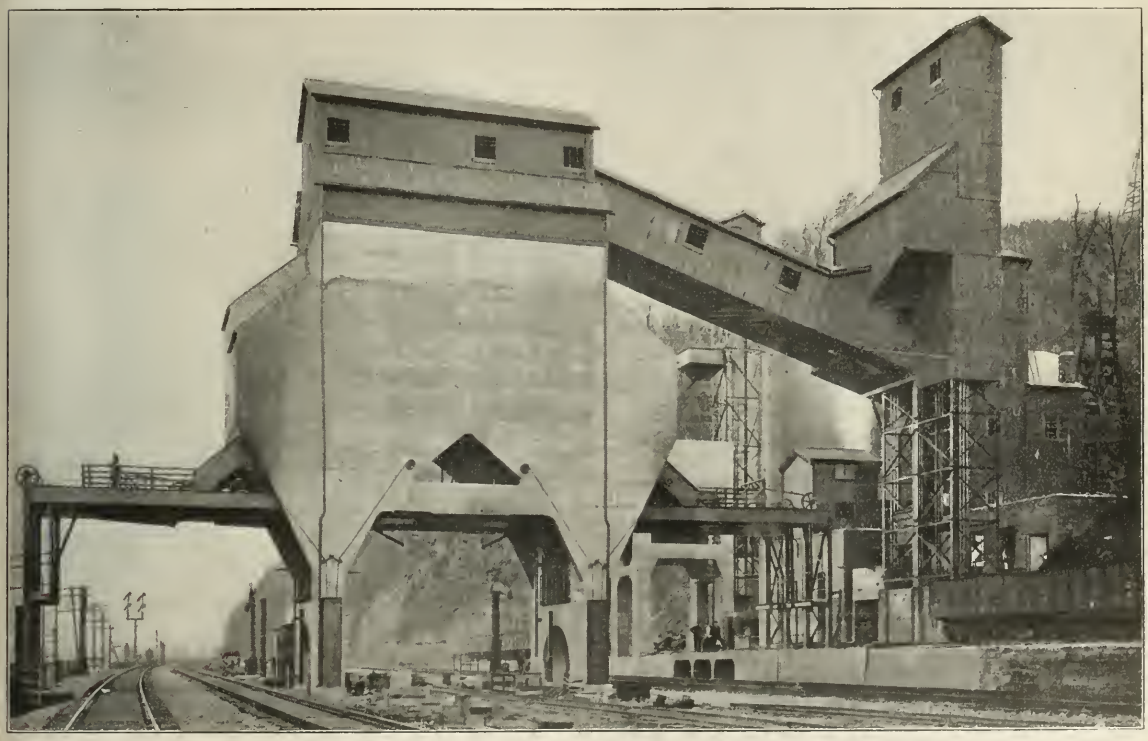
In the new 750-ton coaling station recently completed by the Pittsburgh & Lake Erie at Brightwood, Pa., about seven miles west of Pittsburgh, locomotives are given coal, sand, ashes and water service during a stop of about 20 min., with trains leaving on an estimated spacing of 10 min. This plant, which is primarily for freight service, replaces an obsolete and inadequate one located at Groveton about 1.9 mi. farther west, where the closest spacing of trains leaving the plant was about 30 min., with resultant congested traffic conditions and serious delays.

In order to facilitate the movement of trains through the station, the four-track main line of the railroad was widened through this section to permit the construction of two freight sidings with a capacity of 100 cars each, the general layout being shown in the illustration. Freight trains pulling in for service are handled on both main and siding tracks, and as the total time consumed for services is not over twice the estimated train spacing, the main line is kept free from confusion or congestion. The plant facilities in connection with the track arrangement are such that two trains in each direction, or four in all, can be given the full service simultaneously, and in addition locomotives on each of the passenger tracks can be served with coal, sand and water, although ashes cannot be handled. In operation the ashes are dropped and water delivered at one stop, while separate stops are made for coal and sand.

The coaling structure was constructed of reinforced concrete, the superstructure and other steel frame construction being covered with asbestos-covered corrugated iron, with a roof of prepared roofing materials laid on wood sheathing. The coaling pockets have a capacity for 750 tons of coal and serve all six tracks, with two chutes at each track. Coal is delivered to the plant in hopper bottom cars, which are placed on a supply track located along the hillside, and having a capacity for 10 loaded cars above the hoppers and 10 empties below. This track is on a one per cent grade and is provided with a derail and a safety track at the lower end to protect the main tracks from runaway cars.

Two hoppers are placed tandem under the supply track, which feed into two separate 2½-ton skip bucket hoists, each capable of handling 75 tons of run-of-mine coal per hour and operated by independent machinery and counterweights, etc. The two skip hoists discharge into a common hopper at the top of the elevator tower, from which the coal is fed automatically on to a large-capacity belt conveyor which carries it up an incline to the center of the coaling pocket, where it is dumped automatically. In general, only one hoist is operated at a time, the other being held in reserve, the capacity of the hoists and the pockets being sufficient to allow a 24-hr. supply of coal to be placed during the day shift.

The wet sand is delivered to the 40-car capacity storage house in hopper bottom cars, which dump into a track hopper located slightly down grade from the two coal hoppers. It is then elevated by a bucket elevator to the top of the storage



The Completed Brightwood Plant

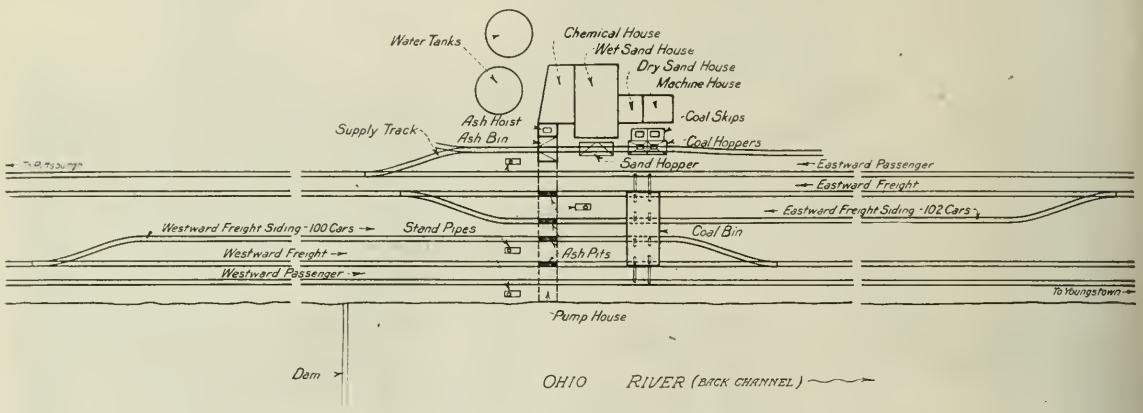
house, where it is discharged on a belt conveyor which carries it to the center of the bin. In reclaiming the sand from the storage bin it is loaded by hand labor into a belt bucket elevator which carries it to the hoppers over the drying stove, where, after drying, it runs down over inclined screens into a bin located under the floor. From here it is fed by gravity to the "boot" of the dry sand elevator, which delivers it to another belt conveyor running to the two storage bins over the coaling pocket, each bin having a capacity of 225 cu. ft. and discharging by gravity to three of the six tracks.

The Ash Dumping and Water Facilities

Each of the two main line freight tracks on the two sidings has been provided with an ash pit 14 ft. long and having a capacity of 225 cu. ft. The passenger tracks are not equipped for this service. The ashes after being dropped from the locomotive to the pit are allowed to fall into a 75-cu. ft. motor-operated car running in a tunnel under the pit, the fall of the ashes being controlled by gates in the bottom of each pit. The arrangement is such that the ashes continue to blow until the opening is choked up, after which the gate is forced through the ashes, cutting off that portion which remains in the pit. The car is sufficiently large so that no ashes are spilled on the floor while it is being moved to the hill end of the tunnel, where it is dumped into a 90-cu. ft. skip bucket hoist and then moved back a required distance to clear. The operation of the hoist is entirely automatic and is electrically operated and controlled by a push button, the cycle being completed by the bucket going to the top of the elevator, where it dumps into a reinforced concrete ash bin with a capacity for two carloads, and then returns to the bottom, where it remains until the push button is again operated. In order to prevent the tunnel car from interfering with the bucket hoist when either are in operation, the two are interlocked mechanically and electrically. By this method one man can remove the ashes from the pit at the rate of 12 locomotives per hr., a feature which has permitted a reduction in labor from the two-men per shift at other plants on the road to one man, representing a saving of three men each 24 hr.

The water in the Ohio river adjacent is not suitable for boiler use without treatment, for during dry weather periods it is extremely hard and during flood times it has so much soil in suspension that it is at times unsafe to use owing to the deposit of mud on the crown sheets, which in some cases forms arches between the flues, resulting in burnt boilers. An effort was made to secure water from the gravel bed under the river bottom by using deep driven wells, but this method was abandoned on account of the large amount of salt in the water so obtained. It therefore became necessary to depend on the river water with treatment for scale-forming solids and for sedimentation of the mud and other matter in suspension. A careful study of the problem was made to determine whether a continuous or an intermittent plant should be used and whether the size of the plant should be small, thereby requiring the services of a pumper on each of the three shifts per day, or large enough to allow a pumper on one shift to pump and treat enough water for 24-hr. use, and also the kind of plant which would provide the best water, including the problem of sedimentation.

Two 350-gal. per min. triplex pumps, formerly used at Groveton, were available; these pumps working together could deliver 42,000 gal. an hr., which would permit the pumper on one eight-hour shift to furnish easily the 300,000 gal. needed for a reasonable increase in demand over the present peak load of daily consumption. The use of a continuous treating plant which would deliver the treated water into one storage tank would under these conditions not allow time for the solids to settle properly. For these and other reasons the intermittent method was adopted, and two 400,000-gal. steel tanks were provided, to be used alternately. As the water is being pumped into one tank the proper amount of soda ash and lime is forced by a separate chemical pump into the raw water pipe at the point where it enters the tank, the chemicals and the old sediment in the bottom of the tank being mixed with the incoming water by the currents formed by it. The size of the tank and the short pumping period of eight hours gives about 16 hr. for the chemical reaction and the subsequent sedimentation to take place before the water is used. While this work is going on the treated water in the other tank is being used.



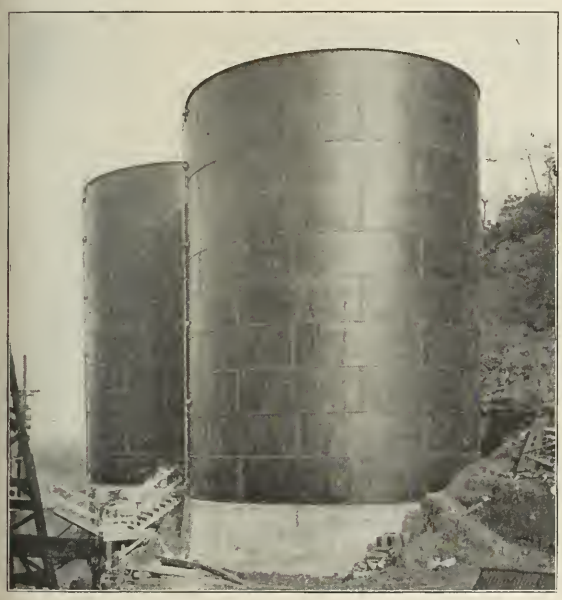
General Layout of the Coaling Station

At the commencement of the next pumping period the pumper operates or changes the valves, six in number, which disconnects it with the water pump and the chemical pump pipe lines. The full tank is then connected with the standpipe line and the water and the chemical pump lines are closed from it, the three lines being 16 in., 10 in. and 1½ in. in diameter, respectively. All of the valves are of the quick-operating gate type and are operated by levers attached to the stems which are extended up through the concrete covering over the valve pit. These levers are attached to the stems in the proper manner to produce the desired results at one tank, with the handle ends either all up or all down. The valves are in proper position for each tank when the three levers for one are up and the three levers for the other are down. This arrangement makes the mental problem for the pumper very simple. Water is supplied through four 12-in. standpipes, one for each passenger track and one for each of the two freight tracks. On account of the short ash pits (14

ft.), the locomotives on the freight tracks are spotted each time in the same place over the ash pits, and the standpipes are so located that the fireman can take water while the ashes are being dropped by the hostlers.

Other Miscellaneous Features

The electric current used for light and power is furnished from the company's power house at McKees Rocks, the combined horsepower of the motors and of the light load being about 200 hp. An attempt was made to secure current from an outside company, but no allowance could be secured to compensate for the short periods during which the various motors would operate. This made the minimum charge on account of the demand too high to be considered, and as an alternating current power line was being constructed over the territory involved for signal purposes, three additional power wires were installed on the signal poles for the 6,600-volt current needed for this purpose. It is estimated that the saving accomplished by using power from the company power house, after allowing liberally for its cost, will pay the cost



The Tandem Tanks for Water Service

of the power lines, which are about four miles long, and the cost of the transformers in less than three years. The continuity of the power service from this source is considered to be fully as reliable as that offered by the outside company.

Much attention was given in the design of this plant to Safety First features. All counterweights were so located and so protected that in case the supporting cables or chains should break they will not fall on the chutes or in any way harm the workmen. All stairs and walks are guarded by railings. The men are provided with comfort rooms, containing stoves, toilet facilities, wash basins, etc.

The construction of this plant was carried out under the direction and supervision of the engineering department of the Pittsburgh & Lake Erie, J. A. Atwood, chief engineer, now deceased, and A. R. Raymer, then assistant chief engineer and now chief engineer.

It is plain the government should look into the equities of the costs, wages, materials, management, and so forth. We must have railway transportation, so we must pay the bill.—*Helena (Mont.) Record-Herald.*

Commission on Car Service

The Commission on Car Service has sent telegrams to all the principal railroads advising them that on account of depletion of the bituminous coal stocks, particularly east of the Mississippi river, during the coal strike and the period of low production thereafter, a critical condition now exists and that it is urgently necessary that bituminous production be immediately increased and maintained above 11,000,000 tons weekly, beginning March 29. The telegram stated that "continued and concerted attention to the job by all concerned" would make this possible and still leave a fair and reasonable car supply and transportation for other commodities requiring coal cars. Coal loading lines were asked to check their performance of the past few weeks with the record attained during September and October, 1919, and to endeavor to reach and surpass those figures. Requirements of the car service rules, it was stated, may be temporarily waived when necessary to obtain more prompt handling. Last week the production was increased to approximately 10,900,000 tons.

Refrigerator Cars

Recognition of the seriousness of the refrigerator car situation was given in the telegram sent by Chairman Kendall of the Commission on Car Service to all railroads under date of March 23. He said that the railroads are confronted by a perishable crop situation which immediately and for several months to come makes imperative the most effective utilization of refrigerator cars. Demands will be continually far in excess of the available refrigerator car supply and unless otherwise advised by the commission refrigerator cars must not be loaded with other than perishable freight requiring the use of a refrigerator car. If perishable freight loading is not immediately available, such cars must be expedited empty to perishable freight loading territory in strict accordance with instructions governing from time to time.

Coal and Ore at Lake Ports

In a circular sent to the railroads it is stated that present information is that the volume of coal scheduled to move to Lake Erie ports this year and the volume of ore scheduled to move from such ports exceeds all previous records. It is, therefore, essential that all hopper or so-called heavy clearing cars of the ownership of lines serving the Lake Erie ports be assembled on these lines with the least possible delay and that these cars be confined to the lake coal and ore service to the extent necessary that the lake lines may transport to the maximum those commodities offered for movement during the coming season. To accomplish this all lines were directed to give the home movement of cars belonging to the roads serving the ports preferred attention in order that their speedy return may be expedited. In the absence of prompt loading it is directed that they should be forwarded empty without delay by the most direct route.

Grain Loading

The Commission has issued a circular providing that, effective at once, the following rules will, during periods of car shortage, govern uniformly the distribution between shippers of cars available for grain loading at stations:

1. Each shipper of grain will advise the carrier's agent each Saturday of the total quantity of grain on hand tendered for rail shipment. The ratio of the quantity so reported by each shipper to the total quantity reported by all shippers shall be the percentage basis for the distribution of available cars at that station during the ensuing week for grain loading.

2. Each shipper of grain shall make written order on the carrier's agent for cars wanted for grain loading, showing the following information:

A. Date of order.

B. Number of cars wanted (in units of 40-ton cars) and whether for sacked or bulk grain.
C. Destinations.
D. Date wanted to load.
E. Quantity of each kind of grain on hand and conveniently located for prompt loading tendered for rail shipment.
F. Name of shipper.

Copies of orders by a shipper located on more than one carrier (steam, electric, or water) shall be filed with the agent of each carrier. Such combined orders must not exceed the total grain conveniently located for prompt loading tendered for shipment.

3. Cars will not be furnished in excess of a shipper's ability to load and ship promptly.

4. When a shipper's pro-rata share of the available car supply is a fraction of a car, the fraction will be carried to his credit, and he will be entitled to car supply on the basis of the aggregate of such fractional credits.

5. The term "prompt loading," as used in these rules, is intended to mean that a car placed for loading not later than 10 a. m. must be loaded and billing instructions tendered before the close of the day on which it is placed, failing which, such car will be charged against the shipper's allotment as an additional empty for each succeeding day held for loading, or for billing instructions.

Stock Cars

The following rules will, effective at once, govern with respect to distribution of stock cars on all railroads:

1. The distribution of privately owned stock cars as between railroads and as between stations on each railroad will be authorized by the owners of such cars.

2. Such privately owned stock cars as are placed for loading by direction of the owner shall count against the daily allotment of cars to the shipper.

3. The owners of so-called private stock cars will give distribution to all their equipment before calling upon the railroads for assistance in filling orders for stock cars for their shippers or for their account.

4. If the number of privately owned stock cars placed for a shipper equals or exceeds that shipper's pro rata share of the available supply, he shall not be entitled in addition to any railroad-owned stock cars.

5. If the number of privately owned stock cars placed for a shipper is less than his pro rata share based on his daily ability to load and ship, he is entitled to be allotted railroad-owned equipment in addition thereto to make up his pro rata share.

6. The railroad will distribute available railroad-owned stock cars on a pro rata basis which shall take into consideration the ability of the shipper to load and ship.

A circular has also been issued giving instructions for changing the reporting marks on the freight cars bought by the Railroad Administration which were temporarily handled under a general equipment trust and lettered G. E. T., pending their allocation to the railroads. All of the cars have now been allocated.

Car Shortage Propaganda

The Commission on Car Service has recently received an interesting illustration of the way a car shortage is sometimes magnified by propaganda conducted among shippers and consignees. A lumber company having a salt sales department has sent a form letter to its customers expressing its regret that it has not been able to ship the car of salt ordered because "the car shortage is the worst by far that we have ever experienced." The company says it has large stocks of salt which it is anxious to ship and is in a position to load out orders at the rate of 35 carloads per day if the equipment is furnished it. The customers, therefore, are urged to write a letter to the Car Service Section, mailing it in the envelope enclosed for that purpose, stating how long they have been waiting for the shipment of their particular order and how badly they are in need of salt. "And," the letter continues, "if your town is short do not fail to make mention of that fact. In other words, make your case as strong as you can, *and ask that a car be furnished us for the loading of your particular order.* We will certainly appreciate your co-operation in this matter and if you can secure a car we will make immediate shipment of your salt."

This is in effect a request for preferential car supply and the Commission on Car Service has already received 70 letters in the envelopes sent out by the company asking that cars be furnished it. The commission is also in possession of the form letter because one of the customers did not take the trouble to write its own letter but merely passed along the form letter with a notation asking that the request be complied with.

THE PROBLEM TO BE FACED, after March 1, is one of wages and rates. There will be a request for rates that will enable the railroads to live, to improve and to expand. Shippers admit the necessity of a revision upward.—*Amsterdam (N. Y.) Recorder.*

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The Gare de L'Ouest at Paris During the Strike

Annual Dinner of Railway Business Association.

Note of Optimism for Future of Railroads Under Transportation Act Feature of Meeting

PROBABLY THE MOST INTERESTING feature of the annual meeting and banquet of the Railway Business Association held at the Waldorf-Astoria Hotel on Wednesday of this week was the optimistic feeling expressed that the railroads would fare far better under the terms of the new Transportation Act than they had in the past. Combined with this was a feeling of congratulation concerning the work that the association had done in connection with the bill and an appreciation of the task that had been carried out by Senator Cummins and Representative Esch.

These thoughts were carried out not only in the eight resolutions passed by the meeting, but also in the speeches at the banquet in the evening.

The latter was attended by some 1,500 to 1,700 members and their guests, including the leaders of the railway and railway supply fields. It was presided over by Alba B. Johnson, president of the association, and the speakers included Frederick J. Koster, of San Francisco, president of the California Barrel Company; George W. Simmons, of St. Louis, vice-president of the Simmons Hardware Company, and Joseph S. Frelinghuysen, United States Senator from New Jersey.

Mr. Koster spoke on the subject of "American Destiny" and pointed out that the public was on trial almost as much as the railroads, for it is only through a favorable and interested public opinion that the best results can be worked out.

Mr. Simmons spoke on the subject of "A Continent Marking Time." He has only recently returned from Siberia, where he has been engaged in Red Cross work. He showed how the primary reason for the downfall of the Kolchak government was due to the failure of the Trans-Siberian Railway. Speaking at greater length on our own railroads, he told about a questionnaire his company had worked out through its corps of 500 to 600 salesmen on the transportation question which showed a very favorable feeling for the railroads and especially a desire on the part of the public in most parts of the country to help in any way that would secure improved service. He also made some pointed suggestions as to what steps the railroad managers should take to keep and encourage favorable public sentiment.

Senator Frelinghuysen spoke on the subject of "Partners in Prosperity." He paid a splendid tribute to George A. Post, past president of the Railway Business Association, and to Senator Cummins and Mr. Esch. He then spoke of some of the underlying essentials of the new Transportation Act and showed how the railway situation should be considerably helped in the future by the favorable public opinion that has shown its results in the act.

Abstracts of their papers follow:

American Destiny

By Frederick J. Koster,
President, California Barrel Co.

This great organization, the Railway Business Association, at whose invitation we are here gathered, has for its objective bringing about a fuller understanding of what is today, perhaps, and I know not but that at all times during the past generation it has been, the most vital concern of every American citizen—that of maintaining at the highest point of efficiency the great arterial system of commerce, the railways of our country. Their proper maintenance is an indispensable factor in our well-being and progress and vitally affects in its minutest phases, the life of each and everyone of our people. Our manner of dealing with them through government attitude and act is now to be the major test of the soundness of the very substance of our American institutions.

This great gathering has for its purpose the serious consideration of the big question of the restoration of the railroads of America. * * *

It is our personal business to do our part in developing an understanding on the part of our people, generally, of what the maintenance of these great vital agencies means to themselves directly.

We cannot look to the railway managers—we must not look to the Railway Business Association, our hosts. They do their best work by bringing us together and laying the problem before us—by awakening us to an appreciation of our own interest. But we can individually, and through our organizations—Chambers of Commerce, Traffic Bureaus, and our many agencies—arouse that interest and understanding which shall result in favorable legislation, a favorable attitude on the part of regulating bodies; awaken investors, and generally create that atmosphere of public opinion which shall result in attracting the necessary capital to enable these arterial systems of our material life to function and not only serve existing needs, but, as they were in the past, to become again the very pioneer element in our further growth.

Can anyone name a single enterprise that is not dependent upon the healthy condition of the railroad systems of our country, in one way or another, for its own continuity—not to say its very existence? All production is limited by the capacity of transportation. Let us make it clear to ourselves that what exertion we put forward toward the restoration of the railroads of America is less our service to them than it is meeting our own necessity and thus best serving ourselves. * * *

Our People Are on Trial

It is not, as we hear it generally discussed, that the railways are under trial as to whether or not private ownership shall continue, but it is we who represent the practical leadership of America who are under trial as to how we shall influence the public attitude, so that this one great step in the direction of destroying our whole national character shall not be taken.

It is the people of America who are under trial. It is their representative agency of government—the Interstate Commerce Commission—that is under test.

It is true that the managers of the great transportation systems are not freed from a large measure of responsibility, but, after all, the great test is of the leadership of American business life and its power so to influence public attitudes that we shall not again be subjected to the dangers of taking that one biggest step in contravention of the very essence of our institutions, public ownership and operation of these, the most necessary instrumentalities of commerce, and so vital to the every-day life of each and everyone of our citizens.

Nothing so directly and vitally affects business as do the acts of Legislators, of governing bodies. We have concerned ourselves far too much with the correction of apparent evils, overlooking the tremendous values that have been created, the immense forward movement of our nation and the part therein played by these pioneers of progress—the American Railway Systems.

We have lived through a veritable orgy of interference and regulation resulting in repression, retardation and almost in paralysis.

And what an opportunity there is today for a revival of the

pioneer spirit—the spirit of burning your bridges behind you—boldly and fearlessly moving toward necessary fields of endeavor.

Transportation as it exists today is by no means in a fixed and definitely established condition, and the field for intensive as well as extensive pioneering in transportation, opens wide before us. I believe that what in substance is demanded is that there shall be no checking of elasticity, that enterprise shall not be retarded, and that such a degree of regulation only shall be imposed as will prevent discrimination of that which is definitely destructive of the public interest. We, as a people, must substitute by every possible exercise of true leadership the courageous forward-going pioneer attitude for that of making our main consideration watchfulness lest there might be some transgression. * * *

What an indictment of our own neglect of our leadership duties it is that a condition should prevail in this great pioneer land giving us the problem of the restoration of the railroads! And I believe that we business men of America have provided the major contributing cause resulting in their present condition, through our constant selfish attacks upon them, our short-sighted policy of continuously fighting for reductions of rates and special consideration—thereby justifying, if not, in fact, stimulating, the hostile attitude of the public generally and of legislators; particularly to the end that the major concern of legislative bodies became that of control and regulation in greater and greater detail.

We cannot absolve the railway managers from all blame because they too failed, as most of us have failed, to exert ourselves in the direction of guidance in the development of a sound public attitude.

A Continent Marking Time

By G. W. Simmons,
Vice-President, Simmons Hardware Co.

As your chairman has said, I am comparatively recently back in the hardware business after some two and a half years in Red Cross service, including considerable spent in France and more lately in Russia.

I am so "chock-full" of interesting experiences in that wonderful but afflicted country that I feel sure I could interest you far more if I might talk of Russia than by presuming to advise on one of the greatest, if not the most vital, of all of our domestic national questions. In the short time I shall speak I will refer to but a few of the striking facts about Russia which seem to have a bearing on the subject of our discussion tonight—transportation. . . .

Today the great powers of the world are trying to feed the Russian people through the Bolshevik forces, which is evidently a difficult, if not impossible, task. For at least a year and a half, commencing in the summer of 1918, this could have been easily accomplished by the extension, not of military aid, but of economic assistance to the people of Russia through the honest all-Siberian government. Had such action been taken, as urged by practically all Americans on the ground, it is my belief that the spread of Bolshevik power would have been largely prevented.

Russia had plenty of food for its entire 180,000,000 population last year, but it was not properly distributed, and literally millions died of starvation, while comparatively a short distance away from them was food a-plenty; but no transportation existed to bring the food to the starving. . . .

Failure of Trans-Siberian Primary Cause of Russian Downfall

The primary cause of the downfall of the Kolchak government—the only real force opposed to Bolshevism—was the failure of that great artery stretching some 6,000 miles from the Pacific across into Europe and known as the Trans-Siberian Railroad. When this railroad functioned the people fared comparatively well. When regular train service had almost been suspended things began to go to pieces. It was at that time that I traveled in a special train for ten weeks covering some 12,000 miles and had an opportunity—probably not afforded to any other American—to see almost every phase of the Russian question and particularly the stagnation and chaos which resulted directly from the lack of transportation. Even our own renowned engineer, John F. Stevens of Panama Canal fame, at the head of the Inter-Allied Railroad Commission, was unable to keep the Trans-Siberian Railroad in operation. It is to me no surprise that the Kolchak army should disintegrate when I realize that there were last winter about 150,000 cases of typhus fever in his army of some 600,000 and that much of the scanty supplies obtained in the East failed to reach him at the fighting front in Western Siberia. With no drugs, no hospitals, no clothing, no manufactured articles of any kind, no factories in all of Siberia and no help from the outside world, it is small wonder to me that Kolchak's army was destroyed. With it went all hopes of an early overthrow of Bolshevism.

It may seem a far cry from Russia to America or to compare the Russian railroad with the American railroad, yet only a few short years ago Schenectady locomotives and American Car & Foundry box cars and gondolas were running about as well on the Trans-Siberian Railroad as on any of our American railroads. Considering the service it was called upon to perform, the Trans-Siberian compared creditably with a great many American roads; yet in only a few years of neglect, with little or no upkeep, repairs, maintenance or renewals, it broke down entirely. And with the stoppage of this great artery went the life of that magnificent country—endowed by nature with unlimited resources and riches upon the soil and under the soil, which, if transportation were available, could in a few years create new wealth sufficient to reconstruct all of Europe; but without transportation these resources are today about as worthless as the sands of the Sahara desert.

Desire for Service Dates Back to Beginning

When my father started in the hardware business in St. Louis there were no railroads west of the Mississippi river. Boats on the Missouri river and the now-extinct canvas prairie schooner carried our merchandise beyond the rain belt, as they called that part of the world now known as Kansas.

With the building of the great Western trunk lines came such prosperity and development that communities vied with each other in offering inducements to the pioneer railroad builders to construct a line through their particular settlement. They wanted railroad service and were willing to pay almost any price to get it.

I recently made a careful inquiry throughout the country to ascertain how nearly we are today in a similar condition. I wondered whether the many parts of the country which are today suffering from inadequate transportation service would be ready to do as our forefathers did and make the personal effort and sacrifice to get that service as did the early settlers in our western country. I refer not so much to those vast stretches of arable land not now near enough to a railroad to be cultivated at a profit, but particularly to those cities and agricultural communities through which pass the rails of our great railroad systems. I wondered to what extent our people realize that the conflict between the public and the railroads during the past decade is directly responsible for the lack of locomotives and freight cars to haul to market crops raised by the sweat of the brow of the American farmer. . . .

Salesmen Keep Company Informed on Economic Developments

The company with which I am associated has over 500 traveling salesmen, covering practically every county in the United States, each of whom makes his territory every two or

four weeks, and hence comes to know it intimately. Before we send our salesmen out we teach them that it is highly important for them to be able to learn intelligently and accurately to read the sentiment of their territory on any great question or to report the actual condition of business or crops in their particular territory whenever we call for it. We must make all of our plans for securing merchandise six months or more in advance. We cannot afford to guess on business which it is possible to forecast. The hardware and general stores in the small towns and villages are the centers of gossip, so to speak, of the men of the community. When the farmer comes to town he visits the hardware store, while his wife sells her butter and eggs or purchases her dry goods. Our salesmen are instructed not only to cultivate that farmer when they meet in the store but also to explain to the merchant himself just what information they are going to ask him for on the next trip, so that he can talk with his customers when they come in and hence have the accurate information.

Opinions from Various States

We first adopted this method in the summer of 1896 after Bryan had been nominated on the "free silver platform." Thirty-one days before the election these reports from our salesmen were tabulated and enabled us to predict the exact electoral vote. With the positive knowledge that the gold standard would be maintained, we bought everything in sight and placed orders to run us on a big volume for a year ahead. Since 1896 we have been able to to forecast all presidential elections, and in mast cases to forecast the electoral vote as we did in 1896. I asked our salesmen to report on March 6 on a number of questions. These questions, together with a canvass of the answers, I will present to you in a moment. First let me read you a number of general statements selected from the reports.

Indiana

"People generally seem to think present rates ought to bring sufficient revenue to have the roads economically operated. In my presence, a railroad employee said that four men were holding positions in the same capacity and had a hard fight to find enough work to keep them out of mischief. He said that all he did was to sit in a comfortable chair, smoking good cigars and draw $264 per month from the public. The remedy is to discharge three of these men, who can easily find employment elsewhere, and give the $264 man enough to keep him busy, which, in the case of this particular man, he would be glad to get. He wants to be busy. When the workers realize they must produce something, these questions will largely adjust themselves."

Louisiana

"Louisiana needs more efficient service, and the people are willing to pay for it if they can get courteous ticket agents, clean stations, sanitary toilets in trains and stations, and trains swept when not occupied by passengers."

Minnesota

"Most people are opposed to increased rates, believing private ownership should produce economies sufficient to relieve present conditions. Railroads now have three men to one job, each idle about two-thirds of the time. Before government control, the C. & N. W. ran freight trains from Winona to Waseca—100 miles in eight hours. Under government 'mismanagement' the division was cut in half—Winona to Rochester (50 miles) in the same eight hours."

Nebraska

"Most people have not given the railroad question much thought. When I discuss it with them, practically everybody agrees we must have better railroad facilities and must expect to pay higher rates. Many farmers now have wheat and corn to market, but no cars to move it. I feel that there will be many 'kicks' on advanced rates until people actually see improved service."

Illinois

"Re-grade idiers now drawing big wages for a few hours per day; pay employees on merit system; restore old-time courtesy, and people will stand by the railroads."

Arkansas, Texas and Idaho

"Railroad train crews squander time in order to draw overtime pay. They do not care whether freight or passengers ever get over the line. Railroad management might offer a bonus to crews for efficiency and minimum amount of claims."

Maine

"The only people not in favor of returning railroads to owners are army and navy men, who rode at one cent per mile under government operation. People generally desire more efficient transportation."

North Carolina

"Many people still indifferent to railroad question, but beginning to think about it. Those who have thought about it are ready to pay higher rates for decent service. Years ago the Southern Railway was in politics and created many enemies, but in recent years gained thousands of friends by boosting the south. Most people comment on how good this service was as compared to present government operation."

Tennessee

"In my part of Tennessee, people generally look on railroads as something apart from them, and know little of railroad operation or finances. They do not realize how dependent they are on railroad transportation. Of course, I do not refer to business men, but believe people generally are not interested in railroad investment."

Montana

"Traveling men boast of how many orders they took and the extra town they made that day. Railroad employees boast of how few hours they actually worked the day before and for which they drew eight hours' pay. People around here are sick and tired of that kind of slackers."

The Questionnaire

The questionnaire is as follows:

Question 1. Do the people in your section generally approve of the return of the railroads to private operation?

The answer is almost 100 per cent yes.

Question 2. Are people willing that the railroads should have a "square deal" by which their revenues may be increased in proportion to their advanced expenses?

Question 3. Do the people desire first of all — efficient transportation service?

Question 4. Are they willing to pay what this service is fairly worth, as determined by the Interstate Commerce Commission?

Question 5. Are they willing to have freight rates advanced in order that the railways may be able to render efficient service?

Yes greatly predominates. The people are willing to grant a square deal, but there is some difference of opinion as to what a square deal really is. Many people feel that railroad rates are now sufficiently high to produce the required revenue if railroad operation is made as efficient as it was before 1914. These expressions are representative of general insistence on the part of the public that the railroads shall produce through economies at least a part of the increased income to meet the necessary requirements. The people generally will accept the decision of the Interstate Commrce Commission as to what adequate service is fairly worth.

Great emphasis is laid on the question of service, in many instances to the extent of "service at any price—but give us service."

In several sections merchants and business men favor rate advances, but have not yet taken the steps to convert the general public to this idea. In almost every part of the country exists the decided opposition to any further increase in wages of railroad employees. This sentiment results largely form the experience of the public in seeing the amount of loafing and waste on the part of railroad employees under government administration.

Question 6. Do the people generally realize that the railroads need immense amounts of money to put them in physical condition to render good transportation service?

About two-thirds of the replies are in the affirmative and

one-third in the negative. A few replies indicate that it will be necessary for the railroads to keep the public constantly and fully informed as to the broken-down condition—whether inherited from pre-war or war conditions—which it is their superhuman task to remedy. Here again a number of answers, particularly from the Middle West, indicate that the merchants and other business men realize the facts but have not as yet converted the man in the street and the farmer.

Increasing Investment by Public Will Require Comprehensive Work

Question 7. Realizing that railroad capital has not increased in recent years and numbers of cars and locomotives and all other equipment are far below the amount required to render efficient service to the public, are people in your section willing to buy railroad securities—bonds or stocks—to help the railroads thus secure funds for equipment and other capital expenditures?

The majority of replies indicate that to increase the number of people investing in railroad securities will involve skilful and comprehensive work on the part of railway managers and financiers. It will be for them to convince many citizens that changes in railroad methods and managements on the one hand, and improvement in governmental regulation on the other, are actual and of such character that the people are warranted in looking with greater confidence to railroad issues. It would be advantageous to emphasize early and late that the creation of railroad capitalization is now under the central control of the federal government and that not one share of stock or other security can be issued without government sanction. It would help immensely if the general public could be constantly reminded that the so-called "high finance deals" which have been so severely criticized are things of the past and can now never recur.

In many southern states the "noes," almost 100 per cent, indicate how fruitful a field lies before us in cultivating an appreciation of southern transportation needs and southern dependence upon railway investment in meeting these needs. There is plenty of money in the South. In no part of the continental United States does there remain so much to be done in the opening up of rich resources as in the South. Yet you just heard me read a report from Tennessee, a state sorely in need of new mileage, but its people unconvinced that investment in the instrumentality *of their own prosperity* is necessary, or, if necessary, a matter *for them* to attend to. Local crop conditions are clearly reflected in the sentiment on this question. Railroad financiers like other wholesalers seeking the market must recognize the fluctuating ability and desire to purchase as local crop and other conditions bring investable income to the various sections of the country. In the South and West people are not at all familiar with railroad securities, and often have a hazy idea of the difference between stocks and bonds. The demonstration that the railroads are being properly and efficiently managed under present private management will go far to enlighten and convince them. The Eastern financier can improve his own knowledge of America at the same time he is extending the market for his securities by educating buyers in those sections which have hitherto not bought such securities.

Question 8. Do the people generally recognize that efficient transportation, even at considerable increased cost to shippers, will produce more net profit for users of transportation?

Again the "yes" is in majority—about two to one—which is an exceedingly promising sign. In Indiana 100 per cent of the replies are "yes," while in Texas about 65 per cent are "yes," and in Tennessee about 55 per cent. The realization of the value of efficient service to business seems strongest in the northern sections of the country and weakest in the South.

The Problem Before the Railroad Manager

The managers of the railroads today are confronted with an exceedingly difficult problem. If they handle it successfully they may confidently count upon a continuance and strengthening of the present greatly improved public sentiment toward them both by the wider distribution of railway securities and by sedulous dissemination of the fact that the railroads are not to be financial footballs for Wall street speculators. A vast number of people in the United States, either as owners of railway securities or otherwise, will be confirmed in a sympathetic attitude.

In closing, may I make some concrete suggestions—first to the operating officers and directors of railroads?

Reduce your forces to normal. If you cut out surplus employees and tell the public the plain, unvarnished facts, the public will be behind you solidly.

Insist on a full day's work for a full day's pay *in the name of all the people* who pay your revenue and who will stand by you if you refuse to permit agitators to continue decreasing the efficiency of the individual worker.

Operate passenger trains on time and restore pre-war courtesy of your employees and their recognition of the rights of the public. This will go far toward encouraging the public in an attitude of patient forbearance toward your great task, for which time is inevitably required. A great improvement in punctuality of passenger trains is already noticeable.

Avoid short-sighted mistakes of some railroad managements who are now refusing cars for loading off their line. While this will eventually be necessary, such action immediately after the return to private control is very dangerous under present conditions. It will likely result in the Interstate Commerce Commission requiring exchange of equipment, as under government operation. Railroad managements should accept this condition as a result of government's failure to build sufficient equipment during the last two years. Do not irritate the public in this way and produce results far worse in the long run than any road will suffer from liberal interchange regulations.

Avoid short-sighted mistakes which irritate people beyond any possible benefit to be accomplished; I refer to such policies as some railroad managements are now following in refusing cars for loading when consigned off their line.

Let the Public Know

Above all, not only give the public a square deal but let the public know you are doing so. Put all your cards on the table. Make it clearly understood that you cannot restore normal service immediately. Thus you will gain the patient tolerance of a public which is prone to expect the impossible.

Do not hesitate to tell the public plainly that practically every railroad office was unionized since the government took control and that merit has not been the measure of promotion; that you have been forced to give the next man in line the job in any vacancy, whether he was fitted for it or not.

Let the public know that you recognize that all extra and needless expense in railroad operation eventually comes out of the pockets of the people as a whole—the vast army of consumers who in the last analysis pay not only the freight but all the pyramid of increased cost.

Remember that private operation is on trial. If you now make good the people will willingly pay whatever rates and provide whatever capital may be needed. If you cannot now make good the Plumb plan or some other form of government ownership is inescapable, in which case "Good bye, America."

But as a business man I also have a concrete suggestion for business men, farmers and all other users of transportation.

The Cummins-Esch act has transferred from the carrier to the Interstate Commerce Commission the responsibility for initiating adjustment of railroad revenue to public needs, whereas in the past the railroads have appealed to the public

for help to convince the Interstate Commerce Commission of their needs. This function under new conditions is also transferred. It now rests with the *users of transportation* and the *consumers* of things transported to study their own transportation needs and the cost of meeting them, and then to *volunteer to the commission their idea of adequacy.*

We have been, all of us in the several communities, too prone to concern ourselves with getting all we could out of the transportation plant and organization as it existed. For the future let us perfect our own organization by providing systematic mechanism and personnel for the looking ahead, and let us co-operate with the railway managers and financiers so that transportation once more, as in the former period, will anticipate rather than lag tardily behind traffic needs.

We Must Overcome Public Indifference

In Russia I saw Bolshevism as an unrestrained engine of destruction. In America I have seen destructive criticism of Bolshevism ineffective because we have been too busy to offer something better in its place. We must profit by the frightful experience of Russia, where chaos followed the breakdown of transportation facilities, and find some better way to refute the lies and false promises of Bolshevik propaganada, even more than by denunciation of it. We must offer to the American workmen and American people generally something constructive, something American and something that will appeal to them as better to tie up to than the illogical propaganda of radical agitators.

We must overcome the indifference of our citizens to these great questions. We must teach them that Americanism means constructive progress for the benefit of all classes of our American people; that class favoritism must cease, regardless of whether the favored class is of laborers, of capitalists, of farmers or of any other part of the whole. Particularly must our representatives in municipal, state and national legislative bodies understand that they cannot hold their offices unless they at all times stand for the entire people or against any group of the people.

Our war requirements gave us an interesting but dangerous experiment with state socialism and government control of transportation. We have emerged under a new law which places the transportation industry on a safe basis. Let us not now forget one of the greatest lessons which the war has taught us—the duty of every individual citizen to do his full share of the nation's work. Let us not drift back into our previous selfish attitude of being so busy with our own individual interests and so busy criticising others that we have forgotten our own individual responsibility. Let us continue to emphasize the necessity that every real American shall work for his nation on the reconstruction program as he worked for his nation on the war program. To do less would brand us as unwilling to assume the obligations which always have and always must accompany the privileges of American citizenship.

Partners in Prosperity

By Joseph S. Frelinghuysen,
U. S. Senator for New Jersey.

Upon the wall yonder, you have caused to be blazoned a quotation from the Transportation Act of 1920.

"The commission * * * * shall give due consideration, among other things, to the transportation needs of the country and the necessity (under honest, efficient and economical management of existing transportation facilities) of enlarging such facilities in order to provide the people of the United States with adequate transportation."

The passage is a rule of adequate return. As everyone knows, the feature of the legislation was accepted by the House of Representatives not at the outset but at the end. Acceptance of that rule by the House was made possible by the most impressive manifestation of public opinion, and I desire to say here and now, as a member of the Congress which framed that Act, that I know of no group of men who with regard to that rule were clearer in their heads, more steadfast in their purpose, more indefatigable in their labors or more influential in making and registering opinion, than the members of the Association whose guest I am tonight, under the remarkable leadership of its distinguished President, Alba B. Johnson.

A Tribute to George A. Post

While it would be entirely out of place for me to catalogue the numerous representatives of the world of transportation who aided Congress in its great work of shaping the Cummins-Esch Act, I cannot well omit a reference to a former president of this association who was a conspicuous factor in this notable achievement. In the manifold duties which I had as a member of the Military Affairs and Banking and Currency Committees, I was loath to undertake any new ones, and the modest part that I have had in this legislation was due to the spur of inspiration given me by my neighbor, my friend and comrade, George A. Post, for nine years president of this association. He came to Washington and not only drafted me, but commanded me to do my small part in the effort to help Senator Cummins bear the great burden which had fallen upon his shoulders.

To the advice and counsel he gave me he brought not only his great wealth of experience but also the conclusions of the great committee which was formed to study this problem at the instance of the National Chamber of Commerce, known as the National Transportation Conference.

Whenever Mr. Post appeared and to whomsoever he spoke upon the railroad subject, he was impressive, persuasive, persevering and effective and the Chamber of Commerce of the United States has had in him as Chairman of its Railroad Committee a man broad in view, patient, discreet, and a faithful representative of the great commercial interests of our country.

These conclusions of the National Transportation Conference were finally drafted in the concrete form which was commonly known as the Chamber of Commerce Bill, introduced by me. Many of the provisions of this measure were incorporated and absorbed in the Transportation Act of 1920 as finally enacted.

My earliest interest in railroads was that of a business man whose duties required him to seek safe and legitimate opportunities for the investment of the surplus funds of several of our great fire insurance companies. At that time, quite naturally perhaps, my chief concern was that the transportation systems in which were invested the enormous reserves which protected the property and welfare of thousands of policy-holders should be managed and operated in an efficient manner, permitted to earn a fair return, and regulated with a spirit of tolerance.

Too long did we treat the greatest and most capably operated transportation system possessed by any country on the face of the globe as an undeserving mendicant. The wonder is that we have reaped incredibly better than we have sown.

In my opinion the man who deserves the greatest credit for the broad and effective treatment of this subject, for the embodiment of various fundamental provisions in legislative form, and for the prophetic vision which made possible this progressive enactment, is none other than Senator Cummins. * * * * Though I did not have the same intimate association with Chairman Esch of the House Committee on Interstate and Foreign Commerce that I did with Chairman Cummins, I am familiar with the extraordinary service which he performed in the consummation of this

monumental legislative project, and I know that no public servant ever displayed greater zeal, or labored with a more acute regard for the public welfare.

As a member of the Committee presided over by Senator Cummins, I was soon precipitated, together with my colleagues, into the midst of the whirling vortex of bills and schemes designed to solve the railroad problem. It was then that I paused to get my bearings and to reflect upon what had gone before.

I recalled the history of early railroad pioneering in this country, with its magic conquest of sand-swept deserts, its invasion of virgin forests, and the reclamation of trackless wastes, accompanied, as it was, with hardship, privation and danger, against which only the energy, enterprise, and daring of the Stalwart American railroader could prevail.

"Thou Shalt Not"

I remembered, also, the less pleasing side of the story, when legislators were less scrupulous than they are now, before the public conscience and consciousness were aroused and when, ofttimes, the carriers deemed it necessary to resort to questionable methods, long since abandoned, I am happy to say. This era marked the darkest days of railway development, when rebates and preferences were conferred secretly upon powerful auxiliaries; when the speculator was accused too often with justice, of satisfying his greed by taking stock bonuses larger than were actually needed to float the bonds; when extensive flotation commissions were enacted by grasping bankers who took advantage of a narrowed money market to squeeze the carriers, who were compelled to resort to them for credit. Is it any wonder that the worm turned, or that the pendulum swung far the other way?

I recalled the early rumblings of popular discontent aroused by real and fancied wrongs committed by the railroads, soon followed by state legislation, ofttimes well intentioned for public protection, but also ofttimes oppressive, retaliatory, and improperly creative of selfish advantage to the individual State, while unjust to other States and prejudicial to the general welfare.

The conclusion could not be escaped that, no matter how remiss the railroads themselves might have been in the matter of honesty and fair-dealing, the statesman's role in connection with the upbuilding of the railway system of the United States had become almost that of an executioner. Personifying the admonition "Thou Shalt Not," the legislator had blocked progress as effectively as he had checked wrongdoing. Thousands of miles of fertile domain lay awaiting only the advent of the railroad to spring into productivity to help feed and clothe the people. Time and again factories, mines, and shops had closed down, entailing widespread unemployment and misery, for lack of cars in which to transport their products. Wasteful grades remained unleveled, urgently needed bridges and terminals remained unbuilt, and antiquated equipment remained unreplaced. The one answer of the legislator and the public service commissioner was "Thou Shalt Not." So long had their lips been attuned to that refrain, so long had they been accustomed to repress and restrain, that it had never seriously occurred to them that there existed a limit beyond which further repression and restraint spelled stagnation and disaster, not for the railroads alone, but for the entire country as well.

I do not wish to enter a general indictment of all former laws and orders concerning railroads. For years it corrected certain evils and abuses.

The Cullom and Hepburn Acts were remarkable pieces of legislation, and some splendid results have followed their enactment. To the extent that failure ensued, the fault was not due to any impotence or incompetence on the part of the Interstate Commerce Commission, but to that state of the public mind which displayed avowed hostility to adequate protection of the interests of the railroads, and to the narrow vision of Congress which, until recently, failed to grasp the magnitude of the problem and the necessity of handling it in a catholic, generous spirit.

A Constructive Measure, Committee's Objective

It was in the light of knowledge gained from sad experience, and from this broader viewpoint, that the Senate Interstate Commerce Committee entered upon its work of preparing a proper transportation bill. A constructive rather than a destructive measure was our primary objective.

In the course of the hearings which followed, many distinct plans for solving the railroad problem were presented. Though many of them were obviously unfeasible, they all possessed the merit of dealing with the problem in a fundamental manner. The temporizing attitude seemed to have vanished. Everyone appeared to recognize that heroic measures were necessary in order to restore the credit and efficiency of our railroad systems.

It would have been easy, of course, for Congress to provide simply for hurling the railroads back at their owners without regard for what might happen to them. But such action would have spelled disaster for the railroads, and consequent chaos and incalculable injury for the public. Instead, we saw the necessity of providing, and did provide, for compensating the non-contract carriers, reimbursing the short-lines for losses incurred by them while their neighbors were under Federal control, funding the indebtedness of the carriers to the United States, the continuation of existing rates for six months, a federal guaranty of railway operating income to all railroads for the same period, and a $300,000,000 revolving fund out of which loans at 6 per cent interest may be made to the railroads.

The provisions respecting the rates and permitted earnings of railroads, finally agreed upon are, in my opinion, the most important and far-reaching in the entire statute. They represent the greatest step forward in railroad regulation since the passage of the original Act to Regulate Commerce in 1887.

Stated abruptly, the provision for diverting the excess returns of prosperous railroads sounds rather appalling. Constitutional lawyers will argue that the more flourishing carriers have a property right in a rule of rate-making which has always favored the more fortunately situated carriers, and that the value of their securities is based on the application of this long-standing rule, hence that it is a violation of the Fifth Amendment of the Federal Constitution to change the rule and perhaps undermine the value of the railway stock.

On the other hand, it can be argued that absolute necessity renders it imperative that a rule of rate-making evolved under one set of conditions should not stand in the way of progress —nay, even of national self-preservation—when an entirely new set of conditions exists. The old rule of rate-making was not prescribed as a safeguard for the carrier; it grew out of the old hostile attitude towards the railroads. To say that a common carrier has a constitutional right to continue exacting and keeping rates which give it an unfairly high return is to state that Congress is powerless to remedy an insufferable condition.

Our transportation system stands in a very intimate relation to our government organization, and to all intents and purposes must be considered part and parcel thereof. The rights of the individual stockholder or of the corporation itself must be subordinated to those of the public generally. Thus, every railroad, however small, is, relatively speaking, as much of a public utility as a great trunk line, and must be protected and developed as a part of a great national system, whose component elements maintain a state of correlation and interdependence which few would admit 20 years ago.

Government's Attitude Should Restore Confidence

Let us say that the thing about the railroads which Congress had to correct was the impairment of credit; not only this, but to show that the government's attitude should in the future restore confidence on the part not merely of the lender's but on the investor's part, who could feel safe as a partner in the enterprise.

Under conditions as they were before the war, it was difficult to sell railway bonds and almost impossible to sell railroad stock. The question upon which you might ask my judgment is whether the new legislation does strengthen railway credit, whether it will be easier now than formerly, money market conditions being equal, to sell bonds and possible to sell stock.

While neither a lawyer or a banker, my answer is: unquestionably, yes. To argue to the contrary is to write the Interstate Commerce Commission down as a body which has learned nothing by the experience of the last few years, incapable of broadened views and incompetent to administer the laws of Congress intended to be more liberal than any previous legislation. Such is not my conception of that body. Though lacking power to do certain things in the past, they are now clothed with power, well-nigh plenary, and to them I feel that we can look confidently for the exercise of wise judgment and liberal construction of the new law, enacted with the purpose of dealing with the railroads constructively and not repressively.

A few days ago—March 22—the commission gave a hearing on the territorial grouping and basis of valuation for purposes of rate-making. No one in attendance upon that occasion could have heard one member after another frame questions to witnesses without reaching the conclusion that the seven commissioners then and there present had accepted in good faith the governmental purpose as determined by Congress and dedicated himself in good faith to its full accomplishment. Commissioner McChord, who had been frankly out of sympathy with that purpose before its enactment, volunteered an explicit recognition of the facts and the official obligations which have been created by the law of 1920.

As a business man carrying fiduciary responsibilities, I say to the railway managers and to the financiers, Congress has done its part, the commission will do its part, see to it that you do yours, attacking your great problem with courage and energy, and showing always to the public an eager desire to be an efficient and an obliging servant. Be confident. Once the American government gives its pledge it does not welch.

To individuals in every walk of life I say, you are partners in prosperity; acquit you then like partners. You will share in the benefits. Do then your share, not thinking only of interest and dividends but thinking a great deal about the transportation service which can be given only by well-financed railways and of the national well-being which can only be ours if transportation be adequate.

Our railroad systems have been the nation's pathfinders and pathmakers.

A Revival of the Old Spirit of Progress

With efficient, economical management on the part of the railroad officials, with the approval of the public, with the active and vigorous support of the Interstate Commerce Commission and all others in authority, with the loyal co-operation of the railroad emlpoyees and with the financial backing (which, under existing conditions, should be extended to the fullest degree) of the great body of investors, there can be no question of a complete revival of the spirit of expansion and development which formerly dominated our vast railroad systems.

The government has its hands on one of our fundamental institutions—the steam railways. This industry, for it is an industry, a big industry, creating and sustaining all other vital activities in our national life, is less free to expand, because, unlike the factory, workshop, store or other private concern, the government actively regulates and controls its operations, its revenues and its disbursements.

Regulation is necessarily inherent in the business. But insofar as freedom is consistent with the character of public utility, we are now to invite the finest ability in the nation to come into transportation as investors, as directors, as managers, as employees of every grade, as developers of improvements in mechanism and methods. And we must see to it that government, in the exercise of the power it has assumed, shall be the big brother, alert not only to guide but to strengthen.

The fact that so many constructive, upbuilding provisions could be put through both houses of the federal legislature and incorporated in this epoch-making measure is a significant commentary on the change that has come in men's minds. The old repressive attitude has largely disappeared. Keen appreciation of the fact that a country can grow and expand no faster than its railroads, that any deterioration in its trensportation system means a proportionate strangling of its prosperity, and that neglect or oppression of the railroads means national retrogression, has slowly but surely pervaded the popular consciousness.

Resolutions

At its business meeting the association passed the following resolutions giving its ideas on the more recent developments in railway matters:

(1) We offer the Sixty-Sixth Congress grateful acknowledgment for its services to the republic in correcting defects in railway regulation. Congress has made it the law of the land that railways built and operated by citizens shall be regulated by the government with the aim that they shall thrive and grow. From this Act, Americans may hope for more adequate transportation and hence more vigorous agriculture, industry and trade. They are also encouraged by this inspiring proof of American capacity in crises to believe that political reliance upon individual self-development in every field of human activity is not to perish from the earth.

(2) We hail with satisfaction the view of their new duty disclosed in utterances by members of the Interstate Commerce Commission. They accept the Transportation Act as a mandate to make private ownership and operation prevail if possible and to do so by initiating immediately and continuously the adjustment of rates to a basis of railway income which will adequately enlarge the plant. That purpose has overwhelming public approval. The function which it imposes upon the Commission has now for the first time the quality of statutory power and duty. The future course of the Commission should be met by all concerned in a spirit of co-operation.

(3) New duties of the Interstate Commerce Commission demand a high order of quality and equipment for their adequate performance. The added duty to sustain and construct as well as to regulate, is, under the new law placed upon the Commission. We urge the President to nominate as Commissioners men of positive force who are known to be in sympathy with the purpose of the Transportation Act.

(4) We welcome the many manifestations of a broader public attitude affecting transportation. The user is coming to recognize this facility as a part of his own plant—a utility co-operatively established and maintained, and serviceable only so long as all concerned work in harmonious foresight. We counsel business organizations which include traffic in their scope to establish relations between appropriate agencies of their own and of the carriers for the determination of improvements and for estimate of their cost. This will enable each community and its instrumentality to acquaint the Interstate Commerce Commission with facts and views upon

which it may judge the needs of the community in respect to railway capital, income and revenue. It will also facilitate activity for stimulating the requisite investment by railway users and citizens as such. Especially encouraging is the disposition, shown throughout the Union, to be patient and forebearing toward the railway managers in their struggle out of confusion to normal.

We observe with satisfaction the energy and courage of the railway managers in beginning the task of reconstruction. Stability is assured only if the users of transportation are reasonably content. Public contentment requires service as good as possible and as cheap as is consistent with excellence, and that the managers continuously and frankly discuss with the public their plans, their difficulties and their need of co-operation.

(6) We urge the public to bear constantly in mind that revenue rate adjustments under the Act of 1920 are to be initiated by the Commission. For two years they are to yield an income per cent prescribed by law. After two years they are to yield income sufficient for an explicit purpose. That purpose is adequate enlargement of the plant by investment of private capital. It is for the Commission to estimate service needs and their cost, the going rate for new railway capital, and the revenue required, and if they are so minded, to call upon the carriers for tariffs to accomplish the results. The public interest is now paramount and the public agency carries the public responsibility.

Officers were elected for the ensuing years as follows: President, Alba B. Johnson; honorary vice-president, Geo. A. Post; vice-presidents, Robert F. Carr, A. L. Humphrey, G. W. Simmons, W. W. Salmon, W. W. Willits, Knox Taylor, and W. H. Woodin. M. S. Clayton has been re-elected treasurer and Frank W. Noxon, secretary.

Distribution of I. C. C. Accident Bulletins

By William S. Wollner

Attention was recently called in Congress to the tremendous waste involved in the printing of millions of documents annually by the government printing office, but a very small portion of which serve any useful purpose. It is stated that the worst offender during 1918 and 1919 was the United States Railroad Administration. This raises the question whether printed matter issued by the government which should be of value to railroad men is being properly availed of.

For some years the Interstate Commerce Commission has been issuing its quarterly accident bulletins containing statistics of railroad accidents and the reports of investigations of accidents made by the commission's inspectors. While the statistics in these bulletins are interesting to the analyst and the executive officer, the portions detailing the investigation of accidents contain instructive material that should be made available to the operating officers and employees so that they may learn to avoid the occurrence of accidents through the experience of those who have erred.

A railroad with about 500 miles of track and 2,500 employees had purchased 20 copies of these bulletins as issued, sending them to the division superintendents for distribution, but at the beginning of the present year plans were adopted for a wider and more effective distribution of them than had been secured theretofore. Bulletin No. 70 containing statistics for the entire year 1918, as well as statistics for the last three months thereof, was received from the government printing office in January. Although the figures contained therein were something over a year old, those referring to grade crossing accidents were abstracted and included in a news bulletin which was released to the papers published in this road's territory. Two copies of the I. C. C. bulletin were then sent to each engineman and trainman member of safety committees, accompanied by a personal letter from the officer in charge of safety, calling attention to lessons that could be learned from reading the investigations detailed in the bulletin and requesting that the recipient immediately hand one of the bulletins to a fellow employee who he believed would profit by reading its contents, retaining the second copy for his own perusal, which also should be handed to some other employee when he had finished reading it. A card was attached to each bulletin bearing on one side the name and address of the officer in charge of safety to whom it was to be returned, and on the other side the brief statement, "I have today handed Accident Bulletin No. 70 to ———," with a space for signature. The man to whom the bulletins were sent was requested to drop this card in the railroad mail when the bulletin was passed to a fellow employee.

As soon as one of these cards was received, the officer in charge of safety wrote a personal letter to the man to whom the bulletin had been handed explaining to him, in turn, the benefit the contents of the bulletin might be to him and asking him also to pass the bulletin to a fellow employee when it had served his purpose. A notification card as described above was inclosed in this letter. The success of this plan in getting wider distribution of the bulletin than was formerly possible is shown by the fact that by the middle of March one of these bulletins had been passed to the fifth man, and six had each been passed to the third man.

Accident Bulletin No. 71, containing statistics for the first three months of 1919, was received from the government printing office at the same time as was Bulletin No. 70, but immediate distribution was withheld so that the following plan could be put into effect:

When a safety committee member to whom two copies of Bulletin No 70 had been sent advised by means of the cards that had been furnished him that both bulletins had been passed to fellow employees, a copy of Bulletin No. 71 was sent him, together with a letter from the officer in charge of safety thanking him for his interest in the distribution of Bulletin No. 70, calling his attention to matters of interest in Bulletin No. 71 and asking him to follow the same procedure with Bulletin No. 71 as he had used with Bulletin No. 70. This plan was also followed where the employee to whom Bulletin No. 70 had been handed by a fellow employee reported that he had passed it to a colleague. In each case a personal letter accompanied the bulletin, together with a card to be returned when the bulletin was passed along. Up to the middle of March three of these bulletins had passed to the third parties and seven to the second parties.

The figures given above show the success of numerical distribution, but that this plan of distribution has also worked out more successfully from the educational viewpoint than the former method has been shown by the contents of these bulletins being discussed in conductors' rooms, in engine-houses and at safety and fuel meetings. Incidentally, it formed a means for the railroad management to show its desire to co-operate closely with its employees in the solution of problems mutually affecting them.

The railroad problem is the people's problem, because the people must have transportation proportionate to their needs and at reasonable cost. Our commerce about equals the present carrying capacity of the railroad; the carriers cannot increase their facilities because of inadequate revenues and consequent demoralized credit; the nation's industry and commerce cannot grow beyond the carrier's capacity or ability to serve. With industrial advantages and commercial opportunities greater than ever before shall the West stand still? That's the problem of the hour and it's the people's problem.—*Cheyenne (Wyo.) Leader.*

Pennsylvania Decapod, Type I1s

Pennsylvania Decapod Develops 3,500 Horsepower

Restricted Cut-Off Effects Remarkable Savings in Fuel— Hand and Stoker Firing Compared

IN 1910 the Pennsylvania Railroad built a locomotive of the 2-10-0 type with cylinders working at a maximum cut-off of 50 per cent. This locomotive with minor alterations was adopted for heavy freight service and a large number of the clas I1s, as this type is designated, are now in use. The design of this locomotive was described in the *Railway Age* for June 15, 1917, page 1241. Details of the performance as disclosed by the results of test plant trials,

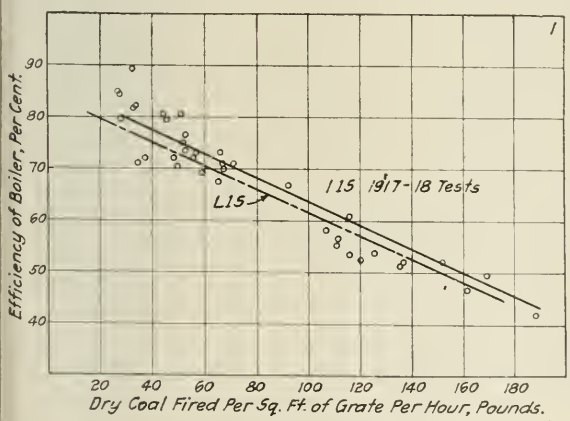


Fig. 1. Rate of Combustion and Boiler Efficiency

are now available in Bulletin No. 31 (copyright 1919 by the Pennsylvania Railroad), from which the information in this article has been secured.

In discussing the considerations which led to the development of the I1s the bulletin points out that many locomotives, in helping service especially, are worked almost continuously with a cut-off near the end of the stroke. If they were designed so as to work at but 50 per cent cut-off when in full gear, without a sacrifice of drawbar pull, there would be gained the difference between the coal and water rates at full stroke cut-off and those at half stroke, or a saving of approximately 25 per cent. The locomotive needed at a number of points on the Pennsylvania was one having a drawbar pull 25 per cent greater than that of the class L1s, Mikado type, or one having a pull of about 75,000 lb. at 10 miles an hour. A study of such a locomotive, with a limited or restricted cut-off in a two-cylinder arrangement, indicated that the desired result could be obtained with a half stroke maximum cut-off, giving a turning moment diagram very similar to that of locomotives cutting off at full stroke.

For the purpose of developing a practical means of obtaining the economies above outlined, a locomotive was built and placed on the locomotive testing plant before going into road service, as the innovations in design made it especially desirable to have complete test results before building additional ones. As a result of the tests and the general performance of the locomotive in service, certain alterations were found advisable.

Description of the Locomotive

Locomotive No. 790, as finally arranged for these tests, is of the Decapod or 2-10-0 type with two cylinders 30½ in. in diameter and having a stroke of 32 in. The boiler pressure is 250 lb. per sq. in. and the maximum cut-off is limited to approximately 50 per cent of the stroke. In many particulars the design follows closely that of the class L1s, Mikado type, which preceded it.

The table following shows how the locomotive compares with the class L1s in certain leading dimensions. The total heating surface is about 12 per cent larger than that of the class L1s, and the total weight about 16 per cent greater. The grate areas of the two locomotives are alike.

GENERAL DIMENSIONS OF LOCOMOTIVES OF THE I1s AND L1s CLASSES

	Class I1s 790	Class L1s 1,752	Increase of I1s over L1s, per cent
Weight in working order, total pounds..	371,800	320,700	15.9
Weight on drivers, working order, pounds	342,050	240,200	42.4
Driving wheels, diameter, inches	62	62	...
Cylinders (simple), inches	30½ by 32	27 by 30	37.6 Vol.
Heating surface, tubes (water side), sq. ft.	4,043.94	3,715.71	8.8
Heating surface, firebox (including arch tubes), sq. ft.	290.20	301.51	3.8 Dec.
Heating surface, superheater (fireside), sq. ft.	1,478.91	1,171.63*	26.2
Heating surface, total (based on water-side of tubes), includ. superh., sq. ft.	5,810.25	5,188.85	12.0
Heating surface, total (based on fireside of tubes), including superheater, sq. ft.	5,423.12	4,847.72	11.9
Grate area, sq. ft.	70.0	70.0	0.0
Boiler pressure, pounds per square inch.	250.0	205.0	22.0
Valves	12-in. piston	12-in. piston	...
Valve motion, type	Walschaert	Walschaert	...
Firebox, type	wide, Belpaire	wide, Belpaire	...
Tubes, number	244	237	...
Tubes (outside diameter), inches	2.25	2.25	...
Flues (for superheater), number	48	40	...
Flues (outside diameter), inches	5.5	5.5	...
Tubes and flues, length, inches	228.32	228.51	...

*This is the heating surface of the 17-ft. superheater. The standard length superheater for the L1s is now the same as for the I1s or 18 ft., with a heating surface of 1,234.65 sq. ft., but the 17-ft. superheater was used in the L1s tests herein reported. The I1s superheater surface is about 20 per cent larger than that of the 18-ft. superheater for the L1s.

Tractive Force

In calculating the maximum tractive force of this locomotive the mean effective pressure reaching the drawbar

cannot be taken as the usual 85 per cent of the boiler pressure, because of the limitation of the cut off. Indicator diagrams, made in road service, at starting in full gear, show an average m.e.p. of about 75 per cent of the rated 250 lb. boiler pressure, or somewhat more, according to the time in which the first revolution is made, controlling the amount of steam passing through the auxiliary port. With 30½-in. by 32-in. cylinders, the calculated maximum tractive force may, therefore, be assumed to be that based on 75 per cent of the boiler pressure, or 90,000 lb. The ratio of weight on drivers to this calculated tractive force is 3.8. After the first few revolutions, it is expected that the drawbar pull will fall to that due to about 70 per cent of boiler pressure as m.e.p., or 84,000 lb., with a ratio of 4.07.

Boiler

The boiler is similar in design to the boiler of the class Lls, but the boiler tube surface and superheating surface are both somewhat larger. The superheater has 48 elements, where the class Lls has 40. The length of tubes and superheater flues, 19 ft., is the same as in the class Lls locomotive.

The details of the cylinders, ports and valves were described in the article referred to above. It may be well to mention that the valves have a travel of six inches in full gear and to obtain a short cut-off with this long travel, it was necessary to make the steam lap two inches. Full gear cut-off with six-inch valve travel is at 50 per cent of the stroke; however, to distinguish tests in full gear cut-off at slow speed, with allowance for steam passing through the auxiliary ports, such tests are marked 55 per cent cut-off as

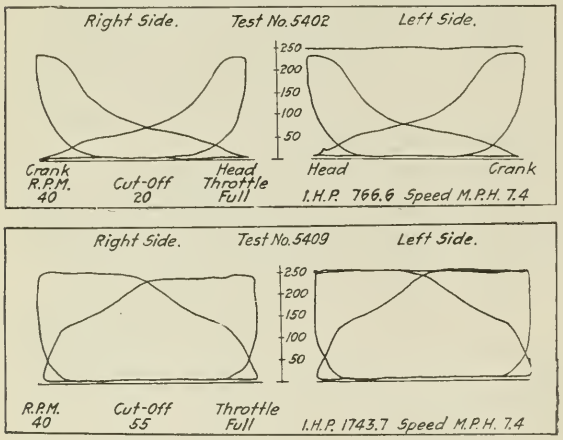


Fig. 2. Typical Indicator Diagrams

determined from the indicator diagrams. The lead of the valves in full gear is 3/16 in. The exhaust lap is ⅛ in.

Auxiliary ports are cut in the valve cages, 1¾ in. in advance of each of the main steam ports, and are intended to assist in starting; however, they are in action at all times when the locomotive is moving under steam. The ports are ⅛ in. by 1½ in., with a steam lap of ¼ in., and are located at each end of each cylinder at the bottom of the valve cage or bushing, making four ports in all.

Coal

Over 70 tests were made to develop the performance of the locomotive, and of these tests 39 were fired by hand with run-of-mine coal. In the 1917 tests Jamison coal was used, but on account of the difficulty in getting this coal in 1918, the tests were made with Crows Nest coal. These two coals are from the same region and vein and are alike in many respects. This is further illustrated by the average analyses, given in the following table, which have been made from all of the coal used in the hand-fired tests:

	Jamison coal 1917	Crows Nest coal 1918
Fixed carbon, percentage	56.21	56.80
Volatile combustible, percentage	31.34	29.68
Ash, percentage	11.67	12.26
Moisture, percentage	0.97	1.25
Total	100.19	99.99
Sulphur, percentage	2.15	1.41
B. t. u. per lb. dry	13,429	13,420
B. t. u. per lb. combustible	15,221	15,324

Tests with Hand Firing

Boiler Performance

Pressures and Temperatures.—An average boiler pressure within about four pounds of the rated pressure of 250 lb.

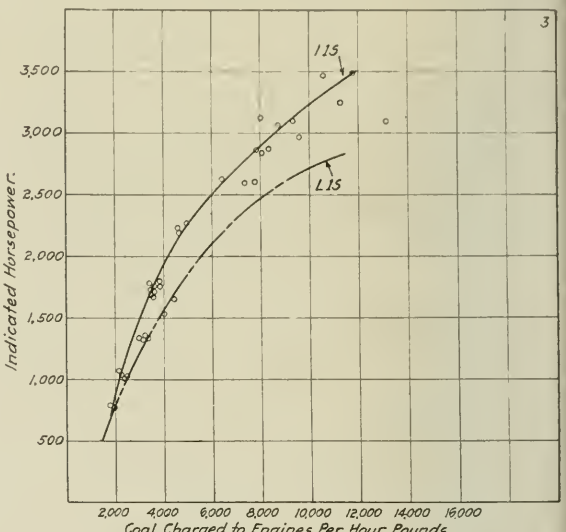


Fig. 3. Coal to Engine and Indicated Horsepower

per square inch, was maintained in all of these tests. The maximum pressure drop, or loss between the boiler and branch pipe was 18 lb., this drop being at a rate of steam

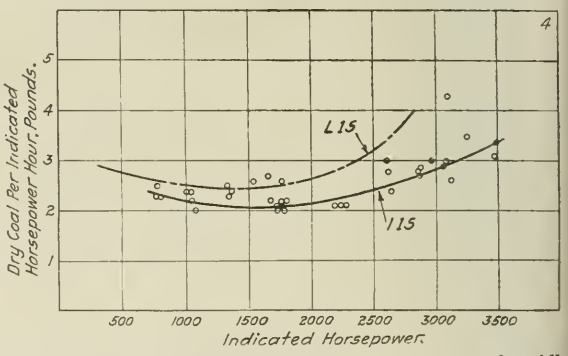


Fig. 4. Indicated Horsepower and Coal (Average for All Cut-offs)

flow of 58,000 lb. per hour. The exhaust steam pressure shows a maximum of 16.3 lb. per square inch. Even with a boiler pressure of 250 lb., the maximum superheat temperature was 282.8 deg., which is nearly as high as has been obtained on any locomotive on the test plant, all of which have had a boiler pressure at or below 205 lb.

Combustion, Draft and Temperature.—In general, the draft or vacuum was higher in the Ils than in the Lls at all rates of evaporation. This is to be expected, as the exhaust nozzle area was 35.8 sq. in. for the Ils and 38.3 sq. in. for the Lls. Though not greatly different, the smokebox temperatures are somewhat higher than in tests of the Lls.

The feedwater temperature was between 37.3 and 64.9 deg. The firing was all by hand as the locomotive was not at this time equipped with a stoker. The rate of firing reached 189 lb. an hour per square foot of grate, and at this rate the evaporation per square foot of heating surface was

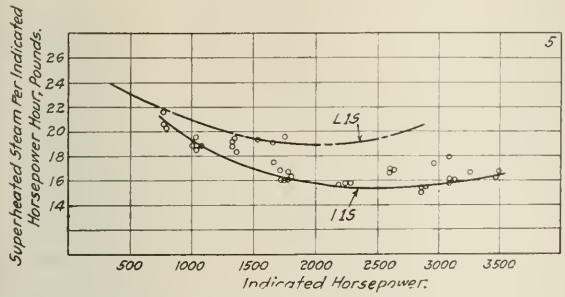


Fig. 5. Indicated Horsepower and Steam (Average for all Cut-offs)

10.3. The maximum rate of firing, in pounds per hour, was 13,226.

Evaporation.—The evaporation of this boiler appears to be less than was obtained from the smaller Lls boiler, but when the higher pressure and superheat of the Ils are considered, the maximum equivalent evaporation of the Ils is considerably above that of the Lls. The equivalent evaporation per pound of coal is illustrated by Fig. 15. The evaporation per pound of coal and the boiler efficiency results are about the same as were obtained in 1917 (see Fig. 1.). The equivalent evaporation per square foot of heating surface for the Ils reached a maximum of 14.7 lb. per hour.

Superheat.—The Ils shows a maximum superheat of about

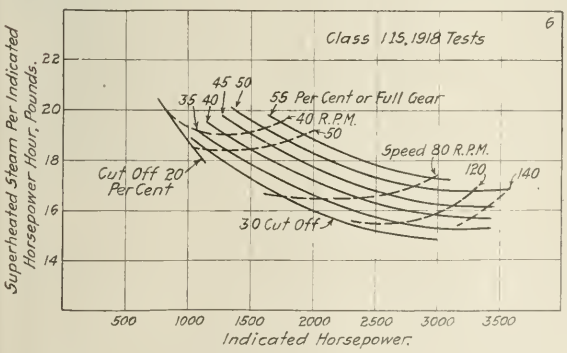


Fig. 6. Water Rates at All Cut-offs, Class Ils

280 deg. and at a rate of firing of 11,000 lb. per hour the superheat is about 15 per cent higher than for the Lls when equipped with a superheater of the same length as in the Ils, or 18 ft. When these two superheater surfaces are compared, that of the Ils is larger by about 20 per cent, on account of the larger number of elements.

The normal saturated steam temperature for the Ils is 406 deg. and for the Lls, with a boiler pressure of 205 lb., it is 389.5 deg. It would appear to be more difficult then to superheat the steam from the Ils boiler on account of its higher initial temperature, but notwithstanding this, a higher maximum superheat was obtained, although it is somewhat lower over part of the range.

The water heating surface of the Ils boiler is 8.8 per cent, the total heating surface 12.0 per cent, and the fire area through the tubes 7 per cent greater than the corresponding parts of the class Lls. For these reasons it was expected that an evaporation somewhat higher than in the case of the Lls class, over 59,000 actual, or 77,000 equivalent pounds per hour, would be possible when using an exhaust nozzle seven inches in diameter, or the same diameter as was used on the Lls.

With a seven-inch diameter exhaust nozzle (1917 tests), an evaporation of about 53,600 actual, or 72,500 equivalent pounds per hour was obtained. This was not considered sufficient, in view of the performance of the class Lls, and many changes were made in the arrangement of the diaphragm in the smokebox and different forms of stack were tried. Finally, by reducing the nozzle diameter to 6¼ in., an evaporation of 59,300 actual, or 81,900 equivalent pounds was obtained.

The tests of the 1918 series, beginning with 5401 and ending with 5416, were made with a seven-inch exhaust

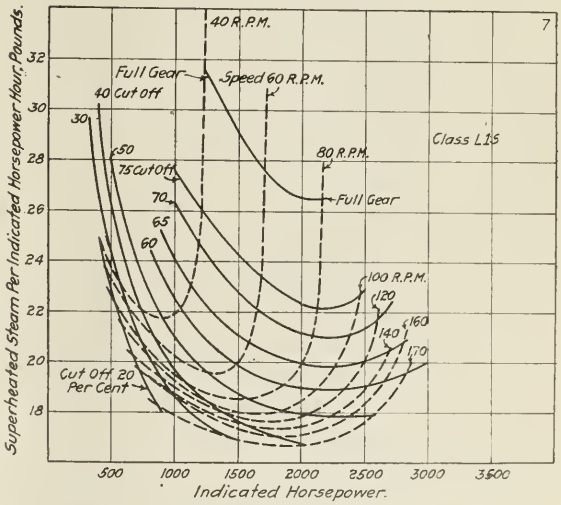


Fig. 7. Water Rates at All Cut-offs, Class Lls

nozzle, and it was used again in tests 5431 to 5438. Test 5412 at 80-55-F, evaporating 51,280 lb. per hour, proved to be the limit with this nozzle and smokebox arrangement. It was found, after test 5416, that cinders were accumulating in the front end, and to overcome this the exhaust nozzle was reduced to 6¾ in. and a deflector plate, eight inches wide, put on the edge of the table plate in front of the nozzle. This deflector made the gas passage, at the smallest area, the same proportion of the fire area of tubes as on the classes Lls and K4s, where it is 68 per cent.

Arranged in this way, the evaporation, in test 5443 was 58,300 lb., or an increase of about 14 per cent over the evaporation that could be obtained with the seven-inch nozzle without the deflector. When equipped with a stoker in later tests, an evaporation of 60,906 lb. was obtained, showing that the expected evaporation is easily possible with this locomotive.

While in the earlier tests a 6¼-in. exhaust nozzle was used, in the final tests it was found possible to use a 6¾-in. nozzle, but not a 7-in. The boiler conditions had been improved by the changes in the stack and front end, so that the 6¾-in. nozzle gave draft conditions as good and a

capacity as high as could be obtained with the 6¼ in. nozzle and the earlier arrangement of the front end.

Engine Performance

The engines of this locomotive, compared with long cut-off locomotives as to economy in coal and steam, have yielded expected results. The tests have shown that the restricting of the cut-off has had the desired effect in that, in full gear, where the bulk of the work is done, this locomotive operates much more economically than the Lls. This advantage, as expected, is reduced as the engines are cut back, but it is not until we have gone below the most economical cut-off for both locomotives that the Lls and Ils show the same economy at a given horsepower. This, moreover, is the case only at the lower horsepower (in short cut-offs at low speeds), that is, for but a small portion of the work done by the locomotive when in normal railroad service.

Indicator Diagrams and Action of Starting Ports.—Representative indicator diagrams are shown in Fig. 2. The principal point of interest in these diagrams is the action of the auxiliary starting port. It opens before the opening of the main port, having a lead of 1 15/16 in. in the tests

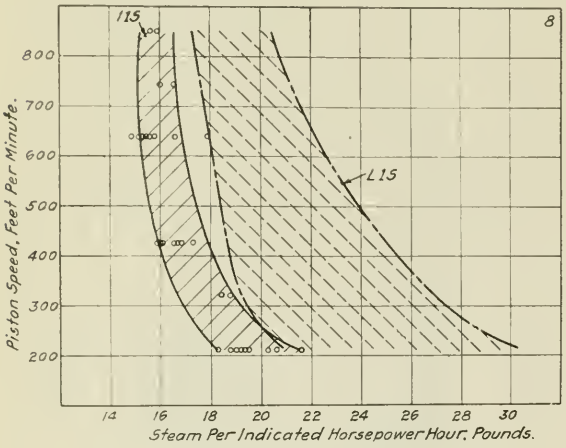


Fig. 8. Piston Speed and Water Rate

here recorded, as against 3/16 in. for the main port and, on the indicator diagrams, the effect caused thereby can scarcely be noticed. Considering the cards for full gear, there is no evidence that the auxiliary ports admit a sufficient amount of steam to hold up the admission line appreciably, after the cut-off of the main port. The testing plant conditions in starting are not the same as on the road, on account of there being little or no resistance to turning the locomotive wheels and no rolling load, in the form of the locomotive itself and the train.

Indicated Horsepower.—The test results in indicated horsepower are plotted on Fig. 3. The range of horsepower was between 766.6 and 3,486.1. The highest power was obtained at a speed of 140 r.p.m, which is equivalent to 25.3 m.p.h.

The superheated steam used per i.h.p. hour was between 14.9 and 21.6 lb. In 12 of the tests the steam used per i.h.p. hour was 16 lb. or less. On 16.6 lb. of steam per i.h.p. hour, an indicated horsepower of about 3,500 was developed.

Many tests show a coal consumption of between two and two and a half pounds per horsepower hour, while the maximum rate, neglecting test No. 5417 as abnormal, was less than three and a half pounds per i.h.p. hour. The curves as drawn for the class Ils, Figs. 4 and 5, show lower results in steam and coal per unit of power than for the class Lls at any power.

The indicated horsepower at 7.4 miles per hour, in full gear, is 1,743.7. With the Lls at the same speed in full gear it is about 1,220. This is an increase in power over the Lls of about 43 per cent. The maximum horsepower was obtained at 25 miles per hour and 45 per cent cut-off; this was 3,486. With the Lls the maximum power at this speed was 2,755, or about 80 per cent of that of the Ils. The Lls has developed on the test plant 2,954 hp. at a speed of 29 m.p.h.

Steam Rate Curves.—In Figs. 6 and 7 curves are plotted

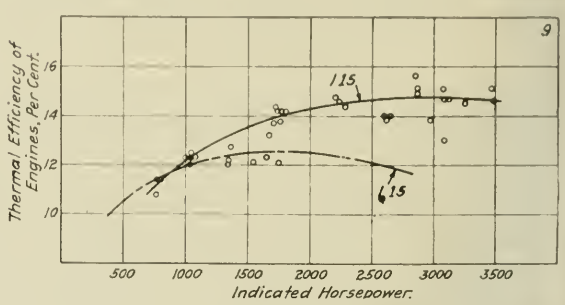


Fig. 9. Indicated Horsepower and Efficiency of Engines

showing the whole range of weight of steam per indicated horsepower hour for the locomotives, classes Ils and Lls. Considering the speed of 40 revolutions per minute or 7 m.p.h., and full gear, it is found from these diagrams that the Ils developed 1,740 i.h.p. and used about 19.5 lb. of steam per horsepower hour, while the Lls developed 1,230 hp. and used 31.5 lb. of steam per horsepower hour. At a speed of 120 r.p.m., 22.1 m.p.h., and at a cut-off of 50 per cent, for the Ils the horsepower is about 3,280, while for

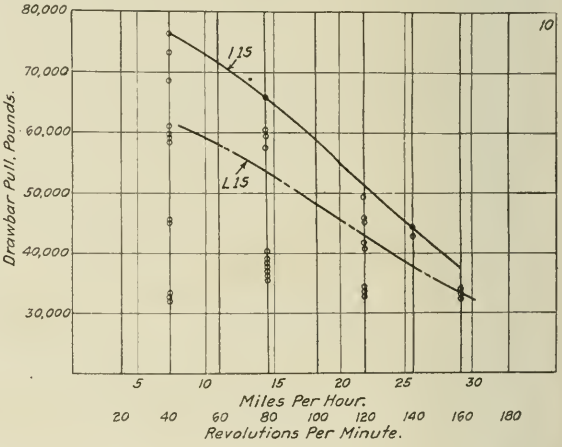


Fig. 10. Drawbar Pull of the Ils and Lls at Various Speeds

the Lls it is about 2,050, and the steam per indicated horsepower for the Ils is 16.8, while for the Lls it is 18.0. In this latter case little or no saving would be expected and the difference may be attributed to difference in quality (pressure and superheat) of the steam. In full gear, at low speed, the reduction in the steam per indicated horsepower by the Ils over the Lls is, as above indicated, approximately 38 per cent.

Piston Speed and Water Rates.—The water rate of the locomotive improves to a certain extent with an increase in piston speed, and this is shown by the plotted results in Fig. 8. The weight of steam per indicated horsepower for the Ils locomotive is in a separate zone from that of the

Lls, and less steam is used when the two locomotives are tested under like conditions.

On account of the small exhaust nozzle and higher boiler pressure, the back pressure was in general somewhat greater than for the Lls.

Thermal Efficiency of Engines.—The thermal efficiency of the engines alone, referred to indicated horsepower, calculated according to the method of the A.S.M.E., is shown in Fig. 9. This efficiency is the proportion of the total heat consumed which is converted into work in the cylinders. The heat considered is that in the steam in the branch pipe,

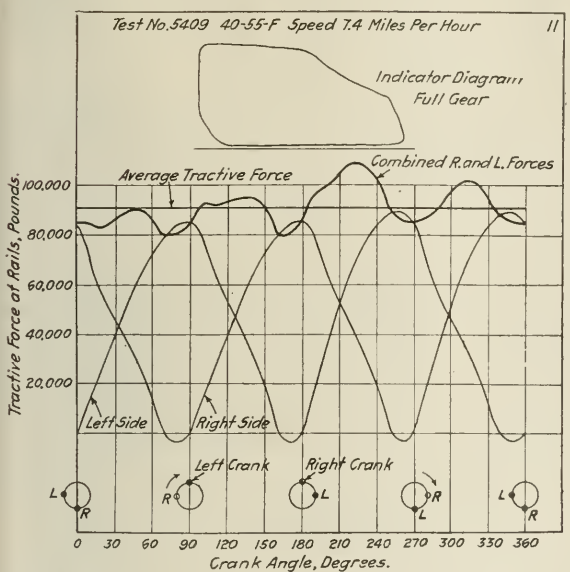


Fig. 10. Tractive Effort Curves, Full Gear, Class Ils

above an ideal feedwater temperature which is assumed to be that as observed of the steam in the exhaust pipe. These efficiency results show that there is much improvement in the Ils over the class Lls. The efficiencies of the locomotive are between 10 and 16 per cent, while those of the class Lls are between 10 and 14 per cent.

Locomotive Performance

The dynamometer horsepower shows increases and economies closely following those for indicated horsepower. Many tests have a coal rate of 2½ lb. (see Fig. 16) and a steam rate of less than 18 lb. The minimum rate was 16.8 lb. of steam per d.h.p. hour. Both the coal and water rates are below those of the class Lls for all dynamometer horsepowers.

The drawbar pulls obtained upon the testing plant are shown in Fig. 10. To be 25 per cent greater than the pull of the Lls at 40 r.p.m., the Ils should have a pull of about 75,000 lb., and this pull was considerably exceeded. In the tests with 30-in. cylinders at a speed of 40 r.p.m. or 7½ m.p.h., the drawbar pull on the test plant was 68,000 lb., and later on the road about 76,000 lb. With the new 30½-in. cylinders, on the test plant the pull at this speed was 76,000 lb.

Cylinder Tractive Force.—Comparative turning moment or cylinder tractive force curves for the class Ils Decapod type, and the class Lls Mikado type, are shown in Figs. 11 and 12. It will be seen from these diagrams that the turning moment in the case of the class Ils, cutting off at half stroke, forms nearly as smooth a curve as for the class Lls, cutting off at nearly full stroke, and therefore that the advantages of a favorable cut-off are obtained in this locomotive without introducing high peaks in the curve or any unusual tendency toward slipping of the driving wheels.

Machine Friction.—The machine efficiency of this locomotive is plotted in Fig. 13. The highest efficiency is 91.7 per cent. At the lowest speed of the tests, 7.4 m.p.h. in full gear, it was 85.6 per cent. In tests of the class Lls the machine efficiency was in some cases as high as 95 per cent and at 7 m.p.h., in full gear, it was 94 per cent. The thermal efficiency of the locomotive (proportion of total heat consumed converted into work at the drawbar) is shown in Fig. 14. The Ils developed a maximum efficiency of 8.1 per cent, while the highest atained by the Lls was 7.0 per cent.

Tests with Duplex Stoker

Following the hand-fired tests locomotive No. 790 was equipped with a Duplex stoker. It was then returned to the test plant and the tests continued with the stoker in use. The stoker was piped so that its exhaust steam could be turned into the base of the elevator screws to dampen the coal, the claim being made that this will reduce the smoke.

For the remaining tests the stoker was used without any hand firing and the test conditions duplicated as nearly as possible the hand-fired tests. Some of the stoker-fired tests were made to obtain the steam consumption of the locomotive only and were run for too short a time for reliable coal data. These have not been plotted on the diagrams.

The stoker speed at first was found to be too low, not over 40 strokes per minute, and in order to increase the

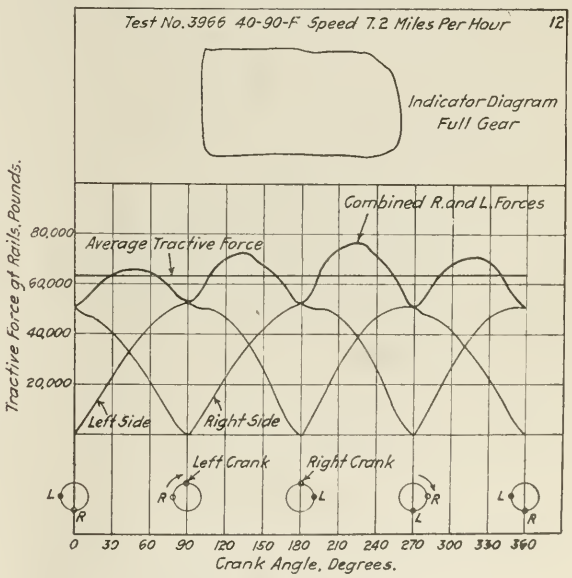


Fig. 12. Tractive Curves, Full Gear, Class Lls

speed changes were made in the steam ports of the stoker cylinder by enlarging and extending them. The exhaust pipe from the stoker engine was also enlarged to two inches. After these changes the stoker could be run at 48 strokes per minute, and it was possible to fire all of the coal that could be burned. The same kind of coal was used for the stoker tests as for the hand-fired tests, namely, Crows Nest run-of-mine.

The exhaust steam from the stoker cylinder was led to a condenser and the condensed steam weighed in the first nine tests. From these records it was found that about ¼ lb. of steam was used per double stroke or revolution of the stoker, and for the remaining tests the stoker exhausted to the atmosphere and the steam used was calculated. The

steam used by the stoker steam jets could not be measured directly and was calculated by the Grashof formula.

Coal.—The average analyses of the Crows Nest coal used for the hand-fired and stoker tests, are shown in the following table and indicate a very small difference.

	Hand fired	Stoker fired
Fixed carbon, percentage	56.80	58.68
Volatile combustible, percentage	29.68	29.92
Ash, percentage	12.26	10.18
Moisture, percentage	1.25	1.23
Total	99.99	100.01
Sulphur, percentage	1.41	1.54
B.t.u. per lb. dry	13,420	14,130
B.t.u. per lb. combustible	15,324	15,662

Results of Tests.—The results of the stoker-fired tests are plotted in Figs. 15 and 16, and on these diagrams the hand-fired test results, made immediately before the application of the stoker, are shown for comparison.

Maximum Capacity with Stoker.—It is evident from the tests that the evaporation and rates of firing are but little more than can be obtained by hand firing, so that the capacity of the locomotive was not increased by the stoker, but of course the maximum evaporation is obtained with much less exertion on the part of the fireman, and also it is evident that the maximum evaporation can be sustained for a longer time with the stoker.

It was found that the boiler could not be forced much beyond an evaporation of 60,000 lb. per hour, indicating this to be the boiler limit for both hand and stoker firing.

Coal Economy with Stoker.—A further analysis of the stoker test results shows that hand firing is superior

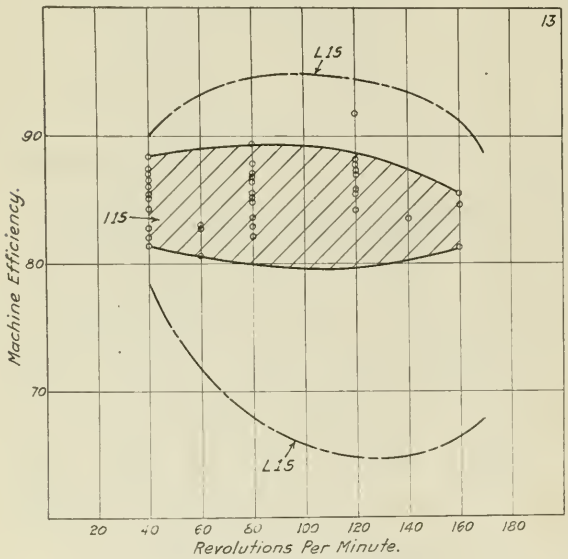


Fig. 13. Machine Efficiency

in evaporation per pound of coal at low rates of firing, but that this advantage decreases until, when the boiler is evaporating its maximum weight of water the stoker firing is no less economical than the expert hand firing. The advantage shown for hand firing is about 19 per cent when firing 40 lb. of coal per square foot of grate per hour, and decreases to nothing when firing 180 lb. per square foot. (See Fig. 15.) There is practically no difference in the superheat of the steam with or without the stoker. The range of the superheat is between 130 and 285 deg.

Stoker Exhaust to Conveyor.—The stoker engine ordinarily exhausts to the atmosphere, but there is also a pipe connection to the base of the elevator screws, and when this was used the coal was dampened by the exhaust steam. With this connection in use in test No. 5470 there was a marked reduction in the smoke and also a smaller coal consumption, but as there was only one test made under these conditions no very definite conclusions can be drawn, although the indications are that there is some advantage to be gained by its use. The results obtained with it, compared with both hand and stoker-fired tests without it, are shown in the following table:

Test No.	Test designation	Coal fired, lb. per hour	Equivalent evaporation per lb. dry coal	Smoke percentage	Exhaust of stoker engine to—
Stoker Fired Tests					
5,470	120-30-F	5,505	9.1	15.6	Conveyor
5,447	120-30-F	5,783	8.7	27.0	Atmosphere
5,449	120-30-F	6,019	8.3	22.8	Atmosphere
5,456	120-30-F	6,304	7.8	32.4	Atmosphere
Hand Fired Tests					
5,432	120-30-F	4,641	10.3	7.2	.....
5,428	120-30-F	4,720	9.8	8.2	.....
5,441	120-30-F	4,943	9.7	18.8	.....

Steam Used by Stoker.—The estimated weight of steam used by the stoker ranged between 393 and 1,629 lb. per

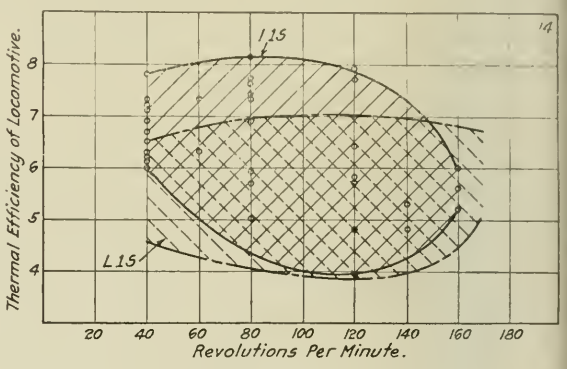


Fig. 14. Thermal Efficiency of the Locomotive

hour, and was about two per cent of the steam generated by the boiler. There was more hooking or leveling of the fire in hand firing than when the stoker was used. This would indicate that the stoker maintained a more nearly level fire than could be obtained by hand firing. The number of times the grates were shaken was practically the same for either hand or stoker firing.

Conclusions

With this boiler, carrying a steam pressure of 250 lb. per sq. in., no difficulty was found in superheating the steam to a high temperature. The water and superheating surfaces are larger than those of the class Lls locomotive and a greater equivalent evaporation was obtained.

The engines of this locomotive compared with long cut-off locomotives as to economy in coal and steam, have met expectations. The tests have shown that the restricting of the cut-off has had the desired effect in that, in full gear, where the bulk of the work is done, this locomotive operates much more economically than the Lls. This advantage, as expected, is reduced as the engines are cut back, but it is not until below the most economical cut-off for both locomotives that the two classes of locomotives show the same economy.

In the results of the tests which show power and steam used, the action of the stoker need not be considered, and it was found in many tests that the steam rate per i.h.p. hour was 16 lb. or less. At a rate of only 16.8 lb. of steam per hour an indicated horsepower of over 3,500 was developed. The saving in steam per indicated horsepower over the Lls is very evident and, except at low horsepower at low speed, it is not possible to operate the Lls at as good advantage as the Ils, and in full gear at low speed, the reduction in steam per indicated horsepower, over the Lls is 38 per cent.

The maximum evaporation was obtained with the stoker with very little exertion on the part of the fireman. The stoker fired a fairly level fire, and could be operated under

all conditions in a satisfactory manner without any hand firing.

Except at the highest rates of firing, the stoker is wasteful in the use of coal, but appears to be no more wasteful than other stokers, and in addition has advantages over the other

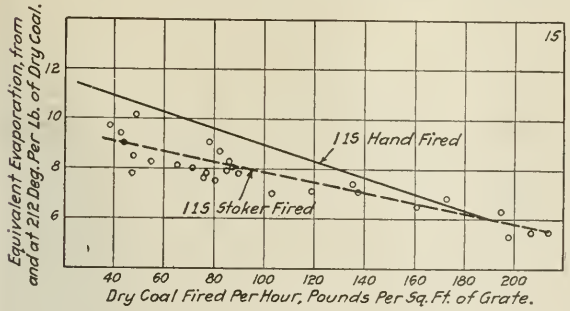


Fig. 15. Evaporation per Pound of Coal, Hand and Stoker Firing

stokers tested, in ease of operation and in the absence of obstructions at the fire door and on the grates.

The estimated weight of steam used by the stoker was about two per cent of the steam generated by the boiler. The advantage shown for hand firing over the stoker firing in

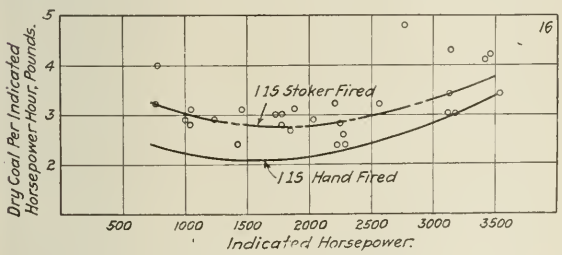


Fig. 16. Indicated Horsepower and Coal, Hand and Stoker Firing

equivalent evaporation per pound of coal is about 19 per cent when firing 40 lb. of coal per square foot of grate per hour, and decreases to nothing when firing 180 lb. per sq. ft.

With the stoker it is to be supposed that a greater number of firemen could obtain the full capacity of the locomotive than would be the case with hand firing, because of the ease of handling the stoker. Such considerations, combined with those of economy or capacity as shown by tests, in the case of locomotives of this class, must govern in deciding whether a stoker is necessary.

Campaign to Stabilize Coal Industry

A NATION-WIDE DRIVE to stabilize the coal industry by promoting the early purchase and storage of coal, in order to distribute production and the consequent demand upon railroad facilities more evenly throughout the year, was initiated by the Bituminous Coal Commission, appointed by the President to settle the question of miners' wages, before it closed up its affairs last week. The Council of National Defense has been asked by authority of the President, to assume the specific duties outlined for it in the recommendations of the commission, which were published in last week's issue, and which contemplate that it shall try to bring about a concentrated effort by all concerned to put them into effect.

The following definite steps have been taken:

1. The President has written a personal letter of instruction to the heads of all departments and federal agencies, to the end that they may give personal attention to the purchase and storage of a three months' winter supply of coal. The President believed that a personal letter to this end would do the work even better than a mere formal executive order.

2. The Council of National Defense has assumed the duty of obtaining the support of the general public in the stabilization of the coal industry through the purchase, transportation and storage at the point of ultimate consumption of its winter supply of coal—this to be done during the spring and summer months.

3. The President has transmitted to the Interstate Commerce Commission a copy of the bituminous award and recommendations, to the end that the Interstate Commerce Commission take such action as it may deem advisable in the premises. (This is in connection with the car problem.)

4. Letters have been sent to the governors of the various states, (2) the supervisors of all counties, and (3) the mayors of all cities asking that executive orders be issued for the purchase and storage of coal for public buildings and on all public works.

5. The steel corporations have been asked to purchase and store coal during the spring and summer. They have agreed.

6. The support of the public utility corporations of the country for the purchase and storage of coal has been pledged by their representatives in Washington.

7. A letter has gone to the governor of the Federal Reserve Board asking that board to issue memoranda to the various Federal Reserve Banks, requesting that they look with favor upon paper for rediscount drawn against coal in storage.

8. The Washington representatives of the various state railway and public utility commissions will transmit to the various state bodies having control over rates the report and award of the coal commission, asking that the state bodies use their influence with public utility companies for the purchase and storage of coal, reflecting the cost in rates if necessary.

9. The United States Chamber of Commerce will issue copies of the commission's report, award and recommendations to all chambers of commerce in the United States, so that the business men of the country may be informed as to conditions and may be induced to purchase and store coal.

10. Through the Association of Railway Executives, copies of the commission's award will be transmitted to all railroad and steamship companies in the United States, with the request for their co-operation.

The commission believed that it was not at all adequate to ask people to buy and store coal, but that constituted authority should issue orders wherever possible for such purchase and storage, and that where orders could not be issued it should be made financially attractive for the general public and the various corporations to purchase and store this coal—this because the commission realized that with a car shortage in the winter and with a lack of market in the summer no other method could be devised for the stabilization of this industry.

If the school houses of the United States, the various court houses, jails and other public buildings can be ordered to lay in the necessary supply, a part of the domestic peak of winter requirement will be eliminated.

The public utility corporations and a great many manufacturers have been so dangerously near coal famine in the past, and want of cars next winter may so seriously affect the ability of the carriers to handle coal, that it was the commission's belief that the purchase of coal during the summer months could be made a permanent thing. In this regard, the public utility corporations already have agreed to store more than 12,000,000 tons, although no complete canvass of the companies has as yet even been attempted. Therefore, the storage of coal by utilities will greatly exceed this amount.

The general public was warned, however, to place its orders

in May, June and July, on the ground that unnecessary buying in April would be liable to result in a flurry in coal prices.

Director General Hines on March 24 issued an order suspending all regulations pertaining to coal issued under his authority, as of April 1, and the central, regional and district coal committees were instructed to devote the remaining period before that date to carrying out to conclusion settlements for coal diverted prior to April 1.

The Relation of Punitive Overtime to Freight Train Operation

By G. D. Brooke

Superintendent of Transportation, Baltimore & Ohio, Western Lines; Cincinnati, Ohio

WITH THE ADVENT OF THE time and-one-half overtime rate in road freight service, the problem presents itself to the operating man to determine to what extent the speed of freight trains can be increased to meet the higher cost of wages. The conditions surrounding quick-despatch or preference trains, local or way freight trains and pick-up, mine-run or roustabout trains are usually such that their speed while moving is determined by other factors than those which govern the speed of slow freight train. The speed of quick-despatch or preference trains is governed by the traffic or service conditions; way freight, pick-up and other trains having a great deal of switching and other work at stations have to move rapidly between stations in order to maintain schedules and to prevent the total time on the road becoming excessive. In reducing the hours of service of the crews of such trains it is necessary to deal with other features of operation than the speed between stations.

With slow or tonnage freight trains the time moving on road forms a large percentage of the total time and the speed of the trains has an important bearing on the tonnage hauled and consequently on the cost per ton mile of the transportation. The speed of such trains in ascending the ruling grades of the engine district is a governing factor in fixing the tonnage rating of the engine. Conversely, the tonnage rating assigned to the engine governs the speed of the train on the ruling grade. And the speed on the ruling grade determines to a greater or less extent, depending on the number or lengths of the grades of the ruling gradient, the average speed of the train over the district and the number of hours required to make the run.

The table gives the cost per train hour of a slow freight train drawn by a Mikado locomotive for various train-days of from 8 to 16 hours, inclusive, and the diagram shows for various grades from level to 2½ per cent the decrease in tonnage rating of a Mikado locomotive with increases in speed from 5 to 30 miles per hour. It will be noted that the increase in cost per train-hour due to overtime, when the total of all items of expense which may reasonably be considered as affected by lengthening the train-day is taken into account, is relatively small, while the decrease in tonnage rating with increases in speed is very great. The exercise of much care is therefore advisable in increasing the speed on ruling grades and the effect on the cost per ton-mile should be the criterion rather than the reduction in overtime.

Since conditions on engine districts vary widely, each will present a separate study, but the principles involved will be the same. By small reductions of the train load on the ruling grade trains will be enabled to start more quickly, sidings can be entered and left more promptly, the engine and train crew will have more confidence in their ability to move with precision and will be able to better take advantage of any situation to advance the movement when opposing or following trains are involved; the train despatcher will work with more confidence and the general result will be a more snappy movement and reduced train hours. On the other hand, high speeds on running grades will require such reductions in trainload that the number of trains will be greatly increased with resulting interference; aggregate train hours required to handle the tonnage will remain high and ton mile cost will be increased.

While each division superintendent has his particular problem, small reductions in tonnage rating are advocated where any are necessary, while proposals for large reductions in trainload should be scrutinized with care and acceded to only after exhaustive study and positive conclusions that they are sound.

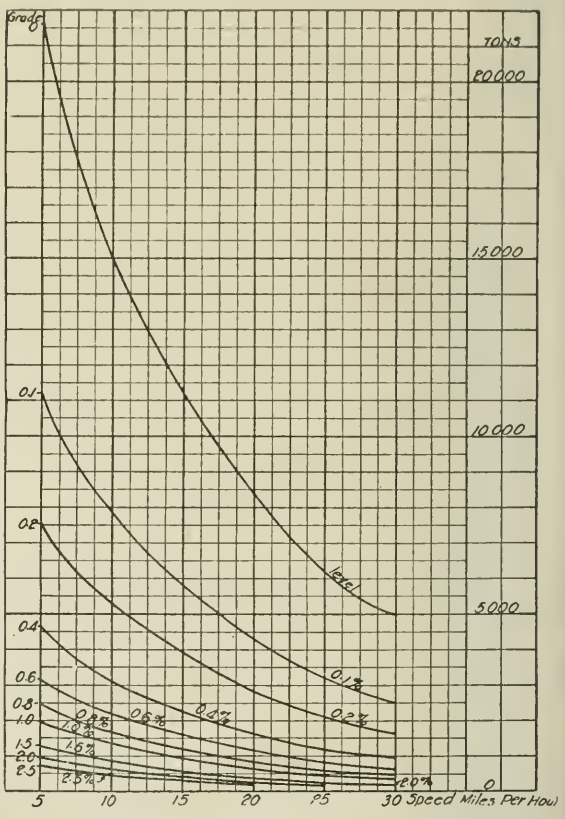


Diagram Showing Decrease in Tonnage Rating with Increase in Speed for a Mikado Locomotive with a Tractive Power of 50,300 Lb.

TABLE SHOWING RELATION OF TIME-AND-ONE-HALF OVERTIME TO TRAIN-HOUR COSTS

Hours per trip	Slow freight service cost per hour			Per cent wages to total
	Wages	Other	Total	
8	$3.17	$8.85	$12.02	26.4
9	3.34	8.85	12.19	27.4
10	3.48	8.85	12.33	28.2
11	3.60	8.85	12.45	28.9
12	3.69	8.85	12.54	29.4
13	3.77	8.85	12.62	29.9
14	3.85	8.85	12.70	30.3
15	3.91	8.85	12.76	30.6
16	3.96	8.85	12.81	30.9

Note—The figures are for trains handled by Mikado freight locomotives. Other cost includes fuel, water, engine and train supplies, locomotive repairs, depreciation, etc., but does not include maintenance of way and general expenses.

*From the report of the Committee on Economics of Railway Operation of the American Railway Engineering Association.

Railroad Valuation and the Unearned Increment*

"To Limit Railway Income Is to Legislate Into an Affirmative Policy What Was First Developed as a Rule of Negation"

By Homer B. Vanderblue
Assistant Professor of Transportation, Northwestern University

THE PROPOSAL to regulate railroad earnings, of which so much has recently been spoken in both houses of Congress, is a disguised, even if an unconscious, attempt to discriminate against the holders of railroad securities. Certainly the American people have not passed upon the proposal to regulate profits; perhaps, indeed, because the rising level of railroad operating costs has served since 1907 to consume the differential which with an expanding tonnage might otherwise have been pointed out as monopoly profit or unearned increment—both terms seldom defined. The railroads have repeatedly come to the Interstate Commerce Commission asking higher rates, which have been but sparingly given. In 1910 and in 1914 the railroads received small advances and considerable obvious advice to economize. Under the war powers of the President an executive order raised the level of rates beyond what the private interest had ever asked. But when a return to private ownership is contemplated, discussion of limiting earnings is coupled with the discussion of the surrender of the properties.

Why? The answer is to be found not alone in loose talk about monopoly, but in the twisting of a doctrine based upon general remarks appearing in a Supreme Court opinion of 1898; the famous case of Smyth vs. Ames. To limit railroad income is to legislate into an affirmative policy what was first developed as a rule of negation.

The Supreme Court has held that the fourteenth amendment (which was passed to meet quite another set of problems) insures to the railroad the right to receive just compensation for the service given the public. And in the course of adjudication Justice Harlan voiced his now-famous rule:

But this rule set only a minimum below which a legislative body might not go. In its effect (whatever the wording) it was purely a restraining influence. Rates might not be established "so unreasonably low as to prevent the railroad companies from earning such compensation as would be just." The confiscation doctrine set only a minimum. How much more the rate of return might be rested within the range of "legislative discretion."

"The basis of all calculations as to the reasonableness of rates must be the fair value of the property being used for the public."

But Congress in 1913, acting upon urging by the Interstate Commerce Commission, which at no time appears to have made a rigorous analysis of the underlying economic problem, passed an act directing the commission to "value" the railroads. In this task that body, through a subordinate bureau, has, therefore, been since engaged. This work promises now to be completed, in large part at least, before the end of 1920. For the Texas Midland, Winston-Salem Southbound, and Kansas City Southern roads formal findings and orders as to "basic facts" have been published. Strictly speaking, these findings do not contain totals of value at all, but instead a heterogeneous group of unrelated figures. There is a summary of "cost of reproduction new" and of "cost of reproduction less depreciation" of the railroad plant, as distinguished from land; figures of the "present value" of land and of "original cost" where found. Somehow these are later to be used to fix a single sum as value, but nowhere is a method of procedure made evident. The valuation act offers no help by way of definition or formula. Value would seem to be one thing and cost quite another. A "cost value" is indeed *sui generis*. The truth is that the Congress and the commission are blindly following *dicta* of Justice Harlan when analysis of the underlying problem in terms of economic principles is demanded. For the valuation act is after all only an attempt to measure in dollars the elements of "fair value" listed in the "rule" of Smyth vs. Ames:

"In order to ascertain that value the original cost of construction, the amount expended in permanent improvements, the amount and market value of its bonds and stocks, the present as compared with the original cost of construction, the probable earning capacity under particular rates prescribed by statute, and the sum required to meet operating expenses, are all matters for consideration, and are to be given such weight as may be just and right in each case. We do not say that there may not be other matters to be regarded in estimating the value of the property."

Instead of stating a rule or expressing a judgment, the truth is rather that Justice Harlan sought to avoid committing the Supreme Court to a single standard of value. He included in his summary every element which entered into the record at any point. But in the Minnesota Rate Cases (1913) Justice Hughes subscribed to an inquiry based broadly upon these vague provisions. "Value is not controlled by artificial rules" and its ascertainment is "not a matter of formula." On the contrary, "there must be a reasonable judgment of all relevant facts." Surely so long as "reasonable" qualifies both the process of determination and the "value" sought for, a rule has not been voiced in unequivocal language.

Valuation and Reasonableness of Rates

The truth is that the value of a railroad cannot be used as a test of the reasonableness of that carrier's rates. For the value of any machine (and the railroad is a highly specialized machine) depends upon the earnings which accrue from its use. To test rates by the value of the property before the act of regulation is made effective means the abandonment of regulation. And to test them by the value of the property, once new schedules are in effect, means the approval of any schedule that may be established. Something other than value (as the economist and business man usually speak) is meant.

To step out of this vicious circle resort has been had to appraisal, and most frequently to appraisal in terms of "cost of reproduction." But cost of reproduction obviously does not measure value in the sense of what a purchaser would pay for a property. Let the owners of the old Wabash Pittsburgh Terminal put their road upon the market to prove the truth of this assertion. To be sure, cost of reproduction has been one of the elements considered in purchases in the past; but it is important, not as a test value but rather as insurance, that the original property has been maintained. Or if a railroad faces the alternative of building a parallel line or of absorbing a potential competitor, the sellers know that the prospective purchaser's maximum price is set by the cost of building an alternative road. Reproduction cost may be "a fundamental though not necessarily a controlling element in

*The basic economic theories here discussed are expanded and authenticated in the writer's Railroad Valuation, Houghton Mifflin Co., 1917; and in an article appearing in the November, 1919, and February, 1920, Quarterly Journal of Economics, "Railroad Valuation by the Interstate Commerce Commission." References to page and volume of authorities is therefore here omitted.

value."[1] But (as taking account of competition) revenue, existing or prospective, will still be the ultimate determinant of value. The crucial test is the stock market quotation. Value is an exchange relationship.

The commission has reported no figures of the cost of reproducing or reacquiring carrier lands, although the act directs, as regards land, an investigation and report of "present values" and "original cost" and "separately the original and present cost of condemnation and damages or of purchase in excess of . . . original cost." The authority for this omission is language of Justice Hughes in the Minnesota Rate Cases:

"The conditions of ownership of the property and the amounts which would have to be paid in acquiring the right of way, supposing the railroad to be removed, are wholly beyond reach of any processes of rational determination. The cost of reproduction method * * * does not justify the acceptance of results which depend upon mere conjecture."

The commission has felt the "clear" duty to abstain from reporting as an "ascertained fact" figures which are incapable of rational ascertainment.

Instead the "present value" of land is reported. These so-called value figures are in turn premised upon a conscious attempt to apply other *dicta* of Justice Hughes:

"Assuming that the company is entitled to a reasonable share in the general prosperity of the communities which it serves, and thus to attribute to its property an increase in value, still the increase so allowed * * * cannot extend beyond the fair average of the normal market value of land in the vicinity having a similar character."

The court here really decided nothing affirmatively or explicitly. The conclusion is qualified by an assumption neither approved nor disapproved. But in terms of this assumption Justice Hughes set a maximum which is now reported as "present value" without analysis of the underlying problem.

"Present value * * * is arrived at by ascertaining the number of acres of land owned or used by the carrier for its purposes as a common carrier and multiplying this acreage by a market value of similar and adjoining lands."

The figures of "present value" so determined have been justly denominated as "*a* present value measured in *a* particular way" and not as "*the* present value."

Determining Value of Railroad Land

Can the value of railroad land be measured by the value of adjacent land? Take first the situation of agricultural land; eliminate the railroad, what would the land be worth, deprived of a mode of transportation to market? Or consider the value of land in villages and the smaller towns served by a single road. Not infrequently the railroad itself, when extending into relatively unsettled areas, has plotted town sites and sold single lots for sums which before the coming of the road would have bought acres. Sometimes an enterprising promoter has done the work of exploitation. But in either case depriving the town of the railroad would destroy the site rent. Nor is the situation essentially different where a number of roads have centered and a city—large or small—has grown up. The value of land, urban and rural, is itself largely dependent upon the presence of the railroad. "If there were no railroads in Chicago there would be no Chicago."

The commission formula must fail also when applied to land peculiarly adapted for railroad purposes. How apply the formula to the narrow river bank or the mountain pass? For any purpose except for that of transportation these sites may be quite valueless. Everywhere the railroad follows the line of least physical resistance. How value the right of way of the New York Central up the Hudson by the adjacent land test, or that of the Chesapeake & Ohio in the Kanawha and Ohio valleys? It is not accidental that the railroad follows the river, nor in the older sections that an abandoned canal is frequently seen from the car window. The Baltimore & Ohio fought a bitter legislative battle with the Chesapeake & Ohio Canal for the narrow gap near Harpers Ferry, and the Santa Fe and Rio Grande used armed forces during the struggle for the Royal Gorge of the Arkansas. The easy slope or the rift in the mountains means a saving in construction and a continuing saving in operation. Such a site for a railroad is in a position essentially similar to the wheat land which can be cultivated at the least cost per bushel of wheat. Until the coming of the railroad much of this land was unused and unusable. But the easier slope and the natural cuts make land valuable for railroad purposes which is for any other purpose substantially valueless. Because the railroad must conform to the construction standards imposed by operating requirements it will bid high for land which offers differential advantages.

But how is this value to be determined? The answer of the economist must be that (so long as *value* is sought) the value of the railroad site must be determined as the value of other land is determined—by the capitalization of the economic rent accruing on the site. The value of land used for business cannot be determined by comparison with the value of land for residence purposes. How much a man can afford to pay for a given trading site depends upon how much above the return on the cost of the building the returns from the business can net. Now, the railroad structure occupies a position analogous to that occupied by the modern office building, with the exception — save perhaps in a crowded city—that the railroad site, if tracks are removed, cannot be devoted to another purpose. The abandoned line of the Buffalo & Susquehanna or the unfinished grade of the Providence extension of the Grand Trunk are lost for economic purposes. The sites (however much they may have cost) are worthless, and that portion of the investment analogous to cost of the office building proper, the cost of the grade, the ties, the culverts and bridges, is lost once for all. By removing the rails and selling them, as by tearing down the building and selling the materials, something can be recovered; but only a portion. For the railroad is a highly specialized case of "capital sunk in soil," and once investment is made in grading and providing the necessary permanent structures the roadbed and site are substantially merged. Whether the investment shall prove warranted depends in the long run not on the cost on producing the structure but upon demand—the volume of traffic, the level of rates maintained and operating costs. The return is a "quasi-rent."

Factors Determining Railroad Value

With a constant price level net earnings tend to increase with the passage of time, partly from general social causes, partly from effort expended by the railroad organization. Population filters in; industries and groups of industries concentrate. The volume of traffic increases, and, due to the large element of fixed costs in railroad operating expenses, increasing returns develop. Much necessarily depends upon the natural resources of the tributary country—deposits of coal and iron ore, oil, supplies of lumber, but not everything. Efficient management in seeking out business for locations and locations for businesses and in establishing favorable rate structures (such as those which built up the Pacific coast lumber industry) has been a not inconsiderable factor in increasing the "traffic density" of the railroads. Or the railroad manager, seeing that the building of a short connection will increase the use of his plant for through business, constructs the necessary railroad. The joint building of the Winston-Salem Southbound by the Atlantic Coast Line and the Norfolk & Western is here a case in point. Or a railroad built to exploit a particular natural resource, as the Carolina, Clinchfield & Ohio was built to open up coal fields owned by the syndicate which built the road, seeks to become a link in a new through route competing for the traffic between the Ohio river and the southeast. Additional business secured is analogous here to additional business

1. Report, Railroad Securities Commission, 1911 (of which President Hadley was Chairman), p. 18.

done on a given trading site. There is a more intensive use of a transportation agency built primarily to serve quite another kind of traffic. The additional business accrues as a result of effort by the railroad organization.

The established railway has advantages which, unless it shall be required to open its terminals to competitors, must normally be permanent. The elevators, distributing houses or manufacturing plants have located alongside the pioneer. The railroad which builds into an old country not only buys its land on the basis of a value dependent upon the presence of the older and competing line, but it also usually buys an inferior operating site. Compare, for example, the easy grade of the Cincinnati, Hamilton & Dayton out of Cincinnati with the steep grade and costly trestle construction of the Chesapeake & Ohio of Indiana, which as the old Cincinnati, Richmond & Muncie used the C. H. & D. tracks. The new line normally finds also the sources of income physically attached to its rival. An essential link in the dream of the Gould transcontinental was the West Side Belt which should give access to the industries of Pittsburgh. Without such access the agreement of Mr. Carnegie to give 25 per cent of the Carnegie steel tonnage meant nothing. And upon this tonnage depended the financial success of the Wabash Pittsburgh Terminal project. But even had the competitor proved able to bear the strain of the starving time, the position of the Pennsylvania in the Pittsburgh industrial area must still have been dominant.

Once the net earnings extend beyond the point which was necessary to induce the original investment, an element of "unearned increment" appears which is comparable with the unearned increment accruing in the economic rent of sites devoted to other than railroad purposes. The difficulty is that most of the reasoning upon this subject assumes a "natural" continuing increase in the value of land. The forces of cause and effect are ignored. But for railroad land, as for the building site or the farm, any increase in land value must be a result of earnings (economic rent) and not a cause. The rent for the corner of State and Madison streets in Chicago is not determined by the value of the site; the value of the site is determined by capitalizing the rent which the business men will pay for the corner. And so for the site of the railroad. How much the railroad can pay for its site depends upon how much more than interest on plan and equipment investment it can earn to apply as return on the land. At least the normal return must be expected to accrue or the carrier cannot afford to buy the site. Only if the total net earnings extend beyond the point necessary to induce investment do the excess earnings represent "unearned increment."

The Heart of the Valuation Problem

The heart of the valuation problem lies here. The regulation of earnings seeks to limit the amount of the revenue which may accrue by reason of the possession of a "water grade," a "canyon pass" or a "gap"; the possession of coal mines bought long ago at a low price, or by reason of the clustering together of traffic-furnishing industries or the development of traffic-producing intercarrier agreements. The railroads, perhaps unconsciously, have sensed the relationship of the proposal here stated in bald terms. They have insisted that the "final value" of the property as found by the commission must take account of the value-producing elements, even though these elements affect value (i. e., "selling price") either through increasing gross earnings or decreasing operating expenses. When Commissioner Daniels spoke of a value imparted to the Kansas City Southern as a whole by its Port Arthur Terminal, he was struggling with the same underlying difficulty. The railroad operates as a unit, and for other than local business the possession of an ocean terminal has been strategically essential in order to insure remunerative divisions. Financing the Western Pacific was presumably justified from the viewpoint of the Rio Grande security holders because it promised to add to the earnings of that property amounts then flowing into a competitor's treasury. The building of the west end connection therefore "promised to add a value" through fairer divisions of joint revenue and promise of greater contributions to eastbound transcontinental traffic. But the "added value" was to accrue from greater net earnings, real or anticipated.

The Texas Midland, Winston-Salem Southbound and Kansas City Southern opinions contain general statements testifying to the truth of assertions made by the carriers; traffic connections are listed; the density of traffic is summarized; the character of the adjacent country is described and its products classified; the maximum grade and curvature are stated. Even for the Texas Midland (which has never proved commercially profitable) it had been urged that a "value" should be found because of connections facilities and gradients. President Lamb indicated that investors would be influenced by the fact that the Atlanta, Birmingham & Atlantic "traverses a section of the country rapidly increasing in population and wealth." And the Elgin, Joliet & Eastern (the Chicago "Outer Belt") emphasized particularly "the density of the traffic over the railroad . . . by reason of its favorable location and connection with other railroads and industrial plants." But to appraise these elements as "value" in terms of dollars necessarily involves a consideration of earnings. These are the factors which govern earnings. Clearly they bear no relation to cost or investment. The truth is that the railroads, consciously or unconsciously, are proposing the capitalization of the net earnings which accrue through the possession of differential advantages—a capitalization of the economic rent accruing on the railroad site.

To measure earnings by a value based upon the differential advantages of the railroad site would deny the existence of an unearned increment in railroad earnings by increasing *pari passu* the value of the property. This is to step again into the vicious circle. But it serves to indicate the real "valuation problem"—to find a basis which can logically be used to determine the existence or non-existence of the "unearned" element in the total carrier net income.

There can be no other test than the test of investment, of cost. A return upon the cost of the carrier site is a necessary part of the "long run" cost of producing railroad service. Without the expectation of earning this amount there is lacking all inducement to furnish private funds for construction. It follows logically then that an "unearned" element appears in income only when railroad income extends beyond the point necessary to reward the skill and judgment exercised in its building. Why else, indeed, "unearned?"

If "cost" rather than value is significant for railroad land, what of the carrier plant? Obviously the value of the units on the market is a second-hand value—they are junk. It is again to be seen, therefore, that the term "value" is not appropriate. The figure to be secured, if the problem is to be analyzed into its logical elements, is a figure by which to measure that portion of the long run cost of producing transportation which accrues in net earnings. This holds for plant as for land.

Accounting records do not show the economic facts. To be sure property investment, the first item on the assets side of the railroad balance sheet, purports to indicate the amount of the investment which the railroad devotes to the public service. That the account is quite devoid of such significance is a matter of common knowledge. Too often, as originally set up, it has been hardly more than the journal entry to balance the par value of securities. Even had the first figures been substantially accurate, conservative management, preferring to err on the side of safety if at all, has swelled

the actual investment in plant through charges of net additions to operating expense. Or less significant management, perhaps less honest management, even less fortunate management, has permitted the original plant to wear out without changing the accounts.

It must be recognized, however, that when a large and varied plant such as a railroad is worn to a state of normal depreciation, a formal depreciation reserve is not needed except for clearer exhibition of the facts. Bookkeeping has been simplified by charging replacements to operating expense (maintenance) in preference to setting up a depreciation reserve against which replacements should be charged. The effect of this confusing short cut has been to create generally in the minds of railroad men the idea that they have a "right" to make needed replacements out of current earnings. This assumes that the entire cost of a new rail or car bought in 1919 is a part of the cost of producing transportation in 1919. As a matter of fact, the cost of the old rail (not the cost of the new rail, which represents instead new investment) has been properly chargeable against the cost of producing transportation throughout its service life. The cost of the *new* rail is not significant for cost of past service. Practice has omitted the formal credit to depreciation reserve, and if attending to the detail at all has assumed that the amounts spent for maintenance and replacements balanced the accruing depreciation. In the absence of depreciation charges, or when charges based upon an expected life of a hundred years have been made on equipment which will probably last less than thirty, that extensions or realignments have been paid for out of earnings does not, therefore, of *itself* prove that *net additions to investment* have been made. The income spent for fixed improvements may be that received in reimbursement for the wearing out of the plant made in the past. It is only when the amount of the maintenance cost in any one year, plus the amount spent for new plant, exceeds the accruing depreciation in plant not yet ready for discard that there is net addition to investment.

Maintenance, an operating cost upon the books, has been here spoken of as investment. This concept (although the reasoning has not been clean cut) is at the bottom of the railroad claim for appreciation of roadbed. Too frequently the evidence (expert testimony) has sought to show that the old roadbed is more "valuable" than the new roadbed, because maintenance expenses are less or a purchaser would be willing to pay more. But the essential point is that a railroad is not a finished product when the construction forces have turned it over to the operating department. There is still much work to be done "in resurfacing, in opening up clogged waterways and in bringing about an improved condition of roadbed, right of way and station grounds." And to the extent that this work represents a net addition to investment it may be said that an "appreciation" has occurred which is quite independent of earnings or "value" or of the method of handling the extraordinary expenses upon the books. When the commission falls back on its accounting categories the real underlying problem is passed over. That under the prescribed rules of accounting the carrier cannot carry any part of this expense into its investment account proves nothing conclusively, except that when tested by a refinement of economic theory the accounting rules are inadequate. The argument that "seasoning does not cost anything because it has all been paid for as operating expenses" is beside the point. The accounting rules of the commission are based upon the concept of maintenance in terms of operating efficiency and not of maintenance in terms of dollars of investment. No account is taken of any difference between the cost of the new unit and the original cost of the unit retired, an important consideration in a period of advancing prices, and especially important for those units of plant subject to frequent replacement.

Take the case of the locomotive. In the course of its service life parts are renewed from time to time. When the locomotive comes fresh from the shop it is the cost of the new wheel, or piston rod, or driving axle which constitutes the existing investment, not the cost of the original part which has become worn out and useless for productive purposes. The general manager of the Texas Midland spoke of one of his locomotives in the following terms: "There was not much of the original locomotive left except the outside shell of the boiler, the frame and the cylinders." The question thus resolves itself into the question of whether we are now interested in what the existing plant cost or what the original plant cost five, ten, fifty years ago. Which constitutes original cost to date, which constitutes investment? Obviously the cost of the existing unit.

"Cost to Date in Valuation"

Now, what of the valuation act and what of the commission? The act calls for the ascertainment and report in detail of the "original cost to date" of each piece of property. This requirement the commission has interpreted as demanding the report of a *fact* as contrasted with an *estimate*. The properties have been "actually produced in the past, and their production has cost a given amount of money." Provided the records suffice, original cost, "a fact of prime importance," can be exactly known, and it is in the "exact" sense that the words are interpreted by the commission. But the commission's accountants, finding it impossible to allocate costs to unit of plant, have shown a "kind of original cost" by seeking to determine the source of the funds spent for plant when units of plant have been added otherwise than as replacements charged to operating expenses. "When the proper retirements have been made the result is the original cost of the property in existence, assuming those retirements to have been all identified and the original cost properly determined." The difference between any amounts charged to operating expense because of a more expensive replacement in kind (a $1 tie instead of a 50-cent one) and the original cost of the original unit (the 50-cent tie) is assumed not to constitute investment, since it has been charged to operating expenses.

In substance, this is a proposal to accept the carrier accounts for operating expenses at the same time the property accounts are rejected as worthless. The inadequacy of accounting theory and practice would seem to apply equally to both. Because it could not be determined from the accounts whether one of the Texas Midland box cars had been built at the company's shops and the cost charged to operating expenses or whether it had been donated, no original cost for this unit of plant was reported. This is perhaps an extreme illustration, but it serves to bring out clearly the essential point of principle. The commission, seeking to differentiate between funds furnished by the corporation and those furnished by the public, fails to recognize that within uncertain limits set by a variable standard as to what constitutes the most economical operating condition (or from the other angle, what constitutes "deferred maintenance"), the carrier has had very real control over the disposition of its income. The public has not paid the operating expenses of the railroad in any different sense than it has paid the operating expenses of any other private business. The public has paid a price for service, and out of the total income, the disposition of which has been largely in the hands of the directors, appropriations have been made for dividends, for maintenance, for extension, etc. Once the income accrued to the private company its distribution, except as affected by safety regulations, has been determined by the private interest, and under private control. Heavy appropriations for maintenance, replacements and renewals (even for additional structures) have been made out of earnings, but the direc-

tors have had the choice of making such reinvestment of earnings or of distributing the earnings, including even the amounts properly representing the wearing out of equipment and plant. When dividends have been suspended, or interest repudiated, in order to put money back into the property, can it be said that the plant bought from earnings did not cost the owners anything because charged as operating expense upon the books? It would be different to convince holders of Boston & Maine or Rock Island securities that such a conclusion was valid.

The railroad surplus accounts call also for discussion. It is quite possible that a number of the railroad surplus accounts represent a mere surplus paper. When the present management of the Baltimore & Ohio took hold the surplus was written down to recognize accrued depreciation in equipment. In this sense the surplus represented really the accumulated depreciation reserve which practice had omitted. If in the past net earnings have been actually overstated through failure to charge the amount necessary to take account of depreciation—either through neglect of maintenance or failure to set up an adequate depreciation reserve, or both—any addition to surplus in that year has by so much been unreal. On the other hand, when net additions have been made through charges to operating expenses (in substance, where a secret reserve has been created) the surplus has been understated. In view of the haphazard mode of handling railroad accounts, therefore, the fact that a "surplus" account is carried on the books signifies nothing one way or the other.

How, then, determine the facts? How measure the total investment (cost to date) represented by the plant? Enough has been said to indicate the inadequacy of depending upon figures taken from the carrier books of account. Resort must be had to appraisal—appraisal in terms of the cost of the units in place, and appraisal of accrued depreciation. For, while an appraisal based on the cost of the units in place measures original cost to date, it does not measure unimpaired investment: the amount of original cost not used up in producing past service. An appraisal of accrued depreciation is still necessary in order to measure the amount of that cost which has been so used up; or, in accounting terms, to measure the depreciation reserve which would appear upon the books, did the accounts show the actual economic (and business) facts. That the Valuation Act calls for no analysis in these terms, but only a vague cost to date, is evidence of the further inadequacy of that legislation.

Objections to Using Cost of Reproduction

But may not cost of reproduction, which the Commission reports as a "fact" be taken as a rough measure of the investment? Much of the existing plant has been built or acquired during the period of price advance, and for such portions, original cost and cost of reproduction might well coincide within reasonable limits of approximation. But the approach of the Commission has been such as to render such coincidence purely accidental. The reproduction hypothesis would estimate the cost of building and equipping "as economically as possible under existing conditions—by a single continuous impulse." That "the present railroads of this country are the product of a process of gradual development," that "the narrow gage road has passed into the standard gage, and low class into the high class, the single track into the double track," that "grades have been improved, curves eliminated"—"all this is disregarded." Present conditions, present methods, present courses of materials, present prices; these shall govern.

Let the railroad disappear; and then let there be a "rational conception" of the process of reproduction. Such reproduction involves the securing of a charter and the raising of the needed funds. For simplicity it is assumed that the credit of all railroads will be equally good. Engineering parties must be organized and placed in the field; but through the country side, and in the heart of the great city, there is a long stretch of vacant land, corresponding to the exact site now occupied by the railroad. The engineer—instead of running preliminary surveys, indulging in "supposititious groping around the country"—is to walk to the exact spot where the road now exists, and to stumble at once on the best route.

Nor in fixing upon his construction program is he governed by the history of the road. This is an entirely new venture, where the uncertainties faced in original construction need not be faced. The watercourse which presented a problem at the time of original construction, but which (perhaps because of the change in drainage resulting from the building of the railroad) has since disappeared, presents no present difficulties. If a swamp has been drained, the present construction is through non-swampy land. Though actual construction began at the East end, he may begin at the West; though the original construction required four years, he may finish in three. None of those unforeseen happenings and conditions which, in preliminary estimates must be recognized by an allowance for contingencies need be considered. His materials for reproduction come from the most available present source, although it has been indicated that if there was not enough sand in the pits of the Texas Midland properly to ballast the road, it would be assumed, "for reproduction purposes," to have been put back. Ordinarily the reproduction is in kind. But, for the Atlanta, Birmingham & Atlantic, open hearth steel has been "substituted" for the Bessemer rail laid before the carrier had a Birmingham terminal, and for the Texas Midland, treated pine timbers have been "substituted" for the unavailable bois d'arc. Relay rails, however, are reproduced not "new," but as "relay"; and locomotives bought second hand are reproduced as "new" second hand locomotives.

The engineer's problem is further simplified by the fact that he has at his command, all existing means of transportation (except the road under reproduction), whether or not the competing and connecting lines were in existence when the road was built. The accident of ownership is therefore important. Had the Texas Midland been absorbed, say by the St. Louis Southwestern, the latter road would not, as now, be available to haul men and materials. Conceivably a different construction program, and a different cost or reproduction would result. Likewise if the Pacific Coast extension of the St. Paul had not been built, a different construction program for the Northern Pacific would be necessary, from the program now available. That line, extended as a pioneer, carried materials over its completed portion to the end of track. Now that the St. Paul is built, it can receive men and materials at many points along the line. And prosecution of the work simultaneously in many sections very much reduces the total construction period: an important consideration for the calculation of "interest during construction," itself a function of two variables both dependent on hypothesis and judgment.

Surely the indictment of cost of reproduction need not be carried farther. It is purely an artificial and hypothetical figure, bearing no real relationship to past sacrifices or present investment.

A Weight to Be Given "Intangibles"

The unfortunate presence in the court doctrine of the word "value" has caused further difficulty in the consideration of "intangibles." Surely a business man would pay more for a going concern than for one without established external and internal organization. And when a business is taken over by the government should not something be allowed for the fact that these relations exist, and that a preliminary

starving time has been passed through? One might answer these questions in the affirmative, and still be no nearer a solution of the problem of securing a measure of reasonableness. At first the Commission found "no other values or elements of value . . . . to exist," a finding which in more recent reports has been modified to read that "no other values or elements of value to which specific sums can now be ascribed are found to exist." How to determine the value of the "intangibles" is still an open question.

The carriers have proposed a subtraction program. Let the value of the property as a whole be determined; and then subtract from this amount the "physical value." The amount (if any) remaining constitutes the "value" of the intangibles. But this assumes that this intangible value is a result, and not a cause, and calls for an independent determination of total value. It is signficant that no method of determining total value has been suggested except the capitalization of earnings. Elements of value have been suggested; and the Atlanta, Birmingham & Atlantic insisted that a denial of the existence of "other values," and a report, in the same document of interchange facilities, terminals, expanding traffic, and favorable grades, constituted a contradiction. The criticism is at least pertinent. What is the function of data reflecting the forces which make for earnings if no "values" are assigned? That the Commission should have changed the form of its tentative finding is perhaps indicative that the line of reasoning suggested in these terms is making itself felt. But this argument is none the less circular; none the less fallacious, as was demonstrated in the discussion of land values. Earnings cannot be tested by a value dependent upon earnings.

What of cost? Much of the expense of attaching the customer (whether he purchases coal, or gas, or ton-miles) is incurred once for all at the beginning. And so is a portion of the expense to create a functioning organization. Business practice has not set up any part of these first costs as "deferred assets," presumably aiming, in the interest of conservatism, to over-state, rather than run the risk of understanding current operating expenses. But from the point of view of economic analysis, there is no reason why such a "deferred asset" account might not have been set up, to measure the amount of any cost properly spread over the future.

Such an account would not, however, measure a permanent level of "investment." It would be necessary each year to charge off a *pro rata* share. The situation is parallel with that presented by the charge against current earnings to compensate the depreciation of fixed assets. Some part of selling the product, ton-miles or passenger miles, consists of the cost of making the particular sale. There is a turnover in the organization personnel. Some of the effort fails entirely of result, like the effort expended in making a machine which proves useless. There may also be some very real investment. The expense of bringing settlers to the tributary country, of securing an industry to locate along the line of the railroad, is such an expense as might be chargeable against income subsequently accruing. But in the absence of records or attempt by the companies to carry such accounts, the task of "appraising" the intangible must be a delicate one. In the face of active competition, it would seem that the largest part of "traffic expense," for example, is not to be spread over a period of years. Present solicitation, present effort to get business, is probably in largest measure chargeable against the returns from that business. But that some amounts might be recognized as costs of securing the permanent relations may, nevertheless, be granted.

"Unimpaired Investment" the Correct Basis

The conclusion to be drawn from the foregoing discussion is that the figure of "final value" reported by the Interstate Commerce Commission should seek to approximate the *unimpaired investment* cost of existing units in place, less accrued depreciation. Not the cost of the locomotive boiler which has worn out; not the amount derived from the sale of securities; but the cost of the railroad property now devoted to the transportation service, whether charged to operating expense (maintenance), or to investment: this is the significant element. To this sum can be added "intangibles": any cost of organization such as the cost of the franchise, the right to operate, any cost of establishing business relations not yet fully depreciated.

But neither the Act itself, nor the attitude of the Interstate Commerce Commission (i.e., the Bureau, for to this time the Commission has practically "rubber-stamped" the recommendations of its Bureau of Valuation) promises that a figure of "value" will be found, which would meet the test of economic theory, as the theory has been presented in this paper. Certainly the totals now being published as tentative valuations offer no basis for a figure of "final value" founded upon sound economics. They represent a nominal compliance with a statute, as that statue has been interpreted, but they represent nothing more. It is too early to say that the Commission will not fulfill the promise to state single figures of value. It is even conceivable that the sum of cost of reproduction and the "present value" of land may in some cases be so reported. But it is not too early to raise the question of the real scientific validity of such figures (or any other figures reported) when based upon a "judgment" purporting to consider the irreconcilable totals and elements made final in the preliminary opinions. Any value, based upon the set of "underlying facts" as made final in the preliminary opinions, must be an arbitrary figure, however stated in the opinion of the Commission. Perhaps the very requirements of the Act make this inevitable.

This conclusion, if valid, pulls the props from under the assumption which is at the base of the proposal to regulate profits. It has been assumed that the Interstate Commerce Commission will determine figures of value. And it may do so without regard to the relevancy of the premises. But one thing is clear, that if, upon these "values", rates are to be adjusted to limit profits, the result will be anything but scientific. The return to the carrier is a part of the long run cost of producing transportation. This amount should then be measured in terms consistent with the expectation of the investor. It is in terms of cost, of investment, that the business man makes his decisions involving original construction, replacements, and extensions. Of the amounts spent, no inconsiderable portion is sunk once for all. The grade, the tunnels, the concrete abutments and retaining walls, can never be used except in the place where originally built. The result of this initial investment (in that great multitude of cases a permanent investment) is the large importance of the element of the return to investors in the cost of transportation. For the moment, this element may be ignored since it is advantageous to operate the railroad which is built, even though less than the return necessary to tempt investment is secured. This is the risk of business. But, in the long run, the reward for investing, assuming risk, directing enterprise, must be met in the case of the railroad which could justify building.

This again raises fundamental issues. For promise of a profit greater than that now needed to attract investment in a well-established railroad was originally necessary to attract the investors of the earlier days who undertook pioneer risks. Once the enterprise has become profitable and the risk in part eliminated for future investors, shall it be conceived that only a return sufficient to attract this future investment is reasonable, that anything more than this amount represents excessive profit? Less than this would mean a check to railroad enterprise and to the further development of facilities. But can it be said that this minimum, so broadly

stated, represents a *reasonable* return under the set of circumstances to be considered, that anything in excess represents extortion—"monopoly profit"? On the contrary, there are circumstances when a "reasonable return" is something more than "one which under honest accounting and responsible management will attract the amount of investor's money needed for the development of our railroad facilities." More than this amount is not always "an unnecessary public burden", even though it be granted, with the Railroad Securities Commission, that "less than this means a check to railroad construction." And the conclusion follows because so considerable portion of railroad investment represents pioneer risks. In those enterprises in which there are risks of great losses—surely railroad history would bear out the inclusion of railroads in this category of ventures—there must be hope of gain.

Causes of Differences in Earnings

One further point: existing railroads do not represent the same exercise of judgment in original planning, the same efficiency in creating and maintaining an organization, in establishing relations with shippers and passengers, in solving operating problems. Clearly focused are seen the forces which create a differential element in earnings. It is difficult to say how much of this differential is "profits", how much "economic rent", though how the differential accrues to the better located, better managed roads can be readily indicated. The differential is due to natural conditions (a "water grade", or the possession of a canyon pass, for example), to "social" causes (the increasing of population, the clustering together of allied branches of industry), or to superior management. The actual income is a resultant of these forces. It is the old question of the New York Central and the Pennsylvania, the one operating through river valleys and along the lake shore, going around the mountains, the other cutting through. An extra gain comparable to a site rent appears, as a reward for skill in original location,—perhaps even for the one company having first dared to risk the cost of building. The "legitimate" differential return in profits, whether due to judgment in picking an original line which possesses superior operating conditions, or to subsequent active management in building up an efficient organization, or in establishing satisfactory relations with the shipping and traveling public, is intermingled with any return above the costs necessary to induce promotion and management of high grade. To bring American railroad service to its present preeminent place has required courage, imagination, skill of the highest order. The emphasis upon the important investments in railroad plant which are now being made—track elevation, passenger terminals—as "unproductive" indicates the presence still of a considerable risk element.

But entirely aside from the question of the practicability of disassociating an element of "unearned increment" in the return to the railroad, is a broader challenge which looks to the validity of appropriating this increment either through taxation or reduction of charges. The power of regulation, alone, hardly warrants reduction of rates simply because the tendency exists for railroad net earnings to increase in proportion to the investment. That the railroad is a common carrier, that the furnishing of transportation is a "public" business, only accounts for regulation. By itself it does not justify a deliberate attempt to capture the "unearned increment' on one class of sites. To appropriate the "unearned increment" (if any) which accrues to the railroad with the increase of traffic may represent a desirable policy for the community to adopt. But that it is more desirable than the appropriation of the "unearned increment" which accrues in the rent of lands devoted to other purposes one may well be skeptical.

But the American people have not passed upon the proposal to regulate profits. "Valuation" was thought necessary by the body to which is committed the regulation of the railroads in order to combat claims made by the companies. In response to urging by the Interstate Commerce Commission, which at no time appears to have made a rigorous analysis of the underlying economic problem, Congress passed the "Valuation" Act, with its miscellaneous provisions. The Act is not in any sense an expression of a policy. And investigations for which it provides can furnish nothing of even temporary usefulness in solving the inherent problem of justice. An economic problem cannot be solved by a judicial formula.

An Improved Track Spike

Increased holding power, longer tie life against destruction of wood fibers, a lower cost of maintenance, a longer spike life against mechanical wear, a low cost of installation and extraction with unskilled labor and a low ultimate cost are advantages claimed for the Sessler-Grip-Spike which has recently been placed on the market by the American Spike Company, New York. While embodying radical changes in design, this spike requires no change from the ordinary spike in the method of application. It has a fluted twisted shank, a round head not unlike a screw spike with the nut portion removed, and a weight of one pound. It is made of steel, with specifications exactly as those outlined by the American Railway Engineering Association, and is furnished in standard kegs of 200 lb. each.

In a series of comparative tests made by the Engineering Laboratories of Columbia University, an abstract of the results of which was published in the *Railway Age* for December 26, 1919, page 1237, this spike was shown to average over the entire half-inch withdrawal in all conditions, in all ties, about 42 per cent greater resistance to vertical pull than the cut spike used by the Pennsylvania Lines West, which measured 6 in. under the head and 5/8 in. in cross section. The unusual holding power of the Sessler-Grip-Spike is due to three elements of design:

The Spike Cuts the Wood Fibers

(1) It has a surface area in the same length of shank over 25 per cent greater than the cut spike used in the tests.

(2) Its point is divided into four flat walls, which extend 1 in. back on the shank. Any tendency to turn these walls to the smallest degree meets with a marked resistance of these four flat walls against the wood fibers packed between them. The rebounding of the rail has a tendency to pull up a spike. In coming out, the Sessler-Grip-Spike would naturally fol-

low the pitch of its twist, but, due to the fact that the point prevents its following this pitch, the pull of the Sessler-Grip-Spike is directly upward without any rotation whatsoever for the first ¼-in. movement. Consequently, the flat-sided flutes bear directly against the undisturbed fibers, which, being in their original elastic state, press back the spike into its original position without any appreciable movement or permanent set of the spike in the tie.

(3) In driving this spike its rounded surface compresses the fibers instead of crushing or abrading them downward. The practically undisturbed condition of the wood fibers presents a greater resistance to lateral thrust than is the case with wood fibers broken down. Lateral thrust is in itself determined by three factors: (1) The condition of the wood fibers at the neck of a spike; (2) the form of cross-section at the neck of a spike; (3) the resistance to upward pull. When the wood fibers are crushed down about the neck there is little resistance to the side thrust against the throat of the spike, as is the case with the cut spike, while when the fibers are not crushed down there is a great resistance to their displacement to side thrust. This is the case with the Sessler-Grip-Spike.

The square cut spike has less resistance to bending than the circular cross section, while the bending backward of a spike due to lateral thrust is likewise accompanied by a certain amount of upward pull, which results from the bending backward of the member. Insofar as the resistance to upward pull of the Sessler-Grip-Spike is greater than that of the cut spike, it claims this advantage.

A marked reduction in wood fiber destruction is obtained

The Spike Has a Fluted, Twisted Shank

with the Sessler-Grip-Spike. A cut spike driven into a tie without first pre-forming the hole, crushes and bunches the fibers over a wide area, due largely to the splitting and wedging action being confined to one plane. With the Sessler-Grip-Spike this splitting action appears to be less, due partly to the shape of the point, which tends to produce a combined cutting and splitting action, but much more to the rotation of the spike on driving, averaging 63 deg. when driven without a hole and 68 deg. when driven into a hole. Due to this rotation of the spike, the splitting and wedging is not confined to any one plane, and the cumulative effect upon the wood fibers appears to be reduced thereby.

The following is quoted from pages 46 and 47 of the Columbia bulletin: "Within the elastic withdrawal limit the resistance to direct pull developed by a spike is directly proportional to the displacement of the spike in the wood. Also within the elastic withdrawal range the permanent set is practically negligible.

"It is obvious that the least number of spikes and greatest efficiency per rail fastening will be obtained with that type of spike having the highest elastic withdrawal resistance.

"Based upon the results of these tests the relative average elastic limits of the Sessler-Grip-Spike was 129 per cent, assuming the cut spike at 100 per cent. This elastic withdrawal limit is the loading below which no permanent or appreciable movement of the spike in the tie takes place and is the point beyond which permanent sets are induced and the frictional resistance of the spike in the tie is decreased. This means that the higher the elastic withdrawal limit the less the number of spikes necessary to obtain a permanent track structure."

Spikes affect tie maintenance in (1) the frequency of tie replacements, and (2) in the frequency of hammering down the spikes after they have worked upward. Tie placements are largely governed by the mechanical wear, as above mentioned. The frequent redriving of the cut spike is due to its comparatively low initial holding power or elastic withdrawal resistance, and its materially reduced holding power by successive redriving. The Columbia University tests show that in practically every instance the third withdrawal of the Sessler-Grip-Spike is as good and frequently better than the first withdrawal of the cut spike. This means that the Sessler-Grip-Spike would have to be redriven but once, if at all, where the cut spike would be redriven three or more times. Spike redriving is also governed by the moisture contained, which gradually rots the broken fibers around the spike shank. Moisture is very largely excluded by the spike shank of the Sessler-Grip-Spike which closes and seals the paths made by the fluted shank.

In replacing rails the maintenance costs to be considered comprise the withdrawal and replacing of spikes and the gaging of track. Sessler-Grip-Spikes are driven with the ordinary spike maul and are extracted with the ordinary claw bar. Both these costs are therefore the same as they are with the cut spike.

When the throat of a cut spike becomes worn the head either bends backward, due to lateral thrust on a weakened cross-sectional area, or the head snaps off in cold weather. The wear on the throat of a Sessler-Grip-Spike is reduced because of the limited amount of withdrawal that takes place on account of its higher holding power and higher elastic withdrawal resistance. Its cross-sectional area has a greater resistance to backward bending. In addition to this, the Sessler-Grip-Spike can be re-used numerous times because of its round throat and head, which permits its withdrawal and re-insertion in a slightly different position.

From the Birmingham (Ala.) Age-Herald

Isn't He Just a Little Spoiled?

General News Department

The Brotherhood of Locomotive Engineers and the Order of Railway Conductors have decided to join the American Federation of Labor next month, according to a statement of Samuel Gompers, president of the A. F. of L.

Employees of the Pennsylvania Railroad belonging to the National Guard may have two weeks' leave of absence without loss of pay or of annual vacation privilege, wren required to take time for field training. This is the substance of a resolution which has been adopted by the directors of the road.

The annual convention of the National Association of Railroad Tie Producers, which was originally scheduled to be held in Chicago on February 12 and 13 and which was postponed at that time because of the influenza epidemic, will be held at the Hotel Sherman, Chicago, Thursday and Friday, April 22 and 23.

The American Railway Engineering Association, through its committee on personnel, has sent a letter to the members of various committees of that organization asking for suggestions regarding personnel for the ensuing year. The entire subject of committee organization is now being given careful consideration by the board of direction in order that the increasing membership may be given representation and a part in the work of the association.

Graduates in engineering of Cornell University will meet on the evening of April 9 in the Engineering Societies building, New York. A meeting has been called by the Cornell Society of Civil Engineers, partly with the idea of forming a general Cornell engineering society, now that the different engineering schools at Cornell are to be combined into one general engineering college. The new dean of the combined college, Professor Dexter S. Kimball, will be one of the speakers.

A strike of clerks on the Norfolk & Western, on March 22, blocked freight office work at Norfolk and also at some other points, to the extent that a partial embargo on freight shipments was placed at Norfolk on March 26. The strikers' grievance appears to have been local and to have been disapproved by general officers of their union; but the strike was still on at the time of going to press; and the shopmen in the large shops of the road at Roanoke, Va., struck in sympathy with the clerks, on the 31st. The shop strikers claim that 5,000 men were out.

Congestion of cotton at Boston has become so serious that importers are asking the government to suspend temporarily the requirement that cotton from Egypt be fumigated at the port. It is estimated that the two fumigation plants at Boston, which have a capacity for about 2,500 bales a day, are two months behind in their work. Ships which have been in port a month are still waiting to discharge their cargoes. One cause of congestion has been the shortage of freight cars, and cotton has been carried by automobile trucks from Boston to Fall River, 50 miles, and New Bedford, 56 miles, as well as to other places less distant.

The Roswell Railroad, extending from the Southern Railway at Chamblee, Ga., northward ten miles to Roswell, has suspended operations, and Judge Bell of Fulton County Superior Court has appointed Henry Troutman receiver. This road was operated by the Southern Railway, but on the termination of federal control, train service was suspended, the Southern finding that, because of increasing costs and the competition of automobiles, there was a constant heavy deficit. The Railroad Commission of Georgia ordered the Southern to resume the operation of trains beginning March 29, but an injunction was obtained from the Court restraining the enforcement of the order. Following the issuance of the injunction the receiver was appointed.

An attempt to wreck Chicago, Burlington & Quincy westbound train No. 5 was made on the evening of March 26, soon after the train left Chicago, carrying an express shipment valued at $150,000. Acting upon a tip that a hold-up was contemplated, the train was switched to the eastbound track, near Neponset, Ill., and it safely passed a large pile of ties placed on the westbound track. The suspicions of farmers living in the vicinity of Neponset were aroused earlier in the day by inquiries made by strangers and the appearance, on the evening of the attempted wreck, of four unknown men. The farmers later notified police officers, who in turn notified the road's special police. Search is now being made for the strangers.

A. R. Urion, chairman of the committee on refrigeration of the Michigan State Horticultural Society in a recent address before that organization at St. Joseph, Mich., stated that farmers and fruit growers were facing a serious situation resulting from the shortage of refrigerator cars in that district. According to Mr. Urion, the present shortage of cars approximates 6,000. This shortage, it is alleged, had existed since the railroads went under federal control and no replacements have been made since that time. Following these statements the meeting went on record as being in favor of making a special appeal to the government to intercede in their behalf toward obtaining the necessary cars.

The Employees' Mutual Relief Association of the Long Island Railroad now has a membership of more than 8,000, which is greater than the number of persons employed by the railroad, the explanation of this discrepancy being that employees who have left the service of the road retain their membership, when desired, by the payment of regular dues. At the present time there are about 1,500 members who are out of the service. In 1919 benefits amounting to $83,370 were paid to 1,150 members and to the families of 89 members who died from natural illness or accidents. This relief association was organized on February 1, 1886, and in the 34 years of its existence has disbursed to members and their families or dependents approximately $1,500,000.

The contention of members of the Brotherhood of Locomotive Firemen and Enginemen employed on the Canadian National Railways that the period of duty after which trains may be laid up between terminals for firemen to obtain rest should be reduced from 15 to 12 hours, has been sustained by the Canadian Railway Board of Adjustment No. 1. The employees contended that the present 15 hour optional rest rule was agreed to several years ago and when small power was in service and good grades of fuel were being used. Since that time the power has increased and engines are now hauling twice the tonnage hauled at that time and with inferior grades of fuel. The railways contended that no hardship exists under the present rule inasmuch as the work of the fireman is being reduced by the equipment which is now being applied to locomotives.

Political Activities of the Plumb Plan League

The Plumb Plan League has sent a questionnaire to all candidates for the presidential nomination asking them to state for publication in "Labor," the league's newspaper, the source of their campaign funds, but it does not promise to reciprocate by disclosing information as to its own campaign funds. "Labor" has also called upon railroad men in Wisconsin to support the La Follette Progressive Republican ticket and to defeat Senator Lenroot and Representative Esch because they voted for the railroad bill.

The railroad transportation brotherhoods are not joining the political campaign of the American Federation of Labor, but

are working along their own lines. On the other hand, the A. F. of L. is taking no part in the propaganda for the Plumb plan or government ownership of railroads.

New England Railway Club

At the next meeting of the New England Railroad Club to be held in Boston, Mass., on April 13, a paper will be presented on the subject of Accounting by William J. Cunningham, Professor of Transportation at Harvard University.

Correction

J. L. Cone, grand president of the Railroad Yardmasters of America, advises that he was misquoted in the report of the hearing before the Interstate Commerce Commission regarding the classification of subordinate officials in the *Railway Age* of March 19, page 964. The report indicated that Mr. Cone considered the general yardmasters as officials, whereas he says that he asked that all yardmasters, general and otherwise, be termed subordinate officials.

Pacific Railway Club Elects Officers

At its annual meeting held in San Francisco, Cal., on March 16, the Pacific Railway Club elected the following officers for the ensuing year: President, Dennistoun Wood, assistant mechanical engineer and engineer of tests, Southern Pacific; first vice-president, G. H. Harris, general superintendent, San Francisco—Oakland Terminal; second vice-president, F. S. Foote, Jr., professor of railroad engineering, University of California; treasurer, G. H. Baker, assistant general freight agent, Atchison, Topeka & Santa Fe; secretary, William S. Wollner, general safety and welfare agent, Northwestern Pacific.

Following the election of officers, Samuel O. Dunn, editor of *Railway Age*, delivered an address on "The Future of the Railroads."

A Real Grievance—Gross and Net

"Growlerville, N. J., February ——.

"D. L. W. Co., Gentlemen:

"After I left your office my car of cattle was weighed and placed on rear end of train which was wrong, as it jerks and throws the cattle and damages them to a great extent. My cattle drank considerable of your water when in yard, and the hay I placed in the car, when you weighed the car, and I payed freight on the hay and water, which looks to be wrong. When I loaded these cattle they were full, then they droped in that car and then they filled up again on water and I had to pay on the freight on over-weight, which I think is very wrong. I wish you gentlemen would look into the matter and think of it right or wrong to pay for so much water. I wish you would look the matter up and write me." (Signed)

H. W. S———.

Uses for for Confiscated Railroad Earnings

Roberts Walker, discussing the Transportation Act, and referring to that part of the law providing for the confiscation of a part of the income of railroads above 6 per cent, says: "Railroads are as great a public need whether they run through tortuous defiles or over wide farm lands, and not all of the differences between the prosperous and the poor roads arise from better management or other human factors. It is thus possible that the confiscation of part of the income in excess of 6 per cent will be held warranted, on the ground that in no other manner can disparities in geographical situation and physical conditions, no less than disparities of management, be ironed out and placed upon a footing just to the public as a whole. And if the court should not so decide, a ready method of reaching the same result exists through the use of the taxing power."

Engineering Advertisers' Association Elects Officers

The following officers of the Engineering Advertisers' Association of Chicago were elected for the ensuing year at a meeting held at Chicago on March 9: President, A. H. Hopkins, advertising manager, C. F. Pease Company; vice-president, J. J. Arnsfield, advertising manager, Fairbanks, Morse & Co.; secretary, G. S. Hamilton, advertising manager, American Steam Conveyor Corporation; treasurer, E. I. Pratt, advertising manager, Kellogg Switchboard & Supply Company.

The following directors were elected to serve two years: L. L. Gerstenberger, assistant general manager, Imperial Belting Company; J. B. Patterson, district manager, P. H. & F. M. Roots Company; G. H. Eddy, advertising manager, Green Engineering Company.

The retiring president, H. L. Delander, advertising manager, Crane Company, was elected ex-officio member of the Board of Directors.

Division of Purchases Discontinued

The Division of Purchases of the United States Railroad Administration was discontinued on April 1. Henry B. Spencer, director of the division, who has been elected president of the Fruit Growers' Express Company, will become an advisory member of the director general's staff with respect to matters growing out of purchases during the period of federal control of railroads. Such portions of the work of the Division of Purchases as remain to be completed after April 1, with the exception of the completion of activities incident to control over the distribution of coal, will be under the direction of the Division of Liquidation of Claims; Max Thelen, director.

Control over the distribution of coal, growing out of the strike of bituminous coal miners, was ended on April 1, in accordance with an executive order of the President. Any work remaining to be done in connection with the winding-up of the matters relating thereto will be dealt with in the director general's office, through Brice Claggett, assistant to the director general.

National Federation of Construction Industries

The first annual meeting of the National Federation of Construction Industries was held at the Hotel Sherman, Chicago, on March 24 and 25. Morning and afternoon sessions were held on both days of the meeting. The afternoon session of the first day was devoted to the general subject of "Freight Traffic." W. S. Dickey, president of the W. S. Dickey Clay Manufacturing Company, Kansas City, Mo., and chairman of the Federation's transportation committee, presided over the session. A. G. Gutheim, assistant manager of the Commission on car service; E. Guy Sutton, secretary of the National Association of Sand and Gravel Producers, Indianapolis, Ind., and Robert C. Wright, general traffic manager of the Pennsylvania, were the principal speakers.

Mr. Gutheim urged the material men to be patient with the present freight service, declaring that it would be six months before any appreciable betterment in conditions becomes apparent. Mr. Sutton declared strikes among the railway brotherhoods will probably be called in September, after the government has relinquished control over wages.

"The guarantee of 5½ per cent under the Esch-Cummins bill will not work out in favor of the shippers because the incentive for enterprise is nullified," he said. "A further increase in freight rates will call a halt in the building of homes because the freight rates on building materials are too high proportionately even now."

The Federation staff council meeting was held on March 26, following the annual meeting.

North Western to Pay for Highway Relocation

The most important case yet to come up under the Wisconsin law which authorizes the state railroad commission to assess benefits against a railroad company where improvement, relocation or reconstruction of a highway grade crossing of a railroad diverts a material portion of the traffic so as to eliminate danger, was determined by the Wisconsin Railroad Commission recently. The Wisconsin Highway Commission submitted to the Railroad Commission a plan for so relocating a portion of Sheridan road in Racine County as to make possible the elimination of two highway crossings of the Chicago & North Western and the substitution of another crossing.

The two crossings in question are on one of the most heavily traveled highways in the state. The North Western at these points is doubled tracked and there are frequent train movements at high speed.

The Railroad Commission, in its findings, states that were it not for the changes proposed by the Highway Commission a separation of grades would have to be made to provide for the reasonable safety of the traveling public. "By relocating the highway," said the Railroad Commission, "such a reduction in the traffic on the crossings in question will be accomplished that a far less costly method of protection will be reasonably adequate and the possibility of a grade separation extremely remote." The order of the Railroad Commission directs the Chicago & North Western to pay the sum of $29,000 into the state treasury, and when the relocation is accomplished the railroad company must install at each of the two crossings automatic signals in place of the flagmen now required.

Storms and Tornado Tie Up Traffic

Two violent storms, one originating in Alaska and moving southeast across the United States, and the other originating in the plains of Nevada and Arizona and moving northeast, have resulted in tying up railroad traffic in the west and, meeting, formed a tornado which caused serious damage and loss to railway equipment and facilities in the vicinity of Chicago. The Alaskan storm, sweeping across southern Minnesota, South Dakota, Montana, northern Iowa and northern Wisconsin, effectively tied up traffic and necessitated detouring Chicago, Milwaukee & St. Paul trains over the Northern Pacific, between Minneapolis and Miles City, Mont. Snow blockades were frequent in this territory and trains were operated with difficulty on the Great Northern, Northern Pacific, and St. Paul. The Alaskan storm, upon reaching the central west, was met by the storm which originated in Nevada and Arizona and resulted in the creation of a tornado, which swept across the suburbs of Chicago, destroying large portions of Elgin, Ill., Melrose Park, Willimette and other smaller suburbs and seriously affecting train service in the two-hour period, during which the storm was at its height in this vicinity. The total amount of damage to railway equipment has not been determined as yet, although it is believed that the partial demolition of station houses and other stationary equipment will be costly.

Daylight Saving

"Summer Time" was adopted in New York City last Sunday, and also quite generally in surrounding cities and towns; but many people were confused because a part of the railroads changed their timetables (retaining 75th Meridian time) and part changed their clocks. The New York, New Haven & Hartford, and the New York Central issued new timetables, changing large numbers of suburban trains, morning and evening, to times about one hour earlier than they were; many of the changes being, however, not in hours because of the dense traffic and the necessity of adjusting the schedules between those of other trains not changed. The Delaware, Lackawanna & Western issued a supplement, advancing suburban trains on the Morris & Essex division to the extent of one hour. The Long Island, the Erie and the Central of New Jersey changed their clocks. The Central of New Jersey, however, had to issue a supplement to its timetables because of trains which run through to and from Philadelphia over the Philadelphia & Reading, which retained standard time. On this line there is now a new train from Philadelphia to New York, starting at 6 a. m., to take passengers who desire to reach New York at 8 a. m., standard time, equivalent to 9 a. m. New York summer time. The train leaving Philadelphia for New York at noon has been changed to start at 11 a. m., Monday to Friday, inclusive. Similar changes have been made in certain westbound trains and in others affected by the change in New York City.

The Pennsylvania, continuing to use the time of the 75th Meridian, has advanced by one hour the time of suburban trains to and from New York within the territory bounded on the west by New Brunswick, N. J., and on the south by Point Pleasant. No changes were made in the schedules of trains running to or starting from points west of New Brunswick.

The legislature of New York is almost evenly divided in sentiment; and, as we go to press, is still discussing a bill to repeal the state law. This law corresponds to federal law, except that the section requiring changes spring and fall has not been repealed. Members of the legislature who are working in the interest of farmers who are opposed to the use of summer time, threaten to appeal to the courts to declare the state law unconstitutional, as being in conflict with the federal law on standard time, which makes the adoption of "summer time" illegal. This federal law, however, prescribes no penalty for disobedience; so the railroads which have acted in disregard of its provisions are not likely to be called to account, unless some district attorney should institute proceedings for a mandamus. The post offices and the federal courts in New York City have set their clocks ahead an hour. That section of the law affecting these offices simply requires that statutes, orders, etc., relating to the time of performance of any act by any officer of the United States, * * * or relating to the time within which any rights shall accrue, * * * shall be denominated in accordance with standard time. It does not say how clocks shall be set.

The railroads of Canada, conforming to the action of their connections extending into the United States, continue the use of standard time.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

Air Brake Association.—F. M. Nellis, Room 3014, 163 Broadway, New York City. Next convention, May 4-7, Hotel Sherman, Chicago.

American Association of Demurrage Officers.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

American Association of Dining Car Superintendents.—S. W. Derr, C. R. R. of N. J., Philadelphia, Pa.

American Association of Freight Agents.—R. O. Wells, Illinois Central, Chicago. Next annual meeting, June, 1920.

American Association of General Baggage Agents.—E. R. Reynolds, C. G. W. R. R., Chicago.

American Association of Passenger Traffic Officers.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—J. Rothschild, Union Station, St. Louis, Mo.

American Electric Railway Association.—E. B. Burritt, 8 W. 40th St., New York.

American Electric Railway Manufacturers' Association.—C. F. J. Dell, 50 E. 42nd St., New York.

American Railroad Master Tinners', Coppersmiths' and Pipe Fitters' Association.—Otto E. Schlinck, 185 W. 5th St., Peru, Ind.

American Railroad Association.—J. E. Fairbanks, 75 Church St., New York:

- Section I, Operating (including former activities of Association of Railway Telegraph Superintendents).—W. J. Fripp (chairman), N. Y. C. R. R., New York, N. Y.
  - Telegraph and Telephone Division.—J. F. Caskey (chairman), Supt. of Telegraph, Lehigh Valley.
- Section II, Engineering.—E. H. Fritch, 431 South Dearborn St., Chicago.
  - Signal Division.—H. S. Balliet, 75 Church St., New York.
- Section III, Mechanical (including former activities of Master Car Builders' and Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago. Next convention, June 9-16, 1920, Atlantic City, N. J.
- Section IV, Traffic.—Robert C. Wright (chairman), Assistant Director, Division of Traffic, U. S. R. A., Washington, D. C.
- Section V, Transportation (including former activities of Association of Transportation and Car Accounting Officials).—E. J. Pearson (chairman), Federal Manager, N. Y., N. H. & H. R. R., New Haven, Conn.
- Section VI, Purchases and Stores (including former activities of Railway Storekeepers' Association).—J. P. Murphy, N. Y. C. R. R., Collinwood, Ohio. First annual meeting, June 14-16, 1920, Atlantic City, N. J.
- Section VII, Freight Claims (including former activities of the Freight Claim Association).—Lewis Pilcher, 431 South Dearborn St., Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention, October 19-21, 1920, Atlanta, Ga.

American Railway Engineering Association.—(Works in co-operation with the American Railroad Association, Section II.) E. H. Fritch, 431 South Dearborn St., Chicago.

American Railway Master Mechanics' Association.—(See American Railroad Association, Section III, Mechanical.)

American Railway Perishable Freight Association.—E. F. McPike, 135 E. 11th Place, Chicago. Regular meetings, 2nd Wednesday in March and September.

American Railway Tool Foremen's Association.—R. D. Fletcher, 1145 East Marquette Road, Chicago.

American Society for Testing Materials.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 21, 1920, New Monterey Hotel, Asbury Park, N. J.

American Society of Civil Engineers.—Col. H. S. Cracker (acting secretary), Engineering Societies Building, 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 33 W. 39th St., New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Steel Treaters' Society.—W. H. Eisenman, 154 East Erie St., Chicago.

American Train Despatchers' Association.—D. L. Darling, Northern Pacific Ry., Spokane, Wash.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next annual meeting, February, 1921, San Francisco.

Association of Railway Claim Agents.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J. Next meeting, May, 1920, Atlantic City.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago.

Association of Railway Executives.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.
Association of Railway Telegraph Superintendents.—(See American Railroad Association, Section 1, Operating.)
Association of Transportation and Car Accounting Officers.—(See American Railroad Association, Section V, Transportation.)
Bridge and Building Supply Men's Association.—G. R. McVay, Barrett Company, Chicago.
Canadian Railway Club.—W. A. Booth 131 Charron St., Montreal, Que.
Car Foremen's Association of Chicago.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.
Car Foremen's Association of St. Louis.—Thomas B. Koeneke, Federal Reserve Bank Bldg., St. Louis, Mo.
Central Railway Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.
Chief Interchange Car Inspectors' and Car Foremen's Association.—J. C. Keene, General Car Inspector, Wabash R. R., Decatur, Ill.
Chief Interchange Car Inspectors' and Car Foremen's Supply Men's Association.—D. B. Wright, Lehon Company, 45th and Oakley Sts., Chicago.
Eastern Railroad Association.—D. G. Stuart, Washington, D. C.
Freight Claim Association.—(See American Railroad Association, Section VII, Freight Claims.)
General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.
International Railroad Master Blacksmiths' Association.—A. L. Woodworth, B. & O., Lima, Ohio.
International Railway Fuel Association.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May 24-27, 1920, Hotel Sherman, Chicago.
International Railway General Foremen's Association.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn. Next convention, September 7-10, Hotel Sherman, Chicago.
Maintenance of Way Master Painters' Association.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention, October 5-7, 1920, Detroit, Mich.
Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 25-28, Curtis Hotel, Minneapolis, Minn.
Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass.
Master Car Builders' Association.—(See American Railroad Association, Section III, Mechanical.)
National Association of Railway and Utilities Commissioners.—James B. Walker, 49 Lafayette St., New York. Next convention, November, 1920, Washington, D. C.
National Foreign Trade Council.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 12-15, 1920, San Francisco.
National Railway Appliances Association.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago.
New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.
New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.
Pacific Railway Club.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting 2d Thursday in month, alternately in San Francisco and Oakland.
Railway Accounting Officers' Association.—E. R. Woodson, 1116 Woodward Bldg., Washington, D. C. Next convention, May 12, 1920, Hotel Traymore, Atlantic City, N. J.
Railway Business Association.—Frank W. Noxon, 30 Church St., New York.
Railway Club of Pittsburgh.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Americus Club House, Pittsburgh, Pa.
Railway Development Association.—D. C. Welty, Missouri Pacific R. R., Little Rock, Ark.
Railway Electric Supply Manufacturers' Association.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.
Railway Equipment Manufacturers' Association.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va.
Railway Fire Protection Association.—R. R. Hackett, Baltimore & Ohio R. R. Baltimore, Md.
Railway Real Estate Association.—R. H. Morrison, C. & O., Richmond, Va.
Railway Signal Association.—(See American Railroad Association, Section II, Signal Division.)
Railway Storekeepers' Association.—(See American Railroad Association, Section VI, Purchases and Stores.)
Railway Supply Manufacturers' Association.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Next convention, June 9-16, Atlantic City, N. J.
Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.
Roadmasters' and Maintenance of Way Association.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill.
St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.
Signal Appliance Association.—F. W. Edmunds, West Nyack, Rockland County, New York.
Society of Railway Financial Officers.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.
Southern and Southwestern Railway Club.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.
Southern Association of Car Service Officers.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.
Supply Association of American Railway Tool Foremen's Association.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.
Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y.
Traveling Engineers' Association.—W. O. Thompson, N. Y. C. R. R., Cleveland, O.
Western Association of Short Line Railroads.—Clarence M. Oddie, Mills Bldg., San Francisco.
Western Railway Club.—J. M. Byrne, 916 W. 78th St., Chicago. Regular meetings, 3d Monday in month, except June, July and August.

Traffic News

The Pacific Mail Steamship Company has announced in San Francisco regular passenger steamship service between that city and Havana, Cuba, beginning May 8. The voyage will take about 16 days.

The Montana State Railroad Commission and practically every commercial club in Montana are co-operating in a campaign to secure an extension of the half-rate on livestock to this state for 90 days. This rate expired on March 31.

The consolidated ticket office at Denver, Colo., is still running, the report that it had been given up having been erroneous. All of the roads which were party to it during government control are still parties, and the office will continue for an indefinite time. The Southern Pacific and the Missouri Pacific have established freight and passenger offices in the Denham building, above the ground floor, but no tickets are sold in those offices.

The Ohio State Industrial Traffic League has elected the following officers: Guy L. Cory, president, Springfield; H. D. Rhodehouse, first vice-president, Youngstown; L. G. Macomber, second vice-president, Toledo; J. G. Young, secretary-treasurer, Columbus. Directors, F. H. Baer, Cleveland; O. J. Vesper, Mansfield; F. M. Renshaw, Cincinnati; H. E. Dean, Toledo; J. E. Harris, Columbus; R. M. Robinson, Dayton; A. Z. Baker, Cleveland; E. T. Butler, Warren; W. W. Hall, Akron; E. W. Huberty, Canton.

Charles S. Fee, passenger traffic manager of the Southern Pacific, has announced that low local summer resort rates to mountain and seashore resorts will be made effective commencing April 30. Two classes of tickets will be sold, one at a 20 per cent reduction from the regular round-trip rate, and good for 90 days, with the final limit placed at October 31; and another, intended to meet the requirements of the average vacationist, will be sold on Fridays and Saturdays, with a time limit of 15 days, and will cost one-third less than the regular round-trip rate.

Fairfax Harrison, president of the Southern Railway, tells R. L. Philips, president of the South Atlantic Ports Association, that he and his lines will oppose any cancellation of the export freight rates from the middle west to the south Atlantic ports. The railroads not in Central Freight Association territory have not as yet filed any concurrence in the export tariffs established by the Railroad Administration December 1 and 31. Daniel Willard, president of the Baltimore & Ohio, filed a protest with the Railroad Administration against the establishment of the export rates to the south Atlantic ports, but no further action has been taken by any of the northern trunk lines.

St. Louis (Mo.) business, according to traffic figures of railroads entering that district, shows an astonishing gain over the volume shown at this season last year. According to a report recently submitted to Acting President T. M. Pierce, of the Terminal Railroad Association of St. Louis, for the first 15 days of March, a gain of 38,266 cars over the corresponding period last year has been recorded. The total interchange service rendered during the first half of March by the Terminal Association for lines entering St. Louis, represented a movement of 149,199 cars, or an average of approximately 10,000 cars daily. For the same period last year 110,933 cars were interchanged between connecting roads at St. Louis, or a daily average of less than 7,400. A new record for 1920 was established on March 14, when the Terminal Association received from or delivered to connections a total of 11,356 cars.

Fruit Growers' Express

The Fruit Growers' Express Company, incorporated under the laws of Delaware, has been organized by the principal railroads east of the Mississippi river to acquire and operate, after May 1, the Fruit Growers' Express, heretofore operated by Armour & Company. It is to perform the refrigerator and other protective service for the movement of perishable freight on the railroads

heretofore handled by Armour & Company. H. B. Spencer, who has been director of the Division of Purchases of the Railroad Administration, and was formerly vice-president, in charge of purchases, of the Southern Railway, is president of the company. The other officers include W. G. Brantley, during federal control president and general counsel of the Atlanta, Birmingham & Atlantic, who will be vice-president and counsel; E. J. Roth, during federal control manager of the Stores Section of the Railroad Administration, who will be general manager; D. R. MacLeod, secretary; H. F. Pierce, treasurer, and C. P. Cooper, controller. The headquarters of the company will be at Washington, D. C.

Bureau of Traffic, I. C. C.

The Interstate Commerce Commission on March 30 announced the appointment of W. V. Hardie as its director of traffic, effective at once. Mr. Hardie will have charge of the newly-created Bureau of Traffic, which is to absorb the present Bureau of Tariffs and will devote itself, under the direction of the commission, to matters pertaining to traffic and rates as to which the commission's jurisdiction has been greatly enlarged by the new transportation act. The former Bureau of Tariffs will be the tariff section of the new bureau, and possibly other sections will be organized. The commission also proposes to organize other bureaus to handle matters in connection with its new functions, among which it is expected there will be a bureau of car service and a bureau to deal with financial matters, such as the regulation of security issues.

One of the most important functions of the new bureau is to assist the commission in matters pertaining to the division of the country into rate groups or districts and the making of rates in each district to produce the 5½ or 6 per cent return provided for by the law. While it is expected that the railroads may file or propose tariffs carrying out their own ideas as to changes in rates to produce the required amount of revenue, the commission, by the law, is also given the power to initiate, modify or adjust the rates. Mr. Hardie has been assistant to the director of the Division of Public Service of the Railroad Administration and prior to that time was traffic manager of the Oklahoma Shippers' Association. After the termination of government control he was appointed to an office in the traffic department of the Missouri, Kansas & Texas lines.

Silk Prohibition Illegal

The clause in freight tariffs forbidding the acceptance of silk for transportation by freight was this week brought before the United States Circuit Court of Appeals in New York City and was declared by the Court unlawful. This clause, applying to unmanufactured silk, except when offered in carloads, was put into the tariff by order of Director General Hines, while the railroads were in the hands of the government, and it has since been in effect on substantially all of the railroads of the country. This prohibition was ordered because of heavy losses due to thefts of silk from freight cars.

The suit was brought by Cheney Brothers, silk manufacturers and other silk dealers, asking for an injunction against the director-general. In the district court Judge Mayer decided in favor of the plaintiffs, but this decision is now reversed, the Court of Appeals holding that the act of the director-general in making a permanent prohibition against the carriage of silk was reviewable by the court. The decision of the court of appeals says:

"It is the elemental duty of the common carriers to accept and carry all goods usually carried. Silk is a form of merchandise which has been carried by the companies for many years. The output of the mills in 1919 in this country is said to have exceeded in value $600,000,000, and the plaintiffs, if refused transportation, will suffer irreparable injury.

"The refusal of the defendant, Director General Hines, had no connection with his war powers, but was founded solely on the value of the silk and the danger of loss to the carriers through theft. This would be a reason for fixing a rate of freight proportional to the value of the silk and to the risk of the carriers, but is no better reason for an absolute prohibition than would exist in the case of wheat, coal, or other goods."

The opinion was written by Judge Ward.

Commission and Court News

Interstate Commerce Commission

The Post Office Department has filed with the Interstate Commerce Commission an answer to the reply of the carriers to the petition of the department for a rehearing in the railway mail pay case.

The Interstate Commerce Commission has issued an order approving tariffs put into effect by the Railroad Administration, naming carload minimum weights on mixed stock feeds. Owing to the shortage of cars, the carriers under federal control were authorized by the Railroad Administration to establish these increased minimum weights, subject to tariff provisions making them expire on March 31. The commission recognized the continuance of the emergency, and its order will allow the tariffs to remain in effect.

The Interstate Commerce Commission has announced a hearing at Washington on April 20 regarding the rules and regulations to be prescribed, in accordance with the provisions of the transportation act, that after July 1 no carrier subject to the act shall deliver freight transported by it until all charges have been paid, except under regulations prescribed by the commission. The law says that these provisions must not be construed to prohibit carriers from extending credit to the United States or any department, bureau or agency thereof, or to any state or territory or political subdivision thereof, or the District of Columbia. The commission will hear all who desire to be heard.

State Commissions

The Canadian Railroad Commission has announced that it will not interfere with the ruling of Canadian railways against accepting prepayment charges on freight destined to the United States. This ruling was made because of the unfavorable exchange rate. The commission has decided, however, to continue its hearings on applications made by the boards of trade of a number of Canadian cities. These organizations contend that the railways are without authority to make such a ruling.

The Canadian Freight Association has successfully applied to the Board of Railway Commissioners for Canada, on behalf of the railway companies in Canada subject to the jurisdiction of the board for an order authorizing the railway companies to publish and file charges for the use of heated refrigerator cars on the basis of 1½ cents per mile, with a minimum of $2 in addition to the regular freight charges. The board's order stated that the necessary tariffs may be published and filed not less than seven days previously to the date, or dates, on which they are intended to come into force.

The Pacific Electric has been ordered by the Railroad Commission of California to file monthly reports showing the progress made by the company in its plans for depot construction and main line track changes at San Pedro, Cal. The action was taken in response to a complaint filed by the San Pedro Chamber of Commerce and requires "due diligence in executing the plan." Referring to the depot construction and changes in the trackage, the commission stated that it appears that delays in this work have been due to shortage of men and high prices. Revised estimates show that the cost of the depot to be constructed will be $10,000 greater than was originally authorized.

Personnel of Commissions

Robert Hutcherson, assistant rate expert for the Railroad Commission of California, has resigned to become connected with the Parr Terminal and the Parr-McCormick Steamship Line, with headquarters at San Francisco, Cal. **J. E. Harraman,** heretofore rate expert for the Wells-Fargo Express Company, and the Interstate Commerce Commission, with headquarters at San Francisco, Cal., succeeds Mr. Hutcherson as assistant rate expert for the Railroad Commission.

Foreign Railway News

Chinese Railway Strike

LONDON.

A Reuter cable states that the State Department has been advised of a general strike on the Chinese Eastern Railway, which is in Manchuria, following upon an unsuccessful demand by the social revolutionists that General Horvat, director of the railway, should relinquish his authority over the line.

New Transandine Railway

A government decree has been signed, writes George Mallet to the Weekly Bulletin of the Canadian Department of Trade and Commerce, authorizing the concession of a metre railway between the Yelcho lake and the Argentine frontier. This new line will be 70 kilometers in length, and will connect with another projected line under consideration in the neighboring republic which will extend to Colonia 16 de Octubre, in the Department of Chubut.

The concession will be for fifty years, but the state will have the power to acquire it at any time on payment of its net cost, subject to a rebate of 2½ per cent for depreciation for each year which has passed since its construction.

American Machine Tools in the Dutch East Indies

American machine tools are rapidly gaining an enviable reputation in this market, writes Consul Harry Campbell, Soerabaya, Java. One of the largest and most successful machine shops in Soerabaya is completely equipped with modern American machine tools and is securing an abundance of orders for shop-work which, it appears, it is able to fill more satisfactorily than any of its competitors. It is announced that this concern has recently been awarded the contract for the iron and steel work of a new government railway terminal at Tandjong Priok, the port of Batavia. This speaks well for the Soerabaya shop, with its American equipment, in view of the competition of Batavia firms located so much nearer the work.

Italy to Use Liquid Fuel for Railway Locomotives

LONDON.

An article in the Times Trade Supplement says that in consequence of the scarcity and high cost of coal, the Italian Minister of Railways has ordered the immediate remodeling of 100 locomotives for use with liquid fuel. If the results are satisfactory, a further 200 locomotives will be adapted.

In Verona and Florence trials are being made with oil and coal mixed, and in Naples with oil only. Fourteen locomotives have been remodeled and are in use between Brindisi and Bari. All tests made hitherto have been very satisfactory.

The use of liquid fuel on a large scale is the only means of replacing coal quickly, as the electrification of railways can only be carried out in the course of some years. The Italian experiment must be regarded as an attempt to cope with one of the most important economic problems of the immediate future.

Condition of Belgian Railways

The following is stated to be the condition of the Belgian railways on January 1, writes Trade Commissioner C. E. Herring, Brussels: Freight cars available average about 14,000 daily, while in 1914 the daily average furnished Belgian shippers was in the neighborhood of 20,000. The number of freight trains running is about 84 per cent of the number of trains before the war. The average daily tonnage hauled is 171,000 tons, as compared with a daily average of 190,000 tons in 1914. The passenger trains in daily operation number 1,536.

On January 1, 1919, there were but 578 locomotives in good running condition; this number is now said to be increased to 2,776. Railway receipts have greatly increased in recent months, although there will probably be some deficit for the year because of the heavy monthly deficits during the period following the armistice. For the 11 months ending November 30, 1919, the total receipts amounted to 296,000,000 francs ($57,128,000 at normal exchange), while the total for the year 1913 was 308,000,000 francs ($59,444,000).

During November, 1919, passenger and passengers' baggage receipts amounted to 13,040,000 francs ($2,516,720), while freight receipts came to 21,400,000 francs ($4,130,200). The corresponding figures for November, 1913, were 7,757,000 francs ($1,497,101) and 19,493,000 francs ($3,762,149), respectively. This increase of current receipts is, of course, partly occasioned by an increase in rates since the armistice, and it is reported that a further increase is imminent.

The need for additional rolling stock is acute. Locomotives and cars reclaimed from Germany are usually found to be in need of extensive repairs, and it has been impossible to obtain prompt delivery of new orders. At present it is stated that it would take more than 4,000 additional freight cars daily to meet the demands of commerce and industry.

Belgian Railway Reconstruction

The rapid rate of railway reconstruction in Belgium has really been remarkable, says the Railway Gazette, London. At the beginning of last year the total number of locomotives actually fit for service only amounted to 279. By the end of 1919 this number had been increased to 2,700, a ten-fold growth. The effect of this increase was to make it possible to operate 50 per cent of the pre-war passenger service and 65 per cent of the pre-war number of goods trains. In addition, 675 new locomotives were ordered last year. Altogether, 9,400 passenger cars and 57,800 freight cars of various types were repaired during the year, and 9,000 new freight cars were ordered. Perhaps the most striking fact in the whole of the year's operation was that in December, 1919, it was possible to run some 1,100 freight trains a day, which is 40 times the number operated in January of the same year.. Belgium, whose transport system suffered terribly during the war, including the wanton damage inflicted by the Germans on their final evacuation, can certainly claim to have accomplished something notable in its railway reconstruction.

Use of Air Brakes on Swedish Railways

Some few months ago, writes Consul General D. I. Murphy, Stockholm, the Swedish State Railways began to equip their rolling stock with Kunze-Knorr air brakes, a German invention. By the end of this year it is expected that 60 locomotives and 1,000 cars will be equipped with them. A project is before the Riksdag to grant an increased appropriation so that all the rolling stock of the State Railways, consisting of 1,100 locomotives, 2,500 passenger cars, and about 27,000 freight cars, may be provided with this particular brake.

The Swedish newspapers express gratification that the Kunze-Knorr brakes are to be manufactured by Aktiebolaget Nordiska Armaturfabrikerna, at Lund, that company having purchased the manufacturing rights for Sweden, Norway, and Denmark. The private railways in Sweden have been undecided as to the adoption of an air-brake system, but the papers announce that there is no longer any doubt as to its adoption.

British Railway Regulation

LONDON.

At practically all the annual meetings of the English railway companies, held recently, a statement was made that a committee of the council of the Railway Companies' Association has been appointed and is in close touch with the Ministry of Transport, and that it has been agreed that before legislation is introduced as to the future of the railways the government will consult with the association through that committee. The impression apparently prevails that there is no cause for uneasiness as to the relations between the railways and the Ministry of Transport.

Sir Gilbert Claughton, the chairman of the London & North Western, said at the annual meeting of his company that he would deprecate in the strongest possible terms any doubt being cast upon the good faith of the government as to its intention of dealing fairly with the railways. The railways knew the great value which the government placed upon the services which the railways admittedly rendered during the war and he was convinced that the shareholders need not have the slightest doubt that proper regard would be given to their rights.

Equipment and Supplies

Plans for Use of $300,000,000 Loan Fund

Plans for the use of the $300,000,000 revolving fund, placed at the disposition of the Interstate Commerce Commission to make loans to railroads, were discussed at a conference on March 25 by a committee representing the Association of Railway Executives, with Commissioners Clark, Meyer, Daniels and Eastman, Director General Hines and R. B. Leffingwell, assistant secretary of the treasury.

Among the questions discussed was as to whether most of the available sum would be used to greatest advantage if invested in terminal improvements, etc., or in equipment.

It is understood that the executives, represented by T. De Witt Cuyler, Samuel Rea, Howard Elliott, Daniel Willard, Henry Walters and Alfred P. Thom, were inclined to urge the use of the fund largely for equipment, both because of the great need for it and because equipment can be purchased for a 25 per cent initial payment, and the fund would, therefore, accomplish more than if used otherwise.

The purchase of 80,000 freight cars, 20,000 refrigerator cars, 2,000 passenger cars, and 2,000 locomotives was discussed.

The railroads' program of capital expenditures also depends on how soon they can collect from the Railroad Administration for rental due. Director General Hines is expected to ask Congress soon for an appropriation of over $400,000,000, which will enable him to make further payments to the roads.

Locomotives

The Pacific Great Eastern is inquiring for three Mikado type locomotives.

The Illinois Terminal has ordered two Mogul type locomotives from the Baldwin Locomotive Works.

The Pittsburg & Shawmut has ordered 2 Atlantic type locomotives from the American Locomotive Company.

The Chicago Heights Terminal and Transfer has ordered one 0-6-0 type locomotive from the Baldwin Locomotive Works.

The New York, New Haven & Hartford is reported as about to place orders for about 50 Mountain and Mikado type locomotives.

The California Western Railroad & Navigation Company has ordered one Prairie type locomotive from the Baldwin Locomotive Works.

The Ann Arbor is having five Consolidation type locomotives repaired and equipped with superheaters at the plant of the Lima Locomotive Works.

The National Railways of Mexico are inquiring for 16 Pacific and 15 Mikado locomotives. The inquiries have been issued from Mexico City.

The Central of New Jersey is having 25 locomotives repaired by the Baldwin Locomotive Works and 15 by the American Locomotive Company.

The Pennsylvania Railroad is having 53 Mikado type locomotives repaired at the shops of the Baldwin Locomotive Works and may have repairs made to a total of 300 locomotives at the same shops.

The Louisiana & Arkansas, reported in the *Railway Age* of February 20 as having ordered two locomotives from the Baldwin Locomotive Works, has ordered two additional 10-wheel locomotives from the same company.

The Atchison, Topeka & Santa Fe, reported in the *Railway Age* of February 27 as being in the market for 50 locomotives, has ordered 30 Mikado, 10 Santa Fe and 10 Mountain type locomotives from the Baldwin Locomotive Works.

The Chilean State Railways, through their office at room 1504 City Investing building, 165 Broadway, New York, are inquiring for 30 Mikado and 10 other locomotives of 5 ft. gage, and 20 Mikado and one Mallet locomotives of metre gage.

Freight Cars

The Liberty Export & Import Company is inquiring for 100 cane cars.

The Maine Central is inquiring for 6 30-ft. steel underframe caboose cars.

The Buffalo, Rochester & Pittsburgh is inquiring for 40 caboose cars.

The Chicago, Burlington & Quincy is inquiring for 500 gondola cars.

The Hershey Sugar Corporation (Cuba) is inquiring for 20 30-ton gondola cars.

The Northern Pacific is inquiring for 100 24-ft. double-sheathed caboose cars.

The American Smelting & Refining Company is inquiring for 40 50-ton box cars.

The Nashville, Chattanooga & St. Louis is inquiring for 1,000 to 2,000 steel underframes.

The Boston & Maine is in the market for 1,000 40-ton box cars and for 1,000 50-ton box cars.

The Standard Steel Car Company is planning to build 100 10,000 gal. capacity tank cars for stock.

The U. S. Smelting, Refining & Mining Company is inquiring for 40 50-ton single-sheathed box cars.

The Chilean State Railways are in the market for 200 coal cars, 160 freight cars, 200 flat cars and 20 refrigerator cars. (See note above under locomotives.)

The New York Central reported in the *Railway Age* of February 27, as being in the market for a large number of freight cars, on Wednesday placed orders for 8,000 box and hopper cars.

The Erie Railroad is having repairs made to 150 freight cars at the shops of the American Car & Foundry Company, and repairs to 125 freight cars at the shops of the Standard Steel Car Company.

The Baltimore & Ohio is asking for prices on car bodies for 2,500 box cars of 40-ton capacity, 600 hopper cars of 50-ton capacity, 500 refrigerators of 40-ton capacity and 600 flat cars of 50-ton capacity.

The Prudential Oil Company, reported in the *Railway Age* of March 19, as inquiring for 50 40-ton, 8,000 gal. tank cars and 50 50-ton 10,000 gal. capacity tank cars, has ordered this equipment from the American Car & Foundry Company.

Passenger Cars

The Georgia Railroad is inquiring for six coaches.

The Louisiana & Arkansas is inquiring for 3 steel coaches.

The Boston Elevated has ordered 65 subway cars from the Pressed Steel Car Company.

The Pittsburg & Shawmut is inquiring for 3 steel coaches and 2 combination baggage and smoking cars.

The Chilean State Railways are in the market for 80 passenger coaches. (See note above under locomotives.)

Machinery and Tools

The Lehigh Valley is asking for prices on a large list of machine tools.

Supply Trade News

The Copper Clad Steel Company, Rankin, Pa., has opened a sales office at room 530, 30 Church street, New York. **R. A. Paterson** is district sales agent.

Stewart H. Ford has recently opened an office at 608 Mutual building, Richmond, Va., and is engaged in the railway supply business, specializing on the Rees car and journal jacks and Hisey-Wolf electric portable tools.

The Oxweld Acetylene Company, Newark, N. J., has taken over the manufacture of the Prest-O-Lite welding and cutting equipment. This apparatus, with certain refinements of design, is now being manufactured by the Oxweld Acetylene Company under the name of Eveready welding and cutting outfits.

Joseph T. Ryerson & Son, Chicago, have made an arrangement with the **Camden Iron Works,** Camden, N. J., to become the selling representatives of that company, which is engaged in manufacturing hydraulic tools, centrifugal pumps, cast iron pipe and fittings, gas holders and kindred products.

Charles C. Phelps has recently become associated with the **Uehling Instrument Company,** 71 Broadway, New York, combustion engineers and manufacturers of CO_2 recording equipment and other fuel economy apparatus. Mr. Phelps is devoting most of his attention to research work in connection with the efficient combustion of fuel oil in boiler furnaces. He graduated from Stevens Institute of Technology with the degree of mechanical engineer and has since been studying power plant problems, having been for five years associated with the Ingersoll-Rand Company, New York. Mr. Phelps is an associate member of the American Society of Mechanical Engineers.

J. S. Lemley, who for the past five years has been general sales manager of the G. F. Cotter Supply Company, Houston, Texas, has left that company to become associated with and a partner of **W. D. Jenkins,** Dallas, Texas, representative of manufacturers of railway equipment and supplies, with principal office at Dallas and offices also at Houston and New Orleans, La. Mr. Lemley will have full charge of all mechanical matters. He served on the Baltimore & Ohio in 1898 as a locomotive engineman and a short time later was promoted to trainmaster. After serving in this capacity for two years he went to the mechanical department of the Chicago, Milwaukee & St. Paul. Two years later he was appointed general supervisor of locomotive operation of the Baltimore & Ohio South-Western and the Cincinnati, Hamilton & Dayton, with headquarters at Cincinnati. After serving in that capacity for two years he went to the mechanical department of the Texas & Pacific, remaining with that road until July 1, 1915, when he became associated with the G. F. Cotter Supply Company. **C. E. Naylor,** who has been associated with Mr. Jenkins since 1916, and formerly served on the Texas & Pacific and the International & Great Northern in the mechanical and traffic departments, is in charge of the Houston office. **R. L. Irwin** is in charge of the New Orleans territory. Mr. Irwin was formerly purchasing agent of the Texas & Pacific, and during federal control of the railroads was purchasing agent of the lines under the jurisdiction of F. G. Pettibone as federal manager at Dallas, Texas. **J. K. Bagley,** formerly with the Texas & Pacific as chief clerk in the purchasing department, is in charge of the New Orleans office.

Locomotive Stoker Company

A. C. Deverell has resigned as superintendent of motive power of the Great Northern, at St. Paul, Minn., to become western sales manager of the **Locomotive Stoker Company,** Pittsburgh, Pa., with office at Chicago. He was born in Montreal, Que., and after attending the public schools of that city began his career in the shops of the Grand Trunk at Montreal. He went west in 1895, and while performing some special work for Samuel Hill, president of the Eastern Minnesota Railway, came to the notice of the late James J. Hill, who appointed him superintendent of the freight car shops at St. Cloud, Minn. He was promoted to superintendent of the St. Paul locomotive and passenger car shops, the largest shops on the Great Northern system, employing approximately 19,000 men. He subsequently became assistant superintendent of motive power and later served as superintendent of motive power until his recent appointment as western sales manager of the Locomotive Stoker Company.

A. C. Deverell

H. C. Woodbridge

J. J. Byrne

H. C. Woodbridge has resigned as supervisor of the Fuel Conservation Section of the U. S. Railroad Administration to enter the service of the Locomotive Stoker Company as representative, with headquarters at Pittsburgh, Pa. He was born on October 7, 1874. He worked in the machine shops at Chatham, N. Y., and was extra fireman on the Lebanon Springs Railroad during 1891 and 1892. In 1897, he graduated as mechanical engineer from Cornell University. From June, 1897, to March, 1899, he worked as a machinist in the Minneapolis & St. Louis shops at Minneapolis, Minn. He was foreman at Albert Lea, in charge of locomotive and car work from March, 1899, to February 1903, but during the last two years of this period served as traveling fireman and extra locomotive engineman and pilot. In February, 1903, he was made traveling engineer and inspector for the American Locomotive Company, resigning in September, 1904, to take service as general foreman on the Delaware, Lackawanna & Western, at Elmira, N. Y., serving until November, 1905. He was appointed a master mechanic on the Buffalo, Rochester

& Pittsburgh, in November, 1905, remaining in that position until January, 1908. From January, 1908, to August, 1909, he was occupied in special work for the superintendent of motive power, and was made special representative and assistant to general manager in August, 1909, remaining in that work until June, 1918. He was then appointed supervisor, Fuel Conservation Section, U. S. Railroad Administration, Allegheny Region, which position he now leaves to take service with the Locomotive Stoker Company.

J. J. Byrne has been appointed district representative of the Locomotive Stoker Company, with his headquarters at new offices opened in Washington, D. C. He was born in Cincinnati, Ohio, and attended the public schools of that city and Delaware, Ohio. He entered railroad service in 1903, in the Cleveland, Cincinnati, Chicago & St. Louis shops at Delaware, as machinist apprentice. After completing his apprenticeship, he entered the service of the New York Central Lines as machinist in the Collinwood shops. He remained in the employ of the New York Central until 1909, when he left to accept a position as mechanical expert, with the Locomotive Stoker Company. In 1917 he was appointed representative with headquarters in New York, and the following year was transferred to the southern territory, with headquarters at Roanoke, Va. Later in the year he was located in Richmond, Va., in charge of the Locomotive Stoker Company's office at that place.

Chicago Pneumatic Tool Co. Moves to New York

The general offices of the **Chicago Pneumatic Tool Company** on March 31, were removed from Chicago to the Chicago Pneumatic building, a new ten-story structure erected for the exclusive use of the company of 6 East Forty-fourth street, New York. The move was accomplished without appreciable interruption to business over the week-end. Arrangements, carefully made in advance, made possible the jump of the organization across half of the continent without interference to the normal routine of business except for a brief period. The Chicago district sales branch, previously in the Fisher building, has been moved to new quarters at 300 North Michigan Boulevard. The Chicago service branch, formerly at 521 South Dearborn street, has been consolidated with the sales branch, at the new address, occupying the first floor of the building, while the sales offices will be on the second floor or Boulevard level. Both departments of the Chicago branch are under the direction of **J. L. Canby**, district manager.

J. H. Williams & Co. Expands Activities

Special meetings of the stockholders of **J. H. Williams & Co.**, Brooklyn, N. Y., and of the **Whitman & Barnes Manufacturing Company**, Akron, Ohio, have been called for April 2 to ratify an agreement entered into by their respective presidents, made subject to the approval of the stockholders, for the merging of the Chicago and St. Catherines, Ont., plants of the Whitman & Barnes Manufacturing Company with J. H. Williams & Co. This plan contemplates the operation by J. H. Williams & Co. of drop forging and drop forged tool plants at Brooklyn, N. Y., Buffalo, N. Y., and West Pullman, Chicago, Ill., in the United States, and at St. Catherines, Ont. in Canada, which is located close to Buffalo, and the business will be operated by the individuals now connected with these plants. The plans of J. H. Williams & Co., under this arrangement, call for a considerably extended business. The Whitman & Barnes Manufacturing Company's Chicago plant includes the new forge shop 100 ft. by 500 ft., and power house built recently by Stone & Webster at a cost, including complete equipment, of $1,250,000. The Whitman & Barnes Manufacturing Company will continue its business of making twist drills, reamers and collateral lines on an extended scale at Akron, Ohio.

Obituary

John N. Derby, vice-president of **Manning, Maxwell & Moore, Inc.**, New York, died at his home in Greenwich, Conn., on March 29.

Fred W. Snow, president and general manager of the **Ramapo Iron Works**, Hilburn, N. Y., died at his home in Hilburn on March 26. He was born at Woonsocket, R. I., on September 12, 1853, and was educated in the public schools of Jersey City, also at a private school in Newburgh, the Peekskill Military Academy and the Rensselaer Polytechnic Institute, Troy, N. Y. At the completion of his second year in the institute, in July, 1872, he entered the Rhode Island Locomotive Works at Providence, to learn the practical part of iron manufacturing. In 1875, he was appointed assistant superintendent of the Ramapo Wheel & Foundry Company and in 1881, when the Ramapo Iron Works was organized, he accepted the position of superintendent of this company, resigning his former position. In May, 1900, he was elected president and general manager of the company and held that position until his death. He also was president of the Rockland Electric Company and the Mountain Spring Water Company. Mr. Snow invented a number of important inventions for railroad equipment, including automatic switch stands which are in extensive use on railroads throughout the United States. He was a director of the American Brake Shoe & Foundry Company and other corporations. In 1906 he organized the Canadian Ramapo Iron Works, Ltd., of which he was treasurer.

F. W. Snow

Trade Publications

TRACK MAINTENANCE.—Templeton, Kenly & Co., Ltd., Chicago, have recently issued a large size four-page illustrated folder which describes the application of the Simplex track jack manufactured by this company in modern maintenance work. The illustrations show the general dimensions of the jack and its method of use with a standard lining bar.

CRANES.—The Whiting Foundry Equipment Company, Harvey, Ill., has issued a new edition of its crane catalogue, designated as catalogue No. 151, containing 80 pages, 6 in. by 9 in., with a great many illustrations. Cranes of all types are represented and detailed information is given concerning them.

AIR COMPRESSORS.—Bulletin 75-U of the Sullivan Machinery Company, Chicago, describes in considerable detail the Sullivan tandem compound Corliss steam driven air compressors, class "WC," which are available in unit capacities of from 1,000 to 3,150 cu. ft. of free air a minute. Photographs accompanying the text show installations of the Sullivan-Corliss compressors and indicate the range of service which they are performing.

TRAIN OPERATION BY SIGNAL INDICATION is the title of Bulletin No. 2 recently issued by the four signal companies, the Union, the General, the Federal and the Hall, and made up of reprints of articles which have appeared in the *Railway Age*. The first one is that which was published December 27, 1918, with comments by H. M. Sperry, publicity agent for the four companies. The cost of stopping trains is discussed by C. C. Anthony and others. This compilation has been made to show that the use of automatic block signals is justified, not only for the purpose of saving life and limb and preventing damage to property but by the economic results in every-day operation. Figures are given showing a saving on 100 miles of road of $86,000 a year. The pamphlet consists of 12 pages, 8½ in. by 11 in., and may be had from Mr. Sperry, 347 Madison avenue, New York.

Financial and Construction

Railway Financial News

CHICAGO & NORTH WESTERN.—At the annual meeting on April 13, the stockholders will be asked to authorize the creation of a blanket refunding and improvement mortgage so drawn that the amount of bonds issued thereunder, together with the outstanding prior debt, shall not exceed three times the outstanding capital stock. The mortgage is to mature May 1, 2037.

At the same meeting the stockholders will be asked to approve the purchase of the property of proprietary companies, all of the capital stock of which is owned by the Chicago & North Western.

MACON, DUBLIN & SAVANNAH.—J. A. Streyer, of Macon, Ga., and W. L. Seddon, of Norfolk, Va., have been elected directors to succeed E. T. Brown, of Atlanta, Ga., and M. J. Caples, of Richmond, Va.

MARSHALL & EAST TEXAS.—An order has been entered by Federal Judge Estes, of Austin, Tex., instructing Bryan Snyder, receiver of the Marshall & East Texas, to sell certain sections of the road. The Marshall & East Texas, operation of which was discontinued during federal control, extends from Winnsboro, Tex., to Marshall, a distance of 92 miles. The statutes of Texas forbid tearing up the main-line track of a railroad once laid, and the attorney general's department has not given assent to any portion of the road being taken up, despite the fact that it has not been in operation for two years. Those portions which are offered for sale are: Gilmer to James, 14 miles; James to Harleton, 12 miles; Harleton to Marshall, about 16 miles; Marshall to Elysian Fields, 17 miles. The Marshall terminals are to be sold separately.

WABASH, CHESTER & WESTERN.—The Wabash, Chester & Western, running from Menard, Ill., to Mt. Vernon, a distance of approximately 64 miles, was purchased on March 27 by Jesse Dimond, a Chicago coal operator, for $400,000.

Railway Construction

DE QUEEN & EASTERN.—The De Queen & Eastern and the Texas, Oklahoma & Eastern are extending their lines between De Queen, Ark., and Broken Bow, Okla., to form a connection midway between the two cities. It is expected that the construction will be completed the latter part of this year.

ERIE RAILROAD.—A contract has been given to the Arthur McMullen Company, New York, for removing the present bridge over the Passaic river, Newark, N. J., and building the substructure for a new bridge. The plans call for a double-track bascule bridge, Strauss type.

KANSAS CITY, MEXICO & ORIENT.—At a recent meeting of the directors of the Kansas City, Mexico & Orient, held at San Angelo, the matter of resuming the construction at an early date of the long proposed branch line that is to run from that city to Del Rio, a distance of 170 miles, was informally discussed. It is planned to carry this project to fulfillment as soon as the necessary financial arrangements for doing so can be made. Part of the grade for this branch was constructed a few years ago. With its completion and the construction of an international railroad bridge across the Rio Grande river, connecting Del Rio with Las Vacas, Mexico, a new international gateway will have been established. The National Railways of Mexico have had a branch line under construction for some time. This line is to run from Allende, on its Eagle Pass Torreon division, to Las Vacas, about 75 miles, passing through a region that is under irrigation and in a high state of cultivation.

PITTSBURG & SHAWMUT.—Contracts are to be let in the near future for the construction of a 40 ft. by 160 ft. storehouse with offices for the mechanical department at Brookville, Pa., and for lining the Mauck tunnel on the same line, 2,000 ft., with concrete.

Railway Officers

Executive

Harlan J. German has been elected vice-president in charge of operation of the Montour, with headquarters at Pittsburgh, Pa., succeeding F. C. Baird, resigned, effective April 1.

Archibald Fries, who has been elected vice-president in charge of traffic and commercial development of the Baltimore & Ohio, with headquarters at Baltimore, Md., as noted in the *Railway Age* of March 5 (page 737), was throughout most of federal control traffic manager. Mr. Fries was born in Cincinnati, Ohio, on February 27, 1864. He was educated in the Cincinnati public schools and completed a special college course. He entered the service of the Ohio & Mississippi, now the Mississippi division of the Baltimore & Ohio, in October, 1882, as entry clerk in the local transfer freight office at Storrs Station, Ohio. Having served in various clerical capacities up to that of chief clerk until 1890, he was then given the position of chief rate and claim clerk in the office of the general manager of the Continental Line, operating a fast freight line over the Ohio & Mississippi and the Baltimore & Ohio. Later he became accountant, chief clerk and acting manager. He was afterwards transferred as chief clerk to the general freight office. While there he was appointed general agent and assistant general freight agent. On January 1, 1913, he was promoted to general freight agent of the Baltimore & Ohio, with headquarters at Pittsburgh, Pa., and on October 21, 1916, was appointed freight traffic manager of the eastern lines, with headquarters at Baltimore, Ohio. On January 1, 1918, his jurisdiction was extended over the entire traffic department of the Baltimore & Ohio system. Shortly afterwards he was appointed traffic manager of the eastern lines, the Western Maryland, the Coal & Coke and other roads in the Allegheny region, under the jurisdiction of C. W. Galloway, as federal manager. He retained that position until January 1, 1920, when he was appointed general traffic manager for the corporation.

A. Fries

B. L. Bugg, formerly general manager of the Atlanta, Birmingham & Atlantic, who has been elected president of that road, as noted in the *Railway Age* of February 20 (page 595), was born on August 8, 1869 near Palo Alto, Miss. He received a grammar and high school education and began railroad work in 1887 with the Florida Railway & Navigation Company, now part of the Seaboard Air Line. From 1889 until 1891 he served as operator and agent of the Florida Central & Peninsular, now also part of the Seaboard Air Line. In 1891, he became agent of Georgia Southern & Florida and remained in that position until 1894. He went to the Central of Georgia as agent at Savannah, Ga., in 1895. Resigning from that position in 1907, he became general agent of the Old Dominion Steamship Company. In 1910 he was appointed traffic manager of the Norfolk Southern but resigned in 1912 to accept the same position with the Atlanta, Birmingham & Atlantic. In October, 1912, he was promoted to assistant general manager and later to general manager. Shortly after the United States entered the war he

was given a commission as lieutenant colonel in charge of the organiation of the Sixty-sixth engineers. He was ordered to France in June, 1918, and there his regiment was assigned to operate the Twentieth Grand Division, Transporation Corps on the line of the Paris, Lyons & Mediterranean Railway. Colonel Bugg returned to the United States in June, 1919, and shortly after resumed his duties as general manager of the Atlanta, Birmingham & Atlantic.

Charles W. Galloway, who has been elected vice-president in charge of operation and maintenance of the Baltimore & Ohio, with headquarters at Baltimore, Md., as noted in the *Railway Age* of March 5 (page 737), served as federal manager of the same company during federal control. Mr. Galloway was born in Baltimore, Md., on December 11, 1868, and educated in the public schools of that city. His entire railroad service has been with the Baltimore & Ohio, whose employ he entered on April 1, 1883, as messenger in the telegraph department at Baltimore. From then until April 1, 1891, he served consecutively as clerk and messenger in the transportation office, stenographer to the superintendent of car service and stenographer to the general superintendent and superintendent of transportation. He was appointed trainmaster at Baltimore in 1897 and promoted to assistant superintendent, with the same headquarters, in 1918. On July 1, 1899, he was appointed superintendent of the Cumberland division at Cumberland, Md., but returned to Baltimore in 1901 as superintendent of the Baltimore division. He became superintendent of transportation in 1906 and general superintendent of transportation on July 1, 1910. The following September he was transferred to Cincinnati as general superintendent of the Baltimore & Ohio Southwestern. He was appointed general manager of the Baltimore & Ohio, with headquarters at Baltimore, in April, 1912; transferred again to Cincinnati on July 1, 1916, as general manager of the western lines and on the same date elected vice-president of the Baltimore & Ohio Southwestern. He became federal manager of the Baltimore & Ohio, Western Lines, the Dayton & Union and the Dayton Union on June 1, 1918, and of the Baltimore & Ohio Eastern Lines, the Coal & Coke, the Western Maryland and other roads, on February 1, 1919, and of the entire Baltimore & Ohio system on February 15, 1920.

C. W. Galloway

Financial, Legal and Accounting

Leslie L. Sheppard, assistant auditor and traffic manager of the Raritan River with headquarters at South Amboy, N. J., has been appointed auditor and traffic, effective March 8, succeeding George C. Chittick, deceased.

George H. Hess, Jr., whose appointment as controller of the Great Northern, with headquarters at St. Paul, Minn., was announced in the *Railway Age* of March 5 (page 742), was born at Dubuque, Iowa, on July 14, 1873. He entered railway service in 1892 in the bookkeeping department of the Pacific Express Company at Omaha, Neb. On June 1, 1911, he was appointed examiner in the Bureau of Carriers' Accounts of the Interstate Commerce Commission, which position he retained until January, 1914, when he was appointed accountant in the Bureau of Valuation, Western district of the Interstate Commerce Commission. From April, 1916, to February 29, 1920, he was assistant controller of the Great Northern and on the latter date was promoted to controller. He succeeds J. R. Martin, whose election to vice-president of the Great Northern was announced in the *Railway Age* of March 5 (page 742).

James C. Wallace, who has been appointed auditor of the Cleveland, Cincinnati, Chicago & St. Louis with headquarters at Cincinnati, Ohio, as noted in the *Railway Age* of March 19 (page 994), was up to March 1 assistant auditor of the same company. Mr. Wallace was born at Battle Creek, Mich., on May 22, 1874 and was educated in the public schools of Detroit. He began railroad work in the auditor's office of the Michigan Central at Detroit, Mich., in January, 1903, and remained there until 1906 when he went to New York as accountant in the office of the auditor of the Delaware, Lackawanna & Western. From 1909 until 1911 he was examiner of accounts in the carriers' account division of the Interstate Commerce Commission. He was appointed auditor of disbursements of the Cleveland, Cincinnati, Chicago & St. Louis with headquarters at Cincinnati in December, 1911, becoming assistant auditor in 1912.

Operating

T. W. Evans, assistant general manager of the New York Central, has had his headquarters transferred from New York City to Syracuse, N. Y., effective April 1.

J. W. Tipton has been appointed assistant superintendent and car accountant of the Gulf, Texas & Western, with headquarters at Jermyn, Tex., effective March 1.

W. H. Gemmell, general superintendent of the Minnesota & International during federal control, has been appointed general manager, with headquarters at Brainerd, Minn.

W. K. Lynn, master mechanic of the Gulf & Ship Island at Gulfport, Miss., has been appointed superintendent, with headquarters at Hattiesburg, Miss., succeeding **M. D. Fohey.**

Charles F. Craig, whose appointment as assistant to the general manager of the Western Pacific, with headquarters at San Francisco, Cal., was announced in the *Railway Age* of March 12 (page 807), was born at Burlington, Ia., on March 3, 1884. He entered railway service in May, 1902, in the office of the general manager of the Missouri Lines of the Chicago, Burlington & Quincy, remaining in the operating department of that road until June, 1905, when he entered the service of the Northern Pacific in the office of the assistant to the vice-president at Tacoma, Wash. Later he was promoted to secretary to the vice-president and general manager of that road. In December, 1909, he was employed in a similar position on the Western Pacific at San Francisco. He served as chief clerk to the vice-president and general manager from October, 1902, until the receivers for the property were appointed (in March, 1915), at which time he was appointed secretary to the receiver. Upon the reorganization of the property, in June, 1916, he became secretary of the Western Pacific, and during the period of federal control served as secretary and assistant treasurer. This position he held until his present appointment as assistant to the general manager.

Chas. F. Craig

Traffic

M. O'Connor has been appointed southwestern freight agent of the Seaboard Air Line, with headquarters at New Orleans, La., effective March 16.

Charles F. Case has been appointed commercial agent of the Erie, with headquarters at New York.

N. J. Van Schoyck, assistant superintendent of transportation of the Chicago, Milwaukee & St. Paul, with office at Chicago, has been appointed supervisor of mail and express traffic, with the same headquarters, effective March 18.

Edgar D. Hilleary, assistant general freight agent of the Philadelphia & Reading, who has been appointed general freight agent, with headquarters at Philadelphia, Pa., as noted in the *Railway Age* of March 5 (page 746), was born on September 1, 1877, in Frederick County, Md. He graduated from St. John's College, Annapolis, Md., in 1897. On July 1 of the same year he began railroad work in the office of the foreign freight agent of the Philadelphia & Reading. In October, 1897, he was transferred to the office of the assistant general freight agent in charge of export and import traffic. He served in various other capacities in the same office until he was finally appointed chief clerk. In June, 1905, he became agent of the Central States Despatch Fast Freight Line at Philadelphia, Pa., and in January, 1906, was appointed division freight agent of the New York Division of the Philadelphia & Reading and the Atlantic City. He was transferred to Harrisburg, Pa., on February, 14, 1910, and was promoted to assistant general freight agent in December, 1918.

E. A. Hilleary

Frank J. Woulfe, who has been appointed assistant traffic manager of the Lehigh Valley, with headquarters in New York, as noted in the *Railway Age* of March 5 (page 743), served as general freight agent of the same road from August 1, 1909, until the termination of federal control. Mr. Woulfe was born on November 9, 1863, at Fort Wayne, Ind. He received a public school education and began railroad work on April 1, 1879, as night bill clerk for the Wabash. From then until 1890 he served as cashier and in various clerical capacities. In 1890 he was appointed traveling freight agent of the Lehigh & Wabash Despatch and the Lehigh Valley Transportation Company, with headquarters at Decatur, Ill. In 1898 he went to the Lehigh Valley as general agent at St. Louis, Mo., and was transferred to New York as city freight agent in 1901. Afterwards he was appointed general eastern freight agent and on August 1, 1909, became general freight agent of the system with headquarters at New York, as mentioned above.

F. J. Woulfe

C. J. McDonald, assistant to the regional director of the Central Western region during federal control, has been appointed general agent refrigerator service of the Southern Pacific, with headquarters at San Francisco, effective March 1.

W. P. Buffington, member of the Central Territory Coal & Coke committee of the Railroad Administration, with headquarters at Pittsburgh, Pa., during federal control, has been appointed traffic manager of the Montour, effective April 1.

D. P. Grier has been appointed commercial agent of the Seaboard Air Line, with headquarters at St. Louis, Mo., and **E. D. Lappin** has been appointed commercial agent at Kansas City, Mo., effective March 1.

B. F. Seggerson, traffic manager of the New Mexico Central, with headquarters at Santa Fe, N. M., has been appointed assistant general freight and passenger agent of the Gulf, Texas & Western, with headquarters at Jermyn, Tex., effective March 1.

W. J. Curtis, general agent of the Atchison, Topeka & Santa Fe, with headquarters at Salt Lake City, prior to federal control, has been appointed general agent of the freight and passenger departments of the same road, with headquarters at Atlanta, Ga.

Edwin L. Lewis, formerly assistant general passenger agent of the Philadelphia & Reading, who has been appointed general passenger agent of the same road, as noted in the *Railway Age* of March 5 (page 746), was born September 17, 1882, and educated in Chaffee's Phonetic Institute of Oswego, N. Y., graduating December 22, 1899. He began railroad work as stenographer to the general superintendent of the Central of New Jersey, with headquarters at Jersey City, N. J. On March 12, 1903, he accepted the same position in the office of the general passenger agent of the Philadelphia & Reading. He was promoted to assistant chief clerk in June, 1906, and on December 1, 1909, became district passenger agent at Philadelphia. He was appointed assistant general passenger agent on April 11, 1917, and held that position until July 1, 1918, when he resigned to become assistant sales manager of the Packard Motor Car Company. Later he became sales manager, then general distribution manager and afterwards assistant general manager. He resigned from the latter position on March 1 to accept his recent appointment with the Philadelphia & Reading.

E. L. Lewis

William T. Vandenburgh has been appointed commercial agent of the Seaboard Air Line, with headquarters at Louisville, Ky.; **W. H. H. Terrell** has been appointed commercial agent, with headquarters at Chicago, and **Charles E. Boisseau, Jr.,** commercial agent at Cincinnati, Ohio, effective March 1.

Charles W. Walker has been appointed assistant general freight agent of the Carolina, Clinchfield & Ohio; **C. A. Smith** has been appointed general freight and passenger agent, and **E. P. McEwan,** formerly general agent at Atlanta, Ga., has been appointed general western agent, with headquarters at Cincinnati, Ohio. **H. O. Yant** has been appointed commercial agent, with headquarters at Detroit, Mich.

Joseph J. Byrne, whose appointment as assistant freight traffic manager of the Delaware, Lackawanna & Western, with headquarters at New York, was noted in the *Railway Age* of March 5, (page 741), was, prior to March 1, general freight agent, with the same headquarters. Mr. Byrne was born in Riley, Ohio. He was educated in the public schools

of Indianapolis, Ind., and began railroad work in that city as telegraph operator for the Cleveland, Cincinnati, Chicago & St. Louis. In 1892 he became contracting freight agent of the Nickel Plate Line at Indianapolis, and retained that position until September, 1897, when he was appointed agent of the Lackawanna Line at the same place. In 1901 he was transferred as commercial agent to Cleveland, Ohio, where he remained until November, 1905, when he entered the employ of the Delaware, Lackawanna & Western as division freight agent at Syracuse, N. Y. In November, 1909, he was appointed general eastern freight agent of the same road, with headquarters at New York, and was promoted to assistant general freight agent in 1918. He became general freight agent in February, 1919.

Edson J. Weeks, who has been appointed passenger traffic manager of the Philadelphia & Reading, as noted in the *Railway Age* of March 5 (page 746), served during federal control as general passenger agent of the same road, with headquarters at Philadelphia. Mr. Weeks was born in Schodack, Rensselaer County, N. Y., on January 22, 1857. He graduated from the East Greenbush Collegiate Institute in 1874 and began railroad work in 1875, as a telegraph operator for the Erie at Buffalo, N. Y. Afterwards he became ticket clerk and city ticket agent at the same place. From October 15, 1883, to December 31, 1883, he was city ticket agent for the Chicago & St. Louis, now part of the Atchison, Topeka & Santa Fe, at New York. He was appointed general agent of the passenger department of the West Shore in January, 1884, and retained that position until March, 1886, when he became general agent of the New York Central & Hudson River and the West Shore, with headquarters at Buffalo. He was appointed general passenger agent of the Philadelphia & Reading in 1897, and retained that position until his recent appointment on March 1.

E. J. Weeks

George W. Kridler, whose appointment as general freight agent on the Baltimore & Ohio, with headquarters at Chicago, was announced in the *Railway Age* of March 5 (page 738), entered railway service in the local freight office of the Pennsylvania at Hudson, Ohio, at the age of 18 years. He continued in the employ of this road in the freight offices at Steubenville, Ohio, and Wellsville, for three years, when he was employed by the Empire Fast Freight Line, at Cleveland, Ohio. He remained with the Empire line for seven years, then becoming connected with the New York Central Fast Freight Lines at Cleveland. Later he was employed by the Lake Shore & Michigan Southern as a contracting agent at Cleveland. He was later successively promoted to commercial freight agent, at Cleveland, to general agent at Pittsburgh, Pa., to division freight agent at Youngstown, Ohio, and to assistant general freight agent at Cleveland. He was appointed assistant general freight agent of the New York Central Lines West at Cleveland, a short time prior to July 1, 1918, on which date he became connected with the Division of Traffic of the United States Railroad Administration at Washington. This position he retained until his recent appointment as general freight agent of the Baltimore & Ohio.

Engineering, Maintenance of Way and Signalling

R. P. Forsberg, special engineer of the Pittsburgh & Lake Erie, has been appointed principal assistant engineer of the same road, with headquarters at Pittsburgh, Pa.

H. M. Bassett, corporate engineer of roadway and structures of the New York Central Lines, with headquarters at New York, has been appointed general office engineer, the former corporate title of engineer of roadway and structures having been abolished.

Charles H. Koyl, whose appointment as engineer of water service of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, was announced in the *Railway Age* of January 16 (page 280), was born at Amherstburg, Ont., on August 14, 1855. He graduated from Victoria College, Cobourg, Ont., in 1877, and attended Johns Hopkins University as a fellow in physics from 1881 to 1883. He entered railway service with the Great Northern in 1904 as engineer of water service, which position he retained until December 31, 1919, when he was appointed engineer of water service on the Chicago, Milwaukee & St. Paul. During this period he has had charge of the development of a comprehensive program of water treatment on the Great Northern, particularly on the lines in North Dakota and Montana.

Chas. H. Koyl

John R. Sexton, division engineer of the Marion and Chicago divisions of the Erie, with headquarters at Huntington, Inc., whose promotion to regional engineer in charge of the Chicago region, with headquarters at Chicago, was noted in the *Railway Age* of February 27 (page 662), was born on January 18, 1889, at Long Branch, N. J. He graduated from Rutgers College in 1911, but had been previously employed as a rodman on the Lehigh Valley in the summer of 1909. From August 1, 1911, to October 13, 1913, he was employed consecutively on the New York Central as chainman, rodman, instrumentman and inspector. He then entered the service of the Erie as resident engineer, later becoming assistant division engineer of the Mahoning division. In April, 1916, he was promoted to division engineer of the Meadville division, and in May, 1917, was transferred to the Marion and Chicago divisions, where he remained until his recent promotion to regional engineer.

J. R. Sexton

Mechanical

F. P. Barnes has been appointed master mechanic of the Colorado, Wyoming & Eastern, succeeding **A. D. Howard,** resigned, effective March 8.

Charles Hyland has been appointed mechanical superintendent of the Toledo Terminal, with headquarters at the Boulevard shops of the Toledo Terminal at Toledo, Ohio, effective March 15.

Fred L. Voerge has been appointed assistant master mechanic of the Montana division of the Northern Pacific Railway, with headquarters at Livingston, Mont., effective March 15.

J. L. Butler, master mechanic of the Missouri Pacific at DeSoto, Mo., has been transferred to the position of master mechanic of the St. Louis (Mo.) terminals of the Missouri Pacific.

W. C. Ross, master car builder of the Copper Range, has been appointed master mechanic at Houghton, Mich., succeeding N. M. Barker, resigned to engage in other business, effective March 26.

G. W. Cundiff has been appointed road foreman of engines of the St. Louis division of the Mobile & Ohio at Mobile, Ala., and A. J. Meriwether has been appointed road foreman of engines of the Mobile division of the Mobile & Ohio and of the Southern Railway in Mississippi, at Meridian, Miss., effective March 1.

J. E. Ennis, corporate assistant engineer of rolling stock of the New York Central Lines, with headquarters at New York, has been appointed engineer of equipment claims, the former corporate title of engineer of rolling stock having been abolished.

G. H. Langton, shop superintendent of the Virginian at Princeton, Va., has been appointed master mechanic, with the same headquarters, and the title of shop superintendent has been abolished. B. E. Nevins has been appointed master mechanic at Victoria; H. L. Getty has been appointed master mechanic at Roanoke, Va., all these appointments are effective March 12.

L. P. Michael, whose appointment as mechanical engineer of the Chicago & North Western, with headquarters at Chicago, was announced in the *Railway Age* of March 26 (page 1076), graduated from Purdue University as a bachelor of science in mechanical engineering, specializing in railroad work, in 1896. He was first employed for about one year as a locomotive fireman by the Wabash and Monon Railways and later worked as a special machinist helper in the shops of the Monon at Lafayette, Ind. He was then for eight years in the service of the Cleveland, Cincinnati, Chicago & St. Louis and during that time held the positions of machinist, air brake foreman, erecting foreman, enginehouse and general foreman, draftsman and inspector of shops and machinery. Since 1906, he has been with the Chicago & North Western, being employed as a draftsman until 1908, when he was promoted to the position of chief draftsman of the motive power and car departments, which position he held until he was recently appointed mechanical engineer.

L. P. Michael

A. J. Devlin, master mechanic of the Western division of the St. Louis-San Francisco at Enid, Okla., has been appointed shop superintendent of the North shops at Springfield, Mo., succeeding J. E. Henshaw, transferred; W. J. Foley, assistant master mechanic of the Northern division at Monett, Mo., has been appointed master mechanic, succeeding Mr. Devlin, and F. G. Fisher has been appointed assistant master mechanic to succeed Mr. Foley, all effective March 16.

General

ATCHISON, TOPEKA & SANTA FE.

The following is part of the personnel of the newly organized traffic department of the Atchison, Topeka & Santa Fe, effective March 1:

F. B. Houghton..	Freight traffic manager....	Chicago.
F. H. Manter....	Asst. freight traffic mgr....	"
J. R. Koontz.....	" " " "	Topeka, Kan.
D. L. Meyers....	" " " "	Chicago.
R. G. Merrick....	General freight agent.....	Topeka, Kan.
H. P. Anewalt...	" " "	Los Angeles, Cal.
J. H. McCabe....	Asst. gen. freight agent....	Chicago.
J. B. Coffey.....	" " " "	"
J. J. Grogan.....	Foreign freight agent.....	"

BALTIMORE & OHIO

The following gives those portions of the new organization of the Baltimore & Ohio not included in the lists of names given in the *Railway Age* of March 5, page 737, and March 12, page 801:

LEGAL DEPARTMENT

R. Marsden Smith.	General attorney.....	Baltimore, Md.
A. H. Boyd, Jr...	General attorney.....	"
Duncan K. Brent.	General attorney.....	"
Chas. R. Webber.	Asst. gen. attorney.....	"
Allen S. Bowie..	Asst. gen. attorney.....	"
F. R. Cross.....	Asst. gen. attorney.....	"
Geo. D. Penniman.	Counsel for Relief Dep't...	"
Morison R. Waite.	Gen. solicitor, west. lines...	Cincinnati, Ohio.
W. A. Eggers.....	Asst. gen. sol., west. lines.	"
Wm. G. Conley...	Gen. atty. for W. Va.....	Charleston, W. Va.
C. W. Egan.....	General claim agent.....	Baltimore, Md.
E. L. Williams...	General claim agent.....	Cincinnati, Ohio.

ACCOUNTING DEPARTMENT

W. D. Owens.....	Assistant comptroller.....	Baltimore, Md.
F. A. Deverell....	Assistant comptroller.....	"
J. P. O'Malley....	Assistant comptroller.....	"
O. J. Rider.....	General accountant.....	"
G. H. Pryor.....	Auditor of disbursements..	"
S. W. Hill.....	Ast. aud. of disbursements.	"
W. E. Rittenhouse.	Aud. merchandise receipts..	"
N. F. Davis.....	Asst. aud. merch. receipts..	"
H. S. Maccubbin..	Asst. aud. merch. receipts..	"
L. A. Lambert....	Aud. coal and coke receipts.	"
W. B. Dudderar..	Asst. aud. coal & coke rec's.	"
C. H. Poumairat..	Auditor passenger receipts.	"
L. M. Grice.....	Asst. aud. pass. receipts....	"
J. F. Schutte.....	Auditor freight claims.....	"
C. G. Pollock.....	Auditor miscel. receipts....	"

TREASURY DEPARTMENT

P. C. Swein.....	General paymaster.....	Baltimore, Md.

ADJUSTMENT DIVISION

H. Gardner.....	Mech. eng. Adjustment Div.	Baltimore, Md.

VALUATION DEPARTMENT

H. B. Dick.....	Assistant valuation eng'r...	Baltimore, Md.

OPERATING DEPARTMENT

A. G. Sandman....	Mechanical engineer.....	Baltimore, Md.
J. H. Davis.....	Electrical engineer.....	"
I. J. Poole.....	Supervisor of shops.....	"
F. J. Pfahler.....	Sup'or loco. maintenance...	"
J. D. Clarke.....	Supt. transportation	"
G. D. Brooke.....	Supt. transportation	Cincinnati, Ohio.
C. W. Gorsuch...	Transportation assistant...	Pittsburgh, Pa.
F. J. Angier.....	Supt. timber preservation...	Baltimore, Md.
E. W. Day.....	Asst. supt. telegraph.....	"
E. T. Ambach....	Asst. supt. telegraph.....	Cincinnati, Ohio.
H. L. Denton....	Gen. superintendent police..	Baltimore, Md.

NEW YORK TERMINAL LINES

E. J. Hamner....	Superintendent	St. George, S. I.

EASTERN LINES

C. G. Martin.....	Asst. to general manager...	Baltimore, Md.
C. A. Gill.....	Supt. motive power.....	"
S. A. Jordan.....	Engr. maintenance of way..	"
E. T. Horn.....	Supervisor of terminals....	"

Maryland District

A. K. Galloway...	District master mechanic...	Baltimore, Md.
R. B. White.....	Supt. Baltimore division...	"
F. G. Hoskins....	Supt. terminal	"
J. W. Deneen....	Supt. Cumberland division..	Cumberland, Md.

West Virginia District

J. F. Bowden....District master mechanic...Wheeling, W. Va.
C. W. Van Horn.Supt. Monongah division..Grafton, W. Va.
E. V. Smith.....Supt. Wheeling division....Wheeling, W. Va.
J. W. Root.....Supt. Ohio River division..Parkersburg,W.Va
W. Trapnell.....Supt. Charleston division...Weston, W. Va.

Pennsylvania District

G. A. Schmoll....District master mechanic...Pittsburgh, Pa.
T. J. Brady.....Supt. Connellsville division.Connellsville, Pa.
C. B. Gorsuch....Supt. Pittsburgh division...Pittsburgh, Pa.

WESTERN LINES

J. B. Carothers....Asst. to general manager...Cincinnati, Ohio.
E. B. Russell.....Asst. to general manager... "
W. Malthaner....Supt. of motive power..... "
F. J. Young.....Superintendent police..... "
E. G. Lane.....Engr. maintenance of way.. "

Northwest District

W. D. Johnson...District master mechanic...Cleveland, Ohio.
D. F. Stevens.....Supt. New Castle division..New CastleJct.,Pa.
H. B. Green.....Supt. Cleveland division...Cleveland, Ohio.
E. W. Hoffman...Supt. Chicago division.....Garrett, Ind.
S. U. Hooper.....Supt. Newark division.....Newark, Ohio.

Southwest District

G. R. Galloway...District master mechanic...Cincinnati, Ohio.
R. W. Brown.....Supt. Ohio division.....Chillicothe, Ohio.
J. H. Meyers.....Terminal superintendent....Cincinnati, Ohio.
A. A. Iams.....Supt. Indiana division.....Seymour, Ind.
C. G. Stevens.....Supt. Illinois division.....Flora, Ill.

Kentucky District. Sandy Valley & Elkhorn Railroad. Long Fork Railroad. Millers Creek Railroad.

H. R. Laughlin...Superintendent .....Jenkins, Ky.

ENGINEERING DEPARTMENT

H. A. Lane.....Chief engineer .....Baltimore, Md.
H. R. Talcott.....Asst. chief engineer..... "
W. S. Bouton....Engineer bridges ..... "
L. P. Kimball....Engineer buildings..... "
A. M. Kinsman...Engineer construction..... "
Paul Didier.....Principal assistant engineer.Pittsburgh, Pa.
J. T. Wilson.....Consulting engineer..... "
A. C. Clarke.....District engineer..... "
R. Mather .....District engineer.....Baltimore, Md.
A. H. Griffith....District engineer.....Cincinnati, Ohio.
C. H. Moran.....Real estate agent.....Baltimore, Md.
B. S. Mace.....Superintendent insurance... "

PURCHASING DEPARTMENT

E. W. Thornley..Assistant purchasing agent.Baltimore, Md.
C. H. Dyson.....Assistant fuel agent.....Cincinnati, Ohio.

PASSENGER DEPARTMENT

J. P. Dugan.....Gen. bag. and milk agent...Baltimore, Md.
H. B. Faroat.....Asst. gen. pass. agent..... "
J. P. Taggart.....Asst. gen. pass. agent.....Pittsburgh, Pa.
C. J. Proudfoot...Div. pass. agent.....Wheeling, W. Va.
J. B. Scott.....Gen. eastern pass. agent...New York, N. Y.
E. E. Baekey.....Division passenger agent... "
R. C. Haase.....Division passenger agent...Philadelphia, Pa.
H. H. Taggart....Division passenger agent...Baltimore, Md.
W. V. Shipley....Division passenger agent...Washington, D. C.
W. W. Picking...Division passenger agent...Cumberland, Md.
E. D. Ainslie.....Asst. gen. pass. agent.....St. Louis, Mo.
J. D. Strickenburg.Division passenger agent...Cleveland, Ohio.
B. E. White.....Division passenger agent...Columbus, Ohio.
G. F. Sheer.....Division passenger agent...Toledo, Ohio.
T. J. West.....Division passenger agent...Cincinnati, Ohio.
F. J. Parmelee....Division passenger agent...Louisville, Ky.
Theo. Heiland....Division passenger agent...Dayton, Ohio.
W. P. Townsend.Division passenger agent...Springfield, Ill.
P. C. Benedict...Division passenger agent...Chicago, Ill.

FREIGHT DEPARTMENT

W. L. Cromlish..Coal freight agent.....Pittsburgh, Pa.
C. H. Ashar.....Coal freight agent.....Cincinnati, Ohio.
J. A. Schuerman..Coal freight agent.....Cleveland, Ohio.
M. W. Pryor.....Asst. foreign freight agent.Baltimore, Md.
E. D. Curtis.....Asst. gen. live stock agent..Pittsburgh, Pa.
M. J. Bevans.....Division freight agent.....New York, N. Y.
S. D. Riddle.....Commercial freight agent... "
C. A. Schultz.....Commercial freight agent... "
J. H. Carroll, Jr.Asst. general freight agent..Philadelphia, Pa.
C. H. Pumphrey..Commercial freight agent... "
G. W. Bumpas....Commercial freight agent...Wilmington, Del.
Samuel House....Asst. general freight agent.Baltimore, Md.
A. J. Anderson...Asst. general freight agent. "
Geo. S. Harlan...Division freight agent..... "
Edward S. King..Commercial freight agent...Baltimore, Md.
F. L. Marshall, Jr.Commercial freight agent...Washington, D. C.
J. L. Hayes.....Division freight agent.....Cumberland, Md.
C. S. Roberts.....Asst. general freight agent.Pittsburgh, Pa.
J. C. Kimes.....Asst. general freight agent.Cleveland, Ohio.
C. M. Groninger..Commercial freight agent..Akron, Ohio.
W. W. Blakely...Division freight agent.....Pittsburgh, Pa.
W. E. Magill.....Commercial freight agent.. "
W. A. Eaton.....Division freight agent.....Uniontown, Pa.
A. L. Doggett....Division freight agent.....Youngstown, O.
F. M. Jordan.....Division freight agent.....Grafton, W. Va.
Samuel Strachan..Division freight agent.....Charleston, W.Va.
F. H. Fowler.....Division freight agent.....Parkersb'g, W. Va.
R. E. Barnhart...Commercial freight agent..Huntington,W.Va.
S. C. Williams...Commercial freight agent..Wheeling, W. Va.
S. T. McLaughlin.Asst. to freight traffic mgr..Cincinnati, Ohio.
J. D. Marney.....Asst. general freight agent.Louisville, Ky.
L. C. Smith.....Commercial freight agent.. "
C. H. Gomm.....Asst. general freight agent.Cincinnati, Ohio.
R. L. Galleher....Division freight agent..... "
F. T. Sturtevant..Commercial freight agent.. "
E. N. Kendall....Division freight agent.....Columbus, Ohio.
H. G. Settle.....Division freight agent.....Chillicothe, Ohio.
D. L. Ogg.....Commercial freight agent..Portsmouth, Ohio.
H. E. Warburton.Division freight agent.....Dayton, Ohio.
J. G. Fry.....Gen. Southw'rn frt. agent..St. Louis, Mo.
J. W. Lindsay....Division freight agent.....Vincennes, Ind.
W. C. McLaughlin.Asst. gen. freight agent....Chicago, Ill.
D. E. Sullivan....Division freight agent..... "
J. E. Melone.....Division freight agent.....Toledo, Ohio.
E. C. Law.....Commercial freight agent.. "

COMMERCIAL DEVELOPMENT DEPARTMENT

W. I. Bishop.....Industrial agent.....Baltimore, Md.
J. M. McDermott.Industrial agent.....Chicago, Ill.
G. C. Arnold.....Industrial agent.....Cincinnati, Ohio.
C. M. Gosnell....Industrial agent.....Pittsburgh, Pa.
G. P. Grimsley...Geologist .....Baltimore, Md.
P. S. Phenix.....Industrial survey agent.... "

CHICAGO GREAT WESTERN

The following appointments have been made on the Chicago Great Western, effective on April 1, in addition to those announced in the *Railway Age* of March 12, page 802:

William L. Derr.Land and tax commissioner.Chicago, Ill.
Sid. V. Royland..Supt. Western division....Clarion, Ia.
George W. Berry.Supt. Northern division...St. Paul, Minn.
Guy J. Congdon..Trainmaster North. div.... "
Albert E. Staup..Asst. to vice-president.....Chicago, Ill.

CHICAGO, ROCK ISLAND & PACIFIC

The following appointments have been made in the traffic department of the Chicago, Rock Island & Pacific, effective as noted:

M. T. McCraney.General agent (Mar. 10)..Pittsburgh, Pa.
J. Merrow, Jr..... " " (Mar. 22)..Cincinnati, Ohio.
G. W. Teare..... " " (Mar. 15)..Cleveland, "
E. R. Hines..... " " (Mar. 3)..Boston, Mass.
George P. Cave.. " " (Mar. 16)..Seattle, Wash.
V. M. Cluis..... " " (Mar. 16)..Atlanta, Ga.
C. H. Caswell.... " " (Mar. 1)..Chicago.
J. A. Roach.....Asst. gen. agent (Mar. 1).. "
E. A. Groves.....General agent (Mar. 1)..New Orleans, La.
F. W. Thompson. " " (Mar. 1)..San Francisco

CHICAGO & ALTON.

The executive personnel of the Chicago & Alton has been announced as follows:

Robt. S. Lovett...Chairman exec. comm.....New York
Robt. S. Walker..Vice-president ..... " "
James Williams..Secretary and treasurer... " "
W. G. Bierd.....President .....Chicago.
S. G. Lutz.....Vice-president, traffic..... "
A. P. Titus.....General manager..... "
H. E. R. Wood..Asst. sec. and asst. treas... "
E. S. Benson.....Controller ..... "
Silas H. Strawn..General solicitor..... "
H. T. Douglas, Jr.Chief engineer..... "
J. F. Marshall....Purchasing agent..... "
J. H. Howard...General claims agent..... "
Geo. J. Charlton.Pass. traffic manager..... "
C. W. Galligan...Freight traffic manager.... "
W. C. Steffa.....Supt. of car service..... "
G. W. Seidel.....Supt of m. p. & equip....Bloomington, Ill.
W. H. Penrith...General superintendent.... " "

DETROIT & MACKINAC

The following is the new organization of the Detroit & Mackinac, effective March 1:

H. K. McHarg...President ..... New York.
J. McNeil.....Secretary and treasurer...New York.
J. D. Hawks.....V.-P. and gen. manager...Detroit, Mich.
H. K. McHarg, Jr.Asst. to v.-p. & gen. mgr.East Tawas, Mich.
C. W. Luce.....General superintendent.... "
John Mulreny.....Master mechanic..... "
C. A. Pinkerton..Supt. of car service..... "
A. Wilkins.....Trainmaster ..... "
J. V. McKeon.....Chief engineer .. ..East Tawas, Mich.
E. H. Gilman.....Land agent .....Alpena, Mich.
J. McNamara.....General counsel..... "
P. Richardson....Asst. treas. and pur. agent. "
C. E. Glass.....Auditor ..... "
G. F. Townsend...Assistant auditor.....East Tawas, Mich.
J. Halligan .....Storekeeper .....Detroit, Mich.
G. L. Wakeman...Gen. frt. and pass. agent...Bay City, Mich.
A. S. Matteson....Freight claim agent..... "

DULUTH, SOUTH SHORE & ATLANTIC

The following is the new organization of the Duluth, South Shore & Atlantic and the Mineral Range:

E. Pennington....President .....Minneapolis.
G. R. Huntington.General manager..... "
W. L. Martin....Traffic manager..... "
C. W. Gardner....Comptroller ..... "
A. E. Delf.....Assistant comptroller.....Marquette, Mich.
A. E. Miller.....General solicitor..... " "
G. W. Webster...Secretary .....Minneapolis.
W. J. Ellison....Treasurer .....Marquette, Mich.
T. A. Foque.....Gen. mechanical supt.....Minneapolis.
E. A. Whitman..Chief engineer..... "
E. T. Stone.....Purchasing agent..... "
W. H. Schutt....Real estate agent..... "
W. R. Callaway..Pass. traffic manager..... "
H. M. Lewis.....Gen. passenger agent..... "
Jas. Maney.....Asst. gen. passenger agent.Duluth.
S. R. Lewis.....General freight agent..... "
R. O. Hambly....Asst. gen. freight agent.... "
Jas. Robertson...Asst. gen. frt. & pass agt..Houghton.
O. A. Roedell....General baggage agent....Minneapolis.

ILLINOIS CENTRAL

The following appointments have been made in the controller's office of the Illinois Central and the Yazoo & Mississippi Valley in addition to other appointments announced in the *Railway Age* of March 5, page 742:

B. D. Bristol.....Assistant controller.....Chicago, Ill.
J. F. Shepherd...Auditor of freight receipts. "
L. C. Esschen....Auditor of pass. receipts.. "
J. J. Crane.....Asst. aud. of pass. receipts. "
L. B. Butts.....Aud. of station accts..... "
J. M. O'Day.....Car accountant ..... "
J. R. Breidenstein.Freight claim agent..... "
R. E. Kimbell....Aud. of misc. accounts.... "
J. F. Dartt.....Aud. of disbursements.... "
A. P. McComb...Asst. aud. of disbursements. "

MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE

The following gives a portion of the new organization of the Minneapolis, St. Paul & Sault Ste. Marie, effective March 1:

E. Pennington....President .....Minneapolis.
G. R. Huntington. Vice-pres. and gen. mgr.... "
W. L. Martin.... Vice-pres.—traffic ..... "
C. F. Clement....Treasurer ..... "
H. N. Paist.....Assistant Treasurer ..... "

Accounting Department

C. W. Gardner...Comptroller .....Minneapolis.
D. J. Bond.....Assistant comptroller ..... "
B. Newhouse..... " " ..... "
J. F. Heberle....Assistant auditor ..... "
R. Brownlee..... " " ..... "
B. E. McCune.... " " ..... "
A. E. Hancock...Auditor disbursements .... "
F. E. Dooley.....Aud. capital expenditures.. "
R. A. Mueller....Freight auditor ..... "
L. E. Hodson....Assistant freight auditor... "
A. A. Smith.....Ticket auditor ..... "
C. E. Leatsch....Assistant ticket auditor.... "

Legal Department

H. B. Dike.....General counsel.....Minneapolis.
John L. Erdall...General solicitor ..... "
Geo. A. Kingsley.General attorney ..... "
A. H. Lossow....Commerce counsel ..... Minneapolis.
W. A. Hayes....Gen. attorney, Wisconsin..Milwaukee, Wis.
J. L. McInerney.Gen. Attorney, Illinois..... "
H. G. Richardson.Claims attorney.....Minneapolis.
J. H. Rishmiller..Chief surgeon..... "
A. E. Hodson....Freight claim agent..... "
J. E. Westlake...Right of way agent..... .. "
C. G. Sturtevant..Tax commissioner..... "
C. B. Reinardy...Chief special agent..... "

Operating Department

W. C. Ranous....General superintendent....Minneapolis.
C. M. Winter....Supt. So. dist. Ohio div....Fond du Lac, Wis.
F. W. Urbahns...Assistant superintendent...Chicago.

The following appointments have been made in the traffic department of the Minneapolis, St. Paul & Sault Ste. Marie, effective on March 10:

Freight Department

T. E. Sands.....Freight traffic manager....Minneapolis, Minn.
E. G. Clark.....General freight agent..... "
C. V. Gallagher..Asst. gen. freight agent...Chicago.
J. H. Rees.....Asst. gen. freight agent...Minneapolis, Minn.
A. L. Preston....Asst. gen. freight agent...St. Paul, Minn.

Passenger Department

W. R. Callaway..Pass. traffic manager.....Minneapolis, Minn.
H. M. Lewis.....General pass. agent..... "
J. C. Pond.....Asst. gen. pass. agent.....Chicago.
Jas. Maney .....Asst. gen. pass. agent.....Duluth, Minn.
O. A. Roedell....General baggage agent....Minneapolis, Minn.
E. G. Chesbrough.Gen. agent, pass. dept.....Atlanta, Ga.
L. R. Robinson...General agent.....Boston, Mass.
H. W. Hobbs....New England agent..... "
L. R. Hart.....General agent, pass. dept.. "
C. S. Richardson.District freight agent.....Buffalo, N. Y.
Geo. O. Walton..General agent, pass. dept.. "
C. V. Gallagher..Asst. gen. freight agent...Chicago.
W.A.Kittermaster.General agent, freight dept. "
Thos. J. Wall.....General agent, pass. dept.. "
E. C. Frost.....Div. frt. and pass. agent...Chippewa F'ls,Wis.
C. K. Landes.....District freight agent.....Cincinnati, Ohio.
M. E. Malone.....General agent, pass. dept.. "
G. Hiam .....Dis. freight agent.....Cleveland, Ohio.
G. B. Burpee....General agent, pass. dept.. "
G. C. Cochlan....District freight agent.....Detroit, Mich.
M. G. Murphy....General agent, pass. dept.. "
G. A. Sherwood..General agent.....Duluth, Minn.
L. C. Jack.....District freight agent.....Kansas City, Mo.
R. C. Norris.....Traveling pass. agent..... "
A. A. Polhamus..General agent, pass. dept..Los Angeles, Cal.
C. P. McGhee....Traveling freight agent... "
J. A. Millington..General agent.....Milwaukee, Wis.
A. G. G. Lauder..District freight agent..... "
F. T. Sansom....City passenger agent..... "
J. C. Carey.....District freight agent.....Memphis, Tenn.
H. M. Weston...Commercial agent.....Minneapolis, Minn.
Geo. T. Huey....General agent..... "
C. F. Ronnan....Commercial agent..... "
G. W. Hawes.....General agent..... "
J. P. Gehrey.....General agent, pass. dept.. "
A. C. Wilson.....Div. frt. and pass. agent...Neenah, Wis.
M. S. Throne.....Gen. agent, freight dept...New York, N. Y.
F. R. Perry.....General agent, pass. dept.. "
F. T. Goodman...District freight agent.....Philadelphia, Pa.
R. C. Clayton... City passenger agent..... "
Robt. Main.....District freight agent.....Pittsburgh, Pa.
C. L. Williams...General agent, pass. dept.. "
O. H. Becker.....District freight agent.....Portland, Ore.
E. E. Penn.....General agent, pass. dept. "
W. M. Porteous..District freight agent.....St. Louis, Mo.
E. L. Sheehan....General agent pass. dept.... "
A. L. Preston....Asst. gen. freight agent....St. Paul, Minn.
B. E. Smeed.....General agent, pass. dept.. "
W. W. Smith....District freight agent.....San Francisco, Cal.
F. L. Nason.....General agent, pass. dept.. "
J. W. Draper.....District freight agent.....Seattle, Wash.
E. F. L. Sturdee..General agent, pass. dept.. "
E. L. Cardle.....Tr. mgr., Spokane Inter'al.Spokane, Wash.
J. C. Peterson....General agent.....Winnipeg,Man.,C'a

TEXAS & PACIFIC

The following officers have been appointed on the Texas Pacific, in addition to those announced in the *Railway Age* of March 5 (page 751), and of March 26 (page 1080):

O. F. Ellington...General claim agent.....Dallas, Tex.
H. S. Buescher...Freight claim agent..... " "
Z. J. Reese.....General baggage agent.... " "

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

The Unfinished Picture

Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers and president of the Plumb Plan League, has furnished us with another use for the story told by Senator Frelinghuysen in his address at the Railway Business Association dinner. Mr. Stone, in a speech before the Cleveland Chamber of Commerce said that "the so-called Plumb plan received its name from Wall Street," and that the name was adopted by its sponsors in order to retain the benefit of the very valuable free advertising it had received. "When you think of it," Mr. Stone said, "forget it is called the Plumb plan. Think of it as your plan, and if you want to go a little further, call it God's plan, because we really think it is that." Senator Frelinghuysen's boy artist, who said he was drawing a picture of God, was not discouraged when told that no one knows what God looks like, because, he said, "They will know when I finish this picture." Mr. Stone and Mr. Plumb failed to explain the divine origin of the plan when they were advocating the Plumb plan bill, which Representative Thetus W. Sims introduced in Congress last summer. We are not certain whether any explanation they might have made would have got the bill out of the committee, but they might have prevented Mr. Sims from introducing so many later bills with different plans for the disposition of the railroads. Mr. Plumb gave the House Committee a glowing verbal picture of his plan, but it seems that some one omitted to supply the halo.

Conditions in Germany

The *Railway Age* presents in this issue the first of two articles by Robert E. Thayer, its European editor, on economic conditions in Germany. Mr. Thayer has written these articles on the basis of his own observations on a trip into Germany. The first article deals with the economic conditions in Germany as a whole; the second will deal entirely with the railway situation there. Economic conditions in Germany are indeed in a bad way. Disorganization is the best word to use in characterizing the situation. Let alone the fact that the value of the mark is so low that everything in which the matter of money enters is set away, there is a lassitude on the part of labor, a severe shortage of coal and other raw materials, a feeling of hopelessness and a sullen attitude towards the rest of the world that bodes no good for anyone. It is pitiful to see how the German is inclined to blame the low value of the mark on the Allies, who he thinks are trying to keep it down so as to handicap his country's recovery. The particularly "fermented state" of labor does not looking well for the future; in some of the railroad shops the output per man became so small that the shops had to be closed for a time entirely. The shortage of materials, combined with the shortage of coal, only adds to what already seem insurmountable difficulties. It would appear that Germany is certainly being punished for becoming an outlaw nation and that it has a long way to go morally and physically before it can again take its place as one of the leading industrial nations of the world.

Regulation by Subsidized Competition

According to the first annual budget submitted to the Canadian House of Commons by J. D. Reid, minister of railways, the Canadian National Railways operated at a loss of $14,000,000 during the fiscal year ending June 31, 1919. In commenting on this result, Dr. Reid declined to be placed on record as favoring or opposing an increase in rates sufficient to wipe out the disproportionate relation between earnings and expenses. No doubt a rate increase will be unpopular. The people of Canada probably prefer to pay for transportation in their taxes, where, like the price of the salesman's suit in the expense account, it "is there, but you can't see it." Were all the railways in Canada publicly owned our comment would end here, but the Canadian Pacific is still in private hands and must, of necessity, operate under the same rate structure that applies to the national lines which are virtually subsidized to the extent of the annual deficit. Therefore, except as the Canadian Pacific may have been more conservatively financed and more favorably located and is being more efficiently operated than the government lines, any deficit on the national lines paid out of the treasury is reflected by a proportionate loss to the Canadian Pacific which must come—not out of public funds but from the pockets of the stockholders.

The Future of England's Railroads

While it is perhaps rather early to say definitely as to the final solution of the railway problem in Great Britain, one may hazard a fairly good guess on the strength of the address of Sir Eric Geddes, England's Minister of Transport, before the opening meeting of the Institute of Transport, an abstract of which appears in this issue. During the time the Transport Bill was being considered in Parliament, the labor constituency indicated very strongly that it was working towards ultimate nationalization of the roads. The administration on the other hand very adroitly dodged the question of nationalization and the Ministry of Transport was formed with nationalization remaining an open question. At that time the British nation was not in a position to consider nationalization safely and without bias, for the labor element was not in a sufficiently quiescent or reasonable state of mind. Since the Transport Bill was passed, however, there has been a railroad strike, there has been a molders' strike, and the British nation has weathered what appeared a year ago to be a severe industrial storm. At present there seems to be a clearer understanding between labor and the government, as a result of the experiences of the past months in regard to the question of state ownership and private ownership which is of a much more rational tendency.

While Sir Eric in his address does not attempt to discuss the "pros" and "cons" of nationalization of England's transport systems, he points out the conditions under which other nations have nationalized their railway systems and shows that in every case the situation was one of practical expediency rather than a result of theoretical study. His comments indicate a certain degree of approval on the action the

United States has taken in the settlement of its railway problems. He advocates more governmental control over railways than has ever before existed in Great Britain and states quite clearly his reasons for this position. By taking his utterances as representative of the government's attitude and by taking the attitude of labor as it appears today, one would seem justified in prophesying for the railways of Great Britain an arrangement similar to that which now exists in the United States with perhaps a governmental body of greater power in the dictation of operating policies than is even now reposed in the Interstate Commerce Commission.

A Test of Fairness

One of the most complicated problems confronting the government in closing up its accounts with the roads covering the period of federal control is that of determining the amount of deferred expenditures for maintenance of way for which compensation should be made. That there has been deferred maintenance on the properties as a whole, no one familiar with the situation will deny. The shortages of rails and of ties are indicative of that. That these deficiencies apply to nearly all roads is equally certain. The problem is to determine their amount.

The determination of the amounts which the government owes the roads for deferred maintenance is essentially an engineering rather than a legal problem, involving a comparison of the units of work and of materials expended during the twenty-six months of federal control with those which should have been expended under normal conditions, with similar traffic and climatic conditions. In order to protect itself against over-expenditures the government took precautions early in 1919 to restrict the maintenance program to the point that it would be smaller than those of the test-period years. More recently counter claims for over-expenditures have been filed in some instances, presumably for trading purposes in the final settlement and to insure that no payments are made in excess of those which the final negotiations will show are due the roads.

In many details the determination of the amounts of the deficiencies can be ascertained readily, as in the renewal of rails and of ties. In others, such as track-laying and surfacing, various influences, such as the density of traffic, weather conditions, etc., introduce elements of uncertainty which call for the exercise of mature judgment. In one respect particularly, large deficiencies have accrued which are difficult to evaluate. This relates to the operating charges incident to a large part of the routine betterment work normally undertaken from year to year. In the routine operation of the roads large expenditures are necessarily made for a wide variety of improvements, the cost of which is divided between capital account and operating charges, according to rules laid down by the Interstate Commerce Commission. During the war, work of this character was necessarily deferred, and the government continued this policy during 1919. There has, therefore, been an almost complete cessation of the routine betterment work for two years. In the meantime the demands of traffic have steadily increased, and the work which was not done during 1918 and 1919 has not been abandoned but simply deferred. Now that the roads are back in the hands of their owners it is necessary that this accumulation of deferred improvement work be cleared away and the operating portions of these charges which should normally have come out of 1918 and 1919 revenues, and therefore have been included in the government guarantee, are thrown into the expenditures for later years. To this extent the roads have valid claims for further deferred maintenance.

In conducting these negotiations the representatives must approach the problem with a desire to arrive at a result fair to both parties, if justice is to be done. Because of the lack of definite measures neither party can assume a position which the other cannot assail successfully. The conditions of the situation demand a broad-gage attitude by the representatives of the government and the roads, devoid of quibbling, so that the question can be brought to an early and fair decision.

The Railroads and the Labor Problem

The presence of a labor problem is neither new nor novel for the railroads. Nor is it confined to any one department of the service. Every officer is facing it in one form or another, but certain branches are confronted with it in more serious form than others.

The labor problem is particularly acute in the maintenance of way department because of the class of men employed for most of the work. While efficiency in the conduct of track work requires experience, and this work is therefore skilled, this fact is not in general recognized by the roads today, who hire men regardless of experience and pay uniform rates to experienced and inexperienced alike. The result is that the greater part of this labor, other than that drawn from the small communities along the lines, is recruited in the large centers in most active competition with other industries. In such competition the roads always have and will probably continue to secure only the more inferior labor.

The railways are now confronted with a tremendous amount of work—the provision of additional facilities and the taking up of the deferred maintenance of the last two or three years are pressing. It is already evident at the beginning of the season that the supply of labor is to be the limiting factor in the amount of work which can and will be done. It is, therefore, essential that every effort be made to utilize most efficiently these men which are available.

Under government control a number of new relations in the handling of maintenance of way labor were introduced—the maintenance of way forces were thoroughly organized, uniform wage rates and working conditions were established, and the eight-hour day was made effective. While these developments were applied officially only to the roads operated by the United States Railroad Administration, in actual practice they were effective on all of the roads of the United States, and of Canada as well. The conditions are therefore universal. The result of these developments is that the output of work is curtailed materially at a time when an increase is so greatly needed.

The great danger of the present situation lies in the possibility of the roads engaging in destructive competition with each other for men—a practice not unknown in pre-war days. At present, when the automobile and other industries can and will continue to pay more than the roads for these men, since they can immediately transfer any increase in cost of labor into the selling price of the finished product, the amount of labor which the roads can secure is more or less fixed. As a result any increase in wages above the prevailing market price will not bring any new labor to the railways but will only draw it from one road to another. The general bidding of one road against another in this way will only demoralize the forces already at hand and will decrease rather than increase the amount of work on the roads as a whole. It is to be hoped that the managements will see the folly of wasteful competition of this character and will curb the tendencies in this direction which are already appearing in certain quarters.

Another tendency to which attention may well be called is that of contracting maintenance of way work on a cost plus basis. This practice was developed successfully on certain roads before the advent of federal control, as a result of which it was possible to effect certain economies because of the more effective supervision and direction which the smaller organi-

zation of the contractor made possible. However, within the last two or three years this plan has been resorted to in numerous instances as a subterfuge for the paying of higher wages in certain localities, a contractor frequently employing the same forces which had been on the road. The demoralizing effect of such an expedient is self-evident.

The labor situation which the roads are now facing is so serious that it warrants the best united action of all, not for the purpose of restricting wages below the fair market rate, but to curb the action of individual roads so that the interests of all may be promoted. Unless sound judgment prevails, the ill-advised action of one road, prompted by a desire for a temporary advantage for itself, may demoralize the situation for all. The next sixty days will constitute a severe test on whatever methods that may be employed.

The Calling-on or Slow Speed Signal

THE CALLING-ON SIGNAL at interlocking plants has figured in two accidents, reports of which appeared on page 637 of the *Railway Age* of February 27 and on page 970 of the issue of March 19. In one case one of the contributing causes of the accident was that the calling-on signal had been left in the 45-deg. position after having been placed in that position for a previous train instead of having been returned to the "stop" position after the passage of the train for which it was cleared. In the case of the accident at Walton, Va., the report of the Bureau of Safety censures the operator for exercising poor judgment in using the signal. The fireman, in the course of the investigation, was also found to have had a wrong conception of the meaning of the permissive indication of the calling-on signal, as he thought this signal in the 45-deg. position and displaying a yellow light was to be read the same as an automatic block signal displaying a yellow light, which indicates that the block ahead is clear, but to approach the next signal prepared to stop. *The indication of a calling-on on arm does not confer this right.* This raises the question as to whether proper instructions have been issued to levermen, enginemen and others who may have occasion to use or to operate trains by the indication of a calling-on signal.

The use of this signal at interlocking plants is a comparatively recent development, brought about by the desirability of facilitating traffic across interlocking plants where for any reason the higher home signal interlocking arms cannot be given because of the presence of another train in the block, or from other causes. It appears that different instructions governing the use of the calling-on signal are in force on different railroads. Under the interlocking rules of the Standard Code, 601G shows a typical aspect which indicates that the "route is set; track may or may not be occupied." In some cases an engineman is required to stop before accepting the calling-on indication, but this defeats one of the purposes for which it was installed, which is to permit slow movements to be made without actually stopping heavy tonnage trains. In general, the rules specify that trains accepting such slow speed signals must proceed at slow speed prepared to stop short of train or obstruction and that signalmen must not use the slow speed signal when the main or diverging route signals can be cleared.

The more or less general impression which seems to prevail —that this signal when in the 45-deg. position and displaying a yellow light confers the same rights as does an automatic signal giving the same indication — should be corrected by proper instructions. It should be emphasized that a calling-on signal *does not* confer rights through a block but simply indicates that the straight or the diverging routes are set up properly; it is of the utmost importance that enginemen, signalmen and others recognize that the calling-on arm is an *emergency signal* to be used only as such.

Discipline for Train Safety

THE LETTER on block signaling which is printed in another column sets forth some beautiful theories; but the proof of the pudding is in the eating. We do seem to ignore—or to conduct a good deal of discussion oblivious to—the importance of having good discipline *with* good machinery, and it is well to look back once in a while; but perfection, like liberty, is not to be attained without eternal vigilance. Enginemen and tail-end men *can* be educated; the question is, have we the resources, energy and persistent courage to do it?

It is easy to agree with our correspondent's main points. The present plan of train protection is a loose combination which everybody would like to see improved. Whistles and torpedoes are often used carelessly, and they are a noise-nuisance even when used carefully. The most comprehensive improvement now in sight is the automatic stop; and the signal engineer of the Interborough, a man of long experience with such devices, says that we can perfect it. At the same time it is to be admitted that the stop would depend on the track relay; and the only way that the conductor of a train can be sure that the track relay has acted to protect the rear of his train is to get positive evidence of the fact every time he passes a protection point. There would not be much difficulty in making each stop-signal record itself in the rear car of every train; but the crucial point would be met in the arrangements to have this record watched. What we are trying to do is not only to supplant the flagman and the delays and uncertainties inseparable from the flagging system, but to protect from collision trains following one another only two minutes apart (which the flagman could not do); and to do it as well on curves and through dense fogs as in easier conditions.

Bearing in mind that all mechanical devices conceived by human beings are subject to failure, we must admit that to get real satisfaction out of this rear-end recording-machine protection there must be a reliable man to read the record on the machine immediately on entering every block. Can the best trainman—let alone the average trainman—be schooled to do this effectively? Ask your trainmasters about this? To get the fireman to check the engineman's vision and vigilance every mile, or even every two miles, is a problem that has not yet been solved with satisfaction; would a similar problem with the rear brakeman be any easier? Much money has been wasted by railroad companies in the installation of machinery the usefulness of which was neutralized or wholly lost by lack of care in its operation. Here is a point where the lessons of such losses should be heeded. The experiment of having the rear trainman keep a record of every signal that he passes has been tried, and that kind of safeguard is by no means impossible or unreasonable; but it would be folly to inaugurate such a scheme unless it were to be carried out with vigor and thoroughness.

The argument for better discipline on the locomotive presents essentially the same problem. An audible signal would make the engineman vigilant (assuming him to be alive and in his senses) and could readily be made to compel coincident attention by two men, or even three (including a man in a car behind the engine); it could give proceed as well as cautionary indications and, in that way, failures of apparatus could be made so infrequent as to obviate danger from that source; and an apparatus entirely unconnected with the brakes would be free from the perplexities and costliness of speed control or reduction of track capacity; but the question would still remain: How fully should we utilize the benefits of this theoretically perfect scheme for 100 per cent efficiency? Such a scheme on 100,000 miles of railroad would prevent a collision once in, say, ten years; on how many occasions in that length of time would the scheme be "out of commission" because of failure of enginemen, or firemen, or trainmasters, or maintainers, or master mechanics to do their part? We

do not mean forgetfulness, or blunders; but conscious, deliberate omission to keep the safeguards in working order.

Finally, the technical question must not be separated from the financial. As we have shown, the cab signal, though simpler than the train stop, is subject in some degree to the same economic limitations. There does seem to be a deadlock, as has been suggested; but this deadlock between the conservative railroad and the enthusiastic electrical engineer or inventor is no worse just now than the deadlock between the railroad and the government—that branch of the government which controls the railroads' income. The railroads of this country, at present, lack the money to introduce refinements, and everybody is waiting to see when and how they are going to get it. When they get even so much as the promise of it—a promise that will hold water—some breaking of deadlocks may be looked for.

Before Buying Equipment Consult the Mechanical Department

MANY ORDERS FOR CARS are now being placed, and with still heavier buying in prospect there is a tendency for roads that are short of equipment to rush into the market. As a result some railroad executives have placed orders without specifying the details of construction to be followed, leaving this to the judgment of the builders. Such a policy is apt to be very costly for the railroads as has been shown by past experience. Freight and passenger cars are not a standardized commodity and their purchase should not be a matter of bartering with a view to obtaining the equipment at the lowest price. Any difference in the first cost between a well constructed car and a poor car is negligible when compared with the differences in the cost of maintaining the cars, the length of time elapsing before they must be retired, and the percentage of time they are held out of service for repairs. The design of freight cars could safely be put in the builders' hands if the interests of the railroads and the builders were identical, but this is not the case. The builders are interested in securing a design that can be manufactured at a low cost; but they are not concerned with the cost of maintenance or the service life of the car.

In the past it was not uncommon for roads to request bids on cars of a certain type and capacity and naturally each builder designed the car that could be built most cheaply in his own shop. Oftentimes the successful bidder, knowing that the design did not possess sufficient strength, would try to arrange for a change before the cars were built. This "bargain counter" buying of freight cars has proved an expensive practice. One road that bought cars on this basis found a few years later that this weak equipment was out of service a large share of the time and was requiring a disproportionate amount of work on the repair track. An analysis of the situation disclosed that the cars had five major defects each of which cost from $25 to $300 to correct. The cars were finally rebuilt at a cost of about $800 per car as the only means of keeping them in service. Numerous similar examples could be cited but this should suffice to show that executives make a serious mistake if they purchase equipment without having complete plans and specifications drawn up by the mechanical department.

LET THE RAILROADS MAKE MONEY. Let any railroad make big dividends if it can. It is not probable that the management of that railroad will settle back in the easy chair and let the profits flow in. No, the management will work itself to death to make the road bigger and stronger and serve the public better and earn more dividends, and get in more capital and earn yet more dividends. What the country needs most is larger transportation capacity.—*Lewiston (Me.) Sun.*

Letters to the Editor

Super-Refined Block Signaling

CAMBRIDGE, MASS.

TO THE EDITOR:

Your report of the meeting of the New York Railroad Club on March 19 gives a very good idea of what was said on that occasion, but you do not tell your readers what was not said—what was left out. As I sat there trying to estimate the spirit and motives of the various speakers, I wondered if we do not too carefully adhere to tradition and past experience; we are too anxious to stay on the ground; are afraid to soar above the clouds. Other meetings of the club, and of other railroad clubs, have started the same line of reflections. Instead of harping forever on the empirical data of the past why not follow more purely scientific lines? To explain what I mean I will pose as a scientist, if you will pardon my presumption, and ask a few questions concerning the matter of automatic train control.

Why must we always base our arguments on the records of casualties? From a strictly scientific standpoint our train service ought to be greatly improved if never a passenger had been killed. Under our present system, even where we have the best automatic block signals, the flagman is constantly in evidence. If a train stops for one minute a flagman has to go back, making a journey of one or two minutes, and then when the train is ready to start along the conductor spends about 30 seconds fixing up a signal to call in the flagman, and *he* spends a minute or two more in coming in; and the chances are that even then no torpedo has been put down, and complete safety is still lacking. The delay in blowing the whistle is annoying to passengers and exposes the slowness of the railroad mind; and the noise of the whistle annoys passengers and everybody else. Thus we see that the boasted scientific block signaling has a loophole; and this must be noticeable to passengers who are well enough informed to see the true situation.

Where torpedoes are used according to the rules to make up for the lack in the signal system the noise caused by them is a nuisance. The well-managed road is worse than the one that is poorly managed because the torpedo explosions are more numerous.

The flagman and the torpedo are necessary, mind you, not alone because the engineman of the following train may be careless but because the signal itself may give a false indication. In the Interborough and the Brooklyn Rapid Transit and the Hudson and Manhattan tunnels in New York we do indeed have a scientific system, and there is no flagman; but even here there is one loose thread—the possibility of a track relay sticking clear. These lines being comparatively straight, and their train-speeds being usually not over 45 miles an hour, and the block sections being short and of uniform length, they have never got into trouble in this direction; but the possibility is there, nevertheless. On the ordinary standard railroad, with longer block sections, with more numerous curves and other complications, the chance of a false clear signal must still be reckoned with. Nothing untoward may occur for five or even ten years; but the scientific signal man must have this point in mind. We read in the gospel of Luke, fifteenth chapter, that there is joy in the presence of the angels of God over one sinner that repenteth more than over 90 and nine just persons who need no repentance; likewise there is more anguish among the signal department angels of our railroads over one false clear indication than over 999,999 perfect signal operations.

This is a point for scientific attention. None of the speak-

ers at this meeting made reference to it, although it is an element which is in everybody's mind.

The scientist aims to provide a signal system which will give absolute assurance that the signal behind the advancing train actually indicates stop; and if there is an automatic stopping apparatus that also should correspond to an occupied block. The Boston & Maine has for several years tried to cover this point by having the engineman see the automatic block signal go to the stop position just before he passed it; but this arrangement does not seem to satisfy the majority and it has not found general favor. Indeed, I understand that the Boston & Maine does not intend to maintain this arrangement forever.

The true and the simple way to assure the protection of a train at the rear is to have the trainman who is on the rear car record the indication of each signal as his train passes it. This can be done. Why has no one ever tried it? It is true that the average brakeman is lazy and that he will not keep this record except under strict discipline. It is to be admitted also that sometimes the presence of snow or smoke may prevent him from seeing a signal after his train has passed it. These two objections, however, can be met at a single stroke. The use of an automatic recording device in the rear car can be made an effective means of discipline, and the checking or actuating of this device by the roadside signal will get around the difficulty of smoke or snow or fog. The recent experiments of General Squier on the New York Central with Hertzian waves, guided by a wire, suggest that a roadside signal—every cautionary signal—can be made to produce a signal on the speed indicator in the train with simplicity and certainty and at moderate expense.

Each semaphore signal can readily be made to indicate in the rear car, on the movable tape of a speed recorder, whether it is displaying proceed, or stop, or caution. The apparatus would be locked in a glass-covered case where the trainman could see it; and he would be required to write his own record on passing each signal; and his record would have to agree, as to time, with the automatic record or his delay or neglect would be exposed. If the record shows that the signal indicates behind the train anything other than stop (which would mean probably that the automatic stop also was not properly functioning) he must at once throw off one or more fuses. This would be important, because with short block sections a following fast train may be so near that there would be no time for slackening speed and dropping off a flagman; or if he did drop off he would not have time to go back any distance. Of course, if the false clear signal remained clear it would deceive the following train also.

It would be desirable, of course, for the trainman to drop off torpedoes as well as fusees, but nobody has yet shown how to do this satisfactorily at high speed. A bag of torpedoes 10 ft. long and 6in. in diameter might be so dropped as to fall across one or both rails; but I will refrain from going that far, as you have already, no doubt, classed me as visionary. However, I can stand that.

Whatever you do, or whatever you say, all must admit that no space interval system is complete as long as you trust in one machine, with no check, as your only means of preventing a fast train from running into the rear of another fast train. At present we depend on the flagman for the check, but with the certainty that he will fail us occasionally; and I might add that with trains running only three minutes apart these failures are liable to be of a kind for which the flagman cannot be held wholly responsible.

Having mnetioned Hertzian waves, I will go a step farther. The scientist recognizes a stone wall when he sees it. That discussion at the meeting only concerns what we have seen in the public prints for months past; there is a deadlock. The progressives, typified by Mr. Sprague, backed by the government, call upon the railroads to proceed to develop the automatic stop. The conservatives, represented by Mr. Felton, president of the Chicago Great Western, hold back; and for some very good reasons. The conservative side was not well represented at the meeting, but it was easy to read between the lines. When such a brilliant progressive as Major Ames takes the conservative side we shall do well to walk with circumspection. In the presence of this deadlock the thing to do is to turn again to the audible cab signal. The exclusive attention which has been given to automatic stops by American railroad men to the entire neglect of the cab signal is believed, no doubt, by those who are leaders in guiding public opinion in this matter to be real science; the cab signal is dependent on the alertness of the man in the cab, and we have got into the habit of saying that that is unscientific.

But, as I said before, the true scientist meets facts as he finds them. Making the locomotive runner truly reliable is not a hopeless problem as the automatic stop people are claiming. Mr. Waldron said that the automatic stops on the Interborough were significant as enforcers of discipline. It is by no means settled that the stop is the only means of enforcing discipline. Smash signals at draw bridges have done great things in this respect, although we never hear of their touching the locomotive. The late John T. Cade, back in 1913, proposed his audible roadside signal as a scheme for holding enginemen to vigilant observance of signals, the practicability of which no one will deny. The only obstacles to his scheme were the cost and the entrenched conservatism of American railroad officers. If we can keep both the fireman and the engineman awake and alert we cover all reasonable contingencies, except the death of both of these men, and even in that case it is easy to take in the baggageman as a third person. In short, a cab signal properly managed gives reality to the monitorship of the fireman, a safeguard which ostensibly we have had in operation for many years past.

The recent experiments of General Squier (*Railway Age*, March 12) are enough to give all necessary assurance that a cab signal can be readily devised. His wireless apparatus does away with all trouble about clearances. It is capable, no doubt, of working both a cab signal and a recorder such as I have suggested in the rear car. To those who say that the cultivation of vigilance to a satisfactory degree is impossible, I reply that this problem has never yet been tackled on the ordinary railroad with suitable vigor. It is the proper function of a scientist to perfect the discipline of enginemen. We have to have in cabs men of good brains to meet other responsibilities — running down long grades, deciding when lost time can be made up with safety, etc., to say nothing of using the fire and the water with safety and intelligence. Why, therefore, should we not train him to an efficiency where we can get rid of the bugbear of automatic stops and speed control, ramps and clearances and excessive costs, countrywide uniformity and the other things which are holding everybody back?

The automatic stop is a beautiful ideal, and so is the League of Nations; but both of these idealistic proposals are having such very hard sledding that it is time that somebody, somewhere, starts out on a new tack.

JOHN C. HOWARD.

IT IS TIME FOR THE SHIPPERS to recognize that the service of the railways belongs to them, as much as the bond interest belongs to those who have furnished the money for betterments. The stoppage of the flow of funds into railway investments and the turning of railway earnings into wages is not for the advantage of the service of shippers. The growth of the railways has stopped and the growth of the country has increased. The railways are about at the limit of their efficiency, and the country must make up its mind to get along with less railway service or impose an alternative on those who talk and talk and do nothing. —*New York Times.*

A—Typical Platform and Shelter at German Stations

B—A Typical Way Station on the Prussian-Hessian System

C—Dusseldorf Station Approach Showing Signals and an Untidy Yard

D—German Steel and Wooden Open Top Freight Cars

E—German Box Car Equipment

F—Rail Joint on Steel Ties: In Some Cases a Special Double Tie is Used at the Joints

G—Railway Crossing Gates. These are Operated by Levers in the Shelter at the Right. The Signal at the Left is for the Street Railway

H—A Pile of Steel Ties at Essen

Germany's Economic Position as a World Nation*

Labor Insurgency and a Weak Government Have Made Its Industry and the Railroads Impotent

By Robert E. Thayer
European Editor of the *Railway Age*.

Part I—General Conditions

March 19, 1920.

Germany today is in worse condition economically and politically than any of the other nations that participated in the war with the exception of Russia. Regardless of the fact that no part of its territory suffered the devastation of battle, it is reaping the harvest from the seeds it sowed on that fateful day in the summer of 1914. Disorganization, discontent and a feeling of hopelessness foreign to German traditions pervades the entire country to so great an extent as to belie those traditions. The system and organization for which Germany was so well noted before the war was based on one foundation—militarism—with no guy wires to support it in case that foundation failed. As a result Germany today presents a decidedly disconsolate picture—a nation divided by widely conflicting interests which recent developments have indicated there is not much hope of uniting. Germany will be slow in recovering its standing as one of the principal nations of the world until a stable, sound and honest government is established. But that government will not be controlled by the militaristic party for the people are done with it.

The Value of the Mark

It was extremely interesting to talk with the Germans on their home ground. No matter how hard one tries to avoid discussing the recent conflict, the German, particularly the North German, will invariably work the conversation around to that subject. They are very free to admit that they lost the war and with that acknowledgment they seem to think that it should be written off the books. Their greatest complaint now is the "valuta" or the value of the mark as compared with foreign monies—and that cuts them to the "quick." In all cases the impression prevails that the low value of the mark is purely artificial and is due to a premeditated determination upon the part of their former enemies to crush Germany economically. They forget that the Allied nations now have so great an investment in Germany through their indemnities that it is not for the best interests of the Allies to bankrupt the nation.

Laws have been passed which all Germans take a particular delight to enforce; they are to the effect that foreigners shall be charged anywhere from 300 to 500 per cent above the quoted prices for their purchases. Even in the hotels the price of accommodation is based upon the guest's nationality. Booksellers and merchants of all descriptions inflate their prices to foreigners. In one case one ardent "Junker" went so far as to charge the normal rate of exchange for his products, but needless to say no purchase was made.

In discussing the low value of the mark the German points to Switzerland, Holland and other small countries which "are not nearly so able and progressive countries as Germany" as an example of how absurd it is that the German mark should have such a low value. They absolutely overlook the fact that unlimited quantities of paper money have been issued by the German government and that all nations on the earth have little confidence in that country today. As a matter of fact money means nothing in Germany. Contracts are absolutely worthless. Arrangements may be made today for the purchase of materials at certain prices with delivery three or six months hence, but at the time of delivery the price is subject to a revision both by the manufacturer and by the government which places a tax on all exports based on the rate of exchange at the time of export.

The German's argument for this is that they do not want to be accused of "dumping," but the real reason is they seek retalliation for the low value of the mark and they also want to prevent foreigners from buying them out. There is much to be said on this last point. Before the Germans raised their prices to foreigners and the government export tax was put into effect, merchants from all over the world flocked to Germany to procure materials in order to benefit by the low rate of exchange, and Germany was in danger of being gutted. In one particular case, a Swedish merchant went to Germany for bicycles. The manufacturers had agreed among themselves not to sell at the prevailing rate of exchange, but this enterprising merchant went from town to town, bought his requirements at retail, shipped them to Sweden and realized a wonderful profit. In another case a merchant desired to send out thousands of circulars. He brought them to Germany and mailed them from there to save on the postage.

This condition of affairs makes it quite difficult to contract with German firms at the present time. Even in the country itself difficulty is found in trading. Manufacturers will demand premiums ranging anywhere from 50 to 100 per cent for their products for prompt delivery, part of this premium to be paid in food or clothing for their workmen and the other part in the currency of some foreign country which they may choose to name. This last is for the purpose of establishing credits in those countries.

Germany's Position as Regards Basic Products

No more illustrative picture of Germany's condition can be obtained by a brief study of its position as regards raw materials. Primarily, as in every other country in Europe, Germany's industry is limited by coal.

The Coal Supply

All over the country coal is mentioned as the limiting factor. In the year 1913, the production of coal in Germany was 175,000,000 tons. Under the peace treaty Germany has lost about 35 per cent of its coal producing territory, Alsace-Lorraine and the Saar regions with 16,000,000 tons, Upper Silesia with 41,000,000 tons, and the occupied territory with 3,000,000 tons. In addition to this, Germany must, under the terms of the peace treaty, deliver from 31,000,000 to 39,000,000 tons of coal each year to the Allies.

The coal miners under the new régime in Germany have a seven-hour day, but in view of the present crisis, they have agreed to work two half shifts extra each week at double pay, thus making a 49-hour week. The grade of

*This article is written from observations made on a recent trip into Germany by Mr. Thayer. It will appear in two parts. That part dealing more particularly with railroads will appear in next week's issue. In the article no attempt has been made to convert the German marks into dollars because of the varying rates of exchange, a mark now being worth only 1.44 cents as compared with 23.8 cents before the war.

coal is greatly inferior to what it was before the war. In keeping with everything else the prices have risen tremendously. Families are rationed to one-quarter of a ton of fuel until the next supply is received, which will probably come next summer. Of this three-fifths can be obtained in coal and coke and two-fifths in wood and peat. Household coal is selling now at 350 marks a ton. Coke three months ago was 170 marks a ton and now it is selling for 370 marks. Fire-wood for household use is 280 marks a ton. Similarly, bunker coal has risen greatly in price, being sold for 300 marks. Railway coal is being purchased for 200 marks a ton, the price being lower in this case because of the quantity purchased.

The scarcity of coal has made it necessary to ration the entire country and some of the "luxury" industries are excluded from the ration list entirely. An interesting incident in this respect is that of one "luxury" manufacturer who absolutely had to have coal to the extent that he found it expedient to import coal from the United States at a price of 4,200 marks a ton. Germany is further limited from furnishing coal for home consumption by the contract which it has entered into with France. An arrangement has been made whereby France is to exchange 8,125 tons of iron-ore a day for 6,500 tons of coal from Germany.

A very interesting side light on the condition in Germany is illustrated in the way the coal rationing is handled. The hotels in Germany are particularly well heated and, in fact, uncomfortably so and upon inquiry it was learned that it was an easy matter for those with money to purchase all the coal they desired, regardless of the governmental restrictions.

The Iron and Steel Industry

The principal industry in Germany before the war was iron and steel. With the territory which Germany has lost went 72.1 per cent of her ore fields and a very large proportion of her pig iron and steel manufacturing facilities. Her production of pig iron decreased from 19,309,000 metric

Railway Station at Essen

tons in 1913 to 6,292,537 metric tons in 1919. Her steel ingot production decreased from 18,953,000 metric tons in 1913 to 7,768,569 metric tons in 1919. There was a smaller decrease in the production of ingot steel than in the production of pig iron, due to the fact that in 1919, and in fact throughout the war, steel was made with an increased use of scrap.

The theoretical capacity of steel production within the present German boundaries is from 12,000,000 to 14,000,000 tons per year, but on account of the lack of coal received, the shortage of ore and general labor conditions, it is impossible to obtain a production of more than 7,000,000 or 8,000,000 tons. During 1919, Germany imported iron ore from Sweden to the amount of 8,000,000 tons, but on account of the great difference in the rate of exchange such importations are greatly restricted, for, as it has been estimated, Germany now owes Sweden 2,500,000,000 marks.

In addition to this the freight charges on iron ore have greatly increased, particularly for the Germans with the present low value of the mark. Before the war, iron ore was brought from Rotterdam to the German steel district in the vicinity of Dusseldorf by barges for 50 pfennigs a ton. The price today is 75 marks—an increase of 15,000 per cent! Transportation facilities via this route are in the hands of the Dutch.

The Labor Situation

The labor situation in Germany also has a very direct bearing on an extent to which Germany will recover. At the time of the revolution in January of this year, labor all over

Home of the Inter-Allied Railway Commission at Weisbaden

the country was in a particularly fermented state. It has been estimated that, regardless of the great increase in wages, the output per man has decreased *to* 30 to 20 per cent of the prewar standard. The eight-hour day is universal throughout the country. Where two shifts are used the men usually work from six in the morning till two in the afternoon, with but a short time for lunch, and from two in the afternoon until ten at night. On the railways it was found necessary to close some of the shops absolutely and abandon all work, the productive labor of the men being practically nil. The shops were reopened a short time later and those men who would work taken on under a definite contract. In one railway shop the pattern makers were found spending most of their time during working hours making toys, which they sold in the street in their off hours. The labor unions, which are now strong in Germany, are constantly preaching to the men, "work less and provide labor for all."

The wages of the workmen have increased from six to seven times their prewar rates. Metal workers in March, 1914, earned 5.54 marks a day on an average; today they are receiving 35 marks. Car repairers receive 4 marks an hour and work piece work, as compared with 60 pfennigs before the war. Shipbuilders receive 3.50 marks an hour, as against 50 pfennigs before the war. In some localities the employers are strongly organized. In the case of the Berlin district, founders are able to obtain help for from 4 to 4½ marks an hour, whereas moulders in other parts of the country are obtaining 5 marks an hour.

Cost of Materials

The great decrease in output of the men, coupled with a large increase in wages, naturally has a tremendous effect on the price of materials. Boiler plate at one of the large locomotive manufacturing plants costs 4,000 marks a ton—

when they can get it. Basic pig iron prices have increased from 60.56 marks a ton at the beginning of 1914 to 2,227 marks on March 1, 1920. Billets have increased from 100 marks in January, 1914, to 2,290 marks at the present time. The price of plates has increased from 103.50 marks in January, 1914, to 3,435 marks per ton at present. Acid bessemer rails have increased from 118 marks in January, 1914, to 2,800 marks in March, 1920. The price of ordinary finished steel has increased in a like proportion, but in this case, where the demand is so great, high premiums are being demanded. These premiums vary; in some cases money is required, in other cases scrap is required and in still further cases credits on countries outside of Germany, as has been previously mentioned. In a like manner the cost of cars and locomotives has tremendously increased. Before the war one of Germany's up-to-date express passenger locomotives would cost in the vicinity of 115,000 marks. Today the same locomotive costs approximately 700,- marks. The ordinary freight car, which cost 3,000 marks before the war, now costs 40,000 marks, and 80,000 marks if it is to be exported from the country.

The information given above, which includes authentic figures in so far as it has been possible to obtain them, represents perhaps more clearly than anything else the real situation in Germany today. With 72 per cent of her iron ore deposits lost, Germany is hardly in a position to recover her export trade, particularly as a large percentage of the ore which is necessary to keep her extensive steel plants busy is under the control of France. German industry has, however, great hopes of recuperation. It has the equipment well developed and can see no reason why, now that the war is over, it should not again participate in the world's trade. There seems to be an utter lack of appreciation of the unfriendly feeling other nations bear to Germany as a result of the war. Without ships she, of course, does not count much on her overseas business, but Russia looms up as a great market, and when conditions become settled it is expected that she will keep Germany busy for many years. The munition manufacturers are making extensive preparations for a peace business. The chief concern of the character in Germany is, of course, Krupps.

The concern is entering upon its reconstruction with a wonderful spirit and determination. Whereas before the war 50 per cent of the income derived from its products came from war materials, in its present program the income from this source will be practically negligible. The only war materials Krupps intends to make will be to meet the requirements of Germany's small army and navy. This company is looking principally to the railroad field as an outlet for its energies. It delivered its first locomotive last December and it is now building locomotives and cars at the rate of 300 and 2,000 per year, respectively, working two shifts a day. It is its ultimate desire to be in a position to provide everything in the iron and steel line for the complete building of a railroad system. The present capacity of these works for railway material is sufficient to meet from one-fifth to one-third of the German railway requirements as regards iron and steel materials, including cars and locomotives. The car and locomotive plants will be increased as occasion demands to an output of 900 locomotives and 20,000 cars per year, and with the equipment now available this company is in a position to build cheaply under normal conditions.

Cologne Bridge. Railway Station at Left of Cathedral. Railway Yards on Opposite Side of River.

One interesting feature in the construction of the locomotives is the making of bar frames from steel slabs rolled in the heavy rolling mills previously used for armor plate. The frames are cut out of these slabs, some 5 to 6 in. thick and wide enough for three frames, with the oxy-acetylene torch. Krupp has increased its plant for the manufacture of wheels and axles by about 100 per cent. The spring plant is well developed and at present time working to capacity. This company is also developing its plant for the production of agricultural machinery, typewriters, automobile parts and all other materials requiring special steels.

During the war the working area of the Krupp plant has been increased about 70 per cent and it employed 115,- 000 hands. At present, due to the lack of coal and raw materials, the plant is working to but one-third capacity and has in its employ only 43,000 hands. The demands for its products are so great that it can not begin to supply what is required, but it was hoped to be able to increase the output to one-half or even two-thirds of the plant capacity by next summer. In view of recent events it is doubtful if this will be accomplished.

Railroad Administration Asks $420,000,000 Additional Appropriation

WASHINGTON, D. C.

AN ADDITIONAL APPROPRIATION of $420,727,341 for the Railroad Administration was asked of Congress in a letter of estimate submitted to the Secretary of the Treasury on April 2 by Director General Hines. With the $1,450,000,000 already appropriated this would make a total of $1,870,727,341, of which $861,963,932 represents the indebtedness of the railroads and other properties to the government; $104,839,431 represents investments, chiefly Liberty bonds and additions and betterments to inland waterways; $900,478,756 represents the debit balance of the Railroad Administration to March 1, 1920, and $3,445,222 is an estimate of the administrative expenses of the Railroad Administration for the balance of this year.

Swagar Sherley, director of the Division of Finance, and Brice Clagett, assistant to the director general, discussed the details of the appropriation with Chairman Good of the House Committee on Appropriations on Monday and Director General Hines and other officials of the Railroad Administration were given a hearing before the committee on Wednesday.

In Director General Hines' report to the President dated February 28, and in the statements submitted to Congress at the time of the passage of the railroad bill the additional appropriation that would be required was estimated at $436,000,000. This has been somewhat reduced in the revised statement but the $420,000,000 now asked is not considered final because it is impossible to state at this time what will be the result of the settlement of claims for and against the government and the companies and no allowance has been made for the net amount that may be required to settle maintenance claims. Mr. Hines' letter explaining the need for the appropriation is as follows:

"I have the honor to submit herewith an estimate in the sum of $420,727,341 to be immediately available and to remain available until expended, and to be added to and considered a part of the monies provided for in Section 202 of the transportation act of 1920.

"This additional sum would be expended in the same manner and for the same purpose and under the same conditions as the amount appropriated in the above mentioned section. The need for this appropriation is explained by the following statement showing the transactions of the United States Railroad Administration:

Indebtedness to the Government of Railroads and Other Properties, Including Express Companies:		
1. Total advances by the Government for additions and betterments to roadway and structures and equipment (except funded allocated equipment)		$765,821,450
2. Amount of probable deductions therefrom on account of compensation, depreciation, open account, etc., due companies		495,741,875
3. Net amount of advances for additions and betterments to roadway and structures and equipment (except allocated equipment) to be funded for ten years		270,079,575
4. Advances for purchase of "Allocated" equipment which has been funded through equipment trusts, principal payable in 15 annual installments		367,806,968
5. Other indebtedness due Government to be evidenced by one-year notes		144,422,526
6. Long term notes payable to Government		44,433,664
7. Stocks, bonds, and receivers' certificates of railroad companies owned by Government		35,221,199
8. Total, representing indebtedness of railroads and other properties, including express companies		861,963,932
Other investments of Railroad Administration:		
9. Additions and betterments to inland waterways (including $3,479,011, to be yet expended in satisfaction of contracts made prior to March 1, 1920)	$14,581,126	
10. Miscellaneous investment (chiefly Liberty Bonds)	90,258,305	
		104,839,431
11. Total of items of indebtedness and investment		966,803,363
PROFIT AND LOSS ACCOUNT		
Estimated Excess of Operating Expenses and Rentals Over Operating Revenues:		
12. Class (1) railroads	$677,513,152	
13. Other privately owned properties (smaller roads, sleeping and refrigerator car line and steamship lines)	43,011,120	
14. Inland waterways	2,449,739	
15. Expense of central and regional organizations	13,954,980	
16. American Railway Express Company	38,111,742	
Other Profit and Loss Debit Balances.		
17. Adjustment for materials and supplies in settlement with railroad companies on account increasing prices	85,204,618	
18. Net interest adjustments and miscellaneous income debits and credits	40,233,396	
19. Total profit and loss debit balance		900,478,756
20. Administrative expenses of the Railroad Administration from March 1, 1920, to January 1, 1921		3,445,222
21. Grand total requirements		1,870,727,341
23. Original appropriation, Federal Control Act	$500,000,000	
24. Deficiency appropriation	750,000,000	
25. Appropriation carried in Transportation Act of 1920	200,000,000	
26. Total appropriations		1,450,000,000
27. Estimated amount required to enable Railroad Administration to fund certain indebtedness of the railroad companies in accordance with the Transportation Act, and to defray the costs of the Federal control		420,727,341

"In connection with the foregoing estimate of the amount of the appropriation required to liquidate the affairs of the Railroad Administration, no allowance has been made for the settlement of claims on the part of the corporations for under maintenance of their property during the period of federal control. While there may be such claims on the part of some corporations, there will be, on the other hand, claims by the government against other corporations for maintenance of the property in excess of the contract requirements, which may require the payment of sums by the corporations to the government. In the absence of final figures, it seems best not to make any estimate of the net amount required to settle maintenance claims."

Thus far the only large road that has filed its claim for undermaintenance is the Seaboard Air Line and the amount of its claim has not been made public. The Railroad Administration has not yet stated its claims against the companies for maintenance in excess of its contract obligation, but it is withholding sums from its payments to the companies on account of their rental for the period of federal control to cover the amount of such possible claims for overmaintenance. The railroads that think they have something coming to them for deferred maintenance are not in such a fortunate position as to be able to retain control of the amount in dispute.

As far as the present estimate indicates, the cost to the government of federal control of the railroads and other transportation systems stands at about $904,000,000, assuming that the outstanding indebtedness to the government will be paid in full. This does not, of course, include the deficit which the government is expected to have to pay on account of its extension of the guaranteed standard return for six months.

The revised statement contains many changes in the figures as compared with the estimates made by the Railroad Administration before the January and February returns were in. (*Railway Age* for March 5, page 695). For instance, the advances for additions and betterments, estimated at $780,000,000, are now stated at $765,000,000. The amount which may be deducted therefrom on account of rental has been increased from $461,000,000 to $495,000,000. The net amount of the indebtedness for additions and betterments which the roads are given 10 years to pay for has been reduced from $318,000,000 to $270,000,000. but the amount due on account of the equipment funded for 15 years has been increased from $357,000,0000 to $367,000,000. The indebtedness of the roads to the government to be evidenced by one-year notes has been reduced from $194,000,000 to $144,000,000. The amount of railroad securities owned by the government has been increased from $23,000,000 to $35,000,000.

The total representing the indebtedness of the railroads and other companies to the government has been reduced from

$938,000,000 to $861,963,932, and the government's investment in additions and betterments to inland waterways and in Liberty bonds, etc., has been increased from $93,000,000 to $104,839,431, making the total of items of indebtedness and investment, which the government may be expected to recover, $966,803,363 instead of $1,031,899,451, as previously estimated.

The amount of the Railroad Administration's debit balance has been increased in the revised statement from $854,000,000 to $900,000,000, to which must be added the estimate of $3,445,000 for its expenses for the balance of 1920. The estimated excess of operating expenses and rentals of Class I roads has been reduced in the revised statement from $715,000,000 to $677,000,000, while the loss from the operation of other properties has been increased and the amount for adjustment of materials and supplies has been increased from $74,000,000 to $85,000,000. The item which includes interest adjustments has been converted from a credit of $17,900,000 to a debit of $40,000,000.

Wage Controversy to Go to Labor Board

WASHINGTON, D. C.

NEGOTIATIONS between the conference committees constituting a bi-partisan board representing the railroads and the principal organizations of railroad employees that are asking additional increases in wages estimated at over one billion dollars annually were terminated on April 1, after the railroad committee had declined the requests on the ground that the roads could not assume the responsibility of adding such a burden to the costs of transportation, which are necessarily borne by the public, without the full knowledge and consent of the public, through its representatives, and that the entire matter must be disposed of as provided in the Transportation Act. This means that the controversy must be submitted to the Railroad Labor Board to be appointed by the President, on which the public will have three representatives, the employees three and the railroad managements three. The railroad committee invited the committee representing the employees to join with it in the formation of a committee to prepare data on the various aspects of the subject which must ultimately be presented to the Labor Board, with a view to expediting the disposition of the case. The labor committee declined to join with it in the formation of such a committee and announced its intention of appealing direct to the Labor Board.

The conference committee representing the employees insisted that the representatives of the railroads and of the employees by conference should reach an agreement upon wages and working conditions and that the law contemplates such an agreement prior to any opportunity for participation by the representatives of the public. In reply to this contention, E. T. Whiter, chairman of the Railway Executives' Conference Committee, said in a public statement:

"While Section 301 of the transportation act does provide that representatives of the carriers and of their employees *may* reach agreement upon matters in controversy, it is not believed by the management conferees that Congress ever contemplated that a controversy involving so great an addition to transportation costs and in which the public is therefore so vitally interested should be disposed of by direct negotiation.

"This interpretation of the spirit of the law is borne out by the provision in Section 307 that if the carriers and the employees should by direct negotiation agree upon wage increases 'likely to necessitate a substantial readjustment of the rates of any carrier,' the Labor Board may suspend such agreement until it can inquire into its character.

"Another provision brings out this thought still more clearly by providing that in important cases at least one member of the public group on the Labor Board must join in the decision in order to make it effective. In view of this specific provision of the law it seems clear to us that its framers never intended that representatives of the managements and of the employees, without any public representation, should reach an agreement upon demands involving more than a billion dollars increase in wages."

The position of the railroads was stated in a letter from Mr. Whiter to B. M. Jewell, chairman, Railway Employees' Conference Committee, on March 30, as follows:

"In conformity with a request made by the President of the United States upon the Association of Railway Executives and the chief executives of the various organizations of employees, this board, or joint conference, was convened for the purpose of endeavoring to dispose of the wage requests pending at the end of federal control by the method provided in Section 301 of the transportation act.

"The first meeting was held on March 10, 1920, at which the director general addressed the board and left with us the thought that, owing to the importance of the subject and the delay that had already ensued, the whole matter should be taken up at once and expedited to the greatest possible extent. As some preliminary work was necessary, subsequent conferences were held March 22 to 25, inclusive, within which time you submitted your respective propositions. A recess was then taken during which the railroad representatives considered your requests and compiled figures to estimate the increased yearly costs. A very conservative estimate shows a total of more than one billion dollars.

"This estimate is based only on the requested changes in the rates of pay, and no attempt has been made to estimate the cost of changes in rules which would further materially increase the total. Consideration of your requests and the bases upon which they are predicated has convinced our conferees that there is no intermediate ground which could be reached that in itself would not represent an aggregate sum so great as to be beyond the possibility of our reaching a settlement.

"To study all angles of the subject exhaustively would require a long time, and, notwithstanding any points which might develop in your favor, the railroads could not assume the responsibility of adding such a burden to the costs of transportation, excepting with the full knowledge and consent of the public through its representatives, and we must, therefore, decline to grant your requests, and let the matter be disposed of as provided in the transportation act.

"We feel that it would be an injustice to you and to those you represent to further prolong these conferences, and if you desire to appeal to the Labor Board, we invite you to select a committee of your representatives to work with a committee which we may select to prepare data on the various aspects of the subject, so that we can agree upon such data, even in part, some time at least, will have been saved in presenting the case to the Labor Board.

"We note that the propositions submitted include several subjects which we understand were disposed of by the United States Railroad Administration prior to the termination of federal control, and therefore ought not to be considered as pending. However, in view of our conclusions as to the disposition of the present requests, it appears unnecessary to enter into a discussion of these features of the situation at this time."

To this Mr. Jewell, as chairman of the employees' committee, replied on April 1 in part as follows:

"The attitude of your committee in failing to carry out the wishes of the President of the United States comes as a surprise to us, and will result in keen disappointment to our constituents, as well as the general public, both of whom are parties as interest and entitled to more consideration from the bi-partisan board than you have elected to give.

"We understand from this that your committee has definitely declined to assume the responsibility and perform the duty which is so clearly desired in the public interest, and which Section 301, as we understand it, contemplates; that of agreeing in conference upon rates of pay for railroad employees which are just and reasonable.

"Your statement that no agreement should be reached by the railroads and employees which has not been passed upon by the representatives of the public, given as the reason for terminating the negotiations, is not in accord with our understanding of the law.

"Section 301 clearly intends that the representatives of the railroads and employees should, by conference, agree upon just and reasonable rates of pay, working conditions, etc.

"Your committee has declined to comply with the plain provisions of the law, and assume the responsibility of railroad managements with regard thereto, and has not given consideration to the requests of the employees for just and reasonable rates of pay, working conditions, etc., based upon the provisions of Section 307, paragraph (d), which shall be the guide of the labor board. Therefore, these same provisions should be the guide of all parties who deal with these questions.

"Your entire deliberations seem to have been predicated upon the sole basis of the costs without regard to the justness and reasonableness of the requests of railroad employees.

"Your declination to consider the requests of the employees upon their merits does not place us in a position, at this time, to join with you in the appointment of committees to prepare data for presentation to the Labor Board.

"The decision of your committee forces us to appeal to the Labor Board under the provisions of the transportation act, and so notify President Wilson, because of his request for the creation of this bi-partisan board."

Copies of this correspondence were sent to the President.

The labor committee also tried to secure an agreement from the railroad committee to preserve the effect of the general orders of the Railroad Administration relating to wages, and the supplements, amendments, addenda, national agreements and interpretations thereof, but the committee representing the railroads took the position that this was outside its province.

The principal labor organizations made the following nominations for appointment to the Labor Board, in accordance with the regulations promulgated by the Interstate Commerce Commission:

Group No. 1. F. A. Burgess, assistant grand chief, Brotherhood of Locomotive Engineers; Albert Phillips, vice president, Brotherhood of Locomotive Firemen and Enginemen; L. E. Sheppard, president, Order of Railway Conductors; G. H. Sines, vice president, Brotherhood of Railroad Trainmen; William A. Titus, vice president, Switchmen's Union of North America.

Group No. 2. A. O. Wharton, president, railway employees' department, American Federation of Labor, first choice; B. M. Jewell, acting president, railway employees' department, American Federation of Labor is named as second choice.

Group No. 3. J. J. Dermody, vice president, Order of Railroad Telegraphers; A. E. Barker, president, United Brotherhood of Maintenance of Way Employees and Railroad Shop Workers; James J. Forrester, president, Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees.

The railway executives also submitted six nominations and the organizations representing subordinate officials and several minor labor organizations were also allowed to submit nominations.

Railroad Law Departments to Settle Claims for Director General

THE LAW DEPARTMENT of the various railroads have been authorized and requested to handle and settle for the director general of railroads, claims and suits for loss and damage, personal injuries, etc., during federal control, subject to a limitation as to the amount. The instructions are given in a circular issued by E. Marvin Underwood, general counsel of the Railroad Administration, as follows:

"Supplementing previous instructions and until further notice, your law department is authorized and requested, pursuant to existing general orders Nos. 41 and 57a, and circulars Nos. 3, 5, 6 and 7 of the Claims and Property Protection Section, to handle, for the director general of railroads, and for his account, all claims, demands, actions and suits (except claims and suits of carriers against the director general or the United States).

"(1) Whether now pending or hereafter instituted, growing out of the operation of the properties of your company by the director general during federal control; (2) which are now pending and which, although arising out of the operation, during federal control, of some other system of transportation, were handled, during federal control, by attorneys who had charge, for the director general, of litigation and claims arising out of the operation of your properties; (3) which, unless otherwise specifically provided for, may be hereafter filed or instituted and which would be, according to the practice during the period of federal control, handled by your law department, although such litigation or claims have arisen out of the operation during federal control of some other system of transportation (for example, freight claims made upon you as a connecting carrier, although the damage may have been caused by another carrier).

"When it is thought that a claim or suit may be better handled by another carrier, which, because more directly affected, agrees to take charge of same, it may be, with the approval of the general counsel of the director general, transferred to such other carrier for future handling.

"Authority is hereby conferred upon your law department, upon such terms as in its judgment will best protect and promote the interests of the director general and of the United States, to compromise and settle all suits and claims arising out of personal injuries, involving not more than $3,500 in any one case; all suits and claims arising out of loss and damage to freight, fire and stock claims and suits, and miscellaneous claims and suits, involving not more than $500 in any one case, and to arrange for the accounting with reference thereto and payments thereof as provided in general orders Nos. 66, 67 and 68 (except as to payment of final judgments, decrees and awards, rendered after February 29, 1920, as to which special instructions are necessary and will be subsequently issued). As to the settlement and payment of all other suits and claims specific authority therefor must be first secured from the general counsel of the director general, and a statement of facts, together with your recommendations, should be forwarded to him with the request for such authority.

"These instructions do not refer to payment of overcharges, which are covered by General Order No. 68, nor to reparation claims which have not been made the subject of formal complaint before the Interstate Commerce Commission. Such reparation claims will be handled pursuant to instructions contained in circular No. 7, of the Division of Traffic, as amended February 25, 1920."

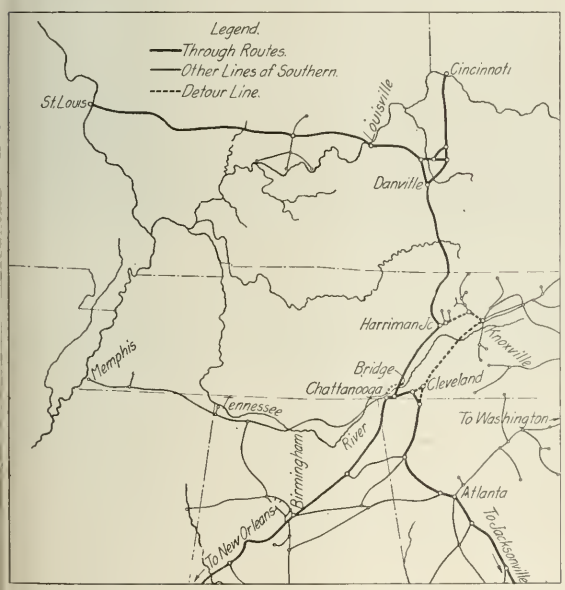
HIGHER RATES OR TAXES.—If there must under private ownership and management be a direct increase of rates it will be instead of the absorption of losses by the taxpayers.—*Moline (Ill.) Dispatch.*

Southern Railway Rebuilds Chattanooga Bridge

Condemnation of the Old Spans Forces Rapid Completion of the New Tennessee River Structure

A PROJECT in emergency bridge construction was recently completed by the Southern Railway at Chattanooga, Tenn., as a consequence of an unusual predicament brought about through the barring of traffic from its Tennessee river bridge at that point subsequent to the raising of a question as to its safety under the loads imposed by the existing traffic. Following complaints regarding the adequacy of the truss spans of this structure, engineers in the employ of the United States Railroad Administration made an inspection and report on the bridge with the result that the operation of trains over the structure was discontinued until the truss spans could be strengthened or replaced.

The obstacle which this ruling imposed on the Southern in the handling of traffic on its western lines will be more readily understood with the help of the small map showing the lines of the system in the vicinity of Chattanooga, Knoxville and Atlanta. The through traffic over the Cincinnati, New Orleans & Texas Pacific from Cincinnati to Birmingham, New Orleans, Atlanta, Jacksonville and other points in the south, is normally handled through Chattanooga as indicated by the heavy lines on the map. This route involves the crossing of the Tennessee river over the bridge in question at Tennbridge, about six miles northeast of Chattanooga.



Map Showing How Traffic Was Detoured During Reconstruction

During the time that the bridge was out of service, it was necescsary to detour all through freight trains between Cincinnati and southern points, as indicated by the heavy dotted line, via Harriman Junction, Knoxville and Cleveland, and thence either south through Atlanta and beyond, or west through Chattanooga to Birmingham and New Orleans. Through passenger trains between Cincinnati and the southeast followed the same route, but those running between Cincinnati and New Orleans followed the usual line of the Cincinnati, New Orleans & Texas Pacific to a point just north of the bridge, thence westward over an industrial spur and the tracks of the Chattanooga Traction Company to North Chattanooga, a suburb located just across the river from Chattanooga. A temporary passenger station was installed at this point from which passengers were taken by bus to the business center of the city or to the terminal station for transfer to trains for the southwest. A more detailed statement of the manner in which the detouring was acomplished appeared in the *Railway Age* for March 12, 1920, page 772.

Old Structure in Service 40 Years

The old Tennessee River bridge was built in 1878 for single track and consisted of six through, Whipple truss spans 210 ft. long, one through span of 261 ft., and one through swing span of 283 ft., all measured center to center of piers. The elevation of the base of rail was 65 feet above low water level in the river, but only about 11 ft. above the maximum recorded high water. The ground level adjacent to the river, more especially on the south bank, is relatively low, so that long approach embankments were necessary. The substructure consisted of high stone masonry piers and T-abutments. Owing to the fact that the river bottom is bare rock, or rock covered with a relatively thin blanket of loose stone, clay and gravel, nearly all of the old piers were placed directly on the rock bottom.

The renewal of this bridge to provide for modern train loads and double track was undertaken in 1916. It was decided to replace six of the old 210-ft. fixed spans by new ones of the same length, move the channel opening northward about 260 ft., so as to occupy the position of the old 261-ft. span and a part of the old north channel opening, and, in place of a draw span, provide a vertical lift span with a channel opening of 300 ft. clear width and arranged to raise sufficiently to give a vertical clearance of 50 ft. above high water. This involved provision for a new 230-ft. fixed span south of the lift span. It also required the widening of the two abutments and Piers 4, 5, 6, 7 and 8 to accommodate the double-track superstructure, in addition to the construction of a new pier to carry the south end of the new lift span.

Work was prosecuted along this line during 1916 and part of 1917. The new pier was built and the old ones jacketed and extended and the abutments were widened by changing them into reinforced concrete counterfort wing abutments. Progress on the superstructure was carried to the point of fabricating and erecting the 300-ft. lift span, but omitting the elevating towers and machinery. To provide room for this span it was necessary to cut off about 53 ft. from the north end of the old draw span, provide a counterbalance and continue the span in operation in that shape. With the bridge in this condition, work was suspended in 1917 on account of the war and nothing further was done until the structure was ordered out of service in August, 1919.

Rapid Construction Imperative

The emergency brought about by this order called for a construction program that would insure the restoration of this river crossing at the earliest possible date. Aside from the interference with traffic, the recurrence of high water in the Tennessee river each winter made it necessary to institute a plan that would insure the completion of the substructure work before cold weather. After making estimates of the

time necessary to fabricate and erect the truss spans required for the adopted plan and taking into account the fact that the erection falsework would be in use just at the time when the danger of high water was the greatest, it was decided to make radical changes in the plans for the bridge. In place of the truss spans it was decided to provide deck plate girder spans, consisting, in general, of two 105-ft. girders for each of the 210-ft. truss spans and two 115-ft. girders for the 230-ft. truss span. This required the construction of six additional intermediate piers and the raising of the entire substructure, since the substitution of deck plate girders for the through truss spans made it necessary to raise the track grade by 5.62 ft. to meet the requirements of the War Department.

View of the Old Spans on the Rebuilt Piers

One effect of this was to require the embankment approaches to the bridge to be raised, the elevation at the north end being carried back 3,400 ft. and requirng the placing of 65,000 cu. yd. of filling and that on the south end going back 2,700 ft. with the use of 115,000 cu. yd. of additional embankment material.

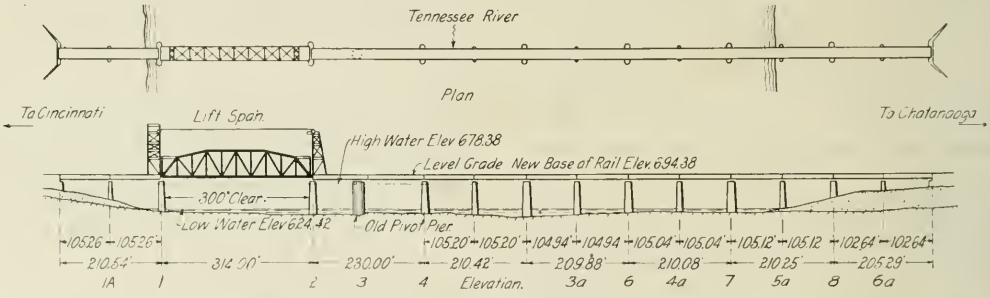
How the Foundation Work Was Handled

New Pier 6-A was placed on 45 Raymond concrete piles with about 24 to 30 ft. penetration, their tops being embedded in a reinforced concrete footing slab 4 ft. thick. The other five new piers were carried to rock. Piers 2-A to 5-A, inclusive, were located directly in, or close to, open water, with the depth of water running up to about 23 ft., so that the construction and sinking of cofferdams or open caissons, which would have permitted excavation and concreting in the dry, would have constituted a difficult piece of work that would unquestionably have extended long into the high water season. As a consequence, it was decided to adopt the more expeditious plan of placing the concrete under water since the cofferdams or underwater forms required for this procedure could be built in much less time than puddled cofferdams.

To this end the material overlying the rock at the site of each pier was removed with an orange-peel bucket, handled by a stiff-leg derrick mounted on a scow, the spoil being dumped back into the river at a point within the reach of the swing of the boom. On the rock surface thus prepared, a cofferdam 16.5 ft. by 40 ft. in plan was floated into position and sunk by weighting it with steel rails. This was composed of a single thickness of 12-in. by 12-in. timbers placed horizontally and drifted together. It was stiffened by other 12-in. by 12-in. pieces placed vertically inside the

The Cofferdam, Bottom Dump Bucket and Tower Spout

walls at the corners and at intervals between. To take care of any irregularities in the rock surface, sheet piling was driven inside the walls at places where the bottom of the cofferdam walls was not in contact with rock. The condition of the bottom and the position of the cofferdam with respect to the rock was carefully checked by a diver. As a further precaution, the outside of the open caisson was banked with the excavated material which was re-deposited against it by the grab bucket from the spoil piles. Before placing any of the concrete, a diver sealed the edges of the dam by placing sacks of concrete along the walls.



General Elevation and Plan of the Bridge as Rebuilt

The concrete was deposited under water by a bottom-dump bucket, handled by a stiff-leg derrick mounted on a barge. This bucket was filled with concrete from a small hopper and spout rig set up in a 10-ft. tower on a second barge, this hopper in turn receiving its supply of concrete from the mixing plant in a bucket delivered by a 2,000-ft. cableway spanning from shore to shore. The building up of the mass of

concrete under the water surface was checked carefully while the work was in progress with the aid of sounding rods and, when deemed necessary, through an examination by the diver.

After the top of the concrete had been brought to within two feet of low water level, forms were erected and the rest of the concrete poured inside these. As all of the new piers are of the same dimensions from the top to the cofferdam level, the forms, which were built in portable horizontal sections, could be readily re-used on the several piers since the form section built for use at a given elevation on one pier would fit the same elevation on any other. The concreting in the forms was carried on in exactly the same way as for the portion that was deposited under water except that the

The Concrete Plant with New Lift Span at the Left

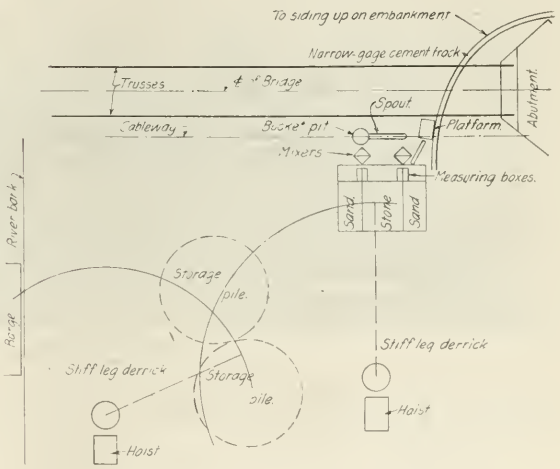
bottom dump bucket was eliminated. In other words, the spout and hopper rig was set up on top of the forms in a position where it was readily accessible to the cableway while the spout was long enough to deliver the concrete to any part of the pier.

A total of 4,700 cu. yd. of concrete was required for the new sub-structure work, all of which was supplied from one mixing plant located on the north bank of the river, just east of the bridge between the north abutment and Pier 1-A. All of this concrete was also delivered to the piers by the cableway which was located parallel to, and just clear of, the east line of the trusses of the bridge. The layout of the mixing plant is indicated in the sketch. Stone and sand were delivered at the river bank in barges. The cement arrived in cars set out on the bridge track just north of the abutment. Delivery of these materials to the plant involved the use of two stiff-leg derrick outfits with grab buckets for the stone and sand, and cars running on a narrow-gage track to take the cement from the railway cars down the end of the embankment to the mixers which stood at the foot of the abutment.

The mixing plant, which was in duplicate, was of the conventional type with overhead material pockets, one for stone in the middle with a smaller one for sand on each side. This arrangement made it possible to deliver these materials to two measuring boxes, each having separate compartments for sand and stone. These boxes stood on a working platform flanking the north side of the hopper structure which also afforded space for the water barrels and storage for a limited supply of cement sacks. The two mixers, a ½-yd. and a ¾-yd., stood in front of the measuring boxes at an elevation low enough to receive the contents of the measuring boxes by gravity, while in front of the south mixer was a pit for the reception of the cableway bucket while it was being filled with concrete. This bucket received the charges of the south mixer by direct dumping, but a spout was required for the north mixer. The capacity of the plant was limited by the capacity of the cableway, which varied with the length of travel.

The Work on the Superstructure

When the sub-structure was ready for the erection of the new superstructure, the old fixed spans were shifted westward on the piers as far as the length of the piers permitted so as to make room on the east ends of the piers for the erection of the girders for the east track. The erection of the new superstructure proceeded progressively from both ends of the bridge. Each girder was set into place independently by a bridge derrick car, the girders of each span then being assembled by the cross and lateral bracing and decked to permit the advance of the derrick car to the next span. The last span to be erected was set complete by two derricks, one on each of the adjacent spans. With the erection of all of the girders for one track, it was possible to restore traffic on January 20. However, several important steps in the work remained to be completed. The old truss spans had to be removed, after which the girders for second track were installed, although for the present this has been done only for the first five spans, including the lift span. The towers for the lift span have been erected and the lift span, which was erected to correspond to the old base of rail level, has



Layout of the Concrete Plant

been jacked up so that it comes to the newly established grade line.

The work on this structure was carried on under the general direction of E. M. Durham, Jr., until recently chief engineer of construction, Southern Railway, Washington, D. C., and under the more immediate direction of R. W. Jones, Jr., district engineer, Lexington, Ky., with P. R. Shields, resident engineer at the bridge. G. H. Gilbert, bridge engineer, Southern Railway Lines West, had charge of the details of the steel work. The American Bridge Company, New York, had the contract for the steel fabrication and erection.

In the long run the whole people are more concerned in the steady, regular and efficient operation of the railroads than either the railroad owners or the railroad workers.—*Yonkers (N. Y.) Statesman.*

Locomotives for the Belgian State Railways

On March 1 the American Locomotive Company at its Schenectady works completed the first engine of the order recently placed by the Belgian State Railways. The contract for this order, which calls for 150 locomotives, 75 to be built by the American Locomotive Company and 75 by the Baldwin Locomotive Works, was signed in Brussels on December 13. It was not until December 24 that the engineering department of the American Locomotive Company was furnished the information necessary to enable it to proceed with the design of the locomotive. The design was entirely new and the metric system was used throughout, yet in 52 working days the first locomotive was completed.

While the locomotives are of American design in all their details, as will be noted from the photograph, the Belgian type of cab and tender were used. This was done in order to permit the American locomotives to couple with the existing Belgian tenders and vice versa. The Belgian State Railway's standard train connection of the screw link type with two spring buffers, the international system of threads, and French-Westinghouse brake equipment with French-Westinghouse pipe threads were also included.

These engines are to be used in both freight and passenger service and are designed for 16-deg. curves and a maximum grade of 3.3 per cent. Following European practice, all the engines are built for left-hand drive. All gages are graduated in kilograms per square centimeter.

The specification called for a weight on drivers of 164,000 lb., weight on truck of 22,000 lb., total weight of engine 186,000 lb., and a weight limit per axle of 42,900 lb. The official scale weights are as follows:

First driver	41,600 lb.
Second driver	41,600 lb.
Third driver	41,900 lb.
Fourth driver	41,900 lb.
Total drivers	167,000 lb.
Truck	21,000 lb.
Total engine	188,000 lb.

The boiler is of the straight top type, 68 in. in diameter at the front end. It carries 200 lb. steam pressure and has a copper firebox 96 in. by 60¼ in. All staybolts are of copper, with a tell-tale hole drilled in both ends. The firebox is supported at the front end by a sliding shoe, with a brass wearing plate and a large oil groove. The jacket is supported on a crinoline frame and is extended to the front end of the smokebox. A brick arch supported on tubes and a Locomotive Superheater Company's type A superheater are also included. The finished boiler was tested with cold water to a pressure of 19 kg. per sq. cm. (270 lb. per sq. in.), but no steam test was required.

The revolving parts were completely balanced in each wheel. The counterbalance for the reciprocating parts was divided among the eight coupled wheels, and had to be such that the dynamic augment should not exceed 15 per cent of the static weight on the rail at 60 km. (37.3 mi.) per hour.

In accordance with European practice all of the side rods have adjustable bearings. The by-pass valves are operated from the superheater damper cylinder. All of the material used is in conformity with the A. S. T. M. standard specifications. The last five of the locomotives to be built by the American Locomotive Company are to be equipped with Worthington feedwater heaters.

The tender frame is made of steel plate and is supported on three pairs of wheels held in rigid pedestals, the tender tank being arranged so as to drop down in between the frame.

General Data

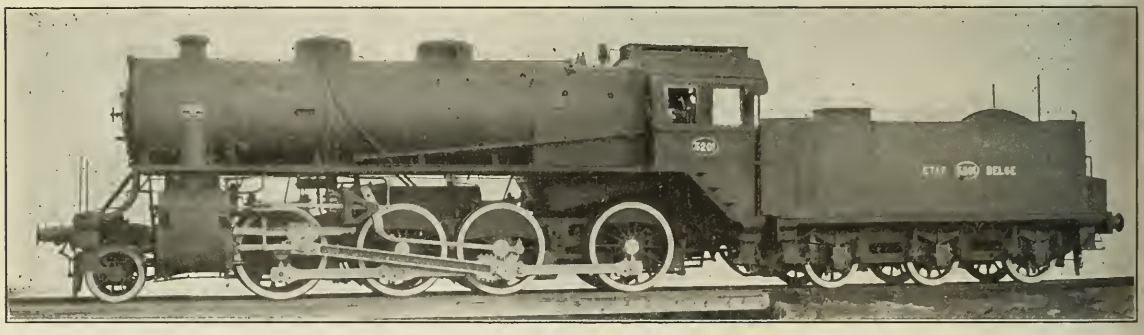
Gage	1.435 m. (4 ft. 8½ in.)
Service	Passenger and freight
Fuel	Bituminous coal
Tractive effort	15,800 kg. (34,800 lb.) at 65 per cent m. e. p.
Weight in working order	85,276 kg. (188,000 lb.)
Weight on drivers	75,750 kg. (167,000 lb.)
Weight on leading truck	9,526 kg. (21,000 lb.)
Weight of engine and tender in working order	138,619 kg. (306,000 lb.)
Wheel base, driving	5.941 m. (19 ft. 6 in.)
Wheel base, total	8.532 m. (28 ft.)
Wheel base, engine and tender	16.344 m. (53 ft. 8 in.)
Weight on drivers ÷ tractive effort	4.79

Cylinders

Kind	Simple
Diameter and stroke	.610 m. by .711 m. (24 in. by 28 in.)

Valves

Kind	Piston
Diameter	305 mm. (12 in.)
Greatest travel	165 mm. (6½ in.)
Outside lap	27 mm. (1⅛ in.)
Inside clearance	3 mm. (.118 in.)
Lead in full gear	4.5 mm. (.177 in.)



Consolidation Type Locomotive for Belgium Built in Record Time

Wheels

Driving, diameter over tires	1.520 m. (60 in.)
Driving, thickness of tires	.76 mm. (3 in.)
Driving journals, main, diameter and length	.263 in.
Engine truck wheels, diameter	.90 m. (35½ in.)

Boiler

Style	Straight top
Working pressure	14 kg. per sq. cm. (199.3 lb. per sq. in.)
Outside diameter of first ring	1.694 m. (66¾ in.)
Firebox, length and width	2.438 m. by 1.530 m. (96 in. by 60¼ in.)
Firebox plates, thickness	16 mm. (⅝ in.)
Firebox, water space Front, 102 mm (4 in.); sides and back, 89 mm. (3½ in.)	
Tubes, number and outside diameter	160—51 mm. (2 in.)
Flues, number and outside diameter	26—137 mm. (5⅜ in.)
Tubes and flues, length	4.724 m. (15 ft. 6 in.)
Heating surface, tubes and flues	171.7 sq. m. (1,847 sq. ft.)
Heating surface, firebox, including arch tubes	15.7 sq. m. (169 sq. ft.)
Heating surface, total	187.4 sq. m. (2,016 sq. ft.)
Superheater heating surface	45 sq. m. (484 sq. ft.)
Equivalent heating surface*	254.9 sq. m. (2,742 sq. ft.)
Grate area	3.7 sq. m.

Tender

Tank	Water bottom
Frame	Steel plate
Wheels, diameter	1.067 m. (42 in.)
Water capacity	24,000 litres (6,350 gal.)
Coal capacity	7,000 kg. (7.72 tons)

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

Strikes and Storms Conspire to Cripple Traffic

Walkout of Switchmen and Blizzard Hit Chicago Simultaneously, Tying Up Freight and Passenger Trains

STRIKES, THREATENED STRIKES, blizzards and even tornados have conspired during the past few weeks to interfere with and eliminate if possible, the carrying on of transportation in the central west. In the vicinity of Chicago at the present time two of these forces combined to interfere seriously with the movement of freight and passenger trains, namely: An unauthorized strike of switchmen, members of the Chicago Yardmen's Association, and a six inch snowfall which accompanied a blizzard in this district on Easter Sunday. Several days prior to this, passenger and freight traffic in Nebraska, Iowa and adjacent states was badly crippled by the same storm which was moving east. Coincident with the severe storm in the middle west, 3,000 brakemen and switchmen, members of the Brotherhood of Railway Trainmen employed on the Chicago, Rock Island & Pacific, were threatening to strike. However, this difficulty was averted by the institution of a new set of working rules submitted by the brotherhood and accepted by the company. Prior to this, considerable damage was done to railway equipment and facilities in the vicinity of Chicago by a tornado which swept across the western and northern suburbs of the city on Sunday afternoon, March 28.

The Chicago Strike Situation

The strike of switchmen and switch tenders in the Chicago district originated on the Chicago, Milwaukee & St. Paul on April 1, following the removal of John Granau, a yard conductor and organizer and president of the Chicago Yardmen's Association. The 700 striking members of this organization on the St. Paul presented the removal of Granau as their main grievance. However, at the same time they filed the following demands:

"The Chicago Yardmen's Association submits to you the following working conditions and rate of pay to govern the Chicago switching district.

"Foreman of all yard and transfer engines, $1 per hour; yard helpers, 95 cents per hour; switch tenders, $5 per day for attending not more than three switches; helpers' rate of pay to apply at 95 cents an hour; time and a half for overtime, Sundays and all legal holidays, and where they are required to work more than eight hours on Sundays or legal holidays double time for all time exceeding eight hours."

Yardmen employed on the Illinois Central, the Chicago & North Western and the Chicago Junction walked out on April 3. Abetted by the blizzard which hit Chicago simultaneously, the walk out for a time completely tied up yard traffic in the Chicago switching district. Afterwards yard employees on the Atchison, Topeka & Santa Fe, the New York, Chicago & St. Louis, the Grand Trunk, the Belt Railway of Chicago, the Indiana Harbor Belt, the Michigan Central and the Pennsylvania left their work in small groups, and on Monday, April 5, approximately 60 per cent of the switchmen employed on the roads involved were on strike.

Conflict Between Brotherhoods

A peculiar situation has arisen as a result of the status of the organization behind the walkout. A large majority of the men on strike are members also of the Brotherhood of Railway Trainmen. When the strike was called, following the dismissal of John Granau, the General Managers Association, representing the railroads involved, went into conference with representatives of the Brotherhood of Railway Trainmen and the Switchmen's Union of North America, of which some of the striking switchmen are also members. These two unions, both national in scope, agreed to stand by their contracts and assist the managers in ending the strike. As a result of this conference, the following statement was issued by the association on April 5:

"Sixty per cent of the switch engines in Chicago are out of service. This has been caused by an outlaw organization which has presented demands for rates of pay that already had been presented to the railroad organizations by the Brotherhood of Railway Trainmen and the Switchmen's Union of North America.

"These demands are being handled by the wage conference at Washington and must, under the transportation act, be concluded before the labor board, yet to be named by the President.

"All the railroads at Chicago have contracts covering yard rates and conditions for switchmen and switch tenders with either the Brotherhood of Railway Trainmen or the Switchmen's Union of North America. The railroads have called the officers of these organizations to live up to and carry out these demands, which the organizations have agreed to do until such time as the wage question now being handled under the transportation act is disposed of by the labor board."

It is evident from the manner in which freight and passenger traffic is being handled in this district that the unauthorized strike would not have affected transportation in the Chicago district seriously had it not been for the effect of the Easter blizzard, which, of itself, demoralized schedules on Easter Sunday, and has, up to the present time, seriously handicapped the movement of traffic. The six inches of snow which accompanied the blizzard was extremely heavy and packed easily, and has, therefore, seriously interfered with switch movements and interlocking.

The strikers claim they have nearly 14,000 men out. This is derided by the officers of the lines involved and officers of the Brotherhood of Railroad Trainmen, who announced after a careful canvass that not more than 2,500 men, switchmen and switchtenders, are participating in the walkout. By replacing some 800 strikers with unionists, they say, the troublesome spots will be relieved and the tieup will begin to unravel itself.

Congestion in the yards by reason of through freight was relieved when freight trains, routed through Chicago, began to pass east and west through other points. Thousands of cars were diverted.

Railroad officers state that the yards are operating at at least 40 per cent efficiency, and, as a matter of fact, the blizzard has been tying things up worse than the strike itself.

Results of the Strike and Storm

As a result of the unauthorized strike and the traffic situation at Chicago, embargoes have been placed by all roads in Chicago upon shipments receivable from other lines and an embargo on all outgoing shipments has been declared by the American Railway Express Company. The situation at the Chicago stock yards has been seriously complicated by the walkout in that the receipts of live stock immediately fell to approximately 20 per cent of normal.

A development in the situation occurred on Tuesday, April 6, when leaders of the Brotherhood of Railway Trainmen and the Switchmen's Union of America entered the fight actively to break the strike by bringing in between 400 and 500 yardmen, all unionists, from outside points. It is expected that by this action the various railroads affected will be operating normally by Saturday, April 10.

Congestion in the Chicago yards has been greatly relieved by detouring freight trains ordinarily routed through Chicago to the east and west through other points.

Power-Limiting and Indicating System of the St. Paul

THE POWER LIMITING and indicating system constitutes a novel feature of the original equipment furnished by the General Electric Company to the Chicago, Milwaukee & St. Paul for the electrification of its Rocky Mountain and Missoula divisions. This system has overcome a number of difficult problems.

Several different schemes were proposed and investigated, such as increasing the frequency of the circuit proportional to the power input, adding electrical impulses of different kinds, etc., but the system which was finally adopted was found to be the simplest, to require the least number of pilot wires, and to necessitate very little apparatus in either the substations or the despatcher's office.

The general requirements specified by the railway were based on its desire to obtain an equipment which, with heavy trains comparatively few in number, would give the highest load-factor consistent with good railroading; and on the part of the Montana Power Company to prevent excessive peaks which might cause serious voltage variations and require the installation of excess generating apparatus to take care of the railway load. The power company was also very desirous of obtaining means by which the total power supplied to the railroad transmission line at a number of different points, over a distance of 220 miles, could be accurately recorded at one place and on one meter; to replace the former practice of having laboriously to add up records of as many as five curve-drawing meters, which are somewhat difficult to synchronize as to time, in order to obtain proper peak load data upon which to base the price of power. It is, therefore, very evident that the accomplishment of these results is of great mutual advantage and benefit to the railway company and the power company.

The 220-mile Rocky Mountain division was selected for the first installation as being the most difficult section due to the five feeding points and the heavy grades with regenerative braking. The apparatus was designed, built, installed, and tried out on service on this section before going ahead with similar equipment for the 220-mile Missoula division which has only two feeding points.

The equipment for the Rocky Mountain division as first installed was based on metering the power at the five feeding points (Two Dot, Josephine, Piedmont, Janney and Morel substations), but was later changed to meter the power at the low-tension side of the motor-generator set step-down transformers. This change was decided upon by the two companies concerned as it was found impossible to prevent the transfer of very large blocks of power from one of the power company's lines to the other lines through the railway company's transmission line at times of switching or line troubles with resultant losses not correctly chargeable to the railway company, added duty to the metering equipment due to the necessity of adding and then subtracting this power, excess meter capacity, etc. The Missoula division with only two feeding points did not have these objections and power for this division is metered on the high-tension side.

The despatcher's office is located at Deer Lodge, Mont., the center of the 440-mile electrification, and all the indicating and recording apparatus for both divisions is installed in the despatcher's office at this point.

The complete system comprises the two separate and distinct functions of limiting the maximum power demand at the will of the train despatcher and of indicating and recording the total net power at all times. The combination of these two functions accomplishes the following results:

(1) Independent of the number of feeding points, it indicates to the train despatcher at all times the total net amount of energy being delivered to his division and it makes a permanent record for future study and as a basis for power bills.

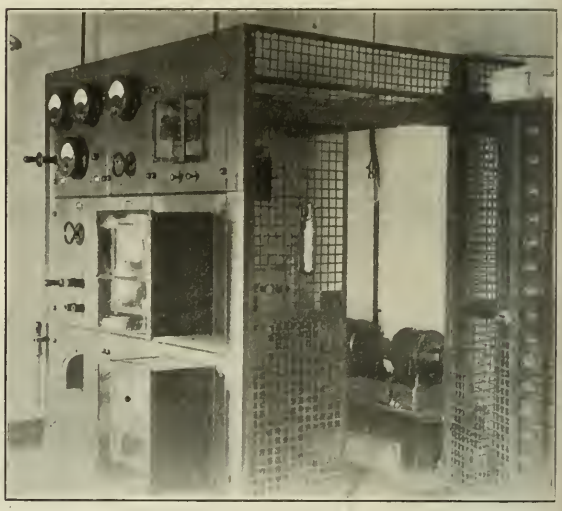
(2) It automatically deducts regenerated power if returned to the power company's lines or transfer of power from one line to another over the railway company's transmission line.

(3) It automatically limits the amount of power supplied to the division by lowering the trolley voltage and slowing down the trains so that the maximum peak load on the system cannot exceed a certain predetermined maximum.

(4) Its maximum limit can be changed instantly, easily, accurately and directly by the despatcher at any time without any necessity of notifying substation operators.

(5) It is capable of reducing the peak power demand by 30 per cent.

(6) If desired, the equipment can be adjusted so that the lightly loaded substations will not be affected, thereby providing the highest possible voltage for the operation of passenger trains.



Power Limiting and Indicating System in the Despatcher's Office, Deer Lodge, Montana

(7) If desired, the equipment can be adjusted to reduce the voltage on the heaviest loaded substations at the time of peak demand (above the maximum limit) slightly in advance of the other stations, thereby tending to equalize the load on all the stations.

(8) If an excessive demand for power occurs near any one substation, the voltage of the nearest substation is automatically lowered without affecting the voltage of the other substations, dividing the load between this substation and the stations on either side.

(9) The total power fed in at any point or transferred from one power line to another or the amount returned due to regeneration can be easily taken care of by a change in the ratio of the current transformers or by an adjustment of the wattmeter rheostats.

Preliminary negotations between the railway company, the power company, and the manufacturer were completed in November, 1915. The equipment was completed and installed for the first division in 1917, and has been in successful operation since that time. The equipment for the second or Missoula division has been installed and is now in operation.

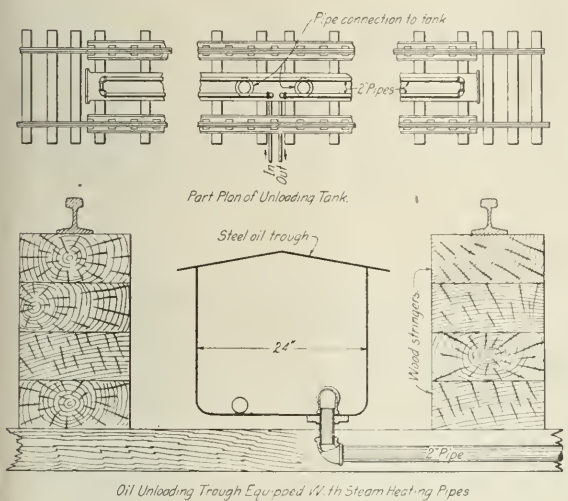
CALAMITY HOWLING never helped a good cause, and that is what the railroads are, no matter whether they be operated by the government or by the private owners.—*Clarksburg (W. Va.) Express.*

Handling Heavy Oils at Locomotive Fuel Stations

Tanks and Pipe Lines Must be Heated to Obtain Necessary Fluidity in Service Installations

By J. L. Starkie
Office Engineer, Gulf, Colorado & Santa Fe, Galveston, Tex.

THE HIGHLY VISCOUS NATURE of the heavy Mexican oil recently introduced as fuel for locomotives on the railroads in the Southwest imposes a problem in the handling of this oil at the fuel stations which is entirely different from that which is encountered in the distribution of the more fluid oils which have been used in the oil producing states of the Southwest for several years. These residue oils which remain after the more valuable fractions have been removed by distillation have a comparatively high gravity and no difficulty is experienced in handling them without the assistance of heat, even at the winter temperatures encountered as far north as central Oklahoma. But the railroads that are using the heavy Mexican fuel oil, even when located geographically so as to avoid extremes of winter, have found it necessary to heat the oil for its transmission from the oil cars to storage tanks and from the storage tanks to the service outlets. This is a problem which embodies a number of interesting phases.



Details of the Unloading Trough and Manner of Heating

Oil produced in the Mexican fields south of Tampico has a very small content of light volatile oils, and is of a low gravity (12 to 17 deg. Baumé). The Tampico fields were developed and are operated extensively by American companies. Since the close of the European war, the possibility of the increased assignment of shipping facilities to the oil traffic and a slackening in the demand for oil for war purposes, has led these producers to seek American markets for their products. Mexican oil played a very important part in the successful conclusion of the war for the United States and her allies, by supplying the American and British navies with fuel at a time when the supply which could be secured from other sources was scant.

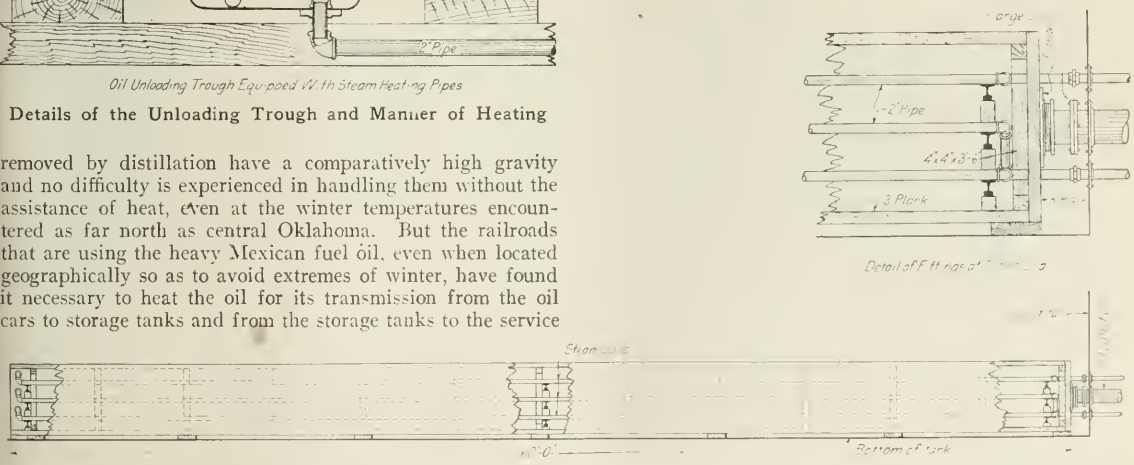
A number of Texas railroads have made contracts with production companies for this heavy Mexican oil for use as locomotive fuel. These lines include the Gulf, Colorado & Santa Fe, the Texas & Pacific and the Missouri, Kansas & Texas. The Southern Pacific Lines, the San Antonio & Arkansas Pass and the Gulf Coast Lines are already users of this kind of oil in their locomotives and were pioneers in installing equipment for heating, handling and distributing it. The other roads mentioned are now engaged in planning and installing facilities on their lines for similar purposes. This work divides itself into two classes:

(1) The construction of entirely new fuel oil facilities required on roads heretofore using coal for locomotive fuel.

(2) The modeling of existing fuel facilities on roads now using light grades of oil for such purposes.

The work on the Santa Fe comes within the second head and a brief description of what is being done on that road follows:

The producing company supplying the Santa Fe has its own storage, docking and loading facilities at Tampico and operates its own tank ships, but as the contract provides for delivery f.o.b. cars at Galveston, it was necessary for the producer to provide dock, storage and loading facilities at that port. These are under construction on harbor front property owned by the Santa Fe and are so far completed that ships are now discharging cargoes and the oil is being delivered to the railroad.



Heater Box Placed Inside Oil Storage Tank So That the Oil Is Heated Only as It Is Withdrawn

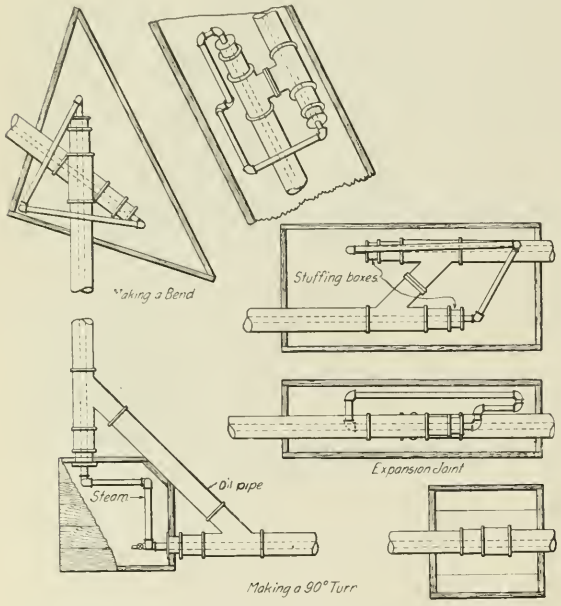
The first feature of the railroad facilities for handling the oil which needed modification in order to substitute the heavier material embodies the facilities for receiving the oil from the tank cars. The Santa Fe's equipment for this con-

sists of unloading tracks accommodating from 5 to 10 cars each, depending upon the importance of the station. The rails of these tracks are set up on several courses of wooden stringers to accommodate a long steel trough which receives the oil directly from the tank cars, this track and trough being sloped slightly towards one end which is connected with an underground receiving tank of about 9,000 gal. capacity. This tank is placed lower than the trough to draw off the oil by gravity as fast as it runs into the trough.

In order to obtain sufficient fluidity to secure prompt emptying of the tank cars, one or more steam cranes are provided at each station for jetting live steam directly into the heavy Mexican oil which, at 65 deg. F., is extremely viscous and of a consistency very much like that of very heavy molasses. From 30 to 40 min. application of a one-inch steam jet, however, is usually sufficient to secure the necessary rate of flow.

To get the desired flow of this oil in the receiving trough, it is necessary to equip it with a double line of two-inch steam pipe extending practically the full length, while to obtain the necessary fluidity in the underground storage tanks so that the oil can be readily pumped out of them into the main storage tank, these underground tanks must also be supplied with coils of two-inch steam pipe.

From the underground receiving tanks the oil is either



How Turns, Bends and Expansion Joints Are Handled When Steam Pipes Are Placed Inside the Oil Pipes

pumped directly to elevated delivery tanks or, at large stations, to 55,000-bbl. circular steel storage tanks. Ordinarily, if the distance is short to the delivery or storage tanks, it is not necessary to apply heat in the connecting pipe line, but where the distance is relatively great, steam lines of small diameter have been provided inside the larger diameter oil lines, which in some cases are being increased from 6-in. or 8-in. pipe, which were found satisfactory in handling the lighter oil, to 8-in. or 12-in pipe.

The construction and maintenance of the oil pipe lines with steam pipe lines inside of them introduces a number of interesting problems, largely because of the necessity for providing adequately for the expansion of the inside and outside pipe lines independently of each other. The manner in which this has been accomplished is shown in one of the drawings.

The 55,000-bbl. storage tanks are equipped with heating arrangements of such a nature that only the oil that is being drawn off is heated. To accomplish this, the storage tank is equipped with a long, horizontal wooden box 4 ft. by 4½ ft. in section, which extends from the side wall of the tank, at the point where the oil outlet pipe is connected, to about the center of the tank. This inner end of the box is open, so that all the oil which leaves the tank through the outlet pipe must flow the length of this box (approximately 60 ft.) before it reaches the outlet pipe, and by equipping this box with a series of coils of two-inch longitudinal steam heating lines the oil is effectively heated by the time it reaches the outlet. The construction of this box and the arrangement of the coils is shown in one of the drawings. The pipe coils and the box are weighted by means of relay rails which also serve as separators for the coils.

As the amount of oil required from the storage tanks varies from time to time and is usually a relatively small quantity as compared with the entire contents of the tank, the use of a box in connection with this coil will permit more rapid and economical heating, since it allows the drawing off of the heated oil in quantities as demanded, without waiting to raise the temperature of a considerable portion of the contents of the large tank, as is the case where open coils only are provided for heating. Small storage tanks, 24 ft. in diameter by 45 ft. high, are planned for the smaller stations, and box heaters 18 ft. long of similar design are to be put in them.

Accident Bulletin No. 72

The Interstate Commerce Commission has issued its quarterly Accident Bulletin No. 72, giving statistics of railroad accidents in the United States in the months of April, May and June, 1919. The total number of persons killed in train accidents in the quarter under review was 77, and the total number of killed and injured on the railroads of the country from all causes was 35,886. The details are shown in the following table, in which the term "Other Persons" includes both trespassers and non-trespassers and "trespassers" includes some employees, this classification being followed in all of the tables. For example, of the 752 trespassers killed in train-service accidents, 44 are classed as employees.

Casualties in Three Months—April, May, June.

	1919		1918	
In Train Accidents.	Killed	Injured	Killed	Injured
Passengers	7	626	79	1,318
Employees	59	460	110	937
Other persons	11	38	26	134
Total	77	1,124	215	2,389
In Train Service Accidents.				
All classes	1,456	9,392	1,828	13,146
Total	1,533	10,516	2,043	15,535
In Non-train Accidents	117	23,720	127	28,184
Grand total	1,650	34,236	2,170	43,719

The bulletin gives the usual summaries of accidents of different kinds and the average number of each kind per million locomotive miles. In the quarter under review there were 1,423 collisions, and 3,432 derailments. The damage to railway property by these and miscellaneous train accidents, amounted to $4,828,830.

Seventeen pages of the bulletin are filled with reports of investigations of train accidents which were completed by the Bureau of Safety during the quarter ending June 30, 1919; eight collisions and eight derailments. These reports contain many illustrations of how not to run trains with safety and some of them make interesting reading, notwithstanding the fact that they are about a year old.

For example, on the Chesapeake & Ohio, near Prince, W. Va., on April 26, 1919, a train of empty passenger cars ran off the track at a derailing switch at the end of double track, the locomotive was overturned, and two employees were killed. The inspector believes that the engineman was misled by lights in a signal cabin which were so arranged that he thought that he had a clear signal indication when in fact the signal was against him. The derailment occurred at about 5:43 a. m. and the signal light is believed to have been quite dim. The report refers to the use of green for the night proceed indication as "standard practice." It does not say that with a green light the derailment would have been prevented, but merely that "it is possible" that it would not have occurred.

The lamp in the distant signal was not burning and the testimony as to the lamp in the home signal seems to be unreliable. The report does not indicate what degree of daylight prevailed at the time of the derailment. The approach to this point was on a curve to the right and the two white lights in the tower could be seen from a point back of the distant signal, whereas the light in the home signal could be seen by an approaching engineman for only a few hundred feet.

The report says nothing about the engineman and it is to be assumed that he was one of the two employees killed.

A butting collision of electric cars on the line of the Union Traction Company of Indiana, near Carmel, Ind., on June 13, 1919, resulting in the death of two passengers, was due to careless handling or misreading of orders received from the train despatcher by telephone and, according to the report, "a contributing cause was the failure to maintain block signals in proper condition." In this case a conductor took a train order by telephone and claimed that after writing "335" as the number of a train which was to be met he changed it to "331" by direction of the despatcher. The motorman to whom he said he explained the change corroborated the conductor's testimony and both men claimed to have repeated the order to the despatcher as changed, yet the despatcher declared that he had made no change or correction of any kind. Another despatcher, off duty, heard the order given, and testified that no corrections were made. The report seems to indicate that orders for meeting points are made without complying with the rule that such orders should be in the same words to both trains.

The conductor at fault appears to have admitted that he had made a blunder and afterwards to have denied making the admissions and the weight of the evidence, according to the report, is that the pencil change in the order was made by the motorman and the conductor, after the collision, in an effort to evade responsibility. As to the automatic block signals it appears that only one maintainer is employed to take care of 122 signals on 99 miles of line. Signals were inoperative so frequently that orders from the despatcher directing trains to disregard them were very frequent, 59 such orders having been issued on the day of this collision. Large numbers were found in the records on other days. Several train orders were discovered on file in the despatcher's office which bore alterations in both serial and train numbers.

A Self-Clearing Hopper Car Built Exclusively for Grain Service

In the construction of freight cars there is apparently a tendency to adapt them to carrying a wide variety of lading. It is therefore interesting to note that the Canadian Pacific has recently built a large capacity hopper car which is designed to handle but one commodity, grain. This car was constructed to determine by actual service test the net advantages to be obtained from a grain-tight self-clearing car of maximum tonnage capacity, as compared to standard box cars of ordinary capacity.

Canadian Pacific 75-Ton Hopper Grain Car

The limiting tonnage adapted as the basis of the design is the maximum capacity of four M. C. B. axles having 6-in. by 11-in. journals. The length was determined by the dis-

tance from center to center of unloading hoppers in the modern elevators at Montreal and West St. John, there being one elevator having hopper centers spaced 48 ft. The height was determined by the actual cubic space required to contain the full load of wheat, plus an allowance of at least 12 in. on top to permit of full load being placed in the car without trimming. To meet this condition it was necessary to make the height at the eaves 13 ft. The width at the eaves is 10 ft. 3 in.

The car is all-steel with the exception of the running board and the ridge on top of the center sill. The general design is practically the same as is commonly used for coal cars of equal capacity, except that this car is built with a steel roof. The roof is provided with three hatch openings on each side of the running board.

The hoppers are arranged four on each side of the center sill. The hopper openings are purposely made relatively small and the frame and slides are machined and carefully fitted. The slides are opened and closed by a rack and pinion arrangement and are locked by means of a sealing pin passing through the slide and hopper frame. The trucks are of the Vulcan type built to U. S. R. A. dimensions. The light weight is 59,700 lb. making the allowable load limit 150,000 lb.

The car having given satisfactory performance on its initial trip between Port McNicoll, Ontario and Montreal, it has been placed in regular service between the same port and West St. John.

Fuel Supervision Pays on the D. & R. G.

During the year 1919 the Denver & Rio Grande in its full bill saved $386,000 and $520,000, respectively, as compared with 1918 and 1917. This saving represents 9½ per cent as compared with 1918 and 12½ per cent as compared with 1917. A definite organization for the purpose of inspection, accounting, handling and conservation of fuel was formed in August, 1918, and a noticeable improvement was effected in fuel performance during the balance of that year. However, not until 1919 was the full value of this organization secured.

The operating and fuel statistics for the years 1919, 1918 and 1917, on which the calculation of the above savings are based, are as follows:

	1919	1918	1917	Saving (tons) 1918	Saving (tons) 1917
Gross ton miles (thousands)	4,066,830	4,647,379	4,873,967		
Tons coal consumed	559,494	711,888	756,992		
Pounds per 1,000 G. T. M.	275.1	306.4	310.6		
Saving 31.3 lb. per 1,000 G. T. M.	.....	.....	.....	63,646	
Saving 35.5 lb. per 1,000 G. T. M.	.....	.....	.....	.....	72,186
Pass. train car miles	19,019,317	16,962,828	20,720,558		
Tons coal consumed	207,758	215,903	277,255		
Lb. per pass. train car mile.	21.8	25.5	26.8		
Saving 3.7 lb. per car mile.	.....	.....	.....	35,185	
Saving 5 lb. per car mile.	.....	.....	.....	.....	47,548
Switching loco. miles	1,749,108	1,882,993	2,109,569		
Tons coal consumed	122,910	135,519	159,226		
Lb. per loco. mile	140 5	143.9	151.0		
Saving 3.4 lb. per eng. mile	.....	.....	.....	2,973	
Saving 10.5 lb. per eng. mile	.....	.....	.....	.....	9,182
Work service loco. miles	326,089	365,580	357,150		
Tons coal consumed	20,716	22,792	23,904		
Lb. per loco. mile	127.1	124.7	133.9		
Loss 2.4 lb. per loco. mile	.....	.....	.....	*391*	
Saving 6.8 lb. per eng. mile	.....	.....	.....	.....	1,109
Total saving 1919 over 1918	.....	.....	.....	101,413	
Total saving 1919 over 1917	.....	.....	.....	.....	130,025
Deduct account of adjustment in charges involving an amount for which credit cannot be taken					4,748
Total net saving 1919 over 1918					96,665

At a cost of $4.00 at the furnace door, the saving for 1919 over 1918 was $386,660, and for 1919 over 1917, $520,100. In addition there was released during the year for revenue purposes, 2,600 cars, or an addition of about 2,600 car days, which, at a minimum value of the per diem rate, represents a saving of $15,600.

The fuel saving is almost entirely the result of increased and constant supervision along the following lines:

(1) Activities of an adequate field force of traveling engineers and firemen, devoting attention to train movements, reporting mechanical defects on locomotives, instructing enginemen and firemen in team work, better locomotive handling, good firing practices and proper schooling of new firemen before entering the service.

(2) Better terminal regulations, such as avoiding firing up engines before required for use, and eliminating the overloading of tanks.

(3) Developing and maintaining interest in fuel conservation by holding monthly meetings and instructions at division terminals.

Fuel consumption was also decreased to some extent by the application of superheaters, table grates, shields on tanks to prevent gang-way losses, and closing the openings in coal racks on tanks to prevent the loss of the fines in mine run coal. Further decreased consumption is anticipated for the future by closer supervision of fuel inspection at the mines and inspection of equipment set at the mines for loading. Another source of saving, the particular value of which was an object lesson in general cleanliness, is the constant attention to the cleaning up of coal scattered under and around coal chutes, shops, and in train yards.

The widely varying operating conditions under which this decrease in fuel consumption was obtained may be illustrated by the variation in ruling grades on this system which run from 0.5 per cent to 7 per cent, and the variation in locomotive capacity which ranges from narrow gage locomotives of 13,000 to 27,500 lb. tractive effort to standard gage locomotives of the Santa Fe and Mallet types with 90,000 and 101,000 lb. tractive effort, respectively. The narrow gage locomotives make 16 per cent of the system locomotive mileage, but handle only 4 per cent of the system tonnage.

During the summer season of 1919, the Denver & Rio Grande stored 145,000 tons of coal. Arrangements were made to have straight mine run coal screened so that eight-inch mine run could be used for current requirements and the lump coal which passed over the eight-inch screen placed in storage. This afforded a very high percentage of lump coal in all storage piles and as a result, when used six months after being placed in storage, very little deterioration had taken place. The stored coal was as good as the average mine run received at the mines, except for a small mixture of snow and dirt picked up in the re-handling from the piles.

The storage coal was almost entirely consumed during the months of November and December, 1919. For November about 40 per cent, and for December about 60 per cent of all coal consumed was storage coal, and even with this large percentage of storage coal a substantial reduction in fuel consumption was secured, amounting approximately to nine per cent and eight per cent, respectively, as compared with November and December, 1918.

No scheme of political appointment has ever yet been devised that will replace competition in its selection of ability and character. Both shipping and railways have today the advantage of many skilled personnel, sifted out in a hard school of competition, and even the government operation of these enterprises is not proving satisfactory. Therefore, the ultimate inefficiency that would arise from the deadening paralysis of bureaucracy has not yet had full opportunity for development. Already we can show that no government under pressure of ever present political or sectional interests can properly conduct the risks of extension and improvement, or can be free from local pressure to conduct unwarranted service in industrial enterprise.—*Herbert Hoover in a New York address.*

Reports of Sections of the Division of Operation

Police; Telegraph; Engineering Tests; Health and Medical Relief; Administration

On January 1, 1919, the Secret Service and Police Section was created in the Division of Operation and W. J. Flynn was appointed chief. Prior to that date the secret service was in the Claims and Property Protection Section, Division of Law, under Mr. Flynn as chief, but on that date it was abolished. On July 1, 1919, Mr. Flynn resigned as chief of the Secret Service and Police Section and R. S. Mitchell was appointed as his successor, and is still chief. This section with 21 inspectors and 10 operatives has been co-operating with the special service and police departments of the railroads in efforts and plans to prevent stealing and pilfering from the carrier and arresting and prosecuting all parties accused of offenses against the carriers.

The following tabulation gives a result of the combined efforts of this section and special service and police departments of the carriers, assisted by city, state and other federal officers from March 26, 1918, to September 30, 1919.

Arrests and Convictions

Arrests for theft	21,681
Employees arrested	8,133
Others (not employees)	13,548
Pending	6,213
Convictions	14,224
Dismissed, paroled and suspended	3,461
Fines imposed	$271,685.41
Approximate value of property stolen above arrests	1,678,638.55
Approximate value of property recovered above arrests	1,322,718.34

The experience gained in this work shows clearly the need of a statute making evidence that the goods alleged to have been stolen from a carrier handling interstate freight prima facie evidence that the stolen goods were interstate shipments. At present proof of the interstate character of freight too often requires bringing many witnesses from distant points for a trial. This is not only expensive but it also operates to prevent prosecution and convictions.

Telegraph Section

The principal subjects engaging the Telegraph Section during the year have been:

(*a*) The use of railroad wires instead of commercial wires was continued and increased, resulting in substantial savings in expense for telegraphing. This result was obtained without leasing any telegraph wires.

(*b*) The supervision of messages actually sent over commercial wires by the Railroad Administration and the railroads, and the making of the most economical arrangements practicable for handling.

(*c*) Efforts to reduce the length and number of telegraphic communications, as contemplated by Circular No. 61 of the director general, were continued with beneficial results.

(*d*) For economic reasons a few additional combinations of telegraph and telephone offices were made.

(*e*) Attention was given to the proper maintenance of the telegraph and telephone facilities of the railroads.

(*f*) A large amount of time was spent and a great deal accomplished by the section in the work of developing telegraph and telephone standards in conjunction with the telegraph and telephone division of the American Railroad Association.

(*g*) A study of the contractual relations between the commercial telegraph companies and the railroads was continued and finished. This study was originally undertaken with a view of obtaining information for use in making a general agreement between the commercial telegraph companies and the railroads. This purpose was finally abandoned. A report of this study has been furnished to the Division of Operation for reference purposes.

(*h*) Certain miscellaneous telegraph and telephone subjects of general benefit to the railroads were considered and given such attention as their importance warranted.

In the above work the telegraph representatives of the different regional directors appointed last year continued to co-operate with and help the Telegraph Service in its work of supervising the telegraph and telephone facilities of the railroads under federal control. A small decrease was made during the year in the organization of the Telegraph Section at Washington. The organization has been under the direction of Martin H. Clapp, manager.

The sending of telegraph messages of the Railroad Administration and the interchange of messages between the different railroads over the wires of the railroads in place of using commercial telegraph wires was continued with gratifying results. It was not thought advisable, under the circumstances, to attempt to organize a complete and comprehensive national railroad telegraph system, as such a system would have necessitated the establishment of telegraph offices and distributing centers and radical rearrangements of wire facilities at different points in the United States. A great deal toward this end proved to be practicable through adapting the existing telegraph offices and wire facilities to provide facilities for the general interchange of telegraph messages between the director general, the regional directors, the federal managers and the different railroads. Additions were made to the telegraph circuits terminating in the telegraph offices of the Railroad Administration at Washington and different points in the regions. Considerable was accomplished in improving the administration circuits obtained last year, most of the circuits used at present being obtained by superimposing the telegraph circuits on existing telephone wires. While the obtaining of these circuits necessitated a considerable amount of planning and installation of apparatus at different points, the total cost was small. A total of 10,672 miles of wire was provided from existing wire facilities of the railroads for the handling of the telegraph messages of the director general and his staff. In addition there were also 10,021 miles of wire used by the different regions and railroads in the interchange of telegraph messages. All these wire facilities were obtained without the leasing of telegraph circuits from the commercial companies. Having in mind that the railroads in this country are not in general oversupplied with telegraph and telephone facilities, it is believed that the results from these existing wire facilities for the use of the Railroad Administration and the railroads without the leasing of commercial circuits is indicative of the caliber of effort made by the Telegraph Section.

During the year there was an increase in the number of messages handled over railroad wires. It is possible only to approximate the amount of this increase. Normally there are at least 150,000,000 messages handled annually on railroad wires. It is estimated that the number of messages handled during 1919 increased approximately 10 per cent as compared with the messages handled during 1918. It is further estimated that a considerable amount of this increase was due to the increased interchange of messages between the different railroads. This increased use of railroad wires is very clearly reflected in the increase in the number of messages handled in the administration telegraph office at Wash-

[1] Preceding articles giving matter from the annual report of the Division of Operation were printed in the *Railway Age* of March 12, page 759, and March 19, page 949.

ington. The increase in this office of the total number of messages handled in 1919 over 1918 is about 150 per cent. Further, about 40 per cent of the messages handled were relay messages; in other words, messages interchanged between the different regions and railroads. As these latter messages otherwise would have been sent over commercial wires, this increase in service secured from the railroad wires meant a considerable saving in expense to the administration and the railroads.

The supervision of the cost of telegraph messages sent over commercial wires was continued during the year and very satisfactory results obtained. This work is closely allied with the work outlined in the preceding section of arranging for the use of railroad wire facilities instead of commercial wire facilities.

In a number of cases of considerable use of commercial wires it was found cheaper to handle the messages over them, due to the fact that it would have been necessary to put on additional help in order to handle them over railroad wires. If, however, the messages could be readily delivered to and received from an existing railroad telegraph office where the average operating cost in general is about five cents per message, there usually was no question as to the most economical plan to follow.

The total amounts of the tolls of the mesages sent by the Railroad Administration for the first eight months of 1918 and 1919, were $431,724.87 and $212,555.29, respectively, the business of August, 1919, being the last month available. These amounts indicate a decrease in the cost of commercial telegraphing of nearly 51 per cent in spite of the fact that the telegraphing of the administration has increased during the year, as has already been shown.

The reduction of the use of commercial wires by the ndividual railroads was a very difficult matter to handle, due to the complicated contract situation between the railroads and the telegraph companies. Of course, in those cases where the railroad company paid full commercial rates for its telegraphing there was no question as to the action to be taken. Where the railroad had a substantial unused free allowance there was also very little question except that the element of service had to be considered. Where the free telegraphing allowance was liable to be exceeded during a contract year and part of the telegraphing charged free and part at half or full rates, the situation had to be considered carefully by the railroad involved.

The following are the general policies that were followed by the Telegraph Section in connection with the use of the wires of the commercial telegraph companies by the Railroad Administration and the different railroads under federal control:

(*a*) Messages to and from the offices of the Railroad Administration, including the regional directors, were, when practicable, handled over railroad wires, the cost of handling being considered.

(*b*) Railroads having no free telegraph allowances sent their messages to other railroads on railroad wires when practicable, cost and relay and delivery service considered.

(*c*) Railroads having unused free telegraph allowances sent their messages to other railroads over commercial telegraph wires, the probable cost of handling these messages on railroad wires and service conditions being taken into consideration.

Efforts during the year were continued to reduce the length and number of telegraphic communications by means of censoring and by the use of the symbol system and traingrams, as contemplated by General Circular No. 61 of the director general. A symbol system was adopted. While no general traingram system was sent out, the railroads having such systems were encouraged to use them. It is believed that considerable was accomplished by the efforts of the section in its endeavor to reduce the length and number of telegraphic communications.

Attention was given to the maintenance of the telegraph and telephone wires and apparatus of the railroads with a view of maintaining the plants up to their previous standards.

On January 10 the director general issued General Circular No. 70, stating that the scope of the American Railway Association had been enlarged and its name changed to the American Railroad Association, and that it would cover during the period of federal control of the railroads the former activities of a number of the railroad associations, the Association of Railway Telegraph Superintendents, in which the Telegraph Section is primarily interested, being one of the associations included. The Association of Railway Telegraph Superintendents, in compliance with this circular, arranged to transfer its activities to the telegraph and telephone division of the American Railroad Association and the manager of the Telegraph Section of the administration was elected chairman of the newly created division. In this position and with view of carrying out the general plan contemplated by Circular No. 70, it was arranged as far as practicable to work out and develop practically all of the telegraph and telephone standards necessary through the Telegraph and Telephone Division.

Recommendations.

(*a*) More attention should be given to the maintenance and betterment of telegraph pole lines and wires.

(*b*) The work begun in connection with the telegraph and telephone standards should be continued by the telegraph and telephone division of the American Railroad Association.

(*c*) The railroads should make greater use of telephone facilities.

(*d*) The organizations of the telegraph departments of railroads should be given attention with view of making them more uniform and complete.

(*e*) There are certain subjects mentioned in this report which have been considered either completely or in part by this section which should be referred to the telegraph and telephone division of the American Railroad Association for its consideration and possible use in its future work.

Inspection and Test Section

The Inspection and Test Section has been continuously under the direction of C. B. Young, manager.

The section has been engaged since its establishment, primarily in inspecting materials entering into the construction of 100,000 freight cars and 1,930 locomotives, as well as supervising the construction of this equipment. Starting with material in its raw condition, as plain iron or timber, the section has given detailed attention to its manufacture, fabrication, and final evolution into freight cars and locomotives, which the committee on design believe to be the highest types now in the service of the public. On January 1, 1919, 12,680 cars and 743 locomotives on the general contract had been finished, and during the year 1919, 77,520 cars and 1,138 locomotives were constructed. The work has been under way at 28-car building plants and 8-locomotive building plants. The materials entering into the construction of this equipment have been manufactured in all parts of the country from Laconia, N. H., on the east to Portland, Ore., on the west; from Milwaukee, Wis., on the north to Knoxville, Tenn., on the south. To handle this enormous inspection of material and construction it was necessary to enlist the services of both the scientific forces and the practical expert mechanics of a large number of railroads, over 700 men lending their aid to the section during the time of greatest activity. The central office in Washington organized to direct inspection and inspection forces consisted of 44 employees as a maximum.

In addition to the work outlined above, various other activities were taken care of by the section.

The following specifications for material have been written:

Adapted to United States Railroad Administration work from the standards of various technical societies	45
Written new from various data already available or secured for the purpose	21
Tentative requirements for various articles issued for temporary use	3
Presidential committee specifications for illuminating oils and gasoline, reprinted for Railroad Administration use	5
Total specifications issued	74

The section has organized a committee of railroad chemists, which has formulated tentative specifications for 11 kinds of lubricating oils (in addition to those included above) for use on cars, locomotives, and shop machinery.

The section has also co-operated extensively in the work of the interdepartmental committee for the standardization of paint specifications. This committee has in hand the writing of specifications for various painting materials, which can be used by all departments of the government. Uniform specifications help toward more ready purchasing and lower prices.

It has taken a very active part in the beginning of what will be an important investigation in connection with the steel industry as related to the railroads, this being a study of the effect of impurities, especially sulphur, on the safety and service value of steel. The constant tendency is toward higher percentages of impurities, due to the depreciation in quality of raw materials.

In conjunction with the Bureau of Standards, the Inspection and Test Section has under investigation a very important line of work in the investigation of cast iron, which it is anticipated will shed new light on this subject and will be very helpful to the railroads of the country in the future, as it will enable a specification for locomotive parts to be made up with greater knowledge than has heretofore been available.

With respect to volume, the largest work of the material division of the section has been the inspection and testing of the material for the locomotives and cars purchased by the administration.

A test of various devices commonly used by railroads is under way, including the following:

Draft-Gear Tests. These tests include an extensive investigation into the action of new draft gears, together with such information of a reliable character as can be assembled on gears that have been in service.

There are 59 gears representing 18 different types in the test, and these gears are being carefully studied under such laboratory tests as the 9,000-pound drop, the compression machine, and rivet shearing tests. Their actions in actual service have also been studied and recorded by means of the car-impact plant of the T. H. Symington Company, at Rochester, N. Y.

The gathering of data in this test will shortly be completed and the extensive report is in the process of preparation and should be completed during the next few weeks.

All of the test work on draft gears is being done directly by the force of this section.

Power Reverse-Gear Tests. In this test we are making an exhaustive study of nine reverse gears, these representing all of the present commercial devices of this character. The test is well under way, but can not be completed for at least one year on account of the necessity of one year of service for each of the gears.

The results of these tests will not only demonstrate the merits and demerits of each of the reverse gears tested, but will also provide complete information for future designs and specifications.

The larger part of the test work on reverse gears is being done by the force of the Norfolk & Western Railway, and is under the joint supervision of the engineer of tests of that road and the engineering staff of this section.

Pneumatic Fire Doors. This test is just being started on the Erie Railroad, and the program includes a complete study of fire-door action and a complete comparison of the various fire doors now on the market. There will be included in the test two each of four different doors, which represent all of the pneumatic doors offered for test.

This test also includes one year's service on locomotives, hence the complete report will not be available until at least one year from date.

This test work is being done by the force of the Erie Railroad, and is under the joint supervision of the engineer of tests of that road and the engineering staff of this section.

Locomotive Headlight Generator. This test is being started and the program includes complete headlight generators, and from the results of which it will be possible to write a specification as to requirements in this regard. From the results of the test it also will be possible to compare the merits and demerits of the various machines and to set a standard for future design. This test work is being done by the force of the Pennsylvania Railroad, and is under the supervision of the staff of this section working with the Pennsylvania Railroad forces. The importance of an impartial determination of the preferable draft gear and of locomotive headlight generators needs no comment. It is apparent that standards in these particular devices can be used by roads generally without incurring the disadvantages which sometimes come in other lines from attempting to apply standards of a rigid nature to physical conditions which vary and thereby forbid rigidity in their successful solution.

The section has also looked after the historical records of all of the cars and locomotives purchased by the administration and is sending out from time to time to the purchasing railroads the details of all specialties, devices, and standard parts entering into their construction, accurately listed, in order that such railroads may have full information concerning the construction of their equipment.

The section has also handled or is handling certain matters of less importance, which it is believed are for the general good. Its information has also been of service to certain roads which have not, through their own organization, been able to determine the preferable practice.

Committee on Health and Medical Relief

The committee established an office in Washington, D. C., but was unable to begin active work before the latter part of November, 1918, due to the prevalence of influenza over the country, the members of the committee being engaged in the work of combating this terrible scourge.

Since November 22, 1918, the committee has held frequent meetings; has had referred to it through the Bureau for Suggestions and Complaints a large number of complaints received from the general public concerning the unsanitary condition of stations, car shops, and toilets; this gave an excellent opportunity to investigate the conditions which patrons of railroads complained of and we were able in many instances to suggest a remedy; also handled a number of health conditions that confronted the Railroad Administration to a satisfactory conclusion; and reported from time to time upon questions submitted to it by the Railroad Administration.

In order to familiarize itself with railroad conditions in so far as they applied, the committee made surveys through questionnaires sent to all railroads under federal control, and inspected railroad sanitary and health conditions in 32 states. Upon knowledge gained during these inspections and data procured through questionnaires the committee has based its recommendations.

The committee recognizes that probably its best service is along the line of preventive medicine and preventive surg-

ery; it offers opportunity not only for humanitarian effort, but will make possible greater efficiency and lessened cost in operation. Typhoid fever, smallpox, malaria, and hookworm are preventable from a practical standpoint; in fact, the continuation of these diseases should not be tolerated. Reconstruction surgery is in its infancy, opening up a great field for research and betterment in the care of the injured.

The medical and surgical departments connected with railroads offer unusual opportunity for the dissemination of information on these several subjects.

The following recommendations of the Committee on Health and Medical Relief have been submitted to the director, Division of Operation, and have been approved as recommendatory practice and ordered printed and distributed:

Railway Sanitary Code.

General and departmental rules governing physical examination of applicants for employment, promotion, and periodic examination in order to determine their fitness for service.

Recommendations concerning control of malarial fever.

Recommendations covering separation of claims and surgical departments.

Recommendations covering privilege of trip transportation for local surgeons to attend medical and surgical meetings and clinics.

Survey of inspection of rest houses, with recommendations.

Recommendations regarding practice of laymen being used to make vision, hearing and color examinations.

Model first aid kit, with directions for its use and maintenance and estimate of cost.

Dr. D. Z. Dunott has been in charge of the Section of Health and Medical Relief since its organization.

Labor Assistant

The labor assistant to the director of the Division of Operation acts as adviser to the director on labor questions involving submissions to the Board of Railroad Wages and Working Conditions and reports therefrom as differentiated from the assistant to the director of the Division of Operation who deals with labor problems not involving submission to the Board of Railroad Wages and Working Conditions. The labor assistant, also in conjunction with officers of the Division of Labor, advises the director general on general labor matters.

During the period from January 1, 1919, to December 1, 1919, there were received through the director general's office for review and analysis the following submissions of the Board of Railroad Wages and Working Conditions:

Interpretations	98
Recommendations	75
Miscellaneous dockets	31
Total	204

The interpretations submitted by the wage board are for the purpose of clarifying the language of the supplement and to definitely state the intent of the rules contained therein.

The recommendations are broader in scope in that they cover rates, hours of service, and working conditions for the classes of employees involved. In many cases exhaustive hearings are held by the Board of Railroad Wages and Working Conditions, and on the testimony given at such hearings the board formulates the recommendations. These recommendations are both general and local in character. The general recommendations cover classes of employees on all railroads in federal operation; also the American Railway Express and the Pullman Car Lines. The local recommendations cover individual classes, such as harbor craft, car ferries, longshoremen and dock workers, whose conditions of service are governed by local requirements that demand special treatment. The general recommendations are printed and distributed as wage orders; the local recommendations are not printed, but instead the interested parties are notified by letter.

The submission of the Board of Railroad Wages and Working Conditions, as well as other labor questions arising, are reviewed and passed on jointly by the labor assistant of the Division of Operations and an assistant of the Division of Labor. As the various questions involve all classes of railroad, marine, Pullman and express employees, the majority of the time of the labor assistant is taken up with conferences.

J. G. Walber has acted as labor assistant since January 15, 1919, when the position was given this definite title.

Assistant to Director

The assistant to director, Division of Operation, is charged with the duty of reviewing all matters in dispute between managers and employees, presented in writing to the director, Division of Labor, and, in conjunction with representatives of the latter, to give direction for final disposition.

It is also his duty to represent the Division of Operation in deciding upon the merits of questions in dispute between managers and employees, which may not properly be transmitted to the Board of Railroad Wages and Working Conditions, or Railway Boards of Adjustment Nos. 1, 2 and 3 for decisions, and to hear such cases when oral testimony is offered, and to confer and communicate with railroad representatives and organization executives, and to conduct special investigations and perform such other duties as may be required by the director.

C. S. Lake has been assistant to director in charge of this work throughout the year. E. C. Manson has been associated with Mr. Lake in this work.

The report of the Division of Operation also includes the following:

Unnecessary Competitive Passenger Service

Prior to federal control very extensive and wasteful passenger-train service was maintained, for competitive reasons, between many of the large cities of the country. Under federal control and as a war measure it was found practicable to reduce the number of such trains materially, while at the same time distributing those retained over such hours of departure as to actually improve the service between the cities concerned. It is to be hoped that here also, when the railroads are again in private operation, a leaf may be taken from the experience of the Railroad Administration and very careful consideration be given to any proposals for the restoration of passenger-train service to see that the service asked for can be justified as reasonable.

The French Railway Strike. Troops Guarding a Bridge

The Relation of the Public to the Railroads*

The Duties of Organizations and Individuals to the Carriers Outlined and Explained

By Charles A. Prouty
Director of Valuation, Interstate Commerce Commission.

IT HAS ALSO COME to be universally admitted that the business of transportation by rail is of such underlying importance that the government itself must either provide this transportation, or see that it is provided by private capital under proper governmental supervision. In this country, in response to an overwhelming public sentiment, the railroads returned to private operation on March 1. I believe that conditions today are much more favorable to private operation than they have been in the last quarter of a century. Let me indicate some of the particulars in which *today* differs from the pre-war period.

First. The Interstate Commerce Commission is for the first time invested with the authority, and expressly directed by the statute, to protect and assist the carrier. In the past the principal function of the Commission has been to protect the public against the carrier, and such a protection, looking at the matter from the historic standpoint, was necessarily the case.

The present bill, which is the first piece of really constructive legislation since the Interstate Commerce Act itself, makes it the duty of the Commission to see that a fair value is placed upon the property which is devoted to the public use, and that sufficient rates are established to yield a suitable return upon that property. It gives the Commission power to protect carriers themselves from unreasonable competition with one another, to open up terminals, to distribute equipment, and, in short, to see to it that the whole transportation machine is conducted in the best interest of the public but always with an eye to the fair interest of the owner.

Second. The government has for the first time extended substantial financial assistance to our carriers while under private control. This has been done not only by way of the guaranty covering the first six months while carriers are readjusting their rates and operating conditions, which is only a measure of simple justice, but in addition, by the appropriation of $300,000,000 to be extended under the direction of the Commission in providing adequate transportation facilities. This sum, of course, represents but a very small part of the total expenditure which will be necessary to provide such facilities, but it will enable the weaker roads which can not at this time finance themselves, to furnish their portion of such additions.

Third. For the last quarter of a century our railroads have been operated under a continuous increase in the cost of operation, particularly in the cost of labor.

For the next dozen years at least, the exact reverse is likely to be true. I do not apprehend any considerable decline, either in wages or in the price of materials for the next year, but it does seem altogether probable that present costs are abnormal and that the future will see a gradual decline. This from the financial standpoint is a factor of extreme importance.

Fourth. The attitude of the public toward our railroads has entirely changed. It has come to be understood that the railroad is a public servant absolutely dependent upon the will of the public for its existence. It has finally come to be appreciated that this servant can not render a proper service unless it is properly housed, and fed, and clothed. The public as a whole is prepared to submit to whatever may be necessary to secure to this servant fair treatment.

These are the four conditions which occur to me as being the principal respects in which the future is likely to be more favorable to private operation than the past, and of these four infinitely the most important is the last. It is this change of heart upon the part of the public which has produced the change in the Act to Regulate Commerce and which has appropriated money from the public treasury in aid of our carriers. Public opinion will dominate future legislation and will produce a most active impression upon the administration of this day by the Interstate Commerce Commission.

The success of private ownership depends upon the attitude of the public and it behooves, not only every great body like the Chicago Association of Commerce, but every individual member of that body, to inquire what it, as an organization, and what he, as an individual, can do to help on to success the efforts of our railroads.

Duties of the Public to the Carriers

In what way can the public contribute to make private operation a success? What is the duty of the public to the carrier at this time when we are entering upon a final test of private operation? You who are the members of this association can approach the discharge of that duty from two standpoints:

First. You can act as an organization. You should first of all get into touch with the situation from the viewpoint of the carrier as well as your own. You can employ expert assistants who will up to a certain point advise you, but beyond that, the members of the association must stand responsible themselves.

Second. Even more important than the action of your association as a body is the attitude and the conduct of the individual member. You gentlemen are interested in particular rates and in particular service. Now apply to your demands for that rate and for that service the same rule of fairness and of equity which you as an association enjoin upon others. Ask nothing, take nothing other than you would approve in the case of your competitors.

Adequate Rates a Necessity

Having in mind now the fact that you gentlemen are to act through your association in part, and in part as individuals, what are the things for which you ought at this time to strive as good citizens in the public interest.

1. Your first and most important duty is to see that these carriers are allowed adequate rates.

The railroad industry is the greatest of all private industries, except agriculture, and yet, the private capital which is invested in it has no final control of where or how the railroad shall be built, nor of the way it shall be equipped or operated, nor can it determine a single charge which it shall make for the performance of its service.

The first requisite to the economical performance of a railroad is an adequate plant. Without proper facilities, a suitable road, adequate equipment, the service which you require can not be economically performed. Today, it seems to be admitted on all sides that very large sums must be expended at once in producing this plant. Now, I do not for one mo-

*Abstract of an address before the Chicago Association of Commerce at Chicago, April 7, 1920.

ment suggest that the rates to be allowed should be sufficient to provide for these additions. I have long believed that to keep these properties good in fact, the carrier should be allowed to earn and put into its property some comparatively small amount each year which should not be capitalized and should not be made the basis for increased earnings, but for the most part these additions and betterments must be provided out of money to be borrowed. The rate of interest at which these funds can be provided becomes a charge upon the property and, therefore, finally a charge upon the public. Unless, therefore, carriers can obtain this money, finally, at a figure approximating that which the government would pay, the public will not permanently consent to bear this additional expense.

The rate of interest at which money can be borrowed depends upon the confidence of the investing public. Just in proportion as the lender is certain that his loan will be repaid, will he accept a low rate. Today, railroad securities are not in favor and they will not be until the investing public is again convinced that a railroad promise to pay is absolutely good. This never can come to pass so long as our railroads are merely earning for the present 6 per cent upon their value. There must be some assurance for the future. The attitude of the government must be clearly defined. There must be above all some surplus fund upon which carriers may rely in a period of adversity.

Now, the intention of this bill was to provide exactly that safeguard. Nothing could improve railroad credit like a liberal attitude upon the part of the Commission which would enable carriers to accumulate something substantial for the first year or two in addition to their bare necessities. I believe, therefore, that if you desire to make private operation a success, your first thought should be to secure to carriers rates which are too high rather than too low. Congress has fixed the limit and that requirement must be observed, but in the administration of this law there is a wide range of judgment, a broad twilight zone, and my feeling is that the Commission should be encouraged by shippers to incline within this sphere of doubt toward a liberal allowance.

Personally, I have no doubt that this will result in the application of higher rates under private than would have been necessary under government ownership; but the question is not of the immediate present. We are inquiring whether in the long run private operation, or government operation, is the better. Most of us believe that private operation will be found more efficient than public, but this can not be accomplished unless a proper credit can be established and proper facilities provided. You believe that private operation will provide a better service than public, and if so, it may be better in the long run to pay a somewhat higher rate for the service.

Service Demands

2. Do not become impatient; at least do not talk.

Our railroads are resuming private operation under adverse circumstances. For over two years they have been deprived of the use of their property. Their organizations have been disrupted; their traffic has been diverted. New methods are in vogue, many of which are an improvement and will be retained, but a certain amount of friction and of inefficiency always accompanies a new thing. Time will be required for this new transportation machine to wear down its bearings.

The ordinary member of the public knows very little as to the adequacy with which railroads are handling their business. His information and that of the press comes largely from people like yourselves. If you criticize and publish every failure to give satisfaction, the opinion will speedily become current that our carriers have failed and public attention will once more be turned to the government for adequate service. You can be of the greatest assistance to carriers in these earlier days if you will overlook and excuse until it becomes apparent that the condition of inefficiency is permanent.

Restoration of Competition

3. Previous to government control there was in certain sections active competition between railroads. That competition produced a high class of service but resulted in unnecessary waste of transportation effort. Under the government this wasteful competition was cut out. Now one of the most essential duties of the shipper is not to demand a restoration of these former facilities, unless in the general interest they ought to be restored.

The Government Guarantee

Much is said about the guarantee which this bill gives to our railroads, but except for the first six months there is no guarantee. The law provides that rates shall be established which will yield to railroad property, as a whole, five and a half per cent upon its rate-making value for the next two years. After that, the percentage is left to the judgment of the Commission. The carrier may be permitted to earn an additional one-half of one per cent which must go into the property without being capitalized, or made the basis for an increase in rate-making value. Will any sane person contend that for the next two years six per cent is too great a return?

Let me illustrate my meaning by a reference to the past. Carriers are claiming that in determining the aggregate value upon which this rate shall be allowed the investment account should be taken. Assume for a moment that the investment account measures the value of these properties upon which this return is to be computed.

The preliminary report of the Interstate Commerce Commission for the year ending December 31, 1918, gives the investment account of Class I roads on common carrier property at something less than $15,000,000,000. The so-called "test period" covered the three years ending June 30, 1917. The average investment account of Class I roads during that period could not have exceeded $14,500,000,000. Six per cent upon that amount would be $870,000,000, which is something less than the standard return. If the rates of our carriers had been so adjusted as to yield the maximum earnings permitted by this law during the test period, they would have been not higher, but slightly lower than they were in fact.

This plan does not increase transportation charges. It should in the long run diminish them. It does more fairly distribute the earnings of our carriers. It infuses into the financial condition of those carriers the element of certainty which is the foundation of all credit. It affords a reservoir into which surplus earnings may be poured in good years and out of which something may be drawn in poor years. It provides in a measure at least for those permanent additions to the property which do not add materially to its earning capacity and should maintain the property as a whole.

Looking to the more distant future, your duty will be if private operation continues, to see to it that rates are not too high. If the private owners of this public property can not render an adequate service for as little compensation as that service can be provided by the public, then the properties will pass to government operation. You gentlemen might not favor this even in that event, but a majority of the voters of this country will.

I am addressing what I say to the present exigency. We have just emerged from the most destructive war of the ages. All business and economic conditions have been upset. The owners of those properties renew their operation under the most disadvantageous circumstances. This being so, private operation can not be given a fair chance unless the public is prepared to treat its railroads during this critical period with all the liberality which the law allows.

The First Meeting of the Institute of Transport

Sir Eric Geddes, Minister of Transport, in Presidential Address, Discusses English Problems

THE FIRST MEETING of the Institute of Transport which has recently been formed in England was held on March 22, and Sir Eric Geddes, Minister of Transport, the first president of the Institute, presented his inaugural address. The formation of this Institute has been previously noted in these columns and the membership at the time of the meeting was approximately 350 members and associated members.

Sir Eric Geddes chose as his subject "Transport in Relation to the State." He laid particular stress on the fact that under the changed conditions it is impossible for any of the transport agencies of the country to live under their pre-war revenue. He strongly advocated greater unification of existing lines with more government control and less

Sir Eric Geddes, Minister of Transport and President of the Institute of Transport

drastic competition. He believes the state should have power to reduce operating costs in every possible way and that full and detailed statistics should be made public in order that the public may have a more accurate idea of the problems of the nation's railways. Throughout his address he hinted strongly of drastic measures that should be taken regarding greater standardization and hinted that there is much to be done in the matter of electrification of the English railroads. The following is an abstract of his Presidential address:

Sir Eric Geddes' Address

In commenting on the "chaos" which the politicians claim exists on the English railroads today, Sir Eric said that the transport facilities of Great Britain are well on their way to beating their 1913 record, which was the highest possible standard. "In the Port of London," he said, "where the so-called chaos is worse, those engaged in transport may congratulate themselves on exceeding both in imports as well as exports the 1913 records."

Never before in the history of the country has the public so fully comprehended its position and dependence upon transport as at the present time. The war was the reason for this, for it was at that time that the public realized how important an adequate transportation system was to them. "In spite of the fact that the railway property was owned in this country by the small investor and despite the fact that the return on capital had always been a modest one, generally speaking, the railways," he said, "had figured in the minds of the people as a bloated capitalist organization, an object not of sympathy but of suspicion and of jealousy."

In commenting on the private control of railways in both England and the United States, he said, "that as soon as the railways grew out of their elementary state and were no longer considered as merely turnpikes or public highways, competition between the railway companies was used as a means of securing adequate public service and legislation, gradually followed to correct the evils accompanying it. Even before the war," he said, "this system was breaking down and the idea of unbridled competition was giving place to an idea of regulated monopoly. It was gradually becoming recognized that state control had to be administered rather than legislative and judicial."

In commenting on America's recent action of turning the roads back to their private owners on March 1, he said: "The United States unhampered as we were with an agreement to retain control of the railways and guarantee their net revenue for two years after the conclusion of the war—have said to the companies: 'We will enable you to earn a living wage on your capital and we will adjust rates in order to enable you to do that, but in return we propose to see that you are operating in the best interests of the community and to give you certain orders as to what from time to time a competent body decides you must do."

In commenting on what other nations have done in an endeavor to improve the railway situation, he called attention to the fact that from April 1, all the German railways will be unified under a single federal system; that in France arrangements are being considered for the increase of governmental control; that in Canada, with the exception of the Canadian Pacific, the railways are under the jurisdiction of the Canadian government as the sole shareholder because the companies had been unable to carry the burden the government encouraged them to assume; that in Belgium and Switzerland, state railways were formed to prevent foreign capital obtaining control of them; that in Italy the state took control of the railways in order to get away from the entanglement of badly drawn leases; that in Japan, state ownership came about in order to terminate concessions to the private companies which prevented a reduction of rates; that in Australasia and, in the early days, in East Prussia because the railways were necessary and private capital could not build them, and that in Germany, in 1870, in Russia and in North West India, the state took over the railways primarily for military reasons. In other words, no country had ever adopted governmental ownership for theoretical reasons.

It was not the purpose of Sir Eric to enter upon a dis-

cussion for or against state ownership but he merely desired to point out what had been done, and call attention particularly to the fact that after two years of experience in governmental operation of the railways of the United States, it was almost unanimously decided, in that country, to return the roads to private management and that with the new law passed in that country the relation between the government and the companies has been strengthened and improved.

In commenting on the conditions in England, he said, that while this country was the first to develop modern transport it had been the last to recognize the intimacy of the relation between the transport agencies and the public welfare.

In commenting on the new arrangements that must now exist between the railways and the public on account of the altered conditions, he called attention to the fact that it is absolutely necessary for all modes of transport to increase their earnings if they are to provide adequate means of transportation for the nation and that it is impossible for them to exist under their pre-war charges. "Wherever there were statutory undertakings, whether in the hands of companies or public authorities" he said, "the position was this: The state authorized the undertakers to embark upon the provision of certain facilities for the public benefit and gave them statutory rights to enable them to provide these facilities, but imposed a condition that certain charges were not to be exceeded in the interest of the community and that the monopoly or comparative monopoly should not be used to exploit unduly the public dependence upon transports. Now we must admit that these maximum charges will not be sufficient to enable undertakings to operate and exist as a healthy part of the social and industrial structure of the country." In other words, the transport facilities must be able to raise money and money cannot be raised unless it can earn its keep.

Sir Eric went on to ask that if the community agrees to alter one side of the bargain in favor of the operators, is it not also entitled to say: "Let us review also the other side of the bargain for their is no reason why it should only be altered in one direction. The burdens of taxation and cost of living are high. We cannot afford to be as generous as perhaps we would wish to be and we must see whether there are no means by which we can reduce the cost of transport by alteration of the system." And in this regard he pointed out as illustrations, the fact that at the present time greater economy can be obtained in transport if the locks on the through routes of canals are made of the same dimensions, and that economy can be obtained by the use of large freight cars on railways only if the authorities conform to the highest or most modern standard. And again that larger cars or faster trains cannot be operated because of certain companies refusing to conform to a standard brake or a standard loading gage. As the community agrees on its part to permit the transport facilities to increase their rates it should on the other hand have the powers to alter this state of affairs.

Sir Eric also pointed out that under the new conditions and with the public permitting the transport facilities to increase their rates, they are entitled to know more about what these transport facilities actually accomplish and should be provided with statistical information in sufficient detail to enable them to determine whether or not this money they are giving in the form of additional rates and fares is being used to the best advantage.

As regards labor, he said: "Has not the community the right to say: 'Experience of labor questions has shown us that it is no longer possible to go on with the pre-war system of railway companies fighting out their fights with labor to the disaster of the community.'" In all these matters said Sir Eric, and in others, the community has the right to say that it must be considered. Without sufficient available statistical information, suspicion—which is bred throughout the world and throughout all classes of society and in all ages through ignorance—will never be dispelled.

In commenting upon what great quantities of capital had been wasted in the early days of the railways, due to the fact that there was no concerted action between them, he called attention to the "battle of gages" and referred to the present question of a lack of uniformity in air brakes as analogous to the gage situation in the old days. Furthermore, he said, the English railways are now on the eve of great extensions of the application of electricity to railway traction and there is need of determining between the standard use of alternating and direct current.

In conclusion Sir Eric called attention to the fact that the state must harmonize the operation of the different transport agencies as between themselves and in the interest of the community as a whole. There must be constant conferences and co-operation both between the various agencies and between these agencies as a whole and the Ministry of Transport as a representative of the community which it serves. "We must all realize," he said, "that as the community pays and gives to the various transport agencies the statutory protection and rights which they enjoy, it is entitled to have a say as to the services performed, as to the charges levied, as to the smooth running of the industry and that with this object it is entitled to accurate, comparative statistics and figures which will enable it to judge with intelligent certainty the work of those by whose skill and devotion it profits, and for whose mistakes it pays."

Commission On Car Service

Reports received by the Commission on Car Service of unfilled requisitions for freight cars as of March 15 show an improvement over previous reports, indicating that the peak of the car shortage has been passed for the time being at least. As of that date the United States roads show an aggregate average daily shortage of approximately 80,000 cars, about evenly divided between box cars and all others. A few weeks ago the average was about 90,000. The box car shortage was felt mostly in eastern territory and in the northwest, with some scattering shortages in the southeast and central west. There continues a shortage of automobile cars in the automobile loading territory of Michigan, Ohio and Indiana, and also a shortage of coal cars, particularly in Pennsylvania, Ohio, Illinois and West Virginia.

Reports for March 15 received by the Commission on Car Service indicate that some progress is being made in the direction of getting freight cars returned to their "home" lines, which is the purpose of the new car service rules that went into effect on March 1, although the rules are being applied with discretion to avoid unnecessary empty movement and to give service the first consideration. On March 1 the percentage of cars on the rails of the owning roads was at the lowest point that had been reached in two years, 22.2 per cent or about half of the normal percentage. While the gain is slight it would seem to indicate that there may be a continued improvement, which is particularly gratifying in the face of a heavy traffic requirement. The gain is most noticeable in coal cars. Box cars and flat cars show little change but there has been a slight gain as to box cars.

The Commission on Car Service has been devoting special efforts to getting a relocation of the coal cars which found their way into the western territory at the time of the coal strike, and which have been very slow in returning to the coal loading roads. For the first 15-day period of March the reports indicate that the western roads turned several thousand cars in the direction of coal loading territory. While the reports up to that date indicated that no gain had been made in New England and some of the other

eastern territory which was in serious condition because of the weather, the daily movement records since the 15th have indicated that the April 1 figures will show a perceptible improvement, coal loading roads thereby benefiting.

Railroads in the Eastern region on March 15 had freight cars on their lines amounting to 106.2 per cent of their ownership, according to the semi-monthly bulletin compiled by the Commission on Car Service. Group A, which includes the New England roads, had 136.8 per cent. The Allegheny region had 92.9 per cent, the Pocahontas region 62.4 per cent, the Southern region 95.8 per cent, the North Western region 104.1 per cent, the Central Western region 97.1 per cent, and the South Western region 103 per cent, while the Canadian roads had 133.1 per cent.

The bulletin also gives the following summary of general conditions as of March 30:

Box Cars—Demands continue heavy in all sections, which emphasizes the importance of all roads giving prompt movement this class of equipment, loaded and empty. The requirements for the movement of building materials are steadily increasing. The fertilizer movement is now at its peak, and there will be a continued heavy movement for approximately three weeks. Florida vegetable and fruit movement, requiring ventilated cars, at the present time is very heavy. Beginning about April 10, requirements in the Texas territory for ventilated equipment will be heavy. Roads holding ventilated equipment of Southwestern roads ownership, should expedite the movement to owners in accordance with Car Service Rules.

Automobile Cars—The accumulation of shipments in producing territories, due to shortage of cars is increasing rather than decreasing, notwithstanding the fact all manufacturers are taking advantage of drive-aways to fullest possible extent. It is essential Commission on Car Service Circular Six be complied with to secure the maximum efficiency from this class of equipment.

Flat Cars—Demand greater than supply of available cars, and to relieve shortages, special action should be taken to avoid undue detention to this class of equipment.

Stock Cars—Demand at all market centers continues heavy, and will increase with the spring and summer movement. Action should be taken to see that cars are properly conditioned that requirements during the coming season will be adequately protected.

Open Cars—During the last half of March the car supply at bituminous coal mines is reflected by the very satisfactory upward trend which production has taken. Considerable improvement has been noted in the car supply at steel mills in the Pittsburgh-Youngstown District. All railroads are putting forth extraordinary efforts in order that the amount of piled steel may be reduced to normal. Car requirements of stone, sand and gravel are increasing as these commodities are now moving in greater volume for road construction purposes.

Refrigerator Cars—Refrigerator situation getting more serious account slow compliance with our movement orders: Maine situation being fairly met with. Northwest supply some better; Florida about the same but Southwest extremely critical. Orders issued March 23 restricting use of refrigerators to perishable freight.

The car supply at the coal mines last week showed considerable improvement but because of two partial holidays, Mitchell Day and Good Friday, the production of bituminous for the week did not reach the mark of 11,000,000 tons, which the Commission on Car Service had asked the railroads to try to make possible. Production for the week was estimated at 9,750,000 tons, as compared with 10,900,000 the week before.

In Circular CCS-15, Chairman Kendall of the commission says that the demand for automobile cars at the present time is far in excess of the supply, and the extraordinary amount of this business offering this season makes it of the utmost importance that there be no unavoidable delay in the handling of this equipment, and that detention at unloading points be reduced to a minimum. "Information is being received that this equipment in some cases is unduly detained under load at destination," the circular says. "Where such instances do occur, it will be appreciated if you will advise this commission promptly the names of delinquents at fault, showing car number, initial, point of shipment, date of waybill, date of arrival, name of shipper and consignee, and the make and type (truck or passenger car) of automobile under load therein. On receipt of this information, we can assist in controlling the situation through the co-operation of the loading concerns."

The commission has established a refrigerator car department at Chicago with W. L. Barnes temporarily in charge.

Reconstruction and Extensions on the National Railways of Mexico

NOTWITHSTANDING the many difficulties arising out of, and damage done during the last revolutionary period in Mexico, the National Railways of Mexico are practically reconstructed and in operation, except for approximately 20 miles in the states of Morelos and Guerrero which will be ready for traffic within three months. Trains are running without interruption and in the state of Chihuahua are escorted by soldiers to protect passengers.

The traffic on the system has increased considerably; the gross monthly income of the railways, which in 1919 was $4,000,000 (Mex.), now totals approximately $8,000,000 (Mex.) The figure given is for the month of February, 1920. The gross income during the last year was $70,000,000 (Mex.), and expenses amounted to $45,000,000 (Mex.). That is to say, the operating ratio is about 65 per cent; the commercial tariffs, both freight and passenger, have not been changed, except in a few special cases, during the last 18 years.

In view of this condition, briefly outlined, the Mexican Railway Administration desires to acquire a quantity of new locomotives and rolling stock in order to comply with the public requirements, which are increasing every day. During the last month the box car shortage on the Mexican lines totaled over 2,000 cars. About 1,000 box cars of between 40 and 60 tons capacity, and 30 to 40 locomotives, between 90 and 120 tons capacity, are needed immediately. Nearly all locomotives are burning oil, and the remainder are being quickly changed to use this fuel.

There are about 5,000 temporary bridges, culverts, etc., on the system still to be built or reconstructed permanently. The government administration is taking steps to replace these with concrete structures.

The preservation of ties is another matter which has been taken into consideration. For this purpose two large treating plants are being installed. One is located in Aguas Calientes, and the other in Perote, Vera Cruz. It is possible that even with these plants it may become necessary to order a large amount of creosoted timber from the United States.

In connection with new lines, there are under construction: (1) An extension from Durango, Durango, to Mazatlan, Sinaloa, on the Pacific coast, which, when completed, will comprise about 180 miles of single track and will have 80 tunnels, the longest of which will be approximately 1300 ft., and the shortest about 260 ft. This line will cost about $21,000,000 (Mex.) and, when completed, will provide transportation facilities from the ports of Tampico and Vera Cruz on the Gulf of Mexico to the Mazatlan harbor, crossing a rich mining and agricultural zone. (2) An

extension is being built from San Marcos, Jalisco, on the National Railways of Mexico to Tepic on the Southern Pacific, which runs along the Pacific coast of Mexico. When this connection is completed, transportation facilities will be provided between Mexico City, the center of the country and the states of Jalisco, Sinaloa, and Sonora. This line comprises about 72 miles of road, and when complete will cost approximately $8,000,000 (Mex.) (3) Other lines of less importance are also in the process of construction, as for instance the line from Saltillo, Coahuila, to the east, and a line from Cuatro Cienegas, Coahuila, to Sierra Mozada, which will join the old International Railway to the North Mexican Railway. In other words the latter line will connect Escalon, Chihuahua, with Monclova, Coahuila. In addition to the above, surveys are being made between the F. C. & T. Railways and the United Railways of Yucatan, starting from Port of Mexico, Vera Cruz, or Santa Lucrecia to Campeche, Campeche. Another line which is being investigated will run from Zacatecas, Zacatecas, to San Luis Potosi and Tampico. At present about $450,000 in gold is being spent per month in connection with construction work.

The track facilities and passenger stations at Tampico, Torreon and Guadalajara are now under construction. These buildings consist of first-class brickwork and dressed stone walls, with reinforced roofing. They are two-stories high and will contain railroad offices and accommodations for the traveling public.

The new passenger stations at Durango and Saltillo will be finished shortly, as will the shops and roundhouse at Saltillo. These shops are designed for heavy repair work and will take care of approximately 24 engines of about 120 tons.

The car shop will have a capacity of about 200 cars, and the necessary machinery, tools, etc., for these shops are estimated to cost $2,000,000 (Mex.).

Journal Cooling Compound

If it was possible to obtain accurate figures of the direct and indirect costs of cutting out freight cars in this country on account of hot boxes, the total figure would doubtless be surprisingly large. Some railroads make a direct charge of three dollars each time a car is cut out because of a hot bearing. Indirectly there is the loss due to delaying other freight cars, and in case the car cut out is loaded with perishable freight, the railroad may be liable for damages.

The estimated cost of removing and reapplying a pair of freight car wheels is six dollars. This amount plus $1.20, the cost of machining, makes a total labor cost of $7.20 on account of each hot box. The total labor cost, plus the charge of three dollars for cutting out, gives a grand total of $10.20, representing the direct cost of a hot bearing. The indirect cost will depend on circumstances and may be little or great.

While it is not maintained that a journal cooling compound can prevent all of the hot boxes and their attendant costs, there is no doubt that with a suitable compound, used as soon as bearings show signs of becoming overheated, a large saving can be effected.

A cooling compound in the form of soft grease, which combines the qualities of a lubricant and a cooling compound, has been developed by the Mohawk Lubricating Company, Cincinnati, Ohio.

After a long and thorough test under actual service conditions this compound has proved its value and several of the roads testing it have arranged for a supply to be carried in each caboose. The method of application is simply to refill the box with clean waste, placing a liberal supply of compound between the waste and the journal. When placed in contact with a hot journal, the compound effervesces, expands and spreads until it reaches the dry spot on the journal, lubricates it and removes the cause of the heat. Under heavy loads and high speeds hot boxes are more or less inevitable and when this cooling compound is applied in time, the hot box is prevented and there is no delay of the train.

It is stated that the cooling compound is not affected by climatic conditions such as heat or cold and, in a test at 40 deg. F. below zero, it did not freeze. Those familiar with the difficulty of starting heavy freight trains in the winter time, due to congealed oil and waste in the journal boxes, will appreciate this property. The compound is stated to be free of acids or any other ingredients that would injure metal or the hands.

Industrial Trucks in C. P. R. General Store House

Great impetus has been given to the development and extension of the use of electric industrial trucks during the last few years by the rapidly growing cost and shortage of labor. The railroads have shared extensively in this development, particularly in the handling of freight and baggage and in the movement of material about car and locomotive repair shops. The possibilities for the effective use of industrial trucks for the movement of material within the storehouse have been demonstrated clearly in the general storehouse of the Canadian Pacific at Montreal, Quebec. As is generally the case, the trucks are used here primarily be-

Self-Loading Truck with Portable Platform in Use at the General Storehouse of the Canadian Pacific

cause of the reduction which they effect in the amount of labor required for the direct movement of material. However, other secondary advantages of importance have attended their use, including a saving in car time, at the general storehouse and a much later distribution of material in making up the daily l.c.l. shipments to local storehouses, which permits a complete classification of these shipments in station order with a consequent increase in the facility of unloading at destination.

About four years ago two Elwell-Parker electric trucks of the self-loading type were placed in service in the Montreal general storehouse and the details of the present system of consolidating and loading daily l.c.l. shipments have been

developed to take full advantage of the possibility for economy which trucks of this type possess.

The illustrations convey a clear conception of the methods employed. The bins shown are arranged along the outside wall of the storehouse near the point where the smaller miscellaneous articles are brought together and packed for shipment. Each bin is labeled with the name of the station to which it is exclusively devoted. At the beginning of each day, a ruggedly constructed wood platform suitable for self-loading on the truck is placed by one of the trucks in each of these bins. The truck, accompanied by a stores man, is then used to call at the different sections to secure the material to fill the requisitions and deliver it to the bins, where it is loaded on the platforms instead of being placed on the floor, as was the former practice. One handling of all material shipped has thus been eliminated. Should a shipment require more than the capacity of one platform, another is placed in the bin after the first is loaded.

Later in the day when the cars have been spotted ready for loading, the trucks are used to pick up the platforms, move them into the cars and leave them. While one platform is being unloaded by the car gang, a truck returns for another, thus eliminating the loss of time by the car gangs while waiting for loads. The loading is thus handled so expeditiously that distribution of material may be continued much later than was possible when using hand trucks, and the loading may be completed with all material in perfect station order. This eliminates the necessity of moving articles loaded out of station order each time the car is opened and greatly facilitates unloading. The later loading made possible by the use of the trucks also effects a material saving in car time.

The self-loading trucks have proved almost equally effective as labor savers in handling incoming material as they have in shipping. When purchased materials are delivered to the stores department by teamsters, they are unloaded from the wagons directly onto truck platforms assigned for that purpose. The loaded platforms are then moved to the proper sections of the storehouse for unloading directly into stock and one handling operation is saved.

The general storehouse at Montreal is located at the Angus shops and a comparatively large amount of stores materials are manufactured in the shops. The self-loading trucks and platforms are used in handling such materials. Empty platforms are placed by the trucks at suitable locations in the shops where completed materials for stores stock are loaded directly onto them. The trucks convey the material on these platforms from the shops to the storehouse, replacing loaded platforms with empty ones.

It frequently happens that some heavy pieces of material require moving from stock by the traveling crane. To provide for this, an extension of the store loading platform has been made so that empty truck platforms may be placed under the crane. This permits the loading of such material directly onto the platforms, which the trucks then pick up and move directly into the car for shipment. This arrangement has eliminated a large amount of labor in the handling of heavy pieces, which under the old method frequently required the help of a whole gang.

The saving in time and labor which has followed the adoption of the platform method of loading l.c.l. shipments has led to the development of this scheme one step further in connection with the full carload shipments of miscellaneous stores to a single point. Instead of unloading the material from the platforms when they are placed in the car, as is the practice with l.c.l. shipments, the platforms are left in the car and shipped with the loads on them. When the shipment reaches its destination it is then only necessary to run a truck into the car and carry the loaded platforms out, instead of handling each piece of material separately. This scheme, of course, involves the installation of a truck at the receiving point, but the reduction in the expense of handling at points where carload shipments are received is believed to be ample justification for the capital expenditure involved in the purchase of the necessary truck.

Since the adoption of this system of handling material, the labor cost of loading and unloading cars has decreased to 46 per cent of the cost with the old system of hand trucking. It is entirely to the use of the self-loading trucks that this very considerable saving is attributed.

The Method of Classifying L. C. L. Shipments for Handling with Self-Loading Trucks at the General Storehouse of the Canadian Pacific

General News Department

The Western Railway Club will hold its next meeting on April 19, at the Hotel Sherman, Chicago. S. W. Mullinix, superintendent of shops of the Chicago, Rock Island & Pacific, will present a paper on "Modern Methods of Reducing Cost of Locomotive Repairs."

The Canadian Railway Commission has ordered Canadian railway companies to cancel the announced 10 per cent passenger fare increase to points in the United States, which was to go into effect on March 29, to make up for the adverse rate of exchange in the United States. The increase was to have applied to all through tickets, except sleeping and parlor cars.

Co-ordination of terminal operation in the Cincinnati (Ohio) district will be continued permanently, with John A. Morris, terminal manager of the Cincinnati Terminals during federal control, in charge, acting as chairman of the Cincinnati terminal operating committee, representing all of the initial lines. This decision was reached at a meeting of railroad officers representing all of the roads entering the Cincinnati terminals.

The National Safety Council now has a constituency of 7,500 industrial plants, and the library of the council has become a large institution. The librarian has spent 140 hours in preparing an index to the report of the proceedings of the last congress of the council. This report will soon be issued. Following the example of other cities, which have reported encouraging results it is announced that Akron, Ohio, Wilmington, Del., and several other cities are planning to have a "safety week campaign" in the month of May.

The Delaware & Hudson Company recognizes the advantages that have been gained by the Safety Organization which was established in September, 1918, and Vice-President F. P. Gutelius, in a circular stating this fact, and citing the gratifying record which has been made, calls on all officers and employees to continue the same determined and concerted effort to eliminate accidents. J. E. Long, superintendent of safety, with the safety agents, will continue their work. The division, shop and general safety committees will be maintained.

The Federal Reserve Board has appointed an advisory committee to render advice and assistance to the Treasury Department and the Interstate Commerce Commission with respect to applications of railroad companies for loans from the $300,000,000 fund appropriated for that purpose by the transportation act, and particularly regarding the security to be furnished by the railroads. The committee consists of F. A. Delano, a former member of the Federal Reserve Board and former railroad president; Paul M. Warburg, also a former member of the board, and Bradley Palmer, a Boston attorney.

Representatives of the Railroad Brotherhoods and of the National Farmers' Council have been conferring with Samuel Gompers and other officers of the American Federation of Labor in an effort to bring about a greater degree of harmony in the political campaigns of the two groups, which have been proceeding along divergent lines. The somewhat strained relations between some of the brotherhood leaders and Mr. Gompers, said to have resulted in part from his refusal to endorse the Plumb plan, have not been improved by a letter which Mr. Gompers wrote to the Chicago Federation of Labor endorsing some Congressmen who had voted for the Esch-Cummins railroad bill, but it is understood that he has since qualified his endorsement.

The American Railway Express Company has announced that on and after April 15, it will require prepayment of express charges on all shipments going to Canada. This action, according to the announcement, is in line with that taken by the railroads, and has been made necessary because of the rate of exchange, which makes the Canadian dollar worth only 86 cents in United States money. The tariff rates from express offices in the United States to those in Canada have always been calculated in the currency of the United States. The express company has found that it thus loses 14 cents on every dollar of express charges when collection is made in Canadian funds. The date of the enforcement of this new rule has been placed in advance so as to give shippers in the United States an opportunity to make necessary arrangements with customers in Canada.

The strike of clerks and shopmen on the Norfolk and Western, said to have been kept up until 12,000 men were out, was reported settled on Saturday, April 3. At Roanoke, Va., train movements and shop operations were then reported as restored to normal. "Important concessions" were said to have been made by both employer and employees. The only tangible reason for the clerks' strike that was made public was a demand for the dismissal of two non-union clerks, whose offense is not clearly explained. The railroad is understood have agreed to transfer the clerks to another department, and the leaders of the strikers agreed that in the future it should be understood that organized employees on the road will not walk out without submitting to a thorough investigation of their grievances.

New Station at New Haven, Conn.

The New York, New Haven & Hartford on Tuesday formally opened to the public its new station at New Haven. The station was built by the Thompson Starrett Company. It has a small amount of office space which will be used by the division offices, etc.

The plans for the development at New Haven also include further improvements in the way of baggage and express buildings, etc., which will be carried out in the future.

Correction

The statement of revenues and expenses of railways for the month of January, 1920, as shown on page 977 of the March 19 issue of the *Railway Age*, contained several incorrect figures for the Denver & Rio Grande.

The following table will show the figures as they appear in the various columns, and as they should appear:

Operating expenses:	As given in *Railway Age*	Correct figures
Traffic	$248,997	$20,615
Transportation	719,558	1,137,961
General	20,615	71,812
Total	1,137,961	2,238,425
Operating ratio	33.27	65.44
Net from railway operations	$71,812	$1,182,416
Railway tax accruals	2,238,426	115,000

An error also appeared in the figures for the St. Louis-San Francisco, which were given on page 1065 of the *Railway Age* of March 26, in that the operating income of $751,763 was shown with a minus indicating a loss. The minus sign should not have appeared.

Increase in Cost of Coal

Before relinquishing his authority over fuel distribution as of April 1, Director General Hines announced a decision that it would be legal for the Railroad Administration to allow for the 14 per cent increase in miners' wages authorized by Fuel Administrator Garfield at the time the coal strike was settled, in paying for railroad fuel on contracts carrying wage adjustment clauses, even though such an adjustment produced a price in excess of the applicable government maximum price.

H. B. Spencer, director of the Division of Purchases, advised the regional purchasing committees of this fact on March 27, requesting that they make a prompt adjustment of such accounts.

The standard form of contract covering coal purchases contained a clause stating that the prices named were based on existing rates of pay and would be subject to readjustment in the event wages should be changed.

New York Railroad Club

B. B. Miller, engineer of motive power and rolling stock of the New York Central Railroad, will present a paper on "How to Increase Efficiency and Operating Capacity of Steam Locomotives" at the meeting of the New York Railroad Club on Friday evening, April 16. Among other things, Mr. Milner will discuss feed-water heating, trailer boosters, dynamic augment, and cut-off adjustment to secure maximum horsepower.

Frauds in Disposing of Unclaimed Freight

In the United States District Court at New York City on March 31, four men, two of them employees of the Central Railroad of New Jersey, were sentenced for conspiracy to defraud the United States Government (the United States Railroad Administration) in connection with the sale of unclaimed freight. G. S. Dumont, who pleaded guilty, was sentenced to 30 days' imprisonment, Solomon Shuldiner to five days and Charles E. Johnson and Robert Laurie to one day each. The men had formed a brokerage and trading company and this concern was fined $500. Also, part of the proceeds of goods wrongfully taken had been restored, and hence the lightness of the penalties. Freight valued at more than $140,000 had been diverted, and in the trial it was said that similar frauds amounting to millions had been perpetrated. The Central of New Jersey and the Central Vermont are the roads most prominently mentioned in the record.

The Chicago Strike

On page 1145 of this issue will be found an article on the strike in Chicago, entitled "Strikes and Storms Conspire to Cripple Traffic." The following will give later details:

On Wednesday the situation remained practically unchanged. Appeals sent out by the Brotherhood of Railroad Trainmen for recruits to fill the places of members of the outlaw organization had not brought the results expected, and all freight movements in the Chicago district were badly hampered. The movement of perishables and other foods has been greatly curtailed and the city's food supply is endangered. Embargoes have been laid in all directions.

Locomotive enginemen and firemen, on freight trains, both road and switching, said to number 8,500 in the Chicago district, members of a national enginemen's association similar to the outlaw switchmen's organization, are reported as having taken a sympathetic-strike vote to walk out on the 8th (Thursday). The mania for forming outlaw unions seems to be spreading, and reports indicate that such action may be expected at Kansas City, Mo., and Bloomington, East St. Louis, Champaign and Centralia, Illinois.

Bureau of Explosives

The Bureau for the Safe Transportation of Explosives and Other Dangerous Articles has issued the annual report of the chief inspector, Colonel B. W. Dunn, dated March 1, 1920. The report, with appendices, fills 117 large pages. The constituency of the bureau now numbers 439 railroads, together with ten steamship lines and four express companies, and 76 associate members.

During the year 1919 the number of boxes of high explosives condemned as unsafe for transportation was 1,291, a far smaller number than in either of the last three preceding years. The total number of inspections made was nearly 10,000. The list of inspectors includes 33 names, and a dozen of these men have been in the service of the bureau more than ten years.

Gasoline is now the most destructive of the articles classed as dangerous to transport, the quantity transported annually in the United States amounting to about 3½ billion gallons.

Colonel James L. Taylor, assistant to the chief inspector, has delivered 102 illustrated lectures during the year, with a total attendance of 11,710, and the inspectors have delivered 188 lectures. The inspectors of the bureau are constantly called upon for advice, examination of proposed facilities and other matters, so that they have less time than formerly to make routine inspections.

Decennial Celebration for the Forest Products Laboratory

Preliminary arrangements have been completed for the celebration of the tenth anniversary of the opening of the Forest Products Laboratory at Madison, Wis., during the latter part of June. It is expected that a large gathering of representatives from the various industries interested in the laboratory's work will be present. Present plans call for a two-day meeting, with addresses by men of national reputation in science and industry.

The Forest Products Laboratory is a branch of the United States Forest Service, established in 1910 in cooperation with the University of Wisconsin, and is a consolidation of a number of testing laboratories and other units of the Forest Service which had been located at various points throughout the United States. It is engaged principally in industrial research on problems connected with the manufacture and use of forest products. At the present time the laboratory employs about 200 people and occupies five buildings in whole or in part.

Savings Through Accident Prevention

The railroads of the United States saved at least $4,000,000 as a result of their accident prevention work during the calendar year of 1919, according to recent statistics compiled by the National Safety Council. This estimate is based on the records of the Safety Section of the United States Railroad Administration, which show that during the first eleven months of 1919 there were 27,933 fewer injuries and 2,103 fewer deaths than occurred during the first eleven months of the preceding year, a total reduction in the railroad accident casualty list of 30,036. The financial saving as a result of this conservation of men has been computed and estimated by the Council at $4,000,000. In addition the following figures have been compiled by the Interstate Commerce Commission for the National Safety Council and show the comparison between the annual operating expenses incurred on account of injuries to persons on roads reporting to the Commission from 1911 to 1918:

Year ending June 30, 1911	$25,408,316
Year ending June 30, 1912	27,068,802
Year ending June 30, 1913	29,783,431
Year ending June 30, 1914	31,954,890
Year ending June 30, 1915	26,425,884
Year ending June 30, 1916	26,880,717
Year ending December 31, 1916	29,485,700
Year ending December 31, 1917	33,699,135
Year ending December 31, 1918	33,369,199

Compensation of Arkansas and Louisiana Midland

A board of referees appointed by the Interstate Commerce Commission has rendered a decision that the Arkansas & Louisiana Midland was under federal control from December 28, 1917, to June 30, 1918, when it was relinquished by the government, and that it is entitled to compensation at the rate of $38,789 a year for that period, being the amount of its average net operating income for the three years ended June 30, 1917, as certified by the Interstate Commerce Commission.

The Railroad Administration took the position that the railroad had not been taken under federal control, this on the ground that no jurisdiction was exercised over it and that its just compensation at any rate would not exceed its standard return and probably ought not to be more than $15,000. The company claimed that if all except necessary and tenantable repairs be borne by the company during the period of federal control the just compensation would not be less than 10 per cent per annum on its investment, or $86,672; that if the government should assume the upkeep and maintenance, and undertake to return the property in substantially as good condition as it was in at the beginning of federal control, the just compensation would be 6

per cent, or $42,003, but that if the board should reject these claims and should prefer to calculate the compensation upon evidence of estimated prospective income, the just compensation would be $200,376 annually. The board of referees does not undertake to apportion the maintenance expenses, but says that the applicant in a proper proceeding in the proper tribunal may seek to establish the items of its claim for undermaintenance.

Railroad Matters at Ottawa

The Minister of Railways of Canada, reporting to the House of Commons at Ottawa last week, presented statements showing that the Canadian National Railways in the fiscal year ending March 31 had fallen short of paying expense by about $14,000,000. That part of the government system represented by the Canadian Northern lines lost $6,500,000, and the lines owned by the government $7,500,000. In addition the fixed charges for the year will amount to $19,000,000. About 78 per cent of the receipts were required to pay the wages of employees, and the aggregate operating expenses increased from $84,000,000 in 1918 to $108,000,000 in 1919. The minister said that no work would be done at present on the Hudson Bay Railroad. The length of track already laid is 332 miles and the distance yet to be covered is 92 miles. Over twenty millions already has been expended on this line, and to complete the road, with suitable terminals, would cost between five and six millions.

It is understood that the government is not likely to take any action this year looking to the acquirement of the Edmonton, Dunvegan & British Columbia Railway, or the Alberta & Great Waterways Railway. The first-named road extends into the Peace River region and it is conjectured that the Alberta government may appoint a receiver for the two roads, and that they may be sold to the Canadian Pacific. That company has disclaimed a desire to get them, but is believed to be anxious to get an entry into the Peace River country, which this year is expected to have the greatest influx of settlers in its history. The fur industry has been given a great impetus by present high prices, and there are hopes of developing vast oil fields.

Railroad Administration Appoints Regional Counsel

E. Marvin Underwood, general counsel for the Railroad Administration, has announced the appointment of regional counsel for the administration in various parts of the country to represent the general counsel in the respective territories and, in addition to such other duties as may be assigned to them, to supervise generally under direction of the general counsel, the adjustment or other disposition by carriers of personal injury, freight, fire and stock damage claims growing out of the operation of the railroads by the government in order to permit close and direct cooperation between the Division of Law of the administration and the legal departments of the carriers.

"They will render all possible assistance to the latter," the announcement says, "in connection with the adjustment, settlement, or other disposition of pending claims and litigation; and it is hoped by the director general that their appointment will facilitate, for the advantage of all parties, the speedy closing of matters of this character arising out of federal control."

Douglas Brookman, of San Francisco, has been appointed regional counsel for the western region, and C. L. Birch, of San Francisco, has been appointed regional claim agent to assist Mr. Brookman. Charles P. Williams, of St. Louis, Mo., has been appointed regional counsel for the southwestern region, and Sidney F. Andrews and J. P. Shea, also St. Louis, have been appointed assistant regional counsel and region claim agent, respectively. Joseph W. Cox, of Washington, D. C., has been appointed regional counsel for the Central region. Elias Field, of Boston, Mass., has been appointed regional counsel for the New England region, and J. P. Manning, Jr., and J. P. Henson, also Boston, have been appointed assistant regional counsel and regional claim agent, respectively. Victor Lamar Smith, of Atlanta, Ga., has been appointed regional counsel for the southeastern region. Alexander W. Smith, of Atlanta, Ga., has been appointed special counsel with headquarters in Washington, D. C., and will assist general counsel in financial and compensation contract matters especially assigned. The regions do not correspond to those formerly maintained by the Railroad Administration, but are defined by lists of roads in the appointment circulars.

Traffic News

Various government departments in Washington, acting under directions from the Bureau of Mines, are taking steps to order and place in storage this spring a three months' supply of coal. This is in accordance with recommendations of the Bituminous Coal Commission for a campaign to stimulate coal production during the early part of the year.

The volume of fruit moving northward from Florida is now very large. At Lynchburg, Va., 250 carloads of oranges and grape fruit are reported as passing through over the Southern Railway daily. Merchants in New York City complain, however, that cabbages grown in southern states which are in great demand in the north cannot be had because of a shortage of freight cars, and it is declared that cabbages worth $60 a ton are going to waste in the fields.

A bill to authorize the Interstate Commerce Commission to fix the percentage of express earnings which shall be paid to the railroads for the transportation of express matter, is said to be under preparation by Representative Esch and Senator Underwood, the purpose being to enable the commission to increase express rates without the necessity for increasing them twice as much as the express company needs. Under present contracts the railroads usually receive about 50 per cent of the express revenues.

The Southwestern Tariff Committee has resumed its functions under the name of the Southwestern Freight Bureau, with F. A. Leland as chairman and the former Standing Rate Committee, consisting of C. P. Dowlin, J. E. Johanson and Frank Koch as members. Its headquarters are in the Century building, St. Louis, Mo. The plan of operation is similar to that which was in effect prior to federal control. Changes in rates, rules, and regulations are determined by a general traffic committee, consisting of the principal freight traffic officers of the member lines.

The eighteenth annual dinner of the Traffic Club of Pittsburgh (Pa.) will be held on April 8, at the William Penn Hotel, Pittsburgh. President Charles B. Ellis will preside and J. F. Townsend, traffic manager of the National Tube Company, Pittsburgh, a former president of the club, will be toastmaster. Dr. Charles Aubrey Eaton, associate editor of Leslie's Weekly, will deliver the principal address. A. Dewitt Foster, superintendent of resources, Canadian National Railways, Chicago, will also address the club on "America's Place in the New Map of the World."

The freight embargo on traffic destined to the oil fields of Texas, in effect on the Texas & Pacific, has been lifted, allowing free traffic movement within these districts without the use of permits. The order raising the ban adds, however, that, to avoid congestion, traffic department representatives will impress upon shippers the necessity of distributing traffic so as to avoid accumulation at any one junction. Congestion in the Texas oil fields has resulted in an almost continuous embargo on all lines in this district for the past two years. Relief came when the Wichita Falls, Ranger & Ft. Worth began operation on March 15, between Ranger, Tex., and Jakehamon.

The Transportation Club of San Francisco recently elected the following directors: H. C. Ewing, Pacific coast manager, D. C. Andrews, Inc.; M. F. Cropley, assistant general freight agent, Pacific Steamship Company; W. B. Hinchman, assistant traffic manager, Tonopah & Tidewater; F. C. Lathrop, assistant general passenger agent, Southern Pacific, and D. M. Swobe, vice-president, McCloud River Railroad. The following were elected officers of the club: A. A. Moran, Dollar Steamship Company, president; D. M. Swobe, first vice-president; W. B. Hinchman, second vice-president; Henry Avila, district passenger agent, Union Pacific, treasurer; and R. G. Guyett, secretary.

The Chicago Traffic Club, at its annual election held on March 30, unanimously elected the following officers and directors:

President, E. L. Dalton, general traffic manager, Montgomery, Ward & Co.; first vice-president, R. B. Robertson, assistant freight traffic manager, Union Pacific; second vice-president, G. K. Sage, traffic manager, Fairbanks, Morse & Co.; third vice-president, L. W. Landmann, passenger traffic manager, New York Central; secretary, E. S. Buckmaster, assistant general agent, American Railway Express Company, and treasurer, J. F. Coykendall, treasurer, Chicago Great Western. The directors elected for two years include: Carl Howe, traffic manager, Michigan Central; H. C. Barlow, traffic director, Chicago Association of Commerce; Henry A. Palmer, editor, the Traffic World, and S. F. Miller, general freight agent, Chicago & North Western.

A strike of men on freight boats in New York harbor has hampered freight movement seriously since April 1 and for a day or two the movement of the railroad companies' passenger ferries between New York and Jersey City was somewhat disturbed, but on Wednesday the 7th the railroads had filled the strikers places so successfully that they rejected all proposals to arbitrate. Perishable freight was being moved satisfactorily and the situation as to other freight was rapidly improving. The strikers claimed that the Erie was evading the eight-hour rule by selling its lighters to an outside concern, with a view to having its lighterage done by contract and that the other railroads were to follow; but the Erie replied that a large part of its lighterage had all along been done by contract. A statement issued by the general managers' association said that the strike was started because of the refusal of the railroad companies to accede to the demand of the Marine Workers' Association that the railroad companies stop the delivery of freight to the United Fruit Company's piers, where a strike of the United Fruit Company's longshoremen was in effect. The sale by the Erie Railroad of a few of its tugs to the Phoenix Transit Company was declared to be a false reason. The United Fruit Company is contending against a closed shop.

Chicago Consolidated Ticket Office

The rearrangement of the Chicago consolidated ticket office necessitated by the withdrawal of the Chicago & North Western and the Minneapolis, St. Paul & Sault Ste. Marie has been agreed upon by the passenger traffic representatives of the 19 lines which will continue the arrangement inaugurated under federal control. The regrouping of ticket offices is to be effective April 5, and non-competing lines will be grouped as separate units wherever possible.

The eastern and southern lines which will continue the arrangement are: The Baltimore & Ohio, the Chicago & Eastern Illinois, and the Nickel Plate; the Illinois Central and the Grand Trunk; the Michigan Central, the Big Four, and the Chesapeake & Ohio; the Monon, the Pere Marquette, the Erie and the Wabash; the New York Central; and the Pennsylvania System.

The western lines which will remain in the consolidated office are the Chicago & Alton and the Chicago Great Western; the Atchison, Topeka & Santa Fe; the Chicago, Rock Island & Pacific; the Chicago, Milwaukee & St. Paul; and the Chicago, Burlington & Quincy. Each of the latter four roads will operate separate unit ticket offices.

The Western Passenger Association

The Western Passenger Association has been reorganized by officers of the passenger departments of western railroads at recent meetings held at Chicago. Eben E. MacLeod and T. Thompson, respectively chairman and secretary of the association prior to government control, were re-elected to these positions and will have offices in the Transportation Building, Chicago.

There will be three organizations hereafter to handle passenger matters in western territories. The Western Passenger Association will serve for the territory from Chicago to Colorado and to a boundary with the Southwestern Passenger Association. The latter association has been created to handle matters in the southwest and the Transcontinental Passenger Association will handle matters for the roads on the Pacific coast and matters affecting through business from Chicago to the Pacific coast. These associations will take the place of the Western Passenger Committee which existed during federal control.

Western Trunk Line Rates

Executives of the lines in Western trunk line territory have adopted a policy of dockets and hearings in the matter of rates. The Western Trunk Line Standing Rate Committee, composed of E. B. Boyd (chairman), Frank Bannister, James Coffey and G. H. Merrick, will sit in Chicago. The members are on salary and have no other railroad employment. District committees will be formed in Chicago, St. Louis, Mo., St. Paul, Minn., Kansas City, Mo., Denver, Colo., Omaha, Neb., and Salt Lake City, Utah. Subjects for consideration will be docketed by the Standing Rate Committee and assigned by it to the district committees. A shipper who wishes to be heard may have his hearing either before the standing committee or the district committee to which the matter has been assigned.

The N. I. T. League on the Transportation Act

The following is part of the report of the executive committee of the National Industrial Traffic League, presented at the spring meeting of that organization held at St. Louis, Mo., on March 18 and 19:

"The Railroad bill as passed by the House of Representatives was substantially in conformity with the views of the League, except as to its labor provisions, while the bill as passed by the Senate was radically different, and, on the whole, was quite unsatisfactory to the League. The House bill as amended by the Senate was referred to a joint conference committee which labored earnestly, conscientiously and without regard to politics to agree upon some legislation which would best meet the needs of the country, and which, even if far from perfect, might provide for the orderly return of the carriers to their owners, give them reasonable protection in shape of a government guaranty while they were building up their organizations and adjusting themselves to the new conditions, and furnish to the Interstate Commerce Commission more complete authority and more definite directions to enable it to properly regulate the carriers in the public interest.

"Except for the labor and rate-making sections of the bill, the conferees were able to reach an agreement which, on the whole, was quite satisfactory to us. In the labor section the Senate conferees were insistent on some anti-strike clause and this was also desired by the League. However, canvass of the House showed the impossibility of passing such legislation, and a compromise provision was agreed upon. This was bitterly fought by organized labor, apparently for the reasons that it gave the public a voice in the settlement of wage controversies and that it permitted 100 or more unorganized employees to have their grievances heard. Though this labor section was not as strong as we desired, the passage of it in the House over the violent opposition of organized labor, was, in my opinion, a most gratifying sign. With respect to the rate-making section we were on record as strongly opposing the fixing of rates to yield a specified rate of return and the recapture from the more prosperous carriers of a percentage of the excess earnings over such rate of return. As the Senate conferees refused to yield on the principle of this section, it was finally agreed to by the conferees in a modified form.

"Like all compromise measures, the result of the conference committee's work was not wholly satisfactory to anyone, including the conferees, but it was unquestionably the only legislation which could be enacted at the time. The fact that the bill as finally adopted was not entirely satisfactory to any interest may perhaps indicate that it reasonably measures up to the standard of legislation for the benefit of the whole people without unduly favoring any interest.

"In conclusion it should be said that, regardless of differences of opinion, respecting the wisdom of certain features of this legislation, it is now the privilege and the duty of the League and each of its members to accept it cheerfully, and do our utmost to see that it is given a fair trial. To that end we have already advised the Commission and the associations representing the railroads of our earnest desire to co-operate with them and with other interests in working out the problems which may arise under the new conditions.

Commission and Court News

Interstate Commerce Commission

Railway carriers and water carriers have been asked by the Interstate Commerce Commission to arrange for conferences at the earliest practicable date with a view to immediately complying with the provisions of paragraph (4) of Section 25 of the transportation act, which imposed upon the railway carrier the duty of issuing a through bill of lading to the foreign point of destination and after an agreement as to this uniform bill of lading has been reached by such carriers, it is to be presented to the commission for its approval. Representatives of shippers should be freely consulted, the commission says, and the commission should be advised from time to time as to the progress which is being made.

The commission on April 3 suspended the proposed increase in local passenger fares on the Hudson & Manhattan, between points in New York and Jersey City and Hoboken, but the company was advised by letter that division No. 2 of the commission is of the opinion that some increase is warranted and that the suspension is without prejudice to the filing of a tariff providing for a 10-cent fare from New Jersey points to uptown New York, and a 6-cent fare to downtown New York, in place of the proposed uniform 8-cent fare. The company will accept and act on the suggestion of the commission, which contemplates a three months' or six months' trial of the advanced rates. The commission proposes these rates to "obviate the necessity of a detailed and prolonged investigation."

Personnel of Commissions

J. A. Lindstrand, senior architect in the Bureau of Valuation of the Interstate Commerce Commission, with headquarters at Chicago, has resigned to engage in private business as an architect, with office at 800 North Clark street, Chicago.

State Commissions

The Public Utilities Commission of Illinois issued an order on March 30, citing representatives of all railways of Illinois to appear before the Commission on April 14, when a hearing on the freight rates charged by carriers in Illinois will be held. The order stated that a number of informal complaints had been received by the Commission against the continuation of the present rates, which were instituted during the period of federal control. The complaints allege that the tariffs were "discriminatory, unjust and unreasonable."

Railroad and steamboat charges for the transportation of rice have been attacked in a complaint filed recently with the Railroad Commission of California by the Pacific Rice Growers' Association. The defendants in the action are the Atchison, Topeka & Santa Fe, the Southern Pacific, the Western Pacific and nine other railroads operating in California. The charges made by the Rice Growers' Association are that the present rates on rice and rice products are unreasonable and discriminatory to the rice growers of California. The association asks, not only a reduction in rice rates, but the same transit privileges, such as milling, cleaning, storing and hulking, that are accorded analogous commodities.

The South San Francisco (Cal.) Chamber of Commerce recently filed a complaint with the Railroad Commission of California asking the commission to compel the Southern Pacific to extend the "San Francisco switching limits" to include South San Francisco and to maintain a rate of $2.50 per car for switching carload traffic of all kinds, irrespective of its origin and destination, between industry tracks or wharves at South San Francisco and its interchange tracks with the Atchison, Topeka & Santa Fe and the Western Pacific in San Francisco, when incident to a line haul. The Chamber of Commerce maintains that in the matter of charges for switching carload freight, the railroad companies discriminate in favor of other communities. A similar action was pending before the commission before federal control and the action was dismissed because of lack of jurisdiction.

Court News

Injunction Against Eminent Domain Proceedings

The Pennsylvania Supreme Court holds that where a railroad files a bond in condemnation proceedings to take land for a branch, the owner is not entitled to a preliminary injunction to prevent it on the ground that the branch is not for a public use, but merely in the interest of a private coal company. Where a railroad franchise is established the commonwealth is the only party to restrain a fraudulent use of it.—Mountz v. Pittsburgh, Bessemer & Lake Erie (Pa.), 108 Atl. 170.

Jurisdiction of Actions for Liabilities Incurred in Period of Federal Control

The federal district court for the Northern District of Ohio holds that an action to enforce a liability incurred in the operation of a railroad while under federal control may be maintained in such courts, and only such courts, as would have had jurisdiction in the absence of federal control, and the citizenship of the railroad company, and not of the Director-General, determines the jurisdiction of a federal court.—Smith v. Babcock, 260 Fed. 679.

Stipulation for Specified Items of Damage Reasonable and Claims Restricted Thereto

A contract for the carriage of live stock contained the usual four months' limit for filing claims and stipulated for damages that "no damages can be recovered except those set forth in the written notice and in no greater amount than claimed in said notice." The Kansas Supreme Court holds, in an action for damages, that such a stipulation is reasonable; allowances made by a jury in excess of any of the itemized claims thus presented by the shipper must be reduced and limited thereto.—Caston v. Schaff (Kan.) 185 Pac. 33.

Stop, Look, Listen; Pennsylvania Rule

A driver of a horse and wagon, familiar with a crossing, stopped, looked and listened 20 feet from the nearest of the two tracks. Seeing the gates were up he drove on without stopping or looking again, though his view was obstructed, and he was struck on the second track. The Pennsylvania Supreme Court held that he was guilty of contributory negligence as a matter of law; that a person who has entered on railroad tracks with a view to crossing must continue to look and listen for approaching cars, and that the fact that the safety gates are not lowered at a crossing does not relieve a driver from the duty of exercising ordinary care.—Kipp v. Central of New Jersey (Pa.), 108 Atl. 175.

Reparation for Misquoted Rates

A shipper in interstate commerce paid a freight rate less than that established by authority of the Interstate Commerce Commission, the parties not being aware that the rates had been increased by the Commission. When the mistake was discovered the railroad demanded the difference between the old and new tariffs. The shipper paid, on the railroad's agreement or promise to submit the shipper's claim for reparation to the Interstate Commission. This was not done until more than two years after, when the Commission disallowed the claim because on account of the delay it had no power to consider it. The shipper sued the railroad and recovered judgment for the railroad's breach of its promise. On appeal, the North Carolina Supreme Court revised the judgment and directed a nonsuit, the promise being void under the federal statutes prohibiting rebating, and the damages being speculative, because of the impossibility of determining how the Commission would have decided the case. The principle is firmly settled that the only rate is the rate fixed by the Interstate Commerce Commission and published, and no contract, agreement, understanding, or misquotation by mistake between the parties can change it.—Edenton Cotton Mills v. Norfolk Southern (N. Car.) 100 S. E. 341.

Foreign Railway News

Egyptian Railways Short of Coal

LONDON.

The Egyptian railway services are being considerably reduced owing to a shortage of coal. Efforts are being made to obtain supplies of coal from India and South Africa.

New Railways for Ecuador

LONDON.

The Ecuadorian Senate has approved a bill, already passed by the deputies, authorizing a contract with a Chilian-Ecuadorian syndicate, for the construction of a railway from Port Bolivar through Cuenca and Loja, eastward to the Amazon.

In Ecuador it is expected that the work will be of benefit not only to Ecuador, but to Chile, as it means the establishing of an interoceanic route through the valleys of the Amazon from the Pacific to the Atlantic, from Port Bolivar and the gulf of Guayaquil to the port of Para in Brazil.

This line will serve an immense and wealthy Ecuadorian region, as yet only partially explored, whose soil is extraordinarily fertile, being watered by navigable rivers like the Zamora, the Santiago, the Morona, the Pastaza, the Napo and other affluents and tributaries of the Amazon.

Committee to Investigate Electrification

LONDON, March 22, 1920.

A committee has been formed in the Ministry of Transport to investigate the electrification of English railways. It is formed with Sir Alexander Kennedy, consulting electrical engineer, as chairman, with the following as other members:

Sir John A. F. Aspinall, consulting mechanical engineer to the ministry of transport.
A. R. Cooper, electrical engineer of district railway.
Sir Alexander Gibb, K. B. E., C. B., director general of civil engineering, ministry of transport.
C. H. Merz, consulting engineer.
Sir Philip Nash, K. C. M. G., C. B., ministry of transport.
Sir John Snell, chairman of the committee under the electricity supply bill.
Sir Henry Thornton, representing the Railway Companies' Association, secretary.
Major Redmond.

The terms of reference to the committee are:
That the committee should report on:

(1) Whether any regulation should be made for the purpose of ensuring that the future electrification of railways in this country is carried out to the best advantage in regard to interchange of electric locomotives and rolling stock, uniformity of equipment, and other matters.
(2) If any such regulations are desirable, what matters should be dealt with and what regulations should be made.
(3) How far it is desirable, if at all, that railways or sections of railways already electrified should be altered so that they may form parts of a unified system.

Railway Construction in Central Africa

Since the termination of the war attention is again being given to the construction of various railway lines in Central Africa which were planned and surveyed prior to 1914. The following details concerning these lines is given in Commerce Reports by Vice-Consul Charles J. Pisar, Capetown, South Africa.

Complete communication between Cape Town and Bukama, on the Lualaba River, Belgian Congo, which is the upper part of the Congo River, has been established. Navigation is possible from here down the river, but it is difficult, owing to the obstructions caused by sand banks. For this reason the railway is to be immediately extended from Bukama to Kibombo, a distance of 53 miles, which is lower down and on the same river. A good supply of coal has been found about 15 miles south of Bukama, only a little over a mile from the railway. This should have an important effect upon the development of the whole of Katanga. The survey of the line mentioned above has been completed by the Coloniale de Construction and work on it will commence at once.

Work on the Benguella Railway is to be restarted, but it is not expected that much can be done before next summer, owing to the difficulty of obtaining material. The lower Congo-Katanga Railway, which has been projected for some time, cannot be attempted for some years. It is this railway which would open up the heart of the Belgian Congo, especially the rich rubber districts; it would terminate at Stanley Pool and there join the railway from Boma.

Another railway that is seriously contemplated is from Bumba, on the Upper Congo River, to the north of the Equator, to the Moto gold fields and thence to the River Nile, probably ending at Redjaf, whence the Nile is navigable for 1,100 miles to Khartum. The survey has been completed of the Bumba Buta section, a distance of 500 kilometers (312 miles), following closely the River Lubi.

In Portuguese East Africa an important program of railway construction is contemplated, estimated to cost $15,000,000. Survey parties have been formed, with many engineers from the Union of South Africa. One line is from Lourenco Marques through Gaza to Inhambane, a distance of 250 miles, in order that the rich coastal belt may be opened up. A large graving dock will be constructed at Lourenco Marques and the harbor will be improved. The other two lines to be started at once are from Quelimane and Lumbo, the port opposite to the island of Mozambique. Harbor works at Lumbo will be commenced.

Passenger Fares in England

LONDON.

In answer to a question in the English Parliament it was stated recently that the Minister of Transport did not intend to take any steps to effect a further general increase on ordinary passenger fares above their present level.

A. Neal, the parliamentary secretary to the Ministry of Transport, said, in reply to a deputation of London members of Parliament, whereas in the year 1913 the total number of ticket holders who were conveyed by the 17 principal railway companies in the country was 821,711,160, in the year 1919 the figure had increased to 957,999,990, or an increase of 16.1 per cent. These figures did not include those of the underground railways. He added that there were a smaller number of locomotives in actual operation and a larger number under repair which aggravated the problem. On the other hand, the introduction of the eight-hour day has caused a shortage of enginemen on the railways, and while the companies were doing all they could to overcome the shortage at the present time, it was not sufficient to enable them to run any further passenger trains.

Railway Developments in China

PEKING, February 15.

The Ministry of Communications has refused to sanction the petition for permission to build the new port to the east of Tientsin, mentioned in the last group of these notes. A persistent propaganda has connected American interests with the proposition. For this reason it is apparent to all Americans that there was no American connection with it, but that this was being used as cover for permission to open a port to which the proposed Japanese line to Jehol could be extended, as provided in the September agreements of 1918. The refusal of the Ministry of Communications is attributed to the activity of public interest in the general political situation.

* * *

The general attitude of the Chinese public to the Shantung situation has given rise to several projects for buying out the Japanese contract for an extension from Tsinan to Chentingfu. The latest form of the campaign is for a line to be built by China from Shih Kia Chuang to Tsangchow. Shih Kia Chuang is some 50 miles to the north of Chentingfu and is the junction of the Cheng Tai (Shansi) line with the Peking Hankow. Tsangchow is on the Tientsin Pukow line, about 35 miles south of Tientsin. This line would put the immense supply of coal and iron in Shansi in the closest possible connection with Tientsin. It would probably forestall any construction of a line to Tsinan, and thus prevent this traffic from being diverted from Tientsin to Tsingtau. But lately some other influence has intervened to put the Tientsin-Pukow junction point at Tehchow rather than at Tsangchow. The line to be built would be a few miles shorter, and Tehchow is a more important city than Tsangchow. But the haul to Tientsin would be made considerably longer and the haul to Tsing Tau would be made more than correspondingly shorter.

The publication by the Ministry of Communications that the surplus for the year upon the Chinese Government railways in 1918 was $34,700,000, has led to some interesting comment as to what becomes of the money. An analysis of the balance sheet for the combined lines and for the individual lines shows that over $12,000,000 was invested in government bonds, $4,000,000 was put into improvements and additions to the physical property, $2,500,000 was used for redemption of funded debt, $3,000,000 went into additional stores (or higher store prices), nearly $6,000,000 consisted of revenue from government transportation, which is merely a "paper" figure, and $7,000,000 consisted of inconvertible bank notes which have been deposited as security for special loans. So as a revenue producer to the government for general purposes, the railways seem to have contributed very little.

But the value to the government of $6,000,000 of service and the purchase of $12,000,000 of its bonds is not inconsiderable, especially when it is understood that these $12,000,000 of bonds virtually means the redemption of that amount of inconvertible bank notes.

Preliminary figures for 1919 indicate that the gross revenues of the government railways will exceed those of 1918 by about $3,000,000 and amount to about $80,000,000. This is relatively a small increase until it is remembered that the year 1918 was acknowledged at the time to be abnormal in that a very considerable traffic normally belonging to 1917 was left over for 1918, due to floods in 1917. Operating expenses are known to have increased largely, so that net operating revenue for the year will probably be some $2,000,000 short of the 1918 figure. The rate of exchange for interest payments has been so favorable, however, that this, together with the gradual reduction of funded debt, will probably result in a reduction of interest charges by at least $1,000,000. Hence it is expected that the final surplus for the year will not be far short of $33,000,000. This will be in fact a much better figure than that in 1918, although it is $1,500,000 lower, for in 1919 the acceptance of inconvertible bank notes on the Peking Mukden and the Tientsin Pukow lines had practically been stopped, and on the Peking Hankow and the Peking Suiyuan it had been considerably restricted compared with 1918.

* * *

The high price of silver, instead of being a blessing to this silver-using country, is making it almost impossible to think of new construction. The French franc now sells at fourteen to the Chinese dollar compared with two in 1914. The English pound has sunk to $3.00 Mex., compared with nearly twelve. The American dollar sells for 85 cents, compared with $2.30. In the construction of railways in China, by means of a foreign loan, perhaps half of the loan is spent in the loaning country for interest, tools, rolling stock, and a certain amount of rail and bridge steel. The remaining half is spent in China for land, formation, ballast, stations and buildings, and labor generally. The average cost of construction has been about $75,000 Mex. per kilometer. Put in terms of English pounds, there was about £3,500 spent in China and £3,500 spent in England, if that were the loaning country. Today, in order to realize the $38,000 Mex. for expenditure in China (allowing for no discounts or exchange costs), over £12,000 are necessary. And to buy the foreign materials, because of the higher prices, instead of £3,500 some £7,000 are required. This makes the total cost of construction £19,000, instead of £7,000 before the war.

At present an interest rate of 8 per cent is being asked upon all Chinese loans, compared with 5 in the "good old days." This makes the interest payment per kilometer of line £1,520, instead of £350 as it used to be. Of course, at present rates of exchange, these £1,520 cost only about $4,600 Mex., whereas the £350 at the old rates used to cost nearly $4,000. If there were only this difference of $600 to be considered, the "high cost of waiting" would certainly outweigh the high cost of building. But there is a great deal of uncertainty as to what the rate of exchange is going to do. Let us suppose after about five years it should resume something like its former position. Say the pound becomes worth $7.00 Mex., instead of the old $11.00 or $12.00. Then interest charges become over $10,000 per kilometer of line. Only two railways in China, the two oldest, can pay this rate of interest. If the lines could not pay the interest, who would? That is what the foreign contractor asks, and he has not received a satisfactory answer. Perhaps the rate of exchange will begin to improve soon. Who knows? At least the argument for waiting is strong.

Equipment and Supplies

Bids were received on Monday at the office of the chief of engineers, War Department, for the 113 Decapod locomotives built for the Russian government which were offered for sale, and also for a number of miscellaneous cars. While no announcement has yet been made, the indications are that the government will be able to dispose of the entire amount of equipment for cash. Eighty-seven of the locomotives had already been sold to American railroads.

Locomotives

The Missouri Pacific is inquiring for 15 Mikado type locomotives.

The Chicago, Burlington & Quincy is in the market for 15 Santa Fe type and 15 Mikado type locomotives.

The Joso Railway (Japan) has ordered three 2-6-2 type locomotives from the Baldwin Locomotive Works.

The Banshu Railway (Japan) has ordered one 2-6-2 type locomotive from the Baldwin Locomotive Company.

The Taiwan Seito Formosa Company has ordered two 0-6-0 type locomotives from the Baldwin Locomotive Works.

The Imperial Japanese Government Railways' requirements for the next 12 months include 80 Consolidation type and 120 Mogul type locomotives.

The Pacific Great Eastern, reported in the *Railway Age* of April 2 as being in the market for three Mikado type locomotives, has ordered this equipment from the Canadian Locomotive Company.

The Texas, Oklahoma & Eastern has ordered one ten-wheel type locomotive from the American Locomotive Company. This locomotive will have 20 by 26 in. cylinders, and a total weight in working order of 168,000 lb.

The New York, New Haven & Hartford, reported in the *Railway Age* of April 2, as about to place orders for locomotives, has ordered from the American Locomotive Company 30 Mountain type and 10 other locomotives.

Portland Terminal Railroad (Maine Central) has ordered two six-wheel locomotives from the American Locomotive Company. These locomotives will have 21 by 28 in. cylinders and a total weight in working order of 167,000 lb.

The Newburgh & South Shore has ordered two 0-8-0 type switching locomotives with a weight of 216,000 lb. on drivers, and two 0-6-0 type switching locomotives, with a weight of 183,000 lb. on drivers from the Baldwin Locomotive Works.

The New York Central, reported in the *Railway Age* of February 27 as being in the market for 100 eight-wheel switching locomotives, has ordered 82 of these locomotives from the Lima Locomotive Works, and has also ordered from the American Locomotive Company 65 Mikado type, 46 Pacific type and 13 Mallet type locomotives.

The Chesapeake & Ohio, reported in the *Railway Age* of March 19 as being in the market for 20 Mallet type locomotives, has ordered 20 Mallet and five switching locomotives from the American Locomotive Company. The Mallet type engines will have 22 and 35 by 32 in. cylinders, and a total weight in working order of 441,000 lb., and the switching engines will have 27 by 28 in. cylinders, and a total weight in working order of 295,000 lb.

Freight Cars

The Carnegie Steel Company, Pittsburgh, Pa., is inquiring for 500 steel car bodies.

The Grand Trunk, reported in the *Railway Age* of February 6 as being in the market for 3,000 automobile cars, has ordered

2,000 of these cars from the American Car & Foundry Company, and 1,000 from the Canadian Car & Foundry Company, and has also ordered 1,000 50-ton flat cars from the National Steel Car Corporation.

The Chicago, Burlington & Quincy has issued inquiries for 500 stock cars.

The Chicago, Rock Island & Pacific, reported in the *Railway Age* of February 27 as being in the market for freight cars, has ordered 500 gondola cars from the Bettendorf Company.

The Pittsburg & Shawmut has ordered 6 eight-wheel steel undertrame caboose cars, two 20-yd. all-steel dump cars from the Kilbourne & Jacobs Manufacturing Company, one steam ditcher from the American Hoist & Derrick Company, and one all-steel test weight car from the American Car & Foundry Company.

The New York Central's order for 8,000 freight cars, reported in the *Railway Age* of April 2, was divided as follows: To the Standard Steel Car Company, 3,500 55-ton hopper cars; American Car & Foundry Company, 1,750 hopper cars, and 1,750 double-sheathed box cars; Pressed Steel Car Company, 50 hopper cars, and Haskell & Barker Car Company, 500 box cars.

The Southern Pacific has arranged to construct 4,065 freight cars in its own shops, as follows:

To Be Constructed by Lines West of El Paso, at Company Shops

Class	For lines west of El Paso	For Tex. and La. lines	Total
Box	750	1,250	2,000
Flat	500	.....	500
Stock	1,000	.....	1,000
Caboose	50	.....	50
	2,300	1,250	3,550

To Be Constructed by Texas-Louisiana Lines at Company Shops On Their Own Account

Flat (including 100 for which trucks are available)	500
Caboose	15
	515
Total	4,065

Passenger Cars

The Southern Pacific has ordered 58 steel passenger train cars from the Pullman Company for 1920 delivery, including 28, 60 ft. coaches, 25, 60-ft. baggage cars and 5, 70-ft. baggage cars. Of this equipment, 8 of the coaches are for the San Diego & Arizona.

The New York Central, reported in the *Railway Age* of February 20 as being in the market for a number of passenger train cars, has placed orders for 215 cars, as follows: American Car & Foundry Company, 20 coaches and 80 baggage cars; the Standard Steel Car Company, 85 coaches and 15 multiple unit steel suburban cars: Pressed Steel Car Company, 15 combination passenger and baggage cars.

Iron and Steel

Sophus Berendson, Inc., 15 Broad street, New York, has ordered 200 tons of 128 lb. rail and accessories from the United States Steel Products Company, for export to Denmark.

The New York, New Haven & Hartford has recently completed the purchase of a number of shop machine tools, including engine lathes, planers, drill presses, crane tractors and trailer trucks, for a number of its shops.

The War Department is offering for sale under sealed proposals 63,437 tons of 128 lb. rail and large quantities of track accessories suitable for export. Bids will be received at the office of the chief of engineers, Washington, D. C., until April 26.

The National Railways of Mexico have given an order to the United States Steel Corporation for rivets, bolts, iron pipe, firebox steel plate, tank steel plate, and spring steel to cost $100,000, and to the Crucible Steel Company, and the Railway Steel Spring Company, for tool steel to cost $26,000. An order has also been given to the Rome Iron Mills for staybolt iron to cost $18,000.

Machinery and Tools

Sophus Berendson, Inc., 15 Broad street, New York, is in the market for 100 or more screw jacks, with a lifting capacity of 15 to 20 tons, and a 12 to 15 in. lift, for use in Denmark.

Miscellaneous

The Great Northern is requesting bids for built-up draft arms for reinforcing the ends of 2,000 of its cars.

The Cuba Railroad has ordered from the Wine Railway Appliance Company, Toledo, Ohio, 1,000 ventilators, for use on 500 box cars recently ordered by that road.

The Boston & Maine has ordered 20 pyrometers from the Locomotive Superheater Company for installation on 20 locomotives recently ordered from the American Locomotive Company.

The Union Pacific has ordered from the Browning Company, Cleveland, Ohio, three 15-ton cranes for handling coal, and has also ordered from the Industrial Works, Bay City, Mich., three cranes equipped with electro-magnets of 15 tons' capacity.

The National Railways of Mexico have given an order to the United States Rubber Export Company for airbrake hose to cost $30,000; orders have also been given to J. W. Masury & Sons, Brooklyn, for paint to cost $20,000, and to Charles R. Long & Co., Louisville, Ky., for paint to cost about $20,000.

Signaling

The Pennsylvania Railroad (Western Lines) has ordered from the General Railway Signal Company an electric interlocking, 61 working levers, for Island avenue, Pittsburgh, Pa., installation to be done by the railroad company's forces.

The Pennsylvania (Southwestern region) has ordered an electric interlocking machine, model 2, with 59 working levers, to be installed at Nineteenth street, Richmond, Ind. This interlocking is to be made and installed by the General Railway Signal Company.

The Pennsylvania System, Southwestern region, has awarded a contract to the General Railway Signal Company, Rochester, N. Y., for a Model 2, unit-lever type, electric interlocking machine, to be installed by signal company forces at Richmond, Ind. This machine will have 59 working levers and 13 spare spaces and will be equipped with rotary circuit controllers.

The Pennsylvania System, Central region, has placed an order with the General Railway Signal Company, Rochester, N. Y., for a 72-lever, Model 2, unit-lever type, electric interlocking machine, having 61 working levers and 11 spare spaces. This machine will be equipped with rotary circuit controllers, 42 electric locks and operating switchboard, and will be installed by railroad forces at Pittsburgh, Pa.

Railway Construction

New York, New Haven & Hartford.—Construction of the large terminals for freight trains and classification at Cedar Hill, New Haven, Conn., and at Providence, R. I., has been resumed, and it is expected that the work will be largely completed by the close of the season.

Newburgh & South Shore.—Work is to begin at once on the erection of a steel car repair shop at Marcelline avenue, Cleveland, Ohio, at an estimated cost of $265,600. The main shop will consist of a building 250 ft. long and 70 ft. wide, with four tracks and an overhead crane reaching across all the tracks for the entire length of the building. An annex 40 ft. by 250 ft. for machinery, will also be put up. The buildings will be of brick and steel construction.

It is better to allow lawyers to handle lawsuits, contractors to erect buildings, newspaper men to operate their newspapers, physicians to practice medicine and railroad men to run railroads.—*Carson City (Nev.) News.*

Supply Trade News

Charles C. Kilander, Chicago manager of the **American Steam Gauge & Valve Manufacturing Company**, Boston, Mass., died on March 1st.

M. C. M. Hatch, formerly with the Pulverized Fuel Equipment Corporation, New York, has become associated with the **Railway & Industrial Engineers, Inc.**, 25 Broad street, New York.

The **H. K. Fairbanks Company**, engineers and builders, Cleveland, Ohio, have opened for the convenience of its eastern customers an office at 21 West Forty-third street, New York, in charge of **L. D. Stauffer.**

The **Electric Storage Battery Company**, Philadelphia, Pa., announces that on April 24, its New York office, which has been for 22 years at 100 Broadway, will be removed to 23 West Forty-third street, New York.

Fred J. Passino, who for many years traveled out of the general offices of the **Independent Pneumatic Tool Company**, Chicago, covering the southwest, has been appointed assistant manager of the eastern division, with headquarters at 1463 Broadway, New York.

D. Gleisan, manager, industrial bearings division of the **Hyatt Roller Bearing Company**, New York, announces that its offices have been removed from 1 Madison avenue, to 100 West Forty-first street, New York, where much larger headquarters have been secured for the advertising, sales and engineering department of the division.

The Campbell-Howard Machine Company, formerly the Sherbrooke Iron Works, Ltd., Sherbrooke, Que., has been purchased by G. L. Bourne and F. A. Schaff, respectively president and vice-president of the Locomotive Superheater Company, New York. The company's plant will be utilized partially to manufacture railway supplies for Canadian railroads.

The Hulson Grate Company, Keokuk, Ia., has been incorporated for the purposes of manufacturing and selling engine and locomotive appliances and devices. The amount of capital stock authorized is $100,000 and the incorporators and officers include, A. W. Hulson, president; B. D. Streeter, vice-president; J. W. Hulson, secretary-treasurer; C. R. Joy; and W. M. Hogle.

N. M. Barker, master mechanic of the Copper Range Railroad, at Houghton, Mich., has resigned to become mechanical superintendent of the **American Automatic Connector Company**, Cleveland, Ohio. He will have supervision of the manufacturing and installation of the connector this company is placing on the market, which is designed to automatically connect steam and air hose on freight and passenger cars.

R. Rivett, supervisor of car repairs for the United States Railroad Administration, with headquarters at Washington, D. C., resigned on March 1 to enter the service of the **Oxweld Railroad Service Company**, New York, as district manager, with headquarters at Chicago. Mr. Rivett was formerly connected with the Chicago, Burlington & Quincy, entering the service of that railroad in 1881, and resigning in 1902 as general car foreman. Subsequently he was appointed general car inspector for the Union Pacific. He left the service of the latter road in 1910 to become general car inspector for the Illinois Central. In 1918 he became supervisor of car repairs for the Railroad Administration, which position he held until his recent appointment.

The Wonham, Bates & Goode Trading Corporation, New York, has been established jointly by Wonham, Bates & Goode, Inc. New York; E. Naumburg & Co., New York, and M. Samuel & Co., Ltd., of London, for the purpose of enlarging and expanding foreign business, both export and import, carried on for many years by Wonham, Bates & Goode, Inc., at 17 Battery Place, New York. The active management of the company will remain in the hands of the present officers and there has been added to the board of directors George W. Naumburg and William S. Hernon of E. Naumburg & Co., Major Julian Day of M. Samuel & Co., Ltd., and Myron S. Falk as chairman of the board. The new company through its new affiliations has the immediate benefit of many foreign connections and branches in addition to those inherited from the old firm. It will be identified commercially with M. Samuel & Co., Ltd.'s, branch houses established for many years in Japan, China, East Indies, etc.

The **Carborundum Company**, Niagara Falls, N. Y., is carrying out improvements at a cost of about $500,000, extending and improving its plant at Niagara Falls and its two furnace plants, one at Niagara Falls, Ont., and the other at Shawinigan Falls, Que. A three-story addition to the paper and cloth plant at Niagara Falls has just been finished; it is 432 ft. long and 81 ft. wide and will provide greater facilities for the storing and curing of all carborundum, Garnet and Aloxite paper and cloth products and for the extension of the rubber bonded wheel department. Another addition, just completed, extends one of the wheel-making and kiln departments, the new building being two stories high, 96 ft. long and 64 ft. wide. Both of these new structures are of concrete and are of the most modern type. Other extensions and improvements have been planned and work will be started immediately. These call for additions to the crushing departments and other improvements at the furnace plant at Niagara Falls, Ont., where the abrasive Aloxite is made, and at Shawinigan Falls, Que., where is located an extensive carborundum furnace plant. Besides these buildings the program calls for the extension of at least 14 different departments at the Niagara Falls, N. Y., plant of the Carborundum Company.

Westinghouse Air Brake Company

In his review of the work of the Westinghouse Air Brake Company for the fiscal year ended December 31, 1919, H. H. Westinghouse, chairman of the board, makes the statement that "The business of your company for the fiscal year under review reflects closely the general condition of affairs. While the volume of business has been large, owing to the unsettled condition of the railways the orders received have not been up to normal."

"The return of the railways to private ownership," he continues, "and orders booked during the two months of the current fiscal year indicate a volume of business in our standard line of manufacture equal to, if not exceeding, that of previous years."

The consolidated balance sheet this year includes not only the Westinghouse Air Brake Company, the Union Switch & Signal Company, etc., but also the Locomotive Stoker Company, the latter company being now regarded as a subsidiary rather than as an associated company as in the past. The consolidated balance sheet follows:

ASSETS.

Cash	$5,084,848
Accounts and bills receivable	5,577,765
Inventories	12,869,214
Deferred charges to operation	162,437
U. S. Certificates of Indebtedness	1,000,000
Liberty Bonds	2,777,184
Investments	8,131,133
Factories, less depreciation	9,999,129
Real estate, other than for factories	2,093,608
Patents and goodwill (all companies)	5,019,668
	$52,714,986

LIABILITIES.

Accounts payable		$1,107,588
Accrued liabilities		214,110
Contingent liabilities account of sales		161,569
		$1,483,267
Reserve for federal taxes		2,556,670
Capital stock, at par, of subsidiary companies not held by Westinghouse Air Brake Company		39,658
Capital stock	$29,165,800	
Less held in treasury	78,050	
		29,087,750
Accumulated funds:		
(1) Sundry reserves (including amount held against patent and goodwill account)	4,486,803	
(2) Pension and workmen's compensation funds (Union Switch & Signal Company)	181,208	
(3) Surplus	14,879,630	
		19,547,641
		$48,635,391
		$52,714,986

Obituary

Charles H. McCullough, Jr., president of the Lackawanna Steel Company, Buffalo, N. Y., died on April 3 in Baltimore, Md. Mr. McCullough had been president of the Lackawanna Steel Company since January 1, 1919, at which time he succeeded E. A. S. Clarke, who became president of the Consolidated Steel Company organized by several steel companies to handle export business. He was born on December 25, 1868, at Philadelphia, Pa., and graduated from Stevens Institute of Technology, Hoboken, N. J., with the degree of mechanical engineer. He was in the service of the Illinois Steel Company for 14 years and when he left had risen to the position of second vice-president of the company. He then went to the Lackawanna Steel Company and served for 12 years as vice-president and general manager until January 1, 1919, when he was elected president of the same company. Mr. McCullough during 1919 was elected a director of the American Iron & Steel Institute, in the work of which he for many years took an active interest. He was a director of the Consolidated Steel Company, the Pierce-Arrow Motor Car Company, and other industrial organizations.

C. H. McCullough, Jr.

John N. Derby, vice-president of Manning, Maxwell & Moore, Inc., New York, whose death on March 29 was briefly noted in the *Railway Age* of April 2, was born 53 years ago. He was a graduate of the University of Michigan, and in 1888 organized the Hayden & Derby Manufacturing Company in the state of Michigan. About 30 years ago he became associated with Manning, Maxwell & Moore, and the Hayden & Derby Manufacturing Company was afterwards absorbed by the United Injector Company. Mr. Derby, at the time Manning, Maxwell & Moore was incorporated, was made first vice-president, director and a member of the executive committee. His special end of the business was looking after the brass department, managing the sales of the Ashcroft Manufacturing Company, the Consolidated Safety Valve Company, and the Hancock Inspirator Company, and looking after the general railroad trade covering these lines. He was the inventor of the Metropolitan injector used on steam engines and locomotives.

J. N. Derby

Trade Publications

Locomotive Chart.—The Angus Sinclair Company, New York, has recently prepared a chart of a Pacific type locomotive showing a longitudinal cross section and a rear view of the interior of the cab. The detail parts are numbered and the names are given in a list printed on the sheet.

Railway Financial News

Atchison, Topeka & Santa Fe.—Arthur T. Hadley, president of Yale University; Frederick A. Juillard, of New York, and J. E. Otis, of Chicago, have been elected directors to fill existing vacancies.

Atlanta & West Point.—This company has executed a compensation contract with the Railroad Administration for $252,995 a year.

Boston & Maine.—The Maine Public Utilities Commission has authorized this company to issue $7,000,000 6 per cent equipment notes. These notes shall be issued in 15 serials of equal amounts and shall mature respectively on January 15 in each of the years 1921 to 1935, inclusive.

Chicago Great Western.—President Felton says: "The Chicago Great Western will not declare any more dividends until we know just what is to be expected in the way of adjustment with the government and advances in rates. The whole transportation financial problem is fraught with uncertainties and we must know just where we stand before acting upon preferred dividends.

"The company has asked the Interstate Commerce Commission for a loan of $2,000,000 from the new loan revolving fund appropriated by the Transportation Act of 1920."

Hocking Valley.—Maurice S. Connors, of Columbus, Ohio, has been elected a director to succeed W. L. Ross, of Toledo, Ohio.

Illinois Central.—The War Finance Corporation announced on March 31 that this company has paid off its loan of $5,700,000, this being the unpaid balance of loans originally amounting to $12,000,000.

The Illinois Southern.—This road, running from Salem, Ill., to Bismark, has been purchased by a syndicate of Chicago men, according to a recent announcement made by James B. Forgan, chairman of the board of directors of the First National Bank, Chicago, to the Chicago Clearing House Association. The road has not been in operation since December 12, 1919, when Federal Judge Carpenter, at Chicago, ordered its operation suspended because the road was incurring deficits.

Minneapolis, St. Paul & Sault Ste. Marie.—Equipment notes to the amount of $500,000, maturing in blocks of $50,000 annually until 1930, were placed on sale April 1 by the Minneapolis Trust Company, the Minnesota Loan & Trust Company, the First National and Northwestern National Banks of Minneapolis.

Newport & Sherman's Valley.—Rodney Gring, of Newport, Pa., has purchased this road for $40,000. The company was organized in 1890 by the late David Gring, father of the new owner. It operates between Newport, Pa., and Germantown, 31 miles.

Pennsylvania.—Kuhn, Loeb & Co. are forming a syndicate to offer an issue of $50,000,000 ten-year 7 per cent bonds at par and accrued interest. The new bonds are to be secured by $50,000,000 general mortgage 6 per cent bonds of the Pennsylvania Railroad Company and $5,000,000 new general mortgage 6 per cent. bonds of the Philadelphia, Baltimore & Washington Railroad.

Pennsylvania.—A special meeting of the stockholders of the Pittsburgh, Cincinnati, Chicago & St. Louis will be held in Pittsburgh on May 27 for the purpose of authorizing the issue of $35,000,000 5 per cent general mortgage bonds, $20,000,000 of which will be issued at once to reimburse the Pennsylvania company for advances made to cover the improvement and extension of the property.

Pennsylvania.—The number of stockholders on March 1, last, was 121,586, an increase of 1,273 over February 1 and an increase of 13,040 over a year ago.

Pittsburgh, Cincinnati, Chicago & St. Louis.—See Pennsylvania.

Railway Officers

Executive

E. E. Adams, consulting engineer of the Union Pacific system, with headquarters at New York, has been appointed assistant to the president, with headquarters at Omaha, Neb., in charge of purchases, engineering and standards.

John J. Corcoran, assistant to the general manager of the Great Northern, with headquarters at St. Paul, Minn., has been appointed assistant to the vice-president in charge of operation, with the same headquarters. Mr. Corcoran was born at Port Huron, Mich., on December 9, 1875. He entered railway service in 1895 as a locomotive fireman on the Great Northern. He was subsequently promoted to engineman and later was appointed superintendent of stations, after which he was promoted to assistant to the general manager, the position he held prior to his recent promotion.

Norman Call, who has been elected vice-president of the Richmond, Fredericksburg & Potomac, with headquarters at Richmond, Va., as noted in the *Railway Age* of March 5 (page 747), served as assistant to the president and secretary of the same road from April, 1917, until the termination of federal control. Mr. Call was born at Richmond, Va., on March 29, 1880. He was educated in the public schools of that city and graduated from the Virginia Mechanics' Institute. His entire railroad service has been with the Richmond, Fredericksburg & Potomac. On November 1, 1901, he began work as secretary and chief clerk to the president and remained in that position until September 30, 1910, when he became also secretary and chief clerk to the secretary of the company. In April, 1917, he was appointed assistant to the president and secretary, as noted above.

N. Call

Robert B. Pegram, who has been elected vice-president and resident executive officer at Atlanta, Ga., of the Southern Railway as noted in the *Railway Age* of March 5 (page 749), served during the greater part of the period of federal control as general purchasing agent with headquarters at Washington. Mr. Pegram was born on August 22, 1874, at Marion, Ala. He received a private school education and began railroad work on July 1, 1890 as utility clerk in the office of the assistant general freight agent of the Memphis & Charleston, now the Memphis division of the Southern, at Memphis, Tenn. From 1890 until 1895 he served in various clerical capacities in the freight traffic department. He was appointed chief clerk of the Memphis freight bureau in 1895 and later became chief clerk in the assistant general freight agent's office of the Illinois Central. From 1896 until 1899 he acted as chief clerk to the assistant general freight agent of the Southern at Memphis and was then transferred to the freight claim office at Washington, D. C. In 1902 he went to Birmingham, Ala., as chief clerk to the division freight agent, the soliciting freight agent and the commercial freight agent. He was promoted to chief clerk to the vice-president with headquarters at St. Louis, Mo., in April, 1905, and retained that position until December of the same year. From that time until July, 1908, he was assistant general freight agent and general freight agent respectively, with headquarters at Nashville, Tenn. He was transferred to Charleston, S. C., in 1908 and remained there until May, 1910. He was then appointed executive general agent in the executive department at Charleston and transferred to Memphis in the same capacity in January, 1917. He was appointed general purchasing agent with headquarters at Washington in July, 1918.

George A. Harwood, who has been appointed assistant to the president of the New York Central Lines, with headquarters at the Grand Central Terminal, New York, as noted in the *Railway Age* of February 27 (page 659), served during the greater part of federal control as corporate chief engineer. Mr. Harwood was born on August 29, 1875, at Waltham, Mass. He graduated from Tufts College with the degree of B. S. in civil and electrical engineering in 1898; in 1901 he received the degree of M.S. in the same sciences and again in 1913 the honorary degree of master of science. He began railroad work in 1893 in the engineering department of the Fitchburg Railroad, now part of the Boston & Maine, and with the exception of the time spent in college he remained with that road until 1900, when he entered the employ of the New York Central. From April, 1900, until November 1, 1906, he held various subordinate positions in the engineering departments of that road. He was then appointed chief engineer, electric zone improvements, in charge of the construction of the Grand Central Terminal and general improvements of the electric zone, later handling in addition special work in connection with west side improvements in New York city, and other developments in Buffalo, Cleveland and other places. On July 1, 1916, he became engineering assistant to the vice-president, New York Central Lines, which position he retained until June 10, 1918, when he was appointed engineering assistant to the federal manager of the New York Central Railroad. The following July he was appointed corporate chief engineer of all the roads embraced in the New York Central Lines.

G. A. Harwood

Financial, Legal and Accounting

W. J. Conaty has been appointed valuation auditor and member of the valuation committee of the Chesapeake & Ohio with headquarters at Richmond, Va., effective April 1.

Thomas M. Cunningham Jr., who has been appointed general counsel of the Central of Georgia with headquarters at Savannah, Ga., as noted in the *Railway Age* of March 5 (page 738), was born on January 30, 1869 at Savannah, Ga. He graduated from the University of Georgia in 1888 and on August 1, 1892, became a member of the firm of Lawton & Cunningham, general counsel for the Central of Georgia and the Ocean Steamship Company of Savannah. During federal control he was appointed federal solicitor, and upon the return of the road to private control he became general counsel.

Albert V. B. Gilbert, who has been appointed secretary of the Atlanta, Birmingham & Atlantic, as noted in the *Railway Age* of March 12 (page 800), served during the greater part of federal control as chief clerk to the federal manager of the same road and of the Atlanta & West Point, the Georgia and others. Mr. Gilbert was born on December 12, 1885, at Paducah, Ky. He received a public school education and began railroad work on June 1, 1902, as stenographer in the general agent's office of the Mobile & Ohio. In December of the same year he went to the superintendent's office of the Mobile, Jackson & Kansas City, now the Gulf, Mobile & Northern, but returned to the Mobile & Ohio on August 1, 1903, to serve as chief clerk in the office of the general agent at Mobile, Ala. He became solicit-

ing freight agent in June, 1905, and retained that position until July 1, 1909, when he was appointed general freight and passenger agent of the Alabama, Tennessee & Northern and the Toledo Valley, with headquarters at Mobile. On March 1, 1910, he was appointed solicitation clerk of the Atlanta, Birmingham & Atlantic, with headquarters at Atlanta, Ga., which position he retained until June 1, 1917, when he became division freight agent at Fitzgerald, Ga. He was appointed chief clerk to the president of the same road on May 13, 1918, and on the date mentioned above he was transferred as chief clerk to the federal manager.

Clayton E. Hildum, who has been appointed comptroller of the Lehigh Valley with headquarters at New York, as noted in the *Railway Age* of March 5 (page 743), served during federal control as manager of the accounting section of the Railroad Administration. Mr. Hildum was born at Jamestown, N. Y., and graduated from Wittenberg College in Springfield, Ohio, in 1897. He entered railway service in the accounting department of the Erie on March 1, 1898. In 1905, he was appointed traveling auditor and in 1909, chief clerk to the auditor. He was promoted to auditor of disbursements in 1911. In 1913 he became auditor of freight accounts, which position he retained until his appointment as manager of the accounting section in 1918.

C. E. Hildum

Herbert A. Taylor who has been appointed general solicitor of the Erie with headquarters at New York, as noted in the *Railway Age* of March 26 (page 1079), served from May, 1919, until the termination of federal control as general assistant to the director general of railroads. Mr. Taylor was born on October 6, 1876, at Beverly, N. J. He graduated from Cornell University with the degree of A. B. in 1897 and from the University of Buffalo law school in 1898. He entered railway service in the legal department of the Erie as managing clerk in July, 1899. He remained in that capacity until 1904 when he was appointed assistant general solicitor. From July until October, 1912, he served as commerce counsel of the same road. He was then appointed general attorney and retained that title until June, 1918. In March of that year he was appointed assistant to Walker D. Hines, then assistant director general of railroads. When Mr. Hines succeeded William G. McAdoo as director general, Mr. Taylor took the title of assistant to the director general.

H. A. Taylor

Operating

J. L. East, superintendent of freight service of the Illinois Valley, has been appointed superintendent of stations and transfers and **C. G. Richmond** has been appointed assistant superintendent of stations and transfers, effective April 1.

W. B. Kirkland has been appointed assistant trainmaster on the Stockton division of the Southern Pacific, with headquarters at Tracy, Cal., effective April 1.

H. H. Hooper, superintendent on the St. Louis Southwestern, with headquarters at Mt. Pleasant, Tex., has been transferred to Pine Bluff, Ark., succeeding M. J. Kennelly, who has been transferred.

Harry E. Speaks, who has been appointed general manager of the Toledo & Ohio Central and the Kanawha & Michigan, with headquarters at Columbus, Ohio, as noted in the *Railway Age* of March 19 (page 996), has been superintendent of these same roads since July 1, 1909. Mr. Speaks was born on June 18, 1872, at Canal Winchester, Ohio. He received a public school education and began railroad work in September, 1888, as a messenger for the Hocking Valley. From 1890 until 1893 he served consecutively as yard clerk, telegraph operator and station agent. He became chief clerk to the division superintendent in 1893 and retained that position until 1895, when he became chief clerk to the general superintendent. He was appointed assistant trainmaster in 1900 and left the service of the Hocking Valley in September, 1901, to become trainmaster for the Toledo & Ohio Central. In October, 1902, he was appointed superintendent and on July 1, 1909, general superintendent, with headquarters at Columbus, Ohio.

H. E. Speaks

T. H. Lantry, assistant general manager of the Northern Pacific with headquarters at St. Paul, Minn., has been appointed superintendent of the Montana division with headquarters at Livingston, Mont., succeeding **W. C. Showalter** who returns to his former position as trainmaster at Missoula, Mont., effective April 1.

W. A. Baldwin, who has been appointed manager of the Ohio region of the Erie, with headquarters at Youngstown, Ohio, under the road's new plan of organization, was born on July 26, 1876, at Elmira, N. Y. He graduated from Cornell University in 1896 and began railroad work the same year as a chainman for the Erie. In May, 1899, he was promoted to rodman and some time later to assistant engineer. From March, 1902, until September, 1903, he acted as trainmaster. He was then appointed division engineer and retained that position until 1909, from which time until December, 1910, he again served as trainmaster. He was promoted to superintendent of the Chicago and Lima divisions in 1910 and was transferred to the Jefferson and Delaware divisions in May, 1912. Afterwards he was promoted to general superintendent of the Lines East of Salamanca and in 1917 was transferred to the Lines West with headquarters at Youngstown. He was appointed transportation assistant with jurisdiction over transportation matters formerly in charge of the general manager in June, 1918, and a month later was appointed general manager.

W. A. Baldwin

W. S. Joy has been appointed acting trainmaster on the Salt Lake division of the Southern Pacific, with headquarters at Mina, Neb., with jurisdiction over the Mina sub-division, effective April 1, succeeding **D. M. Mergen**, assigned to other duties.

Lockett G. Coleman, general manager of the Grand Trunk Lines in New England during federal control, who has been appointed assistant general manager of the Boston & Maine, with headquarters at Boston, Mass., was born on December 7, 1877, at Macon, Ga. He graduated from Harvard University in 1899, and began railroad work on October 1, 1900, in the motive power department of the Grand Trunk. In April, 1901, he went to the Delaware, Lackawanna & Western, where he served in various capacities in the motive power department. He became assistant to the general manager of the Rogers Locomotive Works in December, 1901, but returned to the Grand Trunk as assistant to the superintendent at Allandale, Ont., in May, 1902. He was appointed trainmaster at Montreal, Que., in October, 1903, and was promoted to assistant superintendent, with headquarters at Ottawa, Ont., in May, 1906. In December of the same year he was transferred to Belleville, Ont., and was promoted to superintendent at Ottawa in May, 1910. He became general manager of the Grand Trunk Lines in New England in June, 1918.

L. G. Coleman

Michael H. Cahill, who has been appointed general manager of the Seaboard Air Line, as noted in the *Railway Age* of February 27 (page 658), served as general superintendent of the Maryland district of the Baltimore & Ohio from November, 1917, until the termination of federal control. Mr. Cahill was born at Lexington, Ohio, in 1874. He graduated from the Lexington high school in 1891. His first railroad service, begun in 1886, was as a messenger boy for the Baltimore & Ohio. Afterwards he became operator and despatcher. He served as division operator in 1905 and retained that position until 1910, when he was appointed trainmaster. He was promoted to assistant superintendent in January, 1912, and the following August became superintendent. In November, 1912, he left the Baltimore & Ohio to accept a position with the Delaware, Lackawanna & Western as a division superintendent, but returned to the Baltimore & Ohio, in May, 1913, as assistant superintendent of the Cumberland division with headquarters in Keyser, W. Va. He subsequently became superintendent of the New Castle division at New Castle, Pa. In 1916 he was promoted to general superintendent of the Pennsylvania district, with headquarters at Pittsburgh, Pa., being later transferred to the Maryland division, with headquarters at Baltimore, Md.

M. H. Cahill

G. V. Peyton, superintendent of the East Carolina division of the Seaboard Air Line, has been transferred to the North Carolina division with headquarters at Hamlet, N. C., succeeding **E. C. Bagwell**, who has been transferred to the East Carolina division with headquarters at Charleston, S. C. succeeding Mr. Peyton, effective April 5.

Henry B. Voorhees, who has been appointed general manager of the New York terminal lines of the Baltimore & Ohio, with headquarters at New York, as noted in the *Railway Age* of March 5 (page 737), is promoted to this position from that of manager of the New York terminal lines. Mr. Voorhees was born on January 22, 1876, at Saratoga Springs, N. Y. He graduated from the Rensselaer Polytechnic Institute with the class of 1896 and began railroad work on March 1, 1897, as assistant supervisor for the Philadelphia & Reading. He remained with that road in various positions until December 1, 1901, when he went to Baltimore & Ohio as assistant engineer at Pittsburgh, Pa., in which capacity he served until July 1, 1902. He then became division engineer at Baltimore, Md., and on September 1, 1903, was appointed assistant to the general superintendent of transportation. He was transferred to Philadelphia on February 1, 1905, as superintendent and general agent, but returned to Baltimore on June 1, 1909, as assistant to the president. He was appointed general superintendent of transportation in 1910 and general superintendent with headquarters at Cincinnati, Ohio, in 1911. On October 1, 1917, he was promoted to general superintendent of transportation with headquarters at Baltimore. He became manager of the New York terminal lines on July 15, 1919.

H. B. Voorhees

James E. Hutchison, whose appointment as general manager of the St. Louis-San Francisco was announced in the *Railway Age* of March 5 (page 747), was born at Washburn, Ill. He began railway service as a telegraph operator on the Chicago & Alton at the age of 13 years, and at 16 years of age was promoted to train despatcher. Prior to March 1, 1903, he was successively despatcher, chief despatcher and trainmaster, with the exception of a year when he served as a despatcher on the Denver & Rio Grande, with headquarters at Pueblo, Col., and on the Union Pacific as a despatcher at Denver, Col. In March, 1903, he was employed as a train despatcher on the St. Louis-San Francisco and in July, 1904, was promoted to superintendent of terminals at Kansas City, Mo. From June 1, 1906, to August 21, 1907, he was superintendent of the Northern division with headquarters at Fort Scott, Kan., retaining jurisdiction over the Kansas City Terminals. On August 21, 1907, he was promoted to general superintendent of the first district and on December 15, 1909, was transferred to the second district which position he held at the time of his appointment as general manager, effective March 1, 1920. He succeeds J. M. Kurn, notice of whose election as presi-

J. E. Hutchison

dent of the St. Louis-San Francisco appeared in the *Railway Age* of February 27, page 658.

R. Boone Abbott, who has been appointed assistant general superintendent of the Philadelphia & Reading, with headquarters at Reading, Pa., as noted in the *Railway Age* of March 5 (page 746), served during the greater part of federal control as superintendent of the New York division of the same road. Mr. Abbott was born on July 14, 1881, at Philadelphia. He graduated from the Pottsville High School in 1900. After taking a two months' post graduate course in higher mathematics, he entered the employ of the Reading as a clerk in the office of the superintendent at Tamaqua, Pa., on October 1, 1900. The following September he was appointed assistant supervisor and as such served at Tamaqua, Milton, Reading and Harrisburg, Pa. On June 6, 1905, he was promoted to supervisor. He was appointed division engineer at Harrisburg on March 9, 1910, and on March 17, 1916, he became superintendent of the Shamokin division, with headquarters at Tamaqua. He was transferred to the Harrisburg division, with headquarters at Harrisburg, on March 28, 1916, and on July 16, 1918, he was transferred to Philadelphia as superintendent of the New York division.

R. B. Abbott

Claude C. Ray, whose appointment as assistant general manager and traffic manager of the De Queen & Eastern, and of the Texas, Oklahoma & Eastern, with headquarters at De Queen, Ark., was announced in the *Railway Age* of February 20 (page 597), was born at Joplin, Mo., on March 2, 1883. He entered railway service as a clerk in the office of the general freight and passenger agent of the De Queen & Eastern in 1903. On September 1, 1903, he was employed as a stenographer in the office of the vice-president and general manager of the De Queen & Eastern, and also as a stenographer for the Dierks Lumber & Coal Company, De Queen, Ark. Three years later he was employed as chief clerk in the office of the general freight and passenger agent of the De Queen & Eastern, which position he held until May 1, 1907, when he became office manager of the Waterman Lumber Supply Company, Waterman, Tex. On August 1, 1907, he was promoted to manager of the Waterman Lumber Supply Company, and the following year again entered railway service as general freight and passenger agent and assistant auditor and assistant treasurer of the De Queen & Eastern, with headquarters at De Queen. On June 7, 1911, his authority was extended over the traffic, accounting and treasury departments of the Texas, Oklahoma & Eastern, which position he retained until January 1, 1920, when he was appointed assistant general manager and traffic manager of the De Queen & Eastern and the Texas, Oklahoma & Eastern, hving jurisdiction over the operating, traffic accounting and treasury departments, also being in charge of the valuation of these two

C. C. Ray

S. W. Crabbe, superintendent of the Schreiber division of the Algoma district of the Canadian Pacific with headquarters at Schreiber, Ont., has been transferred to the Smith Falls division, Quebec district, succeeding **T. A. Wilson** who has been transferred to the Sudbury division with headquarters at Sudbury, Ont. Mr. Wilson succeeds W. R. Boucher who has been transferred to the Chapleau division with headquarters at Chapleau, Ont., succeeding **W. C. Guthrie,** who has been transferred to the Schreiber division to succed Mr. Crabbe, all effective April 1.

Traffic

E. W. White has been appointed general agent of the Central-Savannah Line with headquarters at St. Louis, Mo., effective April 1.

Peter N. Butzen has been appointed district passenger agent of the Chicago Great Western, with headquarters at Chicago, effective April 1.

R. W. Smallwood has been appointed freight and passenger agent of the Maryland & Pennsylvania with headquarters at Baltimore, Md., effective April 1.

R. H. Wallace who has been appointed passenger traffic manager of the Erie with headquarters at New York, as noted in the *Railway Age* of March 26 (page 1079), served during the greater part of federal control as a member of the passenger traffic committee, for the Eastern Allegheny and Pocahontas regions of the Railroad Administration. Mr. Wallace was born at Zanesville, Ohio, and received a public school education in Crawford Country, Pa. He began railroad work as station agent and telegraph operator for the Atlantic & Great Western, now part of the Erie at Geneva, Pa. In March, 1875, he was transferred to a similar position on the New York, Pennsylvania & Ohio, now also part of the Erie, at Lakewood, N. Y., in November, 1880. Later he was transferred to Atlantic, Pa. In March, 1887, he was appointed passenger and ticket agent of the same road at Oil City, Pa. He was promoted to traveling passenger agent, with headquarters at Akron, Ohio, in March, 1892, and while serving in that capacity was transferred to Youngstown, Ohio, in 1894. He was appointed general agent of the Erie, with headquarters at Cleveland, Ohio, in May, 1896, and in March, 1902, he became assistant general passenger agent, with the same headquarters. He was promoted to general passenger agent, with headquarters at New York, in January, 1905. In April, 1918, he became a member of the passenger traffic committee, as mentioned above. In 1912-1913 Mr. Wallace was president of the Passenger Traffic Officers' Association and in 1913-1914, president of the New York Traffic Club.

R. H. Wallace

A. C. Hultgren has been appointed assistant general freight agent of the Chicago, Terre Haute & Southwestern, with headquarters at Chicago, effective April 1.

Harry Wilson, general freight agent of the Erie with headquarters at New York, has resigned and has been appointed senior member, auxiliary committee, Trunk Line Association, freight department, effective April 1.

Clarence L. Chapman, acting general passenger agent of the Erie with headquarters at New York, has been appointed general freight agent with the same headquarters succeeding **Harry Wilson,** resigned, effective April 1.

John T. Carter has been appointed commercial agent of the Seaboard Air Line with headquarters at Savannah, Ga., succeeding **C. E. Felton**, resigned; **John T. Baird** has been appointed commercial agent at Detroit and **Henry C. Thompson** at Nashville, Tenn.

Robert J. Carmichael, whose appointment as assistant general passenger agent on the Illinois Central and the Yazoo & Mississippi Valley, with headquarters at Memphis, Tenn., was announced in the *Railway Age* of March 5 (page 743), was born at Chicago in 1880. He entered railway service in 1897 as a clerk in the office of the general passenger agent of the Illinois Central at Chicago. He was later promoted to passenger agent of the same road at St. Louis, Mo., and to traveling passenger agent at Cincinnati, Ohio. Several years later he was made city passenger agent of the same road at Chicago and later was promoted to district passenger agent, with the same headquarters. Prior to his present appointment as assistant passenger agent at Memphis, he was, successively, division passenger agent at Chicago and instructor of passenger train and station employees, with the same headquarters.

R. J. Carmichael

W. F. Griffitts, general passenger agent of the Delaware, Lackawanna & Western, has taken over the duties heretofore performed by George A. Cullen, passenger traffic manager, who has resigned, effective April 1. **W. H. Dominick** has been appointed assistant general passenger agent of the same road.

Charles W. Kieswetter, whose appointment as traffic manager of the Duluth, Missabe & Northern, with headquarters at Duluth, Minn., was announced in the *Railway Age* of March 5 (page 740), was born in Queens county, N. Y., in October, 1871. He entered railway service in September, 1891, as a clerk in the general freight and passenger department of the St. Paul & Duluth, now part of the Northern Pacific. In July, 1893, he was employed as a chief clerk on the Duluth, Missabe & Northern at Duluth, and two years later was transferred to the auditor's office. In July, 1897, he was appointed a traveling auditor and chief clerk and in January, 1906, was appointed a general agent in the freight and passenger department. In November, 1914, he was appointed assistant general freight agent, which office he held until August, 1918, when he was promoted to general freight and passenger agent. This position he held at the time of his promotion to traffic manager.

C. W. Kieswetter

George Krause, Jr., who has been appointed general freight agent of the Cleveland, Cincinnati, Chicago & St. Louis, with headquarters at Cincinnati, Ohio, as noted in the *Railway Age* of March 19 (page 994), served as assistant general freight agent from January, 1911, until the termination of federal control. Mr. Krause was born on April 27, 1861, at Cleveland, Ohio. He received a public school education. His entire railroad service has been with the road of which he is now general freight agent. He entered its employ on September 1, 1877. In May, 1884, he became contracting agent and in 1901 commercial agent. He was appointed division freight agent in August, 1909, and retained that position until his appointment as assistant general freight agent, as mentioned above.

Richard Van Ummersen, who has been appointed freight traffic manager of the Boston & Albany, with headquarters at Boston, Mass., as noted in the *Railway Age* of March 5 (page 738), has been general freight agent of that road since 1911. Mr. Van Ummersen was born in Boston, Mass., on December 14, 1874. His entire railroad service has been with the Boston & Albany, the employ of which he entered on July 26, 1891, in the ticket auditor's office. In that office he served in various capacities until 1896, when he was transferred to the general freight office. While there he was promoted to chief clerk. On June 1, 1906, he was appointed division freight agent at Worcester, Mass., but returned to Boston on November 2, 1907, as assistant general freight agent. He was appointed general freight agent on June 5, 1911.

R. Van Ummersen

George C. Manning, who has been appointed general freight and passenger agent of the Ohio region of the Erie, with headquarters at Youngstown, Ohio, as noted in the *Railway Age* of February 27 (page 662), served from March 1, 1919, until the termination of federal control as assistant general freight agent of the same road at Chicago. Mr. Manning was born on September 3, 1874, at Lockport, N. Y. He graduated from the Lockport High School and began railroad work in October, 1889, as a clerk in the freight office of the Erie at Lockport. Afterwards he served in other clerical capacities in the same office and in Tonawanda, N. Y. He became agent at Lockport in May, 1903, and in May, 1904, was transferred to Buffalo as contracting freight agent. In May, 1907, he went to New York in the same capacity, and in October, 1909, was appointed division freight agent. While acting as division freight agent he was transferred to Elmira, N. Y., and on November 15, 1916, was appointed general agent at Youngstown, Ohio. In August, 1918, he was promoted to assistant general freight agent with the same headquarters, having jurisdiction over the lines west of Buffalo, and on March 1, 1919, was transferred, as mentioned above, to Chicago.

G. C. Manning

William T. Stevenson, who has been appointed traffic manager of the Cleveland, Cincinnati, Chicago & St. Louis, as noted in the *Railway Age* of March 26 (page 996), served as chairman of the Cincinnati district freight traffic committee during federal control. Mr. Stevenson was born at Covington, Ky.,

on September 20, 1873, and graduated from the high school there. He began railroad work in 1896 as secretary to the freight traffic manager of the Cleveland, Cincinnati, Chicago & St. Louis. He was afterwards appointed chief clerk to the assistant general freight agent. He then became, consecutively, traveling freight agent, division freight agent and chief of the tariff bureau. He was appointed assistant general freight agent in 1914 and general freight agent in 1916. His next position was as chairman of the district freight traffic committee, as mentioned above.

J. W. Allison who has been appointed freight traffic manager of the Western Maryland with headquarters at Baltimore, Md., as noted in the *Railway Age* of March 12 (page 807) served as assistant to the central territory freight traffic committee of the Railroad Administration during the greater part of federal control. Mr. Allison began railroad work as messenger in the general freight department of the Erie at Cleveland, Ohio on December 23, 1893. He filled various clerical positions until July 2, 1903, when he became chief clerk to the assistant general freight agent at Chicago. On May 16, 1906 he became chief clerk in the general freight department of the Cincinnati, Hamilton & Dayton at Cincinnati, Ohio. The following July he was appointed assistant general freight agent of that road. On September 7, 1909, he was promoted to general freight agent, and filled that position until the consolidation, of operation of the Baltimore & Ohio Southwestern and the Cincinnati, Hamilton & Dayton when he became freight tariff agent of both. He was appointed assistant general freight agent of the two companies on January 1, 1913. Upon the establishment of the permanent Official Classification Committee in December, 1915, he became a member of that committee and served in that capacity until August 1, 1918 when he was appointed to serve under the Railroad Administration central territory freight traffic committee with headquarters at Chicago.

J. W. Allison

R. L. Helstrom has been appointed commercial agent of the Carolina, Clinchfield & Ohio, with headquarters at Chicago; **E. S. Hiner** has been appointed commercial agent at Cincinnati, Ohio; **L. E. Sauer,** commercial agent at Columbus, Ohio, and **Robert Hunter,** commercial agent at Pittsburgh, Pa., effective March 1.

George E. Boulineau, who has been appointed general freight agent of the Atlanta & West Point, with headquarters at Atlanta, Ga., as noted in the *Railway Age* of March 12 (page 801), served during the greater part of federal control as assistant staff traffic officer on the staff of the regional director of the Southern region. Mr. Boulineau was born in Augusta, Ga., on May 11, 1884. He graduated from the high school at Charleston, S. C., in 1901. On November 1, 1902, he began railroad work as clerk in the traffic department of the Central of Georgia. He went to the Southern in 1904 as clerk, and remained there until 1905, when he accepted the position of secretary to the general freight agent of the Georgia. Soon afterwards he became executive clerk and then chief rate clerk, chief clerk and assistant general freight agent, respectively. On July 1, 1918, when the operation of the Georgia was consolidated under government control with several other southern lines, he was appointed assistant general freight agent of the consolidated system. Subsequently he became assistant staff traffic officer for the Southern region, as mentioned above.

George T. Atkins, Jr., whose appointment as freight traffic manager of the Missouri, Kansas & Texas Lines, with headquarters at Dallas, Tex., was announced in the *Railway Age* of March 5 (page 745), was born at Petersburg, Va., on August 13, 1878. He entered railway service on October 1, 1897, as a messenger and clerk in the auditor's office of the Missouri, Kansas & Texas of Texas. From 1901 to 1906, he was successively file clerk, rate clerk, cotton clerk and chief rate clerk in the general freight office of the same road at Dallas, Tex. On October 1, 1906, he was appointed commercial agent at Dallas, and, later in the same year, was chief clerk in the general freight office of the Katy at Dallas. On June 1, 1910, he was appointed traffic manager of the Shreveport, La., Chamber of Commerce, which position he retained until July 1, 1918, when he was appointed traffic assistant in the Division of Public Service and Accounting of the United States Railroad Administration, with headquarters at Washington. Later in the same year he was promoted to assistant to the director of the Division of Public Service, and, in 1919, was promoted to assistant director of the same division. This position he retained until the time of his appointment as freight and traffic manager of the Missouri, Kansas & Texas Lines.

Harry R. Lewis, who has been appointed freight traffic manager of the southwest region of the Baltimore & Ohio, with headquarters at Cincinnati, Ohio, as noted in the *Railway Age* of March 5, 1920 (page 738), was born on March 25, 1872, at Mattoon, Ill. He began railroad work in December, 1889, in the freight office of the Missouri, Kansas & Texas, at Sedalia, Mo. From 1891 until 1896 he served as clerk in the general freight office of the Cleveland, Cincinnati, Chicago & St. Louis, at Cincinnati, Ohio. He went to the Baltimore & Ohio in 1897 as tariff clerk at Baltimore, Md., and afterwards became rate clerk and chief clerk, respectively. In 1912, he was appointed division freight agent at Baltimore, being promoted to general freight agent in 1913 and retaining that position until 1916. He was appointed general freight agent, with headquarters at Pittsburgh, Pa., in 1917. During the period of federal control he was a member of the trunk line freight traffic committee at New York. Mr. Lewis also served as a member of the official classification committee from 1913 to 1916.

Mechanical

Edwin B. DeVilbiss, who has been appointed superintendent of motive power of the Eastern Ohio division, central region of the Pennsylvania, with headquarters at Pittsburgh, Pa., as noted in the *Railway Age* of February 20 (page 599) was assistant engineer of motive power in the office of the general superintendent of motive power of the Lines West from October 15, 1917, until the termination of federal control. Mr. DeVilbiss was born on September 13, 1884, at Fort Wayne, Ind. He graduated from Purdue University in 1908 with the degree of mechanical engineer and entered the employ of the Pennsylvania Lines West on July 1, 1908, as a special apprentice. He was promoted to motive power inspector on January 1, 1911, to electrical engineer of the Northwest system on April 1, 1912, and to assistant engineer of motive power of the Central system on June 1, 1915, and to assistant engineer of motive power in the office of the general superintendent motive power on October 15, 1917, as above noted.

E. B. De Vilbiss

W. R. Parker, road foreman of engines of the Southern Pacific at Stockton, Cal., has been transferred to West Oakland, Cal., succeeding **E. E. House,** retired because of ill health.

G. B. Jefferis has been appointed road foreman of engines of the Stockton division of the Southern Pacific, with headquarters at Tracy, Cal., succeeding **W. R. Parker**, transferred, effective April 1.

George T. Depue, who has been appointed mechanical superintendent of the newly-created Chicago region of the Erie, as noted in the *Railway Age* of February 27 (page 662), served as shop superintendent of the same road at Susquehanna, Pa., from July 1, 1916, until the termination of federal control. Mr. Depue was born on December 2, 1872, at Hornell, N. Y., and received a grammar school education. On March 1, 1889, he entered the employ of the Erie as a machinist apprentice. He afterwards worked as a machinist and extra gang foreman until March 1, 1901, when he was promoted to the position of general foreman of the Bradford division, with headquarters at Bradford, Pa. On August 1, 1901, he was appointed general foreman of the Hornell shop; on July 1, 1903, master mechanic at Hornell; on April 1, 1908, master mechanic at Galion, Ohio, and on August 1, 1913, shop superintendent at Galion, holding that position until July 1, 1916, when he was appointed shop superintendent at Susquehanna, Pa.

G. T. Depue

Amos C. Davis, who was appointed superintendent motive power of the Southern division, eastern region of the Pennsylvania system, as noted in the *Railway Age* of February 20 (page 598), served as master mechanic of the Maryland division during the greater part of federal control. Mr. Davis was born on March 20, 1876, at Altoona, Pa. He was educated in public and private schools in Indiana County, Pa. His entire railroad service, dating from April 3, 1893, has been with the Pennsylvania, his first position being that of machinist apprentice at the Altoona shops. At the end of his apprenticeship he was employed as a machinist for about two years and was then made gang leader in the erecting shop. After several minor promotions he was appointed acting assistant master mechanic at Altoona on March 8, 1909, and on April 1, 1910, foreman of the miscellaneous shop. For five years, or from July, 1912, to July, 1917, he was general foreman of the locomotive erecting shop at Altoona. On the latter date he was made general foreman at East Altoona, and in October of that year general foreman of the Altoona machine shop. On October 21, 1918, Mr. Davis was appointed master mechanic of the Maryland division, with headquarters at Wilmington, Del.

A. C. Davis

Engineering, Maintenance of Way and Signalling

C. R. Stewart has resigned from his position as consulting engineer in the executive department of the Erie to engage in other business.

C. J. Parker, principal assistant engineer of the New York Central lines east of Buffalo, with headquarters at New York, has been appointed chief fire protection engineer, a newly created position, effective March 1.

Orlando K. Morgan, who has been appointed chief engineer of the Carolina, Clinchfield & Ohio, as noted in the *Railway Age* of March 5 (page 738), was until recently engineer in charge of the same road. Mr. Morgan was born on January 27, 1870 at Alliance, Ohio. He graduated from the high school at Carrollton, Ohio. In 1888 he began railroad work as rodman for the Coshocton & Southern, now part of the Wheeling & Lake Erie. Soon afterwards he became transitman. From 1889 until 1890 he was draftsman for the Wrought Iron Bridge Company in Canton, Ohio. In 1890 he went to the Norfolk & Western as draftsman and assistant engineer, which position he retained until 1893, when he became assistant engineer of the Boston, Revere Beach & Lynn. He went to Brockton, Mass., in 1895, as city draftsman and held that position until 1896, when he was appointed assistant engineer of the Boston & Maine. In 1900 he became engineer for the board of sewer commissioners of Wakefield, Mass. He was appointed assistant engineer of the Massachusetts Electric Railways, with headquarters at Boston, Mass., in 1904 and remained with that company until 1905, when he received his appointment with the Carolina, Clinchfield & Ohio as chief draftsman. He subsequently held the positions respectively of office engineer, engineer maintenance of way and engineer in charge.

O. K. Morgan

Purchasing and Stores

L. V. Guild has been appointed purchasing agent of the Union Pacific, succeeding **G. H. Robinson**, transferred, effective April 1.

Special

R. H. Dwyer, trainmaster on the Missouri Pacific at Alexandria, La., has been promoted to superintendent of safety, with headquarters at St. Louis, Mo., succeeding M. McKernan, who has been assigned to other duties. The promotion is effective April 1.

Railroad Administration

M. J. Wise has been appointed manager of the department of materials and supplies, Division of Liquidation Claims, of the United States Railroad Administration, with office at Washington. **J. H. Lauderdale** has been appointed assistant manager, and **H. R. Condon** and **J. A. Turner**, assistants to the manager.

Obituary

George Ziegler, secretary of the Philadelphia & Reading, died suddenly at his home near New Hope, Pa., on April 5.

W. C. F. Rechenback, paymaster of the Atchison, Topeka & Santa Fe, died March 24 at Topeka, Kan., at the age of 75.

R. F. Kelley, traffic manager of the Wheeling & Lake Erie, died in Cleveland, Ohio, on March 24 after an illness of six months.

Nicholas J. O'Brien, superintendent on the Kansas City, Mexico & Orient, with headquarters at San Angelo, Tex., died at Wichita, Kan., on March 28.

EDITORIAL

Railway Age

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Improvement in Dining Car Service

In general dining car service is an expense, not a source of revenue. On the other hand, in no other class of service possibly was it feasible to make a quick and obvious change after the roads were returned to private operation. Many roads, both in the east and west, have been prompt to recognize this fact and progressive passenger departments have seized the opportunity here presented. A really well-served, good meal at a reasonable price in these days of bad service and high prices will go far toward making sympathetic friends for the railroads. No other class of advertising is more effective. The passenger traffic managers who are making larger appropriations under this head and who are holding their dining car superintendents up to a higher standard than ever before are pretty surely right, and they should have the support of their executives. It is good public policy. It may take years to reinstil courtesy into trainmen, ticket sellers and station agents. The domestic servant problem is a good illustration to the average man of how difficult it is to secure courtesy and willing effort. Let him imagine what his problem would be if he had lent his servants to some one else who had for two years both spoiled them and made them dissatisfied. This is the problem confronting the railroads, but the dining car service is small compared with the whole problem and the immediate loss of some additional money in this service can well be charged to gaining good will and be considered as money well spent.

Utilizing Resources to Best Advantage

In talking to the business paper editors in New York City last week, Samuel Gompers indicated that the shortening of the work day was a distinct advantage to industry because it forced the adoption of labor and time-saving facilities and methods. Railroad officers for many years have been faced with steadily increasing costs without corresponding increases in revenue and this has compelled them to look more or less closely into capacity and efficiency increasing equipment and practices. The roads generally are today unable to handle the traffic which is offered to them and production in many industries is restricted by the lack of transportation. It will be a slow and tedious process to improve the efficiency and productive capacity of the human element; there is no large amount of money available for new physical facilities, and if there were, it would in most cases be impossible to get sufficiently prompt delivery to promise any great amount of relief in the near future. The problem then resolves itself largely into using the available resources to the utmost in improving or modernizing the existing equipment and facilities. So great is the necessity that it would seem that all departments would be justified in putting their best men at work to concentrate their efforts toward devising ways and means of doing this to the best possible advantage. Steps might also well be taken by the American Railroad Association and its various sections to arrange for the pooling of the suggestions and experiences of the different roads in order that all of them could quickly be informed as to the important capacity-increasing developments on any one of the whole number.

Train Operation by Signal Indication

As a result of a careful study made to determine how best to handle heavy traffic over a stretch of single track, the Louisville & Nashville found that the rearrangement of the original signal system and the installation of a traffic locking scheme in connection with the automatic signals saved the expense of building an additional track, trestle and bridge over the Ohio river. The stretch of single track in question is approximately 4½ miles long between Evansville, Ind., and Henderson, Ky., and has 24 passenger and 22 freight trains scheduled a day in addition to a number of extra passenger and freight trains. One of the attractive features of the present method of operation is the fact that train orders have been dispensed with. Formerly, considerable time was lost by trains in waiting for orders governing their movements over this stretch of track; this delay has now been eliminated. A description of the results accomplished appears elsewhere in this issue and should be of value in helping to solve similar problems on other short stretches of congested single track. A study of the article will well illustrate the important possibilities of signaling, in relieving congestion and facilitating the handling of traffic in addition to saving large amounts which would otherwise have to be expended for other facilities.

Cotton Belt Refuses Guarantee

J. M. Herbert, president of the St. Louis Southwestern, refused to accept the guarantee of government rental for the current six months because he wished to spend about $1,000,000 more on maintenance during these six months than the administration would have spent on the program of maintenance carried out during the two years of government operation. The government's standards of maintenance called for about $2,000 a mile. The St. Louis Southwestern is planning to spend between $3,000 and $4,000 per mile. If the company had accepted the guarantee and had spent $3,500 a mile for maintenance of way, and had earned the full amount of the guarantee it might have had to pay over to the government the difference between $2,000 a mile and $3,500. As it is now if the company earns only its fixed charges it will lose $600,000 as compared with what it would have got by accepting the guarantee, but it will have charged to expenses $1,000,000 more than it could have charged to them in accordance with the provision of the Transportation Act, which limits maintenance to the same rate as under government operation and it will be $400,000 to the good. As a matter of fact, the St. Louis Southwestern is doing remarkably well. A strike such as that of the switchmen at St. Louis may upset all calculations, but barring some such catastrophe such as this, the prospects are that the road will earn considerably more than its guarantee even after having spent the additional $1,000,000 on maintenance. It took courage to refuse the guarantee. The company's risk is by no means theoretical. On the other hand, the decision is the result apparently of sound business judgment based however on hopes for the future rather than on immediate expediency. Competition in the Southwest is particularly keen. The St. Louis Southwestern had difficulties with the railroad administra-

tion during government operation and it is the opinion not only of the St. Louis Southwestern officers but of large shippers along its lines that the road did not get all of the traffic under government operation that it would have gotten under free competition. The only effective means of competition between railroads now is service. A railroad in poor physical condition cannot give service satisfactory to its patrons. The St. Louis Southwestern evidently intends to give this service even if it has to risk its own good money to do so. The decision of the company should and probably will have the approval of the shippers along its lines, and the reasons which lead to it are deserving of respect.

Strikes that Must be Fought to a Finish

The American public has witnessed many struggles between the railroad companies and the railroad labor brotherhoods. Recently, it has been treated to the unusual spectacle of the companies and the brotherhoods fighting side by side to defeat sporadic strikes which have broken out in various parts of the country. Doubtless this spectacle has been regarded by many persons with wonder. The strikes are causing the public much inconvenience and loss. Doubtless many business men are impatient because the companies, instead of refusing to deal with the strikers, do not negotiate and make settlements with them.

The railroad brotherhoods and the companies are seeking to protect their own interests, but at the same time are acting in the interest of the public, and the public cannot promote its own welfare any better than by backing the brotherhoods and the companies in the struggle to the limit.

Some months before the new railroad law was passed the various classes of railway employees had presented to President Wilson and the Railroad Administration demands for advances in wages aggregating about $1,000,000,000. After the law was enacted committees representing the companies and the employees were appointed to negotiate regarding these proposed advances. The outcome was what might naturally have been expected. Any advance in wages made would have had to be added to the advance in rates which the railways must be given if they are to be put on their feet financially again—in other words, would have had to be paid by the public. No committee of railway officers could have been expected to assume the heavy responsibility of granting a large advance in wages which would be made directly and entirely at the expense of the public. On the other hand, no committee representing the employees could have been expected to accept, much less propose, as a settlement a wage advance much less than that which had been demanded. Consequently, as might have been anticipated, the two committees agreed to disagree, thus making a record on which, under the provisions of the new law, appeal lay to the Railroad Labor Board provided for by that measure.

The officers of the large railroad labor brotherhoods bitterly opposed the enactment of the labor provisions of the new law. Sometimes, however, their actions, like those of many other people, are wiser and more public-spirited than their utterances. Instead of calling a strike, they bowed with unexpectedly good grace to public sentiment, and prepared to present their case to the Railroad Labor Board.

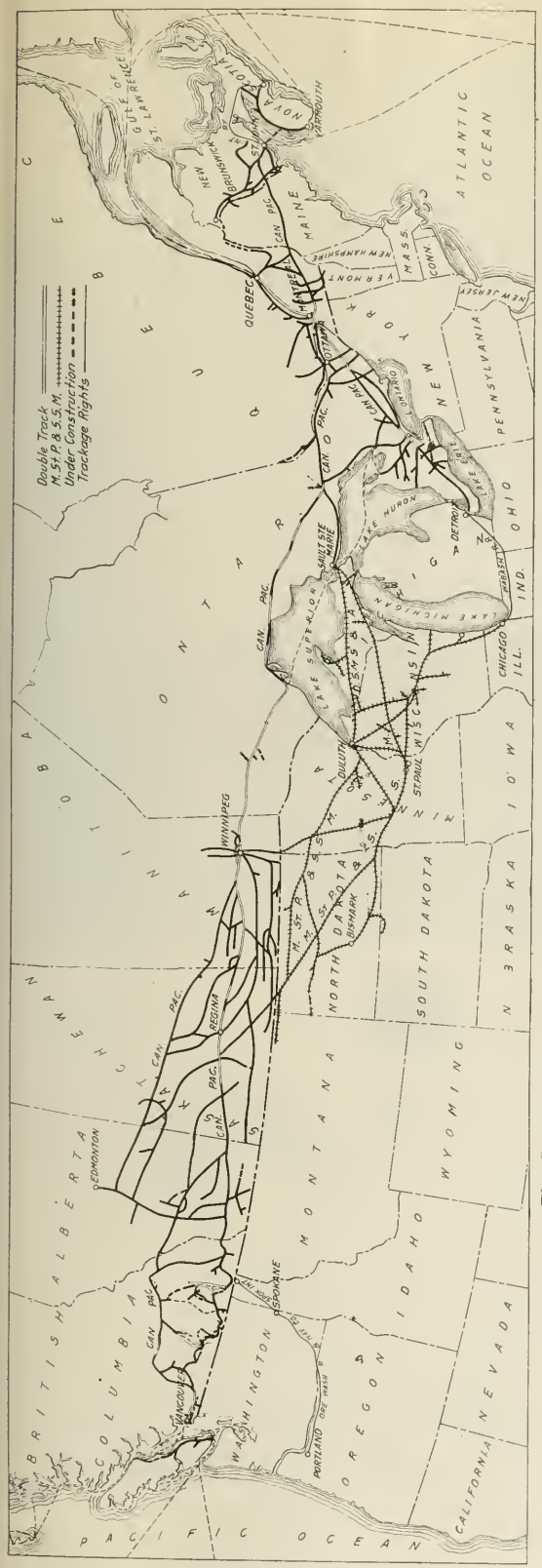
Unfortunately, President Wilson had not appointed the board. The President's failure to appoint the board seemed to mean further delay in getting some kind of a settlement. The railroad labor brotherhoods, like most other unions, contain an element of radicals who believe in "direct action," both as the best means of getting promptly from employers what the employees want now, as one of the best means of making the kind of industrial and social trouble which ultimately, as they think, will cause the complete overthrow of the present system of private ownership and management of property and the substitution for it of the soviet system. These radicals, as an aid to accomplishing both their present and their ultimate purposes, desire either to secure control of the existing labor organizations or to "smash" them and establish the "one big union." They welcome every opportunity to embarrass and harass labor leaders who are disposed to use peaceful means of accomplishing their end before resorting to strikes.

The situation presented when the wage negotiations between the committees of the railway companies and the labor organizations were terminated afforded the radicals a good chance to make trouble. It gave them an opportunity to say that the employees had waited long enough to have their wage demands settled; that they had been tricked first by President Wilson and then by the railroad companies, that the old labor organizations and their leaders had shown incapacity for dealing with the situation, and that the only way the employees could promptly get what they were entitled to was by breaking away from the old organizations and going on strike. With the spirit of unrest prevailing among all classes of labor, including those employed on the railways, this kind of talk was bound, under the conditions, to cause some trouble. It first caused a strike of switching crews in the yards in Chicago and then similar outbreaks in other parts of the country.

The leaders of the large labor brotherhoods have been put in a difficult position by these developments. They have been working steadily for years to enlarge the scope of labor movements until there should be established practically uniform wages and conditions of employment throughout the country; and, finally, under government operation they achieved almost complete success. Their organizations have contracts with the various railways. The strikes which have occurred, being participated in by members of the organizations, are in direct violation of these contracts. The railway companies are put in a position to say that there is no use in making contracts with organizations which cannot carry them out, and to demand that the brotherhoods shall help them fight and win the strikes both as a matter of good faith and to show that it is worth while to make contracts with the brotherhoods. The brotherhoods have a strong incentive to fight the strikes, not only in the fact that they endanger their contract relations with the railways, but also in the fact that any success the strikers might have in getting concessions from the railways which the brotherhoods have been unable to get would tend to discredit and disrupt the brotherhoods and nullify what the brotherhood leaders have accomplished in getting the relations and dealings of their organizations with the railways on a nation-wide basis.

Altogether aside from the interference with transportation service they have caused, the strikes have also presented some serious difficulties to the railway companies. They can not well negotiate with the strikers, first, because in most cases the strikers are unorganized mobs, and, secondly, because the railways have contracts with the brotherhoods, and therefore any recognition of the strikers by the railways, through negotiations or otherwise, probably would soon embroil them with the brotherhoods.

In the background, also, are the demands for $1,000,000,000 in advances in wages, which railway employees, as a whole, are making. If the wage demands of the striking employees of any particular class in any particular part of the country should be granted it would at once become necessary, on pain of strikes elsewhere, to make similar advances to all other employees of the same class throughout the country. But there are well-recognized relationships between the wages of different classes of railway employees, and if, except under the mandate of some authoritative body, such as the Rail-



The Canadian Pacific and Its Controlled Line, the Minneapolis, St. Paul & Sault Ste. Marie

road Labor Board, an advance in wages should be given to one class of employees throughout the country corresponding advances would have to be given at once to other classes throughout the country or there would be strikes by them. It is no exaggeration, therefore, to say that if, in order to end the strike at Chicago, for example, the railways should grant the advances in wages which are being demanded by the striking switchmen there, they would make a change in the adjustment of wages which probably would soon either force them to grant the entire billion dollar advance now being demanded without any hearings before the Railroad Labor Board or to fight a general strike.

The public certainly does not want a billion dollar wage advance granted without full hearings and an intelligent determination of the issues involved by an impartial public authority. This would defeat the entire spirit and purpose of the labor provisions of the new railroad law. And the public certainly does not want a general railroad strike. Therefore, as we have said, the public should back the railways and the brotherhoods to the limit in fighting the strikes now occurring. Whatever may have been their relations and conduct in the past, whatever may be their present motives, both the labor brotherhoods and the companies are struggling to get the wage controversies now pending settled peacefully and in accordance with the requirements of the law. The strikers are trying to get what they want by force, regardless of the merits of their demands, of the provisions of law and of the rights and welfare of the public. It is vitally important to the public peace and welfare that in the first great controversy to arise between the railways and their employees since the resumption of private ownership there shall be set the precedent of a settlement reached peacefully, intelligently and in the manner prescribed by law. Otherwise, the labor provisions of the new railroad law will become a dead letter, and we shall probably enter a new era of constant threats of strikes on the railroads, frequently resulting in disturbances far worse than those we are passing through now.

Canadian Pacific

Under any system of rates which will permit the Canadian National Railways to earn even 3 per cent or 4 per cent on the capital invested by the government, the Canadian Pacific can continue to operate profitably. The history of any American railroad can usually be divided into three periods. The first is when the road is in advance of population and industrial development. During this period overhead charges and the cost of rendering passenger service, as yet unprofitable, tend to preclude the possibility of prosperity. Most of the railroads in the United States went through bankruptcies and reorganizations before they emerged from this period. The second is the period of what might be called increasing returns. Traffic on main lines is heavy enough to give full tonnage freight trains and well-filled passenger trains and a large proportion of branch line mileage earns at least operating expenses. As traffic grows, the railroad can save a considerable proportion of the increase in gross earnings. The third period is when traffic has increased to such an extent that all classes of facilities are overtaxed. It is no longer possible to add passing tracks in large yards, or to take care of additional business economically by shortening block sections. This is the period of decreasing returns. The Canadian Pacific is still in the second period. Most of the large railroads in eastern United States are in the third period.

The Canadian Pacific in 1919 earned more than ever before in its history. It did not do as large a freight business as in either 1918 or 1917, but there was considerable increase in passenger business. The average earnings per ton per

mile on freight, however, amounted to one cent in 1919, as against 0.85 cent in 1918 and 0.70 cent in 1917. The total number of tons of freight carried in 1919 was 25,103,000, as against 29,857,000 in 1918 and 31,199,000 in 1917. The total ton mileage handled in 1919 was 11,121,000,000; in 1918, 15,015,000,000; in 1917, 14,883,000,000.

Total operating revenue, including that from sleeping cars and express, was $176,929,000. This was an increase of $19,391,000 over 1918. Operating expenses, including sleeping car and express expenses, amount to $143,996,000, an increase of $20,961,000. After paying fixed charges and making an appropriation of $500,000 toward the pension fund, the Canadian Pacific had $22,272,000 available for dividends from the railroad and sleeping car earnings. In addition, there was $23,214,000 income from investments, ocean steamships, commercial telegraph, etc. The regular 4 per cent dividends were paid on the preferred stock and 10 per cent on the common stock, calling for $3,227,000 and $26,000,000, leaving a balance of approximately $15,000,000.

President Beatty said in his report to the stockholders, "Your directors cannot hold out any hope of substantial relief for some time to come from these high costs which are reflected so strongly in the operating expenses of the company, but every effort is being made to offset the effect on your revenues by economy in operation and extension of the company's freight and passenger business. It is not to be expected, however, that any normal increase in business can possibly equal the extraordinary increase in wage and other costs, which all railway companies have experienced during the past two years."

The Canadian Pacific has passed through a more trying time insofar as shortage of men is concerned, than have the roads in the United States. It did not have the added burden of two years' government operation, but it caught the reflex of this condition in the United States. The present Canadian wage scale is known as the "McAdoo scale." Both the Canadian government railways and the Canadian Pacific were forced to follow increases in wages made in the United States. They also followed increases in freight and passenger rates and if the Interstate Commerce Commission allows an increase in this country, the Canadian government will be likely to also authorize the government railways and the Canadian Pacific to make similar increases. If it does not, the Canadian government railways are going to have a hard time to earn anything substantial above bare operating expenses, not to mention the great interest on the money that has built them. The Canadian Pacific is apparently safe, even if the Canadian government should not allow an increase in freight rates. The Canadian Pacific has a better chance than most of the railroads in the United States to make economies in operation through obtaining more efficient work from its employees. Canadian railway labor has not been demoralized by the wage advances that it received. The bitterness of the struggle for existence in the war was felt more keenly by Canadians, and especially by Canadian workingmen, than it was in the United States. There is a chance for the Canadian Pacific management to treat with its employees as reasoning human beings who are citizens before they are members of a class. This is not to imply that there is no chance of this in the United States, but simply to hazard the opinion that radical class feeling has not gone so far among Canadian railway employees as among United States railway employees.

With the increase in traffic on the Canadian Pacific there will not be the unbearable pressure on transportation facilities that there is on a road like the Pennsylvania or the Baltimore & Ohio. The total ton mileage of revenue freight per mile or road on the Canadian Pacific was only 840,928 in 1919, comparing with 991,680 in 1918.

There was a falling off in train loading in 1919, the average for revenue freight being 498 tons, as against 530 tons in 1918. In part this is due to a smaller loading per car, the average for revenue freight being 22.08 tons in 1919, as against 22.90 tons in 1918, a decrease of 7.62 per cent On the other hand traffic was better balanced in 1919 than in 1918; there was a decrease in loaded car mileage of 8.22 per cent and in empty car mileage of 14.33 per cent. In 1919, there were 494,862,000 loaded car miles with 170,620,000 empty car miles, while in 1918 there were 539,157,000 loaded car miles and 199,157,000 empty. Probably the reaction after the patriotic efforts which were made to get the greatest possible loading of cars is responsible for the decrease in tons per loaded car mile.

In handling the passenger business, the Canadian Pacific made considerable economies. The number of passengers carried in 1919 was 15,672,000, an increase over 1918 of 8.86 per cent, and the average passenger journey was 112.53 miles, as against 88.95 miles in 1918; thus there was an increase in passenger mileage of 37.72 per cent. This increase of passenger mileage was handled with an increase of only 26.46 per cent in total passenger car mileage, and an increase of only 22.47 per cent in passenger train mileage.

The following table shows the principal figures for operation in 1919 as compared with 1918:

	1919	1918
Mileage operated	13,389	13,389
Freight revenue	$111,064,442	$110,187,288
Passenger revenue	46,182,151	30,837,254
Total operating revenue	176,929,060	157,537,698
Maintenance of way expenses	28,912,220	22,646,106
Maintenance of equipment expenses	33,897,728	28,226,991
Traffic expenses	3,829,687	3,001,579
Transportation expenses	68,054,175	61,047,813
General expenses	6,105,783	5,421,601
Total operating expenses	143,996,024	123,035,310
Net operating income	32,933,036	34,502,388
Interest, including debenture charges	10,161,510	10,177,513
*Railroad income available for dividends	22,271,527	23,630,898
Other income	9,049,342	8,128,752
Net corporate income	31,320,869	31,759,650
Dividends	29,227,276	29,227,276
Surplus	2,093,593	2,532,374

*The net from commercial telegraph and Atlantic steamship lines is deducted before arriving at this figure, and is included in the other income in the next item.

From the N. Y. World

A Dangerous Pastime

Transportation Tied Up by Unauthorized Strikes

New York Suburban Traffic Almost Paralyzed; Severe Freight Congestion for a Whole Week

THE LABOR TROUBLES which originated in the walkout of the switchmen in the Chicago district, beginning April 1, spread to New York City on Thursday, April 9, and in a few days have resulted in an almost complete tie-up of freight service, a crippling of passenger service on some roads and a complete suspension of commuter service on others. Railroad switchmen, members of the Brotherhood of Railway Trainmen and Switchmen's Union of North America went out Thursday evening against the authority of their organizations and practically without notice in the yards of the Erie, Pennsylvania, Lehigh Valley, Lackawanna and Central of New Jersey in Jersey City and Weehawken. By Saturday the disaffection had begun to extend to the firemen, not only helping further to tie-up the freight traffic but resulting in complete suspension of suburban passenger service on the Erie Saturday morning, on the Lackawanna Sunday morning and

Freight Piled Up at a West Shore Station

on the Central of New Jersey Monday afternoon and evening. The difficulties have also affected the Pennsylvania and the New Haven, resulting in a tie-up of freight service as on the other roads and also temporary suspensions of passenger service and the cancellation of many local and through runs. The New Haven on Monday was compelled to abandon parlor and sleeping car service on its trains between New York and Boston. The West Shore and New York Central have had their freight and passenger service affected, but in the case of the latter not to as great an extent as on the other roads mentioned.

The roads which operate ferry and lighter service in New York harbor and which have been combating a strike of their boat crews since April 1 have thus far been able to put only a few of their tugs back in service. With the exception of the Lackawanna, whose ferries have not been affected by the difficulty, they have been able to restore a considerable portion of their ferry service with the aid of strikebreakers. This luckily happened in time to compensate for a walk-out of the crews Saturday morning on the Hudson & Manhattan, causing a complete suspension of service on its rapid transit line to Newark, N. J., and the tubes under the Hudson river.

Reason for the Strike

The outstanding feature of the walkout of the switchmen and firemen is the fact that it has occurred in most cases without notice and without the presentation of any demands for increased wages or improved conditions or without such presentation at least until the strike was under way. Unlike the situation in the Chicago district, where John Granau, as the organizer and president of the Chicago Yardmen's Association, has been the leader, in New York there have been no names of leaders mentioned and apparently no organization has been perfected to carry out the strike. In some cases the men have walked out by twos and threes. In others there have been meetings of the men and concerted action has been agreed upon as to the steps to be taken. In but few cases have there been threats of violence. The men have complained personally of what they term the dilatory action of their brotherhood leaders and that they are tired of receiving only promises instead of increases in wages. In all cases the action taken has been as much directed at the brotherhood organizations as at the railroads or the public. The brotherhood officers have issued statements emphasizing this fact and that they are absolutely opposed to the strike. Officers of the Brotherhood of Railway Trainmen and of the Switchmen's Union have been trying to get the strikers to return, but without success. Timothy Shea, first vice-president of the Brotherhood of Locomotive Firemen and Enginemen, tried to argue the matter with a crowd of 1,500 men at Odd Fellows' Hall in Jersey City on Monday, but could not make himself heard above the din that accompanied his attempts to speak.

The officers of the four brotherhoods have put themselves

A Meeting Place of the Outlaws in Jersey City

on record in the following statement issued from Cleveland on April 9:

> The present strike of men engaged in switching service was originated in Chicago by a new organization that has for its purpose the destruction of the Brotherhood of Railroad Trainmen and the Switchmen's Union, and in its inception had nothing to do with the wage question, but was a demand for the reinstatement of the leader of this opposition organization.
>
> After this strike was instituted for this purpose the leaders of the new organization then injected the wage question for the sole purpose of deceiving the yardmen throughout the United States and to promote the "One Big Union" idea.
>
> There can be no settlement of pending wage questions while this illegal action continues. We insist that every

member of these brotherhoods do everything within their power to preserve their existing contracts, which it abrogated may take years to rebuild. The laws of all of these organizations provide penalties for members engaging in illegal strikes, and these penalties will be enforced.

The statement is signed by L. E. Sheppard, president of the Order of Railroad Conductors; W. G. Lee, president, Brotherhood of Railroad Trainmen; W. S. Stone, grand chief engineer, Brotherhood of Locomotive Engineers, and W. S. Carter, president, Brotherhood of Locomotive Firemen and Engineers.

The statement in this communication was further amplified by letters to W. W. Atterbury, vice-president of the Pennsylvania Railroad. Mr. Atterbury wrote as follows to the brotherhood heads:

I find that the strongest propaganda that is influencing our men, particularly the younger men, is the word that is being passed around that this movement has the support of you gentlemen and the organizations you represent, but that, in view of the fear of injunction being served on you and your organization, the strike is being engineered by word of mouth and that no regular orders have been issued or are to be expected.

Of course, I am not in a position to know what you have already done, but I cannot help but feel that your position is not understood by all your members locally, and therefore, for your own sake and the sake of the organizations you represent, my suggestion is that you declare your position, through your regular channels, to the local chairmen in no uncertain terms.

Warren S. Stone, president of the Brotherhood of Locomotive Trainmen, replied on Monday:

There is no truth in the report that present strike movement has our support. Everything possible is being done to have our members remain at work and carry out their contracts. There are no secret instructions to the contrary being issued. Any such statements being circulated among the men are absolutely untrue. In order that there may be no mistake regarding our position I am today issuing a circular letter to all divisions.

The Strikers' Demands

The statement is made above that the walkout of the men occurred without the presentation of wage demands before the walkout occurred. These demands were, however, formulated later and were announced following a meeting of the outlaws on Sunday to be as follows:

Automobiles and Trucks Were Barred from Ferries During Rush Hours

We are all railroad men affiliated with various organizations and orders to better our conditions. We have called the meetings that we have been holding to further strengthen ourselves, and we have decided to be known hereafter as the United Railroad Workers of America. Our officers have been elected, and they have drawn up demands which will be presented to the proper officials for consideration. We do not want our name to be misunderstood as representing the national organization. We still belong to our present railroad body, but if the general organization does not uphold us in this strike we shall continue our activities under our adopted name.

We want it emphasized that the men who have attended our meetings are affiliated with one or more of the four big organizations.

All officers and members, you can say, are satisfied with the progress we have made so far, and also we have caused no trouble outside of leaving our posts, and we intend to conduct ourselves in the same manner in the future. Here are the demands that we intend to present to the railroad officials:

Conductors, $1.10 an hour. Brakemen, 95 cents an hour.

Eight hours or less to constitute a day's work.

Time and a half for overtime.

Time and a half for Sundays and holidays.

Double time for overtime on Sundays and holidays.

Switch tenders to receive the same wages and hours as brakemen.

Yardmaster, $325 for general yardmaster, $295 a month for yardmaster, one day off in each seven, with pay; two weeks off a year and pay; eight hours to constitute a day's wages; seniority to prevail.

Jersey Commuters Jam the Trolleys

Firemen, $8.20 for two freight services, $7.20 a day for yard firemen, $7.50 a day for passenger firemen, $8.20 a day for outside hostlers, $7.20 a day for inside hostlers, $6.75 a day for hostlers' helpers, $1 a day to be added to all freight rates.

Engineers, $1.35 an hour for yard service; $1.50 an hour for road engineers; $12 a day, eight hours or less. Eighty miles or less constitute a day for freight engineers; $1.50 an hour for passenger engineers, or $12 a day, eight hours or less; eighty miles or less on short "turnabouts," $1.10 an hour, or $8.80 a day.

For conductors in suburban service, 97 cents an hour, or $7.76 a day; for collectors, 82 cents an hour; for baggagemen, 90 cents an hour, or $7.20 for baggage men who handle dynamos or express; 80 cents an hour for brakemen in suburban service; $6 a day for 80 miles or less for conductors on through service; $4.50 a day for brakemen on through service; $4.75 a day for baggage men; $4.75 a day for passenger service men on through service; $9.20 a day for freight conductors, local or through service; $7.60 a day for freight flagmen, local or through service. In road service 80 miles or less, eight hours or less constitute a day's work.

We will ask for back pay from June 1, 1919, on the difference in wages and the new scale.

These demands were further amplified following a meeting on Tuesday by a statement reading as follows:

In determining the justness and reasonableness of such salaries so far as applicable we have taken into consideration, among other relevant circumstances, the following:

1. The scale of wages paid for similar work in other industries.
2. The relation between wages and the cost of living.
3. The hazard of employment.
4. Training and skill required.
5. The degree of responsibility.
6. The character and regularity of employment.
7. Inequalities of increase in wages or of treatment, the result of previous wage orders or adjustment.

We further demand the guarantee of twenty-six working days for all assigned men. We further demand that the system of physical examination be abolished after applicants

have passed a preliminary examination. Any employee who fails to pass the prescribed color test shall be given a field test and if he fails to pass the field test he shall be retained in the service in any capacity that his physical condition will enable him to perform and at the same rate of pay that applicant received in his former position.

At these and other meetings the strikers finally declared that they were not fighting the brotherhood, although they did express the opinion that the brotherhood officers had not done as much for them as they should have done. One of the significant features of the situation is that the name adopted at first — United Railway Workers of America — was later changed to United Brotherhoods of America, which some take to be a new version of the one big union idea.

At the meeting on Tuesday the strikers reaffirmed their determination to stay out until their demands should be granted. They discussed, however, the matter of handling milk and foodstuffs and decided to continue to move trains carrying the former and to consider further their action as to supplying New York with its necessary food supply.

Embargoes on Freight

The nearly absolute cessation of freight service resulted in complete embargoes being placed on all freight from or destined to New York. Milk was being moved in fairly good shape, this being because the New York Central was able to bring in nearly its entire supply, because considerable of the

Rush Hour on the Ferryboats in New York Harbor

supply was coming in on motor trucks and also because the strikers in most cases made an exception in the case of this commodity. Of foodstuffs practically none was being carried on the railroads with terminals in New Jersey.

On Thursday morning the freight situation was reported generally improving and complaints by city authorities and others of impending starvation were mostly silenced; but there was still great congestion in all of the large freight yards around New York, the difficulties extending many miles out, in all directions. Switching crews at the principal yards of the Pennsylvania on the New Jersey side of the Hudson River had resumed work. The New York Central which, throughout the strike, has kept freight moving in a more nearly normal way than any of the other roads, reported continued improvement. On the New York, New Haven & Hartford, the freight situation was still acute and there was difficulty in keeping up the locomotive fuel supply. The Lehigh Valley reported freight moving in considerable volume, and the switchmen in the large yards of this road at Hazleton, Sayre, and Wilkes-Barre, at a meeting on Wednesday, voted to remain loyal to the company. On the same day the men at the Potomac yards, Alexandria, Va., and at West Albany, on the New York Central, returned to work.

Passenger Service

The chief difficulty in the matter of passenger service was in the suburban traffic. Most of the roads were operating their through trains, although with some difficulty and delays. On the New Haven a number of through trains had to be cancelled, and for a period there were no parlor, sleeping or dining cars. The Pennsylvania passenger service has been erratic, several trains having been cancelled and there having been a partial suspension of service in other ways. The situation on this road was further complicated by a walkout of the shopmen at the Meadows shops on the New Jersey meadows and at Trenton, N. J. The stiuation on Wednesday morning was characterized by the expression, "Road paralyzed east of Harrisburg, Pa.," but later in the day the road was able to run a number of trains.

The commuters on all the roads in New Jersey have been greatly inconvenienced not only by the lack of trains but by the shutting down of the Hudson & Manhattan and the labor difficulties on the ferries which have not been sufficiently overcome as yet to permit of normal service, let alone of extra service required. The trolley lines in New Jersey adjacent to New York have been almost overwhelmed, and so many commuters have staid in New York overnight that they have almost swamped the hotels. The result has been the calling of indignation meetings in a number of suburban communities and prominent citizens have volunteered to man trains. This has happened notably on the Erie and Lackawanna. In addition to that, the roads have received offers from students at Stevens Institute of Technology and at Princeton University to man trains. In numerous cases the roads have utilized the services of men on their pension rolls who have offered their services; and the services of loyal conductors and enginemen have been supplemented by those of officers.

The passenger-train situation on the roads out of New York up to Wednesday was as follows:

Long Island.—Electric service only 85 per cent normal. Only one train a day on each division of the lines operating by steam.

Central of New Jersey.—The firemen left their work as they arrived at Jersey City Monday morning. The officers induced some of them to come back to run some of the commuter trains out Monday afternoon and evening, but on Tuesday the suspension of service was complete. On Wednesday, however, the road managed to bring in about 24 commuter trains to its terminal at Jersey City.

Erie.—The firemen on this road walked out, so that there was no commuter service on Saturday at all. A number of through trains were abandoned at Port Jervis, the passengers being carried to Jersey City only with difficulty and many hours late. By Wednesday the service was crippled from Susquehanna, Pa., eastward. Commuters in several of the centers adjacent to New York held indignation meetings, at which rather uncomplimentary remarks were made concerning the strikers, and business men volunteered their services to help bring trains into Jersey City. On Tuesday three such trains were operated, and on Wednesday a number additional. Richard Sanderson, representative of the Baldwin Locomotive Works at New York, served as fireman on one of these trains on the Greenwood Lake division. Mr. Sanderson is a resident of Montclair Heights, on that division.

Delaware, Lackawanna & Western.—The Lackawanna's walkout occurred Sunday morning, since which time there has been no regular commuter service. Numbers of residents of the towns in the Lackawanna's suburban area offered themselves as volunteers. On Monday the 8:20 express from Morristown was run with two volunteer firemen, one of the two being John W. Stedman, vice-president of the Prudential Life Insurance Company. On Wednesday the number of volunteers was sufficient to permit of running nine trains, including two from Morristown, three from South Orange,

one from Gladstone, one from Dover and two from Montclair. Volunteers from the ranks of the commuters, in several cases chosen at mass meetings of the commuters, students of Stevens Institute of Technology, officers of the company and loyal employees were all called upon to fill up the quota of the crews. The through trains were all running and all practically on time.

Lehigh Valley.—This road does not operate much commuter service. The through trains were running off schedule and trains from Pennsylvania station, New York, were annulled.

New York Central.—Passenger service nearly normal.

West Shore.—Passenger service nearly normal.

Baltimore & Ohio.—Passenger service from Pennsylvania station partly suspended. Staten Island Rapid Transit completely suspended.

Hudson & Manhattan.—Idle since Saturday. New crews were being trained, but no passengers carried.

New York, New Haven & Hartford.—As noted above, the New Haven was compelled to annul several trains on Monday, including the Merchants Limited, and to abandon sleeping, dining and parlor-car service. On Wednesday the service of both local and through trains was reported as 90 per cent normal.

Pennsylvania.—Reference to the situation on the Pennsylvania is made above. Note should also be made of the fact that the Pennsylvania has accepted the offer of a considerable number of Princeton students to man its trains.

Situation in Other Cities

The walkout, in addition to hitting the Chicago and New York districts, also affected other sections. The strike of the railroad men in the Pittsburgh district was reported on Tuesday to have thrown some 200,000 men out of work; in the Detroit district something like 110,000, and similar inconvenience is reported in other indusrtial centers. New England was not affected, except by the failure to receive freight from connecting lines to the west.

The yardmen employed in the Washington terminals and at the Southern railway's Potomac yard voted to return to work at a meeting on Tuesday evening, at which it was decided to await the findings of the Railroad Labor Board as to the wage demands and the crews scheduled for duty at 10:30 in the evening reported at that time.

Chicago Strike Losing Its Effectiveness

At the present time, however, the Chicago strike is gradually losing its effectiveness. It is being defeated by the combined efforts of, (1) the members and officers of the two regular switchmen's unions, who have been doing missionary work among the strikers in addition to inducing many members of the two organizations located at points outside Chicago to fill the places left vacant by the strikers; (2), the railway executives and employees who have to a large measure jumped into the breech and, by taking the strikers' places in the yards, have kept freight and passenger traffic moving; and (3), the loyal members of the brotherhoods who have refused to participate in the strike. Daily statements, issued on behalf of the railroads involved, show that substantial progress is being made each day in the number of switch engines in operation and in the amount of live stock, coal and other commodities handled, both in and outbound, and it is expected that the effects of the tieup will have been overcome in a short time.

The result of the failure of the Chicago strike will undoubtedly be the subsidance of the strike fever at other points. Already this tendency has been noted in some places. Several groups of men, spurred on by the apparent success of the Chicago strike have returned to their work. This is true at Battle Creek, Mich., Ft. Worth, Texas, Kansas City, Mo., Akron, Ohio, Ft. Wayne, Ind., Los Angeles, Cal., Kent, Ohio, Saginaw, Mich., Kankakee, Ill., Bloomington. Ill., Du Quoin, Ill., Dayton, Ohio, and Willard. As the failure of the Chicago strike becomes more and more apparent the insurgents at other points are also reconsidering their action and returning to work. When the final collapse of the movement is apparent, it is not unduly optimistic to expect that the situation throughout the country will clear rapidly.

The story of the Chicago strike, because of its varied developments and angles, can best be told in chronological order. The developments, therefore, up to the present time are briefly as follows:

Thursday, April 1.—The strike of switchmen and switchtenders in the Chicago district originated on the Chicago, Milwaukee & St. Paul, following the removal of John Grunau, organizer and president of the Chicago Yardmen's Association, as a yard conductor. Approximately 700 members of this organization, which at that time was approximately three months old, presented the removal of Grunau as their main grievance, however, at the same time they filed demands for increased pay as reported in the *Railway Age* of April 9 (page 1145). Grunau, a yard conductor on an employee train running between Chicago and Bentonville, Ill., was displaced by a road conductor in accordance with the contract with the Brotherhood of Railroad Trainmen, when a revenue car was placed on the train.

With the announcement of the strike, A. F. Whitney, vice-president of the Brotherhood of Railroad Trainmen, imme-

Leaders of Outlaw Strikers at Chicago

Left to right—John Grunau, President and Organizer, and James S. O'Gara, Organizer of the Chicago Yardmen's Association

diately announced that the move was unauthorized and illegal and that steps would be taken by the brotherhood to combat its effects. This opposition on the part of the officers of the regular brotherhoods has been continued throughout the strike and has been instrumental in depriving the walkout of its effectiveness.

Friday, April 2.—The number of men on strike the second day of the movement did not materially increase although many local organizations were contemplating action. The situation was featured mainly by attempts on the part of officers of the Brotherhood of Railroad Trainmen to speak before meetings of members of that organization. These meetings were repeatedly broken up by the striking switchmen. The walkout at this time had not caused serious inconvenience to transportation either freight or passenger.

Saturday, April 3.—The members of the Chicago Yardmen's Association had by this time outlined their demands and stated that if they were not granted within 48 hours, a general walkout of practically all of the switchmen and switch tenders employed in the Chicago district would ensue. Although the strike up to this time had tied up freight service on the St. Paul it had not had a serious effect on transportation in the Chicago switching district.

Sunday, April 4.—The strike of the employees of the St. Paul was abetted on April 4 by both the Easter Sunday blizzard and by the extension of the strike to the Chicago Junction, the Illinois Central and the Chicago & North Western. Insofar as tying up transportation is concerned, the blizzard alone would have accomplished this regardless of the strike. The strikers were ordered back to work in a statement signed

Parcel Post Mail Piled Up in Front of Chicago Post Office

by Mr. Whitney and H. G. Gallagher, general chairman of the Brotherhood of Railroad Trainmen, for the St. Paul, and at the same time the brotherhood officers sent out a call for members of their organization to come to Chicago to take the place of the men who had left. The strike of the switchmen on the Chicago Junction immediately crippled operation at the Chicago stockyards.

Monday, April 5.—This was the crucial day of the strike insofar as paralysis of transportation was concerned. Traffic in general in the Chicago switching district was demoralized, notwithstanding the fact that a large number of members of the Brotherhood of Railroad Trainmen and the Switchmen's Union of North America had been brought to Chicago to fill the places of the strikers and the fact that many executives and employees of the railroads had jumped into the breech and were acting as switchmen and switch tenders in the affected yards. At this time officers of the Chicago Yardmen's Association announced that 16,000 yardmen had quit work in the Chicago switching district, while brotherhood officers and the railway executives stated that the strikers did not number more than 2,700. Indicative of the manner in which the strike was being fought by the brotherhoods is the fact that on the Chicago & North Western 150 recruits from terminals outside of Chicago were assembled at Chicago. Similarly 110 men were brought to Chicago on the St. Paul. By this time also the strike on the Chicago Junction had seriously crippled production at the stockyards and more than 10,000 employees had been laid off by the packing houses. At the same time an ultimatum was issued to members of the Brotherhood of Railroad Trainmen setting forth that the walkout had its origin in a personal grievance of John Grunau against the St. Paul and pointing out the fallacy of strike action at the present time. This ultimatum was signed by 23 brotherhood officers, embracing 20 chairmen of general committees on the affected roads and Vice-presidents Whitney, Farquharson, and Bannon. At this time the general situation in Chicago was described by the General Manager's Association of Chicago as follows:

"Sixty per cent of the engines in Chicago are out of service, caused by an outlaw organization presenting demands for an increase in rates of pay which could not be considered by the railroads. The Brotherhood of Railroad Trainmen and the Switchmen's Union of North America had presented demands together with all crafts, which are being handled by the Wage Conference at Washington and must, under the Transportation Act, be concluded before the Labor Board—yet to be appointed by the President. All railroads at Chicago have contracts covering yard rates and conditions for switchmen and switch tenders with either the Brotherhood of Railroad Trainmen or the Switchmen's Union of North America. Railroads have called on the officers of these organizations to live up to and carry out these contracts which the organizations have agreed to do until such time as the wage question now being handled under the Transportation Act is disposed of by the Labor Board."

During the day the strike spread to other lines in the Chicago district. The situation in general was outlined as follows: all of the switching force on the New York Central, the Elgin, Joliet & Eastern, the Chicago, Rock Island & Pacific, the Pennsylvania (Ft. Wayne division), the Michigan Central, the Minneapolis, St. Paul & Sault Ste Marie, and the Chicago, Indianapolis & Louisville remained at work. Roadmen, members of the Brotherhood of Railroad Trainmen, and the Switchmen's Union of North America were responding to the appeal of their leaders in Chicago and as a result the Chicago, Burlington & Quincy, the St. Paul, the Chicago & Northwestern, and the Illinois Central were gradually replenishing their crews. Some of the men on the Belt Railway of Chicago, the Chicago & Alton, the Erie, the At-

A Blizzard Adds to the Congestion in Chicago

chison Topeka & Santa Fe, the Indiana Harbor Belt and the New York, Chicago & St. Louis did not leave their work. On the roads on which all of the switching force walked out, i.e., the Wabash, the Chicago & Eastern Indiana, the Baltimore & Ohio, the Grand Trunk and the Chicago Great Western the condition was unchanged.

Tuesday, April 6. By this time Chicago had begun to feel the effects of the unauthorized strike and strenuous efforts were made during the day to bring union switchmen to Chicago from outside points and to clear the freight yards of the accumulation. The shipment of perishables to Chicago began to be greatly hampered and despite the fact that the railroads involved were operating at approximately 40 per cent of their normal efficiency, alarmist reports began to be spread concerning the endangering of the city's food and coal supply.

Efforts of the brotherhood officers to bring in members of their organizations did not meet with a generous response, although approximately 400 men were induced to aid in relieving the traffic jam resulting from the strike. This serious congestion in the Chicago yards led to the placing of embargoes by many of the roads involved, although these embargoes were in many cases not extensive.

The situation at the Chicago stockyards began to be even more acute and, according to O. T. Henkle, general manager of the Union Stock Yards Company, only 200 to 300 cars of cattle had been received during the day, as compared with the usual supply of between 1,800 and 2,000 cars. This situation can not be entirely attributed to the strike, however, for shippers were reluctant to ship their cattle because of the severe weather and the consequent danger of loss.

Congestion in the Chicago yards was partially relieved by routing through freight trains east and west via other points.

According to the General Managers' Association of Chicago all the railroads were working as many switch engines at Chicago on this day and some, notably the Chicago & North Western, the Chicago, Milwaukee & St. Paul, the Chicago, Burlington & Quincy, the Elgin, Joliet & Eastern, the Illinois Central, the New York Central and the Minneapolis, St. Paul & Sault Ste. Marie, were working more than at any time since the strike began.

Wednesday, April 7. On this day the paralysis of transportation was practically at its height due to a combination of several conditions. The apex in the number of men on strike had been reached, freight had been piled up in the yards until extensive movement and improvement was impossible and officers of the regular brotherhoods were having some difficulty in inducing men to take the place of the strikers in the Chicago district. From this time on, however, the conditions gradually began to improve as will be noted.

Thursday, April 8. On this day the railroads in Chicago were handling between 40 and 50 per cent of normal freight traffic with the aid of loyal employees, union men imported from other divisions and executives and employees pressed into service as switchtenders and switchmen. At this time sufficient crews to operate approximately 300 switching locomotives had been rceruited in the Chicago area, according to the General Managers' Association of Chicago, as compared with the normal number of approximately 700.

One of the developments on this day of the strike was the formation of a new "outlaw" organization, the United Enginemens' Association, by striking members of the Brotherhood of Locomotive Engineers' and the Brotherhood of Locomotive Firemen and Enginemen. Following the organization of this new union enginemen and firemen on several of the roads involved in the switching strike walked out and further aided in the traffic tie up, although the movement did not gain extensive headway and has not resulted in any serious trouble.

Thursday, Friday, Saturday and Sunday, April 8, 9, 10 *and* 11. During these days there was no change in the situation at Chicago. With the aid of the men who had taken the places of the strikers the accumulation of traffic in the Chicago yards was cleaned up and, with the small amount of freight coming into Chicago because of the embargoes placed by practically all of the affected lines, the men were able to handle practically all of the traffic which was offered. During this time also the situation was practically deadlocked with no additional men walking out and with but slight increases in the number of men available for handling traffic. During all of this time the railroads in Chicago were operating approximately 50 per cent of the normal number of switch engines. During this period also reports were circulated that mediation between the strikers and the railway companies was to take place. These reports were vigorously denied in statements issued on behalf of the railroads, all of which said in general that there could not be mediation between the strikers and the companies, inasmuch as the companies now have contracts with the Brotherhood of Railway Trainmen and the Swithmen's Union of North America, and the question of increased compensation for the members of these organizations is already up for consideration before the Railroad Labor Board, which was to be appointed by President Wilson.

On April 10, definite breaks began to appear in the ranks of the strikers, small numbers of men returning to their work on several of the roads. As a result of the improved conditions at this time embargoes were lifted gradually and conditions generally were favorable to an increase in the amount of freight traffic which could be handled in the Chicago switching district.

Monday, April 12. The reaction toward the Chicago strike throughout the country and especially in the east by this time gave a national rather than a local aspect to the situation and enabled the federal government to view the strike as a violation of federal laws and as a result reports of contemplated action on the part of the government were frequent. Insofar as the situation in Chicago was concerned it continued to improve, there being increases noted in the number of men returning to work and in the amount of live stock, coal, etc., moved both in and out of Chicago.

Wednesday, April 15. During the day decided breaks in the ranks of the strikers were reported. The situation in general is adequately described in a statement made public on behalf of the railroads during the day, reading as follows: Strike situation in Chicago shows improvement today as indicated by facts that roads involved worked 408 engines yesterday as compared with 765 switch engines normally worked under favorable conditions. This improvement in switching crews during the past week is shown by the following figures indicating the number of switch crews in service daily on roads involved: Monday, 355; Tuesday, 322; Wednesday, 328; Thursday, 331; Friday and Saturday, 341 each; Sunday, 354; Monday, 349; Tuesday, 386; Wednesday, 408. The switchmen on the Rock Island and the Soo Line voted to return. Employees on other roads will undoubtedly do likewise. The striking firemen on the Pennsylvania returned to service. Also small groups of switchmen and firemen on other roads affected. Live stock moved into stock yards showed an increase of 83 cars over the previous day. Also an increase of 71 cars of fresh meat shipped from Chicago to Eastern points. Passenger and suburban business, unaffected.

The Effect at Washington

WASHINGTON, D. C.

Official Washington seemed somewhat at a loss as to how to deal with a leaderless strike, and there was some questioning as to whether the various sporadic strikes had not been indirectly inspired by leaders of the standard labor organiza-

tions who had been deterred from acting in the usual way by a wholesome fear of injunction proceedings such as were used in the case of the coal strike. This feeling was to a large extent dispelled, however, by the reports of the activity of the brotherhood executives in trying to persuade the insurgent strikers to return to work and in furnishing strikebreakers from the union ranks. The inflammatory propaganda of the Plumb Plan League was given considerable credit for having incited the spirit which prompted the walkouts in many places, but no good explanation was offered as to why unorganized and sporadic strikes happen to occur at the terminals where they can be most effective in interfering with transportation without some form of leadership and inspiration.

It has been observed that for some reason the unorganized strikes seldom fail to include Washington and its vicinity, where they will be close enough to afford an object lesson to Congress, and on Sunday night the yardmen employed by the Washington Terminal Company left their work. On Monday about 220 employed at the Potomac yard of the Southern Railway also went out. The strike of the terminal yardmen interfered with the handling of through trains, both freight and passenger, and in some cases incoming passengers were required to leave the trains some distance out from the station. The strike at Potomac yards also interfered with movement from the southern lines.

Naturally, one of the first moves made in Washington was a demand for a Congressional investigation, and the Senate on April 9 adopted a resolution introduced by Senator McCormick of Illinois directing the committee on interstate commerce to conduct an inquiry, by sub-committee or otherwise, "respecting any existing strike of interstate railroad employees not conducted or authorized by any recognized organization of railroad employees." Chairman Cummins of the committee began to arrange for a hearing at Chicago on Tuesday, but after some telegraphic communication with the brotherhood leaders and after Senator Cummins and W. N. Doak, vice-president of the Brotherhood of Railroad Trainmen, had called at the White House on Monday and been assured that the labor board would be appointed on the following day, the plan for a hearing was called off and the committee held an executive meeting in Washington.

In proposing the resolution, Senator McCormick said that the Railroad Labor Board would have been in a position to take up the investigation "if the executive branch of the government had been functioning with full energy," and Senator Cummins was quoted as saying that the delay in appointing the board was "inexplicable and inexcusable."

A suggestion that the government take steps to prevent the strike by injunction was apparently contained in a telegram addressed by W. G. Lee, president of the Brotherhood of Railroad Trainmen, to Representative Cooper of Ohio, a former railroad trainman. The telegram said:

"Illegal strike of switchmen spreading all over country, regardless of efforts of officers, brotherhood and Switchmen's Union. Only bona fide organizations entitled to represent yardmen. It seems strange that present laws against strikes of railroad employees can be threatened or used only against bona fide labor organizations that have supported government at all times and made good their contracts with railroads. Must we understand that such laws do not apply to renegade organizations or those inciting illegal strikes?"

Representative Cooper took the matter up with the Department of Justice and was told that the department was watching the situation. The provisions of the Lever act prohibiting conspiracies to limit the production or distribution of food and other necessities were used as the basis of an injunction against the officers of the miners' union that had ordered the coal strike, and while they have not been applied in connection with any railroad strike the possibility that they might be so used has been regarded in some quarters as one of the reasons for the less belligerent attitude assumed by the labor leaders since November 1.

It was announced that the Department of Justice was keeping in close touch with the situation and receiving reports from the districts affected by the strikes. Attorney General Palmer returned to Washington on Monday from a speaking tour and conferred with Joseph P. Tumulty, secretary to the President, regarding the strike situation. He told newspaper men that "the people's interests are going to be protected," but it was understood that the government was not inclined to take any precipitate action, such as the use of an injunction, as long as it appeared likely that the railroad managements and the brotherhood officials might be able to deal with the situation. It was feared that an injunction against those who have openly incited strikes in the various cities might merely inflame many others whom it would be difficult to reach by similar proceedings. The Department of Justice on Tuesday telegraphed to Presidents Smith of the New York Central and Rea of the Pennsylvania asking them to send at once the names of all of their employees who are on strike, indicating the names of any of them who appear to be leaders.

G. W. W. Hanger of the Board of Mediation and Conciliation went to Chicago and returned to Washington, saying that the dispute between the brotherhoods and their members afforded no room for action by the board and that any wage demands should be referred to the new labor board.

The strikers were roundly denounced in the Senate on Monday after Senator Poindexter had introduced a bill providing for a fine or imprisonment or both for persuading or attempting to persuade employees to quit their work with intent to interfere with the movement of commodities in commerce, for the use of violence or threats to prevent employees from continuing their work, or for destroying cars, bridges, etc., or persuading others to do so, with intent to interfere with commerce. The Senator said that none of these prohibitions affect in any way the right of any individual to quit his employment at any time he sees fit and that the attempt which has brought about this paralysis of interstate commerce is not the assumption of the right of men to quit their employment but is their exercise of a right to persuade or coerce others to quit their employment.

Senators Frelinghuysen, Edge, Thomas and Kellogg also criticised the strikers and to some extent Congress for failing to pass more drastic legislation dealing with strikes. "There is nothing haphazard about this strike in my opinion," said Senator Thomas. "It betrays an organization, thorough, systematized, acting upon common lines of previously conceived effort and punishing if not designed to punish 110,000,000 innocent people so severely as to compel their adhesion to or their acquiescence in any measure demanded by extreme leaders, of which the Plumb plan is one." He said he was glad that the strike had not received the countenance of the official heads of the brotherhoods, but he said the strikers are following the example which those heads have set in the past.

Senator Edge of New Jersey introduced a bill on Tuesday providing that an employee of an interstate railroad or of an industry supplying any commodity essential to the continued operation of interstate commerce, who quits his employment either in combination with a substantial number of his fellow employees or at or about the same time that a substantial number quit for the purpose of obtaining better conditions of employment, shall be guilty of a misdemeanor and punishable by a fine or imprisonment. The bill would also make it unlawful for two or more persons to agree to do anything or omit to do anything the natural consequence of which would be to interfere with the movement of commerce or diminish the supply of necessary commodities.

Mail Service

Otto Praeger, second assistant postmaster general, sent a telegram to all superintendents of the railway mail service

instructing them to instruct all chief clerks, transfer clerks and others to report any obstructions, directly or indirectly, by conspiracy or otherwise, of the passage of mails as a result of strikes and to bring them to the immediate attention of local postoffice inspectors and district attorneys with a request that offenders be vigorously prosecuted if the facts warranted.

Statement by the Attorney General

The outlaw railroad strike is a manifestation of the working out of the program of the International Communist Party in America, which includes the activities of the I. W. W. and other revolutionary organizations, under general directions dictated from Russia and other European centers of communistic propaganda, according to a statement made on Wednesday evening by Attorney General Palmer.

The railroad workers, said Mr. Palmer, have been led into this unauthorized strike and taken advantage of by leaders for far deeper purposes than they had any idea of. "The purpose is to capture the industries of the country, secure political power, overthrow governments and establish a dictatorship of the leaders of the so-called proletariat; they would transport to this country the chaotic conditions that exist in Russia."

Mr .Palmer gave out copies of letters and other documents outlining the plan of organization and purposes of the movement. He said that the Department of Justice has known for some time of these plans and also of dates fixed for country-wide strikes in other industries, as well as of efforts to promote a general uprising for May 1. W. Z. Foster and some of his associates who brought about the steel strike have been active in promoting the railroad strike, said Mr. Palmer, and he gave the names of other leaders who have followed the "boring-in" policy and sought to play upon the spirit of unrest and the dissatisfaction with the leadership of the brotherhoods, and the A. F. L.. The purpose is to destroy those bodies and promote a movement for one big union which would be secretly under I. W. W. leadership. The President's cabinet met and discused the strike situation Wednesday morning and the Attorney General submitted a report, but no course of action was announced. The President telegraphed to the members of Railroad Labor Board to come to Washington at once, assuming that their appointments would be confirmed by the Senate during the day. The Senate committee had recommended confirmation; but there was some opposition to Messrs. Hanger, Hunt and Forrester, and action was postponed.

The president's cabinet discussed the the strike situation on Wednesday and Attorney General Palmer submitted a report but no decision as to any course of action was announced. The President telegraphed to the members of Railroad Labor Board asking them to come to Washington at once and assume duty, saying he expected their appointments to be confirmed by Senate during the day.

The Use of Motor Trucks

Plans for the use of motor trucks to supplement the efforts of the railways in meeting the strike conditions were discussed by the Council of National Defense and the Federal Highway Council. It would be possible for the government on comparatively short notice to mobilize about 45,000 of its own motor trucks, according to a statement issued by Herbert N. Shenton, acting director of the Council of National Defense, and feasible to reinforce them with 700,000 privately owned trucks, and eventually with about 7,000,000 passenger automobiles." Of the government trucks, he said, 1,800 could be equipped and manned by the Motor Transport Corps of the War Department for the relief of New York in a few days; and about 100 of the trucks could be rushed to each of the principal cities. Charles W. Reid, manager of the transportation bureau of the Federal Highways Council, telegraphed to the affiliated chambers of commerce and other business bodies in all the principal cities affected by the strike to make a comprehensive report of the condition of the railways in respect to their cities, and preparations were made to line up these organizations for volunteer truck transport service. A meeting of the former Highways Transport Committee of the Council of National Defense was held on Monday at Washington, and the chairman, S. M. Williams, said that the entire machinery of the organization had been tendered to the council to help it to meet the emergency. After the meeting the following statement was issued:

"The Motor Transport Corps of the army is ready to move to the aid of any city imperiled by the 'outlaw' railway strike the instant it receives orders. Detailed plans have been prepared and the corps is ready to co-operate with whatever civil department of the government may be authorized to represent the federal government. This information was laid before officials of the Federal Highway Council when they consulted with former members of the highways transport committee of the Council of National Defense this afternoon, and thereafter advised that the Council of National Defense should undertake the central co-ordination of the various schemes for utilizing motor transport should the switchmen's outlaw strike continue.

"The conference was of the opinion that since the strike is decentralized rather than national in its scope it presents a group of local transportation problems which must be dealt with in the especially affected congested centers.

"It was, therefore, recommended that the Council of National Defense should communicate with the mayors of the strike center cities and suggest the organization of a pool of all motor trucks, the same to be directed by a local committee, which should include representatives of the transportation bureaus of local chambers of commerce, of the railways, of the truck users, of the Motor Transport Corps of the War Department and a representative of the Council of National Defense, should the latter be the body through which the federal government should act in co-ordinating capacity.

"It was advised that this local committee should have full power to establish priorities as to goods to be moved by the pooled trucks and as to who should have the use of them. In general, it was thought that army trucks could be used to bring necessary goods into affected cities from a distance of up to 75 miles; and it was ascertained that the army is ready with its trucks should it receive instructions to act.

"The Federal Highway Council has tendered all the resources of its organization to the Council of National Defense for the purpose of securing some central direction of the situation.

"This body has 1,300 organization members, such as chambers of commerce, Rotary and Kiwanis clubs, Travelers' Protective Association, United Commercial Travelers, etc., and 19,000 individual members, and the director of its transportation bureau was executive officer of the highways transport committee of the Council of National Defense during the war and is representative of the highway transportation interests of the country."

THE CAUSE OF UNION LABOR and of collective bargaining and of that public responsibility to which great power in union must hold itself if it is to exist, is being given a blow at its own hands that cannot be recovered from in years.—*The N. Y. World.*

HOWEVER DIFFERENT THE INSURGENT STRIKE may be from the ordinary strike in the respect that it reveals a cleavage in labor's ranks, it is not different from the ordinary strike in the sense that it is an unwarrantable wrong against the public generally and an unspeakable injury to organized labor itself.—*Houston Post.*

Increasing Locomotive Operating Efficiency

Adapting Design to Service Conditions; Modernizing; Reassigning; Accurate Train Loading

By R. S. Mounce

IF THERE EVER WAS A TIME in the history of American railroads when savings in operating costs were a vital necessity, that time is now. The costs of labor and materials of every kind are higher than ever before, and there seems but little likelihood of any reductions in these items for some time to come. However, it is quite possible partially to offset these increased costs by means entirely within the control of the mechanical and operating officers of the railroads. One of the most important fields of endeavor along the line suggested is the matter of securing the maximum operating efficiency of locomotives. In the discussion of this important subject four factors will be considered, the first three somewhat briefly and the fourth at some length.

1. Design of New Locomotives to Meet Most Fully the Operating Conditions in the Territory or on the Division to Which They Will Be Assigned.

The design of passenger locomotives involves a careful analysis of grades, curves, bridge and track limitations, train weights and speeds both over ruling grades and over the division as a whole. The type, size and characteristics of the contemplated locomotives will depend largely on the above data, but it is imperative to insure a sufficient starting tractive power by providing first-class engine efficiency and large sustained tractive power at high speeds which requires a boiler of ample steaming capacity.

It goes without saying that full advantage will be taken of the latest approved labor and fuel-saving devices in the design of locomotives for all classes of service. But in high speed locomotives, particularly, the use of light weight reciprocating parts should not be overlooked. Their advantages apply not only to the machine itself but to the roadway as well.

New freight locomotives demand a detailed study of every physical and operating condition of the territory or division involved. It is assumed that new power for first-class railroads will be large units equipped with every device which makes for economy.

Bridge and roadway conditions will determine the limiting weight per pair of drivers and will have a bearing also on the total weight and wheel base of the locomotive. The topography of the division will influence the length of the rigid wheel base. If very large units are required and curvature conditions limit the wheel base to four connected drivers it may be economical to go to a light Mallet type, while if there is no serious curvature a heavy Santa Fe type locomotive will probably meet the requirements.

The economical train load, together with the required speed over the division, taken in conjunction with ruling grades, will give a basis for the determination of driving wheel diameter, piston stroke, cylinder diameter, boiler pressure and maximum tractive effort. The question as to whether the locomotive will operate at high speeds, low speeds or whether it is to be suitable for fairly high speeds and at the same time powerful enough to handle very heavy trains at lower speeds will also have to be taken into account in the determination of these details, but the higher the speed required the greater must be the steaming capacity of the boiler.

In general, the economical train load will be determined largely by the characteristics of the topography of the division, which will influence the train length, and by the nature of the principal business handled over the territory, which will have a bearing on average car weights, and, in the ratio of empties to loads, on average train weights. The nature of the business handled also will have some influence in the matter of speeds.

Too careful attention cannot be given to the design of fireboxes and grates in all locomotives, regardless of the class of service. Even a small saving in fuel consumption means much in locomotive operation, and the first place to make such savings is in the firebox. Proper firebox volume, correct height of crown sheet above grates, a well-placed brick arch and sufficient air openings through ashpans and grates, together with well-designed grate bars, all based on the nature of the fuel to be burned, will result in the best fuel economy. The addition of a high-degree superheater of ample capacity augments the savings in the firebox and gives a very efficient boiler. Further increase of boiler efficiency appears to be a probability of the near future, because the development of successful feedwater heaters has already passed the experimental stage.

Another feature which must not be overlooked in the selection of locomotives is the matter of shop and enginehouse facilities. Inadequate facilities for making classified and running repairs will offset to a considerable extent fuel and other savings resulting from the operation of large units of power.

2. Modernizing the Older Types of Locomotives by the Application of Labor and Fuel Saving Devices.

If a locomotive is worth continuing in service it certainly should be modernized by the addition of at least some of the highly developed labor and fuel-saving devices whose advantages are now so well established.

These devices have been applied to practically all locomotives of recent construction, and many railroads have done much to modernize some of their better power by the application of the devices referred to. But more remains to be done, because any locomotive not modernized is a poor investment, for the reason that it is not doing as much work as it ought to for a given amount of fuel burned, and if the prevention of this loss of power would not show a good return on the cost of making the improvements then that locomotive is not a paying proposition.

No time should be lost in making a survey of all old power from the standpoint of modernization, comparing estimated savings due to increased power and greater fuel economy with fixed and maintenance charges on the proposed improvements. In making such a survey yard power is worthy of special attention, because terminal yard congestion is becoming serious at a great many places, and such a condition greatly retards the movement of freight over the entire railroad. Yard expansion is frequently next to impossible, but relief can be had by making such improvements in yard locomotives that they will start faster, handle more cars and spend more time in actual switching or transfer work by requiring less coal and water. This can be done by the use of power reverse gears and superheaters.

3. Assignment of Existing Locomotives to Territory Where Their Characteristics Will Be Best

Adapted to the Physical Conditions Under Which They Will Operate.

Beyond all doubt many railroads are failing to secure large economies in locomotive operation because they are neglecting to study carefully the characteristics of locomotives already in service from the same standpoint as that which should be used in the selection of new locomotives—namely, adaptability to operating conditions.

The same items must be studied, both in the reassignments of existing locomotives and in the design of new locomotives, but the problems are somewhat different. In the case of locomotives already in service, trainloads will have to be adjusted to the locomotive rather than, in the case of new power, building the locomotive to handle the desired maximum trainload, and the cost of locomotive operation per ton-mile may not, of course, be kept as low as it can in the case of specially designed large units of power. But modernizing the older power and putting it to work in a territory where its characteristics and capacity will permit it to operate most satisfactorily will amply warrant the required investigation and the possible temporary inconvenience of transferring power from one division to another or over several divisions.

If, in the reassignment of existing power, all locomotives of a class can be concentrated on one division or on two or even three adjacent divisions further economy will be secured from a maintenance standpoint, for the reason that smaller stocks of repair parts will be necessary to maintain the locomotives if the entire group in one class can be served from one or two adjacent repair points.

In some cases locomotives not suitable for their present class of service will, with a moderate expenditure for any necessary modifications, be very satisfactory for another class of service. For example, light Consolidation type locomotives may no longer be suitable for road freight service, but by installing superheaters and power reverse gears, if these devices have not already been applied, removing the engine truck and making the necessary adjustment in spring equalization, these locomotives will undoubtedly be entirely suitable as eight-wheel switchers for yard or transfer work.

4. An Accurate and Practical Freight Train Loading Method Applicable Under All Conditions.

Too strong emphasis cannot be placed on the importance of properly loading locomotives. It is almost obvious that a locomotive underloaded is wasting a portion of its hauling capacity and that one which is overloaded is retarding operation; in either case there is an economic loss.

Any train-loading method to be satisfactory must be easy to apply and should involve no loss of time in making up trains. For this reason no calculations should be left to the yard forces other than the necessary addition of gross car weights and the allowance for car friction. Allowance for car friction should be a constant quantity for a given weather condition on any division and of such a value that it will accurately equate any combination of car weights entering into the make-up of the train. It has been established that the friction allowance cannot be constant for all temperature conditions, because if it is correct for summer conditions it will be too small at low temperatures. This feature will be fully covered later.

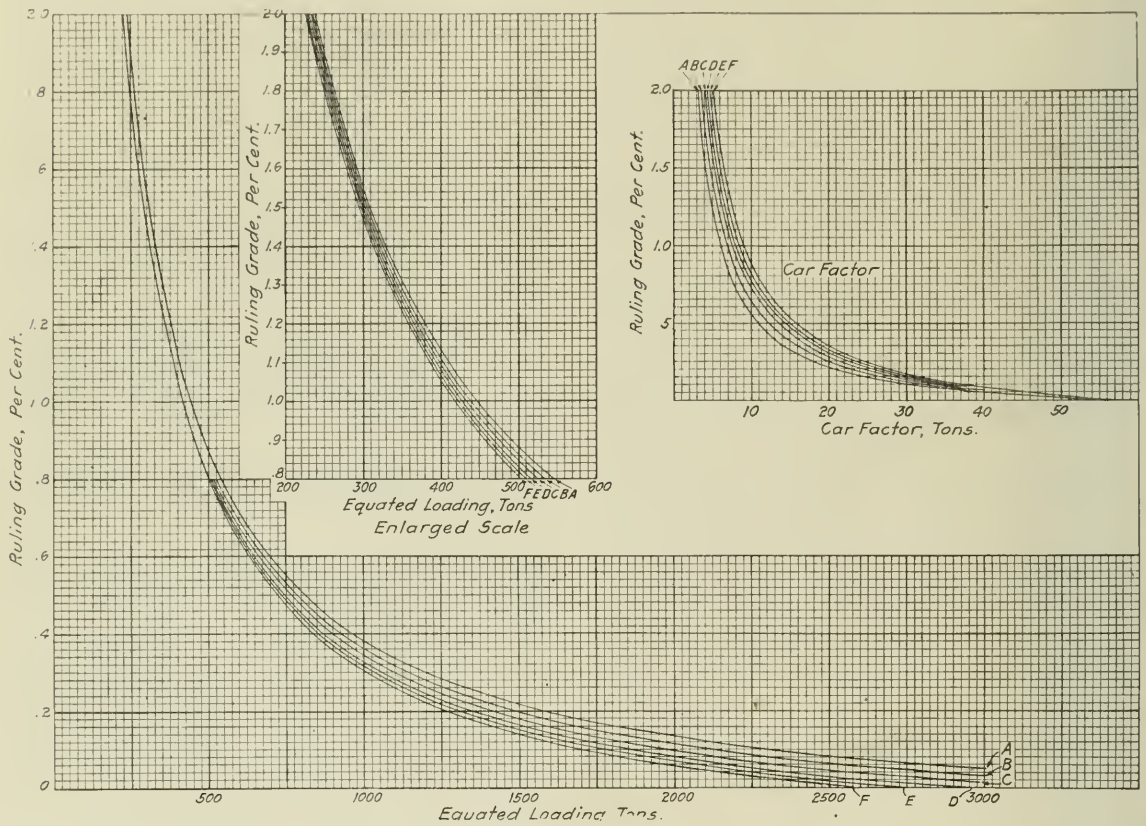


Fig. 1—Standard Loading Chart for 10,000-Lb. Available Tractive Effort at Speeds Between 5 and 12 M.P.H. Under Various Weather Conditions

The train-loading method given herewith has been thoroughly tested under a wide variation of weather conditions on both low grade and hilly railroads. The data have been reduced to graphic form where possible, and it is believed that the amount of calculation necessary to apply the method to specific conditions will be comparatively small.

Standard Loading Chart.—A standard loading chart showing the equated loading for an available drawbar pull of 10,000 lb. on grades from zero to two per cent, together with corresponding car factors, is taken as the basis for this train-loading method. A loading curve and its corresponding car factor are plotted for six different weather conditions in Fig. 1. It is assumed that these loading curves are applicable to speeds of from five to twelve miles per hour over ruling grades.

Data for this chart are obtained in the following manner: Train resistances per ton for various car weights, as shown in the proceedings of the Master Mechanics' Association, for good average track conditions, were verified by further tests. These figures for 10 miles per hour were taken to be substantially correct for speeds between 5 and 12 miles per hour. The average increased train resistance per degree Fahrenheit drop in temperature has been shown by test to be .715 per cent. The several temperature loadings are designated *A, B, C, D, E* and *F*, and the resistance per ton for cars of 70 and 20 tons gross weight as used in the chart are shown in the table below. The resistances for loadings *B* to *F*, respectively, are calculated, using the above data based on the figures 4.25 and 9.00 lb. per ton at loading *A*, for 70 and 20-ton cars, respectively.

	Weather loadings		Resistance, lb. per ton, on level tangent track	
Rating	Temperature range deg. F.	Average temp. deg. F.	70-ton cars	20-ton cars
A	50 and above	70	4.25	9.00
B	49 to 35	45	5.00	10.60
C	34 to 20	25	5.60	11.90
D	19 to 5	10	6.10	12.90
E	4 to —10	—5	6.50	13.80
F	—11 and below	—20	7.00	14.80

The formulæ used to derive the curves shown on the standard loading chart are:

70-ton cars—

$$\text{Train load (tons)} = \frac{P}{r}$$

$$\text{Number of cars in train} = \frac{P}{70\ R}$$

20-ton cars—

$$\text{Train load (tons)} = \frac{P}{r}$$

$$\text{Number of cars in train} = \frac{P}{20\ r}$$

$$\text{Car factor} = C = \frac{\frac{P}{R} - \frac{P}{r}}{\frac{P}{20r} - \frac{P}{70R}} = \frac{70\ (r - R)}{3.5\ R - r}$$

$$\text{Equated train loading} = \frac{P}{R} + \frac{PC}{70R} = \frac{P}{r} + \frac{PC}{20r}$$

Where P = Available tractive effort.
R = Total resistance, per ton for 70-ton cars.
r = Total resistance, per ton for 20-ton cars.

Applying these formulæ to one point on one of the curves, together with a check of the derived car factor to prove its accuracy in equating various car weights:

Assume:
Weather rating *A*
Equivalent grade, .5 per cent = G
P = 10,000 lb. (basic figure)

Then R = 4.25 + 20 G = 4.25 + 10 = 14.25 lb. per ton
and r = 9.00 + 20 G = 9.00 + 10 = 19.00 lb. per ton

$$\text{Car factor} = \frac{70\ (19.00 - 14.25)}{3.5 \times 14.25 - 19.00} = 10.7 \text{ tons}$$

$$\text{Equated train loading} = \frac{10{,}000}{14.25} + \frac{10{,}000 \times 10.7}{70 \times 14.25}$$

$$= 809 \text{ tons}$$

$$\text{or} = \frac{10{,}000}{19.00} + \frac{10{,}000 \times 10.7}{20 \times 19.00} = 808 \text{ tons}$$

In this manner the series of equated train loading and car factor curves shown in Fig. 1 are derived.

Available Tractive Effort of Locomotives—Fig. 2 shows the per cent of the theoretical cylinder tractive effort at various piston speeds up to 600 ft. per minute for modern hand-fired locomotives, both with and without superheaters. These curves are derived from reliable test data and represent good average locomotive conditions, and give a basis for calculating available tractive effort at various speeds for modern locomotives, by using the following data and formulae.

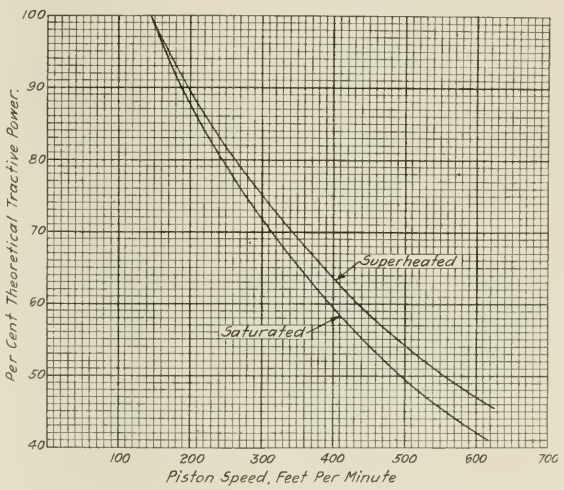


Fig. 2—Percentage of Theoretical Tractive Effort Developed at Various Speeds

$$\text{Piston speed (ft. per min.)} = 56 \times \text{m.p.h.} \times \frac{S}{D}$$

Where m.p.h. = Speed, miles per hour
S = Piston stroke, inches
D = Diameter of drivers, inches

Internal resistance of locomotive = sum of resistances of drivers, engine and tender trucks, and grade resistance.

1. Resistance of drivers, lb. = $W_D \times 22\frac{1}{2}$
2. Resistance of engine and tender trucks, lb. = $(W_{ET} + W_{TT} + W_T)\left(3 + \frac{V}{6}\right)$
3. Resistance due to grade, lb. = $W_{TOT} \times 20 \times G$

W_D = Weight on drivers, tons

W_{LT} = Weight on leading truck, tons

W_{TT} = Weight on trailing truck, tons

W_T = Weight on tender, tons

W_{TOT} = Total Weight, engine and tender, tons

V = Speed, miles per hour

G = Equivalent grade, per cent

Available tractive effort = cylinder tractive effort — internal resistance of locomotive.

For each class of locomotive for which train loading data are desired, a chart showing the available tractive effort at various speeds over the range of grades encountered, should be prepared. The following example shows how easily this can be done:

MIKADO TYPE LOCOMOTIVE WITH SUPERHEATER, CLASS S-4.

Cylinders	28 in. by 32 in.
Drivers	63 in.
Boiler pressure	180 lb.
Weight on drivers	240,000 lb.
Weight on leading truck	29,000 lb.
Weight on trailing truck	52,500 lb.
Weight on engine, loaded	321,500 lb.
Weight on tender, loaded	162,500 lb.
Weight on engine and tender, loaded	484,000 lb.
Theoretical tractive effort (at 85 per cent B. P.)	60,900 lb.

Fig. 2 shows that the maximum tractive power is obtained from the starting speed up to a piston speed of 145 ft. per minute.

Substituting this value in the formula stated above:

$$145 = 56 \times \text{m.p.h.} \times \frac{32}{63}$$

m.p.h. = 5.1, speed below which locomotive will give maximum available tractive effort.

At this speed, 5.1 miles per hour, the available tractive effort on level tangent track will be:

60,900 minus resistances 1, 2 and 3.

1. Drivers $= \frac{240{,}000}{2{,}000} \times 22\frac{1}{2} = 2{,}700$ lb.

2. Engine and tender trucks $= \frac{29{,}000 + 52{,}500 + 162{,}500}{2{,}000} \times \left(3 + \frac{5.1}{6}\right) = 470$ lb.

3. Grade = O

Sum of friction and grade resistances = 3,170 lb.

Available tractive effort = 60,900 — 3,170 = 57,730 lb.

For a three per cent equivalent grade at this speed, resistances 1 and 2 are the same as for level tangent track, but:

3. Grade $= \frac{484{,}000}{2{,}000} \times 20 \times 3 = 14{,}200$ lb., and the total friction and grade resistance = 17,370 lb.

Available tractive effort = 60,900 — 17,370 = 43,530 lb.

Plotting these two points on a chart, Fig. 3, and connecting them by a straight line, gives the available tractive effort over equivalent grades up to three per cent for locomotive Class S-4, at speeds below 5.1 miles per hour. Using the same formulae, available tractive effort curves for speeds of six, seven, eight, nine and ten miles an hour are plotted. These curves give complete available tractive effort data for Class S-4 locomotives. The same process is followed for the various classes of locomotives to be used, and these charts, of the form shown in Fig. 2, together with the standard loading chart, Fig. 1, make further calculations unnecessary and the process of obtaining standard loading over any division a comparatively simple one.

Application of the Method to a Given Set of Operating Conditions—Case 1.—Typical hilly division with heavy ruling grade in one direction. Profile shown by Fig. 4, all

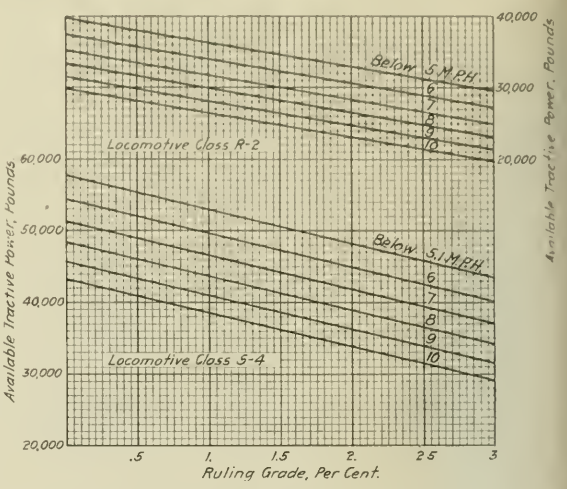


Fig. 3—Available Tractive Effort for Two Typical Locomotives Under Various Conditions of Speed and Grade

grades compensated for curvature. The operating conditions on the *AB* division are assumed to be as follows:

Total time allowed for making a trip over the division in either direction, including terminal and road delays	8 hrs. 0 min.
Average terminal delays	1 hr. 0 min.
Taking water and other road delays	0 hr. 45 min.
Time left for making run within the eight hours	6 hrs. 15 min
Length of division	93 miles
Average speed over division	16½ m.p.h.

Northbound, the *AB* division has 46 miles of heavy ascending grade, 37 miles of low descending grade and 10 miles of level road. The descending grade and level portion can be covered in approximately one hour and 45 minutes, leaving four hours and 30 minutes to cover the 46 miles of ascending grade, over which the average speed will, accordingly, be slightly more than 10 miles per hour. This average speed can probably be maintained if the train loading is based on a speed of nine miles per hour over the .76 per cent ruling grade.

Southbound this division has 37 miles of low ascending grade and 46 miles of heavy descending grade and 10 miles of level road. The run over the descending grade and level stretches will not require over two hours, leaving four hours and 15 minutes in which to make the 37 miles of ascending grade, at an average speed of 8.8 miles per hour. At a speed of 8.5 miles per hour over the .2 per cent ruling grade, which is 13 miles in length, this average speed should be easily maintained.

Assuming that train loading is desired for Class S-4 locomotives over the *AB* division, the procedure is as follows:

Northbound.—From Fig. 3, for the Class S-4 locomotive, the available tractive effort at nine miles per hour on the ruling grade of .76 per cent is 42,250 lb. (4,225 x 10,000 lb.) The standard train loading chart, Fig. 1, gives the follow-

ing data for 10,000 lb. available tractive power on a .76 per cent grade:

Equated Loading for Class S-4 on .76 Per Cent Grade for Various Weather Conditions

Weather	A	B	C	D	E	F
Equated tons	565	550	540	534	530	525

Multiplying these figures by 4.225 gives the equated loading for the S-4 locomotive.

The car factor for a .76 per cent grade, taken to the nearest one-half ton is:

Car Factor on .76 Per Cent Grade for Various Weather Conditions

Weather	A	B	C	D	E	F
Equated tons	7½	8½	9½	10	11	11½

Southbound.—In a similar manner, for a .2 per cent grade and a speed of 8.5 miles per hour, the available tractive effort = 46,100 lb. (4.61 x 10,000 lb.) The equated loading for 10,000 available tractive power on .2 per cent grade is as follows:

Equated Loading for Class S-4 on .2 Per Cent Grade for Various Weather Conditions.

Weather	A	B	C	D	E	F
Equated tons	1,570	1,480	1,405	1,345	1,305	1,265

Car Factor on .2 Per Cent Grade for Various Weather Conditions.

Weather	A	B	C	D	E	F
Equated tons	21	23	25	26	27	27½

The final train loading, Class S-4 locomotive over the *AB* division would then be:

Equated Train Loading for Class S-4, Tons

Northbound

Weather	A	B	C	D	E	F
Car factor, tons	7½	8½	9½	10	11	11½
Equated tons, locomotive, Class S-4	2,387	2,324	2,282	2,256	2,239	2,218

Southbound

Weather	A	B	C	D	E	F
Car factor, tons	21	23	25	26	27	27½
Equated tons, locomotive, Class S-4	7,235	6,825	6,475	6,200	6,015	5,830

Case II.—Tonnage rating for a typical low grade division. Profile shown by Fig. 5. All grades compensated for curvature.

The operating conditions on the *CD* division are assumed to be as follows:

Total time allowed for one way trip over the division, including terminal and road delays	12 hrs. 0 min.
Average terminal delays	1 hr. 0 min.
Taking water and other road delays	2 hrs. 0 min.
Time left for making run within the 12 hours	9 hrs. 0 min.
Length of division	138 miles
Average speed over division	15 ⅓ m.p.h.

Northbound the *CD* division has 68 miles of slightly ascending grade, 45 miles of slightly descending grade and 25 miles of level road. The run over the level and descending portions of the division can be made in about three hours, leaving six hours in which to cover the 68 miles of ascending grade, at an average speed of 11.3 miles an hour. On account of the general low grade nature of this division, the ruling portion of which is but .25 per cent northbound, this average speed can probably be maintained if the train passes over the two ruling portions, of six and three miles in length, respectively, at a speed of 10 miles an hour.

Southbound, this division has but 45 miles of slightly ascending grade, 68 miles of slightly descending grade and 25 miles of level road. The descending and level parts of the division can be covered in approximately four hours, leaving five hours in which to traverse the 45 miles of ascending grade, at an average speed of nine miles an hour. For the reason that practically all of this grade is about .2 per cent, the maximum southbound grade, nine miles per hour is taken as the speed over the ruling grade.

On account of the prevailing general low grade character of the *CD* division a smaller locomotive than the Class S-4 Mikado is to be used, the Class R-2 superheated Consolidation type locomotive having been selected. Data regarding the available tractive effort for this class of locomotive are shown in Fig. 3.

Northbound.—The speed over the ruling grade is assumed

Fig. 4—Profile of the A-B Division

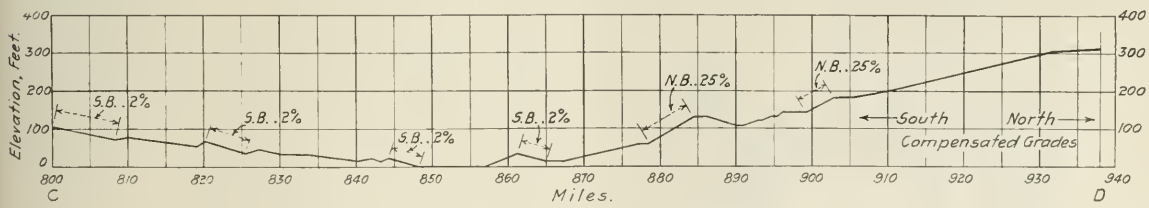


Fig. 5—Profile of the C-D Division

to be 10 miles an hour. The available tractive effort at this speed over a .25 per cent grade is 29,000 lb., or 2.9 x 10,000 lb.

From the standard loading chart, Fig. 1, the loading data for 10,000 lb. available tractive effort on a .25 per cent ruling grade is found to be as follows:

Equated Loading for Class R-2 on .25 Per Cent Grade

Weather	A	B	C	D	E	F
Equated tons	1,195	1,140	1,095	1,060	1,037	1,012

The corresponding car factors are:

Weather	A	B	C	D	E	F
Car factor, tons	18	20	21½	22½	23½	24½

Southbound.—Similarly for a .2 per cent grade and a speed of nine miles per hour, the available tractive effort is 30,800 lb. or 3.08 x 10,000 lb. The equated loading for 10,000 lb. available tractive power on a .2 per cent grade and the car factors are:

Weather	A	B	C	D	E	F
Equated tons	1,570	1,480	1,405	1,345	1,305	1,265
Car factor, tons	21	23	25	26	27	27½

The final train loading for the Class R-2 locomotive over *CD* division would then be:

Equated Train Loading, Tons

Northbound

Weather	A	B	C	D	E	F
Car factor, tons	18	20	21½	22½	23½	24½
Equated tons, locomotive, Class R-2	3,465	3,305	3,175	3,075	3,005	2,935

Southbound

Weather	A	B	C	D	E	F
Car factor, tons	21	23	25	26	27	27½
Equated tons, locomotive, Class R-2	4,835	4,560	4,330	4,125	4,020	3,895

The foregoing method of freight train loading is working out very well in practice. To apply it successfully, it is of course necessary to have an accurate knowledge of the operating conditions, and profile and topography of that portion of the railroad under consideration. It is to be expected that slight changes will, in some cases, be necessary in the loading figures assigned from the standard charts used, dictated, of course, by service trials of the predetermined loadings. The basic idea in presenting this method of train loading is to afford a reasonably accurate means of loading locomotives to their economic capacity, without necessitating extensive tests to determine equated loads and friction allowances.

From the N. Y. World

The New Hold-Up Man

Commission Expresses Views on Proposed Legislation

Senator Cummins, chairman of the Senate committee on interstate commerce, has made public a letter from Chairman Clark of the Interstate Commerce Commission setting forth the views of the commission on pending railroad legislation.

The commission's legislative committee expressed approval of Senator Frelinghuysen's bill which proposes to require the observance of seasonal differential rates on coal, the purpose being to secure a more even distribution of coal throughout the entire year, but opposed the provision prohibiting railroads from confiscating coal in transit.

The commission is of the opinion that S. 4031, which requires establishment and enforcement of "preferential rates" on shipments of cotton based upon the cubic contents of the bale, would revolutionize the practices and customs of marketing and shipping cotton which have prevailed in cotton-producing sections for many years, and it is not prepared to endorse the measure or express opposition to it.

Objection was made to S. 3183, which proposes to require an investigation as to warehouse and elevator facilities at export ports for the handling of grain and grain products. "The bill does not make any provision as to the carriers' ability to finance the acquirement of such facilities," the commission pointed out, and "it would apparently give precedence to those facilities over others which might be equally or more important in the public interest," and "the transportation act authorizes the commission to order a carrier to provide itself with safe and adequate facilities for performing as a common carrier its car service as that term is used in the act and to extend its line or lines." The term car service is defined as including the use, control, supply, movement, distribution, exchange, interchange and return of locomotives, cars and other vehicles used in the transportation of property, including special types of equipment.

Of S. 115, which would require the use of ventilated closed cars for the transportation of live stock in certain parts of the country and would prohibit during a part of the year transportation of live stock in open cars "or cars not having closed sides composed of material not less than one inch in thickness," the letter says that there are now in existence no cars that would meet these requirements and that "there is a deplorable shortage of cars of nearly every kind that are demanded in general transportation. It would, under present conditions, take a substantial period of time to acquire equipment that would meet the provisions of this bill even if there were no difficulties about financing the acquirement. We are inclined to doubt the advisability of such a requirement at this time and in view of the general conditions in connection with and surrounding our railroads and their ability to meet the transportation needs of the country. It is not at all impossible that at a later day it may be most desirable to prescribe a type of car for the transportation of live stock which by conversion can be available for other uses," the letter continues, adding that it would be most appropriate to "bend every energy to the acquirement of a sufficient number of cars of already known and approved design."

A Record Fast Run. Another record run was made between Seward and Anchorage, when the regular mixed train on Wednesday, March 10, made the run in 6 hours 20 minutes. This train consisted of one buffet-observation car, one passenger coach, two carloads of commercial merchandise, one carload of supplies for the Alaskan Engineering Commission and one caboose. It left Seward at 8.00 a. m. and arrived in Anchorage at 2.20 p. m., in charge of Conductor G. L. Jenkins and Engineer F. W. Brayford. [Distance 114 miles; average rate, 18 miles an hour.]—*Alaska Railroad Record.*

Essential Considerations in Steel Specifications*

In Which It Is Emphasized That Service Requirements Should Be the Basic Principle

By F. A. Weymouth
Sales Metallurgist, Bethlehem Steel Company

A STEEL SPECIFICATION should be based on one principle and one principle only, and that is—

"The material furnished under this specification must be suitable for the service to which it is to be subjected."

While this seems perfectly obvious and elemental, this one basic consideration is frequently overlooked in many of our steel specifications. For example, if we are making containers that must stand in service a severe pressure, it is obviously more logical to test these finished containers with a pressure sufficient to allow the necessary factor of safety, and place our acceptance or rejection upon this test, rather than on a rigid surface inspection and tensile requirement on the material of which this container is made.

As a part of or supplemental to this basic principle, it should be kept in mind that the material should be no better than will meet these requirements of service, with, of course, a reasonable factor of safety.

This statement seems rather revolutionary, but we must keep in mind that an engineer is only efficient when he accomplishes a given object at the minimum cost. There has crept into the training of engineers of almost all branches a feeling that the engineer should confine himself to technical questions and leave the commercial considerations to the purchasing department, but the most successful engineers are those that develop the commercial and economic side of their work in conjunction with the technical. An engineer who specifies, for example, a high priced chrome nickel steel when a cheaper plain carbon steel will serve the purpose, or so writes a specification that the cost of the material is greatly increased without in any manner improving the quality, is a liability to his employer. His alibi usually is that "the best is none too good," when "the best" is sometimes much better than the service requires. The excess is money wasted.

Our whole economic situation in regard to steel usage needs careful attention. Hundreds of thousands of tons of steel that have just missed meeting the requirements of a high-grade steel by a small margin are scrapped, when such steel should be in service somewhere. This loss must be paid for, and it is certainly our duty to find uses for as much of the steel produced as we can, without in any way sacrificing the safety of our structures.

Conversely, an engineer is very short-sighted who does not recommend an article or type of steel that will give him longer life when that life is necessary, even at an advance in cost. Unfortunately, the railroad engineers have been greatly hampered in that they sometimes have very little control of purchases. Since everybody seems to be suggesting so-called remedies to be applied to the railroads, I may be pardoned if I were to suggest one change that would be reflected at once in maintenance and operating costs, and that is, "Give the engineers and master mechanics full charge over purchases of the materials they use."

In drawing up a specification, consideration should be given to previous experience of our own or of others using material for a similar purpose, together with information from the manufacturers, who not only have accurate, reliable information in regard to the physical properties of all grades of steel, but considerable data as to the use of various grades of steel for difficult purposes.

I have little regard for the man who, by spreading out before him all the existing specifications for that class of material and increasing the severity of each requirement, evolves a specification that is extremely difficult to meet, and sits back satisfied that he has produced the best specification because it is difficult for the manufacturer to meet the requirements. He certainly raises the cost of that material and may be specifying a steel that is wholly unsuitable for the service in which it is to be used. The foundation on which to build a specification is the observations of material in use, coupled with the knowledge of the basic physical properties of steel.

Keeping in mind the basic principle that a specification should be so drawn up that the material made under it is suitable for the service required, we come to the necessary details that should be embodied.

First: Design or size of material.

This is almost entirely within the hands of the consumer and is of course linked closely with the grade of steel specified.

Second: Grade of material.

Here we must have all the information that is available as to past performance of our own or others, together with our knowledge of the properties of steel under various heat treatments. Under this heading the first consideration should be given to—

(a) Physical properties; and if necessary, to

(b) Chemical properties.

Too much emphasis cannot be given to the fact that it is the physical result we are all looking for and not the composition. If a piece of steel has the necessary hardness, strength and ductility, and is of the proper shape and size, we should not concern ourselves with how it is made or what it is made of. A steel of a certain chemical composition, of a certain size, given a certain heat treatment, has absolutely definite physical properties, so that in specifying the physical result desired we are indirectly specifying the chemical composition.

There is a great tendency in this country to specify not only a physical test, but a chemical requirement as well, with the hope that both requirements will coincide.

During the war it was very interesting to note that our foreign allies had in their specifications very little reference to chemical composition, and placed very little importance on what few chemical requirements they did have, but when they began to place orders in this country they reluctantly added to their specifications a chemical requirement, thinking that the American manufacturers wished both requirements.

It is needless to state that the manufacturers worked to the original specification which required rigid physical properties with very little reference to chemical limits.

This one feature of the foreign specification made possible the enormous tonnage of steel of all grades supplied to our Allies and this steel met the severe war service satisfactorily.

In many cases it is desirable to buy steel on chemistry

*From a paper presented before the January 13, 1920, meeting of the New England Railroad Club.

alone, but when a physical requirement is specified, it is rarely necessary to include any chemical requirement except, perhaps, the maximum phosphorus content, and in rare cases the maximum sulphur content.

Phosphorus and sulphur have generally been considered impurities in steel, and due to the fact that our raw materials in this country permitted the manufacture of steel lower in these two elements than has ever been possible abroad, there have crept into our specifications very rigid requirements as to the maximum contents of these two elements. Investigations of failed material have often shown that it contained slightly higher percentages of these elements than was, in the minds of some, a safe limit, and the conclusion was immediately made that these percentages were the cause of the failure.

The study of material that has been in service is undoubtedly the most prolific source of information on which to base our specification, but this study should be made with equal zeal on material that has given satisfactory service as well as on material that has failed. No one phase of so-called scientific work is being carried on in such a misleading, unscientific and unintelligent manner as the investigation of failed material. If any member fails before others, used in apparently similar service, or sooner than it should in the opinion of the user, the first step in an investigation is a chemical analysis made from drillings taken near the fracture, but more often away from the break. This is followed by a tensile test made from a specimen cut at a convenient location, and to lend a more scientific tone to the report, a few microphotographs are made. If the phosphorus or sulphur are three or four one-thousandths of one per cent higher than was specified, or the elongation one per cent less, or the microphotographs show non-metallic impurities, or a grain size that appears large to the observer, the steel is condemned on one or all of these accounts.

The fact that the failed member may have been injured by receiving abnormal treatment at some period of its life, been improperly machined or fabricated, or of the wrong design or size, is almost always absolutely ignored, while a careful examination of the fractured member and the history of its use will many times give us the true cause of the failure. A report of this nature will not be so impressive, but the conclusion will be nearer the truth.

The scarcity of the high-grade ores and low sulphur fuels prevents the manufacturer to-day from producing the extremely low contents of phosphorus and sulphur sometimes required. Extensive investigations have been made and are now being made to show the effect of different percentages of those elements. We find that phosphorus is not an element that produces brittleness, as has usually been the consensus of opinion, but a hardener more intense than the carbon, but acting in the same manner. In other words, we can use higher phosphorus steels if we compensate for this hardness by a reduction in the carbon content.

As to sulphur, we are very thoroughly convinced that in almost all cases, even in such steel as rivets, which would show the effect of hot brittleness the quickest, steel with sulphur much above the present standard requirement gives satisfaction in every respect.

Much tradition and mystery surrounds the effect of small percentages of these so-called impurities. Even in the comparatively few years that I have been in the steel business, I have seen the situation in regard to copper change from one where material was rejected if it contained five hundredths of one per cent of copper, to its being specified in the steel.

There is nothing mysterious in the steel business. There is a lot that we do not know, and not a day passes that some new phase does not present itself, but it is only by keeping an open mind and continuing our investigations that real constructive progress is made.

After the design, size and shape of the material and the physical properties or chemical requirements, or a reasonable combination of both, are specified, sufficient tests of a suitable nature should be required. Many times we find that parts subjected to abrasion only are bought on a tensile requirement, so here again we must keep in mind the ultimate use of our product. Rolling tolerances should be stated clearly in a specification, but clauses as to length, percentage of second-quality material accepted, et cetera, would best be part of the contract.

The ideal specification from the standpoint of the customer is the clear, concise, brief specification executed by an inspector who has sufficient knowledge of the ultimate use of the material to intelligently interpret the specification.

It must be remembered that no specification can be drawn up which, in the hands of an inspector who knows nothing but what is written in this specification, will deliver accepted material that will be satisfactory to the user.

American purchasers of steel are sorely in need of capable inspectors. Not a greater number of inspectors, but better inspectors.

This is one of the main reasons why foreign work is so attractive to American steel manufacturers. Practically all of the foreign inspectors are men well versed in the ultimate use of the material and the limitations under which it is used, together with a wide enough training among the many steel plants to appreciate the possible limits of manufacture. A man so trained does not penalize a steel plant and protects both the purchaser and manufacturer in that the material accepted by him will be satisfactory for use in the service for which it is intended.

The "radicals" or "left wing" among the "specificationists" have recently gone to the extreme of not only specifying the grade of steel required with the necessary test, but of specifying in detail how the manufacturer shall proceed to make this steel, together with a rather crude description of some of the various manipulations which have been regular practice among steel manufacturers since the time when steel was first cast into ingots.

It is their contention that a specification of this kind instructs an inspector as to the correct method of manufacture, and thus insures that the material accepted by him will be far superior to that bought under a specification that omits these instructions.

Sight is lost of the fact that no person can learn any trade from a text-book, and what may be considered good practice today may be poor practice tomorrow, and that the manufacturer may be so hampered in his operation by an inspector who interprets these clauses to suit his own whim that you cannot reasonably hold him responsible for the resulting product. It is not fair to specify how a man shall make his steel and then hold him responsible for the quality.

To summarize:

First: The grade of material specified should be that which experience has shown is satisfactory in service.

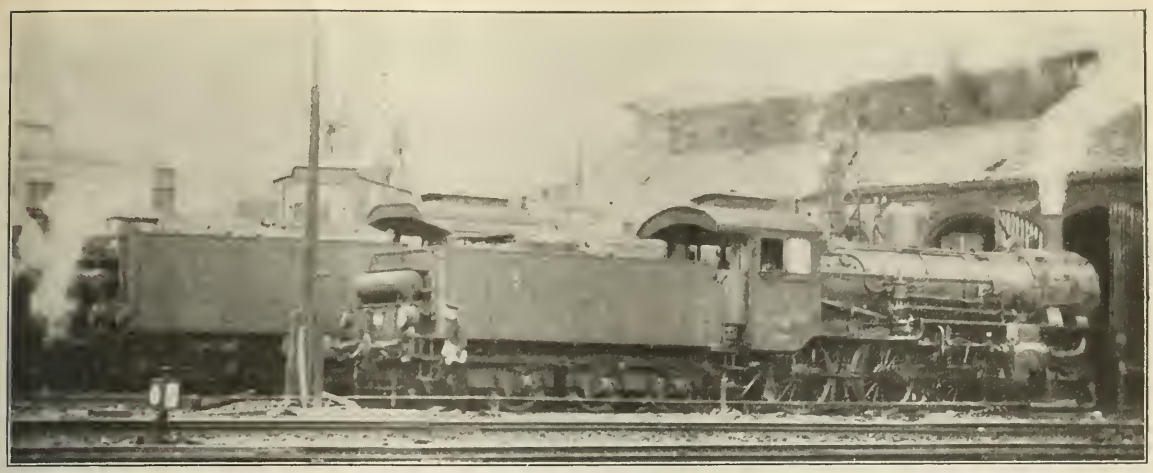
Second: Draw up your specification so that for important parts, high-grade material is required, and for parts of lesser importance steel of lower requirements, keeping in mind that it is our duty to make an economic use of steel.

Third: Turn a deaf ear to the traditions on the mysterious, disastrous effect of small percentages of various elements in steel.

Fourth: Confine your specification to a brief statement of the grade of material required, omitting those clauses that are primarily a part of the contract.

Fifth: Place your specification in the hands of a competent inspector who has some authority other than that written in the specification.

Sixth: For your own protection and peace of mind, do not tell the manufacturer how to make your steel and then try to hold him responsible for its behavior in service.



Engine Shed at Dusseldorf

Germany's Economic Position as a World Nation*

Labor Insurgency and a Weak Government Have Made Its Industry and the Railroads Impotent

By Robert E. Thayer
European Editor of the *Railway Age*

Part II—The German Railways

THE RAILWAYS OF GERMANY have suffered physically to a greater extent than any other industry. This has been particularly noticeable since the signing of the armistice. Whereas during the war there was a shortage of freight cars due to the fact that the Germans had some 10,000 additional miles of track to operate in their occupied territory, the real difficulty experienced now is in a shortage of locomotives. This shortage is due not to a lack of numbers, for Germany today has more locomotives than it had before the war, but to the fact that a very great proportion of them are out of service for repairs.

Condition of Roadbed

To a passenger traveling over the German lines, the roadbed appears to be in a good condition considering the fact that it was put to such a severe test during the war and that it has been difficult, on account of labor troubles since the war, to do much work upon it. The German roadbed is well ballasted. Steel ties are used to a great extent and rails of 82 and 90-lb. per yard are used. The ballast is generally of basalt or basalt-lava, which is 12 to 16 in. deep below the top of the steel ties. An inspection made of the German lines directly after the signing of the armistice disclosed the fact that on certain portions of the line, particularly those which had been subjected to very heavy traffic, the track bolts which fasten the rails to the steel ties and the bolts in the fish-plates were loose, but regardless of this defect the trains rode well. This fact speaks well for the type of roadway used by the German railroads. Conditions were favored, however, by the fact that the maximum allowable axle loads are not excessive. On some of the heaviest locomotives the axle load does not exceed 18,000 lb.

Condition of Equipment

The passenger equipment used on the German roads is in good operative condition but its finish and upkeep is deplorable. The cars are dirty inside and out. There is practically no plush or velvet remaining in any of the cars and the passengers have to remain content to ride on cushions covered with a dirty buckram which has become shiny from use. Many of the windows, which are of the drop sash type, are in an inoperative condition due to the fact that the leather straps have been removed. Upon inquiry regarding this condition of affairs it was stated that at one time there was such a severe shortage of leather and cloth in Germany that even passengers, let alone thieves in the car yards, would cut away the seat coverings and all other such material from the cars for their individual use. Stealing has been exceedingly prevalent. In 1919 tools and material to the value of 5,000,000 marks were stolen from the railway shops.

Heavy Deficits in Operation

The financial condition of all German roads is extremely serious. While it was impossible to obtain detailed information regarding all of the roads, an idea can be obtained of their condition from the Prussian-Hessen system, which is by far the largest system in Germany. From the year 1910 to the year 1917 inclusive, this system paid dividends to the state, according to its method of accounting, as shown in the table below:

1910	6.48 per cent	1914	3.59 per cent
1911	7.20 per cent	1915	5.57 per cent
1912	7.17 per cent	1916	6.24 per cent
1913	6.39 per cent	1917	4.03 per cent

In contrast to the above particularly good record, there was a deficit or rather, it was necessary to draw from the Prussian State 1,229,841,000 marks with which to meet the expenses of railway operation in 1918, and in 1919 the deficit

*This is the second of two articles written by Mr. Thayer from recent observations in Germany. The first appeared in the *Railway Age* of April 9, page 1135.

rose to 1,892,000,000 marks. If to this is added the amount usually paid for the amortization of the railway debt, the deficit in 1918 would have been 5,800,000,000 marks and in 1919 it would have been 4,600,000,000 marks. For the year 1920 there will be a further burden of some 2,000,000,000 marks in increased wages which were awarded recently in order to forestall a strike. In order better to meet the greatly increased cost of operation it has been decided to bring all the railways in Germany into one large state company thus uniting the Prussian-Hessen system which operates about three-quarters of all the railway mileage in Germany with the Bayern, Sachsen, Wurttemburg, Baden, Oldenburg and the Mecklenburg-Schwerin systems. It was expected that this amalgamation would take effect on April 1 of this year, but as this is written no definite plan of action had been evolved.

Rate Increases

With such deficits it is apparent that the revenues must be increased and on March 1, of this year, a 100 per cent increase was made in both passenger and freight rates, so that at the present time the freight rates have been increased by some 800 per cent and the passenger fares by some 700 per cent above the pre-war rates. This is a fine commentary on the statement of the Prussian Minister of Finance who in 1917 said, in connection with a relatively small increase in rates put into effect at that time: "The new raising of the railroad rates is only temporary; we hope to abolish them after the war." There have been four distinct increases in

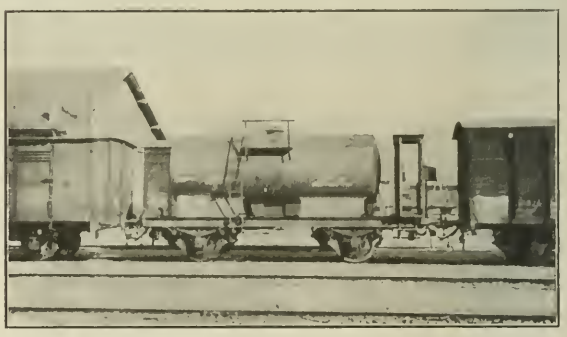
German Locomotive Equipped with Knorr Feed Water Heater

the passenger fares, the first amounting to 20 per cent, the second 100 per cent of the new rate. This was then increased 50 per cent on March 1, 1918, and this new fare doubled on March 1, 1920, so that a ticket costing 21.20 marks in pre-war days now costs 153.60 marks.

Traveling Conditions

Under such conditions it may readily be appreciated that traveling conditions are not of the best. With the shortage of locomotives, with locomotives in poor operative condition and having to contend with a very poor grade of coal, the trains are crowded and most always late. There are fourth class passenger cars in Germany; these present a most disconsolate picture on some of the through heavy services. They are crowded to the doors. They consist principally of compartments about 8 ft. wide and 10 or 12 ft. long with benches along the walls of the compartments. These are soon filled and the open space in the middle is also filled with German peasants going to or from market with all the supplies that they are strong enough to carry. As a result, these compartments are so crowded that it is all but impossible to close the doors.

Nor is there much more comfort in some of the better class compartments. In a ride from Dusseldorf to Cologne, in one second class compartment scheduled to hold six passengers there were 15. The train schedules have been lengthened, the maximum speed being about 30 m.p.h., and at the same time the number of trains reduced. Practically no trains run



A German Tank Car

on Sundays. Between Berlin and Cologne a distance of 362 miles, there were before the war 15 trains each way which took 8½ to 9 hours to make the journey. Early in 1918, there were 9 trains for civil passengers and 4 trains for the military on leave and the trip took 11 hours. Now there are only 8 through trains operating between these points, which, by the way, handles the heaviest passenger traffic of any line in Germany, and the fastest scheduled running time is 12 hours although the actual time is frequently between 13 and 14 hours.

Because of the smaller number of trains it is exceedingly difficult to provide the necessary accommodations for first and second class passengers, but this is very adroitly overcome by the resourceful German trainmen. One amusing instance will serve to indicate the methods followed. At the originating terminal where it appeared there would be a shortage of first-class compartments, a trainman simply changed the number on the door of a second-class compartment from "2" to "1" and a first-class passenger entering this particular compartment felt quite contented to think he had a first-class seat. A little further along the line, however, the number of second-class passengers increased and overflowed into his compartment regardless of the fact that it was marked "first." The ticket collector on finding that the majority of passengers in this particular compartment were traveling second-class calmly changed the number of the compartment back to "2." The first-class passenger noticed this and immediately raised the point that in as much as he had a first-class ticket he was entitled to a refund. After some talk, the trainman again changed the number of the compartment back to "1" thus removing all points of argument from the dissatisfied first-class passengers. As a matter of fact one has to be content with any seat on the German trains regardless of the compartment in which he rides and of the ticket which he holds.

Photos from Keystone View Company

Repair Work on German Locomotives

Coal Situation

The German railroads have suffered from the lack of fuel in the same manner as all Germany. In pre-war days it was the custom to keep 90 days' supply of coal in storage, but now it is difficult to get a supply of more than three or four days. A few figures are given below to show how the quantity in storage has decreased:

December, 1913	3,000,000 tons supply
November, 1918	1,431,000 tons supply
December, 1919	190,000 tons supply
February, 1920	100,000 tons supply

In addition to this the coal is of a very inferior quality and where the standard consumption was about 15 tons per 1,000 kilometers it is now between 20 to 25 tons. Because of the severe shortage of lubricating oils it has been necessary to extract the coal tar products from the coal, leaving the coke for locomotive use.

Locomotive Situation

While it was impossible to obtain detail figures regarding the condition of locomotives for the entire railways of Germany, the condition of the Prussian-Hessen system is indicative of the entire country. The system owns about 81 per cent of all the locomotives in Germany. On January, 15, of this year, over 47 per cent of its locomotives were out of service for repairs. There has been difficulty in obtaining materials and providing adequate labor to make the repairs. In addition to this, as in the case of the "one hoss shay," the effects of the wear and tear on the power during the war began to show in 1919. Table I showing the number of locomotives owned and the number in bad order at different times since before the war, indicates the condition of affairs as regards locomotives in Germany. It is particularly interesting to note that on August 1, 1914, the Prussian-Hessen system owned 21,882 locomotives and on February 12, of this year the total number was 23,224.

TABLE 1—CONDITIONS OF LOCOMOTIVES ON THE PRUSSIAN-HESSIAN SYSTEM

Date	Locomotives owned	Percentage in bad order
1910	19,670	....
1911	20,187	....
1912	20,758	....
August 1, 1914	21,882	19.5
November 1, 1918	27,991	33.5
March 30, 1919	22,538*	43.2
September 3, 1919	23,248	44.6
January 15, 1920	23,956	47.2
February 12, 1920	23,224**	46.2

*After locomotives were delivered to the Allies.
**After locomotives were delivered to Poland.
NOTE.—Germany has still to deliver 280 locomotives and 2,000 cars to the Allies under the terms of the Armistice. The Prussian railways now have on order some 1,500 locomotives.

It will be seen that before the Armistice was signed (November 11, 1918) the Prussian System had 27,991 locomotives as compared with 21,882 at the beginning of the war—an increase of 6,109. For all the railroads in Germany the increase in locomotives owned was 6,648 (about 24 per cent) or a total of 34,570 on November 1, 1918. Of the locomotives turned over to the Allies under the terms of the Armistice the Prussian system furnished about 83 per cent and this accounts for the drop between November 1, 1918, and March 30, 1919. There is a further drop between January 15 and February 12 of this year of some 734 locomotives which is accounted for by the fact that at that time Germany was required to turn over a large number of locomotives to Poland.

The fact that Germany has more locomotives today than she had before the war, regardless of the fact that she had already turned over about 5,000 to the Allies, is accounted for by the intense locomotive production during the war. The locomotive manufacturing plants were called upon to do nothing else but build locomotives. Each plant was given a specific design to build and turned that design out in large numbers. Practically all of the locomotives built were of a heavy and most improved design. Railway locomotive shops have been particularly hard hit as regards labor and it is on account of the greatly reduced output that it has been impossible to repair the locomotives as fast as they become disabled. In the unoccupied territory of Germany there has been greater difficulty in getting the men to work than in the occupied territory as is shown by the fact that of the locomotives under the jurisdiction of the Allies in the occupied territory the percentage in bad order is only 32 per cent at the present time. Detailed statistics are notoriously lacking but from general observation it can be said that those locomotives which were under operation were in good condition. There were a few cases of bad steam leaks noticed but there was not much evidence of defective machinery.

Modernizing Railway Equipment

One extremely interesting fact in regard to the locomotives was the very large number of feedwater heaters that are being used in Germany today. With coal at 200 marks a ton as compared with 12.50 marks before the war and furthermore with a coal of a greatly inferior grade, it is necessary to exert the greatest care in the use of fuel. The mechanical engineer of the Prussian system stated that without these heaters it would have been impossible to operate and meet the requirements as well as they have. They not only saved fuel but increased the capacity of their locomotives to the extent that their claims for economy range from 20 to 25 per cent in overall efficiency. This heater is of the tubular type, taking exhaust steam from the cylinders and auxiliaries. Water is forced through the heater with a pump located between the heater and the tank which keeps the heater under boiler pressure. Plans are being made to equip all of the Prussian locomotives with these heaters regardless of their size and service. As in the case of many other European roads the Prussian system will build no more compound locomotives. With superheaters and feedwater heaters it is felt that compounding is unnecessary.

The number of bad order locomotives has been so great that the railway locomotive shops were incapable of handling them. The extremely low morale of the men has reduced the output tremendously and furthermore the Prussian system now has only 60 large central repair shops whereas before the war it had 70. Everywhere throughout Germany one will find the railway equipment being repaired in plants capable of handling such work. The ship yards which are now practically devoid of shipwork have turned their energies to the repair of railroad equipment. The North German Lloyd at Hamburg is doing practically no other work than repairing railway stock. It is concentrating chiefly on car repairs but also has 14 locomotives in its shops for heavy repairs. The Hanover Locomotive Works has 50 locomotives to repair. Krupps has already repaired 300 locomotives and has 150 now in its shops undergoing repairs.

As indicated by the manner in which the German railways are applying feedwater heaters to their locomotives, the officers are not hesitating to spend money in order to save money regardless of the fact that the roads are now being operated under such heavy deficits. In addition to improving the locomotives a very extensive program is being carried out in equipping the freight cars with Kunse-Knoer automatic air brakes. This is a compressed air brake which is standard on the Prussian system. A program involving the expenditure of 260,000,000 marks for this purpose has been started. One third of the existing cars on the Prussian system, or about 175,000, have been equipped with this brake and all new cars will be. By 1927 it is planned to have all the freight cars on the Prussian system equipped. It has been estimated that at the end of ten years a saving of 60,000,000 marks will be obtained, after having paid for the cost of the installation, as a result of the saving in wages of the train crews alone. This brake is of a relatively new design and operates on a principle similar to the Westinghouse brake.

The continental roads before the war endeavored to come to some arrangement for the application of a standard brake to all freight cars in order to facilitate the interchange of traffic. The problem at that time was whether the vacuum or compressed air brake should be used. Strangely enough the strongest advocates of the vacuum brake were to be found in Austria and even during the war, tests and negotiations were carried on between the Austrian and the German roads in an attempt to settle the matter between themselves, but the unsatisfactory closing of the war to those countries prevented an agreement being reached and it appears that by this extensive application of power brakes to the Prussian road, an attempt is being made to force the compressed-air brake on all other nations in Central Europe if they want to participate in the exchange of equipment with the German lines. While the use of automatic couplers is greatly desired to replace the screw couplings on freight cars, plans have not been developed sufficiently to permit of any definite action in this respect.

Germany's Position as to Exports

This outline of Germany's industrial and transport situation will give a good idea of the present possibilities of Germany for exporting its manufactured products. With the internal dissension her hands are tied. With the great reductions in her supply of raw materials her power is restricted. With a loss of her merchant marine she must rely on other nations for transport. And with the work that is yet to be done within her own borders, she will be kept busy for some time to come. But the salvation of Germany's industry and the salvation of her economic position amongst the nations of the world demand that she export all she possibly can.

While the picture painted in this article shows Germany in a decidedly weakened and impotent state, the fact must not be lost to sight of what Germany was before the war and what it did during the war. Germany still has the equipment and talent for big business and whenever its internal affairs become settled it will be a nation to be reckoned with in the world's business. It is looking to Russia for its start and Russia—when *its* internal affairs become settled—will be the greatest market the world has ever seen, particularly for railroad equipment which Germany is preparing to supply.

The freight car builders of Germany have already joined together in an association known as the Verband Deutscher Wagonfabriken, which is similar to the Railway Car Manufacturers' Association in the United States but with far greater powers and more executive authority. Every car manufacturer receiving an order for equipment must communicate with the head offices of this association, which is located in Berlin, and receive the approval of the association on the price he desires to charge for the equipment and must also receive permission to undertake the work. Similar organizations will undoubtedly be formed and export business will be handled not as individual enterprises but as national combinations.

More Equipment Needed.—Industry continues to be hampered by inefficient transportation. This is not a condition which can be materially aided by redistribution of cars, but can be remedied only by the purchase of a large amount of new equipment and the heavy repairing of old. Although a number of railroads are now in the market for rails, cars and locomotives, the buying movement has not yet reached large proportions. Extensive purchases on the part of the roads must wait the making of adequate financial plans. Some needs, however, such as the requirements of the repair shops, are so urgent that buying of this kind cannot long be postponed.—*National Bank of Commerce in New York.*

February Returns Show Large Deficit

Washington, D. C.

Railroad earnings and expenses for February, the last month of government operation, made the worst showing of any of the 26 months during which the Railroad Administration was in charge, according to the preliminary bulletin issued by the Interstate Commerce Commission covering the reports of all roads that earned over $25,000,000 gross in 1919, or 80 per cent of the revenues of all Class I roads. These roads not only failed to earn anything toward the $75,000,000 a month rental guaranteed by the government but had an actual operating deficit of $8,654,313 and it is understood this deficit will be increased when the complete statement is issued.

This is the third month in which the railroads under federal control failed to earn any of the rental. In January, 1918, the first month of government operation, there was an operating deficit of $3,288,205. In June, 1918, there was also an operating deficit of $63,326,726 but this was caused by the fact that five months of retroactive wage increases ordered by Director General McAdoo were charged to the June accounts. The February, 1920, showing is largely attributable to the effects of severe winter weather on the Eastern roads, as the Eastern roads included in this bulletin earned $24,263,163 less than their operating expenses, while the Southern roads had a net operating income of $5,594,659 and the Western roads earned $10,014,191. The 45 roads covered by the bulletin had total operating revenues for February of $340,660,620, an increase of $56,000,000 as compared with February, 1919, but their expenses were $331,460,846, an increase of $72,000,000.

The fact that the rental paid for the use of the railroads by the government for each month was one-twelfth of the standard return based on the average net operating income for the three years ending June 30, 1917, works out very favorably for the railroad companies for the two months of 1920 during which the railroads were operated by the government. The average January net operating income during the test period for the Class I roads was $56,613,000 and for February the average was $47,934,000 so the government guaranty for the two months of $75,000,000 gives the railroads about $45,000,000 more than they earned in the corresponding months of the test period.

For the six months, March 1 to August 31, during which the government is to continue the guaranty, the $75,000,000 a month average works out as about $3,000,000 less than the average net for those months in the test period but this year the railroads should get the benefit of the larger earnings of the last four months of the year which were used by the government, when it had a full year to go on, to offset the unfavorable showing of the earlier months. For September of the test period the standard return for the Class I roads was $91,273,000, for October it was $94,333,000, for November it was $83,536,000 and for December it was $73,282,000. The guaranteed rental, under the terms of the standard contract, was to be paid in equal quarterly instalments and pro rata for any fraction of a year. For the six-months period, however, the amount of the monthly guaranty will be reduced by about $5,000,000 or $6,000,000 by the fact that some 40 roads did not accept the guaranty.

With constant demands for increased wages on the part of their employees on the one hand and an incessant clamoring of the public for lower passenger and freight rates on the other, it has thrown our greatest agencies for progress and development in a precarious condition. It is high time that we show a more liberal spirit toward these public servants and give them that support and co-operation that will enable them to better serve the public.—*Vidalia (Ga.) Advance.*

Railroad Labor Board Appointed

PRESIDENT WILSON on Tuesday sent to the Senate for its confirmation the appointments of the nine members of the Railroad Labor Board, provided for in Section 304 of the transportation act, which is to have jurisdiction over disputes between railroads and their employes and which is expected to give early attention to the present situation caused by the unauthorized strikes in various parts of the country. The board is composed of three representatives of the public selected by the President, three representatives of the railroad companies selected by him from six names nominated by the Association of Railway Executives, and three representatives of labor selected by the President from 10 nominations by the principal railroad labor organizations. The board is to select its own chairman and secretary and is to have its headquarters at Chicago, although it is authorized to hold meetings elsewhere. The members appointed by the President are:

Public Group: G. W. W. Hanger, assistant commissioner of the United States Board of Mediation and Conciliation; Henry Hunt, former mayor of Cincinnati and a member of the board of trustees of the Cincinnati Southern; and R. M. Barton of Memphis, Tenn., a former member of the Tennessee court of appeals.

Management Group: Horace Baker, former general manager of the Cincinnati, New Orleans & Texas Pacific; J. H. Elliott, former general manager of the Texas & Pacific and later a colonel in the Transportation Corps, A. E. F.; W. L. Park, former vice-president of the Illinois Central and later vice-president and federal manager of the Chicago Great Western.

Labor Group: Albert Phillips, vice-president of the Brotherhood of Locomotive Firemen and Enginemen; A. O. Wharton, president of the Railroad Employes Department of the American Federation of Labor and formerly a member of the Board of Railroad Wages and Working Conditions of the Railroad Administration; and J. J. Forrester, president of the Brotherhood of Railway and Steamship Clerks, Freight Handlers and Express and Station employes.

Messrs. Barton, Phillips and Baker are appointed for a term of three years, Messrs. Hanger, Wharton and Elliott for two years, and Messrs. Hunt, Forrester and Park for a term of one year.

The nominations were at once referred by the Senate to the committee on interstate commerce and the committee promptly held a meeting for the purpose of considering its recommendation as to confirmation but it was decided to ask further information regarding the members of the public group. The Senate committee held another meeting Wednesday and recommended confirmation of appointments, but some opposition to Messrs. Hanger and Hunt developed during executive session of Senate and action was postponed.

Mr. Hanger has had an unusually broad experience in dealing with labor and wage matters during his service with the United States Board of Mediation and Conciliation, to which he was appointed in 1913 by President Wilson. He was formerly chief statistician of the Bureau of Labor Statistics. During federal control of the railroads he was an assistant to the director of the Division of Labor of the Railroad Administration. The other two representatives of the public on the board have not been identified with railroad labor questions.

The three representatives of labor on the board are entirely familiar with the questions to be handled by the board, both through long experience as labor leaders and because of their connection with the wage propositions which were submitted to the Railroad Administration and are still in an unsettled state. Mr. Wharton has been a member of the Board of Railroad Wages and Working Conditions, which has investigated all wage questions for the Railroad Administration since the issuance of General Order No. 27 in May, 1918, and, under the practice of that board of alternating the chairmanship between the representatives of the management and of the labor organizations, he has twice been chosen as chairman.

Mr. Baker had been general manager of the Cincinnati, New Orleans & Texas Pacific, with office at Cincinnati, from 1906 to March 1, 1920. He entered railway service as a clerk in 1878 and had later been chief clerk, trainmaster, local freight agent, division superintendent, assistant general superintendent and general superintendent. Mr. Elliott began railway work as a messenger and was later an operator, despatcher, chief despatcher and trainmaster. Subsequently he was employed on the Texas & Pacific, the St. Louis & San Francisco and other roads in various capacities in the construction and operating departments. In 1914 he was appointed inspector of transportation of the Texas & Pacific and later he was promoted to superintendent, general superintendent and general manager. Mr. Park has also come up through the ranks and has had a great deal of experience in labor matters on both the side of the employees and on the side of the management. He entered railway service in 1875 as brakeman on the Union Pacific and was later freight conductor and passenger conductor, serving as chairman of the grievance committee for the conductors for a time. In 1900 he was appointed division superintendent and later general superintendent of the Union Pacific and in March, 1910, he was elected vice-president of the Illinois Central. In October, 1917, he was granted leave of absence by the Illinois Central for the duration of the war and was made first vice-president of the Chicago Great Western, later being appointed federal manager. He was a member of the board of arbitration that passed on the wage demands of the western enginemen and firemen in 1915.

Members of the Railroad Labor Board are to be paid salaries of $10,000 a year.

The board is directed by the law to hear and decide any dispute involving grievances, rules or working conditions in respect to which any adjustment board fails to reach a decision within a reasonable time, or, if no adjustment board has been organized, upon the application of the chief executive of a carrier or of a labor organization or of 100 unorganized employees, or upon its own motion if it is of the opinion that the dispute is likely substantially to interrupt commerce. It is also directed to receive for hearing and to decide disputes with respect to the wages or salaries of employees or subordinate officials and in case of a voluntary agreement the board may suspend the operation of the decision reached for its own review, if it is of the opinion that the decision involves such an increase in wages or salaries as will be likely to necessitate a substantial readjustment of rates. Decisions by the board require the concurrence of at least five of the nine members and in cases involving wages or salaries at least one of the representatives of the public must concur.

In addition to the settlement of disputes the board is directed to investigate and collect data pertaining to the relations between carriers and their employees.

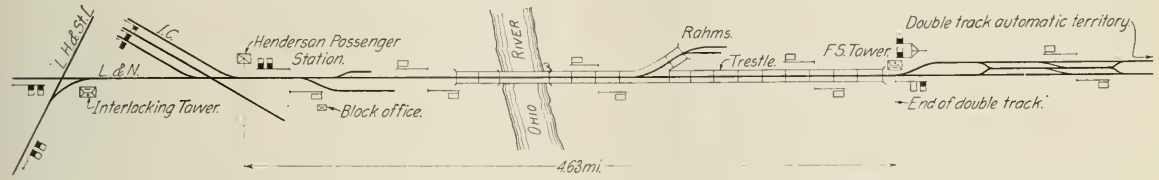
THE CINDERELLA OF AMERICAN POLITICS.—For a number of years the railroads have been the Cinderella of American politics. They have been kicked around, demagogues have delighted to seek political profit at their expense. Even politicians who are sane enough on other points were unable for a long time to see why the railroads should not constantly pay increased wages and increased prices for materials, while charging the old rates for hauling passengers and freight. It was a pretty game, while it lasted. But the time has come when the country, for its own sake, will have to give the railroads something like fair play.—*Cincinnati Times-Star.*

Single Track Operation Without Train Orders

A Busy Stretch Operated By Signal Indication By the Installation of a Traffic Locking Scheme

By F. H. Bagley
Asistant Signal Engineer, Louisville & Nashville, Louisville, Ky.

THERE IS A GROWING INCLINATION among railroad officers to consider methods of operating trains by signal indication instead of by written orders. Where traffic is congested this plan presents attractive possibilities in saving delays, increasing the capacity of the track and in reducing operating expenses. Train operation by signal indication was established in October, 1919, on a very busy stretch of single track between Henderson, Ky., and FS Tower, Ind., on the Henderson division of the Louisville & Nashville. At Henderson a mechanical interlocking controls the junction of the Louisville & Nashville, the Louisville, Henderson & St. Louis, and Illinois Central, and the traffic from all three roads is sent over this single track to Evansville, Ind. The double track from Evansville ends at FS Tower, which controls the southbound traffic to the single track towards Henderson. This stretch of single track is approximately 4½ mi. long and is on a trestle across the low flat lands bordering on the Ohio river at this point. The crossing of the Ohio river is made over a single-track truss bridge, which is located just north of Henderson.



The Track Layout After the First Installation of Automatic Signals

How Trains Were Operated Formerly

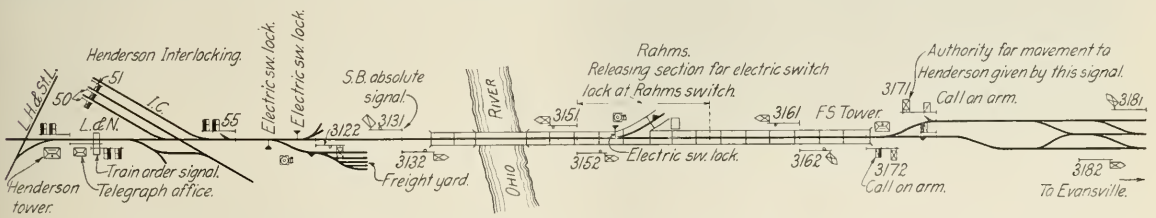
Automatic signals operating on the overlap scheme, together with a time block and written orders, have controlled the traffic over this track for the past eight years, and there was a very noticeable increase in track capacity after the automatic signals were first installed. The traffic increased to such an extent as to make it necessary to further increase the capacity of the track or resort to the only other alternative — double track. As a double-track trestle of such proportions would be very expensive, other means were considered.

The track layout after the first installation of automatic signals is shown in the diagram. The block was handled by the telegraph operators located at FS Tower and at Henderson. The operators at Henderson are located in a small office adjacent to the interlocking tower. The operators at this telegraph office were provided with a train order signal with which to govern the trains, while the operators at FS Tower controlled movements to the single track by means of the southbound interlocking home signal.

The scheduled traffic between Henderson and FS Tower is 24 passenger and 22 freight trains a day. A considerable number of extra passenger and freight trains are run daily, however, and the actual daily traffic lately has averaged 26 passenger and 48 freight trains. Restricted speed rules are in effect over the bridge and trestle, which tend to aggravate the conditions prevailing. The despatchers have frequently been required to issue an average of 50 train orders for each 24-hour period. As a rule there was an average delay of 14 minutes to each southbound freight train and a delay of 12 minutes to each northbound freight. The delays to some of the trains were, of course, less than the stated average, while others were greater and quite serious, tending to disorganize the regular schedules.

In order to expedite movements and save delay at either Henderson or FS Tower, the conductor of a freight train usually left the caboose in time to reach the head end as the engine neared the telegraph office on approaching the single track. This resulted in the saving of considerable time and oftentimes eliminated serious delays.

One great cause for delay was the fact that the I. C. and the L. H. & St. L. joined with the L. & N. tracks at Henderson and the traffic of all three roads between Henderson and Evansville was handled over the single track. As the L. & N. despatcher had no information about I. C. and L. H. & St. L. trains bound for Evansville until their arrival at Henderson, it was frequently necessary to change orders for freight trains at Henderson or at FS Tower because of the arrival of a superior I. C. or L. H. & St. L. train at Henderson. This delay, due to obtaining orders, was very objectionable, and it was realized that if such delays could be eliminated train movements would be greatly expedited. It was evident that



Changes and Additions Made to Original Track Layout Showing Present Method of Operation

some scheme of operation was needed that would decrease the delay at each end of the single track by providing means, if possible, to allow trains to enter the single track without stopping

Changes Made in Signal System

It was finally decided to install a traffic-locking arrangement between Henderson and FS Tower, to be handled by the telegraph operators located at these points. The operators were instructed to arrange with each other for movements over the single track, and when the route was set up for a movement in one direction a "traffic" lever in the interlocking machine would lock up the route so that the operator at the other end of the block could not set up the route for an opposing movement and vice versa. It was also planned, in addition, that trains would not be required to stop for orders, but could pass onto the single track by signal indication and be governed over it by the automatic signals.

The changes and additions made in the signaling arrangement are shown in the second track layout and were as follows: The automatic signals between Henderson and FS Tower were changed to operate in the upper quadrant and their control changed to the "Absolute-Permissive-Block" scheme, thus providing absolute protection for opposing movements and permissive protection for following movements. This change alone increased the capacity of the track considerably. The old interlocking arrangement at FS Tower was entirely rebuilt, making the protection complete and modern. This necessitated the building of a new tower and the installation of a new electro-mechanical interlocking, equipped with derails and semi-automatic home signals with calling-on arms. Route locking was also provided.

A two-lever set of interlocked circuit controllers was installed on the telegraph operator's table at Henderson. One of these levers controls the northbound absolute semi-automatic signal No. 3122 at Henderson. The other lever is used as the traffic lever and controls movements southbound from FS Tower. There is a traffic lever in the machine at FS Tower also to control movements northbound from Henderson. When the traffic levers are normal, it is impossible to clear the northbound absolute signal No. 3122 located at Henderson governing northbound movements to the single track, or to clear the southbound home signal at FS Tower, which is the southbound absolute signal governing southbound movements to the single track. However, if the traffic lever at FS Tower is reversed the lever controlling the northbound absolute signal No. 3122 at Henderson may be reversed and this signal cleared. When the traffic lever at Henderson telegraph office is reversed the lever controlling the southbound home signal at FS Tower — i. e., signal No. 3171—may be reversed and this signal cleared. In this way it is assured that the route can be given for one direction of traffic only. No additional operation is necessary for following movements, as these may be made according to the indication of the automatic signals. Trains proceed onto the single track on signal indication only, so that no time is lost in stopping for orders, as was formerly the case. An independent telephone circuit was installed between the Henderson telegraph office and FS Tower so that the operators could arrange for train movements. This line was made independent of all other circuits to prevent all chance of delay in arranging for these movements as would occur if other telephones were connected to the line.

As switching movements at Rahms Siding are such that the main track is cleared at times, an electric switch lock with a telephone was installed at this switch. This electric lock was wired so that it is entirely in the control of the operator at FS Tower. The switching at Rahms is done by a pusher engine which is regularly used to help southbound trains over the bridge, there being a steep grade southbound on the trestle approaching the bridge. This pusher engine on its return movement stops at Rahms to do any necessary switching. Before leaving FS Tower, the conductor of the switching crew advises the operator at FS Tower of the work he wishes to do at Rahms and the operator then arranges with the Henderson operator for the movement and instructs the conductor accordingly. Arriving at Rahms switch, the conductor telephones the operator at FS Tower, who then presses a button which unlocks the switch and enables the train to enter the siding. If the train entirely clears the main track and the switch is again set for the main line movement, the switch will automatically become locked. When the train is ready to come out the conductor of the crew must call FS Tower on the telephone and secure permission to do so. After the operator at FS Tower has arranged for the protection of the movement, he unlocks the switch by pressing the button, allowing the trainmen to throw the switch and come out onto the main track. The switch will be locked again automatically when it is set for the main line movement. If the trainmen should enter Rahms switch and leave the switch open it would be impossible for either the operator at FS Tower or at Henderson to line up for through movements.

The switches at Henderson leading to the freight house and to the freight yard, as shown in the revised layout, also are equipped with electric switch locks, the control of which is in the hands of the operator at Henderson. Switching movements are continually being made through these switches, and it was desired not to restrict these movements any more than was necessary. For this reason these switches are arranged to be normally unlocked, but will be electrically locked automatically when a southbound train comes within a certain distance of them. This distance is approximately 7,000 ft., which was considered sufficient because the southbound movements are slow up the steep grade approaching the bridge.

The switch locks used are equipped with a mechanical key release for use in case of failure of the electric control of the lock. The key release is kept sealed and the switchmen are governed by rigid rules regarding its use. Switch indicators are installed at the switch locks to give a visual indication to the switchmen when the switches are automatically locked. A bell, operating automatically, is also located at each of the two switches at Henderson, which gives an audible indication on the approach of a train. This enables the switching crews to clear the main track in time to prevent stopping through trains.

It was thought advisable to leave the train order signal in place at Henderson, as it gives the operator better control of a train in the event that it becomes necessary to stop it. Signal No. 3122 continues to be the leaving signal at Henderson. The signal arrangement as described was placed in service October 22, 1919, and seems to be meeting every expectation in facilitating the handling of trains and in eliminating delays.

From the Chicago News

As Usual

Unique Design of Reinforced Concrete Wing Walls

Application of Cantilever Principle Effects Appreciable Economy in L. & N. Structures

THE ENGINEERS on the Louisville & Nashville like those on certain other roads which have made extended use of reinforced concrete have found that this material affords an unlimited opportunity for the exercise of originality in developing new designs for relatively simple structures. Thus in the design of wing walls for culverts and larger structures of the same type, the L. & N. has adopted the principle of cantilever support from the body of the structure. While this is a relatively simple matter in small culverts, the extension of this idea to larger structures with unfavorable conditions as to site and foundation has resulted in

A Novel Design for a Skew Undercrossing

some rather unusual designs. While these seem rather bold, a study demonstrates that they represent much more economical solutions of the problems in hand than could be obtained by the adoption of more conventional designs.

In the design of wing walls for culverts this road has followed the prevailing practice on the small structures, of supporting the wings by building them monolithic with the barrel. In the larger structures the wing walls become so long that they cannot be designed economically as cantilever extensions on the barrel wall, so the designs used by most roads have embodied the use of self-sustaining and, in many cases, independent retaining walls. The engineers on the Louisville & Nashville, however, have hit upon another solution which is, in effect, an adaptation of the counterfort type of retaining wall with the difference that the counterfort extends underneath the wall and across the space between the two walls to form a sort of stiff yoke. This really acts in much the same way as an extension of the culvert barrel to the same point so that the wing wall beyond the yoke is designed in much the same way as the shorter wing walls of the smaller culverts. Between the yoke and the end of the culvert the walls are designed as continuous slabs. The cross wall of the yoke serves as a bulkhead or cutoff wall for the end of the culvert while the space between the wings and this yoke and the end of the barrel is paved with concrete.

As the wing walls are only 12 in. wide, they are not very heavy and in consequence it has been possible to eliminate the footings under these walls and support them by vertical cantilever action from the body of the structure. The tops of the wing walls have a slope of 1.6 to 1 in a direction at right angles to the track with the idea that the use of a slope flatter than that of the embankment material will afford a measure of protection for the embankment when the culvert is running full.

This same principle in wing wall design has been carried even further in the wing walls of highway underpasses like the one shown in one of the drawings. This provides an opening under the track 16 ft. wide by 12 ft. high. In these wing walls two yokes are provided instead of one and the inner yoke is transformed from a stiff U-frame to a complete rectangle by the addition of a strut across the top 12 in. by 24 in. in section. Such overhead struts or false parapet walls have been used previously, as, for instance, by the Chicago, Milwaukee & St. Paul as illustrated on page 1031 of the *Railway Age Gazette* of March 8, 1914. This feature is only possible in cases where the wings have sufficient height to afford adequate headroom under the strut. The unique feature in the Louisville & Nashville design is the use of the struts as a member of a stiff frame.

The wing walls of this structure are even thinner than those in the culverts, being only 10 in. wide, but they have been widened at the bottom to 16 in. by a 6-in. hub guard

The Suspended Wing of the Railways Under Crossing

or fender projecting 9 in. above the roadway. As in the culverts, the footings under these walls have been dispensed with and the weight of the wall is carried partly by the cross walls of the yokes and partly by cantilever action from the barrel of the structure to which they are attached monolithically.

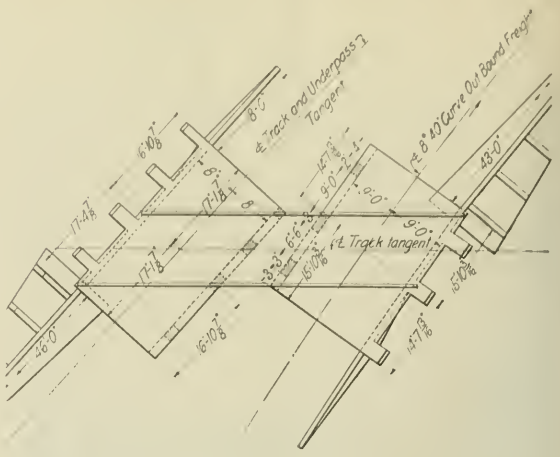
Another interesting feature in the design of this structure is the chamfering of the corner of the barrel wall where it joins the 30-deg. wing so that the angle of the barrel wall and wing is located 2 ft. 7¾ in. inside the barrel. To afford adequate support for the roadway slab overhead, the corner of this wall is bracketed out to the full width from a point 4 ft. below the soffit of the cover.

Another departure from common practice in this design is to be noted at the connection of the two wings at the op-

posite end of this structure which are parallel with the barrel walls. Instead of making the inside faces of the wings and barrel walls flush, the outside faces are flush and the resulting offset of 17 in. on the inside is protected by an extension of the hub guard beyond the end of the barrel. It is also to be noted that the barrel of the structure has a solid slab footing.

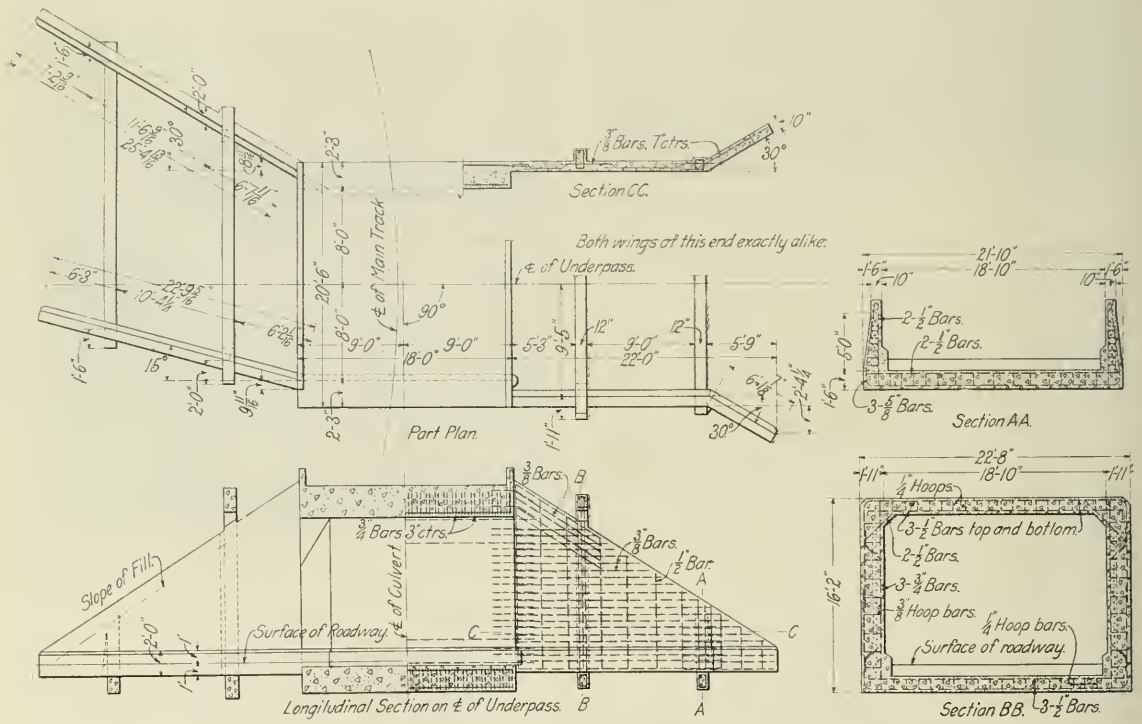
Having developed this type of design it was but natural to apply it in a more complex manner to a difficult piece of engineering encountered in providing a railroad undercrossing on a sharp skew. Foundation conditions required the carrying of the footings to rock at an elevation some 15 ft. or more below the rail level of the lower track, or 13 ft. below the level at which a retaining wall would serve any useful purpose. This condition led to the development of a design in which the floor load is transmitted by means of a transverse concrete girder to a row of reinforced concrete piers spaced from 7 to 10 ft. apart and extended to rock foundation. This same form of construction is used for both intermediate piers and those forming the abutments, except that in the latter, curtain walls are provided between the piers to retain the earth fill. Hence, these piers serve both as columns to support the vertical load of the deck and as counterforts to take the lateral thrust of the curtain walls. As these curtain walls can serve no useful purpose below an elevation of about 3 ft. below the base of rail, they are not carried below that level, being virtually suspended between the piers. These walls have a normal thickness of 10 in.

Owing to the skew of the structure there are two wings, 43 ft. and 46 ft. long, respectively, that are turned against the embankment, and two other wings 18 ft. and 20 ft. long, respectively, that are on the two corners where they turn away from the embankment. For the two long wings the only practicable solution was to use independent wings designed as reinforced concrete counterfort retaining walls. In the case of the two short wings, however, a study of the problem indicated the economy of extending the wall construction used for the abutments, that is, to build cantilever wing walls projecting from the ends of the abutment. The resulting



General Layout of the Skew Railway

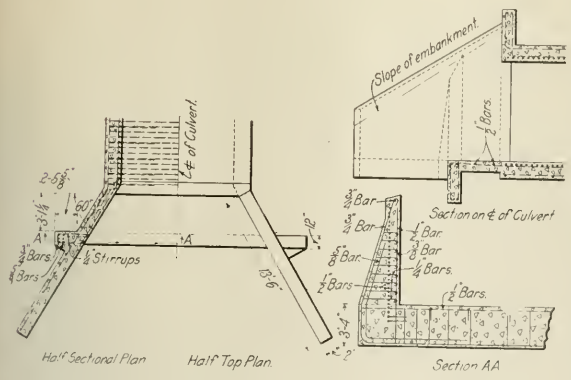
design is shown in the plan and photographs, and contains only a small portion of the material which would have been required for wings supported on their own footings. Owing



Layout and Details of the Highway Underpass

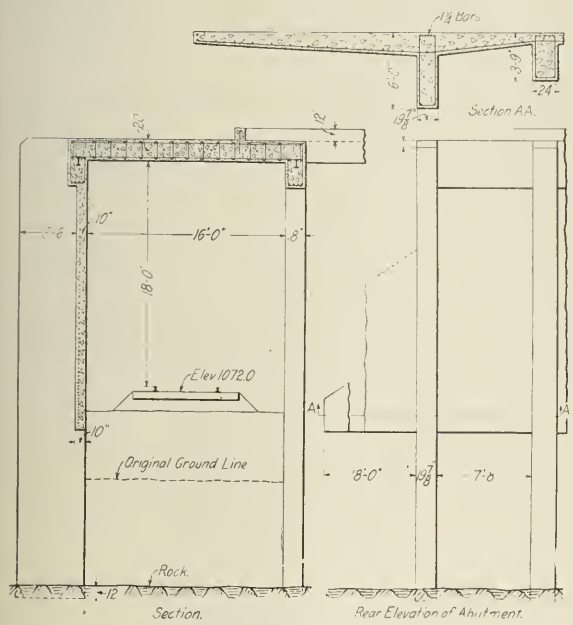
to the fact that this extended portion acts as a cantilever in resisting the earth pressure and is of much longer span than the intermediate cross walls, it was necessary to make this portion of the wall thicker, it being 21 in. at the bottom of the inner end. The first section of the abutment curtain wall adjacent to the wing wall is also given a greater thickness, as shown in the horizontal section.

This structure has a number of other peculiarities that require some explanation. The situation at this crossing is one affording very limited headroom, so that it was necessary to use a relatively thin floor. A still further complication arose from the fact that the two lower tracks are not



Details of Wings for a 9 ft. by 8 ft. Culvert

parallel and are separated by a greater distance than is necessary for operating clearance. To shorten the span length as much as possible, two intermediate rows of supports were provided, so as to form two spans of 16 ft. net clearance for the two tracks, with a short third span in the middle to take up the remaining space. The intermediate piers were made of such length that the floor construction could span crosswise



Part Sections and Elevation of the Railroad Crossing

rather than along the skew and 15-in. 36-lb. I-beams encased in concrete were used for the portions of the two longer spans carrying the major portion of the track load, while the outer portions of these spans and the short intermediate span were designed as true reinforced concrete.

These designs were developed under the immediate direction of Elmer Zarbell, assistant engineer, and under the general supervision of W. H. Courtenay, chief engineer of the Louisville & Nashville, Louisville, Ky.

Award May End Yard Rates for Enginemen

THE PRECEDENTS established by the Wage Board during the period of federal control are continued by law until September 1, 1920, and will probably be continued indefinitely after that date as a matter of policy. Apparently, therefore, precedents, and consequently practices and wages now prevailing in railroad service will continue to be operative. The agitations which have brought about these precedents during the past two years will also be continued without interruption or alleviation. It is this fact which gives a peculiar significance to a majority award and a dissenting opinion rendered in the arbitration case involving the East St. Louis Junction Railroad (Stockyards terminal), and its engineers and firemen with reference to the application of the so-called transfer rate to its switch engines.

The rate for engineers and firemen on yard engines established by the United States Railroad Administration is less than the rate established for engineers and firemen on road engines. In Interpretation 15, to General Order 27, it is held that the road rate shall also apply to engines engaged in various classes of service, neither yard nor road service, but including transfer service and unclassified service. The result of this interpretation has been that the railway brotherhoods have been endeavoring to extend the scope of application of the so-called transfer rate, which in turn means that the road rate is gradually being applied more and more in detail to switch engines engaged largely in yard service. As a result of an instance of this kind a disagreement came about between the officers of the East St. Louis Junction and the representatives of its engineers and firemen and the matter was submitted to arbitration.

Albert Phillips, vice-president of the Brotherhood of Locomotive Firemen and Enginemen, was selected by the employees to serve on the arbitration board. C. E. Smith, consulting engineer at St. Louis, Mo., was selected by the company as its representative and Judge S. J. Peelle was appointed by the United States Board of Mediation and Conciliation as the third member. The latter was later elected chairman of the board.

The majority award, made after hearings held in St. Louis, Mo., on February 3 to 7 inclusive, grants the transfer rate to the engineers and firemen employed on this road. Mr. Smith, dissented from this award and in so doing presented his reasons therefor in a separate brief. In so doing he said, "If this matter involved the East St. Louis Junction alone, the matter would not be of national importance but the application of the majority award to other roads that have similar conditions would in a sense practically wipe out the yard rate for switch engineers and firemen at practically every point in the country where any interchange whatever is made with foreign roads. Manifestly this was never the intent of the establishment of the transfer rate or unclassified service, and the general application of this award as a precedent would remove the differential that has existed between road and yard service. Then would follow a demand by the road engineers and firemen for the former differential."

The Majority Award

The majority award reads in part as follows: "The principal question submitted in the agreement of arbitration is as follows: '(1) Whether the service which the engineers, firemen, and hostlers are engaged in takes and carries the transfer rate pay, and, if not in their entirety, to what extent such employees in said service are entitled to transfer rates.'

"The service under consideration consists of the handling of cars on tracks of the East St. Louis Junction and industrial tracks adjacent thereto, and at times moving cars to and from and over tracks of other railroads.

"Prior to federal control and before the issuance of Gen-

eral Order 27 by the Railroad Administration, the following rates were in effect: engineers $4.55 per day, firemen $2.95 per day.

"Under provision and interpretation of General Order 27, the rates were increased as follows: engineers $5.66 per day; firemen $4.16 per day. The foregoing rates applied to all engineers and firemen and on all engines in the service of the company.

"Under Supplement 15 to General Order 27, a schedule of rates was provided for engineers and firemen in freight service and a separate schedule of rates for engineers and firemen in yard service, with a provision that engineers and firemen engaged in certain designated and unclassified service would be paid freight rates.

"Under Interpretation 1 to Supplement 15 to General Order 27, the following question (No. 85) was submitted to and decided by the director general of railroads.

"'Is it to be understood that the negotiated rates mentioned under the head of "Special Allowances" in Interpretation 2 to General Order 27, for example, the $4.50 rate for engineers and the $3.00 for firemen, which were increased under the daily table, are to be retained as minima if the rates provided for yard service for the class of engine used do not exceed such rates? Decision: The service comes within the provisions of unclassified service taking through freight rates.'

"In the judgment of a majority of the board the service involved in this case is not wholly transfer service; neither is it entirely yard service; but is rather of an unclassified nature, for which as hereinbefore set forth an intermediate rate (neither yard nor road) has heretofore applied.

"Therefore, there having been in effect a rate which was neither a yard rate nor a road rate, a majority of the board holds that the service comes within the term 'unclassified' as referred to in the above question and decision thereon hereinbefore quoted, and the rate shall be as provided for through freight service, according to size of engines, in Article 4 of Supplement 15 to General Order 27.

Dissenting Opinion of C. E. Smith

As stated before, Mr. Smith, representing the railroad company, did not concur in this award and subsequently filed the following dissenting brief outlining his reasons for refusing to agree to the award:

"The East St. Louis Junction is essentially a terminal switching railroad serving the East St. Louis stock yards, several large packing houses and a number of other industries. The extreme length of its main line is less than 1½ miles. Connections are made with several other railroads. The distance between the head blocks of the various connections of the East St. Louis Junction and the head blocks of the interchange tracks of the connecting roads are as follows:

	Feet
Southern	300
Terminal (E. St. Louis)	900
Wabash	2,100
Terminal (Madison Yd.)	6,100
Wiggins Ferry	6,700
Vandalia	6,100

"As a rule the foreign lines deliver cars at the interchange tracks on the East St. Louis Junction and, to a certain extent, call for and haul cars away from those interchange tracks. The East St. Louis Junction engines move the cars between its interchange tracks and the various stock chutes and industry tracks, and also handle a portion of the outgoing cars over the lines and distances enumerated above to the interchange yards of the various railroads.

"The record shows that the number of cars handled to the interchange tracks of other roads by the East St. Louis Junction engines usually consist of one to four movements a day consisting of comparatively small cuts, most of which do not exceed 10 or 15 cars; although, in an exceptional case 76 cars were handled in one cut double headed.

"Witnesses for the men testified that the work of the engines was divided almost equally between yard switching on the tracks of the Junction and interchanges with other roads. This was later controverted by the sworn testimony of the vice-president of the company, that out of a total of 136 engine-hours daily on the Junction, 4½ hours, which amounts to 3.3 per cent of the total engine hours, would be consumed in making interchange deliveries with foreign roads.

"The brotherhood contended throughout the hearing that the service performed by the East St. Louis Junction engines is transfer service and made no other contention. It is significant that the majority award does not classify this service as transfer service. There is not one word of sworn testimony in the record that the switching service of the East St. Louis Junction is unclassified service, but on the other hand the record states that it has always been classified as yard service; yet the majority award of this board holds, contrary to the evidence, that the service is unclassified and, therefore, entitled to the road rate.

"The brotherhood arbitrator laid great stress upon the fact that where a negotiated rate applied the road rates should have been applied under Supplement 15. Reference to Supplement 15 and the correlated documents indicates clearly that the negotiated rate to which reference is made is a rate that was negotiated to make a higher allowance to the yard switchmen on account of performing transfer service. No evidence was introduced to show that the rates heretofore paid on the Junction were negotiated with any reference to transfer service and it was the conclusion of a majority of the arbitrators, the chairmen and the writer, that the service did not consist of transfer service. As the rate had not been negotiated with any allowance for transfer service in mind, the ruling applying to rates negotiated for that purpose should not apply.

"Practically the majority award was based on Question 85 of Interpretation 1 to Supplement 15 to General Order 27, and the answer thereto.

"The reference to negotiated rates mentioned under the head of 'special allowances' in Interpretation 2 to General Order 27 reads as follows:

> (1) 'The negotiated rate since the arbitration of the engineers and firemen in the east and west, for transfer service, for example, the $4.50 rate for engineers and the $3.00 rates for firemen in the western territory shall be increased under section B of Article 2. Where through freight rates apply to transfer service the increase under Section E, Article 2, will apply.'

"This interpretation clearly relates to transfer service and was not a proper precedent for deciding the case at hand, as the East St. Louis Junction rates had not been negotiated for transfer service but have always been considered yard rates, although at times higher than the going yard rates. That interpretation is not a precedent for the case in hand.

"In the Buffalo, Rochester & Pittsburgh case (No. 417) the Railway Board of Adjustment decided as follows:

> 'Section 1. When the service performed during the day is confined strictly to industrial switching of cars arriving on the different roads mentioned, or from the industries to the different roads, yard rates shall apply. However, should one or more cars be handled from one road to another during the course of a day's work by the joint engine, the transfer rate will apply.'

"The majority decision was reached the same day the hearing closed and without, in my opinion, sufficient consideration of the issues involved. The record was not consulted once and the applicability of the precedents was not carefully considered.

"Although the actual amount of money involved is not extremely large, yet it is large in proportion to the operations and resources of the Junction. The award of the two arbitrators established a new precedent which may have a far-reaching effect. It is unfortunate that such an important question could not have been considered by a board of three competent, disinterested arbitrators."

General News Department

Employees of the Minnesota, Dakota & Western at International Falls, Minn., who have been on strike since December, 1919, returned to work on March 27, after an agreement had been reached between the company and the men. The strike at International Falls became so serious in December that Governor Burnquist of Minnesota ordered the state militia to the town. The troops were not withdrawn until about three weeks ago.

G. H. Parker, controller of the Railroad Administration, has issued a circular to carriers whose property was under federal control, calling attention to section 206 of the transportation act of 1920, requiring payments of final judgments, etc., rendered subsequent to February 29, 1920, to be made out of the revolving fund created under section 210. Chief accounting officers of the carriers must not approve for payment from federal funds any such judgments, etc., or set up in the federal accounts in any manner the amounts of such judgments. Further instructions will be issued outlining the procedure to be followed.

Twelve passengers were injured, one of them fatally, as a result of a collision on the Ninth avenue elevated line of the Interborough Rapid Transit Company, New York City, near the Rector street station on the morning of April 12. Two southbound trains, one of six cars and the other of seven, were running on converging tracks and one of them, running past a stop signal, ran into the side of the other, and one car was knocked off the elevated structure and lodged against a brick building. Some of the injured persons fell to the street. The engineman at fault had been in the service 34 years without before being involved in any serious accident. With the signal which was disregarded there was an automatic train stop, but this was so located as to serve its purpose only for trains moving at very low speed, whereas in this case, the train was moving at a rate considerably faster than the prescribed limit.

The Commission on Car Service.

In a circular addressed to the railroads on April 8, Chairman Kendall, of the Commission on Car Service, American Railroad Association, said that reports from the steel mill districts indicate an extreme shortage of the long low-side gondolas for movement of finished product. At most of the plants the storage facilities have been exhausted, resulting in reduced hours of work, restricting the manufacture and forwarding of shipments for which there is a heavy demand. The situation is further aggravated by the loss of labor which it will be difficult to replace. These cars are not adaptable for coal traffic, and, said Mr. Kendall, "it is very important that each road issue instructions prohibiting the misuse of these cars and providing for their prompt return to the owners, that they may be utilized to relieve urgent requirements."

Memphis Terminal Property to Be Sold

The sale of 18 acres of ground in Memphis, Tenn., originally bought by the Memphis Railroad Terminal Company for the location of a Union passenger station, will be closed shortly. The property was purchased in 1907 by lines entering Memphis and plans for the buildings were drawn up at that time, but, on account of the inability of the proprietary lines to agree in regard to the project, the plan was abandoned. Later two stations were built. One, known as the Union Station, is used by the Louisville & Nashville, the Nashville, Chattanooga & St. Louis, the Southern, the Missouri Pacific and the St. Louis Southwestern. The other, known as the Grand Central station, is used by the Illinois Central, the Yazoo & Mississippi Valley, the St. Louis-San Francisco, and the Chicago, Rock Island & Pacific. The ground has consequently been idle since it was sold to the railroads and recently negotiations were opened by two firms seeking new sites for plants.

Coal Prices Declared Too High

Present high prices of bituminous coal were characterized as inexcusable on any theory of supply and demand or on any economic principle in a formal statement issued by Herbert N. Shenton, secretary of the U. S. Bituminous Coal Commission, which adjudicated the dispute between the soft coal operators and miners. Neither the advice of the commission to buy and store coal early, the requirements of the export trade, the status of car service, the daily output of the mines, the weather conditions, nor supposed shortage of supply explain in any manner the rise in prices, which are out of all relation to the increase in the cost of production caused by higher wages granted by the commission, Mr. Shenton said. After reviewing the factors contributing to the sky-rocketing of prices, he concludes that they will soon decline. Continuing, he says:

"The fear of immediate suffering from car shortage seems to figure in the reasons for the flurry. There were sufficient cars and motive power to distribute this unusual production of the past few months, on account of careful and energetic car distribution. These cars and motive power are practically all available, and, while there is definite need for more or both in order to stabilize the industry, there is no immediate serious threatening of a car shortage such as has not existed during the winter, unless it is necessary, because of emergencies, to divert coal cars for other purposes. The more open weather conditions and the efforts to improve allocation of cars by the Car Service Commission of the American Railroad Association give promise of a greatly improved car situation in the near future. There is no reason to believe that there will be a limited supply of coal for the domestic market. Efforts are being made to stabilize prices through regulations of the Interstate Commerce Commission and by special legislation. The educational campaign for early buying and storage will also tend to stabilize the market. . . ."

Butting Collision on a Staff-Operated Line

On the evening of June 19, 1919, a butting collision between a passenger train and a freight on the East Indian Railway at milepost 763, near Firozabad, resulted in 15 passengers and four men on the locomotives being killed, and a large number of persons injured; and the fire which broke out following the wreck burnt up six passenger cars and caused additional loss of life.

It appears, says the Railway Gazette (London), in speaking of the collision, that the tablet or token given to the engineman of one of the trains was for another section of the road; that is to say, the token for the B-A section was given to the train moving over the B-C section. Just how the mistake was made is not explained. Whether the assistant stationmaster gave the tablet to the signalman to be handed to the engineman, or whether the signalman took it from the stationmaster's table, is not cleared up. The tokens for different sections are differentiated by their shape, and also are lettered; but evidently the men become careless of these details. The East Indian Railway uses Neale's token instrument and also some of Tyer's; but what was used in this case does not appear. The committee which investigated the collision recommended the introduction of some system to make it more difficult for enginemen to start with a wrong token; to improve locomotive headlights; to provide better means of communication between the engineman and the guard on freight trains; to put the rules into a small book

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY, 1920

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss)	Increase (or decr.) compared with last year
					Maintenance of										
		Freight.	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	141	$170,391	$63,079	$248,058	$37,599	$71,549	$7,241	$108,902	$8,921	$237,445	95.72	$10,612	$12,390	—$1,778	[illegible]
Alabama Great Southern	312	660,895	154,435	864,227	127,930	246,329	19,916	341,803	21,286	763,759	88.37	100,468	26,556	73,478	[illegible]
Ann Arbor	301	267,325	44,190	331,762	39,074	88,059	6,536	186,475	10,198	330,375	99.58	1,388	16,760	—15,372	[illegible]
Atchison, Topeka & Santa Fe	8,662	11,867,440	3,820,723	16,790,663	1,996,378	3,195,629	138,899	5,419,024	245,656	10,998,386	65.47	5,792,278	679,101	5,113,177	[illegible]
Atlanta & West Point	93	148,431	71,393	247,190	28,397	48,158	6,711	97,022	6,900	191,629	77.52	55,561	7,450	48,111	1,2[illegible]
Atlanta, Birm. & Atlantic	639	344,691	65,963	440,100	81,472	132,799	14,945	236,206	12,308	477,759	108.56	—37,659	16,000	—53,957	59,873
Atlantic City	177	103,856	105,446	224,619	43,856	34,535	1,086	169,760	1,279	250,597	111.56	—25,979	—14,500	—40,489	5,76[illegible]
Atlantic Coast Line	4,892	4,375,759	1,760,749	6,558,805	706,948	1,129,753	82,349	2,693,414	118,214	4,783,299	72.92	1,775,507	—200,000	1,574,899	948,[illegible]
Baltimore & Ohio Chicago Terminal	90	.....	—35	193,459	32,242	54,138	1,280	151,704	15,776	258,898	133.82	—65,439	26,542	—91,962	36,[illegible]
Baltimore & Ohio	5,154	11,047,285	1,844,390	13,989,718	1,671,321	5,027,693	275,271	7,863,808	406,996	15,354,129	109.75	—1,364,411	682,618	—2,047,791	3[illegible]
Baltimore, Ches. & Atl	87	58,734	15,911	80,966	8,275	41,936	1,197	69,440	3,950	124,798	154.10	—43,832	3,700	—47,523	41,768
Bangor & Aroostook	658	276,005	56,846	362,167	149,535	117,256	4,325	224,312	10,847	512,738	141.57	—150,572	24,599	—175,172	—165,176
Beaumont, Sour Lake & Western	118	122,103	28,678	158,516	33,315	24,440	1,418	52,887	4,599	116,642	73.58	41,874	2,350	39,512	[illegible]7,943
Belt Ry. Co. of Chicago	31	.....	.....	370,765	26,596	81,292	316	250,396	6,804	365,404	98.55	5,361	15,682	—10,321	[illegible]7,293
Bessemer & L. E	217	573,609	34,477	633,135	24,019	307,248	10,790	281,010	23,724	654,252	103.33	—21,117	13,900	—35,021	9,[illegible]
Bingham & Garfield	36	146,704	1,912	150,943	29,624	35,887	2,142	32,910	3,538	105,529	69.91	45,414	7,425	37,987	[illegible]7,798
Birmingham Southern	31	27,569	.....	37,834	3,420	3,663	794	23,456	3,426	34,759	91.87	3,076	1,754	1,322	—10,191
Boston & Maine	2,257	2,282,838	1,555,376	4,470,285	1,159,094	1,388,563	39,028	3,762,788	177,399	6,556,404	146.66	—2,086,120	239,288	—2,325,477	1,961,545
Brooklyn Eastern Dist. Terminal	9	66,717	.....	78,260	33,720	96,146	.....	57,533	3,230	190,630	243 58	—112,370	5,943	—118,313	—83,577
Buffalo & Susquehanna	205	195,185	6,143	205,039	29,877	91,532	1,989	88,079	10,801	222,279	108.40	—17,240	3,350	—20,590	1,838
Buffalo, Rochester & Pittsburgh	589	1,070,151	115,935	1,223,042	185,193	520,284	16,650	636,508	31,038	1,391,985	113.81	—168,943	25,000	—193,949	—[illegible]983
Canadian Pacific Lines in Maine	233	121,739	80,447	214,443	49,425	60,597	3,070	188,675	3,211	304,978	142.21	—90,534	12,200	—102,734	—100,[illegible]
Carolina, Clinchfield & Ohio	282	400,567	29,025	440,029	75,377	120,394	3,770	169,701	12,953	381,979	86.81	58,051	—8,316	66,356	7,[illegible]
Central New England	301	265,570	19,210	309,444	129,076	169,998	2,582	317,305	14,913	633,897	204.85	—324,453	17,800	—342,308	340,69[illegible]
Central of Georgia	1,924	1,279,934	503,707	1,980,626	331,502	409,073	33,954	856,094	63,448	1,702,166	85 94	278,460	74,975	203,446	142,13[illegible]
Central R. R. of N. J	686	2,272,861	572,705	3,166,087	599,250	1,330,208	25,434	1,987,607	103,459	4,059,172	128.20	—893,086	213,272	—1,106,335	—784,624
Central Vermont	411	253,181	77,823	378,950	94,690	206,667	12,555	353,456	17,440	687,196	181.34	—308,253	17,400	—325,653	—44,163
Charleston & W. Carolina	342	244,598	47,595	307,322	60,955	58,484	6,417	144,297	2,537	272,690	88.73	34,631	8,500	26,131	2,02[illegible]
Chesapeake & Ohio	2,516	5,222,562	644,780	6,236,381	1,013,404	1,629,156	63,414	2,485,819	123,574	5,339,703	85 62	896,678	189,810	706,307	544,405
Chicago & Alton	1,050	1,439,370	431,406	2,048,702	266,269	629,543	28,738	1,097,469	59,422	2,086,219	101.83	—37,518	70,088	—107,722	—216,462
Chicago & East Illinois	1,131	1,491,932	371,984	2,057,719	118,693	749,809	28,571	1,005,989	48,457	1,961,773	95.33	95,947	85,000	10,829	349,350
Chicago & Erie	269	646,790	47,375	768,993	99,931	199,686	13,636	530,838	25,947	871,971	113.39	—102,979	40,909	—143,932	—189,84[illegible]
Chicago & North Western	8,090	7,582,402	2,529,363	11,180,934	1,379,805	2,889,367	85,553	6,638,444	266,498	11,363,730	101.63	—182,795	577,178	—762,842	—900,947
Chicago, Burlington & Quincy	9,371	9,614,657	2,369,694	13,216,615	1,664,340	2,909,740	89,435	5,978,108	335,861	11,101,722	83.99	2,114,893	552,683	1,560,655	237,095
Chicago Great Western	1,496	1,389,220	382,381	1,921,768	214,314	535,377	32,425	996,807	47,508	1,841,908	95.84	79,860	54,976	24,396	123,818
Chicago, Indianapolis & Louisville	654	722,835	206,385	1,028,605	94,030	305,403	23,198	535,750	30,784	1,001,917	97.40	26,687	47,135	—20,456	—137,278
Chicago Junction	12	.....	.....	289,306	43,911	47,908	637	251,895	6,970	351,321	121.43	—62,015	2,876	—64,891	27,216
Chicago, Milwaukee & St. Paul	10,628	8,434,154	2,026,117	11,595,155	2,218,780	3,898,198	98,803	7,274,478	369,726	13,907,583	119.94	—2,312,428	725,496	—3,047,503	—3,139,034
Chicago, St. Paul, Minn. & Omaha	1,749	1,759,894	576,549	2,511,365	188,890	580,362	20,748	1,283,768	68,384	2,156,337	85.86	355,028	153,436	200,877	36,017
Chicago, Rhode Island & Gulf	463	390,195	104,447	535,944	73,481	105,923	7,037	231,022	13,322	431,306	80.47	104,638	14,017	90,532	46,937
Chicago, Rhode Island & Pacific	7,595	6,848,204	2,206,315	9,738,195	1,393,920	2,425,344	106,498	4,626,156	207,975	8,792,736	90.29	945,459	377,806	566,979	493,410
Chicago, Peoria & St. Louis	247	175,558	22,786	208,129	32,780	89,394	5,202	101,492	8,472	235,300	113.05	—27,171	6,106	—33,287	42,002
Chicago, Terre Haute & S. E	374	401,724	22,796	432,004	41,511	141,135	6,596	188,892	10,096	389,589	90.18	42,414	18,000	24,414	81,671
Cincinnati, Lebanon & Northern	76	92,998	7,894	114,811	11,931	40,977	2,559	59,800	1,817	117,082	101.97	—2,272	3,972	—6,244	—10,276
Cincinnati, Ind. & Western	321	248,234	47,826	319,846	51,400	142,141	6,941	161,112	13,818	376,358	117.66	—56,512	11,061	—67,573	—23,514
Cincinnati, New Orleans & Texas Pacific	337	1,164,096	271,300	1,521,345	246,809	507,673	33,425	507,647	38,900	1,346,813	88.52	174,531	42,072	131,581	22,124
Cincinnati Northern	251	224,691	17,125	249,506	25,840	46,142	4,763	101,641	6,168	184,553	73 96	64,953	9,615	55,335	34,307
Cleveland, Cincinnati, Chicago & St. L.	2,408	4,962,013	1,203,438	6,743,754	540,553	1,101,397	160,450	2,873,119	118,756	4,813,355	71.38	1,930,399	206,977	1,721,699	1,026,941
Colorado & Southern	1,099	952,225	173,131	1,211,284	141,868	245,525	12,344	369,947	35,608	813,704	67.18	397,580	50,991	346,146	184,639
Colorado & Wyoming	43	11,851	870	60,315	11,737	12,424	183	29,679	3,956	57,980	96.12	2,335	5,000	—2,665	—22,083
Cumberland Valley	163	396,003	72,742	504,751	93,366	91,681	7,220	172,842	14,301	379,395	75.16	125,356	5,853	119,466	178,858
Delaware & Hudson	875	1,935,199	237,988	2,428,366	296,998	899,990	19,975	1,458,427	111,195	2,803,897	115.46	—375,531	78,000	—453,915	236,973
Delaware, Lackawanna & Western	956	3,732,135	868,505	5,536,045	650,816	1,385,957	81,009	3,009,696	116,925	5,304,873	95.82	231,172	287,500	—56,393	—950,244
Denver & Rio Grande	2,585	2,324,198	434,991	2,933,715	384,626	677,516	38,674	1,038,005	67,437	2,254,107	76.83	679,607	125,000	540,336	431,052
Denver & Salt Lake	255	215,850	24,558	263,404	53,650	100,679	993	162,689	6,506	324,517	123.20	—61,113	10,583	—71,762	27,369
Detroit & Mackinac	376	73,038	27,255	134,788	29,029	60,460	2,290	83,286	6,847	181,910	134.96	—47,122	7,455	—54,577	—24,491
Detroit & Toledo Shore Line	61	116,066	.....	116,752	23,538	19,728	2,363	80,928	7,523	134,080	114.84	—17,328	7,900	—26,550	—104,013
Detroit, Toledo & Ironton	454	319,687	13,144	388,188	39,901	96,497	4,693	190,278	12,499	342,245	88.16	45,943	8,799	36,639	103,076
Duluth & Iron Range	292	107,773	20,204	142,863	81,949	95,254	412	129,812	12,467	320,134	224.08	—177,271	11,023	—188,439	—34,493
Duluth, Missabe & Northern	407	99,680	40,194	169,486	144,413	183,150	2,431	179,395	15,543	526,470	310.63	—356,984	8,948	—365,965	—155,150
Duluth, South Shore & Atlantic	614	202,567	63,605	290,672	60,805	80,888	4,283	193,461	8,169	351,748	120.97	—61,076	30,500	—81,574	—29,967
Duluth, Winnipeg & Pacific	178	169,415	27,262	200,329	26,991	33,412	2,778	90,551	7,360	161,093	80.41	39,237	10,598	28,639	15,390
East St. Louis Connecting	3	.....	.....	152,634	17,027	24,357	231	91,829	3,245	136,689	89 55	15,944	2,000	13,944	29,518
El Paso & Southwestern	1,027	986,005	226,957	1,274,353	322,030	188,077	12,456	304,426	25,873	862,695	67.69	411,658	60,415	351,239	—6,718
Elgin, Joliet & Eastern	831	1,557,394	8	1,838,432	131,975	394,831	5,434	749,534	25,989	1,307,671	71.12	530,761	51,843	478,917	—68,046
Erie	1,989	5,305,064	923,244	7,007,211	959,358	2,838,245	58,352	4,087,594	189,600	8,188,552	116.85	—1,181,340	196,417	—1,378,800	—1,120,616
Florida East Coast	764	625,175	536,003	1,487,731	118,147	224,784	10,776	443,159	18,997	831,110	55.86	656,621	39,583	616,898	497,465
Fonda, Johnstown & Gloversville	88	31,051	60,788	96,753	14,847	9,930	442	36,749	5,112	67,079	69.33	29,674	4,900	24,774	6,760
Ft. Smith & Western	253	117,148	27,834	153,865	36,493	35,833	3,998	69,566	6,708	153,667	99.86	198	5,000	—5,015	—9,776
Ft. Worth & Denver City	452	620,882	296,403	942,809	164,805	206,478	5,648	444,835	25,893	851,354	90.29	91,454	21,900	69,433	—134,919

instead of a bulky one; to light passenger cars by electricity; and to equip passenger trains with ladders and hooks for extinguishing fires.

A Department of Public Works

The question of whether or not the federal government should establish a Department of Public Works has been submitted for a referendum vote to the 1,305 member organizations of the United States Chamber of Commerce. The result of the referendum will determine the national chamber's attitude on this question when it comes up for Congressional action. The desirability of a federal Department of Public Works was suggested by the Engineering Council, an organization member of the national chamber. The Engineering Council believes there is an urgent need in the national government for such a department to carry on the work of an engineering and construction character. The Engineering Council has gone on record as favoring the adoption of the Jones-Reavis bill, now pending in Congress, providing that the name of the executive department at present designated as "Department of Interior" be changed to the name of "Department of Public Works," and that the head thereof shall continue to be a member of the Cabinet under the official designation "Secretary of Public Works." This bill would transfer much of the work now transacted by bureaus under the Department of Interior to other departments and would also place additional bureaus under the new department.

I. C. C. to Create New Bureaus

While awaiting the appointment by the President of the three new members of the Interstate Commerce Commission the commission has been engaged in strengthening its own organization to enable it to cope with the numerous new duties imposed upon it by the transportation act. Early announcement is expected of the creation of a Bureau of Capital Issues to handle the details of the supervision of railroad security issues and of a Bureau of Service to handle matters pertaining to transportation, car service, embargoes, joint use of terminals and other similar matters as to which the commission is given broad powers under the new law. While the commission's most extensive powers relating to operating matters are to be exercised only in case the commission declares that in its judgment an emergency exists, it is regarded as necessary to maintain an organization to keep in constant touch with the situation so that the commission may be prepared to act if necessary. The provisions relative to regulation of security issues do not become effective for 120 days from March 1, when the law went into effect. It is understood that Col. F. G. Robbins, formerly general superintendent of the Erie Railroad at Chicago, has been selected for appointment as director of the Division of Service. Mr. Robbins left the Erie in January, 1918, to accept a commission as major in the Engineer Officers' Reserve Corps, and after some service at Washington in the office of S. M. Felton, director general of military railways, went to France as assistant general manager, Service of Supply, of the Transportation Corps, A. E. F., where he was promoted to colonel. After the armistice he was assigned to the office of the chief of engineers of the Army at Washington.

The commission has recently announced the creation of a new Traffic Bureau, with W. V. Hardie as director of traffic, which has taken over jurisdiction over the Bureau of Tariffs, the Fourth Section Board and the Suspension Board and will have much to do with the adjustment of rates in the various districts or rate groups to meet the 5½ per cent. standard of return. Mr. Hardie when appointed was assistant general freight agent of the Missouri, Kansas & Texas, at Dallas, Tex., and had been assistant to the director of the Division of Public Service of the Railroad Administration. Prior to federal control he had been for ten years with the Oklahoma Traffic Association, an organization of shippers, at Oklahoma City.

It is understood that the new heads of bureaus of the commission are to receive salaries of $10,000 a year, corresponding to those received by the director of the bureau of valuation and the chief counsel.

Traffic News

The Central of Georgia, which owns and operates the sleeping cars on its lines, has applied to the Railroad Commission of Georgia for authority to increase sleeping car rates approximately 20 per cent. It is proposed to make the minimum charge for lower berths $2 instead of $1.50, and for seats in parlors cars 50 cents instead of 45 cents.

The Southern Freight Rate Committee, G. K. Caldwell, chairman, announces the establishment of freight tariff bureaus at Atlanta, Louisville, Richmond, and New Orleans, with the following agents in charge; Atlanta, J. H. Glenn; Louisville, F. L. Speiden; Richmond, J. J. Cottrell; New Orleans, W. P. Emerson. The members of the Southern Freight Rate Committee, besides Mr. Caldwell, are S. B. Mitchell, formerly assistant to the freight traffic manager of the Louisville & Nashville; C. McD. Davis, formerly general freight agent of the Atlantic Coast Line; E. K. Bryan, formerly assistant general freight agent of the Illinois Central; G. S. Rains, formerly assistant general freight agent of the Seaboard Air Line, and L. E. Chalenor (secretary), formerly chairman of the South Eastern Freight Association.

Old Dominion Line

The Old Dominion Steamship Company, one of the best known coastwise freight and passenger lines, making daily trips between New York and Norfolk, has discontinued this line and is going to abandon coastwise business entirely. Control of the company has passed into new hands, and it is proposed to buy larger vessels and go into the trans-Atlantic trade. The Old Dominion Line has been running steamships between New York and southern ports since 1867.

Southern Railway Agents' Association

Six of the principal railways of the south are represented in the list of officers of the Southern Railway Agents' Association, an organization of development and immigration officers which was formed at a meeting at Atlanta, Ga., on April 7. The officers of the new association are: president, W. L. Henderson, industrial and immigration agent, Southern Railway; vice-presidents, J. M. Jones, Seaboard Air Line; J. L. Peeler, Missouri, Kansas & Texas; H. B. Hoyroyd, Louisville & Nashville; W. R. Tucker, Atlanta, Birmingham & Atlantic; secretary, J. F. Jackson, Central of Georgia. Mr. Jackson's office is at Savannah, Ga.

Western Short Lines Ask Rehearing on Mail Pay

The Western Association of Short Line Railroads has filed a petition with the Interstate Commerce Commission asking for a rehearing and a revised finding by the Commission as to the fair and reasonable rates for the transportation of the mails and also replying to the postmaster general's petition for a rehearing. They allege that the rates provided in the commission's decision are not fair to "short line" railroads in general and to the western short lines in particular; and that according to the advice they have received from the postmaster general as to the amounts they are to be paid on the basis of the rates prescribed by the commission the majority of the western short lines that have heretofore been paid on the weight basis for mail service will suffer a very great reduction, exceeding 30 per cent. below what they have been receiving on the basis of the 1917 weighing; and consequently less than the pay based on the 1914 weighing, in spite of the fact that the weight carried increased 100 per cent. on such roads between 1914 and 1917. They express the belief that the commission did not intend thus to reduce pay and that higher rates and differentials can be ordered without necessitating a re-examination of the entire proceeding. The western short lines are represented by Clarence M. Oddie.

Suburban Fares in Canada

The Board of Railway Commissioners for Canada, reporting on complaints of season ticket passengers at Toronto, Montreal and other places, and on proposed advances in fares filed by the railways, disallows the rates proposed by the carriers, but permits them to file new tariffs for commutation passenger traffic, applicable between the points included in the existing tariffs of commutation fares, as follows:

(a) 50-trip tickets, good for 30 days, on the basis of 8½ mills per mile of travel, subject to a minimum charge per ride of 7½ cents.

(b) 40-trip tickets (scholars' tickets), good for 30 days, on the basis of 4¼ mills per mile of travel, subject to a minimum charge per ride of 7½ cents.

(c) 10-trip tickets, good for three months, on the basis of 2.5 cents per mile of travel, subject to a minimum charge per ride of 7½ cents.

Daylight Saving in New England

"Summer Time" has finally been ordered by the Massachusetts Legislature after long discussion, a bill having been adopted to make the standard of the sixtieth meridian the lawful time in that state beginning April 25. The city of Hartford, Connecticut, which adopted the sixtieth meridian some time since, has gone back to the seventy-fifth, because of the refusal of the New York, New Haven & Hartford Railroad to change schedules of trains to accommodate suburban workers; but it is expected that on April 25 another attempt will be made to change the standard. The railroad company has indicated its willingness to change timetables whenever the different communities in Connecticut, Rhode Island and Massachusetts shall come to an agreement as to what they desire.

Daylight-saving bills have been defeated in the legislatures of New Jersey and in New York, but in New York it is said that another attempt will be made this week. The legislature of Maryland has rejected a bill to provide for summer time in the city of Baltimore. At Montreal it is announced that, beginning May 2, the principal Canadian lines will make changes in the times of trains to accommodate the cities and towns which have adopted or intend to adopt summer time.

Southern Rate Committee

Carriers in Southern Classification territory have about completed their rate organization. Lincoln Green, vice-president in charge of traffic of the Southern, will be chairman of the executive committee of the new organization to be known as the Southern Freight Rate Association, which will take the place of the old Southern Freight Rate Association, the Southeastern Mississippi Valley Association, and the Associated Railways of Virginia and the Carolinas. Those associations may not be wholly abolished but, during federal control, they did not function to any extent and the question would be more one of revival than of re-establishment.

The headquarters of the new rate organization will be in Atlanta, Ga. The rate committee has been tentatively agreed on, as follows: G. K. Caldwell, assistant freight traffic manager of the Southern, Washington, D. C., chairman; N. B. Wright, assistant freight traffic manager of the Central of Georgia, Savannah, Ga.; C. McD. Davis, general freight agent of the Atlantic Coast Line, Wilmington, N. C.; E. K. Bryan, assistant general freight agent of the Illinois Central, Memphis, Tenn.; and G. S. Rains, assistant freight traffic manager of the Seaboard Air Line, Norfolk, Va. The appointment of Mr. Davis is not certain, but either he or Roscoe Doss, also connected with the Atlantic Coast Line, will be on the committee.

WHAT IS THE VALUE of an artificially low freight rate if it disturbs industry, leads to freight tieups, to partial or complete shutdowns of production in various communities and to the losses due to such a checking of national energy? For the public the balance is far on the wrong side, leaving entirely out of consideration the injustice done to investors in railroad securities.—*New York Tribune.*

Commission and Court News

Court News

Financial Inability to Perform Repairs Ordered

The Florida Supreme Court refuses to issue a peremptory writ of mandamus to require a railroad company to repair its roadbed and track, "and in doing so to have due regard for" an order of the railroad commissioners giving details for reconstructing the entire line of the company's roadbed and track, especially where the financial inability of the company to comply with the order is admitted.—State v. Taveres & Gulf (Fla.) 82 So. 833.

Carrier Not Obliged to Protect Passenger Against Lawful Arrest

The West Virginia Supreme Court of Appeals holds that although a railroad is obliged to use reasonable diligence to protect its passengers against unlawful assaults, its servants are under no duty to resist or interfere with a known officer in making an arrest of a passenger, unless they knew or by reasonable diligence ought to know that the arrest is unlawful; neither are they bound to make inquiry into such known officer's authority.—Clark v. Norfolk & Western (W. Va.) 100 S. E. 480.

Liability for Brakemen Falling Into Culvert

The Kentucky Court of Appeals holds that a railroad was not liable under the Federal Employers' Limited Liability Act to its brakeman who, to throw a switch for the train, to do which it was not necessary to leave the train at a distance of more than 600 to 700 feet from the switch, voluntarily got off 25 or 30 feet from an unguarded culvert, which was 893 feet from the switch, and in the dark fell into it. Ordinarily, a railroad company is not liable for an injury to an experienced brakeman or switchman, by falling into an open culvert or drain. The company was under no duty to anticipate that the brakeman would cross the culvert and to guard it by barriers.—Manuel v. L. & N. (Ky.) 215 S. W. 280.

Terminal Companies Subject to Hours of Service Act

A terminal company which owned a terminal passenger station and the tracks leading thereto, used by various interstate railroads, sold tickets and checked and loaded baggage for the companies' trains, maintained a telegraph office through which train orders were transmitted, operated all switches to and from its tracks, and through its station master directed the movements of all trains while on its tracks. In a civil suit for a penalty under the Hours of Service Act, the Circuit Court of Appeals, Fifth Circuit, holds that the company is a common carrier engaged in transportation of passengers and baggage by railroad in interstate commerce, although it has no cars or engines, trainmen or engineers. It is subject to the provisions of the Hours of Service Act as to its telegraph operator who transmitted the train orders.—United States v. Atlanta Terminal Co., 260 Fed. 779.

Recovery for Occasional Damage by Flood

The West Virginia Supreme Court of Appeals holds, in accordance with the prior decisions of that court, that where a railroad company or other person by temporary or permanent structures or fills built in a stream obstructs the channel and thereby diverts the regular flow of the waters therein, resulting in occasional damages to the lands of a riparian owner, such damages in contemplation of law are impermanent and temporary, as distinguished from permanent damages, and recovery therefor is limited to the damages as from time to time they occur. In the trial of an action for such impermanent damages it is error to admit evidence of prospective or future damages liable to be sustained by the owner, and an instruction to the jury which does not limit recovery to such temporary damages constitutes reversible error.—Covert v. C. & O (W Va.), 100 S. E. 854

Boiler Inspection Act Violation

In an action for the death of a brakeman, thrown under the train when his clothing came in contact with an unguarded hook on the tender of the locomotive, there was evidence that the hook could have been guarded when not in use. The New York Supreme Court, affirmed by the Appellate Division, holds that the question whether the locomotive was equipped with a safe and suitable boiler and appurtenances, as required by section 2 of the Federal Boiler Inspection Act, and the acts amendatory thereof, was for the jury. Whether the hook was the proximate cause of the death was also held a question for the jury. Judgment for plaintiff was affirmed.—Ford v. McAdoo, 178 N. Y. Supp. 631, affirmed 890.

Failure to Fence Evidence of Negligence

The New York Appellate Division holds that the failure of a railroad company to comply with the requirement of New York Railroad Law, § 52, to fence its road to prevent livestock going thereon is evidence of negligence in favor of one suing for the death of a child struck by a train on an unfenced track onto which he had strayed. The court, reversing a judgment of nonsuit on a jury trial, conceded that the decisions in the various states are not in harmony on these fence statutes, but considers that the New York Court of Appeals, in Donnegan v. Erhardt, 119 N. Y. 468, has established that there may be a liability for personal injuries for a failure to comply with this particular statute.—Di Caprio v. N. Y. C., 178 N. Y. Supp. 626.

Lien for "Loss or Damage" Does not Include Overcharge on Freight

An overcharge in freight rates does not entitle the person overcharged to a lien on the railroad's roadbed. In an action for overcharge the Arkansas Supreme Court held that the right to such a lien must exist, if at all, under the provision of the State statute (Kirby's Dig. §6661) providing that "every person who shall sustain loss or damage to person or property from any railroad for which a liability may exist at law shall have a lien on said railroad." It is held that "loss or damage," as used in the section, has no reference whatever to an excess payment of freight rates, but only to loss or injury to the thing itself.—Gallup v. St. Louis, I. M. & S. (Ark.) 215 S. W. 586.

Maintenance of Switching Tracks, Etc., Across Streets

The Michigan Supreme Court holds that where a railroad has built on its right of way switching and storage tracks crossing city streets without the city's permission, and has continued to use the tracks for six years without objection, the city is estopped from requiring the railroad to remove its tracks. It is also held that a railroad which has incurred considerable expense in building sidings on its right of way before a city council rescinds its resolution granting permission to cross city streets, will be permitted to complete the tracks by extending them to its main track, so as to relieve the situation as to local freight and facilitate the movement of through freight, with safeguards for the users of the streets.—City of Flint v. Grand Trunk Western (Mich.) 174 N. W. 147.

Implied Promise to Pay for Services Rendered Railroad

A postmaster, with an office 200 to 300 feet from a railroad station where mail was delivered, for four consecutive years, under the impression that it was his duty, the situation being known to the railroad, carried the mail from the station to the office four times a day. He then ascertained that the railroad was under contract with the government to do this work. In an action by him the North Carolina Supreme Court held that the railroad was liable to the postmaster for the value of the services rendered for its benefit, under the rule that, in the absence of a special contract, where one person has rendered services of value for the benefit of another, which the latter is under a binding obligation to perform, and such services and the benefits therefrom, not intended to be gratuitous, have been knowingly accepted and received, the law will imply a promise to pay what such services are reasonably worth.—Blackwood v. Southern (N. Car.) 100 S. E. 610.

Foreign Railway News

LONDON.

A daily train service between Ostend and Central Europe is being arranged, and it is hoped that it will begin to run not later than May 1, 1920.

Women Employed on English Railways

LONDON.

In answer to a question in the British Parliament recently it was stated that the number of women employed on English railways on August 1, 1914, was about 12,000, on November 11, 1918, approximately 66,000, and at the end of January, 1920, approximately 30,000.

Higher Rates on Italian Railways

LONDON

An order has just been issued by the Italian State Railways imposing 100 per cent super-tax on the ordinary rates for foreign merchandise entering Italy. This super-tax is applicable to the distance to be covered between frontier stations and the place of destination.

Strike on Chinese Eastern Railway

LONDON.

A Reuter telegram from Peking states that on March 14 the Russian workmen on the Chinese Eastern railway went out on strike owing to General Horvath not replying to their ultimatum to hand over authority in the railway territory to the Provisional Government of Siberia. The Chinese authorities took immediate measures to stop disturbances and warned the strikers that they would be turned out of Manchuria unless they resumed work immediately. The strikers had counted on the co-operation of the Chinese workmen who failed to respond.

Exports of Locomotives in February

The exports of locomotives in February numbered 132 valued at $4,588,074, as compared with 146 in January valued at $4,159,214. The larger part of the February total was consigned to Poland, Italy and Cuba. The detailed figures, as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce, are as follows:

EXPORTS OF STEAM LOCOMOTIVES IN FEBRUARY

Countries	Number	Dollars
Italy	30	1,114,000
Spain	1	20,125
Canada	6	51,107
Salvador	1	23,325
Mexico	4	41,376
Jamaica	1	12,500
Other British West Indies	1	5,785
Cuba	12	314,815
Dominican Republic	1	7,800
Argentina	3	21,000
Brazil	6	136,505
Chile	1	3,835
China	4	81,537
Japanese China	8	350,680
British India	1	9,650
Dutch East Indies	6	299,040
Japan	2	12,144
British South Africa	3	179,250
Poland and Danzig	41	1,903,600
Total	132	$4,588,074

Railway Strike in Spain

LONDON, March 25.

The railway strike in Spain is spreading to the principal lines throughout the country with a rapidity denoting a widespread organization. The Federation of Spanish Railwaymen recently issued a statement declaring that if the government did not enable the railway companies to increase wages, they would declare a general strike on all lines. On March 23 practically every train in Spain stopped, but there has been no disorder. The government's efforts to maintain a skeleton service have failed, and the railway companies were informed that if a solution is not found at once the government would take immediate steps to end the strike. It is reported that on March 24 the government issued

a royal order advancing to the railway companies a sum sufficient to pay for one month the increase in wages demanded by the employees. The parliament meanwhile will discuss measures to satisfy the requirements of the railway service. This temporary arrangement by which it is hoped to end the strike today leaves the real question open for another government to solve, since the mission of the present cabinet ends with the approval of the budget on April 9.

Committee to Investigate Electrification

A note in this column in the *Railway Age* of April 2 (page 1167), spoke of the formation of a committee in the Ministry of Transport to investigate the electrification of the English railways. The committee in addition to the names given in the item in question will also include Philip Dawson, consulting engineer, and Roger T. Smith, electrical engineer of the Great Western and president of the Institute of Electrical Engineers.

In view of the inquiry about to be undertaken, it may be noted that the London & North Western is contemplating an electrification scheme, which will enable it to run trains between Watford and Euston, a distance of about 17 miles, but this cannot be done until the widening between Queen's Park and Chalk Farm has been completed.

The Midland Railway, under the provision of the Tilbury and Southend Section Purchase Act of 1912, is under obligation to seek powers to electrify the railway.

Proposals for the electrification of the suburban portion of the Great Eastern Railway are under discussion.

The London & South Western Railway is considering the electrification of the portions of its lines not now electrified.

The London, Brighton & South Coast has plans ready for the complete electrification of all the suburban lines not now electrified and is also considering electrification of the main line from London to Brighton, a distance of about 50 miles.

The North Eastern Railway is considering schemes for the electrification of the main line from York to Newcastle, a distance of 80 miles, and also the loop line from Notherallerton to Ferryhill via Stockton, a distance of about 31 miles.

The Great Western Railway is completing the electrical equipment of the line over which the trains of the Central London Railway will run to and from Ealing Broadway.

Exports of Car Wheels and Axles in February

The exports of car wheels and axles in February reached a value of $1,217,199, as compared with only $652,251 in January. Half the February total was included in shipments to France. The detailed figures as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce were as follows:

EXPORTS OF CAR WHEELS AND AXLES IN FEBRUARY

Countries	
France	$657,603
Italy	29,250
Russia in Europe	9,000
Spain	123,241
England	175
Ireland	10,616
Canada	55,115
Costa Rica	1,429
Guatemala	25
Nicaragua	98
Panama	1,989
Mexico	48,395
Jamaica	372
Cuba	95,872
Haiti	184
Dominican Republic	1,856
Argentina	5,697
Brazil	2,083
Chile	8,905
Colombia	7,653
British Guiana	363
French Guiana	133
Peru	13,545
Venezuela	519
China	90
Chosen	902
Dutch East Indies	4,450
Hongkong	9,075
Japan	22,910
Russia in Asia	94,320
Australia	1,392
New Zealand	101
Philippine Islands	5,466
British West Africa	120
British South Africa	4,255
Total	$1,217,199

Exports of Railway Cars in February

Exports of freight cars in February totaled 1,986, valued at $3,574,366; of passenger cars, to the value of $83,365; of cars for other railways 677, valued at $400,074, and of parts of cars to the value of $1,747,746. The detailed figures as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce were as follows:

EXPORTS OF CARS FOR RAILWAYS IN FEBRUARY

	Passenger		Freight and other		For other railways		Parts of cars
Countries	Number		Number		Number		
Cuba	5	$73,365	431	$577,432	215	$83,010	$115,708
Colombia	1	10,000	12	22,000	3	315	323
France	..	..	965	1,892,360	200	19,515	1,317,804
Italy	..	..	506	959,320	...	.....	8,016
Canada	..	..	10	14,364	23	110,851	72,938
Mexico	..	..	20	47,700	7	770	1,551
Jamaica	..	..	29	35,810	30	44,640	40,965
Dominican Republic	..	..	1	180	56	36,641	14,821
Hongkong	..	..	12	25,200	...	.....	.....
Costa Rica	..	..	...	.....	20	1,960	2,165
Haiti	..	..	..	.....	100	96,150	34,253
Ecuador	..	..	...	.....	22	5,622	49
British Guiana	..	..	...	.....	1	600	6,363
Russia in Europe	..	..	...	.....	...	.....	250
Spain	..	..	...	.....	...	.....	77,430
England	..	..	...	.....	...	.....	450
Scotland	..	..	...	.....	...	.....	2,530
Honduras	..	..	...	.....	...	.....	1,183
Nicaragua	..	..	...	.....	...	.....	49
Salvador	..	..	...	.....	...	.....	286
Argentina	..	..	...	.....	...	.....	1,789
Brazil	..	..	...	.....	...	.....	6,290
Chile	..	..	...	.....	...	.....	1,578
Peru	..	..	...	.....	...	.....	21,858
Uruguay	..	..	...	.....	...	.....	1,300
China	..	..	...	.....	...	.....	2,844
Japanese China	..	..	...	.....	...	.....	1,651
British India	..	..	...	.....	...	.....	5,600
Japan	..	..	...	.....	...	.....	1,861
Russia in Asia	..	..	...	.....	...	.....	1,300
Australia	..	..	...	.....	...	.....	3,421
Philippine Islands	..	..	...	.....	...	.....	280
Belgian Kongo	..	..	...	.....	...	.....	840
Total	6	83,365	1,986	3,574,366	677	400,074	1,747,746

Exports of Railway Track Material in February

Exports of rails in February totaled 31,241 tons valued at $1,724,970; of spikes 2,787,036 lb. valued at $117,130, and of switches, frogs, splice bars, etc., to the value of $411,538. The detailed figures, as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce were as follows:

EXPORTS OF CAR WHEELS AND AXLES IN FEBRUARY

	Spikes		Steel rails		Switches, frogs, splice bars, etc.
Countries	Pounds		Tons		
Belgium	.....	.....	237	$15,456	$2,204
Denmark	.....	.....	997	59,295	.....
France	.....	.....	4,603	248,186	31,941
Greece	.....	.....	.....	.....	33,848
Netherlands	.....	.....	.....	.....	160
Norway	.....	.....	62	3,783	.....
Russia in Europe	41,000	$2,659	.....	.....	8,176
Spain	.....	.....	669	42,152	1,482
England	.....	.....	.....	.....	2,450
Scotland	.....	.....	712	45,965	672
Ireland	.....	.....	.....	.....	622
Canada	7,980	251	303	20,292	7,688
Costa Rica	31,300	1,579	.....	.....	8,258
Guatemala	.....	.....	.....	.....	17
Honduras	1,000	49	594	35,601	3,957
Nicaragua	.....	.....	.....	.....	1,359
Panama	3,000	288	.....	.....	.....
Salvador	.....	.....	.....	.....	240
Mexico	228,831	9,121	885	49,773	45,379
Barbados	.....	.....	.....	.....	317
Jamaica	.....	.....	16	1,157	5,585
Trinidad and Tobago	.....	.....	1	80	550
Other British West Indies	.....	.....	13	1,028	689
Cuba	855,383	37,872	7,763	422,706	93,679
French West Indies	12,065	584	41	1,826	617
Haiti	.....	.....	.....	.....	2,238
Dominican Republic	61,960	2,218	1,485	76,802	5,865
Argentina	.....	.....	904	58,823	6,271
Bolivia	.....	.....	.....	.....	93
Brazil	229,702	22,386	2,667	105,927	39,910
Chile	36,964	1,124	8	524	263
Colombia	19,720	1,005	132	6,768	8,039
Ecuador	40,000	1,620	.....	.....	43
British Guiana	46,960	1,876	.....	.....	.....
Peru	22,400	862	40	1,143	7,292
Uruguay	.....	.....	164	12,114	10,634
Venezuela	3,000	149	.....	.....	4,411
China	.....	.....	535	27,197	1,091
British India	.....	.....	430	26,636	10,507
Dutch East Indies	36,600	3,350	142	6,034	.....
Japan	418,431	11,360	7,161	412,320	27,247
Russia in Asia	544,000	16,718	.....	.....	.....
Australia	.....	.....	50	3,302	158
New Zealand	.....	.....	252	16,082	1,364
Philippine Islands	46,800	2,059	114	7,179	8,138
British South Africa	.....	.....	150	8,642	27,701
Portuguese Africa	.....	.....	111	8,177	383
Total	2,787,036	$117,130	31,241	$1,724,970	$411,538

Equipment and Supplies

Locomotives

Mitsui & Co., New York, are inquiring for 6 or 12 Consolidation type locomotives for the Taiwan Railway, Formosa.

The Northern Pacific is inquiring for 25 Mikado, 25 Pacific, 20, 8-wheel switching locomotives, and 6 Mallet type locomotives.

The Pittsburgh, Allegheny & McKees Rocks has ordered one 0-6-0 type locomotive from the Porter Locomotive Works.

The Standard Tank Car Company, Masury, Ohio, has ordered one 0-6-0 type locomotive from the Porter Locomotive Works.

Canadian National.—D. B. Hanna, chairman, announces that orders for equipment totaling $25,000,000 in value have recently been given as follows: Canadian Locomotive Company, Kingston, 45 locomotives; Montreal Locomotive Works, 67 locomotives; Canadian Car & Foundry Company, Montreal, 18 sleeping cars, 12 dining cars, 20 baggage cars, 1,000 box cars, 600 refrigerator cars, 80 cabooses; Eastern Car Company, Trenton, N. S., 500 box cars, 1,150 coal cars, 6 snow ploughs; National Steel Car Company, Hamilton, 1,500 box cars; Preston Car & Coach Company, Preston, Ont., 20 cabooses; Hart-Otis Car Company, Montreal, 350 ballast cars. Part of these orders have already been announced in the *Railway Age*.

Freight Cars

The New York, Chicago & St. Louis is inquiring for 500 box cars.

The American Trading Company is inquiring for 4, 30-ton box cars.

The Richard De Cou Company, Philadelphia, Pa., is inquiring for 10 sugar cane cars.

The Bethlehem Steel Company, Pittsburgh, Pa., is inquiring for 500, 70-ton all steel hopper cars.

The Northwest Trading Company, Chicago, is inquiring for 30 underframes and trucks for export.

The Missouri, Kansas & Texas has ordered 150 tie cars from the Mt. Vernon Car & Manufacturing Company.

The Cuba Northern has ordered 350 box cars, of 40 tons' capacity each, from the American Car & Foundry Company.

J. S. Young & Co., Baltimore, Md., have ordered four 8,050-gal., 50-ton truck tank cars from the Pennsylvania Tank Car Company.

The Sinclair Refining Company, Chicago, has ordered 500 tank cars from the General American Tank Car Company, and 500 from the American Car & Foundry Company.

The Donner Steel Company, Buffalo, N. Y., reported in the *Railway Age* of March 26, as inquiring for from 500 to 750, 70-ton hopper cars, has withdrawn its inquiry for this equipment.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for 10 steel underframe flat cars of 30 to 40 ton capacity, and 36 ft. to 40 ft. long; also for 50 80,000 lb. capacity flat cars 40 ft. long.

The Union Pacific, reported in the *Railway Age* of March 19 as being in the market for 2,000 all-steel, 100 per cent drop-bottom general service gondola cars of 100,000-lb. capacity, has ordered 1,000 of these cars from the Ralston Steel Car Company and 1,000 from the Pullman Company.

New York Central.—This road has ordered 500 hopper cars from the Pressed Steel Car Company. Through a typographical error this was reported as 50 cars in our issue of April 9. In addition to the 8,000 freight cars let by this road, as reported in the *Railway Age* of April 9, this road will buy 904 stock cars, and 30 milk cars. It is also rebuilding 1,000 all-steel coal cars of 55 tons capacity each.

Passenger Cars

The United Railways of Havana are inquiring for 12 third-class passenger coaches.

The Baldwin Locomotive Works is inquiring for 4 sleeping cars and one dining car for export.

The Pere Marquette is contemplating the purchase of 47 cars for passenger train equipment.

The Louisville & Nashville has ordered 13 passenger coaches from the American Car & Foundry Company.

New York Central.—This road will buy 11 mail cars and 12 all-steel dining cars, in addition to the passenger train cars recently ordered, as reported in the *Railway Age* of April 9.

The Hudson & Manhattan, reported in the *Railway Age* of February 20 as being in the market for 25 subway cars, has ordered this equipment from the American Car & Foundry Company.

Iron and Steel

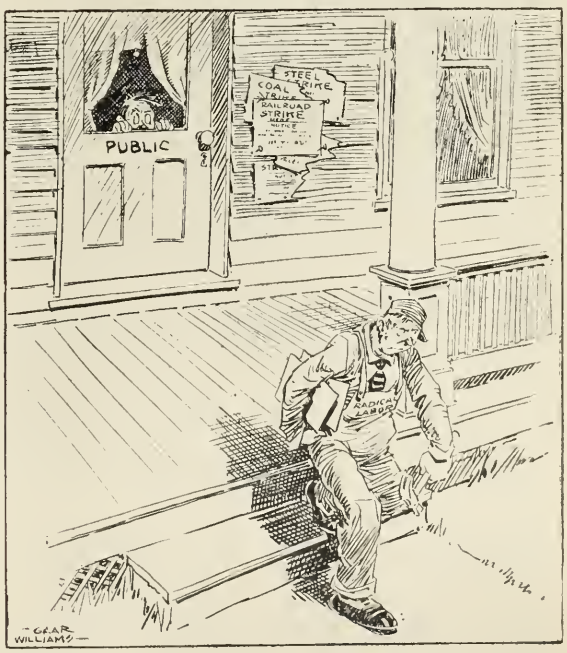
Mitsui & Co., New York, are inquiring for 24,000 tons of 80-lb. rail for the Pekin-Mukden Railway.

The Delaware, Lackawanna & Western has ordered a turntable from the American Bridge Company calling for about 100 tons of steel.

The United Railways of Havana have ordered 6,000 tons of 80-lb. rail and accessories, from the United States Steel Products Company.

The Chicago, Burlington & Quincy has awarded a contract to the American Bridge Company, Chicago, for six turntables aggregating 432 tons of steel.

The New York Central has ordered 200 tons of fabricated steel from the American Bridge Company for new bridges to be put up at Rochester, N. Y., and at Canton.



From the Indianapolis News

Just One Ailment After Another!!

Supply Trade News

The Lakewood Engineering Company, Cleveland, Ohio, has awarded to Clarence I. McNair, Jr., of Cloquet, Minn., its first prize of $1,000 for the best essay on industrial haulage, emphasizing the usefulness of tier-lift trucks made by the Lakewood Company.

Charles A. Coons, who resigned as secretary and treasurer of the Paxton-Mitchell Company, Omaha, Neb., on April 1, will enter the railway supply business in Omaha. Mr. Coons has been connected with the Paxton-Mitchell Company for the last 14 years and prior to that time was in the motive power and car department of the Union Pacific for 20 years.

Karl J. Eklund, general manager of Mudge & Co., has been elected vice-president in charge of sales and service. In this capacity Mr. Eklund will also have charge of western sales for the Pilliod Company, Swanton, Ohio, and the Chambers-Lyle Company. Mr. Eklund was born on July 8, 1884, and entered railroad service as a blacksmith's helper in the shops of the Boston & Maine. After three years as an apprentice machinist he was employed on various railroads as a journeyman machinist. In 1908 he returned to the Boston & Maine as machinist and foreman in the Keene, N. H., shops, and on March 1, 1910, he became connected with the Pilliod Company as a valve gear inspector. On February 1, 1915, he was appointed assistant to the president of the Pilliod Company, with headquarters at New York City. He occupied this position until April 1, 1917, when he was appointed assistant to the president of Mudge & Co., Chicago, and served in this capacity until his appointment as general manager on March 1, 1918.

K. T. Eklund

The **H. K. Ferguson Company**, engineers and builders, Cleveland, Ohio, has opened for the convenience of its eastern customers an office at 21 West Forty-third street, New York, in charge of **L. D. Stauffer**. This was incorrectly reported in the *Railway Age* of April 9, as the H. K. Fairbanks Company.

H. U. Morton, vice-president of the Dunbar Manufacturing Company, Chicago, has been elected president of that company, succeeding Thomas Dunbar, who has resigned. The Dunbar Manufacturing Company during the period of the war was engaged entirely on war work and received an award for distinguished service for quantity production of artillery ammunition bodies. The company has resumed the manufacture and sale of its various railway appliances and is also in position to manufacture steel doors for cars, steel pressings, stampings and drawn steel shades.

R. T. Walsh, general sales manager of the Sullivan Machinery Company, Chicago, for the past eight years, has been appointed vice-president in charge of sales and has also been elected a director. Mr. Walsh was born in Massachusetts and received his education at Worcester Polytechnic institute, graduating in 1900. He entered the service of the Sullivan Machinery Company at Claremont, N. H., and after several months was assigned to the western branch of the company at Denver, Colo., as a salesman. In 1906 he was appointed Pacific Coast manager, with headquarters at San Francisco, Cal. He was promoted to European sales manager, with headquarters at London, Eng., five years later, and in 1913 he was appointed as general sales manager, which position he has held until his recent promotion.

The properties of the Southern Locomotive Valve Gear Company, Knoxville, Tenn., have been purchased by **General L. D. Tyson** (former president) and associates, and reorganized as the **Southern Valve Gear Company**, with ample capital and facilities to take care of any and all demands for Southern valve gears and Brown power reverse gears. The officers of the new company are: **General L. D. Tyson**, president; **Forrest W. Andrews**, vice-president; **William Whaley**, general manager, and **H. P. Strayer**, secretary. The headquarters of the new company are at Knoxville.

Haskell & Barker Car Company

Net earnings of the Haskell & Barker Car Company, Inc., Chicago, for the year ending January 31, 1920, amounted to $3,126,653, from which was deducted a depreciation appropriation of $3,000,000 and estimated federal taxes of $1,100,000, leaving a balance for the stockholders of $1,727,653. Quarterly dividends of $1 a share requiring a total of $880,000 have been paid out of the year's earnings, leaving $847,653 as a net addition to the previous surplus.

The income accounts for the year ending January 31, 1920, is as follows:

Gross earnings		$3,743,131
From car department, foundries, discounts and other sources	$534,185	
Less: Repairs, renewals, general maintenance of buildings and other equipment since April 6, 1917, under regulations of 1918 revenue act	81,293	
		615,478
Net earnings		$3,127,653
Less: Reserve for renewals and replacements	$300,000	
Four quarterly dividends paid	880,000	
		1,180,000
Surplus profits for year		$1,947,653

Trade Publications

TANK CAR CENTER SILLS.—The Pennsylvania Tank Car Company, Sharon, Pa., describes its type A-1 center sill in a booklet entitled "One Reason Why Pennsylvania Tank Cars Are Used by Leaders of Industry." Although the booklet briefly describes the construction of the sill, it deal principally with tests conducted by Professor Endsley of the University of Pittsburgh at the testing laboratory of the Union Draft Gear Company in December, 1918, to determine the relative strength of the type A-1 center sill, which is patented and used exclusively by the Pennsylvania Tank Car Company, and the type A center sill, now in general use. The booklet contains a number of illustrations.

Photograph from Underwood & Underwood, N. Y.

Traveling on the Trans-Siberian

Railway Financial News

CANADIAN PACIFIC.—See editorial elsewhere in this issue.

CHICAGO & EASTERN ILLINOIS.—William J. Jackson has been appointed receiver succeeding Thomas H. Deeds, who is to remain with the company as financial assistant to Mr. Jackson.

CHICAGO & NORTH WESTERN.—The stockholders at a special meeting approved a new refunding mortgage and authorized the absorption of eleven proprietary companies, all of whose stock is now owned by the Chicago & North Western. The new mortgage will be a first lien on these properties and the bonds are to be dated May 1, 1920. The purpose of the new mortgage is to provide for refunding the entire bonded indebtedness, aggregating $213,653,000, of which $118,770,000 will mature between 1921 and 1948 and for financing, from time to time, necessary permanent improvements, additions, betterments, equipment, etc.

Gordon Abbutt, of Boston, has been elected a director to succeed Henry C. Frick, deceased.

CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS.—Festus J. Wade, of St. Louis, has been elected a director to succeed Horace E. Andrews, deceased.

NEW YORK CENTRAL.—A syndicate headed by J. P. Morgan & Co. is offering an issue of $36,225,000 New York Central 7 per cent equipment trust certificates, dated April 15, 1920, and maturing at the rate of $2,415,000 annually from April 15, 1921 to 1935. The issue is being offered at par and accrued interest.

ceived the permission of the Connecticut Public Utilities Commission to issue 6 per cent equipment notes to the amount of $4,813,930.

NEW YORK, NEW HAVEN & HARTFORD.—This company has re-

PENNSYLVANIA.—Percival Roberts, Jr., has resigned as a director.

MICHIGAN CENTRAL.—A. H. Harris has been elected a director to succeed Henry Russell, deceased.

PITTSBURGH & WEST VIRGINIA.—Reports are current that action has been taken by the board of directors looking to the separation of the West Side Belt Railroad from the Pittsburgh Terminal Railroad & Coal Company, and its merger into the Pittsburgh & West Virginia, thus placing all railroad properties in one corporate organization.

THE FAILURE of this strike is certain, even if it should apparently grow worse.—*The New York Times.*

"IF PRIVATE OPERATION be unsatisfactory, the threat of retaking by the government, this time for good and all, will hang overhead. The challenge is for the ablest railroad minds and courageous financiers, under adverse conditions, to render such admirable service that government ownership talk will not be tolerated."—*Roberts Walker, President Chicago & Alton.*

IT WOULD BE FOLLY of the worst sort to permit the railroads to become more inefficient, or even to continue as they now are. The rehabilitation of the railroads ought to have been one of the main points of a careful program of reconstruction, put into operation immediately after the signing of the armistice. Now it is one of the prime needs of the nation, and as it cannot be accomplished without the aid of the national government that aid should be given promptly, along reasonable lines, to an amount necessary to accomplish the purpose required.—*Pueblo (Colo.) Chief.*

Canadian Pacific Railway Company—Thirty-Ninth Annual Report

To the Shareholders:

The accounts of the company for the year ended December 31, 1919, show the following results:

Gross earnings		$176,929,060.00
Working expenses		143,996,023.58
Net earnings		$32,933,036.42
Deduct fixed charges		10,161,509.77
Surplus		$22,771,526.65
Contribution to pension fund		500,000.00
		$22,271,526.65
From this there has been charged a half-yearly dividend on Preference Stock of 2 per cent, paid October 1, 1919	$1,613,638.42	
And three quarterly dividends on Ordinary Stock of 1¾ per cent each, paid June 30, 1919, October 1, 1919, and December 31, 1919	13,650,000.00	
		15,263,638.42
		$7,007,888.23
From this there has been declared a second half-yearly dividend on Preference Stock of 2 per cent payable April 1, 1920	$1,613,638.42	
And a fourth quarterly dividend on Ordinary Stock of 1¾ per cent, payable April 1, 1920	4,550,000.00	
		6,163,638.42
Leaving net surplus for the year (which amount has been placed in reserve to meet special taxes imposed by the Dominion Government)		$844,249.81

In addition to the above dividends on Ordinary Stock, three per cent was paid from Special Income.

2. The working expenses for the year amounted to 81.39 per cent of the gross earnings, and the net earnings to 18.61 per cent, as compared with 78.10 per cent and 21.90 per cent respectively in 1918.

3. The gross earnings of your transportation system during the fiscal year under review exceeded those of any previous year in the history of the company, and exceeded the gross earnings of 1918 by $19,391,362, but the net earnings were less by $1,569,351. This large addition of $20,960,713 to working expenses is due to the great advance in wages and the increased cost of fuel and other materials.

Your Directors cannot hold out any hope of substantial relief for some time to come from these high costs which are reflected so strongly in the operating expenses of the company, but every effort is being made to offset the effect on your revenues by economy in operation and the extension of the company's freight and passenger business. It is not to be expected, however, that any normal increase in business can possibly equal the extraordinary increase in wage and other costs which all railway companies have experienced during the past two years.

4. The sales of agricultural land in the year were 681,763 acres for $13,668,443, being an average of $20.05 per acre. Included in this area were 80,795 acres of irrigated land which brought $52.53 per acre, so that the average price for the balance was $15.68 per acre.

5. There were no sales of 4 per cent Consolidated Debenture Stock, 4 per cent Preference Stock, or other capital securities during the year.

6. The late granting of the necessary statutory authority, combined with difficulty in securing labor and the early setting in of winter in the West, prevented extensive construction during the year of branch line mileage which you authorized at the last annual meeting. Your Directors are of the opinion that reasonable additional construction should be gone on with as conditions warrant, and your authority will be asked for proceeding with the construction of the following lines and for the issue and sale of a sufficient amount of 4 per cent Consolidated Debenture Stock to meet the expenditure, namely:

Wymark-Archive Branch, 25 miles.
Rosetown South Branch, 45 miles.
Weyburn-Lethbridge Branch from Altawan to Manyberries, 35 miles.
Moose Jaw Southwesterly Branch from Consul Southeasterly, mileage 35 to 60.
Moose Jaw Southwesterly Branch from Assiniboia Southwesterly, 30 miles.
Leader Southerly Branch, 50 miles.
Duchess or Rosemary North Branch, 34 miles.
Cutknife to Whitford Lake Branch, 40 miles.
An extension of the Swift Current Northwesterly Branch from Empress Northwesterly, a distance of 20 miles.
An extension of the Swift Current Northwesterly Branch from Sedgewick to Vegreville, 54 miles.

Your directors appreciate that the construction of the above lines can only be proceeded with gradually in view of the probable shortage of labor available for such purposes, but they deem it desirable to obtain your authority in order that the work may be gone on with from time to time as circumstances permit.

7. In order to facilitate the economic handling of traffic in and out of Winnipeg your directors think it desirable to double-track the line extending from Winnipeg to Molson, and, for the purpose of relieving the main line of pressure of traffic during grain shipping seasons, that capital expenditure should be made on the Bassano Branch, extending from Bassano to Java, with the view of raising it to the standard of the company's main line, and thus permitting the expeditious and cheap handling of grain and other traffic from points west of Bassano. The estimated total cost of these works will be about $2,000,000, but in the opinion of your directors the heavy present and prospective traffic in these districts amply warrants the outlay.

8. In anticipation of your confirmation your directors authorized capital appropriations, in addition to those approved at the last annual meeting for 1919, aggregating $3,359,000, and subject to your approval have authorized expenditures on capital account during the present year of $9,613,353. Of this amount the principal items are:

Replacement and enlargement of structures in permanent form	$1,267,144
Additional stations, roundhouses, freight sheds and shops, and extensions to existing buildings	2,009,166
Tie plates, rail anchors, ballasting, ditching and miscellaneous betterments	1,113,599

Replacement of rail in main and branch line tracks with heavier section	979,493
Additional terminal and side track accommodation	442,363
New coal dock at Port William Terminals	871,000
Proposed new station and yard changes at Trois Rivieres	500,000
Improvements in connection with Telegraph Service	575,860
British Columbia Coast Service	135,000
Mechanical Department, machinery at various Shops	463,936

The balance of the amount is required for miscellaneous works to improve facilities over the whole system and effect

9. Your directors are making provision for obtaining the following necessary additions to your company's equipment, namely

3 dining cars,
43 sleeping cars,
67 air dump cars,
3500 sixty ton box cars,
800 refrigerator cars,

at a total cost of approximately $13,162,000.

10. During the course of the year the following steamships were disposed of, namely:

S.S. Prince George,
S.S. Princess Margaret,
S.S. Princess May,
S.S. Virginian,
S.S. Monmouth.

The S.S. War Peridot and War Beryl, having a dead-weight tonnage of 10,500 tons each, were purchased.

11. You will be asked to approve By-law No. 91, repealing By-law of the same number, naming officers authorized to prepare and issue Tariffs of Tolls pursuant to the provisions of the Railway Act of Canada.

12. The lease of the Nakusp and Slocan Railway, extending from Nakusp to Three Forks, with branches to Sandon and White Water, and having an aggregate mileage of 48.47 miles, which was executed in 1895 and under which the railway of that company was leased to your company for a period of 25 years from July, 1895, will expire in July of the present year. Your directors will therefore submit for your approval a new lease of the railway to this company for a period of ninety-nine years on the usual terms.

13. Appreciating the vital importance to Canada of the success of the Victory Loan of 1919, your company subscribed to $20,000,000, of which $14,000,000 was taken for the company's Special Investment Fund.

14. The Consolidated Mining and Smelting Company, in which your company has a substantial direct interest through its holdings of bonds and stock and upon the success of whose undertaking the prosperity of Southern British Columbia and the consequent traffic for your railway depend to a marked degree, will require during the present year additional sums for needed extensions and additions to its plant. In anticipation of your consent your directors have decided to advance such amounts as may be required pending the making of capital issues or other permanent financial arrangements by the Consolidated Company.

15. Your directors regret to report the death on the 24th of May last of Mr. Wilmot D. Matthews, of Toronto, who had been a director of the company for thirty-one years, and whose advice and counsel have always been of the utmost value to his associates on the Board.

During the year the Hon. James Dunsmuir, of Victoria, resigned as a director. The Hon. William J. Shaughnessy was elected to succeed the Hon. James Dunsmuir, and Sir John C. Eaton was elected to the Board to fill the vacancy created by the death of Mr. Matthews.

16. The undermentioned directors will retire from office at the approaching annual meeting. They are eligible for re-election:

Sir John C. Eaton,
Mr. Grant Hall,
Sir Vincent Meredith, Bart.,
Sir Augustus M. Nanton.

For the directors, E. W. Beatty, *President.*

Montreal, March 15, 1920.

Receipts and Expenditures, Year Ended December 31, 1919

Receipts		
Cash in hand, December 31, 1918		$39,548,416.63
Surplus revenue as per statement	$22,271,526.65	
Special income as per statement	9,049,341.90	
		31,320,868.55
Land Department		
Lands and townsite		
Proceeds of sales and interest, less cancellations	$14,893,966.31	
Less sales expenses and irrigation	4,284,045.93	
	$10,609,914.38	
Deferred payments on previous year's sales	3,228,239.02	
	$13,838,153.40	
Amount remaining in Deferred Payments on the sales of the year	9,183,640.97	4,654,512.43
Amount received from sales of government securities and repayment of advances to governments		9,017,458.13
Amount of West Kootenay Power & Light Co.'s first mortgage bonds transferred from Miscellaneous securities to pension fund (cost)		35,283.33
Amount applied in reduction of cost of mining and other properties, Exhibit "D"		17,956.58
Increase in current liabilities, rentals of leased lines and coupons on mortgage bonds, and reserves and appropriations		24,740,569.94
		$109,335,065.59
Expenditures		
Dividends on Preference Stock—		
2 Per cent paid April 1st, 1919	$1,613,638.42	
2 Per cent paid October 1st, 1919	1,613,638.42	
		$3,227,276.84
Dividends on Ordinary Stock—		
2½ Per cent paid April 1st, 1919	$6,500,000.00	
2½ Per cent paid June 30th, 1919	6,500,000.00	
2½ Per cent paid October 1st, 1919	6,500,000.00	
2½ Per cent paid December 31st, 1919	6,500,000.00	
		26,000,000.00
Construction of branch lines, Exhibit "E"		1,415,970.35
Additions and improvements, main line and branches, Exhibit "F"		3,095,694.08
Expenditure on leased and acquired lines, Exhibit "G"		1,198,548.55
Shops and machinery		64,452.85
Lake and river steamers		27,115.40
Ocean and Coastal Steamships—		
Payments on steamships acquired and under construction	$10,394,443.06	
Less amount paid from steamship replacement	8,009,690.30	
		2,384,752.76
Deposited with Trustee, Special Investment Fund		6,607,318.59

CANADIAN PACIFIC RAILWAY COMPANY GENERAL BALANCE SHEET, DECEMBER 31ST, 1919.

ASSETS

Property Investment:		
Railway, rolling stock equipment and lake and river steamers		$548,458,756.20
Ocean and Coastal Steamships, Exhibit "A"		29,894,172.43
Acquired Securities (Cost): Exhibit "B"		124,329,836.18
Advances to Controlled Properties and Insurance Premiums		8,065,575.66
Investments and Available Resources: (Including amount held in trust for 6% Note Certificates, $58,461,538.37)		
Deferred payments on lands and townsites	$66,659,932.43	
Imperial and Dominion Government securities	37,702,580.56	
Provincial and municipal securities	2,031,721.29	
Debenture stock loaned to Imperial Government	40,000,000.00	
Miscellaneous investments, Exhibit "C," Cost	31,762,214.85	
Assets in Lands and Properties, Exhibit "D"	95,211,438.66	
Cash	2,969,683.12	
		276,337,570.91
Working Assets:		
Material and supplies on hand	$21,990,868.65	
Agents' and conductors' balances	3,618,072.48	
Net traffic balances	809,397.19	
Imperial, Dominion and United States Governments, accounts due for transportation, etc	4,176,804.15	
Miscellaneous accounts receivable	7,576,884.16	
Cash in hand	53,519,420.78	
		91,691,447.41
		$1,078,777,358.79

LIABILITIES

Capital Stock:		
Ordinary stock	$260,000,000.00	
Four per cent Preference Stock	80,681,921.12	
		$340,681,921.12
Four Per Cent Consolidated Debenture Stock		216,284,882.10
Mortgage Bonds:		
Algoma Branch 1st mortgages 5 per cent		3,650,000.00
Note Certificates 6 Per Cent		52,000,000.00
Current:		
Audited vouchers	10,700,097.44	
Payrolls	4,637,770.33	
Miscellaneous accounts payable	12,006,966.49	
	27,344,834.26	
Accrued:		
Rentals of leased lines and coupons on mortgage bonds		570,621.38
Equipment Obligations		7,990,000.00
Reserves and Appropriations:		
Equipment replacement	3,376,703.28	
Steamship replacement	23,672,436.83	
Reserve fund for contingencies and for contingent war taxes	38,219,661.53	
		65,268,801.64
Premium on Ordinary Capital Stock Sold		45,000,000.00
Net Proceeds Lands and Townsites		91,569,599.26
Surplus Revenue from Operation		127,275,369.58
Special Reserve to Meet Taxes Imposed by Dominion Government		3,047,871.02
Surplus in Other Assets		98,093,458.43
		$1,078,777,358.79

J. LESLIE, *Comptroller.*

Auditors' Certificate.

We have examined the books and records of the Canadian Pacific Rail-way Co. for the year ending December 31, 1919, and having compared the annexed Balance Sheet and Income Account therewith, we certify that, inour opinion, the Balance Sheet is properly drawn up so as to show the true financial position of the company at that date, and that the relativeIncome Account for the year is correct.

PRICE, WATERHOUSE & CO.,
Chartered Accountants (England).

Montreal, March 8, 1920.

Securities Acquired—		
Consolidated Mining & Smelting Co. bonds	$2,698,400.00	
Lake Erie & Northern Ry. 1st mortgage bonds	6,700.00	
Nakusp & Slocan Ry. bonds	647,072.00	
Alberta Stock Yards Co., Ltd., preferred stock	430,500.00	
Public Markets, Ltd., of Manitoba, stock	50,000.00	
Trustee securities	2,201,539.69	
		6,034,211.69
Payments on subscription to government loans		2,037,981.25
Payment of equipment obligations		940,000.00
Increase in working assets and advances to controlled properties and insurance premiums		2,782,322.45
		$55,815,644.81
Cash in hand, December 31st, 1919		53,519,420.78
		$109,335,065.59

EXHIBIT "F."

DETAILS OF EXPENDITURE ON ADDITIONS AND IMPROVEMENTS FROM JANUARY 1ST TO DECEMBER 31ST, 1919.

Eastern Lines—		
Additional sidings, buildings, stations and yards	$201,367.45	
Permanent bridges and improvements of line	392,153.25	
		$593,520.70
Montreal Terminals		142,940.44
Quebec Joint Terminals		23,317.77
Western Lines—		
Additional sidings, buildings, stations and yards	$234,394.52	
Permanent bridges and improvements of line	778,058.14	
Fort William Terminals, including coaling plant	47,263.92	
Winnipeg Terminals	2,075.51	
Vancouver Terminals	42,901.75	
Connaught Tunnel	66,009.47	
Right of way	12,680.44	
		$1,183,383.75
Additions to office buildings and hotels		407,107.46
Telegraph extensions and additions		579,738.12
Rented and temporary sidings		165,685.84
		$3,095,694.08

STATEMENT OF EARNINGS FOR THE YEAR ENDED DECEMBER 31ST, 1919

From passengers	$46,182,151.12
From freight	111,064,441.68
From mails	1,483,332.26
From sleeping cars, express and miscellaneous	18,199,134.94
Total	$176,929,060.00

STATEMENT OF WORKING EXPENSES FOR THE YEAR ENDED DECEMBER 31ST, 1919

Transportation expenses	$68,054,174.76
Maintenance of way an dstructures	28,912,220.30
Maintenance of Equipment	33,897,727.64
Traffic expenses	3,829,686.56
Parlor and sleeping car expenses	1,861,428.05
Expenses of lake and river steamers	1,335,003.19
General expenses	6,105,783.08
Total	$143,996,023.58

DESCRIPTION OF FREIGHT FORWARDED

	Years Ended December 31st		
	1917	1918	1919
Flour, barrels	13,727,970	13,301,740	12,787,020
Grain, bushels	213,340,507	137,070,428	121,059,921
Live stock, head	2,190,596	2,364,870	2,603,571
Lumber, feet	3,178,554,667	3,241,312,802	3,143,431,200
Firewood, cords	295,277	339,631	279,925
Manufactured articles, tons	10,148,568	9,718,373	7,854,163
All other articles, tons	8,788,423	9,798,523	7,589,275

FREIGHT TRAFFIC

	Years Ended December 31st		
	1917	1918	1919
Number of tons carried	31,198,685	29,856,694	25,102,821
Number of tons carried one mile	14,882,991,224	13,014,665,922	11,121,322,012
Earnings per ton per mile	0.70 cents	0.85 cents	1.00 cents

PASSENGER TRAFFIC

	Years Ended December 31st	
	1918	1919
Number of passengers carried	14,502,546	15,815,982
Number of passengers carried one mile	1,289,280,061	1,776,740,850
Earnings per passenger per mile	2.39 cents	2.60 cents

TRAIN TRAFFIC STATISTICS—FOR TWELVE MONTHS ENDED DECEMBER 31st, 1919, AND 1918

EARNINGS OF LAKE AND RIVER STEAMERS AND OF KETTLE VALLEY RAILWAY NOT INCLUDED IN THIS STATEMENT

	Year ended December 31st, 1919	Year ended December 31st, 1918	Increase or decrease	
			Amount or number	Per Cent
Train Mileage—				
Passenger trains	20,411,110	16,665,928	3,745,182	22.47
Freight trains	19,994,867	22,326,115	—2,331,248	—10.44
Mixed trains	1,943,410	1,966,362	—22,952	—1.17
Total trains	42,349,387	40,958,405	1,390,982	3.40
Car Mileage—				
Passenger:				
Coaches and P. D. and S. cars	110,759,727	82,747,310	28,012,417	33.85
Combination cars	2,400,909	2,366,268	34,641	1.46
Baggage, mail and express cars	46,196,600	40,903,961	5,292,639	12.94
Total passenger cars	159,357,236	126,017,539	33,339,697	26.46
Freight:				
Loaded	494,862,169	539,157,440	—44,295,271	—8.22
Empty	170,620,412	199,157,368	—28,536,956	—14.33
Caboose	23,988,547	25,343,851	—1,355,304	—5.35
Total freight cars	689,471,128	763,658,659	74,187,531	—9 71
Passenger cars per traffic train mile	7.13	6.76	.37	5.47
Freight cars per traffic train mile	31.43	31.44	.01	—.03
Passenger Traffic—				
Passengers carried (earning revenue)	15,671,752	14,396,753	1,274,999	8.86
Passengers carried (earning revenue), one mile	1,763,604,596	1,280,533,734	483,070,862	37.72
Passengers carried (earning revenue), one mile, per mile of road	135,727	98,550	37,177	37.72
Average journey per passenger...miles	112.53	88.95	23.58	26.51
Average amount received per passenger	$2.91	$2.12	$0.79	37.26
Average amount received per passenger mile...cents	2.59	2.38	.21	8.82
Average number of passengers per train mile	78.89	68.73	10.16	14.78
Average number of passengers per car mile	15.58	15.04	.54	3.59
Revenue from passengers per passenger car mile...cents	40.32	35.81	4.51	12.59
Total passenger train earnings per train mile	$2.59	$2.15	$0.44	20.47
Total passenger train earnings per mile of road	$1,463.87	$3,078.88	$1,384.99	44.98
Freight Traffic—				
Tons of revenue freight carried one mile	10,926,848,494	12,885,684,625	—1,958,836,131	—15.20
Tons of non-revenue freight carried one mile	1,378,437,805	1,423,459,482	—45,021,677	—3.16
Total tons (all classes) freight carried one mile	12,305,286,299	14,309,144,107	—2,003,857,808	—14.00
Tons of revenue freight carried one mile per mile of road	840,928	991,680	—150,752	—15.20
Tons of non-revenue freight carried one mile per mile of road	106,084	109,549	—3,465	—3.16
Total tons (all classes) freight carried one mile per mile of road	947,012	1,101,229	—154,217	—14.00
Average amount received per ton per mile of revenue freight...cents	1.003	0.847	0.156	18.42
Average number of tons of revenue freight per train mile	498.07	530.44	—32.37	—6.10
Average number of tons of non-revenue freight per train mile	62.83	58.60	4.23	7.22
Average number of tons of (all classes) freight per train mile	560.90	589.04	—28.14	—4.78
Average number of tons of revenue freight per loaded car mile	22.08	23.90	—1.82	—7.62
Average number of tons of non-revenue freight per loaded car mile	2.79	2.64	.15	5.68
Average number of tons of (all classes) freight per loaded care mile	24.87	26.54	—1.67	—6.29
Freight train earnings per loaded car mile...cents	22.15	20.24	1.91	9.44
Freight train earnings per loaded train mile	$5.00	$4.49	$0.51	11.36
Freight train earnings per mile of road	$8.434.11	$8,398.25	$35.86	43

Railway Officers

Executive

A. E. Sweet, federal manager of the El Paso & Southwestern during federal control and from March 1 general manager, with headquarters at El Paso, Tex., has been elected vice-president and general manager in charge of operation of the same system, effective March 10.

Edward D. Crosley, who has been elected vice-president of the Philadelphia & Reading, with headquarters at Philadelphia, as noted in the *Railway Age* of March 5 (page 746), served as chairman of the Trunk Line territory coal and coke committee of the Railroad Administration during federal control, as well as coal traffic manager of the Central of New Jersey and the Philadelphia & Reading. Mr. Crosley began railroad work as clerk in the office of the auditor of the Indiana, Bloomington & Western, now part of the Cleveland, Cincinnati, Chicago & St. Louis. Afterwards he became chief clerk in the same office. In 1890 he went to the Philadelphia & Reading Coal & Iron Company as chief clerk to the general manager. In September of the same year he became line sales agent. He was appointed resident manager at Chicago in November, 1893. In 1898 he was appointed assistant general freight agent of the Philadelphia & Reading Railroad, and in July, 1907, he became coal freight agent. He later was promoted to general coal freight agent, which position he retained until appointed coal traffic manager under the Railroad Administration.

Financial, Legal and Accounting

I. Walter Booth, who has been appointed secretary and assistant treasurer of the Norfolk & Western with headquarters at Philadelphia, as noted in the *Railway Age* of March 12 (page 805), served as assistant secretary and cashier of the same road from February 1, 1914, until the termination of federal control. Mr. Booth was born on April 1, 1883, at Philadelphia. He graduated from the Central High School at Philadelphia and from the University of Pennsylvania. He began railroad work on May 1, 1902, as clerk and stenographer to the secretary and assistant treasurer of the Norfolk & Western, to which road he has given his entire railroad service. On July 1, 1911, he was appointed chief clerk to the secretary and assistant treasurer and retained that position until February 1, 1914, when, as noted above, he became assistant secretary and cashier.

I. W. Booth

Duane E. Minard, who has been appointed general attorney of the Erie, with headquarters at New York, as noted in the *Railway Age* of April 2 (page 1079), served as assistant general solicitor of the same road until March 1. Mr. Minard was born on April 27, 1880, at Rockaway Valley, N. J. His first railroad service began when he was a clerk in the office of Cortland & Wayne Parker, attoirneys of Newark, N. J., who were retained by the Erie. He became a member of the same firm in January, 1909. He was appointed assistant general solicitor of the Erie in 1912.

H. P. Burns, who has been appointed acting general auditor of the Bangor & Aroostook, as noted in the *Railway Age* of March 5 (page 738), served as chief clerk to the auditor of the same road from 1912 until the termination of federal control. Mr. Burns was born on December 29, 1869, at St. Albans, Vt. He was educated in public schools and began railroad work in March, 1894, with the Central Vermont. From 1904 until 1907 he was chief clerk of freight accounts. He became traveling auditor in 1907 and retained that position until 1912, when he was appointed chief clerk to the auditor.

William H. Smith, who has been appointed comptroller of the Atlanta & West Point, the Western of Alabama and the Georgia, with headquarters at Atlanta, Ga., as noted in the *Railway Age* of March 12 (page 801), was until March 1 auditor of the Atlanta & West Point and the Western of Alabama. Mr. Smith was born on August 31, 1868, at Greensboro, N. C. He was educated in the grammar schools of Charlotte, N. C., and Atlanta, Ga. He began railroad work in September, 1886, with the Richmond & Danville, now part of the Southern. He remained with that road until 1893 as clerk and cashier at Atlanta. He was then appointed traveling auditor. He went as traveling auditor to the Atlanta & West Point and the Western of Alabama in 1901. Afterwards he became freight claim agent and on January 1, 1907, he was appointed auditor. Mr. Smith is a member of the committee on general accounts of the Railway Accounting Officers' Association.

W. H. Smith

L. R. Powell, Jr., who has been appointed comptroller of the Seaboard Air Line, with headquarters at Baltimore, Md., as noted in the *Railway Age* of February 27 (page 658), was born on March 10, 1884, at Portsmouth, Va. He was educated in the public schools and began railroad work on April 6, 1902, as clerk in the office of the auditor of passenger accounts of the Seaboard Air Line. In 1903 he was transferred as clerk to the comptroller's office, in which capacity he served until 1912, when he was appointed chief clerk to the comptroller. In 1913 he became general bookkeeper and filled that position until 1917. He was then appointed assistant comptroller. On September 25, 1918, he became auditor for the corporation.

Alexander H. Elder, who has been appointed general solicitor of the Central of New Jersey, with headquarters at New York, as noted in the *Railway Age* of February 27 (page 661), served as assistant general solicitor of the same road and of the Philadelphia & Reading during federal control. Mr. Elder was born on October 8, 1883. He graduated from Harvard University in 1907, and from Harvard Law School in 1910. In October, 1911, he became legal assistant to Franklin K. Lane, interstate commerce commissioner. Afterwards he served for the Interstate Commerce Commission as examiner and then as chief of the division of prosecution. He became assistant general counsel of the Central of New Jersey in June, 1917, and retained that position until he was appointed assistant general solicitor under the Railroad Administration, as mentioned above.

Walter L. Stanley, who has been appointed general attorney of the Seaboard Air Line with headquarters at Atlanta, Ga., as noted in the *Railway Age* of March 12 (page 806) served as assistant to the federal manager of the same road

during federal control and as staff officer to the regional director of the southern region. Mr. Stanley was born at Wytheville, Va., on May 24, 1871. He graduated from Emory and Henry College at Emory, Va., in 1890 and completed a law course at the University of Virginia in 1891. On May 25, 1892, he entered railway service as local counsel for the Norfolk & Western. From September 1, 1901, until July 1, 1907, he served as claim agent and claim attorney of the same road. He became general claim agent in 1907 and retained that position until September 1, 1916, when he was appointed assistant to the president. On January 1, 1918, he was appointed assistant to the federal manager, as mentioned above.

John B. Duke, who has been appointed general auditor of the Southern Railway, with headquarters at Washington, D. C., as noted in the *Railway Age* of March 5 (page 749), served as assistant comptroller and assistant federal auditor of the same road during federal control. Mr. Duke was born on September 23, 1879, at Jackson, Tenn. He studied at the Southwestern Baptist University and Vanderbilt University. His entire service has been with the Southern, the employ of which road he entered on March 5, 1900, as clerk in the office of the auditor of freight accounts. He was transferred to the comptroller's office on September 1, 1902, and remained there as clerk until 1906, when he was appointed chief clerk to the assistant auditor at Augusta, Ga. He served as chief clerk to the comptroller at Augusta from 1907 until 1909. He was then appointed auditor of revenue and from 1914 to 1916 was assistant to the comptroller. Shortly after the establishment of federal control he was appointed assistant comptroller and assistant federal auditor.

Operating

W. H. Lokey has been appointed assistant trainmaster of the Charleston & Western Carolina, with headquarters at Augusta, Ga., effective April 1.

William W. Berry, trainmaster of the Rocky Mountain division of the Northern Pacific, has been appointed inspector passenger train service, effective April 1.

Howard William McAbee, superintendent of the dining car and hotel department of the Denver & Rio Grande, with headquarters at Denver, Colo., has resigned, effective May 1, to engage in other business.

R. M. Nicoles, prior to federal control superintendent of transportation and telegraph of Western Pacific, with headquarters at San Francisco, Cal., has been appointed general car service agent of the Northwestern Pacific, with headquarters at Sausalito, Cal., effective April 1.

F. E. House, trainmaster of the Erie, with headquarters at Elmira, N. Y., has been appointed superintendent of the Cincinnati division, with headquarters at Marion, Ohio, effective April 1. The Cincinnati division has been newly created and consists of the Marion terminal and the line Dayton to Marion, Ohio, with headquarters at Marion. It is included within the Chicago region.

V. E. Whitaker, who has been appointed superintendent of traffic and transportation of the Atlanta, Birmingham & Atlantic, with headquarters at Birmingham, Ala., as noted in the *Railway Age* of March 12 (page 800), served during the greater part of federal control as superintendent of the Georgia Railroad at Augusta, Ga. Mr. Whitaker was born on February 23, 1881, in North Carolina. He received a public school education at Raleigh, N. C., and began railroad work in the spring of 1898 as a clerk in the office of the Southern at Washington, D. C. In 1900 he became clerk in the agent's office of the Alabama Great Southern, now part of the Southern, and retained that position for about five years, at the end of which time he was appointed soliciting freight agent. In 1907 he went to the Seaboard Air Line as agent and in 1908 to the Cincinnati, Hamilton & Dayton as commercial agent. He was appointed general agent of the Atlanta, Birmingham & Atlantic in 1912 and filled that position until June 1, 1918, when he was appointed superintendent, with headquarters at Fitzgerald, Ga. The following June he was transferred to Augusta, Ga., and remained there in that capacity until appointed superintendent of traffic and transportation on March 1.

Charles E. Brower, who has been appointed general superintendent of transportation of the Atlanta, Birmingham & Atlantic, with headquarters at Atlanta, Ga., as noted in the *Railway Age* of March 12 (page 800), served as superintendent and general superintendent of the same road during federal control. Mr. Brower was born in 1873 at Franklinville, N. C. He received a public school education and began railroad work in October, 1893, as telegraph operator for the Cape Fear & Yadkin Valley, now part of the Atlantic Coast Line and the Southern. In 1897 he became despatcher and continued in that capacity until 1899, when he left railroad service to engage in other business. He returned in 1901, as telegraph operator for the Southern, and remained with that road until July, 1902, when he went to the Atlanta, Birmingham & Atlantic as despatcher and clerk in the superintendent's office. He was appointed chief despatcher in October, 1903, and in March, 1906, trainmaster. He was promoted to superintendent in March, 1913, and served in that capacity until shortly after the establishment of federal control, when he was appointed general superintendent.

J. W. Wassum, who has been appointed general superintendent of the Southern district of the Southern, with headquarters at Birmingham, Ala., as noted in the *Railway Age* of March 5 (page 749), served as superintendent of the Charlotte division of the same road from 1917 until the termination of federal control. Mr. Wassum began railroad work in 1890 as a clerk on the Norfolk & Western. The following twelve years he served as clerk, conductor and yardmaster, consecutively. In 1902 he went to the Seaboard Air Line as general yardmaster at Savannah, Ga. He was transferred to the Portsmouth Terminal in 1905, but returned to Savannah in 1906, and remained there for only two months, when he was again transferred to Jacksonville, Fla. He went to the Southern as superintendent of the Spencer-Salisbury terminals in 1906. He was transferred to Birmingham, Ala., in 1908; to Charleston, S. C., as superintendent of the Charleston division in 1910; to Spartanburg, S. C., as superintendent of the Spartanburg division in 1912, and to Columbia, S. C., as superintendent of the Columbia division in 1914. He was transferred to the Charlotte division shortly before the establishment of federal control.

Traffic

A. L. Shanley has been appointed industrial agent of the Grand Trunk, with headquarters at Detroit, Mich., effective April 1.

J. H. Barr has been appointed commercial agent of the Central of Georgia, with headquarters at Kansas City, Mo., succeeding **H. A. Fletcher,** transferred.

James E. Blake has been appointed assistant general traffic manager of the Cedar Rapids & Iowa City, and **J. S. Reid** has been appointed assistant traffic manager, effective April 10.

G. K. Caldwell, assistant freight traffic manager of the Southern, with headquarters at Washington, D. C., has resigned to become chairman of the Southern Freight Rate Committee and **F. D. Claggett,** general freight agent of the lines west, with headquarters at Cincinnati, Ohio, has been appointed to succeed him, effective April 1.

R. L. Fuga has been appointed assistant general passenger agent of the Alabama & Vicksburg and the Alabama, Shreveport & Pacific, with headquarters at Vicksburg, Miss. **J. R. Morrow** has been appointed district passenger agent at Shreveport, La., and **R. E. Willingham,** district passenger agent at Atlanta, Ga. These appointments became effective April 1.

Earl J. Brittain has been appointed division freight and passenger agent of the Chicago region of the Erie, with headquarters at Dayton, Ohio; **John H. Hackett** has been

appointed division freight agent of the same region, with headquarters at Huntington, Ind.; **Leon B. Smith** has been appointed division passenger agent, with headquarters at Huntington, and **Alva R. Tennis** has been appointed division freight agent, with headquarters at Marion, Ohio. These appointments became effective April 1.

George M. Wood, who has been appointed general freight agent of the New York, New Haven & Hartford with headquarters at New Haven, Conn., as noted in the *Railway Age* of March 12 (page 805), was until March 1 acting general freight agent of the same road. Mr. Wood was born on November 28, 1872, at Newton, Mass. He received a grammar school education and began railroad work on August 1, 1888, in the general freight office of the Old Colony, now part of the New York, New Haven & Hartford. He occupied various clerical positions in the same department until he was appointed chief clerk to the acting general freight agent and afterwards to the general freight agent of the New York, New Haven & Hartford. He was then appointed chief clerk to the freight traffic manager. He became acting general freight agent on September 15, 1908.

Will Albert Terry, whose appointment as freight traffic manager of the New York Central with headquarters at Chicago was announced in the *Railway Age* of March 5 (page 745), was born on March 20, 1864. In 1879 he entered railroad service with the Canada Southern, now part of the Michigan Central, as a telegraph operator. He was later connected with the Ft. Wayne & Jackson, now part of the New York Central, with headquarters at Jackson, Mich., and in 1883, he entered the freight department of the Wheeling & Lake Erie with headquarters at Marietta, Ohio. From 1886 to 1890 he was out of railway service, on the latter date entering the master car builders' office of the Pittsburgh & West Virginia. For a period of six years, from 1891 to 1897, he served successively as commercial agent for the Wheeling & Lake Erie, with headquarters at Pittsburgh, Pa., for the Pittsburgh, Shenango & Lake Erie; for the Cincinnati, Hamilton & Dayton, and for the Cleveland, Lorain & Wheeling (now a part of the Baltimore & Ohio) railroads. In 1903 he was promoted to assistant general freight agent of the Pittsburgh & Lake Erie, with headquarters at Pittsburgh. Seven years later he was appointed general freight agent for that road and later he was again promoted to assistant freight traffic manager, which position he held until his present appointment.

W. A. Terry

Benjamin C. Prince, who has been appointed freight traffic manager of the Seaboard Air Line, with headquarters at Norfolk, Va., as noted in the *Railway Age* of February 27 (page 658), served from May 1, 1919, until the termination of federal control as assistant traffic manager of the same road. Mr. Prince was born in 1877 at Americus, Ga. He studied at Kentucky University in Lexington, Ky., and began railroad work in 1891 as junior clerk to the auditor of the Savannah, Americus & Montgomery, now part of the Seaboard Air Line, at Americus. Afterwards he served in the traffic manager's office of the Chattanooga, Rome & Columbus, now part of the Central of Georgia, at Rome, Ga., and in the general freight office of the Central of Georgia at Savannah, Ga. From 1897 until 1901 he was chief clerk to the traffic manager of the Florida East Coast at St. Augustine, Fla. He returned to the Central of Georgia in 1901 as chief clerk to the division freight and passenger agent at Chattanooga, Tenn. He was appointed commercial agent at Atlanta, Ga., in 1906, and in 1907 he went to the Georgia, Florida & Alabama as traffic manager, with headquarters at Bainbridge, Ga. He became assistant general freight agent of the Seaboard Air Line, with headquarters at Jacksonville, Fla., in 1911, and served in that capacity until 1914, when he was appointed assistant to the first vice-president, with headquarters at Norfolk, Va. He was appointed assistant to the traffic manager in 1918, and on May 1, 1919, he became assistant traffic manager, with headquarters at Norfolk, Va.

Mechanical

Charles I. Hyland, who has been appointed mechanical superintendent of the Toledo Terminal, with headquarters at Toledo, Ohio, as noted in the *Railway Age* of April 2 (page 1125), served as chief boiler inspector of the Michigan Central from January 15, 1919, until the termination of federal control. Mr. Hyland was born on November 3, 1874, at Detroit, Mich. He graduated from the high school at Jackson, Mich., and began railroad work as an apprentice for the Michigan Central in August, 1891. He was promoted to foreman of the boiler department in July, 1906, and left railroad service in November, 1913, to become boiler expert for the Flannery Bolt Company. He returned to the Michigan Central in 1919 as chief boiler inspector, with headquarters at Detroit, Mich

C. Hyland

F. W. Rhuark has been appointed mechanical superintendent of the Pittsburgh & West Virginia. Mr. Rhuark was formerly master mechanic of the Baltimore & Ohio, eastern lines with headquarters at Connellsville, Pa.

Thomas W. Demarest, who has been appointed general superintendent motive power of the northwestern region of the Pennsylvania, with headquarters at Chicago, as noted in the *Railway Age* of February 20 (page 599), served as superintendent motive power of the Lines West, northwest system, from July, 1903, until the termination of federal control. Mr. Demarest was born on March 18, 1868, at Englewood, N. J., and graduated from Stevens Institute of Technology in 1888. He began railroad work as a special apprentice in the shops of the Pittsburgh, Cincinnati & St. Louis, later a part of the Panhandle, at Columbus, Ohio. He was later assistant to the master mechanic at Columbus and on February 1, 1897, was appointed general foreman of the locomotive department of the same shops. He was promoted to master mechanic at the Logansport, Ind., shops on August 1, 1899, and on January 1, 1900, was appointed superintendent motive power of the Pittsburgh, Cincinnati, Chicago & St. Louis. He became superintendent of

T. W. Demarest

motive power of the Pennsylvania Lines West, northwest system, in 1903, as above noted. His headquarters for some years past have been at Pittsburgh, Pa.

G. S. Edmonds, shop superintendent of the Delaware & Hudson at Colonie, N. Y., has been appointed acting superintendent of motive power, effective April 5, succeeding **J. H. Manning,** deceased.

Alfred E. Calkins, who has been appointed superintendent of rolling stock of the New York Central, lines east of Buffalo, with headquarters at New York, as noted in the *Railway Age* of March 12 (page 805), began railroad work on January, 1892, as stenographer in the transportation department of the New York Central. On March 5, of the same year he was transferred to the general office of the mechanical department. He became chief clerk in the car shop at Rochester, N. Y., on February 15, 1898. On September 1, 1899, he was again transferred to the general office of the mechanical department as assistant chief clerk of the car department and in 1903 he was promoted to chief clerk in the same department. Afterwards he was appointed assistant to the superintendent rolling stock and on August 1, 1918, he became engineer rolling stock, which position he retained until his recent appointment.

A. E. Calkins

James Reed, who has been appointed master car builder of the New York Central, 4th district (west), with headquarters at Englewood, Ill., as noted in the *Railway Age* of March 12 (page 805), served from 1913 until the termination of federal control as an assistant master car builder of the same road, with headquarters at Chicago. Mr. Reed was born in 1869, at Utica, N. Y. He received a public school education and began railroad work in 1888 as car repairer on the Rome, Watertown & Ogdensburg, now part of the New York Central, at Utica, N. Y. In 1891 he entered the employ of the New York Central as inspector at Herkimer, N. Y., and in 1892 he was transferred to Malone, N. Y., as foreman inspector. While serving in that capacity he was stationed at Lyons, N. Y., from 1896 until 1897, and at Rochester, N. Y., from 1897 until 1902, when he became chief joint inspector at Buffalo, N. Y. He retained that position until 1913, when he was appointed assistant master car builder.

Engineering, Maintenance of Way and Signalling

H. D. Row has been appointed division engineer of the Cincinnati division of the Erie, with headquarters at Marion, Ohio, effective April 1.

G. W. Harris, corporate chief engineer of the Atchison, Topeka & Santa Fe System, with headquarters at Chicago, has been appointed assistant chief engineer, system with the same headquarters, effective March 1.

D. J. Brumley has been appointed chief engineer, Chicago terminal improvement, of the Illinois Central, with headquarters at Chicago, effective April 1. Prior to federal control, Mr. Brumley was valuation engineer, with headquarters at Chicago.

R. S. Belcher, superintendent of the Somerville (Texas) treating plant of the Atchison, Topeka & Santa Fe has been promoted to manager of treating plants for that system with headquarters at Topeka, Kan., effective on April 1. He succeeds G. E. Rex, who resigned to become vice-president of the National Lumber & Creosoting Co., at Kansas City, Mo.

A. E. Triplett, division engineer on the St. Louis Southwestern, with headquarters at Pine Bluff, Ark., has been promoted to superintendent, on the St. Louis Southwestern of Texas, with headquarters at Mt. Pleasant, Tex., succeeding H. H. Hooper. Mr. Triplett served as division engineer on the St. Louis-Southwestern for only one month, having been appointed to that position on March 1.

Edgar M. Hastings, who has been appointed principal assistant engineer of the Richmond, Fredericksburg & Potomac, with headquarters at Richmond, Va., as noted in the *Railway Age* of March 5 (page 747), served as resident engineer of the same road until March 1. Mr. Hastings was born on March 5, 1881, in Maryland. He was educated at the Baltimore Polytechnic Institute. During the summers of 1900 and 1901, while he was still studying, he was employed by the Baltimore & Ohio, but his first permanent railroad work did not begin until 1902, when he became chainman and rodman for the same road. He left the Baltimore & Ohio in 1903 and went to the Richmond, Fredericksburg & Potomac as instrumentman. He was appointed resident engineer in 1906 and although his title remained the same until March 1 his duties were meanwhile increased to cover design and supervision of construction and maintenance.

Rudolf P. Forsberg, who has been appointed principal assistant engineer of the Pittsburgh & Lake Erie, with headquarters at Pittsburgh, Pa., effective March 1, was born at Lynchburg, Va., in November, 1870. He entered railroad work in June, 1887, as a rodman on the Lynchburg & Durham, now part of the Norfolk & Western. In 1888 he went, as rodman, to the Richmond & Danville, now part of the Southern Railway, being promoted to levelman and transitman in 1889. During construction of the Yadkin division of that road in 1890 and 1891 he was resident engineer, with office at Salisbury, N. C. He left the employ of the railroad in 1891 to become a draftsman in the office of Charles Read, architect, at Richmond, Va., but returned the following year to the Norfolk & Western as draftsman in the office of the engineer of maintenance of way at Roanoke, Va. In September, 1892, he left that company to go with the New York Central Lines as draftsman in the office of engineer of maintenance of way of the Pittsburgh & Lake Erie at Pittsburgh, Pa., later being transferred to the office of the chief engineer in the same capacity. In March, 1899, he was made chief draftsman at Pittsburgh and in 1902 was appointed assistant engineer at the same place, being promoted to the position of special engineer in July, 1919, from which position he was appointed principal assistant engineer, as noted above.

R. P. Forsberg

Railroad Administration

H. E. Kelly, of Chicago, has been appointed regional counsel for the central western region of the Railroad Administration, and **H. T. White** has been appointed regional claim agent.

Evan Shelby has been appointed regional counsel for the eastern region of the Railroad Administration, with headquarters at New York, and **A. L. Green** has been appointed regional claim agent, also of New York.

M. Stringfellow, district engineer in charge of double track construction on the Southern Railway, with headquarters at Charlotte, N. C., has been appointed regional engineer of the Southwestern Region of the United States Railroad Administration, with office at St. Louis, Mo., effective March 1. Mr. Stringfellow graduated from the University of the South in 1903, and entered the employ of the Southern Railway as levelman on railway location, remaining in the continuous employ of that company until September, 1913, when for a short time he was general superintendent for a contractor. He returned to railway service in January, 1914, as field engineer in the valuation department of the Atlanta, Birmingham & Atlantic. In April of that year he returned to the Southern Railway as assistant engineer in charge of double track construction. In November, 1917, he was promoted to the position of district engineer in charge of double track construction on the Cincinnati, New Orleans & Texas Pacific. In January, 1919, he entered the United States Army, receiving a commission as captain of engineers. Upon his discharge from the army he returned to the Southern as district engineer in charge of double track construction from Washington, D. C., to Central, S. C., in which position he remained until his recent appointment as regional engineer, as noted above.

Special

E. Eugene Adams, consulting engineer of the Union Pacific, with headquarters at New York, has been appointed assistant to the president in charge of purchases, engineering and standards, with headquarters at Omaha, Neb., effective March 1. Mr. Adams was born on September 12, 1881, at Watertown, Mass., and graduated from the University of California in 1904. On August 1, 1905, he entered railway service with the Southern Pacific as assistant engineer and superintendent of pipe lines. He was later appointed assistant engineer and assistant consulting engineer on the Union Pacific system, with headquarters at Chicago and later at New York, which position he held from November, 1906, to February, 1913. On the latter date he was promoted to consulting engineer of the Union Pacific System, with headquarters at New York, and on March 1, 1918, was appointed assistant director of the Division of Capital Expenditures of the United States Railroad Administration, with headquarters at Washington. On January 1, 1920, he returned to the Union Pacific as consulting engineer, with headquarters at New York, which position he held until his recent appointment.

E. E. Adams

John L. Mohun, assistant to E. E. Adams while consulting engineer of the Union Pacific at New York, has been appointed mechanical assistant, with headquarters at Omaha, Neb., effective April 1. Mr. Mohun began railroad work as an apprentice in the Altoona shops of the Pennsylvania. Afterwards he became assistant master mechanic of the Juniata shops. He was then appointed assistant engineer of motive power and master mechanic of the New Jersey division with headquarters at Jersey City, N. J. He became assistant to the consulting engineer of the Union Pacific, with headquarters in New York in 1914.

E. W. Englebright, also formerly assistant to E. E. Adams while consulting engineer of the Union Pacific at New York, has been appointed engineer for the executive officers with headquarters at New York, effective April 1. Mr. Englebright began railroad work in the engineering department of the Southern Pacific in 1903. Afterwards he served as assistant engineer, roadmaster and assistant division engineer, successively, of the same road. He went to New York in 1913 as assistant to the consulting engineer of the Union Pacific, as noted above. During 1918 and 1919, while Mr. Adams was in Washington as engineer of the division of capital expenditures of the Railroad Administration, Mr. Englebright served as corporate acting consulting engineer of the Union Pacific.

Obituary

James H. Manning, superintendent of motive power of the Delaware & Hudson, with headquarters at Colonie, N. Y., died April 15.

J. L. Durrett, formerly assistant general freight agent of the Illinois Central with headquarters at Louisville, Ky., died at his home in Louisville on March 27 at the age of 56.

Marshall T. McCraney, recently appointed general agent of the Chicago, Rock Island & Pacific, with headquarters at Pittsburgh, Pa., died suddenly of acute indigestion, on April 6.

J. C. Jacobs, pioneer railroad builder of Utah, died at his home in Salt Lake City, Utah, on March 24, at the age of 74 years. Mr. Jacobs was connected with the building of a railroad from Salt Lake City to Alta in 1890.

Henry B. Brown, superintendent of the fuel department of the Lehigh Valley died suddenly at his home at Bethlehem, Pa. on April 1, aged 62 years. Mr. Brown had been superintendent of the fuel department of the Lehigh Valley since the summer of 1917 prior to which he was general fuel inspector of the Illinois Central.

W. H. Wells, construction engineer of the Southern, with headquarters at Washington, D. C., died at Athens, Ga., on April 13. Mr. Wells was born on May 7, 1852, at Dalton, Ga. He studied at the University of Georgia during 1870 and 1871. His first railroad work began in 1868 as rodman for the Savannah & Memphis, now part of the Central of Georgia. Afterwards he became levelman and later transitman. He was appointed assistant engineer in 1871. From 1872 until 1874 he was locating engineer. He then became associated with the United States engineering department, with headquarters at Chattanooga, Tenn. He went to the Marietta & North Georgia, now part of the Louisville & Nashville, in 1876 and in 1878 he was appointed division engineer of the Louisville & Nashville. In 1880 he went to the New Orleans Pacific, now part of the Texas & Pacific, in the same capacity and in 1883 to the Mississippi & Rio Grande as locating engineer. He became district engineer for the Mobile & Ohio in 1886 and in 1887 entered the employ of the St. Louis, Arkansas & Texas, now part of the St. Louis Southwestern, in the same capacity. He was appointed chief engineer of the Georgia, Southern & Florida in 1890, and shortly afterwards took an office in New York as consulting engineer. He received his appointment as construction engineer of the Southern in 1895.

The Italian Railway Strike—Military Guards at Milan

EDITORIAL

Railway Age

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False-Clear Signal Failures

Train baggagemen often seem to take delight in dropping small packages on trucks or platforms without thought of the possibility of injuring the contents of these packages. Signal materials such as signal relays are frequently handled in this manner even though they are packed in special boxes and marked conspicuously as to contents. The fact that rough handling of a relay while in shipment from a signal repair shop (although carefully packed in a special container), recently led to a false-clear signal failure indicates the possible serious results of such abuse. These relays are ruggedly constructed and under ordinary conditions can be shipped in good condition, but extremely rough handling in transit may damage them to such an extent that a false-clear failure may result. Signal department officers and employees are constantly working to reduce the number of such failures, and the success they are having is well indicated by the fact that these failures occur on an average of only once in from two million to four million signal movements. It is just as important to operating as to signal officers that these failures be reduced to the minimum. The handling of signal material by train baggagemen has received little attention from the operating officers but its importance warrants the taking of proper steps to correct such conditions. The train baggagemen would perhaps be the first to suffer if a collision were to occur under circumstances as outlined in the incident mentioned above. If instructions are not already in force regarding the handling of signal material shipped by passenger train it would appear that they should be issued and proper measures taken to enforce them.

The Indignation Specials

Despite the outlaw strike of the switchmen and firemen last week, the commuters on the railroads out of New York were not nearly as much inconvenienced as might have been expected from the serious character of the strike. This inconvenience they saved or ameliorated (after a day or two with little or no service) by what the newspaper men promptly dubbed the "indignation" specials. One or two of these trains were run during the rush hours from and to each of the important suburban towns, manned sometimes by parts of their regular crews assisted by volunteers—largely firemen—from the ranks of the commuters themselves. It is very seldom that a strike has been carried out—although it is becoming more frequent of late— in which a public utility of any kind has been able to secure as good co-operation from the public as was secured in this case. The outlaw switchmen and firemen had absolutely no case whatever with the public, and the volunteers worked with no feeling that they were scabs or strikebreakers. Any one who attended the mass meetings that were called in the suburban communities to discuss the matter or to facilitate the securing of volunteers could not fail to have been impressed with the caustic comments that were made about the strikers or with the favorable opinion that was shown for the railroads. Each town was ready to assist in manning trains, supplied the volunteers necessary to do so and seemed to take a particular pride in seeing that the indignation special for that particular town was put through in good time. Although the one or two specials did not, of course, give the same service that a town with 20 or 30 trains each way daily is accustomed to, criticism of the railroad was notably absent. It is an old argument that the railroads under private control will succeed or fail according to whether they have a favorable public on their side.

Great Need for Heavy Car Repairs

In the January 2 issue, the *Railway Age* presented an estimate of the requirements of the railroads for new equipment, in which it was developed that 260,000 freight cars were needed to make up the present shortage, 100,000 were needed to provide an adequate working surplus and a total of over 800,000 new freight cars would be required within the next three years in the United States and Canada to take care of probable increases in traffic and deferred and normal requirements. This would require the construction of over a quarter of a million freight cars each year during the next three years. It hardly seems possible at the present time, considering labor and material conditions and the reluctance of the roads to come into the market, that enough new freight cars will be built during the current year to more than barely take care of normal requirements. There is but one alternative available for effecting any material improvement in the present car shortage,—the railroads must bend every effort to place existing equipment in first-class condition and get the greatest possible work out of it. That means they must catch up on deferred heavy repairs and betterment programs. The box car is the most generally used class of equipment in service and constitutes almost one-half of all freight equipment. Of the slightly more than 1,000,000 box cars, less than half are of all-steel or steel underframe construction and over 49 per cent are of less than 40-ton capacity,—in fact, largely of 30 tons capacity. It is obvious that so large a proportion of the total number of box cars can not be retired from service for years to come and that the probable number of cars which can be added within the current year will be so small as to have little effect in raising the average condition of the cars available for service. The conclusion is obvious. If congestion on repair tracks and excessive delays to the movement of traffic are to be avoided, these cars must be placed in condition to remain in service and away from repair tracks for months instead of days.

Cut the Red Tape

One task imposed on the railroads with their return to private control is to divest themselves of the superfluous red tape with which they were entangled during the Railroad Administration period. This observation applies particularly to the devious routine surrounding the inception of any project for additions and betterments. Much of the accounting now imposed on the engineering department is required in compliance with Valuation Order No. 3, according to the interpretations of the Division of Valuation, and the extent to which this order may be made a purposeless burden on the roads is something which

is very largely beyond their own control. To a certain extent this order will prove a benefit since it will afford valuable records on construction work which many of the railroads have failed to keep in the past. Moreover, the burden of accounting which is imposed by Order No. 3 relates more largely to the work entailed during the progress and following the completion of a piece of construction work than to the formalities necessary to secure an authority for expenditure.

On the other hand, the Railroad Administration was responsible for considerable complication in the initiation of improvement projects, especially during the second year of government control when it became necessary to obtain dual authority for work,—that of the railroad corporation as well as the Administration, before proceeding. Other complications were introduced such as the rule for subdividing the costs of industry tracks. All of these formalities constituted an impediment to the expeditious handling of work. The consequent routine necessarily occupied considerable time and delay becomes the rule. While March 1, 1920, saw the end of many of these formalities, their psychological effect is still noticeable in some quarters. Under the spell produced by the entanglement of red tape, delay was accepted as a necessary accompaniment of the system and the railway personnel has not fully recovered from its effects. It must now be made clear that the days of the government red tape are over insofar as they concern the actual prosecution of work and it behooves the railroads to encourage expedition by simplifying procedure wherever it is possible to do so.

An Acute Situation Which May Become a Desperate One

IF EVER THERE WAS A TIME when transportation conditions imperatively demanded that shippers and receivers of freight should, for their own interest, and even their own salvation, co-operate to the utmost with the railways in securing the most efficient possible use of railroad facilities that time is now. Even if normal conditions with respect to the handling of freight traffic existed it would be impossible for the railways, with their present facilities, to handle all the business that would be offered to them. The conditions, however, have been rendered extremely abnormal by certain recent developments, the most important of which have been the coal strike and the recent railroad strikes in all parts of the country.

The coal strike, by closing down a large part of the bituminous mines, enormously reduced both the production and transportation of coal for several weeks. Consequently, the reserve supplies of coal held by domestic consumers, by manufacturers and all other classes of business concerns, and by the railroads, were enormously depleted. If it had been possible, after the coal strike ended, for the production and transportation of fuel to be carried on for a long time to the limit of the capacity of the railways there would have been a large shortage of coal for months afterward. This would have meant that to keep the industries in the country supplied with anywhere near sufficient fuel until next fall, and to enable domestic consumers, dealers, manufacturers and business concerns, and railroads to accumulate surplus supplies for next fall and winter, it would have been necessary for the railways throughout the year to exert themselves to the utmost in the carrying of coal.

Unfortunately, before the effects of the coal strike had ceased to be felt very acutely, there came the recent railroad strikes. They resulted in greatly curtailing not only the transportation of coal but of all other commodities. The consequence is, that although the railways are not yet operating anywhere near normally there have been accumulated vast amounts of commodities already produced which must yet be moved in addition to those which the industries of the country will produce in future.

The transportation situation at present is one of the most serious that ever existed. There has never been anything comparable to it except the situation created by the nation's war activities late in 1917. So far as the year 1920 is concerned, the problem presented cannot be solved to any appreciable degree by an increase in railroad facilities. Owing to financial and other conditions, the facilities cannot be materially increased this year, and the effect of any increase of them which is made this year will not be felt until next year. It is stating almost the exact truth to say that the business of 1920 must be handled with the transportation facilities now available.

Almost the only possible way in which the amount of freight transportation the railroads can haul can be increased, is by securing the movement of every ton of freight possible with every car that is available. The amount of freight that can be moved with existing facilities is absolutely dependent upon how much freight can be loaded into every car, and how many miles a day every car can be made to travel.

The number of miles per day that each car can be made to travel is mainly dependent upon the efficiency with which the railway managements and employees do their work. It is also largely dependent, however, upon the promptness and celerity with which every shipper loads cars and every receiver of freight unloads them. As to the heavy loading of cars, that is a matter which is mainly in the hands of the shippers. The only way the railways could force heavier loading of cars would be by a general advance in minimum carload weights, and while probably there should be such an advance made, it would meet with opposition and might do injustice to many shippers.

The most effective thing the shippers could do to help themselves, and help the industry and people of the United States, in the present emergency would be for every individual shipper, regardless of minimum carload weights, to follow the policy of loading every car with every pound of freight that it could carry. The average capacity of the freight cars of this country exceeds 40 tons. The average tons loaded per loaded car at present is only about 28 tons. It should be easily practicable to increase this average loading 10 or 15 per cent. The effect would be to make it practicable for the railways to handle 10 or 15 per cent more freight business than they otherwise would be in a position to do.

Surely, it must be plain to the business interests of the country that their own welfare, if not their actual economic salvation, is dependent upon an increase in the amount of freight moved.

Some shippers' organizations are carrying on an agitation among their members to influence them to increase the loading of cars. The manufacturers of Portland cement and of steel have long been among the leaders in promoting heavy loading. The American Newspaper Publishers Association recently has been circularizing its members urging them to unload cars as promptly as possible. Such agitation ought to be carried on by every organization of industrial concerns in the country. The railways are doing a good deal of this kind of work and are going to do more, but uninformed or prejudiced people are likely to think that they are doing it for their own selfish interest, and therefore to be less responsive to appeals from the roads than to appeals from organizations of concerns of their own class.

Business men and the general public ought to be made to understand that the present transportation situation is very critical, and is likely to become desperate unless every individual concern contributes all in its power toward relieving it.

Labor Leaders Must Share the Responsibility

THE CONDUCT of the principal officers of the railroad brotherhoods during the recent outbreak of strikes has been public spirited and admirable. They have sought in every legitimate way to break the strikes and to cause the matters in controversy between the railways and their employees to be submitted to the new Railroad Labor Board for settlement. Nobody can criticize them for contending, meantime, that there is reason for discontent among the employees. It is their official function and their duty to get all they can for their followers which it would not be plainly contrary to the public welfare for their followers to have.

But, while the public is thanking the brotherhood leaders for having co-operated with the railway managers in breaking these outlaw strikes, the public should not overlook the fact that the brotherhood leaders are in a large measure morally responsible for the strikes. For many years they have disseminated among their followers the grossest misrepresentations regarding the financing, the operation and other features of the management of the railroads. They have recently taken the lead in advocating the Plumb plan, a scheme for the ownership and management of the railroads which is the most wildly bolshevistic ever proposed in this country. They have employed Glenn E. Plumb to write and speak in support of his plan, and he has been going about the country for months disseminating the most vicious misrepresentations of railway financing and management among all classes of railway employees, and trying to make them believe they never can hope for decent treatment under the "capitalistic" system of industry. The brotherhood leaders have been telling the country constantly that discontent among their followers has been growing more and more acute, have been greatly exaggerating the extent to which their members have been suffering from the increase in the cost of living, and have been saying that unless large advances in wages were granted them at once, it would become impossible for the "conservative" leaders to control them. Most important of all, perhaps, in its bearing upon this subject, is the fact that not only did the brotherhood leaders bitterly oppose all legislation to require the substitution of arbitration for strikes as a means of settling labor controversies, but repeatedly announced that such legislation would not be obeyed by railway employees.

Is it surprising, in view of these facts, that there has been a great increase of dangerous radicalism among railway employees? Is it surprising that when the so-called "conservative" leaders began actually to talk and act conservatively a large part of their followers were astonished and became suspicious and rebellious? Is it surprising that, in spite of the belated opposition of their leaders, many railway employees went out on the lawless strikes which the brotherhood leaders had so often predicted would occur? In the recent strikes the railways, the public and the brotherhoods have been reaping what the so-called "conservative" as well as the avowedly radical labor leaders have diligently been engaged in sowing for years. If the strikes should result not only in great injury to the public, but in the absolute disruption of the brotherhoods, the direct encouragement to the worst kind of radicalism which the utterances of the leaders of the brotherhoods and of the Plumb plan propaganda have given would be largely, if not mainly, responsible for them.

Let us hope that recent experience will teach the leaders of the brotherhoods to practice in speech as well as action a little of the conservatism, good sense and public spirit which, since the "outlaw" strikes began, they actually have been practicing and urging their members to practice. If they continue lashing their members into a fury by trying to out-radical the radicals in what they say and propose, they are likely to awaken soon to find that their positions of leadership have been seized by men who demonstrate a willingness not only to talk recklessly but to act even more recklessly.

Most of the "outlaw" strikers were members of the Brotherhood of Railway Trainmen. It is reported that some of the principal officers of this brotherhood recently have turned against the Plumb plan, and that W. G. Lee, president of the Brotherhood of Trainmen, has resigned as a director in the Plumb Plan League. If these reports are true, they are an encouraging sign that some of the leaders of the brotherhoods are awakening to the fact that their advocacy of radical schemes plays directly into the hands of the worst class of radicals, and is contrary to the best interests of real trade unionism and of the American people. The welfare of labor always has been, and always will be, most effectively promoted by labor organizations that work, first to promote general industrial peace and prosperity, and, secondly, to secure for their members the share of the fruits of industrial prosperity to which they are entitled. The reckless talk and radical methods which within recent years have been used by many powerful labor leaders have tended to increase unrest, to restrict production and to destroy the industrial prosperity without which labor cannot prosper.

Help the Railways Get Materials

THE PROBLEM of increasing railroad facilities is becoming one not merely of raising the necessary capital, but also one of getting necessary materials.

The railways under normal conditions are the largest consumers of iron and steel, and also of some other metals. While the legislation for the solution of the railroad problem and the return of the roads to their owners was pending it was impracticable for large orders for equipment and materials for them to be placed. The manufacturers of railway equipment and materials did not know when they were going to begin to receive orders or how large they would be, and therefore most of them did not find it practicable to place large material orders.

Meantime, industries of other kinds were rushing into the market and placing large orders. This was especially true of the automobile industry. The manufacture of passenger automobiles was curtailed during the war, and there was an enormously increased demand for them after the war ended. The manufacturers of the United States are planning to build two million automobiles in 1920. There also has been a large increase in the demand for motor trucks. The railways have now begun to place substantial orders with the railway equipment and supply companies. The equipment and supply companies, are going into the market in turn, for materials. They are finding it extremely difficult to get them, however, principally because the market has been so largely monopolized by the automobile and other manufacturers.

The resulting condition of the material market as it affects the transportation situation, and through it the entire business situation of the United States, is one of great seriousness. The *Railway Age* has no disposition to decry either the manufacture or use of automobiles. The motor truck is a valuable addition to the machinery of industry. The passenger automobile is useful to many persons in business and is a source of pleasure to millions of people. But it is far more essential to the welfare of the American people that they should have adequate railroad transportation than that there shall be an immediate increase in the number of motor trucks; and it is certainly far more essential to their welfare that there should be an increase in the

capacity of the railroads for handling freight than that there should be a further and immediate increase in the number of passenger automobiles.

If, however, the orders which have been placed for materials by the automobile and other manufacturers are to be given precedence over the orders which are now being placed by the railways and the railway equipment and supply companies, it will be impossible for the railways to be made able to render adequate freight service to any industry in the country.

If the orders placed for railway materials are not given priority and filled as rapidly as practicable, the limitations imposed by the inadequacy of means of transportation will prevent increased production in every line of industry. No industry is feeling more acutely at the present time the shortage of freight cars for bringing in raw materials and taking away finished products than the automobile industry itself. In the long run, the manufacturers will be able to make and sell more automobiles if they co-operate in enabling the railways to get promptly the materials the roads require than if, by opposing the giving of priority to railway materials, they become one of the chief obstacles to the development of railroad facilities. The manufacturers of materials cannot serve the public or, in the long run, themselves in any better way than by helping the railways to get promptly the materials that they need.

Norfolk & Western

SINCE 1917 THE NET REVENUE from railway operation of the Norfolk & Western has been cut in two and in 1919 the property earned for the government only a little more than half of the rental which was being paid on the basis of the net operating income in 1915, 1916 and 1917. In 1917 the operating ratio was 62.45 per cent and in 1919 it was 83.22 per cent. The guaranteed rental amounts to $20,712,000. Net operating revenues of the properties amounted to $12,904,000 in 1919. These facts have particular significance because the Norfolk & Western has been one of the most ably and successfully managed railroads in the United States and at the time the government took the property over the company had completed a program of development which involved large expenditures on capital account and resulted in the perfection of a transportation machine which represents, broadly speaking, the most modern and scientific practice of American railroading.

To cite but a few evidences of the progress which was made in more economical railroad operation; the revenue train-load of freight in 1916 was 980 tons; in 1917 it was 1,021 tons, in 1918, 1,041 tons, and in 1919, notwithstanding a decrease in the tonnage of coal carried, it was 1,106 tons. At the end of 1919 only 125 locomotives, or 11.6 per cent of the total number, needed repairs and of these 69 needed light repairs only. Only 2.1 per cent of the passenger cars in service needed repairs, and less than 2 per cent of the freight and work cars. In 1918, the year of greatest traffic, the Norfolk & Western caried 46,802,000 tons and the total ton mileage moved was 12,255,000,000. This is a freight density of 5,881,000 ton miles per mile of road. The density per mile of track was 3,040,000. In addition, the road caried 7,856,000 passengers. Nowhere except in America could we find such economical handling of freight, nor could we find a railroad of only two tracks handling any such quantity of freight and passengers.

In 1919 the total freight carried amounted to 37,945,000 tons—a decrease as compared with 1918 of 18.93 per cent. The length of haul was about the same and the decrease in ton mileage was 18.18 per cent. On the other hand, the freight revenue per ton per mile in 1919 was 6.25 mills compared to 5.61 mills in 1918—an increase of 11.41 per cent. Even in 1919, however, the gross revenue which the Norfolk & Western received for carrying one ton of freight 246 miles (the average haul) was only a little over a dollar and a half. In obtaining such economy as this, everything that money could buy and engineering skill devise has been tested out on the Norfolk & Western and where it proved successful it has been adopted. The Norfolk & Western was one of the first roads to adopt 100 lb. rail as standard for the main line. It was the first road to build a coal pier capable of dumping mechanically an entire carload of coal at one time into the chutes for loading into vessels, and it was the first road to adopt electrification on a large scale for the purpose of expediting and cheapening the hauling of heavy trains of freight up mountain grades.

The financing of the capital expenditures has been particularly sucessful, and has been conservatively managed. The total funded debt of the Norfolk & Western at the end of 1919 was $105,973,000, while the stock outstanding amounted to $144,399,000. It has been the practice of the company to issue bonds convertible into stock and it has been particularly successful in earning sufficient to make the stock conversion privilege attractive enough to be availed of. Of the funded debt mentioned above, $17,754,000 is convertible bonds; and even in 1919, with the railroad situation as uncertain as it was, bonds to the amount of $833,000 were converted into stock. The Norfolk & Western is paying 7 per cent on its common stock and 4 per cent on its adjusted preferred. This calls for a total of $9,379,000 and the interest on funded and unfunded debt amounts to $5,461,000. While, therefore, if the road had been operated by its owners in 1919, interest on the bonds and dividends on the preferred stock would have been safe, the property would not have earned the full 7 per cent dividend on the common. The rentals received from the government were more than sufficient, of course, to pay dividends, and the company has elected to take the government rental for the current six months.

The program of yearly betterment to the property was continued in 1919, and a total of $9,179,000 was spent for additions and betterments to road and equipment. The new equipment bought and delivered during the year included 21 steam freight locomotives and 312 wooden hopper cars. The additions to permanent structures included a 21-stall roundhouse with a 115 ft. turntable, stock pens and yard tracks at Shenandoah, Va.; a re-icing station at Crewe, Va., and the installation of 55 miles additional automatic block signals on single track. The Norfolk & Western now has 309 miles of single track and 553 miles of double track equipped with automatic signals.

Maintenance expenses continued to increase, as they have on nearly all roads. The average amount spent for maintenance of way per mile of road in 1919 was $5,105—an increase of 11.88 per cent as compared with 1918. The total amount spent for maintenance of equipment was $23,089,000—an increase of $1,816,000 or 8.5 per cent. It is rather interesting to note, however, that the average amount spent for repairs per steam freight locomotive was $7,947 in 1919 as against $9,220 in 1918. On the other hand, the average for passenger locomotives was $9,249 in 1919 as against $8,154 in 1918. The mileage of freight locomotives was 11,569,000 in 1919 as against 16,108,000 in 1918, and the mileage of passenger locomotives was 5,099,000 in 1919 as against 4,743,000 in 1918.

The Norfolk & Western has in operation 12 electric freight locomotives with a total tractive power of 864,000 lb. The total amount spent for maintenance of these locomotives in 1919 was $560,000 as compared with $254,000 in 1918. The average per locomotive was $46,668 in 1919—an increase of a little over 120 per cent as compared with the average in 1918. This seems very high when compared with the maintenance of steam freight locomotives and even on a

basis of ton miles carried the comparison is greatly in favor of the steam locomotive. In 1919 the average cost of maintenance of steam freight locomotives, including retirements and depreciation, was 72 cents per 1,000 tons hauled one mile. For electric locomotives the corresponding cost was $2.95.

When the corporation resumed operation of the Norfolk & Western on March 1, N. D. Maher, who had been regional director of the Pocahontas region, which includes the Norfolk & Western, and who, with one short interruption, has been connected with the Norfolk & Western for 32 years, was elected president. There was no drastic change in organization. A. C. Needles, who had been formerly vice-president in charge of operation and was federal manager during government operation was elected vice-president in charge of operation again; and, except for some promotions, there was little change in the personnel either during the period of government operation or on resumption of operation by the corporation. Ranking equally in importance with the highly developed physical plant is an organization of officers and employees, most of whom have grown up on the property. This is of particular importance at the present time. It is generally the opinion of railroad operating officers, both in the East and the West, that the older employees have retained to a large degree their loyalty to their companies and have been comparatively unaffected by the radical element in the labor organizations.

The Norfolk & Western, before government operation, paid good wages—as a matter of fact, a somewhat higher scale in many instances than that of its neighbors; and, under Mr. Maher especially, supervision had been much closer than on many American railroads. Mr. Maher himself had gained the confidence of both officers and employees to a marked extent. He has the reputation of being a diplomat, both with employees and with patrons of the road. As a matter of fact, this reputation probably rests largely on the confidence felt by those who deal with him, either as subordinates or in a business way, that Mr. Maher can see their side of the question as well as his own, and is in all his dealings essentially just. The company has a liberal pension system and this was undoubtedly of help in inducing employees who had been in the company's service and who served during the war in military service to return to the road.

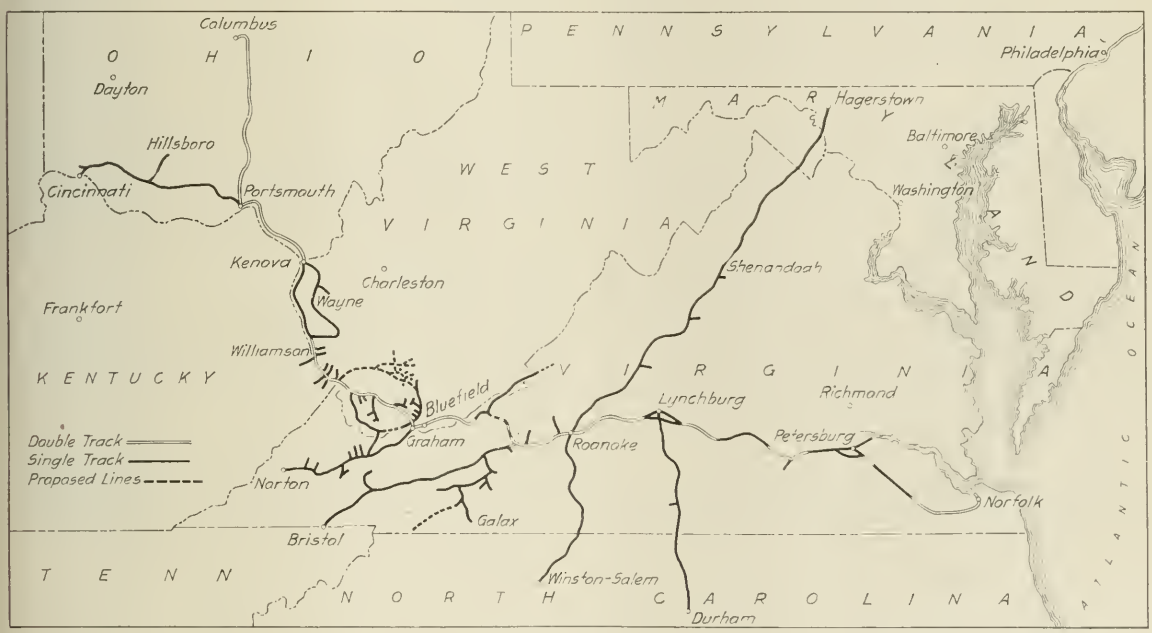
The following table shows the principal figures for operation of the property in 1919 as compared with 1918. This is not the corporation income account:

	1919	1918
Average mileage operating	2,088	2,084
Freight revenue	$62,681,028	$68,752,260
Passenger revenue	10,824,463	10,237,600
Total operating revenues	76,925,599	82,004,034
Maintenance of way and structures	10,660,872	9,524,659
Maintenance of equipment	23,089,001	21,273,002
Traffic expenses	445,585	536,709
Transportation expenses	28,323,932	28,739,291
General expenses	1,274,624	1,309,866
Total operating expense	64,021,285	61,579,297
Net*	12,904,314	20,424,737

*From this net in both years, taxes would have to be deducted to arrive at the net operating income since the government pays taxes, except war taxes.

The corporation income account for 1919 and 1918 is as follows:

	1919	1918
Rental	$20,711,875	$20,634,142
War taxes (paid by corporation)	1,856,097	1,716,000
Gross income	19,975,222	19,918,302
Interest and rents	5,461,443	4,113,775
Preferred dividends	919,692	919,692
Common dividends	8,459,373	8,437,411



The Norfolk & Western

New Books

The Condensed Chemical Dictionary. 523 pages, 6 in. by 9 in., bound in cloth. Published by the Chemical Catalog Company, 1 Madison Avenue, New York.

In the shipment of chemical products railroads are often confronted with the perplexing problem of determining whether the nature of the chemical makes its transportation hazardous. Realizing the need for a work that would give in a condensed non-technical form information regarding the properties of chemicals the publishers have compiled this reference work. In addition to a concise statement of the physical and chemical properties commonly included in more voluminous works, there is stated for each substance the type of container used, the fire hazard and the shipping regulations. The book will be found particularly useful for those who desire chemical data in a non-technical form.

Letters to the Editor

The Superelevation of Curves

WASHINGTON, D. C.

TO THE EDITOR:

My attention has been called to an article by W. F. Rench in your issue of March 12, criticising certain statements of the chief of the Bureau of Safety in a report on the derailment of Southern Pacific passenger train No. 50 near Vincent, Calif., on October 29, 1919.

It is noted that Mr. Rench does not disagree with the conclusion stated in the Vincent report that the derailment was the result of excessive speed, and that if the speed of trains on this curve had been restricted in accordance with the recommended practice of the American Railway Engineering Association for the existing elevation, the accident would not have occurred. The real basis of his criticism seems to be contained in the statement that "in recommending absolute compliance with the American Railway Engineering Association rule, the Chief of the Bureau is taking debatable ground."

Mr. Rench's remarks command respect, and it is not my purpose to controvert his statements. It occurs to me, however, that his criticism would more properly have been directed at the rule of the American Railway Engineering Association than at the report of the Chief of the Bureau of Safety on the Vincent derailment. He very truly says that "a rule is only effective when it has but one interpretation." In the interest of safety, no reason has presented itself which would warrant a recommendation that a rule of the American Railway Engineering Association be not observed. The rule under consideration represents the concurrent judgment of a large body of competent engineers; compliance with a specific rule must be absolute, else there is non-compliance, and if non-compliance is to be sanctioned it would be interesting to know just what percentage of departure from the rule is permissible.

In this connection it may be helpful to call Mr. Rench's attention to a point of view (necessarily that of the chief of the Bureau of Safety) which perhaps may have occurred to him. The Bureau of Safety functions under federal laws enacted for the protection of travelers and employees upon railroads. In formulating conclusions and making recommendations the Chief of the Bureau must always have in mind the highest degree of safety attainable, consistent with proper, and reasonably practicable, operation; he must take account of all the facts and circumstances coming within the purview of the Bureau's investigations from that standpoint. The paramount consideration affecting the publicly expressed judgments of the Bureau must be *safety*, even though such judgments may, on occasion, run counter to somewhat well settled convictions regarding recognized engineering or operating standards and practices.

The material facts upon which the conclusion in the Vincent report was based are as follows: Train No. 50 was derailed on the outside of an 8 deg. 10 min. curve. No evidence was presented that any defect of track or equipment existed which under normal conditions of running would account for the derailment. High rate of speed alone remained as the possible and probable cause of the accident, a result reached by the process of elimination and fortified by the testimony of a reliable witness. It was impossible absolutely to determine whether or not the train at the time of derailment was exceeding the speed permitted by rule, but as the permitted speed was clearly excessive the report insists that a sufficient margin be maintained between theoretical overturning speeds and speeds authorized for common practice to meet all contingencies, enumerating errors in estimating speeds, worn rails, and track imperfections. There was no suggestion that curve superelevation be increased to conform to permitted speed; *no such recommendation has ever emanated from the Bureau of Safety.* The converse is true.

Mr. Rench's remarks about crossovers are beside the point. The reduction of superelevation on a curve of, say 4 deg. to zero, for the purpose of introducing a crossover, does not fall within the pale of engineering practice. The Bureau of Safety is in possession of plenty of evidence of injury to track, broken rails, and derailments due to lateral stresses of the same character as those which were involved in the Vincent derailment, and with such evidence before him the Chief of the Bureau would be derelict in his duty should he fail to call attention to avoidable danger. W. P. BORLAND.

Chief, Bureau of Safety, Interstate Commerce Commission.

Light for the "Shades" of Harvard

NEW YORK CITY.

TO THE EDITOR:

Permit me to make a brief comment on the communication from John C. Howard in your issue of April 9. This gentleman divides those who have given thought to the subject of train control, apparently visualized in his mind as a simple automatic stop, into two classes, optimists and pessimists. The former he designates as progressives, to whom he assigns men of my modicum of experience and the United States government, including of course, the Bureau of Safety of the Interstate Commerce Commission. The other class are termed conservatives, such as are represented by Mr. Felton, who holds, with regard to accomplishment, that it never has been and probably never can be done, and would not be worth a d——n if it could.

Such being the conflicting attitude of minds, your correspondent would return to audible cab signals as a means of enforcing discipline—progress along the line of least resistance. He is in error as to certain statements, and although supported by sundry references to the Gospel and science, somewhat in ignorance of certain important facts,—very much so as to the auxiliary system of control which has been developed under my direction and auspices; a complete system of audible and visible cab-signals combined with auxiliary train control, under the proper restraint of the engineer, which while protecting him and his train will permit of every reasonable latitude of judgment in train operation.

Whenever Mr. Howard can escape from the classic shades of Cambridge and the University I shall be glad to demonstrate this system to him, in the confident expectation that he will prove a convert like unto those often found in religion; and a like invitation is cordially extended to any properly inquiring mind.

Having developed auxiliary train control to what I deem a satisfactory condition, I must correct one statement of intention attributed to the progressives, who I think, may claim the greater knowledge of what has been, and can be, done. We do not urge the railroads to make that development; we simply ask their co-operation. We, or at least my company, are just hungry to tackle the hardest section of a trunk line division, under the extreme of operating conditions; and believing in that peremptory termination of many a fruitless discussion—"put up or shut up"—we are quite prepared not only to undertake that kind of a contract, either with a trunk line railway, or with the government, for the benefit of all; but to stand or fall on the results.

What more, in this rapidly changing mundane sphere, can a progressive do? On more than one critical occasion in the course of the electrical developments with which I have been identified during the past thirty years I have found it necessary to make this sometimes onerous condition. The results are fairly well known; and they will be repeated in the matter of auxiliary train control. FRANK J. SPRAGUE.

An Interesting Type of Flat Slab Construction

Lackawanna Applies This Design to Large Grade Separation Viaduct at Newark After Extensive Study

In the separation of the grades of the Newark Turnpike and the tracks of its Morris & Essex branch at a point known as Sanfords Crossing, N. J., the Delaware, Lackawanna & Western is constructing a reinforced concrete viaduct of the flat slab type reinforced in four directions which will carry the roadway over the tracks. The unusual application of this type of construction to a highway bridge in a grade separation project, which was decided on only after extensive studies had been made to determine the most advantageous type applicable to this location, resulted in the development of many interesting features in design and important economies in construction.

The Newark Turnpike is one of the two thoroughfares connecting the highly developed manufacturing center of Newark, N. J., and the Metropolitan district of New York City. It, and the so-called Plank road, the only other thoroughfare extending between Newark and New York, are numbered among the most important intersectional highways in this country.

The traffic over these two highways is extremely heavy and is moved almost exclusively by motor driven vehicles. For years the greater portion of it has moved over the Plank road because of the poor condition of the Turnpike. That highway has now become inadequate to meet the demands of the rapidly increasing traffic and the Turnpike is being improved so that the congested conditions on the Plank road may be relieved.

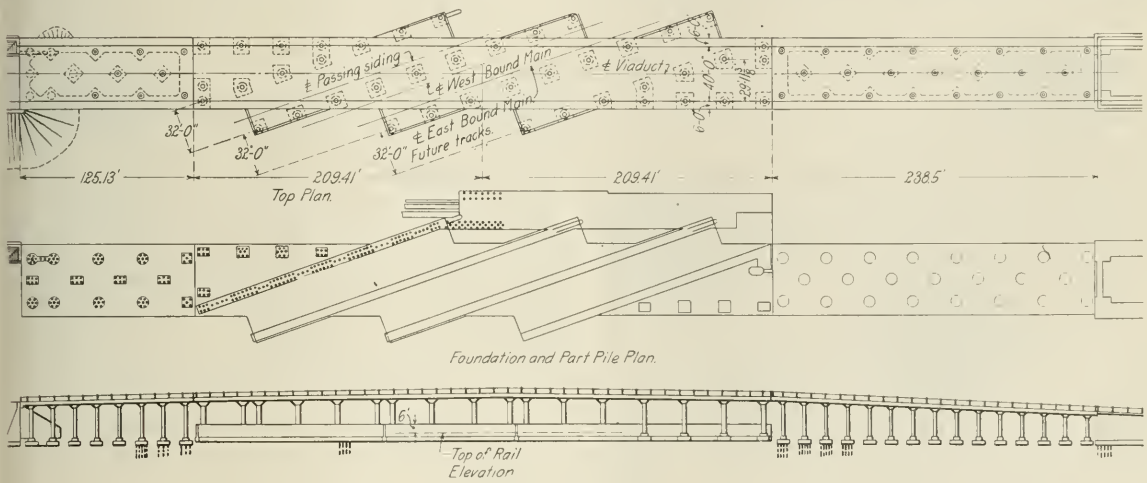
In connection with the highway improvement the roadway is being raised about five feet above its former surface from a point in Harrison, N. J., to the Hackensack river bridge in Jersey City, a distance of 3¾ miles. The roadway is to be 40 ft. in width between curbs and a 10-in. Telford macadam road forms the base of the pavement. The base will serve as a temporary surface until the completion of the pavement which will consist of Belgian blocks laid on a one-inch sand cushion over the macadam.

As mentioned, the Turnpike intersects the railroad at Sanfords Crossing, 3½ miles west of Hoboken, N. J. Through this district the highway and the railroad traverse the perfectly flat country known as the Newark Meadows and the highway is to be carried over the tracks by means of a viaduct and earth fills sustained by retaining walls.

Crossing on a Very Flat Skew

Referring to the general layout it will be noted that the center line of the bridge forms the acute angle of crossing of 19 deg. 12 min. 20 sec. with the line of the tracks. The viaduct is divided into three sections, a center section 418.82 ft. in length spanning six tracks, a north approach 125.13 ft. long and a south approach 238.5 ft. in length. Each section is separated from its adjacent section by an expansion joint formed by a 2-in. break in the floor slab located between a double row of columns.

The south approach was stopped at a height where retaining walls and fill were found to be more economical. It was necessary to carry these walls for a length of 293 ft.



General Plan and Elevation of the Viaduct

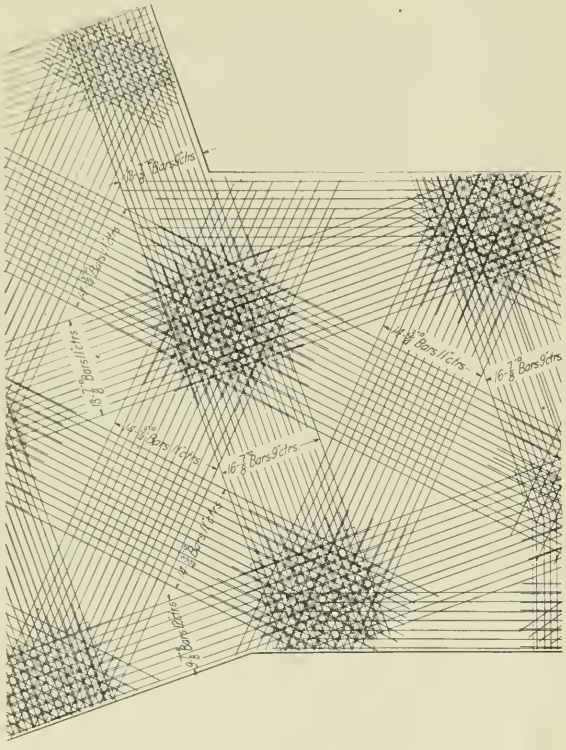
The Morris and Essex branch of the Lackawanna carries a very heavy traffic, consisting largely of high speed suburban trains. At the point of intersection by the turnpike it at present includes an east and a westbound main track and a westbound passing siding. In the plans for the improvement provision has been made for one additional westbound track and two future eastbound tracks. It will be noted that the tracks are arranged in pairs and the size of the slab panels of the center section over the tracks was determined in the one direction by placing the column lines on 32-ft. centers between each of the three pairs of tracks. In the other direction, lengthwise with the track, the spacing of the columns is 30 ft. 6⅝ in., forming an almost square panel. This spacing was determined by placing on the curb line of the viaduct the diagonally opposite end columns of the two rows adjacent to and parallel with the future outside tracks. The total distance between these two columns, one line projected on the other, is divided into 13 equal spaces of 30 ft. 6⅝ in..

In addition to the columns of the center section placed be-

to prevent the encroachment of the fill on adjoining property. The length of the north approach was fixed so that the approach fill fanning around the end corner would not encroach upon the future outside tracks.

tween the tracks, there is another row of four columns along the curb line which forms several irregularly shaped panels in order to carry out the triangular portion on each end of the center section, to a row of columns normal to the center line of the roadway in line with the last column of the outer row parallel with the tracks. With the exception of these few irregular panels all the panels of the center section are 30 ft. 6⅝ in. by 32 ft. This arrangement whereby the panels of the center section are placed normal to the track forms eight triangular portions of the slab which project beyond the sidewalk or balustrade line. These, however, considering the acute angle of crossing, are comparatively small, and little of the bridge floor is unused.

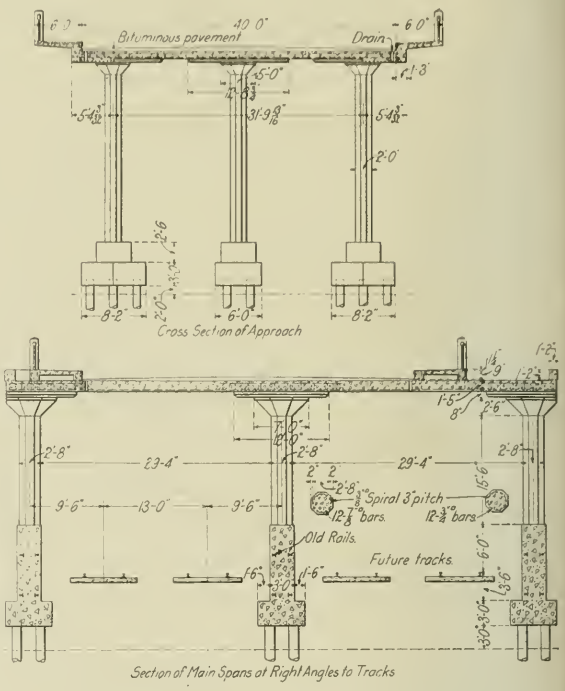
The columns or panels of the approach spans are placed in an unusual manner. Instead of being normal to the center line of the roadway, the panels are placed in a diagonal direction. This was done in order to bring the outside row of columns a sufficient distance from the face of the bridge so that the overhang formed thereby would balance the moments over the columns. The total lead load on the outside columns is eccentric on the side of the overhang to such an extent that when the roadway live load is applied on the other side of the columns the resultant is a



Arrangement of Reinforcement in Flat Slab Construction Over the Track Openings

load slightly eccentric toward the inner side of the columns. By this arrangement a minimum range of eccentricity is effected. The curb is designed as a beam to carry the cantilevered sidewalk and to concentrate this load on the cantilevered section over the column.

The center section over the tracks was designed to carry a uniform live load of 150 lb. per sq. ft., disregarding an impact factor and the approach panels, which are of greater size, are designed for 200 lb. live load or a maximum concentration around the columns of three 20-ton trucks. It was found, however, that the uniform live load gave the maximum moment. The total dead and live load in the design of the approach spans was 450 lb. per sq. ft. which included the heavy Belgian block pavement. In computing the loads for the footings which are supported on wooden piles, four 20-ton trucks were concentrated around the columns in the natural line of travel to procure a maximum. In proportioning the overhang to balance the moment over the outer row of columns consideration was given also to an equal loading on all columns, so that each foot-



Typical Sections Through the Structure

ing required the same number of piles loaded to 18 tons per pile for the extreme maximum live load.

Slab of Minimum Thickness

The depth of the slab in the approach spans is 10½ in. increased to 15½ in. with the drop panel. The drop panel over the outer row of columns is carried for one-half its width along the edge of the slab to give the outer diagonal band the proper strength. In other words, the slab for a 5 ft. 7 in. strip along either edge has a depth of 15½ in. This outside diagonal band is further strengthened by the continuation of the bent-up bars of the direct bands (22 ft. 6 in. span) over the columns to the edge of the slab. In this manner the area of the cantilever action over the columns is increased, thereby effecting a greater stiffness in this long band by extending the point of contraflexure. The effect of approximately balancing the moments over the outer row of columns was a reduction in the amount of steel in the so-called interior panel.

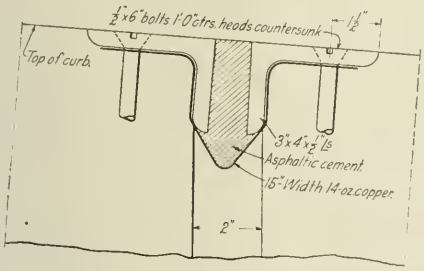
Twenty-two feet is the minimum vertical clearance from the top of rail to the underside of the drop panel, the edge of which is practically the edge of equipment. The same clearance could safely have been made to the underside of the slab but this additional clearance will in time be partially absorbed by raising the track due to re-ballasting.

The columns between the tracks are protected to a considerable extent in case of a sideswipe from a derailment by

placing them on a pier 3-ft. wide 6 ft. above the top of rail. The piers are reinforced by four lines of old rails. This high pier has another function in acting as a girder for the distribution of the loads on the piles which are spread out from column to column in narrow confines between the tracks, obviating the necessity of driving piles beneath the tracks.

The panels of the concrete balustrade are to be 2 in. in thickness and are to be precast in a horizontal position during the construction of the viaduct. After they are thoroughly cured they are to be set in position and the posts will be cast in place around them. The precast panels will project into the posts 1½ in.

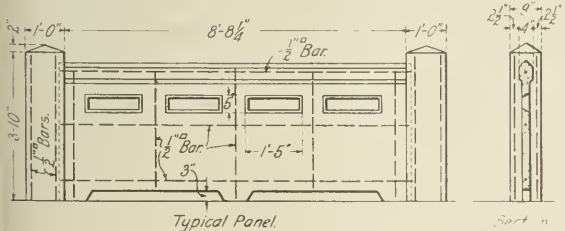
This type of construction was decided on only after ex-



Details of Expansion Joint in the Roadway Slab

tensive studies had been made to determine the most advantageous type applicable to this location. It has the primary advantage of giving the most shallow floor system that could possibly be obtained. This was of particular advantage in this location as it gave the minimum length to the approaches which were to be built over perfectly flat ground. In addition the flat slab offered a flexibility not found in any other type of bridge design except the arch type, which could not advantageously be used here in that the floor slab could be warped slightly or the grade changed between the columns to fit the surface of the slab concentrically to a vertical curve of the highway formed at the intersection of the approach grades at the center of the structure over the tracks.

As compared with all other forms of reinforced concrete



Details of the Concrete Railing

construction the flat slab also offers the advantages of simplicity in the form work and in the arrangement of the reinforcing steel. In this type of construction there are two flat planes of the underside of the forms, the upper plane forming the underside of the slab and the lower plane around the columns forming the drop panel. The saving in materials in the flat slab type of construction is appreciable and increases with increased loading. In this structure, which had to be supported on piles, the use of this light type of construction resulted in a reduced cost of substructure and foundations.

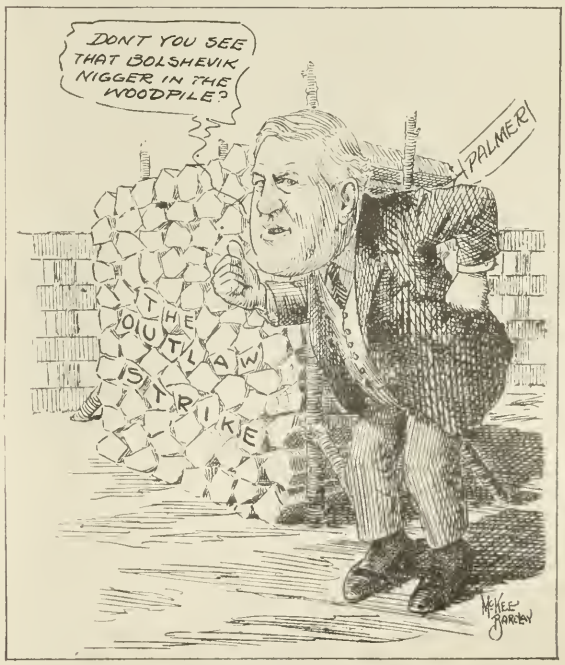
By reason of its uniform cross-section and continuity of the reinforcement there is no type of reinforced concrete construction that is better able to resist shrinkage and thermal changes than the flat slab. Where expansion joints are necessary they are easily incorporated by forming a double row of columns, splitting the structure into independent sections with a clean cut joint, the slab being cantilevered beyond the end columns to balance the negative movement.

The wooden piles used in the work were reclaimed from repairs made to ferry boat racks on the water front of the Hoboken terminal. These piles, after 15 years of service, were broken down by impact of ferry boats and by weathering. The failure however was confined to the upper 18 ft. of the piles exposed above the water. The original length of piles was approximately 80 ft. so that by cutting off the defective ends after the piles were pulled a length in excess of the 35 to 50 ft. required for the viaduct construction remained in a perfect state of preservation.

Construction

With a limited space to carry on construction, the tower and chute method of depositing the concrete was chosen. Three towers, each 120 ft. in height, have been erected, one on the north side and two on the south side of the tracks. In laying out the plant due consideration was given to a minimum construction operation over the main line tracks.

The construction of this viaduct, which was begun late in 1919 and which is expected to be completed early in the summer of this year, involves 1,800 cu. yd. of concrete in the retaining walls, 2,010 cu. yd. in the column footings and protection piers, 2,530 cu. yd. in the columns, slab and parapet as well as 1,150 wood piles and 176 tons of reinforcing steel. The work is being carried on under the direction of Geo. J. Ray, chief engineer and L. L. Tallyn, until recently acting chief engineer of the Lackawanna and M. H. Doughty, division engineer, A. H. Henckel, resident engineer is in charge in the field, and A. B. Cohen, concrete engineer is in charge of the design. H. F. Curtis, New York, is the contractor.



From the Baltimore Sun.

No, We Do Not!

New York City and the Railroad Problem

A. H. Smith, president of the New York Central, in an address before the Merchants' Association of New York on April 14, told the business men of the city how very short-sighted the citizens are in the management of their own interests, in the matter of transportation, and gave striking figures to illustrate the costliness of the delays, legislative and otherwise, which have attended the attempts of the past 15 years to improve the freight facilities on the west side of Manhattan.

Mr. Smith began by referring to the general suspension of freight traffic in and around New York, which on the day of his address was the chief subject in many of the members' minds, and said that despite the deplorable losses incident to the strike a wholesome effect might be hoped for. The strike would prove a much needed test of the condition of the railroad army; a milestone indicating the soundness or otherwise of the great body of railroad forces, the morale of what may be called the fighting forces of transportation. He expected an outcome which would provide a sound basis on which the railroad companies could succeed in rebuilding their service after the demoralization of the past two years. Even today (This was several days before the railroads, as a whole, were out of the woods) said Mr. Smith:

"My own inside view reveals splendid results and most encouraging facts concerning the elements which are really important and determining factors. The railroad army is sound at the bottom. It is loyal in its Americanism and though demoralized in spots by events of the immediate past, and faced with tremendously difficult tasks and obligations in the immediate future, as a whole the railroad forces retain the courage, the patience and the determination to fulfill the great demands of the American public. I could tell you of many inspiring deeds by railroad men during the past few days in the strenuous battles all along the line to keep the transportation machine functioning. You have read of the numerous desertions but you have not been able to notice the countless acts of the loyal majority who remained at their posts of duty against persistent temptation, and who in very many instances volunteered for extraordinary service. . . . Men in various branches have cheerfully toiled long hours and unquestionably accepted any assignment of duty during the emergency, while officers have remained on duty night and day, abandoning home and all thought of comfort, in many instances going into the yards for work from which they were graduated many years ago, in order to keep the trains moving.

"I hope that you will consider as pardonable pride my feelings toward the record made the past week by the New York Central forces which resulted in our railroad maintaining absolutely unbroken service of passenger trains between New York and Chicago, as well as locally and in all commuting zones, together with the delivery of such vast food supplies on the West Side tracks of Manhattan Island that the teeming population of greater New York was protected against suffering or possible starvation. Our freight service on those West Side tracks during the past five critical days, confined for the emergency almost wholly to foodstuffs, delivered on to Manhattan Island approximately 1,564 carloads of feed; probably 31,280 tons or 62,560,000 lb. of life's necessities."

The speaker then referred to the timely and invaluable service done by these New York Central tracks in Manhattan in 1917 and 1918 when our soldiers were in need of food in France, and went on to discuss the general railroad problem of today—the shortage of facilities following the stress of war and the need now of good service rather than low transportation rates. He told of the Central's orders, just given, for fifty millions' worth of new cars and locomotives, and the impossibility of making progress in rehabilitation as fast as is desirable. It takes courage to make large expenditures for the future at this time.

It is just ten years ago that the ten per cent rate case first brought the freight rate problem vividly before the public. By the decision in that case the hopes of the railroads were deferred, and in the same year an arbitration award (which went into effect on April 1) added $35,000,000 annually to the payrolls of the railroads in the eastern territory (50,000 miles). The Interstate Commerce Commission in February, 1911, denied the increase in freight rates, and fourteen pages of the commission's report on that question were taken up with the list of the names of the shippers who appeared at the hearings to oppose an increase in rates.

A different decision, a decision giving the railroads reasonable rates would have strengthened the cariers in their great war effort.

Today we have the Transportation Act of 1920, the most important railroad legislation for many years; and, what is more, the Congress declared explicitly its "policy to foster and preserve in full vigor both rail and water transportation." In the future as in the past the American railroads will be willing and no doubt will be able, to give America the best transportation in the world.

"Nothing will stop the advancement of this country if we but use that common sense, clear judgment and energy toward affording the transportation lines the fair play which, in the main, we have been noted for. Great good has come out of the events of this war period and we have learned many lessons that I believe we are going to profit by. I believe the Interstate Commerce Commissioners, rendering effective the will of the people as expressed through Congress, will recognize the railroad question in the light that I have briefly described it; and with their help and your patience while we are regaining our lost ground, I hope that we are going to become all that you want us to become. There is to be regulation and not strangulation; there is to be justice and not persecution; there is to be equality and fairness by the user and by the used. The people have said so and what the people say prevails in this country."

The speaker referred again to the situation in New York City. Manhattan Island lives a hand-to-mouth existence, because of the dearth of warehouses and storage facilities and of modern equipment for handling freight. The unnecessary costs and losses yearly are prodigious; none but a rich and growing city could have borne the burden. It has been estimated that $200,000 is the daily loss in New York because of inefficient methods of distribution. The daily newspapers have quite recently lost thousands of dollars because of shortage of news print paper; they have paid for special trains and many extra bonuses for long hauls by truck, all this largely because of insufficient warehouse room. The New York Central's efforts to improve its freight facilities on the west side have for fifteen years been hampered by legislative and other obstructions. The upper part of Manhattan—Harlem—has a population of about 1,000,000 but has railroad facilities suitable for a town of twenty thousand; freight is hauled ten miles further downtown and then hauled back by wagon at 50 cents per ton per mile. The citizens of New York, in 1847, when the New York Central's present freight railroad was built, appreciated its value; and the speaker called upon the members of the Merchants' Association to investigate and consider the problem of its usefulness, value and efficiency today; this in their own interest no less than that of the carrier.

Overall Clubs to combat the high cost of clothing have been formed by Chesapeake & Ohio clerks at Lynchburg, Va., and Fort Worth & Denver City Railway Employees at Fort Worth, Texas.

American Short Line Railroad Association

Relations to New Law Discussed; Legal, Traffic, Purchasing and Publicity Bureaus to Be Established

A SPECIAL MEETING of the American Short Line Railroad Association was held at Washington on April 15 and 16. The meeting was also attended by about 15 members of the Western Association of Short Line railroads, which is affiliated with it. President Bird M. Robinson presented a report of the activities of the association, discussing the various problems with which the short lines are confronted in their relation to the new transportation act, and addresses were made by E. E. Clark, chairman of the Interstate Commerce Commission; John J. Esch, chairman of the House Committee on Interstate and Foreign Commerce; Samuel O. Dunn, editor of the *Railway Age*, and George C. Taylor, president of the American Railway Express Company.

It was decided to resolve the meeting into the annual meeting of the association, which was scheduled for September, and it was decided to hold the annual meeting hereafter on the second Wednesday in May at a place to be determined by the executive board or the members. The articles of organization and by-laws of the association were revised to provide for three vice-presidents in place of the seven regional vice-presidents which were maintained during the period of federal control, and an executive board consisting of 15 members was elected. It was decided to organize legal, traffic, purchasing and publicity bureaus to be established under the direction of the president to represent the interests of the short lines or of such lines as wish to avail themselves of their services and plans were laid for an active campaign to increase the membership of the association. There was a general discussion of the particular problems now confronting the short lines which include the obtaining of adequate rates under the provisions of the new transportation act, more favorable divisions with the trunk lines, the question of obtaining reimbursement from the government for losses or decreases in net operating income sustained by the lines as a result of the effects of federal control of the railroads generally after the short lines were relinquished and the question of increased per diem rates and rules adopted by the American Short Line Railroad Association which no longer allow the short lines the two days free per diem which they were allowed by the Railroad Administration. An abstract of President Robinson's report follows:

Report of President Bird M. Robinson

The members of this association and the members of the Western Association of Short Line Railroads consist very largely of independently owned and operated roads, the great majority of which are short lines in so far as the length of their roads is concerned. A few of the members own as much as 500 miles, but they are so situated as to be short in revenue and are properly members of this organization.

There are		Miles of Road
621	Standard gage, steam roads, 100 miles and less in length	16,598
55	Standard gage, steam roads, over 100 miles in length	11,924
97	Standard gage, electric roads engaged in the general transportation of freight	6,663
47	Narrow gage, steam roads	1,499
820		36,584

There are so many short line railroads and they are so widely scattered, that it has been very difficult to obtain an accurate list. Our secretary, after months of industrious efforts, which were made in conjunction with the officials of the Railroad Administration and the officials of the Interstate Commerce Commission, has completed a list as of January 1, 1920, which is believed to be fairly accurate, and from that record the foregoing information is obtained.

In addition there are a large number of independently operated short lines, the stock of which is owned or controlled by another railroad company. All such roads should be included in any complete statement of the short lines as a class and should be members of this association for the reason that the question of who owns and holds the stock certificates cannot morally or properly make a difference in the rights or duties of the corporation that owns the property.

Recognizing for the time being the false distinction that has been injected into the situation, we do not include short lines so owned in the foregoing statement. Only about 50 per cent of the 820 roads have up to this time joined in the work being done for all concerned.

Transportation Act

After years of investigation and months of intensive consideration Congress passed what is officially known as the Transportation Act. Many new and important principles were incorporated. Some of them will aid to a substantial degree in improving the rail transportation system of the country, while others will retard, if they do not prove to be seriously detrimental.

We have had the opportunity to appear before, and to confer with the commission, since the passage of that act and we are most favorably impressed with the prompt and vigorous manner with which it is meeting the problems confronting it, the carriers and the public. There is every indication that the commission intends to, and will rise to the occasion, and will do everything possible to enable the carriers to meet the transportation needs of the public, and to receive a fair return for the services rendered.

It is quite apparent that, notwithstanding its great power and authority it cannot, of or by itself, meet and overcome the many difficult and complex problems now involving the rail transportation systems of the country.

The situation can be successfully met, if the owners, operators and employees of the carriers and any large part of the public will fully, completely and constantly co-operate with and support the commission in the execution of the law. The present attitude of a part of the employees indicates that they will not assist or co-operate, and it remains to be seen to what extent the public will assist, if the commission finds it necessary to increase rates, a thing about which there can be no doubt. The failure of any part of the interested parties to assist, makes it more and more necessary for the remainder to assist and support. Speaking for the short lines, I recommend that we not only pledge our support and assistance to the commission, but that we fulfill that promise through thick and thin.

Legislative Work

This association conducted a most active campaign before Congress in its efforts to obtain legislation that would fully protect the short lines and weak railroads. We, at all times, recognized that our class of roads could not hope to be or remain prosperous unless the main lines were placed in a healthy condition. We, therefore, directed our efforts in such a way as to aid in obtaining what was for the best interest of all carriers, and we are proud to say that we were remarkably successful. We obtained practically everything requested

for the short lines, and we were an important factor in obtaining much that is good for all roads.

Consolidation of Railroads

One of the most important, if not the most important, principle affecting short lines is contained in Section 407. The section, when taken in connection with the valuation of all railroad property, now being made by the Interstate Commerce Commission, involves in a new way and to an unlimited extent every dollar invested in such properties.

The provisions of Section 407 require the commission to "as soon as practicable prepare and adopt a plan for the consolidation of the railway property of the continental United States into a limited number of systems." The commission, when adopting its proposed systems, will assign to each certain separately owned and independently operated railroads, and it will necessarily include short line railroads. The result of such an assignment will be to exclude or make it impossible for any railroad or railroad system to purchase a short line that has been assigned to some other system. The effect will be to at once destroy any present possible market for short line railroads and force the owners of a given property either to sell their road to the system to which it is assigned or to compel them to continue to operate their properties regardless of conditions and results.

The great majority of the present transportation systems have been built up by the purchase and absorption of short line railroads, and the adoption of plans by the commission for the creation of systems will at once restrict all of the roads, and in many cases seriously, if not fatally, affect some of the roads. It is true that the transportation act does not contain the Senate provision forcing consolidation at any given period, but the adoption of the proposed plan is, in our opinion, merely a preliminary step, and Congress is liable hereafter to make provision for compulsory consolidation of the proposed systems.

The commission is given very wide discretion in making its plans for the creation of various transportation systems, and it will no doubt earnestly and conscientiously try to adopt plans that will do the least injury to interested carriers. Notwithstanding that fact, interested short lines must see that their respective properties are given due consideration, and that they be assigned in such a way as to insure that the owners of the property shall receive fair treatment and the full value of the property in the event that it is merged into any system.

The value to be placed upon these properties by the commission as the result of the work now being done, now becomes almost, if not the most important question involving the rights of railroad owners. That question is complicated and demands most intelligent and constant attention, and a failure to give it such attention may and probably will result in losses to the owners of such properties. Under the law the commission cannot permit the sale or merger of a railroad at a price higher than the value fixed by it.

The main line companies are well organized and have a large staff of able lawyers, engineers and accountants actively at work in an effort to see that the value of their respective properties fixed by the commission shall be fair, and that no part of the property devoted to the public service is either undervalued or omitted. The short line railroads have no such organization, and in addition to the risk heretofore involved in neglecting that important work, they are now exposed to the greatly increased danger of having an unfair or inadequate valuation placed upon their property and that they may be subsequently forced to sell on the basis of such unfair valuation.

We are of the opinion that the question of the consolidation and valuation of these roads now demands joint, aggressive, and intelligent attention and that this association can accomplish more for the owners of the properties by devoting all necessary time and attention thereto than it probably can in any other way.

Value as a Basis for Rate-Making

One of the most important and far-reaching provisions of the Transportation Act is the establishment of the principle that rates are to be based upon the value of the property held and used in the transportation service.

We undertook to point out to the commission that the 5½ per cent or 6 per cent limitation fixed by Congress might prove to be a very serious obstacle in the way of the establishment of rates sufficient to enable the carriers to furnish adequate transportation. We called attention to the fact that the commission had been given full discretion in the matter of fixing values, and that the conditions demanded that liberal values be fixed so that adequate rates could be established and an adequate amount of revenue be obtained. We urged the commission, in view of the extraordinary condition now existing, to fix values at least somewhat in keeping with the present high price of everything that enters into the transportation business, and we hope that the commission will recognize all of the conditions and fix values that will enable it to provide the necessary revenue and thus provide all necessary transportation.

The commission took both questions under consideration, and we understand that they are seeking information necessary to enable them to determine the total amount of revenue that will be necessary to furnish the public the transportation that it wants.

Loan Fund

This association was an important factor in inducing Congress to provide the $300,000,000 fund to be loaned to carriers under the provisions of Section 210 of the Transportation Act.

The Treasury Department and the Interstate Commerce Commission have been considering the question of how to make loans, and they have invited into conference the director general, the governor of the Federal Reserve Board, the Association of Railway Executives and this association for the purpose of determining how the loans should be made and secured and what are the aggregate requirements of all carriers that desire to obtain loans out of that fund.

The consensus of opinion of the government officials and the representatives of the carriers present at the conference was that the funds available should be used principally for the purpose of acquiring new equipment. Many of those present expressed the opinion that the funds advanced by the government should be used in the purchase of equipment and should be applied as a first payment of say 25 per cent on the purchase price, the balance to be obtained through the sale of car trust certificates, and while it was uncertain whether the government would permit the use of the funds as a first payment, thereby necessitating its becoming a secondary creditor, yet the consensus of opinion seemed to be that some such plans should be worked out and put into effect.

The commission requested the Association of Railway Executives to ascertain from Class 1 Roads what funds they desire to obtain and what use would be made of such funds. They also requested this association to ascertain from the short and weak lines what funds they desired and the use to be made of such funds. That information is now being obtained and tabulated and will be submitted to the commission for its information, after which the two branches of the government charged with handling the fund will agree upon plans of procedure and will then be prepared to receive applications from the individual roads, but up to that time the commission will not attempt to consider any individual application.

At the appropriate time this association will ask the com-

mission to allocate a given amount of the funds to be loaned to the short line railroads.

Car Per Diem

An attempt was made in the latter part of 1919, through the American Railroad Association, to fix $1.25 per day as the charge for freight cars. This association appealed to the chairman of the Association of Railway Executives to have action delayed until we could investigate. That delay was granted and we learned through some of our members that the present cost of maintenance had increased to such an extent that there was little or no return to the owner of a car at the then proposed 90 cent rate. Recognizing that fact and fearing that the $1.25 rate would be established, we did not then offer any opposition. Many of the owners of the cars are dissatisfied with the 90 cent rate, and have renewed their efforts to have the rate fixed at $1.25 per day, and I anticipate that they will succeed in the near future in obtaining an increase in the rate.

Many of our members have earnestly importuned us to obtain a continuation of the practice adopted by the director general, of giving two days free time on each freight car delivered to short lines. This association induced the director general to give that free time—a thing that could then easily be done—but we have found many difficulties in the way of securing from the numerous owners of cars a continuation of that practice. Under the law of the various states, carriers are required to give shippers and receivers of freight two days free time, and, in addition, they are not permitted to charge for Sundays and holidays. In view of the fact that the short line must grant the same free time to its patrons, and, in addition, the short lines are, in most instances, the terminal line, there are strong reasons why the connecting line should grant such short line two days free time. There is another important reason why short lines should receive at least that much free time on cars. Many of such lines were constructed under agreement providing that no per diem charges were to be made, and the division of the joint rate was fixed on that basis. Some of them were constructed when the per diem charges were 25 cents per day, and others when the charges for cars were on a mileage basis, and the division of joint rates of such lines were fixed under such conditions. Now that the per diem rate has been advanced to 90 cents, the effect is to substantially reduce the division of the joint rates going to such short line roads. In many cases the present per diem rate costs short lines as much as 50 per cent of the division of the joint rate now being paid, and it is quite apparent that such a condition cannot be continued.

The officials of some of the short lines are of the opinion that under Section 208 of the transportation act, the practice of giving two days free time to short line railroads, that was in effect on February 29, 1920, cannot be changed prior to September 1, 1920, unless the change be made by mutual agreement between the interested carriers or by state or federal authorities. They contend that that section of the law taken into connection with the guaranty provided by the government under Section 209, not only gives the short line railroads the legal right to have that practice continued, but that Section 209 provides that the government will, through its guaranty, equalize the situation so far as all roads that accepted that section are concerned. The parties who made that contention believe that it would be hazardous for the short lines that accepted Section 209, to pay for the first two days for equipment for the reason that the commission, when considering the amount to be paid by the government under its guaranty, may hold that the short lines had no obligation to pay the two days per diem, hence that it would strike that amount from the accounts of the road that had made such payments.

We do not express any opinion on the correctness of that contention, but submit the matter to this meeting with a view to having it fully discussed and acted upon as may seem best.

We have foreseen that the matter of per diem on cars would probably result in increasing the burden of the short lines, and we have sought to meet and confidently believe we have met that situation by the insertion of two provisions in the transportation act.

1. That act confers upon the commission full power to fix and determine the per diem charge to be made for cars, and grants the commission power to distribute cars to meet the transportation of all shippers.
2. That act unconditionally confers upon the commission the power to make division of the joint rates, and we are of the opinion that the rule prescribing the division of rates, which we had inserted, is such as to require the commission to give, out of the joint rates, sufficient revenue to pay the cost of the service which includes the per diem on cars.

Rule of Divisions

Responding to the active efforts of this association, Congress gave the Interstate Commerce Commission full authority to "establish through routes, joint classification, and joint rates, fares or charges, applicable to the transportation of passengers or property," and it gave the commission full and complete authority to make divisions of joint rates. This association prepared and Congress inserted in paragraph 6 of Section 418, a definite rule governing the commission when making divisions, which we confidently believe fixes the cost of the service as the basis for divisions. We believe that rule, if properly interpreted and applied, will go far towards stabilizing the short lines and weak roads and that it can be properly used as a basis for insisting upon rates that will give each of the interested lines rates that will pay each the cost of their service.

That rule, among other things, provides that the interested lines shall receive "the amount of revenue required to pay their respective operating expenses, taxes, and a fair return on their property held for and used in the service of transportation."

We call attention to the fact that that provision is the only one in the transportation act that provides for an individual line to receive a fair return on its property, which is fixed for all lines in Section 422, as 5½ to 6 per cent, hence, we believe that in the long run that rule of division will prove to be beneficial to all concerned.

Present Divisions

Congress, in response to our urgent request, inserted the following in Section 208 of the transportation act:

> "(b) All divisions of joint rates, fares, or charges, which on February 29, 1920, are in effect between the lines of carriers subject to the Interstate Commerce Act, shall continue in force and effect until thereafter changed by mutual agreement between the interested carriers or by state or federal authorities, respectively."

While Congress was considering that provision, some of the traffic officials in the government employ attempted to reduce the divisions of a large number of the short lines, by restoring those in effect on June 24, 1918, and thereby deprive such roads of any benefit of the 25 per cent increase in rates made by the director general as well as any other increase in divisions granted some of the lines. That nefarious attempt was deliberately made to defeat that part of the law just read.

We demonstrated to Director of Traffic Chambers that some of his subordinates were thus resorting to unfair and sharp practices, and he promptly undertook to correct what had been done, and to prevent any such further proceedings. He succeeded in all but one case. That road was so situated that it could retain its divisions regardless of the attempt to

change or reduce the amount that had been duly and legally agreed upon.

Increase of Rates

Beginning on March 22 last, the Interstate Commerce Commission held extended public hearings on the question of what rate groups or territories it should designate and what basis of value of the railway property held for and used in the service of transportation should be adopted for the purpose of establishing just and reasonable rates.

One of the most encouraging things that occurred was the rather broad and liberal attitude assumed by most of the representatives of the commercial bodies and traffic leagues. Speaking generally, they took the position that what the public wanted, as well as required, was service; they stated very frankly that the question of rates was of secondary importance to the public, while it was of first importance to the carriers.

In the meantime, the proper committees representing the carriers, including the short lines, are industriously at work, obtaining information and preparing data that the commission must have before it establishes any rates. This matter is of great importance to the short lines, for the reason that they have never before been included in any plans for establishing rates. It is most important that the value of every mile of road in the country which is devoted to the public service should be included in the total value on which the commission will base rates.

Payment by the Government of Deficits During Federal Control

The Railroad Administration, as you know, excluded the great majority of short line roads from federal control, notwithstanding Congress twice provided that they should be included. That exclusion was a very serious matter for most of that class of roads. They were left to struggle not only with the rising tide of cost, but were forced to meet any unfair and burdensome practices and competition upon the part of federal controlled lines.

The officers of this association, especially L. S. Cass, and myself, gave that situation great consideration, and finally determined to make a vigorous fight before Congress to secure legislation that would require the government to restore, at least in part, the short lines to their financial status before the period of federal control.

We discussed this matter with many of our friends in the Senate and House and met with all the discouragement one could meet. The great majority of those consulted expressed the opinion that Congress could not be induced to assume any such financial obligations. Nevertheless, I prepared an amendment specifically providing that the government should pay the full amount of the deficit incurred during the period of federal control, by any short line that was included as a part of federal controlled roads under the provisions of the Cummins amendment to Section 1 of the federal control act, but subsequently relinquished by the Railroad Administration.

We requested Senator Curtis, of Kansas, to introduce that amendment, which he did. There was instant opposition and we worked most diligently for some days to overcome that opposition. We finally succeeded and Senator Curtis had our amendment adopted by the Senate.

When the Senate and House bills went to conference, some of the House conferees opposed vigorously any and all propositions looking to requiring the government to pay any part of the deficits of the excluded short lines, regardless of equities existing in their favor. We determined not to permit any opposition to deprive that class of roads from obtaining the relief so urgently needed, and so justly due, and we conducted a most vigorous campaign in our efforts to accomplish the desired result. The conference committee, solely in response to our efforts, agreed finally upon and inserted in the place of the Curtis amendment Section 204 of the transportation act.

The amount of relief that will accrue to the various short lines, under that section, while much less than it should be, is very great in fact and it will save many roads from bankruptcy.

The provisions of that section are somewhat complicated and great care should be exercised by the representatives of roads applying to the Interstate Commerce Commission for the benefits authorized.

As we construe that section, it provides that the government will pay to any excluded short line, any decrease in its railway operating income during the federal control period as compared with its railway operating income during the test period, or will pay such line its operating deficit during the federal control period, as compared with its operating income or deficit during the test period. In other words, it will restore as nearly as may be, for the federal control period, any decrease in earnings or any increase in losses, as compared with the test period.

We have filed with the Interstate Commerce Commission an application made by one of our members under Section 204, and in acknowledging receipt thereof, Dr. M. O. Lorenz, statistician for the commission, writes as follows:

> "Upon examination of the returns it is observed that during the 26 months of federal control, as a whole, the operations of the Frankfort & Cincinnati Railway Company resulted in an income. It would appear, therefore, that this road is specifically excluded from obtaining any payment under the above-mentioned section.
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> "You will observe, upon reference to the act, that Section 204 does not apply unless the carrier 'sustained a deficit in its railway operating income for that portion (as a whole) of the period of federal control during which it operated its own railroad.'"

We are of the opinion that the interpretation placed upon that Section in the foregoing letter is contrary to the intention of Congress. If it is so applied, it will defeat the object that Congress had in view, and that was to accord to the relinquished short line railroads the rights that were conferred upon them in Section 1 of the federal control act, the Railroad Administration having arbitrarily deprived such roads of all such rights. We not only do not concur, but are of the opinion that we should make an application to the commission for a hearing, and that in the event the commission shall sustain the interpretation of its statistician, we should take necessary steps, through the courts, to obtain for the interested roads the benefits which Congress intended that they should have.

It is apparent that all questions arising under Section 204 should be very carefully considered and properly presented and it is apparent that it will be necessary for the legal department of this association to advise the short lines how to prepare their application, how to present the same and how to conduct any and all hearings before the commission and before the courts if there is any failure to properly interpret and apply the provisions of that section.

Notwithstanding Section 204 was a direct result of the efforts of this association, a number of roads, following their usual selfish practices, are rushing in to try to collect the amounts believed to be due them and they at the same time decline to become members of this association or to recognize in any way the obligations that are justly and morally due. Some of such roads announce that they do not need the assistance of the association, but in assuming such a position and following such a practice, they will, in many cases, not only fail to obtain what might be recovered but they will complicate the situation and embarass all others.

In view of the fact that we secured the enactment of

Section 204, hence made provisions for interested roads whereby they could secure a very large amount of money, not one dollar of which they could otherwise obtain; in view of the fact that there will have to be conducted a vigorous contest before the commission and properly executed litigation before the courts before all the interested roads can obtain the funds due them, it would seem to be wise for this association to provide by proper resolution or otherwise that all railroads deriving funds from the government under Section 204 should contribute a given percentage thereof to this association for two purposes—first with a view to placing the association on a strong financial basis so that it may function hereafter at all times and under all circumstances; and, second, to provide funds with which to conduct all the work necessary in connection with the contest that apparently will have to be made to obtain the proper construction and application of Section 204.

One of the important things accomplished by this Association is the provision of Section 209. That section constitutes a guaranty by the Government that it will pay to any carrier that accepted its provision on or before March 15, 1920, the equivalent of a proportional part of the standard return, such guaranty to continue from March 1 to September 1, 1920. There was great opposition in and out of Congress to any guaranty by the Government, and there was decided opposition to our demand that the guaranty should be extended to and include the short line roads that had been excluded from Government control.

The objectors attempted to ridicule the idea of asking the government to guarantee a road that had not been under government control. We succeeded in convincing Congress, first, that excluded roads needed the protection more than a road that had been fully provided for during the past 26 months, and second, that none of the roads would be under federal control during the six months guaranty period, hence one kind of a road was entitled to have the guaranty of the government as much as another.

Labor Problems

The demands of union labor presents one of the most serious problems confronting rail carriers. The transportation act contains 16 sections governing the rights and duties of both carriers and employees, and provides for the creation of certain boards to consider and act upon disputes that may arise.

President Wilson requested the Association of Railway Executives to appoint representatives to join representatives of the organized railroad brotherhoods in a conference under the provisions of Section 301 of the transportation act, for the purpose of considering the wage increase demands theretofore made upon the director general. The Association of Railway Executives invited this association to join in that conference, and offered us an opportunity to appoint representatives of our class of roads. This association respectfully declined to participate for the reason that the pending demand for an increase had been made upon the director general for and in behalf of the employees on roads being operated by him.

When that conference met, the representatives of the brotherhoods submitted demands that aggregated more than $1,000,000,000 annual increase in wages, and insisted that all rail carriers must be represented for the reason that there must be established a uniform minimum wage on all roads, regardless of class or conditions.

The chairman of the committee representing the carriers advised me of that demand and I definitely and finally declined to have this association participate in any way or to any extent and authorized said chairman to say that his committee did not represent the short lines.

When we took that position, we knew that the Railroad Labor Board would have the right to hear and decide questions between short lines and their employees, and we had no doubt that it would have many such cases before it. We based our action upon the fact that the great majority of short lines, for several justifiable reasons, do not pay and should not be required to pay main line standard wages. In other words, that they were entitled to a differential in the wages paid, and we did not believe that it would be best for any concerned for this association to ask for one third of the representatives authorized for the carriers. We thought it best to permit the roads that pay the very great percentage of the wages to have the responsibility of making such nominations.

Judging from reports received I am of the opinion that a strong and constant effort will be made by organized labor to force the payment by short lines of a standard minimum wage to their employees, regardless of any and all surrounding conditions, and that that effort will succeed unless the interested roads agree upon and adopt an intelligent working plan for their own protection. Under present conditions, the great majority of short lines cannot pay standard wages, but if the commission will provide adequate revenue either through increased rates or divisions, it might be wise to then and thereafter pay standard wages and thus dispose of that question.

No doubt case after case will be brought before the Railroad Labor Board in Chicago, and the litigation will be conducted by able and most expert representatives of the brotherhoods. All such efforts must be resisted by equally able and expert men, or undue and unjust burdens will be thrown upon our class of roads.

The work of defending against all such efforts can be done through this association at least as well if not better than any existing agency and at much less cost. If that additional work is to be done by the association, it will be necessary to establish an office in Chicago and employ therein necessary competent assistants.

The Compensation on the Space Basis

The compensation for carrying the mail has been a live question with this association from the time of its organization.

On November 1, 1916, the postmaster general placed 1800 mail routes upon the space system authorized by the law and left 1200 on the weight basis. After long and laborious preparation the case was presented before the commission both by the post office department and the carriers.

On the short line railroads about 350 mail routes were started, about 300 of them being on the weight basis under the order of the postmaster general, and about 50 of them on the space basis. The compensation on the space basis was established by the third section of the order of December 23, 1919, copies of which have been extensively circulated. It was the contention of this association that the independently operated short line railroads were, because of their conditions and higher cost of operation, entitled to a differential over and above any rate established for the trunk lines. This view was elaborately presented at the hearing and accepted by the commission, giving all short line railroads less than 100 miles and more than 50 miles in length, a differential of 20 per cent above the trunk line rates, and the roads of 50 miles or less in length a differential of 50 per cent.

The order provided that from and after January 1, 1918, 25 per cent should be added to the rate prescribed as of November 1, 1916, and that the minimum pay on any mail route, over any part of which mail is transported not less than six days a week, should be $50 per mile per annum.

The short line railroads on the 300 or more weight routes, on November 1, 1916, were receiving annually about $250,000, and those routes which were put upon the space basis on November 1, 1916, were receiving about $600,000 an-

nually. Under the order of the commission, the increase in pay on the short line routes placed upon the space basis would amount to something more than $200,000 a year.

Under the wording of the order of the commission it was doubtful whether the 1200 weight routes, 300 of which were upon short line railroads, were included within the adjustment made in Section 3 of the order applying to the 1800 space routes. An application was made by this association to the commission for a more definite statement upon this point, and for the readjustment of pay on the 1200 weight routes, if they were not included in the adjustment already made. Information has now been received by this association that the 1200 weight routes were included within the rates of pay fixed by the commission as of November 1, 1916. It is understood that the postmaster general has not readjusted the pay on the 1200 weight routes since November 1, 1916, but has intended to apply the new rates to these weight routes only from and after March 1, 1920.

Under the new ruling of the commission the 300 or more weight routes on short line railroads are entitled to this increase in compensation from November 1, 1916, for which a demand should be made upon the postmaster general. If this demand should be refused, then proceedings must be instituted to enforce the rights of the several railroad companies interested in this increase.

Another point in dispute involved the date of application of the $50 per mile per annum as a minimum rate. Application was made by this association to the commission for information upon this point also, and we are now informed that the $50 minimum per mile per annum begins on November 1, 1916. An application must be made to the postmaster general for a proper readjustment in favor of all routes that have been operating on a minimum basis, adding $7.25 annually for each mile of mail route from and after November 1, 1916. The commission also decided that as this $50 per mile per annum is a minimum that it does not take on the 25 per cent additional from and after January 1, 1918.

It will be necessary to have this readjustment carried out before any final settlement can be made by any railroad company with the government under the transportation act of 1920, because of losses or damages sustained under Federal control.

On all of these questions this matter of railway mail pay has now taken on a renewed activity. The amount that each road is entitled to under the order taking effect March 1, 1920, and the interpretation now given to it, must be definitely ascertained and these amounts will have a bearing upon the claims of each road for settlement with the Railroad Administration. It is entirely probable and likely unavoidable that further applications will be necessary before the Interstate Commerce Commission; that continuous demands upon the Post Office Department will need to be made in particular cases where the amounts of mail pay under the new orders are reduced; that applications for an increase will be necessary; and in all probability, applications to the courts will be necessary in order to settle disputes or to secure the relief already granted.

The amounts involved, while somewhat indefinite at the present time, are to the short line railroads substantial and are well worth careful consideration.

Stock Ownership

This association has contended during the past four years that the ownership of the stock of a railroad had and could have no bearing upon the legal status of the property, if devoted to the public service as a common carrier; that the only test of the rights and duties of a carrier by rail was the character of the service rendered, and that the carriers rendering like service should receive like treatment by the government and courts.

The main line companies, that own the stock of separately or independently operated short lines, and the individuals that own the stock of such short line roads, are directly interested in the character of the treatment accorded to all such roads.

For example, it has become the custom with many of the roads, the stock of which is owned by a main line company, to charge main line or junction point rates on commodities and some classes of freight with the result, so far as that road is concerned, of not receiving the necessary revenue and being forced to call upon the company that owns the stock to make up the deficit. In addition to the unfairness of the situation so far as the road itself is concerned and the same as to its owner, it frequently creates a most unfair competition so far as the independently owned short line is concerned.

In cases where two such owned roads extend into the same general territory or transport the same general character of traffic, and the main line owned road charges only junction point rates, it forces one of two things. The independently owned road cannot hope to secure the location of enterprises on its road, if the interested parties can find a satisfactory location and desired material on the other road, unless the said independently owned road will also charge junction point rates only. In most cases that cannot be done without resulting in a deficit, which can only be made upon an increase in the divisions out of the joint rates; in other words, out of the funds that otherwise would be available for the main line.

The practice that has grown up in connection with some of the separately operated main line owned roads to charge such rates has caused the Interstate Commerce Commission to decide in several cases, notably the Whitewater Lumber Company vs. Alabama Central Railway, that the independently owned road may not charge more than the junction point rates on lumber and other commodities. That principle, if finally adopted, will result in the reduction of rates to shippers, and force the short lines, regardless of the character of ownership, to depend very largely, in some cases wholly, upon the division of the joint rates for its revenues. The new rule in the transportation act governing divisions provides such carriers shall receive the cost of service, that is its operating expenses, taxes and a fair return on their railway property held for and used in the service of transportation.

If the present practices continue, and the short lines, the stock of which is owned by main line companies, charge more favorable rates, it will result not only in the owning main line company paying its deficit, but the independently owned short line will be forced to charge like rates and then demand that the commission divide the joint rates so as to give it the cost of its services.

The net result would be more favorable rates for the shipper and the resultant burden being thrown upon the main line. It is possible that the independent owners of short lines would prefer to reduce their charges and obtain the revenue necessary for the maintenance of their property through an increase of divisions, but it would seem to be wise for all concerned to recognize the necessity for adequate revenue for all and to so handle the business as to do justice to all.

Now that the necessary principles have been enacted into the law, there should be no conflict of interest between the main lines and short lines.

The policy of this association has been and will continue to be, one of co-operation with the main lines. It will insist upon fair, yes, liberal treatment to its class of roads and in return for such treatment it will be most earnest and diligent in its efforts to obtain through legislation, the commission, the courts and the public, fair and liberal treatment for all classes of roads.

The Association

The number of members should be double what it is now, and it is difficult to understand why many of our class of roads remain outside. The results accomplished have been very great, in fact will, in the long run, aggregate many millions of dollars. The cost of producing the great results so far attained has been comparatively insignificant and we are convinced that many additional beneficial results can be obtained if the members co-operate as their interest would seem to demand.

There has been an urgent and continuous demand that the work of the association be expanded and that it render service to the members in a number of ways. We have delayed undertaking anything additional until the legislative campaign had been finished and we had demonstrated anew the good results that can be accomplished by united efforts.

We believe that the time has now arrived when certain bureaus can be established in the association, with profit to all concerned, and we submit for your consideration the following:

One of the greatest needs of this association and its members, in fact, one of the greatest needs of all short lines, is the establishment of a strong well organized legal department.

The transportation act has changed the law to such an extent that it creates a new and untried situation, one that is gravely uncertain in many respects, and one that demands the greatest care when the many important questions are presented to the Interstate Commerce Commission and the courts for interpretation.

This association secured from Congress the enactment of several important principles for the protection of the short and weak roads, but those provisions of the law will avail little if they be not properly construed and applied.

It is now quite apparent that there will be extensive litigation over the provisions of the transportation act; in fact, every principle incorporated, and almost every paragraph and line will, sooner or later, be presented to the court for adjudication, hence it is now, more than ever, important that there be a well organized legal department that can at least supervise, if it does not conduct, the litigation on the important questions as they arise.

The question of the valuation of short line railroads is now all important, and that class of roads are without an intelligent central organization charged with carefully guarding the legal rights of all concerned.

The association has heretofore employed counsel to conduct the mail pay case before the Interstate Commerce Commission in behalf of a part of its members, all of them not being interested alike. It has accomplished much for the members, but there is a large amount of additional legal work yet to be performed, and that work can not be successfully done by the attorneys of the members without special knowledge of the questions involved and located at distant points. The legal work in connection with the mail pay case must be continued.

We recommend the establishment of a legal department, and that in view of the fact that a large part of the work to be done will be for the benefit of all members alike, a part of the expenses should be paid out of the treasury. A large amount of the work will be performed primarily for the individual members, and provision should be made that such members shall pay to the legal department an agreed amount for services rendered, thus providing the funds necessary for that department.

Purchasing Bureau

Under existing conditions and practices, the great majority of short line roads are weak, very weak, in respect to their ability to purchase equipment, rail, fuel and all other necessary supplies. Many of the roads are so situated that they can acquire one or more of the articles necessary for the operation of their properties, at reasonable prices and under favorable conditions, but almost all of such fortunate roads cannot acquire many other necessary articles except at very full or high prices.

The annual purchases of the 820 short lines, consisting of 36,584 miles, aggregate many millions of dollars, and if concentrated in a single agency, would at least equal the total purchasing power of two of the largest railway systems in the country. At present, each of these lines purchase all material and supplies in the open market, and as a rule, pay the top market price. That practice has heretofore cost the short lines an enormous amount, and unless there is a change in the manner of making purchases, the high cost will continue.

This association has, in the past, purchased a limited amount of material and supplies for some of its members, and it has in that way demonstrated that the short lines can, by co-operation through the association, purchase anything from locomotives to pins or pens, including fuel and all other supplies of every character and description, at a substantial reduction over the prices paid under present practices.

We are of the opinion that the present is an opportune time for the establishment in the association of a purchasing bureau through which any member may purchase anything that it may require. That bureau, if established, should be under the full and complete control of the association, but the revenue necessary for its maintenance should, after it is firmly established, be derived from special charges or commission on the purchases made. In this way the members that will avail themselves of the benefit will pay, and members that do not use the bureau will not pay.

Our investigation of this subject has called attention to many things that can be accomplished. For example: The transportation act authorizes the Interstate Commerce Commission to order any carrier to purchase equipment, and it is apparent that it will require that all such shall be standard new equipment. Any road may be directed to purchase from say, 25 to 100 cars. Any road attempting to purchase such a limited number of cars will have to pay a high price therefor, whereas if a number of roads receiving such orders would combine, the purchasing bureau could purchase 1,000 or more cars at a substantially reduced price, and the interested roads would receive the benefit thereof. In addition to the low prices, the association acting for the bureau can, in some instances, obtain equipment under a car trust, and thereby greatly increase the benefit to be derived.

One of the things that the bureau can accomplish for many of the roads is the purchase of fuel. It can buy the output of mines and oil wells and distribute the fuel to interested lines at a substantial reduction in cost. Many other articles; in fact, most other necessary supplies can be purchased in large quantities through the bureau with advantage to all concerned.

It has been suggested that the purchasing bureau can arrange for fire, liability and indemnity insurance for such members as desire it, on terms more favorable to the roads than can be obtained by any individual road.

In addition to the direct benefit of lower cost and frequently better quality, that bureau can be made reciprocal as between many of the short lines. It can in many cases buy fuel on one such line and furnish it to, say, a line which produces lumber, and it can purchase lumber on that line and deliver it to the road that produced the fuel.

We suggest that this matter be considered by a committee appointed at this meeting, and that the delegates determine at this time whether a purchasing bureau shall be established.

Traffic Department

Many members have during the past few months urgently recommended that the association establish and conduct a traffic bureau, for the benefit of such members as desire to avail themselves of it.

The plan suggested involves three distinct kinds of service as follows:

1. That the bureau establish and conduct, in a number of the leading commercial centers, agencies to represent such members as desire it, in soliciting and procuring the proper routing and competitive traffic.

2. The preparation and filing of tariffs with the Interstate Commerce Commission and keeping close track of such matters, so that the interested member may at all times have its tariffs in legal shape and condition.

3. Have the traffic manager in charge of such bureau act in an advisory way and assist the members thereof in handling any and all traffic questions that may arise.

Many of our members that compete for business with other lines would gladly avail themselves of commercial agencies established by the proposed traffic bureau in the various commercial centers for two reasons; first, as a rule such members do not compete with one another; and, second, they can, through such a bureau, be represented by a number of agencies at a cost little more, if any, than it would take to maintain one or two agencies on its own account. Such members have advised that they will pay their proportionate part of the maintenance of such agencies as they authorize to represent them.

We also find that many of our members are now employing persons and concerns outside their own organizations to keep up and file their tariffs with the Interstate Commerce Commission; at least, a part of our members desire this association to perform that service for them and they have stated they will be willing to pay their proportionate part of the expense of the bureau.

The officers of the association recommend the establishment of a traffic bureau with the understanding that the members that avail themselves of its services shall pay an amount sufficient to maintain it, so that members that do not avail themselves of such services will not be required to make any payment in connection therewith.

We hope to obtain the services of the best traffic man possible to handle the bureau, if established, and it is expected that he will be able to give the members advice on traffic questions.

New and Future Conditions

The short line railroads are now governed by a new and an untried law. They are confronted with very greatly increased prices for every article necessary in the transaction of their business, and they are menaced by a demand for a large increase in wages.

A proper interpretation and application of the law must be secured; prices and wages must not be permitted to go beyond the ability to pay; and a substantial increase in the revenue must be obtained.

Over and above such conditions, the rail carriers as a whole have just entered the twilight zone of the campaign that is being conducted to deprive the owners of their property. The radical element of the country is determined to leave nothing undone to appropriate not only the railroads, but practically all other property. The radicals have selected the railroads as the first object of attack, hence we must meet the full force of the coming aggressive campaign.

All parties interested in the transportation problem are strongly organized and equipped for every emergency. The Interstate Commerce Commission is practically unlimited as to funds, and can engage an army of employees. A large per cent of the shippers are well organized through chambers of commerce, traffic leagues, etc., and they have all necessary funds to employ experts and able lawyers; the railroad employees have strong, virile organizations with large available funds for the purpose of obtaining what they want; the main line companies have one or more strong organizations with all necessary funds to employ experts, and strong lawyers for the purpose of protecting their interests; the radicals seem to have an unlimited amount of energy and ample funds, but notwithstanding the inherent strength and strategic position of the short lines, they are not so well organized. They are long on strength and influence, and short on funds.

The situation now demands that all short line railroads join in the work being done for the good of all, and if the large number of that class of roads do join together, they can, without any substantial financial burden upon any one, provide funds to meet any and all emergencies, and the question now is whether the members of this association will join in an active, aggressive campaign to enlist the co-operation of all.

Chairman Clark's Address

"The public must be willing to pay for the class of transportation that the public demands, and if the public is not willing to pay for the kind of transportation that it wants, it will have to be content with the kind it is willing to pay for," declared Edgar E. Clark, chairman of the Interstate Commerce Commission in his address.

Chairman Clark said the degree of successful administration of the new transportation law would depend on the co-operation between the commission, the carriers and the public, and that if all concerned viewed the situation from a broad standpoint and not from narrow, selfish interest, a system of transportation would be developed in the next five years that would not cause any one to desire to go back to old days. Abstract of this address follows:

I think the new transportation law represents what may be fairly termed to be the starting of private ownership and operation of the railroads on its last trial in this country, said Mr. Clark. I believe that if the experience of the next few years under this law are such as to be generally unsatisfactory; if it shall develop that under this law we cannot provide an adequate and efficient transportation system, such as the country desires, that government ownership will inevitably follow.

I do not believe that government ownership and operation of railroads in this country is the most desirable thing. In that connection I think that all of the responsible railroad officials should realize that each must do his part in providing the most thorough, adequate and efficient transportation system it is possible to build up.

To my mind the most striking thing about the new legislation is the very extreme and radical change in the governmental or public policy with regard to the regulation of railroads. Perhaps the most complete change is that with regard to pooling and the consolidation of competing lines and to such amalgamation of the different carriers into larger systems as will tend to increase the effectiveness and the efficiency of our transportation system and render a greater and a better public service.

The one thought that I want to bring to you in connection with the magnitude of the undertaking that lies before us all is that any substantial degree of success in the administration of the law and in experiences under it, must, as I see it, necessarily be obtained through a cordial, helpful, co-operation in good faith as between those who have the most direct influence and the most power to influence the result.

The Interstate Commerce Commission, the state commission, the representatives and officials of the railroads, the representatives of the shippers, the shippers themselves, must all contribute, each his share, in an earnest and help-

ful effort to contribute to the general welfare and good. I do not mean to suggest that anybody should completely submerge his interest or that he should prove absolutely false to any interests that are placed in his charge. I urge that every one take a broad view of the situation and look beyond the selfish interests that he may for the time being directly represent. I do not expect 100 per cent of that kind of co-operation, but I do confidently expect that among the great mass of the representatives of the railroads and of the shippers we will have that co-operation.

I believe we will have that same kind of co-operation at the hands of the state commissions. I believe that in the main and generally they are impressed, as the rest of us are, with the unusual conditions, the exigencies of the situation, and are possessed of a disposition to be helpful in so far as in their power consistently lies.

The powers of the commission which administers the statutes have been greatly broadened; they have been extended into new fields not heretofore occupied, and there has been left to the commission a very great power of discretion. It lays upon the commission a tremendous responsibility and our earnest hope is that the moral effect of those powers will be sufficient to meet all of the exigencies that may come without the necessity of resorting to an excuse of those powers in the full measure that is given under the law, and with this co-operation that I have spoken of, the necessity of such exercise of power will come seldom, if ever.

I am firmly convinced that we can accomplish great good for all interests and that the best measure of success can be attained in no other way if there be from the very start a thoroughly understood and persistently pursued policy on the part of the representatives and officials of the railroads and those of the shipping interests, in considering proposed changes in rates, proposed changes that affect the public, before an attempt is made to put them into effect. Every man feels a great deal better if any thing that he considers adverse to his interests is established against his wishes if he has had an opportunity to have been heard and to have expressed his views and have those views considered in a careful and thorough and proper manner. I believe that the relations that will exist in the minds of the public, and in the minds of the railroad officials, toward each other, that will result from that kind of a public, will contribute in untold degree to those better relations which are bound to result in benefit and in profit to both.

Your chairman has suggested that I would give you the point of view of the commission on some of the points of which are perhaps most intensely interesting in connection with this new legislation. I do not believe I can do that, because ever since the law became effective everybody who was interested in any particular phase of the law—and there are many of those phases, has rather expected that we would be able to hand him out our view on his particular point. The commission could not make a success of administering a law of that kind if it started out guessing at every point as fast as it was brought up.

To my mind the commission cannot be effective except in pursuit of a sound policy, and so we have been endeavoring, as best we could, with the commission not yet completed, to study some of these most important matters from the standpoint of policy. The Congress has appropriated $300,000,000 as a fund from which loans may be made to railroads in order to permit them to more adequately and satisfactorily serve the public, and the commission is charged with the duty of certifying to the Secretary of the Treasury when and in what amounts loans from that fund should be made. It has seemed to us that it would be a very easy matter in these days when everybody thinks and acts and talks in millions to parcel out that $300,000,000 in such a way that its influence would not be felt. We have been unwilling to undertake it, except under some definite policy, so that every move we make might be in harmony with that policy, and so that the fund may be made to go as far as possible in the direction that the Congress intended it should go.

No one questions that there is today a great need for the acquirement of additional cars and locomotives, and when we stop to think that under present day prices if we were to go out and purchase 100,000 ordinary freight cars the $300,000,000 would all be gone. I think it is easy to arrive at the conclusion that it would be unwise to expend from that fund, or to certify loans from that fund, until a study of the situation has demonstrated to the satisfaction of those who are charged with that responsibility that certain parts of it should be devoted at least to certain purposes. It may be that it will be possible to acquire equipment, depending somewhat upon the point of view of the Treasury Department under equipment trust obligations, in which event the payments from the loan fund provided by the government will permit of making it go three or four times as far as we would be able to go with it if 100 per cent of the purchase price had to be paid.

It is going to be necessary, in spite of all we can do and in spite of all of the aid that the government has proposed to furnish, either in the way of loans or in guarantees, for every railroad to acquire its equipment and to meet its financial needs just as far as it is possible to do it on its own credit.

The purpose of the Congress, has been, as I have said, to build up a system of transportation that is adequate and efficient. It has declared the purpose to make the users of that transportation system pay what is reasonable for the services which they get, and to afford to those who are owners of those properties a fair return upon the value of the property that they devote to the public use.

The intent of the Congress is clear. There are going to be a great many instances in which railroads can, with profit and in the interest of development of a good general transportation system, be merged into, by some arrangement, ownership, lease, or otherwise, a more prosperous and larger system, and so economies can be effected and better service can be rendered and better returns can be secured from the operation of those properties.

The plain intent of the Congress is that we shall work toward a limited number of large systems of railroads. It used to be thought that there were all kinds of evils and inequities in anything that savored of a consolidation of two railroads that could possibly compete with each other. I think that that policy, that thought, ignored the fact that unrestrained competition would inevitably work to a point at which those railroads, assuming equal vitality to start with, would have exhausted each other so that it would be impossible for them to properly serve the public or to make any return upon their properties. I have never believed that that policy was sound. I have believed and still believe, that so long as we have privately owned and operated railroads we shall have government regulation, and as long as the government exercises the right to regulate the charges that may be made against the public, to regulate the general conduct of the transportation company in its service to the public, I have never seen where there was any danger in that transportation company getting big, because I think it is a great deal easier to deal with a big, strong, healthy corporation organization than it is to deal with a large number of individuals that are in more or less distress.

Now, gentlemen, the one thing I want to do, and if I do that one thing I shall be content, is to bring to you the message that the members of the body of which I have the honor to be a member, realize the magnitude and the importance of this question; we realize that the admonition that all of these relations shall be just and reasonable means

that they shall be reasonable for the one and reasonable for the other, just to the one and just to the other, and that in so far as in us lies we shall endeavor to carry out to the fullest possible extent the intent of the Congress, without ignoring, of course, any fundamental principle or any substantive provision of the law, looking more to its intent and purpose and spirit than to a narrow interpretation that may be put upon it.

We invite your co-operation, we invite your assistance. We cannot do this alone. We have powers under that law to do almost anything, but if we sat down here and tried to do it in accordance with our own preconceived ideas or notions, and do it by mandatory orders, nobody would like what we did, and we would not like it ourselves when we looked back at it.

So I repeat I want to bring to you this message and I hope that it will go as far as the echoes of this convention may reach, that the needs of the hour, the needs of the coming day, the needs of the commerce, the industry, the happiness and welfare of our country, as well as the needs of all of the transportation systems large and small, that attempt to serve our public, demand the fullest co-operation in cordial spirit and in perfect good faith, as to all of which I have no question of doubt as to what the results will be, and have no doubt but that we will build up within five years a condition of affairs which no man would depart from to return to what now exists.

Representative Esch Reviews New Transportation Act

In a review of the legislative story of the enactment of the Transportation Act, Chairman John J. Esch, of the House Committee on Interstate and Foreign Commerce, gave great credit to the members of the Short Line Association for their assistance to the committee in preparing the bill that is now law.

After giving a chronological history of the legislation, Mr. Esch said that the rule for rate-making now in the law is the first great change that had been made in it since its original enactment in 1887.

"It is a new rule for rate-making," said the speaker. "It makes more definite the rate-making power of the commission. It imposes a new duty on the Interstate Commerce Commission. It gives confidence to the investing public. That was one of the arguments in favor of its enactment. It was a difficult task in coming to an agreement on it. More than once I left the conference room with a feeling of hopelessness. It seemed impossible to harmonize differences of opinion. It is the outgrowth of the fact that equal rates must be made on competitive traffic and when rates are equal, one road will make a big income while another will not make more than enough to live upon. But we agreed upon it and we have passed it along to the Interstate Commerce Commission, without regret, but with the hope that it will make a successful administration thereof. As a matter of fact we look forward to a successful administration of Section 422 of the Transportation Act.

"The committees of the two houses of Congress were opposed to government ownership, or government operation. They believed the people of the country were opposed. Government operation had not shown them benefits of quality good enough to warrant a continuance of control for five years, or two years or any period whatever. I am not here to criticize the director general. He had a great task. But the benefits shown by government operation were not such as to warrant a continuance. The conference committee threw out federal incorporation, compulsory consolidation and a transportation board. I did not notice that you were hot-footed for a transportation board. We believed it would divide authority and responsibility between the proposed board and the Interstate Commerce Commission. We were opposed to divided power or responsibility."

In conclusion, Mr. Esch bespoke cordial support for the Interstate Commerce Commission by the short lines.

"I know there is an impression abroad in the country that the new transportation law further contracts, restricts and hampers railroads," said Mr. Esch. "That is why I have called attention to some things in the statute of especial benefit to the short lines. But I also desire to call your attention to the fact that the new law sets aside restrictions that have been on the statute books for more than a generation.

"No great law is self-enforcing. There must be a human agency and to the extent that the human agency is given the support of those for whose benefit it is working, to that extent will the new law be a success. If the short lines, the big lines, the state commissions and the shippers give the Interstate Commerce Commission their support to that extent will be the success of the new law."

National Welfare Depends on Success of Private Railroad Management

"The short line railroads of the United States are a brotherhood of American initiative, energy, brains, pioneering, which are peculiarly characteristic of this country," said Samuel O. Dunn, editor of the *Railway Age*. "As I look over you gentlemen, I realize that in a sense you are the contemporary ancestors of the trunk lines, because, as Mr. Esch said, if there had never been any short lines, there never would have been any long lines. The American railway system exists as it does principally because of the courage and initiative of individual citizens, who first built the small lines, which have been merged into the large ones."

An abstract of Mr. Dunn's address follows:

Two great forces are now struggling for mastery in the industries and governments of every nation which, according to our modern standards, is civilized. On the one side are those who desire to accomplish the so-called "socialization" of industry and property. Opposed to those who advocate the "socialization" of all property and industry are those who believe that the continuance of the system of private ownership and management of property and industry will in the long run be better for the people as a whole, although none of them could deny that that system has serious faults, some of which can best be remedied by government intervention.

Whether private management of railroads will succeed or fail will doubtless depend principally upon the way in which, under the new legislation, the railways are regulated by the Interstate Commerce Commission, and are operated and conducted by their owners and managers. Upon the way in which they perform their duties probably will largely depend, not only the future of the railroads, but in a large measure the entire industrial and political future of the United States.

Some of the conditions are more favorable and some are less favorable to the success of private management than ever before. One of the favorable conditions is that after an experience of more than two years with government operation a large majority of the public is more friendly to private operation and therefore more disposed to be tolerant regarding its shortcomings and to give it a fair chance than it has been in many years. Another favorable condition is that the present trial of private management is being made under a law which is more intelligent and constructive than any other legislation, state or federal, for the regulation of railroads which has ever been enacted.

I do not think anyone would contend that the railroad law recently enacted is perfect. Probably it is significant, however, that the severest criticisms of it have come from those

who are opposed on principle to private ownership and management, and whose natural tendency, therefore, would be to find fault with any legislation which seems adapted to create conditions which would be conducive to the success of private management. There could be no higher tribute than this paid to the legislation because the government had a mandate from public opinion to return the railways to private operation. This being the case it was the duty of Congress to try to frame legislation under which private management could be made successful; and criticisms of the legislation from the opponents of private ownership and management are one good indication that Congress did succeed in drafting legislation adapted to create conditions conducive to the success of private management.

Among the circumstances which must prove a serious obstacle to the success of private management is the fact that private operation has been resumed with railway facilities which are utterly inadequate to the handling of the passenger and freight traffic of the country in a satisfactory manner. Even if the railways should begin at once an expansion of their facilities on a very large scale it would be months, and even years before they could increase them enough to give good service. One of the greatest dangers confronting private management is that the public will become very impatient with the service rendered before this deficiency of facilities can be remedied, and that its impatience will result in harmful agitation and ill-advised action.

Congress by implication recognized the existence of this inadequacy of railroad facilities by expressly directing the Interstate Commerce Commission in the regulation of rates to give consideration to the need of the country for adequate railroad transportation. The valuation of railways which the commission is making is not finished. The desire of Congress that the rates should be so fixed as to cause a revival of railroad development was made so plain, however, that I have never had any serious doubt that until its valuation is available the commission would take as a basis for the regulation of rates, if not exactly the book cost of the railways, some basis which would be substantially equivalent to the book cost. We know from the commission's statistics what percentages of return upon their book cost the railways have earned in the past, and we know that when within recent years the percentage earned upon book cost has fallen below 5½ per cent the development of the railways has slowed down. It is not conceivable to me that the commission, acting under the provisions of the new law, would fix rates that would yield returns which past experience has shown to be inadequate. As to the regulation of rates after the valuation is finished, I have no doubt that the aggregate valuation of the railways will be such that rates fixed to yield a return of 6 per cent or even 5½ per cent upon it will yield a return relatively as large as the railroads have had in the past.

If these assumptions are correct the returns which the commission is required to let the railways earn probably would prove sufficient, if the normal general financial conditions of the past prevailed, to enable the railways to raise large amounts of new capital. Unfortunately, another condition which is very unfavorable is the general financial condition. The war caused the destruction of vast amounts of capital, and at the present time the supply of capital available is much less than the amount needed to conduct and develop our various lines of industry. Many evidences of the existence of this condition might be cited, but the only evidence that need be mentioned is the current high rate of interest. Even if the Interstate Commerce Commission, in regulating rates, shall deal with the railways just as generously as the provisions of the new railroad law permit it to, it is clear that until general financial conditions improve the railway companies will have great difficulty in raising anywhere near as much new capital as they need.

Another very unfavorable condition under which private operation has been resumed is the labor situation.

Whether under such conditions, we shall find that the railroad problem can be solved under private management is obviously a question which nobody can answer at the present time. There is no doubt in my mind that the new legislation recently enacted would make it practicable to solve the problem under government regulation and private management if all those who are in a position to influence directly and in a substantial measure the course of events in the railroad field would act intelligently in accordance with a certain rule which ought to govern the conduct of every citizen of a democratic nation whatever his position in life. That rule is the rule of always considering first what policy apparently will in the long run most effectively promote the interest of the public and only secondly what policy apparently will in the short run most effectively promote the selfish interest of the individual or of the particular class or community of which he is a member.

George C. Taylor Discusses Express Contract

George C. Taylor, president of the American Railway Express Company, addressed the convention on business. He said the express company desires to continue as a consolidation and not as the four companies which were merged in it because the director general of railroads did not care to deal with four companies. He said the company has made contracts, of a temporary character, with the railroads formerly under federal control, that have 90 per cent of the mileage of the country. The temporary contract calls for the payment of 50.25 per cent of the gross receipts of the express company to the railroads which carry the express matter. The contracts expire on August 31, the end of the period of the guaranty of income by the government. He said the company expected soon to be ready to offer contracts to the short lines. His idea was to have the country divided into districts in which the contracts between the express company and the railroad companies in the district would be uniform. He indicated that, in his opinion, the difference in transportation conditions in the different sections of the country required some difference in the contracts.

"The idea, however, is to have uniform contracts for all railroads in a given territory," said Mr. Taylor. "That is to say, one short line in a given section shall have the same kind of contracts as its neighbors."

Mr. Taylor said that, as construed by the express company, the Transportation Act abrogated the contract between the director general and the express company and substituted therefor the 50.25 per cent division of receipts as to all roads that accept the six months' guaranty. As to roads that were not under federal control and have not accepted the guaranty, but did assign their old contracts to the new express company, Mr. Taylor said the contracts in effect before federal control continue until cancelled or expired by limitation.

"But I expect to be able to offer you a contract that you will be glad to trade for the old one," said Mr. Taylor. "I think it will be better for all of us to cancel the existing contracts and face the future together. But we cannot compel the cancellation of any contract that was in existence at the beginning of federal control, the holder of which was not taken over by the government and has not accepted the offer of a guaranty. Such a contract remains in force."

The matter of negotiating an express contract seemed so important that the convention carried a motion made by F. J. Lisman, directing President Robinson to appoint a committee of not fewer than five to consult with the express company. A suggestion was made that the subject

be placed in the hands of the traffic bureau the association may establish, but the convention voted it down.

Mr. Taylor assured a number of inquiries that even if the contract entered into between the express company and the director general had been abrogated, as the express company believed, there would be no change in the apportionment of expenses as between the express company and the short lines.

After Chairman Clark's address, the association adopted resolutions declaring and re-affirming its abiding confidence in the integrity of the Interstate Commerce Commission and expressing the belief that the situation that confronts the commission and the country may be successfully met if the railroads, employees and a substantial part of the public will support the commission in its discharge of its great and delicate task.

Committee Reports

Special committees were appointed during the meeting to consider the various recommendations made by President Robinson in his report. The report of the purchasing committee, of which Ross Beeson, traffic manager of the Salt Lake and Utah, was chairman, was adopted as follows:

The committee is of the opinion that the actual and potential power of the collective purchases of 820 short lines, with a mileage in excess of 36,000, and annual purchases of many millions, will be most strongly impressed upon those from whom the short lines purchase, if a central purchasing agency is created. The committee urges discussion looking toward definite action at this time, and as a basis for discussion—and it is hoped for action—the committee recommends

1. That a central purchasing agency be established under the direction of the president.
2. That the entire expense incident to the establishment and maintenance of such purchasing agency shall be met from the profits of the agency.
3. That the agency, by discount arrangements with dealers in railway supplies, by brokerage commissions and otherwise, shall assure itself of a sufficient income to pay all expenses and possibly in addition sufficient to pay a dividend on purchases to such member lines as use the agency.
4. That purchasing through the agency by member lines shall be optional, leaving to each line whether all or any part of its purchases shall be through the agency.
5. That after payment of operating expenses of the agency each year, any remaining profits shall be distributed as a dividend among the lines who have purchased through the agency during the preceding year, such dividend to be prorated equitably on basis of purchases made.
6. That the expense of establishing and putting into operation of this agency which will necessarily accrue before any operating profits are available shall be met by borrowing from the general fund of the association, but all amounts so borrowed shall be returned to the general fund out of the first available income, it being the intent that no part of the agency expense shall be met from assessments levied upon all lines generally.
7. That the president be charged with putting these recommendations into effect at the earliest consistent time.

The report of the finance committee, E. D. Luce, vice-president, Electric Short Line, chairman, which was adopted, authorized the executive board to recommend and establish rules for the collection of a proportion of the money ultimately collected under Section 204 of the transportation act by way of reimbursement for losses or decreases in income after the relinquishment of the short lines.

The legal committee, J. C. Rich, general counsel, Gulf, Mobile & Northern, chairman, presented a report, which was adopted, recommending that a law department for the association be established to take care of legal questions affecting the general interests of the association which may arise under the transportation act, excluding only questions affecting interests of a particular line or controversies between two lines, and that the president be authorized to employ such number of competent counsel as may be necessary to perform the work of the department and to fix adequate compensation for the services to be rendered. The executive board was directed to arrange some fair basis of assessment upon the membership to meet the expenses of the law department, it being understood that individual members desiring to make use of it in individual cases shall pay such additional amounts as may be agreed upon. The report also provided for the appointment of a standing committee of five to be appointed from the membership, to be known as the legal advisory committee.

The traffic committee, W. E. Halm, president, New York Dock Railway, chairman, presented a report, which was adopted, recommending the establishment of a traffic department at the Washington office of the association to furnish advice and assistance to the officers and members, its establishment and scope to be left to the judgment of the executive board. It was suggested that this department might afford possible sources of revenue by establishing offices at commercial centers to solicit business for such member lines as care to use such agencies and by acting as agent for the filing of tariffs with the Interstate Commerce Commission. A resolution was also adopted that efforts be made by officers of the organization to secure representation on the several regional and district freight traffic committees of one or more members of the traffic department of short line railroads.

The electric line committee, G. T. Detrick, president, Sacramento Northern, chairman, made a recommendation, which was adopted, that electrically operated member lines doing a general freight business be given representation on the executive, legal, traffic, purchasing, membership and other standing or special committees in order that the interests of the electric lines may at all times receive adequate consideration.

On motion of F. J. Lisman, it was decided to establish a publicity bureau under the direction of the president with the idea of furnishing information to be distributed to and by individual roads and especially with a view to furnishing acceptable letters to country newspapers.

The committee on car service, D. M. Swobe, vice-president, McCloud River, chairman, presented a report, which was adopted, expressing the opinion that the increase in the per diem rate from 60 cents to 90 cents and the discontinuance of the two days free time, is not in conformity with the intention of Congress as expressed in the act, to prevent a reduction in the net revenue of any railroad during the six months guaranty period. The committee, therefore, recommended that the president be authorized to notify the American Railroad Association of this resolution and to request it to rescind the action with reference to per diem rates and also to continue the practice of allowing short line railroads two days free time. Pending the outcome of the negotiations it was recommended that all members of the association make their per diem reports on the same basis as during the federal control.

The per diem question aroused considerable discussion, during which the point was made that the majority of the car-owning roads have accepted the guaranty under Sec-

tion 209 of the Transportation Act and, therefore, would not receive the benefit of the increased per diem rate, but that a large number of the short line railroads have not accepted the guaranty. About half of the members present indicated that their lines had not accepted the guaranty.

There was much discussion throughout the meeting as to the effect on the rates of the short lines of the provision in the Transportation Act providing for a 5½ per cent return on the aggregate value of railway property. In reply to various questions from members as to whether this contemplated that the short lines should receive a 5½ per cent return, President Robinson pointed out that no individual line is guaranteed 5½ per cent, but that the act provides that their divisions of through rates shall be sufficient to provide a fair return, which fair return is elsewhere defined in the act to be 5½ per cent. He also pointed out, however, that some of the trunk line roads participating in a division of through rates might not themselves earn 5½ per cent and that under some circumstances it would be practically impossible under any division of rates to give the short lines 5½ per cent. The remedy, he said, lies in the establishment of rates as a whole which will be sufficiently high that a fair division with short lines will give them adequate revenue. The Interstate Commerce Commission now has under consideration the question of the values to be used in computing the 5½ per cent return and the railway executives and some representatives of the short lines are acting jointly in trying to obtain from all carriers by a questionnaire, a statement of their financial condition and as to the value of their property. When that information is gathered it will be submitted to the commission at its suggestion, because the commission has asked the roads to assist it in arriving at the facts and in constructing the rate bases. His view was that the commission is exceedingly friendly to the short line interests and will go as far as it consistently can to give them adequate protection, but that if they do not furnish the information called for by the questionnaire their value is likely not to be taken into consideration. It was stated that there has been some difficulty in obtaining this information from the short lines as many of them have reported that they are too busy or too short-handed to compile the necessary data.

There was also a general discussion of the labor situation confronting the short lines, most of whom pay less than the standard rates of wages, but are now confronted by a general demand from the railroad labor organizations that minimum rates of pay be established for all railroads. Only seven or eight of the members present indicated that they paid standard wages, although two or three said that in some instances they were paying more than the standard wages because of competition with local industries. One road was paying 30 per cent below the standard rates. The opinion was expressed by several members that all the short lines might eventually have to pay standard wages and that this fact should be presented to the Interstate Commerce Commission for its consideration in establishing rates. No action was taken on the wage question as the matter is now before the Railroad labor board in connection with the wage demands of the employees' organizations.

The letter from Statistician Lorenz of the Commission, holding that short lines relinquished by the Railroad Administration are entitled to reimbursement only in case they have sustained an actual deficit during the period of federal control, was discussed and the matter was left in the hands of the officers to be handled in such manner as they see fit. It was stated that while one section of the act is apparently in conformity with the position taken by the commission, this is negatived by several other sections prescribing the method of computing the difference between the net operating income or deficit during the test period and the net operating income or deficit during the federal control period, and the opinion was expressed that it might be necessary to go to Congress and ask it to say more specifically what it was understood to have clearly intended.

Officers

Bird M. Robinson of Washington, D. C., was re-elected president of the association for the ensuing year, and the following were elected vice-presidents: B. S. Barker, vice-president and general manager, Gainesville & Northwestern, Gainesville, Ga.; L. S. Cass, president, Waterloo, Cedar Falls & Northern, Waterloo, Ia., and F. J. Lisman, of F. J. Lisman & Company, New York. T. F. Whittlesy of Washington, D. C., was re-elected secretary-treasurer.

Collection of Freight Charges

The Interstate Commerce Commission held a hearing on April 20 and 21 on the question of what rules and regulations it should prescribe to assure prompt payment of freight charges in accordance with Section 405 of the transportation act. The railroads, represented by Alfred P. Thom, counsel for the Association of Railway Executives, and others took the position that the commission should adopt a rule similar to that of General Order No. 25 issued by the Railroad Administration as amended and in effect on February 29, which Mr. Thom defined as providing for payment of freight charges within 48 hours except where a bond is required and within 96 hours when a bond is furnished. Various other representatives of the railroads also urged the importance of prompt collection of freight charges, not on the ground that they do not wish to help finance the shippers, but on the ground that the needs of the railroads for cash is so great that the shippers ought to assist them by paying freight charges as promptly as possible. The representatives of the shippers generally did not ask for the extension of credit for the sake of credit, but asked that a reasonable time be allowed for the receipt of freight bills and opportunity to check them, on the ground that there are a large number of incorrect bills rendered.

G. M. Freer, executive secretary of the National Industrial Traffic League, presented a recommendation expressing the views of a committee of the league for a rule providing that when approved by the proper officer of the carrier the remittance of a check on the business day following the delivery of the goods and receipt of the freight bills shall be considered cash payment, provided that in cases where the enforcement of the rule will delay the prompt forwarding or delivery of freight, the prompt release of equipment, or the congestion of station facilities or where it will deprive the shipper or consignee of reasonable opportunity to verify the correctness of its freight bills and thereby avoid the payment of overcharge, time for payment shall be extended and shippers or consignees shall be permitted to make not less than four monthly settlements. Other representatives of the shippers expressed approval of this plan, but many of them described practices common to their business which they thought would require special consideration.

T. J. Norton, of the Atchison, Topeka & Santa Fe, described the method of the collection bureau maintained by the railroads at Kansas City where he said experience has shown that disputed bills have amounted to only 2½ per cent of the total and that each day of extended credit would involve tying up $200,000 of the carriers' money for that city alone.

Chairman Clark suggested that the representatives of the carriers and shippers hold a conference and try to compose their views for the purpose of making a suggestion to the commission on the following day and such a conference was held, but Mr. Freer announced that in the absence of mem-

bers of his committee he was not empowered to accept certain suggestions offered by the railroads. The railroads proposed a rule that payment within 48 hours should be considered as cash and allowing 144 hours of credit under certain conditions including 48 hours for checking and paying undisputed bills, 48 hours with bond for making corrections, and 48 additional hours for disposing of bills which shippers might contend were incorrect, but which the railroads contended were correct. Mr. Freer stated that the statement made on behalf of the railroads that General Order No. 25 provides for payment within 48 hours being considered cash, was obtained by disregarding the rule and using an interpretation made by the railroad agents and by C. A. Prouty when he was director of public service and accounting of the Railroad Administration. A. B. Jones, treasurer of the Chicago & North Western; E. C. Rossiter, treasurer of the New York Central, and J. F. Fahnestock, treasurer of the Pennsylvania, described the advantages of the cash system of payment and urged the need of the railroads for prompt collections.

Commission on Car Service

The Commission on Car Service has issued a circular to the railroads under the caption, "What are the new Car Service Rules accomplishing?", as follows:

"The individual railroad may analyze this question to its own satisfaction, but all roads are interested in the progress which is being made throughout the country in the return of cars to the home lines. Seemingly, the rules are at least assisting materially, whatever other factors are present.

"On March 1, only 21.9 per cent of all revenue freight equipment was on the home line. This, by the way, was the lowest recorded percentage. On March 15, a gain had been made to 22.2 per cent. On April 1, the figures show 24.1 per cent of home cars on home lines—a net gain of 2.2 per cent or the equivalent of approximately 55,000 cars in 30 days.

"Now is the season of the year when grain cars should be moving to home lines in anticipation of this season's crop, but it is fully as important that the coal cars get home to meet the coal requirements which are constantly pressing, and particularly for the summer's business which bids fair to be a record breaker in all respects. The lake coal carrying lines have the heaviest program ever laid out for them—an increase of at least 25 per cent over last season, and greater even than the war season of 1918. These roads need their hopper cars and other high capacity equipment for this service. They must be protected. All roads are anxious to get their cars home that a better maintenance program may be carried out.

"It will be very helpful if all roads will issue instructions or precautions which will be instrumental in having Car Service Rules supervised to the greatest possible extent in the immediate future."

Another circular says that this season's crop of fruit and vegetables requiring the use of ventilated box cars, it is estimated, will be in excess of any previous period. It will be necessary, therefore, that ventilated box cars be withdrawn from other service and forwarded promptly to the owners empty via the most direct route, providing loading is not immediately available direct to southern territory, including Texas.

When moving box cars on Commission on Car Service orders care should be taken not to apply ventilated cars unless the order so specifies. Originating roads will economize on ventilated box cars by the use of ordinary box cars during the period weather conditions will permit. All railroads are asked to issue instructions in accordance with the above.

The Interstate Commerce Commission on April 20 made public a communication from the Commission on Car Service referring to a statement by the Minister of Railways of Canada, generally published in the newspapers last week, that 59,716 Canadian freight cars were in the United States. This statement, the Commission on Car Service said, is misleading as it seems to invite the inference that Canadian lines have suffered a depletion of car supply to that extent, whereas the fact is that at the latest date for which complete reports are available, April 1, although 54,401 Canadian cars were on United States lines, there were 36,245 cars on Canadian lines and the net balance against Canadian lines was, therefore, only 18,156 cars. The situation varies on different lines, the commission said, because some Canadian roads have on their own lines more cars than they own and the excess represents a surplus of equipment in the United States; also the situation as to Canadian lines on April 1 was practically normal, that is, while Canadian lines as producers of box car freight had less than their ownership of box cars, as non-producers and consumers of coal and other open top car freight they had a surplus above ownership of open top cars.

The commission has issued the following summary of general conditions as of April 16:

Box Cars.—As result adverse weather conditions and recent switchmen and marine workers' strike it has been impossible to relocate equipment to points of shortages in sufficient volume to materially relieve the general situation. Shortages ciency in the movement, placement and release of cars. The cooperation of shippers and consignees should be solicited for the more prompt loading and unloading, otherwise the approaching seasonal movements will further materially increase the existing shortages.

Automobile Cars.—Demand continues and in excess of the supply, making it necessary to move promptly this class of equipment and handle strictly in accordance with Car Service Rules and special instructions.

Flat Cars.—Special attention should be given repairs and movement. Shortage exists in all sections but more particularly in the central and southeastern states. Flat cars should be used only for loading commodities that cannot be accommodated with other types of cars.

Stock Cars.—Demand is easier except in the Texas territory. To relieve box car shortages, this class of equipment should be used to fullest extent for miscellaneous loading after live stock requirements fully protected, confining the loading as far as possible to or in the direction of live stock loading territory, with due regard to Car Service Rules.

Open Cars.—The interferences of Easter Holidays and labor difficulties in a number of the principal gateways through which open top cars normally move resulted in a coal production in the first half of April slightly below March average. All roads are now concentrating on rushing home the cars owned by lines serving Lake Erie ports to care for the unusually heavy tonnage of coal and ore which it is contemplated will move during period of open navigation. An acute shortage of mill gondolas exists in the Pittsburgh-Youngstown district and it is imperative that this class of equipment be handled to home roads as expeditiously as possible. Stone, sand and gravel are receiving practically full car supply with some few exceptions on coal loading railroads where they are restricted to a pro-rata basis owing to necessities for coal.

Refrigerator Cars.—Interruption in movement of empties and loads account strikes at principal gateways has rather upset the refrigerator situation, and until the labor trouble is adjusted normal loading of perishables will probably not be resumed. The situation will, however, call for extra attention when the movement again starts in order to overcome the delays due to the strike.

Increasing Efficiency and Capacity of Locomotives*

Feedwater Heaters, Trailer Boosters, Lighter Rods and Cut-off Regulations Will Improve Performance

By B. B. Milner,
Engineer of Motive Power and Rolling Stock, New York Central.

IN DISCUSSING METHODS OF INCREASING the efficiency and operating capacity of steam locomotives, I shall pass over the well-worked questions of maintenance, fuel, feedwater treatment, lubrication, stokers and the whole unlimited question of locomotive design by confining my remarks to a very few operating efficiency and capacity increasing adjuncts which I believe important because susceptible of profitable application to existing power.

Feedwater Heaters

First, I shall suggest one locomotive accessory, which in my judgment stands out with surpassing and immediate importance, viz.: the feedwater heater, an instrument by means of which a portion of the heat ordinarily rejected at the stack of a locomotive may be conserved and used by abstracting this heat from either the smokebox gases or the exhaust steam, and using it for the preheating of feedwater. Thus far the heat source of the more successful schemes for thus conserving the ordinarily rejected energy has been the exhaust steam. These schemes involve replacement of the injector. The injector is a 100 per cent instrument from the standpoint of returning to the boiler all of the heat energy delivered to it from the boiler in the form of operating or driving steam, and it does most efficiently take feedwater at ordinary temperatures and deliver it to the boiler. The energy of the steam supply is divided between elevating the feedwater temperature and imparting to it the kinetic energy necessary to drive it into the boiler, and there is practically no heat lost. Against this arrangement, a saving must be represented in elevating the temperature of the feedwater by the use, not of heat drawn from the boiler, but of heat otherwise rejected at the stack, provided, of course, that the energy consumed by the mechanical operation of the feedwater heating means does not approach closely the quantity of heat caught and used instead of being rejected. A number of such means are now currently and regularly raising the ordinary temperature of locomotive feedwater—say, from 62 deg. F. to approximately 212 deg. F.

Twenty or more years ago, the late M. N. Forney introduced a paper on the feedwater heater with the following statement: "To convert one pound of water of zero temperature into steam of 200 lb. pressure requires 1231.7 units of heat; a unit being the amount required to raise one pound of water one degree. If the average temperature of water in a locomotive tender is 60 deg., then 1231.7 — 60 = 1171.7 units of heat must be imparted to it to convert it into steam of the pressure named. One per cent of that will be 11.71 units, so that if each pound of feedwater is increased that many—or say 12 deg. in temperature, by waste heat, before it enters the boiler, it will be equivalent to a saving of one per cent of the fuel required to convert it into steam. This is true theoretically and has often been proved practically." Therefore, a locomotive feedwater heater which raises the temperature of feedwater through 150 deg. F., gives a fuel saving of over 12 per cent—a considerable margin of saving upon which to work.

It therefore appears that the problem of successful feedwater heating by means of exhaust steam should not involve any elaborate tests, particularly directed to the ever difficult weight and work measurement of fuel economy, but may and should be properly restricted to the mechanical performance of the feedwater heating instrument, the reduction in the cost of its maintenance and the development of assured continuity of service. We are dealing with such a large actual economy that the carriers may well afford the expenditures involved in the contribution to more definitely establishing the solution of the mechanical problem involved, without any particular concern for the question of what may be the thermal results upon which actual savings in fuel consumption must necessarily be based; that is, they may well afford active contribution to the working out of whatever mechanical difficulties may yet have to be met by the application and use of feedwater heater equipment now available or hereafter developed for locomotive service.

The above has been addressed particularly to the question of efficiency or economy. The question of capacity is also favorably affected in that not only is heat reclaimed from the exhaust and used, but the condensed steam as well. And to the extent that condensation is so reclaimed, it is returned to the boiler, thereby reducing the quantity of water which must be supplied to the locomotive tender for covering a given amount of work. The quantity of steam reclaimed from the exhaust figures about 15 per cent. This means that a locomotive tender of given capacity will cover an amount of work that much greater; that either the work per unit of time may be correspondingly increased or, if this work remains constant, it may be continued for a correspondingly greater distance or time. Every pound of steam reclaimed from the exhaust reduces by that amount the weight of tank water which must be evaporated.

Trailer Booster

There has been recently developed what has come to be known as a "booster," consisting of an ordinary reciprocating steam engine geared to the locomotive trailer wheels, designed for use as may be required in the starting of trains, getting them to speed the more promptly, or both, by adding to the tractive efforts ordinarily developed at the lower speeds.

The operation of this booster is controlled by air pressure. At the front end of the reverse lever quadrant is provided a manually operated latch, by means of which the booster is made "normally" inoperative or operative when the reverse lever is in the extreme forward position. With this latch in the operative position, the reverse lever, when pushed "into the corner" engages an air valve which permits air pressure to pass from the main reservoir to the booster clutch cylinder, and thence to what has come to be known as the pilot valve, mounted back of the boiler dome. When the main throttle is opened, a supply of steam from the dry pipe to this pilot valve causes it to permit air pressure from the booster clutch cylinder to open the booster throttle valve. When the reverse lever is pulled "from the corner" or the latch at the front end of the reverse lever quadrant is "thrown out," the booster's steam supply is cut off and the booster clutch immediately disengaged. The apparatus is, therefore, protected against damage from broken pipes, lack of air, or damage from other possible cause. When the booster is not in use, it is "out of gear" and idle, none of its parts being

*From a paper presented before the New York Railroad Club, April 16, 1920.

in operation, and the performance of the locomotive then being in no way affected by reason of the booster application.

Characteristic drawbar pull and horsepower-speed curves taken from dynamometer car data are shown by Fig. 1, from which it will be noted that the initial drawbar-pull is, by use of the booster, increased from some 37,000 lb. to 47,000 lb., that the increase in drawbar-pull and the horsepower begins to diminish perceptibly at about 15 miles per hour, and that the booster becomes a load upon the regular locomotive cylinders at speeds approximating 20 miles an hour. Recalling, however, that the booster operation is discontinued by removal of the reverse lever "from the corner," it will be understood that interruption of booster operation is assured for quite some time before having attained even the speed of 15 miles per hour, at which the advantage in the use of the booster begins to appreciably diminish; that is, long before the diminution of this advantage occurs, and much longer before there is any possibility of the booster becoming a load on the main cylinders, the booster will always have been thrown out of gear. Fig. 1 also discloses the wide margin in the ability of the boiler to supply the booster with steam, as has been proven in service, and becomes very apparent by realization of how small are the horsepower outputs from the start up to speeds at which the booster will be thrown out of gear, in comparison with the much larger horsepowers for which locomotive boilers are amply able to supply the necessary steam.

The booster, as a means of helping existing locomotives

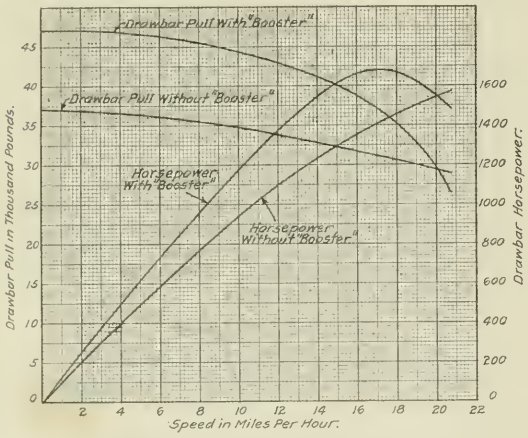


Fig. 1. Drawbar Pull and Horsepower, with and without Trailer Booster

through work which they are now only able to do with difficulty, if indeed they are able to do at all, will result in the satisfactory handling of larger trains, increased acceleration rates, or both. Increased acceleration should be particularly valuable in frequent-stop passenger service, and the higher initial or starting drawbar pulls and the ability to start heavier trains should be valuable in both freight and passenger services under what are now trying, if not prohibitive, starting conditions. The booster is applicable to most existing trailing wheel locomotives, and should materially increase the efficiency of operation, particularly from the standpoint of the locomotive being a transportation producing instrument.

The curves in Fig. 2, however, show clearly the advantages of the booster use from an acceleration standpoint, the train hauled being one consisting of 2,210 gross tons in 104 cars on a slightly opposing grade. Note, for example, that without the booster the speed of 16 miles an hour was obtained in 450 seconds, while with the booster this speed was obtained in 250 seconds or in nearly 50 per cent less time, amounting to over three minutes. The arrangement will undoubtedly prove a valuable addition to many existing trailing wheel locomotives which have become inadequate to serve needs on account of deficiency in starting capacity, and also valuable for new trailing wheel locomotives in that greater starting power and capacity may be obtained without increasing the boiler, number of driving wheels, or materially increasing weights.

Dynamic Augment

Another way to increase the operating capacity of locomotives is to lighten the reciprocating and revolving weights by the use of alloy steel. This will permit of increasing the

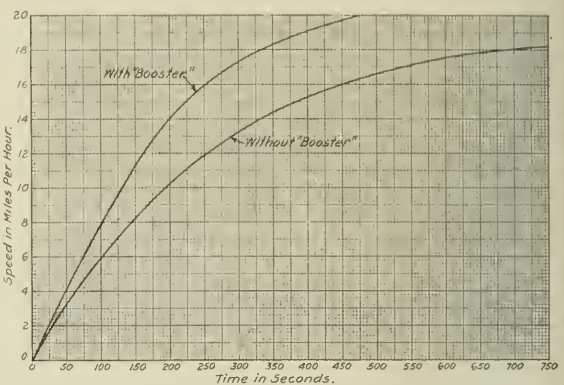


Fig. 2. Curves Showing Increased Acceleration Secured with Booster

weight of the boiler without increasing the rail pressure at speeds. In fact, the rail pressure at speeds may be actually reduced with even heavier boilers by reducing the dynamic augment of the balancing forces. This subject is sufficient for a paper by itself and may be only mentioned here.

Proper Cut-off for Maximum Horse-Power

One of the most important factors in locomotive operation and one to which very little attention has been paid, is the

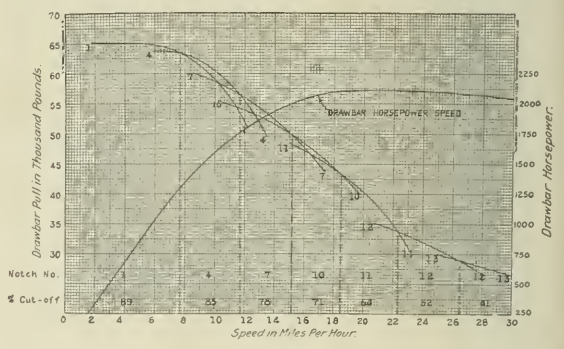


Fig. 3. Composite Drawbar Pull-Speed Curve

science involved in selecting the proper cut-off or the reverse lever locations required at various speeds for the development of maximum horsepower or drawbar-pull. Everyone probably knows that for any and each particular speed, there is only one reverse lever position or cut-off at which the locomotive will deliver its maximum in either horse-power or drawbar-pull; that is, if this reverse lever position be notch No. 7, cut-off 78 per cent, at say, 14 miles per hour, in any

other reverse lever position and at any other cut-off, either greater or less, the locomotive will not deliver the maximum at this speed. But how do enginemen actually select various reverse lever positions at various speeds, or how have they been taught to select them when maximum horsepower or draw-bar pull output is desired or actually required in order to go through a "tight" situation either on account of the liability of "sticking" or of failing to make satisfactory time. I suggest that to have done so little for enginemen in this connection is, to say the least, somewhat of a reflection. To spend time and money in the arrangement and design of a locomotive, which in these days represents an investment of $60,000 or more, and then turn such an engine over to enginemen to run "catch as catch can," so far as concerns cut-off selection, is not very creditable.

The graphic chart, Fig. 3, shows the general relations existing between speeds and the drawbar-pulls developed by the use of the various constant cut-offs as represented by reverse lever notches, numbered 1, 4, 7, 10, etc., consecutively from the most forward or longest cut-off reverse lever position. In accordance with facts, this chart indicates that initial drawbar-pull at zero speed, or when starting, decreases with decreases in the cut-off used; that is, a longer cut-off will develop a higher initial drawbar-pull, whereas a shorter cut-off will develop a correspondingly lower initial draw-bar pull. This chart also indicates that at successively higher speeds successively shorter cut-offs develop maximum draw-bar pulls, or that, for any speed there exists a definite cut-off at which the draw-bar pulls will be maximum and the selection of any other than the "maximum draw-bar-pull cut-off," will develop a lesser drawbar-pull.

It becomes, therefore, apparent that some knowledge of the precise cut-offs or reverse lever positions, which at various speeds will result in the development of the desired maximum drawbar-pull, must obtain and be used if maximum results are to be secured. What I have said covers the situation in a general way, but there remains the problem of how the necessary cut-off-speed-drawbar-pull data may best be obtained, and having obtained it how use may be made thereof. By inserting a second speed controlling engine between the dynamometer car and the train the drawbar-pulls developed by the first or leading engine ahead of the dynamometer car and under test, may be very easily obtained for all desired speeds. In Fig. 4 are shown the results of four tests made with the same engine and same train on the same day over a ruling grade indicating the advantage of using proper cut-offs.

All of the information, supplemented only by a watch, used in making the fourth and successful run covered by Fig. 4, is shown by Fig. 5, which presents the front and back of conveniently arranged vest pocket cards for the use and information of enginemen. This information is sufficient for them if they be careful, painstaking and understanding, but it must be freely admitted that the very neat selection of cut-offs from this card information cannot be expected or depended upon, because all attention possible may not be enough and enginemen have other matters for their thought and time. It is suggested that the development of automatic means of taking care of this cut-off selection matter remains to be worked out, and there is reason for believing that several mechanical schemes for covering the matter will be developed into practical form, and that, in due course, enginemen will be relieved entirely of attention to reverse levers and cut-off selection, except where less than

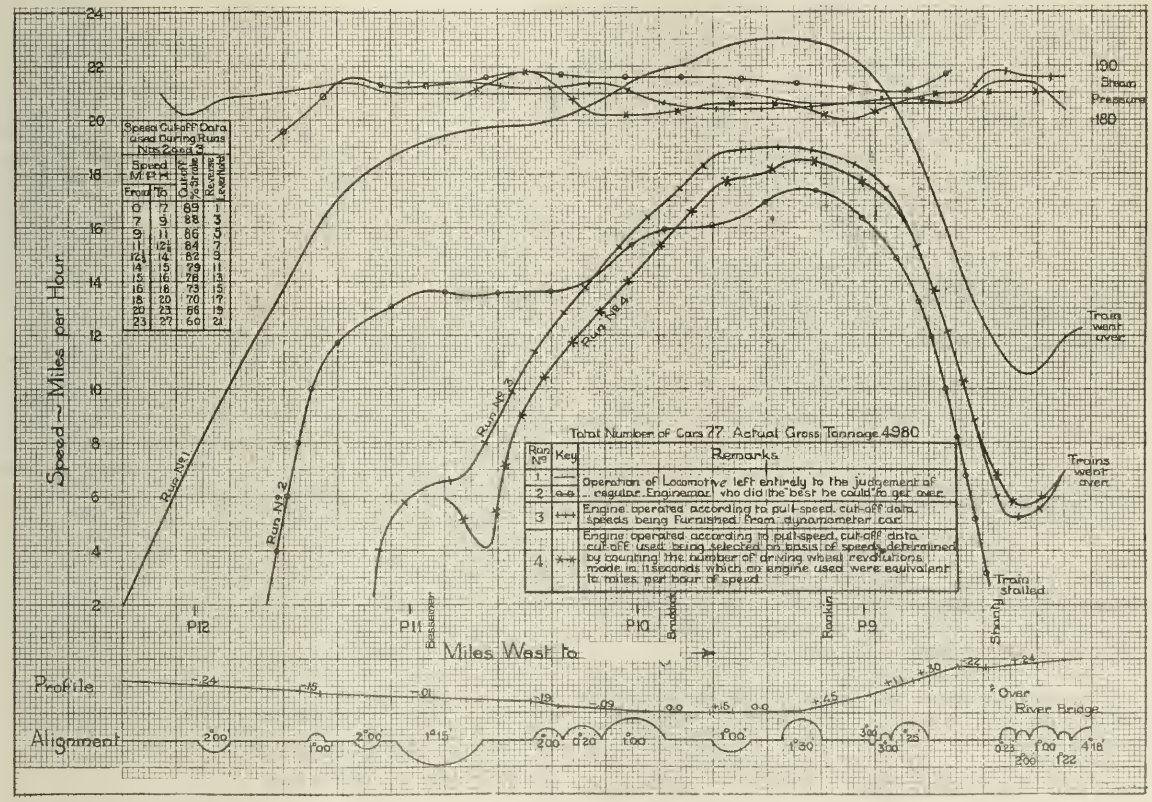
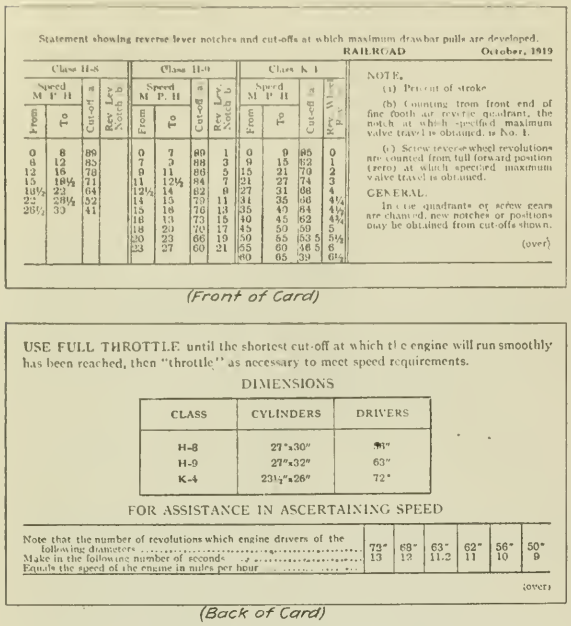


Fig. 4. Graphic Chart of Four Runs, Indicating the Advantage of Using Proper Cut-Off

maximum output is desired, under which conditions the engineman's mind will continue to be required, as at present, for following instructions to "use full throttle until the shortest cut-off, meeting the speed and load requirements, or the least at which the engine will run smoothly has been reached and thereafter 'throttle' as necessary to meet speed



Statement showing reverse lever notches and cut-offs at which maximum drawbar pulls are developed.

RAILROAD October, 1919

Class H-8 Speed M. P. H. From	To	Cut-off a	Rev. Lev. Notch b	Class H-9 Speed M. P. H. From	To	Cut-off a	Rev. Lev. Notch b	Class K-4 Speed M. P. H. From	To	Cut-off a	Rev. Wheel Pos.
0	8	80	7	0	7	80	1	0	9	85	0
8	12	85	7	7	9	88	3	9	15	82	1
12	16	78	6	9	11	86	5	15	21	79	2
15	18½	71	5	11	12½	84	7	21	27	74	3
18½	22	64	4	12½	14	82	9	27	31	68	4
22	28½	52	3	14	15	70	11	31	35	56	4¼
28½	30	41	2	15	18	76	13	35	40	64	4½
				18	19	77	15	40	45	62	4¾
				18	20	70	17	45	50	59	5
				20	23	66	19	50	55	53.5	5½
				23	27	60	21	55	60	46.5	6
								60	65	39	6½

NOTE.

(a) Percent of stroke.

(b) Counting from front end of fine tooth air reverse quadrant, the notch at which specified maximum valve travel is obtained is No. 1.

(c) Screw reverse wheel revolutions are counted from full forward position (zero) at which specified maximum valve travel is obtained.

GENERAL.

In case quadrants or screw gears are changed, new notches or positions may be obtained from cut-offs shown.

(over)

(Front of Card)

USE FULL THROTTLE until the shortest cut-off at which the engine will run smoothly has been reached, then "throttle" as necessary to meet speed requirements.

DIMENSIONS

CLASS	CYLINDERS	DRIVERS
H-8	27"x30"	80"
H-9	27"x32"	63"
K-4	23½"x26"	72"

FOR ASSISTANCE IN ASCERTAINING SPEED

Note that the number of revolutions which engine drivers of the following diameters	73"	69"	63"	62"	56"	50"
Make in the following number of seconds	13	12	11.2	11	10	9
Equals the speed of the engine in miles per hour						

(over)

(Back of Card)

Fig. 5. Data for the Guidance of Enginemen in Selecting Cut-Off.

requirements." Essentially these instructions are exhibited upon the back of the enginemen's card referred to, and shown herein as Fig. 5.

Discussion

W. E. Woodward (Lima Locomotive Corporation) referred to a recent comparison of electric and steam locomotives in which the average coal consumption per horsepower-hour for steam locomotives was given as 7.86 lb. These tests were conducted several years ago and the results of recent road trials showed the comparable figure for modern locomotives to be between 3.4 and 4.0 lb., showing that a considerable increase in efficiency had been effected in the last few years. Mr. Woodward pointed out that a reduction in the dynamic augment is a promising method of increasing the capacity and efficiency of locomotives. The limit of driving wheel loads has now been reached, but there is no reason why the static load cannot be increased if the pressure on the rail at high speeds developed at present is not exceeded. By reducing the dynamic augment the weight on each pair of driving wheels could be increased 10,000 lb. and this increased weight could be utilized in capacity or efficiency increasing devices. The trailer booster gives a considerable increase in the drawbar pull, with a slight increase in weight and cost, and in Mr. Woodward's opinion represents the most practical method yet devised to utilize the potential boiler capacity of the locomotive at low speeds.

George M. Basford (Locomotive Feedwater Heater Company) referred to the fact that the stability of the railroads depends on whether railroad securities are attractive to the investor, and mentioned the appliances discussed in the paper as means by which the investment in locomotives could be made to bring a higher return. Describing the performance of feedwater heaters Mr. Basford stated that temperatures as high as 250 deg. F. had been obtained with the closed type of heater, effecting a saving of 15 per cent. He called attention to the incidental increase in boiler efficiency resulting from the lower rate of combustion and evaporation, which cause an additional gain of about four per cent. Mr. Basford expressed the opinion that the field for the trailer booster was not confined to freight locomotives, but on passenger power this device would prevent delays and improve operating conditions.

W. D. Wood (Fuller Engineering Company), submitted data to show the possibility of increasing efficiency by the use of pulverized coal. He stated that a mixture of bituminous coal with 38 per cent anthracite silt having a heating value of approximately 11,800 B.t.u. per pound, was developing an actual evaporation of 6.5 to 7 lb., or an equivalent evaporation of approximately 8 lb. per pound of fuel.

Commission Reinstates "Assigned Car" Rule

FOLLOWING FAILURE of the representatives of the railroads and of the National Coal Association to agree on plans for the handling of coal cars in such a way as to assure the railroads a necessary fuel supply without confiscation, the Interstate Commerce Commission on April 15 issued an order reinstating the "assigned car" rule by which railroads may assign cars for railroad fuel loading, that was in effect before it was abolished during the war by the Railroad Administration at the instance of the Fuel Administration.

When the government's regulation of the coal industry was removed on April 1 the priority list by which the railroads had been able to obtain coal went by the board and several of the roads were left in a precarious situation unless they should confiscate coal. Negotiations with the Interstate Commerce Commission and the coal operators were taken up by representatives of the Commission on Car Service in an effort to reach an agreement but the assigned car rule and the practice of confiscation are both objected to by many of the operators and it became necessary for the commission to act. The rule reinstated by the commission's order was put into effect several years ago and has been sustained by the Supreme Court. The order follows:

"The supply of cars available for the transportation of coal continues insufficient to meet the demand. In view of the cessation of government control of coal production and distribution, effective April 1, 1920, and in order that railroad fuel requirements may be reasonably met without the necessity of carriers resorting to confiscation of commercial coal, it becomes necessary to amend our notice to carriers and shippers dated March 2, 1920, and our recommendation therein to read as follows:

The commission recommends that until experience and careful study demonstrate that other rules will be more effective and beneficial, the uniform rules as contained in the Railroad Administration's Car Service Section Circular CS 31 (Revised) be continued in effect, except that rule 8 as contained in said circular should be amended to read:

"8. Private cars and cars placed for railroad fuel loading in accordance with the decisions of the Interstate Commerce Commission in *RR. Com. of Ohio, et al.*, v. *H. V. Ry. Co.*, 12 I. C. C., 398, and *Traer* v. *Chicago & Alton Railroad Co., et al*, 13 I. C. C., 451, will be designated as 'assigned' cars. All other cars will be designated as 'unassigned' cars."

"The commission is of opinion that an emergency exists requiring immediate action, and in exercise of the authority conferred by paragraph (15) of Section 1 of the Interstate Commerce Act, as amended by Section 402 of the Transportation Act, 1920, hereby suspends the operation of the existing Rule 8 and directs the observance of all carriers by railroad subject to the Interstate Commerce Act of Rule 8 modified as above, effective April 16, 1920, and until the further direction or order of the commission."

The Commission on Car Service has sent out copies of the commission's order in a circular, calling attention to the fact that it is mandatory.

Railroad Labor Board Begins Wage Hearing

Representatives of "Outlaw" Strikers Denied Hearing and General Demands Taken Under Consideration

WASHINGTON, D. C.

REPRESENTATIVES of the "outlaw" strikers were refused an immediate hearing before the Railroad Labor Board on Monday, on the ground that they had not complied with the terms of the law under which the board was appointed and that cases brought before the board in accordance with the procedure outlined by the law were entitled to precedence. The "outlaws" were, however, allowed to file written complaints and requests for a hearing with the secretary of the board and public hearings were begun on Tuesday on the general wage demands filed with the Railroad Administration last year by the "standard" railroad labor organizations on behalf of all classes of employees, which it has been estimated would add over $1,000,000,000 a year to the railroad payroll.

E. A. McHugh of New York, who claimed to represent 8,000 members of the Railroad Workers of America from the vicinity of New York, applied on Monday for a hearing. W. N. Doak, vice-president of the Brotherhood of Railroad Trainmen, protested against a hearing of the representatives of the strikers on the ground that officers of the "standard" organizations were present to represent the railroad employees unless they had quit their jobs, in which case, he said, they were no longer employees of the railroads nor members of the unions.

The board went into executive session after which it issued the following Order No. 1:

"It is decided and ordered by the board as one of the rules governing its procedure that, as the law under which this board was created and organized makes it the duty of both carriers and their employees and subordinate officials having differences and disputes to have and hold conferences between representatives of the different parties and interests, to consider and if possible to decide such disputes in conference, and where such dispute is not decided in such conference to refer it to this board to hear and decide; and as it is further contemplated and provided by the law that pending such conference, reference to and hearing by this board it shall be the duty of all carriers, their officers, employees and agents to exert every reasonable effort and adopt every available means to avoid any interruption to the operation of any carrier growing out of any such disputes; therefore, this board will not receive, entertain or consider any application or complaint from or by any party, parties or their representatives who have not complied with or who are not complying with the provisions of the law or who are not exerting every reasonable effort and adopting every available means to avoid any interruption to the operation of any carrier growing out of any dispute between the carrier and employees.

"Any party or parties, person or persons desiring to bring before or securing a hearing by this board of any complaint, grievance or dispute, must first file with the secretary of the board a complaint or application in writing, showing by express statement and facts set out, among other things, that the dispute is one which this board is authorized to hear and decide and that the petitioners or applicants belong to the class or classes of persons or carriers authorized to make such application and that the applicants have been and are complying with the requirements and provisions of the law.

"When so filed and docketed by the secretary, it shall by him be brought to the attention of the board which will then make such orders as to notice, answers of parties affected and further hearings as in its opinion the nature and character of the matter involved may require.

"All applications and cases presented will be considered and decided in the order in which they have been filed with the board unless in the opinion of the board the public interests require a change of precedence. All motions or requests to expedite the consideration of a case must be made in writing, stating reasons, and filed with the secretary. All applicants shall comply with all other rules of procedure hereafter adopted by this board."

Representatives of the principal railroad labor organizations and members of the conference committee representing the railroads, of which E. T. Whiter is chairman, were on hand for the hearing on Tuesday and the first statement was made by W. N. Doak, on behalf of the Brotherhood of Railroad Trainmen. He said he would be followed by representatives of the other organizations. R. M. Barton, chairman of the board, said the board could not devote all of its time to hearings but must hold executive sessions for the purpose of looking after the many details of its organization, etc., and arrangements for opening headquarters at Chicago.

Mr. Doak's opening statement was interrupted by W. A. Robinson of the Chicago Yardmen's Association, who asked whether this was the proper time to file papers with the secretary. Chairman Barton said that the board could not allow the pending case to be interfered with, but that all times were proper to file any request with the secretary. Mr. Doak interjected that the Brotherhood of Railroad Trainmen and the Switchmen's Union represented all the yardmen in Chicago that are legitimate railroad employees. Chairman Barton then made an explanatory statement referring to the order issued by the board outlining a form of procedure which he said was clear and should be followed. He said the board has only the powers conferred upon it by the law and it is subject to the limitations imposed by the law. The law prescribes the class of controversies it may handle, which include controversies between carriers and their employees or subordinate officials. It is not a general grievance board for the United States, he said. The board understands that there are controversies between organizations whose requests have already been filed with the board and certain other organizations or unorganized employees, but it has no interest in or disposition to take part in any such controversies. The case regularly before the board, he said, had been before other boards and had been accepted by this board and, therefore, will be allowed to be presented to it unhampered. The board, however, is not limited to what may be presented to it, but is authorized to summon witnesses and obtain any information it needs, which it will seek from such sources as it deems proper.

The doors of the board are open to every one that is entitled to hearing under the terms of the law and any one desiring a hearing can file an application with the secretary and if, in the opinion of the board, they come within the provisions of the law they will be heard in the order in which they are filed and properly come before it except that emergency matters may be given precedence.

Mr. Doak began by naming the various classes of employees for which he said the Brotherhood of Railroad Trainmen is authorized to speak and he outlined the history of the demands to show that the provisions of the law had been complied with. He said that at the time the railroads were taken over by the government the organization had an understanding with the President that their existing contracts would remain in effect except as amended by wage orders of the Railroad Administration, that it had issued various

orders and that on July 3, 1919, the brotherhood had presented to the Board of Railroad Wages and Working Conditions the same request which is now being presented to the Railroad Labor Board. Hearings were held before the Board of Railroad Wages and Working Conditions, but no decision had been made because the President had directed that no general increases in wages be allowed pending the efforts of the government departments to reduce the cost of living. In acordance with the President's request after the termination of federal control, the demands had been referred to a bi-partisan conference which had failed to come to any agreement and the demands were appealed to the Railroad Labor Board with a request for prompt consideration. Mr. Doak added that the provisions of Section 301 as to conferences with the railroad companies prior to taking the case to the board had not been complied with as to all lines but that the demands would be presented to all lines and a report would be made. This apparently referred to the fact that the demands had not been presented to the short lines, who were not represented by the railroads' conference committee.

Mr. Doak said that the brotherhood took the position that the present wages of trainmen are out of keeping both with the cost of living and the wages paid in outside industries, that the lower paid men cannot get along on their present wages and that the demands were predicated on a minimum of $150 a month for 26 days, or $5.77 a day as the lowest possible wage on which a man could be expected to live and maintain a family in accordance with the American standard of living. The various rates had been built up from this minimum by various differentials, taking into consideration the different classes of service and degrees of responsibility and predicated on the assumption that the wages of brakemen and flagmen should be not less than 75 per cent of the conductors' rate and of baggagemen not less than 80 per cent. He said that the rates proposed provided for increases ranging from $1.77 to $2.00 a day, or from 41 to 47 per cent over the rates in effect under Railroad Administration orders and that the requested rates were formulated last June, since which the cost of living has been increased nearly 20 per cent.

Mr. Doak took up each of the 22 articles of the trainmen's demands, which include time and one-half for overtime in passenger service as is now paid in freight service, and also time and one-half for Sundays and seven holidays. A. O. Wharton, a member of the board, asked how the guarantee of pay for 26 days a month had been arrived at in view of the fact that seven holidays and Sundays would allow only 25½ days of straight time. He took the position that the employees ought not to request service and pay on days for which they asked for time and one-half for overtime, presumably on the ground that they should not be requested to work on those days, but should be allowed the time for rest and recreation.

Mr. Doak said there was no desire to take advantage of the doubling up and that he appreciated the point, but that 26 days had been used instead of a figure representing a fraction of a day. Mr. Wharton suggested that the subject be given further consideration later. The request also provided for a differential of 10 per cent for divisions on which there is a grade exceeding 1.8 per cent, for a uniform deadhead rule, uniform lunch hour rule, and, in general, uniform rates and rules in all parts of the country including application to all railroads.

After a morning session, the hearing was adjourned until the following day.

At the opening of the session on Wednesday Mr. Whiter read a letter stating that there were numerous short lines which the railroad managers' committee is not authorized to represent and are, therefore, not represented before the board. Mr. Doak repeated his statement of the day before that he was speaking for all railroad employees of the classes included in the Brotherhood of Railroad Trainmen except those represented by other bona fide organizations and that their demands contemplate standard wages on all roads. He continued his statement regarding the need for higher wages for trainmen, stating they had received less increases than street railway employees and employees in outside industries since 1913. He said other witnesses would go into detail regarding the cost of living, but he presented some figures indicating an increase of 97 per cent from December, 1913, to December, 1919. He asked that the board take into consideration the expenses of train employees away from home, which he said had increased about $20 a month since 1913 and that about 4 cents per hour should be added to whatever was figured as a just and reasonable wage to meet this expense. He urged that the board secure the latest available data from which it could ascertain a reasonable wage for the year 1913 and add to that sufficient to cover the increased cost of living and differentials for various classes of employees.

Mr. Doak also presented statistics to show the hazard of the occupation, stating that switchmen are engaged in more hazardous work than any other class of railroad employees or employees in any industry. He said the records of the Brotherhood of Railroad Trainmen since its organization in 1883 show that it has paid 36,418 claims for death or permanent disability and that the industrial life of its members as a whole is less than 10 years and a wage should be fixed which will enable men to lay aside a provision for the future. He said that thousands of railroad employees had left the service to go into other industries because of the higher wages paid with resulting effect on the railroad service, but when Chairman Barton asked if he had any statistics he said that he was speaking only from a general knowledge of the subject. When Mr. Doak said that hundreds and thousands of railroad employees now receive less than $100 a month, Henry Hunt, a member of the board, asked if any statistics were available showing the proportion of railroad employees that have families. Mr. Doak said this information was not available but that most of them have families.

At the conclusion of Mr. Doak's statement, Mr. Whiter made a brief statement regarding the need for the collection of comprehensive data regarding wages of railroad employees, the cost of living and wages in outside industries and read from Director General Hines' recent letter to the President to show that comprehensive data of the sort needed is lacking. He said the statistics collected by the Board of Railroad Wages and Working Conditions were not sufficiently comprehensive to be of much help and that the railroads had made a rough estimate of the amount of the wage demands by calculations based on the October, 1919, payrolls. He said the managers had invited the other side to join with them in the preparation of data to be submitted to the Labor Board in an effort to save time, but that they had declined and the railroads have prepared some forms to be sent out to the roads which the committee would like to submit to the board for its approval or for any suggestions as to other or additional information that should be collected. He said it would take three months to prepare the information called for on the forms which had been prepared. L. E. Sheppard, president of the Order of Railway Conductors, objected to the delay incident to the preparation of statistics, saying that the railroad statistics are mainly concerned with the question of cost.

"We think," he said, "that the law provides that this tribunal shall fix wages based on what is just and right rather than on the cost. The law provides for taking care of the cost through the Interstate Commerce Commission. The more the board goes back into the statistics of the

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past, the more of a maze it will be in. The Interstate Commerce Commission are the people who want to know what it is going to cost."

Chairman Barton said the board intends to expedite the matter with all the energy and speed possible but it does not intend to be rushed into inconsiderate action and he asked that each side present its suggestions in writing within the next two days as to what information should be collected by the board. Chairman Barton also said the board would like to postpone further hearings for this week in order that it may hold executive sessions to consider the mass of communications that had been addressed to it and also the organization of its force, but after Mr. Sheppard had objected to any further delay on the ground that the transportation organizations were ready to proceed and that many men had been induced to return to work on the understanding that the board would proceed promptly, it was decided to hear S. E. Heberling, president of the Switchmen's Union, on Thursday.

Formal demands and requests for an immediate hearing were filed with the board by Edward McHugh on behalf of the New York employees, James Eubanks on behalf of the St. Louis Yardmen's Association, W. A. Robinson on behalf of the Chicago Yardmen's Association, and J. L. Kohiel on behalf of Philadelphia employees. It was announced on Wednesday that the New York and New Jersey employees had reached an agreement with the brotherhood leaders to represent them and that under this condition the men would return to work.

After an executive session the board announced its decision on the statement filed by Mr. McHugh in Decision No. 1 as follows:

"This matter is brought to the attention of the board in two written applications filed with the secretary, one signed by Edward A. McHugh, chairman, the other by Edward A. McHugh, chairman, and by some 100 or more other names, the men referred to therein as railroad men.

"The board declines to authorize the application to be filed and docketed as the case, because the same does not comply with the provisions of the Transportation Act, 1920, and Order No. 1 adopted by the board. These petitions do not show by expressed statements of facts set out the matters required by the Transportation Act and Order No. 1.

"The petitioners recite that every possible means of remedying the situation had been exhausted before the applicants as individuals stopped work, but this is a conclusion of the applicants and not a setting out of facts. The application does not show that the applicants had held or sought conference between their representatives and the carriers. It does not show that the applicants had exerted every reasonable effort and adopted every possible means to avoid any interruption to the operation of the carriers. It does not show that the applicants are employees of any carrier or carriers. On the contrary it appears from the face of the petition that the applicants have retired from the work and employment of the railroads on their own motion and on their own account.

"For these reasons the board declines to entertain, and on its own motion dismisses these applicants and rules that it must affirmatively appear and be made known to the board before an application will be entertained that the applicants have fully and in all respects complied with the provisions of the law and Order No. 1 of this board, and come within the classes whom the law provides are entitled to be heard. This decision and statement will be entered on the records, communicated to the parties, the President and the commission."

On the following day letters were written to the representatives of the Chicago Yardmen Association and the St. Louis Yardmen's Association as follows:

"Replying to your communication of April 17 presenting claims of the Chicago Yardmen Association: Your application is declined as it does not conform to Order No. 1 and Decision No. 1, copies attached. By order of the United States Railroad Labor Board."

President Wilson's nominations for appointment to the Railroad Labor Board were confirmed by the Senate on April 15 after some discussion in which opposition was expressed by Senators to some of the members of the board, particularly Messrs. Hunt, Forrester and Hanger. The board began its first meeting on April 16 at the offices of the Railroad Administration after the members who were present had been sworn into office by Chairman Clark of the Interstate Commerce Commission. R. M. Barton and A. O. Wharton were not present at the first session but arrived later. The board organized by selecting Henry Hunt as temporary chairman and G. W. W. Hanger as temporary secretary, but at its second meeting R. M. Barton was elected permanent chairman and C. P. Carrithers, formerly secretary of the Railroad Administration Board of Adjustment No. 1, was elected secretary.

The demands of the 18 railroad labor organizations for increased wages, were referred to the new board by representatives of the bi-partisan conference committee representing the railroads and the labor organizations which had taken up consideration of the demands after the termination of federal control of the railroads but which had taken no action upon them because of the refusal of the railroad committee to take any action toward granting the demands without representation by the public. W. N. Doak spoke for the employees and the railroad committee was represented by E. T. Whiter.

In a special circular sent out last week to the general chairman of the principal railroad labor organization instructions were given as to the presentation on April 28 of wage demands to the separate railroad companies. This action was regarded as necessary after the railroad mangers' conference committee had declined the demands in its conference with the representatives of the labor organizations at Washington on March 30, although the demands are the same as those originally presented to the Railroad Administration last year and laid before the new Railroad Labor Board at its first meeting. The instructions provided that a written reply shall be demanded of each railroad and reports are to be presented by local or system committees by May 20. Apparently this action is a formality as to most roads as the Railroad Labor Board has indicated its intention of proceeding immediately with the consideration of the entire question, but the demands will also be presented to the short lines that pay less than standard wages.

E. T. Fitzgerald, president of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees, and J. H. Pruett, representing the Masters', Mates' and Pilots' Association, appeared before the board on April 16 to ask that the New England Steamship Association be forced to reinstate men who had left the service during the recent outlaw strike of steamship employees, but the board decided it had no jurisdiction over the matter.

As a matter of fact the number of those who are interested in maintaining the solvency of the railroads is far greater than the number of those who individually own railroad securities.—*Cincinnati (O.) Times-Star.*

The seeds of trouble were sown when the Adamson law pistol was pointed at the public's head and the President and Congress weakly yielded, buying a temporary settlement at the expense of future security. Since the Adamson holdup there has been an increase of the highwayman spirit, as might have been expected.—*The New York Tribune.*

Appropriation for Railroad Administration Reduced

Bill for $300,000,000 Passed by House Will Enable Government to Pay Railroads $661,000,000 on Compensation

WASHINGTON, D. C.

THE HOUSE COMMITTEE ON APPROPRIATIONS on Monday, April 19, submitted a report recommending a reduction from $420,000,000 to $300,000,000 in the appropriation asked by the Railroad Administration and also introduced an urgent deficiency appropriation bill, H. R. 13,677, providing for the $300,000,000 amount and also $162,004 for additional salaries and expenses for the Interstate Commerce Commission. The reduction was made possible by a provision in the bill requiring the War Finance Corporation to take over at par about $90,000,000 of Liberty bonds, a large part of which were left on the hands of the Railroad Administration by railroad employees, and by omitting about $30,000,000 for claims which the committee thought could be taken care of out of the $300,000,000 revolving fund provided by the transportation act.

The report filed by Chairman Good of the committee said in part:

"The amount requested by the director general of railroads to terminate the matters connected with the federal control is $420,727,341. The committee recommends the appropriation of $300,000,000. They also recommend a provision requiring the War Finance Corporation to take over from the Railroad Administration, at par and accrued interest, bonds of the United States of the various Liberty loan issues and the Victory loan issue aggregating approximately $90,000,000. The Transportation Act, 1920, which was approved February 28, 1920, carries an appropriation of $300,000,000 for the making of new loans to railroads. The act provides that this sum also shall be available for the payment of final judgments, decrees, and awards in actions, suits, proceedings, or reparation claims arising out of federal control. The amount of such payments has been estimated roughly from $30,000,000 to $40,000,000. The liabilities of the Railroad Administration having included general items for the payment of claims of all character, the committee believe that the sum of $30,000,000 may be deducted from the amount of the estimate. It will be seen therefore, that while the direct appropriation recommended in the bill is $300,000,000, the committee have provided practically for the full amount of the estimate submitted, first, by the appropriation of $300,000,000, second, by the converting into cash of approximately $90,000,000 of assets which otherwise could not be made available except at a considerable loss, and third, by deducting from the estimate the sum of approximately $30,000,000 which has been provided for in another appropriation.

"The estimate of the director general of railroads of the total of expenditures from the federal treasury during the 26 months of federal control and the expenditures that remain to be made in order to terminate the matters of federal control is the sum of $1,870,000,000. Deducting from this sum the amount included therein which is invested in Liberty loan and Victory loan bonds of approximately $90,000,000, which the War Finance Corporation is directed to take over at par, there remains the sum of $1,780,000,000.

"The relinquishment of federal control and the appropriation of the sum carried in this bill to terminate the matters arising out of federal control, give rise to the proper inquiry as to what proportion of this very large sum represents a loss to the government and what proportion represents investment in railroad properties and loans that are to be repaid to the government. The director general states that the task of winding up the affairs of the Railroad Administration will continue certainly until December 31, 1920, and that it is entirely probable it may run beyond March 1, 1921. The sums, therefore, stated at this time as loss to the government and as capital assets which the government hopes to have returned are dependent in large measure upon the settlements that the Railroad Administration makes with the roads, the future condition of the roads, and their ability to pay the government the amounts in which they will be indebted to it.

"It should also be said that the appropriations stated do not include any amount for the settlement of claims on the part of the railroads for undermaintenance of their property during federal control nor has the Railroad Administration credited itself with any amounts for overmaintenance. The director general believes that such claims by some roads will be more than offset in the net by claims which the government may have against other roads for maintenance of their property in excess of the contract requirements, and as the question of overmaintenance or undermaintenance is one which requires considerable study and examination by both the carriers and the government, the figures presented in this report do not deal with that factor.

"The total outlay of the government as stated herein amounts to $1,780,000,000. This sum may be divided into two parts, namely: Approximately $904,000,000 representing the amount stated by the Railroad Administration to be the loss of the government on account of federal control and $876,000,000 representing the portion thereof which is capital assets and which the government hopes may be returned ultimately to the Treasury.

The loss in operation under federal control, estimated by the director general at $904,000,000, is made up of the following items:

Excess of operating expenses and rentals over operating revenues for Class I railroads	$677,513,152
Excess of operating expenses and rentals over operating revenues for smaller railroads, sleeping and refrigerator car lines and steamship lines	43,011,129
Excess of operating expenses and rentals over operating revenues for inland waterways	2,449,739
Expenses of Railroad Administration for central and regional organizations	17,400,202
Excess of operating expenses and rentals over operating revenues for American Railway Express Co	38,111,742
Difference in value of materials and supplies taken over from roads at beginning of federal control and materials and supplies restored at end of federal control	85,204,618
Net interest adjustments and miscellaneous debits and credits	40,233,396
Total stated loss (approximately)	$904,000,000

*Includes $30,000,000 for payment of judgments, etc., arising out of Federal control, estimated to be paid from appropriation of $300,000,000 for making new loans.

"The item of $876,000,000, representing the portion of the appropriations made by the federal government which is known as capital assets of the Railroad Administration and for which the government will hold securities of the roads, is made up of the following items:

Net amount of advances for additions and betterments to roadway and structures and equipment (except allocated equip), to be funded for 10 years and to bear interest at 6 per cent	$270,079,575
Advances for purchase of allocated equipment which has been funded through equipment trusts, principal payable in 15 annual installments, with interest at 6 per cent	367,806,968
Other indebtedness due the Government, to be evidenced by 1-year notes bearing interest at 6 per cent	144,422,526
Long-term notes, payable to the Government	44,433,664
Stocks, bonds, and receivers' certificates of railroad companies owned by the Government	35,221,199
Total indebtedness of railroads and other properties, including express companies, to the Government	$861,963,932
Investments of the Railroad Administration in additions and betterments to inland waterways	14,581,126
Total capital assets (approximately)	$876,000,000

"The foregoing tabulations deal only with the period of federal control and do not include the sums which the gov-

ernment has obligated itself to pay or may pay the roads in the period immediately following federal control. The Transportation Act, 1920, approved February 28, 1920, carries several appropriations for payments to roads during the period immediately following federal control. One of these provides for the payment of certain losses which the shortline railroads, not under federal control, suffered during the period of federal control. No very accurate estimate can be made of this sum, but the nearest approximation that the committee has received is $25,000,000. Another provision in the Transportation Act makes a guaranty to the railroads and express companies during the six months period following termination of federal control (Mar. 1 to Aug. 31, 1920), and a rough estimate of this sum by the director of finance is approximately $200,000,000.

"The Transportation Act also contains an appropriation of $300,000,000 which is to be available for a period of 26 months following the termination of federal control for the making of new loans to railroads. This appropriation, as heretofore stated, is also available for the payment of judgments, awards, etc., arising out of federal control, approximated at $30,000,000. There will be left, therefore, the sum of approximately $270,000,000 which will be available for the purpose of making these loans.

"The appropriations made in the Transportation Act are for purposes so intimately connected with federal control, and arise so directly from the termination of federal control that they should be coupled with the appropriation, made for the operation of the roads during federal control in order to ascertain what the total outlay of the government will be for the period beginning January 1, 1918, and continuing to the end of the guaranty period, August 31, 1920, and the end of the 26 months' period for the making of new loans. The following table recapitulates the several amounts heretofore stated:

Operating loss under federal control, estimated by director general (approximately)	$904,000,000	
Estimated cost of six months' guaranty following federal control	200,000,000	
Estimated payment to short-line roads for federal-control period	25,000,000	
Total loss to August 31, 1920		$1,129,000,000
Indebtedness of railroads and other properties, including express companies, to government at termination of federal control, estimated by director-general	$861,963,932	
Investment of Railroad Administration in additions and betterments to inland waterways	14,581,126	
New loans to railroads for period of 26 months following federal control	270,000,000	
Total investments (approximately)		1,146,000,000
Grand total		$2,275,000,000

"Clearly it was not the purpose of the director general of the railroads to give the impression that $904,000,000 would cover the total losses sustained by the government during federal control, nor should it be inferred that the sum of $225,000,000, heretofore shown as the additional loss the government will suffer because of federal control, is the only loss which the government will sustain because of the federal control and operation of the railroads.

"Assuming that the director general's contention is sound that his claims for overmaintenance will more than offset the claims of the roads for undermaintenance, there still remains items of loss not included in the director general's statement. The loss to the government on account of interest on $1,450,000,000, already appropriated for the Railroad Administration, approximates $65,000,000. It also must be remembered that the proposed settlement with the railroads will leave the government with an investment in railroad securities arising from federal control of $862,000,000. Many of these loans were made to weaker roads in order to prevent receiverships during federal control.

"No one will contend that the government will realize the full amount invested in these securities. From every standpoint they should not be thrown upon the market. It is not the intention of the director general to dispose of them and hence the actual loss to the government on account of such investments cannot be stated. If, however, all the securities owned by the government at the present time, including its investment in Liberty and Victory bonds, were sold upon the market for cash, it is quite probable that the loss to the government in these transactions alone would total more than $250,000,000 on a total investment of more than $966,000,000, including the investment in inland waterways. Assuming that the railroad securities owned by the government would shrink $250,000,000 by the present conversion thereof into cash the total loss to the government chargeable to federal control and operation of railroads would amount to $1,375,000,000.

Testimony Before Committee

In connection with the committee's report on the bill there was made public the printed record of the testimony presented before a subcommittee by Director General Hines and his assistants in executive session on April 7 and following days. The examination went into great detail regarding the financial and other transactions of the Railroad Administration. According to testimony by Swagar Sherley, director of the Division of Finance, passage of the appropriation bill will enable the Railroad Administration to pay the railroad companies $661,000,000 due them on account of rentals and other items toward settling up the accounts. Mr. Sherley presented a balance sheet as of March 1 showing that as of that date the Railroad Administration owed the carriers a total of $1,476,928,805, including $1,091,534,012 for compensation (rental) with interest adjustments, etc., $337,000,064 on account of depreciation, and $48,934,728 to make up the value of the materials and supplies taken over with the roads. Against this total there was placed $815,379,145 as an estimate of what could be deducted on what the carriers owed the government, leaving $661,549,659 of cash to be paid the railroads. The Railroad Administration also had on that date an estimated amount of $244,000,000 after paying the bills to everybody other than the railroads, which would be increased by the sale of its Liberty bonds and by leaving the $30,000,000 item to be cared for out of the new revolving fund, and its new appropriation was asked for the purpose of making up the balance of the $661,000,000.

The bill was taken up in the House on Tuesday and promptly passed.

On the other side of the balance sheet the railroads owned the government $1,677,343,077, against which the $815,379,145 offset would be made, leaving a balance of $681,963,932 representing the long term indebtedness, which includes $270,000,000 to be funded for 10 years, $367,000,000 already funded by 15-year equipment trusts and smaller amounts represented by notes and securities. Of the $661,000,000 to be paid in cash, about $95,000,000 was actually paid them during March and from June 1, 1919, to March 1, 1920, a total of $776,825,760 was paid on account.

Chairman Good of the committee asked how much of the appropriation might be deferred, say, to the first of January. Mr. Sherley replied that any delay of the appropriation would naturally delay the settlement with the railroads. He said later, however, that the government should not be called upon to pay out everything it admittedly owes until there has been an adjustment of matters in disputes and that it may be necessary "to withhold a good deal of money but we ought to have it to withhold as a means of trading with these people." He added that creditor railroads may find it to their interest to speed up the presentation of their claims when they find out that they can secure the balance due them only after they have proved their case.

The adjustment on account of materials and supplies is

necessary because the Railroad Administration took over as of December 31, 1917, $532,528,864 worth of materials and supplies whereas the amount on hand as of February 29, 1920, was $569,338,753 and the adjustment was required to make good the value of the quantities taken over at present prices.

Mr. Sherley estimated the amount necessary to pay the losses of the short lines relinquished from federal control at about $25,000,000, although he said this should not be charged against the Railroad Administration because it had always insisted there was no justification for such payment. He estimated the government's probable loss under the six months' extension of the guaranty at $200,000,000.

Chairman Good remarked that the government would hold, after settling with the railroads, approximately $861,000,000 of railroad securities, which would be increased to about $1,161,000,000 by the loans from the new revolving fund, and asked: "Is that not an indication that we are sort of headed toward government ownership of the railroads, and have we not already taken a pretty long step in acquiring railroad securities and railroad properties?"

"It is certainly an indication that the government has a very large financial investment in the railroads," replied Mr. Sherley. "Personally, I hope it does not mean that we have taken a long step toward government ownership because I think government ownership should be a thing to be undertaken only as a last resort. My judgment is that if there is worked out under the new transportation act a proper grouping and a proper system of rates for the railroads, their credit ought, and will be, re-established sufficiently to enable them to pay within the next few years the major portion of that debt."

A total of 165 compensation contracts, with a total annual compensation of $812,428,607, have now been executed, Mr. Sherley testified, in addition to two contracts carrying a lump sum total of $129,734.

Mr. Sherley said that "the railroads are today very properly seeking to find means to obtain the money for new equipment, and yet during the major part of last year the hardest work I have had to do in many years was to convince the railroads that they ought to accept the equipment that was ordered by the Railroad Administration for their benefit and which they insisted they should not be required to take."

Deficit Due to Failure to Raise Rates

Mr. Hines defended the increase in railroad operating expenses, and particularly wages, during federal control as being no greater than was necessary. He said that while the increased price per hour of railroad labor at the end of 1919 was somewhere between 100 and 106 per cent over what it was in 1914 the earnings of the men had probably increased only something over 80 per cent, due to the substitution of the eight-hour for the ten-hour day.

"The real element involved in this question," he said, referring to the deficit, "is that, growing out of the peculiar conditions which confronted the Railroad Administration, transportation rates were not raised soon enough and often enough to pay the full element of cost, leaving an amount which, for the Class I railroads, was something like $700,000,000 less than the cost of doing business." Over a dozen pages of the record are taken up with Mr. Hines' explanation of why he did not increase rates in 1919. He said that based on the results of the early months of 1919 an increase made at that time would have had to be 25 per cent or more over the existing rates, whereas on the basis of the more favorable months 5 per cent would have been enough and if the rates had been advanced 14 per cent more than they were in June, 1918, there would have been no deficit.

"I have been under the impression," said Chairman Good, "that, owing to your increase in wages, right at the beginning there ought to have been a much more generous increase of rates because of the increase in the value of the things carried and the greatly increased cost of the service. While I realize the problem that confronted the director general, it has seemed to me all along that if rates had been increased to a point where they would have more nearly met the operating expenses, plus the rentals, you could then be in a position to turn the roads back to the owners with less disturbance than to turn them back at a time when, after you had taken them over, you had readjusted the pay of every man out of proportion, and, also at a time when we were compelled to go to the people to raise money by bonds to run the government. Our revenue law itself carried an increase of freight rates in order to meet the expenses of the war, and now we are compelled to sell bonds to meet the deficit from the operation of the railroads.

"It looks to me as we have been working at cross-purposes. In the first place, we ought to have seen to it that the railroads collected enough to pay the expenses of operating the railroads, with perhaps a margin of safety, because the money so collected went into the Treasury of the United States. Then, in addition to that, we were collecting taxes on freight in order to get money to put in the Treasury. Of course, from your statement I think it is obvious to you that some increase in freight rates or passenger fares will be necessary in order to allow the roads to pay operating expenses and a fair return on the value of their property. That being the case, a great many people who are inclined to be unfair will say that during federal control you operated the railroads and paid a higher return to the railroad companies under a much lower rate than they will have to pay under private control. They will not think about this $900,000,000 deficit, or any additions that will be made to it under the settlements that will follow. They will forget that in playing it up to the public and will never mention the loss to the Federal Treasury."

Regarding the question of maintenance claims, Mr. Hines said:

"These returns necessarily are not yet in for the entire period, and pending their receipt and analysis, it will be impracticable to form a reliable judgment. We have had various tentative figures which were made by the regional directors during the period of federal control, but they would necessarily have to be reviewed in the light of the more accurate accounting returns. On the whole, my judgment has been and is that the government is not warranted in assuming that there will be any net amount due by it to the railroad companies for undermaintenance. No doubt some particular company may be able to claim, with great plausibility, that as to some particular branch of its property more maintenance ought to have been applied, but I believe these claims will be largely dispelled by viewing the situation of each company as a whole; and even if in some cases a particular company should be able to sustain a claim for a net amount there is the probability that the government would be able to sustain a claim of equal amount against some other company for overmaintenance. Viewing this entire situation, it has seemed to me there was no basis at present for the assumption that any additional amounts would have to be appropriated to take care of any possible balance of claims for undermaintenance in excess of claims the government may maintain for overmaintenance. The matter is necessarily of a controversial nature, and it would clearly be inexpedient for the government to undertake in advance of getting all the facts to commit itself either as to any particular company or as to companies generally, because such commitment, if favorable to the government, would not be allowed to operate in its favor; and if unfavorable to the government, might be seized upon and used to the government's detriment."

Max Thelen, director of the Division of Liquidation

Claims, also discussed the maintenance question, saying in part: "The uncertainty as to the amount of those claims and also the very large amount of money that can be saved by careful and efficient management as against that which would be lost otherwise is, I think, well illustrated by the first claim that has come in. We have now before us the claim of one of the largest railroads which claim is for some $3,000,000 of alleged undermaintenance of equipment, some $2,000,000 for alleged undermaintenance of way and structures, and a little less than $1,000,000 for alleged failure to turn back materials and supplies in the quantity and the quality we should have turned back, making a total of $6,000,000 of claims against the government presented by this one railroad. On the other hand, our own tentative figures would seem to indicate an overmaintenance of equipment running somewhere between two and three million dollars as contrasted with their claim of undermaintenance amounting to $3,000,000. There is a difference there of almost five or six million dollars in the respective claims of the company and of the government on that one item. As far as maintenance of way and structures is concerned, our figures show a very much less amount than what they claim."

Former Railroad Employee in Congress Gives Views on Plumb Plan League

Representative John G. Cooper of Ohio, a former railroad employee and a member of one of the brotherhoods, in a discussion of the railroad strike in the House of Representatives on April 14 expressed the opinion that the paper called "Labor" published by the Plumb Plan League "has done more to poison the minds and hearts of the railroad men than anything else that has happened in this country in the last year." Mr. Cooper said he did not believe that the Plumb Plan League had anything to do directly with the strike, although there was no question in his mind but that it was instigated by radicals. Railroad men, however, he said, are in a condition to be influenced by radicals because they are not receiving adequate wages. He quoted the rates paid to yard employees and declared they are less than is being paid to common labor, whereas the public, he thought, had been influenced by examples of high wages paid to men on preferred runs.

Mr. Cooper discussed at length the way in which the Plumb plan paper has been misleading railroad employees and he called attention to the cartoons published in that paper which were drawn by Congressman J. M. Baer of North Dakota. Mr. Cooper said in part, as reported in the Congressional Record:

"But, as I said in the beginning, I deplore this strike. There is no question in my mind but what it was started by radicals, but by reason of unsatisfactory conditions, by the poor wages that the railroad men are receiving it only needed a spark to touch the powder keg, and it went like a house afire. The gentleman from Ohio made the statement that he thought the 'one big union' was back of this movement. I received a telegram only yesterday from 3,500 switchmen in my home city of Youngstown, Ohio, denying that the 'one big union' was back of this strike; that they wanted to remain loyal to their organizations, and they were ready to meet the representatives of the railroad managers any time they could get an audience with them. I have too much confidence in the patriotism of the American railway employees to believe that they will be led by and influenced by the I. W. W.'s of this country. [Applause.]

"Mr. Speaker, I must confess that I have some feeling on this question. For 17 years before I came to Congress I associated with the railroad men, working with them as a locomotive fireman and engineer on the Pennsylvania Railroad. And while I have no authority to speak for the railroad brotherhoods I desire to say that from the time I commenced work as a railroad employee, up to this day, I have been proud of the fact that my name is recorded as being a member in good standing in one of the brotherhood organizations. And I also believe that if the President of the United States had taken the interest that he should have taken in this matter and used the power granted him in the Cummins-Esch bill, the power to appoint a labor board, which was passed by the House and Senate more than six weeks ago—if he had appointed this board at once so that the wage questions of railroad employees could have been considered, I say if the President had done this then this strike could have been averted, and we would not have had the wheels of transportation tied up in our country to-day. But, no; the President of the United States had to wait until the crisis came before he appointed this board, which gave him the power by law to settle these labor disputes as far as railway employees are concerned. Then again there is another thing I want to touch on just a moment.

"It has been prominently mentioned in the papers that the Plumb Plan League is back of this strike. I do not believe that. I do not believe that the Plumb Plan League had anything to do with this strike, but I do believe that this official organ of the Plumb Plan League, printed and published here in Washington, managed by a former member of Congress who has been drawing $7,500 a year from the government of the United States at least part of the time he was managing this paper called 'Labor'—I do believe that this paper has done more to poison the minds and hearts of the railroad men than anything else that has happened in this country in the last year. [Applause.]

"The name of this publication is 'Labor.' You have all read it. For weeks this paper has been picturing the American Congress as the enemy of railroad employees and the special friend of the railway owners and big interests. This paper makes a bitter attack upon every member of Congress who voted for the Cummins-Esch bill; and no less a person than Mr. Plumb, the author of the Plumb plan, is now campaigning across the country advocating the defeat of every member of this body who would not submit to his way of thinking and support the Plumb plan for the operation of our transportation systems. But I thank God that regardless of the threats of Mr. Plumb and the official organ of the league, that 250 members of this House had the courage of their honest convictions and cast their vote in a way which they believed would be for the best interests of all the American people. I trust the day will never come when the American Congress will yield to the threats of any class, whether it be labor or capital. Now, I know what I am going to get from the Plumb Plan League because I am making this statement here to-day, but I have never smothered my convictions on any great question in order to stay in public life, and I am going to express myself as to what I think about this paper. [Applause.] I have here a copy of this paper. You see headline after headline which reads, 'Defeat every Member of Congress who voted for the railroad bill.' No matter how friendly he may have been to labor in the past, if he voted for the railroad bill he is an enemy of labor and the tool of Wall Street.

"This paper is being sent into the districts of Congressmen who have always been friendly to labor during their service in this House, members who have supported labor's cause every time legislation has been considered which was for their benefit. I say that this paper is now going into the districts of these men and asking for their defeat for reelection, because they had the courage to vote their convictions on the railroad bill.

"Then they even go so far as to say—if not in direct words, by inference—that we got our price, that we were paid by Wall Street to vote for this railroad bill. They are

attacking the labor provisions of the railroad bill. There is not a thing in the labor section but what gives labor the same rights and privileges that it has had in the past. [Applause.] There is no antistrike clause in the law, and they know there is not. If a question of dispute goes to the United States Labor Board and they agree in regard to the question of wages or conditions, there is nothing compulsory in their findings. The railroads employees can either accept or reject the decision of the board, and there is no provision in the law that will stop the railroad employees from going on strike if they so desire. They condemn us because we refused to vote for recommitting the conference report. They have said it would have given an opportunity to strike out the antistrike section and other obnoxious features. There was not a thing in the motion to recommit which would have given them an opportunity to do that any more than it would have given them an opportunity to put in an antistrike provision. It was a straight motion to recommit, and the gentleman from Kentucky, who made the motion to recommit, and 22 others who voted for the motion to recommit, all voted against the Anderson amendment, which would have prohibited the antistrike provision in the railroad bill. [Applause.]

"These men have a clear sheet as far as the Plumb plan advocates are concerned, but the members of this House who have been loyal to labor and have supported them and spoke for them here on the floor of this House, they are now condemned as grafters and as the tools of Wall Street and as bowing to the big interests because they voted for the railroad bill.

"They say that we guaranteed 5½ per cent on watered stock. Why, there is not a thing in that bill that guarantees one penny to the railroads except for the first six months, and then we guarantee to them the same return that the government guaranteed during governmental control. After that the law establishes a rule of rate making which permits the Interstate Commerce Commission to fix a rate which will give to the railroads a return of 5½ per cent. On what? On the value of their property as the value is fixed by the Interstate Commerce Commission, not by the railroad company.

"And if the Interstate Commerce Commission follows out the law in the rule of rate as it is written in the Cummins-Esch bill it will be impossible for the railroad owners to receive any revenue on watered stocks. A few days ago the representatives of the railroad-security owners appeared before the Interstate Commerce Commission and argued that the commission, in fixing the rates, should take the book value of the roads as a basis. The law says that the commission shall take into consideration that part of the railroad property that is used for transportation purposes as a basis for fixing rates. And the advocates of the Plumb plan know that the law has this provision, for on the same day that the representative of the railroad securities appeared before the commission Donald R. Rishberg, representing the Plumb Plan League, and speaking in place of Mr. Plumb, appeared before the commission and argued that the Cummins-Esch law would not permit a return of revenue to the railroads on watered stock. It is strange, indeed, that a representative of the Plumb Plan League should make this statement before the commission when every issue of their paper states that the Cummins-Esch bill guarantees 5½ per cent on watered stock.

"There is another matter to which I want to call the attention of the House. It is a disagreeable task for me to do it, but I feel moved to do it. The Plumb Plan League paper has been running a series of cartoons which picture every member of Congress as bowing to Wall Street, as getting their price, as the enemies of labor, tying the laboring man to the railroad tracks and letting a train come along and crush him.

"I am very sorry, indeed, that one of the members of this body has seen fit to use his talent in this way. He seems to take great pride in the fact that he is the author of these cartoons. Above every one of these cartoons that have been published in the official organ of the Plumb Plan League you will find this notice: 'Drawn for Labor by Congressman J. M. Baer.' Mr. Speaker, I want to say to the gentleman from North Dakota that if I believed as he does, that the 250 members of this body who voted for the Cummins-Esch bill, and President Wilson, who signed it, are as corrupt and as unclean as he represents them to be in the cartoons he is drawing for the Plumb-plan organ—I say, if I believed as he does, I would resign my seat to-day, as I would not want to contaminate myself in such a presence." [Loud and long applause.]

Mr. Baer undertook to reply to Mr. Cooper and to justify his cartoons representing Congress as working in the interests of Wall street by saying that the president of the American Bankers' Association had recently stated in a convention that the bankers had written five or six provisions into the railroad bill. "Now, as the bankers are the looters of the railroads," Mr. Baer said, "I believe it would be logical and consistent for me to show that because the bankers of this country had succeeded in writing five or six provisions into the bill it was a bill practically drawn by a soviet of bankers in Wall street."

Representative Foster also took up the discussion, saying that he had a large labor constituency and had voted in the way that the American Federation of Labor desired on all recent bills in which it was interested except the railroad bill, yet he had been included among the Congressmen characterized by the labor paper as those who had voted for the "soviet of Wall street." "If the gentleman from North Dakota objects to his company in the House," he said, "there is a way to part company without the retirement from the House of the 250 members who supported the railroad bill."

Coal Operators Ask Car Service Order

EXERCISE of the Interstate Commerce Commission's powers over car service has been demanded by a group of coal operators in the form of a petition asking the commission to make effective an order of the Commission on Car Service before the federal commission has worked out its own policy of dealing with such matters. The Harlan County Coal Operators' Association, the Hazard Coal Operators' Exchange, the Southern Appalachian Coal Operators' Association and the Western Kentucky Coal Bureau filed a petition with the commission for peremptory orders requiring defendant carriers to return promptly the open top cars belonging to the Louisville & Nashville and to deliver daily a reasonable number of their own or other open top cars in their possession to that road until such time as the open top cars of the Louisville & Nashville may be returned to it in sufficient numbers to relieve what they assert to be an unprecedented shortage of open top cars at mines of the complainants served by the Louisville & Nashville. The commission is particularly requested to make effective an order of the Commission on Car Service directing the connecting lines to deliver to the Louisville & Nashville at specified junctions each day 245 empty coal cars more than they receive loaded cars from the Louisville & Nashville and the commission is asked to take such other action as will meet the emergency and serve the public interest.

The petition asserts that during March the Louisville & Nashville furnished its mines only 46.85 per cent of the empty coal cars ordered and for the period March 20 to 28 there were due to this road under the orders of the Commission on Car Service 4,619 cars, indicating that its orders were not receiving serious consideration.

Theodore N. Vail

Theodore N. Vail, who died at Johns Hopkins hospital, Baltimore, Md., on April 16, became president of the American Telephone & Telegraph Company in 1907. He had been with the Bell telephone system from its beginning up until 1890 and had been president of the American Telephone & Telegraph Company for five years prior to that date. When he came back to the company, a man of about 62, he was known among certain number of people for a man of solid achievements but he could hardly have been called a great national figure. He had founded the railway mail service and had helped to build the foundation for the American Telephone & Telegraph Company. In the thirteen years, from 1907 until his death a few days ago, Mr. Vail perfected the telephone system of the United States. He successfully combated advocates of the government ownership of telephones and telegraph and during the period of corporation baiting and bitter criticism of public utilities he developed an almost complete monopoly which, so far from earning the enmity of its patrons, was at the outbreak of the war, almost universally conceded to be a conspicuous example of the public benefits accruing from successful private operation. Much of the credit for this remarkable achievement is due to Mr. Vail personally.

T. N. Vail

He had this advantage as compared with the railroads in meeting attacks on privately owned and operated public utilities. The telephone system was a united whole. There were well run and poorly run railroads, but there was just one Bell System and that was extraordinarily well run. The policy toward the public could be arrived at without compromise between varying opinions. The policy adopted by the American Telephone & Telegraph Company was a concrete expression of Mr. Vail's personality.

Outstanding characteristics of this personality were his courage, openmindedness and sense of justice. He had a passion for knowing the facts in any given case comparable to the most profound scientific student, but he differed from the student in his ability to use ascertained facts as a basis for action. He was remarkably quick to act when action became necessary. Furthermore, he had that most unusual quality of courage in a man of action which permitted him to explain and justify his actions. Possibly the very fact that his actions were based on thorough knowledge of all the facts entering into a situation made him both capable and willing to lead another along the paths which led to a given action.

The annual reports of the American Telephone & Telegraph Company since 1906 are among the most interesting documents in the history of American business enterprise. Mr. Vail wrote these reports personally, much of them longhand, and they were a work of great care and precision. Mr. Vail in these reports faced the possibilities of government ownership of the telephones squarely. He discussed the subject pro and con with great frankness and he presented the fundamental economic principles which entered into this industry with perfect clearness. He was not afraid to point out the factors which might work out favorably under government ownership. He met criticism of his policies squarely, and he discussed the situation as regards his competitors freely. He drove home the logic of his position irresistibly.

The American Telephone & Telegraph Company, which is the holding company for local Bell companies and is the owner and operator of the long distance telephone system of the country, carried on a fairly extensive and very successful campaign of national advertising in addition to obtaining a wide distribution among all classes of intelligent people for its annual report.

It is not the province of the *Railway Age* to describe and discuss Mr. Vail's work as the organizer of the telephone system. Our interest lies especially in his way of meeting the question of government ownership which more imminently threatened the telephone and telegraph than it ever did railroads. It must not be forgotten, however, that in his fight against government ownership Mr. Vail had a record of achievement in providing a system of public service so nearly perfect that criticism of it was at a minimum. In his relations with state commissions, state legislatures and with the national government, the American Telephone & Telegraph Company could be exhibited without reservations. In a long record of state and national investigations made into the telephone business the American Telephone & Telegraph Company has come out scathless. During the years from 1907 until the government took over the telephone system, Mr. Vail dominated this system exclusively.

A Middle-Class Union.—This is what, in the opinion of Chauncey M. Depew, chairman of the New York Central (86 years old), is needed to establish industrial justice in the United States. Speaking before the Merchants' Association of New York City on April 14, he said:

I have been dealing with unions all my life. I never had any trouble with them. I believe in them. You can get down to a fair, square, man-to-man talk with them, as to what is needed on the one side, on the other, and on all sides. But there is one thing that must not be forgotten, and that is that no section, no class, no occupation, should be able to prevent the people in other occupations from exercising their functions; and the only way to stop that is to have a new union of the middle class men and the middle class women of this country, who constitute eighty or ninety per cent of our population. Let them form a union which shall declare that all classes must be treated fairly, squarely, rightly, justly and righteously.

Those railroads don't look much like the ones that were loaned to the federal government a few years ago. Some people never are careful about borrowed articles.—*Boston Transcript.*

Long Continued Disturbance of Traffic by Strikes

Strike Leaders Arrested; Slow Restoration of Freight Movements; Situation Hopeful, but Still Confused

THE DISTURBANCE of railroad passenger traffic in and around New York City has been gradually abated during the past week and train movements are now nearly normal; but the freight situation as a whole continues to be much restricted; there has been marked improvement during the past week and officers of the different roads give out hopeful statements each day; but because of the widespread congestion, due in part to causes other than the strikes, the task of catching up on the enormous number of delayed shipments is difficult and slow. Live stock and perishable food have been moved with tolerable success, and the supply of coal to industries has been kept up with an approach to regularity, and there have been few shut-downs for lack of fuel; but deliveries of other freight are still far behind.

The return of the strikers to their positions has been spasmodic and in many cases apparently with only half

A Group of Volunteer Firemen

formed purpose. Considerable numbers of men remained idle and continued their mass meetings up to Wednesday of this week, and train operations were still being carried on in some cases by the aid of volunteer college students and other inexperienced men. In suburban passenger service to and from Jersey City numerous crews made up in part of these amateurs were depended on every day for more than a week.

J. J. Mantell, spokesman for the General Managers Association of New York, said on Wednesday that road train service, both passenger and freight, was nearing normal; that the difficulties still remaining were confined mostly to the freight yards on the waterfront; and that these yards were between 40 and 50 per cent efficient. The railroads issued a joint notice at New York on Thursday, April 15, notifying all men who had left their work to return by Sunday noon and agreeing to take back without prejudice those who had not participated in acts of violence or intimidation. On Monday it appeared that the number of men responding to this notice, while large, was not satisfactory and one road, the Pennsylvania, issued another notice on Tuesday, giving the strikers until Wednesday night to come back without losing their seniority rights. New York City reporters said that extension of the time limit was general, and that among the new men recruited for train service were many drafted from sources which the railroad managements kept secret.

On Wednesday evening, Mr. Mantell, replying on behalf of the railroads to representatives of the four principal brotherhoods, declined further to extend the time limit within which employees would be taken back without prejudice.

J. C. Lincoln, manager of the Traffic Bureau of the Merchants' Association of New York estimated that the commercial life of the city suffered from the freight congestion to the extent of $1,000,000 a day. He told of innumerable complaints made by merchants, farmers, and others in suburban towns and manufacturing cities at delays of coal and merchandise.

The New York Central announced the lifting of all embargoes except to and from New York City, and on the West Shore Division south of Newburgh, on Saturday the 17th.

The Hudson & Manhattan Railroad, operating the tubes from Manhattan to Jersey City and Hoboken, resumed a part of its train service on Sunday, and more on Monday and Tuesday; but trains were run only in the daytime. The increased fares recently authorized on this road by the Interstate Commerce Commission went into effect on the resumption of service, and at once the newspapers and some organizations of passengers seemed to have lost their interest in service and to have concentrated on rates; and they began an agitation to secure the revocation of the increases. Each of these tube trains carried a policeman.

A volunteer fireman on the Erie is said to have received $550 as a gift from grateful passengers, of whom 1,650 are said to have been on the train fired by this man. On the Central of New Jersey a crew of four men, following several days of voluntary service on suburban trains, received a purse said to contain $385.

On Wednesday of this week the embargoes on express matter were lifted at many places. This action was taken, even while still there was much congestion and delay, in order to relieve the Post Office Department, parcel post shipments having been brought into the post offices in the large cities in enormous quantities. In Massachusetts a manufacturer shipped by post at one time enough shoes to fill a freight car; and shirts were shipped from New York in similar quantities. Passengers passing through the Grand Central Terminal, New York, saw the unusual sight of long strings of freight cars standing at the platforms to be loaded with parcels.

At Philadelphia

At Philadelphia the officers of the State of Pennsylvania took a hand in the negotiations, and William J. Tracey, chief of the Bureau of Mediation and Arbitration held various conferences with officers of the railroads. The Pennsylvania issued a statement on Sunday night indicating that Philadelphia freight yards were working from 50 to 75 per cent of normal, that passenger train service was normal except to New York and that even there a through train was being run every hour; that the Altoona district was back to a normal basis, Harrisburg nearly so, and Baltimore rapidly improving. At the company's engine terminals the day forces were at work. Many freight embargoes were removed on Sunday. The Pennsylvania employed scores of students from the University of Pennsyl-

vania and Johns Hopkins, as well as from Princeton, and also some from other colleges.

The strikers on the Philadelphia & Reading, including shopmen, were said to number 3,000; these all voted on Saturday to return to work, following conferences between the officers of the road and State Mediator Tracey.

Samuel Rea, president of the Pennsylvania Railroad, writing to the president of Princeton University expressing the thanks of the road for the voluntary services of students, said:

"The work done by the Princeton boys during the railroad strike was wonderful and their spirit is beyond praise. The public need had no fear of Bolsheviki with the young men of the country at its back, but the present disturbance is a warning to the people to look alive and try to discover the true needs and the underlying causes of the grievances of the great number of honest, law-abiding railroad men who are serving their country at this time by remaining at work and refusing to treat their solemn obligations as scraps of paper.

"The public will no doubt be called upon to pay the proper cost of adjusting railroad wages, but if they are wise they will first insist on knowing why a "green" hand from Princeton can produce a greater output than many of the skilled laborers are now producing, since the cost to the public of decreased output is quite likely to exceed the cost of increased wages."

The Chicago Situation

The strike of switchmen and switch tenders, which started in the Chicago switching district and spread throughout the country has been featured during the past week by the arrest of leaders of the Chicago Yardmen's Association and the United Enginemen's Association, the organizations which have been behind the walkout, and the gradual collapse of the strike. As the result of these developments traffic conditions at Chicago have been slowly improving, the number of men returning to work increasing from day to day.

John Grunau, organizer and president of the Chicago Yardmen's Association, H. E. Reading, chairman of the board of directors of the United Enginemen's Association, and the other leaders in the unauthorized walk out were arrested on April 15, charged with the violation of sections of the Lever act making it unlawful to conspire, combine, agree or arrange with any other person to limit facilities for transporting, supplying or dealing in the necessities of life. All of the men were taken by operatives of the Department of Justice and none resisted arrest. After being arraigned the men were given their liberty to secure bonds.

Chronological Narrative

In the *Railway Age* of April 16 (page 1183), the strike situation at Chicago was described in chronological order up to and including April 14. The developments since that time in their daily order have been as follows:

Wednesday April 14.—Late in the afternoon John Grunau and other leaders of the Chicago Yardmen's Association were arrested. All of the men denied the charges under which they were arrested and many indicated that they were ignorant of violation of the federal statutes. Insofar as the traffic conditions at Chicago are concerned the break in the strike began to be apparent. The movement of perishables and other necessary commodities began to approach normal because of the increases recorded in the number of men returning and in the traffic handled, both of which were noted in the *Railway Age* of April 16 (page 1188).

Thursday, April 15.—A list of those arrested by federal operatives late Wednesday was made public. Among those for whom warrants were issued and who were arrested were the following:

John Grunau, president and organizer of Chicago Yardmen's Association; Harold E. Reading, chairman of board of directors, Fred L. Schultz, vice chairman and Michael Elgass, treasurer of the United Enginemen's Association; Martin J. Kenney, vice president of the Chicago Yardmen's Association; A. W. Cassedy, subsecretary of the Chicago Yardmen's Association; William L. Bond, secretary of the Chicago Yardmen's Association; H. W. Dahlby, secretary of the United Enginemen's Association; Joseph Scott, trustee of the Chicago Yardmen's Association; William Larrabell, treasurer of the Chicago Yardmen's Association; F. S. Lockwood, chairman of the speakers' bureau, Chicago Yardmen's Association; R. S. Murphy, chairman of the publicity committee, Chicago Yardmen's Association; Elmer Bidwell, member of the Chicago Yardmen's Association and ex-president of the United Railway Yardmen; H. A. Daley, director of the United Enginemen's Association; John Devoy, director of the United Enginemen's Association. Seven of those arrested were released on bonds of $1,000 each and the remainder were released on their own recognizance to report later in the day with bondsmen. Following his arrest, Grunau issued a statement reiterating his contention that members of his organization had left their positions voluntarily and the movement could not therefore be called a strike. Later in the day Grunau refused to give bail and indicated his desire to be held in custody.

Residents of Morristown, N. J., Who Acted as Volunteer Firemen on the Lackawanna

Left to Right, John Stedman, Vice-President of the Prudential Life Insurance Company, and Alfred Maury. Lower Step, Captain Henry Rawle.

Friday, April 16.—This unexpected development in the situation, coupled with the fact that the Brotherhood of Railroad Trainmen, of which many of the strikers are members, issued an ultimatum that all members must be back at work by midnight Sunday or forfeit their membership in the organization, resulted in a substantial improvement.

This improvement was noted in the daily statement issued by and on behalf of the railroads which showed 481 switching engines in service as compared with 443 the previous day, or better than 60 per cent of the normal number of engines in service. The passenger and suburban business continued unaffected. The movement of live stock into the stock yards had been restored to normal, the receipts for 24 hours totaling 798 cars. The movement of live stock to easter points was likewise normal, there being 121 cars moved. Approximately 60 per cent or 180 cars of the normal movement of fresh meat from the stock yards to western points was moved on Friday.

Saturday, April 17.—All available reports indicated a further gradual return of traffic to normal. The number of switch engines in service was increased to 495 as compared with 481 Friday. Receipts of live stock were above the normal Saturday's receipts, 450 cars being received and the movement to eastern points was normal, 180 cars. Fresh meat to Eastern points showed continued improvement, being 244 cars, or approximately 75 per cent of normal number. John Grunau and other strike leaders, arrested on April 15, were again released on their own recognizance although they had repeatedly refused to give bail. The hearing on the case was scheduled for April 24. The appointment of the new Railroad Labor Board and its assembling on this day was expected to lead to a definite break in the ranks of the strikers. This, however, did not materialize.

Champion Bike Rider Serves as Volunteer Fireman

Left to Right, Engineer Patrick Ash, Frank Kramer, and Mayor Charles H. Martens of East Orange, N. J., in the cab of a Lackawanna locomotive.

Freight Handlers Threaten Strike

Monday, April 19.—Another factor entered at this time to further the return of men, namely, the issuance of ultimatums by several of the railroads involved that if the strikers did not return to work by designated days they would lose their seniority rights and their places would be filled by new men. On the other hand, the freight handlers in the Chicago district after meetings, issued a statement demanding the re-establishment of certain differentials between truckers, stowers and callers wiped out in the various awards made by the United States Railroad Administration. In reply to these demands a statement was issued by the General Managers' Association of Chicago setting forth that although it is impossible under the present conditions for the managers to treat with the freight handlers on this subject, the contentions of the employees were justified. The statement further recommended that the Labor Board give immediate and favorable consideration to the men's demands. Insofar as the strike of the switchmen is concerned, the situation continued to improve gradually. Approximately 526 crews reported for work as compared with 495 crews on Saturday and the normal number, 765. The movement of livestock inbound totaled 1,112 cars, equaling the average on Monday, the heaviest day of the week.

Tuesday, April 20.—The improvement in the situation continued there being 568 crews operating, as compared with 526 the previous day. The movement of inbound coal and live stock, the barometers of traffic conditions, also showed substantial improvement. The number of live stock cars brought into the stock yards totaled 1,420. In addition, 1,200 cars of coal were brought into Chicago. The latest reports showed that 418 switchmen had returned to work in the Chicago district.

Wednesday.—The summary of the situation issued by the railroads on Wednesday showed 582 switching crews at work as compared with 568 the previous day. About 60 brakemen returned to work, bringing the total up to 471 returned. Livestock arrivals amounted to 777 cars, or 100 more than last year. Fresh meat and livestock were moved eastward in normal volume, 410 cars being sent out. Coal arriving at Chicago amounted to 1,448 cars.

John Grunau, in jail at Joliet, was released and started for Chicago. A mass meeting was announced at which prominent men of the city were to address the strikers in an effort to induce them to return to work, but the meeting was broken up by hecklers, demanding the presence of Grunau, and charging that their temporary leaders had betrayed their cause. Grunau was expected to address a meeting, as soon as one could be arranged, with a view to getting the men to return to work pending acceptance of the demands which have been made by the established brotherhoods.

Additional warrants have been issued for leaders in the strike movement.

The situation at other points in the Middle West has, to a large extent, closely followed the course of the strike in Chicago. Its effectiveness at these points has fluctuated in proportion to the tone of the press notices regarding conditions at Chicago. However, at the present time traffic through the country is gradually returning to normal and it has been predicted by railroad officers in close touch with the conditions that the strike fever will burn itself out within a few days, as the fallacy of attempting to ignore the machinery for the handling of such matters set up by the Transportation Act is recognized by the men.

Burning of the Missouri Pacific Station at Little Rock, Ark., April 7, 1920

General News Department

The Pennsylvania Railroad section of the American Association of engineers has postponed its second annual convention, scheduled for April 17, at Pittsburgh, Pa., on account of the strike situation throughout the country.

The Senate on April 20 passed the army reorganization bill with a provision for separate construction and transportation services. The House had passed the bill placing these services under the Quartermaster Corps.

One hundred car record clerks of the Pennsylvania Railroad who, with their office, have moved from Pittsburgh to Philadelphia, are to have lodgings in houses now vacant in a "shipyard village" near Gloucester City, N. J.

The new headhouse of the St. Paul (Minn.), Union Station, was opened for business on Sunday, April 4. This structure, costing $1,500,000, is a part of the extensive general terminal improvement in St. Paul, to be completed in 1923, and to cost over fourteen millions.

Silk to the amount of six tons and valued at over $200,000 was seized by the police at Maspeth, Long Island, on the night of April 20 and five men were arrested. The silk is said to have been stolen from freight cars in the New York Central yard, Manhattan, on March 8.

The passenger station of the Missouri Pacific at Little Rock, Ark., was destroyed by fire on the night of April 7, only the walls of the building being left standing. The loss, including furniture, equipment and baggage, is estimated at nearly $1,000,000. The station was built in 1909, at a cost of $750,000.

William J. Leonard, Ohio State Fire Marshal, Columbus, Ohio, has recently issued a pamphlet under the auspices of his department containing suggestions for combating losses from fire on steam and interurban railways. The pamphlet contains fire fighting and fire prevention suggestions for the protection of stations, rights of way, freight and express sheds, trestles and bridges, etc.

The Michigan Central, one of the principal carriers of the automobile traffic from Detroit, Mich., to other points, owns approximately 13,643 automobile cars. However, its location statement, that of April 1, shows that only 842 of these cars, in other words, but 6½ per cent of its total ownership, was on its lines. As a result of this car shortage, thousands of new automobiles are being run to their destinations by their own power.

Destruction of highway bridges by overloading is a possible sequel to the recent railroad congestion, as brought out by a report from Wilmington, Del., where the county engineer has received numerous reports of bridges on the county roads broken down or damaged by the sudden and large increase of automobile freight traffic incident to the general imposition of embargoes on the transportation of freight by railroad. Two bridges between Blackbird and Smyrna were put out of commission by the passage of twenty-ton loads, producing strains for which the structures were not intended.

John J. Dempsey, former vice-president of the Brooklyn Rapid Transit Company, was tried last week in the Supreme Court of New York, at Mineola, on a charge of manslaughter in connection with the derailment in Brooklyn, N. Y., on November 1, 1918, when 92 passengers were killed; and the jury, after deliberating three hours, acquitted him. Vice-president Dempsey had been on trial before but there was a disagreement of the jury. Three other persons had been tried for manslaughter in connection with this derailment and all have been acquitted; T. F. Blewett, division superintendent; Anthony Luciano, motorman, and W. S. Menden, chief engineer. Colonel T. S. Williams, president of the company, is still under indictment.

The New York, New Haven & Hartford announces new timetables for Sunday, April 25, and it is understood that in New England a considerable number of trains are to be run one hour earlier than at present in order to accommodate the people when they adopt summer time. A law has been passed in Massachusetts establishing the 60th meridian as the standard of the State, beginning April 25, but there is a suit in court asking for an injunction on the ground that this law, being in conflict with the federal law regulating the time of the railroads, is repugnant to the Constitution of the United States. The suit is brought mainly in the interest of farmers.

A loaf of bread, worth five cents, picked up by a passenger in a car of a train of the New York Consolidated Railroad Company, in Brooklyn, N. Y., was the principal "exhibit" in a newspaper report published last week, telling of five years of litigation. The passenger, Foulke, in July, 1915, found a package; the owner had left the car; Foulke refused the request of a trainman to turn the package over to the company, and was thereupon arrested, and was held in $500 bail in court on a charge of petit larceny. At the trial it appeared that the package contained only a loaf of bread. The man was acquitted, and then he sued the railroad company for causing his arrest. He lost his case, however, and the decision in favor of the company has now been affirmed by the highest court in the state.

G. H. Parker, controller of the Railroad Administration, has issued to railroads instructions for their guidance in preparing vouchers for claims—on account of judgments, awards, etc., rendered since February 29—for sums due to claimants from the United States on account of transactions which took place while the railroads were in the hands of the government; this in pursuance of circular No. 143, noticed in the *Railway Age* of April 16, page 1211. By that circular the carriers were notified not to make such payments from federal funds in their hands, the transportation act (section 206) having provided that payment must be made out of the revolving fund, provided for by section 210. Payments are to be made by the treasurer of the Railroad Administration, acting as a disbursing officer of the treasury department.

Thomas J. Curley, flagman of the passenger train of the Canadian Pacific which was run into by a following train near Corbeil, Ont., on January 25, was tried in the Supreme Court of Ontario on April 9, on a charge of criminal negligence, and was acquitted. Reports printed at the time of the collision indicated that Curley had gone back and had put torpedoes on the rail, but that these either had not exploded or had exploded and had not been heard by the engineman; and Curley was said to have gone back, about a half hour after the collision and picked up the fragments of the torpedoes. The attorney general of Ontario prosecuted Curley on the strength of statements, made at the inquest on the collision, which, it is understood, tended to show that Curley had not gone back a reasonable distance and had not put down the torpedoes.

The United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers has been temporarily suspended by the American Federation of Labor. According to E. F. Grable, grand president of the organization, its charter has been temporarily suspended owing to jurisdiction disputes which have arisen. However, according to Mr. Grable, the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers will send delegates

to the convention of the American Federation of Labor at Montreal, Que., next June, where these questions of dispute will be settled. Several changes have taken place in the officers of the organization, Allen E. Barker, grand president, and George Seal, grand secretary and treasurer, having resigned. Mr. Grable has succeeded Mr. Barker and F. J. Pegg, has succeeded Mr. Seal.

The American Brotherhood of Maintenance of Way Employees, founded and organized at Bonne Terre, Mo., in 1916, as the American Brotherhood of Railway Trackmen and amalgamated with the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers in July, 1919, is now being reorganized as a separate body. Resolutions adopted by the Grand Lodge of the new organization state that the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers has not lived up to certain agreements reached when the amalgamation of the two bodies was made, and that the amalgamation itself was consummated by the United Brotherhood after false representations had been made. The new organization has applied to the American Federation of Labor for affiliation with that body. Robert H. Eaves, organizer and former president of the American Brotherhood of Railway Trackmen, is the grand president of the new organization.

Samuel Gompers, president of the American Federation of Labor, has been misrepresented. A report that he has issued a public statement of his approval of public ownership of railroads, or of the Plumb plan, has gained considerable circulation during the past week, with some assistance from one of Mr. Hearst's papers. The report is based on the fact that the American Federation of Labor has reprinted in pamphlet form an editorial entitled "Labor's Political Banner Unfurled," written by Mr. Gompers for the American Federationist, with the insertion of a sentence (which did not appear in the original editorial) stating that the American Federation of Labor, at its convention in June, 1919, had "declared in favor of ownership or control of railroads by the United States Government." An examination of the pamphlet does not disclose any statement of Mr. Gompers' opinion on the subject which would indicate any change in his opinion as previously expressed that personally he does not believe in government ownership.

Lehigh Valley Maintained Passenger Service Despite Strike

The Railway Age has been informed that it made a grievous blunder in its reference to the Lehigh Valley's passenger service during the strike, which was given on page 1186 of the issue of April 16, in the article entitled "Transportation Tied Up By Unauthorized Strikes." The reference in question purported to give the passenger train situation up to Wednesday, April 14, and read: "*Lehigh Valley.*—This road does not operate much commuter service. The through trains were running off schedule and trains from Pennsylvania Station, New York, were annulled."

The statement was incorrect. The Lehigh Valley annulled none of its passenger service out of Pennsylvania Station and trains were delayed only slightly on the first three days of the strike. Afterward the road was able to maintain its passenger train schedule without inconvenience to passengers despite the great difficulties attendant upon the nature of the strike.

The Shortage of Cars in Canada

The Railway Association of Canada has issued a circular stating that it is most desirable that no obstacle should be placed in way of the prompt return of empty Canadian cars to home rails and therefore until further notice Canadian railways should continue to accept empty Canadian equipment from United States railways at any junction point regardless of ownership.

On April 1, according to the Railway Association of Canada, there were 63,783 Canadian cars on lines in the United States, as compared with 42,415 United States cars on Canadian lines, an adverse balance against the Canadian lines of 21,368 cars.

C. P. Riddell, general secretary of the association, in outlining the situation stated that there are many thousands of carloads of forest and mine products piled up in Canada waiting movement to the United States. The Railway Association of Canada has been working with the Commission on Car Service of the American Railroad Association in an attempt to relieve the situation in Canada, but, owing to the many operating difficulties on lines in the United States during the past few months, substantial improvement has not been made.

Signal Division—A. R. A.

Nominees for officers of the American Railroad Association, Signal Division, to be voted on at the next annual meeting have been selected by the nominating committee and are announced by H. S. Balliet, secretary, as follows: Chairman of the Division, F. W. Pfleging (U. P.); first vice-chairman, F. B. Wiegand (N. Y. C.); second vice-chairman, C. A. Christofferson (N. P.). For members of the committee of direction, to serve three years, the following are nominated: C. J. Kelloway (A. C. L.); W. E. Boland (S. P.); J. B. Latimer (C. B. & Q.); C. R. Hodgdon (C. P.).

Increasing Locomotive Operating Efficiency

Several typographical errors occurred in the article on the above subject by R. S. Mounce, printed on page 1191 of the issue of April 16. On page 1193 the first formula in the first column should have read:

70-ton cars—

$$\text{Train load (tons)} = \frac{P}{R}, \text{ instead of } \frac{P}{r}$$

On page 1194 the first line in the second column should have referred to Fig. 3 instead of Fig. 2.

On page 1195 the first table in the first column should have been headed Equated Loading for 10,000 lb. Tractive Effort, instead of Equated Loading for Class S-4. This applies also to the first table under Fig. 4 in the same column.

The first table on page 1196 should have read Equated Loading for 10,000 lb. Tractive Effort, instead of Equated Loading for Class R-2.

American Association of Engineers

The American Association of Engineers has prepared a tentative program for its fifth annual convention to be held at the Planters' hotel, St. Louis, Mo., on May 10 and 11. Among the subjects which will be discussed, according to this tentative program, are the following: Shall a special charge for special service be made by the employment department; a permanent home for A. A. E., what part shall A. A. E. take in the Presidential campaign; Americanization and man power engineering; the federal department of A. A. E., at Washington; opportunities for the engineer in civil, structural, mechanical, mining and chemical fields; unity of the engineering profession in the United States. In addition to these subjects, group meetings will be held, one of which, a meeting for railroad engineers, will be held at 8.00 p. m., on the first day of the convention.

Annual Meeting of Chamber of Commerce of the United States

The railroad question will be one of the important features on the program of the eighth annual meeting of the Chamber of Commerce of the United States to be held at Atlantic City, N. J., from April 26 to 29.

Group I of the seven group meetings to be held on the afternoon of April 27 will be devoted entirely to railroads. The chairman of the meeting will be George A. Post, president of the Standard Coupler Company, New York, and chairman of the Chamber's railroad committee, and the secretary, Richard Waterman, secretary to the railroad committee.

Papers will be delivered as follows:

Report of Railroad Committee, by George A. Post.

Railroad Consolidation, by John E. Oldham, of Oldham, Merrill & Co., Boston, Mass.

Car Supply and Car Service, by Charles E. Lee, transportation engineer of Ford, Bacon & Davis Corporation, New York.

Mr. Post will also deliver a paper on the subject of the railroads before the general session on the morning of April 28, dealing with Transportation in Relation to Production.

The meeting will be divided into general and group sessions

and will deal particularly with means to increase production in the country's industries. The group sessions will total eleven in number, including, besides railroads, shipping, cost accounting, foreign commerce, finance, domestic distribution, the business press, highways, industrial production, civic development and insurance.

The Mechanical Conventions

The great demand for space at the exhibit of the Railway Supply Manufacturers' Association in connection with the June Mechanical Conventions at Atlantic City, June 9 to 16, has necessitated an expansion of the space to be used to 99,817 sq. ft. This compares with 93,499 sq. ft. used in 1919, and is made possible by the use of 6,706 sq. ft. in the main building balcony of Young's Million Dollar Pier. Up to April 13 space had been assigned to 335 exhibitors, to which number may be added firms securing space with others who have already had their space assigned to them. There were applications this year for at least 30,000 sq. ft. more than the exhibit committee had available, and it was necessary in a great many instances to curtail the amount of space allotted to some of the applicants in order to take care of a greater number. There are still 25 or 30 concerns on the waiting list at this time.

J. D. Conway, secretary of the association draws attention to the fact that the record breaking attendance which is expected has already exhausted the reservations at many of the hotels. There are still some hotel rooms available, however, at the Breakers, St. Charles, Strand, etc. Mr. Conway has offered to be of assistance in the matter and suggests that those who have not yet secured their reservations might find it of value to communicate with his office at 1841 Oliver building, Pittsburgh.

President George R. Carr of the Association has supplied the following additional details:

At the present time, the largest hotels, namely, the Marlborough-Blenheim, Traymore, Dennis, Brighton and Chalfonte, have made assignments, filling the hotels to capacity.

Rooms are still available at the following hotels on the boardwalk: the St. Charles, Strand, the Breakers, Alamac, Ambassador and Chelsea. The Supply Association has arranged to have the Hotel Esplanade which is directly beyond the Chelsea opened for the convention. This hotel does not regularly open until July 1. This hotel has 250 rooms with 60 private baths, running water in all rooms and swimming pool in hotel. American plan rates $6.00 to $10.00 per day.

There are many good hotels located off the boardwalk, among which are the Wilshire, Craig Hall and the Grand Atlantic.

People generally feel, adds Mr. Carr, that the Chelsea and Ambassador are too far from Youngs Million Dollar Pier; in fact, the Chelsea is 100 feet nearer the pier than the Chalfonte, and the Esplanade is three blocks nearer the pier than the Breakers.

For those stopping at hotels located some distance from the pier there is good jitney service on Atlantic avenue, one block from the boardwalk where jitneys run every two or three minutes. The fare is 5 to 10 cents, and from the Hotels Esplanade or Breakers to the pier is covered in five minutes.

The list of exhibitors follows:

A-B-C Transit Refrigeration Co, Chicago.
AGA Railway Light and Signal Co., Elizabeth, N. J.
Ajax Manufacturing Co., Cleveland, Ohio.
Ajax Metal Company, Philadelphia, Pa.
American Abrasive Metals Co., New York.
American Arch Co., New York.
American Automatic Connector Co., Cleveland, Ohio.
American Brake Shoe & Foundry Co., New York.
American Car & Foundry Co., New York.
American Chain Company, Inc., New York.
American Flexible Bolt Co., Pittsburgh, Pa.
American Locomotive Co.,, New York.
American Malleable Castings Assn., Cleveland, Ohio.
American Mason Safety Tread Co., Boston, Mass.
American Rolling Mill Co., Middletown, Ohio.
American Steam Gauge & Valve Mfg. Co., Boston, Mass.
American Steel Foundries, Chicago.
American Tool Works Co., Cincinnati, Ohio.
Anchor Packing Co., Philadelphia, Pa.
Ashton Valve Co., Boston, Mass.
Association of Manufacturers of Chilled Car Wheels, Chicago.
Aterite Company, Inc., New York.
Atlantic Hand Brake Corporation, Buffalo, N. Y.

Baird Pneumatic Tool Co., Kansas City, Mo.
Baker, R. & L., Co., Cleveland, Ohio.
Barco Manufacturing Co., Chicago.
Barrett Company, New York.
Beaudry & Company, Inc., Boston, Mass.
Besly, Charles H., & Co., Chicago.
Bettendorf Co., Bettendorf, Iowa.
Betts Machine Company, Rochester, N. Y.
Bird Archer Company, New York.
Black & Decker Manufacturing Co., Towson, Md.
Blackall, Robert H., Pittsburgh, Pa.
Blevney Machine Co., Greenfield, Mass.
Boss Nut Company, Chicago.
Bowser, S. F., & Co., Inc., Ft. Wayne, Ind.
Bradford Draft Gear Co., New York.
Brown & Co., Inc., Pittsburgh, Pa.
Buckeye Steel Castings Co., Columbus, Ohio.
Buda Company, Chicago.
Buffalo Brake Beam Co., New York.
Bullard Machine Tool Co., Bridgeport, Conn.
Burden Iron Company, Troy, N. Y.
Byers, A. M. Company, Pittsburgh, Pa.

Cambria Steel Co., Philadelphia, Pa.
Camel Company, Chicago.
Carbic Manufacturing Co., Duluth, Minn.
Carborundum Company, Niagara Falls, N. Y.
Carnegie Steel Co., Pittsburgh, Pa.
Chambers Valve Co., New York.
Chase, L. C., & Co., Boston, Mass.
Chesapeake Iron Works, Baltimore, Md.
Chicago-Cleveland Car Roofing Co., Chicago.
Chicago Pneumatic Tool Co., Chicago.
Chicago Railway Equipment Co., Chicago.
Clark Car Company, Pittsburgh, Pa.
Cleveland Pneumatic Tool Co., Cleveland, Ohio.
Cleveland Punch & Shear Works Co., Cleveland, Ohio.
Cleveland Twist Drill Co., Cleveland, Ohio.
Clipper Belt Lacer Co., Grand Rapids, Mich.
Commonwealth Steel Co., St. Louis, Mo.
Consolidated Car-Heating Co., Albany, N. Y.
Consolidated Expanded Metal Companies, Braddock, Pa.
Crane Company, Chicago.
Crosby Steam Gage & Valve Co., Boston, Mass.
Curtain Supply Co., Chicago.
Cutler-Hammer Manufacturing Co., Milwaukee, Wis.
Cyclops Steel Company, New York.
Damascus Brake Beam Co., Cleveland, Ohio.
Davis Brake Beam Co., Johnstown, Pa.
Dayton Pneumatic Tool Co., Dayton, Ohio.
Davis Boring Tool Co., Inc., St. Louis, Mo.
Davis Machine Tool Co., Inc., Rochester, N. Y.
Dearborn Chemical Co., Chicago.
Dickinson, Paul, Inc., Chicago.
Disston, Henry & Sons, Inc., Philadelphia Pa.
Dixon, Joseph, Crucible Co., Jersey City, N. J.
Dixon Valve & Coupling Co., Philadelphia, Pa.
Draper Manufacturing Co., Port Huron, Mich.
Dressel Railway Lamp Works, New York.
Duff Manufacturing Co., N. S. Pittsburgh, Pa.
Dunbar Manufacturing Co., Chicago.
Dunn, W. C., Company, Cincinnati, Ohio.

Edgewater Steel Co., Pittsburgh, Pa.
Edison Storage Battery Co., Orange, N. J.
Edna Brass Manufacturing Co., Cincinnati, Ohio.
Edwards, O. M., Company, Inc., Syracuse, N. Y.
Electric Arc Cutting & Welding Co., Newark, N. J.
Electric Railway Journal, New York.
Electric Service Supplies Co., Philadelphia, Pa.
Electric Storage Battery Co., Philadelphia, Pa.
Elliott-Fisher Co., Harrisburg, Pa.
Elvin Mechanical Stoker Co., New York.
Elwell-Parker Electric Co., New York.
Emmert Manufacturing Co., Waynesboro, Pa.
Enterprise Railway Equipment Co., Chicago.
Ewald Iron Company, Louisville, Ky.

Fairbanks Company, Baltimore, Md.
Fairbanks, Morse & Co., Chicago.
Fire Gun Manufacturing Co., Inc., New York.
Flannery Bolt Co., Pittsburgh, Pa.
Ford, J. B., Company, Wyandotte, Mich.
Fort Pitt Spring & Manufacturing Co., Pittsburgh, Pa.
Foster, Walter H., Co., New York.
Franklin Railway Supply Co., Inc., New York.
Frontier Chuck & Tool Co., Buffalo.
Frost Railway Supply Co., Detroit, Mich.
Fuller Engineering Co., Allentown, Pa.
Fuller Lehigh Company, Fullerton, Pa.

Galena-Signal Oil Co., New York.
Garlock Packing Co., Palmyra, N. Y.
Geist Manufacturing Co., Atlantic City, N. J.
General Electric Company, Schenectady, N. Y.
Germain Company, Pittsburgh, Pa.
Gibb Instrument Co., Detroit, Mich.
Gillespie, A. W., & Co., Chicago.
Globe Seamless Steel Tubes Co., Chicago.
Gold Car Heating & Lighting Co., New York.
Goodall Rubber Co., Inc., Philadelphia, Pa.
Gould & Eberhardt, Newark, N. J.
Gould Coupler Co., New York.
Grand Rapids Grinding Machinery Co., Grand Rapids, Mich.
Greenfield Tap & Die Corporation, Greenfield, Mass.

Griffin Wheel Co., Chicago.
Grip Nut Company, Chicago.
Gustin-Bacon Manufacturing Co., Kansas City, Mo.

Hale & Kilburn Corporation, Philadelphia, Pa.
Hammett, H. G., Troy, N. Y.
Hanna Locomotive Stoker Co., Cincinnati, Ohio.
Haring, Ellsworth, New York.
Harrington, Edwin, Son & Co., Inc., Philadelphia, Pa.
Hauck Manufacturing Co., Brooklyn, N. Y.
Heald Machine Co., Worcester, Mass.
Herbert, Alfred, Ltd., New York.
Heywood Bros., & Wakefield Co., Wakefield, Mass.
Hunt-Spiller Manufacturing Corporation, South Boston, Mass.
Hutchins Car Roofing Co., Detroit, Mich.
Hyatt Roller Bearing Co., New York.

Independent Pneumatic Tool Co., Chicago.
Individual Drinking Cup Co., Inc., New York.
Ingersoll-Rand Co., New York.
International Couplers Co., Pittsburgh, Pa.
International Machine Tool Co., Indianapolis, Ind.
Iron City Products Co., Pittsburgh, Pa.
Irving Iron Works Co., Long Island City, N. Y.

Jacobs Manufacturing Co., Hartford, Conn.
Jefferson Union Co., Lexington, Mass.
Johns-Manville, H. W., Co., New York.
Johnson Bronze Co., New Castle, Pa.
Joliet Railway Supply Co., Chicago.
Jones & Laughlin Steel Co., Pittsburgh, Pa.
Jones, B. M., & Co., Inc., New York.
Joyce-Cridland Company, Dayton, Ohio.
Justice, Philip S., & Co., Philadelphia, Pa.

Karry Lode Industrial Truck Co., Inc., Long Island City, N. Y.
Kaustine Company, Inc., Buffalo, N. Y.
Keller Pneumatic Tool Co., Chicago.
Kerite Insulated Wire & Cable Co., New York.
Keyoke Railway Equipment Co., Chicago.
Keystone Drop Forge Works, Chester, Pa.
King, Julius, Optical Co., New York.

Lakewood Engineering Co., Cleveland, Ohio.
Landis Machine Co., Waynesboro, Pa.
Latrobe Tool Co., Latrobe, Pa.
Lehon Company, Chicago.
Liberty Manufacturing Co., Pittsburgh, Pa.
Liberty Steel Products Co., Inc., Pittsburgh, Pa.
Liberty Tool Corporation, The, Baltimore, Md.
Lincoln Electric Co., Cleveland, Ohio.
Loco Light Co., Indianapolis, Ind.
Locomotive Appliance Co., Toledo, Ohio.
Locomotive Feed Water Heater Co., New York.
Locomotive Firebox Co., Chicago.
Locomotive Lubricator Co., Chicago.
Locomotive Stoker Co., N. S. Pittsburgh, Pa.
Locomotive Superheater Co., New York.
Locomotive Terminal Equipment Association, Chicago.
Long, Chas. R., Jr., Co., Inc., Louisville, Ky.
Ludlow Steel Co., Watervliet, N. Y.
Lukens Steel Co., Coatesville, Pa.
Lunkenheimer Co., Cincinnati, Ohio.
Luster Machinery Co., Philadelphia, Pa.

MacRae's Blue Book Co., New York.
Mahr Manufacturing Co., Minneapolis, Minn.
Manning, Maxwell & Moore, Inc., New York.
Massachusetts Mohair Plush Co., Boston, Mass.
Metal & Thermit Corporation, New York.
Midvale Steel & Ordnance Co., Philadelphia, Pa.
Miller Saw Trimmer Co., Pittsburgh, Pa.
Miner, W. H., Chicago.
Mudge & Co., Chicago.
McCabe Manufacturing Co., Lawrence, Mass.
McConway & Torley Co., Pittsburgh, Pa.
McCord & Co., Chicago.
McCoy, Elijah, Manufacturing Co., Detroit, Mich.
McNab & Harlin Manufacturiing Co., New York.

Nathan Manufacturing Co., New York.
National Brake Co., Buffalo, N. Y.
National Car Equipment Co., Chicago.
National Car Wheel Co., Pittsburgh, Pa.
National Carbon Co., Inc., Cleveland, Ohio.
National Lock Washer Co., Newark, N. J.
National Malleable Castings Co., Cleveland, Ohio.
National Railway Appliance Co., New York.
National Railway Devices Co., Chicago.
National Tube Co., Pittsburgh, Pa.
National Waste Co., Philadelphia, Pa.
New York Air Brake Co., New York.
Newton Machine Tool Works, Inc., Philadelphia, Pa.
Niles-Bement-Pond Co., New York.
Norton, A. C., Inc., Boston, Mass.

Okadee Company, Inc., Chicago.
Okonite Co., Passaic, N. J.
O'Malley-Beare Valve Co., Chicago.
Onondaga Steel Co., Inc., Syracuse, N. Y.
Oxweld Railroad Service Co., Chicago.

Page Steel & Wire Co., New York.
Paige & Jones Chemical Co., New York.
Pantasote Co., New York.
Parkesburg Iron Co., Parkesburg, Pa.
Paxton-Mitchell Co., Omaha, Neb.
Penn Iron & Steel Co., Creighton, Pa.
Penn Seaboard Steel Corporation, Philadelphia, Pa.
Pilliod Company, Swanton, Ohio
Pittsburgh Power Reverse Gear Co., N. S. Pittsburgh, Pa.
Pocket List of Railroad Officials, New York.
Pollak Steel Co., Cincinnati, Ohio.
Potter & Johnston Machine Co., New York.
Pratt & Lambert, Inc., Buffalo, N. Y.
Pressed Steel Car Co., New York.
Pulverized Fuel Equipment Corporation, New York.
Pyle-National Company, Chicago.

Q & C Packing & Lubricator Co., New York.
Quickwork Co., St. Mary's Ohio.
Quigley Furnace Specialties Co., New York.

Racine Tool & Machine Co., Racine, Wis.
Railway Devices Co., St. Louis, Mo.
Railway Materials, Chicago.
Railway Materials Co., Chicago.
Railway Review, Chicago.
Railway Storage Battery Car Co., New York.
Ralston Steel Car Co., Columbus, Ohio.
Reading Iron Company, Reading, Pa.
Reading Specialties Co., Reading, Pa.
Refrigerator, Heater & Ventilator Car Co., St. Paul, Minn.
Republic Iron & Steel Co., Youngstown, Ohio.
Rhodes Manufacturing Co., Hartford, Conn.
Rice Manufacturing Co., Indianapolis, Ind.
Rivet Cutting Gun Co., Cincinnati, Ohio.
Roberts Automatic Connector Co., Ltd., Sarnia, Ont.
Robinson Company, Boston, Mass.
Robinson Connector Co., New York.
Rogers, H. A. Company, New York.
Rome Iron Mills, Inc., New York.
Ryerson, Joseph T., & Son, Chicago.

Safety Car Heating & Lighting Co., New York.
Sargent Company, Chicago.
Schaefer Equipment Co., Pittsburgh, Pa.
Scullin Steel Co., St. Louis, Mo.
Sellers, Wm., & Co., Inc., Philadelphia, Pa.
Simmons-Boardman Publishing Co., New York.
Simmons Hardware Co., Philadelphia, Pa.
Simonds Manufacturing Co., Fitchburg, Mass.
Southwark Foundry & Machine Co., Philadelphia, Pa.
Standard Asphalt & Refining Co., Chicago.
Standard Brake Shoe & Foundry Co., Pine Bluff, Ark.
Standard Car Truck Co., Chicago.
Standard Coupler Co., New York.
Standard Forgings Co., Chicago.
Standard Railway Equipment Co., New Kensington, Pa.
Standard Stoker Co., Inc., New York.
Stone-Franklin Co., New York.
Stucki, A., Company, Pittsburgh, Pa.
Sunbeam Electric Manufacturing Co., Evansville, Ind.
Swind Machinery Co., Philadelphia, Pa.
Symington, T. H., Co., New York.

Talmage Manufacturing Co., Cleveland, Ohio.
Transportation Engineering Corporation, New York.
Tuco Products Corporation, New York.

Underwood, H. B. Corporation, Philadelphia, Pa.
Union Connector Co., St. Louis, Mo.
Union Draft Gear Co., Chicago
Union Railway Equipment Co., Chicago.
Union Spring & Manufacturing Co., Pittsburgh, Pa.
United Engineering & Foundry Co., Pittsburgh, Pa.
United States Graphite Co., Saginaw, Mich
U. S. Light & Heat Corporation, Niagara Falls, N. Y
U. S. Metallic Packing Co., Philadelphia, Pa.
United States Rubber Co., New York.
Universal Car & Hose Coupler Co., Louisville, Ky.
Universal Draft Gear Attachment Co., Chicago.

Vanadium-Alloys Steel Co., Pittsburgh, Pa.
Van Dorn Girder Plate Co., Chicago.
Vapor Car Heating Co., Inc., Chicago.
Victor Tool Company, Inc., Waynesboro, Pa.
Vissering, Harry & Co., Inc., Chicago.

Walworth Manufacturing Co., Boston, Mass.
Ward's Edgar T., Sons Co., Philadelphia, Pa.
Warner & Swasey Co., Cleveland, Ohio.
West Disinfecting Co., New York.
Western Railway Equipment Co., St. Louis, Mo.
Western Steel Car & Foundry Co., New York.
Westinghouse Air Brake Co., Wilmerding, Pa.
Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa.
Wheel Truing Brake Shoe Co., Detroit, Mich.
White American Locomotive Sander Co., Roanoke, Va.
Whiting Foundry Equipment Co., Harvey, Ill.
Whitman & Barnes Manufacturing Co., Akron, Ohio.
Willard Storage Battery Co., Cleveland, Ohio.
Williams-Hayward Co., Chicago.
Wilmarth & Morman Co., Grand Rapids, Mich.
Wilson-Imperial Co., Newark, N. J.
Wilson Welder & Metals Co., Inc., New York.

Wine Railway Appliance Co., Toledo, Ohio.
Woods, Edwin S. & Co., Chicago.
Worthington Pump & Machinery Corporation, New York
Wyoming Shovel Works, Wyoming, Pa

Yale & Towne Manufacturing Co., New York
Yarnall Paint Co., Philadelphia, Pa.
Youngstown Steel Car Co., Youngstown, O.

Zapon Leather Cloth Co., New York

National Foreign Trade Convention

Railroads and the railway supply industry will be given considerably more attention at the Seventh National Foreign Trade Convention to be held at San Francisco, Cal., May 12 to 15, than has been the case in the past.

The convention, in accordance with the usual practice, will be divided into general and group sessions. At the general session to be held on the afternoon of May 12, William Sproule, president of the Southern Pacific, will deliver a paper on Railway Service in Foreign Trade.

Group III, which meets on the evening of May 12, is devoted to Transportation and Communication. The chairman of the meeting will be R. M. Calkins, vice-president of the Chicago, Milwaukee & St. Paul, who will also deliver a paper on Export and Import Transportation.

Railway supplies will be discussed by Frank W. Noxon, secretary of the Railway Business Association, who will present a paper entitled Foreign Trade in Railway Supplies before the group session on Direct Selling Abroad to be held on the afternoon of May 13.

Those in charge of arrangements for the convention have made elaborate plans for the meeting. They have arranged for three special trains, one each over the Northern, Southern and Central routes, as well as for side trips to the important ports on the Pacific Coast.

New Terminal at Jersey City for the Lehigh Valley

The Lehigh Valley has begun construction work on the initial unit of an ocean terminal on New York Bay in the Greenville Section of Jersey City, N. J., which the company has had under contemplation for some time. The new development will be known as Claremont Terminal.

The first unit will be a 3,000-ft. wharf near the foot of Chapel avenue, Jersey City. To reach it from deep water a 35-ft. channel is now being dredged. This will require the removal of 3,500,000 cu. yd. of material.

Ultimately the terminal will cover about 550 acres of ground and be about eight times the size of the first unit. The dock space in the completed project will be about six miles in length.

The wharf now under construction, which will afford berthing facilities for five or six large ocean-going steamers, will be on timber piles with a concrete deck. At the extreme outer end a modern plant for the unloading of ore from vessels to cars will be erected. At first two unloading machines will be installed, but it is planned later to place four machines on the wharf. When this is done it will afford a maximum capacity for unloading 2,500 tons of ore an hour, which means work at the rate of a car a minute.

The unloaders will be used principally by the Bethlehem Steel Company in connection with the movement of ore from steamers to cars en route to its plant at Bethlehem, Pa.

The shore end of the wharf will be utilized as an open pier, with an electrically operated gantry crane of 30-ton capacity covering four tracks, for the handling of the heaviest shipments from cars to vessels and similarly from vessels to cars.

Between the ore unloaders and the open pier will be a two-story steel and concrete warehouse 800 ft. long and 100 ft. wide. There will be railroad tracks on either side of the warehouse and over the track between the house and water will be a traveling gantry crane to facilitate the loading of freight to vessels from the cars and the warehouse, or vice versa.

A yard with a capacity for 500 cars will be built immediately adjacent to the wharf and a power house of 4,000 kw. capacity of brick and steel is in contemplation. While the original plant will be largely for ocean traffic, there will be lighterage and teaming facilities, and roadways will be constructed in connection with nearby Jersey City thoroughfares.

Traffic News

Seventy carloads of hay were sent from Ottawa, Ont., by the government, on April 9, to places in western Canada, where the severe winter and the shortage of fodder have combined to endanger the lives of large numbers of cattle.

F. S. Gibons, assistant to the general manager of the Illinois Central, with headquarters at Chicago, has been appointed general traffic manager of the Sinclair Refining Company, with the same headquarters, effective April 7. Mr. Gibons will have charge of the transportation, shop and traffic departments.

Senator Kellogg has introduced a bill in the Senate to amend the Panama canal act to permit railroads to operate competing steamship lines on the Great Lakes and other inland waterways and the Panama Canal. He said the bill was introduced by request of New England interests and that he was not in favor of it.

The industrial development work of the Southern Railway Company is now carried out by specialists in a half dozen different departments. J. C. Williams, manager of development service, announces the appointment of industrial and immigration agents at Atlanta, Chattanooga, Memphis, Mobile and St. Louis, as follows: Atlanta, G. W. Lee; Chattanooga, E. D. Stratton; Memphis, M. H. Brown; Mobile, W. L. Henderson; St. Louis, F. E. Resler. At Atlanta there is a cotton agent, T. O. Plunkett, and a tobacco agent, E. L. Ring.

The Interstate Commerce Commission, which is struggling with the various questions involved in grouping the railroads and fixing a temporary value, by groups, for their aggregate property, for the purpose of making rates to fit the standard set by the transportation act, has held informal conferences regarding various phases of the question with members of the rate committee of the Association of Railway Executives, and questionnaires have been sent out to the railroads to gather information to be submitted to the commission, both regarding the amount of the value of their property and their estimated budgets of expenses for 1920.

The Southwestern Passenger Association, comprised of passenger traffic officers of lines in Arkansas, Oklahoma and Texas, and parts of Missouri, Louisiana and Kansas, has been formed at St. Louis, Mo., and offices have been obtained in the Century building, St. Louis. J. E. Hannegan, assistant manager of the Western Passenger Bureau, Chicago, is chairman of the new organization. The purpose of the association is to provide means for the interchange of information regarding tariffs and methods of ticketing, the compilation and distribution of tariffs and statistics, consultation and mutual advice with respect to the conservation of revenue and the conduct of passenger traffic.

Traffic Club of Pittsburgh

The Traffic Club of Pittsburgh (Pa.) held its annual dinner on April 8, with addresses by A. D. Foster, superintendent of resources of the Canadian National Railways, Chicago, and Dr. C. A. Eaton, of New York. J. F. Townsend, traffic manager of the National Tube Company and a prominent member of the club, spoke on the freight car situation. He said that on large numbers of cars, in the Pittsburgh district, 24 hours could be saved by having outgoing freight billed from the outlying yard offices. By having the cars moved from the mill to the yard on card waybills; this, he said, could readily be done. In the Connellsville coke region also there are long delays, many cars not being started on the road until 15 hours after they are loaded. Mr. Townsend says that shippers in his district are glad that the pooling of coal cars has been terminated. They prefer to take their chances with the Pittsburgh initial roads. The speaker thought that if the railroads could forget about the eight-hour working limit they could improve their service greatly.

Commission and Court News

Interstate Commerce Commission

The Commission has ordered all carriers that still have in effect passenger tariffs amended by special supplements establishing the increases in fares ordered by Director General McAdoo in 1918 to file re-issued tariffs not later than September 1.

The Commission has announced a series of hearings throughout the country on the recent application of the American Railway Express Company for a general increase in express rates. The hearings will be held before Examiner Barclay as follows: New York, May 17; Chicago, May 24; Spokane, June 1; San Francisco, June 7; Houston, June 14; Atlanta, June 21, and Washington, June 28.

Requests have been made to the Commission by the Milwaukee Chamber of Commerce and the Chicago Board of Trade for suspension of proposed increased proportional rates on ex-lake grain, at and east of Buffalo, destined to New York, Boston, Philadelphia, Baltimore and interior eastern points, also to North Atlantic ports when for export as published in supplement No. 5 to F. S. Davis's Tariff No. A-15 and No. A-25, indicated to become effective June 1. Responsive to requests therefor, an informal hearing will be held at Washington on May 21.

State Commissions

The Public Utilities Commission of Illinois on its own motion has instituted an inquiry into the application of the Western and Official Classifications in Illinois. The Atchison, Topeka & Santa Fe has been cited to show cause why it should be permitted to continue to apply the Western and Official Classification rules, regulations, practices and class rates in Illinois or what classification rules, regulations, class rates should be substituted therefor.

Court News

Riding Free, with Consent of Trainmen, Bars Recovery for Injuries

A person riding in the engine cab of an interstate freight train, without payment of fare, with the consent of the conductor and the engineer, sued the railroad for injuries received in a collision on the theory that he was a licensee and therefore under contract. The South Carolina Supreme Court holds that he was on the train in violation of both the state and federal statutes and could not recover, following the decision in a similar case, Illinois Central v. Messina, 240 U. S. 395, 36 Sup. Ct. 368. Neither the conductor, the engineer, nor the railroad itself could make a contract in violation of law, or waive the requirements of the law.—Hainant v. Southern (S. Car.) 100 S. E. 709.

Compensation for Switching Cars—Tariffs

The Pennsylvania Supreme Court holds that under the Interstate Commerce Act, a railroad company owning a short line operated as a facility to a large steel plant, could not recover compensation from an interstate carrier where the latter had filed no tariff of rates.

A claim for switching intrastate traffic was held to be different; to it the federal statutes have no application. Here, according to the evidence, services were rendered for which payment at less than actual cost was received under protest, and upon an agreement that the amount should finally be determined by a tribunal which, in fact, had no right to act in the premises (the Interstate Commerce Commission). It was held that the agreement for such determination did not oust the jurisdiction of the courts, and the short line company could recover on a *quantum meruit* whatever balance might be its due for the expense of the service actually rendered.—Pittsburgh & Lake Erie v. South Shore (Pa.) 107 Atl. 680.

Foreign Railway News

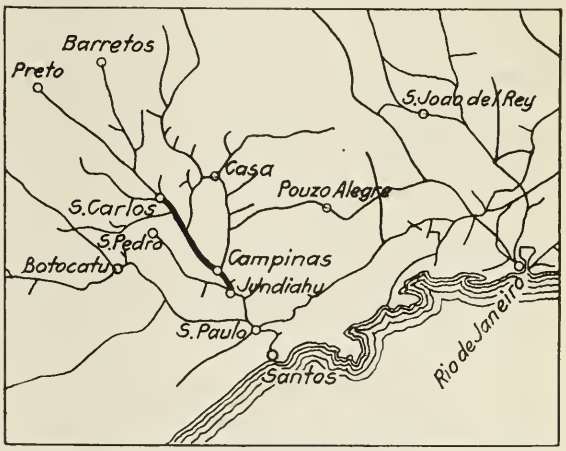
Australia Suffers from Small Stocks

The shipping situation is so serious at present, says a publication of the Guaranty Trust Company that stocks of all commodities in Australia are very low. It is, for instance, almost impossible to obtain steel rails at any price, according to reports, and the completion of the electrification of the Melbourne suburban railways is being delayed through inability to secure essential equipment.

Brazilian Railway to Electrify Main Line

The International General Electric Company has secured a contract amounting to nearly $2,000,000 for the electrification of a mainline railway in South America.

The electrification is over the line of the Paulista Railway between Jundiahy and Campinas, Brazil, a distance of 45 kilometers or about 28 miles. The road is of double track



The General Location of the Section of the Paulista Railway to Be Electrified

construction and the total mileage, including switches and extra track amounts to 76 miles.

The equipment to be supplied consists of 12 locomotives, 8 freight and 4 passenger engines, material for the transmission line and sub-station and a 3000 volt over-head, a type similar to that used on the Chicago, Milwaukee & St. Paul. It is

Type of Electric Locomotive to Be Used

one of the largest railway contracts received since the C. M. & St. P. electrification.

This project anticipates further extensions amounting to 100 additional miles of route which may eventually bring the total electrification up to 128 miles extending, between Jundiahy and San Carlos.

Power for the operation of the lines will be supplied by the

San Paulo Light & Power Company at 88,000 volts, 60 cycles.

The locomotives will be of the geared type, 3000 volt direct current. The freight locomotive will weigh 100 tons each, all weight on driving axles, and the passenger engine 120 tons, equipped with two axle guiding trucks at each end. They will be built at the Erie Works of the General Electric Company. All of them will be equipped with regenerative braking apparatus. The design of the power and distribution equipment will parallel closely that used on the C. M. & St. P. electrification, while the locomotives will be almost the duplicates of those used on the Butte, Anaconda & Pacific Railway, except for slightly increased weight and the addition of regenerative braking.

It is expected that the new line will be in operation in July, 1921.

Railroad Conditions in Roumania

By Francis Jaques

The following is an extract of an article written by Paul Erio, a correspondent of the French newspaper, Le Journal. It was Mr. Erio who wrote a remarkable series of articles for the same paper describing his life in Petrograd during the darkest period of the revolution there. He is now in Roumania, where he is making a careful study of the conditions, and he writes from Bucharest:

"No one here doubts but that Roumania will be able to rise up from the state of exhaustion, which is preventing its progress, and succeed in assuring its economical reconstruction by following a rational program. It is agreed that the country cannot be allowed to remain in its present anemic condition and that, by properly developing its incomparable natural riches, which are only partly utilized at present, it ought to be able to attain a state of prosperity even greater than that which it ever enjoyed before. Unfortunately each of the political parties desires to have the honor of saving its country and as the methods and also the personal interests differ, the various projects initiated work against each other. Nothing useful is accomplished. The state of affairs remains stationary and the difficulties increase.

"Although the condition is not desperate, it is, however, very critical, and it must be recognized that, in order to get out of the chaos in which it wallows, Roumania must accomplish a gigantic task, all the more difficult owing to the fact that at the same time, she will have to put through an agrarian reform, a most delicate matter, and also because she must reckon with the unreasonable exactions and lack of good will of a working class upset by the Bolshevistic movement which has full play in Bucharest and the principal industrial centers.

The Reorganization of the Railroads

"Above all, the future of Roumania is dependent on the reorganization of the railroads. At present, the lack of transportation facilities limits the production of petroleum, prevents other possible exports and naturally contributes to the high cost of living. Formerly Roumania possessed 2,250 miles of railroad. Today she has 7,125 miles. Although the length of the lines, however, has more than tripled, the number of available locomotives has diminished in the same proportions. Roumania had, when she entered the war, 1,063 locomotives. The Germans made off with 400 of these when they occupied the country. Since then the Roumanians have recaptured equipment in revenge for this brutal requisition, and rather to their advantage. They found locomotives in Bukovania and in Transylvania. They also seized engines in Hungary, in their turn, and they thus collected in all about 2,000. There are, however, only about 700 which can be operated and, as Transylvania and Bukovinia kept more than 300 of them, there are scarcely 400 left for the territory of the former kingdom. This is absolutely insufficient.

"If Roumania were able to repair rapidly the bad-order locomotives stalled everywhere on the sidings, she could appreciably increase her traffic. This, however, is not possible on account of the deplorable state of mind of the workmen in the government shops where the output is reduced to almost nothing. It is not a wave of laziness which is stopping the work. It is a systematic obstruction, thoughtless and criminal, which is increasing the difficulties of the country, and against which no one dares to take action. The happy initiative shown by the assistant director general of railroads, the engineer Hanulesco, proves this. Being unable to furnish the trains which he was requested to supply for shipments of great urgency, this engineer suggested to several people, who asked him for equipment, that they themselves repair the locomotives which they needed. They accepted this proposal with enthusiasm, and during the month of February, 25 locomotives were repaired in shops which were in no way prepared for this task. This is a significant result, for during the same period only 26 locomotives were turned out by the government shops, where 4,000 workmen are employed. Before the war an average of 80 were repaired a month in these shops.

"It will be seen that a sincere effort is being made to remedy the disastrous transportation crisis. The railroads cannot, however, solve the question themselves with the means that they have at their disposal. In order to maintain a normal traffic in Greater Roumania 4,000 locomotives are needed. The railroads are ready to buy them anywhere. No orders have, however, been placed and, as several years will pass before Roumania can receive this equipment, which is also lacking in many other countries, its exports will necessarily suffer in the meantime. In spite of the uniting of Bessarabia and part of the Banat to Roumania, the cereal trade, which, was its fortune, is compromised. The agrarian reform will be one of the causes for the dividing up of the great estates and the changes in the methods of cultivation will reduce the production by at least 30 per cent. The petroleum industry, however, will develop as much as the conditions of the railroads will permit. Nevertheless, however much this industry may grow, it will not bring back its former prosperity to Roumania, for the value of the cereals exported was 13 times that of the petroleum and its products."

Roumania's Needs and American Exporters

It will be noted that in the above article Mr. Erio states that the Roumanians desire to buy locomotives anywhere that they can obtain them, but he goes on to say, in the last part of his article where he takes up the financial crisis of the country, that naturally Roumania will be obliged to reduce its importations to a minimum in order to try to raise the "lei," which is now worth about 1¼ cents, to its former value in the money markets of the world. The truth of the situation is that Roumania absolutely needs locomotives and would like to buy them anywhere, from America, for instance, but it takes so many "lei" today to make a dollar, that the transaction might appear rather difficult. That it is not impossible, however, is shown by the order for 50 locomotives placed recently with the Baldwin Locomotive Works.

Railway Development in Siam

It is understood by Eastern Engineers that as soon as the necessary material can be obtained the Siam Northern Railway, which now reaches Lampang, a distance of 400 miles due north of Bangkok, will be carried a further 60 miles, as far as Chiengmai, the northern capital; and that a survey has been ordered for the continuation of the short branch line running due east from Bangkok, and now reaching Patriew, 40 miles distant, with a view to its extension as far as the border of French Indo-China. Another line will shortly be established connecting Singapore with the Siamese frontier via Kelantay and Pahang. The Eastern connection with French Indo-China has not yet been developed. The present terminus is at Korat, and the existing motor and steam-boat services northward are very limited.

A project is now on foot to extend the railway which runs from Bangkok to Patriew as far as the French border at Aranya Pradesa via Prachinburi, Chantakarm, and Krabin, and a Royal Decree was issued May 10, 1919 ordering a complete survey of the proposed line to be effected in two years. This extension would open up connection by road with Battambong and Pnom-Penh.

For the purpose of providing a system of good roads to connect the villages, and act as feeders to the railways, the Royal Railway Department has formed a roadmaking section, with a British engineer at its head. It is confidently expected that the linking up of the Federated Malay States with Siam will give a great impetus to trade between the two countries, and be a means of bringing Siam more into contact with the outside world.

After all the great thing is that a grave crisis has been safely passed and that a good start toward solving the problem of railroad reconstruction has been made.—*Philadelphia (Pa.) Inquirer.*

Equipment and Supplies

Sale of Russian Locomotives

The director of sales of the War Department has sold the remaining 113 of the 200 Decapod locomotives originally built for the Russian government to Cuthell, White, Bayles and Appel, counsellors at law, Washington, for export, under a condition that the locomotives will not be resold to the Russian soviet republic. They will be repaired, altered to 5 ft. gage, be equipped with Russian couplers and boxed for ocean shipment by the Baldwin Locomotive Works. The purchasers are still negotiating for their disposition. The price was $47,710. The 87 locomotives sold to American railroads were sold at $25,000 in consideration of their inaptitude for service on roads in this country and in order to make their purchase as attractive as possible to American railroads to which the entire lot was originally offered. The War Department has also received bids on about 7,500 freight cars, built for military service in France, but the sale has not yet been made

Locomotives

The Richmond, Fredericksburg & Potomac has ordered eight locomotives from the American Locomotive Company.

The Temiskaming & Northern Ontario is inquiring for two 8-wheel switching locomotives and 4 Mikado type locomotives.

Dutilh-Smith, McMillan & Co., 50 Broad street, New York, are inquiring for 3 locomotives to have a weight of 16 tons or less, and one meter gage, to be either new or second hand equipment.

The Tientsin-Pukow (China) has ordered 12, 4-6-2 type locomotives from the American Locomotive Company. These locomotives will have 22 by 26 in. cylinders, and a total weight in working order of 215,000 lb.

The Roumanian Government.—A contract has been signed with the Baldwin Locomotive Works for the delivery of 50 standard gage Consolidation type locomotives. Payment is to be made by a monthly consignment of oil which makes the deal a barter arrangement. Twenty-five of these locomotives are to be built by the American Locomotive Company.

The Bell Locomotive Works has received orders for contractors' road building locomotives as follows: A number for the State Highway Department, Harrisburg, Pa.; Samuel Gamble & Co., Carnegie, Pa., two 10-ton 8-wheel locomotives; State Construction Company, New Kensington, Pa., one 10-ton and one 6-ton locomotive, and the John J. Shanley Company, Philadelphia, two 6-ton locomotives.

The Central of Brazil has ordered 6, 4-6-0 type locomotives from the American Locomotive Company. These locomotives will have 21½ by 26 in. cylinders and a total weight in working order of 174,000 lb. Also, 6, 4-6-0 type locomotives, with 16 by 20 in. cylinders and a total weight in working order of 82,000 lb.; 18, 2-8-0 type locomotives, with 21½ by 26 in. cylinders, and a total weight in working order of 170,000 lb., and 10, 2-8-0 type locomotives, with 17 by 20 in. cylinders, and a total weight in working order of 93,000 lb. All of these locomotives were ordered from the American Locomotive Company.

Freight Cars

The Chicago & North Western is inquiring for 500 50-ton ore cars.

The Bedford Petroleum Company is inquiring for 150 four-wheel tank cars.

The Chesapeake & Ohio is inquiring for 1,000 coal cars of 100 tons' capacity.

The Cuban Sugar Refining Company, New York, is inquiring for 50, 36-in. ballast cars.

The Southern Pacific is inquiring for 500 automobile box cars and 250 general service cars.

The Atlantic Coast Line is inquiring for 500 ventilated, double-sheath box cars of 50 tons' capacity.

The Northern Pacific has ordered 300 ballast cars of 55 tons' capacity from the American Car & Foundry Company.

The Tidewater Oil Company, New York, has ordered 100 tank cars from the General American Tank Car Corporation.

The American Smelting & Refining Company is inquiring for from 5 to 10, 60,000-lb. capacity ore cars, of 36 in. gage, for export to Mexico.

The Havana Central is inquiring for equipment, for account of the United Railways of Havana, as follows: 200 30-ton freight cars, 200 40-ton box cars, 75 40-ton hopper coal cars.

The New York Central.—The Haskell & Barker Car Company will build 500 stock cars for this road, and the Merchants' Despatch Transportation Company's shops will build 494 stock cars and 30 milk cars.

The Tennessee Coal, Iron & Railroad Company is inquiring for 10 steel underframe box cars of 40 tons' capacity each, 10 all-steel box cars of 70 tons' capacity each, and 25 steel gondola cars of 70 tons' capacity each.

Passenger Cars

The Havana Central is inquiring, for account of the United Railways of Havana, for 10 first-class passenger cars.

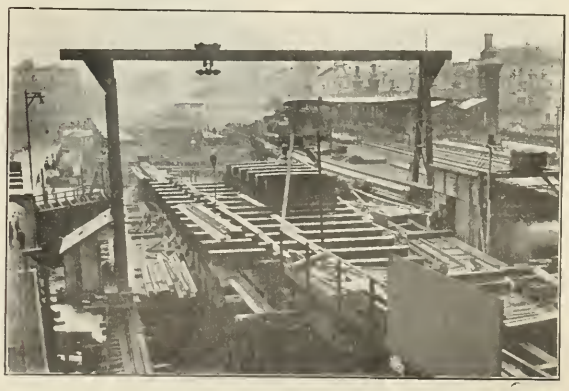
The New York Central.—This road will build in its own shops the 12 all-steel dining cars mentioned in the *Railway Age* of last week.

Iron and Steel

Dutilh-Smith, McMillan & Co., 50 Broad street, New York, are inquiring for 1,000 pieces about 150 ton of 50-lb. rail, 20 per cent to be in 7 meter lengths, the balance in five to six meter lengths. This firm recently ordered 300 tons of relaying rail for export.

Machinery and Tools

Announcement is made by the Navy Department that it will sell by sealed proposals, to be opened May 24, 1920, by the Disbursing Officer, Senior Member Board of Sale, Navy Yard, Washington, D. C., a considerable quantity of machine tools consisting of various kinds of milling and boring machines, lathes, grinders, drill presses, planers, trimmers, saws and shapers. These machines were manufactured by some of the leading firms in the country, and are still in such condition as to render satisfactory service. They are being offered at prices far below the cost of production at the present time.



A New Station Under Construction in Berlin

Supply Trade News

The **United States Gauge Company** will move its general sales office from 67 Wall street, to 37-39 Liberty street, New York, on May 1.

A. C. Moore has been appointed assistant to the president of the **Globe Seamless Steel Tubes Company**, Chicago, with headquarters at Chicago, effective April 12.

Harry U. Morton, whose appointment as president and treasurer of the **Dunbar Manufacturing Company**, Chicago, was announced in the *Railway Age* of April 16 (page 1218), was born on April 25, 1866 in Painesville, Ohio. He entered railway service in 1891 with the Pullman Company and remaining with that company for 17 years of which he served four years in the manufacturing department, and for 13 years in the operating department. In 1907 he was appointed vice-president and general manager of the General Railway Supply Company. Seven years later he was appointed vice-president and secretary of the Acme Supply Company, Chicago, the corporate name of this company being changed in 1917 to the Dunbar Manufacturing Company. On April 1, of this year, he was elected president and treasurer of the latter company succeeding Thomas Dunbar, who has resigned.

H. U. Morton

Robert Sinclair, vice-president of **Mudge & Co.**, Chicago, has been elected executive vice-president in charge of all departments, including the manufacturing plant recently constructed in Chicago. Mr. Sinclair was born on April 12, 1878, at Chicago, and entered railway service in the auditing department of the Chicago & Eastern Illinois in 1892. The following year he became connected with the operating department of the Columbian Intramural Railway at the Chicago Worlds fair. At the close of this exposition he entered the service of the Union National Bank of Chicago, and remained with it until its consolidation with the First National Bank in 1900, when he became associated with the larger institution. He left the banking business on September 1, 1910, to become secretary and treasurer of Mudge & Co. On June 9, 1912, he was elected second vice-president of this company, later being made first vice-president. On November 1, 1916, he was appointed vice-president in charge of the sales, manufacturing and treasury departments, which position he has held until his recent appointment.

R. Sinclair

G. B. Albright, has been appointed manager of the railway department, western district, of the **Lowe Brothers Company**, Dayton, Ohio, with headquarters at Chicago, effective April 1.

The All Weather Products Company, Streator, Ill., has been formed for the manufacture of "Stay White" asbestos coatings for felt or composition roofs, and various paints and weather proofing materials.

L. B. Stillwell and **H. S. Putnam**, consulting engineers, and the L. B. Stillwell Engineering Corporation, constructing engineers, now at 100 Broadway, New York, will remove their offices on May 1 to 143 Liberty street.

J. L. Ray, manager at Pittsburgh, Pa., of the **Western Electric Company**, New York, has been appointed power apparatus sales manager in the general sales department, New York, and **W. H. MacCrellish** has been appointed manager at Pittsburgh, to succeed Mr. Ray.

The Triangle Equipment Company has been organized to deal in railway and contractors' equipment of all descriptions. The officers of the new company are **W. P. Gleason**, president, **Richard E. Lewis**, manager, both previously with the Pennsylvania Railroad, and **Anderson Allyn**, treasurer, formerly with the director of sales, War Department. The headquarters of the company are in the Munsey building, Washington, D. C.

Obituary

Roger C. Sullivan, chairman of the board of directors of the **Independent Pneumatic Tool Company**, Chicago, died on April 14.

Trade Publications

UNION FITTINGS.—The E. M. Dart Manufacturing Company, Providence, R. I., has issued its 1920 catalogue (S) of unions and flanges, with illustrations, prices and schedules showing sizes, dimensions, weights, etc.

SHOP MACHINERY AND TOOLS.—The Brown & Sharpe Manufacturing Company, Providence, R. I., has revised its catalogue of machinery and tools. The new catalogue is known as No. 137 and contains 609 pages, 5¾ in. by 3½ in., and is illustrated. It covers the complete line of equipment manufactured by this company, including milling and grinding machines, automatic gear cutting and screw machines, cutters, machinists' and test tools; and contains a number of tables for the convenience of mechanics.

STEEL TANKS FOR RAILWAY SERVICE.—The Chicago Bridge & Iron Works, Chicago, has recently issued a 24-page illustrated folder which is descriptive of the different tanks manufactured by this company for railway installations. It is illustrated by photographs showing views of actual installations and has various designs suitable for different classes of service. The accompanying data gives values, capacities, methods of operating, control appliances, and such other information descriptive of the same.

GASOLINE LOCOMOTIVES.—Record No. 95, published by the Baldwin Locomotive Works, Philadelphia, Pa., deals with internal combustion locomotives, weighing from 5 to 25 tons, adapted to work in contracting operations, plantations, quarries, switching in railroad yards, etc. Various changes and improvements have been made in these locomotives since their introduction and the general principles of construction are described and illustrated. A table shows the performance, rating and principal dimensions of the standard sizes of Baldwin gasoline locomotives.

SUPERHEATERS.—Bulletin T-5, published by the Locomotive Superheater Company, New York, describes the advantages of superheated steam for stationary power plants and presents the engineering reasons for these advantages from a new angle. The argument is clear and concise and should be of interest to all power plant owners and operators in every industry, or in power plant service. Charts are included showing the effect of superheat on steam consumption, the superheat required to prevent condensation and the increase in thermal efficiency due to superheat.

Financial and Construction

Railway Financial News

BOSTON & MAINE.—The stockholders at their annual meeting on April 14 voted to authorize the issuance of $8,843,000 bonds to refund bonds of the Concord & Montreal and the Fitchburg and notes of the Boston & Lowell falling due within the next six months. This is a result of the Boston & Maine having taken over the subsidiary roads. At the same time it was voted to confirm the mortgage now running to the Old Colony Trust Company and S. Parkman Shaw, trustees, and dated December 1, 1919, the mortgage being the security for the new bond issue.

NEW YORK, NEW HAVEN & HARTFORD.—President E. J. Pearson and Vice-President Benjamin Campbell have been elected directors, the latter succeeding Arthur E. Clark, the company's secretary, who had been serving.

The other action by the stockholders at their annual meeting was to authorize the officers to act in all questions and matters relative to the use, control and operation of the property by the federal government to authorize a new loan from the United States government for rolling stock, not to exceed $4,165,000; to ratify and approve of an equipment trust agreement with Walker D. Hines, covering allocation of rolling stock at a cost not to exceed $4,813,930, and the issuance of equipment trust certificates not to exceed the latter amount.

NORFOLK & WESTERN.—See editorial elsewhere in this issue.

PENNSYLVANIA.—President Rea appeared before the New Jersey Public Utility Commission at Trenton on April 20 to ask the commission's sanction for a $50,000,000 bond issue by the railway. President Rea told the commissioners his road faced $24,000,000 in obligations due July 1. The issue would be underwritten by Kuhn, Loeb & Co., New York, in 10-year 7 per cent bonds.

UNION PACIFIC.—E. Roland Harriman and Charles A. Stone have been elected directors, succeeding A. J. Earling and W. V. S. Thorne.

WESTERN PACIFIC.—F. W. McCutcheon has been elected a member of the executive committee and a director succeeding William Salomon.

Railway Construction

CANADIAN PACIFIC—The Strauss Bascule Bridge Company, Chicago, has been retained to design the bascule span on a joint railway and highway bridge over Inner Harbor at Johnston street in Victoria, B. C. The cost will be borne jointly by the city of Victoria, the provincial government of British Columbia, and the Canadian Pacific.

CENTRAL OF GEORGIA.—A contract has been given to the George B. Swift Company, Chicago, to build at Macon, Ga., an outbound freight house of reinforced concrete construction, about 800 ft. long, and a transfer shed of wood construction about 600 ft. long. These two structures are part of the plan for a complete freight terminal, but the remaining buildings will not be built at present. The work has already been started and will cost about $150,000.

NEW YORK CENTRAL.—Plans are being made for carrying out extensive additions to the freight terminals at Weehawken, N. J. The improvement will include considerable mileage of new tracks, connecting with the new terminal yards being built near Weehawken for the Cunard Steamship Line, in connection with the new pier under construction for the steamship company.

QUEBEC CENTRAL.—A contract has been given to J. T. & J. F. Davis, Montreal, Que., to build a branch from Scotts' Station, Quebec, on the main line, for a distance of 8 miles to a point 2.5 miles west of St. Isidore on the Canadian National Railways. The branch is to be built to provide a connection for the Quebec Central with Quebec City over the Quebec bridge. There will be one steel bridge 125 ft. long and a station at St. Isidore Junction.

Railway Officers

Executive

F. E. Blaser, who has been appointed assistant to the vice-president of the Baltimore & Ohio in charge of the bureau of wages, working conditions and the bureau of employment and discipline, as noted in the *Railway Age* of March 12 (page 801), served as assistant general manager of the eastern lines, with headquarters at Baltimore, during federal control. Mr. Blaser was born on December 14, 1858, at Tomah, Wis. He was educated in the public schools and began railroad work in 1871 as a water carrier on the West Wisconsin, now part of the Chicago, St. Paul, Minneapolis & Omaha. Afterwards he served consecutively as telegraph operator, agent, brakeman, conductor, train despatcher and trainmaster. He was appointed superintendent of the Ohio River Railroad in 1900, and remained in the same position after that road was taken over by the Baltimore & Ohio. Afterwards he became superintendent of the Wheeling division of the Baltimore & Ohio and later he was transferred to the Cumberland division in the same capacity. In April, 1910, he was promoted to general superintendent, with headquarters at Baltimore, Md. He was appointed assistant general manager in the latter part of 1917.

F. E. Blaser

Henry Miller, president of the Missouri & Illinois Bridge & Belt, has been elected president of the Terminal Railroad Association of St. Louis, effective April 12. Mr. Miller was born at Hannibal, Mo., on February 24, 1863. He entered railway service as a boilermaker's apprentice on the Hannibal & St. Joseph, now a part of the Chicago, Burlington & Quincy, in 1878. The following year he became a switchman, and in 1883 he was promoted to yardmaster on the same road. From 1890 to 1892, he served as trainmaster on the St. Louis, Keokuk & North Western, now a part of the Burlington, on the latter date being appointed assistant superintendent of that road and also of the Chicago, Burlington & Kansas City, now also a part of the Burlington. He was later appointed superintendent of the St. Louis, Keokuk & North Western and the Chicago, Burlington & Kansas City, and from 1903 to 1905 he served as general superintendent of the same roads and also of the Kansas City, St. Joseph & Council Bluffs, now part of the Burlington. He was appointed general superintendent of the Missouri district of the Burlington in 1904. In 1905 he

H. Miller

was appointed general manager of the Wabash, and later vice president of that road, resigning in 1915 as general manager, but remaining as vice-president and director. In 1915 he was elected president and auditor of the Missouri & Illinois Bridge & Belt, with headquarters at St Louis. During the war Mr. Miller was one of the American railroad experts sent to Russia by the government to aid that country to rebuild its lines. This commission, known as the Stevens commission, had plans prepared to aid the Kerensky government to rehabilitate the transportation machinery. This work was in progress when the Bolsheviki proletariat under the leadership of Lenine and Trotzky seized the control of the country, causing a complete upset of the commission's plan. Following his return from Russia he was elected president of the Title Guaranty Trust Company, St. Louis, which position he resigned upon his election as president of the Terminal Association.

Henry Miller having been elected president of the Terminal Railroad Association, **T. M. Pierce**, who has been acting as president and general counsel, has been elected vice-president

Financial, Legal and Accounting

F. W. Elder has been appointed auditor and car accountant of the Batesville Southwestern, with headquarters at Batesville, Miss., effective March 15.

Operating

E. J. Naylor, general superintendent of the Batesville Southwestern, will assume, in addition to his present office, the duties of trainmaster, this position having been abolished on March 15.

Charles W. Bradley, superintendent of telegraph of the Chesapeake & Ohio, with headquarters at Richmond, Va., has been appointed, in addition, superintendent of telegraph of the Hocking Valley, with the same headquarters, effective April 1.

J. Munday, vice-president of the Eastern Texas Railroad (St. Louis Southwestern of Texas), with headquarters at Lufkin, Tex., has been appointed superintendent of the Dallas Terminal Railway & Union Depot, with headquarters in Dallas, Tex., effective April 1.

C. A. Veale, signal supervisor of the Southern Pacific, with headquarters at Los Angeles, Cal., has been appointed assistant trainmaster, Oakland, Alameda & Berkeley electric lines, with headquarters at Oakland Pier, Cal., succeeding **J. S. Shakespeare**, assigned to other duties, effective April 1.

Operating heads of the first and second districts of the Chicago, Rock Island & Pacific will hereafter be known as managers instead of assistant general managers. **C. W. Jones**, assistant general manager with headquarters at Des Moines, Iowa, will be manager of the first district, same headquarters and **A. B. Warner**, assistant general manager with headquarters at El Reno, Okla., will be manager of the second district, same headquarters.

Traffic

L. E. Saupe has been appointed industrial commissioner of the St. Louis Southwestern, with headquarters at St. Louis, Mo., effective April 1.

Frank C. Johnson, commercial agent on the Chicago, Rock Island & Pacific, has been appointed general agent, with headquarters at Memphis, Tenn., effective April 1.

Charles Benish has been appointed commercial agent of the Atlanta, Birmingham & Atlanta, with headquarters at Atlanta, Ga., succeeding **J. W. Brown**, effective April 5, and **C. B. Austin** has been appointed commercial agent at Toledo, Ohio, effective April 10.

L. L. Hyde, general freight agent of the Lake Erie & Western, with headquarters at Indianapolis, Ind., has been appointed general freight and passenger agent, with the same headquarters, effective April 1. Mr. Hyde will assume the duties of J. F. Hall, general passenger agent, who has resigned.

Stuart A. Allen, who has been appointed assistant freight traffic manager of the Baltimore & Ohio, with headquarters at New York, as noted in the *Railway Age* of March 5 (page 738), began railroad work as traveling freight agent for the Cincinnati, Hamilton & Dayton. In 1904 he was appointed southern agent and in 1905, general southern agent. He was promoted to assistant general freight agent in 1907. In 1911 he became general agent of the Baltimore & Ohio, Cincinnati, Hamilton & Dayton lines, at Cincinnati, Ohio. He was appointed manager of the Continental Line and the Central States Despatch, fast freight connections of the Baltimore & Ohio, on October 15, 1914. In October, 1916, he became general eastern freight agent of the Baltimore & Ohio, with headquarters at New York, and early in 1917 was promoted to general freight agent.

S. A. Allen

Charles Crichton Clark, assistant general passenger agent on the Michigan Central, with headquarters at Chicago, has been appointed general passenger agent, with the same headquarters, effective March 1. Mr. Clark succeeds **L. W. Landman**, who has been appointed passenger traffic manager. He was born in Loveland, Ohio, on April 1, 1872. He entered railway service in 1889 and in 1895 was appointed soliciting passenger agent on the Cleveland, Cincinnati, Chicago & St. Louis. He was later appointed as traveling passenger agent of that road, with headquarters in Chattanooga, Tenn., and in 1902 was promoted to central passenger agent, with headquarters at Cincinnati, Ohio. From 1905 to 1909, he served as general agent in the passenger department, with headquarters respectively at Columbus, Ohio, Indianapolis, Ind., and Cincinnati, Ohio. On the latter date he was appointed general agent in the passenger department of the Big Four and the Michigan Central, with headquarters at Chicago. In 1917 he was promoted to assistant general passenger agent on the Michigan Central and during federal control served as manager of the consolidated ticket offices at Chicago.

C. C. Clark

Walter Walthall, who has been in the railway supply business at Houston, Tex., for the past year, has been appointed assistant general freight and passenger agent of the Missouri, Kansas & Texas, with headquarters at San Antonio, Tex. Mr. Walthall was born October 29, 1879, in Perry county, Alabama, and was educated in the public schools there. He entered railway service in 1903 with the Missouri, Kansas &

Texas, as a yard clerk and was later promoted to assistant city ticket agent. In 1907 he was appointed city passenger and ticket agent, with headquarters in Austin, Tex., later being transferred to San Antonio. He was promoted to district passenger agent, with headquarters in San Antonio, in 1912, which position he held until 1918, when he was appointed general agent. On May 1, 1919, he entered the railway supply business in Houston, in which he continued until his present appointment.

James F. Shinn, who has been appointed general passenger agent of the Erie, with headquarters at New York, as noted in the *Railway Age* of March 26 (page 1079), served as assistant to the general passenger agent from April 1, 1909, until the termination of federal control. Mr. Shinn was born in Noble County, Ohio. He graduated from Smith College at Beverly, Ohio, in 1885. His first railroad work began in the fall of 1886 as agent and telegraph operator for the Cleveland & Marietta, now part of the Pennsylvania. In 1891 he became a clerk for the same road and in 1893, chief clerk to the auditor of freight and passenger accounts at Cambridge, Ohio. He was transferred to the office of the general passenger agent as chief clerk in 1894, and served in that position until 1899, when he became rate clerk in the passenger department of the Pennsylvania at Pittsburgh, Pa. He went to the Erie as chief rate clerk in the passenger department at Cleveland, Ohio, on August 20, 1902, and on April 1, 1909, as mentioned above, he was promoted to assistant to the general passenger agent, with headquarters at New York.

J. F. Shinn

Louis W. Landman, general passenger agent of the Michigan Central, with headquarters at Chicago, who has been appointed passenger traffic manager of the New York Central and the Michigan Central, with the same headquarters, was born at Waynestown, Ind., on December 6, 1869, He entered railway service in 1888 as telegraph operator on the Indiana, Bloomington & Western, now part of the Cleveland, Cincinnati, Chicago & St. Louis. In 1890 he was appointed city passenger agent on the Ft. Wayne, Cincinnati & Louisville, now part of the Lake Erie & Western, with headquarters at Ft. Wayne, Ind., and one year later he was appointed general traveling passenger agent on the Hocking Valley, with headquarters at Detroit, Mich. He was later appointed general agent in the passenger department of the New York Central, with headquarters at Toledo, Ohio, and in 1906 he was appointed general western passenger agent of the Lake Shore & Michigan Southern, now part of the New York Central, with headquarters at Chicago. In 1910, he was promoted to general passenger agent of the Lake Erie & Western, with headquarters at Indianapolis, Ind., and later he was appointed general passenger agent of the Michigan Central, which position he held until his recent promotion.

L. W. Landman

John B. Nessle, who has been appointed freight traffic manager of the Pittsburgh & Lake Erie, with headquarters at Pittsburgh, Pa., as noted in the *Railway Age* of March 19 (page 996), served as general freight agent of the same road from March 1, 1914, until the termination of federal control. Mr. Nessle was born in Mahoning county, Ohio, on June 20, 1871. He was educated in public schools and began railroad work on December 20, 1886, as agent's clerk and telegraph operator for the Pittsburgh & Lake Erie. He became local agent of the same road at Struthers, Ohio, in 1888. Afterwards he was transferred as traveling car agent to the operating department at Pittsburgh, Pa. In October, 1901, he was made freight agent at McKeesport, Pa., and on January 5, 1904, he went to Brownsville, Pa., as commercial agent. He returned to Pittsburgh as general agent on February 1, 1906, and on October 7, 1907, he was promoted to assistant general freight agent, with the same headquarters. He left the Pittsburgh & Lake Erie in 1911, to accept appointment as general coal and ore agent of the New York Central, Lines West, with headquarters at Cleveland, Ohio. He again entered the employ of the Pittsburgh & Lake Erie in 1914, when he was appointed general freight agent.

J. B. Nessle

Edward A. Niel, who has been appointed general freight agent of the Buffalo, Rochester & Pittsburgh, with headquarters at Rochester, N. Y., as noted in the *Railway Age* of March 19 (page 991), served as coal freight agent from February, 1912, until the termination of federal control. Mr. Niel was born at Selma, Ala., on July 3, 1865. He was educated at Dallas Academy and began railroad work in June, 1878, as office boy for the Selma, Rome & Dalton, now part of the Southern. Afterwards he became telegraph operator for the same road and in June, 1879, went to the East Tennessee, Virginia & Georgia, also now part of the Southern, where he remained until September 1, 1888, serving consecutively as operator, train despatcher and secretary to the superintendent and trainmaster. He then became chief clerk to the assistant general freight agent and retained that position until July, 1894, when he was appointed chief clerk to the general freight agent of the Southern. From March, 1895, until December, 1898, he was general freight and passenger agent of the Mobile & Birmingham, now part of the Southern. He was appointed assistant general freight agent of the Southern in January, 1899, and the following July he was promoted to general freight agent. From September, 1904, until May, 1905, he was traffic manager of the Atlantic

E. A. Niel

& North Carolina, now part of the Norfolk Southern, and the following June he left that road to take the same position with the Buffalo & Susquehanna which later merged with the Wellsville & Buffalo, not at present in operation. He also served as traffic manager of the Attica & Arcade and the New Orleans Great Northern. He entered the employ of the Buffalo, Rochester & Pittsburgh as coal freight agent in 1912.

N. D. Ballantine, prior to federal control superintendent of car service and assistant to the second vice-president of the Chicago, Rock Island & Pacific, has been appointed superintendent of transportation of the Union Pacific, with headquarters at Omaha, Neb. Mr. Ballantine was born on March 12, 1872, at Booneville, Mo., and entered railway service in 1886 as a messenger in the telegraph department of the Kansas City, Ft. Scott & Memphis, now part of the St. Louis-San Francisco. He was consecutively promoted to clerk, operator, stenographer and electrician of the same road and in 1892 was appointed ticket agent of the Manitou & Pikes Peak. From 1893 to 1896, he served as electrician of the Kansas City, Ft. Scott & Memphis and for the following two years as auditor of the Manitou & Pikes Peak. He was later appointed secretary to the general manager of the Kansas City, Pittsburgh & Gulf, now part of the Kansas City Southern, being promoted in 1899 to superintendent of telegraph, and in 1903 to superintendent of transportation. In 1906 he was appointed superintendent of car service of the Chicago, Rock Island & Pacific, and on June 1, 1912, he was appointed assistant to the second vice-president of the Rock Island. From 1917 to 1919 he served as a major in the signal corps, A. E. F., and was later promoted to lieutenant colonel, serving as general superintendent of transportation of the American Expeditionary Forces. From July, 1919, to February 29, 1920, he served as special assistant manager of the car service section of the United States Railroad Administration, and on the latter date was appointed to his present position.

Engineering, Maintenance of Way and Signalling

Daniel Joseph Brumley, whose appointment as chief engineer Chicago Terminal Improvement of the Illinois Central, with headquarters at Chicago was announced in the *Railway Age* of April 16, page 1225, was born near Belmore, Ohio, on March 19, 1965. He graduated from the civil engineering school at Ohio State University in 1895 and entered railway service as assistant section foreman on the Louisville & Nashville in June of that year. During the latter part of 1896 he became assistant engineer for the Columbus & Hocking Coal & Iron Co., at Straitsville, Ohio. The following two years he was successively assistant supervisor on the Louisville & Nashville at Belleville, Ill., section foreman at Evansville, Ind., rodman at Louisville, Ky., and assistant engineer at Clarksville, Tenn. He was transferred to the chief engineer's office at Louisville, Ky., in 1898 and in September, 1901, he left the Louisville & Nashville, being appointed roadmaster of the Mexican National with headquarters at Laredo, Texas. He returned to the former road one month later where he remained until October, 1904, when he was appointed division engineer of the Indianapolis Southern, now part of the Illinois Central, at Indianapolis, Ind. In March, 1905, he became principal assistant engineer of the Illinois Central, the Yazoo & Mississippi Valley and the Indianapolis Southern, with headquarters at Chicago. Mr. Brumley was engineer of construction of these two roads from June, 1910, to April, 1913, when he was appointed engineer maintenance of way. In November, 1913, he was promoted to assistant chief engineer, with headquarters at Chicago, and in April, 1914, he became valuation engineer, which position he held until his appointment as chief engineer of the corporation in 1918.

D. J. Brumley

Mechanical

J. E. Goodman, who was granted leave of absence a few months ago, has resumed his duties as master mechanic of the Lake Superior division of the Northern Pacific, with headquarters at Duluth, Minn., and **John A. Marshall,** who served as acting master mechanic during Mr. Goodman's absence, has resumed his position as road foreman of engines at Duluth, effective April 1.

Railroad Administration

John F. Finerty, assistant general counsel of the Great Northern, has been appointed assistant general counsel of the Railroad Administration in charge of rate litigation before the Interstate Commerce Commission and in the courts, effective April 1.

General

H. A. Scandrett, valuation and commerce counsel of the Union Pacific, with headquarters at Chicago, will change his headquarters to the Union Pacific building, Omaha, Neb., on May 1.

Obituary

Lewis T. Kavanaugh, manager of the Mississippi division of the Mississippi-Warrior Service with headquarters at St. Louis, Mo., was drowned in the Mississippi River at Memphis, Tenn., on April 14.

James H. Manning, superintendent motive power of the Delaware & Hudson, with headquarters at Colonie, N. Y., notice of whose death was published in the *Railway Age* of April 16 (page 1226), was born on February 2, 1862. He was educated in the public schools. His first railroad work began in 1876 as machinist's apprentice on the Union Pacific. Afterwards he became machinist. From 1883 until 1886 he was gang foreman and from then until 1890, general foreman. He was appointed master mechanic at Omaha, Neb., in 1890 and in 1898 he was transferred in the same capacity to Cheyenne, Wyo. In May, 1901, he left railroad work to engage in the foundry business but returned in March, 1903, as assistant superintendent of rolling stock of the Canadian Pacific. He retained that position until March, 1904, when he was appointed superintendent motive power of the Delaware & Hudson, in which capacity he served continuously until his death.

J. H. Manning

Timothy H. Hickey, inspector of maintenance of way on the Michigan Central with headquarters at Detroit, Mich., died at his home on April 17, after an illness of a few days with pneumonia. Mr. Hickey was at one time president of the Roadmasters' Association.

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

Notice

Notice is hereby given that the services of Clayton L. Smythe as circulation manager of this publication have been discontinued by us and that he does not now in any way represent the company or any of its publications.

A Proposal to Tax Advertising

The bill to enact a tax on advertising which has been introduced in the lower House of Congress by Mr. Thompson of Ohio is a notable example of childish innocence. Mr. Thompson estimates that the sum spent yearly for advertising in this country is from 300 to 500 millions of dollars, and he has introduced his bill simply because he sees here an "untapped source of revenue." Ten per cent of this sum is what he proposes to take; and he would thus make up for what the treasury is going to lose by having to refund stock-dividend taxes already collected but now declared unconstitutional. When that score is balanced, the advertising tax will be available toward paying the billions in bonuses which it is proposed to give to the soldiers. Aside from this the sponsor (or sponsors) of the bill appear to have given to their project no thought whatever. Printers' Ink tried to interview the congressman, but to all pertinent questions he answered like a school boy—and a school boy too young to write an essay on such a subject. Whether thirty to fifty millions a year would be a fair basis on which to "tap" the revenues of the publishers of the country, or whether a constructive and productive business ought to be taxed at twice the highest rate ever thought of for luxuries such as five-thousand-dollar passenger automobiles, were points on which his mind was a blank. The most that can be said seriously about Mr. Thompson's bill is that, if it ever comes to a hearing, the actual facts concerning the advertising business ought to be aired most thoroughly. That would be all that would be necessary to show the crudity and absurdity of the proposal.

Government by Speech-Making

Samuel G. Blythe, who seems to know well above 90 per cent of all there is to be known about American politics, has expressed the opinion that for a few years past the powers that be in Washington have been trying to govern the United States by the power of the spoken word—by speech-making rather than by deeds. Success, he intimates, has been measured by oratory and the manner of remedying evils has been to dictate a speech on the issue to deliver it, and after securing the widest publicity to let it go at that. We have no desire to be harsh on Attorney General Palmer, who is apparently a very estimable man, but we agree with those who think that Mr. Palmer specialized rather on words than acts in connection with the late outlaw strike of railroad switchmen and firemen. "The purpose of the strikes," said Mr. Palmer, "is to capture the industries of the country, secure political power, overthrow governments and establish a dictatorship of the leaders of the so-called proletariat; they would transport to this country the chaotic conditions that exist in Russia." Mr. Palmer also added that the Department of Justice had known for some time of the plans and that W. Z. Foster of steel strike fame had been active in promoting the railroad strike. Presumably Mr. Palmer may believe that the issuing of these statements is the way to cure the evil of the strike. The general public who pay the bills and the railroad commuters who had to man their own "indignation" specials might have liked to have had it cured in some more effective way, preferably in advance. But perhaps Mr. Blythe is right in the matter after all. Actions may speak louder than words, but words make the most noise and to see one's name in print certainly does appeal.

Newspapers Help Car Efficiency

A new and valuable recruit has enlisted in the campaign to help improve the present railroad situation. The American Newspaper Publishers' Association includes the large newspapers of the United States. The newspapers have had forcibly and directly brought home to them the effects of inadequacy of railway facilities, and of interruptions of railway service, by increasing difficulties many of them have met in securing sufficient transportation for paper. They realize that the danger to American industry and commerce arising from inadequate transportation is not imaginary, but very real. The Association therefore recently sent out a circular letter urging its members to load freight cars to capacity and to load and unload them promptly. More lately, at its annual convention in New York, it adopted resolutions in which it set forth that "the prosperity of the nation is interwoven with and dependent upon the maintenance and efficiency of its railroad transportation facilities." The resolutions then referred to the shortage of means of transportation which exists, and added, "This problem is one affecting the welfare of every individual in the nation, and one to which the widest publicity should be given so that a more intelligent understanding may be had of the situation and the co-operation of all classes be secured in its solution." The Association concluded by resolving that its members should "secure and publish fully the essential facts with regard to the car shortage, and the legitimate necessities of the railways, so that the public may be intelligently advised, and also use every endeavor to co-operate in the present emergency, in conducting campaigns for expediting the unloading and despatch of freight cars, and in other proper ways."

Democratic government is government by public opinion. Public opinion is formed in this country chiefly by the presentation and the discussion of facts in the newspapers. If, in the spirit of the resolutions adopted by their Association, the newspapers will put forth every effort to get and publish the facts and nothing but the facts regarding the railroad situation, and will urge all classes of their readers to do the things which the facts regarding the situation show ought to be done, the railroad problem will be advanced rapidly toward a solution. But the present inadequacy of railroad facilities is so great, and the difficulties in the way of raising capital to remedy it are so great, that even if all who can

help in the emergency do help to the utmost it will be years before the railways will be able to give satisfactory service. The newspapers can contribute enormously to enlightening the public about the situation and also prevailing on it to be patient while the problem is being worked out.

The Proper Cut-Off

IT WOULD BE DIFFICULT to get two locomotive engineers to agree on the best cut-off for any given condition. There is in fact no agreement among enginemen, road foremen and master mechanics on what has always been the most debated subject connected with locomotive operation. The theorist knows that a short cut-off means less steam per indicated horsepower and consequently argues for the shortest cut-off at which the engine will turn a wheel, despite the fact that at low speeds the maximum boiler horsepower cannot possibly be utilized. The engineer who habitually works his engine with a long stroke is unmindful of fuel and maintenance costs. Impartial observation favors the engineer who exercises moderation in the handling of his engine, but even the best engineer occasionally falls down on a bad grade because he fails to get the lever in just the right notch.

It is important, therefore, to find that there *is* a proper cut-off and that within speeds at which locomotives are required to negotiate ruling grades a locomotive may be worked according to an established rule to produce the maximum tractive effort. B. B. Milner, in a paper before the New York Railroad Club, abstracted in the *Railway Age* of April 23, 1920, page 1251, states that the proper cut-off is within certain limits *a function of the speed.* Many practical men have always believed this, but it has remained for Mr. Milner to demonstrate it. The significance of this fact is that every day the greater number of locomotives in operation over difficult grades are not availing themselves of their full potential power. Some engineers, guided by good judgment and long years of experience, are getting the maximum effort out of the machinery under their control, but the majority are not.

It should not require mechanical men long to take advantage of a practicable means for establishing rules that will make it possible for enginemen to know what notch will enable them to get the best out of the locomotive. It is intimated that mechanical means may be perfected for automatically selecting the proper cut-off on difficult pulls, but as the desired cut-off is a function of the speed it would appear to be practicable to determine the proper cut-off for each locomotive class, according to the method outlined by Mr. Milner, and then instruct engineers how to apply this cut-off. Where speed recorders are in use the problem is comparatively simple, as it might be practical to indicate in red figures on the face of the recorder dial the correct notch for the reverse lever at certain speeds.

The Relation of Railway Terminals to City Planning

THAT ADEQUATE, well located railway terminals are necessary to the prosperity and growth of a city has been generally recognized for years. That the development of such facilities should bear a more or less direct relation to the general plan for the development of the city as a whole is a more recent conception. In the past, railway terminals, both freight and passenger, were commonly located, designed and built with regard only to their utility to their owners. As a result, as the cities have grown about them, these terminals have frequently imposed severe limitations on the normal development of the surrounding areas. As these restrictions have become more evident in recent years and as the obligation of the individual citizen and corporation to the community at large has been more fully emphasized, a sentiment has developed that the railways should not be allowed to construct their facilities in highly developed communities without consideration of various other influences affecting the city and its future expansion. The close interrelation between the railway terminals and the city at large is outlined in the report of the railroad terminals committee of the Twelfth National Conference on City Planning abstracted on another page in this issue. It is also borne out by the negotiations preceding the passage of ordinances for large railway improvements in cities, the most recent of which is the agreement just consummated between the Illinois Central and the City of Chicago, the Park Board of that city and the United States War Department, all of whose interests in this terminal were conceded by the road.

The declaration of principles contained in the report of the committee dwells on a number of points which are worthy of consideration. The unification of control and operation within the limits of any city, the prevention of needless duplication of lines and terminals, the "common use" of industrial tracks, the co-ordination of railway and water terminals and the improvement in appearance of railway right of way to reduce the decline in value of adjacent property are considerations which would not have been given serious attention by railway men a few years ago, but which, backed by a growing public opinion, now demand consideration. That a railway owes a duty to the community which it serves is self-evident. That the interests of the community and the railroads are common in many ways is also being realized by city authorities. The best results can only be obtained by a full understanding of the position of each by the other. Railway men cannot afford to ignore the recent trend of public opinion in this direction; rather should they ally themselves with movements of this character and endeavor to direct them along sane, practical lines.

Large Business, Huge Losses, Marked Last Months of Government Operation

COMPLETE STATISTICS regarding the freight traffic handled the total earnings made and the expenses incurred by the railways in January and February, 1920, the last two months of government operation, are now available. Study of these statistics should destroy the illusion which may have been created in the minds of some persons by statements which had been made by defenders of government operation that no large advance in rates would have been necessary to stop the government's deficit if government operation had been continued.

The coal strike ended in December. The recent railroad strikes did not begin until March. Weather conditions in January and February were about normal for that time of year. The total business moved, because of conditions which on the whole were favorable, was much larger than it was in any preceding January and February in history. It is therefore worth while to compare the statistics of traffic earnings and expenses for January and February, 1917, the last time when the railways were under private operation in those months, and the corresponding figures for January and February, 1920, the last two months when the railways were under government operation.

The number of tons moved one mile in January and February, 1917, was 61,000,000,000. In the corresponding months of this year it was 67,470,000,000, an increase of 10½ per cent. Total earnings in January and February, 1917, were $566,200,000. In the same month of this year they were $837,800,000, an increase of 42½ per cent. (This

is exclusive of $50,000,000 of back mail pay which was included in the January earnings by the Interstate Commerce Commission for accounting reasons but which was not earned in that month.) In January and February, 1917, operating expenses were $423,000,000, while in the same months of this year they were $829,000,000, an increase of 96 per cent.

The increase in operating expenses was so much larger relatively than the increase in earnings as to cause a heavy decline in net earnings. There were also some increases in taxes. The results of all these influences are strikingly reflected in net operating income, which is the part of earnings left after paying expenses, taxes, and so on. The net operating income of the railways in January and February, 1917, under private operation was $108,931,000. In January and February, 1920, which marked the termination of government operation, the net operating income was only $1,100,000. How bad the operating results of the railways had become before government operation was ended is made almost shockingly clear when it is stated that the total earnings in these two months were almost $838,000,000, which broke all records, and that nevertheless after expenses and taxes were paid a little more than $1,000,000 of this was left to apply on the standard return guaranteed by the government to the railway companies.

The foregoing statistics are for the Class 1 railways, which were almost identical with the railways under government control. The guaranteed standard return for the Class 1 roads for January and February was $104,600,000. The net operating income actually earned was less than 1 per cent of this amount, the government's deficit in the two months being over $103,000,000. The guaranteed standard return of these roads for an entire year was $905,000,000. It will therefore be seen that if government operation had continued throughout 1920, and the net operating income earned had been relatively as small as it was in January and February, the deficit incurred would have been almost equal to the total guaranteed return.

The following table gives the guaranteed standard return and the net operating income actually earned during the last six months of government operation, as reported by the Interstate Commerce Commission, shows how rapidly the deficit was increasing during this period:

	Guaranteed standard return	Net operating income, 1919-1920
September	$91,273,000	$77,763,000
October	94,333,000	76,397,000
November	83,536,000	21,960,000
December	73,282,000	12,780,000
January	56,600,000	14,000,000
February	47,900,000	*12,900,000
	$446,924,000	$190,000,000
	190,000,000	
Six months' deficit	$256,924,000	

*Operating deficit.

In the months of July and August, 1919, the railways earned a little more than the guaranteed standard return, and it has been claimed that this showed what, under normal conditions, they could do under government operation. It will be noted, however, that they began to incur deficits again in September and October, when the so-called "normal" conditions still continued, for the coal strike did not come until November. Furthermore, in spite of the coal strike, which began in November and ended in December, the gross earnings of the railways in the six months September to February, inclusive were $2,775,000,000, or almost $165,000,000 more than they ever were before in any corresponding six months, and yet the net operating income was almost $257,000,000 less than the amount required to pay the guaranteed standard return for that period.

Just how anybody can draw from facts such as these the conclusion that under government operation only a small advance in rates would have been necessary to stop the incurring of a deficit we are unable to comprehend. They seem a complete vindication of the contention the *Railway Age* repeatedly has made that as large an advance in rates would have been necessary under government operation to stop the incurring of a deficit as will be necessary under private operation to secure to the railway companies the net return provided for in the Transportation Act.

Whether the increase in the operating expenses under government operation was reasonable or not is beside the question. The fact is, that an enormous increase of expenses did occur, and that under either government or private operation it would have been impossible, without an advance of 25 or 30 per cent in rates, to make the railways self supporting.

Delaware and Hudson

IN ALL THE DISCUSSION before the two committees of Congress preceding the drafting and passage of the Transportation Act, railway credit emerged as one of the fundamental problems involved in any practical plan for the future development of the American transportation system. Comparatively few railroad men are called upon to deal directly with the financing of their properties. The American public generally took slight interest in railroad financial problems until the first rate advance case in 1910, in which the argument of the railroads for advanced rates rested on their need for an adequate return on the capital invested in the properties. Prior to the war so large a part of the capital needed for American railroads was furnished on the one hand by great financial institutions like the savings banks and insurance companies, and on the other by European investors, that the comparatively small group of individual investors who relied on their own judgement in buying railroad securities were looked upon as insiders with special knowledge.

The war, the sale of Liberty Bonds, high earnings, and now the high price in money of all commodities has led to a very general discussion of economic questions including the credit position of the railroads. The Transportation Act may or may not have laid the foundation for a future working out of plans by which maturing railroad securities may be refinanced, money provided for additions and betterments, more cars, heavier locomotives and more adequate facilities generally and other railroad extension.

One thing may be said with assurance, if the financial necessities of the railroads are to be met successfully a broader general understanding of the problem, unclouded by prejudice, must accompany the interpretation and working out of the Transportation Act.

L. F. Loree, president of the Delaware & Hudson, is one of the most profound students of railroad economics and more especially of the financial problems involved therein. At the outbreak of the European war Mr. Loree made a survey of the conditions in Europe in regard to the holdings of American railroad securities. He followed up the return of these securities to America and has probably as intimate a knowledge of the capital requirements of the railroads and the sources from which new capital may be had, and the conditions under which it may become available, as any banker, railroad man, or economist either in this country or abroad. In the annual report of the Delaware & Hudson for 1920 which has just been made public, Mr. Loree discusses at some length, but in a nontechnical way, present general economic conditions and the effect that they have on the financial necessities of the railroads.

The showing made by the Delaware & Hudson in the operation of its railroad in 1919 may be passed over without extended comment. It is not indicative of the earning power of the property under private operation. The rental

from the government which amounted to $7,415,000, together with other corporate income totaled in all $10,883,000 and after the payment of interest, taxes, etc., there was $4,605,000 net available for dividends which was at the rate of 10.83 per cent on the company's outstanding $42,503,000 stock. Operation of the railroad, however, by the government yielded but a little over $3,000,000 before the payment of taxes. The total tonnage of freight moved one mile over the Delaware & Hudson in 1919 was 3,531,000,000. This was 13.06 per cent less than in 1918 and 10.69 per cent less than in 1917. Mr. Loree sums up the situation by saying, "Diversion of traffic from your lines by reason of the orders and policy of the Railroad Administration continued throughout the year."

During the period of federal control the company was forced to accept 1,000 55-ton hopper cars and 500 50-ton box cars for which it will have to pay between $3,913,000 and $4,366,000. The board of directors passed a resolution accepting these cars only under protest and pointing out that in the opinion of the company they were not necessary to the proper conduct of the company's business.

On the other hand portions of the program for improvement of the road year by year were interrupted with a consequent loss to the company in interest on uncompleted work and a loss to earning power now that the roads are under private operation, which will continue until the program can be caught up with. This loss, after September 1, 1920, will fall not on the government, but on the private corporation.

These are things, however, which, while they may be unjust, are of temporary importance. The Delaware & Hudson is one of the oldest railroad companies in the United States. Its credit when the government took it over was very high. The fact that the assets of the Delaware & Hudson Company included not only the railroad but also extensive coal mines gives it, as a corporation, a far better position financially than most railroad corporations. It is not, therefore, the particular case of the Delaware & Hudson which is most interesting in Mr. Loree's discussion of present conditions but rather his analysis of general economic conditions. He does not confine himself to railroad financial problems alone but treats them as part of the business conditions which affect all of us. He finds that the chief domestic obstacles to the resumption of progress are "(1) The extremely low purchasing power of money; (2) continued absorption of liquid capital by the federal government and (3) excessive and badly adjusted taxation." He shows in a particularly clear and easily understood way the relations between taxation and the low purchasing power of money, and the financial stringency which all American business faces. It is particularly interesting to note that Mr. Loree does not ascribe all of the drop in the purchasing power of the dollar to inflation and increase of money in the country. His argument is so closely thought out and so concisely put that it should be read as he himself puts it in his report to Delaware & Hudson stockholders, which is published elsewhere in this issue.

Judgments against the Lehigh Valley Railroad aggregating $750,000, contained in court decisions on suits connected with the Black Tom disaster were affirmed by the Supreme Court of the United States on April 26. These suits were for damages due to the explosion of war munitions in the railroad company's yard at Black Tom, New York harbor, in July, 1916. The railroad contested the claims on the ground that the responsibility for the explosion rested on others. Thirteen different suits were appealed to the Supreme Court. Large numbers of other suits, for sums aggregating millions of dollars, are still pending in the courts in New Jersey and New York.

Letters to the Editor

Interest in N. R. A. A. Exhibit

New York City.

To the Editor:

I hope you can find space in your columns for a word of appreciation concerning the interest shown by the railroad men in the exhibits at the Chicago display of the National Railway Appliances Association. Never before have I seen such intense, consistent and intelligent interest in the exhibits. I speak for myself and unofficially for others when I say that the way the roadway officers and track men went after new things and new ideas in this case means a lot in the way of improvement of track to decrease railroad operating expense.

It is my hope that the higher officers of the railroads will be informed of the increased interest on the part of their track people. I also hope that the track people will be earnestly and cordially encouraged. I have attended conventions for many years, but never before have I seen such interest.

An Exhibitor.

Railroads Oppose Compulsory Metric Legislation

Indianapolis, Ind.

To the Editor:

In view of the efforts now being made at Washington to persuade Congress to enact a law providing for the "Compulsory Introduction of the Metric System" the following reasons suggest themselves as to why such action would place an unnecessary burden on the railroads and incidentally on the people at large, for the reason that in the last resort the people must pay for all of these excessive and unnecessary expenditures:

1. The railroads of the country have spent several million dollars preparing plans in compliance with Valuation Orders of the Interstate Commerce Commission. These plans, as well as other plans, both of right-of-way, structures, standards, etc., will become, in effect, obsolete and their replacement would eventually be necessary on the metric system. This would entail a very large expenditure.

2. The enactment of this law would cause all freight tariffs to be revised and readjusted from their present pound and ton basis. This would not only involve a very large expense but great confusion and the loss in connection therewith would be inestimable.

3. All passenger tariffs would also have to be revised and changed from their mileage basis of calculation.

4. Platform, wagon and track scales would be of no value as they now exist until they were remodelled and changed to meet the requirements of the new measure. This would result in throwing away and scrapping a large amount of valuable railroad property.

5. In addition to the above would be the expense incident to educating railroad employees to adapt themselves to the new system and the resultant confusion in connection therewith.

6. It seems to me we ought to let well enough alone. The present system is taking care of all our requirements and there is no sound reason for any change. I sincerely hope that no such drastic proposition will get any serious consideration from Congress.

B. A. Worthington,
President, Cincinnati, Indianapolis & Western.

Relation of Railroad Terminals to City Plan

Intimate Connection Between Urban Development and Transportation Facilities Emphasized.

THAT THE RAILWAY TERMINALS bear an important relation to city planning developments is indicated by the fact that an entire session of the Twelfth National Conference on City Planning, which was held at Cincinnati, Ohio, on April 19-22 inclusive, was devoted to this phase of the problem. At this session, which was held on Tuesday morning, April 20, a report was presented by the Railroad Terminal Committee and Ward Baldwin, chief engineer for the Board of Trustees of the Cincinnati Southern, described the two terminal plans now under consideration at Cincinnati. These reports are abstracted below.

Report of Railroads Terminal Committee

The report of this committee, consisting of Nelson P. Lewis, chief engineer, Board of Estimate and Apportionment, New York City, chairman; Col. William J. Wilgus, consulting engineer, New York City; E. P. Goodrich, consulting engineer, New York City, and C. H. Cheney, city planning engineer, Portland, Ore., was presented by the chairman. It consisted principally of a discussion prepared by Colonel Wilgus and another prepared by Mr. Cheney and J. P. Newell.

The Railroad Terminal Problem
In Its Relation to City Planning

By William J. Wilgus.

The railroad terminal problem may be said to embrace three separate and distinct phases; that having to do with passenger and freight traffic destined for local distribution; that dealing with direct movements to and from local industries and other facilities having their own side tracks; and that having to do with the interchange of traffic destined for points beyond.

In discussing the first of these phases, which has to do with the local distribution of freight and passenger traffic, it should be borne in mind that the railroad terminal is not such in the sense that the movement of either freight or passengers there terminates. The terminal is merely a step in the journey between the point of origin and that of final destination, where the passengers or freight are transferred from one means of transportation to another. Stated differently, the terminal is to be considered as a means of transition from one transportation agency to another. It is a terminal only for the vehicles employed in effecting a portion of the journey of their contents. The passenger, on arrival at the terminal, alights from his train and continues therefrom by vehicle or on foot to his residence or place of business; and the article of freight is transferred from the freight car to the truck that is to effect the final delivery.

In the early stages of the growth of the American city there were no rapid transit facilities to convey the passenger quickly and cheaply from the terminal to his home or place of business, and land for terminal purposes was comparatively cheap. Therefore the station was placed as closely as possible to the business center of the community. Similarly, the comparative cheapness of property, coupled with the slowness and limited radius of action of horse-drawn trucks, led to the placing of local freight terminals adjacent to the business center.

In the course of time conditions in these particulars have changed radically. Our cities have shown a remarkable increase in population, the property occupied for railroad terminals has become extremely valuable and is in urgent demand for civic expansion; streets have become congested with pedestrians and vehicles; rapid transit facilities for annihilating space have been installed in most of our large cities, and the slow-going horse-drawn vehicle has been largely replaced by the high-capacity fast moving motor truck.

In considering the solution of any given railroad problem it is therefore necessary to weigh carefully the arguments for and against the location of passenger and freight terminals as near as possible to the business center. The advantages are convenience to that portion of the traveling public which can most easily complete its journey on foot; and, in the case of freight, a slight saving in time and expense because of shortness of haul by motor truck between the freight station and the point of origin or destination. The disadvantages are the maintaining for railroad purposes in the midst of the city, of vast wastes which block orderly civic expansion and contribute largely to the congestion that increasingly is becoming such a fruitful source of delay, inconvenience and expense to the public.

If, as in the case of the Grand Central Terminal at New York, the railroad approaches and station can be placed beneath the surface so that streets may be carried overhead without interference with the city's normal development, and if it is practicable to move trains by electricity so as to do away with nuisances incident to the use of steam locomotives

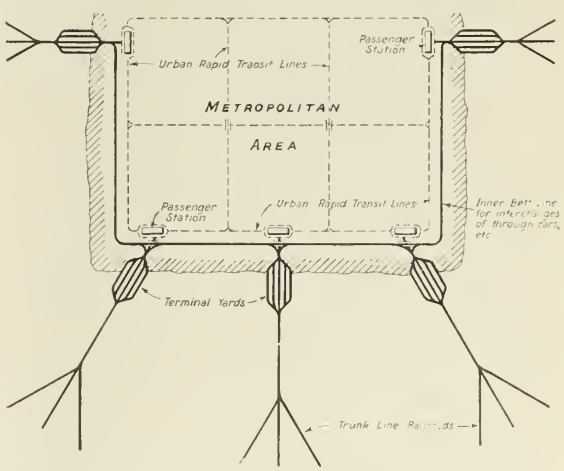


Fig. 1—Sketch Showing Possible Connection Between Terminals Comparatively Remote

and thereby permit the utilization of valuable "aerial rights" for revenue producing purposes, the better solution may be the placing of the terminal as near as possible to the business center. If, however, the underground treatment is impracticable and if the number of railroad lines and the shape of the city are such as to make undesirable this manner of solution, the course to pursue would be the banishment of the passenger terminals from the heart of the city to points sufficiently removed therefrom to afford ample space at moderate cost for the stations and yards, with contiguous parks, all

planned in such manner as not unduly to interfere with future city growth.

An arrangement whereby two or more passenger terminals, thus located at points comparatively remote from the business center, may be inter-connected and also placed in close touch with all parts of the city by means of urban rapid transit facilities, is illustrated in the accompanying sketch (Fig. 1).

In the case of local freight terminals the advantages of having them well removed from the business center would seem to far outweigh the small advantages of a shortened haul for the motor truck. The larger portion of the expense of freight distribution lies in delays to trucks awaiting opportunities for loading and unloading at the terminals, due to restricted facilities and congested surroundings. This situation is constantly becoming worse, and is contributing in a large degree to the high cost of living in great cities. Instead of continuing the journey of the railroad car as close as possible to the business center, with the attendant high cost of property and of operation, coupled with congestion and general inefficiency, for the sole purpose of shortening the haul by motor truck, it would be better to shorten the railroad haul somewhat, lengthen the haul of the motor truck, and place the points of interchange where cheap lands abound.

In communities where the streets are broad and not overcrowded, it would be possible to continue freight distribution by means of motor trucks, but where surface congestion makes this course undesirable small car freight subways, as illustrated in the accompanying sketch (Fig. 2) should be created, in which the freight would be moved by electrically-operated multiple unit trains of cars having a capacity of say ten tons,

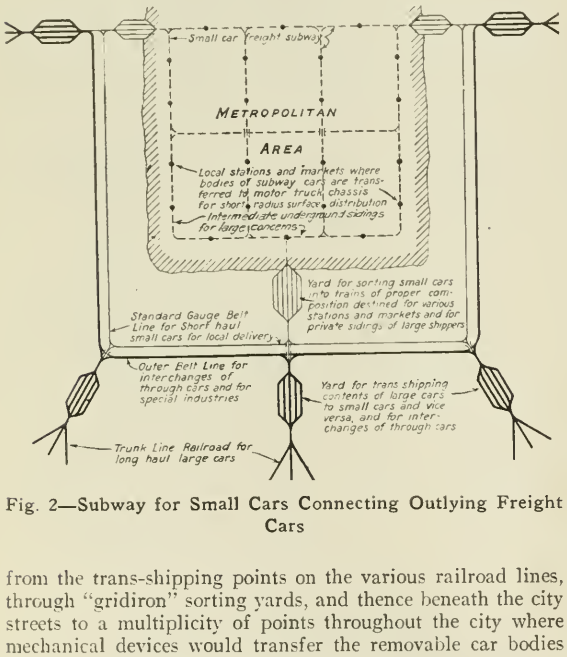


Fig. 2—Subway for Small Cars Connecting Outlying Freight Cars

from the trans-shipping points on the various railroad lines, through "gridiron" sorting yards, and thence beneath the city streets to a multiplicity of points throughout the city where mechanical devices would transfer the removable car bodies from the subway vehicles to the chassis of motor trucks for short-radius surface distribution, in a manner similar to that now in vogue at the Norwood substation of the Baltimore & Ohio in Cincinnati.

This arrangement, offering as it does all the advantages of the American type large-capacity car for long hauls and of the European type of car of moderate capacity for short hauls in cramped quarters, would mean diffusion instead of concentration of freight deliveries, and in so doing would solve the market problem and enormously reduce terminal costs and delays through centralized control and the employment of labor saving devices.

There still remain to be considered the phases of the railroad problem which have to do with the placing of cars on the side tracks of private industries and waterfront facilities at or near the business center; and also means of interchange between carriers for the kind of traffic that is destined for points beyond. These needs as a rule are best met by means of belt lines, an inner one for local interchanges and an outer one for the bulk of the traffic that should be excluded from the congested regions of the city. The majority of the large cities of the country are already served with inner belt lines, and many of them also have outer ones. Both are highly desirable, not only from the standpoint of interchange of passenger and freight equipment, but also for the proper development of large industrial enterprises and for the unrestricted and prompt movement of military trains in time of war. The latter need was strongly proved at Paris during the World War when it became necessary to construct missing links in the outer belt line so that troop and supply trains from different directions could be thrown to the aid of the Allied armies in stemming the advance of the enemy. An example of the evil effects that flow from the lack of adequate inner belt lines and of a comprehensive outer belt line, is that of Greater New York, where the absence of these facilities is a growing menace to its commercial supremacy and to its safety in time of war. In fact, the experiences of the World War demonstrated that the latter defect bore heavily, not alone on the local community, but on the nation at large, through gross delays and confusion in the embarkation of troops and supplies.

Summarizing, the railroad problem in its relation to city planning should be treated in the light of the situation as it exists in each community, due weight being given to the following considerations:

Passenger and freight terminals for serving the community should be so located, in liaison with suitable lines of urban distribution, that the business and residential sections will be given ample opportunity for healthy expansion, that congestion will be avoided on the city streets, that full opportunity will be given for the aesthetic development of the community, and that delays and costs to the public will be reduced to the minimum.

Inner belt lines should be provided for the convenient placing of cars on private sidings of industries located where labor is readily accessible, and on tracks serving the local water front; and

Outer belt lines should be created for the speedy and economical interchange of through freight and for access to water terminals lying outside of the city proper.

It should be added that of course grade crossings, in the interest of both safety and economy, should be avoided to the fullest extent.

Principles of Correlation of Railroad Terminals with The City Plan

By Chas. H. Cheney and J. P. Newell

1. Unified control and operation of all standard railroad lines within the limits of any city, is essential both to the requirements of modern business and to the convenience of the public. It should be brought about with as little delay as possible, at the same time providing opportunities for expansion, both of trackage and terminals, in connection with a well considered plan of city development. Means should be found and taken for persuading or compelling all railroads entering the city to connect up with such a unified system at the city limits. The entire question of railroad service should be considered as a whole, not with relation to one system or one part of the city only.

2. The present wasteful and needless duplication of lines

and terminals inside of city limits cannot be permitted to continue. Many cities can show millions of dollars spent in unnecessary duplication of passenger stations when the same sums expended in added industrial lines would have increased both the business of the carriers and the prosperity of the city. This is a useless drain on the railroads, resulting in additional cost of operation, for which the public pays. It is a needless inconvenience to the public which can be remedied at comparatively small cost by proper co-operation in planning by both the city and the railroads. Voluntary action on the part of one road is not to be expected and generally impracticable. The city, with the aid of the state or National Government, holds an advantageous position to undertake bringing the railroads together for such intra-city unification.

3. All shippers within the city should be free from dependence on one road for cars. In some cities shippers now have to maintain needless additional warehouses on a second line in order to insure prompt delivery of cars on the first line. This is a wasteful expense which must be added to the cost of shipping and doing business, particularly where a perishable product is involved.

4. All spurs and industrial tracks within the city limits should be "common user" tracks, served by a belt line connected with all main lines entering the city, a fair pro rata return being made to the original owner of each line for such use.

5. Municipal ownership of intra-city lines is probably not necessary, provided there is unified control. Expansion of existing terminal companies to include all lines within city limits is probably the most economical, quickest and easiest method of accomplishing unification in most cities. New trunk lines should be allowed to hook on to the city terminal lines at the city limits, at any time in the future. This would provide for competitive lines through the country without cutting the city into further pie-shaped sections, or causing further blighted areas to property within a block or two of each side of the railroad right of way, through a city, as at present.

6. Provision of complete modern business facilities is essential to all industries. Railroad service, while important, is not the only one of these facilities necessary. Protected industrial districts or zones appropriately and conveniently situated, free from hampering residential requirements, with wide heavy hauling pavements, high pressure fire protection, extra large sewers for industrial wastes, etc., as well as unlimited spur tracks, are necessary in any city of consequence, and many of the progressive cities of the country have already established such zones. The fullest co-operation between the city and the railroads is necessary to make the facilities in these zones most useful in the development of business. Once such zones are established both railroads and shippers can feel safe in concentrating large investments for permanent ultimate service, not otherwise justified.

7. One of the greatest opportunities for railroads to cut down expenses and freight rates is by simplification of terminals. On most of the big roads it costs as much to get a car of freight out of the city limits as it does to haul it 250 miles or more on the main line. Some roads report as much as 35 per cent. of their total freight cost in handling at terminals (from reports of O. W. R. & N. to Oregon Public Service Commission). This is by far the biggest single item to the railroads in their cost of doing business. A small saving, therefore, in terminal handling should effect a considerable amount of saving in freight cost and should be welcomed by railroads and shippers alike.

8. Whatever the origin or destination, a merchant or manufacturer should be able to receive and ship at the freight station which entails the shortest team haul.

9. Adequate expanded classification and freight yards must be provided in every city as part of its future plan and as an adjunct of industrial development. These yards should have long areas uninterrupted by grade crossings and preferably located at one side of or on the outskirts of the city, away from the probable expansion of business and main street traffic lines. Main railroad lines should be diverted around the city and outside the city limits, wherever practicable, so that through freight and other through trains need not pass through the congested parts of the city. In the light of the development of modern street transit, consideration should also be given to the possible advantages of relocating main stations away from the congested districts.

10. In cities which have water-borne commerce, whether coast or inland ports, rail and water terminals should be considered as a single rather than as separate problems; co-ordination of facilities for both methods of transportation should be insisted upon in the interest of the public and of the carriers themselves.

11. The relation of the railroad to the street system of the city should be carefully worked out. The value of the railroad to the prosperity and the very life of the city should be recognized. Wide heavy hauling pavements to freight terminals, docks, and the industrial zones are equally essential and form a natural and important complement to the greatest use of railroad facilities. Direct and amply wide traffic thoroughfares should lead to all principal passenger and freight stations, before which large open spaces are necessary for the convenient arrival and departure of large numbers of pedestrians, vehicles, and street cars.

12. The elimination of grade crossings on both steam and electric rapid transit lines is essential to public safety and convenience, to prevent the interruption of traffic and for the proper conduct of business. The problem of grade crossing eliminations should be studied in the most comprehensive way and not in a piece-meal fashion, even though the execution of the work is to be carried out gradually.

13. The fullest co-operation should be given to cities by the railroads in planting and improving the appearance of borders of rights of way, yards, bridges, viaducts, stations and terminals within the city limits. Much of the present damage to adjacent property values and rentals can be done away with in these matters, at reasonably small expense, by closer working together of railroad officials, park boards and other city officers.

The Cincinnati Terminal Problem

Ward Baldwin, chief engineer for the Board of Tustees of the Cincinnati Southern, outlined in detail the problem confronting the roads of Cincinnati in developing their terminals and traced the history of the various projects and plans which have been advanced for its solution.

The peculiar topography of Cincinnati, a valley hemmed in by hills unbroken on the entire north side, has made the problem of terminal facilities for the railroads so difficult, and has interposed such a multitude of obstacles, the overcoming of which was attended by such great expense, that the growth of the railroad terminals has been unduly restricted and has fallen far short of the demands of the traffic to be handled. For at least three quarters of a century efforts have been made by the railroads and shipping interests to evolve a generally acceptable plan for a system of terminals to supersede the uncorrelated haphazard arrangements that immediate necessities have from time to time compelled the several transportation companies to provide for the single purpose of meeting their individual emergency demands. The futility of these efforts has been due mainly to two causes, the lack of sufficient money, and the non-existence of a bureau such as the City Planning Commission we now have, vested with authority and charged with the duty of preparing a harmonious plan for the city to grow up to in respect to transportation as well as all other civic needs.

A number of plans were advanced for the location of

passenger terminals prior to 1905. In that year practically all railroads that now use the Central Union passenger depot reached an agreement to build and use jointly a union passenger terminal to be located above high water at and west of Fourth and John streets. Detail plans were prepared by the railroads, and construction was started by building the "Interterminal" elevated single track that connects the C. & O. bridge with the C. H. & D. at Fifth and Baymiller streets. The railroads, however, were obliged at that time to make large expenditures to repair the damages caused by abnormal floods, and the depletion of their resources thereby caused compelled a suspension of construction work. The repressive policy of government control has since kept the railroads too impoverished to resume work on these or any other terminal plans.

The extension of the freight terminals has been the subject of similar investigations in practically all of which a belt railway has been the underlying idea. In 1889 H. M. Lane, president of the Lane & Bodley Company, published in the Cincinnati Enquirer an able discussion of "Cincinnati's Present and Future as a Manufacturing City," illustrated by a map that made the disclosure that the tracks of several of the railroads were already so connected as to constitute a line fulfilling all the requirements of a "Belt Road," and that the only step necessary to relieve freight traffic from the congestion and excessive cost would be to operate them as one line. This belt line has formed the frame work for all the plans for the improvement of the terminals that have been advanced since that time, but the one remaining condition to be fulfilled in order to actually create a belt line, namely to *use* the designated tracks as a belt, was not complied with until the government assumed control of the railroads in 1917, and thereupon instituted the plan of operating these tracks as a belt. This was done with such benefit to our transportation system that this plan of operation has been continued by the railroads since the return of the roads to their owners.

In 1904 all the roads entering Cincinnati joined in a preparation of a comprehensive plan for the relief of congestion of the local freight terminals, and in 1918, at the request of the Railroad Administration, they undertook to prepare a comprehensive plan for the improvement of the freight terminals with a view not only to relieve local congestion but also to provide for the free movement of through traffic.

This committee submitted a plan for a belt line which substantially coincided with the 1904 report. It also recommended the building of a union freight station on the site of the present Central Union passenger station and of two smaller freight stations at outlying points; and suggested the inauguration of store door delivery for freight and the operation of all terminals by a terminal company; also the building of a union passenger terminal in a location not specified. The trustees of the Cincinnati Southern also recommended to the government at the same time an alternative plan similar to the one just referred to, except that the southern part of the belt line was placed in Cincinnati instead of on the Kentucky side of the river. The consideration of these plans was, however, abandoned by the government upon the signing of the armistice.

In an effort to solve the passenger terminal problem the trustees of the Cincinnati Southern have secured from the city government, subject to approval by popular vote, authority to issue $20,000,000 of city bonds to finance the building of a union passenger terminal. Agreement of the several roads as to the location of such a terminal and on a plan for payment of rentals to meet the maintenance, interest and sinking fund charges, all subject to approval by referendum vote, are the only necessary preliminaries to the construction of this terminal.

Activities of the American Railway Express Company

By George C. Taylor, President of the Company

THE EXPRESS BUSINESS started eighty years ago, and gradually grew with the development of the country. Up to 1914, the surviving companies, generally speaking, prospered by contracting for their railroad transportation as best they could and by purchasing all commodities at prevailing prices. In 1913, after an exhaustive investigation and study, the Interstate Commerce Commission issued an entirely new rate structure, founded upon an entirely new and greatly reduced basis. Almost simultaneously therewith, the parcel post became a competitor, and the situation looked hopeless. Three companies retired from business. The remaining seven decided to make the best of it and give it a fair trial. We could not, however, expand our facilities by capital outlay by reason of the uncertainty, and some of our facilities were thus outgrown. The next year, 1914, proved a bad year, the companies, as a whole, failing to meet operating expenses; but by vigorous economies the years 1915 and 1916 yielded a fair profit and the service was dependable and generally good.

In 1917, however, by reason mainly of the effect of the European war, heavy increases in wages and costs of everything used in the conduct of the business, and by reason, further, of the let-up in efficiency of labor, our operation disclosed a failure to meet operating expenses, the actual deficit from transportation activities running into a sum well over $2,000,000. Even now this is being added to by the settlement of old loss and damage claims and personal injury suits, most of which, I am pleased to say, are now behind us.

With the taking over of the railroads in December, 1917, we were not included. We continued our operations, however, with a determination to perform the express service so essential to the commerce of the country, as best we could, and to work out our wholly new situation; and this determination was the more pronounced by reason of the railroads' fast freight service being badly crippled. Hundreds of cars were necessarily and properly taken from regular express service for troop-train movement, and we had to use box cars, neither heated nor lighted, nor in any way suitable. Their use resulted in a very heavy loss and damage account, running into millions of dollars; but considering the many necessary freight embargoes and other abnormal conditions, it was better than to give up and furnish no service at all.

Our burdens were again increased by reason of the large amount of wagon service we were called upon to render in connection with freight normally handled by the shippers themselves, and for which we had neither the facilities nor men at our disposal. With the general disruption of the transportation service, the express company was oftentimes the only avenue through which industries were able to secure raw material. I recall carloads of brick and lumber; carloads of automobile parts to be employed in the manufacture of vehicles for the army; train-loads of anchor chains for the government; train-loads of ammunition to go to Europe for war purposes, and many other burdens which we assumed as best we could. We felt it our duty to do so.

When the director general declined to recognize our operating contracts, he did say he would deal with us as *one* company and enter into an agreement with that one company to conduct the express business, as his agent on all federal-controlled lines.

After constant negotiations for nearly six months, there was formed on June 22, 1918, the American Railway Ex-

*An address before the Merchants' Association of New York City on April 14, 1920.—Abridged.

press Company, which was not a merger but an entirely new corporation, to which each of the four old companies—the Adams, American, Southern and Wells-Fargo, sold their tangible property used in express operations, at its depreciated book value, and took stock therefor; and in addition, subscribed three millions in cash as working capital.

Birth of the New Company

The inventory of this property, real and personal, was verified and certified by the government. There is no "water" or good-will in the capital of this company and neither was there put into it the outside financial and foreign activities of the old companies. For their former transportation properties and activities they were simply given stock at par as a stockholder only, in the new concern.

Effective July 1, 1918, with a contract with the director general, we began the operation of the new company, necessarily helping so far as we could, in the liquidation of the transportation affairs of the old companies as they lay all over the country in some 35,000 offices. This was a burden, but we felt it to be a duty we owed to the public and the old companies, the latter paying the new company, however, the expense thereof.

Two of the companies in February, 1919, decided to handle their own liquidation items. The other two are still working through this company, and their unadjusted matters are reduced to a very nominal amount, all of which we hope to close out before the end of June.

The new company, by reason of constantly increasing wages and cost of materials has never been able to meet its expenses.

Its deficit to the end of 1918 was over nine millions of dollars, and for 1919 was over twenty-four millions. We were never guaranteed, as the railways were, a standard return, but we were guaranteed against deficit.

Thus we have operated as best we could for 22 months, with absolutely no return to the owners or stockholders upon thirty-five million dollars actual value of real estate and plant, of which three million was new cash put up by the stockholders on July 1, 1918.

We feel, therefore, that we have at least tried to carry our share of the war burden, and we still have confidence and nerve and energy left, to stare the future squarely in the face, and if allowed a fair fighting chance to build from the wreck an efficient and dependable express service, so necessary, we believe, for the well-being of our commerce and industry.

As I look into the future, I cannot see the best and cheapest express service come from a restoration of the several old companies, nor the formation of several new ones. It would mean again, adding to the rates, enough more to pay for duplicate services in the elimination of which this company has saved many millions of dollars; and it would mean a less efficient express service for reasons which I will briefly mention.

We realize our service has not been up to the standard and is not now, and it will take time to make it so; probably at least two years to reach anything like a normal situation.

We are dependent upon the railroads for our cars and transportation. There is not enough express car equipment in existence by some 2,000 cars, to properly handle the business of today. The railroads are not to blame for this, and neither are we. Their present situation is but the outgrowth of conditions over which they had no control. No railroad could be blamed for not being willing to spend vast sums in new equipment and facilities, and neither could this company, with the uncertain future up to the end of Federal control, money could not have been obtained.

Our transportation contract for all lines formerly under Federal control expired automatically February 29th, when the roads went back to private management.

Under the Transportation Act, we are in process of making contracts with the several hundred large and small roads, over 90 per cent of which have already been negotiated; but under the law these are only made for the period to August 31, 1920. Until that date, we are protected against deficit. After that, if we exist at all, we must have higher rates to meet our higher wages and costs. Our application for such rates is before the Interstate Commerce Commission.

We are also permitted, under the law, to apply to the Interstate Commerce Commission for legalization of this new company. Our prayer for that is now before that body. The railroads are mindful of our car and terminal requirements, and I am informed will shortly place orders for at least a portion of such cars.

We need equipment and buildings, and are ready, provided we can be assured some reasonable tenure of existence, to endeavor to interest new capital in such facilities; but we cannot do this unless the public is willing for us to continue, and not until we have closed proper contracts with the railroads and secured increased rates to enable us to have an assurance of a fair return for the use of our organization and capital invested. All of our efforts are now centered toward a consummation of all these matters, which, at the best, will take time and patience.

As one express company operating over all lines, we can give a better service by the use of the most direct routes.

We can avoid much duplicate service and expense, which in the end must be borne by the public.

We can give to the shipper only one company to look to and not a divided responsibility and resultant delay in case of loss.

We can avoid all circuitous routing.

We can avoid rehandling by maintaining more through-car routes.

We can avoid delays and damage by rehandling at junction points in transfer to or from other companies as formerly, and by use of all the rail mileage, can fairly, we believe, compete with the parcel post. We are glad to have this competitor, and with the competition of restored normal freight service and the competition of the fast growing trucking service, we certainly can have no monopoly.

Further, we are regulated as to rates, practices and service by the Interstate Commerce Commission and the commissions of the several 48 states.

We have a splendid organization of over 135,000 people; 35,000 offices; our annual turnover in charges is approximately $300,000,000; handling on the average 1,000,000 shipments a day.

We have all been passing and are still passing through perhaps the most trying period in the history of the world. To give this express organization of 135,000 people, of which I am proud to be one, a fighting chance to give you an efficient, co-operative and dependable fast transportation service, is all we are seeking to accomplish, and the results of our effort will, in my judgment, work to our mutual benefit.

The Merchants' Limited Express of the New York, New Haven & Hartford, the afternoon five-hour train between New York and Boston, was at no time omitted because of the strike. This statement, contrary to reports printed in the *Railway Age* of April 16, we have from an officer of the road. This and the Knickerbocker Limited, the other all-parlor-car train, were kept in service without interruption. Nor were sleeping-car or dining-car services cancelled. Statements printed in numerous newspapers to the effect that sleeping cars were not running or that the through night trains had been discontinued entirely are declared to have been due to acceptance by reporters of misinformation given to them by interested persons, for purposes of their own.

American Welding Society Holds First Annual Meeting

The American Welding Society held its first annual convention in the Engineering Societies Building, 33 West 39th street, New York, on Thursday, April 22. The morning session was devoted to society business and announcement was made of the election of officers. J. H. Deppler was elected president, J. W. Owens vice-president for two years, and D. B. Rushmore vice-president for one year.

Comfort A. Adams, chairman of the American Bureau of Welding, spoke briefly on the subject of welded joints for pressure vessels. A point of particular interest was brought out in this connection concerning the use of different kinds of welding machines. Mr. Adams showed that within the limits of arc length consistent with good practice in electric welding, it made no difference whether the machine used was a constant current, constant heat or constant unit heat machine. The objective of the bureau's activities will be to determine how a good weld can be assured. Methods will be sought for testing the quality of a weld after it is made and for determining the best way of eliminating locked up stresses in long welds. At present the greatest hope lies in controlling the conditions under which the work is done. This will greatly reduce the amount of nitrogen in the weld. Heat treatment is beneficial in that it tends to break up the combined nitrogen.

The afternoon session was concluded by an announcement that a number of manufacturing companies have offered to assist the bureau with its research work. Much of this work is in a partially finished condition.

Speed of Metal Arc Welding

At the evening session three papers were presented and discussed. The first one presented was "The Speed of Metal Arc Welding," by William Spraragen of the department of electrical engineering of the University of Washington. In substance, the more important portions of the paper are covered in the following statements:

The range of metal arc welding, or rather the range of application of metal arc welding, is very large. At one time it was considered necessary to scrap metal parts that were worn away. Autogenous welding is responsible for the discontinuance of this practice to a large extent. Without a doubt the welding operator is a most important factor in successful arc welding and, of course, the more skillful the operator the more and the better work will be turned out. It is very desirable to be able to compute the rate at which arc welding may be accomplished, but the complexity of the different elements entering into it are such that it is very difficult to calculate the time required to produce certain kinds of joints. For inside work 1.8 lb. of metal deposited per hour is a reasonable estimate, but when the work is performed outdoors there appears to be a reduction in the amount of metal deposited, so that the average appears to be 1.2 lb. of metal deposited per hour for outdoor work. This reduction in the amount of metal deposited is probably due to the cooling action of the air.

With reference to the type of welding apparatus used, whether it be alternating current apparatus or direct current apparatus, it is estimated that where first-class welding operators are employed there is no difference in the speed between the two kinds of equipment.

In a few words of explanation the retiring president, Comfort A. Adams, explained that the paper on speed of arc welding was based upon conclusions arrived at by tests made by the General Electric Company in welding up some 10½ tons of welding material. This work was done just prior to the signing of the armistice, and while the work had been cut up into coupons, ready for testing, the tests have not been made up to the present time.

Automatic Arc Welding

The second subject for the evening was "Automatic Arc Welding Machines" by H. L. Unland of the Power & Mining Engineering Department of the General Electric Company.

Mr. Unland stated that the automatic control of arc welding was not new. He said that the automatic arc welding machine had been developed for the reason that it was desirable in turning out large quantities of duplicate parts to make this operation as nearly mechanical as possible. As a precedent he mentioned that years ago the General Electric Company had developed a similar machine for a gas-cutting process which was used in the making of small gears, wheels, etc. Operators, cutting by hand, frequently ran over the line; these factors influenced the company to take up the question of mechanical feed, and a satisfactory cutting torch was eventually produced. At that time it was found that the gas consumption was reduced to one-third and that the speed was increased four or five times over the time required for hand work. The development of the automatic arc welding machine is merely an extension of the same principles into another field, and for sections that are being turned out continuously the mechanical feed is the proper thing to use. Mr. Unland described the General Electric's machine, and with the aid of numerous stereopticon slides explained very carefully the operation of the various circuits used in the control of the welding wire to the work.

Gas Cutting.

The third paper on "Recent Development in Gas Cutting" by Stuart Plumley of the Davis Bournonville Company was not read, but Mr. Plumley spoke briefly of the more important developments. The most successful development has been the cutting of cast iron with the gas torch. Cutting cast iron is particularly difficult, because the oxide of iron melts at a higher temperature than the iron itself. The cutting is now accomplished by preheating the oxygen. It is so easy to break cast iron that gas cutting is not often desirable, but it can be used to excellent advantage for such operations as cutting a frozen blast furnace cap.

The discussion brought out the fact that the rigid method was used for welding tanks with the automatic electric welding machine. The statement was made that locked-up stresses were greatly reduced by reason of the fact that the speed of welding was very high. It was further stated that alternating current cannot be adapted successfully to automatic welding, as a sensitive variable speed motor is required for feeding the metal into the arc.

Training of welding operators with the alternating current arc was advocated on the ground that because the alternating current arc had to be held within closer limits, the welders trained to use the alternating arc make better operators than those who receive their initial training with the direct current arc.

The Forest Products Laboratory, Madison, Wis., has established a training course in the principles that underlie box and crate construction. The course will start in July and will be given monthly so long as there is a sufficient demand by shippers and others interested in good container construction. The course consists of one week's instruction in boxing and crating under a staff of specialists and will include demonstrations of the necessity of adequate nailing, the relative holding power of different kinds of nails, and the effect of using wet lumber, strapping, including methods of application, etc.

Report of Division of Capital Expenditures

Work Authorized 1918 and 1919, $1,171,131,168, of Which $805,895,738 Actually Done

THE DIVISION OF CAPITAL Expenditures of the Railroad Administration has submitted a report for the year 1919, from which the following is taken:

During the year 1918 the Division of Capital Expenditures specifically authorized for improvements chargeable to capital account of Class I railroads and switching and terminal companies (exclusive of equipment ordered by the Railroad Administration for federal-controlled roads) the cost of which aggregated $906,178,538.

In the stress of war conditions, many projects were started and completed but were not reported in a formal way until 1919, but including those authorized and those not authorized by the Division of Capital Expenditures, there was actually expended during the calendar year 1918 because of shortage of labor and material a total sum hardly more than one-half of the amount authorized, namely, $473,628,013.

The details of these figures will be found in the exhibits attached to this report for the following periods:

Authorizations for year 1918	$906,178,538
Expenditures for 1918	473,628,013
Authorizations for year 1919 (one month estimated)	264,952,630
Estimated expenditures for 12 months, 1919	315,000,000
Authorizations for two years of federal control	1,171,131,163
Expenditures for two years of federal control	788,628,013

The outstanding feature of these detailed statements is that during the two years of federal control the following items involving the heaviest expenditures in roadway and structures in the order given were:

1. Additional yard tracks, sidings, and industry tracks.
2. Shop building, enginehouses, and appurtenances.
3. Additional main tracks.
4. Bridges, trestles, and culverts (renewals).
5. Improvements to existing equipment.
6. Rails and other track material (renewals).
7. Freight and passenger stations, office buildings and other station facilities.
8. Shop machinery and tools.

The signing of the armistice on November 11, 1918, relaxed the strain to some extent, and the conditions which governed the supply of material and labor were almost immediately changed.

While the war was still in progress in August, 1918, the regional directors were called upon to prepare and submit their budgets for 1919 in conformity with the rules laid down by the director general in his General Order No. 12. The cessation of active hostilities materially affected the scope of these plans. It was no longer necessary to anticipate the needs of the carriers for purely war purposes.

By the middle of January, 1919, the movement of men and material overseas had been largely reduced, while, on the other hand, manufacturers had not been able to resume normal production and many of them had practically suspended operations while engaged in making settlements with the government, so that the volume of traffic offering for transportation was substantially reduced.

This situation suggested the propriety of again soliciting the co-operation of the corporate officers in reaching a determination as to additions and betterments for the year 1919.

The adjournment of Congress on March 4 without making any provision or appropriation for the continued development of the railroad facilities created a condition requiring prompt and decisive action.

Without an appropriation it was deemed necessary by the Division of Capital Expenditures to further reduce the proposed budget and to suspend all improvements previously authorized except in such cases where it was necessary to continue work to insure safety, or where the progress had been so far advanced that to stop the work would be much more expensive than to continue it, or except in those cases where the railroad companies were willing to furnish the funds necessary to carry the project to completion without aid from the Railroad Administration.

In connection with new work not previously authorized it was deemed expedient to obtain from the corporate officer of each company a definite statement as to the extent to which said company was willing to finance the cost of the work, either by paying for it outright or by depositing with the United States Railroad Administration securities sufficient in amount to cover the cost.

To this end the federal managers dealing direct with the corporate officers were instructed to afford the said corporate officers full opportunity to review all projects chargeable to capital account, whether in progress or contemplated, and also uncompleted projects brought over from the year 1918.

The appropriation made by Congress in June, 1919, did not materially change this situation because the appropriation was not sufficient to enable the Railroad Administration to settle in full with the railroad companies without at the same time requiring them to pay a large part of their indebtedness for capital expenditures; so that a situation was produced where the Railroad Administration was not itself in a position to furnish large additional amounts of money for improvements and the railroad companies were not in position to finance large additional amounts.

Besides, the period during which extensive plans could be put into effect before the end of the year had passed.

The result was that the addition and betterment projects continued to be limited almost entirely to those involving safety of operation, facilities necessary for handling current volumes of traffic, and completion of those larger items which could not be economically discontinued.

The conditions above explained, together with the opposition of several of the corporations to which equipment had been allocated, made it impracticable to order any locomotives or cars in addition to those which had been ordered in 1918 as a war measure, namely, 1,930 locomotives of 12 different types, estimated to cost approximately $110,000,000, and 100,000 freight cars of five different types estimated to cost approximately $292,000,000, or a total of about $402,000,000.

A larger amount of equipment could not be ordered in 1918, because of the impracticability of securing the allotment of any greater amount of material for the construction of railroad equipment, all such material being in such urgent demand for other war necessities. The equipment thus ordered in 1918 was allocated to the various railroads under federal control according to the needs of the traffic of each road. In many cases these allocations were opposed by the corporations, various reasons being alleged. The opposition was in some cases so extreme as to seriously delay final disposition of the cars and engines. Under these circumstances the director general made no effort to place further orders for equipment. After a number of conferences some changes were made in specific cases (the allocations being increased in a number of instances at the request of the corporation), so that before the end of federal control the entire number

of engines and cars were allocated to and accepted by the carriers.

It is estimated that it will require a minimum of $200,000,000 and possibly $250,000,000 to complete in a satisfactory way and ready for operation:

(*a*) Projects which were started in 1918, or prior thereto, but on which work has stopped because of lack of funds.

(*b*) Projects tentatively approved during federal control and which, while considered necessary for the proper development of the roads, have not been started through lack of proper credit.

(*c*) Those projects on which work is now progressing because they are considered absolutely necessary for the safe and proper operation of the railroad on which located, but

The Division of Capital Expenditures has not undertaken to introduce novel or untried methods. It has used the rules prescribed by the Interstate Commerce Commission as a foundation. It has adopted the best practices of the conservatively managed railroads under private control and has endeavored to introduce those as a standard throughout the country with the hope that after the expiration of federal control and the removal of a central authority in these matters the officers of the railroad corporations will continue to use such methods, and perhaps one of the results of federal control of railroads will be the active watchfulness of the railroad companies in connection with the authorization of moneys for additions, betterments, road extensions and the purchase of equipment, and the closer and more prompt ac-

AUTHORIZATIONS AND EXPENDITURES FOR WORK CHARGEABLE TO CAPITAL ACCOUNT DURING THE CALENDAR YEARS 1918 AND 1919 (THREE MONTHS ESTIMATED) FOR CLASS I RAILROADS, AND TERMINAL AND SWITCHING COMPANIES

[Excluding Equipment Purchased by United States Railroad Administration for Federal Controlled Roads]

Class of work	Estimated cost of work authorized			Expenditures for work actually done		
	During year 1918	During year 1919	Total for 2 years 1918 and 1919	During year 1918	During year 1919	Total for 2 years 1918 and 1919
1	2	3	4	5	6	7
Additions and Betterments (Existing Lines)						
Widening cuts and fills, filling trestles, etc.	$7,867,801	$5,476,381	$13,344,182	$4,214,617	$4,383,535	$8,598,152
Ballasting	10,211,521	5,595,724	15,807,245	4,441,845	4,860,246	9,302,091
Rails and other track material	34,926,896	29,643,517	64,570,413	15,300,068	24,473,859	39,773,927
Bridges, trestles and culverts	43,582,779	23,387,835	66,970,614	24,312,035	15,963,112	40,275,147
Tunnel and subway improvements	2,426,591	991,543	3,418,134	1,254,257	787,796	2,042,053
Track elevations or depressions	18,462,784	4,900,610	23,363,394	4,370,542	3,099,761	7,470,303
Elimination of grade crossings	14,253,313	5,093,382	19,346,695	4,643,083	3,859,440	8,502,523
Grade crossings and crossing signals	1,646,023	1,276,985	2,923,008	936,211	911,122	1,847,333
Additional main tracks	62,899,741	17,566,522	80,466,263	32,432.890	16,893,523	49,326,413
Additional yard tracks, sidings and industry tracks	127,333,055	30,957,584	158,290,639	62,828,103	37,650,726	100,478,829
Changes of grade or alignment	8,254,829	1,869,989	10,124,818	3,679,500	3,049,674	6,729,174
Signals and interlocking plants	17,277,111	3,256,481	20,533,592	6,805,653	6,604,614	13,410,267
Telegraph and telephone lines	5,859,440	1,466,011	7,325,451	3,071,422	2,563,717	5,635,139
Roadway machinery and tools	2,153,943	768,978	2,922,921	1,268,904	1,249,997	2,518,901
Section houses and other roadway buildings	3,327,865	2,023,384	5,351,249	2,052,717	1,762,469	3,816,186
Fences and snowsheds—right of way, snow or sand fences	1,875,321	942,784	2,818,105	954,443	762,050	1,716,493
Freight and passenger stations, office buildings and other station facilities	49,202,227	13,492,270	62,694,497	19,149,023	13,415,712	32,564,735
Hotels and restaurants	951,822	464,298	1,416,120	555,869	593,278	1,149,147
Fuel stations and appurtenances	8,100,426	3,723,450	11,823,876	4,461,832	4,727,367	9,189,199
Water stations and appurtenances	12,875,393	4,981,844	17,857,237	6,818,530	5,674,918	12,493,448
Shop buildings, engine houses and appurtenances	58,114,009	30,119,703	88,233,712	35,373,374	45,259,663	80,633,037
Shop machinery and tools	22,390,530	8,514,951	30,905,481	8,368,837	12,819,342	21,188,179
Electric power plants, substations, transmission and distribution lines	19,425,506	4,887,272	24,312,778	7,390,287	9,186,443	16,576,730
Wharves and docks	5,945,977	1,856,418	7,803,395	1,939,963	2,221,891	4,161,854
Coal and ore wharves	5,917,618	931,278	6,848,896	4,687.634	895,954	5,583,588
Grain elevators and storage warehouses	2,981,285	1,763,721	4,745,006	1,739,637	1,892,353	3,631,990
Real estate	4,350,769	5,270,598	9,621,367	983,278	7,493,467	8,476,745
Assessments for public improvements	3,219,439	1,918,810	5,138,249	1,602,212	1,483,032	3,085,244
All other improvements	11,493,126	2,804,426	14,297,552	6,586,206	2,614,880	9,201,086
Total (excluding equipment)	$567,327,140	$215,946,749	$783,273.889	$272,222,972	$237,143,941	$509,376,913
Equipment						
Locomotives, steam	$121,643,680	$12,211,716	$133,855,396	$70,092,226	$39,327,182	$109,419,408
Locomotives, other	5,423,049	674,418	6,097,467	1,136,628	810,270	1,946,898
Freight-train cars	92,025,037	4,141,892	96,166,929	72,284,277	15,971,742	88,256,019
Passenger-train cars	16,911,728	1,125,022	18,036,750	12.648,486	1,530,318	14,178,804
Work equipment	7,753,539	2,089,104	9,842,643	2,214,616	4,879,246	7,093,862
Motor cars and trailers	587,998	56,577	644,575	55,926	568,997	624,923
Floating equipment	1,843,843	183,989	2,027,832	818,847	723,073	1,541,920
Miscellaneous equipment	2,857,097	192,787	3,049.844	1,824,952	186,738	2,011,690
Improvements to existing equipment	40,201,867	20,504,113	60,705,980	18,982,852	21,104,386	40,087,238
Total equipment	$289,247,838	$41,179,618	$330,427,456	$180,058,810	$85,101,952	$265,160,762
Other Capital Expenditures						
Construction of extensions, branches and other new lines	$49,603,560	$7,826,263	$57,429,823	$21,346,231	$10,011,832	$31,358,063
Total all expenditures	$906,178,538	$264,952,630	$1,171,131,168	$473,628,013	$332,267,725	$805,895,738

Note—Columns 5, 6 and 7 include approximately $50,000,000 paid by railroad companies, principally for equipment.

which will not have been completed on December 31, 1919.

The amounts named are in addition to those properly chargeable to operating account and not to capital.

At the beginning of federal control it developed that as to capital expenditures the method of handling divided the companies into three classes:

(1) Those companies which pursued a well-defined course in preparing a budget within their resources and prepared in an orderly way to finance the projects.

(2) Those companies which prepared a partial budget but permitted a large latitude to local officials with the result that in the aggregate large sums were spent before arranging for finances.

(3) Those companies which, living from hand to mouth, prepared no budget, made no provision for financing, etc.

counting of expenditures made therefor, and this will be of material assistance to the railroad companies in the preparation of reports required by the Valuation Section of the Interstate Commerce Commission.

Much of the work of the Division of Capital Expenditures has depended upon the conscientious service rendered by the federal auditor of each railroad and his staff.

The difficulty of retaining trained men under war conditions has been recognized. Frequently the best men were those who were most anxious to enter the Army or Navy, and it has been hard on short notice to fill their places.

For the careful work that has been done under these trying circumstances the Division of Capital Expenditures of the United States Railroad Administration, extends its thanks.

Rock Island Installs Automatic Train Control

Twenty-One Miles of Heavy Traffic Double Track Territory Equipped with Stop and Speed Control Apparatus

An initial installation of automatic train control has recently been completed on the main line of the Chicago, Rock Island & Pacific, between Blue Island, Ill., and Joliet, a distance of about 21 miles. The line is double track and handles a heavy passenger and freight traffic. The Regan Safety Devices Company, Inc., New York, successor to the Casale Safety Device Company, Inc., is the designer of the train control system, which consists of two elements; one the locomotive and tender equipment and the other the roadside apparatus. The locomotive and tender equipment includes a shoe mechanism, a speed controller, an electro-pneumatic valve, a relay, a battery, a release switch and the necessary conduits and wiring for the electric circuit. The roadside apparatus consists of a ramp, located by the side of the track, a battery, a relay and the necessary conduits and wiring for connecting the ramp with the existing signal system. The locomotive and roadside apparatus were installed by the railroad mechanical and signal forces respectively. Twenty locomotives are equipped and in service.

The Locomotive and Tender Equipment

The system, which is of the intermittent electrical contact type, embraces automatic speed control, as well as automatic stop features and is arranged to carry continuous speed control through caution territory. In other words, after having been actuated to provide speed control, it operates to restrict the speed of the train to a predetermined rate until the conditions permit unlimited speed or necessitate a stop, as the case may be, depending upon the position of the next signal.

General Arrangement of the Apparatus

The arrangement of the apparatus upon one type of locomotive is shown in one of the illustrations. The speed controller is rigidly bolted to the end of the axle of the pony truck and is contained in a dust-proof housing. It consists of a centrifugal governor arranged to open and close a circuit at any predetermined speed, the setting of which depends upon the class of traffic to which the locomotive is assigned. Connection is made to the controlling circuit through a stationary junction box and flexible conduit. A ball or roller bearing is provided to reduce friction to a practicable degree and to permit free movement of the condulet.

The electro-pneumatic valve is located at a point convenient for connection to the air brake system. This valve operates in response to an electromagnet and controls the brake pipe pressure and the reservoir supply to the engineman's brake valve. When the magnet is de-energized, the valve reduces the brake pipe pressure to insure a service application of the brakes; and at the same time it restricts the reservoir supply, so that the brakes cannot be released by the engineman's brake valve. The brake pipe pressure may, however, be still further reduced by the engineman in about the same manner as with the conductor's emergency valve.

The shoe mechanism consists of a shoe stem, a circuit controller and a cylinder housed in a substantial steel case which is bolted rigidly to the arch bar of the tender truck or to the trailer truck of the locomotive, as the case may be. The shoe stem is fitted with a tempered steel shoe sole for ramp contact. It is held in position and in contact while moving over a ramp by means of brake pipe pressure in the shoe stem cylinder, to which the brake pipe is connected. The stem is of cast iron and cored so that, should it be broken, a service application of the brakes would result. The shoe circuit controller operates to substitute, in a normally closed circuit, energy from the roadside battery for that from the storage battery carried on the locomotive, also to transmit current of the proper characteristic from the roadside battery to actuate the locomotive apparatus and control the train consistent with the indication displayed by the block signal. If for any reason it is desired to fasten the shoe stem in the "up" position, as in the case of a locomotive operating outside of automatic train control territory, a bolt lock is provided which holds it securely in place.

The storage battery is of the portable lead type. It consists of 5 cells of 80-ampere-hour capacity and operates through resistance to insure economical and efficient service.

A three-position relay is connected in the circuit so as to repeat the position of the signal. This is accomplished by means of electric currents of the several characteristics that may be transmitted by the roadside and locomotive apparatus.

The ramp is made up of angle iron, with a copper insert. This is mounted upon cast iron supports which are bolted rigidly to the standard crossties. A wood block separates the ramp iron from the supporting castings. This ramp is patented and is different from any ramp used elsewhere for other devices. As installed on the Rock Island it is 120 ft. long and is located approximately 160 ft. in the rear of each signal. The ramp and the track are so connected with the automatic block system that the signal will assume the stop position if the ramp circuit is de-energized.

This train control system is operated in connection with three-position upper quadrant, semaphore type signals with polarized line circuits. The relays and terminals for the ramp circuits are housed in the signal case or in a special relay box bolted thereto. Connection from the mechanism to the ramp in each case is made through conduits, although trunking was placed above ground at a few locations in order to complete the installation, because some of the materials

The Roadside Apparatus Showing the Ramp Approximately 160 ft. from Signal

required could not be had promptly. This temporary work is expected to be replaced with "Parkway" conduit in the near future.

The Operation of the System

In the operation of this system an application of the brakes is made by the automatic control apparatus when any of the following conditions exist:

(a) When a train passes a signal in the caution position at an excessive speed.

(b) Whenever a train exceeds a predetermined speed while running in a caution block.

(c) At a stop signal, or when a block is occupied.

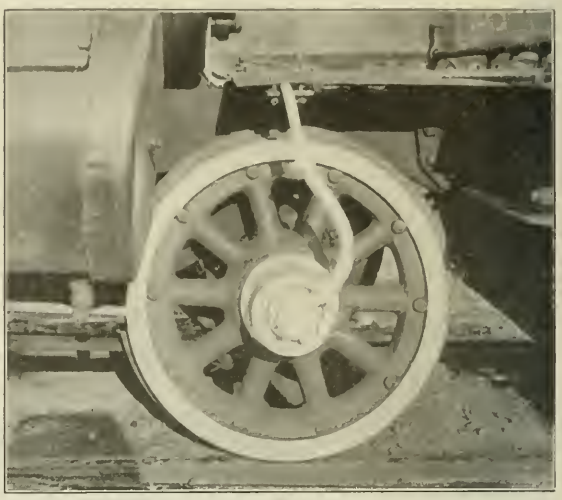
When an application of the brakes is made by the automatic control apparatus, a release may be had, with the system in service, only by one of three methods:

1. By automatic release, as in caution block territory, when the speed is below a predetermined point.

2. By automatic release, as when passing from caution block territory to a clear block.

3. By the engineman operating the release switch to pass a stop signal.

In order to pass a block signal in the stop position it is necessary for the engineman to operate the release switch provided for that purpose. The train may then proceed, but



The Speed Circuit Controller

only under automatic speed control, until the next block signal is reached, when, if the block is clear, unlimited speed will be restored automatically.

On this installation there is no part of the automatic train control system located in the engine cab, its operation being entirely independent of the engineman. It does not in any way interfere with the control or operation of the train by the engineman so long as he obeys signal indications. It is intended to operate if for any reason the engineman fails.

The first official inspection of the original installation of this system was made on the Rock Island, on July 1, 1919, and a second official test was made on July 28, 1919, under the supervision of the Automatic Train Control Committee of the United States Railroad Administration. Subsequently, arrangements were made for a more extended service test, and the initial installation on the double track main line between Blue Island and Joliet is the result.

On March 12, 1920, a special train was operated from Chicago to Joliet for the purpose of demonstrating this automatic train control system. The train equipment consisted of an engine, two private cars and a heavy combination baggage car. The private cars were fitted with speed indicators and brake pipe pressure gages. For this occasion the speed controller on the locomotive was adjusted at a predetermined speed of 30 miles an hour. A report of this inspection trip appeared in the *Railway Age* of March 19, page 948.

One significant development of the hearings before the Interstate Commerce Commission was the apparent new attitude of the organized shippers. With some exceptions they were represented as more interested in obtaining service and in facilities than in rate paring. There was an absence of the old animosities of the other big rate cases before the Commission.—*Washington Correspondent, New York Sun.*

Tie Producers Discuss Production Outlook

Relations with Railroads, Specifications and Threatened Strike Considered at Chicago Meeting

That the railways will be fortunate if the production of cross ties this year reaches the normal pre-war figure was evident from the discussion at the annual convention of the National Association of Railroad Tie Producers which was held at the Sherman hotel, Chicago, on April 22 and 23. The readjustments in the tie-producing industry following the return of the railroads to private control after two years of centralized purchases during which time new and uniform specifications were introduced, and the universal difficulties with labor, accentuated by a strike of workers in the saw mills and woods called for May 1, lead to the belief that the output of ties will probably be below normal. This situation is of particular interest to the railways because of the fact that the production for the two years preceeding this was likewise below normal and the present heavy demand is forcing the prices upward rapidly.

The National Association of Railroad Tie Producers was formed at St. Louis in January, 1919, and comprises within its membership many of the larger producers of railway cross ties, particularly in the middle-west. The officers of the association for the past year were, president, John W. Fristoe, president, T. J. Moss Company, St. Louis, Mo.; vice-president, E. M. Blake, production engineer with Charles R. McCormick & Company, San Francisco, Cal.; secretary of the Board of Directors, Robert E. Hussey, vice-president and treasurer, Hussey Tie Company, St. Louis, Mo.; treasurer, Robert E. Lee, president, Hobart-Lee Tie Company, Springfield, Mo.; secretary-manager, Orville A. Pier, St. Louis, Mo.

The Present Situation

The situation now confronting the producers of cross ties was outlined by J. W. Bristoe, president, in part as follows:

Up to a few months ago our industry was dominant by substantially the same authorities that controlled our railroads. Published prices were offered to any and all producers, and yet I have been reliably informed that on two of our largest tie-producing railroads substantially three-fourths of all the cross ties purchased by them under federal control, were obtained from firms or individuals who had been previously known and established as tie contractors. There certainly could be no more convincing proof of the necessity and usefulness of efficient and established organizations of men and capital who make a business of the production of cross ties, unless it was the immediate decision on the part of these two producing roads to purchase their cross tie supplies through line contractors as soon as they were permitted to do so.

We have endorsed the principle of a standard specification and the uniform application of the same, but until the railroads, collectively and universally, refuse to purchase cross ties on any other basis, there can be no concerted action or binding resolutions. The influences making up the demand for cross ties do not at present indicate any universal desire for a standard specification in actual cross tie purchases, and likewise the supply of cross ties at the present time, counting those within and those entirely without the requirements of heretofore standard specifications, is beyond doubt inadequate.

The demand for cross ties, as expressed in the best of all barometers, that is actual and bonafide inquiries, has caused a number of us to invest additional capital as fast as we could properly do so on the assumption that increased production must come through the employment of additional labor and equipment. Coincident with our desire for increased production, the demand for other necessities is even greater than that for cross ties, and credits have been generally expanded to such a point that interest rates are a matter of grave concern.

The purchase and production of cross ties is a peculiar business wherein we perforce must make large and substantial investments considerably in advance of the actual date of delivery of cross ties to our customers. We in turn sell our cross ties on a basis of what sometimes becomes a short term loan. Good business always prompts us to keep our aims well within our means, and a tight money market may probably restrict the production until this situation is relieved. Let me emphasize that we shall need all the help possible from our customers in obtaining equipment to more rapidly turn over our stock, and we must expect prompt remittance if we are to increase production.

The Pacific Coast As a Producer of Cross Ties

The relatively large shipments of ties from the Pacific Coast to the roads in the Eastern and Central states during the last two years have attracted attention to that area as a source of supply for the future. The possibilities of the western states as a source of tie supply were described in detail by E. M. Blake, production engineer with Charles R. McCormick & Company, San Francisco, Cal., from whose paper the following information was taken.

Based upon the most reliable information obtainable, there are in the United States today probably about 550,000,000 acres of standing forest including both privately owned and public lands. Of this total there are about 80,000,000 acres in the Pacific Coast states of California, Oregon and Washington. Although a relatively small percentage of the whole, it is estimated there are about thirteen hundred billion board feet of standing timber on these 80,000,000 acres, which is approximately one-half of the remaining supply of standing timber in the United States. About one-half of this quantity, or 630 billion board feet, is estimated to be Douglas fir, representing about one-quarter of the total timber stand in the United States today. It is interesting to note, in comparison, that the total stand of yellow pine in the southern states today, is probably not much in excess of 225 billion board feet.

The present relation between the annual production of lumber and the resources of the Pacific Coast states gives an indication of the future possibilities of that district. The three states combined, in 1918, produced about 8,500,000,000 board feet and in 1919 about 8,800,000,000 board feet. The estimated total lumber production in the United States for 1919 is placed at about 30,000,000,000 board feet as against about 32,750,000,000 in 1918 and 36,000,000,000 board feet in 1917. The normal annual lumber export total from the Pacific Northwest is approximately 600,000,000 board feet but the total exported in 1919 was probably less than 400,000,000 board feet, this reduction being accounted for by conditions brought on by the war and the acute shortage of available tonnage.

The manufacture of cross ties on the Pacific Coast is largely incidental to the lumber business. While the number of hewed cross ties produced annually on the Pacific Coast is small in comparison with the number of sawed ties, still a large number of split and hewed redwood and

hewed tie ties are produced each year outside of the mills. There are also many tie sawmills in the Lewis River district of Southern Washington and along the Willamette Valley in Oregon. The production of cross ties, however, has been principally a mill problem of secondary importance and the annual output of cross ties in the future will depend, aside from the pressure of the demand, upon the attitude of the lumber mills toward the manufacture of this particular railway timber product. This, in turn, will depend upon the specifications, inspection rules and prices controlling the transactions.

The production of cross ties on the Pacific Coast in 1919 probably represented only from 6 to 7 per cent of the total lumber production, from which it is evident that cross ties today are a relatively small factor in the lumber industry. Probably over 90 per cent of the Douglas fir ties manufactured on the Pacific Coast are sawed in lumber mills from logs of large dimension because the average stand of Douglas fir trees is of large size and it has not paid to log the smaller trees except for use as piling. Therefore, the conditions and problems which are encountered in the production of cross ties on the Pacific Coast are quite fundamentally different from those which influence the tie situation east of the Rocky mountains.

Douglas Fir Ties

The principal sources of Douglas fir ties are as follows:

Washington: in the Bellingham and Everett districts, on the Olympic peninsula, in the Gray's Harbor and Willapa Harbor districts, in the Lewis River district of Southern Washington, along the Columbia river and in general back to and occasionally east of the line of the Cascade mountains.

Oregon: along the Columbia river, in the Coos Bay district, along both sides of the Willamette river and generally in the west central areas of the state from the Willamette river to the coastline.

California: in scattering areas along the coast from the Oregon line nearly to Santa Cruz, in the Mt. Shasta region of north central California, and along the slopes of the Sierra Nevadas as far South as the Yosemite Valley district.

In connection with the use of Douglas fir it is interesting to note that the great durability and resistance to saturation by water of Douglas fir and its great mechanical strength, combined with its lightness in weight, particularly fit it for use in the form of cross ties. The unusual refractoriness of its cellular structure has, in the past, tended to limit the treatment of the heartwood with creosote oil or other preservatives, but the recent development and perfection of the mechanical perforating process assures a greatly increased use of treated Douglas fir in cross ties in the future. Douglas fir also grows very large in size and very dense in stand and the number of hewed ties is very small, most fir ties being sawed from the logs. The stands commonly run over 1,000,000 board feet to the acre. Individual trees run up to 14 ft. and 15 ft. in diameter and over 300 ft. in height. They often grow to a height of 150 feet without a single branch. On account of its large average size, therefore, it is probable that the majority of Douglas fir cross ties will generally be manufactured from the heartwood of the timber.

Redwood and Other Ties

The principal sources of redwood ties are in Mendocino, Humboldt, Sonoma and Marino counties, lying along the coastline north of San Francisco, from which areas ties are shipped both by rail and water. A smaller quantity of redwood ties is provided annually from the Santa Cruz district, lying along the coast south of San Francisco, and including the Big Basin in which is located the California Redwood Park.

Probably 85 to 90 per cent of redwood ties are split from the logs, many of them from the logs as they lie on the hills after being felled. The splitting is usally followed by some hewing, constituting a large volume of work every year. About 10 to 15 per cent are sawed, most of which are for export.

Cedar ties are manufactured principally in the Coos Bay district of Southern Oregon. Cross ties of other kinds of wood, including hemlock, larch, spruce, cedar and western yellow pine, are produced on the Pacific Coast but only in relatively small quantities.

The Available Markets

The principal markets for the sale of cross ties produced on the Pacific Coast have been as follows:

1. Local markets in the states of Washington, Oregon, California, Nevada and Arizona to meet the requirements of the steam and electric railroads, industrial lines, logging roads and mining tracks.

2. Domestic markets for the supply of railroad requirements between the Rocky mountains and the Mississippi Valley. While ties have been shipped to those markets in the past, principally for use on railroad lines in Montana, Idaho, Wyoming and the Dakotas, during government control of railroads, large numbers were shipped for widespread use in other sections of the district above defined.

3. Domestic markets for the supply of cross tie requirements to railroads in the Atlantic seaboard district north of the Carolinas and east of the Mississippi Valley. Shipments to these markets were inaugurated under government control of railroads and ties were shipped from the Pacific Northwest in vessels through the Panama Canal to the Atlantic ports of New York, Philadelphia and Baltimore.

4. Foreign markets have been supplied with cross ties from the Pacific Northwest for a period covering about ten years. Large numbers of creosoted Douglas fir ties have been exported to India for the British Indian Railways. Heavy shipments have also been made in the past to China, Mexico, Central America and the west coast of South America. At the present time negotiations are under way, if not already completed, for the shipment of 3,000,000 pieces of cross ties to China for use on extensive railway construction work contemplated in that country. Since the signing of the armistice in November, 1918, many shipments of Douglas fir ties have been made to the United Kingdom and inquiries, which have not yet been followed by actual orders, have been received from Italy, France, Belgium and South Africa. The export of ties from the Pacific Coast during the past year would have been much larger had the tonnage been available.

The estimated production of cross ties in the states of California, Oregon and Washington for the calendar year 1919 by distribution of woods and distribution of markets, is as follows:

	Number of pieces	
Douglas fir:		
For Pacific Coast railroads	5,710,000	
For Inland and Eastern railroads by rail	3,850,000	
For Inland and Eastern railroads by vessel	1,225,000	
For export—		
To United Kingdom	1,579,400	
To west coast of South America	46,200	
To Mexico	2,100	
Estimated total for Douglas fir		12,412,700
Redwood:		
For Pacific Coast railroads	2,575,000	
To west coast of South America, etc.	200,000	
Estimated total for redwood		2,775,000
Cedar for Pacific Coast railroads		175,000
Yellow pine, western larch, western spruce, western hemlock and other kinds for Pacific Coast railroads		250,000
Estimated total production, 1919		15,612,700

The Possibilities of the Future

Quantity production of Douglas fir cross ties in Oregon and Washington is capable of almost unlimited increase in the future provided the conditions controlling production are

favorable. These conditions are based fundamentally upon a purchase price balanced with the requirements of both specifications and inspection rules. It is anticipated that the use of Douglas fir lumber will steadily increase to meet both domestic and foreign demand and if heartwood cross ties of close grain wood are called for in future specifications, their price again must be rationally balanced with the market for the higher priced lumber products inasmuch as these lumber products, bringing the higher prices, can be manufactured by the mills from the same logs which would be used in the production of the majority of cross ties.

As the quality specified and the consequent cost of cross ties has advanced it has been a matter of prudent economy to give them some form of preservative treatment in order to get the maximum life out of the higher priced tie. Thus it is that sapwood ties are rapidly going out of use and heartwood ties are taking their place at the higher price which heartwood commands.

With regard to redwood ties, their production will probably be limited to a percentage of the requirements of the western rail lines, for use generally in arid climates, and to meet certain export demand. There is only a relatively small amount of new growth redwood trees, and reforestation is taking place principally on Government reservations. Furthermore, very decided efforts are being made to save the redwood forests of California from further so-called inroads of commercial lumbering. While this movement is probably not destined to bring about any marked conservation in the commercial use of redwood, particularly on account of the great demand for this wood for building purposes, still it tends to limit the use of redwood for cross ties. Therefore, it does not appear probable that the future production of redwood ties will increase much above the normal annual output at the present time.

In conclusion, the railroad cross ties, produced on the Pacific Coast have been very largely a by-product of the lumber mill. In logging operations today, the smaller growth is left untouched except as removed for piling. With an increased demand for cross ties, however, this smaller growth will doubtless be hewed into ties or cut up in portable or small permanent tie sawmills. Therefore, it is quite entirely within the range of possibility that tie production on the Pacific Coast may become in the future a distinct and separate business of itself, as it is east of the Rock Mountains, correlated with but independent of the lumber mill. Mechanically perforated promptly after its manufacture to control or prevent checking, to hasten air seasoning, and to insure a uniform predetermined penetration of preservative, then economically treated with the maximum conservation of oil possible and with the vitally important reduction of time and temperature made possible by perforating, it is doubtful whether any cross tie timber will give a better account of itself in the track bed than Douglas fir.

Reforestation Commercially Practicable

The commercial practicability of reforesting cut-over timber lands to provide a future supply of cross ties was described by Howard Andrews, president of the Nashville Tie Company, Nashville, Tenn. In this paper Mr. Andrews stated that there is sufficient land not suitable for agriculture to provide a perpetual supply of timber, and if taken in hand now, at the end of 50 years there would be as much timber in the country as there is today. Forestry or reforestation methods can be made a safe and profitable business investment. A good tree can be raised on a square rod of land as easily as a farmer can raise two stalks of corn in hills three and one-half to four feet apart. It is my observation that an average tree protected from fire and in only reasonable good soil will increase in diameter one-fourth of an inch per year. Now, suppose a tree that is 12 inches in diameter with a body length of 32 feet becomes a tree 13 inches in diameter in four years. This represents an increase of 8½ feet board measure per year. Take an acre with 160 trees and this makes an aggregate gain of 1,360 feet board measure per year.

I am not an ardent advocate of planting new trees to any great extent on ordinary cut-over land, although this may be a wise thing to do in many instances, but there are scattered over the country so many tracts of land, large and small, which have been cut over and on which there are young growths of native trees which can be utilized for our future timber supply. Leave such land alone, keeping the woods fires out as much as possible, and the growth of timber will more than pay 6 per cent on the investment, and added to the growth is coming the enhancement in stumpage values which is sure to be great in the course of the next 10, 20 to 30 years.

However, to secure most efficient results, a system of practical forestry should be used on such timbered land. For instance, not oftener than every five years, or perhaps ten, it would pay to work over the land and cut trees where they stand too thick, remove those of inferior growth, or even cut all of the trees of marketable value. However, I would recommend that such occasional working of the forest be done more as a farmer weeds his corn or other growing fields, leaving the promising young growing trees to mature.

The feeling of the average tie man is that there will be enough timber for his life time, so why worry about the distant future. I maintain that tree growing can be made a good present-day business, a little slow, perhaps, but sure. There is certainly a profit each year if an acre will grow 1,000 feet board measure of timber, and such an acre is worth more at the end of the year, depending on the money

A Central Inspection Bureau

Railway men and tie producers alike have taken a great deal of interest in the subject of standard uniform specifications for cross ties and the corollary, the development of a central inspection bureau. While such measures were in effect during federal control they became inoperative at its termination except as supported by the individual roads.

The suggestion made by W. C. Nixon, a tie producer, that a central inspection bureau be formed is therefore of special significance at the present time. Mr. Nixon's suggestion is outlined below:

I believe in a standard set of specifications universally applied both in the manufacture and taking up of ties which will permit: (1) Any railroad under the specification may buy whatever it may want to, whether it be a large tie or a small tie, an oak tie or a gum tie, and (2) the producer to utilize his rapidly depleting timber to its very limit with the least possible wastage.

Having due regard for the existence of a standard specification, I must believe in the right of every railroad to buy any sort of a tie it wants; that is, to buy and to get any class of tie under the specification, and I would want the specification so complete as to cover all the possible requirements of every railroad. But I do not believe that a railroad which buys a No. 3 tie should attempt to get a No. 4 when the inspection starts, nor do I believe in a railroad buying a No. 3 and then accepting No. 2s and No. 1s as No. 3s. Neither do I believe in a railroad attempting to buy a No. 3 tie for a No. 2 price. As a result of the Federal control of railroads, what amounted to a central inspection bureau was put into effect, except that this inspection bureau was controlled entirely by one of the parties to the contract. When Federal control of railroads ceased, the officers under Federal control attempted to pass along to the tie business a central inspection bureau, which was to be controlled and operated by the American Railroad Asso-

ciation The proposal was never agreed to, or even seriously considered by the tie producers, because it was felt that an inspection bureau of any sort should be properly neutral in its make up, both in its control and in its operation.

I submit the following as being a tentative plan for the organization of such a bureau which would be entirely neutral in its organization and neutral in its administration. I would have the producers' association appoint three representatives as members of a board of directors. I would have the American Railroad Association appoint three of its number as members of a board of directors; these six would meet and among themselves determine upon a seventh man, who would become president and general manager of the inspection bureau. I would have these seven people organize a corporation as its board of directors, the corporation to be organized under the laws of any state, according to the then existing conditions. Its purposes would be to operate a central inspection bureau for the inspection of cross ties without any attempt to make a profit thereon.

When ready to load any ties a producer would notify the nearest office of the bureau, giving date ready for inspector, probably number ready for inspection, approximate line up, etc. When the producer had no cars for the inspector, or no ties, the inspector would merely report to his office and go on another job. The railroad would not worry, for it would know that its ties would come to it as ordered, as far as humanly possible.

Such a plan would mean that no producer would know what particular inspector he was going to have, but he would know that if he had sold a certain number of ties of a certain grade that they were going to be taken up that way. If he did not believe he was being fairly treated, he would have an appeal to a regional inspector, and an appeal from that inspection to the Bureau itself. If a producer had reason to believe that a competitor was getting too easy inspection he in turn, would have an appeal to the Bureau.

Other Business

At the closing session of the convention the following officers were elected for the ensuing year: President, E. M. Blake, Chas. R. McCormick & Company, San Francisco, Cal.; vice-president, Robert E. Lee, Hobart-Lee Tie Company, Springfield, Mo.; secretary, J. J. Schafly, Potosi Tie & Lumber Company, St. Louis, Mo.; treasurer, John H. Johnson, B. Johnson & Son, Richmond, Ind.

Photograph from "International."

On the Bagdad Railway

Reading Combination Ordered Dissolved

WASHINGTON, D. C.

THE COMBINATION of the Reading Company, the Philadelphia & Reading Railway, the Philadelphia & Reading Coal & Iron Company, the Central Railroad of New Jersey and the Lehigh & Wilkesbarre Coal Company, was ordered dissolved by a decision of the United States Supreme Court handed down on Monday, April 26, affirming in part and reversing in part the decree of the district court in the suit instituted by the government to dissolve the intercorporate relations existing between the defendants on the ground that through such relations they constitute a combination in restraint of interstate commerce in anthracite coal, an attempt to monopolize or a monopolization of such trade in violation of the anti-trust act and that the railway companies had violated the commodities clause of the interstate commerce law.

The decision of the court was rendered by a 4 to 3 division, Chief Justice White and Justices Holmes and Van Devanter dissenting, while Justices McReynolds and Brandeis took no part in the decision. No decision was announced in the similar case pending against the Lehigh Valley.

The result of the decision, the court said, is that "the decree of the district court will be affirmed, as to the Lehigh Coal & Navigation Company, the Lehigh & New England Railroad Company, the Lehigh & Hudson River Railway Company, as to the restrictive covenants in the mining leases with respect to the shipping of coal, as to the dissolution of the combination between the Philadelphia & Reading Coal & Iron Company and the Lehigh & Wilkes-Barre Coal Company, maintained through the Reading Company and the Central Railroad Company of New Jersey. As to the Wilmington & Northern Railroad Company and as in the individual defendants, the bill will be dismissed without prejudice. As to the Reading Company, the Philadelphia & Reading Railway Company, the Philadelphia & Reading Coal & Iron Company and the Central Railroad Company of New Jersey, the decree of the district court will be reversed and the cause remanded with direction to enter a decree in conformity with this opinion, dissolving the combination of the Reading Company, the Philadelphia & Reading Railway Company, the Philadelphia & Reading Coal & Iron Company, the Central Railroad Company of New Jersey and the Lehigh & Wilkes-Barre Coal Company, existing and maintained through the Reading Company, with such provision for the disposition of the shares of stock and bonds and other property of the various companies, held by the Reading Company, as may be necessary to establish the entire independence from that company and from each other, of the Philadelphia & Reading Railway Company, the Philadelphia & Reading Coal & Iron Company, the Central Railroad Company of New Jersey and the Lehigh & Wilkes-Barre Coal Company, and also that such disposition shall be made by the decree of the stocks and bonds of the Lehigh & Wilkes-Barre Coal Company, held by the Central Railroad Company of New Jersey, as may be necessary to establish entire independence between these two companies to the end that the affairs of all of these now combined companies may be conducted in harmony with the law."

The majority opinion written by Justice Clarke sustains practically all of the contentions made by the government. After outlining the history of the case, the majority opinion said that the scheme of reorganization adopted in 1896, six years after the enactment of the anti-trust act, combined and delivered into the complete control of the board of directors of the holding company, all of the property of much the largest single coal company operated in the Schuylkill anthracite field, and almost one thousand miles of railway, over

which its coal must find its access to interstate markets. Its board of directors, obviously, the opinion said, thus acquired power to increase or decrease the output of coal from very extensive mines, the supply of it in the market and the cost of it to the consumer; to increase or lower the charge for transporting such coal to market; and to regulate car supply and other shipping conveniences, and thereby to help or hinder the operations of independent miners and shippers of coal.

"This constituted a combination to unduly restrain interstate commerce within the meaning of the act," the court said. "Obviously, also, it made the coal company and the railway company mere agents or instrumentalities of the holding company—the mining and transportation department of its business—for producing, purchasing and selling coal and for transporting it to market."

After disposing of several minor contentions, the opinion continued:

"We are thus brought to the consideration of what the decree shall be with respect to the really important defendants in the case, the three Reading companies, the Central Railroad Company of New Jersey and the Wilkes-Barre Coal Company.

"Before the re-organization of 1896 the gathering of more than two-thirds of the acreage of the Schuylkill field into the control of the two Reading companies was, as their reports show for the frankly avowed purpose, then not forbidden by statute, of monopolizing the production, transportation and sale of the anthracite coal of the largest of the three sources of supply.

"When in 1896 the problem was presented of re-organizing the financial affairs of the two companies, it was not solved, as it might have been, by creating separate coal and railroad companies to conduct independently interstate commerce in the two departments to which their railroad and coal properties were adapted, but, on the contrary, and very obviously for the purpose of evading the provision of the constitution of Pennsylvania prohibiting any incorporated common carrier from, directly or indirectly, engaging in mining 'articles' for transportation over its lines, and also of evading the provisions of the federal anti-trust act against restraining and monopolizing interstate commerce, resort was had to the holding company device, by which one company was given unrestricted control over the other two, with the power, inherent in that form of organization, of continuing and carrying forward the restraint and monopoly which had previously been acquired over that large volume of interstate commerce which was to be conducted by the coal and railroad companies.

"Again, when in 1901 a rivalry, imaginary or real, arose for the control of the Central Railroad Company, the holding company, regardless of the law, did not hesitate to purchase control of that great competing anthracite coal carrying system, with its extensive coal owning and mining subsidiary. This acquisition placed the holding company in a position of dominating control not only over two great competing interstate railroad carriers but also over two great competing coal companies engaged extensively in mining and selling anthracite coal, which must be transported to interstate markets over the controlled interstate lines of railway.

"Again, and obviously, this dominating power was not obtained by normal expansion to meet the demands of a business growing as a result of superior and enterprising management, but by deliberate, calculated purchase for control.

"That such a power, so obtained, regardless of the use made of it, constitutes a menace to and an undue restraint upon interstate commerce within the meaning of the anti-trust act, has been frequently held by this court.

"Thus, this record clearly shows a group of men selecting the holding company with an 'omnibus' charter and not only investing it by stock control with such complete dominion over two great competing interstate carriers and over two great competing coal companies extensively engaged in interstate commerce in anthracite coal as to bring it, without more, within the condemnation of the anti-trust act, but it also shows that this power of control was actually used, once successfully, to suppress the building of a prospective competitive railway line, and a second time, successfully until the court condemned the 65 per cent contracts as illegal, to suppress the last prospect of competition in anthracite production and transportation. To this it must be added that up to the time when this suit was commenced this holding company had continued in active, dominating control of the Reading Railway Company and of the competing Central Railroad system, and also of the two coal companies, thus effectually suppressing all competition between the four companies and pooling their earnings. It is difficult to imagine a clearer case and in all essential particulars it rests on undisputed conduct and upon perfectly established law. It is ruled by many decisions of this court, but specifically and clearly by United States v. Union Pacific R. R. Co., supra.

"For flagrant violation of the first and second sections of the anti-trust act, the relations between the Reading Company, the Reading Railway Company and the Reading Coal Company and between these companies and the Central Railroad Company of New Jersey must be so dissolved as to give to each of them a position in all respects independent and free from stock or other control of either of the other corporations.

"With respect to the contention that the commodities clause of the act of June 29, 1906 (34 Stat. 584, 585), is being violated by the Reading Railway Company and the Central Railroad Company.

"The circuit judges centering their attention: upon the fact that the Reading Railway Company did not own any of the stock of the Reading Coal Company; that the two companies had separate forces of operatives and separate accounting systems; and upon the importance of maintaining the theory of separate corporate entity as a legal doctrine, concluded, upon the authority of United States v. Delaware & Hudson Co., 213 U. S. 366, 413, that the evidence did not justify holding that in transporting the products of the Reading Coal Company's mines to market the Reading Railway Company was carrying a commodity mined or produced by it or under its authority or which it owned in whole or in part or in which it had any interest, direct or indirect.

"But the question which we have presented by this branch of the case is not the technical one of whether ownership by a railroad company of stock in a coal company renders it unlawful for the former to carry the product of the latter, for here the railroad company did not own any of the stock of the coal company. The real question is whether combining in a single corporation the ownership of all of the stock of a carrier and all of the stock of a coal company results in such community of interest or title in the product of the latter as to bring the case within the scope of the provisions of the act.

"The purpose of the commodity clause was to put an end to the injustice to the shipping public, which experience had shown to result from discriminations of various kinds, which inevitably grew up where a railroad company occupied the inconsistent positions of carrier and shipper. Plainly in such a case as we have here this evil would be present as fully as if the title to both the coal lands and the railroads were in the holding company, for all of the profits realized from the operations of the two must find their way ultimately into its treasury—any discriminating practice which would harm the general shipper would profit the holding company. Being thus clearly within the evil to be remedied, there remains the question whether such a

controlling stock ownership in a corporation is fairly within the scope of the language of the statute.

"In terms the act declares that it shall be unlawful for any railroad company to transport in interstate commerce any article or commodity . . . mined or produced by it, or under its authority, or which it may own in whole or in part, or in which it may have any interest, direct or indirect.

"Accepting the risk of obscuring the obvious by discussing it, and without splitting hairs as to where the naked legal title to the coal would be when in transit, we may be sure that it was mined and produced under the same authority that transported it over the railroad. All three of the Reading companies had the same officers and directors and it was under their authority that the mines were worked and the railroad operated, and they exercised that authority in the one case in precisely the same character as in the other —as officials of the holding company. The manner in which the stock of the three was held resulted, and was intended to result, in the abdication of all independent corporate action by both the railway company and the coal company, involving as it did the surrender to the holding company of the entire conduct of their affairs. It would be to subordinate reality to legal form to hold that the coal mined by the coal company, under direction of the holding company's officials, was not produced by the same authority that operated the Reading Railway lines. The case falls clearly within the scope of the act, and for the violation of this commodity clause, as well as for its violation of the anti-trust act, the combination between the Reading Railway Company and the Reading Coal Company must be dissolved.

"The relation between the Central Railroad Company and the Wilkes-Barre coal company presents a different question, for here the railroad company owns over eleven-twelfths of the stock of the coal company, and therefore the holding in 213 U. S. 366, supra, is especially pressed in argument,—that the ownership of stock by a railroad company in a coal company does not cause the former to have such an interest in a legal or equitable sense in the product of the latter as to bring it within the prohibition of the act. But this holding was considered in United States v. Lehigh Valley R. R. Co., 220 U. S. 257, 272 and it was there held not applicable where a railroad company used its stock ownership for the purpose of securing a complete control over the affairs of a coal company, and of treating it as a mere agency or department of the owning company. This rule was repeated and applied in United States v. D. L. & W. R. R. Co., 238 U. S. 516, 529. It results that it may confidently be stated that the law upon this subject now is, that while the ownership by a railroad company of shares of the capital stock of a mining company does not necessarily create an identity of corporate interest between the two such as to render it unlawful under the commodities clause for the railroad company to transport in interstate commerce the products of such mining company, yet where such ownership of stock is resorted to, not for the purpose of participating in the affairs of the corporation in which it is held in a manner normal and usual with stockholders, but for the purpose of making it a mere agent, or instrumentality or department of another company, the courts will look through the forms to the realities of the relation between the companies as if the corporate agency did not exist and will deal with them as the justice of the case may require.

"Applying this rule of law to the relation between the Central Railroad Company and the Wilkes-Barre Coal Company with the former owning over eleven-twelfths of the capital stock of the latter and using it as the coal mining department of its organization, we cannot doubt that it falls within the condemnation of the commodities clause and that this relation must also, for this reason, be dissolved.

False Clear Signal Cause of Damage Suit

A SUIT FOR DAMAGES filed by the Nashville, Chattanooga & St. Louis jointly with the administration for the William Brame estate against the Western Union Telegraph Company, was decided by the United States district court at Nashville, Tenn., in favor of the defendant on April 14. The suit was the outgrowth of a butting collision between a freight and a passenger train caused by a false clear signal accepted by the freight train. The collision occurred near Rockledge, Tenn., on December 23, 1915, and resulted in the death of 12 persons and the injury of 35. A report of this collision appeared in the January 21, 1916, issue of the *Railway Age Gazette*, page 104.

Evidence was produced in court which indicated that the signal might have assumed a false clear indication due to the crossing of signal and telegraph circuits. Both the Western Union and the railroad signal wires were carried on the same poles and these were being transferred to a new location some distance away from the old pole line to make room for another track which the railroad company desired to construct. The important points argued during the trial were whether crosses and grounds might have existed in the signal circuit itself causing the failure, and whether a wire carrying a voltage and current which existed in the telegraph circuits could operate a relay if it were allowed to rest on the weatherproof installation of the signal circuit. In the latter case the expert witnesses for the defense were of the opinion that it would require from 1,500 to 4,000 volts to break down the insulation, although no tests were made to substantiate this testimony. The plaintiff maintained that under the conditions existing at the time of the accident there was sufficient voltage to penetrate the insulation. Evidence was also introduced to show that an eight-cell battery, which after having been in service for some time and which operated two 500-ohm relays at another point did not have sufficient capacity to operate a relay which required 5.6 volts. The test on this battery showed, at the time of the accident, that it delivered 4.5 volts which, it was claimed, was insufficient to operate the relay.

The decision in the case hinged on whether telegraph company wires came in contact with signal wires. The judge's instructions to the jury pointed out that in order to arrive at a verdict in favor of the plaintiff it was necessary to show (1) that the false clearing of the signal was caused by a contact being made between a signal wire and a telegraph company wire; (2) that the contact was brought about by the act of a telegraph company's employee; and (3) that if such a contact was made through the action of the Western Union Telegraph Company or one of its employees it was an act of negligence that caused the contact.

No witnesses testified to having seen any wire of the telegraph company in contact with a signal wire to cause the false clear signal or that such contact was brought about by an employee of the telegraph company. Since these three conditions were not proven to the satisfaction of the jury a verdict in favor of the defendant was given.

THE WORLD'S PRODUCTION OF COAL is estimated by the United States Geological Survey as 1,170,000,000 metric tons in 1919 (metric tons of 2,205 lb.), as compared with 1,332,000,000 metric tons in 1918.

CANADA BUYS HEAVILY HERE.—Canadian trade returns for February show that during that month the Dominion bought from the United States $23,000,000 worth of goods more than she sold to that country. American sales to Canada during the month were greater by $29,000,000 than American sales to Japan; $35,000,000 greater than American sales to Argentina, Brazil, Chile and Uruguay combined, and $47,000,000 greater than sales to China, British India and Egypt put together.

Modern Tendencies in Railway Water Supply*

The Great Importance of This Branch of the Service Demands Well Organized Supervision

By C. R. Knowles
Superintendent, Water Service, Illinois Central, Chicago.

The estimated annual consumption of water by the railroads of the United States is, in round numbers, 900,000,000,000 gals. The cost of furnishing this water, not including interest and depreciation charges, will average over 7 cents per 1,000 gal., making a total annual expenditure of more than $63,000,000 for water. To supply this water it is necessary to maintain approximately 13,000 water stations for locomotive supply in addition to many connections for general service.

An analysis of the consumption of 15,622,000,000 gal. of water on a middle western railroad indicated that 23 per cent, or 3,600,000,000 gal., was purchased from 232 cities and private waterworks plants and 12,022,000,000 gal. pumped by 230 railroad pumping plants. A further analysis of the various uses of this water indicated that locomotives consumed 74 per cent, or 11,560,280,000 gal.; washing and filling boilers at terminals used 12 per cent, or 1,874,640,000 gal.; 5½ per cent, or 859,210,000 gal., was required by stationary power plants, and 8½ per cent, or 1,327,870,000 gal., was used for sanitary and domestic purposes.

Pumping Equipment

There has been a marked development in pumping equipment used in railway water stations within the past few years, not only in providing larger equipment to take care of the increased requirements for water, but in the type of pumping equipment and power units as well, the old steam plant, long considered most satisfactory because of its adaptability to the varying conditions found in railway water service and its ease of operation with unskilled labor, giving way to more modern equipment. The gasoline engine was a popular power unit for railway pumping stations as well as in the general industrial field for a time, but it was really never a serious competitor of steam except at the smaller stations and points where the cost of pumping with coal was excessive.

Electricity has become available in many communities at rates sufficiently attractive to warrant serious consideration, with the result that there has been considerable use of electric motor drive for pumping plants at water stations. Two factors have been responsible for this development. One is the increased number of points where electric power is available; the other is the economies which may be effected by the substitution of electric motors for steam and gasoline engines, especially when the motors can be operated by automatic control, thereby eliminating the expense for constant attendance.

Oil engines of the so-called semi-Diesel type are being used extensively in railway water service and are proving very economical and satisfactory power units. Oil engines operating on the lower grades of oil have been perfected to such an extent that their operation is practically as reliable as steam, although they are not as flexible when used with triplex and other positive displacement pumps. Failure to consider this feature has resulted in a few unsatisfactory installations. Oil engines have gained in favor as the centrifugal pump has been developed, as an oil engine and centrifugal pump make an ideal pumping unit. As an example of the increased use of oil engines, one of the largest manufacturers of this type of power unit in the United States sold 496 oil engines to railroads in the five years ending January 1, 1919. These engines represent a total of 9,827 h.p., 451 of the engines being 25 h.p. and under. Of this equipment the total h.p. sold in 1918 was 4,125, or 42 per cent of the total business of the previous four years, an increase over the average for the four years of about 290 per cent.

The use of oil engines and electricity has encouraged the further development of centrifugal and power pumps for use in connection with these power units and has resulted in a decided improvement in the efficiency of these pumps, which is especially true of the centrifugal pump. The cost for fuel will, of course, vary in different localities, but there is scarcely any place in the country where oil will not compare favorably with coal in operating a pumping plant. The economy of an electrical installation will, of course, depend upon the rate paid for electricity and the economies to be effected by decreased attendance.

Storage

Storage is an important feature of railway water service, but unfortunately it is a detail that has been much neglected in the past. Up to within the past few years the standard roadside tanks rarely exceeded 50,000 to 60,000 gal., although the standard roadside tanks today include those with a capacity of from 100,000 to 200,000 gal.

The necessity for greater storage is more evident at this time than ever before, with shorter hours of service and the increased wages of pumpers. The purpose of a water tank is to provide storage for a volume of water that will be ample for all requirements at a head sufficient to deliver the water in adequate quantity at the points required. The size and capacity of the tank and the height of the tower will be governed entirely by these two requirements.

The amount of storage available is an important factor in the operation of a railway pumping station, as the expense of operation can be doubled easily through the necessity for employment of additional pumpers by reason of the tank being too small to carry over the night hours, notwithstanding the fact that the equipment may be large enough to pump all of the water required during the day shift.

One important development along this line has been the use of treated timber for the construction of tanks. On certain railroads favorably situated the creosoted tank has proved a very profitable investment, as the first cost of construction has been much less than either an untreated tank of more permanent timber or the steel tank. While these tanks of treated timber have not been in service long enough to determine their useful life, there is every reason to believe that their life will be as great as that of the best untreated timber and the maintenance of a treated tank properly framed before treatment much less than either the untreated timber tank or the steel tank.

One decided advantage possessed by the modern conical bottom or hemispherical steel tank over the wooden tank or flat bottom steel tank is the removal of suspended matter carried by the water, through precipitation. There is a great need for a simple type of settling basin or filter for use in connection with the wood tank, as the removal of the suspended

*Abstract from a paper presented before the Western Society of Engineers, Chicago, on April 29.

matter from water supplied from a stream before it enters the locomotives will effect material economies in boiler repairs and washouts.

Water Treatment

There has probably never been a time when more interest has been displayed in the treatment of locomotive water supplies than within the past two or three years, the reason for the increased interest in water treatment being, of course, due to the greatly increased cost of fuel and boiler repairs and the importance of keeping locomotives in service. It is only too true that the treatment of locomotive boiler supplies has been neglected, as may readily be seen by comparing the amount of water treated with that requiring treatment. While there is no complete record of the number of water-treating plants in service on the railroads of the country, a fairly accurate estimate would be in the neighborhood of 600 plants, and from the known capacity of some 200 plants the average amount treated by each plant is 36,000,000 gal. per year, or approximately 21,600,000,000 gal. of treated water is used annually on railroads.

Assuming that 80 per cent of the total consumption, or 720,000,000,000 gal., of water is used by locomotives and power plants and that 50 per cent is of such quality that treatment would be economical, it means that we have less than 6 per cent of the treating plants in service that are needed. It is only necessary to check the reports of the results obtained from treating plants on those roads having them in service to be convinced that there are few investments that can be made on a railroad that will show quicker or greater returns than a properly designed and operated water-softening plant.

The United States Fuel Administration stated in its Engineering Bulletin No. 3 that it has been estimated that the use of hard water in a great number of the locomotive boilers of the country involved the consumption of 15,000,000 tons of coal more than would be needed if soft water only was used. There is no lack of data on the benefits to be derived from the treatment of water, nor apparently is there a lack of appreciation of the importance of water treatment. The fact that a larger percentage of the water conditions are not improved is evidently due to the fact that there is not a centralized responsibility for the quality of the water.

Water Waste

The Illinois Central has been making a campaign against water waste for the past five years, with the result that the saving during this period has amounted to $326,900, an average saving of $65,380, or nearly $200 per day. This saving has been accomplished by investigating every possible source of waste and keeping the importance of the subject constantly before officer and employee. The principal saving was made in the cost of city water, and efforts were directed chiefly toward correcting the waste of water purchased from outside parties, as the cost of water purchased is generally higher than that pumped by company forces, although large reductions were made in the consumption of company water as well as city water.

In order to keep a check upon the water purchased, all bills are entered on a card index for the purpose of comparing cost and consumption. Any increased consumption is noted and called to the attention of the officer having jurisdiction over the water at that particular point. If a satisfactory explanation cannot be given an investigation is made, which invariably results in disclosing and correcting the waste.

While many instances of conditions found and corrected in these water waste surveys might be recounted, it is sufficient to say that there are few water services on the average railroad where a saving cannot be made in water. While large wastes, such as overflooding tenders and tanks, bursted mains, etc., are important, as a general thing they do not require much attention to correct, as the loss is very apparent. It is usually the smaller leaks, such as at slop sinks, wash basins, toilets, urinals and other fixtures connected direct to sewers and drains, that cause the greatest waste and are the most difficult to correct because of the apparent insignificance of the loss and hidden nature of the waste.

It is not surprising that water waste on our railroads when one considers that the daily consumption is nearly two and one-half billion gallons, delivered through innumerable connections and under the control of thousands of employees, the greatest number of whom have no conception of the value of water. The fact that waste does occur is generally accepted, but it is a mistake to assume that the waste cannot be corrected or that correcting an occasional waste here and there solves the problem as it is only by continued effort that maximum results are to be obtained.

Organization

The general idea prevailing as to a water service organization is usually associated with the construction of water facilities rather than with the maintenance and operation. While the development of water supplies and the proper design and construction of water facilities demands careful study, operation and maintenance are of equal importance and continued trained supervision is necessary if economical results are to be obtained.

Providing water for locomotives and other railway purposes is a feature of railway operation that varies more widely than any other department. While several railroads have recently established water departments others still retain the old organization whereby the development, design and construction is handled by someone in the engineering department in connection with other duties and the maintenance and operation of water stations is handled by the supervisor or foreman of bridges and buildings as a part of his duties. The development of an adequate water supply, the economical and efficient design and construction of water stations together with efficient supervision over maintenance and operation are problems that require the undivided attention of a staff trained in water service work. The problems connected with water supply can best be solved with a separate organization charged with the sole responsibility for their successful operation. On most railroads the nucleus of a water department organization exists and the establishing of an individual department would not necessarily mean that there would be any material change in the division or local forces but rather that the local officers and the engineering department would be relieved of the duties incident to the design, development and operation of water facilities and the work placed under the direction of those trained along this particular line. The results obtained by roads that have established a water department have shown conclusively that there is an urgent necessity for an organization to handle this very important feature of railroad operation.

Mr. McAdoo's Influence.—Horatio Alger's heroes may have to look to their laurels, according to a Canadian paper. A call-boy of the Grand Trunk is likely to write his career as "From call boy to president." No clock watcher is this youngster. He has just drawn a pay check for two weeks for $109.35, the result of his overtime efforts as a call boy. At this rate he is drawing a salary on the basis of $218.70 a month, which is more than the chief clerk—his boss—receives. Several other officials admit that he is getting more than they, says our Canadian contemporary, "but they explain that the scale set in the McAdoo award is responsible for the anomaly."

Chamber of Commerce Discusses Railroad Problem

Business Men Show Understanding of Transportation Difficulties and Readiness to Assist in Remedy

"ONE OF THE LEADING FACTORS that enters into present high prices is the paralyzed condition of our railroads. The railroads of the country must be improved and made adequate to handle their share of transportation if we are to obtain any relief from advancing costs of life's necessities." This statement made by Homer L. Ferguson, president of the Chamber of Commerce of the United States in his address before the eighth annual meeting of that body held at Atlantic City, N. J., June 26 to 29, will emphasize the point of view taken by the members present on the important problem of the railroads.

The meeting in its four-day session covered no small amount of ground but it considered the railroad problem of sufficient importance to discuss it in a group session devoted entirely to that subject, as well as in other papers presented before the general and others of the eleven group sessions.

The Group Session on Railroads

Group I—the group session on railroads was held on Tuesday afternoon. It was presided over by George A. Post, president of the Standard Coupler Company, and chairman of the Chamber's committee on Railroads. Richard Waterman, who is also secretary of the Railroad Committee, served as secretary for the session. The session was well attended and an unusually lively discussion followed the presentation of the report of the Railroad Committee and the reading of a paper on Railroad Consolidation by John E. Oldham, of Oldham, Merrill & Co., of Boston, Mass., and one on Control of Freight Cars by Charles E. Lee, transportation manager of Ford, Bacon & Davis Corporation of New York. Abstracts of the committee report and the papers follow:

Report of the Railroad Committee

The report signed by George A. Post as chairman of the Railroad Committee, devoted the greater part of its length to a discussion of the manner in which the various important sections of the Transportation Act will probably work out in practice and to a consideration of the part the Chamber of Commerce played in securing the enactment of the provisions in question.

Attention was drawn to the work of the Chamber to transportation conference as followed out in the bill introduced in the Senate by Senator Joseph S. Frelinghuysen and to the fact that of the seven principles incorporated in Referendum No. 28, submitted in April, 1919, no less than five appeared in the final form of the Transportation Act.

In conclusion the report outlined the following as the work which still lies before the Railroad Committee and the Chamber of Commerce of the United States.

A National System of Transportation

The business men of the country recognize that as a result of the passage of the new act responsibility for providing the people with adequate transportation now rests on the Interstate Commerce Commission; and that an equally great responsibility rests on the business men themselves to aid the commission in every way possible. For the first time the commission is now in a position to develop for the United States a great national system of transportation privately owned and operated under a comprehensive system of regulation.

The national system of transportation proposed in the recommendation of the chamber would include five important groups of transportation agencies—the railroads, the electric inter-urban lines, the electric street railways, the public highways, and the inland and coastal waterways.

How is the commission going to bind these agencies together into a national system of transportation? This problem must be solved by our representatives in the national congress and in the Interstate Commerce Commission with the maximum of assistance we may be willing and able to give them.

From time to time the Congress will enact further legislation designed to accomplish this purpose; the Interstate Commerce Commission and other regulatory bodies will be charged by Congress with responsibility for putting this legislation into effect; but the business men of the country, the citizens whose prosperity and welfare depend in very large measure on their ability to secure adequate transportation, must take an active part in the work.

What can the business men do to help in accomplishing this purpose? Every individual busines man can organize the transportation department of his own business in such a way that in securing his raw materials and in shipping his finished products, he will help to assure the efficiency of our national transportation system by means of prompt loading and unloading of cars, heavier car loading, direct routing of freight, and in many other ways that are directly under his control as a business executive.

Local chambers of commerce and national trade organizations can help their members to realize that the transportation question is a great national question that should not be regarded from a local viewpoint; that the railroads are entitled to receive from shippers and passenger rates that will pay them a living wage for services performed; and that it is the duty of the public to insist that its representatives in city councils, in state legislatures and in the national congress shall establish by legal enactment a national transportation policy that is sound from a business standpoint.

And the Chamber of Commerce of the United States can aid in this work by collecting from every available source recent and reliable information on transportation questions that are of national importance, and placing this information at the service of the members of the Chamber; and can also assist by formulating sound business policies for the development and regulation of the various transportation agencies, submitting these policies to a referendum vote of the business men of the country, and when this vote is completed, reporting the result to the members of congress and urging that the principles approved by the chamber shall be enacted into law.

The Chamber of Commerce of the United States has worked along these lines almost from its inception. At the present time it has five working committees appointed to deal with different aspects of the transportation problem, viz., the Committee on Railroads, the Committee on Public Utilities, the Committee on Ocean Transportation, the Committee on Inland Waterways and the Committee on Highways. Under the proposed plan for reorganizing the administrative departments of the chamber which was adopted a year ago at the St. Louis meeting, the work of these five committees will be coordinated, or possibly combined, in the new Department of Transportation and Communication which will, as President Wheeler stated in his St. Louis address, "embrace associations related to railroad operation, telephone, telegraph,

public utilities and water transportation, over seas and inland."

Meantime, until the plans for the new department are put into effect, the Railroad Committee will continue to make a careful study of the work done by the Interstate Commerce Commission and by the railroads themselves to put the provisions of the Transportation Act into effect; and from time to time will report to the members of the Chamber the results of its study.

Railroad Consolidation

John E. Oldham, of Oldham, Merrill & Co., in his paper on Railroad Consolidation, discussed the difficulties the railroads had had in the past in financing their expansion, equipment, etc. He discussed particularly the necessity they had been brought to of financing through issues of bonds rather than through the sale of stock and showed how through lack of increased rates they had been unable to keep their securities of one kind and another up to a level that would appeal to the investor. He particularly drew attention to the fact that only recently bonds had been placed at rates as high as 7½ or 8 per cent. Discussing then the new Transportation act he said that even now people differed as to whether the provisions of that act would enable the railroads to attract funds and expressed his opinion that their hope lay especially in three kinds of provisions in the act, namely those relating to rate making, security issues, and consolidation.

Control of Freight Cars

Charles E. Lee, transportation engineer of Ford, Bacon & Davis Corporation, New York, presented a paper on this subject, based, he said, on a careful study of statistical information and on careful observation of methods used in the control of available freight cars from 1916 to 1919. From this study he drew the following conclusions:

1. That there is a necessity for a centralized control of supervision of the movement of freight cars.
2. That it may be ultimately desirable to have all freight cars not only used, but owned and maintained in common.
3. That the intelligent, unselfish co-operation of the shipper, with some central authority, is necessary to secure economical and efficient service from freight cars.
4. That it may be advisable for the various business interests to establish a central body to study methods for improving the handling of freight cars, to anticipate the necessities of shippers, and to present to the proper authorities in a comprehensive manner, any information or suggestion that may help to bring about greater efficiency.
5. That the enactment of inelastic laws and the use of co-operative methods to force the construction or require the more efficient handling of freight cars will inevitably fail to provide the necessary capital for the construction of the cars or brains for their control.

During the year 1917, to meet the emergency created by the World War, the shippers of the country worked unselfishly, patriotically and whole-hearted with a central organization established by the railroads, joined in a campaign and originated or adopted plans to secure a maximum of service from the available car supply. The result was an increase in 1917 of 32,021,003,264 tons of revenue freight carried one mile, with only 48,833 more revenue freight carrying cars than were owned the previous year; and it is interesting to learn that this result was accomplished by the shippers loading an average of only 1.9 tons more freight into each car that they were furnished, and the railroads increasing the average mileage made by each car loaded 10.7 miles.

If this effort had not been made and the car efficiency had remained the same as in 1916, it would have been necessary, in order to handle the increased business, to construct 150,349 new cars at an estimated cost of over $420,000,000, and in addition it would have cost $45,000,000 a year for interest, repairs, renewals and depreciation of these cars.

During the year 1918, with a continuation of the assistance of the shippers and the centralized control of freight cars, 37,934,887,077 more tons of revenue freight were moved one mile than in 1916. This traffic was handled with an increase in car ownership over 1916 of only 53,197 cars. This satisfactory result was secured by shippers increasing the average loading per car 3.8 tons and by the railroads increasing the average mileage made by each car loaded 17.2 miles.

Improved Car Efficiency

To have moved the originating tonnage of 1918 with no greater car efficiency than during 1916 would have required an increase of 165,799 in the number of cars owned, which would have cost over 465 million dollars. This would have entitled in interest, maintenance, depreciation and renewal expense of approximately $48,000,000, that would under existing laws have been an unnecessary burden on the business of the country.

Probably no year has ever presented more perplexing problems in railroad operation than 1919 with its unprecedented fluctuations in the demand for car service.

Early in the year, and in fact for the first six months, there was a large slump in business. The surpluses of freight cars in February amounted to over 450,000 cars. This changed to a shortage of 59,510 cars in October.

Statistics showing the revenue ton miles, originating tonnage and other necessary information for comparison with 1916 are not available at this time. However, it can be safely estimated that it would have required over 90,000 more cars than were owned, to move the tonnage that was transported during 1919 on the same basis of car efficiency as in 1916.

The advantages to the shippers, resulting from the common use of freight cars, are great, especially the economy of operation by the saving of light mileage and by the reduction of switching expense, and it is doubtful if shippers will again see, if they ever have seen, the necessity of restricting their loading to cars bearing certain initials when other cars are available. It is unreasonable and unfair to expect the road whose officials' good judgment have secured for it an adequate supply of cars to meet the requirements of their business to share their use with less provident roads. However, it is certainly an economic waste to have idle cars in the country, when there is freight awaiting transportation, or for cars to move empty when there are loads for them, so it would seem that an equitable solution of this problem might be the joint ownership of all cars.

If all cars were of a design that would meet the requirements of the shippers on each individual road, it would make no difference to any road if their own cars were never returned to their lines, provided that they are furnished with an equal number of cars owned by other roads, but with this one exception—under present methods the car away from home does not receive the same attention as to repairs and improvement as it does while on its owners' line.

Centralized Supervision

If all car repair facilities were owned jointly by all roads and maintenance directed by a central authority, this difficulty might be overcome. In the latter part of 1916 there was an acute car shortage. At that time and prior thereto, there was no established central authority for the control of freight cars owned by the railroads.

They were operated on what might be called a strictly ownership basis, which was first and foremost a recognition

of the fact that the car was the private and undisputed property of the road whose initials it bore. Rules were promulgated with this one thought ever in the foreground. From time to time some of these rules were enforced—punitive rules, high per diem rates and even fines for mis-use of cars by foreign roads, or roads using the cars of other roads which they did not own—but like "signs in dry times" all failed to attain their object: i.e., the return of the cars to owners when there was a general shortage of cars. Following the acute shortage in 1916 the American Railroad Association established a Commission on Car Service composed of expert transportation men, with plenary powers to control the freight cars owned by all of the railroads, and to get from them the most efficient service in moving the enormous volume of freight due to the World War. The personnel and functions of the Commission were taken over by the Railroad Administration as soon as it was established, and made a section of the Division of Operation; and it might be said in passing that it was indeed fortunate that the administration had at hand an established body of trained men to whom it could turn over so important a factor in railroad operation as freight control.

Comparison of Car Service Statistics, 1917 to 1919, Inclusive

Class 1 Roads Year ended	December 31, 1916	December 31, 1917	December 31, 1918
Total rev. frt. tonnage	2,177,247,081	2,270,035,053	2,305,868,245
Originating freight tonnage	1,202,000,067	1,264,015,725	1,263,265,890
Avg. daily origtg. tonnage	3,293,151	3,463,056	3,461,002
Rev. freight cars owned	2,253,111	2,301,947	2,323,262
Total rev. frt. ton miles	362,444,397,129	394,465,400,493	400,379,284,206
Loaded freight car miles	15,879,370,777	15,932,049,759	15,028,393,450
Total freight car miles	22,639,356,927	22,695,744,503	22,191,586,263
Number of cars used daily to move originating freight	144,437	140,204	130,112
Tons originating freight handled for each car owned	533.5	549.1	548.0
Number of cars owned to each car required to move originating freight	15.6	16.4	17.8
Ton miles per car per day	440.7	469.5	472.1
Tons per loaded car	22.8	24.7	26.6
Times necessary to load each car	23.4	22.2	20.6
Avg. number of days between loading	15.6	16.4	17.8

Thus we have had centralized supervision of freight cars since 1916. Under this plan of control, and with the co-operation of the shippers, the results as compared with those secured in 1916, prior to this arrangement, are worth more careful consideration as it seems to be a reasonable conclusion that results, once secured, can at least be equalled, if not improved, by a continuation of the same general policy. Statistics are generally uninteresting and averages and comparisons are often unsatisfactory. Nevertheless, it seems necessary to lay before you a few figures in order to illustrate certain points and support certain claims that I have made in this paper. For the year ending June 30, 1915, the total revenue freight tonnage originating on Class I railroads, as compiled by the Interstate Commerce Commission was 923,438,445 tons. The number of freight cars owned and used in moving this tonnage was 2,258,655. For the calendar year 1916, the revenue freight tonnage originating on these same roads increased a little over 20 per cent and the freight cars owned decreased 5,744. We find that in 1916 there originated on Class I railroads 1,202,000,067 tons of revenue freight and the number of tons handled one mile was 362,444,397,129. There were owned 2,263,111 cars used in revenue freight service. Each car carried a total of 533.5 tons originating freight during the year. 15.6 cars were owned for each car loaded, or in other words, it took an average of 15.6 days from the time each car was loaded until it was again under way with a new load. There was an average of 144,437 cars used every day and each car was loaded an average of 23.4 times during the year.

In 1916 each car was loaded with an average of 22.3 tons. With the aid of the shipper this average was materially increased in 1917, and again in 1918. All cars owned moved a total of 22,639,336,927 miles, of which they moved loaded 15,879,370,770 miles, or approximately 79 per cent of the total freight car mileage.

Every freight car owned in the revenue freight service carried 440.7 tons one mile every day in the year, Sundays and holidays included. This represents the all inclusive factor of car efficiency.

In 1917 there were 1,264,015,725 tons of freight originating on those same railroads, and the number of tons carried one mile was 394,465,400,493, an increase over 1916 of 8.8 per cent.

The number of freight cars owned by the same carriers increased 48,836, or 2.1 per cent. Each car carried a total of 549.1 tons, an increase of 2.9 per cent; 140,204 cars were used daily to move this increased tonnage, a daily decrease of 4,233 cars, or 3 per cent.

We find that each car was loaded with 24.7 tons, an increase of 8.3 per cent. Altogether making the number of tons carried one mile by each car daily 469.5 tons, an increase of 6.5 per cent in car efficiency.

In the calendar year 1918, there originated on these same roads 1,263,268,245 tons of revenue freight and the number of tons carried one mile was 400,379,284,206, an increase over 1916 of 10.5 per cent.

There were owned 2,323,362 cars used in revenue service by these same carriers, an increase of 3.1 per cent. Each car carried a total of 548.0 tons, an increase of 2.7 per cent; 130,112 cars were used daily to move this business, a decrease of 14,325 cars daily.

Each car loaded had 26.6 tons to move, an increase of 3.8 tons or 17.6 per cent. We find the all inclusive factor of car efficiency the number of tons carried one mile by each car to have increased 7.1 per cent.

The freight car is a large factor in the expense of railroad operation, and there is no more perplexing problem than its efficient control in order to secure from it a maximum of service. . . .

Co-operation by Shippers

There is no other item in railroad operating expenses that can be so greatly reduced by co-operation between the shippers and the railroads as the handling of this most important unit; and if the shippers and the railroads will work harmoniously together, the number of tons carried every day can be substantially increased.

At no time in our history have the shippers been more vitally interested, not only in the efficient, but in the economical operation of *all* railroads.

Under the Transportation Act now in force the rates that a shipper must pay depends upon the cost of operation of all the railroads in the entire section in which his industry is located. The uneconomical operation of any railroad in that section may adversely affect his freight rates, even if his goods do not pass over that road, and even if all of the roads over which his goods do move, including the one on which his plant is located are efficiently and economically operated.

The shipper has a new burden of responsibility which he cannot entirely escape, except at an increased cost of transportation. He is as never before interested directly in the transportation problem as a whole; and this problem cannot be satisfactorily solved in a narrow and selfish way. The public is too vitally interested in securing adequate transportation facilities to be satisfied with any solution other than that which provides a national transportation system in which all methods of transportation are so co-ordinated as to be used to the fullest practicable extent. . . .

If the shippers would co-ordinate their efforts at this time and would authorize some central body to study the transportation problem as a whole and then would work with the Commission on Car Service in matters pertaining to car ef-

ficiency, it would help the railroads to furnish the maximum of service with the facilities now available. It would also help the Interstate Commerce Commission to decide fairly what additional expenditures should be allowed for the construction of new equipment.

Discussion at the Group Meeting

It was expected that the discussion at the group meeting would be interesting, but the ideas presented and the oratory used to present them exceeded all expectations, making the group session probably the most lively of all those held Tuesday afternoon. The speakers in no mistaken terms told what they thought of the difficulties encountered through labor troubles, low morale and lack of discipline. Several speakers from the Central West and the Pacific Coast, in particular, spoke of the difficulties their sections were having for lack of cars, one speaker from Bellingham, Wash., drawing attention to the fact that in his city no less than $6,000 in wages was being lost daily because it was impossible even with the aid of additional shipping to load lumber on cars. A clean cut sympathy with the railroad managers was evidenced in the discussion and nearly all of those who spoke emphasized the great desirability of the shippers co-operating in every way possible with the rail road officers. Frank W. Noxon, secretary of the Railway Business Association, brought out the point that one cure for the situation lay in the proposal now under consideration by the Interstate Commerce Commission to permit increases in rates. The need of prompt action is paramount, he said, so that investors may understand whether or not there will be sufficient attraction in railroad securities in the near future. As soon as this point is cleared up the sooner the railroads will be able to start buying cars and locomotives and the better opportunity they will have to overcome the delays in deliveries through labor difficulties or shortage of materials.

Transportation in Relation to Production

This was the title given to the general session of the meeting on Wednesday morning, April 28. Three papers were presented, one on Railroads, by George A. Post, chairman of the Chamber's railroad committee; one on Electric Railways, by John H. Pardee, president of the J. G. White Management Corporation, and president of the American Electric Railway Association, and the third on Highways, by George M. Graham, general sales manager of the Pierce-Arrow Motor Car Company, Buffalo, N. Y.

Address of George A. Post

Is this new law (the Transportation Act) perfect in its every feature? Undoubtedly not. Any piece of legislation attempting to cover so many details, affecting many diverse interests, making provision for so many prospective contingencies, so tremendous in its effect upon our national life can only be the best possible composite of the views of many diverging minds. Compromises had to be effected, proposals possibly wise had to be eliminated to avoid a legislative impasse. Beyond doubt it is the best legislative program of railroad regulation ever enacted, more constructive and less repressive.

It was the expressed opinion of the Chamber of Commerce of the United States, that the Interstate Commerce Commission should be relieved of some of its burdens while others were added, and a new body called the "Transportation Board" should be created to perform many important functions which in the new order of things required to be done by a governmental agency. Congress thought otherwise, and placed more duties upon the Commission, and increased the number of augmented responsibilities.

It was the right of Congress to so decide and there is no complaint about it. Everybody has faith, or should have faith, that the Commission, now clothed with all the powers it asked for, and much more beside, will proceed to exercise its great powers with an eye single to the public welfare. In the performance of its herculean task the Commission needs, and is entitled to, the sympathetic, honest-minded, square-dealing and generous co-operation of all our people.

As a federation of business bodies the Chamber of Commerce of the United States has brought before it by the new Act an opportunity to serve the organization members. This is particularly true of the community associations. Experience long ago fixed upon the local community as the population unit for dealing with transportation. Shippers when co-operating have had the local traffic bureau as their agency. That practice will continue. To the former scope, however, a new scope is now added. The primary if not the sole function of the traffic bureau in the past has been to deal with matters arising out of the use of the existing railway plant. From now on, in addition to this function, such bureaus, or at any rate the organizations which maintain such bureaus, will have another function—that of dealing with matters related to the enlargement of the railway plant for adequate service.

Precisely what work the Chamber of Commerce of the United States can now best undertake, it is perhaps too soon to define. Each community, each region, has its peculiar problems, but they all have also much in common, one with another, and it is sufficient at this time to suggest that the Chamber can in a valuable way lend its good offices in aiding the constituent bodies to study the problem and in giving central clearance to their several experiences for the ultimate benefit of the Interstate Commerce Commission.

The keynote of this great assemblage of the representatives of our nation's business is Production. In order to increase production we must make a corresponding increase in railroad facilities. At this very time the railroads are carrying a greater tonnage than ever before, greater even than during the war. The demands upon them are increasing by leaps and bounds, and they are meeting them as best they may with facilities badly impaired, and badly needing vast additions and betterments. They are short today at least 4,000 locomotives and 200,000 freight cars, and 8,000 passenger cars.

The railroad officials are at this time naturally more anxious than ever to meet the demands upon them. Even if they had the money now, which they have not, it would be some time before they could add substantially to their equipment. Some of the strong roads have already contracted for new equipment, but not more than half they need, because of the restricted money market and the high cost for borrowings. Meantime, while the rates are being discussed and fixed by the Interstate Commerce Commission; means of access to the government revolving fund (provided for in the new law) are being arranged, and a modicum of relief is afforded by the delivery later on of such equipment as has already been ordered, it is the duty of the public to be good humored, patient and considerate. Those who receive cars for lading must load them quickly to their capacity, and consignees must unload with greatest possible celerity. We must not expect miracles simply because the roads have been turned back to their owners for operation. We have a right to expect, and do expect, that the railroad officials will do all that is humanly possible to meet the emergency. We also have the right to expect and insist that the railroad employees will co-operate with their officers and keep the wheels rolling, and not paralyze commerce by quarrels among themselves, which, in effect, is a strike against the public, whose Congress has established a tribunal for the fair, impartial adjudication of labor disputes.

Having made mention of the creation of the "Railroad Labor Board," I am impelled at this moment to refer to the attitude of organized labor toward that provision, which is deeply to be deplored. So bitter was their opposition that

after the passage of the Transportation Act, publication was made by labor leaders of their intention to mark for condign punishment at the polls all senators and representatives who voted for the measure. And why? Because provision was made for including the "Public" in the tribunal which should deal with the demand of labor.

The theory was pressed that only the representatives of the officials of the railroads and the representatives of the employees should determine labor disputes; and whatever their conclusions were, the public, which pays the bills, should have nothing to say. When did it become a crime, punishable by official death, for a representative in Congress to vote in defense of the rights of the public? This National Chamber of Commerce represents a large part of the public, and it seems entirely proper that an appeal should be made to this body, and to all those whom you represent, to see to it that no congressman or senator is defeated because he upheld the right of the public to officially participate in deliberations and decisions, involving hundreds of millions of dollars additional wages to railroad employees, which it must pay in the shape of increased rates and fares.

I do not deny the right of organized labor to vote for or against any man for any reason; but I do assert that if and when organized labor demands of its membership that a senator or representative shall be driven from public life because he stood for public representation upon the Railroad Labor Board, every mother's son of the Chamber of Commerce of the United States owes it to himself, to his country and to the target of organized wrath, to see to it, that courageous, fair, public service shall have its reward in militant support at our hands. As for me, my affiliations are with the Democratic party, but I here and now declare that in the congressional district and state where I vote, I shall ardently support for re-election, regardless of the political ticket upon which they run, the man or men who in Congress, refused to bend the knee of subjection when threatened with defeat therefor and manfully maintained their convictions by voting "Aye" upon the "Transportation Act of 1920."

Men of the Chamber of Commerce: "Go thou, and do likewise!" No threats were made against those who voted "No." The defeat of no Congressman is sought because he voted "No." Freedom of thought and action is conceded without a question to those who could not or did not favor the Act. About some of its provisions, there is room for honest differences of opinion, and doubts as to their wisdom or efficacy. The fact remains that every letter and line of the Act was an earnest attempt made under many embarrassments to solve a difficult problem. Certainly the railroad executives did not get much that they wanted—much that they opposed was included therein. The Chamber of Commerce failed to write into the new law all that it desired. The vigorous and vigilant Warfield association had its ambitious plan drastically curtailed. The Interstate Commerce Commission revised some of its original recommendations. Thoughtful students of finance are disappointed in the failure of Congress to pay heed to some of their proposals. But at all times the animating thought of those responsible for the final form of the Act, was the adequate service of the public, with every safeguard they could think of for its welfare included therein.

Shall those in Congress who thus labored, who thus staunchly stood the gaff, bite the dust as their requital? It is up to us.

Highways

The remarks on this subject by George N. Graham, general sales manager of the Pierce-Arrow Motor Car Company, dealt only in part with railways.

Ships, railroads and motor trucks constitute the great transportation trinity which distribute production, each having an equally important place in the general transportation scheme, said Mr. Graham.

The steel rail has ever been the herald of development, but locomotives and cars cannot travel beyond its bounds. Experience has shown that the profitable operation of the railroad is largely a matter of bulk shipment over extended distances.

Motor trucks properly applied can aid the railways in the immense task of serving 105 million persons, spread out over 3,000,000 square miles. We have never simultaneously used all three kinds of transportation to top efficiency.

The old idea that prosperity in the railroad business was to be defined alone in terms of tonnage is passing. We are all learning that volume of business does not in itself assure profits.

Formerly the railroad in its capacity as a public carrier was not in a position to refuse unprofitable freight. No other medium was available to have it.

Temporarily our railroads have reached the limit of their capacity. They can have no greater volume. The *Railway Age* says they are 712,400 freight cars short, and only 300,000 can be built yearly. There is an estimated shortage of 50 per cent on locomotives. Five years is suggested as the minimum time in which railroad facilities can be brought to normal. Meantime is it not sound logic that present railroad equipment should be limited to profitable work, leaving the short haul, L. C. L., to other mediums?

No rational person considers the motor truck a rival of the railroads in long haul traffic. In occasional emergency service it has performed wonders, but the labor factor eliminates it for long distance work. A modern freight train will move 3,000 tons with a crew of six men. To move the same tonnage by motor truck would call for 600 5-ton trucks, at least 600 drivers and possibly 600 helpers.

That there may be wisdom in a re-arrangement of our present methods is suggested by a brief analysis of the short haul steam railways of the United States. This class I have limited to railroads having a maximum trackage of 100 miles, alhtough many lines with more than this mileage render a short haul service.

The figures were obtained from the Short Line Association and are accurate as of April 1. They show that 659 roads have 100 miles, or less, trackage. Their total mileage is 16,860, an average of 25.6 miles per road. Their total number of locomotives is 2,491, an average of 4 locomotives per road. 133 roads have but one locomotive. 186 roads are less than 10 miles in length, their average being 6.4 miles. 410 roads are less than 25 miles, their average being 12.6 miles.

A foremost railroad authority has frankly conceded that no longer will such lines be constructed either as individual lines or branches of trunk lines. The future tendency will be to substitute other agencies.

The great strain in our modern transportation systems is to be found at the terminals. Freight cars move on an average of only 25 miles per day. We also have the spectacle of something like 2,400,000 freight cars with an average capacity of 50 tons carrying seldom as an average more than 32 tons in carload lot shipments and 7 tons in L. C. L. shipments.

If we could, by abolishing terminal delays, make the daily average mileage 37½ miles per car, there would be a 5 per cent increase in efficiency, a possible equivalent of an addition of 1,200,000 cars. . . .

Railroads Discussed at Other Group Sessions

The railroad problem came in for attention at several of the other group sessions as well as that dealing particularly with the railroads reported above.

Transportation and Production

In speaking before the Group Session VII, the Business and Daily Press, Roy V. Wright, managing editor of the

Railway Age, spoke in part as follows on the subject of Transportation and Production:

Railway transportation is today the limiting factor in production in this country. This condition, acute as it is in many of the industries, promises to continue for a considerable time. The underlying causes for this shortage of transportation are the lack of sufficient equipment and facilities and the low morale which now exists among railway workers.

In addition to the vast sums which must be spent for ordinary maintenance and to take up deferred maintenance caused by war conditions at least $6,000,000,000 should be expended from capital account within the next three years to provide equipment and facilities needed to put the roads in normal condition for handling the steadily growing traffic.

Over regulation has killed the credit of the roads. The new Interstate Commerce Commission must see that this condition is remedied and that the roads are allowed to charge such rates that investors will be encouraged to buy their securities and help them to finance the additions which must be made if the roads are properly to serve the public. If this is not done, production will continue to be restricted and the progress and prosperity of the country will be seriously curtailed.

Unfortunately, even if the funds were available immediately, it would take some considerable time for the railroads to secure the necessary equipment and enlarged facilities. Meanwhile the public in its own selfish interest should put forth every effort to co-operate with the roads in order to secure the greatest possible use from the existing equipment and facilities. Excellent results were obtained in this way during the war but unfortunately there has been a falling off in this co-operation since the signing of the armistice. It is just as necessary today, if not more so, than it was then and the business papers can do much to revive the former intense spirit of co-operation.

The low morale among the employees is not very different from that existing to a greater or less extent throughout the business and industry of this country. Increased production and a lower cost of living will not be brought about until this condition is changed. The business papers have a distinct responsibility in educating the men in their respective fields to the necessity of doing their part in raising the morale of the forces generally.

The delay in passing the Transportation Act and returning the roads to their owners kept the railways out of the market until recently and they are now finding great difficulty in getting deliveries on such materials as they need. Other industries, less essential to the prosperity of the country as a whole, would do well to allow the railroads priority on such materials as they need. If they do not they will shortly find themselves hampered because the railroads, lacking these materials, will be unable to handle their business.

Port and Terminal Facilities as a Factor in Production

The American railroad as a medium of transportation has made great progress in the past two decades and the American manufacturer can look forward to having his increased output carried with speed and economy from the point of manufacture to tidewater for shipment abroad, said B. F. Cresson, Jr., consulting engineer, New York, New Jersey, Port and Harbor Development Commission, New York, speaking before Group II—Shipping.

The principal point of congestion, expense and delay in the transportation system between this country and foreign countries is at the point of contact between the railroads and the ships, and this point is the neck of the bottle in the American transportation system.

It is no exaggeration to say that the tidewater terminals at the great American ports have not kept pace with the development of railroad transportation or with the improvement in shipping, and the American manufacturer must face this situation squarely and see to it that steps be taken whereby the delays that now occur in the transfer of his products between rail and water carrier and the expense incident to this transfer are reduced.

With the present shortage of railroad cars it is little short of an economic crime that it is necessary to hold cars within the terminal districts for from three days to a week and more, acting as storehouses for freight awaiting an opportunity and a favorable location to deposit their contents convenient for the ship. It is essential in the modern terminal that provision be made for the quick discharge of freight from railroad cars and the quick release of railroad cars in order to perform their proper function, which is that of transporting goods. Demurrage receipts to the railroads by no means compensate for the loss of the use of rolling stock, and these charges should be considered not as revenue producers to the railroads but as a compelling medium for the release of cars.

I. C. C. Creates Bureau of Service

WASHINGTON, D. C.

HERETOFORE the principal functions of the Interstate Commerce Commission have had to do with the relations between carriers and shippers and questions relating to the charges for transportation. Under the new transportation act it is given authority and responsibility over matters pertaining to the adequacy of transportation service and the relations of carriers to each other for the purpose of insuring that the entire railroad plant may be developed and utilized in a way to respond to the transportation needs of the country. To assist the commission in performing its new functions of this kind it has created a Bureau of Service and put in charge of it as director a practical railroad officer, F. G. Robbins, formerly general superintendent of the Erie at Chicago and later assistant general manager of the Transportation Corps of the A. E. F. in France. No announcement was made by the commission at the time, but Mr. Robbins assumed the duties of his new office on April 15.

As head of this bureau Mr. Robbins will have general charge of car service matters and of a car service section to be organized and will advise and assist the commission in relation to many other matters in which operating conditions are a factor, such as the exercise of its powers with respect to the joint use of terminals, the issuance of certificates of necessity and convenience on applications for authority for new construction or the abandonment of service or facilities, the routing of unrouted freight, projects of consolidation or joint operation of connecting carriers and the development of plans which will reduce interruptions to transportation such as those resulting from car shortage, congestion or inadequacy of terminals. Probably other sections will be created within the bureau.

The new powers of the commission over matters pertaining to operation, which are especially broad under such conditions as in its opinion constitute an emergency requiring immediate action, are included in Section 402, the "car service section" of the new act, which defines car service to include the use, control, supply, movement, distribution, exchange, interchange, and return of locomotives, cars, and other vehicles used in the transportation of property, including special types of equipment, and the supply of trains. It is made the duty of the carrier to furnish safe and adequate car service and to enforce just and reasonable rules with respect to car service, which may be required to be filed with the commission and the commission may itself establish reasonable rules, regulations and practices with respect to car service, including the compensation to be paid for the use of locomotives and cars.

The emergency powers of the commission as stated in Section 402 of the act are in part as follows:

"Whenever the commission is of opinion that shortage of equipment, congestion of traffic, or other emergency requiring immediate action exists in any section of the country, the commission shall have, and it is hereby given, authority, either upon complaint or upon its own initiative without complaint, at once, if it so orders, without answer or other formal pleading by the interested carrier or carriers, and with or without notice, hearing, or the making or filing of a report, according as the commission may determine:

"(a) To suspend the operation of any or all rules, rgeulations, or practices then established with respect to car service for such time as may be determined by the commission;

"(b) To take such just and reasonable directions with respect to car service without regard to the ownership as between carriers of locomotives, cars, and other vehicles, during such emergency as in its opinion will best promote the service in the interest of the public and the commerce of the people, upon such terms of compensation as between the carriers as they may agree upon, or, in the event of their disagreement, as the commission may after subsequent hearing find to be just and reasonable;

"(c) To require such joint or common use of terminals, including main line track or tracks for a reasonable distance outside of such terminals, as in its opinion will best meet the emergency and serve the public interest, and upon such terms as between the carriers as they may agree upon, or, in the event of their disagreement, as the commission may after subsequent hearing find to be just and reasonable;

"(d) To give directions for preference or priority in transportation, embargoes, or movement of traffic under permits, at such time and for such periods as it may determine, and to modify, change, suspend, or annul them. In time of war or threatened war the President may certify to the commission that it is essential to the national defense and security that certain traffic shall have preference or priority in transportation and a commission shall, under the power herein conferred, direct that such preference or priority be afforded.

"(16) Whenever the commission is of opinion that any carrier by railroad subject to this act is for any reason unable to transport the traffic offered it so as properly to serve the public, it may, upon the same procedure as provided in paragraph (15), make such just and reasonable directions with respect to the handling, routing, and movement of the traffic of such carrier and its distribution over other lines of roads, as in the opinion of the commission will best promote the service in the interest of the public and the commerce of the people, and upon such terms as between the carriers as they may agree upon, or, in the event of their disagreement, as the commission may after subsequent hearing find to be just and reasonable.

"(17) The directions of the commission as to car service and to the matters referred to in paragraphs (15) and (16) may be made through and by such agents or agencies as the commission shall designate and appoint for that purpose. It shall be the duty of all carriers by railroad subject to this act, and of their officers, agents, and employees, to obey strictly and conform promptly to such orders or directions of the commission, and in case of failure or refusal on the part of any carrier, receiver, or operating trustee to comply with any such order or direction such carrier, receiver, or trustee shall be liable to a penalty of not less than $100 nor more than $500 for each such offense and $50 for each and every day of the continuance of such offense, which shall accrue to the United States and may be recovered in a civil action brought by the United States.

"(18) After ninety days after this paragraph takes effect no carrier by railroad subject to this act shall undertake the extension of its line of railroad, or the construction of a new line of railroad, or shall require or operate any line of railroad, or extension thereof, or shall engage in transportation under this act over or by means of such additional or extended line of railroad, unless and until there shall first have been obtained from the commission a certificate that the present or future public convenience and necessity require or will require the construction, or operation, or construction and operation, of such additional or extended line of railroad, and no carrier by railroad subject to this act shall abandon all or any portion of a line of railroad, or the operation thereof, unless and until there shall first have been obtained from the commission a certificate that the present or future public convenience and necessity permit of such abandonment.

"(21) The commission may, after hearing, in a proceeding upon complaint or upon its own initiative without complaint, authorize or require by order any carrier by railroad subject to this act, party to such proceeding, to provide itself with safe and adequate facilities for performing as a common carrier its car service as that term is used in this act, and to extend its line or lines."

Continued Freight Congestion Because of Strikes

THE RAILROAD STRIKE situation in the east has settled down to a slow campaign for the re-establishment of normal conditions in the large freight yards on the New Jersey side of New York harbor. Passenger trains have been restored to their normal number and regularity. In the freight service there seems to be little or no trouble among road trainmen, and except in the vicinity of New York the situation appears to be quiet. But the New York terminal yards are not yet able to handle more than half of their normal movement of freight, and considerable groups of strikers are still trying to keep up their agitation. Small groups are returning to work, now and then, and considerable numbers of new men have been hired; but from the shippers' standpoint the situation is still serious, not to say desperate. With the constantly heavy movement of perishable freight and live stock, and the long-continued congested condition of all freight facilities (because of conditions not due to the strike), a yard which is only 50 per cent efficient is moving much less than 50 per cent of the non-perishable commodities; which, of course, means costly inconvenience to shippers and large losses both to shippers and carriers.

The certainty of the collapse of the strike was apparent, even on the New Jersey waterfront, by Friday, the 23d; and the General Managers' Association refused the appeal of Edward A. McHugh, chairman of the committee representing the strikers, for further leniency in restoring men to duty without discrimination, and with their seniority rights undisturbed. The strikers' committee then appealed to the mayors of New Jersey cities, who were in convention at Atlantic City, but the mayors gave them no encouragement. One proposition of the strikers was to return to work for a month pending the decision of their demands by the government Labor Board, but the railroad managers would not listen to it.

On Sunday, the 25th, the Brotherhood of Railroad Trainmen expelled about 2,000 of its members by revoking the charters of locals in Jersey City and adjacent cities; these representing employees of the Erie, the Pennsylvania, the West Shore (New York Central) and the Hudson & Manhattan.

The very good pay which trainmen and yardmen have been receiving of late has its influence in prolonging the strike as may be seen from the remark of one of the strikers

to a New York reporter. Replying to a question, he said: "We'd go back right now if we could retain our priority; but as we have to go back as new men to new jobs, what is the use going back until we have to? We may as well hold out until we are flat broke, because something may happen in the meantime. We are not broke yet. Grocers and butchers aren't refusing to give credit to strikers, and landlords are not collecting from them either."

The roads employing college students and other volunteers as brakemen on passenger trains, dismissed most of these volunteers on Monday the 26th.

On the 20th the attorney general sent to New York from Washington one of his assistants, C. B. Ames, who, at the request of the Merchants' Association of New York City, began an investigation of the general industrial situation in New York, including not only the railroad strike but that of the longshoremen. In this move the Merchants' Association was joined by the Chamber of Commerce and other mercantile bodies. Refusal of certain trucking contractors to move freight to or from piers where non-union men are at work was one of the things complained of, this boycott having interfered seriously with the distribution of food. On Wednesday Mr. Ames announced that prosecutions of men believed (from evidence in hand) to be responsible for the railroad strike would be begun at once. He said that the identity of those responsible had been established by agents of the Department of Justice, and their names would be placed before the Federal Grand Jury in New Jersey. Similar prosecutions, he said, are now being pushed against insurgent leaders in Chicago, New Orleans, Salt Lake City and Los Angeles, the government in each instance holding that the Lever act was violated through interruption in the distribution of foodstuffs and other necessaries of life by the concerted action of the strikers.

The Hudson & Manhattan, operating the tubes between Manhattan and New Jersey, resumed full operation in the day time (but not at night) on Tuesday of this week. This road was obliged to organize new crews for practically the whole of its service, about 450 men.

The Baltimore & Ohio lines on Staten Island—the Staten Island Rapid Transit Company, which does a large commutation passenger service — resumed full passenger train service on the 26th.

From Pittsburgh, Pa., it was reported on the 23d that the charters of 12 locals of the Brotherhood of Railroad Trainmen had been revoked.

Several hundred freight handlers who had been on a strike of their own returned to work on the Jersey City waterfront on the morning of the 22d, their demand for $6 a day for eight hours instead of $4.50 for 10 hours having been partly granted.

The Chicago Situation

Conditions in the Chicago switching district incident to the walkout of members of the Chicago Yardmen's Association almost a month ago have been steadily, although slowly, improving during the past week. Many of the strikers have found employment in other industries, some of them obtaining wages as high as a dollar an hour as common laborers on government construction work in one of the western suburbs. Consequently they have refused to return to railroad service for the wages which they were receiving at the time of the walkout. Many more have found that the strike has so tied up industry in Chicago that by their own action they have eliminated many of the opportunities for obtaining employment elsewhere. The arrest of the heads of the Chicago Yardmen's Association and United Enginemen's Association has left the strikers without leaders, and the gradual subsidence of the strike seems assured. As each day passes, striking switchmen are returning to their work in small numbers, although at the present time the expiration of many of the ultimatums issued by the railroads has necessitated the return of these men as new employees. On several of the roads in the Chicago district enough men have been hired or brought in from other points to permit the announcement that no more employees are desired; and if this development continues, as it is likely it will, the strikers will find that railroad service has been closed to them.

The chronological story of the strike, continuing the report in the *Railway Age* of April 23 (page 1265), is as follows:

Thursday, April 22.—The only development was the calling of another meeting by John Granau. Representatives of the government, the Illinois Manufacturers' Association, the General Managers' Association and the brotherhoods were invited to attend the meeting, but all declined. Traffic conditions continued to improve. Approximately 80 per cent of the normal number of switch crews operated 605 engines in the Chicago district or 160 less than are operated under normal conditions. Local officers of the Brotherhood of Railroad Trainmen, in statements issued to the press, claim that they are being deluged with requests from returning strikers for reinstatement in the brotherhood and from local organizations requesting a suspension of judgment on the revocation of their charters.

Friday, April 23.—The meeting called by John Granau terminated without definite action. Granau, closely watched by federal operatives, addressed the mass meeting and, after obtaining the unanimous opinion of the men present that he had not ordered them on strike nor could he order them back to work, left the matter entirely in the hands of the audience. When it was found that no representatives of the general managers or of the federal authorities were present the meeting adjourned quietly with no action taken. The statement issued in behalf of the railroads said that approximately 83 per cent of the normal number of crews operating in the Chicago district were working. The total number of strikers returned to work was increased to 686. Live stock cars moved into the stock yards Friday totaled 941, an increase of 460 over the same day last year. Movement of live stock eastbound was normal, 265 cars; and of meat 206 cars.

Saturday, April 24.—John Grunau, president of the Chicago Yardmen's Association, with 49 other leaders of that organization and the United Enginemen's Association were arraigned before United States Commissioner Mason and by agreement their cases were postponed until May 3. All of the men were allowed their freedom after they had been warned by federal officers not to participate in any meetings of the strikers or to act in an advisory capacity to the men. The Saturday statement issued on behalf of the railroads gave the number of strikers who had returned to work as 1,036. In addition there were on duty 773 recently employed switchmen or men brought into the Chicago district from other points, bringing the total number of switchmen on duty to 1,809. The number of switching crews in service totaled 651, as compared with 630 the previous day. The slight increase in the number of crews on duty as compared with the large increase in the number of men available for duty was due to the fact that the returned strikers and new men were relieving employees who had been doing emergency duty. Receipts of live stock, 401 cars. Fresh meat and live stock each continued normal, 206 cars of meat and 400 cars of stock being moved. The movement of coal inbound totaled 1,073 cars, although industries in many parts of Chicago were threatened with closing because of a fuel shortage in the Chicago district.

Sunday, April 25.—There was practically no change in the situation at Chicago on Sunday. The return of 16 additional switchmen brought the total number of returned strikers to 1,052. The number of men employed or brought in from other points during the day totaled 67, making 840 switchmen of this class on duty in the Chicago district, and a total of 1,892 switchmen at work.

Monday, April 26.—The gradual improvement continued; total number of returned and new switchmen, 1,983; including 45 returned strikers and 129 new men employed or brought into Chicago from other points. The movement of coal during the past 48 hours had increased materially, 2,422 carloads being brought into the Chicago district to relieve what threatened to become a serious situation in so far as the city's supply of fuel was concerned.

Tuesday, April 27. The only development in the strike situation on Tuesday other than the gradual return of men and the improvement of conditions in freight traffic generally, was the widening of the breach between the railroad managers and striking yardmen. The railroads have openly announced their policy of hiring new men and of maintaining the provisions of the ultimatums which have been issued. In this policy of taking on new men the railroad managers have been aided by officers of the Brotherhood of Railroad Trainmen, and the Switchmen's Union of North America. The statement issued on behalf of the railroads outlined the traffic and labor situation in the Chicago district as follows:

"Indicative of the industrial traffic conditions at Chicago is the situation prevailing today on the Indiana Harbor Belt and the Chicago Junction. On the former, practically every industry was working yesterday and continues so today. The road handled approximately 59 per cent of the business handled on the same day last year, and indications are that this condition will continue to improve. The Chicago Junction received 837 cars from connections yesterday for industries on its rails as compared with the normal receipts of 1,200 cars on the same day last year. The outbound movement on the Junction was approximately 60 per cent of normal. In addition, 757 cars of live stock were moved into the stock yards over the Chicago Junction. In general this road is now handling 50 per cent of its normal traffic.

"The number of switchmen on duty was increased to 2,214, an increase of 231 over yesterday. The total number of returned strikers is now 1,146, of new men employed 359, of men brought in from other points 709."

Wage Hearings Before Railroad Labor Board

Demands of Labor Organizations Originally Presented to Railroad Administration Repeated

The Railroad Labor Board this week continued its public hearings at Washington on the wage demands originally filed with the Railroad Administration by the various organizations of railroad employees. S. E. Heberling appeared on April 22 for the Switchmen's Union and L. E. Sheppard for the conductors. Warren S. Stone appeared on April 23 for the engineers, Timothy Shea on April 24, 26 and 27 for the firemen and hostlers and W. S. Carter on April 28.

In each case the schedule presented was that which had been submitted to the Board of Railroad Wages and Working Conditions, except that the engineers had not made a formal demand upon the Railroad Administration, and the statements made were largely a brief repetition of the testimony that had been presented before that board, with a request that further increases in the cost of living since the proposed scales were made up be taken into consideration.

S. E. Heberling Speaks for Switchmen's Union

S. E. Heberling, president of the Switchmen's Union, and L. E. Sheppard, president of the Order of Railroad Conductors, presented their requests for increased wages to the board on April 22. Mr. Heberling resubmitted the scale of proposed rates which had been presented to the Railroad Administration, and said that the rules he had asked for were the same as those proposed by the Brotherhood of Railroad Trainmen. His proposed scale applying east of the Rocky mountains provided for a rate of $8 a day for night foremen, $7.50 for night helpers, $7.50 for day foremen and $7 for day helpers. He also asked differentials above these rates for the Rocky Mountain district and that switchtenders be given the pay of helpers. Mr. Heberling said that switchmen, being exposed to all kinds of weather conditions, are put to great expense on account of clothing, which has increased in price from 100 to 200 per cent, and that when a helper's wage was $3.50 a day he could buy for that a pair of shoes which would last two months, whereas today the same pair of shoes costs him $10, or two days' pay. He said the cost of living has increased 120 per cent since 1913 and the purchasing power of a dollar is now only 43 cents, and therefore the switchman's standard of living has been reduced, and he asked that wages be increased so as to restore the pre-war standard.

He quoted figures from a table compiled by the Railroad Administration showing that, whereas other classes of trainmen had had their earnings increased 48.7 per cent from December, 1917, to July, 1919, the earnings of yard foremen had increased only 20.5 per cent and those of yard helpers 28 per cent and of all classes of railroad employees had increased 42.7 per cent. He said that 26 days and eight hours a day should be sufficient to provide the American standard of living, so that overtime earnings ought not to be taken into consideration in determining a proper wage. Regarding the hazards of the occupation, he said that in the first six months of 1917 one switchman in 3.32 had been either killed or injured, but that there had been a reduction in accidents since the government put the yardmen on an eight-hour day. The records of the Switchmen's Union, he said, show that the average working life of a switchman is about seven years and a large number of death claims are paid on account of pneumonia caused by exposure. He read a letter from one of the locals of his organization showing that 75 per cent of the members had left the railroad service to take other positions at higher wages, and said that in Detroit common labor receives more pay than the switchmen. He said the increases asked average 46½ per cent, or from $2 to $2.50 a day, and he asked that the board give them consideration at the earliest possible date.

L. E. Sheppard Testifies for Conductors

Mr. Sheppard said that the conductors had refrained from striking during the war, although they had witnessed men in other classes of employment receiving substantial increases in wages and although railroad employees that had formerly received less than the conductors were given greater increases and in some cases higher wages than the conductors. Under the report of the Railroad Wage Commission, he said, freight firemen received greater increases and greater wages than the freight conductors, and he pointed out that enginemen receive higher rates in proportion to the increased weight of the engine, whereas conductors do not receive anything for increased weight or length of the train. Horace Baker, a

member of the board, asked if the higher rates for firemen are not offset by the fact that the conductor makes more mileage. Mr. Sheppard said that simply represents the fact that the enginemen had been more successful than the conductors in getting 100 miles fixed as the basis of a day's work instead of 150. He also said that whereas shop employees receive time and one-half for overtime after eight hours and pay for their time away from home, as well as an expense account, conductors receive overtime only for the time above that required at 12½ miles per hour, receive no pay for time away from home until after 16 hours, and no allowance for expenses, and in many cases are paid only half time for deadheading.

A. O. Wharton, a member of the board, said the difference is because the conditions referred to as to shop employees represent emergency performance, whereas in the case of conductors they represent regular service.

Mr. Sheppard cited the example of a conductor on the Virginian Railway who makes a round trip covering 190 miles in 12 hours of elapsed time and is paid $7.60 at 4 cents a mile and $1.70 overtime, a total of $9.47, whereas a car man sent out on the same train to work at an intermediate point receives $10.08.

The expenses of conductors away from home, Mr. Sheppard said, amount to $35 to $45 a month, although these do not apply to all men. He thought these expenses should be taken into consideration in fixing the rates or else covered by a separate expense account. He recommended a percentage increase in the rates for men who have to incur expenses away from home. Referring to questions by members of the board as to what percentage of train employees have families, Mr. Sheppard said that wages should not be fixed with reference to bachelors but with reference to the expenses of a man with an ordinary family.

Referring to examples frequently cited of conductors who receive large earnings, Mr. Sheppard said that such cases usually represent runs on which two men ought to be employed. He cited a run on the Norfolk & Western where a man leaves at 5:30 a. m. and returns at 8:50 p. m., on which he would make $11.12 mileage and $3.15 overtime, or a total of $14.27, but under another rule the company is allowed to pay for this run on the basis of two minimum days, or $12. The conductor, therefore, earns $360 a month by making the round trip, but two men can be used on this run at $180 a month each. He said the director general had changed many such conditions so that certain men would not receive abnormal pay. Mr. Sheppard expressed an opinion, although he said he would be criticized by some members of his organization for it, that local passenger conductors should receive higher rates per mile than those on faster trains, because, he said, it is easier to make large earnings on long, high-speed runs. He had once framed a schedule providing lower rates for higher speed trains, but had not received much support.

Mr. Sheppard figured the increase in the cost of living since 1913 at 97 per cent, whereas, he said, the wages of conductors have increased only 29 to 33 per cent in that time. If the reduction of the basic day from ten to eight hours be considered as an increase, he said, the conductors' wages have increased about 50 per cent, which means that they are entitled to a further increase of 47 per cent to restore their pre-war condition, and he estimated that the increases he asked for would amount to 35 or 40 per cent. He asked for a minimum of $225 a month for passenger conductors, $191.10 for assistant conductors and ticket collectors, $7.85 a day for through freight conductors in valley service, $8.38 in mountain service, $8.38 for local freight conductors in valley service and $9.13 in mountain service, and he asked that the board take into consideration proper differentials between various classes of employees in proportion to their service and responsibility, saying that he felt that the railroad officers on the board were entirely competent to establish such differentials. He said that many men are now refusing promotion from brakemen to conductors because they are unwilling to assume the increased responsibility for the small increase in pay, and it had been necessary for himself and W. G. Lee to use the power of their offices to force men to accept promotions, which had caused some criticism of himself and Mr. Lee within the organizations. One reason, he said, was that conductors have to put in a great deal of time for which they are not paid in making out reports.

Mr. Sheppard said that new wage contracts are being made all over the country in other industries at 90 cents to $1.25 per hour, and he compared the responsibility of a conductor with the foreman of a shipyard or the captain of a ship. The conductor, he said, must combine the qualifications of a Chesterfield or a diplomat and a pugilist and is as exposed to assault as a policeman and on his feet as much as a letter carrier.

In conclusion Mr. Sheppard asked that the board do not spend too much time in trying to figure the probable cost of the wage increase on the ground that it would be impossible to ascertain it accurately in advance and that the railroads will be called upon by the Interstate Commerce Commission to report the exact cost after the wages have been put into effect.

Railroad Did Not Delay Proceedings

E. T. Whiter asked permission to make a statement in reply to statements made on behalf of the labor leaders indicating that the railroads were seeking to delay the proceedings. He said that the railroads are in no way responsible for any delay that may have elapsed because their officers were government officers and the railroads had nothing to do with the preparation of the data necessary for the determination of wages, except as they were given orders from Washington. Many railroads, he said, do not yet know what is contained in the requests made by the labor organizations, because they were submitted to Washington and only a few of the railroad officers had been called into consultation on them.

W. N. Doak said that he had not intended to blame the railroads for the delay since the demands were presented, but that nearly a year has elapsed since they were presented to the Railroad Administration and the employees were anxious to avoid any further delays.

Chairman Barton of the board said the railroads might furnish copies of their proposed forms for the collection of statistical data and that copies should be furnished the other side for criticism or suggestion.

Warren S. Stone

Warren S. Stone, grand chief of the Brotherhood of Locomotive Engineers, on April 23 submitted to the board a proposed scale for engineers ranging from $8 to $9 a day in passenger service, with a minimum daily guaranty of $8.75; from $8.34 to $10.26 in freight service, with an addition of 64 cents for local or way freight service; and from $8 to $9.32 for yard service. The rates vary according to the engine, the highest rates being for Mallets. He said that according to the Railroad Administration statistics the average passenger engineer in July, 1919, had averaged $256.41, as compared with $186.02 in 1917, an increase of 37.8 per cent, but that these figures were too high. For freight service the average was $223.86, as compared with $175.55, an increase of 27.5 per cent, which he said was approximately correct. For yard service the figures showed an average of $175.14, as compared with $148.62, an increase of 17.4 per cent, which he said was too high.

Mr. Stone said he had participated in the making of engineers' schedules from the first and that the engineers had always received the highest rates paid to any railroad em-

ployees, but that under federal control the firemen had in some cases received more than the engineer on the same engine. The differential had been partially restored under a later order, and he asked that the former differential in dollars and cents be preserved.

The board will be told, Mr. Stone said, that many roads are bankrupt and cannot pay increased wages, but he asserted that they are mostly controlled by roads that do pay, and he cited various court decisions to the effect that employees have the first claim on railroad earnings whether or not the road is a paying investment. He also said the board would be told of instances where engineers receive large earnings, but that these cases are exceptional and indicate that men are crowding two or three years of life into one, whereas the cost to the railroad is no greater when an engineer makes big mileage than if the work were divided between two or three men.

"I have never dwelt very largely on the cost of living in making wage schedules," Mr. Stone said. "The cost of living, beyond the question of a bare existence, is what the individual man chooses to make it for himself, and the mere cost of living should not fix a man's wage. The wage ought to be fixed so it would be an incentive to a higher standard of citizenship and a higher standard of home life.

"I do not believe the mere question of wages is going to solve this present economic condition. We all know what a hopeless muddle the government has made trying to stop profiteering and reduce the cost of living. I believe if the President had retained his health we would have a different condition today. Some remedy has to be found different from the question of wages alone if we are going to exist as a nation. First of all I am an American citizen and after that a so-called labor leader. This thing cannot go on, and with this constant climbing spiral cost of living and wages trying to catch up and never quite doing it there is a smash on ahead somewhere."

Mr. Stone added that if wages are increased it will be merely an excuse for the "profiteers" to pass the amount on to the consumer fivefold, but when pressed by members of the board for the remedy Mr. Stone said he had no solution except "stop profiteering."

"I haven't any solution, I say to you frankly," he replied. "I do not believe an increase in wages alone is going to solve this problem. We have got to find a way to curb this profiteering."

Speaking of the hazard of the occupation, Mr. Stone said that "from the time a man comes to us until we pay his insurance, either through death or disability, the average term of insured life is 11 years and 7 days," and "out of 100 men who start as firemen but 17 ever become engineers, and out of every 100 who become engineers only 6 get to a passenger engine." "It is the survival of the fittest," he said, "and takes the cream out of a man's life, from the age of 30 to 45."

He said the engineer on the Congressional Limited from Washington to Jersey City, about 229 miles, has to observe 678 signals, or 2 a minute, and that the engineer on the Twentieth Century between Cleveland and Buffalo runs 181 miles in 184 minutes. "No wage you could pay a man would recompense him for that kind of driving," Mr. Stone said.

Referring to items of expense, Mr. Stone told the board that a suit of overalls that used to cost $2.50 to $3.50 now costs $9.

"A man who works for a railroad never gets too much pay," he continued, "and the engineers haven't received enough. Skilled mechanics are now getting almost double what the engineer gets, and common labor as much. I haven't tried to figure the cost of the increased wages, but I have wondered what the cost would be if we do not find some solution for the present industrial unrest. We are facing the most critical time in the history of our country. I think it would be much better for this board to take the necessary time to hand down a just and equitable decision than to undertake to pass snap judgment, but it should give some relief as speedily as possible."

Mr. Stone said he could prepare a schedule for engineers on one sheet of paper. "There are four fundamental principles," he said; "the rest is all trimmings. The schedules contain a lot of fake rules that take a lot of time of the operating officials and of committees and are a very expensive luxury at the best for both sides. If we had shown the acumen of the shop crafts and had a standard national schedule for all roads I think we would have improved our condition a lot."

Timothy Shea

Timothy Shea, assistant president of the Brotherhood of Locomotive Firemen & Enginemen, told the board on April 24 that the lesson to be learned from the steel, coal and railroad strikes was that "men will not work when they cannot live decently on the wages they are paid." When he had urged the striking railroad men in the Eastern terminals to return to their jobs, Mr. Shea said, their almost universal justification for going on strike was, "We and our families were starving at work; we could not keep our children in school, and we decided we might just as well starve not working."

Mr. Shea presented the demands of the firemen and hostlers for a basic wage of $6.50 per day, with differentials for responsibilty, skill, experience and the increase in the cost of living since the demands were first presented last June. No other basis of compensation than this would be acceptable, he said, and he warned the board against the dangers incident to further delays in settling the wage demands of railway workers.

Mr. Shea discussed the increase in the cost of living and the failure of the government to bring about price reductions, and introduced a large number of statistical exhibits in support of his views, but the burden of his argument was on the importance of the establishment of the principle of the living wage.

"This principle has already been officially and authoritatively recognized," said Mr. Shea. "As a war-time measure it received the support of the federal government in President Wilson's proclamation creating the National War Labor Board. At Paris, in negotiating the treaty of peace after the war, this same principle received the sanction of the enlightened opinion of the civilized world, and the guarantee of a living wage for industrial workers was embodied in the so-called labor provisions of the final draft of the treaty of peace. It was recognized and accepted as fundamental by the majority report of the President's Coal Commission, which says that 'in arriving at the present wage award we were guided by the principle that every industry must support its workers in accordance with the American standard of living.' A further sanction of the principle was given in a clear-cut and unequivocal form by the Industrial Conference recently called by President Wilson for the purpose of formulating a constructive program for regulating industrial relations and bringing about a greater measure of industrial peace."

Averaging the estimates of various authorities on the budget requirements for a living wage, Mr. Shea said this necessitated an annual income of approximately $2,250. As to the importance of immediate action Mr. Shea said:

"When our country was at war we were asked to be patriotic and bear as best we might with an inadequate wage in the face of constantly increasing costs of living. Last August, when we had waited almost a year after the armistice for relief that seemed as remote as peace itself, we urged our necessities and we were asked to be patient and promised that the government would see that living costs came down.

"We have been patriotic. We have been patient. We

were patriotic while the thousands and tens of thousands of war millionaires were being created. We have been patient while the profiteers have paused in their orgy of spending ill-gotten gains only long enough to skyrocket prices still higher and make a mockery of our government's promise that living costs would be reduced.

"Gentlemen, the time has come when our people say they will no longer be patriotic only to be plundered, nor patient only to be pauperized. They have learned by bitter experience that their landlords are not 'patriotic' and that their grocers are not 'patient.' They are fed up on promises, and they are dead, dog-tired of delays.

"The railroad men of the United States are Americans—don't forget that. They are proud of their country and proud of its institutions. They believe in them. But to them justice is just as precious as liberty, and that is all that they are asking at the hands of this board—justice and a square deal without further delay."

Mr. Shea said he had failed to discover any I. W. W.'s or bolsheviks among the strikers, but that many of them were ex-soldiers.

From an exhibit showing the earnings and expenses of firemen on 21 roads for three months in 1919 he said the men "were going behind every month from $5 to $100." The weighted average wage of firemen now, he said, is $4.41 a day for passenger service, $4.72 for freight service and $4.23 for yard service, or an average of $4.48 for all firemen, and this represents an increase since 1915 of $1.44 a day, or 47.4 per cent, whereas he figured the increase in the cost of living as 97 per cent. Therefore, he said, the present rates should be increased one-third to restore the pre-war status, and he also contended that there should be a further increase to make up for the accumulated deficiency of the past four years. During the war, he said, the men made up for the fact that their wages were not keeping pace with the cost of living by working overtime, but when the traffic fell off after the armistice that opportunity was denied them. "The time has arrived," he said, "when a man should be able to maintain an American standard of living by working eight hours a day and the basic wage should be sufficient without overtime."

After discussing various living budgets that had been compiled by various authorities, Mr. Shea said that the least a fireman ought to have would be $2,500 a year and that his scale, with the addition of about 15 per cent for the increase in the cost of living since it was made up, would produce about that amount. He also asked the elimination of differentials between the rates for oil-burning and electric locomotives and coal-burning locomotives, or on account of labor-saving devices, such as stokers, on the ground that although they may reduce the physical labor they require a knowledge of complicated mechanical appliances and increase the responsibility. He said the time is past when the work of a fireman should be considered in terms of physical labor, because the mechanical appliances and the longer time required for promotion from fireman to engineer have changed the position of fireman from that of an apprentice to a distinct trade. Also, he argued, a fireman has only his time to sell, and it is worth just as much to him even if he does less physical work in a day.

Labor Saving Devices

Mr. Shea's testimony covered three days. On the third day he took up his demand for the installation of labor-saving devices, such as automatic stokers, mechanical coal-producers, fire-door openers and grate shakers, on locomotives over 200,000 lb. on drivers, with an alternative that two firemen be employed on such engines. He said he had asked the director general to have all coal-burning locomotives over 175,000 lb. equipped with stokers, but that it had been decided it was necessary to get the consent of the corporations, and little had been accomplished. Mr. Shea said that it is "almost beyond physical endurance for one man to fire a large modern locomotive," and he argued that an extra fireman would prevent delays and save overtime for the entire crew enough to more than pay the wages of the extra man. He also asked that firemen be relieved of such work as cleaning locomotives, cleaning fires, breaking up or loading coal and other such incidental work on railroads where they have not already been relieved. A question was raised as to the power of the board to order the installation of new devices.

W. S. Carter

W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, who was director of the Division of Labor of the Railroad Administration, said in part:

"I desire to register my most solemn protest against what appears to be a conspiracy to coerce and intimidate this board into denying railroad workers the wage increases to which they are entitled by every consideration of justice and fair dealing. From the beginning the press has been full of the idea that to raise the pay of railroad men will necessitate an immediate further advance in the cost of living and be simply another step in the so-called vicious circle of raising prices. There has been so much of this that it amounts to a conspiracy, if it is not actually that, and I protest that it shall no ebe permitted to render abortive our efforts to secure for the men, women and children we represent the relief that has been denied them for 10 long months.

"The general acceptance of this vicious circle lie is abundant evidence that the American people do like to be humbugged. To accept it is to believe that American labor is in a conspiracy to boost prices. If it is true, we are either criminals or criminally ignorant, and to say that we are the one or the other is an insult to the aspirations and intelligence of working men and women. We are not asking more money just to ease the itching palms of profiteers. We are not merely after more dollars in the pay envelope, but, rather, we are seeking more and better food, clothing and housing, and a shave of the reasonable comforts of iife, in exchange for what is in the pay envelope.

"Mr. Chairman, our jails could and should be filled with Shylocks of trade whose crimes have been committed in the name of increased labor costs.

"I urge this board, when it has determined the amount of increase dwages railroad labor shall receive, to ascertain and inform the public exactly how much that increase should affect th eprices of all the principal commodities when railroad rates presumably have been raised to meet the increased labor cost. We want the American people to know the truth about this. We want to protect the public against a 10-dollar raise in the price of a suit of clothes on the grounds that railroad workers have been given higher wages, when as a matter of fact the increased cost of that suit of clothes incident to increased pay to railroad workers is only two or three cents."

Mr. Carter's argument was devoted largely to the relation of railroad labor costs to freight and passenger rates and commodity prices.

"Increased wage payments to railroad employees have been almost imperceptible in their effect on prices and may practically be dismissed from consideration as a factor in the high cost of living," he asserted. "If the rates of pay to all employees were increased 100 per cent the addition to the average commodity value of each ton of freight transported would be less than one per cent. Doubling the wages o fall employees, in other words, adding 100 per cent to railroad labor casts, would add only 88 cents to each $100 of freight transported.

"Although the average commodity value of each ton of freight originated from 1914 to 1919 increased $63 or 114 per cent, the freight charges per ton originated increased only 80 cents. In other words, the commodities which in 1914

sold at an average price of $56 per ton could have been sold for $56.80 per ton in 1919 without any curtailment of profit from additional freight charges.

"To illustrate further, in 1914 a suit of clothes from one of the Chicago factories selling at retail for $30, was carried from Chicago to Los Angeles for 16½ cents. The price of a similar suit in 1919 was about $50, an increase of $20, although the freight rate on the 2,200-mile haul had gone up only 5.6 cents. If the rates of pay of all employees were increased 50 per cent the additional freight charges on a similar haul would not exceed 4 cents or eight-hundredths of one per cent of the price of a similar suit of clothes to the consumer.

"In 1914 shoes manufactured in New England were shipped from Boston to Key West at a cost of 4.8 cents per pair. In 1919 the freight rate was only nine-tenths of one cent higher or 5.7 cents per pair, although the price of these shoes had advanced to $10, an increase of $5 per pair, or 100 per cent. Of this increase in prices, additional freight charges on the finished product represented only two-tenths of one per cent. an amount of negligible importance if it had all been paid to labor. The rates of pay of all railroad employees could be doubled, in short, without perceptibly affecting the price of such staple commodities as shoes.

"On long distance hauls of from 750 to 3,000 miles an increase in railroad labor costs of 50 per cent could involve in increased freight charges an addition to prices of only 15 cents per barrel for flour, only 12 cents per pound for beef cattle, less than two-tenths of one cent per pound for beef, only 12 cents each for typewriters, only 50 cents for a phonograph, only 60 cents per bale for cotton, only 10 cents per 100 pounds for copper, only 40 cents per ton for bituminous coal, only 60 cents per ton for anthracite coal, and only $5 for so bulky and valuable an article as a grand piano. As the typical ton of freight moves a distance of less than 300 miles the addition of 50 per cent to railroad labor costs would increase the freight charges for the average haul only about one-third of the amounts noted above.

"In his report of March 1, 1920, the director general of railroads shows that there would have been no loss whatever in the operation of the railroads up to October 31, 1919, if the principal rate increase had been made effective January 1, 1918, when the principal advances were made in operating costs, instead of six months later. But for the coal strike which caused a loss of $114,000,000, the steel strike, the slump in freight traffic occasioned by the industrial depression during the first six months of 1919, and other abnormal conditions, the additional operating deficit of $234,000,000 incurred under government control of the railroads would practically all have been avoided.

"The average increase of 32 per cent in freight and passenger rates during the war shows the direct cost to the public, therefore, under normal conditions, not only of the wage advances and shorter work days conceded railroad labor since 1914, but also of the great advance in the price of all commodities purchased by the railroads such as repair material, coal, oil, etc. The increase in wholesale prices of about 112 per cent has been more than twice as great as the percentage of increases in labor costs per traffic unit and more than three times as great as the increase in freight and passenger rates."

Board's Relation to Outlaw Strikers

That President Wilson intends to leave the entire wage controversy in the hands of the Railroad Labor Board was announced at the White House on April 22 after officers of the brotherhoods had called on Secretary Tumulty and informed him that rumors were being circulated among the striking yardmen in Jersey City that the President would intercede on behalf of the strikers with the board. "The President rests the entire question of a possible adjustment of the demands of all railway workers with the Railroad Labor Board," Secretary Tumulty announced. Some representatives of the strikers also called at the White House and were given a similar answer, after which they spoke of asking Congress to take a part in the proceedings.

The President is said to have ordered an investigation of the situation in the New York district by the Department of Justice.

Numerous representatives of the "insurgents" from various districts have been hanging around the offices of the labor board and attending its hearings since they were denied a separate hearing on the ground that they had not complied with the provisions of the law, and they have been doing a good deal of talking to newspaper men and conferring about organizing a new union or unions, but there are several among them ambitious of being officers of the new organization and there has been some question as to which of the several new organizations formed since the strike would be taken as the nucleus for the new ones. Meanwhile, they have referred to themselves as being in an alliance, except for those who went back to work. A delegation from Philadelphia said their followers had returned to work and asked for a hearing before the board on the ground that they had asked the railroads for a conference and had received no reply. They seemed dissatisfied with the brotherhood leaders and said they wished to ask for larger increases than had been asked by the brotherhoods or by the Switchmen's Union, which is now frequently referred to as "one of the five transportation brotherhoods" even by officers of the "big four."

Some of the leaders of the men who had left the service in New York and New Jersey left Washington on April 21 with the intention of advising their followers to return to work and leaving their case to be presented to the board by the brotherhood officers, but when they reached New York and were informed that the managers had refused to take them back with full seniority rights many of them returned to Washington, announcing their intention of "fighting to a finish."

Some of these men said that they were perfectly willing to return to work and await the action of the board as soon as they saw it begin to function at the public hearing that began on April 19, but that they had been unwilling to do so at the time set by the railroad ultimatum before they actually saw the board begin to take up the wage case. Many of them insisted that they were not disloyal to the unions and that they were not strikers but had "gone on a vacation" by way of protest because of the delay in getting action on their wage demands. Some of them felt that they had forced the expedited action to get the board started, and were very much surprised at being denied a hearing.

The board on April 24 announced its decision not to grant the application of the Cleveland Yardmen's Association for a hearing on the ground that it had not complied with the terms of the law and the conditions prescribed by the board, and on April 26 a similar decision was announced as to the Kansas City Yardmen's Association. A similar decision was later announced as to employees on the Pennsylvania, Baltimore & Ohio and Philadelphia & Reading lines, represented by George F. Koehl, chairman; employees in the Pittsburgh territory represented by George W. Yount, and the Chicago Express & Freight Handlers' Union.

In reply to telegrams received from chambers of commerce and other commercial organizations, the board on April 26 sent a telegram saying it was proceeding with all diligence in an effort to effect an early adjustment.

Chairman Barton said on Tuesday that the board had under consideration the question as to whether representatives of the short lines and others not represented by the managers' committee should be asked to appear before the board.

General News Department

The Western Union Telegraph Company on April 23 instituted mandamus proceedings in the Supreme Court of the District of Columbia to compel the Interstate Commerce Commission to correct its valuations of the Texas Midland and Kansas City Southern railways, and to report the values of telegraph lines along the right of way of the railways as the property of the telegraph companies instead of including them in the railway valuation.

The Southeastern Demurrage & Storage Bureau has been organized, with headquarters at Atlanta, Ga. F. M. Hardin, formerly assistant manager of the Southern Freight Inspection Bureau, is manager. About sixty roads are represented. Prior to the federal control of railroads there were seven demurrage bureaus in southeastern territory, but during the war all of them were merged in the Southern Freight Inspection Bureau. This merger is now dissolved.

Trainmen and enginemen employed on the Sonora division of the Southern Pacific of Mexico went on strike on April 3, completely tying up traffic on its lines in the state of Sonora, Mexico. On April 9, the Sonora State government seized the road and since that time has been operating it, running for the most part military trains. The employees left their work in spite of an injunction issued at the instance of President Carranza by the Mexican Federal Court. The railroad, according to press despatches, is still practically idle as far south as Mazatlan, Mex.

The National Safety Council, in its campaign to prevent highway crossing accidents, recently promulgated a questionnaire to be forwarded to railroads throughout the country requesting information as to the success or failure of the "Nine Second Whistle Code" which was adopted as a standard crossing whistle several years ago by the Chicago & North Western, and which is now in more or less general use. A tabulation of the information received on the questionnaire will be made by the Safety Council and forwarded to all members of the Steam Railroad Section.

Signal Engineers' Meeting

The New York Sectional Committee of the Signal Division, of the American Railroad Association, will hold a meeting at Hotel McAlpin, 34th street, New York City, on Thursday evening, May 20. A. H. Rudd, chief signal engineer of the Pennsylvania, will read a paper on light signals.

Progress in Valuation

In a report issued on April 15 by Frederick H. Lee, secretary of the Presidents' Conference Committee on Federal Valuation, the statement is made that although no tentative valuations have been served by the Interstate Commerce Commission since the 8th of November, 151 preliminary engineering, 167 land and 53 accounting reports have been tendered to the carriers for examination.

A. S. C. E. Question 3 Fails of Adoption

Although no public announcement has been made of the vote on the questionnaire submitted to its members by the American Society of Civil Engineers asking for an expression of opinion regarding a number of points raised by the report of the Development Committee, it is understood that Question 3, relating to the formation of a large organization of all engineering societies to handle other than technical matters, failed of adoption by a small majority. This question has been the source of active discussion which developed marked differences of opinion. It is understood that a generally favorable attitude was expressed on most of the other questions.

A. R. E. E. To Meet at Atlantic City

The semi-annual meeting of the Association of Railway Electrical Engineers will be held at the Hotel Dennis, Atlantic City, on June 14. The meeting will be called to order at 9 a. m. Progress reports will be presented by the following committees: Trucks and tractors; electric welding; illumination; train lighting equipment and practice; railway stationary power plants; electric head lights; electrification; electric repair shop facilities and equipment.

Mechanical Section Scholarships

Two of the four scholarships at Stevens Institute of Technology, which the Mechanical Section of the American Railroad Association offers to sons of members of the section, will be vacant in June. These scholarships cover the regular tuition charges for a four-year course, leading to the degree of mechanical engineer. The course offered also includes instruction in electrical, civil and other branches of engineering. Applications should be in the hands of V. R. Hawthorne, secretary, Chicago, not later than June 15. In case there are more than two applicants the scholarships will be given to the two passing the entrance examination with the highest standing. Full information will be supplied by the secretary upon application.

Parmelee Drivers Strike at Chicago

Parmelee Transfer Company drivers at Chicago, numbering 700, struck on April 24 and immediately tied up the baggage transfer business in that city. As a result of the strike thousands of travelers have been forced to carry their own baggage between stations and to hotels. Passengers were transferred from one station to another in taxicabs hired by the company, while three baggage cars were used in delivering baggage to the various stations via the Belt Line Railroad. The men struck after their demands for increases of from 55 to 75 per cent were refused. They were getting 40 cents an hour and averaged, with Sunday work and overtime, from $140 to $165 a month, according to Charles A. McCulloch, president of the company.

Mr. McAdoo's View

W. G. McAdoo, former director general of Railroads, in a reply to a questionnaire sent to presidential candidates by the National Board of Farm Organizations, says:

"While I think that the Esch-Cummins bill should be given a fair trial, I am sure that it does not and cannot settle the railroad problem because it does not reach the fundamentals.

"Private ownership is on trial and if the railroads now fail to provide the facilities and service demanded by the growing needs of the American public the problem must be grappled with vigorously and intelligently until the right solution is found. If satisfactory service is not rendered under private control within a reasonable time, we shall not have to wait two years before the question is reopened—it will reopen itself just as soon as the American people are convinced that private control is unequal to the task."

Railroad Appropriation Bill Passed

The deficiency appropriation bill carrying $300,000,000 appropriation for the Railroad Administration was passed by the Senate on April 27, with an amendment designed to protect the interest of the short lines that were relinquished from federal control and that thought they were to be reimbursed, under the provisions of the transportation act, for deficits or decreases in their operating income during the period of federal control. The Interstate Commerce Com-

mission, however, interpreted this provision as applying only to roads that had a deficit. The appropriation bill, as passed by the House, contained a provision for the deduction of such sums as may be due from such carriers to the government on account of traffic balances or other indebtedness, and the Senate inserted words to indicate that the deductions shall be made from the amount of the "deficit or decrease" in railway operating income.

Louisville & Nashville Experimenting with Wireless

The Louisville & Nashville is experimenting with wireless telegraph for the purpose of reaching division headquarters located along the Gulf of Mexico from the general offices at Louisville. Certain sections in this area are subject to storms which appear with more or less intensity each year, and which cause considerable damage not only to the telephone and telegraph lines but to the railroad itself. The loss of land communication is a serious detriment to the assembling of material for prompt repairs after such storms and strenuous efforts have been made to maintain telephone and telegraph service on pole lines with varying success.

It is expected that if the wireless is successful, stations will be installed in the storm district around New Orleans and Bay St. Louis, which will communicate direct with the general offices at Louisville. This service will also be of assistance in handling ordinary message business, relieving the congested conditions of the wires. The practicability of radio communication for this purpose has not been thoroughly demonstrated as yet, as the weather effects on wireless constitute an interference which it may not be possible to eliminate. The equipment being used is of the deForest type, long distance service, with which no difficulty has been experienced in reading European and South American stations.

Proposed National Council of Engineers

L. C. Marburg, secretary of the "Joint Conference Committee" representing the four leading engineering societies, has issued a call for a conference to be held at Washington, D. C., on June 3 and 4, to take action on the resolution, which was adopted last January, looking to the formation of a national association of engineering organizations for the purpose of facilitating united action in local questions of public welfare and other matters of common interest.

The leaders in this movement are the four committees appointed by the four associations, as follows: for the American Society of Civil Engineers, Richard L. Humphrye (chairman), George G. Anderson and Gardner S. Williams; for the American Institute of Mining and Metallurgical Engineers, Joseph W. Richards (chairman), Philip N. Moore, John V. W. Reynders and Allen H. Rogers; for the American Society of Mechanical Engineers, L. C. Marburg (chairman), L. P. Breckenridge, E. S. Carman and D. S. Kimball; for the American Institute of Electrical Engineers, Charles F. Scott (chairman), L. T. Robinson and Calvert Townley.

All engineering organizations whose chief object is the advancement of the knowledge and practice of engineering, and the allied technical arts, and which are not organized for commercial purposes, are invited to send delegates to this conference. Delegates should be selected as soon as possible and responses are desired by May 15, if possible. The address of the secretary is 39 West 39th street, New York City.

Engineers' Dinner at Chicago

The governing boards of the four national engineering societies—the American Society of Civil Engineers, the American Institute of Mining & Metallurgical Engineers, the American Society of Mechanical Engineers, and the American Institute of Electrical Engineers—met in separate sessions in Chicago on Monday and Tuesday, April 19 and 20. On Monday evening the boards of these societies and of the Western Society of Engineers, joined in a dinner at the LaSalle hotel, and in a conference relative to the joint activities of these organizations. A. Stuart Baldwin, vice-president of the Illinois Central and past president of the Western Society of Engineers, presided. The principal address was given by Dr. Theodore G. Soares, University of Chicago, on the application of engineering to the various activities of life. Short talks were also given by Arthur P. Davis, president American Society of Civil Engineers; Arthur Thatcher, director, American Institute of Mining and Metallurgical Engineers; Fred J. Miller, president, American Society of Mechanical Engineers, and Calvert Townley, president, American Institute of Electrical Engineers.

Daylight Saving

"Summer Time" went into effect quite generally in Massachusetts on Sunday, April 25, the Supreme Court of the state having dismissed the bill in equity which had been brought before the court with a view to having the law declared unconstitutional because of its being in conflict with the federal law regulating the time of railroads. The governor and council of New Hampshire last week adopted a resolution in opposition to the use of summer time, and telegraphed to President Wilson, and the New Hampshire members in Congress, protesting against the use of the new time tables issued by the Boston & Maine.

The city of Providence and most other places in Rhode Island set their clocks forward an hour on Sunday, but the legislature of that state has not yet approved the proposition. Trenton, N. J., and Wilmington, Del., have adopted summer time, though Trenton does not put it into effect until next Sunday. Both places thus will be out of step with Philadelphia, which, in compliance with the state law of Pennsylvania, continues to use Eastern standard or 75th meridian time. In Pittsburgh, Pa., the mayor issued a proclamation on April 23 asking all the citizens to set their clocks forward one hour on the following Sunday.

The legislature of New York, in its closing days, passed a bill repealing the present law of the state. This requires the use of summer time, and to that extent is in conflict, so far as the practice of interstate railroads is concerned, with the federal law; but the governor has not yet signed the bill. The repeal is understood to have been carried for the purpose of favoring the farmers; but the governor is expected to nullify it by his veto.

The $300,000,000 Revolving Fund

The Interstate Commerce Commission on April 28 issued the following notice to carriers:

"By section 210 of the transportation act, 1920, the sum of $300,000,000 was appropriated which shall be used as a revolving fund for the purpose of making loans to carriers by railroad subject to the interstate commerce act upon the certificate of the commission to enable them properly to serve the public during the transition period immediately following the termination of federal control, and for paying the judgments, decrees and awards referred to in subdivision 2, of section 206 of said act.

"Compared to the transportation needs of the public for new equipment and additional facilities, the available part of this fund is small, and it must not be administered piecemeal, but in accordance with the best interests of the public as a whole. At the request of the commission, therefore, the Association of Railway Executives is preparing a comprehensive plan for the use of this money, for new cars and locomotives and for additions and betterments which will speed up the movement of existing equipment, in the way which in their opinion will do most to improve service all over the country. The commission's task will be simplified and prompt action made possible if carriers desiring to apply for loans will work with the association, so that their applications may be in harmony with its recommendations. The commission, however, will not be limited by the recommendations of the association and careful consideration will be given to all applications which are received.

"Applications should be filed, if possible, on or before May 10. Forms showing the information which the commission requires may be obtained upon request from the secretary. Any applicant desiring to furnish further data or arguments in support of its application should do so by filing a brief in the usual form on or before May 15."

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year
					Maintenance of										
		Freight.	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General	Total					
Ft. Worth & Rio Grande	235	$90,053	$54,375	$155,063	$43,837	$28,975	$2,123	$105,541	$6,422	$186,897	120.52	—$31,834	$3,785	—$35,035	—$2,443
Galveston, Harrisburg & San Ant.	1,381	1,258,843	438,019	1,795,605	262,136	535,096	18,744	799,932	53,477	1,690,564	94.15	108,041	61,224	45,518	—43,845
Galveston Wharf	13	.....	.....	83,768	26,765	636	43	34,415	1,932	79,146	94.48	4,621	12,200	—7,578	—8,328
Georgia	328	360,701	122,060	519,693	56,644	93,264	11,440	282,143	18,573	462,245	88.94	57,449	5,950	51,501	—18,762
Green Bay & Western	252	69,409	18,089	93,457	9,596	28,754	823	41,791	2,644	83,603	89.45	9,854	5,380	4,475	—1,107
Georgia Southern & Fla.	402	330,063	129,903	486,939	80,188	125,151	7,493	236,506	11,226	464,014	95.29	22,926	17,500	5,170	—35,529
Grand Rapids & Ind.	569	501,896	129,853	701,699	81,062	178,631	12,465	385,807	23,548	682,899	97.32	18,800	40,111	—21,311	12,754
Grand Trunk Western	1,020	1,287,668	225,152	1,914,855	217,111	629,333	22,381	1,014,213	60,340	1,952,912	101.99	—38,057	52,803	—90,928	—101,759
Grand Lines in N. E.	172	222,390	29,022	279,132	74,499	66,338	4,331	188,559	13,288	372,019	133.28	— 92,887	12,699	—105,586	—2,840
Great Northern	8,176	5,006,821	1,299,075	7,252,817	1,534,915	1,786,819	61,431	4,031,711	155,577	7,722,658	106.47	—469,842	668,288	—1,141,447	—1,024,809
Georgia & Florida	405	67,170	19,809	95,391	68,081	29,272	3,275	94,563	6,801	201,992	211.75	—106,601	6,000	—112,622	—89,460
Gulf & Ship Island	307	135,351	41,333	191,985	64,423	58,905	5,056	92,004	9,174	230,013	119.81	—38,028	14,119	—52,201	—36,687
Gulf, Colorado & Santa Fe	1,937	1,386,217	430,650	1,931,171	602,799	412,673	20,653	916,981	56,583	2,000,964	103.61	—69,793	85,918	—156,098	—376,563
Gulf, Mobile & Northern	470	188,820	50,111	255,663	106,677	69,327	12,604	125,531	10,192	324,331	126.86	—68,669	12,987	—81,731	—51,393
Hocking Valley	350	904,957	85,375	1,031,033	86,256	331,047	23,941	433,941	20,370	895,524	86.85	135,509	80,797	54,711	281,108
Houston & Texas Central	885	639,186	197,327	894,555	184,992	188,136	6,301	371,955	23,035	774,104	86.53	120,451	37,685	32,429	68,995
Houston, East and West Texas	190	184,046	45,396	240,629	39,589	39,951	921	115,993	4,798	201,254	83.63	39,375	7,570	31,700	17,448
Illinois Central	4,800	8,434,456	1,907,094	11,093,800	1,814,491	2,741,463	135,548	4,559,510	231,851	9,536,809	85.97	1,556,991	507,980	1,043,976	787,766
Indiana Harbor Belt	120	.....	.....	688,090	54,109	141,057	2,778	463,560	17,940	679,443	98.74	8,647	10,101	—1,454	98,684
International & Great Northern	1,159	983,106	251,190	1,316,520	370,851	367,262	15,568	669,237	40,848	1,468,903	111.57	—152,382	32,503	—185,096	—24,040
Kanawha & Michigan	176	300,711	44,829	382,742	45,553	111,145	3,591	141,959	10,966	313,215	81.83	69,527	25,000	44,527	136,716
Kansas City, Mexico & O.	272	107,481	16,251	131,944	58,093	47,576	4,423	67,118	8,458	185,669	140.71	53,725	7,700	—61,441	1,351
Kansas City, Mexico & O. of Texas	465	130,325	19,550	161,771	50,717	58,278	5,097	72,475	12,066	198,633	122.78	—36,862	6,419	—43,505	41,695
Kansas City Southern	774	1,210,996	222,379	1,538,382	194,203	406,372	20,769	599,408	43,953	1,263,975	82.16	274,408	54,571	219,228	178,206
Kansas City Terminal	27	.....	.....	117,896	21,853	41,199	.....	81,322	2,606	149,093	126.46	—31,196	27,350	—58,546	—40,367
Lake Erie & Western	902	673,051	59,459	772,441	75,186	250,415	19,092	361,682	22,731	729,105	94.38	43,335	49,000	—5,676	—14,928
Lake Terminal	12	.....	180	97,439	12,181	23,641	.....	70,129	105	108,057	110.90	—8,618	5,767	—14,385	—23,114
Lehigh & Hudson River	96	126,735	3,721	138,599	22,198	44,892	1,221	96,696	6,310	171,317	123.61	—32,718	8,562	—41,309	—76,485
Lehigh & New England	229	212,132	2,813	227,276	34,218	83,601	2,982	121,807	11,462	252,217	110.73	—24,440	10,860	—35,300	5,376
Lehigh Valley	1,435	3,618,429	442,017	4,504,277	798,904	1,713,601	39,109	3,107,997	96,297	5,775,560	128.22	—1,271,282	176,000	—1,447,458	—1,258,053
Long Island	398	360,613	751,348	1,318,686	276,985	385,095	12,751	1,120,335	52,526	1,859,467	141.00	—540,781	105,609	—647,543	—522,095
Louisiana & Arkansas	302	312,977	49,656	375,807	44,331	43,318	3,328	123,568	7,537	222,031	59.08	153,775	13,587	140,183	140,999
Louisiana Ry. & Nav. Co.	343	284,194	39,792	337,156	85,024	61,497	4,705	132,755	9,808	293,790	87.13	43,367	14,023	29,329	75,619
Louisiana Western	207	264,557	100,745	385,981	86,944	70,768	5,260	103,998	11,123	280,694	72.90	105,287	19,795	85,403	15,285
Louisville & Nashville	5,040	7,675,380	1,899,013	10,111,516	1,959,832	2,548,027	238,339	4,296,746	197,955	9,285,183	91.83	826,333	250,699	575,391	—160,831
Louisville, Henderson & St. Louis	199	177,204	57,332	246,726	49,032	29,386	5,414	93,975	8,459	186,266	75.49	60,460	—18,147	78,597	46,999
Maine Central	1,216	624,737	273,115	1,024,381	408,636	383,477	9,755	769,458	38,698	1,610,125	157.18	—585,744	82,742	—668,503	—498,781
Maryland, Delaware & Virginia	82	40,809	13,958	58,672	6,211	39,963	908	59,802	2,379	109,264	186.22	— 50,592	2,000	—52,592	45,039
Michigan Central	1,862	4,328,180	1,270,132	6,213,735	546,777	1,436,611	56,500	3,026,916	103,458	5,268,625	84.78	95,109	250,000	694,085	—97,754
Midland Valley	388	262,487	95,557	373,373	68,104	119,404	3,891	159,327	14,006	364,732	97.68	8,641	7,183	1,396	—66,771
Mineral Range	101	42,386	144	44,575	16,460	18,498	314	30,232	934	66,439	149.04	—21,864	3,600	—25,464	—22,331
Minneapolis & St. Louis	1,646	916,132	201,525	1,148,581	130,282	330,077	15,798	648,159	28,505	1,153,287	100.41	—4,706	56,306	—61,150	96,111
Minneapolis, St. Paul & S. Ste. Marie	4,243	2,375,246	521,225	3,481,254	451,691	735,121	21,674	1,692,816	89,036	3,002,254	86.24	479,000	216,177	262,654	95,118
Minnesota & International	194	69,954	27,071	111,901	8,364	28,067	547	67,248	4,018	108,243	96.73	3,658	5,667	—2,013	2,507
Missouri & North Arkansas	254	90,516	43,551	143,597	60,117	27,431	2,728	85,631	9,687	185,594	129.25	—41,997	6,242	—48,239	42,693
Mo., Kansas & Texas Railroad of Texas	1,796	1,329,288	725,647	2,235,264	572,475	467,215	29,487	1,526,693	85,513	2,715,477	121.48	—480,213	59,580	—540,454	—498,226
Missouri, Kansas & Texas	1,715	2,098,041	689,672	2,996,268	498,973	871,119	30,177	1,902,218	89,999	2,509,964	83.76	486,303	108,834	376,846	248,330
Missouri, Oklahoma & Gulf	329	175,100	20,232	202,793	55,046	75,552	1,740	119,355	8,185	260,109	128.26	—57,316	9,100	—66,455	3,934
Missouri Pacific	7,299	7,271,641	1,507,517	9,442,931	1,600,726	1,824,313	85,426	4,024,795	225,012	7,789,679	82.49	1,653,252	171,151	1,479,926	1,225,899
Mobile & Ohio	997	1,284,337	171,030	1,544,656	252,565	410,036	26,632	708,021	44,372	1,442,441	93.38	102,215	73,000	28,988	159,145
Monongahela	108	289,863	21,988	317,564	57,321	72,743	529	88,502	6,920	226,016	71.17	91,547	5,000	86,548	22,525
Monongahela Connecting	7	.....	.....	242,662	20,108	35,618	572	105,113	6,583	167,994	69.22	74,668	3,403	71,264	99,476
Montour R. R.	56	75,247	1,221	78,519	14,899	33,075	1,317	29,406	6,765	86,747	110.47	—8,228	2,430	—10,660	39,099
Morgan's Louisiana & Texas	400	542,852	166,926	751,265	106,216	157,751	12,187	250,540	20,229	549,796	73.18	201,469	36,551	164,675	158,204
Nashville, Chattanooga & St. Louis	1,247	1,393,915	405,108	1,908,613	358,043	872,538	56,152	782,470	44,252	2,115,030	110.82	—206,417	46,000	—252,653	—129,923
Nevada Northern	168	138,848	9,150	153,921	30,355	27,752	561	41,887	3,483	104,192	67.69	49,730	9,267	40,462	13,606
New Orleans & N. E.	398	504,767	90,168	653,782	111,665	130,335	12,715	240,008	15,329	515,675	78.87	138,108	39,781	98,266	206,023
New Orleans Great Northern	284	144,264	39,141	192,191	42,911	50,292	3,946	73,392	8,868	179,854	93.58	12,336	11,000	1,317	1,292
New Orleans, Texas & Mexico	191	139,882	38,278	184,292	52,695	44,810	3,671	60,500	6,809	168,513	91.43	15,779	11,000	4,723	—7,493
New York Central	6,069	14,145,320	5,554,946	23,724,048	2,948,377	6,300,875	272,550	13,293,042	676,018	23,901,374	100.75	—177,326	1,008,503	—1,190,327	—2,104,960
New York, Chicago & St. Louis	574	1,925,825	88,522	2,077,935	105,985	403,667	42,788	1,035,487	67,049	1,718,948	82.72	358,987	60,000	298,949	—224,215
New York, New Haven & Hartford	1,965	2,578,812	3,142,987	6,915,962	1,498,773	1,937,216	51,340	4,761,776	266,011	8,676,541	125.45	—1,760,579	315,000	—2,078,499	—1,768,596
New York, Ontario & Western	569	533,435	86,219	773,644	136,130	169,848	8,069	446,558	22,550	783,154	101.23	—9,510	12,483	—21,993	70,564
New York, Philadelphia & Norfolk	121	451,469	74,434	594,305	50,897	195,600	8,684	362,237	10,911	636,270	107.06	—41,965	19,451	—61,499	—120,690
New York, Susquehanna & Western	135	205,580	64,917	308,264	61,838	120,997	5,594	320,678	8,489	517,596	167.91	—209,333	18,674	—228,025	—208,977
Newburgh & South Shore	7	.....	.....	120,757	11,110	31,128	.....	82,222	4,560	129,020	106.84	—8,263	6,999	—15,262	—30,261
Norfolk & Western	2,202	5,241,956	606,192	6,237,718	749,631	2,196,702	69,091	2,573,393	108,754	5,728,419	91.84	509,299	285,000	233,196	—624,401
Norfolk Southern	906	291,513	134,083	462,460	95,680	129,300	10,738	289,287	22,059	547,191	118.32	—84,731	16,000	—100,876	—51,744
Northern Pacific	6,642	6,114,670	1,260,871	8,122,484	893,439	1,578,911	96,266	3,595,439	175,441	6,442,906	79.31	1,679,579	610,982	1,066,835	—122,527
Northwestern Pacific	538	250,116	158,548	461,650	144,553	76,164	4,602	237,859	15,750	481,311	104.26	—19,660	25,593	—45,373	—6,318

Traffic News

The Trans-Canada Limited express of the Canadian Pacific, crossing the continent in about 92 hours, will be put in service for the summer on May 2.

The railroad strikes were the cause of a reduction of 2,000,000 tons in the production of bituminous coal during the week ended April 17, according to the weekly bulletin of the Geological Survey. The output for the week was 7,668,000 tons.

The Wabash has withdrawn from the consolidated ticket offices in the Insurance Exchange Building, Chicago, and will establish new offices on May 1. Similar action has already been taken by the Chicago & North Western and the Soo Line.

The Southeastern Passenger Association has announced that carriers in the territory south of the Ohio and Potomac and east of the Mississippi rivers, discontinued the prepay order system on April 1. The order was abolished as a means of decreasing operating expenses. Under the new system it is impossible for anyone in one city to deposit the cost of a railroad ticket for a person in another city.

The Commission on Car Service has sent to the eastern railroads a telegram saying that the demand for stock cars as a result of inability to ship due to strike difficulties is such that unless stock cars are confined to livestock loading there will be a very serious shortage. It will be necessary therefore that stock cars be withdrawn from general service and forwarded to stock market centers without delay.

Seasonal Coal Rates

Senator Frelinghuysen's bill to stabilize the coal industry and promote a more even distribution of coal production throughout the year by providing for a 15 per cent reduction in freight rates on coal during the summer and a corresponding increase in the winter found very little support at a hearing before a sub-committee of the Senate interstate commerce committee on April 22 and 23. Representatives of the railroads and many coal operators objected to a statute prescribing rigidly the extent of the reduction, on the ground that the Interstate Commerce Commission has full authority over rates. The railroad representatives particularly objected to a seasonal reduction in rates this year on the ground that it would not accomplish the desired object of promoing early shipment of coal because there is not now any surplus of transportation facilities, and there is not likely to be for some time to come. Therefore, they argued, a reduction in the freight rate at this time would merely increase the profits of the coal operators, because the price will be more influenced by the shortage of coal production than by the freight rate. Many shippers opposed the bill on the ground that they would not be able to buy all their coal early in the year and would be penalized in that part of their supply which they cannot get until winter.

Eugene McAuliffe, appearing on behalf of the American Institute of Mining and Metallurgical Engineers, advocated the principle of seasonal coal rates but he criticized the flat percentage named in the bill and proposed a substitute bill providing for varying differentials (in cents per ton) for each month. The hearing brought out the fact that parties interested in different grades of coal would be differently affected by seasonal rates.

G. M. Snider, appearing on behalf of eastern railroads, said no possible benefit would accrue from revising the rate on coal from the mines to the Lake Erie ports, which is normally moved during the summer months and that a reduction in rates to New England ports during the summer would increase the rail movement of coal and require the use of cars that ought not to be used for that purpose but should be used in connection with the shorter hauls to and from water points. Asked by Senator Frelinghuysen as to whether lower rates during the summer would not mean that the consumer would pay less for his coal, Mr. Snider said that such a result could not be expected where the demand exceeds the supply.

Commission and Court News

Interstate Commerce Commission

Proposed Double Loading of Grain

Carriers generally throughout the United States, under authority of a Railroad Administration freight rate authority of October 29, 1919, and a fifteenth section order of the Interstate Commerce Commission, filed with the commission supplements establishing certain increased carload minimum weights on grain, which expire on August 31, 1920. Acting on complaints that the effect of these minimum weights will be injurious to certain interests, and believing it desirable to permit double loading of cars, the commission to obtain additional facts has called an informal conference of state commissions, shippers, carriers and others at Hotel Jefferson, St. Louis, on May 10. The commission makes the following suggestions; but parties appearing may propose other measures:

1. To establish a minimum weight of 40,000 lb. on grain products now subject to a minimum of 60,000 lb., subject to the following provisions:
2. Not less than two shipments shall be loaded in the same car, each to be subject to the minimum of 40,000 lb.
3. . . . The destination of one shall be directly intermediate to that of the second via some route authorized in the tariffs. If more than two shipments are loaded, the destinations of two must be directly intermediate to that of the third.
4. Circuitous or back hauling to reach the last point of consignment through the first point or points of consignment will be permitted over the lines of the same carriers not exceeding 25 per cent of the distance to the last point of consignment.
5. The distance from the destination of the first shipment to the destination of the last shipment over the route of movement shall not be greater than one-half the total distance from the point of origin (or in the case of transit shipments, the transit point) to the last destination point via the first destination.
6. Tariffs shall provide that it is the duty of carriers' agents at destination to supervise the unloading and make record of delivery of each of such shipments.

State Commissions

The New York State Public Service Commission, Second District, has called on the New York Central to show cause, on May 13, why passenger fares between Albany and Buffalo should not be put back to the rate of two cents a mile, which is the rate prescribed in the company's charter and which was in effect until all fares were advanced by the Railroad Administration while the road was under federal operation.

The "Association of Railroad and Public Utility Commissioners of the Cotton-Growing States" was organized recently at a meeting in Montgomery, Ala. One of its chief objects is co-operation with the American Cotton Association for the protection of cotton in transit. S. P. Kennedy, president of the Alabama Public Service Commission, is president; B. H. Cooper, of Alabama, first vice-president; H. H. Arnold, of South Carolina, treasurer; Frank W. Shealy, of South Carolina, secretary.

Court News

No Presumption That Automobile Will Break Down on Crossing

The driver of an automobile attempted to cross a track at a road crossing, and had ample time to do so, but his engine choked down and the automobile stopped on the track, was struck by a train and destroyed. In an action for its loss the Florida Supreme Court held that the railroad was not guilty of negligence in not assuming that the car would break down and stop on the track. The engineer had the right to presume that an automobile crossing the track a quarter of a mile ahead of his train would be over and away in ample time before his train could reach the crossing. He was not called on to presume that the engine

would choke and cause the automobile to stop on the track. The railroad's obligation began only at the instant that its employees knew that the auto had stopped on the track. It then became its duty to stop the train if possible. This was done and no recovery could be had. Judgment for the plaintiff was therefore reversed.—L. & N. v. Harrison (Fla.), 83 So. 89.

Enjoining Numerous Separate Actions on Similar Freight Claims

The Atchison, T. & S. F. filed a complaint in equity to enjoin the prosecution in a justice court of 648 separate actions against it by the same person and to compel their litigation in a single action. The plaintiff had obtained assignments of claims from consignees for alleged excess freight charges, fixed by the company's regular schedules, but alleged to be in contravention of the long and short haul clause of the California Constitution. The total amount of the claims was $6,015. The minimum court costs would far exceed that amount and if appeals were taken the total cost would run up to $15,000 or $20,000. The company alleged that it had a good defense to all the claims (which the consignees had all paid voluntarily), in that the clause of the State Constitution was void because in conflict with the commerce clause of the Federal Constitution.

The California District Court of Appeal, Second District, assuming the facts as pleaded to be true, held the railroad entitled to relief on two grounds. First, if a conspiracy and combination had been entered into between the assignee of the claims and the justice of the peace before whom the actions were pending to force a settlement and payment of these claims by reason of the prohibitive cost of defending them, it was such an abuse of the process of the courts as should estop the assignee from prosecuting them and the justice from trying them. A remedy by change of venue would involve the prepayment of costs greater in amount than the total of the claims, and still subject the railroad to the same multiplicity of suits and indefinite future costs in another tribunal. Whatever potential rights the assignee might have, the fact remained under the pleadings that he was using the process of the courts, not to procure a judicial determination of his rights, but to prevent such a determination, and to force a settlement by piling up against the railroad excessive and prohibitive costs. Second, if the assignee was acting in good faith, it was in his own interests, as well as the railroad's, to demand a consolidation of the actions. It would require two years of constant work of the justice's court, if each of these cases should be tried separately, before they could be disposed of; whereas they could be tried in a consolidated action in a few days at most. The justice court itself could not consolidate the actions. Therefore, the railroad was held entitled to injunction in equity.—Atchison, T. & S. F. v. Smith (Cal.), 183 Pac. 824.

United States Supreme Court

Grab Irons Required at Two Corners Only

Relying upon the federal Employer's Liability Act, a brakeman sought damages for personal injuries sustained by him on November 8, 1915. He claimed that the railroad was negligent in using a freight car not equipped with handholds on all four corners; and also in failing to instruct him that he would be required to work about cars not so equipped. The car had adequate handholds on the diagonally opposite corners. The trial court, holding that this equipment fulfilled the commands of the statute and that failure to instruct the brakeman concerning possible use of such car did not constitute negligence, directed a verdict for the railroad. The Circuit Court of Appeals affirmed the consequent judgment. On appeal the plaintiff insisted that section 4 of the Safety Appliance Act of 1893 providing for "secure grab irons or handholds in the ends and sides of each car" intended that they should be placed at all four corners.

The Supreme Court of the United States has affirmed the judgments of the courts below, holding that the section must be interpreted and applied in view of practical railroad operations. "Likewise we accept the concurrent judgment of the lower courts that the carrier was not negligent in failing to give warning concerning the use of cars with handholds only at two diagonal corners. Whether this constituted negligence depended upon an appreciation of the peculiar facts presented, and the rule is well settled that in such circumstances where two courts have agreed we will not enter into a minute analysis of the evidence.—Chicago Junction Railway Co. v. King, 222 U. S. 222." Per W. Justice McReynolds. Boehmer v. Pennsylvania. Decided April 19, 1920.

Limitation of Time for Actions for Injuries

A citizen and resident of North Dakota sued the Canadian Northern, a corporation organized under the laws of the Dominion of Canada, in a federal district court of Minnesota for damages for personal injuries sustained on November 29, 1913, when employed by the defendant as a switchman in its yards at Humbolt, Saskatchewan. He commenced his action on October 15, 1915, almost two years after the date of the accident. By the laws of Canada, where the cause of action arose, an action of this kind must be begun within one year. Section 7709 of the Statutes of Minnesota (1913) reads: "When a cause of action has arisen outside of this state and, by the laws of the place where it arose, an action thereon is there barred by lapse of time, no such action shall be maintained in this State unless the plaintiff be a citizen of the State who has owned the cause of action ever since it accrued." If this statute is valid, it is applicable to the action, which, being barred in Canada, cannot be maintained in Minnesota by a non-resident plaintiff. If, however, the statute is invalid, the general statute of limitations of Minnesota, allowing a period of six years within which to commence action, would be applicable. The Circuit Court of Appeals held the statute unconstitution and void.

The Supreme Court of the United States, per M. Justice Clarke, has reversed the judgment of the Circuit Court of Appeals and holds the Minnesota statute valid. "The laws of Minnesota gave to the non-resident respondent free access to its courts for the purpose of enforcing any right which he may have had, for a year, —as long a time as was given him for that purpose by the laws under which he chose to live and work—and having neglected to avail himself of that law, he may not successfully complain because his expired right to maintain suit elsewhere is not revived for his benefit by the laws of the State to which he went for the sole purpose of prosecuting his suit. The privilege extended to him for enforcing his claim was reasonably sufficient and adequate and the statute is a valid law."—Canadian Northern v. Eggen. Decided April 19, 1920.

Question of Employment on Through Joint Freight Train

Action was brought for death against the Philadelphia & Reading under the federal Employers' Liability Act. The Maryland state courts (132 Md. 540) held that the deceased at the time he was killed was not in the defendant's employ within the meaning of the act. The deceased was in the general employ of the Western Maryland operating from Hagerstown, Md., to Lurgan, Pa., where it connected with the Philadelphia & Reading, which extended from Lurgan to Rutherford. Through freight trains were operated from Hagerstown to Rutherford, on one of which deceased was a brakeman when he was killed. On the previous day a Western Maryland crew, which included the deceased, had taken a train hauled by a Western Maryland engine from Hagerstown to Rutherford, and were returning with another train. The yardmaster at Rutherford, an employee of the Reading, gave them instructions as to the operation of the train, including directions to pick up seven cars at Harrisburg. While picking up these cars deceased was run over and killed by one of defendant's locomotives. The through freight service was conducted under a written agreement between the companies, one clause of which provided that the employees of each company while upon the tracks of the other should be subject to the rules, regulations, discipline and orders of the owning company.

The Supreme Court of the United States affirms the judgment of the Maryland Court of Appeals, holding that under the facts the deceased had not been transferred from the Western Maryland's employ to that of defendant for the purposes of the train movement in which he was engaged; that each company retained control of its own train crews; that what these crews did on the other road's line was done as a part of their duty to their general employer; and that so far as they were subject while on the other company's tracks to its rules, etc., this was for the purpose of co-ordinating their movements to the other operations of the owning company, securing the safety of all concerned, and furthering the general object of the agreement between the companies. M. Justice Clarke dissented.—Hull v. P. & R. Decided April 19, 1920.

Foreign Railway News

The Times Trade Supplement (London) says that locomotives to the value of $254,522 were shipped to the Argentine Republic from Canada in January.

According to El Mercurio, Valparaiso, Chile, a decree has been issued, dated January 31, authorizing Manuel Augusto Maza to build and operate a railway of one meter gage between Lake Yelcho and the Argentine frontier, about 70 kilometers (43 miles).

Fifty persons killed and as many injured, is the report of the casualties in a collision of passenger trains reported on April 24 from Moradabad, India, a place east of Delhi on the Oudh & Rohilkhand Railway. Four coaches were destroyed by fire.

The Mexican government has granted the Mexico North Western permission to increase its freight, passenger and express rates approximately 20 per cent. The increases went into effect on March 4, and were granted because of the inability of the Mexico North Western to earn sufficient funds to meet its operating expenses.

New Locomotives for India

LONDON.

An order for 15 more 2-8-0 class H. S. locomotives has been placed by the Bengal-Nagpur railway with the North British Locomotive Company.

New Rolling Stock Needed in Spain

LONDON.

The Spanish railways are greatly in need of locomotives to replace those which have become worn out during the war. To enable them to purchase these, the railways are pressing the Spanish government to allow them to raise their rates.

The Five-Day Week in Australia

LONDON.

The London Times Trade Supplement says that a five-day week has been successfully instituted in the Western Australian workshops and the government has decided to extend the practice to other departments where the 44-hour week applies; principally to construction gangs, laborers and trackmen.

Increased Demurrage Charges

LONDON.

The Ministry of Transport announces that very gratifying results have followed the increase of the demurrage charges on railway companies' trucks, which became operative on January 1. For February, the figures show that the freight car detention has decreased by 42 per cent as compared with December, representing a saving of over 150,000 car days.

Belgium's Progress Towards Recovery

The British Board of Trade Journal, quoting the Exportateur Belge, gives a table showing the progress made towards recovery in the metallurgical industries in Belgium, from which it appears that the percentage of the pre-war output in locomotives and steam engines is 100; in rolling stock and railway materials, 90 per cent; machine tools, 90; general mechanical production, 70, and electrical construction, 100 per cent.

Proposed New Railway in Australia

An abstract from the Board of Trade Journal (London) states that the Queensland government has submitted proposals to Parliament for the construction of six new lines of railway. The new lines include an extension of the Boyne Valley railway from Many Peaks to the northern end of the line, from Mundubbera to Northern Burnett, 78 miles, and from Monto to Rannes, to open up the Callide valley and prairie lands, 109 miles.

Other proposed lines are a branch railway from Peeramount towards Boonjee, an extension of the Mary Valley railway from Brooloo to Kenilworth, a branch from Gargett to Own's Creek, and a line from Dobbyn to Myally Creek.

Freight Car Building at Woolwich

LONDON.

In reply to a question in the English Parliament, the Deputy Minister of Munitions said recently that the number of freight cars which had been ordered to be built at Woolwich Arsenal was 2,500. He said that the rate of delivery had been adversely affected by the moulders' strike, but that during the week ending March 10, eleven freight cars had been completed and it was hoped to increase the rate of production in the course of the next few weeks.

Egyptian State Railways

LONDON.

The British commercial agent for Egypt has been informed on good authority that during the next five years the Egyptian State Railways will require about $10,000,000 for roadway, bridges, etc., and $15,000,000 for engines and rolling stock; $7,500,000 for larger bridges, $2,500,000 for telegraphs and telephones, as well as additional sums for improvements at stations, increased facilities and so forth, due to increase of traffic.

In addition to this, an annual sum of over $5,000,000 must be debited to revenue for renewals to road way and rolling stock. It is probable that offers will be asked for the supply of about 65 locomotives during this summer for delivery in 1921 and 1922.

French Imports and Exports

PARIS.

The American Chamber of Commerce (Paris), in its bulletin for March 15 gives two items of the imports into France from the United States and Exports from France into the United States, for the calendar year 1919, as against the same period for the year 1918, as follows:

Imports Into France from the United States.

	1919 Francs	1918 Francs.
Machines and machinery	643,024,000	391,887,000
Tools and Hardware	279,493,000	311,724,000

Exports from France to the United States.

	1919 Francs	1918 Francs
Machines and mechanical appliances	1,208,000	463,000
Tools and manufactures of metal	1,133,000	758,000

English Locomotive Contracts

LONDON.

English railways are now going outside to place orders for rolling stock, which previously was built in their own shops.

The London & North Western has ordered from William Beardmore & Co., Ltd., 90 locomotives of the 4-6-0 type, with 20½ in. by 26 in. cylinders. The driving wheels are 75 in. diameter. These locomotives will be fitted with Schmidt superheater, Wakefield mechanical lubricator, Joy valve gear and the vacuum brake. They will weigh in working order 66½ tons each.

The Great Northern has ordered 50 locomotives from the North British Locomotive Company, each to be fitted with the Gresley superheater; also 25 locomotives 2-6-0 type from Kitson & Co., Ltd., these to have the Robinson superheater.

Belgian Equipment Orders

LONDON.

The Board of Trade Journal, London, states that the Belgian government has ordered 100 locomotives from Belgian locomotive builders. The price of these will amount to 41,000,000 francs and delivery must be made within 18 months after the confirmation of the order. It has in addition placed orders for 200 locomotives with a British firm, one for 50 locomotives in Canada and one for 100 in the United States. The British engines are to be delivered by the end of June next.

Orders have also been given to Belgian manufacturers for 1,200 passenger coaches, to be delivered within ten months.

The Belgian government also requires 42 new steel coaches for electric trains. These are expected to cost 250,000 francs each. They will be 21 meters (69 ft.) long.

Russian Railways

LONDON.

The Journal des Transports published in a recent issue the following figures giving the percentage of locomotives and cars out of service in Russia.

	Locomotives	Freight cars
May, 1919	48.4 per cent	34.7 per cent
June, 1919	47.4 per cent	29.1 per cent
July, 1919	50.9 per cent	29.3 per cent
August, 1919	51.3 per cent	29.3 per cent

Since June, 1917, the passenger rates have been increased 15 times and freight rates 35 times.

Rumanian Oil to Pay for American Railway Equipment

With reference to the order for 50 locomotives placed with the Baldwin Locomotive Works by the Rumanian Government as noted in the *Railway Age* of April 23, page 1275, the following cablegram from Joseph W. Carroll, charge d'affaires at Belgrade, Jugoslavia will be of interest:

"Arrangements for the sale of a large quantity of railway equipment to the Government of Rumania have just been concluded by an American concern. The Rumanian Government is to pay for the equipment in petroleum, which the American concern will probably sell, at the wells, to an American petroleaum concern. This illustrates the ingenuity that is being used by enterprising Americans in attacking the difficult problems of financing their exports at this time."

British Freight Cars in France

LONDON.

In answer to a question asked in Parliament the Secretary of State for War said recently that the return of freight cars from France to England is dependent on the capacity of the train ferry service, and that it has not been possible, owing to numerous causes, to maintain the anticipated return of 800 to 900 cars a week. The average number of cars returned during the 33 weeks ending March 7, was 363 per week. The present rate of return is approximately 500 per week, and it is hoped to increase the number during the summer months. There are still approximately 13,000 cars in France to be returned to British railway companies and 4,300 belonging to the war department. It is anticipated that all cars will be returned before the end of this year.

English Enginemen Obtain Advance in Wages

LONDON.

The Central Wages Board recently formed under the direction of the Minister of Transport, has granted an increase to engine drivers, motormen, firemen and adult cleaners of one shilling a week retroactive to November 1, 1919, two shillings retroactive to December 1, 1919, and three shillings retroactive to March 1, 1920. This increase has been granted to meet the extra cost of living.

Owing to the fact tha the government has made a partial withdrawal of the bread subsidy on April 1, a further increase in the cost of living is expected and the Central Wages Board will again meet to review the situation when the Ministry of Labor statistics as to the cost of living on May 1 are available. If at any time it is found that an additional increase is justified, it will be made retroactive to April 12, the date on which the price of bread to the consumer was raised.

Chinese Railway Standardization

LONDON.

The following is an abstract of a letter from the Department of Overseas Trade published in the Bulletin of the Federation of British Industries, regarding the position of railway standardization in China:

"His Majesty's Minister at Peking reports that the Committee appointed by the Chinese Government comprises five advisers, of American, Belgian, British, French and Japanese nationality. These advisers are now engaged in the study of railway standards, but full consultation will take place with the engineers of all the Government railways, assembled in conference for the purpose, before any decision is taken. This will ensure full use being made of local experience, and in the meantime everything goes to show that the work of the Committee is proceeding impartially and smoothly."

The letter also says that the sole reason for the purchase of American equipment in unusual quantities is to be found in the fact that it is not possible for the British manufacturers to quote dates for delivery and prices to meet the urgent needs of the Chinese market.

German Railways Under Single Ownership

Associated Press despatches from Berlin dated April 25 report the approval by the National Assembly of the government's purchase of the Federated States Railways at a cost of 40,000,000,000 marks or $8,000,000,000 at normal rate of exchange.

The annual interest incurred in the nation's huge investment is estimated says the despatch at 14,000,000 marks. The government is not over-sanguine with respect to early returns from the investment, in view of the dilapidated condition of the railways, the delayed output from repair shops and continued demands by the men for wage increases.

"The peace treaty we have completed does not present a bewitchingly beautiful face, but it possesses desirable qualities in political and economic directions," said Dr. Bell, the Minister of Transport, in the National Assembly just before the vote was taken. He described the transaction as one of the most gigantic ever effected by any parliament.

The minister added that more than a million employes of the railways will be on the government payroll. He admitted that the government had to pay heavily for a final settlement with the various states.

English Rolling Stock to Be Standardized

LONDON.

Sir Eric Geddes, Minister of Transport, recently outlined the plans of the Ministry of Transport with regard to standardization on the English railroads. He said that the mechanical engineering department of the Ministry was endeavoring to standardize the freight cars, and a commencement had been made by arranging with all railways and all owners of cars that all running gear should conform to certain standards. This he stated would help materially to overcome one of the chief difficulties brought to light by pooling. As a result of pooling, cars which used to work only in specified areas now run all over the country and as they differ in construction, spare parts have often to be sent long distances after them. What this means in time and money may be gathered from the fact that there are something like 500 different types of axle-boxes as well as innumerable types of other essential parts.

With regard to the cars themselves, there is not the least doubt that for certain classes of traffic the object to be aimed at is a car of much higher capacity, for this will lead to a great saving in the weight and length of trains, and consequently in the length of new sidings. Larger cars are not, of course, suitable to all kinds of traffic but for coal traffic they would be of enormous value. In deciding on the size of the car to be used, consideration must be given to existing conditions, to the cost of the alterations to be made in the right of way and structures and what economies would result.

As to the standardization of locomotives, this would lead to economy in manufacture. "But," says Sir Eric Geddes, "the standardization of locomotives is at present limited by the capacity of bridges and roads already built to carry locomotives of a certain size. Bridges and so on cannot be strengthened or replaced in a day and therefore at present we must allow for two or even three classes in each type, say light and heavy, or light, medium and heavy, of which parts could be interchangeable and a considerable reduction effected in the number of types."

The mechanical engineering department is also considering the standardization of signaling apparatus, economies to be effected in workshops, improvement in the plant and equipment of docks, and the economy in the production and use of everything of a mechanical nature connected with transport.

Equipment and Supplies

Locomotives

The Atlantic Coast Line is inquiring for 5, six-wheel switching locomotives.

The Boston & Albany has ordered 6, 4-6-2 type locomotives from the American Locomotive Company.

The Central of Georgia has ordered 4, 4-8-2 type locomotives from the American Locomotive Company.

The South Georgia Railway has ordered one 4-6-0 type locomotive from the Baldwin Locomotive Works.

The Inland Steel Company, Chicago, has ordered one 0-6-0 type locomotive from the American Locomotive Company.

The East Broad Top Railroad has ordered one 2-8-0 type, narrow gage locomotive from the Baldwin Locomotive Works.

The Southern Pacific has ordered 15, 2-10-2 type, 15 Pacific type and 10 switching locomotives from the Baldwin Locomotive Works.

The Charlotte Harbor & Northern, reported in the *Railway Age* of February 29, as inquiring for 3 locomotives, has ordered 4, 2-8-0 type locomotives from the Baldwin Locomotive Works.

The **Chicago, Rock Island & Pacific,** reported in the *Railway Age* of March 5, as inquiring for 10 Mountain, 10 Pacific and 15 Santa Fe type locomotives, has ordered 35 locomotives from the American Locomotive Company.

Freight Cars

Henry Ford & Co., Detroit, Mich., is inquiring for two 35-ton coke cars.

The International Harvester Company, Chicago, is inquiring for 500 hopper cars of 50 tons capacity.

The Chicago, Burlington & Quincy has withdrawn its inquiry from 500 box cars and 500 gondola cars.

The Fruit Growers' Express, Washington, D. C., is inquiring for from 1,000 to 2,000, 30-ton refrigerator cars.

The Phoenix Iron Works Company, Portland, Ore., is inquiring for 1,000 tank cars of 8,000 gal. capacity.

The East Jersey Railroad & Terminal Company is in the market for from 8 to 12 36-ft. box cars with 30 ton trucks.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for 12, 80,000-lb. capacity 40 ft. steel underframe box cars; also for 12 eight-wheel, bottom dump, ore cars of from 12 to 15-ton capacity and 36 in. gage.

Passenger Cars

The Central of Brazil is inquiring for passenger coaches and sleeping cars.

The Virginian Railroad is inquiring for 1 club car, 10 passenger coaches, and 4 mail and baggage cars.

Iron and Steel

Mitsui & Co., 65 Broadway, New York, is inquiring for 3,000 tons of plate girders for the Taiwan Railway (Japan), and is in the market for 4,000 tons of galvanized steel transmission towers for the Joban Hydraulic Power Company, Japan, and for 3,000 tons of similar material for the Gumma Hydraulic Power Company, Japan.

Supply Trade News

Frederick A. Molitor, consulting engineer, will remove his office on May 1, from 35 Nassau street, to 143 Liberty street, New York.

The Jerome-Edwards Metallic Packing Company, Chicago, Ill., on April 24, removed to its new factory at 3136-3138 W. Chicago avenue, Chicago.

A. B. Burgess, sales manager of the Powell Machine Company, Worcester, Mass., has been appointed eastern representative of the **Houghton Elevator & Machine Company,** Toledo, Ohio.

On April 30 the New York office of the **Sunbeam Electric Company** (formerly Schroeder Headlight & Generator Company), Evansville, Indiana, was moved from 50 Church street to 52 Vanderbilt avenue, New York.

The Independent Pneumatic Tool Company, Chicago, on May 1, will remove its Detroit, Mich., offices from 736 David Whitney building, to larger quarters at 55 Garfield building. The new offices have 1,500 sq. ft. of floor space.

F. P. Roesch, prior to federal control master mechanic on the El Paso & Southwestern and during federal control supervisor of fuel conservation, Northwestern Region, United States Railroad Administration, has been appointed western manager of the Standard Stoker Co., Inc., Erie, Pa., with headquarters at Chicago.

On April 1, **Dwight E. Robinson** was placed in charge of eastern railway sales for the Du Pont Fabrikoid Company, Wilmington, Del., with offices at 21 East Fortieth street, New York. The selling arrangements previously existing with the Wendell & MacDuffie Company, 61 Broadway, New York, have been terminated.

The partnership lately existing between **L. H. Turner, Jr.,** and **L. W. Garratt,** under the name of **L. H. Turner, Jr., & Co.,** dealers in railway equipment, having been terminated by the recent death of Mr. Turner, the business will henceforth be conducted by Mr. Garratt as its sole proprietor, and under the name of **L. W. Garratt,** 358 Union Arcade, Pittsburgh, Pa.

Peter P. Beck, dealer in railway and manufacturers' supplies, will remove his office and showroom on May 1, from 105-107 Chambers street, New York, to 22 Thames street. Mr. Beck is sales agent at New York for the Bettendorf Company, Bettendorf, Iowa; Wine Railway Appliance Company, Toledo, Ohio; Railway Brake Specialties Company, Toledo, Ohio; Slick-Knox Steel Company, Sharon, Pa.; Sturdi-Truck Manufacturing Company, Holyoke, Mass.; Liberty Tool Corporation, Baltimore, Md.; Howe Waste & Packing Company, Providence, R. I.; Wm. A. Tottle & Company, Baltimore, Md.; and the Nu-ex Fire Appliance Company, Columbus, Ohio.

D. H. Colcord has been appointed advertising manager of the **Square D Company,** manufacturers of safety switches, Detroit, Mich., and Walkerville, Canada. Prior to this change he served in the capacity of director of research engineering. Mr. Colcord came to the Square D Company from the publicity department of the Westinghouse Air Brake Company. Prior to this he was associated with the department of publicity of the Westinghouse Electric & Manufacturing Company, Pittsburgh. Mr. Colcord is known for his contributions to technical and scientific journals and popular magazines. **L. W. Strong,** formerly of the publicity department of the Westinghouse Air Brake Company, has been appointed director of research engineering.

W. H. Patterson, manager, resale section, **Westinghouse Electric & Manufacturing Company,** East Pittsburgh, Pa., has been appointed assistant to manager, industrial department, in charge of metal working and wood working in-

dustries. Mr. Patterson graduated from the electrical engineering course of Perdue University in 1905. The following January he entered the apprenticeship course of the Westinghouse Company, and in 1910 was made manager of the resale section. Mr. Patterson has been identified for a number of years with the development of motors and control apparatus for application to cranes, elevators, hoists, and machine tools. During the war he served on the United States Shipping Board, Emergency Fleet Corporation, Electric Welding Committee.

At the second annual meeting of the **Industrial Car Manufacturers' Institute,** held in Pittsburgh, Pa., on April 20, members of the board of directors were elected as follows: **Lion Gardiner,** vice-president, the Lakewood Engineering Company, chairman; **N. A. Doyle,** vice-president, American Car & Foundry Company; **W. E. Farrell,** president, Easton Car & Construction Company; **J. M. Hansen,** president, Standard Steel Car Company; **J. R. Kilbourne,** vice-president and general manager, The Kilbourne & Jacobs Company; **R. J. Magor,** president, Magor Car Corporation; **J. C. Shirer,** president, the Star Manufacturing Company. Col. James Milliken was re-elected president of the Institute and H. M. Wey secretary. The Institute is really a get-together association of a number of the manufacturers of industrial cars; to procure economical results, promote a spirit of co-operation among its members, provide means for interchange of views affecting industrial car building interests, to preserve equitable conditions not only in the workshop, but in selling practices, to standardize designs and specifications, and to bring about a uniformity in method of inspection, purchase, etc. In order to secure the best results the organization has been divided into four groups, according to the class of cars manufactured, namely, builders of—1, coal mine cars; 2, standard gage dump cars; 3, other standard gage cars, and 4, all narrow gage cars, except coal mine cars.

William N. Keiser has been appointed manager of the general construction equipment department of the **Lakewood Engineering Company,** Cleveland, Ohio. Mr. Keiser was born near Logansport, Ind., and served in the Spanish-American war. He graduated from Purdue University with the degree of electrical engineer. He began work with the General electric Company, for whom he built power houses and underground systems, and then served with a public utility company as chief electrical engineer. Subsequently he was sales manager of the Parsons Company, Newton, Iowa, and then was with the Hydraulic Steelcraft Company, Cleveland, until his appointment as manager with the Lakewood Engineering Company as above noted.

W. N. Keiser

The **Westinghouse Union Battery Company** was recently organized in Pittsburgh, Pa., to produce storage batteries for every industry in which batteries are used. The company will specialize in starting and lighting batteries for renewal in automobiles, although the complete line will include batteries for trucks, tractors, motor boats and airplanes; also for home lighting systems, train lighting and railway signals. **A. L. Humphrey,** president of the Westinghouse Air Brake Company, and active in the management of all of its subsidiary organizations, is chairman of the board of directors of the new company. **D. F. Crawford,** vice-president and general manager of the Locomotive Stoker Company, is president of the new company, and **T. R. Cook,** formerly chief engineer and general production manager of the Willard Storage Battery Company, is vice-president and general manager. **T. S. Grubbs,** vice-president of the Union Switch & Signal Company, is also vice-president and secretary and treasurer of the new organization. The company is now occupying three floors of the Union Switch & Signal Company's factory at Pittsburgh. Its initial production will be from 1,200 to 1,500 batteries a day and the employees to start with will number about 500. It was decided to occupy the present working quarters instead of building a new factory at once, in order to lose no time in starting production. Preparations have been made to build a factory of from two to three times their present capacity on adjoining property. The company expects production to be started in June.

J. J. Thomas, Jr., formerly superintendent of motive power and car equipment of the Mobile & Ohio, at Mobile, Ala., has been appointed district manager of the **Oxweld Railroad Service Company,** Chicago, with headquarters at Mobile. Mr. Thomas entered railway service in 1881 as a fireman on the Selma, Rome & Dalton, now part of the Southern, later becoming a machinist apprentice on the same road. From 1885 to 1898 he was successively locomotive engineer, machine shop foreman, general foreman and master mechanic on the Birmingham & Atlantic. In 1898 he was appointed master mechanic on the Mobile & Ohio, with headquarters at Tuscaloosa, Ala., and was later promoted to assistant superintendent of motive power and car equipment, with headquarters at Mobile. In 1902 he was appointed master mechanic of the Seaboard Air Line, with headquarters at Savannah, Ga., resigning some time later to become master mechanic on the Atlantic Coast Line, with headquarters at South Rocky Mount, N. C. He was appointed superintendent of motive power and car equipment on the Mobile & Ohio in 1909, which position he held until the time of his appointment as district manager for the Oxweld Railroad Service Company.

J. J. Thomas, Jr.

Haskell & Barker Car Company

The announcement of the annual report of the Haskell & Barker Car Co., Inc., Chicago, for the year ending January 31, 1920, published in the *Railway Age* of April 16, page 1218, was inaccurate in stating that a depreciation appropriation of $3,000,000 was deducted from the net earnings of that company. According to the annual report of the company this appropriation amounted to $300,000.

Movies to Show Break Beam Manufacture

A novel method of familiarizing railway men with the manufacture and use of brake beams will be introduced shortly by the Chicago Railway Equipment Company, Chicago, by means of a five-reel film entitled, "Brake Beams—Their Manufacture and Use." The film was taken under the supervision of T. A. Le Beau of the Chicago Railway Equipment Company and traces the developments from the handling of the raw material at the rolling mill until the various parts are assembled into a finished brake beam. Four of the large industrial plants of the country were visited in making the film. It concludes with the brake beam in service showing the damage that results from improperly applied brake beams. It is planned to show the film at various gatherings of railroad executives, at railroad conventions and to groups of workmen, after which it will be sent abroad.

Fairbanks, Morse & Company

The final net profits, made by Fairbanks, Morse & Company Chicago, according to that company's annual report for the year ending December 31, 1919, after providing for all expenses and after setting aside $1,000,000 as a reserve for income and excess profits taxes and for contingencies, amounted to $3,289,254.77. Dividends on the preferred and common stocks for the year have absorbed $900,842.00, leaving the amount of $2,388,412.77 to be transferred to surplus account, which now stands at $18,300,225.37. After deducting the preferred stock dividend, the net profit shown above is equal to 17 per cent on the average common capital and surplus employed in the business during the year, as compared with a net return of 13 per cent in 1918 on the same basis.

In accordance with the provisions of the preferred stock issue there has been set aside, before arriving at the profit, the sum of $100,000 as a sinking fund, which will be used for the retirement of an equivalent amount of preferred stock by purchase during the current year.

During the year the directors voted a special donation of $50,000 in Liberty Loan Bonds to the Employee's Pension Fund making the total contributions of the company to this fund during the year $115,874.49. The accumulated funds in the hands of the Trustees of the Pension Fund at December 31 amounted to $505,256.05.

Since the date of the last report the balance of the unissued capital stock, namely 1,050 shares of common stock and 2,778 shares of preferred stock has been disposed of. The common stock was sold pro rata to the common stockholders at $100 per share, the preferred stock being sold to employees and others at par.

The present accounts show the capital stock of the company as it existed on December 31, 1919, but since the close of the fiscal year the common capital stock has been increased from 25,000 shares of $100 each to 325,000 shares of no par value. Of this increase, 250,000 shares have been exchanged with the common stockholders for the 25,000 shares then outstanding and 22,617 shares have been sold to employees on extended terms, the payments to be made during a period of three years. Of the balance, 37,500 shares have been sold to interests outside the company and the remainder reserved for future disposition by Board of Directors.

The balance sheet is as follows:

Assets		
Cash on hand and in banks:		
At Chicago, branch houses and factories....	$858,956.03	
Accounts receivable:		
For merchandise sold and work done and miscellaneous accounts owing at Chicago, branch houses and factories, less reserves.	5,137,277.98	
Notes receivable:		
At Chicago and branch houses, less reserves	1,084,944.33	
Inventories of merchandise:		
On hand and on consignment at Chicago and branch houses, and work in process, finished goods and raw material at factories..	11,138,538.47	
Foreign branch houses:		
Balances owing at date, less reserves.....	799,683.10	
Current investments	213,339.02	
Total current assets.....		$19,232,738.93
Deferred charges		54,667.31
Furniture and fixtures.....		112,906.45
Machinery, tools and equipment:		
At Chicago branch houses and factories, including patterns and drawings		3,810,711.89
Factory buildings and real estate.....		2,673,175.80
Warehouse buildings and sundry real estate.....		343,699.73
Patents, trade marks and goodwill.....		1.00
Special investment:		
Capital stock of E. & T. Fairbanks & Company, St. Johnsbury, Vermont		1,500,000.00
		$27,727,901.11
Liabilities		
Accounts payable:		
Owing for goods purchased and expenses at Chicago, branch houses and factories, and for credit balances on sales ledgers.....	$3,038,015.94	
Accrued expense	245,764.57	
Total current liabilities.....		$3,283,780.51
Reserve for taxes and contingencies.....		1,643,895.23
Capital stock—authorized and issued:		
Common stock	$2,500,000.00	
Preferred stock	2,000,000.00	
		4,500,000.00
Surplus:		
Sinking fund for redemption of preferred stock	$100,000.00	
General surplus	7,772,710.23	
Special surplus	8,039,102.37	
Undivided profits as per attached statement..	2,388,412.77	
		18,300,225.37
Contingent liability on notes under discount...	$568,824.42	
		$27,727,901.11

Railway Financial News

ATLANTA & WEST POINT.—W. L. Mapother has been elected a director succeeding Milton H. Smith, resigned.

CHICAGO UNION STATION COMPANY.—A syndicate composed of Kuhn, Loeb & Co., the National City Company, Lee, Higginson & Co., the First National Bank of New York, and the Illinois Trust and Savings Bank of Chicago, are offering $10,000,000 43-year 6½ per cent first mortage bonds of the Chicago Union Station Company. The bonds are being offered at 98½ and interest to yield about 6.60 per cent.

DELAWARE & HUDSON.—See editorial elsewhere in this issue.

MARSHALL & EAST TEXAS.—The Texas & Pacific has purchased a portion of the Marshall & East Texas Railroad from Receiver Bryan Snyder for $17,500.

PENNSYLVANIA.—The New Jersey Public Utility Commission has approved the application of this company for the issuance of $50,000,000 of general mortgage bonds at par.

TEXAS & PACIFIC.—*See* Marshall & East Texas.

WESTERN PACIFIC.—The holders of the preferred stock who received 4 per cent in 1919 instead of 6 per cent the stock calls for, may receive the 2 per cent which was not paid them last year in the form of additional dividends, provided compensation is received from the government sufficient to allow for such payment. A circular sent to the preferred stockholders says, in part:

"The board of directors are advised by counsel that if as a result of this pending proceeding, the Western Pacific Railroad Company is awarded as compensation a sum which may properly be credited to income for any period on account whereof full 6 per cent dividends have not been paid, and there is thus made available a fund for dividends on account of such period at a rate in excess of that already paid, then, though the preference granted the preferred stock of this corporation is not cumulative, it will nevertheless be proper, if then existing conditions in the judgment of the directors permit the disbursement, for this corporation to pay the holders of its preferred stock on account of the period referred to additional sums which, together with such dividends as shall actually have been paid, will absorb the profits of such period available for distribution up to but not exceeding the full amount required for dividends on the preferred stock at the rate of 6 per cent per annum.

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The Railroad Station in Melbourne, Australia

ANNUAL REPORT

The Delaware and Hudson Company—Ninetieth Annual Report

New York, N. Y., April 1, 1920.

To the Stockholders of
The Delaware and Hudson Company:

The following presents the income account of your company for the year 1919, arranged in accordance with the rules promulgated by the Interstate Commerce Commission, with comparative results for the year 1918:

		1919	COMPARISON WITH 1918 Increase or Decrease
Compensation accrued under Federal Control (on basis of Standard Return) for possession, use and control of railway property of the company and its leased and operated lines	.....	$7,415,148.72	.....
OTHER CORPORATE INCOME:			
Miscellaneous rent income	$56,979.37	.....	—$80,218.14
Income from lease of road	86,763.87	.....	—16,059.10
Miscellaneous non-operating physical property	85,942.05	.....	63,440.95
Dividend income	934,267.98	.....	—3,895.12
Income from funded securities	234,251.46	.....	9,018.63
Income from unfunded securities and accounts	377,089.87	.....	—70,010.08
Income from sinking and other reserve funds	107,245.01	.....	—54,923.12
Miscellaneous income	1,585,378.24	.....	432,931.96
TOTAL OTHER CORPORATE INCOME	.....	3,467,917.85	$280,285.98
GROSS INCOME	.....	$10,883,066.57	$280,285.98
DEDUCTIONS FROM GROSS INCOME:			
Railway operating expenses	$215,048.62	.....	119,278.17
War taxes	138,000.00	.....	10,972.48
Miscellaneous tax accruals	28,542.53	.....	10,906.26
Rent for leased roads	1,954,123.97	.....	7,137.89
Miscellaneous rents	3,268.00	.....	3,268.00
Interest on funded debt	2,919,237.04	.....	—19,081.22
Interest on unfunded debt	369,382.36	.....	226,654.35
Miscellaneous income charges	650,459.57	.....	30,938.00
TOTAL DEDUCTIONS FROM GROSS INCOME	.....	6,278,062.09	$390,073.93
NET INCOME—THE DELAWARE AND HUDSON COMPANY CARRIED TO GENERAL PROFIT AND LOSS	.....	$4,605,004.48	—$109,787.95
PERCENTAGE TO CAPITAL STOCK	.....	10.83	.26

FINANCIAL.

The capital stock of The Delaware and Hudson Company, on December 31, 1919, was $42,503,000, there having been no change during the year.

The total funded debt on December 31, 1919, was $65,143,000, a reduction of $867,000 having been effected during the year by the purchase and cancellation of that amount of First Lien Equipment bonds through the sinking fund established in connection with their issue.

The sum of $395,040, being one per cent of the par value of the First and Refunding Mortgage Gold bonds outstanding on June 1, 1919, was paid during the year to the trustee under the First and Refunding Mortgage, making the total paid to December 31, 1919, $3,241,190. This amount has been expended in additions and betterments to the mortgaged property in accordance with the trust agreement.

There was accumulated in the Coal Department sinking fund during the year, in accordance with the ordinance passed on May 9, 1899, and amended on May 10, 1910, $353,787.82, which has been applied to reimburse the treasury for coal lands and unmined coal in Pennsylvania.

The usual payment of $650,000 required under the terms of the First Lien Equipment Trust indenture, was made, making the total paid to date $7,800,000. This has been increased by accumulations of interest on balances and investments.

During the year there was received from the United States, in partial payment of compensation for the taking over of the company's property in December, 1917, and its subsequent occupation and use by the United States, the sum of $7,201,100, and the company borrowed from the United States Railroad Administration, without security, $608,000; making a total of $7,869,100 for the year, which with the amount for 1918, namely, $6,290,000, makes a total for both years of $14,099,100. The Interstate Commerce Commission certified to the President, under the Act of March 21, 1918, that the average income of your company's railway for the three years that ended June 30, 1917, was $7,409,600.12. On that basis your company received $720,100.24, or 4.86 per cent less than it should have received to December 31, 1919. This balance, subject to any adjustments which may be necessary on account of additions to the property during Federal control and for other purposes, will be provided for in the final settlement with the Government.

The changes in the accounts "Current Assets" and "Current Liabilities" are principally the result of relations with the Federal government consequent upon the taking over of your railway. During the year the Railroad Administration accepted a collateral note, in the sum of $1,900,000, in reimbursement for additions and betterments made by the Director General, and two notes aggregating $2,410,000 to apply in liquidation of an open account based upon the current assets and liabilities taken over at the end of 1917 and subsequent operations in connection therewith. These notes were insisted upon by the Railroad Administration although any balance resulting from these transactions was amply secured by cash and materials taken over with the railway property.

COAL DEPARTMENT.

The anthracite produced by your system corporations during the year 1919, including the product of washeries, aggregated 8,205,495 long tons, a decrease of 853,733 tons, or 9.42 per cent below 1918. The year's output was 12.27 per cent of the total output of Pennsylvania mines and washeries, which was 66,855,311 long tons or 12.78 per cent below 1918. The decrease in production, compared with 1918, was almost entirely in the output of the washeries. The demand for steam sizes was very much below 1918 and, as these sizes make up nearly all the coal recovered from the culm banks and prepared in the washeries their operation was necessarily less constant and extensive than during the previous year.

The demand for domestic sizes of anthracite was good throughout the year, except during February and March, and every effort was made to maintain production. Underground development was duly prosecuted and the properties were fully maintained.

In February the United States Fuel Administration relinquished most of its control over the production and distribution of anthracite.

On January 22, 1919, Plymouth No. 5 Breaker was entirely destroyed by fire. Clearing of debris began immediately and was followed at once by construction of foundations for a new structure and the erection of a larger and more efficient breaker equipped with the most modern machinery. Vigorous prosecution made it possible that on June 2, 1919, only 131 days after the fire, the new plant was complete and began preparing coal. This breaker has a capacity of 6,000 tons per day and is built of steel with the minimum of inflammable material so that the fire-risk is reduced to the lowest practicable limit. The structure replaced was of wood. While construction was in progress the coal produced in the Plymouth District was transported in railroad cars to other system breakers so that there was little reduction in output or in the work offered to the mine employees, thus making it possible to keep the organization intact.

The calendar year 1919 was the first since 1915 in which there was no upward revision of the wages-scale provided for in the agreement between the employees and the mine owners. The wages rates which took effect on November 1, 1918, as explained in the report for last year, were in force throughout the year. The term of the present agreement will expire with the close of business on March 31, 1920, and the employees have formulated proposals for a new agreement, among which are the following:

1. That the next contract shall be for not more than two years, instead of four years as provided in recent agreements.
2. That all contract wages rates shall be increased sixty per cent and all men working by the day shall receive a minimum increase of $2.00 per day.
3. That a working day of six hours, from bank to bank, shall be established for all classes of labor.
4. That work shall be carried on for only five days per week instead of six days as at present.
5. That all employees shall be allowed one and one-half times the standard wages for ordinary overtime and double the standard pay for work on Sundays and holidays.
6. That only members of the Union shall be employed (the "closed-shop") and that there shall be full recognition of the United Mine Workers of America.

The proposals include other items, some of them of a rather technical nature and involving large sums of money. Those outlined above indicate, however, the extent and radical character of the views that may be pressed by representatives of the employees. Negotiations have begun but it is as yet too early to forecast the result. Pending these negotiations, work is in progress at all operations, under an agreement that any change that may be made shall be retroactive to April 1, 1920.

RAILROAD DEPARTMENT.

The United States continued in possession, throughout 1919, of your railway property and that of your system corporations in the United States, together with your boat lines operating on Lake Champlain and Lake George, and these properties continued to be operated through the United States Railroad Administration. All operations during the year were for the account of the United States which were responsible for all expenses of operation, including maintenance, and for all taxes except war taxes, and for compensation, in the nature of rent, for your temporary expropriation, in accordance with a contract with the Director General of Railroads, acting for the United States and for the President, which was executed on December 9, 1919. The compensation stated in this contract, determined by the Interstate Commerce Commission in pursuance of the Act of Congress of March 21, 1918, for all system property taken under Federal control, and possibly subject to some further adjustment, is at the annual rate of $7,480,204.83. In addition you will be entitled to compensation in respect of additions to the properties provided for your account during the period of Federal control. The compensation thus secured is less, in the opinion of your officers, than the *just compensation* required in such cases by the Constitution of the United States, the right to which is commonly supposed to be fully protected by the Bill of Rights. In other respects the contract is regarded as unsatisfactory and as failing to accord that protection to the rights of ownership which was expressly promised by the President's proclamation of December 26, 1917, and plainly intended in the Act of Congress of March 21, 1918. The terms of this contract were, in every practical sense, dictated by officers of the Railroad Administration. Federal representatives were met in your behalf, but not in open negotiation and your representatives were never free agents. The alternatives were the acceptance of the proffered contract or its rejection; that is to say, the acceptance of inadequate compensation and harsh terms, on the one hand, or, on the other, the possibly indefinite postponement of compensation and the uncertainties and delays of litigation involving unprecedented conditions. Confronted by conditions in which justice delayed might prove as injurious as justice wholly denied it seemed more in your interest to accept an immediate though unsatisfactory definition of the terms on which your property was taken and held than to press to solution questions of corporate rights and public obligation which would certainly require years for judicial determination and would still leave the ultimate settlement to depend upon political action.

Contemporaneously with the execution of this contract your company was required formally to accept fifteen hundred freight cars, one thousand 55-tons hopper cars and five hundred 50-tons box cars, the cost of which, not yet accurately determined, will not be less than $3,912,500 nor more than $4,365,545. This additional equipment was not accepted until every available and proper means of convincing the authorities of the Railroad Administration that your company ought not to be forced to this additional

investment had been exhausted, nor until your officers had been told that no contract under the Act of March 21, 1918, providing compensation for the use of your railway, would be executed by the Director General until such action had formally been taken. Under this practical coercion it was considered that the objections to the acceptance of the equipment were less than the objections to being forced into a situation in which all the relations arising out of Federal control would necessarily become the subject of litigation. In authorizing the acceptance of these cars your Board of Managers adopted resolutions as follows:

WHEREAS, the Director General of Railroads of the United States has purchased and allocated to this Company five hundred (500) single sheathed box cars, at the price each of approximately $3,050.00, or $1,525,000.00 in the aggregate, and one thousand (1,000) 55-T hopper cars, at the price each of approximately $2,817.00 or $2,817,000.00 in the aggregate, making a total of $4,342,000.00 for said equipment; subject, however, to the rights of the company under Section 8 of the contract proposed to be entered into between this Company and the said Director General, for the possession, use, control and operation of the Company's railroads and systems of transportation, in case a loss is claimed in respect of the foregoing equipment; and the said Director General has demanded that this Company accept and purchase said equipment at a price not exceeding $4,342,000.00* and

WHEREAS, an understanding has been effected between the Director General and representatives of this Company and other corporations owning railroad properties, to the effect that the purchase of equipment obtained in the manner aforesaid may be financed under a national equipment trust, to be provided for with the aid and co-operation of the United States Railroad Administration, in such manner that the amounts necessarily to be provided on behalf of this Company can be repaid serially and that the interest thereon will not exceed six per cent per annum, and

WHEREAS, although the officers of this Company have protested that said additional equipment is not necessary or desirable for any corporate purposes or to render any services performed by the railway owned by this Company and that the purchase thereof at the prices aforesaid or at any prices approximately commensurate with the cost at which said Director General obtained such equipment will cause a loss to this Company, said Director General has pressed and insisted upon his said demand, and has now made acquiescence by this Company and the acceptance and purchase of said equipment a condition of the execution by himself, on behalf of the United States and of the President of a contract, as provided by the Act of Congress of March 21, 1918, for the possession, use, control and operation of the properties of this Company and its subsidiaries which were taken under Federal control by the President of the United States by his Proclamation of December 26, 1917, and has refused to enter into such contract unless this Company agrees to accept and purchase said equipment at the prices aforesaid, and

WHEREAS, it is desirable that this Company should have a contract for such possession, use, control and operation of the properties aforesaid and a contract has been conditionally tendered by said Director General and this Company has been advised that said contract will be executed by him, on behalf of the United States and of the President, provided this Company does agree to purchase and accept said equipment, and the objections to such acceptance and the losses to be entailed thereby are less serious than the objections to be forced to do without the contract aforesaid and less serious than the losses which would be threatened by the absence of such contract.

Now, THEREFORE, in consideration of the facts recited above, the President and the Vice-President of this Company, or either of them be, and they are hereby authorized formally to agree, for this Company, to accept and purchase said equipment, the price thereof not to exceed $3,050.00 for each of said five-hundred (500) single sheathed box cars or $2,817.00 for each of said one thousand (1,000) 55-T hopper cars, and the total price not to exceed $4,342,000.00 and to enter into said agreement to accept and purchase in such form as may be required by said Director General. And said officers are further empowered and authorized to make such arrangements for financing said purchase, either through an equipment trust or otherwise, as may to them seem best for the interests of the Company with full power and discretion in the premises.

*The prices stated in the foregoing were those originally and tentatively indicated by the Railroad Administration. There was some subsequent revision of the estimates and, as they now stand, the minimum and maximum prices are as stated in the text.

The position taken by the Director General in making acceptance of this equipment a condition prerequisite to the execution of a contract for compensation, is believed to evidence acquiescence, on the part of the Railroad Administration, in the view widely held by railway officers and counsel that neither in the Act of March 21, 1918, nor in the contract dictated by the Railroad Administration is to be found authority to compel any railway corporation to make such an addition to its property or to its investment. The intention of Congress that all additional equipment deemed necessary should be obtained for the account of the United States seems incontestably established by the terms of the sixth section of the Act of March 21, 1918.

Early during the period of Federal control, the Director General of Railroads ordered from car-builders 100,000 freight cars, the determination to do so probably expressing his purpose most amply to provide in advance for the maximum demands which the exigencies of war could possibly make upon the transportation agencies which had been seized under the war-power and placed under his control. It does not appear that in connection with this action any consideration was given to the financial condition or equipment requirements of any particular carrier or the normal necessities of the railway industry as a whole. At the time these orders were entered it was doubtless intended that the new equipment should become the property of the United States and, at the end of Federal control, be subject to such disposition as Congress might provide. The decision to make a compulsory distribution of these cars among railway corporations, forcing certain carriers to become obligated for their cost at the excessive prices of the war period, was apparently an afterthought derived from the failure of the Railroad Administration to keep its expenses within the limits of its income, the reluctance of Congress to meet additional deficits and the financial pressure which resulted. Your officers are unable to find that in the distribution which was enforced, there was any genuine inquiry as to the sufficiency of the equipment already owned by the companies to which allocations were made, as to the specific character of their equipment requirements or as to prospective changes in the nature and volume of their traffic. In other words, the distribution decided upon appears to have been purely arbitrary and took no account of the generation-long controversy between roads originating and roads distributing traffic, between roads lending and roads borrowing cars. On behalf of your company, attention was called to the large favorable balance in "hire of equipment" which your system has enjoyed over a ten years period, to the special character of its position and traffic and facts and figures were adduced showing the complete adequacy of the equipment already owned. These representations did not suffice either to obtain a withdrawal of the official demand or to induce a reduction in the number of cars allocated. This was the more disappointing in view of the fact that similar representations on behalf of other carriers resulted more favorably.

Under an agreement with the Director General, these cars have been placed under an equipment trust which secures the entire purchase price, which is to be their cost as finally determined in accordance with the contracts under which they were manufactured. Payment will be made in fifteen equal, annual installments, the first to fall due on January 15, 1921, with interest at the rate of six per cent. Notes in the total sum of $3,912,000 have already been issued to the Director General under this trust, and additional notes will be given in case the cost, as finally determined, exceeds that figure. The maximum possibly required under this agreement is $4,365,545.

The Transportation Act of 1920 is primarily an effort to provide for the readjustments necessitated by the restoration of the railways to their owners and the anticipated return to normal conditions. It contains, in addition, important changes in the regulative system some of the defects of which, repeatedly illustrated in these reports, were demonstrated beyond all controversy, during the war-period. Probably no informed individual now doubts that except for these defects the dangerous and costly expedient of Federal control would have been wholly without justification or excuse.

The immediate period of readjustment is provided for in the Act by the creation of a revolving fund of $300,000,000 out of which loans, for periods of not more than five years and at six per cent, may be made to carriers and by guaranteeing to those which accept stated conditions, for a period of six months ending with August 31, 1920, the "standard return" computed in accordance with the Act of March 21, 1918. Your Board has accepted the conditions of this guarantee and has thereby pledged your company to pay to the United States any railway earnings during the period from March 1 to August 31, inclusive, in excess of the amount guaranteed.

A permanent provision is that the carriers subject to the regulative system—

> "as a whole, or as a whole in each of such rate groups or territories as the Commission shall from time to time designate,"

shall be accorded rates that will—

> "under honest, efficient and economical management and reasonable expenditures for maintenance of way, structures and equipment, earn an aggregate annual net railway operating income equal, as nearly as may be, to a fair return upon the aggregate value of the railway property of such carriers held for and used in the service of transportation."

The Interstate Commerce Commission is required from time to time to determine and make public the percentage rate deemed to constitute the "fair return" contemplated by the foregoing, and in fixing such rate to—

> "give due consideration, among other things, to the transportation needs of the country and the necessity (under honest, efficient and economical management of existing transportation facilities) of enlarging such facilities in order to provide the people of the United States with adequate transportation."

For a period of two years, however, from March 1, 1920, to February 28, 1922, inclusive, the determination of the rate constituting a fair return is taken out of the powers conferred on the Commission and the rate is fixed by the statute at five and one-half per cent, with an additional one-half of one per cent which, in the discretion of the Commission, may be allowed for the purpose of providing for expenditures chargeable to capital. Earnings in excess of the statutory "fair return" and also in excess of six per cent upon the value of their property are to be equally divided between the United States and the carrier, the portion of the latter to be accumulated, to an aggregate equal to five per cent of such value, as a special reserve fund, available, only during periods of inadequate earnings, for certain income deductions and dividends. The portion taken by the United States is also to constitute a special fund, to be administered by the Interstate Commerce Commission and, in the extent deemed necessary and according to the terms of the statute, to be available for use—

> "in furtherance of the public interest in railway transportation either by making loans to carriers to meet expenditures for capital account or to refund maturing securities originally issued for capital account, or by purchasing transportation equipment and facilities and leasing the same to carriers, . . ."

It is to be noted that the "fair return," whether under the temporary determination by Congress or subsequently under determination by the Commission, is to be an *average* return for all the railways of the country or for groups of railways designated by the Commission. An average necessarily represents items some of which are above and others below the average. Provision is made for taking half the excess in the case of railways that earn more than the average and for controlling such railways in the use of the moiety they may retain. But there is no provision for making up to those below the average all or any part of the deficiency below the statutory "fair return." Question has been made as to the right of Congress to take from any corporation, except by taxation, any part of its earnings at rates fixed by public authority as reasonable and just; it is at least equally questionable whether Congress has power to enforce a system of rate-making which, by its terms, plainly requires some carriers to render services for less than a fair return.

While your railway was under Federal control your income account was not affected by the operating results obtained by the Railroad Administration and these results are of importance only to the extent that they indicate the conditions under which the property is returned to your possession and control. All the following data relating to operating results have been supplied by the Railroad Administration.

The railway operating revenues amounted, in 1919, to $34,749,709, which was *$40,155* or about *one-eighth of one per cent less* than in 1918 and $4,760,310 or 15.87 per cent more than in 1917. Operating expenses amounted to $31,671,504, an increase of $317,720 or 1.01 per cent over 1918 and $8,221,551 or 35.06 per cent more than 1917. Operating income, before deduction of taxes, was, therefore, *$357,875* or *10.42* per cent *lower* than in 1918 and $3,461,241 or *52.93* per cent below 1917.

Freight receipts were *$621,482* or *2.06* per cent *less* than in 1918 but $4,136,081 more than in 1917. Total freight movement amounted to 3,531,432,611 ton-miles, which compares with 4,062,078,074 in 1918 and 3,954,096,760 in 1917; the *decrease* from 1918 being *530,645,463* ton-miles or *13.06* per cent and that from 1917 being *422,664,149* ton-miles or *10.69* per cent. Average receipts per ton-mile amounted to 8.35 mills in 1919, 7.41 mills in 1918 and 6.41 in 1917, the gain amounting to 12.69 per cent over 1918 and 30.27 per cent over 1917. There were no important changes in freight rates during the year and the gain in the average receipts per ton per mile results from the fact that the advances made by the Director General in 1918, and operative for only a part of that year, were in force throughout the whole of 1919. There were no very significant changes in the relative volume of different kinds of traffic, as compared with 1918, the total reduction being distributed among the various classes and attributable to the termination of actual war. Diversion of traffic from your lines, by reason of the orders and policy of the Railroad Administration, continued throughout the year.

Passenger movement aggregated 132,884,475 passenger-miles, which is to be compared with 112,180,679 miles in 1918 and 129,620,729 in 1917. The increase over 1918 was 18.46 per cent and that over 1917 was 2.52 per cent. Mileage of passenger trains increased 10.07 per cent over 1918 but remained *14.77* per cent *below* 1917. Passenger-car-miles show an increase

of 15.15 per cent over 1918 and a *decrease* of 12.96 per cent under 1917. Average receipts per passenger per mile travelled amounted to 2.45 cents, comparing with 2.50 cents in 1918 and 2.34 cents in 1917. Per passenger train mile these receipts increased from $1.14 in 1917 and $1.36 in 1918 to $1.44, the increase being 5.88 per cent over 1918 and 26.32 per cent over 1917. Per passenger car mile the increase was 23.22 per cent over 1917 and six tenths of one per cent over 1918 to an average of 28.60 cents in 1919. The increased passenger travel was due to renewed efforts to stimulate such business, the Railroad Administration having sought to discourage non essential movement of passengers throughout the previous year. In June, 1918, the Railroad Administration advanced the standard passenger rate to three cents per mile and this rate was in force throughout the entire year 1919. That this did not more materially influence the average passenger-mile receipts is due to the extensive movement of soldiers, sailors, clergymen and others at special rates lower than the standard.

Express revenue increased $97,222.00, or 21.77 per cent, of which $34,498 represents an adjustment on account of understatements prior to the beginning of the year and $62,724 is your railway's portion of the increase in express receipts resulting from the general advance in express rates which the Railroad Administration instituted on January 1, 1919.

Per diem demurrage rates were reduced on July 20, 1919, from $3.00, $6.00 and $10.00 charged, respectively, for the first four days; the fifth to seventh days, inclusive, and the eighth and all subsequent days, to $2.00 for the first four days and $5.00 for each subsequent day. This chiefly accounts for *reduction* of *$207,529*, or *59.99* per cent, in receipts from demurrage.

Miscellaneous revenue increased $144,465, or 147.64 per cent, chiefly representing unusually large receipts from storage charges, resulting from the removal from storage in 1919 of a large volume of anthracite which had been placed in storage in 1918.

By the Act of Congress of July 28, 1916, it became the duty of the Interstate Commerce Commission to establish rates for railway services in the transportation of the mails and to make rules governing their application. This duty has just been performed and the judgment of the Commission requires considerable increases over the rates recently paid by the Post Office Department. The new rates are to be retroactive to November 1, 1916, and it is estimated that the adjustment should benefit your company to the extent of $43,750, representing underpayments between November 1, 1916, and December 31, 1917. The adjustment covering the period of Federal control will be with the Railroad Administration and will have no effect in your accounts. The new rates will somewhat increase your future revenue from mail service and you will be relieved of operating expenses in the amount of about $12,000 per year, as the Post Office Department will hereafter assume the expense of handling the mails between your stations and the post offices.

Operating revenues, as already noted, increased $40,155 over 1918 (although freight movement *decreased* more than one-eighth) and $4,760,310 over 1917 (in comparison with which the movement of 1919 was *reduced* more than one-tenth). Compared with 1918, expenses for maintenance of way and structures increased $440,341, or 11.78 per cent; expenses for maintenance of equipment increased $443,993, or 4.66 per cent, and transportation expenses *decreased $949,316*, or *5.73* per cent, a reduction wholly due to *decreased* freight movement. Compared with 1917, expenses for maintenance of way and structures increased $1,655,895, or 65.66 per cent; expenses for maintenance of equipment increased $3,317,824, or 49.80 per cent, and transportation expenses increased $2,860,571, or 22.44 per cent. These comparisons with the last year of corporate operation, prior to Federal control, show the very large extent in which the ratio of expenses to work accomplished was raised while your property was operated by the Railroad Administration.

The wages of enginemen and trainmen were further increased on January 1, 1919, and those of shopmen on May 1, 1919. Other increases, over the wages paid in 1918, resulted from interpretations of its previous orders which were promulgated by the Railroad Administration during 1919. Disturbance of established relations among the rates of compensation paid to different classes of employees, resulted from the adoption of the recommendations of the commission of which Honorable Franklin K. Lane was chairman and the numerous advances in wages thus originated. Much of the present unrest on the part of the employees is attributable to this breaking down of adjustments sanctioned by the practice of many years and that had long been accepted.

GENERAL REMARKS

The business of the United States waits upon the restoration of normal conditions at home and abroad. The chief domestic obstacles to the resumption of progress are (1) the extremely low purchasing power of money, (2) continued absorption of liquid capital by the Federal government and (3) excessive and badly adjusted taxation. These conditions may be separately indicated although they are closely related and interdependent. For example, low purchasing power of money, commonly suggested by the popular phrase "high cost of living," is in part a consequence of the unprecedented extent in which high taxes have been made a part of the cost of every productive process, while in some degree the volume of taxation is necessarily augmented in order to meet increased governmental expenses resulting from the high level of prices.

The diminished purchasing power of money is sufficiently indicated by the index numbers of wholesale prices compiled and published by the Bureau of Labor Statistics of the United States. These numbers, the year 1913 being used as the basis of comparison, i. e., 100 per cent, are:

Year	Average wholesale prices of "all commodities" compared with 1913	Year	Average wholesale prices of "all commodities" compared with 1913
1913	100	1917	176
1914	100	1918	196
1915	101	1919	212
1916	124		

In considering the foregoing it is desirable to bear in mind that the prices of 1913, the year used as the basis of the comparisons, represented a great advance which had been substantially continuous since 1896. The prices of 1913 averaged more than fifty per cent higher than those of 1896, and about eighteen per cent higher than those of 1905. The upward movement of prices during the last half of the year 1919 was much more rapid than during any previous six months' period.

The easy conclusion that such advances in prices, to which so far as they represent necessaries of life all costs of production must be adjusted, are fully explained by the term "inflation" will not suffice. Money in circulation in the United States has greatly increased, but not in the degree required by the theory suggested. The data are as follows:

July 1	Gold and gold certificates	Silver and currency	Total
1913	$1,612,398,508	$1,751,339,941	$3,363,738,449
1914	1,637,693,820	1,764,321,607	3,402,015,427
1915	1,662,981,438	1,906,238,136	3,569,219,574
1916	2,051,073,561	1,973,057,006	4,024,130,567
1917	2,428,226,886	2,335,348,746	4,763,575,632
1918	1,932,430,775	3,446,996,649	5,379,427,424
1919	1,715,173,257	4,125,853,271	5,841,026,528
1920*	1,270,196,627	4,690,186,239	5,960,382,866

*January 1, 1920.

While these figures show very rapid increase in the volume of the circulating medium, it will be noted that the increase by no means coincides with the increase in prices, nor was there any accentuation of the rate of increase in the monetary supply which compares with the great acceleration in the upward movement of prices that occurred during the last half of 1919. Statistics of bank clearings show, however, that the work done by the average monetary unit can be and has been greatly increased, probably to supply the larger funds required to do business at the higher levels of prices and wages. The figures are:

Year	Total bank clearings	Average per $1.00 of money in circulation
1913	$169,815,700,600	$50.48
1914	155,242,201,536	45.63
1915	187,817,564,545	52.62
1916	261,855,773,663	65.07
1917	306,940,364,112	64.43
1918	332,354,026,463	61.78
1919	417,519,523,388	71.48

Although the volume of money in circulation decreased to $5,846,086,199 on February 1, 1920, the first two months of the year show an increase in bank clearings of 28.50 per cent to an aggregate for the period of $74,832,130,591, which compares with $58,236,285,740 in the same portion of 1919. These data suggest the operation of an impulse towards high prices other than the volume of money in use. Increases in bank loans and in individual deposits have been roughly proportionate to the increases in coin and currency in circulation. Such loans, reported by the Comptroller of the Currency, stood at $15,288,357,283 in 1914, and at $27,114,262,000 on June 30, 1919, while the growth in deposits was from $18,517,232,879 in 1914 to $33,180,744,000 in 1919.

Prior to the year 1917, early in which the United States became engaged in the conflict with the Central Powers of Europe, Federal expenses, not including the cost of the Panama Canal, had never in any year reached a total of three-fourths of a billion dollars. The highest for any year, 1915, was $731,399,759 and the average for ten years, 1907 to 1916, inclusive, was $664,244,727. For the first eight months of the current fiscal year, that is from July 1, 1919, to February 29, 1920, the corresponding aggregate was $4,107,732,751. During February, 1920, these expenses amounted to $274,950,739, or at an annual rate in excess of $3,450,000,000. Although the expenditures for these periods show a notable reduction below the eight months from July 1, 1918, to February 28, 1919 (during a large part of which war was actually in progress), when the total was $11,254,465,355, it was still necessary to rely heavily upon the issue of Treasury certificates of indebtedness and the proceeds of such issues covered into the Treasury (but used, in part, to redeem certificates of the same character) during the later period amounted to $9,709,974,969. The total of such certificates outstanding on October 31, 1919, was $3,733,423,800.37, representing 14.38 per cent of the total interest bearing debt of that date which was $25,969,641,645.36. Banking resources are also absorbed in loans made to enable purchases of United States bonds, these loans being repeatedly extended. Data showing the combined resources and liabilities of the twelve Federal Reserve banks show that the following conditions existed on the dates indicated:

Twelve Federal Reserve banks	1919 March 14	1920 March 12
Total resources	$5,247,803,000	$6,127,705,000
Bills on hand:		
Total	2,148,502,000	2,927,618,000
Per cent of resources	40.94	47.78
Bills on hand:		
Total	$2,148,502,000	$2,927,618,000
Secured by Government war obligations:		
Total	1,702,351,000	1,515,959,000
Per cent of bills on hand	79.23	51.78
Otherwise secured:		
Total	$446,151,000	$1,411,659,000
Per cent of bills on hand	20.77	48.22

The foregoing shows progress mainly in the accumulation of resources and it is evident that a reduction in the year of but $186,392,000, or 10.95 per cent, in the loans secured by Federal war obligations is unsatisfactory. To the extent that the resources of these banks continue to be used to finance the Government they are withdrawn from the commercial field and the normal utility of the Federal Reserve system is impaired. Taxation impinging principally upon potential saving has prevented the liquidation of a far larger proportion of these loans and has congealed assets that ought to be, and were intended to be, available for business purposes. Indeed, from whatever angle the present system of Federal taxation is approached, it is found to work badly, to penalize frugality and saving, to promote profligate and wasteful expenditure, to interfere with the accumulation of capital and the normal course of industrial development. The Secretary of the Treasury of the United States has recommended changes which would relieve some of the most depressing features of the system, including repeal of the "excess profits" tax and moderation of the surtaxes on individual incomes. Concerning the latter, he has said:

> "... methods of taxation employed should in all cases penalize saving and investment as little as possible. Our present surtaxes offend greatly in this respect. ... The result is to make investment by wealthier taxpayers in the expansion of industry or foreign trade unattractive and unprofitable. It is obvious that this situation should be remedied."

For many years prior to the war the situation of American railways had forced them to finance their extensive capital requirements almost exclusively by issues of bonds and secured notes. Railway stock had not been marketable upon terms which it was practicable to meet. The market for such bonds was supplied principally by insurance companies, savings banks, trust estates and large individual investors. The system of taxation criticized by the Secretary of the Treasury has not only substantially destroyed the market supplied by the class last indicated, but has transformed those who were formerly potential purchasers in large amounts into sellers of railway bonds. That is to say, these individual investors now find it unprofitable to purchase such securities and, on the other hand, regard it as desirable to transfer their investments to other classes of securities and, therefore, offer portions of their present holdings for sale whenever the market appears to be favorable. It has been suggested that a new market among smaller investors can be built up, but, as to railway securities, this has not yet been accomplished and the present state of railway credit does not warrant much confidence that it is possible except after prolonged effort and a considerable lapse of time. The financial necessities of the railways are imperative and cannot be postponed without heavy loss to the people and their industries.

By order of the Board of Managers,
L. F. LOREE, President.

(ADV.)

Railway Officers

Executive

Harry E. Paisley, treasurer of the Philadelphia & Reading, has been elected vice-president and treasurer of the Reading Company, effective April 21.

Albert B. Bierck, comptroller of the Philadelphia & Reading, has been elected vice-president of the Reading Company, with headquarters at the Reading Terminal, Philadelphia, effective April 21. Mr. Bierck was born on October 9, 1867, at New York. He was educated in the New York University and began railroad work in 1885 as freight clerk for the Pennsylvania. He went to the Baltimore & Ohio in 1887 and remained in charge of lighterage until 1889, when he was appointed traveling agent of the Union Pacific and the Northern Pacific. In 1891 he became general manager and auditor of the Prospect Park and Coney Island, which position he held until 1892, when he was appointed auditor of the Long Island, serving in that capacity until 1910. He was then promoted to general auditor and shortly after the railroads were placed under federal control, his title was changed to federal auditor. Besides being federal auditor of the Long Island he became federal auditor of the Philadelphia & Reading, the Central of New Jersey, the Baltimore & Ohio, New York Terminals, and the Staten Island Rapid Transit, and served in that capacity until the termination of federal control, when he was appointed comptroller of the Philadelphia & Reading.

Aaron M. Burt, whose appointment as assistant to the vice-president in charge of operation of the Northern Pacific was announced in the *Railway Age* of March 26 (page 1073), was born on May 1, 1866, at Syracuse, N. Y. Mr. Burt entered railway service in March, 1885, with the Colorado Midland, as an axeman in the engineering department, and up to January 1, 1897, held various positions in the engineering departments of that road, the Northern Pacific, the Adirondack & St. Lawrence, the Wisconsin Central, now part of the Minneapolis, St. Paul & Sault Ste. Marie, and the Chicago & North Western. In 1897, he was appointed superintendent of bridges and buildings on the Northern Pacific, and five years later he was promoted to assistant division superintendent on the same road. He was later promoted to division superintendent, in which capacity he served on the Dakota, Fargo, Rocky Mountain and Idaho divisions. After 10 years in this position he was appointed chief engineer maintenance of way. From April, 1918, to June, 1919, he served as assistant general manager, and from June, 1919, to March 1, 1920, as assistant director of the Division of Operation of the United States Railroad Administration, in charge of engineering and maintenance, receiving his present appointment on the latter date.

A. M. Burt

Financial, Legal and Accounting

Jay V. Hare, assistant secretary of the Philadelphia & Reading, has been elected secretary, effective April 21, succeeding **George Ziegler,** deceased.

Frederick Reel, transfer agent of the Philadelphia & Reading, has been appointed assistant secretary and transfer agent of the Reading Company, effective April 21.

W. G. Van DeWater, who has been elected secretary and treasurer of the Delaware, Lackawanna & Western, with headquarters at New York, as noted in the *Railway Age* of March 5 (page 741), served as auditor of the coal department of the same road at Scranton, Pa., during the greater part of federal control. Mr. Van DeWater was educated in New York. He entered the employ of the Delaware, Lackawanna & Western Express Company at Hoboken, N. J., in April, 1876, as office boy. Later he became clerk, then express messenger, baggage master, cashier, agent and auditor consecutively. In July, 1886, he was transferred to the auditor's office of the Delaware, Lackawanna & Western Railroad at New York. He was promoted to auditor of disbursements, with headquarters at New York, on September 1, 1906, and transferred to Scranton as auditor of the coal department on December 8, 1908.

Operating

H. L. Bell, acting superintendent of the Ogden Union & Depot, has been appointed superintendent, with headquarters at Ogden, Utah, effective March 10.

W. M. Neal, assistant general superintendent of the Quebec district on the Canadian Pacific, has been transferred to the Ontario district, with headquarters at Toronto, succeeding J. K. Savage, who has been promoted, effective April 19.

George H. Westcott, general freight and passenger agent of the Copper Range, has been appointed general manager with headquarters at Houghton, Mich., succeeding **F. R. Bolles,** resigned.

C. G. Richmond, assistant superintendent of stations and transfers of the Illinois Central and the Yazoo & Mississippi Valley, has been appointed superintendent of stations and transfers succeeding **J. L. East,** who has been promoted, effective April 21. The position of assistant superintendent of stations and transfers has been abolished.

Frederick W. Brown, who has been appointed assistant to the general manager of the Atlantic Coast Line, with headquarters at Wilmington, N. C., served as staff officer of the Southern and associated railroads during federal control. Mr. Brown was born on February 17, 1872, at New Canaan, Conn. He was educated at the high school at South Norwalk, Conn. His first railroad work began on June 1, 1887, as freight clerk for the New York, New Haven & Hartford at Stamford, Conn. He became clerk for the Housatonic, now part of the New York, New Haven & Hartford, in 1889. Afterwards he served as operator, despatcher, chief despatcher and trainmaster, consecutively. From 1901 until 1902 he was despatcher for the New York, New Haven & Hartford. He was then appointed chief clerk to the superintendent of the New York division, with headquarters at New York. In 1906 he was promoted to assistant superintendent of the same division, with headquarters at New Haven, Conn., in charge of the New Haven terminal. He went to the Southern as despatcher in 1906 and from then until 1914 he served as trainmaster, superintendent terminals and superintendent of the St. Louis-Louisville divisions, respectively. He was sent to Washington, D. C., as chief in charge of train tonnage bureau in 1914 and remained in that capacity until 1916, when he was appointed assistant to the general manager and assistant to the vice-president of the Southern. Shortly after the railroads went under federal control he was appointed staff officer, as mentioned above.

Traffic

L. B. Pittman has been appointed commercial agent of the Seaboard Air Line, with headquarters at Richmond, Va., effective April 15.

Stuart C. Leake has been released from military service and has resumed his former position as commercial agent

of the Richmond, Fredericksburg & Potomac, with headquarters at Richmond, Va., effective April 15. Mr. Leake served as a captain in the construction division of the United States Army.

L. M. Souders, acting assistant general freight agent of the New York Central, lines west of Buffalo, has been appointed general eastern freight agent, with headquarters at New York, effective April 1, and **R. J. Hopper**, has been appointed general agent, with the same headquarters, effective the same date.

Frederick D. Claggett, who has been appointed assistant freight traffic manager of the Southern, with headquarters at Washington, D. C., as noted in the *Railway Age* of April 16 (page 1223), served as general freight agent from January, 1917, until the termination of federal control. Mr. Claggett was born on August 14, 1874, at Hagerstown, Md. He graduated from the Washington County High School and began railroad work in September, 1891, with the Norfolk & Western. He went to the Southern in November, 1895, in the freight traffic department at Washington, D. C. On March 1, 1897, he entered the freight traffic department of the Cincinnati, New Orleans & Texas Pacific. He was appointed assistant general freight agent of that road, with headquarters at Cincinnati, Ohio, on June 1, 1912, and retained that position until he became general freight agent of the Southern, in January, 1917, as mentioned above.

E. T. Willcox, who has been appointed assistant freight traffic manager of the Seaboard Air Line, as noted in the *Railway Age* of March 5 (page 748), served as general freight agent at the time of his appointment to that position. Mr. Willcox began railroad work as rate clerk in the office of the assistant general freight agent of the Kansas City, Memphis & Birmingham in 1893, and remained in that capacity until 1894, being transferred from Memphis, Tenn., to Birmingham, Ala., during that interval. He was promoted to chief clerk at Birmingham in 1895 and in 1897 was appointed contracting freight agent with the same headquarters. Although he remained at Birmingham, in 1901 he transferred his services to the St. Louis-San Francisco as commercial agent. He was appointed division freight agent in 1905 and assistant general freight agent in 1907, at which time he returned to Memphis, Tenn., where he remained in the same capacity until September 1, 1911. He was then transferred to St. Louis, Mo. On December 1, 1911, he became assistant general freight agent of the Seaboard Air Line, with headquarters at Birmingham. He was promoted to general freight agent, with headquarters at Norfolk, Va., on July 1, 1916, and with the exception of a short time during the period of federal control, when he served as chairman of the committee of freight traffic control under C. R. Gray, director of the division of operation of the Railroad Administration, he served in that positon until his recent promotion as noted above.

Mechanical

G. S. Edmonds, recently appointed acting superintendent of motive power of the Delaware & Hudson, with headquarters at Colonie, N. Y., has been appointed superintendent motive power, succeeding **James H. Manning**, deceased; and **H. G. Becker**, general foreman at Colonie, has been appointed shop superintendent to fill the position made vacant when Mr. Edmonds was appointed acting superintendent motive power.

Purchasing and Stores

G. W. Bichlmeir has been appointed purchasing agent of the Kansas City Southern, effective March 1, succeeding **W. S. Atkinson**, resigned.

W. J. Diehl, general storekeeper of the Mobile & Ohio, with headquarters at Mobile, Ala., has been appointed purchasing agent, with the same headquarters, succeeding **J. A. Turner**, resigned. The office of general storekeeper has been abolished.

Engineering, Maintenance of Way and Signaling

R. F. Nicholson has been appointed assistant engineer of the Portland division of the Grand Trunk, with headquarters at Portland, Me., effective April 15.

Edward B. Pry, whose appointment as superintendent of telegraph and signals of the Southwestern region of the Pennsylvania System, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of March 12 (page 805), was born at Burgettstown, Pa., on January 12, 1872. Mr. Pry entered the service of the Pittsburgh, Cincinnati, Chicago & St. Louis as signal maintainer on December 12, 1894. Six years later he was promoted to signal foreman and on February 1, 1903, was appointed signal supervisor on the Grand Rapids & Indiana. Three years later he was promoted to signal inspector on the Pennsylvania, Lines West, with headquarters at Pittsburgh, Pa., which position he held until his recent appointment as superintendent of telegraph and signals of the Southwestern region of the Pennsylvania System, with headquarters at St. Louis.

E. B. Pry

G. C. Koons, assistant division superintendent of the Pennsylvania, with headquarters at Miffintown, Pa., has been promoted to assistant chief engineer, with headquarters at Philadelphia, effective March 1.

Fred W. Bender, who has been appointed signal engineer of the Central of New Jersey, with headquarters at Elizabeth, N. J., as noted in the *Railway Age* of February 27 (page 661), served as assistant signal engineer during federal control. Mr. Bender was born at Elizabeth, N. J., on October 15, 1882. His first railroad work began as secretary to the superintendent of telegraph of the Central of New Jersey. During part of the time that he served in the capacity just mentioned the department in which he served included the telephone, electric light, power and signals of the entire system. In 1902, however, the signal department became a separate organization and at that time he was appointed chief clerk. For some time following he performed the duties of assistant engineer and in 1918 he was given the title of that office. As noted above, he retained that position until his promotion on March 1.

F. W. Bender

Charles A. Whitcomb, circuit designer in the signal engineers' office of the Boston & Maine, has been promoted to signal supervisor of the Berkshire division, with headquarters at North Adams, Mass., effective on April 1.

Charles Stephens, signal engineer of the Chesapeake & Ohio, with headquarters at Richmond, Va., has been ap-

pointed, in addition, signal engineer of the Hocking Valley, with the same headquarters, effective April 1.

T. H. Gatlin, who has been appointed chief engineer in charge of construction of the Southern, with headquarters at Washington, D. C., as noted in the *Railway Age* of March 5 (page 749), served as assistant to the president from June, 1918, until the termination of federal control. Mr. Gatlin was born on November 8, 1876, at Tarboro, N. C. He studied at Trinity College in Durham, N. C. His first railroad work began in May, 1892, in the engineering department of the Atlantic Coast Line. He went to the East Carolina, as chief engineer in 1899, and served in that capacity until 1901. From March, 1905, until July, 1906, he was assistant chief engineer in the maintenance of way office of the same road in charge of track work drafting. Later he was appointed engineer maintenance of way of the Middle district of the Southern, with headquarters at Knoxville, Tenn. On August 1, 1911, he was promoted to assistant chief engineer maintenance of way and structures, with headquarters at Washington, D. C. He was appointed assistant to the vice-president in charge of operation in January, 1917, and retained that position until he became assistant to the president on the date mentioned above.

T. H. Gatlin

Alexander Holley Rudd, whose appointment as chief signal engineer of the Pennsylvania system was announced in the *Railway Age* of February 20, page 598, was born March 8, 1867, in Lakeville, Conn. He graduated from the Sheffield Scientific School, Yale University, in 1886, and entered railway service as draftsman in the real estate department of the Pennsylvania in 1886. In 1888 he was promoted to draftsman in the signal department, and in 1892 was appointed inspector of signals of the New York Central & Hudson River. He was later promoted to signal engineer of that road, and in 1893 was appointed assistant superintendent of signals on the Hudson division of that road. In 1894 he was appointed foreman of electric signals, Hudson division, on the New York, New Haven & Hartford, and was later appointed signal engineer of the Hartford and Valley divisions of that road. On April 1, 1900, he was appointed signal engineer of the entire system of the Delaware, Lackawanna & Western, returning to the Pennsylvania as assistant signal engineer in 1903. He was promoted to signal engineer of the Pennsylvania in 1907, which position he has held until his present appointment.

A. H. Rudd

C. E. Dare, supervisor of the Fredericksburg & Potomac, with headquarters at Fredericksburg, Va., has been appointed resident engineer, succeeding **E. M. Hastings,** promoted, and **G. A. Thomas,** transitman, has been appointed supervisor, with headquarters at Fredericksburg, succeeding Mr. Dare, effective March 1.

Wm. Post, whose appointment as superintendent of telegraph and signals of the Central region of the Pennsylvania System was announced in the *Railway Age* of March 12 (page 805), was born at Andover, Conn., on July 10, 1876. He entered the signal department construction forces of the New York, New Haven & Hartford in May, 1896. He was later appointed batteryman and then promoted to maintainer. In 1900, he was appointed division signal foreman on the same road, resigning in June, 1905, to become circuit draftsman in the signal engineer's office of the Pennsylvania. In February, 1906, he was promoted to assistant supervisor of signals on the West Jersey & Seashore and in December of the same year he was transferred to the Pittsburgh division as assistant supervisor of signals. He was promoted to supervisor in February, 1909, having jurisdiction over the Chautauqua division. In June of the same year he returned to the signal engineer's office and the following month became supervisor of signals of the New York division. On August 1, 1907, he was promoted to assistant signal engineer and in the following year to assistant superintendent of the Middle division, with headquarters at Mifflin, Pa. Later in the same year he returned to the Pittsburgh division as assistant superintendent, with headquarters at Cresson, Pa., which position he held until his recent appointment.

Wm. Post

Julian D. Jones, division operator on the Williamsport division of the Pennsylvania, has been appointed superintendent of telegraph and signals of the Eastern region of the Pennsylvania System, with headquarters at Philadelphia, Pa. Mr. Jones was born at Richmond, Va., on August 23, 1883, and was educated at Virginia Polytechnic Institute. On March 1, 1910, he entered the service of the Pennsylvania Railroad as electrical engineer in the telegraph department. In October of the following year he was appointed assistant division operator on the Pittsburgh division and on January 16, 1916, he became division operator on the Williamsport division, where he remained until November, 1917, when he entered military service as captain in the Signal Corps of the United States Army. In January of the following year he was assigned to duty in the office of the chief signal officer at Tours, where he was engaged in engineering work on telegraph and telephone lines of communication on heavy and light railroads. On January 3, 1919, he was assigned to duty with the transportation corps and in February of last year he was promoted to the rank of Major in the Signal Corps. He served as general superintendent of telegraph of the transportation

J. D. Jones

corps lines in the service of supply of the American Expeditionary Force from April to July, 1919. He then returned to the United States and resumed duty as division operator on the Williamsport division of the Pennsylvania, which position he held until his recent promotion.

Alden Monroe Pence, division operator on the Cincinnati division of the Southwest System of the Pennsylvania, Lines West, has been promoted to assistant superintendent of telegraph and signals of the Southwestern region of the Pennsylvania System, with headquarters at St. Louis, Mo., effective March 18.

D. Rounseville, assistant to the chief engineer of the Chicago & North Western, with headquarters at Chicago, has been appointed assistant engineer of maintenance of lines east of the Missouri River, with the same headquarters. **A. S. Redfield,** division engineer of the Northern Wisconsin division, with office at Fond du Lac, Wis., has been promoted to assistant engineer of maintenance of lines west of the Missouri River, with office at Omaha, Neb. **T. J. Irving,** division engineer of the Southern Illinois division, with headquarters at South Pekin, Ill., has been transferred to the West Iowa division, with headquarters at Boone, Ia. **J. A. Dyer,** division engineer of the Madison division, with headquarters at Madison, Wis., has been transferred to the Iowa and Minnesota division, with headquarters at Mason City, Ia. **W. T. Main,** division engineer of the Black Hills division and the Wyoming & North Western, with headquarters at Chadron, Neb., has been transferred to the Northern division, with headquarters at Eagle Grove, Ia. **C. J. Frederici,** general inspector of bridges, with headquarters at Chicago, has been promoted to division engineer of the Northern Wisconsin division, with headquarters at Fond du Lac, Wis., succeeding Mr. Redfield. **H. G. Lennox** has been appointed division engineer of the Southern Illinois division, with headquarters at South Pekin, Ill., succeeding Mr. Irving. **B. R. Kulp** has been appointed division engineer of the Madison division, with headquarters at Madison, Wis., succeeding Mr. Dyer. **D. K. Van Ingen** has been appointed division engineer of the Black Hills division and the Wyoming and North Western, with headquarters at Chadron, Neb., succeeding Mr. Main. **H. M. Spahr** has been appointed division engineer on the Lake Shore division, with headquarters at Green Bay, Wis. **R. D. Anderson** has been appointed division engineer, with jurisdiction over the Dakota division, the Pierre & Ft. Pierre Bridge and the Pierre, Rapid City & North Western, with headquarters at Huron, S. D.

General

PENNSYLVANIA RAILROAD

The following additional appointments have been made, effective March 1:

Name	Position.	Headquarters.
J. H. Harris	Eng. m. w. N. J. div.	New York
J. H. Nichol	Eng. m. w. Cen. Penn. div.	Wil'ms'port
C. P. MacArthur	Eng. m. w. Northern div.	Buffalo
W. T. Covert	Eng. m. w. Penn. div.	Pittsburgh
Fred H. Watts	Eng. m. w. Ill. div.	Chicago
W. R. Hillary	Eng. m. w. Northern div.	Toledo, O.
J. H. Redding	Asst. supt. Pittsburgh div.	Cresson, Pa.
H. H. Garrigues	Eng. m. w. Southern div.	Wilm'gton
J. B. Baker	Eng. m. w. Lake div.	Clev'land,O.
R. R. Nace	Eng. m. w. E. Ohio div.	Pittsburgh
C. E. Brinser	Eng. m. w. E. Penn. div.	Harrisburg
C. W. Richey	Div. eng. Terminal div.	Pittsburgh
F. D. Davis	Div. eng. N. Y. div.	New York
J. E. Hopkins	Div. Eng. Monongahela div.	Pittsburgh
W. F. Miller	Div. eng.	Wil'ms'port

Railroad Administration

Walker D. Hines has resigned as director general of railroads, effective May 15, and after a vacation trip abroad he plans to resume the practice of law in New York City. Max Thelen, now director of the Division of Liquidation Claims of the Railroad Administration, has been recommended to the President by Mr. Hines for appointment as his successor to remain in charge of the winding up of the affairs of the Railroad Administration. In accepting Mr. Hines' resignation the President wrote that he could not let the director general retire without telling him how he had "personally valued and admired the quite unusual services you have rendered the government and the country." Mr. Hines has been connected with the Railroad Administration since its organization. He was first appointed assistant to the director general and later, when Mr. McAdoo left Washington for an extended trip, he was appointed assistant director general and left in direct charge of the organization at Washington. He was appointed director general to succeed Mr. McAdoo on January 11, 1919. Prior to federal control he was chairman of the board of the Atchison, Topeka & Santa Fe and a member of the law firm of Cravath, Henderson & de Gersdorff. A photograph and complete sketch of Mr. Hines' career were published in the *Railway Age* of January 17, 1919 (page 187).

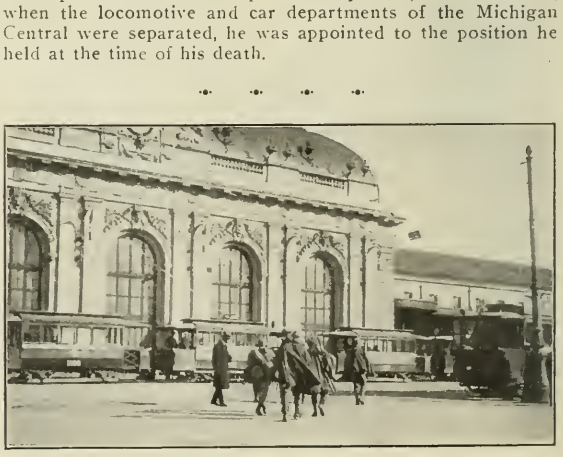
Obituary

J. E. Duval, general superintendent car service of the Grand Trunk, with headquarters at Montreal, Que., died in that city on April 28 at the age of 60 years.

Colonel John Bogart, well known civil engineer of New York, and formerly New York state engineer, died at his home in New York on April 25, at the age of 84 years.

George H. Gilman, master car builder of the Northern Pacific, with headquarters at St. Paul, Minn., died on February 27 after a short illness. Mr. Gillman was born at McArthur, Ohio, on April 11, 1862. He began railroad work as a car carpenter on the Northern Pacific when 22 years old. In October, 1884, shortly after entering the employ of that road, he was promoted to car foreman. While serving in that capacity he was transferred several times to different places. He was appointed shop superintendent and master car builder at the Como shops in 1903, and on November 26, 1905, his title was changed to master car builder.

Thomas J. Burns, superintendent rolling stock of the Michigan Central, with headquarters at Detroit, Mich., died in that city on April 18. Mr. Burns was born at Hillsdale, Mich., on July 24, 1868. He graduated from Assumption College and spent some years at Grand Seminary, Montreal. His first railroad work began as clerk in the maintenance of way department of the Michigan Central at Bay City, Mich. He became engine despatcher on November 1, 1896, and was appointed chief clerk to the master mechanic at Jackson, Mich., on December 15, 1902. In August, 1905, he was transferred to Detroit, Mich., as chief clerk to the superintendent motive power, and promoted to assistant to the superintendent motive power on July 1, 1909. He was appointed assistant superintendent motive power on June 1, 1912. In 1915, when the locomotive and car departments of the Michigan Central were separated, he was appointed to the position he held at the time of his death.



The Italian Railway Strike—Soldiers in Front of the Milan Station

EDITORIAL

Railway Age

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Shall Trains or Workmen Be Delayed?

Does it cost more to delay a freight train or a gang of men? This is a question which is answered correctly or incorrectly every time such a train approaches a force engaged in any operation which interferes with the use of the track structure. No one answer can be given for all conditions. It varies with the character of the train, the density of traffic, the relation of the train to following and opposing trains, etc. It also varies with the size of the gang whose operations are interrupted, the seriousness of the interference involved to let a train by, etc. The operating results of a railroad are a composite of the returns from a number of more or less inter-related departments. The net result is the one to be considered. Where any conflict of interests between departments exists, such as is inherent in the condition of maintenance operations such as the relaying of rail, the interest of the road is best promoted when that expedient is adopted which results in the least net cost. Changed conditions make necessary the revision of rules and practices of long standing. The changes in conditions have been many and varied during the last year or two. For this reason the old rules and regulations governing such interference may now be obsolete; they are at least worthy of reconsideration at the present time, particularly in view of the fact that the operations of the maintenance department are being seriously handicapped by the recent large increases in wages, the inauguration of the eight-hour day and the universal shortage of maintenance labor, all of which are serving greatly to curtail the results obtained at the time when maintenance of way forces are facing large programs of work.

The Field for Pulverized Coal

The greatest handicap to the development of pulverized coal on the railroads of this country has undoubtedly been the relatively low cost of high grade locomotive coal. With higher fuel costs to contend with it is probable that the railroads will find greater economic cause for the utilization of lignite and other inferior fuels and that the development of means for burning pulverized coal will receive fresh impetus. Some years ago plans were made to use Dakota lignite in a pulverized form on one of the railroads in the northwest. The railroad planned to equip a single locomotive with pulverized coal burning apparatus designed by its own engineering staff and a state university volunteered its support and co-operation to the extent of supplying a quantity of test fuel comprising a variety of native lignites. Attempts to conduct this experiment terminated with the outbreak of the war, but it is earnestly hoped that development work of so broad a character will be revived now that the opportunity exists to effect a greater saving than ever before through the utilization of a cheap low grade fuel. If it can be demonstrated that locomotives may be operated successfully with lignite fuel in pulverized form, it is conceivable that the railroads operating in certain sections of the northwest and the southwest could effect a remarkable reduction in fuel costs and aid the conservation of our rapidly diminishing supply of high grade coal through the utilization of lignite. While it is understood that the fuel problem is far more acute in Italy than in this country, the results from pulverized fuel burning equipment designed by American engineers to burn low-grade Italian lignite fuel, as described in this issue, should have an important bearing on a similar development in this country.

More Attention to Locomotive Terminal Design

Nothing could have demonstrated the deficiencies in engine terminals more pointedly than the breakdown which developed at a number of points during the winter of 1917-18. While conditions were aggravated greatly by the unusually severe weather and by the heavy migration of skilled mechanics to the war industries, the basic difficulty lay in the inadequacy of the facilities themselves. After the roads were brought under federal control the Railroad Administration gave first attention to the amplification of these facilities since they constituted a direct limitation on the amount of traffic which could be handled. As a result, the summer of 1918 saw more work of this character under way than ever before, a large amount of which was carried over into 1919 before completion. However, the campaign for modern engine terminal facilities has only begun. There are no facilities the need for which is more urgent or the possible returns from which are greater. Not only are more and larger facilities required, but many layouts should be rebuilt to modernize them. The heavier power and the more exacting demands made on it require new and heavier equipment for its upkeep, which, in turn influences the design of buildings and the track layouts. The economy with which locomotive terminal operations can be conducted depends on the organization and efficiency of the forces employed thereon and on the extent and character of the labor-saving equipment installed. It also depends to an extent not generally realized on the nature of the buildings, track layouts and other facilities provided by the engineering department. For this reason, engineers can afford to give more attention to the problems involved in the operation of locomotive terminals in order that they may be so designed as to be operated most efficiently. The recent creation by the American Railway Engineering Association of a standing committee on Shops and Engine Terminals is a recognition of this need, which is of much significance.

Immigration and the Labor Problem

A question which is of vital interest to the railroads and which Congress has yet to settle is that of our future immigration policy. While this has been and will continue to be a very live issue it has now assumed an importance which justifies a large amount of careful thought and deliberation on the part of all concerned. It has been estimated by leading authorities that the United States is now short about four million laborers resulting from such causes as restricted immigration, decreased immigration, increased emigration, and the natural increase in the demands for labor brought about by the expansion of our industries and natural resources. In the early part of 1919 the *Railway Age* in an editorial on immigration and emigration discussed this question of labor shortage and predicted at that time that the situation would soon become acute. It was shown then that for the year ending 1914, 1,200,000 immigrants entered this country; for the four years ending 1918, 200,000; and for the

year 1918 alone, there was only a net gain of 16,000. In contrast to this was the fact that over 400,000 emigrants left the country during the six months immediately following the signing of the armistice. It is true that this was an abnormal condition brought about by the war, but it is also one which will not come back to normal for many years unless some definite measures are taken to correct it. What can be done to alleviate this condition? The obvious answer is to promote immigration of a desirable class of people. It must be remembered, however, that other countries are short of labor, and that the countries from which we secure the largest amount of unskilled labor are doing everything in their power to keep their people at home. This means that the United States will have to adopt a really constructive policy to encourage immigration. With this in view the Inter-Racial Council has proposed several measures which are being urged upon the House Committee on Immigration and Naturalization in Washington. One of the main points is the repeal of the literacy test, which requires an immigrant to be able to read and write a prescribed amount before admittance to this country. The advanced policy advocated by the Inter-Racial Council proposes the selection of industrious and thrifty men and women, trained and hardened by the exigencies of war, and their distribution to the points where they can do the work for which they are fitted. The fact is emphasized that while a laborer may read and write a certain minimum amount, it does not have any particular bearing upon his ability to perform useful and valuable work. It is firmly believed by the men advocating the policy of admitting immigrants without book learning that our present labor shortage would be greatly relieved since we would be much more able to secure men of good character with sound bodies and minds and with old-world habits of frugality and industry. A Federal Assimilation Bureau is to be established in connection with this movement for the purpose of securing better relations between the American nation and the immigrants. This bureau will look after the welfare of the immigrant, protect him against fraud, extortion and violence, help him learn our language and place him where he can work to the best advantage for himself and the nation. In general, the entire movement combines the essentials of securing legislation which will permit the securing of a high grade class of unskilled laborers, either illiterates or not, the weeding out of the undesirable, a better method of assimilating these people into the nation, and the setting of a higher standard of citizenship. With such a goal the movement can do much towards increasing the supply of desirable labor if backed by intelligent and constructive legislation. The railroads are so greatly in need of labor that they should take a more active part in helping to secure proper legislation to improve the situation and to make the above mentioned measure effective.

Wages, Rates and the Cost of Living

EXECUTIVES OF THE RAILROAD LABOR organizations, who as officers of the Plumb Plan League have been showering the country with propaganda asserting that an increase in freight rates will result in an "enormous" increase in the cost of living, which Mr. Plumb usually places at five times the amount of the rate advance, have been appearing before the Railroad Labor Board asking for a further increase in wages. The wage increase asked for is estimated at about one billion dollars a year, or about equal to the amount of the rate advance the railroads are seeking, to make up for the wage increases already allowed, together with other increases in the prices of materials and fuel, which also include a few wage advances. Not satisfied with their other arguments, the labor leaders are now taking the position that wage advances in the past have not caused increases in the cost of living, but are merely the effect of increases in prices caused largely by profiteering, and that any further increases in wages should not occasion further increases in prices.

The *Railway Age* has no occasion to deny the existence of profiteering, but we have had some difficulty in reconciling the vast difference thus attributed to the effect of wages and that of rates.

W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, told the board that the press had "been full of the idea that to raise the pay of railroad men will necessitate an immediate further advance in the cost of living and be simply another step in the so-called vicious circle of rising prices," and that "there has been so much of this that it amounts to a conspiracy." He also gave some figures to show what a small percentage of the prices of various commodities is due to the freight rate and that prices have increased in far greater proportion than either railroad wages or railroad rates.

This paper has also found it necessary to controvert on numerous occasions some of the frequent assertions that freight rates are largely responsible for increased prices and that prices can be held down by the simple expedient of regulating the rate, but when he talks about a "conspiracy," Mr. Carter might address his remarks to some of his associates who have been trying to "humbug" the American people on this subject. There was a time when the railroad labor leaders proceeded on the beautiful theory that wages could be increased by curtailing the profits of the capital invested in the railroads, but since the time has arrived when their demands for a year exceed the largest returns ever paid to capital for a year the theory is no longer usable, to say nothing of being tenable, at least as far as the railroads are concerned.

Neither Mr. Carter nor Mr. Plumb can show very satisfactorily how the wage advance could be paid out of the $516,000,000 net operating income earned by the railroads in 1919, which would be reduced to nearer $200,000,000 on the present basis of expenses, and in the two months of this year for which the returns are available, January and February, they did not earn any return at all.

Mr. Carter, from his two years of experience in the Railroad Administration, where he had occasion to take part in staff conferences in a capacity similar to that of a member of a board of directors, has probably derived somewhat of an appreciation of the similarity of the condition in which he finds the railroad employees and that of the companies themselves. Both have had large increases in their expenses—their cost of living—and both are asking for what they consider necessary to restore their pre-war status. Many railroad employees have seen employees in other industries receive greater increases in pay than they have received, while the railroad companies have seen many other companies make huge profits while they have been limited to their pre-war earnings, with some deductions even from that level. Railroad employees, however, if they have not had all they were entitled to, have at least received some large payments on account, while the companies have as yet not had a cent in the way of adjustment to meet their increased expenses, as the increase in rates made in 1918 has thus far gone merely to assist the government in carrying the load.

We take it, therefore, that Mr. Carter appreciates these facts and that he recognizes the need for higher rates, but that he would like to use the higher wages and rates as a sort of excess profits tax to reduce the margins of the other industries who primarily pay the freight rates, without allowing them to be passed on to the consumer. At any rate, Mr. Carter does not try to make the absurd claim that rates increase the cost of living but that wages do not.

Advances in Rates on Foreign Railways

THE FREIGHT RATES of the railways of the United States have been advanced an average of about 33 per cent and the passenger rates an average of about 20 per cent since pre-war days. Additional large advances must be made if the railways are to be rendered self-supporting. However large these additional advances may be, the people of the United States may congratulate themselves that the advances in rates necessitated in this country by the war and government operation will be much less than those that have been made in many foreign countries.

The railways of Great Britain were placed under government control at the beginning of the war and are still being thus operated. During the war the passenger rates were advanced 50 per cent, while the freight rates were not advanced at all, and because the increases in expenses greatly exceeded the increases in rates the government incurred a large deficit. To reduce or wipe out this deficit advances in the freight rates of the British Railways ranging from 25 to 100 per cent were made effective on January 15, 1920, and extra charges were added to rates which cover the collection and delivery of freight at stations as well as its transportation. In March, 1920, the demurrage charges imposed for holding a car one day beyond the period of free time were increased 100 per cent, and the charges for subsequent days 200 per cent.

During December, 1919, and January, 1920, the Italian railways advanced their first class passenger fares 80 per cent, their second class fares 60 per cent and their third class fares 50 per cent. Both freight and passenger rates already have been advanced 30 to 40 per cent. The demands of the railway workers for higher wages and the question of freight rate increases were taken under consideration by the government. It was decided that the freight rates were too high to be raised further and that taxation would have to be utilized to meet the deficit of the railways, which are owned as well as operated by the government. The Italian railways even before the war incurred a large deficit each year which had to be paid by the taxpayers. In April, 1920, an order was issued by the Italian State railways imposing a 100 per cent supertax on the rates for foreign merchandise entering Italy.

The passenger rates of the French railways, two of which are owned by the government, and all of which are being operated under government control, were advanced 40 per cent during the war, and the freight rates 30 to 37 per cent. Because of the deficits which have continued to be incurred, proposals for further advances have been under consideration.

The advances in rates on the Austrian railways since pre-war days have been enormous. The increase of 30 per cent made in February, 1920, made the total increases about 330 per cent. Doubtless the immensity of these increases is largely explained by the depreciation of the country's currency.

In September, 1919, freight and passenger rates in Belgium had been increased 40 to 50 per cent since pre-war times. Further increases have been made since then, but the amount of these increases is not known.

In September, 1919, freight and passenger rates in the Netherlands were advanced 50 per cent.

Very much the largest advances reported in any country have been made in Germany where, as it is well known, practically all the railways are owned and operated by the government. Repeated advances were made during the war and still further very great advances have been made since the signing of the armistice. The passenger rates now, according to our European editor, who recently visited Germany, average about 700 per cent higher than before the war and the freight rates about 800 per cent higher. These enormous advances are explained not only by the fact that the operating expenses of the German railways have increased very greatly, but by the fact that the value of the country's currency has greatly depreciated. Even measured in the pre-war value of money, the passenger and freight rates in Germany apparently have been increased much more than in any other country.

Larger advances in rates have also had to be made in many countries which were remote from the seat of hostilities. For example, in December, 1919, all freight and passenger rates on the South African government railways were advanced 25 per cent, while in August, 1919, a raise of 20 per cent in both freight and passenger rates was made in Brazil, and in October of the same year additional increases were proposed. In Canada the railways have made the same advances in rates as have been made in the United States, and it is assumed that they will duplicate any further advances which may be made in this country. Even in Australia, which was about as remote from the theatre of hostilities as any part of the world, all the government railways have suffered severely from the effects of the war and have had to make advances in their rates, although we have no detailed information as to the exact percentages of increase.

Business Men and the Railroad Strikes

THE RECENT STRIKES on the railways have subjected to a very severe test not only the operating organizations of the railways but also the industrial and financial structure, and the patience and sporting spirit of the business men of the country. It seems safe to say that the strikes have now been definitely won by the railways. In many parts of the country the roads are still operating with reduced forces in the yards, but the number of men at work is steadily increasing, and it seems but a matter of a short time until the normal amount of traffic will be moving.

The effects of the strikes are still being seriously felt, however, and will be felt for months. When the statistics regarding earnings and expenses in March and April are available they will show the roads have suffered severely in respect to net earnings. Large deficits have been incurred which the taxpayers will have to pay, since the standard return of most companies is guaranteed by the government until September.

The result of the inability of the roads to operate anywhere near to capacity has been that vast amounts of products have been accumulated which could not be moved, and that many large industrial concerns have been obliged, because of inability to get raw materials or ship finished products, to curtail their operations or shut down. Large amounts of capital tied up in raw materials and finished products have been rendered useless for the time being, and hundreds of thousands of men throughout the country have been thrown out of employment. The reduction in the productive and mercantile activities of the country has increased the already great strain upon financial institutions and has tended to increase the cost of living and the general unrest.

It has been most instructive to observe the way in which the various classes of the people, and especially business men, have borne the inconveniences, losses and suffering due to the railroad strikes. Advocates of government operation or the Plumb plan were sure to find much in private operation to criticise and to use its shortcomings, both apparent and real, as material in the propaganda against private ownership. On the other hand, we had hoped that business men, who had almost unanimously favored the return of the railways to private operation, would be patient with shortcomings of transportation which were certain to be experienced,

and would almost unanimously back the railway managements in their efforts to re-establish discipline, to restore efficiency of operation, and to prevent the companies from having undue burdens imposed upon them which would have to be transferred to the public.

The recent strikes and their effects put the consistency and courage of business men to their first serious test since private operation was resumed. It seemed clear when the strikes began that the railways should fight them to a finish, and the reasons for this appeared to be generally understood. For the railways to have made any concessions to the strikers would have resulted in men who struck in disregard of their contracts with the companies and of the provisions of the Federal law gaining by so doing, and the much larger number of employees who stayed at work and agreed to the settlement of their claims by peaceful and lawful means losing, at least for the time, by so doing. Besides, since the strikers were acting in violation of the rules and the orders of the officers of their own brotherhoods, for the railways to have made concessions to them would have embroiled the roads with the brotherhoods. Finally, the total wage demands which have been made by the various railway labor unions amount to about $1,000,000,000 a year. If the railways had granted the demands of the outlaw organizations they would have rendered it illogical and practically impossible for them to have resisted the demands of the regular organizations, and would have taken a step which almost automatically would have added at least $1,000,000,000 a year to operating expenses. If the Interstate Commerce Commission, under the provisions of the Transportation Act, had held that there was no justification for this enormous increase in wages it would have refused to advance the rates enough to cover it, in which case a large part of the railroads would have been bankrupted. On the other hand, if, under the provisions of the Transportation Act, the Commission had decided it was required to make advances in rates large enough to cover this increase of expenses, the entire amount of it would have been passed along to the industries and people of the country in the form of advances in rates.

A large majority of the business men have seemed to appreciate that the welfare of business and the nation in the long run would be best promoted by the managements fighting the strikes out and winning them regardless of temporary inconveniences and losses. But the fact must be noted that many business men, concerns and organizations have adopted a tone of criticism with reference to the course the railways have taken. This has been especially true of a large part of the traffic managers of industrial concerns and commercial organizations. They have complained in private and often in public because, as they have said, the railways did not "do something" to move business better, in spite of the fact that railway officers, high and low, during the crisis have acted with all the intelligence and energy they could, numerous officers having put in many extremely long days working in the places of the strikers. One journal which devotes itself especially to traffic affairs, and whose clientele consists principally of the traffic managers of industrial concerns, published an editorial making a bitter attack upon the General Managers Association of Chicago upon the ground that it issued untruthful statements regarding the situation. If this paper had ever sent a representative to the office of the General Managers Association to get the facts it would have known that no statement had been issued on behalf of the Chicago lines which was not carefully based upon detailed information furnished to the General Managers' Association by the officers of the individual railways. Its attack upon the good faith of the managements of the Chicago lines was significant chiefly because it reflected the views of business men who seemed to know and care nothing about the situation except that the railways were unable to move the normal amounts of freight.

Developments such as those mentioned indicate why the *Railway Age* long has believed that whether private operation will stand the test to which it is now being subjected will not be determined principally by propaganda carried on for government operation or the Plumb plan, but by persons who assert and believe they are in favor of private operation but who constantly say and do things which tend to render it impossible for private operation to be successfully conducted. It was this class of people who from the year 1910 until government operation was adopted, successfully opposed every advance in rates for which the railways asked and thereby rendered it impracticable for the roads adequately to develop their facilities. Many men of this class, after having thus helped to bring about government operation, became, after it was adopted, among its loudest and bitterest critics. It seemed evident that there could be no reasonable hope that private operation could be made successful after the railways were returned to their owners unless legislation was enacted reconstructing the whole system of regulation. Nevertheless, many men of this same class alined themselves in opposition to almost every proposal which was put forward with the object of making it reasonably certain that the railways would be given opportunity to earn enough money to enable them to develop their facilities. And now, within two months since the railways were returned to private operation, we find people of the same class criticising the railway managements because of the results of strikes and because, as they say, the railway managements do not "do something." Just what they would have the railway managements do in addition to what they have been doing is not stated.

It is easy enough to meet the arguments of the avowed propagandists for the Plumb plan or for government operation of the railroads. The propaganda against private management of railroads which is the most harmful always has been, and always will be, that carried on by persons who pretend to be, and who really think they are, in favor of private management, but who will never do anything to help solve the railroad problem under private management, and who seize upon every possible pretext to carp at what the managements of the railroads themselves do in trying to solve the problem.

New Books

Proceedings, American Railway Bridge & Building Association, 1919; 6 in. by 9 in., bound in cloth or paper, 210 pages, illustrated, published by the association, C. A. Lichty, Chicago & North Western, Chicago, secretary.

The American Railway Bridge & Building Asociation has held 29 annual conventions, the last one taking place at the Hotel Statler, Cleveland, Ohio, on October 21 to 23, 1919. The present volume is a complete report of this convention. The preceedings cover papers and discussion on various phases of the bridge and building master's duties. The first report covers bridge inspection, taking up the variations in practice on the different railways and including a very comprehensive set of recommendations on organization, personnel, form of reports, etc. Two reports, that on the storage of fuels used in railway pumping outfits and one on a comparison of the internal combustion engine with the steam engine as the prime mover for pumping units, contain a large amount of valuable information on this phase of water service. Another report contains detailed directions for the renewal of timber trestles and wooden bridges. Other subjects covered in the report of this convention were the repair and inspection of roofs, the painting of metal structures and country.

Railroads File Application for Rate Advance

Need of $1,017,000,000 More Revenue—Average Increase of 28 Per Cent in Freight Rates

WASHINGTON, D. C.

THE RAILROADS of the country have submitted to the Interstate Commerce Commission statements showing the amount of additional revenues needed to meet increased operating costs, and to adjust their income to the 6 per cent income basis provided in the new Transportation Act. The total increase is estimated at $1,017,000,000, and the statements filed constitute formal applications for rate increases to produce that amount.

The carriers show that while the basis of operating expenses due to higher wages and increased prices of material and fuel has advanced about 100 per cent, their revenue basis has increased less than 40 per cent, and that it will require now to restore the relation between revenues and expenses an increase of 19.46 per cent.

The railroads suggest to the commission, however, that the additional revenue be gained from freight traffic, leaving passenger rates at the present level. To provide these increases to total revenues without disturbing passenger rates the carriers estimate will require an average increase in freight rates of about 28 per cent. The figures have been prepared, however, by groups, on the assumption that the commission may divide the country into three districts.

Railroads in Eastern territory estimate the need of an increase of $544,000,000, which is 21.1 per cent of total revenues for the 12-months' period ending October 31 has been used.

It is understood that the commission is working with the idea of making the rates designed to produce the revenue which it finally decides to allow effective on September 1, when the government guaranty expires, or sooner if possible. After having calculated the amount of revenue needed, a big problem will remain in working out the necessary rate adjustments. The railroads have also made some proposals as to the basis of the increase in freight rates. It is expected that hearings will be held during the early summer, but the commission has indicated a desire to have the carriers cooperate with the representatives of the shippers as much as possible in working out the proposed tariffs before the hearings are held.

For the purpose of determining the temporary value for rate-making purposes it is understood that the commission is giving consideration to all the available data, including the property investment accounts and its own valuation data. Both because of the new responsibility put upon the commission by the law and because of the emergency nature of the case, the proceedings incident to the proposed readjustment of rates are being handled along different lines from previous general rate advance cases. Last November, after the director general had advised the carriers that the government would initiate no further advances in rates, the Association of Railway Executives appointed various committees to study the situation with the idea of developing the necessities of the railroads as to increased revenues and the methods to be followed in obtaining them. After the passage of the transportation act the commission asked the executives to furnish it with the information they had gathered by questionnaires from the various roads and several informal conferences have been held between the commission and executive, traffic and accounting officers of the roads.

SUMMARY—RAILWAYS OF CLASS I, II AND III, AND SWITCHING AND TERMINAL COMPANIES

Item	Eastern District	Southern District	Western District	United States
Property investment, October 31, 1919	$9,368,698,698	$2,283,990,948	$8,963,883,753	$20,616,573,399
Six per cent on investment	562,121,921	137,039,457	537,833,024	1,236,994,402
Adjusted net railway operating income	18,003,219	16,269,429	184,939,759	219,217,407
Difference between adjusted net operating income and 6 per cent on investment	544,113,702	120,770,028	352,893,265	1,017,776,995
Total freight revenue	1,788,033,734	390,199,595	1,475,695,163	3,653,928,492
Per cent on freight revenue required to meet deficit under 6 per cent	30.43	30.95	23.91	27.85
Total all revenues adjusted	2,570,967,815	581,768,519	2,078,245,598	5,230,981,932
Per cent on total all revenues required to meet deficit under 6 per cent	21.16	20.76	16.98	19.46

NOTE—Eastern District includes the Illinois Central lines north of Cairo, and the Southern District includes the Illinois Central lines south of Cairo.

nues for 1919, or 30.4 per cent if applied only to freight rates. Southern railroads propose to advance freight rates by 30.9 per cent to provide 20.7 per cent larger revenues or an increase of $120,000,000. The needed freight advance in the West is put at 23.9 per cent to increase all revenues by $353,000,000, or 17 per cent. The need for greater advances east of the Mississippi, the carriers show, is largely due to the effect of standardization of railroad wages and working conditions during the war.

The carriers show that their net income in 1916 was $1,056,000,000, and that in 1919 it fell to $510,000,000, notwithstanding an increased investment in these three years of more than $2,000,000,000. But, the carriers point out, if the present level of costs had been in operation throughout 1919 the year's net would have been only $220,000,000, or a little more than 1 per cent on their property investment of $20,616,000,000.

A summary of the principal facts shown is given in the table. The estimated requirement is figured, therefore, by readjusting the 1919 results to take account of increases in wages or prices that became effective during the year and were in effect at the end of the year and also the recent increases in fuel prices, but no allowance is made for any wage increase that may be awarded by the Railroad Labor Board nor for several other uncertain factors. To secure a more normal basis than the entire calendar year, and because the figures are based on questionnaires sent out in December,

At a conference on April 7 Howard Elliott, chairman of the Northern Pacific, and chairman of the executives' rate committee, made a statement outlining the situation of the carriers in general and particularly of the eastern roads, in which he estimated their requirements in the way of additional net operating income as $500,000,000. On April 16, detailed preliminary exhibits were filed on behalf of the Southern and Western roads, accompanied by statements by C. H. Markham, president of the Illinois Central, for the Southern roads, and by S. M. Felton, president of the Chicago, Great Western, as chairman of a sub-committee of executives for the Western district. These have since been revised in some particulars and the revised statements were filed this week. On April 24, similar statistics were submitted on behalf of the Eastern roads accompanied by statements by Daniel Willard, president of the Baltimore & Ohio, and by George M. Shriver, chairman of the accounting com-

mittee for Official Classification territory. In his statement to the commission on April 7 Mr. Elliott said in part:

Statement by Howard Elliott

We appear before you today not primarily as railway officials, trying to extract all we can from the American public for the benefit of railway security owners, but rather as quasi-public servants charged with the very great responsibility of so operating and developing the railways that they may render adequate service and the country may continue to grow.

The people of the United States have decided, through their representatives in Congress, that they desire private ownership and governmental regulation of the railways; also governmental protection and encouragement. Such being the case, the railway business must obtain earnings enough and have sufficient credit to sustain it in competition with other forms of industry, into which people put their time, brains, energy and money.

To restore the credit of the railways a number of things are necessary, but especially the *confidence* of the every-day investor must be obtained. The passage of the new bill has already encouraged him, but he needs greater encouragement through the co-operative work of the Interstate Commerce Commission, railroad owners, railroad officers, and railroad employees. Unless all of us will look at the matter in a broad, far-seeing way, remembering that the United States is a relatively undeveloped country, needing transportation in almost unlimited quantities, and in improving quality, the growth of the country will be checked.

At present, there is congestion at many points. Lumber and grain movements from the northwest are choked because of insufficiency of available equipment, and the same is true of fruit shipments from the southwest, corn movements from the middle west, and coal and coke, ore, vegetables, manufactured articles and merchandise in other sections. There is a continually increasing demand on the part of the traveling public for more passenger equipment, more frequent train service, and better accommodations.

All this calls for more and better equipment and motive power. The immediate equipment needs of the railways, and the cost of meeting those demands, have been estimated by a committee of the railway executives as follows:

100,000 freight cars	$370,000,000
2,000 engines	130,000,000
3,000 passenger cars	90,000,000
1,000 baggage cars	20,000,000
	$610,000,000

*Including 20,000 refrigerator cars.

Some portion of this $610,000,000 can probably be raised by loan from the fund of $300,000,000 provided for the purpose in the transportation act, but the bulk of it must be raised by the railways, on the basis of their own credit.

In considering the matter of credit, two considerations must be borne in mind; first, the general state of the money market, and second, the standing of railway securities already outstanding. As to the money market, it is common knowledge that conditions are difficult the whole world over, and will doubtless continue so for some time, as a result of the world-wide economic and financial disturbance brought about by the war. It is hard to get large amounts of money for new capital purposes, the price is high, and will apparently continue high for a long time. For example, United States Liberty Bonds, the premier securities of the world, are selling today on a 5¼ to 5½ per cent basis. New York City six-month notes, free of every form of taxation, are selling on a 5¾ per cent basis, while one-year notes of the city of Cambridge, Mass., likewise wholly exempt from taxation, are on a 6 per cent basis.

Recent issues of obligations by various corporations have sold on a high yield basis. The Anglo-American Oil Company, which is the Standard Oil Company of England, has issued five-year notes at a net cost to the company of about 8.5 per cent. The stock of that company is selling around 700. Texas Oil Company notes have sold at a basis higher than 8 per cent to the company, although its stock is selling above 200. The Bell Telephone Company of Canada has issued five-year 7 per cent notes at a price netting above 8 per cent. Canadian Pacific equipment notes, maturing serially in from 1 to 12 years, have sold at about a 7½ per cent basis, and it has been hard to distribute them to investors. Virginian Railway ten-year notes were recently issued at a net cost of 7¾ per cent. It is estimated that equipment notes of the stronger railway companies must net from 7½ to 8½ per cent to the individual investor in order to find a market.

Chicago, Burlington & Quincy joint fours, due in 1921, can be bought now to yield 9 per cent. No one seems able to say how the refunding of these securities next year is to be accomplished. In fact, it is difficult today to handle a large refunding proposition of this sort on any basis. A short-term extension would cost probably more than 7 per cent, although if confidence is restored a long-time refunding proposition might be handled at less than 7 per cent.

The outstanding fact throughout all this presentation is that virtually no railway company can borrow money today for less than 7 per cent. This statement is borne out by the yield which the purchaser of railway bonds now outstanding in the market secures on his investment, and it is manifest that, other things being equal, new issues will hardly fare as well as seasoned securities already on the market. On the basis of present quotations, Baltimore & Ohio convertible 4½s of 1933 yield 9½ per cent; Chesapeake & Ohio convertible 4½s of 1930, 8 per cent; Chicago & North Western 5s of 1933, 6½ per cent; Erie prior lien 4s, about 8 per cent; Ft. Worth & Denver City first 6s of 1921, over 10 per cent; Long Island 4s of 1948, over 7 per cent; New York Central convertible debenture 6s of 1935, nearly 7 per cent; various New York, New Haven & Hartford debenture 4s, 8 per cent, irrespective of maturity; Norfolk & Western bonds, about 6 per cent; Union Pacific 4s of 1927, over 6½ per cent.

So-called high-grade railroad stocks are selling today at prices to net the rates of return to the purchaser indicated below:

	Price, about	Yield
Northern Pacific	80	8¾
Pennsylvania	43	7
A. T. & S. F.	90	7.7
Louisville & Nashville	90	7
New York Central	79	7.6
C. & N. W.	86	8.1

Promptness now in reaching conclusions will help very much; prompt appointment of new commissioners so that you can go ahead under full steam; prompt appointment of the Railroad Labor Board; prompt action by both bodies as to rates to be charged the *public* and rates to be paid to the *employees*. The next important step will be *decisions* by these two bodies that will show the investor that the theory of the new law to protect and encourage the railroad business is being put into actual *practice*. In the interest of service to the public, the law ought to be interpreted in a generous spirit. The 5½ and 6 per cent provisions of the law reflect the idea that those rates of return were ample in years gone by. Conditions are rapidly changing, and the commission may find it wise to increase the rates after the close of the two-year period. In its future interpretation of what constitutes a *fair* return on the *fair* value of railway property the commission may well find that 6 per cent is not adequate. On the other hand, if the commission should find that any conclusion as to rates produces more than is needed, the power exists to make immediate correction.

It seems to us that the imperative need today is for the commission to decide at once what the Eastern group of car-

riers need and then permit rates so as to meet that need. In some ways the Eastern railways are the most important group of all, and their failure to develop adequately, in comparison with the traffic growth of the country, will choke the balance of the railway lines. *Service* is what the country wants and is willing to pay for. In view of all these considerations, the Eastern railways have come to the conclusion that an addition of at least $500,000,000 to their *net* operating income, over and above that earned in 1919, is needed to put them on a basis to furnish service and develop their facilities. This is approximately the sum by which their net operating income in 1919 fell short of a return of 6 per cent on their property investment. In arriving at the amount, allowance is made for the estimated increased cost of fuel growing out of the recent decision of the coal commission and also for increased rates of pay and increased material prices that became effective in 1919, but where not reflected in the whole year's operating expenses; but it does not include any allowance for possible wage increases resulting from present demands of railway labor nor for a possible increase in the rate of depreciation (which now averages about 3 per cent in the Eastern district, as compared with 4½ per cent charged by the director general on new equipment), nor for additional payments to connecting short lines under joint divisions, nor for additional cost of capital for improvements in 1920. The amount of $500,000,000 seems large, and it is, but we must recall that the United States is a large country, that our national wealth is very great, and that the American people have shown an astonishing ability to absorb large items of cost without difficulty. Our national wealth is estimated by the Department of Commerce at $258,000,000,000 in 1919 and about $270,000,000,000 in 1920. Statisticians who have given the matter careful study feel that this estimate is too low, in view of the great increase in general values during the past four years, and that an estimate of $300,000,000,000 is by no means too high. This wealth is increasing at an annual rate of from 10 to 15 billions, or more than half the value of the railways. Our consumption of sugar in 1919 was priced at about $800,000,000. During the past few months the increase in sugar prices has added at least $500,000,000 to the sugar bill of the American people, yet it has been absorbed almost without a protest. Alfred Reeves, general manager of the National Automobile Chamber of Commerce, estimates that the output of the automobile industry in 1919 was 1,891,929 motor vehicles, with a wholesale value of $1,807,594,580. The output for 1920 is estimated at not less than 2,000,000 vehicles, at an average retail value of $1,200, or an automobile bill for the American people this year of $2,400,000,000. I instance these items of national wealth and national consumption merely to indicate the prodigious absorptive and purchasing power of the people of the United States and also to emphasize the point that our power both to produce and to consume is very great. We should not be afraid to take hold boldly of the transportation needs and permit revenues sufficient to make the railroads successful as going concerns.

Statement for Eastern Roads

An abstract of the statement by Daniel Willard, as chairman of the rate committee for the Eastern lines, is as follows:

A statement is attached giving the operating revenues, expenses, net revenues and net railway operating income of these carriers for the years 1916 to 1919, inclusive, as audited, and also for the year 1919, so adjusted as to reflect more nearly the present conditions—and shows as follows:

Calendar year	Net revenues	Operating ratio	Net railway operating income	Decrease compared with 1916
1916.....	$570,377,155	67.41	$464,434,104	.....
1917.....	497,477,306	74.21	368,231,549	D 20.71
1918.....	365,341,843	84.71	251,215,146	D 45.91
1919.....	297,706,179	87.87	182,238,706	D 60.76
1919 (as adjusted) ...	207,518,156	91.58	42,409,693	D 90.87

Taking 1916, which is selected because it is the last full year preceding the radical changes that have since occurred in both revenues and expenses, and comparing it with the year 1919, as audited, there is noted a change in the ratio of expenses to earnings from 67.41 in 1916 to 87.87 in 1919, and this notwithstanding the freight ton-miles handled decreased but 5.77 per cent, while freight train miles actually decreased 18.72 per cent, due to an increase in tons per train mile from 699 to 810. During the same period there was an increase in passengers carried one mile of 30.27 per cent, with a decrease in passenger train miles of 12.75 per cent. Ordinarily a condition such as indicated by these figures would have resulted in a substantially lower operating ratio, with a corresponding increase in net revenue.

This comparison clearly demonstrates that the increase in the basis of operating expenses has far exceeded the increase in the basis of operating revenues. The extent to which the increases in operating expenses have outstripped the increases in rates may be more definitely shown by applying to the business of 1916 the increased rates and charges and the increased bases of expense which actually obtained in March, 1920.

Careful estimates, based on the experience of the Pennsylvania, New York Central and Baltimore & Ohio Railroads, have been made, and the percentages of increased cost and rates so ascertained have been applied to the aggregate business handled in 1916 by the 38 Eastern systems, petitioners in the 15 per cent case. Statement attached shows in detail the combined income account so adjusted and the effect of increased rates and increased expenses as of March, 1920, applied to the business of the year 1916, which may be summarized as follows:

Effect of Increased Rates and Increased Basis of Expenses as of March, 1920, Applied to the Total Business of the 38 Eastern Systems During the Year 1916

Increase in revenues derived from:	
I. C. C. authority—15% case, etc.....	$158,462,984
U. S. Railroad Administration—freight increase, 25%	337,007,051
U. S. Railroad Administration—passenger increase, 26.98%	86,803,036
I. C. C. authority—mail increase, 55%.....	12,554,149
I. C. C. authority—express increase, 10%.....	4,311,649
Miscellaneous increase—estimated	9,648,011
Total increased revenues as above.....	$608,786,880, or 36.37%
Increase in expenses, taxes and rents:	
Rates of pay (per hour), 102.33%..	$692,786,352
Fuel, 154.78%	175,121,726
Materials, 74%	156,103,050
Miscellaneous (claims, freight car repairs, and joint facility operations, etc., estimated).....	125,576,367
Taxes	49,318,862
Hire of equipment and joint facility rents.....	16,282,389
Total increase in basis of expenses.....	$1,215,188,746, or 99.10%
Net increase of costs over increase of revenues	$606,401,866

Note.—This computation does not reflect the full weight of increased basis of costs as it makes no provision for increases due to changes in working conditions.

It will be noted that while the expense basis since 1916 has been increased 99.10 per cent, the revenue basis during the same period has been increased but 36.37 per cent.

As a result the ratio of operating expenses to operating revenues, which in 1916 was 67.32 per cent, becomes 99.73 per cent when revenues and expenses are restated on existing cost and revenue basis. A comparison of these results with the actual results for 1919, as audited, indicates that the increase in passenger earnings and economies in operation incident to increased train load, direction of traffic, etc., made possible largely by unusual conditions resulting from the war, including the demobilization of the military forces, enabled the Railroad Administration to offset to a substantial degree the increased basis of expense shown above, resulting in an operating ratio of 87.87 per cent for the year 1919, as audited. Increased passenger business handled with less train mileage might account for one-half of this reduction. However, the results of 1919 operations are of little value as a basis for

future calculations, unless consideration be given to the circumstances under which the traffic (much of it incident to the demobilization of the army) was actually handled, and, further, unless the audited figures be so adjusted as to fairly reflect the elements of increased revenue and increased expense which it is now known will be effective in the future.

It has been suggested that the year ended December 31, 1919, was not typical because of the reduced traffic in the first quarter and because of the effect of the strikes in the steel and coal industries in the last quarter. While freight traffic did fall off considerably after the armistice in November, 1918, and recovered rather slowly, yet there was a constant and steady increase of such traffic from January on, reaching a maximum in October, the period from May to October being unusually high. The winter months, January, February and March, 1919, were also exceptionally mild and open.

During the steel strike, shipments of steel products were largely maintained from the accumulation of stock. The coal strike was of short duration and did not, upon the whole, seriously affect the earnings of the Eastern carriers. Moreover, the largely increased passenger traffic during the demobilization period, with a decreased train mileage, contributed an unusual measure of net earnings, possibly more than offsetting any adverse effect of fluctuations in freight traffic. The fact is that fluctuations in traffic are the rule and not the exception. A year during which traffic remained steadily at the maximum would not be typical.

However, because of the possible effect of the steel and coal strikes, these carriers have compiled figures for the 12 months ended October 31, 1919, based on a questionnaire submitted with detailed instructions to each carrier. The questionnaire and instructions, as well as all data upon which the compilation is based, are available. The figures both for the calendar year 1919 and for the constructive year ended October 31, 1919, have been adjusted and restated so as to illustrate as nearly as possible the results that might be expected were the business of the calendar year, or of the 12 months to October 31, 1919, to be done over again under the conditions affecting revenues and expenses which now exist, or will exist in the immediate future.

Taking the adjusted figures for the year ended December 31, 1919, the results shown indicate that under the changed conditions the operating ratio resulting from the identical business would be 91.58 per cent. To reduce this to a 75 per cent ratio, with the same volume of business, would require an addition to revenues of some $544,000,000.

The average ratio of operating expenses to operating revenues of these carriers for the nine years previous to and including 1916 was 70.4 per cent, and it would seem that rates ought now to be so adjusted that the same standard of operating efficiency that obtained during that period would now produce approximately the same operating ratio. It is also noted that the operating ratio during the three-year test period averaged 69.5 per cent.

However, to overcome measurably the difference between the increased basis of earnings and the increased basis of costs, and also to adjust the return upon property investment, which in the "test period" was 5.32 per cent, to a basis of 6 per cent, would require for the Class I roads herein referred to, based upon the figures of the year ended December 31, 1919, adjusted, additional revenues equal to about $494,000,000. If revenues were so increased the net return would be about $139,000,000 greater than the average for the three years of the test period. Since June 30, 1917, the property investment of these carriers has been increased by more than $1,076,000,000. The annual carrying cost of this investment averages at least 6 per cent, or $64,000,000 in round figures, and there would be left about $75,000,000 to aid in the re-establishment of credit as a basis for future financing and for improvements, largely unproductive, and for possible contribution to reserve funds.

The average net railway operating income of the "test period" was adopted by the Congress, not as a measure of profit to the carriers while conducting operations at their own risk and bearing the burden of the financing necessary to provide improvements and extensions of facilities, but rather as the measure of a guaranteed rental to be paid by the government during a period when the government itself was to assume the risks of operating results and was to provide new capital necessary for additions, betterments and equipment.

The carriers must now reassume the burdens and risks of operation in a period of uncertain conditions affecting business generally. The demands for additional facilities and extensions were never more pressing than now. The cost of new capital is more than 7 per cent per annum even to those railroad companies whose credit is of the best.

The government Victory Loan bonds are currently selling on a basis of return in excess of 6 per cent. New industrial issues, with which railroad financing must compete, are offering returns from 7½ per cent to 8 per cent in addition to liberal commissions for their sale and distribution, and underlying bonds of substantial railroads may be bought on a basis to yield 7 per cent and in some instances in excess of 8 per cent. Further, the European markets, heretofore available for American railroad issues, are now closed and are in fact absorbing our surplus funds, and this applies not only to Europe but to practically the whole world including Japan and the East.

In 1920 and 1921 from $200,000,000 to $250,000,000 per annum of maturing obligations of these carriers, now bearing low rates of interest (some as low as 3½ per cent), must be taken care of, and in such financing the railroads must secure funds on the basis of the current cost of capital. Little can be hoped for in the immediate future in the way of lower operating costs. There is nothing in the existing situation to justify the expectation that either wages or material prices will soon be lower, while the public expects, and justly so, a constantly higher standard of service. The carriers will undoubtedly endeavor to increase their operating efficiency, and substantial results may be expected in that direction, but increased efficiency is largely dependent upon increased capital expenditures for improved facilities.

Clearly, unless increased revenues on a liberal basis are measurably assured, these carriers will not be able to meet their maturing obligations or secure additional capital on a basis such as the public interest demands, nor will they be able to render the transportation service necessary for the growing commerce of the country.

The preceding facts and figures indicate strongly that the railroads as a whole in the Eastern district will require as a minimum an increase in revenue, to be derived from increased rates and charges, of approximately $550,000,000 per annum, in order that they may be able to furnish adequate service for the public. The additional amount necessary could be obtained by an increase of about 22 per cent if applied to all business, or about 30 per cent if applied to the freight traffic only.

Statement attached shows the estimated net operating income of all the carriers in the Eastern district in relation to property investment (based on the questionnaire data for year ended October 31, 1919) segregated as to Class I, II and III roads, and switching and terminal companies, which for 144 roads represented may be summarized as shown in the table on following page.

The estimated aggregate annual net railway operating income is related to the aggregate property investment account in the belief that as an aggregate amount this account is not excessive but more probably the minimum as representing true value, and, further, because it is the only estimate of

aggregate value practically available at this time, just as it was the only estimate of value available to Congress when it prescribed the percentage on aggregate value that should be taken as a fair return for the two years beginning March 1, 1920. The commission will, of course, make use of any other data it may find available.

Assuming, as we may and must, that the Congress clearly intended to lay down in the transportation act of 1920 a definite policy for the guidance of the commission, the guiding policy so prescribed will undoubtedly control the commission's acts and decisions in the administration of all the provisions of the act, which include, viz.: "due consideration, among other things, to the transportation needs of the country and the necessity of enlarging such facilities in order to provide the people of the United States with adequate transportation."

EASTERN DISTRICT

Railways of Class I, II and III Roads and Switching and Terminal Companies, Year Ended October 31, 1919

Property investment		$9,368,698,698
Six per cent on property investment		$562,121,921
Net railway operating income, year ended October 31, 1919—adjusted		18,008,219
Difference between adjusted net operating income and 6 per cent on property investment		$544,113,702
Total of all revenues	$2,570,967,815	
Per cent on total revenues required to meet deficit under 6 per cent		21.16%
Total freight revenues	1,788,033,724	
Per cent on freight revenue required to meet deficit under 6 per cent		30.43%

Under the provisions of the transportation act of 1920 the duty has been imposed upon the commission of fixing rates and charges so as to yield as nearly as may be a fixed percentage return upon the aggregate value of the transportation properties devoted to the public use.

The information necessary to enable the commission to determine final aggregate value cannot be obtained within any reasonable time.

Elements and conditions affecting railroad operations and business generally have changed and are still changing so rapidly as to make the results of 1919 alone—even as adjusted — unreliable as a basis upon which to forecast the future.

Under these conditions it cannot be estimated (much less determined) with anything like accuracy what net railway operating income will be obtained during 1920 and 1921 from any given percentage increase in rates made at this time.

However, a failure to provide, as far as possible, net railway operating income sufficient to enable the carriers to reestablish their credit would defeat the clear intent of the act, because the carriers under such conditions would not be able to "provide the people of the United States with adequate transportation," and such a course would bring serious consequences to the whole public—including shippers and carriers alike.

It is submitted, therefore, that under the conditions above outlined the only secure course is for the commission to use all information available and to resolve all reasonable doubts in favor of the higher rates and charges shown to be necessary, for on that side lies safety.

Application of Southern Roads

The application for an increase of revenues in Southern classification territory, filed by C. H. Markham on May 3, is in part as follows:

The purpose of this application is to call to the attention of the commission the need of the carriers for an increase of revenue and to suggest to the commission the advisability and desirability of giving prompt consideration of these needs, with a view to so adjusting the rates and charges as to permit the carriers to earn such revenue as is provided by law and as is commensurate with their requirements in order to make them efficient transportation agencies.

The group described and known as Southern classification territory constitutes a well-defined rate territory. The greater number of the railroads operating in this territory have their total mileage within the limits of the group. The commission has in numerous cases recognized that Southern classification territory constitutes a separate group of railways having a rate structure different from that which prevails in other parts of the country and with transportation, traffic and commercial conditions and problems which are peculiar thereto.

The carriers are now operating under rates which were in effect on the 29th day of February, 1920, at the end of the period of federal control. These rates do not yield sufficient revenue to pay an appreciable return on their investment over and above operating expenses, and indeed many of the carriers are not now earning their operating expenses. Owing to the tremendous increase in the cost of operation, which has not been accompanied by a corresponding increase in rates of transportation, these carriers will sustain exceedingly heavy losses unless their rates are substantially advanced. Most of the carriers are now operating under the government guaranty which will expire on September 1, 1920, after which it is obvious that they cannot continue as efficient transportation agencies unless there is a substantial increase in revenue. It is of the greatest importance that such action should be taken by the commission as will insure such an increase to become effective as soon as possible.

For the calendar year 1919 the Class I roads in the Southern region earned only 49.25 per cent of their standard return, the standard return being for those roads $91,115,467, while the net federal income earned was only $44,876,819. The carriers are now confronted not only with the increased basis of expenses under which they operated during 1919, but with still further increases resulting from advanced fuel costs, cost of material, wage scales already effective and other costs. Comparing the actual results for the calendar year 1919 with those for the year 1916, for Class I roads in the Southern group it will be found that while total railway operating revenues increased $234,656,887, or 58.87 per cent, operating expenses increased $294,492,274, or 110.88 per cent, and net railway operating income decreased $76,026,522, or 62.88 per cent; and that while the operating ratio for 1916 was 66.63 per cent, for 1919 it was 88.44 per cent. It will be noted that this makes no allowance for increased taxes during said period.

The bases of operating expenses in effect in 1919 do not fully reflect the expenses now confronting the carriers, among other reasons because increases in fuel costs and wage scales, as well as in costs of material, reflected in the expenses for 1919, were not in effect throughout that year, but became effective at various dates therein, whereas these interests, as well as further and additional increases, are now in effect and will remain in effect during the year 1920.

For the 12 months ending October 31, 1919, statistics reflecting federal operations for the 31 Class I roads, 34 Class II roads, 49 Class III roads and 28 switching and terminal companies in the Southern group, constituting approximately 38,900 miles out of a total of 43,000 miles (total mileage in the group), show the following results:

Total operating revenues	$577,635,493
Total operating expense	504,212,747
Leaving net operating revenue	$73,422,746

After deducting railway tax accruals, uncollectible revenue and adjusting equipment and joint facility rents, the net railway operating income for the 12 months ending October 31, 1919, was $51,208,428.

When the actual results for the 12 months ending October

31, 1919, are revised to reflect adjustments in revenue and expenses now in effect, but not in effect throughout the 12 months' period, so as to adjust the results of that period to present-day conditions, the final result is to reduce the net railway operating income from $51,208,428 to $16,269,429.

For the year ending October 31, 1919, the property investment represented by the book cost of road and equipment and materials and supplies for railways and switching and terminal companies in the Southern group (exclusive of the St. Louis-San Francisco Railway) was $2,283,990,948. Exhibit "A," hereinafter referred to, shows that the sum of $137,059,457 is required to pay 6 per cent on this property investment, as contrasted with the net railway operating income for the year ending October 31, 1919, after making final adjustments to reflect present conditions—namely, $16,269,429. This deficit amounts to $120,770,028.

It is apparent, therefore, that if the needed increase in revenue is to be derived from increases in freight rates and charges, then the same (both interstate and intrastate) must be advanced 30.95 per cent to produce the sum of $120,770,028, the difference between adjusted net operating income for the constructive year ending October 31, 1919, and 6 per cent on the value of the property.

By the term "net railway operating income, adjusted," is meant that to the net railway operating income of the railroads in this group, as reported to the Interstate Commerce Commission, there was added or deducted an amount sufficient to make a constructive year at current rates of pay and prices of important materials, and there were deducted therefrom items included in the returns which applied to a period other than the year above stated.

The attention of the commission is called to the fact that under the transportation act it is discretionary with the commission whether rates shall be so adjusted as to yield 5½ per cent or 6 per cent upon the aggregate value of the property of the carriers held for and used in the service of transportation. At the present time the carriers find themselves unable to secure available capital at a rate of interest less than 7½ per cent. This rate of interest is charged even to railroad companies having good credit and offering sound collateral as security. It is evident, therefore, that the commission at the present time and under the present conditions should exercise its discretion so as to provide a basis of rates which will yield as much as 6 per cent upon the value of the property. Anything less than this will certainly not strengthen the credit of the carriers or permit them to secure sufficient capital to carry on the business of transportation in an adequate or effective way. A rate basis which yields less than 6 per cent will not give due consideration to the transportation needs of the country and the necessity under honest, efficient and economical management of enlarging the carriers' facilities so as to provide the people of the United States with adequate transportation. The carriers ask, therefore, that at least 6 per cent be adopted at this time by the commission as a basis of return, as permitted by the Transportation Act.

The carriers have used their property investment account as representing, for the purposes of this proceeding, the aggregate value of property of the carriers in the Southern group held for and used in the service of transportation. No other basis is at the present time available. This property investment account basis is believed to be substantially less than the aggregate value of the property in the Southern group, and in the consideration of the present problem this basis should be taken as the minimum representing the lowest value which can fairly be used for the purpose of establishing a rate basis to meet the present emergency.

The carriers have given consideration to what appears to them to be the best and promptest method, through the medium of increasing rates for transportation, of increasing their revenue and of meeting financial necessities essential in the public interest to be provided for. It does not appear to them at this time practicable to increase the passenger rates, and they have, therefore, concluded to recommend to the commission that the needed additions to their revenue be obtained by increasing the rates for freight transportation. It is evident that the total interstate and intrastate freight revenue must be increased by an amount which will represent 30.951 per cent of the total freight revenue. It is believed, however, that the least disturbance in the distribution of traffic will result by giving special treatment to carload commodities on coal and coke, cement, cement plaster and plaster, building lime, sand, gravel, chert, crude clay, slag, shale, crushed, ground and broken stone, so that such rates may be increased in specific amounts according to the following table:

COAL AND COKE

Rates less than....	$1.00		to be increased	$0.30	per ton of 2,000 lb.
Rates ranging from	1.00	to $1.59	to be increased	.45	per ton of 2,000 lb.
Rates ranging from	1.60	to 2.29	to be increased	.60	per ton of 2,000 lb.
Rates ranging from	2.30	to 3.40	to be increased	.75	per ton of 2,000 lb.
Rates of	3.50	and over	to be increased	.90	per ton of 2,000 lb.

The amount of increase from the base group of any district to be the amount of increase from related groups in the same district.

CEMENT, CEMENT PLASTER AND PLASTER

Rates less than....	$2.00		to be increased	$0.50	per ton of 2,000 lb.
Rates ranging from	2.00	to $3.99	to be increased	.90	per ton of 2,000 lb.
Rates ranging from	4.00	to 5.99	to be increased	1.40	per ton of 2,000 lb.

If in the judgment of the commission these commodities should be subjected to a blanket increase, it is the opinion of your petitioners that a blanket increase of 90 cents per ton of 2,000 lb. will be necessary to yield on these commodities the percentage of increase recommended on other traffic.

BUILDING LIME

Rates less than....	$2.00		to be increased	$0.35	per ton of 2,000 lb.
Rates ranging from	2.00	to $3.99	to be increased	.70	per ton of 2,000 lb.
Rates ranging from	4.00	to 5.99	to be increased	1.00	per ton of 2,000 lb.

If in the judgment of the commission this commodity should be subjected to a blanket increase, it is the opinion of your petitioners that a blanket increase of 70 cents per ton of 2,000 lb. will be necessary to yield on this commodity the percentage of increase recommended on other traffic.

SAND, GRAVEL, CHERT, CRUDE CLAY, SLAG, SHALE, CRUSHED, GROUND AND BROKEN STONE

Rates less than....	$0.75		to be increased	$0.25	per ton of 2,000 lb.
Rates ranging from	.75	to .99	to be increased	.30	per ton of 2,000 lb.
Rates ranging from	1.00	to 1.49	to be increased	.40	per ton of 2,000 lb.
Rates ranging from	1.50	to 1.99	to be increased	.50	per ton of 2,000 lb.
Any rates of.....	2.00	and over	to be increased	31	per cent.

All other freight transportation rates, class and commodity are recommended to be increased 31 per cent.

To meet the existing emergency and enable the carriers to publish and make effective as promptly as possible the increases sought, or which may ultimately be allowed, it will be necessary for them to use special or blanket supplements carrying the percentage or other increases imposed.

They, therefore, now request the commission to waive temporarily the provisions of its rules governing the publication and filing of rate schedules insofar as may be necessary or appropriate to permit the filing in simplified form of schedules making effective the percentage or specific increases in all rates and charges herein sought, or such increases as the commission may finally approve in these proceedings, by means of blanket or special supplements to the tariffs to provide for cancellations, minimum charges and increases in rates and charges by the percentages or amounts sought in this petition or which may hereafter be fixed, allowed or approved by the commission in these proceedings.

To accomplish this and make effective the filing of schedules providing for the percentage increase in rates and charges and the specific increases upon certain designated commodities herein requested, it will be necessary for petitioners to have

and be accorded relief generally similar to that authorized by Special Permissions No. 45950, under date of May 27, 1918.

If this is permitted the carriers will undertake, with the utmost expedition, to substitute for these blanket or special supplements, tariffs in the ordinary form which will comply with the commission's tariff rules and regulations.

For the same purposes and to the end that the advances herein sought or such as may be finally approved by the commission may be made effective as expeditiously as possible, your petitioners respectfully request that an order be entered at the proper time by the commission modifying any and all of its outstanding and unexpired orders to the extent necessary, as was done by the order of the commission entered on May 27, 1918, upon the application of the director general of railroads, for the purpose of permitting the rates initiated in General Order No. 28 to be made effective.

Attached to this application will be found a statement setting forth additional reasons why the increase in revenue herein sought should be granted.

Attached to this application are exhibits which are asked to be taken as a part of this application.

In view of the present situation, as disclosed in this application and the accompanying exhibits, as well as further and additional facts and information which the carriers will be prepared to present when given an opportunity to do so, the commission is respectfully requested to give consideration to the situation in which the carriers now find themselves, to take cognizance of the present existing emergency and to establish or authorize rates so that the carriers in this rate group or territory will earn an aggregate annual net railway operating income equal as nearly as may be to a return of 6 per cent upon the aggregate value of the railway property of these carriers held for and used in the service of transportation. To this end the carriers offer to present such further additional information and lay before the commission such additional facts as the commission may suggest or require.

At the conclusion of the commission's consideration of this matter the carriers respectfully ask that rates be so adjusted as to yield to the carriers not less than 6 per cent upon the value of their property, through the advances herein requested or in such manner and form as the commission may seem right and proper.

In conclusion, the carriers desire specially to emphasize the need for the proposed increase in rates, to the end that they may not be deprived of needed revenue at a time when a grave emergency exists and when it is necessary that the credit of the carriers be firmly established, so that needed capital may be secured and the country be furnished with adequate transportation service.

Formal Application of Eastern Lines

Mr. Willard on April 26 also submitted a formal statement on behalf of the roads in official classification territory, which discusses the method of putting the increase in effect, in part as follows:

The territory commonly known as official classification territory has been since 1887 a well-defined rate territory, substantially differentiated from other rate territories in the United States by differences in industrial, commercial and transportation conditions. Within this territory there are a large number of railways and railway systems whose lines are confined thereto. There is very little overlapping of lines of railway more largely identified with other rate territories. It has been recognized by this commission in many cases as a separate territory within which rates may be and have been adjusted with relation to each other.

It is the judgment of the carriers that the increases in revenue necessary to meet present known expenses and provide a fair return should be secured from freight traffic. Because of the complexities of ordinary freight tariff publication, such increases in rates can, generally speaking, be made within a short time only by the application of a percentage method of increase in rates. The carriers, therefore, propose that they be permitted to file supplements proposing percentage increases. If this is permitted the carriers will undertake, with the utmost expedition, to substitute for these percentage supplements tariffs in the ordinary form, preserving differentials in the usual manner.

On grain and grain products from points in central territory to points in Trunk Line, New England and Virginia territory, the tariff is comparatively simple, and it would be practicable to publish a specific tariff on this traffic in lieu of a percentage supplement. This, it is believed, would be in the public interest.

In proposing advances on bituminous coal, other than lake cargo and tidewater coal, the carriers propose a slight modification of the strict percentage basis for the purpose of preserving differentials from groups of origin. This method would involve, taking certain basing groups of origin, advancing the rates from these groups the same percentage as all other freight traffic and applying the amount of the increase thus ascertained in cents per ton as a specific increase from each related group to the same point of destination. In dealing with lake cargo and tidewater coal, the same percentage is proposed and the same method suggested, with certain necessary adjustments to preserve differentials.

In advancing rates on coke from the Connellsville region and related districts, the same method is suggested, using the Connellsville rates as the basis for advancing rates both eastbound and westbound.

In order to expedite this investigation and to arrive at a prompt decision, it is suggested that there should be co-operation between this commission and the various state commissions as to the matter of rates necessary to produce the revenue mentioned herein.

In conclusion, without prejudice to the right of any of them in due course to ask for special consideration of rates or divisions thereof, either generally or on particular traffic, the carriers respectfully propose that this commission designate Official Classification territory as a rate territory and establish or authorize such freight rates, not less than 30 per cent in excess of existing rates, as may be found to be necessary in order to assure to the carriers a return of at least 6 per cent upon the aggregate value of their property, as provided in section 15a (3) of the Interstate Commerce Act, and that such advance be permitted to be made by brief supplements to existing tariffs and to be made effective as soon as practicable.

Photo from Kadel & Herbert, N. Y.

Railroad Station at Cairo, Egypt

Democratic Committee Creates Transportation Bureau

With a view to reducing to a minimum the congestion of passenger traffic which is apt to result in connection with the convention of the Democratic National Committee at San Francisco, Cal., a Transportation Bureau has been organized by the committee to be under the direction of E. K. Bixby, traveling passenger agent of the Pennsylvania Lines at Chicago. The organization of this bureau is a new departure in political convention management and its inception is due to the present shortage of railroad equipment, the excessively heavy passenger traffic which is now being handled by all western lines and the fact that several large conventions are to be held at approximately the same time. The object of the new bureau is to organize, concentrate and distribute the movement of the 10,000 delegates and visitors who are expected to attend the convention so that the transportation lines reaching San Francisco will be enabled to handle the transportation of those attending the convention with a maximum of safety and comfort.

Mr. Bixby has planned to produce these results by making arrangements with those planning to attend the convention, in order that the movement westward can be spread over a period of two or three weeks prior to the convention. This in turn will be accomplished by inducing those desiring to stop over *enroute* to visit various points of interest, to start their trip early and to do so on the going trip rather than on the return trip.

To avoid the confusion which always accompanies the return of national convention delegates—owing to the uncertainty of the day and hour of the closing and their inability to make arrangements—a plan has been worked out to care for those leaving at once by inaugurating special train service to principal points, leaving eight hours after the close of the convention and for which delegates can make advance sleeping car reservations and purchase tickets on their arrival at San Francisco. Advance reservations made for the return trip must be claimed 36 hours after the convention opens, and used within 8 hours after it closes.

Mr. Bixby's solution of this passenger traffic problem has met with the approval of the passenger traffic officers of the western lines which will bear the brunt of this movement and the co-operation of the Trans-Continental Passenger Association and the Pullman Company has been promised him in the effort to eliminate the possibility of serious congestion.

The details of this plan were outlined in a letter addressed to E. L. Bevington, Chairman of the Trans-Continental Passenger Association by Mr. Bixby, in part as follows:

The following plan of operation has been proposed by those in charge of the bureau:

Through the various state organizations, the bureau will be furnished with the names of all delegates and alternates attending, the names of all organizations and their leaders, which information, in turn, will be at the disposal of the various lines interested.

A form letter will be mailed by the bureau to all delegates and alternates as soon as elected, urging upon them the necessity of making prompt arrangements for their trip, *both going and returning*, through the representatives of initial lines serving their community.

The names and addresses of all delegates and alternates will be furnished to the initial railroads interested, with requests that they instruct their agent to communicate with, and co-operate along these lines.

This information will be on file in the bureau's office so that the various western and trans-continental lines can obtain it for the purpose of communicating with the delegates to the convention in the interests of their respective roads.

A form postal card for return reservations will also be enclosed in the letter to the delegates, showing the route returning, and the point to which sleeping car reservations are desired, on special service to be operated by terminal lines from San Francisco, within eight hours after the close of the convention, but not later than 1 a. m. In case the lapsed time should be later, the departure will be postponed until 9 a. m. the following morning. This postal card is to be filled in, and forwarded to a representative of the terminal lines at San Francisco and all reservations made in this manner must be claimed within 36 hours after the opening of the convention, in order that preparations may be made for the return trip.

The Democratic National Committee has appointed a committee of five to arrange for the transportation of delegates and others attending the national gathering. This committee is composed of Charles Boeschenstein, Illinois, Chairman; Isidore B. Dozkweiler, California; W. W. Marsh, Iowa; Fred B. Lynch, Minnesota; and Patrick H. Quinn, Rhode Island.

Photo from "International"

Turkish Prisoners of War Boarding a Transport at Alexandria, Egypt, Bound for Home

Italian Soldiers on Guard at Milan During the Recent Railway Strike

New Track Scale Contains Many Novel Features

Includes Use of Levers of Double Web Section to Which Loads Are Transmitted Through Center Lines

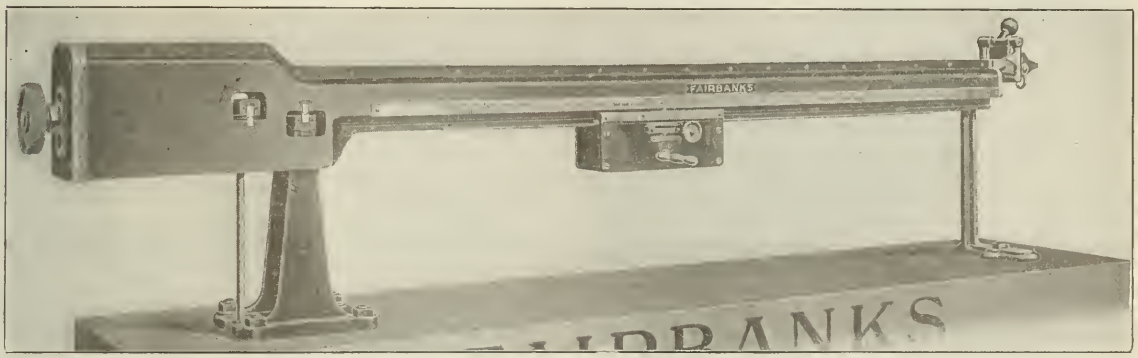
By L. R. Boyer
Sales Engineer, Fairbanks, Morse & Co., Chicago

A NEW TRACK SCALE embodying a number of new and exclusive features has been developed by E. & T. Fairbanks & Company, St. Johnsbury, Vt. This development was occasioned partly by the new specifications adopted jointly by the American Railway Association, the American Railway Engineering Association, the Railroad and Warehouse Commission of Minnesota, the National Scale Men's Association, the Bureau of Standards, and the Scale Manufacturers' Association. These specifications make necessary such changes in the design of scales on the market up to this time, that the new scales in accord with them are not interchangeable with the old scales. While changes were being made that were sufficient to destroy the interchangeability of the new and old scales, it was decided to go further and remove incongruities in design that were and have been present in scales ever since the first was built nearly ninety years ago.

The feature first noticed in this scale is the departure from the use of the customary I-section levers, and going to the consistent use of the double web section throughout all levers of the scale. In designing scale levers it has been common practice to assume that the load is applied at the center of each bearing and is transmitted along the center line of each connected lever. The connections between levers of the standard I section must be made between pivots projecting from both sides of the levers. If the load on both sides is not equal, and it seldom is, or if there is the least warp or horizontal deflection of the lever, a torsional strain is produced which levers of I section are not calculated to resist. Loads applied to a track scale in ordinary car weighing are frequently greater on one side than the other, with the consequence that the pivots are unequally loaded and torsion set up in the levers.

In this new scale the initial load is suspended from the center of the main lever bearing, and from that point is transmitted through the true center line of the lever to each succeeding bearing. The tip of one main lever of each pair is directly over or below the true center line of the opposite lever so that the combined pull of both levers is in one straight line to the center of the bearing, which is on the center line of the longitudinal lever. The same is true at the connection of the longitudinal levers to the transverse or fifth lever. The important effect of bringing this theory into actual practice is that the load on each knife edge is so applied and the levers are so designed that there is neither torsional strain in the levers nor any tendency to displace the levers from their bearings, nor to produce unequal wear upon different parts of the same bearing.

The scale is built in four sections, with a series of primary or main levers transmitting the load to longitudinal extension levers, which in turn transmit the load to a transverse extension lever which connects through a shelf lever to the beam. It is built in two capacities for light duty service, or such service where only a relatively small number of cars are to be weighed. These two capacities are 60 tons and 75 tons per section and in lengths of 50 ft., 56 ft. and 60 ft. effective weighing rail. For heavy service or where a large number of cars are to be weighed the scale will be built in capacities of 75 tons and 100 tons per section, and in the same three lengths as above. The difference between the light duty and heavy duty scales is mainly in the loading per linear inch of knife edges, this being 5,000 lb. in the heavy duty scales and 6,000 lb. in the light duty scales. This difference in allowable loading and the allowance of a higher multiple main lever in the light duty scales serves to make somewhat lighter castings than are necessary in the heavy duty scales.



Fly Beam Introduces Novel Features

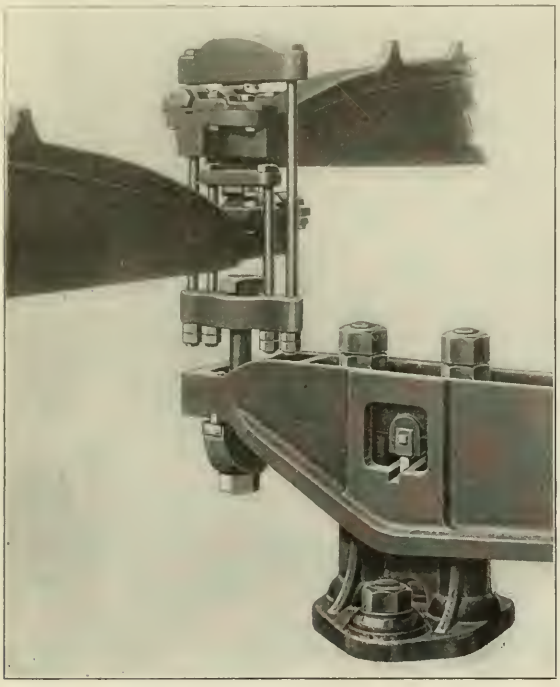
The main suspension consists of a T-head bolt of special bolt steel, carried at its head on a double web steel saddle resting on self-aligning steel blocks which bear equally upon two elements of the main lever load knife edges. The lower end of the suspension bolt is threaded and carries a circular steel nut. The upper face of this nut has circular milled recesses along three equally-spaced diameters. A steel trunnion block resting on the nut has milled cylindrical bosses on the lower side for the purpose of seating in any desired recess on the nut. When the trunnion, which has a fixed position, rests in the recesses of the nut, the combination is self-locking so that the nut cannot back off during the disturbance of the scale in regular weighing service. The

trunnion block has circular turned hubs positioned to run coincident with the center line of the main lever. The main girder chair has circular chilled seats to rest upon the trunnion block hubs. The combination of these elements allows universal motion of the scale platform in a horizontal plane without displacing the knife edges on their bearings.

The combination of the six-pitch thread on the suspension bolt and 1/6-turn of the nut provided by the milled recesses on the face of the nut provides a vertical adjustment by 1/36-in steps.

All connections between levers are made on the center lines of the levers. The main levers are connected to the extension levers by two bolts of special bolt steel. These bolts connect steel lined bearing blocks which engage the knife edges of the extension lever and the main levers. The bolts are threaded to provide vertical adjustment and have lock nuts to secure the position of each bearing block.

The connection between the end and middle extension



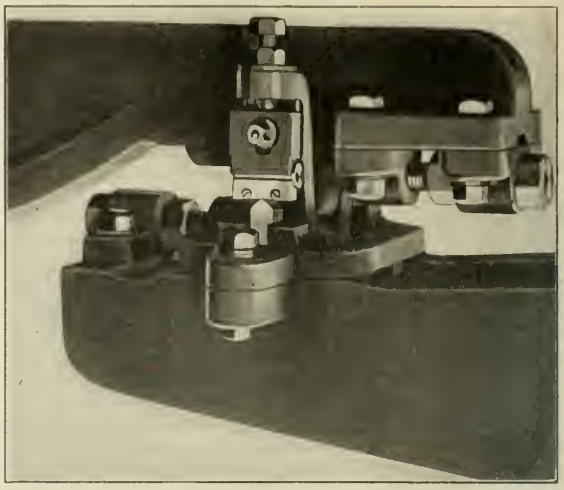
A Single Bolt Connects Longitudinal and Transverse Levers

levers is suspended on the knife edge of the middle lever. It contains three compensating steel bearing blocks, one resting on the knife edge of the middle lever, and the other two engaging the two elements of the knife edge of the end extension lever.

The longitudinal connecting levers transfer their load through a single bolt directly to the center of the transverse lever bearing. Independent vertical adjustment is provided for each of the longitudinal levers. This center line connection allows for the transverse or fifth lever to extend at any desired angle with the center line of the scale, providing a wide latitude in placing the beam without the use of extension levers.

Nose irons have machined tongue and groove engagement with the levers, insuring movement of the knife edges truly along the center line of the lever, and maintaining their parallel alignment. Such movement is controlled by non-corroding adjusting screws.

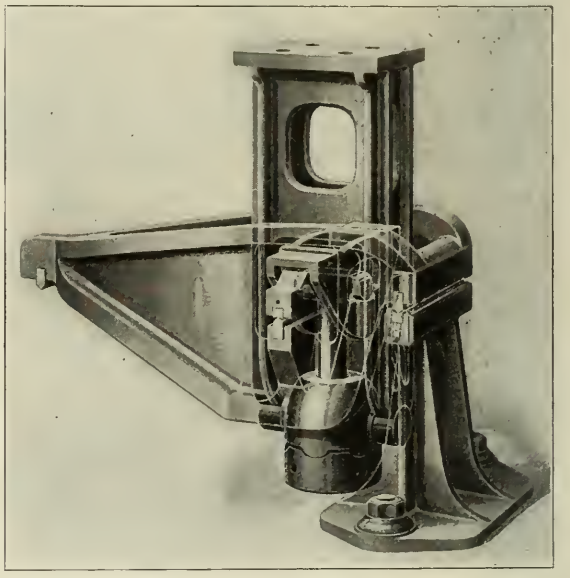
All pivots throughout the scale are machined all over and fitted into machined seats. The edge of the pivot is hardened to resist scratching with a file while the back of the pivot is drawn relatively soft. The design of the levers is such that all pivots and their bearings are in contact throughout their full length. This means that there are no



Knife Edge Connection Between End and Middle Extension Levers

overhanging pivots driven through the lever which must be backed up by heavy bosses of metal.

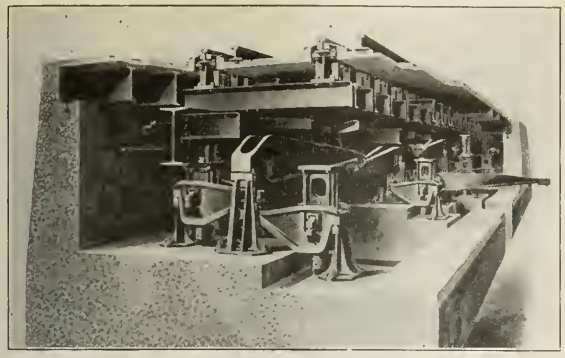
The beam, in keeping with the other parts of the scale, is novel in design. It is of cast iron with a cross section of inverted U shape. This shape, besides giving the maximum rigidity, furnishes a housing over the balance ball and track



Details of the Main Suspension

for carrying the poise. The notches are cut in a steel bar inserted in the bottom of the back web, which insures that no dirt can fall and lodge in them. The type for printing weights on tickets is fastened on the bottom of the front web.

The center indicating poise suspended from three ball-bearing trolley wheels runs smoothly upon a machined track housed inside the beam. Its exact weighing position is determined by a positive locking device of 30 or more teeth engaging the same number of notches of the beam. This locking dvice or pawl moves in vertical guides arranged to be always tight, to insure a positive position of the poise.



The Interior of the New Fairbanks Scale

A convenient handle on the front of the poise serves to operate the pawl when turned in one direction and to print the tickets when turned in the other direction. The beam stand is of the upright pillar type with compensating steel bearing blocks machined in.

For both light and heavy service scales all parts are designed so that when loaded to rated capacity the stresses developed will not exceed those in the following table.

Showing the Manner of Making Connections Between Levers

Working Stresses in Pounds per Square Inch

Nature of stress	Cast-iron	Steel castings	Machinery steel	Structural steel	Steel for knife edge and bearings: High carbon	Steel for knife edge and bearings: Special alloy	Special bolt steel
Tension	1,500	8,000	8,000	10,000	24,000	30,000	15,000
Compression	8,000	10,000	8,000	10,000	24,000	30,000	.....
Transverse Bending—							
Tension	2,500	8,000	8,000	10,000	24,000	30,000	.....
Compression	8,000	10,000	8,000	10,000	24,000	30,000	.....
Shear	2,500	6,000	5,000	7,000	.....	.....	.....
Torsion	2,500	6,000	.....	7,000	.....	.....	.....

The loading for knife edges will not exceed 5,000 lb. per linear inch on heavy duty scales and 6,000 lb. on light duty scales. The tensile strength of special bolt steel used is not less than 120,000 lb. per sq. in.

Standard erection plans have been drawn which incorporate the best recognized practice as to all details of installation. Wide pits afford ample room for installing the scale correctly as well as for convenient examination from time to time. The design of weighbridge, the mounting of dead rail supports and fastening, the arrangement of weather guards, and other details have been worked out carefully, with a view to obtaining the most economical way, consistent with accurate performance and at the same time the lowest maintenance cost.

Commission Asks Co-operation of Carriers and Shippers

The Interstate Commerce Commission on April 30 issued a public notice calling upon all carriers and shippers for co-operation in all practical ways to promote the greatest efficiency in transportation, declaring that present transportation conditions are such as to call for such endeavor on the part of both sides as was prompted by patriotism during the war. At the same time the commission asked the American Railroad Association, representing the carriers, and the National Industrial Traffic League, representing the shippers, to organize a joint committee to promote co-operative action for the improvement of railroad operating conditions.

Chairman Clark addressed the following letter to R. H. Aishton, president, American Railroad Association, and Guy M. Freer, executive secretary, National Industrial Traffic League:

"In view of present operating conditions well known to you both, the need, always present, of hearty co-operation on the part of those who use and those who furnish transportation is emphasized to the point of calling for such endeavor as was prompted by patriotic impulse while our country was in active participation in the war.

"As a means to this end you are each requested to immediately appoint a small committee, representative of your organization, the two committees to meet as a joint committee of the two organizations, and to promote co-operative action by both organizations throughout their membership looking to immediate relief in all practical ways, including:

1. Taking all steps agreed upon by the joint committee which call for no exercise by this commission of its powers under the car service and other provisions of the interstate commerce act.

2. Recommending to this commission any action so agreed upon which calls for exercise of its powers.

3. Referring to this commission matters, not so agreed upon, which the joint committee desires to submit for decision by this commisison, or for exercise of its powers.

"It is hoped that your respective committees can be vested with appropriate powers to act or insure action commensurate with the need, and that the aid of shippers and their organizations and of the working forces of the carriers will be secured in full measure. We regard speedy betterment of operating conditions as a public duty of first importance."

The commission's notice to carriers and shippers follows:

"The greatest efficiency in transportation is the immediate need of the country to stop present and avoid future widespread economic loss.

"Your individual and concerted action is needed for prompt restoration of better operating conditions. All available equipment should be loaded and handled to capacity, where practicable, and every effort made to rapidly and progressively reduce accumulations.

"Your full co-operation and support is also invoked in giving effect to such steps as may be taken by the joint committee to be appointed under our letter of this date."

Two Interstate Commerce Commissioners Appointed

PRESIDENT WILSON on April 30 sent to the Senate nominations for two of the three vacancies on the Interstate Commerce Commission, Henry Jones Ford, professor of politics at Princeton University, to succeed James S. Harlan, whose term expired on December 31, 1918, and James Duncan, of Quincy, Mass., first vice-president and a member of the executive council of the American Federation of Labor and president of the Granite Cutters' International Association, for one of the new positions created by the Transportation Act, for the term expiring December 31, 1924.

Professor Ford is in his sixty-ninth year. He was born at Baltimore, Md., on August 25, 1851, was graduated from Baltimore City College in 1868, and until 1905 was engaged in the newspaper profession. He was an editorial writer on the Baltimore American in 1872 and was later city editor of the Baltimore Sun, managing editor of the Baltimore American, editorial writer on the New York Sun and on the staff of the Baltimore Sun. From 1885 to 1895 he was managing editor of the Pittsburgh Commercial Gazette; from 1895 to 1901 managing editor of the Pittsburgh Chronicle Telegraph, and from 1901 to 1905 editor of the

H. J. Ford

Pittsburgh Gazette. In 1906 and 1907 he was a lecturer on political science at Johns Hopkins University and since June, 1908, he has been professor of politics at Princeton University. He is the author of a number of books and articles on political science and other subjects, including "Woodrow Wilson, the Man and His Work," and "The Scotch-Irish in America."

James Duncan was born in Kincardine county, Scotland, May 5, 1857, and attended school at Aberdeen, Scotland. In 1873 he became a monumental and statue granite cutter. In 1881 he became secretary of the New York branch of the Granite Cutters' International Association and in 1895 he was made president of the union. In this capacity, according to his biography in Who's Who, he led successfully an educational campaign and ultimately the great strike in the granite cutting industry for an eight-hour work day, in 1900. He became editor of the Granite Cutters' Journal in 1895 and since 1894 he has been a vice-president of the American Federation of Labor. He represented the American labor movement in the British Trades Congress at Bristol, England, in 1898, represented the American Federation of Labor at the International Secretariat Conference of Labor at Budapest, Hungary, in 1911, and was a member of the commission sent to Russia by President Wilson in the year 1917.

Although he has been a labor leader most of his life, Mr.

J. Duncan

Duncan is regarded as a strong representative of the conservative element in the councils of the American Federation of Labor, and it is understood that he is strongly opposed to government ownership of railroads. The executive council of the federation has never gone on record as endorsing the Plumb plan.

NEW ENTERPRISES, involving $1,354,262,400 and numbering 1,262 companies, were incorporated under the laws of the principal states in April. This showing, according to the New York Journal of Commerce and Commercial Bulletin, compares with a total of $515,665,300 in the same period a year ago, when 700 companies were organized.

I DO NOT CARE who owns or operates the railroads. I want the best service and most accommodating management for the lowest possible price. And I do not wish to be taxed to help pay for other people's rides or for transporting any other person's property. I am satisfied that I shall not get the best or most accommodating service from the government and that under government operation I shall be taxed to pay for carrying other persons and their property. Consequently I hope for a public opinion which will compel regulating bodies to prescribe rates which will pay the costs of transportation.—*E. T. Adams, in the San Francisco Chronicle.*

The Santa Fe System's Apprenticeship Course*

Department for School and Shop Instruction of Prospective Mechanics Thoroughly Established

By F. W. Thomas,
Supervisor of Apprentices, A. T. & S. F., Topeka, Kans.

THE APPRENTICE SYSTEM on the Santa Fe had its inception 22 years ago, at the hands of John Purcell, chief mechanical officer of the system, who was then master mechanic at Fort Madison, Iowa. Feeling the necessity of mechanics in the shops having a working knowledge of mechanical and free-hand drawing, and ability to read blue prints intelligently, from his own pocket he provided an instructor, furnished a room, drawing instruments, etc., free to the apprentices in the shops at Fort Madison. Years afterward, when the question arose of establishing a thorough and modern apprentice system on the Santa Fe, he lent his ability to establish it on a firm and lasting foundation.

The 26 months of Federal control and operation of the railroads and the efforts of the Railroad Administration towards unification of the roads, methods and men, made many changes in our apprentice system, but as we proposed gradually to work back to our former status and methods, much that follows deals with the scheme as it stood prior to the war—which state we hope soon to regain. During the early part of 1907, when we could not get enough mechanics at any price, the management said, "If we cannot hire them, we will make them." A commission was sent out to learn what schemes or systems were used by other railroads and manufacturers in training their apprentices. We made our report the last day of August, 1907, and our present apprentice system was established at Topeka on September 15.

School and Shop Instruction

There are two correlated features of our apprenticeship system, school and shop instruction. We have a room, preferably in a separate building, in the midst of our shops, fitted up with desks, tables, lockers, blackboards, drawing boards, instruments, models for drawing lessons, etc. This is established and dedicated to educational work. It is a place where the mechanics, foremen, officers and clerks can and do obtain information or help upon any mechanical device or question. The apprentices assemble in classes at stated hours, in this room, twice each week, and are paid their regular rate. We teach them mechanical and free hand drawing, sketching, etc., practical shop arithmetic, problems in mechanics, some descriptive geometry, algebra, etc. They study a treatise on their trade, something about the materials with which they work, a little railroad business letter writing, etc. Through the medium of charts, working models and reading matter, the different auxiliary devices, such as injectors, lubricators, safety valves, superheaters and air brakes, are studied. Each apprentice also familiarizes himself with the company rules and the Federal rules pertaining to his trade. The lessons, examination questions, etc., are all prepared by us and printed in our own print shop, and are representative of Santa Fe standards and practices. They are in loose leaf form and are up to date.

In the shop we have a man known as the shop instructor, one for each department or one for about every twenty-five boys. He is selected from the ranks, a man of character, skilled in his trade, patient in his teaching and capable of imparting his knowledge intelligently to the boys in his charge. He is responsible for the thorough instruction of the boy, and jointly responsible with the apprentice school instructor for the physical, hygienic and moral instruction or welfare of the apprentice. He is not responsible for the output of the shop, though he is responsible for the maximum effort of the boy. He sees that each boy gets a fair and equal opportunity, and he is particularly charged with responsibility for the careful training of the timid or backward boy. The shop instructor ranks along with the department foreman, and both report to the same shop officer. In the temporary absence of the foreman, the instructor takes his place. While much of this monitorial and parental watchfulness was abrogated by the government during its control of the railroads, we still exercise some of it and hope for the day of its complete resumption.

We have in our shops a body known as the Apprentice Board, composed of the general foreman, department and gang foreman, the shop instructors and the school instructor. Each apprentice, either in person or in name, is brought before this board every six months during his entire apprenticeship of four years. All matters in reference to the talent or fitness of the boy, discipline, transfers, etc., are investigated and handled in a recommendatory manner to the ranking mechanical officer of that shop for his action, and finally to the supervisor of apprentices.

I do not know of anything that has been so fruitful of good results as this apprentice board. It makes each shop officer take an active individual interest in the boy. He is called on to pass judgment on the boy, and knows he must find out all about him. It has also created an interest in the other shop employees by the foremen, and a desire upon the part of each foreman to treat all his men with that interest and feeling which begets loyalty and service.

At the larger shops affording ample facilities, a fixed schedule of work is outlined for each apprentice to pursue. This is so arranged that he completes the course in three years and six months, leaving six months for review or specializing. When he completes his apprenticeship he is given the standard rate of pay and, before the advent of seniority he was assigned to a class of work for which he had shown himself best adapted.

While the Railroad Administration, in its efforts at standardization and unification, took away much that was attractive, interesting and beneficial, greatly lowering the morale, it still left much of value and, at the end, or near the end of federal control, it ordered the establishment of schools similar to those on the Santa Fe for apprentices on all roads, or the co-operation of the railroads with the vocational training of the public schools.

College Men

The national agreement made by the director general with the shop crafts, makes no provision for special apprentices, a very unfortunate omission. We had, before it was abolished by the Federal authorities, a well defined and productive course for these young college men, and a still shorter course for the brighter young men who had completed their apprenticeship. The object of these courses was to select and develop material for positions of responsibility. The young college man was required to work one year on machines, one year in the erecting shop, and the third year, known as "special course," was spent in car shop, boiler

*Abstract of a paper read before the Western Society of Engineers, Chicago, May 3, 1920.

shop, roundhouse, with traveling engineer, and on inspection. With these went a course of reading and study, the preparation of a thesis on the department in which he was working, and a monthly letter giving details of the work he had done and any constructive criticism he had to offer. This course produced ample material from which to select our supply of shop and staff officers. Not all, of course, made good, but as the course was so exacting and exhaustive, it gave us a very close knowledge of the young man's calibre and makeup. Better have him fail in the preparation than to fail after being placed in a position of responsibility.

Personal Interest in the Apprentices

When an apprentice completes his course and is assigned to regular work our responsibilities do not end. He may be transferred to an adjacent shop, or one a thousand miles away. If so, his name and personal file is sent by the local instructor to the instructor where he may be sent. When he arrives at his new location, about the first person he meets is the local apprentice instructor. He will always be sure of one person who will give him a friendly welcome, assist him in getting located, and put him next to the ways of the place.

If the graduate leaves the service, we still keep track of what he is doing, the pay he receives, and the kind of people with whom he is working. We know where practically all of the young fellows who have left us are located.

Following up the young man after he has been promoted to some position of trust, is one of our particular features. His first position is the most trying one of his life. He needs a balancing hand more than at any other time. He needs some one to hold him in check, to push him on at another time, to encourage him in his hour of despondency. One of our master mechanics told me that when placing one of his graduates in charge of his roundhouse, he spent eight hours per day the first week, getting the young fellow started right. His reward was one of the best roundhouse men on the system.

What we have done others can do. There is nothing complicated about the system. It has required the entire time of its directing officer, it has required the full approval of our chief executive officers and it has had the full co-operation of all our employees, officers and men. The apprentice system on the Sante Fe is as much a part of the mechanical organization as is the smith shop.

Results

This is not a cold-blooded proposition. There is nothing cold-blooded or cold calculating about it. It is no longer the style on the Santa Fe to fire a man because he may have slipped once. It is no longer permissible to discharge a man to cover up the failure of a supervising officer. We want these young men to feel secure so long as they do their part and make an honest effort to give a day's work for a day's pay.

Our present apprentice system has been in vogue thirteen years. From 345 boys in 1907 the number has grown to 1,303 today. Starting out with machinist apprentices, we are now giving instruction to boys in nine trades. Our apprentice system, the past ten years, has furnished the road with all of its shop officers. It has not been necessary to go outside for a foreman, or master mechanic. It has provided all the draftsmen for our drawing rooms and men for staff duties. We have young men educated and trained, waiting for any emergency or any job that may turn up.

Up to May 1 we had graduated 1,400 skilled mechanics. Of this number, 60 per cent, or 840, are in service today, and 200 have been promoted to some position of responsibility. Topeka shops, the largest on the system, had not, in 1917, employed a skilled mechanic from the outside for over two and a half years. In habits and character, these mechanics are of the best. Their homes are on the road, their friends and companions are there. They are more than shop men; they are good citizens.

The advantages gained from our apprentice system may be summed up briefly:

1.—Ample supply of skilled mechanics for our shops, mechanics who are thoroughly skilled in our ways and methods.

2.—Stabilizing employment. The recruits being at home and at work under favorable conditions, don't care much about roaming around.

3.—Material from which shop officers and mechanical staff may be recruited, young men with whom we are thoroughly acquainted and who have been especially trained and tried out.

We have not accomplished this in a day.

Yet the growth in numbers, in quality of men, and in instruction has been so gradual that we do not realize what we really have accomplished.

The Santa Fe System Apprenticeship Course

Graduates of the Santa Fe Apprenticeship Course Who Have Received Promotions to

Division and general foremen	10
Roundhouse foremen	18
Assistant roundhouse foremen	47
Machine and erecting foremen	27
Boilermaker foremen	10
Car foremen	2
Miscellaneous foremen	3
Apprentice instructors	38
Material inspectors	4
Engine inspectors	13
Boiler inspectors	5
Car inspectors	7
Miscellaneous	16
Total	200

Discussion

The paper brought out a lively discussion by a number of supervisors of apprenticeship courses, covering both the manufacturing and printing trades. It was the consensus of opinion that the fundamental principles underlying the Santa Fe apprenticeship system are correct, and are universally applicable with such changes in the details of the organization and methods of instruction as are dictated by differences between trades, conditions surrounding the organization of the plant and the nature of the product. Two fundamental points were particularly stressed, the absolute necessity of subordinating the output of the apprentices to proper instruction and knowing how to select boys naturally adapted to the work of the trade for which they propose to train. To meet the first of these conditions the Western Electric Company, for the purpose of training toolmakers, has equipped a special training shop in which the boys receive the greater part of their shop instruction before they are allowed in the shop on production work. The output of the instruction shop is utilized after being subjected to rigid inspection, but the training shop enables the boys to receive careful instructions without interfering with smoothness of operation of the production departments.

A number of questions were asked as to the ability of the organizations to retain their apprentices at the low apprentice wage scale generally prevailing, and as to the seriousness of the loss of apprentice graduates from the organization. Mr. Thomas stated that about one-third of the Santa Fe apprentices are expected to complete the course. The Western Electric Company's course for toolmakers has suffered a loss of apprentices of only 25 per cent in four years. None of the courses represented at the meeting has experienced any difficulty in securing applicants either in smaller communities such as are largely involved on the railroads or the city of Chicago itself. The Western Electric Company has 10 applicants for every opening. The general experience has been that, when graduated, the boys stick. At the present time, the Santa Fe still has 61 per cent of its graduate apprentices in its own service; 71 per cent of the graduate toolmaker apprentices of the Western Electric Com-

pany are still in the service of that company; 70 to 75 per cent of its graduate apprentices in the printing trades are still in the services of R. R. Donnelley & Sons (Lakeside Press), Chicago. This company graduated 24 apprentices in 1915, all of whom are still in its service.

In discussing the ratio of apprentices to mechanics in the various trades, it was brought up that a check of 50 manufacturing companies and 50 railroads indicated that a ratio of one apprentice to each 2.3 mechanics is required to maintain a supply of mechanics equal to the demand, taking into consideration the fact that a growing industry doubles the number of men employed approximately every ten years.

In considering the cost of establishing an adequate apprenticeship course, the by-products of the course must be considered. These are the production of the apprentices, the trained material from which to select supervisors and, in the case of the railroads, the school and shop instructors, the former performing functions which would otherwise require a man, such as taking care of shop blue prints, shop sketchings, etc., and the latter acting as aid to the regular supervision. The experience of the Western Electric Company has been that its course has not cost a cent.

Augereau's Wireless Cab Signal

The State Railroad Administration of France has made quite extensive experiments with an audible cab signal controlled by Hertzian waves—a "repeater," as the Frenchmen term it—to call the attention of the engineman when he passes a caution signal which is set against him; and the experiments have proved so satisfactory that the government plans to instal the apparatus on long sections

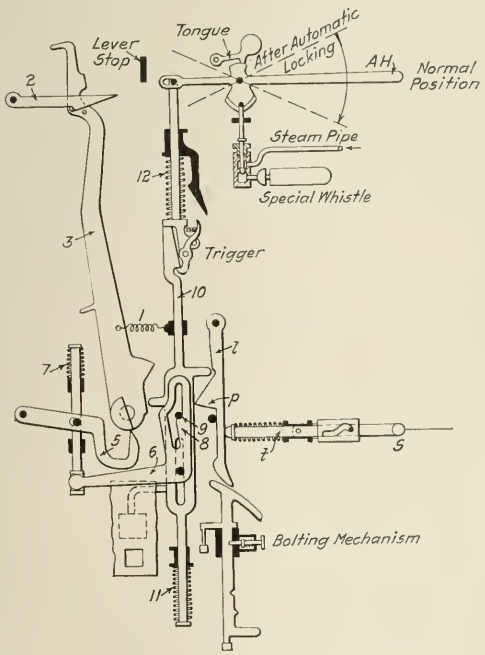
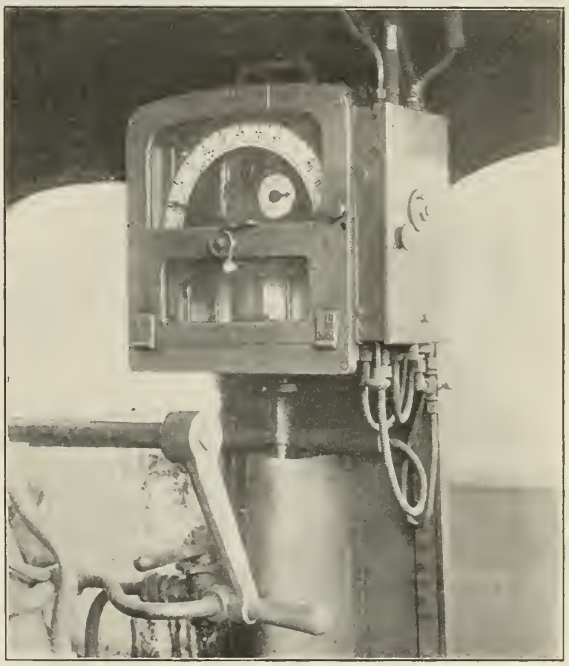


Fig. 1—Augereau's Wireless Cab Signal

of its railroads and to equip a large number of locomotives. This announcement of proposed extensive installations is not yet officially confirmed, but as the system is of interest on its own account and as the experiments have been continued over a series of months we give herewith a brief description of the apparatus. The installation is on the line running from Paris, southwest, 48 miles, to Chartres. Nearly or quite all of the distant signals between Trappes and Maintenon, on this section, a distance of about 15 miles, are fitted with the "wireless."

The apparatus is the invention of a French engineer, Mr. Augereau, and the essential features are similar to those which were used for wireless communication by aviators during the war. At the roadside station a Ruhmkorff coil, energized by a small battery and acting by means of a buzzer, produces Hertzian waves which, by acting on a coherer on the locomotive, cause the sounding of a whistle in the cab. The antenna at the station and that on the locomotive are each about 4 ft. above the level of the rail, and are of sufficient length, parallel to the track, to function satisfactorily on trains moving at any speed. The roadside battery is active only when the visual roadside signal is against the train, and only while a train is passing, track instruments being used to give the train this control.

The arrangement of the apparatus on the locomotive is illus-



Flaman Speed Recorder, Used with Augereau's Wireless Cab Signal

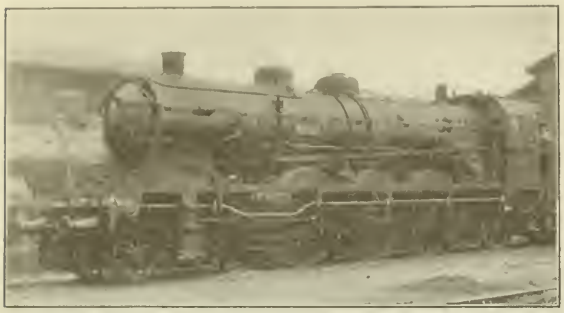
The Scale Shows Kilometers Per Hour

trated in fig. 2. The circuit from the battery energizes the solenoid, 1, sufficiently to lift its core whenever the coherer is traversed by the current coming from the antenna. The antenna consists of a copper tube on the side of the locomotive, as shown (white) in the photographic illustration. (In France trains on double-track roads use the left-hand track, and therefore this antenna is on the left side of the engine; but to provide for running locomotives backward antennae can be mounted on both sides.)

The induction coil at the roadside station, with a primary current of 8 volts, is capable of producing a spark about one inch long. The secondary coil has one end connected to the ground and the other to a buzzer and to the roadside antenna, as shown. This antenna consists of a copper wire about 16 ft. long.

The roadside battery, 2, has one pole grounded and the

other is connected to a wire extending through the induction coil to an insulated section of rail, as shown. The commutator placed between the battery and the ground is controlled by the visual signal, which makes or breaks the ground connection, the current flowing only when the signal is set against approaching trains. With the signal in the adverse position and the insulated rail grounded (by the presence of wheels upon it), the current from the battery traverses the primary coil; the induced current then actuates the buzzer and the Hertzian waves are produced. As before stated, these latter



Antenna on Locomotive for Augereau's Wireless Cab Signal

continue only so long as the train is passing a signal. As soon as the wheels of the locomotive have passed the signal the roadside circuit is broken by means of a treadle, which is depressed by the wheels.

On the engine, the resistance of the coherer normally opposes the passage of the current from the engine battery, E B; but on passing the roadside antenna this resistance diminishes and the current then lifts the core of the solenoid. This movement releases a lock, fig. 1, which is enclosed in a box fixed to the side of the speed recorder, as shown in the illustration. This lock controls the valve of the cab-signal whistle (which is mounted in the front of the cab.) The blast of the whistle continues until the engineman, by restoring lever A H to normal position, stops it.

Referring to fig. 1, the pawl, 2, raised by the electro magnet, releases lever 3, and this is pulled to the right by spring 1. The locking mechanism is worked by springs 7, 11 and 12. In this operation rod 10 moves down and sounds the whistle. The stylus, *s*, is moved by the pushing of lever 1 to the right.

Each operation of the wireless signal is recorded by means of a cam forming a part of the lock, which gives a slight movement of the stylus against the paper tape of the speed recorder. At the end of the run the inspector at the engine-house finds this record in the form of a short, straight line cutting at right angles the speed-record curve. This indicates that the whistle was in working order. When the engineman sees a signal set against him it is his duty to give the stylus a movement in the other direction (by moving lever A H downward), and the marks so made, different from those made by the roadside impulse, afford evidence that the engineman was attending to his duty.

Steel Merger in Canada

CANADIAN NEWSPAPERS of May 3 report that Colonel W. Grant Morden, representing English interests, has announced the consolidation of nine steel, coal, shipbuilding and transportation companies of Canada into the British Empire Steel Corporation, with a capital of $500,000,000. The capital stock of the corporation will be divided as follows: Seven per cent cumulative preferred, $50,000,000, of which $37,000,000 is to be issued; 8 per cent cumulative preferred participating, $100,000,000, of which $25,000,000 is to be issued; 7 per cent non-cumulative preferred, $150,000,000, of which $68,000,000 is to be issued; common, $200,000,000, of which $77,000,000 is to be issued.

Included in the consolidation are the following companies and their subsidiaries: Dominion Steel Corporation; Nova Scotia Steel & Coal Company, Ltd.; Canada Steamship Lines, Ltd.; Canada Foundries and Forgings, Ltd.; Maritime Rail Company; also the Collingswood Shipbuilding Company, Ltd.; Port Arthur Shipbuilding Company, Ltd.; Halifax Shipyards, Ltd.; and the Davie Shipbuilding and Repairing Company, Ltd. The officers of the new corporation will be men now prominent in the constituent concerns. The London advisory board of the corporation, Colonel Morden said, will include Sir William Beardmore, chairman of Wm. Beardmore & Co., Glasgow; Henry Steel, chairman of the United Steel Companies of Great Britain; Viscount Furness, chairman of the Furness group of English steel industries; Benjamin Talbot and J. P. Mangan, directors of the Furness companies; Maj.-Gen. Sir Newton Moore, formerly prime minister of Western Australia; and Sir Trevor Dawson, deputy chairman and managing director of Vickers, Limited.

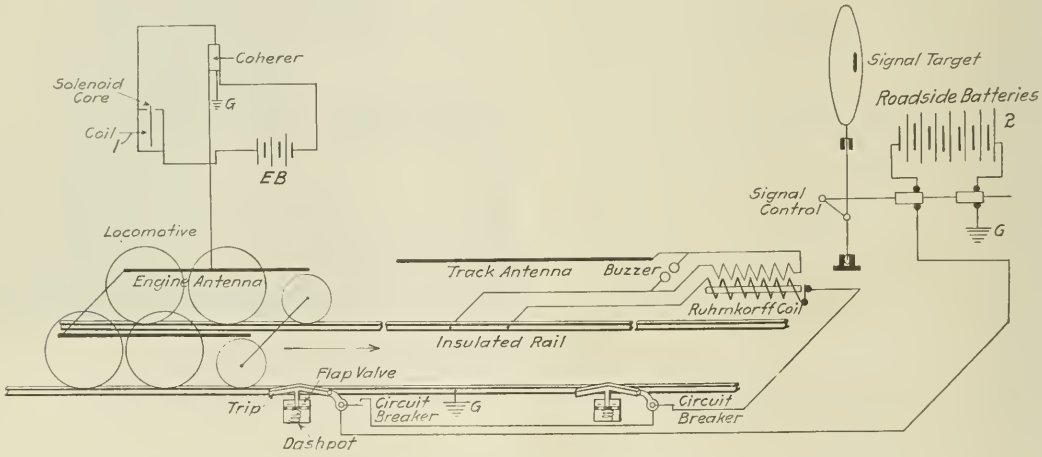


Fig. 2—"Wireless" Cab Signal Tried on the State Railroad of France

Ministry of Transport Fiscal Year Estimates

A Total of £1,433,642 Required—An Outline of the Action to Be Taken with British Railways

LONDON.

THE BRITISH MINISTRY OF TRANSPORT has recently issued a statement in which it is stated that the reqnirements of the Ministry for the current fiscal year will be £1,433,642, which is subdivided as follows:

(1)	Salaries, wages, allowances	£416,592
(2)	Miscellaneous charges	28,650
(3)	Grants to transportation schemes amounting to	1,000,000
(4)	Government pool of motor passenger cars	54,500
(5)	Advances to electricity commissioners	25,000
		£1,524,742
	Deduct appropriation in aid	91,100
		£1,433,642

In addition to the general expenses of the ministry set out above and amounting to £1,433,642, a net sum of £23,000,000 is provided in the railway agreements vote. Of this, £22,000,000 is for arrears of maintenance and renewal works which have accrued during the war and for interest* on capital expenditure, while a net sum of £1,000,000 is for purchase of rolling stock from the ministry of munitions for the government pool. These amounts compare with a total of £60,000,000 provided for the railway agreements vote last year.

The railway agreements vote arises out of the arrangement with the railways during the war. In this general agreement the arrangement with regard to government liabilities for deferred maintenance is set out, as follows:

". . . if in the special circumstances obtaining during the period of control, a railway company has postponed works of maintenance (*i.e.*, the repairs and renewals of its works and plant), which in ordinary course would have been executed within the period and their cost charged as working expenses, the cost of such works, when they come to be executed, is a fair charge against the Government."

The shortage of labor and material during the war, the work undertaken by the railway companies in manufacturing for war purposes, and the need for keeping expenditure down to the minimum compatible with safety has resulted in the accumulation of a heavy arrears of maintenance and renewals, both as to permanent way and to rolling stock.

The following is a brief account of what action is being taken in regard to the railways by the Ministry of Transport:

Finance.—Since the amount due from public funds depends upon the earnings of the railways the minister is directly concerned in the administration of the companies. To safeguard the exchequer, while leaving the companies discretion in directing their own financial policy, constitutes a problem of administration which the ministry is working out in close consultation with the companies. This involves the examination of a gross annual expenditure at the rate of approximately £200,000,000 per annum. The necessary staff of expert railway accountants has been appointed in connection with these duties.

All proposed capital expenditure of the railway companies is most closely examined by the engineering, traffic, finance and other departments of the ministry and submitted to the Treasury before authority to claim interest from the government is given. In the course of this examination the technical departments are able to suggest alterations and improvements with a view to reducing expenditure, in which direction important results have been achieved. The technical departments are able to guide development in the right direction by levelling up to the best practice, and to ensure that no opportunity for standardization is lost. This is of particular importance in connection with the many proposals for electrification now being received, to deal with which a special expert committee has been set up.

Rates.—Having completed their enquiry into the temporary increase of rates necessary to restore the financial equilibrium of the railways the rates advisory committee is now embarking upon the larger and more important question of a thorough and scientific revision of the basis of railway rates and charges. Such a revision is overdue both in the interests of the traders and the railways.

The present parliamentary classification of goods for the purpose of conveyance charges is at least 30 years old, and although an endeavor is made to keep the working classification up to date, there are, undoubtedly, certain anomalies owing to changed conditions of trade, new uses of materials, etc.

In originally determining the class, it is evident that the value of the goods was largely taken into consideration, and although this should probably enter into the question, it is for consideration whether more weight should not be given to the cost of the service and the conditions under which the traffic is conveyed as to quantity, bulk, regularity of flow, method of packing, etc.

Class rates have been provided for the various classes on a more or less uniform scale throughout the country, but not more than 25 per cent of the total business is carried at these class rates, the remainder being carried at what are known as "exceptional" rates, which are lower than the class rates.

The general result has been that a most complex system of varying rates has been built up, there being probably hundreds of millions of different rates on the railway companies' books, with inevitable anomalies.

Statistics.—British railway statistics were deficient in many important respects before the war, and the restoration and extension of statistics was an essential preliminary to securing economy in operation and construction and to the systematic revision of rates. The necessary organization was accordingly set up and arrangements were made to institute for each railway system as many of the new returns as practicable from the beginning of January, 1920, including ton-mile statistics (for coal and coke, for other minerals, and for general merchandise separately), tons and receipts of principal traffic, commodity ton-miles, car-miles, train and engine hours and train and engine mileage in greater detail than hitherto.

The new statistics provide for the tons and receipts of 72 main commodities, and the traffic to be included under each commodity heading have been classified in order to secure uniformity of practice throughout the country.

Ton-miles in respect of each of the commodities are to be compiled for one four-weekly period during the year. The average distance the traffic was conveyed will then be ascertained by dividing the ton-miles by the tons carried, but the information will also be tabulated to show the quantity of traffic conveyed each distance, and the receipts therefrom. These figures, used in conjunction with the tons and receipts for the whole year, provide a valuable guide for estimating the probable financial results of any contemplated revision of rates, and so afford a sound commercial basis for the enquiry into the whole system of railway rates and charges which is now being undertaken.

The information available in respect of train miles has

*For any capital expenditure made by the railway companies the government agreed to pay the interest charges inasmuch as the railway companies would not derive any financial benefits because of the guaranteed return.

previously been confined to "Passenger," "Freight," "Shunting," and "Other miles." The new statistics provide for the separation of the mileage incurred on week days and Sundays, and for a further analysis of "Other miles" to show separately "Assisting miles required," "Assisting miles not required" (*i.e.*, engines working home on trains, etc.), "Departmental miles," and "Light miles."

Labor.—Not only have all the principles regarding standardization of wages been settled, but machinery has been devised which will enable any adjustments which may be required in the future in railway wages to be made apart from the ordinary administrative work of the Department. The scheme consists of a Central Wages Board of five representatives of the companies and five representatives of the men, to whom disputes will be referred. Should they be unable to reach an agreement reference will be made from them to the National Wages Board, consisting of four railway managers, four railway workers, and four users of railways (one nominated by the parliamentary committee of the Trades Union Congress, one by the Co-operative Union, one by the Federation of British Industries, and one by the Associated Chambers of Commerce), with an independent chairman appointed by the government. It is agreed that no strike shall take place until one month after a reference has been made from the Central to the National Wages Board. Local machinery is also to be set up to deal with local matters.

Traffic Congestion.—With a decreased number of locomotives and freight cars in traffic, and with a shorter working day, the railways are actually coping with a larger volume of work than in 1913.

The total number of passengers carried by the 16 principal railway companies (exclusive of season ticket holders) during the year 1919, was 974,259,966; an increase of 156,278,127 passengers, or 19.1 per cent as compared with 1913.

The number of season ticket holders, equated to annual tickets, conveyed during the year 1919, was 735,172; an increase of 245,692 or 50.2 per cent as compared with the year 1913. These season ticket holders are responsible for from 100,000,000 to 150,000,000 additional journeys, so that the annual carriage of passengers is nearly 300,000,000 more than in 1913.

Freight revenue on the controlled railways during the past year was nearly £5,000,000, or 7 per cent more than in 1913, on the basis of the same charges and excluding government traffic amounting to £21,000,000, of which probably about one-half was freight traffic. The total freight receipts were, therefore, approximately, 20 per cent in excess of 1913. This indicates that, even after allowing for a change in the class of goods carried, the average distance traffic was conveyed has been increased, thus involving a greater tax upon the carrying capacity.

The stock of locomotives available for traffic on the 16 principal railways on June 30, 1919, was 17,743; a decrease of 1,186 as compared with the number available at the end of 1913; this decrease was reduced to 293 locomotives on December 31, 1919, brought about by a deduction of 447 locomotives from the number under or awaiting repair, 429 locomotives lent by the government, and 17 added to the companies' stock.

Since December 31, twenty-two additional government locomotives have been hired to the railways, who are making strenuous efforts to reduce the number under and awaiting repair as quickly as possible, and to increase the rate of construction of new locomotives.

These 16 principal companies in Great Britain had actually in traffic on June 30, 1919, 650,606 freight cars, or 45,315 less than on December 31, 1913. By September 30 this deficiency had been reduced to 43,486, and by December 31 to 19,391. Considerable pressure had been put upon the railways to increase the construction of new freight cars; on June 30, 1919, there were 17,141 freight cars on order at railway companies' shops and 3,995 on order from outside firms, a total of 21,136. On December 31 these orders had increased to 21,306 at railways' workshops and 11,542 from outside firms, making the total 32,848 on order, or an increase of 11,712 since June. During the present year additional orders have been authorized for the construction of 7,277 freight cars by outside firms.

Far more important than the actual car shortage have been the delays caused by the alteration in working hours, both on the railways and in other trades. Whereas before the war the working day of 11½ hours was available on railways for unloading freight cars, there is now the universal eight-hour day. The men are naturally reluctant to impair the advantages which they have gained by the establishment of this principle by any frequent resort to overtime.

During December 365,533 freight car days over and above the "free time" for loading and unloading were lost.

Equally important as contributing to the traffic congestion is the alteration in the flow of traffic. This change, which is common in the case of many commodities, is due to a variety of causes, the chief being the increased cost of sea traffic, which has thrown the coastal trade on to the railways.

Development.—Many facilities suspended during the war have not yet been restored, and the development department is constantly considering the public need for the reinstatement of such lines and services as were closed or curtailed during the war, and which, owing to financial considerations or scarcity of material, have not yet been restored.

Standardization.—Great advantages can be secured by the standardization of rolling stock and of loading gage. At present there is no uniform design either for freight cars or coaches, but each railway builds its rolling stock to meet its own particular requirements. This diversity causes very great inconvenience in effecting repairs of freight cars which necessarily travel over lines distant from their home system. The trouble is accentuated by the privately-owned cars. Standardization by reducing the number of types to be manufactured will help very largely, but following on the heels of standarization must come the reorganization and possible regrouping of workshops.

In the case of passenger coaches the absence of standardization precludes the use of some particularly modern and up-to-date equipment in through running, owing to the diversity of the loading gage of different systems. If the loading gage could be increased freight cars of a higher capacity could be employed, and it is universally recognized that for certain classes of traffic this would prove economical. Investigations are required as to the cost of such an improvement compared with the possible resulting economies; for it would involve an increase in the carrying capacity of many existing bridges which could not bear the locomotives required for the heavier trains. Indeed, at the present time this very difficulty limits the use of locomotives built by the government for use in the war areas.

Electrification.—The policy of the ministry with regard to the electrification of railways is to encourage the different railway companies to spend their own capital on electrification schemes wherever a well-considered scheme can be produced, more especially with regard to suburban traffic.

There are, however, important points of principle to be settled, so that the various schemes which have been sent forward to the ministry, both for suburban and for main-line railways, shall be so arranged as to facilitate the continuity of traffic and permit the rolling stock of one company to go over the lines of all others. A committee of well-known technical engineers and others is at present sitting to consider the technical points in connection with the interchange of electric rolling stock and to advise on any questions which may arise in respect of through running.

The Recent Strike on the French Railways

Radical Labor Syndicalists Precipitate a Transport Crisis Over a Minor Question of Discipline

By Francis Jaques

Paris, France.

Almost unfortunate and stupid strike, lasting a week, recently paralyzed the French railroads, which at last were just beginning to show a slight improvement in their operation. As a result they are now worse off than ever before, and the effect has been a most disastrous one to the whole country. The ostensible reason for the big strike, as given by its leaders, was an incident of too little importance, compared to the inevitably serious effect on the life of the nation, to have been the real cause of the affair. There were other influences at work of which mention will be made later.

This minor incident took place at Villeneuve-Saint-Georges, near Paris, in one of the Paris-Lyons & Mediterranean shops. The actual facts of the case are these: A certain number of employees of the Paris-Lyons & Mediterranean asked for permission to go to Dijon to a reunion of labor syndicates. The president of the Paris-Lyons & Mediterranean, in accordance with the usual custom, authorized the members of the administration council and of the executive commission to go to the reunion; but he did not believe it his duty to give this authorization to three delegates of the propaganda commission.

One of these delegates, Campanaud, went to the meeting in Dijon in spite of the fact that he had been refused permission to do so, and upon his return he was laid off for two days without pay. The employees protested, but the president of the Paris-Lyons-Mediterranean refused to remove the punishment. Campanaud's comrades in the shops at Villeneuve-Saint-Georges, therefore, on February 13, stopped all work, hoping thus to force the president to reconsider his decision, and the strike gradually spread throughout the Paris-Lyons & Mediterranean.

At the same time the personnel of the shops at Villeneuve-Saint-Georges sent a delegation to see the Minister of Public Works. Their spokesman admitted the facts with reference to Campanaud's punishment, as cited above, but said that those delegated who were to go to Dijon, upon being obliged to choose between the syndicate's order and the company's order, had preferred to obey the former.

Thereupon the Minister of Public Works, Le Trocquer, announced that he could not interfere in respect to a purely disciplinary measure within the company, although he was always willing to take action in regard to the legitimate claims of the workmen for bettering their financial or moral situation.

Start of the Strike

On February 25, the "Union of the Syndicates of Parisian Railroad Employees" put out a strike circular under the heading: "Solidarity Strike in Favor of Comrade Campanaud, of the Paris-Lyons & Mediterranean, Punished for Having Carried Out a Syndicate Mission."

The first effects of the strike were felt by the passengers of the early trains on February 25, from the suburbs of Paris to the city. Many of these trains had to stop on the way, and the passengers were obliged to finish their trip on foot. Most of the principal express trains ran through, but far behind their schedules. The services of the Paris-Lyons & Mediterranean station in Paris were completely upset, and few trains were able to leave. The freight service was entirely stopped, and the supply trains for the central markets arrived too late for the day's sales, thus causing an increase in prices.

Trains Tied Up During the French Railway Strike

In the meantime, the Paris-Lyons & Mediterranean had the following notice posted:

> The Paris-Lyons & Mediterranean advises its employees, of all categories, that on account of its obligation to assure the operation of the public service, without interruption, it will be obliged to replace those employees who voluntarily leave their work. A special decision of the administration council, dated January 23, 1920, gave the chief engineer of equipment and motive power the necessary powers to discharge the employees missing and to replace them. These employees are therefore warned that any unjustified absence will lead to their immediate discharge.

Meeting of the Railroad Employees at Vincennes

A second notice recalled the law of July 15, 1845, which punishes by arrest those who injure railway property, and by solitary confinement, hard labor or death those who are the cause of deaths or who encourage disobedience.

On the afternoon of February 25, the railroad employees

of the Paris-Lyons & Mediterranean held an open-air mass meeting in the Bois de Vincennes, and a number of orators addressed the crowd from a cafe table. After listening to a great many speeches encouraging the continuance of the strike, the following order of the day was adopted unanimously by a show of hands:

The railroad employees of the P. L. M., at a meeting on February 25, in the Bois de Vincennes, after having listened to an explanation of the situation by their leaders, declare they were obliged to strike because of the violation of the syndicate rights committed by their employers.

They take note of the admirable unanimity of their movement.

They declare that, forced to employ the only efficacious means in their hands—a general strike—they intend now to bring up the question of *all* their claims, namely:

The establishment and application of the scales of wages and of the status of the personnel.

The basing of the wages of the female personnel on the basis of equal wages for the same work.

The payment of the supplementary hours of work during the war.

The reduction of the length of the apprenticeship before being regularly employed.

The re-establishment of the indemnity of 1,080 francs on account of the high cost of living and the *nationalization of the railroads.*

They greet the entrance of the syndicates of other railroads into the struggle, and they pledge themselves not to resume their work before receiving the orders from their organization, and not to permit any comrade to be punished for striking.

A General Strike Ordered

A meeting of 4,000 strikers was held at Villeneuve-Saint Georges, and a reunion also took place in Paris the same day at the Bourse du Travail, at which the Union of the Syndicates of Parisian Railroad Employees decided to order the operating personnel of all the railroads to cease work, authorizing the motive power personnel to operate the suburban trains up to 1 a. m. the next day. This grave decision meant a general strike on all the railroads about Paris. It was made without the authorization of the National Federation of Railroad Employees which usually alone has the power to start such a movement. The Federation had in fact refused to accede to the request made to send a delegate to the meeting at the Bourse du Travail. The Parisian Syndicate announced that it was determined to continue the strike, even if Campanaud's punishment were not insisted upon, until the various claims, held in abeyance since the temporary agreement of February 9, were granted. At the head of these was the demand to nationalize the railroads.

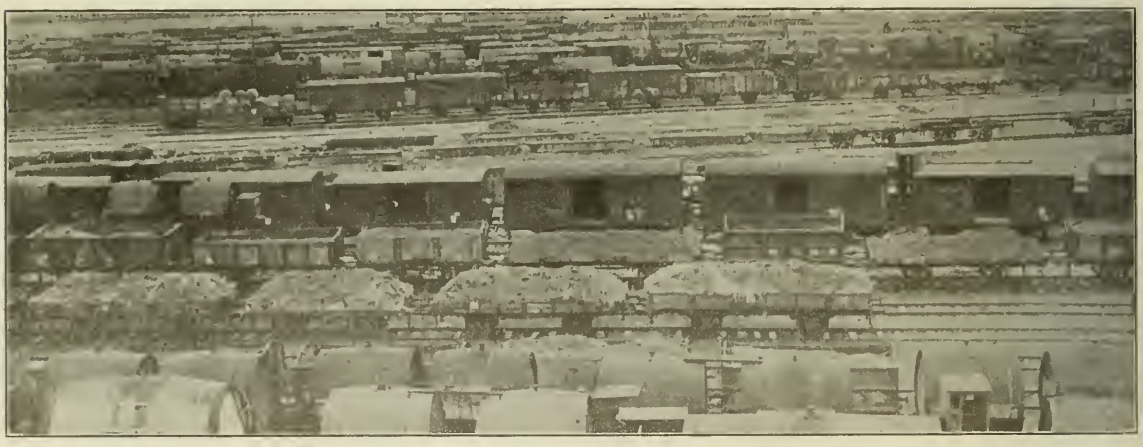
By February 26 the strike had spread to certain services of the Nord and of the State railroads, but it was really only on the P. L. M. that the operation of the trains was seriously paralyzed. On the Nord, as a matter of fact, there was a very powerful movement beginning to show itself against the strike.

Conference with Mr. Millerand

On the evening of February 26, Mr. Millerand, president of the council of ministers, returned from London, and at once received a delegation of the National Federation of Railroad Employees, which so far had remained outside the strike, lending all its efforts towards bringing about a conciliation between the strikers and the railroad company through the intervention of the government. The conference between Mr. Millerand and the delegates lasted until after midnight and no official announcement of the results was made by either party. Mr. Millerand then conferred with Minister Le Trocquer, General Gassouin and other officials.

Government Measures

As a result of a cabinet meeting on the morning of February 27, certain strong measures were proposed and the afternoon of the same day they were voted by the chamber of deputies and ratified by the senate. These comprised a partial mobilization of the railroad employees, the temporary requisition of automobile trucks, automobiles, wagons, boats and, in general, all other means of transportation wherever needed. Any person attempting to avoid the requisition of his property by concealment or otherwise was subject to punishment, as was also any officer convicted of illegal requisition. Indemnities were to be paid for all property requisitioned.



Idle Because of the Strike

A return was also voted to certain war time restrictions, such as the limiting of the number of courses to be served to one client at meals in all public places including clubs. Milk was to be entirely reserved for children, the aged and sick people. It was voted to have these restrictions begin on March 1, and they were accordingly put into operation on that date.

During the debate on February 27 in the Chamber of Deputies, at which these measures were voted, a number of violent speeches were made by certain socialists. At the end Mr. Millerand made an interesting declaration. He recalled the Campanaud incident and stated that when this employee was punished by two days' lay off for leaving his work without permission, the minister of public works could not substitute his authority for that of the employers of the

employee punished. The minister was right, he said, to refuse to intervene in a question of discipline.

Mr. Millerand announced that no demand to arbitrate had been made, but that if work were resumed and arbitration requested, the government would name an arbitration commission to examine all the causes of the conflict and verify whether the rules for granting leavees were sufficiently precise. He continued by declaring, amid the almost unanimous applause of the chamber, that no one could believe that it was possible to allow the economic life of the country to be suspended for such a motive. It was not the big men whose interests were most threatened by the conflict but the common people.

Mr. Millerand then stated, in spite of the protests of the extreme left and applauded by three quarters of the assembly, that the country was not in the presence of a trade union movement, but of a political and revolutionary movement, released on a trivial pretext. The proof of this was that only that very day a list of new claims had been submitted to the minister of public works.

The government's duty was clear, he declared. It must ask the population to submit to certain restrictions on account of the strike. Others would follow. It was also necessary for the government to use the means at its disposal to assure the revictualment service. Already several "classes" of the employees of the P. L. M. had been mobilized, and this would be continued if necessary. If disobedience or violence were encouraged, the authors would be punished by law at once.

Mr. Millerand then asked for volunteer assistance, which was of such help in breaking the English railroad strike. He appealed not only to the public, but also to the railroad employees themselves who certainly must realize the harm they are doing to the country. National union should take preponderance over trade union as there was no interest, however important, which had a right to set itself up against the nation.

Mr. Millerand was much applauded by nearly the entire assembly when he left the platform.

As a result of the strong measures voted by the government, 10,000 employees of the P. L. M. railroad were mobilized on February 27. This permitted the operation of 500 locomotives. A certain number of men were mobilized on the State railways also. Troops were sent to Paris, and all the bridges, junctions, signals and other important points of the railroads were put under military guard.

Deliberations and Conferences

In the meantime meetings were held by the different syndicates. On the afternoon of February 27, Jouhaux, general secretary of the General Confederation of Labor, accompanied by the members of the council of that body, went to the office of the National Federation of Railroad Employees, and as a result of this visit a delegation was sent to interview the president of the P. L. M. to demand the withdrawal of the punishment which had been meted out to Campanaud. The P. L. M. refused absolutely to change its decision.

All the evening meetings were held by the different syndicate groups. Great pressure was brought to bear on the executive commission of the National Federation of Railroad Employees and that body officially considered the causes of the strike.

National Federation of Railroad Employees Sanction General Strike

On Saturday, February 28, at noon, the federal council ratified the proposal submitted to it by the executive commission the evening before to declare a general strike and an order to cease work was circulated among the syndicates. In that order the Federation said:

"The executive commission of the Federation, in view of its responsibility and after having exhausted all methods of conciliation, meeting with an obstinate resistance on the part of the P. L. M., the minister of public works and the president of the council, who refuse to suspend the punishment while waiting for a decision by an arbitration commission, has decided the general cessation of work on all the railroads."

As a result of this order declaring a general railroad strike, the government promptly decided to mobilize a certain number of employees on all the railroads, and to employ throughout the country the same measures of protection as taken on the P. L. M. Special steps were taken to ensure the revictualment of Paris in any eventuality.

In the meantime, the railroad companies were making every effort to continue the operation of their lines. In general, the great majority of the railroad employees remained faithful to their duty; in fact, nearly all those of the Nord and Est Railroads—perhaps because they appreciated better than the others what a calamity this strike was for the country, their service leading them daily through the regions devastated by the war.

For days everyone wondered what part the General Confederation of Labor would take in the conflict, and whether it would declare a general sympathetic strike of all labor corporations. The Confederation continued its very guarded attitude, apparently fully understanding that public opinion was absolutely against the strike, and consistently refused to be moved by the clamors of the various agitators. On February 29 it issued a cautious note to the Press which was sympathetic to the strikers but reserved action until all hope of conciliation had been abandoned.

Protests Against the Strike

It is interesting to note the large number of circulars which began to appear about this same period, showing a very strong sentiment in various quarters against the strike. Former soldiers of the Est Railroad issued the following appeal:

The combatant railroad men of the Est Railroad protest with all their energy against the general strike forced on them by the rabid political agitators of the syndicates of railroad employees.

They declare that it is not for a personnel, which was favorized during the war, to wreck this victory of the "poilus."

They know that the responsibilities of the situation are to be shared between the agitators at the bottom and the profiteers at the top. Above this conflict, however, there is France, which may die in the hour of victory. One must think of the regions which will lack supplies most indispensible to their very life, particularly in the liberated sections.

Under these conditions, the members of the association request all their comrades to resume their work, and united as at the front, they offer their services for all the active positions such as firemen, trainsmen, etc.; in a word, where their services may be judged the most useful.

Forward, comrades, for duty, for justice, in peace and in war.

Long live France first of all!

The Nord Railroad placarded on the walls of its stations, the following notice:—

An agitation is manifesting itself among the railroad men of certain lines.

Whatever may be the cause, it is the duty of the personnel of the Nord to remain outside of this agitation on account of the special situation of our regions which have been devastated by the war.

Employees of the Nord, of all degrees of the hierarchy, of all services, you know how we have been destroyed by the war, you know what difficulty you have had to build up the railroad again, what tremendous efforts you have had to make it render its operation once more almost regular.

We have all of us begun in the last few weeks to see the

fruit of our efforts. We have begun to see our trains running more regularly, more fittingly allotted and better classified. For those reasons and thanks to the progress of our installations, we have been able to offer more cars to the public. In other words, we felt that we were going to begin to give satisfaction to the population of the devastated regions.

Were this reorganization interfered with we would lose, in a few days, the benefit of the results which we have obtained with so much difficulty in the last few months. This would bring suffering to your families and friends, and new privations after those caused by the enemy during four years and a half.

The employees of the Nord will not do this. They will understand that, above all, their duty is not to deprive the liberated regions of a single train, of a single car or of a single package, because a Frenchman does not kill off a wounded man, and the region which we supply is, all of it, severely wounded.

The Professional Syndicate of the Railroad Men of France, Midi Railroad, also published an appeal against the strike.

Several French chambers of commerce sent addresses of sympathy to the government. The National Confederation of Agricultural Syndicates added its voice, also, to the many raised against the strike.

The Strike Fails to Progress

The situation on the morning of March 1 showed rather an improvement as far as the railroad companies were concerned. In spite of the order for a general strike the movement continued to remain stationary and as a result of the partial mobilization and other measures adopted by the government there was a slight increase in the number of trains operated. It was clearly evident that public opinion was strongly against the strike, and that the great majority of the railroad employees realized that they were being used as tools by political agitators.

On March 1 the government arrested five strike leaders, all railroad men, for advising resistance to the law and encouraging soldiers to disobey. Two days before the editor of a paper called the "Libertaire" a long-haired youth only 20 years of age, with rather advanced ideas, had been arrested because of an unsigned editorial which had appeared in that paper on February 24, containing anarchistic propaganda. In making these arrests, the government carefully avoided any action which might be construed as a provocation, but showed its determination to be firm and carry out the law.

The Railroad Strike Comes to an End

The end of the strike was brought about by a number of causes. In the first place, the railroad employees had begun to realize that they could no longer brave the increasing hostility of the nation, whose most vital interests were compromised by the movement. The strikers were even boycotted in many places, and dealers refused to sell them supplies. On all the railroads the strike movement was decreasing in force and, thanks to the number of volunteers and of employees who had returned to work, the train service was improving.

On the other hand, the General Confederation of Labor, whose help certain agitators had hoped to obtain, fully took into account the fact that the great majority of labor syndicates and the entire population desired to see the end of the strike.

The able attitude of the government, combining prudence with firmness, helped not a little, too, in facilitating the happy solution of the crisis. The workmen could not plead that there was the slightest provocation because of the fact that a certain number of arrests had been made after the strike had been going five days. No government could have allowed the right to work to be interfered with, and soldiers to be publicly encouraged to disobey.

Terms of the Agreement

The following are the terms of the agreement reached at midnight, March 1, between the delegates of the Federation of Railroad Men and the officers of the principal railroads:—

1. Respect for syndicate rights. It is agreed that the situation will be clearly defined for the future.

2. Application, in a general way, of the proposals concerning scales of wages and the statutes of the Federation within the time limit determined by the Federal Council.

3. The naming of special commission composed of railroad officers and employees for the secondary railroads in order to take up the same claims.

4. Immediate study in common of the future method of operating railroads.

As it was impossible to reach an agreement as to the 5th point:—"No punishment for striking," the two parties decided to allow the president of the council to settle this question, and he rendered the following decision:

"The employees will not be paid their wages for the days when they were on a strike.

"The disciplinary measures will be considered as annulled which were taken against those who merely refused to resume their work after being requested to do so.

"This disciplinary measure adopted as a result of all other acts will be submitted for reconsideration by each railroad president in a spirit of fairness."

The Strikers Go Back to Work

As a result of the agreement reached the striking employees gradually resumed their work, but unfortunately this did not put an end to the disastrous effects of the strike. The stopping of the traffic and congested the passenger and freight stations worse than ever. At least two weeks time was required to get back to even an approximately normal state of operation. The task was particularly hard for the Paris, Lyons and Mediterranean, which had suffered more than any other from the effects of the strike. Even by the end of March nearly all the railroads were still operating under great difficulties with reduced train service, and their condition was certainly much worse than that before the strike, which, heaven only knows, was bad enough.

The P. L. M. decided to double the wages of all its employees, for the month of March, who remained faithful to the company during the strike in order to compensate them for their extra work and loyalty under great difficulties.

The Real Causes of the Strike and Its Lessons

It is quite certain that the real reasons for this lamentable strike were not of a professional nature. The railroad employees had already made a list of their claims, and this was being examined in a most serious manner by the government and the different commissions which were studying the question of the reorganization of the railroads. Even the most rabid socialists in the chamber of deputies had been obliged to recognize that serious efforts were being made to improve the moral and financial situation of the railroad personnel and the method of operating the railroads.

Now just at a moment when the railroad rates had been raised, thus permitting the companies to pay higher wages to their employees, and when the commissions made up of railroad officers and workmen were beginning to reach the end of their studies, a certain number of agitators believed that the hour had come to carry out their political dreams and attain the marvelous benefits promised them by the prophets of "bolshevism."

Upon a trifling pretext they gave the strike order, without considering the disastrous effects to the nation—the children without milk, whole cities without flour and bread and thousands of laborers forced to cease their work. The first to suffer were the families of the working people themselves.

Fortunately the General Confederation of Labor, realizing fully that public opinion was against the movement, resisted the pressure of the Syndicates of the Paris district and refused to declare a general strike of all labor corporations. It was thus able to be a helping factor in the negotiations leading to the end of the strike, and which were conducted in such an able manner by Mr. Millerand.

Now the railroad employees have gone back to work, it will be necessary to make up for the time lost. A valuable object lesson to them will be the fact that the agitators, who tried to lead them astray and who encouraged disobeying the mobilization orders, will be tried and punished by the courts through the strict application of the law.

It is to be hoped that thus the crisis will not have been entirely useless, for it would be an error to suppose that the life of the nation can be interrupted in this way whenever radical agitators may wish to try out their political experiments.

Wage Hearings Before Railroad Labor Board

Headquarters to Be Established at Chicago After Testimony of Labor Organizations Is Presented

WASHINGTON, D. C.

THE RAILROAD LABOR BOARD expected to complete by the end of this week its hearings in Washington on the petitions of the railroad labor organizations for general increases in wages and to adjourn to its permanent headquarters in Chicago, which are to be established in the Kesner building there on May 17. The replies on behalf of the railroad companies to the statements made by the labor leaders here will probably be heard in Chicago.

Following the testimony of W. S. Carter, which concluded the initial presentation of the trainmen's organizations, the board heard E. H. Fitzgerald, representing the clerks, station employees, etc.; E. J. Manion, of the Order of Railroad Telegraphers; D. W. Helt, president of the Brotherhood of Railroad Signalmen; E. F. Grable, president of the Maintenance of Way Employees' organization, and B. M. Jewell, president of the Railroad Employees' Department of the American Federation of Labor, was expected to testify on behalf of six shop organizations.

Some idea of the magnitude of the task before the board is given by the fact that it asked Congress on May 1 for an appropriation of $400,000 for the next fiscal year and $50,000 in addition to the $50,000 already appropriated for the balance of the year ending June 30, 1920, to enable it to maintain the necessary organization and establish adequate offices at Chicago.

W. S. Carter

W. S. Carter, president of the Brotherhood of Locomotive Firemen and Enginemen, completed his statement before the board on April 30 after presenting voluminous statistical exhibits. Many of these were to show the hazard of the fireman's work and the irregularity of his employment. The great majority, he said, either work very short hours or very long hours per month, and while men in the building trades receive rates as high as $1.25 an hour because of the knowledge that their work will probably not last for more than eight months of the year, the fireman's work is still more irregular.

Mr. Carter criticised the statistics usually compiled to show the earnings of trainmen as obscuring the number of irregularly employed and poorly paid in averages raised by men who work many hours of overtime or cover excessive mileage, and he hoped the board would make a study on one or more individual railroads and trace the earnings of individual men by name to show exactly what they earned. He contended that the earnings of individual men would fall 20 per cent below the figures shown by averages, because if the figures were taken in October many of the men who were included at that time were out of a job in July, but the averages were brought up by the men who were left at work firing in July but were running engines in October. The average yearly earnings of firemen compiled in this way, he said, include the earnings of more than one man. When Mr. Carter also suggested that the board obtain other statistics, Mr. Wharton asked how long Mr. Carter thought it would take to collect the data and make the studies. When Mr. Carter replied that the board would do well to obtain the necessary information within a year, Mr. Wharton asked if he meant to suggest that the board should take that long to reach a decision.

"The board should not hold up its decision," Mr. Carter replied, "but it would have the information when I come back again next year."

Mr. Wharton said the Board of Wages and Working Conditions had obtained the information as to the earnings of 700 or 800 men on regular or assigned runs on representative divisions of various roads for the month of April, but Mr. Carter insisted that these figures do not give an accurate impression of what the individual firemen earn or have an opportunity to earn for a year. To show the "turnover" among firemen, Mr. Carter said that the membership of his organization had increased in 10 years by 49,000, but that there had been 153,000 new members, while 85,000 had left it permanently because of leaving railroad service, and he said the actual turnover among all firemen is even greater because many of the younger men leave before they become members of the brotherhood. Most of the new men who try firing quit after the first trip, he said, and when the "insurgents" left the service recently, large numbers of them did not return to work because they could go across the street and get better pay for easier work.

"This turnover costs the companies enormous amounts of money," he declared, "and it creates a bad situation for everybody. It is not the fault of the companies. They can't help it, but it is a fault of the industry." He suggested that the board make a study to find out how many firemen remain in service long enough to become engineers.

Mr. Carter also cautioned the board against placing too much reliance upon a statement which he said had been compiled by the director general showing the hourly earnings of railroad employees, because, he said, that it is possible in such statements to show a 50 per cent increase in wages as a 125 per cent increase in the hourly rate. For example, a man paid $3.20 in January, 1917, for a 10-hour day would have an hourly rate of 32 cents an hour and the rate would be the same if he worked 14 hours. He has since received a 50 per cent increase to $4.80 and time and one-half for overtime after 8 hours. So if he worked 14 hours in January, 1920, he would receive 60 cents an hour for 8 hours, or $4.80, and 6 hours' overtime at 90 cents, or $5.40, a total of $10.20, or 72 cents an hour, although his normal earnings have increased only 50 per cent.

Mr. Carter urged that the board should not give a hearing

to the "insurgents" who had repudiated wage agreements made by the brotherhoods. "If the board is going to allow itself to be swamped by cases brought before it by groups of 100," he said, "you are going to cease to function, and what you have seen in the last six weeks is only a taste of what would happen." He expressed the opinion that the provision in the law for petitions by groups of 100 or more unorganized employees was not intended to apply to such men as the insurgent members of the standard organizations, but to those who were not allowed by their employees to be organized.

He also expressed regret that the railroads had not made a greater effort to reach an agreement with the employees on the wage demands without referring the case to the board for decision, on the ground that he thought the law contemplated that both sides should get together and attempt to settle the question. "If they are going to pass the buck every time," he said, "the board will be so swamped it will never get anywhere."

The executives of the brotherhoods, he said, had hoped that the boards of adjustment created by the Railroad Administration would be retained, and they had arranged to establish an officer of each organization at Cleveland to pass upon each case to be submitted to the boards in order to reduce the number, but now they understand that the railroad companies are not willing to continue the boards of adjustment. He thought that voluntary agreements obtained through mutual negotiation or decisions of a bi-partisan board would be preferable to a decision reached by a tribunal created by law.

E. H. Fitzgerald

E. H. Fitzgerald addressed the board on April 30 on behalf of the Brotherhood of Railway and Steamship Clerks, Freight Handlers, Express and Station Employees. He asked for a 20 cent increase per hour, retroactive to January 1, 1919, time and one-half for Sundays and holidays, two weeks' vacation with pay, the elimination of piecework and tonnage and bonus system of payment, and re-establishment of differentials for scalers, stowers and callers over the rates paid to truckers. He said the great majority of the employees he represented receive $87.50 a month, "which is wholly inadequate for even a minimum standard of living."

Under the wage orders of the Railroad Administration, he said, the wages of freight handlers and station employees cannot exceed $3.44 per day and those of clerical workers cannot exceed $3.43 a day. "While the employees of other industries were granted one increase after another, the railroad employees were receiving one promise after another of an increase to afford them some relief.

"The railroad employees are entitled to a living wage, and any industry that cannot pay a living wage to all of its employees is a menace to our country. We are all Americans and should receive a wage sufficiently adequate to live as Americans, be able to properly feed and clothe our children, give them an education and to enjoy the pleasure of living as Americans should live. This is in marked contrast to the prseent conditions confronting the employees I represent before this board.

"I am representing thousands and thousands of these employees, the sons and daughters of engineers, machinists, trackmen and others, who have had to take their children out of school to help maintain the home. These sons and daughters will be found in most of the parcel and baggage rooms, in yard offices, on station platforms, all doing their bit to assist in keeping the home together. There is no American who can provide a home and its comforts on $87.50 per month. Over 15,000 employees I represent receive at this time $2.94 per day. They approximate $75 per month.

"My purpose has been to keep the experienced employees in the service of the railroads, especially during the war, in order that there would be no impairment of the service, but when the government repeatedly promised relief from the high cost of living, established a rate of $87.50 per month for several hundred thousand employees, and at the same time established rates in excess of $200 per month for its employees in the shipyards, the employees lost hope of obtaining any relief. This has been evidenced by the recent upheavals in this country of the employees in industries over which the government exercised price-fixing."

Mr. Fitzgerald said that under Supplement 13 in many cases the increases awarded by General Order No. 27 were reduced and that his own case was an example. He was employed as information clerk upon the Southern Pacific at $85 a month, and under General Order No. 27 was given an increase of $34 or 40 per cent to $119, but Supplement No. 13 reduced him to $110. Mr. Wharton pointed out that the supplement had given large increases to the clerks as a class and was based on the representations of the organization.

"I am not here to apologize for what was done by the organization before I became connected with it," said Mr. Fitzgerald, "but on many roads the clerks had not been allowed to organize and had no voice in what was done by the organization." He described the effect of the various wage orders as applied by the roads and said that many men received a very small increase when the wages were stated in rates per day because many had been rated as 365-day employees, although they had not worked every day. He said that some roads tried to increase the hours by half an hour, but that the men simply " soldiered" for the half hour.

E. J. Manion

E. J. Manion, president of the Order of Railroad Telegraphers, testified on May 1 on behalf of train despatchers, agents, telegraphers and telephoners, block operators, etc. He presented the same request that had been made to the Railroad Administration, on which a hearing was held before the Board of Railroad Wages and Working Conditions on December 4, proposing the establishment of standard basic rates for the 13 classes of employees represented, which, he said, would increase the average hourly rate from 55.75 cents to 81 cents and would reduce the number of different rates from 182 to 24. He also asked for a minimum of $225 a month for train despatchers and an increase of $60 for all monthly-paid employees.

Mr. Manion explained that the large number of different rates in effect resulted from the former plan by which wage negotiations were handled by individual roads in conference with the representative of the organization, and lump sums were agreed upon to be divided among the employees in increased wages. This resulted, he said, in different rates being paid for the same work frequently on the same road and in the same building, and an analysis of the wages of 64,736 employees on 128 roads showed that there were 173 rates for agents, which he proposed to reduce to 24; 135 rates for agent telegraphers, which it was proposed to reduce to 11; 101 rates for agent telephoners, which it was proposed to reduce to 11; 94 rates for other telegraphers, which it was proposed to reduce to 8; 98 rates for towermen and levermen, which it was proposed to reduce to 8. On the Southern Pacific, with 1,530 different positions, there were 46 rates of pay; on the Illinois Central, with 1,471 positions, there were 97 different rates of pay, and on the Texas & Pacific, with 516 positions, there were 64 rates of pay. The average earnings of 64,000 employees were 55.75 cents per hour, while 54 per cent received an average of 51.36 cents.

The average earnings of the employees represented on 25 roads in 1914 were $71.98 a month. Some of these employees worked 365 days a year and some only 313 days, and the hours varied from 8 to 12. Mr. Manion said that these earnings before the war were barely sufficient to maintain a physical existence, and he asked the board to award wages which would allow a proper living wage based on the standard of decency, health and reasonable comfort, and differ-

entials above this amount for skill, training and hazard. Later witnesses appearing on behalf of all of the organizations would submit a detailed scientific budget of living expenses. Mr. Manion said that since the President's coal commission has awarded a minimum of $6 a day, he considered that his organization was conservative in asking for approximately this amount. He asked that the board render a decision as soon as practicable without allowing the railroads time to prepare "irrelevant" statistics as to what the increase in wages would cost, on the ground that the cost of establishing a reasonable wage is not a subject for the consideration of the board.

D. W. Helt

D. W. Helt, president of the Brotherhood of Railroad Signalmen, presented a modification of the request which he had filed with the Railroad Administration in March, 1919, saying that an agreement had been reached with the railroads on certain items of the request, although not to the entire satisfaction of the men. He asked for rates for the various classes of employees represented, to be made retroactive to January 1, 1919, and to be further increased on a percentage basis by the amount of the increase in the cost of living since that time. The figures to which he asked that these increases be added are as follows: Signalmen and signal maintainers, a minimum hourly rate of 85 cents; signal department helpers, including lamp men, 60 cents; assistant signalmen and assistant signal maintainers, 60 cents for the first six months, with an increase of 2 cents per hour for each six months thereafter for four years; signal inspectors and general foremen, $1.10 a year; signal foremen, $1 a year; assistant foremen, 90 cents.

Mr. Helt said that data would be presented on behalf of all of the shop crafts showing comparisons with the wages paid in other industries. He asserted that the occupation of the signalmen should be classed as hazardous because while these employees normally handle low-voltage wires and apparatus and therefore are not furnished with rubber gloves and insulated tools, they are continually exposed to the danger of high-voltage current as a result of crosses and short circuits and most of their work is done under traffic conditions. About 70 per cent of the signal employees are skilled craftsmen whose work requires technical knowledge, although it is now almost impossible to get skilled craftsmen to take these positions at the present wages. He described at length the character of the work and the necessary qualifications and responsibilities of signalmen.

Mr. Helt also asked for the correction of inequalities resulting from orders of the Railroad Administration, saying that Supplement No. 4 to General Order No. 27 had inflicted a gross injustice on signal department employees by establishing a differential of 10 cents per hour for employees working in low-voltage territory under 240 volts. This had the effect of setting up two classes of these employees where one existed before, and he asked that the differential be removed. A considerable number of roads as a result of negotiations had awarded the 68-cent rate for first-class electricians and composite mechanics to employees in low-voltage territory on the ground that their duties were those of first-class electricians, and Supplement No. 28 had decreased the inequality but had left a 4-cent differential.

E. F. Grable

E. F. Grable, president of the United Brotherhood of Maintenance of Way Employees and Railway Shop Laborers, in presenting the demands of his organization to the board, stated that he represented "the largest body of the most inadequately paid men in railroad service." Moreover, he said, certain of the occupations are actually the lowest paid industrial occupations for adult males in the United States.

"Almost 300,000 of the men in our occupations," said Mr. Grable, "receive annual incomes that average only $924 or less, according to the figures of the United States Bureau of Labor Statistics. Forty thousand more, men who are competent to boss gangs of workmen, average $1,208 annually. Our best paid workers average under $1,600 annually, and there are only 10,000 of them. No one would have the effrontery to contend that men can live and support families on such wages.

"In 1909 the Sage Foundation published the result of an investigation by Dr. Robert C. Chapin, which showed that 76 per cent of families with an annual income of $600 or less were underfed, underclothed and overcrowded. That means that at that time $600 was a starvation wage. Since that investigation was made the cost of living has advanced 110 per cent, and on that basis Dr. Chapin's minimum of existence wage would now be $1,260, or more than the average annual earnings of more than 85 per cent of our men. In fact, the big majority of our men have annual incomes that are actually one-fourth less than Dr. Chapin's starvation wage, as computed on present-day living costs. That statement may sound almost incredible to the general public, but it is as true as it is astounding.

"That any considerable body of men should be so inadequately paid is worse than criminal—it is stupid. Like all stupid things it is costly, for it is a menace to both our political and economic institutions. There is one thing worse than political oppression, and that is economic exploitation. People who can't get bread don't like to be told to eat cake, and they don't like it any better in democratic America than they like it in monarchical France.

"The trouble with our country just now is that we have too many people who are eating cake, and too many who find it next to impossible to get enough bread for their families and themselves. That is the underlying cause for all our unrest which has found expression in various forms of so-called radicalism.

"Establish the principle of the minimum living wage—a wage that means adequate food, adequate housing, adequate clothing and a fair share of the reasonable comforts of life for every worker and his family—and you will take the first long step toward industrial peace and stability. And until that step has been taken it is useless to talk about speeding up production and getting business back to a normal or permanent basis." The maintenance of way and shop workers, through Mr. Grable, asked a minimum wage of 60 cents per hour, as against a present maximum wage of 53 cents.

The minimum rate of 60 cents an hour which Mr. Grable referred to applied, however, to only one or two positions in his proposed wage scale, crossing flagmen and "other laborers." He asked for $270 a month for general bridge and building foremen, $250 a month for house carpenter foremen, $250 for painter, tinner, water supply, brick and concrete, cabinet and bench carpenter, steel bridge and steel tank foremen, and from $208 to $250 for other foremen in this department. In the track department he asked for rates ranging from $208 to $250 for foremen, 65 cents an hour for regular trackmen, and other rates ranging from 60 cents to $1 an hour for various classes of employees. For gang foremen the proposed rate was $156 a month. Mr. Grable also asked for an order extending the present national agreement in which he proposed several changes. E. T. Whiter, chairman of the railroad conference committee, objected on the ground that these proposed changes had not been submitted to the railroads, so far as he knew, and that some of the rates had not been submitted.

B. M. Jewell, president of the Railroad Employees' Department, American Federation of Labor, explained, however, that all of the proposals submitted to the board had been submitted to the individual railroads on April 28 in order to be sure to take in all railroads and to comply with all

the requirements of the law and that a report would soon be made certifying that the demands had been presented.

Mr. Grable said that employees in the maintenance of way department are being generally asked to work over eight hours a day because the roads cannot get enough men at the wages paid.

J. H. Pruett, of the Masters', Mates' and Pilots' Association, followed Mr. Grable, presenting a request for wage increases for the marine department employees.

The board on May 4 denied the application of the Columbus, Ohio, Yardmen's Association, presented by E. C. Sawyer for a hearing, on the ground that it had not complied with the requirements prescribed by the board.

Representatives of the various organizations of "insurgent" yardmen on April 29 filed with the board a letter again asking for a hearing and that the board require the railroad managers to allow them to return to work. They claimed to represent 125,000 men who desired to be represented by the new yardmen's and enginemen's associations rather than by the brotherhood officers. A similar letter was sent to members of Congress. The Order of Railroad Station Agents has filed a petition with the Interstate Commerce Commission for a rehearing on its classification of officials, subordinate officials and employees. Station agents by the commission's order were classed as officials and they wish to be classed as subordinate officials so they may petition the labor board for increases in pay.

The Widespread Freight Blockade

The strike of freight train men, particularly yard men, continues to hamper the movement of freight seriously. The employment of new men and the restoration of strikers goes on slowly and there is some improvement; but also many setbacks. New strikes of yard men are reported here and there; small and local, but very troublesome. The general freight-yard situation at and around New York does not seem to be definitely very different from that reported in our last issue. In Jersey City and Hoboken the strikers, who are still out, keep up a considerable agitation, and at a parade and meeting held by them on Wednesday evening, May 5, the attendance was given as 3,000.

The Merchants' Association, the Chamber of Commerce and other business organizations of New York City are moving to take drastic action toward breaking up the paralysis of the city's wholesale trade which is declared to be suffering enormous losses estimated at $2,000,000 a day; due not alone to the railroad strike but also to sympathetic movements. Several hundred representatives of these mercantile bodies held a meeting on May 5 and adopted strong resolutions to meet the labor-union menace. The refusal of the truckmen to haul merchandise to and from piers in sympathy with strikers there is declared to be the main cause of the stagnation of business in the port. If necessary, the tradesmen say, they will obtain their own vehicles and go into the trucking business themselves on an unprecedented scale. Negotiations are now proceeding for the purchase of hundreds of army trucks from the government.

The railroads, say the merchants, are entirely too optimistic in their reports on progress in moving freight in and out of the city. Merchants have been attempting to get their goods into and out of the city through rerouting and then by steamships, but in this they have been balked by the union truckmen. The 20,000 truckmen of the city are said to be organized about 95 per cent and are acting in concert with 6,000 striking longshoremen on the coastwise lines, 4,500 longshoremen and harbor workers on strike against the ferries and floating equipment of the railroads, 2,000 insurgent railroad yardmen and switchmen and 2,000 striking checkers and longshoremen at the piers of the United Fruit Company, whose troubles were reported to have been patched up, but who are still out.

Some of the commercial reporters of the daily papers report the situation, from the merchants' standpoint, as slowly improving; but in very guarded language. Dealers in cement and other building materials declare that in Manhattan, where there is powerful pressure from city officers and from the press for the construction of new dwelling houses, the work of builders has been brought almost to a standstill because of the freight blockade. Carloads of building materials coming in by railroad cannot get within 20 or 30 miles of New York. Wholesale receivers of eggs say that immense quantities of their goods have been kept so long a time on the road that the condition of the egg has been seriously impaired. Banks are reported as being embarrassed by great numbers of drafts which they are carrying and which cannot be collected until the arrival of the freight represented by these papers; and the freight is still indefinitely delayed. One competent observer guesses that the value of freight shipments thus abnormally delayed, and while delayed, constituting an abnormal load on the banks, will aggregate a billion dollars.

From Charleston, S. C., cotton merchants and others are reported as complaining of heavy losses by delay in shipments.

The shortage of freight cars, due in some cases to the large number of cars held under load, has slackened freight train movements here and there. The Western Maryland last week laid off 30 trainmen.

At New Orleans on Saturday, the Belt Railroad notified shippers and connecting roads that no freight could be moved to the river front because of congestion caused by the freight handlers refusing to handle freight cars in the movement of which non-union clerks had a hand.

At Buffalo, on April 30, a large number of switchmen, said to be members of the recently organized Yardmen's Association, walked out, and for the second time within two weeks every freight yard in the city was reported as tied up. The railroads brought in men from other yards and also pressed into yard service large numbers of men from other departments, so that they soon had enough volunteer crews to keep moving a considerable volume of freight. By Wednesday of this week, the New York Central reported the eastbound movement as nearly or quite normal; and the Lackawanna and the Erie removed embargoes which had been placed when the strike broke out, on May 1. There was a general improvement; but a new difficulty developed in the refusal of a number of clerks in the Erie and Nickel Plate freight houses to handle bills turned in by non-union yard conductors.

If the law works, as most of our experts in business and finance believe that it will, a convincing answer to the radicals will be given; it will be demonstrated that private enterprise can give its benefits to free people freely while the people's government acts simply to safeguard against transgression of public rights.—*Rochester (N. Y.) Post-Express.*

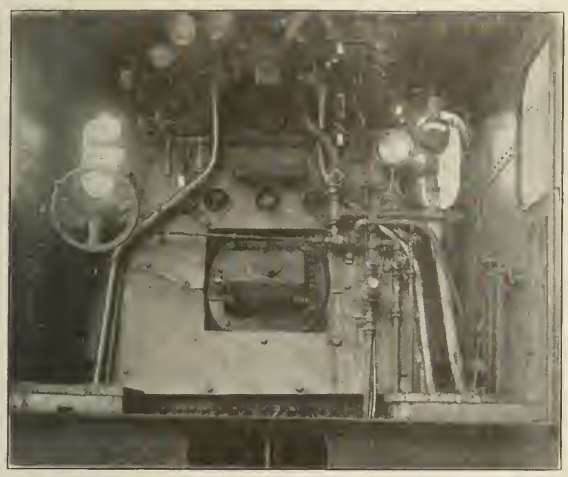
One striking charge which has come over the aspect of freight rates is that in the attitude of the shippers toward the proposed increases asked by the railroads. Before the government took control of the roads every increase asked was strenuously opposed by the shippers' associations. But the return of the roads to their owners sees a complete face-about. High rates with service are now looked upon with favor. Low rates without service have had their trial. It is noteworthy that it is the element of service, regular, frequent and uninterrupted, which is now recognized as the real province of the railroads.—*Worcester (Mass.) Telegram.*

Pulverized Coal for Italian Locomotives

Description of Equipment Designed for Italian State Railways to Utilize Native Low Grade Lignites

BECAUSE THE FUEL SITUATION in Italy is becoming more critical every day, the Italian State Railways decided in December to equip two of their new heavy Consolidation type locomotives for burning pulverized coal, the object being to utilize the lignite fuel in Italy, which can be mined at a reasonable price.

The coal used on the Italian State Railways is today practically all imported and costs about $34 a ton in United States currency, delivered.



Interior of Cab Showing Fireman's Control Apparatus on Right Hand Side

The following may be taken as a fair sample of an average analysis of the Italian lignite fuel:

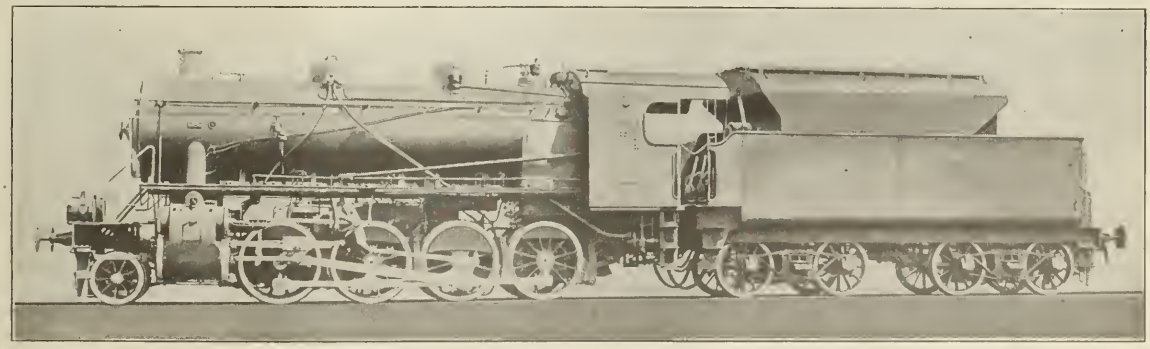
Ash	10 per cent	Fixed carbon	30 per cent
Volatile	40 per cent	Moisture	20 per cent

It is proposed to operate the pulverized fuel locomotives between Rome and Viterbo, a distance of approximately 80 kilometers.

At the time the Italian State Railways placed this order, the last of an order of 150 Consolidation type locomotives was being completed in the shops of the American Locomotive Company at Schenectady, N. Y. The order was placed with the Fuller Engineering Company for two complete equipments. These were applied to the locomotives in less than 60 days and tested out with pulverized coal, about 10 tons being consumed on the two locomotives.

The pulverized coal burning equipment installed on the locomotive is of practically the same size and capacity as that in use on Lehigh Valley locomotive 1360, which has been burning mixtures of anthracite and bituminous coal successfully for some time. This installation was described in the *Railway Age* of September 12, 1919. Practically the only change required in the tender was to substitute a U-shaped tank and move this bodily on the tender frame seven inches to the rear in order better to distribute the weight on the front and rear trucks. Because of the compactness of the equipment it was possible to install it without altering the water legs from the standard design, the only change in this respect being that the hand brake handle had to be raised to allow for clearance. As only one pulverized fuel plant is to be provided in the initial installation, it was of course necessary to provide for a much larger fuel capacity than on the hand-fired locomotives, which is the reason for applying a tank holding 10 metric tons.

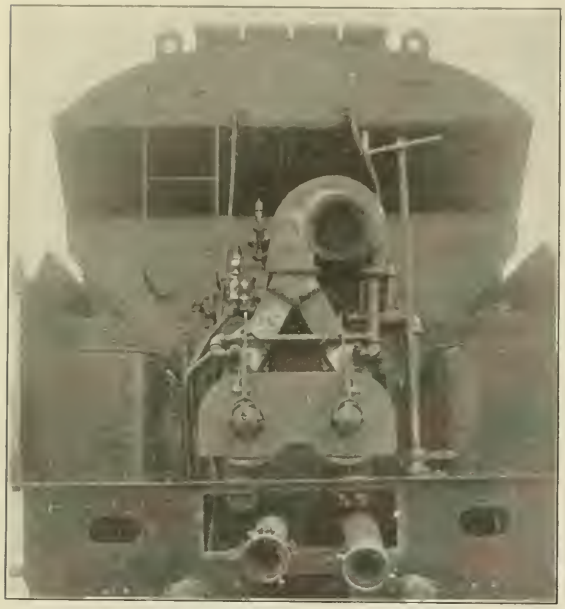
A brick arch supported on tubes is placed in the firebox and the sides of the combustion chamber beneath the firebox proper are bricked up with air vents controlled by dampers, these all being controlled from the cab on the fireman's side. This arrangement is similar in detail to the Lehigh Valley locomotive, although the smaller size of the firebox on the Italian engines restricts the dimensions of the combustion spaces and brings the flash wall very much nearer to the burner. The feed screws are driven by a two-cylinder, a double-acting reciprocating engine, enabling a wide variation to be obtained with the minimum steam consumption at all times. A feature of this equipment is that the screws can be started up and operated on a 25-lb. steam pressure. This is a great advantage when it is considered that very often the pressure in roundhouse firing up lines drops to 30 lb. As the screws are operated in pairs, it is impossible for the coal to arch over and a steady constant feed is obtained, no matter how heavy the coal or how long it has been in the tank.



Italian Locomotive Equipped for Burning Pulverized Coal

At the time the order was placed for the locomotive equipment a pulverizing plant was also ordered from the Fuller Company to consist of two standard 42-in. screen type pulver-

izing mills, having a capacity of approximately four tons per hour each, a standard drier fired by pulverized coal and having an approximate capacity of 10 tons of dried coal per hour. The coal plant throughout is of the standard type with a track hopper for receiving the coal from the cars, single roll crusher for crushing it down to the proper size for the pulverizing machines, magnetic separator, and all necessary conveyors, as well as a 40-ton pulverized coal storage bin, which is placed over the track. Two separate butterfly valves with filling spouts are provided for coaling the locomotives. The plant is driven throughout with electric motors and is



Pulverized Coal Apparatus Applied to Tender

equipped with dust collectors and separators in order to make a clean, dustless, modern plant.

On account of the extremely low grade fuels it is proposed to burn in pulverized form, the performance of these locomotives will be watched with considerable interest by American engineers. It is stated that some of the native coal to be experimented with contains over 62 per cent ash and has a B.t.u. value of only 3,640.

Interstate Commerce Commission Favors Seasonal Coal Rates

Chairman Clark of the Interstate Commerce Commission, testifying on April 29 before the Frelinghuysen sub-committee of the Senate committee on interstate commerce, said that the members of the commission had voted unanimously in favor of the principle of seasonal freight rates on coal. "It being possible, as we believe," he said, "to store coal in reasonable quantities, we are convinced that any plan that will more nearly equalize throughout the year the operation of mines and the distribution of coal will be in the public interest and inure to the benefit of coal producers."

He said that while the effect in inducing consumers to store coal might not be very noticeable at the start, eventually the public would come to see the desirability of the plan. The coal industry is over-developed, there is too much competition in it and legislation of the kind proposed cannot be enacted without pinching somebody's toes. But the question is whether the matter is to be viewed from the standpoint of the country as a whole or whether the coal interests shall be allowed to fight it out among themselves. The opposition or endorsement of the railroads, Mr. Clark said, would depend on whether they expected it would increase or decrease their traffic, and if they think the people will not purchase coal in reasonable quantities during the summer months while lower rates are in effect, he did not see why the railroads should object because they would receive the higher rates for the coal moving in the winter months. Even if only 10 or 15 per cent of the coal movement were transferred from the winter to the summer months it would have a beneficial effect. He preferred the plan of reducing the rates by stated amounts per month, as provided in the substitute for the Frelinghuysen bill proposed by Eugene McAuliffe, to the plan of a percentage decrease in the summer and increase in the winter on the ground that the former plan would work less disturbance in rate relationships. He did not believe that the commission has the power to establish seasonal rates under existing law because the commission has no authority to change rates merely to produce certain economic or industrial results.

Chairman Clark also discussed in detail the various objections made to the bill by coal operators and shippers from various districts. Senator Frelinghuysen asked if there is any ground for believing that the coal car supply can be increased in the next two or three years. Chairman Clark said the number of cars would be increased to a certain extent, but that it would hardly be possible within two or three years to make up for the shortage that accrued during the war period and also the current replacements. Whereas in May, 1919, there was a surplus of 103,000 open top cars, on March 1 there was a shortage of 18,000, and during the first week of April there was an average shortage of 12,000. He said that the 100,000 cars bought by the Railroad Administration in 1918 were equivalent only to the normal annual replacement and that practically no cars had been bought in 1919. The problem of financing the carriers to enable them to buy new cars is yet to be worked out, although the commission, the Treasury Department and the Federal Reserve Board are trying to devise a plan by which the revolving fund created by the transportation act can be made to go as far as possible. He said he had told railway executives that they were not getting as much mileage out of their cars as they should.

George Otis Smith, director of the United States Geological Survey, also testified in support of the principle of the bill. He said in part:

"The seasonal fluctuation in coal output comes from a seasonal fluctuation in demand. The consumer must be hitched on to the problem of giving the mines more orders for the spring and early summer months and of relieving both mines and railroads of their extra heavy burden in the fall and winter months. In a normal year the country over this seasonal inequality of demand calls for 35 per cent to 60 per cent more coal being mined in November, the peak load month, than in April, the usual month of greatest slump in mine operation. In Eastern coal fields the difference is less than this average and in Western fields much worse. Uneven demand thus requires more mines and more miners, both working a 75 per cent year, and conditions of unequal seasonal demand are also bad for the railroads, especially when combined with crop movements and winter interference with traffic. Stabilization is sought to lower costs and prices.

"The legislation proposed seeks to induce summer buying of coal by freight reductions in the spring months and increases in the fall and winter months. What statistics are available indicate that the rate differentials proposed by the committee of mining engineers are timed to influence

buying in what are now the months of lowest production, yet taking some of the Appalachian fields, provision might well be made for some adjustment by the Interstate Commerce Commission. In fact, the principle of the remedy seems correct, but discretion may be required in its application. It must be admitted moreover that this legislation is not a cure-all and may be expected to make conditions even worse locally, but on the whole the coal business will be helped and miners, operators and consumers eventually benefited by surer supplies of cheaper coal. To allow present conditions to continue is to invite the industrial paralysis, which has been averted rather narrowly several times in the past few years."

Service Results with Titanium-Treated Rail

PRIOR TO 1915 The Titanium Alloy Manufacturing Company, Niagara Falls, N. Y., issued a series of rail report bulletins covering a very considerable amount of work done to demonstrate the improvement effected in rail steel by treatment with ferro carbon-titanium. Engineers generally were favorably impressed with this work, but very naturally questioned whether the demonstrated reduction of segregation and the greater cleanness in the treated steel would cause any material decrease of failures in service.

The data which follows has been compiled from American Railway Engineering Association Bulletin No. 81 of the Rail committee, covering all years from 1913 to 1918, inclusive, in which any titanium-treated rails were rolled for roads reporting to the association. In considering these results it will be interesting to recall the statement of W. M. Wickhorst, engineer of tests of the Rail committee, in a paper read before the American Society for Testing Materials in June, 1913, which follows:

"The conclusion seems to be, however, that for rails a well-deoxidized, quiet-setting steel must be used in order to avoid excessive segregation and to obtain rail with a uniform hardness at the wearing surface in the several rails of an ingot. *A solution of the ingot problem means the prevention of about half of the failed rails of the country.*"

The average failure per year in service per 100 miles of track for all untreated open hearth rails covered in these schedules were 14.3, while those for titanium-treated open hearth were 6.8. For bessemer rail the average failures per year in service per 100 miles of track were 24.6 for the untreated steel and 5.2 for titanium-treated.

These results indicate clearly that a solution of the ingot problem referred to by Mr. Wickhorst has been found in the use of ferro carbon-titanium to deoxidize and cleanse the steel, as the failures for the titanium-treated open hearth steel in service have been 48 per cent of the average for untreated open hearth and those for the titanium-treated bessemer show only 21 per cent of those for untreated bessemer, this latter very low figure being due to excessively high failures for untreated bessemer rail constituting the output from one plant.

SCHEDULE OF MAXIMUM AND MINIMUM FAILURES PER YEAR FOR 100 TRACK MILES FOR ANY ONE YEAR

Type of rail	Open hearth		Bessemer	
	Maximum	Minimum	Maximum	Minimum
Titanium-treated	9.9	0.0	10.4	0.0
Carnegie—untreated	16.1	6.3	30.2	14.4
Colorado—untreated	16.4	5.0	....	....
Tennessee—untreated	18.5	10.1	....	....
Pennsylvania—untreated	23.0	9.3	....	....
Bethlehem—untreated	21.2	5.4	....	....
Lackawanna—untreated	23.0	12.3	21.3	15.5
Algoma—untreated	21.0	7.6	236.2	81.2
Cambria—untreated	24.0	11.3	46.8	32.4
Illinois—untreated	20.9	13.6	21.7	19.6
Maryland—untreated	31.9	9.0	19.3	13.9

SERVICE RESULTS WITH TITANIUM-TREATED RAIL
FAILURES OF OPEN-HEARTH RAIL STEEL AS REPORTED IN A. R. E. A. BULLETIN NO. 81 OF THE RAIL COMMITTEE FOR THE PERIOD ENDING OCTOBER 31, 1918

	Mileage reported laid in				Failures per 100 track miles				Average failures per year in service per 100 track miles
	1913	1914	1915	1916	1913	1914	1915	1916	
Titanium—treated rail	101.14	33.32	12.66	10.21	49.5	30.0	0.0	19.6	6.8
Carnegie—untreated rail	761.33	487.40	722.03	873.59	82.2	25.4	16.9	13.2	8.7
Colorado—untreated rail	1,205.68	1,047.82	1,030.66	1,172.01	82.1	27.3	15.1	15.7	9.0
Tennessee—untreated rail	1,788.25	1,848.70	1,005.90	1,197.84	57.3	44.2	30.5	37.1	12.7
Pennsylvania—untreated rail	617.63	271.13	161.30	47.75	71.2	38.0	27.9	46.1	14.0
Bethlehem—untreated rail	981.95	558.68	534.25	515.07	97.3	21.6	41.0	42.5	15.0
Algoma—untreated rail	....	76.62	374.74	221.08	....	67.9	22.9	42.1	15.2
Lackawanna—untreated rail	1,379.17	746.61	732.50	942.87	113.3	51.0	38.8	25.5	15.3
Cambria—untreated rail	408.69	300.34	255.68	194.70	120.1	64.3	34.1	26.1	16.3
Illinois—untreated rail	3,002.97	1,472.04	1,890.44	2,476.75	96.2	83.4	40.9	26.0	16.5
Maryland—untreated rail	410.29	480.30	291.28	365.74	159.7	36.2	99.6	61.8	26.2
					5 years	4 years	3 years	2 years	

1913 mileage of titanium-treated rail was rolled as follows: Bethlehem, 13.21; Carnegie, 23.23; Illinois, 64.70.
1914 mileage of titanium-treated rail was rolled as follows: Lackawanna, 26.28; Illinois, 7.04.
1915 mileage of titanium-treated rail was rolled as follows: All at Lackawanna.
1916 mileage of titanium-treated rail was rolled as follows: All at Cambria.

FAILURES OF BESSEMER RAIL STEEL FOR 1913 AND 1914 ROLLINGS, AS REPORTED IN A. R. E. A. BULLETIN NO. 81 OF THE RAIL COMMITTEE FOR THE PERIOD ENDING OCTOBER 31, 1918

	Mileage reported laid in		Failures per 100 track miles		Average failures per year in service per 100 track miles
	1913	1914	1913	1914	
Titanium-treated	94.59	31.91	51.8	0.0	5.2
Maryland—untreated	443.51	91.87	69.9	77.3	16.6
Lackawanna—untreated	94.05	62.08	77.6	85.3	18.4
Illinois—untreated	197.28	87.37	98.3	86.9	20.6
Carnegie—untreated	228.64	77.74	151.3	57.9	22.3
Cambria—untreated	60.44	11.56	243.2	129.7	40.5
Algoma—untreated	7.96	66.78	1,181.0	324.9	158.6
In service	....	....	5 years	4 years	....

Mileage of titanium-treated Bessemer was rolled as follows: 1913—Lackawanna, 37.43; Illinois, 57.16; 1914—Lackawanna, 23.47; Illinois, 8.44.

RAILROAD PRESIDENTS who take back their properties only to worry and fret over the condition of roadbed and rolling stock overlook the fact that the liability is compensated for by a new asset. That is the far greater understanding on the part of the public in general as to the railroads' problems.—*Baltimore (Md.) News.*

COMPETITION RESTORED.—It is pleasing once more to have a call from the "traveling freight and passenger agent" who is out looking up the trade, seeking out complaints as to the service, studying the needs of the various communities, and otherwise showing an interest which has been lacking under government operation. Competition has been restored, and already the railroad service is showing an improvement.—*Sioux Falls, (S. D.) Argus-Leader.*

Proposed Grouping of Great Britain's Railways

A Plan for Uniting Approximately One Hundred Separate Railways into Six Distinct Systems

LONDON.

WHILE THE BRITISH PRESS and parliament have been chafing over what has appeared to them the inactivity of the new Ministry of Transport, evidences of the work of this department are rapidly being brought to light. The latest and most drastic of its plans for the reconstruction of the British railway systems is that of the grouping of all railways into six distinct systems. The first public information of the Ministry's plans in this respect was given through the columns of Modern Transport (London) and while it does not bear the official stamp of authenticity it is believed that the information was obtained from sufficiently reliable sources to warrant repeating.

Modern Transport says:

We understand that a definite scheme for the future administration of the railways of this country has been drawn up by the Ministry of Transport and is now under consideration by the cabinet. This scheme provides for the distribution of the railways of England and Wales into four well-defined districts, based largely upon the working agreements which were in operation between groups of railway companies prior to the war. The districts into which it is proposed to group the railways are as follows:

	Mileage.
(1) North Eastern and Central System: Great Central, Great Eastern, Great Northern and North Eastern Railways	4,772
(2) North Western and Midland System: L. and N. W., Midland, Lancs and Yorks, and North Staffordshire Railways	4,899
(3) South Western and South Coast System: L. and S. W., L. B. and S. C., and S. E. and C. Railways	2,108
(4) Western and Wales System: Great Western, Cambrian and South Wales Railways (*i.e.*, Alexandria, Barry, Brecon, Rhymney and Taff Vale)	3,594
	15,373

There are approximately 100 separate railway undertakings in England and Wales alone, and these, of course, will have to be absorbed into the various district groups, according to their geographical position. By this process of combination it is estimated that large economies will be obtained in administrative and working expenses.

The Scottish railways will together constitute a separate district and the electric railways of London will form another, as it is realized that in the latter case the best working results will be obtained by treating these undertakings separately.

Friendly Rivalry to Replace Competition

It is significant that each of the big English groups will radiate from London, and the fact that there will be two series of trunk routes to the north and two to the west, indicates a desire on the part of those responsible for the framing of the scheme to preserve a certain amount of rivalry between the large combinations. The new plans have not yet been worked out in their entirety, as extensive alterations have to be made in the present system of inter-company "running powers," which together result in the expenditure of much unnecessary engine power. Limited running powers will, however, continue to exist between the various groups to facilitate the working of cross-country services, whilst superfluous freight and passenger trains will be withdrawn. The locomotives and rolling-stock in the various groups will be pooled and a large amount of recording and other work, formerly carried out by officials of the Railway Clearing House will be dispensed with.

The Basis of the New Policy

In arriving at what is considered to be a fundamentally economic division of the railways, the Minister of Transport has been obliged to pay due regard to two factors. The first was the necessity for balancing the groups in areas of as nearly as possible equally relative importance from a commercial point of view, as it was realized that each must be self-contained in the matter of population and industry with its own route to the metropolis. Secondly, it was essential that minimum disturbance should be caused to existing undertakings, and, therefore, it has been decided to follow certain well-defined lines of development which were apparent before the war rather than adhere to a strictly geographical distribution.

Most of the companies comprised in the two groups radiating from London to the north already possess working agreements; the London & North Western, Midland and Lancashire & Yorkshire Companies are parties to one agreement, and the Great Northern, Great Central and Great Eastern Companies are comprised in the other. The latter tripartite agreement was the result of the abandonment of the railway amalgamation bill, which was deposited in Parliament by the companies concerned in 1909, but which received unfair and unwarrantable opposition from the government.

It is a noteworthy fact that whereas the legislature, from the birth of railways right up to recent years, did its best to encourage competition and deliberately set its face against a normal policy of amalgamation, it should now be anxious to secure unification on the basis for so long urged by the railway companies. On several occasions during the last 70 years the question of distributing the railways of Great Britain into districts has been brought before the notice of the government. So far as we are able to ascertain the subject was first propounded before the Select Committee on Railways in 1846. In 1872 a Select Committee on Railway Companies' Amalgamation again considered this question.

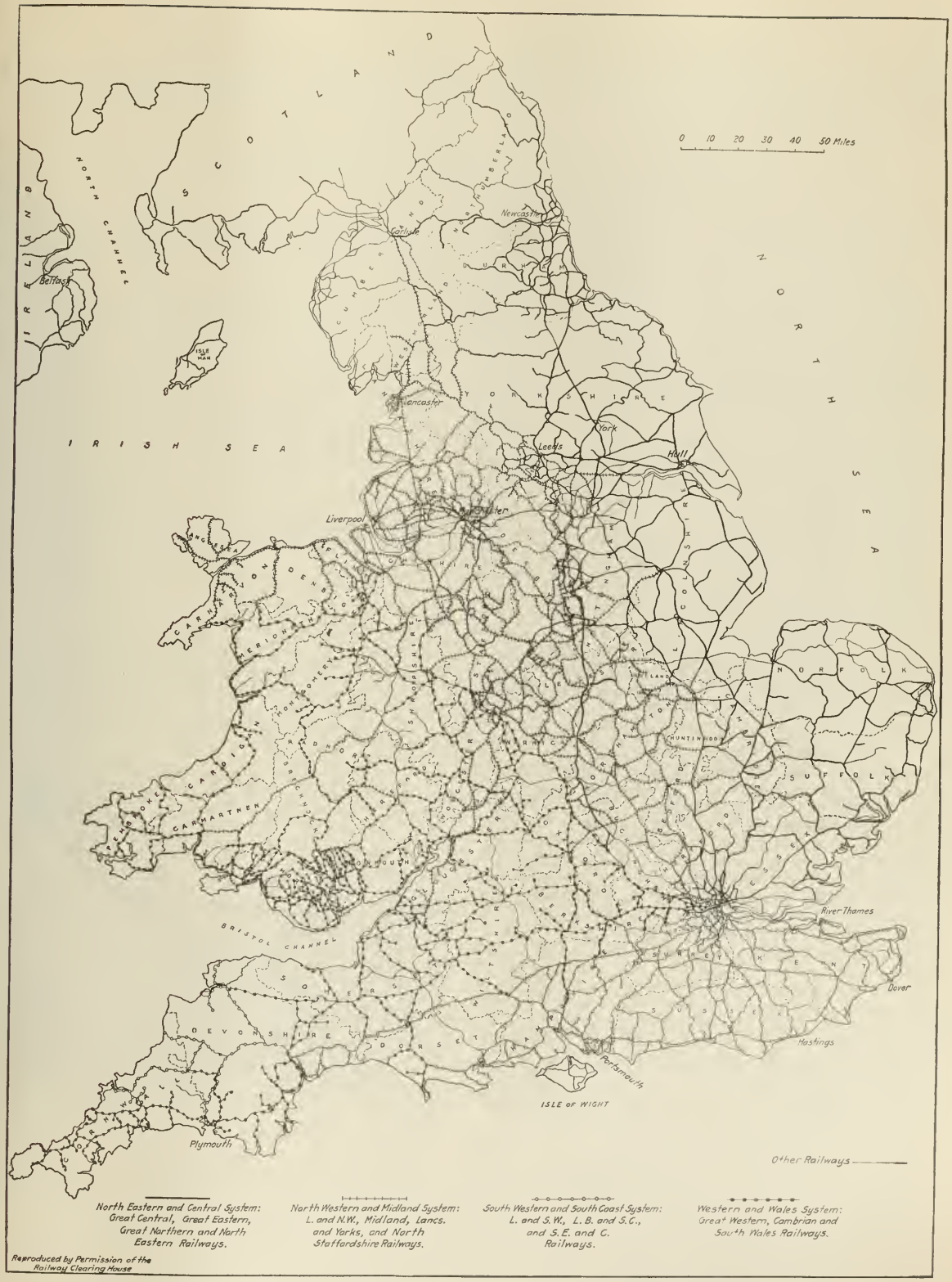
State to Purchase Small Companies

As to the means whereby the policy of the Ministry of Transport will be carried out, it is understood that the state will purchase the majority of the smaller companies and lease them to the larger undertakings comprising the various groups. In this connection we may quote the following passage from an address, delivered on March 3 to the Economic Science Section of the Royal Philosophical Society of Glasgow by W. Whitelaw, the chairman of the North British Railway:

"I think we may assume that nationalization of the railways, including the working of them by the state, is at present quite out of the running, but the more limited form of nationalization under which railway stocks might be purchased by the state and the management entrusted to private working companies, has received too little consideration. One thing is admitted on all hands—namely, that for working purposes railway systems should cover large areas; the numerous managements existing today must be reduced in one way or another to comparatively few. This reduction would, I think, be most easily and simply brought about by the state purchasing by agreement a large number of the smaller companies and leasing them to a few of the very large ones.

"In making the purchase no financial difficulties would be met with, the exchange of a state railway stock for existing company stocks is a simple clerical operation, and as regards the great bulk of the stocks no question of valuation would arise, the holders of all stocks with fixed dividends, which have been paid in full for a period of years, would receive sufficient state railway stock to yield them the same return as today, and the only stocks requiring valuation would be the ordinary stocks and any pre-ordinary stock which had not paid its dividend in full. Of course, if the state is to buy companies in this way it must be able to lease them to working companies, and negotiations for purchase of companies would have to proceed *pari passu* with negotiations for leasing; failure to agree as to leasing would prevent purchases being completed, it being assumed that the state is to have no power of working.

Not only will the grouping of the railways result in a sav-



The English Railways Showing Their Suggested Consolidation Into Four Main Systems

ing in connection with the expenses of administration, but also in the cost of supervision of traffic operation and the maintenance of way and works, as it will be possible to coordinate to an unprecedented extent the work and responsibilities of the many divisional officers. It is known that the government has consulted the railway companies in this new scheme of development, and they have received considerable assistance from at least one well-known general manager, who for years has been an advocate of a fair system of combination from which the railways, the traders and the public stand to derive full benefit.

STATISTICS OF PRINCIPAL RAILWAYS TO BE GROUPED.

Railway Company	Total Paid-Up Capital (1912) £	Net Revenue (1912) £	Ordinary Stock Div. (1912) £	Mileage	Locomotives	Passenger Cars	Freight Cars
North Eastern & Central System:							
Great Central	53,498,280	1,732,356	....	816	1,352	2,691	33,753
Great Eastern	54,435,194	1,965,286	2.5	1,217	1,284	5,748	29,975
Great Northern	59,657,799	2,217,194	3.58	1,005	1,357	3,537	38,374
North Eastern	80,889,532	3,841,425	6.00	1,734	2,007	4,594	116,694
Total	248,480,805	9,756,261	3.87	4,772	6,000	16,570	218,796
North Western & Midland System:							
London & North Western	125,053,447	5,803,579	6.5	1,941	3,204	9,621	82,109
Midland	203,722,343	5,515,104	3.19	2,134	3,020	6,827	118,956
Lancaster & Yorkshire	70,462,618	2,435,371	4.125	597	1,601	4,398	34,021
North Staffordshire	10,928,123	390,463	4.375	227	192	508	6,097
Total	410,166,525	14,144,517	4.33	4,899	8,017	21,354	241,183
South Western & South Coast System:							
London & South Western	56,481,682	1,929,755	5.375	981	948	4,625	14,886
London, Brigh. & So. Coast	29,431,243	1,428,948	5.00	480	611	2,917	9,736
So. Eastern & Chatham	63,512,148	1,935,643	3.81	647	721	3,945	11,110
Total	149,425,073	5,294,346	3.63	2,108	2,380	11,487	35,792
Western & Wales System:							
Great Western	99,086,455	4,961,872	5.625	3,008	3,212	8,431	78,416
Cambrian	6,532,952	123,450	——	230	98	342	2,229
Alexandra D. & R.	3,261,787	70,659	——	9	*	*	*
Barry	6,323,559	271,467	7.00	45	148	184	1,564
Brecon & Merthyr	2,085,463	43,729	——	62	*	*	*
Cardiff	6,333,300	167,566	1.38	14	30	5	1,746
Neath & Brecon	1,337,653	40,160	——	40	*	*	*
Rhymney	2,804,218	142,584	8.75	62	125	141	1,047
Taff Vale	9,821,469	372,064	3.75	124	251	317	2,296
Total	137,586,856	6,193,550	4.94	3,594	3,864	9,420	16,688
Gross Total	945,659,259	35,388,674	4.21	15,373	20,261	58,831	512,459

*Figures not available.

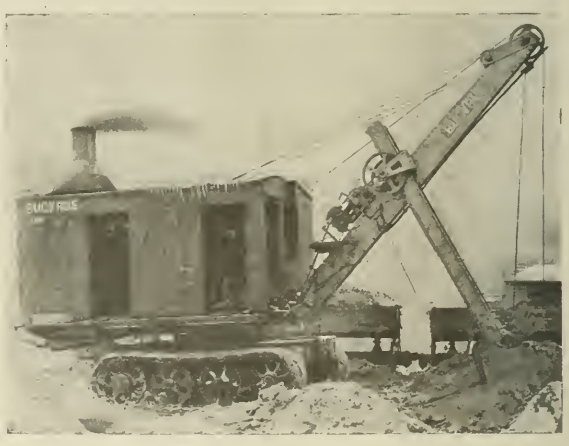
New General Utility Revolving Shovel

A NEW REVOLVING SHOVEL has been introduced which is intended to serve as a universal machine, inasmuch as it may be used as a revolving shovel, or—with the addition of a few extra parts—as a dragline excavator, a clam-shell excavator, a locomotive crane, a sewer shovel, or—with a long boom and dipper sticks—for work requiring unusually high lifts. It is being placed on the market by the Bucyrus Company, South Milwaukee, Wis., under the name 30-B and it will supersede the 18-B, ⅞-cu. yd. revolving shovel manufactured by that firm.

As a revolving shovel the machine carries a 1-cu. yd. dipper (struck measure). When heaped up, the capacity is about 1¼ cu. yd. Its truck frame is so designed that it will accommodate caterpillar traction, traction wheels or railroad trucks of any gage from 3 ft. 3 in. to 5 ft., these three mountings being interchangeable. Such a change can be made in the field at small expense. The working weight of the 30-B shovel on caterpillars is about 34 tons; on traction wheels, 31 tons, and on railroad trucks, 29½ tons.

The 30-B will carry a 1-cu. yd. clam-shell bucket with a 35-ft. boom or a ¾-cu. yd. clam shell bucket with a 40-ft. boom. The changes required in this installation include an additional drum on the main hoist shaft with the necessary brake clutch, thrust cylinder and operating levers, additional ropes, boom, bucket, tag line and trolley, and are readily made. As a crane the 30-B has a capacity of 9¾ tons at a 20-ft. radius when mounted on caterpillars and 9 tons at the same radius when mounted on trucks or traction wheels. To make this change, the same parts are required as for the clam-shell machine, with the addition of the hook.

To use this equipment with a dragline bucket the same changes are required with the exception that the tag line and trolley is not necessary and a fairlead, drag-bucket and rope must be ordered. The 30-B dragline supersedes the Class 7 Bucyrus dragline excavator. It carries a 1-cu. yd. bucket on a 35-ft. boom, or a ¾-cu. yd. bucket on a 40-ft. boom. The caterpillar mounting is recommended, but other types may be used if conditions require. It often happens that the work requires an exceptionally high lift, as for loading wagons from deep excavation or for special work. To fulfill this demand a 26-ft. boom and 17-ft. handle may be purchased.



In Use as a Revolving Shovel with Caterpillar Tractor

In the 30-B caterpillar the use of chains in the driving mechanism has been completely eliminated. Instead, driving is accomplished through direct gearing. The treads are entirely of cast steel with a large, smooth bearing surface, enabling the machine to travel over city streets, pavements and finished roads, without any danger of damaging the road surface and allowing extensive operation over rough ground without the continual necessity of renewing the treads.

General News Department

Green for "Proceed" is now the night color in fixed signals on the Philadelphia & Reading, an order abolishing the use of white lights in these signals having gone into effect on May 1.

The Railroad Employees' Department (Division No. 2) of the American Federation of Labor, is holding its second biennial convention at Scranton, Pa., about 200 delegates being present.

Harry Rogers and **Sidney Schroeder,** flying in an H S 2-L flying boat, made the trip from Miami, Fla., to New York City, about 1,300 miles, on Friday, April 30, in 15 hours, 35 minutes. The trip was begun at 3 a. m. and was made with only one stop.

The Bureau of Valuation of the Interstate Commerce Commission held an informal meeting with representatives of carriers at Chicago on April 29 and 30. Engineers from roads in all sections of the country were present to discuss the progress made by the Bureau in the preparation of valuation reports.

The United States Supreme Court on May 3 affirmed the decision of the federal court for the district of North Dakota which granted a preliminary injunction to prevent the enforcement of a North Dakota law levying an excise tax upon mileage of trunk line railroads operating into and through the state.

Fruit to the extent of several hundred tons was dumped in the ocean, off New York, on April 30, because it had been spoiled by age; this not because of the freight blockade, but, according to the newspaper statements, because shippers in Cuba had sent it to New York to be held for higher prices—and it was held too long.

The Industrial Relations Association of America will hold its second annual convention on May 19, 20 and 21, in the Auditorium theatre, Chicago. Representatives of numerous industries throughout the country will address the meetings upon a variety of subjects relative to labor and industry. A sectional dinner meeting for railroad men will be held on May 20.

An appropriation of $4,693,100 for the Interstate Commerce Commission for the fiscal year ending June 30, 1921, was recommended by the House Committee on Appropriations in reporting the Sundry Civil bill on April 29. This represents a reduction of $651,504 under the appropriation for 1920 because of the reduction of valuation work; and the total is $222,400 less than the commission asked for.

Western exhibitors at the June mechanical conventions at Atlantic City, who have been apprehensive of their ability to move their exhibits from Chicago to Atlantic City in time for the opening of the convention have been urged by George R. Carr, president of the Railway Supply Manufacturers' Association, to deliver their exhibits at the Polk street terminal of the Pennsylvania, at Chicago. By this they will expedite the movement of these materials.

Hon. Miles Poindexter, Senator from the State of Washington, has abandoned a speaking tour in the interest of his candidacy for the presidential nomination to return to Washington city and hold hearings on his so-called "anti-strike" bill. Senator Poindexter was appointed chairman of a subcommittee of the Senate committee on interstate commerce to consider the bill and he has announced that there is a prospect of early action by the committee on it.

Failure on the part of a night operator to deliver a second order regarding the passing of two passenger trains on the Chicago & North Western resulted in a head-on collision near Lamberton, Minn., on April 29. As a result of the wreck three of the crew and two passengers on east bound train, No. 516, were killed. Orders were first given out that the two trains should pass at Sanborn, Minn., but later these orders were changed to read Lamberton. This second order was not delivered to the crew of train No. 516.

The Mississippi Valley Waterways Association, at a meeting held at St. Louis, Mo., on April 19, resolved that transportation had become the most vital question before the public, that the railroads had reached the limit of their capacity for service, and that the only means of relief was through the improvement and use of our navigable waterways. The opinion was also expressed that the railroads of today do not look upon waterways as undesirable competitors, but as a very necessary ally in the solution of the present enormous national transportation problems.

Invitations to attend the exhibition of the American Railway Supply Manufacturers' Association at Atlantic City, N. J., during the conventions of the Mechanical and of the Purchase and Stores Sections of the American Railroad Association, from June 9 to June 16 inclusive, have been issued to a number of foreign railway officers and representatives who are expected to be in the United States at that time. If other foreign railway men who have not received formal invitations should desire to visit the exhibit, credentials of identification will be issued by George R. Carr, president of the American Railway Supply Manufacturers' Association, 332 South Michigan Avenue, Chicago.

The opening for operation on or before May 1 of the Wichita Falls, Ranger & Ft. Worth between Dublin, Tex., and Ranger, has been announced. Regular service will be inaugurated on this line with through service on St. Louis-San Francisco to Dublin and on the Wichita Falls, Ranger & Ft. Worth to Ranger. The Wichita Falls, Ranger & Ft. Worth is also constructing lines from Ranger north to Breckenridge, Tex., and upon the completion of this branch, the Frisco lines will operate through service to Dublin on the new line between Ft. Worth and Ranger, according to the contract made by the Frisco with the owners of the new line. A large amount of freight traffic is expected by the Frisco through the opening up of the Stevens County oil fields and because of this development additional tracks in the Ft. Worth and Dublin yards are to be constructed. A small roundhouse will also be constructed at Dublin.

The United States Supreme Court on May 3 denied the petition of the government for a rehearing of the anti-trust suit against the United States Steel Corporation. In this petition, presented to the Court after its decision ordering the dissolution of the Reading coal and railroad combination, the government took the position that the decision of the court, if allowed to stand, would hamper the government in its prosecution of similar cases under the Sherman anti-trust law. The petition said in part: "While this case has been argued twice, yet a sense of official duty, a belief that the principal point involved is really not decided by the majority opinion, and would require a reversal, coupled with the belief of counsel that the effect of the decision is materially to change and restrict a number of recent opinions of this court construing the anti-trust statutes, and may seriously affect other cases still pending as well as the future enforcement of those acts, has convinced counsel for the United States that their duty requires them most earnestly to ask for a rehearing. It is most respectfully insisted that the opinion fails to discuss the question pressed most strongly by counsel, i. e., that the corporation itself is a combination in restraint of trade. The opinion does hold that the corporation

REVENUES AND EXPENSES OF RAILWAYS

Two Months of Calendar Year 1920

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	141	$333,385	$135,568	$544,360	$78,518	$119,774	$11,234	$214,842	$18,819	$449,609	82.58	$94,751	$24,709	$69,981	$56,293
Alabama Great Southern	312	1,239,938	329,481	1,783,244	233,566	449,802	41,007	625,739	41,700	1,404,648	78.76	378,596	48,687	329,433	161,85[illegible]
Ann Arbor	301	607,518	97,804	787,746	78,596	174,804	12,010	403,054	21,598	690,094	87.60	97,652	33,[illegible]00	64,231	16,178
Atchison, Topeka & Santa Fe	8,662	23,659,071	8,244,762	36,968,634	3,674,382	7,289,820	320,724	11,245,949	506,900	23,013,915	62.25	13,954,718	1,368,599	12,582,8[illegible]	8,165,993
Atlanta & West Point	93	275,035	158,151	524,717	69,567	84,731	12,281	198,818	14,443	388,816	74.10	135,902	14,[illegible]62	121,0[illegible]0	30,566
Atlanta, Birm. & Atlantic	639	680,367	138,306	963,903	169,209	279,092	28,748	458,013	24,813	960,034	99.59	3,879	32,[illegible]00	—28,644	279,269
Atlantic City	177	215,868	223,606	485,484	84,826	60,358	2,040	352,106	2,102	501,624	103.32	—16,141	26,103	—42,259	—44,917
Atlantic Coast Line	4,893	8,665,173	3,158,673	13,378,945	1,528,179	2,385,995	172,878	5,497,161	250,337	9,937,749	74.27	3,441,195	400,00[illegible]	3,039,684	1,091,372
Balto. & Ohio Chicago Terminal	90	.....	35	400,338	45,646	90,386	2,537	315,357	23,798	485,538	121.28	—77,200	53,085	—130,284	157,046
Baltimore & Ohio	5,153	23,388,467	3,943,152	31,333,386	3,220,109	10,303,401	468,173	16,237,528	794,870	31,233,218	99.68	100,168	1,159,015	—1,068,531	2,890,063
Baltimore, Chesapeake & Atlantic	81	89,714	28,134	140,975	16,951	75,070	2,096	121,942	7,528	223,585	158.59	—82,610	7,400	—90,010	81,221
Bangor & Aroostook	658	693,619	136,746	953,343	218,689	261,114	7,730	435,520	22,601	958,031	100.49	—4,689	49,198	—53,888	—76,003
Beaumont, Sour Lake & Western	118	223,386	57,367	301,453	79,704	746,025	3,564	103,640	9,079	241,986	80.27	59,467	4,7[illegible]	54,751	24,438
Belt Ry. Co. of Chicago	31	.....	.....	790,552	59,521	150,436	630	514,129	14,382	739,097	93.49	51,455	31,364	20,090	107,332
Bessemer & Lake Erie	217	1,128,629	69,219	1,272,484	89,261	634,680	21,759	577,200	49,657	1,386,025	108.92	—113,542	27,800	—141,358	—39,995
Bingham & Garfield	36	293,934	3,757	303,094	63,042	75,799	3,730	71,154	6,664	224,654	74.12	78,441	14,850	63,589	44,678
Birmingham Southern	31	51,453	.....	72,982	7,670	9,965	1,693	48,445	6,729	74,503	102.08	—1,521	3,508	—5,038	—37,960
Boston & Maine	2,257	6,385,019	3,187,252	11,248,561	1,782,326	2,964,336	89,990	7,679,250	369,649	12,924,983	114.90	—1,676,422	453,323	—2,133,[illegible]42	—1,616,338
Brooklyn Eastern District Terminal	9	150,796	.....	170,288	69,177	144,570	.....	117,350	6,992	338,089	198.54	—167,801	11,886	—179,687	—92,053
Buffalo & Susquehanna	296	405,590	13,058	431,537	59,083	199,667	4,854	179,219	18,770	461,592	104.54	—30,055	6,700	—36,756	3,665
Buffalo, Rochester & Pittsburgh	589	2,180,686	244,120	2,545,746	379,018	1,024,403	29,853	1,316,223	62,762	2,817,004	110.66	—271,258	50,[illegible]00	—321,898	—148,833
Canadian Pacific Lines in Maine	233	401,545	146,403	571,838	76,401	136,118	5,947	447,624	6,891	672,982	117.69	—101,143	24,400	—125,543	—58,543
Carolina Clinchfield & Ohio	282	952,039	61,303	1,056,816	155,802	317,540	8,230	359,906	27,933	868,942	82.22	187,874	5,184	182,638	25,799
Central New England	301	737,201	43,875	841,155	239,524	369,847	5,361	650,628	30,303	1,295,806	154.05	—454,651	35,600	—4[illegible],[illegible]39	—458,487
Central of Georgia	1,924	2,576,904	1,042,757	4,391,969	692,299	838,646	85,552	1,751,920	127,273	3,510,368	79.92	881,601	145,198	736,226	671,660
Central Railroad of New Jersey	686	5,019,965	1,173,040	6,838,255	1,005,388	2,422,342	44,238	4,078,461	177,075	7,758,341	113.45	—920,086	444,473	—1,364,538	—1,511,804
Central Vermont	411	596,832	167,057	915,450	148,693	341,466	24,305	717,164	35,330	1,271,871	138.93	—356,426	—34,800	391,242	—217,119
Charleston & Western Carolina	342	456,484	102,247	586,243	119,017	144,664	6,988	285,319	2,799	558,787	95.31	27,456	17,000	10,456	—20,705
Chesapeake & Ohio	2,516	10,038,822	1,412,101	12,656,892	1,719,888	3,370,766	104,262	5,191,833	237,996	10,671,666	84.32	1,985,226	379,620	1,604,582	527,363
Chicago & Alton	1,050	2,966,031	902,969	4,589,881	497,230	1,350,179	52,424	2,236,373	110,078	4,263,758	92.89	326,123	129,359	196,389	—30,740
Chicago & Eastern Illinois	1,131	3,202,906	788,552	4,990,137	359,963	1,510,403	46,782	2,038,330	96,885	4,072,214	81.60	917,923	170,000	747,695	1,112,873
Chicago & Erie	269	1,398,979	108,114	1,767,344	166,012	374,936	27,502	1,104,372	52,790	1,730,624	97.92	36,721	75,909	—39,292	—162,425
Chicago and North Western	8,090	15,150,246	5,304,275	24,273,998	2,864,913	5,896,833	169,753	13,365,321	540,282	23,038,506	94.91	1,235,491	1,[illegible]55,621	—75,707	—142,907
Chicago, Burlington & Quincy	9,371	19,690,745	5,078,510	29,786,962	2,853,967	5,757,605	179,834	12,279,660	673,534	21,999,968	73.85	7,786,995	1,098,044	6,684,88[illegible]	2,965,166
Chicago Great Western	1,496	2,709,415	856,677	4,179,329	437,043	1,024,326	60,673	2,010,809	99,120	3,662,123	87.62	517,207	109,842	406,951	214,782
Chicago, Indianapolis & Louisville	654	1,522,733	430,544	2,341,422	214,776	648,271	44,041	1,038,591	58,233	2,029,411	86.67	312,011	94,611	217,371	36,498
Chicago Junction	12	.....	.....	637,371	80,834	102,270	960	544,913	13,507	742,482	116.49	—105,112	5,753	—110,864	88,395
Chicago, Milwaukee & St. Paul	10,628	17,228,184	4,293,197	26,128,745	3,848,348	7,235,388	193,609	14,207,489	742,856	26,349,966	100.85	—220,220	1,205,736	1,457,139	—1,011,129
Chicago, Peoria & St. Louis	247	324,072	48,645	410,082	64,571	168,466	4,441	196,761	10,892	445,063	108.53	—34,980	12,200	—47,195	95,852
Chicago, Rock Island & Gulf	463	818,312	216,071	1,196,987	161,482	212,954	14,374	443,330	25,729	859,352	71.79	337,635	28,034	309,435	284,414
Chicago, Rock Island & Pacific	7,595	14,014,833	4,739,314	22,082,761	3,130,227	4,796,957	216,810	9,723,230	417,366	18,327,995	82.99	3,754,76[illegible]	759,839	2,993,327	3,217,673
Chicago, St. Paul, Minn. & Omaha	1,749	3,485,604	1,224,514	5,421,790	415,299	1,014,753	39,090	2,580,056	132,461	4,210,415	77.65	1,211,375	275,412	934,928	400,264
Chicago, Terre Haute & S. E.	374	790,724	45,447	869,164	81,805	272,919	10,266	397,280	19,860	785,678	90.39	83,486	36,000	47,486	144,741
Cincinnati, Lebanon & Northern	76	143,474	15,776	191,387	25,664	68,236	4,092	120,648	2,749	221,389	115.67	—30,002	10,158	—40,162	17,167
Cincinnati, Indianapolis & Western	321	480,992	97,140	696,002	98,934	265,953	12,798	333,368	28,537	741,480	106.53	—45,478	22,071	—67,555	52,195
Cincinnati, New Orleans & Texas Pacific	337	2,269,083	606,580	3,271,657	429,606	860,957	70,531	1,159,591	75,963	2,625,508	80.10	652,149	76,072	575,040	65,834
Cincinnati Northern	251	388,068	37,312	474,424	48,349	103,884	7,297	207,875	10,052	377,434	79.55	96,990	19,230	77,757	24,884
Cleveland, Cincinnati, Chic. & St. Louis	2,408	9,383,750	2,544,649	14,121,014	1,036,806	2,581,236	249,021	5,863,777	234,943	10,040,698	73.69	4,080,316	357,285	3,720,240	2,471,179
Colorado & Southern	1,099	1,758,541	365,138	2,433,917	251,909	516,478	20,871	817,209	67,980	1,689,819	69.42	744,099	101,980	641,980	263,080
Colorado & Wyoming	43	23,277	1,541	109,191	19,306	24,873	508	54,046	7,799	106,533	97.56	2,658	10,000	—7,342	—40,468
Cumberland Valley	163	731,223	147,438	987,901	144,324	207,232	16,221	350,485	26,275	745,186	75.43	242,715	11,395	231,284	216,502
Delaware & Hudson	875	4,291,021	465,502	5,200,331	607,472	1,831,343	36,457	2,994,613	220,870	5,734,090	110 26	—533,758	156,000	—690,197	—331,751
Delaware, Lackawanna & Western	956	7,976,675	1,810,099	11,428,931	1,161,329	2,825,286	145,755	6,088,147	236,008	10,581,053	92.58	847,879	575,000	271,813	—1,600,315
Denver & Rio Grande	2,585	4,780,265	953,457	6,354,556	633,622	1,397,075	59,289	2,175,966	139,250	4,492,533	70.69	1,862,024	240,000	1,607,450	1,074,121
Denver & Salt Lake	255	426,832	51,422	509,074	127,843	226,580	1,962	316,041	12,012	684,439	134.44	—175,364	21,166	—196,599	28,457
Detroit & Mackinac	377	142,261	64,873	253,101	55,370	101,012	4,932	160,617	13,783	335,684	132.62	—82,583	15,189	—97,772	—9,318
Detroit & Toledo Shore Line	61	302,518	.....	303,114	36,207	42,750	3,910	160,803	13,079	256,750	84.70	46,362	15,800	29,101	155,957
Detroit, Toledo & Ironton	454	641,881	26,036	739,569	98,381	180,276	8,060	427,333	26,159	738 626	99.87	942	17,840	—17,660	100,554
Duluth & Iron Range	292	180,101	43,952	270,585	133,174	193,347	840	262,108	24,427	614,871	227.23	—344,286	17,330	—361,822	—31,413
Duluth, Missabe & Northern	407	161,170	82,160	314,177	247,238	356,297	4,507	362,326	32,114	1,005,647	32.00	—691,470	17,529	—709,032	—220,374
Duluth, South Shore & Atlantic	614	411,767	166,057	758,439	128,469	192,387	9,980	492,934	19,080	853,907	112.58	—95,468	41,000	—136,520	—61,395
Duluth, Winnipeg & Pacific	178	319,839	57,931	384,784	44,503	72,036	4,750	183,731	15,337	320,358	83.25	64,426	20,726	43,700	10,427
East St. Louis Connecting	3	.....	.....	268,019	28,622	68,270	517	187,537	6,699	291,646	108.81	—23,627	4,000	—27,627	—18,037
El Paso & Southwestern	1,027	1,904,093	464,865	2,625,189	538,163	422,655	22,212	628,684	54,033	1,685,417	64.20	939,772	120,830	818,822	161,974
Elgin, Joliet & Eastern	831	3,005,886	10	3,578,971	259,191	838,443	12,078	1,499,036	52,569	2,661,222	74.34	917,749	103,682	814,066	—226,871
Erie	1,989	11,222,732	1,885,492	15,201,129	1,840,118	5,651,860	129,019	8,520,770	408,212	16,662,308	109.61	—1,461,179	479,167	—1,954,198	—1,016,314
Florida East Coast	764	1,258,414	979,482	2,677,686	239,991	396,399	23,208	873,906	40,925	1,599,938	59.75	1,077,747	78,767	998,737	721,006
Fonda, Johnstown & Gloversville	88	61,350	133,379	205,275	26,382	19,666	857	78,933	10,584	136,422	66.45	68,852	9,800	59,053	15,768
Ft. Smith & Western	253	229,998	59,867	308,361	70,984	71,980	8,146	139,535	13,297	306,483	99.38	1,878	10,000	—8,409	—19,103
Ft. Worth & Denver City	454	1,248,100	628,256	2,043,847	288,991	419,359	10,566	889,675	55,209	1,670,739	81.74	373,108	43,800	328,887	—19,290

did not achieve a monopoly. That point arises, however, under the second section of the Sherman act. The opinion does not decide the question raised under the first section, namely, that the corporation is a combination in restraint of trade."

The conference report on the bill appropriating $300,000,000 for the Railroad Administration was adopted by the Senate on May 3 and by the House on May 4 after the conferees had agreed to omit the Senate amendment intended to make explicit provision for reimbursement of the short lines relinquished from federal control for any "deficit or decrease" in net operating income for the federal control period. The short lines had received a letter from the statistician of the Interstate Commerce Commission interpreting the provisions of the transportation act for the reimbursement of these lines as applying only to those that had deficits during the federal control period.

Striking Switchmen Forfeit Seniority Rights

The last move in the strike of switchmen in the Chicago district was made on May 5, when the following statement was issued on behalf of the railroads involved:

"In reference to men who continue on strike, it was explained that the individual railway managements, several days before the expiration of final notices to return to work which were given to striking switchmen, mailed letters to each individual employee and posted notices on bulletin boards informing each one that unless he returned to work on or before the date mentioned, he would not subsequently be taken back except as a new employee. As to those men who thereafter failed to return to work at the times mentioned, the railways employed men to take their places, many of whom moved to Chicago from other points. These new men, together with those who remained loyal to the service, were promised that the seniority rights thus gained over those on strike would be preserved, and good faith requires that that promise be scrupulously kept."

"It is therefore announced on behalf of the railways, there could be no change in this position and that, insofar as positions were still open, men on strike would generally be returned to service on application, but without restoration of former rights."

Conditions in the Chicago district are improving rapidly with the addition of new men and the continued return of strikers, many of whom are re-entering service with other roads than those for which they have formerly worked. Railway officers freely predict that conditions will be normal by the first of next week, although it will take some time to move the accumulation of inbound and outbound freight at Chicago.

Disastrous Fire at Waycross.

The shops of the Atlantic Coast Line at Waycross, Ga., were damaged by fire on the night of April 8, to the amount of about $500,000. The fire started in the car repair shops about 9 o'clock in the evening and the flames were fought all night. The car shops, and a small blacksmith shop were completely destroyed, together with the combustible portions of 200 box cars. About 500 men were thrown out of work temporarily.

Proposed Amendment to Valuation Act

Senator Cummins on May 3 introduced in the Senate a bill to strike out of the valuation act the direction to the Interstate Commerce Commission, which was involved in the recent decision of the Supreme Court in the Kansas City Southern case, to ascertain and report "the present cost of condemnation and damages or of the purchase in excess of original cost or present value" of railroad lands. The commission had reported that this was impossible, but the court held that the commission was required to comply with the law.

Freight By Automobile

A great impetus to transportation by motor truck has been given by the traffic demoralization, following a severe winter and the "outlaw" railway strike. Highways between scores of cities are dotted, day and night, by "motor-cades." New England and the industrial middle west are conspicuous new patrons of the long-distance motor truck. There are now on the road, headed west, nearly 200 five-ton trucks in fleets of 20, carrying tire fabrics to the Goodyear Tire and Rubber Company, Akron, Ohio, in what is declared to be the biggest truck venture yet made. The round trip takes about a fortnight, the route running through New Haven, New York and over the Lincoln highway by way of Philadelphia and Pittsburgh, with spare trucks kept available in the mountains.

These trucks, costing about one dollar a mile, and each insured at $25,000 for the trip, are carrying a million pounds of cotton fabric, now valued at $2.50 a pound, making the total consignment worth about $2,500,000. The fabric is the product of seven mills in New Bedford and Connecticut. The trucks will bring back tires and rubber heels. Formerly these goods all traveled by rail. As high as $3.25 a pound is now bid for the best spot Sea Island cotton. The steam roads were already groaning under their traffic burden, being billions behind in proper provision for serving the nation, before their latest troubles with weather and with labor came upon them. One of the worst sufferers by the freight blockade has been the automobile industry. But it may get a later compensation in the opportunity of self-demonstration given to the truck.—*Boston News Bureau.*

"An Increased Production Convention"

This is the name which has been given to the eighth annual meeting of the Chamber of Commerce of the United States held last week at Atlantic City, N. J., and reported in the *Railway Age* of April 30, page 1303; and the resolutions adopted at the close of the meeting, emphasizing this idea, are summarized as follows:

"The country's problems can be largely solved through increased production and economy must be practiced by public authorities and by every citizen.

"A treaty of peace should be put into effect without more delay.

"The government should refrain from entering any field of business where it can be conducted by private enterprise.

"American ideals should be maintained.

"Agricultural organizations should be taken into the Chamber as an integral part of business.

"Railroad transportation facilities should be built up.

"Congress should expedite shipping legislation as the means of giving the country a merchant marine.

"Adequate appropriation should be made for development of waterways.

"The traction situation should be improved.

"Pivotal industries should be protected.

"It is the duty of everyone to join in preventing fire waste.

"It is imperative that the War Department delay no longer in making final disposition of war plants and machinery.

"Public welfare requires that immediate compensation be made for war damages.

"Changes in postal rates without determination of the results on business enterprise may have inequitable effects.

"A national budget should be adopted.

"The Chamber should hold a referendum on taxation.

"The Chamber opposes a general cash bonus given to all men who served in the war without any discrimination.

"Provision should be made for supplying populations with the necessities of life in emergencies."

Air Brake Association Meets.

The twenty-seventh annual convention of the Air Brake Association was called to order Tuesday morning at the Hotel Sherman, Chicago, by the president, T. F. Lyons. Following the usual opening exercises, Frank McManamy, manager, department of equipment, Division of Liquidation of Claims, United States Railroad Administration, addressed the convention informally. He made a number of suggestions to the association for consideration, the principal one of which was the need for the reorganization of air brake supervision on the railroads to include an expansion of the number of supervisors assigned exclusively to air brake work and the need for special facilities for the maintenance of air brakes at all terminals—not the principal terminal only—of each railroad.

Following Mr. McManamy's address, President Lyons delivered his official address. Badges were presented to past presidents Albers, Slattery and Barry, and other matters of associa-

tion business were taken up. The consideration of technical papers and committee reports was taken up at the afternoon session. A full account of the proceedings of the convention will appear in a later issue.

February Shows Large Deficit

The railroads during February, the last month of government operation, in spite of an increase in freight tonnage of 27 per cent, had an operating deficit of $12,217,639, as compared with a net operating income in February, 1919, of $9,788,055, according to the monthly bulletin of revenues and expenses issued by the Interstate Commerce Commission. The bulletin covers 189 Class I roads and 15 switching and terminal companies. As the rental guaranteed by the government is approximately $75,000,000 a month this represents a loss to it for the month of $87,000,000. For the two months of the calendar year the net operating income is shown as $51,959,904, but as this includes over $50,000,000 as an estimate of back mail pay the government's loss for the two months alone was in the neighborhood of $150,000,000. The February figures as compiled by the commission are shown in the table.

RAILROAD EARNINGS IN FEBRUARY, 1919 AND 1920

Item	Amount		Per mile of road operated	
	1920	1919	1920	1919
1. Average miles operated..	235,075.35	234,657.57	.....	.....
Revenues:				
2 Freight	$298,917,221	$242,295,875	$1,272	$1,033
3. Passenger	82,632,766	79,318,347	351	338
4. Mail	9,553,603	4,171,441	40	18
5. Express	11,683,867	7,823,221	50	33
6. Other transportation....	10,752,614	8,570,129	46	37
7. Incidental	10,850,792	9,803,947	46	42
8. Joint facility—Cr.	654,620	539,725	3	2
9. Joint facility—Dr.	188,987	137,456	1	1
10. Ry. op. revenues	424,856,496	352,385,229	1,807	1,502
Expenses:				
11. Maint. way	64,415,432	54,275,209	274	231
12. Maint. equip.	118,731,081	90,020,341	505	384
13. Traffic	4,970,805	3,564,322	21	15
14. Transportation	211,889,157	164,219,880	901	700
15. Misc. operations.	4,390,258	3,357,512	19	14
16. General	10,962,274	10,202,928	47	44
17. Transportation for investment—Cr.	355,970	492,551	2	2
18. Ry. op. expenses	415,003,037	325,147,641	1,765	1,386
19. Net revenue from r. op..	9,853,459	27,237,588	42	116
20. Railway tax accruals (excl. "war taxes")...	17,676,394	15,043,697	75	64
21. Uncollectible	101,337	58,377	1	.....
22. Ry. op. income	*7,924,272	12,135,514	*34	52
23. Equip't rents (Dr. Bal.)	2,716,270	1,430,713	11	6
24. Joint fac. rent (Dr. Bal.)	1,577,097	916,146	7	4
25. Net of items 22, 23, 24..	*12,217,639	9,788,655	*52	42
26. Per cent exps.	97.68	92.27	.....	.....

*Debit item.

Shippers' Calls for Cars

A delegation of representatives of farmers' organizations, grain shippers and commercial bodies from western states appeared before the Senate and House committees on interstate commerce at Washington this week to describe the serious conditions which they said would result unless steps are taken to increase the car supply. They urged that Congress increase the revolving fund recently appropriated from $300,000,000 to $600,000,000 in order that increased loans might be made to the railroads for the purpose of buying cars. Senator Cummins asked some of the railway executives to appear before his committee on Thursday and announced his intention of calling in representatives of the investment bankers later. On Wednesday the delegation also held a conference with members of the Interstate Commerce Commission and asked for orders that cars be returned to the western roads and that they be allowed to retain 100 per cent of their ownership.

J. W. Shorthill, of Omaha, chairman of the delegation, said the shortage of cars was tying up the business of the country, creating increased business expenses and causing prices of commodities to go higher than was necessary.

G. F. Ewe, representing the Minneapolis Chamber of Commerce, said millions of bushels of wheat were tied up in the northwest because of the lack of cars and that unless this grain could be moved the banks could not finance the new crop of wheat. He said that every pressure had been brought to bear on the car service commission in the last 60 days, but without result. He declared it was impossible to convey the seriousness of the situation. He said the Interstate Commerce Commission would be asked to issue an order requiring box cars to be returned to owning lines.

If all of the appropriation were used for new cars, it would not buy more than 100,000 and the needs were four times as great as that.

R. E. Lawrence, secretary of the Farmers' Co-operative Grain Dealers' Association of Kansas, told of conditions in Kansas where he said that grain elevators could not get cars to move grain.

C. M. Reed, member of the Court of Industrial Relations of Kansas, said that because of lack of cars the excess of grain on hand as of April 17, over normal, was 28,524,000 bushels. There were 21,934,000 bushels of wheat on hand on farms and in country elevators of that date as against 5,000,000 bushels, the normal amount for that time of the year. He said because of the inability to move the grain crop many state banks had taken up farmers' notes far in excess of the amount permitted by the laws of the state, but that if such action had not been taken the state would have faced disaster. He said that in the last eight months no flour mill in the state had been able to operate full time, because they could not get cars. Mr. Reed said he did not agree that an order should be made requiring 100 per cent ownership on line, but that he favored pooling of cars as the method of meeting the present situation.

A. Sykes, of Ida Grove, Ia., speaking for live stock raisers, declared that unless provision were made for adequate transportation facilities for the shipment of live stock the farmers in the middle west would simply quit raising cattle and hogs; they would not stand the losses incurred by the lack of cars at the time when the livestock must be shipped. The producers of the middle west would gladly pay increased taxes necessary to provide adequate transportation facilities; they would rather do that than suffer the losses due to lack of cars. He pointed out that at present $100,000,000 worth of meat products on the farms in Iowa is delayed in moving to market because of the car shortage.

Commissioners Clark, Atchison, Hall and Daniels heard the farmers' appeal. Chairman Clark said it would give the commission genuine satisfaction if it could grant the relief sought and that the commission would do everything within its power to correct the situation. However, he added, the commission was not making any definite promises in the matter because it did not know what new conditions might develop.

A. G. Gutheim, member of the commission Car Service of the American Railroad Association, was present at the conference at the request of the commission. He said the process of getting cars back to the owning lines would take months and not weeks. The situation as to grain and livestock cars was disappointing and he sympathized with the grain and livestock interests. Every effort was being made to correct existing conditions. While there was a surplus of box cars in the east, it was equally true that there was a surplus of coal cars in the west, and the situation as to coal cars was just as serious as that with respect to grain and livestock cars.

Government Operation of Telegraph and Telephone Wires Cost $14,000,000

Operation of the telegraph and telephone companies during the war cost the government $14,005,565, Postmaster General Burleson informed Congress on May 4 in asking an appropriation of that amount to liquidate the affairs of the federal wire administration.

Mr. Burleson said that no loss would have been suffered had the government retained operation of the lines "a few months longer" or had rate increases not been temporarily halted by court injunction. "The deficit," wrote Mr. Burleson, "is the outcome of operations involving gross revenues of over $600,000,000, and therefore represents less than 2½ per cent of the total gross revenues."

The Air Brake Appliance Association Exhibit

The exhibits of the Air Brake Appliance Association during the Air Brake Association convention held at the Sherman Hotel, Chicago, this week, occupy the entire space available. The following is a list of the companies exhibiting, with the names of the representatives at the booths and the products on display:

American Brake Shoe & Foundry Co. Diamond S. brake shoes. Represented by L. R. Dewey, R. S. Stewart, J. W. Waters and C. F. Weil.

Ashton Valve Company, Boston, Mass.—Gages, gage testers and safety valves, portable boiler test pump, inspectors' testing and proving outfit. Represented by J. W. Motherwell and J. F. Gettrust.

Barco Manufacturing Company, Chicago, Ill.—Metallic engine-tender air, steam, oil and water connections, air reservoir and pump and distributing valve joint connections, metallic car steam heat connections, automatic smoke box blower fitting, loose bolt cross-head and shoes, terminal metallic steam heating and air testing sets. Represented by F. N. Bard and C. L. Mellor.

Boss Nut Co., Chicago. Exhibiting Lock nuts and bolts and rivets. Represented by J. A. MacLean, J. W. Fogg and A. W. MacLean.

Broschart Treadless Pipe Coupling Company, Trenton, Mo.—Emergency train-line repair coupling. Represented by J. L. Broschart.

Chicago Railway Equipment Company, Chicago, Ill.—Brake beam supports, and moving picture of brake beams, their manufacture and use. Represented by E. G. Busse and E. A. LeBeau.

Crane Co., Chicago.—Railroad unions and union fittings for air brake equipment. Represented by F. W. Venton and Chas. Ammison.

Detroit Lubricator Company, Detroit, Mich.—Lubricators and flange oiler. Represented by A. G. Machesney.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Graphite and graphite products for railroad service. Represented by L. H. Snyder, Wm. Ernst and J. E. Simpson.

Edna Brass Manufacturing Company, Cincinnati, Ohio.—Lubricators, injectors and boiler checks, including U. S. R. A. standard locomotive appliances. Represented by E. O. Corey and H. A. Glenn.

J. B. Ford Co., Wyandotte, Mich.—Metal cleaner for removing oils and greases. Represented by H. J. Wilwerth, George Lawrence and A. O. Gilbertson.

Garlock Packing Company, Palmyra, N. Y.—Air brake gaskets, air pump throttle, cab cock and reverse gear packing and spiral packing. Represented by W. G. Cook.

Gustin-Bacon Mfg. Co., Kansas City, Mo.—Brake cylinder lubricant and air pump strainer. Represented by John W. Foyle, Fred C. Fuller, E. A. Emery, Fred Speer and James S. Hearons.

Johns-Manville Company, H. W., New York.—Air pump, throttle and brake cylinder packing and packing cups and expander rings. Represented by J. E. Meek, C. E. Murphy, Fred Horne, G. Christenson, L. S. Wilbur, J. C. Younglove, P. C. Jacobs, P. R. Austin and Walter Stewart.

Leslie Company, The, Lyndhurst, N. J.—Steam heat regulators and removable injector coupling nuts. Represented by S. I. Leslie and J. J. Cizek.

Manning, Maxwell & Moore, Inc., New York City.—Ashcroft gages, Consolidated safety valves, Hancock inspirator equipment. Represented by C. L. Brown and James Briscoe.

Nathan Manufacturing Company, New York.—Injectors, lubricators, boiler check, gage cocks, non-lifting coal sprinkler. Represented by W. E. Brumble, Richard Welch, W. R. Walsh and F. C. Davern.

New York Air Brake Co., New York City.—Represented by C. P. Lovell, L. W. Sawyer, Jas. A. Hicks, Geo. Kleifges, Wm. Owens and N. A. Campbell.

New York & New Jersey Lubricant Company, New York.—Non-fluid-oil brake cylinder lubricant and N. F. O. triple valve lubricant. Represented by J. H. Bennis and F. J. Barnes.

Ohio Injector Company, Chicago, Ill.—Injectors, non-lifting injectors, lubricators, flange oilers, automatic drifting valves, waterglass protectors, boiler checks and feed hose strainers. Represented by A. C. Beckwith and W. S. Furry.

Pyle-National Co., Chicago.—K-2 turbo generator, combined white and red electric back up lamp, white back up lamp and 18-in. standard incandescent headlight. Represented by Wm. Miller, Crawford McGinnis and J. Will Johnson.

Railway Devices Co., St. Louis, Mo.—Spiral pipe clamps and angle cock holder. Represented by Roland M. Hoerr.

Railway Review, Chicago.—Represented by L. H. Lozier and J. M. Lammedee.

Sargent Co., Chicago.—Exhibiting Gage cocks, water glass protectors, Sargent safety water gages, Reflex water gages and blower valves. Represented by Geo. S. Garren.

Simmons-Boardman Publishing Company, New York—*Railway Age* and Railway Mechanical Engineer. Represented by C. B. Peck and J. M. Rutherford.

Sunbeam Electric Mfg. Co., Evansville, Ind.—Turbo generator, headlight and accessories. Represented by C. E. Kinnaw and H. A. Varney.

U. S. Metallic Packing Company, Philadelphia, Pa.—King type air pump packing. Represented by M. B. Brewster, H. E. Hyslop and L. B. Miller.

Guilford S. Wood, Chicago.—Hose protectors. Represented by Robert I. Lillie.

Anchor Packing Company, Chicago.—Packing. Represented by John P. Landreth.

Duff Manufacturing Company.—Jacks. Represented by C. N. Thulin.

Galena Signal Oil Company, Franklin, Pa.—Represented by Geo. W. Buckpitt.

Gould Coupler Company, New York City.—Gould universal automatic brake slack adjuster. Represented by William H. Sauvage.

New York Belting & Packing Company, New York.—Represented by L. F. Purtill.

Wm. Sellers & Co., Philadelphia, Pa.—Represented by J. R. New.

United States Rubber Company, New York.—Mechanical Goods Division. Air brake hose, pneumatic tool hose, gaskets and packings. Represented by C. S. Prosser.

Westinghouse Air Brake Company, Pittsburgh, Pa.—Universal valve, sectional 116 brake valve with collapsible equalizing piston, angle cock with side vent, No. 4 brake pipe vent valve and auxiliary devices governor. Represented by J. B. Wright, F. H. Parke, A. L. Berghane, E. H. Dewson, H. H. Burns, F. B. Johnson, J. S. Y. Fralich, E. Weaver, A. G. Houston, R. E. Miller, L. M. Carlton, L. Wilcox, F. W. Nagle, T. L. Burton, A. B. Brown, C. C. Farmer, F. B. Farmer, H. A. Wahlert, C. D. Foltz, O. W. Dudley, T. H. Thomas, H. Orchard, T. W. Newburn, John Henry, J. C. McClune, J. W. Read, M. O. Davis, John Hume and Charles McVinstoy.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, Room 3014, 163 Broadway, New York City. Next convention, May 4-7, Hotel Sherman, Chicago.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—S. W. Derr, C. R. R. of N. J., Philadelphia, Pa.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, Illinois Central, Chicago. Next annual meeting, June 15, 1920, Minneapolis, Minn.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, C. & E. I. R. R., 332 South Michigan Ave., Chicago.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothschild, Union Station, St. Louis, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 8 W. 40th St., New York.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOCIATION.—C. F. J. Dell, 50 E. 42nd St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—Otto E. Schlinck, 185 W. 5th St., Peru, Ind.

AMERICAN RAILROAD ASSOCIATION.—J. E. Fairbanks, 75 Chuch St., New York:

Section I, Operating (including former activities of Association of Railway Telegraph Superintendents).—W. J. Fripp (chairman), N. Y. C. R. R., New York, N. Y.

Telegraph and Telephone Division.—J. F. Caskey (chairman), Supt. of Telegraph, Lehigh Valley.

Section II, Engineering.—E. H. Fritch, 431 South Dearborn St., Chicago.

Signal Division.—H. S. Balliet, 75 Church St., New York.

Section III, Mechanical (including former activities of Master Car Builders' and Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago. Next convention, June 9-16, 1920, Atlantic City, N. J.

Section IV, Traffic.—Robert C. Wright (chairman), Assistant Director, Division of Traffic, U. S. R. A., Washington, D. C.

Section V, Transportation (including former activities of Association of Transportation and Car Accounting Officials.—E. J. Pearson (chairman), Federal Manager, N. Y., N. H. & H. R. R., New Haven, Conn.

Section VI, Purchases and Stores (including former activities of Railway Storekeepers' Association).—J. P. Murphy, N. Y. C. R. R., Collinwood, Ohio. First annual meeting, June 14-16, 1920, Atlantic City, N. J.

Section VII, Freight Claims (including former activities of the Freight Claim Association).—Lewis Pilcher, 431 South Dearborn St., Chicago.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention, October 26-28, 1920, Atlanta, Ga.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railroad Association, Section II.) E. H. Fritch, 431 South Dearborn St., Chicago.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railroad Association, Section III, Mechanical.)

AMERICAN RAILWAY PERISHABLE FREIGHT ASSOCIATION.—E. F. McPike, 135 E. 11th Place, Chicago. Regular meetings, 2nd Wednesday in March and September.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—R. D. Fletcher, 1145 East Marquette Road, Chicago.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Bldg., Washington, D. C.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 21, 1920, New Monterey Hotel, Asbury Park, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Col H. S. Cracker (acting secretary), Engineering Societies Building, 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York.

AMERICAN STEEL TREATERS' SOCIETY.—W. H. Eisenman, 154 East Erie St., Chicago.

AMERICAN TRAIN DESPATCHERS' ASSOCIATION.—D. L. Darling, Northern Pacific Ry., Spokane, Wash.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next annual meeting, January 25-27, 1921, San Francisco.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J. Next meeting, May, 1920, Atlantic City.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Semi-annual meeting, June 14, Hotel Dennis, Atlantic City.

ASSOCIATION OF RAILWAY EXECUTIVES.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railroad Association, Section I, Operating.)

Association of Transportation and Car Accounting Officers.—(See American Railroad Association, Section V, Transportation.)

Bridge and Building Supply Men's Association.—C. R. McVay, Barrett Company, Chicago.

Canadian Railway Club.—W. A. Booth, 131 Charron St., Montreal, Que.

Car Foremen's Association of Chicago.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

Car Foremen's Association of St. Louis.—Thomas B. Kocueke, Federal Reserve Bank Bldg., St. Louis, Mo. Meetings first Tuesday in month at the American Hotel Annex, St. Louis.

Central Railway Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 3d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

Chief Interchange Car Inspectors' and Car Foremen's Association.—J. C. Keene, General Car Inspector, Wabash R. R., Decatur, Ill.

Chief Interchange Car Inspectors' and Car Foremen's Supply Men's Association.—D. B. Wright, Lehon Company, 15th and Oakley Sts., Chicago.

Cincinnati Railway Club.—H. Boutet, 101 Carew Bldg., Cincinnati, Ohio.

Eastern Railroad Association.—D. G. Stuart, Washington, D. C.

Freight Claim Association.—(See American Railroad Association, Section VIII, Freight Claims.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, B. & O., Lima, Ohio.

International Railway Fuel Association.—J. G. Crawford, 702 E. 51st St., Chicago. Next annual meeting, May 24-27, 1920, Hotel Sherman, Chicago.

International Railway General Foremen's Association.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn. Next convention, September 7-10, Hotel Sherman, Chicago.

Maintenance of Way Master Painters' Association.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention, October 5-7, 1920, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 25-28, Curtis Hotel, Minneapolis, Minn.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass.

Master Car Builders' Association.—(See American Railroad Association, Section III, Mechanical.)

National Association of Railroad Tie Producers.—J. J. Schafly, Potosi Tie & Lumber Company, St. Louis, Mo.

National Association of Railway and Utilities Commissioners.—James B. Walker, 49 Lafayette St., New York. Next convention, November 9, 1920, Washington, D. C.

National Foreign Trade Council.—O. K. Davis, 1 Hanover Square, New York. Next convention, May 12-15, 1920, San Francisco.

National Railway Appliances Association.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Pacific Railway Club.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting 2d Thursday in month, alternately in San Francisco and Oakland.

Railway Accounting Officers' Association.—E. R. Woodson, 1116 Woodward Bldg., Washington, D. C. Next convention, May 12, 1920, Hotel Traymore, Atlantic City, N. J.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York.

Railway Club of Pittsburgh.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Americus Club House, Pittsburgh, Pa.

Railway Development Association.—D. C. Welty, Missouri Pacific R. R., Little Rock, Ark.

Railway Electric Supply Manufacturers' Association.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers

Railway Equipment Manufacturers' Association.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va.

Railway Fire Protection Association.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

Railway Real Estate Association.—R. H. Morrison, C. & O., Richmond, Va.

Railway Signal Association.—(See American Railroad Association, Section II, Signal Division.)

Railway Storekeepers' Association.—(See American Railroad Association, Section VI, Purchases and Stores.)

Railway Supply Manufacturers' Association.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Next convention, June 9-16, Atlantic City, N. J.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

Roadmasters' and Maintenance of Way Association.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

Signal Appliance Association.—F. W. Edmunds, West Nyack, Rockland County, New York.

Society of Railway Financial Officers.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

Southern and Southwestern Railway Club.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

Southern Association of Car Service Officers.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

Supply Association of American Railway Tool Foremen's Association.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. R. R., Cleveland, O. Next convention, September 14-17, Hotel Sherman, Chicago.

Western Association of Short Line Railroads.—Clarence M. Oddie, Mills Bldg., San Francisco.

Western Railway Club.—J. M. Byrne, 916 W. 78th St., Chicago. Regular meetings, 3d Monday in month, except June, July and August.

Traffic News

An advance of 20 per cent has been made in sleeping car and parlor car rates on the railroads of Canada.

The Board of Trade of Newark, N. J., has established a traffic bureau, the manager of which is C. J. Fagg.

The Missouri Public Service Commission has ordered a 120-day suspension of the intra-state rate increase for sleeping and parlor car accommodations asked by the Pullman Company. The proposed increases are about 20 per cent.

The New York, Philadelphia & Norfolk has notified shippers of fruit and vegetables at Norfolk that it will take fifty cars of their produce north daily. Congestion and delay have been serious at Norfolk partly on account of the railroad strike and partly because of the discontinuance of the Old Dominion Line steamers.

The Commission on Car Service, in a circular addressed to the railroads, shows that during the first 15 days of April there was a slight gain all along the line in the relocation of cars to the home roads. For the 15-day period it totalled 8 per cent, or approximately 20,000 cars. Considering the retarded circulation due to the switchmen's strike, this improvement is considered gratifying. Some roads showed a gain of from 5 to 10 per cent in coal cars. Box cars do not as yet show the same tendency to get to the home line.

The New York State Barge Canal will be opened for business between Buffalo and Troy on May 10. The eastern end of the canal was opened on May 1, and sections as far west as Lyons on May 5. The Merchants' Association of New York City has issued a circular, for the information of merchants and manufacturers, setting forth the advantages of shipping freight westward by the canal. The canal boats will take freight to Buffalo at 50 cents per 100 lb. (first class), as compared with 61.5 cents by rail all the way; and at similar discounts for the other classes. Fifth class is 20.5 cents, compared with 25 cents by rail; by canal and lake to Cleveland the first class is 65 cents, as compared with 80 cents by rail; to Duluth by canal, lake and rail, 70 cents, and by rail all the way, 92.5 cents (first class). The Inland Marine Corporation, a consolidation of several companies, will operate this year on the canal 11 modern cargo steamers and 55 barges; and has under construction a large number of boats. The United States government (War Department) proposes to operate 51 steel barges, 20 concrete and three wooden barges, and 20 new self-propelling steel barges of 350 tons' capacity.

Increased Pullman Rates Allowed

The Interstate Commerce Commission, having given consideration to protests against tariffs filed by the Pullman Company to become effective May 1, 1920, proposing a 20 per cent increase in fares and charges for accommodations in Pullman cars, announced on April 30 that it had voted not to suspend the operation of the tariffs. The commission by this action does not approve any of the rates.

Freight Traffic Movement and Car Performance

The net ton-miles of revenue and non-revenue freight handled by the railroads in February amounted to 32,699,143,000, according to the monthly report compiled by the Railroad Administration. This is an increase of 27 per cent as compared with February, 1919. Train miles increased 19.7 per cent and car miles 17.3 per cent. The miles per car per day averaged 22.3 as compared with 20.2 and the net ton miles per car day averaged 453 as compared with 378, an increase of 19.8 per cent. The percentage of unserviceable freight cars was 6.5 as compared with 5.4.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has announced a hearing at Washington on May 26 before Examiner Gerry on the question of 25-trip family commutation ticket fares.

The commission has issued a reduced rate order authorizing carriers to file freight tariffs providing for changes in present rule 25, rule 26 and rule 28 rates, so as to restore their normal relationship with the respective basic rates, i. e., the existing second, third and fourth class rates, insofar as said changes result in reductions.

In an application filed in the office of the Interstate Commerce Commission on March 22, 1920, as supplemented April 24, the American Railway Express Company requests the commission to issue an order approving and authorizing the consolidation of the express transportation business and the property devoted to that business of the Adams, American, Wells Fargo, and Southern express companies, and the consolidation of the said companies so far as the business and property are concerned, into the American Railway Express Company, a Delaware corporation, as provided in the Transportation Act. The commission has ordered an investigation which will be assigned for hearing at places and dates hereafter to be specified.

The commission, in a decision in the cases of Armour Grain Company v. Director General, Illinois Central Railroad Company, et al, and Minneapolis Traffic Association et al, v. Director General, Ann Arbor Railroad Company, et al., has dismissed complaints that due to congestion of grain elevators consequent upon complainants' inability to obtain, during a period of car shortage, cars sufficient in number for outbound loading, demurrage accrued upon grain, in carloads, shipped into transit points on local billing and there held in cars for unloading into the elevators, and that, in such circumstances, the rules governing the assessment of demurrage were and are unreasonable and unduly prejudicial. The commission held that such rules were not shown to have been or to be unreasonable or unduly prejudicial.

Express Classification

The American Railway Express Company having filed a petition in the matter of proposed changes in official express classification, alleging that various changes in the classification are required to properly meet present conditions and requesting a hearing, the commission has announced that hearings will be held before Examiner F. H. Barclay as follows: May 17, New York, N. Y.; May 24, Chicago, Ill.; June 1, Spokane, Wash.; June 7, San Francisco, Cal.; June 14, Houston, Tex.; June 21, Atlanta, Ga.; June 28, Washington, D. C.

Restoration of Alleged Obsolete Rates and Charges

The Interstate Commerce Commission has authorized all carriers to re-establish rates and charges canceled subsequent to June 24 1918, solely upon the ground that such rates and charges are obsolete, where it is found that traffic is offered in such volume as to warrant said re-establishment, such rates being in most cases identified by the following notation or one of similar tenor: "These rates (subject to any general advance or reduction made in the meantime) to be restored by publication should any movement thereafter develop within one year of date of cancellation." Such reduced rates or charges must in no instance be higher or lower than the rates or charges in force on the date of such cancellation; and the changes being approved without formal hearing, such approval shall not affect any subsequent proceeding relative thereto. As to intrastate rates and charges, this order shall not be deemed to exempt said carriers from the requirements of any state law, rule or regulation.

State Commissions

Charles V. Halley, Jr., has been appointed Deputy Public Service Commissioner for the State of New York, First District, succeeding E. J. Glennon, office 49 Lafayette street, New York City. From 1907 to 1914 Mr. Halley was secretary to Commissioner Eustis.

Personnel of Commissions

F. G. Robins has been appointed director of the new Bureau of Service of the Interstate Commerce Commission, as noted in the article entitled "I. C. C. Creates Bureau of Service," on another page of this issue. Mr. Robins was born at La Crosse, Wis., on February 15, 1876. He attended the public schools at Minneapolis, Minn., and the Shattuck School, Fairbault, Minn. He began railroad work in 1888 with the Minneapolis, St. Paul & Sault Ste. Marie, working during summer vacations as messenger and later as operator and rodman with a surveying party. After leaving school in 1896 he became connected with Kenneth, Hopkins & Co. on the Chicago Board of Trade, and in 1906 he entered the service of the Chicago, Burlington & Quincy as special car agent. He was later traveling yardmaster, assistant trainmaster, trainmaster, assistant superintendent and superintendent of the same road, and in 1913 he became superintendent of the Elmira Corning & Waverly. In 1914 he went to the Erie and in 1916 he was appointed general superintendent. In 1917 he entered the United States army as major, and he was promoted to lieutenant-colonel as assistant general manager of the Transportation Corps. In 1919 he returned to the erie as general superintendent at Chicago, and from December, 1919, to the date of his appointment with the commission he was manager of Imbrie & Co.

F. G. Robbins

Court News

Gasoline Billed as Unrefined Naphtha

The Gulf Refining Company, tried in the United States District Court at Tulsa, Okla., was convicted by a jury on April 23 of violation of the Interstate Commerce law, the offense being the transportation of casinghead gasoline from Kiefer, Okla., to Port Arthur, Tex., billed as unrefined naphtha. Due to its extremely volatile character casinghead gasoline must be handled with great care involving high freight charges, while unrefined naphtha is shipped at approximately 50 per cent of the gasoline rate, the difference in freight charges being from $70 to $100 for each car. The Gulf Refining Company complied with the shipping requirements in force, insofar as placing placards on the cars was concerned, but used the term unrefined naphtha for the purpose of taking advantage of a commodity rate on this material. Testimony showed that the company had been in the habit of billing in this manner for the past three years. Judge Williams deferred further action in the case to a later term of the court with the notation that no judgment would be pronounced upon the finding of the jury until that time.

Stepping Off Moving Train

In view of section 55 of the New Jersey General Railroad Law, declaring that "if any person shall be injured . . . by jumping on or off a car while in motion, such person shall be deemed to have contributed to the injury sustained, and shall not recover therefor," the New Jersey Supreme

Court holds that the boarding or alighting from a moving railroad train is presumably and generally a negligent act *per se*, and in order to rebut this presumption it must appear that the passenger was, by the act of the defendant, put to an election between alternative dangers, or that some situation was created which interfered with his free agency, and was calculated to create a confidence that the attempt could be made in safety. A passenger who, as the train slackened speed and the trainman called out "Park Place, last stop, Newark," arose, walked to the front of the car, following a passenger ahead of her, and, finding the door open, stepped off the moving train in the belief that it had stopped, could not recover for injuries sustained, since no act or direction of those in charge of the train interfered with her free agency or in any manner diverted her attention.—Zelman vs. Pennsylvania (N. J.) 107 Atl 442.

Railroad Not Liable for State Tax on Receipts From Distinct Ferry System

The California Supreme Court holds that article 13, § 14, subdivision *a* of the State Constitution, providing that all railroad companies shall annually pay a tax on their franchises, roadways, rolling stock, "and other property, or any part thereof, used exclusively in the operation of their business in the state," refers by the phrases "all railroad companies" and "other property or any part thereof," etc., only to the kinds of business which are declared to be so taxable in the opening paragraph of section 14, and includes only property used exclusively in the operation of such business. The court holds that the gross receipts of a railroad company from the operation of a ferry, entirely separate and distinct from its railroad business and unconnected therewith, were not taxable by the state board of equalization (at 5¼ per cent) under section 14. The ferry in question was the Southern Pacific's system of ferryboats between San Francisco and Oakland, known as the "Creek Route," which do not connect with any of the railroad's lines, nor with any other line.—Southern Pacific v. Richardson (Cal.) 184 Pac. 3.

Railroad Not Liable for Remote Damages

The North Carolina Supreme Court holds that a woman who purchased a ticket and boarded a train which would not stop at her destination, so that she was compelled to get off at an intermediate station, where she might have changed trains and been carried to destination, assuming that she had a cause of action for the railroad's failure to transport her, could not recover for injuries she received by reason of going to her destination on a street car from the intermediate point. Such damages are too remote. The court said: "The plaintiff reached Greensboro (the intermediate point) about 12 o'clock and left the train at the station, where there was a waiting room. A local train of the defendant left this point at 2 o'clock, and if she had taken it she would have reached Terra Cotta (her destination) about 2.11 o'clock; but instead of waiting, and without making inquiry of anyone, she took a street car for Pomona, one-fourth mile from Terra Cotta, which she reached about 2.30 o'clock, and it is for injuries on the street car and while walking from Pomona that she seeks a recovery. They are too remote, and could not have been foreseen or anticipated."—Blaylock v. Southern (N. Car.) 100 S. E. 599.

Employers' Liability Act Decisions

A trackman of an interstate railroad, injured returning from his work by attempting to board a moving freight train, pursuant to orders of the foreman, is engaged in interstate commerce within the act.—Schantz v. Northern Pacific (N. Dak.) 173 N. W. 556.

The New York Appellate Division holds that a man employed to pump water into a tank for supplying engines for interstate trains, who was injured while oiling the pump machinery after having started the pump, was within the federal act.—Kelly v. Erie, 188 App. Div. 863, 177 N. Y. Supp. 278.

The Illinois Supreme Court holds that a flagman employed by the defendant railroad at a street crossing where all its tracks and those of another company, which reimbursed the defendant for one-third of the cost of maintaining the flagman, were used indiscriminately for interstate and intrastate commerce, and killed by an interstate train of the other company in the course of his employment, was within the federal act.—Chicago & Alton v. Industrial Commission (Ill.), 124 N. E. 344.

A railroad engaged in interstate commerce maintains at one of its division points a roundhouse and turntable for engines used in such commerce. The Oklahoma Supreme Court holds that the roundhouse, tracks and turntable are instrumentalities used in interstate commerce, and that an employee whose duties were to wash the engine boilers, was, while in discharge of his duties and in going to and from his work when ordered by the roundhouse foreman, engaged in interstate commerce within the act.—Lusk v. Bandy (Okla.), 184 Pac. 144.

A non-suit was held properly entered by the Pennsylvania Supreme Court in an action under the federal employers' Liability Act for the death of an employee struck by a train when it was shown that the tunnel in which he was working when killed was not used at all by the railroad in interstate commerce.—Tilli v. Philadelphia & Reading (Pa.) 107 Atl. 330.

The New Jersey Court of Errors and Appeals holds that the state court has no jurisdiction of a workmen's compensation case arising from the death of a railroad's employee killed by its train containing cars engaged in interstate commerce, the employee at the time having been himself so engaged, the federal statute applying and being exclusive. The holding in the case of Winfield v. Erie, 88 N. J. Law 619, 96 Atl. 394, that the state act would apply unless the employer pleaded and proved that the accident in question was due to the negligence of himself or his servants was overruled by the Supreme Court of the United States in Erie v Winfield, 244 U. S. 170, which decision is controlling.—Talmadge v. New York, Susquehanna & Western (N. J.) 107 Atl. 411.

United States Supreme Court

Reading Case Combination Dissolved

The decision of the Supreme Court of the United States in the government's case against the Reading and other companies, noticed last week, page 1298, reverses in part the judgment of the Circuit Court of Appeals (226 Fed. 229). For violation of the first and second sections of the Anti-trust Act. The relations between the several companies must be so dissolved as to give to each of them a position in all respects independent and free from stock or other control of either of the other corporations. In requiring the Central of New Jersey to divest itself of the Wilkes-Barre Coal Company, the Court cites five decisions: United States v. Lehigh Valley 220 U. S., 257, 272, 273; United States v. D., L. & W., 238 U. S., 516, 529, and Chicago, M. & St. P. v. Minneapolis Civic & Commerce Association, 247 U. S., 490, 501.

Mr. Chief Justice White, Mr. Justice Holmes and Mr. Justice Van Devanter dissent, basing their opinions on the decision of the Court below (226 Fed. 229), that opinion handed down in 1915, was by three circuit judges and covers 40 printed pages. The court found that while there had been, since their reorganization in 1896, a common ownership of the two companies and to some extent common directorates, their operating departments and officers had been entirely separate, and the business between them had been conducted at arms' length. The railroad company charged the coal company customary rates for the carriage of its coal, without discrimination, and purchased and paid for all coal for its own use. It was held that the railroad company did not mine or produce the coal transported for the coal company, nor did it own or have any interest, direct or indirect, in such coal, which rendered its transportation thereof unlawful under the Commodities Clause of the Interstate Commerce Act.

It was also there held that a combination of a coal-mining company and a railroad company, by whose line the coal of the mining company can be transported from the mines, through the medium of a holding company which owns the stock of both other companies, is not necessarily unlawful as in violation of the Sherman Anti-trust Act unless unlawful methods or practices are resorted to which tend to create a monopoly or restrain competition. U. S. v. Reading Co., 226 Fed. 229 (1915).

Foreign Railway News

The Times Trade Supplement says that railway and tramway plant to the value of £269,350 was imported by New Zealand in the year 1919, as against £52,214 in 1918.

An article in the North Eastern Railway Magazine (London), states that the German standard freight cars have capacities of 12½ tons, 15 tons and 20 tons, there being only a few 10-ton cars.

Engineering (London) reports that the government of the Serbs, Croats and Slovenes contemplates doubling the railway line from the Italian frontier to the Bulgarian border as an undertaking of imperative necessity.

The Tasmanian government has ordered ten passenger and freight locomotives from a South Australian firm. The rate of exchange prevented the placing of the order in the United States, and the time of delivery quoted by British firms was unsatisfactory.

The Ministry of Transport has recommended to the British government that the State buy up the smaller railways in the United Kingdom and lease them to the large companies. It is declared that large economies could be effected. The number of British railway companies is 135 and of these over 100 are classed as small.

The British Ministry of Transport reports railway receipts for England during the month of January as £16,115,554; and total expenditure, £16,447,693. Passenger traffic increased from £5,719,383 in January, 1919, to £6,772,858 in January, 1920, and freight receipts from £5,973,876 to £9,167,812; but government traffic fell from an estimate of £2,700,267 to £993,458.

Equipment of Paulista Railway

Since the announcement of the Paulista Railway electrification in Brazil was made in the *Railway Age* of April 23, it has been learned that the Westinghouse Electric International Company has obtained contracts for a portion of the equipment; two locomotives for passenger service and two for freight; gage, 5 ft. 3 in. The passenger locomotives have a one-hour rating of 2,000 h.p. and weigh 121 tons each. They will be operated from a 3,000 volt, d.c., overhead trolley system, and will be complete with regenerative control. They are designed for a maximum speed of 65 miles an hour. The freight locomotives have a one-hour rating of 1,500 h.p. and will weigh 87 tons each: maximum speed, 40 miles an hour.

May-Day Strike in France.

There was a general strike of railroad men, coal miners and dock workers in France on May 1, as had been threatened, but by Tuesday, the 4th, the movement, so far as train operations were concerned, was declared a failure. Not over 30 per cent of the trainmen left their work, and within two days considerable numbers came back. On Tuesday the railroad employees were notified that they must return to duty by Thursday or consider themselves irrevocably discharged. At the ports, dock laborers and seamen struck in considerable numbers and some of the ports were almost tied up, but others were but little affected. A Paris report of Tuesday was to the effect that no through passenger trains had been taken off and that suburban service was tolerable. There had, up to that day, been no serious shortage of food and the stocks of coal were said to be sufficient for two weeks, or longer.

Electrification on the Upper Rhine Railways of France

LONDON.

An article in the Times' Engineering Supplement states that the electrification of the Haut-Phin railways around Belfort, France, has been completed. The length of road is approximately 44 miles. The gage is one meter and the gradients are fairly good. On the other hand there are numerous curves of small radius, many of 100 ft. and some even of 130 ft. The single phase system at 6,000 volts, and 25 cycles, has been adopted. The power is obtained from the steam generating station of the Societe des Houilleres de Ronchamp. This station is situated about 12½ miles from Belfort, and has one turbo-generator of 5,000 hp. and three of 2,500 hp. each. The motor cars of the trains have two motor trucks, each carrying two 4-pole motors of 35 hp. each. The multiple unit system of control is used.

Plans for Nationalization of Greek Railways

LONDON.

Mr. Repulis, vice-president of the Greek cabinet, recently presented a bill to the Parliament regarding the nationalization of the railways, in order to complete the bill already passed in 1917. All railway lines in Greece become the property of the government according to the new bill, or the government operates a line for the account of a company. In introducing the bill, Mr. Repulis said that as soon as the government takes possession of the railways a great improvement will take place, and the first thing to be done will be to complete and improve the permanent way and rolling stock, which could not be done by the existing companies, as they had not sufficient funds with which to do it. Then will come an improvement as regards the salaries of the railway staff and the modification of certain tariffs. The new bill contains a proivsion that the staff will participate in the net profits of the railways, under certain conditions, while provision is also made for pensions for retiring employees. The length of the railway lines which will thus become state-owned is approximately 2,000 miles.

England's Railway Exports

LONDON.

The British Board of Trade reports the value of exports of railway material for the first two months of the present year, as against the figures for January and February, 1919, as follows (£1 = $4.86):

	Jan. and Feb., 1919	Jan. and Feb., 1920
Locomotives	$584,673	$2,322,686
Rails	314,709	958,300
Passenger cars	153,255	1,043,452
Freight cars	409,690	4,136,900
Wheels and axles	187,232	1,405,702
Tires and axles	599,048	997,520
Chairs and metal settees	51,001	284,536
Miscellaneous track material	834,749	5,179,273

The tonnage of rails was 11,792 for January and February 1920 as against 3,620 for the same period of the year 1919, and of chairs and metal sleepers 2,646 for the first two months of 1920, as against 600 for the corresponding period of the year 1919. During the month of February, locomotives to the value of $248,988 went to India and $153,090 to the Straits Settlements. Rails to the value of $74,805 went to India.

Great Northern Prepares to Handle Continental Traffic

LONDON.

Although sanction to construct the Channel Tunnel has not yet been given by the Parliament of Great Britain, the Great Northern Railway has set about the task of moving back its station platforms to provide for the handling of Continental trains. The clearance limitations in England generally are such that when the Channel Tunnel is built the Continental trains will be limited to a very few roads unless such changes as the Great Northern had in hand are made. While the track gage of both the English and French railways is the same, the English roads have smaller clearance limitations both in width and height than do the French roads.

In England all the stations have raised platforms enabling the passengers to step directly into the trains, whereas in France it is necessary, except in some of the large stations, to mount several steps before entering the cars.

The English roads have made special efforts to eliminate level crossings and have more overhead bridges in proportion to length of line than any other country in the world.

It is not only necessary for the English roads to increase

their loading gage for Continental traffic, but also for the purpose of using larger locomotives. The present clearance limitations are now so small that it will require a large amount of rebuilding of bridges or the lowering of track to meet the required conditions, and this would be a very expensive undertaking.

Railway Mileage Lost to Germany

From a map which was published last year by the German government it appears that the railroads lost by Germany, under the terms of the Peace Treaty, aggregated about one-sixth of the total mileage of the empire. In the black portion of the map are shown railroads immediately surrendered on the conclusion of peace, while the shaded portion shows those in the Plebiscite territory. Taken together there is a total loss of 6,550 miles, or 16.8 per cent of 38,800, the total mileage. In the territory immediately surrendered at the conclusion of peace, there is a total railway mileage of 1,505 miles, and in the Plebiscite territory 5,045 miles. This is distributed among the different countries, as follows:

	Immediate loss	Plebiscite territory
Belgium	90 miles	.....
France	270 miles	1,190 miles
Denmark	315 miles	.....
Poland	830 miles	.....
Province of Memel	.....	85 miles
Province of Danzig	.....	100 miles
Poland and Czecho-Slovakia	.....	3,670 miles
Total	1,505 miles	5,045 miles

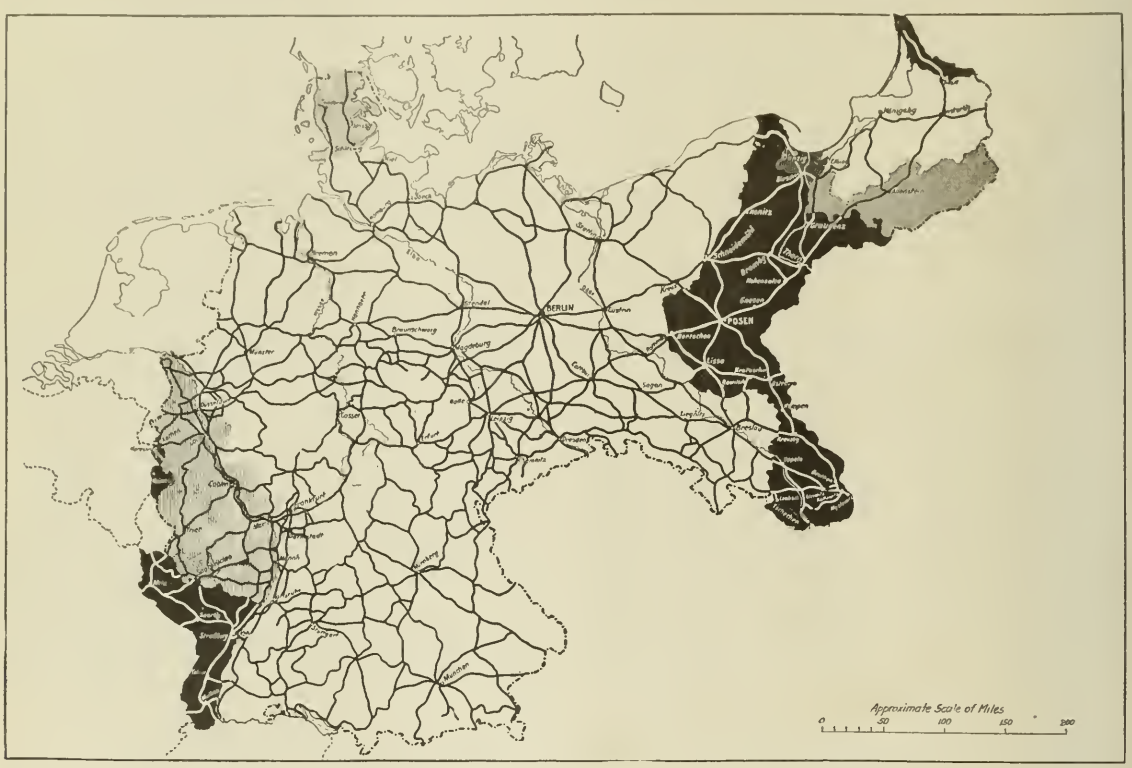
There are included in the lost territory 12 principal repair shops and three small repair shops, which leaves the railways of Germany with 67 main repair shops and 10 smaller shops.

Some English Operating Statistics

The British Ministry of Transport, now in charge of the operation of all the railroads of Great Britain, has adopted a scheme for the compilation and publication of operating statistics like those with which we are familiar in America; and, freed from the stress of wartime burdens, announces that some of the data gathered will shortly be published. A few figures have already been given out, and for the first time there is now a basis, other than rule-of-thumb estimates, for comparing the service for different periods and as between different roads. The statement issued gives average freight train loads for four weeks ending February 1, 1920, as follows:

	Average load	Average length of haul
Great Central	174.15 tons	35.94 miles
Great Northern	156.36 tons	45.89 miles
Midland Railway	145.11 tons	54.11 miles
Taff Vale	144.49 tons	12.89 miles
Great Western	143.43 tons	48.76 miles
London & North Western	140.35 tons	43.55 miles
Lancashire & Yorkshire	139.01 tons	25.36 miles
North Eastern	154.81 tons	32.25 miles
North Staffordshire	90.70 tons	16.39 miles

The average freight carload for all railways of Great Britain of standard gage is approximately 5.42 tons, or a little over 50 per cent of the actual average capacity of the wagons (cars) in use. The longest average passenger journey is reported by the London & Southwestern, 11.26 miles, the average for all railways being 10 miles. The gross freight train receipts per ton-mile, after deduction of costs of collection and delivery, work out at 1.155 pence (2.31 cents).



Railroads of Germany—Black and Shaded Areas Show Lines Ceded by the Peace Treaty

Progress in Electrification of Swiss Railways

The electrification of the important Swiss Federal Railway running south from Lucerne to the Italian border at Chiasso, thence into Italy to Milan (the Gotthard line), is progressing rapidly. It is now announced that the stretch of 15.5 miles through the Gotthard tunnel from Göschenen to Airolo will be operated electrically beginning in May next, followed by the stretch north of the tunnel from Erstfeld to Göschenen, 28.6 miles, in June; the line south of the tunnel from Airolo to Biasca, 45.3 miles, in September; and probably at a later date this year the stretch of 11.8 miles from Biasca to Bellinzona will be finished. The first trials with electrical equipment have been carried out through the Gotthard tunnel, and are stated to have proved very successful.

As rapidly as conditions will permit, the Federal authorities now plan to electrify practically all of the Government-

owned main line roads in the Confederation. It is planned to spread the work over a period of about 20 years. Within the next 10 years it is proposed to transform the line from Zurich, via Olten, Bern, Fribourg, and Lausanne, to Geneva. The part from Zurich to Bern, according to the present plan, will be started in 1922 and completed in 1924, and, in the following two years, it is thought that the section from Bern to Lausanne can be completed.

The electric locomotives for the Erstfeld-Bellinzona line are being built by the Swiss firm of Brown Boveri & Co. (Ltd.), at Baden. The motor is constructed for the use of single-phase alternating current of 15,000 volts, with a frequency of 16 2/3, and will develop 540 horsepower. Each locomotive will carry four such motors, enabling it to develop a maximum speed of 46.5 miles per hour. The width of the gage is 4 ft. 8½ in.; the diameter of the drive wheels, 53 in., and the diameter of the running wheels 37½ in. The total weight of the electric equipment and parts of each locomotive is 94.6 metric tons, and that of the purely mechanical parts, 58 metric tons. The latter equipment is being made by the Swiss Locomotive & Engine Works, at Waterthur.

Increased Cost of Operation on Spanish Railways

The Revue Generale des Chemins de Fer published in a recent issue an abstract from the Los Transportes Ferreos which discussed briefly the 1918 financial condition of the three principal railways of Spain as compared with 1913.

On the Compagnie du Nord during this five year period, the receipts increased only 31.34 per cent, whereas the expenses increased 116.52 per cent. This large increase in expenses is due principally to the increased cost of materials and especially coal. The cost of locomotive coal increased 336.77 per cent; the cost of material for roadway and shops increased 64 per cent, and the cost of various other repairs increased 319 per cent. The average purchase price of coal increased 194 per cent, but at the same time the fuel consumption per locomotive mile increased 55 per cent. The increase in the wages of the personnel was 35.11 per cent.

On the Madrid, Saragosa & Alicante there was an increase in the consumption of coal in 1918, of 35.51 per cent over that of 1913, and this increase does not correspond to the increase in traffic; it was due to the poor quality of the fuel. In other indispensable railway material the increased cost varied anywhere between 60 and 1,000 per cent. Wages of personnel were one of the principal causes for the increase of expenses. This increased 33 per cent in 1918 over that of 1913 and under recent grants to the workmen the increase for 1919 will be 60 per cent. The total increases in the receipts of this road in 1918, as compared with 1913 was only 39.76 per cent, as against an increase in operating expenses of 117.83 per cent.

The situation on the Madrid, Caceres & Portugal et Ouest de l'Espagne is similar to that of the other companies. The amount of coal consumed increased 44.67 per cent and the price per ton increased 177.74 per cent. The total cost of the fuel increased 299 per cent. The receipts of this company increased only 84.65 per cent as against an increase in operating expenses of 84.47 per cent.

It will be seen that all of the Spanish railway companies have suffered greatly by increased prices on account of the war and the financial position of the roads is such as to justify the most serious apprehensions.

Locomotive Construction in Belgium

Although all the locomotive works in Belguim except two have resumed operation, says Vice Consul Carl C. Lumry in Commerce Reports production of new engines is practically nil, according to information furnished by the industrial inspection service of the Ministry of Economic Affairs. All Belgian builders, it is stated, are occupied at present in overhauling locomotives of the state railway, including the light railway (steam interurban) lines. A number of locomotives which were ordered in 1914, material for which was hidden and escaped the attention of the Germans, are now being completed, as are also a number of locomotives intended for the light railways and a small number for the use of Belgian industry.

Present conditions of production are considered very unfavorable on account of the cost and scarcity of all raw materials, the reduction in the hours of work, the demands of the workers, and the exodus of many of the better workmen to France and England where wages are said to be even higher. There are at present employed in this industry 4,542 men, which is only 75 per cent of the personnel employed in 1913. On account of the greatly reduced hours of work, it is estimated that even with the necessary materials available, it would be possible to build only about 50 per cent of the 1913 output with the personnel now employed.

The cost of materials has, of course, increased tremendously.

Capacity Of Belgian Shops Insufficient To Meet Government Demand

Before the war there were 20 shops building locomotives; 3 of these were located in the Province of Brabant, 1 in eastern Flanders, 12 in the Province of Hainaut, and 4 in the Province of Liege. Of this number, 2 built locomotives exclusively, and the other 18 manufactured machinery and equipment as well as locomotives; 17 manufactured locomotives of all types, while 3 specialized on locomotives for industrial purposes. At present, several Belgian builders are working on oil-burning locomotives.

The Belgian Government has recently placed an order with Belgian builders for 100 locomotives; this is in addition to the order placed in the United States for 150 locomotives of American type and construction. It is thought that it will be necessary to place another order with foreign builders for locomotives and railway equipment in the near future, as the Belgian works are not in position to take care of the government's needs.

It should be borne in mind that the "Ministere des Chemins de Fer. Marine, Postes et Telegraphes" has under consideration a project for the electrification of all the Belgian railways. Work on the Antwerp-Brussels line will undoubtedly be started in the near future. When electrified, it is planned to have 30-minute service between Brussels and Antwerp, thus uniting the political and financial center of the country with its principal port.

Railway Notes from China

Peking, March 27, 1920.

During the past month work upon the unification program has been put under way by the holding of two important conferences, one of the engineering officers of the several lines and the other of the mechanical officers. The conferences were considered as being merely preliminary, serving the purpose of extending acquaintance among the officers of the same department and putting the line officers in closer touch with the ministry officials and their advisers. The engineering conference gave its principal attention to the subject of a standard clearance, but also took up tentatively the subject of a standard rail section. The mechanical officer's conference devoted most of its time to the subject of standard 40-ton freight cars. No decision has been taken upon any of these subjects, a further conference being scheduled in each department for the month of April.

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To assist F. H. Clarke, the technical adviser, William M. Peitch, formerly of the Pullman Company and the Pressed Steel Car Company, has been engaged by the commission on railway technics, of the Ministry of Communications, as chief draftsman.

* * *

Preliminary figures covering the operations of the Chinese government railways for the year 1919 now given out by the Ministry of Communications, indicate that earlier estimates were unduly conservative. Operating revenues are stated as approximating $82,000,000, or a gain of $4,500,000 over the abnormal year of 1918. Operating expenses, however, also show a large increase so that the operating ratio will stand at nearly 46 instead of 43, as it was in 1918. Operating expenses are $37,200,000, compared with $34,300,000 during the year before. More favorable rates of exchange, however, will reduce interest payments by over $2,000,000 so that the net income figures for the year will be not far short of $37,000,000. Out of the net revenues of the several lines probably $3,500,000 will be used to redeem mortgage bonds. But due to the favorable rate of exchange compared with the rate obtaining when the bonds were first floated, the normal amount of bonds outstanding on the books will be reduced by between seven and eight million. Practically all the bonds outstanding upon Chinese railways are expressed in terms of pounds, sterling, or francs. When the books of the lines were made up in terms of Chinese dollars these pounds sterling were rated in the balance sheet at about $11.00 to the pound and francs were converted at the rate of about two and a half to the dollar. During the year

1919 the repayments have cost on the average only about $4.50 to the pound while francs could be bought for nine or more to the dollar. Counting these considerable gains from exchange, the combined balance sheet for the government railways will show a gain over last year of approximately $39,000,000 less remittances to government.

* * *

The last issue of these notes called attention to the proposed construction of a line from Shihchiachuang to Tehchow. Shihchiachuang is the junction of the Peking Hankow line with the Cheng Tai—the latter being the line which serves the rich ore bearing province of Shansi. Tehchow is a large city on the Tientsin Pukow line about 30 miles north of Tsinan the western terminus of the Shantung railway. The Tientsin mercantile interests had petitioned that this line be built to Tsangchow, only 60 miles south of Tientsin. The change of terminus has given rise to no little discussion and telegraphing from the provinces in opposition, with the result that probably nothing will be done finally. However, the Ministry of Communications has formed a special bureau for floating a domestic loan to the amount of $30,000,000, of which $10,000,000 will be set aside for the building of this line. These circumstances have given rise to the charge that the terminus was changed from Tsangchow to Tehchow on the promise that Japanese capital will see to it that the domestic loan does not fail (almost a certainty otherwise) and that Japanese interests will not press for the construction of the Tsinan-Shunteh line. The plausible character of this surmise is apparent when one looks at the map. Via the Tsangchow route Shihchiachuang is only 160 miles from Tientsin compared with 430 from Tsingtau, while by the Tehchow route Tientsin is 230 miles compared with 380 to Tsingtau. While Tientsin still has the advantage, it is not such an advantage that preferential rates on the Shantung line and favorable treatment at the port of Tsingtau could not be overcome. Especially is this true, when the demand for Shansi ores in Japan is considered.

However, British interests with holdings in both the Tientsin and the Shansi regions need to have the short route to Tientsin. These interests are said to be bringing to light an old contract which provides that if Tientsin is ever connected by rail with a point not far north of Shihchiachuang, known as Paotingfu, the British administration of the Peking Mukden line will be allowed to build it. They are said to hold that Shihchiachuang is in the natural Tientsin area, and that the line from Paotingfu is the natural line to build, to make the direct connection; for by this connection the haul to Tientsin is identical in length via Paotingfu and via Tsangchow and requires only 80 miles of new construction compared with 100 miles via either of the other routes. Yet, a strange favoritism toward the Tehchow route is reported from the British Legation, which can be explained to some minds only on the theory that British and Japanese interests in China are making a *rapprochement.*

* * *

The Chinese Government has taken over full responsibility for the Chinese Eastern Railway. It has appointed a board of directors, of which former Russian chief, Gen. Horvath, is one. The military governor of Kirin province has taken over the policing of the line. Chinese stationmasters are on their way to take the place of Russians in the more important stations, the Russians doubtless remaining as assistants if they care to do so. The threat of a strike some days ago was promptly met by an offer to let the men walk out if they chose, promising that every place would be filled by a Chinese if any men left their posts. The Japanese attitude upon this move is revealed best by this one question asked by the editor of "Hochi": "Can Japan, which is directly interested in the railway, overlook this state of affairs?" But Japan is put in a very difficult position for resistance. The readiness with which the Russians delivered over the line to the Chinese indicates that they felt this to be the only means of saving anything out of it. China has promised to redeem it according to the terms of the original agreement, and Russia's one chance of getting her money back is to support the Chinese against Japanese aggression upon it. Then, too, the great cause of the inter-Allied military operations in Russia and Siberia had as its first cause the French desire to protect the French investment in this security. Hence, another source of support may be looked for in that quarter. But the growing sense of national strength in China and the knowledge of the internal unrest in Japan, is leading to a much more self-respecting attitude on the part of China than has characterized her attitude toward Japan in the recent past.

Equipment and Supplies

Locomotives

The Lehigh Valley is inquiring for 5 Mikado type locomotives.

The Oklahoma Southwestern, which is now building a new line from Bristow, Okla., to Okmulgee, is in the market for locomotives.

The Forbes-Perkins Company, Rodney D. Chipp, New York manager, 120 Liberty street, is in the market for 15 Mikado type locomotives, 24 Consolidated type locomotives, and 24 Pacific type locomotives, for export.

The Koppers Company, Pittsburgh, Pa., has ordered one 6-wheel switching locomotive from the American Locomotive Company. This locomotive will have 19 by 26 in. cylinders and a total weight in working order of 121,000 lb.

The United Fruit Company has ordered 3 Mogul locomotives from the H. K. Porter Company. These locomotives will have 12 by 16 in. cylinders and 33 in. gage; they are to be used on the United Fruit Company's railroads in Panama.

The Chino Copper Company, 25 Broad street, New York, has ordered three 8-wheel tank locomotives from the American Locomotive Company. These will have 21 by 26 in. cylinders and a total weight in working order of 157,000 lb., and will be equipped with superheaters.

The Northern Pacific, reported in the *Railway Age* of April 16 as being in the market for 71 locomotives, has ordered these from the American Locomotive Company. This order consists of 25 Mikado type locomotives, with 28 by 30 in. cylinders and a total weight in working order of 335,000 lb.; 20 Pacific type locomotives, with 26 by 28 in. cylinders and a total weight in working order of 296,000 lb.; 20 eight-wheel switching locomotives, with 25 by 28 in. cylinders and a total weight in working order of 214,000 lb.; and 6 Mallet type locomotives, having 26 in. and 40 in. by 30 in. cylinders and a total weight in working order of 476,000 lb. All these locomotives will be equipped with superheaters.

Freight Cars

The Havana Central is in the market for 50 narrow gage box cars and 50 narrow gage flat cars.

The Phelps Dodge Corporation, New York, is inquiring for 2 narrow gage tank cars, of 2,000 gal. capacity.

The Utah Idaho Central has ordered 100, all-steel, 100 per cent drop bottom gondola cars from the Ralston Steel Car Company.

The War Department has sold to the U. S. International Corporation, New York, 7,025 box and gondola cars at prices ranging from $850 to $1,350 each.

The Oliver Iron Mining Company, Duluth, Minn., has ordered from the Magor Car Company 65 air dump cars of 30 cu. yd. capacity for the Missabe Range.

The International Harvester Company, Chicago, reported in the *Railway Age* of April 30 as inquiring for 500 hopper cars, has ordered this equipment from the Standard Steel Car Company.

The Baltimore & Ohio, reported in the *Railway Age* of April 2 as asking prices on car bodies, has ordered 1,200 hopper car bodies from the Pressed Steel Car Company, and 1,000 box car bodies from the Mt. Vernon Car Manufacturing Company.

The Forbes-Perkins Company, Rodney D. Chipp, New York manager, 120 Liberty street, is in the market for 20 ballast cars, 40 tons' capacity; 20 ballast cars, 30 tons' capacity; 200 box cars,

28 tons' capacity; 150 flat cars; 50 coal cars; 50 stock cars; 250 box cars, 44,000 lb. capacity; 100 flat cars, 44,000 lb. capacity, and 555 miscellaneous freight cars for export.

Passenger Cars

THE LEHIGH VALLEY is inquiring for two dining cars.

THE HAVANA CENTRAL is inquiring for 18 baggage cars.

THE BALTIMORE & OHIO is inquiring for a number of cars for passenger train equipment.

THE MINNEAPOLIS, ST. PAUL & SAULT STE. MARIE has ordered 6 sleeping cars and 1 business car from the American Car & Foundry Company.

THE FORBES-PERKINS COMPANY, RODNEY D. CHIPP, New York manager, 120 Liberty street, is in the market for 8 baggage cars, 4 mail, 12 first-class passenger, 12 second-class passenger, 4 sleeping cars, 4 baggage and mail cars, and 48 miscellaneous passenger cars, for export.

Iron and Steel

THE BOSTON & MAINE has ordered 200 tons of fabricated bridge steel from the American Bridge Company.

THE NORFOLK & WESTERN has ordered 600 tons of fabricated bridge steel from the American Bridge Company.

THE BALTIMORE & OHIO has ordered 300 tons of fabricated bridge steel from the American Bridge Company.

THE NETHERLANDS GOVERNMENT is in the market for 14,000 tons of 50 and 70 lb. rails for use on the State Railways in Java.

THE UNITED FRUIT COMPANY is in the market for 2,550 tons of 50 lb. rails, also for 1,000 tons of 30 lb. rails, for use on its railroads in Honduras.

THE SOUTHERN RAILWAY has let a contract for the fabrication and erection of a double track steel bridge crossing on the Ohio river at Cincinnati to the American Bridge Company.

Miscellaneous

THE HANSHIN RAILWAY (Japan) has ordered 80 electric trucks from the Baldwin Locomotive Works.

THE IMPERIAL JAPANESE GOVERNMENT RAILWAYS have ordered 4,550 steel tires from the Consolidated Steel Company.

THE GREAT NORTHERN has ordered built-up draft arms and Bradford draft gear for repairs to 1,500 cars from the Bradford Draft Gear Company, New York.

THE FORBES-PERKINS COMPANY, RODNEY D. CHIPP, New York manager, 120 Liberty street, is in the market for the following railroad equipment for export: 230 tons of steel; 13 tons sheet iron; 50,000 bolts: 1,000,000 spikes; 50,000 casks of cement weighing 330 lb. each; 6 track automobiles; 20,000 pieces of steel rail, 65 lb. to the yard; 22,000 pairs of fish plates; 132,000 bolts and nuts; 60 complete sets of switches; 10 sets of steel underframes, with wheels and axles for freight cars; and 1,016 locomotive tires, with a diameter of 23½ in. and weighing 400 lb. each.

Signaling

THE CENTRAL RAILROAD OF NEW JERSEY has awarded a contract to the Union Switch & Signal Company, Swissvale, Pa., for an extensive electro-pneumatic interlocking plant to include the Delaware river bridge, between Phillipsburg, N. J., and Easton, Pa. All switch and signal functions will be operated from one machine located at Phillipsburg. A 59-lever machine will be installed with 45 working levers for the operation of 55 signals, 29 switches, 16 derails, 2 double slip switches with movable point frogs and a single slip switch with movable point frog. Alternating current will be used for track circuits and signal lights.

Supply Trade News

The **Grip Nut Company,** Chicago, has opened a new plant at 5917 Western avenue, Chicago.

The **Ingersoll-Rand Company,** New York, reports the sale to the Lehigh Valley of twenty-five "Little David" pneumatic rail-bonding outfits.

The Railway Audit & Inspection Company, Incorporated, Philadelphia, Pa., on April 1, opened an office in the Perry Payne building, Cleveland, Ohio.

The **Transportation Engineering Corporation** has moved its Chicago office from the Manhattan building to the Transportation building. **K. R. Hare,** is district manager.

B. H. Forsyth, salesman for the Grip Nut Company, Chicago, has been appointed manager of the Pittsburgh office of the Chisholm-Moore Manufacturing Co., Cleveland, Ohio.

William B. Ross, district manager in charge of sales for Mudge & Co., Chicago, with headquarters at New York City, has been appointed manager of sales of Edwin S. Woods & Co., Chicago.

The **General Electric Company,** Syracuse, N. Y., has bought the factory of the Bartlett-Hayward Company, on Columbia avenue, Baltimore, Md., and will use this plant to manufacture electrical devices.

The firm of **Richardson & Gay,** consulting engineers, 220 Devonshire street, Boston, Mass., has been formed by **Colonel Edward B. Richardson,** formerly of Richardson & Hale, consulting engineers, and **Harry Gay,** who for the past nine years was in the Boston office of Stone & Webster, division of construction and engineering.

J. Hampton Baumgartner, heretofore assistant to the president of the National Association of Owners of Railroad Securities, is now president of the Baumgartner Advertising-Publicity Company, recently established, with headquarters at Baltimore, Md. Mr. Baumgartner has been connected with the investors' association since its organization in 1917, and formerly was publicity agent of the Baltimore & Ohio for several years.

J. W. Austin has been elected a member of the **Detroit Graphite Company,** Detroit, Mich., with the title of assistant secretary. He is well known throughout the paint and varnish industry, having been for 20 years with the Acme White Lead & Color Works, during the past 15 years as general purchasing agent of that company. In addition to other duties in the Detroit Graphite Company, Mr. Austin will direct the purchasing policy for both its Detroit and allied Canadian plants.

Sereno P. Fenn, vice-president of the Sherwin-Williams Company, Cleveland, Ohio, upon the completion of his fiftieth year of service with that company, was the guest of honor at a complimentary dinner given on April 1 at the Hollenden Hotel, Cleveland, by the Sherwin-Williams Company, its directors, officers, Get-together Club, Foreman's Club and Long Service Employees. Mr. Fenn has served in various capacities with this company, principally as cashier, treasurer and vice-president, since April 1, 1870.

Luis G. Morphy has resigned as principal assistant engineer of the Boston & Albany to take a position with **The Foundation Company,** New York City, as its representative in South America, and sailed on May 5 for Lima, Peru. Mr. Morphy was born in Orizaba, Mexico, on December 4, 1876, and was graduated from Rensselaer Polytechnic Institute in 1900. He began railway service on the New York Central, at Albany, N. Y., and went to Boston in 1907, as assistant engineer of maintenance of way. He is a member of the executive committee of the New England Railroad Club.

Obituary

George F. Griffin, son of the late Thomas A. Griffin, founder of the Griffin Wheel Company, and a director of that company, died on May 4 at Miami, Fla., at the age of 39 years.

Charles W. Johnson, assistant director of engineering for the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., died of double pneumonia on April 21, following an illness of only a few days. He was born on June 30, 1874, and graduated from the Ohio State University in 1896. He then entered the employ of the Steel Motor Company, Johnstown, Pa. Later he became superintendent of the Allis-Chalmers Bullock Company, of Cincinnati, Ohio. In 1907, he entered the employ of the Westinghouse Electric & Manufacturing Company, and was soon appointed chief inspector. In 1912 he became general superintendent of the East Pittsburgh works and in the early part of 1919 was made assistant manager of works. On January 1, 1920, he was appointed assistant director of engineering. Mr. Johnson was a member of the American Society of Mechanical Engineers, the American Institute of Mining Engineers, and the Engineering Society of Western Pennsylvania.

C. W. Johnson

Trade Publications

Air Compressors.—The National Compressed Air Machinery Company, San Francisco, Cal., has published a bulletin, No. 20, describing the construction of a vertical type air compressor and containing a table of dimensions and specifications of the various models built by this company.

Ingot Iron Wire.—The Page Steel & Wire Company, 30 Church street, New York, has published a pamphlet describing fully the electrical and physical properties of American ingot iron wire. This is the first complete publication of this data and the result of many tests which have been made during the past two years under the supervision of the Electrical Testing Laboratory, New York, and Frank F. Fowle, consulting electrical engineer for this company.

Standardized Concrete.—The Koehring Machine Company, Milwaukee, Wis., has issued a 20-page pamphlet containing a review of present practice in the improved mixing of concrete, written by E. A. Van Vleck. The book closes with a short statement of the special facilities of the Koehring mixer for controlling the proper proportion of water, for insuring thorough mixing and for controlling the time that the batch is in the mixer.

Regardless of how efficiently the railways may be operated and how much co-operation they may be given by the shipping public, it will be impracticable, if industry and commerce continue to be as active as they have been for some months, for the railways to handle satisfactorily all the traffic which will be offered them. The fundamental trouble is that railroad facilities are now absolutely inadequate to the needs of the country and that they must be largely increased before the railways will be able to handle satisfactorily all the traffic which is offered to them.—*S. M. Felton, President Chicago Great Western Railroad.*

Financial and Construction

Railway Financial News

Delaware & Hudson.—An issue of $10,000,000 7 per cent ten-year gold bonds have been sold at par by Kuhn, Loeb & Co., and the First National Bank. The proceeds will be used to meet the maturity on August 1, 1920, of $9,000,000 three-year notes, and for other general needs of the company.

Denver & Rio Grande.—The Supreme Court has issued an order permitting the sale of securities owned by the Denver & Rio Grande so that the proceeds may be applied on a judgment for $36,000,000 obtained by the Equitable Trust Company. The collateral to be sold consists of 3,000 shares of Western Realty stock; 30,000 shares of Globe Express Company; $523,000 Colorado Midland Railway gold 4s; $30,000 Western Pacific Railroad first mortgage bonds; 412½ shares Western Pacific Railroad preferred stock, and 712 shares of Western Pacific Railroad common stock.

Long Island.—Walter E. Frew, president of the Corn Exchange Bank, and James A. McCrea, formerly general manager of the Long Island Railroad, have been elected directors succeeding Percival Roberts, Jr., and Walter G. Oakman, resigned.

Norfolk & Western.—An issue of $2,500,000 four-year 6 per cent secured gold notes have been sold by the Guaranty Trust Company at 96½, to yield more than 7 per cent. The notes, which are callable at 101¾, are secured by the deposit of Liberty bonds of a market value which shall at all times be 110 per cent of the principal of the notes. The proceeds of this issue will be used for building 18½ miles of branch line extending from Lenore, W. Va., to coal properties.

Pennsylvania.—The time for minority stockholders of the Pittsburgh, Cincinnati, Chicago & St. Louis to deposit their holdings in exchange for 5 per cent mortgage bonds under the terms of the offer made by the Pennsylvania Company on March 15, 1920, has been extended from May 1 until May 29, 1920.

Pittsburgh, Cincinnati, Chicago & St. Louis.—See Pennsylvania.

Railway Construction

Pennsylvania.—Pennsylvania Offices, a new four-story building, 73 ft. by 100 ft., on Wells street, between Jackson and Van Buren streets, Chicago, is to be erected by the Pennsylvania Offices Corporation and leased to the Pennsylvania lines for 10 years at a net term rental of $100,000. All of the general offices of that line at Chicago, except the ticket offices, will be housed in the new structure. The estimated cost of the building is approximatel y$350,000, and it is expected that it will be ready for occupancy by August 1.

Wabash.—Contracts for the fabrication and erection of a bascule bridge over the River Rouge at Detroit, Mich., have been let and it is expected that the bridge will be in operation in the spring of 1921. The contract for the manufacture of the steel work and machinery was obtained by the American Bridge Company, New York City; the erection of the steel work machinery and dismantling of the present superstructure will be done by the Kansas City Bridge Company, Kansas City, Mo.; and the masonry work and removal of the present substructure will be done by the J. W. McMurry Contracting Company, Kansas City, Mo. The proposed structure is a single trunnion bascule bridge with a double track, providing a clear navigating span of 125 ft., aand is to be operated by electricity with an auxiliary operating plant using a gasoline engine. The foundation piers carrying the trunnion will be of concrete, carried to bedrock, and the rest pier supporting the end of the bridge is to be carried on a pile foundation. The bridge will be erected in a vertical position so as not to interfere with the use of the present bridge.

Railway Officers

Financial, Legal and Accounting

Frederick W. Sercombe, whose appointment as auditor of the Oregon-Washington Railroad and Navigation Company was announced in the *Railway Age* of March 5 (page 751), was born on August 23, 1869, at Taunton, England. Mr. Sercombe was educated at Huish College, England, and entered railway service on January 1, 1898, as a clerk in the general auditor's office of the Union Pacific, later being placed in charge of the land grant, land and coal accounts. In 1903 he entered the employ of the Southern Pacific, with headquarters at San Francisco, Cal., doing special work. From 1904 to 1907 he was chief clerk of general and miscellaneous accounts on the same road and in 1907 he was promoted to special accountant. Three years later he was transferred to the executive offices of the Union Pacific and Southern Pacific at New York City as special accountant. In 1912 he was appointed assistant comptroller on the Union Pacific and served in this capacity until 1917, when he was appointed assistant to the director of the Division of Capital Expenditure of the United States Railroad Administration. He held this position until his appointment as auditor of the Oregon Washington Railroad and Navigation Company on March 1.

F. W. Sercombe

L. C. Sauerhammer who has been appointed assistant to the vice-president in charge of operation and maintenance of the Baltimore & Ohio with headquarters at Baltimore, Md., served as assistant to the federal manager during the greater part of federal control. Mr. Sauerhammer was born at Littlestown, Pa., on September 7, 1883. He was educated in public schools and began railroad work on December 9, 1899 as clerk to a supervisor of the Baltimore & Ohio, to which road he has given his entire railroad service. On September 16, 1901, he was transferred to Cumberland, Md., as clerk to the division engineer. While at Cumberland he was appointed accountant and on September 1, 1902, he went to Pittsburgh, Pa., as chief clerk to the division engineer in which position he served until April 20, 1907, when he was appointed secretary to the chief engineer, maintenance of way at Baltimore, Ohio. A few months later he became assistant chief clerk with the same headquarters and in 1911, chief clerk to the superintendent, also located at Baltimore. He was appointed chief of the bureau of federal and state commission reports, under the direction of the operating vice-president, on July 1, 1913. He was transferred to New York as chief clerk to the general manager in 1916 but returned to Baltimore on June 1, 1918 as chief clerk to the operating vice-president. Shortly afterwards, while remaining on the staff of the operating vice-president, he was appointed to superintendent of office organization and retained that position until April 1, 1919, when he became assistant to the federal manager.

L. C. Sauerhammer

J. L. East, who was recently appointed superintendent of stations and transfers of the Illinois Central and the Yazoo & Mississippi Valley, has been appointed car accountant of the same lines, with headquarters at Chicago, succeeding **J. M. O'Day,** who has resigned.

The Louisville & Nashville has announced the following appointments, effective March 1, all with headquarters at Louisville, Ky.: **Geo. W. Lamb,** assistant comptroller; **H. F. Thompson,** assistant comptroller; **W. F. Kennedy,** auditor capital expenditures; **Geo. Becker,** auditor receipts; **H. B. Cutter,** auditor freight accounts; **W. A. Meglemry,** auditor passenger accounts, and **G. B. Reeves,** auditor of disbursements.

Operating

Bernard J. Quilty has been appointed assistant superintendent of the Sudbury division of the Canadian Pacific, with headquarters at Sudbury, Ont., succeeding **R. B. Girouard,** transferred.

Forrest Wood Rosser, whose appointment as superintendent of the Chicago and Hammond terminals of the Erie, with headquarters at Chicago, was announced in the *Railway Age* of February 27 (page 662), was born on April 19, 1873, at Arcanum, Ohio. Mr. Rosser entered railway service on July 1, 1888, as a messenger with the Baltimore & Ohio. Two years later he was promoted to telegraph operator and yard clerk of the Cincinnati, Jackson & Mackinaw, now part of the Cleveland, Cincinnati, Chicago & St. Louis, and on October 1, 1891, he became operator, car distributor and extra despatcher on the Pennsylvania. In 1898 he was appointed despatcher on the Baltimore & Ohio and one year later he was appointed despatcher on the Chicago, Milwaukee & St. Paul. He was later promoted to chief despatcher on the Chicago, Rock Island & Pacific and on February 20, 1904, he was promoted to trainmaster on that road. On July 1, 1912, he was promoted to superintendent. Four years later he entered the service of the Missouri, Kansas & Texas, as a trainmaster. From January 15, 1917, to February 1, 1918, he served as superintendent on that road and on the latter date was appointed assistant superintendent on the Erie, which position he held until March 1, 1920, when he was promoted to superintendent.

F. W. Rosser

T. W. Flannagan, general storekeeper on the Minneapolis, St. Paul & Sault Ste Marie, with headquarters at Minneapolis, Minn., has been promoted to assistant to the general manager and assigned to special duties, effective May 1. **G. W. Leigh,** assistant general storekeeper, has been promoted to succeed Mr. Flannagan.

W. J. Uren, superintendent of the Quebec district of the Canadian Pacific, with headquarters at Farnham, Que., has been appointed assistant general superintendent of the same

district, succeeding **W. M. Neal**, transferred, effective April 19. **A. Williams**, superintendent of the Ontario district, with headquarters at London, Ont., has been transferred to Farnham to succeed Mr. Uren.

W. D. Post, trainmaster of the Southern, with headquarters at Knoxville, Tenn., has been appointed superintendent of the Columbia division of the Southern, with headquarters at Columbia, S. C., succeeding **F. S. Collins**, transferred; **R. L. McCullough** has been appointed superintendent of the Murphy division, with headquarters at Asheville, N. C., succeeding **T. S. Boswell**, promoted. These appointments became effective May 1.

J. E. Craver, superintendent of the Seattle division of the Northern Pacific, with headquarters at Seattle, Wash., has been appointed acting general superintendent of the Western district, with headquarters at Tacoma, Wash., succeeding **I. B. Richards**, who has been granted a leave of absence on account of ill health. **J. E. Campbell**, trainmaster at Seattle, has been appointed acting superintendent, to succeed Mr. Craver. The changes were effective April 24.

Charles Gilbert Johnson, who has been appointed superintendent station service of the Ohio region of the Erie, with headquarters at Youngstown, Ohio, as noted in the *Railway Age* of February 27 (page 662), served as supervisor station service, with headquarters at New York during federal control. Mr. Johnson was born on January 8, 1876, near Ottawa, Kan. He received a public school education and began railroad work in 1894 as telegraph operator on the Southern Kansas division of the Santa Fe at Elk City, Kan. Afterwards he served as telegraph operator, agent and operator at various stations of the same division until March, 1897, when he was appointed joint live stock, passenger and freight agent at Cedarvale, Kan., where he remained until January, 1901. He then entered the service of the St. Louis, Iron Mountain & Southern, as clerk in the office of the superintendent of the Arkansas division at Little Rock, Ark. He filled other positions at the same place until March, 1905, when he was appointed local agent of the Little Rock & Hot Springs Western, now part of the Missouri Pacific, at Hot Springs, Ark. In March, 1906, he was promoted to the position of division agent of the Memphis division of the St. Louis, Iron Mountain & Southern, with headquarters at Wynne, Ark. In May, 1907, he was transferred to Monroe, La., as passenger and freight agent of the same road as well as of the Little Rock & Monroe, also part of the Missouri Pacific now. He became commercial freight agent of the Missouri Pacific, with headquarters at Monroe, in October, 1910, and in March, 1913, he was promoted to general agent, with headquarters at Jefferson City, Mo. He went to the Erie in 1917 as supervisor station service.

C. G. Johnson

George E. Bates, real estate and industrial agent of the Delaware & Hudson, has been appointed assistant to the general manager for industrial development; **W. W. Bates**, superintendent personnel has been appointed assistant to the general manager for personnel and **H. F. Burch** superintendent transportation, has been appointed assistant to the general manager for transportation. These are newly created positions becoming effective May 2. The offices of superintendent of transportation and personnel have been abolished.

George M. Smith, superintendent of the Delaware division of the Pennsylvania, with headquarters at Wilmington, Del., has been transferred to the Baltimore Division, with headquarters at Baltimore, Md., succeeding **George R. Sinnickson**, resigned, and **W. L. Burt**, assistant superintendent of the Maryland division, has been transferred to the Baltimore division, the position of assistant superintendent of the Maryland division having been abolished for the present. These changes became effective May 1.

George A. Cellar, whose appointment as general superintendent of telegraph of the Pennsylvania System was announced in the *Railway Age* of February 20 (page 598), was born in Delaware county, Ohio, on September 12, 1860. In 1877 he entered the service of the Pennsylvania on the Pittsburgh, Ft. Wayne & Chicago, serving as a clerk, telegraph operator and relief agent. In 1884 he was appointed manager and wire chief. The following year he was appointed chief clerk to the superintendent of telegraph of the Pennsylvania, Western lines, with headquarters at Pittsburgh, Pa., which position he held until his recent appointment as general superintendent of telegraph of the Pennsylvania Systems, with headquarters at Philadelphia. The position of general superintendent of telegraph of the Pennsylvania System is a newly created one and Mr. Cellar reports to C. M. Sheaffer, chief of transportation.

G. A. Cellar

J. Leonard East, whose appointment as superintendent of stations and transfers of the Illinois Central and Yazoo & Mississippi Valley, with headquarters at Chicago, was announced in the *Railway Age* of April 9 (page 1173), has been promoted to car accountant of the same roads, with the same headquarters, succeeding J. M. O'Day, who has resigned to accept service elsewhere. Mr. East was born at Coulterville, Ill., and at the age of 15 entered railway service with the Illinois Central as a telegraph operator. He has served continuously with the Illinois Central for a period of 34 years, being promoted successively from operator to agent, division agent, industrial agent, inspector of stations, agent of the loss and damage bureau and superintendent of stations and transfers. During federal control Mr. East acted as a member of the committee which was appointed by the director of traffic of the United States Railroad Administration, to investigate efficient and economical methods of handling freight.

J. L. East

J. C. Austin, who has been appointed superintendent of the Mobile division of the Southern, with headquarters at Selma, Ala., as noted in the *Railway Age* of March 5 (page 750), served as trainmaster of the Birmingham division, with

headquarters at Birmingham, Ala., from 1917 until the termination of federal control. Mr. Austin began railroad work with the Southern and has been with that road continuously since 1891. He served first as lamp lighter at Sugar Valley, Ga. He became clerk in 1896; afterwards switchman and in 1901 yard foreman. He was promoted to general yardmaster in 1902. In 1915 he was appointed trainmaster of the Mobile division, with headquarters at Selma, Ala., and at the time mentioned above he was transferred to Birmingham.

Traffic

P. G. Findlay, freight traffic manager of the Michigan Central, with headquarters at Detroit, Mich., has resigned, effective March 5.

A. E. Hueneryager has been apointed chief of the tariff bureau of the New York Central, with headquarters at Cleveland, Ohio, effective May 1.

W. C. Barnes, general freight agent of the El Paso & Southwestern, with headquarters in El Paso, Tex., has been promoted to freight traffic manager, with the same headquarters, effective May 1.

W. S. Dawson, general claim agent of the El Paso & Southwestern, with headquarters in El Paso, Tex., has been promoted to assistant general freight agent, with the same headquarters, effective May 1.

W. H. Francis, special representative of the Buffalo, Rochester & Pittsburgh, has been appointed chief of tariff bureau, with headquarters at Rochester, N. Y., succeeding **J. F. Hamilton,** resigned.

C. E. Hilsabeck, assistant general freight agent of the El Paso & Southwestern, with headquarters in El Paso, Tex., has been appointed general agent, with headquarters at St. Louis, Mo., effective May 1.

Walter S. Saunders, who has been appointed general freight agent of the Virginian, with headquarters at Norfolk, Va., as noted in the *Railway Age* of March 5 (page 735), served as assistant general freight agent from March, 1910, until the termination of federal control. Mr. Saunders was born on August 3, 1871, at Richmond, Va. He was educated in public schools of that city and began railroad work in 1888, with the Chesapeake & Ohio at Richmond. He served first as billing clerk in the local freight office; then went to Roanoke, Va., in March, 1890, as an employee in the general freight office of the Norfolk & Western. In May, 1896, he became chief clerk of all mail despatch lines operating over the Norfolk & Western. In June, 1905, he was transferred as chief clerk to the assistant general freight agent of the same road. He went to the Virginian in 1909 as chief clerk to the general freight agent at Norfolk. He was promoted to assistant general freight agent at the time mentioned above.

W. S. Saunders

T. E. Harris, who has been appointed traffic manager of the Georgia & Florida, with headquarters at Augusta, Ga., as noted in the *Railway Age* of March 19 (page 995), served as general freight agent from 1916 until the termination of federal control. Mr. Harris began railroad work in 1900 as waybill clerk in the agent's office of the Georgia Southern & Florida at Valdosta, Ga. He remained in that office until 1909 holding various positions, among them chief clerk and cashier. He was then appointed traveling freight agent at Cordele, Ga. In 1910 he returned to Valdosta as commercial agent for the Georgia & Florida. He was promoted to division freight agent in 1914, and in December, 1916, was appointed general freight agent.

Henry C. Snyder, who has been appointed general freight and passenger agent of the Erie, with headquarters at New York, as noted in the *Railway Age* of February 27 (page 661), served as general freight agent, with headquarters at Chicago from September, 1918, until the termination of federal control. Mr. Snyder was born at Delaware Water Gap, Penn., on July 14, 1868. He graduated from Belvidere Seminary, N. J. His first railroad work began in 1886 as agent and operator for the Lehigh & Hudson River. He entered the service of the Erie in October, 1887, as agent at Ramapo, N. Y. In 1892 he was transferred to Middletown, N. Y., and in 1893 to Newark, N. J. While at Newark he was appointed general agent in September, 1896. In 1903 he became division freight agent, with headquarters at Bradford, Pa. While serving in that capacity he was transferred first to Youngstown, Ohio, and afterwards to Buffalo, N. Y. He was appointed assistant general freight agent, with headquarters at Chicago in September, 1908, and on the date mentioned above he was promoted to general freight agent.

H. C. Snyder

Mechanical

Ernest V. Williams, shop superintendent of the Buffalo, Rochester & Pittsburgh at DuBois, Pa., has been appointed superintendent motive power, with the same headquarters, effective May 1, succeeding **F. J. Harrison,** deceased.

E. Bowie has been appointed division master mechanic of the Brownville division of the Canadian Pacific, with headquarters at Brownville Junction, Me., succeeding **W. Wright,** who has been transferred, effective April 24.

Engineering, Maintenance of Way and Signaling

Luis G. Morphy, principal assistant engineer of the Boston & Albany, with headquarters at Boston, Mass., has resigned, effective May 1.

L. C. Miller, office engineer of the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn., has been appointed assistant chief engineer in charge of valuation; **R. C. Smith,** assistant engineer at Minneapolis, has been appointed principal assistant engineer succeeding **F. K. Bennett,** resigned. These appointments became effective March 15.

H. H. Garrigues, engineer maintenance of way of the Southern division, has been appointed superintendent of the Delaware division, succeeding George M. Smith, transferred; **Franklin Duane,** division engineer of the Baltimore division, has been appointed engineer maintenance of way, succeeding Mr. Garrigues; **W. F. Miller,** division engineer of the Williamsport division, has been transferred to the Baltimore division, succeeding Mr. Duane, and **N. D. Vernon,** supervisor of the Maryland division, has been appointed division engineer, succeeding Mr. Miller. These changes became effective May 1.

Railroad Administration

J. W. Newell, assistant comptroller of the Railroad Administration, with headquarters at Washington, has been appointed comptroller, succeeding **George H. Parker**, who has resigned.

J. W. Roberts, auditor, **Fred Pettijohn**, cost accountant, and **Stanley Wood**, office manager of the accounting section of the Railroad Administration, resigned on May 1 and have organized the Roberts-Pettijohn Wood Corporation, with office at 20 East Jackson boulevard, Chicago, which will render a general accounting service, specializing in railroad accounting in matters arising under the new transportation act, settlements with the Railroad Administration, etc., and in allied industrial work. Mr. Roberts was formerly in the accounting department of the Atchison, Topeka & Santa Fe, and before federal control was district accountant for the Bureau of Valuation, Interstate Commerce Commission, at Kansas City.

General

The Lorain, Ashland & Southern has announced that the following officers were elected, effective April 16:

Name	Position	Headquarters
W. D. Holliday	Supt. mchg. oper.	Lorain, Ohio
John Dorsey	Gen. fr. & pass. agt.	Lorain, Ohio
J. F. Allenspaugh	Train master	Lorain, Ohio
P. H. Goda	Gen. m. of e. foreman	Lorain, Ohio
H. W. Scott	Supervisor	Lorain, Ohio
D. M. Messmore	Storekeeper	Lorain, Ohio

The Northwestern Pacific has announced that the following is its personnel, effective April 10:

Name	Position	Headquarters
W. S. Palmer	Pres. & Gen. Mgr.	San Francisco
A. H. Payson	Vice-pres	San Francisco
Paul Shoup	Vice-pres	San Francisco
G. L. King	Sec.	San Francisco
D. P. Ewing	Asst. Sec.	San Francisco
W. B. Burris	Compt.	San Francisco
H. W. Ellicott	Treas.	San Francisco
A. K. Van Deventer	Asst. treas.	New York
Stanley Moore	Gen counsel	San Francisco
Elliott Johnson	Claims Atty.	San Francisco
H. G. Jenkins	Ass. to pres. & gen. mgr.	San Francisco
M. L. Gillogly	Indtl Asst. to pres. & g mgr.	San Francisco
J. K. Brassill	Gen. supt.	Sausalito
J. W. Williams	Ch. engr.	San Francisco
F. K. Zook	Val. engr.	San Francisco
G. H. McMullin	Supt. southern div.	Sausalito
W. J. Hunter	Supt. northern div.	Eureka
F. T. Vanatta	Supt. elec. activities	Sausalito
K. M. Nicoles	Gen. car serv. agt.	Sausalito
H. W. Ellicott	Gen. pur. agt.	San Francisco
A. W. Dayton	Gen. storekeeper	Tiburon
J. J. Geary	Gen. fr. & pass. agt.	San Francisco
W. J. Cummings	Div. fr. & pass. agt.	Eureka

Obituary

Charles Watts, formerly general superintendent passenger transportation of the Pennsylvania, died on April 29 at Mt. Dora, Fla., at the age of 75 years.

Guy M. Freer, of Cincinnati, Ohio, executive secretary of the National Industrial Traffic League, with headquarters at Chicago, died suddenly on April 30, of pneumonia. Mr. Freer was born in Ohio in 1872. He was formerly traffic manager of the Chamber of Commerce of Cincinnati, and while in that position was elected president of the National Industrial Traffic League, which office he held for four years, up to November last. Since then he has been executive secretary of the League, with office in Chicago.

Wilson Worsdell, formerly chief mechanical engineer of the North Eastern Railway of England, died recently at South Ascot, Berkshire, England, his death being reported in the Railway Gazette (London), of April 16. Mr. Worsdell was a pupil at the Altoona shops of the Pennsylvania Railroad when he was a young man and began his railway service in England on the London & North Western. He was at the head of the mechanical department of the North Eastern from 1890 to 1910. During this period he built about 1,000 locomotives and several thousand cars. He introduced high capacity freight cars. He had been president of the Association of Railway Locomotive Engineers, and for several years past had been a director of the Westinghouse Brake Company.

Frederick J. Harrison, superintendent motive power of the Buffalo, Rochester & Pittsburgh, with headquarters at Du Bois, Pa., died on April 16 following an illness of several months resulting from pneumonia. Mr. Harrison was born in Rochester, N. Y., on February 22, 1864. He attended a public school in his native city until he was 14, when he started to learn the machinist's trade. After 11 years spent as an apprentice and a machinist he became foreman for the New York Central, in which capacity he served for three years. He then discontinued railroad work for a short time but resumed it in 1888, when he became machinist in the Buffalo, Rochester & Pittsburgh's shops at Rochester. He was promoted to foreman of the same shops in 1890 and in 1894 was again promoted to the position of general foreman in charge of locomotive and car works at Rochester. He held that position for six years. In 1901 he went to DuBois, Pa., as general foreman of the DuBois Iron Works, but resigned shortly afterwards to return to the Buffalo, Rochester & Pittsburgh as general foreman of the DuBois shops, then under construction. In 1904 he was appointed master mechanic and in 1910 he was promoted to the position he held at the time of his death.

E. W. McKenna, formerly vice-president of the Chicago, Milwaukee & St. Paul, died recently. Mr. McKenna was born on October 24, 1848, at Pittsburgh, Pa. His first railroad work began in May, 1862, as messenger for the Pennsylvania. Afterwards he became operator. For a portion of the time from 1864 until 1865 he served as operator on the military railroads in Virginia. At the close of the civil war he entered the employ of the Pittsburgh, Cincinnati & St. Louis and served consecutively as operator, freight clerk and general superintendent's clerk until 1869. From then until 1880 he filled other minor railroad positions and was then appointed superintendent of the Jeffersonville, Madison & Indianapolis. On February 1, 1886, he went to the Pennsylvania to undertake special services under the direction of the general manager of the lines west of Pittsburgh. From 1887 until 1904 he made steady progress, occupying various positions on the New York, Lake Erie & Western, Chicago, Milwaukee & St. Paul and the Great Northern. He became assistant to the president of the Chicago, Milwaukee & St. Paul on February 1, 1904, and on September 23, 1905, was elected second vice-president of that road. In 1909 he became vice-president in charge of operation and construction. He was retired in the latter part of 1914. Mr. McKenna was the inventor of a process for renewing steel rails and organizer of the McKenna Steel Working Company, of which he was president for a number of years.

Photograph from Underwood & Underwood, N. Y.

A Bad Break Near Boston

EDITORIAL

Railway Age

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It has long been the general practice of many roads to house their maintenance of way floating gangs in box cars. This equipment lends itself readily to such service because of the ease with which it can be moved from point to point as the work progresses. In general, the cars utilized for this purpose are those which have become obsolete for revenue service, but as several hundred and even thousands of cars are frequently required for this service on a single road the demand sometimes exceeds the amount of such equipment available, with the result that cars suitable for revenue business are withdrawn from service. In normal years the season in which equipment of this character is used in maintenance work is one of light traffic when the demand for such cars in revenue service is lightest and a surplus usually exists. This year these conditions are changed and the demand for cars so far exceeds the number available that every car is being utilized, whether obsolete or not. As a result, the withdrawal of any car for revenue service not only results in a loss of the earnings what would accrue from that car, but decreases the ability of the railroad to handle the traffic of the country to that extent. Maintenance-of-way officers are, therefore, confronted with a public as well as a financial necessity for curtailing their demands for such equipment to the minimum. Several roads are resorting to the use of small portable houses to meet this condition. This expedient is entitled to more general consideration, for if all of the cars normally used for the housing of maintenance gangs are released for revenue service it will increase the traffic-carrying ability of the roads materially and will be of direct assistance in tiding them over the present crisis.

Box Cars in Camp Service

Attendance at the so-called minor association conventions by those directly interested in the departments which they represent has always been a valuable means of broadening the viewpoint of the individual and raising the standard of service of the department. During the period of Railroad Administration control not only was this fact clearly recognized and acted on, but advantage was taken of the value of convention attendance as a means of educating operating officers and others on whom the success of the association's work in a measure depended. This applied particularly to the Air Brake and Fuel Associations' conventions. Now that the roads are returned to private operation there is danger that these opportunities will be overlooked. Evidence of this was seen in the recent convention of the Air Brake Association. While the attendance in itself was good, it showed a marked falling off from that of last year when, at the instigation of the Railroad Administration, there was an unusually large attendance. It is to be hoped that at the coming convention of the International Railway Fuel Association, which opens May 24 at the Hotel Sherman, Chicago, the railroads will not overlook these opportunities. The importance of the work of this association is indicated by the results accomplished by the Fuel Conservation Section of the Railroad Administration, which are well known and need not be reviewed here; it only needs to be pointed out that the groundwork for this accomplishment had long been established by the association. The material reductions in unit coal consumption which were effected during the years 1918 and 1919 were brought about by the most completely concerted effort toward a single end which has probably ever been put forth by railroad organizations as a whole. While there is no longer a central administrative body dealing with fuel conservation matters, there still is the convention of the Fuel Association, the real value of which depends entirely upon the extent to which railway managements avail themselves of the opportunity which it offers. Fuel problems are operating problems; they are mechanical department problems; they are purchasing department problems. Let the managements display the same enlightened liberality in encouraging attendance this year as was displayed last, and the result in keeping up the high standard of fuel performance set last year will be gratifying to the railroads and the nation as well.

Attend the Fuel Convention

The business of transportation is not simply to move freight, but to move freight expeditiously and cheaply. At least one, and sometimes both of these objectives have frequently been lost sight of in train loading. The welfare of the railroad from a business standpoint has often been overlooked by the mechanical department in an endeavor to lighten the burden on the machinery, and more frequently by the operating department in the determination to arrive at an unusual showing in train loading. It is essential that both departments consider the operation as a whole. Recent discussion of the subject, however, bears evidence of a growing appreciation among operating as well as mechanical men of the importance of the time factor in tonnage rating. The Traveling Engineers' Association has gone on record as advocating an average speed for slow freight trains of 12 miles an hour, the importance of which will be realized when it is understood that the actual speed of slow freight trains has been more nearly 10 miles per hour as determined by the Operating Statistics Section of the Railroad Administration. Tonnage rating with respect to speed is in reality a very simple matter and many excellent studies of this subject are available. Mr. Mounce's article appearing in the *Railway Age* of April 16, page 1191, is in itself a comprehensive review of the entire question. The problem of determining the maximum tonnage that a locomotive will pull between two divisions within a certain time must primarily be an adjusted rating; that is, one which takes into consideration the range in frictional resistance per ton, dependent upon the average weight of each car in the train. The relative importance of this factor diminishes as the grade resistance increases, but there are many practically level divisions on the different railroads today that are now being operated without the slightest consideration for adjusted ratings. If the average speed of a freight train is to be given the consideration it deserves, the profile of the division must be considered with respect to the extent of ruling grade. If it is practically a level division, then obviously the locomotive must be given a train with which it can at any point on the

The Trend in Train Loading

division maintain a speed considerably in excess of the average, as it may be considered that this train is negotiating a ruling grade over the entire division. The same rule applies if the division represents a continuous or nearly constant ascent in one direction, but if opposing grades cover only a minor portion of the mileage between terminals; then the locomotive may possibly be required to haul a train with which it cannot exceed eight or ten miles per hour on this ruling grade, with the assurance that a very much higher average speed will be made over the entire division. While this is an extremely elementary view of the problem, the application of these principles is so far from universal that the subject is worthy of more general consideration.

Half Way Measures Will Be Ruinous

THE RAILWAY COMPANIES have asked the Interstate Commerce Commission for advances in rates which it is estimated would yield increases in earnings exceeding $1,000,000,000 annually. The advances sought are somewhat larger than anybody thought would be necessary until a few months ago. But almost all estimates up to a few months ago were based on the operating results of the railways in the year ending October 31, 1919, just before the coal strike.

Statistics are now available showing income and outgo in November to February, inclusive, the last four months of government operation, and in March, the first month after the resumption of private operation. The coal strike ended in December, and January, February and March were months of record-breaking freight and passenger business. But in these months, as well as during November and December, while the railways made large increases in their earnings, they made much larger increases in their expenses. The result was that net operating income was relatively much the smallest it had been since the advances in rates made by the Railroad Administration in June, 1918. The figures for these months indicate that on the basis of present rates and expenses the roads could not realize more than $200,000,000 net operating income in a year, whereas over $1,200,000,000 is required to pay 6 per cent on their aggregate book cost of road and equipment.

The advances in rates asked are enormous. Nor are they all that may be sought in the near future. The railway employees are petitioning the Railroad Labor Board to increase their wages another $1,000,000,000 a year. The railway companies unquestionably will add to the advances in rates for which they are now petitioning one dollar for every dollar which the award of the Railroad Labor Board may add to their present payroll.

The Interstate Commerce Commission doubtless feels that it will assume a heavy responsibility if it authorizes such large advances in rates as are being asked for. But for the commission to grant advances which will be practically certain to make the net operating income of the roads on their book cost *at least* 6 per cent is the only way in which the solution of the railroad problem can be advanced without further legislation. Probably it is the only way that the solution of the railroad problem under public regulation and private ownership can be made possible. Among the reasons why this is the case are the following:

First: Regardless of whether the book costs of individual roads or the roads as a whole represent approximately the investment in them or their value, we have the advantage of knowing what the percentages of return earned on the book cost in the past have been and the effects on railroad development produced by the earning of these various percentages. We know that when the percentage earned on book cost dropped below 5½ per cent the annual investment in the railroads began rapidly to decline, and that when it dropped below 5 per cent railroad expansion practically came to a stop.

Second: It is well known that the average percentage of return the railways must now pay to raise new capital is very much higher than it was when they were earning a return on their book cost equal to or exceeding 5½ per cent and raising substantial amounts of new capital. It necessarily follows that they would be unable to raise substantial amounts of new capital now or in the near future if they were restricted to the earning of any amount of net operating income which would not be equivalent to at least 6 per cent on their book cost. But it is absolutely essential to the prevention of a great national disaster that the railways should be enabled to raise vast amounts of new capital in the near future with which to expand their facilities and make it possible for them to handle more traffic.

Third: Government regulation and private management are once more on trial. They are on trial this time for their lives. If the commission allows the railways to earn the very maximum permitted under the Transportation Act there probably will be complaints regarding the amount of the advances in rates, but at the same time the railway companies may thereby be enabled within a few years to make sufficient additions to their facilities and improvements in their service to save the country from disaster and to give reasonable satisfaction to the public. In that event government regulation and private management may be voted a success by the public and continued. Suppose, however, the commission tries so hard to avoid letting the railways earn too much that it prevents them from earning an average of 6 per cent. Most of the public will assume that the commission has done all for the railways that should be done. If the railways fail adequately to increase their facilities and improve their service—as they undoubtedly will—a large part of the public, instead of attributing this to the insufficiency of the rates granted by the commission, will attribute it to the shortsightedness or incompetency of the railroad managements. We shall then go through a long period of increasingly inadequate transportation service, resulting in exasperating and costly congestions and delays and growing agitation against private management. This period would be bad enough for everybody; and the ultimate outcome probably would be still worse, for that ultimate outcome probably would be the adoption of government ownership and operation or of the Plumb plan.

Enormous as will be the advance in rates that will be necessary to enable the railways to earn a net operating income equivalent to 6 per cent on their book cost, there is no possible escape from the conclusion that they must be allowed to earn this much in order to give private management a good chance to succeed. Private management may fail if the railways are allowed to earn this much; it is at this time impossible to conceive how it can help failing if they are not allowed to earn this much.

The commission is likely to hesitate to make as large advances in rates as the railway companies have suggested for fear this will enable them to earn more than 6 per cent. But the incurring of any deficiency as compared with 6 per cent will retard the development of the railways, while the earning of any excess over that amount will tend to stimulate development, and, of course, one-half of anything over 6 per cent earned by any individual road will be owned by the government. In the circumstances, it would seem that it would be much safer, from the standpoint of the national welfare, for the commission to take the chance of making the return earned by the companies a little larger than to make it a little smaller than is contemplated by the Transportation Act.

One point is very clear. This is that if the commission is to help in solving the railroad problem it must for the present use its lawful powers to the limit to help the railway com-

panies. The adoption of half-way measures in the present emergency would not only do absolutely no good, but would be ruinous.

Getting Full Value from the June Conventions

The cost of holding the mechanical department conventions at Atlantic City in June, and of providing for the record-breaking exhibit which will cover almost 100,000 square feet of space, will run into hundreds of thousands, possibly a million dollars. Part of this will be in the nature of a direct outlay on the part of the railroads in preparing the convention reports and paying the expenses of the delegates; in the last analysis, however, the cost of the exhibit will be paid for indirectly by the roads.

All of the activities of the railroads must be conducted on a strictly business basis and incidentally it is important that the greatest possible returns be secured from the investment in this and other railway conventions. How is this to be done? Last year, when the roads were under the Railroad Administration, orders were issued that every mechanical department officer possible should attend the conventions; more than this, the men were asked to report on those things which they heard or saw at the conventions which in their opinion could be used to advantage on their individual roads. The head of the mechanical department of each road was asked to summarize the reports of his subordinates and send a copy of it to Washington. The sole idea in making this request was to encourage the delegates to get the greatest possible concrete returns from the convention; it was not intended as a check upon the activities of mechanical department officers, although unfortunately its intention was construed in this way by some of them. The fact that greater concrete results will be obtained from the convention where the delegates are instructed to report back their findings, than if they go uninstructed, cannot be gainsaid. It is important in any field of endeavor that men have constantly before them a definite objective.

There was not only misunderstanding last year as to the exact purpose of the reports, but comparatively few of those making the reports had a real conception of what was wanted. For instance, a story of the visit to Atlantic City with comments on the high points in the various reports which were presented and a listing of the more important exhibits was not what was desired; nor was it necessary that the report should be lengthy or formal. What was really desired was a report, brief and very much to the point, on those things which were learned either from the reports or discussions in the convention hall, in conversation with other railroad officers, or in visiting the exhibits, which would help to solve some concrete problem on the individual road and which the observer believed should be drawn to the attention of the head of his department.

One of the very best reports was made by two of the younger men on the mechanical staff of one of the more important railroads. One of these men recommended for trial or investigation on his particular road six different devices which he believed could be applied to certain classes of equipment to very good advantage. In each instance about fifty or sixty words were used to tell why, in the opinion of the observer, the device was necessary, what it would cost, what its limitations were, and where it should be used. The report of his associate was somewhat broader and possibly not quite so definite. It called attention to certain things in the reports and discussion which were of prime importance to the railroad in question and also recommended the trying out of certain devices which were noticed in the exhibit or had been drawn to the attention of the observer while at Atlantic City. Both of these reports were so good that the head of the mechanical department refrained from making a definite report himself but forwarded the findings of his subordinates.

One or two excellent reports were made by individuals who had been definitely assigned to investigate certain questions. One chief clerk, for instance, reported the result of a number of interviews with different mechanical department officers on the interpretation of certain rules which had been made effective shortly before the convention and which were not clearly understood on his road.

Where a number of men attend the convention from the same road, special assignments could well be made to each of them so that all phases of the convention activities and exhibits will be covered without too much duplication of effort. It would then be profitable to hold a staff meeting of these men upon their return home in order to secure a consensus of opinion on the part of all of them as to the recommendations of the various individuals.

In a number of cases, however, the heads of the mechanical departments have preferred to take their men with them in a group in visiting the exhibits in order that they might be in continual conference and thus benefit from the questions or suggestions of the different men in examining the exhibits.

Whatever course is followed, it is earnestly to be hoped that every railroad will plan in advance and carefully study how to get the greatest possible concrete returns from the coming conventions.

Priority of Capital and Materials for Essential Industries

During the war it was recognized as a national necessity that discrimination should be practiced between "essential" and "non-essential" industries in the furnishing of capital, materials, fuel and transportation. An essential industry, in the sense in which the words were then used, was one whose operation to maximum capacity was required in order that the war might be carried to a successful conclusion. The government, in order to insure that industries of this class would be able to operate to their capacity, established systems of priority by which they were given precedence in securing materials, capital, fuel and transportation.

It was assumed that after the war ended there would be no further need for systems of priority. The progress of events is showing that that assumption was incorrect. Doubtless it would be undesirable to re-establish priority in industry by government intervention; but conditions have developed which demonstrate the need for the private managements of certain classes of business concerns to establish systems of priority which will favor essential industries. If the managers of private businesses show they have not enough judgment, courage and foresight to adopt the measures necessary to put American industry and finance on a sound basis, they will help to justify demands which may be made for a renewal of government intervention.

Industries can correctly be classed as essential and non-essential in peace as well as in war. It is impossible precisely to draw the line between them, but it is possible to say as to most industries whether they are essential or non-essential. An essential industry is one which produces food, clothing, fuel or housing for the people or whose operation is necessary for the production of some or all of these things. A non-essential industry is one which produces articles of luxury which it is desirable people should have, if they are already provided with necessaries, but without which they could maintain an existence and even live comfortably.

Agriculture is plainly an essential industry. Coal min-

ing is another. Railroad transportation is another. Without railroad transportation it would be impossible in a country such as the United States to produce or to distribute the things without which the people could not live. The manufacture of passenger automobiles, of pianos, or of silk shirts is not essential. People would not freeze or starve, or go naked or unsheltered without these things.

Developments have demonstrated that because of the war there are not now available enough materials and capital to supply all the demands of both the essential and the non-essential industries of the United States. Recently the live stock producers of the Southwest adopted resolutions addressed to the Federal Reserve Bank of Kansas City, calling attention to the fact that the farmers in that territory were being denied credit at the banks which they required in order to carry on the operation of their farms, while vast amounts of capital were being absorbed in non-essential industries. The railways might reasonably memorialize the banks and producers of materials upon the same subject.

The railways need vast amounts of new capital to provide facilities with which to transport the country's commerce. They are unable, with their present facilities, to haul the agricultural products, the coal and the lumber which are imperatively needed to provide the people with food and housing, to keep them warm and enable their other essential industries to operate. But railways with the very best records for earning and paying interest and substantial dividends are finding it extremely difficult to raise new capital and are having to pay exorbitant rates for it. Railways with less credit are finding it almost impossible to raise capital at all. Meantime billions of new capital are being absorbed by automobile companies, moving picture companies, wild cat oil companies and so on.

The railways need vast amounts of equipment and materials with which to rehabilitate their properties and enlarge their capacity. They, and the railway equipment and supply companies, which build cars and locomotives and fabricate materials for the roads, are finding it impossible to get sufficient materials. Recently one of the largest freight car manufacturing concerns in the United States had to close down when it had large orders for freight cars on its books because it could not get materials with which to build them.

The two principal things regarding which priority should be established are capital and materials. The banks can establish a system of priority with respect to capital that will be very helpful by sharply curtailing loans to non-essential industries and loaning relatively larger amounts to the farmers, the railway companies and other persons and concerns engaged in essential industries. The manufacturers can establish a system of priority with respect to materials by giving preference in supplying them to the railways and other essential industries.

It may seem to the financiers and the manufacturers of materials that if they do this they will suffer losses because many of the non-essential industries can pay higher rates for capital and higher prices for materials than can the railways and some other essential industries. But what is going to happen to the entire industrial and financial structure of the country if those who are able do not help the railways to get capital and materials? The railways will become more and more unable to handle the country's commerce, and the less essential industries which now offer higher prices for capital and materials will themselves become unable to increase their production because the railways will be unable to give them adequate transportation. If these less essential industries continue to increase their investments without being able to increase their production they will be unable to earn a return upon their increased capital. Becoming unable to earn a return upon their increased capital, they will get into financial difficulties and the result may be that the entire industrial and financial structure of the country will come down.

The *Railway Age* began to point out months ago the menace not merely to the development but to the solvency of the industries of the United States which was presented by the fact that large amounts of capital were being invested in other industries to expand them while practically no capital was being invested in the railways to expand them. The conditions to which we have repeatedly referred have been greatly aggravated by the fact that for months other industries have been buying the kind of materials the railways need while the railway companies themselves, owing to the delay in returning the roads to private operation, have been unable to enter the market for materials. Now the railways that are able to buy materials cannot get them. There are many more people who today realize the nature and seriousness of the situation which has been developing than there were some months ago, but unfortunately there are comparatively few even now. The sanity and foresight of the business men of America, and especially of its financiers and manufacturers of materials, are now confronted with one of the most critical tests to which they ever were subjected. Upon the way their sanity and foresight stand that test will depend future developments of vast importance.

In this connection, it may be well to refer to the fact that the new Transportation Act gives the Interstate Commerce Commission a kind of authority which possibly might be beneficially exercised under present conditions. The act authorizes the commission whenever it "is of the opinion that shortage of equipment, congestion of traffic or other emergency requiring immediate action exists in any section of the country," "to give directions for preference or priority in transportation, embargoes, or in movement of traffic under permits, at such time and for such periods as it may determine, and to modify, change or annul them." It is not inconceivable that the transportation situation may become such, or is such now, as to justify the commission in establishing a system of priority and permits in the handling of traffic, and if this should be the case, will the commission not be justified in using its authority to give priority to commodities produced by or intended for essential industries?

Lehigh Valley

The Lehigh Valley is a double-track line between Buffalo and New York, doing, besides its trunk line business, a large anthracite coal business. It is keenly competitive with the Lackawanna, the New York Central, the Erie and to a lesser extent with the Pennsylvania and the Baltimore & Ohio. The average mileage operated is 1,436, and of the total of 30,935,000 tons of freight carried in 1919, 42.74 per cent was furnished by anthracite coal and 10.23 per cent by bituminous coal and coke. Since competitive considerations were largely disregarded in 1919 and 1918, the financial showing of the property under government operation is not indicative of the real earning power under present conditions; neither is the showing made in operating statistics. Artificial conditions of operation were imposed on all roads and on the eastern trunk lines probably to a greater extent than on the lines west of the Mississippi.

It is well to bear this fact in mind in studying the 1919 annual report, because otherwise the condition of the property, and more especially its prospects of earning a dividend for its stockholders, would appear unduly bad. In 1919 total operating revenues amounted to $65,543,000, a decrease as compared with 1918 of $1,246,000. In 1917 the property earned $53,358,000. Rates, of course, were much higher in 1919, so that the business done in 1919 was actually considerably less than in 1917. Thus the total tons of all freight carried one mile in 1919 was 5,968,000,000—a decrease as compared with 1918 of 1,169,000,000, and with 6,663,000,000 ton miles carried in 1917. Even passenger business, which should have shown a great increase over

1917, amounted to 262,693,000 passengers carried one mile in 1919 as against 243,924,000 passengers carried one mile in 1917.

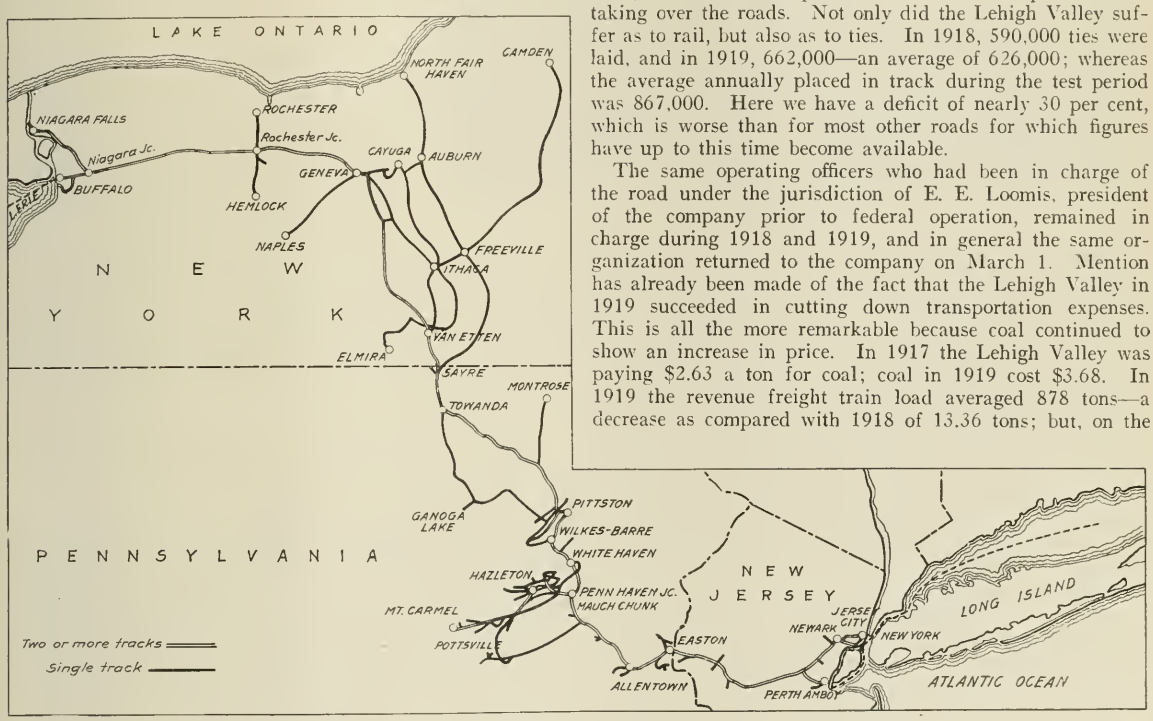
Before the government took over the road, the company was paying 10 per cent dividends and earning a margin of $1,000,000 to $2,000,000 surplus above dividend requirements. Under the government rental the company continued to receive a net income based on the three years prior to 1917, but reduced its dividend payments, beginning with the quarterly dividend paid July 5, 1919, to 7 per cent, although this fact is adduced only from a study of the profit and loss account, and is not mentioned specifically in the annual report. This rate of dividends would call for approximately $4,100,000. Actually the net income of the company, after paying interest charges and taking into its accounts dividends received from other companies, etc., was $4,977,000 in 1919 and $6,593,000 in 1918. Had the company, however, been operating on its own property in 1919, it would have had but $3,779,000, to which would have been added $1,848,000 from other corporate income, and against which there would have been charged $8,187,000, leaving, instead of any surplus for dividends, a very considerable deficit after paying interest.

The Lehigh Valley has now 16,942 stockholders, and the average holdings of stock are 71.54 shares per stockholder. Over one-third of the stockholders are women, the total number being 6,139.

In 1919, even when a road had a falling off in freight business, it generally proved difficult to hold transportation expenses (the out-of-pocket cost of doing business) down to the high levels of 1918; for one reason because additional wage increases were made by the government effective during all of 1919 and not during all of 1918. The Lehigh Valley, however, spent only $28,871,000 on transportation in 1919 as against $30,010,000 in 1918—a decrease of $1,139,000. In 1919 transportation expenses consumed 44 per cent of operating revenues; in 1918, 45 per cent.

On the other hand, maintenance expenses showed considerable increases in 1919 over 1918. Thus maintenance of way cost $9,825,000 last year as against $7,820,000 the year before, and maintenance of equipment cost $18,153,000 last year as against $17,035,000 in 1918. It is evident from the report that there is considerable deferred maintenance. Most roads in the country have deferred maintenance as regards new rail. The Lehigh Valley laid only 13,626 tons in 1918 and 15,082 tons in 1919, an average of 14,354 tons, which compares with an average of 20,092 tons laid annually during the three-year test period on which the rental is based. A deficit of 25 per cent in rail renewal hardly seems to carry out the letter of the contract with the government, much less the spirit of the President's proclamation taking over the roads. Not only did the Lehigh Valley suffer as to rail, but also as to ties. In 1918, 590,000 ties were laid, and in 1919, 662,000—an average of 626,000; whereas the average annually placed in track during the test period was 867,000. Here we have a deficit of nearly 30 per cent, which is worse than for most other roads for which figures have up to this time become available.

The same operating officers who had been in charge of the road under the jurisdiction of E. E. Loomis, president of the company prior to federal operation, remained in charge during 1918 and 1919, and in general the same organization returned to the company on March 1. Mention has already been made of the fact that the Lehigh Valley in 1919 succeeded in cutting down transportation expenses. This is all the more remarkable because coal continued to show an increase in price. In 1917 the Lehigh Valley was paying $2.63 a ton for coal; coal in 1919 cost $3.68. In 1919 the revenue freight train load averaged 878 tons—a decrease as compared with 1918 of 13.36 tons; but, on the other hand, the tons of all freight handled averaged 727 per revenue service locomotive mile as against 705 tons in 1918.



The Lehigh Valley

The following table gives the principal figures for operation in 1919 compared with 1918. This is not the corporation income account:

	1919	1918
Average mileage operated	1,436	1,441
Anthracite coal freight revenue	$20,740,000	$21,225,000
Bituminous coal freight revenue	2,335,000	2,893,000
Merchandise freight revenue	28,532,000	29,156,000
Total operating revenues	65,543,000	66,789,000
Maintenance of way and structures	9,825,000	7,820,000
Maintenance of equipment	18,153,000	17,035,000
Transportation expenses (rail)u	28,871,000	30,010,000
Traffic expenses	481,000	655,000
General expenses	1,293,000	1,193,000
Total operating expenses	60,089,000	57,927,000
Texas	1,825,000	1,876,000
Operating income	3,629,000	6,986,000
Net federal income	3,779,000	6,763,000

Corporate Income Account

	1919	1918
Rental	$11,316,000	$11,321,000
Other corporate income	1,848,000	3,026,000
Gross income	13,164,000	14,438,000
Interest, war taxes, etc.	8,187,000	7,755,000
Net corporate income	4,977,000	6,593,000
Dividends	4,700,000	6,061,000
Surplus	277,000	532,000

Letters to the Editor

Flagging and Its Relation to Railroad Accidents

To the Editor:

The article on the above subject by Interstate Commerce Commissioner C. C. McChord, which appeared in the *Railway Age* of June 20 last, has been read many times by the writer, and each time some kind of excuse in connection with Rule 99 occurs to me. The commissioner says the fact that train movements are protected by automatic block signals does not alter the requirements for the flagging rule. Everybody knows this; and just so long as railroad officers wink at loose observance of Rule 99, there will be disastrous collisions. Some officials try to protect trains while doing station work, or taking meals, by train order, thus placing the burden of possible collision on the train despatcher, who is miles away. This is not fair. The following incident happened some time ago. We were breaking in a despatcher who had been promoted from an operator on the road and after he proved himself confident to take charge of the job, he was placed on third trick. One of the mixed runs which the despatcher is supposed to protect at the rear starts at J, which we will call its initial terminal. On the morning in question there was an extra train to operate in the same direction as the mixed train, for the purpose of picking up ties. The extra engine was given a running order from J west to O where it was to turn back and load ties eastward. The conductor expected to leave J about 6:30 a. m. or the same time as the mixed run was due out. After fixing the extra west the despatcher put out the protecting order to the mixed run in words like this: "All extra west wait at J until ten-thirty, 10:30 a. m.," and cleared the mixed run on it. He had received from the operator at J a report that the extra west had left there at 6:30 a. m. In taking the transfer at 7 o'clock my attention centered on the extra west out of J, because very few extras were being run in that territory at that time. I then looked in the order book and saw the protecting order for the mixed run and asked the despatcher whom I was relieving if he expected the tie train extra in the order and he said he did not. I said to him: "Suppose the extra west should go in the siding at K (which was the next station west and without an operator), and then follow the mixed one out?"

The boy will never be any whiter when he is dead than he turned at that particular moment and he said, "I did not think of that." Just as soon as I could raise the operator at the next station I caught the mixed run and took up the order. It happened, though, that the extra kept ahead of the mixed run to the next telegraph office. However, the mixed run might have passed the extra at any point and, without giving the matter any thought, rely on the protecting order for protection, when as a matter of fact, the extra could have overtaken him and found him unprotected. Of course, the argument would be put up that it was the despatcher's fault; we will agree; but this is an example of just how an accident may happen when there is no reason to have such a condition exist.

I was working a trick a long time ago in Sedalia, Mo., and one evening the superintendent happened to come into the office and sit down for a short while. During this time I fixed up an extra to go out on the Lexington Branch and return with a train of coal. After the extra had been cleared the conductor asked the operator to ask me if there would be anything following him. There was not much traffic on this branch at night; in fact, this was the only train I could see for the entire night; and I told him "no." The superintendent immediately told me I was working out of my jurisdiction when I did anything like that; that I could not tell at what minute it would be necessary to run something else out there and that the conductor was supposed to protect his own train and for me to tell him so. And I did.

When men in the train service on a railroad are not taught and made to flag as per Rule 99 at all times and under all circumstances collisions will continue to pile up regardless of all fixed signals that may be put in use. J. L. Coss.

"Postage Due" Expensive in Foreign Countries

Peking, China.

To the Editor:

For the sake of your advertisers run this: "See that your mail clerks put five cents postage on all letter mail to China."

For insufficient postage there is a penalty of 12 cents Mex. in China and 12 cents Mex. means about 15 cents U. S. A. at present rates of exchange. Shanghai has an American postoffice, hence domestic rates apply. But outside of Shanghai foreign rates apply. The enterprise of American advertisers is making itself felt. Every mail contains quantities of stereotyped "personal" letters setting forth the reasons why the Chinese prospect should part with his money for the American device. The prospect cannot buy them all, and then the merciless "follow up system" begins to hammer on him, each letter costing the recipient 12 cents Mex. Imagine the popularity of that American device about the time the fourth instalment of the "follow up" series arrives!

Chinese Correspondent.

Some Reasons for Car Shortage

New Bedford, Mass.

To the Editor:

We noticed a clipping recently from your paper with reference to the shortage of railroad equipment, and the necessity for the full loading of cars.

There is an abuse from which the purchasers of lumber have suffered, and which entails unnecessary car equipment on the part of the railroads, which is caused by the reprehensible practice of some lumber shippers in loading cars with small loads, even under the minimum, because of the fact that the purchases were made long ago and the lumber has advanced greatly in the meantime. We ourselves have three such cases, and we presume thousands of other retailers have suffered in the same way. Our shipments have been delayed from all sorts of excuses, and finally if they were made at all the quantity was cut down and we were without redress, simply because the shippers were not compelled to load a car to its full capacity. We have a car which arrived this morning which has a capacity of 60,000 lb., and it has less than 11,000 ft. of spruce lumber on it, which on a basis of 3,500 lb. to 1,000 ft. of lumber would show an underloading of at least 20,000 lb.

The "transit car" evil is another thing that contributes not only to the car shortage but to the high cost of lumber. The cupidity of the seller is given a wide range of possibility, as any buyer well knows that he cannot place an order for a transit car unless it is first submitted to the office, and that means in many cases that the highest offer gets the lumber. We have a great many such lists every week. Now if shippers were only allowed to load bona fide orders, lumber purchased long ago at low prices would be in the hands of the retailer instead of this high priced stuff. I have written various letters to our representatives at Washington, but they do not seem to get any action. We think that if all retailers would take hold and do their part there might be some relief. C. G. Ferguson, Treasurer.

Central Lumber & Supply Co.

Extending the Life of the Niagara Gorge Arch

Scientific Adjustment of This Railway Structure Greatly Increases Its Loading Capacity

The Arch and Gorge from the American Side

As a result of a thorough overhauling, the arch carrying the Grand Trunk over the Niagara gorge has been strengthened to carry loads 62 per cent greater than those for which it was designed 22 years ago. This has been accomplished with the addition of only 600 tons of new metal, no portion of which was used to strengthen the main members of the arch structure, and the total expenditure involved is less than one-quarter of that which would have been required for the construction of a new bridge. Credit for this remarkable result must be given to both the past and present generations of bridge engineers,—to the past for their conservatism in the use of low unit stresses to compensate for factors of uncertainty in a structure of indeterminate stresses and to the present for the advance in the science of bridge engineering whereby it has been possible to utilize the elements of latent capacity in old structures, through an ability to determine actual stresses under various conditions of load.

Aside from the field of opportunity for the conservation of other important railway structures which it suggests, an account of the work done on the Niagara arch is of interest because it is one of the best known bridges in America,

The Compression Toggle Used to Open Up the Crown Joint in the Top Chord

having been built in 1897 as the third structure to span the Niagara river gorge at the same site. The first bridge, a light suspension span for pedestrian traffic, was built in 1848. This was replaced in 1855 by the famous suspension bridge constructed by John A. Roebling, which performed useful service for 43 years, although requiring general reconstruction between 1877 and 1880.

The present structure is a two-truss, two-hinged, spandrel-braced arch of 500 ft. span, flanked on either end by a 115-ft. pin-connected truss span and short lengths of steel viaduct. The structure carries two railway tracks on an upper deck and a highway on a lower deck with sidewalks cantilevered on either side. The railway deck carries train and switching movements of the Grand Trunk, the Wabash, the New York Central, the Erie and the Lehigh Valley, aggregating some 70 or 80 trains a day.

The improvement of this bridge recently completed came about as a result of an investigation made by Charles E. Fowler, consulting engineer, New York City, in 1918, at the instance of the Niagara Suspension Bridge Company, owner of this bridge, whose officers realized that it was being subjected to train loads much in excess of those for which it was designed (about E37). Not only was it desired to ascertain the capacity of the structure for the loads it was carrying, but it was also important to consider possible increases in train loadings in the future as influencing the ultimate life of the bridge.

The study made by Mr. Fowler consisted very largely of strain-gage measurements to ascertain stresses in the members of the structure under various loadings, a large part of which consisted of test trains run over the bridge under different speeds, arrangements and loads. This investigation not only disclosed the direct stresses, but the data taken were sufficiently complete to give a good idea of the secondary stresses and impact. Studies were also made to determine what loadings the bridge should be capable of carrying if it were to continue in service for any considerable period. This led to a conclusion that a loading of E-60 for the main trusses and E-70 for the floor would be adequate for many years to come.

Following this, the work of strengthening was undertaken. The new steel introduced was applied primarily in increasing the strength of the floor system, in strengthening certain members of the approach spans and the viaducts, and in providing a new system of transverse bracing in the arch. However, the crowning feature of this entire project comprised the adjustment of the arch trusses so as to relieve certain conditions of over-stress in main members and thereby obtain a structure that is entirely adequate for present day loadings.

How the Arch Was Adjusted

The main span of the bridge was designed and built to act as a two-hinged arch for both dead and live loads. In other words, both top and bottom chords are under stress

at the crown for all usual conditions of loading. Owing to unavoidable inaccuracies in erection, this condition was not obtained when the two halves of the structure (which were erected by the cantilever method) were brought together at the crown. Instead the top chords failed to come in contact by one quarter inch. To overcome this defect, L. L. Buck, the designer and builder of the arch, arranged to jack the top chords apart at the crown by means of a special toggle arrangement and introduce shims one inch thick between the abutting ends. Another important feature in this connection was a precaution taken in the design, owing to Mr. Buck's feeling of uncertainty as to the actual behavior of the bridge, to proportion the lower or main chords of the arch for stresses that were a mean between those of the two-hinged and the three-hinged conditions. Therefore, the lower chords as built were considerably heavier than necessary for the stiffer two-hinged construction.

These two circumstances relating to the design and erection of the bridge afforded the element of reserve strength which has been utilized in the recent readjustment. Furthermore, the fact that provision had been made for jacking

American End of the Arch Showing Old Cross Bracing Still in Place in the End Bent and the New Bracing in the Other Bents

apart the top chords at the crown proved of value for the present purpose as will be shown hereafter.

Strain gage measurements on a completed structure under dead load are normally of value only in ascertaining the increase or decrease in stress taking place as train loadings are applied or removed from the structure. They disclose nothing as to the stresses already existing in the span as a consequence of its own weight. This is a matter of fundamental importance in an arch such as this because of the unreliability of an analytical determination of the stresses in a case where so much depends on the conditions obtaining in the erection. If, on the other hand, it is possible in any way to determine the actual dead load stress in one of the main members of the arch, this would enable computations to be completed that would disclose stresses in all the other members. This was accomplished in the Niagara arch by jacking the abutting ends of the top chords apart at the crown so that the crown panels of the top chord would be relieved of all stress. The resultant increase in their length as recorded by strain gages showed that the top chords had been relieved of a compressive stress of 689,000 lb.

Previous to this operation, various analyses had been made

The New Floor Under Construction—Floor Plates in the Foreground

of the arch stresses under dead load on the assumption of different conditions of compression in this center panel of the top chord, from total stresses varying from 200,000 lb. to 1,200,000 lb. and after a careful review of the stresses in the several members of the structure under these various assumptions, it was concluded that a dead load compressive stress of 300,000 lb. in the top chords at the crown would give the most favorable conditions of stress throughout all the members of the trusses. This is about half the stress actually found to exist with the one-inch crown shims in place. Consequently, by reducing the thickness of these shims to 5/8 in., the stress in the top chord at the crown was reduced to the amount that would give the most favorable conditions throughout. Some irregularities in stress were noted immediately after this operation was performed, but after the structure had been permitted some time in which to adjust itself under traffic, it was found that the stresses were within six per cent of those desired.

This was the critical feature of the entire project. With this adjustment of the dead load stresses, it was possible to load the bridge with an equivalent of E-60, with allowances for impact as obtained by the old A. R. E. A. or Pencoyd formula and certain percentages for secondary stresses, and obtain unit stresses not exceeding 20,000 lb. in tension and 19,000 lb. (less a slenderness factor) for compression. Records of tests show that the bridge had been built of steel having a yield point of 30,000 lb. per sq. in.

Another factor of advantage in making this adjustment is to be found in the fact that low rivet values were used in the original design, namely, 6,500 lb. for shear. Investigations of the various joints on the basis of the increased loading showed that the rivets were not stressed in excess of 10,000 to 11,000 lb. per sq. in.

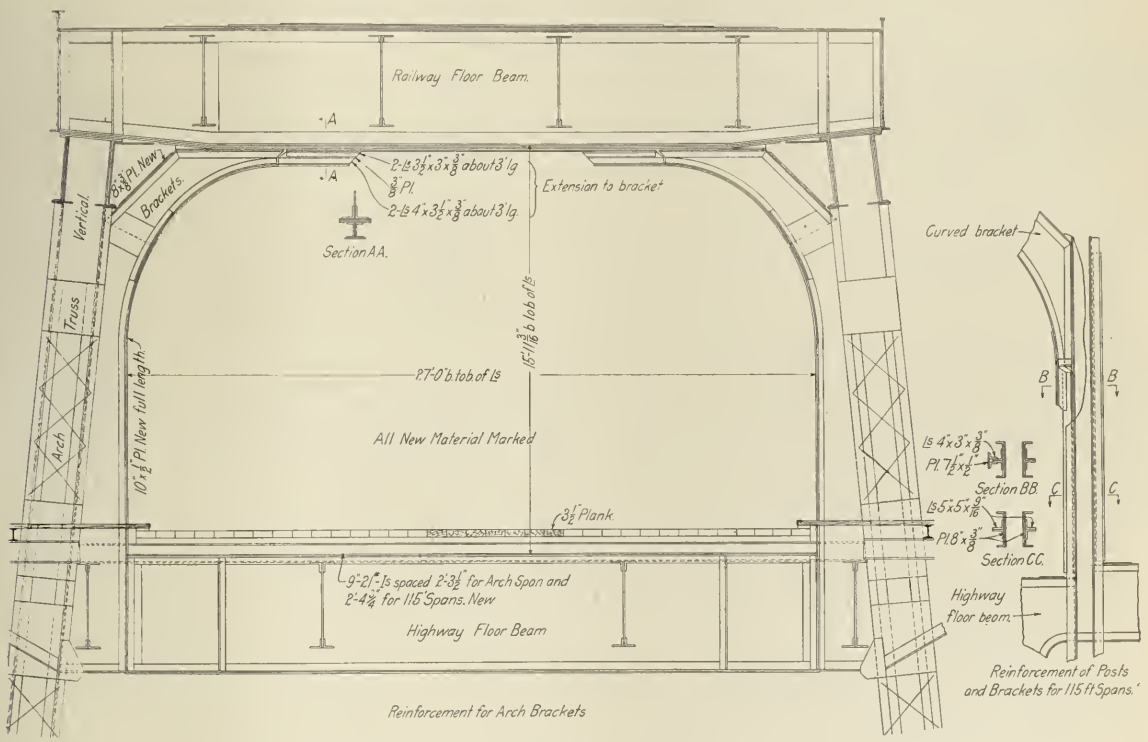
The 115-ft. approach spans were also found to possess an excess of strength in the top chords on account of the extra section required when they acted as backstays for cantilever erection of the arch. The main diagonals and bottom chords were also found adequate because of the low unit stresses used in the design of these eye-bar members. The counters and the vertical web members, however, were found to need reinforcement. In the case of the counters this was accomplished by supplementing them with U-bars over the pins adjusted by turn-buckle connections. The posts were strengthened by the addition of a pair of angles and a plate (or a pair of angles alone) on the outside and inside faces, together with additional material in the arch brackets under the floor beams. To make this additional metal thoroughly effective, measures were taken to unload each of these posts with a toggle arrangement while the new angles were being riveted in place, so that when the toggles were again released the additional metal took its full proportion of the dead load stress.

Another matter closely related to the safety of the main arch structure under the heavier loadings, which was disclosed by the investigation in 1918, was the obvious weakness of the transverse bracing, indicated by excessive vibration of the structure under traffic. Some measure of correction of this feature was obtained by tuning up the cross-bracing, which consisted entirely of round rods, by adjusting them with the aid of the strain gage to a uniform stress of 7,000 lb. per sq. in. throughout but when the bridge was overhauled during the past year the project included provision for new rigid bracing. The five bents of web verticals from each end of the arch were equipped either with stiff cross-bracing or with lattice trusses 10 ft. deep, while two of the main diagonals were fitted with new horizontal struts and cross-bracing composed of the rods taken from the vertical sway bracing. The inspection also showed that a large number of the rivets were loose and as a result 11,000 rivets in various parts of the structure were replaced by new ones.

The Floor System

In remodeling the bridge to increase its loading capacity, the most radical change was made in the floor system which naturally was affected more directly by the increased live loading than any other part. Moreover, it comprised the only portion of the structure that had suffered any appreciable depreciation. The top flange plates of the floor beams and stringers had been reduced approximately one-third by corrosion, largely the result of brine drippings, but even in the floors considerable reserve capacity was discovered in the case of the floor beams of the arch and this also was verified through the strain gage investigation.

As seen in the cross section of the bridge, the railway and highway floor beams together with the two web ver-



How the Brackets in the Arch Span and the Posts of the 115-ft. Spans Were Strengthened

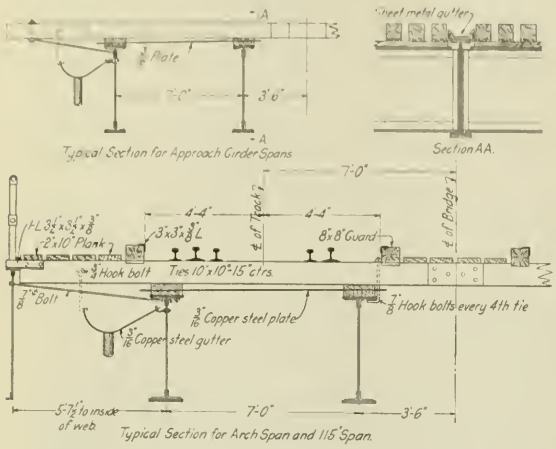
ticals of the arch trusses and the deep brackets connecting the posts to the railway floor beams form a stiff rectangular frame affording a considerable excess of load-carrying capacity in the railway floor beams over that which would be obtained by calculating the strength of the floor beams as a simple beam between supports. While it was found that the floor beams were somewhat inadequate for E-70 loading, studies made indicated that this could best be corrected by strengthening the brackets and extending them further along the floor beams than by adding additional cover plates to the beams themselves. It was, however, necessary to add a full length cover plate to the top of the floor beams to replace the metal lost on account of corrosion.

The stringers on the arch and the 115-ft. approach spans were strengthened by the addition of top and bottom cover plates except on the American approach span and six panels at the American end of the arch where a raise of grade was introduced. Here the top flanges were strengthened by the

use of a superimposed I-section that served also to raise the grade. About 65,000 rivets were cut out and redriven in the course of the work on the floor system.

Special Waterproof Deck Construction

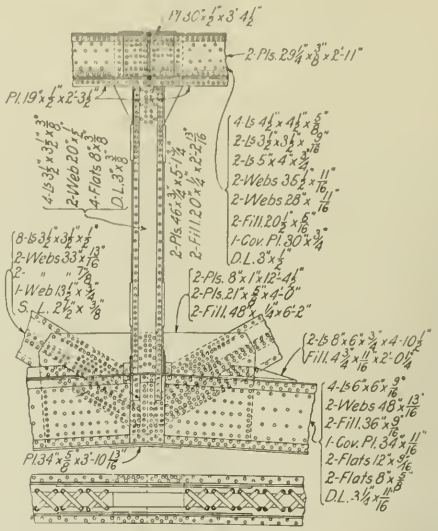
Another important change made in the floor system consisted in provision for a new waterproof deck, designed to protect the steel work as well as the users of the highway against drippings from the track deck and passing trains.



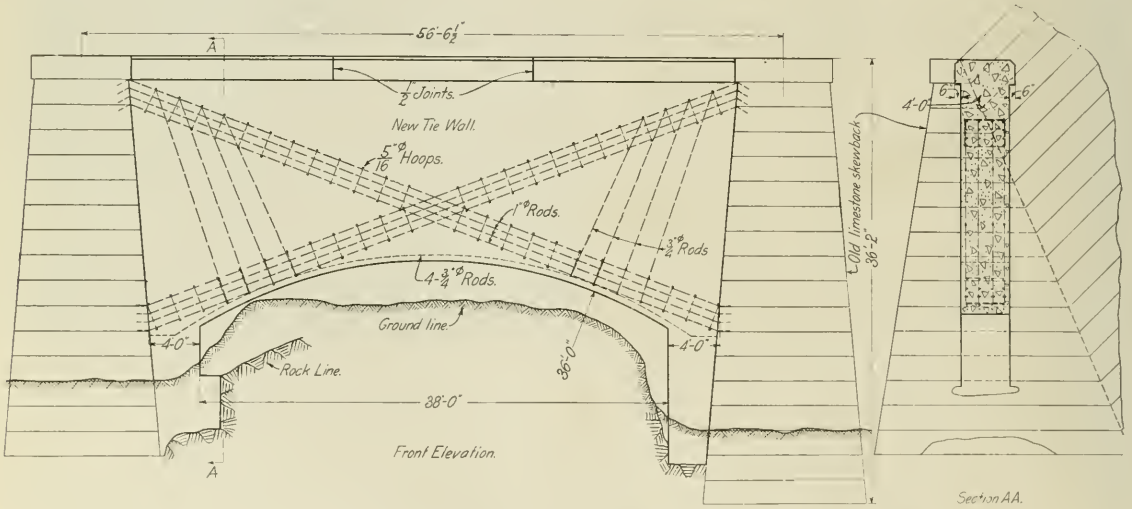
Details of the New Waterproof Deck Construction

The character of this construction is shown in one of the drawings and consists essentially of a copper-steel plate covering over the floor beams and stringers, the track load being transmitted to the stringers by means of wooden shims under the ties and planks laid on top of the stringer flanges. These blocks and planks vary in thickness and are beveled so as to give the necessary transverse slope to the deck plates so that they will drain into large gutters on the two outer sides. The blocks also served to elevate the ties a sufficient distance above the plates so that the ties will not interfere with the drainage. The gutters, which are of large proportions, are sloped to a downspout at the end of each floor panel. These gutters are also of copper-steel and have the end diaphragms welded in place. They are suspended from the steel work in such a way that they can be removed for cleaning readily. The deck plates are made in sections 3 ft. 9 in. wide with flanged sides forming transverse joints in the deck that are closed by covering the adjacent upturned flanges by a channel-shaped sheet-metal cover.

After the plates and gutter were installed they were coated with Hermastic enamel, supplied by the American Bitumastic Enamel Company of New York. The design of this deck construction is such that any of the deck plates may be slid out from under the track for the purpose of cleaning, refinishing, etc. The drawing also shows how the track deck was secured in place without interfering with the ef-



Structural Details at the Crown of the Arch Trusses



Details of the Concrete Thrust Walls Connecting the Two Limestone Skewbacks

fectiveness of the drainage system. Hook bolts through every fourth tie engage the inside stringer flange, this bolt passing through the deck plate on the high end. On the outer side of the structure, the deck is held down to the stringers by means of long bolts connecting the outer end

of every fourth tie with the web of the stringer. On the arch, the end of the tie is connected to the fascia girder by means of a short angle and bolt connection.

The drawing indicates the character of the track construction which is designed to give a minimum opportunity for accidents on a structure that is at such a high elevation above the bottom of the gorge. Ten-inch by 10-in. ties are used 15 in. center to center. In addition to standard inside guard rails, a third T-rail is placed outside the outer running rail, while still further protection against derailed wheels running off the bridge is afforded by fitting the inside edges of the timber guard rails with 3-in. by 3-in. steel angles. All timber used in the deck was treated with hot carbolineum, the ties are spaced by means of cast-iron spacers and rail anchors are used so as to concentrate expansion at the two expansion joints which are of the same type as those used on the Quebec bridge.

Strengthening the Masonry

Not the least among the measures for the improvement of this structure was the work done on the masonry. The limestone skewbacks of the arch had shown signs of considerable weathering and were also in need of transverse stiffening. To correct these shortcomings, the entire surface of the old masonry was covered with 6 in. to 12 in. the two piers of each skewback. This was made 4 ft. wide and 16 ft. deep including a coping 3-ft. deep. It was amply reinforced with rods extended into holes drilled in the old masonry. The rock face of the bluffs behind the of "gunite" applied with a cement gun over wire mesh reinforcement, while a thrust wall was introduced between skewbacks was examined for loose rock and projecting ledges in danger of breaking off and dropping on the skewbacks if the steelwork were removed.

The abutment at the west end of the Canadian viaduct had bearings that were badly shattered. This condition was overcome by building a new pier in front of the old abutment and installing shoes for the support of the girders on the front of the old ones, the girders being equipped with new bearing stiffeners to transmit the end reaction at the new locations.

Raise of Grade at the American End

To eliminate an objectionable sag in the track grade at the east end of the bridge, a raise of about 18 in. was made in the approach embankment as well as the approach viaduct and a considerable portion of the main structure. In the viaduct this was accomplished by inserting cast steel raising blocks underneath the columns.

All of the work done on the structure was carried on under the direction of Charles E. Fowler, consulting engineer, and H. C. Dickinson, general manager of the bridge for the owners. Terry & Tench Company of New York were the contractors for the improvement work.

Coal Prices in Paris.—The prices of the several kinds of coal, effective from March 16, 1920, were issued by the préfet of the Seine for the city of Paris, as follows: Anthracite, nut, 450 francs, or $86.85 per ton; anthracite, large, 430 francs, or $82.99; anthracite, small, 390 francs, or $75.25; run of the mine (tout venant), 400 francs, or $77.20; boulets and briquets, 425 francs, or $82.02.—*Commerce Reports.*

Railroads must have greater revenue. The only equitable way to provide it is to increase rates. Those who have given transportation conditions the thought they deserve know that higher rates are inevitable. The public's concern should not be centered in the justice of allowing carriers to charge more, but in the importance of quick action so that both the people and railroad management may know what to expect.—*Cleveland Plain Dealer.*

Strikes and Continued Freight Congestion

The country-wide freight congestion continues with only indistinct changes in the movement of freight or in the prospects of clearing up the trouble, due to the five-weeks' strike. Very slow progress is made in recruiting yard crews and the fragmentary statements given out by the railroads afford no intelligible basis for marking any decided progress, each hopeful indication being neutralized by some new complaint on the part of shippers or receivers of freight. At New York the general managers, on Tuesday of this week, united in reiterating their refusal to restore seniority rights to men who are still on strike. The statement, signed by E. M. Rine, vice president of the Delaware, Lackawanna & Western, as chairman of the General Managers' Association, said:

"The status of those men who left the service of the railroad companies and thereby violated the law as set forth in the Transportation Act of 1920, has already been fully established by Order No. 1 of the Railroad Labor Board, viz.:

" 'This board will not receive, entertain, or consider any application or complaint from or by any party, parties, or their representatives who have not complied with or who are not complying with the provisions of the law.'

"Under all the circumstances we may not disregard this order, nor the procedure as required by law. The position of the railroad companies has repeatedly been made clear to the men involved in this illegal strike; they must first report for work before any consideration can be given to them or their representatives."

A succinct review of the general situation was given on May 10 by the Interstate Commerce Commission in a telegram sent by the Commission on May 10 to the mayors of fifteen cities—New York, Jersey City, Philadelphia, Buffalo, Pittsburgh, Youngstown, Cleveland, Toledo, Cincinnati, Detroit, Chicago, Peoria, St. Louis, Kansas City (Missouri), and Kansas City (Kansas).

In the message the Commission says:

"The Interstate Commerce Comimssion invites your attention and that of your citizens to the condition of the railroad yards in your city and vicinity. It does so without consultation with or knowledge of any party to the controversies which during the last five weeks have largely contributed to arresting the flow of traffic. Many thousands of men are out of employment in their several industries, foodstuffs fail to reach consumers and glut sources of supply, overtaxing banks and credit. New crops must be provided for. The effect upon shippers and consumers is felt throughout the country, and as the railroads are now operating under government guaranty the cost and loss falls upon the public, individually or as taxpayers. Without regard to the merits of any existing controversies or to the respective rights or obligations of the parties there is pressing need for co-operative action in some 15 localities which now block traffic. Yours is one of them and similar telegrams are being sent to the others. Even if the railroad yards were fully manned today existing unprecedented accumulations could hardly be fully distributed and the railroads restored to normal functioning in less than 60 days. By that time we shall have another crop to move."

In New York City the merchants continue to lay the blame for their delays and losses on the railroads, the longshoremen on strike and the truckmen in the city. The merchants, through a strong representative committee, are carrying out their plans for doing trucking independently of the union truckmen who refuse to carry freight to or from stations and docks where men are on strike; but no actual "strike-breaking" trucks are yet reported as in operation.

Spokesmen for the union truckmen complain at being blamed for all of the carting troubles in the city, when, as a

matter of fact, the business affected by their action amounts to only five per cent of the freight movement of the city.

Large quantities of freight are still being moved to and from distant cities by automobiles at great cost. Canal boats are being used to carry merchandise from New York to Philadelphia and Baltimore. At Cleveland, Ohio, package freight was being loaded last week in large quantities to go to other lake ports by water.

At Pittsburgh, Pa., on May 8, the Pennsylvania announced that the seniority rights of conductors and trainmen in road and yard service on the Pittsburgh, the Conemaugh, the Monongahela, the Eastern, the Panhandle, the Cleveland & Pittsburgh, the Erie & Ashtabula, the Marietta and the Wheeling divisions, would be merged or consolidated, this announcement evidently being intended as a new appeal to the men out on strike to return; and the men were given until Wednesday, May 12, to take advantage of the offer. William J. Tracy, the state mediator in Pennsylvania, made persistent efforts to get the strikers to return to work, but with only slight success.

The Pittsburgh & Lake Erie on the 7th issued a last notice to the yard strikers setting a time limit within which they might return but only about 50 men responded. On Monday the 10th, it was said that 500 shop men of this road failed to report for work, this action being in response to a vote taken the night before. The Bessemer & Lake Erie on the 10th placed new embargoes on freight.

On Wednesday night there was a meeting of strikers at Pittsburgh from which came loud threats of a new strike on the following morning (the 13th), which would call out enginemen and firemen of the three principal roads centering in that city, but the railroad officers and conservative observers accorded no great weight to the incident and up to the time of going to press no serious trouble had been reported.

At Altoona, Pa., agitators tried hard to induce employees of the Pennsylvania Railroad to strike but with no success whatever.

At Buffalo, N. Y., the strike of yard men continued, but officers of the railroads reported some progress each day; but all freight except perishable goods and shipments of an urgent character were subject to much delay.

At Cleveland, Ohio, the reorganization of switching crews proceeded very slowly, large numbers of the strikers having secured work elsewhere. Many large industries were wholly or partly closed because of lack of coal or other necessaries dependent on freight car movement.

The inability of leaders of the outlaw Chicago Yardmen's Association, members of which started the nation-wide walkout of switchmen, to fulfill their promises of increased wages is leading to serious breaks between those men who are still on strike and the heads of the organization. R. S. Murphy, publicity chairman of the organization, and said to represent the insurgents among the remaining strikers, recently addressed a letter to John Grunau, president of the association, demanding an explanation why the men had not been granted wage increases and in general why the strike had failed to produce the results expected. The letter said in part: "It is logical to conclude the Labor Board will not give our members recognition or consideration until we return to work. What have you to offer us? . . . We all know that the roads have recalled their property which has been in the possession of switchmen on vacation, and are hiring great numbers of new men to man the yards. We also know that the roads are operating fairly well under the circumstances; but the question is, How can the seniority rights of the men who have followed the Chicago Yardmen's Association be restored?"

The Interstate Commerce Commission in the statement concerning the general situation which is quoted above gave no details. On Wednesday, W. C. Kendall, chairman of the Car Service Committee of the American Railroad Association, gave out at Washington a similar statement, containing more detail; but his statement like that of the Commission, gave few definite facts; this for the reason, no doubt, that the confused situation and the magnitude of the field to be covered made any comprehensive or useful brief review impossible. Mr. Kendall said that just now the situation was less acute than ten days ago, though still bad. The complaints of shippers and receivers are louder and much more numerous, though the amount of freight actually delayed has been somewhat reduced. Appeals for relief now pouring into Washington are addressed to the Interstate Commerce Commission, the Railroad Administration, and to members of Congress and reports of thousands of cars choking gateways are literally too numerous to mention. Mr. Kendall's most immediate trouble is with coal cars. Commercial stocks of coal have been depleted and the railroads are trying to fill up the gaps caused by their confiscation of coal in transit.

On April 10 the total number of cars "tied up" as reported to the Car Service Committee was 288,000, but the latest reports reduce this number to 235,000. Mr. Kendall estimates the car shortage this week, as measured apparently by reports which indicate only the more pressing needs, as 82,411 cars.

A Motor Truck for Short Haul Traffic

The Palatine, Lake Zurich & Wauconda has introduced a motor truck to facilitate freight and passenger transportation on short hauls. The truck was manufactured by the Four-Wheel Drive Auto Company of Clintonville, Wis., and travels on a 16-mile track from Wauconda, Ill., to Palatine. It is provided with flanged wheels and is equipped as shown in the illustration. In addition, the truck has a trailer capable of carrying five

Motor Truck Used on Palatine, Lake Zurich & Wauconda

tons of baggage and freight. Reports from the officers of the railroad company indicate that the truck can handle a varied type of work economically. Records covering its maintenance and upkeep, although not complete and for only a brief period, show a total expense of 17½ cents per mile. These figures represent a daily mileage of 64 miles and are based upon a depreciation rate allowing the truck a life of 3,000,000 miles.

Pennsylvania Railroad Stockholders on April 1, numbered 122,921, an increase of 1,335 over March 1, and of 13,502 over April 1, 1919.

Western Roads Apply for Rate Advance

Samuel M. Felton Shows That $352,000,000 Additional Revenue Will Be Required by These Roads

WASHINGTON, D. C.

THE RAILROADS west of the Mississippi river on May 6 filed with the Interstate Commerce Commission proposals for advances in freight rates of 24 per cent, in order to increase their revenues by $352,893,000 a year. This amount, they contend, is the minimum necessary to bring their net income up to 6 per cent on a property investment of $8,963,883,000.

Samuel M. Felton, president of the Chicago Great Western, as chairman of the Western executives' rate committee, in presenting the application, laid stress on the inadequacy of present railroad facilities to handle efficiently the growing traffic of the country, and the need for the immediate outlay of hundreds of millions of new capital for cars, engines and additions and betterments.

The application requested that the Interstate Commerce Commission proceed under the provisions of the new transportation act to investigate and determine the increases in freight rates required by the carriers in order that their net revenues may be as contemplated by that act. An abstract of Mr. Felton's statement follows:

A statement is attached giving the combined operating revenues and expenses and net revenues and net railway operating income of Class I roads in the Western district for the years 1916 to 1919, inclusive, as audited, also for the year 1919 so adjusted as to reflect more nearly present conditions, as follows:

Calendar year	Net revenue from railway operation	Operating ratio	Net railway operating income	Decrease compared to 1916
1916	$537,207,096	63.01	$460,181,522	.....
1917	544,207,942	66.46	431,359,919	6.27%
1918	410,016,546	78.30	305,884,143	33.53%
1919	394,382,424	80.67	261,456,373	43.18%
1919 Adjusted	331,057,407	83.36	186,027,141	59.57%

Comparing 1916 with 1919 there was in the latter year an *increase* of 5.97 per cent in revenue ton miles, and a *decrease* of 5.56 per cent in freight train miles, while in revenue passenger miles there was an *increase* of 32.68 per cent, and in passenger train miles a *decrease* of 8.16 per cent. Ordinarily these conditions would have resulted in a substantially lower operating ratio and likewise a substantial increase in net railway operating income, while the foregoing table shows that the contrary was the case, the explanation being that the economies effected through heavier train loading and the increased revenues resulting from advances in both freight and passenger rates were more than offset by the tremendous increase in the operating expenses, due to higher wage scales and increased costs of fuel, material and supplies. The decrease in net railway operating income in 1919 as compared with 1916 was accompanied by an increase in property investment of $648,049,958, with the result that for the year 1919 the return on property investment decreased 62.54 per cent below that of 1916. These figures demonstrate that the present revenues of the carriers are inadequate either to absorb the increased expenses of operation or to provide that fair return upon the value of their properties required by the transportation act; they fall short of the amount which the government has guaranteed for the period between March 1 and September 1, 1920, and the only way in which the requirements of that act can be met is by substantial increases in rates.

Paragraph (3), Section 422 of the Transportation Act, provides, "That during the two years beginning March 1, 1920, the commission shall take as such fair return a sum equal to 5½ per centum of such aggregate value, but may, in its discretion, add thereto a sum not exceeding one-half of one per centum of such aggregate value to make provision in whole or in part for improvement, betterments or equipment, which, according to the accounting system prescribed by the commission are chargeable to capital account." The immediately preceding portion of the same paragraph provides, "In making such determination it shall give due consideration, among other things, to the transportation needs of the country and the necessity (under honest, efficient and economical management of existing transportation facilities) of enlarging such facilities in order to provide the people of the United States with adequate transportation." In order to determine the rate per cent to be applied for the next two years the commission must therefore take into consideration the transportation needs of the country. The situation requires prompt as well as adequate treatment. The maintenance and growth of national prosperity are dependent upon adequate transportation facilities. As is well known, these facilities are not commensurate to present demands.

There is congestion at many points. Lumber and grain movements from the northwest are choked back because of insufficiency of available equipment, and the same is true of fruit shipments from the west, grain from the middle west, and coal and coke, ore, vegetables, automobiles, manufactured articles and merchandise in other sections. There is a continually increasing demand on the part of the traveling public for more passenger equipment, more frequent train service, and better accommodations.

All this calls for more and better equipment. The needs of the railways of the entire country at the end of federal control have been estimated by a committee of the railway executives as follows:

100,000 freight cars	$370,000,000
2,000 locomotives	130,000,000
3,000 passenger cars	90,000,000
1,000 baggage cars	20,000,000
	$610,000,000

This makes no provision for normal replacements and additions in 1920 and thereafter. Some portion of this $610,000,000 can probably be raised by loan from the fund of $300,000,000 provided for the purpose in the transportation act, but the bulk of it must be raised by the railways on the basis of their own credit. Large amounts must also be expended for other additions and betterments.

Particularly is there a great public and national need for the building of railroads into the undeveloped and unoccupied areas in the great country west of the Mississippi river, so that there may be a greater production of food of all kinds, of lumber and other building materials, and of other natural resources.

The population of the country of 105,000,000 will, within a relatively few years, be 125,000,000, and the problem of providing food, fuel, shelter and the protection of the general welfare of the people will become more and more pressing. A sound policy of national growth and development requires that transportation facilities be kept abreast at all times of the needs of the country. This is not the case today, and many parts of the west are much in need of the extension of existing roads and the building of new ones.

In 1920 and 1921 about $430,000,000 of maturing obligations of western carriers now bearing low rates of interest, some as low as 4 per cent, must be refunded.

The cost of new capital is more than 7 per cent per annum, even to those railroad companies whose credit is of the best. The government Victory Loan notes are currently selling on a basis of return in excess of 6 per cent. New in-

dustrial issues with which railroad financing must compete are offering returns of over 8 per cent, in addition to liberal commissions for their sale and distribution, and underlying railroad bonds may be bought on a basis yielding 7 per cent, and in some instances more than 8 per cent. Furthermore, European markets which have heretofore been available for American railroad issues are now closed to them, and those markets are in fact absorbing surplus funds of this country. As illustrative of the worldwide revolution in credit conditions the Bank of England has recently advanced its discount rate to 7 per cent—a step which has been taken only twice since the panic of 1873.

In considering the financial situation confronting the carriers it must be noted that the effect of the existing system of taxation in the United States is to absorb for treasury needs by far the larger part of the surplus of the incomes of the well-to-do people, which has heretofore been devoted to investment in useful enterprises and developments, and thus largely to eliminate that source of capital supply from investments in additional railroad facilities. The appeal for new capital must accordingly be made to persons of moderate means, who still have some but not a large surplus for investment and therefore must reach and attract a much larger public than heretofore. Moreover, persons of moderate means naturally seek investments bringing large returns and are accordingly likely to be attracted to industrial in preference to railroad investment opportunities. If, therefore, new capital is to be obtained from this important source, the returns from investment in railroad securities must be made substantially more inviting.

It seems palpable from the foregoing that the commission in the exercise of the discretion vested in it for the two-year period beginning March 1, 1920, should so adjust the rates of the carriers that their net operating income will be equal to the higher rate of return which it is authorized to prescribe by the transportation act. The maximum of 6 per cent is the minimum which can be justified at this time. The fact that on the money advanced by the government during federal control for additions and betterments and for current liabilities, as well as for loans to be made to the carriers out of the revolving fund created by the transportation act, the government exacts an interest charge of 6 per cent, is also persuasive that the carriers should at least be permitted to earn an equal return on their value.

Last November, with the return of the roads to private management impending, there were appointed by the Association of Railway Executives various committees to study the situation for the purpose of developing the necessities of the railroads as to increased revenue. To this end a questionnaire was sent to all the railroads calling for data as to their property investment, revenues, expenses, rents and all items affecting the income account, both federal and corporate, for the year ended October 31, 1919. That year was selected because the questionnaire was sent out in December, 1919, and that was the latest available year at that time.

The results of the questionnaire with subsequent adjustments as explained hereinafter may be summarized as follows:

Results for Year Ended October 31, 1919, of 185 Railroads and Systems (Class I, II and III) Operating 138,244 Miles of Road

Property investment	$8,963,883,753
Six per cent return on property investment	537,833,024
Net railway operating income, adjusted	184,939,759
Deficit	$352,893,265
Total freight revenue for the year ended October 31, 1919	1,475,695,163
Increases in freight rates needed to cover deficit under 6 per cent return	23.91%

With regard to the income account, the questionnaire provided for adjustments by additions to and deductions from revenues, operating expenses, taxes, rentals, etc., so as to produce an income account which would reflect the wages, prices and conditions as of October 31, 1919, for the full year. The replies have been thoroughly examined and tested, and where found necessary, corrections made so that the figures presented in the compilation of results reflect as clearly as possible the actual conditions as of that date.

Subsequently increases in wages have been granted to employees, demands have been made by the owners of privately operated refrigerator cars for increased mileage payments by the railroads, and the decision of the Interstate Commerce Commission granting increase in mail pay to the railroads has become effective, and those items have been computed and added to or subtracted from the results produced by the questionnaire compilations.

To the amount thus ascertained has been added the amount necessary to take care of the recent increase in the price of coal and the increase in feedral income tax which will result from increased net income, making the additional revenue needed $352,893,265 to produce a return of 6 per cent on the property investment.

The first table on the preceding page shows the net railway operating income of Class I roads for the calendar year 1919 similarly adjusted as nearly as possible from the data at hand. On the basis of these figures an increase of 23.4 per cent in revenue is required to yield a return of 6 per cent on the property investment of Class I roads based on the calendar year figures. A study of the operating results of Class II and Class III roads, as disclosed for the year ended October 31, 1919, demonstrates that if the operation of those roads were included the percentage of freight revenue required for all roads, if based on calendar year figures, would at least equal that based on the October 31, 1919, year.

In the foregoing compilations the carriers have used as the aggregate value their property investment accounts made up of investment in road and equipment and materials and supplies as the best estimate practically available at this time. It is confidently believed that for the reasons advanced at the public hearing on March 22 this sum is the minimum conservative estimate of present aggregate value and that the definitive valuation to be made by the commission will be greatly in excess thereof.

The carriers have carefully considered whether a part of the necessary increased revenue could be obtained from passenger traffic and are of the opinion that it would be inadvisable to undertake to increase passenger fares at the present time, and furthermore it is exceedingly difficult to estimate what increase in revenue would actually result from increase in passenger fares if made. It is believed that the increase should be applied to all freight traffic, both state and interstate, and be apportioned as uniformly as practicable alike on all classes of commodities. Well recognized and long standing differentials and relationships should be observed, as far as possible, and it is anticipated that individual tariffs will be checked accordingly and that some of the important adjustments can be determined before the hearings of the commission and others before the decision of the commission is finally rendered.

Summing up, there is no evidence to warrant a belief that either the cost of labor or materials will in the near future reach a lower level than that now in effect and much evidence to the contrary. The figures compiled do not and cannot tell the whole story. We are in a period of uncertain industrial conditions, uncertain price levels and high money rates. The public demands, and justly so, a higher standard of service than that now being accorded and is, we confidently believe, entirely willing to pay what is reasonably necessary to obtain same. This can only be accomplished by liberal treatment in the matter of increased revenues, thereby enabling the carriers to meet their maturing obligations and to secure the additional capital which is requisite to the proper performance of their duty to provide for their patrons efficient transportation service. For these purposes the situation demands increased revenues sufficient to yield at least 6 per cent on the conservatively estimated aggregate values above set forth.

Annual Convention of the Air Brake Association

Proceedings Dwelt on the Value of Adequate Maintenance from the Operating and Revenue Standpoint

DESPITE UNFAVORABLE CONDITIONS resulting from the recent widespread railroad strikes, from which the roads have not all fully recovered, the twenty-seventh annual convention of the Air Brake Association opened on Tuesday morning, May 4, at the Hotel Sherman, Chicago, with a good attendance, which was retained throughout the later sessions. Following the invocation and address of welcome, Frank McManamy, manager, department of equipment, division of liquidation of claims, United States Railroad Administration, delivered an informal address, which was followed by the address of T. F. Lyons, president of the association.

Mr. McManamy's Address

In his talk Mr. McManamy offered two suggestions for the consideration of the association. He first drew attention to the comparatively small number of men who are charged with the responsibility of supervising the maintenance and operation of air brake equipment. This was brought out forcibly by comparison with the equipment under the supervision of the road foreman of engines. Each road foreman supervises the operation of the locomotives on one division or less, these locomotives always remaining on the division and running in to one or the other of the terminals at least once every 24 hours where they are available for necessary repairs. Usually one air brake supervisor, alone or with comparatively few assistants, must supervise the air brake equipment in operation on an entire system, much of which, in the case of freight cars, he may never see but once during its life.

Mr. McManamy suggested that air brake departments need re-organization to provide more supervisors directly responsible for air brake conditions, to provide adequate equipment for making repairs, not at one terminal alone but at every terminal on the road, and he pointed out that to get these things the support of the managements must be obtained. As one means of securing this needed support, he recommended that the Air Brake Association affiliate with the American Railroad Association, as such affiliation would bring the recommendations of the air brake men of the country in a position to receive the backing of an authoritative body. In closing, Mr. McManamy paid a warm tribute to the support given by the members of the association and other railroad men to the Railroad Administration during its period of control.

Address of the President

In his address, President Lyons dwelt particularly on the responsibilities and advantages of the members attending at the convention. Foremost of these is the responsibility of taking such an interest in the discussion as will insure that each subject is thoroughly covered, the time and labor expended in the preparation of papers and committee reports meriting the most careful attention by the members. One of the benefits from convention attendance which Mr. Lyons dwelt upon was the opportunity to talk "shop" with other air brake men outside of the convention hall, from which talks are obtained many valuable suggestions directly applicable to the solution of his own problems by each member.

Better Maintenance of Air Compressors*

By Mark Purcell
General Air Brake Inspector, Northern Pacific.

When direct inquiry is made, the usual impression is that compressors are giving good service. At the same time service records may show a large amount of wheel sliding and breaking in two of trains that, at first, does not appear to have any relation to the manner in which the compressors are operating, for which the compressor is largely responsible.

If a compressor runs slow, or for any reason raises pressure slowly, there may not be enough accumulated after a brake application to make a proper release, with the result that a part of the brakes only are released and wheels are slid or drawbars pulled out. With passenger trains, passengers are annoyed and sometimes injured, by rough handling of the train, and still the compressor has not actually refused to work.

We find that most of the low efficiency and some of the failures are due to lack of repairs, or the quality of the repairs made being below often only slightly the standard required. In some cases it is an error in a single feature, but more often a combination, such as a number of leaks, any of which may be too slight to cause trouble, yet when combined are serious. This applies more particularly to compressors having steam and air cylinders compounded, on account of the balancing effect that may be caused by leakage.

It is not uncommon to find a compound compressor that is chronically inefficient, and be advised that one part after another has been repaired or replaced, until nearly all of the working parts have been gone over, and yet the operation is not improved. Some such cases are a matter of record, where a careful inspection showed everything in fair condition, except that the high pressure air piston rings were 3/16 in. to 5/16 in. open, or rings in both high and low pressure air pistons were 3/16 in. to ¼ in. open when the smallest part of cylinder, or rings in some of the pistons of the main valve were ⅛ in. to 3/16 in. open and a poor fit in the grooves. When these were properly repaired the compressors worked properly.

Recommended standards to cover repairing and adjustment of the different parts of compressors have been published extensively and discussed ever since the cross compound compressor came into use, but general observation would indicate that these are not taken seriously. On this account the general standard of service of these compressors is considerably below what may reasonably be expected and obtained by uniformly raising the standard of work done in maintaining them at slightly increased cost, and by simply following standards such as those outlined in its recommended practice by the Air Brake Association.

The number of engine failures chargeable to the air compressor alone, indicates the need for improved compressor maintenance, and this is emphasized by the other troubles that can readily be traced directly to a lowered compressor efficiency.

Discussion

The paper drew out a lively discussion which, however, dealt more with the various causes of failure, particularly of the cross compound pump, than to the details of maintenance. One of the most frequently mentioned causes of failure was

*Submitted by the North-West Air Brake Club.

improper lubrication, there being a diversity of opinions expressed and methods described for oiling the air cylinders, but a general agreement that a satisfactory system of lubricating these cylinders has yet to be developed. One of the measures to be taken to avoid air pump failures and excessive maintenance is to give close attention to brake pipe leakage and in doing this not to overlook the brake cylinder.

The members quite generally agreed with the author as to the desirability of tightening up generally on air compressor maintenance, one of the reasons particularly stressed being the damage done in service by failure of the brakes properly to release in cycling which is frequently caused by the inability of a poor compressor to raise the main reservoir pressure within the time allowed by the cycle, even though it may pass the condemning test.

Terminal Tests of Air Brakes

By W. P. Borland

Chief of the Bureau of Safety, Interstate Commerce Commission.

There is no disposition on the part of the Interstate Commerce Commission at the present time to take extreme measures, nor to assume an unreasonable attitude in its administration of the power brake provisions of the safety appliance law; but the time has arrived when better observance of the requirements of law by those who are responsible for the condition of air brake equipment may well be insisted upon.

The percentage of non-air cars now in service is so small as to be negligible. In air brake tests of 1,196 trains departing from terminals last year, comprising a total of 41,846 cars, inspectors of the Bureau of Safety found but 6 non-air cars. There is no longer any lack of available equipment, and any failure to comply with the requirements of law must be ascribed to neglect of the condition of equipment.

In the terminal tests above referred to our inspectors found 330 cars with brakes cut out and 1,947 cars with inoperative brakes. It is a matter of common knowledge that these terminal tests on departing trains do not correctly disclose actual operating conditions, for the reason that when the presence of a government inspector is known more than usual care and diligence are exercised in inspecting and testing brakes, as well as in setting out or repairing cars with defective brake equipment. As a result, reports of such tests are misleading and indicate better conditions and practices than actually exist.

In order to obtain a check upon the true condition of air brake equipment in general, tests of trains upon their arrival at terminals have also been made during the past year. In some instances the contrasts between the condition of arriving and departing trains are extreme and striking; for example, in one yard from which trains were departing with 100 per cent operative brakes, trains were arriving with as low as 56 per cent operative brakes. Of course it is as much a violation of law to haul a train into a terminal as away from a terminal with less than the specified minimum percentage of operative brakes or with associated power brakes not used and operated.

The fact that prosecutions have not generally been filed in the past, except in cases where trains have departed from terminals with inadequate brake equipment, does not alter the requirements of law. In connection with these arriving tests, it should be noted that they serve merely to disclose cut out or inoperative brakes; in the reports of these tests there is nothing to indicate whether or not the brakes classed as operative are in effective and efficient condition. Statistics for the first year based upon these arriving tests will not be complete until July, but the results of these tests will be set forth in the next annual report of the bureau, and will probably be published in detail in order to show the actual condition of air brake equipment in use.

It goes without saying that the terminal air brake tests conducted by the railroads, both arriving and departing, should be much more comprehensive and thorough than the inspections and tests made by the government inspectors. The tests made by the government inspectors are designed merely to indicate the general condition of air brake equipment for the purpose of ascertaining whether or not the law is being complied with.

It has been found that repair work was not being properly done. In one case in the middle west one of the bureau's inspectors made an air brake test on a train of 97 cars, in which the brakes on 17 cars were found inoperative, the majority of them being refrigerator cars. The triples on six of these cars bore stencil marks indicating that the triples had been cleaned within a month, but outward appearances led the inspector to believe that no work other than stencilling had been done on them. Subsequently an investigation was made at points where these triple valves had been stencilled and one triple valve was found newly stencilled that had not been cleaned; and on another newly stencilled car the dust collector was full of dirt and corrosion.

It is essential that air brake men be continually on the alert with a view of detecting and correcting improper maintenance and repair work resulting from ignorance, incompetence, lack of proper facilities, or slip-shod methods.

In many locations tests which are intended merely to show that brakes are operative are insufficient to meet operating requirements; it is essential not only to have operative brakes, but also to make certain that the equipment is in effective operating condition, including foundation brake rigging, brake cylinder, triple valve, retaining valve and all piping. Inoperative and inefficient brakes combined have resulted in numerous violations of the air brake law on mountain grades. There are a number of mountain grades in various parts of the country upon which it is common practice to control trains by means of hand brakes, holding the air brakes in reserve and using them only in case of necessity or emergency to supplement the hand brakes. Proper maintenance of present equipment is all that is required to permit trains to be handled safely on these grades by means of power brakes. And it is in the terminals through which these cars pass en route to these grades that the greater part of this maintenance work must be done. Excessive leakage and defective retainers were among the prevailing conditions which required considerable attention.

The order of the commission of June 6, 1910, requires that not less than 85 per cent of the cars of a train shall have their brakes used and operated by the engineer of the locomotive drawing the train, and that "all power-brake cars in every such train which are associated together with the 85 per cent shall have their brakes so used and operated."

The minimum percentage requirement of this order is generally understood and recognized, and it is an infrequent occurrence that a train is hauled from a terminal having less than 85 per cent of the cars equipped with power brakes in operative condition. But in addition to the minimum percentage requirement specified, the order reiterates the provision of law that all power-brake cars in a train which are associated together with the specified minimum percentage shall have their brakes used and operated. It is common practice for trains to leave terminals having cars with inoperative brakes, or having brakes cut out, notwithstanding the fact that facilities are available at such terminals for making repairs or replacements necessary to place all power brake equipment in proper operative condition.

Strict observance of the associated car provision of the law, as applied to trains leaving terminals or other points where facilities for making repairs are available, would result in

100 per cent operative power brakes in practically all trains leaving such points. The number of violations of the minimum percentage requirement would also be reduced, for the reason that trains now frequently leave terminals with barely 85 per cent of the cars having power brakes in operative condition, and if the brake equipment on additional cars becomes defective en route, or if cars with defective brakes are picked up, or if the cars having operative brakes are set out, the train then has less than the minimum of 85 per cent required.

If required to do so in order to bring about necessary air brake improvements, the Commission can adopt a different policy in the administration of the air brake law, and the existing minimum percentage required can be increased. But it is to be hoped that the railroads themselves are fully alive to the needs of the present situation and will voluntarily take such steps as may be necessary. Proper action by the Air Brake Association and active co-operation of all concerned with these matters will undoubtedly go far toward forestalling necessity for further action in the matter by the commission.

Air Consumption of Locomotive Auxiliaries

The subject of pneumatically operated auxiliary devices on locomotives was assigned to a committee subsequent to the meeting of the association held at Cleveland, May, 1918. The committee presented a report of progress at the last meeting and was continued for the following purposes:

(1) To obtain more complete and representative data concerning the air consumption of locomotive auxiliary devices.
(2) To obtain data for comparing the performance of metallic versus non-metallic packing in reverse gears.
(3) To devise a satisfactory method for testing auxiliary devices on locomotives.
(4) To submit a suitable test code for testing auxiliary devices on locomotives.
(5) To suggest and recommend suitable limits for rates of air consumption of auxiliary devices to serve as a maintenance standard and to condemn defective devices out of service.

The larger portion of the data collected and analyzed by the committee were in connection with standing tests, i.e., tests made to determine the rate of air consumption of auxiliary devices with the locomotive standing in the roundhouse. A total of 497 such tests were made on as many devices. These tests involved 111 locomotives as found on 12 railroad systems.

The first work done was to devise a method of test and prepare a suitable test code so that it would be possible to direct the making of the standing tests at different localities in a systematic and uniform manner. Likewise, it was necessary for this code to specify tests which could be made conveniently in a practical way with the rather limited apparatus and facilities which are ordinarily available at round houses.

The test code was sent out to about 30 members, with a request that standing tests be made of all kinds of auxiliary devices in use on the system with which each member was identified. In every case where the recipients of this request were able to comply with it, a number of tests were made in strict accordance with the code, and no special difficulties were reported either in following out the method of making the tests or in computing the results.

With this code the committee sent out a tentative set of condemning limits which were chosen on a purely arbitrary basis in an attempt to compromise between the degree of perfection possible to attain on the one hand and what might be regarded as excessive maintenance costs on the other hand. All the standing test data has been referred to these limits elsewhere in this report, and while this comparison shows that they would condemn a very large percentage of the devices tested, no change in the limit basis is thereby justified. It should be borne in mind that the devices tested were taken as they happened to be found in service where no accurate or reliable provisions for their maintenance were in force. It is obvious that under conditions of systematic maintenance very much better results would be obtained and it is not improbable that the limits here suggested could be materially reduced before passing the point of diminishing returns on maintenance investment. This, of course, is a matter which will be dictated by future experience with the care of auxiliary devices.

The determination of the leakage rate for each auxiliary device tested depends on the results of three tests. However, two of these tests will always be common to all devices tested on the same locomotive, so that after the first device is tested only one test will be required for each succeeding device tested on that locomotive.

Standing Tests and Condemning Limits

Essentially, the tests developed by the committee and described in the report provide for the following determinations: first, the leakage of the locomotive piping only, with all auxiliary devices shut off; second, this leakage plus the flow through an orifice of known diameter attached preferably to the main reservoir drain cock; third, the leakage of the locomotive piping plus the air consumption of each auxiliary device in turn. These rates of air consumption are recorded in terms of strokes per minute of the compressor required to maintain a balance at 60 lb. gage pressure in the

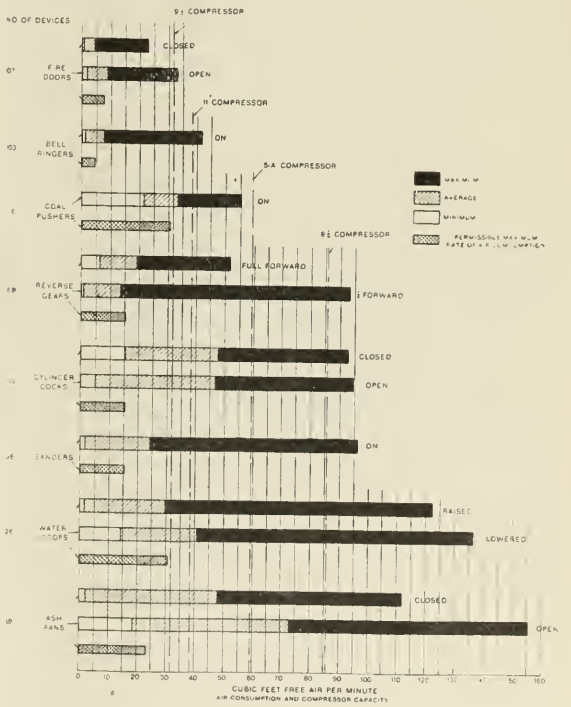


Fig. 1 Air Consumption of Auxiliary Devices on Locomotives Determined from Tests of 111 Engines

main reservoir. Results are computed by deducting the value for engine piping leakage from each of the other two and dividing the net figure for device consumption by the net figure for flow through the orifice. This is expressed in per cent and shows the proportion of the number of compressor strokes needed to supply the orifice which are required to operate the device. For each type of compressor the same orifice is used which is required for the Interstate Commerce Commission condemnation test.

For practical application the condemning limits proposed by the committee are expressed as a percentage of the orifice

strokes, for direct comparison with the results obtained from the tests.

The results of the standing tests made by the committee are shown plotted in Fig. 1. The average, maximum and minimum values for leakage are given for each condition under which the various devices were tested, on the basis of 100 lb. main reservoir pressure. The corresponding test code leakage limit value is also shown for each device. These values are on the 100-lb. main reservoir pressure basis to agree with average operating conditions. Passenger locomotives should be considered on the 140-lb. basis for true comparison.

The data shown is the most complete information of its kind in existence at this time. The large number of auxiliary devices tested and their wide distribution in railway service means that the values given can be regarded as a true index of the general condition and performance of auxiliary devices.

Table I shows the effect of applying the recommended condemning limits on all devices tested. The figures indicate that more than one-half of all devices tested were condemned.

Table I—Condemning Limits Applied to Standing Tests

Device	No. tested	No. passed	Per cent passed	Per cent failed
Reverse gears	68	47	69	31
Bell ringers	103	48	47	53
Ash pans	19	4	21	79
Sanders	136	46	33.8	66.2
Cylinder cocks	32	4	12.5	87.5
Water scoops	26	11	42	58
Fire doors	107	50	47	53
Coal pushers	6	3	50	50
Totals	497	213	42.9	57.1

Running Tests of Reverse Gears

To determine the air consumption rate for reverse gears when running in service, a very complete program of tests was outlined by the committee covering a period of about five weeks' work. Owing to bad weather conditions and other unfavorable incidents, it was impossible to carry out the program fully, but a number of very interesting running tests were made. These tests included 15 gears having metallic packing and 6 gears with non-metallic packing. The results show a distinct difference in the quality of service to be expected from these two types of packing. This difference is very much in favor of the metallic packing, the comparison being obtained by dividing the gear mileage from the date of packing application up to the date of the test by the average leakage in cubic feet per minute. The figures show that where the non-metallic packed gears made 249 miles for each average cubic foot per minute leakage developed the metallic packed gears made 2,491 miles, a ratio of just 10 to 1 in favor of metallic packing. The number of years tested is not sufficient to warrant final conclusions but the results are so positive in favor of the metallic packing as to make it appear very attractive.

Economic Value of Better Maintenance

The general aspect of all the test results indicates that the air operated auxiliary devices in use on our railroads are in a more or less uneconomical condition. They undoubtedly perform the intended functions in a very satisfactory manner, but only at the cost of compressed air. The test figures show a wide field for profitable investment in maintenance, and better maintenance will carry with it other betterments, such as less wear and tear, more perfect performance and greater reliability.

The test code condemning limits suggested for adoption will serve to reduce the waste at least one-half, and when this saving is accomplished, the association will be in a position to scale the limits downward on a scientific basis, because it will then have available actual maintenance cost figures.

Some of the facts demonstrated by the committee's tests have a very important bearing on how much it is costing the railroads to operate auxiliary devices as compared to what it really ought to cost. It is possible to point out, on the basis of compressed air used, the probable margin of saving that could be effected by a reasonable maintenance program. This is important information even when no maintenance cost data is available because when the amount of the saving is known it is comparatively easy to decide how much maintenance expense is warranted.

The data of the standing tests are presented in graphic form in Fig. 1 and cover all the devices tested. It is not permissible to base a comparison on all of the devices listed because several of them are not subject to constant use while the engine is in service. For the purpose of this comparison only three devices are chosen: bell ringers, fire doors and reverse gears. It is assumed that the respective average rates of air consumption found for these three devices in the standing tests are characteristic of their average conditions in service. It can also be assumed that if these devices were maintained within the maximum rates of air consumption fixed by the test code limits the average leakage could be held to not more than one-half that represented by the limits. The actual figures for such a comparison can be taken directly from the data of Fig. 1 and are given in Table II.

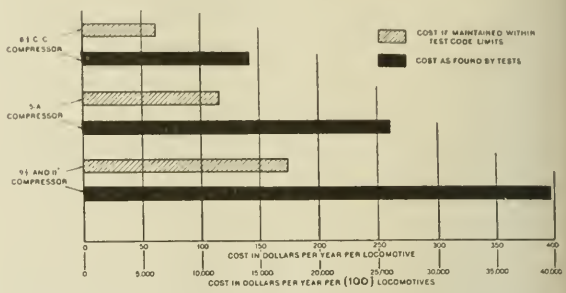


Fig. 2 Annual Cost of Compressed Air Used by Three Auxiliaries and the Probable Cost Under Proposed Condemning Limits

Table II

Number of devices	Average consumption in cu. ft. free air per minute at 100 lb. main reservoir pressure: Actually found during tests	Insured by test code limits
103 Bell ringers	7.75	2.30
107 Fire doors	6.80	3.80
68 Reverse gears	16.57	7.60
Totals	31.12	13.70

It will be evident from the above table that locomotives, equipped with the three devices listed would supply 31.12 cu. ft. of free air per minute to operate these devices whereas if the devices were maintained and held within the test code limits the air requirement would only be 13.70 cu. ft. of free air per minute. This difference is decidedly impressive when its meaning is expressed in terms of the money value of compressed air. Such a comparison is shown in graphic form by Fig. 2. The cost values were computed from the data by using the following assumptions which are commonly accepted as conservative for the factors involved:

(1) That the average working time for locomotives is six hours per day or 2,190 hours per year.
(2) That the average evaporation rate for locomotives will be seven pounds of water per pound of coal.
(3) That the rate of steam consumption per 100 cu. ft. of free air compressed to 100 lb. pressure will be 68 lb. for 9½-in. and 11-in. pumps, 44.7 lb. for 5-A pumps and 24-lb. for 8½-in. cross compound pumps, values which are based on actual steam consumption tests.
(4) That the price of coal on the tender is $2 per ton.

A study of Fig. 1 will readily convince those interested that the maintenance of auxiliary devices on locomotives offers a splendid opportunity for the reduction of operating costs. The two extremes of the comparison can be pointed out as follows:

1. On the basis of 100 locomotives having 8½-in. cross compound compressors, the cost per year without maintenance would be $14,000.00, and with maintenance $6,170.00, leaving a margin of $7,830.00.

2. On the basis of 100 locomotives having 11-in. compressors, the cost per year without maintenance would be $39,700.00, and with maintenance, $17,480.00, leaving a margin of $22,220.00.

The assumption of coal cost as $2 per ton or $1 per 1,000 lbs. on the tender, was taken to make it easy to convert the cost figures to correspond to any price paid for coal. It would not be unreasonable to contend that the average cost of coal on the tender is about $5 per ton, and in such event the costs and margin for economy, would be two and one-half times greater than those given in Fig. 1. It should be remembered that these figures are based on only three devices, all the others being ignored, although many locomotives have them. Those devices are, therefore, an additional source of compressed air waste, which was omitted in this comparison because no accurate data were available, and because its omission is in the direction of making the cost values more conservative. Other cost increasing factors, such as wear and tear on the compressor plant, cost of water, labor, etc., were also omitted, because exact data were lacking.

The report was signed by the following committee: C. H. Weaver (N. Y. C.), chairman; C. B. Miles (Big Four), W. W. White (M. C.), and R. E. Miller (W. A. B. Co.).

Discussion

It was very evident from the discussion that few of the members have realized the seriousness of the losses from air leakage in connection with the operation of auxiliary devices on locomotives as they are generally maintained. Some of the members, who had applied the tests recommended by the committee at its request for the purpose of securing data to be used in the preparation of the report, testified as to their efficacy in bringing to light conditions causing excessive air consumption which might otherwise continue indefinitely so long as the apparatus functions without positive failure. No objections were raised as to the practicability of the tests.

The committee was continued to report at the next convention what progress has been made in generally establishing the tests and to what extent they have led to improved conditions. It was suggested that the executive committee take measures to bring the paper to the attention of the American Railroad Association, Section III—Mechanical.

Relation of Terminal Brake Work to Freight Train Revenue*

By C. C. Ferguson,
General Air Brake Instructor, Great Northern

The investment in all that constitutes a railway is earning just so long as cars are moving toward their destinations. When they are not, it is losing, because interest, wages and other necessary expenses are going on. This means that switching, testing air brakes, repairing and other work in terminals are losing revenue. Such delays are necessary, but it is plain that they should be kept as low as possible.

The problem is how to test and make necessary repairs in the least time and with the minimum of switching. The North West Air Brake Club presents the following with respect to the instructions on consideration and in particular reference to Test and Repairs to Brakes on Cars in Terminal Yards, recently made recommended practice by the American Railroad Association, Section III—Mechanical.

1. Freight cars in terminal yards should have the air brakes tested as follows:

Incoming Trains

2. Freight trains, on arrival at terminals where inspectors are stationed to make immediate brake inspection and repairs, shall have slack stretched and left with brakes fully applied in service application. Inspection of brakes should be made as soon thereafter as practicable and any needed repairs made, or promptly mark for repair tracks any cars that cannot otherwise be repaired.

Outcoming Trains and Yard Tests

3. While the train is being charged, make a visual inspection of retaining valves and retaining valve pipes, position of angle cocks and hose, and examine closely for leaks from the brake pipe and its connections, and make necessary repairs to reduce this leakage to a minimum when the brake system is charged to standard pressure.

4. When the brake is charged to standard pressure, make a 15-lb. service reduction, after which a second examination of the train should be made to determine:

a—Brake pipe leakage.
b—If triple valve will operate on service application.
c—Piston travel.
d—Brake cylinder leakage.
e—If the brakes release properly.

5. If during this test the brake pipe leakage, as indicated by the brake pipe gage, exceeds 8 lb. per minute, it should be reduced to 8 lb., preferably 5 lb., and if piston travel is less than 6 in. or more than 8 in. it should be adjusted to 7 in. All defects found shall be repaired in the yard or car sent to shop or repair track for necessary attention.

6. In addition to the above terminal tests, at last terminal inspection point prior to descending mountain grades, it must be known that a sufficient number of retaining valves are in good operating condition to control the train.

*Submitted by the North-Western Air Brake Club.

The time and a half for overtime since allowed to freight train men, and insufficient consideration given to certain features of the recommended practices warrant some changes in the foregoing.

Normally the first thing done to an incoming freight train or transfer is to make the general inspection. Here we have dead time that, by means of the incoming brake test, should be utilized to locate air brake defects so that such as are heavy may be marked for the repair tracks before switching is done and all available time employed for repairing the others.

Several of the roads represented in our club have long since demonstrated the practicability and value of the incoming brake test. In fact, the Soo Line is undoubtedly the pioneer in making this test, with the Northern Pacific a close second. This is mentioned that due weight may be given to recommendations as being based on long experience.

Our first recommendation is that paragraph 2 in the foregoing be changed to read as follows:

2. The incoming air brake test should be made with all arriving freight trains and transfers, and to permit of this the incoming crews shall leave the brakes fully applied from standard pressure by a service reduction or reductions totalling 20 lb. Inspection of the brakes shall be begun immediately and completed within 20 minutes, confining it to observance of piston travel, brakes that do not apply or that leak off and to other observable leakage, and quickly indicating defects found by suitable chalk marks. On completion of this inspection make indicated repairs or mark cars for the repair tracks, as the circumstances require.

We recognize the advantage of having the slack stretched while inspecting draft rigging and air hose, but submit that since to do it effectively will require releasing the air brakes after the stop, applying rear hand brakes, pulling out the slack, fully recharging and reapplying the air brakes, an attempt to include it would increase the amount of over-time and would decrease the reliability of the incoming brake test.

The present reading of paragraph 2 discourages the incoming test, instead of recommending it, first, by the qualification, "where inspectors are stationed to make immediate inspection and repairs"; and, second, by stating that, following the application of the brakes, inspection "should be made as soon thereafter as practicable."

This inspection is mainly to determine whether the brakes are reasonably efficient, and it will assuredly be granted that a brake which has not leaked off in 20 minutes will meet with this requirement. To appreciably extend this inspection time is unwarrantedly to delay traffic and increase expense, as it will send cars with reasonably efficient brakes to the repair tracks. The alternative is that inefficient brakes will not be detected.

While in our recommended change of paragraph 2 we have referred to "standard pressure" understood for freight to mean 70 lb., attention is called to the fact that if the test is made from a higher pressure it will pass some defective brakes as satisfactory because of the greater amount of auxiliary reservoir air to be leaked away. Hence, if any road is using a higher brake pipe pressure on any moving trains we recommend that it be reduced to 70 lb. by applying and releasing before making the test application.

The haste more or less incident to the outgoing terminal test referred to in paragraph 4 will often result in the application being made before some brakes are fully charged. Hence, a reduction of 15 lb. with long trains will result in some brakes failing to apply or to hold long enough for the inspection which would be found satisfactory if they had been charged or if the reduction had been 20 lb. We appreciate the desire to combine with this test a fairly satisfactory measure of the rate of brake pipe leakage; hence, make no recommendation for a change, preferring to observe this farther.

Clause (e), paragraph 4, is a detail which cannot be determined while brakes are applied, as here stipulated. While the object will doubtless be generally understood we feel that the wording of this paragraph could be changed to make the meaning clearer.

R. H. Aishton's circular 95 of January 8, 1920, dealing particularly with avoiding delays at terminals to lessen time and a half for overtime, suggests for each important yard the need of a yard plant for testing the outgoing train before the engine is applied. We approve of this but with the distinct understanding that such cannot accomplish the needed results unless the incoming test is made.

This is not time nor place to make other than the lightest repairs, mainly stopping brake pipe leaks. In fact, if the incoming test and indicated repairs have been made as they should be. The character of the remaining work will usually be such as to enable the despatcher to figure quite accurately as to when a train will be ready. The outgoing crew would then find the train tested and charged and requiring no more brake work on their part than making the brake pipe test immediately after attaching to the train.

Conditional on evidence that operating departments really propose to provide and make use of outgoing yard brake charging and testing plants, it would be well to add to the recommended practice instructions to cover the above points.

Discussion

The discussion covered the whole field of freight brake conditions, which all have a bearing on the difficulties of getting trains out of terminals with brakes in condition to meet the requirements of the safety appliance law without causing excessive terminal delays. It was indicated clearly that freight brakes are in a generally unsatisfactory condition from the service standpoint and that this condition is not due to any one cause but to a large number of causes. Some of the causes mentioned were excessive brake pipe leakage, careless and unskilled workmanship in maintenance, neglect of maintenance, inadequacy of the customary type of attachments for brake cylinders and auxiliary reservoirs, retention in service of wornout brake cylinders in which tight packing leathers are an impossibility, and lack of appreciation and indifference of managements to the resulting loss in railroad operating efficiency.

That a high standard of brake maintenance is not only possible but practicable was indicated by the experience of several roads operating with a high percentage of their own equipment, which is retained and maintained at home. Several instances were given where railroads regularly send trains, in some cases with as many as 90 to 100 cars, from terminals with not more than two or three pounds per minute brake pipe leakage and one instance was mentioned where such a train departing from the initial terminal with a leakage not to exceed three pounds per minute, on arrival at the end of a 125-mile run tested but four pounds per minute.

That when once placed in good condition, the maintenance of a high standard of freight brake conditions is not a difficult matter was evident from the experience of the Duluth, Missabe & Northern, which was mentioned several times by members from other roads as having exceptionally good brake conditions. With a total of 7,000 cars in regular freight service on this line, it was necessary to set out on account of brake conditions but four cars in a period of twelve months. From an initial brake cylinder leakage of three pounds per minute, 2,000 cars after 24 months' service without cleaning, had developed cylinder leakage not exceeding a four-pound per minute maximum. Other roads reported as high as from 10 to 20 per cent of the brakes tested requiring recleaning in from one to three months following the last cleaning date.

The inability of the Air Brake Association alone to remedy these conditions because of the possible terminal delays at the outset and initial expense required to bring about a countrywide improvement of these conditions, was touched on several times. A significant point was brought out in connection with the establishment of the incoming test on one road where it has been in effect for a number of years. Some difficulty had been experienced in convincing the management of the desirability of the test, as the time available for repairs resulted in a material increase of the work done. It was found, however, that an increased credit balance resulted from the increases in legal charges against other roads for the extra work done on foreign cars and the presentation of this fact to the management secured approval for the establishment of the incoming brake test.

The convention voted to refer the subject to a committee with instructions to investigate conditions on the railroads, formulate recommendations and present data as to possible savings from a revenue standpoint from their establishment in practice.

Other Papers and Addresses

Two papers were submitted by the Central Air Brake Club, one on the Location of Brake Pipe Ends at Locomotive Pilots, by W. W. Wood (C. I. & L.), and one on Air Signal Valve Maintenance by James Elder (C. M. & St. P.). The St. Louis Air Brake Club submitted a report on Changes in the H-6 Brake Valve, signed by W. H. Davies, R. E. Wark and F. B. Johnson. An illustrated lecture on Modern Trains and the UC Equipment, by J. C. McCune, was submitted by the Manhattan Air Brake Club.

During the course of the convention, the association was addressed briefly by W. H. Winterrowd, chief mechanical engineer of the Canadian Pacific, and F. W. Brazier, assistant to the general superintendent of rolling stock, New York Central. R. I. Cunningham of the Westinghouse Air Brake Company gave an interesting talk on air brake conditions in France.

Business

An invitation from the American Railroad Association, Section III—Mechanical, to affiliate as a division of that organization, was brought before the association and referred to a committee which drafted a tentative set of by-laws designed to protect the interests of the association membership as it is now organized, in the event of affiliation. The matter was finally referred to the executive committee with instructions to conduct negotiations with Section III—Mechanical and report to the association at the next convention for the action of the members.

The following officers were elected for the ensuing year: President, L. P. Streeter (Illinois Central); first vice-president, Mark Purcell (Northern Pacific); second vice-president, George H. Wood (A. T. & S. F.); third vice-president, B. M. Kidd (Norfolk & Western); secretary, F. M. Nellis (Westinghouse Air Brake Company); treasurer, Otto Best (Nathan Manufacturing Company). W. W. White (Michigan Central) was elected a member of the executive committee to fill the vacancy created by Mr. Kidd's election as third vice-president.

The exhibit this year was pronounced the best in the history of the association.

The English Transport Service in France

Machinery, Organization and Emulation Were Responsible for Efficient and Business Like Results

By W. M. Acworth

In the early days of the British army in France, when no one except perhaps Lord Kitchener had any idea of the dimensions to which it would attain, the transport services were under a dual control. The Lines of Communication were in charge of an Inspector General who was stationed at Abbeville, and was responsible for the ports, the depots, and the railways leading up to the forward area. In the forward area there was a Director of Railways, who was also responsible for inland water transport, who reported to the Quartermaster-General. But the Director of Railways had a double responsibility. If he was called upon to build or add to railways in the forward area he took his orders from the Q. M. G.; behind that he was subject to the I. G. Communications. And sometimes not he at all, but the Royal Engineers, reporting to the Engineer-in-Chief at general headquarters, undertook to build extensions of the French metre gage light railways. Arrangements with the French military and railway authorities were also duplicated, and communications between railway transport officers in the two areas had to pass through the two independent organizations at the top.

That the dual organization was wrong, Mr. Lloyd George became convinced early in 1916, nearly two years before he succeeded in introducing unity of control under Marshal Foch on a larger scale and a more conspicuous stage. In August, 1916, Sir Eric Geddes arrived in France accompanied by Mr., now Major General Sir Philip Nash, an Indian railway official, and Mr., now Lt. Colonel Sir George Beharrell, an official of the North Eastern railway, and a very meagre staff. After a preliminary reconnaissance the three squatted in a Nissen hut at La Calotterie, three miles from the G. H. Q. at Montreuil. And here in a few weeks arose a new town of huts which furnished both living and office accommodation for a transport staff which ultimately consisted of about 130 officers and 400 to 500 men.

Under the Director there were three Deputy Directors General of Transport, commonly known as "Digits." One of them remained at G. H. Q., for the Director General of Transport in France was also Director General of movement and railways at home, and consequently had to divide his time between France and Englnad. The other two Digits exercised general supervision respectively in the northern and southern portion of the forward area. The H. Q. service at La Calotterie was organized in six directorates, inland water transport, docks, roads, construction and operation of light railways, broad gage railway construction, and broad gage railway transportation, this last Directorate exercising two main functions, liaison with the French railway companies and actual operation of the railways which we either took over from the French and the Belgians or ourselves built. The headquarters organization was reproduced on a smaller scale at the headquarters of each separate army.

The Railway Operating Division under Colonel Cecil Paget, formerly general superintendent of the Midland Railway, who lived for over two years in a train, had no light task. It employed over 1,600 locomotives, about half on our own lines and half on the French railways, and about 70,000 wagons. And whereas in the spring of 1917 only 20 per cent of the traffic of the British army was hauled by British locomotives, by the time the armistice came our locomotives were not only hauling all our own traffic, but actually doing a good deal of haulage on behalf of the French. Our own lines were worked according to home ideas, though with methods drastically modified to meet the special conditions, there being, for instance, not a fixed signal on the whole system. But on the French lines our men had to conform to the French regulations.

A Serious Task

To cater for an army is a serious task. A rough calculation is that a division—say 20,000 men—needs a train every other day to supply it with food, forage, clothing, petrol and other daily necessaries, not forgetting mails and parcels. And there were about 60 divisions in front line areas. And the material could not be taken straight from the ports to the divisions. It had to go from the ports to be handled and rehandled at depots and sub-depots, till it finally could be sorted and loaded for the division rail head. For the whole army supplies sometimes amounted to over 10,000 tons, say 40 train loads in a day. And "supplies," in the technical sense, were less than half the total material that the railways had to carry for the armies. Ammunition alone averaged something like 50,000 tons a week. Timber, R. E. stores, railway and road material, coal, averaged as much again.

In the month of the great push towards Arras the railways handled in all something like 1,000,000 tons of traffic. And through all this room had to be found for the ambulance trains, of which during the second battle of Ypres 21 came back from the port in a single day. And a large proportion of this traffic was dealt with on lines which, so to speak, had only come into existence over night. Between January, 1917, and the date of the armistice our construction corps laid nearly 1,600 miles of line, besides dismantling 245 miles, the need for which was over, and whose materials were used for construction elsewhere. The railway men alone formed a good sized army. There were over 30,000 employed in construction and maintenance of track, another 3,500 in the shops, and about 10,000 in actual train working.

Roads and Light Railways

Hardly less important than the railways were the roads. Somehow the roads had to be made to stand up against the enormous traffic not only of transport wagons and motor lorries, of which alone there were over 50,000 in France, but of heavy artillery and caterpillars and tanks. And the consumption of road stone, and ties and pit-props when road stone could not be got, or there was no time to lay it, was something appalling. In early days shipload after shipload of granite from Guernsey and of slag from Middlesborough was brought in. Later on local quarries, especially at Marquise near Calais, were developed. On the average something like 70,000 tons of stone were put on the roads each week. In one week the Director resurfaced over 300,000 sq. yd. or, say, 60 acres, which is precisely the area of the London Green Park. About 20,000 men and 150 steam or petrol-driven rollers were employed on the job. Some of it went by canal. There was a light railway which carried 720 tons a day to feed the water service, but Marquise in addition required 12 to 20 broad gage trains a day.

Relieving and supplementing the main railways and the roads there was a whole system of light railways with a

2 ft. gage in the forward areas. To call them a system is, perhaps, inaccurate; for, if one may quote Shelley, they were

"Withdrawn and uplifted,
Sunk, shattered and shifted
To and fro!"

They ran right up to the forward ammunition dumps, and if buried in a shell hole one minute, they were at work again the next, and always kept going, being, however, constantly taken up and relaid as the troops and guns moved. There were 1,200 miles of them in operation at one period, and in one week at the commencement of the German offensive in March, 1918, they handled 260,000 tons.

Barge Traffic

And railways and roads were supplemented again by the barge traffic. On the canals there were barges equipped as hospitals, with doctors and nursing staff complete, which were especially useful in the case of patients with abdominal wounds. There was a fleet devoted to the carriage of sick and wounded horses. But the main traffic was in road stone, engineering stores and ammunition. At Zeneghen, for instance, behind the Ypres sector, there was an ammunition depot mainly fed by water from Calais, normally containing 50,000 tons of ammunition, and intersected by 35 miles of sidings where shells could be loaded up into trucks for conveyance by rail to different portions of the area.

Except for the local road stone and some 20,000 tons a week of material loaded direct across the Channel in barges from Richborough, the whole of the supplies for the army had to be dealt with through the congested French ports. Dunkirk, a good and well equipped port, was too near the German guns and too accessible to bombing aeroplanes for its capacity to be fully used. A lucky hit on a load of ammunition might have wrecked the town. Most people know something of the capacity of Calais, Boulogne and Dieppe. Havre and Rouen were largely occupied by the French for their own necessities, but were also used to a large extent for our Southern armies in the early days. Later on the Northern ports managed to do the bulk of the work and leave to the French the space that they badly needed. The other little ports, such as St. Valery and Fécamp, could do but little. Yet the needs of the army in France were urgent and could not wait for additional quay space.

How It Was Done

In January, 1917, it was only possible to unload the waiting ships at the rate of ten tons per ship per hour. Fourteen months later the average had been brought up to 37½ tons. The explanation is to be found in three words—machinery, organization, emulation. Cranes by the score were brought from England and erected. As fast as it was landed, the material, instead of being allowed to cumber the quays, was loaded straight into trucks and hauled away to the interior depots. And, lastly, by the help of carefully kept statistics, the performance of each port was matched against the rest. To each port was allotted, according to its quay space and other facilities, a certain proportion of the total traffic; and if any port failed to discharge its allotted quantum of tonnage, the official in charge heard of it next day from headquarters. And there was competition not only of port with port, but of race with race. For if the figures showed that a labor company of Chinese had discharged 14 cwt. per man per hour, while a company of negroes had only discharged 11 cwt. of similar cargo, negroes worked their hardest to redress the balance of yellow over black the following week.

The ships that brought the traffic across were under the control of the Admiralty. But the traffic from Richborough, the "mystery port" as it was called at one time, was controlled by the Director General of Transportation throughout. Richborough had three functions: It was the point of origin of the Channel ferry which carried railway rolling stock on its own wheels, being duplicated towards the end of the war by a smaller ferry at Southampton; secondly, it was the departure and arrival point for the cross-Channel barge traffic to France, which amounted towards the end to something like 30,000 tons a week; and, lastly, it was the place to which a large amount of damaged material was barged from France for repair, and where large numbers of craftsmen, accustomed only to the works of peace, were trained for the kind of jobs they would have to perform later close behind the lines.

I have sketched above the organization of the transport machine, and essayed to give some idea of the functions of its component parts. How did the machine work as a whole? An ordinary transport undertaking in peace time, a railway or a line of steamers, is judged by results: does it pay? No such test was possible in this case. Money was not a primary consideration. Cost what it might, the work had to be done. But at least the cost should be as low as possible. And the transport organization in France claimed that by the use of statistics—planned on scientific lines, and kept up to date from day to day—of the work done and to be done, the closest possible check was kept, and means adapted as nearly as might be to the necessary ends. If a general asked for new transport facilities, he was requested to make a careful and detailed estimate of the amount of traffic to be handled. His requisition might imply a new broad gage railway, or a light railway, or a road, or perhaps nothing more than a dozen lorries or only a bunch of pack mules.

Every effort was made to see that steam hammers were not supplied when only nuts had to be broken. Week by week the program was discussed between G. H. Q. or the army commanders and the representatives of the Transport Service. If a big push was in contemplation, the Director General was informed in advance as to the number of troops to be employed, the number of guns, and the probable requirements of ammunition. He could thus decide how far the existing facilities would suffice, and if so, how the total traffic was to be apportioned between them; or, on the other hand, whether it was necessary to build new railways or light railways or roads, or to accumulate materials on the spot for their instant repair.

In the case of the attack on Vimy Ridge, to take one instance, the plan of attack as disclosed to the Transport Service implied the construction of considerable lengths of entirely new railways and of a new marshalling yard at Doullens; and even then the Transport Director had to point out that the rail heads immediately behind the forward lines would only suffice to deal with ammunition, supplies and ambulance trains, and that the supporting troops must be detrained ten miles or so behind the actual fighting line. When fighting in the Arras sector was fiercest, the traffic through Amiens station grew so congested that an avoiding line, 25 miles in length, was hastily built and brought into use. And when heavy guns were imperatively needed there were cases where broad gage railways were built right up to the trenches. At the battle of Messines Ridge the broad gage railway from Bailleul through "Clapham Junction," which for some weeks had been delivering the goods at "Daylight Corner" when shell fire did not interrupt the service, was actually less than a mile away from the German firing lines.

Perhaps the most dramatic achievement of the construction corps was at the time of the great German Push in March, 1918. Night after night the bridge over the Somme below Abbeville on the main line from Calais to Amiens and Paris was bombed by aeroplanes. In all haste our men constructed a deviation railway and a temporary bridge. And the very night after the deviation was completed the German bombs broke the permanent structure.

The Need for Additional Railroad Equipment

Railway Officers and Bankers Appear Before Senate Committee on Interstate Commerce

PROSPECTS FOR OBTAINING any considerable addition to railroad equipment this year appeared rather slim after a three-day discussion of the car shortage problem last week at Washington from the standpoint of the shippers, the railroads and the investment bankers.

An additional appropriation by the government of $500,000,000 and the immediate use of $125,000,000 from the $300,000,000 revolving fund provided by the transportation act will be needed to enable the railroads to acquire 100,000 freight cars, 4,000 passenger cars and 2,000 locomotives within a year, members of the equipment committee of the Association of Railway Executives testified before members of the Senate committee on interstate commerce on May 6. The executives appeared at the request of Chairman Cummins of the Senate committee after a delegation of shippers from the corn belt section had called on the Senate committee, the House committee and the Interstate Commerce Commission on May 5 urging the need of an improved car supply and recommending an additional appropriation of $300,000,000. They explained that they were not "knocking" the railroads but needed more cars to enable them to ship their products to market. The executives also said that a general car shortage existed and that they were unable to borrow sufficient money on their own credit, until after the result of the rate and wage readjustments is known, to buy equipment needed to remedy the situation.

Members of the Senate committee expressed an appreciation of the situation but were very reluctant to accept the proposal for an additional appropriation in view of the present state of government financing and until it has been ascertained more definitely what can be done with the $300,000,000 fund, and investment bankers who were called before the committee on the following day expressed disapproval of the plan for an additional appropriation. They declared that the market for equipment securities is very limited and that additions to railroad facilities in the immediate future must be limited to those which can be financed by the stronger roads on their own credit and by whatever amounts can be made available from the revolving fund. It was also brought out that the roads which are best able to do so have already placed orders for cars and engines to the amount of approximately $140,000,000. The question of equipment led to a general discussion of the entire railroad credit situation and while it was agreed that the transportation act would greatly improve the situation it was stated that its effect is yet to be demonstrated by concrete action by the Interstate Commerce Commission to put the rate structure on the proper level.

Roads Need Much New Equipment

E. N. Brown, chairman of the St. Louis-San Francisco and Pere Marquette and chairman of the executives' committee on equipment, said that for four or five years the credit of the railroads had been so impaired that it was practically impossible to get enough money for cars at any reasonable rate, and that most roads could not get it at all. The condition finally became such that it was necessary for the President to take over the roads. When they were returned few roads had any cash, their equipment was not up to the usual standard and they had no means of financing additional equipment. He showed that on calculations based on the former additions to equipment and the growth in traffic 226,000 freight cars would be needed to make up for the shortage of 1917, 1918 and 1919, and 9,540 passenger cars and 3,190 locomotives. To make up this shortage instantly would cost about $1,600,000,000, but after considering the capacity of the builders and the utmost possibility of financing a minimum program had been arrived at of 100,000 freight cars, 4,000 passenger cars and 2,000 locomotives as the most that could be obtained within a year. These would cost $610,000,000.

Since January 1, railroads have ordered 27,778 freight cars, 518 locomotives and 496 passenger cars. If additional cars were to be ordered now very few would be available this fall. The best rate of interest that any railroad has been able to obtain this year on equipment trust certificates has been 7¾ per cent, and bankers have advised that it is very difficult to place such securities at this time and that $100,000,000 additional would be the maximum that can be marketed, in addition to $144,000,000 already placed. Senator Pomerene asked why the roads did not go to Mr. Plumb for some of the 4 per cent money. Mr. Brown continued that the market could possibly absorb about $150,000,000 at 8 per cent, but that the bankers had given very little encouragement, saying that the sale of securities to old investors is almost impossible. The bankers say, Mr. Brown testified, that the first thing necessary is to establish railroad credit, after which they can do some financing, but the rate question and the wage question are still unknown factors. After these two problems are satisfactorily solved he thought the railroads would find themselves in a much better condition after a few months.

Mr. Brown explained that the $300,000,000 revolving fund is by no means all available for equipment. The Interstate Commerce Commission and the executives are still working on the problem of how it shall be used, but $30,000,000 to $40,000,000 of judgments against the Railroad Administration are to be taken from the fund, also the amount required to reimburse the short lines, which is estimated at about $12,000,000 and a large part of the balance will be needed for additions and betterments. Therefore, the committee had thought that if $125,000,000 of the fund could be made available in the immediate future and an additional appropriation of $500,000,000 be obtained, orders could be placed at once for the minimum program of equipment. Mr. Brown said that the equipment could be financed only by 15-year certificates and that the five-year maturity of the present revolving fund is a handicap.

Samuel Rea, president of the Pennsylvania, said that the financial condition of the railroads is to a large extent dependent on the settlements with the Railroad Administration so that they may know whether they are to have any cash. The Pennsylvania has issued $50,000,000 of bonds at 7½ per cent and expects to use $24,000,000 of that amount to pay maturities, leaving $26,000,000 for additions and betterments. The committee has undertaken to ascertain what the roads could do if they received part of the $125,000,000 from the revolving fund divided in the proportion that each road's standard return bore to the total standard return and that the information would shortly be ready for submission to the Interstate Commerce Commission. He thought this fund should be put at work as soon as possible while the question of a larger appropriation is being considered, but that the five-year maturity should be extended at least to 10 years. If this money can be made

available at once it will help the situation in the next six or eight months, but to get the equipment within a year it would be necessary to have the additional appropriation of $500,000,000.

Senator Cummins asked Mr. Rea if the Pennsylvania would have any trouble in raising money. Mr. Rea replied that it would have very great difficulty. One hundred and fifty-seven million dollars of improvements have been put on the property during federal control which it is necessary to finance and the company has repaid $22,000,000 of this amount and has just borrowed $50,000,000 additional, but no settlement has yet been made with the Railroad Administration to determine how much can be funded. He said that roads having surplus funds, such as the Southern Pacific, the Union Pacific and the Atchison, had placed large orders for equipment. In reply to a question by Senator Cummins as to what rate would have to be paid on car trusts for 10 years guaranteed by the government, Mr. Rea stated that the interest would have to be at least 6½ per cent.

A. H. Smith, president of the New York Central, said that the 100,000 cars which are now being considered ought to have been bought in 1919, but that the only hope of relief now lies in the solution of the rate question and restoration of the credit of the railroads.

Railroad Administration Holding Back Funds

Meanwhile, it is essential to do something to tide over the present situation so that the activities of the country, which are retarded by lack of transportation, can proceed. If orders could be placed promptly for equipment, the shippers would feel better, but if nothing is done they will become discouraged. Mr. Smith also spoke of the importance of a prompt settlement with the Railroad Administration saying that the railroads have not received a large part of their rental because it has been used up in providing facilities that it was necessary to provide during the war period, but which ought not to be paid for out of current earnings. The government, having taken the railroads to win the war, ought to fund these expenditures for a period of years and tide the railroads over a condition nearly as bad as the war. The government's discretion dominates the financial condition of the railroads today, because the Railroad Administration pays them only as little as it thinks they can get along with.

The railroads have not had the credit they should have for a good many years, and gradually the country has caught up with its transportation facilities and in some ways has passed them. The New York Central itself bought 40,000 cars in 1916 which were delivered in the latter part of 1917, and 1918, at prices half of the cost today. All of them went into the government service and the company received no allowance for them in its rental. Senator Cummins asked whether car equipment is being used to the best possible advantage. Mr. Smith said that was a broad question, but that under the existing conditions he thought it was. He said railroads are competing for labor with industries that can outpay them, which is part of the reason for the switchmen's strike, and while conditions have been restored to nearly normal on many roads some roads are handling only 60, 70 or 80 per cent of the traffic they should. As long as some men are being paid 65 cents an hour for pushing a wheel barrow, municipalities and states and counties are paying 75 cents for common labor, and carpenters get $1.25, he said it is no wonder that railroad men get disheartened and dissatisfied. Asked whether the Commission on Car Service is accomplishing anything, Mr. Smith said he thought that it was obtaining some results, but he said the division superintendent has difficulty in distributing cars on one division and that the problem is enormously multiplied when it is attempted to handle it from one office.

Better Use of Cars

L. F. Loree, president of the Delaware & Hudson, pointed out that the revolving fund is subject to serious limitations because all of it is not available for equipment; it is limited to five years and it can be loaned only to roads that can furnish collateral security, and many roads that need it most cannot do this. He thought the car shortage condition has been exaggerated, but that the railroads would certainly need 100,000 cars within a year and that the solution of the rate question is of the greatest importance. The difficulty has been caused, he said, because people have been trying to get something for nothing for too many years, and while cars are a capital expense adequate rates are needed to pay the interest on them. Mr. Loree said that the joint committee representing the National Industrial Traffic League and the American Railroad Association, which the Interstate Commerce Commission had proposed, had discussed several plans which he thought would bring some relief, such as heavier loading of cars, increased demurrage rates, reduction of free time, a reduction of reconsignment privileges, restriction of the use of order bills of lading, etc.

C. H. Markham, president of the Illinois Central, emphasized the necessity of making provision for early car orders so that the builders can make necessary arrangements for materials.

E. J. Pearson, president of the New York, New Haven & Hartford, and chairman of the transportation section of the American Railroad Association, which had made up the estimate of 100,000 cars, said that that was a minimum figure arrived at after making several compromises, taking into consideration the capacity of the builders, the possibility of securing materials and the ability to pay for them. He pointed out that the traffic situation which confronts the railroads should not be measured by the average of last year, but by its heaviest months, and said the best that can be offered the shippers is the promise that the railroads will do the best they can with available facilities until their credit is improved by a rate advance and they can do their own financing.

The proposed 100,000 freight cars includes 20,000 refrigerator cars, 50,000 open-top cars, 20,000 box cars, 5,000 stock cars and 5,000 flat cars.

Bankers Do Not Favor Additional Appropriation

The bankers were inclined to disapprove an additional appropriation on the ground that it would complicate the government financing and the general credit structure and it was stated that a government guaranty of car trust certificates would have the same effect. J. G. Hanauer, of Kuhn, Loeb & Co., appeared as chairman of the committee of investment bankers and instead of the appropriation he suggested that Congress extend the period of the $300,000,000 loan from 5 to 15 years, also that a large part of the sum be used for the improvement of terminals and perhaps for some increase in motive power, and that the railroads endeavor to expedite the movement of cars and reduce to a minimum the requirements for new equipment.

Senator Cummins said every one realizes that neither the merchant, the manufacturer, nor the banker can prosper without adequate transportation facilities and that it seems to be agreed that $600,000,000 should be raised this year and he thought it would be necessary to get it in some way. He asked the bankers whether the principal obstacle is distrust of the earning power of the railroads or the rate of interest. F. W. Allen of Lee, Higginson & Co., said that the principal difficulty is the limited supply of investment capital available. Railroad credit had been improved by the passage of the transportation law but the increase in rates is needed to produce the full effect.

Charles E. Mitchell, president of the National City Bank,

said the whole subject is tied up with the general financial problem and that of the three great reservoirs of capital for investment, institutions, the large individual investor and the small individual investor, the latter is the only one available. The Federal Reserve system places a limit on the credit structure measured by the supply of free gold and that has nearly been reached on account of the expansion we have been through. It is, therefore, not a question of the interest rate but where the money is to come from. Railroad financing is in absolute competition with half a dozen other kinds of government and corporate demands and in view of the world-wide conditions the rate at which railroads have already been able to borrow this year is really a very low one. If the railroad bill had not been passed, he said, they would not have been able to borrow at 7½ per cent. Senator Cummins asked whether it would be better to try to raise the money by taxation or by trying to put securities on the market. Mr. Mitchell said that any increase in taxation would be a very serious step because taxation is already having a strangling effect and he thought securities should be placed on the market as fast as they can reasonably be absorbed.

S. Davies Warfield, president of the National Association of Owners of Railroad Securities, said that the principal need of the railroads at the present time is re-establishment of their credit so that they may meet their maturing obligations and place themselves in a condition to finance themselves. He objected to the idea of using up the $300,000,000 fund until after the Interstate Commerce Commission has had an opportunity to make a thorough survey of the situation and of the needs of the various roads and said that if the government is to appropriate money for equipment it should be used for the creation of a national equipment trust to purchase and finance equipment for all the railroads. He pointed out that the railroads have been returned without a dollar in their treasuries and that they could not be expected to have credit at the present time because they cannot pay the government for the additions and betterments it has made and borrow new money on that basis. A large equipment trust which would place the cars under a central management would require less equipment than if the cars were owned by competing companies, and he did not see how Congress could be expected to put up additional money until the railroads have had an opportunity to show what can be done under the new rates. He laid great stress on the necessity of providing some way for the railroads to pay back to the government what they owe it and to keep some of the loan fund in reserve if it is necessary to meet maturities. "You want a little more light on this situation before you use up this $300,000,000 fund," he said.

Mr. Warfield also emphasized the necessity of spending a good deal of money on the equipment to improve its condition and that the same amount of money might accomplish more if used in this way. Senator Cummins said there will be no undue haste with regard to the proposed $500,000,000 additional appropriation until Congress has had an opportunity to see what disposition is made of the $300,000,000 fund. Mr. Warfield also objected to the plan suggested by the executives allocating the fund on the basis of the proportion of the standard return.

Senator Cummins and Senator Robinson agreed with him on this, saying that their understanding of the purpose of the act was that the fund should be used for the weaker roads. Alfred P. Thom, counsel of the Association of Railway Executives, said that this purpose had been largely nullified by the requirements as to security. He also pointed out that the executives had originally urged a $750,000,000 appropriation, and that the Senate had passed the bill with provision for $500,000,000, but that the House had reduced the amount.

J. R. Swan, vice-president of the Guaranty Trust Company, said that heretofore there has been a feeling among the investing public that the Interstate Commerce Commission has rather leaned toward the side of the shippers, but that since the passage of the new law it has shown more disposition to recognize a degree of responsibility to the security owners. He thought if the idea could be "got across to the investing public" that the commission is endeavoring to improve railroad credit the situation would be greatly improved, as, generally speaking, the public would rather buy railroad securities than any others. He said the railroad issues that have been made recently have been the most successful that have ever been made. The public is looking for a new deal, he said, and while the new law has been very favorably received, they want to see the Interstate Commerce Commission back it up by action. He also thought that it would be wise to proceed cautiously in issuing securities for the reason that a failure would have a very bad effect, and he also said any railroad receivership at this time would have a very bad effect.

E. B. Sweezey, vice-president of the First National Bank, said he was optimistic on the railroad situation and believed that the country is facing favorable developments. He thought the strongest roads could sell a certain amount of securities now, but that there are a large number of railroads that could not sell any, and that the law should be amended so that the Interstate Commerce Commission can loan to the railroads that cannot borrow on their own account. He said the bankers recognize the necessity of giving precedence to the railroad problem, and he thought that probably $150,000,000 to $250,000,000 might be raised on the equipment securities of the stronger roads. If the government would duplicate this amount out of the loan fund for the weaker roads he thought the problem would be solved.

Mr. Hanauer pointed out that during the last two months about $125,000,000 of securities have been issued by the stronger roads, and he thought that during the next few months it might be possible to sell a considerable amount additional, but that it would be necessary for the railroads to actually see the money before they could make much use of it.

Mr. Thom said the Interstate Commerce Commission is giving consideration to the per diem question and is very likely to raise the per diem rate.

Throughout the hearing there was considerable criticism of the policy of the Railroad Administration, which it was stated has adopted the attitude of a collection agency whose only interest is in regaining for the government the sums invested in railroad improvements during federal control, as quickly as possible.

Amendments to the section of the transportation act which provides for the $300,000,000 revolving fund to meet the suggestions made at the hearing were discussed on Monday at a conference between Senator Cummins, Representative Esch and Commissioners Clark, and Meyer, and were approved at a meeting of the Senate Committee on Wednesday. It was agreed to change the provision requiring the loans to be repaid within 5 years to 15 years, but sentiment appeared to be against increasing the amount. Another change approved was to make clear that the fund may be used for loans to meet maturities. While the Interstate Commerce Commission has taken the position that the fund may be used for such purposes, the Treasury Department has taken the position that it is available only for new facilities. It was also decided to amend the section so as to permit of car trust certificates being used as security for a loan. Senator Cummins was authorized to draft the amendments.

TEN YEARS AGO the railroads had the ill will of the government and the people; they now have good will. That is an asset which they will value the more highly because it is newly acquired.—*Portland (Ore.) Oregonian.*

Rate Advance Hearings Are to begin May 24

THE INTERSTATE COMMERCE COMMISSION is moving promptly to the consideration of the railroads' applications for increases in rates to comply with the standard prescribed by the new transportation law and to meet the increases in expenses which have occurred since the rate advance ordered by Mr. McAdoo in 1918.

Announcement was made on May 11 that the commission has decided to deal with the carriers in three groups, eastern, western and southern, and that hearings will be held before the commissioners at Washington, beginning on May 24, without waiting for its determination as to the aggregate values which it will use as the basis for the 5½ or 6 per cent return contemplated by the law. The applications filed by the eastern and southern roads, accompanied by statements showing the amount of increased revenue which they believe is necessary, were published in detail in last week's issue and that of the western lines, which was not filed until the later part of the week, is printed in this week's issue. Printed copies of the three applications which had been announced by the Association of Railway Executives last week, were made public by the commission in connection with its announcement of the hearing by being placed on the press table in the secretary's office.

The commission's notice to all interested parties was as follows:

"Pursuant to the purposes of section 15(a) of the interstate commerce act, section 422 of the transportation act, 1920, and at the suggestion of the commission, the carriers in official, southern and western classification territories, respectively, have filed with the commission applications for authority to increase rates for the purpose of securing from those rates the revenue which the carriers believe to be essential to the successful operation of their properties and to which they believe they are entitled as a fair return upon the value of their properties in the groups referred to.

"These applications are supported by suggestions of the carriers as to the manner in which the increase should be spread over the traffic. In general they propose to secure the revenue from increased freight rates, asserting that it is inadvisable to make a general increase in passenger fares.

"The commission has decided to deal with the carriers in three groups, to wit—those whose lines are substantially all within official, southern and western classification territories, respectively.

"It is not deemed necessary that before proceeding with hearings on these applications the commission shall determine the aggregate property values for these several and respective groups which it will use in carrying out the provisions of section 15(a). It is deemed desirable and important that hearings on these applications shall be had at an early date. The commission cannot with satisfaction to itself or to the interested parties or with justice to the issues involved assign this subject for hearing at various points before examiners. It is wholly impracticable for the members of the commission to hear all or substantially all of the evidence elsewhere than at Washington. It will, therefore, begin hearings on these applications at its offices in Washington on Monday, May 24, at 10 o'clock a. m.

"There are certain considerations of a general character applicable alike to the situation in each of these groups. It is desirable to avoid duplication of that or any other evidence in this proceeding. The commission will hear first the carriers in official classification territory, together with the evidence of a general character which is applicable to all of the territories. It will then hear the carriers in southern classification territory, followed by those in western classification territory. It will then hear evidence of a general character applicable to all of the territories in opposition to the proposals, followed by evidence in opposition to the proposals of the official, southern and western classification territories in the order named. It is impracticable at this time to indicate the time that will be devoted to each of the several branches of this subject."

The procedure at the forthcoming hearings is expected to vary somewhat from that of previous general rate advance cases, in that it will not be confined to particular tariffs previously filed by the railroads, and also in the fact that there is no longer any room for argument as to whether there shall be an increase in rates. The fact that there must be a large advance in order to put the railroads on the self-sustaining basis which the Railroad Administration never attained—because in 1918 it underestimated its increase in expenses and because in 1919 it could not settle upon the proper measure of increase—is this time the principal self-evident factor in the entire proceeding and merely the starting point of the case.

The opportunity for differences of opinion will lie in the question of the value to be taken as the basis and in the distribution of the burden of bearing the advance found necessary in the adjustment of the rates. Presumably there will be some among the numerous representatives of the shippers that will participate who will make an effort to shave the amount of the advance by contending that a 5½ per cent return is sufficient without the additional ½ per cent which the commission is given discretion to allow for what are usually referred to as "unproductive" capital improvements. Room for argument will also be afforded in the necessary speculation as to the probable volume of traffic, since tonnage as well as the rate level is a factor to be considered in determining how to produce a given amount of net revenue. It is believed, however, that the principal contention will be as to the figures to be used for the aggregate property values. The carriers have set up a figure to be the target in suggesting their book value of $20,600,000,000. As each billion dollars of reduction from that total would represent a difference of $60,000,000 in the amount of net operating income to be raised, the commission will not be without plenty of volunteer assistance in locating any weak spots or suspicious items in the property accounts and the discrepancy between the books of the Kansas City Southern and the items of value or of cost thus far found by the commission's Bureau of Valuation will probably be worked overtime.

The association of state railroad commissioners is understood to be planning an aggressive campaign along this line, and some of the spokesmen for shippers who in the past have been the most bitter opponents of rate increases are expected to concentrate particularly on the question of value, but on the whole it is believed that the atmosphere of the hearings will be considerably less controversial than that of former rate cases, and that most of the shippers' representatives will be on hand for the purpose of protecting their clients' interests in the matter of differentials and relationships.

TRANSPORTATION is just as important to the farm hand and timber cutter in the interior of any southern state as it is to the owner of mines, mills or to the owner of railroad securities.—*Memphis (Tenn.) Commercial Appeal.*

STARVING THE ROADS will not produce cars or new mileage or passenger trains. The nation, as a whole, must judge whether it prefers to get along without new transportation facilities or whether it believes them to be sufficiently important to it to pay for them. This is the main point involved in the hearings before the Interstate Commerce Commission.—*N. Y. Journal of Commerce and Commercial Bulletin.*

The Critical Period Under the New Railroad Law*

The Need for Patience and Co-operation During Time of Unsatisfactory Transportation Service

By Walker D. Hines,
Director General of Railroads

THIS OCCASION furnishes a convenient opportunity for me to make to my newspaper friends some valedictory comments upon the railroad situation and particularly as to the prospects of the success or failure of the transportation act of February 28, 1920. These prospects are almost wholly dependent upon the degree of public satisfaction with current results of railroad operation. I wish, therefore, first to discuss three phases of railroad operation which will have an important bearing upon public sentiment. These phases are the service rendered the public, the relations with labor and the rates charged the public.

In discussing these matters I shall necessarily have to refer to what I regard as causes of some of the existing conditions. I shall do this purely for the purpose of stating the facts and not for the purpose of implying that blame ought to attach to the thing done or that blame ought to be attributed to any particular agency. The war brought about such radical and rapid changes in conditions that one should be exceedingly careful before charging any particular agency with blame for a result which may be the inevitable outgrowth of unavoidable conditions, or for a delay which may have been wholly unavoidable in view of the magnitude and complexity of the problem. We are entering upon a new transportation era, and the practical thing is to view conditions as they are and take them as a starting point rather than to engage in the unprofitable task of trying to decide who is to blame for existing conditions. During federal control the fashion was quite general to blame the United States Railroad Administration for every unsatisfactory feature connected with railroad transportation. This attitude was so completely wrong and its error is already being so clearly demonstrated by the facts that there is a strong temptation for me to go into the blaming business myself, but I shall refrain from any such course, because while there might be personal gratification in it there would not be any element of public service in it.

The public's paramount interest is in obtaining adequate and satisfactory service, and in the long run any scheme of management or regulation which fails to produce this result will be condemned. The first requisite, therefore, of success of the railroad managements under the new transportation act is that they shall render satisfactory service.

But it is in the highest degree important that the public shall hold in reserve its judgment as to service until a reasonable opportunity can be had for providing the necessary facilities and equipment. The war conditions have prevented the normal increase in facilities and equipment, and the termination of unified control will make existing facilities and equipment do less work than they could and did perform under unified control. Therefore, as a practical proposition, it cannot be expected that railroad service will be satisfactory until there can be an opportunity to make substantial additions to facilities and equipment.

In 1915, 1916 and 1917 the amount of provision for facilities and equipment was below normal because of the complications created by the war, including the high prices and scarcity of labor and material, impairment of railroad credit, etc.

During federal control the expenditures for the improvement of the railroads were unavoidably reduced to a minimum. During the year 1918 the demand for material and labor for other war activities was such that no railroad improvements could be undertaken except those that were believed to be absolutely necessary as measures calculated to help win the war. During 1919 the expenditures had to be kept to a minimum because of the clearly indicated policy of Congress and the public to turn the railroads back to private management just as soon as legislation could be adopted and to keep government expenditures for railroad improvements down to a minimum pending the adoption of legislation and the return of the railroads to private management.

Specifically, the acquisition of additional equipment during federal control was absolutely limited by the war restrictions during 1918 and by the financial restrictions during 1919. An impression appears to prevail in some quarters that the Railroad Administration ought to have bought additional equipment and that the present extraordinary impairment of transportation through shortage of equipment is due to some failure on the part of the Railroad Administration to buy more equipment than was bought. This impression is without foundation. During 1918 the Railroad Administration ordered all the equipment for which it could hope to get materials. Early in 1919 the director general suggested the adoption of a substantial and definite extension of federal control to admit of carrying forward a comprehensive program for obtaining needed facilities and equipment so as to insure satisfactory transportation service, but this was emphatically opposed by the railroad executives, numerous elements of the public and Congress. The railroad executives strongly opposed paying for even the equipment which the director general had ordered, and it required practically continuous effort throughout the year 1919 to induce the railroad companies to accept the equipment already ordered, and repeated arguments were made by them to the effect that they did not need the equipment which had been ordered and that it ought to be paid for by the government as a war emergency. Congress early manifested the most pronounced unwillingness to make any appropriations for the Railroad Administration beyond its absolute necessities. In such circumstances, with the railroad companies unwilling to take even the equipment ordered and Congress unwilling to encourage or provide for any further expenditures on the part of the government, the construction of additional equipment was out of the question.

On October 7, 1919, the attention of the interstate commerce committees of the House and Senate was called by me to the pressing needs of the railroads of the country for additional facilities and equipment, and the consequent necessity for promptly establishing a basis of certainty upon which the railroad companies could go ahead and make the improvements and additions which the Railroad Administration was powerless to make. The legislation, however, despite the most arduous efforts of those committees, was not passed until the end of February, 1920, and the existing financial difficulties and uncertainties have been such that it is not apparent even yet that the railroad companies have been able to make substantial progress toward obtaining the facilities and equipment which are now so far in arrears and which are so urgently needed.

In such circumstances, with an enormous volume of busi-

*Address before the National Press Club, Washington, D. C., on May 11, 1920.

ness being insistently offered for transportation, with a long suspension of the normal increase in facilities and equipment, with continued hesitation in making beginnings in that direction, and with a breaking off, to a considerable extent, of unified practices which prevailed during federal control, the public must be prepared for an unsatisfactory transportation service, and I strongly advise the exercise of patience and good temper in putting up with a service that, especially as measured by volume of freight traffic moved during periods of heavy demand, is, and promises to continue for some time to be, less satisfactory than was rendered during federal control.

Need for Capital Expenditures

I cannot too strongly emphasize the supreme importance of putting and keeping the transportation service on a basis where it can raise the necessary funds for needed facilities and equipment. I believe an expenditure of one billion dollars per year is an exceedingly moderate estimate, on the basis of present prices, as to the capital expenditure which must be made upon the railroads of this country to meet satisfactorily the demands for transportation. The man not intimately acquainted with railroad affairs finds it difficult to understand the magnitude and pressing character of the demands for additional capital expenditures. The need for additional equipment is understood with reasonable ease, and that need alone perhaps calls for $600,000,000 or more per year, but in addition to that there is on nearly all railroads need for great enlargement of terminals, generally in costly localities, modernization of shops and engine houses and construction of additional shops and engine houses, provision of additional main tracks and passing tracks, construction of passenger terminals, the putting in of heavier bridges to admit of the use of heavier power, the reduction of grades and curvature, the installation of safety signals, the elevation of tracks in streets, the elimination of grade crossings, etc., etc. On any railroad system of considerable importance the number of demands for capital expenditure which would promote efficiency and convenience of operation is bewildering in its extent and variety, and no scheme of railroad management and regulation can permanently succeed unless it is able to draw from some source the capital necessary to make these expenditures.

Let me say in passing that this matter of putting the transportation service on a rate basis to admit of the raising of the necessary funds was a matter wholly beyond the power or the scope of the Railroad Administration. It was a matter which Congress clearly indicated by its discussions throughout the year 1918 ought to be dealt with according to the normal rate-making processes of the Interstate Commerce Commission, and this was emphasized by the passage of a bill in the fall of 1919 which provided that any rates initiated by the President should be subject to suspension by the Interstate Commerce Commission and that no intrastate rates could be initiated by the President except with the consent of the state commissions. Moreover, the federal control act contemplated the initiation of rates by the President only for the purposes of unified control and did not contemplate his undertaking to make rates designed to protect the credit of the railroad companies operating independently. A rate increase necessary to meet the costs of unified operation would apparently have been substantially less than what would be needed for purposes of establishing railroad credit under private control. It is also true that no reliable basis existed for general rate changes in the year following the armistice, because railroad operations fluctuated in an unprecedented way; first a six months' slump in freight traffic, then four months of heavy traffic and then two months of a nation-wide coal strike. The whole subject of rates sufficient to protect the credit of the railroads in private operation was properly and indeed necessarily a subject to be referred to the commission, in accordance with the permanent legislative policy to be established by Congress for private management.

A considerable amount of the funds necessary for these capital purposes can and ought to be derived from current income. The annual rental for Class I railroads, paid by the government to the railroad corporation during federal control, was about $900,000,000. It was estimated that after paying fixed charges and dividends there remained a surplus of about $150,000,000 available for capital expenditures. In addition to this, the charges to operating expenses to create a reserve fund for the depreciation of equipment produce a reserve of over $100,000,000 per year which may properly be employed in the purchase of equipment. The result is that, even on the basis of the annual rental of $900,000,000, about $250,000,000 or more would be available out of income, year by year, for capital purposes. If the new rate basis established by the transportation act shall, as is contended by the railroads, be computed on the basis of the book values of the railroad properties, the annual return to the railroads will be more than $200,000,000 in excess of the $900,000,000, so this would make an annual amount available out of income for capital expenditures of approximately $450,000,000, although this will probably be appreciably reduced by the heavy interest charges which must be paid for new money. It will be seen, therefore, that even on this basis, after obtaining for expeditures, for facilities and equipment probably $400,000,000 or $480,000,000 annually out of surplus income, perhaps $600,000,000 per year of new money will have to be raised in order to take care of needed improvements, and in addition to this the companies must raise substantial amounts, perhaps averaging $200,000,000 or more per year, to pay off existing funded debt as it matures from time to time.

Therefore the financial problem ahead of the railroad companies in raising the money needed for facilities and equipment is of the most serious character, especially in view of the burdensome rates of interest which must now be paid, and calls for the most sympathetic attention by the public and the commission.

With regard to the question of increases in railroad rates, we have another subject concerning which the public needs to show patience and philosophy. It is agreed on all hands that on account of the increased costs, which appear to be still increasing, a substantial increase in rates is necessary.

A considerable part of the public was misled into thinking during the period of federal control that the increased railroad costs were not due to the new conditions growing out of the war which were affecting correspondingly all other business activities but were merely due to federal control of the railroads. The error in this view is strikingly shown by the proposals of the railroad executives for increased rates. The railroad executives represent that, in order to pay the necessary return to the railroad companies and the necessary increases in operating costs, railroad rates must be raised so as to produce one billion dollars more revenue every 12 months, without taking into consideration any increases in wages. Yet the excess of the railroad rental and the railroad expenses over the revenues during the entire 26 months of federal control was only $900,000,000. When the railroad executives represent that they need one billion dollars more every 12 months, they strikingly prove that heavy increases in cost are not confined to federal control. After making all allowances for the increase in the compensation to the railroads over the rental paid during federal control and for all other factors, the proposals of the railroad executives confirm me in the conviction I have entertained for some time that in the present exceedingly troublesome period the cost of private railroad operation will be greater than the cost of federal control would be.

I earnestly urge upon every element of the public the most cordial acquiescence in the conclusion the Interstate Commerce Commission may reach in regard to that matter. That commission, after deciding what operating expenses are reasonable and proper and what tentative valuation shall be put on the railroad property, will adopt a rate scheme sufficient to produce the return which the transportation act contemplates, and while that rate scheme will probably involve substantial increases in rates, it ought to be cheerfully accepted by the public as an indispensable element in properly supporting the transportation system of the country and in giving it the credit which is essential to the proper enlargement of facilities and equipment.

The Labor Situation

Turning to the labor situation, that, of course, has a vital relation to the rendition of service. I believe a brief review of recent history will be serviceable in enabling the public the better to appreciate the point of view of labor. In August, 1919, demands for increased wages, aggregating more than $800,000,000 per year, were being pressed by railroad employees. It was evident that these wage increases, if granted, would be permanent. It was necessary, therefore, to regard them as a peace-time proposition, although asserted during the period of war control of the railroads. I strongly advised that a peace-time tribunal, on which the public would be represented, should be at once created by Congress to deal with this matter, and the President so recommended. The Congress, however, was unwilling to deal with this question in advance of the adoption of general railroad legislation, and indeed railroad labor itself violently opposed any such tribunal, although it is now clear that much time would have been saved if such a tribunal had been promptly created. When it became evident that Congress was unwilling to create a wage tribunal in advance of general railroad legislation, the President took the position that while it would be proper for the Railroad Administration to readjust inequalities as between different wage schedules, the employees ought to withhold their demands for general increases pending a better opportunity to estimate the trend of the cost of living. He indicated that if the developments as to the cost of living should not take sufficiently definite shape for action by the end of federal control, which it was then expected would be December 31, 1919, he would continue to use his influence to see that justice was done to the railroad employees.

In December, 1919, it became evident that Congress could not complete its legislation in less than two months' additional time, and therefore federal control was continued until the end of February. It was obvious, however, that in that brief remaining period the Railroad Administration could not possibly undertake general wage increases and thereby forestall the action of the labor machinery to be created by the new legislation. The employees were asked again to withhold their demands until the new machinery could be organized. While both in August, 1919, and in February, 1920, the employees felt greatly disappointed that action on their demands was postponed, they loyally accepted the situation. Every other element of the public applauded the action taken in deferring this matter until it could be dealt with by the new and permanent labor machinery.

When the transportation act was approved a period of 30 days had to elapse in order to give time for nominations to be sent to the President, in accordance with regulations of the Interstate Commerce Commission, for positions on the labor board. Meanwhile the railroad representatives and the representatives of labor, in response to a request from the President, had begun a conference, as was contemplated by the new act, with a view to endeavoring to agree upon wage increases. About April 1, just about the time the 30 days for making nominations to the President had expired and before the President had had an opportunity to transmit his appointments of the members of the labor board to the Senate, the representatives of the railroad companies took the position that the amount of wage increases demanded was so great that they were not willing to discuss the merits of them with the representatives of the employees and that the whole matter must be referred to the labor board. Since the transportation act directed that an effort be made on the part of the managements and employees to agree, and since the labor board had not even come into existence, the action thus taken in breaking off these negotiations created the most widespread disappointment on the part of railroad employees. I believe this disappointment, coming on top of the long delay in dealing with railroad wages, which in turn was the inevitable outgrowth of the inability to get the legislation adopted at an earlier date, contributed very greatly to the state of mind on the part of the employees which made practicable the insurgent strikes which we have been seeing in various parts of the country.

I think the public ought clearly to appreciate that this transition from federal control to private control, delayed as it necessarily was by the inability to complete the legislation at an earlier date, coupled with the subsequent breaking off of negotiations with the managements and employees, has subjected the employees to the greatest uncertainty and disappointment, and hence I think the public should view in a sympathetic spirit any action which the labor board may take to bring about an expeditious decision upon this important problem.

I also wish to say, and I say this with the keenest appreciation of the difficulties through which the employees have gone, that I believe it continues to be of the highest importance in their own interest, as well as in the public interest, for them to maintain the splendid record of staying on their jobs which the great majority of them established throughout the difficult period of the war, realizing that the delays have been the unavoidable outgrowth of the fact of the transition to private control, which transition was itself unavoidably delayed, and that the new system must have time to get started.

I believe the labor machinery created by the new act is a highly important forward step, and when once action can be taken upon the matters which have been so long pending, and which could not have been adjusted in advance of the creation of permanent peace-time labor machinery, the labor situation will distinctly clarify itself.

Next Two Years Critical Period

I regard the next two years as a peculiarly critical period. The opportunities for the development of discontent are very great. The increases in rates cannot inspire enthusiasm, and service is bound to be unsatisfactory, especially until a large amount of new equipment can be constructed. Yet both these factors ought to be regarded as necessary incidents of the time in which we live. If the public will philosophically adjust itself to these unfavorable conditions, and this critical period can be gone through without a revulsion of feeling which will prevent a fair trial being given to the transportation act, I believe there is a great deal to hope for in that act, although I believe further modifications will be found to be necessary.

The transportation act has established some highly important and radical reforms which I believe are clearly in the public interest. It has created a definite standard for rate-making and has given the commission the specific jurisdiction to take the responsibility of initiating rates. The act provides for the excess revenues of the exceptionally prosperous carriers being divided, so that part will become a permanent government fund to be devoted to aiding in improvement of railroad facilities. It provides a greatly improved method of studying and dealing with labor problems. It provides a uniform and exclusive control over railroad securities. Out of these provisions there will necessarily grow a closer contact

and a better understanding between the railroad executives and the commission than has ever been the case in the past, and I hope there will also grow a closer contact and a better understanding between railroad labor and the railroad executives than has ever existed in the past.

Adequate Degree of Unification Needed

The one leading respect in which I believe the act falls short of the necessity of the situation is that the act leaves the several hundred railroad companies of the country still free to operate each on its own account. I do not believe there can ever be a successful, permanent development of the theory of private management of the railroads of this country without far-reaching and thoroughgoing consolidation into a few large systems. While the present act permits voluntary consolidations when sanctioned by the commission and requires the commission to work out a program looking toward the consolidation of the railroads of the country into a few large competitive systems, I seriously doubt whether substantial results can be accomplished in the absence of further legislative provisions which will either compel consolidations or offer such inducements to consolidations as will insure their taking place.

We cannot turn back or arrest the great currents of human progress. One of those currents is the irresistible movement in the direction of unification of transportation so as to promote the general public interest. The rate structures apply equally to the different railroads. Joint rates and through routes must be established, regardless of the selfish interest of particular railroads. The freight cars of the country are already universally interchangeable. The terminals of the country are already subjected to a common use to a large extent and must be subjected to a greater common use. Railroad wages and working conditions have been steadily moving towards a standardization for many years, and the process was necessarily accentuated during the period of unified government control. All of these elements of national scope in railroad operation must be accepted and others developed in order to promote the greatest degree of public convenience.

I do not believe this great and necessary movement toward unification for the public good can proceed as it ought to do without far-reaching consolidation of the numerous different railroad interests. At present there are perhaps 50 or 60 different railroad interests of large extent and importance and several hundred of smaller extent and importance. This condition results in conflicting interests and policies which are not only contrary to the public good but are detrimental to the best interests of the owners of the railroads. I believe, therefore, that the movement toward consolidation of different railroads must be carried forward in a definite and effective way, and that if we are to avoid government ownership we must have in place of it a very few large railroad systems through which an adequate degree of unification may be accomplished with a minimum of conflicting policies and methods.

I do not think there has been an adequate appreciation of the importance, both directly and indirectly, of the unifications which were put into effect during and for the period of federal control, and I believe a substantial economic loss will be suffered by the country to the extent these unifications are dissipated, and that eventually the advantage will have to be regained through some enforced consolidation into a few large systems.

The Government as a Holder of Railroad Securities

One of the important things which has necessarily come about as a result of the conditions created by the war is that for the first time in its history the government has become a large owner of railroad investments. It now owns $354,000,000 of equipment trust certificates and about $490,000,000 of additional railroad debt which will be evidenced by notes or bonds. In addition it appears probable that most of the $300,000,000 appropriation made by the transportation act will be loaned to the railroad companies. The prospect, therefore, is that the government at an early date will hold approximately $1,100,000,000 of the railroad securities of the country. If, in addition, the proposals just made by the railroad executives to Congress should be adopted and $500,000,000 additional be loaned to the railroad companies, the government's holding of railroad investments would be increased to $1,600,000,000. This is perhaps one-twelfth or more of the total value of the railroads of the country. The development of such a governmental interest has been the necessary outgrowth of the war conditions, and indeed was authorized by the federal control act of March 24, 1918. The necessity for this policy has grown out of the fact that it seemed wholly impracticable under the unprecedented conditions created by the war for the railroads to derive from private sources the capital necessary to obtain indispensable facilities and equipment, and the congressional policy is merely an expression of this fundamental necessity of the situation which had become apparent even prior to the beginning of federal control of the railroads. It has been the carrying out of this proper and inevitable congressional policy that has produced the existing holding by the government. Congress has further confirmed this policy by the funding provisions of the equipment trust act, which was passed November 19, 1919, and by the funding provisions of the transportation act of 1920, contemplating the funding of the government's debt due from the railroads which was thus created during federal control. Congress in its adoption by the transportation act made an extension of this policy by providing the additional fund of $300,000,000, most of which the act apparently intended should be loaned to the railroad companies, the government taking railroad securities in exchange therefor.

In contemplating the future relations of the government to the railroads, it is important to bear in mind that for a long time to come the prospect is that the government will be the owner of an impressive total of railroad securities, and it is a question whether this total may not increase instead of diminish as the years go by.

I have no reason to anticipate that I shall have any further connection with the railroad operations of the country, and therefore I believe I can look at the present and prospective situation from a standpoint of reasonable detachment. From that standpoint my advice to you gentlemen, and through you to the people of the country, including the railroad employees, is to give the new transportation act a fair trial, to realize that the readjustments growing out of the war must take considerable time and must put transportation rates on a substantially higher basis and that service must be unsatisfactory pending large acquisitions of facilities and equipment. The prospects of success will be promising if there can be an attitude of patient support on the part of the public and a proper disposition on the part of the corporate agencies and labor agencies to co-operate with each other and with the commission.

ELEVEN STRIKING SWITCHMEN were recently arrested at Salt Lake, Utah, on a charge of violation of the Lever and Transportation Acts. At preliminary hearing before United States Commissioner H. V. Van Pelt on May 5, the defense, in petitioning for a demurrer, alleged that the complaint did not state a public offense, that it was ambiguous, that it charged violation of two acts in one complaint, and that the men were not guilty of violation of the Transportation Act, inasmuch as they did not use physical force to gain their ends; and that the Lever Act is invalid.

Railroad Labor Board Moves to Chicago

W. J. Lauck Claims That Only 2½ Per Cent of the Railway Workers Now Receive Living Wages

WASHINGTON, D. C.

THE RAILROAD LABOR BOARD on May 8 terminated its hearings at Washington, which have been devoted to the testimony of the representatives of the railroad labor organizations that are asking further increases in wages, and announced that it would have a week of executive sessions before opening its permanent headquarters at Chicago on May 17, where it will receive testimony on behalf of the railroad companies at a later date. Regarding the questionnaires proposed by the railroad conference committee to be sent out for the purpose of gathering statistical information, bearing on the case, the board ruled that it would not for the present restrict or advise as to the character of the information which either side may submit nor as to the manner in which they may determine to submit data. The railroad committee had proposed to send out the questionnaires on its own account but had submitted them to the board for its approval or suggestions and the labor organizations had objected to the delay they said would be involved in compiling the information.

The concluding testimony before the board was presented by Timothy Healy, president of the International Brotherhood of Stationary Firemen and Oilers; B. M. Jewell, president of the Railroad Employees' Department of the American Federation of Labor, and W. J. Lauck, consulting economist appearing on behalf of all the railroad organizations. Mr. Healy devoted most of his statement to an attack on the position taken by Attorney General Palmer that the recent strikes have been caused by communistic activities and asserted that the government had engaged in a propaganda against labor, as being largely responsible for the high cost of living, instead of taking the necessary steps to prevent profiteering. Chairman Barton felt it necessary to ask the witness to tone down his reflections on the government.

Mr. Jewell appeared on behalf of the six shop craft unions and presented to the board the original demands which were presented to the Railroad Administration on January 7, 1919. A small increase was granted to the shop employees in August, 1919, but the general demands were held in abeyance and Mr. Jewell asked that they be allowed by the board retroactive to January 1, 1919, with the addition of a percentage to represent the increase in the cost of living since they were originally presented. Mr. Jewell said he represented 425,000 employees on roads that had been under federal control and he asked that the awards be applied to all roads. Because the conference committee declined to consider a demand that the national agreement and wage orders of the Railroad Administration be confirmed for the future the entire proposition had been submitted to the individual roads and the results will be certified to the board when reports are received. The original wage demand provided for a minimum rate of 85 cents per hour for first-class mechanics, 60 cents for helpers and various differentials above these amounts for special classes of service and for foremen. It was also asked that the rates be incorporated in the national agreement.

Mr. Jewell denied the contention that the regularity of employment of railroad shop employees is such as to justify a lower rate of pay than is paid in other industries and he submitted many statistics to show the irregularity of railroad employment. Last year, he said, thousands of shop employees had been laid off but now so many men are leaving the service because of the higher wages elsewhere that those who are left are generally working overtime, and many roads are having work done by contractors who pay as high as 90 cents an hour for work done by regular employees at 72 cents. He said the average rate for railroad mechanics paid by the Railroad Administration was 69.88 cents an hour, while generally speaking the pay of comparable mechanics in other industries varies from $6.40 to $10 a day and over.

Mr. Lauck, who as a witness for the engineers and firemen in the western arbitration case a few years ago attracted some attention by presenting a statistical theory that the "productive efficiency" of train men had increased faster than their rates of pay, pursued a different line of argument on this occasion. He presented elaborate statistical exhibits entitled "An analysis of the effect of increased wages and profits upon commodity prices," to show that the high cost of living is entirely due to profiteering and that increased wages to labor are in no way responsible for increased prices.

Mr. Lauck submitted several thousand typewritten pages of tabulations, charts, statements, and comparative statistics to show that the wages paid to labor have fallen far behind the increase in the cost of living and to show that increased prices have redounded to the benefit of capital with no corresponding compensatory return to labor. His statement to the Labor Board was concluded with the submission of the following general demands in the name of the railroad workers:

"1. Labor in general, and railroad labor in particular, must have wage increases proportionate to advances in living costs.

"2. In the present crisis, and for all time to come, producers and middlemen must be restrained from advancing prices in excess of increases in labor and material costs.

"3. Producers and middlemen must refrain from including income and excess profit taxes in their costs and passing them on to the consumer with an added profit.

"4. The principle of a living wage must be accepted and established in order that normal production may be restored and increased production hoped for in all fields of industry."

Mr. Lauck also presented a series of studies of the cost of maintaining a family at a level of health and reasonable comfort from which he concluded that the railroad employees should have a minimum wage of $2,500 a year, because, he said, even if a man has no family he should be allowed to accumulate a surplus that will enable him to get married.

Placing the sum of $2,500 as the very least upon which an American family can maintain itself in even decent poverty under existing conditions, Mr. Lauck submitted to the board compilations to show that only 2½ per cent of the railroad workers are receiving a living wage today, and he asserted that this small percentage is composed of division officials, general mechanical foremen, other supervisory groups and road passenger engineers and motormen.

"Of the whole army of wage workers in the transportation industry in the United States today," said Mr. Lauck, "44 per cent of their families are underfed, 69 per cent are underclothed and 61 per cent of them are overcrowded or inadequately housed. On the basis of what is accepted as the most accurate estimate of a bare subsistence level of earnings, which is $1,700 per year, 88 per cent of the

country's railway workers are attempting to maintain their families below a bare subsistence level. More than 600,000 railway employees do not earn, in a normal working year, $1,073, below which figure nearly three-quarters of the families are undernourished and seven-eighths are underclad.

"Here is the entire transportation system of the country, not with its unskilled alone below the level of subsistence, but with seven-eighths of its entire working force below this level, and a large proportion actually below the starvation wage. Whole classes—the largest classes in the railway service—must face the prospect of seeing their families without the barest necessities of physical wellbeing, while only a small proportion can look forward after nearly a lifetime of service, to attaining even an approximation to normal comforts.

"These statements are made conservatively. They are made on the basis of the most reliable figures in existence in the world today on the effect of various income levels on family life, namely, the studies made for the Russell Sage Foundation by Dr. Robert Coite Chapin, scrupulously revised as of this date.

Says $1,280.30 Is Average Pay

"The average yearly wage paid to the entire number of railroad workers in the United States today is $1,280.30 for a normal working year of 306 eight-hour days, allowing nothing for sickness, emergency or irregularity of employment. Compared with $1,700, the lowest subsistence wage budget worthy of consideration, and $2,533, the bureau of labor statistics' minimum comfort budget for Washington, D. C., this average alone should be sufficient to compel immediate relief for the railroad workers of the country. So great is the issue that there can be no question as to the practicability of paying rates which will make possible for 2,000,000 families a standard of health and reasonable comfort. Let no one dare to say that it would be a good thing if it were only possible. No such 'ifs' are permissible. A living wage is the only practicable answer to the present industrial situation. It is the only possible answer in terms of citizenship. Any other answer will only postpone the settlement until conditions render a real solution more difficult—if not forever impossible."

Later the board announced that it had denied a hearing to the American Train Dispatchers' Association on the ground that its application did not comply with the provisions of the law.

Mr. Hines Retires as Director General

WALKER D. HINES' resignation as director general of railroads becomes effective on May 15, and he is to sail at once for Europe to act as arbitrator in determining the ownership of a number of vessels, formerly under the German flag, which were given up by the terms of the peace treaty. The President was asked by a number of interested nations to appoint an arbitrator. At the same time Mr. Hines retires from the railroad business, as he severed his corporate relations shortly after becoming connected with the Railroad Administration in 1918 as assistant to Director General McAdoo, resigning as chairman of the board of directors of the Atchison, Topeka & Santa Fe.

Mr. Hines gave a "valedictory" address before the National Press Club at Washington on Tuesday evening, which is published elsewhere in this issue.

A proclamation from the White House appointing Max Thelen, now director of the Division of Liquidation Claims of the Railroad Administration, as Mr. Hines' successor, is expected before the end of the week.

Mr. Hines was born February 2, 1870, at Russellville, Ky. He was graduated from Ogden College in 1888 with the degree of B. S. and from the University of Virginia in 1893 with the degree of LL. B. He entered railway service in 1893 as assistant attorney of the Louisville & Nashville, which position he held until 1897, when he was appointed assistant chief attorney. From 1900 to 1904 he was first vice-president of the same road, and from 1904 to 1906 he was a member of the law firm of Humphrey, Hines & Humphrey at Louisville. In 1907 he became a member of the law firm of Cravath, Henderson & deGersdorff. In 1906 he was appointed general counsel of the Atchison, Topeka & Santa Fe, and in 1908 became chairman of the executive committee of that road while continuing his private law practice, and he was later elected chairman of the board of directors of the same road. In connection with his law practice Mr. Hines represented numerous important clients in litigation before the Interstate Commerce Commission.

A Scene on the Transandine Railway

Recent Developments on the Railways of England

Sir Eric Geddes Gives Some Figures on Railway Operation—Local Strike—Shopmen's Award

By Robert E. Thayer
European Editor of the *Railway Age*

London.

Sir Eric Geddes, Minister of Transport, replied before the House of Commons some time ago to the criticisms of members of the House regarding the transport situation in England.

In speaking of the general situation he reiterated the statement which is common knowledge that the railways had been called upon to handle a very large amount of traffic which before the war was handled by coastal service and even at the present time this service had not picked up its pre-war load. The railways are hauling coal from Northumberland and Durham to London, an almost unheard-of thing before the war, and from Wales to London in quantities that were almost undreamed of before the war. He said that the country must remember that with the government guaranteed dividends to the railways there existed no direct incentive to economy on the part of those operating the railways. The incentives of profit and the advancement of the individual were required, and they had not operated since the beginning of the war. There was the sense of devotion to duty, and the management and staffs had done their work with great patriotism and zeal, but the other incentives were wanting. Besides that, there were no statistics. When the Ministry of Transport came into existence there were no returns or records showing what the railways were carrying, owing to the depletion of staffs. The income of the railways was £250,000,000, and the outgoing was £200,000,000. It was decided that there must be a proper system of check on this vast expenditure. The railways agreed that there must be such a check. That check was established. The accountants of the ministry sat with the accountants of the railway companies in checking the expenditure. That was a side of the activities of the ministry which he thought few members of the House had realized. Ninety per cent of the cost of the Ministry of Transport was justifiable on that work alone.

Position of Railway Traffic

Dealing with the railway traffic position, Sir Eric took the 16 principal railways, proceeding on the basis that if the railways reasonably soon attained the 1913 basis they were not doing badly in the way of recovery. He said that on June 30, 1919, there were 650,000 freight cars belonging to the railways in the country, a deficiency on December, 1913, of 45,000. In December, 1919, the deficiency was down to 19,000, and it was still going down very fast. Today 40,125 freight cars were on order. For the three months ended November 30, 880 freight cars were produced per month, and for the last three months the average had been 1,668 a month. On September 30, 1919, 42,000 freight cars were waiting for repair, or 5.7 per cent of the total stock. In December that had come down to 24,000 freight cars awaiting repair, or 3.3 per cent, whereas in America 5.6 per cent of the rolling stock was awaiting repair. On June 30, 1919, there were 17,700 locomotives in use in traffic. That was 1,100 less than at the end of 1913. By December, 1919, that deficiency had come down to 293. The railways were not pushing on with passenger cars as fast as with other things, and advisedly so, because they had to consider essentials. In 1919, notwithstanding the increase in fares, passengers who bought their tickets for the journey were 156,000,000 more than the railways had ever carried in any year in their history, and in addition to that the season tickets went up by 50 per cent, which was estimated at another 100,000,000 to 150,000,000. Today they might take the carriage of passengers as nearly 300 millions more than it was in the boom year.

The only satisfactory measure of what a railway was doing was to take weight with distance, Sir Eric continued, but he had not got the ton-mile figures. He had, however, the gross freight receipts for 1919 and for 1913, and 1919 was not a year in which any increase of freight rates had been made. Irrespective of government traffic the railways earned £5,000,000 more at similar rates in 1919 than in 1913. There was a total of £21,000,000 of services performed for the government.

The actual tonnage carried during the last half of 1919 was affected very much by the railway strike, but the House might take it that it was 1 per cent less in the same period of 1913. But it was carried farther, and undoubtedly much more freight was earned. That was not a favorable figure, and it was the one blot on the statement. It was, however, steadily improving. The fourth quarter of 1919 showed an increase over the previous quarter of 10 per cent in the tonnage carried, and there was much more work done. That day he had received the returns for January of the Great Northern, Great Western, Lancashire & Yorkshire, London & North-Western, and the Midland Railways, a fairly representative bunch, and they showed another 10 per cent on top of the monthly average for the last quarter of last year. The train mileage comparing the first and second halves of last year was 4 per cent up. Everything was going up. As regarded tonnage carried he doubted whether they were not today on top of the 1913 tonnage. That was the chaos and muddle of which the railways were accused.

Of course, the ports were congested. The ports had the aftermath of the war to face. Coastal shipping was notoriously not pulling its load, and was being used for wrong purposes. The ports of London and Liverpool were usually thrown up as showing the chaotic conditions and breakdown of the railways. Liverpool always exported less than she imported. It never made its own empties; it always had empties sent to it on balance. The traffic forwarded from Liverpool—mainly dock traffic—was 26 per cent higher for the whole of 1919 than for 1913, and 1919 had a lean beginning and a fat end, and the fat end was going on. London was a far more difficult place to work because of the congestion, but it showed an increase of 5 per cent on 1913, the boom year. There were 600 freight cars a day more out of Liverpool, and 80 freight cars a day more out of London. There never would be a country in which they would not be able to find actual complaints against the railways. That was part of the reason why the railways were there. But generalizing, taking the whole figures comparing what the railways were doing today with what they did in 1913, he contended they were doing their share in the reconstruction of this country in a way that deserved credit and not blame. He asked the house to give the credit to the railway managers and the railwaymen.

A dangerous situation threatening the stoppage of the Lancashire & Yorkshire railway was cleared up at a conference between Arthur Watson, general manager of the Lancashire & Yorkshire; Ashton Davies, the general superintendent

of the line, and Mr. Abraham, president; Mr. Cramp, general secretary; and other representatives of the National Union of Railwaymen. The cause of the strike was the suspension of a driver for refusing to do additional work on his return from his regular trip. In the background was the question of the "control" system, which has been established with the object of securing the most effective use both of engines and men. There is reason to believe that the protest of the driver was not the irresponsible act of an individual, but a deliberate measure to review the working of the "control." When the driver declined to drive a particular train he had already worked seven hours five minutes, and the additional duty would have lengthened his working day to nine hours 50 minutes. The man he refused to relieve had to work twelve hours and a half. A protest against the suspension of this driver was made by the Wakefield branch, and the case was reviewed by the management, who decided that there was no reason to alter its first decision, and that the suspension must stand.

J. H. Thomas, general secretary of the National Union of railwaymen, stated that the union was behind the strikers, and would see them through. A conference was arranged and the terms of the settlement are as follows:

1. The record against the driver is to be expunged on his giving an assurance to his shed foreman that the action he took was not in defiance of the discipline.

2. The representatives of the union agreed that trainmen should continue to give effect to the instruction of the management through their "control," and that they should do all they possibly could to co-operate with the management in dealing with the large amount of traffic.

3. Having in view the desirability of securing smooth and efficient working through the control system, a committee of representatives of the company and of the men will be set up forthwith.

At a meeting of the men at Wakefield on March 25, it was agreed to accept the agreement and return to work at once.

Railway Shopmen's Award

An award was issued on March 24 by the Industrial Court on the application made in February of the National Union of Railwaymen for an advance of 15 shillings ($3.60) a week for all men and women in railway shops, and seven shillings six pence ($1.80) a week for boys and girls, such to include all those employed in electric generating stations on railways in the United Kingdom. The claim was based on the cost of living, but the court found that the increase in the cost of living has not been so considerable as to justify any further advance on that ground alone.

The award states: "The court, after careful consideration, have come to the conclusion that there shall be a general alteration in wages by an advance in the time or day rates of 6s. per full ordinary week, or 1d. and ½d. per hour according to the custom of payment in the various workshops, and of 15 per cent on present list or net piece-work prices. The advance in the time or day rates shall apply to male workers of 21 years of age and over other than apprentices, and the advance on piece-work prices shall apply to all male piece-workers irrespective of age. The advances shall take effect as follows:—3s. per week, or ¾d. (three farthings) per hour, or 7½ per cent, as the case may be, as from the beginning of the pay period immediately following March 31, 1920, and similar advances as from the beginning of the pay period immediately following May 31.

"The advances granted are to be taken into account in the calculation of payment for overtime and night duty, and for work on Sundays and holidays, and such allowances as are computed on basis rates, and will form part of the total earnings of time and piece workers, upon which the bonuses of 12½ per cent and 7½ per cent, respectively, are to be calculated. The advance to time-workers is to be regarded as being in addition to present time rates and shall be taken into account for the purpose of fixing new piece-work prices, or calculating bonus earnings."

The court will deal with the case of men in the generating stations in a supplementary decision.

Mark W. Potter Appointed to I. C. C.

THE PRESIDENT on May 6 sent to the Senate a nomination for the appointment to the Interstate Commerce Commission of Mark Winslow Potter, a member of the law firm of Hornblower, Miller, Garrison & Potter of New York, and president of the Carolina, Clinchfield & Ohio. Mr. Potter was born on January 9, 1866, at Kaneville, Ill., and was educated at the high school at Aurora, Ill., and at New York University Law School. For the past 15 years he has been interested in the development of the natural resources of the Appalachian Highlands, embracing mountainous sections of Kentucky, Virginia, Tennessee and North Carolina and in connection with this he became interested in the Carolina, Clinchfield & Ohio, of which he became counsel in 1905. In 1907 he was elected chairman of the board and in February, 1911, he was also elected president. Mr. Potter took an active part in the negotiations for the financing of the standard equipment ordered by the Railroad Administration.

M. W. Potter

The appointment of Mr. Potter, together with the recent appointments of Henry Jones Ford and James Duncan, if confirmed by the Senate, will complete the membership of the commission, which was increased to 11 by the recent transportation law.

Confirmation of the three appointments to the Interstate Commerce Commission was discussed at a meeting of the Senate committee on interstate commerce on Wednesday, but no action was taken and it is strongly rumored around the Capitol that these appointments, together with several others recently made by President Wilson, may be held up for the rest of the present session of Congress, which is expected to adjourn about June 5, which would mean that they would go over until November or December.

1919 Rail Production
Lowest in Five Years

THE PRODUCTION OF RAILS in the United States in 1919 was the lowest since 1914. According to the statistics issued by the American Iron & Steel Institute the number of gross tons of rails rolled last year was 2,203,843 as compared with 1,945,095 tons for 1914, 2,944,161 for 1917, and 3,636,031 for 1910. The table below shows a comparison of the rail production last year (by processes) with those of a number of years previous. One point of interest to be noted is that while rail production gradually increased during the European war, it fell off suddenly during the period of government control. Another fact of interest in this table is the small rolling of Bessemer rail in 1919, 214,121 tons or 9.71 per cent of the total, as compared with 19.45 per cent of the production in 1918.

PRODUCTION OF RAILS BY PROCESSES, IN GROSS TONS

Years	Open-hearth	Bessemer	Rerolled*	Electric	Iron	Total
1904	145,883	2,137,957	.....	.....	871	2,284,711
1905	183,264	3,192,347	.....	.....	318	3,375,929
1906	186,413	3,791,459	.....	.....	15	3,977,887
1907	252,704	3,380,025	.....	.....	925	3,633,654
1908	571,791	1,349,153	.....	.....	71	1,921,015
1909	1,256,674	1,767,171	.....	†	.....	3,023,845
1910	1,751,359	1,884,442	.....	†	230	3,636,031
1911	1,676,923	1,053,420	91,751	462	234	2,822,790
1912	2,105,144	1,099,926	119,390	3,455	.....	3,327,915
1913	2,527,710	817,591	155,043	2,436	.....	3,502,780
1914	1,525,851	323,897	95,169	178	.....	1,945,095
1915	1,775,168	326,952	102,083	.....	.....	2,204,203
1916	2,269,600	440,092	144,826	.....	.....	2,854,518
1917	2,292,197	533,325	118,639	.....	.....	2,944,161
1918	1,945,443	494,193	101,256	.....	.....	2,540,892
1919	1,893,250	214,121	96,422	50	.....	2,203,843

*Rerolled from old steel rails. Included with Bessemer and open-hearth steel rails from 1904 to 1910 inclusive.
†Small tonnages rolled in 1909 and 1910 but included with Bessemer and open-hearth rails for these years.

The total production of rails as given above includes, in addition to new rails rolled, rails rerolled from defective rails and from old rails. The total of renewed or rerolled rails so included is given in gross tons below.

PRODUCTION OF RENEWED AND REROLLED RAILS, 1911-1919

Years	Rolled from new ingots, new defective rails, etc.			Rolled from old rails	Total rerolled
	Openhearth	Bessemer	Total		
1911	2,631	19,379	22,010	91,751	113,761
1912	13,140	29,446	42,586	119,390	161,976
1913	13,052	30,741	43,793	155,043	198,836
1914	13,538	13,234	26,772	95,169	121,941
1915	6,477	2,652	9,129	102,083	111,212
1916	1,711	2,149	3,860	144,826	148,686
1917	1,825	7,182	9,007	118,639	127,646
1918	13,296	19,462	32,758	101,256	134,014
1919	1,933	5,766	7,699	96,422	104,121

The next table shows the production of rails by weight per yard which records a further falling off of the production of rail weighing 100 lb. per yard or over. The 1919 rolling was 478,892 tons, whereas the maximum figure obtained in 1916 was 766,851 tons. There was some recovery in the case of rail weighing 85 lb. and less than 100 lb., but the total of 965,571 tons for 1919 is still considerably under the 1,225,341 tons of 1916.

PRODUCTION OF RAILS BY WEIGHT PER YARD, 1902-1919

Years	Under 45 pounds	45 and less than 85	85 and less than 100	100 pounds and over	Total Gross tons
1902	261,887	2,040,884	645,162		2,947,933
1903	221,262	1,603,088	1,168,127		2,992,477
1904	291,883	1,320,677	672,151		2,284,711
1905	228,252	1,601,624	1,546,053		3,375,929
1906	284,612	1,749,650	1,943,625		3,977,887
1907	295,838	1,569,985	1,767,831		3,633,654
1908	183,869	687,632	1,049,514		1,921,015
1909	285,736	1,024,856	1,743,263		3,023,845
1910	260,709	1,275,339	2,099,983		3,636,031
1911	218,758	1,067,696	1,536,336		2,822,790
1912	248,672	1,118,592	1,960,651		3,327,915
1913	*270,405	†967,313	2,265,062		3,502,780
1914	*238,423	†309,865	868,104	528,703	1,945,095
1915	*254,101	†518,291	742,816	688,995	2,204,203
1916	*295,535	†566,791	1,225,341	766,851	2,854,518
1917	*308,258	†882,673	989,704	763,526	2,944,161
1918	*395,124	†665,165	888,141	592,462	2,540,892
1919	*263,803	†495,577	965,571	478,892	2,203,843

*Includes rails under 50 pounds.
†Includes 50 pounds and less than 85 pounds.

New York - Philadelphia
Motor Truck Service

THE AMERICAN MOTOR FREIGHT CORPORATION, in business a little over two years, now operates 18 five-ton trucks daily, except Sunday, between New York and Philadelphia (about 90 miles) and moves 80 tons of merchandise a day. From a descriptive notice issued by the National Automobile Chamber of Commerce (New York) we take the following notes concerning this corporation's business.

The corporation, capitalized at $10,000, is incorporated under the laws of the state of Pennsylvania. It was organized by two truckmen, who pooled their equipment and interests. Five truckmen now comprise the corporation and hold the entire stock issue. The equipment used by the corporation belongs to the individual stockholders and is under contract with the corporation. Each truckman is paid a flat rate for each round trip. When new equipment is found necessary, each truckman member makes a personal purchase and at present each of three stockholders owns four trucks while two own five each.

The corporation operates but one line—New York to Philadelphia. The trucks do no way business except at Newark. Shipments are collected and delivered by service cars, which act as feeders to the large trucks. Through trucks travel at night via the Lincoln Highway, arriving at the depot in the morning. They are reloaded in the afternoon and that night return to their point of origin. At present the corporation has nine trucks traveling each way each night. Four trucks are held in reserve for repair and emergency work. At 80 tons a day and an average rate of $1.00 per 100 lb. the gross annual revenue is about $250,000.

In a period of less than two years the corporation has been able to reduce its rates 36 per cent while railway express rates have increased 28 per cent. The minimum truck rate is now 80 cents per 100 lb., while the railway express rate is $1.15. The first-class freight rate is 33 cents; adding carting charges, at points of origin and delivery, say 15 cents, would amount to 30 cents, thus bringing the freight cost up to 63 cents.

Merchandise shipped from either terminal depot is delivered to the consignee the following day. Railway express shipments now take at least two days and sometimes a week. Less-than-carlot freight takes a minimum of three days and frequently as long as twenty-one days to cover the same distance. During two recent heavy snowstorms, the trucks were unable to travel for three days; before and since then the service has been uninterrupted.

About fifty per cent of the goods hauled consists of fresh beef, chemicals, cloth and paints. The Victor Talking Machine Company sends all its phonographs and records from Camden, N. J., to New York City by this line. A large paint concern sends all its shipments to Philadelphia by motor truck, finding that instead of using heavy, expensive wooden containers they can use fiber containers, lighter and less expensive. The cost of hauling to and from the railroad at points of origin and delivery, the difference in cost of material and labor between wooden and fiber containers, and the more expeditious service make the trucks the cheaper.

When first organized the corporation found it necessary to employ a number of business solicitors for it had great difficulty in securing enough merchandise for solid loads. Now it has more business than it can handle with its 22 trucks; eight more have been ordered. The corporation's depot in New York measures 8,500 sq. ft. and that in Philadelphia 50,000 sq. ft.

Among the advantages that decide shippers in favor of motor transportation are:

Closed vans, which are locked while the truck is in tran-

sit. Railroad freight cars, while lying in yards awaiting unloading are more or less unguarded. Merchandise consigned to a certain point is placed on a truck bound for that point, so that the shipment cannot be misdirected or sent to a foreign point. A misdirected shipment means a delayed shipment. Perishable merchandise rapidly loses much of its market value; rapid delivery is a very important factor.

Railroad Employees and Their Compensation for January

WASHINGTON, D. C.

THE RAILROAD ADMINISTRATION has compiled a table showing the number of hours and days worked by railroad employees and their compensation for the month of January, 1920, which gives an indication of the wage scale as it stood at the end of federal control, although the figures represent the *earnings* of the employees during the month rather than the *rates* of pay and are, therefore, affected by the conditions that prevailed during that month.

The statement shows a larger number of employees, 1,953,571, than has been shown in any previous compilations issued by the Railroad Administration. For January, 1919, the total was 1,871,035. The volume of traffic was greater this January than last. A previous statement published by the Railroad Administration gave the number for December, 1917, as 1,703,748 and for July, 1919, as 1,894,287. The increase from December, 1917, to January, 1920, therefore, is 249,823.

The number of hours worked and the number of days worked also show increases.

The total payroll for January was $258,290,393. This was for 232,014 miles. This is also larger than has been shown in any previously published statement. The total compensation for December, 1917, was $153,039,988. For

EMPLOYEES AND THEIR COMPENSATION

MONTH OF JANUARY, 1920, COMPARED WITH SAME MONTH OF PREVIOUS YEAR

	Class of employee	Number of employees		Hours worked		Days worked		Compensation 1920		
								Amount	Per hour	Per day
		This year	Last year	This year	Last year	This year	Last year	This year	This year	This year
1 and 2	General officers	7,534	7,177	.....	.....	210,417	196,687	$2,707,549	....	$12.87
3 and 4	Division officers	12,905	12,208	.....	.....	381,999	364,064	3,214,476	....	8.41
5 and 6	Clerks	228,164	215,885	49,217,047	48,296,142	.....	.....	26,818,064	$0.545	....
7	Messengers and attendants	10,620	9,893	.....	.....	295,378	278,932	786,260	....	2.66
8	Assistant engineers and draftsmen	10,024	10,817	.....	.....	267,988	291,335	1,551,249	....	5.79
9	M. W. & S. foremen (excluding Nos. 10 and 26)	8,048	8,043	.....	.....	222,351	231,546	1,282,998	....	5.77
10	Section foremen	40,822	40,513	.....	.....	1,155,058	1,169,638	4,699,419	....	4.07
11	General foremen—M. E. department	1,806	1,735	.....	.....	53 912	52,466	457,937	....	8.49
12	Gang and other foremen—M. E. department	25,019	21,879	.....	.....	714,726	628,140	5,042,724	....	7.06
13	Machinists	64,568	55,213	15,064,548	12,732,455	.....	.....	10,957,147	.727	....
14	Boiler makers	20,172	17,304	4,664,925	4,131,705	.....	.....	3,577,120	.767	....
15	Blacksmiths	10,707	9,910	2,287,786	2,071,142	.....	.....	1,713,294	.749	....
16	Masons and bricklayers	1,064	1,285	1,207,037	252,710	.....	.....	127,573	1.057	....
17	Structural iron workers	564	758	113,574	114,019	.....	.....	78,120	.688	....
18	Carpenters	52,196	56,423	10,720,783	11,961,688	.....	.....	6,787,378	.633	....
19	Painters and upholsterers	12,079	11,000	2,453,707	2,253,240	.....	.....	1,667,866	.680	....
20	Electricians	14,213	12,820	.....	.....	389.915	356,467	2,300,990	....	5.90
21	Air-brakemen	8,151	7,074	1,838,944	1,600,470	.....	.....	1,321,686	.719	....
22	Car inspectors	25,750	24,896	6,260,066	6,347,785	.....	.....	4,509,010	.720	....
23	Car repairers	89,712	82,570	18,808,257	18,353,187	.....	.....	13,095,156	.696	....
24	Other skilled laborers	58,931	57,787	13,052,074	13,194,075	.....	.....	9,126,231	.699	....
25	Mechanics' helpers and apprentices	128,296	109,748	28,560,927	24,999,820	.....	.....	14,479,174	.507	....
26	Section men	250,003	254,306	52,807,378	57,900,647	.....	.....	20,007,165	.379	....
27	Other unskilled laborers	120,717	125,797	25,995,728	29,841,224	.....	.....	11,258,807	.433	....
28	Foremen of construction gangs and work trains	1,542	2,209	354,270	494,505	.....	.....	211,595	.597	....
29	Other men in construction gangs and work trains	20,138	30,987	4,632,479	6,581,133	.....	.....	1,899,240	.410	....
30	Traveling agents and solicitors	1,269	1,181	.....	.....	34,078	32,148	226,963	....	6.66
31	Employees in outside agencies	847	927	.....	.....	21,482	24,496	123,431	....	5.75
32	Other traffic employees	489	442	.....	.....	12,880	11,777	84,927	....	6.59
33	Train despatchers and directors	5,809	5,501	1,348,066	1,346,879	.....	.....	1,343,664	.997	....
34	Telegraphers, telephoners and block operators	21,550	21,638	5,135,728	5,192,710	.....	.....	2,903,740	.565	....
35	Telegraphers and telephoners operating interlockers	8,015	7,880	1,918,757	1,855,840	.....	.....	1,120,311	.584	....
36	Levermen (non-telegraphers)	3,711	4,086	890,370	997,197	.....	.....	472,169	.530	....
37	Telegraphers—clerks	12,130	11,520	2,891,537	2,825,747	.....	.....	1,609,623	.557	....
38	Agent—telegraphers	19,353	19,204	4,722,294	5,099,312	.....	.....	2,753,932	.583	....
39	Station agents (non-telegraphers)	13,774	14,349	.....	.....	397,418	427,634	1,999,856	....	5.03
40	Station masters and assistants	656	618	.....	.....	19,579	18,415	104,866	....	5.36
41	Station service employees (except Nos. 5, 6, 37, 38, 39, 40, and 66)	118,587	102,835	26,654,250	24,895,551	.....	.....	11,434,144	.429	....
42	Yardmasters	4,001	4,069	.....	.....	121,766	122,990	974,907	....	8.01
43	Yardmasters' assistants (not yard clerks)	3,468	3,481	.....	.....	103,656	104,122	735,388	....	7.09
44	Yard engineers and motormen	22,093	20,137	5,671,853	4,946,452	.....	.....	4,325,302	.763	....
45	Yard firemen and helpers	22,338	20,646	5,659,336	4,944,829	.....	.....	3,186,985	.563	....
46	Yard conductors (or foremen)	21,663	19,891	5,444,330	4,799,080	.....	.....	3,764,583	.691	....
47	Yard brakemen (switchmen or helpers)	54,209	51,803	13,045,695	11,795,650	.....	.....	8,455,391	.648	....
48	Yard switch tenders	6,328	5,570	1,522,916	1,519,439	.....	.....	780,948	.513	....
49	Other yard employees	4,974	4,789	1,215,134	1,217,660	.....	.....	497,918	.410	....
50	Hostlers	11,847	10,119	3,024,521	3,215,953	.....	.....	1,728,821	.572	....
51	Enginehouse-men	76,711	72,813	19,523,093	21,931,479	.....	.....	8,494,047	.435	....
52	Road freight engineers and motormen	33,635	32,621	8,865,881	7,906,751	.....	.....	8,756,161	.988	....
53	Road freight firemen and helpers	35,924	34,978	8,946,416	7,986,382	.....	.....	6,490,723	.726	....
54	Road freight conductors	27,736	25,720	7,578,646	6,636,551	.....	.....	6,157,946	.813	....
55	Road freight brakemen and flagmen	67,737	63,888	18,023,540	15,967,390	.....	.....	11,285,071	.626	....
56	Road passenger engineers and motormen	12,651	11,943	2,785,793	2,695,654	.....	.....	3,298,216	1.184	....
57	Road passenger firemen and helpers	12,335	11,725	2,671,047	2,601,296	.....	.....	2,345,032	.878	....
58	Road passenger conductors	10,516	10,031	2,463,415	2,329,838	.....	.....	2,392,411	.971	....
59	Road passenger baggagemen	5,522	5,213	1,330,108	1,270,023	.....	.....	902,931	.679	....
60	Road passenger brakemen and flagmen	15,354	14,219	3,475,861	3,245,673	.....	.....	2,323,307	.668	....
61	Other road train employees	3,691	3,470	862,001	831,211	.....	.....	464,326	.539	....
62	Crossing flagmen and gatemen	22,741	21,692	.....	.....	677,942	675,548	1,791,671	....	2.64
63	Drawbridge operators	1,550	1,516	.....	.....	46,010	45,825	150,898	....	3.28
64	Floating equipment employees	9,324	7,860	2,450,297	2,241,233	.....	.....	1,374,774	.561	....
65	Express service employees	.....	.....	.....	.....	.....	.....	.....	....	....
66	Policemen and watchmen	11,771	10,855	.....	.....	357,649	330,165	1,424,804	....	3.98
67	Other transportation employees	5,833	5,449	.....	.....	764.752	162.000	637,735	....	3.87
68	All other employees	19,684	18,119	.....	.....	561.012	532,977	1,694,243	....	3.02
69	Totals	1,953,571	1,871,035	396,160,415	391,421,727	6,209,968	6,057 372	258,290,393	.571	5.15

Count of employees taken as of January 16, 1920, and January 16, 1919, in accordance with I. C. C. rules.

Average per day and per hour shown opposite Class 69, "Totals," are for those classes only whose time is reported by days and by hours, respectively.

Back pay and hours or days relating to back pay eliminated from January, 1920, figures.

January, 1919, it was $230,140,935, and for July, 1919, it was $226,140,935.

The average compensation per hour for employees whose time is reported on an hourly basis, in January, 1920, was $.571 and the average compensation per day for those reported on a daily basis was $5.15. For December, 1917, the average hourly compensation was $.342 and for July, 1919, it was $.532. For December, 1917, the average daily compensation was $3.52, and for the month of July, 1919, it was $4.93.

Dividing the total compensation paid by the number of employees gives an average monthly compensation of $132.25, which compares with $119.38 for July, 1919, $89.83 for December, 1917, and $83.64 for the calendar year 1917.

Increase in Rates on French Railroads

By Francis Jaques

PARIS, FRANCE.

ON FEBRUARY 23, new rates were put into effect on all French railroads, increasing the old tariffs by a large margin. This radical measure was not adopted without serious and mature consideration, and only after long discussions in the Chamber of Deputies and Senate, during which numerous amendments to the law proposed by the new Minister of Public Works, M. Le Trocque, were voted down.

Passenger Fares

For the passenger traffic, the increase in fares amounts to 45 per cent on third-class, 50 per cent on second-class, and 55 per cent on first-class tickets. This increase in fares is added, however, by taking as a basis for the calculation the old tariffs before the 25 per cent tax, put into effect on April 15, 1918, to replace the former tax of 12 per cent, and before the increase of 25 per cent made in the rates in March, 1918. To obtain the new price of a ticket today the following method is employed:

1. The 25 per cent tax is deducted from the existing price of a ticket.
2. The 25 per cent increase is then deducted from the sum thus obtained.
3. According to the class, 45, 50 or 55 per cent of the resulting sum is then added to the existing price of the ticket.

A concrete example will explain very clearly this calculation, which at first reading may appear somewhat complicated. Take a second-class ticket, for instance, costing 1 franc on February 22. First the 25 per cent tax is deducted, leaving 80 centimes. Secondly, the previous increase of 25 per cent is deducted from this sum, leaving 64 centimes. Thirdly, 50 per cent of the 64 centimes, being the percentage for second-class tickets, is added to 1 franc, the price of the ticket of February 22. We thus obtain 32 centimes plus 1 franc, making 1.32 francs, the new cost of the ticket.

On certain suburban lines of the State and Est Railroads, where there are only first and second-class cars, the 50 per cent increase provided for second-class tickets is applied to first-class, and the 45 per cent increase, usually used for third-class, is applied to second-class tickets.

In order to avoid the complicated calculations which would be necessary to determine the new price of tickets by carrying out the provisions of the law as above indicated, the railroads have adopted coefficients to be used which give the new prices much more rapidly and sufficiently accurately. The figures employed for these coefficients are the following: 1.288 for third-class tickets, 1.32 for second-class tickets, and 1.352 for first-class tickets.

The increase in rates on return trip tickets is calculated in exactly the same way, employing the same coefficients.

Exceptions to the Increase of Rates.—In putting into effect the new tariffs, it was found necessary to make certain exceptions. For instance, people who held season tickets on February 22 were allowed to use them until their time was up, even in cases where the payments are made on the instalment plan and have not been entirely completed.

Commercial travelers will also escape the new tax. The companies are going to give certain privileges to working people living in the suburbs of all the big cities, who earn less than 6,000 francs a year, or less than 8,000 where they have a family to support, and paying an annual rental less than 1,000 francs in the first case and 1,600 francs in the second case.

Freight Rates

All freight rates were also increased on February 23. The tariffs were revised by an amount equal to 115 per cent of the old rates before the 25 per cent increase was put into effect on April 15, 1918, and the 10 per cent tax, applied to most freight shipments, or the 5 per cent tax placed on certain shipments such as foodstuffs. The 25 per cent increase and these taxes are kept. The following example will explain how the new rate is obtained.

On February 22, before the new increase, the method employed for fixing the cost of a shipment which, let us say, cost 100 francs previous to the 25 per cent increase of April 15, 1918, and the addition of the 10 per cent or 5 per cent tax, was this: To 100 francs was added 25 francs (the tax), plus 12.50 francs (10 per cent) or 6.25 francs (5 per cent), making a total of 137.50 francs in the first case, and of 131.25 francs in the second case.

Since February 23, the new rate is obtained by adding 115 per cent to the 100 francs, plus 25 francs (the tax) plus 12.50 francs (10 per cent) or 6.25 francs (5 per cent).

In the first case the new increased rate obtained is 252.50 francs, instead of 137.50 francs, as on February 22, and 246.24 francs, instead of 131.25 francs in the second case.

As with the passenger fares, in order to avoid these complicated calculations, the companies have adopted coefficients for figuring the new tariffs more readily and sufficiently exactly. In the case of shipments which pay the 10 per cent tax above-mentioned, the figure used is 1.83, and with those paying the 5 per cent tax 1.87 is employed. If we take the example, cited above, of a shipment costing 137.50 francs on February 22, and multiply that sum by the coefficient 1.83, we obtain 251.625 francs, which is considered sufficiently near the figure 252.50 francs found the other way. In the case of the shipment previously costing 131.25 francs, we obtain 245.4375 francs by using the coefficient 1.87 instead of 246.25 francs found by the other method. In spite of the slight difference in the figures obtained by using the coefficients, this system has been adopted on account of its simplicity.

Absolute Necessity for the Increase

The above description shows the very large increase in all rates put into effect on the French railroads on February 23. These new tariffs were not adopted without a great deal of opposition on the part of all sorts and kinds of shippers who claimed that the increase would have a disastrous effect on commerce and tend to increase the high cost of living. The most competent authorities, however, saw no other way of helping the railroads to solve their financial difficulties and organize their future. This can be readily understood, for it is estimated that the railroads have a total deficit of 3,703,000,000 francs accumulated since the beginning of the war. This tremendous increase in rates was therefore voted by the chamber of deputies and the senate, and it is now in effect.

General News Department

The Western Railway Club will hold its annual meeting and election of officers on May 17, at the Hotel Sherman, Chicago.

President Wilson on May 8 signed the urgent deficiency bill carrying the appropriation of $300,000,000 for the Railroad Administration.

The American Association of Engineers held its sixth annual convention at St. Louis, Mo., on May 10 and 11. Group meetings for engineers in various services were held

One hundred prisoners of the Maryland State Penitentiary have been engaged to do track work on the Baltimore & Ohio, at Jefferson, Md. The convicts are to be paid $3.95 a day, working ten hours.

Six passengers and three employees were killed and three employees and 35 or more passengers were injured in a butting collision of two multiple-unit electric trains on the Portland division of the Southern Pacific near Bertha, Ore., on May 9. It is understood that the collision was due to the failure of the eastbound train, No. 124, to wait at Bertha for the westbound train, No. 107.

Protection of Forests from Fires was the subject of a conference at Harrisburg, on May 4 between the governor of Pennsylvania, the Chief of the Department of Forestry, Gifford Pinchot, and about 40 railroad representatives. In a number of especially dangerous locations the railroads agreed to burn a strip 100 ft. wide along their rights of way, the officers of the state making the necessary arrangements with the owners of the land.

The Southern Railway has issued a circular inviting ambitious young Southern men to join the "apprentice squad" in the railway company's Freight Traffic Department at Atlanta, Ga. The squad is composed of 10 young men and as fast as members are promoted there are vacancies for beginners. Applications from high school graduates will be considered. At the start the pay is $60 a month. After six months' service the pay of those whose progress has been satisfactory will be advanced to $75.

The Board of Railroad Wages and Working Conditions of the United States Railroad Administration was discontinued on April 1. The board since the termination of federal control on March 1, has been engaged solely in completing the tabulation of data relating to railroad wages and working conditions, the collection of which was begun during the period of federal control, and in recommending necessary interpretations involving readjustments chargeable to the director general of railroads for some portion of the period of federal control under the wage orders issued during federal control. This work has now been completed, insofar as the board is concerned. In accordance with Section 311 (c) of the transportation act, all books, papers and documents of the Board of Railroad Wages and Working Conditions will be transferred to the Labor Board created by the transportation act.

The Sectional committee on Steel Shapes composed of representatives from the American Society of Civil Engineers, the Association of American Steel Manufacturers and other allied organizations, have finished a preliminary report to be used in securing an international standard for rolled steel shapes as used in structures, bridges, railway cars and ships, etc. This is the result of a movement started in 1919 by the British Engineering Standards Association, who undertook to revise their standards and to secure the co-operation of the American Engineering Standards Committee in the possible adoption of Anglo-American standards. Under the auspices of the American body the following organizations were requested to confer on the proposed standardizations: The United States Navy, the Association of American Steel Manufacturers, the American Bureau of Shipping, the American Society of Civil Engineers, the American Railroad Association, the Society of Naval Architects and Marine Engineers, and the Railway Car Manufacturers' Association. As this is a very important subject the committee is desirous of obtaining a full and free discussion by anyone interested.

Dr. P. G. Agnew is secretary of the American Engineering Standards Committee with offices at 29 West Thirty-ninth street, New York.

A. F. Duffy, manager of the Safety Section of the United States Railroad Administration has issued his farewell address—Bulletin No. 14—giving the records made up by his department for the months of January and February, the last two under government operation. There has been an increase in the number of casualties reported by the railroads which were under federal control, and Mr. Duffy attributes this to the fact that, beginning about Christmas, the safety work throughout the country began to slacken, owing to the near approach of the dissolution of federal control. For the two months the number of employees killed was 422, as compared with 404 in the same period of 1919; and of injured 22,215 as compared with 20,100. The bulletin gives the usual data concerning casualties to other persons, attendance at meetings, etc. In the two months 3,386 safety meetings were held with an aggregate attendance of 51,619. Of the 122 safety rallies held, 100 were in the Allegheny Region. The number of men talked to by safety committee men in the two months was 201,894, besides large numbers addressed in meetings. Mr. Duffy tells the safety agents of his warm appreciation of the "fine manner in which you have supported the great cause for which we have been laboring."

Grain Men Complain

Representatives of the grain trade, at a conference with Julius H. Barnes, United States wheat director at Chicago on May 7, stated that because of a shortage of grain cars, together with the strikes and bad weather which have seriously interfered with transportation, wheat is now in a critical plight, on the eve of the expiration of the Wheat Guarantee Act on June 1. The conference was held to take steps to establish a free and open market for the handling of wheat and grain products after the expiration of federal control on June 1. The grain men said that a large part of the old crop is still on farms, that country and terminal elevators are filled, that bank credits for handling the old crop are being stretched far beyond the usual season and that room will soon be needed in elevators for the new wheat crop. No definite recommendations were made.

Immigration and the Labor Problem

In an editorial on the above subject appearing on page 1333 of our issue of May 7 were two typographical errors concerning the number of immigrants and also the number of emigrants leaving the country during the six months after the armistice. The statements should have read, "for the four years ending 1918, 200,000 less," and "over 100,000 emigrants left the country during the six months * * *."

Applications for Government Orders to Extend Railroad Facilities

The Public Utilities Commission of Idaho has applied to the Interstate Commerce Commission for an order requiring the

Northern Pacific, the Oregon-Washington Railroad & Navigation Company and the Camas Prairie Railroad to provide a north and south railroad for the state by the extension of the Camas Prairie to New Meadows, where it would connect with the Pacific & Idaho Northern. The application is filed under the provision of the transportation act which authorizes the commission to require a carrier to extend its lines or increase its facilities. The Natchez (Miss.) Chamber of Commerce has asked for an order requiring the Louisiana & Arkansas to bring its trains across the Mississippi river from Vidalia, La., into Natchez over a ferry.

British Locomotives for Belgian Railways

Modern Transport says that the Belgian Government's order for 200 locomotives recently placed in England, goes to Sir W. G. Armstrong, Whitworth & Co., Limited, of Newcastle-upon-Tyne. These locomotives are to be built to designs prepared by the Belgian State Railways Administration type No. 33. The eight coupled wheels will be 4 ft. 11¾ in. in diameter and the truck wheels 2 ft. 11½ in. The cylinders will be 24 in. by 28 in., and Walschaerts valve gear will be used. Working steam pressure will be 200 lb. per sq. in., and the grate area 34.87 sq. ft. Twenty-five of these locomotives will be fitted with the Robinson superheater. The tender, 6-wheel, will carry 5,275 gallons of water and about seven tons of coal. The automatic and direct Westinghouse brake will be fitted to both engine and tender. The tractive force will be 46,000 lb., and the ratio of tractive force to adhesion will be 3.45. In running order the engines will each weigh 80 tons 4 cwt. Weight of engine and tender, 133 tons.

Material-Handling Committee—Work Englarged

The Board of Governors of the Material Handling Machinery Manufacturers' Association, 110 West Fortieth street, New York, has appointed 12 special committees. These committees will devote their time to the work of securing better co-operation on the part of the material handling industry and by such efforts to aid in increasing the average production per man with a resultant reduction in the price of commodities. The material handling industry has been divided into six representative divisions as follows: (1) cranes, hoists and winches; (2) gravity and power conveyors; (3) elevators; (4) industrial trucks; (5) bulk handling machinery, and (6) miscellaneous equipment. The 12 committees and their chairmen are as follows:

Membership Committee: E. Logan Hill (Heyl & Patterson, Inc., New York), chairman. Engineering Committee: F. W. Hall (Sprague Electric Works, New York), chairman. Main committee to be made up of the chairman and one additional member of each of the six sub-committees representing the respective six divisions of the industry. Finance Committee: Lucian C. Brown (Elwell-Parker Electric Company, New York), chairman. Meetings Committee: Charles A. Rohr (General Electric Company, New York), chairman. Committee to Co-Operate with Technical Societies: James A. Shepard (Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.), chairman. Committee to Co-Operate with Trade Associations and Industries: J. H. Flynn (Blaw-Knox Company, Pittsburgh, Pa.), chairman. Committee to Co-Operate with Marine Terminal Commissions: C. A. Luster (Clyde Iron Works, Duluth, Minn.), chairman. Committee to Co-Operate with Railroads and Railroad Commissions: Francis L. Stuart (International Conveyor Company, New York), chairman. Committee to Co-Operate with Civic Associations and Governmental Bodies: F. S. Chavannes (Chesapeake Iron Works, Baltimore, Md.), chairman. Special Crane Committee: W. B. Clarke (Manning, Maxwell & Moore, Inc., New York), chairman. Committee on Standardized Containers: Calvin Tomkins (New York), chairman. Publicity Committee, Advertising Council: A. J. Barnes (Shepard Electric Crane & Hoist Co., Montour Falls, N. Y.), chairman.

The committee to co-operate with railroads and railroad commissions consists of Francis L. Stuart, F. B. Fink, I. L. Bretzfelder, B. F. Fitch, F. Logan Hill, F. R. Fishback, Justin Griess, Benjamin Dixon, M. Oliver Crosby and G. A. Mitchell.

The committee on standardized containers consists of Calvin Tomkins, B. F. Fitch, F. W. Hall, F. Stadelman, D. Rushmore, F. L. DuBosque and R. W. Scott.

American Society for Testing Materials

This society will hold its twenty-third annual meeting at Asbury Park, N. J., on June 22 to 25 inclusive, with headquarters at the New Monterey hotel. The first session will be held at 10 a. m., Tuesday, June 22. Papers and reports will be presented at the various sessions in accordance with the following general outline:

Tuesday morning	Non-Ferrous Metals.
Tuesday afternoon	Wrought and Malleable Iron and Corrosion.
Tuesday evening	Presidential address and reports of administrative committees.
Wednesday morning	Steel.
Wednesday afternoon	Committee meetings.
Wednesday evening	Testing Apparatus.
Thursday morning	Preservative Coatings and Lubricants.
Thursday afternoon	Miscellaneous Committee Reports and Papers
Thursday evening	Ceramics.
Friday morning	Road, Materials, Lime and Gypsum.
Friday afternoon	Golf tournament.
Friday evening	Cement and Concrete.

J. E. Howard will present on Wednesday morning a paper on "The Shattered Zones in Certain Steel Rails, with Notes on the Interior Origin of Transverse Fissures." The report of the Committee on Preservative Coatings for Structural Materials will be presented on Thursday morning.

Supervising Officers in Maintenance Work

At a meeting of the New England Railroad Club held in Boston on May 11, W. J. Backes, engineer of maintenance of way, of the New York, New Haven & Hartford, presented a paper on the "Responsibilities of Supervising Officers in the Maintenance of Way Department." In his paper, Mr. Backes brought out the many difficulties with which the maintenance of way department has had to contend in the past and the increasing complexity of its duties in the future.

Better co-operation was urged not only all along the line down to and including the foreman, but between the various departments of the railways. In the discussion which followed it was brought out that the railroads at present are virtually running a training school for the benefit of the electric railways and other industries who can and do pay higher wages.

F. S. Austin, general storekeeper of the Boston & Albany, was elected a member of the executive committee, and F. J. Carty, mechanical engineer of the same road, was elected member of the membership committee, in place of L. G. Morphy, who recently resigned his position on the Boston & Albany to go to South America.

Signal Division—A. R. A.

H. S. Balliet, secretary of the American Railroad Association, Signal Division, 75 Church street, New York City, has issued the announcement of the annual meeting of the Division, which is to be held at Alexandria Bay, N. Y., on Wednesday, Thursday and Friday, July 14, 15 and 16. Reports of committees will be mailed to members of the Division about June 25.

Headquarters will be at the Thousand Island House, and the rates at the hotel, American plan, are for room and bath $7 a day, and room without bath $6. Requests for hotel reservations should be sent to the secretary, who on June 15 will assign rooms in the order in which the requests are received. The secretary will also make sleeping car reservations on trains of the New York Central either from New York or from Chicago, provided members make their wants known to him by July 1.

The round trip fare from New York City to Redwood, N. Y., the nearest railroad station, is $19.80; from Chicago, by rail to Lewiston, N. Y., and thence by steamer via Toronto, $48.76. The steamer leaves Toronto at 3.30 p. m and reaches Alexandria Bay the next morning.

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF FEBRUARY, 1920

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (Inc. misc.)	Maintenance of: Way and structures.	Equipment.	Ouerating expenses: Trafnc.	Trans-portation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Lake Superior & Ishpeming	34	$5,708	$252	$6,489	$20,080	$17,150	$174	$9,791	$2,590	$49,736	766.46	—$43,247	$3,872	—$47,119	—$8,444
Mississippi Central	164	36,215	19,307	58,956	49,862	41,236	1,522	67,506	5,952	166,178	281.86	—107,221	3,900	—111,121	—88,268
New Jersey & New York	47	11,629	75,231	93,254	11,883	18,467	4,343	66,428	1,983	103,099	110.55	—9,845	1,928	—11,774	—7,946
Northern Alabama	110	101,358	13,364	116,821	26,106	5,193	1,795	55,610	1,629	90,332	67.33	26,489	3,554	22,893	13,630
Oregon Short Line	2,347	2,740,769	511,779	3,497,119	206,886	528,665	21,718	1,171,052	105,551	2,101,345	60.08	1,395,775	217,335	1,178,176	807,328
Oregon-Washington R.R. & Nav	2,070	1,996,212	477,393	2,674,545	359,311	439,130	27,424	1,169,289	101,751	2,135,874	79.71	538,670	177,103	361,429	249,797
Panhandle & Santa Fe	772	374,513	127,770	535,568	108,254	239,113	3,997	280,686	15,383	647,288	120.86	—111,720	20,438	—132,163	—2,962
Pennsylvania R.R.—Western Lines	1,754	5,436,317	1,440,837	7,699,568	1,219,969	2,986,479	87,147	4,338,796	230,198	8,936,207	116.06	—1,236,639	344,756	—1,583,319	1,092,628
Pennsylvania R. R.—Eastern Lines	5,376	16,879,305	6,601,442	26,627,155	4,582,223	11,511,169	232,162	16,034,613	762,764	33,737,771	126.70	—7,110,616	908,376	—8,028,839	—8,352,236
Peoria & Pekin Union	19	45,110	3,353	166,666	12,399	37,570	70	84,220	3,112	137,372	82.42	29,294	9,500	19,794	39,439
Pere Marquette	2,230	1,931,487	382,927	2,582,769	267,514	749,726	44,290	1,568,930	77,815	2,713,134	105.04	—130,366	58,696	—189,176	—496,914
Perkiomen	41	82,970	8,760	95,532	7,152	4,259	13	34,748	352	46,546	48.72	48,987	144	48,842	12,510
Philadelphia & Reading	1,126	5,241,521	805,094	6,420,628	670,583	2,713,146	42,308	3,472,697	144,693	7,068,036	110.89	—647,408	66,014	—713,033	—183,997
Philadelphia, Bethlehem & N. E	71	.....	.....	74,486	21,366	12,155	410	71,300	1,317	106,546	143.04	—32,060	1,030	—33,091	—42,963
Pittsburgh & Lake Erie	224	2,835,619	217,340	3,253,376	431,536	1,228,452	21,051	1,137,758	46,244	2,868,098	88.15	385,278	75,000	310,123	—33,269
Pittsburgh & West Virginia	63	138,864	7,984	159,912	35,780	119,272	2,305	71,302	6,094	244,936	153.16	—85,023	17,888	—102,984	—51,741
Pittsburgh & Shawmut	103	112,750	4,219	117,847	28,679	31,499	1,873	45,466	3,504	111,057	94.23	6,791	105	6,686	34,023
Pittsburgh, Concinnati, Chicago & St. L	2,383	5,031,337	1,490,492	7,410,095	926,968	3,295,627	82,349	4,287,188	207,597	8,875,769	119.77	—1,465,674	286,719	—1,753,077	1,641,038
Pittsburgh, Shawmut & Northern	204	108,930	6,293	117,502	17,289	47,013	2,752	61,898	5,508	134,465	114.43	—16,961	1,901	—18,862	22,340
Port Reading	21	122,435	.....	171,172	18,164	22,292	18	132,923	190	173,587	101.41	—2,415	2,000	—415	—86,192
Quincy, Omaha & Kansas City	255	63,503	21,555	94,739	15,575	14,812	105	62,465	2,089	95,010	100.29	—271	3,647	—3,918	—16,208
Richmond, Fred. & Potomac	81	353,209	254,959	673,634	37,913	103,593	5,181	293,195	17,216	465,460	6,909	208,174	21,705	186,464	—69,788
Rutland	415	167,341	88,994	313,194	68,081	97,714	6,572	225,253	11,036	410,196	130.97	—97,002	17,202	—114,205	—49,437
St. Joseph & Grand Island	258	216,171	32,944	258,559	41,305	45,305	1,995	159,792	12,880	263,086	101.75	—4,526	10,914	—15,444	13,516
St. Louis, Brownsville and Mexico	548	242,348	158,196	430,871	145,292	154,432	5,626	202,492	21,456	526,630	122.22	—95,759	9,800	—105,858	—85,773
St. Louis Merchants' Bridge Terminal	9	.....	758	332,566	58,463	50,606	650	248,292	6,039	364,048	109.46	—31,482	8,250	—39,732	—41,078
St. Louis-San Francisco	4,761	5,082,442	1,709,768	7,200,865	1,068,390	1,532,733	59,459	2,982,911	202,300	5,824,407	80.88	1,376,458	227,951	1,146,050	356,164
St. Louis Transfer	6	.....	.....	116,548	10,119	14,890	158	60,381	2,099	87,648	75.20	28,900	110	28,790	9,587
St. Louis S. W.	939	1,366,999	161,644	1,562,159	206,472	403,219	24,833	313,547	36,245	988,670	63.29	573,489	42,984	530,487	478,521
St. Louis S. W. of Texas	807	536,792	105,829	689,909	219,025	313,733	9,237	416,209	28,413	986,109	14,293	—296,199	23,018	—319,223	—212,004
San Antonio & Aransas Pass	736	219,194	80,874	323,877	161,726	124,566	5,622	234,819	17,035	543,490	167.81	—219,613	15,000	—234,613	—184,607
San Antonio, Uvalde & Gulf	217	65,154	61,957	132,539	60,476	25,799	1,889	61,362	3,382	152,909	115.36	—20,370	2,200	—22,589	—5,455
Seaboard Air Line	3,563	2,866,089	760,353	4,259,559	627,324	786,434	80,383	2,048,567	108,924	3,710,924	87.11	549,057	150,000	398,386	328,602
South Buffalo	11	34,509	.....	85,413	5,677	16,275	534	60,274	1,283	84,042	98.39	1,372	—3,493	—2,122	—46,994
Southern	6,983	8,134,045	2,393,919	11,479,475	1,869,046	2,102,769	162,374	5,640,848	292,260	10,207,392	88.92	1,272,083	387,175	881,884	511,783
Southern Railway in Mississippi	278	94,742	47,622	152,627	39,130	22,418	2,609	80,086	4,168	148,411	97.23	4,216	9,800	—5,601	—15,290
Southern Pacific	7,024	8,789,874	3,566,616	13,033,251	2,480,945	3,106,736	113,488	5,356,917	238,947	11,632,114	89.24	1,401,137	661,217	734,199	13,359
Southern Pacific Steamship Lines	.....	473,282	16,949	516,622	12,906	857,579	12,852	681,624	23,735	1,588,697	307.51	—1,072,074	10,035	—1,082,109	—909,031
Spokane International	156	101,193	14,516	119,273	14,833	10,980	2,281	38,440	5,202	71,737	60.14	47,536	5,170	42,366	32,735
Spokane, Portland & Seattle	538	440,780	129,783	611,071	169,236	75,422	5,454	229,408	22,654	505,756	82.76	105,316	80,000	25,295	—30,651
Staten Island Rapid Transit	23	48,495	67,102	126,031	40,944	44,474	1,362	114,170	9,209	210,159	166.75	—84,128	15,000	—99,128	—103,141
Tenessee Central	292	154,187	35,646	202,878	51,929	60,347	5,877	116,521	8,236	242,909	119.73	—40,031	4,524	—44,559	43,868
Terminal R.R. Assn. of St. Louis	36	.....	2,055	378,782	78,560	57,301	798	187,663	4,347	332,340	87.73	46,442	39,139	7,298	35,705
Texas & Fort Smith	87	109,975	21,435	150,808	21,822	13,932	653	9,257	1,760	50,019	3,317	100,789	15,776	84,996	51,345
Texas & New Orleans	469	506,728	152,274	729,571	150,078	187,874	4,373	320,338	17,671	717,790	98.38	11,782	21,129	—10,180	56,413
Texas & Pacific	1,946	2,056,026	914,271	3,171,891	648,006	726,423	34,164	1,503,178	70,760	3,019,748	95.20	152,143	113,300	38,155	210,255
Toledo & Ohio Central	435	853,806	61,493	998,399	83,524	280,431	20,037	420,243	17,280	824,525	82.58	173,874	36,220	137,659	221,091
Toledo, Peoria & Western	247	722,537	48,460	130,115	16,413	46,869	2,883	89,632	4,979	160,775	123.56	—30,669	8,500	—39,160	—9,071
Toledo, St. Louis & Western	454	713,776	29,380	826,827	97,092	171,258	7,141	379,103	10,338	664,931	80.41	161,896	31,000	130,896	101,237
Trinity & Brazos Valley	368	108,499	17,672	139,809	83,405	64,435	2,366	78,650	7,713	236,571	169.21	—96,761	12,604	—109,365	—52,116
Ulster & Delaware	128	27,882	13,371	64,926	18,999	20,748	1,424	57,110	4,793	103,454	159.34	—38,528	5,000	—43,527	—18,530
Union R. R. of Pennsylvania	40	.....	.....	595,307	60,677	210,651	322	407,620	8,999	688,270	115.61	—92,962	8,456	—101,418	—124,317
Union Pacific	3,614	6,653,961	1,383,557	8,822,330	993,418	1,722,227	44,615	2,834,240	238,663	6,045,291	68.52	2,777,040	291,842	2,484,599	119,248
Utah	98	174,518	444	175,574	7,250	30,398	200	46,914	2,486	87,248	49.69	88,326	5,066	83,259	45,559
Vicksburg, Shreveport & Pacific	171	230,036	87,750	346,754	40,835	53,590	7,363	126,043	9,438	241,041	69.51	105,713	11,311	94,367	66,468
Virginian	523	744,031	50,736	891,314	125,473	229,396	4,419	487,078	17,630	864,554	96.99	26,760	45,000	—18,240	191,099
Wabash	2,472	2,963,724	687,004	4,043,925	613,739	1,380,671	65,214	2,156,335	125,354	4,365,505	107.95	—321,580	132,055	—453,838	—430,763
Washington Southern	35	139,439	114,332	309,844	32,485	44,582	2,809	136,593	8,134	228,203	73.65	81,641	6,857	74,772	—54,676
West Jersey & Seashore	351	252,000	409,752	734,174	278,641	167,272	7,224	517,784	22,164	1,000,122	136.22	—265,940	48,992	—315,037	171,749
Western Maryland	689	1,166,728	72,706	1,322,529	329,903	745,756	86,152	536,108	42,125	1,752,834	132.53	—430,305	43,200	—473,505	—332,541
Western Pacific	1,041	869,903	126,809	1,039,260	210,603	239,853	13,481	358,676	26,736	870,289	83.74	168,971	51,939	116,897	178,405
Western Railway of Alabama	133	138,990	63,228	220,655	30,743	53,138	6,719	84,748	6,146	185,495	84.07	35,160	6,125	29,036	—669
Wheeling & Lake Erie	511	953,921	55,410	1,134,611	119,559	323,838	23,184	516,195	23,554	1,009,284	88.95	125,327	65,000	60,327	233,341
Wichita Falls & N. W.	328	196,573	51,641	261,254	51,884	25,709	2,096	117,454	7,161	204,304	78.20	56,950	11,178	45,695	65,314
Wichita Valley	356	110,601	35,310	148,889	22,674	11,221	.....	67,077	1,560	102,533	68.86	46,356	5,107	41,249	42,182
Yazoo & Mississippi Valley	1,381	1,833,237	477,648	2,421,344	460,092	531,999	27,473	928,292	53,918	2,002,991	82.72	418,353	80,967	336,906	—7,318

REVENUES AND EXPENSES OF RAILWAYS

Two Months of Calendar 1920

Name of road.	Average mileage operated during period.	Operating revenues			Maintenance of		Operating expenses				Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Ft. Worth & Rio Grande	235	$188,822	$120,688	$340,595	$80,646	$54,101	$4,440	$193,754	$13,355	$346,295	101.67	—$5,700	$7,570	—$13,287	$46,478
Galveston, Harrisburgh & San Antonio	1,381	2,666,299	881,005	3,924,166	563,400	982,980	42,955	1,580,021	106,232	3,316,035	84.50	608,121	122,668	482,455	23,638
Galveston Wharf	13	.....	.....	172,055	53,798	2,396	211	78,521	3,287	166,129	96.55	5,925	24,400	—18,475	—31,139
Georgia	328	660,462	264,026	1,004,297	126,920	222,275	18,645	580,191	32,886	981,332	97.71	22,965	11,900	11,059	—191,042
Georgia & Florida	405	129,582	42,531	209,524	129,372	51,240	5,631	173,328	13,337	372,909	77.98	—163,385	12,000	—175,406	—131,976
Georgia Southern & Florida	402	593,162	313,719	1,048,858	153,998	230,744	16,755	458,530	24,141	892,137	85.06	156,721	35,000	120,527	37,389
Grand Rapids & Indiana	569	982,055	286,306	1,536,811	150,640	370,443	21,901	788,189	45,688	1,378,956	89.72	157,856	80,221	77,628	207,486
Grand Trunk Western	1,021	2,668,376	505,240	3,756,865	413,401	1,158,146	50,133	2,144,986	124,070	3,905,456	103.96	—148,591	105,606	—254,372	—416,908
Grand Trunk Lines in New England	172	188,410	58,332	622,298	137,437	119,311	6,966	362,184	32,486	708,847	113.91	—86,549	25,399	—111,948	140,389
Great Northern	8,176	10,535,194	2,730,871	17,404,752	2,895,073	3,788,192	116,043	8,269,670	311,773	15,626,622	89.78	1,778,131	1,314,905	458,962	—361,106
Green Bay & Western	252	156,552	37,426	209,113	20,120	55,691	2,267	99,288	4,557	181,917	86.99	27,196	11,534	15,662	—15,497
Gulf & Ship Island	307	314,397	85,430	465,104	128,836	111,147	12,188	194,342	18,913	466,332	100.26	—1,228	25,981	—27,298	4,700
Gulf, Colorado & Santa Fe	1,937	3,003,769	971,031	4,522,191	1,012,738	814,621	41,121	1,827,301	113,560	3,786,282	83.72	735,909	171,836	563,581	129,300
Gulf, Mobile & Northern	468	390,558	105,018	583,351	187,565	136,032	18,931	259,224	19,835	621,585	106.55	—38,234	24,723	—63,397	—17,077
Hocking Valley	350	1,875,874	183,629	2,195,639	193,616	694,033	32,252	891,809	46,075	1,857,735	84.61	337,903	138,420	199,484	792,734
Houston & Texas Central	866	1,298,069	425,561	1,972,817	347,346	366,819	12,860	745,225	46,731	1,518,666	76.95	454,151	75,370	377,878	287,489
Houston, East & West Texas	190	315,266	92,155	457,808	84,297	79,894	3,887	214,493	11,548	394,130	86.09	63,678	15,140	47,934	—20,180
Illinois Central	4,800	16,224,637	4,042,522	23,349,683	3,484,024	5,517,732	214,663	9,226,863	460,957	19,044,070	81.56	4,305,622	1,011,650	3,286,112	3,153,236
Indiana Harbor Belt	126	.....	.....	1,342,586	181,963	268,467	4,712	983,087	35,148	1,473,378	109.74	—130,791	20,203	—150,997	—82,446
International & Great Northern	1,159	2,096,454	537,031	3,045,096	666,429	742,137	30,980	1,336,636	84,403	2,874,321	94.39	170,776	65,003	105,206	273,283
Kanawha & Michigan	176	582,869	92,673	722,727	99,066	264,929	6,468	286,674	24,524	681,661	94.31	41,067	50,000	—8,934	192,187
Kansas City, Mexico & Orient	272	215,014	35,764	281,520	99,089	99,271	6,496	154,112	16,753	375,720	133.46	—94,201	15,415	—109,665	45,323
Kansas City, Mexico & Orient of Texas	465	229,765	46,015	321,270	87,774	112,994	6,527	153,842	21,118	382,255	118.98	—60,986	12,669	—73,980	96,077
Kansas City Southern	774	2,194,022	461,067	3,037,378	373,920	725,021	54,710	1,149,188	87,430	2,388,746	78.64	648,633	109,142	538,707	384,154
Kansas City Terminal	27	.....	.....	244,716	40,570	76,151	.....	161,056	4,471	287,899	117.64	—43,184	61,621	—104,805	—66,549
Lake Erie & Western	902	1,419,062	120,660	1,705,937	155,134	517,726	35,357	781,488	46,506	1,536,212	90.05	169,725	100,000	69,682	125,680
Lehigh & Hudson River	96	307,771	7,483	336,099	47,198	93,529	3,255	203,145	12,543	359,668	107.01	—23,569	17,125	—40,722	—75,432
Lehigh & New England	230	561,883	4,646	596,137	64,943	170,046	13,050	250,692	20,666	517,320	86.77	78,817	21,720	57,096	30,652
Lehigh Valley	1,435	7,938,888	945,270	9,991,754	1,558,896	3,442,919	78,493	6,183,009	197,885	11,501,199	115.10	—1,509,444	352,006	—1,862,248	—1,803,460
Long Island	398	885,334	1,640,652	2,975,258	503,764	759,828	26,061	2,220,790	103,327	3,638,675	122.29	—663,417	209,668	—874,290	—547,395
Louisiana & Arkansas	302	547,379	101,286	693,859	83,050	89,773	7,919	228,173	14,026	422,889	60.94	270,970	26,431	244,532	253,675
Louisiana Railway & Navigation Co	343	543,041	77,955	650,919	159,081	114,509	8,171	257,908	19,405	559,075	85.89	91,844	28,080	63,714	134,366
Louisiana Western	207	571,833	220,594	866,657	155,113	148,011	9,917	204,731	22,471	545,155	62.90	321,502	39,590	281,790	108,939
Louisville & Nashville	5,040	14,172,344	3,844,366	20,381,231	3,406,097	5,127,063	415,239	8,644,337	406,646	18,098,090	88.79	2,283,141	500,840	1,781,404	544,044
Louisville, Henderson & St. Louis	199	328,393	114,767	498,068	83,873	66,766	9,623	193,026	16,587	369,875	74.26	128,192	—13,147	141,327	63,028
Maine Central	1,216	1,658,395	597,996	2,628,726	602,542	768,110	20,030	1,689,929	78,567	3,159,282	120.18	—530,556	165,483	—696,184	—341,879
Maryland, Delaware & Virginia	82	66,925	25,094	103,927	13,376	65,960	1,260	108,084	4,494	193,173	185.87	—89,245	4,000	—93,246	83,725
Michigan Central	1,862	8,722,907	2,534,527	13,192,992	1,208,989	2,996,128	135,663	6,112,091	225,970	10,882,329	82.48	2,310,663	500,000	1,809,140	—126,660
Midland Valley	388	512,272	192,853	759,360	143,180	186,594	7,638	326,265	27,606	691,283	91.03	68,077	14,367	53,464	—42,112
Mineral Range	101	97,760	484	101,386	31,837	41,390	633	65,155	1,903	140,918	138.99	—39,532	7,200	—46,732	—53,809
Minneapolis & St. Louis	1,646	1,906,270	429,610	2,651,332	246,466	662,692	26,923	1,339,459	58,379	2,334,525	88.05	316,806	112,500	204,103	595,726
Minneapolis, St. Paul & Sault Ste. Marie	4,243	4,840,904	1,156,040	6,973,456	971,457	1,479,825	50,677	3,488,000	166,820	6,185,196	88.69	788,260	574,919	213,166	—332,311
Minnesota & International	194	132,341	57,392	209,228	17,318	45,825	1,080	119,062	7,560	190,844	91.21	18,385	10,529	7,834	18,479
Missouri & North Arkansas	365	177,527	86,916	311,141	115,650	66,287	5,880	166,126	18,043	371,985	119.55	—60,843	12,483	—73,302	75,679
Missouri, Kansas & Texas Railroad	1,714	4,121,125	1,453,308	6,470,226	966,728	1,812,190	64,577	2,237,700	174,243	5,288,622	81.73	1,181,604	217,673	962,887	873,894
Missouri, Kansas & Texas of Texas	1,796	2,586,780	1,526,175	4,819,961	1,094,608	1,038,075	58,785	3,076,811	160,595	5,486,364	113.82	—666,402	119,041	—786,952	—582,302
Missouri, Oklahoma & Gulf	329	310,878	42,821	376,878	110,386	155,344	3,524	232,860	18,957	521,537	138.38	—144,659	27,566	—172,386	—29,646
Missouri Pacific	7,299	13,804,714	3,194,274	19,938,158	3,113,047	3,985,567	189,819	7,970,775	454,672	15,777,766	79.13	4,160,392	504,442	3,650,707	3,757,093
Mobile & Ohio	997	2,421,529	360,007	3,135,374	520,283	880,937	61,852	1,437,150	89,281	2,991,337	95.41	144,036	123,000	20,728	240,193
Monongahela	108	549,767	43,840	611,534	114,287	143,611	1,601	253,269	13,470	526,239	86.05	85,295	10,000	75,295	—58,940
Monongahela Connecting	7	.....	.....	466,990	44,485	62,021	1,090	211,971	11,695	331,263	70.93	135,728	5,604	130,124	199,118
Montour R. R.	56	153,588	2,549	158,530	33,911	69,668	2,508	64,558	13,499	185,886	117.25	—27,356	4,861	—32,217	50,415
Morgan's Louisiana & Texas	400	1,133,748	353,739	1,654,190	168,999	282,619	20,993	527,276	41,886	1,046,989	63.29	607,200	73,095	533,492	431,959
Nashville Chattanooga & St. Louis	1,247	2,601,256	873,803	4,063,304	607,356	1,396,920	124,840	1,617,797	91,243	3,854,333	94.85	208,970	92,000	116,056	413,097
Nevada Northern	168	294,338	18,012	323,398	50,869	57,246	1,701	85,945	9,263	205,319	63.47	118,079	18,535	99,544	8,562
New Jersey & New York	47	28,333	151,403	202,252	20,761	37,292	4,580	127,913	4,371	194,917	96.37	7,336	5,728	1,604	16,260
New Orleans & N. E.	398	1,001,721	185,083	1,384,018	328,229	270,273	26,667	485,172	31,704	1,051,913	76.00	332,105	68,903	262,783	321,981
New Orleans Great Northern	284	299,743	77,637	395,063	85,239	96,441	5,873	162,143	16,537	367,063	92.91	28,000	22,000	5,962	—7,447
New Orleans, Texas & Mexico	191	241,417	77,319	356,739	103,682	79,214	8,044	127,211	13,440	332,206	93.12	24,533	22,000	2,450	36,844
New York Central	6,069	29,867,540	11,892,343	53,921,340	5,267,344	12,465,066	512,999	26,979,031	1,316,615	47,372,978	87.85	6,548,362	2,052,554	4,490,124	312,176
New York, Chicago & St. Louis	574	3,907,161	159,941	4,271,592	358,295	804,971	76,030	2,128,934	122,340	3,499,085	81.91	772,508	120,000	650,726	—223,341
New York, New Haven & Hartford	1,965	6,909,067	6,821,766	17,229,037	2,632,325	4,215,033	92,995	9,891,021	568,051	17,721,937	102.86	—492,900	630,000	—1,127,267	—234,137
New York, Ontario & Western	569	1,015,327	186,395	1,508,811	273,902	399,789	16,707	952,744	45,576	1,688,718	111.92	—179,907	39,983	—219,889	—58,302
New York, Philadelphia & Norfolk	121	880,725	170,836	1,174,798	105,237	371,283	22,962	707,950	23,641	1,255,196	106.84	—80,398	38,902	—119,392	—290,102
New York, Susquehanna & Western	135	418,496	125,587	639,442	104,842	210,965	6,919	588,519	16,502	927,746	145.08	—288,304	53,261	—344,555	—351,616
Newburgh & South Shore	7	.....	.....	248,026	25,331	58,711	.....	156,656	8,422	249,121	100.44	—1,094	15,293	—16,387	—33,231
Norfolk & Western	2,202	10,698,800	1,297,052	13,072,912	1,496,969	4,473,306	119,772	5,361,083	226,980	11,745,274	89.84	1,327,639	570,000	756,394	—683,388
Norfolk Southern	906	775,883	280,931	1,206,071	205,602	257,794	22,302	577,312	43,452	1,106,731	91.71	99,340	32,000	67,170	157,678
Northern Pacific	6,642	12,233,783	2,764,282	17,573,547	1,981,015	3,171,031	157,328	7,163,700	372,973	13,073,759	74.39	4,499,788	1,332,159	3,164,587	530,579
Northwestern Pacific	538	553,120	329,553	1,042,341	270,756	153,537	11,590	486,573	29,770	956,444	91.75	85,897	51,182	34,267	108,058

Engineering Foundation Seeks Large Endowment

Based on the gifts of Ambrose Swasey, Engineering Foundation has maintained a liaison between engineers since 1915, as represented by the national engineering societies through the National Research Council. Through these means practical mediums have been established for co-operation and technical research to support this work which reacts to the benefit of the entire nation. Engineering Foundation is now seeking to build up this endowment from the $300,000 given by Mr. Swasey to $1,000,000. The Foundation does not plan to build laboratories and to conduct research work directly, but rather to stimulate, co-ordinate and support research work in existing scientific and industrial laboratories, co-operating with the National Research Council. Charles F. Rand, past-president of the United Engineering Society, and of the American Institute of Mining and Metallurgical Engineers, who was elected chairman of Engineering Foundation on March 19, to succeed Dr. W. F. M. Goss, is taking active charge of this campaign. The headquarters of Engineering Foundation are in the Engineering Societies building, 29 West 39th street, New York.

State Railroad Commission Fines L. R. & N.

The Louisiana Railway & Navigation Company has been fined $1,000 for violation of the terms of the Louisiana Railroad Commission's order requiring the company to "repair and place in a safe and satisfactory condition its entire roadbed including switches, cross ties, rails, bridges, frogs, trestles and any and all portions of said railroad by replacing such defective material as may be necessary, and renewing such parts of bridges and tracks as may appear to be in an unsafe condition," within a period of 120 days. In addition, the Commission has required the payment of $100 a day for each day after March 30, during which the company shall fail or refuse to comply with this order. The original order demanding the repairing of the road was issued on March 25.

In outlining the position of the company, R. E. Milling, general attorney of the Louisiana Railroad & Navigation Company, recently said in part: "About a year ago, the Louisiana Railroad Commission notified the Louisiana Railway & Navigation Company to improve its tracks. Similar notice was also issued to other railroads even though at that time unprecedented rains had prevented in part the maintenance of track in the ordinary way. At the time the Commission's request to improve the track was received, the president of the railroad had already issued instructions to the immediate managers in charge of the property, and while continually hampered by excessive rainfall, the property was improved in all directions.

"Gravel ballast was distributed in larger quantities than ordinary maintenance required. Over 170,000 ties were placed in the last year under the track, which amount is more than double the number ever placed in any one year. Bridges and trestles were repaired and painted, stations were also repaired and painted and several new structures were erected where it was deemed necessary. The motive power was given a general and thorough repair, as well as the coaches and freight cars. This resulted in increased business, both passenger and freight. The extra large amount of work done in the past year can be testified to by many of the best businessmen and planters along the line of the road.

"The statement that the tracks of the company are not in safe condition is not well founded. The Louisiana Railway & Navigation Company has a record second to none in the matter of safety. During 22 years of operation not a passenger was killed, and none of them hurt, unless very slightly, and in 22 years not one trestle collapsed under the traffic, which at times was very heavy. Of course, there have been derailments, but no railroad in operation can eliminate derailments entirely, because derailments are sometimes occasioned by outside interference with tracks.

"Statements in the press, apparently sanctioned by the Railroad Commission of Louisiana, are unjust and unfair. South Louisiana, and especially the Southwestern part, near New Orleans, from August, 1918, to August, 1919, had more than 100 in. of rainfall. It was almost impossible to maintain properly the track, but the Louisiana Railway & Navigation Company performed that service as well as any other road in the same section similarly situated, and this publication was issued and a fine imposed without any further notice to the company or giving it an opportunity to be heard."

Traffic News

The Union Transportation Line, Louisville, Ky., having bought two other motor truck lines, now operates 20 automobile trucks which make regular trips on five lines extending in different directions into the country roundabout. Plans have been made for seven main and 47 secondary routes, taking in 136 towns within a radius of 75 miles of Louisville. From the large central freight depot in Louisville trucks go out, on the principal lines, twice a day.

The Transportation Club of Tulsa, Okla., has elected the following officers: President, L. K. Klein, Gulf Pipe Line Co.; secretary R. V. Miller, Wabash Railway; treasurer, J. M. C. Usher, Price Sand Co.; first vice-president, J. A. Bernier, Kerr Glass Manufacturing Co.; second vice-president, F. W. Dunn, M. K. & T.; third vice-president, J. E. Springer, St. L.-S. F. The directors elected at the same time are: A. C. Holmes, Empire Refineries, Inc.; W. O. Allen, Kerr Glass Manufacturing Co.; T. H. Steffens, Sand Springs Railway.

Coal Production

The production of soft coal continued to recover slowly during the week ended May 1, according to the weekly bulletin of the Geological Survey, but was still 16 per cent below the average during the first quarter of the year, being estimated at 8,898,000 tons. The cause of the continued depression was the railroad strike, which delayed movements at the most important rail gateways and junction points. For the preceding week the report says the loss of operating time at the mines was 46.8 per cent. The congestion caused by the strike had the double effect of blocking the rails with trains loaded with coal and of delaying the return of empties to the mines.

P. O. Department Needs More Money for Increased Compensation to Railroads

The Interstate Commerce Commission has denied the petition of the postmaster general and also that of the Western Association of Short Line Railroads for a rehearing and for a revised finding as to fair and reasonable rates for the transportation of the mails. This leaves in effect the commission's decision announced on January 15 ordering increases in the mail pay rates retroactive to November 1, 1916, which will increase the revenues of the roads by over $30,000,000 a year. It also required the postoffice department to ask Congress for a supplemental appropriation in order to pay the railroads. In asking for its appropriation for the next fiscal year the department took no account of the increase, declining to recognize it until after the commission had passed upon its application for a rehearing, but on May 8 the postmaster general asked Congress for an additional appropriation including $8,000,000 for increased payments to the railroads for the transportation of the mails for the four months of the present fiscal year, March 1 to June 30. In his letter of estimate to the Secretary of the Treasury, the postmaster general says:

"The annual rate of expenditure for service on space and weight routes combined on December 31, 1919, was $52,380,047. The annual rate March 31, 1920, at the increased rates was $82,300,973, to which should be added an estimated amount of $3.000.000 to compensate the railroad companies separately for the performance of side, terminal, and transfer service, or a combined rate of $85,300,973. While the annual rate of increase for the four months' period is approximately $11,000,000 it is not believed that more than $8,000,000 additional will be necessary to meet the payments during that period, for the reason that the department, at the suggestion of the United States Railroad Administration, has under consideration the settlement of the increased amounts due the administration during the period of government control by a transfer of funds. Should an additional appropriation be necessary for that purpose, the matter will be presented to you for submission to Congress at the appropriate time."

Commission and Court News

Interstate Commerce Commission

The Bureau of Finance of the Interstate Commerce Commission, the newly-created department established to supervise the financial activities now devolving on the commission by the terms of the Transportation Act, will be in charge of W. A. Colston, heretofore general solicitor of the Louisville & Nashville. Mr. Colston took up his duties on May 10.

State Commissions

The Railroad Commission of Kentucky has been asked by the Louisville & Nashville for authority to discontinue agencies at four places: Hobbs, Withrow, Dants and Greenbrier, all because of the falling off in business due to the discontinuance of distilleries at those places.

The Railroad Commission of Louisiana has denied the application of the Pullman Company for authority to advance rates within that state, the commission being "not convinced from testimony and the exhibits filed, that there is necessity for an advance in the rates on interstate business."

The Newport & Sherman's Valley Railroad has been complained of before the Public Service Commission of Pennsylvania because of the suspension of traffic between Newport, Pa., the eastern terminus of the line (on the Middle Division of the Pennsylvania), and Bloomfield Junction, eight miles west of Newport. The road extends from Newport westward 29 miles to New Germantown, and it is of 3 ft. gage. The road was sold on April 27 to Rodney M. Gring and George H. Ross, and on the 21st the operation of trains east of Bloomfield Junction was suspended. The shortest route by railroad now between this place and Newport is 27 miles long.

The Railroad Commission of Wisconsin has ordered 50,000 handbills printed dealing with the danger at railroad grade crossings. These handbills are to be distributed throughout the state and will be posted by both municipal and steam railroads. In addition 10,000 of the handbills have been printed on cardboard and these will be hung in public garages, hotels and banks and will be attached to every highway map sent out by the State Highway Commission. The handbill is headed "YOU MAY BE THE NEXT." The number of railroad crossing accidents for 1919 is quoted, with the interesting notation, "do you realize that in 1919, out of every 8,400 persons in the state of Wisconsin, one was either killed or injured in a grade crossing accident?" The usual grade crossing signs are illustrated on the handbills with an explanation of the meaning of each.

Court News

Lessor Railroad Not Taxable as "Doing Business for Profit" in the State

Dismissing an information by the Attorney General of Massachusettts against the Boston & Albany, the Massachusetts Supreme Court holds that the company is not "doing business for profit," within Mass. St. 1918, c. 255, § 1, imposing a tax on corporations so engaged. The Boston & Albany was organized as a corporation under Mass. St. 1867, c. 276, by the consolidation of the Boston & Worcester and the Western Railroad corporations, and empowered to maintain and operate a railroad, but in 1900 leased its entire property to the New York Central for 99 years, to which the commonwealth consented by St. 1900, c. 468. The court said: "The seizure or purchase of property at the request of the lessee in accordance with the obligations impressed on the lessor by the terms of the lease and the approving statute is necessarily for the benefit of the lessee. Whatever profit there may be accrues wholly to the lessee. Improvement of the railroad property by taking land for increased trackage, the building of freight houses and stations, was for the advantage of the lessee. These acts do not redound in any particular to the profit of the lessor. They do not enable it to receive any additional gain or advantage beyond the rental reserved in the lease. Even as to these powers to exercise eminent domain and to issue bonds, it has no right of initiative. It can act in these matters only at the instance of the lessee. Its conduct is but an automatic reflection of determinations conceived, instituted and carried into final effect by the lessee. The exercise of these attributes by the lessor is the act of a naked repository of corporate power, dormant so far as any possibility of profit to itself is concerned. Under our law a corporation cannot be organized merely for letting a railroad. When a corporation established for the operation of a railroad is permitted by the sovereign power to retire utterly from that business, to become wholly inactive respecting it, and to be simply the quiescent recipient of a fixed income from a single permanent investment, it is difficult to say with due regard to the meaning of words that such a corporation is conducting business for profit." This conclusion is in harmony with several decisions of circuit courts of appeal. Anderson v. Morris & Essex, 216 Fed. 83; N. Y. C. & H. R. v. Gill, 219 Fed. 184; Lewellyn v. P. B. & L. E., 222 Fed. 177; Jasper & Eastern v. Walker, 238 Fed. 553.—Attorney General v. B. & A. (Mass.) 124 N. E. 257.

The Massachusetts Supreme Court also holds that the Ware River Railroad, which before its road was completed leased its entire properties to the Boston & Albany for 999 years from 1874, the road being operated by the lessee up to the time of a lease by the lessee to the New York Central in 1899, and thereafter by the latter, is not taxable under St. 1918, c. 255 § 1, as a Massachusetts corporation doing business for profit.—Attorney General v. Ware River (Mass.), 124 N. E., 289.

United States Supreme Court

Injunction Against North Dakota Tax Affirmed

The Supreme Court of the United States has affirmed the order of three judges restraining the enforcement of taxes imposed by an act of North Dakota, approved March 7, 1919, until the further order of the court. The injunction suit was at the instance of the Northern Pacific and other railroads.

The tax purports to be a special excise tax upon doing business in the state. The tax commissioner calculates the value of the total property of each railroad by the total value of its stocks and bonds and assesses the proportion of this value that the main track mileage in North Dakota bears to the main track of the whole line. But on the allegations of the bill for injunction, the Supreme Court holds the circumstances are such as to make that mode of assessment indefensible. North Dakota is a state of plains, very different from the other states, and the cost of the roads there was much less than it was in mountainous regions that the roads had to traverse. The state is mainly agricultural. Its markets are outside its boundaries and most of the distributing centers from which it purchases also are outside. It naturally follows that the great and very valuable terminals of the roads are in other states. So looking only to the physical track, the injustice of assuming value to be evenly distributed according to mileage is plain. But that is not all.

The only reason for allowing a state to look beyond its borders when it taxes the property of foreign corporations is that it may get the true value of the things within the state, when they are part of the organic system of wide extent, that gives them a value above what they otherwise would possess. The possession of bonds secured by mortgage of lands in other states, or of a land grant in another state, or of other property that adds to the riches of the corporation but does not affect the North Dakota part of the road, is no sufficient ground for the increase of the tax—whatever it may be—whether a tax on property, or, as here, an excise upon doing business in the state. St. Louis Southwestern v. Arkansas, 235 U. S., 350, 364. In this case it was alleged that the tax commissioner's valuation included items of the kind described in very large amounts. The foregoing considerations were held to justify the preliminary injunction that was granted against what would appear to be an unwarranted interference with interstate commerce and a taking of property without due process of law. Opinion by Mr. Justice Holmes, Wallace v. Hines, decided May 3, 1920.

Foreign Railway News

LONDON.

An abstract by the Technical Review from the Zeitung des Verines Deutscher Eisenbahnverwaltungen, states that a standard gage railway, 2½ miles long with an elevation of nearly 1,100 ft., has been constructed to facilitate access to the renowned Thuringian forest. As the bulk of the rise occurs over a short distance where the gradient is 1 in 4, this portion of the line will be operated as a wire rope railway.

LONDON

An abstract by the Technical Review from the Elektrotechnische Zeitschrift, states that owing to the scarcity of coal, the Arlberg railway is to be electrified, and work has commenced on the section from Landeck to Bludenz and will shortly commence on the section from Innsbruck to Landeck and Bludenz to Bregenz. The Czecho-Slovak government proposes to electrify this year the Selrainthal railway in Tyrol, and the lines from Hohenems to Herbrog, Ischl to Weissenbach, Scharding to St. Roman, Prague to Brandeis, Harland to Pyhra, Erlach to Wiesmath, Linz to Leonfelden, and Peuerbach to Engelhartzell.

Exports of Wheels and Axles

The exports of car wheels and axles in the month of March were valued at $789,265. One-third of the whole is represented by shipments to France. The detailed figures, as compiled by the Division of Statistics of the Bureau of Foreign and Domestic Commerce are as follows:

EXPORTS OF CARS FROM THE UNITED STATES, MARCH, 1920

Countries	Value	Countries	Value
France	$256,952	Chile	$4,795
Italy	20,398	Colombia	1,962
Netherlands	50	Ecuador	204
Spain	82,785	Peru	4,532
England	2,252	Uruguay	12
Canada	7,413	Venezuela	763
Costa Rica	1,576	British India	2,625
Guatemala	1,436	Hongkong	3,720
Honduras	890	Japan	56,613
Nicaragua	29	Australia	528
Mexico	22,095	New Zealand	719
Jamaica	492	Philippine Islands	1,394
Trinidad and Tobago	175	British South Africa	4,116
Other British West Indies	146	French Africa	45,000
Cuba	78,859	Egypt	1,721
Dominican Republic	2,029		
Argentina	2,741	Total	$789,265
Brazil	110,243		

Annual Report on Indian Railways

LONDON.

The Government report on the railways of India for the year ended March 31, 1919, shows gross earnings of the State railways to have been 763,500,000 rupees ($381,750,000), or an increase of $36,700,000 over the preceding year. The percentage of return on capital was 7.07 per cent, as against 6.83 per cent for the previous year. The ton-mileage of coal increased from 9,836,150,000 to 10,114,493,000, and other goods from 11,178,951,000 to 12,026,313,000 ton miles.

The total length of road under construction or sanctioned was 618 miles of 5 ft. 6 in. gage, including 200 miles of State lines worked by the State and 403 miles of State lines worked by companies; 792 miles of meter gage, including 79 miles of State lines worked by companies; 336 miles of 2 ft. 6 in. gage, including 22 miles of State lines worked by the State and 8.43 miles of State lines worked by companies; and 57 miles of 2 ft. gage, none of which was on State lines. The total was 1,803 miles. To help industrial development the government of India has undertaken to purchase in India at least 3,000 wagons (freight cars) annually for ten years, provided that the price is not higher than the price at which wagons can be imported.

The Indian railways endeavored during the war to make minimum demands on Great Britain, but it was necessary in 1918 to ask for 100 locomotives, which were supplied by England, and 5,000 wagons. These wagons eventually were obtained from the United States, being made from materials which had been ordered for the Russian railways.

Designs for standard types of rolling stock were under preparation at the close of the year. Except with the special permission of the government, only British standard rail sections will be used in future for new lines and for extensive renewals.

Experiments on the Great Indian Peninsular Railway indicate that when the proper degrees of pulverization and dryness have been attained, it will be possible to use the lowest grades of Indian coal for fuel on the railways. In the year 1919, the North Western Railway had 112 locomotives burning oil fuel.

Owing to the increasing cost of sleepers, the North Western Railway is preparing a creosoting plant, capable of treating 300,000 sleepers yearly.

Exports of Locomotives

In the month of March the locomotives exported, as reported by the Bureau of Foreign and Domestic Commerce, Washington, numbered 125, and their total value was $3,672,579. The total value of these exports in February was $4,588,074, and in January $4,159,214. The figures for March are as follows:

EXPORTS OF STEAM LOCOMOTIVES, MARCH, 1920

Countries	Number	Value
Denmark	16	$619,680
Spain	10	230,000
Canada	3	27,340
Mexico	7	203,500
Jamaica	1	35,590
Trinidad and Tobago	6	98,646
Cuba	20	519,188
French West Indies	1	1,925
Dominican Republic	2	26,024
Bolivia	1	21,410
Brazil	16	521,006
Chile	3	12,904
Colombia	4	113,200
Peru	1	11,550
China	7	56,740
Dutch East Indies	3	161,370
Japan	7	92,925
New Zealand	1	11,450
Philippine Islands	1	13,881
British South Africa	15	894,250
Total	125	$3,672,579

Railway Wage Increases in France

The recent report of the Government Railway Commission in France shows that on the French railways the increase in wages of employees since 1914 has been enormous. In July, 1914, an engineman received $637 a year, and by December last this had risen to $1.357, (calculating exchange at the normal rate). A shop employee's annual wages increased in the same period from $213 to $1,112, and among other increases are from $247 to $1.015, and from $342 to $1,015. The whole of this rise is not accounted for by the increase in wages proper, allowances similar in principle to our war bonus making up a considerable proportion of the total. For instance, in the case of the grade whose pay has been raised from $247 to $1,110 a year, in addition to the increase of the minimum rate from $247 to $456, there is an annual allowance of $205 to meet the high cost of living, and special family and other allowances, not granted before the war, totaling another $352 a year. How these increases affect operating expenditure is strikingly shown in the following table of annual wages bills:

	Wages bill, 1913	Wages bill, 1919	Increase
Northern Railway	$27,075,000	$89,680,000	$62,605,000
Eastern	24,700,000	76,000,000	51,300,000
Paris, Lyons & M.	33,820,000	133,950,000	100,130,000
Southern	7,330,200	36,835,110	29,504,910
Paris & Orleans	21,714,150	70,902,490	49,188,340
State Railways	31,043,340	114,271,510	83,227,980
Total	$145,682,690	$521,639,110	$375,956,230

It should, however, be pointed out that this increase is by no means entirely due to the higher average wage per employee, the growth in the number of persons employed being also a contributory factor. From 1913 to 1919 the staffs of the six railways mentioned above rose from 329,762 to 465,555, an increase of 136,783.

Equipment and Supplies

Locomotives

THE LAKE ERIE & NORTHERN is in the market for two 60-ton electric locomotives.

THE ILLINOIS CENTRAL is inquiring for 50 Mikado type locomotives and 25 Pacific type locomotives.

THE PENNSYLVANIA RAILROAD is having 100 locomotives repaired at the shops of the Baltimore Locomotive Works.

THE CHICAGO, BURLINGTON & QUINCY, reported in the *Railway Age* of April 9 as being in the market for 15 Mikado and 15 Santa Fé type locomotives, has ordered this equipment from the Baldwin Locomotive Works.

THE MISSABI IRON COMPANY, New York, has ordered 3, six-wheel tank locomotives from the American Locomotive Company. These locomotives will have 21 by 26 in. cylinders, will weigh 157,000 lb. in working order, and will be equipped with superheaters.

THE TEMISKAMING & NORTHERN ONTARIO, reported in the *Railway Age* of April 23 as being in the market for 2, 8-wheel switching locomotives, has ordered these locomotives from the American Locomotive Company. These locomotives will have 23 by 28 in. cylinders, and a total weight in working order of 203,000 lb.

Freight Cars

THE ILLINOIS CENTRAL is inquiring for 1,000 refrigerator cars and 200 flat cars.

THE OLIVER IRON MINING COMPANY, Duluth, Minn., has ordered 65 dump cars from the Western Wheeled Scraper Company.

THE CHICAGO, BURLINGTON & QUINCY, reported in the *Railway Age* of March 26 as being in the market for 500 stock cars, has ordered this equipment from the Western Steel Car Company.

THE INTERNATIONAL RAILWAY SUPPLY COMPANY, New York, has ordered 7 tank cars of 6,000 gal. capacity for the Trinidad Government Railways, from the American Car & Foundry Company.

THE BETHLEHEM STEEL COMPANY, Bethlehem, Pa., reported in the *Railway Age* of April 16 as inquiring for 500 70-ton steel hopper cars, has ordered 1,000 70-ton cars from the Cambria Steel Company.

Passenger Cars

THE PHILADELPHIA & READING is in the market for 50 cars for passenger train equipment.

THE LAKE ERIE & NORTHERN is in the market for ten 60-ft. interurban passenger cars and one 60-ft. express car.

THE ILLINOIS CENTRAL, reported in the *Railway Age* of March 26 as being in the market for 30 all-steel suburban coaches, is now in the market for 50 steel coaches, 72 ft. 7½ in. long.

THE BALTIMORE & OHIO, reported in the *Railway Age* of May 7 as inquiring for a number of cars for passenger train equipment, is in the market for 60 coaches, 4 dining cars, 20 baggage cars, 10 passenger and baggage cars and 6 baggage and mail cars.

Machinery and Tools

THE AUTOMATIC STRAIGHT AIR BRAKE COMPANY, New York, is inquiring for Jones & Lamson turret lathes, plain and universal milling machines, cylindrical and rotary surface grinders, engine lathes, speed lathes and shapers.

Supply Trade News

H. McL. Harding, designing terminal engineer, has removed from the Concourse building, 52 Vanderbilt avenue, to 5730 Grand Central Terminal, Forty-second street, New York.

F. R. Bolles, formerly vice-president and general manager of the Copper Range Railroad, Houghton, Mich., has been appointed vice-president and general manager of the **American Automatic Connector Company**, Cleveland, Ohio.

J. G. McNeely, formerly in charge of the incandescent lamp department of the Western Electric Company, Chicago, with headquarters at Pittsburgh, Pa., has been placed in charge of railroad sales of that company in Pittsburgh, succeeding **Oscar Lepper**, who has been granted a leave of absence on account of ill health.

William B. Ross, district manager in charge of sales for Mudge & Co., Chicago, with headquarters at New York City, has been appointed manager of sales of **Edwin S. Woods & Co.**, Chicago. Mr. Ross began his railway career with the Burlington, Cedar Rapids and Northern as a freight house clerk at Cedar Rapids, Iowa. In January, 1891, he was transferred to the auditor's office, where he served in various capacities until June, 1893. From this time until June, 1898, he served as timekeeper and chief clerk to the superintendent, and from July, 1898, to June, 1901, he was utility clerk to the vice-president and general superintendent of the same road. In July, 1901, he was promoted to car accountant, which position he held until that company was absorbed by the Chicago, Rock Island & Pacific. He was transferred to the latter company as a car agent, and in January, 1903, he was appointed statistician to the general manager of the system. In September, 1903, he was appointed transportation clerk to the third vice-president, and subsequently he was employed consecutively as transportation clerk and statistician to the president. In January, 1909, he was appointed chief clerk to the standardization committee. On January 1, 1910, he was elected secretary of the Board of Pensions and later appointed secretary of the Pension and Personal Record Bureau. In July, 1916, he entered the railway supply business as secretary and assistant treasurer of Mudge & Co. In April, 1917, he was elected secretary and treasurer of this company and in May, 1918, he was appointed assistant to the president, with headquarters at Washington, D. C., in which capacity he served until his appointment as district manager.

W. B. Ross

The officers of the **Elvin Mechanical Stoker Company**, 23 West Forty-third street, New York, are as follows: **Frank H. Clark**, president; **John R. Given**, vice-president; **A. G. Elvin**, treasurer; **Frederick P. Whittaker**, secretary; **J. Snowden Bell**, patent attorney, 149 Broadway, New York.

At the fourth annual convention of the American Gear Manufacturers' Association in Detroit, Mich., April 29 to May 1, **F. W. Sinram**, president of the **Van Dorn & Dutton Company**, Cleveland, Ohio, was for the fourth time unanimously re-elected to the presidency of the association.

J. F. McDonnell, who for the past nine years has been connected with the Dearborn Chemical Company, has been appointed special railroad representative, packing department, mechanical rubber division of the **United States Rubber Company**, with headquarters at Chicago.

E. G. Lewis, manager of the Cleveland, Ohio, office of the **Bucyrus Company**, South Milwaukee, Wis., has been appointed central sales manager of that company, with headquarters in the McCormick building, Chicago, succeeding **E. C. Hingston**, who has resigned. Mr. Lewis will continue to have jurisdiction over the Cleveland office.

Henry A. Koach, formerly assistant chairman of the Railway Ticket Protective Bureau, and during the period of federal control inspector in charge of the Secret Service and Police Section of the United States Railroad Administration at Chicago, is now associated with **J. E. White** in the **White Service Company**, Transportation building, Chicago.

G. E. Ellis, executive secretary of the Automatic Train Control Committee, has been appointed chief engineer of the foreign department of the **Casale Safety Devices Company, Inc.**, New York City, with office in London, England. Mr. Ellis was born at Fairhaven, Mass., on January 13, 1870, and was educated in civil engineering at Rensselaer Polytechnic Institute, Troy, N. Y. He first entered railway service in 1892, as a signal inspector on the Hudson division of the New York Central & Hudson River. The following year he was transferred to the western division of the same road in the same capacity, and in May, 1894, he returned to the Hudson division. Four years later he was promoted to assistant superintendent of signals of the Mohawk division and at the same time acted as superintendent of the Hudson River Bridge Company. In June, 1900, he was appointed signal engineer of the Standard Signal Company and from September, 1902, to July, 1904, he was western agent of the Pneumatic Signal Company. On the latter date he became assistant chief engineer of the General Railway Signal Company, and in November of the same year he was appointed signal engineer of the Chicago, Rock Island & Pacific. Four years later he left the service of the Rock Island to become manager of installation for the Federal Signal Company and in December, 1909, he became associated with the Hayes Track Appliance Company, Richmond, Ind. In August of the following year he was appointed signal engineer of the Kansas City Terminal, resigning after five years to become senior signal engineer of the Division of Safety of the Interstate Commerce Commission, at Washington, where he remained until he was appointed executive secretary of the Automatic Train Control Committee in January, 1919.

G. E. Ellis

George A. Price has been elected treasurer of the **American Arch Company**, 30 Church street, New York. Mr. Price has spent his entire business life in railroad work. He started work on the New York Central & Hudson River in the motive power department, at the DeWitt enginehouse, and from there was transferred to the office of the superintendent of motive power of the New York Central. In August, 1912, he resigned to enter the service of the American Arch Company. On March 1, 1918, he was elected assistant secretary, and he has now been elected treasurer. In addition to being treasurer Mr. Price will also continue his duties as assistant secretary.

A. G. Shaver, consulting signal and electrical engineer, with headquarters in Chicago, has recently been appointed chief engineer of the **Casale Safety Devices Company, Inc.**, New York City. Mr. Shaver was educated at Rose Polytechnic Institute, Terre Haute, Ind., and during his summer vacations worked as a trainmen's caller on the Pennsylvania. After graduating he entered the service of that road as a machinists' helper. In 1898, he left the Pennsylvania to become a signal maintainer and batteryman on the Chicago & Eastern Illinois, resigning from the service of that company on April 1, 1901, to become assistant engineer in charge of the signal department of the Union Pacific, with headquarters at Omaha, Neb. On November 1, of the same year, he was given the title of signal engineer, which position he held until April 3, 1906, when he was appointed signal engineer of the Hall Signal Company, now the Hall Switch & Signal Company, Garwood, N. J. After two years with this company he was appointed signal engineer of the Chicago, Rock Island & Pacific. In May, 1914, he resigned to become secretary and treasurer of the Hallet Iron Works, Chicago, and in April of the following year he severed his connection with that company and opened an office as consulting signal and electrical engineer at Chicago. Mr. Shaver intends to continue this work in addition to his new duties.

A. G. Shaver

Obituary

Arthur Benedict Bellows, first vice-president of the **Pittsburgh testing Laboratory**, Pittsburgh, Pa., died on April 17.

Daniel Cram Noble, president and treasurer of the **Pittsburgh Spring & Steel Company**, Pittsburgh, Pa., died at his home in that city on May 8, at the age of 75. He was born in Baldwin, Maine, on August 5, 1845 and was educated at Hebron Academy, Maine. For more than 25 years Mr. Noble was identified with branch lines of the Pennsylvania Railroad. He went to Pittsburgh in 1868, and in 1880 became associated with the A. French Spring Company of that city, remaining with that company until 1902, when he founded the Pittsburgh Spring & Steel Company. At the time of his death Mr. Noble was a director of a number of banks and insurance companies of Pittsburgh.

D. C. Noble

John Wesley Hyatt, inventor of the Hyatt roller bearing, died on May 10, at his home in Short Hills, N. J., at the age of 83. Mr. Hyatt was not connected with the Hyatt Roller Bearing Company, having sold the patent for this invention about 25 years ago.

Railway Construction

Atchison, Topeka & Santa Fe.—This road is completing plans for the construction of a number of buildings at its mechanical terminal at Albuquerque, N. Mex. In addition to the buildings completed before the war, a machine shop, 240 ft. by 600 ft., of steel frame construction; a babbitt shop, 36 ft. by 50 ft.; a flue shop, 46 ft. by 96 ft.; a waste cleaning and paint shop, 24 ft. by 60 ft.; a cab painting and asbestos shop, 30 ft. by 112 ft.; a fire department building, 40 ft. by 60 ft.; a pattern shop, 40 ft. by 70 ft., and a tin shop, 24 ft. by 42 ft., will be constructed. The main buildings are to be principally of reinforced concrete. The addition of these buildings will make this terminal the most complete and modern on the Santa Fe system, and it will be second in size only to the one at Topeka, Kan. F. M. Bisbee, chief engineer of the Western lines, is in charge of the work.

Canadian Pacific.—Improvements are to be carried out at the Angus shops in Montreal, Que., at a cost of about $1,000,000, as follows: Extensions to the locomotive shops to give an additional floor area of 58,000 sq. ft.; extension to freight shop 106 ft. by 400 ft., extension to pattern shop 50 ft. by 75 ft.; three extension to passenger car shops, one of 102 ft. by 161 ft., another of 137 ft. by 161 ft. and a third 137 ft. by 239 ft.; new car electrical shop 62 ft. by 362 ft.; planing mill shelter 126 ft. by 144 ft.; four new stalls will be added to the dry kiln, increasing the area 7,400 sq. ft.; a new heavy service tapered floor scale will be installed; a number of track changes and additions will be made in the yard, and a mechanical coaling plant, also a new stand pipe will be installed.

Lake Erie & Northern.—Improvements and betterments have been authorized to be carried out this year on the Lake Erie & Northern and Grand River Railway subsidiary lines of the Canadian Pacific, operated by electricity. Contracts have already been let for two line revisions, one at Kitchener and the other at Galt, Ont., also for an addition to the repair shop at Preston, Ont., and for two fireproof sub-stations, one at Preston and the other at Brantford.

Moore Haven & Clewiston.—It is proposed to build a 13-mile line from Moore Haven, Fla., to Clewiston. C. D. Waring will be the engineer in charge of the location and construction of this new line.

Oklahoma Southwestern.—This company, announcement of whose incorporation and general construction plans was made in the *Railway Age* of January 30 (page 395) has now completed about 33 per cent of its new line from Bristow, Okla., through Youngstown and Flick to Okmulgee, a distance of approximately 50 miles. The maximum grade on this line is 0.7 per cent and the maximum curvature 6 deg. The structures consist of one 50-ft. girder span and about 2 miles of timber bridging. Contracts for the construction were let to the Allhands & Davis Company, Rogers, Ark., on March 1. The grading averages about 15,000 yd. per mile. In addition to the construction now under way the company contemplates the extension of its line from Okmulgee to a point on the Red River in Jefferson county, a distance of about 200 miles. The line now under construction will connect at Okmulgee with the St. Louis-San Francisco and the Okmulgee Northern.

Southern Railway.—Construction of a modern double-track steel bridge across the Ohio river at Cincinnati, Ohio, for the Southern Railway System will be begun immediately, a contract for the fabrication and erection of the steel superstructure having been let to the American Bridge Company. The new bridge will take the place of the present single-track structure and will support the heaviest locomotives.

Seasonal coal rates, as provided for in a bill before the Senate committee on interstate commerce, with specific reductions in cents per ton during the summer months and corresponding increases during the winter months, has been recommended to the committee by Senator Frelinghuysen, chairman of a sub-committee which has been holding hearings on the subject.

Railway Financial News

Chicago & North Western.—Application has been made to the Illinois Public Utilities Commission for permission to issue $15,000,000 1st refunding mortgage bonds.

Application has been made also for authority to purchase and acquire the properties of the Macoupin County Extension and the De Pue, Ladd & Eastern railroads.

Grand Trunk.—Dr. J. D. Reid, Canadian minister of railways, recently introduced a bill in the Canadian House of Representatives, providing for the inclusion in the agreement between the government and the company of the names of two small lines, the Vermont & Providence and the Pembroke Southern, which were omitted from the draft approved by the Canadian ministry and subsequently by the Grand Trunk at a special general meeting held in London, Eng., in March, 1920.

Lehigh Valley.—See editorial elsewhere in this issue.

Minneapolis, St. Paul & Sault Ste. Marie.—William A. Read & Co. are offering an issue of $2,500,000 7 per cent equipment trust notes at par. These notes are a direct obligation of the railway company, and are secured by equipment having a value 25 per cent in excess of the amount of the notes. The notes mature in equal instalments of $250,000, beginning June 1, 1921, and ending June 1, 1930.

Northern Pacific.—J. P. Morgan & Co., the First National Bank and the National City Company are offering an issue of $4,500,000 one to ten year serial 7 per cent equipment trust certificates.

Pacific Fruit Express Company.—An offering of $25,000,000 7 per cent equipment trust certificates, maturing in equal instalments from June 1, 1925, to June 1, 1935, and jointly guaranteed by the Union Pacific and Southern Pacific railroads, have been sold by a syndicate headed by Kuhn, Loeb & Co.

Wichita Falls, Ranger & Ft. Worth.—See Wichita Falls & Southern.

Wichita Falls & Southern.—This road, operating between Newcastle, Tex., and Wichita Falls, a distance of 56 miles, has recently been taken over by the Wichita Falls, Ranger & Ft. Worth. The acquired line has been operated for several years under lease by the Missouri, Kansas & Texas and will be connected with the Wichita Falls, Ranger & Ft. Worth line now under construction from Dublin, Tex., north through Ranger, Tex., to Newcastle. The announcement of the opening for operation of the latter line between Dublin and Ranger was made in the *Railway Age* of May 7, page 1369.

Chicago Great Western.—The consolidation of the Wisconsin, Minnesota & Pacific with the Chicago Great Western has been approved by the stockholders. All of the stock of the Wisconsin, Minnesota & Pacific is owned by the Chicago Great Western and the line has been operated for a number of years by the latter company.

One of the most heartening things about the return of the railroads, shorn as they are under the bill of some functions they previously exercised as a matter of course, is the optimistic spirit in which the carriers' executives are welcoming it and seem disposed to carry out the provisions of the act.—*Newark (N. J.) Evening News.*

A Department of Health and Recreation is the latest novelty on the New York, New Haven & Hartford. B. Thomas Pest, a former physical director for the Young Men's Christian Association, and who was wounded in France, is the director of the new department, with headquarters at New Haven. His business will be to manage the organization of baseball clubs and other athletic activities among the trainmen, shopmen, clerks and other employees of the railroad. It is the purpose to establish athletic leagues on each division and at centers where conditions warrant.

Railway Officers

Executive

Leon Salinas was elected executive vice-president of the National Railways of Mexico, and empowered with the duties of executive president on April 16.

Richard O. Fischer, who served as office manager under the regional director of the Allegheny Region at Philadelphia, Pa., during federal control, has been appointed office manager for the vice-president and general manager of the Illinois Central and the Yazoo & Mississippi Valley, with headquarters at Chicago, assuming the duties of **F. S. Gibons**, assistant to the general manager, who has left railway service, as noted in the *Railway Age* of April 23 (page 1272).

Financial, Legal and Accounting

A. T. Cole, paymaster on the Houston Belt & Terminal, with headquarters at Houston, Tex., has been appointed acting treasurer of the Gulf Coast Lines, with the same headquarters, succeeding **J. H. Lauderdale**, who has been granted an indefinite leave of absence to become assistant manager of the Material and Supplies Division of the United States Railroad Administration under Max Thelan, Director of Liquidation Claims Division. His headquarters will be at Washington.

Walter E. Paschall, who has been elected treasurer of the Atlanta, Birmingham & Atlantic, with headquarters at Atlanta, Ga., as noted in the *Railway Age* of February 20 (page 595), served as acting auditor of the Atlanta, Birmingham & Atlantic Railroad Company during the greater part of federal control. Mr. Paschall was born on June 13, 1875, at Brentwood, Tenn. He was educated in public schools and began railroad work in November, 1911, with the road of which he is now treasurer. He was appointed assistant treasurer on March 1, 1913, and served in that capacity until December 31, 1916. From July 1, 1917, until July 1, 1918, he was treasurer of the Cuban Sugar Mills Corporation, with headquarters at Havana, Cuba. He was appointed acting auditor on November 18, 1918.

Operating

V. Parvin has been appointed superintendent of the Ann Arbor, with headquarters at Owosso, Mich., succeeding **A. Syverson**, resigned, effective May 1.

R. J. McCarthy has been appointed superintendent of the Saratoga division of the Delaware & Hudson, with headquarters at Albany, N. Y., succeeding **H. F. Burch**, promoted, effective May 4.

Albert S. Johnson, assistant general manager of the Terminal Railroad Association of St. Louis, has been promoted to general manager, effective May 10, succeeding **Ira L. Burlingame**, who resigned on May 1.

J. A. Kaufman, formerly of the Seaboard Air Line, has been appointed superintendent of the Cumberland & Manchester, effective April 26, and **J. W. McCallister**, foreman, has been promoted to supervisor, effective April 12.

W. H. Haley, superintendent of car service on the Missouri Pacific, has been appointed assistant superintendent of transportation, with headquarters at St. Louis, Mo., effective May 1. The position of superintendent of car service has been abolished and Mr. Haley will continue his former duties under the newly created title of assistant superintendent of transportation.

L. Ennis, chief despatcher of the Southern, has been appointed trainmaster, having jurisdiction from Sheffield, Ala., to Chattanooga, Tenn., with headquarters at Sheffield, Ala., succeeding **L. Woodall**, promoted. **M. J. Bryan** has been appointed chief despatcher, with the same headquarters, succeeding Mr. Ennis. These appointments became effective May 1.

William F. Cooper, who has been appointed superintendent terminals of the Southern, with headquarters at Columbia, S. C., as noted in the *Railway Age* of February 27 (page 656), served as trainmaster from July 26, 1917, until the termination of federal control. Mr. Cooper was born on November 3, 1885, at Salisbury, N. C. He received a high school education, graduating in 1901. His first railroad work began on July 23, 1904, as freight brakeman for the Southern, to which road he has given his entire railroad service. On December 24, 1906, he was promoted to freight conductor and served in that capacity continuously until July 26, 1917, when, as noted above, he was appointed trainmaster of the Charlotte division, with headquarters at Toccoa, Ga. His appointment as superintendent terminals became effective February 15.

W. F. Cooper

C. E. Urbahns, superintendent of the Northern district of the Chicago division of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Stevens Point, Wis., has been promoted to general superintendent, with headquarters at Minneapolis, Minn., effective May 1. **W. W. Wade**, assistant superintendent of the Southern district of the Chicago division of the Soo line, with headquarters at Chicago, will succeed Mr. Urbahns.

C. L. Hinkle, who recently resigned as general superintendent of the Toledo, St. Louis & Western, with headquarters at Frankfort, Ind., has been appointed general manager of the Chicago Great Western in charge of operation and maintenance, with headquarters at Chicago, effective May 1. Mr. Hinkle succeeds **W. L. Park**, who resigned to become a member of the new Railroad Labor Board. Mr. Hinkle entered railway service in 1883, with the Evansville & Terre Haute and was successively operator, station agent and bill clerk until 1888. Later he became associated with the Chicago & Eastern Illinois as a clerk in the mechanical department. He was subsequently promoted to general storekeeper, in which capacity he served from 1891 to 1893, at which time he went to the Ohio Southern as storekeeper and chief clerk in the mechanical department. In 1900 he became chief clerk to the chief engineer on the Detroit, Toledo & Ironton and from 1901 to 1902 he served as a traveling auditor. He became connected with the Toledo, St. Louis & Western the following year, serving as chief clerk to the superintendent. Later he was promoted to chief clerk to the general superintendent and in 1907 he was promoted to chief clerk to the general manager and vice-presi-

C. L. Hinkle

dent in charge of operation and maintenance of that road and the Chicago & Alton. Three years later he was promoted to assistant to the general manager of these roads. In March, 1912, he was appointed superintendent of the Toledo, St. Louis & Western and two years later was promoted to general superintendent, with headquarters at Frankfort. During the war, from February, 1918, to July, 1919, Mr. Hinkle served as a major in the Transportation Corps and while in France was appointed general superintendent of the large depot at Jievres and later to general manager of the depot at Tours. He resumed his former position after his return from service and continued in that capacity until recently.

Frank E. House, who has been appointed superintendent of the Cincinnati division of the Erie, with headquarters at Marion, Ohio, as noted in the *Railway Age* of April 16 (page 1223), served as trainmaster of the Susquehanna division during federal control. Mr. House was born in 1880. He received a grammar school education and began railroad work with the Erie on December 27, 1897, as brakeman. From 1903 until 1913 he served as conductor and was then appointed general yardmaster at Avoca, Pa. He was promoted to trainmaster of the Buffalo division on October 1, 1916, which position he retained until transferred to the Susquehanna division at the time mentioned above.

R. H. McKay, who has been appointed superintendent in charge of traffic and transportation of the Atlanta, Birmingham & Atlantic, with headquarters at Fitzgerald, Ga., as noted in the *Railway Age* of March 12 (page 800), served as general agent of the same road and others during the greater part of federal control. Mr. McKay was born on December 10, 1884, at Andersonville, Ga. He was educated in public schools and began railroad work in 1900 as clerk for the Central of Georgia. He retained that position until 1902, when he entered the employ of the Commercial Telegraph Company. He became telegraph operator for the Atlanta, Birmingham & Atlantic in September, 1908, and in 1912 was appointed division freight agent at Fitzgerald. He was promoted to general agent, with headquarters at Atlanta, Ga., in June, 1917.

Ralph Peters, Jr., who has been appointed superintendent-passenger of the Long Island, with headquarters at Jamaica, N. Y., as noted in the *Railway Age* of March 5 (page 744), served as assistant superintendent from June 1, 1919, until the termination of federal control. Mr. Peters was born at Cincinnati, Ohio, on May 5, 1887. He graduated from Princeton University with the degree of civil engineer in June 1908, and began railroad work as draftsman in the engineering department of the Long Island the following August. Afterwards he filled such positions as rodman, transitman and assistant engineer. He was then appointed office engineer in the department of construction and maintenance of way. On August 1, 1916, he was transferred to the transportation department for special work. On May 1, 1917, he was appointed assistant trainmaster, with duties involving the operation of various freight terminals in the western territory and on October 1, 1917, he became assistant superintendent in charge of operation of the Bay Ridge division, including the Bay Ridge yards. Shortly afterwards his jurisdiction was extended over the passenger operation in the electrified territory. He was granted a furlough on May 1, 1918, to engage in military service, which included a year with the American Expeditionary Forces as lieutenant in the Transportation Corps. Most of the time he served under Colonel J. A. McCrea, while Colonel McCrea was general manager of transportation service, with headquarters at Tours, and later, while he was Deputy Director General of Transportation, located at the general headquarters of the A. E. F. After he was discharged from military service he resumed the position he held prior to his service.

Traffic

H. D. Page has been appointed general agent of the Chicago, Burlington & Quincy, with headquarters at Peoria, Ill., effective May 1.

G. F. Ramspacker has been appointed general agent of the Chicago, Rock Island & Pacific, with headquarters at Pittsburgh, Pa., effective May 5, succeeding **M. T. McCraney,** deceased.

H. K. Mack has been appointed division freight agent of the Chicago, Burlington & Quincy, with headquarters at Galesburg, Ill., succeeding **H. D. Skidmore,** assigned to other duties, effective May 1.

W. C. Esgar has been appointed superintendent passenger transportation of the New York Central, Lines West of Buffalo, with headquarters at Cleveland, Ohio, effective May 1, succeeding **L. C. Anderson,** promoted.

George F. Ramspacher, formerly general agent of the Chicago, Rock Island & Pacific at Philadelphia, Pa., has been appointed general agent in the freight department, with headquarters at Pittsburgh, Pa., succeeding **M. T. McCraney,** deceased.

John B. Warrington, who has been appointed manager, through freight and passenger service of the Baltimore & Ohio, the Philadelphia & Reading and the Central of New Jersey, with headquarters at Philadelphia, as noted in the *Railway Age* of March 12 (page 799), served as terminal manager of the Washington Terminal for the Railroad Administration during the greater part of federal control. Mr. Warrington was born on April 21, 1866, at Hummelstown, Pa. He began railroad work in 1876 as car cleaner for the Philadelphia & Reading at Port Clinton, Pa. Later he became yard brakeman; then brakeman, and afterwards conductor. Within a short time after being transferred to the trainmaster's office at Reading, Pa., as assistant train despatcher, he was promoted to train despatcher, in which capacity he served until 1888, when he was appointed yardmaster at Harrisburg, Pa. He was transferred as yardmaster to West Falls, Pa., in 1895, and on November 7, 1899, he was appointed assistant trainmaster of the Philadelphia division of the Philadelphia & Reading, at Philadelphia. On March 19, 1902, he was promoted to superintendent of the same division. He went to the roads of which he is now manager, through freight and passenger service, on May 15, 1918, as general superintendent interline freight transportation. The following June 17 he accepted the position of manager of the Washington terminal, as referred to above.

J. B. Warrington

Walter H. Dominick, who has been appointed assistant general passenger agent of the Delaware, Lackawanna & Western, with headquarters at New York, as noted in the *Railway Age* of April 9 (page 1176), served as secretary of the Joint Committee on Consolidated Ticket Offices, eastern territory of the United States Railroad Administration from January 1, 1919, until the termination of federal control. Mr. Dominick was born on March 23, 1892, at New York. He graduated from the Stuyvesant High School and the Albany Business College. His first railroad work began on May 12, 1910, as rate clerk in the passenger department of the Delaware, Lackawanna & Western. He served in that capacity until 1914, when he was promoted to chief rate clerk. He was transferred as chief clerk to the dining car department in 1918. He was then appointed secretary, as mentioned above.

Mechanical

W. Wright has been appointed division master mechanic of Farnham division of the Canadian Pacific, with headquarters at Farnham, Que., succeeding **R. Walton,** transferred, effective April 15.

F. P. Pfahler, who has been chief mechanical engineer of the Railroad Administration, with office at Washington, D. C., has been appointed supervisor of locomotive maintenance of the Baltimore & Ohio, with office at Baltimore, and also the mechanical member of a committee appointed to investigate the feasibility of electrifying one or two of its divisions.

George S. Edmonds, who has been appointed superintendent motive power of the Delaware & Hudson, with headquarters at Colonia, N. Y., as noted in the *Railway Age* of April 30 (page 1330), graduated from Cornell University in 1895. He began railroad work shortly after graduation in the shops of the New York Central. Afterwards he served in the road and mechanical engineers' office of the same road. He went to the Delaware & Hudson in 1900 as mechanical engineer. He was appointed master mechanic in 1905 and retained that position until 1912, when he was appointed shop superintendent. On April 5, 1920, he became acting superintendent motive power and was promoted to superintendent motive power on April 21.

Ernest V. Williams, shop superintendent of the Buffalo, Rochester & Pittsburgh, who has been appointed superintendent motive power, with headquarters at DuBois, Pa., as announced in the *Railway Age* of May 7 (page 1385), served as an apprentice at the Brooks Locomotive Works, Dunkirk, N. Y., and afterwards as machinist for the Rome Locomotive Works, Rome, N. Y., prior to beginning actual railroad work. He then entered the employ of the New York Central as machinist at West Albany, N. Y. Shortly afterwards he was promoted to assistant machine shop foreman at the same place and then to assistant to the superintendent of shop. His next promotion was that of machine shop foreman, also at West Albany. Later he was transferred to Depew, N. Y., as assistant general foreman but afterwards he returned to West Albany as general foreman. He went to the Buffalo, Rochester & Pittsburgh on June 1, 1917, to accept his appointment as shop superintendent, the position he filled at the time of his recent promotion.

E. V. Williams

Engineering, Maintenance of Way and Signaling

E. S. Draper, engineer of structures of the Boston & Albany, with headquarters at Boston, has been appointed principal assistant engineer, with the same headquarters, effective May 1, succeeding **L. G. Morphy,** retired.

J. S. Lemond, who has been appointed chief engineer, maintenance of way and structures of the Southern lines east, with headquarters at Charlotte, N. C., as noted in the *Railway Age* of March 5 (page 750), served as assistant to chief engineer maintenance of way and structures during federal control. Mr. Lemond was born in Walton County, Ga., and educated in a country school. He began railroad work on April 3, 1883, as section hand at Alcovy, Ga. Soon afterwards he went to the Southern as section foreman and served in that capacity until April 1, 1886, when he became work train conductor. He was appointed track supervisor in 1887, and road master in 1890. He was then promoted to superintendent and retained that position from July 1, 1899, until September 30, 1900. From then until June 30, 1906, he again served as roadmaster. On July 1, 1906, he became engineer maintenance of way and was appointed assistant to chief engineer maintenance of way and structures on January 18, 1917.

O. T. Nelson, who has been appointed chief engineer of the Atlanta & West Point, the Georgia and the Western of Alabama, with headquarters at Atlanta, Ga., as noted in the *Railway Age* of March 12 (page 801), served as engineer maintenance of way of that road and others under the direction of Hale Holden, regional director, during federal control. Mr. Nelson spent about nine years in railroad construction work prior to entering railroad service. At the age of 26 he entered the employ of the Mobile & Ohio as supervisor of tracks. Nine years later he was appointed roadmaster of the Southern. Afterwards he went to the Georgia as superintendent maintenance of way. He also served in the same capacity for the West Point Route, now part of the Atlanta & West Point. He was then elected vice-president and general manager of the Elberton & Eastern and the Washington & Lincolnton and held that position when the railroads were placed under federal control. The position he filled from 1918 until the termination of federal control has already been mentioned above.

Purchasing and Stores

E. W. Thornley, formerly supervisor of stores, United States Railroad Administration, has been appointed assistant purchasing agent of the Baltimore & Ohio, with headquarters at Baltimore, Md.

D. C. Curtis, prior to federal control inspector of stores on the Chicago, Burlington & Quincy, and during federal control storekeeper for the Northwestern Regional Purchasing Committee, has been appointed general storekeeper of the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee Shops, Wis., succeeding F. J. O'Connor, who has been assigned to other duties. The changes are effective May 1.

Charles R. Craig, who has been appointed general purchasing agent of the Southern, with headquarters at Washington, D. C., as noted in the *Railway Age* of March 5 (page 749), served as purchasing agent from 1914 until the termination of federal control. Mr. Craig was born on October 12, 1872, at Richmond, Va. He received a high and business school education and began railroad work in 1889 as clerk in the stores department of the Richmond & Danville, now part of the Southern. He went to the Southern as storekeeper at Selma, Ala., in 1894, and retained those headquarters until 1897, when he was transferred to Richmond, Va. Afterwards he served in the same capacity at Charleston, S. C. In 1903 he became clerk in the office of the assistant general manager, at Washington, D. C., and in 1905 purchasing agent of the Lenoir Car Works, a subsidiary of the Southern. In 1909 he went to the Mobile & Ohio as purchasing agent, and remained with that road until 1914, when he returned to the Southern in the same capacity.

Railroad Administration

Edward A. Sweeley, a member of the Railway Board of Adjustment No. 2, of the Railroad Administration, has resigned, to become mechanical superintendent of the Fruit Growers' Express.

Obituary

Fred. H. Tristram, assistant general passenger agent of the Wabash, died on May 5 at his home in Delaware, Ohio.

Herbert A. Boomer, general manager of the Lake Erie & Western, with headquarters at Indianapolis, Ind., died in his private car in the railroad yards at Lima, Ohio, on May 6, at the age of 58 years.

EDITORIAL

Railway Age

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The progress made in the last ten years in the electric and gas-torch welding of metals has frequently raised the question as to the possibility of substituting the shop or field weld for the riveted joint in structural steel work and renewed impetus is given to this idea by the recent fabrication and erection of a small mill building in New York City, in which all parts of the columns and roof trusses were joined by electric welds. This method of construction was approved by the city building department only after load tests gave satisfactory evidence of the strength of the joints made. While it is a far cry from a 40-ft. roof truss to a 300-ft. railroad bridge span, or even a 100-ft. plate girder, there is bound to be speculation as to the extent to which the weld may eventually be substituted for the rivet. Even if rivets are indifferently driven, the riveted joint suggests attributes of comfortable assurance that cannot be obtained in the welded joint until records of tests show a ratio of failures to total trials that compares favorably with the proportion of false-clear indications in block signal operation. But the structural effectiveness of the joints is not the only consideration; greater economy as compared with riveted work is a further requisite, and herein lies the chief promise of the weld. While the efficiency of the riveted joint is definitely limited by reason of the necessity of cutting holes through the adjoining members, the limitations of the welded joints are of an entirely different character, and it will be interesting to note with what degree of success they may be made more efficient than the riveted connection. Reliability, of course, remains the prime consideration.

The Welded Joint in Structural Steel

The meeting of the Association of Railway Accounting Officers which was held at Atlantic City last week had unusual reason for enthusiasm and earnestness. Both American Railroad Association and the Association of Railway Accounting Officers have now been affiliated with the Association of Railway Executives, but unlike the mechanical association, the accounting officers' association retains its own name and complete independent identity. Sentiment alone would have led to satisfaction in this respect, but there are sound reasons other than sentiment that led to the decision to retain the accounting officers' association separate both from the American Railroad Association and the Association of Railway Executives. Even before public regulation of the railways had assumed the overshadowing importance in the internal management of the companies, the accounting department performed a dual function. It acted as a check on the department that took in revenues and that paid out expenses, and it formed a link between the security holders and the management. The second function was often enough disregarded by managements in the past, but is no longer treated lightly. Now the accounting department also performs an important function as the link between the regulatory authorities and the management. All during government operation the Railroad Administration showed entire confidence in the accounting officers' association, and although both federal and corporation officers were on an equal footing in the association, no internal dissension arose. It is becoming more and more usual for the larger companies to elect their chief accounting officer a vice-president, and since without exception the chief accounting officers of the larger roads are members of the association, the opinions of the association, its practices, and ideals, carry unusual weight with the Association of Railway Executives. If anyone is interested in getting a clear idea of the work which the association is doing, they can do no better than read the address of a retiring president of the association, A. D. McDonald, vice-president of the Southern Pacific. This address is printed elsewhere in this issue in connection with a report of the proceedings.

The Accounting Officers' Association

"A Menace to the Railroads" is the head line which one editor has used to emphasize the news item, published in our issue of May 7 (page 1371), about the use of automobile trucks to carry freight 800 miles. A "menace" implies an impending evil; the word may or may not be applicable in this case. It is very questionable whether trucks running on the highway will make any permanent inroads on the railroads' traffic, except for short distances; and undoubtedly there are many kinds of valuable freight which can be handled short distances in congested districts more advantageously by motor truck than by rail. Indeed, the "ship-by-truck" booms now being exploited here and there are largely based on the temporary high value of certain classes of goods. But there would be no "menace" in sight, even if a lot of freight-car traffic were to be lost; the railroads are unable to carry what traffic is offered. They can use all their resources for a long time to come in performing services, much needed by the public, which the automobiles cannot render. The real "menace" is to the general public; the menace of being fooled into thinking that costs which are concealed are abolished; or that wasting is saving. The manufacturer who runs trucks and lets the town or the state pay for the maintenance of his roadway is shifting a part of his costs; but he may not be escaping them entirely. In the long run the public has to support the railroads; and whether it is good economy, after building a railroad, to turn a part of its business over to private carriers, unregulated, is a question which ought to be settled rationally, not ignored childishly. Cloth and rubber worth fabulous prices, which put them in the class with diamonds, may feel their importance too acutely to ride in common freight cars, even when cars are plenty; but if, finally, they become parts of luxurious limousines they only help to postpone the long-desired day when the production of necessaries shall overtake the pressing shortage of men and materials now felt everywhere. The public, which at last is in a state of mind to appreciate the value of its railroads as a fundamental element in the essentials of existence, should feel menaced, not when freight cars are used exclusively for food, fuel, building materials and other necessaries, but rather when luxury shipments are so numerous and pressing that long-distance freight costs of twenty cents per ton per mile are an every-day affair.

Long-Distance Freight by Automobile

How Much Railway Wages Really Have Advanced

THE QUESTION whether railway wages should be advanced, and if so, how much, is now primarily a public question. This is due to two facts: First, the net operating income of the railways has been practically wiped out, and therefore it is incontrovertible that any advance in wages which may be made will have to be met by advances in rates which the public must pay and not out of the net operating income of the companies. Second, an agency created by law which represents the public, namely, the Railroad Labor Board, must determine what advances, if any, shall be made. Since the question has become almost solely a public question, it is extremely desirable that the public should know all the facts about changes which have been made within recent years in wages and conditions of employment of railway employees.

The payroll of the Railroad Administration for January, 1920, has been made public since the hearings before the Railroad Labor Board began. Some very interesting and pertinent comparisons can be made between the statistics it contains and past statistics regarding railway wages. The demand of railway employees for additional large increases in their wages is based chiefly on the increase in the cost of living. In the estimates made by government bureaus regarding increases in the cost of living, the cost of living for the year 1914 is usually taken as a basis. The increase in the cost of living since 1914 is now officially estimated at approximately 100 per cent. How near have the advances in railway wages come to keeping pace with the increase in the cost of living? The average wage per railway employee in the year ended on June 30, 1914, was $810. The average wage per employee in January, 1920, was $132.25. This on an annual basis would amount to at least $1,587, on which basis the increase in the average compensation per employee since 1914 has been 96 per cent. It should be borne in mind also that in 1914 a large majority of employees, to earn the wage they were paid then, worked on a 10-hour basis, while in January, 1920, a large majority worked on an 8-hour basis. In other words, since 1914 a large majority of the employees have been given a reduction of approximately 20 per cent in their working hours, and employees as a whole have been given an average increase of 96 per cent in their wages.

Largely owing to the establishment of the eight-hour day, there was a very large increase in the number of railway employees during government control. The number in December, 1917, was 1,703,748, while the report of the Railroad Administration shows that in January, 1920, the number was 1,953,571, an increase of 249,823. The increase in the average earnings per employee between December, 1917, and January, 1920, was over 47 per cent, the average wage paid in December, 1917, being $89.33, and the average paid in January, 1920, being $132.25. There should be some relationship between the wages paid in any industry and the amount of product turned out per employee. The principal product of railways is freight transportation, and the amount of it produced is measured in ton-miles. In December, 1917, the number of tons moved one mile per employee was 18,758. The total amount of freight traffic handled in January, 1920, was substantially larger, but because of the large increase in the number of employees the number of tons hauled one mile per employee was only 17,798, a decrease as compared with December, 1917, of a little over 5 per cent. This decrease in the amount of freight traffic handled per employee is small, but it must be considered in the light of the fact that for years before government operation was adopted there was a constant and large increase in the amount of traffic handled per employee, this being chiefly due to improvements in the railway plant and in operating methods.

In wage hearings prior to two years ago great emphasis was placed upon the increase in the amount of freight traffic handled per employee as a reason why wages should be advanced. In the light of a decrease of over 5 per cent in the so-called "productive efficiency" of the employees and an increase of over 47 per cent in their average earnings, it is easy to see why there has been such an enormous increase in the railroad payroll. The total wages of railway employees in 1917 amounted to about $1,740,000,000. On the basis of the wages paid in January, 1920, the annual payroll would amount to about $3,010,000,000 a year. If the advance of over $1,000,000,000 for which the employees are now asking should be granted the payroll would be made approximately $4,020,000,000 annually, an increase over that of 1917 of approximately $2,280,000,000, or 130 per cent. The average annual wage of a railway employee on this basis would be about $2,100, or 160 per cent higher than in 1914.

The committee of managers representing the railroads in the hearings before the Railroad Labor Board has indicated in a statement to the board that it is appearing chiefly to give it information, since the responsibility for the advance in wages given will rest entirely on the board and any increase in wages made will have to be borne entirely by the public. Doubtless, however, the Labor Board will give great consideration to all the possible effects that may be produced before it grants the employees advances in wages anywhere near as large as those for which they are asking.

The Lesson from the Collision Statistics

A CLASSIFICATION of the 225 collisions that have been investigated by the Interstate Commerce Commission during the past four years shows them to be divided as follows:

Year ending June 30	Collisions	Signal territory: Automatic	Signal territory: Non-automatic	Train-order and time-interval system	On yard and switching tracks
1916.....	55	11	15	22	7
1917.....	54	11	10	33	..
1918.....	63	13	13	31	6
1919.....	53	18	10	19	6
Total	225	53	48	105	19

These accidents resulted in 841 deaths and 4,007 injuries. At the present time about fifty per cent of the total mileage of tracks in the United States upon which passenger trains are operated is protected by some form of block signaling, and it is on these lines that almost half of the collisions occurred. However, it must be realized that a very much larger volume of business is handled on these lines than on the unprotected lines. Other things being equal, the dangers of collision are, therefore, very much more pronounced than in the territory where trains are less frequent and the volume of business less heavy. It is, therefore, evident that block signaled lines have a considerably smaller number of collisions in proportion to the number of trains operated on them and the amount of traffic handled than lines without signals. Referring again to the collisions that occurred in block-signal territory, it will be noted that 53, or about one-half, of the 101 accidents took place on lines protected by automatic block signals. This type of protection is in service on about fifty per cent of the block signaled lines, and although the number of collisions is again about equally divided it must be realized that automatic signals are installed, at least in a majority of cases, on those lines with the heaviest traffic. Again, other things being equal, the chances of collisions on such lines are very much more pronounced than in non-automatic territories, where the traffic is less heavy. It is, therefore, evident that automatic block signaled lines have fewer collisions in proportion to train mileage than those with non-automatic signals and that the degree of protection afforded is of a higher order. During the four-year period covered by these statistics the investigations show that only four colli-

sions resulted from failures in the proper operation of the block signal system. Of these four cases, false clear signals were responsible for two collisions, one of which occurred in automatic block territory. It is, therefore, evident that as long as the signal indications are observed and acted upon, automatic block signals furnish reasonably adequate protection. But from the foregoing it is also evident that the large majority of the collisions in block-signal territory are caused by the failures of enginemen to observe and obey signal indications, and by the lack of adequate flag protection. It is to further restrict the possibility of collisions due to these causes that the automatic stop and train control are being advocated. Such installations should first be made on those lines where automatic signals are in service, and this will probably be the next step in the placing of the railways of this country on a still higher plane of safe operation.

Priority in Transportation

THE railways have applied to the Interstate Commerce Commission for exercise of the authority given it in Section 402, paragraph (15), of the Transportation Act. This paragraph empowers the Commission in time of shortage of equipment, congestion of traffic, or other emergency, to change the rules regarding the distribution of the equipment of the various carriers, to require joint or common use of terminals and to give directions for preference or priority in transportation. It is the application for the Commission to establish a system of priority in transportation which, under present conditions, is the most interesting and important.

The application by the railway companies for the exercise by the Commission of its power in regard to these matters has been construed by advocates of government control, or of the Plumb plan, as was to be anticipated, as an admission of the breakdown of private operation and, as a practical result, of the resumption of government control. What are the facts? First, even when the railways were operating to the limit of their capacity before the railway strikes occurred, they were unable to handle all the traffic that was being offered to them, in spite of the fact that in March they moved more freight than ever was moved in that month before. Second, the railway strikes came, interfered with the operation of the roads, and therefore widened the gap between the traffic being offered for movement and the traffic which could be moved.

The position in which the railways have been placed is similar to that in which many other industries have been placed. For example, the hotel business of our large cities has increased more than the capacity of the hotels. Therefore, as every traveler knows, even when the hotels are able to operate to their capacity they are obliged to turn away many guests who have asked for reservations, and practically all who have not asked for them. When, as was recently the case in Chicago, there has been a cooks' and waiters' strike, the inability of the hotels to entertain all those who have applied for entertainment has been seriously increased.

There is one important difference, however, between a concern of almost any other kind which becomes unable to handle all the business offered to it and a railway which becomes unable to handle all the business offered to it. A concern of almost any other kind can, in these circumstances, arbitrarily accept the business offered to it by some persons and turn away that offered by others. A railway, on the other hand, being engaged in a public service, is required to treat all its customers alike unless it is given a special legal dispensation by some competent public authority to discriminate between them. If one concern offers it a carload of coal and another offers it a carload of pianos for movement, in the absence of such a special dispensation as mentioned, it, as a common carrier, owes the same duty to both.

It is perfectly evident, however, that in a period such as the present, when it is impossible for the railways to handle all the traffic offered to them, the public welfare demands that they shall give priority in transportation to commodities such as coal, foodstuffs, etc., the proper distribution of which is essential to the very existence of the people, and shall move only such amounts of non-essential commodities as can be moved after the essential commodities have been moved.

The necessity for vesting in some public authority the power to authorize the railways to give preference and priority in transportation in periods such as the present was made evident during the war, and it was for this reason this authority was conferred by the Transportation Act on the Interstate Commerce Commission. It long since began to appear that in a comparatively short time the Commission would have to exercise this authority. It probably would have been desirable for it to have exercised it within the next few months even if the railway strikes had not come. Reduction by the railway strikes of the amount of traffic which the railways could handle precipitated the necessity for its exercise.

The railway managers are to be commended for having taken the initiative in asking that a system of priority be established. The transportation situation has become extremely bad, and it cannot be remedied until the railways begin to refuse to accept for movement a larger amount of traffic than they actually can handle. Under such conditions as exist at present the more traffic is allowed to be loaded the worse the congestion is made, and the less is the amount of freight actually transported.

While it will be contended that private management has "broken down," what the managements have asked the Interstate Commerce Commission to do is merely what the Railroad Administration actually did throughout the time it was in charge of the operation of the railroads. Being a government body it could and did constantly refuse to accept large tonnages of commodities which were offered to it. The simple fact is, as the *Railway Age* has pointed out many times, that the transportation facilities of the country have become totally inadequate to handling all the commodities that the industries of the country can produce, and until either the transportation facilities are increased or the amount of traffic demanding transportation is reduced, there will be need for frequent exercise by the Interstate Commerce Commission of its authority to say what traffic the railways shall move and what they shall refuse to move.

Chicago, St. Paul, Minneapolis & Omaha

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA is controlled by the Chicago & North Western through the ownership of $5,380,000 preferred stock and $9,540,000 common stock. The total outstanding preferred stock is $11,260,000 and the total outstanding common stock is $18,560,000. The Omaha performs three important functions in the rounding out of the Chicago & North Western system. It gives the system its entrance into the Twin Cities, the Chicago-Twin Cities line being owned by the North Western as far as Elroy, Wis., and by the Omaha from Elroy to St. Paul. Second, it gives the system a good line from Omaha through St. Paul to Duluth and Ashland. Third, it is an important feeder for the rest of the system, with its branch lines extending out into the grain country of Iowa and Nebraska on the west, and extending into the rich dairying and farming country of western and northern Wisconsin.

The total mileage owned is 1,680, and in addition the company has trackage rights of over 70 miles of other lines. The road is conservatively capitalized, the total bonds out-

standing amounting to about $41,362,000 par, at the rate of less than $25,000 per mile.

The rental which the government paid annually for the property during government operation was $4,935,000. This permitted the company to pay 5 per cent on its common stock and to continue the regular 7 per cent dividends on its preferred stock. The property actually earned in 1919 $27,732,000 gross and the net accruing to the government after taxes was $3,101,000. This compares with $2,652,000, the federal net income in 1918.

During 1919 $675,000 was spent for additions and betterments exclusive of equipment. There was little change in the equipment account since the cost of the few new cars bought was a little more than offset by the original cost of equipment retired. The Omaha has in service now 392 locomotives, 342 passenger train cars, and 12,867 freight train cars.

When private operation was resumed on March 1, James T. Clarke, who had been president of the company during government operation, and who had been president also prior to government operation, resumed his management of the road; in his annual report he says in regard to the future: "The Transportation Act gives to the Interstate Commerce Commission complete power as to the regulation of the railroad under private ownership and with enlightened public opinion should result in greatly improved transportation facilities and establishment of railroad credit."

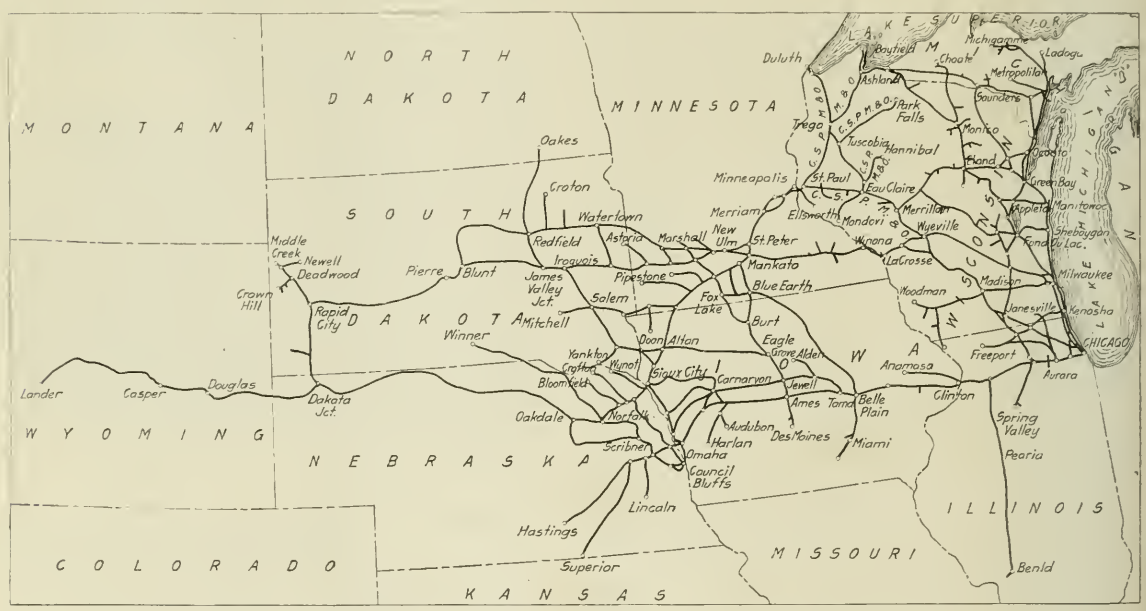
The following table shows the figures for operation of the property by the government:

	1919	1918
Average mileage operated	1,749	1,749
Freight revenue	$18,335,828	$16,897,812
Passenger revenue	7,589,482	6,238,806
Total operating revenue	27,732,018	24,829,981
Maintenance of way and structures	3,838,174	3,056,376
Maintenance of equipment	5,230,102	5,055,958
Traffic expenses	256,361	244,791
Transportation expenses	13,079,739	11,720,793
Total operating expenses	23,316,464	20,884,199
Taxes	3,101,078	2,651,912
Corporate Income Account.		
Rental	4,934,790	4,934,790
Gross income	5,031,160	5,000,370
Net income	2,376,718	2,406,181
Dividends	1,715,986	1,715,986
Surplus	660,732	690,195

Chicago & North Western

No other road in the west has had a higher credit than the Chicago & North Western. Even in 1917 the common stock paying 7 per cent dividends was selling at 124. In 1910, paying the same dividends, the common stock sold at 182; and the preferred, an 8 per cent stock, sold at 225. The history of the development of the property in the thirty years from 1887 to 1917 has been one of extraordinary conservatism based on sound business judgment and particularly successful competition through rendering shippers and travelers a very high class of service. Unlike most western roads, the extension of the property was not rapid and the steadiness of earning power has no parallels. In 1887 the Chicago & North Western operated 3,891 miles of road. Its earnings were at the rate of $6,239 per mile and its operating ratio was 57. It had outstanding at that time $41,375,000 common stock and $22,325,000 preferred, with $90,512,000 funded debt.

In 1917 increasing costs had been operative for about a year, but even in that year the operating ratio was 72.75 per cent and railway operating income amounted to $23,815,000. The mileage operated was 8,095. Operating revenues amounted to $13,500 a mile. The total outstanding stock, including both preferred and common, was $167,619,000. The outstanding funded debt was $201,951,000. Roughly, then, with an increase in outstanding securities of $215,000,000 the road had been extended from 3,891 miles of light single-track prairie lines to 8,095 miles of modern railroad with heavy rails and with double track from Chicago to Omaha, to Milwaukee and most of the way to the twin cities. It is probable that the Interstate Commerce Commission's physical valuation of the North Western will show both a cost of reproduction new and an original cost far in excess of the par value of all of the securities outstanding. A market price of from $182 to $124 for a 7 per cent common stock is indicative of the value which investors placed on the assets and permanent earning power of the company in the years from 1910 to 1917. During all



The Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha

the years from 1887 to 1917 the Chicago & North Western stood for the best in service both in freight and passenger service. It would seem that if any road in the country can face the future with confidence, the Chicago & North Western should be that road.

The annual rental which the government paid the Chicago & North Western was $23,201,000. This left the company with a surplus in 1919 of $2,030,000 after the payment of interest charges, war taxes and 8 per cent on the preferred and 7 per cent on the common stock. The property earned far and away the largest gross in its history; the total operating revenues taken in by the government were $139,590,000, comparing with $127,296,000 in 1918, and $108,265,000 earned by the property under private operation in 1917. Increases in operating expenses, especially in transportation expenses, however, were so great that the net operating income accruing to the government in 1919 was but $14,246,000, comparing with the above mentioned $23,201,000 rental which the government paid for the property. Net in 1918 amounted to $12,273,000. Transportation expenses in 1919 amounted to $64,202,000, compared with $58,834,000 in 1918 and $43,178,000 in 1917.

A characteristic of the Chicago & North Western under private operation prior to 1917 was the extraordinary low cost per unit of both maintenance of equipment and maintenance of way combined with a quite extraordinary high standard of physical maintenance. In 1916, before the increasing cost of labor and materials had become fully operative, maintenance of way per mile cost $1,459, repairs of equipment per locomotive $2,748, per passenger train car $594, and per freight train car $78. In that year total maintenance of way amounted to $11,831,000, and maintenance of equipment amounted to $15,087,000. In the year 1919, under government operation, maintenance of way totaled $20,696,000, and maintenance of equipment $29,687,000.

Some of the important elements in the great financial success which the North Western had made prior to 1917 were its ability to compete successfully with other roads serving the same territory, its ability to secure as high or higher standard of maintenance with the expenditure of less money than most of its competitors, and to render a particularly satisfactory transportation service at a lower train mile cost than the majority of western roads. The traffic relations of the Chicago & North Western were particularly valuable. Its relations with the New York Central Lines on the east and with the Union Pacific on the west made it a connecting link between one of the best of the western transcontinentals, so-called, and one of the two strongest eastern trunk lines. Its relations with its local shippers also were particularly fortunate.

The country which the North Western serves is rapidly changing from a newly developed granger country into a rich, settled, stable, agricultural country with ample capital investment. Thus, in Iowa, across which the North Western has a double track line touching the wealthiest and most fully developed parts of the state and within which the company has in all 1,630 miles of road, farm land sells from $200 to $600 an acre now. The farms are well stocked with ample buildings and machinery. In South Dakota, in which the North Western has 1,063 miles of line, wheat lands are being made to yield 30 to 50 bushels of wheat; and in Nebraska, in which the North Western has 1,102 miles, not only are the portions of the state where rainfall is ample yielding heavy crops of corn and the staple corn product, hogs, but also dry farming is proving thoroughly successful and the dairying industry is rapidly growing. It is hardly conceivable that with any solution of the railroad problem worked out which provides for private operation a road like the North Western will fail to be prosperous.

The following table shows the earnings of the property under government operation in 1919 compared to 1918. This is not a corporate income account:

	1919	1918
Average mileage operated	8,090	8,090
Freight revenue	$92,084,613	$87,630,795
Passenger revenue	35,213,606	28,000,861
Total operating revenue	139,589,915	127,295,678
Maintenance of way and structures	20,696,215	19,492,620
Maintenance of equipment	29,687,410	26,834,170
Traffic expenses	879,110	951,457
Transportation expenses	64,202,497	58,833,776
Total operating expenses	119,579,386	109,498,572
Taxes	5,752,459	5,497,481
Operating income	14,245,619	12,272,956

Corporate Income Account

	1919	1918
Rental	$23,201,016	$23,201,016
Gross income	25,493,023	25,463,677
Interest, war taxes, etc.	11,510,441	11,092,446
Net income	13,982,582	14,371,231
Dividends	11,952,275	11,952,275
Surplus	2,030,307	2,418,956

New Books

The Building Estimators' Reference Book, by Frank R. Walker, 2,831 pages, 4½ in. by 6½ in. Bound in flexible leather. Published by the Frank R. Walker Company, 168 North Michigan Avenue, Chicago, Ill.

This book is essentially a reference book for the use of contractors and estimators engaged in estimating the cost of and in constructing all types of modern buildings. The first part of the book, which contains 20 chapters, is devoted to the making of the proper allowance for overhead expenses and general conditions. All phases of this are carefully worked out in a manner that makes them available for all classes of work. The remainder of the book treats with the subjects of excavation and back filling; concrete piles, foundations, floors, paving and other forms of reinforced concrete construction and the means of waterproofing such work; brick masonry, cut stone and rubble stone work, etc.; timber and general carpentry work, floor work and exterior finishes; sheet metal work, roofing and painting, etc., and special iron and steel work. The subjects of material and labor costs have been arranged throughout the book in such a form as to be adaptable to the varying local conditions encountered.

American Civil Engineers' Handbook, Mansfield Merriman, editor-in-chief, fourth edition, 1920, 4 in. by 7 in., 1,955 pages, illustrated, bound in flexible fabrikoid. Published by John Wiley & Sons, Inc., 432 Fourth avenue, New York.

The fourth edition of this handbook constitutes a revision and enlargement of the third edition, as indicated by an increase from 1,580 to 1,955 pages. The first edition was published in 1911, and the total issue to date is 36,000. The particular change of interest to railway engineers in the new edition is a rewriting of Section 3 on steam railroads by Fred Asa Barnes, professor of railroad engineering, Cornell University. In the third edition this section combined railroad and highway engineering under the authorship of Walter Loring Webb. In the new edition these two subjects are treated separately, the latter being covered in a new section by Arthur H. Blanchard. Another new section in the present edition is one of 54 pages on electric railways by William A. Del Mar, the subject being covered largely from the standpoint of the street railway and interurban line rather than the electrified steam railroad. Materials of construction, covered in Section 4, has been re-written by Herbert F. Moore and the section on steel structures by Frank H. Constant. The material of interest to the railway engineer in this valuable book is not limited to the sections on surveying, curves and earth work, and railway engineering and operation, covering the first 252 pages, for there is much of value for them in other sections covering structures, materials of construction, hydraulics, waterworks, sanitation, drainage, etc., which, for the purpose of logical classification, are treated under independent headings.

Exterior View of the New St. Paul Station Head House from Waconta Street near Fourth Street

First Unit of St. Paul Union Station Completed

Design of New Head House Structure Takes Advantage of the Topography of the Site Selected

On Monday, April 5, the first unit of the new union station at St. Paul, Minn., was placed in service. Its formal opening to the public preceded this date by two days since the people of St. Paul were permitted to visit and inspect the building on April 3 and 4. The completed portion of the structure is the head house, a structure of monumental proportions and classic design, the completion of which means much to the people of St. Paul, who have been waiting for new passenger station facilities since October 3, 1913, when the head house of the old union station was destroyed by fire. The completion of this first unit of the new station project will be followed by the construction of the remaining portions, including the station tracks, train sheds, general waiting room, baggage, mail and express accommodations, etc., which will be finished in units according to a program extending over four years.

The general layout of the new station project, of which the structure just completed forms the most conspicuous feature, was described in the *Railway Age Gazette* of May 18, 1917, page 1041. When completed the new station will embrace all of the property occupied by the old terminal and considerable space in addition. The old station faced on Sibley street, some 200 ft. south of Third street, and the property which it occupied extended east from that street parallel to Third street. This area was entirely inadequate for the requirements of the new terminal which provides for a station track layout occupying all of the old site and the land between Third street and the old north property line in addition, or a total width of 400 ft. Because of this it was necessary to place the head house on a new site, and the entire block bounded by Third, Fourth, Sibley and Wacouta streets was acquired for this purpose. This plan embodies one very important advantage in that the construction work could be carried on within this area without interfering in any way with the operation of the existing station facilities. Consequently the head house was the first portion of the station to be built.

Station Will Serve Nine Railroads

This station is built for the combined service of the nine railroads entering St. Paul, namely, the Great Northern; the Northern Pacific; the Chicago, St. Paul, Minneapolis & Omaha; the Chicago, Milwaukee & St. Paul; the Chicago Great Western; the Chicago, Burlington & Quincy; the Minneapolis, St. Paul & Sault Ste. Marie; the Minneapolis & St. Louis and the Chicago, Rock Island & Pacific. The present schedules of these roads show 142 trains departing and 140 trains arriving at this station each 24 hours. The distribution of this service between the several roads is as given in the table below:

	Departing	Arriving
C., B. & Q.	10	10
C., G. W.	14	14
C., M. & St. P.	24	24
C., R. I. & P.	8	8
C., St. P., M. & O.	15	15
G. N.	16	16
M. & St. L.	6	6
M., St. P. & S. S. M.	17	17
N. P.	32	30

The average number of people handled daily is 20,000, of which a large portion are through passengers. Further data on the traffic handled in this terminal are indicated by the statistics on passengers, baggage, mail, etc., for the calendar year 1919, given below:

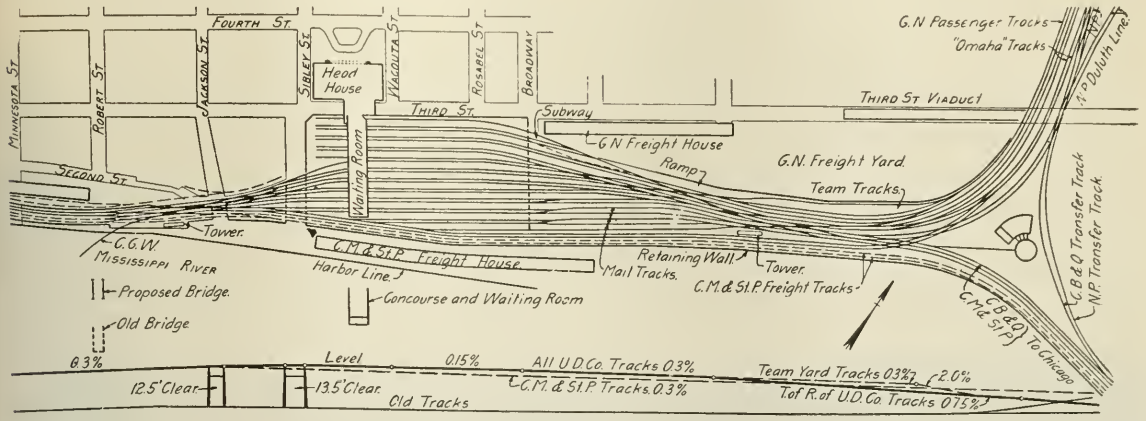
Number of tickets sold, 1919	1,069,621
Average daily sale of tickets	2,944
Ticket revenue	$4,408,849.55
Average number of pieces of baggage handled daily	7,170
Average number tons of mail handled daily	746
Number of train and engine movements	206,006

The station is being built by the St. Paul Union Depot Company, a terminal corporation, the stock of which is

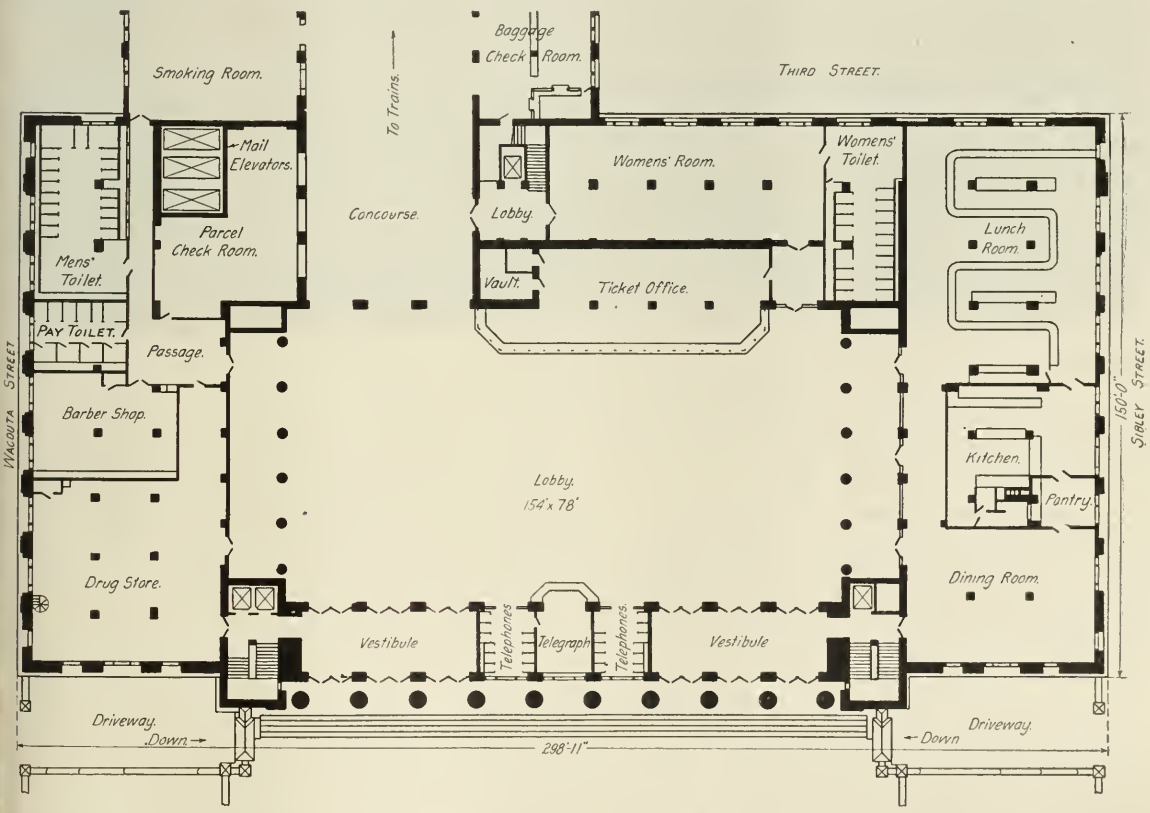
shared equally by the nine roads. The execution of the work is under the general direction of an executive committee consisting of five members of the board of directors, viz.: Edmund Pennington, chairman; Ralph Budd, president of the Great Northern; J. T. Clark, president of the Chicago, St. Paul, Minneapolis & Omaha; C. W. Bunn, vice president of the Northern Pacific, and E. D. Sewall, vice president of the Chicago, Milwaukee & St. Paul. Advisory to the executive committee is an engineering committee, consisting of Ralph Budd, chairman; Samuel Felton, president, Chicago & Great Western; C. F. Loweth, chief engineer, Chicago, Milwaukee & St. Paul; and George Hand, assistant to the president, Chicago & Northwestern.

The station company handles the passenger business and maintains and operates a coach cleaning yard, but does not provide locomotive terminal facilities. The station company will operate the parcel check, but all news stand, restaurant and lunch counter concessions have been let to the Union News Company.

The head house is a structure 300 ft. by 150 ft., the pri-



Track Layout and General Location



Plan of the Head House in the Lobby on Fourth Street Level

mary object of which is to house the business lobby or ticket concourse, a room 180 ft. by 80 ft., located centrally in the structure. The arrangement is simple and obvious. Passengers enter the building through duplicate doorways in a splendid Doric facade on the north or Fourth street side, traverse vestibules 16 ft. deep, and emerge immediately into the business lobby. On the left, directly opposite, is the entrance to the train concourse or the future main waiting room. On the right, directly opposite, is a ticket office with 18 ticket windows. To the right along the west side of the building is a restaurant and lunch room, while the other minor facilities are distributed conveniently surrounding the walls of the lobby. A drug store and other shops are housed along the east side. The women's waiting rooms are located in the south side of the structure behind the ticket offices. A large barber shop, parcel check room and men's section are at the left end of the lobby. The duplicate main entrances each have a total opening 48 ft. wide, divided into three doorways by the massive stone columns of the facade. Between these two entrances, in a space equal to the depth of the vestibules, the telephone booths, telegraph office and information bureau have been located. Pneumatic tube service affords direct and prompt communication between the ticket office and the auditor's office on an upper floor.

View of the Lobby Looking Toward Southwest, Showing Ticket Offices in Center, Entrance to Train Concourse on Left and Restaurant and Lunch Room on Right

Dignified Architectural Treatment

Both the exterior and interior of the building are of applied classic design, the exterior in gray stone and the interior largely marble. The floor of the business lobby, the walls, wainscot, counters and free standing columns are all of Tennessee marble. All woodwork is oak with a dull finish. Being surrounded on all four sides by rooms or vestibules, the lobby of necessity receives natural lighting through clearstory windows and nine large skylights in the ceiling. The efficiency of this lighting has been largely increased through the use of a saw-tooth roof construction over the skylights, each transverse unit of the skylight being covered by one unit of the saw tooth roof. This is not apparent, however, from the interior of the room. At night the suggestion of the natural skylighting is carred out by electric lights placed in the space between the flat skylights and the saw-tooth roof. The real artificial illumination of the room, however, is accomplished by large electroliers distributed as shown in the photos. An interestng feature of the facilities is an installation of eight Howard synchronized clocks, more of which will be added as the station is completed.

The arrangement of the building was controlled very largely by the contour of the ground surface. The ground drops off very abruptly toward the river on the south, Third street being a full story below the level of Fourth street. Consequently, with the main floor of the building at the level of Fourth street, the floor below has frontage on Third street. Approximately two-thirds of the Third street level is used as a postal sub-station, while the north third toward Fourth street is used for accommodations for the station employees, including a cafeteria seating 186 persons, storage space for the drug store, etc. The space directly under the Fourth street entrance to the building has been arranged as a taxi-cab entrance to the station, to which all taxi-cabs will be directed, with ramps leading to Sibley street on the west and Wacouta street on the east. The taxi-cab entrance is also arranged as a continuous corridor extending the full length of the building so as to afford entrance for pedestrians from both Wacouta street and Sibley street. Carriages other than taxi-cabs will be permitted to drive to the main entrance on the Fourth street level. Communication from the taxi-cab entrance to the main floor of the building is afforded by staircases and elevators to the left and right.

The mechanical equipment is in a basement on a level below that of the Third street level just described. This basement level also is arranged to provide space for work shops and facilities for immigrant passengers. Accommodations for their comfort are unusually complete, including bathrooms, laundries, kitchens, etc.

The new structure provides a limited amount of office space, it having been decided to provide accommodations only for the Pullman Company and the officers of the station company. These occupy a second or mezzanine floor surrounding the business lobby on the east, west and south sides, except for four rooms to serve as hospitals for men, women and children, and a play room.

The building is of reinforced concrete construction. The roof consists of reinforced concrete slabs covered with a tar and felt waterproofing finished in flat tiles set in cement with expansion joints at intervals. The building is provided with a complete system of ventilation, the air being taken in through two inlets on the roof, passing down into the basement where it is washed before passing into the various rooms of the building. Exhaust fans on the roof also aid

in making the ventilating system positive. All heat and light are purchased from a local public utility company. Water for all purposes is obtained from an artesian well on the site.

Relation to the Completed Terminal

A description of the new head house for the St. Paul station is not complete without an account of its relation to the rest of the terminal, which will be completed according to a program carrying the work through the latter part of 1923. The tracks of the present station layout, which is a combined through and stub station, are at such a level that the through tracks cross Sibley street at grade. The new plan contemplates the raising of these tracks approximately 17 ft. so that Sibley street will pass under the tracks. However, this still leaves the station tracks sufficiently below the level of the floors in the business lobby of the new head house so that a waiting room with a floor level only 2½ ft. above that of the business lobby may be placed directly over the tracks. This waiting room will be connected with the lobby in the headhouse by a corridor 45 ft. wide spanning Third street. Communication between this waiting room, which will be about 80 ft. wide and 400 ft. long, will be afforded by vestibules and stairways along the east side of the room descending to the tracks. On a floor above the north 70 ft. of the waiting room and over the corridor between the waiting room and the lobby, a large space will be provided for the railway post office, which will handle the combined business now carried on in both St. Paul and Minneapolis. Below the north end of the waiting room underneath the track level, a large basement will be provided for baggage and mail, while a similar basement extending east along the south side of Third street will afford space for the express companies and locker rooms for train crews.

These basement facilities will be served from the track level by truck elevators either opening directly into the working space or connected with it by means of short lengths of tunnels extending under the more remote tracks. As a large amount of mail will need to be handled between the basement mail room and the railway post office on the upper floor level, three automatic elevators of 5,000-lb. capacity have been provided exclusively for this service. Owing to the inclined grade of Sibley street, the baggage and mail basement is afforded direct communication with the street level, while the express rooms along Third street are connected with the street by means of a driveway extending west from Broadway.

The Work Will Be Completed in Stages

After the old station building was destroyed by fire in 1913, arrangements were made to provide waiting rooms in an old warehouse building fronting on Third street some distance east of Sibley street. This was connected with the station tracks by a temporary train concourse consisting of a frame building constructed on a viaduct over the tracks with stairways to the various platforms. This temporary concourse has been connected with the head house by an enclosed overhead bridge and all the old buildings fronting on Third street which occupy any portion of the new track layout have been removed. This makes it possible to provide for six of the tracks of the new layout without disturbing any of those of the old station yard. This much of the work will be completed in 1920. In 1921, after the first six tracks have been placed in service, six tracks of the old facilities will be torn out and replaced by six more tracks on the new level. These 12 northernmost tracks of the new terminal will occupy the space directly over the rooms provided for baggage, mail, express, etc., and will be supported on a reinforced concrete flat slab construction. In 1922, six more of the old station tracks will be removed and replaced by the third set of six tracks on the new level, while in 1923 the last of the old tracks will be removed to make room for the last four of the 22 tracks provided for in the new plan. The tracks to be installed in 1922 and 1923, being beyond the limits of the basement space, will be supported on sand filling except where provision is necessary for the baggage and express tunnels. According to this plan of construction, the track capacity will at no time be less than that of the present layout. The waiting room will be built in sections over the track space in substantially the same units as would be determined by the completion of the new facilities underneath.

Two incidental problems encountered in connection with the raising of the track structure to the new level concern the raising of the Roberts street bridge to a sufficient elevation to provide headroom over the tracks and the raising of the Chicago Great Western bridge so as to meet the station tracks at the new level. When the Great Western structure was rebuilt some six or seven years ago, this feature was taken into account in providing a vertical lift draw span.

View of the Lobby Looking Toward the Fourth Street Entrance

The entire station project is being carried out under the direction of W. C. Armstrong, chief engineer, with G. H. Wilsey, structural engineer in charge of design, and O. L. Hoebel, assistant engineer in charge of construction. Charles S. Frost, Chicago, is the architect, and was represented on the ground by Lambert Bassindale. The work was handled under contract by Morris, Shepard & Dougherty, and the George J. Grant Construction Company, W. R. Powrie, being general superintendent for the contractors.

Average Pay of Railroad Employees 1915-1920

THE BUREAU OF RAILWAY ECONOMICS has issued a table showing the average compensation received, since 1914, by the different classes of employees on Class I railroads, and the same is here shown. The data for 1915 are from reports of the Interstate Commerce Commission, covering all Class I railways; and those for 1917, 1919 and 1920 from reports of the United States Railroad Administration, covering Class I railways under federal control.

The averages for the calendar year 1917 and the calendar year 1920 are based on returns for December, 1917, and January, 1920, respectively, multiplied by twelve. Averages for the calendar year 1919 were obtained from a compilation of the monthly reports of "Employees and Their Compensation," issued by the Railroad Administration. Because of the fact that monthly reports subsequent to April, 1919, exclude compensation applicable to previous months (i. e., back pay, amounting to approximately $28,000,000) the total of the compensation shown on the statements for the individual months January-December, 1919, does not represent the total payroll for 1919: hence the averages here shown are conservative, being below the actual figures. On April 12, 1920, in his testimony before the Congressional committee, Mr. Hines estimated the number of employees of Class I railways under Federal control at 1,891,607 for 1919, and their aggregate 1919 compensation at $2,744,000,000, on which basis the average annual compensation per railway employee for 1919 amounts to $1,451, instead of $1,436 as here shown. The distribution of this fifteen-dollar excess per employee throughout the various classes of employees is impracticable, but the conservatism of the present averages is evident. For the same reason the 1920 figures are probably below actual.

The Railroad Administration's report of compensation (and hours worked) in January, 1920, was given in the *Railway Age* of May 14, page 1422.

AVERAGE ANNUAL COMPENSATION PER RAILWAY EMPLOYEE

COMPILED BY THE BUREAU OF RAILWAY ECONOMICS, COVERING CLASS I RAILWAYS FOR 1915, 1917 AND 1919; AND 1920 ESTIMATED

Class of employees	Fiscal year 1915 (average)	Calendar year 1917 (average)	Calendar year 1917 (Dec. basis)	Calendar year 1919 (average)	Calendar year 1920 (Jan. basis)	Per cent of increase, 1919 over: Fiscal year 1915	Calendar year 1917 (average)	Calendar year 1917 (Dec. basis)	Per cent of increase 1920 (Jan. basis) over calendar year 1919
General officers	$4,528	$4,558	$4,683	$4,317	$4,313	d 4.7	d 5.3	d 7.8	d 0.1
Division officers	2,013	2,099	2,139	2,944	2,989	46.2	40.3	37.6	1.5
Clerks	832	932	955	1,349	1,410	62.1	44.7	41.3	4.5
Messengers and attendants	434	514	531	855	888	97.0	66.3	61.0	3.9
Assistant engineers and draftsmen	1,121	1,145	1,257	1,707	1,857	52.3	49.1	35.8	8.8
Maint. of Way and Structure foremen	1,107	1,197	1,283	1,780	1,913	60.8	48.7	38.7	7.5
Section foremen	772	886	939	1,314	1,381	70.2	48.3	39.9	5.1
General foremen—M. E. department	1,533	1,660	1,628	2,975	3,043	94.1	79.2	82.7	2.3
Gang and other foremen—M. E. department	1,167	1,352	1,467	2,358	2,419	102.1	74.4	60.7	2.6
Machinists	1,030	1,394	1,513	1,763	2,036	71.2	26.5	16.5	15.5
Boiler makers	1,076	1,425	1,532	1,831	2,128	70.2	28.5	19.5	16.2
Blacksmiths	927	1,258	1,331	1,664	1,920	79.5	32.3	25.0	15.4
Masons and bricklayers	789	932	971	1,376	1,439	74.4	47.6	41.7	4.6
Structural ironworkers	898	1,014	1,034	1,630	1,662	81.5	60.7	57.6	2.0
Carpenters	768	940	980	1,430	1,560	86.2	52.1	45.9	9.1
Painters and upholsterers	758	951	1,031	1,463	1,657	93.0	53.8	41.9	13.3
Electricians	941	1,030	1,123	1,721	1,943	82.9	67.1	53.3	12.9
Air-brakemen	812	1,086	1,207	1,623	1,946	99.9	49.4	34.5	19.9
Car inspectors	887	1,140	1,272	1,780	2,101	100.7	56.1	39.9	18.6
Car repairers	751	994	1,053	1,529	1,752	103.6	53.8	45.2	14.6
Other skilled laborers	855	1,065	1,140	1,620	1,858	89.5	52.1	42.1	14.7
Mechanics' helpers and apprentices	607	822	890	1,173	1,354	93.2	42.7	31.8	15.4
Section men	454	601	642	938	960	106.6	56.1	46.1	2.3
Other unskilled laborers	560	695	765	1,062	1,119	89.6	52.8	38.8	5.4
Foremen of construction gangs and work trains	1,016	1,031	1,221	1,530	1,647	50.6	48.4	25.3	7.6
Other men in construction gangs and work trains	516	623	711	990	1,132	91.9	58.9	39.2	14.3
Traveling agents and solicitors	1,495	1,642	1,851	2,115	2,146	41.5	28.8	14.3	1.5
Employees in outside agencies	980	1,066	1,437	1,718	1,749	75.3	61.2	19.6	1.8
Other traffic employees	960	1,330	1,502	2,076	2,084	116.3	56.1	38.2	0.4
Train dispatchers and directors	1,606	1,802	1,868	2,717	2,776	69.2	50.8	45.4	2.2
Telegraphers, telephoners and block operators	800	917	967	1,543	1,617	92.9	68.3	59.6	4.8
Telegraphers and telephoners oper. interlockers	822	957	1,026	1,614	1,677	96.4	68.7	57.3	3.9
Levermen (non-telegraphers)	731	852	891	1,496	1,527	104.7	75.6	67.9	2.1
Telegrapher, clerks	797	892	963	1,535	1,592	92.6	72.1	59.4	3.7
Agent, telegraphers	828	949	1,050	1,675	1,708	102.3	76.5	59.5	2.0
Station agents (non-telegraphers)	937	1,038	1,108	1,654	1,742	76.5	59.3	49.3	5.3
Station masters and assistants	1,095	1,292	1,309	1,883	1,918	72.0	45.7	43.9	1.9
Station service employees	605	710	777	1,120	1,157	85.1	57.7	44.1	3.3
Yardmasters	1,584	1,802	1,896	2,907	2,924	83.5	61.3	53.3	0.6
Yardmasters' assistants (not yard clerks)	1,428	1,705	1,632	2,523	2,545	76.7	48.0	54.6	0.9
Yard engineers and motormen	1,528	1,790	1,783	2,063	2,349	35.0	15.3	15.7	13.9
Yard firemen and helpers	916	1,093	1,106	1,468	1,712	60.3	34.3	32.7	16.6
Yard conductors (or foremen)	1,358	1,584	1,556	1,877	2,085	38.2	18.5	20.6	11.1
Yard brakemen (switchmen or helpers)	1,169	1,327	1,342	1,671	1,872	42.9	25.9	24.5	12.0
Yard switch tenders	720	846	905	1,339	1,481	86.0	58.3	48.0	10.6
Other yard employees	622	666	728	1,109	1,201	78.3	66.5	52.3	8.3
Hostlers	976	1,245	1,330	1,595	1,751	63.4	28.1	19.9	9.8
Enginehouse men	684	835	922	1,278	1,329	86.8	53.1	38.6	4.0
Road freight engineers and motormen	1,846	2,107	2,281	2,611	3,124	41.4	23.9	14.5	19.6
Road freight firemen and helpers	1,136	1,273	1,370	1,806	2,168	59.0	41.9	31.8	20.0
Road freight conductors	1,589	1,854	1,967	2,288	2,664	44.0	23.4	16.3	16.4
Road freight brakemen and flagmen	1,036	1,202	1,278	1,709	1,999	65.0	42.2	33.7	17.0
Road passenger engineers and motormen	2,141	2,232	2,418	2,873	3,129	34.2	28.7	18.8	8.9
Road passenger firemen and helpers	1,287	1,353	1,498	2,052	2,281	59.4	51.7	37.0	11.2
Road passenger conductors	1,850	1,966	2,058	2,542	2,730	37.4	29.3	23.5	7.4
Road passenger baggagemen	1,049	1,175	1,236	1,821	1,962	73.6	55.0	47.3	7.7
Road passenger brakemen and flagmen	1,026	1,093	1,188	1,703	1,816	66.0	55.8	43.4	6.6
Other road train employees	840	817	897	1,366	1,510	62.6	67.2	52.3	10.5
Crossing flagmen and gatemen	476	535	579	949	945	99.4	77.4	63.9	d 0.4
Drawbridge operators	666	761	839	1,190	1,168	78.7	56.4	41.8	d 1.8
Floating equipment employees	775	928	1,111	1,619	1,769	108.9	74.5	45.7	9.3
Policemen and watchmen	713	896	941	1,372	1,452	92.4	53.1	45.8	5.8
Other transportation employees	634	845	934	1,200	1,312	89.3	42.0	28.5	9.3
All other employees	610	663	699	993	1,033	62.8	49.8	42.1	4.0
Total	$830	$1,004	$1,078	$1,436	$1,587	73.0	43.0	33.2	10.5

The Seventh National Foreign Trade Convention

The Effect of Being a Creditor Nation, Theme of Record-Breaking Meeting at San Francisco

An attendance of some 2,300 accredited delegates—500 more than the best previous attendance at a meeting of this kind—typified the interest that was shown in the seventh National Foreign Trade convention held at San Francisco May 12 to 15. Included in the list of delegates from the United States were the leaders of American business thought, while delegates were also present from a large portion of the other countries of the globe.

The theme of the convention was "The Effect of Being a Creditor Nation." The argument at the sessions, therefore, was not so much how to increase the foreign trade of the United States, but rather how to maintain the enormous trade we now have and how to remove the handicaps that at present exist in carrying it on. Along this line reference was made to the lack of government assistance, many speakers bringing out the point that the laws of the United States so handicapped the American exporter in many cases as to prove of positive assistance to our competitors in other nations. The need of more flexibility in American shipping, the necessity of better parcel post service to other countries, the urgent desirability of increasing the cable lines across the Pacific were among the important points brought out by various speakers.

Considerable attention was also given to the present exchange situation and to the fact that our foreign trade cannot continue in its present volume unless there are considerable increases in imports to balance our enormous exports. As Captain Robert Dollar put it in his speech of welcome at the first session "True commerce is to buy and sell. A great many people think that commerce is to sell only. We must buy. Did it ever occur to you that it would cost twice as much to ship your commodities from this country and bring back ships with empty bottoms? By bringing back commodities, half the freight is paid. Therefore, true commerce is to bring cargoes both ways. The balance of trade would necessitate that and if we do not have the correct balance of trade we have got to export gold and silver."

Naturally, inasmuch as the convention was held on the Pacific coast, many speakers discussed the new importance of San Francisco, Seattle, and other Pacific ports as gateways to China, Japan, the Philippines, etc. The impression sought to be made was that the trade with these countries has hardly begun. Captain Dollar, however, was the only speaker who ventured to prophesy that before many years the center of the world's commerce would be on the Pacific coast, as it is now in New York or as it was formerly in London.

Railroad Problem Discussed

For the first time at a National Foreign Trade Convention, papers were read on the problem of the railroads. William Sproule, president of the Pacific Lines of the Southern Pacific Company, read a paper on "The Railroads and the Foreign Trade," before the second general session on May 12, which was enthusiastically received. An abstract of it will be found on another page of this week's issue. In addition to that one of the group sessions—Group III on the evening of May 12—was devoted entirely to "Transportation and Communication." R. M. Calkins, vice-president of the Chicago, Milwaukee & St. Paul, presided and also read a paper on "Development of Export and Import Transportation," an abstract of which will be found below.

The business press also came in for recognition at the convention. Group Session VIII held on the evening of May 13 was devoted to "Foreign Trade and the Press" and James H. McGraw, president of the McGraw-Hill Company, made an address entitled "The Service of the Business Press."

An Outline of the Subjects Covered

The sessions of the convention were held in the Civic Auditorium soon to be made famous by the National Democratic Convention which will be held there next month. In accordance with the usual custom there were general and group sessions, including five of the former and 14 of the latter. There were also two luncheons at which particular problems were discussed and a banquet was held on Friday evening, May 14.

The topics of the group sessions were as follows: I Fundamentals of Our Foreign Trade; II Exports and Imports; III Foreign Trade Policies; IV The Merchant Marine, and V National Program for Foreign Trade.

The 14 group sessions discussed the following subjects: I Education for Foreign Trade; II Financing Foreign Trade; III Transportation and Communication; IV Foreign Trade Advertising.

V Direct Selling Abroad; VI Banking Service to Foreign Trade; VII Trade with the Orient; VIII Foreign Trade and the Press; IX Foreign Credits and Credit Information; X American Trade with Russia; XI Foreign Trade Information.

XII Practical Problems of the Export Manager; XIII Webb Law in Operation, and XIV Pacific Problems.

Railway Supply Man Presides

The convention was called to order by James A. Farrell, president of the United States Steel Corporation and chairman of the National Foreign Trade Council. Captain Robert Dollar, head of the Robert Dollar Company and chairman of the Pacific Coast Committee of the National Foreign Trade Council, made the address of welcome, after which Alba B. Johnson, president of the Railway Business Association, was elected president of the convention to preside over its deliberations.

Inasmuch as nearly 75 papers were read at the convention, it is impossible to refer to all of them. The following, however, will give abstracts of some of the papers of interest to railway or railway supply men.

The Relation of Our Industrial Capacity to Our Foreign Trade

By James A. Farrell

When we are confronted by the fact that the imports and exports of the United States for the calendar year 1919 amounted to nearly 12 billions of dollars—in round figures $11,800,000,000—as against $4,258,000,000 for the year before the war, it would appear to be superfluous to insist that we must become a foreign trading nation. The figures would seem to indicate that, consciously or unconsciously, we were already there. But figures must be interpreted with due regard to the facts for which they stand, if their true meaning is to be extracted.

Even when measured solely by the volume of expansion, the rate of progress has been much greater than that established during any preceding five years. But the advance

made in the agencies and instruments of production has been on an entirely unexampled scale, and the conclusion is brought home with an entirely new emphasis that American industrial development has reached the stage when the United States must become, in all that the words imply, a foreign trading nation. That involves the further requirement that the American people generally must understand their personal relation to the international commerce of the country as a whole; they must realize that it is not only those directly connected with foreign trade, but every inhabitant of the land, wherever located and however occupied, that shares in its benefits as bears a direct responsibility for its continued success. In other words, the whole people must be prepared to join in giving sustained and intelligent support to the efforts of those who, whether in government employ or in private enterprise, are charged with the obligation of directing and maintaining this increasingly important factor in our common life.

The census taken this year will disclose the full extent of the marvelous industrial changes which have been effected during the last five years, but it is too early as yet to have any reliable information from that source. What is apparent to all, however, is that this development was super-imposed upon an industrial structure which, before the war, was capable of producing a substantial surplus of manufactures for export. The situation has been obscured to some extent by the long duration of the war and the consequent exhaustion of reserve stocks of all kinds throughout the world. The withdrawal of from twenty-five to thirty millions of men from active production to engage in military service, and the greatly increased consumption by these men of the output of the largely reduced number of producers resulted in an eager but abnormal demand upon our production during the war. The exhaustion of the world's reserve stocks has projected into the first years of peace that abnormal demand upon our industrial resources. The psychological reaction resulting from the long strain of war has greatly lessened the ratio of production by unit of labor in all countries—in those directly engaged in fighting as well as those not immediately affected by it. The situation in this country has been further complicated by the release of the pent-up buying power of our people, who, while hostilities continued, were intent upon displaying the utmost frugality that they might take their full share in the war financing, which included the huge loans of our American allies.

We see how fortuitous and casual our foreign trade has been, not merely in the time when it only meant four per cent of our production, but in the enormously increased exports brought about by the war. Of scientific organization for foreign trade we were, in our earlier years, throughout the war, and are even now, lacking. We see that we have created an enormous machinery for production, not alone that in well-organized hands but all over the country; while our machinery for salesmanship and distribution to the foreign consumer requires further development in order to compete with countries which have been at war but can now increasingly compete with us in manufacture for the world's trade. The world's demand for manufactured articles is limited only by its purchasing power, in credits, loans or the exchange of commodities. It is not merely that with scientific and broadly conceived organization we can develop a trade that will take up what we do not need at home, it is that we must devise such a plan of campaign, organizing for peaceful contest equipped with finance and transport, or we must be confronted with an overproduction unwieldly and beyond assimilation in this country.

Briefly, the time is almost at hand, if indeed it is not already here, when the effect of the great plant expansion that took place during the war will no longer be considered only by those who give special attention to such matters, but will be observable, and observed, by all our people. As Europe progresses toward her own recovery, and comes back into the full energy of production, that effect will be more and more evident. Some of the European countries have already made great strides toward recovery. It has been estimated that Belgium has attained 80 per cent of her normal productivity and, as the rapidly mounting figures of her exports testify, Great Britain is fast resuming her old form. The anticipation is by no means unduly optimistic that in the near future Europe will be in a position to begin making payments of interest, if not of principal, on the loans we have made to her. These payments, when they come, will be, as far as Europe can make them so, in the shape of merchandise, the products of industry. It is to the advantage of Europe to export to us as largely as she can of the fruits of her labor, and it is obviously to our advantage to receive payment of the interest on her debt to us. It will be our effort to stimulate the importation of raw materials for the benefit of our own industry and to promote the investment of American capital abroad by way of lessening the necessity of immediate payment.

But the fact has always to be borne in mind that foreign trade is at least two-sided, and that it can be successful only when both sides derive profit from it. Imports pay for exports, and we have a huge balance of exports to be paid for. We have no longer a great annual interest bill to meet in London; that has been replaced by an interest bill twice as large to be met in this country. Necessarily, a large part of this bill will be met with goods, and these goods will come into a market equipped industrially to produce much more than it can consume. There is, of course, always room for certain classes of imports; no country is capable of producing all that its people need and desire. We shall continue to sell large quantities of our products in the very countries of Europe which are deeply indebted to us. We shall be confronted, in a quite unmistakable way, with the fact that we are able to produce more than we can sell at home. We shall face, accordingly, such an urgency for foreign trade as we have never before experienced. For, either we shall find markets abroad for the surplus of our industrial productivity, or we shall cease to produce it, which is quite unthinkable. That way lies stagnation, unemployment and business reverses. But the world offers vast opportunities for American enterprise. Needs that have been restricted by jealous and discordant political policies, material development that has been checked by the insistence on narrow spheres of interest, will be governed in the future by a broader and freer conception of international co-operation than has ever prevailed before. It is at least possible to cherish the belief that railroads will be built with a single eye to their commercial value and not to their place in military strategy; that the wealth producing industries which follow in the wake of the railroad will spread throughout long stagnant regions of the earth.

There can be no question about the economic rebirth of the civilized world, for it is already in progress even in places where industrial distress seems most acute and social disorganization most profound. Vast undeveloped portions of the world with fertile soil and cheap labor are entering upon a field of rapid development. They will help supply the rapidly increasing needs for foodstuffs and raw materials, and they will at the same time furnish new markets for finished products. We may not be able to tell the precise extent or fix the exact direction of the forces that are about to change the face of the world, but we may face the future with confidence by the exercise of an intelligent foresight and by being ready to adjust ourselves to the new course of economic development. We must devote the same sustained and intelligent effort to international commerce that has produced such wonderful results in our domestic trade. The development of our industrial productive capacity during

the war, coupled with the change in our national financial status, might, if unintelligently handled, be the forerunner of distress. But if only it be handled with intelligence, energy and courage, there lies in it a vastly greater potentiality for general benefit through foreign trade.

Development of Export and Import Transportation

By R. M. Calkins,
Vice President, Chicago, Milwaukee & St. Paul.

As the growth of our commerce exceeds the demands made by the domestic markets, the surplus can only be disposed of in the markets of the world. Our manufacturing institutions have shown a phenomenal growth and expansion in recent years, testing the capacity of the railroads to accomplish the movement of raw materials and manufactured products. That this situation has been recognized by the Federal Administration and by Congress is evidenced by the passing of the recent constructive Transportation Act which it is confidently anticipated will enable the carriers to provide adequate rail transportation to take care of our constantly increasing volume of traffic of every kind.

Our country is more dependent than any other country in the world upon its railroads for transportation—the greater portion of the tonnage from the farms, mines and manufacturing industries being produced in the interior of the country, and, therefore, subject to rail transportation for long distances before it reaches the consuming markets or ports of transhipment.

The American railroads have proved themselves to be the greatest commerce builders that the world has ever known. Through the wonderful system of interchange and communication established by them, the buyers and sellers of our domestic products have been brought into close contact. The system of through-zone rates has made it possible for the producer and manufacturer, regardless of location, to compete in the most widely separated and distant markets of our country.

In the building of this stupendous transportation system, it was necessary for the pioneers of these projects to undertake tremendous tasks, involving the spending of vast sums of private capital contributed by themselves or realized by the sale of securities, all on the hazard of a successful outcome. Nevertheless, they stepped boldly to the front and opened up the most remote sections of our country, so that an efficient and economical system of transportation and communication was established. Since this initial work was done, it has been the constant effort of these great carriers to foster and encourage in every conceivable manner the territory, towns and latent resources tributary to their lines. Very low rates were made to the settler as an inducement to enter these new fields of endeavor and hew therefrom a home of his own.

The rapid settling of our western country should be an object lesson to every observer and proof conclusive that the method followed by these transportation lines has been productive of remarkable results not otherwise obtainable. Now that the construction of our railway system has been so largely completed and the work of opening up these new territories and countries has been virtually accomplished, it becomes necessary for us to look to other commercial fields as outlets for our surplus raw materials and manufactured products, and such fields must be beyond our shores in foreign countries.

In the minds of railroad men, transportation and communication are fundamental to all of the instrumentalities which go to make up a perfectly balanced foreign trade. When these instrumentalities shall have been established on well known trade routes, advertised thoroughly through the various channels open to the organization operating over these trade routes, the buyer and seller of raw material or manufactured article will in the natural course of business be promptly brought together, and in this way the entire problem will be largely solved.

In the mapping out and establishing the through trade routes, they should be closely allied with the principal railway lines of the country. In fact, there should be a very close working arrangement between the railroad and the shipping interests to the end that through rates and fares between foreign ports and all principal American centers be established and published, and through bills of lading and tickets be obtainable. The wharfage or terminal charge on all through business should be uniform at all of our principal ports. More elasticity should be given to the adjustment of these joint water and rail rates. We must not lose sight of the fact that, in the handling of this foreign commerce, we will at all times be subjected to the keenest foreign competition with water rates which will not be subjected to regulation but will, in all likelihood, be based upon the principle of what the business will stand.

By making this alliance between the shipping and the railway systems, a continuous and uninterrupted through service between foreign destinations and the principal American cities will be established with very beneficial results. Furthermore, such an alliance will encourage the railway lines to become interested in the assembling and despatch of the business, and, given the proper encouragement, will be very helpful in promoting the growth of our foreign business and in stimulating the proper handling of the same. Through the medium of these rail carriers and their allied connection, the American public can be more quickly educated and interested in the building up of foreign trade than by any other method.

Mr. Calkins supplemented his written address by a reference to the present situation of the railroads. He drew attention to the fact that the capitalization of the American railways is the lowest of any representative country, the rates also the lowest, while wages were the highest. He showed, however, that under present conditions there was not enough transportation—in fact, the railways were four years behind the commerce of the country. To the severe car shortage and congestion of the railways, he attributed a large share of the high cost of living and concluded by saying that the present difficulty could only be remedied by higher rates and renewed confidence in railway investments.

Increasing Imports

By Eugene P. Thomas,
President, United States Steel Products Co.

Foreign trade is necessarily reciprocal. We have long been accustomed to speak of competition for foreign trade in terms of commercial warfare. The result has been a deplorable confusion of ideas with regard to the true conception of commerce among nations, which is mutual exchange to mutual benefit. The time has come when it is of vital importance to us, not only to recognize that fact but to adopt it as the guide of our commercial policy.

As the result of the war, the United States has become a creditor nation. Europe now owes us more than ten thouand millions of dollars, the annual interest on which alone would more than absorb all the stocks of gold likely to be acquired by debtor nations. Payment, both of principal and interest, can only be possible by larger exports of the products of the nations that owe us money. Aside from the question of interest on these loans, to attempt to exact payment for American exports only in gold would be an economic mistake. The stimulus of more and more gold with the ac-

companiment of easy money and low interest rates, naturally produces an expansion of credits, and forces prices and wages upward, until the level of costs upon which business is done runs far above that of the rest of the world. The reaction of such a process on domestic trade may not be immediately apparent, but its contracting influences on foreign trade is inevitable.

The problem of a continuous and enduring expansion of our export trade, particularly in manufactured products, depends for its solution on a corresponding increase in our imports. Unless we can accept in payment for our exports, the products of those countries which import from us, their purchases will necessarily be restricted to the commodities which they cannot do without and which they are unable to obtain elsewhere.

Now that we are becoming a great ship-building nation, the necessity for the development of our import trade is manifestly more pressing. There can be no profitable employment of our merchant marine in foreign trade, when maritime competition becomes more pressing, unless the ships can find cargoes to bring back as well as to take out. It may require a triangular voyage to effect that end, but imports there must be as well as exports. That, it will be perceived, means not only a readjustment of some of our ideals of domestic prosperity, but also the development of a commercial and industrial organization of much wider range than that to which we have been accustomed.

The Function of Imports in Our Foreign Trade

By George E. Roberts,
Vice President, National City Bank of New York.

In conclusion, it should be said that the readjustments incidental to our transition from the conditions of a debtor country to those of a creditor country may be greatly eased and facilitated by the development in the United States of a market for foreign investments. It is understood that the interest running on the outstanding obligations of foreign governments to the United States government will be funded for several years, and therefore will not in the meantime affect the exchange situation. If our people will take a lesson from the history of the upbuilding of the great foreign trade of Great Britain and Germany, they will take advantage of low exchange rates to secure permanent investments which will be helpful to trade in the future. Both of these countries have played a large part not only in the expansion of international commerce but in the increase of world production, by supplying capital in the form of industrial equipment for the countries of undeveloped natural resources. They kept exchange rates from rising against them by admitting freely the products of the countries where they were building up their exports, and by re-investing in part the income derived from those countries for further expansion of their interests.

These are the policies which have brought success to the countries that have preceded us in the development of world trade. They will be practicing the same methods in the future, studying the needs and interests of the people whose trade they are seeking. We can have success upon the same terms, but upon no other. In the long run and taking the large view, the greatest prosperity for every country is to be found in such a balanced and mutually-supporting state of international trade as stimulates industry and prosperity everywhere.

This is a fundamental proposition which in its broad significance cannot be controverted; but in the eagerness of individuals to sell and amid the apprehensions which arise from rigorous competition, the people of every country are prone to overestimate the dangers which threaten them from the competition of other countries. It is possible for one country, by reason of natural advantages as by painstaking efforts, to obtain a dominant position in a single industry; but the same reasons which prevent a great one-sided trade in favor of the United States likewise forbid such a trade in favor of any country. It is impossible for any country to monopolize the trade of the world.

Why Direct Selling

By William L. Saunders,
President, American Manufacturers' Export Association.

It seems to me to be altogether a question whether or not we are in a position to finance a project looking to the extension of one's business on a permanent scale. All experience points to the conclusion that if we have a product of value, something which is, or which might be, used in a foreign locality, and if there is a fair chance to sell it at a price not too much above that of the native product, we should send one of our best men first to look over the ground, and then open an office there. At first, except with large concerns with plenty of money, it is best to get desk room in a house of established reputation. This enables one to get accustomed to the ropes, to learn the ways and means of doing business and to obtain credit. After a while, if all goes well, the branch can be extended.

It is obviously best to send men abroad who speak the language of the country where they do business; but this is not always an essential condition. To know the product and the business is the first and most important qualification; to have business judgment, tact and adaptability to meet conditions as they arise, is next in importance. The right man will make connections with those who speak the language, he will keep things going until he himself learns the language.

In no case that I am familiar with has a business been established on any large and permanent scale abroad except through direct selling. I have a case in mind where a foreigner had the agency of an American product. He was doing a good business and the manufacturer at home was well satisfied. This agent retired from business. An American youth, who was only a sales clerk in his office, was made manager, and he doubled the business the first year.

All foreign connections are not the same in their methods of doing business, hence there is no rule of three that can be set down as applicable to all of them. In some it pays to talk American goods, for there is a charm about the name; in others to say that the goods were made in America is of no selling value. A good man on the ground will learn how to steer in these things.

Not only does direct selling bring the maker and buyer in closer contact and afford means of mutual sympathy and interest, but it enables the maker of the goods to more nearly meet competitive conditions. It shows him how to build his product to meet the needs or the fancies of his customer. He gets closer to him. There is also a psychological value in direct selling. The customer thinks and feels that he is in a position to get better prices and terms. Close contact between principal and agent always makes for the best results; there is created a mutual bond of interest. All trade to be permanent and profitable must contain the elements of mutuality of interests. Direct selling promotes this; it is like seeing a man yourself and talking over with him rather than writing letters or sending someone else to talk to him and represent your case.

All buyers in all countries like to place orders with someone who is on the spot. In machinery trades, this is of the greatest value. The buyer feels that there is someone nearby to take care of the product, to see that it performs properly and to aid in overcoming difficulties and in repairing trouble.

Financing Foreign Trade Under the Edge Law

By Elmer H. Youngman,
Editor, Bankers Magazine.

This act gives us for the first time in our history a financial institution, organized under Federal law, for the express purpose of engaging in the financing of foreign trade. The original Federal Reserve Act authorized the establishment of branches of our national banks in foreign countries, and by an amendment to that act the national banks were empowered to subscribe for stock in American banks or corporations principally engaged in foreign banking. Under this amendment several corporations have been formed and are now in operation. But the Edge Law goes beyond this in providing for the formation of these foreign banks under Federal charter, thus giving them whatever prestige the authority of the National government confers.

The provision in the Edge Law which is not only novel but of first importance is that which permits these corporations to issue their own notes and debentures for sale to investors.

It has been my good fortune within recent months to attend a number of representative gatherings of business men and bankers, and it has been the prevailing opinion at these meetings that if we are effectually to finance our foreign trade under present conditions the participation of the individual investor must be enlisted. In other words, we shall have to find some means of selling foreign securities, either directly or indirectly, to a large body of American investors. The Edge Law gives us what is perhaps as good a measure for this purpose as could be devised.

We cannot reasonably expect that the average American, even if possessed of some experience with domestic securities, could have the knowledge of foreign investments which would enable him to discriminate between those which are sound or otherwise. But the Edge Law Corporations will relieve him of this responsibility. The investor who buys their debentures will be in fact buying an American security, the obligation of an American corporation, with foreign collateral.

We can no longer plead lack of adequate machinery to enable us to make such financial provision for our foreign trade as it may require. It may be said also that the new law comes at an opportune time, for the limits of short-term financing seem not far off; and furthermore, some of these credits which were supposed to be liquid have shown a tendency to congeal, so that if our foreign trade is not actually to suffer through inadequate financing, we must resort to the long-term credits, which the Edge Law makes possible.

Locomotives for the Far East

The use of American built locomotives in the Far East is constantly increasing; among those built during 1919 are two types constructed by the Baldwin Locomotive Works.

Consolidations for Shantung Railway

Four locomotives of the Consolidation—2-8-0—type have been built for the Shantung Railway of China. These are for freight service and follow American practice and design closely. They are of standard gage and are designed to operate on curves having a radius of 990 ft. on main line track and with 495 ft. radius on sidings.

The cylinders are 21 in. in diameter with a 26-in. stroke, 10-in. piston valves being used. The Walschaert valve gear is applied and is controlled by a screw reverse gear. The driving wheels are 54 in. in diameter and the maximum tractive effort is 32,500 lb. with a ratio of adhesion of 4.24.

The boiler is of the extended wagon top type with a wide firebox. The front end of the crown sheet is supported by two rows of Baldwin expansion stays. A fire-tube superheater is installed and the equipment includes a pyrometer for registering the steam temperature. The throttle valve is of the Rushton pattern equipped with an auxiliary drifting valve. The working steam pressure is 180 lb. The steam dome, sand box, bell, smoke stack and headlight are similar in design and location to those on locomotives used in America. The locomotive pilot and coupler are distinctly American and give these locomotives an appearance quite in harmony with railroads in the United States.

Pacific Type Locomotive for the Federated Malay States Railways

Not infrequently locomotives designed for service in China are arranged with a left hand operation, but in this case the engineman is located on the right hand side and the cab fittings are installed accordingly.

In addition to the air brake equipment a powerful screw hand brake, which is connected with all of the driving wheels, is also supplied. An unusual feature is that the smokebox is lagged and jacketed, a practice not generally followed in American locomotive construction. The lubrication of the cylinders and air pump is supplied by a force feed lubricator. The tender tank is of the water bottom type and is carried on a steel underframe. The tender trucks are of the arch bar type, with steel bolsters supported by triple elliptic bolster springs.

Pacifics for Federated Malay States Railway

Another interesting group of locomotives for service in the Far East consists of 12 Pacific—4-6-2—type built at the

Baldwin works for the Federated Malay States Railways. They are of narrow gage—3 ft. 5½ in.—and are used for both passenger and freight service.

These engines have an interesting frame arrangement; a Commonwealth steel cradle is applied in connection with a Hodges improved rear or trailing truck. The cylinders are 17 in. in diameter with a 24-in. stroke. The steam is distributed by 8-in. piston valves which are controlled by Walschaert valve gear. The driving wheels are 54 in. in diameter and the maximum tractive effort is 18,600 lb. with a ratio of adhesion of 3.54.

The boiler has a straight top and is equipped with a fire-tube superheater. The front end of the crown sheet is supported by two rows of Baldwin expansion stays. A firebrick arch, supported on three tubes, is installed. Bituminous coal is used for fuel and the working steam pressure is 170 lb.

American steam brake equipment is applied to all of the drivers, but the tender is equipped with an English automatic vacuum brake. Two sand boxes are provided, the sanders being steam operated and arranged to sand both in front of and back of the driving wheels. The headlight is arranged to burn acetylene and in order to insure an adequate supply, a storage tank of unusually large capacity is provided.

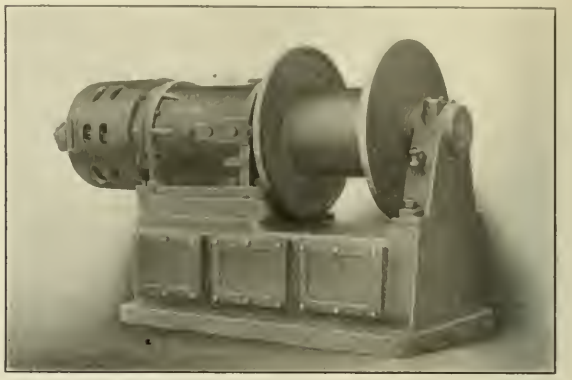
The tender is of the water bottom type carried on a steel underframe. The tender trucks are of the arch bar type with steel bolsters supported by double elliptic springs. The coupler and drawbar on these locomotives are not of the design which is standard American practice.

These locomotives present the same clean lines and simplicity of outside arrangements which is typical of the best American practice. A comparison of the principal dimensions of the locomotives described in this article is given in the following table:

	Shantung Railway	Malay States Federated
Cylinders	21 in. by 26 in.	17 in. by 24 in.
Boiler diameter	64¾ in.	56 in.
Steam pressure	180 lb.	170 lb.
Firebox, length	90-7/16 in.	66-3/16 in.
Firebox, width	65¼ in.	54¼ in.
Tubes, number and outside diameter	26—5⅜ in.	18—5⅜ in.
	167—2 in.	107—2 in.
Tubes, length	14 ft. 3 in.	16 ft. 0 in.
Water heating surface	1,906 sq. ft.	1 403 sq. ft.
Superheating surface	444 sq. ft.	350 sq. ft.
Grate area	40.9 sq. ft.	24.9 sq. ft.
Driving wheels, diameter	54 in.	54 in.
Front truck wheels, diameter	31½ in.	30 in.
Back truck wheels, diameter	.....	33¼ in.
Wheel base, driving	15 ft. 6 in.	9 ft. 6 in.
Wheel base, total	23 ft. 6 in.	27 ft. 0 in.
Wheel base, engine and tender	52 ft. 2 in.	50 ft. ¾ in.
Weight on driving wheels	137,860 lb.	67,400 lb.
Weight, total engine	158,890 lb.	114,800 lb.
Weight, total engine and tender	262,000 lb.	177,600 lb.
Weight, front truck	.....	27,700 lb.
Weight, rear truck	.....	19,700 lb.
Tank capacity	5,000 U. S. gals.	2,400 U. S. gals.
Fuel capacity	8 tons	5 tons

An Electric Car-Hauling Winch

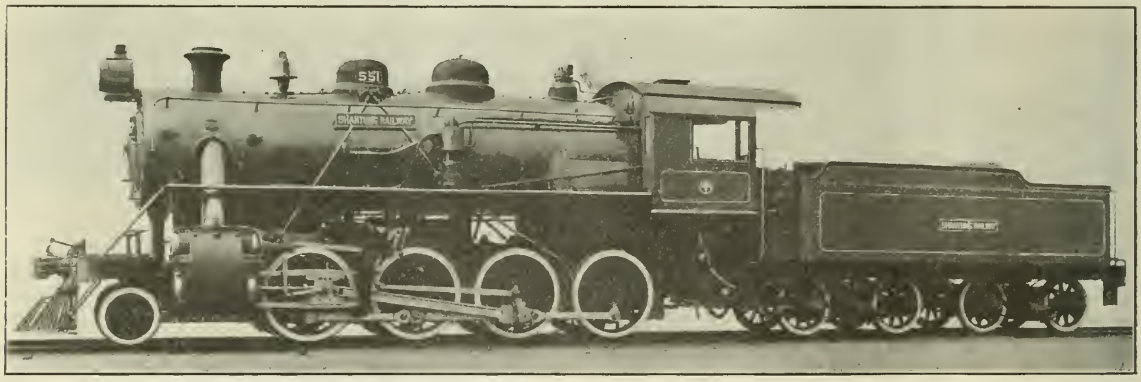
The Shepard Electric Crane & Hoist Company, Montour Falls, N. Y., has recently developed a new type electric car-hauling winch for use at coaling stations, or other points where it is advantageous to move cars without the aid of a locomotive. The new winch is mounted on a cast iron base which also forms the enclosure for the controller resistance, the controller being mounted either directly on the base or separate where remote control is desired.



The New Shepard Electric Winch

The gearing is of the balanced drive type, driving at two points diametrically opposite, thus insuring long life for the gears and bearings and quietness of operation. This machine is also arranged so that a gear shift can be installed which gives a 4 to 1 reduction, thus permitting the winch to handle four times the rated load at one-fourth the rated speed. All moving parts are fully enclosed, making the machine waterproof. Lubrication is secured by the oil-bath system.

One of these hoists has been installed at the new coaling station of the New York Central at Rensselaer, New York, to haul loaded cars up to the coal dump in place of locomotives. This installation has a capacity of 4½ tons, a speed of 55 ft. per min., and a winding drum capacity up to 250 ft. of cable. It is driven by a 22-hp. electric motor of the alternating current type at a speed of 700 r.p.m. In a recent test made with this machine 14 cars were pulled around a sharp curve and up grade after having been partly frozen in.



Consolidation Locomotive for the Shantung Railway of China

The Relation of the Railways to Foreign Trade*

An Analysis of the Problems Confronting the Railroads in Adjusting Rates on Export Traffic

By William Sproule
President of the Southern Pacific

"The Railroads and the Foreign Trade" is a subject that has a familiar and even a controversial sound. There has always been an atmosphere of controversy about foreign trade, whether as a matter of commerce or of transportation. That is because in the popular mind there is something alien about foreign trade. The consequence has been seen in the difficulty of getting protection for our industries or our commercial business in foreign countries. In sympathy with this has been the lack of initiative and diligence in the promotion of our foreign commerce and the lack of organized plan for promoting that commerce, until the National Foreign Trade Council came to consider its problems and their solution.

The railroads have been in very much the same position in handling the transportation problems connected with foreign trade. When the railroads have made special rates to meet the needs of foreign trade, as these needs were understood, they, too, often have been accused of discriminating in favor of the foreigner as against the traffic moving within the confines of the United States, which for convenience we call domestic traffic. One of the familiar aspects of controversy about foreign trade is the claim of damage done to or exactions levied upon our domestic trade whenever an article produced or made in this country is sold in a foreign country for the same or for a less price than that at which it may be had in this country. Precisely in the same way, when the railroads make a rate from point of production or manufacture to the United States port of export that is less than the rate to the same port or related ports for home distribution, they are apt to be charged with discrimination in favor of the foreign user as against the home user of the same goods.

Except as to the nations whose frontiers are to the north and south of us, the only way our prosperity can be permanent is by increase in our foreign trade overseas. In this increase the railroads have an interest that is direct and not merely incidental. It is a question vital to our country, and the desire of the railroads to be of service in that trade is not only in direct self-interest but from a larger motive, because of the knowledge that what makes for the prosperity of all makes for the prosperity of the contributing agencies.

But just as profiteering at home and dumping abroad is apt to be the popular idea of what foreign trade means, so the making by the railroads of rates necessary for foreign trade, which may be lower than charged at the same time for local or domestic trade, is apt to be misunderstood by the public, who may be led to think that the lower rates so made are at the expense of the people at home. This misunderstanding has been fostered for a generation. The railroads have been so accused, and unjustly. Nor has the accusation been confined to those seeking popular favor from personal motives. It has come also from boards of trade, chambers of commerce and others in commercial life. The rates have been used too often as an argument for lower rates at home. This has been on the general principle that whenever a lower rate on a commodity could be found it was used in comparisons to push down the existing rate at home, though there is nothing that is more misleading than such comparisons. The relatively longer distances that our overseas commerce must move, with the consequent greater transportation burden, is not generally recognized even by the merchant and manufacturer. The merchant who made the same percentage of profit on the great variety of goods carried in the several stories of his building and its basements would not last long against his competitor with a flexible scale of profits based upon his experience of what the trade to which he caters will accept, and which in combination will yield him profitable returns, with satisfaction to himself and his customers. Like the successful merchant, the railroad or the nation that wishes to be of greatest usefulness seeks to be responsive to the greatest variety of needs on the part of its customers. The railroads' customers are the public—the producers and shippers of the country—whose needs differ as widely as the customers of that department store, or differ as greatly as the lines of latitude and lines of longitude of our country.

As to the railroads, the first point to be remembered is that neither the railroads nor the merchants would have in many lines any foreign trade worthy of consideration if the railroad rate was restricted to the rate charged for goods in domestic carriage and if the ocean rate was also held rigidly to that which applies locally from home port to the port of foreign destination. The prices the party at destination can pay are fixed by conditions that prevail at the foreign destination. We have to do business in a way that will meet those prices under the conditions that obtain at that foreign destination or we have to stay out of the business. If there is a reasonable way of taking part in the traffic at that point a public service is rendered by the shipper and by the railroads and the water carriers when their efforts are combined to reach that commerce and so extend the trade of our country abroad. Yet as the merchant or manufacturer has been accused of profiteering (which is merely a new word with an old meaning) because the prices are lowered by him for the purpose of achieving that foreign market, the railroads have been accused in like manner when they have helped to carry the burden by rates for carriage of business which without this aid would not be moved. To move or not to move the business, that is the question.

This brings us to another phase of the subject. Every port of the United States yearns for a share of the foreign trade. Ports which have merely tasted a little of that trade will readily claim that their deep water, their port facilities and their location give them a natural claim for a share of the foreign trade, and generally they are right if only there is enough foreign trade to go around among all the ports that seek it. Under any conditions export trade will follow the line of least resistance, which means that it will go through the port best suited to the needs of the traffic for each piece of business. This ambition of each port to get the largest part of the foreign trade puts upon the railroads a pressure constantly exerted to make rates to the port or ports served by each railroad that will make it possible for the business to move over the railroad upon which the pressure is brought. Thus in the Asiatic trade there always has been pressure upon the railroads in the middle west of our country to make rates to the Atlantic ports that would enable the business to move through those ports via the Suez Canal, while at the same

*Abstract of a paper read before the Seventh National Foreign Trade Convention at San Francisco, May 12.

time the competitive effort is exerted to put the business through Pacific ports in vessels plying directly across the Pacific Ocean. Now comes the Panama Canal with its problems, tending to throw out of gear the arrangements of the past, probably to force readjustment in the relation of all of the United States competing ports in their struggle to retain the share of the foreign trade they had before the war and gain new advantage as the trade of the world increases in volume. Although the Panama Canal has been held in leash, as it were, by the world war, it is the most powerful factor that has come into foreign trade since the Central Pacific (now the Southern Pacific) completed the spanning of the continent by railroad and the Southern Pacific linked the cotton fields of Texas with the ports of the Pacific. The Panama Canal will make more intense the competition between the ports of the United States for the foreign trade, and so will increase the competition between the railroads, not only because of a proper desire upon the part of the railroads serving the ports to share in the foreign trade but because of the pressure exerted upon those railroads for rates that will permit our industries to reach the foreign markets. When against the railroads there is combined with the pressure of the industries requiring transportation the pressure of each port to build up its own trade as a port and the urging by each steamship line using the port that cargo be brought to ships' tackle in quantity to maintain that trade route, it can be seen that the railroads have no easy task in meeting the rate requirements of the varied interests concerned.

Railroads in the foreign trade have the further problem of meeting the views of the water carriers, without whose service foreign trade would be impossible. The water carrier knows as well as the railroad, and often better, what through rate must be made from the point where the business originates in the United States to the destination sought for the goods to find market in the foreign country. It is to the interest of the water carrier that the railroad shall accept the lowest possible earning as its proportion of the through rate, for obviously the smaller the railroad's share of the rate the more is left for the water carrier. Here again the railroads have their difficulties. The same steamship line, for example, may have liners plying from competing ports. It does not stretch the imagination to perceive one steamship interest having sailings from an Atlantic port and a port in the Gulf of Mexico and one or two ports on the Pacific slope, all sharing in the Oriental trade. Thus for all of these ports there are competing and conflicting interests, and in the white heat of competition that is bound to follow the restoration of the world to its normal activities the railroads will be placed in a more difficult position than at any time heretofore. Greater calls than ever before are likely to be made upon them, responsive to the competition which in turn will be intense between the commercial agencies that handle the production and distribution of our mills, factories and fields. These conditions will but make the railroads the more eager to be useful, for they share the atmosphere of their constituents.

It should not be assumed, however, that the intention to be of service means that a railroad is ready to give or is allowed to give the transportation for the mere cost of the service or less than its cost. It is expected, and is reasonably expected, of a railroad that it shall not render to anyone a service in which it sustains a loss. It is reasonably expected that for every service the railroad renders it shall earn at least the out-of-pocket cost of that service, with some compensation added to this cost as a contribution toward the net result of its operation.

It is also expected, and reasonably expected, that the rates accepted on one class of traffic shall not be so low as to impose a burden upon another class of traffic by charging it higher rates than otherwise that traffic should pay. As the highest rates the railroad may charge on any of the commodities it carries are fixed under approval of governmental authority, it follows that the range from the highest to the lowest rate charges must be such as will yield the railroad a reasonable aggregate return if the business of the carrier is so to prosper as to function fully for the public service. It follows, further, that any expectation that the railroads can meet at will the needs of foreign trade by reduction in their rates is not well founded. They can do so only to the extent, first, that they can justify reduction as necessary in the case, and, secondly, that they can justify the lower rate when necessary as a compensatory one for the service, in the sense that it yields them some profit over the net cost of carriage under the circumstances covering that transportation.

This reminder has special reference to the railroads serving the Pacific coast ports, because those railroads have to haul long distances much of the foreign freight they carry, the Pacific coast being as yet not a large manufacturing area, although its factory growth is active. For cargo the water carriers serving the Pacific ports have to rely largely on the products natural to the Pacific slope, supplemented by cargo brought by rail from the Gulf states and from the manufacturing districts of the states east of the Rocky mountains.

I have dealt so far with export traffic because it is the great field we have in mind in the first instance. In doing so the importance of import traffic has neither been forgotten nor can it be allowed to remain obscure. The factors in import traffic are in all essentials the same as in export traffic so far as concerns the railroads, and having dealt with some length on the export phases of the business it does not seem necessary to say much about the imports, as the controlling features are for the most part interchangeable. Foreign trade consists of exports and imports for the railroads and for the ships and for the nation. The railroads in foreign traffic have not only to join in through rates, whenever they properly can do so, that will help move the traffic; they have also to recognize that a ship is a unit which has to be loaded with heavy cargo below and with cargo that, in gradations of space related to weight, will permit the ship to be loaded to her carrying capacity in seaworthy fashion. For if the ship is to pay her way she must find such cargo as will give her tonnage and stability, and in both directions, and the railroads have to be ready to participate in the carriage of that cargo in each direction.

This summary of the situation doubtless brings to mind the query as to how, under these trying and conflicting conditions, the railroads can find basis upon which to make rates to fit the foreign trade. It is no secret among railroad men that this has always been a difficult question. The railroads have been beset by the competition between producers or manufacturers, between points of production or manufacture, between rival commercial bodies and interests, between rival ports and rival ocean carriers, and last but not least, the rivalry between the railroads themselves in competition with each other and in response to the communities they serve. In the end the main effect has been to bring the railroads to a point in their history in which the foreign traffic has been the least profitable and most debatable part of their business.

How these uncertainties and this lack of profit in the foreign business carried by the railroads can be obviated for the future is an interesting question. It is not unlikely that the solution for it rests in the National Foreign Trade Council. If the railroads find in this council a common source of information and common fount of facts, it will be a step forward of no small moment. While the factors that lead to entry into a foreign market, whether as importer or exporter, are variable, there are certain factors that will be less variable; one of these factors is transportation, and of this the rail transportation will of necessity be the least variable. The railroad is a fixed entity. It is always at your service and it is always in the same places. The ships can come and go, can change their route or lay off or quit. Not so the rail-

road. It follows that in any scheme of through rates the railroad, since it serves all the people and the foreign trade is only a small part of its functions, cannot be expected to be responsive to those wide and rapid fluctuations in rates in which other vehicles of commerce, especially water carriers, may indulge. Indeed, a substantial volume of the foreign trade carried to and from the ports by the rail carriers of our country will always be done under the same rates that apply to the home traffic, but there is also a large traffic that will continue to need rates that are helpful. This makes it important that the basis of information upon which the rail carriers fix their foreign rates shall be both accurate and up to date, with adjustment as to competing ports in the United States that will not cause the railroads simply to see-saw each others' rates and fritter away their revenues without any substantial benefit to the foreign trade. No business can long be done and no business can be done well except on the basis of profit. This is the more true in railroad service that calls for promptness and which must be reliable; and in the foreign trade prompt and reliable service by our railroads is one of the most urgent requirements.

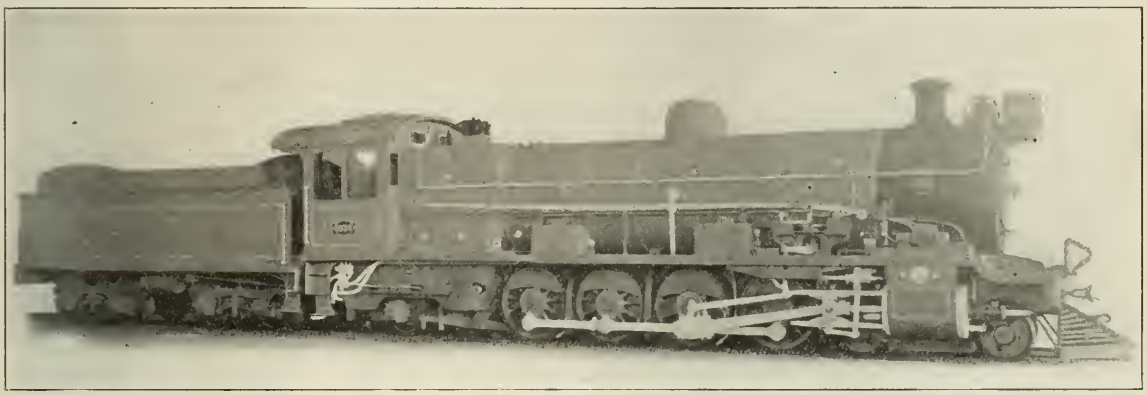
The National Foreign Trade Council can be helpful in this respect, not merely in educating the general public to the importance of foreign trade, but also in educating all concerned, including even the agencies of the government, that foreign trade is necessary to the welfare of our country; that it has problems of its own for the carrier as well as the merchant, and that rates made for foreign trade should not be considered any criterion for measuring the rates on the business done at home. The people should also be educated to the fact that foreign trade is not to be built up on the basis of chronic agitation for reduced rail rates, as these can be granted only under circumstances and conditions that may be justified by close analysis. This is the day of regulation, and for the railroads it is the day of regulation in the fullest sense, although from that regulation the ocean carriers are largely free. The ocean carriers will have to do their part in building up the traffic, for in their failure to do so the efforts of the railroads would be futile. But that is another story which the ocean carriers can tell to better advantage.

As I have already said, this summary of the situation induces the query as to how, under the trying and sometimes conflicting conditions to be met, the railroads can find the basis on which to make rates from time to time to fit the foreign trade. This brings me to the closing suggestion that the railroad which bases its rates upon the best information and applies that information with the greatest intelligence is the best servant, other things being equal; and the railroads are sincere and consistent in aiming to make their rates only upon reliable data, for this is to their self-interest and to the public interest alike. If the National Foreign Trade Council is successful in providing such information—up-to-date, open to all and of general acceptance—as will contribute toward making it possible for the railroads to reach their conclusions from the solid foundation of fact, the railroads will thereby be better able to take their part in the foreign trade, and so further the laudable purposes of this young and ardent and patriotic organization.

Mountain Type Freight Locomotives for the South African Railways

WHILE IT IS TRUE that locomotives built in accordance with American practice have demonstrated their fitness for service in all parts of the world, there are many railways which, for good and sufficient reasons, when purchasing locomotives from builders in the United States, specify that European designs be followed. American builders have had considerable experience in work of this kind, even to the extent of building locomotives throughout to the metric system of measurement.

The Baldwin Locomotive Works have recently constructed thirty locomotives for the South African Railways, built throughout in accordance with the railways' designs and specifications. The South African lines are built to a gauge of 3 ft. 6 in., and in view of the narrow gage and clearance limits, the motive power is conspicuous because of its exceptional weight and capacity. The new locomotives are of the 4-8-2 type, and the average weight carried per pair of coupled wheels is very nearly 38,000 lb. The tractive effort is 41,700 lb., which compares favorably with the motive power used on standard gage lines in the United States.



Baldwin Narrow Gage Mountain Type Locomotive for Export

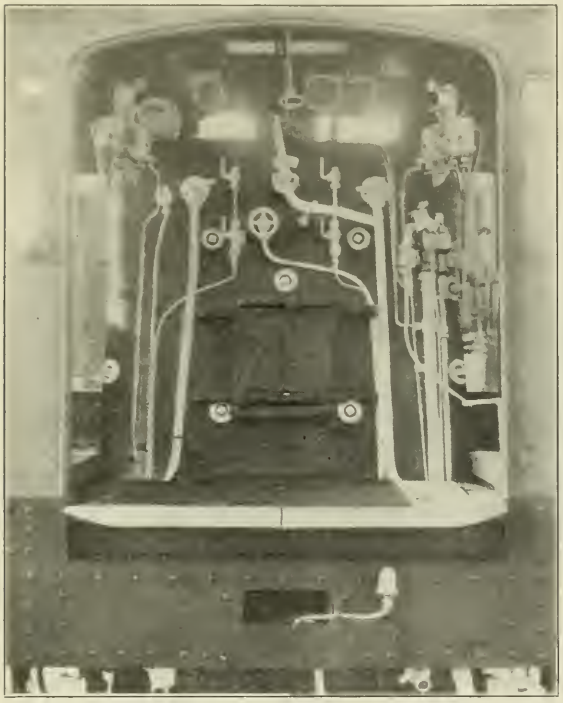
Locomotives of this general design have been in service on the South African Railways for some time, working between the Witbank coal fields and Johannesburg, hauling trains of 1,400 tons over this 80-mile stretch of track, the maximum grades being 1 per cent. The locomotives are designed to traverse curves of 300 ft. radius.

The new Baldwin engines have straight top boilers, with wide fireboxes of the Belpaire type. The inside firebox plates are of copper; a material which has given excellent service results in this district, where the water used is of exceptionally poor quality. A fire-tube superheater is installed, and the steam temperatures are indicated by the permanent installation of an electric pyrometer.

The frames are of the plate type, which were shipped completely assembled with cross-ties, cylinder saddle, cylinders, guides and guide yoke. The pistons were in the cylin-

ders, and the cross-heads in the guides. This type of sub-assembly makes for considerable convenience in the final erection.

The equipmen tof these locomotives includes American steam brakes on the coupled wheels, and automatic vacuum brakes on the tender, with train connections. The equipment includes Hasler speed recorders and a power operated grate shaker. On the right hand side of this locomotive is located a combination steam and hydraulic reverse mechanism, connected directly to the reversing shaft of the locomotive. This mechanism consists of one steam sylinder and one water cylinder. The two cylinder pistons are connected to a common piston rod, which in turn is fastened to the reverse shaft arm. The water cylinder is simply a cylinder with passages from one end to the other, and is entirely filled with water. This cylinder acts as a locking device for the holding of the reverse shaft in a desired position. The steam cylinder is used for moving the reverse shaft and at



Interior of Cab

the same time causing the water piston to move it. When the steam valve in the cab is closed, the steam ceases to function and the water cylinder, by having equal pressure on both sides of the piston holds the gear in the proper position.

General Data

Gage	3 ft. 6 in.
Service	Freight
Fuel	Coal
Tractive effort	41,700 lb.
Weight in working order	205,100 lb.
Weight on drivers	151,900 lb.
Weight on leading truck	27,200 lb.
Weight on trailing truck	26,000 lb.
Weight of engine and tender in working order	310,000 lb.
Wheel base, driving	13 ft. 6 in.
Wheel base, total	31 ft. 9½ in.
Wheel base, engine and tender	57 ft. 7⅜ in.

Ratios

Weight on drivers ÷ tractive effort	3.64

Cylinders

Kind	
Diameter and stroke	22½ in. by 26 in.

Valves

Kind	Piston
Diameter	11 in.

Wheels

Driving, diameter over tires	51 in.
Driving, thickness of tires	3 in.
Driving journals, main, diameter and length	9 in. by 10½ in.
Driving journals, others, diameter and length	8½ in. by 10½ in.
Engine truck wheels, diameter	28½ in.
Engine truck, journals	5½ in. by 8½ in.
Trailing truck wheels, diameter	33 in.
Trailing truck, journals	5½ in. by 11 in

Boiler

Style	Straight top
Working pressure	190 lb. per sq. in.
Outside diameter of first ring	69 in.
Firebox, length and width	88 in. by 65⅛ in.
Firebox plates, thickness	⅜ in.
Firebox, water space	3 in.
Tubes, number and outside diameter	139 2¼ in.
Flues, number, and outside diameter	24 5½ in.
Tubes and flues, length	20 ft. 1⅜ in.
Heating surface, tubes and flues	2,338 sq. ft.
Heating surface, firebox	158 sq. ft.
Heating surface, total	2,496 sq. ft.
Superheater, heating surface	532 sq. ft
Equivalent heating surface*	3,294 sq. ft.
Grate area	39.9 sq. ft.

Tender

Weight	104,900 lb.
Wheels, diameter	33½ in.
Journals, diameter and length	5½ in. by 10⅛ in
Water capacity	5,100 gal.
Coal capacity	8 tons

*Equivalent heating surface = total evaporative heating surface + 1.5 times the superheating surface.

THE PATTERSON & WESTERN, 23.6 miles in length, and operating from Patterson, Cal. (on the Southern Pacific, 25 miles south of Tracy) west to Jones, has filed with the Railroad Commission of California a petition for the abandonment of the road. The road, built by the Mineral Products Company, Ltd., for the purpose of "tapping what was supposed to be wonderfully rich and varied resources and to transport the tonnage from the mines of the company," has failed because these resources have been found to be without value sufficient to justify their development. The owners of the railroad suggest that the line be abandoned and that the roadbed be used as the foundation of a proposed highway from Patterson to San Jose. The railroad cost approximately $280,000 and has been operated at a loss since its completion in 1917.

Photo from International Film Service

A Cog Railway in the Department of Haute Savoie, France

The Meeting of Railway Accounting Officers' Association.

Accounting Officers' Association Annual Meeting

Discussion of the New Burdens Imposed by the Transportation Act and the Settlement of Affairs with the Government

THE THIRTY-SECOND ANNUAL MEETING of the Railway Accounting Officers' Association was held at the Hotel Traymore, Atlantic City, N. J., on May 12, 1920. Two speakers had been invited to address the meeting at the first session—Hon. Joseph B. Eastman, member of the Interstate Commerce Commission, and A. J. County, vice-president of the Pennsylvania Railroad. Mr. County's address will be reported in a later issue. Mr. Eastman's address follows:

The New Accounting Problems Under the Transportation Act

By Joseph B. Eastman,
Interstate Commerce Commission.

As you know, I have not long been with the commission, and I have felt honored in being selected as the member to whom our Bureau of Carriers' Accounts reports. Not a few of you to whom I speak today are graduates of this bureau. Its name, by the way, has just been changed from the Bureau of Carriers' Accounts to the Bureau of Accounts, not out of any disrespect to the carriers, but in the interest of economy and efficiency.

For my own part I am not an expert accountant and have little expectation that I shall ever become one. The only claim that I venture to make is that I think I can understand most accounting questions if sufficient time is given me. But even with time I still find myself in doubt now and then whether the proper word is "charged" or "credited," and when it comes to unadjusted credits, unadjusted debits and suspense accounts I often feel like an excursionist in No Man's Land.

Speaking as a layman, it seems to me that the important thing about railroad accounts is that they shall clearly portray the facts in one uniform language as simple and understandable as it can be made. There are few things more misleading and vicious than devious, untruthful and crooked accounting, and there are few things of more real value and help than straightforward, well-conceived, honest accounting. I think I am correct in saying that the importance of sound principles in carriers' accounts was first recognized in my home state, Massachusetts. At one time I had the task, which proved to be a pleasure, of reading the reports of the old Railroad Commission of Massachusetts from the time of its origin in 1869 under Charles Francis Adams; and one of the interesting things was the opposition encountered in introducing a system of uniform, supervised accounts. There were railroad men in those days who regarded it as an unwarranted and dangerous invasion of private property rights.

But times have changed, and no one thinks of such objections now, and I know it is your endeavor, as it is our own, not to weaken the system of public regulation but to improve and strengthen it and help it to accomplish the results which it is designed to produce. The railroads have gone back to private control. Personally, I thought it wiser under existing conditions that they should remain in the hands of the government. But however much you may disagree with me in this, I think you will have no difficulty in agreeing that private control will be a success only if the essential public nature of the business is fully recognized, and to the extent that you and the other responsible officers and directors of the carriers act upon the principle that public office is a public trust. We of the commission regard you not as antagonists but as co-laborers in a common undertaking. We look for your faithful and loyal help and have confidence that we shall not be disappointed in our expectations.

The Interstate Commerce Commission has been the subject

of a great deal of criticism; but we want criticism, not only of our policies, but of our ways of doing business. Much is said of economy and efficiency in railroad operation, but we are just as anxious to have economy and efficiency in commission operation. Under the new legislation our administrative functions have been enlarged, and if we are to be successful in this work we must be organized for prompt, decisive action. The word "red tape" has come to be associated with government departments, often very unjustly, I think; but I assure you that there is no one in the commission or in its employ who has any passion for "red tape." We want to meet our duties in the most direct and simple way and carry on the work with energy and despatch and without lost motion. Speaking for the Bureau of Accounts, if at any time you think our methods can be improved I shall greatly appreciate frank criticism, and I know that Mr. Wylie will, too; and what I say for this department applies with equal force to other branches of the commission's work.

And while I am making such suggestions as these there is one more that I should like to offer. I have wanted to make it for a long time, not to you in particular, but to any who are interested. In the course of your duties most of you are called upon from time to time to appear as witnesses in proceedings before the commission. As a result of some experience upon the bench in both state and federal matters, permit me to say that very few realize the persuasive force of testimony from a witness who is not afraid to say he does not know, when that is the fact; who answers questions of opponents courteously and frankly and without equivocation; and who does not seek to sustain a position which he knows in his inmost heart the facts will not support. And such testimony can be detected by those upon the bench more easily than many think.

Turning now to the more specific accounting questions by which the commission is confronted: We have asked Congress for an appropriation which will permit us to double our existing force of accountants, and we are hopeful that we shall be able to bring this improvement to pass. One of the important matters that we have in mind is a revision of the existing classifications. In the spring of 1907, just after the uniform system of accounts had been prescribed as a result of the joint labors of the commission and special committees of your own association, we were asked whether there would be any further labor for the association to perform in this connection. Apparently some then thought that a perfect system of accounts had been evolved, but it was seen that there would be need for revision and improvement in the future, and experience has justified this prediction. Changing conditions create new requirements. Our own experience in valuation work has suggested certain changes.

By way of illustration it has been suggested that the balance sheet accounts for additions to property through income and surplus fall short of being true statements of property expenditures defrayed in this way; that a more uniform treatment of discount on funded debt is desirable; that investment in property devoted to ancillary operations, such as shops for the manufacture of equipment, should not be merged with investment in road and equipment, and that the operations of such properties should be segregated for accounting purposes; that greater uniformity is desirable in the determination and use of revenue, tax and other accruals, and that accounting for betterments might well be modified so that the investment accounts may more accurately reflect changes in cost where property is replaced in kind. Upon these and similar questions we shall soon be seeking your views.

With the help of an enlarged force we hope to be able to police the accounts of the carriers more frequently and more thoroughly. "Police" may seem a harsh word, but you understand the process of inspection and review which has come to be known by that term. Briefly, our purpose is to make sure that our accounting rules are followed in good faith and applied with care and uniformity. The files of the commission contain thousands of inquiries and interpretations upon points of doubtful construction. The very complexity of the subject makes it inevitable that differences of opinion should develop, and it is our belief that more frequent personal inspections by our field forces will lighten the burden upon our central office and make it easier for you to harmonize your practices and straighten out the difficulties that you encounter.

Passing to the new accounting duties which the Transportation Act, 1920, has laid upon us, I have said that some of these are temporary and, frankly, we are glad that they are. I refer particularly to the duties in connection with the ascertainment of deficits and guaranties and the making of advances. It is our threefold task in this respect to be fair to the carriers, to protect the treasury of the United States and to keep within the mandates of Congress. The strain upon our present forces, while the construction of a larger organization is in progress, has not been small; but we are striving to avoid delay. In the very near future you may expect announcements in regard to the standard of maintenance during the guaranty period and the vexatious questions of so-called "lapover" items, matters upon which you have already conferred with us at length. Aside from maintenance, the statute also requires the commission, in determining the amount to be paid under the guaranty, to correct and exclude any disproportionate or unreasonable charges to operating revenues or expenses, and I am informed that this provision has been the cause of some perturbation. Permit me to say that no carrier should fear that charges will be excluded or corrected which the transportation needs of the public demand or that any narrow view will be taken of those needs; but we shall be as vigilant as we know how to be in safeguarding the public treasury. If carriers will but scrutinize their expenditures during the guaranty period and make none which they are not prepared to justify on demand, they need apprehend little trouble.

In nearly all the permanent new duties which are added to the commission's work by the Transportation Act, such as the supervision of security issues, the granting of certificates of public convenience and necessity, the approval of leases, mergers and consolidations, accounting plays an important part.

There are many who believe that the weak spot in the armor of the present classifications prescribed by the commission is that they fail in sufficient degree to require uniform accounting for one of the chief items of the cost of operation, that item being depreciation through use, obsolescence or inadequacy of the units which make up the physical property. It is urged that this cost can be ascertained within reasonable limits, that it should be provided for regularly and uniformly, either by expenditures for maintenance or by contributions to a reserve fund for future renewals, and that the accounts should be so stated that it can be determined at any time whether or not and to what extent the carrier is meeting this part of the cost of operation.

Carriers in the past met this cost in many irregular ways—some by the use of reserve funds, some by reducing from time to time the book value of property through charges to profit and loss, others by charging to operating expenses or surplus the cost of additions and betterments. Many did not meet it at all. Under the present classifications this irregularity has been diminished, but the accounting for depreciation on fixed improvements is still optional, and there is no uniformity in the accounting for depreciation on equipment. Regardless of legislation, it had been the intention of the commission to give this very important matter further study; but as you know, the recent act lays upon us the definite mandate to "prescribe, for carriers subject to this act, the classes of

property for which depreciation charges may properly be included under operating expenses and the percentages of depreciation which shall be charged with respect to each of such classes of property, classifying the carriers as it may deem proper for this purpose."

In my judgment no more arduous or difficult task has been given us either by the old or by the new legislation. I call your attention to the fact that the mandate applies not only to railroads but to every carrier subject to our jurisdiction, including telephone, telegraph and cable, pipe lines, express, sleeping car and steamship companies. We shall undertake the task, however, with confidence that sound and valuable results can be achieved, and plans for the prosecution of the work are under way. Our Bureau of Valuation already has accumulated an immense amount of information in regard to the depreciation rates of various classes of property, and our Bureaus of Accounts and Statistics have similar information in regard to the accounting phases of the problem. It is our present purpose, subject to modification as the work progresses, to create a special section whose entire time and attention will be devoted to this work, with the duty of assembling data from all sources and bringing forward specific recommendations in the form of a report which will be opened up for public criticism and discussion before final action is taken.

In order that you may prepare yourselves for some of the questions which will arise I venture a few suggestions for your consideration, with the understanding that they in no way represent final conclusions. It seems to me that the practical use of a depreciation reserve or fund is not to act as an offset to the theoretical depreciation of the property, but to provide what may be called either a balance wheel or a reservoir, so that the company may be in a position at any time to make the renewals or replacement which first-class, up-to-date service demands without varying from a regular and even burden upon its operating expenses. In the case of certain classes of property it may be that the annual replacements, when the property is well maintained, average up in such a way that no reserve is necessary. Yet the accounting should disclose whether or not this standard of maintenance is observed. What is true of one carrier also may not be true of another, and care must be had not to prescribe rigid rules which make insufficient allowance for such variations. Furthermore, it will be necessary, I take it, to determine whether or not there shall be a real fund or a mere bookkeeping reserve, and if there is to be a fund to what extent and in what manner investment may be permitted, whether or not a certain portion should be maintained in the form of cash or liquid assets, and whether it should be credited with its own earnings upon what is known as the sinking-fund plan.

So much for our new duties. You will realize that I have attempted only an outline of some of the questions by which both you and we will be confronted and upon which we shall want your help. Before closing, however, I cannot refrain from mentioning another matter which is not brought to the front either by old or by new legislation, but which I conceive to be of prime importance. You know and I know that specific railroad rates have seldom been determined upon the basis of cost but by the exercise of judgment after all manner of factors have been taken into consideration. Without suggesting that there should be any revolutionary change in the methods of rate-making, I am yet impelled to the conclusion that insufficient attention has been given by railroad carriers to cost accounting. You ought to know and we ought to know from what classes of traffic the roads make their largest profits and whether or not and in what degree they are carrying freight or passengers in certain cases at an actual out-of-pocket loss. Moreover, it ought to be possible to develop statistics which will enable a more intelligent comparison of the operations of one railroad with those of another, so that it may be known where economy and efficiency reside. I realize the difficulties in cost accounting, particularly upon railroad properties, but similar difficulties have been surmounted in large measure in industries almost as complex. At all events, I think you will not disagree that more can be done than is now being done. I apprehend that this matter will grow in importance in the administration of the revised fourth section and in the development and extension of class rate scales throughout the country. It was brought forcibly to my own attention last winter in the perishable freight investigation, where an attempt was made by the carriers to base rates on actual cost, and the evidence disclosed the utterly insecure foundation for such an attempt in present methods of accounting.

In conclusion, may I express my appreciation again of the opportunity to be with you? After all, the railroads are merely public highways, lined with steel, upon which single carriers are permitted to operate. In our complex modern life, with its problems of distribution, these highways bear the same relation to the nation as the arteries and veins of the human body, and hardening or congestion of the arteries is as serious a disease in the one case as it is in the other. The vital thing is that the railroads should function properly without abuse of what may be called their powers of taxation. We are violent partisans in this country and too often are enthusiasts for the means rather than for the end. I hope we shall be able to keep our eyes on the results to be achieved, and if we do, and hold the public interest paramount, I am confident of success.

Report of the Executive Committee

The committee has held two meetings since the last annual meeting of the association, and begs to report on the various subjects that have come before it as follows:

Getting the Most Out of the Meetings. — Every annual meeting of this association is a brand new opportunity. What kind of opportunity and what use is to be made of it depend entirely on the individual.

It would look like a good idea for the chief accounting officer of a railroad to have the auditor of freight accounts, auditor of disbursements, auditor of passenger accounts, etc., attending the annual meetings, write out their impressions, what new ideas came to their notice, and any suggestions resulting from their contact with the other accounting officers at the meeting, or from the discussions. The chief accounting officer could also impress upon his fellow workers the desirability of being keenly interested in the exhibits of mechanical devices. Furthermore, the chief accounting officer might, with advantage, write out his own impressions of the annual meetings, mechanical devices and other situations with which he came in contact. He might even go further and submit to the president of the association any suggestions that would help in the administration of the association's affairs. An eminent philosopher once remarked that the acid test of a man's grasp and knowledge of a situation is whether he can and will put it into written words. A chief accounting officer represents not only the knowledge, training and experience of himself, but also the knowledge, training and experience of all the members of his staff. The problem is to make this all available for practical use.

Card Record Biography.—In his address at the New York meeting, President R. E. Berger referred to inquiries with reference to the record, experience and qualifications of some of our members received by the secretary from commercial concerns and others who were seeking the services of experienced men, and congratulated the association upon being thus recognized as standing in such a relation to the members themselves and with the business public. And Mr. Berger recommended that the secretary be authorized to collect and keep up currently data of a biographical and business experience nature in connection with each member. In accordance

with instructions from the executive committee, the secretary on October 28, 1919, issued a circular requesting such information as would be necessary to establish a card record biography of railway accounting officers.

Termination of Federal Control.—Your executive committee on October 15, 1919, adopted the following resolutions:

> That the committee on general accounts is hereby designated as the association's representative through which emergency matters incident to the termination of federal control shall be conducted, and it is authorized and directed to act for the association in all matters relating to such emergency, including matters incident to accounts and returns required by governmental authorities which may need prompt and decisive action, without referring such matters to the association for its approval, but shall be reported in the usual manner to the members of the association.

Commodity Classification.—In submitting the proposal regarding the new commodity statistics to become effective January 1, 1920, the Interstate Commerce Commission's representative indicated that the commission had in mind issuing, under order of the commission, its own commodity classification. The previous commodity classification for that purpose had been issued by the Railway Accounting Officers' Association in 1911. Ultimately it was decided that the Railway Accounting Officers' Association should issue the new commodity classification instead of the commission. A new R. A. O. A. commodity classification was compiled by a subcommittee of the freight committee, under considerable stress, and was issued by the association.

Membership Changes.—During the current year your committee has admitted into the association 121 new members. As of March 18, 1920, the association has 848 active members, representing 318,945 miles of railroad, also certain express companies and water carriers—an increase (as compared with April 21, 1919) of 68 active members. The association is now carrying the names of 21 persons on its honorary rolls.

Attendance at Committee Meetings. The committee has adopted the following resolutions:

Any member of a committee of the Railway Accounting Officers Association (except the Executive Committee) who hereafter fails to attend three consecutive meetings of such committee shall forfeit his membership on that committee. No member shall serve two consecutive terms as chairman of any committee of this association.

Affiliation with the Association of Railway Executives. Thomas DeWitt Cuyler, Chairman of the Association of Railway Executives wrote J. A. Taylor, Chairman, Railway Corporate Accounting Conference, on April 14, 1920 as follows: Dear Mr. Taylor:

Referring to your letter of April 1 in reference to the dissolution of the Railway Corporate Accounting Conference and its amalgamation with the Railway Accounting Officers' Association, I beg to say that at a meeting of the standing committee held in Chicago on April 9, the recommendations contained in your letter were approved and I am authorized to say that we are prepared to take over as a part of our organization the Railway Accounting Officers Association, of which Mr. McDonald is president.

Mr. McDonald wrote Mr. Cuyler in part:

As our organization has never had a head or superior association to which it could look for guidance and counsel, your advice that we are now a subsidiary section of your organization is very gratifying. Both on behalf of the members of our association and on my own, I beg to assure you that our work henceforth will be characterized by the same spirit of co-operation and loyalty that has inspired and guided us in the past.

The committee approves the action shown in the above correspondence.

This report is signed by A. D. McDonald, president.

Committee on General Accounts

Separating Operating Expenses. The committee urged that the consideration of any change in the rules for separating operating expenses between freight and passenger services differing from those in effect prior to Federal control, be postponed at least until January 1, 1921. On December 1, 1919, the Interstate Commerce Commission prescribed rules governing the separation on large steam railways, effective on January 1, 1920.

Commodity Statistics. The committee urged on the statistician of the Interstate Commerce Commission that the new rules for compiling commodity statistics be deferred until 1921.

Per Diem Settlements. The committee, acting on a report made by a committee of the American Railroad Association, asked the Association of Railway Executives to work for delay on the plan proposed for the settlement of per diem between carriers at the expiration of Federal control, which plan embodies the establishment of a clearing house through which all transactions regarding per diem are to be handled. The committee does not oppose the suggested plan of a clearing house in its entirety, but believes that on a matter of such importance, involving as it does both physical and financial transactions, no decisive action should at this time be taken other than the re-establishment of the plans in effect prior to Federal control. The matter should be given most careful and joint consideration before any final action is taken to put the proposed plan in use.

The report was signed by A. M. Plant, chairman.

Freight Accounts

The committee has held five meetings during the year, and reports the following conclusions:

Overcharge and Agency Relief Claims. Acting on amendments to the constitution, providing for mandatory overcharge and agency relief claim rules submitted by the committee last June, the meeting adopted the following amendments to the constitution:

(1) To add to Article XI the words "Except as provided in Article XII," so that Article XI as then amended would read, "Except as provided in Article XII, this constitution can be changed only by amendments to be offered at any regular meeting by a vote of not less than two-thirds of a quorum of members then present." (2) To add to the constitution Article XII, reading: "The following rules, relating to overcharge and agency relief claims, shall be mandatory and binding upon carriers operating in North America that are members of the Railway Accounting Officers Association and shall become effective and operative on the date on which this article is adopted by the association.

Forwarding Original Abstract. The committee recommends that the settling carrier shall retain original abstracts and division statements, sending first carbon copy to waybilling carrier and legible copies to each intermediate carrier in time to reach them by the 18th of the succeeding month.

Standard Form of Freight Bill. The committee has carefully considered the question of a change so that the columns would agree with those on the waybill to insure a more correct rendering of the freight bill and avoid having shipments waybilled prepaid and the freight bill made collect; but believes that no change should be made in the form at this time; carriers should call attention of agent when incorrect freight bills are made.

Direct Correspondence With Agents of Other Carriers. The committee recommends that wherever the conditions warrant or require direct inquiry, an accounting officer may

send direct inquiry to agents of another carrier, enclosing, for reply, a self-addressed envelope, with postage stamp, if necessary for transmission by United States mail. It would be desirable for each carrier to outline, to its agents, its policy regarding replies to direct inquiries made of its agents by accounting officers of other roads.

Method of Writing Waybills. The committee recommends that all waybills be prepared by the use of a typewriter, pen and ink, or indelible pencil. To overcome the obvious objection to the use of indelible pencil, wherever it is used, the writing should be set by a press or damp cloth. Under no circumstances should a black lead pencil be used.

Weighing Cars Enroute. The committee calls attention to the importance of weighing freight, both carload and less than carload, and the necessity of having more track scales properly located, and the institution of automatic warehouse scales. Particularly is it desirable to ask the hearty co-operation of the operating and transportation departments in this matter. The need is a necessity for more attention to the matter of weighing rather than for the adoption of any particular plan which it is not believed can be made general.

Use of Large Envelopes. The committee recommends that for ordinary correspondence, handled through the United States mail, carriers should use envelopes in sizes like the standard sized stamped envelopes sold by the Post Office. In every case particular attention should be given to having the envelope adapted to its contents.

Prepaid Charges Billed in Error. The application of the principles of accounting as contained in PS&A Circular No. 61 of January 4, 1919, has been of material advantage and should be continued. It is therefore recommended:

(a) That when a shipment is contracted for "Prepaid," and the shipper is a credit patron, the bill of lading be stamped over the agent's signature: "The charges on this shipment fully 'Prepaid,' and the waybill stamped 'Fully Prepaid.'

(b) That when a shipment is contracted for "Prepaid," with a shipper other than a credit patron, the bill of lading to be receipted, in the space provided therefor, for the amount collected.

(c) That in the event of an error in billing "Collect" or "Insufficiently Prepaid," a shipment contracted for "Fully Prepaid" shipment to be delivered, and agent of billing carrier requested to make necessary adjustment. Billing agent must furnish immediately a "Prepaid Only" waybill or correction notice to fully prepay the charges.

(d) That in the event of an error in billing "Collect" or "Insufficiently Prepaid," a shipment contracted with a shipper other than a credit patron, the additional amount necessary shall be collected at destination and waybill correction notice, increasing freight charges to proper basis, duly issued, the total prepaid to be increased only upon authority of the waybilling carrier.

Tracing Unreported Waybills. To facilitate the checking of unreported waybills, it is the committee's opinion that interline forwarded abstracts should be sorted in forwarding station order and in so far as possible, waybill number order, regardless of the road rendering the abstract. The waybills that are reported can be readily checked on the forwarded report, and the month and year in which reported shown. In this manner, by referring to the forwarded report, it can readily be determined the month in which reported. After the checking is completed, the unreported waybills and the open items on the advances and prepaid can be readily drawn off. When replying to tracing carrier, the actual reporting to that carrier should be shown.

Copies of Waybills. The committee recommends that no copies of waybills be furnished to destination or intermediate carriers except, that for specific purposes, copies of each individual waybill requested should be furnished.

Waybill to Accompany Car. The committee recommends that paragraphs 84, 85, 86, 87 and 150, of the 1917 synopsis be cancelled, and that the following be inserted in lieu of paragraph 150 of the 1917 synopsis:

Waybills for carload freight must move with the cars; waybills for l. c. l. freight must move with the cars when practicable; otherwise they will be mailed in accordance with the requirements of each carrier to junction, transfer, break-bulk or destination station. When waybills for a solid car of l. c. l. freight are mailed, a separate waybill for the car movement must be made on standard form, in duplicate, showing destination and complete routing, and bear notation:

"Merchandise car. Waybills mailed to ....."

The original car movement waybill shall accompany the car, the duplicate shall be placed on top of the revenue waybills, all securely fastened together and mailed as outlined above. Agents receiving merchandise waybills without car shall take immediate action to locate car and forward waybills in accordance with the information obtained, and connecting carrier's requirements to junction, transfer, break-bulk or destination station. Single waybills which become separated from the freight shall be promptly mailed to destination. Forwarding junction agents must stamp car movement waybills.

The committee also recommends that Standard Form No. 111, "Interline Card Waybill" be cancelled.

Revision of Forms. The committee will give consideration to whatever revision is needed in the present freight accounting forms and will welcome suggestions and criticisms. The report was signed by A. J. Moran, chairman.

Passenger Accounts

The committee has held three meetings during the year.

Handling Scrip by Honoring Agents. The committee recommends that tickets and baggage checks issued in exchange for scrip be taken into agency accounts at tariff fare or rate and so reported. The manner in which agents shall receive credit for scrip detachments is left to discretion of carriers.

Clergy Fare Certificates. Clergy certificates are particularly susceptible of manipulation. There is no known accounting practice that will adequately protect the revenues of the carriers in connection with such certificates. From a financial standpoint, it would obviously be to the interest of the carriers to withdraw the reduced fares for this class of traffic, but if this is not found practicable or desirable the committee believes that the form of certificate should be altered or its use should be surrounded with added protective features. The committee recommends that the secretary transmit the foregoing to the American Association of Passenger Traffic Officers.

Reporting Numbers of Interline Tickets. The committee recommends that when reporting interline tickets from a given selling station of the same form, via the same route, to different destinations, the commencing and closing numbers representing the entire sales of such form should be shown opposite the first destination, using a separate line for void tickets, if any, the separate numbers of which should be shown, so that all the entries will equal the number of tickets as represented by the opening and closing numbers of the form. When reporting multi-road, combination, or skeleton forms, also any other forms where the numbers do not run consecutively, the separate numbers to each destination should be shown. The association's recommendation as contained in paragraph 192 of the 1917 synopsis is recommended to be rescinded.

Tax on C. O. D.'s.—To comply with the rulings of the internal revenue department, it is the understanding of the committee that war tax on C. O. D. checks should be paid by carrier making the collection, except that when collection is made by Canadian carriers, the war tax should be reported to United States carrier issuing the C. O. D. check, who will make settlement with the internal revenue department.

Federal and Corporate Scrip Accounts. It is the sense of the committee that a new form of scrip, of distinctive color, or the present scrip coupons bearing a distinguishing marking should be prepared and placed on sale. Following the action of the passenger committee and as a result of its sug-

gestion, the various passenger traffic committees issued instructions in conformity with the foregoing. Where scrip bears the designation as outlined, the honoring carriers should separate the two forms on monthly statements (marked "Federal" or "Corporate") sent to the issuing carriers.

Standard Forms No. 10. The committee recommends that Standard Form No. 10, Recapitulation of Interline Passenger Traffic Reports, be abolished and that Paragraph No. 185 of the 1917 synopsis be amended accordingly.

The report was signed by F. M. Brine, chairman.

Disbursement Accounts

The committee has held three meetings during the year, and reports the following conclusions:

Addition and Betterment Accounting. This subject came before the association at St. Louis, 1918, and New York, 1919, and was left with this committee for consideration. Since the last annual report of this committee, copies of Valuation Order No. 3, second revised issue, promulgated by the Interstate Commerce Commission, have been received by all common carriers. This valuation order prescribes forms indicating the minimum information required for the commission's purposes for the following records: Authority for expenditure; registers of authorities for expenditures; roadway completion report; semi-annual report of changes in equipment; record of property changes. The establishing of the forms of the above records still leaves to the option of the individual carrier the accounting forms for recording detailed records of labor expended and material applied for addition and betterment purposes, the forms for recording, consolidating and reporting such detailed expenditures, and the forms of records to be maintained, in the offices in which the permanent file copies of such expenditures are kept. After careful consideration of the accounting forms in use by railroads generally for such purposes, it has seemed desirable that at this time this association adopt the following forms: R. A. O. A. Standard Form No. 204—Detailed report of disbursements under Authorities for Expenditures; R. A. O. A. Standard Form No. 205—Abstracts of disbursements under Authorities for Expenditures; leaving for future consideration, all forms which may ultimately be decided to be advantageous in securing uniformity in the compilation of particular or specific information, relative to capital expenditures for extension and improvements to railway property.

Pay for Shop Foremen When Shops Are Idle.—The committee is of the opinion that pay and expenses allowed for the period of a strike, at the regular established rates, should be charged to the accounts to which these items are ordinarily chargeable. Additional or special allowances of pay and expenses for duties performed should be charged to the operating expense accounts appropriate for the specific services rendered.

Definition of Joint Facility. The committee suggests that the association recommend the revision of the definition contained in Accounting Series Circular No. 14, issued by the Interstate Commerce Commission, to read:

"Joint tracks, yards and other facilities are tracks, bridges, yards, stations, towers, turn tables, water stations and other facilities which are regularly operated by one carrier for the benefit of one or more other carriers.

"The company operating such joint tracks, yards and other facilities will include the amount paid for maintenance and operation of such joint yards and other facilities in its detailed primary accounts of operating expenses (other than the joint facilities accounts), crediting the amounts collected from other users to the appropriate joint facility credit accounts in operating expenses. The carriers, other than the operating carrier, jointly using such tracks and facilities will charge the amounts paid by them to the appropriate joint facility debit accounts in operating expenses, in accordance with the distribution shown in the bills of the operating carrier.

"Taxes upon property used jointly should be charged by the owner to income account No. 532, railway tax accruals, and the proportion paid by the user should be charged to income account No. 541, joint facility rents, and credited to income account No. 508, joint facility rent income, by the owning carrier.

"Amounts paid for the joint rental of railroad facilities should be charged to income account No. 541, joint facility rents, and credited by the receiving carrier to income account No. 508, joint facility rent income.

"When the amount paid for the use of joint facilities is based upon a rate per ton mile, rate per train mile, or upon a lump sum basis, such amount embracing the cost of maintenance, operation, taxes and rentals the respective carriers interested should jointly agree upon the division among the joint facilities expenses and rental accounts involved before bill is rendered by the operating carrier.

"Amounts collected by an operating carrier for rent of rooms in stations, restaurant, news stand, or other privileges and concessions in stations, storage, parcel room receipts and analogous items, in facilities used jointly with other carriers, should include such receipts in the appropriate primary accounts in operating revenues and the amounts paid to the using carriers for a proportion of such receipts should be charged to operating revenue account No. 152, joint facility, Dr., and credited by the receiving carrier to operating revenue account No. 151, joint facility, Cr.

"Union depot, ferry, bridge and similar companies, operated for the joint benefit of tenant lines, the revenues, expenses, taxes and rentals being distributed upon a user or other agreed basis, should be accounted for as Joint Facilities.

"(Exceptions: Freight charges assessed at tariff rates by the operating company on materials and supplies used in the maintenance and operation of joint facilities shall be credited to freight revenue, and charged by the debtor company to the appropriate joint facility accounts in operating expenses. Payments or receipts on account of joint facility arrangements with electric railways or telegraph and cable companies shall be treated in the joint facility accounts by steam roads, regardless of the distribution by the other parties to the arrangement. When a joint facility is a terminal operation on one line and a road operation on the other, the amounts paid or received shall be charged or credited to "operating joint yards and terminals," or "Operating joint tracks and facilities" as may be appropriate for each carrier.)"

Standard Forms for Rendering Bills. The committee is of the opinion that a standard form for rendering of bills by firms from whom material is purchased is essential, and recommends the adoption of a form 8½ in. by 11 in. (Form No. 201). The adoption of a standard form for the purpose described should result in the supply firms printing their own supply of the standard form.

Electric Sorting and Tabulating Machines. Realizing the advantages to be derived from the use of mechanical devices in disbursement work, the committee has endeavored to ascertain to what extent electric sorting and tabulating machines are used in connection with work in disbursement offices. The investigation included all roads using or having used electric sorting and tabulating machines in disbursement work, so far as the committee could ascertain, but the committee was able to find but nine such roads.

The experience of these roads, however, may be an indication of the class of work on which the machines can be used, but it is not the intention of this report to express an opinion as to the merits or the disadvantages of the machines as applied to disbursement work, the report being a summary

of the replies received and is intended purely as a matter of information. The mileage of roads using the machines ranges from 1,053 to 9,581.

In order to operate under the system, it is necessary to devise a more or less elaborate system of number symbols depending upon the extent to which the machines are used; that is, accounts are designated by one set of numbers, states by another, operating divisions by a third, accounting divisions by still another set, etc., each class of information having a particular set of numbers assigned to it.

The information is punched on the cards by means of hand key punch or gang punch machines, the gang punch being used when the same information, such as dates, operating or accounting divisions, etc., are shown on a large number of cards and the cards may be punched with this information in advance. The detailed information such as account numbers, charges to accounts, etc., being punched on each separate card by means of the hand punch operated in the same manner as a non-listing computing machine.

The cards are of uniform size and thickness, being specially printed for use in connection with the machine system. Color schemes of cards are used to indicate sources from which the charges or other data are obtained, such as, one color for vouchers, a second for bills, a third for payrolls, etc., in order to be able to distinguish at a glance the class of expense or information contained on the card.

The regular equipment consists of hand key punch machines which are purchased outright; electrically operated sorting machines by means of which the cards are sorted to obtain the required information and electrically operated tabulating machines through which the cards are run to obtain totals.

The sorting and tabulating machines are rented from the manufacturers at a specified amount per month. Additional equipment consists of gang punch machines by means of which a number of cards all having the same information may be punched at one time and proof punching machines, hand operated in the same manner as the key punch machines, by means of which errors punched in the original card may be detected before running through the tabulating machines.

The investigation covered nine roads having had the machines in operation for periods ranging from one to nine years, the maximum full equipment employed being four sorters and eight tabulators; the minimum being one sorter and one tabulator, although one road which confines the operations to bills, vouchers and material accounts, is doing the work on the equipment of another office and using the machines only part of the time. One other road, which confines the work purely to a record of equipment, is doing the work on the equipment of one of the other accounting offices.

Five roads report using the machines for the distribution of all debits and credits to operating and other accounts from which the monthly analysis of operations is compiled, also compiling operating results by divisions.

One road distributes vouchers, bill and material charges and credits only, to operating and other accounts.

One road has equipped its largest shop with machines for assembling time of employees for payroll purposes and for the compilation of shop cost data.

One road compiles casualty statistics only, that is, loss and damage to freight, baggage and personal injury statistics by commodities, causes, districts, etc., by means of the machines, but has not extended their use to other branches of disbursement accounting, although the question of preparing statement of employees and their compensation by means of the machines is now under consideration.

One road reports using the machines only to obtain record of equipment for purposes of typing loose leaf unit record of locomotives and cars, the cards being used as a working medium for depreciation reports, annual and valuation reports, etc.

The replies received indicate that the roads using the machines extensively in disbursement work have divisional accounting in effect, the cards being punched from division reports, although in the material accounting one road uses a combination requisition and punch card, the material being ordered on information posted to the card and the card punched when received in the accounting office.

Five roads report distributing payroll charges and credits to accounts by means of the machines, one road distributing locomotive department payrolls only.

In addition to distributing charges, a number of roads have applied the machines to the compilation of the report of employees and their compensation, which is rendered to the Interstate Commerce Commission.

With the installation of the machines on such roads as used the machines extensively in distributing charges and credits, the former hand posted records by accounts were dispensed with and simple records of vouchers and bills showing only voucher number, brief description and total of the payment substituted.

Cards after having been punched are balanced against these records to insure correctness of punched amounts. Some roads, however, go to the extent of posting and footing account numbers, division numbers, etc., in the registers and totaling these same numbers on the cards by means of the machines as a verification of the correctness of the entire punching of the card.

It is claimed that it has not been necessary to install additional records except assembling sheets because of the elimination of the former hand posted distribution sheets and that the elimination of these former detailed records has not resulted in any difficulty in obtaining additional information when required at a future date.

No reconcilements of outstanding amounts are arrived at by means of the machines, the simplified voucher and bill registers being used for this purpose.

Extensive casualty statistics are prepared by one road covering loss and damage to freight and baggage and personal injury accounts and the preparation of individual locomotive repair costs by another. Aside from these two roads, so far as the information furnished indicates, no statistics are compiled by means of the machines except those relating to the distribution of operating expenses by accounts divided between freight, passenger and undivided for the I. C. C. report, and further subdivided by states. In addition to this, wage statistics for the I. C. C. are arrived at through the medium of the machines. In distributing to operating accounts by states and operating divisions, it is claimed that it is necessary to punch but one card, although one road reports the necessity of punching a separate card for each account when handling material distributions.

All roads report a saving through installation of machines. Some claim a material saving and others no material saving but better results being obtained. It is claimed that in one instance the machines were installed to meet special requirements which could not otherwise have been obtained except at prohibitive cost. It is also claimed that results have been satisfactory, the machines assisting materially in obtaining figures at an earlier date than they otherwise could have been obtained and that additional information can be obtained at a minimum cost.

One road, however, reports having installed the machines in the disbursement office and in one of the large shops, but after a short period dispensed with the machines in the disbursement office, claiming the volume of work was not great enough to justify their continuance. They were, however, continued in the shop for payroll and shop statistical purposes.

Where the machines have been continued it is claimed

that the principal advantages are the saving of time and expense in the accumulation of original data and the compilation of additional data when called for at a later date and the elimination of errors. It is claimed that no difficulty has been encountered in obtaining additional data after a lapse of time.

The principal disadvantage seems to be in that the large volume of cards requires considerable filing space, also the possibility of misfiling cards and careless handling results in frayed edges making it necessary in some instances to repunch cards. Some roads have overcome this by placing a special file clerk in charge of the cards. This disarrangement of the cards, misfiling, etc., has apparently resulted in some confusion at times.

One road using the cards for equipment purposes finds it necessary to insert certain information on the card with pen and ink or typewriter because of the various purposes for which it is used. It is claimed by one road that where only one class of information is required, machines will accomplish no saving but will prove a disadvantage.

On some roads the practice has been to punch one card for debits and another card for credits, totaling each and deducting one from the other. This has been overcome by at least one road by the use of complements in the handling of credits, that is, punching the 9's up to the first figure in the amount of the credit and subtracting the balance except the first unit from 9 and punching those figures, subtracting the first unit from 10 and punching it. By so handling the credits automatically deduct themselves.

Analyzing Charges for Operating Expenses. The committee recommends, as a means of providing a check of the charges to the primary accounts under the account operating expenses, or to suspense accounts, the use of a blotter especially designed to afford a comparison of the total monthly charges to such accounts, the current accounting period with preceding ones. The blotter suggested takes the form of columnar sheets of twelve and fourteen columns, the columnar headings being the primary operating or other accounts, number and title, and the left hand marginal reference the twelve months of the fiscal year, provision being made for semi-annual sub-totals. Such a blotter to be used in conjunction with a ledger sheet for each of the primary operating or other accounts, to which shall be posted, for condensing and analytical purposes, the charges from pay-rolls and the items appearing on bills, vouchers, etc., with suitable description and document number reference from which totals may be posted to the proposed blotter.

That the blotter suggested may be extended, if desired, to provide separate sets of sheets for each of the several sources of charges, namely, payrolls, vouchers, bills, etc., likewise to provide for a sub-division of the sources of charge according to accounting districts. The ledger sheets, if the blotter is so extended, should carry column headings corresponding to accounting districts, also suitable space for grouping the postings according to sources of charges, and inserting sub-totals by sources of charges for convenience in posting to blotter.

The report was signed by H. W. Johnson, chairman.

President's Address

A. D. McDonald
Vice-President Southern Pacific

The reports of your various committees contain detailed and enlightening accounts of the things accomplished during the year, and the enormous amount of work performed. Both on your behalf and on my own, I thank most sincerely the committeemen and chairmen for their excellent work; and our genial and efficient secretary and his associates. It would be helpful for our secretary to make a brief annual report summarizing the year's work and giving us the benefit of his observations, as he is in more intimate touch with our affairs than any one else.

Commissioner Eastman has told you of the plans of the Interstate Commerce Commission with respect to the revision of the accounting rules. No one denies the advantages of uniform accounting, but I seriously doubt whether these rules should be changed materially at this time. We have had many changes in the past. Some of these have disturbed and destroyed comparisons; and while changes in accounting rules to keep pace with the times are as necessary as the pruning of an orchard, I hope that the commission will proceed slowly. I am not so sanguine as to believe that our rules will ever be perfect, neither do I advocate that the commission remain idle, but I do believe that the commission should not issue a revised set of accounting rules before January 1, 1922. Meanwhile, I think it desirable that the members of this association should continue the study of the rules that was begun at the request of the commission after last year's meeting; and that, from time to time they should submit to the secretary suggested changes. The representatives of the commission also, particularly those in the field who are in daily contact with the application of the rules, are in an especially favorable position to propose changes. After we reach a normal basis in the daily routine of our business affairs at home, the representatives of the commission and a committee of this association should get together to study and "Fletcherize," so to speak, the recommendations submitted, and then should take up the work of revising the rules. I see no difficulties that can arise from so conservative and judicious a procedure, but I do see difficulty if the commission rushes ahead and issues new classifications of rules that are to become effective before January 1, 1922. I fully realize that knowledge comes of doing, and that never to act is never to know, but if this work is rushed now, it will only mean that later on more changes will have to be made, with the result that comparisons will be further destroyed.

A vital question in the minds of many of us has always been, how far the Interstate Commerce Commission should go in prescribing rules to produce uniform accounting. Little discernment is needed for one to know that in many respects the accounts of railroads are not kept in a uniform way. As pointed out by Commissioner Meyer in his letter that was read at yesterday's session, our experience during Federal control brought this fact to our attention more forcibly than ever before. Though the commission should not go to the extreme in prescribing rules that will produce uniformity, I do believe that it ought to go further in that direction than it has hitherto gone. We all know that revenues are not accounted for by all railroads in a uniform manner; we know that each railroad has its own method of keeping agents' accounts; we know that various practices exist with respect to the cash and material accounts; we know that accounting for taxes, for the so-called depreciation on equipment, and the retirement of property is not handled uniformly on all lines; and we also know that other methods differ to a greater or a less extent.

In the past it has been one of our few privileges to arrange our office and inter-department methods and, to a limited extent, our inter-road methods, in accordance with our own ideas and judgment. While I dislike to advocate that we surrender these privileges, it does seem to me that in the interest of uniform accounting we shall have to revise some of our ideas to conform to the spirit and the requirements of the times. To progress, we must understand the thoughts, the desires and the purposes of those to whose rules and orders we are subject, and of those with whom we live and associate.

If we had uniform accounting in connection with all the things I have mentioned, many advantages would accrue, and I hope to see the day when this association shall have in

print a book, outlining in detail standard instructions and samples of forms covering railroad accounting in all its branches. Local conditions will always require special treatment, as for example, a particular railroad handles certain accounts at divisional headquarters; but, subject to some exceptions of this kind, uniform accounting could, and should be universally adopted.

The past year has been an eventful one in the railroad world. The most important occurrence, and one which gives special significance to our meeting this year, was the passage of the Cummins-Esch railroad bill. Owing to the almost unlimited powers granted to the Interstate Commerce Commission under this act, we enter upon a new era in railroad history, and certainly no man can say definitely what the outcome will be.

[The speaker here referred to the report of General Counsel Thom on the Cummins-Esch bill, and continued.]

The carriers are on trial, because an effort has been made to extend to them help of a substantial character in the performance of their public duties, and public opinion will hold them to a strict accountability for the fidelity and efficiency with which these duties are performed. The great lesson to be drawn from Mr. Thom's statement is that the interests of the three agencies—the commissions (representing the shippers, the consumers, and the general public), the labor unions, and the railroads—are identical, and that they are partners in this great enterprise. Upon the success or the failure of their efforts depends not only the future ownership of the railroads, but also, in my opinion, the very future of our form of government.

There is an old, old story of an Arab who desired to test which of his three sons loved him best. He sent them out to see which of the three would bring him the most valuable present. The three sons met in a distant city and compared the gifts they had found. The first had found a rug on which he could transport himself and others whithersoever he would. The second found a medicine which would cure any disease. The third found a glass in which he could see what was going on at any place in the world. The third used his glass and saw his father ill in bed. The first transported all three home on his rug. The second administered his medicine and saved his father's life. Now, the perplexity of the father when he had to decide which son's gift had been of most value to him, illustrates very fairly the difficulty of determining what particular interest is most essential to the success of this experiment in conducting the railroads. Just as the old Arab's life could not have been saved without the co-operation of his three sons, just so, in my opinion, the life of the railroads cannot be saved unless these three interests—the commissions, the labor unions, and the railroads—co-operate. Let us hope that all these interests have been made wise by experience, and that as we stand today in a wider world we shall move forward with a more conscious purpose along more open ways.

While in years gone by some of us have looked upon these meetings as a short vacation, I conceive that you are all here this year because you are thoroughly alive to the new condition of affairs that confronts us. I conceive that you are here because you know the welfare of this association to be inseparable from the welfare of the railroads, and I conceive that you are here because you feel that in order to meet the changed conditions it may be necessary for this association to propose some changes in our accounting methods and practices. Never before in railroad history have questions so vast, so complex, and so fraught with trouble, presented themselves; and I most heartily concur in Mr. Commissioner Eastman's statement that in this mighty upheaval this association is bound to play a large and important part in pointing to the right and proper way out of many of the difficulties. Gentlemen, I feel that the dawn of a more glorious day has risen upon our profession. This faith is not a mere delusion. It is a living faith, arousing in each of us the impulse to strong and persevering effort, and spurring us to honorable exertion.

This association has accomplished a great deal in many directions, but much still remains to be done. The changed conditions brought about by the recent legislation, imperatively demand more intelligent work than ever before. New situations have been created, new relations established, and it is the office, and should be the purpose, of this association to assist in every way to regulate and systematize the accounting affairs of railroads so as to produce the best possible results. I repeat, that I do not believe in violent changes at this time, nor do I expect them. As new situations develop, we must dispose of them in an orderly way and not allow ourselves to become stampeded. As you cannot transplant a tree frequently and expect it to bear fruit, so you cannot continually make radical changes in accounting rules or in anything else and expect the best results. Whatever we think of the past, whatever we may fear or hope for the future, we should turn that experience and practical sense which have developed our accounting methods to their present high standard, to the cultivation and development of whatever systems or methods this new railroad era may require. Here and now, if ever anywhere at any time, there is need of wise counsel, and our work henceforth should be characterized by the same keen relish for high enterprise and love of excellence that has inspired and guided us in the past.

Election of Officers

After the president's address the election of new officers was held, and J. G. Drew, vice-president of the Missouri Pacific and first vice-president of the Railway Accounting Officers' Association, was elected president of the association, succeeding A. D. McDonald. J. J. Elkin, Controller of the Baltimore & Ohio, and second vice-president of the association, was elected first vice-president; and L. G. Scott, vice-president and controller of the Wabash, was elected second vice-president of the association.

Three new members of the executive committee to serve two years each were elected: E. A. Stockton, controller of the Pennsylvania Railroad; A. P. Foss, controller of the Maine Central, and Charles A. Lutz, vice-president of the American Railway Express. F. W. Charske, controller of the Union Pacific, was also elected a member of the executive committee to serve one year.

A Co-operative general store has been started by employees of the Union Pacific at Junction City, Kan., with the intention of meeting the high cost of living. The organization is capitalized for $5,000 and 80 per cent of the stock is owned by railroad employees. The railroad company has no interest in the store. Goods will be sold to the stockholders at wholesale prices, plus overhead expenses.

John H. Milburn, office engineer of the Baltimore & Ohio, has been appointed representative of the American Railway Engineering Association on the Advisory Council to the United States Board of Surveys and Maps. This council will be composed of one representative from each of the major engineering associations and will function in behalf of the public with the newly created board of surveys and maps of the federal government.

Handling Freight in New York.—As an example of the merchants' difficulties in New York during the past month, it is reported that a marketman of Manhattan, running short of meat, was informed that perhaps he could get a consignment which had arrived from the west by going across the Hudson river with his truck and taking the meat from the refrigerator car in the freight yard. This he did, but to get the meat to his wagon he was obliged to take it out through the hatches in the car roof and carry it across the roofs of 15 cars on 15 tracks.

Another Study of Transverse Fissures

The Interstate Commerce Commission has just issued a report prepared by the chief of the Bureau of Safety on the derailment of a freight train on the Chesapeake & Ohio near Hardware, Va., on January 7, 1919, which resulted in the death of two employees. The derailment was caused by the failure of a 90-lb. rail in which a number of transverse fissures were found. A study of this rail was made by James E. Howard, engineer-physicist of the commission, whose conclusions are summarized briefly as follows:

Investigations on the occasion of different previous accident reports have defined the strains and stresses which are peculiar to and inherent in rails, conditions which are inseparable from the method of carrying heavy loads on wheels. All rails are subject to internal strains which wheel pressures induce. Independent of such other indications as there may be, which are indexical of the properties of the steel, failure, whenever it occurs, is the result of overstraining forces. There are two comprehensive questions in the rail problem, namely, what are the loads or stresses which rails can endure successfully, and what are they required to do in service.

All rails are exposed to substantially the same kind of stresses, differing, however, in degree. Information, based on reliable track data, is needed to point out definitely what conditions of service are present which lead to this type of fracture in rails which have passed prescribed specifications and have been accepted as satisfactory rails. If the tests for acceptance are inadequate for their purpose, provided relief lies in that direction, they should be modified along the necessary lines to accomplish their purpose.

Or, if the limit of endurance of rails has been reached, that fact should be made clear. Since it is a question of degree in all cases when steel fails under stresses, the relation between the ability of the rail to sustain long-continued stresses and the permissible weight of equipment should be established.

The discovery of shattered zones in the heads and bases of rails gave encouragement, for a time, that a cause for their early failure, or premature failure it might be called, had been found, the elimination of which would restore a margin of safety in rails, in locations where they are now breaking. Whether these hopes will in a measure be realized it is yet too early to state. The display of transverse fissures in rails in which diligent search has so far failed to reveal shattered metal indicates their development is not basically dependent upon the presence of this particular defect.

In the investigation of rails which have failed by transverse fissures attention has been directed intensely to their physical properties and structural state. The results have brought about a clearer conception of the phases through which rails pass, which may be held as precursors to rupture. No common physical defect has been discovered to the presence of which transverse fissures may be ascribed. Some grades of steel are more prone than others to develop such fractures. The interior origins of transverse fissures are explained by the engineer-physicist on physical laws.

Whether rails are likely to fail by transverse fissures or not appears to depend upon track conditions being unfavorable or favorable. With such abundant opportunities as are afforded by the combined efforts of the railroads of the country to acquire the necessary information, this phase of the subject should be actively entered upon and brought to a conclusion. In respect to the presentation of data upon transverse fissured rails it is felt that information upon the relation of equipment and service conditions to their formation has not kept pace with the investigation of the physical properties of the steel, a deficiency which calls for early correction.

I. C. C. Creates Bureau of Finance

W. A. Colston, of Louisville, Ky., heretofore general solicitor of the Louisville & Nashville, was sworn in on May 10, as director of the newly created Bureau of Finance of the Interstate Commerce Commission. The director of finance, according to the commission's announcement, will be charged with the supervision of the financial activities and duties placed upon the commission by the transportation act, approved February 28, 1920, including certificates for disbursements from the revolving fund of $500,000,000 provided for by section 210 of the act, the issuance of all railroad securities after 120 days from the date of approval of the act, the regulation of intercorporate relations of interstate carriers, the plan for the consolidation of the railway properties of the United States into a limited number of systems, the recapture of excess earnings of railways and the financial arrangements involved in the building of new lines and abandonment of old lines of railway.

Col. W. A. Colston

Mr. Colston has been connected with the Louisville & Nashville Railroad for nearly 30 years, having entered the service of that company in 1891 in a subordinate capacity and having advanced through various grades to the position of assistant controller in active charge of all the records, accounts and statistics of the company. From his position as head of the accounting department he was transferred to the law department of the company as commerce attorney and upon the death of the late Albert S. Brandeis about seven or eight years ago succeeded to the position of general solicitor of the company. Mr. Colston brings to his new position a broad experience both in accounting and in law, with particular reference to the traffic, operating and financial affairs of railroads, and is therefore peculiarly fitted for the position which he has assumed.

Mr. Colston has also had a wide experience in the military service of his state and of the United States. During the Spanish War he served in Porto Rico as a captain of the First Kentucky Infantry, U. S. Volunteers. He has been a commissioned officer in the National Guard of his state for about 25 years and during the Mexican border troubles served in the El Paso district as colonel of the First Kentucky Infantry in federal service. Upon the declaration of war with Germany, his regiment was converted to artillery and he served as its commanding officer under its new designation, 138th Field Artillery, both in this country and in France. He returned from France in command of the 63d Field Artillery Brigade and upon muster out of the service resumed his old duties as general solicitor of the Louisville & Nashville Railroad Company, which he pursued until his appointment by the commission as director of finance.

The Philadelphia Electric Company, during the first weeks of the railroad strike, used up its coal so closely that at one time there was only a single day's supply on hand, and the stock was replenished only by fifteen employees from the company's office going out and manning freight trains to bring in the needed coal.

Commission Asked to Exercise Emergency Powers

Railroad Executives Say Transportation Conditions Require Action Similar to That During the War

WASHINGTON, D. C.

EXERCISE of the emergency powers conferred upon the Interstate Commerce Commission by the car service section of the transportation act to assist the carriers in dealing with the developing transportation crisis resulting from the shortage of equipment and other facilities that has accumulated during the war period and emphasized by the switchmen's strike, was formally requested in a petition filed with the commission on May 15 by the executives of 23 railroads. The carriers represented to the commission that they are unable themselves to deal adequately with the situation, and desiring to do their full duty, felt it necessary to take advantage of the powers placed in the hands of the commission which are not available to the railroad organizations, particularly for the purpose of establishing legal preference and priority in the movement of food, fuel and other vital commodities essential under present conditions.

The petition was presented to the commission by Alfred P. Thom, vice-chairman and counsel of the Association of Railway Executives, and R. H. Aishton, president of the American Railroad Association, at the request of the advisory committee of the executives' association. The advisory committee had held a meeting in New York the day before to discuss operating conditions and the work of the Commission on Car Service, whose organization it was decided to enlarge, and the appeal to the commission was decided upon at that time, some of the signatures to the petition being obtained by telegraphic authority.

Possibly the determination to call upon the commission was influenced to some extent by the likelihood that the commission would itself decide to make use of its authority and by a feeling that, as the relief could be given in no other way, valuable time would be gained by asking it to do so before conditions became any worse. The commission made no immediate announcement of a plan of action but made arrangements for a conference with railroad executives and operating officials to be held on Wednesday, May 19, and it issued the following public statement:

"With reference to the annexed petition, which has today been received and filed, the Interstate Commerce Commission is proceeding actively with steps toward the effective exercise of the powers and duties cast upon it in such emergencies, to afford such relief as may be possible in the present situation."

The Railroads' Petition

The Chicago, Burlington & Quincy Railroad Company, Chicago, Milwaukee & St. Paul Railway Company, Chicago & North Western Railway Company, Southern Pacific Company, Northern Pacific Railway Company, Pere Marquette Railway Company, St. Louis-San Francisco Railway Company, New York Central System, Boston & Maine Railroad Company, Pennsylvania System, Illinois Central Railroad Company, Colorado & Southern Railway Company, and Fort Worth & Denver City Railway Company, for themselves, and in behalf of such other railroad companies as may join in this petition, and generally in behalf of the railroads of the United States, represent and show to the commission that there is at the present time, and has been for some weeks past, an emergency because of shortage of equipment, congestion of traffic, and insufficiency of railroad labor, which has assumed such serious proportions as to justify and require the exercise by the commission of the emergency powers granted and imposed upon it by Section 402, paragraphs 15, 16 and 17 thereof of the transportation act, 1920, in order to afford the necessary public relief and enable the carriers of the country under the orders and direction of the commission to immediately adopt, and so long as the emergency continues, continue to apply the methods of transportation necessary for that purpose.

Petitioners further represent that although the railroads of the country are urgently in need of large numbers of additional freight cars and locomotives, there is no immediate opportunity of procuring the same in time to be available during the present emergency, and therefore relief in the movement of those commodities most essential at the present time, namely, food and foodstuffs, perishable products, livestock, coal, newsprint paper, etc., can only be afforded by the current daily use and movement in the most effective manner of the existing equipment. Under present conditions, it will require many months to provide the needed additions to equipment and power, and a much larger capital outlay than the carriers are now able to provide.

Petitioners further show that there is an enormous volume of traffic of all kinds awaiting movement; there still remains to be moved a considerable portion of the agricultural products of the year 1919, and the new crop of the present year will in certain sections of the country begin in the near future to be offered for shipment. There is general need in almost all sections of the country for the movement of coal, not only for current purposes, but for the accumulation of necessary stores and reserves for the coming winter, especially in movement to lake ports of the coal to be moved by water to upper lake ports, before the end of navigation.

Petitioners further show, that resulting from conditions developed during the war, there is, and has for some time past, been a general shortage of competent railroad labor, recently made more pronounced because of the unwarranted and illegal action of large bodies of certain classes of railroad labor who have suspended work, thereby adding to the difficulty of maintaining full operations of the railroads, and contributing to the growing public distress on account of the delay in the movement of the necessary products and raw materials of the commerce of the country.

Under these conditions, which promise to continue for some period of time, the public interest requires, and the carriers are entitled to ask, the exercise of the emergency powers granted to the commission by the transportation act, 1920, aforesaid, so that:

(1) Necessary food, fuel, and other vital commodities directly affecting the cost of living and the life and comfort of the people, may have preference and priority in movement;

(2) That empty equipment, particularly box, refrigerator, stock and coal cars needed to move these commodities may have like preference and priority in movement to those sections of the country where they are currently required for loading;

(3) That for these purposes, and under the orders and direction of the commission, the carriers may be authorized, so far as necessary, to postpone or delay the loading and movement of other less important commodities, including as and to the extent that may from time to time be necessary the reduction of existing passenger service, and generally to take such other action as the commission under the exercise of the powers aforesaid may find proper and necessary, to currently meet the conditions aforesaid;

(4) That to the extent the commission may find neces-

sary and may by order authorize, the carriers may be relieved from the operation of federal and state laws and orders recognized as ordinarily effective during normal transportation conditions and governing the service of the carriers in the usual and ordinary conduct of their public service, so that in adopting and carrying out the orders issued by this commission during the present emergency, the carriers may be protected against penalties and complaints which would otherwise accrue, and be enabled to lawfully adopt and currently apply the necessary emergency measures as the commission may order to relieve present conditions.

Petitioners and all carriers have, and currently maintain, records of car location, movement, orders for cars for shipment of commodities, and generally all data and information necessary for an understanding of the facts upon which this petition is presented, and tender the use of the same and such other aid and assistance as may be helpful to the commission in the framing and administration of such orders as from time to time it may issue in this matter.

WHEREFORE, petitioners in their own behalf, and in behalf of all carriers, joining herein, pray that this proceeding under the summary and expedited power contained in Section 402, paragraph 15 of the transportation act, 1920, be set down for immediate hearing and investigation, and without formal summons or notice, excepting as same may be publicly given to other public authorities, shippers and other carriers, and without further formal pleading or answer, and that thereafter, and from time to time as may be necessary, the commission enter its order or orders giving directions and requiring such preference or priority in transportation, embargoes and movement of traffic under permits, including equally the necessary empty cars required therefor, together with such just and reasonable directions as present emergency conditions may require with respect to car service without regard to the ownership as between carriers as in its opinion will best promote the movement of those commodities and the empty cars therefor most needed to relieve present conditions and generally such further orders and directions in the premises as may be required to enable the carriers to more promptly and effectively furnish the transportation necessary to serve the public, so long as these conditions continue.

The petition was signed by Hale Holden, president, Chicago, Burlington & Quincy; H. E. Byram, president, Chicago, Milwaukee & St. Paul; W. H. Finley, president, Chicago & North Western; J. Kruttschnitt, chairman of board, Southern Pacific; Howard Elliott, chairman, Northern Pacific; E. N. Brown, chairman, Pere Marquette; E. N. Brown, chairman, St. Louis-San Francisco; A. H. Smith, president, New York Central System; J. H. Hustis, president, Boston & Maine; W. W. Atterbury, vice-president, Pennsylvania; C. H. Markham, president, Illinois Central; Hale Holden, president, Colorado & Southern; Hale Holden, president, Fort Worth & Denver City; S. M. Felton, president, Chicago Great Western; E. J. Pearson, president, New York, New Haven & Hartford; C. L. Bardo, president, Central New England; W. H. Truesdale, president, Delaware, Lackawanna & Western; W. H. Bremner, president, Minneapolis & St. Louis; J. B. Tigrett, president, Gulf, Mobile & Northern; N. D. Maher, president, Norfolk & Western; J. L. Lancaster, president, Texas & Pacific; W. S. Palmer, president, Northwestern Pacific; J. M. Herbert, president, St. Louis Southwestern.

Thomas De Witt Cuyler, chairman of the Association of Railway Executives, authorized a statement in explanation of the action of the roads in part as follows:

"There exists today a menacing shortage of cars and transportation due to restricted building of equipment during the war; to the unusual degree of equipment requiring repair; to the wide dispersion of equipment during the period of federal control; to the heavy traffic in all kinds of commodities; and all of these elements greatly complicated and emphasized by the recent switchmen's strike. In the opinion of the railroad companies, the situation is such as to warrant and require emergency action similar to that taken when this country entered the war.

"Without the exercise by the Interstate Commerce Commission of its emergency powers, the railroad companies are themselves not able to afford the relief necessary because they are subject to general laws, federal and state, governing transportation, and cannot legally prefer traffic except under very limited conditions, nor discriminate between shippers, sections of the country, or commodities. The unauthorized switchmen's strike, added to the general scarcity of labor, reduced available operating forces so that all of the transportation needed, including the movement of empty cars, cannot now be supplied. As a result the food and fuel situation is assuming threatening proportions, increasing the cost of living and affecting the banking and credit conditions throughout the country in a manner requiring immediate relief."

The issuance of orders by the commission itself in the near future had been looked upon as a possibility for several days, following a change in its organization by which Commissioner C. B. Aitchison was placed in charge of car service matters in place of Commissioner H. C. Hall, who was placed in charge of the law division. E. E. Clark, who was recently elected chairman of the commission, was in charge of the law division. The commission had been keeping in close touch with the developments as to car shortage and congestion both by the flood of complaints received from shippers and through its Bureau of Service and by conferences with the officials of the Commission on Car Service and after Mr. Aitchison had been given direction of service matters about 125 of the commission's safety appliance inspectors were called upon to submit reports on transportation conditions. The commission had not yet built up the organization of its own Bureau of Service and had started out with a policy of not issuing orders on its own authority but of co-operating with the railroads' own organization as long as such a policy seemed sufficient.

Thus far the Commission on Car Service has been working on a temporary basis, with only a small organization as compared to that which it had in 1917, although plans for strengthening and enlarging it have been under consideration. The commission has been issuing relocation orders to various roads directing them to deliver a certain number of cars of a given type to other roads at specified junction points at the rate of so many a day, and it has been keeping in touch with the situation throughout the country for the purpose of making the necessary orders to take care of the most pressing requirements. It has also been devoting attention to the relocation of cars in accordance with ownership in so far as it could be done without undue empty movement, but particularly for the purpose of getting particular types of cars back into the territory where they were most needed. There have been large numbers of coal cars in the West which are owned and are particularly needed in the coal-loading territory in the East and large numbers of western box cars have been caught in the congestion in the east.

The congestion which existed at the time the roads were returned to their owners on March 1, resulting from severe winter weather, was being gradually overcome and a slight improvement was being made in the direction of reducing the car shortage when the "outlaw" switchmen's strikes began about April 1. While the strikes as such have been practically at an end for some time and a majority of the men have either returned to work or had their places filled by others, even a restoration of normal activity has been insufficient to make up for the accumulated loss of work and the accumulations of loaded cars resulting from the strikes have slowed up the movement since. According to railroad men who have been in Washington recently large numbers of the strikers

have left the railroad service to take other jobs, many of them, particularly in the larger cities and industrial centers, at considerably higher wages than those paid by the railroads for yard service.

Asked to Exercise Emergency Powers

Reports from individual railroads received by the Commission on Car Service and by the Interstate Commerce Commission indicate that the peak of the congestion was about April 24, since which time the situation has shown a gradual improvement. Figures showing the number of cars moved each day began to fall rapidly during the first part of April, beginning on April 5, while the figures showing cars on hand to move correspondingly increased. Since about April 15, however, the number of cars moved daily has increased until the latest reports show a return to the normal condition, or at least to the condition as it existed before the strike, while the number of cars on hand to move has been showing gradual decreases. In the case of many roads the number has been reduced to that of the period before the strike, although on many other roads handling the normal number of cars has not yet been sufficient to reduce the accumulation.

The Commission on Car Service has issued the following summary of general conditions as of May 13:

Accumulation Being Reduced

The accumulations of cars to be moved on April 2, according to reports, amounted to 93,019, as compared with a normal of perhaps 30,000 to 40,000. On April 24, after the strike had been in effect for nearly three weeks, the accumulation was 269,069 cars, but on May 8, the date of the latest report, it had been reduced to 201,392. In February, 1918, shortly after the government took over the railroads, the accumulations amounted to 206,000, and the lowest record of recent years was on May 30, 1919, when the total was only 20,000.

Box Cars.—Shortage of box cars in Central and Northwestern territory continues. Strike conditions have impeded the relocation of box cars to the territories in which shortages exist, to an extent that will provide effective relief. The situation is improving and it is expected a regular and continuous movement of empty box cars can be started and maintained within a short period. Empties in increased number are being moved out of the south and southeastern territory to Ohio, Indiana and the Northwest. Demands are increasing daily, and all roads should continue the suggestion made in the general summary April 16. Ventilated box car requirements are heavy in the southeastern section and increasing in the southwestern and California section, and situation is such special action should be taken by roads to see there is no undue delay to this equipment, and handled strictly in accordance with Circular CCS-20, withdrawing this equipment from general service.

Automobile Cars.—Demand continues heavy and in excess of the supply. Considerable equipment of this class has been delayed in movement due to labor disturbances, and special attention should be given the prompt movement in accordance with car service rules and special instructions.

Flat Cars.—Flat cars should be used only for loading commodities that cannot be accommodated with other types of cars. Give special attention to movement and repairs. This equipment should be handled strictly in accordance with car service rules and special instructions.

Stock Cars.—To adequately protect stock car requirements, which are particularly heavy in Texas and at market centers, it has been necessary to withdraw this class of equipment from general service in the territory formerly comprising the Eastern and Allegheny regions, and roads in the southwestern section. There should be no undue delay in forwarding this equipment to live stock loading territory with due regard to car service rules.

Refrigerator Cars.—While no serious shortage is reported from any district, the prospective movement is heavy, and with the unavoidable delays already encountered in the movement of empties, we are practically certain to face shortages, not only in California, but also in the Southeast. Heavy cantaloupe movement from Imperial Valley now starting and miscellaneous refrigerators ordered to California. Packing houses are short of private equipment, but we are not now able to give them much assistance from supply of railroad cars.

Open Cars.—The production of bituminous coal during the first half of May showing a slight improvement over the month of April reflects the extraordinary efforts which the railroads are making to provide a favorable car supply. Continuation of labor difficulties has very seriously affected the ability of all roads, particularly the lines east of the Mississippi River. The movement of lake coal and ore started with the formal opening of navigation on May 3, and it is of tremendous importance that open top equipment owned by the lines serving Lake Erie ports be promptly returned to home rails. Circular CCS-9 was framed to accomplish this, and while some progress has been made, as indicated by percentage of increase in number of home cars on home rails of the Lake lines involved, there should be no relaxing in our efforts if the unusually heavy program planned for this year is to be successfully carried out. Mill gondola situation continues serious and it is urgently necessary that this type of equipment be handled as expeditiously as possible in the direction of the steel mill districts. Miscellaneous commodities are being reasonably well protected in car supply. With the increase in road building activities there is a corresponding increased demand for cars to protect movement of sand, stone and gravel. Every consistent means should be taken to accord these commodities their share of transportation.

As a response to numerous queries as to what it proposed to do in regard to the petition presented by the railroads, the Interstate Commerce Commission on May 17 issued the following:

"For the purpose of developing accurately the situation as to car shortage and traffic congestion throughout the country, the Interstate Commerce Commission has, for several days past, been utilizing fully the services of about a hundred of its safety appliances, hours of service, and locomotive inspectors at the important terminals in the country.

Reports received by wire from these inspectors are taken up by the commission promptly with the carriers affected or with the American Railroad Association for attention. The commission is in close touch with the reports received by the Car Service Commission of the American Railroad Association. Today the commission requested by wire the co-operation of the respective state railway and public service commissions in developing the actual situation in each of the states.

"In the last few days complaints and requests for assistance have been received from shipping interests throughout the country, by letter, by telegraph, through members of Congress, and by personal appeal. These have been handled immediately with the carriers, and in many instances the inspectors of the commission have been employed upon the ground to help break the jam at some congested point.

"The commission today advised the Ore and Coal Exchange, with headquarters at Cleveland, Ohio, that there is a present necessity for co-operation between the carriers and shippers in handling coal and ore upon the railroads and lakes, along the lines followed in 1918, by means of the creation of an effective coal and ore pool, saying that the record shows that continuance of existing arrangements means far-reaching hardship and perhaps disaster, and suggesting that as an initial step the interested parties should

re-establish immediately a similar arrangement to that in effect in 1918.

"Many requests have been received for information as to whether the commission contemplates hearings upon the application filed by numerous important railroads last Saturday, asking the commission to exercise its emergency powers under the transportation act. The commission does not contemplate the holding of any hearings in the immediate future; but it expects, from time to time, and as the facts develop, to give such directions as seem warranted and necessary."

Without waiting for priority orders, the railroads, with the co-operation of the commission, have taken steps to give preference to the movement of empty box cars westward and coal cars eastward. This has the effect of neglecting certain shippers, who would like to use the coal cars and box cars for other commodities and in other directions, and the roads would not have felt like doing too much of it without the backing of the commission. The commission issued the following statement on Tuesday:

"The movement of empty box cars, suitable for transportation of grain, continues in large volume from New England and the Atlantic seaboard states to the grain-producing regions of the Central and Northwest. These cars are being moved in solid trainloads, under expedited orders, and their movement is watched continually to avoid any preventable delay in getting the equipment where it is most needed. Simultaneously there is a movement in the reverse direction of trainloads of empty open-top cars suitable for coal loading, from the Middle West to the coal-producing sections of the East and Southeast. This expedited movement will be continued until a more proper balance of these classes of equipment is obtained, and should result in considerable relief both by providing foodstuffs and fuel where needed and by easing the financial strain resulting from the long-continued inability to move these commodities.

"Measures are under way for an intensive local study of the congested areas in important terminals and gateways, where, owing to the continuance of extremely unfavorable labor conditions and shortage of man power, or for other causes, the free movement of traffic is obstructed. This will permit the exercise of the emergency powers of the commission as to local situations in appropriate ways.

"More than one hundred inspectors of the Interstate Commerce Commission are actively in the field at the important terminals. There has been a general response by the state railway and public service commissions to the request of the Interstate Commerce Commission for information as to the conditions in each state. The state commissions are tendering the services of their inspectors to co-operate with those of the Interstate Commission in the present emergency."

The situation was further discussed with the commission on Wednesday afternoon for the purpose of considering the necessary steps to be taken by a committee of executives headed by Hale Holden, president of the Burlington, and including C. H. Markham, president of the Illinois Central; W. W. Atterbury, vice-president of the Pennsylvania; A. H. Smith, president of the New York Central; C. R. Gray, president of the Union Pacific; Samuel Rea, president of the Pennsylvania, and Alfred P. Thom, counsel for the Association of Railway Executives. There were present also R. H. Aishton, president of the American Railway Association; W. C. Kendall, chairman of the Commission on Car Service; C. M. Sheaffer, general superintendent of transportation of the Pennsylvania, and W. L. Barnes, general superintendent of transportation of the Chicago, Burlington & Quincy. The railroad men made some recommendations and after the meeting the commission made the following announcement:

"This afternoon the committee of railroad executives and R. H. Aishton, president of the American Railroad Association, met informally with the Interstate Commerce Commission as by arrangement, for the purpose of submitting their views as to the manner in which the emergency power of the commission should be exercised under the transportation act with respect to the relocation and disposition of cars. Hale Holden, president of the Chicago, Burlington & Quincy, presented the views of the executives to the commission. The executives contemplate, that in order to relieve the existing situation it is necessary that 20,000 box cars shall be relocated from eastern territory to the lines west of Chicago within a period of 30 days and that in the same period of time 30,000 open top cars shall be transferred from the middle west to eastern territory.

"It is suggested that it will be necessary to give preferred movement to these diversions of equipment, which are in the meantime being carried forward as rapidly as possible. The details of the orders will be considered by the commission and a decision reached as speedily as the complexity of the question permits.

"In the morning the Michigan congressional delegation representatives of the public utilities of Michigan and numerous public officials had a conference with Commissioner Aitchison and the Director of Service with respect to the pressing need of the public utilities of Michigan for coal, and asked that in any orders issued by the Commission respecting coal movement, public utilities should be given preferential consideration. They pointed out that there is in that section a serious mis-use of open top equipment and that in consequence of the inability of the lines south of the Ohio river to secure equipment from the rail lines serving them and their northern connections, gas plants and electric plants in Michigan were operating daily from hand to mouth, and that a number of them had been closed for periods from 2 to 8 days.

"The American Canners' Association has presented a request for priority for its shipments of box cars in the Pittsburgh, McKeesport and Youngstown district to load cars for growing crops and the canning of other fruit products.

"In connection with the movement of open top equipment back to the coal mines, considerable opposition has developed locally in certain districts because such movement interferes with the manufacture of cement and with the carrying on of road building plans."

While many newspapers have discussed the latest developments as pointing to a control over railroad operations by the Interstate Commerce Commission similar to that exercised by the Railroad Administration the indications are that the commission intends to proceed jointly with the railroads and to bring to bear all the co-operation possible on both sides, supporting the roads wherever possible in such action as is agreed upon as being necessary and advisable and exercising its independent judgment in such instances as it may fail to agree with the ideas of the railroads. To this end the commission is engaged in strengthening its own organization and is understood to be making arrangements for obtaining the services of several practical railroad men for work with its Bureau of Service, of which F. G. Robbins is director. Also the Commission on Car Service is to be enlarged to seven members, the number it had in 1917, representing various sections of the country, and arrangements are being made for locating district organizations of the commission in various parts of the country at the most important terminal centers and gateways.

The commission now consists of W. C. Kendall, W. J. McGarry and A. G. Gutheim. This week C. B. Phelps, formerly superintendent of transportation of the Louisville & Nashville, has been appointed an additional member, representing the Southeast, and additional members are to be appointed for the Southwest, Central West and Northwest.

W. L. Barnes, who recently resigned from the commission to return to the Burlington, has been appointed assistant to President Aishton of the American Railroad Association, in charge of car service matters with office at Washington. A

Boston office of the commission has been established, in charge of F. E. Dewey as district representative, a Chicago office was recently established with M. B. Casey as district representative and manager of the refrigerator department, and three district representatives are to be appointed.

Transportation Affecting Credit Situation

The effect of the transportation shortage on the credit situation, because of the tying up of credits in goods which ought to be moved but have been held back, was one of the principal topics of discussion at a conference of bankers from various parts of the country with the Federal Reserve Board at Washington on Tuesday. A committee was appointed with E. W. Decker as chairman, which called on the Interstate Commerce Commission on Wednesday morning and presented a resolution urging, as one of the most important remedies for the existing situation, that the commission and the Shipping Board "give increased rates and adequate facilities such immediate effect as may be warranted under their authority." In addressing the commission the spokesman for the committee said:

"The whole country is suffering from inflation of prices, with the consequent inflation of credit. From the reports made by the members of this conference, representing every section of the country, it is obvious that great sums are tied up in products which if marketed would relieve necessity, tend to reduce the price level and relieve the strain on credit.

"This congestion of freight is found in practically all of the large railroad centers and shipping ports. It arises chiefly from inadequate transportation facilities available at this time, and is seriously crippling business. We are informed that the per ton mile of freight increased in three years—1916, 1917 and 1918—47½ per cent, while the freight cars in service during the same period increased 1.9 per cent.

"A striking situation exists which can only be relieved through the upbuilding of the credit of the railroads. This must come through adequate and prompt increase in freight rates. Any delay means the paying of a greater cost, directly and indirectly, and places a burden on the credit system which in the approaching time for seasonable expansion may cause abnormal strain. Even under the load of war inflation, high-price level and extravagances the bank reserves would probably be sufficient if quick transportation would be assured during the time of the greatest strain."

A policy of general curtailment of bank credits except for the more essential purposes was also strongly recommended to the bankers by Governor Harding of the reserve board, who urged individual action by the banks to "check further expansion and to bring about a normal and healthy liquidation without curtailment of any essential industry."

The Michigan Congressional delegation also called on the Interstate Commerce Commission on Wednesday to ask that 500 carloads of coal per day be sent into the state for the relief of public utilities.

The transportation situation also was the principal topic of discussion at a conference of grain shippers, railroad officers, bankers and others called by Julius H. Barnes of the United States Grain Corporation on Wednesday to consider the steps necessary to be taken to prevent chaotic conditions when the grain corporation dissolves on June 1. C. B. Aitchison of the Interstate Commerce Commission told the meeting that the switchmen's strike is responsible for about 60 per cent of the transportation difficulty and that the labor situation on the railroads must be solved in some way. He said that the Interstate Commerce Commission is fully cognizant of the seriousness of the situation and that every effort will be made to give as much relief as possible. The principal requirement is that coal and grain will be moved and every possible effort is being made in that direction, but he expressed the opinion that it would not be at all advisable for the commission to issue blanket priority orders or to attempt to make up any list of non-essentials and indicated that it would be necessary to deal with individual situations, although it would doubtless be necessary to give priority to certain shipments. Meanwhile, he said, the conditions demand the utmost co-operation of the public.

The railroads were represented by Hale Holden, president of the Chicago, Burlington & Quincy; Samuel Rea, president of the Pennsylvania; and A. H. Smith, president of the New York Central. Mr. Holden said that the railroads are doing the best they can with the available facilities and pointed out that the railroads had been turned back to their owners on March 1 in an inadequate condition. He said that the appeal to the Interstate Commerce Commission did not indicate any relaxation of effort on the part of the railroads, but rather represented a call for all the help possible in meeting a difficult situation because the commission possessed powers which the railroads could not exercise on their own account. The representatives of the grain interests and of the bankers also emphasized the need for cars, not only for the handling of new crops, but to get the remainder of last year's crops to market and thus release credits.

The Senate on May 14 adopted a resolution introduced by Senator Reed of Missouri calling on the Interstate Commerce Commission to furnish the Senate at the earliest possible date information showing the causes for the present freight car congestion in the principal cities of the United States and what efforts have been, are being, or should be taken to relieve the condition and move freight promptly.

Railroad Unions also View Wage Delay with Alarm

OFFICERS of the 17 railroad unions on their arrival at Chicago on May 17 for attendance at the resumption of hearings before the United States Railroad Labor board on the question of general wage scale advances for the 2,000,000 railway employees, issued a statement expressing apprehension as to the effect of further delay in meeting the workers' request for increased wages.

"The country is face to face with the menace of a breakdown in transportation service," the statement declared. "Already the efficiency and safety of the service have been seriously impaired by the action of thousands of employees who voluntarily have quit to find higher wages elsewhere. The car shortage now threatening to stop the wheels of all industry in the country is one of the first effects traceable to the failure to provide the railway workers with a living wage. Moreover, railroad travel is becoming hazardous by reason of the reduction to almost one-third in the number of track walkers whose duty it is to guard the roads against causes of wrecks and other accidents.

"As the chosen representatives of the two million railroad workers we have every confidence that the decision of the Railroad Labor Board in the wage question with which it is now engaged will be equitable and just and arrived at with all possible speed. But, acutely conscious of the gravity of the situation in the transportation industry, we feel it our duty to acquaint the country with the essential facts.

"We have presented our case for a living wage for the workers. Expert opinion, predicated on incontrovertible facts, indicates that the lowest figure at which a family of five can be maintained in health and reasonable comfort is $2,500 a year. We have also submitted evidence proving that only 2½ per cent of the whole army of railroad workers are receiving a living wage today. This small percentage is composed almost wholly of division officials, general mechanical foremen and other supervisory groups. On the basis of what is accepted as the most accurate estimate of a bare subsistence level of earnings, which is $1,700 per year, 83 per cent of

the country's railway workers are attempting to maintain their families below a bare subsistence level. More than 600,000 railway employees do not earn in a normal working year $1,075, below which figure nearly three-quarters of the families are undernourished and seven-eighths are underclad.

"Here is the entire transportation system of the country, not with its unskilled alone below the level of subsistence, but with seven-eighths of its entire working force below this level, and a large proportion actually below the starvation wage. Whole classes—the largest classes in the railway service—must face the prospect of seeing their families without the barest necessities of physical well-being, while only a small proportion can look forward after nearly a lifetime of service to attaining an approximation to normal comforts.

"The average yearly wage paid to the entire number of railroad workers in the United States today is $1,280.30 for a normal working year of 306 eight-hour days, allowing nothing for sickness, emergency or irregularity of employment. Compared with $1,700, the lowest subsistence wage budget worthy of consideration, and $2,533, the Bureau of Labor Statistics' minimum comfort budget for Washington, D. C., this average alone should be sufficient to compel immediate relief for the railroad workers of the country.

"Under such conditions as we have here outlined it should not be surprising that officials of the various organizations of railway employees should find it difficult to maintain 100 per cent discipline within their ranks. Neither should it be strange that men are leaving the railway service and that other men cast respect for wage agreements to the winds in an effort to keep their families above the level of pauperism. Unrest in the ranks is naturally increasing, and increasing at an alarming rate.

"So great is the issue that there can be no question as to the practicability of paying rates which will make possible for 2,000,000 families a standard of health and reasonable comfort. A living wage is the only practicable answer to the present industrial situation. It is the only possible answer in terms of citizenship. Any other answer will only postpone the settlement until conditions render a real solution more difficult."

The Freight Situation at New York

THE GENERAL freight traffic situation is dealt with in a previous article in the shape of reports from Washington. In New York City and vicinity no marked improvement in freight movement can be reported, though there is the negative encouragement to be had from the negative fact that the numerous predictions of impending suspension of factories or shortage of food have not as yet come true in any general sense. The railroad situation, moreover, is not now the main issue at New York; the congestion at numerous docks, due to the longshoremen's strike, and the truckmen's refusal to move freight which has been handled by non-union men are the more prominent elements of trouble. The merchants' committee, which is preparing to run non-union or "open shop" automobile trucks to move wholesalers' freight, has not yet got its enterprise started.

The newspapers of New York print reports, evidently authentic, of large factories being closed, but with names omitted. The exportation of large quantities of freight through Philadelphia by firms who usually and preferably would send their goods through New York has started a great deal of discussion in the metropolis. A New York paper of May 18, says:

"Nearly all of the New York steamship companies are using other ports for general cargo vessels. Philadelphia, Baltimore, Portland, Newport News and Boston are among the cities to which the freight is being diverted. Eighty per cent of the export freight consigned through New York forwarding houses is now being shipped from Philadelphia and Baltimore, it is estimated. Only one ship has left New York for the Far East in the last three weeks and it carried only half a cargo. Two boats now being loaded at Philadelphia will carry cargoes of general merchandise to Mediterranean ports. One shipping man declares that conditions in the Port of New York have been abnormal for several years and seem to be growing worse. Philadelphia and Baltimore are likely to be used permanently. The pier facilities there are better, and there is a disposition on the part of both the railroads and the city authorities to do everything possible for the accommodation of the shipping companies."

A Philadelphia paper of May 15 reported 1,653 cars of export goods as going through that city in two days, each shipment of which normally would have gone through New York. Seventeen steamships had been ordered from New York to Philadelphia to take freight of this kind. Most of the shipments consisted of steel, oil or flour. Of the 1,653 cars, 1,159 were brought in by the Pennsylvania Railroad, 449 by the Philadelphia & Reading, and 45 by the Baltimore & Ohio.

A train of five automobile trucks left New York on May 14 for Chicago. On that day it was said that the number of cars delayed on side tracks of the Pennsylvania Railroad between New York and Pittsburgh was 14,000. When the strike was at its worst the number of cars thus left was 22,000.

Shippers who have used automobile trucks for urgent shipments say that they cost $1.50 a mile; at this rate the five trucks above mentioned earned, in going from New York to Chicago and back, a total of $15,000.

A wagon load of machinery, about three tons, for South Carolina, had to stand in line more than two days, waiting to get into a freight station in Brooklyn, N. Y.—and this in a case where, before starting out, the shipper had received assurances from the railroad that freight for South Carolina could be received.

At Buffalo, N. Y., the shortage of coal continues, and the people are exercised over the fact that 150 cars of soft coal pass through the city almost every day bound for points in Canada.

At Haverhill, Mass., large quantities of shoes are left on the makers' hands because of delays in freight transportation.

Local strikes of yard men were reported last week on the New York Central at the freight yards at Sixtieth street, New York city, and on the New York, New Haven & Hartford, at Hartford, Conn., both of which appear to have been fully settled after a few days.

The New York, New Haven & Hartford has published some of its daily statements of freight car movement, showing an aggregate volume of traffic nearly the same as that in May last year. The Lehigh Valley reports for sixteen days of May about the same freight movement as in 1919. Shipments of anthracite over that road were twenty per cent in excess of the movement last year. Other Eastern roads report some encouraging features, similar to the foregoing, but not with so much definiteness.

More than 1,000 carloads of freight for export to India, New Zealand and Australia are are being held at Newport News, Va., because of a lack of ships for loading it, according to a statement printed in Richmond and credited to officers of the Chesapeake & Ohio. Tobacco, iron and steel, steel rails, automobiles, trucks, iron pipe, agricultural implements, wire, tin plate and glass comprise the bulk of the shipments. There are 171 carloads of automobiles, 131 cars of rails, 19 cars of automobile trucks and 20 cars of iron pipe bound for India. For Australia and New Zealand there are 237 cars loaded with automobiles, 213 of iron and steel, 97 of tobacco, 66 of agricultural implements and 53 of wire.

Hearings Before the Railroad Labor Board

Presentation of Evidence on Behalf of the Carriers Occupies Wage Tribunal at Chicago Sessions

ADMITTING FRANKLY that wages ought to be granted to many railroad workers to enable them to meet the high cost of living, the Conference Committee of Managers of the Association of Railway Executives began the presentation of the railroads' views on the petitions of the members of the various railway brotherhoods for increased compensation before the Railroad Labor Board at Chicago on May 17. The testimony backing the petitions of the railroad labor organizations was taken and completed by the board at its hearings held in Washington. The board then adjourned to its permanent headquarters at Chicago, and it is estimated that the replies on behalf of the railroad companies to the testimony given by the labor leaders at Washington will occupy about two weeks. The board's decision on the petitions should therefore be rendered early in June.

The first session of the board in its new headquarters was held on Monday morning, May 17, and opened with the presentation of a general statement regarding the whole question of proposed wage increase.

E. T. Whiter, as chairman of the Conference Committee of Managers, in opening the railroad presentation of the case, stated that the demands by the 2,000,000 employees aggregated more than a billion dollars a year on top of a $1,000,000,000 wage advance in the past two years and a $300,000,000 advance in the two years prior to the taking over of the roads by the government, as is shown in the Lane Commission Report. Some part of the new demands, he said, the board would probably find justified by the rise in the cost of living.

Mr. Whiter's Testimony

"We are not here," said Mr. Whiter, "as the *opponents* of the representatives of the railroad employees who are before you seeking increases in wages; we are not here to argue that *all* of their requests should be denied; we are not here to obstruct or to delay a speedy hearing or a fair and prompt disposition of the requests presented. We are here in good faith to assist your board to grapple understandingly with the vast and complex problem that has been presented to you for your consideration and decision.

"We appreciate fully that the increases received by *some* employees in the last five years have not been commensurate with the increases in the cost of living and that due consideration to this fact must be given by the board in determining which of these employees are fairly entitled to increases to enable them better to meet the burdens resulting from the increased cost of living.

"We appreciate also that there are other employees who are receiving rates which cannot be considered at all low in an absolute sense, yet which do not compare favorably in some localities with wages paid similar occupations in outside industries; and we further appreciate that the discrepancies are such that the railroads cannot under present conditions in such localities hold these employees for their very necessary work unless some increases are given. However, in many such cases the outside wages are paid for classes of service which have no counterparts in the railroad employment and which are made possible by the product of the industries and the prices they are able to command.

"We cannot, of course, hope to compete with outside rates, cent for cent per hour, nor should this be considered necessary. Consideration must be given to the greater regularity and continuity of employment in railroad service, to the greater stability of railroad rates of wages when once established and to other attractive features of railroad employment which in the past have induced men to prefer to continue in railroad employment even when outside employment offered a somewhat higher rate per hour.

"The Transportation Act directs that your board shall establish rates of wages 'which in the opinion of the board are just and reasonable.' We are fully in accord with the principle thus laid down in the law, believing that efficient or satisfactory service cannot be expected for wages that are not 'just and reasonable.' We desire to see the transportation work of the country carried on by employees who have no just cause for dissatisfaction over their wage rates, and we are not, therefore, before you to urge that your board put a narrow or illiberal construction upon the words 'just and reasonable wage' used in the law. We believe equally that in return for a fair wage every employee or organization of employees should feel obligated to give efficient and ungrudging service. We are opposed, therefore, to the granting or perpetuation of rules which result in preventing the railroads—and through them the public—from receiving a fair return in service for payment made. We are opposed equally to the granting or perpetuation of so-called punitive rules which, while usually asked for on the basis that they are to protect against hardships or abuse, yet in their practical application, in which no exceptions are allowed, are converted into rules which regularly serve to increase earnings of employees."

Arrangements Should Be Made for Decreases

The great increase in the cost of living, Mr. Whiter said, was an evident fact, and wage adjustments must take this factor into account. But he pointed out that the peak in the cost of living had probably been reached and that the board must consider the situation which would be brought about when the cost of living declined. On this subject he said:

"With the forces now at work to bring about a reduction in the high living cost, with the now thoroughly aroused public sentiment, with the organized movement to curtail inflation, it is next to impossible to believe that the peak in the increase in cost of living has not been reached; and a procedure that would fix railroad wages permanently on the basis of the present living cost could hardly be defended. And unless some automatic principle is embodied in the award of your board that will operate to readjust basic rates as living costs go back toward the pre-war basis, or unless something is incorporated that will provide for a review of the award after some specified period, any wage rates that may now be fixed by your board would be practically permanent rates.

"It is not at all intended here to say that any wage rates that your board might award to meet the increased cost of living should be taken away again as fast as, and in the very same percentage as, the cost of living comes down. This would be, in effect, to decree that railroad employees should remain in the same comparative situation they were in before your award. We are not asking or suggesting this; but if, as costs of living go down toward the pre-war basis, a less than proportionate decrease in basic wages were provided for, the employees would be better and better off, as compared with pre-war conditions, in spite of such reductions."

Wage Advances Already Made

Wage advances made by the Railroad Administration during the two years of federal control, as shown by

reports issued by the director general, Mr. Whiter gave as follows

To all employees, January 1, 1916	$360,000,000
To shopmen, January 1, 1918	500,000,000
To maintenance of way employees and clerks, September 1, 1918	190,000,000
To agents and telegraphers, October 1, 1918	25,000,000
To dining and sleeping car employees, January 1, 1919	8,000,000
To enginemen and trainmen, January 1, 1919	60,000,000
To shopmen, May 1, 1919	50,000,000
To enginemen and trainmen (time and one-half in road freight service), December 1, 1919	38,000,000
To maintenance of way employees (time and one-half for overtime), December 16, 1919, and the same for clerks, January 1, 1920	25,000,000

These advances, totaling $965,000,000, Mr. Whiter said, did not include wages charged to capital account, which would bring the total government wage advance to $1,071,000,000 a year.

The new Transportation Act, Mr. Whiter pointed out, provides that any substantial increase in the railroad labor cost must result in increased rates to the public for railroad service. For every $100,000,000 added to the payroll about 3 per cent must be added to freight rates, he said.

Wage Increases Expected

A summary of the estimated wage increases based on the pending demands was filed by Mr. Whiter as follows:

Class of employees	1919 payroll	Increases asked: Amount	Increases asked: Per cent
Clerks	$415,163,018	$175,098,406	42.17
Maintenance of way men	634,627,732	421,357,046	66.4
Shop	721,468,190	162,734,357	25.3
Telegraphers	89,957,985	43,415,145	48.2
Engine and train	672,489,869	276,872,123	41.2
Totals	$2,533,706,794	$1,079,477,077	42.6
Marine employees		681,760	
		$1,080,158,837	

This does not include employees not involved in the demands, whose salaries and wages amount to about $211,000,000 a year, the total payroll for 1919 being $2,744,000,000.

Growth of the American Payroll

Mr. Whiter, in addition, gave these statistics of the growth of the American railroad payroll during and following the war:

Year	Payroll	Percentage to gross earnings	Number of Employes
1915	$1,134,665,000	39.5	1,366,316
1916	1,468,576,000	40.8	1,650,000
1917	1,730,057,000	43.3	1,703,748
1918	2,581,584,000	53.3	1,848,774
1919	2,744,000,000	53.6	1,977,616

Replies in detail to articles incorporated in demands made to Railroad Labor Board by representatives of transportation brotherhoods were continued Wednesday by E. T. Whiter. All testimony at this session dealt with those employed in road freight service. The question of rates to be paid for service which involves heavy grades was first considered. Regarding service and its pay, Mr. Whiter said in part: "Since adoption and installation of automatic air brake, the character of work required is completely changed and at the present time government requirements compel the application of power brakes sufficient to control the train on all grades. When this case was submitted to the Board of Railway Wages and Working Conditions last July, testimony by representatives of trainmen would indicate that living conditions in mountain territory today are as good and in some instances better than in other sections of the country. Therefore, no necessity exists for the present differentials in that territory, and certainly no reason for the extensions proposed. The adoption of the proposed rule would cause mountain rates to be established and differentials applied to a very large percentage of divisions of railroads in United States. It is understanding of the application of this article, as explained by representative of trainmen that where crew operates over gradient of one and eight-tenths per cent, no matter how short, that higher rate would govern for entire trip. For example: Employees working over short gradients on main lines, branch lines, approaches to bridges, elevated coal shed tracks, etc., that in no way affect speed of train, hazard or duties of trainmen would under proposed rules be paid the higher rate for the entire trip. Discussion of guarantees and held away from home terminal pay occupied a large part of today's session. Mr. Whiter, in case of guarantees, advocated the continuance of present provisions on the ground that to change the basis would; one, restrict the use of assigned crews on holidays or layover days; two, make it necessary to pay either assigned or unassigned crews for service not performed; three, increase payments held under way from home terminal rule; four, increased deadhead payments. In the case of held away from home terminal rule Mr. Whiter cited, the rulings of Walker D. Hines, Director General of United States Railroad Administration to effect that punitive overtime should not be paid because of detention away from home terminals. During the day the board issued a statement to the effect that it cannot and will not undertake to hear any disputes or controversies, except those which it is authorized by law to hear and cannot and will not hear applications of parties who are acting in disregard of law and who are not in compliance with law and the requirements of the board. It further states that the board will not allow hearing of proposed cases to be disturbed or delayed by any attempt to get other cases before it.

"Let no man be blind to the fact that a crisis in the transportation industry is at hand," said Timothy Shea, assistant president of the Brotherhood of Locomotive Firemen and Enginemen, in a brief filed with the Railroad Labor Board as a supplement to his previous oral testimony. "Six weeks ago we achieved the almost impossible feat of persuading men to return or to continue at work without securing for them any immediate relief and with nothing but promises as to the future, and now we have every evidence that these men are concluding that they have been fooled again.

"One great trouble with the American people is that they never believe that anything disagreeable is going to happen until it has actually happened. They wouldn't believe we would get into the world war until we were in it up to our ears, and more recently they refused to believe that there would be a steel strike or a coal strike until those industrial disasters were upon us. Now apparently they refuse to believe that the railroad situation is absolutely critical. The steel strike cost the country half a billion dollars at a conservative estimate and the coal strike half as much more. Both could have been averted. The lesson in the present situation is obvious.

"There is not even an implied threat in calling attention to another impending industrial catastrophe. It is a simple statement of fact. The railroad workers must have relief, and they must be given relief at once.

"There is another phase of the situation to which attention should be called. Notice has already been served on the public that whatever railroad rate increase may be necessitated by increases in wages to railroad workers will be multiplied four or five times by the profiteers and added to the already intolerable burden of the cost of living. The public is told that it is helpless to prevent this. If that is true it is a sad commentary on our political institutions, for it means that this is a government for, of and by an organized plunderbund.

"In this connection the public should understand that if it were not for the profiteers railroad workers could be given a square deal and a living wage without any increase in railroad rates. Next to wage earners and salaried people the railroads are the greatest victims of the profiteers. Railway equipment corporations, the steel trust, the coal barons and the petroleum pirates have grown fat on the excessive and unjustifiable profits they have exacted from the railroads, and

unless some means is found to curb their greed they will gobble up the greater part of the billions which the railroads must spend for new equipment, betterments and materials of all kinds during the next few years. The Railroad Labor Board may not have the authority to deal with this phase of the railroad problem, but there must be some governmental agency that has the necessary power and the courage to exercise it."

In closing the case for his organization, Mr. Shea said that in a comparison of earnings for eight hours of labor locomotive firemen rank seventy-seventh in a list of the various occupations and industries for which authoritative data are available. Only nine occupations are paid less than the firemen, he said.

Executives Make Recommendations for Use of Loan Fund

THE SPECIAL COMMITTEE of the Association of Railway Exetutives, which has been considering the method of using the $300,000,000 loaning fund provided by Section 210 of the transportation act, and has been prosecuting inquiries with regard to the needs of the carriers, has submitted a report which was transmitted to the Interstate Commerce Commission on May 12 by Thomas De Witt Cuyler, chairman of the association.

The committee, of which E. N. Brown is chairman, has received replies from 64 railways with regard to equipment, and from 55 railways with regard to additions and betterments, which will promote the movement of cars. It is expected that additional replies will come in, and these will be forwarded with an additional report.

In view of the desirability of putting a portion of this fund at work immediately, and of securing the placing of contracts for the construction of a portion of the needed equipment without further delay, the committee concurs in recommending:

1. That the Interstate Commerce Commission set aside immediately $125,000,000 to aid in the acquisition of equipment.

2. That the commission offer to each company having indicated a desire to purchase equipment, its percentage of the $125,000,000, being that percentage which the standard return of the company bears to the total standard return of all the railroads.

3. That if there be a balance left by the failure of certain companies to accept their percentages of the above sum, this balance be distributed to companies purchasing equipment, on the same basis as indicated in paragraph 2.

4. That the commission set aside $40,000,000 for claims and judgments against the Railroad Administration.

5. That the commission set aside $12,000,000 for meeting the requirements of the short lines.

6. Pending a determination as to whether or not maturities can be taken care of from this fund, this committee suggests that $50,000,000 be temporarily set aside for this purpose if the decision is favorable. If not, that this amount be used later on either as an increase in the amount to be used for equipment purchase, or an increase in the amount available for additions and betterments, or both.

7. That the commission proceed on the assumption that the balance of the fund for the time being, namely approximately $73,000,000, is available for additions and betterments of such character as will promote the movement of cars.

8. That within the limits covered by recommendations 1, 2, 7 and 11, the Interstate Commerce Commission proceed to make loans not exceeding the limits indicated by the paragraphs above mentioned.

9. That every effort be made, and the co-operation of the Interstate Commerce Commission be requested, to secure the amendment of the transportation act so as to make loans from the fund provided by Section 210 repayable in 15 instead of 5 years. The committee believes that the present five-year limitation has caused many companies to withhold applications for loans and orders for equipment, and is convinced that if the term were extended to 15 years, the amount of equipment for which the companies would request loans would be far in excess of the funds available.

10. That in exacting security from the weaker companies, the Interstate Commerce Commission and the Secretary of the Treasury be urged to pursue a liberal policy.

11. That in case of any extension of time or more favorable modification of the terms and conditions connected with loans from the fund provided by Section 210, the companies now making applications and receiving loans shall receive the benefit of any such extension or favorable modification.

12. In recapitulation, that for purposes of immediate administration the fund be considered as apportioned temporarily as follows:

(a) Temporary reserve for claims and judgments	$40,000,000
(b) Appropriation for Short Line railroads	12,000,000
(c) Temporary reserve for maturities	50,000,000
(d) Appropriation to aid in acquisition of equipment	125,000,000
(e) Appropriation for additions and betterments which will promote the movement of cars	73,000,000
Total	$300,000,000

If the recommendations made above be accepted, the committee says the Interstate Commerce Commission can proceed immediately to put approximately two-thirds of the loaning fund at work to enable the companies "properly to serve the public during the transition period immediately following the termination of federal control." In view of the importance of prompt action, the necessity and desirability of which is generally appreciated, the committee earnestly urges that the above recommendations be carried out without delay.

Financial Relief for Carriers Proposed

WASHINGTON, D. C.

FUNDS WHICH MIGHT BE USED for the purchase of additional cars and locomotives would be provided by requiring the Railroad Administration to pay to the railroads sums which it owes them on account of rental for the use of their properties during the period of federal control, instead of by making increased loans to the carriers, if Congress passes the amendment to the transportation act introduced by Senator Cummins on May 13, with the approval of the committee on interstate commerce.

Although the suggestion of an additional appropriation to assist the railroads in acquiring new equipment failed to meet the approval of the committee, practically the same result would be accomplished in another way by the amendment. In addition to increasing from 5 to 15 years the period within which loans from the $300,000,000 revolving fund already provided must be repaid to the government, the proposed amendment also provides that the entire amount of the indebtedness of the railroads to the government for additions and betterments made during federal control may be funded for a period of 10 years. Under the terms of the law as it was passed Director General Hines had proposed to require the companies to pay off about $495,000,000 of the total of $765,000,000 of additions and betterments by deducting that amount from the rental and other sums owed by the government to the railroads. This would leave only $270,000,000 to be funded for 10 years, in addition to $368,000,000 which has already been funded by equipment trusts payable in 15 annual instalments.

Senator Cummins' amendment allows deductions to be made from the rental due the companies only as an offset

against their other indebtedness to the government, the principal items of which are $144,422,526, which was to be evidenced by one-year notes and $44,433,664 of long term notes. The result, therefore, would be to give the railroads about $300,000,000 in cash. The railroads had strongly urged, before the passage of the act, that any deductions from their rental should be applied first to that portion of their indebtedness to be evidenced by one-year notes, instead of against the class of expenditures which under normal conditions would have been financed by long-term securities, and the Senate had adopted this view of the matter, but as the law was passed the matter was left in the discretion of the President, which means that of the Railroad Administration as his agent.

At the recent hearings before the Senate committee, held to discuss ways and means of financing new equipment, after shippers had urged the need of more cars, some of the railroad executives complained that the Railroad Administration had taken the attitude of a collection agency in trying to withhold as much as possible of the current rental to apply on the capital expenditures. The amendment was proposed because of the representations made at the hearing both by the executives and by the bankers, as to the necessity of doing something to help the railroads to finance themselves. Its passage, therefore, would increase the amount of cash which the railroads may collect from the Railroad Administration and give some of them a surplus which may be used to finance equipment, but it would hasten the time when the Railroad Administration would have to ask for more money.

As changed by Senator Cummins' amendment, paragraph (a) of Section 207 of the act would provide that the amount of the indebtedness of the United States to a carrier arising out of federal control may be set off against the amount of indebtedness of such carrier incurred otherwise than for additions and betterments, so far as deemed wise by the President, but only to the extent permitted by any contract between such carrier and the United States in respect to the matters of federal control. The law provided for a set-off against "either or both" classes of indebtedness.

Section 207 (b) would also be changed to read: "The indebtedness of the carrier to the United States incurred for additions and betterments made during federal control, properly chargeable to capital account, shall be funded for a period of 10 years. . . . The funding of such indebtedness shall be in such form and upon such terms as the President may prescribe for the reasonable assurance of payment of the same to the United States."

To meet the question raised by the Treasury Department as to whether loans from the $300,000,000 fund may be used for meeting maturities, Senator Cummins' amendment proposes to insert in Section 210, providing for the loan fund, the words "to meet its maturing indebtedness or to provide itself with equipment or other additions and betterments."

In order to make the fund available to weak roads which may not be able to furnish technical security, discretion as to the security to be given is placed in the Interstate Commerce Commission, whereas the law provides that it shall be prescribed by the Secretary of the Treasury.

The amendment was introduced and favorably reported by the committee as a rider to the sundry civil appropriation bill, which has already been passed by the House, and it was referred to the committee on appropriations. The provision for increasing the amount which may be funded is being opposed by Swager Sherley, director of the Division of Finance of the Railroad Administration.

Further consideration of the amendment was taken up by the Senate committee on Tuesday after Director General Hines had stated, in a letter to Senator Kellogg, that to adopt the provision for increasing the amount of railroad indebtedness to be funded would make it necessary for the Railroad Administration to ask for an additional appropriation of about $350,000,000 to meet the cash payments. A sub-committee, including Senators Kellogg, Townsend, and Underwood, was appointed to confer with members of the House as to the possibility of getting such an appropriation through.

Mr. Hines' European Mission

WALKER D. HINES, who has been nominated by the President as the arbitrator between the European powers concerned in various questions affecting navigation on the Danube, Rhine, Oder and Elbe and some other rivers of Central Europe, has received a note from M. Millerand, president of the Peace Conference, which follows in part:

"The government of the United States has informed the allied and associated powers that the President of the United States has nominated you as arbitrator on river shipping, in the execution of paragraph 6 of annex 3 part 8 and articles 339 and 357 of the Treaty of Versailles, as well as analogous articles in the other treaties of peace.

"The allied and associated powers congratulate themselves upon the choice of the American government. I have the honor in their name to thank you for kindly allowing them to profit by your experience, and assuring them your aid in the execution of so important provisions of the peace treaty, they trust that it will be possible for you to undertake shortly the task which you have been good enough to accept and execution of which cannot be delayed much longer, and they will be happy to facilitate in every way the accomplishment of your mission. Diplomatic privileges and immunity will be granted you, moreover, throughout the duration of your functions."

The work to be performed by Mr. Hines as arbitrator under the German, Austrian and Bulgarian treaties is of particular importance in connection with the Danube river, where the ownership of a very large number of steamers and other river property is in dispute with the result that navigation on the Danube has been seriously interfered with with consequent deterrent effects on economic conditions in the various countries for which the Danube is a principal means of communication. While the work affecting navigation on the Rhine, Oder and Elbe and some other rivers of Central Europe is also important, it is anticipated that the conditions on the Danube are particularly pressing.

As to the vessels in dispute on the Danube, many of them fell into allied hands during the allied advance into territory to be occupied by the allies under terms of the armistice and were taken possession of after the enemy had agreed to an armistice. A few of them were turned over to the Allies by the enemy for supply of the armies of occupation under the terms of the Austrian armistice and Hungarian military convention. The balance was seized by allied forces in territory beyond that which was to be occupied under the original terms of the armistice. The questions of ownership are further complicated by the fact that some of the vessels in question belonged to enemy ports which have since become allied ports under the changed frontiers.

The German, Austrian and Bulgarian treaties contemplate that as between the European powers affected the arbitrator, Mr. Hines, shall settle the conditions as to the cession of all boats and movable appliances belonging to inland navigation which are necessary to be ceded for the purpose of reparation or restitution in kind, and shall also determine the amount of boats and other material to be ceded for the utilization of the rivers referred to by the allied and associated powers and shall distribute among such allied and associated powers the materials and boats so ceded. Various questions relating to the nationality of the boats on some of

these rivers and to the ownership of the boats and the amount of compensations to be paid to the owners will also be involved in the determination.

In connection with the final determination of the issues as to the situation on the Danube it probably will be necessary for a decision to be made as to the date of the cessation of hostilities on the Eastern front, the effect of the armistice of the third of November, 1918, and of the military convention of November 13 and the validity of captures made by Jugo-Slavs, Roumanians and French in October and November of 1918. The cession to allied and associated powers of material of all kinds needed for the exploitation and improvement of the rivers under changed frontiers is also involved.

The British, French, Italian, Belgian, Greek, Polish, Roumanian, Serb-Croat-Slovene and Czecho-Slovak governments as well as Germany, Austria and Bulgaria appear to be interested in questions which will be presented to the arbitrator for determination.

It is anticipated that Mr. Hines will have to establish main headquarters in Paris and branch headquarters in various places including, perhaps, Vienna, Budapest, Belgrade and Bucharest, and the work of the branch office will involve largely the actual investigation of facts, the assessment of the value of various river property, the examination of the condition of the boats and the investigation of legal points.

Mr. Hines has appointed Brice Clagett, who has been assistant to the director general of railroads, as his executive assistant, and Mr. Clagett has left for Paris to organize the force, Mr. Hines to follow early in June.

Members of the Railroad Administration staff on Saturday presented Mr. Hines with a watch, Max Thelen making the presentation speech.

Seasonal Coal Rates to Be Put Into Effect

Committee Reports the Frelinghuysen Bill with a Strong Argument for Its Passage

THE SENATE COMMITTEE ON INTERSTATE COMMERCE, having conducted extended hearings, has reported the Frelinghuysen seasonal coal-rate bill (S. 4278), with the recommendation that the bill be passed with amendments.

This bill incorporates amendments suggested by Chairman Clark of the Interstate Commerce Commission. It has the approval of the members of that commission. The bill S. 4087 proposed that rates on coal should be 15 per cent less than the tariff rate from April 1 to August 31 in each year, and 15 per cent above the tariff rate for the remainder of the year. The bill introduced at the request of the American Society of Mining and Metallurgical Engineers, S. 4278, adopted the principle and most of the phraseology of the original bill, but provided definite differentials, expressed in cents instead of in percentages, above and below the tariff rates, for the transportation of coal, and provided a graduated series of increases and decreases.

The committee believes that legislation of this character requiring lower freight rates on coal during the spring and summer months and higher freight rates during the fall and winter months will tend to encourage consumers to develop storage accommodations, to accept deliveries of coal in advance of their seasonal needs, and thus to keep the mines operating more constantly throughout the year. The report by Senator Frelinghuysen, chairman of the sub-committee that considered the bill, expresses the opinion that such legislation will bring about the following beneficial results:

"1. It will stabilize the price of coal. The capacity output of all the coal mines in the United States, assuming fairly constant operation, would far exceed the present consumption. The output of all these mines working as at present only intermittently during the spring and summer months and working to capacity during the fall and winter months is barely sufficient to supply the current needs and the greatly increased cold-weather demand for coal. During the winter the demand so nearly equals the currently available supply that scarcity prices prevail. In addition to this the actual cost of production per ton is unduly enhanced because the operator must during the time his mine is closed down or working intermittently keep together his organization and expend money for the upkeep and maintenance of the property, all of which must be added to the price of the coal which he mines and sells during the rush season. If the demand for coal were reasonably constant throughout the year, many of these costs based on holding plant, capital, and personnel idle for a large portion of the time would disappear, and the price of coal would more nearly represent only current costs of production plus a reasonable profit, leaving no opportunity for charging scarcity prices during the months when the greatest amount of coal is consumed.

"2. Such legislation will obviate very largely the pressing necessity for more coal cars. The present supply of coal cars, while totally insufficient to handle the fall and winter rush under existing conditions, would be fairly adequate to carry all the coal desired by consumers if this equipment could be kept moving with greater regularity throughout the year, as would be the case if the advantage of lower summer and spring freight rates could be held out to induce consumers to receive coal shipments in advance of their winter needs. Under the present system, thousands of coal cars ordinarily lie idle during the spring and summer, while the whole available supply of coal cars is entirely insufficient to handle the fall and winter emergency.

"3. Such legislation would remedy the present inadequacy of terminal facilities. The large amount of coal which must now be transported within a comparatively short time in each year tends to glut already overcrowded terminals. The increasing inability of existing terminal facilities to handle extraordinary seasonal demands without entailing serious delays and disproportionate terminal costs is one of the most glaring weaknesses in the present American railroad transportation system, according to the testimony of Chairman Clark of the Interstate Commerce Commission.

"4. Such a measure would promote regularity of employment in mines, and would thus settle most of the outstanding grievances of the miners. Increased compensation for miners, under the present regime, is demanded not so much as an actual wage for work performed, but rather as a pension for periods of enforced idlleness due to the seasonal demand for coal."

The subcommittee finds most of the objections untenable:

"1. No confusion, either for carriers or shipments, will result from changing the rate on coal monthly by specified amounts. The proposed legislation prescribes that the carriers shall file their tariff rates on coal in the same manner as at present, and instead of requiring them to alter these tariffs monthly, provides a series of automatic statutory dif-

ferentials below the tariff rate for one portion of the year, and above the tariff rate for the remainder of the year, with discretion in the Interstate Commerce Commission to change the amount of the differential where it finds it necessary.

"2. The revenues of the carriers would not be affected. A large amount of coal would still have to be mined and shipped in fall and winter to consumers who lacked the capital, credit, foresight, or storage accommodations to enable them to secure their supply during the warmer months. If the differentials in favor of the spring and summer months should prove an unnecessarily large inducement, so that too great a proportion of coal were shipped during this period, the Interstate Commerce Commission is authorized to change the differentials so as to balance the summer and winter shipments properly.

"3. The transportation of more coal in the spring and summer will not embarrass the railroads in handling other seasonal movements, e. g., crops. In some localities cars carrying grain are loaded only in one direction, returning empty to the point of origin because of lack of shipments moving in that direction. If coal could be encouraged to move at the same time, this wasteful practice of hauling empty cars might be at least partially eliminated. Operating conditions during the clear weather of the spring and summer months are much more favorable, so that railroads can better withstand heavy demands for transportation at that period of year than during the fall and winter months when coal has heretofore moved in greatest volume. The cost to the railroads of transporting coal is also much less in warm weather, when locomotives can haul heavier trains, when they consume less fuel, and when fewer employees can handle more traffic.

"4. The acquisition of more coal cars does not afford a practicable and complete remedy for existing difficulties. Under the transportation act, recently approved, the Interstate Commerce Commission is given the power to require carriers to provide themselves with sufficient cars. But most of the railroads have neither the money nor the credit with which to buy a supply of coal cars adequate for current needs under the present system of large seasonal shipments, so it would be useless for the commission to order them to purchase this equipment. On the other hand, most of the railroads which have enough money or credit to finance such purchases already possess an adequate number of coal cars to care for the needs of their own patrons, and they could not reasonably be required by the commission to purchase additional cars to take care of the traffic of other lines."

The report also continues in part as follows:

"The transportation act also appropriates $300,000,000 as a revolving fund, a part of which may be used for loans to the railroads. In view of the fact, however, that this money will very likely be used only in small part for new equipment, and that of the portion which is spent for equipment much will go for new locomotives, refrigerator cars, and other types of urgently needed rolling stock, it is not probable that any considerable number of coal cars will be purchased out of this fund. It has been estimated that 100,000 new coal cars will be necessary to handle properly the usual seasonal demand. These alone would cost the entire amount of the appropriation mentioned above. The same statute also provides for creating a general railroad contingent fund, made up of a portion of the excess earnings of prosperous railroads, out of which loans may be made to the railroads, and out of which the commission may purchase equipment and facilities to be leased to the railroads. This fund will, however, be wholly an expectancy for many months to come, and at least one more winter, with its heavy demand on the present totally inadequate coal-car supply, would elapse before any relief could be had from this quarter. Even if funds were immediately available with which to purchase coal cars, and only coal cars were to be built, the car shops in the United States could not turn out sufficient cars between now and next fall to handle properly the coal shipments during the winter of 1920-21, assuming that the proposed legislation were not enacted in the meantime. Finally, even if this money were obtainable, and cars could be turned out in sufficient quantity, the acquisition of cars which, under the present system of uniform freight rates on coal, would stand idle the greater part of the year, would entail enormous depreciation and capital charges, all of which would have to be borne by the coal transported during the rush season.

"5. It may be urged that the interstate commerce act now contains ample provisions to permit the commission or the carrier to institute lower summer-freight rates for coal. The conclusive answer to this contention is that, during the many years that the same provisions have been law, this practice has never been introduced. When the carriers have been asked to initiate such seasonal rates on coal, the request has usually been coupled with a demand that, while rates might be lowered in summer, they should not be raised in the winter, and the carriers, facing a consequent depletion of their revenues, have declined to co-operate on this basis. The shippers and consumers, motivated by their individual needs, have been by no means unanimous as to the amount of the difference in rates or the seasons in which lower or higher rates should prevail. In the very nature of the case, it is a subject for legislation, where Congress, representing all the people, may enact rules which will take into consideration the interests of the whole population.

"The Interstate Commerce Commission, while it might feel justified in approving schedules initiated by the carriers instituting such seasonal rates, could not make such differentials in rates permanent. The carriers, pressed by coal operators or consumers, might at any time file new schedules abandoning or modifying these seasonal rates. General confusion would result.

"The commission does not believe that it possesses the power to require the establishment of such seasonal rates on coal. It has never attempted to exercise this power, and its chairman states that it does not contemplate doing so in the future in the absence of further legislation. Even if the carriers, the shippers, and the commission could and did institute such seasonal rate schedules, their action in this matter would be the subject of interminable litigation. It would be contended that no power had been delegated to the commission to approve or initiate such seasonal rates, and the action of the commission in this connection would most likely be enjoined until the matter had been decided by the United States Supreme Court. The result would be that two or three winters might elapse before this urgently needed practice could be put into effect. Definite legislation, such as that proposed, will remedy the situation at once.

"While a considerable number of coal operators appeared at the hearings and testified against the proposed legislation, the opposition of the operators was by no means unanimous. One of the most earnest advocates of this legislation is Eugene McAuliffe, of St. Louis, Mo., a gentleman who is interested in various coal mines and public utilities, and who has had many years of experience in connection with the operation of railroads. Most of the operators who opposed the legislation founded their objections on local considerations peculiar to their own properties in relation to the changes in rates proposed in this legislation. For example, certain operators whose coal is of such inferior quality that it will not store satisfactorily feared the introduction of rates which will encourage the storage of the coal produced by their competitors. The subcommittee feels, however, that legislation which will result in incalculable benefit for the whole public, and which will entail but slight disadvantages for the great majority of mine operators, should not be denied approval because it may be injurious to the interests of isolated coal operators.

"Some of the criticism aimed at the proposed legislation was based on the fact that it affected coal moving to Lake Erie points for trans-shipment by water to upper lake ports and coal moving to tidewater, as well as coal moving but a short distance. This bill remedies the latter objection by specifically excluding from its operation coal moving on rates of 75 cents or less. It also confers on the Interstate Commerce Commission the broadest discretion to alter or modify the prescribed differentials where their enforcement might result in unreasonable hardship to individuals, communities, or carriers, thus permitting the commission to examine carefully and to remedy peculiar local situations which may be called to its attention.

"The committee realizes, of course, that the feasibility and effectiveness of the proposed legislation depends very largely upon the practicability of storing coal in large and small quantities. It therefore solicited and received a large amount of testimony from such experts as George Otis Smith, director of the Geological Survey, various coal operators, and from coal dealers on this point. As a result of this testimony and from information secured through correspondence, the committee entertains no doubt whatever but what practically every kind of coal mined in the United States can be stored safely, conveniently and cheaply. The tonnage of coal produced which cannot be stored satisfactorily is almost negligible. The committee is of the opinion that most of the testimony advanced to cast a doubt on the feasibility of storing coal is based almost uniformly on a disinclination to change the present hand-to-mouth policy. It feels that this ultra conservative attitude, in the face of constantly recurring coal famines, bringing unemployment and possible starvation in their wake, is entirely unwarranted."

The bill provides that after 30 days following its enactment, no railroad subject to the act shall demand, collect, receive, or enforce, for the carriage of coal, any individual, proportional, or joint rate which is greater or less than 5 cents per ton more than the schedule base rate then in effect for shipments made during August; 15 cents per ton more than such rate for September; 25 cents per ton more than such rate for October, November and December, or 10 cents per ton more than such rate for January, or which is greater or less than 10 cents per ton less than the schedule base rate then in effect for February; 25 cents per ton less than such rate for March, April and May; 15 cents per ton less than such rate for June, or 5 cents per ton less than such rate for July.

Whenever the commission is of the opinion that any such rate as so reduced or increased, is or will be unjust or unreasonable or unjustly discriminatory or unduly preferential or prejudicial, the commission is authorized to determine and prescribe what will be the just and reasonable rate to be thereafter observed. Whenever the commission is of the opinion that any of the increases or deductions in rates as prescribed by the law, or by order of the commission, cause or will cause shipments of coal to be made in such disproportionately large or small quantities during the months in question as to prevent the carriers affected from handling their traffic properly, from using their equipment and facilities most uniformly and efficiently, or from receiving just and reasonable revenue from such coal traffic as a whole, the commission is authorized and empowered to prescribe what increases or deductions will be just and proper, to be thereafter observed. Nothing contained in this paragraph is to be construed to authorize or require any carrier to receive any rate less than its schedule base rate for coal which has already been carried by it, or by any other carrier, under a rate as reduced under the provisions of this paragraph or by order of the commission, unless a carriage by water has immediately preceded such subsequent carriage by rail, or any charge which is greater or less than that shown in its schedules for switching and other incidental services performed in connection with the carriage of coal, or any rate which is greater or less than its schedule base rate for the carriage of coal, when such schedule base rate is 75 cents or less per ton for the carriage in question. For the purposes of this act the schedule rate for the carriage of coal, except as otherwise provided herein, shall be construed to mean the schedule rate therefor as increased or reduced under the provisions of this paragraph or by order of the commission.

Framing Timber Bridge Trusses Before Treatment

The Central Railroad of New Jersey recently completed the installation of a transfer bridge for a ferry slip at its Bronx terminal, consisting of a three-truss span composed of Howe trusses which were framed in their entirety, then dismantled, creosoted and reassembled before moving to their final location. The new structure replaced an old one which had been in continuous service for 13 years.

The erection of the bridge differed from the customary methods employed in that all the material entering into its construction was shipped direct to the creosoting plant at Port Reading, N. J., where it was assembled into the span. The members composing the bridge were run through the mill at the plant, where, in the majority of instances, they were sized by machinery and, where "gaining" was found necessary, the work was done on a tie-gaining machine. This

The Span after Creosoting Ready for Erection

practically eliminated hand labor and produced a uniform quality of work with a minimum possibility of error. As soon as this work was finished the different members were taken to an open area in the rear of the mill upon which a runway had been constructed previously to facilitate the erection. In assembling the bridge the heavier members were handled by locomotive cranes operating on tracks laid on each side of the runway.

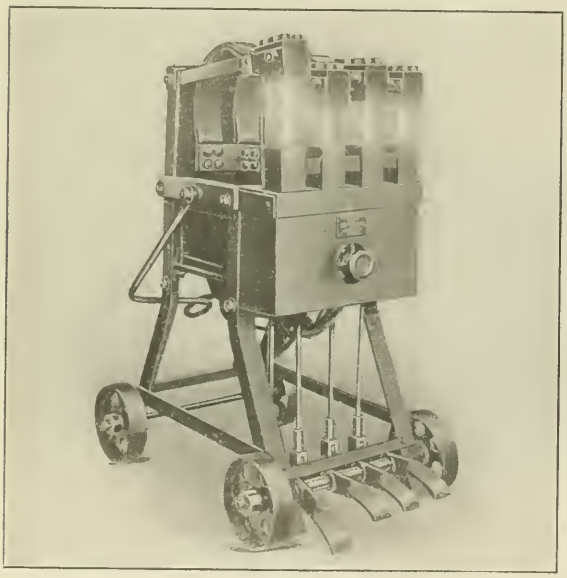
After the entire structure had been completely assembled and all connections made, the operation was reversed and the span was dismantled piece by piece. Each member was marked carefully for identification and then loaded on tram cars for conveying to the creosoting cylinders, where it received the full cell treatment, having been thoroughly air-seasoned for one year previous to framing. About 8.5 lb. of creosote oil was absorbed per cu. ft. of timber.

The work of reassembling was carried on without any serious difficulties. For purposes of moving to the site, the bridge itself was erected on an old cartloat about 235 ft. long and 36 ft. wide, drawing about 4t. 6 in. of water when light, the float having been moored in a slip between two piers upon which the tram cars carrying the creosoted timbers were run. The actual work of reassembling was similar to that in the original construction, the main difference being that to facilitate erection the entire structure was placed, in this case, on six car trucks of 50 tons capacity, each free to run on rails laid on the deck of the car float.

By framing the timber previous to treatment in this manner, it was not necessary to cut into the treated wood, less oil was required and it also cost less to erect, the plant being adjacent to the mill.

Electric Rivet Heaters

THREE ELECTRIC RIVET HEATERS have appeared on the market during the past year, and the results they have shown apparently indicate they have come to stay. One of these was described in the June 25, 1919, and another in the November 21, 1919, issue of the *Railway Age*.



A Four-Head, Type B-4 Humil Electric Rivet Heater

The one which has not been mentioned before is manufactured by the Humil Corporation, 101 Park avenue, New York.

Electrically, the Humil rivet heater consists of a specially designed transformer with a single primary winding and one or more secondary windings connected in multiple. The secondary terminals consist of heavy copper blocks between which the rivets are to be heated are placed. A control switch in the primary makes it possible to adjust the current or the heat quickly to any desired value within the limits of the machine.

The operation of heating rivets is very simple. The copper blocks which form the secondary terminals are forced apart by a handle or a foot treadle, a rivet is placed endwise between the blocks, and on releasing the handle or treadle the blocks are made to grip the rivet either by their weight or by springs, depending on the type of machine. A stop prevents the blocks from coming in actual contact with each other when there is no rivet between them. A little bump or a slight twist of the rivet insures contact and the rivet starts heating immediately. Owing to its smaller cross-section, the end of the rivet to be upset becomes hotter than the head of the rivet. This, of course, is a desirable feature. As the rivet is not heated in a blast of air, a rivet may be heated and cooled several times without injurious oxidation.

Rivets can be heated in from 3 to 150 seconds, depending upon the size of the rivet, the type of machine used and the number of rivets heated at once.

A machine designed for heating four rivets at once can be used to heat three rivets of larger sizes.

The machines are of rugged construction and the secondaries can be short-circuited indefinitely without injury to the transformers. They can be used in places where it is impossible to use oil furnaces, as they are compact and do not give off objectionable gases. The machines are built to operate on alternating current supply voltages from 110 to 550, but there is no danger to the operator, as the voltage across the secondary terminals is always less than five volts. From five to seven pounds of rivets can be heated with a power consumption of one kilowatt hour.

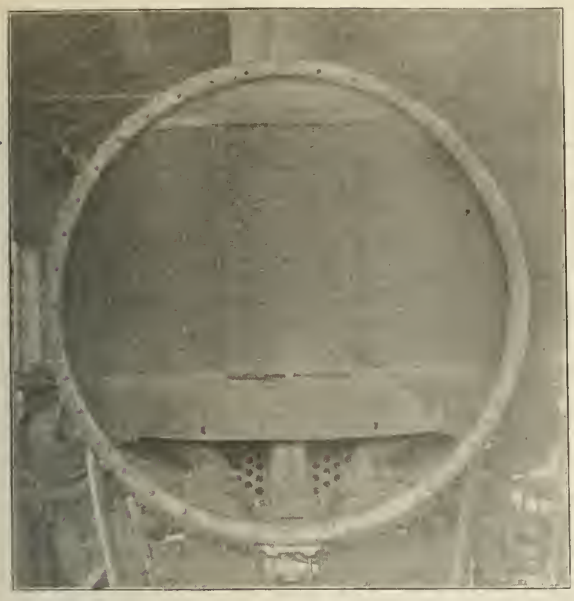
Quick Opening Door for Locomotive Spark Arrester

A FRONT END netting door which may quickly be removed and replaced and which has sufficient area of opening to facilitate thorough and rapid inspection of the spark arrester and draft appliances, is shown in the illustration. This device was developed and patented by John Herron, general foreman, Duluth, South Shore & Atlantic, Marquette, Mich., and the patents are controlled by Mr. Herron and John A. Higgins, Manistee, Mich. The features of this device which are of especial interest are the size of the door opening, the fact that it is locked in place by the use of one cotter key and the simplicity and rigidity of the door and door frame.

By referring to the drawing it will be seen that the entire device is built up of angle sections, the door itself being of ½-in. by ½-in. section, while the door frame is of 1¾-in. by 1¾-in. section. Both are built up by cutting 90-deg. V-notches in the horizontal flanges of the angles at points corresponding to the corners, then forming the frames by bending the vertical flanges at these points and completing the structure by welding. The door and frame angles are then fitted with countersunk bolts and the netting secured in place by the application of washers and nuts. The relative sizes of the door and frame are such that the door fits inside of the frame with an easy working fit. The door is held in place by retaining angles riveted to the top and bottom of the door frame, the vertical flanges of which extend up or down, as the case may be, in front of the door when it is placed in the frame. The frame is made enough longer

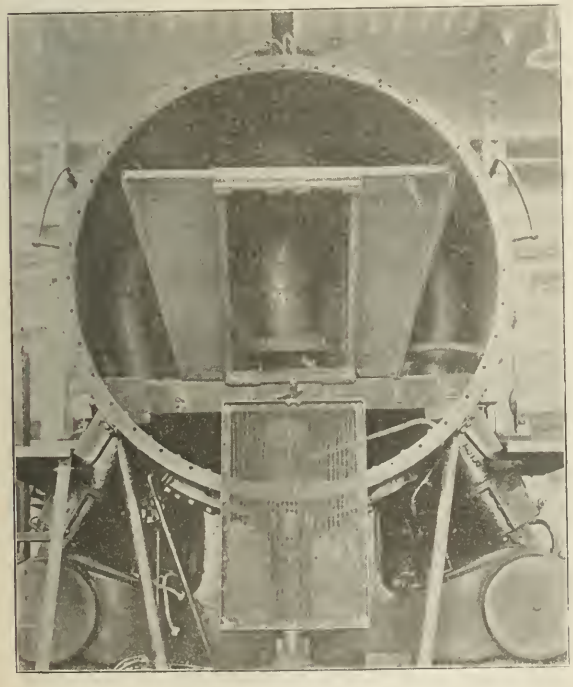
than the door to permit the latter to be raised so that it clears the bottom retaining angles.

Aside from the retaining angles, which prevent the door



Application of the Door to a Master Mechanic's Front End

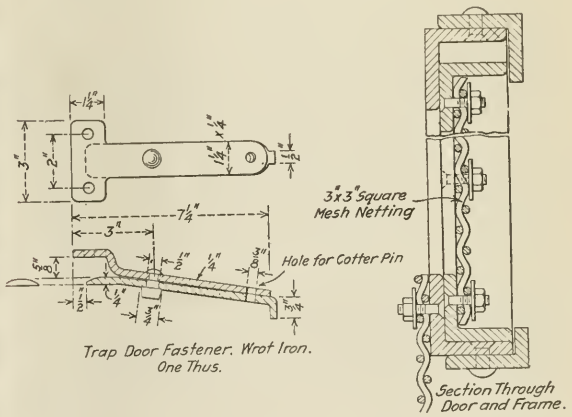
from being removed without raising it in the frame, it is also secured by a simple fastener, which is locked by the use of a single cotter key in a ⅜-in. hole. This fastener, which



The Door Applied to a Mudge-Slater Spark Arrester

is shown in detail in the drawing, consists of two parts, one of which is riveted to the bottom of the door. A movable piece is pivoted to the fixed piece in such a way that when it is latched under the door frame it lies under the fixed piece, to which it is immovably secured by the use of a cotter key. To unlock the door the key is removed and the movable piece turned parallel to the face of the netting, when the door may be raised and removed from the frame.

This door has been in use on a large number of the locomotives of the Duluth, South Shore & Atlantic since 1917,



Details of Herron Spark Arrester

and is also being applied to a number of locomotives on other railroads. In many localities where there is serious danger of fires from locomotive sparks during the dry season, inspection of the spark arrester and draft appliances is required as frequently as once every 24 hours. Under such conditions the convenience of a quick opening netting door of large area is apparent.

Gas Eliminating System for Refrigerator Cars

A system for facilitating proper refrigeration of meat, vegetables or other substances subject to decomposition under ordinary atmospheric conditions, which is applicable alike to large or small ice boxes as well as to refrigerator cars, has been developed and is now controlled by the Acme Refrigerator Corporation, Chicago. This system, known as the Clinton Refrigerating and Eliminating System, is not in the ordinary sense of the term a refrigerating system. Its function is to remove from the atmosphere of the refrigerator the gases produced by bacterial action in the breaking down of the tissues of the product under refrigeration, and it is designed for use with any cooling system.

In all living animals there are myriads of active bacteria both toxic and anti-toxic. As soon as life is extinct, however, all anti-toxic activity ceases while that of the toxic bacteria continues. Immediate chilling to a temperature below 40 deg. F. causes the activity of all acid producing bacteria to be suspended, with the result that the meat becomes coated with a firm serum film which will protect the product against the action of air-born bacteria, provided the atmosphere surrounding the product is kept free from excessive moisture.

The action of bacteria on the product produces both heat and gas, the heat being removed by the circulation of the air over the cooling medium. The so-called tissue gas and other gaseous by-products resulting from bacterial activity, however, readily absorb moisture which is deposited against the cool surfaces of the product and the sides of the car. As

a result of such condensation the car sweats and becomes moldy, and the moisture deposited on the surface of the product dissolves the serum film and increases the moisture content above the point at which the activity of all harmful bacteria is suspended. In the case of meats, the result is a slimy surface and an increased bacterial activity which breaks down and liquefies the solid protein material with the production of the acids CH_3SH and H_2S, both of which have disagreeable odors. Essentially the action is the same in the case of vegetable products.

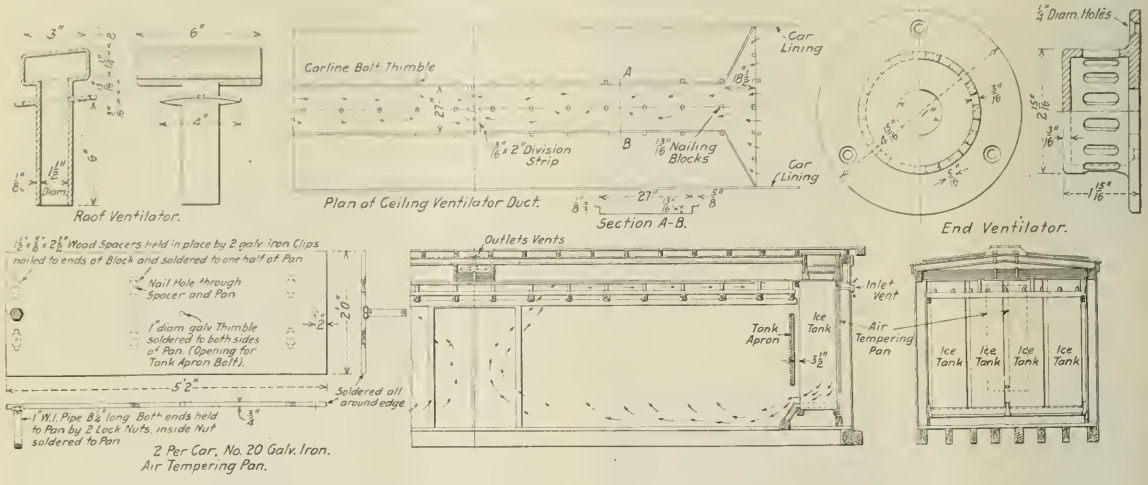
The design of the Clinton Eliminating System is based on the principle that it is necessary to remove from the car the bacterial produced gases without lessening the efficiency of the refrigeration and circulation of the atmosphere within the car. The removal of these gases with their high moisture content produces a dry, clean atmosphere, the condition least favorable for bacterial activity and hence most favorable for the preservation of perishable products.

The gases produced by bacterial action, due to their difference in density as compared with the air, tend to stratify in the upper part of the car close to the ceiling and the eliminating system makes use of this difference in density as the propelling force to remove these gases and replace them with air from outside the car. The gases are collected in a shallow duct 13/16 in. deep, located just below the ceiling and open for the full width of the car near its ends. The duct is divided into two parts near the longitudinal centerline of the car, from each of which an outlet vent is led through the roof, the tops of the vents being located under the running board. These vents have an inside diameter of 1½ in. and their continuity is broken in a chamber located between the ceiling insulation and the roof of the car.

In order to effect the elimination of the gases collecting in this duct, provision must be made for drawing in an equivalent amount of fresh air. This is done through inlet vents in the ends of the car opening into thin air-tempering pans which are placed in the space between the end lining and the ice tanks. In the drawing these are shown to be 5 ft. 2 in. long by 2 ft. wide, and are only ¾ in. deep. The vents through the ends of the car open into the pans near the top and the pre-cooled air is admitted to the car through openings just above the bottom on the sides facing the ice tank. The air is thus cool and dry before it enters circulation in the car. The amount of air admitted is only sufficient to replace the weight of the lighter gases collecting in the top of the car and passing out through the outlet vents. As these gases are not only heavily charged with moisture but carry a considerable amount of heat resulting from bacterial action, the ease with which the proper conditions of refrigeration may be maintained is considered to be more than an offset for the amount of heat which must be removed from the replacement air.

As an inspection of the drawing will show, the Clinton Eliminating System consists essentially of but two parts, the gas collecting duct attached to the ceiling of the car and the ice tempering pans which are attached to the end lining of the car and occupy a portion of the space between the lining and the ice tanks. It will be seen that the system may, therefore, readily be installed in existing refrigerator cars with only minor alterations in the car structure to accommodate the inlet and outlet vents.

This system has been installed in a number of cars of the Cudahy Refrigerator Line. The service of this equipment during the last hot season was satisfactory in that it has apparently demonstrated the correctness of the principle of the system as a means of greatly reducing the rate of decomposition of perishable products, and more cars are to be equipped.



Details of the Clinton Eliminating System and Method of Application

Photograph from Underwood & Underwood, N. Y.

Formosa Railroad; Tunnel at Kelung

General News Department

A. B. Konsberg, dealer in railway equipment, has moved his offices from 226 South La Salle street, Chicago, to 40 North Dearborn street.

Fifty thousand dollars, not $500,000, as reported, was the amount of the loss by the fire at the shops of the Atlantic Coast Line at Waycross, Ga., on the night of April 8.

The Southern Traffic League, composed of merchants' freight bureaus of prominent cities, held its annual meeting at Jacksonville, Fla., last week, and action was taken looking to the extension of the league into a number of smaller cities. C. S. Hoskins, of Tampa, Fla., was chosen president of the League.

A new train from New York to Cincinnati is announced by the Pennsylvania Railroad, to run through in eighteen hours; and the fast train to St. Louis, leaving New York 5:04 p. m., will leave instead at 4.50, and will have no connection for Cincinnati. The fast trains between New York and Cleveland, taken off two years ago, are to be restored.

The general grievance committee of the Canadian Brotherhood of Railroad Employees, in session at Winnipeg, has undertaken a revision of wage schedules and working conditions for 3,500 employees in the clerical, freight and station departments of the Canadian National Railways. The new schedule will be presented to the railway officers in the near future.

W. H. Finley, president of the Chicago & North Western, presented a paper on "Some Railroad Problems" before the Railway Engineering section of the Western Society of Engineers, Chicago, on Thursday evening, May 20. In this paper Mr. Finley included a discussion of the labor turnover, finances, operation and the provision of proper equipment.

Operation of the New York Barge Canal would be removed from the jurisdiction of the War Department by a joint resolution adopted by the Senate on May 10. By the transportation act waterway facilities operated by the Railroad Administration during the period of federal control of the railroads were turned over to the War Department for operation.

Decreased business in the last month, caused by congestion on connecting lines, has caused the Chicago, Peoria & St. Louis to close its Jacksonville (Ill.) shops. Embargoes have made it impossible to obtain empty cars in sufficient number to take care of local freight business and the resultant lack of funds necessitated a curtailment of expenses. Resumption of shop operations is expected with an improvement in conditions.

An increase of 30 per cent in freight rates, in Eastern territory—absolutely necessary to the continuation of efficient service—was the subject of an address by Daniel Willard, president of the Baltimore & Ohio, before the Cincinnati Chamber of Commerce on May 12; and following the address the meeting voted unanimously to approve the proposal. The resolution which was adopted will be sent to the chairman of the Interstate Commerce Commission.

The Interstate Commerce Commission has invited the National Association of Railway & Utilities Commissioners to select three state railroad commissioners to sit with the Interstate Commerce Commission in an advisory capacity in the 1920 advanced rate case, on which hearings are to begin on May 24. The transportation act authorizes the commission to "avail itself of the co-operation, services, records and facilities" of such state authorities in the enforcement of any provision of the act.

The American Railroad Master Tinners', Coppersmiths' and Pipecutters' Association will hold its annual convention at the Hotel Sherman, Chicago, from June 1 to 4, inclusive. Among the subjects which will be discussed are: Headlights and Their Maintenance, Locomotive Jackets, Manufacturing and Locomotive Tin Shops, Steam Heat and Its Upkeep; Acetylene Welding in the Tin Shop, Arc Welding in the Tin Shop; Repairs to Steel Coaches, Methods of Babbitting, Reclamation of Scrap Sheet Metal and Air Brake Piping.

Engineering Council in a referendum on a National Department of Public Works conducted by the Chamber of Commerce of the U. S. A., voted as follows on the three questions propounded: Shall a department of public works be established by the national government? In favor. Shall a department of public works be established by suitable modification of the existing Department of the Interior, excluding therefrom the non-related bureaus and offices and by change of name from the Department of the Interior to the Department of Public Works? In favor. Shall a department of public works be established by the creation of an entirely new department? Opposed.

Frank P. Walsh charges that the Phœnix Transit Company, which operates the floating equipment formerly owned by the Erie Railroad in New York Harbor, has been violating the Adamson Eight-Hour Law by working its employees in 12-hour shifts. Mr. Walsh, representing marine employees who have been on strike, presented these charges to the Department of Justice at Washington last week. He says that the strike was caused by the action of the Erie in turning its floating equipment over to a separate organization as a subterfuge to evade the law. It is claimed that the company is nevertheless responsible for this service as a common carrier, within the meaning of the law, and that if the law were enforced the strike would be settled.

The International Railway Fuel Association will hold its twelfth annual meeting at the Hotel Sherman, Chicago, on May 24 to 27, inclusive. Among the speakers will be Roy V. Wright, managing editor, *Railway Age*; C. M. Darling, fuel engineer, United States Bureau of Mines, who will speak on "The Possibility of Sub-Bituminous and Lignite Coal"; Eugene McAuliffe, president, Union Colliery Company, who will speak on "Economic Aspects of the Railroad Oil Situation"; Walter Bohnstengel, assistant engineer tests, Atchison, Topeka & Santa Fe, Topeka, who will discuss "Oil Burning Practice on Locomotives with Resultant Fuel Permanence on the A. T. & S. F."; D. C. Buell, director, Railway Educational Bureau, Omaha, Neb., who will talk on "Fuel Economy Kinks"; and George Esherick, Jr., who will discuss "Carbocoal." Reports will also be presented on locomotive feed water heating, fuel accounting, firing practice, front ends, grates and ash pans and fuel stations.

Payne Appointed Director General

President Wilson on May 18 issued two proclamations appointing John Barton Payne, Secretary of the Interior, as director general of railroads, to have charge of the liquidation of the Railroad Administration, and also as the agent designated in Section 206 of the Transportation act, to be sued for the government on account of transactions growing out of federal control, to succeed Walker D. Hines. Judge Payne was general counsel of the Railroad Administration during its first year, resigning to become chairman of the Shipping Board, which he left to accept his present cabinet office. It had been expected that Max Thelen, director of the Division of Liquidation Claims, would be appointed as Mr. Hines' successor, but the plan was changed for some reason.

REVENUES AND EXPENSES OF RAILWAYS

Two Months of Calendar 1920

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss)	Increase (or decrease) comp. with last year.
Northern Ala.	110	$203,864	$27,894	$265,667	$65,240	$10,294	$3,596	$113,231	$3,116	$195,479	73.58	$70,187	$7,384	$62,75[illegible]	$60,[illegible]
Oregon Short Line	2,347	4,606,416	1,044,291	7,665,546	624,832	1,134,176	46,496	2,355,666	211,196	4,510,085	58.83	3,155,461	432,085	2,722,811	1,714,256
Oregon-Wash. R.R. & Nav.	2,070	3,803,255	999,610	5,574,789	763,386	879,864	56,588	2,275,792	202,685	4,239,191	76.04	1,335,598	323,193	1,012,280	748,911
Panhandle & Santa Fe.	772	877,712	268,470	1,304,339	208,507	442,266	8,926	565,348	33,924	1,257,298	96.39	47,041	40,876	6,142	287,858
Penn. R.R. Western Lines	1,754	10,668,418	3,279,370	17,206,560	2,203,204	5,734,096	179,783	8,720,190	451,742	17,443,471	101.37	– 236,911	692,476	—931,496	—177,962
Penn. R.R.-Eastern Lines	5,376	36,527,839	13,784,169	56,667,128	8,641,835	22,026,421	754,174	32,035,118	1,588,543	66,268,777	116.94	—9,601,649	1,821,370	—11,440,520	11,410,811
Peoria & Pekin Union	19	81,794	7,457	313,894	24,298	78,569	765	180,625	7,946	292,203	93.08	21,691	19,000	2,691	75,106
Pere Marquette	2,230	3,858,525	840,609	5,699,581	529,308	1,553,917	82,395	3,162,638	158,058	5,509,546	96.67	190,035	116,677	72,559	—513,798
Perkiomen	41	166,731	16 682	204,052	15,943	8,318	25	87,461	531	112,320	55.04	91,732	689	91,042	28,013
Phila. & Reading	1,126	10,746,556	1,627,905	13,352,450	1,264,082	4,746,434	80,627	7,040,238	297,320	13,472,365	100.90	—119,916	132,028	—252,025	329,948
Phila., Bethlehem & N. E.	71	.....	.....	157,682	28,569	24,777	816	145,926	2,618	202,707	128.55	—45,025	2,060	—47,085	—77,738
Pitts. & Lake Erie	224	5,101,660	447,509	6,037,617	920,906	2,157,125	41,885	2,160,316	99,912	5,384,984	89.19	652,634	150,000	502,267	—501,605
Pitts. & W. Va.	63	271,958	16,634	323,028	64,405	184,552	3,903	140,820	12,920	425,602	131.75	—102,574	28,670	—131,770	—9,440
Pitts. & Shawmut	103	235,178	8,711	246,418	43,765	67,744	3,113	96,448	7,224	218,294	88.58	28,124	212	27,912	56,610
Pitts., Cinc., Chicago & St. L.	2,283	10,338,542	3,314,092	17,990,607	1,877,475	6,193,439	195,857	8,735,418	405,534	17,566,844	97.64	423,763	587,782	—164,869	70,600
Pitts., Shawmut & Northern	204	228,778	12,994	246,359	40,279	100,523	4,924	122,875	14,961	283,564	151.01	—37,204	3,804	—41,008	21,498
Port Reading	21	263,848	.....	362,161	28,481	40,459	43	241,315	526	310,823	85.82	51,338	—3,249	54,587	—46,269
Quincy, Omaha & K. City	255	124,007	45,583	217,844	32,753	45,914	223	135,022	3,548	217,433	99.81	411	7,295	—6,884	1,882
Richmond, Pt. Frd. & Potomac	81	615,069	394,751	1,366,192	75,972	211,083	13,031	513,326	30,615	846,931	61 99	519,261	36,698	482,554	—152,745
Rutland	415	397,578	203,721	797,187	120,115	211,886	11,561	441,830	28,652	817,183	102.51	—19,996	35,536	—55,542	66,668
St. Joseph & Grand Island	258	415,213	73,054	549,967	94,477	92,204	4,428	289,943	25,511	508,374	92.43	41,593	21,822	19,734	60,284
St. Louis, Brownsville & Mex.	548	556,049	349,645	1,038,808	297,416	252,706	13,045	360,545	41,851	962,059	92.61	76,749	19,600	56,747	—137,337
St. Louis Merchants' Bridge Terminal	9	.....	1,420	666,415	97,525	128,066	1,480	502,434	11,775	741,280	111.23	—74,866	16,500	—91,366	—49,421
St. Louis-San Francisco	4,761	9,717,057	3,613,287	14,224,035	2,107,646	3,141,173	127,482	6,104,494	417,351	11,871,808	83 46	2,352,227	450,110	1,987,813	764,794
St. Louis Transfer	6	.....	.....	262,617	20,359	41,546	361	145,746	4,284	212,346	80.85	50,271	200	50,050	10,477
St. Louis S. W.	939	2,602,580	326,106	3,131,899	406,943	671,442	48,188	801,046	73,485	2,010,086	64.21	1,121,813	85,968	1,035,752	840,548
St. Louis S. W. of Texas	807	1,011,305	243,499	1,452,289	424,034	536,680	18,904	908,494	51,756	1,939,349	133.53	—487,061	54,468	—541,744	—271,204
San Antonio & Aransas Pass	736	428,725	171,098	736,028	305,086	250,729	12,386	407,991	34,959	1,010,641	137.31	—274,612	30,000	—304,881	—169,641
Seaboard Air Line	3,563	5,724,925	1,620,232	9,054,804	1,184,864	1,648,759	170,070	3,979,222	216,679	7,310,450	80.73	1,744,354	300,000	1,442,647	1,185,075
South Buffalo	11	61,176	.....	171,960	11,852	30,776	876	113,075	2,793	159,373	92.68	12,588	—7,160	5,428	—90,336
Southern	6,983	16,077,986	5,169,385	25,525,151	3,847,998	4,729,016	339,339	11,135,652	589,278	20,899,638	81.87	4,625,512	750,610	3,869,824	2,573,241
Southern Ry. in Miss.	278	217,784	107,551	374,773	86,037	47,934	7,627	174,347	9,609	325,555	86.86	49,218	19,600	29,600	27,312
Southern Pacific	7,024	17,292,992	7,605,501	29,143,505	4,749,096	6,033,969	249,187	11,205,737	514,924	23,390,373	80.25	5,753,132	1,838,149	4,405,640	1,563,228
Southern Pacific S. S. Lines	.....	1,217,005	48,225	1,347,162	20,320	1,215,524	31,063	1,349,474	50,178	2,666,559	197.93	—1,319,397	20,002	—1,339,398	—1,380,066
Spokane International	156	215,883	34,677	256,430	29,750	21,709	4,491	78,525	10,503	145,092	56.58	111,338	9,688	101,629	69,882
Spokane, Portland & Seattle	538	957,401	267,028	1,371,359	290,866	168,920	13,618	468,844	44,515	994,799	72.54	376,561	160,000	216,219	170,593
Staten Island Rapid Transit	23	137,413	133,662	294,206	60,265	72,022	2,504	216,887	17,995	369,672	125.65	—75,465	30,000	—105,465	—132,611
Tennessee Central	292	350,558	80,934	491,638	101,312	116,778	10,606	234,577	15,044	478,314	97.28	13,323	10,212	3,107	106,975
Terminal R.R. Assn. of St. L.	36	.....	5,427	743,288	126,004	132,510	1,952	365,910	8,906	643,620	86.59	99,669	66,279	33,385	130,050
Tex. & Ft. Smith	87	219,117	43,120	308,580	41,904	33,650	1,520	58,997	4,278	142,633	46.22	165,948	31,556	134,374	103,245
Tex. & N. Orleans	469	1,051,939	312,584	1,566,891	281,216	401,324	10,117	587,071	34,658	1,391,358	88.79	175,533	42,258	130,452	231,500
Texas & Pacific	1,946	3,990,552	1,942,813	6,731,813	1,123,363	1,496,559	68,524	2,977,802	143,727	5,891,955	87.52	839,858	224,200	614,780	718,031
Toledo & Ohio Central	435	1,521,952	131,035	1,772,410	167,561	530,676	29,679	860,765	36,824	1,631,758	92.06	140,652	74,356	66,268	296,774
Toledo, Peoria & Western	247	194,155	97,393	310,705	33,700	94,018	5,075	181,332	10,424	324,549	104 45	—13,844	17,006	—30,843	—21,387
Toledo, St. Louis & Western	454	1,459,372	60,092	1,640,274	192,494	352,427	13,598	767,580	21,862	1,347,960	79.74	292,314	62,000	230,020	134,810
Trinity & Brazos Valley	368	246,250	39,389	313,822	142,822	117,623	4,645	171,045	14,916	451,051	143.73	—137,229	19,563	—156,886	—58,341
Ulster & Delaware	128	62,068	28,109	155,917	32,852	40,180	2,640	111,300	9,130	196,929	126.30	—41,012	10,000	—51,010	4,157
Union R. R. of Penna.	40	.....	.....	1,182,965	102,806	422,173	541	812,549	15,732	1,353,801	114.44	—170,836	13,456	—184,291	—257,814
Union Pacific	3,614	13,845,945	2,931,390	20,548,338	2,108,407	3,645,936	87,461	6,114,913	492,360	12,887,416	62.72	7,660,922	576,842	7,082,679	2,128,802
Utah	98	342,832	1,036	344,888	19,877	59,836	432	83,115	4,761	168.020	48.71	176,868	9,089	167,778	97,258
Vicks., Shreveport & Pacific	171	464,329	186,587	737,037	77,531	127,520	14,211	305,638	20,027	552,838	75.01	184,199	23,728	160,383	108,482
Virginian	523	1,820,189	108,296	2,190,302	238,432	477,941	8,438	975,894	34,714	1,732,589	79.10	457,713	90,000	367,708	514,281
Wabash	2,473	6,269,770	1,488,627	9,157,840	1,177,239	2,577,468	118,107	4,566,455	255,332	8,742,024	95.45	415,816	245,026	169,715	131,930
Washington Southern	35	250,543	195,646	685,472	64,209	89,321	6,785	269,253	14,242	451,678	65.89	233,794	14,669	219,112	—156,613
West Jersey & Seashore	361	501,500	788,828	1,438,407	480,652	394,924	22,582	1,045,696	45,864	2,004,337	139.34	—565,930	97,984	—664,020	282,122
Western Md.	689	2,345,825	148,539	2,740,078	517,378	1,198,592	105,565	1,094,129	85,520	3,025,038	110.39	—284,961	86,400	—371,361	—40,844
Western Pacific	1,041	1,980,297	258,124	2,385,733	396,853	429,223	34,808	780,334	55,356	1,736,949	72 81	648,785	119,541	529,027	480,765
Western Ry. of Ala.	133	271,556	137,970	484,346	59,656	93,192	12,063	170,366	12,703	355,930	73.48	128,416	12,250	116,159	58,756
Wheeling & Lake Erie	511	1,840,440	114,056	2,169,152	227,394	639,880	28,748	1,053,240	49,445	2,004,652	92.42	164,500	127,000	37,499	380,616
Wichita Falls & N. W.	328	313,400	108,767	462,331	110,179	61,231	4,067	271,376	12,459	459,310	99.34	3,020	22,357	—19,551	11,326
Yazoo & Miss. Valley	1,381	3,559,886	1,019,844	5,026,114	881,991	1,104,091	42,074	1,864,764	106,999	4,007,482	79.73	1,018,632	151,800	863,614	295,566
San Ant., Uvalde & Gulf	217	110,536	102,132	224,834	125,437	51,103	4,387	114,420	8,994	304,340	135.36	—79,506	4,579	—84,126	—18,321
Wichita Valley	256	217,023	86,268	331,460	46,039	21,622	275	144,922	5,011	217,868	65.72	113,592	10,172	103,418	122,000
Mississippi Central	164	72,636	41,073	134,771	81,996	75,988	3.765	116,654	13,537	291,940	216.61	—157,169	7,817	—165,147	—125,353
Lake Terminal	12	.....	550	187,231	26,940	43,158	.....	135,691	70	205,859	109.94	—18,627	11,535	—30,163	—40,792
Lake Superior & Ishpeming	34	11,639	523	13,908	39,297	34,479	345	20,319	4,887	99,328	714 18	—85,421	7,744	—93,165	—12,518

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH, 1920

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (Inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Alabama & Vicksburg	141	$150,776	$64,851	$233,939	$35,298	$39,831	$4,046	$85,183	$10,159	$177,300	69.81	$56,640	$14,244	$42,395	$43,094
Alabama Great Southern	312	606,498	171,541	843,405	82,352	205,636	12,326	320,931	18,734	642,910	78.07	180,495	34,314	146,081	96,921
Atchison, Topeka & Sant Fe	8,723	10,991,175	3,835,046	16,075,181	2,743,980	3,988,351	153,469	5,833,939	292,284	13,028,629	81.05	3,046,552	931,650	2,114,333	836,980
Atlanta, Birmingham & Atlanta	639	354,598	67,824	454,201	101,307	117,522	2,148	161,793	13,387	317,469	162.35	—121,921	12,300	—134,222	—108,296
Atlanta & St. Lawrence	166	155,253	26,052	195,547	69,746	69,371	21,288	237,851	17,725	495,728	109.14	—41,527	16,479	—58,007	—62,458
Atlantic City	177	110,740	144,962	269,563	49,964	43,494	1,278	174,248	1,436	270,508	100.35	—945	14,520	—15,465	—18,587
Atlantic Coast Line	4,891	3,628,644	1,891,289	5,959,249	764,713	1,244,484	50,219	2,622,080	114,296	4,849,088	81.37	1,110,161	265,000	842,676	289,291
Baltimore & Ohio Chicago Terminal	90	.....	.....	238,526	25,184	66,246	970	156,439	9,690	263,090	110.20	—24,564	30,669	—55,233	44,819
Baltimore, Chesapeake & Atlantic	87	82,962	27,341	116,731	6,918	46,490	921	67,164	3,714	125,207	107.26	—88,477	3,700	—12,177	4,630
Bangor & Aroostook	658	383,298	91,395	498,251	143,104	139,065	3,871	211,729	19,707	524,424	105.25	—26,173	27,001	—53,174	—87,164
Beaumont, Sour Lake & Western	118	139,398	30,066	174,591	32,991	15,110	1,871	49,872	5,312	105,082	60.18	69,509	2,850	66,636	97,778
Belt Ry. Co. of Chicago	31	.....	.....	377,324	27,914	78,590	591	227,967	8,331	343,393	91.01	33,931	19,384	14,547	30,290
Bessemer & Lake Erie	217	542,433	39,108	606,573	90,955	329,427	10,320	267,629	27,377	730,407	120.41	—123,834	15,800	—139,634	—79,226
Bingham & Garfield	36	134,495	1,679	137,206	25,155	31,626	1,509	33,513	3,388	96,775	70.53	40,431	7,425	33,006	64,254
Birmingham Southern	31	34,918	.....	48,669	4,511	9,764	1,565	29,927	3,559	49,327	101.34	—658	1,754	—2,412	—13,525
Boston & Maine	2,304	3,860,179	1,752,506	6,216,164	1,336,086	1,478,896	34,858	3,524,200	218,677	6,627,454	106.61	—411,291	234,887	—646,243	—424,281
Buffalo, Rochester & Pittsburgh	589	1,366,264	138,021	1,555,998	160,851	473,725	12,344	711,240	35,822	1,396,249	90.90	159,749	35,000	124,737	155,176
Canadian Pacific Lines in Maine	233	270,137	60,875	343,515	52,549	94,833	2,744	211,863	2,721	365,710	106.46	—22,195	12,200	—34,395	—19,087
Central New England	301	395,209	27,499	444,329	150,560	108,258	2,863	280,575	16,688	559,072	125.82	—114,743	18,800	—133,543	—39,857
Central of Georgia	1,924	1,385,176	491,608	2,073,346	326,833	396,895	36,967	901,989	69,363	1,731,784	83.52	341,563	77,397	264,185	236,530
Central Vermont	413	401,567	82,006	531,001	73,931	136,085	9,335	348,208	19,715	589,409	110.99	—58,409	17,400	—75,819	6,603
Charleston & Western Carolina	342	187,948	50,126	256,346	53,765	54,286	4,994	146,808	2,947	262,800	102.52	—6,454	8,500	—14,954	—43,369
Chesapeake & Ohio	2,516	4,985,998	777,281	6,200,033	752,270	1,638,691	40,763	2,580,625	150,300	5,191,926	83.74	1,008,106	229,810	778,265	170,029
Chicago & Alton	1,050	1,565,024	487,251	2,197,265	244,917	539,515	22,969	1,026,067	63,838	1,912,740	87.05	284,524	72,434	212,013	190,881
Chicago & Eastern Illinois	1,131	1,685,945	416,022	2,311,008	228,686	771,858	18,480	1,014,533	82,064	2,128,123	92.08	182,885	100,000	82,667	432,565
Chicago & Erie	269	754,945	61,609	887,604	61,851	134,256	9,389	457,446	27,572	695,564	78.36	192,040	40,909	150,969	101,548
Chicago Great Western	1,496	1,047,830	430,835	1,638,790	236,201	469,854	21,945	857,750	51,490	1,655,088	100.99	—16,299	67,061	—83,398	—203,538
Chicago Junction	12	.....	.....	293,685	51,967	88,061	224	337,089	9,639	386,980	131.76	—93,295	2,992	—96,287	39,253
Chicago, Milwaukee & St. Paul	10,628	9,407,888	2,404,885	13,114,063	1,242,794	2,905,391	92,108	5,999,847	358,309	10,682,253	81.45	2,431,811	677,263	1,754,515	1,936,331
Cincinnati, Indiana & Western	321	306,391	53,534	378,556	44,332	116,283	7,542	158,652	17,868	345,690	91.31	212,866	15,569	17,297	32,362
Cincinnati, New Orleans & Texas Pacific	337	1,086,495	286,502	1,470,822	153,773	395,364	21,179	594,928	33,970	1,212,908	82.46	257,914	58,967	198,948	104,237
Cincinnati Northern	251	267,691	20,471	297,845	21,834	48,217	2,192	83,554	5,566	161,363	54.17	136,483	9,615	126,868	85,682
Cleveland, Cincinnati, Chicago & St. L.	2,408	5,103,832	1,379,426	7,046,588	528,244	1,340,502	69,073	2,618,193	122,596	4,729,516	67.11	2,317,072	210,010	2,106,716	1,324,751
Colorado & Southern	1,099	727,947	188,109	987,908	128,487	222,504	10,400	373,006	45,944	786,201	79.58	201,708	59,791	141,786	—7,267
Colorado & Wyoming	43	20,961	987	78,359	12,345	21,462	202	40,600	4,007	78,617	100.32	—259	5,000	—5,259	—15,289
Delaware, Lackawanna & Western	956	3,517,463	846,309	5,082,370	513,394	1,327,012	65,879	2,948,630	140,466	5,059,816	99.55	22,555	287,500	—264,945	—842,418
Denver & Rio Grande	2,585	2,172,395	363,071	2,711,060	288,234	735,954	30,525	914,050	78,462	2,091,441	77.14	619,619	125,000	494,618	408,533
Denver & Salt Lake	255	106,612	22,336	136,799	53,424	85,950	722	114,417	8,393	262,907	192.18	—126,108	10,583	—136,691	—16,200
Detroit & Mackinac	376	129,189	32,999	172,129	15,088	34,322	3 689	83,088	6,561	142,725	82.91	29,405	9,571	19,655	30,605
Detroit, Toledo & Ironton	454	372,562	15,374	408,538	62,120	72,389	6,022	172,276	15,466	328,273	80.35	80,265	8,582	71,683	151,648
Duluth & Iron Range	292	87,337	23,970	127,024	61,911	110,767	845	118,096	20,713	312,561	246.06	—185,537	7,667	—193,205	—61,807
Duluth, Missabe & Northern	407	130,831	49,471	207,471	125,809	186,367	2,275	154,118	18,865	489,190	235.78	—281,719	13,748	—295,467	—167,471
Duluth, South Shore & Atlantic	614	170,089	74,167	272,646	56,537	50,129	5,039	184,691	13,781	313,766	115.08	—41,119	20,500	—61,628	—43,182
Duluth, Winnipeg & Pacific	178	166,506	30,496	200,184	23,161	42,471	2,940	100,839	9,466	178,882	89.35	21,302	10,186	11,116	—23,697
El Paso & Southwestern	1,027	758,859	191,453	1,003,102	185,224	239,836	11,714	332,517	38,426	808,753	80.63	194,849	100,415	94,428	—221,409
Elgin, Joliet & Eastern	832	1,712,926	2	1,979,242	164,567	493,394	6,596	773,593	33,438	1,471,532	74.34	506,709	51,600	455,109	2,870
Erie	1,989	6,667,935	1,055,816	8,500,417	721,489	2,456,554	71,075	4,221,684	217,074	7,749,374	91.16	751,042	253,739	491,104	1,450,387
Florida East Coast	764	687,390	494,213	1,315,134	132,527	162,169	7,664	439,400	25,234	781,360	59.41	533,774	39,583	494,105	408,097
Fonda, Johnstown & Gloversville	88	41,903	60,974	107,584	16,678	9,631	442	40,271	4,960	71,983	66.90	35,602	5,075	30,526	12,149
Ft. Smith & Western	253	107,948	27,917	146,298	39,778	40,059	4,086	62,959	6,812	154,818	105.82	—8,520	5,000	—13,762	—21,776
Ft. Worth & Denver City	454	580,014	262,366	880,284	150,460	221,852	5,386	411,526	36,737	825,794	93.81	54,490	23,100	31,369	—134,277
Ft. Worth & Rio Grande	235	80,512	62,553	153,235	39,774	23,092	1,561	80,475	6,494	151,336	98.76	1,899	3,785	—1,886	40,599
Galveston Wharf	13	.....	.....	102,310	20,600	3,020	363	42,199	2,903	82,952	81.07	19,359	14,500	4,859	7,900
Georgia	328	396,334	130,461	564,189	54,762	109,662	13,127	283,760	17,149	478,657	84.83	85,531	5,950	79,581	—60,460
Georgia Southern & Fla	402	237,195	130,369	395,447	49,108	99,796	5,729	184,194	12,092	351,601	88.91	43,846	19,250	24,596	17,559
Grand Trunk Western Ry. Company	350	2,923,691	557,829	3,879,829	303,003	1,120,982	46,691	1,796,279	113,635	3,391,571	87.41	488,259	131,359	357,084	—159,084
Great Northern	8,175	5,277,896	1,547,955	7,713,119	1,525,997	2,009,003	58,908	3,736,183	201,191	7,664,412	99.36	48,707	773,821	—726,165	—1,025,032
Gulf & Ship Island	307	164,156	46,544	226,897	55,319	58,711	4,108	86,446	13,036	217,976	96.06	8,921	8,965	—56	10,432
Gulf, Colorado & Santa Fe	1,907	1,481,394	471,564	2,101,389	526,325	392,997	18,461	828,583	48,993	1,814,788	86.36	286,601	87,016	199,419	157,335
Gulf, Mobile & Northern	407	237,202	51,910	303,064	69,746	68,103	9,616	118,455	17,072	282,992	93.37	20,072	13,745	6,328	33,376
Hocking Valley	350	965,015	102,502	1,117,081	128,694	366,184	5,824	420,958	28,467	950,125	85.05	166,956	68,457	98,499	230,629
Indiana Harbor Belt	120	.....	.....	704,748	100 890	183,290	2,098	463,457	18,576	768,311	109.01	—63,563	10,070	—73,634	5,213
International & Great Northern	1,159	955,843	220,727	1,261,696	342,905	368,830	17,643	762,451	46,394	1,544,912	122.44	—283,216	32,500	—315,986	—1,600
Kanawha & Michigan	176	295,437	44,732	352,340	45,823	141,658	865	137,276	12,209	337,837	95.88	14,504	25,000	—10,496	16,876
Kansas City, Mexico & Orient	272	88,030	13,565	108,674	41,270	34,759	1,966	56,149	10,162	144,306	132.79	—35,632	7,700	—43,332	15,768
Kansas City, Mexico & Orient of Texas	465	100,686	18,927	126,816	57,124	33,300	1,963	68,427	9,912	170,726	134.62	—43,909	6,250	—50,162	—2,050
Kansas City Southern	774	1,055,815	223,742	1,351,857	208,078	330,295	26,369	572,517	54,866	1,192,126	88 18	159,731	70,900	88,348	98,092
Lake Erie & Western	741	665,513	65,561	751,267	112,532	201,720	10,888	323,381	24,816	673,338	89.62	77,929	35,000	41,170	29,110
Lake Superior & Ishpeming	34	4,919	291	6,963	17,649	20,474	372	10,111	2,800	51,406	738.27	—44,443	4,939	—49,382	—7,328
Lehigh & New England	229	384,672	2.668	399,801	40,868	73,450	12,034	129,104	15,344	270,748	67.71	129,052	14,803	114,249	139,270
Lehigh Valley	1,435	4,711,746	500,981	5,613,533	634,544	1,449,673	52,407	2,911,171	111,408	5,179,637	92.27	433,896	176,000	257,832	344,647

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF MARCH, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year
					Maintenance of—									
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.				
Long Island	398	$580,176	$989,860	$1,745,818	$265,733	$437,543	$8,978	$1,080,255	$52,525	$1,856,113	106.31	$110,295	$101,096	—$244,745
Lake Terminal	12	.....	280	101,382	7,861	27,856	.....	73,701	29	109,446	107.95	—8,065	6,048	—6,668
Los Angeles & Salt Lake	1,168	1,121,871	396,352	1,640,203	186,474	261,286	17,414	504,885	36,880	1,051,218	64.09	588,985	79,293	509,403	—63,126
Louisiana & Arkansas	302	308,873	53,377	378,349	70,134	49,742	4,432	123,406	9,013	255,390	67.50	122,959	18,078	104,803	134,414
Louisiana Railway & Navigation Co.	343	268,840	40,506	329,225	87,659	58,452	4,222	154,030	11,822	316,186	96.03	13,039	14,000	—961	—30,814
Louisville & Nashville	5,040	6,484,168	1,887,974	9,275,447	1,345,348	2,637,410	150,050	4,064,326	215,528	8,463,917	91.25	811,531	336,964	473,038	—689,936
Louisville, Henderson & St. Louis	199	167,515	48,604	249,263	42,520	26,483	3,766	74,819	8,130	155,717	62.47	93,546	7,215	86,331	43,114
Maine Central	1,216	880,999	359,168	1,340,453	313,965	365,051	10,364	882,929	44,908	1,618,097	207.13	—277,645	95,742	—373,386	—172,985
Maryland, Delaware & Va.	82	60,485	22,440	87,229	7,785	38,900	538	59,262	2,702	109,187	124.17	—21,959	2,000	—23,959	10,936
Michigan Central	1,862	5,158,294	1,509,955	7,296,956	593,766	1,614,766	43,831	2,976,746	119,962	5,453,725	74.73	1,843,231	235,000	1,607,541	758,825
Mineral Range	101	42,984	330	45,499	10,113	16,971	256	28,660	1,098	57,098	125.41	—11,599	3,600	—15,199	—14,546
Minneapolis & St. Louis	1,646	897,443	243,901	1,204,628	135,638	334,651	16,845	613,802	38,590	1,140,210	94.65	64,418	56,711	7,601	—7,686
Minneapolis, St. Paul & S. Ste. Marie	4,243	1,571,726	622,579	2,433,309	482,410	702,427	39,234	1,483,631	89,358	2,816,345	115.74	—383,036	253,873	—636,910	—650,373
Minnesota & International	194	77,836	32,352	117,010	8,870	15,856	457	57,572	3,892	86,649	74.05	30,360	5,851	24,509	21,158
Mississippi Central	164	67,685	19,270	91,071	21,926	23,961	1,971	35,973	12,364	96,196	105.62	—5,125	3,399	—8,524	7,831
Missouri & North Arkansas	365	106,943	43,999	159,247	47,028	31,227	2,119	69,098	6,855	157,138	98.67	2,108	5,893	—3,842	50,352
Missouri, Kansas & Texas Railroad	1,715	2,080,646	416,728	2,686,642	500,393	706,299	29,228	989,478	108,163	2,350,761	87.49	335,881	112,294	223,222	158,373
Missouri, Kansas & Texas of Texas	1,739	1,378,839	564,360	2,107,049	414,656	466,212	20,019	1,103,493	80,256	2,108,593	100.06	—1,544	59,584	—61,167	—8,542
Missouri Pacific	7,299	6,060,373	1,253,284	8,008,851	1,750,854	1,914,005	129,097	3,476,347	255,988	7,577,181	94.61	431,370	476,139	—45,388	33,986
Mobile & Ohio	1,052	1,244,912	178,532	1,510,674	220,836	490,316	25,464	684,643	44,650	1,466,614	97.08	44,060	59,652	—15,592	199,859
Monongahela Connecting	7	.....	.....	263,136	27,262	45,430	585	117,156	6,566	197,000	74.86	66,135	3,016	63,119	68,159
Montour Railway	56	92,011	1,503	99,750	20,674	39,352	747	33,018	6,516	103,585	103.84	—3,835	2,179	—6,014	10,486
Nashville, Chattanooga & St. Louis	1,247	1,248,576	328,919	1,723,691	231,105	421,419	35,619	785,744	51,204	1,544,159	89.58	179,532	42,560	136,977	—54,449
Nevada Northern	165	133,171	11,404	149,842	35,622	32,510	677	41,437	4,173	114,543	76.44	35,299	6,267	29,031	11,568
New Jersey & New York	47	15,245	85,373	105,654	8,257	18,387	343	71,107	2,303	100,396	95.02	5,258	1,927	3,329	11,506
New Orleans & N. E.	203	404,151	101,642	552,888	71,620	131,359	8,423	231,567	12,364	457,277	82.71	95,611	43,119	52,492	61,540
New Orleans Great Northern	284	172,420	42,686	224,877	39,441	42,207	3,410	86,921	10,139	182,526	81.16	42,351	12,031	30,320	26,640
New Orleans, Texas & Mexico	191	152,744	41,576	199,746	47,845	24,864	2,791	62,476	8,164	145,995	73.09	53,751	12,167	41,582	15,455
New York Central	6,069	12,569,102	6,828,753	22,831,133	2,393,923	5,912,736	214,480	13,185,614	678,628	22,802,827	99.88	28,306	820,415	—797,391	—2,211,752
New York, Chicago & St. Louis	574	2,202,960	75,890	2,346,256	211,678	437,111	29,304	898,201	64,616	1,645,301	70.12	700,955	25,000	675,949	179,020
New York, New Haven & Hartford	1,965	4,065,799	3,709,104	9,092,874	1,309,395	2,240,220	37,520	4,897,733	312,927	8,969,266	98.64	123,609	337,000	—214,653	—309,883
New York, Susquehanna & Western	135	258,646	68,120	362,592	30,482	48,030	1,134	265,703	8,383	353,731	97.44	8,862	18,674	—9,814	59,826
Newburgh & South Shore	7	.....	.....	151,829	14,517	33,304	.....	93,373	4,397	145,590	95.89	6,239	7,783	—1,544	31,913
Norfolk & Western	2,202	3,775,448	667,719	4,804,575	1,064,815	2,262,653	34,003	2,487,887	155,272	6,032,642	125.56	—1,228,067	425,000	—1,653,396	—2,526,797
Northern Pacific	6,655	5,995,606	1,533,139	8,247,856	1,569,726	2,117,320	75,189	3,503,502	227,004	7,603,460	92.18	644,396	730 082	—86,230	—863,148
Northwestern Pacific	538	272,097	167,954	496,390	102,946	71,959	4,077	229,775	14,665	426,021	85.82	70,369	25,591	44,766	92,637
Northern Alabama	10	104,253	13,521	119,974	16,187	7,020	1,311	55,415	1,613	81,547	67.97	38,426	4,580	33,846	40,851
Panhandle & Santa Fe	772	483,884	132,655	651,809	199,819	244,813	2,873	284,381	15,606	727,492	111.61	—75,683	20,435	—96,028	30,418
Peoria & Pekin Union	19	22,932	4,629	133,418	13,217	29,592	86	88,444	5,309	136,647	102.42	—3,229	9,500	—12,729	35,290
Perkiomen	41	74,288	9,175	87,304	8,180	4,355	17	37,292	233	50,087	57.37	37,216	3,276	33,940	7,364
Philadelphia & Reading	1,126	6,068,515	737,343	7,173,090	630,176	1,944,928	50,609	3,557,902	160,037	6,361,854	88.69	811,236	209,584	601,722	1,718,219
Philadelphia, Bethlehem & N. R.	71	.....	.....	80,664	12,161	15,835	415	75,528	2,220	106,158	131.60	—25,495	1,020	—26,525	28,097
Pittsburgh & West Virginia	63	108,981	9,626	135,205	29,280	39,238	1,143	59,641	9,062	144,530	106.89	—9,325	13,951	—23,277	38,579
Pittsburgh & Shawmut	103	140,875	5,755	147,450	26,029	27,468	1,405	53,500	6,074	114,475	77.63	32,974	123	32,851	74,432
Port Reading	21	142,036	.....	205,221	15,429	8,676	18	95,365	5,050	124,537	60.68	80,684	12,007	68,677	39,340
Richmond, Fred. & Potomac	116	460,334	340,267	916,892	78,255	153,661	4,164	357,952	23,553	617,599	67.35	299,294	31,050	268,243	—133,209
Rutland	415	199,031	94,265	359,414	78,994	99,030	4,323	253,252	12,873	450,028	125.21	—90,614	21,121	—111,735	108,697
St. Joseph & Grand Island	258	205,410	41,797	260,984	60,516	47,682	1,836	136,560	12,374	253,969	97.31	7,014	11,889	—4,874	42,092
St. Louis, Brownsville & Mexico	548	413,995	171,368	617,180	126,956	78,837	7,586	194,951	24,183	432,115	70.01	185,066	12,300	172,629	55,847
St. Louis-San Francisco	4,761	5,035,641	1,822,246	7,262,462	969,787	1,507,809	50,339	2,798,484	205,040	5,527,387	76.11	1,735,076	225,277	1,509,376	784,831
St. Louis, San Francisco & Texas	134	107,650	18,209	135,799	22,301	23,611	1,410	79,198	5,493	132,015	97.20	37,851	1,880	1,906	12,326
San Antonio & Aransas Pass	736	229,981	83,073	338,776	99,187	87,463	6,152	156,367	19,338	368,502	108.77	—29,727	15,000	—44,727	82,348
Seaboard Air Line	3,563	2,859,722	860,816	4,111,950	646,395	1,001,115	73,794	2,084,935	126,092	3,995,363	97.16	116,587	150,000	—33,548	—315,372
South Buffalo	11	56,487	.....	121,082	6,294	17,111	453	79,463	1,906	105,226	86.90	15,856	—3,580	12,276	22,637
Southern	6,972	8,311,706	2,583,934	11,879,410	1,339,382	2,460,652	132,154	5,231,302	306,068	9,671,017	80.57	2,308,393	401,921	1,906,472	1,731,960
Southern Ry. in Mississippi	278	97,245	47,176	156,567	45,183	28,525	2,069	83,021	4,720	163,517	104.43	—6,951	9,800	—16,751	13,837
Spokane & International	156	89,971	17,666	112,088	15,787	11,372	2,441	38,988	5,069	73,480	65.55	38,608	5,170	33,421	25,437
Spokane, Portland & Seattle	338	447,015	142,227	633,021	90,789	83,687	4,968	217,345	22,299	424,324	67.02	208,697	75,003	133,695	35,712
Staten Island Rapid Transit	23	100,743	78,115	191,788	25,656	41,570	1,231	97,312	9,691	175,459	91.48	16,330	15,000	1,329	24,309
Tennessee Central	292	165,506	44,242	222,780	30,697	43,826	3,349	102,167	13,980	194,018	87.08	28,762	5,687	23,075	63,919
Texas & Fort Smith	87	70,349	22,789	106,853	14,497	21,718	1,307	44,055	5,873	87,303	81.70	19,550	15,360	4,190	222
Texas & Pacific	1,946	1,876,993	1,019,447	3,115,811	620,881	710,814	36,431	1,349,454	89,298	2,849,319	91.44	266,492	120,800	145,558	181,731
Toledo & Ohio Central	503	706,111	57,271	796,324	80,289	253,558	4,481	375,981	17,620	734,906	92.28	61,419	37,919	23,500	32,209
Toledo, Peoria & Western	247	92,780	53,791	155,866	18,829	14,982	1,788	68,163	9,373	113,133	72.58	42,733	8,500	34,233	65,054
Toledo, St. Louis & Western	454	711,532	30,168	793,922	113,375	139,494	8,917	330,391	12,604	604,729	76.17	189,193	31,000	158,193	110,902
Trinity & Brazos Valley	368	149,427	18,672	174,174	87,739	32,955	681	61,793	9,026	192,194	110.34	—18,021	7,200	—25,229	43,124
Ulster & Delaware	128	40,968	15,496	80,626	17,190	20,326	2,015	57,968	8,596	106,665	132.29	—26,039	5,000	—31,039	—2,634
Union R. R. of Pennsylvania	40	.....	.....	669,333	80,159	188,031	310	448,768	7,778	725,046	108.32	—55,713	7,728	—63,441	—193,546
Union Pacific	3,614	6,732,769	1,574,382	9,167,611	1,068,742	1,639,578	68,453	2,792,796	294,824	6,082,487	66.35	3,085,123	437,434	2,646,610	703,867
Utah	98	151,419	625	152,369	15,642	28,433	174	34,839	2,754	81,841	53.71	70,527	5,066	65,461	33,336

The Traffic Club of Chicago, at a business meeting held on May 13, drafted a petition to Congress asking that legislation be enacted making it unlawful for two or more employees of any common carrier engaged in interstate commerce, to enter into an agreement to hinder the operation of any transportation facilities. It was also resolved that a similar petition be made to the legislatures of the several states, urging them to enact similar legislation. The club approved the Kellogg Bill, in the United States Senate, permitting railroad companies to own and operate steamship lines on the Great Lakes.

A daring robbery of the mail coach of the northbound New Orleans Limited of the Illinois Central at Kankakee, was made by a lone bandit early on the morning of May 14. The man was later apprehended in Chicago and after a revolver battle in which he succeeded in killing one policeman, he himself was shot to death. A large amount of the stolen money, all in gold and currency, was recovered. The robber, who at one time was a postal employee, boarded the train at Gilman, Ill., taking a seat in one of the forward Pullmans. As the train left Kankakee he proceeded to the mail coach. He remained in the mail coach until the train stopped at the 63rd St. station, Chicago, when he dropped off. One of the mail clerks notified the police of the robbery, but two policemen meeting the robber on the street had already apprehended him, and within a half hour he was cornered and was killed in a struggle with police officers. An investigation is being made to connect this man with other recent robberies of this character.

Safety-First on the Chicago & North Western

F. Walters, general manager of the Chicago & North Western, has reissued the circular, promulgated last year, reminding trainmen and enginemen of the importance of special care in approaching highway crossings where automobiles are liable to approach without observing due precautions.

The circular prescribes the "nine-second" whistle signal as indicated by the lines below:

The first two lines indicate a space of two seconds each; and the other lines, and the spaces between lines, indicate one second each.

Pictures are shown in the circular to emphasize the point that people in automobiles, moving in the same general direction as an approaching train, will sometimes run on to a crossing without raising their side curtains; and to illustrate how a party in a large car will continue in animated conversation, with faces turned away from the railroad. Every engineman is exhorted to take the same precautions that he would if he knew that his own wife or children occupied the endangered automobile.

American Association of Engineers

At the annual convention of the American Association of Engineers, held in St. Louis on May 10 and 11, the following officers were elected for the ensuing year: President, L. K. Sherman, president of the U. S. Housing Corporation, Washington, D. C.; vice-presidents, H. O. Garman, chief engineer, Public Service Commission of Indiana, Indianapolis, Ind., and A. B. McDaniel, principal engineer, construction division, U. S. Army, Washington, D. C.; directors, Edmund T. Perkins, consulting drainage engineer, Chicago; Charles A. Finley, managing engineer, water bureau, Pittsburgh, Pa.; W. C. Bolin, assistant engineer, Baltimore & Ohio, Chicago; B. A. Bertenshaw, valuation engineer, Big Four, Cincinnati, O.; Frederick Bass, professor, University of Minnesota, Minneapolis, Minn., and R. W. Barnes, principal assistant engineer Southern Pacific, Portland, Ore. Retiring president, F. H. Newell, head of the department of civil engineering, University of Illinois, becomes a member of the board of directors automatically. The following directors also hold over another year: Raymond Burnham, consulting engineer, Chicago; E. F. Collins, civil engineer, St. Louis, Mo.; P. E. Harroun, consulting engineer, San Francisco, Cal.; A. A. Matthews, chief engineer, St. Louis Southwestern, St. Louis, Mo., and F. D. Richards, consulting engineer, Cleveland, Ohio.

Results of the A. S. C. E. Questionnaires

Of the nine questions submitted to the members of the American Society of Civil Engineers only two questions, A-3 and B-7, received a negative vote, failing by a vote of 87 and 275, respectively. Question A-3 related to the formation of a large organization of all engineering societies to handle other than techincal matters, the other related to a second increase of non-resident dues, in addition to the increase provided for in question B-6, should the activities brought about by the movement to expand both the internal and external work of the society call for additional funds. The remainder of the questions—those dealing with the development and expansion of the society, co-operation with other societies, the election of directors, the abolishment of a nominating committee, the allotting of dues to local sections and the increase of non-resident dues to provide for greater activities received a favorable vote.

Mechanical Engineers' Meeting

The Spring meeting of the American Society of Mechanical Engineers will be held at St. Louis, Mo., on May 24, 25, 26 and 27. Special trains (or cars) are to be run so that members from the east and north can visit Keokuk, Iowa, on Sunday, the 23d, and Tulsa, Okla., after the meeting.

Headquarters willl be at the Hotel Statler, and the first general meeting for discussion will be on Monday afternoon, with papers on valuation methods, by D. H. Ray, J. R. Bibbins, H. C. Anderson and Cecil Elmes; also a paper contributed by Dr. M. E. Cooley, containing data collected by the late F. B. H. Paine.

Railroad men will be interested also in papers to be read on Tuesday; by William S. Mitchell on River Barges and Terminals; by E. W. Schadek on Mississippi River Transportation; and by C. B. Lord on Tight-Fitting Threads for Bolts and Nuts. On Wednesday morning there will be a session devoted to foundry practice, with papers by Richard Moldenke, Enrique Touceda, John H. Hall, Zay Jeffries and Charles Pack. On Thursday morning there will be a session devoted to power and combustion, with papers by Otis L. McIntyre and Thos. C. McBride.

Between the sessions visits will be made to various industries in and around St. Louis.

Frisco Asks Injunction Against Missouri Tax Law

The St. Louis-San Francisco has instituted injunction proceedings against the state treasurer and the attorney general of Missouri to enjoin the enforcement of the 1917 Missouri Franchise Tax Law. A hearing was held on April 29, before Judge Van Valkenburgh at Kansas City, Mo., on the application for a preliminary injunction. However, no decision was reached. The decisions in this case will undoubtedly have a far-reaching effect on the taxation of corporations, inasmuch as the case hinges upon the definition of the term "surplus" upon which the franchise tax is based.

In outlining the case, E. T. Miller, general attorney of the Frisco, said, in part:

"The Legislature of Missouri in 1917 passed a Franchise Tax Act providing for the assessment of a franchise tax equal to three-fortieths of one per cent on the par value of the outstanding capital stock and surplus of corporations doing business in Missouri. In 1918 the State Tax Commission followed the clear language of the law in assessing the tax and considered "surplus" as the excess of assets over liabilities. When the new Commission came into office in 1919 it found a formula (agreed to, possibly by the old commission) under which "surplus" was to be considered as excess of gross assets over the par value of the outstanding capital stock. In other words, the total gross value of all assets less the par value of the outstanding capital stock was taxable as "surplus" under the act without considering or deducting liabilities. The Tax Commission in 1920 followed this formula in assessing the taxes.

"The Marquette Hotel Investment Company, a Missouri corporation, employing all of its capital stock in business in this state,

was granted a writ of certiorari by the Supreme Court of Missouri to the State Tax Commission, and on hearing in the Supreme Court the definition of "surplus" given by the Tax Commission was approved. Motion for rehearing was filed by the hotel company and is still pending. The St. Louis Clearing House, The Missouri State Bankers' Association, the St. Louis Chamber of Commerce and organizations at Kansas City, have filed briefs in support of this motion. The sole question involved and determined in the hotel case was as to the definition of the term "surplus" used in the act. The facts in that case are as follows: The hotel company reported to the Tax Commission that the par value of its outstanding capital stock was $350,000; its assets were $708,770.90; its outstanding indebtedness to creditors was $350,000; its capital stock liability was $350,000; and its surplus was $8,770.90. It contended that the par value of its outstanding capital stock and surplus was $358,770.90. The Tax Commission found that the par value of its outstanding capital stock and surplus was $708,770.90.

"The St. Louis-San Francisco instituted proceedings by injunction against the state treasurer and the attorney general in the United States District Court for the Western District of Missouri to enjoin the collection of the franchise tax assessed against it for the year 1919. The amount of the tax determined by the Commission was approximately $92,000. The railway company contended that on a proper basis, the report showing that it had no surplus, the tax would be approximately $16,000 computed only on the par value of its outstanding capital stock employed in Missouri.

"In the latter proceeding the act is attacked as violating the Federal Constitution, particularly the Fourteenth Amendment, the Commerce Clause and the clause relating to the impairment of contracts. It was also attacked as violating various provisions of the Missouri Constitution, particularly those relating to uniformity of taxation, those prohibiting the legislature from exempting persons other than those specifically enumerated, and those prohibiting discrimination.

"It further contended that if the act was constitutional, yet it was improperly administered by the Tax Commission in that its definition of "Surplus" was erroneous, and because the plaintiff was discriminated against in favor of other corporations in the same class. Another contention is that under Sections 11551 and 11552 of the Missouri Statutes, 1909, provision was made for the taxation of all franchises of railroad corporations other than the right to be a corporation, and that the plaintiff had paid its taxes, including taxation on its franchises for the year 1919."

Valuation Conference in Chicago

A meeting of valuation engineers of the railways, with representatives of the Division of Valuation of the Interstate Commerce Commission, was held at Chicago on April 29 and 30, the meetings being open to the representatives of all railroads and about 225 being in attendance. The meeting was called for the exchange of views as to the character and sufficiency of the work done by the Bureau of Valuation, in the preparation of cost of reproduction inventories, in estimating the value of lands, in preparation of investment statements, and for an exchange of views generally as to the progress of the work and the methods employed. It was clear from the statements made that while there were differences in some cases upon the question of quantities, as a rule the work had been well done in the ascertainment thereof, but that vital differences generally exist in the determination of the cost of grading, the elimination of grade crossings, and track laying and surfacing. Exceptions were also taken to the amounts allowed for general expenditures and interest during construction. The greatest difference in the land values was found in the cities and suburban districts, and in connection with the valuation of water front property.

The work of the accountants of the Bureau of Valuation in the preparation of their statement of the investment of each railroad company, seemed to have been principally a process of elimination of items that would not be included under present accounting rules, such as unamortized discounts on securities issued prior to 1907, without including amounts which would naturally be an offset thereto, such as interest during construction, etc. Arrangements were made for early meetings of the Engineering and Land committees, and the Committee on Preparation of Financial Histories and Accounts, to give consideration to the matters which the developments of the meetings indicated should have further attention.

Traffic News

The Atlanta, Birmingham & Atlantic announces the establishment of a regular sleeping car between Birmingham, Ala., and Brunswick, Ga.

The Kansas City Southern has filed an intervening complaint in the proceedings brought by the Pullman Company before the Public Service Commission of Missouri, to secure an increase in rates for Pullman accommodations. The Interstate Commerce Commission has authorized an increase from $1.50 to $2 in the Pullman sleeping car rates between Kansas City, Mo., and Joplin. This rate applies on the Kansas City Southern since traffic over its line between those points constitutes an interstate trip. Movement on the Missouri Pacific between Kansas City and Joplin is intrastate and since the Public Service Commission of Missouri has not yet authorized an increase in the sleeping car rates between points in Missouri, the Pullman Company is still charging $1.50 to passengers on the Missouri Pacific between those points and $2 on the Kansas City Southern. The complaint of the Kansas City Southern sets forth these facts and alleges that it is being discriminated against. It asks that the intrastate rate should be increased to $2, the same as the interstate rate.

Coal Production

The total output of soft coal during the week ended May 8, including lignite and coal coked, is estimated at 9,069,000 net tons, according to the weekly bulletin of the United States Geological Survey. This was an increase over the preceding week of 173,000 tons, or 2 per cent. In spite of the increase, production was still 1,946,000 tons short of that of the last normal week, March 22-27, and amounted to only 86 per cent of the average during the first quarter of the year. The cause of the depression was the persistence of the railroad workers' strike, which continued greatly to hamper the movement of freight through rail gateways and junction points from Kansas City and St. Louis to Buffalo and New York. Incomplete reports from the principal carriers show little improvement during the week of May 10-15.

Production during the first 110 working days of the last four years has been as follows:

1917	192,657,000	1919	149,979,000
1918	195,398,000	1920	184,153,000

The year 1920 is thus 34 million tons ahead of 1919, but is 8½ million behind 1917 and 11¼ million behind 1918.

"The shadow of the switchmen's strike was the outstanding feature of the week ended May 1," says the bulletin. "The car shortage which the strike has precipitated is the most acute in recent years and little improvement was shown during the week of the first. The lack of empties at the mines far outweighed all other causes of lost time. No market, for example, was reported from only three mines east of the Mississippi and all in Illinois. Although lack of demand was reported from many of the trans-Mississippi fields, only in Texas, Arkansas and Oklahoma was it the dominant factor limiting production. The average for the country showed a market value loss of 0.7 per cent.

"In comparison with the car shortage, all the other causes of loss were insignificant. Complete returns are expected to show that over the country as a whole the mines were closed down for that reason from 45 to 47 per cent of full time; that is, about 22 hours out of the 48. The cause of the acute shortage was the yard and switchmen's strike. The strike continued to hamper to varying degrees of severity, movement through most of the principal gateways and junction points east of the Mississippi and north of the Ohio and Potomac.

"The yards at Kansas City, St. Louis, Chicago, Columbus, Cincinnati, Cleveland, Toledo, Pittsburgh, Buffalo and New York were partially paralyzed."

Commission and Court News

Interstate Commerce Commission

Certificate of Necessity Not Required

The Commission has issued a conference ruling that paragraph 18 of Section 1 of the interstate commerce act, as amended by Section 402 of the transportation act, 1920, does not include ordinary spur, industrial, team, switching or side tracks of an existing line of railroad. Such a track is not regarded as constituting in itself an extension of the existing line, or a new line, within the meaning of that section, and, where not forming part of a proposed extension or new line, in respect of which certificate of public convenience and necessity must be obtained from the commission under that section, may be constructed, changed or abandoned by the carrier without such certificate.

No Special Rate for Metal Containers Returned

The Interstate Commerce Commission, in its decision on case No. 10,048, Pneumatic Scales Corporation vs. the railroads, has reaffirmed its former decision in the same case (51 I. C. C., 686), refusing to grant the concessions asked for by complainant. Request was made for a nallowance of weight on goods shipped in metal boxes, and for half fourth-class rates on returned containers, knocked down. Complainant holds patents on its steel container and the railroads contended that the tariff specifications asked for would permit the use of only the patented article; but complainant denies this. The claims that the container would reduce losses from breakage and thefts, and would facilitate economical loading of cars, are declared by the commission to be too speculative to warrant a decision reducing the compensation of the carrier.

State Commissions

The members of the New Jersey State Board of Public Utility Commissioners have sent to the governor of the state an answer to charges of inefficiency recently filed with the governor by the mayor and aldermen of Jersey City. It is a pamphlet of 25 pages.

The Southern Pacific, the Tidewater Railroad Company and the Cement Tolenas, are made defendants in an action filed with the Railroad Commission of the state of California by the Pacific Portland Cement Company, on May 12. Complaint is made of the rates charged for transporting lime rock. These rates were fixed by the United States government during federal control and are claimed to be a violation of the Public Utilities Act of California in that they were not fixed by the State Railroad Commission. The cement company asks for a readjustment and for reparation.

United States Supreme Court

The United States Supreme Court on May 17 reversed the decision of the district court for the southern district of New York in the bill of lading case, thereby dismissing the petition of railroads and steamship companies for a decree to set aside the order of the Interstate Commerce Commission prescribing the terms and forms of bills of lading; but the court explained that this action was taken because the Transportation act of 1920 gives the commission such authority over bills of lading as to render the case in question a moot case.

A Bill to permit American coastwise vessels to use the Panama Canal free of tolls has been introduced in the Senate by Senator Borah, of Idaho.

Foreign Railway News

A press despatch from Wellington says that the New Zealand government is about to place an order for rolling stock to the value of £1,750,000 ($8,750,000).

In answer to an inquiry, the Minister of Transport has stated in Parliament that the approximate number of railway freight wagons of all kinds in Great Britain is 1,354,000, of which no less than 628,000 are privately-owned.

W. Howard Williams, heretofore assistant general manager of the London & North Western, has been appointed general manager of the Central Argentine railway. Mr. Williams entered the service of the London & North Western in 1897. He was for several years assistant district goods manager at Wolverhampton and Liverpool. In 1913, he was transferred to the general manager's department at London to take charge of the work connected with the company's conciliation boards. In 1915 he was appointed mineral traffic manager, and four years later became assistant general manager. During the war he held the position of director of Inland Transport at the Ministry of Munitions.

The general strike, in France, appears to have failed,as far as the railroads are concerned, a large percentage of the train employees having returned to work at the beginning of this week; although the situation on the docks at important ports, as well as in the coal mining districts, continues uncertain.

Four French railroads announce that they will dismiss the men from their large shops and will have car and locomotive repairs done by contract. This is the gist of a cable despatch of May 17. The four roads are the State, the Orleans, the Paris, Lyons & Mediterranean and the Southern. The reason given for this action is that the shops were hotbeds of radicalism and their output was low. Ten thousand men will be released. Repairs will be done by private corporations able to discharge unwilling workers. The railroads are restricted by law in dealing with their employees.

Sad Plight of Austria's Railways

The following brief article sent to the *Railway Age* by an officer of the Austrian State Railways gives rather a melancholy picture of what was formerly the important railway system of Austria.

The Austrian-Hungarian monarchy has ceased to exist.

Locomotives Out of Commission Which the Austrians Cannot Repair for Lack of Materials

Austria was a state with 20,000,000 inhabitants. The republic of the same name which remains, is a little state of only 6,000,000 inhabitants. A similar fate has overcome the Austrian railways. The Austrian railways which approximated 13,000 miles before the war are now reduced to only 4,000

miles. Formerly 10,800 were in the possession of the state of Austria, while now there remain only 2,600 miles, one-fourth of the former system. Formerly the Austrian railways were in connection with the railways of six neighboring states: Italy, Switzerland, Germany, Hungary, Russia and Rumania. Now the Austrian railways are no more in connection with Russia and Rumania. Instead of these fertile countries they are in connection with the railways of Czecho-Slovakia and Jugoslavia, only parts of the old Austrian monarchy.

The effects of the war have particularly hit Vienna the capital of the Austrian empire, a city with nearly 2,000,000 inhabitants. As this town was situated in the centre of the Austro-Hungarian monarchy, railways radiated in all directions of the compass. Now there is only one line, the line from Vienna to Switzerland, which has its former extent (360 miles) and importance. All the other lines, especially those leading to the north are remnants of less than a hundred miles, because there the boundaries of the new states begin.

The railways of Austria are now in a bad condition in every respect. The rolling-stock, principally the locomotives and the freight cars are worn out by use during the war. Their number is diminished. There is a want of all repair materials, as for example copper and glass. But the lack of coal effects the greatest damage. In Austria there are very few coal pits. She depends entirely on her neighboring states, especially on Czecho-Slovakia, which however, has not enough coal for its own industry. Therefore Austria has the greatest difficulty in maintaining its railway traffic. From time to time all passenger traffic must be stopped, in order to carry on the traffic of the most important freight, such as food. For half a year passenger traffic has had to be stopped on each Sunday to save coal. This condition of the railways combined with the need of food and lack of coal for industry and household necessities and the low value of the Austrian paper-crown, practically effect a blockade of the country, which in many respects is harder than the blockade during the war.

Exports of Cars in March

The Department of Commerce reports eight passenger cars and 1,649 freight cars exported from the United States in the month of March, the whole valued at $2,593,005. The detailed figures, as compiled by the Division of Statistics, are as follows:

EXPORTS OF CARS FROM THE UNITED STATES MARCH, 1920

	Passenger		Freight and other		For other railways		Parts of cars.
Countries	Number	Dollars	Number	Dollars	Number	Dollars	Dollars
France	..	.....	725	1,755,820	250	24,951	380,875
Italy	..	.....	....	.....	....	.....	113,038
Norway	..	.....	....	.....	....	.....	2,625
England	..	.....	....	.....	6	6,582	7,292
British Honduras	..	.....	1	825	....	.....	.....
Canada	2	13,000	33	59,441	7	37,410	61,520
Guatemala	..	.....	....	.....	....	.....	273
Honduras	..	.....	....	.....	1	83	.....
Nicaragua	..	.....	....	.....	3	2,399	.....
Panama	..	.....	....	.....	....	.....	1,489
Mexico	..	.....	34	9,685	68	8,450	41,472
Newfoundland and Labrador	..	.....	....	.....	....	.....	1,318
Barbados	..	.....	....	.....	....	.....	795
Jamaica	..	.....	....	.....	13	24,884	.....
Trinidad and Tobago	..	.....	....	.....	....	.....	295
Other British West Indies	..	.....	....	.....	....	.....	835
Cuba	6	90,474	481	562,036	194	232,951	136,546
Virgin Islands of U. S.	..	.....	....	.....	....	.....	50
French West Indies	..	.....	7	9,632	....	.....	.....
Haiti	..	.....	....	.....	....	.....	20,111
Dominican Republic	..	.....	....	.....	144	90,913	5,103
Argentina	..	.....	....	.....	100	13,500	.....
Bolivia	..	.....	....	.....	....	.....	1,440
Brazil	..	.....	154	16,900	5	10,680	29,743
Chile	..	.....	....	.....	....	.....	12,448
Colombia	..	.....	5	5,300	....	.....	3,386
Ecuador	..	.....	....	.....	....	.....	8,092
British Guiana	..	.....	10	42,406	1	836	31,901
Peru	..	.....	2	1,230	70	15,466	8,693
Venezuela	..	.....	....	.....	....	.....	133
China	..	.....	....	.....	....	.....	3,280
Japanese China	..	.....	....	.....	....	.....	1,700
British India	..	.....	....	.....	....	.....	15,145
Hongkong	..	.....	....	.....	....	.....	71,840
Japan	..	.....	....	.....	....	.....	216,816
Philippine Islands	..	.....	197	26,256	68	12,461	6,131
British West Africa	..	.....	....	.....	....	.....	620
British South Africa	..	.....	....	.....	....	.....	122
Total	8	103,474	1,649	2,489,531	930	481,566	1,185,127

Equipment and Supplies

Locomotives

The Fuji Minobu (Japan) has ordered two 4-6-0 type locomotives from the Baldwin Locomotive Works.

The Kipawa Company, Mattawa, Ont., has ordered one four-wheel switching locomotive from the American Locomotive Company. This locomotive will have 14 by 22 in. cylinders and a total weight in working order of 79,000 lb.

The U. S. Ferro Alloys Corporation, New York, has ordered one four-wheel switching locomotive from the American Locomotive Company. This locomotive will have 14 by 22 in. cylinders and a total weight in working order of 79,000 lb.

The Richmond, Fredericksburg & Potomac has ordered 2 Pacific type locomotives from the American Locomotive Company. These locomotives will have 26 by 28 in. cylinders, and a total weight in working order of 287,000 lb. This was incorrectly reported in our issue of April 23, as 8 locomotives.

Freight Cars

The Humble Oil & Refining Company, Houston, Tex., is inquiring for 300 tank cars.

The United Verde Copper Company, New York, is inquiring for 50 ore cars of 75 tons capacity.

The Baltimore & Ohio will have repairs made to 300 refrigerator cars, 2,000 box cars and 1,000 composite gondola cars.

The Canadian National has ordered 50 express refrigerator cars of 30 ton capacity from the National Steel Car Corporation, Ltd.

The New Jersey Zinc Company, New York, has ordered 10 general service cars of 50 tons' capacity from the Pressed Steel Car Company.

The International Petroleum Company, 26 Broadway, New York, is inquiring for 10 tank cars of 10,000 gal. capacity, for export to Peru.

The Franklin Quality Refining Company, Franklin, Pa., has ordered ten 8,050-gal. capacity tank cars from the Pennsylvania Tank Car Company.

The Union Gas and Electric Company, Cincinnati, Ohio, has ordered 100 55-ton self-clearing hopper cars from the Pressed Steel Car Company, Pittsburgh, Pa.

The Chicago & North Western, reported in the *Railway Age* of April 23 as inquiring for 500 50-ton ore cars, has ordered this equipment from the Pullman Company.

The Acar Manufacturing Corporation, 30 Church street, New York, has ordered seventeen 10,100-gal. capacity tank cars from the Pennsylvania Tank Car Company.

The Southern Pacific has ordered 250 ballast cars from the Mt. Vernon Car & Manufacturing Company and 500 automobile cars from the Standard Steel Car Company.

Thomas F. Carey, 120 Liberty street, New York, is in the market for second-hand equipment as follows: 250 box cars and 250 flat cars of 30 tons capacity; also for 250 box cars and 250 flat cars of 40 tons capacity.

Passenger Cars

The Canadian Pacific is in the market for five mail cars.

The Atlantic Coast Line has ordered 25 passenger cars from the Pullman Company.

Supply Trade News

W. G. Cook, manager of the Chicago office of the **Garlock Packing Company**, Palmyra, N. Y., has been transferred and is now manager of its Philadelphia, Pa., office.

F. R. Ryan, sales engineer of the **Roller-Smith Company**, New York, has been appointed district manager of its Chicago office, with headquarters at 739 Monadnock block.

The Page Steel & Wire Company, has removed its offices from 30 Church street, to the offices of the **American Chain Company**, with whom it has been consolidated, Grand Central Terminal, New York.

The **R. W. Young Manufacturing Company**, electric turntable tractors, electric hoists and cranes, announces its removal from 80 East Jackson boulevard, to the Harris Trust building, 111 West Monroe street, Chicago.

The Yale & Towne Manufacturing Company has removed its general offices from New York to Stamford, Conn. The company maintains an office in New York City, but all communications should be sent to Stamford.

The name of the **Madden Company** has been changed to **Maintenance Equipment Company.** The organization and character of business remains the same as before and the headquarters will continue in the Railway Exchange Building, Chicago.

The Union Railway Equipment Company, Chicago, has purchased a tract of land at Hammond, Ind., and is now erecting shops for the manufacture of its railroad freight car specialties. When completed the plant will total an investment of approximately $1,500,000.

The Rome Iron Mills, Inc., New York, manufacturer of solid and hollow locomotive staybolt and engine bolt iron, announces the appointment of **A. M. Castle & Company** as its western representative. Castle & Company have offices in the principal western cities, with warehouses at Chicago and Seattle.

K-G Welding & Cutting Company, 556 West Thirty-fourth street, New York, manufacturers of welding and cutting apparatus, has opened a sales office in order to accommodate its western trade, at 12 and 14 East Harrison street, Chicago, where a complete line of welding and cutting apparatus will be carried. **William McCarthy**, who has been in charge of the railroad service department, has been appointed western sales manager.

Paul Kircher, formerly resident manager of the eastern territory at New York, for the **Massey Concrete Products Corporation**, Chicago, has been made resident manager, with headquarters in Chicago, in charge of sales of the reinforced concrete poles which this company makes by the centrifugal process. Mr. Kircher will continue to serve as resident manager also of the **Canadian Concrete Products Corporation, Ltd.**

DeWitt V. D. Reiley, vice-president of the **Davis-Bournville Company**, Jersey City, N. J., has been elected president, succeeding **Augustine Davis**, who resigned last November. **Charles B. Wortham**, treasurer of the company since its organization, was selected vice-president and **William G. McCune** secretary and treasurer. The directors include the above officers and **Augustine Davis**, **Charles J. Mayer**, **Daniel E. Evarts** and **H. Rowntree.**

Frank A. DeWolff, assistant locomotive superintendent of the **Cuban Central**, has joined the forces of the **International Railway Supply Company**, 30 Church street, New York, as its traveling representative. Mr. DeWolff has been engaged in active railroad work for the past 22 years, having begun as a machinist's apprentice in Mexico. He subsequently served as machinist, power house engineer, locomotive fireman, engineman and superintendent of shops. From July, 1916, to January, 1919, he was general master mechanic on the Cuban Central and from the latter date was assistant locomotive superintendent in charge of the locomotive and car departments of the same roads.

Frank P. Roesch, whose appointment as western manager of the **Standard Stoker Company, Inc.**, New York, was announced in the *Railway Age* of April 30, will have charge of the Chicago office of the company, which was recently opened at 1549 McCormick building, for the purpose of handling the newly developed Du Pont type locomotive stoker. Mr. Roesch was during federal control connected with the United States Railroad Administration as regional fuel supervisor for the northwestern region, with headquarters at Chicago, and prior to that was employed as master mechanic on the El Paso & Southwestern, the Southern, and the Chicago & Alton. Mr. Roesch is a member of the American Society of Mechanical Engineers and several of the prominent mechanical department associations.

F. R. Roesch

Obituary

G. E. Lemmerich, railroad layout engineer for the Austin Company, Cleveland, Ohio, died on April 25, of heart failure.

Trade Publications

TRUCTRACTOR.—The Clark Tructractor Company, Chicago, has issued a pamphlet showing photographs and specifications of all models of the Clark Tructractor, with illustrations showing it at work in various industrial plants.

TOOL STEEL.—A brief discussion of the question whether chemical analyses are of greater importance in the quality of tool steel than its careful manufacture in all processes, is printed in a pamphlet of eight pages published by the Vanadium-Alloys Steel Company, Pittsburgh, Pa.

FORMS FOR ROADS AND STREETS.—The Blaw-Knox Company, Pittsburgh, Pa., has issued a bulletin of 44 pages, describing and illustrating metal forms used in paving and sidewalk construction. While a large part of this bulletin is devoted to concrete highways some of the forms described for concrete walks and curbs are also applicable to railway platform construction.

MACHINE GUARD HANDBOOK.—A handbook dealing with the subject of machine guards has been compiled for the Consolidated Expanded Metal Companies, Braddock, Pa., and is being issued by that company. It is designed for the use of managers, purchasing agents and guard makers and contains information regarding the requirements of practical guards and how to obtain suitable guards for any purpose.

HAMMERS.—A Captain of Industry is the title of a booklet published by the David Maydole Hammer Company, Norwich, N. Y. It contains a brief story of the life of David Maydole, the inventor of the adz-eye hammer, written by James Parton. In addition it includes a catalogue of the principal varieties of hammers made by the company and an amount of useful information for mechanics, which has been compiled mostly in tabular form, showing the weights and specific gravity of materials of various kinds, speeds of wheels and drills, rules for calculating measurements, etc.

Chicago and North Western Railway Company—Sixtieth Annual Report

REPORT OF THE BOARD OF DIRECTORS.

To the Stockholders of the Chicago and North Western Railway Company:

The Board of Directors submits herewith its report of the affairs of the Chicago and Northwestern Railway Company for the year ending December 31, 1919.

As the operation of your property continued throughout the year 1919 under the control and direction of the United States Railroad Administration, the transactions recorded in this report are those of the corporation and do not include transactions incident to the physical operation of the property.

The Income Account of the Chicago and Northwestern Railway Company for the years ending December 31, 1918 and 1919, was as follows:

	1918	1919
GROSS INCOME:		
Compensation for Lease of Road	$23,201,015.60	$23,201,015.60
All Other Rent Income	676,387.69	731,161.44
Dividends on Stocks Owned	1,026,130.00	1,020,460.00
Income from Funded Securities	350,601.14	368,825.98
Income from Unfunded Securities and Accounts, and Other Items	209,542.51	171,560.12
GROSS INCOME	$25,463,676.94	$25,493,023.14
DEDUCTIONS FROM GROSS INCOME:		
Corporate and Operating Expenses	$149,577.04	$382,313.82
Rent for Lease of Other Roads	299,440.87	300,812.46
War Tax Accruals	925,000.00	927,756.86
Miscellaneous Tax Accruals	194,980.02	178,954.08
Interest on Funded Debt	8,816,106.39	9,273,858.67
Other Deductions	707,341.62	446,744.77
TOTAL DEDUCTIONS	$11,092,445.94	$11,510,440.66
NET INCOME	$14,371,231.00	$13,982,582.48
Dividends on Stock	11,952,275.00	11,952,275.00
BALANCE INCOME	$2,418,956.00	$2,030,307.48

On December 24, 1919, the President issued a proclamation relinquishing control and operation of the railroads, effective at 12.01 a. m., March 1, 1920. This was followed by the passage of what is known as the "Transportation Act, 1920," by both houses of Congress, which Act became a law on February 28, 1920, upon being signed by the President.

This law confers broad powers on the Interstate Commerce Commission in the regulation and control of the railroads. Under the Act, for a period of six months beginning March 1, 1920, the railroads are guaranteed an operating income equal to their compensation during government control. The law, however, stipulates that any carrier to avail itself of this provision must, on or before March 15, 1920, file with the Commission a written statement that it accepts all the provisions of Section 209 of the Act, covering such guarantee. Your Board of Directors by appropriate resolution accepted this guarantee and said resolution was duly filed with the Interstate Commerce Commission.

The Commission is also directed to establish rates which will be adequate to provide the carriers as a whole, either in the entire country or in rate groups or territories to be established by the Commission, with an aggregate annual net railway operating income equal, as nearly as may be, to a fair return upon the aggregate value of the railway property of such carriers held for and used in the service of transportation. For the two years beginning March 1, 1920, it is directed to take as such fair return a sum equal to 5½% of such aggregate value. It may in its discretion, however, add not more than one-half of one per cent of such aggregate value to make provision for improvements, betterments or equipment chargeable to capital account. It must be understood that this is not in any way a guaranty of earnings in any amount or at any rate to any individual railroad.

If any carrier receives for any year a net railway operating income in excess of 6 per cent of the value of the railway property held for and used by it in the service of transportation, one-half of such excess shall be placed in a reserve fund established and maintained by such carrier, and the remaining one-half thereof shall be paid to the Interstate Commerce Commission for the purpose of establishing and maintaining a general railroad contingent fund. The moneys in this contingent fund are to remain the property of the government and not to be given to any other carrier.

A $300,000,000 revolving fund is created to assist the carriers in financing their requirements during the period of transition immediately following the termination of federal control.

The Interstate Commerce Commission under this Act has exclusive and plenary jurisdiction over the issuance of railroad securities, or the assumption by the railroad of contingent obligations.

A Railroad Labor Board is created, to consist of nine members equally divided between representatives of the carriers, the employees and the public. This Board has no power to enforce its findings, except through the force of public opinion.

The Transportation Act gives to the Interstate Commerce Commission complete power as to the regulation of the railroad under private ownership and with enlightened public opinion should result in greatly improved transportation facilities and establishment of railroad credit.

MILES OF RAILROAD

The total number of miles of railroad owned December 31, 1919, was	7,927.24	miles
In addition to which the Company had exclusive or trackage rights over the following:		
THROUGH OWNERSHIP OF ENTIRE CAPITAL STOCK—		
Wolf River Valley Railway (Junction east of Elton to White Lake, Wis.)	1.98	"
UNDER LEASE		
De Pue, Ladd & Eastern Railroad (Ladd to Seatonville, Ill.)	3.25	miles
Belle Fourche Valley Railway (Belle Fourche to Newell, S. D.)	23.52	"
James River Valley and North Western Railway (Blunt to Gettysburg, S. D.)	39.55	"
Macoupin County Extension Railway (Benld to Staunton, Ill.)	4.36	"
Iowa Southern Railway (Miami to end of track beyond Consol, Iowa)	13.77	"
Missouri Valley and Blair Railway and Bridge Company's track	3.36	"
	87.81	miles
UNDER TRACKAGE RIGHTS—		
Peoria & Pekin Union Railway (in the City of Peoria, Ill.)	2.02	"
New York Central Railroad (Churchill to Ladd, Ill.)	2.80	"
Union Pacific Railroad (Broadway Station, Council Bluffs, Iowa, to South Omaha, Neb.)	8.73	"
Chicago, St. Paul, Minneapolis & Omaha Railway:		
Blair to Omaha, Neb.	24.70	"
Elroy to Wyeville, Wis.	22.79	"
In Sioux City, Iowa	2.28	"
Illinois Central Railroad (Sioux City to Wren, Iowa)	10.10	"
	73.42	"
Total miles of railroad in operation, December 31, 1919	8,090.45	"

The foregoing mileage is located as follows:

In Illinois	824.53	"
" Wisconsin	2,160.12	"
" Michigan	510.90	"
" Minnesota	650.30	"
" Iowa	1,634.66	"
" North Dakota	14.28	"
" South Dakota	1,063.15	"
" Nebraska	1,102.05	"
" Wyoming	130.46	"
Total	8,090.45	"

CAPITAL STOCK

There has been no change since the close of the preceding year in the Capital Stock and Scrip of the Company.

The Company's authorized Capital Stock is Two Hundred Million Dollars ($200,000,000.00), of which the following has been issued to December 31, 1919:

OUTSTANDING:		
Common Stock and Scrip	$145,157,218.82	
Preferred Stock and Scrip	22,395,120.00	
Special Stock	65,000.00	
Total Stock and Scrip Outstanding		$167,617,338.82
OWNED BY THE COMPANY:		
Common Stock and Scrip	$2,342,422.15	
Preferred Stock and Scrip	3,834.56	
Total Stock and Scrip owned by the Company		2,346,256.71
Total Capital Stock and Scrip, December 31, 1919		$169,963,595.53

FUNDED DEBT

At the close of the preceding year the amount of Funded Debt, exclusive of Bonds in the Treasury and Due from Trustee, was $213,896,000.00

The above amount has been decreased during the year ending December 31, 1919, by Bonds and Equipment Trust Certificates redeemed, as follows:

M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage, 5%, redeemed	$ 65,000.00
C. & N. W. Ry. Sinking Fund of 1879, 5%, redeemed	141,000.00
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%, redeemed	265,000.00

GENERAL BALANCE SHEET, DECEMBER 31, 1919

(7,927.24 Miles)

ASSETS

INVESTMENTS:		
Road and Equipment—		
Balance to Debit of this Account, December 31, 1918	$406,275,150.46	
Add Sundry Construction and Equipment Expenditures for the year ending December 31, 1919, including Trust Equipment (see statement page 12)	5,844,309.76	
		$412,119,460.22
Cash and Securities in Sinking Funds		2,445,268.02
Miscellaneous Physical Property		544,120.81
Investments in Affiliated Companies		14,983,960.39
Other Investments—		
149,200 Shares of Capital Stock of Chicago, St. Paul, Minneapolis & Omaha Ry. Co.	$ 10,337,152.29	
41,715 Shares of Freferred Stock of Union Pacific Railroad Company	3,910,575.93	
$3,000 C. St. P. M. & O. Ry. Debs. of 1930	2,670.00	
96,000 New York Central & Hudson River R. R. Refunding and Imp. Bonds	89,064.00	
60,000 New York Central Railroad Consolidated Bonds	56,959.44	
5,000,000 United States Government 15-20 Year 4½% Gold Bonds	5,000,000.00	
Miscellaneous	3,481.10	
		19,399,902.76
		$449,492,712.20
CURRENT ASSETS:		
Cash	$ 6,122,861.14	
Special Deposit	700,000.00	
Loans and Bills Receivable	1,001,712.35	
Miscellaneous Accounts prior to January 1, 1918, Receivable	333,139.60	
Other Companies and Individuals	96,258.23	
Due on Land Contracts	705,082.21	
		8,959,053.53
UNITED STATES RAILROAD ADMINISTRATION:		
Accrued Compensation $46,402,031.20		
Less received on account 26,900,000.00		
	$ 19,502,031.20	
Cash, December 31, 1917, taken over	5,722,051.43	
Agents' and Conductors' Balances, December 31, 1917, taken over	4,035,549.53	
Material and Supplies on Hand, December 31, 1917, taken over	9,832,829.33	
Assets, December 31, 1917, Collected	3,775,613.67	
Revenue prior to January 1, 1918	1,818,699.55	
Road Retired and not Replaced	384,596.48	
Equipment Retired	1,039,368.07	
Accrued Depreciation on Equipment	6,407,416.26	
		52,518,155.52
UNADJUSTED DEBITS:		
Capital Stock and Scrip, C. & N. W. Ry. Co., held in Treasury	$ 2,346,256.71	
Company's Bonds in the Treasury, viz.:		
M. L. S. & W. Ry. Ext. & Imp. Skg. Fund Mtge	16,000.00	
C. & N. W. Ry. 5% Sinking Fund of 1879	6,000.00	
C. & N. W. Ry. Skg. Fund Debentures of 1933	65,000.00	
C. & N. W. Ry. General Mortgage Gold of 1987	3,000,000.00	
C. & N. W. Ry. General Mortgage Gold of 1987 (due from Trustee)	1,506,600.00	
C. & N. W. Ry. Equipment Trust Certificates of 1913, Series D, E and F	6,400,000.00	
C. & N. W. Ry. Equipment Trust Certificates of 1917, Series G, H and I	8,756,000.00	
Other Unadjusted Debits	541,394.97	
		22,637,251.68
		$533,607,172.93

LIABILITIES

CAPITAL STOCK (see statement page 9):		
Outstanding	$167,617,338.82	
Owned by Company	2,346,256.71	
		$169,963,595.53
Premium Realized on Capital Stock		29,657.75
LONG TERM DEBT (see statement pages 20-21):		
Funded Debt held by the Public	$212,250,000.00	
Funded Debt held by Trustee account Sinking Funds	875,000.00	
Funded Debt held by Company and Due from Trustee	19,749,600.00	
		232,874,600.00
CURRENT LIABILITIES:		
Loans and Bills Payable	$ 10,900,000.00	
Audited Accounts Payable	76,277.05	
Miscellaneous Accounts prior to January 1, 1918, Payable	61,094.84	
Matured Interest and Dividends Unpaid	3,669,194.29	
Funded Debt Matured Unpaid	39,400.00	
Unmatured Interest Accrued	1,890,777.49	
Other Current Liabilities	37,067.71	
		16,673,811.38
UNITED STATES RAILROAD ADMINISTRATION:		
Additions and Betterments	$ 12,093,570.11	
Liabilities, December 31, 1917, Paid	13,663,199.22	
Corporate Transactions	2,025,240.22	
Expense prior to January 1, 1918	6,277,162.63	
		33,459,172.18
UNADJUSTED CREDITS:		
Tax Liability	$ 979,629.60	
Accrued Depreciation—Equipment	19,849,503.70	
Balance Premium on C. & N. W. Ry. 5% General Mortgage Gold Bonds of 1987	685,053.68	
Other Unadjusted Credits	498,180.49	
		22,012,367.47
CORPORATE SURPLUS:		
Additions to Property through Surplus	$ 623,971.12	
Sinking Fund on North Western Union Ry. Gold Bonds	1,036,870.52	
Sinking Fund on W. & St. P. R. R. Extension Gold Bonds	1,401,755.56	
		3,062,597.20
Profit and Loss		55,531,371.42
		$533,607,172.93

C. & N. W. Ry. Equipment Trust Certificates of 1913, 4½%, redeemed, viz.:

Series A	$300,000.00	
Series B	300,000.00	
Series C	400,000.00	
	$1,000,000.00	
Total Funded Debt redeemed		$1,471,000.00
		$212,425,000.00
And the above amount has been increased by C. & N. W. Ry. Co. Serial Notes, 5¼%, sold during the year		700,000.00
Leaving Funded Debt Outstanding, December 31, 1919		$213,125,000.00

BONDS IN THE TREASURY AND DUE FROM TRUSTEE

At the close of the preceding year the amount of the Company's Bonds and Equipment Trust Certificates in the Treasury and Due from Trustee was		$16,241,900.00
The above amount has been increased during the year ending December 31, 1919, as follows:		
W. & St. P. R. R. (Extension Western Division) First Mortgage, 7%, redeemed	$ 27,700.00	
North Western Union Ry. First Mortgage 7%, redeemed	51,000.00	
M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mtge., 5%, redeemed	65,000.00	
C. & N. W. Ry. Sinking Fund of 1879, 5%, redeemed	141,000.00	
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%, redeemed	265,000.00	
C. & N. W. Ry. Equipment Trust Certificates of 1917, Series I, 5%, issued	1,780,000.00	
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, 5%, received from Trustee account betterment or increase of Company's properties	2,000,000.00	
C. & N. W. Ry. General Mortgage Gold Bonds of 1987, due from Trustee on account of Construction Expenditures made during the year	1,000,000.00	
		5,329,700.00
		$21,571,600.00
And the above amount has been decreased during the year, as follows:		
C. & N. W. Ry. Equipment Trust Certificates of 1913, 4½%, retired, viz.:		
Series D	$400,000.00	
Series E	485,000.00	
Series F	115,000.00	
C. & N. W. Ry. Equipment Trust Certificates of 1917, 5%, retired, viz.:		
Series G	422,000.00	
Series H	400,000.00	
		1,822,000.00
Total, December 31, 1919		$19,749,600.00

In addition to the foregoing transactions, the following Treasury Bonds were exchanged for Trustee's Certificates entitling the Company to an equal amount of C. & N. W. Ry. General Mortgage Gold Bonds of 1987, viz.:

W. & St. P. R. R. (Ext. Western Div.) First Mtge., 7%	$27,800.00
North Western Union Ry. First Mortgage, 7%	51,500.00
M. L. S. & W. Ry. Extension and Improvement Sinking Fund Mortgage, 5%	49,000.00
C. & N. W. Ry. Sinking Fund of 1879, 5%	135,000.00
C. & N. W. Ry. Sinking Fund Debentures of 1933, 5%	200,000.00
Total	$463,300.00

CONSTRUCTION

The construction charges for the year ending December 31, 1919, were as follows:

SUNDRY CONSTRUCTION:		
Bridges, Trestles and Culverts	$ 625,380.37	
New Sidings, Yard Tracks and Spurs to Industries	497,663.45	
Track Elevation	276,643.72	
Buildings and Fixtures	1,010,975.28	
Betterment of Roadway and Track	1,364,825.17	
Shop Machinery and Tools	126,139.57	
Grain Elevators and Storage Warehouses	260,764.79	
Assessments for Public Improvements	59,336.51	
Miscellaneous Construction, including Grade Crossings and other items	26,468.40	
		$4,248,197.26
EQUIPMENT:		
14 Locomotives and 2 Work Equipment Cars	$ 689,940.50	
Improvement of Equipment	335,197.93	
Trust Equipment of 1917, added:		
40 Locomotives	1,832,274.86	
	$2,857,413.29	
Less Original Cost of Equipment Retired, as follows:		
38 Locomotives	$359,521.60	
1 Passenger-train Car	2,026.40	
1,398 Freight-train Cars	845,620.88	
111 Work Equipment Cars	34,087.14	
Other Items	20,044.77	
	1,261,300.79	
		1,596,112.50
Total		$5,844,309.76

LANDS

During the year ending December 31, 1919, 43,553.80 acres and 73 town lots of the Company's Land Grant lands were sold for the total consideration of $1,674,702.18. The number of acres remaining in the several Grants December 31, 1919, amounted to 276,744.39 acres, of which 34,289.63 acres were under contract for sale, leaving unsold 242,454.76 acres.

Appended hereto may be found statements and accounts relating to the business of the Company for the year, and the condition of its affairs on December 31, 1919.

By order of the Board of Directors.

W. H. FINLEY,
President.

Chicago, April 1, 1920.

Chicago, Saint Paul, Minneapolis and Omaha Railway Co.—38th Annual Report

REPORT OF THE BOARD OF DIRECTORS

To the Stockholders of the Chicago, Saint Paul, Minneapolis and Omaha Railway Company:

The Board of Directors submits herewith its report of the affairs of the Chicago, St. Paul, Minneapolis and Omaha Railway Company for the year ending December 31, 1919.

As the operation of your property continued throughout the year 1919 under the control and direction of the United States Railroad Administration, the transactions recorded in this report are those of the corporation and do not include transactions incident to the physical operation of the property.

The Income Account of the Chicago, St. Paul, Minneapolis and Omaha Railway Company for the years ending December 31, 1918 and 1919, was as follows:

	1918	1919
GROSS INCOME:		
Compensation for Lease of Road	$4,934,789.51	$4,934,789.51
All Other Rent Income	32,637.57	35,019.84
Income from Unfunded Securities and Accounts, and Other Items	32,943.36	61,351.09
GROSS INCOME	$5,000,370.44	$5,031,160.44
DEDUCTIONS FROM GROSS INCOME:		
Corporate Operating Expenses	$38,260.51	$88,246.04
War Tax Accruals	192,000.00	182,000.00
Interest on Funded Debt	2,260,474.85	2,282,180.33
Interest on Unfunded Debt	89,105.26	83,634.90
Other Deductions	14,349.32	18,381.58
TOTAL DEDUCTIONS	$2,594,189.94	$2,654,442.85
NET INCOME	$2,406,180.50	$2,376,717.59
Dividends on Stock	1,715,986.00	1,715,986.00
BALANCE INCOME	$690,194.50	$660,731.59

On December 24, 1919, the President issued a proclamation relinquishing control and operation of the railroads, effective at 12.01 a. m., March 1, 1920. This was followed by the passage of what is known as the "Transportation Act, 1920," by both houses of Congress, which act became a law on February 28, 1920, upon being signed by the President.

This law confers broad powers on the Interstate Commerce Commission in the regulation and control of the railroads. Under the Act, for a period of six months beginning March 1, 1920, the railroads are guaranteed an operating income equal to their compensation during government control. The law, however, stipulates that any carrier to avail itself of this provision must, on or before March 15, 1920, file with the Commission a written statement that it accepts all the provisions of Section 209 of the Act, covering such guarantee. Your Board of Directors by appropriate resolution accepted this guarantee and said resolution was duly filed with the Interstate Commerce Commission.

The Commission is also directed to establish rates which will be adequate to provide the carriers as a whole either in the entire country or in rate groups or territories to be established by the Commission with an aggregate annual net railway operating income, equal as nearly as may be to a fair return upon the aggregate value of the railway property of such carriers held for and used in the service of transportation. For the two years beginning March 1, 1920, it is directed to take as such fair return a sum equal to 5½% of such aggregate value. It may, in its discretion, however, add not more than one-half of one per cent of such aggregate value

GENERAL BALANCE SHEET, DECEMBER 31, 1919
(1,679.60 Miles)

ASSETS

Investments:		
Road and Equipment—		
Balance to Debit of this Account, December 31, 1918	$80,408,354.67	
Add Sundry Construction and Equipment Expenditures for the year ending December 31, 1919 (see statement page 10)	647,280.03	
		$81,055,634.70
Debenture Gold Bonds of 1930, deposited in Lieu of Mortgaged Property Sold		139,000.00
Miscellaneous Physical Property		189,421.28
Investments in Affiliated Companies		356,600.87
		$81,740,656.85
Current Assets:		
Cash	$ 147,479.19	
Special Deposit Account Matured Bonds Unpresented and Interest	35,390.00	
Miscellaneous Accounts prior to January 1, 1918, Receivable	128,330.51	
Other Companies and Individuals	5,840.59	
Other Current Assets	150.00	
		317,190.29
United States Railroad Administration:		
Accrued Compensation $9,869,579.02		
Less Received on Account 6,899,985.00		
	$ 2,969,594.02	
Cash, December 31, 1917, taken over	622,808.58	
Agents' and Conductors' Balances, December 31, 1917, taken over	886,299.82	
Material and Supplies on hand, December 31, 1917, taken over	3,356,113.35	
Assets, December 31, 1917, Collected	1,480,626.87	
Revenue prior to January 1, 1918	329,794.20	
Road Retired and Not Replaced	31,636.55	
Equipment Retired	130,195.27	
Accrued Depreciation on Equipment	1,081,326.93	
		10,888,395.59
Unadjusted Debits:		
Discount on Funded Debt	$ 15,098.62	
C. St. P. M. & O. Ry. Common Stock and Scrip, held in Treasury	2,844,206.64	
C. St. P. M. & O. Ry. Preferred Stock and Scrip, held in Treasury	1,386,974.20	
Debenture Gold Bonds of 1930, held in Treasury	2,561,000.00	
Equipment Trust Certificates of 1917, Series A, held in Treasury	880,000.00	
Consolidated Mortgage Bond Scrip Due from Central Trust Company	634.09	
Other Unadjusted Debits	270,061.17	
		7,957,974.72
		$100,904,217.45

LIABILITIES

Capital Stock (see statement page 9):		
Outstanding	$ 29,818,945.78	
Owned by Company	4,231,180.84	
		$34,050,126.62
Long Term Debt (see statement page 16):		
Bonds held by the Public	$ 41,362,000.00	
Bonds and Scrip owned by Company	3,580,634.09	
		44,942,634.09
Current Liabilities:		
Loans and Bills Payable	$ 1,150,000.00	
Audited Accounts Payable	13,177.18	
Miscellaneous Accounts prior to January 1, 1918, Payable	25,156.46	
Matured Interest and Dividends Unpaid	64,607.50	
Funded Debt Matured Unpaid	60,000.00	
Unmatured Interest and Dividends	1,202,540.50	
Other Current Liabilities	6,146.42	
		2,521,628.06
United States Railroad Administration:		
Additions and Betterments	$ 1,656,981.39	
Liabilities, December 31, 1917, Paid	3,953,243.85	
Corporate Transactions	281,646.24	
Expense prior to January 1, 1918	907,529.66	
		6,799,401.14
Unadjusted Credits:		
Tax Liability	$ 713,143.45	
Premium on Funded Debt	321,530.67	
Accrued Depreciation—Equipment	3,926,066.19	
Other Unadjusted Credits	86,318.36	
		5,047,058.67
Corporate Surplus:		
Additions to Property through Surplus	$ 1,038,763.76	
Profit and Loss	6,504,605.11	
		7,543,368.87
		$100,904,217.45

to make provision for improvements betterments or equipment chargeable to capital account. It must be understood that this is not in any way a guaranty of earnings in any amount or at any rate to any individual railroad.

If any carrier receives for any year a net railway operating income in excess of 6 per cent of the value of the railway property held for and used by it in the service of transportation, one-half of such excess shall be placed in a reserve fund established and maintained by such carrier, and the remaining one-half thereof shall be paid to the Interstate Commerce Commission for the purpose of establishing and maintaining a general railroad contingent fund. The moneys in this contingent fund are to remain the property of the government and not be given to any other carrier.

A $300,000,000 revolving fund is created to assist the carriers in financing their requirements during the period of transition immediately following the termination of Federal control.

The Interstate Commerce Commission under this act has exclusive and plenary jurisdiction over the issuance of railroad securities, or the assumption by the railroad of contingent obligations.

A Railroad Labor Board is created to consist of nine members equally divided between representatives of the carriers, the employees and the public. This Board has no power to enforce its findings, except through the force of public opinion.

The Transportation Act gives to the Interstate Commerce Commission complete power as to the regulation of the railroad under private ownership and with enlightened public opinion should result in greatly improved transportation facilities and establishment of railroad credit.

MILES OF RAILROAD

The total number of miles of railroad owned December 31, 1919, was		1,679.60 miles
In addition to which the company had trackage rights as follows:		
Northern Pacific Railway (Superior, Wis., to Rice's Point, Minn.)	1.59 miles	
Great Northern Railway (St. Paul to Minneapolis, Minn.)	11.40 "	
Minneapolis and St. Louis Railroad (Minneapolis to Merriam, Minn.)	27.00 "	
Illinois Central Railroad (Le Mars to Sioux City, Iowa)	25.20 "	
Sioux City Bridge Company (bridge across Missouri River and tracks at Sioux City, Iowa)	3.90 "	
Chicago and North Western Railway (Sioux City to Sioux City Bridge Company's track)	.50 "	
	69.59 "	
Total Miles of Railroad in Operation December 31, 1919		1,749.19 "

The above mileage is located as follows:

In Wisconsin	777.55	miles
In Minnesota	473.01	"
In Iowa	102.04	"
In South Dakota	88.20	"
In Nebraska	308.39	"
Total	1,749.19	"

In addition to the foregoing, the company owned 183.03 miles of second track, located as follows:

In Wisconsin	157.09	miles
In Minnesota	24.23	"
In Nebraska	1.71	"
Total	183.03	"

CAPITAL STOCK

There has been no change since the close of the preceding year in the Capital Stock and Scrip of the Company.

The Company's authorized Capital Stock is Fifty Million Dollars ($50,000,000.00), of which the following has been issued to December 31, 1919:

Outstanding:		
Common Stock and Scrip	$18,559,086.69	
Preferred Stock and Scrip	11,259,859.09	
		$29,818,945.78
Owned by the Company:		
Common Stock and Scrip	$2,844,206.64	
Preferred Stock and Scrip	1,386,974.20	
		4,231,180.84
Total Capital Stock and Scrip, December 31, 1919		$34,050,126.62

FUNDED DEBT

During the year ending December 31, 1919, Chicago, Saint Paul, Minneapolis and Omaha Railway Consolidated Mortgage 6% Bonds of 1880 were issued in lieu of a like amount of the following underlying bonds:

Saint Paul and Sioux City Railroad First Mortgage of 1879, 6%, matured	$6,070,000.00
Chicago, Saint Paul and Minneapolis Railway First Mortgage of 1878, 6%, matured	13,000.00
North Wisconsin Railway First Mortgage of 1880, 6%	6,000.00
	$6,089,000.00

BONDS IN THE TREASURY

On December 31, 1918, the amount of the Company's Bonds and Scrip in the Treasury was	$2,990,634.09
The above was increased during the year by the issuance of Chicago, Saint Paul, Minneapolis and Omaha Railway, 5% Debenture Gold Bonds of 1930	700,000.00
	$3,690,634.09
And decreased by the retirement of Equipment Trust Certificates of 1917, Series A	110,000.00
Total Bonds and Scrip in the Treasury, December 31, 1919	$3,580,634.09

CONSTRUCTION

The construction charges for the year ending December 31, 1919, were as follows:

SUNDRY CONSTRUCTION:		
Bridges, Trestles and Culverts	$135,233.15	
Betterment of Roadway and Track	245,945.65	
Sidings and Yard Tracks	64,749.22	
Account Cost of Additional Shop Buildings at St. Paul, Minn.	18,918.38	
Other Buildings	167,624.86	
Machinery and Tools	15,477.83	
Assessments for Public Improvements	26,607.27	
Miscellaneous Charges	379.43	
		$674,935.79
EQUIPMENT:		
Equipment acquired (10 caboose cars)	$28,441.29	
Improvement of Equipment	85,465.83	
	$113,907.12	
Less Original Cost of Equipment Retired, as follows:		
204 Freight-train Cars	$133,635.88	
9 Work Cars	7,927.00	
	141,562.88	
		Cr.27,655.76
		$647,280.03

LANDS

During the year ending December 31, 1919, 5,651.09 acres of the Company's Land Grant lands were sold for the total consideration of $44,925.56. The number of acres remaining in the several Grants December 31, 1919, amounted to 75,772.09 acres, of which 14,885.24 acres were under contract for sale, leaving unsold 60,886.85 acres.

Appended hereto may be found Statements and Accounts relating to the business of the Company for the year, and the condition of its affairs on December 31, 1919.

By order of the Board of Directors.

JAMES T. CLARK,
President.

St. Paul, Minn., April 1, 1920.

[ADV.]

Railway Officers

Executive

A. P. Russell, chairman valuation committee and assistant general counsel of the New York, New Haven & Hartford, and vice-president of the Rutland, has been elected vice-president of the Central New England, with headquarters at Boston, Mass., effective May 12.

William R. Scott, whose appointment as president of the Southern Pacific, Texas and Louisiana lines, with headquarters at Houston, Tex., was noted in the *Railway Age* of March 5 (page 733), was born November 8, 1860. Mr. Scott entered railway service in 1881 as a locomotive fireman on the Atchison, Topeka & Santa Fe. From 1883 to 1891 he served as a locomotive engineer on that road and on the latter date was promoted to traveling engineer. In 1898 he was appointed trainmaster on the Northern division of the Gulf, Colorado & Santa Fe, and in 1900 he was promoted to division superintendent. One year later he was appointed general superintendent of the Ft. Worth & Denver City. In September, 1903, he was appointed assistant superintendent on the Sacramento division of the Southern Pacific, and two months later was promoted to superintendent of the Salt Lake division. He was later appointed superintendent of the Western division and in 1907 he was promoted to general superintendent of the Northern district of the Southern Pacific. From November, 1907, to July, 1912, he served as assistant general manager and on the latter date was promoted to general manager. For the four years prior to federal control he served as vice-president and general manager, being appointed federal manager for the U. S. Railroad Administration in July, 1918. On March 1, 1920, he was elected president of the Southern Pacific lines in Texas and Louisiana.

W. R. Scott

Operating

In the sketch of **Charles Gilbert Johnson,** appearing on page 1384 of the *Railway Age* of May 7, the fact was omitted that Mr. Gilbert served as supervisor of efficiency service of the Minneapolis, St. Paul & Sault St. Marie, with headquarters at Minneapolis, Minn., from June 1, 1914, until going to the Erie in 1917.

A. Buckley, assistant superintendent of the First division of the Oregon-Washington Railroad & Navigation Company, with headquarters at Portland, Oregon, has been promoted to superintendent of that division, with the same headquarters, succeeding **B. E. Palmer,** who has resigned, effective May 1. **J. F. Corbett,** assistant superintendent on the second division, with headquarters at La Grande, Ore., has been transferred to succeed Mr. Buckley. **C. F. Roberts,** chief despatcher, with headquarters at La Grande, has been promoted to assistant superintendent, succeeding Mr. Corbett. **T. A. McKinstry,** night chief despatcher, with headquarters at La Grande, has been promoted to chief despatcher, succeeding Mr. Roberts.

Charles Chandler, who has been appointed superintendent of the Southern, with headquarters at Atlanta, Ga., as noted in the *Railway Age* of March 5 (page 750), served as trainmaster of the same road from 1914 until the termination of federal control. Mr. Chandler received a public school education and began railroad work in April, 1892, with the Memphis & Charleston. He served in various capacities until 1895, when he was appointed agent and operator. He went to the North Alabama, now part of the Louisville & Nashville, in 1900, as despatcher, and in 1903 entered the employ of the Southern in the same capacity. He returned to the North Alabama in 1907 as chief despatcher, and retained that position until 1910, when he was appointed trainmaster of the same road. He filled that position until 1914, when he returned to the Southern in the same capacity.

C. D. Baker, who has been appointed assistant general superintendent of the Long Island, with headquarters at Jamaica, N. Y., as noted in the *Railway Age* of March 5 (page 744), served as superintendent with the same headquarters from 1916 until the termination of federal control. With the exception of about six months, Mr. Baker has given his entire railroad service to the Long Island, entering the employ of that road in 1891 as clerk in the car record office. He filled various other positions until 1909, when he was appointed passenger trainmaster in charge of all electrified lines. In 1912 he was detached from the Long Island and became a member of a committee appointed to look into the possibilities of electrifying the surburban lines of the Pennsylvania radiating from the Broad Street station in Philadelphia. In 1913 he again took up service for the Long Island as trainmaster, with supervision over all train operation. He retained that position until 1916, when, as noted above, he was appointed superintendent.

C. D. Baker

Financial, Legal and Accounting

John A. Robinson, who has been appointed auditor of the Cincinnati, New Orleans & Texas Pacific and other roads, with headquarters at Cincinnati, Ohio, as noted in the *Railway Age* of March 5 (page 749), served as assistant federal auditor during part of federal control. Mr. Robinson was born on May 28, 1872, in Jackson County, Ala. He received a public school education and began railroad work, on September 1, 1889, as clerk in the accounting department of the Memphis & Charleston, now part of the Southern. He was appointed assistant chief clerk to the auditor of freight accounts in August, 1903, and promoted to chief clerk on July 15, 1907. He then became auditor freight accounts and served in that capacity until August 1, 1914, when he became auditor of revenue. He was appointed assistant federal auditor on August 1, 1918, and retained that position until February 1, 1919, from which time until the termination of federal control he acted as auditor for the corporation, although no official announcement of his appointment was made until just prior to March 1, to take effect on that date.

Traffic

H. G. Burkhalter has been appointed commercial agent of the Louisiana Railway & Navigation Company, with headquarters at Shreveport, La. Other commercial agents appointed are: **E. C. Marens,** Kansas City, Mo.; **R. L. McKee,** Oklahoma City, Okla.; **H. J. Reinhardt,** Little Rock, Ark.; **John A. Smith,** New Orleans, La.; **George Hixon,** Chatta-

nooga, Tenn.; **H. T. Lindsey**, Dallas, Tex.; **T. F. Wilder**, Alexandria, La.; **C. E. Millson**, Baton Rouge, La.

Edwin E. Smith, who has been appointed general passenger agent of the Pittsburgh & Lake Erie, with headquarters at Pittsburgh, Pa., as noted in the *Railway Age* of March 19 (page 996), served as general agent in the passenger department of the Cleveland, Cincinnati, Chicago & St. Louis from March, 1913, until the termination of federal control. Mr. Smith was born on February 28, 1875, and began railroad work on September 1, 1895, with the Cleveland, Cincinnati, Chicago & St. Louis as telegraph operator and ticket agent at Marion, Ind. On May 1, 1900, he went to Louisville, Ky., as city ticket agent, and in June, 1901, he was transferred to Indianapolis, Ind., to serve in the same capacity. He became traveling passenger, with headquarters at Atlanta, Ga., on July 15, 1906, and retained that position until March 1, 1913, when he was appointed general agent at Louisville, Ky. While serving as general agent he was transferred to Cleveland, Ohio, in 1916, and then to Chicago on June 1, 1917.

Andrew K. Morris, who has been appointed coal traffic manager of the Erie, with headquarters at New York, as noted in the *Railway Age* of March 26 (page 1079), served on the Eastern Regional Coal Committee of the Railroad Administration from November, 1919, until the termination of federal control. Mr. Morris was born on August 11, 1878, at Paterson, N. J. He received a high school education and began railroad work on May 1, 1897, as office boy in the coal traffic department of the Erie. Later he served in various other capacities in the same department. He was appointed chief clerk in June, 1903, and promoted to assistant to the coal traffic manager in March, 1913. He became coal freight agent in January, 1916, and retained that position until the establishment of government control, shortly after which he was appointed assistant to the manager of inland traffic, U. S. Fuel Administration, at Washington, D. C. In May, 1918, he was transferred to New York as director of tidewater coal traffic for the Anthracite Committee of the Fuel Administration. The following July he was appointed manager of anthracite distribution in New York state. He was appointed a member of the Eastern Regional Coal Committee as noted above.

J. H. Ketner who has been appointed general freight agent of the Seaboard Air Line with headquarters at Norfolk, Va., as noted in the *Railway Age* of March 5 (page 748) served as assistant general freight agent from July, 1916 until the termination of federal control. Mr. Ketner was born at Atlanta, Ga., and educated in public schools of that city and Washington, D. C. His first railroad work began at Washington in December, 1897 as clerk in the office of the traffic manager of the Southern. Afterwards he served in other clerical capacities in the traffic department until 1902 when he left railroad work to study surgery. He returned in 1903 as rate clerk to the acting general freight agent of the Seaboard Air Line with headquarters at Savannah, Ga. He was promoted to chief clerk on January 1, 1904, and on March 1, 1905, was transferred to Montgomery, Ala., as commercial agent having jurisdiction over the freight and passenger service of the Montgomery territory. He was placed in charge of the commerce department of the Seaboard Air Line with headquarters at Norfolk, Va., on November 1, 1907, and appointed assistant to the general freight agent in January, 1912, and was promoted to assistant general freight agent at the time mentioned above.

Engineering, Maintenance of Way and Signaling

F. Q. Barlow, assistant chief engineer Southern Pacific, with headquarters in San Francisco, has been appointed regional engineer Railroad Administration with headquarters in San Francisco.

H. L. Ripley, corporate chief engineer of the New York, New Haven & Hartford, has been appointed corporate and valuation engineer of the Central New England, effective May 12.

J. C. Schwaab, assistant engineer in the valuation department of the Chicago & Alton, with headquarters in Chicago, has resigned to become city engineer of Alton, Ill., effective May 17.

H. Rhoads has been appointed acting roadmaster on the Minnesota division of the Illinois Central, with headquarters at Dubuque, Ia., succeeding **J. S. McNamara**, who has been granted leave of absence because of sickness.

The biography of **George A. Cellar**, general superintendent of telegraph on the Pennsylvania System, which appeared in the *Railway Age* of May 7 (page 1384), omitted his promotion to superintendent of telegraph of the Western Lines of the Pennsylvania System, with headquarters at Pittsburgh, Pa., in 1904, which position he held at the time of his recent promotion.

W. F. Miller, division engineer of the Pennsylvania, has been assigned to the Delaware division, with headquarters at Wilmington, Del., succeeding S. L. Church, transferred to the Baltimore division. This will appear as a second transfer for Mr. Miller, as the circular dated May 1 and issued by the railroad announced that he had been assigned to the Baltimore division, as stated in the *Railway Age* of May 7 (page 1385).

Obituary

Hobart A. Boomer, general manager of the Lake Erie & Western, with headquarters at Indianapolis, Ind., notice of whose death was published in the *Railway Age* of May 14, page 1436, was born on October 13, 1862, at Philo, Ill. Mr. Boomer entered railway service in 1880, as telegraph operator on the Wabash, St. Louis & Pacific, with headquarters at Edwardsville, Ill., and was later appointed agent. For a few months in 1883, he served as an agent on the Toledo, St. Louis & Western, and in August of that year was appointed chief despatcher. From 1884 to 1896, he was successively promoted to chief despatcher, trainmaster and division superintendent. In May, 1896, he was appointed division superintendent of the Lake Erie & Western, with headquarters at Lafayette, Ind., and in October, 1903, was promoted to general superintendent of that road, with headquarters in Indianapolis. Ten years later he was appointed general manager, with the same headquarters. In June, 1918, Mr. Boomer was appointed federal manager, holding this position until the railroads were returned to private ownership, at which time he was reappointed to his former position of general manager.

H. A. Boomer

Harry F. Lowther, formerly connected with the Chicago, Rock Island & Pacific, and the Delaware, Lackawanna & Western, died in New York City on May 8. Mr. Lowther's last active railroad work was that of chief clerk in the purchasing department of the Delaware, Lackawanna & Western at New York City.

The Metropolitan Railway of London, by means of subsidiary organizations, is reported to be furnishing a substantial contribution of new dwelling houses to meet the prevailing scarcity. In the districts served by the Metropolitan about 1,000 acres are to be utilized. These tracts lie in one of the most beautiful parts of England, being 200 ft. to 450 ft. above sea level. The directors of the railway have a two-fold purpose: to utilize their special resources in providing moderately priced new houses and to create new traffic for their passenger trains.

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

Using Accident Bulletins Advantageously

The Safety idea in its broadest sense contemplates that a railroad employee should not only look after his own welfare but that of his fellow workers. A careful man will do this, because if he takes an interest in looking for and helping to correct unsafe practices from his own selfish standpoint he will soon come to think intuitively of his fellow worker also. The Safety habit is largely the result of education and many employees who mean to be careful do or overlook things which may cause accidents. In order to call the contributing causes of accidents to the attention of such employees forcibly, accident bulletins may be used as an educational medium. The Bureau of Safety of the Interstate Commerce Commission makes careful investigations of the causes of various classes of accidents and publishes the results in its accident bulletins. Such information should be brought to the attention of all employees who may be in a position to err in a like manner, through the medium of the various safety committees. Certain information contained in these bulletins, of direct interest to the public, may also well be abstracted and issued as news bulletins to the newspapers. A careful man is, in general, an efficient man. Efficiency and increased production are the crying need of the present and the campaigns of the railway safety committees, if not carried on in a perfunctory manner, can do much towards increasing safety, efficiency and production.

Freight Rates and Living Costs

To informed railroad men the readiness which a storekeeper shows to blame his high prices on increased freight rates is often humorous. Nevertheless, it is something more than merely humorous, because by repetition the uninformed, and in a large measure, uninterested consumer is very likely to be finally converted to the idea that perhaps there is something in what the storekeeper says. This is no doubt the idea behind the advertising campaign which the Southern Pacific is carrying out on its lines on the Pacific coast with a view to showing how small a part the freight rate really plays in the cost of a commodity and how infinitesimal will be the increase in that freight rate if the proposed 25 per cent increase in freight rates go into effect. Acknowledging thus that the idea of the campaign is good, particular attention should be drawn to the judgment shown in working it out, as described on another page of this issue. The railway has not contented itself with a statement of generalities about the part a freight rate plays in the cost of a commodity, but instead it has had placards made for each individual station. The placards differ for each station and their message is brought home because each deals in so far as possible with some particular commodity of special interest to patrons in the town or city where the placard is displayed. Thus the card displayed at El Centro, Cal., explains that it costs but 5½ cents to ship a pair of size 7 shoes to El Centro from San Francisco and that an increase of 25 per cent will add less than 1½ cents to their cost. People who are told facts that get down to first principles like that will certainly admit that they should be "willing," as the placards conclude "to pay a rate necessary for a reasonable return on the money invested to secure good railway service," and to scoff at another of the merchant's many excuses for the high prices for his goods.

The Foreign Trade Convention

On another page of this issue will be found the declaration of the general committee of the Seventh National Foreign Trade Convention, which heads up the many important points brought out in the deliberations of that body. The national foreign trade conventions which have been held annually in various important cities of the country for the past several years have achieved their acknowledged success because of the timeliness which the officers have introduced into the programs. The Seventh National Foreign Trade Convention held in San Francisco, May 12 to 15, was no exception. Perhaps the main point brought out this year was that having now attained a great foreign trade we must maintain that trade as a permanent support to the country's prosperity. That, the convention determined, could be done by educating the people of the country to the value of foreign trade and by emphasizing the necessity of building up a large import trade to balance our great export trade. The latter idea, in particular, was stressed by several prominent speakers who all pointed out that trade could not be one-sided and also permanent. Another point of interest brought out was the potential value of our trade across the Pacific—there being many present who felt that we had hardly begun to build up the business that lies before us in China, the Philippines and the Far East in general. For the first time at a National Foreign Trade Convention the railroads were given a hearing and no one present could fail to sense the friendly attitude with which the delegates received the expression of the railroads' desire to be of service in foreign trade as aptly given by William Sproule, president of the Southern Pacific in his paper before the second general session, or by R. M. Calkins, vice-president of the Chicago, Milwaukee & St. Paul, who presided over and read a paper before the group session on Transportation and Communication. It has long been recognized that the business men of this country are overwhelmingly in favor of private ownership of railroads. Nevertheless, it is pleasing to read in the declaration of the general committee, the words—"Efficient rail and inland waterway transportation is no less a part of export and import trade than ocean shipping. Sound public policy supporting private operation of the railways is imperative."

The Public Pays

The public has been told not only once or twice but many times, that it will have to pay eventually for all wage awards which may be made by the Railroad Labor Board. To all appearances it has signified a willingness to pay, provided it shall receive in return adequate and efficient service. The public having signified its willingness to pay, it is possible that the "rubbing in" that it must pay may lead to rebellion. As a statement of fact this is true; as a warning

it is timely, but it is to be feared it describes what is being done. The stand taken by the railroads of the country in the past in labor controversies has been dictated by the circumstances in which they have found themselves. If the management lost, part at least of the increase in the payroll had to be met out of the net earnings. Psychologically, the struggle was natural, the human fight for self-preservation actuating both factions. But now the railroads have no net earnings. The Transportation Act fixes the return which may be earned upon the invested capital. The Interstate Commerce Commission must, by the provisions of this act, fix rates so that return may be earned. Theoretically, then, any increases in the railroad payroll must be paid by the public in the form of increased rates.

Under these conditions the railroads could take any of several positions in regard to the demands of employees upon which hearings are now being held. They could acquiesce, knowing that any awards made would be met by the public. They could go to the other extreme and oppose all advances upon the ground of avoiding increased rates. What they have attempted to do is to present testimony to the board aimed primarily at assisting that body to understand the complicated wage structure, built up through years of co-operative effort, and at the same time assist in the establishment of more equitable wage scales by which every employee will be paid enough for the service he renders to permit him to live properly. Indicative of this constructive attitude is the recommendation made to the board by the railroad managers' committe for the re-establishment of yard classifications as a wage basis. By such action, it is pointed out, men in large industrial centers where living costs soar will receive more pay than similar employees in smaller centers where the cost of necessities is considerably lower.

The situation in general was aptly summarized recently by a certain gentleman, a representative of a group of shippers, who, after attending several of the hearings, said: "It seems to me the railroads are pulling the public's chestnuts out of the fire." The public must pay. The national managers' committee is doing all it can to insure that the bill will be reasonable.

Transportation Situation Bad But Improving

THE TRANSPORTATION SITUATION is bad. It is getting better, but the improvement is small and slow. Furthermore, no substantial improvement in it can be made for months under any system of management without herculean efforts. The Interstate Commerce Commission and the officers of the railways are exerting themselves to the utmost to remedy the especially acute conditions which now exist, but neither anything nor all the things they can do will for a long time enable the railways to handle the country's commerce anywhere near satisfactorily.

The foregoing statements may sound pessimistic, but they are the plain truth, and if there is any problem regarding which it is imperative that the American people should know the plain truth it is the railroad problem. It is astounding how many persons there are who ought to know what the present railway situation is and the reasons for it but who do not appear to know them. Some of these persons are severely criticizing the railway managements because of the serious delays to and congestions of traffic. It is time the American people learned that it takes locomotives, cars and tracks, not recriminations and denunciations, to move freight.

Why is the present transportation situation so bad? First, because, owing to unreasonable regulation, the return earned by the railways on their book cost of road and equipment declined from about 5¾ per cent in 1910 to about 4 per cent in 1915, and in consequence the annual investment in the railways declined from about $800,000,000 to about $500,000,000. Second, because since 1915, chiefly owing to the war and to government operation, there have been almost no increases in railway facilities, although the facilities were already inadequate in 1916. Third, because during this period, when the capacity of the railways was hardly being increased at all, the productive capacity of the country's industries was being very greatly increased. In consequence, even before the railroad strikes came the traffic offered was substantially greater than the roads could handle. The strikes, of course, reduced the amount of business they could move. The steel strike reduced the output of the steel mills and the coal strike reduced the output of the coal mines, but apparently there are people who believe a railroad strike should not reduce the output of the railroads. Inexplicable as it may seem, however, strikes on railroads do reduce the amount of business they can handle. Since they were unable to handle all the freight offered to them when there were no railroad strikes, it necessarily followed that when the strikes came there was an increase in the business offered to them that they could not handle.

Although the results of the railroad strikes have been serious, they have been exaggerated. One would think from the way some people talk that the railroads had handled hardly any coal this year. The reports of the Geological Survey show that between January 1 and May 1 they moved 175,114,000 tons of bituminous coal. This was 33½ million tons more than were moved during the same period of 1919 and only 8,000,000 tons less than were moved in the same period of 1918. They moved 27,731,000 tons of anthracite coal during the same period, an increase of 2,600,000 tons over 1919. The existing shortage of coal is not primarily due to reduced transportation caused by the recent railroad strikes, but to the reduced production and transportation of coal caused by the coal strike in November and December.

With respect to the general transportation situation, the facts show that it is steadily improving. On April 2 the accumulations of cars awaiting movement amounted to 93,019. On April 24, after the strikes had been going on for three weeks, the accumulations had increased to 269,069. On May 8 they had been reduced to 201,392 cars. Why does the situation superficially appear to be growing worse when the facts show it is getting better? Because there is so much more freight available than the railways can handle with their existing facilities and forces that they may move more business every day, and yet day by day get farther behind the business demanding movement.

The transportation situation is what it is chiefly because so many people have devoted most of their energies to denouncing the railroad management and opposing the advances in rates which the railway managements have sought, instead of giving some of their time and energy to studying and helping solve the railroad problem. Surely it is time that the people, and especially business men, should recognize the fact that the country is right up against it so far as transportation is concerned and that there are just three things which will help it to avoid the disaster, industrial and financial, which is unavoidable unless the railroad problem is solved. These things are: First, frank recognition of the fact that under any system of management, government or private, the railways cannot be made for months and even years satisfactorily to handle all the commerce of the country. Second, active co-operation between the Interstate Commerce Commission, the shipping interests and the railway managements to enable the railways during the critical period we are now passing through to handle all the business with their existing facilities that is physically practicable. Third, allowing the railways to charge rates which will enable them to raise vast amounts of capital to invest in new facilities.

Unless the railway companies are given opportunity to earn adequate net returns the transportation conditions which are now causing so much trouble will be chronic, not merely temporary. As long as the railways are not able, when working to their capacity, to handle all the business available, it is certain that every time their operations are slightly deranged either by bad weather, strikes or anything else, the result will be serious interference with all the normal industrial, commercial and financial processes of the country.

The conditions now prevailing were not unforeseen. They are consequences of ten years of unwise and unfair regulation, followed by two years of government operation inaugurated in time of war. Year after year they have been predicted as the certain results of the governmental policies followed in dealing with the railways. They can be remedied only by a reversal of certain of these governmental policies; and even after this reversal has occurred—if it does occur—it will take years to put the railways in shape satisfactorily to handle the country's business.

The Interstate Commerce Commission now has up the entire question of what rates the railways shall be allowed to charge and what net returns they shall be allowed to earn. Other methods and measures will determine how much business the railways will be able to handle within the next few months, *but the commission's decision in the rate case will principally determine how much freight the railways will be able to handle in future months and years.* If shippers and business men generally would concern themselves less about the existing transportation conditions, which for the present can be improved only comparatively little, and would concern themselves more about the rate case, a right outcome of which is absolutely essential to any permanent and substantial improvement in the transportation situation, they would improve the prospects of their being furnished sufficient transportation—not this year, when sufficient transportation is out of the question—but next year and in following years when it will be just as much needed as it is now.

Wages and the Cost of Living

The case of the railroad employees for another large general advance in wages is being presented to the Railroad Labor Board. Like the demands for advances in wages in all industries, it is being based mainly upon the increase in the cost of living. As to many railway employees, this seems a precarious ground on which to base a case for higher wages. Not only have the hours of work of most railway employees been reduced within the last two years, but in addition the average wage paid on the railways has increased since 1914 almost exactly in the same ratio as the average cost of living. The wages of many railway employees have increased much more in proportion than the cost of living, and if all the demands now being pressed by the railway employees were granted the aggregate increases in their average wage since 1914 would be made very greatly to exceed the total increase since then in the cost of living. The railway employees are as much entitled to advances in their wages to offset, or more than offset, the increase in the cost of living as any other class of people. They are, however, no more entitled to them than any other large class of people of small incomes; and larger classes of people of small incomes include the vast majority. With a few exceptions, all classes of the people have received substantial increases in their money incomes since pre-war days. But most of them complain, and with truth, that the increases in the cost of living have exceeded the increases in their incomes.

The situation raises the question whether, under present conditions, it is economically possible to increase the incomes of a large majority of the people sufficiently to offset the increases which have occurred and are still occurring in the cost of living.

To what are these increases in the cost of living due? They are due to several causes, but for the purpose of this discussion it is necessary to consider only one of these causes. This is the world-wide shortage of the things that are the necessities and comforts of human existence. These things include foodstuffs, materials for clothing, houses in which to live and so on. It is not necessary to present to any intelligent person evidence of the existence of this shortage of necessities and comforts. The evidences of its existence are encountered upon every hand. It exists because during the war the consumption and destruction of commodities went on for years faster than their production. The shortage of things necessary to human subsistence and comfort caused by the war is far greater in Europe than in the United States; but there is a large shortage here.

While the war caused a great reduction in the available supply of necessities and comforts, it did not correspondingly reduce the effective demand for them. When the supply of a thing is reduced, and the demand for it is not reduced, its price tends to rise. That is an economic law with which we are all familiar. Ordinarily, in such circumstances, only government control can keep the price down. Government control did keep the prices of some things down during the war, but it did not extend to most commodities, and as the supply of them became small relatively to the demand their prices naturally advanced. This, of course, increased the cost of living.

To offset this initial great increase in the cost of living we began advancing wages. We have been watching a race between prices and wages ever since.

This often is explained upon the theory that the advances in wages have increased the costs of producing commodities, building houses, etc., and that business men have had to advance prices, rentals and so on to cover these increased costs. But this is only part of the explanation. Not only has every advance in wages increased the cost of production, but every advance in wages has, temporarily at least, increased the purchasing power of those who have received it. They have utilized their increased purchasing power to increase the effective demand for goods. This increased demand has not been accompanied by any corresponding increase in the supply of goods; and the inevitable result of every advance of wages has been another increase of prices.

When would this process result in the incomes of a majority of the people catching up with the cost of living? Never. Why? Because the original great increase in prices and in the cost of living was due to a shortage of goods caused by the war, and never while that shortage of goods or any part of it still exists can any general advance or any number of general advances in wages nullify its effect upon prices. On the contrary, as has been shown, advances in wages have a direct tendency to aggravate and perpetuate the high cost of living, not merely because they enter into the cost of production, but because, by maintaining and increasing the purchasing power and the actual purchases of those receiving the wages, they tend to cause, and do cause, ever greater advances in prices.

The conclusion is inevitable that in attempting to nullify, for the people as a whole, the effects of the increase in the cost of living merely by advances in money incomes, we are attempting an absolute economic impossibility. All the efforts of that kind which have been made have been futile, and all those made in future will be futile. The only way to re-establish the relationship which formerly existed between the incomes and the cost of living of a great majority of the people is to re-establish the relationship which formerly existed between the supply of and the demand for commodities. This can be done in only one way—by producing more things.

than we consume, until the shortage of things caused by the war has been made up and the old balance between supply and demand has been restored. Almost all classes of people are disposed to consume more and produce less than they did before the war. If we should advance wages until doomsday we should never make the advances in wages sufficient to offset the increase in the cost of living if we did not by increased production or reduced consumption make up the deficiency of goods which was the great initiating cause of the increases in the cost of living within the last six years.

The application of all this to the question of advances in the wages of railway employees is evident. The increase in the cost of living cannot possibly, for most of the people, be offset by advances in their money wages. Therefore, railway employees or any other class of persons under existing conditions, who receive advances in their wages which completely offset or exceed the increases in the cost of living necessarily receive advances relatively greater than those received by a great majority of the people, and receive them mainly at the expense of this great majority of the people. Therefore, the Railroad Labor Board, in determining what advances in wages, if any, should be given to railway employees, should consider not merely what changes have occurred in the relations between the incomes and the cost of living of railway employees, but also what changes have occurred in the relations between the incomes and the cost of living of all the classes of the people who have to maintain themselves by their physical or mental exertions. Official statistics indicate that the cost of living has increased nearly 100 per cent in the last six or seven years. Will not the brain or hand worker who during this time has received an increase of only 50 per cent in his income have a right to complain if he is required to help pay a further increase in wages to men who during the same period have received advances in their incomes amounting to, say, 96 per cent?

The Railroad Labor Board was created to do justice between the railway companies, the railway employees *and the public*. It will not do justice to the public if it ignores considerations of this kind.

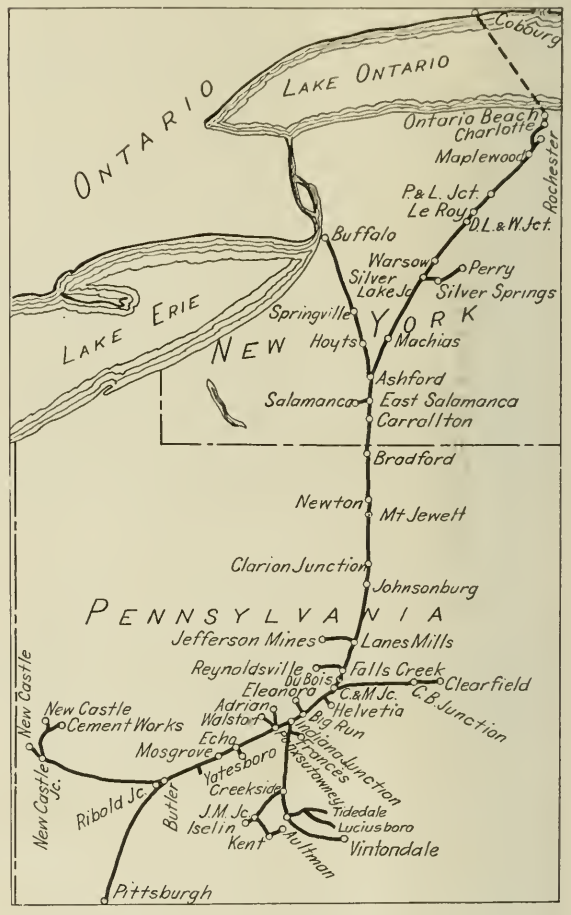
Buffalo, Rochester & Pittsburgh

THE OPERATION of the Buffalo, Rochester & Pittsburgh in normal times is a finely adjusted piece of work, on the success of which depends the successful carrying on of a number of important industries, including the marketing of large quantities of coal; likewise the successful operation of the railroad is dependent on a nice adjustment of industrial relations. The road connects the southwest Pennsylvania coal fields with the Great Lakes, thus competing with the Pennsylvania's lake line, the New York Central's Pittsburgh & Lake Erie and with the Erie. It forms an outlet for the Baltimore & Ohio to Buffalo and Rochester. The history of the road in detail would show with what infinite care and skill every detail of a nice adjustment had been worked out to build up a most economical transportation machine capable of profitable operation at very low rates and at the same time rendering a service effectually competing with the Pennsylvania Railroad, the New York Central and the Erie.

The establishment of the Punxsutawney iron furnaces at the southern end of the line has been mentioned before in commenting on the Buffalo, Rochester & Pittsburgh situation, but it must be borne in mind that this is only one, although probably the most important single one, of a great number of developments which have been working out to make the railroad property what it is. Under normal conditions the demands of the Punxsutawney furnaces give the Buffalo, Rochester & Pittsburgh ore as a load for coal cars which would otherwise return south empty.

Originally the Buffalo, Rochester & Pittsburgh was a coal road purely and simply. It is controlled by the same capitalists who own some of the largest coal mines reached by the road. During the last ten or twelve years, however, the property has been developed in accordance with scientific principles of a modern general freight and passenger railroad. This development, of course, took place in the face of the business rivalry of two such well-entrenched and powerful roads as the Pennsylvania and New York Central. It should be mentioned, however, that in the course of this development it was found mutually advantageous for the New York Central and the Buffalo, Rochester & Pittsburgh to co-operate in securing certain traffic, especially coal, for certain markets.

It is only in the light of the history of the road and its



The Buffalo, Rochester & Pittsburgh

particular conditions that any sound evaluation can be made of its showing in 1918 and 1919. The road did not even earn its operating expenses in 1919, much less its interest charges. This did not immediately affect the security holders, because the company was receiving rentals based on its earnings under competitive conditions. The important question is, however, does the showing in 1919 forecast dire results which will follow the discontinuance of the rental and guarantee? The company was earning an ample margin above 5 per cent dividends on its common stock in 1917. Are the causes that reduced the earning power of the road in 1919 permanent or are they only temporary?

It is significant and suggestive that freight revenue in 1919 amounted to $11,787,000,000, as against $16,438,000,000 in

1917, when rates were from 20 to 25 per cent lower than they were in the later part of 1918 and all of 1919. The ton miles of freight handled in 1919 total 1,695,000,000; in 1918 the total was 2,844,000,000; in 1917 it was 2,697,000,000. Further, the passenger business, which has furnished a steadily growing part of the company's revenue, totaled 57,828,000 passengers one mile in 1919; 51,380,000 passengers one mile in 1918; 57,112,000 passengers one mile in 1917.

It needs more than the general increased costs of labor and materials to explain an operating deficit on a road so well managed as the Buffalo, Rochester & Pittsburgh. The unescapable explanation is that the peculiar conditions which exist in the coal fields following the armistice and incidental to the coal miners' strike of last winter, and the suspension of competitive conditions so completely upset the operation of the road as to make the showing in 1919 no criterion of what may be expected in 1921. It is somewhat as if we were to expect a modern printing press to continue to turn off perfect printed sheets because paper continued to be fed into it and the type faces remained in the proper place, notwithstanding the fact that the power to run the press was used for some other purpose considered more important; some of the connecting rods were taken out because they were needed on another machine, and half of the gears were removed for some other more important purpose.

In 1919 the total operating revenues amounted to $13,957,000, a decrease as compared to 1918 of $4,524,000. Operating expenses amounted to $15,029,000, a decrease of $2,548,000 when compared with the previous year. The saving was about equally divided between maintenance and transportation. The saving in transportation expenses, even with the large falling off in business, is notable under the present labor conditions. Transportation expenses, which include the wages of engine and trainmen, the cost of fuel and the other out-of-pocket costs of actually handling business, amounting to $6,801,000 in 1919, as against $8,180,000 in 1918, a saving of $1,379,000. The cost of fuel for the yard locomotives was cut in half; $217,000 in 1919, as against $433,000 in 1918, and fuel for train locomotives cost $1,150,000 in 1919, as compared with $1,723,000 in 1918. There were cuts in the amount paid for wages of engine and trainmen, due of course to a much smaller mileage, but they were by no means as large proportionately as the reductions in the cost of fuel.

The decrease in the average train load is surprisingly small. The average train load in 1919 was 784 tons, comparing with 943 tons in 1918 and 836 tons in 1917.

Prior to government operation the Buffalo, Rochester & Pittsburgh was maintained at a very high standard. Especially was this true of equipment. The company had a large supply of steel cars and had applied steel underframes to such wooden cars as remained in service. A policy of keeping shop forces intact, even at the risk of running up expenses at times when earnings were low, had been carried on for a number of years. The company had an open shop and there was a spirit of co-operation among employees of the mechanical department. These facts, combined with the policy of the company to make extensive repairs in slack times, resulted in getting an extraordinary amount and quality of work out of car and locomotive repair shops. About 80 per cent of the company's own equipment was in normal times on its own lines. It was considered a part of sound business judgment to keep this equipment up, so that it was not only in runnable shape but could be said with truth to be in perfect repair. One form of competition at the steel mills consisted in being able to place exactly the right car when the need arose for it.

Under government operation it was found impossible to continue as high a standard of maintenance. It is probably no exaggeration to say that nearly twice as much effective work an hour was done by a car repair man in the periods when the Buffalo, Rochester & Pittsburgh was doing repair work in times of slack traffic, in part in order to keep its shop forces intact, as was done by the same man in an hour during 1918 or 1919. At present not over 10 to 15 per cent of cars owned are on home line. Those that have been off the home line are not being maintained up to the Buffalo, Rochester & Pittsburgh standard. The fact has to be faced squarely that there is deferred maintenance now both in equipment and in way of structures.

The Buffalo, Rochester & Pittsburgh is one of the very few roads in the East which may be classed as still working under the law of increasing returns. In the past 10 years a very comprehensive program of additions and betterments was carried out. Gradually Mikado locomotives were substituted for lighter locomotives, but not until bridges and structures had been strengthened to take care of them.

Purchases of 70 heavy locomotives in 1917, representing 35 per cent increase in tractive power, were delivered at the beginning of federal control; simultaneously there was construction of additional shop and roundhouse facilities, with large additions to machine tool equipment, the result being that the road is ideally situated to handle economically an increasing tonnage, and without additional capital expenditure of moment. It is also in very good financial condition, for after providing for long debt maturities of about $5,000,000 during the next two years, it has no underlying debt ahead of its general mortgage, and with the exception of car trusts, no important maturities for the next 17 years, an almost ideal situation from the present financial outlook. As to car trusts, it is an interesting sidelight on the policy of this company in the past in its purchase of equipment in periods of business inactivity that there are outstanding car trust obligations of less than $9,000,000 against an equipment of 17,000 steel or steel-underframe freight cars and 325 locomotives of modern and heavy design, the vast majority of this equipment being less than 15 years of age. This could not be replaced today, or at any time during the past two years, for within $25,000,000 of the present debt against it, all of which will tend to strengthen the position of the company in meeting business reaction.

If the road should suddenly begin to get 25 per cent more traffic than it is getting now facilities would be found equal to handling it. This is true, even assuming that the traffic was dumped on the road without regard to direction of economical movement. If traffic can be built up and selection made of what classes of traffic are most desirable, it is probable that the road could handle 50 per cent more business than it is handling now and handle this additional business economically. Herein lies the great strength of the Buffalo, Rochester & Pittsburgh position. Whereas most eastern roads could not increase their facilities 25 per cent without huge capital expenditures, and are, therefore, today operating under the law of decreasing returns, this road has during the recent past made the capital expenditures that put it today in a position to operate under the laws of increasing returns.

The following table shows the figures for operation of the property by the government. This is not the corporation income account:

	1919	1918
Freight revenue	$11,787,447	$16,437,948
Passenger revenue	1,591,470	1,335,097
Total operating revenue	13,955,592	18,479,659
Maintenance of ways and structures	2,366,024	2,823,761
Maintenance and equipment	5,264,848	5,966,244
Traffic expenses	175,927	187,924
Transportation expenses	6,800,538	8,179,786
General expenses	394,037	393,795
Total operating expenses	15,028,727	17,577,208
Taxes	280,000	294,580
Rentals	361,423	313,527
Net Income or Deficit	*1,057,819	893,396

* Deficit.

Corporate Income Account

	1919	1918
Rental	$3,276,410	$3,276,410
Gross income	3,470,979	3,353,337
Interest and rentals	2,407,013	2,205,026
Dividends	780,000	885,000
Surplus	255,366	233,956

Baltimore & Ohio Builds New Main Line Bridge

Replacement of Allegheny River Crossing at Pittsburgh, Pa., Necessitated by Traffic Conditions

By H. A. Lane
Chief Engineer, Baltimore & Ohio, Baltimore, Md.

THE BALTIMORE & OHIO now has under construction a new bridge over the Allegheny river on its main line at Pittsburgh, Pa., which will replace two old bridges now crossing the main and back channels of that river and will eliminate several minor structures on Herrs Island where the existing tracks of the New York-Chicago line are now carried on a fill. It has been necessary for a number of years to limit the weight of motive power over the old bridge, and in order to protect the spans further against possible overloading, the structure has been operated as a gauntlet. These conditions seriously interfered with operations on the division and, in conjunction with the recently re-affirmed order of the War Department requiring the raising of Allegheny river bridges to provide additional clearances for navigation, the situation was regarded of sufficient urgence to warrant authority in July, 1919, on behalf of both the federal administration and the corporate officers for immediate renewal of the structure.

The improvement involves truss and girder spans over a total length of 2,122 ft. from the end of Thirty-third street in Pittsburgh, across the main channel of the Allegheny river, over Herrs Island and across the back channel of the river, to an abutment forming the westerly end of the new structure. Foundation work was started in August of last year and is now rapidly nearing completion. Steel erection will begin in May and it is expected that the bridge will be turned over to operation sometime next fall.

The easterly approach to the Allegheny river bridge consists of a steel viaduct, 2,151 ft. in length, along Thirty-third street in the city of Pittsburgh. This viaduct was built in 1916 and is so constructed that the grade of its westerly portion for a distance of 1,108 ft. can be raised to meet the grade at the end of the new bridge, at which point the new base of rail is approximately 12 ft. higher than the old elevation. The west approach to the new structure is approximately 2,900 ft. in length and on a 0.9 per cent ascending grade. This approach will be on solid fill for a distance of 2,300 ft. and over a double-track framed trestle for the remaining 600 ft., between the end of the fill and Abutment U.

Leading from the Thirty-third street viaduct, there is at present a single-track frame trestle which serves as a connection to the Baltimore & Ohio's Thirty-sixth street yard, an important industrial facility operated in conjunction with the River branch, on which are located a number of large steel mills and other heavy tonnage-producing plants. The change in gradient on Thirty-third street viaduct will necessitate the reconstruction of the Thirty-third street yard connection which will still continue as a single-track trestle, but on new alinement and decreased grade so as to benefit materially the operating conditions both on the connection and in the Thirty-sixth yard.

From the end of the Thirty-third street viaduct and beginning on new Pier A, which is to be erected on the site of the existing old masonry pier, the new structure will be carried to its westerly end at Abutment U by means of 19 new concrete piers which are identified by the letters B to T in-

General View of Bridge from North Bluff

clusive. All of these piers have distinctive locations which do not interfere in any way with the present masonry although the alinement remains the same to a point well across Herrs Island. At this point the new alinement swings clear of the old tracks and takes an easier curve across the back channel so that the new masonry on this end of the bridge is entirely clear of the old line. At Abutment U the new line is practically parallel to the old line but lies about 130 ft. further west.

Pier A, on the east bank of the main channel, will be constructed in an open cofferdam with timber pile foundations, cut off below the water level. Work on this pier will not be started until the new steel is in place and the old structure removed. Pier E on the west bank of the main channel will be built by means of caissons sunk by pneumatic process to a footing on sandstone rock.

Assembling the Trestle Approach

Piers B, C and D will carry two through truss spans 261 ft. and 434 ft. in length, and these two spans with short approach spans A-B and D-E of the deck girder type will replace the existing four through truss spans over the main channel. The three main channel piers are built on caissons sunk by the pneumatic process to footing on sandstone rock which was found at depths of from 60 ft. to 65 ft. below the water level in the Herrs Island pool. The old bridge limits the height to which the new piers can be constructed and these piers have therefore been brought up for the present to an elevation slightly below the lower chord of the existing trusses. As the new base of rail will be from 12 ft. to 18 ft. higher than at present the new trusses B-C and C-D, when rolled into place, will rest on structural steel supports which will later be encased in concrete when the three piers are brought up to final elevation.

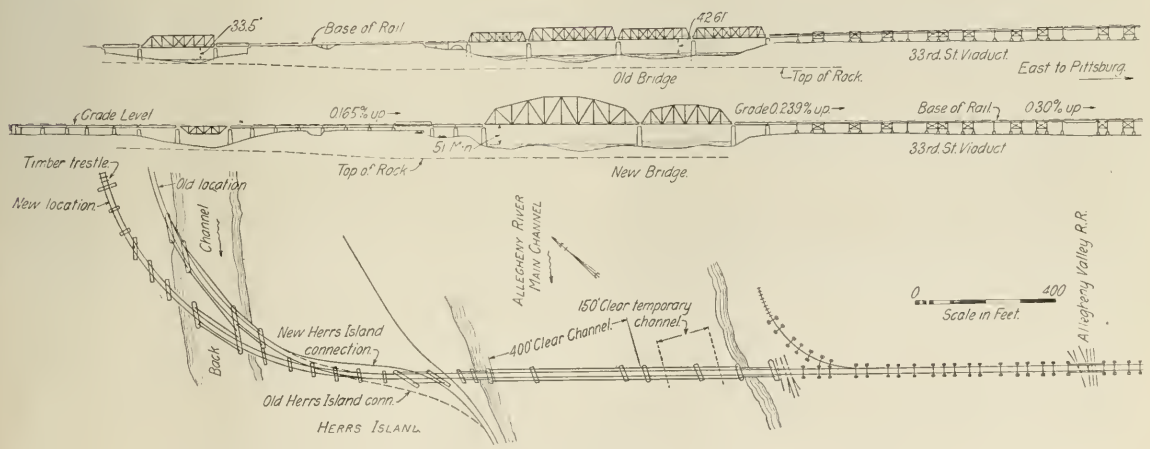
Across Herrs Island, the new structure will rest on Piers F to L inclusive, and will form a viaduct of deck girder spans with the base of rail approximately 20 ft. above existing tracks. It has been possible to detour all traffic across the island over a single-track trestle alongside the permanent alinement and the island piers will therefore be built to final elevation before the steel is placed. These piers rest on Simplex concrete piles.

Piers N and O will carry a 147-ft. deck truss span and with approach girder spans M-N and O-P will form the back channel crossing. The four piers, M to P inclusive, are founded on sandstone rock approximately 20 ft. below Herrs Island pool. Pier M is built on a caisson sunk by pneumatic process. Piers N, O and P were constructed in open cofferdam, but in the case of Pier N recourse was had to a large diving bell operated with pneumatic equipment.

The westerly end of the new structure consists of deck plate girder spans resting on Piers Q, R, S and T and Abutment U. All of this masonry is carried on Simplex concrete piles. Spans P-Q and Q-R provide overhead crossings for the main line above the double track line leading to the lower Allegheny district.

It is planned to start steel erection simultaneously at both ends of the new structure, working ahead from the permanent east and west approaches. The schedule is so arranged that the new steel should reach opposite ends of the main channel span C-D about the same time. The shorter river span B-C (261 ft. in length) will be erected on falsework on the downstream side of the present structure and on the same elevation as the existing spans. When completed, span B-C will be rolled in place and, with girder span A-B and a temporary girder span from Pier C to the old masonry, will replace the first two spans of the old bridge.

The main channel span C-D (434 ft. in length) will be erected on falsework downstream and on final elevation. During construction of this span, the eastbound track on the Thirty-third street viaduct will be raised to final grade. Span C-D will then be rolled in place and spans A-B and B-C raised to meet the new grade. Completion of this part of the program will open the eastbound main track for operation on the new grade, and all traffic will be diverted to this track while the westbound track is being brought up to final



Location Map of the Bridge and Elevations of the New and Old Structures

elevation. The raising of the westbound track will mark the final step in the erection of the new structure.

The old back channel span will not be removed when the new structure is placed in service, but will be continued as an entrance to the stock yards on Herrs Island. At present the stock yards are served by a switch leading off the main line on the island. Elevation of the new main tracks will prohibit this arrangement, and the new connection will, therefore, be made over the present back channel bridge and across the island to an undergrade crossing of the new line between piers F and G.

The work is being carried out under the direction of the engineering department of the Baltimore & Ohio, H. A. Lane, chief engineer; W. S. Bouton, engineer of bridges; A. C. Clarke, district engineer, and W. M. Ray, assistant engineer. All foundation and masonry work is being done by the Vang Construction Company of Cumberland, Md. Steel fabrication and erection has been let to the American Bridge Company.

Report of Division of Finance, U. S. R. A.

A CAREFULLY PREPARED and lucid account of the financing of the United States Railroad Administration is given in the report of Swagar Sherley, director of the Division of Finance, which has been issued by the director general of railroads.

The estimated balance sheet of the Railroad Administration at the conclusion of federal control on February 29, 1920, after 26 months of government operation of the railroads, carried totals of $4,493,972,125, this including all items of debit and credit. Due to the practical inability of the railroad corporations to float bonds or borrow money during and immediately after the war, the government itself was obliged to advance nearly all money needed for capital expenditures and other purposes. At the end of federal control, Mr. Sherley's report shows, there was due to the carriers in unpaid compensation and other large items, including all gross interest accruals, $1,476,928,805.60, while there was due from the carriers to the Railroad Administration, including similar interest accruals, $1,677,243,077. Of the amount due from the carriers it is estimated that $815,379,145 may be used under the terms of the transportation act, 1920, as an immediate offset against the amount due by the government to the carriers, leaving to be paid to the railroads the net sum of $661,549,661.69.

Congress appropriated for the federal control of transportation systems $1,250,000,000, and the transportation act of 1920, under which the properties were returned to private control, carried an additional $200,000,000. The following table from Mr. Sherley's report summarizes the loss sustained by the government:

Estimated excess of operating expenses and rentals over operating revenues:	
Class 1 railroads	$677,513,151.56
Other privately owned properties (smaller railroads, sleeping and refrigerator car lines and steamship lines)	43,011,129.36
Inland waterways	2,449,738.69
Total	$722,974,019.61
Expense of central and regional organization	13,954,979.69
Deficit, American Railway Express Co.	38,111,741.60
Adjustment of materials and supplies in settlement with railroad companies on account of increased prices	85,204,618.26
Net interest accruals for deferred compensation, open accounts, and additions and betterments	37,558,162.01
Deductions from gross income	10,118,034.36
Miscellaneous profit and loss items	4,894,056.38
	$912,815,611.91
Less non-operating incomes	12,336,855.35
Total	$900,478,756.56

S. M. Vauclain on European Business

LONDON, May 6.

S. M. VAUCLAIN, president of the Baldwin Locomotive Works, who has just returned to London from a business trip through Europe, brings with him a very optimistic account of the recuperative powers of the countries he has visited. While there is a seemingly apparent shortage of coal, food and materials, he says that if transportation facilities were sufficiently adequate to handle the business requirements much of this shortage would be overcome. The transportation difficulties are occasioned by a decided shortage of locomotives to haul the trains. There appears to be a sufficient supply of freight cars, but locomotives are needed everywhere. On his visit to Roumania he obtained an order for 50 locomotives. They are consolidations similar in design to those recently supplied to the Belgian State railways from America. The locomotive situation in Roumania is particularly bad, there being over 50 per cent. of the locomotives out of service for repairs. From his observations Mr. Vauclain believes that France, Poland, Roumania and Serbia are in immediate need of about 1,000 locomotives each. The present labor and material situation make it impossible for these countries to provide this equipment. The reason some orders have not been placed in outside countries to make good this deficit is because of the prevailing low rate of exchange and the difficulties in securing proper credits.

In speaking of the economic conditions, he says that of course these countries are very poor; but everywhere the people seem to have a very serious desire to re-establish themselves and to get back on a sound and substantial basis. They are not asking for charity, but they desire and greatly need commercial assistance in the way of credits to rebuild their war-worn economic structure. He believes, as do other Americans who have had an opportunity to study European conditions, that there are wonderful opportunities for American business provided that business is conducted in a spirit of co-operation, both in giving the customer that which he desires and assisting him in establishing a credit basis on which to buy that will not tax him out of existence. Furthermore, he finds that the European people are much more amenable to new (to them) departures in design, appliances, etc., than they were before the war. The war has had a tremendous broadening effect, and has created vastly different conditions. Problems are encountered now that were never thought of before, nor would they have arisen had it not been for the war. Naturally, therefore, any assistance in solving these problems will be greatly appreciated. America, in virtue of the fact that it has had many of these problems to face, as, for instance, the high cost of labor, is in an excellent position to be of considerable help. Labor-saving devices and appliances that will reduce the cost of railway operation should and will find a fertile field on European railways if they are presented right and if adapted to meet the conditions peculiar to the railways there.

This is a particularly important point, and the degree to which it is followed will determine the success with which this foreign business is conducted and, furthermore, the success with which the business is retained.

The Baldwin Locomotive Works has not been slow in recognizing this. It is its intention to give the European roads what they want and at the same time to give them freely expert advice and assist them to solve their problems of which many, under the new conditions now obtaining, are entirely new to them. At its works in Philadelphia a separate and complete organization has been established for handling the building of foreign locomotives. A certain portion of the plant is given over to this work and a staff of employees thoroughly trained in the construction of foreign equipment operate it.

Annual Meeting of the Fuel Association

The Subjects Discussed Include Pulverized Fuel, Feedwater Heating, Front Ends and Grates

THE OPENING SESSION of the twelfth annual meeting of the International Railway Fuel Association was called to order by the president, H. B. McFarland, engineer of tests, Atchison, Topeka & Santa Fe, on Monday morning, May 24, at the Hotel Sherman, Chicago. Following the invocation by Dr. Frank W. Gunsaulus, president of the Armour Institute of Technology, the association was addressed by Roy V. Wright, managing editor of the *Railway Age*.

Mr. Wright's Address

The International Railway Fuel Association can well be proud of its record. But it has a task before it, compared to which its past achievements may be said to be little more than a scratching of the surface. The association has developed and placed on record facts as to how and where savings in fuel may be made. It has done much to supply the inspiration and develop the methods by which such savings were made effective; a great deal remains to be done, however, in these latter respects. The success of a fuel conservation campaign depends directly on the degree to which officers and men are inspired enthusiastically and faithfully to do their part as individuals.

Determining how and where the savings are to be made is largely an engineering problem. Getting the job done, however, demands a keen and thorough understanding of human nature, supplemented by the ability of a salesman or a promoter. It is not enough to attempt to educate men (I use this term to include both officers and men) as to the right way of doing a thing; some incentive must be offered to raise and maintain their interest at a high point. Men are not very different from children. Their attention is caught and retained for a while by one interest and then it restlessly moves on to another.

The men who are selling the idea of fuel conservation to their fellows in the organization must therefore not only study occasionally to change their methods of approach in order to maintain the interest of the men at a high point, but they must be so intimately in touch with the feelings of the men that they will guard against allowing the task to become arduous and will skillfully introduce into it all the spirit of playing a game. We have many experts to tell us how to conserve fuel down to the minutest detail. What we need is more promoters who can stir up enthusiasm and direct the energies of the officers and men along the right channels in carrying out these details.

For years many of us have felt that a large part of the problem of fuel conservation would be solved if we could develop some means of furnishing prompt and accurate records of fuel performance for each locomotive run. This looked most promising until we came to a fuller realization of the fact that almost every one on the railroad from the chairman of the board down to the call boy had some influence on the fuel performance. Why confine the measuring stick to the engine crew when so many other men enter into the problem of using fuel economically and efficiently?

While individual fuel performance records have their value, if they can be promptly and accurately obtained, would it not be better to get the whole team to work together as a unit to beat its own record, or that of its neighbors? The amount of coal used on a division and the train performance statistics can be determined fairly accurately. Two divisions may not be directly comparable, but suppose two divisions on the same or different roads, led in friendly competition by their superintendents, should try to see which one could make the best percentage of improvement. The idea is not new; its value in fuel conservation has been forcefully demonstrated within the past year.

When the fuel conservation promoter has this sort of a campaign going it will not be so necessary laboriously to teach the different men exactly how to do their part of the work. They will develop initiative and interest and will get after the expert or instructor rather than wait for him to get after them.

There is much indifference among the men in railroad service today. In the interests of the public the men, the managements and the owners this must be overcome and overcome quickly. One great difficulty in getting better results is that the men and officers are too far apart and do not really know each other. If they did know each other better a lot of foolish misunderstandings would be wiped out. You can't carry out a program such as the one above mentioned without getting the men and the managements closer together.

There is another phase of the fuel conservation question which is deserving of special emphasis at this time. The Fuel Association is strong enough to take a real stand in attempting to correct some deep-seated abuses which reach back into the very heart of railway operation and management and bulk much larger than even the entire annual fuel bill of the railroads because they are a source of continuing waste not only in fuel but in other important items of cost of operation.

What will happen if instead of looking too intently upon fuel conservation as an end in itself we consider fuel performance as a barometer of efficient and economical operation? How many roads know what is the economical speed of a freight train over a given division? Why do they not know? It is comparatively easy to determine. How much can the capacity of a division be increased and the economy of operation be improved by modernizing the power? What will it mean if really adequate facilities are provided for keeping the cars and locomotives in first class operating condition? What a wonderful saving could be made in fuel and other operating expenses if some real brains and money were expended in providing business-like locomotive terminal facilities instead of having engine houses which without much imagination can be described as "dark holes with walls around them." How do you know that a certain type and size of locomotive is best suited to the conditions on your road? You ought to know! Do your train despatchers ever get out over the division, or are they glued to office chairs with distorted visions or imaginations as to what is really going on over the division? You ought to be the fellows to help supply the dynamite to jolt them loose.

All these things and others which you will call to mind—which the association has fully recorded in its proceedings—will affect fuel consumption as much or far more than can be done by the average engine crew. The call today is for the Fuel Association with its great influence to go to the very roots in tackling the fuel conservation problem in a really big way. The conditions are ripe; now is YOUR opportunity! Will you grasp it?

President MacFarland's Address

In his address Mr. MacFarland confined himself to matters pertaining to the welfare of the association, dwelling particularly on the increase in the cost of conducting the work of the association, the largest part of which is involved in the

publication of the proceedings. In calling attention to the proposed increase of $1 a year in the annual dues, he reminded the members that the value of the proceedings is much more than the full amount of the dues. In referring to future work for the association, Mr. MacFarland suggested the development of a standard of fuel performance for locomotives. At the present time all fuel performance records are comparative with no basic or potential standards and he suggested the investigation of the possibility for the development of a formula for fuel performance in which all the variables are included as factors, as an important subject for the consideration of a standing committee of the association.

Report of Committee on Feed Water Heating

The feed water heaters of today may be divided into the following general classes:

1. Waste gas heaters,
   a. Gas tube,
   b. Water tube.
2. Exhaust steam feed water heaters,
   a. Closed and open types.

The gas tube feed water heaters are used by the various railroads where the Mallet type locomotives have been developed. This type gives a rise in temperature of 70 deg. when new, but in bad water districts this efficiency is lowered rapidly, due to scale forming on the heater surface.

Very little has been accomplished with water tube heaters of the waste gas type, although this type has been the subject of much experimental work. Waste gases passing through the front end will average about 600 deg. in temperature, but the rate at which heat can be transmitted from these gases to the feed water is so low that it necessitates a very large heating surface in the smokebox to realize any appreciable quantity of this heat.

Tests have recently been run on the Santa Fe system with a feed water heater of the Thompson type. After this heater had been four months in service, tests were made. The rise in temperature secured by means of this feed water heater at the end of four months' service was 30 degrees. An examination of the heating surface showed that in the four months' time 1/16 in. of scale had formed on the feed water heating surface. Tests were also made at this time, using a pump in place of the injector, and approximately 70 deg. rise in temperature was secured. No facilities had been designed whereby the scale could be removed from this type of feed water heater, so it was removed after this test was made.

With proper means for the removal of scale and sediment the waste gas heater can be made an effective instrument for the removal of scale forming ingredients and other impurities before these are carried into the boiler.

The exhaust type feed water heaters, due to the lower temperatures, made it practically necessary to use a steam pump in place of the injector. This type is very attractive, due to the fact that the transfer of heat from steam to a heating surface is about ten times that of the transfer of heat by means of waste gases. This allows a rather compact system and the feed water can be brought to within 10 or 15 deg. of the temperature of the exhaust steam.

The closed type of exhaust steam feed water heaters in use in this country are as follows:

Weir feed water heaters, two of which are installed for test purposes on the Southern Railway. The troubles to date with this system have been that the water hammering on the pipes between the pump and feed water heater causes leaks and the expansion and contraction in the feed water heater itself causes leaks between the copper tubes and cast iron tube plates. A re-designed feed water heater has been planned so as to take care of this latter trouble.

The second feed water heater system of this type developed in this country is the heater manufactured by the Locomotive Feed Water Heater Company. This heater has been in service on the New York Central, the Delaware & Hudson, and the Delaware, Lackawanna & Western railways, and to date in the current year the following applications have been or are being made: Central Railroad of New Jersey, Fort Smith & Western, Canadian Pacific, Grand Trunk and Erie railroads. Additional equipments are being applied to the Delaware & Hudson and the New York Central. The design is made so that the expansion and contraction of the brass tubes is taken care of so that no leakage occurs.

In order to increase the effectiveness of the heating surface in the brass tubes a thin brass, corrugated spiral agitator is placed in each tube. This agitator more than doubles the transfer of heat across each square foot of heating surface, and the high velocity and scouring action of the water caused by its presence tends to prevent lodgment of scale or dirt on the heating surface. Not the slightest particle of scale or dirt has ever been found in the heaters now in service. No experience, however, has been obtained from very bad waters.

The open type heater in service is the McBride feed water heater and pump, manufactured by the Worthington Pump & Machinery Corporation. There are four in service on the Pennsylvania Lines East on locomotives in service out of Altoona, Pennsylvania. These have been in service for about a year. The feed water heater and pump are combined and are designed for a capacity of 60,000 lb. of feed water per hour.

The exhaust steam passes through an oil separator enroute to the feed water heater. No trouble has been experienced so far from oil passing through the oil separator with the exhaust steam and being delivered to the boilers with the feed water. On road tests the increase in evaporation per pound of coal was 14.4 per cent for the heater.

The development of the locomotive feed water heater is not a question of theory, but of design. A locomotive feed water heater must be capable of continuous operation under the most adverse conditions; it must not add appreciably to the difficulty of controlling water supplied to the boiler at any required rate; it should not increase the weight on driving wheels to the extent that it becomes necessary to reduce the dimensions of the boiler, and it should be applicable to existing locomotives without necessitating radical alterations.

The substitution of a pump for an injector is the most difficult problem connected with the feed water heating. It complicates the control of boiler feed, increases locomotive maintenance and weight, and is in itself not as efficient nor reliable an instrument as the injector. On this account the success of locomotive feed water heating hinges very largely on the design of a successful pump, unless a practical heater of the waste gas type can be designed which will raise feed water temperatures sufficiently to effect an appreciable saving with the use of an injector.

No great progress in feed water heating can be expected until the solution of this problem is actively taken in hand by the railroads with a determination to make feed water heating a practical operating factor. This committee would urge that the mechanical department of each railroad endeavor to lead in this development. We should each endeavor to be a pioneer in the practical application of the feed water heater.

The report was signed by E. E. Chapman (chairman), A., T. & S. Fe.; E. A. Averill, Loco, Feed Water Co.; O. S. Beyer, Jr.; E. V. De Vilbiss, Penn. System; J. S. Hampson, Rosengrant Coal Co.; F. Kerby, B. & O.; Monro B. Lanier, Monroe-Warrior Coal & Coke Co.; L. G. Plant, *Railway Age*, and L. R. Pyle, Loco, Firebox Co.

Discussion

E. A. Averill (Locomotive Feed Water Heater Company) stated that there are three essential considerations which must be taken into account in judging the practicability of feed

water heater devices. These are (1) safety, (2) reliability and (3) cost of maintenance. Following the ability to meet the requirements of these three points the questions of efficiency, weight of apparatus and cost of installation should be considered. Feed water heaters of the exhaust steam type have now been developed so that the requirements of safety and reliability are fully met and while installations are too few to permit accurate figures to be obtained as to the cost of maintenance under conditions which would exist were large numbers of locomotives equipped, experience indicates that the requirements of low maintenance cost have been met satisfactorily. During the discussion the point was brought out that a saving in fuel greater than could be expected from the actual amount of heat reclaimed was observed in some tests of heaters of the waste gas type. This was attributed to the improved combustion resulting from the decreased amount of fuel consumed, which was great enough to permit the firemen to do a better job of firing than had been possible without the heater.

Possibility of Lignite Coals

By S. M. Darling
Fuel Engineer, United States Bureau of Mines

The nation's resources in the way of solid fuel, while large, are not inexhaustible. During the last twenty years the population of the United States increased 42 per cent, and during the same period our coal consumption increased 172 per cent. Our annual coal consumption in 1919 was about 530,000,000 tons. Should the same rate of increase hold for the next two decades, the consumption in 1940 would be over 1,400,000,000 tons. And it is quite probable that we shall be called upon to export many millions of tons annually to South America, Africa and the Mediterranean.

The nation's coal resources of all ranks total 3,553,637,100,000 minable tons of 2,000 lb., nearly one-third being lignite. Of this lignite 964,424,000,000 tons is in North and South Dakota and northeastern Montana, approximately 23,000,000,000 tons in Texas, and 7,404,300,000 tons in Alaska, and relatively smaller quantities in several of the other Western and Southern States. The lignite tonnage given above includes only true lignite.

The Carbonizing Process

I came to the conclusion early in my lignite work that the large way to utilize this fuel was to carbonize it; that is, break it up into its four main divisions of gas, oils and tars, ammonia, and solid residue, the latter being practically charcoal. The fact that the lignite does not coke in the sense that bituminous coal cokes, but rather crumbles, on being carbonized, makes possible a continuous and comparatively inexpensive carbonizing process. The costly element of labor is reduced practically to that required for directing mechanical operations.

The Products of Carbonization of Lignite

(1)	Gas, per ton of lignite (440 B. t. u. per cu. ft.)	10,000 cu. ft.
(2)	Oil and tar	15 gal.
(3)	Ammoniacal liquor	65 gal.
(4)	Carbon residue	955 lb.

The Gas—Of the yield of 10,000 cu. ft. per ton of lignite carbonized, 6,000 cu. ft. are required to carry on the process, leaving a surplus, costing nothing, of 4,000 cu. ft. of 400 B.t.u. per cu. ft., or a total of 1,600,000 B.t.u. yielding 160 hp.-hrs. This power is comparable in cost with that derived from natural gas, and is fully as cheap as most hydroelectric power.

Oils and Tars—Just what is the most profitable disposition in this country for the oil and tar products remains to be determined. Their treatment and marketing is an industry by itself. It is not probable that Germany will ever again control the coal tar product industry, and it is not unreasonable to expect that in the future a large part of the demand for tar products will be supplied from our immense stores of lignite.

Ammonia.—The ammonia is contained in the gas and gas water; it may be recovered as ammonium sulphate, a valuable fertilizer, as anhydrous ammonia for refrigeration and other commercial purposes, or it may be treated as a source of other nitrogen products, some of which are of vital importance in the manufacture of explosives.

Carbon Residue—Tests of *carbonized lignite,* for use in suction power-gas producers, in carload lots have proved it to be an exceptional and unexcelled fuel for this purpose. Its chemical composition, as shown by analysis, is about the same as that of Pennsylvania anthracite. For the production of power in this way carbonized lignite is fully equal to anthracite coal, charcoal, or bituminous coke, the standard fuels for such purposes. This carbonized lignite can also be burned satisfactorily on the automatic stokers and grates used to consume the smaller sizes of anthracite. *Carbonized lignite briquets* for domestic service have been made in carload lots, and, ton for ton, compare favorably with anthracite coal, and is an ideal domestic fuel in such rigorous climates as those of North Dakota and Alaska.

The territory naturally tributary to the Dakota lignite deposits embraces North Dakota, South Dakota and western Minnesota. Upwards of 2,000,000 tons of bituminous coal are shipped annually into that territory from Illinois, Indiana, West Virginia, Kentucky, and Pennsylvania. The average haul of this coal is 1,000 miles. If the Dakota lignite were put into stable and serviceable condition, by means of carbonizing and briquetting, this fuel demand could be supplied with an average haul of less than 400 miles. The average freight rate is about four mills per ton-mile. Therefore, if the fuel and power requirements of the area tributary to the Dakota lignite fields were supplied from the lignite mines an annual saving would be effected of $4,800,000 in freight charges alone, and such utilization of near-by fuel would also save annually the travel of 50,000 cars and 1,200 engines and crews a distance of 600 miles.

The tonnage mentioned does not include the anthracite shipped into this Dakota territory; this anthracite, carried in lake boats and distributed from the head of Lake Superior, amounts to about 1,500,000 tons annually.

To replace these 3,000,000 tons would require the carbonizing annually of 6,000,000 tons of lignite, yielding 3,000,000 tons of solid fuel, 18,000,000,000 cu. ft. of surplus gas (costing nothing), 45,000 tons of sulphate of ammonia, and 60,000,000 gallons of tar distillates. The Texas lignite situation affords an equally great opportunity for economic saving. And there are many smaller deposits of lignite scattered over the Southern and Western States, where relatively smaller savings can be made in similar fashion.

Conservation of Petroleum to Preserve Source of Lubricants

Bringing this lignite onto the market as fuel, with its attendant production of oils, would release large quantities of petroleum and natural gas for other uses. Of our original supply of petroleum, 42 barrels per capita have been used and only 70 barrels per capita remain for the future. About half of the petroleum currently produced is used as fuel for steam raising. The possibilities in the use of petroleum and its products in connection with the navy, airplanes, the merchant marine, automobiles, motor trucks, and tractors, are so great and vital that before long the use of oil for steam raising will be regarded as an inconceivable folly.

Mr. Requa, Consulting Engineer of the Bureau of Mines and Director of the Petroleum Division of the Fuel Administration, puts the situation in forcible language:

"The operation of hydroelectric generators, of railways and trolley cars, of the machinery of the factories, of internal-

combustion engines, of our battleships and our merchant ships—in fact, of all machinery—is made possible by the use of one product, and of one product alone—petroleum. For if there is no known satisfactory substitute as a lubricant its exhaustion spells commercial chaos or commercial subjugation by the nation or nations that control the future source of supply from which petroleum will be derived."

The urgent necessity is upon us now to begin to bring these enormous stores of lignite into use and make them do their proper part of the economic work of the nation. This does not involve any epoch-making discovery, but just the judicious application of a measure of chemical and engineering knowledge and skill. The carbonizing of lignite will place the lignite-bearing regions substantially on a par as regards fuel and power with those parts of the country that are favored with bituminous and anthracite coal. It will give an equally good domestic fuel in the way of carbonized lignite briquets, better gas, producer fuel in the form of carbonized lignite, enormous quantities of gas to be used for fuel or power purposes, a large tonnage of fertilizer in the form of sulphate of ammonia, and a great amount of oils and tars.

Discussion

The paper aroused considerable discussion as to the possibility of using lignite coal in locomotive service, in which it was pointed out that the development of the use of lignite briquettes as outlined by the author depended on the building up of a market for the by-products. The experience in the by-product coke industry in the east indicates that this will be a process requiring considerable time. As an immediate means of making these coals available, the possibility of using them in pulverized form received considerable attention and it was brought out that in experiments it has been possible to pulverize this fuel with as high as 18 to 22 per cent moisture remaining in it, thus eliminating the requirement for a drier of large capacity and the difficulty involved in heating the lignite to the temperature required to reduce the moisture to the low percentage ordinarily considered necessary in pulverized fuel practice. The fact that lignite can be burned in its natural form was also brought out. This has been done very successfully on the Oregon-Washington Railroad & Navigation Company's lines. The locomotives have large grate area, large netting area, admit about one-third of the air over the fire through a baffle fire door and run with a large exhaust nozzle opening.

Santa Fe Locomotive Oil Burning Practice and Fuel Performance*

By Walter Bohnstengel
Assistant Engineer Tests, A. T. & S. F.

The Santa Fe System has approximately 3,160 locomotives, of which two-thirds use coal and one-third use oil as fuel.

The necessary procedure in converting a coal burner to oil is providing an oil tank of proper shape and size to fit the coal space in the water tank; removing grates, ash pan, and ash pan rigging and applying a fire pan with proper brick lining and burner; and arranging necessary piping on the tender and boiler back head of the locomotive, to regulate the oil outflow to the firebox. All pipe and pipe fittings should be extra heavy, the valves and throttle being of heavy design capable of carrying a maximum pressure of 250 lbs.

Firebox and Flues

It has been demonstrated that button head radial stays should be eliminated and taper head radial stays applied. It is the practice to have all rivets countersunk and driven flush. It is also considered good practice to scarf the door and flue sheet flange from the inner edge of the rivet hole to the outer edge of sheet, making the outer edge approximately 3/16 in. thick to prevent undue cracking from the rivet hole to the edge of sheet. It is not considered that firebox troubles are any greater in oil burning locomotives than in coal burners in proportion to the work performed. The troubles experienced in oil burning locomotives consist of cracks developing in the knuckle of the fire door hole, top flange of door sheet and flue sheet, leaky radial stays and staybolts, as well as cracks developing from staybolt to staybolt in the side sheet. Prompt and careful attention is necessary in boiler washing.

Should the side, flue or door sheets have patches applied by rivet or patch bolts, they are liable to give considerable trouble, and should the fireboxes be of the five-piece type, the longitudinal seams in the crown sheet would cause considerable trouble from leaking. It is Santa Fe practice to cover these seams with brick until they require renewal.

The life of a firebox and a set of flues is somewhat less in an oil burning locomotive than in a coal burning locomotive. The average for all locomotives, old and new, large and small, in all classes of service, shows that the life of staybolt fireboxes in coal is 10 years and 3 months and in oil 9 years. This cannot be used to predict the actual probable life of any one box, as the figures vary to a certain extent by reason of different local conditions. The average life of a set of flues in an oil burning freight locomotive is about 48,000 miles, and in a coal burning locomotive, same service, about 65,000 miles. The life in passenger service is approximately 40 per cent higher and in about the same relation.

Engine Equipment

The Booth burner is used as standard on the Santa Fe. The patent on this burner expired in February, 1912, and it is made and tested in our own shops. Good results are obtained from 1½-in. burners on small locomotives, while the larger power is provided with 2 and 2½-in. burners. For the Mid-Continent oil, a 1½-in. pipe is used to convey the oil from the tank to the firebox, while with California and Mexican oil, 2-in. piping is used to the firing valve.

The larger locomotives having 8,500 and 9,000-gallon water tanks, use an oil tank of about 3,400-gallon capacity. On the smaller locomotives having 5,000 and 6,000-gallon water tanks, the capacity of the oil tank varies from 1,800 to 2,250 gallons.

Comparison of Coal and Oil

The essential features in preparing to burn oil for locomotive fuel is the availability, extent of supply, and relative value of the oil, not at the well, but at the point of consumption.

The coal used on Santa Fe locomotives averages 11,500 B.t.u. and the oil 19,000 B.t.u. per lb. On this basis the theoretical heat value of one pound of oil equals 1.65 lb. of coal. After the ratio of coal to oil is obtained to agree with local conditions, the advantages to be gained by the use of oil may be considered by substituting in the following formula:

$$e = \frac{a \cdot b \cdot c \cdot d \cdot X}{\frac{2000}{2000 \cdot e}} = \text{equivalent price of oil per barrel.}$$

$$d = \frac{2000 \cdot e}{a \cdot b \cdot c \cdot X} = \text{equivalent price of coal per ton.}$$

a = Weight of oil per gallon, pounds = specific gravity oil times weight in pounds of one gallon water.
b = Number of gallons per barrel.
c = Ratio of heating value oil to that of coal in B. t. u.
d = Price of coal per ton, dollars.
e = Price of oil per barrel, dollars.
X = Ratio of boiler efficiency oil to coal.

The results of a number of recent tests on the Santa Fe show that the evaporative efficiency of oil is about 25 per

*A., T. & S. F. locomotive equipment for burning oil was described and illustrated in a paper read before the 1915 convention, an abstract of which will be found in the May 28, 1915, issue of the *Railway Age Gazette*, page 1115.

cent more than coal for hand fired and 40 per cent more than coal for stoker fired locomotives, that is, the factor X is 1.25 for hand fired and 1.40 for stoker fired locomotives.

The cost of changing a locomotive from coal to oil burning depends largely on the size of the locomotive. Recent figures show that the approximate cost of changing a modern locomotive of Pacific, Mikado or Atlantic type is from $2,400 to $2,500, including the construction of an oil tank, draft pan, petticoat pipe, oil burner piping, fittings, etc. This cost would also include the application and the usual overhead charge. A smaller locomotive, such as the eight and ten wheelers, can be converted at a cost of about $1,800 to $2,000 each.

Either the speed of the train or the tonnage is increased on an oil burning locomotive, due to the locomotive being worked to its maximum capacity at all times. A test made in 1919 shows that an oil burning Atlantic type locomotive handled an average tonnage of 750 tons, while the same kind of a coal burning locomotive handled 578 tons in the same class of service.

The Brick Arch in Oil Burning Locomotives

The paper also contained a report of tests on three oil burning locomotives of the 2-10-2 type, all of the same class, to determine the effect of an arch tube supported brick arch on fuel performance, with the standard location of the oil burner at the front end of the firebox as well as at the rear of the firebox. These two arrangements were compared with the standard firebox arrangement, which does not include a brick arch.

The data for the individual runs during these tests as well as the average, show a slightly better fuel performance for the locomotives without the arch than for those with a brick arch. However, the atmospheric temperature averaged slightly higher during the runs made without the arch than for those with the arch, which would be favorable to the former in a lower radiation loss.

The data show no saving in fuel, if anything a lower efficiency for the arch, in comparison with the present front end burner arrangement without arch. This can be explained by noting that with proper drafting, without arch as well as with arch, the locomotive can be fired without showing smoke, and having as low a front end temperature without as with the arch. Obtaining complete combustion in the firebox in either case, further economy could only be obtained by absorbing more of the heat from the gases and getting a lower front end temperature. Another explanation for lower efficiency of the arch with oil, is that radiant heat is not utilized to the best advantage with an arch, as the arch shades part of the firebox.

As a general conclusion, taking the present standard arrangement with front end burner and no arch or arch tubes as a basis, the data secured on these tests show that the advantages resulting from the use of an arch tube supported arch with either the front or back end burner arrangement are more than offset by disadvantages and, from these tests, the installation and maintenance of the arch cannot be justified in oil-burning locomotives.

Discussion

The discussion centered around the difficulty resulting from the accumulation of carbon on the bottom of the draft pan in front of the oil burner on oil burning locomotives. This is being experienced in some cases where oil has only recently been adopted as locomotive fuel, especially where the heavy gravity Mexican oils are in use. On roads which have had considerable experience, this difficulty has been overcome, largely by care in the location of the burner, to keep the flame properly centered in the firebox and away from the bottom of the pan, and by admitting air around the burner, principally under and at the sides of the burner.

In discussing the Santa Fe arch tests, J. T. Anthony stated that experience on other oil burning roads indicates a saving of from five to eight per cent where the arch is used. He took exception to the statement that the arch tended to shield part of the firebox from direct flame radiation, as the temperature of the arch makes it a radiating medium itself. He admitted that where a boiler efficiency as high as 76 per cent was obtained without the arch there was not much range for improvement left for the arch, but doubted the ability, day in and day out, to maintain such a high efficiency.

Report on Front Ends, Grates and Ash Pans

The committee presented data for comparison of two types of grates from tests of two classes of coal, namely Gallup and Kansas on the Santa Fe. The object was to determine what, if any, saving could be effected by using table grates in place of finger grates in locomotives burning Gallup coal. This coal, obtained from Gallup, New Mexico, is a semi-bituminous coal, having the following analysis:

Moisture, per cent	8.25
Volatile matter, per cent	29.91
Fixed carbon, per cent	51.46
Ash, per cent	10.38
Sulphur, per cent	0.64
Calorific value of coal as received B.t.u., per lb	11,484
Calorific value of dry coal, B.t.u., per lb	12,516

The test was made between Belen and Gallup, New Mexico, in May, 1919. The locomotive used for this test is a single expansion Mikado type equipped with a Duplex stoker and superheater. It was new, having just been received from the Baldwin Locomotive Works. The front end draft arrangement and the brick arch arrangement remained the same, and in the comparison of data of finger and table grates, the same fireman was used throughout the test.

The standard finger grates for Gallup coal were installed first, and the brick arch maintained eight bricks high in the center and intermediate rows and seven on the side rows, and all set down against the tube sheet. With Gallup coal, it has been found most economical to run the arch down against the flue sheet and at least seven courses high, on account of stack losses. The standard Gallup coal grates have 5-in. openings between the fingers, while the clearance between the bars on the table grates is ¾-in. with ⅝-in. slots for air passage up through the bars. The percentage of air opening is approximately 37.8 per cent with either design.

The locomotive was run with full compensated tonnage rating, namely, 2,300 tons, Dalies to Gonzales, and 2,700 tons, Gallup to Gonzales.

The equated tonnage, the gross thousand ton-miles, and the boiler pressure averaged very nearly the same for the three tests. The evaporation and the coal per thousand ton-miles were in favor of the finger grates. The average speed over the division was nearly the same for either arrangement; the temperature was nearly the same in either case, but the wind averaged a little higher with the table grates on westbound trips.

The million-foot pounds of work done at the drawbar indicated a higher average drawbar pull, a greater amount of total work done, as well as a greater amount of work per hour while working steam with the table grates than with the finger grates. This is the reason for the table grates using more coal and giving poorer evaporation than the finger grates, as the harder the locomotive is worked, particularly where there is much fine coal or slack, the greater the stack loss.

The table grates do not drop any fire and very little ash except when being shaken, while the finger grates drop considerable fire in certain portions where the fingers are cut short to clear obstructions in the corners of the firebox. The shape of the pan (the high sides) causes the hot ashes and fire to sweep up along the side of the cab into the

enginemen's faces when a high side wind is blowing. The tables grates were very popular with the enginemen on this account; also, on account of being easier to shake. There is very little need of a power grate shaker with table grates and Gallup coal.

Aside from the coal being a little finer and the locomotive being worked a little harder on trips with the table grates,

Summary of Kansas Coal Tests with Dynamometer Records

	Standard grates	Table grates
Running time, hour	5.30	5.51
Dead time, hr.	1.24	1.24
Total time, hr.	6.54	6.75
Heat value as fired, B. t. u. per lb.	12,565	12,219
Ratio, water to coal	5.06	5.47
Boiler pressure, lb. per sq. in.	189	188
Gross thousand ton miles	353.8	354.7
Speed, miles per hour	20.5	19.8
Draw bar pull:		
Average over division, lb.	19,056	20,760
Average working steam, lb.	22,055	23,469
Million foot pounds, total work	10,915	11,898
Coal, lb.:		
Per gross thousand ton miles	100.8	93.8
Per million foot pounds	3.17	2.78
Water, lb.:		
Per gross thousand ton miles	509	523
Per million foot pounds	15.9	15.1
Equiv. evap. lb. per hr., per lb. of coal; boiler and superheater	6.58	7.21

which incurs a greater stack loss, it is possible that the larger coal consumption with the table grates is due to insufficient air admission. While the air openings are calculated to be the same, the ashes or contents of the firebox pack down over the slots in the table grates and there is not the same chance to loosen it up by shaking as with the finger grates. The steaming of the locomotive was about the same with the table grates as with the finger grates.

When all things are taken into consideration, the saving in coal of table grates over the standard Gallup coal finger indicate that the perforated arch cut a very small figure in the saving.

Evaporation is the proper basis on which to make a comparison between table and standard grate. It will be seen from the summary of the dynamometer car data that there is an average saving for the round trip of 8.0 per cent. Based on test without the dynamometer car the saving averages 10 per cent for the round trip. Under all conditions there was some saving in favor of the table grates, and a conservative estimate would be from 1 to 1¼ tons of coal per trip.

The table grates save coal by preventing it from falling through into the pan only partly burned. The loss from this source is very noticeable with the coarse grates now used, particularly when the coal is fine and starting out of a terminal when the fire is light. Part of this loss could be eliminated by using finger grates with fingers closer together, such as those used for Gallup coal.

There is a considerable loss due to finger grate bars having to be replaced on account of fingers being burned off which loss would probably not be so great with the table grates.

Front Ends

During the testing of the Mikado type Locomotive 3209 just referred to, a variable exhaust nozzle designed by Mr. Stevens, a boiler maker on the Santa Fe, was applied for test. This device can be regulated from the cab and gives a discharge area equal to a nozzle area anywhere between 5½-in. and 6-in. diameter. The idea of the inventor was to open up this nozzle when the locomotive was steaming freely and to close it down at gradients of 1/16-in. when for any reason the locomotive did not steam so freely.

When first applied, in February, 1919, no difference could be detected in fuel consumption, and it was found necessary

Summary of the Gallup Coal Tests

	Equated gross 1,000 ton miles	Ratio water to coal: Belen and Suwanee	Ratio water to coal: Suwanee and Gallup	Average boiler pressure, lb.	Coal, lb., per 1,000 ton mile, Belen and Gallup	Water, lb., per 1,000 ton mile, Belen and Gallup	Mileage: Over division	Mileage: Working steam	Drawbar pull lb.—average: Over division	Drawbar pull lb.—average: Working steam	Million ft. lb. of work: Average per mile: Over division	Million ft. lb. of work: Average per mile: Working steam	Million ft. lb. of work: Average per hr. working steam	Pounds per million ft. lb.: Total	Pounds per million ft. lb.: Coal	Pounds per million ft. lb.: Water	Duration of test: Dead time hr., min.	Duration of test: Running time hr., min.	Speed, m. per hr.
West Bound—Belen to Gallup, 144.1 miles																			
A.....	323	4.97	5.18	188	162.8	843	145.40	111.36	20,988	27,421	110.82	144.78	2196	16,112	3.26	16.9	3-48	8-57	16.1
B.....	318	4.51	4.91	187	179.9	881	145.64	113.31	21,384	27,474	112.91	145.06	2475	16,443	3.47	17.0	2-47	8-10	17.7
C.....	322	4.92	4.96	188	181.8	902	145.47	113.28	22,266	28,608	117.57	151.05	2314	17,102	3.43	17.0	4-11	8-58	16.2
East Bound—Gallup to Belen, 144.5 miles																			
A.....	389	...	5.31	187	75.8	402	145.61	51.08	9,996	28,499	52.78	150.48	1951	7,685	3.84	20.3	2-18	7-33	19.1
B.....	389	...	5.03	187	82.2	413	145.48	55.10	10,054	26,586	53.09	140.37	1869	7,723	4.14	20.9	1-35	7-35	19.0
C.....	396	...	5.01	187	79.9	398	145.69	53.17	10,303	28,231	54.40	149.06	1988	7,926	3.98	19.9	1-34	7-38	19.0

Note:—"A" is the average of five trips in each direction, with finger grates and an eight course arch. "B" is the average of two trips in each direction with finger grates and a perforated arch. "C" is the average of three trips in each direction with table grates and an eight course arch.

grates, or vice versa, is very small. Under certain conditions one will show a saving, while under other conditions the other grates may show a saving.

A similar test was made on the road between Argentine and Emporia, Kansas, a distance of 108 miles, with Kansas coal. The analysis of this coal averages about as follows:

Moisture, per cent	2.76
Volatile matter, per cent	31.17
Fixed carbon, per cent	51.33
Ash, per cent	14.74
Sulphur, per cent	4.44
Heating value, B.t.u., per lb.	12,480
Heating value, dry coal, B.t.u., per lb.	12,851

The same type of locomotive, No. 3209, was used on this test as with Gallup coal and with the same equipment.

The data on the table grates were obtained for the most part by an observer on the locomotive after the test with the dynamometer car had been finished. On most of the trips with the observer on the locomotive, a test on a perforated arch in comparison with the standard seven course arch was carried at the same time. However, the results

to put a diamond split in the top. However, as weather conditions got better, the nozzle was run practically wide open all the time. In its operation the nozzle was run either wide open or closed. The specific gradations in closing were not utilized by the enginemen. The chief disadvantage of the variable exhaust nozzle is that if not worked frequently it becomes inoperative in a short time by being stuck up due to the exhaust gases.

At the fourth annual convention in 1912, an exhaustive paper was presented to this association showing the great possibilities in fuel saving and the further possibilities of increasing the power of locomotives by the elimination of back pressure. Information now comes to the committee that a simple and effective drafting system has been developed based on the fundamental assumption in the paper on back pressure previously referred to that there was sufficient energy in the exhaust steam to draft the locomotive with a maximum of four pounds back pressure on the cylinders.

The essential features of this system are an exhaust volume chamber and a governing variable exhaust nozzle which opens under very low static pressure and which has a variable opening with each exhaust blast. The variable opening and constant automatic agitation of the wings is most essential in maintaining a variable exhaust nozzle.

In the committee's last report attention was called to the Master Mechanics' formulæ for the design of stack and front end, showing that they are not properly applicable to present power. The Lewis drafting system, with its exhaust blast of very large contact area of steam and exhaust gases, and its unusually large stack, are convincing testimonials that we should no longer abide by this rule of thumb design, but that we should make investigations to find the limit of design which will give the greatest efficiency of the exhaust blast.

The report was signed by H. B. MacFarland (chairman), A. T. & S. F.; W. J. Bohan, Nor. Pac.; E. B. DeVilbiss, Penn. System; J. P. Neff, American Arch Co.; Frank Zeleny, C. B. & Q., and C. C. Higgins, St. L.-S. F.

Use of Carbocoal on Locomotives

By George Escherick, Jr.
Fuel Engineer, International Coal Products Corporation.

In the firing of bituminous coal many schemes have been tried to promote better efficiency and some of these have met with considerable success. But in spite of all attempts toward better economy the locomotive boiler remains today one of the chief offenders in the extravagant use of fuel. There can be no doubt that the continued demand of the public for abatement of the smoke nuisance will force the railroads to the use of a smokeless fuel or to electrification of their roads in their larger terminals. The limited supply of anthracite in the country makes it unlikely that anthracite can be used generally on railroads, and it is evident that there is a good field for a fuel comparable to anthracite but manufactured from bituminous coal, with a saving of the valuable by-products.

Carbocoal is a dense, smokeless fuel formed by carbonizing bituminous coal. Any coking or non-coking bituminous coal or even lignite can be used in the process, although some coals are more desirable than others. Carbocoal compares very favorably with anthracite coal and has about the same analysis, but it burns with a much less draft. It is manufactured from bituminous coal by carbonization in two stages. The raw coal is first crushed and then fed continuously to horizontal retorts, operated at a relatively low temperature. The volatile matter in the coal is reduced to about eight per cent. This low temperature coke or semi-carbocoal is then ground, briquetted with pitch, and the resulting briquets are carbonized at a temperature corresponding to that used in coke ovens, the by-products again being collected as in coke-oven practice.

The resulting briquet is a smokeless fuel resembling anthracite in its properties and differing considerably from ordinary coke, particularly in that it is a soft form of carbon and much more free burning than coke.

Several carbocoal tests have been made by various railroads in the east, and the results as a whole have been very satisfactory, especially as these tests can only be considered of a preliminary nature.

The first test run on a locomotive with carbocoal as fuel was made on May 21, 1917, and was run to ascertain the possibilities and flexibility in handling when fired on a regular locomotive grate with its draft system. The engine (a switch engine) was equipped to burn anthracite, fuel oil or bituminous coal, and as reported by the superintendent of motive power of this railroad, who was keeping a close watch of this locomotive throughout the day, "the performance on the road was better than with either hard or soft coal. The engine steamed more freely and the fire could be kept in more satisfactory condition, as the briquets did not clinker at all but simply burned up to a fine ash which could be shaken through the grates. In this respect it was superior to any of our ordinary fuel."

It was necessary to shake the grates only four times from the time the fire was originally built. At no time during the test could any smoke be detected coming from the stack. The briquets, despite the many times they had been shoveled from the period following their manufacture to the time they rested in the tender, appeared without any mutilation and with a marked absence of slack and fines. No difficulty was experienced in maintaining a full head of steam. On six occasions it was necessary to start the blower on the engine, whereas the engine crews stated that with coal as a fuel on this particular work it was necessary to keep the forced draft in operation the greater part of the day.

Another series of tests was run on the test plant by a railroad in the east. The object of these tests was to ascertain the manner in which carbocoal responded to the various draft changes and then to compare them with the same conditions under which bituminous coal was used. This series of tests showed that carbocoal can be handled on the locomotive as efficiently as coal and responds to draft changes more rapidly. With the same draft more carbocoal can be burned per square foot of grate surface than with bituminous coal. This is due to the shape of the briquets in the fuel bed, which permit the existence of the void space between them and offer little resistance to the passage of air. Bituminous slack and anthracite form a very compact bed, which creates a larger resistance and requires a greater drop in pressure through the bed.

In September, 1917, the Carolina, Clinchfield & Ohio ran a series of two tests with carbocoal. These were run over the same road from Kingsport to Soldier, a distance of 22 miles, with 43, 50-ton cars in the train, and as far as was feasible external conditions were kept constant. No instructions were given the fireman as to the proper methods of handling carbocoal. There was no opportunity to try out the fuel in advance. The firemen in this locality were accustomed to firing high volatile bituminous coal, while the carbocoal corresponds in many ways to anthracite coal.

Carolina Clinchfield & Ohio Test of Clinchfield Carbocoal

Type of locomotive	2-6-6-2
Weight, total engine, lb	378,650
Tractive effort, lb	77,400
Grate area, sq. ft	78
Heating surface, sq. ft	5,752

Data and results	Run 1	Run 2	Average
Grade, compensated, per cent	0.5	0.5	0.5
Length of route, miles	18	22	20
Tons behind tender	3,022	2,981	3,001
Pull on drawbar (calculated)	43,000	42,250	42,275
Average speed, miles per hour	9.0	10.1	9.55
Fuel burned sq. ft. grate area, per hour	64.0	98.0	81.0
Water evap. per sq. ft. heating surface, hr.	6.75	9.70	8.22
Water evaporated per lb. of coal	7.77	7.30	7.53
Equiv. evap. per lb. of coal	9.36	8.83	9.09
Fuel consumed per ton mile, train load	.184	*.250	.217

*Allowance has been made for fuel due to safety valves being open at least 19½ min.

In addition to these tests a demonstration was made on the Baltimore & Ohio. This demonstration was witnessed by some of the leading citizens of the community in which it was made, and gave entire satisfaction as a smokeless fuel.

Carbocoal can be stored in unlimited quantities without danger of fire from spontaneous combustion. The storage space per ton for carbocoal is but a few per cent greater than for coal; further, the carbocoal does not weather and slack as many coals do on storage.

Discussion

Several inquiries were made relative to the commercial possibilities to the railroads and the cost of production. The first commercial plant will commence operation in the Clinch-

field district in July and no production costs are available. An estimated investment of three million dollars will provide a capacity of 1,000 tons daily with a net return under the present market of one million dollars annually.

Other Papers

A paper on the Economic Aspects of the Fuel Oil Situation was presented by Eugene McAuliffe, and will be published next week. A report of the Committee on Fuel Stations will also be published next week.

M. A. Daly, Northern Pacific, chairman of the committee on firing practice, conducted before the association certain simple chemical experiments which are used in the Northern Pacific instruction car to instruct and interest engine crews in the principles of combustion. The discussion showed considerable interest in these methods. More or less elaborate adaptations of which have been used by several other roads with success.

The committee on pulverized fuel reported that efforts to secure reliable comparative cost data during the year were unproductive and the discussion indicated a desire on the part of members for information of this character applicable to decisions on local problems rather than further data of general character about the process.

M. B. Morrow, Canmore Coal Company, Canmore, Alberta, addressed the association briefly during the closing session.

Association Business

The secretary-treasurer's report showed a gain of membership of 311 during the year with a total of 1,297. Owing to the increase in the cost of printing the proceedings amendments to the constitution and by-laws were passed increasing the annual dues from three to four dollars.

The question of affiliation with the American Railroad Association was brought up and action was deferred till the next convention.

The following officers were elected for the ensuing year: President, J. B. Hurley, Wabash; vice-presidents, W. L. Robinson, Baltimore & Ohio, W. J. Bohan, Northern Pacific, and R. Bradley, Boston & Maine; executive committee: P. E. Bast, Delaware & Hudson; J. N. Clark, Southern Pacific; Robert Collett, New York Central; C. C. Higgins, St. Louis-San Francisco; J. M. Nicholson, Santa Fe; A. W. Perley, Oregon Washington Railroad & Navigation, and T. Duff Smith, Grand Trunk Pacific.

The Essentials of Successful Foreign Trade

"EFFICIENT RAIL and inland waterway transportation is no less a part of export and import trade than ocean shipping. Sound public policy supporting private operation of the railways is imperative." These are the words used by the General Committee of the Seventh National Foreign Trade Convention, held at San Francisco, May 12 to 15, to express the attitude of the attending delegates on the railway problem. As noted in last week's issue the convention met in general and group session to discuss the furtherance of foreign trade. No resolutions were passed, but the spirit of the convention was expressed in the report of a general committee created to formulate a statement of ideas on the work of the convention.

The report of this general committee follows:

Declaration of General Committee

The Seventh National Foreign Trade Convention was composed of upwards of 2,500 delegates from every part of the United States and many foreign countries. It assembled in San Francisco from May 12 to May 15, 1920, to consider the problems of foreign trade arising out of the present position of the United States as a creditor nation. As the authoritative voice of the foreign commerce of the nation, it presents its final declaration on questions of vital import to the future prosperity of our country, and commends to the careful consideration of the government and people of the country these opinions and recommendations.

The United States as a creditor nation should afford to other nations every fair and reasonable opportunity to sell their products to us, especially of raw materials, without detriment to existing industries: (a) To permit of the liquidation of the obligations of the debtor nations; (b) to promote exchange of products in view of the impossibility of their making all payments in gold; (c) to provide return cargoes for our merchant marine, and (d) to relieve the demoralization of industry and exchange in Europe.

Every proper measure should be devised to encourage our manufacturers and producers to exercise the full employment of all their facilities: (a) To satisfy home demand, and (b) to provide a surplus for foreign consumption, for the occupation of our merchant marine, and for the provision of supplies to foreign nations more than ever dependent on us under present conditions for articles of necessity and sustenance, or for materials to rehabilitate their depleted stocks and warworn industries.

As collateral influence in this program of expansion of exports and imports, it is important that (a) the interest of producers generally should be safeguarded and maintained on a fair and equitable basis; (b) that production should be increased to the maximum in order to restore normal conditions of employment and living; (c) that our banking institutions should be afforded every reasonable opportunity and protection in their efforts to expand their services to foreign commerce and in enlisting the interest of American investors in foreign securities, with united action to this end, if possible, by exporters, bankers, manufacturers and other producers of this country; (d) that a greater number of American merchandising houses should be established abroad. They would sell our goods, buy foreign goods and create a better trade and financial situation.

Many associations have been formed under the Webb-Pomerene Act, resulting in expansion of American exports. As time goes on supplemental legislation may be necessary to further develop international trade. The government should maintain as a principle of foreign policy that American enterprise abroad is entitled to the same measure of protection from the government of the country where domiciled that foreign enterprises domiciled in the United States receive from this government.

The American Merchant Marine

Our Merchant Marine should revert as soon as practicable entirely to private ownership and operation as contemplated by the act creating the Shipping Board. We urge that legislation be passed promptly providing for the sale of government owned tonnage on terms uniform to all buyers having regard to the current cost of building vessels of similar type and tonnage in American shipyards. Unsold ships should be chartered at current market rates for world tonnage without restriction as to trade routes.

Owing to the insufficient number of passenger vessels in the trans-Pacific and South American trade, measures should be taken to relieve the situation by promptly utilizing available passenger vessels in these trades.

The investigation of the American nagivation system which the Shipping Board was directed by its organic act to effect should be completed with the least possible delay and such revision and improvement made as will enable the operation of the American merchant marine on a fair competitive basis.

Shipbuilding has become a great industry and we should build for the world's markets, as well as for our own requirements. American ships were once among the largest of our exports and there is no reason why they should not be

so again. We sell locomotives and freight cars and agricultural implements and other manufactured products in all the markets of the world.

A steamship is a commodity of commerce like any other product of the mechanic art and labor should be employed in the building of ships for export as well as in the production of shipbuilding materials for export.

Marine Insurance

The convention considers that this important adjunct to foreign commerce can best be carried on by private enterprise. The state and federal governments are urged to take steps to remove those disabilities caused by non-uniformity of state laws and excessive taxation which place American insurance companies at a disadvantage with the foreign insurance markets with which they must necessarily compete.

The Tariff

The vast market which the United States offers to other nations on a basis of equality; the supplies of American raw materials exported without taxation or discrimination and the large tonnage available in our ports to foreign shipping on equal terms with our own, entitle American export and import trade to equality of treatment in all foreign markets.

To insure such equality of treatment the American tariff, whatever its underlying principle, should provide for additional duties on imports from nations discriminating, by tariffs or administrative practices, against the trade of the United States.

For the non-partisan and scientific ascertainment of the effect upon our commerce of the world-wide readjustment of commercial treaties, revision of tariffs and erection of new preferences and discriminations, the appropriations for the maintenance of the United States tariff commission should be increased, and its investigations supported by Congress and the business public.

Railroads, Canals and Rivers

Efficient rail and inland waterway transportation is no less a part of export and import trade than ocean shipping. Sound public policy supporting private operation of the railways is imperative. Continued development of inland waterways is necessary to the perfection of economic trade routes.

Cables, Wireless and Mails

Conditions of communication with foreign countries are intolerable. The delays in foreign cables and mails hamper commerce and greatly increase the cost and risk of doing business. Additional cable facilities and the extension of wireless telegraph service are imperative.

The expansion of our foreign trade can be greatly facilitated by the further establishment of American chamber of commerce abroad and foreign trade sections of domestic commercial organizations. Effective assistance already has been afforded by these instrumentalities in promoting reciprocal relation, commercial arbitration and adherence by their nationals to the best trade practices.

The establishment of foreign trade zones at the principal American ports, where products from all countries can be assembled, classified, manufactured and reshipped will be of great assistance in developing full cargoes both ways, so essential to the success of the new American merchant marine.

The activity of the post office department in extending international parcel post facilities for the United States is highly commendable. It is hoped this activity will be continued until the service has been established with all nations and colonies.

The State Department should have adequate and competent representation in all lands, and especially in those new nations sprung from the reorganization following the war; its representatives should be properly compensated and housed and equipped with the means for effective service.

Legislation should be enacted establishing both the diplomatic and the consular service on a basis which will attract competent and ambitious young men into our foreign service as a permanent vocation.

The commercial attache and trade commissioner service of the Bureau of Foreign and Domestic Commerce should be materially expanded and placed upon a permanent basis with an adequate scale of compensation.

There should be such reorganization of the foreign service of the government as will eliminate duplication of effort and enable it continuously to perform that effective work essential to the fullest development of our foreign trade.

Scientific Educational Preparation for Foreign Trade

Only in such measure as we equip our business agents and official representatives with accurate knowledge of foreign markets, with practical knowledge of foreign languages and with a wide knowledge of the economic, social and political conditions prevailing among the peoples of other lands, may we expect them effectively to represent us in official life or successfully promote the expansion of our commerce.

The convention, therefore, emphasizes the need of scientific educational preparation for overseas commerce by which the youth of the land may be fitted to cope with, and solve intelligently, the problems growing out of our increased participation in international affairs. Such training is an essential and fundamental factor in any successful foreign trade policy.

Federal Incorporation of American Companies in China

American companies in China must operate under American laws; owing to extra-territorial treaties with China. The present American laws do not give our corporations the same opportunity as corporations of other nations with which we must compete for trade in China.

Under the Hong Kong ordinances, our British competitors operate as China companies without income tax. American companies that have organized under the Hong Kong ordinances are compelled by recent British "Orders in Council" to replace American directors and executives by British.

Bills now pending in Congress, if enacted, will permit such companies to return to the protection of the American flag and will encourage the formation of new American enterprises in China for further development of foreign trade.

These bills provide for Federal incorporation, and will enable American companies to compete with corporations of other nationalities on even terms with respect to taxation.

A treaty of peace safeguarding every fundamental principle of the government of the United States and protecting the rights of American citizens should be effective without delay.

Should Railroads Buy Power for Electric Traction?

Among the papers presented on electrification at the 43d convention of the National Electric Light Association, held at Pasadena, Cal., April 18 to 22, those which had to do with the problem of power supply were of particular interest.

H. H. Cochrane, chief engineer, Montana Power Company, discussed the power end of the electrification problem on the basis of experience obtained in supplying power to the Butte, Anaconda & Pacific and the Chicago, Milwaukee & St. Paul. He explained why he believed that the purchase of power from existing systems, either hydro-electric or steam, is more economical for the railroads than the generation and distribution of their own power. He stated that if the St. Paul had undertaken to generate its own power for the 440 miles

electrified in Montana by means of water power development it would have had to make two 25,000 kw. developments to provide a reasonable reserve for future growth and to allow one spare generating unit in each power plant. It would also have had to build high voltage feeders from its plant to feed points not more than 100 miles apart on the electrified division in addition to its so-called bus line, paralleling the track and tapping in at each substation. This would have called for approximately 700 miles of high voltage line.

By taking power from the Montana Power Company the railroad was able to deliver power to the substations on its two 220-mile divisions by building approximately 400 miles of high-voltage line, while the power company built 200 miles, which is used partly for transmitting power to the railroad and partly for other purposes. The plant required for this purpose is of approximately 30,000-kw. capacity.

The saving in plant capacity is due partly to the diversity factor between the railroad load and the balance of the power company's load and partly to the fact that it is unnecessary for the power company to provide any more spare capacity for growth and for other purposes with the railroad load than would be necessary without it. Furthermore, it would have been difficult for the railroad to find power sites suitable in size and location for its requirements.

In the case of the Butte, Anaconda & Pacific Railway the economic advantages of purchasing power are even more marked, because this road is so situated that the entire system could be supplied by two substations, one at Butte and the other at Anaconda. The power company already had large substations at these points and the railway reuirements were taken care of by merely installing motor-generator sets in them.

Mr. Cochrane suggested that in future electrification projects the power company own all high-voltage lines, switches and transformers and deliver power to the railway at a suitable voltage for its converting apparatus. With this arrangement the power company would own all the equipment necessary to supply consumers other than the railroad along the electrified sections. All towns in which substations are located could be supplied with practically no additional investment except for the necessary local distribution systems. He sees no reason why the power company should not own and operate the railroad substations entirely, selling power to the railroad in the form required by it and delivering directly to its contact wire. This would cut the railroad's investment to that required to cover overhead construction and rail bonds.

Shifting a part of the investment from the railroad to the power company will, of course, necessitate a higher rate for power. It should be immaterial to the railroad whether the expense is met in the form of fixed and operating charges on equipment or in the form of an increased power bill.

Power Rates

Mr. Cochrane pointed out that a rate should be flexible enough to allow quite a wide variation in the amount of power taken and in the load factor without penalizing the railroad to such an extent that it will restrict its operations in order to save on power.

The ideal rate from the railroad point of view is a straight kilowatt-hour rate. Such a rate is hardly feasible from a power company's standpoint, for a peak load can be taken without let, hindrance or compensation, and such a load at times might prove burdensome. A reasonable compromise can be reached by basing the major part of the charge on the small amount of energy taken, but with a small maximum demand charge, just sufficient to offer an incentive to the railroad to keep its demand as low as good operation will permit.

Perhaps the most prominent characteristic of a railroad load, said Mr. Cochrane, is its lack of any outstanding characteristics. The two electrified divisions of the Chicago, Milwaukee & St. Paul take peak loads of about 15,000 kw. each and the Butte, Anaconda & Pacific takes about 8,000 kw. These peak loads do not come at the same time, in general, and the fact that they exist is ascertained by referring to the records rather than by any physical effect which they have on the power system. The power factor is about unity and the load is so scattered that fluctuations in railroad loads have practically no effect on voltage regulation.

Mr. Cochrane showed a typical daily load curve of one of the St. Paul substations indicating a load factor of about 20 per cent. The load factor on the entire Rocky Mountain division was 50 per cent. The Missoula division takes a load very similar to the Butte, Anaconda & Pacific, except that the latter "peaks" at about 8,000 kw. and has a load factor of 30 per cent. Taking the three loads together, however, the total load factor is higher than that of any constituent part. Combining a total railway load with that of the balance of the Montana Power Company's system makes a total with a daily load factor which frequently exceeds 90 per cent, typical figures at present being 144,000 kw. average and 160,000 kw. maximum.

The Power Contract

Peter Junkersfeld, engineering manager, Stone & Webster, went into detail regarding the requisites of an equitable power contract in this field. He said that during the four years since the 1916 report of the committee was prepared the economic advantages of centralized production of electrical energy have become better understood by all parties interested. The 1916 report contained a section under the heading "Form of Equitable Contract for Energy in Bulk." The form suggested tended toward approximations of investment cost and of operating cost from time to time. The extraordinary experience in the meantime and the present outlook would indicate that this suggestion or tendency should now be given further consideration.

Mr. Junkersfeld pointed out that in the sale of power by a power company to a railroad both parties to the transaction are public service corporations. Each should share in the financial benefits resulting from the co-ordination of the power supply systems. The contract for power should provide automatically for wide fluctuations in cost of labor, fuel and other principal elements. This may take the form of a simple rate, perhaps a "block" rate, based upon both demand and consumption, with a provision for revision at suitable intervals at the option of either party to correct it for unforeseen conditions, for changes in the art, in the purchasing power of money, in the interest rates and in taxes, and for other factors which may affect the cost.

Additional provisions may be introduced, such as coal clauses, labor clauses, etc., to apply corrections for anticipated changes in cost, without the delay incident to periodical revision. It would appear wise to lay down clearly the intentions of the contracting parties and the principles upon which charges are to be based from time to time, keeping the relationship in a simple and easily understood form.

In order to minimize the effect of any uncertainty of termination of the contract, for which the seller must charge and the purchaser must pay, the contract should be written for a long term of years, or some arrangement made whereby at termination the load is so removed that the power company will be reasonably sure of finding suitable use for the capacity as it is released.

A. H. Armstrong, General Electric Company, and F. H. Shepard, Westinghouse Electric & Manufacturing Company, presented papers in which they showed how electric traction could be used for relieving railroad congestion.

I. C. C. Holds Hearing on Rate Advance

Railroad Executives Explain Need for Placing Transportation on Sound Financial Basis

WASHINGTON, D. C.

HEARINGS on the applications of the Eastern, Southern and Western groups of railroads for general advances in freight rates designed to increase the return on railroad property investment from slightly over one per cent, which was the result for the year ended October 31, 1919, after the figures had been readjusted to the present basis of expenses, to the 6 per cent standard authorized by the transportation act, were begun before the Interstate Commerce Commission at Washington on Monday, May 24. While the railroads estimate that an increase of $1,017,000,000 in freight revenues is necessary, there were constant reminders that this would have to be increased if a considerable part of the $1,000,000,000 wage advance which is now under consideration by the Railroad Labor Board should be granted.

Three state railroad commissioners, selected by the National Association of Railway and Utilities Commissioners at the request of the Interstate Commerce Commission, sat with the federal commissioners at the hearing, as Chairman Clark explained, "in the interest of ultimate harmony," since both state and interstate rates must ultimately be affected by the result of the proceeding and as the railroad companies have filed similar applications with the various state commissions. The state commissioners were J. A. Guiher of Iowa, R. C. Dunn of Florida, and W. D. B. Ainey of Pennsylvania.

The case has been docketed by the commission as Ex Parte 74 and the commission announced that general testimony and that on behalf of the roads in Official Classification territory would be heard first followed by that of the southern and western lines. T. De Witt Cuyler, chairman of the Association of Railway Executives, introduced Howard Elliott, chairman of the Northern Pacific, as the first witness, on the transportation needs of the country. He was followed by Frederick Strauss, an investment banker, of New York, and the Eastern case was opened by Daniel Willard, president of the Baltimore & Ohio. The Southern case was to be presented by C. H. Markham, president of the Illinois Central and others, and the Western case was to be presented by S. M. Felton, president of the Chicago Great Western, and others.

A large representation of shippers and of state commissioners was present, while the railroad employees were represented by Glenn E. Plumb. Comparatively few of those on the "other side" of the case showed a disposition to oppose the need of a rate advance by their cross-examination of the first witnesses, which appeared rather desultory as compared with that of previous general rate cases. If these questions indicate the probable character of the opposition, however, there will be an effort to whittle down the amount of the advance by attacks on the valuation basis proposed by the carriers and past criticisms or implied criticisms of the inefficiency of government operation were recalled by frequent queries as to why the railroads cannot immediately reduce expenses now that private operation has been resumed. Mr. Plumb apparently prepared to lay the foundation for a claim that increased rates will reduce earnings by decreasing the volume of traffic but his questions along this line aroused few echoes in the responses of the railroad witnesses, who asserted that the great problem is how to handle the present great volume of business demanding transportation.

Howard Elliott Explains Transportation Needs of Country

Following is an abstract of the opening statement by Howard Elliott:

The people have just declared in the new Transportation Act that they desire private ownership and operation of the railroads, with governmental regulation, protection and encouragement. Under these conditions, the railroads must obtain earnings enough to meet all obligations and have sufficient credit to sustain them in competition with other forms of industry into which people put their time, brains, energy and money.

The railroads are now working under the new act and trying hard to improve the difficult, after-the-war conditions that confront all industry.

To make a success of this new plan and to furnish the transportation needed, will require much patience, forbearance, courage and the best of team work by all, with full assent to the fact that the roads must have adequate revenue if they are to survive as going concerns and if the decision of the people for private ownership and operation is to be effective.

The owners and managers of the railroads realize keenly their responsibility and it is their earnest wish to co-operate heartily with the state and national authorities, the public and the employees and to keep the American railroads ready to serve and equal to every call that may be made upon them.

Under this new act there are two very pressing questions now under discussion, the prompt and proper solution of which will mean much to the present and future agricultural, industrial and social progress of the United States. One relates to the fair adjustment of wages to be received by the 2,000,000 or more men who maintain, operate and manage the railroads. The other relates to the fair compensation to the railroads so that they will receive enough to pay these fair wages, all other costs, taxes and such returns on the properties as will induce the individual investor to put part of his savings each year into the transportation business, so that the capacity of the roads will grow a little faster than the country and permit the United States to continue its forward march.

The people, in this new act, have authorized nine men to make a decision as to the first great question, which decision, however, can only become effective through the force of public opinion. The newly created Labor Board has now before it requests for increases in pay amounting to more than $1,000,000,000 a year.

The Interstate Commerce Commission of eight men (with three appointees not yet confirmed) has been given the power and responsibility of determining the second great question which involves obtaining for the railroads for the service they render not less than $1,017,000,000 of added revenue per year if the railroads are to be sustained. This sum is necessary to meet the present basis of wages, costs, interest and a sum for dividends and improvements, and does not include any part of the $1,000,000,000 per annum now under consideration by the Labor Board.

This proceeding is not the old-fashioned rate case, where one group of men is trying to obtain an increase in rates against the protests of other groups of men, but it is a meeting for the purpose of co-operating in a friendly spirit as

American citizens, in order that the will of the people as represented in the new law can be put into effect.

After a number of informal conferences between the commission and representatives of the railroads, careful tabulations have been made, giving the best judgment of the railroads as to the minimum amount of additional revenue that is needed to carry out the theory of the new law. These statements are based on 6 per cent upon the property investment account of the carriers, in the belief that this account should, under the law, be considered in connection with and supplemented by any other available evidence or data sufficiently complete and reasonably adequate for the purpose, on the basis of present wages and costs, but including an estimate for increased fuel prices, but not including anything for any increase in wages if the Labor Board, in the pending hearing in Chicago, should make such increase.

The calculations have also been based on a volume of business substantially equal to that of 1919, which may, however, not prove to be the case because of disturbed commercial and industrial conditions in this country and the world. This question of volume should be considered, because with 1919 volume used as a basis the railroads run the risk of any decrease in volume and it would be impossible to obtain, on a falling volume of business, the minimum return provided by the law.

If the United States can settle down to industrial work and will meet the world demand that no other nation could meet as well as we can if we really work, I have confidence that there will be, in time, an increase in business in this country, and it is surely a sound national policy to plan now for enlarged transportation facilities. It is, however, only fair to point out to the commission the possibility that business for the next year or two, for various reasons, may not show the same rapid growth that took place between 1915 and 1919.

The railroads, after conference with the commission and at their suggestion, have prepared and filed statements and figures for the three classification territories of the country and the figures for these three groups and the supporting reasons therefor will be explained by competent witnesses.

The returns on property investment in the three groups for the year ending October 31, 1919, were:

For the Eastern territory, less than one-fifth of 1 per cent.

For the Southern territory, less than three-quarters of 1 per cent.

For the Western territory, slightly over 2 per cent.

For the country as a whole, slightly over 1 per cent.

To meet the difference betweeen the 6 per cent return on property investment permitted under the Transportation Act there will be needed increases in freight revenue as follows:

	Per Cent
In the Eastern territory	30.43
In the Southern territory	30.95
In the Western territory	23.91

The sums of money involved may seem large, but the United States is a very large country, with enormous resources, developed and undeveloped, and with a great accumulation of national wealth, and normally with a great power of annual increase in that wealth, which means increasing health, comfort and convenience in living and safety, for all the people.

The Department of Commerce estimates the national wealth at $258,000,000,000 in 1919, and about $270,000,000,000 in 1920. Other statisticians think that in view of the great increase in general values during the past four years an estimate of $300,000,000,000 is by no means too high. The annual increase has been at the rate of from $10,000,000,000 to $15,000 000,000, or at least half the value of the railroads.

This present great asset of the nation cannot increase and may diminish unless the transportation system is enlarged and works effectively. The country has an object lesson before it today, showing how agriculture and commerce are checked and the public health and safety threatened when transportation fails.

The American people are powerful enough and rich enough to have the very best transportation machine. They have had the best in the world and they can continue to have it if they want it.

The price of transportation has not increased nearly as much as the cost of producing it. Expenses generally have increased at least 100 per cent, but revenues less than 40 per cent. It is a matter of common knowledge that a given unit of almost any commodity will buy more transportation now than ever before.

While the action taken in other countries is not, of course, compelling in this country, it is significant evidence showing the economic conditions prevailing throughout the world. Rates have been increased in some other countries as follows:

England—Passenger fares increased 50 per cent; freight rates increased 25 to 100 per cent, plus terminal charges per ton of 3d to 1s; average freight rate increase (estimated), 71 per cent.

France—Passenger rates increased 70 to 80 per cent; freight rates increased about 140 per cent.

Belgium—Freight and passenger rates increased about 100 per cent.

Italy—Passenger rates increased 60 to 120 per cent; freight rates increased 40 to 100 per cent.

Holland—Passenger rates increased 75 per cent; freight rates increased 70 to 140 per cent.

Sweden—Passenger rates increased 100 to 200 per cent; freight rates increased 200 per cent.

Norway—Passenger rates increased 60 to 180 per cent; freight rates increased 150 per cent.

It is well known also that trolley companies all over the United States have been pressing for a year past to get some increase in revenue and that they have succeeded in getting the 5c fare increased to 6c, 7c, 8c and 10c, and in some places put on a mileage basis, and even with these increases it is quite difficult for the trolley companies to sustain themselves.

Another interesting price development is in the newspaper world, where many papers have found it necessary to increase the selling price and the advertising prices. One-cent papers have been increased to 2c, or an increase of 100 per cent. Two-cent papers have been increased to 3c, or 50 per cent increase. The same is true of weekly and monthly publications.

The needs of different sections of the country for increased facilities will be made plain by gentlemen who follow me, but these needs are very great.

New England, for example, which with slightly over one-fiftieth of the area of the country, has one-fourteenth of the population, one-twelfth of the national wealth, and consumes one-eighth of the materials of manufacture. That section exchanges raw material and manufactured articles with the whole United States, and to put its transportation system in order is important to the whole country.

The great section of the country embracing Pennsylvania, New Jersey, New York, Ohio, Indiana, Illinois and Michigan, with its enormous manufacturing ability, producing coal, various raw materials and with ports that handle a large amount of the import and export business of the United States, must be given better transportation than they receive today. New railroads are not particularly needed in these two populous regions, but tremendous expansion must be made of terminal, port and road facilities and for additional rolling stock, and the means of maintaining and repairing it.

The great region south of the Ohio and east of the Mississippi has entirely recovered from the effects of the Civil War and produces for the country fruit, cotton, pig iron, lumber,

fuel, and is engaging in many manufacturing enterprises of articles necessary for the welfare of all the people, and it, too, needs better railroad service.

The existing roads there need large additions to their facilities to keep pace with the growth of the South, and additional railroads are also needed because that part of our country is capable of much greater development.

In the same way the empire west of the Mississippi river has only made a start in its ultimate development and thousands of miles of new railroads should be built in the next 25 years, and great additions made to facilities of the existing railroads, so that this section from which a large proportion of the food supply must come can grow.

This region also is one from which the timber supply of the United States must come in increasing quantities; and again, the expansion of foreign commerce means that Pacific Coast ports like Los Angeles, San Francisco, Portland, Tacoma, Seattle and Vancouver, B. C., need increasing transportation and terminal facilities to engage in the foreign commerce to which our people must turn as population increases in this country.

All these great productive and consuming parts of the country are tied together by the railroads and they are dependent and interdependent each upon and with the others and there should be the freest movement of people and commerce between them all.

Now there is congestion and difficulty everywhere; fuel, building materials and raw materials for manufacture are tied up, and industry is threatened, and the sluggish movement of grain and food of all kinds makes the feeding of our people more difficult and more costly.

Of course, temporarily, the situation is made more acute by the present so-called "outlaw strike," but it is natural to suppose that this difficulty will be eliminated within a reasonable time, through the action of the Labor Board and the final good sense and judgment of the American people.

But apart from this, the facilities are inadequate and service is not being given to the extent that is essential, either freight or passenger.

It has been said by some that there could be very marked reductions in expenses that would produce a substantial part of the additional revenue. Under present disturbed conditions in this country, and under present price levels, it does not seem possible to obtain much help in that direction. Railroad managements hope, by close supervision and by the hardest kind of work, to increase the capacity of the existing machine, to encourage a greater spirit of performance and in that way obtain a larger net result from any given quantity of business.

This, however, will be a slow process and until the present feeling of unrest throughout the world and in this country, which encourages, apparently, a lack of a desire to work, is changed and there is a greater spirit to work and save, the country cannot count on any large contribution to the net earnings of the railroads through a saving in expenses. In fact, the results for the month of March are even more disturbing than those for February.

The net operating income for the month of March, 1920, for certain railroads shows as follows:

Baltimore & Ohio	*$270,279
Central R. R. of New Jersey	*399,467
Erie	*147,962
Maine Central	*331,779
Pennsylvania (East and West)	*5,656,334
Wabash	*571,415
Central of Georgia	*134,896
Florida East Coast	461,464
Louisville & Nashville	1,400,630
Seaboard Air Line	*601,547
Chicago North Western	*496,800
Chicago Great Western	*243,301
Texas & Pacific	*72,084

*Deficit.

The country has prospered greatly in the last 20 years and people as a whole have more of comfort and better living conditions than formerly. This indicates that the payments heretofore made for railroad service have not been repressive in any way.

The proposed increases in revenue are essential to restore the credit of the railways and especially to obtain the confidence of the everyday investor. The passage of the new bill has encouraged him somewhat, but he needs greater encouragement and as prompt a decision as possible, if the spirit of the new law is to be carried out in a broad, far-seeing way, realizing that the United States is relatively an undeveloped country, needing transportation in almost unlimited quantities and in improving quality.

The investor wants to be assured that the theory of the new law to protect and encourage the railroad business is now being put into actual practice and that, in the interest of service to the public, the law is being interpreted in a liberal manner.

It is more important than ever before to interest the small investor because the effect of the present income tax is to take away from the man of large means an increasing amount of his income and leave a decreasing part of it to reinvest in industrial enterprises.

In fixing the so-called "standard return," Congress, in 1918, thought that the average of the net operating income for a three-year period was a fair price for the use of the railroads as a war measure. But this is not fair pay if railroads are to be treated, as the people have now decided they shall be, as business enterprises to be self-sustaining and self-supporting, and competing in the markets of the world with other forms of business for the necessary money to carry on the enterprise.

The new Transportation Act in fixing the rate of return at 5½ and 6 per cent, evidently reflects the idea which has been prevalent for many years—that the rate of return under which the railroads had grown up in the past would be sufficient for today; but conditions have changed, the speculative element eliminated from the business, and if the commission were free agents today they might readily conclude that the 5½ and 6 per cent return for this two-year period is wholly inadequate to meet the situation.

Also in their future interpretation of what constitutes a fair return on fair values, the commission may well find that we are in a period of higher returns for capital and that if the business is to be sustained, 6 per cent return is not enough. And it should always be borne in mind that the commission has the power, if any decision as to rates produces any so-called excess earnings, to make reductions in rates; also that the new bill provides for taking away for the general benefit of the public a part of the earnings of any carrier that may be in excess of 6 per cent on fair value.

The railroads, therefore, find that it is to the interest of the country to give the maximum encouragement to the transportation business at this time, when it is not equal to the demands, and permit the rates to be adjusted so as to produce the 6 per cent return permitted under the law.

The cost of new capital today, as is well known, is in excess of 7 per cent.

The Bank of England discount rate today is 7 per cent, and only seven times in the history of the bank has the rate reached that level.

In the next three years there are $564,210,817 of maturing obligations (not counting equipment notes or notes running one year or less) which can be handled to much better advantage if the railroads are self-sustaining. Many of these obligations bear low rates of interest which, of course, is a benefit to the whole situation. If they have to be refunded at a very much increased rate of interest, the burden on the transportation business is that much greater.

A prompt and liberal decision as to the revenue needs of

the railroads will have an undoubted effect on the minds of the investors when these maturing obligations have to be taken up and paid off by the issue of new securities.

The officers of the railroads are here not only as representatives of the 1,500,000 people who own securities, but also of the 50,000,000 or more people who are interested in the integrity of their savings bank deposits and of their insurance policies, which are secured in a large degree by investment in railroads.

They are approaching this subject, not only as railroad officers, but as quasi-public servants realizing their responsibility to do their part in adjusting rightly these two $1,000,000,000 questions.

They realize also the responsibility of the commission and they are here for the common cause of obtaining promptly an adjustment of rates that will meet the letter and spirit of the new law, make the railroads self-sustaining and relieve the Treasury of the United States from the necessity of constant appropriations.

They realize that in any adjustment of rates there will be many difficulties. But they believe it is important for a prompt decision that minor or local irritating questions of detail should not confuse or delay the settlement of the major question of furnishing adequate transportation in keeping with the magnitude of the United States.

They believe that the present earnings of the railroads are plainly inadequate and that in the interest of service to the public and proper development of the country the law should be interpreted in a generous spirit and that their suggestions state the minimum required on the basis of the present scale of wages. Should these wages be increased by the Labor Board, additional revenue must be obtained to meet the increase.

All good citizens should support the Interstate Commerce Commission and the Labor Board in arriving at a prompt and just answer to the two large questions of railroad wages and railroad rates, so that when the decisions are made they will be accepted and the business of the country will again become active.

I believe, as people understand bettter the responsibility of these two groups of men, that have the final deciding voice in these matters, that they will help.

The Association of Railway Executives is ready and anxious to do its part.

Discussion of Mr. Elliott's Statement

Clifford Thorne, after eliciting from Mr. Elliott a statement that the roads had not been returned by the government in as good condition as when taken over, asked how much would be required to put them in that shape. Mr. Elliott said he had no figures for the roads as a whole but that the Northern Pacific is making an investigation and roughly its claim for undermaintenance is about $5,000,000. The government also owes it about $2,500,000 of rental, about $3,500,000 for depreciation and destruction of property, and about $10,000,000 or $11,000,000 for materials and supplies. Mr. Thorne asked if the return of such amounts to the roads would not have an important effect in relieving the situation. Mr. Elliott replied that it would help. Mr. Thorne asked if the figure of $20,600,000,000 stated by the railroads for their aggregate value was synonymous with "book value" and Mr. Elliott said it was approximately so. Mr. Thorne also asked whether the high rates of interest required on new capital are special to the railroads or general. Mr. Elliott said that many industries have paid 8 to 10 per cent and that only the best railroads have been able to borrow at 7 to 8 per cent. Mr. Thorne asked him to file a detailed statement showing the cost of new security issues since the first of the year.

S. H. Cowan, representing live-stock interests, asked where the money is to come from to pay the railroads more and then to pay more for higher wages, and whether the rates will not be so high as to retard the movement of business. Mr. Elliott said that the cost of transportation must be paid either by the business handled or from the public treasury, and that he thought railroad men are doing all that human beings can do to hold down expenses. He said that on the present basis of expenses the Northern Pacific would not have earned its bond interest last year.

Commissioner Eastman asked about counter-claims of the Railroad Administration against the railroads. Mr. Elliott said that it had indicated that it would make claims for overmaintenance but that he had not seen any of them yet and that railroad officers do not believe they can be sustained.

C. E. Cotterill, of the Southern Traffic League, asked about the attitude of the railroads in the proceeding before the labor board. Mr. Cuyler answered that it was not one of opposition to increases in wages that were regarded as reasonable but that demands regarded as excessive are being opposed. D. A. De Vane, counsel of the Florida commission, asked whether the carriers regard the operating expenses for the period of government control as a proper basis to use in this proceeding. Mr. Elliott said that the 1919 figures were used as a basis and that it had been necessary to add to them because of corporate expenses, which were not included in the government's accounts and because of the higher level now than the average for last year.

W. A. Wimbish of Atlanta, Ga., wanted to know what assurance the shippers will have that the railroads will increase their facilities after rates are advanced. Mr. Elliott replied that as business men the railroad officers want to make a success of their business.

Mr. Plumb asked whether the railroads had considered the possible effect of an increase in rates as producing a decline in tonnage. Mr. Elliott said he had not noticed any such effect of previous increases and that passenger traffic had increased in spite of higher fares.

S. H. Cowan desired to "have the issues joined" at the outset, so he was allowed to read a short statement on the "billion dollar rate case," in which he said that the standard o fnet return prescribed by the law does not apply until there has been proof of honest, efficient and economical management, which he contended does not now exist. He also asserted that the cattle raisers and farmers are not able to stand further rate burdens.

Frederick Strauss on Railroad Credit and Prosperity

Frederick Strauss, investment banker of New York, said in part:

"This country needs an enlargement of its transportation facilities. They have not kept pace with the growth of the country in population and in industry.

"Traffic is becoming more and more congested because of a lack of needed new mileage, of additional double track and sidings, of adequate terminals and of increased motive power and rolling stock. The present inflation is, in part, a direct result of this. The present high rates for money are, in a measure, the result of traffic congestion.

"Capital, in the shape of goods that ought to be moved rapidly, is tied up indefinitely because commodities are not moving rapidly from the place of their manufacture to the place of consumption. Congestion of traffic is naturally not the *sole* cause of the present inflated state of affairs, but it is an *important contributing* cause.

"Merely to increase purchasing power without increasing production is simply to create more bidders for the same commodities.

"Increasing the superstructure of railroad credit without increasing the capital base on which that credit stands is to de-

crease stability of the financial structure and to cause a constantly increasing proportion of fixed charges, until an ever-growing doubt is entertained in the mind of the investor as to the ability of the company to meet the ever-growing fixed charges.

"It is not enough that the railroads should be able to borrow money, but they must, in order *prudently* to borrow money, increase steadily the amount of their capital stock outstanding. In order to accomplish this it is needless to say that the stocks of railroads must sell at a considerable premium. In order to have stocks of railroads sell at a substantial premium it is necessary that the earnings of the carriers be sufficiently large to permit safely the payment of dividends on their stocks at rates which compare favorably with dividend rates on stocks of industrial and other concerns.

"The number of railroad common stocks listed on the New York Stock Exchange that sell above par is appallingly meager. With the exception of Union Pacific, which still sells at a fair premium, such stocks are practically confined to a few of the anthracite coal roads.

"There is no moral principle involved here. There is no question of 'what ought the investor to be satisfied with.' The question is what other inducements are being held out to him to invest his money in other more profitable and safer enterprises.

"The recent remedial legislation is good so far as it goes. The return of 6 per cent per annum will, I believe, turn out to be wholly inadequate, as time may demonstrate, but a beginning has been made on sound lines, and as time goes on Congress will realize that the rate of return on railroad property will have to compare favorably with returns to be had in other industries, or else government ownership will inevitably result.

"Railroads can offer at the present time no inducement to investors in the way of safe bonds combined with added speculative attraction. Railroad stocks are so low in value that a conversion privilege would be looked upon for all practical purposes as worthless and as an effort at deception, certainly so long as there was doubt of the safety of even the best railroad stocks, as is the case at the present time.

"In the long run the rate of 6 per cent may have to be increased materially, unless, indeed, interest rates should greatly decline before long. At the moment the main thing is to establish in the mind of the investor a feeling of security, and this can only be done by the Interstate Commerce Commission applying in the most liberal manner within its power the remedies under the terms of the Esch-Cummins bill.

"Low nominal rates merely (and rates are nominally lower in the United States today than in any other country) are of no use to the shipper. What good is it to him if the traffic is not moved in sufficient quantity, that such traffic as is moved enjoys a nominally low rate? What the shipper needs is the speedy movement of his goods, and there are only two ways in which this can ultimately be accomplished. One is by an increased charge for the shipment of the goods, and the other is by an appropriation out of the national treasury by a levy on taxpayers to cover the deficit.

"Government guaranty would necessarily be followed by government ownership. But the people's aversion to government ownership is of no avail unless such policies are adopted as will preclude it.

"Whether government ownership shall come against the will of the people, or whether a system of private ownership shall once again obtain here as it did in the days when the American transportation system was regarded as second to none in the world, will be determined by the events of the next few months or weeks."

Mr. Thorne asked Mr. Strauss whether the banker is more interested in getting a high rate of return for the investor or a low rate for the railroad. Mr. Strauss said there was no conflict of interest. He tries to be fair to both and desires to see a rate under which ample capital will flow to the railroad at as high a rate as is necessary to attract it. In reply to a question as to the effect of a 50 or 60 per cent increase in rates (anticipating a further large increase in wages) on the campaign to reduce prices, Mr. Strauss said he thought the effect of freight rates would not be appreciable as compared with the other factors and forces at work.

In reply to Mr. Plumb, Mr. Strauss declined to admit the assumption that an increase in rates is multiplied three to five times in its effect on prices and that it would retard the movement of traffic, and he referred to the numerous other factors that affect price levels. Commissioner Woolley said that the recent advance in miners' wages, which he figured at 40 cents per ton of coal, had been allowed by an increase of $2 a ton in the price and asked if the effect of a rate advance would not be the same. Mr. Strauss said that if coal had increased that much in price the other causes in addition to the wages should be taken into consideration.

Daniel Willard on Transportation Needs in Eastern District

Speaking for the Eastern district railroads, Daniel Willard, president of the Baltimore & Ohio, said in part:

The railroad executives generally believe that the book investment account of the carriers as a whole is fairly representative of the aggregate value of the railway properties devoted to the public use. It is recognized that there are cases where railroads have been overcapitalized in the past, and perhaps so continue, but there are also well-known cases where railroads are under-capitalized—where it is generally recognized that the property is worth much in excess of its outstanding capitalization.

The railway managers have urged the commission to authorize rates and charges adequate in amount to yield a net operating income of 6 per cent upon the aggregate property investment account of the carriers as a whole, or in the several rate groups.

Briefly, the operation of the railroads in the eastern territory by the government during the last full year yielded a net operating income of about $182,000,000.

The railroads in the Eastern region in the aggregate have, roundly, 71,000 miles of main line. They show an aggregate book property investment account of $9,368,000,000. Last year, or the year ending October 31, 1919, they had gross earnings in excess of $2,575,000,000.

I have taken the year ending October 31 because it may be suggested that the months of November and December last year were not fairly typical, owing to the strike in the coal and steel industries. So we have built up a year of twelve months, ending October 31, 1919.

During that year it cost the Eastern railroads for operation about 88 per cent of the gross earnings, and then after the net revenue so arrived at had been reduced into terms of net income as prescribed by the accounting rules of the Interstate Commerce Commission, they had remaining $220,000,000.

However, if the railroads had been obliged to pay during the entire year ending October 31, the wages now in effect and the prices now in effect, and other incurred expenses, it is estimated they would have had only $18,000,000 net income out of a gross of over $2,500,000,000.

It can fairly be said that these great properties, representing an investment of over $9,368,000,000, would have earned barely more than expenses as a result of last year's operation, if the wages and material prices now in effect had been in effect the entire year.

For the 10 years before the war the railroads in this Eastern region operated on about a 68 per cent basis—that is, 68 per cent of the gross earnings was spent for operating purposes. In 1917 the railroads in the Eastern group operated

on a 74 per cent basis. Last year they operated on an 88 per cent basis with the net results I have shown.

If we may assume that the railroads ought to operate on a basis not higher than 75 per cent—if they ought as sound business concerns to have a net income equal to 25 per cent of the gross earnings, to apply for capital purposes and other corporate obligations, then on the basis of last year's business, and operating with the same measure of efficiency, the Eastern roads would require an increase in income, to be derived from higher rates, of about $544,000,000, and that is the amount the Eastern carriers have asked the commission to grant in the shape of increased rates.

If the commission should grant rates so as to yield 6 per cent upon the aggregate book property investment account, by that measure also, the increase in rates would produce about $550,000,000 for the roads in the Eastern region.

There is one other test that can be applied to the situation in the Eastern region that leads to that same conclusion. In 1916 the combined property investment account of the 38 principal roads in the Eastern region was about seven billion dollars, and these carriers in that year earned $448,000,000 net, equal to 6.46 per cent upon their property investment account.

Now if these same railroads were to do over again today the same business that they did in 1916, paying the wages now in effect and paying the prices for materials now in effect, instead of earning $448,000,000 net or 6.4 per cent on the value of their property, they would fall short $158,000,000 of earning their actual operating expenses and taxes.

To correct that condition brought about by the high cost of living, which applies alike to corporations and individuals, and to put the roads in position to earn only 6 per cent upon the value of their property—not 6½ per cent as they did earn in 1916, but 6 per cent—would require an increase in revenue of some $578,000,000 for handling the same volume of business.

So it appears from these three different methods of reasoning, that the revenues of the Eastern carriers, based upon a volume of business substantially the same as they did last year, ought to be—must be—as a minimum, increased approximately $550,000,000 per year, if they are to be placed upon anything like a sound financial basis.

Before the war railroad rates were said to be lower in this country than in any other country in the world. They are lower today in this country than in any other country in the world. If they are increased as we recommend, they will still be lower than in any other country in the world.

Not only that, they will be lower relatively in this country than they have ever been before, for never before could a workman, by the expenditure of one day's wage, ride so far upon a passenger train as he can at the present time. Never before would a ton of coal, or a bale of cotton, or a ton of steel, or a thousand feet of lumber, or a bushel of wheat buy as much transportation as it will today or as it will buy when the rates are raised, if they are raised.

Discussion

Mr. Willard was asked several questions as to why passenger fares should not be increased. He said he might be in favor of a surcharge for Pullman passengers but not for ordinary travel. He did not know what percentage of travel is for business purposes or for pleasure but he said that any decrease in passenger travel would result in a loss because it would hardly be possible to curtail passenger service further while a decrease in freight could be accomplished by a saving resulting from decreased train mileage.

He was also asked why the railroads could not increase their efficiency, particularly by reducing the number of employees. Mr. Willard said he saw many possibilities for increased efficiency that could be realized by the expenditure of capital but that the increase in the number of employees resulted from the eight-hour day and the abolition of piecework and was beyond the control of the railroads. Co-ordination of terminals might improve service and save the cost of some increases in facilities but he had not been able to see where it would reduce operating expense. He admitted that there has been a reduction in efficiency on account of conditions growing out of the war and that it would be some time before we can get back to the condition of efficiency, discipline and interest on the part of employees in their work that existed before the war, and while he believed that private operation is more efficient than government operation no decided improvement can be expected this year. He also pointed out that if the present application is granted it will make the increase in rates in three years only about 64 per cent as compared with an increase in expenses of 100 per cent and that efficiency is needed to take care of the difference.

The number of employees on the Baltimore & Ohio, Mr. Willard said, has increased from 64,000 in January, 1917, to 73,000 in January, 1920, the largest increase being in the mechanical department, where the number has increased 7,500 or 37 per cent. Mr. Plumb said that if the number of men has increased in proportion to the reduction in hours it doesn't necessarily mean an increase in cost.

Mr. Thorne asked if it is not reasonable to expect an increase in traffic over that of 1919 and if the increase in trainloading in 1919 over 1918 should not be continued. Mr. Willard said he felt confident that there would not be a full recovery in traffic this year and he pointed out that the increased trainloading was largely the effect of the increased carloading required during the war and that there had been a relaxation of the efforts of the shippers in that direction.

In reply to questions as to the condition of the roads when returned by the government, Mr. Willard said that the Baltimore & Ohio would have a claim for undermaintenance of $5,000,000 to $7,000,000, but that he was unable to express an opinion as to the equipment. He also pointed out that to the extent there was undermaintenance during government control the net revenues had been overstated. Mr. Willard refused to blame either the government or the railroads for not adding new equipment last year, saying that the Railroad Administration was unable to get the appropriation it asked for and the railroads were unable to pay for equipment, but that the government had added only as much equipment in 26 months as the railroads usually have in a year, and that, therefore, the roads are a year behind.

In reply to questions by Mr. Thorne apparently intended to reflect on the accuracy of the book value of the roads, Mr. Willard said he had personally seen the expenditure of half of the total on the Baltimore & Ohio and that he knew it represented the full value and had been expended as efficiently and as prudently as it could be.

Mr. Willard said he did not agree with Mr. Hines' statement that an increase in rates would be multiplied three to five times in its effect on the cost of living. "If the railroads should get an increase in rates of a billion dollars a year," he said, "the public would pay the billion. I have no reason to suppose they would pay any more but if they did the railroads certainly would not get it."

Mr. Cowan asked that a statement be filed showing, on the basis of the figures compiled by the roads, what roads would earn over 6 per cent and what they would contribute to the government from the excess earnings. The commission directed that this be done.

Frank Nay, vice-president of the Chicago, Rock Island & Pacific, and chairman of the general accounting committee for the railroads, described in detail the methods used in compiling the figures used by the railroads to show their need for increased rates. George M. Shriver, vice-president of the Baltimore & Ohio, and chairman of the eastern accounting committee, also gave detailed testimony regarding the figures for eastern roads and also answered some of the accounting questions which had been asked of Mr. Willard

and referred to him. He said that if the commision should reduce the property account of the eastern roads by 10 per cent or allow only 5½ instead of 6 per cent, it would practically wipe out all of the increase in net operating income which the transportation act made possible as compared with the income of the test period, because at the best it would give them an increase of only about $60,000,000. That would mean that some roads would not earn their interest charges.

Mr. Thorne took up about two hours with an examination of the witness regarding what seemed to Mr. Thorne a suspicious sudden increase in the cost of road and equipment of the Baltimore & Ohio between 1898 and 1900, but after Mr. Thorne had got through insisting on yes and no answers to his questions, Mr. Shriver explained that that was the time of the reorganization when the various subsidiary companies were taken into the system accounts, which resulted in the large increase. Mr. Shriver also described in some detail the way the property investment account had been built up, explaining that the equipment had been drastically written down at the time of the reorganization, that he had personal knowledge of the expenditure of approximately $400,000,000 since 1898 out of the total of $752,000,000 and that it had been charged into the accounts substantially in accordance with the present rules of the Interstate Commerce Commission. In reply to questions as to why the railroads have not proposed to increase passenger fares, Mr. Shriver said that the increase in the number of passengers per train mile, due to the curtailment of passenger train service and the larger increase in the passenger fares for ordinary travel, excluding commutation fares, than in freight rates, had tended to increase the relative profitableness of passenger traffic as compared with freight. W. E. Lamb, representing western shippers, asked that statements be filed giving a separation of expenses between freight and passenger traffic for representative lines.

Benjamin Campbell, vice-president of the New York, New Haven & Hartford, and chairman of the general traffic committee for the railroads, explained that the railroads recommended a uniform percentage advance, with some exceptions, to be applied by brief supplements and that they desired to make readjustments later to restore established differentials and relationships. The carriers will undertake to substitute specific tariffs with reasonable speed, but it would be physically impossible to publish specific tariffs in time to get the rates effective before September 1, when the government guaranty expires. He also said that the freight rate level was relatively lower than the passenger fare level and a percentage advance had been decided upon by the railroads as being the fairest possible basis and one that would work the least disturbance because the greatest number of complaints against the rate advance put in effect by the Railroad Administration in 1918 was against the specific advances, on the ground that they discriminated against short-haul traffic.

In reply to questions from representatives of the shippers, Mr. Campbell said that it was not intended that switching charges be advanced, but that it was proposed to recommend a revision of switching rates and rates for comparative short haul terminal movements as soon as possible, but that there would not be time to make all the desirable revisions and adjustments in the present proceeding. He also said that a revision of the trunk line scale of rates was now in process but would not be ready to be made public for three months. Mr. Campbell said he disagreed with the statement made in the application of the western roads that some of the adjustments to preserve relationships can be made at once.

Commissioner Daniels asked if it would not be advisable to increase commutation fares, which have been increased only about 10 per cent, whereas many ordinary passenger fares have been increased from 20 to 50 per cent. Mr. Campbell thought the trip tickets might well be abolished, as they are used to break down the ordinary one-way revenue, but that only a slight increase in revenue could be obtained from commutation tickets and that they are a necessity to many people. Commissioner Clark suggested that the carriers make it entirely clear as to the extent to which they propose to increase rates for terminal movements, if at all, because the figures they have submitted include the revenues of switching roads.

In reply to questions as to how the carriers propose to increase interterritorial rates, Mr. Campbell said that it was proposed they should be made on the basis of an average percentage.

A. E. Helm of the Kansas Commisison inquired as to whether a separate application is to be made by the southwestern carriers. Chairman Clark said that the commission has so far taken the position that the carriers should be considered in three groups, but that certain southwestern roads want to show that they are entitled to a larger advance than is allowed for Western territory generally, and the commission proposes to hear them in regular order.

Levy Mayer, representing the Great Lakes Transit Corporation, asked why the carriers had not included its figures in their statement. It was stated that water lines generally had been included if they had replied to the questionnaires sent out by the roads. Mr. Mayer said that the company had applied for an increase in rates similar to that asked by the eastern roads, and W. R. Evans, auditor of the company, explained the need of the company for an increase.

E. B. Crosley, vice-president of the Philadelphia & Reading, explained the proposed application of the advance to specific rates, such as coal and coke. The Eastern carriers, he said, have reached the conclusion that an increase on coal and coke substantially on a percentage basis, will be fair but that it is necessary to deviate slightly from the percentage basis in order to make the rates in multiples of 5 cents and to preserve certain relations. He presented some exhibits showing the specific rates proposed.

C. H. Markham Testifies for Southern Lines

C. H. Markham, president of the Illinois Central and chairman of the committee for the southern lines, made a very brief statement on Wednesday out of the regular order. He said he desired to express concurrence with what had been said by Mr. Willard and Mr. Elliott as to the needs of the carriers generally, and that it applied generally to the condition of the Southern lines so that it would not be necessary to duplicate testimony. He said he would be much disappointed if the railroads are not able to operate their properties as successfully in the future as in the past. The history of railroad operation has been one of progress. If it had not been, the railroad plant today would not be accomplishing as much as it is. He referred to the increase in the trainload and said that although some roads may not be able to continue to improve much in that direction the continued increase in efficiency largely depends upon the amount of the income the roads are allowed to receive and their ability to provide adequate facilities, particularly new equipment. As time goes on he thought the roads would be able to regain the efficiency which has to some extent been disturbed during the war period, if they are given the tools to work with. The railroad machine should always be ready to carry a peak load and if they should be allowed too much that can easily be taken care of later, but if they are allowed too little a great and irreparable loss will be the result.

Commisisoner Meyer asked whether there is "any possibility of the railroads and the shippers getting off the backs of the tax-payers before September 1." Mr. Markham said that would be largely dependent upon general conditions such as the volume of traffic and labor conditions.

For the southern roads, R. V. Fletcher of the Illinois Cen-

tral announced that a correction had been made in the property investment figure which reduced it by $16,000,000 and reduced the percentage of advance needed from 30.9 to 30.6. He also said the southern lines had withdrawn their request for specific advances on certain heavy commodities and would ask for a straight percentage advance.

The commission announced on Wednesday that a recess would be taken after the conclusion of the presentation of the railroads' case until June 7 and that any further cross-examination should be reserved until that time. It was also suggested that the shippers make arrangements for consolidating their cross-examination.

Increased Freight Rates and the Cost of Living

AN EDUCATIONAL CAMPAIGN to acquaint the general public with the actual relation of freight rates to the cost of commodities, and to remove any misconception as to the cost to the individual of the contemplated increase in freight rates, is being carried on by the Southern Pacific along its lines on the Pacific Coast. If comments in the public press are to be taken as a criterion, the campaign is already bearing fruit. Country newspapers, in particular, welcome the railroad's action as a step toward a better understanding between public carriers and the "man in the street" and as a preventive of profiteering under the guise of freight rate costs.

The campaign is somewhat along the lines of one undertaken recently by the Railway Clearing House of Great Britain, except that instead of distributing pamphlets as was

The Placard Displayed at Bakersfield, Cal., Explains That It Costs but 3/10 of One Cent to Ship a Pound of Flour from San Francisco to Bakersfield

done abroad the Southern Pacific is depending on station bulletin boards so that he who runs may read.

The present carload freight rates have been worked out to the price per pound or other unit so that the man in Calexico, Cal., for example, can learn at a glance just what proportion of the cost of his five-dollar hat may be charged up to the railroad. He learns that it is trifling and that a 25 per cent increase in the rate would be so small in its relation to the transportation of the finished product that so far as he is concerned it is insignificant.

Of course, the specimen railway rate furnished does not cover the cost of transporting the goods in the raw state. That is a matter too complex to calculate accurately and still keep within simple terms, but even doubling the charge for the finished product still leaves the cost to the individual in most cases less than the smallest coin made. The passenger can thus readily see that it does not appreciably affect the cost of living, and that is what interests the average consumer. The Southern Pacific has distributed hundreds of hand-illustrated posters, all different and each having particular application to the community in which it is displayed. For example: The San Franciscan learns that the freight rate from New York to San Francisco on his suit of clothes weigh-

The Card Displayed Beside the Ticket Window at Phoenix, Ariz., Relates to the Freight Charges on Potatoes from Stockton, Cal., to Phoenix

ing, say, 5 lb., is but 23 cents and that an increase of 25 per cent would add only 6 cents to the freight rate charges on the suit. The resident of Phoenix, Ariz., learns that it costs 4/5 cents to ship a pound of potatoes from Stockton, Cal., and that the proposed increase in freight rate would add but 1/5 of one cent to the cost per pound.

Again, the patron is informed by another poster, which carries the headline, "A Cotton Dress and Its Freight Rate," that a woman's cotton dress weighing approximately 3 lb. is carried from St. Louis, Mo., across country to the California border at Mexico for less than 9 cents, and the proposed rate would add less than 3 cents to this cost.

The freight charge for transporting a man's hat from New York to Oakland, says a poster displayed at the latter point, is but 4⅔ cents for 3,000 miles, and the difference between the present rate and the one that is proposed means to the consumer a difference of only 1⅕ cents.

The posters all have catchy headlines, such as "The Freight Rate on Your Clothes," "A Hog From Tulare," "3,000 Miles From Broadway," etc., and each closes with the expression, "Californians (or Arizonans, etc., as the case may be) are willing to pay a rate necessary for a reasonable return on the money invested to assure good railway service."

The campaign has already attracted the attention of shippers, chambers of commerce and similar organizations whose interests are allied with the public carriers and many have offered their co-operation.

Commission Issues Emergency Car Service Orders

War Time Priority Orders and Restrictions Are Not Favored. Local Car Service and Terminal Committees Appointed.

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on May 20 took the first formal action to comply in part with the suggestions made by the railroad executives in their petition to the commission on May 15 asking it to exercise its emergency powers to help relieve the critical car service situation, and with the detailed recommendations submitted to it by railroad officers at the informal conference on May 19. The commission issued three service orders, declaring the existence of an emergency which requires immediate action. The first order authorized and directed all carriers to reroute traffic by the most available routes. The second order gave specific directions for the return of empty open top cars from western lines to eastern lines in order to get them back promptly into coal-loading territory, and the third order gave similar directions to eastern lines for the delivery of empty box cars to western lines for grain loading.

The rerouting order is somewhat similar to one of the first orders issued by the Railroad Administration after the government took over the railroads, but instead of specifying the most direct routes it orders "the routes most available" to expedite the movement of traffic and relieve congestion, in order that traffic may be routed around congested centers, regardless of the instructions of shippers or connecting lines or the ownership of cars, and without subjecting the railroads to the legal penalties which would apply to such action if taken without authority. The relocation orders continue a plan which had been put in effect by the railroads for several days before the order, with the informal approval of the commission, of giving preferred movement to trainloads of empty box cars westward and of coal cars eastward. It is similar in form to the relocation orders which have been issued by the Commission on Car Service, but it carries the force of the federal commission's authority, backed up by penalties provided in the law for non-compliance. In effect, it gives a priority to grain and coal, because it requires the railroads to move empty cars toward home which they and their local shippers might prefer to use for some other purpose. The need for such orders was particularly emphasized by the railroads in their recommendations to the commission.

The railroad men had expressed the opinion that 30,000 empty coal cars should be moved eastward and 20,000 box cars westward within 30 days. The commission's orders specifically require the movement of about 40,000 coal cars and about 20,000 box cars.

Service Order No. 1, the rerouting order, was as follows:

Rerouting Order

"The subject of routing of freight traffic being under consideration and it appearing, in the opinion of the commission, that because of shortage of equipment and congestion of traffic an emergency exists on the lines of all carriers by railroad in the United States subject to the interstate commerce act, which requires immediate action,

"*It is ordered* that until the further order or direction of this commission all said common carriers by railroad are hereby directed to forward traffic to destination by the routes most available to expedite its movement and relieve said congestion, without regard to the routing thereof made by shippers or by carriers from which the traffic is received, or to the ownership of the cars, and that all rules, regulations and practices of said carriers with respect to car service are hereby suspended and superseded in so far only as conflicting with the directions hereby made.

"*It is further ordered and directed* that inasmuch as such disregard of routing is deemed to be due to carrier's disability, the rates applicable to traffic so forwarded by routes other than those designated by shippers or by carriers from which the traffic is received shall be the rates which were applicable at date of shipment over the routes so designated.

"*It is further ordered and directed* that in each instance where the traffic is routed or rerouted by carriers by railroad, under the authority of this order, the carrier responsible for such routing or rerouting shall within 24 hours thereafter deposit in the United States mail a notice addressed to the consignee of the traffic stating the car numbers and initials, places and dates of shipment, the routing and respective routes over which the traffic is moving, and that charges for the transportation of the traffic, including transportation and schedules of rates, fares and charges as those terms are defined in said act, will be the same as they would have been if such routing or rerouting had not taken place.

"*It is further ordered and directed* that in executing the directions of the commission contained in this order the common carriers involved shall proceed without reference to contracts, agreements or arrangements now existing between them with reference to the divisions of the rates of transportation applicable to said traffic; that such divisions shall be, during the time this order remains in force, voluntarily agreed upon by and between said carriers, and that upon failure of the carriers to so agree said divisions shall be hereafter fixed by the commission in accordance with pertinent authority conferred upon it by said act.

"*And it is further ordered* that copies of this order and direction be served upon all carriers by railroad in the United States subject to the interstate commerce act, and that notice of this order be given to the general public by depositing a copy of the order in the office of the secretary of the commission at Washington, D. C."

Coal Cars

The order with reference to coal cars, Service Order No. 2, said in part:

"It appearing, in the opinion of the commission, that because of a shortage of equipment and congestion of traffic, aggravated by unfavorable labor conditions, which exist upon the lines of common carriers by railroad in the United States subject to the interstate commerce act, an emergency exists which requires immediate action with respect to the distribution and relocation of open top cars from western territory to eastern territory:

"*It is ordered* that the rules, regulations and practices of said common carriers with respect to car service be, and they are hereby, suspended and superseded in so far as they conflict with this order until further order of the commission."

Then followed the specific orders authorizing and directing individual roads to transport and deliver daily empty serviceable open top cars as follows:

The Atchison, Topeka & Santa Fe to deliver daily 100 empty serviceable open top cars to the Chicago & Alton at Kansas City, Mo.; 50 such cars of eastern railroad ownership to the Pennsylvania at Chicago, and 50 to the Illinois Central at Chicago, preferably of cars owned by the Chicago & Alton, the Pennsylvania and the Illinois Central or by their direct connections, for 20 consecutive days, beginning with May 25.

The Chicago, Burlington & Quincy to deliver daily 40

empty serviceable open top cars of eastern railroad ownership to the Cleveland, Cincinnati, Chicago & St. Louis at Peoria, preferably of cars owned by the Cleveland, Cincinnati, Chicago & St. Louis or by its direct connections, for 20 consecutive days, beginning with May 25.

The Chicago Great Western to deliver daily 75 empty serviceable open top cars to the Illinois Central via junction points, preferably of cars owned by the Illinois Central or by its direct connections, for 20 consecutive days, beginning with May 25.

The Chicago, Milwaukee & St. Paul to deliver daily 70 empty serviceable open top cars of eastern railroad ownership to the Pennsylvania via Elgin, Joliet & Eastern; 70 of eastern railroad ownership to the New York Central via the Elgin, Joliet & Eastern; 70 of eastern railroad ownership to the Erie via the Elgin, Joliet & Eastern; 70 of eastern railroad ownership to the Pennsylvania via the Indiana Harbor Belt; 70 to the Chicago, Terre Haute & Southeastern via the Indiana Harbor Belt; 50 to the Illinois Central at Mendota; 50 to the Chicago, Burlington & Quincy at Mendota; 100 to the Illinois Central at Dubuque; and 100 to the Chicago, Burlington & Quincy at Savannah, preferably of cars owned by the Pennsylvania, the New York Central, Erie, Chicago, Terre Houte & Southeastern, Illinois Central, and the Chicago, Burlington & Quincy, or by their direct connections, for 20 consecutive days, beginning with May 25.

The Chicago & North Western to deliver daily 75 empty serviceable open top cars to the Chicago, Indianapolis & Louisville at Chicago and Peoria; 50 of eastern railroad ownership to the Baltimore & Ohio at Chicago and Peoria; 75 of eastern railroad ownership to the Cleveland, Cincinnati, Chicago & St. Louis at Peoria; 50 of eastern railroad ownership to the Pennsylvania at Chicago; 75 of eastern railroad ownership to the Chesapeake & Ohio of Indiana at Chicago; and 75 to the Chicago, Terre Haute & Southeastern via the Indiana Harbor Belt, preferably of cars owned by the Chicago, Indianapolis & Louisville, the Baltimore & Ohio, the Cleveland, Cincinnati, Chicago & St. Louis, the Pennsylvania, the Chesapeake & Ohio of Indiana and the Chicago, Terre Haute & Southeastern, or by their direct connections, for 20 consecutive days, beginning with May 25.

The Chicago, Rock Island & Pacific to delivery daily 100 empty serviceable open top cars to the Illinois Central at LaSalle and Peoria; 50 to the Louisville & Nashville at Memphis and St. Louis; and 50 of eastern railroad ownership to the Pennsylvania at Chicago, preferably of cars owned by the Illinois Central, Louisville & Nashville and the Pennsylvania, or by their direct connections, for 20 consecutive days, beginning with May 25.

The Minneapolis, St. Paul & Sault Ste. Marie to deliver daily 60 empty serviceable open top cars to the Chicago & Alton at Brighton Park, preferably of cars owned by the Chicago & Alton, or by its direct connections, for 20 consecutive days, beginning with May 25.

The Great Northern to deliver daily to the Chicago, Burlington & Quincy at all junction points 50 empty serviceable open top cars in excess of current equalized interchange until 700 such cars have been delivered beginning with May 25 and preferably cars owned by the Chicago, Burlington & Quincy or by its direct connections. The Indiana Harbor Belt to deliver daily 50 empty serviceable open top cars to the Chicago, Terre Haute & Southeastern via any junction points, preferably of cars owned by the Chicago, Terre Haute & Southeastern, or by its direct connections, for 20 consecutive days, beginning with May 25.

The Minneapolis & St. Louis to deliver semi-weekly 50 empty serviceable open top cars to the Cleveland, Cincinnati, Chicago & St. Louis at Peoria in excess of current equalized interchange until 300 of such cars have been delivered, beginning with May 25, preferably of cars owned by the Cleveland, Cincinnati, Chicago & St. Louis, or owned by its direct connections.

The Missouri, Kansas & Texas to deliver daily 15 empty serviceable open top cars of eastern railroad ownership to the Cleveland, Cincinnati, Chicago & St. Louis at St. Louis; 25 of eastern railroad ownership to the Louisville & Nashville at St. Louis; and 10 of eastern railroad ownership to the Toledo, St. Louis & Western at St. Louis, in excess of current equalized interchange, until 800 of such cars have been delivered, beginning with May 25, preferably cars owned by the Cleveland, Cincinnati, Chicago & St. Louis, Louisville & Nashville, and Toledo, St. Louis & Western, or by their direct connections.

The Missouri Pacific to deliver daily 10 empty serviceable open top cars of eastern railroad ownership to the Baltimore & Ohio at St. Louis, and 10 of eastern railroad ownership to the Pennsylvania at St. Louis, in excess of current equalized interchange, until 400 of such cars have been delivered, beginning with May 25, preferably of cars owned by the Baltimore & Ohio and the Pennsylvania, or by their direct connections.

The Northern Pacific to deliver daily 20 empty serviceable open top cars to the Chicago, Burlington & Quincy via all junctions, in excess of current equalized interchange, until 400 of such cars have been delivered, beginning with May 25, preferably of cars owned by the Chicago, Burlington & Quincy, or by its direct connections.

The Southern Pacific Company to deliver daily 20 empty serviceable open top cars to the Illinois Central at New Orleans, and 20 to the Louisville & Nashville at New Orleans, in excess of current equalized interchange, until 800 of such cars have been delivered, beginning with May 25, preferably of cars owned by the Illinois Central and the Louisville & Nashville, or by their direct connections.

The St. Louis-San Francisco to deliver daily 20 empty serviceable open top cars to the Louisville & Nashville via all junctions, in excess of current equalized interchange, until 600 of such cars have been delivered, beginning with May 25, preferably of cars owned by the Louisville & Nashville, or by its direct connections.

The St. Louis Southwestern to deliver daily 10 empty serviceable open top cars of eastern railroad ownership to the Cleveland, Cincinnati, Chicago & St. Louis at St. Louis, in excess of current equalized interchange, until 200 of such cars have been delivered, beginning with May 25, preferably of cars owned by the Cleveland, Cincinnati, Chicago & St. Louis, or by its direct connections.

The Texas & Pacific to deliver daily 20 empty serviceable open top cars to the Missouri Pacific via all junctions, in excess of current equalized interchange, until 400 of such cars have been delivered, beginning with May 25, preferably of cars owned by the Missouri Pacific, or by its direct connections.

The Union Pacific to deliver daily 50 empty serviceable open top cars to the Illinois Central, at Omaha, preferably o fcars owned by the Illinois Central, or by its direct connections, for 30 consecutive days, beginning with May 25.

It was further ordered that delivery or interchange may be made at any convenient place near the junction named.

Grain Cars

Service Order No. 3, referring to box cars, similarly declared that in the opinion of the commission an emergency exists which requires immediate action with respect to the distribution and relocation of box cars from eastern and southeastern territory to western territory, and ordered:

The New York, New Haven & Hartford to transport daily one train consisting of 60 empty serviceable box cars, preferably cars owned by the Northern Pacific, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Northern Pacific, routed via Maybrook,

N. Y., Erie to Chicago, and Chicago, Milwaukee & St. Paul to St. Paul.

The New York, New Haven & Hartford to transport daily one train consisting of 60 empty serviceable box cars, preferably cars owned by the Northern Pacific and the Great Northern, or by their direct connections, 20 of which to be consigned to the Great Northern and 40 of which to be consigned to the Northern Pacific, routed via Maybrook, N. Y., Lehigh & Hudson River, Port Morris, N. J., Delaware, Lackawanna & Western to Buffalo, N. Y., New York, Chicago & St. Louis to Chicago, and the Chicago Great Western to St. Paul.

The Boston & Albany to transport daily 25 empty serviceable box cars, preferably of cars owned by the Great Northern, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Great Northern and routed via the New York Central to Chicago, and the Chicago, Burlington & Quincy to St. Paul.

The Long Island to transport daily 25 empty serviceable box cars, preferably of cars owned by Great Northern, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Great Northern and routed via Jersey City, N. J., Lehigh Valley, Suspension Bridge, N. Y., Michigan Central to Chicago, and Chicago, Burlington & Quincy to St. Paul, Minn.

The New York, Ontario & Western to transport daily 15 empty serviceable box cars, preferably of cars owned by the Great Northern, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Great Northern and routed via Utica, N. Y., New York Central to Chicago, and Chicago, Burlington & Quincy to St. Paul.

The Pennsylvania to transport daily 75 empty serviceable box cars, preferably of cars owned by Minneapolis, St. Paul & Sault St. Marie, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Minneapolis, St. Paul & Sault Ste. Marie and routed via Chicago, Ill.

The Pennsylvania to transport daily 75 empty serviceable box cars, preferably of cars owned by Chicago & North Western, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Chicago & North Western and routed via Chicago, Ill.

The Atlantic Coast Line to transport daily 75 empty serviceable box cars, preferably of cars owned by the Chicago, Burlington & Quincy, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Chicago, Burlington & Quincy, routed via Augusta, Ga., Georgia Railroad, Atlanta, Nashville, Chattanooga & St. Louis to Paducah, Ky.

The Southern to transport daily 75 empty serviceable box cars, preferably of cars owned by the Chicago, Rock Island & Pacific, or by its direct connections, for 30 consecutive days, beginning with May 25, to the Chicago, Rock Island & Pacific and routed via St. Louis, Mo.

The Southern to transport daily 25 empty serviceable box cars, preferably of cars owned by the Union Pacific, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Union Pacific and routed via St. Louis, Missouri Pacific to Kansas City.

The Seaboard Air Line to transport daily 50 empty serviceable box cars, preferably of cars owned by the Union Pacific, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Union Pacific and routed via Birmingham, St. Louis-San Francisco to Kansas City.

The Wheeling & Lake Erie to transport daily 20 empty serviceable box cars, preferably of cars owned by the Chicago Great Western, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Chicago Great Western and routed via Toledo, Wabash to Chicago.

The Charleston & Western Carolina to transport daily 10 empty serviceable box cars, preferably of cars owned by the Chicago Great Western, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Chicago Great Western and routed via Spartanburg, Southern, Louisville, Chicago, Indianapolis & Louisville to Chicago.

The Atlanta & West Point to transport daily 10 empty serviceable box cars, preferably of cars owned by the Chicago, St. Paul, Minneapolis & Omaha, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Chicago, St. Paul, Minneapolis & Omaha and routed via Atlanta, Southern Railway, St. Louis-San Francisco, Kansas City, Chicago, Burlington & Quincy, Council Bluffs, Chicago & North Western, Sioux City, Iowa.

The Georgia Railroad to transport daily 20 empty serviceable box cars, preferably of cars owned by the Chicago, St. Paul, Minneapolis & Omaha, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Chicago, St. Paul, Minneapolis & Omaha and routed via Atlanta, Seaboard Air Line, Birmingham, St. Louis-San Francisco, Kansas City, Chicago, Burlington & Quincy, Council Bluffs, Chicago & North Western to Sioux City, Iowa.

The Florida East Coast to transport daily 20 empty serviceable box cars, preferably of cars owned by the Minneapolis & St. Louis, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Minneapolis & St. Louis and routed via Jackson, Seaboard Air Line, River Junction, Louisville & Nashville, St. Louis, Wabash to Albia, Iowa.

The Atlanta, Birmingham & Atlantic to transport daily 20 empty serviceable box cars, preferably of cars owned by the Minneapolis & St. Louis, or by its direct connections, for 30 consecutive days, beginning with May 25, consigned to the Minneapolis & St. Louis and routed via Atlanta, Nashville, Chattanooga & St. Louis, Nashville, Tenn., Louisville & Nashville, Evansville, Ind., Cleveland, Cincinnati, Chicago & St. Louis to Peoria, Ill.

The connecting carriers by which the cars are routed were also authorized and directed to transport the cars as directed, delivery or interchange to be made at any convenient place near the junction named.

These orders were served upon the Commission on Car Service, as agent for the various roads, and it promptly transmitted the specific orders to the individual roads by telegraph.

Car Service Commission Organizes Local Committees

Thirty local committees on car service, located in the principal railroad centers of the country, were organized on Monday, May 24, to assist the Commission on Car Service in the handling of local matters pertaining to the present situation and in the following activities:

1. Obtaining prompt loading and unloading of equipment.
2. Loading of cars to full visible or carrying capacity.
3. Placement of car orders in accordance with necessities.
4. Reduction of use of equipment in trap or transfer service when movement can be made by motor truck or wagon.
5. Development of practical arrangements for expedited through merchandise cars.
6. Such other items of operation and transportation in the interests of car service and prompting increase in available equipment.

This establishes an organization similar to that which the commission had in 1917.

By direction of President Aishton of the American Railroad Association, W. C. Kendall, chairman of the Commission on Car Service, on May 20 telegraphed to all railroads local to the 30 cities, asking them to designate operating officers to join in the formation of such committees at meetings to be held on Monday in the offices of designated temporary chairmen. It was suggested that if practicable the official who served as chairman of the Railroad Administration terminal committee prior to March 1 be appointed permanent chairman. The temporary chairmen were also directed to telegraph to Mr. Kendall not later than Monday afternoon the

name of one member of the committee who will act as a representative of the railroads on another committee to be appointed by the Interstate Commerce Commission.

Through these committees it is planned that matters of transportation and car service shall be handled co-operatively. The committees were organized in the following cities: Omaha, Seattle, Baltimore, Cincinnati, Youngstown, Twin Cities, Norfolk, New York, St. Louis, Boston, Denver, Philadelphia, Buffalo, Peoria, Birmingham, Kansas City, Cleveland, Detroit, Portland, Ore., Washington, New Orleans, Pittsburgh, Louisville, Galveston, Atlanta, San Francisco, Dallas, Toledo and Chicago.

I. C. C. Establishes Terminal Committees

The Interstate Commerce Commission on May 24 announced that it, with the co-operation of shippers, carriers and state railroad and public utility commissions, had arranged to establish "Terminal Committees" at certain designated important terminals throughout the United States which correspond to the location of the railroad committees.

The personnel of each terminal committee will consist of a representative of the carriers, a representative of the shippers in the vicinity of the terminal, and a representative of the state railroad or public utility commission, if the latter desires to be represented, and an employee of the Interstate Commerce Commission who is designated to act as chairman of the committee.

The names of these representatives were to be communicated by telegraph to the chairman, who was to proceed to organize his committee and convey these directions to all members.

The committee will communicate through its chairman with the Interstate Commerce Commission and without delay will establish co-operative relations with the Commission on Car Service Committee being organized by the railroads at the terminal designated.

It shall be the function of the Terminal Committee hereby constituted to see that during the present emergency the Interstate Commerce Commission is kept advised as to the railroad transportation situation in and about the terminal mentioned.

The committee will act in an advisory capacity in connection with the operating work of the Commission on Car Service Committee of the railroads, and through such committees shall reach the individual railroads in the terminals. The Terminal Committee should bring to the attention of the Interstate Commerce Commission any matters deemed important and any matters upon which the exercise of the mandatory powers conferred by the transportation act upon the Interstate Commerce Commission seems desirable or necessary, together with its recommendation as to the specific action to be taken. The committee should work in close contact with the shippers, and should use every effort by study, conference and adjustment to overcome any condition which impedes prompt and efficient transportation.

The subjects which it is important at this time to investigate and consider and as to which the committee should concern itself are generally:

1. To consider all matters of operation and transportation which will in any way tend to increase the efficiency of car supply, of motive power, of transportation, or to relieve or minimize congestion or delay at the terminal or upon the line.

2. To see that the routing or rerouting of traffic is in conformity with Service Order No. 1 of the Interstate Commerce Commission, and to advise the commission of violations of the order which may come to the notice of the Terminal Committee, as well as violations of any other service orders entered or to be entered by the commission.

3. To study the embargo situation and make suitable recommendations with respect thereto.

4. To make such recommendations in conjunction with the Commission on Car Service Committee as to the issuance of permits as developments may show to be necessary or advisable.

5. To use every effort to prevent the abuse and misuse of equipment, and especially coal, refrigerator, live stock and grain-loading cars; and to use every effort to see that the use of these cars for the time being is confined as far as is reasonably practicable to the primary purposes for which they were built.

6. To use every effort to obtain the most prompt loading and unloading of equipment by shippers and consignees, and to secure the maximum possible loading of cars.

7. To use every effort that orders for placement of cars shall conform to the actual necessities of the proposed movement, and to discourage waste or needless transportation during the present emergency.

8. To cause a reduction in the use of equipment in transfer service when the movement can be made by motor truck, wagon or other means.

9. To keep advised with respect to the situation in the terminal as to operating conditions, including the quantity and efficiency of labor or lack of switching power, delays in interchange of equipment, delays in placement for unloading and pulling out of loaded cars or released equipment, delays in loading and unloading equipment, delays in movement of cars awaiting billing, bad-order cars, condition of motive power and the railroad fuel situation. At port terminals pertinent advice should be given as to the shipping situation. The committee should also keep advised as to the commercial situation in the terminal as affected by transportation. Reports upon these subjects will be made by the chairman of the committee to the Interstate Commerce Commission daily.

To avoid possible misunderstanding, the commission calls attention that under the law it is not permitted to make any compensation for such co-operation as the representatives of the carriers, the shippers and the state commissions are able to give; but the efforts of the members of the committee in this connection are regarded by the commission as being of a patriotic character in the highest degree necessary in a national emergency. The commission will expect that members of the Terminal Committee who assume responsibility by the acceptance of tender of appointment will give such of their time and attention to this work as the importance of the subject to the nation at large demands and as required by the particular local situation. The situation does not admit of delay and prompt and vigorous action all along the line is essential.

Requests for advice or further instructions are to be made to Commissioner Clyde B. Aitchison.

Instruction to Local Car Service Committees

Chairman Kendall this week issued instructions to the local car service committees setting forth the imperative necessity for immediate action to improve present transportation conditions. He emphasized particularly the principle of solid train movement; build up at originating or concentration points a block of cars consigned via one route to a single destination or breaking point. At industrial centers originating freight in large volume the local committee, in co-operation with the terminal joint committee and working with representatives of shippers, should arrange for group loading on designated days to uniform destinations or zones and concentrate the loading of scattered industries in one central yard where possible. Local conditions should be surveyed to determine points where transfer engines are experiencing delay, and joint use of power, yard tracks, etc., should be availed of. Cars held because of embargo or inability of railroads to accept, should be moved by other than original routing under the authority of Interstate Commerce Commission Service Order No. 1, where practicable.

Where accumulation of cars for local delivery occurs and embargoes are not placed promptly, committees should communicate their recommendation to the negligent road and report facts to Commission on Car Service. Where loaded cars are on hand delayed on account of embargoes at destination prompt action should be taken. In conjunction with the terminal joint committee of shippers and Interstate Commerce Commission representatives careful study should be made of the handling of l. c. l. freight. Switching service to industries must be efficient. A shipper will relax his efforts to conserve cars if he sees them delayed unreasonably after removal from his side track.

The circular contains detailed instructions and advice for consignors and for consignees, and concludes:

"Both consignor and consignee should keep in mind the reward. No serious question can be raised as to the direct benefits accruing to any shipper co-operating in this program for improved car service. While each single act is relatively of small importance, thousands of such methods employed daily will cause an improvement in car supply that will be felt everywhere."

List of Car Service Committees

	Chairman	Railroad representative on terminal joint committee
Atlanta, Ga.	E. W. Sandwich.	E. W. Sandwich, supt. car service A. & W. P.
Baltimore, Md.	O. H. Hobbs	O. H. Hobbs, div. supt., B. & O.
Birmingham, Ala.	E. S. Stovall	E. S. Stovall, gen. agt., Central of Ga.
Boston, Mass.	C. M. Conklin	E. P. Gardner, asst. gen. frt. agt., B. & A.
Buffalo, N. Y.	L. C. Corcoran.	L. C. Corcoran, chf. trans. clk., Penn.
Chicago, Ill.	J. H. Brinkerhoff.	J. H. Brinkerhoff, gen. supt., Belt.
Cincinnati, Ohio.	J. A. Morris.	J. A. Morris, chairm. operating comm.
Cleveland, Ohio.	H. O. Dunkle.	H. O. Dunkle, gen. agent, Erie.
Dallas, Texas	J. Munday	J. Munday, supt. term'ls, St. L. S. W.
Denver, Colo.	J. Russell	A. F. Vickroy, supt., U. P., Denver.
Detroit, Mich.	W. D. Trump.	W. D. Trump, terminal manager.
Galveston, Texas.	G. G. Moore.	G. G. Moore, supt. term'l, G. C. & S. F.
Kansas City, Mo.	W. M. Corbett.	W. N. Corbett, pres., K. Ct.
Louisville, Ky.	J. B. Arbegust.	J. B. Arbegust, term. mgr., L. & N.
New Orleans, La.	J. M. Egan	W. E. Farris, v.-p. & g. m., N.O.& G.N.
New York City.	A. J. Miller.	A. J. Miller, supt. car serv., D.L.& W.
Norfolk, Va.	W. S. Saunders.	W. S. Saunders, A. G. F. A., Virgin.
Omaha, Nebr.	W. M. Jeffers.	W. M. Jeffers, gen. mgr., U. P.
Peoria, Ill.	R. H. Johnson.	S. M. Russell, gen. supt., T. P. & W.
Philadelphia, Pa.	J. M. Jones.	J. M. Jones, asst. term. supt., Penn.
Pittsburgh, Pa.	C. F. Wolcott.	G. F. Wolcott, ch., Pitts., oper. comm.
Portland, Ore.	C. W. Martin.	H. M. Huston, S. C. S., S. P. & S.
St. Louis, Mo.	W. E. McGarry.	A. S. Johnson, gen. mgr., Term. Ry.
San Francisco, Cal.	K. M. Nicoles.	K. M. Nicoles, N. W. Pac.
Seattle, Wash.	J. H. O'Neill.	M. Nicholson, G. M., C. M. & St. P.
Toledo, Ohio	A. B. Newell.	L. C. Reddish, asst. to gen. mgr., Toledo Term.
Twin Cities	H. A. Kennedy.	P. H. McCauley, supt. trans., N. P.
Youngstown, Ohio.	D. T. Murray.	C. Bucholtz, div. supt., Erie.
Washington, D. C.	E. V. King.	E. V. King, gen. yard master, Potomac Yards.

A general report is to be furnished weekly from each committee giving an outline of the activities undertaken and the results secured. A copy of this report is to be sent to each of the other car service committees for their information and to all railroads interested.

The Interstate Commerce Commission

The Interstate Commerce Commission so far does not incline to the recommendations made by the railroad executives in their petition of May 15 that priority orders be issued for food, fuel and the most essential commodities and it is understood that the idea of priority orders was not pressed in the conferences between the commissioners and the railroad officers which were held later to discuss ways and means of dealing with the situation. The commission has made it possible to reroute freight to avoid congestion and has complied with the recommendation for ordering the return of grain and coal cars to the owning roads, but it is understood that at least for the present no further general orders will be issued and that an effort will be made to deal with the situation locally and in accordance with the conditions as they arise. The Car Service Commission is being left free to direct the work of the railroads generally and meanwhile the Interstate Commerce Commission is collecting information independently upon which it may base future action if conditions require.

Ever since the railroad executives suggested the idea of priority orders the commission has been besieged by delegations and flooded with telegrams from representatives of various classes of shippers urging priority for their commodities or asking that they be not classed as non-essentials. Naturally these requests have been of a conflicting nature.

While most of the people who want coal have bitterly criticised the use of open-top cars for other freight, others not particularly interested in the fuel problem have objected to the suggestion that open-top cars should be confined largely to coal traffic. One complaint from Kansas asked priority for grain shipments but objected to the open-top cars in that territory being sent east for coal on the ground that they were needed for road-building materials.

The Michigan Public Utilities Commission filed formal complaint with the commission urging the commission to give priority to shipments of coal to public utilities in Michigan. The complaint declared that the situation is acute in all sections of Michigan, and stated that the gas and electric light plants in Kalamazoo, Pontiac, Saginaw, Otsego, Ludington, Hastings and several other large cities have only one day's supply of coal on hand. The complaint urged the issuance of orders requiring the immediate unloading of all cars throughout the country and the immediate return of the cars to the mine districts. It also urged that if the commission finds that coal companies are profiteering in the price of coal, recommendations be made to Congress that that body establish a maximum selling price.

The National Federation of Construction Industries, in a petition to the commission, objected to any curtailment of the shipments of its members in view of the serious housing situation.

The chairmen of the local car service committees were also instructed to furnish daily wire reports showing general operating conditions in their terminal districts, particularly as to car movement accumulations and other factors affecting car efficiency indicating relative improvement or otherwise from day to day. They were to include also as a special item any undue accumulation of coal, basing this upon such local record of coal movement and detention as conditions may justify.

L. M. Betts has been appointed a member of the Commission on Car Service representing the central western and northwestern lines.

The Present Situation

That the peak of the congestion was passed some time ago is indicated by reports received by the Commission on Car Service for May 14, on which date the accumulations of cars to be moved amounted to 184,987, as compared with 201,000 on May 8 and 269,000 on April 24. For the week ended May 15 the cars loaded amounted to 698,390, as compared with 515,861 during the week ended April 17. On May 20 the cars moved by 48 principal roads totalled 729,958, an increase of 64.5 per cent over April 12, when only 443,000 were moved. On May 6 the total was 701,942, on May 10, 667,889; on May 13, 715,579 and on May 17, 681,062.

In a circular addressed to the railroads on May 22, Chairman Kendall, of the Commission on Car Service, said that the records for May 1 indicate a continued improvement in the movement of cars to the home road. The percentage as of that date is 25.9 or 4 per cent higher than March 1, 1920. Translated into cars this means very close to 100,000. "Again, it is felt," he said, "that the switchmen's strike has somewhat retarded free circulation and it is not believed that the movement is merely accidental, as nearly every road has benefited to some degree. There are scattered instances of losses, which, however, are by far in the minority. We are now relocating empty box and coal cars in considerable quantity. It is a time when by forethought and possibly

a little extra switching cars may be sent home in quantity.

By way of suggestion Mr. Kendall asked "Has any railroad examined its location statement to determine the number of its neighbors' cars (direct connections) it has on its line? Have you undertaken any arrangements with your neighbors by which you may agree to return his cars if he will reciprocate? Have instructions been issued emphasizing the possibility of gain in getting cars home by particularizing in the loading to direct connections cars of their ownership? Cannot much be done at freight houses, transfers, large industrial plants and coal mines by reasonably complete application of this principle?

"All will agree that there is a great deal which can be done in this way if we but issue the necessary instructions and make it someone's business to determine that such instructions shall be carried out. Will not everyone determine that the figures for June 1 will see an improvement?"

At New York

The freight situation at New York City has improved at some localities and in some particulars, while yet railroads and merchants continue to labor under serious burdens of congestion, delays and losses. Reporters, trying to follow the situation, day by day, find the railroads encouraged by an improved movement of cars, while at the same time shippers and consignees continue to voice numerous well-founded complaints; and the reporter is unable to strike a balance. The railroads, in spite of continued shortage and inefficiency of men, because of the yardmen's strike, are moving immense quantities of freight, while yet, because of congestion at New York and other cities, they have to keep many embargoes in force.

The city truckmen and the harbor men still make trouble for shippers. On May 20 about 300 captains and other employees on tugs and lighters in New York Harbor struck in sympathy with the longshoremen, and the existing congestion of freight, (due largely to the tie-up of barges) was made worse. A few days later these men made application to come back, with their seniority rights undisturbed but the application was refused, the employers saying that they had secured a considerable number of new men and demanding that the strikers return to work before the opening of any discussion.

On May 25 large shipments of perishable freight which given by the Merchants' Association and attended by over 2,000 men; the plan to establish a non-union trucking organization was endorsed, and arrangements were made to raise $500,000 to finance the enterprise.

The Merchants' Association announced that the Baltimore & Ohio had embargoed all freight to be delivered in New York City, and on Long Island, and also had embargoed shipments from New York to many western cities; also that the Lehigh Valley had closed all of its New York piers to inbound freight.

New York papers print astonishing figures of the abnormal costs of trucking, due to the congestion and various inconveniences. For example, the National Lead Company, reported that on a shipment of 25 tons of metal, the loads being delayed many hours waiting in line, the cost for a distance of one mile was $2.50 a ton. In some cases trucking charges are six times above the normal costs in 1914.

On May 25 large shipment of perishable freight, which had been delayed came into the city in a rush and wholesale prices of new potatoes, onions, cucumbers and other things fell to very low figures—but with very little effect on retail prices.

Alfred H. Barrett, New York State Deputy Public Service Commissioner, in a report to the Interstate Commerce Commission on the 22d, gave a summary of freight conditions in and around New York city. He showed that several roads had practically cleared their sidings of New York freight, but that others were still seriously congested. The lighterage service suffers from insufficient forces. The carriers have been unable to get enough new men, and the old men are not generally returning. It is estimated that only about 70 per cent of the normal marine forces are at work.

For six weeks there has been delivered to ocean-going steamships at New York only about 40 per cent of the volume of export freight handled during the same period in 1919. Of this amount about 28 per cent was lightered by the railroads and about 12 per cent by private lighterage companies.

As before stated the movement of freight is heavy on all lines in spite of varied hindrances. The Baltimore & Ohio at its extensive freight terminals on Staten Island has received from the west 9,342 loaded cars this month, which is equal to the movement during the same period last year; and the movement of loaded cars westward, 3,084 cars, compares with 2,097 cars last year.

The Central of New Jersey, for the first nineteen days in May, forwarded 47,186 cars, as compared with 47,368 in the same period last year. Anthracite brought in by this road in May thus far has aggregated about 300 cars more than in the corresponding period the year before; but bituminous coal, because of the shortage of coal cars shows a falling off of nearly 5,000 cars. The movement on this road of freight affected by the strikes of longshoremen and the arbitrary conduct of truckmen in New York, is estimated at about two-thirds its normal volume.

The Erie during the past week has moved about eleven per cent more loaded cars than the week before, and reports terminal yards as in normal operation. Freight movement across the Hudson River, however, is about fifteen per cent below normal, and (because of conditions in New York) some embargoes are in effect on l. c. l. freight to New York.

The Lehigh Valley, for the first 24 days of May, moved 1,492 cars more than in the same period last year. Its movement of freight by water in New York Harbor is not quite normal thought the situation is improving, and the number of tugs in service in the day time is above normal. In the Jersey City terminal yards the number of engine crews in service is 63, four more than in the weeks immediately preceding the strike.

The New York, New Haven & Hartford during the past week has moved east from the Harlem River terminal an average of 522 cars a day, and the average westbound movement into that terminal was 676 cars. The yard forces are still about 15 per cent below normal, but the business is handled with no abnormal delay. This road has removed all the embargoes affecting freight to and from New York City.

The Pennsylvania reports the average daily number of loaded cars received at New York terminals for the week ending May 25 as 1,508. The westbound movement averaged 606 cars a day; and about 6,000 empty cars were moved westward during the week. The car floats made in the week 192 trips a day carrying 1,899 cars (eastbound), and approximately the same number of trips and cars westbound.

At Chicago

The freight congestion problem in Chicago and other middle western cities appear to be somewhat easier than for the past two weeks, although the present daily supply of coal is still below normal. The action of the Interstate Commerce Commission on May 19 in issuing orders for the immediate transfer of 20,000 box cars from the east to lines west of Chicago and a corresponding movement of 30,000 open top cars from the west to the east, is largely responsible for this betterment of conditions. A gradual return of outlaw switchmen and of the employment of new men has also improved the outlook. The movement of coal and other essen-

tials does not now depend entirely upon an immediate increase in the number of cars available for transportation, but rather hinges upon the number of men available to move these cars. An immediate lack of coal in Chicago and vicinity appears to be rather doubtful when an approximate number of cars of coal which have been checked into Chicago on recent dates is noted. In a four days from May 15-19 about 280,000 tons of coal were received in the Chicago district. Discrimination is charged by some coal operators and manufacturing concerns in that certain mine operators are said to have been favored by the railroads and also that various non-essentials have been favored. One of the packers in Chicago says that a constriction of the nation's meat supply is threatened by the shortage of refrigerator cars. This shortage is said to have been caused by action of the Interstate Commerce Commission in diverting refrigerator cars to uses other than moving meat.

Hearings Before the Railroad Labor Board

Carriers' Representatives Urge Establishment of Adequate Wages for Various Employees

THE PRESENTATION of the railroads' brief before the Railroad Labor Board on the demands of the various railway workers' organizations was completed, with E.T. Whiter, chairman of the Conference Committee of Managers of the Association of Railway Executives, giving voluminous testimony all of which advocated the establishment of fair and adequate wage scales and wage differentials. All of the evidence which has been submitted on behalf of the railroads has been offered with the expressed intention of helping that body to understand the complicated wage structure built up through years of co-operative work and at the same time of assisting that body to re-adjust this wage structure so that all classes of employees will be adequately compensated for their services and so that differentials depending upon the character and responsibility of the work performed are not disturbed.

The presentation of the railroads' case began on May 17 and was reported up to and including May 19 in the *Railway Age* of May 21, page 473. The demands of yard workers, switchmen, switchtenders, etc., were considered on May 20; the demands of the conductors on May 21; the firemen on May 22 and 24; the clerical and station employees on May 24; the signal and maintenance of way employees on May 25. The rebuttal of the employees was presented on May 27.

Yard Employees

The re-establishment of the yard classifications, in effect in the United States from 1910 until eliminated by the provisions of Supplement 16 to General Order 27, put into effect by the United States Railroad Administration on January 1, 1919, as the basis for wage scales for yard employees and the re-establishment of wage differentials between day and night yard service was advocated by Mr. Whiter, in presenting the railroads' reply to the demands of the yard service employees.

The testimony given at this time was particularly significant because of the fact that it dealt exclusively with the demands of the Brotherhood of Railway Trainmen and the Switchmen's Union of North America, many members of which recently went on an unauthorized strike, principally because of slowness in the consideration of demands for wage increases. The testimony given by Mr. Whiter expressed the railroad's reaction to the demands of the regular brotherhoods, presented to the United States Railroad Administration last year, and which are to a large extent similar to the wage demands recently developed by the "outlaw" switchmen, switchtenders and other yard employees.

In regard to yard service in general, Mr. Whiter, suggested to the Board, first, that the differential in rates of pay for day and night service for yard employees, in effect from 1910 until the issuance of Supplement 16 to General Order 27 by the Railroad Administration, be re-established. Regarding this subject Mr. Whiter said:

"On account of Supplement 16 destroying this day and night differential, and the application of seniority rules, the older and more experienced employees are claiming the daylight work, making it necessary to have the night service performed by junior and less experienced employees regardless of the character and responsibility of the work to be performed. It is felt that this has been a serious obstacle to efficient service and it is believed that if a proper differential were provided for ground crews during the night hours, it would enable the railroads to obtain the services of the more experienced and better qualified employees for night service.

"In considering the situation with reference to the yard men," Mr. Whiter continued, "we are confronted with the fact that since January 1, 1919, uniform rates have been paid throughout the United States in all yards on railroads under federal control east of the Rocky Mountains. We fell that it must be recognized that in the larger centers where the employees feel to a greater extent the effects of the cost of living; the rates paid by outside industries (notwithstanding there may be no similarity whatever in the service performed) and the fact that they have in all previous years received higher rates of pay than similar employees in the smaller centers, has made the solution of the question most difficult. We feel that there is no justification for granting the same amount of increase in all yards throughout the United States, and if the board can see its way clear to re-establish the classification of yards so that the difference in the character of work at big centers and outlying points is recognized, and to re-establish the differentials between day and night service, it will very materially simplify their problem and enable them to more nearly give weight to the elements described in Section 307 of the Transportation Act of 1920, and also materially contribute to the encouragement of the employees in the larger centers and correspondingly contribute to the efficiency of operation."

Regarding the rates of switchtenders, many of whom participated in the recent unauthorized walkout, Mr. Whiter expressed the view that inasmuch as they have already receiced increases far in excess of other classes of train or yard service employees and considering the character of work performed and the further fact that the positions are being filled by men incapacitated for other duties, they have already received very liberal treatment.

The right of the two organizations presenting these demands to represent yardmasters and assistant yardmasters was questioned by Mr. Whiter who cited the Transportation Act and rulings of the Interstate Commerce Commission to the effect that these workers are subordinate officials and

therefore are not in a position to be represented by a labor organization.

Other demands made on the part of the transportation employees in yard service were successively discussed, in many cases Mr. Whiter's testimony being similar to that given in the discussion of similar articles for employees in freight service. The application of the employees in yard service for time and one-half the daily mileage rate for Sunday and holiday work was opposed by Mr. Whiter on the grounds that, because of fact that transportation service must be conducted on Sundays, the effect of any provision for punitive rates for work performed on Sundays or holidays could not in the nature of things be considered otherwise than as an increase in pay.

Conductors' Demands

In replying to the demands made by the Order of Railway Conductors, Mr. Whiter opened his testimony by questioning the assumption made by President L. E. Sheppard of the brotherhood to the effect that contracts and agreements made during the period of federal control are legally inherited by the railroads.

Time and one-half for overtime in road freight service was also opposed by Mr. Whiter, who quoted Director General Walker D. Hines' memorandum of November 15, 1919, stating that the contentions of employees in supporting such a basis of pay as a punitive measure were not well founded, but that they were granted to afford the men in freight service over eight hours an opportunity to increase their earning capacity.

Numerous tables showing the wages earned by various train service employees, as indicated by actual cases, and other statistics relating to the wages paid transportation employees as compared with the wages paid conductors were presented by Mr. Whiter, who said in explanation:

"The conductors have requested that the rates established under Supplement 16 be maintained on a percentage basis, namely, passenger brakemen and flagmen, 66 2/3 per cent; through freight brakemen, 76½ per cent, and local freight brakemen, 75 2/3 per cent of the conductors' rate in each of the classes mentioned.

"The board will notice that the organizations in considering the relation between the conductors' and brakemen's pay referred to the percentage of the brakemen's rate to the conductors' rate. We feel that if rates are to be established on a percentage basis it will be necessary to first fix the conductors' rate and then calculate the brakemen's rate, but in practically all cases the effect has been to maintain the same money differential between the two rates rather than the percentage, for the reason that it will be apparent that if the rate is fixed for the lower class of employees first and then an attempt is made to preserve the same percentage relationship between the two it will seriously disturb the existing money differential. On the other hand, if the rate is first fixed for the higher class of employees and the differential deducted therefrom it may have the effect of giving the lower paid employees a greater proportion of the rate of the higher paid employees than exists today and greater than has existed at any time during the years of schedule negotiations.

"We feel that as the board studies the rates of pay and wages of the diverse classes of railroad employees," he continued, "they will be impressed with the wide range of rates of pay and also the wide range of the occupations. To attempt to adjust all the different rates of pay on a percentage basis would result in the higher rated classes of service receiving money increases far in excess of the lower paid classes of employees. It is argued before your board that the cost of living has increased 97 per cent since 1914.

"If an employee receiving $200 per month were to receive a 97 per cent increase in his wages it would result in adding $194 per month thereto and making his pay $394, while an employee receiving $100 per month would receive $97, or $197. During all the various hearings concerning wages of railroad employees, starting with the Lane Commission, and during the subsequent consideration by the United States Railroad Administration, it has been the contention that the lower paid employees were entitled to more consideration than the higher paid employees, and that treating the situation on a percentage basis would be most satisfactory and would result in giving the employees who are best able to stand increases in the cost of living advantages over the employees who were less able to do so, and that it was only proper to deal with money increases if fairness and reasonableness were to prevail.

"The suggestion has already been made that the Board should ignore the cost of any award and that the rates of pay should be established regardless of cost. In discussing this suggestion, Mr. Whiter said, 'we feel that the law itself covers this situation better than any statistics that could be made.'

"The following provision appears in Section 307-(B):

"'The Labor Board may upon its own motion, within ten days after the decision, in accordance with the provisions of Section 301, of any dispute with respect to wages or salaries of employees or subordinate officials of carriers, suspend the operation of such decision if the Labor Board is of the opinion that the decision involves such an increase in wages or salaries as will be likely to necessitate a substantial readjustment of the rates of any carrier.'

"We feel that with this specific reference to the authority of the board to review and set aside agreements that may be reached under the provisions of Section 301 when a proposition of the magnitude of the present demands is under consideration—there can be no question that the section referred to clearly contemplates that the cost must be taken into consideration by the board before a decision can be reached."

Locomotive Firemen

In presenting the railroads' reply to the demands of locomotive firemen Mr. Whiter repeatedly called attention to the disparities between the proposals of the firemen and other train service employees. In so doing he pointed out that if the firemen's demands were to be granted they would be, in many cases, earning more money for the same mileage and hours of work than many of the other employees on the same train whose responsibilities are greater.

As in the cases of the requests made by the trainmen and conductors, Mr. Whiter opposed the payment of punitive overtime for Sunday work. In addition he presented testimony against proposals made by the firemen for the elimination of the wage differential between the rates of firemen on locomotives using coal and oil as fuel and also between helpers on electric locomotives and firemen on steam locomotives. Exhibits were submitted showing the relative conditions of those services, the hazards involved, etc.

In regard to the whole subject of wage increases for firemen, Mr. Whiter submitted statistics showing the actual work performed and compensation earned by firemen in passenger service on representative railroads during a stated time during the period of federal control as compared with the compensation which would be received if the men's proposals were to be granted. In this connection Mr. Whiter said:

"It will be noted that the present monthly earnings for the assignments covered by this exhibit range from $137.10 to $297.00, the prevent average hourly earnings from 78.2 cents to $1.513.

"From these exhibits it will be noted that the minimum monthly earnings under the proposed rates and conditions would be $208.00; the maximum, $495.04; the minimum increase, $70.90; the maximum increase, $217.92; the minimum percentage of increase, 38.17; the maximum, 94.03;

the average hourly earnings under the proposition ranging from $1.081 to $2.385."

Many of the proposals made by the firemen were opposed by Mr. Whiter on the ground that they covered conditions which were not similar throughout the country and would therefore lead to discrimination and disagreements between the men and between the men and the managements.

Clerical and Station Employees

Demands of clerical and station employees for increases in compensation were discussed on May 24 by Mr. Whiter, who after reviewing the various awards which have been made to this class of employees during the period of federal control, showed that the classes of employees covered by the presentation of the Brotherhood of Railroad and Steamship Clerks, Freight Handlers, Express and Station Employees have received, over the 1915 hourly rates, increases of from 74 per cent to 130 per cent, and over the 1917 hourly rates, increases of 47 per cent to 60 per cent. "The rates proposed by the employees," he said, "would involve increases over the 1915 hourly rates of from 142 per cent to 238 per cent hourly rates of from 39 per cent to 62 per cent."

In regard to a basic wage for junior clerks, Mr. Whiter said:

"Fully 50 per cent of the total clerks employed, both male and female, are what might be termed junior clerks, a great number of whose ages range from 18 to 23 years. Supplement to general order 27 7 placed a minimum rate of $87.50 per month on all clerical positions irrespective of age or experience, and to apply the requested increase (204 x 20c = $40.80) upon the present minimum would establish a new minimum of about $128.30 per month. We believe it will be found in outside industries and in business which generally recruits this class from the public schools and business colleges, that the present minimum for a clerk is below the rate established by Supplement 7, and to concede that this minimum be increased to $128.00 per month is not justified."

Regarding the wages of clerks above the junior grade, Mr. Whiter continued:

"We recognize that clerical forces above the junior clerk merit consideration, but we respectfully call attention to the danger of attempting to level up as between individual positions. Merit, ability, responsblty and years of service have been the factors underlying the successful office organization of railroads as well as other business interests. It is from this class of employees that the office heads must be drawn and to inject and plan whereby these factors are eliminated spells lack of effort and initiative and places the clerical situation at a serious disadvantage."

Many of the demands of the men, such as the establishment of certain differentials, two weeks' vacation with pay, were opposed by Mr. Whiter, on the ground that they were conditions which were local and should therefore be adjusted by the individual men and railroads involved.

Throughout his testimony Mr. Whiter brought out the fact that railroad clerical work so differs by departments, by location and by railroads that clerical workers must necessarily be treated upon individual merit and ability, the character of the position held and other similar factors rather than as a class.

Replies to the demands of members of the Brotherhood of Railroad Signalmen and to maintenance of way employees were presented to the Railroad Labor Board on May 25 by Mr. Whiter. The former organization has proposed, *first*, an increase in the hourly rates of pay for positions named in the agreement entered into with their organization by the Director General of Railroads, effective on February 1, 1920, and, *second*, to establish hourly rates for positions which were not included in said agreement; namely, signal inspectors, general foremen and signal foremen whose present monthly rates were determined during federal control by the federal managers of the individual railroads and approved by the regional directors.

The second demand of the organization was dismissed by Mr. Whiter by citing clauses of the Transportation Act and rulings of the Interstate Commerce Commission relative to "subordinate officials," in which class the employees in question are placed. In this connection Mr. Whiter said:

"It is realized that the compensation of those in charge of other employees should carry a proper differential above the earnings of those whom they employ and whose work they supervise. Efficient operation and the maintenance of proper discipline demand that those vested with authority to employ, discipline or dismiss subordinates shall not be represented by the organization which also represents the employees reporting to them.

"The supervisory duties of signal inspectors, general foremen and signal foremen make it impossible to assign regular hours of service, as a considerable portion of their time is spent on trains and their hours of service are generally as variable as those of a trainmaster, supervisor of signals, supervisor of track and other supervisory officials which require adjustment of hours to meet the requirements of the service. This manifestly makes it necessary to pay these employees a monthly salary to cover all service performed, and it would be inconsistent to pay them on any other basis."

Mr. Whiter then discussed the wages to be paid other signal employees, summarizing his views on the entire matter as follows:

"First: The order of the Interstate Commerce Commission dated March 23, 1920, defines 'subordinate official,' and we submit that it eliminates possibility of action on the part of the board in connection with that portion of the brotherhood's request referring to signal inspectors, general foremen and signal foremen.

"Second: We agree that the two basic rates now paid signalmen and signal maintainers are not justified.

"Third: The statement of the brotherhood in support of their request for increases amounting to from 18 to 22 per cent above the rates established during federal control, 'effective on January 1, 1919, and to be augmented to the extent that the cost of living has increased since January 1, 1919,' does not justify the requested increases in rates, and they have submitted no facts to support either (a) making the request retroactive to January 1, 1919, or (b) the granting of a further increase to the extent that the cost of living has increased since January 1, 1919. The adoption of a standard wage scale for any branch of railroad service or for any class of employees in any industry, without regard to the particular qualifications of the employees and without giving due consideration to the class of work to be performed and the local living costs and conditions surrounding the employment, cannot be justified and is ecenomically unsound.

"It is our conclusion, therefore, that certain positions in the signal department justify the payment of a rate in excess of the minimum basic rate, and further, that such differentials can be fairly established for individual positions only after the managing officers of individual railroads have had an opportunity to fully consider the facts in each case. This applies equally to all of the positions which have been under discussion, namely, signal maintainers and signalmen, assistant signal maintainers and assistant signalmen, gang foremen, leading maintainers, leading signalmen and helpers.

"Fourth: The request as submtited to your board by President Holt of the brotherhood reads: 'These rates of pay to be incorporated in the National Agreement negotiated by the Brotherhood of Railroad Signalmen of America effective February 1, 1920.'

"The agreement to which they refer reads in part as follows: 'These rules and agreements shall remain in full force

and effect during federal operation unless superseded or amended as herein provided.'

"The question of incorporating any new rates of pay or other requests in the so-called National Agreements is one which we believe is not properly before the board at this time, and is not properly a part of the wage questions now under consideration. We respectfully submit that this question is one of importance separate and distinct from the question of wages, and if it comes to the board in accordance with the provisions of the Transportation Act it should be handled separately in order that due consideration may be given to all its many details and that the railroads should then be given proper opportunity for the presentation of their views."

Demands of maintenance of way employees were next considered by Mr. Whiter, who reviewed the increases in compensation which have been granted to employees in this phase of railway work. The request of the maintenance of way employees' representatives is for the establishment of uniform rates. In their presentation they grouped the employees in sub-departments of the general maintenance of way department, i. e., the bridge and building department, the track department, and laborers in the shops. Each of these groups was treated successively by Mr. Whiter.

Owing to the fact that there are no available statistics as to the average rates of pay for men in similar work in outside industries, Mr. Whiter did not attempt to present comparative figures of the increases which have been granted this class of employees and of the cost of living. However, Mr. Whiter did point out certain differences in the character of the work performed by maintenance of way employees and other railway employees and suggested that these differences be taken into consideration.

Regarding the wage of the track laborer or trackman, Mr. Whiter said:

"The track laborer or trackman's rate is generally regarded as the basic rate for the entire wage scale in the track sub-department. It is true that the rate paid to track and other unskilled labor, generally, has been somewhat lower than the rates paid to laborers in industrial plants, by contractors and by farmers, but this has not been on account of any desire to pay railroad employees less, but, because no matter what rate is paid, it will, in a short time, become the low rate, as the manufacturer, the contractor and the farmer offer higher rates to secure the laborers they must have. This is not a theory but a concrete fact and a condition developed many times. After General Order 27 was made effective, it was found that the increased rates provided did not continue to attract a sufficient number of laborers to the railroads; then the rate was again increased, but in the course of events the raising of rates by the manufacturers, the contractors, etc., again made inroads upon the ranks of the railroads forces; then Interpretation 1 to Supplement 8 was promulgated, which further increased the hourly rates. The action now taken by a great many of the railroads, to work 10 hours per day, paying time and one-half for the ninth and tenth hours equalling 11 hours pay for 10 hours work is necessary, because 10 hours work a day is required to get sufficient work done to properly maintain the tracks.

"The only time the railroad laborer is not the lower paid is immediately after a raise of pay by the railroad and before the other employers have readjusted their rates, or during the time of industrial depression, when there is a surplus of labor. No increase in rate for trackmen that the railroads could give will ever change the fundamental condition created by other industries bidding competitively for this class of labor.

"Notwithstanding the fact that the average hourly rate for trackmen has been increased over 100 per cent since 1915, the rates paid by other employers are today higher in some localities than that paid by the railroads. Hence the only question that can enter into the determination of a trackman's rate is—is it a just and reasonable wage for men engaged in this service?

Mr. Whiter then launched into a discussion of the reasons why the requests of the men for the elimination of 10 hours' work per day and the substitution therefor of two shifts of eight hours each, or that the number of section gangs be increased during the working season, are impracticable. He said, "First, there is not sufficient daylight to allow of two eight-hour shifts being worked; the starting hour for the forces, as requested by the organization for the first shift, must be before 7:00 a. m., and this would extend the working period of the second shift to 11:00 p. m. Either plan would require the training and employment of double the number of foremen and assistant foremen. Second, to increase the number of gangs would require an increase in the number of shovels, motor or hand cars, push trucks, outfit cars, labor camps and all other machines appliances and facilities for track work. Either plan would require double the number of track laborers. As a matter of fact, the railroads during the working season now employ all of the laborers available, except at certain points where on account of local conditions the number of laborers available is above normal. Where there are more men than required at any particular point they endeavor to get such men to go to the places where they are needed and also frequently organize them into additional gangs, putting on work trains to carry them to and from the places of work, often many miles away.

"Despite all efforts, it is impossible to get enough men to fill up the present number of gangs or to organize a sufficient number of extra gangs to get the work done and not work the forces more than eight hours per day. It is the judgment of our committee, until a condition in this country obtains when there is a sufficient supply of labor to enable the employment of more men, it will continue to be necessary for track forces to work 10 hours per day during the working season, in order to properly and safely maintain the railroads."

Mr. Whiter closed his testimony at this session by discussing the demands made by the shop laborers. In so doing, he opposed the request of the men for a retroactive award, for time and one-half for Sunday and holiday work, and for a guaranteed minimum of eight hours when required to report for duty on any assigned work day.

In closing the presentation of the railroads reply Mr. Whiter on Wednesday dealt with the requests of the stationary firemen and oilers, the master mates and pilots, and members of the shop crafts.

In considering the demands of the stationary firemen and oilers he said: "No accurate data has been compiled to show the different rates which are now paid in the United States, nor what increases have been given to these rates since 1913, 1914 and 1915 (dates on which comparison with increased living cost data are based), nor what increases have been made in rates for similar positions in comparable industries. Without such data it is impracticable to measure with reasonable accuracy, by comparison with increased living cost or increased wages in comparable industries, the justice of either the increases that have been made or that are requested."

Time and one-half for Sunday and holiday work and the establishment of a uniform rate of pay for work which varies throughout the country was again opposed.

In regard to requests made by the national organization of the master, mates and pilots for an extension of the San Francisco rates as a minimum at all other ports, Mr. Whiter first called attention to the dissimilarity between the services rendered by these employees and other employees more closely connected with railroad operation and maintenance and between ports. In this connection he said "Section 300

of the Transportation Act defines the term 'carrier' as 'any carrier by railroad,' with certain exceptions. It would appear to be necessary to determine whether or not any or all classes of employees on floating equipment owned and operated by railroads or operated as part of the railroad system, or in which railroads are interested only through stock ownership, come within the provisions of Section 300, as they are not specifically mentioned and would seem to be excused by definition of word 'carrier.'

"We believe that, where service is so sufficiently connected with railroad service, working conditions of railroad service can be adopted without placing unjust or unreasonable expense for the time during which no adequate service is rendered, marine working conditions should be withdrawn. Where service is more particularly marine service, workng conditions of marine service only should apply." Mr. Whiter then began the railroads' reply to the presentation made by the railway employees' department of the American Federation of Labor presenting testimony as to increases the shop men have already received and increases proposed, showing in general that employees in this class have already received increases over 1915 rates, ranging from 66 per cent for molders to 152 per cent for regular apprentices. The proposed increases range from 102 per cent to 251 per cent over 1915 rates, an average increase of 103 per cent over 1915.

"This shows that these employees have received increases comparing favorably with the increased cost of living, and they also compare favorably with those granted other classes of railroad employees," Mr. Whiter added.

Establishment of uniform rates for all shops, regardless of location and other factors affecting cost of living, was opposed by the railroads. The suggestion was made to provide a plan for the payment in railroad shops of rates which take into consideration prevailing rates in the surrounding territory for same class of work.

After discussing the hazards as affecting wages, training and skill requred, degree of responsibility, regularity of employment and inequalities, Mr. Whiter closed the railroads presentation by saying in part:

"It has been our endeavor to concisely present to the board the present rates, bases upon which they were devised and rules for their application, to illustrate the application of the present proposals to existing relations as between classes of emloyees and to conditions nnder which service is performed. We feel this cannot properly be considered as opposing just and reasonable rates. As stated at the outset of the presentation, we are not opposing fair increases in existing rates of wages where increases are shown to be justified, as stated at the beginning of our presentation; we believe that in return for fair wage every employee or organization of employees should feel obligated to give efficient and ungrudging service. It is our thought that this issue is one of wage adjustment and only such rules as will be directly affected by such adjustments should be considered at this time.

"We have endeavored to show, as far as time permitted, the punitive results of many of the proposals. Railroads are hemmed in with rules, which originally were destined to correct improper conditions, but, through their continuance and rigid application under changed conditions, have no other effect than to increase payments by means other than regular wage rates. It is our request that all increases awarded shall be given in rates and not through punitive rules.

"With reference to the perpetuation of national agreements which the organizations have requested, we desire again to state our position to the board. These national agreements were not a part of the issue when before the President of the United States, nor when, under Section 301 of the Transportation Act, this committee was appointed and met with the organization's representatives to consider this wage matter. If this board should decide to take up the question of national agreements, it would seem appropriate that there first be presented by the employees their arguments in support of the various details and justification for their applying alike on all railroads, and that thereafter a reasonable opportunity be given the railroads to analyze such supporting arguments, and to prepare and submit their replies thereto."

Rebuttal by Employees

Representatives of the employees on Thursday began their rebuttal before the board, W. N. Doak, of the Brotherhood of Railroad Trainmen, answering the presentation made on behalf of the railroads. He began his testimony by disputing the data presented on wages earned by trainmen and by showing that these wages have not been adequate. Mr. Doak cited numerous affidavits from members showing expenditures for stated fifteen-day periods. On such bases the men were shown to be spending far more than they were earning. One exhibit filed as evidence of the cost of living included in a fifteen-day period three pairs of shoes, two dresses and such items as wholesale purchases of groceries, etc. In addition Mr. Doak requested verification of data submitted by the railroads. He outlined the position of trainmen on time and one-half overtime for Sunday and holiday work. The trainmen's proposition is to pay time and one-half daily, hourly or mileage rate with Sunday or holiday overtime paid for at only time and one-half regular rate. Mr. Doak then stated that the elimination of mountain differentials would not be acceptable to the men. He disputed the application of this differential to all gradients of one and one-eighth per cent.

The feature of Mr. Doak's testimony was the strenuous opposition displayed to yard classification as a basis of pay. In so doing he made the statement that the cost of living in many small centers is larger than in larger centers and cited Bridgeport, Conn., as an example as compared with Chicago, Boston and New York. In addition he maintained that it was worth as much to switch cars in a smaller center as in large ones.

After opposing the establishment of a differential between day and night for yard workers, and defending his right to speak for subordinate officials such as yardmasters he closed the rebuttal with a plea for immediate consideration of the men's demands, saying "we have recently seen a demonstration of a protest in which hundreds and thousands of men have left the service to engage in other industries and the spirit of restlessness the like of which has never been seen in any industry, now prevails in the transportation industry. This has been brought about by long delays and waiting. The buck has been passed so long that the men say, 'what's the use?' and search elsewhere for employment. The demands of the men were filed one year ago. Since that time the cost of living has increased 15 to 20 per cent. We have had to discipline thousands of men to maintain our contracts and the board should now make the necessary adjustments regardless of cost to carriers and as soon as possible. Although we were not favorable to the transportation act, now that it is the law of the land we will try to observe it both in letter and in spirit."

The Pennsylvania Railroad's Women's Division of War Relief, department No. 3, has founded a $5,000 scholarship at the University of Pennsylvania. It was given in memory of three young men who gave their lives in the great war, Arthur Dutton, Robert Gamble and Ernest Stine. The scholarships are to be given with the stipulation that the student shall be a son or daughter of a present or deceased employee of the freight traffic department of the Pennsylvania system, or a son or daughter of a member of department No. 3, Pennsylvania Railroad Women's Division for War Relief.

A Loan of $125,000,000 for Equipment

The Interstate Commerce Commission on May 21 announced its tentative decision to accept in part the recommendation of the special committee of the Association of Railway Executives which has been considering the plan for apportioning and disbursing the revolving fund of $300,000,000 provided for in the transportation act, to the extent that, as at present advised, it will recommend the loaning of at least $125,000,000 out of the fund for the purchase of engines and cars.

The commission says that the minimum needs are 2,000 locomotives and 100,000 freight cars, including 20,000 refrigerator cars. Some of this equipment is already being constructed or has been contracted for, but $125,000,000 is probably less than 25 per cent of the cost of the remainder, which has not been ordered. It is evident that the equipment required "properly to meet the transportation needs of the public" cannot be secured unless the carriers, with the aid of the 25 per cent to be advanced by the government, themselves assume the burden of financing the remaining 75 per cent.

The commission had hoped that the carriers by co-operative action, as suggested in its circular letter of April 28, would submit a definite and agreed plan for the distribution of the entire fund, but this apparently has proved impracticable. The committee of the Association of Railway Executives, in addition to the apportionments for the several purposes, has recommended "that the commission offer to each company having indicated a desire to purchase equipment, its percentage of the $125,000,000, being that percentage which the standard return of the company bears to the total standard return of all the railroads." The National Association of Owners of Railroad Securities opposes this plan. The applications of some of the carriers are too indefinite to afford a basis for intelligent determination, and a number have failed to make applications in the form or to give the information required by the commission's order of April 23. Few applicants seem to appreciate the necessity that the carriers assume a part of the burden.

Division 4 of the commission will accordingly set down for hearing on May 29, at Washington, the matter of applications for loans under section 210, and urges carriers to file their applications on or before that date. It is especially important that the applications should state accurately and in detail the transportation needs which respondent would be unable to meet if the requested loan were not granted, and what security is offered and what is the prospective earning power of the applicant. In regard to cars, the application should state the kinds and numbers of units and the cost per unit of each kind, and whether or not the cars desired are suitable for interchange. If the loan is desired for other additions and betterments it should be clearly stated wherein the expenditures proposed will expedite car movement or "meet the transportation needs of the public."

The commission will not follow any arbitrary methods of allocation but will endeavor to apportion the fund in a manner which will most nearly meet the needs of the country. As at present advised, the commission announces tentatively the following principles according to which it appears the distribution of the fund should be effected:

(a) The apportionment recommended by the committee should be roughly followed, but the amount assigned to meet maturities may have to be relatively increased.

(b) One of the most immediate needs is for refrigerator cars for the movement of perishable foodstuffs.

(c) Other very pressing needs are for other freight-train cars and for locomotives.

(d) The fund should be distributed in such way as to effect the largest possible contributions from the carriers to meet the sums advanced by the United States.

(e) The $125,000,000 for equipment might best be disbursed through a national equipment corporation, in which the carriers would take stock for 25 per cent of the cost of the equipment, the United States advancing the cash for the stock up to $125,000,000 and the remaining 75 per cent being financed through a car trust. Provision would have to be made for adequate per diem or rental with such an arrangement.

(f) In the event such equipment corporation cannot be organized, then the fund should be distributed to those carriers who individually can meet the government's advances with large proportional amounts financed by themselves.

(g) Loans should not be granted for additions and betterments (roadway) unless it can be clearly demonstrated that these improvements will facilitate materially the movement of equipment.

The two subjects to be considered at the hearing are:

1. In what way should the fund of $300,000,000, or that part remaining over and above the amounts required to pay judgments, decrees and awards, be distributed in order to best enable the carriers "properly to meet the transportation needs of the public?

2. In what way should the fund be distributed in order to best insure that the earning power of the recipients and the character and value of the securities offered are such as to furnish reasonable assurance of the applicants' abilities to repay the loans within the time fixed and to meet their other obligations in connection therewith, while realizing the purpose of properly serving the public?

While the commission hopes, as the result of the hearing, to arrive at a comprehensive plan for making its recommendations with respect to loans out of the fund, it will, nevertheless, either before or after the hearing, if in its judgment the public good so requires, receive, consider and make recommendations for loans upon applications independently presented. But this reservation will not ordinarily be construed in favor of applicants failing promptly to reply in due form to the commission's order of April 23.

The plan for giving the railroads about $300,000,000 additional of the rental which the Railroad Administration owes them, by Senator Cummins' amendment to the transportation act providing that the entire $765,000,000 owed by the railroads to the government for capital improvements made during federal control might be funded for 10 years, was abandoned by a sub-committee of the Senate committee on interstate commerce, of which Senator Kellogg is chairman. It is proposed to go ahead and pass that part of Senator Cummins' amendment which applies to Section 210 of the act, increasing the maturity of the $300,000,000 loan fund from 5 to 15 years and putting the discretion as to security in the Interstate Commerce Commission instead of the Secretary of the Treasury, but the proposed amendment to the funding provisions in Section 207 will be omitted because Director General Hines has explained to the committee in a letter to Senator Kellogg, that to pay the railroads the additional amount of their rental in cash, instead of offsetting it against the capital expenditures, would require an immediate appropriation of $350,000,000 for the Railroad Administration. It had been the impression of the committee that the appropriation for the Railroad Administration would not be needed so soon, and after a conference with Representatives Esch and Good it was decided that an appropriation could not be put through at this time.

The Cummins amendment had been made a rider to the sundry civil appropriation bill which was reported to the Senate on May 21.

May Day Strikes in England and France

By Robert E. Thayer

European Editor of the *Railway Age*.

London, May 6.

May first, or "May Day," in Europe is the occasion for all sorts of labor demonstrations, and this year was no exception to the rule. Extravagant promises were made by the labor extremists in both France and England as to what would be done on that day, but fortunately nothing very serious came of those promises. The disturbances are, however, worthy of comment in that they give a fairly good insight into the labor situation.

Situation in England

The situation in England was by far the least disturbing. The railwaymen, as has been previously recorded, are seeking material advances in wages at the present time. Regardless of the fact that organized wage boards, approved by the accredited leaders of the railwaymen's unions, have been established to handle all such matters, certain extremists in the local unions attempted to organize a demonstration for a May Day strike in order to emphasize these claims. Their program was to have the men "work to rule," which is in the nature of a "stay-in" strike. The idea of a "work-to-rule" strike is for the men to work strictly in accordance with the literal wording of the rules rather than in a liberal interpretation of the rules. The nature of the rules is such that by doing this the operation of the trains would be greatly interrupted. The platform on which these extremists based their "work-to-rule" compaign was: first, the abolition of the sliding scale for the adjustment of wages according to the cost of living; second, the revision of the classification of grades under the agreement, and third, the granting to railwaymen a sixteen-shillings-a-day minimum wage, which is about to be given to the dockers.

All branches of the union were circularized and asked to support this program, in spite of the fact that the official heads of the unions had the matter well in hand and were working to their contract by presenting this matter through the wage boards referred to above.

Considerable publicity was given to the matter in the press and May Day arrived. The action of the Labor extremists had been severely condemned in advance by the official unions and the final result showed that conservative counsels had the desired effect. The only disturbance worthy of mention was that the men in the freight yards of the Great Western railway in London adopted a "go-slow" policy which occasioned some delay. Passenger traffic was interfered with in no way. In commenting upon the action of these extremists, J. H. Thomas, the secretary of the National Union of Railwaymen, said, in his address to railwaymen on May 2: "The working classes will be the first to suffer from the adoption of such a policy. Good, swift and efficient transport at this moment is more essential than ever. Did those who advocated such a policy realize that it was one further method of increasing the cost of living?" The result of this demonstration reflects a very sane attitude on the part of the majority of the railwaymen in England.

Situation in France

The situation in France was not nearly as favorable as that in England. Substantially the same plans were adopted for the May Day demonstration but in this case a direct strike was ordered and considerable numbers of railwaymen responded to the call of the extremists. In that country it appears that the railwaymen themselves have not been as careful as they should be in electing their representatives to the main union body. For example, at the railwaymen's Congress, which was held in Paris the latter part of April, it was shown that the extremist delegates were in the majority as indicated by their victory on a strike vote which was won by a majority of over 73,000 votes. This infused great confidence and extensive plans were developed for a May Day strike to last for an unlimited period. There is a total of 432,000 railwaymen in France of which 139,000 are non-union men. By sheer force of votes the extremists overruled the better judgment of the General Federation of Labor and succeeds in securing its sympathy and effective support.

The circulars put out ordering the strike presented as the program of the railway unions, immediate nationalization of railways, the reinstatement of dismissed men, the withdrawal of the prosecution of the militants in connection with the recent strike and respect for union rights. The conditions in France are such that such a program presented a very weak argument for a universal strike.

May Day came and with it a far greater demonstration than was experienced in England. The reports for the first day show that out of 45,000 railwaymen in Paris there were 13,500 on strike. In the rest of the country there was not as large a percentage of strikers as in Paris and train services were not severely affected. Provisions were made by the various companies for emergency forces. On the Paris, Lyon & Mediterranean 500 engineer students were held in reserve but of these only 200 were required. The Paris-Orleans had 400 students on hand to act as volunteers. The shops of the Paris, Lyon & Mediterranean suffered to a greater extent than any other part of the road. At three of its largest plants fully 50 per cent of the men responded to the strike call. This is accounted for by the fact that the February strike centered on the discharge of a P. L. M. shopman.

In accordance with its pledge of sympathy and support the General Federation of Labor, seeing that the progress of the strikers on the railways was slow, ordered on May 3, a strike of the seamen, dockers and miners. The program of action accompanying the order for this strike consisted of:

The constitution of a national economic committee to reorganize production; the constitution of an international consortium for the distribution of raw material; and the constitution of an international fleet to regulate freights.
Control of imports.
Reorganization of rail transport.
International allotment of war burdens.
The economic entente of all peoples on a basis of co-operation.
The cessation of Colonial expeditions and disarmament.

A casual perusal of these demands is sufficient to show the absurd grounds upon which the call for the strike was based and one wonders how such a demand could even interest or be understood by the rank and file of the ordinary labor men. The strike of the seamen and dockers was far more successful than the railway strike due probably to the class of men in that particular service. It did not, as was hoped, strengthen the railway strikers, for the latest reports show that the railwaymen's strike has practically died out and that the situation is rapidly improving on the various systems. The Government has taken a quite decided stand. The extremists' leaders are either in hiding or in jail. Over 100 dismissals were made, which included five labor leaders.

While of course strikes of such a nature are to be greatly regretted it would seem that the recent demonstrations both in France and England have clarified the atmosphere somewhat. It shows quite decidedly that the bulk of the working classes are ready and anxious to do their part in the nations' reconstruction. It was a test of strength between the extremists and the broader minded and more intelligent union leaders. The results have shown that the laboring men are beginning to realize that the policy of the extremists is not to their best interests.

General News Department

Violation of the law requiring that livestock in transportation must be fed and watered at least every 28 hours is the basis of 14 separate suits which were filed recently in the United States District Court by livestock producers against the Chicago, Rock Island & Pacific.

The sundry civil bill, containing an amendment to the transportation act increasing to fifteen years the maturity of revolving funds for loans to railroads, was passed by the Senate on Wednesday. The bill also appropriates $450,000 for expenses of the Railroad Labor Board.

Three months in jail was the sentence imposed at Harrisburg, Pa., on April 24, on eight men who pleaded guilty to charges of theft of merchandise from the American Railway Express Company. The men appear to have been employees of the company, employed on trains.

The Interstate Express is a new, fast, daylight passenger train which has been put in service by the New York Central, between Buffalo and Chicago. The train leaves Buffalo at 8.30 a. m., arriving in Chicago at 7.30 p. m. The corresponding eastbound train leaves Chicago at 8.25 a. m., and arrives at Buffalo at 9.25 p. m.

The Committee of Management for the co-ordination of the Grand Trunk Railway with the Canadian National System consists of C. A. Hayes and S. J. Hungerford representing the Government, and president Howard G. Kelley, vice-president Frank Scott and vice-president W. D. Robb representing the Grand Trunk. Mr. Kelley is chairman of the committee.

A flat increase of 8 per cent in the valuation of the railroads in the State of Nebraska has been ordered, according to figures given out by the State Board of Equalization. The valuation has been fixed at $306,746,940, which represents an increase over the total of 1919, of $22,655,485. The Pullman Company is assessed an increase of the same per cent, the valuation of the standard cars increasing from $15,596 to $16,843 and tourist cars from $8,750 to $9,450.

The Daylight Saving Law, of New York, adopted two years ago and, unlike the federal law then adopted, still unrepealed, will remain in force, the Governor of the State having vetoed the bill, passed recently by the Legislature, to repeal it. The argument for repeal was presented on behalf of farmers who are said to find it difficult to keep their help at work for the hours in the afternoon after which other workmen have gone home, and impossible to start an hour earlier, because of atmospheric and other conditions; but the governor says that he is not impressed by this argument. He feels sure that the majority of the people want "Summer Time."

Representatives of foreign countries in the United States are promptly accepting invitations to attend the annual exhibit of the Railway Supply Manufacturers' Association at Atlantic City from June 9 to 18. Among those who have accepted the invitation are: the Belgian Ambassador; the Danish Minister; A. H. Saastamoine, of the Finnish Legation; Mr. Yamaguchi, representative of the Imperial Japanese Government Railways; V. P. Ananieff, acting commercial attaché to the Russian Embassy; Hipolit Gliwic, commercial counselor, and Stanislas Arct, representative of the Ministry of Approvisation, of the Polish Legation; the representative of the Paris, Lyons & Mediterranean Railway, France; and the commercial attaché of the Mexican Embassy.

An extensive strike of clerks on the Central Railroad of Georgia, on May 17, interfered seriously with freight movement for nearly a whole week, the forces being short-handed at Savannah, Macon, Atlanta and some other places. On the 20th the men were notified to return by Monday the 26th or lose their places; and at last accounts the strike appears to have failed. On Saturday, the 22d, it was announced at Macon that all freight would be received, the officers of the road declaring that the strike was broken. Statements by the clerks, printed in the advertising pages of local papers, indicated that the chief reason for the strike was the refusal of officers of the railroad to negotiate with the clerks as desired; but there seems to have been doubt whether the national officers of the clerks approved the strike.

S. Davies Warfield, president of the National Association of Owners of Railroad Securities, has given a statement to the press, commenting on the crisis in transportation conditions and declaring that it can only be met by the establishment of a permanent means for the co-ordination of railroad service, such co-ordination being necessary to the maintenance of private ownership and operation. The proposal of the Interstate Commerce Commission for the organization of a national equipment corporation, he says, should be adopted, and the powers of the corporation extended to other facilities. Such a corporation, in co-operation with the commission, could make better use of the fund to be created from excess earnings than any other agency. The trustees of this corporation should constitute a management non-political in character and the scheme should be operated without profit.

Construction of the three great tunnels through the Continental Divide was approved by the State Railroad Commission of Colorado on May 12, in passing on a petition containing a form of the proposed amendment to the state constitution. The approximate cost of the construction work is figured at $1,100,000 per mile. These three tunnels, which were described in the *Railway Age* of January 30 (page 371), will be bored through James Peak on the Denver & Salt Lake and through Cumbres Pass and Marshall Pass on the Denver & Rio Grande. The approved petition provides for a 50-year bond issue at not more than 5 per cent, and empowers the Railroad Commission to enter into a contract with the railroads for the use of the tunnels at a rate sufficient to provide for the maintenance of the tunnels, for the payment of interest on the bonds and for the establishment of a sinking fund. Power is also given the Commission to proceed with the tunnel project as soon as the approval of the people is granted at an election which will probably be held in November. A committee has been appointed to determine the amount of money needed.

Confirmation of I. C. C. Appointments Held Up

Confirmation of the appointments recently made by President Wilson of Henry Jones Ford, James Duncan and M. W. Potter as members of the Interstate Commerce Commission, is being deferred by the Senate because the committee on interstate commerce, to which they were referred, has indefinitely postponed its consideration of the matter. This is taken to mean that no action will be taken at least before the proposed recess of Congress in June and possibly not until fall.

Senator Poindexter's Anti-Strike Bill

Senator Poindexter on May 20 held a hearing at Washington on his so-called anti-strike bill to give the American Federation of Labor a chance to protest against it. No other member of his sub-committee was present and the attendance was very small. Henry Stirling, legislative representative of the federation, objected that Congress was doing nothing to prevent profiteering but seemed more interested in "trying

to drive the workingman to work" and that it was more concerned about the $12 a day wages received by a plumber than about $125,000 a day received by "one man who does no work at all for it." P. J. McNamara, vice-president of the Brotherhood of Locomotive Firemen & Enginemen, and W. L. McMenimen, representing the Brotherhood of Railroad Trainmen, also entered protests against the bill. Mr. McNamara said the labor provisions of the transportation act are unsatisfactory to labor but that the organizations are willing to give it a fair trial, and he insisted that any proposal for an anti-strike bill such as that introduced by the Senator merely served to increase the unrest among the men and made more difficult the work of the conservative labor leaders in trying to overcome the efforts of the radicals. "Let things alone," he said. "We have got things running fairly smoothly now and as soon as the cost of living comes down the unrest will disappear."

British Railroad Men at Washington

American methods of regulating railroad rates, and particularly the operation of the rate-making provisions of the new transportation act are being studied for the British railways by Major H. L. Thornhill, counsel for the London & North Western, and Geoffrey Marshall, chief goods manager of the Great Northern, who have come to this country on behalf of the British railway executive committee. They have been consulting with members of the Interstate Commerce Commission and railroad officers and have been attending the hearings on the application of the railroads for general advances in freight rates.

Cost of Running a Railroad One Day

The second step in the reclamation campaign which has been instituted on the Chicago, Milwaukee & St. Paul, as noted in the *Railway Age* of March 12 (page 782), has been taken, in the form of a poster showing the daily expenditures on the road for fuel, lumber, etc. According to the poster, which is printed in brilliant red, 36 cents is paid for materials and supplies out of every dollar received by the company. It is also stated that every 24 hours the road spends:

$45,800 for fuel for locomotives.	$1,620 for station supplies;.
13,700 for lumber and timber.	1,510 for shop machinery and tools.
10,200 for engine house expense.	1,320 for lubricants and supplies for locomotives.
8,660 for train supplies.	300 for electric light bulbs.
8,400 for ties.	
1,750 for stationery and printing.	

The committee asks for the co-operation of the employees to increase efficiency, save material and prevent waste in order to reduce the costs noted in the above items.

Exhibits at the Fuel Association Convention

During the convention of the International Railway Fuel Association held at the Hotel Sherman, Chicago, this week, a large number of locomotive appliances were exhibited. The following is the list of companies and the appliances which were exhibited:

American Arch Company, New York, Security Sectional Arch.—Represented by W. L. Allison, John Neff, R. J. Himmelright, A. W. Clokey, J. T. Anthony, J. L. Nicholson, Minot R. Smith, W. E. Salisbury, F. G. Boomer and Tom Ferguson.

Barco Manufacturing Company, Chicago.—Three-V type metallic connections between engine and tender for air, steam and water; metallic steam heat connections between passenger cars; air reservoir joints, headlight generator joints, automatic smokebox blower fitting, joints for roundhouse blower and blow-off, coach yard and station metallic sets, and joints for expansion. Represented by F. W. Bard, C. L. Mellor and Fred Wilcoxen.

Bird-Archer Company, The, New York.—Harder circulator plate and boiler chemicals. Represented by C. J. McGurn, L. F. Wilson, J. A. McFarland, L. D. Bush, and John L. Callahan.

Boss Nut Company, Chicago.—Lock nuts, machine bolts and rivets. Represented by J. W. Fogg, J. A. McLain and A. MacLain.

Combustion Publishing Company, New York.—Represented by H. Stuart Acheson.

Dearborn Chemical Company, Chicago.—Literature. Represented by J. D. Purcell, L. P. Bowen, I. H. Bowen and O. H. Rehmeyer.

Detroit Lubricator Company, Detroit, Mich.—Lubricaters and flange oiler. Represented by A. G. Machesney.

Double Seal Ring Company, Chicago.—Piston rings. Represented by C. B. Toppan and G. F. Clark.

Edna Brass Manufacturing Company, Cincinnati, O.—Lubricators, injectors, boiler checks and Reflex gages. Represented by H. A. Glenn and D. B. Joseph.

Fairbanks, Morse & Co., Chicago.—Literature on locomotive coal handling and storage plants.

Franklin Railway Supply Company, New York.—Franklin butterfly door, engine and tender trucks, radial buffer and adjustable driving box wedge. Represented by W. H. Coyle, J. L. Randolph, C. W. Floyd Coffin, J. Sinkler, S. D. Rosenfeit, H. M. Evans and John Bacon.

Fuller Engineering Company, Allentown, Pa.—Literature on pulverized coal equipment.

Garlock Packing Company, The, Palmyra, N. Y.—Special packings for general railroad use. Represented by W. G. Cook and C. W. Sullivan.

Hanna Locomotive Stoker Company, Cincinnati, Ohio.—Represented by W. T. Hanna and W. A. Benson.

Hays School of Combustion, Chicago.—Literature. Represented by R. G. Johansen and J. H. Anderson.

Hulson Grate Company, Keokuk, Ia.—Locomotive grate. Represented by A. W. Hulson and J. W. Hulson.

Hunt-Spiller Manufacturing Corporation, Boston, Mass.—Cylinder bushings, cylinder packing, valve packing, piston bull-rings, valve bushings, rod bushings and crosshead shoes. Represented by V. W. Ellet, E. J. Fuller and C. L. Galloway.

The Jeffery Manufacturing Company, Columbus, Ohio—Literature regarding crushers and elevating machinery. Represented by R. W. Stevenson.

Johns-Manville Company, H. W., New York.—Asbestos pipe and boiler insulation, steam traps, monolithic baffle walls, boiler wall coating, refractory cements, packings. Represented by J. C. Younglove, P. C. Jacobs, H. M. Butters, P. R. Austin, F. B. Walker and H. J. Crowe.

Leslie Company, The, Lindhurst, N. J.—Steam heat regulators and removable injector coupling nuts. Represented by S. I. Leslie and J. J. Cizek.

Lewis Draft Appliance Company, Chicago, Ill.—Low pressure drafting device for locomotives.

Represented by D. M. Lewis, G. C. Johnson and J. D. Purcell.

Link Belt Co., Chicago. Steremotograph machine showing views of various Link-Belt installations. Represented by J. C. Nellegar, J. F. Kelly, W. E. Hitchcock, J. S. Holl and C. P. Armstrong.

Locomotive Feedwater Heater Company, New York.—Locomotive feed water heater. Represented by W. L. Allison, E. A. Averill and W. T. Bennison.

Locomotive Firebox Company, Chicago.—Nicholson Thermic syphons. Represented by J. L. Nicholson, J. T. Anthony, L. R. Pyle, C. G. Hawley, C. M. Rogers, W. M. Wilson and Stuart Hawley.

Locomotive Lubricator Company, Chicago.—Force feed lubricator in operation and sectional model. Represented by W. J. Schlacks.

Locomotive Pulverized Fuel Company, New York.

Locomotive Stoker Company, Pittsburgh, Pa.—One-third size working model of duplex locomotive stoker. Represented by D. F. Crawford, W. G. Clark, A. N. Willsie, O. B. Capps, J. J. Byrne, E. F. Milbank, Ira Jordan, Eugene Frouty, R. G. Kelley, E. R. Funk, H. G. Nastin, C. F. Pennypacker, W. T. Capps, F. H. Smith, H. C. Houston, H. C. Cale, H. B. Gardner, C. A. Quallen, A. C. Deverell, Edward Ryan, J. J. Hannahan, W. D. Cook, J. M. Jordan and L. V. Stevens.

Locomotive Superheater Company, New York.—Represented by R. R. Porterfield, George Fogg, B. G. Lynch, R. J. Van Mater, G. E. Ryder, G. L. Bourne, F. A. Schaff, J. E. Mourne, Geo. L. Dolan, H. B. Oatley and W. A. Buckbee.

Manning, Maxwell & Moore, Inc., New York.—Ashcroft gages. Consolidated safety valves, Hancock inspirator equipment. Represented by C. L. Brown.

Nathan Manufacturing Company, New York.—Injectors, lubricators, boiler check, gage cocks, non-lifting coal sprinkler. Represented by Richard Welch, W. R. Walsh and F. C. Davern.

National Railway Devices Company, Chicago.—Shoemaker vertical firedoor. Represented by Jay G. Robinson and A. F. Lind.

Ohio Injector Company, Chicago.—Injectors, non-lifting injectors, lubricators, flange oilers, automatic drifting valves, waterglass protectors, boiler checks and feed hose strainers. Represented by A. C. Beckwith and W. S. Furry.

Okadee Company, The, Chicago.—Blow-off valve, water glass protector, tank hose coupler, blower valve, front end hinge. Represented by A. G. Hollingshead, Harry Vissering, Charles R. Long, Jr., G. S. Turner, W. H. Heckman, Fred Zimmerman and J. M. Monroe.

Pyle-National Company, The, Chicago.—Incandescent electric lighting, turbo-generators, headlight cases and accessories. Represented by George E. Haas, William Miller, J. Will Johnson, C. P. McGinnis and W. T. Brotherton.

Railway Review, Chicago.—Represented by L. H. Lozier, J. M. Lammadee and C. L. Smythe.

Roberts & Schaefer Company, Chicago.—Photographs of locomotive coaling stations, tipple and washer. Represented by C. L. McCoy.

Sellers & Co., Inc., Wm., Philadelphia, Pa.—Injectors, indicators, starting valves, strainers, safety squirts, boiler checks, steel bronze coupling nuts, boiler testers and boiler washers. Represented by P. E. Raymond.

Simmons-Boardman Publishing Company, New York.—*Railway Age* and Railway Mechanical Engineer. Represented by L. B. Sherman, J. M. Rutherford, C. B. Peck, F. H. Thompson, A. R. Jarvis and J. W. Dudley-Roberts.

Standard Stoker Company, New York.—Photos of stokers. Represented by F. P. Roesch and J. A. Carey.

Sunbeam Electric Manufacturing Company, Evansville, Ind.—Turbo generator and headlight accessories. Represented by C. E. Kinnaw and H. A. Varney.

W. S. Tyler Company, The, Cleveland, Ohio.—Draftac spark arrester. Represented by J. H. Jackson and R. T. Massett.

U. S. Metallic Packing Company, Philadelphia, Pa.—Models of single and tandem King type packing. Represented by M. B. Brewster and H. E. Hyslop.

Vissering Company, Harry, Chicago.—Fireproof sanders, metallic piston rod and valve stem packing, steam compression governor and bell ringer. Represented by G. S. Turner, Harry Vissering, Charles D. Long, Jr., W. H. Heckman, F. G. Zimmerman and J. M. Monroe.

Traffic News

The Pennsylvania announces the establishment of through sleeping car service between Philadelphia and Detroit.

The Western Trunk Line Committee announces the appointment of D. A. Lahey, F. G. Banister and J. E. Coffey as the members of the Standing Rate Committee.

The Long Island Railroad, in a circular addressed to the public, announces its intention to apply for authority to make a general advance of 10 per cent in passenger rates, including commutation fares.

Bills of lading issued by the American Railway Express Company will, after July 1, be written in duplicate, the duplicate being retained by the Express Company. Shippers who prepare their own receipts or who have had their own forms have been requested to make provision for supplying duplicates, to be given to the driver or clerk who signs for the shipment.

A bill to limit passenger fares has been passed by the legislature of New York and has been signed by the governor. It aims, it is said, to compel a reduction on the Long Island Railroad. The law requires that "a steam or electric railroad shall not charge rates in excess of the rates charged for similar service in an adjacent state." It is said that the purpose of the framers of the bill is to bring about an equalization between rates on Long Island and rates in New Jersey, the Long Island Railroad being controlled by the Pennsylvania, and both carrying commuters to New York City.

The Traffic Committee of the Illinois Manufacturers' Association and the Executive Committee of the Illinois District Traffic League at a joint meeting on May 19, unanimously adopted recommendations to the Board of Directors of the Illinois Manufacturers' Association, having recently enacted legislation concerning labor, wages and working conditions, declaring that the public should stand behind the law and the carriers until there be a solution along orderly lines. Pending the wage adjustment board's decision the shipping public should render all assistance to carriers in the present emergency through voluntary efforts in moving cars, and in voluntary loading and unloading. "Past experience has demonstrated that general governmental orders given to carriers cannot be so drawn, but that, when literally carried out, great hardship will result. We, therefore, recommend that as few of these be drawn up as possible and that the individual initiative of the carrier's officials should be used to the greatest possible extent. It may be found necessary, in order to re-locate equipment, to have some such orders issued, but they should be confined to the lowest minimum and only used in the most urgent cases. We hope the wartime priorities will not be resorted to, because this is a country of equal rights and equal opportunities, and such orders should only be issued as a last resort to prevent national catastrophe."

Through Truck Service in California

The first application for permission to inaugurate through truck service between Los Angeles, Cal., and San Francisco was filed recently with the Railroad Commission of California. The present truck services out of San Francisco are of a local nature and no attempt has been made to secure long-haul freight. The application which has been presented states that there exists a shortage of cars and a consequent congestion of freight which may take months to remedy and that there is also a considerable dissatisfaction among shippers with the manner in which freight and express is carried by the railroads. The application was filed by the United Motor Freight and Express Line.

Commission and Court News

Interstate Commerce Commission

Payment of Charges for Transportation Across Canadian Border

The Interstate Commerce Commission has issued an amendment to one of its conference rulings providing that where transportation of persons or property or transmission of intelligence by wire or wireless takes place partly within the United States and partly within the Dominion of Canada, the charges of divisions accruing within the United States are payable only in lawful money of the United States, irrespective of the money in which charges accruing in Canada may be payable under the laws there in force. Adjustment should be made in accordance with this ruling by carriers in settling their accounts with connecting carriers, and appropriate regulations may be included by such carriers in their tariffs. The practice, which has grown up since development of the difference in exchange values, of requiring prepayment of charges in cases where not customarily required theretofore, the commission says, tends to embarrass shippers and impede foreign commerce. Carriers subject to the act will be expected to refrain from such unusual requirements in cases where they are not justified by other considerations.

Supervision Practice

The Commission has issued a notice concerning suspension of proposed rates under section 15 as amended. The statutory maximum period of suspension is 120 days beyond the time when the rate would otherwise go into effect. Before filing increased rates the carriers should have considered the action, the reasons underlying it and the effects of it so thoroughly as to be prepared, in case the increases are protested, to immediately present in full their defense. They should also send with each tariff containing increased rates a statement of the increases and the reasons therefor.

Suspension of proposed rates should not be requested unless protestant is sure that he understands the effect of the rates and that his request rests on good grounds. The request should state clearly and concisely the reasons relied upon in support thereof. The one who requests suspension should at the same time advise the carrier that request for suspension has been filed, and give the reasons for that action. The request upon the commission should be accompanied by a statement that the carrier (or agent) naming them has been so advised.

If protestant desires to be heard orally by the Suspension Board, the request for suspension should so state and be filed with the commission at least 15 days prior to the effective date of the tariff.

The commission must have opportunity for full understanding, and therefore the request should be filed as far in advance as is practicable and not less than 10 days before the effective date. It will be the policy of the commission to afford carriers an opportunity to answer or explain allegations or questions raised in a request for suspension, but it is essential that the carriers shall give immediate attention to such matters and forward at once such representations as they desire to have considered. If the request for suspension is not presented within the time above mentioned it may ordinarily be expected that it will not be favorably acted upon. If the carriers neglect to promptly forward the data which they desire to have considered in answer to a request for suspension they may expect that it will be unavailing. It will be the purpose of the commission to avoid so far as possible the suspending of proposed rates except where the date of that action affords opportunity to publish notice of such suspension before the effective date of the proposed rate.

State Commissions

The Public Utilities Commission of Rhode Island received from the New York, New Haven & Hartford an application for authority to make an increase of 30 per cent in freight rates, and to issue new tariffs on one day's notice; the company desiring to make an advance in intrastate rates on the same day that, under the expected action of the Interstate Commerce Commission, interstate rates are advanced. Similar applications, some of them naming 31 per cent and some a less definite percentage, have been received by the State Commissions in other states, indicating a general movement. Reports of this kind come from Illinois, North Carolina and Virginia.

Court News

Prosecution for Car Robbery Not Malicious

Two detectives of a railroad reported a freight car robbery to police headquarters, describing the occurrence, and the officer in charge, acting as a representative of the city police, caused the arrest of a person and his confinement in prison. The subsequent complaint against such person was made by a member of the city police force. The New Jersey Supreme Court holds that prosecution was not instituted against the person by the railroad so as to render it liable to him as for a malicious prosecution.—McLaughlin v. Lehigh Valley (N. J.), 108 Atl. 309.

Title to Land Where Railroad Fails to Complete

The Illinois Supreme Court holds that where a railroad organized under the act for incorporation of railroads did not finish its railroad or commence operation within the ten years prescribed by the act, it had power, during the ten-year period, to purchase title in fee for its railroad right of way, so that its deeds to another railroad, organized for that purpose shortly before the end of the ten-year period, attempting to convey its franchise and also its real estate, while inoperative to locate the contemplated railroad of its successor on the right of way strip, did vest title to the land in such successor.—Gulf Lines Connecting R. v. Golconda Northern (Ill.), 125 N. E. 357.

Damage to Horses—Apportionment

The Texas Court of Civil Appeals holds that if part of injury sustained by a shipment of horses arose solely from their being in a box car, the risk for the use of this being assumed by the shipper, and part solely from the improper condition of the shipping pens, for which the railroad was liable, the damage from each cause should be apportioned, and the shipper given recovery only for the part caused by the condition of the pens.—Gulf, C. & S. F. v. Culwell (Tex.), 216 S. W. 457.

Settlers on Government Land; Railroad's Selection of Lien Lands Is Optional

Settlers going upon unsurveyed government land subsequent to the passage of the Wilson Act, or the Northern Pacific Adjustment Act, cannot, when it later becomes established through government surveys that they have settled upon odd sections to which the road is entitled, compel a selection by the railroad company of lien lands; the government's right of relinquishment being purely optional.—Northern Pac. v. Mueller (Wash.), 185 Pac. 630.

Ejectment Not a Remedy for Unauthorized Use of Land Conveyed for Station

The New York Appellate Division holds that where land is deeded to a railroad on condition that it shall be used "for the purpose of a passenger and freight depot and depot grounds, and for the approaches thereto, and in case . . . the premises shall cease to be used for the purposes aforesaid, then the title thereto shall revert," ejectment does not lie against the railroad on its use of the land for unauthorized erections consisting of storage houses and switches, in addition to a passenger station. Until the premises have ceased to be used for any of the purposes described in the deed there can be no reversion of title.—O'Brien v. New York, N. H. & H., 170 N. Y. Supp. 160.

Commission Cannot Require Steam Road to Issue Bills of Lading Over Electric Roads

The Illinois Supreme Court holds that a fair construction of the entire Illinois Public Utilities Act does not authorize the Public Utilities Commission to require a railroad, such as the Pennsylvania, to give a through bill of lading over an electric line with which it had no through rates or working arrangements, and no physical connection, other than by switching tracks of a terminal railroad association. Such a requirement would mean that steam roads, with a full line of equipment, could be compelled to distribute cars over all kinds of small and irresponsible electric lines with which they had no system of accounting and which produced no trade or traffic. Whether a steam road such as the Pennsylvania could be required to give a through bill of lading to any railroad with which it had direct physical connection was not in the case, and was therefore not decided.—Commission v. Pittsburgh, C. C. & St. L. (Ill.), 125 N. E. 495.

Inefficient Hand Brakes

In an action under the federal Safety Appliance Act for injuries to a brakeman, who alleged that a brake would not "take hold" when he attempted to set it, the New Mexico Supreme Court holds that "defective" is not used as the antonym of "efficient." There are cases which imply that "defective" is synonymous with "inefficient," and the Supreme Court of the United States has used the word "defective" in speaking of a coupler which failed to work (San Antonio v. Wagner, 241 U. S. 476) and of air brakes which failed to function (Spokane v. Campbell, 241 U. S. 503), but in each case the language of the Safety Appliance Act was different, and there was no point made, as here, that a hand brake might be inefficient and not necessarily defective. It therefore holds that a finding that the hand brake rigging was not defective was not equivalent to a finding that the car was equipped with a sufficient hand brake and did not override a general verdict which was necessarily based upon a finding that the hand brake was inefficient.—Thayer v. Denver & Rio Grande (N. Mex.), 185 Pac. 542.

Smooth Rubber Step Not Necessarily Slippery

In an action for injuries to a female passenger it was alleged that she slipped and fell while descending the car steps at her destination because of the failure of the railroad's employees to take her traveling bag and to assist her down the steps, and because the steps were old, worn out and slippery, and not properly pitched. The evidence showed that the plaintiff emerged from the car with a grip; she took it in both hands and held it out in front of her. She made no request for assistance of trainmen standing there. As she stepped on the first step her foot slipped or was caught, causing her to fall. She was wearing shoes of fashionable make with heels about three inches high. The heel from one shoe was wrenched off. The Texas Court of Civil Appeals reversed judgment for the plaintiff and rendered judgment for the defendant for the following reasons: The railroad's employees were held not negligent in failing to assist a healthy young woman, carrying a small traveling bag, where she did not request assistance and the step was in good order, except that the rubber covering was worn smooth. Where it was as reasonable to conclude from the evidence that a passenger fell while alighting by reason of her three-inch heel catching on the edge of the steps as that she slipped because of their smooth condition, a verdict in her favor could not be sustained. The court may take judicial notice of the fact that rubber on a car step merely worn smooth will not become "slick" from that cause alone, so as to invite a slipping of the foot.—Rock Island v. Wisdom (Tex.), 216 S. W. 241.

Foreign Railway News

The Uganda railways are experimenting with oil fuel for locomotives.

The Danish and Swedish railways are experimenting with locomotives burning oil.

Modern Transport says that it is estimated that the 15 per cent increase in the passenger and freight rates on the Australian railways will result in an additional revenue of £1,000,000.

The Nippon Yusen Kaisha and the Osaka Shosen Kaisha have applied for permission to raise passenger fares on the European and the Australian steamship lines, and contemplate a similar application with regard to the North American service. Due to the large increase in working expenses the present fares are too low to make the passenger service on these runs remunerative.

Proposed New Railway in Poland

The Board of Trade Journal says that a law was passed on March 2 by the Polish Diet providing for the construction by the State of a railway from Sierpe to Brudnica, and it is proposed to begin construction this year. A credit of 20,000,000 marks has been granted for immediate expenditure.

Germany Restores Property Taken from Belgium

Up to April 1, 1920, Germany had restored to Belgium 12,154 machines and assortments of industrial material of a total weight of 69,929.75 tons; 14,427 agricultural machines; 51,236 tons of fixed railroad material, 77,796 trucks and carriages and 2,215 locomotives. About $6,000 worth of rail was sold in France, to save the cost of transportation.

German Locomotives in France

LONDON.

The French Minister of Public Works said recently that the number of locomotives delivered by Germany to France in accordance with the treaty was 2,683. Of these, 697 have been ceded to the Allies. The 1,986 others have been apportioned to French railway companies as follows:

Eastern	311 locomotives
State railways	309 locomotives
Southern railway	70 locomotives
Northern	561 locomotives
Paris, Lyons & Mediterranean	178 locomotives
Paris-Orleans	260 locomotives
Alsace-Lorraine	297 locomotives

About seven per cent of the locomotives require extensive repairs.

Receipts and Expenditures on English Railways

LONDON.

The British Ministry of Transport has recently issued a statement regarding the financial results of railway operation for the eleven months ending February 29, 1920. The total revenue during this period was £174,036,157. The total expenditure during this period was £167,054,362, giving a balance of revenue earned over expenditure of £6,981,795, and an operating ratio of 96 per cent. For this period the standard yearly proportion of net receipts under the given guarantee was £43,924,000, to which is added for interest on works brought into use £962,600. Thus the net government liability for the 11 months is £38,305,026. The total traffic revenue earned was distributed roughly as follows:

Passenger train traffic	48 per cent
Freight train traffic	42.5 per cent
Government traffic	9.5 per cent

The report also shows a charge of £23,972,125 for arrears in maintenance and renewal in ways.

Equipment and Supplies

Locomotives

THE UNION RAILROAD is inquiring for two Consolidation type locomotives.

THE NORWOOD & ST. LAWRENCE has ordered one 2-6-2 type locomotive from the Baldwin Locomotive Works.

THE JACKSONVILLE TERMINAL has ordered two 0-6-0 switching locomotives from the Baldwin Locomotive Works.

THE FAIRPORT, PAINESVILLE & EASTERN has ordered one 0-6-0 switching locomotive from the Baldwin Locomotive Works.

THE STANDARD OIL COMPANY OF NEW JERSEY has ordered one 0-6-0 switching locomotive from the Baldwin Locomotive Works.

THE TRUMBULL STEEL COMPANY, Warren, Ohio, has ordered one 0-6-0 switching locomotive from the Baldwin Locomotive Works.

THE LEHIGH VALLEY, reported in the *Railway Age* of May 7, as being in the market for 5 Mikado type locomotives, has ordered this equipment from the Baldwin Locomotive Works.

THE ATLANTIC COAST LINE, reported in the *Railway Age* of April 30 as being in the market for five 6-wheel switching locomotives, has ordered this equipment from the Baldwin Locomotive Works.

THE ILLINOIS CENTRAL, reported in the *Railway Age* of May 14 as being in the market for 75 locomotives, has ordered 50 2-10-2 type locomotives from the Lima Locomotive Works and 25 Pacific type locomotives from the American Locomotive Company.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for two second-hand four-wheel, 40-ton saddle tank switching locomotives of standard gage. Also for one six-wheel switching engine, with tender. The engine is to have cylinders about 19 by 26 in. and a weight of from 65 to 70 tons.

Freight Cars

THE BOSTON & MAINE is inquiring for 50 caboose cars.

THE EAST BROAD TOI is inquiring for 50 30-ton coal cars.

THE SEABOARD AIR LINE is inquiring for 100 phosphate cars.

THE NORFOLK & WESTERN will build 500 100-ton gondola cars in its Roanoke shops.

THE TEXAS & PACIFIC has ordered 50 tank cars from the American Car & Foundry Company.

THE MCKINNEY STEEL COMPANY, Cleveland, Ohio, has ordered 500 70-ton hopper cars from the Standard Steel Car Company.

THE WESTERN OIL CORPORATION, Tulsa, Okla., has ordered 25 8,000-gal. tank cars from the General American Tank Car Corporation, Chicago.

THE CAROLINA, CLINCHFIELD & OHIO has ordered 10 24-ft. U. S. R. A. steel cabooses from the Standard Steel Car Company, Pittsburgh, Pa.

THE HAVANA CENTRAL, reported in the *Railway Age* of April 23 as being in the market for 200 40-ton box cars, has ordered this equipment from the Standard Steel Car Company.

THE ATLANTIC COAST LINE, reported in the *Railway Age* of April 23 as being in the market for 500 double-sheathed box cars, has ordered this equipment from the Standard Steel Car Company.

The Pennsylvania Railroad has ordered repairs on 500 gondola cars from the Western Steel Car & Foundry Company, Pittsburgh, Pa., and on 100 to 500 box cars from the Interstate Car Company, Indianapolis, Ind.

Passenger Cars

Thomas F. Carey, 120 Liberty street, New York, is in the market for 36 second-hand passenger coaches.

The Maine Central has ordered seven baggage cars from the Osgood-Bradley Car Company, Worcester, Mass.

The Seaboard Air Line is inquiring for three dining cars, one mail car and two combination baggage and mail cars.

The Atlanta & West Point has ordered 9 passenger cars and 3 baggage cars from the American Car & Foundry Company.

The Pennsylvania Equipment Company, 1420 Chestnut street, Philadelphia, Pa., is in the market for several second-hand passenger and combination coaches.

The New York Municipal Railway, reported in the *Railway Age* of March 5 as being in the market for 100 subway cars, has ordered this equipment from the Pressed Steel Car Company.

The Chicago Great Western, reported in the *Railway Age* of March 19 as being in the market for six steel coaches, has ordered this equipment from the American Car & Foundry Company.

The Havana Central has ordered 10 first-class passenger cars and 12 third-class passenger cars from the Wason Manufacturing Company. These cars are to be used on the United Railways of Havana.

Iron and Steel

R. S. Willis, Grand Central Palace, New York, is in the market for 150 tons of steel girders, to be used on a railroad in France.

The Netherlands Government, reported in the *Railway Age* of May 7 as being in the market for 14,000 tons of 50 and 70 lb. rails, for use on the State Railways in Java, has ordered these rails from the United States Steel Corporation, for delivery during the first half of 1921.

Machinery and Tools

The St. Louis-San Francisco intends to install lathes, presses and other machinery at the West shop, Springfield, Mo., and at a number of other points.

The Southern Pacific has ordered one 15-ton locomotive crane from the Ohio Locomotive Crane Company, one ditcher from the American Hoist Company, and one 50-ton spreader from the Mann, McCann Company.

Signaling

The Union Switch & Signal Company, Swissvale, Pa., recently shipped 300 style "T" signal mechanisms and 300 sets of track circuit equipment, including track relays, track transformers and impedances for alternating current signals, to Japan for use on the main line of the Imperial Government Railways of Japan, between Yokohama and Osaka.

Railway accidents in Canada during the nine months ending December 31, 1919, numbered 1,347, according to the report of the Board of Railway Commissioners for Canada; non-trespassers killed, 225; injured, 1,502; trespassers killed, 64; injured, 68. Automobile accidents at highway crossings were reported to have increased slightly over the previous year. Only the nine months' period is covered in this report as an amendment to the Canadian Railway Act requires that henceforth the report be made up to December 31 each year, instead of the end of the fiscal year as hitherto.

Supply Trade News

The Page Steel & Wire Company, New York, announces that its central district sales office has been removed from 29 South La Salle street to 208 South La Salle street, Chicago.

The **Rich Tool Company,** Chicago, announces that the **Garlock-Walker Machinery Company, Limited,** with offices in Toronto, Montreal and Winnipeg, has been appointed its exclusive agent for Canada.

W. F. Myer has been appointed directing transmission engineer, industrial bearings division, of the **Hyatt Roller Bearing Company,** New York. Mr. Myer is in charge of the sale of Hyatt line shaft roller bearings.

A. C. Johnston, chief engineer of the **Link Belt Company,** Chicago, has been promoted to vice-president and resident general manager of the Chicago plant, succeeding **Prentiss L. Coonley,** who is devoting his time to other duties.

The **Roller-Smith Company,** New York, announces that the **W. Montelius Price Company,** Seattle, Wash., will handle its line of electrical instruments, meters and circuit breakers in the states of Washington and Idaho and in part of Oregon.

Lewis Thomas, who for three years, 1915-1918, served the government with the Interstate Commerce Commission, Division of Valuation, is now connected with the Chicago office of **The Q. & C. Company,** New York, as a representative.

The Geo. P. Ladd Company, Pittsburgh, Pa., manufacturer of water tube boilers, has opened a district sales office at 528 McCormick Building, Chicago, in charge of **W. M. McKinstrey,** formerly district manager for the Page Boiler Co., Chicago.

S. M. Dolan has been elected vice-president of the **G. F. Cotter Supply Company,** Houston, Texas, dealer in general railway supplies. This firm represents a number of railway supply manufacturers and sells and makes the Simplified piston valve steam chest.

George E. Long, senior vice-president of the **Joseph Dixon Crucible Company,** Jersey City, N. J., following his re-election as a member of the board of directors at the annual meeting, announced his decision to retire from the office of vice-president after 43 years of active service with this company, having begun as stenographer and advancing to the offices of secretary, treasurer and vice-president, respectively. He has taken an active part in the introduction of graphite as a lubricant and of silica-graphite paint.

The Hyman Michaels Company, Chicago, has recently bought at auction sale in the United States Court at Grand Rapids, Mich., the entire property of the Michigan East and West. This road is 75 miles long and runs from Manistee, Mich., to Marion. Included in the purchase are 8,000 tons of standard steel rails, mostly 60 lb., three locomotives and 15 cars. The road will be dismantled and sold by the new owners except portions bought by residents along the road before June 28. The road was owned by the William T. Joyce Company, of Chicago.

The corporate name of Cross & Simmons, Inc., advertising agency, Chicago, has been changed to the **Simmons Associates, Inc.,** of which H. H. Simmons, formerly secretary and treasurer, becomes president, and John H. Cross, formerly president, becomes vice-president. The other officers in the organization are: A. E. Warner, vice-president; Harold L. Brown, secretary, and Paul A. Florian, Jr., treasurer. The personnel and activities of the company remain unchanged. Mr. Cross has resigned as president in order to devote a portion of his time to the newly-organized company of Cross, Neal & Co., which will specialize in the development, financing, management and operation of industrial organizations.

REPORT.

The Directors of the Buffalo, Rochester and Pittsburgh Railway Company submit to the Stockholders the following report for the year ending December 31, 1919.

During this entire period your road continued in the possession of and was operated by the U. S. R. R. Administration under the provisions of the Federal Control Act.

No regular settlements of the stipulated rentals were received, but necessary funds for immediate needs were advanced from time to time as follows:

On account of annual compensation	$5,454,800.00
On open accounts	2,500,000.00
Total	$7,954,800.00

Of this amount $3,600,000 was applied toward reducing the expenditures for additions and betterments, road and equipment accounts, made on behalf of your Company by the Director General.

The account between the Federal Government and the Company at the close of the year is substantially as follows:

DUE FROM U. S R. R. ADMINISTRATION.

Annual compensation (standard return, two years)		$6,552,820.84	
Less payment on account		6,314,800.00	
			$238,020.84
OPEN ACCOUNTS:			
Cash transferred Dec. 31, 1917		$1,475,892.17	
Agents and Conductors balances Dec. 31, 1917		304,244.60	
Assets Dec. 31, 1917, collected		1,665,675.76	
Revenues prior to Jan. 1, 1918, collected		75,536.47	
Cash received subsequent to Dec. 31, 1917		3,311,391.57	
		$6,832,740.57	
Less payment on account		2,500,000.00	
			4,332,740.57
OTHER ACCOUNTS:			
Accrued depreciation:			
Road and shops	$94,026.40		
Rolling stock	1,650,896.09		
		$1,744,922.49	
Equipment retired		385,589.37	
Road property retired and not replaced		48,189.79	
Interest items		390,195.21	
			2,568,896.86
Total			$7,139,658.27

DUE TO U. S. R. R. ADMINISTRATION.

OPEN ACCOUNTS:			
Liabilities Dec. 31, 1917, paid	$1,916,764.48		
Payment for corporate transactions	2,060,605.45		
Expenses prior to Jan. 1, 1918, paid	240,438.56		
		$4,217,808.49	
EXPENDITURES FOR ADDITIONS AND BETTERMENTS:			
Road	$2,295,211.81		
Equipment	3,057,994.37		
General expenditures	16,571.86		
	$5,369,778.04		
Less payment on account	3,600,000.00		
		1,769,778.04	
OTHER ACCOUNTS:			
Interest items	$159,829.26		
Note at 6%	440,000.00		
		599,829.26	
			6,587,415.79
Balance due to Corporation			$552,242.48

In addition the U. S. R. R. Administration owes the value of Material and Supplies taken over Dec. 31, 1917, $2,989,496.03 to be offset at the end of Federal Control by materials equal in quality, quantity and relative usefulness and a cash settlement made of the overs and unders at current prices.

The note for $1,000,000 negotiated with the U. S. R. R. Administration in previous year was transferred, at their request, to the War Finance Corporation on Feb. 8th, 1919, and is not included in the foregoing statement.

In accordance with a Proclamation of the President of the United States issued under date of December 24th, 1919, and with the terms of the Transportation Act of 1920, Government control of railroads was terminated on March 1st, 1920, and a final settlement with the United States Railroad Administration is being progressed as rapidly as possible.

Your company has accepted the guarantee offered under the Act of one-half of the "standard return" for the period from March 1st, 1920, to August 31st, 1920.

In accordance with the precedent established last year, the full details of the operation under Federal control for this year, so far as available, are given in an appendix to this report

ROAD.

(Operated by U. S. R. R. Administration)

	1919.	1918.	DEC.
Owned	368.31	368.31	....
Leased	90.30	90.31	.01
Trackage rights	131.11	131.11	....
Total length of road operated	589.72	589.73	.01
Second track	212.59	212.61	.02
Sidings	456.21	457.48	1.27
Total miles of tracks, all steel rails	1,258.52	1,259.82	1.30

The decrease in miles of track operated is due to remeasurement and minor changes.

INCOME.

OPERATING INCOME:	1919.	1918.	INCREASE OR DECREASE.
Revenues			
Expenses	$91,544.84	$52,281.17	$39,263.67
Net revenue	Dr. $91,544.84	Dr. $52,281.17	$39,263.67
Tax accruals	99,108.52	150,000.00	—50,891.48
Total operating income	Dr. $190,653.36	Dr. $202,281.17	$11,627.81
NON-OPERATING INCOME:			
Guaranteed rental	$3,276,410.42	$3,276,410.42	
Other items	385,222.30	279,207.88	106,014.42
	$3,661,632.72	$3,555,618.30	$106,014.42
Gross income	$3,470,979.36	$3,353,337.13	$117,642.23
DEDUCTIONS:			
Rentals of leased lines, interest, etc.	$2,407,012.07	2,205,025.94	$201,986.13
Net income	$1,063,967.29	$1,148,311.19	—$84,343.90
APPROPRIATIONS:			
Pension and Fire Insurance Funds	$28,601.63	$28,754.45	—$152.82
Special appropriations		600.29	—600.29
Surplus available for dividends	$1,035,365.66	$1,118,956.45	—$83,590.79
Return on capital stock	6.27%	6.78%	—.51%

Expenses were increased $39,263.67, due to the fact that the Corporation bore the entire expense for this year, while in 1918, such expenses for a part of the year were assumed by the U. S. R. R. Administration.

Taxes decreased $50,891.48, due to a reduction of two per cent. in the Federal War Income tax, and an over-estimate for the preceding year.

The increase of $106,014.42 in the non-operating income and $201,986.13 in deductions came principally from interest on accounts with Federal Administration and the adjustment of railway operating expense accounts applicable to period prior to Jan. 1, 1918.

DIVIDENDS.

Dividends in cash were paid on:		1919		1918
Preferred Stock	$6,000,000	6%	$360,000	6% $360,000
Common Stock	10,500,000	4%	420,000	5% 525,000
Total	$16,500,000		$780,000	$885,000

Since the close of the fiscal year, your Board of Directors has declared semi-annual dividends of three dollars per share on the preferred stock and two dollars per share on the common stock, payable February 15, 1920.

CAPITAL STOCK.

There has been no change during the year in this account. The total outstanding Capital Stock of the Company amounts to $16,500,000, and consists of $6,000,000 preferred stock and of $10,500,000 common stock.

FUNDED DEBT.

In accordance with the provisions of the Consolidated Mortgage of 1907, $1,500,000 4½% bonds were received from the Trustee to apply on payments made for improvements and betterments, and the securities placed in the Treasury of the Company.

The Trustee also delivered to the Company $837,000 Consolidated Mortgage 4½% bonds, representing the entire issue of Equipment Bonds, Series A, amounting to $500,000, and 50% of the final installment of Equipment Bonds Series D and a part of Equipment Bonds E and F retired during the year.

These bonds, added to those in the Treasury of the Company, made a

total of $5,307,000, of which $2,285,000 were sold during the year for corporate purposes, leaving a balance of $3,022,000 held in reserve.

Under the terms of the Sinking Funds and Agreements for the payment of Equipment Bonds, $1,611,000 were retired, as follows: $470,000 Series A, in full; $50,000 Series B; $52,000 Series C; $267,000 final installment Series D; $117,000 Series E; $166,000 Series F; $184,000 Series G; $125,000 Series H; $100,000 Series J; and $80,000 Series K.

The net result is an increase of $674,000 in the bonded debt of the Company, held by the public on December 31, 1919.

LOANS.

During the year $1,825,000 notes given by the Company were paid off, reducing the short term indebtedness from $3,699,600.00 to $1,874,600.00

COST OF ROAD.

Capital account has been charged during the year with $411,569.99 for investment in road, as follows:

Right of way	$8,097.36
Interlocking plant, Riverside Junction, N. Y.	30,869.29
Terminal facilities, Buffalo Creek, N. Y.	8,635.76
Terminal facilities, West Shore Junction, N. Y.	3,184.76
Terminal facilities, East Salamanca, N. Y.	11,457.93
Terminal facilities, Du Bois, Pa.	3,826.46
Terminal facilities, Elk Run Junction and Cloe, Pa.	52,593.64
Tie and ballast tamping machines	36,305.61
Shop and power plant machinery	67,228.80
Increased weight of rail, etc.	100,983.15
Stone and slag ballast	25,731.83
Additional yard extensions, sidings, etc.	62,655.40
Total	$411,569.99

The interlocking plant at Riverside Junction, N. Y., referred to in last year's report, is now completed.

The only important work still in progress is the completion of industrial tracks in Buffalo, N. Y., and the interlocking plant and yard tracks at Falls Creek, Pa.

As far as practicable under the present abnormal conditions, the general program of strengthening the road with stone ballast and heavier type of rail will be continued.

COST OF EQUIPMENT.

Expenditures were made for additions to equipment as follows:

Sundry locomotive betterments	$39,935.03
One gondola car purchased	536.43
Forty-one steel underframes applied	2,063.18
Sundry car betterments	15,242.10
	$57,776.74

There was credited for equipment sold, transferred or destroyed, the following book values, of which the accrued depreciation to January 1st, 1918, was charged to Accrued Depreciation Account, and the balance to the U. S. R. R. Administration:

Eighteen locomotives	$214,234.52	
One hundred and forty-three freight train cars	99,704.11	
Five work equipment cars	2,290.31	
		316,228.94
Making a net increase of		$258,452.20

The total tractive power of engines aggregates 15,346,830 pounds, a decrease of 678,532 pounds during the past year.

The average tractive power of each engine increased 788 pounds, being 44,100 pounds as against 43,312 pounds on December 31, 1918.

The total carrying capacity of cars in freight service now amounts to 771,541 net tons, a decrease of 6,116.

The average carrying capacity or efficiency of each freight car increased .03 ton, being 43.97 tons as against 43.94 tons.

Of the cars in passenger service 47.31 per cent. are of all steel construction and in the freight service 94.12 per cent. of the cars are of all steel, or are equipped with steel underframes.

The 800 fifty-five ton steel coal cars allocated to your company by the U. S. R. R. Administration, referred to in last year's report, were accepted as of January 15, 1920.

The entire cost is to be provided for by an issue of six per cent. gold notes, maturing in 15 equal installments from January 15, 1921, to January 15, 1935, inclusive, and will be taken at par by the U. S. Government in full settlement.

FIRE INSURANCE FUND.

The assets of this fund were increased $13,902.08 and now amount to $387,363.73 in interest-bearing securities and cash.

PENSION FUND.

The assets of this fund, created July 1, 1903, were increased $8,699.04, and now amount to $252,697.73 in interest-bearing securities and cash.

There were 72 pensioners upon the roll on December 31, 1919, a net increase of 4 during the year.

GENERAL REMARKS.

The Ontario Car Ferry Company, Limited, paid a dividend of 5% for the year ending December 31, 1918. The sum of $12,500 received on the $250,000 of this Company's stock was credited to non-operating income account.

Effective Jan. 1, 1918, the several contracts with the Baltimore & Ohio R. R. Co. covering trackage rights between Butler Junction, Pa., and New Castle, Pa., and between Ribold Junction, Pa., and Pittsburgh, Pa., etc., were revised and renewed for a term of 15 years.

The valuation of your lines by the Interstate Commerce Commission began July 1, 1917, and is about 70% completed. The amount expended to date on this account has reached $128,428.73.

The officers and employees of your Company subscribed to the Loans of the Government as follows:

Liberty Loans, Nos. 1 to 4 inc.,	18,239	individuals	$1,684,000.00
Victory Loan	5,690	"	619,500.00
Total	23,929	"	$2,303,500.00

In addition they have invested in War Thrift Stamps to the amount of $66,478.37.

The acknowledgments of the Board are renewed to its officers and employees for their faithful and efficient service.

By order of the Board,

WILLIAM T. NOONAN, President.

Rochester, N. Y.,
April 29, 1920.

PROFIT AND LOSS ACCOUNT.

December 31, 1919.

CREDIT.			DEBIT.		
Balance Surplus December 31, 1918		$3,866,342.37	Dividend appropriation of surplus—		
Credit Balance, transferred from Income Account		1,035,365.66	Preferred stock—		
Profit on road and equipment sold		379.78	(No. 51) 3% on $6,000,000, payable February 15, 1919	$180,000.00	
Donations		7,794.17	(No. 52) 3% on $6,000,000, payable August 15, 1919	180,000.00	
MISCELLANEOUS CREDITS—			Common stock—		
Discount on funded debt retired	$7,378.65		(No. 38) 2% on $10,500,000, payable February 15, 1919	$210,000.00	
Balance transferred from sinking fund reserve	2,264.91		(No. 39) 2% on $10,500,000, payable August 15, 1919	210,000.00	
Sundry items	730.49				$780,000.00
		10,374.05	Surplus appropriated for investment in physical property		3,831.23
			Loss on retired road and equipment		2,481.33
			Miscellaneous debits—		
			Discount on funded debt sold	$226,588.99	
			Premium on funded debt retired	1,744.00	
			Loss on securities sold	6,402.50	
			Loss on abandoned projects	2,746.42	
			Sundry items	676.26	
					238,158.17
					1,024,470.73
Total		$4,920,256.03	BALANCE SURPLUS December 31, 1919 (page 16)		$3,895,785.30

[ADV.]

Financial and Construction

Railway Financial News

BOSTON & MAINE.—This company offers holders of $8,843,000 of its notes and bonds which mature this year 50 per cent of the face value in cash and 50 per cent in new 6 per cent mortgage bonds, due in 10 years. This offer followed notification from the Interstate Commerce Commission that a loan of $5,000,000 to the Boston & Maine to help it to meet these obligations had been recommended to the Secretary of the Treasury, on condition that the road finance the refunding of the remainder of this indebtedness.

BUFFALO, ROCHESTER & PITTSBURGH.—J. Herbert Johnston has been elected a director succeeding Walter G. Oakman.
See editorial elsewhere in this issue.

CHICAGO, MILWAUKEE & ST. PAUL.—George C. Mason has been elected a director succeeding Walter P. Bliss, resigned.

DENVER & RIO GRANDE.—See Western Pacific.

NEW YORK, NEW HAVEN & HARTFORD.—Judge Julian W. Mack, of the U. S. District Court of Appeals, has denied the petition of Harry W. Belden and 1,400 other minority stockholders for the appointment of a limited receiver to prosecute the $150,000,000 restitution suit against William Rockefeller and other former directors and officers of the New Haven. Judge Mack, however, allowed five representatives of the minority stockholders to intervene and become parties to the suit conditional upon their sharing in the expense of the litigation. The original suit was brought by Edwin Adams and other stockholders and has been pending for several years.

ST. LOUIS & OHIO RIVER.—The Illinois Public Utilities Commission has authorized this company to purchase the property of the Southern Traction Company of Illinois for $400,000 and has granted a certificate of convenience and necessity to operate the line as a steam railroad between East St. Louis, Ill., and Belleville. The company was also authorized to issue $10,000 of capital stock.

WESTERN PACIFIC.—This company has purchased at a public auction $1,282,235 Denver & Rio Grande stocks and bonds to partially satisfy a judgment obtained by the Equitable Trust Company against the latter road.

Railway Construction

ALASKA RAILWAY.—Bids have been opened by the Alaskan Engineering Commission at Seattle, Wash., for the construction of the Hurricane Gulf bridge. This structure is to be a two-hinge, double-deck, two-arch bridge, 384 ft. in length with approaches of 280 ft. and 360 ft., respectively. From 1,400 to 1,600 tons of steel will be used. The McClintic Marshall Construction Company, Pittsburgh, Pa.; the Phoenix Bridge Company, Phoenixville, Pa., and the United States Steel Products Company, New York, N. Y., bid on the job.

ATCHISON, TOPEKA & SANTA FE.—This road has now practically completed the construction of its subsidiary line, the Buffalo & Northwestern, between Waynoka, Okla., and Buffalo, a distance of 72 miles, and of its subsidiary, the Minkler Southern, between Minkler, Cal., and Ducor.

CHICAGO, MILWAUKEE & ST. PAUL.—General plans are practically completed for three new coaling station to be built at Corliss, Wis.; Davis Junction, Ill., and Dubuque, Ia. The first two will be of 200-ton capacity, serving three and two tracks, respectively, while the last will serve three tracks and be of 175-ton capacity. All are of the balance bucket type and of timber construction, with concrete foundations. All will be equipped with dry-pipe sprinkler systems for fire protection.

Railway Officers

Executive

Henry K. McHarg, Jr., assistant to the vice-president and general manager of the Detroit & Mackinac, has been elected vice-president and general manager, with headquarters at East Tawas, Mich., succeeding **J. D. Hawks**, resigned, effective May 12.

J. L. Lancaster, receiver of the Trans-Mississippi Terminal Railroad Company, has been elected president of the company, with headquarters at New Orleans, La., and A. Robertson, vice-president, operating, on the Missouri Pacific, has been elected vice-president of the Terminal company, both appointments being effective May 12.

Benjamin L. Winchell, recently regional director of the Southern region of the Railroad Administration and prior to federal control director of traffic of the Union Pacific, has been elected vice-president of the Pierce Oil Corporation, in charge of the railroad department, with headquarters at St. Louis, Mo. Mr. Winchell has devoted the greater part of his life to railroad work, which he began in July, 1874, as clerk in the office of the superintendent of machinery of the Hannibal & St. Joseph. In 1875 he was transferred to the auditor's office of the same road and remained there until November 27, 1877, when he was promoted to chief clerk in the general freight and ticket office. He occupied that position until January 1, 1879, when he was appointed assistant general passenger agent of the Atchinson & Nebraska. From April 1 until June 1, 1880, he was chief clerk in the general passenger department of the Kansas City, Ft. Scott & Gulf and the Kansas City, Lawrence & Southern Kansas. He was then promoted to assistant general passenger and ticket agent of the same roads. In May, 1895, he went to the Union Pacific Denver & Gulf as general passenger and ticket agent. He also acted in the same capacity for the Denver, Leadville & Gunnison. From May 1 to December 1, 1898, he served the St. Louis & San Francisco in the same capacity. He was then elected vice-president of the Colorado & Southern and on October 15, 1900, president and general manager of the Kansas City, Ft. Scott & Memphis System. In 1902 he returned to the St. Louis & San Francisco as vice-president and general manager. He became first vice-president on October 15, 1903, and from then until April 5, 1904, he also served as third vice-president of the Chicago, Rock Island & Pacific, as well as vice-president of the Chicago & Eastern Illinois and the Evansville & Terre Haute. Elected president of the Chicago, Rock Island & Pacific on April 6, 1904, he remained in that position until December 1, 1909, when he returned to the St. Louis & San Francisco and the Chicago & Eastern Illinois as president, serving in that capacity until 1913, when he became one of the receivers of the St. Louis & San Francisco. He resigned shortly afterwards upon being appointed director of traffic of the Union Pacific.

B. L. Winchell

James G. Thomas, whose appointment as assistant to the president of the Cincinnati, Indianapolis & Western, with headquarters at Indianapolis, Ind., was announced in the

Railway Age of March 5 (page 740), was born at Mason City, W. Va., on November 26, 1880. He entered railway service on January 7, 1895, as a telegraph operator on the Cincinnati, Hamilton & Dayton, and until 1905 was consecutively cashier, agent and assistant general yardmaster. In 1905 he was appointed agent and general yardmaster on the Detroit, Toledo & Ironton, which position he retained until 1908, when he was appointed a member of the Cincinnati (Ohio) car demurrage bureau. In 1912 he was appointed demurrage inspector on the Cincinnati, Hamilton & Dayton, and the following year was appointed traveling car agent on the Baltimore & Ohio. This position he retained until 1916, when he was appointed general agent on the Cincinnati, Indianapolis & Western. In August, 1918, he was appointed superintendent of car service and during the consolidation of the Cincinnati, Indianapolis & Western and the Chicago, Indianapolis & Louisville under federal control, was made inspector of transportation. He was also a member of the Cincinnati Operating Committee during federal control. These positions he retained until his present promotion to assistant to the president.

Financial, Legal and Accounting

A. L. Pollard, superintendent terminals of the Mobile & Ohio, has been appointed car accountant of that road and the Southern in Mississippi, with headquarters at St. Louis, Mo., the position of the superintendent terminals having been abolished.

Alfred Bettman, of Cincinnati, Ohio, has been appointed regional counsel for the Central Eastern region of the United States Railroad Administration. **O. A. Smith,** also of Cincinnati, has been appointed regional claim agent and will assist Mr. Bettman.

C. W. Veitch, secretary and treasurer of the Texas & Pacific, has been elected assistant secretary and treasurer of the Trans-Mississippi Terminal Railroad Company, with headquarters in New Orleans, La. **George A. Leber** has been re-elected auditor of the company. Thomas J. Freeman and M. D. Cloyde have been re-elected respectively general counsel and secretary and treasurer, all appointments effective May 12.

Operating

Guy V. Keister, chief dispatcher of the Knoxville division of the Southern, has been appointed trainmaster; **Samuel J. Smith** has been promoted from freight conductor to trainmaster of the same division. The appointments became effective May 1.

J. R. Todd, superintendent of the Lansing division of the New York Central Lines West of Buffalo, has been transferred to the Michigan division, succeeding **E. D. Moon,** resigned, effective May 3. E. R. Bissell has been appointed superintendent of the Lansing division, succeeding Mr. Todd, effective the same date.

H. J. Merrick, superintendent freight transportation of the New York Central Lines West of Buffalo, was retired under the pension rules of the company, effective May 1, and appointed assistant to the general manager with headquarters at Cleveland, Ohio, effective May 15. **George A. Coddling,** assistant superintendent freight transportation with headquarters at Cleveland, was appointed superintendent freight transportation succeeding Mr. Merrick, effective May 1. **H. F. Aldrich** was appointed assistant superintendent freight transportation succeeding Mr. Coddling, effective May 1.

George W. Briece, whose appointment as superintendent of transportation of the Missouri Pacific, with headquarters at St. Louis, Mo., was announced in the *Railway Age* of March 5 (page 745), was born at Quincy, Ill., on January 1, 1873. After graduating from a business college at Kansas City, Mo., he entered railway service on July 16, 1892, as a clerk in the transportation department of the Missouri, Kansas & Texas. Prior to November 30, 1902, he occupied various positions in the transportation department and the car accountant's office of the Missouri, Kansas & Texas. On the latter date he was appointed correspondence and fast freight clerk in the transportation department of the Missouri Pacific, and from February, 1907, to June, 1912, he was car distributor in the same department. From 1912 until 1913 he was chief clerk to the superintendent of transportation, and in October, 1913, he was appointed car accountant, which position he retained until July 1, 1918, when he was appointed supervisor of transportation for the Southwestern region of the United States Railroad Administration.

Traffic

W. A. Carlsen has been appointed general agent of the El Paso & Southwestern, with headquarters at Detroit, Mich.

John J. Goodrich has been appointed general agent of the passenger and freight departments of the Chicago, Rock Island & Pacific, with headquarters at St. Joseph, Mo., succeeding **A. E. Martin,** effective May 15.

George B. Farrow has been appointed general agent of the Chicago, Rock Island & Pacific, with headquarters at Philadelphia, effective May 12, succeeding **George F. Ramspacher,** transferred; **W. T. Baldwin** has been appointed general agent, with headquarters at Milwaukee, Wis., effective May 1.

H. G. Van Winkle, general agent on the Chicago & North Western with headquarters at Denver, Colo., has been appointed general agent for the passenger department, with headquarters at Chicago, effective June 1. He succeeds **G. A. Griswold,** who has resigned to engage in other business. G. R. Lind succeeds Mr. Van Winkle.

T. W. Proctor, first assistant general freight agent of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been promoted to general freight agent, effective May 15, succeeding **C. A. Lahey,** appointed a member of the Western Trunk Line Rate Committee. **E. B. Finegan,** assistant general freight agent, has been appointed to succeed Mr. Proctor.

Norman D. Hoke, who has been appointed assistant general freight agent of the Michigan Central, with headquarters at Buffalo, N. Y., as noted in the *Railway Age* of March 19 (page 995), served as chief clerk to the traffic manager of the same road, with headquarters at Chicago, during the greater part of federal control. Mr. Hoke was born in 1885 at Gettysburg, Pa. He was educated in Gettysburg College and entered railroad service on March 1, 1903, with the Philadelphia & Reading. In 1908 he was appointed traveling freight agent of the Philadelphia-Blue Ridge Despatch, and in 1911 he took the same position with the Philadelphia-Merchants Despatch and in 1912 the same position with the Lake Erie & Western. He was appointed commercial agent of the New York Central, with headquarters at Richmond, Va., in 1914, and in 1915 was transferred to Baltimore, Md. He went to the Michigan Central in 1917 as general agent, with headquarters at Detroit, Mich. He was appointed chief clerk to the traffic manager in 1918.

William Gary Brown, whose appointment as general passenger agent on the Baltimore & Ohio, with headquarters at Chicago, was announced in the *Railway Age* of March 5 (page 738), was born on January 2, 1870, at Portland, Ind. He entered railway service in 1886 as office boy on the Ohio & Mississippi, now part of the Baltimore & Ohio, and after several promotions was appointed chief rate clerk of the Cincinnati, Washington & Baltimore, also part of the present Baltimore & Ohio lines, with headquarters at Cincinnati, Ohio. In December, 1893, he was appointed chief rate clerk of the Baltimore & Ohio, Western Lines, which position he held until 1903, when he was promoted to general passenger agent, with headquarters at New York. He was later appointed assistant general passenger agent on the same road and for a short time was also assistant to the general passenger agent on the Cincinnati, Hamilton & Dayton. During

federal control Mr. Brown served as manager of the consolidated ticket office at Cincinnati, later returning to his former position.

Mechanical

John C. Davidson has been appointed engineer of electric traction of the Norfolk & Western, with office at Bluefield, W. Va. Mr. Davidson's early experience in railroad work was obtained in Scotland where he completed his apprenticeship in the locomotive department of the Great North of Scotland Railway. After completing his apprenticeship he was employed in the drafting room and on material inspection and testing. From 1902 to 1906 he was employed by the British Westinghouse Company as assistant engineer on design of rolling stock and electrical equipment for the Mersey Railway and the Metropolitan Railway electrifications. Mr. Davidson then took up work in the United States and was employed for four years as assistant engineer by the Pennsylvania Tunnel & Terminal Railroad. In this connection he worked on the electrification of the New York tunnels, specializing in the development of locomotive equipment. He entered the employ of Gibbs & Hill, consulting engineers when the firm was organized. Here he was employed as engineer on projects and designs, appraisals and reports for heavy main line electrification and was engineer in charge of the Norfolk & Western electrification. He resigned from this work to accept his present position.

J. C. Davidson

Engineering, Maintenance of Way and Signaling

F. A. Jones has been appointed office engineer of the Boston & Albany, effective May 1.

H. L. Ripley, corporate and valuation engineer of the New York, New Haven & Hartford, advises that his jurisdiction does not extend over the Central New England.

E. G. Stradling, signal engineer on the Chicago, Indianapolis & Louisville, with headquarters at Lafayette, Ind., has been promoted to superintendent of telegraph and signals, with the same headquarters, effective May 1.

M. H. Beard, track supervisor on the Baltimore & Ohio, with headquarters at Washington, Ohio, has been promoted to assistant division engineer, with headquarters at New Castle, Pa., to succeed **L. W. Strayer**, who has resigned.

M. M. Backus, roadmaster on the Illinois Central, with headquarters at Carbondale, Ill., has been promoted to district engineer on the Western lines with headquarters at Waterloo, Ia., effective May 20. **J. W. Kern**, roadmaster of the Mississippi division with headquarters at Water Valley, Miss., has been transferred to succeed Mr. Backus, and **C. M. Chumley**, supervisor of bridges and buildings at Memphis, Tenn., has been promoted to succeed Mr. Kern.

Purchasing and Stores

R. B. Bannerman has been appointed storekeeper on the Chicago division of the Minneapolis, St. Paul & Sault Ste. Marie, with headquarters at Fond du Lac, Wis., and **J. B. Noyes** has been appointed storekeeper on the Soo division of the same road, with headquarters at Minneapolis, Minn., effective May 1.

J. C. Kirk, district storekeeper on the Chicago, Rock Island & Pacific, with headquarters at Silvis, Ill., has been promoted to assistant general storekeeper, with the same headquarters, effective May 1. **W. L. Hunker**, district storekeeper at Chicago, has been transferred to Silvis to succeed Mr. Kirk. **E. L. Zink**, chief clerk at Silvis, has been promoted to district storekeeper, with headquarters at Chicago, succeeding Mr. Hunker. **E. A. Ernst**, chief clerk in the office of the district storekeeper at Horton, Kan., has been promoted to district storekeeper at Shawnee, Okla., succeeding **E. W. Morris**, deceased.

Railroad Administration

E. M. Alvord, of the Division of Liquidation Claims of the Railroad Administration, has been appointed assistant to the director general of railroads, succeeding **Brice Clagett**.

General

ATLANTIC COAST LINE

The Atlantic Coast Line has announced that the following appointments have been made, effective May 15, in the traffic department:

Name	Position	Headquarters
J. W. Perrin	Asst. frt. traf. mgr.	Wilmington, N. C.
W. E. Renneker	Asst. gen. frt. agt.	Wilmington, N. C.
R. J. Doss	Asst. gen. frt. agt.	Wilmington, N. C.
F. L. Glover	Asst. gen. frt. agt.	Wilmington, N. C.
W. H. Cobb	Com'c'l agt.	Wilmington, N. C.
C. S. Campbell	Asst. gen. frt. agt.	Richmond, Va.
T. S. Allen	Com'c'l agt.	Richmond, Va.
W. C. Ragin	Asst. gen. frt. agt.	Savannah, Ga.
Thos. Warrick	Com'c'l agt.	Savannah, Ga.
J. F. Mead	Asst. gen. frt. agt.	Jacksonville, Fla.
J. W. Cannon	Com'c'l agt.	Jacksonville, Fla.
H. L. King	Gen. agt.	Norfolk, Va.
J. W. Murdaugh	Com'c'l agt.	Norfolk, Va.
B. S. Meeks	Com'c'l agt.	Florence, S. C.
R. F. Robinson	Com'c'l agt.	Sumter, S. C.
L. D. McCullum	Com'c'l agt.	Columbia, S. C.
L. B. Davidson	Com'c'l agt.	Charleston, S. C.
H. L. Cook	Com'c'l agt.	Augusta, Ga.
Justin Kuss	Com'c'l agt.	Albany, Ga.
C. R. Jones	Com'c'l agt.	Montgomery, Ala.
H. C. Cameron	Com'c'l agt.	Ocala, Fla.
D. E. Freeman	Gen. agt.	Tampa, Fla.
J. F. Menge	Com'c'l agt.	Fort Myers, Fla.
C. A. Maull	Com'c'l agt.	Miami, Fla.
J. H. Johnson	N. E. agt.	Boston, Mass.
G. E. Croissant	Com'c'l agt.	Boston, Mass.
W. L. Radford	Gen. east. frt. agt.	New York, N. Y.
A. R. Mulkins	Com'c'l agt.	New York, N. Y.
R. A. Cooney	Com'c'l agt.	New York, N. Y.
Sam'l Mullin, Jr.	Com'c'l agt.	Philadelphia, Pa.
W. R. Brown	Com'c'l agt.	Philadelphia, Pa.
W. H. Wardin	Frt. and pass. agt.	Baltimore, Md.
J. H. Kaltenbach	Com'c'l agt.	Baltimore, Md.
S. H. Dare	Gen. west. frt. agt.	Chicago.
H. A. Helstrom	Com'c'l agt.	Chicago.
Pend'ton Goodall	Com'c'l agt.	St. Louis, Mo.
E. S. LeGette	Com'c'l agt.	Nashville, Tenn.
H. C. Allen	Gen. agt.	Atlanta, Ga.
Hansford Sams	Com'c'l agt.	Atlanta, Ga.

Obituary

Colonel W. D. Mann, designer of the "boudoir sleeping car," used extensively in Europe, and formerly for a number of years in this country (on the Cincinnati, New Orleans & Texas Pacific), died at his home in Morristown, N. J., on May 17, at the age of 81 years.

THE PRESENT INADEQUACY of railroad transportation is recognized—it is, indeed, notorious, and it cannot be made adequate and efficient without the returns that will permit the very great expenditures for equipment, improvements and extensions that are pressingly required. This cannot be accomplished unless rates are made to accord with present requirements and cost conditions.—*St. Louis Globe-Democrat.*

EDITORIAL Railway Age

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The predicament of the Canadian Pacific in its peculiar position as solvent competitor of the less successful roads which have been taken over by the Canadian government has received previous attention in these columns. The opportunities for the exercise of discrimination in favor of the government lines in the course of regulatory administration are, of course, unlimited, and that there is no little inclination to take advantage of the opportunities thus afforded is evidenced by a recent action of the Canadian government. This places the Canadian Pacific in the position of the unhappy young lady who was granted permission to go swimming with the supplemental admonition to stay away from the water. As reported on another page of this issue, the Canadian House of Commons has denied the Canadian Pacific a charter to build a line in the province of Saskatchewan. The question of wasteful parallel competitive construction does not enter into the controversy. Instead, the petition was denied on the grounds that the territory to be served by the proposed line is to be regarded as having been reserved for exclusive development by the Canadian National Railways. Considered by itself, this case is of minor consideration both to the Canadian government and the Canadian Pacific, but if the decision in this case represents the operation of a general policy to be pursued in the coming years of railway extensions in the undeveloped portions of Canada, the tendency will be to cripple what is now one of the strongest and most effective common carriers in the world.

"But Don't Go Near the Water"

Electric operation will, beyond a probability, be adopted on additional sections of steam roads in the near future. Its use will be based on a large number of reasons, among which are tunnel and terminal requirements, the need for relieving congestion on sections where the traffic density is very great, etc. In putting forth these reasons, the advocates of electrification should adhere rigidly to facts if they wish to gain the confidence of the men whom they expect will use the equipment recommended. In a report on electrification presented at the 43d annual convention of the National Electric Light Association held at Pasadena, Cal., W. H. Armstrong of the General Electric Company in speaking of steam locomotives said: "It is estimated that the coal consumption is about 290 lb. per 1,000 ton miles of gross tonnage moved." The records of the Railroad Administration show that the coal per thousand gross ton miles used for freight service on all regions during the first nine months of 1919 was 186.1 lb. Apparently Mr. Armstrong's figures are based on a very rough estimate. Mr. Armstrong then estimated how much coal would be used by electric locomotives, compared the figures and stated that if all the roads in the United States were electrified 122,500,000 tons of coal might be saved annually. If there are good reasons for the wholesale adoption of electrification, why resort to such persiflage for proof? More reliance could be placed on such an estimate, if it were based on data, covering steam locomotive performance and, also the actual ton mile coal consumption of existing electrified roads that obtained their electric power from coal.

Facts and Fancies

A southwestern railroad having a contract on which it was paying less than one dollar per barrel for fuel oil recently lost this contract because a voucher forwarded in payment was three days late when received by the oil company, which promptly took advantage of the technicality to cancel the contract. This railroad is now paying considerably in excess of three dollars per barrel for the same grade of fuel. Waiving consideration of the ethics of the case, which might not wholly justify the course pursued by the oil company and excepting the possible existence of a factor over which the railroad may have had no control, it is suspected that this circumstance was indirectly the result of dilatory methods that are more or less habitual with the railroads. The impression which business men get when letters are not acknowledged promptly and payments are delayed long after materials have been delivered to the railroad is not a favorable one. Railroad offices are generally undermanned; overtime and irregular hours are customary, the volume of detail to be handled by railroad executives is tremendous and the territory to be covered immense. But business men are not charitably inclined in their attitude towards the railroads, and it is decidedly important that executive officers keep their offices in line with business methods, that the personnel be made adequate, that regular office house be systematically observed, that necessary detail be assigned to competent subordinates and unnecessary detail eliminated. Consider the effect of a prompt acknowledgment to a letter addressed to a general manager who is making an extended inspection trip over the railroad. Letters can always be promptly acknowledged; there is nothing gained in allowing mail to accumulate or payments deferred beyond a certain time, or important decisions postponed. Habitual promptness is more than the sign of an alert versus a slovenly organization; it indicates that the organization is capable of assimilating the peak load, that it has an objective and does not evade it.

A Word for Promptness

The elimination of railway grade crossings with city streets received its initial impetus in this country some 20 or 30 years ago; in other words, before the day of the motor vehicle and the high speed street car, when the run-away horse was still the frequent cause of excitement and personal injury. As compared with the slowing moving street traffic in those days, the railway train was a veritable catapult and it is not surprising that the menace of its presence on city streets loomed large in the eye of a public whose ideas of street traffic speeds were derived from the thrills of a ride behind a span of smart horses. During the subsequent years when many millions of dollars have been spent for grade separation work, a marked change

Grade Crossing Accidents

has taken place in the character of the street traffic. As a result the public street is far more dangerous to the pedestrian, the child at play, and the occupant of a vehicle than it was two or three decades ago. In fact, the record of railway grade crossing accidents now pales to insignificance compared with those from street accidents not involving railway trains.

The annual report of the police department of the city of Chicago, just issued, throws much light on this condition, although the record on accidents caused by trains at street crossings is not entirely clear. Of persons occupying street cars, motor vehicles, horse-drawn vehicles or bicycles that were struck by trains, 7 were killed and 61 injured in 1919, and 10 killed and 84 injured in 1918. The report also shows that the total number of victims struck or run over by trains at street crossings and elsewhere within the city limits was 83 killed and 57 injured in 1919, and 112 killed and 94 injured in 1918. By comparison with earlier figures, differentiating between the casualties at street crossings and elsewhere, it may be assumed that about 30 to 40 per cent of the above figures represent the approximate totals for accidents at the crossings of streets and tracks. However, there is no occasion for quibbling in this regard when making comparisons with the deaths and injuries resulting from other forms of street accidents as shown below.

In 1919 the number of persons struck or run over by street vehicles (including street cars) was 321 killed and 4,745 injured. This, however, is only part of the story, as another large group suffered death and injury while occupying vehicles that were struck by other street conveyances, i. e., collisions of automobiles or of autos and street cars, etc. Such accidents caused 88 deaths and 2,249 injuries. In other words, we find that in 1919, 419 people were killed and approximately 7,000 were injured while walking or riding on the public streets of Chicago through causes for which the railways were in no way responsible. These figures represent totals in deaths 10 times as great and in injuries 25 times as large as the corresponding casualties resulting from accidents involving trains.

The problem of street accidents due to the number of vehicles and the number of street intersections, running into hundreds of thousands, is obviously much more difficult of solution than that arising from the crossing of streets by railway tracks, and while the public authorities and civic bodies are in a sense alive to this new menace, their efforts at solution have been restricted essentially to safety campaigns, traffic rules, the education of school children, etc.

Except in cases of unusual congestion or the separation of commercial and pleasure traffic, the grade separation idea has received little recognition as a solution of the street accident problem. Since the rule is proved by the exception it is interesting to note that the Illinois Central terminal improvement project at Chicago contemplates subways for pedestrian traffic under two important boulevards, but here the basic reason is that of congestion of traffic rather than one of the safety of the pedestrian.

This raises the question as to the further gains to be made in accident prevention through concentration of expenditures on the separation of railway grades from those of the streets. It is true that congestion of traffic on both streets and tracks makes this imperative in many places, but when we turn to the far more important matter of personal safety, what justice is there in singling out the railway accidents (which now comprise a small portion of the total) for drastic elimination, and apply only palliative measures to the great bulk of the casualties?

The only correct principle to apply in expenditures to reduce accidents is to send each dollar where it will result in the greatest saving of life, and under present circumstances it is not certain that track elevation projects always offer the most fertile field.

Reduction in Railway Expense

UNDER GOVERNMENT OPERATION the operating expenses of the railways were increased about 65 per cent. The operating expenses in December, 1917, were $252,000,000, or at the rate of about $3,000,000,000 a year, while in January, 1920, they were $415,000,000, or at the rate of approximately $5,000,000,000 a year. A large part of this vast increase in expenses has been attributed to the inefficiency of government management. The railway companies in seeking advances in rates have, however, based their calculations as to the additional revenues needed largely upon the operating expenses incurred during the closing months of government operation.

Naturally, this action by the railway companies has been challenged. The question has been raised as to why, if government management was responsible for a large part of the increases in expenses, it will not be practicable under private management to effect large reductions in expenses. The manner in, and the purpose for, which the question has been raised necessarily imply that it should be practicable to make large reductions in expenses not merely in the long run, but in the near future, for it is to put them on their feet financially in the near future that the railway companies are asking for the advances in rates.

The *Railway Age* repeatedly has contended that government operation was less economical than private operation would have been, and has never wavered in its belief that in the future private operation would be more economical than government operation would be. To take this position, however, is a very difficult thing from contending that the railway companies can in the immediate future make large reductions in operating expenses. It is much easier to make increases in expenses that ought not to be made than to get rid of them after they have been made. To what have been due the increases in operating expenses which have occurred since government operation was adopted? In the hearings before the Railroad Labor Board some of the spokesmen of the labor organizations have sought to give the impression that they have been due more largely in proportion to increases in other expenses than to advances in the wages and reductions in the hours of work of the employees.

The operating expenses of the railways are broadly divisible into three classes, first, wages; and second, cost of fuel and of materials and supplies. The wages paid in December, 1917, were $153,000,000, while those paid in January, 1920, were $258,000,000, an increase of 68 per cent. The differences between these amounts and the total operating expenses incurred in the same months give approximately the amounts spent in those months for fuel and materials and supplies. The cost of fuel and materials and supplies in December, 1917, was therefore approximately $99,000,000, and their cost in January, 1920, approximately $157,000,000, which shows an increase in them of just about 60 per cent. It will be seen, therefore, that the increase in the pay roll has been both absolutely and relatively greater than the increase in other expenses.

The increase in the pay roll was due partly to the establishment of the eight-hour day, which resulted in an increase of 250,000 in the number of employees, but principally to advances in wages. The manner in which the Railroad Administration made advances in wages is open to severe criticism, especially its course in standardizing wages throughout the United States regardless of local conditions, and in disturbing many of the relationships which had previously existed between different classes of employees. The result of these things was much larger increases to many employees than were justified. Another result, however, was that some employees did not receive relatively as large advances in wages as they were entitled to,

and as they must now be given if the railways are to compete with other employers for labor. Regardless, however, of the unwisdom of many of the advances given under government control, no one believes that any reductions will be made at least for some time to come. On the other hand, some advances undoubtedly will be made by the award of the Railroad Labor Board. With respect to the wage matter the railway companies are doing all they can to get it put on the right basis. They are being represented before the Railroad Labor Board by an able committee of managers, who, while not opposing all advances, are presenting all the data and arguments they can to secure an award which will be fair to both the employees and the public.

The result of the increases in the number of employees is that substantially less freight traffic is now being handled per employee than before government operation was adopted. Cannot the railway companies remedy this condition? They undoubtedly can, but it will take time, and what is equally pertinent, it will require large expenditures of capital. Before government operation was adopted the amount of traffic handled by the railways in proportion to the number of men they employed was steadily increasing. This was principally due to the fact that they were investing new capital in the railway plants all the time for the express purpose of increasing the amount of traffic handled in proportion to the number of men employed. Between 1907 and 1917 the increase in the investment in the railways per man employed was $3,000. Meantime, the number of passengers carried one mile per employee annually increased 37 per cent, and the number of tons carried one mile per employee increased 61 per cent. Reductions in grades, elimination of curvature from track, enlargement of terminals, provision of larger cars and more powerful locomotives enabled the railways largely to increase the amount of traffic handled per car, per locomotive and per train, and it was these things which enabled them to handle a constantly increasing business in proportion to the number of men employed. If they had not been able to raise the capital to make these improvements in the physical properties they never would have been able to have effected the economies that resulted. Likewise, in future their success in increasing the amount of traffic handled more in proportion than the number of men employed will be dependent principally upon their ability to raise new capital for productive improvements.

The railways cannot control the prices they must pay for fuel and materials and supplies. Doubtless in course of time the prices of these things will decline if prices in general decline, but their prices will be subject to the same influences as the prices of other things. Increased efficiency in the use of fuel and materials and supplies will be chiefly dependent, like increased efficiency in the use of labor, upon improvements in the physical properties. Reductions, for example, which have been made in the number of tons of coal required to handle a given amount of passenger and freight traffic have been chiefly due to increases in the tractive power and improvements in the design and equipment of locomotives. But the acquisition of larger and better locomotives involves an increase in the capital invested in the railways.

We do not mean to imply that the efficiency with which the railway plant as it now stands is operated, cannot be increased. Undoubtedly it can be, and will be, and every increase in efficiency results in savings. We emphasize now the point that increased economy of operation will depend in the future, as it has in the past, chiefly upon the ability of the railway companies to make improvements in the physical plants, because this is a point which it is so important should be understood at the present time, but which is often overlooked.

In discussions of the need of the railways for raising large amounts of new capital practically all the stress usually is put on the fact that they need to raise capital to increase their facilities. But there is need for the investment of a vast amount of new capital, primarily to make improvements which will result in reductions of operating expenses. In the long run, the railways will be able to make their expenses and their rates much lower, if their rates are made high enough now to enable them to raise adequate capital, than they will be if their rates are in the immediate future kept as low as they legally can be. The great economies in operation in the future will depend, as in the past they have depended, upon the ability of the railways to make improvements which are essential for the greatest economy in the use of labor, fuel and materials.

Railroad Organizations and New Conditions

One of the principal requisites to continuance of the life, growth and progress of any organism—biological, industrial or social—is that it adapt itself to changes in its environment. A railroad organization is an organism which is strictly subject to this requisite of continued life, growth and progress. Important changes recently have taken place, and are still taking place, in the environment in which railroad organizations must function. Not many railway organizations have been or are being so changed as to adapt them to some very important new conditions; it is largely to this that some of the serious troubles of the roads are due.

Years ago the organizations of the large railroads were divided into operating, traffic, legal, accounting and financial, and purchasing departments. Each of these was created to perform certain functions which, under the conditions existing at that time, had to be performed. Within the last fifteen years the conditions under which the railways must be managed have been enormously changed by two great influences. One of these has been regulation, and the other the labor movement. The conditions have been further changed by the fact that the growth of traffic has so outstripped the expansion of facilities and that today most railways, instead of needing more traffic, as formerly, are in dire need of more facilities with which to handle traffic.

In spite of the revolutionary changes which have occurred, the organizations of most railways are in most important respects what they were fifteen years ago. They have practically the same departments, and the departments are trying to function much as they did then. For example, the traffic department was created, first, to get business, and, second, to fix rates according to what the traffic would bear in order that the railway might make the largest practicable profits. In other words, it was created as the department of sales. It is just as important today to "sell" railroad service at a reasonable price as it was twenty years ago, but this selling must be done in a different way, and requires different qualifications. What is necessary at present is not to convince the shipper that he should route his freight over the traffic man's line, but to convince him that the railway is handling his business as well as it can, and to explain to him why it cannot handle it any better. Also, it is really no longer a function of the traffic department to fix rates. That function now belongs to the Interstate Commerce Commission and the state railroad commissions, and the work of the railroad organization is to get these public authorities to fix adequate rates. This is not merely a matter of preparing data and arguments to present to commissions. What the regulating authorities will do in the long run is determined by public opinion. Therefore, the "selling" of railroad service today is even more a matter of educating public opinion than of convincing public authorities.

There are, however, few railroad companies that have

recognized the fact that either the traffic department should be broadened or an entirely new department—a department of public relations—should be organized for the purpose of constantly presenting the case of the individual roads and the roads as a whole to the general public. The result is that the work of handling public relations—which is mainly that of "selling" railroad service—is divided between the president and all the other departments; that on most roads no particular department concentrates or specializes upon it; and that the work of handling public relations usually is not well done and on many roads is hardly done at all. It is time the railway managements awakened to the fact that the handling of public relations is now one of the most important functions of railroad organization; that it is work which requires as much brains, training and special experience as any other branch of work; and that unless adequate provision for having it properly carried on is made the relations of the railways with the public will not be made satisfactory.

The labor problem also has become entirely different from what it was fifteen years ago. Formerly, most railway employees were unorganized and were dealt with as individuals by the local officers. Furthermore, often the classes of employees that were organized dealt chiefly with the local officers of the individual lines. Most railway employees were then friendly to private operation and did not dream of desiring to substitute management by the employees for management by the companies, as proposed in the Plumb plan. At present all classes of railway employees are organized. National labor movements have taken the place of local negotiations. Many employees are unfriendly to private management, and have been educated to the radical view that management by the employees should be substituted for management by officers representing the owners. Successful handling of labor matters under these changed conditions requires new methods and new types of officers. The conditions suggest the desirability of the employment of high-grade specialists to study the labor problem in all its broader phases and all its details, and to perform the dual function of pointing out to the employees the changes which should be made in their attitude toward their employment and to the companies, and to the companies the changes which should be made in their attitude toward and treatment of the employees. And yet, while, in order to deal with the new conditions in the labor field, many industrial concerns are employing labor managers, we know of no railway which has taken any such step.

In the past the successful railway managers were those who constantly adapted their organizations and their methods to changing conditions. The same thing will be true in future; and in future the most successful railway managers will be those who are as successful in dealing with public relations, and with labor, as they are in devising or adopting improvements in the physical plants and in physical operating methods. But any railway manager who is successful in dealing with the public and with labor will be so because he sees the necessity of adapting his methods and his organization to new conditions.

There is too strong a tendency on most railroads to ignore the extent to which conditions have changed and to refrain from, or to delay making, the changes in their organizations needed. The rapid development and increase in efficiency of our railways in the past were mainly due to the fact that their organizations were constantly adapted to changing conditions. The men who made the organizations what they are now would be the first, if in charge now and as full of initiative as when in their primes, to say there is nothing sacrosanct about the organizations they created and that important changes in them are as necessary now, and will be in the future, as they were in the past.

Letters to the Editor

Reducing Delays in Maintenance Operations

Salt Lake, Utah.

To the Editor:

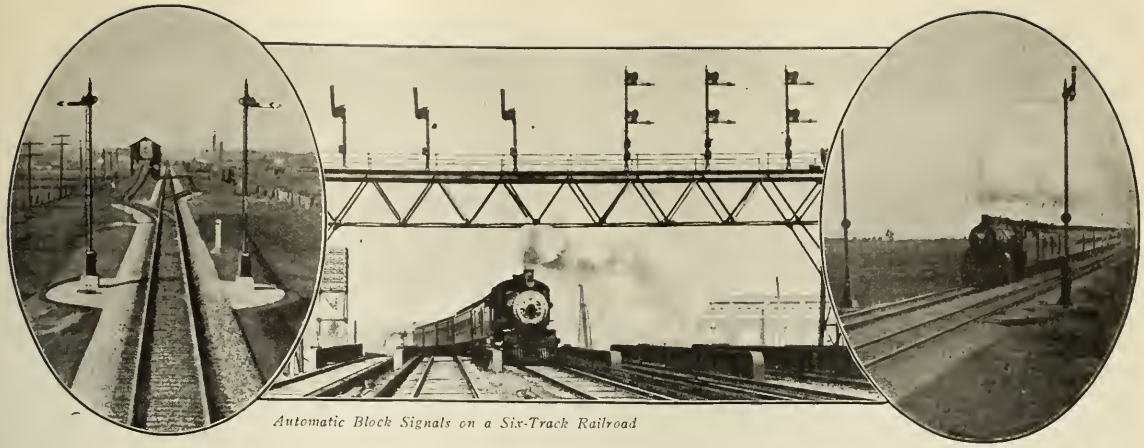
Referring to your editorial in the issue of May 7, entitled "Shall Trains or Workmen be Delayed," one phase of this question not treated in this editorial deserves further consideration. This is proper planning and co-operation on the part of officers and engineers or minor officers under them to bring about the least possible delay both to the operation of trains and the prosecution of work. A strong divisional organization which can properly handle all operations of maintenance, renewals and construction that may to a certain extent interfere with traffic if not properly handled, is preferable to a departmental organization in handling such work. The division superintendent responsible for both operations will find means to carry on the work with the least delay to all.

Recently, in the construction of a section of second track, where the division forces were handling the track laying and work train service in general, the problem of distributing material and handling forces to and from work where train movements had reached 50 to 60, and occasionally 75 per day, became serious. The outcome was that the second track was laid by the use of tracklaying machines and the construction operations carried on entirely independent of the main track then in operation for the distribution of material, resulting in considerable economy. In another case where it was necessary to train haul considerable material for widening banks in preparing a diverging branch line for use as a second main track, it was necessary to move a depot back, lay a track through a station ground and extend it a mile and one-half to reach the desired steam shovel pit. All this was properly considered in the estimate for the work and compared with the assumed cost of delays to train operation, work trains and labor.

In the case of rail or structural renewals involving the use of operated rails, a careful study of the train charts will in most all cases show intervals of considerable length where the board is clear in so far as scheduled trains are concerned, and the co-operation of operating officers and field engineers handling work will make it possible to so run trains as to give one or two, or more, periods each day during which track may be used by work gangs without interruption, in which material may be placed to be finally finished during the balance of the working day.

W. R. Armstrong,
Assistant Chief Engineer, Oregon Short Line.

All Must Co-operate.—It will not help railroad conditions to have the government take back the roads, borrow more and more to provide equipment, pay higher and higher wages to satiate from time to time the clamant demands of the railroad brotherhoods, and saddle the resulting deficits upon the public through heavier and heavier taxation. This is what government ownership or operation has meant up to date, and this is the primary cause of the present troubles. What is needed is a reasonable co-operation on the part of the public authorities in the effort to restore the efficiency of the lines and to bring about a restoration of the favorable attitude of the public with respect to railroad securities. This will take some time. It is desirable to hold the amount and character of government interference to the lowest possible minimum.—*Journal of Commerce (New York)*.



Automatic Block Signals on a Six-Track Railroad

Train Operation By Signal Indication

A Discussion of the Two Principal Methods of Directing Train Movements—The Time Interval and the Space Interval

By Henry M. Sperry, M. Am. Soc. C. E.

In Two Parts—Part I.

ON THE RAILROADS of the United States two principal methods of directing train operation are in use: *a* the Time Interval Method, and *b* the Space Interval Method.

The first part of this article will describe briefly these two principal methods, and a comparison of the two methods will be made. This comparison will show that due to inherent disadvantages the time interval method is not efficient for directing train movements. On the other hand, the advantages of the space interval method are such that it is *the* method that permits of efficient train operation.

The increasing costs of labor and of fuel emphasize more than ever the need for the greatest possible efficiency in train operation.

The second part of the article will describe train operation by signal indication and point out the marked advantages of this method of directing train movements.

Time Interval Method

Train operation under the time interval method is directed by: (*a*) time tables; (*b*) train orders and train order signals, and (*c*) train despatching. The time table is the primary authority for the movement of regular trains. Train orders are the authority for movements not provided for by time tables, and for regular time-table trains when, because of delays, the time table must be modified or temporarily suspended. The movement of trains according to time tables and rules which specify a minimum number of minutes between trains moving in the same direction, is the distinctive feature of the time interval method. For trains not carrying passengers this interval is usually five minutes; for trains carrying passengers it is ten minutes.

Time Tables

As defined by the American Railroad Association's Standard Code, the time table is "The authority for the movement of regular trains, subject to the rules. It contains classified schedules for trains, with special instructions relating thereto." The authority for the movement of an extra train on single track is a written order from the train despatcher, customarily sent by telegraph or telephone; in common parlance, "train orders." On a double track line extra trains may be run without formal train orders. In this case the only serious complication is the necessity for keeping slow trains out of the way of those which run faster, and this is usually provided for by a general rule that extras thus run without formal order shall clear the main track ten minutes before the time at which a following faster train is due, by the time table, to arrive. If the extra is a fast train it is *not* run without a despatcher's order.

Prior to the use of the telegraph in train operation, the time table was the sole authority for train movements. Had it been possible to run all trains in exact accordance with the time table, operation of trains would have been a comparatively simple matter. It was not possible, even in the early days, when every road had light traffic, to avoid serious delays to trains; and without electrical communication the art of railroad operation would have been dwarfed in its infancy. The use of the telegraph for authorizing movements, not provided for by the time table, first made it possible to transport passengers and freight without intolerable delays.

Train Orders

The train order, therefore, came into use to supplement the time table. It is defined by the Standard Code as follows: "For movements not provided for in the time table train orders will be issued by authority and over the signature of the [superintendent]. They must contain neither information nor instructions not essential to such movements. They must be brief and clear; in the prescribed forms when applicable; and without erasure, alteration or interlineation. Figures in train orders must not be surrounded by brackets, circles or other characters."

The Standard Code embodies explicit rules and contains forms designed to insure uniformity of practice in the

preparation, transmission, and delivery of train orders. Train order forms may be grouped into three general classes:

(*a*) *For directing train movements* the orders in use are: the meet, the pass, the right, the time, and the hold orders.

(*b*) *For designating the kind of trains* to be run: the section, the extra, or the work extra orders are used.

(*c*) *For modifying orders:* the annulling or the superseding orders are used.

It will be noted that the principal class is that for directing train movements (*a*).

Train Order Signals

The usual type of station train order signal is the two-arm semaphore signal, one arm for movements in one direction and the other for movements in the opposite direction; each arm capable of being displayed in either one of two positions; one position indicating "stop" to approaching trains and requiring them to stop for train orders to be delivered to them; the other position indicating "proceed," to be displayed when there are no orders to be delivered to trains moving in the direction to which that arm applies.

Train Despatching

Train despatching may be defined as the art of directing train movements. It is to the credit of the American train despatcher that he has been able so skillfully to meet the constantly increasing requirements of transportation.[1]

Directing Train Movements

The directing of train movements is accomplished through the use of general rules, local rules, time tables, train orders and train order signals. Under the space interval method there is, in addition, the use of block and interlocking signals.

Directing train movements may be considered broadly under two general heads—(*a*) the preparation and transmission, and (*b*) the delivery, of instructions, rules, time tables and train orders. This division under two heads is to show the marked difference between the preparation and delivery of instructions, rules and time tables on the one hand, and the preparation and delivery of train orders on the other. In the first class we have what may be termed permanent elements, whereas train orders are of a temporary nature.

Instructions, rules and time tables are the *plans* for conducting train operation. They must be prepared and delivered in advance of the time of their use. Train orders, on the contrary, are to meet the ever changing needs which cannot be provided for in advance and must be often made on the spur of the moment. If train operation could be conducted by time tables without delay it would not be necessary to use train orders; such mathematical precision being impossible, train orders and train despatching are essential in efficient train operation. As stated, train orders differ from instructions, rules, and time tables as to the time available for their preparation and delivery. There is ample time for handling instructions, rules, and time-tables; but train orders must often be formulated and transmitted with the utmost speed. The despatching is not efficient if the handling of the train orders causes delay. This may be true even if the order reduces a prospective loss of time, as where the delay would have been still further reduced had there been no delay in the handling of the order. The delivery of the instructions, rules, and time tables is a simple matter, for it can be made days in advance of the movements to which they apply. The delivery of train orders, however, is an entirely different matter, for delivery must be made to *trains in operation;* hence, the *method* of delivery should not cause loss of time.

The *delivery* of the order is of vital importance, as is evident from the very specific rules provided. A train order of Form 31 is delivered to, and its receipt acknowledged in writing by the persons to whom it is addressed. (The engineman usually is an exception; to avoid the loss of time which would be involved in requiring him to go to the station office it is provided that his copy may be delivered to him by the conductor).

The Form 19 train order is required to be signed for only by the station operator. He is held personally responsible for the delivery of the "19" order, but the form does not require the signature of the conductor or the engineman or any other acknowledgment by signature to the despatcher.

Because of this difference in delivery, a moving train is required to stop for a "31" order, but need only slacken speed for a "19" order. If the order should authorize the train to continue its journey, then the delivery of the "31" order, requiring the train to stop, causes a useless delay that might have been avoided by the use of the "19" order. The disadvantages connected with the stopping of trains simply to give them instructions under which they may proceed will be more fully considered under the Space Interval Method.

William Nichols in his excellent book on "Train Operation" says: "The use of the '19' form is not restricted by the Standard Code. However, some roads prohibit its use for restricting the superiority of a train. There has been and still is, no doubt, considerable prejudice against the '19' form order. This is generally because of not thoroughly understanding the difference between the '31' and '19' forms so far as safety is concerned. With a proper clearance card made for the purpose, and with a few restrictions placed upon its use, it is as safe [as the '31'] and certainly is far the best order for the prompt movement of trains."

John F. Mackie, formerly secretary-editor, Train Despatchers' Association of America, and a veteran railroad operating officer, in his article on "Train Rules and Train Despatching Past and Present" declares the crux of the whole matter to be the delivery of the order. "There is increased assurance of delivery of the '19' form because of the requirements that the operator shall personally deliver the order to both the engineman and conductor. He is, therefore, out on the platform prepared to make the delivery. * * * He is an active, instead of a passive agent, in the delivery of the order."[2]

The Space Interval Method

Train operation under the space interval method is directed by:

(*a*) Time tables; (*b*) train orders and train order signals; (*c*) train despatching, and (*d*) the block system. Trains are operated under the space interval method by time table, train orders, and train despatching, the same as in the time interval method. In addition, there are block signals. Although trains are moved under time tables, the block signals enforce an interval of space between trains moving in the same direction, wholly regardless of the time interval. This is the distinctive feature of the space interval method, and is the basis of the block system. The time interval is maintained by attendants, with watches or clocks, at stations. Suppose, under this system, the prescribed interval be ten minutes. At the expiration of that length of time after the departure of the last preceding train, the attendant displays to a train a proceed signal; but if the preceding train has been unexpectedly stopped at some obscure point between this and the next station, this proceed signal is deceptive; it does not remove the danger of a collision under such circumstances, and this danger has to be provided against by the flagging rules. But if the space interval system is in effect the station agent, instead of allowing a train to proceed at

[1] See Appendix at end of article, for the principles of Train Despatching, from book on "Telegraph as Applied to Train Movements," by J. J. Turner, Vice-President of the Pennsylvania system.

[2] Proceedings Central Railway Club, September, 1916.

the end of a period of 10 minutes holds it until he has been informed that the preceding train has actually arrived at the next station, whether the time be 10 minutes or 10 hours. Thus the time interval, in such a situation, is superseded, so far as concerns its function as a preventive of collisions. It becomes merely a convenience.

Time Tables

Under the time interval method, in order to comply with the five and ten-minute rule, trains must not be scheduled at intervals less than five [or ten] minutes. In the space interval method, however, trains may be scheduled at intervals determined by the time required for them to move through the block sections. The passenger service on the express tracks of the Interborough subway, New York City, is a notable example of moving trains under close intervals.

Automatic Block Signals on a Double Track Road of Heavy Traffic

There, under the automatic block system, with sections less than 900 feet long, ten-car passenger trains, moving at 35 to 40 miles an hour, are allowed to follow one another at intervals of one minute and 48 seconds. Without the block system, the time interval system, dependent for safety on the flagman, would be out of the question. Before a flagman could get off his train to start back with his stop signals the time interval would be used up.

Train Orders

In the space interval method there is a decrease in the number of train orders issued, and of those which are issued a larger number are on form 19, as compared with form 31. The decreased use of the written train order is fully considered under Train Operation by Signal Indication. The "19" order keeps trains moving, and obviates one of the most undesirable features of train operation, as heretofore extensively practiced, the stopping of trains for the sole purpose of giving them written train orders.

Eliminating the unnecessary stopping of trains, saves fuel and water and the cost of the wear and tear on cars and engines for these useless stops. Every unnecessary stop creates an unnecessary hazard. By eliminating unnecessary stops, unnecessary hazards are eliminated. Every unnecessary stop is an unnecessary delay, not only to the train that is required to stop, but often to other trains as well.[3]

The St. Louis-San Francisco Railroad has made an estimate of the economy effected by the elimination of useless stops by the use of the "19," instead of the "31" order, and reports an annual saving of $29,630, as follows:

ESTIMATED MONTHLY SAVING; AVERAGE TRAINS PER DAY, 27½.

Reduction of overtime, 5 hours a day, at $4.18 an hour	$647.90
Saving one-half ton coal per freight train per trip, at $3.25 a ton	1,511.25
Saving in wear and tear in not stopping "long-drags" for orders, $10 per day	310.00
Saving per month	$2,479.15

Or an annual saving of $29,630; which is equal to interest at five per cent on an investment of $592,596.

Train Order Signals

The two-position train order signal, heretofore referred to, *has but a limited use in directing train movements.* It is used only to indicate "stop" for orders; or "proceed" when there are no orders. There is an increasing demand for a signal that can be used in place of, not merely as an adjunct to, written train orders. A signal is needed to direct trains to (*a*) "Take siding"; (*b*) "Hold main," or proceed on main track regardless of superior trains.

On double-track roads equipped with block and interlocking signals, train movements at the interlocking stations are directed by the interlocking signals.

At non-interlocked passing-sidings there is a need for a signal to indicate "take siding," or "hold main." The Erie Railroad (one of the first to meet this need) uses for this purpose a three-position semaphore train order signal giving three indications: "proceed," "take siding," and "stop."[4]

Train Despatching

The principal purpose of train despatching as already suggested in the discussion of the time interval system is to so direct the operations of trains that they may move with maximum safety and minimum delay. Train despatching has

Automatic Block Signals on a Four-Track Railroad

reached a higher level of efficiency under the space interval method than was possible under the time interval method. This has been accomplished by the use of: (*a*) the automatic block system; (*b*) the "19" train order, and (*c*) signal indications in place of written train orders.

The train despatcher directs the movement of trains as if his division were a great interlocking plant. He sends his instructions or orders to the signalmen at the block and interlocking stations; these signalmen in turn direct the movement of trains by signal indications. It is thus possible to move maximum traffic with a minimum delay. The *written* order, with its delays and opportunities for error, is replaced by the fixed signal with its instantaneous operation and unmistakable indications. A despatcher can order a signal cleared, can get it cleared and receive the station operators'

[3] "See Increased Efficiency by Use of Train-Order Form Nineteen," by T. H. Meeks, *Railway Age*, February 1, 1918.

[4] See "Train Operation by Signal Indication on the Erie Railroad," *Railway Age*, July 5, 1918, page 5.

assurance that the object is accomplished in less than one minute; whereas, a train order would require several minutes for transmission and transcription, to say nothing of the delay to the train and the time required by the trainmen for reading it.

The Block System

The Interstate Commerce Commission defined the block system at length in its seventeenth annual report (December, 1903). The following is quoted from this report:

"The term 'block system' shall be taken to mean the methods and rules by means of which the movement of railroad trains (cars or engines) may be regulated in such a manner that an interval of space of absolute length, may be at all times maintained between the rear end of a train and the forward end of train next following."[5]

The Block Signal and Train Control Board defined the block system as:

"Any method of maintaining an interval of space between trains moving on a railroad. Primarily the term refers to the spacing of trains moving on the same track in the same direction, but in practice it is used, on single track lines, both for this purpose and for the protection from each other of trains moving in opposite directions toward each other."[6]

This last definition is a clear statement of the object of the block system, which is to maintain "*an interval of space between trains moving on a railroad.*"

The Standard Code gives definitions, requisites, and rules for the three block systems; the manual, the controlled manual, and the automatic. The manual block system is "a series of consecutive blocks, governed by block signals operated manually, upon information by telegraph, telephone or other means of communication." The controlled manual is "a series of consecutive blocks governed by block signals, controlled by continuous track circuits, operated manually upon information by telegraph, telephone or other means of communication, and so constructed as to require the co-operation of the signalmen at both ends of the block to display a clear or a permissive block signal." The automatic is "a series of consecutive blocks governed by block signals operated by electric, pneumatic, or other agency actuated by a train, or by certain conditions affecting the use of a block."

Time Interval vs. Space Interval; Comparison of the Two Methods

The character of the interval between trains moving in the same direction is the principal difference between these two methods.

In the time interval method, the interval between trains is maintained at stations usually situated at varying distances apart. This time interval, on most railroads, for trains not carrying passengers is five minutes; for trains carrying passengers it is ten minutes. This time interval, as provided by rule, is to allow time for a flagman to protect the rear of a standing train by red flag or red light; and also by torpedoes and fusees. In the space interval method the interval between trains, whatever their class or character, is a *space* interval for all trains. Fixed signals provide for this space interval. The space intervals are called blocks.

The Operating Efficiency of the Two Methods

As has been shown, it is necessary with the time interval method to allow a larger time margin between train movements than is required with the space interval method. On account of this larger time margin, the time interval method is correspondingly less efficient than the space interval.

Both delays and hazards are reduced to the minimum in the space interval method, and its superior efficiency is obvious. Operation at maximum track capacity is not possible under the time interval method. Operation at maximum track capacity under the space interval method *is* possible.

The Relative Safety Factor of the Two Methods

In the time interval method two types of fixed signals are used—train order signals and interlocking signals; these signals not being used to space trains.

The protection of trains depends upon the rules requiring trains to keep a certain number of minutes apart, and upon the flagman's signals for the protection of standing or slow-moving trains.

The Interstate Commerce Commission in a report to Congress, describing the limitations of the time interval method, says: "Without the block system, the right of a train to proceed depends, [a] on the class of the train as regards other trains; [b] on the time, as shown in the time table; and [c] on the vigilance of the engineman in seeing that the preceding train is out of his way. Under the block system these otherwise vital features become matters merely of convenience or expediency. With no block system rear collisions are provided against by flag or lantern signal, but the failure of this safeguard is notorious. It fails both from the negligence of flagmen to carry out or display the signal, and of enginemen to heed it when it is given. On a single-track line, in addition to these uncertainties, the men in charge of trains have the burden of considering their rights as against trains coming from the opposite direction, which are of two or more different classes, and the superiority of which, as related to their train, may vary from hour to hour, or may be varied by telegraphic orders from the train despatcher at any stage of the train's journey. Butting collisions, due to confusion in these things—to mistakes in reading the time table, to wrong telegraphic orders, to non-delivery of orders, to forgetting orders, and other blunders—are as notorious as are rear collisions from flagmen's failures.

"On either double track or single track we have on the one hand (in the block system) fixed signals, situated at known locations, few and simple requirements, and few men to share the responsibility of any given operation. On the other hand, we have in the old system, signals (as flags) not fixed but to be encountered at unexpected places, or no signals at all, compelling dependence on the time tables, watches, and confusing rules of superiority. Responsibility is divided among a larger number of men."[7]

In the space interval (block system) method three classes of signals are used—(1) train order signals, (2) interlocking signals, and (3) block signals. The first two have the same functions as under the time interval system; but the interlocking signals (where they are part of a block system) are used also for spacing trains. The block system, of course, is not absolute perfection, and every road keeps in force the rule requiring flagmen to protect standing or slow-moving trains by hand signals (flags, lanterns, torpedoes and fusees).

"The block system provides that each engineman may, with perfect safety, start and run his train by the sole authority of a visible signal, fixed on a post at the side of the road, which gives him the exclusive right to the track for a given distance (to the next block signal) without limitation as to the time to be spent in getting there, or the speed. The system provides all necessary security against collision, with no question about the importance of the train, or the priority of any other train. So far as safety is concerned, all trains are of the same class." [8]

To maintain between trains a safe and satisfactory interval of *space*—in other words, to prevent collisions—and to do it wholly by means of time—by the use of clocks and watches—would require a station with a clock (and an attendant) every few hundred feet, and it would be imperfect

[5]Seventeenth Annual Report, 1903, p. 345, Sec. 14.

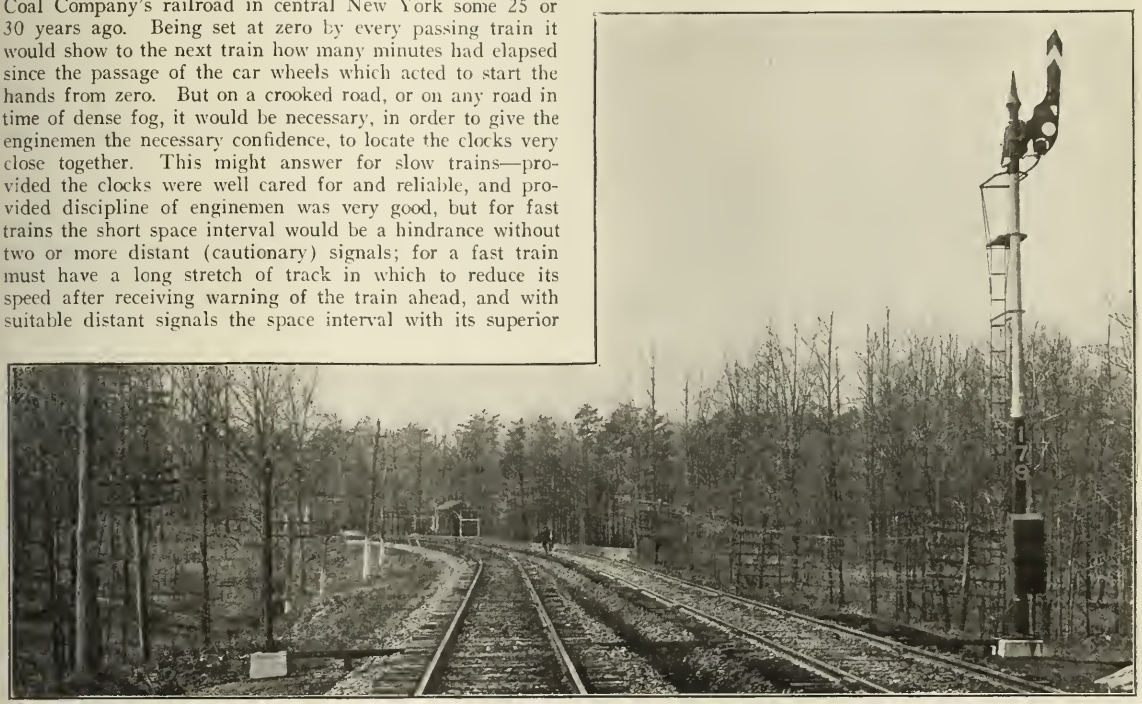
[6]Interstate Commerce Commission; First Annual Report of the Block Signal and Train Control Board (1908), p. 71.

[7]Report of the Interstate Commerce Commission on Block Signal Systems; Senate Document No. 342. 1907; p. 11.

[8]Senate Document No. 342, p. 11.

even then, for the theory of the time interval system requires a length of time sufficient for a flagman to go back and flag. Hence, the inherent weakness of the system. A complete system should have stations, say 1,000 feet apart, and it should have flagmen capable of always going back 1,000 feet, in say, two minutes. A mere glance at a situation like this makes evident the weakness of the system.

Automatic clocks have been tried, but they only serve to show in stronger light the fundamental insufficiency of any time-interval system. A clock on a 20-foot post at the side of the road was in use for a short time on the Fall Brook Coal Company's railroad in central New York some 25 or 30 years ago. Being set at zero by every passing train it would show to the next train how many minutes had elapsed since the passage of the car wheels which acted to start the hands from zero. But on a crooked road, or on any road in time of dense fog, it would be necessary, in order to give the enginemen the necessary confidence, to locate the clocks very close together. This might answer for slow trains—provided the clocks were well cared for and reliable, and provided discipline of enginemen was very good, but for fast trains the short space interval would be a hindrance without two or more distant (cautionary) signals; for a fast train must have a long stretch of track in which to reduce its speed after receiving warning of the train ahead, and with suitable distant signals the space interval with its superior simplicity would be as feasible as the clock interval. And all this ignores one of the important virtues of the automatic block system—its function of detecting broken rails.



Away Down South in Dixie. The "Proceed" Indication of the Signal Extends the Engineman's "Vision" Around the Curve

Relative Safety of the Three Block Systems

The Manual block system: (*a*) A man-operated system. (*b*) The signals are operated *entirely* on information transmitted by telegraph, telephone or electric bell code. (*c*) The correct operation of the system is entirely dependent *upon human agency without mechanical check.*

The Controlled Manual: (*a*) A man-operated system. (*b*) The signals are operated on information transmitted by telegraph, telephone, or bell code. (*c*) The correct operation of the system is dependent *upon human agency, checked by track circuits* throughout the length of the block section.

The Automatic Block System: (*a*) A power-operated system. (*b*) The signals are operated by "electric, pneumatic, or other agency." (*c*) The operation of the instruments in the system is controlled, not by human agency but by the passage of the train into and through the block section, through the medium of the continuous track circuits.

From a safety standpoint, the control of the signals by the train is the vital point of difference between the systems. In the manual block system the *train does not control the operation of the signals,* for no mechanical check is provided, when the block is occupied by a train, to prevent the display of the clear signal behind it. In the controlled manual system the train but partly controls the signals. In the automatic block system the *train completely controls them.*

Relative Operating Efficiency of the Three Systems

Delays of trains reduce the capacity of the tracks, therefore, the operating efficiency of the three block systems may be measured by the relative amount of train delays directly chargeable to block operation.

Train delays chargeable to block operation are unavoidable if the block sections are too long for the movement of trains as frequently as the terminal is ready to send them out.

The ideal method for determining the length of block sections to insure operating efficiency is by taking the required time interval between trains—the frequency required by the volume of traffic which it is desired to move—and making the *time* lengths of the block sections such as will permit of train movements under clear signals. Measured in time the block lengths will be the same, but measured in distance the block lengths will vary with the speed; e. g., the short block on an up grade may be the equivalent of a much longer block on a down grade. Or, further, the block in which a station or other stop is made must be shorter in length than one in which no stop is made.[9]

In the two manual block systems this ideal method is often disregarded because of the tendency, when locating block stations, to give first consideration to the cost of wages of signalmen. This consideration for wage cost is at present a constant disturbing element because of the eight-hour law requirement of three signalmen at each block station. When the wage cost is made the first consideration and block stations are placed at passenger stations to utilize the men at these stations as block operators, the result is often a series of blocks that vary so greatly in length, both as to

[9]See Report of Committee X—Signaling Practice; Journal of the Railway Signal Association, March, 1919, p. 42.

distance and time, that the time of trains is limited by the *longest* block. Long intervals between trains are thus inevitable.

In the automatic block system the ideal method can be followed, as the wage cost for block operators need not be considered. The block section lengths and the location of the signals can be arranged for moving trains at maximum track capacity.

The following is an interesting comparison of a manual block system installed on a double-track division of 139.5 miles that was later changed to an automatic block system with a marked improvement in operating efficiency:

Under the manual block system there were 46 block stations and 90 blocks. The average length of blocks was 3.1 miles, but with great differences in their lengths. The shortest block was .39 miles in length and the longest 7.27 miles; 58 blocks ranging from .39 to 4 miles; 16 blocks from 4 to 5 miles; 12 blocks from 5 to 6 miles; 2 blocks 6.89 miles, and 2 blocks 7.27 miles in length.

Under the automatic block, since introduced, there are 296 blocks of an average length of .94 of a mile.[10]

The elimination of delays chargeable to operation under the manual block was one hour and forty minutes per freight train, or a saving in time per train of 15 per cent.

By the improved operating efficiency the saving of expense in train operation was enough to pay for the automatic block *in less than four years.*

Conclusions

In a final analysis of the three block systems to determine which is the most efficient from an operating standpoint, it is necessary to place them on an *equal basis as to track capacity.* Assuming block sections one mile in length, the manual block is the lowest in first cost. The controlled manual is the highest in first cost (installation); but both systems are so high in cost of operation that it is the exception to find either the manual or the controlled manual with the number of block sections necessary for maximum track capacity.

On the contrary, the first cost of the automatic block (somewhat less than the first cost of the controlled manual) is the lowest of the three systems in cost of operation.

The automatic block shows the greatest operating efficiency per dollar of investment.

Appendix

Principles of Train Despatching

The principles of train despatching were clearly set forth years ago by J. J. Turner in his book on "The Telegraph as Applied to Train Movement," in the following terse paragraphs:

"First. That to prevent conflicting instructions and to insure safety, no more than one man can despatch trains on the same track at the same time."—Complied with by a rule to that effect.

"Second. That the despatcher be kept fully advised of all delays, present or prospective, and the position of every train on the road."—Complied with by reports from stations and terminals.

"Third. That orders must be so clearly expressed as to render a misunderstanding of their meaning impossible."—Complied with by the use of rules and forms of the Standard Code.

"Fourth. That the despatcher must know that they are in the hands of some reliable party for delivery."—Complied with by the acknowledgment of the operator giving his initials and office call.

"Fifth. That it is as near certain as anything human can be, that the party who is to deliver them will stop the train to which they are addressed."—Complied with at each train order office, by the use of a fixed signal which shall indicate "stop" when trains are to stop for train orders.

"Sixth. That when delivered to trainmen, they read just as they did when sent by the despatcher."—Complied with by the receiving operator, who repeats the completed order to the despatcher for verification.

"Seventh. That the instructions given to both trains are identical."—Complied with by the use of the duplicate order system.

"Eighth. That the train whose rights are extended must not be moved against the train whose rights are curtailed, without notice to the latter."—Complied with by sending the order first to the train whose right is restricted before completing the order to the train whose right is extended.

"Ninth. That men who are to act upon orders, acknowledge their receipt."—Complied with by rules relating to "31" and "19" orders.

"Tenth. That men using them know that they are doing so with the full knowledge and authority of the despatcher"—Complied with by the response "Correct" from the train despatcher.

"Eleventh. That trains running against other trains under special orders must be able to recognize each other."—Complied with by giving the number of the engine of every train mentioned in the order, or by train number indicators.

"Twelfth. That a complete record be kept of each transaction."—Complied with by use of the despatcher's order book.

[10] Erie Railroad, Susquehanna Division.

Car Detention and Car Shortage

The widespread and harmful effect of the unnecessary detention of freight cars has recently been shown by an analysis of the official reports of the Pacific Car Demurrage Bureau for the months of February and March, 1920. The figures, which are given below, refer to railroad operation in California only, but if a similar condition exists throughout the country, one of the salient reasons for the present car shortage is apparent.

During the month of February, 1920, there were 131,448 cars reported to the Bureau, an increase of 30,178 cars over the same month last year. During the month of March, 1920, there were reported 143,376 cars, an increase of 32,365 cars over the same month last year. These figures disclose the increase in the volume of business during these months.

The next and most important item in the reports is "cars-held-beyond-free-time." Considering that 48 hours, or 2 days' free time, after the first 7:00 a. m. after the cars are placed for industries by carriers, are allowed for unloading and loading, the following figures are vital.

During the month of February, 1920, 7,303 cars were held beyond the free time, an increase of 46 per cent over the same month the previous year and during March, 8,866 cars were held beyond the free time, an increase of 75 per cent over the same month the previous year.

The demurrage charges assessed by the Bureau for the detention of cars in February, amounted to $38,637 and in March to $58,615, or a total of $97,252 for two months, equal to an annual charge of $583,512. These figures also represent a delay to equipment equal to 80,964 car days for the two months referred to.

Chairman Clark of the Interstate Commerce Commission, in a recent address to the National Industrial Traffic League and the American Railroad Association, stated that the public would have the use of 102,000 additional cars through the saving of one hour per car each day. If a saving of one hour per day for each car would increase the supply by the addition of 102,000 cars what would be the volume of business California shippers alone could move if they could save the 80,964 car days now lost by reason of detention to equipment as disclosed by the Pacific Car Demurrage Bureau's reports? It is evident that the remedy for the present car shortage is in the hands of the shipping public.

Concerted Efforts to Relieve Freight Congestion

Consolidation Into Solid Train-Loads—Details of Local Committee's Work—A New Railroad Committee

WASHINGTON, D. C.

THE CONSOLIDATION of as much freight as possible into solid trains to single destinations and distributing centers, as a means of avoiding car congestion in classification yards and minimizing switching movements, is one of the principal recommendations to the railroads and to shippers sent out recently by the Commission on Car Service and by the Interstate Commerce Commission. In the letter of instructions to the local car service committees issued on May 22 by Chairman W. C. Kendall of the Commission on Car Service (noticed last week, page 1528), this element is elaborated at length.

The advantages of the principle are:

1. No material increase in delay or expense for classification of cars at originating points.
2. Entire elimination of switching or regrouping at division or junction points enroute.
3. Expedited movement automatically secured because cars can be forwarded through each division or junction point as quickly as the crews can be changed.
4. Reduction to the minimum of terminal delays.
5. Greatly increased efficiency in car service by increasing the average miles per car per day with more than a relative decrease in operating expense.

Continuing, Mr. Kendall says:

"This plan may be applied effectively under varying conditions. For instance, the flour mills at Minneapolis have found it of mutual benefit to co-operate with the railroads in loading solid trains for Baltimore today, for Philadelphia tomorrow, for New England points the next day, etc. Such trains, kept intact throughout, have actually arrived at destination in 30 to 50 per cent shorter time than isolated cars turned loose in miscellaneous service.

"Similar results may be secured by concentrating the loading of scattered industries in one central yard. This method was responsible during the war for reducing by one half the time consumed in the movement of lumber for ship and airplane construction from the Pacific to the Atlantic coast. * * *

"In terminal switching service grouping of cars for single industries where volume permits, even when located off line, greatly expedites movement and delivery.

"Conditions will usually justify holding cars one or more days to secure the volume required to make a train for a single destination. Solid lots of not less than 25 cars will be found most effective. Such solid lots will, of course, dovetail easily with any system of symboling trains."

Commissioner Aitchison of the Interstate Commerce Commission on May 27, also issued instruction to the Terminal Joint Committees as follows:

"Efficiency of transportation may be substantially promoted by the consolidation, where practicable, of shipments into solid trains for particular destinations and distributing centers. This plan tends to avoid congestion in the classification yards and to minimize switching. To illustrate: Certain petroleum shippers, acting through one of their organizations, avoided congestion at terminal points and minimized switching by consolidating their shipments into solid trains, so that all cars in a particular train were hauled by one railroad to one destination on one day, to other destinations via different roads on the second day and to other destinations via still another railroad on the third day, and so on.

"Each terminal committee should begin at once a study of this problem * * * and should impress upon all shippers and carriers the importance at this time of bending every effort to bring about this desired result * * *."

The principle of solid train movement was urged on the commission by M. J. Gormley, director of the Division of Transportation of the American Petroleum Institute, who had much to do with the development of this plan as assistant to the northwestern regional director under federal control. In a letter to Commissioner Aitchison, Mr. Gormley said that the railroads are awake to the importance of minimizing switching but suggested that the commission call on shippers for co-operation. "The petroleum industry," said Mr. Gormley, "is attempting in every possible way to relieve the situation by the method pointed out."

Mr. Kendall's letter contained elaborate and detailed suggestions on all points of the local committees' work. These include: Immediate check to be made of all cars in terminal waiting for delivery to connecting lines; arrangement with district embargo distributors for embargo information; reports of cars loaded in violation of embargoes; careful study of the handling of l.c.l., including the holding over of cars where advisable; careful arrangement of merchandise schedules; adoption, as far as may be practicable, of consolidated loading to single destinations on specified days; and adequate switching service to industries.

Where, in the opinion of the Car Service and Terminal Joint Committees sufficient facilities exist in the way of truck or other transport service, consideration should be given to embargoes or restriction by permit system on cross town or trap car service. This matter is one depending entirely on local conditions, but it is important that action be taken restricting the use of cars in this service whenever in the judgment of the two committees it is practicable to do so.

Co-operation with shippers and receivers of freight is dealt with in the circular at length. "Business men generally are willing to do anything within reason to improve transportation conditions, realizing as they never have before that our prosperity is being imperiled by the inability of the railroads to meet the needs of the nation."

Shippers are urged to order according to loading capacity; to restrict car orders to one day's program; do not duplicate orders for cars; order cars according to tonnage; have shipments prepared and ready for immediate loading on receipt of cars; hold shipments until the second or third day in order to make carload; work a little over-time and finish a load where practicable, and thus expedite the movement; co-operate with agent in switching service; furnish the billing agent prompt and full instructions; bill shipments through; confine bill of lading to its proper use, do not make it a commercial instrument; do not try to avoid an embargo by billing shipments to an intermediate point with the expectation of reconsigning into the embargo district; do not bill shipments by a circuitous route in order to avoid the effect of embargoes; load ten per cent above capacity of car; do not utilize full free time.

Consignees are exhorted to purchase to avoid long hauls; insist that shipper load cars to full capacity; pool shipments with others in similar need; unload promptly; have shipper forward freight according to daily capacity to unload; present bill of lading to railroad agent before arrival of cars; complete unloading of cars before usual switching time if at all possible; work a reasonable amount of over-

time if necessary to get cars switched out at the earliest possible time.

Releasing Cars at Galveston

The Interstate Commerce Commission on May 28 issued Service Order No. 4 ordering the Gulf, Colorado & Santa Fe, Galveston, Harrisburg & San Antonio, Missouri, Kansas & Texas of Texas, International & Great Northern and Galveston, Houston & Henderson immediately to exercise the option provided by rule 11 of Texas Lines' tariff I. C. C. 66, and immediately to remove from the cars and store either in their own depot or warehouse or in some convenient and suitable public or licensed warehouse at or near Galveston at the cost of the owner so much of approximately 2,700 cars of grain upon tracks in Galveston subject to the application of said rule 11 as may be accommodated by such depot, or warehouse or by public or licensed warehouses; and that the cars so released shall be at once restored to transportation service.

Reports to the Commission on Car Service continue to indicate a reduction in the accumulations of cars at congested points. On May 21 the total had been reduced to 168,054. On April 24, when the strike conditions were at the worst, the total was 269,000.

At the request of the Interstate Commerce Commission, the Commission on Car Service has directed that coal carrying cars be not used for the loading of automobiles and other commodities that can be transported in box cars, except that coal cars made emptywest of the Rocky mountains may be used for immediate loading to or toward but not beyond the owner's rails.

The General Situation

The Commission on Car Service has issued the following summary of general conditions as of May 27:

Box Cars.—Demands for box cars continue very heavy, with shortages existing principally in central and northwestern territory. The relocation of box cars from eastern and southeastern to western territory, now under way, should provide substantial relief to the territories where shortages are most pronounced. Ventilated box car requirements, which have been heavy in the southeastern section, will be increased with the movement of the watermelon crop, and are also increasing in the southwestern and California sections. Equipment should be handled strictly in accordance with Circular CCS 20, and special action taken to insure against undue delay in movement.

Automobile Cars.—There is a heavy demand for automobile cars which is considerably in excess of supply. Labor disturbances and consequent congestion has contributed in delaying movement, and special attention should be given the prompt movement in accordance with car service rules and special instructions in effect.

Flat Cars.—The loading of flat cars should be restricted to commodities which cannot be accommodated in other types of cars. It is important that movement and repairs be expedited.

Stock Cars.—This equipment should be handled strictly in accordance with car service rules and special instructions. The volume of traffic requiring stock cars is particularly heavy in Texas and at market centers, making it necessary to withdraw this class of equipment from general service in the territory formerly comprising eastern and Allegheny regions and roads in the southwestern section. It is important that delay in forwarding this equipment to live stock territory be minimized to fullest possible extent, due regard, of course, being given to car service rules.

Refrigerator Cars.—Heavy demands in prospect for refrigerators. All available cars being crowded to California to protect cantaloupe movement from Imperial valley now about starting. Loading in southwest is protected practically to full extent. Heavy demands from dairy and meat shippers in territory between Chicago and Missouri river, including reports of short supply from some of the large packers. Preparations being made to handle the peach crop from Georgia which will soon be ready to move.

Open Cars.—A slight increase will be noted in the bituminous coal production during the last half of May as compared with the first 15-day period. Labor conditions in a number of the larger terminals are considerably improved and speedier movement through the important gateways reflects extraordinary efforts being put forth by all concerned to better the situation. The situation at Lake Erie ports is very serious and the car supply for the movement of coal and ore is anything but adequate to protect extraordinarily heavy movement planned for this season. It is expected that the special movement of coal cars from the west to the lines east of the Mississippi river will result in a greatly improved car supply on the roads handling this lake tonnage. There is no improvement in the mill gondola situation and all roads are under special instructions to move these cars as promptly as possible to the steel territory. Miscellaneous commodities are receiving fairly good car service but in some cases it has been found necessary to curtail distribution to stone, sand and gravel owing to the serious country-wide shortage of coal and the necessity for keeping mines operating on a limited basis.

Special Committee of Railroad Executives

The re-establishment of an organization representing the railroads with functions similar to those of the Railroads' War Board in 1917 may result from the appointment, at a meeting of the Association of Railway Executives at Washington on May 28, of a special committee to co-operate with the Interstate Commerce Commission in handling the present emergency situation. The members of the committee are: Daniel Willard, president, Baltimore & Ohio, chairman; A. H. Smith, president, New York Central; C. H. Markham, president, Illinois Central; Hale Holden, president, Chicago, Burlington & Quincy; W. B. Storey, president, Atchison, Topeka & Santa Fe; B. F. Bush, president, Missouri Pacific; E. J. Pearson, president, New York, New Haven & Hartford, and Howard Elliott, chairman, Northern Pacific.

This committee succeeds the committee headed by Hale Holden, president of the Chicago, Burlington & Quincy, that has represented the executives' association in conferences with the Interstate Commerce Commission since the railroads filed their petition asking the commission to exercise its emergency powers in the handling of car service matters. The committee is to consult with the individual roads and attempt to formulate a plan for co-operative action.

Photo from Kadel & Herbert, N. Y.

Turkish Railroad Train on the Line from Alexandria to Cairo, Egypt

Some Roads Not Complying With Car Service Orders

WASHINGTON, D. C.

REPORTS received by the Interstate Commerce Commission indicate that a number of railroad operating officials have not yet had brought home to them the fact that car service orders of the Interstate Commerce Commission have the force of law and that violations are subject to penalties provided by the law. Commissioner Aitchison, in charge of car service matters for the commission, on June 2 sent the following telegram to Daniel Willard, chairman of the special committee on car service matters of the Association of Railway Executives:

"Commission desires me to state that present emergency which led commission to issue its Service Orders Numbers one, two and three is of such grave character that full and prompt compliance with the orders in detail must be expected. Reports which come to us from our inspectors throughout the country show that in many instances deliveries of equipment have not been made as required by Service Orders two and three. In candor, the commission feels it should state to executives of carriers who are represented by committee of which you are chairman, that prompt, full and literal compliance with these service orders is expected and that violations thereof will be made the subject of inquiry by commission with view to institution of proceedings for the enforcement of the penal provisions of the Interstate Commerce Act governing violations of orders of the commission in such cases. The commission will appreciate it if you will see that your committee understands our position in this matter and that the policy outlined is communicated to all carriers affected. The public interests to be served in this emergency require immediate and complete compliance with these orders so that the transportation needs of the country may be even partially met. It is hoped that compliance with these service orders will be so prompt and free that there may be no occasion for recourse to the penalty sections of the act."

The Service Orders Nos. 2 and 3 referred to are those which gave specific directions to individual railroads to deliver definite numbers of empty cars daily in order to return empty box cars of western road ownership to the owning lines or their direct connections and empty coal cars of eastern ownership to the owning lines or their direct connections, in order that they be made available for needed service for grain and coal loading. The reports received by the commission indicate that many operating officers are still under the impression that the interstate commerce act is a matter of concern only for traffic officials and lawyers and that they have failed to appreciate the effect of the jurisdiction over transportation matters which has been given to the commission by the new transportation act.

Paragraph 17 of Section 402 of the transportation act makes it the duty of all carriers by railroad subject to the act and of their officers, agents and employees, to obey strictly and conform promptly to orders and directions of the commission as to car service and provides for a penalty of not less than $100 nor more than $500 for failure or refusal to comply with such an order or direction and $50 for each and every day of the continuance of such offense, the penalties to be recovered in a civil action brought by the United States.

WESTERN MARYLAND RAILWAY EMPLOYEES are making plans to erect soldier monuments near the company's stations in the cities of Cumberland, Elkins (W. Va.), Hagerstown and Baltimore. The monuments will be of granite in the shape of arches and will contain bronze tablets with the names of all employees who served during the war. Each monument will cost approximately four thousand dollars.

Hearing on Loan Fund for Equipment

WASHINGTON, D. C.

A HEARING before Commissioners Meyer, Daniels and Eastman, sitting as Division No. 4 of the Interstate Commerce Commission on the question of the disposition of the $125,000,000 which the commission has tentatively decided to use for equipment out of the $300,000,000 loan fund, brought forth a considerable variety of views.

W. A. Colston, director of the commission's Bureau of Finance, proposed tentatively an equipment corporation, in which the railroads would take stock to the amount of their loans from the government, the stock to be turned over to a voting trust, the trustee to act under the direction of the commission, and the equipment to be rented.

The committee representing the Association of Railway Executives adhered to its original recommendation that the loans be made to the railroads in a proportion based on their standard return, with the alternative that the commission make loans from the fund to the applicants, who would supplement the loans to the largest extent from their own resources and credit.

S. Davies Warfield, president of the National Association of Owners of Railroad Securities, proposed a national equipment corporation not only to purchase the equipment but to manage it.

F. B. Dow, representing fruit and vegetable shippers, urged a centralized control of refrigerator cars.

The railroad representatives objected to the proposals for a single equipment corporation as impracticable, saying the bankers had advised them that equipment trusts of individual roads would find a better market and that a general plan might involve a long delay.

All interests represented spoke of the importance of putting the loan fund at work as quickly as possible, and several individual applicants for portions of the fund described their needs.

Mr. Colston said that many applicants had laid great stress on their own needs for some of the money, but had been less specific as to the public service they could accomplish with it. He seemed to oppose the plan of the executives for apportioning the fund on the basis of the standard return, saying the road with the largest revenues should be the one which can best finance its own needs, but E. N. Brown and Alfred P. Thom pointed out that the way to get the most equipment is to help the company that can supplement the loan and which can finance equipment on a smaller initial payment than some other road. The roads with the best credit, it was said, could finance on the basis of a 20 to 25 per cent initial payment, while others would have to provide 40 per cent cash. Mr. Brown also said that the freight car is a "migratory bird" and will perform public service just the same regardless of who owns it.

Mr. Colston said that $4 of equipment ought to be bought for each $1 of the loan fund, but that it might be necessary for the roads to put up $25,000,000 in cash in addition to the $125,000,000 in order to buy $500,000,000 of equipment. The greatest difficulty lay, however, in the apportionment of the fund. It was brought out that the commission has already practically arranged to make a loan to the Illinois Central to assist it in financing 1,000 refrigerator cars, and Commissioner Daniels said that the road's application had "not been injured" by its showing that its refrigerator cars make 44 miles a day. Mr. Brown and Mr. Thom expressed approval of the idea of the commission handling the fund in a similar way by dealing with individual carriers on the merits of each case. When Commissioner Meyer and Mr. Colston indicated that the commission would much prefer to have a committee of the executives definitely allocate the amount by roads and by numbers and kinds of cars

or locomotives, Mr. Thom explained that this would place the committee in a very embarrassing position, because all roads need some of the fund and it would be hard for a committee of executives to cut any of them off. He pointed out that this fund represents the only 6 per cent money in sight.

E. N. Brown, chairman of the executives' committee on equipment, said the bankers had told him the market is pretty well filled up with equipment trusts and that investors much prefer to discriminate between railroads.

Mr. Warfield said that Mr. Thom's statement as to the difficulty experienced by the executives in trying to apportion the fund between roads represented the strongest argument for a national equipment corporation, because, he said, the railroads have not been able to co-operate among themselves. He said it might be possible to get an authorization for the use of the loan through an equipment corporation by an amendment to Section 210 of the transportation act, which was then in conference, or that it might be accomplished through state laws. He offered to submit a detailed plan.

C. S. Burg spoke on behalf of the application of the Missouri, Kansas & Texas of Texas for a loan of $900,000 to enable it to buy 300 oil tank cars. He was asked to find out whether the receiver cannot furnish part of the cash instead of asking a loan for 100 per cent of the cost.

M. L. Bell said the Chicago, Rock Island & Pacific had filed an application for $5,515,000, the full purchase price of equipment it has already ordered and is now trying to find a way to pay for. If the freight rates are properly increased, he said, the company could finance 75 per cent of the amount by equipment notes.

W. G. Bierd, president of the Chicago & Alton, pointed out that a general plan for buying equipment would not suit his case, as the Alton has applied for $1,000,000 to rebuild coal cars which can be put in service this year. Commissioner Meyer said that no general plan would interfere with such individual applications and that would be passed on as promptly as possible. Mr. Bierd said that the rebuilding of these cars would cost $1,011 each, as compared with $700 for the last lot he had similarly rebuilt and $473 before the war.

The amendment to the loan fund provision in Section 210 of the transportation act, which was passed by the Senate on May 26 and sent to conference, is as follows:

Paragraphs (a), (b) and (c) of Section 210 of the transportation act of 1920, approved February 28, 1920, are hereby amended so as to read as follows:

"Section 210. (a) For the purpose of enabling carriers by railroad subject to the interstate commerce act properly to serve the public during the transition period immediately following the termination of federal control, any such carrier may, at any time after the passage of this act, and before the expiration of two years after the termination of federal control, make application to the commission for a loan from the United States to meet its maturing indebtedness or to provide itself with equipment or other additions and betterments, setting forth the amount of the loan; the term for which it is desired; the purpose of the loan and the use to which it will be applied; the present and prospective ability of the applicant to repay the loan and meet the requirements of its obligations in that regard; the character and value of the security offered; and the extent to which the public convenience and necessity will be served. The application shall be accompanied by statements showing such facts in detail as the commission may require with respect to the physical situation, ownership, capitalization, indebtedness, contract obligations, operation and earning power of the applicant, together with such other facts relating to the propriety and expediency of granting the loan applied for, and the ability of the applicant to make good the obligation as the commission may deem pertinent to the inquiry.

"(b) If the commission, after such hearing and investigation, with or without notice, as it may direct, finds that the making, in whole or in part, of the proposed loan by the United States, for one or more of the aforesaid purposes, is necessary to enable the applicant properly to meet the transportation needs of the public, and that the prospective earning power of the applicant and the character and value of the security offered are such as to furnish reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor, and to meet its other obligations in connection with such loan, the commission shall certify to the Secretary of the Treasury its findings of such facts; also the amount of the loan which is to be made; the time, not exceeding 15 years from the making thereof, within which it is to be repaid; the terms and conditions of the loan, including the security to be given for repayment; that the prospective earning power of the applicant, together with the character and value of the security offered, furnish, in the opinion of the commission, reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor and reasonable protection to the United States; and that the applicant, in the opinion of the commission, is unable to provide itself with the funds necessary for the aforesaid purposes from other sources.

"(c) Upon receipt of such certificate from the commission the Secretary of the Treasury shall immediately, or as soon as practicable, make a loan of the amount recommended in such certificate out of any funds in the revolving fund provided for in this section and accept the security prescribed therefor by the commission. All such loans shall bear interest at the rate of 6 per cent per annum, payable semi-annually, to the Secretary of the Treasury, and to be placed to the credit of said revolving fund. The form of obligation to be entered into shall be prescribed by the Secretary of the Treasury, but the time, not exceeding 15 years from the making thereof, within which such loan is to be repaid, the security which is to be taken therefor, and the terms and conditions of the loan shall be in accordance with the findings and the certificate of the commission."

The Senate on May 28 also passed the amendment proposed by Senator Cummins to Section 207 to provide for funding for 10 years all of the indebtedness of the railroads to the government for additions and betterments made during federal control instead of allowing the Railroad Administration to withhold rental to cover part of the indebtedness. This part of the Cummins amendment had been abandoned by a sub-committee of the Senate committee on interstate commerce and only the amendment to Section 210 was made a rider on the sundry civic bill which was passed. The original amendment, including the proposed changes in both Section 207 and Section 210, came up on the calendar on May 28, and when Senator Underwood said they had both been approved by the full committee the amendment was passed without discussion.

Both the Senate and the House, on June 2, passed the conference report on the Sundry Civil Bill containing an amendment to the Railroad Loan Fund Provision with an additional amendment such as that proposed by Mr. Warfield, providing that loans for equipment may be made to or through such organization, car trust or other agency as may be determined upon or approved or organized for the purpose by the commission for the construction and sale or lease of equipment to carriers.

Pennsylvania Railroad Stockholders on May 1, 1920, numbered 123,887, an increase of 966 from the number on April 1 and 13,513 compared with that of a year ago.

Latest Type of New Haven Electric Passenger Locomotive

180 Ton New Haven Electric Locomotives

Power Collected from 600-Volt Overrunning or Underrunning Third Rail or from 11,000-Volt Overhead Wire

By F. W. Carter
Heavy Traction Railway Department, Westinghouse Electric & Manufacturing Co.

THE ELECTRIFICATION of the passenger tracks of the New York connection railroad over the Hell Gate route has made possible more extensive utilization of the electric locomotives of the New York, New Haven & Hartford Railroad. Through trains may be operated into the Pennsylvania Station in New York from New Haven without changing engines. This electrification has been carried out by the single-phase, overhead catemary trolley system with the same operating characteristics as those employed on the New Haven road, the energy delivered being at 11,000 volts and 25 cycles. The 900-ton express trains and 420-ton local trains are hauled over this route by five Westinghouse 180-ton locomotives, which are built for service on either direct or alternating current. They are capable of operating through the East river tunnels, which are equipped with third rail, into the Pennsylvania Station, the change from overhead to third-rail operation being effected at the east end of Sunnyside Yard.

Each of these five locomotives comprise two complete truck units, above which a single steel cab is superimposed. The cab extends the entire length of the two coupled units and is mounted on a suitable frame which is spring supported on the main unit frames. Thus the center of gravity is kept at a reasonable height above the rails, and a maximum proportion of the weight is spring supported, as in steam locomotive practice.

By means of a wrought-iron drawbar between the main unit frames, no longitudinal play is allowed between frames. A slight amount of vertical play is provided between drawbar and pockets to take care of track irregularities. The wheel arrangement of each of these main trucks is 2-6-2, and the wheel base of each main unit is 26 ft. 9 in., with a rigid wheelbase of 1 f4t. 3 in. No difficulty is experienced in traversing curves of 24 deg. A pony truck of the Rushton type is placed at each end of a unit. These leading and trailing trucks are provided with heart-links, which insure steady riding, and are side equalized with the main truck equalization system. The leading pony truck is side-equalized with the first two pairs of driving wheels, and the trailing pony truck under the center of the locomotive is equalized with the third pair of driving wheels. This arrangement obtains in both units.

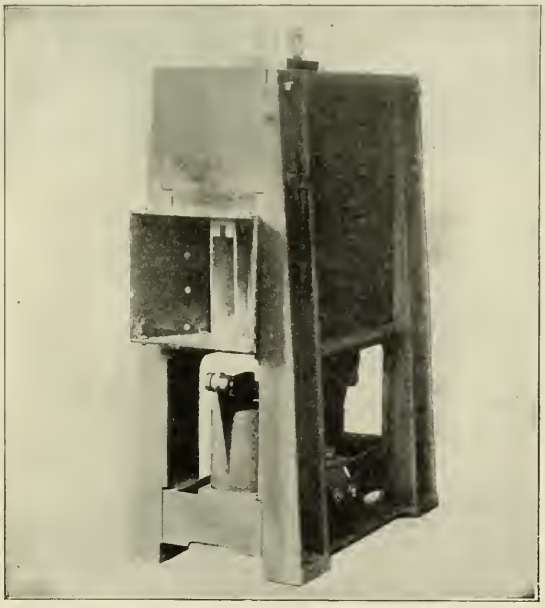
The cab frame consists of a light, rigid structure built of steel plates, and is spring supported at six points on each pair of main unit frames. The cab-carrying springs are of the coil type, four coils to a support, and are open for inspection and renewal. By means of shims, the surfaces of the cab supports are adjustable in height to give a correct distribution of weight on the main frames.

The cab is held in alinement with the main unit frames by two center pins, which are placed 37 ft. 6 in. apart. The distance between these pins must necessarily be constant, while the distance between the unit centers changes somewhat as the two sets of main frames assume an angular position on curves. To provide for this, and to insure that the center pins are allowed a limited amount of longitudinal movement relative to the corresponding unit frame. In this way the

center pins are located in such a position that the locomotive will exert the least possible lateral pressure on the track, due to curving. These forces were analyzed, and it was found that both from the standpoint of lateral pressure on the track and tendency to keep the locomotive progressing in a straight line without nosing, the most desirable location for the center pins was between the Nos. 1 and 2 driving axles of each main truck.

The 12 armatures are arranged in groups of three, connected permanently in series. This arrangement has the advantage of providing a comparatively low voltage across each individual armature, while at the same time the size of the cable in the main motor-circuits and motor-switches need be only sufficient to carry the current of a single motor.

Although these locomotives have a large increase in capacity over the former engines on this road, it was realized that with the continually increasing hauling capacity requirements, the heaviest trains would ultimately have to be double-headed. The control of the new locomotive has been developed so that multiple operation may be obtained with the gearless New



Main, Air Operated, Direct Current Breaker

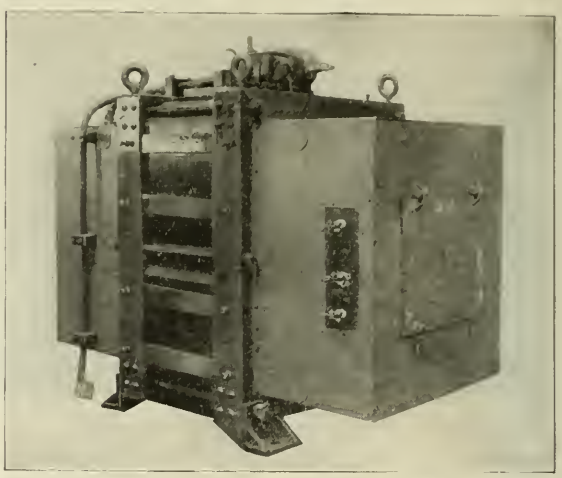
Haven locomotives by changing the master controllers of the latter. In this way, with either locomotive as the leading unit, the load will be divided in proportion to the rated capacity of the two units.

The main transformer is of the two-circuit air-blast type, with a closed metallic circuit on the secondary. The midpoint of the secondary side of the transformer is grounded through a 0.6 kva. transformer, with a lamp across this transformer secondary circuit. In case a ground occurs on the secondary side of the transformer, the effect will be merely to establish a circuit through the ground-detector light, which can be reported and the ground cleared before burning occurs. With the closed metallic circuit, as shown, destructive burning can only happen if two grounds occur at the same time at relatively different voltage points in the circuit.

Another feature is the design of the third-rail shoe and operating mechanism. These locomotives, as previously stated, operate on the tracks of the New York Central, which have an under-running third rail, and the tracks of the Pennsylvania Railroad, which have an over-running third rail. Furthermore, these two third rails are located in a slightly different position, both in respect to height and distance, from the center line of track.

The control and auxiliary circuits are changed over by an electro-pneumatically operated change-over switch, controlled by two small knife switches mounted on the master controller and used to lower the third-rail shoes and to unlock the alternating current pantograph.

The oil circuit breaker can be closed either pneumatically or by hand. It is mechanically latched and electrically tripped.

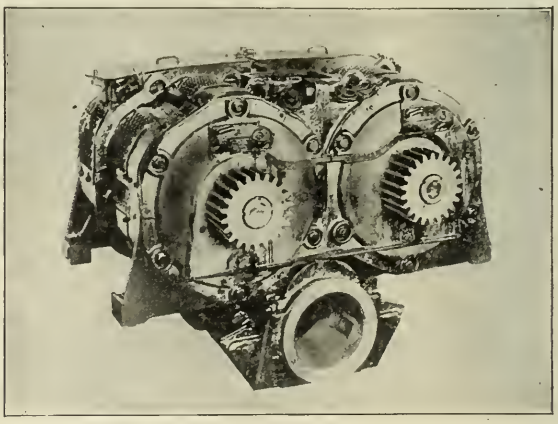


Main Air Blast Transformer

The tripping mechanism is controlled by a time-element relay, so timed as to allow the line section breaker to open ahead of the locomotive breaker in case of short circuit.

The direct-current circuit-breaker is a large, single, electro-pneumatically operated unit switch having a strong magnetic blow-out coil and an automatic trip which operates at a predetermined overload.

Forced ventilation is provided on the locomotives, and the



One of the Pairs of Main Driving Motors

ventilation system has been designed to provide an adequate amount of air for the equipment at all times. The air for the blowers is taken from the inside of the cab, which acts as a large settling chamber for depositing any snow or moisture which may be drawn from the outside. The blowers are used and are arranged with dampers, so that in the event of failure

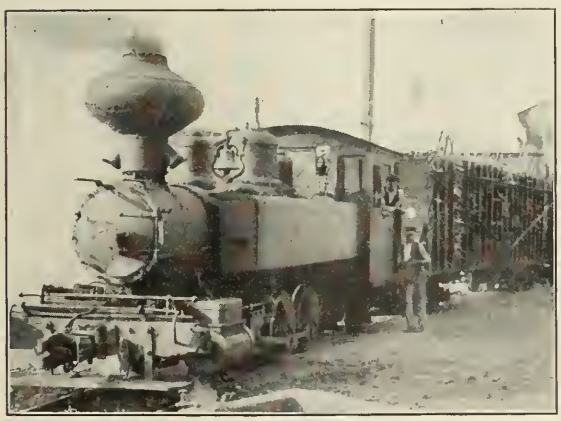
of one blower the other blower can supply air to all the equipment for operation of the locomotive at reduced capacity. The blowers are of the forward curved-blade type, which were chosen on account of their small size and low speed for their capacity and pressure. The blow-motors have been designed so that when operated at a lower voltage they are suitable for driving the air compressors, thus reducing the number of different types of equipment on the engine. Since the safe temperature of the resistance grids is considerably higher than that of the remainder of the equipment, and since it is desirable to cool the main transformer during the periods when the locomotive is operating on direct current, the main transformer is blown at all times, and the air from the outlet of the transformer is used to ventilate the grid resistance. After passing through the apparatus requiring forced ventilation, the air is exhausted outside of the cab at points remote from the air intake.

Air brakes are applied to all of the driving wheels with a separate pair of cylinders for each group. The brake rigging is equalized and the shoes are tandem hung. In addition a hand-brake is provided on each truck unit for holding the locomotive when in a standing position.

The passenger coaches are heated from a kerosene-fired steam boiler installed in the locomotive. Sufficient fuel and water are carried for a one-way trip between New York and New Haven. The water is carried in two main tanks mounted under the cab and suspended from the cab structure. The main reservoir air pressure is maintained in these tanks to force the water into the boiler.

SPECIFICATIONS OF NEW HAVEN ELECTRIC LOCOMOTIVES

Classification: 2-6-2 + 2-6-2.
Number in service: 5.
Class of service: Passenger.
System and voltage: 11,000 volt A. C.—600 volt D. C.
Number driving wheels: 12.
Diameter driving wheels: 63 in.
Number guiding and trailing wheels: 8.
Diameter guiding and trailing wheels: 36 in.
Total weight, including sand, oil and water, is 170 tons.
Average axle weight is 38,500 lb.
Average pony axle weight is 28,750 lb.
Overall length = 69 ft. 0 in.
Total wheel base = 59 ft. 6 in.
Rigid wheel base = 14 ft. 3 in.
Method of drive = geared.
1 Hr. tractive effort = 21,000 lb.
1 Hr. speed = 36 m. p. h.
1 Hr. hp. of locomotive = 2,000.
Max. speed = 70 m. p. h.



Photograph from "International"

A Train Load of Sugar Cane Enroute to a Refinery in Porto Rico

Economic Aspects of the Fuel Oil Situation*

By Eugene McAuliffe
President, Union Colliery Company

WITHIN twelve months the fuel oil situation, insofar as present and future supply, as well as unit costs, are concerned, has undergone startling changes. One year ago we were alone concerned with the economical consumption of fuel oil; today there is a national, even international, feeling that the period of fuel oil consumption for steam making purposes is substantially behind us.

The tide of oil burning for steam making purposes has ebbed and flowed ever since the beginning of the industry, with the discovery and exhaustion of recurring fields, each extraordinary oil development leading to the displacement of coal for steam making purposes on the part of railways, steamship owners and industrial users.

The history of all oil fields is quite alike. They come thundering in to the accompaniment of much that is startling and extravagant, towns spring up over night, fields and hillsides are covered with drilling rigs, temporary tankage, or more frequently earthen storage, is hurriedly provided; not carloads but thousands of carloads of pipe for drilling and oil transport, machinery and building material, are rushed in; extravagance reigns for a period; then comes the steadying down that is invariably followed by the quiet that marks the passing. The more brilliant the beginning the more hurried the end.

Perhaps the greatest stimulus given the consumption of fuel oil for steam making purposes should be credited to the development of the Mexican oil fields, which when due allowance is made for their remoteness, proved the most spectacular oil discoveries the world ever saw. In 1909 and 1910 the greatest oil development in Mexico was well under way and until within the past few months the ever recurring revolution was the principal nightmare suffered by the Mexican oil men. In November of last year Juan Caisno No. 4, after producing 75,000,000 barrels of oil, went to salt water in a few hours. A month later Portrero del Llano of the Mexican Eagle Oil Company, Lord Cowdray's British organization, after producing 110,000,000 barrels of oil at the rate of 16,000,000 barrels annually swung over to salt water in a few hours; then on February 21 of this year Tepetate No. 1 of the Cortez Oil Corporation followed suit; meanwhile numerous less prominent producers have gone the way of all good oil wells.

While the effect of this situation was startling, perhaps the rude awakening suffered by the Naval Department more thoroughly alarmed the oil consumers of the country than did anything else. After practically effecting the consummation of a very extensive oil burning program the Naval Department asking in March last for Pacific Coast bids on 4,500,000 barrels of fuel oil, received but one bid covering a delivery of but 602,000 barrels, at a price of $1.95 per barrel. In April bids were requested for Atlantic Coast deliveries, five tenders returned, covering an entirely insufficient supply, the price for bunker oil ranging from $2.07 to $3.76 per barrel of 42 gallons. A similar fuel problem confronts the American merchant marine, the completed program of the United States Shipping Board, aggregating 10,000,000 dead weight tons, of which 2,000,000 tons will consist of coal burning vessels, 8,000,000 tons of oil burning vessels. The estimated fuel oil requirements of the Shipping Board for the vear 1920 are forty million barrels, and for 1921 sixty million barrels. The Director of Operation of the Shipping Board, in referring to the fuel oil requirements of the American Merchant Marine, said that the volume of

*From an address by Mr McAuliffe before the International Railway Fuel Association.

fuel oil as estimated above "must be produced and transported in special carriers to selected places around the world, failing in which our ships become as useless as painted ships upon a painted ocean."

When we consider that the necessity for maintaining a navy will not cease until the end of the existing generally used form of government, or until the millennium arrives, both of which are perhaps quite remote, it would seem very plain that the requirements of the United States Navy, equipped to carry and burn oil will take precedence over any other demand, and it is equally reasonable to assume that after the American people have spent not only millions but billions in the upbuilding of an American merchant marine, that its fuel oil requirements will take position only second to that of our battleships. The statement of men who should know that 1920 and 1921 will mark the peak period of oil production with a steady decadence from this time forward justifies serious consideration of the oil problem. The United States Geological Survey estimates that with the close of the year 1919 we have taken approximately five billion barrels of oil out of the ground and that the estimated oil reserve yet in the ground is six and one-half billion barrels. What does the future promise?

Between 1909 and 1918 the number of automobiles and trucks increased 1700 per cent, and the consumption of gasoline for automobile purposes jumped from 13,000,000 to 85,000,000 barrels, or 650 per cent, while the production of crude oil increased 95 per cent. Today we operate 7,600,000 automobiles and motor trucks, and 350,000 tractors, and the 1920 construction program totals 2,000,000 automobiles and motor trucks. Power boats, aeroplanes and minor power pumping plants employ thousands of internal combustion engines, all calling for oil and gas. It takes a half pint of oil to translate a ton of coal into power by way of the steam engine, to consume the power so generated takes much more. Without petroleum we could no more grease the bearings and spindles of industry than we could light our great buildings and streets with tallow dips. The total available animal fats together with that which might be possible to extract from sea life in the period of a year would not even dimly light and poorly lubricate the world for one-tenth of that time, even though food fats were taken to swell the supply. The government has thrown open for drilling 6,500,000 acres of national oil reserve, but these lands located in California and Wyoming will not add materially to our supply. In 1919 twenty-nine thousand wells were driven, to success or failure, of these 6,000 were dry, 2,000 returned gas without oil, the drilling expense estimated at $600,000,000.

The translation of oil into steam will quickly cease, through the pressure of economic forces and the transportation companies must perforce sense the changes that are taking place in the fuel oil world. Millions of dollars were saved in past years by the substitution of cheap crude oil and refinery residuum for coal in locomotive fireboxes. Only twelve years ago it was difficult to force the skimming plants of Texas and Oklahoma to take sufficient gasoline out of the crude to make its use on a locomotive safe. The railroads who then absorbed the residue left after the taking off of the lighter distillates built up a comfortable refinery traffic for their rails, but a complete return to coal fuel is now imminent. To avoid the necessity for summary and violent changes the work of shifting fuels should be undertaken at once and conducted quietly and gradually. Fifty million barrels of fuel oil represents twelve million tons of coal. This is not a large tonnage if it were not for the fact that the major portion of the oil is consumed where the coal production is relatively small. Equipment and coaling stations will be required to handle the fuel coal. The subject is one that should command the immediate and serious attention of every railroad executive and operating official in oil burning territory.

Government Versus Private Ownership

The application of the Canadian Pacific to the railway committee of the Canadian House of Commons for a charter to construct a branch line in the province of Saskatchewan has brought to light one phase of the struggle which is now taking place in the Dominion between government and private ownership. At the present time there are in Canada but two great transcontinental systems, practically paralleling each other from the Pacific to the Atlantic coast, one the Canadian National Railways, owned completely by the Dominion government, the other the Canadian Pacific, one of the strongest and best managed privately-owned systems in the world.

As stated before, the Canadian Pacific asked the railway committee of the Dominion House of Commons for the right to build a railway from Saskatoon to Birch Lake in northern Saskatchewan. No request was made for a subsidy or for financial assistance of any kind. The proposed Canadian Pacific line did not parallel any existing lines of the Canadian National or any proposed lines for which the latter holds charters. As a matter of fact, the proposed line crosses at practically right angles two lines which the Canadian National has already constructed and one line for which it holds a charter. Settlers in the territory which would be served by the new line were asking for transportation facilities and in answer to their pleas the Canadian Pacific plans were made.

When hearings were held before the railway committee it was alleged that the Canadian National had in mind the building of a line, which, for a portion of its route, would cover the location of the proposed Canadian Pacific line. However, when the Minister of Railways made a statement to the House of Commons in February, 1920, covering the proposed railway construction to be undertaken by the Canadian National in 1920, no reference was made to a line which would in any way conflict with the proposed line of the Canadian Pacific. It was further argued that, as the Canadian National had been operating the only lines north of the Saskatchewan river in the province of Saskatchewan, all of the country north of that river should be regarded as Canadian National territory, and that the competing railway (the Canadian Pacific) should not be allowed to build even though it was established that the Canadian National had left large tracts of country unserved and neglected. The Canadian Pacific has not subscribed to this principle and in support cites that the Canadian National has every right and, as a matter of fact, has been and is now exercising the right to build into territory in southern Saskatchewan and southern Alberta which has been exclusively served by the Canadian Pacific in the past. In outlining the position of the Canadian Pacific, its representatives stated that it should be allowed to build into the territory north of its existing line provided that such lines are necessary to provide adequate service and to promote further settlement and development. The Canadian Pacific has already signified its willingness that every precaution should be taken against wasteful parallel construction.

In regard to the intention of the Canadian National to build into the territory in question, the Minister of Railways, upon the request of the railway committee, produced a copy of the estimates for 1920 construction, which provided for a start on the Canadian National line in question. The total sum allotted for this work during the present fiscal year was $100,000 which would not, at present costs of construction work, build more than three or four miles of line.

In the end the Canadian Pacific's application was defeated.

Railroads Complete Rate Advance Testimony

Preliminary Valuation Reports Show Cost of Reproduction in Excess of Property Investment Accounts

WASHINGTON, D. C.

DIRECT TESTIMONY of the railroads on their application to the Interstate Commerce Commission for a general advance in freight rates was completed on May 28, thereby establishing a speed record for proceedings of this kind, for the railroads' presentation was made in five days. The hearing will be resumed at Washington on June 7, when the railroad witnesses will be called for further cross-examination, after which evidence on behalf of shippers and state commissioners will be presented. The expediting of the testimony was made possible by the comparative absence of controversy, the fact that the standard of return to be allowed the railroads is prescribed in general terms by the law and they had already submitted the principal facts in support of their request to the commission in filing their applications and in informal conferences, and because the commission showed a marked inclination to discourage the waste of time. The railroads, therefore, planned their presentation to avoid duplications and with a few exceptions there was an absence of the protracted wrangles between witnesses and opposing counsel on comparatively unimportant matters that have consumed so much time in previous rate cases. The railroads were asked, however, to furnish a considerable amount of additional information as soon as it can be compiled, in response to a series of requests for statistical data proposed by the commission and by the shippers for the purpose of a further analysis of the consolidated statistical exhibits already presented.

The testimony given during the first three days of the hearing was reported in last week's issue.

Preliminary Valuation Figures Exceed Property Investment Account

That the preliminary reports of the commission's Bureau of Valuation as to the cost of reproduction are more than sustaining the aggregate property investment accounts of the carriers was asserted by Thomas W. Hulme, vice-chairman of the President's Conference Committee on Valuation, in his testimony before the commission on May 27.

Mr. Hulme gave a summary of the tentative valuations and preliminary reports for 50 railroads, with a mileage of 51,853, showing a cost of reproduction new, including land, as of the valuation dates in 1914, 1915 and 1916, of $3,203,782,543, as compared with a property investment account as carried in the books of the companies of only $3,158,275,156. Mr. Hulme said that when the reports are completed for all roads they will undoubtedly show a reproduction cost, even on the prices prevailing in 1914 and previous years, in excess of the carriers' own book costs, and that on the basis of present prices the total would be far in excess of the investment accounts, because present prices are over 100 per cent above those of 1914.

Mr. Hulme's testimony was presented over the protest of Clifford Thorne, representing a large number of shippers, and Glenn E. Plumb, who appeared for the railroad labor organizations. Mr. Thorne asked that the director of the Bureau of Valuation and the commission's chief counsel be present if the testimony were to be allowed, and said it was "outside of the record." Chairman Clark said the commission was authorized by the transportation act to avail itself of its valuation data in determining the aggregate value and Mr. Prouty and Mr. Farrell were not called in.

Mr. Hulme said the Bureau of Valuation has issued 55 tentative reports but that they are principally for small roads, only nine of them being Class I roads, but that it had tendered informally to the railroads for their suggestions and criticisms a large number of preliminary engineering, land and accounting reports for the purpose of seeking agreements as to questions of fact. The engineering reports included 41 Class I roads, whose figures he added to those for the nine Class I roads covered by the tentative valuations. For 30 of these there were also land reports and for 11 there were no land reports but he had used instead the original cost of land as stated in the reports of the roads.

For the first nine Class I roads, on which tentative valuations were served, the cost of reproduction including land was reported at $242,549,825, as compared with a total property investment account of $344,579,273. But for the 41 roads on which preliminary reports are available, the cost of reproduction plus land is reported at $2,961,187,718, as compared with a property investment account of $2,813,695,883.

The comparisons made by Mr. Hulme for the 50 Class I roads are shown in the tables on the following page.

Mr. Hulme pointed out that these government preliminary reports covered a number of roads recently in receivers' hands, and very few of the larger and stronger companies.

"When you take into consideration," he said, "that a number of roads first investigated by the commission were either at that time or shortly before in the hands of a receiver, and that with but few exceptions there are not included in these valuations any of the larger and stronger companies, and that the totals for the preliminary reports are in excess of the road and equipment accounts, whereas the results for the so-called tentative valuations which represented the earliest work of the commission were less than the road and equipment accounts, it seems to me that the conclusion would naturally be drawn that, for the country as a whole, the engineering inventories and land reports when finally determined will result in a figure in excess of the road and equipment accounts."

In a few words, Mr. Hulme's testimony showed, the reproduction cost falls considerably short of equalling the property investment figure on the books of the carriers, but these deficits are more than made up by the roads showing the higher inventory figures.

The preliminary reports, Mr. Hulme asserted, are minimum figures, and in a number of cases the carriers believed that final figures would be considerably larger. On this point he said: "Wherever there is a difference of opinion between the local engineering forces of the government and the representatives of the carriers, the government engineers put in the figures that they deem to be the minimum, so that the supervising officers of the Bureau of Valuation in Washington may have the opportunity in the first instance to consider the claims of the carriers as to what additional amount should be allowed. In such large inventories involving such great amounts it is but natural that there should be some errors and numerous differences of opinion, which, when considered, result in material increases in the total of the inventories as first tendered to the carriers. Aside from questions of fact which are individual to a carrier, there are great differences now existing between all the representatives of the railroads and the representatives of the Bureau of Valuation as to costs of grading, tracklaying and surfacing, general expenditures and interest during construction."

Commissioner Eastman pointed out that the excess of cost

EASTERN GROUP

Tentative Valuations

Carrier	Cost new	Land	Cost new and land	Investment in R. & E.	Miles of road
Elgin, Joliet & Eastern	$36,418,605	$3,386,896	$39,805,501	$38,683,120	227
Chic. T. H. & S. E.	22,247,890	1,017,415	23,265,305	24,927,762	363
Sub-total	$58,666,495	$4,404,311	$63,070,806	$63,610,882	590

Preliminary Reports

Ann Arbor System	$12,857,069	$683,720	$13,540,789	$18,741,167	354
Bangor & Aroostook	24,784,867	615,563	25,400,430	23,363,164	574
Boston & Maine System	231,775,788	44,752,340	276,528,128	195,903,526	2,295
Montpelier & W. R.	1,937,229	75,551	2,012,780	1,124,320	42
Central New England	15,483,002	1,911,772*	17,394,774	22,342,396	136
Hartford, Connecticut West	5,037,461	669,632*	5,707,093	4,386,613	124
Chicago & Eastern Ill.	72,331,056	5,420,799	77,751,855	78,990,280	1,225
Chicago, Indianapolis & Louisville	27,782,784	2,122,271	29,905,055	37,225,990	509
C. C. C. & St. L.	143,779,304	15,190,541	159,269,845	144,375,812	1,687
Maine Central System	64,925,379	2,214,567*	67,139,946	54,983,162	1,132
Portland Terminal	5,253,647	2,601,268	7,854,915	5,138,223	23
N. Y., N. H. & H.	248,599,023	71,000,000*	319,599,023	195,505,844	1,252
Toledo, St. L. & Western	16,746,019	1,700,149	18,446,168	39,381,687	450
Pere Marquette	65,324,361	4,603,567	69,927,928	87,100,297	1,792
Vandalia	42,351,590 }	6,060,896	51,858,294	36,366,572 }	651
Terre Haute & Peoria	3,445,808 }			6,267,319 }	138
Sub-total	$982,414,387	$159,922,636	$1,142,337,023	$951,196,372	12,384
Total—18 valuations and preliminary reports	$1,041,080,882	$164,326,947	$1,205,407,829	$1,014,807,254	12,974

*Carriers' return to Order No. 7.

SOUTHERN GROUP

Tentative Valuations

Carrier	Cost new	Land	Cost new and land	Investment in R. & E.	Miles of road
A. B. & A. Sys.	$25,114,141	$2,357,676	$27,471,817	$39,255,787[1]	663
Geo., Sou. & Florida	10,297,657	1,231,456	11,529,113	12,273,374	392
Norfolk Southern Sys.	24,076,990	3,010,888	27,087,878	30,617,459	902
Winston-Salem Southbd.	5,428,444	510,655	5,939,099	5,598,558	90
Sub-total	$64,917,232	$7,110,675	$72,027,907	$87,745,178	2,047

Preliminary Reports

Central of Georgia	$62,252,124	$11,357,324	$73,609,448	$62,003,324	1,489
Southwestern R. R.	9,170,145	1,769,732	10,939,877	5,191,100	333
Charleston & West Car.	9,814,315	1,875,745	11,690,060	8,279,563	341
Florida East Coast	43,557,372	4,409,548	47,966,920	48,207,859	739
Mobile & Ohio	47,027,163	3,908,595	50,935,758	45,897,658	923
N. C. & St. L. Sys.	56,309,554	4,857,487	61,167,041	42,066,246	1,100
New Orleans Gt. Nor.	7,298,789	208,825	7,507,614	16,045,669	243
Southern Ry. in Miss.	4,881,786	564,783	5,446,569	610,656	237
Gulf & Ship Island	9,498,259	1,354,196	10,852,455	14,170,083	308
Ga. R. R. & Bank, inc. Ga. R. R. (Lessee org.)	14,041,901	102,493	14,144,394	5,430,000	301
Sub-total	$263,851,408	$30,408,728	$294,260,136	$247,902,158	6,014
Total—14 tentative valuations and preliminary reports	$328,768,640	$37,519,403	$366,288,043	$335,647,336	8,061

[1]Investment as of December 31, 1915 after reorganization—taken from I. C. C. statistics.

WESTERN GROUP

Tentative Valuations

Carrier	Cost new	Land	Cost new and land	Investment in R. & E.	Miles of road
New Orleans, Tex. & Mex.	$8,865,636	$141,686	$9,007,322	$15,780,645	173
Kansas City Southern Sys.	46,732,105	4,530,642	51,262,747	101,050,970	879
San Pedro, Los A. & S. L.	43,127,960	4,098,083	47,226,043	76,391,598	999
Sub-total	$98,725,701	$8,770,411	$107,496,112	$193,223,213	2,051

Preliminary Reports

Arizona Eastern (inc. Phoenix & Eastern)	$12,178,415	$778,654	$12,957,069	$19,227,648	374
Rock Island System	342,830,396	45,770,812	388,601,208	341,401,305	7,686
Grand Canyon Ry.	1,365,674	6,267	1,371,941	1,988,785	64
M. St. P. & S. S. M.	108,066,929	6,634,182*	114,701,111	116,953,635	3,144
Northwestern Pacific	37,461,314	691,879*	38,153,193	65,984,697	506
Duluth, South Shore & Atl.	19,231,742	939,096	20,170,838	48,167,021	539
Mineral Range R. R.	3,230,437	113,582*	3,344,019	3,317,151	64
St. Louis Southwestern Sys.	60,845,317	5,823,190	66,668,507	94,250,627	1,579
Spok. Port. & Seattle	55,906,902	6,093,285*	62,000,187	61,266,414	498
Texas & Pacific	66,290,979	1,127,432*	67,418,411	109,250,903	1,853
Trinity & Brazos Valley	10,528,256	499,638	11,027,894	11,792,807	303
Western Pacific	60,817,087	6,122,412	66,939,499	86,985,845[1]	939
Great Northern	378,204,335	40,000,000	418,204,335	384,273,853	7,090
O. W. R. R. & N. Co.	123,490,128	19,857,000*	143,347,128	156,642,559	1,999
Oregon Short Line	107,018,378	2,666,841*	109,685,219	113,094,103	2,129
Sub-total	$1,387,466,289	$137,124,270	$1,524,590,559	$1,614,597,353	28,767
Total—18 valuations and preliminary reports	$1,486,191,980	$145,894,681	$1,632,086,671	$1,807,820,566	30,818

*Carrier's return Order No. 7.
[1]Investment as of December 31, 1917—after reorganization—taken from I. C. C. statistics.

SUMMARY

	Miles of road	Cost new	Land	Cost new and land	Inv. in R. & E.
(Nine) tentative valuations	4,688	$222,309,428	$20,285,397	$242,594,825	$344,579,273
(Forty-one) preliminary reports	47,165	2,633,732,084	327,455,634	2,961,187,718	2,813,695,883
Grand total (50)	51,853	$2,856,041,512	$347,741,031	$3,203,782,543	$3,158,275,156

CLASS I CARRIERS

No. of carriers	Group	Cost new	Land	Cost new and land	Inv. R. & E.
18	Eastern	$1,041,080,882	$164,326,947	$1,205,407,829	$1,014,807,254
14	Southern	328,768,640	37,519,403	366,288,043	335,647,336
18	Western	1,486,191,990	145,894,681	1,632,086,671	1,807,820,566
Total 50		$2,856,041,512	$347,741,031	$3,203,782,543	$3,158,275,156

of reproduction over book investment for the New England roads would more than offset the total excess.

M. P. Blauvelt, vice-president of the Illinois Central, testified in detail regarding the basis of compilation of the statistics for the Southern lines, showing a need of an increase of 31 per cent in freight revenues to put them on a 6 per cent income basis, and C. R. Capps, vice-president of the Seaboard Air Line, described the proposed adjustment of the rates.

Revised Figures for Southern Lines

The carriers in Southern classification territory called the attention of the commission to the fact that in their application for increase of revenue as filed it is stated that the property investment of the carriers amounts to $2,283,990,948. Since the preparation of this application and accompanying exhibits it has been found that the property investment account of the carriers for whom statistics were compiled is erroneous, in that this total property investment is shown by the books of the carriers to be $2,267,484,847, an item of $16,506,101 expended for additions and betterments prior to 1907 but not in fact charged to the investment account having been in error included in the compilation.

This change made it necessary to revise the exhibit attached to the application as follows:

REVISED STATEMENT

Property investment	$2,283,990,948
Deduct item erroneously included	16,506,101
	$2,267,484,847
Six per cent on property investment (revised)	136,049,091
Net railway operating income—adjusted	16,269,429
Deficit under 6 per cent	119,779,662
Total operating revenues—finally adjusted	581,768,519
Freight revenue	390,199,595
Passenger revenue	149,132,003
Express revenue	12,749,147

Increase needed applied to:

	As shown in petition	As corrected
Total operating revenues	20.759%	20.588%
Freight, passenger and express revenues	21.875	21.696
Freight and express revenues	29.972	29.726
Freight revenue only	30.951	30.697

S. M. Felton, president of the Chicago Great Western, on May 27 opened the presentation for the Western lines that are asking an increase of 24 per cent.

S. M. Felton Describes Need for More Railway Facilities

An abstract of Mr. Felton's statement follows:

In order to provide a return of 6 per cent upon the property investment of the lines in Western Classification territory an increase of approximately 17 per cent in gross revenue is required, and this is equivalent to an increase of approximately 24 per cent in freight revenue.

It is essential to the welfare of the American public that the production of its agricultural, manufacturing, mining and other industries shall be substantially increased from year to year. This increase of production must be greater in proportion than the increase in population. In a country having the geographical and topographical characteristics of the United States the needed increase in production is almost absolutely dependent upon a corresponding increase of railroad transportation. The farmer cannot continue to increase his crops; the coal mine operator cannot long increase the output of his mine; the manufacturer cannot increase his output, unless they can get constantly increasing railroad transportation. Until within comparatively recent years the increase in the capacity of our railroads normally kept pace with the increase in the country's productive capacity. There were times when the growth of the railways outstripped the growth of the productive capacity of the country, and this has been in the past particularly true in the territory west of the Mississippi river. This condition, however, no longer exists.

Dealing with the country as a whole, the statistics of railways as compiled by the commission corroborate what is a matter of general knowledge—that while in the decade between June 30, 1903, and June 30, 1913, the increase in the facilities of the railways was about in proportion to the increase in freight traffic handled by them, while the growth in facilities since that date has fallen far short of keeping pace with the increase in the tonnage actually handled. Data showing the growth and amount of railroad traffic handled reflect the fact that there has been an enormous increase in the productive capacity of the country within recent years. But they do not tell the whole story, because I think it may be safely said that at no time within the last three years have the railways been able satisfactorily to handle all the traffic which the industries of the country have offered them when the industries have been working anywhere near to their capacity. The result has been that in all periods of large production there have been complaints from the large producing industries. Many of these complaints have been only too well founded. In 1915 the actual production of bituminous coal was 442,684,000 tons, in 1916 it was 502,520,000 tons, in 1917 it was 552,000,000 tons, and in 1918 it was 579,500,000 tons. In spite of this large increase the coal mine operators constantly complained in 1917 and 1918 that their production was restricted by shortage of cars. The Statistical Abstract of the United States shows the steel production of the country in 1913 to have been 31,301,000 tons. In 1917 this was increased to 45,061,000 tons, and in 1918 it was 44,462,432 tons. While the steel mills were able to secure this large production there is little doubt that they could have secured still larger production if they had been able to obtain all the transportation they needed. The acreage devoted to the growth of staple agricultural products showed a large increase during the war. In 1913 the acreage devoted to these crops was 258,500,000; in 1916, 271,000,000, and in 1918, 288,500,000. The increase in 1918 over 1916 was 6 per cent and in 1918 over 1913, 11 per cent.

The farms of the country today have a greater productive capacity than they ever had before. The bituminous coal mines can produce at least 700,000,000 tons annually, or about 20 per cent more than they ever have produced in the past. The Iron Age, in a recent issue, estimated the steel ingot producing capacity of the steel mills of the country as now "well above 50,000,000 tons a year" and perhaps as much as 55,000,000 tons.

It is impossible to obtain reliable statistics as to the present productive capacity of most of our large industries, but in almost all cases where such information is obtainable it shows that large increases have taken place since pre-war days and that such increases are still continuing. On the other hand, very little has been done even since 1918 to increase the capacity of the railways. The number of miles of railway abandoned during the last three years has been greater than the number built. The number of locomotives and freight cars ordered during the more than two years of government control would barely suffice to replace the number ordinarily retired in a year. The Interstate Commerce Commission's statistics show that there was an actual decline of 206 in the number of locomotives in service in 1918 and an increase of only 1,425 in the number of freight cars; and when the statistics for 1919 are available they doubtless will show that in that year there was a further decline in the number of both locomotives and freight cars. During government control not a single passenger car was ordered. The already great disparity between the productive capacity of the country and its railroad capacity is continuing to increase.

The effects of the inadequacy of railroad transportation ramify throughout our entire industrial and financial system. There is but one way to remedy this condition and prevent the disastrous results to which an aggravation or even continuance of it would lead. This is to make large investments in railroads attractive.

Turning now to the west we find that the period between

1901 and 1916, like earlier periods, was a period of great expansion in railroad facilities. Statistics compiled for the 46 principal roads or systems in the west for use in the fifteen per cent case in 1917 show that while the tons carried one mile increased 69 per cent during this period and the passengers carried one mile increased 67 per cent, the net cost of road and equipment increased 73.1 per cent. These figures indicate that it was the general policy of the lines in the west during this period to provide facilities in advance of the requirements of commerce and let the business grow up to them. Since 1911 it is possible to compare the growth in traffic and facilities by districts through the use of the annual statistics of the commission. These show a slowing down of the policy of expansion in the later years of the pre-war period and a further marked arrestment of development during the war period because of war conditions.

These figures would seem to indicate, first, that in the decade from 1901 to 1911 the expansion of railroad facilities in the west was in advance of the expansion of industry, as it should be, in this territory of large expanse and great possibilities of development; second, that in the years immediately succeeding 1911 the growth in railroad facilities lagged behind the growth in commerce; and, third, that at the present time the business of the western lines is fully up to or beyond the limit of their capacity. The latter conclusion is reinforced by an analysis of the growth in facilities as expressed in terms of single-track mileage, yards, sidings and equipment up to December 31, 1916, as related to the growth in traffic and the lack of growth in these same facilities since that date.

The annual budget of any company for improvements is considerably over 100 per cent in excess of that required for the same amount of work in the pre-war period. Furthermore, the curtailment of construction and improvement work during the war and in the few years immediately preceding it make it imperative that an improvement budget, as expressed in units of property to be added to the existing plant, should greatly exceed the normal budget of prior years.

Money for these purposes must be raised at interest rates of 7½ to 8 per cent, as compared with rates ranging from 3½ to 5 per cent in the period from 1901 to 1916, or must be contributed by appropriations from income which when made will purchase less than half as much as in prior years, and in the matter of freight cars about one-quarter as much. The average return on property investment from 1901 to 1916, as shown by the exhibits offered in the fifteen per cent case, was about 5 per cent. It will scarcely be contended that the earnings of lines in Western Classification territory were excessive during this period. In view of the increased return on capital in other lines of industry, increased interest rates, increased cost of all elements entering into railroad construction, it is earnestly urged that a return of 6 per cent upon a principal sum similarly stated, namely, in terms of the property investment of the carriers, is no greater than the necessities of the case demand and is in fact less than might be appropriately allowed but for the limitations of the statute.

The construction of a large amount of new mileage is needed in the western territory. It is hardly necessary to emphasize that this new mileage will not be built unless there is a fair prospect of a reasonable return being earned upon the additional investment and that the prospect of a return being earned upon such investment will depend upon the relationship between the general level of operating expenses and rates.

Many people seem to have the impression that most of the territory west of the Mississippi river, except those parts which are regarded as being desert, are fairly well provided with railroad facilities. It is true that this territory contains about 142,000 miles of railway, or more than one-half the mileage of the country, but in proportion to its area and its natural resources its railroad mileage is still small. There is needed not only an increase in the carrying capacity of the railways, but the construction of a large amount of additional mileage to enable new sources of agricultural products, of minerals, oil, lumber and so on to be opened up. This kind of development is needed not merely for the benefit of the west but of the entire country and of the world, for it will contribute toward that increase of general production which is needed to provide mankind with additional necessities and comforts and to reduce the cost of living.

Within recent years not only has new construction in that territory almost ceased, but the statistics of the Interstate Commerce Commission show that in the year ended December 31, 1917, the mileage of railway in eight states west of the Mississippi river declined. It can hardly be regarded otherwise than as ominous that in the newest part of the country, where the undeveloped areas are largest, there should be going on, not an extension, but an actual decline, in railroad mileage.

The construction of new railroads as a speculative venture is practically a thing of the past in this country. Existing railway companies must be relied upon to provide practically all the new mileage. They will be unable to raise capital unless they are given rates which will yield a reasonable return—which is certainly not less, under existing conditions, than 6 per cent—upon both the investment in their existing properties and upon any additional investment they may make in new lines. In fixing rates the transportation act requires the Interstate Commerce Commission to consider the need of the American public for adequate transportation. No one will question that in making this requirement Congress had as much in mind the need of the public for the construction of new lines to help make available to the public the undeveloped resources of the country as it did the need for expansion of the facilities of the railway lines which already are in existence.

It has been impliedly suggested in cross-examination that the percentage of advance in this case should be cut down by the commission on the theory that the carriers' net revenue may be increased through operating economies or by increase in traffic.

As a railroad man I should not like to think that the limits of operating economies or progress in operating efficiency have been reached. It must be borne in mind, however, that in the past economies in operation have been effected primarily through grade reductions, use of heavier power, larger cars and other improvements in the plant itself and that the opportunities for further progress in this direction are constantly diminishing.

Taking the plant as it stands today, and labor and operating conditions as they now exist if traffic remains normal, it is my opinion that no substantial reductions in operating expenses can be looked for in the immediate future, and it is to the immediate future that this case relates. When the credit of the roads is restored and they are able to secure the necessary funds, the program adopted before the war by many of the lines of substituting heavy power for light, of reducing grades wherever the traffic movement justified such reduction, of substituting new modern appliances for old will be resumed, and in course of time results will be secured, but nothing substantial can be accomplished in the immediate future.

Whether the volume of business handled will increase or decrease is purely a matter of speculation. We are in a period of uncertain industrial conditions which may decrease as well as increase the volume of traffic handled. Any increase in net operating revenues which may result from increased business may be met by subsequent action.

There is one thing certain in the immediate future, and that is the pressing need for enormous additional capital expenditures, upon which, as well as upon the present value of their

properties, the carriers are entitled to a fair rate of return as defined in the statute, and for which no calculation has been made in the figures submitted.

The first requirement of the situation is that the carriers should be assured, as nearly as may be, of such adequate return as will make it possible for them to finance and provide these facilities. The commission cannot with safety regulate its judgment in this case by assumptions either as to increased business or decreased cost.

L. E. Wettling, statistician for the Western lines, followed Mr. Felton on May 28 with a detailed explanation of the statistical exhibits. Commissioner Woolley objected to a statement made by the witness regarding the increases in wages as a reflection on the government control and as indicating that a different situation might have resulted under private ownership, but F. H. Wood of the Southern Pacific said that no reflection was intended and no comparison. It was merely the purpose to give the best evidence of the present level of revenues and expenses. Chairman Clark remarked that Congress had had something to do with the level of wages during the guaranty period.

Edward Chambers, vice-president of the Atchison, Topeka & Santa Fe, testified on the traffic aspects of the case. He said a failure to make a uniform advance in both state and interstate rates would have a very serious effect in creating discriminations. In describing the proposed interterritorial adjustments he said that it was proposed to increase transcontinental rates from points west of Chicago to the Pacific coast by 25½ per cent because the Eastern lines insist on having a 30 per cent increase in their present divisions. A similar percentage is proposed on transcontinental rates from the Southeast. On rates from the East to St. Paul and Duluth it is proposed to make the increase 27 per cent.

As to switching rates, Mr. Chambers said it was the original understanding of the traffic men that they were to be included in the advance, but the accountants in compiling the figures had used the technical interpretation of freight revenue. Because of the lack of uniformity in switching rates it was then thought advisable to readjust them after the general increase is made, and this plan was favored by the National Industrial Traffic League Committee.

As to grain rates it is proposed to work out the same relationships that are now in effect and the tariffs will be ready shortly, but the coal adjustment is not yet completed. The intention is to get the full percentage increase on coal, and oil will be increased on a percentage basis.

Commissioner Aitchison made the point that there had been less increase in passenger fares in the west because in many parts of the country they were already on a three-cent or higher basis when rates were advanced to that figure generally.

Southwestern Lines Ask Higher Increase

Columbus Haile, chief traffic officer of the Missouri, Kansas & Texas, testified on behalf of the Southwestern lines that have asked that they be placed in a separate statutory group and given a general rate advance of 32.82 per cent, or at least that they be given special consideration in the adjustment of the rates, because the 24 per cent asked by the Western lines generally is inadequate for the Southwestern group. The Southwestern lines had joined in the general application filed by the Western lines, but felt that their conditions and the fact that Southwestern Tariff Committee territory has for many years been a well-defined rate territory justified them in asking special consideration. Chairman Clark had written a letter saying that the commission desires to consider Western Classification territory as one group, but that it may develop that in distributing the amount of revenue authorized it will be found appropriate to increase certain sets of rates more than certain other sets are increased.

R. C. Fulbright and S. H. Cowan, representing Texas shippers, objected to any segregation of the Southwestern lines. Mr. Haile said that if they were allowed 33 per cent the increase for the other Western lines would be reduced about 2 per cent and that the Southwestern lines would require about $90,000,000 of the proposed increase of $353,000,000 for the western territory.

H. A. Cochran, assistant coal traffic manager of the Baltimore & Ohio, explained the proposed adjustment of ex-lake iron ore rates, which is intended to give the carriers south of the lakes both the new increase and the amount of the increase under General Order No. 28 which was not allowed them.

Additional Information Desired

At the conclusion of the hearing Chairman Clark read a list of 12 requests for additional statistical information to clear up some points which were left uncertain by the testimony and also to bring the statistics more nearly up to date by showing the results of operation for March and April of this year if possible. The questions called for a more detailed analysis of the property investment accounts, separated as to road and equipment, improvements to leased lines, and materials and supplies, and a hint that the commission is giving some consideration to the possibility of an increase in commutation fares, which have been increased less than ordinary fares, and to a surcharge for Pullman passengers, was seen in a question as to the amount of revenue that might be affected by such charges. The commission also asked exact information as to the extent to which it is proposed to increase switching charges.

W. E. Lamb, on behalf of the representatives of the shippers, also submitted a list of questions which the commission said the roads might answer, providing they could do so reasonably within the time available. These dealt principally with the equipment situation and asked for the number of cars and locomotives turned over by the railroads to the Railroad Administration and turned over by it to the railroads on February 29, the number of cars purchased by it and allocated to the various roads, the number of bad-order cars and locomotives at the beginning and at the end of federal control, the cars in shop at the end of federal control and the number repaired since, the cars retired during federal control, whether the need for equipment is due to the condition of maintenance during federal control or to increase in traffic, the percentage of car shortage now and at the end of federal control, and what causes prompted the carriers to ask the commission "to take over car distribution;" also the facts as to the compliance by the railroads with the car service rules or the directions of the Commission on Car Service since federal control.

F. H. Wood on behalf of the carriers, asked the commission to decide as to the relevancy of the questions and as to whether they should be answered. Chairman Clark said that unless they involved an undue amount of special investigation they should be answered, except that those which called for conclusions might better be put to individual witnesses than to a committee or an association.

In reply to a question submitted earlier in the hearing, George M. Shriver, vice-president of the Baltimore & Ohio, submitted a compilation on behalf of the eastern roads showing that the excess earnings over 6 per cent subject to recapture from individual roads, on the basis of their property investment, would be about $104,000,000, of which one-half would go to the government. He said, however, that he had not much confidence in the estimate.

The program for the balance of the hearing after the recess is as follows:

June 7—General cross-examination of railroad witnesses, in the order in which they have already appeared, as to revenues and expenses, valuation and other general financial

matters; also general questions of traffic policy, such as switching charges and interterritorial rates.

June 10—The state commissions; National Industrial Traffic League; other general testimony by shippers.

June 14—Coal and coke.

June 15—Grain and grain products; live stock and packing-house products.

June 17—Brick, cement, stone and gravel; oil.

June 19—Lumber and forest products.

June 21—Fruits and vegetables.

June 22—All others, followed by oral argument.

Clifford Thorne will handle the principal cross-examination for the shippers on the question of value and the statistical testimony.

Report on Riverside (Vermont) Collision

The Interstate Commerce Commission has issued a report, dated April 16 and signed by W. P. Borland, chief of the Bureau of Safety, on the butting collision at Riverside, Vt., on the Rutland Railroad, March 14, in which 10 persons — 5 passengers and 5 employees — were killed and 32 were injured. Northbound passenger No. 165 and southbound freight extra 28 met, about 4:49 p. m., when both trains were moving at good speed. The locomotives, eight freight cars and three cars in the passenger train were wrecked. Among the killed was Engineman Cady of the freight. The collision was due to the misreading of a train order on the part of the men in charge of the freight train, which order was delivered to them at Gassetts, about 15 miles north of the point of collision. The order stated that the passenger would wait for them at Bartonsville, about seven miles north of Riverside, until 4:50 p. m.; but they took it to mean that it would wait at Bellows Falls, which is two miles beyond the point of collision.

The order, as received at Gassetts, was on form 19 and was delivered by the station operator to the fireman on the freight locomotive as it passed his office, and to the conductor on the caboose by means of a hoop. The fireman testified that the operator, in handing up the order said, "Wait at Bellows Falls until 4:50; I haven't got time to make out a clearance; that is all there is; go ahead." The order was handed to the engineman and he read it aloud to the fireman and to the head brakeman, reading "Bellows Falls." The fireman said that it was the engineman's usual practice, after reading an order, to hand it to the fireman and to the head brakeman, but that he did not do so on this occasion. Under the rule the fireman ought to have read the order; and on seeing it at the time of the investigation he thought that if he had read it he would have done so correctly.

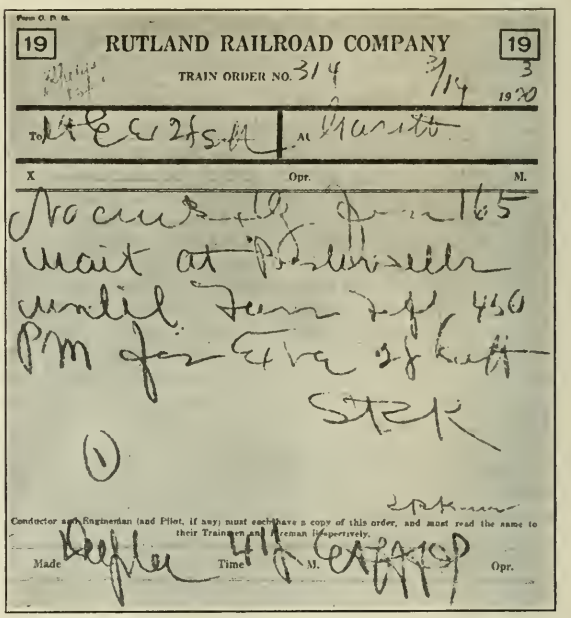
The conductor on the freight thought the order read Bellows Falls, and he handed it to the flagman; and after discussing it, the flagman agreed with the conductor as to its contents. .

The order was No. 414 and it read "No. one sixty five 165 wait at Bartonsville until 4 50 pm for Ex. 28 south." The order as delivered to the freight is shown in the illustration reduced in size. This is copied from the government report. The number, "314," was put on by mistake; the operator testified that in repeating the order this mistake was corrected but that in his hurry he neglected to change the "3" to "4."

The testimony of the conductor of the freight seems to indicate that from the first he doubted the reading of the word "Bartonsville"; and yet, after taking a second look, at Bartonsville, and conferring with the flagman he decided that the obscure word was Bellows Falls; and the assumption that the engineman, more experienced than the conductor, had read it and would act correctly, seems to have been the principal ground for this conclusion. The fact that the engineman passed Bartonsville was enough to lead the conductor to be willing to pass that point. The conductor had never worked with this engineman before. He had made 32 trips as conductor and this was his first trip on this section of the road; though he had been over it frequently as brakeman and baggageman. This conductor had said to the conductor of the passenger train, immediately after the collision "I couldn't quite figure out where you were to wait for us." He had told the assistant superintendent, at an earlier investigation, that he and the flagman had agreed that the station named in the order must be Bellows Falls.

Operator Spafford denied having said anything to the fireman about the contents of the order. He said that the engineman was familiar with his handwriting and, he, Spafford, had frequently issued orders to him during the past five years.

The report, in attributing the collision to the failure to


19 RUTLAND RAILROAD COMPANY 19

TRAIN ORDER NO. 314 3/14 1920

To Mt E & 2 f s ft At Marietta

X Opr. M.

No cut [illegible] 165 wait at Bartonsville until Fam Fr 4:50 PM for Extra 28 south

STEK

(1)

Conductor and Engineman (and Pilot, if any) must each have a copy of this order, and must read the same to their Trainmen and Fireman respectively.

Made Deeper Time 4:17 M. Opr.

correctly read the order holds responsible not only the conductor and engineman but the flagman, the fireman, and the head brakeman, who, according to the rules should read all such orders. Mr. Borland believes that if the engineman had read the order with care he would not have made the error, notwithstanding the illegibility of the writing. It is possible, however, that he heard the remark made by the agent to the fireman. [This remark the agent denied making.]

Referring to the evident condition of doubt in the conductor's mind, the report finds him grossly negligent in failing to stop his train at Chester, the last open telegraph office, for the purpose of finding out exactly what rights he had.

Engineman Cady had been in the service 28 years and a runner 20 years; and had been held responsible for four collisions. Since April, 1916, however, his record was clear. The agent (operator) at Gassetts, Spafford, had been in the service 40 years, and agent at Gassetts 33 years, and had an excellent record.

The report concludes with a recommendation that the block system be installed.

Experiments Give Data on Embankment Shrinkage

Results Obtained by the Burlington Confirm the Prevailing Understanding of This Matter

Because of the apparent lack of any specific data on the subject of shrinkage in embankments other than the allowance in construction of the customary 10 per cent, the valuation department of the Chicago, Burlington & Quincy undertook a series of experiments to determine the actual shrinkage of the material used in embankments on the lines of the Burlington, these experiments following what is known as the density method. For the purpose of avoiding any confusion as to the interpretation of the term "shrinkage" the following definitions have been used to designate the significance of the word "shrinkage" as employed in these experiments:

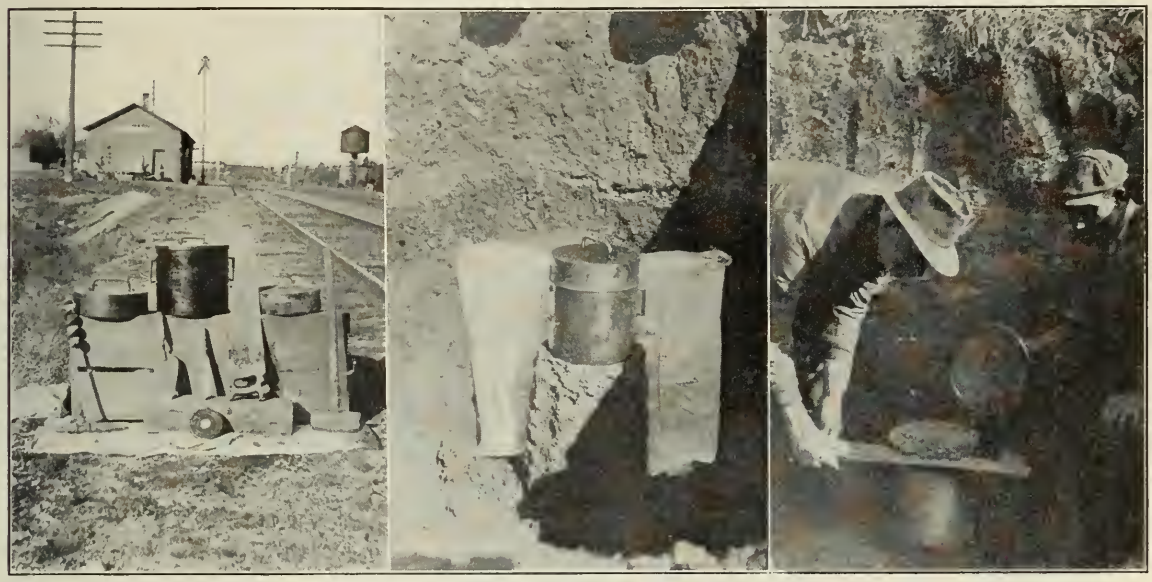
Net shrinkage as herein considered is taken as the lessening in volume of earth as between its formation in the natural bed and its re-formation in the embankment. It is a characteristic presumedly due to the breaking up for movement and the solidification in new position under the influence of its own weight and the effects of superimposed loading and impact.

Gross shrinkage involves, in addition to the net shrinkage, the loss during construction and prior to acceptance for operation by wastage on runways and the erosion by the natural elements; also the slight unmeasured general subsidence which obviously occurs under all embankments built upon glacial drift or arable soil.

The density method of determining shrinkage consists of a comparison of the weights of the net metallic contents of equal sized, unmolested samples of a given kind of earth taken from the embankment and from the natural bed adjacent to the excavation from which the embankment was made. The net metallic content is taken to be the weight of the sample after drying—the moisture content being eliminated by heat. The difference in weight is taken as the measurement of the change in volume.

How the Samples Were Taken

The samples of earth for these studies were taken at points where it could be said or where it was reasonable to suppose that a particular embankment was made from a certain excavation. Geographically, the sampling covered the territory of northern Illinois, northern Missouri and southern Iowa. With possibly some exceptions of points along or close to rivers, the samples are representative of soil said by geologists to have been formed by glacial drift, hence any conclusions concerning shrinkage developed by this investigation may be applicable only to glacial drift formation.



(Left) Apparatus and Tools Used—Driving Cap Cylinder with Neat Closing Cap and Soft Wood Driving Block. (Center) The Cutting Cylinder in Initial Position on Top of Rough Specimen of Earth in the Pit. (Right) Cylinder Completely Covering the Specimen. Driving Cap Removed and Protruding Earth Being Sawed Off

The position of a desired sample having been determined, a pit was dug to the top surface of the sample—the horizontal projection of the sample was roughly marked out in the center of the pit and the excavation continued down around the sample for about eighteen inches. The excavation at this stage presented a rough unmolested projection of earth about the size of the desired sample extending up from the bottom of the pit.

A special sample cutting cylinder was provided for the neat cutting of the sample. This apparatus consisted of a finished cylindrical shell 10 in. long and 10⅜ in. inside diameter. One end of the cylinder was threaded and fitted with a screw cap, the other end was beveled outside to a cutting edge of 1/64 in. Handles were attached to the cylinder and cap for convenient manipulation. A photograph shows this cylinder and the tools used in cutting out the sample.

TABLE 1—NET SHRINKAGE OF EARTH IN RAILROAD ENBANKMENTS—DENSITY METHOD

Geographical location	Sample number	Vertical location in cut	Kind of soil (judgment)	Weight when received at laboratory	Weight after drying	Sample Number	Location in fill Vertical	Location in fill Hor.	Kind of soil (Judgment)	Weight when received at laboratory	Weight after drying	Fills less cut	Shrinkage, per cent	Per cent for addition to fill to obtain cut	Weight per cubic foot Excavation When received at laboratory	Weight per cubic foot Excavation After drying	Weight per cubic foot Embankment When received at laboratory	Weight per cubic foot Embankment After drying
Hastings, Ia.	2	4 5	Sandy yellow clay	100.75	83.7	1	5.0	17	Sandy yellow clay	101.50	89.7	6.0		6 70	7.17	100 75	83.7	101 50	89 7
Hastings, Ia.	2	4.5	Sandy yellow clay	100.75	83.7	3	4.0	6	Sandy yellow clay	109.25	96.1	12.4		12.90	14 81	100.75	83.7	109.25	96 1
Hastings, Ia.	2	4.5	Sandy yellow clay	*100.75	*83.7	4	5.0	5	Sandy yellow clay	*118.50	*96.9	13.2		13.62	15.77	100.75	83.7	118 50	96.9
Ohio, Ill.	5	4 0	Sandy yellow clay	*51.7	*45.6	6	5.5	6	Sandy yellow clay	*56.7	*46.5	0.9		1 94	1.97	105 5	93.1	115.7	94 9
Ohio, Ill.	9	1.0	50% black, 50% yellow	42.9	34.8	7	6.0	5	50% black; 50 yellow	55.7	45.2	10.4		23.01	29.89	87.8	71.1	113.6	92.2
Ohio, Ill.	10	4.5	Sandy reddish yellow clay	64.3	57.1	8	9.0	5	Sandy reddish yellow	64.5	58.6	1.5		2.56	2.63	131.2	116.5	131.6	119.6
Buda, Ill.	11	4.0	Sandy yellow clay	50.5	44.1	14	20.0	46	Sandy yellow clay	63.3	47.8	3.7		7.74	8.39	103.1	90.0	129 2	97.5
Buda, Ill.	12	21.5	Sandy red clay	64.5	58.0	..	...	..		....	....	....		...	. ..	131 6	118.4	....	....
Buda, Ill.	15	23.0	Blue clay	68.6	61.0	13	7.0	19	Blue clay	66.0	58.6	—2.4	Swell	4.10	—3.93	140.0	124.5	136.7	119.6
Ottumwa, Ia.	19	17.5	33% blue; 67% yellow	57.8	49.8	16	7.0	6	33% blue; 67% yellow	61.2	53.3	3.5		6.57	7.03	118.0	101.6	124.7	108.8
Ottumwa, Ia.	17	15.0	33% gray; 70% yellow	56.7	49.0	18	7.0	6	30% gray; 70% yellow	62.2	52.9	3.9		7.37	7.96	115.7	100 0	126.7	108.0
Ottumwa, Ia.	20	10.0	70% gray; 30% yellow	62.3	54.8	21	7.0	6	40% gray; 60% yellow	63.9	54.7	—0.1	Swell	0.18	—0.18	127.1	111.8	130.4	111.7
Tingley, Ia.	23	9.0	10% gray; 90% yellow	63.8	56.4	22	5.0	6	10% black; 90% yellow	61.0	53.9	—2.5	Swell	4.62	—4 43	130.2	115.1	124.5	110.0
Tingley, Ia.	25	3.0	30% gray; 70% yellow	57.8	49.0	24	5.0	6	30% gray; 70% yellow	60.8	52.1	3.1		5 95	6.33	128.0	100.0	124 0	106.4
Tingley Ia.	27	8.0	5% gray; 95% yellow	63.9	57.0	26	5.0	5	40% black; 60% yellow	60.7	51.2	5.8	Swell	11.33	10.17	130.4	116.3	123 8	104 5
Clair, Mo.	31	2.0	Black gumbo	53.1	41.5	28	4.0	4	Black gumbo	55.9	42.0	0.5		1 19	1.20	108.4	84.7	114 1	85 7
Clair, Mo.	32	3.0	Gray gumbo	55.9	46.1	29	4.5	4	Black gumbo	55.3	43.6	—2.5	Swell	5 73	— 5.42	114.1	94 1	112 9	89.0
Clair, Mo.	34	2.0	Black gumbo	51.0	42.2	33	1.5	4	Black gumbo	57.0	46.1	3.9		8.46	9.24	104.1	86.2	116 4	94 1
Clair, Mo.	35	2.5	Black gumbo	54.5	41.2	30	3.0	4	Black gumbo	55.0	42.6	1 1		2 60	2.67	111.2	84 1	114 3	86 9
Cameron, Mo.	37	4.0	10% gray; 90% yellow	53.4	41.5	36	6.0	4	10% gray; 90% yellow	55.0	44.1	2.6		5.89	6.27	109.0	84.7	114.3	90.0
Cameron, Mo.	37	4.0	10% gray; 90% yellow	53.4	41.5	38	6.0	4	10% gray; 90% yellow	55.2	43.1	1.6		3.71	3.85	109.0	84 7	112 7	88.0
Cameron, Mo.	39	3.0	20% gray 80% yellow	56.5	45.2	40	4.0	4	20% gray; 80% yellow	58.8	46.6	1 4		3.00	3.10	115 3	92 3	120.0	95 1
Biggsville, Ill.	42	26.0	Sandy yellow clay	62.5	54.5	41	5.0	4	Sandy yellow clay	64.7	57.3	2.8		4.89	5 14	127 6	111.2	132.0	117.0
Biggsville, Ill.	45	3.0	Sandy yellow clay	51.2	42.2	43	5.0	17	Sandy yellow clay	60.2	49.4	7.2		14.58	17.06	104.5	86.2	122.8	100.8
Biggsville, Ill.	45	3.0	Sandy yellow clay	51.2	42.2	44	7.5	4	Sandy yellow clay	59.4	49.9	7.7		15.43	18.25	104.5	86.2	121 3	101.8
Biggsville, Ill.	47	4.0	Sandy red clay	50.3	43.2	46	5.0	7	Sandy red clay	55.6	44.7	1.5		3.36	3.48	102.7	88.2	113 3	91.2
Melrose, Ia.	50	1.5	Black loam	49.5	39.0	48	3.0	4	Black loam	51.8	41.0	2.0		4.88	5.13	101.0	79.6	105.8	83.7
Melrose, Ia.	51	2.5	Sandy black loam	54.8	45.2	49	3.0	4	Black loam	54.8	42.9	—2.3	Swell	5.36	—5.09	111 8	92.3	111.9	87.6
Melrose, Ia.	54	2.0	Black loam	52.2	41.7	53	3.0	4	Black loam	54.7	39.6	—2.1	Swell	5.30	—5.04	106.7	85.1	111.7	80.8
Melrose, Ia.	55	1.0	Black loam	49.3	39.0	52	3.0	4	Black loam	54.6	42.7	3.7		8.66	9.49	100.6	79.6	111.5	87.1
Melrose, Ia.	57	1.0	Black loam	43.7	34.9	56	3.0	4	Black loam	50.5	38.9	4.2		10.80	12.04	89.2	73.7	103.1	79.4
Russell, Ia.	60	8.5	20% blue; 80% yellow	62.8	56.5	58	8.0	4	10% gray; 90% yellow	61.7	53.1	—3.4	Swell	6.40	—6.02	128.2	115.3	125.9	108.4
Russell, Ia.	63	7.0	60% blue; 40% gray	58.1	48.2	59	5.2	4	25% gray; 75% stiff yellow	61.9	54.3	6.1		11 22	12.66	118.5	98.4	126.3	110.9
Russell, Ia.	63	7.0	60% blue; 40% gray	58.1	48.2	61	8.0	4	100% blue clay	55.5	42.5	—5.7	Swell	13.41	—11.83	118.5	98.4	113.3	86.9
Russell, Ia.	63	7.0	60% blue; 40% gray	58.1	48.2	62	3.0	2	85% Blue; 15% yellow	56.3	45.0	3.2	Swell	7 11	—6.64	118.5	98.4	114 9	91.8
Thayer, Ia.	73	0.7	20% black 80% yellow	49.3	38.9	66	10.0	14	12% black; 88% yellow	57.8	46.9	8.0		17.06	20.57	100.6	79.4	118.0	95.7
Thayer, Ia.	73	0.7	20% black; 80% yellow	49.3	38.9	70	13.0	9	20% black; 80% yellow	60.6	49.5	11.6		23.43	29.82	100.6	79.4	123.6	101.0
Thayer, Ia.	73	0.7	20% black; 80% yellow	49.3	38.9	71	13.0	14	30% black; 70% yellow	61.8	51.7	12.8		24.76	32.91	100.6	79.4	126.1	105.6
Thayer, Ia.	73	0.7	20% black; 80% yellow	49.3	38.9	72	21.0	40	15% black; 85% yellow	56.1	46.1	7.2		15 62	18.51	100.6	79.4	114.5	94.1
Thayer, Ia.	74	1.5	Sandy yellow clay	56.1	44.6	65	7.0	9	Sandy yellow clay	58.7	47.5	2.9		6.11	6.50	114.5	91.0	119.8	96.9
Thayer, Ia.	74	1.5	Sandy yellow clay	56.1	44.6	67	10.0	9	Sandy yellow clay	59.4	48.3	3.7		7.66	8.30	114.5	91.0	121.3	98.6
Thayer, Ia.	74	1.5	Sandy yellow clay	56.1	44.6	68	10.0	4	Sandy yellow clay	58.7	48.0	3.4		7.08	7.62	114.5	91.0	114.5	97.9
Thayer, Ia.	74	1.5	Sandy yellow clay	56.1	44.6	69	13.0	4	Sandy yellow clay	59.1	49.3	4.7		9.53	10.54	114.5	91.0	120.6	100.6
Thayer, Ia.	75	2.3	Sandy yellow clay	59.3	49.2	64	7.0	4	Sandy yellow clay	59.9	49.5	0.3		0.61	0.61	121.0	100.4	122.3	101.0
Thayer, Ia.	76	3.0	Stiff yellow clay	60.1	51.0	..	...	..		....	....	...		....	....	122.5	104.1	....	..
Thayer, Ia.	77	5.0	70% stiff yellow; 30% gray	62.7	54.1	..	...	..		....	....	...		....	....	128.0	110.4	....	..
Thayer, Ia.	78	7.4	80% stiff yellow; 20% gray	64.4	56.0	..	...	..		....	....	...		....	....	131.4	114.3	....	....
Corning, Ia.	81	4.0	80% stiff yellow; 20% gray	56.7	44.6	79	5 0	5	80% stiff yellow; 20% gray	55.5	42.2	—2.4	Swell	5 69	—5.38	115.8	91.0	113.3	86.1
Corning, Ia.	81	4.0	80% stiff yellow; 20% gray	56.7	44.6	80	6.0	5	80% stiff yellow; 20% gray	56.2	43.2	—1.4	Swell	3.24	—3.15	115.8	91.0	114.7	88.2
Corning, Ia.	84	1.0	Black loam	48.4	37.0	83	4.0	5	Black loam	54.2	40.3	3.3		8.19	8 92	98.8	75.9	110.7	82.2
Corning, Ia.	85	1.0	Black loam	47.2	34.7	82	5.0	5	Black loam	54.0	39.5	3.8		9.63	10.95	96.3	73.7	110.2	80.6
Corning, Ia.	88	1.0	Black loam	42.0	35.1	87	3.5	5	Black loam	53.9	39.8	4.7		11.81	13 39	85.7	71.6	110.0	81.2
Corning, Ia.	89	1.0	Black loam	47.0	35.0	86	5.0	5	Black loam	53.8	40.1	5.1		12.72	14 57	95.9	71.5	109.8	81.8

Note:—Vertical locations in cuts are distances down from natural surface.
Vertical locations in fills are distances down from top of tie: Horizontal locations are distances from center of track.
*Changed test box from 1 cu. ft. to test box containing .49 cu. ft.

The sample cylinder, cutting edge down, was placed upon the earth projection and gently forced down over the sample—the projection being dressed down ahead of the cutting edge so that it would have a minimum of work to do, and hence leave the sample in an undisturbed condition. A special driving cap permitted the core to pass entirely through the cylinder. After the cylinder was well down over the sample, the driving cap was removed and the protruding earth was sawed off true with the top of the cylinder. The cylinder was then capped with the neat closing cap—shovels were inserted in the earth projection below and clear of the cutting edge and the cylinder and the bulk projection broken loose from its contact and inverted. The protruding earth on the now upturned lower end of the cylinder was then sawed off true with the cutting edge and the work was completed.

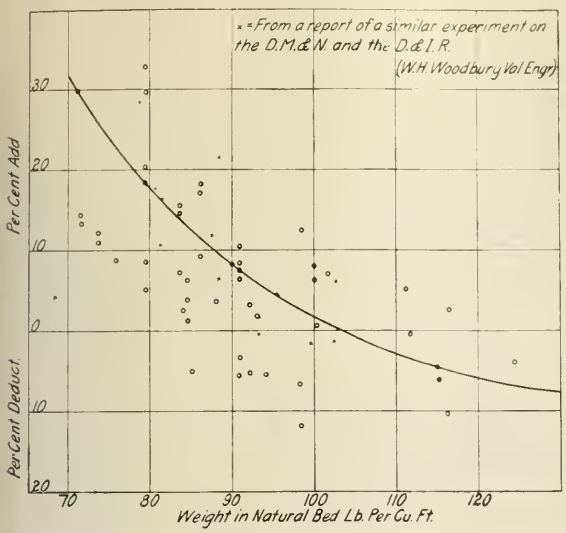


Fig. 1—Curve of Shrinkage, Volume in Embankment to Volume in Excavation

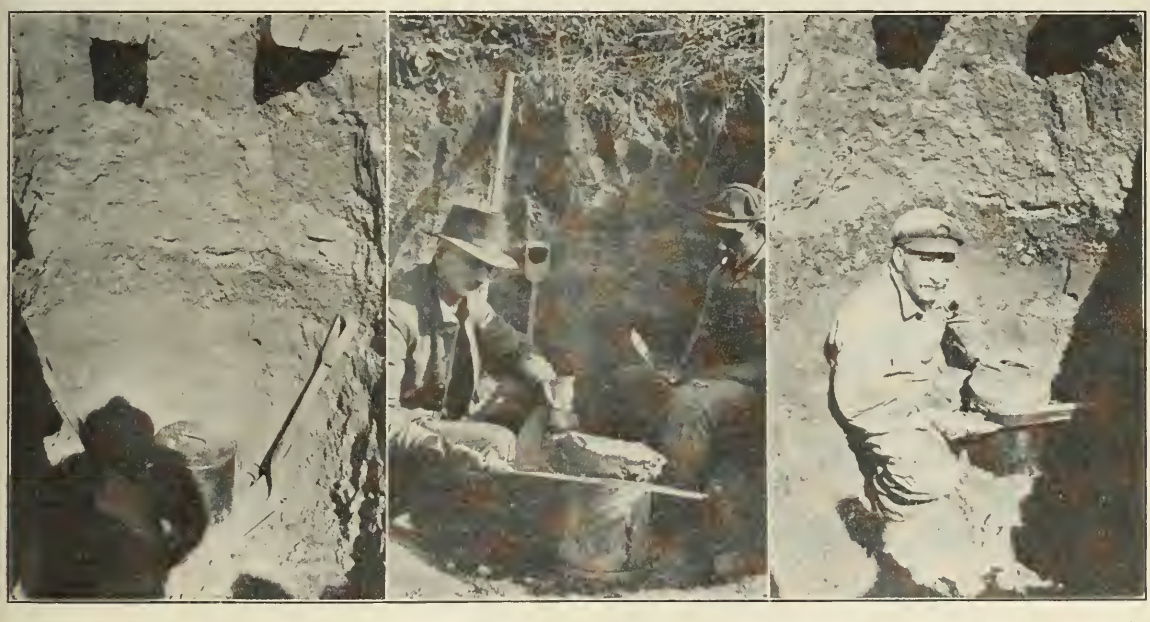
The sample was emptied into a close woven sack—boxed and shipped to the railroad's testing laboratory at Aurora, Ill., where it was broken up into fine aggregates and dried at a temperature of about 170 deg. F., until by successive weighings no further loss in weight was obtained. In all, 89 samples were taken and the critical data relative to these samples are given without segregation or division in Table I.

Analysis of Data

It became apparent early in the course of this experiment that the shrinkage of earth bore some relation to the weight of the earth in its natural bed. Upon this conclusion the shrinkages of the samples were platted in relation to the weight of the metallic content in the natural bed, as shown in Fig. 1. The curve of shrinkage as drawn is merely representative of the center line of the area of the scattered points. It is apparent from the spread of the points that dissimilar materials may have been compared in some cases. The curve, however, as drawn, surely eliminates extreme errors. A similar curve for the complementary or additive factor was developed in the same manner as for shrinkage and is displayed in Fig. 2.

It also became apparent in the course of the experiments that the weight of metallic content in the natural bed bore a relation to the depth below the natural surface. The metallic content weights were platted in relation to the depth below the natural surface and an approximate curve of the relation was drawn as shown in Fig. 3.

Particular attention is drawn to the first series of samples taken—Nos. 1 to 4, inclusive (in the table). Here except for such intermixing of top soil as may have occurred in the movement, the sameness of the material was clearly indicated. The embankment samples were taken in different kinds of embankment—different as to age and use—and the



(Left) Specimen Completely Capped and Shovels Being Inserted Underneath Preparatory to Breaking It Loose and Inverting. (Center) Cylinder Inverted and Earth Protruding from the Bottom Being Sawed Off. (Right) Same Action as Center Picture. Background Shows Irregular Depth of Ballast

results are of particular interest. Sample 1 in comparison with sample 2 returns a shrinkage of 0.7 per cent for a 17-year-old embankment upon which track has never been laid—built for future double tracking; sample 3 in comparison with sample 2 returns a shrinkage of 12.9 per cent for a

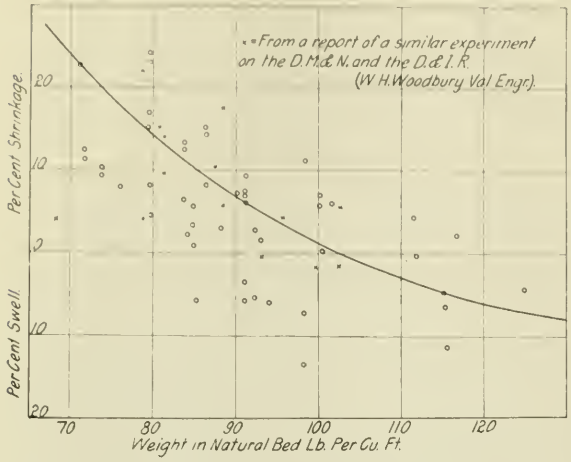


Fig. 2—Curve for the Additive Factor, Volume in Excavation to Volume in Embankment

49-year-old embankment, subjected in its first 32 years of age to the effects of operated traffic—a maximum of 107-ton engines and 30-ton capacity cars—but abandoned for the past 17 years; sample 4 in comparison with sample 2 returns a shrinkage of 13.6 per cent for a 17-year-old embankment subjected during its life to the traffic effects of the heaviest equipment in the service of the railroad.

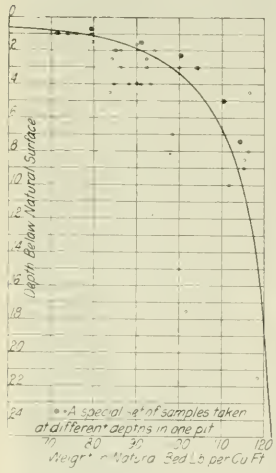


Fig. 3 — Relation of Dry Weight to Depth Below Surface

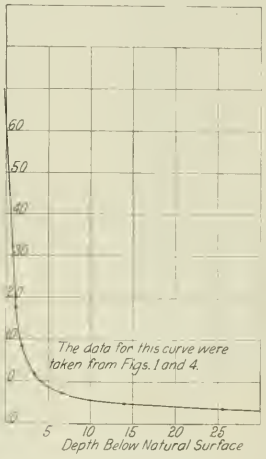


Fig. 4—Relation of Additive Factor Depth of Material in Natural Bed

Conclusions and Method of Applying the Data

It will be seen from Fig. 1 that the studies so far made, and as herein reported upon, indicate that earth, the metal content of which in its natural bed weighs less than 103 lb. per cu. ft., shrinks when placed in embankment subjected to traffic but when the metal content in the natural bed weighs more than 103 lb. per cu. ft. the material retains a more or less permanent swell.

As shrinkage bears a relation to weight and weight bears a relation to the depth below the surface in the natural bed, shrinkage of embankments can be shown to bear a relation to the depth of the material source in excavation below the natural surface. The same holds true for the complementary or additive factor and a curve of this relation has been developed for this characteristic as shown in Fig. 4.

If a conclusion can be sustained upon the evidence, it can be said that, for the territory considered, earth in embankments taken from the top four feet of the excavation shrinks; and that from lower depths in the excavation it swells. Such a conclusion might seem to mean that the average additive factor applicable to embankments may not be impressive, but upon considering that ordinarily from 60 per cent to 100 per cent of railroad embankments are constructed from excavation in the top four feet of earth the average additive figure becomes appreciable. Practically all side borrow falls in this class and the top four feet of roadbed cuttings contains a relatively large yardage on account of the trapezoidal shape of the roadbed section.

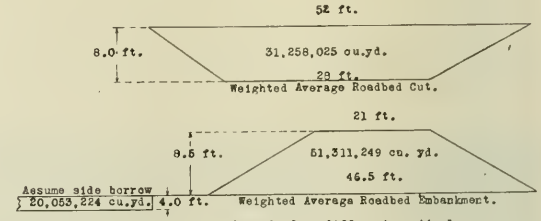
GRADING STATISTICS FOR C.B.& Q.R.R. IOWA LINES

Quantities from unchecked and unaccepted (at this time) I.C.C. Inventory

51,311,249 cu.yd. Roadbed Embankment.
31,258,025 cu.yd. Roadbed Excavation.
20,053,224 cu.yd. Difference - Considered Side Borrow

Miles first main line in Iowa 1407 } Average section taken as for
Miles second main line in Iowa 246 } single track plus 17.5 per cent
Total length of roadbed cutting 2,637,281 ft.
Total length of roadbed embankment 4,791,679 ft.

Cu. Yd. per ft. of Roadbed Cutting 11.85 sq. ft. area 320.0
Cu. Yd. per ft. of Roadbed Embankment 10.71 sq. ft. area 289.2



Embankment of 51,311,249 cu.yd. made from different vertical Areas in Excavation as indicated.

Distance Below Natural Surface.	Cu.Yd. Roadbed Excavation	Cu.Yd. Side Borrow	Cu.Yd. Total Excavation	Additive Factor from Figure 4	Additive Amount
0-1	4,938,768	5013306	9952074	+ 41.0%	+ 4080350
1-2	4,626,188	5013306	9639494	+ 15.4%	+ 1484482
2-3	4,344,865	5013306	9358171	+ 5.3%	+ 495983
3-4	4,063,543	5013306	9076849	+ 1.4%	+ 127076
4-5	3,750,963		3760963	- 0.6%	- 22506
5-6	3,469,641		3469641	- 1.7%	- 58984
6-7	3,188,319		3188319	- 2.6%	- 82896
7-8	2,875,738		2875738	- 3.3%	- 94899
	31,258,025	20053224	51311249		+ 5928606

Weighted Average Additive Factor to Correct Net Shrinkage $\frac{5,928,606}{51,311,294} = 11.55\%$

Fig. 5—A Practical Application of the Test Data

As a practical example the grading statistics for Chicago, Burlington & Quincy lines in Iowa are given in Fig. 5. The average additive factor there indicated for net shrinkage for Iowa embankments is shown to be 11.55 per cent.

As it may be held with some reasonableness that the side areas of embankments—involving those quantities lying in the outside three-foot slabs or beyond a slope line drawn from the toe of the ballast—are clear of the influence of loading and are subject to the leavening effects of frost to an extent which neutralizes the shrinkage, such areas may be eliminated from consideration. The net average additive factor of 11.55 per cent derived for Iowa embankments would under this consideration be reduced 20 per cent—the ratio of the area of the side three-foot slabs to the total

average area of embankment. The net average additive factor for Iowa embankments then becomes 9.24 per cent if the deduction of 20 per cent is a proper one.

Gross Shrinkage

The shrinkage above derived, assuming that the curves herewith shown are correct, is the net or inherent shrinkage. The experiment as drawn has no direct reference to the ascertainment of the miscellaneous factors of gross shrinkage. The establishment, however, of the extreme high shrinkage characteristic of surface soil, which is supported by common knowledge of the high porosity and void content of surface soil, indicates an unmeasured subsidence under all embankments. It appears obvious that if surface earth shrinks 40 per cent when used in embankments it will be compressed in natural bed under the superimposed embankment and the effects of traffic. It is easily conceivable that this subsidence in place may amount to at least 0.2 ft. On this assumption and considering the average embankment in the grading of Burlington lines in Iowa the shrinkage in the top soil under embankments would add 3 per cent to the apparent embankment.

The loss by wastage on runways and by wind and rain erosion during construction and prior to acceptance for operation is difficult to estimate. That there is such a loss will be readily agreed to by all engineers experienced in or familiar with railroad construction. Possibly some small percentage based upon opinions of many competent minds should be added. However, allowing only for the general shrinkage of top soil under embankment on a basis of the above given tentative estimate of 3 per cent, the total additive factor for Iowa embankments would be 12.24 per cent

We are indebted for the above information to H. S. Marshall, valuation engineer, and C. E. Oliphant, cost engineer of the Chicago, Burlington & Quincy, Chicago, under whose direction this investigation was conducted.

Employees Demand Minimum Wage of $2,500 a Year

Representatives of Brotherhoods Complete Rebuttal—Carriers to Present Further Testimony on Billion Dollar Requests

The declaration that $2,500 a year, on an eight-hour basis, for common laborers, with other employees paid a higher rate according to the differentials now established between crafts, would be deemed just and reasonable by railway employees, and a warning that if the award to be made by the Railroad Labor Board did not suit the railway employees the brotherhoods might be forced to acquiesce in the action of the men in leaving railway service for other industries, marked the closing of the employees' rebuttal before the Railroad Labor Board on May 28. B. M. Jewell, acting president of the railroad shopmen's organization, made this demand upon the board and voiced the warning which had already been voiced by representatives of other classes of employees. In addition Mr. Jewell informed the board that the national agreements made during the period of federal control should be considered in the making of any awards. In closing his testimony Mr. Jewell said: "We must have a favorable and quick award applicable to all railway employees. This is absolutely necessary in order to avoid a state of affairs arising wherein we cannot control the situation. Unless a prompt award is made we may find it absolutely necessary, in order to preserve the standard recognized railway labor organizations, to not only refrain from trying to keep men in the service but to acquiesce in the action taken by those who leave the service."

B. F. Grable of the maintenance of way employees' organization also spoke briefly at this session, asking for a speedy adjustment of the wages of maintenance of way employees and the re-establishment of certain differentials. In support of his demands Mr. Grable reiterated that common laborers in outside industries are being paid 20 to 40 cents per hour more than trackmen.

After the rebuttal of the employees had been finished a request was made on the part of the carriers for an opportunity to present further testimony, and the board adjourned until June 1.

At the session of the board on June 1, E. T. Whiter presented the carriers' rebuttal reiterating objections to many of the men's proposals; he again called attention to the discrepancies in their demands and fallacies in the wage plan which the different organizations have requested be established. The first part of the rebuttal dealt with issues common to all of the demands made. The suggestion made by the employees' representatives that statistics presented by the conference committee of managers be checked with figures compiled by the board of railway wages and working conditions and the statistical section, division of operation, Railroad Administration, was concurred in by Mr. Whiter, who in so doing pointed out that all of the carriers' presentation was arranged in a limited time; nevertheless every precaution had been taken to prevent errors and the instances cited to which the men's representatives had objected had been verified as indicative of general objections. All of the exhibits filed with the board were explained by Mr. Whiter.

Regarding the proposal of the trainmen for time and one-half for Sunday and holiday work, Mr. Whiter stated that the rule as proposed was vague and open to construction as a rule providing for payment of time and one-half times time and one-half for this work. W. N. Doak of the Brotherhood of Railway Trainmen denied that the rule was meant to convey this meaning and Mr. Whiter repeated that the rule showed the necessity for the board making clauses in the award clear and applicable to only one construction. Similarly in case of the proposal of the men for the payment of a differential for services on lines having a gradient of one and one-eighth per cent, Mr. Doak asserted that the rule was not meant to apply at such points where grades were encountered as approaches to bridges, coal chutes, etc., and Mr. Whiter called attention to the working of the proposed rule, pointing out that it could be so applied. Subsequently, the carriers' rebuttal dealt with points raised by the representatives of the men in yard service, conductors, firemen, enginemen, telegraphers, signalmen, maintenance of way employees, and members of shop crafts.

Regarding the charge of E. F. Grable of the maintenance of way employees that maintenance of way men were being worked ten hours, not because of the condition of the roads, but to hold men by permitting the earning of increased compensation due to overtime, Mr. Whiter stated that the charge was based on the opinion of one not in position to know the state of the roads and the necessity for the work being done in a short time.

In speaking of shop crafts, Mr. Whiter outlined the car-

riers' position on the national agreement by stating that its restrictive rules were not conductive to economical, efficient operation now that the justification for unification had been taken away by the ending of federal control and the necessity of private corporations to answer for results of operation.

During the hearings it was charged that figures compiled and presented to the board by the carriers were prepared for purpose of ascertaining the costs of operation. The carriers' presentation pointed out that if comparisons were to be made on only basic wage rates the relation of actual cost of the awards and the amounts the men received for work would be but 75 per cent of the total. As to the demand of B. M. Jewell, for the establishment of a basic minimum wage for laborers of $2,500 per year, Mr. Whiter expressed opposition, saying that this figure was larger than the incomes of a vast number of workers.

The hearing before the board on June 2 was opened by the interrogation of Chairman Barton by B. M. Jewell, speaking on behalf of the "associated standard recognized railway labor organizations." Mr. Jewell, after receiving a negative reply to his verbal request for the granting of a temporary award read a prepared statement asking the board to close the hearings on the demands of the men immediately and give consideration to the granting of a temporary award to all railway workers of 18 cents per hour to remain effective until the final awards are made by the board. Mr. Jewell also raised the question as to whether the board under the terms of the transportation act will be able to make its award applicable on all railroads or whether it will apply only to those roads represented by various committees presenting testimony. No decision was rendered by the board on either question during the session.

Mr. Jewell's statement outlined the progress of the wage negotiations during the latter part of federal control, emphasizing promises which have been made to the labor organizations of increases in compensation to meet the rising cost of living. He then read a letter which was filed with the board on May 5 by the committee representing the larger railroad labor organizations and containing a request for an immediate temporary award of 18 cents per hour for all railway workers—this to fulfill promises and enable the men to meet living costs. After citing that the cost of living had risen instead of fallen and that conditions were now even more acute than they were at the time of the filing of the request Mr. Jewell said, "With a full realization of our responsibility and with a desire to do that which will make for the protection of the American public (of which we are a part), as well as securing justice for the railroad employees who have been patient and who have far more than any other been bearing a heavy burden under the most distressing conditions, we now urge the board to close further public hearings and proceed at once in compliance with the rules of the board to reach an agreement and announce an award or decision as per our request in our letter of May 5."

J. G. Luhrsen of the American Train Despatchers' Association was then granted an opportunity to present evidence on behalf of the train despatchers, although Chairman Barton announced that this action should not be taken as a precedent and that nothing would be done by the board to hinder or delay consideration of the demands now before the board. Mr. Luhrsen presented testimony concerning wages, working conditions and responsibility of men in his organization and requested that the trick despatchers be paid $265 and chief despatchers $315 per month as minimum wages. Although there are several points at issue yet which could be made subject to further presentations by both sides it is believed that the hearings will end this week and that the board will go into executive session to consider the awards which may be made. Inasmuch as presentations by both men and carriers have been comprehensive and complete it is argued that decision by the board in the near future will do much to alleviate the unrest now prevalent in labor organizations.

Some Actual Results in Saving Water

The Illinois Central has been conducting water-waste campaign for the past five years to impress upon employees and others the value of water and the importance of water-waste prevention. In order to arrive at the saving accomplished as a result of this, a comparison has been made of the consumption of water at 14 of the largest stations where the supply is taken from the municipal systems, representing 70 per cent of the total consumption and 62 per cent of the total cost of city water, taking 1914 (teh year in which the water-waste campaign was started) as a basis and comparing with the five years ending December 31, 1919.

A statement is submitted herewith showing the decrease in city water consumption during the five-year period, 1915 to 1919 inclusive:

	Gallons	Amount
Chicago	$587,455,000	$36,448.58
Hawthorne, Ill.	7,055,600	705.56
Effingham, Ill.	5,832,200	422.30
Centralia, Ill.	537,663,100	24,194.85
Cairo, Ill.	73,588,440	4,409.66
Mounds, Ill.	139,611,500	3,983.53
E. St. Louis, Ill.	87,015,890	5,038.75
Paducah, Ky.	182,218,400	9,550.88
Louisville, Ky.	209,824,800	9,388.50
Central City, Ky.	9,640,450	497.49
Memphis, Tenn.	388,833,400	38,883.34
Canton, Miss.	51,632,050	2,524.48
Jackson, Miss.	4,637,000	253.24 (Inc.)
New Orleans, La.	5,138,000	359.66 (Inc.)
	$2,270,595,830	$135,435.02

This statement shows that the waste and unnecessary use of city water was decreased 2,270,595,830 gal., an actual reduction on the face of the bills of $135,435.02. During the same period the average increase in tonnage handled amounted to 28 per cent. This would normally increase the consumption of water at least 10 per cent, reflecting a further saving of $131,420.13. During the same period the water pumped by company forces was reduced 5 per cent, which, at 2 cents per thousand gallons, effected a further saving for the five-year period of $60,038.80, a total saving of $326,-893.95 in five years, or an average saving per year of $65,-378.79, nearly $200 per day.

As an example of conditions found in the course of the campaign, the situation at a large terminal can be cited. A request had beeen made for an expenditure of approximately $18,000 for new pumps and pipe lines, and it was stated that the old pumps and pipe lines were too small to furnish sufficient water. A water-waste survey disclosed the fact that approximately 40 per cent of the water being pumped was being wasted. When these conditions were corrected the pumps were found ample to handle the supply without any expenditure for additional equipment.

At a large office building the city-water bill had increased to $440 per month, and as this appeared excessive a water-waste survey was made, with the result that the monthly bill was cut to $116, a decrease of 75 per cent. The cause for waste at this point was a defective control valve on the feed water heater which, operating improperly, allowed city water to pass through the heater to bilge tanks, from which it was pumped into the sewer.

The opportunities for water waste on railroads are many and it is within the power of every employee to save money by practising economy in the use of water, not in the economy that stints, but in the economy of reasonable use. We are indebted for the above information to C. R. Knowles, superintendent of water service of the Illinois Central at Chicago.

The Master Boiler Makers' Convention

Subjects Include Welding of Firebox Sheets and Effect of Steam Pressure on Staybolt Breakage

THE TWELFTH ANNUAL CONVENTION of the Master Boiler Makers' Association opened at the Curtis Hotel, Minneapolis, Minn., at 10:00 a. m., Tuesday, May 25. About 250 members were present at the opening session. The opening address was given by Hon. J. E. Meyers, mayor of Minneapolis, who welcomed the association to the city.

Following this William Schlafge, mechanical manager of the Erie Railroad, spoke of the necessity of organization in the industries, in order that productive efficiency might be increased. The duty of all boiler makers and particularly the foremen, is to hasten the replacement of power equipment in the country by carrying on the good work which has in the past marked their efforts. During the war the principles of conservation of labor and of materials were applied with remarkable results. Machine equipment was adopted wherever possible to aid production, in other words, every effort was made to obtain a maximum result with a minimum expenditure of time and labor. The same principles must be applied to a higher degree now to carry the nation through the present economic crisis without undue hardship. Turning from their constructive duties, Mr. Schlafge spoke of the responsibilities that superintendents and all others in positions of authority have toward the men under them, in instructing them in their work and understanding their requirements. All radical tendencies must be stamped out and the sad experiences of labor in European countries prevented.

The president of the association, John B. Tate, delivered his address on power units of the future. The engineering departments of all roads must provide for more powerful locomotives—engines capable of hauling 150 cars of 150 tons each. In the present freight congestion this need for greater power has been well demonstrated. Stationary boiler design must also be improved so that the operating efficiency may be increased and the cost of upkeep diminished. Because of the increasing tendency toward the electrification of roads, the size and efficiency of power plant units must be increased. During this reconstruction period, the men who hold the responsibilities of supervision in the shops must act at all times in such a manner that decisions are entirely fair and impartial.

The remainder of the Tuesday session was taken up with reports of the secretary and the treasurer and routine business. Under the head of miscellaneous business it was voted to consider the invitation of Section III—Mechanical, American Railroad Association, for the Master Boiler Makers' Association to become a member of the organization.

Wednesday Session

The opening address at the Wednesday session was made by J. M. Hall, assistant chief inspector, Bureau of Locomotive Inspection of the Interstate Commerce Commission, on the causes of boiler failures. Lantern slides of disastrous locomotive explosions were exhibited. The accidents illustrated the more usual contributory causes and in each case these were quite apparent. Low water, corrosion of plates, bad welding of seams, formation of scale in the water glass and gage cock plugs have all increased the total of locomotive disasters. Mention was made of experiments conducted by the chief inspector's office on the relative accuracy of the gage cock and water glass in indicating the true height of water in a boiler. The conclusion reached, after testing various locomotives in different sections of the country, is that a roll of water is raised at the back flue sheet which the gage cock indicates, while the water glass gives the true level of the water as four to eight inches lower, depending on the size and type of the boiler. Within a short time the bureau will issue instructions on the proper installation of gage cocks and water glasses in relation to each other and to the boiler, in order to overcome the danger from former inaccuracies.

W. H. Bremner, president of the Minneapolis & St. Louis, impressed on the members of the association the necessity for the best workmanship and inspection to keep the present equipment of the railroads at 100 per cent efficiency, for although replacements have been commenced it will be many months before any old locomotives will be eliminated. The railroads depend not on any one individual or group to maintain the standards, but upon every man in the organization no matter what his duties may be. The same loyalty must be shown to the private companies now as while the roads were under federal control, for the nation's welfare is absolutely dependent on the service of the railroads, which is being well demonstrated at the present time.

After the conclusion of this talk the remainder of the Wednesday session was devoted to the discussion of papers submitted by members of the association.

Tensile Strength of Firebox Steel

On the question of whether the best results may be obtained from firebox steel having a tensile strength from 48,000 to 58,000 lb. per sq. in., or from 55,000 to 65,000 lb. per sq. in., the committee has endeavored to make the report on the subject as brief as possible. In gathering this information we find there is a very slight difference of opinion, or rather a slight difference in the specifications of the various railroads, for firebox steel.

The members of the committee have given considerable attention to the care of locomotive boilers, including the study of failures of firebox sheets.

In general firebox sheets fail in one of two ways:

(1) Gradual Failure: The sheet may have a good many small cracks which are mostly in a vertical direction. These cracks are thickest, radiating out from the staybolts and frequently run from one staybolt to another in the same vertical row, but never between staybolts horizontally. These cracks are almost always on the fire side and at times extend through the thickness of the sheet, first going through next to the staybolts. Such sheets are almost always accompanied with more or less corrugation and the cracked and corrugated condition is almost always confined to the lower half of the sheet.

(2) Sudden Failure or Rupture: The sheets may fail by a single crack or rupture from a foot to several feet long. In bad cases the crack may extend from the mud ring to the crown sheets, but ordinarily the cracks are confined to the lower half of the sheet, extending upward from the mud ring or from a few inches above it, and it is always near the middle of the side sheet longitudinally. Such sheets may show no corrugations and may show very little if any other defects.

The failures of the first kind are of gradual formation, but those of the second class occur suddenly.

The records on file of one of the largest railroads in the United States show that between the years 1886 and 1913, 115,000 tons of boiler and firebox steel were used on loco-

motive boilers and they do not have any record of any failure that resulted in injury to persons or loss of life due to the character of the material.

This same railroad in 1892 specified and adopted firebox steel with a tensile strength of 55,000 to 65,000 lb. per sq. in., and they are using the same grade today.

It is the opinion of the committee that the life of the firebox sheets does not entirely depend on the specifications or tensile strength of the material, but rather on the care and treatment to which the plates are subject; for instance, the washing of boilers with cold water before the boiler is properly cooled down; second, using the injectors when active steam production is not going on.

In conclusion, from the best information this committee was able to obtain, firebox steel with a tensile strength of 55,000 to 65,000 lb. per sq. in. gives the best results.

However, we would also add that it is our experience that by suitable treatment of water supplies, a proper arrangement for delivering feedwater into the boilers and proper methods of caring for boilers in the enginehouses and elsewhere, long life can be expected with most any grade of firebox steel.

The report is signed by W. J. Murphy, chairman, J. F. Ferestrum and Lewis Eberle.

Discussion

Opinion seemed about equally divided on the desirable tensile strength for firebox steel. Good results have been obtained with steel from 48,000 to 58,000 lb. per square inch, as well as from the higher strength of 55,000 to 65,000 lb. per square inch. It seems to be true that if the staybolts are properly applied along the fire line, crown sheet failures will be prevented. In any case the strength of steel or the carbon content have little to do with failures so long as the material is within the 48,000 to 65,000 lb. per square inch limit.

Effect of Steam Pressures on Staybolt Breakage

On the subject of superheating and reducing steam pressures in locomotive boilers and their effect on staybolt breakage, the committee submitted the following report:

The compiled data taken from six different territories or districts where the service, water condition, etc., differ largely and steam pressure is about the same, are given below:

Data on Staybolt Breakage Covering Period of Five Years

District number	Number of locos.	Steam pressure	Total broken	Bolts broken per year	Bolts broken per engine per year
Superheater	5	185 to 200	127	25.4	5.08
Saturated	5	220	514	102.8	20.56
Superheater	5	185 to 195	216	43.2	8.64
Saturated	5	220	710	142	28.4
Superheater	5	185 to 200	1,193	238.6	47.72
Saturated	5	220	1,848	269.6	73.9
Superheater	5	185 to 200	196	39.2	7.84
Saturated	5	220	1,610	322	64.4
Superheater	5	185	432	86.4	17.28
Saturated	5	220	470	94	18.8
Superheater	1	185 to 200	71		
Saturated	5	220	358	71.6	14.32

All engines involved are Pacific type.

The chart shows there is no doubt that the superheater and reduction of steam pressure of boilers from 220 to 195 lb. pressure will decrease the staybolt breakage.

We have also compared 10 locomotives previously operated as saturated without brick arch. These locomotives were later equipped with a superheater and brick arch, and the pressure remained the same—205 lb.

The comparison shows considerably less staybolt breakage. (While this paper is not on the brick arch, we consider they are co-related and have some bearing on the subject.) The reduced breakage of staybolts is accounted for along these lines: The brick arch acts as an indicator making the proper handling of the boiler compulsory. If the boiler is blown down too soon arch tubes will be distorted. Saving the arch tubes also saves the staybolts.

Our records show that superheating and reducing of steam pressure of boilers result in a reduction of staybolt breakage.

The report is signed by T. L. Mallam, chairman, F. A. Mayer and E. J. Sweeney.

Discussion

An individual report on this subject was submitted by T. L. Mallam, chairman of the report committee.

"The New York Central Railroad in connection with the Pennsylvania, during 1910 made two elaborate series of tests, and the results obtained showed that superheater locomotives decreased the demand on the boiler from 25 to 35 per cent; that is to say, the boilers of the superheater locomotives have to make considerably less steam than the boilers of the other type. This is, of course, due to the fact that less superheated steam, with its greater heat content, is needed for a given power.

"In line with the results of these tests and my own experience, I contend that superheated boilers do not break as many bolts as boilers not superheated. We have in service on our road four O. G. style fireboxes that are not superheated. These four engines carry 200-lb. per square inch pressure, whereas all the others carry 180-lb. pressure. We find that more staybolts are broken in these four engines than in any eight superheaters.

"There is a question in my mind whether the lesser staybolt breakage on our superheaters is the result of the lower boiler pressure or whether it is the result of other conditions caused by superheat, design and service. As just mentioned, I think the superheater boilers do not have to make as much steam as the saturated steam boilers and therefore do not have to be worked as hard as the latter, with the result that firebox sheets are not punished as badly. The lower boiler pressures of a superheater may help, but I am of the opinion that the greater advantage to staybolts and boiler maintenance conditions from superheat is that with it an engine can be more easily fired and the steam maintained more uniformly.

"I believe everyone appreciates the fact that staybolts are caused to break by expansion and contraction, which again causes the inside and outside sheets to move with relation to each other. The harder and more irregularly the boiler is forced, the greater will be such movement and the greater the staybolt strain. The lower the factor of safety in the design, the greater becomes the chance for staybolt breakage with this strain."

The early part of the discussion seemed to indicate that the mere act of decreasing the steam pressure by superheating to obtain the same power as with saturated steam would decrease the breakage of staybolts. However, the problem is not quite as simple, for staybolt breakage depends on a variety of independent factors. The steam must, of course, be considered, but so almost must the type of service, the general topography of the country in which an engine operates, the quality of the water used, and above all the state of repair of the locomotive. To gain even an approximate comparison between superheated locomotives and those utilizing saturated steam, engines of the same type in the same sort of service and the same condition of repair must be used. The nearest approach to such a comparison came from a representative of the Georgia Railroad, in whose charge are eight locomotives fulfilling the above conditions, four of which are superheaters and the other four use saturated steam. From accurate records of the staybolt breakage on these eight machines there does not seem to be a bit of difference. The final conclusion reached is that the design of a locomotive and its service and care have all to do with staybolt breakage.

Cinder Hopper on Bottom of Smoke Arch

From inquiries and observations made, the committee finds that the use of a cinder hopper on the bottom of the smoke

arch is quite varied. There are roads that have some of their engines equipped with a hopper, and others not so equipped, and their performance is also varied; some engines with the hopper as well as those without it clean themselves satisfactorily and steam well, while other engines of the same class and type, having the same design and adjustment of front-end appliance set alike, do not perform as well, accumulating such an amount of cinders in the front end that it is necessary to clean them out while on the road and away from the terminal.

The committee is aware of the fact that with some grades of coal the front end fills up to a greater extent than with other kinds, and to facilitate the removal of cinders the hopper is a convenience, if not a necessity. However, its use or non-use depends largely on local conditions, kind of fuel and grade of coal used. We incline to the opinion that it is not necessary to maintain the hopper on oil burning nor on coal-burning engines that have front-end draft appliances so designed, fitted and adjusted that they will clean themselves without danger of throwing sparks of such size and glow that they cause fires on the road.

Our inquiries further indicate that the foregoing also applies equally as well to the second part of the subject, "On what size locomotives should it be maintained?" and that the use of the cinder hopper is about evenly divided between the larger and smaller classes of engines on the various railroads.

In regard to the third question of the subject, viz., "Which is the better design to overcome air leaks?" we find that there are a number of different designs used by the various roads. Some have hoppers with a double nozzle lengthwise of the smoke arch, others a double nozzle transverse with the arch, the cover held in place by a bolt and spring between the nozzle, while on others a single nozzle with the cover hinged so it will drop down, or one that opens to one side is used. Again, others have the single nozzle hopper, the cover being of wedge shape. As it is of great importance to keep the front end as free as possible from air leaks, it is our opinion that the single nozzle hopper with the cover plate fastened on each side is a better design.

The report is signed by Frank H. Davison, chairman. Thomas J. Reddy and John L. Welk.

Discussion

The need of the cinder hopper on the bottom of the smoke arch has long since been eliminated by most roads. In its place a standard form of non-adjustable, self-cleaning front end has been applied. In some instances a patch is riveted under the smoke arch and a two-inch washout plug arranged to take care of leakage from the pipes or superheater tubes.

Thursday Session

A short talk was given by A. H. Kipp, mechanical superintendent of the Soo Line, on the duties of the members of the association to the country. Following this the discussion of papers was resumed.

Electric and Oxy-Acetylene Welding of Firebox Sheets

In the absence of a report, Prof. A. S. Kinsey, in charge of welding and shop practice at Stevens Institute of Technology, gave a general survey of the present standing of autogenous welding and the future prospects of its recognition as a permissible process of boiler construction.

Professor Kinsey had just been present at the St. Louis meeting of the American Society of Mechanical Engineers, at which a prominent insurance company requested that the Boiler Code Committee, of which Professor Kinsey is a member, allow the use of autogenous welding in stationary heating boilers generating steam up to 15-lb. pressure. The Boiler Code Committee is considering this petition seriously and will probably report favorably on it. In connection with this subject the A. S. M. E. Boiler Code Committee has appointed a sub-committee to investigate the matter of welding seams in boilers and pressure vessels with a similar committee from the American Welding Society.

Forge welding has been allowed a rating of 52 per cent, or a permissable load of 52 per cent of the strength of the metal, by insurance companies. Although autogenous welding is not recognized as yet, there is no reason why fusion welding cannot be made very nearly as strong as forge welding. As a matter of fact, an increase in the rating of forge welding from 52 to 75 per cent is now being considered by the A. S. M. E. If every one interested in advancing the process is united, first of all, in demanding the best welds possible in the shops where the process is used and then in advocating its adoption and recognition by the insurance companies and the A. S. M. E., there can be little doubt of the outcome.

From consultations with A. G. Pack, chief inspector of the Bureau of Locomotive Inspection, and from extensive examinations of defective welds taken from exploded boilers, Professor Kinsey stated that they were some of the worst welds he had ever examined and that they had done a great deal to retard the advance of the process.

The development of autogenous or better fusion welding has nearly reached the point where it is possible to weld manganese steel frogs on rails. Firebox plates can be welded as safely as they can be riveted by either the electric arc or acetylene torch. Any weld may be easily made to lose its strength by burning or oxidizing the metal, and this is the greatest defect to be combated in the operation of welding.

Two rules should be followed in welding. The grain of the metal should be so refined as to come back to its original size and, in the case of steel, the weld should be annealed. When recognized by the A. S. M. E., this requirement for annealing will probably be inserted in the rules for permissible welding procedure.

At the St. Louis meeting of the A. S. M. E. the safe-ending of boiler tubes was discussed at one of the Boiler Code Committee sessions, and the records were consulted to determine if welding were allowable in this case. It was found that it is permissible to weld the safe ends of tubes in fire tube boilers but not in water tubes, which means that locomotives may use it in this connection.

Discussion

The criticisms brought out at the last convention have served their purpose in arousing the interest of all members of the association, and no doubt the fewer accidents from the letting go of welded seams may be due to the closer supervision of all welding in railroad shops. However, if the reports of the Bureau of Locomotive Inspection continue to show any disastrous explosions from the failure of welded seams, it will be a difficult matter to obtain an early official recognition of the process.

A short paper on the procedure used in electric arc welding was given by one of the members.

On the Santa Fe the welding departments of all shops are required to send test specimens of their work to the laboratories to be tested to destruction. The seams are reinforced about 20 per cent and when pulled average about 83 per cent, which is about what is obtained with riveted joints. One instance was cited of 29 specimens taken out of plates after being in service 4½ years, which tested 71 per cent.

As on all other questions, opinion was divided. Certain members advocated great caution in adopting the process, particularly where human life depends on the quality of the work. So long as there is a doubt as to the safety of a seam, and certainly until disasters from weak seams have stopped, it is well to avoid the extensive application of autogenous welding.

The discussion turned from welded seams to the welding

of flues. In certain sections of the country it was found that electrically welded superheater flues cracked, while smaller tubes were not found to do this. In still other districts leaks are found in both superheater and smaller flues. In bad water districts, scale forms in pockets around the flue end, and by preventing the cooling effect of the water, permits the heat to crack the tube. This applies to the side sheet, under the arch as well as where the heat is intense. When staybolts are calked where they enter the side sheets, pin cracks are started if the water does not circulate properly. Flues should be prossered in bad water districts.

Where welds have been found sound in good water districts, a few months with hard water have only been necessary to allow the formation of cracks. The conclusion seemed to be that in good water districts welded flues remained tight, while bad water tended to hasten the formation of cracks in safe ends.

The subject of welding patches was barely touched upon without any definite decision as to their use.

Best Style Grate for Bituminous Coal

No report was submitted by the committee, but a brief outline of the use of the box grate was presented by William Stinsky. In the course of the discussion it was stated that the time is rapidly approaching when the dump grate will be eliminated from both ends of the firebox. The best results have been obtained with box grates having a width of nine inches. If a dump grate is used it must be kept from under the flues, for if used in this position all sorts of leakage and trouble result.

The draft opening in the ashpan was brought up for discussion, and the opinion seemed to be general that at least 15 per cent of the grate area should be opened in the pan to obtain complete combustion of fuel. Even with the opening in the pan, sufficient flues must be installed to carry off the gases. Side openings and center openings have been tried, and netting has been used in the pan, all bringing about good results where used to fill certain operating requirements.

Box grates up to 11 in. wide have been tried and minimum openings of 18 per cent, with varying degrees of success. The standard, however, seems to be a nine-inch grate and a 15 per cent ashpan opening.

Following this the annual election of officers was held.

Officers for 1920-1921

President, Charles P. Patrick, Wilson Welding Repair Company; first vice-president, Thomas Lewis, Lehigh Valley; second vice-president, T. P. Madden, Missouri Pacific; third vice-president, E. W. Young, Chicago, Milwaukee & St. Paul; fourth vice-president, Frank Gray, Chicago & Alton; fifth vice-president, Thomas F. Powers, Chicago & North Western; secretary, Harry D. Vought; treasurer, W. H. Laugbridge, Hocking Valley.

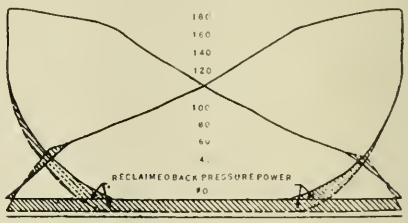
Executive board for one year: L. M. Stewart, Atlantic Coast Line; John F. Raps, Illinois Central; John Harthill, New York Central. For two years: W. J. Murphy, Pennsylvania Railroad; Harry F. Weldin, Pennsylvania Railroad; E. J. Reardon, Interstate Commerce Commission. Three years: B. F. Sarver, Pennsylvania Lines; George Austin, Santa Fe; H. J. Wandberg, Chicago, Milwaukee & St. Paul.

TWELVE MEN, INCLUDING TWO MERCHANTS, were arrested in New York and Jersey City on May 28, charged with theft of 600 bolts of woolen serge which had been stolen from a freight car on the Erie Railroad on the night of May 24. The car was moved surreptitiously in the night from a freight yard in Jersey City about nine miles westward. The cloth appears to have been carried away in automobile trucks and was recovered, some days later, in a garage in New York City.

The Lewis Draft Appliance

A LOCOMOTIVE front-end draft appliance, which produces a non-pulsating, uniformly distributed draft on the fire and automatically maintains a constant, low cylinder back pressure, has been placed on the market by the Lewis Draft Appliance Company, Chicago. This front-end arrangement departs radically from the form of apparatus generally in use, the departure being made to conform to well-established laws relating to the flow of gases.

The device consists essentially of a rectangular nozzle with automatically adjustable vanes to control the size of the outlet, a volume chamber which is inserted in the line of the exhaust passages between the valve chambers and the nozzle, and a stack of oval cross section, the long axis of which is transverse to the center line of the engine. The nozzle vanes, as shown in the drawing, are supported on shafts, the operating ends of which extend outside of the smoke box, where they are geared together. Automatic adjustment of these vanes is obtained by means of dead weights, which are hung from the end of an arm attached to one of the shafts. These weights, once adjusted to maintain a given back pressure, require no further adjustment so long as the conditions of combustion remain unchanged. At the lower end of the case containing the weights is placed a small oil dash pot, the purpose of which is to steady the vanes and prevent chattering, especially



Increased Area of Indicator Card Due to Decreased Back Pressure

when the locomotive is operating at slow speeds and exhaust pulsations are in evidence at the nozzle.

It will be noticed that the stack is arranged in a form roughly corresponding to a two-stage ejector. The inner stack is made wide enough at the bottom to take in the full width of the exhaust jet, which completely fills the main stack at a point just above the top of the inner stack. The space between the inner and the main stacks carries gases only, the motion here being produced not by the entraining action of the jet, but by the vacuum induced by the jet where it fills the main stack.

The form of the exhaust jet is based on two principles; one is that gases tend to take the shortest path in traveling between two points, and the other is that entraining action depends on the periphery of the jet rather than on its sectional area. Where the circular nozzle and stack are used, the tendency is to create a strong pull through the flues near the vertical center line of the tube sheet, thus requiring the usual form of diaphragm in the front end to effect something approaching a uniform distribution of the draft over the grate. With the exhaust jet in the form produced by the Lewis device uniform lateral distribution is provided without the use of the diaphragm, and the resistance to the flow of the gases is thereby considerably reduced.

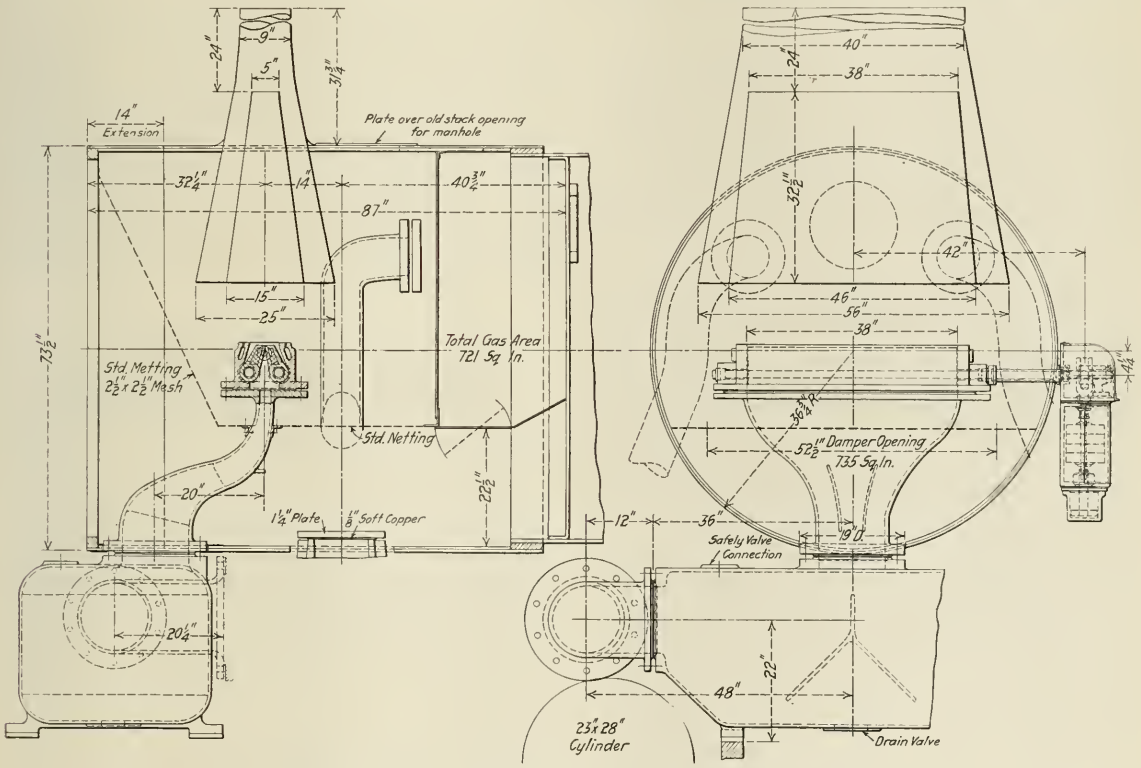
A material improvement in draft conditions is also effected by the volume chamber. This is of sufficient size so that the pulsations of the exhaust practically disappear at speeds above eight miles an hour and at lower speeds, although the pulsations are distinctly noticeable, the sharp, tearing action on the fire is said to be absent.

The drawings show the device as it has been worked out

for application to a superheated locomotive, and a diaphragm and damper have been retained over the superheater flues. Originally it was applied to a saturated locomotive and no diaphragm was used. This engine was of the Mikado type, having 24-in. by 30-in. cylinders and weighing 200,000 lb. on the drivers. On this engine the maximum area of the nozzle opening was equivalent to a 10-in. circular opening and the weighted vanes were adjusted to maintain approximately a back pressure of four pounds per square inch. The effect on the power of the engine is shown on the indicator card. The freedom from back pressure made it possible to change the valve setting so that the exhaust was delayed 3½ per cent longer than formerly, which, together with the decreased back pressure, materially increased the work obtained from a given weight of steam.

While no coal tests have been made, observations of this locomotive in service have indicated that such an increase in work is actually obtained and that the general performance of the locomotive has been improved. The engine is reported to have handled from 10 to 20 per cent in excess of its regular tonnage. The back pressure did not exceed 4 lb. and the maximum draft was not above 2½ in. of water in the front end. This draft has been sufficient to maintain steam pressure both on grades and on level portions of the line.

The variable nozzle, which is normally closed, opens with a minimum of one-pound pressure in the expansion chamber and closes when the engine is drifting; this prevents hot gases from the front end entering the cylinders. When the engine is starting or working at slow speeds and long cut-off, the action of the volume chamber and the wide opening of the nozzle prevents the so-called back lash of the suddenly discharged large volume of exhaust from one cylinder against the piston of the other, thus increasing the power of the locomotive at the critical points when starting a heavy train.



Locomotive Front End Equipped with the Lewis Draft Appliance

Certificates of Public Convenience and Necessity

The Interstate Commerce Commission has issued an interpretation of paragraph 18 of section 1 of the interstate commerce act, as amended by the transportation act, 1920, holding that if a projected extension or construction is actually undertaken in good faith on or before 90 days after the approval of the transportation act, by a carrier, subject to the interstate commerce act, which will operate the line, certificate will not be required of such carrier, either for extension or construction or for acquirement, operation or engaging in transportation under the act; but the undertaking must embrace not merely purpose or intent to extend or construct, but also the actual doing in good faith of acts calculated to completely effect such purpose.

All carriers contemplating or engaged in such work should immediately notify the commission of all the facts and circumstances connected therewith, in order that the commission may determine whether or not the work has been actually undertaken as contemplated by the act and whether or not a certificate of convenience and necessity will be required.

The commission further holds that the mere provision in a charter or prospectus, or the making of a preliminary survey for the extension or construction of a line of railroad, does not constitute an undertaking of such extension or construction, and that where a line of railroad has been constructed by a carrier, corporation or other person, not subject to the act, a certificate of convenience and necessity will be required before the line may be acquired or operated by a carrier subject to the act and before any carrier may engage in transportation under the act over or by means of such additional or extended line of railroad.

General News Department

A memorial tablet, set up in the Railroad Young Men's Christian Association in St. Louis, in honor of the railroad men who died during the war, was unveiled by the St. Louis Railway Club on May 28.

Indictments on charges of conspiring to obstruct interstate commerce were found by the Grand Jury in the United States Court at Pittsburgh, Pa., on the 26th day of May, against five former railroad employees of New Castle, Pa. These men are accused of using threats and foul and abusive language, on May 4, to induce seven other men to refuse to move trains. Similar indictments were found at Newark, N. J., on the 26th against ten men said to have been leaders in the railroad yard strikes in and near Newark.

The anti-strike bill introduced by Senator Poindexter of Washington, was favorably reported to the Senate on May 29 from the committee on interstate commerce. The report by Senator Poindexter declared that "There is no inherent right in any citizen to obstruct or destroy interstate commerce transportation. Organized labor's declaration to the effect that the bill would impose involuntary servitude upon the railway workmen, is entirely unfounded. "There is nothing in the bill," says the report, "which by any possibility can be construed to compel a man to remain against his will in the railroad service."

The Railway Brotherhoods strongly oppose a Board of Arbitration upon which the public is represented; this was the declaration of L. E. Sheppard, president of the Order of Railway Conductors in an address before members of the City Club of Chicago on May 27. In concluding his talk he said that labor should always settle its problems with the employer directly and not by means of an arbitration committee which could not understand the problems of the railroad workers. Mr. Sheppard also said that a general strike of railroad employees need not be feared by the public; that although it has been found advisable to call small strikes, the conservative labor leaders do not favor a general strike and do not intend to interfere with passenger service.

Governor Harding, of the Federal Reserve Board, responding to a Senate resolution, said that the resources of the member and non-member banks would be ample to take care of the essential business of the country, and, to a large extent, of non-essentials as well, if there were a freer flow of goods and credit. If "frozen loans" were liquefied and if commodities which are held back either for speculative purposes or because of lack of transportation facilities should go to the markets, and if large stocks of merchandise should be reduced, the resultant release of credit would have a most beneficial effect upon the general situation. If adequate railroad and steamship transportation facilities can be provided, "the board sees no occasion for apprehension in connection with the movement of crops now being grown."

The New England Weighing & Inspection Bureau has been established at Boston to take over the work, as it relates to the principal New England railroads of the Eastern Freight Inspection Bureau. The new bureau will attend to the correction of errors in classification and weighing; to packing and marking, where attention is required, and to matters connected with storage of freight. The manager of the bureau is F. E. Dewey (with office at South Station), who is also District Manager of the A. R. A. Commission on Car Service. The announcement of the bureau, signed by the Boston & Maine, the Boston & Albany, the Bangor & Aroostook, the Central Vermont, the Maine Central, the New York, New Haven & Hartford and the Rutland, states that matters in connection with freight car demurrage, milling, etc., will be handled by each railroad for itself.

Railway Claim Agents

The Association of Railway Claim Agents held its annual meeting at Atlantic City on May 19, 20 and 21. A. H. Mansfield, claims attorney of the Missouri Pacific, was elected president for the ensuing year; D. H. Kimball (G. N.), John B. Green (C. J.), and Peter K. Soffel (W. & L. E.) were elected vice-presidents; and W. H. Failing (C. R. R. of N. J.), Jersey City, N. J., was re-elected secretary and treasurer.

The meeting voted to meet next year at St. Louis, Mo.

Plumb Plan League

The Plumb Plan League, which has claimed to represent the two million railroad employees, has a membership of approximately 200,000 individuals and 4,000 organizations, according to testimony by Edward Keating, business manager of the league, before the Senate committee investigating campaign expenditures, at Washington on June 2. Mr. Keating said that the organization is not backing any candidate for President. The league's publication, "Labor," he said, has a circulation of approximately 250,000 and the league's income is about $240,000 or $250,000 a year, representing the $1.00 membership fee for individual members and a $10 membership fee for organization members. He said that out of the surplus above the cost of producing the paper six fieldmen are supported and that Glenn E. Plumb receives $1,000 a month.

Reading Company Asks Modification of Supreme Court Decree

The Reading Company on June 1 asked the Supreme Court of the United States to reconsider its recent decree holding the company to be operating in violation of the Sherman anti-trust law. The company said the decree would impose a burden and a possible loss on it and asked especially for modification of the decree, so as to permit the holding by it of the stock of either the Philadelphia & Reading Coal & Iron Company or the Philadelphia & Reading Company, providing that the Reading Company had disenabled itself from exercising any influence upon the conduct of the business of the other of the companies and of the Lehigh & Wilkes-Barre Coal Company and the Central Railroad of New Jersey. It was further asked that the district court be authorized to determine whether the Central of New Jersey after it shall be disassociated from the Reading Company, the Reading Railway Company and the Reading Coal Company, shall be permitted to hold the stock of the Wilkes-Barre Coal Company upon terms which shall impose upon these two companies the conduct of their business in harmony with the law as interpreted by the Supreme Court.

Salaries of Railroad Officers in 1917

A list of the salaries paid to railroad officers in 1917, naming each one who received $5,000 or over, as compiled by the Railroad Wage Commission appointed by Director General McAdoo in 1918, in connection with its investigation of the wage demands of the railroad employees, was published in the Congressional Record for June 1 by Representative Thetus W. Sims of Tennessee. The list was furnished to the congressman for such publication by Interstate Commerce Commissioner C. C. McChord (who was a member of the wage commission) last October. This was in response to a request by Mr. Sims at the time when the legislative committee of the Interstate Commerce Commission was before the House committee on interstate and foreign commerce. A list of 208 railway officers receiving salaries of $20,000 and over for 1917, as previously published in the Con-

gressional Record by Mr. Sims, was reprinted in the *Railway Age* of October 10, 1919 (page 751). This was taken from the complete list now made public. The full list contains approximately 3,000 names, of which about 800 are shown as having received less than $6,000 a year and about 1,800 less than $10,000 a year.

"Better Cause a Delay Than Cause an Accident."

This "slogan" of the Chicago & North Western makes its latest appearance in Safety Bulletin No. 54, recently issued by Chairman R. C. Richards, addressed to "All North Western Men," in which attention is drawn to the fact that in 1919 the number of employees killed per thousand employed was 1.49, as compared with a rate in 1910 of 2.10 per thousand, a reduction of 29 per cent.

Below is a fac-simile of the body of the Bulletin, reduced about one-half in width and height.

SAFETY FIRST, which stands for—
Conservation of Human life and Safety Men as well as Things,

in nine and one-half years on the North Western has brought about the reduction in accidents to employes shown in the following statement:

		KILLED	INJURED
1910	(Before the Safety Organization was started)	97	8404
1911		76	6025
1912		73	6043
1913		67	6395
1914		49	5520
1915		34	5221
1916		60	6939
1917		85	7955
1918		79	6920
1919		78	5709

Mileage, 1910 - - 7,953; 1920 - - 8,423
Number of Employes, 1910 - - 46,559; 1919 - - 52,243
Operating Revenues, 1910 $75,590,300; 1919 $139,589,915

Why not boost for SAFETY FIRST and help wipe out the accident business?

R. C. Richards
Chairman, Central Safety Committee

The Central Safety Committee of the North Western, in Bulletin No. 53, shows that as compared with 9½ years prior to June 30, 1910, the records of the 9½ years ending December 31, 1919, exhibit a decrease of 36.3 per cent in the number of employees killed and 25.6 per cent in employees injured; 7.8 per cent reduction in passengers killed, and 20.8 per cent in passengers injured; 22.8 per cent in "other persons" killed, and 5.4 per cent in "others" injured.

A. S. C. E. Rebukes Engineering Council

As a further step in the Pittsburgh bridge tangle, the board of directors of the American Society of Civil Engineers has taken exception to the resolution adopted jointly by Engineering Council and the American Institute of Architects on May 4 at Washington, D. C., and has disclaimed any concurrence with it. This joint resolution in brief stated that under certain conditions a structure should be aesthetically excellent in addition to such features as safety, adequacy and durability, etc. In such cases the design would involve collaboration between engineers and architects and therefore the fact of whether the engineer was chief and the architect associate or vice versa was an administrative detail of relative unimportance. This was brought about by resolutions adopted previously by the American Society of Civil Engineers and the American Institute of Consulting Engineers, wherein they stated that the responsibility for the design and construction of structures wherein public safety was concerned should be entrusted only to qualified civil engineers. In other words, Engineering Council did not agree with the above statements of the A. S. C. E. and the A. I. C. E.

The resolution adopted by the board of directors and presented before the June 2 meeting of the society states that the board reaffirms its attitude as expressed in its previous resolution and that "the matter of bridge design as established by practice is one solely within the province of civil engineers and is therefore not a matter upon which Engineering Council has been delegated authority of action." It was further resolved "that Engineering Council be requested to refrain from any attempt to represent this society in a discussion of this matter."

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

Air Brake Association.—F. M. Nellis, Room 3014, 163 Broadway, New New York City.

American Association of Demurrage Officers.—F. A. Pontious, Supervisor of Demurrage and Storage, C. & N. W. Ry., Chicago.

American Association of Dining Car Superintendents.—S. W. Derr, C. R. R. of N. J., Philadelphia, Pa.

American Association of Freight Agents.—R. O. Wells, Illinois Central, Chicago. Next annual meeting, June 15, 1920, Minneapolis, Minn.

American Association of General Baggage Agents.—E. L. Duncan, C. & E. I. R. R., 332 South Michigan Ave., Chicago.

American Association of Passenger Traffic Officers.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

American Association of Railroad Superintendents.—J. Rothschild, Union Station, St. Louis, Mo.

American Electric Railway Association.—E. B. Burritt, 8 W. 40th St., New York.

American Electric Railway Manufacturers' Association.—C. F. J. Dell, 50 E. 42nd St., New York.

American Railroad Master Tinners', Coppersmiths' and Pipe Fitters' Association.—Otto E. Schlinck, 185 W. 5th St., Peru, Ind.

American Railroad Association.—J. E. Fairbanks, 75 Chuch St., New York:

Section I, Operating (including former activities of Association of Railway Telegraph Superintendents).—W. J. Fripp (chairman), N. Y. C. R. R., New York, N. Y.

Telegraph and Telephone Division.—J. F. Caskey (chairman), Supt. of Telegraph, Lehigh Valley.

Section II, Engineering.—E. H. Fritch, 431 South Dearborn St., Chicago.

Signal Division.—H. S. Balliet, 75 Church St., New York. Annual meeting, June 14-16, Alexandria Bay, N. Y.

Section III, Mechanical (including former activities of Master Car Builders' and Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago. Next convention, June 9-16, 1920, Atlantic City, N. J.

Section IV, Traffic.—Robert C. Wright (chairman), General Traffic manager, P. R. R., Philadelphia, Pa.

Section V, Transportation (including former activities of Association of Transportation and Car Accounting Officials.—E. J. Pearson (chairman), President, N. Y., N. H. & H. R. R., New Haven, Conn.

Section VI, Purchases and Stores (including former activities of Railway Storekeepers' Association).—J. P. Murphy, N. Y. C. R. R., Collinwood, Ohio. First annual meeting, June 14-16, 1920, Atlantic City, N. J.

Section VII, Freight Claims (including former activities of the Freight Claim Association).—Lewis Pilcher, 431 South Dearborn St., Chicago.

American Railway Bridge and Building Association.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Austin Station, Chicago. Next convention, October 26-28, 1920, Atlanta, Ga.

American Railway Engineering Association.—(Works in co-operation with the American Railroad Association, Section II.) E. H. Fritch, 431 South Dearborn St., Chicago.

American Railway Master Mechanics' Association.—(See American Railroad Association, Section III, Mechanical.)

American Railway Perishable Freight Association.—E. F. McPike, 135 E. 11th Place, Chicago. Regular meetings, 2nd Wednesday in March and September.

American Railway Tool Foremen's Association.—R. D. Fletcher, 1145 East Marquette Road, Chicago.

American Short Line Railroad Association.—T. F. Whittelsey, Union Trust Bldg., Washington, D. C.

American Society for Testing Materials.—C. L. Warwick, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 22-25, 1920. New Monterey Hotel, Asbury Park, N. J.

American Society of Civil Engineers.—Col H. S. Cracker (acting secretary), Engineering Societies Building, 33 W. 39th St., New York. Regular meetings, 1st and 3d Wednesday in month, except July and August, 33 W. 39th St., New York.

American Society of Mechanical Engineers.—Calvin W. Rice, 29 W. 39th St., New York.

American Steel Treaters' Society.—W. H. Eisenman, 154 East Erie St., Chicago.

American Train Despatchers' Association.—D. L. Darling, Northern Pacific Ry., Spokane, Wash.

American Wood Preservers' Association.—F. J. Angier, B. & O., Mt. Royal Sta., Baltimore, Md. Next annual meeting, January 25-27, 1921, San Francisco.

Association of Railway Claim Agents.—Willis H. Failing, C. R. R. of N. J., Jersey City, N. J.

Association of Railway Electrical Engineers.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Semi-annual meeting, June 14, Hotel Dennis, Atlantic City.

Association of Railway Executives.—Thomas De Witt Cuyler (chairman), 61 Broadway, New York, N. Y.

Association of Railway Telegraph Superintendents.—(See American Railroad Association, Section I, Operating.)

Association of Transportation and Car Accounting Officers.—(See American Railroad Association, Section V, Transportation.)

Bridge and Building Supply Men's Association.—G. R. McVay, Barrett Company, Chicago.

Canadian Railway Club.—W. A. Booth, 131 Charron St., Montreal, Que.

Car Foremen's Association of Chicago.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2d Monday in month, except June, July and August, New Morrison Hotel, Chicago.

Car Foremen's Association of St. Louis.—Thomas B. Koeneke, Federal Reserve Bank Bldg., St. Louis, Mo. Meetings first Tuesday in month at the American Hotel Annex, St. Louis.

Central Railway Club.—Harry D. Vought, 95 Liberty St., New York. Regular meetings, 2d Thursday in November and 2d Friday in January, March, May and September, Hotel Statler, Buffalo, N. Y.

Chief Interchange Car Inspectors' and Car Foremen's Association.—J. C. Keene, General Car Inspector, Wabash R. R., Decatur, Ill.

Chief Interchange Car Inspectors' and Car Foremen's Supply Men's Association.—D. B. Wright, Lehon Company, 45th and Oakley Sts., Chicago.

Cincinnati Railway Club.—H. Boutet, 101 Carew Bldg., Cincinnati, Ohio.

Eastern Railroad Association.—D. G. Stuart, Washington, D. C.

Freight Claim Association.—(See American Railroad Association, Section VIII, Freight Claims.

General Superintendents' Association of Chicago.—A. M. Hunter, 321 Grand Central Sta., Chicago. Regular meetings, Wednesday preceding 3d Friday in month, Room 856, Insurance Exchange Bldg., Chicago.

International Railroad Master Blacksmiths' Association.—A. L. Woodworth, B. & O., Lima, Ohio.

International Railway Fuel Association.—J. G. Crawford, 702 E. 51st St., Chicago.

International Railway General Foremen's Association.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn. Next convention, September 7-10, Hotel Sherman, Chicago.

Maintenance of Way Master Painters' Association.—E. E. Martin, Union Pacific R. R., Room No. 19, Union Pacific Bldg., Kansas City, Mo. Next convention, October 5-7, 1920, Detroit, Mich.

Master Boiler Makers' Association.—Harry D. Vought, 95 Liberty St., New York.

Master Car and Locomotive Painters' Association of the United States and Canada.—A. P. Dane, B. & M., Reading, Mass.

Master Car Builders' Association.—(See American Railroad Association, Section III, Mechanical.)

National Association of Railroad Tie Producers.—J. J. Schafly, Potosi Tie & Lumber Company, St. Louis, Mo.

National Association of Railway and Utilities Commissioners.—James B. Walker, 49 Lafayette St., New York. Next convention, November 9, 1920, Washington, D. C.

National Foreign Trade Council.—O. K. Davis, 1 Hanover Square, New York

National Railway Appliances Association.—C. W. Kelly, Kelly-Derby Co., Peoples Gas Bldg., Chicago.

New England Railroad Club.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting months of June, July, August and September.

New York Railroad Club.—Harry D. Vought, 95 Liberty St., New York. Regular meeting, 3d Friday in month, except June, July and August, 29 W. 39th St., New York.

Pacific Railway Club.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meeting 2d Thursday in month, alternately in San Francisco and Oakland.

Railway Accounting Officers' Association.—E. R. Woodson, 1116 Woodward Bldg., Washington, D. C.

Railway Business Association.—Frank W. Noxon, 30 Church St., New York.

Railway Club of Pittsburgh.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Americus Club House, Pittsburgh, Pa.

Railway Development Association.—D. C. Welty, Missouri Pacific R. R., Little Rock, Ark.

Railway Electric Supply Manufacturers' Association.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

Railway Equipment Manufacturers' Association.—D. L. Eubank, Galena Signal Oil Company, Richmond, Va.

Railway Fire Protection Association.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

Railway Real Estate Association.—R. H. Morrison, C. & O. Ry., Richmond, Va.

Railway Signal Association.—(See American Railroad Association, Section II, Signal Division.)

Railway Storekeepers' Association.—(See American Railroad Association, Section VI, Purchases and Stores.)

Railway Supply Manufacturers' Association.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Next convention, June 9-16, Atlantic City.

Railway Telegraph and Telephone Appliance Association.—G. A. Nelson, Waterbury Battery Co., 30 Church St., New York.

Roadmasters' and Maintenance of Way Association.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill.

St. Louis Railway Club.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

Signal Appliance Association.—F. W. Edmunds, West Nyack, Rockland County, New York.

Society of Railway Financial Officers.—L. W. Cox, 1217 Commercial Trust Bldg., Philadelphia, Pa.

Southern and Southwestern Railway Club.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

Southern Association of Car Service Officers.—E. W. Sandwich, Western Ry. of Ala., Atlanta, Ga.

Supply Association of American Railway Tool Foremen's Association.—C. N. Thulin, Duff Manufacturing Company, 935 Peoples Gas Bldg., Chicago.

Track Supply Association.—W. C. Kidd, Ramapo Iron Works, Hillburn, N. Y.

Traveling Engineers' Association.—W. O. Thompson, N. Y. C. R. R., Cleveland, O. Next convention, September 14-17, Hotel Sherman, Chicago.

Western Association of Short Line Railroads.—Clarence M. Oddie, Mills Bldg., San Francisco.

Western Railway Club.—J. M. Byrne, 916 W. 78th St., Chicago. Regular meetings, 3d Monday in month, except June, July and August.

Traffic News

The Southern Pacific Company has resumed its steamship service between New York and New Orleans with the sailing of the steamship Comus.

The Interstate Commerce Commission has authorized the Denver & Rio Grande to make reduced commodity rates on buffalo, in carloads, between all stations on its lines.

Joseph H. Beck, traffic director of the St. Paul Association, St. Paul, Minn., has been appointed executive secretary of the National Industrial Traffic League, with headquarters at Chicago, succeeding Guy M. Freer, deceased.

The Pennsylvania Station, Seventh avenue, New York City, now has six main entrances, an underground passage connecting with Broadway having just been opened. The station fronts on Seventh avenue, Thirty-third street, Eighth avenue and Thirty-first street. Midway between Seventh and Eighth avenues there is a passage from Thirty-fourth street leading to the station level (beneath Thirty-third street), and the new passage to Broadway (and Sixth avenue), is beneath the south sidewalk of Thirty-fourth street. It has entrances to Hotel Pennsylvania and Gimbel Brothers' department store. This passage is 740 feet long, and it connects the station with two city railroads, the Sixth avenue elevated and the Broadway subway.

The Senate on May 29 adopted a resolution, introduced by Senator Harding of Ohio, calling upon the Interstate Commerce Commission to inform the Senate upon what authority, if any, it issued its order of April 15, authorizing the railroads to designate private cars and cars placed for railroad fuel loading in accordance with the decisions of the commission in previous cases as "assigned cars" for railroad fuel. The resolution states that the railroad companies, or a part of them, are making such assignments in a manner alleged to be discriminatory and prejudicial to the public welfare, and Senator Harding, in introducing the resolution, took the position that the order was a suspension of a clearly expressed provision of the transportation act, which requires, in case of shortage, a just and equitable disposition of cars among coal mines.

Coal Production

A slight recovery during the week ended May 22 carried bituminous coal production upwards to almost exactly the level of two weeks before, according to the weekly bulletin of the United States Geological Survey. The total output of soft coal, including lignite and coal coked, is estimated at 9,174,000 tons, an increase over the preceding week of 418,000 tons, or 4.8 per cent. In spite of the improvement the rate of production is still 13 per cent below that of the first quarter of 1920, and 27 per cent below that of October, 1919. Continued for a year, the present rate of 1,529,000 tons per working day would give a total production of 470,000,000 tons. Progress in relieving the traffic congestion caused by the switchmen's strike is thus slow, the bulletin says. The week was the seventh of the strike period, but the total production was 1,841,000 tons less than that of the latest normal week, March 14-20.

The year 1920, although 35,000,000 tons ahead of 1919, is now nearly 12,000,000 tons behind 1917 and 16,000,000 behind 1918

The reports for the week of May 15 show the car shortage which has accompanied the switchmen's strike in a stage of heightened intensity, according to the bulletin. Losses of working time due to transportation disability grew more severe. The zone of dull market west of the Mississippi moved north, but over the country as a whole the no-market loss was insignificant. The dominant factor limiting production remained transportation. The week witnessed an aggravation of the unprecedented shortage of cars which has prevailed since April 10. Losses of working time attributed to "car shortage" increased from 44.9 during the preceding week to 46.6 per cent, or 22.4 hours out of the 48. The present transportation equipment is

the same which in October, 1919, when coal was given priority over other freight, moved over 2,000,000 tons of bituminous coal a day with a car shortage loss of less than 12 per cent.

The Freight Situation at New York

The freight situation at New York shows marked improvement, according to a statement issued on June 2 by B. C. Craig, chairman of the New York joint terminal committee, but it will be many weeks before normal conditions return. The effects of the "outlaw" strike are still felt. The only New York roads that have a normal yard service are the Erie and the Lackawanna. The New York Central is 98 per cent normal, the Pennsylvania 85 per cent, the Baltimore & Ohio 90 per cent, the Lehigh Valley 85 per cent, and the Central of New Jersey 85 per cent.

Embargoes still apply to all non-essential shipments. The movement of perishable food is satisfactory and manufacturers are getting enough coal for their temporary needs. The greatest source of trouble, now, as for the past four weeks, is the marine service, which is only about 65 per cent. in operation. This is seriously crippling the export trade. Building materials and raw material for manufacturers are held up except in exceptional cases. Delay in calling for freight is a serious cause of congestion, and embargoes against consignees who delay unduly in getting freight may be imposed. Hay dealers are among the worst offenders, sixty-nine carloads being delayed by one dealer alone.

More than 1,400 cars of freight were received on Sunday and Monday, but the consignees, for the most part, did not send for it because of the extra holiday pay for truckmen. The railroads kept all of their men at work and unloaded the l. c. l. freight.

The Freight Situation in the West

General improvement in the transportation situation continues to be reported from the middle west, west and southwest. The larger terminals show a loosening of the car tie-up, due largely to the summary action taken by the Interstate Commerce Commission in ordering the movement of box cars west and coal cars east. A number of railroads which transport freight to Gulf and south Atlantic ports sent telegrams to shippers urging them to avoid the congestion at eastern ports and send their freight south. Industries in Detroit and other lake ports have sent considerable quantities of their products to Chicago by water.

The coal shortage in the Chicago district is expected to be considerably relieved through the application of an order issued by the Interstate Commerce Commission on May 26, directing four railroads, the Minneapolis & St. Louis, the Chicago, Rock Island & Pacific, the Chicago & North Western and the Chicago, Milwaukee & St. Paul, not operating in the coal fields, to return 1,300 open top cars daily, for 20 days, to five roads, the Illinois Central, the Chicago, Burlington & Quincy, the Chicago & Eastern Illinois, the Chicago, Indianapolis & Louisville and the Pennsylvania Lines, which serve the Illinois bituminous district. Mines in this territory will thus be enabled to increase their operating time, which is now only about 35 per cent. Several railroads serving the coal producing fields in Illinois have practically stopped storing coal for their own use, as their supplies are now up to normal. While the situation in Chicago is still bad, deliveries in the district have increased in the last week. Reports from the steel industries in the Pittsburgh district, which have been badly crippled through the shortage of coal and coke, show considerable improvement.

Labor conditions in a number of the larger terminals are considerably improved. The latest figures relative to the "outlaw" strike show that, in the Chicago district, a total of 4,479 switchmen, exclusive of officers and clerks, are at work, out of a normal 6,200. Comparative figures of the total number of cars handled by the Indiana Harbor Belt during the last 10 days of May, 1919, and 1920, show an increase in 1920 of 2,877 cars.

The demand for freight cars of every kind continues to be heavy, particularly refrigerator cars, in the west. Miscellaneous commodities are receiving fairly good car service but in some cases it has been found necessary to curtail distribution for stone, sand and gravel. Texas market centers call for stock cars so loudly that it has been found necessary to withdraw these cars from service farther east.

The appointment by the Interstate Commerce Commission of terminal committees in thirty railroad centers is expected to give immediate relief. In addition to these committees, general committees have also been established by the railroads at each of the thirty cities. The Chicago joint terminal committee is headed by T. C. Hays of the Interstate Commerce Commission as chairman; J. H. Brinkerhoff represents the railroads; Robert C. Ross, of the National Industrial Traffic League, acts for the shippers, and Commissioner Funk, for the Illinois Public Utilities Commission.

Business Affected by Transportation Difficulties

Frequent mention of the effects of transportation difficulties is made in a review of general business and financial conditions during the month of May, contained in the Federal Reserve Bulletin. The continuance of labor difficulties and unrest, particularly in connection with the railroads, when added to the difficult situation produced by car shortage, has caused considerable interruption to business operations, the Bulletin says.

In district No. 2 (New York) there was noted a considerable accumulation of goods awaiting shipment resulting from strikes. In district No. 3 (Philadelphia) the congestion of freight and accompanying conditions have combined with a quieter state of things in the markets and a larger relative public demand for medium and lower priced goods, to alter in some respects the general drift of development of preceding months. In district No. 7 (Chicago) the transportation and associated difficulties noted elsewhere in the country are said to appear to be especially acute. In district No. 10 (Kansas City) there has been a curtailed movement of livestock and grain, resulting from bad transportation conditions accompanied by severe financial hardships upon producers and shippers. In district No. 12 (San Francisco) the car shortage has hurt lumbering.

The transportation "tieup" is reported from all districts as having prevented normal movement to the markets, as well as for export, and a correspondingly larger use of credit. Large stocks of both corn and wheat are being carried on farms, in elevators and elsewhere. The delay in the movement of products is said to be serious everywhere.

In iron and steel, demand has continued very heavy and steel mills are booked far ahead. The ore situation is, however, not improved. Lake transportation has been slow. The railroads can handle only a small portion of the ore which is ready for shipment. A shortage of coal in the northwest is expected. Shipments of ore for April were only 231,000 tons, compared with 1,400,000 in April, 1919. Some mills have been fortunately situated in possessing a large supply of raw materials, and orders in practically all lines are booked for a long time ahead, so that manufacturers feel that the present year should be a time of continued prosperity. This, however, is largely contingent upon the development of better transportation and improvement in labor conditions.

Coal conditions have been particularly important in connection with iron and steel, as with other industries. In district No. 2 (New York) the supply is far below the demand and consumers are bidding against one another. Railroads are said to be more or less "the victims of systematic sabotage at their terminals." The car supply at the mines is only 30 per cent of normal, while the labor situation there is also unsettled. The situation as a whole "is such as to cause considerable concern among conservative coal men," and transportation is regarded as a fundamental factor requiring improvement. In the middle west coal shipments have fallen off. Lake shippers will pool their coal in order to increase the movement, but this is only a partial remedy. Not only does a general shortage of coal exist now, but a shortage next winter, which may curtail production of iron and steel at interior furnaces, is foreseen. In district No. 6 (Atlanta) the coal production is being held down, mines being able to get only an insufficient number of cars. Railroads throughout the district have placed orders for fuel for the next 12 months, "the amount in every instance being larger and the price higher than ever before." Production of bituminous coal for the country at large during April amounted to 32,006,000 tons, as compared with 46,792,000 tons during March, and 32,164,000 tons during March, 1919. In the southwest many bituminous coal mines are operating at only about two-thirds of capacity.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has approved for filing a large number of schedules filed by various railroads providing for reduced summer commutation ticket fares, usually on 25-ride or 54-ride tickets.

United States Supreme Court

Reparation Claims for Freight Overcharge Held Assignable

The Supreme Court of the United States holds that there is nothing in the Interstate Commerce Act to prevent an assignment to a third party of a claim for reparation for overcharges.—Spiller v. Atchison, T. & S. F. Decided May 17, 1920.

Decisions Under Employers' Liability Act

The Supreme Court of the United States holds that an employee, preparing sand for engines, who had sanded several engines destined for other states, crossed a track with a pail of ashes from a drying stove, emptied the pail and left it on the ground while he went to the engine-room to get a drink of water, and when returning for the pail and crossing the track was hit by an engine, was then engaged in interstate commerce within the Employers' Liability Act. It was attempted to separate the duty and assign it character by intervals of time and distinctions between the acts of service. The court held that the distinctions were too artificial for acceptance, and that the acts of service were too intimately related and too necessary for the final purpose to be distinguished in legal character. Justices Van Devanter and Pitney dissented.—Erie v. Lzary. Decided May 17, 1920.

An Erie employee worked in a signal tower, near to which was a pumping station for supplying water to Erie engines in whichever commerce engaged. While in attendance at the pumping station, where it was his duty to attend, the employee was injured. It was contended that when he descended from the tower and went to the pumping station he put off an interstate character. The Supreme Court holds, following Pedersen v. D. L. & W., 229 U. S. 146, that the employee's duty in the pumping station was performed on both commerces as were demanded and was a part of interstate commerce. Justices Van Devanter and Pitney dissented. Erie v. Collins. Decided May 17, 1920.

Adamson Law Does Not Require Railroad to Operate at a Loss

The Supreme Court of the United States, in a decision rendered on June 1, held that the Adamson eight-hour basic day law was not applicable to the Fort Smith & Western during 1917, on the ground that the increase in wages would have required the railroad to operate at a loss. The Fort Smith & Western was in the hands of a receiver and had made an agreement with its employees on a basis of wages when the United States district attorney threatened a receiver with a suit for violation of the Adamson law. The Fort Smith & Western Company filed a bill in equity to enjoin the receiver from conforming to the act, but the bill was dismissed by the lower court. The Supreme Court says that while the occasion for relief has now passed, the parties are entitled to a decision as to their rights and says that in its previous decision holding the act constitutional the court did not say that Congress could or did require a railroad to continue in business at a loss. The court says the act was passed to meet an emergency created by the threat of a general railroad strike and an insolvent railroad had succeeded in making satisfactory terms with its employees. To break such a bargain was not within the ends the Adamson act had in view. The decision of the lower court dismissing the bill for an injunction was reversed.

Foreign Railway News

LONDON.

An express train service, with three trains a week, it is reported, will be established from the middle of June between Prague and Trieste.

Passenger and Freight Rates Increased in Rhodesia

LONDON.

It is reported that owing to increased costs of operating the Rhodesian railways, it has been decided to increase freight rates by 25 per cent and passenger rates by 10 per cent.

Military to Help in Construction of Uruguayan Railway

LONDON.

It is reported that a bill has been proposed in Uruguay to authorize the employment of military units in the construction of the railway to unite Uruguayan and Brazilian railways.

German Railroad Officials Demand 1,500 Marks

LONDON.

According to the Deutsche Allgemeine Zeitung German railroad officials have demanded that the Government should pay a sum of 1,500 marks to every employee. They declare that grave consequences will ensue if the Government refuses. The Government's decision is still pending.

Two Class System on German Railroads

LONDON.

The German Minister of Traffic, Dr. Bell, in a speech held at the National Assembly on April 24, to commemorate the day on which the Federal Government took possession of the complete German State railroad system, stated that the German Railroad Administration intends to introduce the two-class system on all lines in the near future.

Modern Methods to Be Introduced on German Railroads

LONDON.

Zeitung des Vereines Deutscher Eisenbahnverwaltingen stated that an extensive reorganization of the railroad administration is planned, aiming to introduce in every section of the railroad modern methods of management, in order to be able to get the greatest output with greatly reduced expenses and with the least amount of effort.

Cost of Railwaymen's Increases in England

LONDON.

The new demands of the National Union of Railwaymen for a uniform increase of 20 shillings ($5) a week which is now being considered by the Railway Wage Boards in Great Britain is estimated to involve an increase in expenses of $125,000,000 to $150,000,000 a year apart from the increases which would have to be given to other classes of men employed by railway companies but not engaged in operation. To meet such an addition to the railway expenses the rates will have to be increased.

Railway Freight Car Builders' Wages to Be Increased

LONDON.

The Industrial Court recently issued its award in the arbitration committee between the Amalgamated Society of Railway Vehicle Builders, Wheelwrights, Carpenters and Mechanics, and the Joint Wages Board of the Railway Wagon Builders' Association and the Railway Wagon Repairers' Association. It is as follows:

Time workers to receive an advance of 6 shillings per full ordinary week or 1½ pence per hour, according to the custom of payment.

Piece workers, an equivalent advance.

German Railwaymen Demand New Highly Increased Wages

LONDON.

According to the Zeitung des Vereines Deutscher Eisenbahnverwaltingen, the wage agreement between railroad and working men expires on May 31. The trade unions have entered into negotiations with the railroad ministry demanding highly increased rates, claiming the wages now in force being about half those paid private establishments. It was finally agreed to grant an advance of 20 to 80 pfennigs (5 to 20 cents) an hour in addition to the wages already paid, amounting to about 250 to 300 pfennigs (6 to 72 cents) per hour. This agreement is pending its final approval by the National Assembly.

Personnel of Ministry of Transport

LONDON.

Sir Eric Geddes, Minister of Transport, replying to a question in Parliament, said that 51 officials have been transferred to the Ministry of Transport from railway companies and 17 are serving in the Ministry of Transport on loan from railway companies or the Railway Clearing House.

He further stated that the following were employed in the headquarters offices of the Ministry on April 30: Administrative and clerical staff, 389; typists, 123; messengers and cleaners, 117. In addition there are employed locally, area transport commissioners and staff, 18; Irish branch, Dublin, 40. The above figures do not include the staff at harbors under the control of the Ministry of Transport or the staff of the government motor car pool.

Working Conditions in the Prussian State Railroad Repair Shops

LONDON.

The Charlottenburger Neue Zeit gives some interesting facts and figures about the working conditions in the repair shops of the former Prussian State Railroad. In consequence of the demobilizing act the number of working men employed by the repair shops was increased from 70,000 to 160,000. Notwithstanding this great increase the shops are unable to meet the demands made upon them. The decrease of efficiency of the repair shops is one of the most serious problems facing the railroad management. The fact that efficiency has gone down although the railroad management spent 447,000,000 marks in 1918, and 110,000,000 marks in 1919, for the improvement of equipment and although the materials needed, especially copper, have been delivered in the meantime in sufficient quantities, tends to show the serious aspect the situation has taken. In the summer of 1919, the repair shops turned out 750 repaired locomotives monthly. In November, 1919, only 650 were repaired and in January, 1920, only 520 locomotives were repaired.

Ball Bearings on Swedish Railway Cars

LONDON.

An abstract by the Technical Review from Zeitschrift des Vereines deutscher Ingenieure states that in the year 1915 the Swedish State Railways equipped 50 ore cars (automatic discharging type) with ball bearings, with which a number of tests have been carried out to determine the effect of the ball bearings on the train resistance.

The test cars were all three-axle ore trucks, weighing 11.5 tons and carrying 35 tons, so that the pressure on the axles at full load was just over 15 tons. It was found, in the comparative trials made as to the starting and traveling resistance with ordinary and ball bearings, that with the plain bearings the resistance is largely dependent on the time during which the trucks were in motion, and on the temperature of the outside air and the load applied. The higher starting resistance, which for the most part is made up of the static frictional resistance, depends on the time the car has remained standing and at the temperature of the air. With ball bearings, however, the resistance is quite independent of these external factors, being 38 per cent lower than with plain bearings. The starting resistance with ball bearings is not greater than the resistance in motion. Repeated experiments have shown that the length of the trains can be increased from 15 to 38 per cent (according to gradient), where ball bearings are exclusively used. No trouble has been caused through hot bearings.

Equipment and Supplies

Locomotives

THE GRAND TRUNK is inquiring for 12 eight-wheel switching locomotives.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for a Consolidation locomotive weighing 75 to 80 tons.

THE PHILADELPHIA & READING has ordered 25 Consolidation type locomotives from the Baldwin Locomotive Works, and will build five Pacific type and five switching locomotives in its shops at Reading.

Freight Cars

THE CLARK CAR COMPANY, Pittsburgh, Pa., is inquiring for 250 side dump cars.

THE YOUNGSTOWN SHEET & TUBE COMPANY, Youngstown, Ohio, is inquiring for 500, 50 to 70 ton hopper coke cars.

THE BY-PRODUCTS COKE CORPORATION, Syracuse, N. Y., is inquiring for 400, 70-ton hopper cars and 575, 55-ton hopper cars.

THE GLEN-NINA TANK LINE COMPANY, Buffalo, N. Y., has ordered five 8,050-gal. tank cars from the Pennsylvania Tank Car Company.

THE KENDALL REFINING COMPANY, Bradford, Pa., has ordered three 8,050-gal. tank cars from the Pennsylvania Tank Car Company.

THE CHESAPEAKE & OHIO, reported in the *Railway Age* of April 23 as being in the market for 1,000, 100-ton coal cars, has ordered 500 of these cars from the Pressed Steel Car Company and 500 from the Standard Steel Car Company.

THE SAN FRANCISCO TANK CAR COMPANY, San Francisco, Cal., is in the market for 40, 80,000-lb. capacity flat cars and 30, 80,000 to 100,000-lb. capacity steel underframe box cars; also 15 steel or wood underframe tank cars, 6,000 to 10,000-gallon capacity.

Passenger Cars

THE JAPAN TRADING COMPANY, INC., 331 Fourth avenue, New York, is inquiring for a number of subway cars.

Iron and Steel

THE MISSOURI, KANSAS & TEXAS has let a contract to the American Bridge Company for a turntable to be installed at Hannibal, Mo., requiring 158 tons of steel.

Miscellaneous

THE FORBES-PERKINS COMPANY, RODNEY D. CHIPP, New York manager, 120 Liberty street, is in the market for 75 tons of iron and steel bars; also for 10 tons of spring steel, 11 tons of copper ingots, and 10 tons of lead for export, to be used on railroads in Brazil.

Signaling

THE MISSOURI, KANSAS & TEXAS has placed an order with the Union Switch & Signal Company, Swissvale, Pa., for automatic block signals to be installed between Wybark, Okla., and McAlester, and between Colbert, Okla., and Red River, including yard protection at San Antonio, Tex. The installation will embrace a total of 111 style "S" d. c. signals with all attendant apparatus.

Supply Trade News

The American Spike Company has removed its offices from 55 Liberty street to 71 West Thirty-fifth street, New York.

W. Searle Rose, district manager of **W. L. Brubaker & Brothers**, manufacturers of taps, dies and reamers, 50 Church street, New York, has been appointed sales manager.

The Central Steel & Wire Company, Chicago, has bought a site, 200 by 432 ft. at Western Boulevard and West 45th Place, Chicago, on which it will build a warehouse at an estimated cost of $400,000.

Henry H. Knapp, who for several months past has been acting treasurer of the **U. S. Light & Heat Corporation**, Niagara Falls, N. Y., was elected treasurer at a meeting of the board of directors held on May 24.

The Electric Storage Battery Company, Philadelphia, Pa., will remove its Cleveland, Ohio, office about June 10, from rooms 1217-1222 Citizens building, which it has occupied since May, 1903, to Chester avenue and East Twenty-fourth street.

Don C. Wilson has been appointed assistant sales manager in charge of the railroad department of the **Edison Storage Battery Company**, Orange, N. J., with office at Room 904, 23 West Forty-third street, New York. Mr. Wilson was educated in the public schools of Broken Bow, Neb., and the Nebraska State University, completing his course in electrical engineering in 1907, after which he was engaged in electrical work in various capacities with the Stone & Webster Construction Company, at Seattle; the United States Navy Yard, Bremerton; the Pacific Gas & Electric Company, Los Angeles; the Independent Telephone Company, Omaha; the Union Pacific Railroad, Omaha; the Central of Georgia, Savannah; the Delco Light Company, Chattanooga, and the Edison Storage Battery Company.

D. C. Wilson

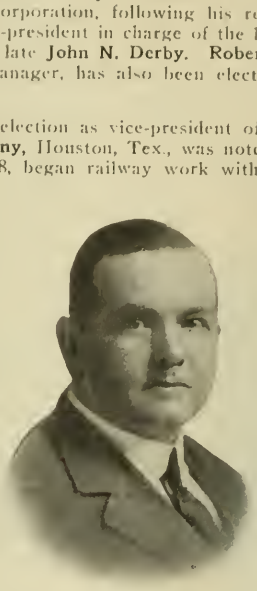
Edward A. Everett, manufacturer of railroad and signal appliances, announces the removal of his sales office and factory from 123 Liberty street, New York, to new and larger quarters at 136-138 West avenue, Long Island City, N. Y.

Charles W. Gregg, formerly connected with the legal department of the New York Central, and later with the Bureau of Safety of the United States Railroad Administration at Washington, has opened an office as counselor at law in New York City, No. 7 East 42nd Street.

Westinghouse, Church, Kerr & Company, Inc., announces the removal of its offices from 37 Wall street, to Grand Central Palace, 125 East Forty-sixth street, New York. Until the completion of the merger with Dwight P. Robinson & Co., Inc., the business will be conducted under the present name.

Percy M. Brotherhood, senior vice-president of **Manning, Maxwell & Moore, Inc.**, New York, has been appointed executive vice-president with the powers and duties attaching to the office of president, succeeding **Alfred J. Babcock**, president, who resigned on account of ill-health. Mr. Brotherhood has been associated with the company for over 25 years and during recent years has been in charge of its machine tool business. **Eugene Maxwell Moore** was recently elected vice-president in charge of foreign sales. **Henry D. Carlton** has been elected a director of the corporation, following his recent election to the office of vice-president in charge of the brass goods sales, succeeding the late **John N. Derby. Robert A. Bole**, Pittsburgh district manager, has also been elected a director.

Simon M. Dolan, whose election as vice-president of the **G. F. Cotter Supply Company**, Houston, Tex., was noted in the *Railway Age* of May 28, began railway work with the Baltimore & Ohio as a boilermaker apprentice at Garrett, Ind. Two years later he was made a machinist apprentice, and subsequently served on various railroads and in industries as a machinist and for a short time as a locomotive fireman. From 1894 to 1902, he was with the Wiggins Ferry Company, St. Louis, consecutively as general foreman, master mechanic and superintendent, and also served as master mechanic on different railroads, including the Arkansas & Choctaw, now part of the St. Louis-San Francisco, and on the St. Louis Sectional Docks. He subsequently went to the Southern Railway as general mechanical inspector, and later was consecutively master mechanic of the Mobile division at Selma, Ala., and of the Atlanta and Charlotte divisions at Atlanta, Ga. In 1905, he went to the Missouri Pacific as master mechanic at Little Rock, Ark., and later served in the shops at Sedalia, Mo. In 1908 he entered the service of the Scullin Steel Company in its steel plant and later was sales agent and assistant to the vice-president in charge of sales, respectively. He was sales agent for the American Car & Foundry Company, St. Louis, in 1911, and four years later went with the Chicago Varnish Company, resigning from the position of western and southwestern representative of its railroad department to become vice-president of the G. F. Cotter Supply Company.



S. M. Dolan

The Worthington Pump & Machinery Corporation, New York, announces that in addition to the lines of hydraulic machinery which it has manufactured since 1840, it has now completed preparations to furnish improved waterpower machinery of all capacities for low, medium and high head service, including hydraulic turbines, oil pressure system, water wheel governors and other auxiliaries.

Obituary

John Scullin, chairman of the board of the **Scullin Steel Company**, St. Louis, Mo., died in St. Luke's hospital, St. Louis, on May 28, at the age of 83.

Trade Publications

COWAN TRANSVEYOR.—A booklet of 28 pages, entitled Transveyor Picture Book, is being distributed by the Cowan Truck Company, Holyoke, Mass. It shows by means of illustrations the work that these transveyors are doing in a great variety of industries where they are being used. It also points out the advantages of their construction and contains specifications for all types.

Financial and Construction

Railway Financial News

CHICAGO & NORTH WESTERN.—The Illinois Public Service Commission has authorized this company to sell $15,000,000 first refunding 6 per cent mortgage bonds at not under 90.

DURHAM & SOUTH CAROLINA.—See Norfolk Southern.

NORTHWESTERN PACIFIC.—In an application filed with the Railroad Commission of California on May 17, this company asks for authority to issue $1,008,000 of bonds to reimburse it for $958,062 expended for additions and betterments.

NORFOLK SOUTHERN.—This company has taken over the Durham & South Carolina Railroad, which operates 42 miles between Durham, N. C., and Duncan.

The board of directors of the Norfolk Southern has been increased from 17 to 21 members, the additional members being Ernest Williams, president of the Durham & South Carolina Railroad; T. T. Harkrader, traffic manager of the American Tobacco Company; C. M. Carr, vice-president of the Durham Hosiery Company, and vice-president of the First National Bank of Durham, and E. C. Granbury, of Harris, Forbes & Co., New York. R. B. Williams, Jr., of New York, has been elected a director to succeed Frank A. Sayles, deceased.

UNION PACIFIC.—Kuhn, Loeb & Co. are offering an issue of $10,000,000 four to fifteen year 7 per cent equipment trust certificates, ranging in prices from 100 to 101, according to maturity. The certificates are secured by about $15,000,000 worth of equipment.

Railway Construction

BALTIMORE & OHIO.—On the main line of this road, between Cumberland, Md., and Sand Patch, Pa., four bridges will be reconstructed at a total estimated cost of about $100,000, as follows: Single-track through plate girder, 82 ft. long, crossing Jenner's Run, Mount Savage Junction, Md.; double-track deck plate girder span 73 ft. long, crossing Wills creek, F. O. Tower, Pa.; double-track deck plate girder span, 72 ft. long, crossing Wills creek, Glencoe, Pa., and double-track deck plate girder span, 72 ft. long, crossing Wills creek, Glencoe, Pa., all on the Connellsville division. The work calls for about 270 tons of steel. A contract for the fabricated steel work has been let to the American Bridge Company, and bids for the erection of these structures will be received in Baltimore on June 10.

CANADIAN PACIFIC.—The stockholders of this road, at the thirty-ninth annual meeting held at Montreal, Can., on May 5, authorized the construction of the following branch lines and extensions of branch lines: the Archive-Wymark branch, 25 miles; the Rosetown Southerly branch, 45 miles; an extension of the Weyburn-Lethbridge branch from Atawan to Manyberries, 35 miles; an extension of the Consul Southeasterly section of the Moose Jaw, Southwesterly branch of which 35 miles have been previously authorized from Vidora easterly, 35 to 60 miles; an extension of the Moose Jaw Southwesterly branch from Assiniboia southwesterly, 30 miles; the Leader southerly branch, 50 miles; the Duchess or Rosemary Northerly branch, 34 miles; the Cutknife to Whitford Lake branch, 40 miles; an extension of the Swiftcurrent Northwesterly branch from Empress northwesterly, 20 miles, and an extension of the Swiftcurrent Northwesterly branch from Sedgewick to Vegreville, 54 miles. The construction and extensions of these branch lines will proceed as soon as conditions warrant. The issuance of consolidated debenture stock was authorized to partly cover expenses.

THE PHILADELPHIA & READING has awarded a contract to the Roberts & Schaefer Company, Chicago, for a reinforced concrete coaling and sanding station at Tulip avenue, Philadelphia, Pa.

Railway Officers

Executive

W. A. Ballard, vice-president and general superintendent of the New Jersey, Indiana & Illinois has been elected president, with headquarters at South Bend, Ind.; **T. A. Hynes,** treasurer and traffic manager, has been elected vice-president and traffic manager, with the same headquarters.

W. H. Tobin has been appointed assistant to the president of the Trans-Mississippi Terminal Railroad Company, New Orleans, La., effective May 17. Mr. Tobin will have jurisdiction over all departments in matters pertaining to wage schedules, agreements and other relations between the company and its employees.

Alexander Robertson, whose appointment as vice-president of the Trans-Mississippi Terminal of New Orleans, La., was noted in the *Railway Age* of May 28 (page 1546), was born at Albany, N. Y., on November 4, 1860. He entered railway service as a brakeman on the Fitchburg Railroad in 1885, serving successively as conductor, general yardmaster, station master and trainmaster, until April, 1897. During the next six years he was employed by the Wabash as general yardmaster, trainmaster and superintendent. He was appointed manager of the Western Maryland and the West Virginia Central & Pittsburgh (now a part of the Western Maryland) in August, 1903. After a brief service, from 1904 to 1905, as manager of the Terminal Association of St. Louis, Mo., he returned to the Western Maryland and the West Virginia Central & Pittsburgh as vice-president and general manager. On May 1, 1911, he was promoted to the presidency of these roads. He was appointed assistant to the president of the Missouri Pacific in June, 1913, and two days later was promoted to chief operating officer. During federal control Mr. Robertson was appointed federal manager and vice-president of this road and on the return of the roads to private ownership he was appointed vice-president in charge of operation, which position he now holds, in addition to that noted above.

A. Robertson

Financial, Legal and Accounting

H. J. Jackson, district freight agent of the New Jersey, Indiana & Illinois, has been appointed treasurer and general freight agent, with headquarters at South Bend, Ind., and **F. E. Emery** has been appointed southwestern freight agent, with headquarters at St. Louis, Mo.

Operating

G. H. Sido has been appointed acting superintendent of transportation in place of **M. B. Casey,** temporarily granted leave of absence.

T. P. Mock has been appointed assistant superintendent of the Houston Belt Terminal, with headquarters at Houston, Texas, effective April 12.

William D. Page, trainmaster of the Northern Pacific, with headquarters at Seattle, Wash., has been transferred, with headquarters at the same place, to succeed **J. E. Campbell**, promoted.

Traffic

J. E. Light, assistant agent on the Southern Pacific, with headquarters at San Francisco, Cal., has been promoted to district freight and passenger agent, with headquarters at Salt Lake City, Utah, effective May 15.

Charles O. Williams, chief clerk to the general passenger agent of the Kansas City Southern, with headquarters at Kansas City, Mo., has been promoted to assistant general passenger agent with the same headquarters, effective May 1. Mr. Williams was born on June 17, 1874, at Springfield, Mo. He entered railway service in May, 1890, with the Kansas City, Fort Scott & Memphis, now part of the Frisco, as agent and operator. He was appointed city passenger and ticket agent on the Kansas City Southern at Shreveport, La., in 1903. Four years later he was appointed agent at the Grand Central Station at Kansas City, Mo., and in 1911 was promoted to traveling passenger agent. He was appointed chief clerk to the general passenger agent in 1917.

Engineering, Maintenance of Way and Signaling

L. H. Bond, assistant engineer on the Illinois Central, has been promoted to district engineer of the Northern lines, with headquarters at Chicago, effective May 20.

J. A. S. Redfield, division engineer of the Chicago & North Western, with headquarters at North Fond du Lac, Wis., has been appointed maintenance engineer, with headquarters at Omaha, Neb., effective April 10.

Purchasing and Stores

L. J. Ahlering, traveling storekeeper on the Chicago & Eastern Illinois, with headquarters at Danville, Ill., has been promoted to general storekeeper, with the same headquarters, succeeding W. T. Bissell, who has resigned to engage in other business, effective June 1.

Railroad Administration

George M. Huss has resigned as chairman of the committee on claims, Division of Liquidation, United States Railroad Administration, effective June 1, to resume his practice as a consulting engineer at Chicago.

Alfred Bettman, of Cincinnati, Ohio, has been appointed regional counsel of the central eastern region of the Railroad Administration and **O. A. Smith**, also of Cincinnati, has been appointed regional claim agent to assist Mr. Bettman.

Horace Epes, heretofore assistant to the assistant to the director general of the Railroad Administration, has been appointed special assistant to the manager of the department of materials and supplies, with office at Washington. Mr. Epes was special assistant to the southern regional director during the period of federal control.

The Department of Traffic, Division of Liquidation Claims of the U. S. Railroad Administration, has announced the following appointments, effective May 17: **W. K. Vandiver**, assistant manager in charge of formal complaints, Southern and Pocahontas regions; **C. I. Johnson**, assistant to manager, in charge of formal complaints, Eastern and Allegheny regions; **C. B. Ackerman**, assistant to manager, in charge of formal complaints, Northwestern and Central Western regions; **W. B. Knight**, assistant to manager, in charge of formal complaints, Southwestern region; **J. A. Little**, assistant to manager, in charge of short line adjustments; **H. D. Boynton**, assistant to manager, in charge of passenger, baggage and express adjustments; **H. S. Jones**, assistant to manager, in charge of informal complaints.

Obituary

E. L. Weisgerber, formerly general master mechanic at the Mount Clare shops of the Baltimore & Ohio, died recently at his home in Newark, Ohio.

Horace Jewel Temple, general superintendent of the Southern Pacific of Mexico, with headquarters at Empalme, Sonora, Mex., died in Empalme on April 2. Mr. Temple was born at Monroe, La., on March 14, 1869, and entered railway service as a messenger with the Gulf, Colorado & Santa Fe, in April, 1882. In 1884, after a brief service as a telegraph operator with the Western Union, he returned to railroad work as an operator on the Texas & Pacific, and four years later was appointed agent and operator on the Southern Pacific. He was appointed claim agent and assistant operator on the Cananea & Consolidated Copper Company Railway in June, 1901, and one year later became superintendent of the Cananea, Rio Yaqui y Pacifico, remaining as superintendent upon the consolidation of this road with the Sonora in 1908. He was appointed general superintendent of the Southern Pacific of Mexico on August 23, 1911.

H. J. Temple

L. J. Putnam, chief engineer of the Chicago & North Western, with headquarters at Chicago, was drowned at Leroy, Mich., on May 29. Mr. Putnam was born at Manchester, Ia., on February 17, 1878, and was educated at Cornell College, Mt. Vernon, Ia., where he studied civil engineering. He began railway service in June, 1898, with the Illinois Central, and in June of the following year entered the service of the Chicago & North Western as an instrument man. From February, 1901, to March, 1906, he was assistant engineer on construction, location and maintenance, following which he was promoted to acting division engineer on the Ashland division at Kaukauna, Wis. From March, 1907, he was consecutively assistant engineer in charge of second track and terminal improvements at Janesville, Wis.; assistant engineer in charge of the construction of a bascule bridge over the North branch of the Chicago river at Chicago and of the Wells Street yard at Chicago, and resident engineer on track elevation at Milwaukee, Wis., and on ore dock construction at Escanaba, Mich. From July, 1910, to April 1, 1912, he was with the Milwaukee, Sparta & North Western, a subsidiary of the Chicago & North Western, as resident engineer on construction and later as acting resident engineer. On April 1, 1912, he was promoted to division engineer at Boone, Ia., and in May, 1913, he was promoted to principal assistant engineer, with headquarters at Chicago. He was promoted to chief engineer on June 12, 1918.

L. J. Putnam

Railway Age

DAILY EDITION

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WE GUARANTEE that of this issue, 15,000 copies were printed; that of these 15,000 copies, 13,480 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 140 were mailed to advertisers, 280 were provided for counter and news companies' sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 1,100 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

Don't Destroy Your *Daily*

The paper shortage is becoming more and more acute. It was only with the greatest difficulty and at an exorbitant expense that we were able to secure sufficient paper to publish the *Daily* this year. The usual number of copies will be provided for distribution at Atlantic City, but the indications are that there will be a greatly increased attendance of both railway and railway supplymen. When you have finished with your copy of the *Daily*, therefore, do not throw it away or destroy it. If you do not care to preserve it for future reference, please pass it on to your neighbor who may not have seen a copy, or return it to the *Railway Age* office. We feel sure that our friends will co-operate with us in helping to make the best possible use of each copy of the *Daily*.

Improvements On the Pier

In former years the mechanical associations have had difficulty in securing improvements in the accommodations on the pier. It is therefore gratifying to note that during the last year the Convention Hall has been remodeled, greatly improving its acoustic properties, and the balcony in the Main Hall has been rebuilt to provide an attractive space for exhibits. The owners of the pier and the officers of both the Mechanical Section and the Railway Supply Manufacturers' Association are to be congratulated on the changes. The need for a larger number of exhibit spaces was clearly shown last year by the fact that in numerous instances booths were shared by two companies. The additional space in the balcony has helped to relieve the situation somewhat, although so many more companies desired to exhibit this year that the shortage of space is even more pronounced than last year. The difficulty of hearing in the Convention Hall has proved extremely annoying at previous conventions and no doubt has checked the free discussion of the papers. With these two improvements this year's meeting should fulfill its early promise and should rank among the most successful of the June conventions.

College Men On the Railroads

Many of the more important industries are fully alive to the necessity of attracting technical men to their organizations and often go so far as to maintain special departments or officers to get in touch with the senior students at engineering colleges and place before them the advantages of becoming affiliated with their organizations. In the past many college graduates have been attracted to the mechanical departments of the railways and have entered the special apprenticeship courses which were maintained in most of them. The special apprenticeship gave the college graduate a general training in the mechanical department affairs, based primarily upon a good course in shop work and repair work. The National Agreement has not only made no provision for allowing technical graduates to gain a shop experience but has even made it impossible for them to take a regular apprenticeship course by limiting the maximum age at which the apprentices will be enrolled to 21 years. Few, if any, technical graduates leave college at this age. It has often been suggested that the railroads could recruit their own technical graduates by selecting the brighter and more capable apprentices and rewarding them with special scholarships in technical courses. This is good but it will take a long time to work it out satisfactorily and meanwhile under the present conditions the railways will be prevented from recruiting college graduates in the mechanical department. The matter is of such vital importance that it would seem that it should receive some consideration at the convention this year. It will be a difficult problem to solve, but the sooner it is tackled the better.

Increase of Locomotive Orders

The locomotive orders which the railways of the United States have placed thus far this year show that they are strongly disposed to increase their facilities as rapidly as they can. On January 1, 1920, the three large locomotive companies of this country had on their books orders for only 99 locomotives from the standard gauge railways of the United States. In other words, they were practically out of domestic orders. From January 1 to May 19 these three companies received orders for a total of 1,166 locomotives from the railways of the United States. Assuming that none of the orders which they had on their books at the beginning of the year or which they had received since then had been canceled, the total orders which they have filled this year and which they still had unfilled up to May 19 was 1,259. This is not a large number of orders for these three companies to have. In the four years 1910 to 1914, when business was good, they built for the railways of the United States 10,541 locomotives, or an average of 2,635 a year. On the other

hand, during the six years 1914 to 1919, inclusive, they built for the railways of the United States only 8,540 locomotives, or an average of only 1,423 annually. Their production for domestic service in 1919 was only 946. Compared with the records of recent years, therefore, the orders that have been placed thus far this year are substantial, and if the Interstate Commerce Commission renders a satisfactory decision in the rate advance case it is probable that numerous roads which have not yet entered the market will do so. There is great need for the placing of much larger orders this year, for most of the railroads are obviously very short of power.

Automatic Turning Machines

It is almost a truism to remark that the development of automatic turning machines, as well as grinding machines, has reached its highest state in the automotive industry. But railway men have learned to profit by the experience of others and several automatic machines of different types developed for railway work can be seen in operation at this convention. These machines, like all other machine tools, have practically doubled in price in the past four years, but in spite of this, their installation in railway shops is not only a good investment but a necessity, due to the scarcity and high cost of labor as well as the imperative need of getting motive power and rolling stock into good serviceable condition before next winter. The automatic machine is really a combination of several machines, each one performing a given operation and using one tool arrangement. The operator's duties are to position each piece accurately at the loading station, remove each piece as the cycle of operations is completed and see that the machine runs continuously without accident. Occasional checking of the work is advisable. Automatics are now made with ample power to remove stock rapidly when enough cooling compound is used, and any desired accuracy up to .001 in. can be obtained. The machines are unequaled for the rapid, accurate production of duplicate parts. The use of automatics has been extended to the manufacture of many parts previously made on other machines. For example, rings for the joints between injectors and injector pipes were formerly made of brass and ground in by hand. It has been found possible on one road to effect a saving of 75 per cent by making these rings on a heavy automatic out of steel tubing, the flat joints being finished on a grinding machine equipped with a magnetic chuck. The different parts that can be made are too numerous to mention and such jobs as the above, taken in the aggregate, show the possibility of large savings by the introduction of automatic machines in railway shops.

Invest in Engine Terminals

Money spent on enlarging and modernizing engine terminals will not only reduce operating and maintenance costs, but it will produce—it will add something to the capacity of the railroad. If the time required to turn 24 locomotives can be reduced an average of one hour per engine by means of improved terminal facilities, the investment in these facilities will, in itself, be equivalent to the addition of a locomotive to the service. Is this always taken into consideration? Is the value of a locomotive per hour generally recognized? A locomotive is of no value to a railroad when it is not available to haul trains, and no matter how powerful or well designed the locomotive may be, it is useless to the road as long as it is held out of service. The design and equipment of engine terminals has more to do with the time that a locomotive is available for service than any other single factor, and consideration of this alone should lead mechanical executives to put greater emphasis on the need for modern engine terminals. A modernized terminal implies a track layout that will not cause a single hitch in the movement of engines to and from the roundhouse, an ash pit with adequate trackage, water spouts located at a number of convenient points, a coal chute so designed that engines can be coaled promptly, and a motor-driven turntable that is large enough to accommodate the longest locomotives without difficulty. Many additional features are essential to modernized terminals, but these are some of the factors that tend to reduce the time required for turning power. If it were possible to cut in half the time now required for turning locomotives on all railroads it would be equivalent to placing at least 10,000 additional locomotives in service. The return from money spent on engine terminal improvements is out of all proportion to the investment required.

Where Progress Is Slow

Apparently there has never been a time when railroad men were so ready to adopt improved appliances as they are at present. In looking over the exhibits one cannot fail to note the numerous devices that were classed as innovations last year, but are now looked on almost as standard equipment. Considering the strides that have been made in perfecting new devices, is it not surprising that, with its wonderful possibilities in increased capacity and efficiency, the matter of reducing the dynamic augment of locomotive drivers has received so little attention? The question has been discussed by the mechanical associations and by railroad clubs, but there has been no interested inventor or manufacturer to keep the advantage of lightening the revolving and reciprocating parts in the minds of railroad men. The difficulties are not insuperable. What is needed is an active realization of the saving that can be effected by reducing the dynamic augment and a determination on the part of the mechanical officers to make it an accomplished fact.

Making Steam

Is heat transmitted through the body of water in a locomotive boiler by conduction or convection? The question is of more than theoretical interest because it has a direct bearing on locomotive efficiency and capacity. If the heat absorbed from the surfaces of the tubes and firebox sheets simply traveled through the water as heat does through a piece of metal, the circulation of water in the boiler would not be an essential factor further than for the beneficial effect derived from the scouring action exerted on the sheets and boiler tubes, which tends to keep these clean and free from scale. But by far the greatest amount of heat taken up by water in the process of steam making is by means of convection; that is, it is literally conveyed to the body of water by particles of water coming in actual contact with the heating surfaces. This is why circulation is of paramount importance in a locomotive. Rapid circulation multiplies the water particles coming in actual contact with the heating surface and consequently increases the quantity of heat absorbed per square foot of heating surface. Any effective means for promoting boiler circulation is therefore equivalent to increasing the area of the heating surfaces without a corresponding increase in the weight of the locomotive. Boiler circulation as a means for increasing the capacity and evaporative efficiency of the locomotive boiler reserves greater attention.

Keeping up with Germany

Not so long ago, about the strongest argument in favor of superheated steam was its almost universal use on German locomotives. The theoretical advantages of superheating steam were appreciated, but American railroads were timorous about applying superheaters until their successful application was demonstrated elsewhere. Today the situation is much the same with respect to locomotive feedwater heating. Its advantages are pretty well understood, but as yet the feedwater heater has not taken hold and discussions on this topic are confined largely to the realm of theory. The practical side of the question is being evaded and the tendency is to let some one else try it out first. As with the superheater, this is exactly what is happening. Every locomotive now being built in Germany is equipped with a feedwater heater and Germany is building more locomotives than ever before. Armor plate mills are now rolling locomotive boiler plate and Germany has actually a greater number of locomotives than before the war. There is no mystery about feedwater heating; boiler efficiency is increased more than one per cent for every 11-deg. rise effected in the temperature of feedwater, and practical means are available for utilizing the heat in exhaust steam and waste gases to raise feedwater temperatures 100 deg. or more on any locomotive. If the feedwater heater has become a practical operating factor in Germany, can it not be made so in this country?

Don't Be a Pessimist

During the past year there has been a widespread feeling of discouragement as to the present labor situation, which has affected the mechanical departments of American railroads no less than all industries. Not only has this related to the present situation, but the utmost pessimism has been expressed as to the probable future development of tendencies which, at first glance, seem to be leading toward chaos. The present conditions are not primarily due to inherent unreasonableness on the part of any class of the country's population. They are due to a general failure by the individual to understand his responsibility and an unwillingness to accept his share in the price of the victorious warfare in which we have so recently participated. There is a shortage of many essential products. There is unrest bred of the complete disorganization of the course of industry and of the careers of many millions of individuals. The monotony of stable modes of living has become irksome and a desire for luxury has temporarily caused a distortion of vision. Hence, prices are now high, and they will continue to mount until individual stability and steadiness of purpose reassert themselves sufficiently to make possible a return of normal industrial efficiency. Then conditions will begin the process of righting themselves, and however slow this process may be no one, unless utterly devoid of faith in the American people, can doubt the outcome. There are signs that the process of readjustment has begun and there is every reason for a feeling of optimism as to the future. But if the course of the natural tendencies toward readjustment is to be undeterred the nation's industrial relations, by no means the least important of which involve the mechanical departments of the railways, must be guided by clear thinking devoid of all prejudice and by the principles of justice springing from a profound faith in the integrity of human nature. There is no place in the ranks of mechanical department officers for a cynic or misanthropist.

Programs for the Three Conventions

THE SESSIONS OF THE CONVENTION of Section III—Mechanical, American Railroad Association, will be held in the Greek Temple, on the Million Dollar Pier. The headquarters will be at the Marlborough-Blenheim Hotel.

The sessions of the convention of Section VI—Purchases and Stores, American Railroad Association, will be held in the Hippodrome, on the Million Dollar Pier. The headquarters will be at the Marlborough-Blenheim Hotel, where the office of the president, secretary and executive committee will be located.

The semi-annual meeting of the Association of Railway Electrical Engineers will be held at the Hotel Dennis on June 14.

The enrollment committee for Section III—Mechanical, and Section VI—Purchases and Stores, will be located in the entrance to the pier. Each member of these associations, immediately on arrival, should go to the enrollment booth, register and procure his membership button, showing his registration. Members will also be provided with badges for their families. Cards for registration will be furnished at the enrollment booth at the entrance to the pier.

Members of these two associations are requested to be in their seats promptly at 9.30 A. M.

Wednesday, June 9, 1920

SECTION III—MECHANICAL

Prayer	9.30 A. M. to 9.40 A. M.
Address of Welcome by Mayor of Atlantic City	9.40 A. M. to 10.00 A. M.
Address by the Chairman	10.00 A. M. to 10.30 A. M.
Action on Minutes of Annual Meeting of 1919 (M. C. B.)	10.30 A. M. to 10.35 A. M.
Appointment of Committee on Subjects, Resolutions, Correspondence, Obituaries, etc.	10.35 A. M. to 10.45 A. M.
Unfinished Business	10.45 A. M. to 10.50 A. M.
New Business	10.50 A. M. to 11.00 A. M.
Report of General Committee, including Announcement of Nominations for Members of Nominating Committee	11.00 A. M. to 11.15 A. M.
Discussion of Reports:	
Nominations	11.15 A. M. to 11.30 A. M.
Mechanical Stokers	11.30 A. M. to 12.00 M.
Modernization of Stationary Boiler Plants	12.00 M. to 12.30 P. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3.30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.

4.30 P. M.—Tea will be served in Entrance Hall.

9.00 P. M.—Informal Dance including Special Features, Ball Room, Million Dollar Pier.

Thursday, June 10, 1920

SECTION III—MECHANICAL

Discussion of Reports on:	
Fuel Economy and Smoke Prevention	9.30 A. M. to 10.30 A. M.
Auxiliary or Safety Connections between Engine and Tender	10.00 A. M. to 10.30 A. M.
Design, Maintenance and Operation of Electric Rolling Stock	10.30 A. M. to 11.00 A. M.
Scheduling and Routing Systems for Locomotive Repair Shops	11.00 A. M. to 11.30 A. M.
Superheater Locomotives	11.30 A. M. to 12.00 M.
Individual Paper on "Snow Fighting Apparatus," by W. H. Winterrowd	12.00 M. to 12.30 P. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3.30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.

4.30 P. M.—Tea will be served in Entrance Hall.

9.30 P. M.—Grand Ball, Ball Room, Million Dollar Pier.

Friday, June 11, 1920

SECTION III—MECHANICAL

Discussion of Reports on:	
Locomotive Headlights and Classification Lamps	9.30 A. M. to 10.00 A. M.
Feed Water Heaters for Locomotives	10.00 A. M. to 10.30 A. M.
Individual Paper on "Locomotives as a Big Investment," by George M. Basford	10.30 A. M. to 11.00 A. M.
Discussion of Reports on:	
Design and Maintenance of Locomotive Boilers	11.00 A. M. to 11.30 A. M.
Engine Terminals, Design and Operation	11.30 A. M. to 12.00 M.
Train Resistance and Tonnage Rating	12.00 M. to 12.30 P. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.
3.30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.
4.30 P. M.—Tea will be served in Entrance Hall.
9.00 P. M.—Carnival Night with Special Features, Ball Room, Million Dollar Pier.

Saturday, June 12, 1920

The entire day has been set aside by Mechanical Section III to view the exhibits.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.
3.30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.
9.00 P. M.—Musicale, Entrance Hall, Million Dollar Pier.

Sunday, June 13, 1920

3.30 P. M.—Sacred Concert in the Music Rooms of the Marlborough-Blenheim. The Albert Taylor Orchestra, New York City.

Monday, June 14, 1920

SECTION III—MECHANICAL

Discussion of Reports on:	
Autogenous and Electric Welding	9.30 A. M. to 10.00 A. M.
Specifications and Tests for Materials	10.00 A. M. to 10.30 A. M.
Standard and Recommended Practice	10.30 A. M. to 10.45 A. M.
Election of Officers	10.45 A. M. to 11.00 A. M.
Discussion of Reports on:	
Repair Shop Layouts	11.00 A. M. to 11.20 A. M.
Amalgamation	11.20 A. M. to 11.30 A. M.
Standard Blocking for Cradles of Car Dumping Machines	11.30 A. M. to 11.40 A. M.
Standard Method of Packing Journal Boxes	11.40 A. M. to 12.10 P. M.
Establishment of a Coöperative Research Bureau	12.10 P. M. to 12.30 P. M.

SECTION VI—PURCHASES AND STORES

MORNING SESSION

Invocation	9.30 A. M. to 9.40 A. M.
Address of Welcome by Mayor of Atlantic City	9.40 A. M. to 10.00 A. M.
Response by J. H. Waterman	10.00 A. M. to 10.15 A. M.
Opening of Meeting by the Chairman.	10.15 A. M. to 10.30 A. M.
Action on Minutes of Annual Meeting 1919 (R. S. A.)	10.30 A. M. to 10.40 A. M.
Appointment of Committees: Resolutions Memorial	10.40 A. M. to 10.45 A. M.
New Business: Report of General Committee, including Announcement of Nominations for Members of Nominating Committee	10.45 A. M. to 11.30 A. M.
Discussion of General Committee's Report	11.30 A. M. to 12.30 P. M.

AFTERNOON SESSION

Discussion of Reports of Committees.	2.00 P. M. to 5.00 P. M.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS

ALL-DAY SESSION

Presentation of Progress Reports:
Committee on Trucks and Tractors
Committee on Electric Welding
Committee on Illumination
Committee on Train Lighting Equipment and Practice
Committee on Railway Stationary Power Plants
Committee on Electric Headlights
Committee on Electrification.
Committee on Electric Repair Shop Facilities and Equipment.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.
3.30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.
4.30 P. M.—Tea will be served in Entrance Hall.
9.00 P. M.—Informal Dance with Special Features, Ball Room, Million Dollar Pier.

Tuesday, June 15, 1920

SECTION III—MECHANICAL

Discussion of Reports on:	
Revision of Passenger Car Rules of Interchange	9.30 A. M. to 10.00 A. M.
Prices for Labor and Materials	10.00 A. M. to 10.30 A. M.
Depreciation for Freight Cars	10.30 A. M. to 11.00 A. M.
Arbitration	11.00 A. M. to 11.30 A. M.
Tank Cars	11.30 A. M. to 12.00 M.
Brake Shoe and Brake Beam Equipment	12.00 M. to 12.30 P. M.

SECTION VI—PURCHASES AND STORES

MORNING SESSION

Discussion of Reports of Committees.	9.30 A. M. to 12.30 P. M.
Discussion of Reports of Committees.	2.00 P. M. to 3.00 P. M.

AFTERNOON SESSION

Discussion of Report of Committee on Supply Train Operation. Moving Pictures of Supply Train on Southern Pacific	3.00 P. M. to 5.00 P. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.
3.30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.
4.30 P. M.—Tea will be served in Entrance Hall.
9.30 P. M.—Grand Ball in Ball Room on Million Dollar Pier.

Wednesday, June 16, 1920

SECTION III—MECHANICAL

Discussion of Reports on:	
Couplers and Draft Gear	9.30 A. M. to 9.50 A. M.
Car Wheels	9.50 A. M. to 10.20 A. M.
Car Construction	10.20 A. M. to 10.50 A. M.
Safety Appliances	10.50 A. M. to 10.55 A. M.
Loading Rules	10.55 A. M. to 11.20 A. M.
Train Brake and Signal Equipment.	11.20 A. M. to 11.50 A. M.
Train Lighting and Equipment	11.50 A. M. to 12.20 P. M.
Subjects	12.20 P. M. to 12.30 P. M.

SECTION VI—PURCHASES AND STORES

Consideration of Rules of Order	9.30 A. M. to 10.00 A. M.
Report of Nominating Committee	10.00 A. M. to 10.30 A. M.
Election of Officers, General Committee and Nominating Committee	10.30 A. M. to 11.00 A. M.

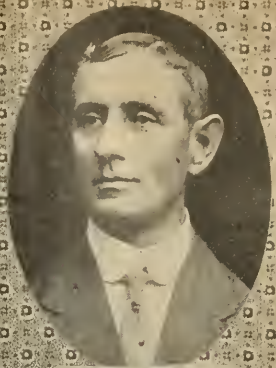
ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

W.H.S.BATEMAN

W.K.KREPPS

C.P.CASS



J.D.CONWAY

L.S.WRIGHT

Railway Supply Manufacturers' Association

Exhibit Smashes All Records

THE BIGGEST PROBLEM which the Railway Supply Manufacturers' Association has had to overcome in preparing for the convention this year has been to try to take care of as many prospective exhibitors as possible. Every inch of space on the pier has been utilized, including the balcony in the main entrance hall. Even then a large number had to be turned away and many others have had to be satisfied with much less space than they desire. As last year, the entertainment program is modest and unpretentious. The committees in charge of the features which look to the comfort and convenience of the visitors have given even more than the usual amount of attention to make the big meeting run off smoothly.

The Railway Supply Manufacturers' Association plays such a large part in making the convention a success because of its

J.F.SCHURCH

JOHN C.KUHNS

GEO. L. MORTON

GEO.A. COOPER

C.H. GAYETTY

C.D. JENKS

C.D.EATON

simple and strong organization and the fact that it has been developing over a period of years in building up to the elaborate affairs which are now being held.

The association during the past year has worked under the leadership of George R. Carr, president of the Association and vice-president of the Dearborn Chemical Company, Chicago. Mr. Carr has been one of the hardest and most efficient workers in the association for many years. His first committee work was done on the entertainment committee, on which he served for about six years. In 1915 he was chairman of this committee. In 1916 he was elected a member of the executive committee and in that year and in 1919 he served on the exhibit committee. (It will be recalled that no conventions were held in 1917 and no exhibit in 1918.) He was elected president of the Railway Supply Manufacturers' Association last year and besides being president he is chairman of the joint committee on arrangements on which the railway as well as the supply associations are represented. Mr. Carr entered upon his work of helping to make this year's convention a success with the enthusiasm and energy which characterize him in everything that he does. The increase in exhibit space from 93,000 to 100,000 ft. was largely due to his efforts, and it is chiefly due to him that the owners of the pier have given to the association all space between 75,000 and 93,000 ft. free of charge.

George R. Carr
President of the R. S. M. A.

Mr. Carr was born at Argenta, Ill., on January 23, 1877. He moved with his family to Chicago in 1893 and graduated from the Austin High School in 1897. Soon afterward he entered the University of Illinois, where he took a course in chemistry and graduated in June, 1901, with the degree of B. S. On July 1 of the same year he entered the employ of the Dearborn Chemical Company as a salesman. He held various positions in this company, and for the last 10 years has been vice-president and general manager.

The vice-president of the association is J. F. Schurch, vice-president of the T. H. Symington Company, Chicago. The secretary-treasurer is John D. Conway, of Pittsburgh.

These officers are supported by an executive committee of twelve members, several of whom are chairmen of important sub-committees. Three of the more important sub-committees—Entertainment, Enrollment and Transportation—are presided over by chairmen who are not members of the executive committee; the important duties and responsibilities of these men are such, however, that they are very strong factors in the successful promotion of the organization.

Executive Committee

The twelve members of the executive committee represent seven geographical districts as follows:

First district (New England states and Canada), one member: J. G. Platt, Hunt-Spiller Mfg. Corporation, Boston, Mass.

Second district (New York and New Jersey), three members: C. D. Eaton, American Car & Foundry Company, New York; Charles W. Beaver, Yale & Towne Mfg. Company, New York, and H. G. Thompson, Transportation Engineering Corporation, New York.

Third district (Pennsylvania), two members: W. H. S. Bateman, The Champion Rivet Company, Philadelphia, Pa. (Mr. Bateman also represents the Parkesburg Iron Company), and John M. Gillespie, Lockhart Iron & Steel Company, Pittsburgh, Pa.

Fourth district (Ohio, Indiana and Michigan), two members; C. D. Jenks, The Damascus Brake Beam Company, Cleveland, Ohio, and George A. Cooper, Frost Railway Supply Company, Detroit, Mich.

Fifth district (Illinois), two members: E. H. Bankard, Jr., Globe Seamless Steel Tubes Company, Chicago, Ill., and L. S. Wright, National Malleable Castings Company, Chicago, Ill.

Sixth district (Delaware, Maryland, District of Columbia, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Florida, Alabama, Mississippi, Kentucky and Tennessee), one member: George L. Morton, Galena-Signal Oil Company, Atlanta, Ga.

Seventh district (states west of the Mississippi river, including Louisiana, Minnesota and Wisconsin), one member: C. P. Cass, Westinghouse Air Brake Company, St. Louis, Mo.

The members of the executive committee who were elected at the 1919 convention were Messrs. Bateman and Gillespie of the Third district; Mr. Jenks of the Fourth district to fill out the unexpired term of J. F. Schurch, who moved from the district; Mr. Wright of the Fifth district, and Mr. Morton of the Sixth district. In the Fifth district Mr. Bankard, Jr., was appointed by the executive committee to serve one year to fill out the term of Mr. Carr who was elected to the presidency of the association.

Five new members will be elected this year to succeed Messrs. Platt of the First district, Eaton of the Second district, Jenks of the Fourth district, Bankard of the Fifth district, and Cass of the Seventh district, all of whose terms expire.

Exhibit Committee

Formerly the exhibit committee consisted of three members, but this year it was increased to five, all of whom are members of the executive committee. J. G. Platt is chairman, and the other members are C. W. Beaver, E. H. Bankard, Jr., J. M. Gillespie and H. G. Thompson. Photographs of the members of the exhibit

committee will be found at the head of the article in this issue describing the exhibit.

Enrollment Committee

This committee has the arduous task of enrolling all members for both the railway and the supply associations and is made up as follows:

C. H. Gayetty, Chairman, Quaker City Rubber Co., Philadelphia, Pa.
Geo. A. Barden, Duntley-Pneumatic Tool Co., Philadelphia, Pa.
Jos. E. Brown, O'Malley-Beare Valve Co., Chicago, Ill.
C. L. Bates, Railway Review, Chicago, Ill.
S. H. Campbell, Western Railway Equipment Co., St. Louis, Mo.
Geo. W. Denyven, Parkesburg Iron Co., Boston, Mass.
F. E. Dodson, U. S. Rubber Co., Baltimore, Md.
Harry Jacques, Simmons Hardware Co., Philadelphia, Pa.
F. C. Koch, Railway Age, New York, N. Y.
S. Inglis Leslie, The Leslie Co., Lyndhurst, N. J.
L. D. Mitchell, Detroit Graphite Co., Chicago, Ill.
F. V. McGinness, Transportation Engineering Co., New York, N. Y.
J. A. Stevens, Devoe & Raynolds Co., Inc., New York, N. Y.
F. H. Smith, Gold Car Heating & Lighting Co., New York, N. Y.
H. K. Williams, Safety Car Heating & Lighting Co, Washington, D. C.

Entertainment Committee

This committee, which has charge of all entertainment features, is made up as follows:

William K. Krepps, Chairman, Crucible Steel Co. of America, New York.
Charles L. Brown, Manning, Maxwell & Moore, Chicago, Ill.
L. O. Cameron, Pressed Steel Car Co., Washington, D. C.
Floyd Coffin, Franklin Railway Supply Co., New York, N. Y.
Dan Eubanks, Galena Signal Oil Co., Cincinnati, Ohio.
J. W. Fogg, Boss Nut Company, Chicago, Ill.
J. R. Forney, Ralston Steel Car Co., Washington, D. C.
W. E. Greenwood, The Texas Company, New York, N. Y.
Horace Hager, American Car & Foundry Co., New York, N. Y.
Ellsworth Haring, New York, N. Y.
Oscar B. Hayward, care of Williams-Hayward Co., Chicago, Ill.
R. I. Himmelright, American Arch Co., New York, N. Y.
T. J. Hudson, Jr., Chicago Pneumatic Tool Co., New York, N. Y.
Langley Ingraham, Lowe Brothers Co., Dayton, Ohio.
William W. Melcher, Massachusetts Mohair Plush Co., Boston, Mass.
John D. McClintock, William Sellers & Co., Philadelphia, Pa.
I. C. Rogers, W. R. Keene & Co., New York, N. Y.
S. W. Sargent, American Steel Foundries, Philadelphia, Pa.
L. B Sherman, Railway Age, Chicago, Illl
Gardner Taylor, care of The J. T. Jones Lumber Co. ,New York, N. Y.
R. P. Townsend, Liberty Steel Products Co., New York, N. Y.
H. A. Varney, Sunbeam Electric Mfg. Co., Chicago, Ill.
W. M. Wilson, Flannery Bolt Co., Chicago, Ill.
W. B. Wise, U. S. Rubber Co., New York, N. Y.

Transportation Committee

The most important function of the Transportation Committee is to look after the handling of the rolling chairs; it also supervises the automobile service and other local transportation features during the conventions. It is made up as follows:

John C. Kuhns, Chairman Burden Iron Co., Chicago, Ill.
Al. McNeill, Central Electric Co., Chicago, Ill.
Roswell P. Cooley, Vapor Car Heating Co., New York.
Walter C. Doerring, Southern Wheel Co., St. Louis, Mo.
T. J. Powell, Galena Signal Oil Co., St. Louis, Mo.
G. R. Berger, Gould Storage Battery Co., Depew, N. Y.
Gilbert E. Ryder, Locomotive Superheater Co., New York, N. Y.
John L. Phillips, The Okonite Co., Passaic, N. J.
W. Jerry King, Hewitt Rubber Co., Chicago, Ill.
S. C. Dinsmore, National Refining Co., Chicago, Ill.
H. A. Glenn, The Edna Brass Mfg. Co., Chicago, Ill.
J. B. Jordan, Crane Company, Chicago, Ill.
Harry Niel, Midvale Steel Co., Philadelphia, Pa.
J. A. McFarland, The Bird Archer Co., St. Louis, Mo.
Bruce P. Owens, Maginnis Company, Chicago, Ill.
Edwin L. Georger, Pratt & Lambert, Buffalo, N. Y.
H. E. Daniels, West Disinfecting Co., Chicago, Ill.
Charles D. Derby, Joyce-Cridland Co., Dayton, Ohio.
F. A. Elmquist, Sherwin-Williams Co., New York, N. Y.
R. R. Porterfield, Locomotive Supply Co., Chicago Ill.
J. W. Trent, H. W. Johns-Manville Co., St. Louis, Mo.
W. Leighton, Oxweld R. R. Service Co, Chicago, Ill.
F. M. Condit, Fairbanks, Morse & Co., Chicago, Ill.
Geo. W. Ristine, Jr., Whiting Fdry. Equipment Co., Harvey, Ill
Jack Ross, Westinghouse Elec & Mfg. Co., E. Pittsburgh, Pa.
C. P. Wright, Amer. Brake Shoe & Fdry. Co., Chicago, Ill.
F. Coolidge, Buckeye Steel Castings Co., Chicago, Ill.

Other Committees

The finance committee includes George A. Cooper as chairman, C. P. Cass and George L. Morton.

The badge committee consists of L. S. Wright, chairman, C. D. Eaton and George L. Morton.

The by-laws committee consists of W. H. S. Bateman, chairman, H. G. Thompson and George L. Morton.

The hotel committee consists of C. D. Jenks, chairman, C. D. Eaton and George L. Morton.

Telephones

A SWITCHBOARD with the necessary operators has been placed on the pier in connection with several long-distance booths, which are conveniently located in different sections of the pier.

Railway Club Secretaries

MEMBERS of the Society of Railway Club Secretaries will, as usual, come to Atlantic City for the annual meeting of the Society to be held at 10 o'clock Friday morning in room 192 of the Blenheim. It will be preceded on Thursday, at 1 P. M., by a round-table luncheon of the secretaries and a limited number of invited guests.

Post Office

UNITED STATES MAIL addressed in the care of the Secretary's Office, Million Dollar Pier, Atlantic City, N. J., will be taken care of and distributed to exhibitors' booths.

Members are requested not to send general circular matter for distribution to other exhibitors, as this is a violation of the association rules.

Registration

THE ENROLLMENT BOOTH at the entrance to the pier will be operated during the convention in accordance with the following schedule:

		Morning	*Afternoon*	*Evening*
Wednesday,	June 9	9 to 1	2 to 6	7 to 8
Thursday,	June 10	9 to 1	2 to 6	7 to 8
Friday,	June 11	9 to 1	2 to 6	7 to 8
Saturday,	June 12	9 to 12	2 to 4	8 to 9
Sunday,	June 13	10 to 12	2 to 4	
Monday,	June 14	9 to 1	2 to 6	8 to 9
Tuesday,	June 15	9 to 12	2 to 5	
Wednesday,	June 16	9 to 11		

Rolling Chairs

THE TRANSPORTATION COMMITTEE will provide rolling chairs for members and guests of the convention wearing official badges, from the following stations, between the hours indicated, from June 9 to June 16, inclusive:

	A. M.	P. M.
The Pier	9.00	to 6.30
Marlborough-Blenheim	9.00	to 6.00
Traymore	9.00	to 6.00
Chalfonte Hotel	9.00	to 6.00
Chelsea Hotel	9.00	to 6.00
Alamac Hotel	9.00	to 6.00
St. Charles Hotel	9.00	to 6.00
The Breakers	9.00	to 6.00
Ambassador Hotel	9.00	to 6.00
	P. M.	P. M.
To all Entertainments on Pier	8.30	to 10.00

Unoccupied chairs may be stopped at any point on the Boardwalk, except between the Marlborough-Blenheim and the Pier, and they may be used in either direction.

Convention chairs are not allowed to wait more than fifteen minutes. The Transportation Committee will consider it a favor if members or guests of the Associations will report to the committee any inattention on the part of an attendant. If the number on the chair is given, it will facilitate checking the complaint.

The Man Who Saw

There's No Place Like Home

Father Time has advanced the hands on the daylight-saving clock a whole year since The Man Who Saw joined the throng of believers in American railroads at their annual manifestation of confidence. He enjoyed himself in the humble capacity of an interested observer at the convention of 1919 and returns more interested than ever in the growth of the exhibit of 1920. And in the meantime he has been given an excellent opportunity to cultivate his ability—or the lack of it—to see better. He saw a lot in the lands of our neighbor, the South American. From Cuba, south to Panama and Ecuador and on through Peru, Bolivia and Chile, he wondered at and admired the ways of railroaders in their contentions with conditions more varied than our own.

He traveled on the roof of the world and marveled at the nerve of the men who promoted the building of the iron trail, and the determination of those who defied hardships in the construction of a line across the Andes from Chile to Argentina—a topography that seems to challenge the agility of a Rocky Mountain goat. Safely over to the other side, his breath was literally taken away by the magnificence of South America's modern metropolis, the city of Buenos Aires, so full of lessons for the hurried American. Of the railways in that country, he carried away an impression that can be described as excellent, both as to administration, equipment and facilities.

On to Brazil, he learned the lesson of distinction of nationalities and the fine line which, apparently unseen, exists nevertheless and defines success or failure for those of us who would cultivate the business relationship of the wide awake and independent Brazilians. In the city of Rio de Janeiro he imagined himself in a tropical garden—for such it is. He did not see any monkeys hanging from the branches of the beautiful palm trees or on the foot of his bed and there were no snakes basking in the sun on the stately Avenida Rio Branco, the Fifth avenue of Rio, albeit, Mr. Volstead is unknown in those parts and "tanglefoot" in an endless variety, flows as freely there as the water in our own pleasant little fountain near the fish tank on the pier. Instead, he saw the hand of every Brazilian in its effort to make the architectural attractiveness of the town match the natural beauty of its mountainous surroundings and he testifies that they did a good job!

The man saw and sometimes he looked twice, and in seeing, he tried to pack away the answers to thousands of questions he felt sure he would be asked on his return. Here he learned the limit of human absorption—and he brought back what he could.

He likewise learned the significance and charm of the homely old phrase—"be it ever so Bolshevik, there's no place like home" and he is glad to be back to oatmeal and cream, 30 cent sugar, the elections of a President, shortage of cars and "strikes, fires and accidents beyond our control."

Heads, We Export; Tails, We Don't

The full South American slant on American exporting is a long-winded tale, too long for the column of The Man Who Saw. But it was rubbed into him in his travels that some of our would-be-exporters to Latin America would do well to concentrate on a constructive policy—or else give up the idea. He is led to believe that the old day of hectic excitement to dump the surplus on these fellows, has passed. They like us; some of them admire us, and in certain fields the latch key hangs on the outside and there's a welcome on the mat.

Why not extend co-operation and improve the service and relations before they take the key away and turn the mat over? This is going to happen if we don't "watch our step."

A Few More Hugs for 10c

The railway patron in the Argentine can get a few more hugs, in addition to those he already got at the train gate, by the simple expenditure of a dime. This valuable little coin, deposited in the slot of a platform ticket machine mounted on the train gates of Buenos Aires stations issues a "platform ticket" which passes one to the train where he can hang on her neck at the open window until the speed of the departing "Rapido" makes continuance impossible. The machines pay, and pay well. They pay the traveller a full 10 cents worth, for all of Latin America loves the absolute final "despedida"—the tenderest of all good-bye's. They pay the railway company in an accumulation of dimes which is said to average $30 for every long distance train out of the city—and there are a score of such trains every day in the year.

American Railroad Names

The Colombian gentleman from Manizales is here to learn our ways and among the many questions he asks his friend, The Man Who Saw, is, "Of what importance are the names of some of our railroads to the territory they serve?" He wonders why the transcontinental Atchison, Topeka & Santa Fe doesn't proclaim it for the edification of those in his country who would be led to believe that the line only connected the three towns named. He likewise enquires the significance of "Missouri Pacific," and why—and others. To which The Man Who Saw replied with the ancient wheeze of the old native who, living twenty miles from the newly built right-of-way of the International & Great Northern spelled with difficulty the letters I.-N. G. N. on the tender of the newly arrived, red wheeled 4-4-0 with its "diamond" stack, and commented dryly "INGN—that's a hell of a way to spell engine!"

Welcome, Britain, To Our Midst

There has hardly occurred a more significant turn in the variable tides of trade than in this year's appearance on our pier of an assortment of machine tools from "the other side"—unless it has been the recent invasion, by our own machine tool builders, of that same territory. It's a signal to reciprocity and a challenge to our builders to remember the famous epithet: "If a man builds a better moustrap than his neighbor, though his house is built in the wilderness, the world will make a beaten path to his door." The sentiments of the friends of the Man Who Saw seem to spell a friendly welcome to our British cousins—an American welcome with a punch, a "fair field and no favors." Show us, Britain, we're from Missouri!

Exhibit Committee, J. M. Gillespie, Missing

Big Exhibit Occupies More Than 100,000 Square Feet

Many Companies Were Unable to Secure Booths; Balcony of Main Hall Utilized to Good Advantage

THOSE who exhibited at the 1919 convention were very greatly impressed with the increased number of railroad men in attendance at the convention and the thorough way in which the larger number of them studied the exhibits. It will be recalled that the Railroad Administration asked that the mechanical department officers of each road make a report as to those things which they saw or heard at Atlantic City which could be utilized to practical advantage on their own roads. The Railway Supply Manufacturers' Association wisely published a booklet containing the names of the exhibitors, with blank spaces on which to make notes as to important features in each exhibit. These books were used to splendid advantage, and as a result the association has gotten out a similar booklet this year, feeling that many of the delegates will want to make notes and continue the practice which was so well started last year.

Undoubtedly the experience of exhibitors last year is responsible for the fact that the demands for space this year far exceeded the capacity of the pier, and that it was not possible to anywhere near accommodate the large number of companies that made application for space. When the convention opened this morning there were 359 exhibitors, with over 100,000 sq. ft. of exhibit space. The increase of almost 7,000 sq. ft. over last year was made possible by utilizing the balcony surrounding the ballroom. To do this it was necessary to remove the last two rows of seats and otherwise remodel the balcony; this resulted in an addition of 63 exhibit spaces, averaging 9 by 11 ft., and making a total of 6,706 sq. ft. In order that there may be no possibility of visitors overlooking these exhibits, arrangements have been made to display the names of the companies prominently on the front of the balcony facing the ballroom.

Many of the exhibitors had great difficulty in getting their material to Atlantic City because of the railroad strike and the freight congestion. Too great credit cannot be given to the railroads for the splendid way in which they co-operated in expediting freight and express shipments containing exhibit material. The Pennsylvania Railroad in particular co-operated very closely with the Railway Supply Manufacturers' Association in this respect.

The table shows the remarkable rate at which the exhibit has grown in recent years. Those who predicted that the closing of the exhibit during the war years would seriously affect its future have been very badly mistaken; it seems rather to have added a renewed impetus to the growth of the big exhibition.

HOW THE EXHIBITS HAVE GROWN

Year	Exhibit space sq.ft.*	Number of exhibits
1910	71,019	...
1911	76,110	245
1912	83,507	262
1913	87,360	277
1914	82,218	266
1915	70,412	222
1916	76,643	258
1917 and 1918†	no exhibit	
1919	93,499	314
1920	100,061	359**

*Square feet of space actually paid for. Does not include free space to M. C. B. Committee.
**Number of exhibitors on Wednesday morning, June 9th.
†No exhibit because of war.

A complete list of the exhibitors, together with details of their exhibits and a list of their representatives follows:

List of Exhibitors

A. B. C. Transit Refrigeration Company, Chicago, Ill.—One model car equipped with A. B. C. system of refrigeration and heating, and one 40 ft. railroad car fully equipped with A. B. C. system of refrigeration and heating on exhibition track. Represented by Lewis Penwell, H. R. Newlean and O. E. Shaw. Space 759.

Aga Railway Light & Signal Company, Elizabeth, N. J.—Oxy-acetylene cutting and welding torch. Represented by J. K. Howard and A. G. Straetz. Space 801.

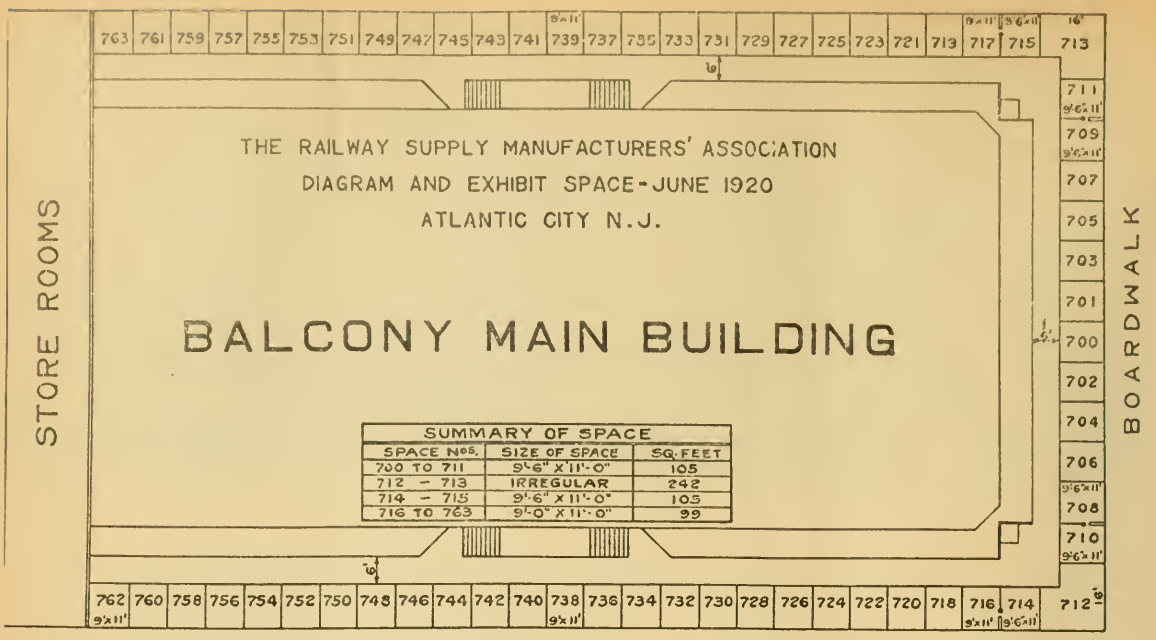


Exhibit Spaces on the Balcony of the Main Building—A New Feature This Year

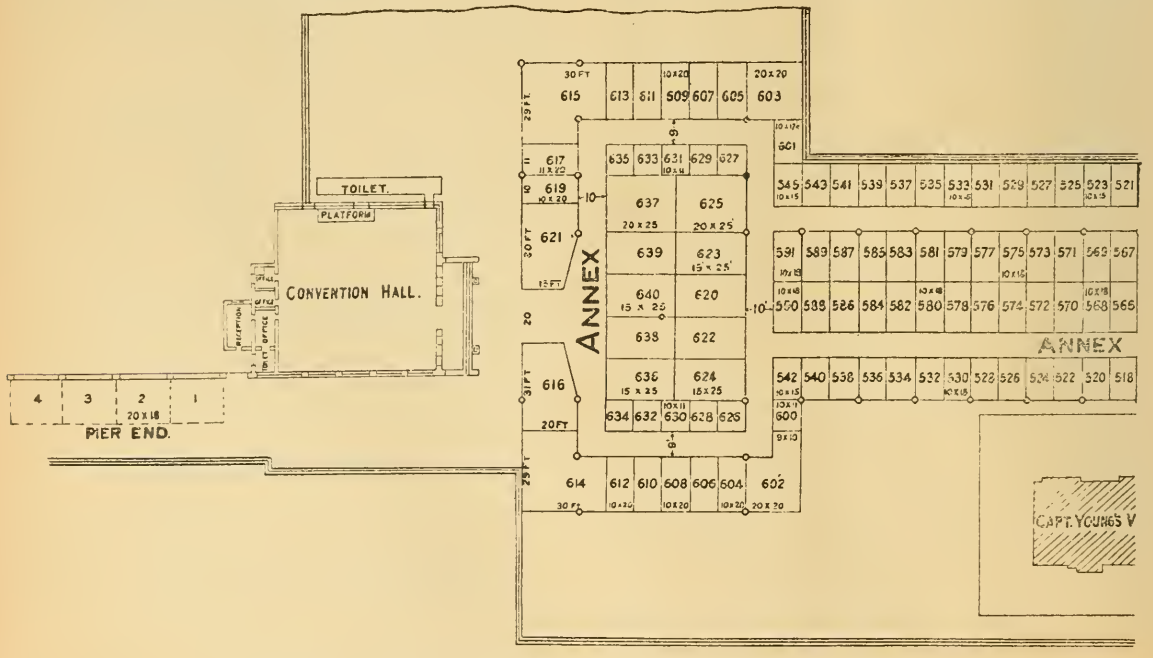
Air Reduction Sales Company, New York, N. Y.—Airco "A" welding torches; "C" lead burning torch; "D" cutting torch, and Airco oxygen and acetylene cylinders. Represented by E. L. Mills, R. T. Peabody, H. F. Weldin, G. H. Crofton, A. S. Kinsey, J. A. Warfel, A. W. Brown, G. W. Irwin, W. P. Roberts, H. H. Melville and D. C. Sinclair. Spaces B and C on the porch.

Ajax Manufacturing Company, The, Cleveland, Ohio.—One 2-inch upsetting forging machine and various forgings. Represented by W. W. Criley, R. W. Bannerman, J. A. Murray and A. L. Guilford. Spaces 120-122-124.

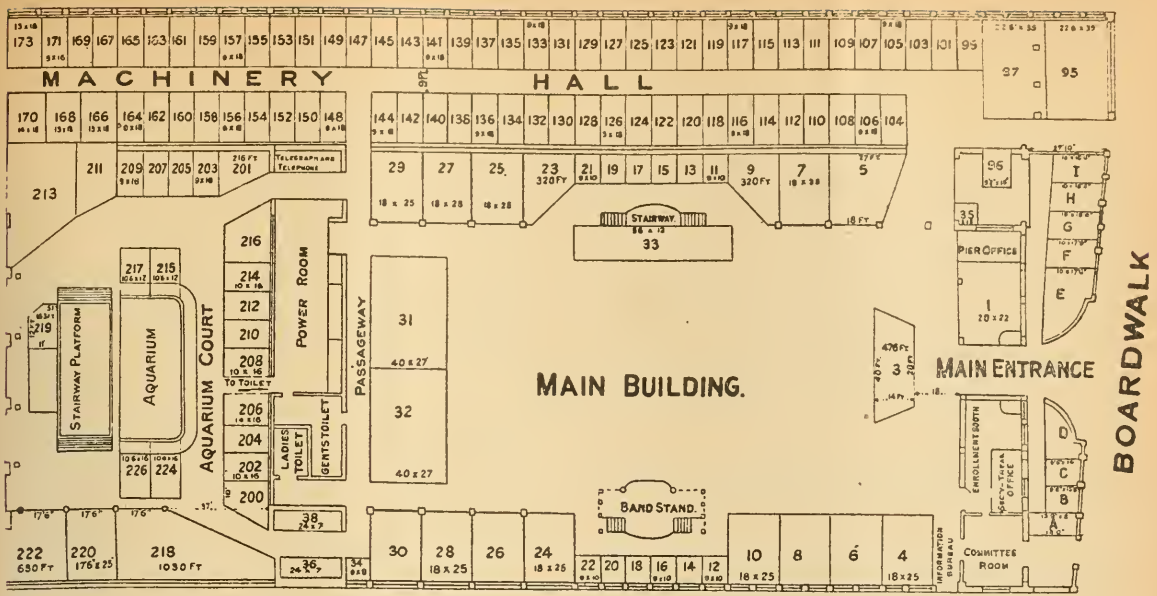
Ajax Metal Company, The, Philadelphia, Pa.—Car journal bearings; locomotive brasses; Ajax process ingots, brass and bronze; Ajax ball bearing alloy. Represented by W. J. Coane, A. MacDougall, S. E. McClure, J. C. Brightbill and G. S. K. Wheeler. Space 749.

Allegheny Steel Company, Brackenridge, Pa.—Asco pressed steel journal box lids; truck spring plates; steel ties, and other pressed steel railway specialties. Represented by L. W. Hostettler. Space 755.

American Abrasive Metals Company, New York, N. Y.—Feralun



Arrangement of Exhibit Spaces at the Convention Hall End of the Pier.



Arrangement of the Exhibit Spaces at the Boardwalk End of the Pier

anti-slip safety treads; door thresholds; anti-slip ladder feet; brake shoes; rabble blades; structural car steps; vuicalun and bronzalun safety treads. Represented by Ellsworth Burger and Ralph C. Davison. Space 626.

American Arch Company, Inc., New York, N. Y.—Locomotive arch brick. Represented by J. S. Coffin, Samuel G. Allen, LeGrand Parish, J. P. Neff, W. L. Allison, R. J. Himmelright, J. T. Anthony, H. B. Slaybaugh, G. A. Price, G. M. Bean, W. W. Neale, T. F. Kilcoyne, E. T. Mulcahy, T. M. Ferguson, M. R. Smith, H. Darby, J. D. Brandon, E. H. Cook, A. W. Clokey, Thos. Mahar and George Wagstaff. Spaces 414-416-422-424.

American Automatic Connector Company, The, Cleveland, Ohio.—American automatic connector for coupling air and steam hose between railroad cars. Represented by M. A. Barber, F. R. Bolles, Frank F. Walker, Frank T. Hyndman and N. M. Barker. Spaces 362-363-364-365.

American Brake Company, St. Louis, Mo.—Reception booth. Represented by R. E. Adreon. Spaces 29-29.

American Brake Shoe & Foundry Company, New York, N. Y.—Standard patterns railway brake shoes; steel back driver shoes; steel back engine truck shoes; steel back pas-

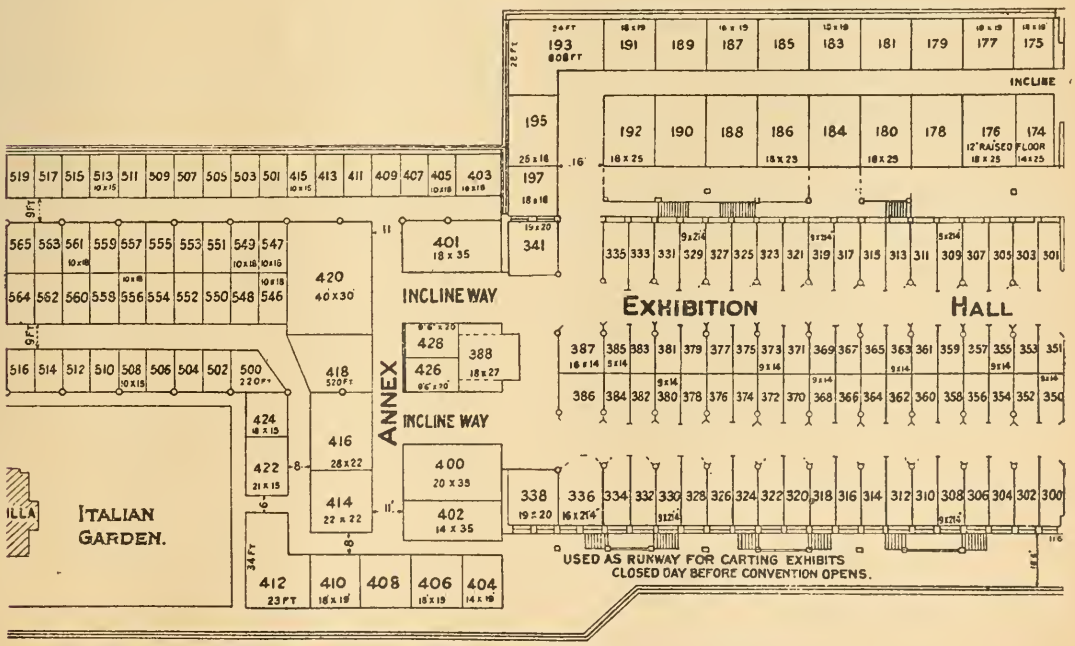


Exhibit Spaces in Part of the Annex, Exhibition Hall and Machinery Hall Extension

senger and tender shoes; steel back freight car shoes; malleable iron locomotive driver brake head and keys. Represented by F. W. Sargent, W. S. McGowan, Thos. Finigan, L. R. Dewey, C. P. Wright, W. B. Given, Jr., F. L. Janes, A. H. Elliot, F. H. Coolidge, R. E. Holt, M. N. Trainer, T. S. L. Seaman, E. B. Smith and F. P. Biggs. Space 418.

American Car & Foundry Company, New York, N. Y.—Two Berwick electric rivet heaters; two tank cars on the exhibition track. Represented by W. H. Woodin, Wm. M. Hager, G. W. Cornell, Horace Hager, Scott H. Blewett, C. S. Gawthrop, M. Buick, N. A. Doyle, W. F. Kingston, C. D. Eaton, J. H. Weishrod, R. H. Davenport, M. C. Shands, S. W. Tuttle, W. V. Williams, H. C. Wick, C. A. Smith, L. T. Carroll, S. S. DeLano, S. A. Mallette, E. G. Wolff, H. C. Lunger, J. J. McBride, E. D. Campbell, Norman Litchfield, W. E. Hedgcock, M. J. Crispin, G. R. Scanland, E. S. Block, L. E. Hess, W. J. Harris, M. H. Connelly, O. H. Mellum, J. L. Onderdonk, A. Speirs, C. D. Terrell, F. H. B. Fowler, W. C. Dickerman, F. A. Stevenson, B. Wilson, D. M. Knox, J. M. Keller, T. A. Dooley, W. H. Sanford, John Ensign, L. M. Roe, Frank Faust, D. J. Whalen, F. H. Gibbs, A. E. Ostrander, F. C. Cheston, J. W. Sheffer, James S. Helt, A. G. Wood and W. M. Earle. Spaces 3 and 175

American Chain Company, Inc., Bridgeport, Conn.—Various chains for use in railroad service. Represented by W. M. Taussig, A. P. Van Schaick and G. C. Isbester. Space 307.

American Flexible Bolt Company, Pittsburgh, Pa.—Type "A" American staybolts for locomotive boilers; type "LW" American reduced body staybolts—water space stays; type "LR" radial staybolts; type "LC" taper thread crown radials. Miscellaneous reduced body staybolts, hollow and with telltale holes drilled, for marine boilers, oil still boilers. Represented by C. A. Seley, H. T. Frauenheim. Also representatives of Benson & Co., sales agents for American Flexible Bolt Co.; R. W. Benson, L. W. Widmeier, J. A. Trainor, H. G. Doran, M. M. McCallister and W. F. Heacock. Space 543.

American Locomotive Company, New York, N. Y.—Alco reverse gear; flexible staybolts; intercepting valves. Represented by A. Fletcher, L. Best, J. Davis, D. W. Fraser, C. K. Lassiter, J. B. Ennis, W. P. Steele, C. M. Muchnic, G. R. Margarvey, W. F. Weller, G. Weller, F. J. Cole, C. J. Mellin, J. Partington, G. P. Robinson, G. G. Jones, Geo. Gurry, O. P. Parsons, Ross Anderson, H. Long, H. J. Downes, A. W. Bruce, C. H. Apps, C. Markel, S. Miller, J. Kindevater, L. S. Carroll, W. K. Farrell, J. R. Foulder, G. R. Ashworth, H. Baxter and C. W. Todd. Space 623.

American Malleable Castings Association, Cleveland, Ohio.—Display of various kinds of malleable iron castings showing uses and quality of material, specifications. Represented by Frank J. Lanahan. Spaces 153-155-157.

American Mason Safety Tread Company, Boston, Mass.—Mason safety treads; Stanwood car steps; Karbolith car flooring. Represented by Edw. F. Kuemmerle. Space 542.

American Metal Product Company, Brooklyn, N. Y.—Electrical specialties for locomotive equipment. Represented by N. A. Levitan. Space 800.

American Rolling Mill Company, The, Middletown, Ohio.—Examples of durable old iron; American ingot iron sheets for locomotive and car construction; polished sheets for locomotive jackets; alloy coated sheets for coach and cab roofs; galvanized sheets for freight car roofs and general building purposes; special finished sheets for painted locomotive jackets; section taken from American ingot iron and steel ingots showing the gas content of each as indicated by blow holes; railroad sign made of American ingot iron; illuminated transparencies showing steel plant and rolling mill views and interesting installations of American ingot iron. Represented by T. W. Jenkins, J. S. Roney, W. S. Stephenson and C. M. Spear. Spaces 588-589.

American Steam Gauge & Valve Manufacturing Company, Boston, Mass.—Locomotive gauges and valves; hydraulagraph; trainagraph, and standard type dead weight gauge tester. Represented by C. A. Allen, H. B. Nickerson and P. H. Ryan. Space 358.

American Steel Foundries, Chicago, Ill.—Economy cast steel draft arm; Davis steel wheel; Ajax and Hercules brake beams; Simplex coupler; cast steel bolster; Simplex clasp brake; Simplex coupler pocket; Vulcan truck. Represented by R. P. Lamont, G. E. Scott, J. W. Dalman, D. T. Harris, G. F. Slaughter, J. V. Bell, W. J. Lynch, G. H. Hopkirk, Theo. Cook and P. A. Martin. Space 193.

American Tool Works Company, The, Cincinnati, Ohio.—Lathes; radials; drills; shapers. Represented by J. C. Hussey, H. W. Schatz and L. W. S. Alter. Spaces 105-113.

Anchor Packing Company, The, Philadelphia, Pa.—Air pump and throttle packing; mechanical rubber goods. Represented by W. R. Haggart, J. P. Landreth, D. J. P. Murray and Wallace Robb. Spaces 367-369.

Ashton Valve Company, The, Boston, Mass.—Safety valves and gages for locomotive and stationary boilers; single, duplex, triplex and quadruplex air gages; dead weight gage testers and standard test gages; three speed air brake and wheel press recording gages; portable boiler test pumps. Represented by A. C. Ashton, H. O. Fettinger, J. F. Gettrust and J. W. Motherwell. Space 518.

Association of Manufacturers of Chilled car Wheels, Chicago, Ill.—One 33 in. No. 625 M. C. B. car wheel for 30-ton cars; one 33 in. No. 700 M. C. B. car wheel for 40-ton cars; one 33 in. No. 725 M. C. B. car wheel for 50-ton cars; one 33 in. No. 850 M. C. B. car wheel for 70-ton cars. Also a moving picture showing the various processes of manufacturing the chilled iron car wheel, including the moulding, pouring, pitting and drop testing of the wheel. In addition thereto are a series of pictures showing the measurement of temperature stresses to which the wheels are subjected, indicated by test gages. These pictures were secured through the courtesy of the officials of the Pennsylvania Railrod. Represented by Geo. W. Lyndon, F. K. Vial and A. D. Whipple. Space 402.

Aterite Company, Inc., New York, N. Y.—Aterite, a high temperature, high pressure, acid and alkali resisting alloy, in castings, rolled rods and sheets, tubes, wire and stampings. Represented by Ernest G. Jarvis. Spaces 719-721.

Atlantic Hand Brake Corporation, Buffalo, N. Y.—Worm gear hand brakes; combination hand and electric power brake. Represented by J. H. Weidenmiller and Chas. E. B. Smith. Space 752.

Baird Pneumatic Tool Company, Kansas City, Mo.—Yoke type riveter; staybolt cutter; pinch bug riveter; pipe bender; furnace and working model of flue rattler. Represented by F. M. Wright, Charles F. Lukins, Archie M. Baird and C. E. Dillon. Spaces 371-373.

Baker R. & L. Company, The, Cleveland, Ohio.—Industrial trucks and tractors. Represented by Nathaniel Platt, M. A. Watterson, Wm. P. Kennedy and H. C. Sherer. Spaces H and I.

Baldwin Locomotive Works, The, Philadelphia, Pa.—Reception booth. Represented by G. Greenough, A. H. Ehle, L. W. Metzger, C. Riddell, R. Sanderson, G. F. Jones, A. S. Goble, P. G. Cheatham, E. C. Peirce, K. Andrew, H. F. Binder, R. M. Campbell, C. W. Frech, E. B. Halsey, S. McNaughton, Jr., B. N. Reiley, R. J. Simmington and F. Woollven. Spaces 723-725.

Barco Manufacturing Company, Chicago, Ill.—Flexible joints and connections; automatic smoke box blower fittings; crossheads and shoes; power reverse gears. Represented by F. N. Bard, C. L. Mellor, A. S. Lewis, F. H. Stiles and F. S. Wilcoxen. Space 639.

Barrett Company, The, New York, N. Y.—Carbosota, coaltar, pitch and felt products; roofing; waterproofing; wood preservatives; metal protective paints. Represented by William S. Babcock and C. T. Bilyea. Spaces 700-702.

Bastian-Blessing Company, The, Chicago, Ill.—Oxy-acetylene welding and cutting apparatus. Represented by F. R. Goehler and F. E. Seiler, Jr. Space 715.

Beaudry and Company, Inc., Boston, Mass.—Quarter size working model, complete in detail, of Beaudry champion power hammer motor driven. Represented by Otto Abrahamsen and A. Parsons. Space 209.

Besly & Company, Charles H., Chicago, Ill.—Besly patternmaker's grinder; Besly taps. Represented by Edward P. Welles, C. A. Knill and John Curns. Spaces 152-154.

Bettendorf Company, The, Bettendorf, Iowa.—Section of Bettendorf steel underframe; comparison of U. S. R. A. and Bettendorf trucks; one complete Bettendorf standard truck; one Bettendorf swing motion truck for caboose and stock cars. Represented by J. W. Bettendorf, J. H. Bendixen, C. J. W. Clasen and K. M. Hamilton. Space 218.

Betts Machine Company, Rochester, N. Y.—Photographs of journal truing lathes, boring mills, slotters, horizontal boring and drilling machines, 26-inch swing and larger engine lathes. Represented by Alfred Trosch, A. H. Ingle, A. W. Van Buren, F. H. Severin and H. M. Bowman. Space 114.

Bird-Archer Company, The, New York, N. Y.—Polarized boiler chemicals; anti-foaming and anti-leak chemicals; Harter Circulator plate; "Baco" core oils, core compounds, brass cleaner, furnace cement, blow-off valves and high-speed cast steel tools. Represented by P. B. Bird, C. A. Bird, L. F. Wilson, J. A. McFarland, W. E. Ridenour, T. A. Peacock, D. T. Main, W. W. Burden, H. E. Wheeler, John Barnes and C. M. Goldman. Space 31.

Black & Decker Manufacturing Company, The, Baltimore, Md. —Portable electric drills, electric valve grinders and electric air compressors. Represented by G. R. Lundane, G. A. Dodge, M. E. Lilley and W. C. Allen. Space 206.

Blackall, Robert H. Pittsburg, Pa.—Blackall ratchet brake lever; improved Lindstrom brake lever; Blackall-Calvin roller side bearing. Represented by Robert H. Blackall and E. Emery. Space 627.

Boss Nut Company, Chicago, Ill.—Boss lock nut; bolts and rivets. Represented by J. A. MacLean, Fred W. Moore, J. W. Coleman, J. W. Fogg and A. MacLean. Spaces 370-371.

Bowser & Company, Inc., S. F., Fort Wayne, Ind.—Tanks and self-measuring pumps for the receipt, storage, distribution and checking of oils and similar liquids; paint handling and mixing equipment. Represented by E. M. Savercool, W. T. Simpson, J. R. Sibley and P. E. Krider. Space 28.

Bradford Draft Gear Company, New York, N. Y.—Bradford high capacity rocker type draft gear; triple spring draft gear; structural draft arm; structural draft arm and draft gear combination. Represented by Horace Parker, Harry F. Lowman, Floyd K. Mays, Chas. F. McCuen, W. A. McWhorter, Edward H. Smith and H. C. Priebe. Spaces 554-555.

Brosius, Edgar E., Pittsburgh, Pa.—Models of Brosius automatic single hoist grab buckets; single hook grab buckets and charging machines. Represented by D. W. Allan. Space 711.

Brown & Company, Inc., Pittsburgh, Pa.—Staybolt and engine bolt iron samples. Represented by J. Wallace Mitchell, W. J. Caton, L. E. Hassman and R. D. Ballantyne. Space 724.

Buckeye Steel Castings Company, The, Columbus, Ohio.—One Buckeye cast steel type truck bolster for 5½ x 10 axle; two cast steel truck side frames for 5½ x 10 axle; two cast steel yokes for friction gear; one cast steel yoke for tandem gear; one A. R. A. type "D" coupler; Major coupler models. Represented by S. P. Bush, J. C. Whitridge, J. G. Bower, F. H. Bonnet, E. W. Campion, G. T. Johnson, A. H. Thomas, F. J. Cooledge, G. H. Sutherland, H. H. Craiglow, W. C. Speck, H. W. Stertzbach and J. C. Larsen. Spaces 603-605.

Buda-Ross Company, Chicago, Ill.—Sectional models of 1000 and G. W. electric headlight turbo generators. Represented by Mark A. Ross and Harry P. Bayley. Space 550.

Buffalo Brake Beam Company, New York, N. Y.—Brake beams and brake beam parts. Represented by S. A. Crone, A. E. Crone, E. C. Farlow, E. Strassburger, A. Gordon Jones, C. R. Busch and E. F. Gladwell. Space 552.

Bullard Machine Tool Company, Bridgeport, Conn.—Bullard verticle turret lathe; Maxi-mill; Bullard mult-au-matic. Represented by S. H. Bullard, John W. Bray, John Beirne, F. C. Smith and J. H. Shanley. Space 97.

Burden Iron Company, The, Troy, N. Y.—Staybolt iron; engine bolt iron, and iron boiler rivets. Represented by John C. Kuhns. Space 22.

Byers Company, A. M., Pittsburgh, Pa. — Genuine wrought iron pipe; nipples and couplings; wrought iron signal pipe. Represented by J. A Hall, Jr., and S. K. Turner. Spaces 580-581.

Cambria Steel Company, Philadelphia, Pa.—See Midvale Steel & Ordnance Company. Space 657.

Camel Company, Chicago, Ill.—Camel freight car door fixtures; freight car doors; all steel freight car doors; freight car door locks; repair parts for freight car doors; burglar proof devices for freight car doors. Represented by H. E. Creer, W. W. Darrow, P. M. Elliott, H. H. Henricks, Arthur Allan, B. D. Jones and A. B. Wegener. Spaces 534-536.

Carbic Manufacturing Company, Duluth, Minn.—Carbic portable lights; oxy-acetylene welding and cutting outfits; welding torches; cutting torches; carbic cakes; carbic portable acetylene generators. Represented by William H. Norden, M. B. Crouse and D. C. Duncan. Space 325.

Carbo-Hydrogen Company of America, Pittsburgh, Pa.—Metal cutting apparatus and materials. Space 808.

Carborundum Company, The, Niagara Falls, N. Y.—Carborundum and Aloxite wheels; carborundum fire brick and other refractories. Represented by R. M. Onan, R. S. Marvin, C. R. Cox, J. W. Fraser, H. P. Frost and W. L. Meek. Spaces 548-549.

Carnegie Steel Company, Pittsburgh, Pa.—Wrought steel wheels for freight car, passenger train car and engine truck service; industrial wheels; crane track wheels; locomotive piston blanks; gear blanks. Represented by W. G. Clyde, John E. Woods, C. L. Wood, C. C. Cluff, R. B. Woodworth, R. W. Steigerwolt, J. C. Shields, G. R. Schreiner, N. B. Trist, L. C. Bihler and Chas. Orchard. Space 420.

Cashman Tool Company, Waynesboro, Pa.—Cashman adjustable shell reamers. Represented by H. I. Cashman. Space 720.

Chambers Valve Company, New York, N. Y.—Chambers throttle valve. Represented by Frank H. Clark. Space 192.

Champion Rivet Company, Cleveland, Ohio.—Rivets. Represented by D. J. Champion, Jos. R. Wetherald, W. H. S. Bateman and Geo. W. Denyven. Space 388.

Chase & Company, L. C., Boston, Mass.—Goat brand of railroad flushes; Chase Leatherwove—artificial leather. Represented by H. T. Wright and Percy W. Fowler. Space 10.

Chesapeake Iron Works, Baltimore, Md.—A standard Chesapeake electric traveling crane, 10 ton capacity; steel structure; machine work. Represented by F. S. Chavannes, C. H. Michel, J. W. Waters, C. S. Hill, Jr., F. L. Perry, C. M. O'Brien, Fred Brown, Jos. Hoff and Miss Shaw. Spaces 160-162-164.

Chicago-Cleveland Car Roofing Company, Chicago, Ill.—Car roofs; car lines; reinforced ends; all steel ends; pressed steel bolster; uncoupling levers. Represented by R. C. Dudley, T. N. Russell, J. E. Tesseyman, J. L. Stark, T. H. Williams, R. C. Munro and J. W. Bernbaum. Space 506.

Chicago Pneumatic Tool Company, New York City, N. Y.—Boyer riveting and chipping hammers; rivet busters; stay-bolt riveters; pneumatic air drills, all sizes; air grinders; portable electric drills and grinders, all sizes, and accessories. Represented by H. A. Jackson, W. P. Pressinger, W. H. Callan, H. D. Megary, H. L. Dean, T. J. Hudson, C. B. Coates, H. G. Barbee, C. W. Cross, J. M. Stayman, T. G. Smallwood, A. M. Brown, Edw. Aplin, A. C. Andresen, Nelson D. Gatch, J. L. Crowley, E. K. Lynch. Space 621.

Chicago Railway Equipment Company, Chicago, Ill.—Moving picture film showing brake beams, their manufacture and use; brake beams; brake beam supports; side bearings. Represented by E. B. Leigh, C. Haines Williams, F. T. De Long, G. N. Van Sweringen, E. E. Griest, R. J. Sheridan, E. G. Busse and E. A. Lebeau. Space 640.

Chrobaltic Tool Company, Chicago, Ill.—High speed milling cutters; tire forming tools. Represented by W. B. Sullivan, L. H. Whiteside, C. R. Canfield and C. M. Conner. Spaces 726-728.

Cisco Machine Tool Company, Cincinnati, Ohio.—One geared head engine lathe. Represented by Charles Morton. Spaces 121-124.

Clark Car Company, Pittsburgh, Pa.—One 30-yard extension side dump car on exhibit track; reception booth on pier. Represented by H. E. Chilcoat and R. L. Mason. Space 722.

Cleveland Pneumatic Tool Company, The, Cleveland, Ohio.—Cleveland pocket-in-head riveting hammers in several sizes; 27 types and styles of air drills, comprising corner drills, compound drills, rotary drills, center spindle machines, stay bolt machines for plain and flexible bolts; chipping hammers, sand rammers, valve grinders, emery grinders in several sizes; Bowes air hose couplings; Cleveland neverslip hose clamps; Cleo pressure seated air valves and Cleco air hose fittings riveter holder-ons; stay bolt hammers; mudring riveters; flue beading hammers. Film showing how pneumatic tools are made will be run in exhibit space on pier. Theater 10 ft. x 36 ft. built on our exhibit space. Represented by H. S. Covey, Arthur Scott, Chas. Garner, Guy Gregory, F. E. Schwarze, R. E. Manning, H. C. Newton, F. H. Burr, L. W. Greve and Geo. H. Hall. Spaces 327, 329, 331, 333.

Cleveland Punch & Shear Works Company, The, Cleveland, Ohio.—Punching machine and six interchangeable attachments, also small tools. Represented by W. C. Sayle, R. E. Graves, C. W. Hancock, R. E. Howells, P. J. Hopkins and W. J. Stewart. Spaces 159, 161.

Cleveland Twist Drill Company, The, Cleveland, Ohio.—Twist drills and reamers. Represented by E. C. Peck, W. E. Caldwell, H. P. Jenson, R. D. Boltey, Francis Kelly, H. G. Smith and R. G. Berrington. Space 97.

Clipper Belt Lacer Company, Grand Rapids, Mich.—Demonstrating method of belt lacing with clipper machine and hooks. Represented by C. P. Field. Space 314.

Commonwealth Steel Company, St. Louis, Mo.—For locomotives; models cast steel tender frames; tender trucks; trailer trucks; cradles; pilots and pilot beams; for passenger-train cars: combination double body bolster and platforms; cast steel one-piece upright end frames; cast steel trucks. Represented by H. M. Pflager, Geo. E. Howard, Boone V. H. Johnson, Charles S. Shallenberger, C. F. Frede, Wm. M. Sheehan, Geo. H. Gibson and H. R. Bartell. Spaces 386-387.

Consolidated Car-Heating Company, Albany, N. Y.—Locomotive steam heat equipment; steam hose couplers; steam traps; end train pipe valves; inlet valves. Represented by W. S. Hammond, Geo. B. Culver and H. L. Hawley. Space 530.

Consolidated Expanded Metal Companies, The, Philadelphia, Pa.—Expanded metal reinforcement for concrete; expanded metal mesh for machine guards, shop partitions, elevator enclosures and window guards; steelcrete expanded metal lath. Represented by T. R. Herbest, Jr., E. A. Kirkpatrick, A. V. Spinosa and H. B. Chess. Space 713.

Crane Company, Chicago, Ill.—Locomotive brass valves, railroad unions and railroad union fittings; locomotive blow-off valves; locomotive pop valves, brass railing fittings. Represented by John B. Jordan and Fred W. Venton. Spaces 502-504.

Crosby Steam Gage & Valve Company, Boston, Mass.—Pressure gages, pop safety valves, blow-off cocks and whistles. Represented by J. J. McCormick and E. L. Taylor. Space 632.

Curtain Supply Company, The, Chicago, Ill.—Car curtains; car curtain fixtures; metal shade rollers; vestibule passageway equipment; canvas vestibule diaphragms; steel vestibule diaphragms; brass window sash; brass window screen; vestibule upper buffer springs. Represented by Holmes Forsyth, T. W. Holt, R. F. Hayes, R. L. Brown and T. P. O'Brian. Space 638.

Cutler-Hammer Manufacturing Company, The, Milwaukee, Wis.—A. C. and D. C. machine tool controller equipment. Represented by T. D. Montgomery, H. W. Stevens and R. H. MacGillivray. Space 743.

Dale-Brewster Machinery Company, Inc., New York, N. Y.—Rivett lathes Milwaukee shapers. Represented by J. J. Dale and Robert Lassiter. Space 112.

Damascus Brake Beam Company, Cleveland, Ohio.—Anglrod, channelrod, Waycott freight and Waycott special brake beams; Brascott ladders; anti-creeping stake pockets; collapsible stake pockets; one piece forged struts for brake beams. Represented by C. D. Jenks and Edward A. Mayhew. Space 619.

Davis Boring Tool Company, St. Louis, Mo.—Full line of Davis expansion car wheel and shop boring tools; Davis micrometer adjustable reamers. Represented by William Morgan and C. C. Koeln. Space 304.

Davis-Bournonville Company, Jersey City, N. J.—General line of oxy-acetylene cutting and welding apparatus. Represented by W. W. Barnes and H. R. Swartley, Jr. Spaces 804-805.

Davis Brake Beam Company.—See Liberty Steel Products Company. Space 539.

Davis Machine Tool Company, Inc., Rochester, N. Y.—One 14-in. close coupled tool room lathe; 16-in. close coupled tool room lathe—(new); 16-in. cone type shaper with swivel table—(new); No. 1 keyseating machine, 24-in. boring, forming and chucking lathe; 24-in. shaper and power down feed. Represented by J. M. Fitzgerald and C. H. Spaulding. Spaces 99-101-103.

Dayton Pneumatic Tool Company, The, Dayton, Ohio.—Complete new line of pneumatic riveting, chipping hammers and sand hammers. Represented by A. B. Hilton, L. B. George, A. B. Clausen, G. C. Towle and L. B. Smyser. Space 704.

Dearborn Chemical Company, Chicago, Ill.—Dearborn water treating preparations for prevention of scale formation, corrosion and foaming in locomotive boilers; No-ox-id rust preventive. Represented by George R. Carr, Grant W. Spear, J. D. Purcell, W. H. Kinney, and D. H. Amsbary. Spaces 6-8.

Detroit Lubricator Company, Detroit, Mich.—Several models of Detroit locomotive lubricators and working model of "Detroit" automatic flange oiler. Represented by H. I. Lord, W. H. Perrine, A. G. Machesney and A. D. Homard. Space 207.

Paul Dickinson, Incorporated, Chicago, Ill.—Engine house smoke jacks, photos and models; building ventilators; camp car and caboose stove jacks; chimneys for small buildings. Represented by A. J. Filkins and D. B. Wright. Space 203.

Disston, & Sons, Henry, Inc., Philadelphia, Pa.—Milling saws—solid and inserted tooth; metal band saws; hack saw frames; hack saw blades—hand and machine; files of all kinds; metal slitting saws. Represented by J. H. Dorrington, W. G. Paul, Edward McKenna and Wm. R. Kendall. Space 186.

Dixon Crucible Company, Joseph, Jersey City, N. J.—Flake lubricating graphite; hub liner grease; brake cylinder lubricant; centerplate grease; engine front finishes; boiler graphite; belt dressings; graphite compound; silica-graphite paint; crucibles; crayons. Represented by L. H. Snyder, Wm. Ernst, W. A. Houston, H. A. Nealley and J. J. Tucker. Space 24.

Dixon Valve & Coupling Company, Philadelphia, Pa.—Air brake hose nipples; car heat hose nipples; couplings for water, steam and air hose; "Boss" high pressure hose coupling; King malleable iron hose bands. Represented by H. W. Goodall, A. W. Swartz and N. S. B. Greene. Space D.

Draper Manufacturing Company, Port Huron, Mich.—Samples of flew welder hollow balanced brass balls; valve facing tools; ball check valves. Represented by J. F. Draper and D. C. Carey. Space 532.

Dressel Railway Lamp Works, The, New York, N. Y.—Reception booth. Represented by F. W. Dressel, F. W. L. Dressel, H. S. Hoskinson and B. P. Claiborne. Space 628.

Duff Manufacturing Company, The, Pittsburgh, Pa.—Inverted high speed ball bearing screw jacks; track jacks with square socket levers; new style journal box jacks; car and locomotive jacks. Represented by G. E. Anderson, E. A. Johnson, T. A. McGinley, C. A. Methfessel, C. N. Thulin and G. E. Watts. Space 401.

Dunbar Manufacturing Company, Chicago, Ill.—Step boxes; Kass safety tread material; diaphrams; vestibule curtains and fixtures; steel flooring; steel doors; anti-pinch shields; tail gate. Represented by H. U. Morton, C. D. Morton, Wm. Wampler, H. B. Chamberlain, G. H. Ord and A. Koenig. Space 609.

Dunn Company, W. C., Cincinnati, Ohio—Pearce journal truing machine. Represented by William Callahan and W. C. Dunn. Space 187.

Duntley Pnuematic Tool Company, Chicago, Ill.—Duntley riveting, scaling and chipping and calking hammers; rivet cutters; electric drills; air drills; rivet sets; all accessories for pneumatic tools. The new Duntley sleeve valve for riveting hammers. Represented by W. O. Duntley, W. M. Hankey, C. A. Duntley, E. A. Warnock, Geo. A. Barden and Robt. K. Crawford. Space 712.

Edgewater Steel Company, Pittsburgh, Pa.—Locomotive tires; rolled steel wheels. Represented by W. V. D. Wright, L. O. Cameron, G. D. Jackson and J. H. Baily. Space 328.

Edison Storage Battery Company, Orange, N. J.—Edison storage batteries for car lighting, signaling, multiple unit control and industrial trucks. Represented by Chas. E. Sholes, John Kelly, D. C. Wilson, A. M. Andersen and A. S. Knox. Space 636.

Edna Brass Manufacturing Company, The, Cincinnati, Ohio.—Locomotive injectors; locomotive lubricators; locomotive boiler check valves; Edna reflex water gauge; duplex water gauge; locomotive coal sprinkler; locomotive fire extinguisher. Represented by D. B. Joseph, E. O. Corey, H. A. Glenn, M. J. Mullen, R. D. Oatman, C. B. Randall and W. W. Scott. Space 316.

Edwards Company, Inc., The O. M., Syracuse, N. Y.—Window fixtures; sash balances; metal extension platform trap doors. Represented by O. M. Edwards, Harold Edwards, J. J. Edwards, E. F. Chaffee, C. H. Rockwell and A. W. Acker. Spaces 527-529-531.

Edwin Harrington, Son & Company, Inc., Philadelphia, Pa.—Harrington multiple spindle drilling machines. Harrington peerless and screw chain hoists and trolleys for operation on overhead I-beam track. Represented by A. H. Harrington, Roger Sherron, W. J. Somerset, M. W. Christian, G. W. Schwager, G. N. Larer and Gustav Westlin. Spaces 28-30.

Electric Arc Cutting & Welding Company, Newark, N. J.—A. C. arc weld and rivet cutting. Represented by O. D. Corbett, C. J. Holslag, C. S. Libby, H. W. Livermore and E. S. Fay. Space 800.

Electric Auto Lite Corporation, Toledo, Ohio.—The Willys light with U. S. L. batteries. Represented by E. J. Blais. Space 315-317-319.

Electric Controller & Manufacturing Co., Cleveland, Ohio.—EC&M automatic compensator, providing push button control of A. C. shop motors EC&M type ZB push button operated starting switch; automatic starters and machine tool controllers for direct current; Youngstown safety limit stop for crane duty; crane protective switchboard. Represented by R. G. Widdows, J. C. Snyder and H. K. Hardcastle. Space 141.

Electric Railway Journal, New York, N. Y.—Electric Railway Journal; McGraw electrical directories; Electrical World; American Machinist, Power, Engineering and Mining Journal; Electrical Merchandising; Coal Age; Journal of Electricity; Chemical and Metallurgical Engineering; Engineering News-Record, Ingenieria Internacional. Represented by H. W. Blake, H. V. Bozell, C. W. Squier, A. C. Davison, J. E. Mason, C. A. Babtiste, W. K. Beard and David Cameron. Space 5.

Electric Service Supplies Company, Philadelphia, Pa.—"Golden Glow" locomotive headlights, sheet metal and cast iron types; keystone turbo generators; "golden glow" and "crystal" mirror glass reflectors; locomotive headlight switches; marker lights; classification lights; lamp guards; flood lights and searchlights. Represented by Chas. J. Mayer, A. H. Englund, J. W. Porter, H. G. Lewis, T. M. Childs, J. R. McFarlin, L. A. Darling and J. G. Dellert. Spaces 760-762.

Electric Storage Battery Company, The, Philadelphia, Pa.—Body hung, constant voltage, axle lighting equipment, complete with hand lever belt tension device; truck type generator; storage batteries; "Chloride Accumulator" giant jar assembly for car lighting; Exide and Ironclad Exide for signal and industrial truck service. Represented by J. Lester Woodbridge, T. L. Mount, F. G. Beetam, W. Van C. Brandt and H. E. Hunt. Space 624.

Elliott-Fisher Company, Harrisburg, Pa.—Accounting, bookkeeping, billing, recording machines. Represented by Charles A. Slingerland and Wm. R. Busch. Spaces 736-738.

Elvin Mechanical Stoker Company, New York, N. Y.—Elvin locomotive stoker. Represented by Frank H. Clark, John B. Given, A. G. Elvin, A. B. Fahnestock and H. D. Eckerson. Space 192.

Elwell-Parker Electric Company, The, New York, N. Y.—Electric storage battery industrial trucks. Represented by Lucian C. Brown, George W. Brown, F. B. Neely, F. B. Fink, C. C. Dietz, J. M. Brown, R. C. Howell, S. H. Ford and W. G. Lockwood. Space 341.

Emmert Manufacturing Company, Waynesboro, Pa.—Emmert universal vises; machinists' vises; drawing instruments and adjustable drawing boards; disc and spindle sanders. Represented by H. S. Kuhn, Edward Gordon and A. G. Blazier. Space G.

Enterprise Railway Equipment Company, Chicago, Ill.—Models illustrating gondola, general service, hopper, ballast, ore, grain and combination cars; also door operating mechanisms for same. Represented by Argyle Campbell, A. E. Zimmer and Wm. F. Batho. Spaces 582-583.

Everlasting Valve Company, New York, N. Y.—Everlasting valve. Represented by John H. Allen, Wylie G. Wilson and Edward N. Corning. Space 509.

Ewald Iron Company, Louisville, Ky.—Staybolt iron. Represented by Baylor Hickman, G. O. Boomer, S. F. Sullivan, E. V. Shackleford, John P. Boorke, R. F. Kilpatrick and George Eisele. Space 535.

Fairbanks Company, The, New York, N. Y.—Machine tools; Radbore heads for boring square holes; valves; Dart unions. Represented by Robert E. Post and John R. Meginnis. Spaces 324-326.

Fairbanks, Morse & Company, Chicago, Ill.—Oil engine, direct-connected to electrical generator in operation; motor-driven centrifugal pump, direct-connected in operation; locomotive water crane; motor cars. Represented by F. M. Condit, E. J. Coverdale, E. C. Golladay, G. Howard, J. L. Jones, E. Lang, E. E. Pendray, Stephen Smith, A. A. Taylor, H. E. Vogel and C. H. Wilson. Space 95.

Fire Gun Manufacturing Company, Inc., New York, N. Y.—Hand fire extinguishers of the carbon tetrachloride type, in three sizes; No. 0 1-quart capacity; No. 1 1¼-quart capacity; No. 2, 1½-quart capacity. Represented by H. E. Tunnell. Space 739.

Flannery Bolt Company, Pittsburgh, Pa.—F. B. C. welded flexible staybolts, flexible crown staybolts and boiler section under test; Tate flexible staybolts; crown adjustable staybolts and marine flexible staybolts. Tools for proper application of "F. B. C." and "Tate" products. Represented by J. Rogers Flannery, B. E. D. Stafford, F. K. Landgraf, E. S. Fitzsimmons, Wm. M. Wilson and George E. Howard. Spaces 590-591.

Flower Waste & Packing Company, Bayonne, N. J.—Journal box packing. Represented by F. J. Clair and P. J. Clair. Space 732.

Foamite Firefoam Company, New York, N. Y.—Approved Foamite Firefoam extinguishers of various sizes; chemical recharges for the extinguishers; Foamite fire pails. Represented by H. J. Marsh and A. R. Thayer. Space 47.

Ford Company, The J. B., Wyandotte, Mich.—Sample jars of cleaning materials and small model cleaning tanks showing agitation with air and steam. Represented by W. E. Ratz, G. E. Gordon, George Lawrence, B. N. Goodell, C. S. Tompkins and W. P. Scott. Space 519.

Fort Pitt Spring & Manufacturing Company, Pittsburgh, Pa.—Coil and elliptic springs. Represented by William McBride, Fred A. Meckert, R. L. Leitch, Atwood Paxson, Maurice Joy and L. O. Cameron. Space 710.

Foster Company, The Walter H., New York, N. Y.—Improved turning and threading machine equipped for radial, crown and side stays; turning and threading from forged blanks; N. E. W. semi-automatic spacing and punching machine, power feed; belt or motor drive. Represented by Walter H. Foster, J. A. Eden, Jr., H. L. Kenah and N. E. Woods. Spaces 135-137.

Franklin Railway Supply Company, Inc., New York, N. Y.—Ragonnet type B reverse gear; automatic adjustable driving box wedge; driving box lubricator; No. 8 fire door, Franklin steam grate shaker; McLaughlin flexible conduit; Franklin ball joint; two-wheel engine truck; radial buffer; unit safety bar; No. 9 fire door; universal valve chest; Booster engine on exhibition track. Represented by J. S. Coffin, S. G. Allen, H. F. Ball, W. F. Coyle, J. L. Randolph, C. W. Floyd Coffin, Harry M. Evans, Bertram S. Allen, S. D. Rosenfelt, W. T. Lane, Montague H. Roberts, F. W. Martin, Frank R. Peters, Paul Weiler, John L. Bacon and Thomas L. Reed. Spaces 414-416.

Frontier Chuck & Tool Company, Buffalo, N. Y.—Lavoie air chucks. Represented by George T. Aitken. Space 115.

Frost Railway Supply Company, The, Detroit, Mich.—Harvey friction spring gears in different sizes; Detroit metal weather strip. Represented by Harry W. Frost, George A. Cooper and George L. Harvey. Space 560.

Fuller Engineering Company, Allentown, Pa.—Fuller pulverized coal locomotive stoker; coal pulverizing and handling equipment. Represented by W. D. Wood and A. G. Kinyon. Space 11.

Fuller Lehigh Company, Fullerton, Pa.—See Fuller Engineering Company. Space 11.

Futrell Coupler Company, Streator, Ill.—Steam and air coupler for railway cars. Represented by T. J. Futrell and W. H. Havlin. Space 228.

Galena-Signal Oil Company, Franklin, Pa.—Reception booth, Represented by L. F. Jordan, J. E. Linahen, W. A. Trubee, W. J. Walsh, W. P. Wescott, W. O. Taylor, P. J. Stack, E. G. Johnson, J. E. Bunn, G. E. McVicar, W. F. Walsh, G. L. Morton and D. A. Eupank. Space 32.

Garlock Packing Company, The, Palmyra, N. Y.—Air pump and throttle, slip and ball joint, and power reverse gear packing; compressor and accumulator, steam hammer and power plant packing; gaskets and pump valves; flexible metal packing. Represented by H. J. Ramshaw, C. W. Sullivan, E. O. Roby, W. G. Cook, Phil Arnold, B. J. Kniest, I. McAllister, J. E. Hillerman, A. C. Hirschman, H. A. Clark and L. P. Duggan. Space 516.

Garratt, L. W., Pittsburgh, Pa.—Neville air pump lubricator; Virginia dust guard. Represented by L. W. Garratt. Space 143.

Geist Manufacturing Company, Atlantic City, N. J.—Wiederwax preheater for preheating preparatory to acetylene welding. Represented by Carlton Geist, G. M. Calmback and L. N. Yetter. Space A.

General Electric Company, Schenectady, N. Y.—Automatic arc welding; hand arc welding; locomotive headlight sets; industrial control equipments; miscellaneous motors. Represented by J. G. Barry, W. J. Clark, C. C. Pierce, F. S. Hartman, John Roberts, R. E. Woolley, J. M. Hollister, L. S. Thurston, W. L. Merrill, John Eaton, C. K. West, C. Dorticos, W. T. Richmond and L. W. Shugg. Spaces 165-173.

Germain Company, The, Pittsburgh, Pa.—Model cross section of a wooden freight car, showing construction and grades of lumber customarily used; cross sections of yellow pine cross ties and piling, treated and untreated; yellow pine decking, car siding, lining and roofing, in all grades. Complete assortment of railroad timber from all parts of the U. S. Represented by C. W. Cantrell, J. H. Austin, Jr., and Ralph Lane. Space 37.

Gibb Instrument Company, Detroit, Michigan.—Zeus A. C. arc welding apparatus. Represented by E. S. Hurd, Chas. Opperman, R. D. Thomas and J. M. Hayes. Space 35.

Gillespie & Company, A. W., Chicago, Ill.—One Economy locomotive fire door; one Henrikson journal bearing boring machine. Represented by A. W. Gillespie and J. S. Seeley. Space 300.

Globe Seamless Steel Tubes Company, Chicago, Ill.—Cold drawn seamless steel locomotive boiler tubes and mechanical tubing. Represented by A. C. Moore, F. J. O'Brien and J. J. Norton. Spaces 526-528.

Goddard & Goddard Company, Detroit, Mich.—New and improved types of milling cutters. Represented by A. N. Goddard and J. W. Sederquist. Space 754.

Gold Car Heating & Lighting Company, New York, N. Y.—Vapor, combination pressure and vapor, pressure, hot water and electric car heating systems; thermostatic control for all types of car heating systems and buildings; ventilators for railway cars; pressure regulators. Represented by Edward E. Gold, E. B. Wilson, A. B. Strange, F. R. Cooper, E. J. Ronan, W. H. Ivers, J. O. Brumbaugh, A. Sheldon, A. D. Stuver, F. H. Smith and G. E. A. Letourneau. Spaces 350-351-352-353.

Goodall Rubber Company, Inc., Philadelphia, Pa.—Goodall semi-metallic air brake hose; car heat, signal, switch, boiler washout and tender hose; mechanical rubber goods. Represented by H. W. Goodall, A. W. Swartz and N. S. B. Greene. Space D.

Gould Coupler Company, New York, N. Y.—Automatic slack adjusters; M. C. B. journal boxes; friction draft gears; couplers; electric car lighting; locomotive headlight equipment; storage batteries. Represented by Charles A. Gould, W. F. Richards, J. W. Reifsnyder, G. B. Young, C. E. Rood, W. H. Sauvage, P. H. Simpson, Charles A. Gould, 2d, G. R. Berger, W. F. Bouche and W. R. Shedd. Space 213.

Gould & Eberhardt, Newark, N. J.—One 28" Invincible type shaper arranged with constant speed Westinghouse motor drive and selective type gear box. Represented by H. Ezra Eberhardt and Charles L. Cameron. Space 181.

Grand Rapids Grinding Machine Company, Grand Rapids, Mich.—Grand Rapids universal cutter, reamer and tool grinders. Represented by B. C. Saunders and J. DeKoning. Space 191.

Greenfield Tap & Die Corporation, Greenfield, Mass.—Working display of No. 1 cutting-off machine; a No. 36 threading machine; and Maxi taps for staybolt; taps, dies, screw plates, reamers, pipe tools and gages. Represented by L. H. Taylor, W. A. Cook, Ralph Barstow and F. W. Strecker. Spaces 308-310-312.

Griffin Wheel Company, Chicago, Ill.—Chilled iron car wheels. Represented by A. A. Hale, H. N. Scott, F. B. Flinn and Geo. D. Casgrain. Space 559.

Grip Nut Company, Chicago, Ill.—Grip nut products; grip lock nut; holding nut; unit nut; pump piston rod nut. Represented by W. E. Sharp, H. E. Passmore, A. Roberts and H. J. Tremey. Space 190.

Gustin-Bacon Manufacturing Company, Kansas City, Mo.—The Emery brake cylinder lubricant; G-B perfect air pump strainer; G-B reversible driving chuck for staybolts; G-B thermoline valve for tire heating. Represented by John W. Foyle, F. L. Bacon, E. A. Emery, Fred Speer and J. S. Hearons. Space 737.

Hale & Kilburn Corporation, Philadelphia, Pa.—Coach seats; reclining chairs; car flooring. Represented by W. M. Swope, H. R. Rochester, P. J. Tucker, A. F. Old, H. C. Minor and R. H. Pilson. Spaces 408-410.

Hammett, H. G., Troy, N. Y.—Triple valve bushing roller; Staytite packing bell ringer. Represented by H. G. Hammett, A. O. Van Der Vort and E. C. Sawyer. Space 512.

Hanna Locomotive Stoker Company, The, Cincinnati, Ohio.—Hanna locomotive coal distributor. Represented by W. T. Hanna, W. A. Benson, J. W. Myers and F. E. McCown. Space 183.

Haring, Ellsworth, New York, N. Y.—Elhar high speed steel and tool steels; non-ferros metals in wires and sheets for special purposes. Resistance wires. Represented by Ellsworth Haring. Space 20.

Hauck Manufacturing Company, Brooklyn, N. Y.—Oil burning equipment such as: Tire heaters, steel car repair burners, rivet forges, furnace burners, hand torches, thawers, sprayers. Steamers for sterilizing purposes; tool dressing furnace; brazing forge; melting furnace; low pressure burner; paint burner; locomotive fire kindler; steam testing burner. Represented by M. R. Jarvis, John D. Moore and F. E. Giersch. Spaces 188-806.

Heald Machine Company, The, Worcester, Mass.—Style No. 60, cylinder grinding machine; style No. 70, internal grinding machine; style No. 85, internal grinding machine; style No. 20, rotary surface grinding machine. Represented by S. T. Massey, J. N. Heald, L. C. Kenyon and S. M. Hershey. Spaces 129-131.

Herbert, Ltd., Alfred, New York, N. Y.—No. 1, Alfred Herbert hexagon turret lathe; No. 4, universal turret lathe; No. 9, combination turret lathe; No. 2, Lumsden power oscillating tool grinder; No. 12, ball bearing plain cup wheel grinder; Alfred Herbert B. B. twist drill grinder; entire line of small tools and supplies. Represented by E. D. Mitchell, J. C. Blair, J. W. Blackford, C. J. Albin, C. R. White, E. G. Blake, E. R. Wood, Felix Harmer, George Boucher and B. Martin. Spaces 168-170.

Heywood Brothers and Wakefield Company, Wakefield, Mass.—Railway car seats; canvas lined rattan car seat webbing. Represented by Bertram Berry, G. E. Cornwall, E. C. Lang, C. A. Van Derveer, F. N. Grigg, W. E. Foreman, F. J. Neale and C. G. Elliott. Spaces 520-524.

Horrocks Desk Company, Herkimer, N. Y.—Danight lubricator on M. C. B. brass with letters from M. M.'s. Represented by G. P. Simmons. Space 761.

Hunt-Spiller Manufacturing Corporation, South Boston, Mass.—Locomotive parts made of Hunt-Spiller gun iron; cylinder bushings; cylinder packing; solid pistons; bull rings; piston valve bushings; tee rings; piston valve packing; crosshead shoes; side rod and knuckle pin bushings for freight service; air pump bushings and packing; driving boxes; pedestal shoes; pedestal wedges; eccentrics and eccentric straps. Represented by W. B. Leach, J. G. Platt, F. M. Weymouth, V. S. Ellet, A. B. Root, Jr., E. J. Fuller, C. L. Galloway and F. B. Hartman. Spaces 562-563.

Hutchins Car Roofing Company, Detroit, Mich.—Car roofs; steel car ends. Represented by F. M. Whyte, M. F. Ryan, F. C. Dunham, J. F. Comee and A. R. Wilson. Space 525.

Hyatt Roller Bearing Company, New York, N. Y.—Large model of Hyatt Bearing in operation. Housing cut away to show just how the different parts function. Bearings in operation in housings made of glass to show just how the helically wound Hyatt rollers circulate the oil. Sample bearings and parts to show construction, manufacture and finished product. A great deal of interesting data on economies effected by Hyatt Bearings in freight and baggage handling trucks. Complete bulletins covering all industrial applications of the Hyatt Bearing. Represented by L. W. Iliff, M. F. Lawrence, P. C. Gunion, H. K. Porter, H. L. Littell, D. Gleisen, G. O. Helmstaedter, F. H. Knight and R. W. Young. Space 620.

Independent Pneumatic Tool Company, Chicago, Ill.—Thor pneumatic drills, reamers, grinders, hammers, hoists, rammers and electric drills and grinders. Represented by J. D. Hurley, R. S. Cooper, R. T. Scott, 2nd, A. G. Anderson, H. F. Finney, F. J. Passino, H. F. White, V. W. Robinson, W. H. Rosevear, W. A. Nugent and A. L. Schuhl. Spaces 556-557.

Individual Drinking Cup Company, Inc., New York, N. Y.—Dixie cup vending machines and cups; Dixie cup dispensing machines; sant-kerchief vending machines, for passenger car and station use. Represented by Arthur R. Lillicrapp and M. E. Morrison. Space 15.

Industrial Works, Bay City, Mich.—Locomotive, wrecking, wharf, gantry, transfer and pillar cranes; combination crane pile drivers and crane steam shovels, pile drivers, rail saws, grab buckets, transfer tables and steam pile hammers. Represented by W. W. Clements, James Shearer, 2nd, George T. Sinks and Wm. L. Brown, 3rd. Space 330.

Ingersoll-Rand Company, New York, N. Y.—Little David pneumatic tools and appliances. Represented by Geo. A. Gallinger, Walter A. Johnson, F. J. Smith, Geo. S. Johnston, F. W. Gaw, Geo. C. Williams, L. W. Schnitzer, J. F. Watson, J. A. Sanford and E. C. Geither. Spaces 572-573.

International Couplers Company, Pittsburgh, Pa.—The White automotic metallic train-pipe coupling system; auto-tite flexible expansion couplings for engine and tender lines; auto-tite flexible pipe joints; auto-tite traverse expansion joints. Represented by Walter Carman White, E. B. Lawson, Nathan W. Stem and J. H. Lonsdale. Space 703 and on exhibit track.

International Machine Tool Company, Indianapolis, Ind.—One 16-18 in. and one 24-26 in. Libby heavy duty turret lathes. Both machines tooled up and operating on railroad work. Represented by J. A. Villard, C. M. Hamersly, C. F. White, J. K. Robson, A. C. L. Black and Geo. A. Crawshaw. Space 180.

Iron City Products Company, Pittsburgh, Pa.—Rees double worm gear drive jacks for railway and industrial purposes; passenger cars and trucks. Represented by E. E. Arnold and C. A. Conklin. Space 404.

Irving Iron Works Company, Long Island City, N. Y.—Irving subway fireproof metallic flooring and Irving safsteps. Represented by W. E. Irving, P. L. Price, H. H. Bunker, W. H. Lown, J. M. Madden and H. H. Schuldt. Space 758.

Jacobs Manufacturing Company, The, Hartford, Conn.—Jacobs improved drill chucks. Represented by Joseph H. Hazley and G. Albert Englund. Space 132.

Jefferson Union Company, Lexington, Mass.—Jefferson unions; union ells and tees; flange unions. Represented by Daniel T. Groff. Space 16.

Johns-Manville Company, H. W., New York, N. Y.—The 85% magnesia pipe covering and boiler lagging; J-M sponge felted pipe covering and blocks; miscellaneous J-M pipe coverings and transite and ebony asbestos wood; asbestos shingles; high temperature and insulating cement; Mastic flooring; J-M built-up and ready roofing; Salamander insulation; Keystone hair felt and standard hair felt; spiral locomotive pipe covering; power reverse gear packing; Mallet locomotive packing; J-M expander rings and packing cups; friction tape and splicing compounds; Transite asbestos wood smoke jacks; miscellaneous packing materials; Vulcabeston gaskets and washers; J.-M. fire extinguishers; Transite ventilators. Represented by J. E. Meek, G. A. Nicol, J. C. Younglove, Geo. Christenson, J. H. Trent, H. G. Newman, C. E. Murphy, F. J. Horne, R. A. Hamaker and W. J. Stewart. Spaces 586-587.

Johnson Bronze Company, New Castle, Pa.—Babcock Water gage protector. Represented by Robt. Redding and F. H. Babcock. Space 373.

Joliet Railway Supply Company, Chicago, Ill.—Brake beams; truck bolsters; side bearings; journal boxes. Represented by F. L. Sivyer, J. H. Slawson, C. A. Carscadin, Jas. E. Simons, and Hamilton Vose. Space 611.

Jones & Company, B. M., Inc., New York, N. Y.—Fractures of double mushet high speed steel; Taylor's best Yorkshire iron. Represented by Fred J. Holden, W. S. Murrian, Ray G. White, W. H. White and Austin Savage. Space 38.

Jones & Laughlin Steel Company, Pittsburgh, Pa.—Various products, including hot rolled sections; cold-finished section; wire; wire fence; wire nails; tubular products; tin and black plate. Represented by A. A. Wagner, J. F. Replinger, Roland Gerry, Ralph Rowles, Robert Geddis, G. C. Fogwell, Robert Kilgore and George B. Mitchell. Spaces 409-411.

Joyce-Cridland Company, The, Dayton, Ohio.—Lifting jacks of all kinds, including self lowering jacks in 50 and 75-ton capacities, all heights. Full automatic geared jacks; full automatic lever jacks; screw jacks of all kinds; plain lever jacks; traversing jacks; hydraulic jacks; pole and emergency jacks. Represented by W. F. Bippus, A. S. Beattys, C. D. Derby and R. L. Skidmore. Space 607.

Justice & Company, Philip S., Philadelphia, Pa.—Reception booth. Represented by Philip J. Mitchell. Space 509.

K-G Welding & Cutting Company, Inc., New York, N. Y. Compressed gas, welding and cutting torches; regulating valves; equipment and supplies. Represented by Wm. D. Flannery, George B. Malone, Wm. McCarthy, Wm. M. Munn and Peter Norren. Space 57.

Karry Lode Industrial Truck Company, Inc., Long Island City, N. Y.—Industrial trucks and tractors. Represented by J. M. Breitenbach, W. W. White and H. A. Spaulding. Spaces 332-334.

Kaustine Company, Inc., Buffalo, N. Y.—Kaustine chemical toilet systems and hydro kaustine iron enameled septic tanks. Represented by J. H. Fotheringham, F. B. Shalters and D. A. Evans. Space 335.

Keller Pneumatic Tool Company, Grand Haven, Mich.—Complete line of Keller-Master riveting, chipping, calking and scaling hammers; jam riveters; holder-ons; sand rammers; pneumatic drills; wood borers and grinders; rivet sets and chisel blanks. Represented by Wm. H. Keller, L. H. Olsen, C. A. Bremmer, J. C. Campbell, W. F. Delaney, W. H. Woody, C. W. Gellinger, J. B. Corby, W. J. Devlin, H. C. Browne and F. S. Eggleston, Jr. Space 197.

Kerite Insulated Wire & Cable Company, Inc., The New York, N. Y.—Reception booth. Represented by Azel Ames, P. W. Miller, J. W. Young, J. A. Benton, B. L. Winchell, Jr., and W. H. Fenley. Space 716.

Keyoke Railway Equipment Company, Chicago, Ill.—Murray cast steel friction draft gear and cast steel coupler yokes. Represented by George C. Murray, R. J. Cook and Edward Walters. Space 309.

Keystone Drop Forge Works, Chester, Pa.—General line of drop forgings. Keystone connecting links; Keystone safety shackle hook. Represented by Geo. H. Berlin and Wm. J. McDevitt. Space 302.

King Optical Company, Julius, New York, N. Y.—Safety goggles; face masks and shields; welding helmets. Represented by Fred W. King and Major J. N. Thomas. Space 745.

Lakewood Engineering Company, The, Cleveland, Ohio.—One Lakewood 703 tier-lift truck; one Lakewood type 701 tractor; one Lakewood No. 810 trailer. Represented by Thos. T. Fauntleroy. Space 220.

Landis Machine Company, Waynesboro, Pa.—One 2 in. Landis double head bolt threading machine; 4 in. Landis pipe threading and cutting machine; 1¼ in. single head leadscrew threading machine; chaser grinder; stationary pipe die head; 1¼ in. Landis automatic die head. Represented by C. N. Kirkpatrick, C. F. Meyer, F. C. Delcher, J. W. Willis, M. M. Lutz, G. M. Stickell, C. M. Creager and H. W. Marker. Spaces 123-125-127.

Latrobe Tool Company, Latrobe, Pa.—High speed twist drills and reamers. Represented by J. B. Moore, W. B. Fetner, F. B. Hull and A. A. Morton. Space 361.

Lehon Company, The, Chicago, Ill.—Mule-hide car roofings; waterproof insulating materials; coach roofings; membranes; roofing and shingles; sill covers; wood-seal. Represented by Tom Lehon and John E. Eipper. Space 18.

Lewis Draft Appliance Company, Chicago, Ill.—Lewis automatic draft and back pressure control. Represented by J. D. Purcell and D. M. Lewis. Space 163.

Liberty Manufacturing Company, Pittsburgh, Pa.—Liberty type air operated cleaners for arch tubes of locomotive boilers and for fire and water tubes of stationary boilers, also Lagonda type machines for same purpose. Represented by Harry A. Pastre. Space 96.

Liberty Steel Products Company, Inc., Chicago, Ill.—Davis solid truss brake beams for passenger, locomotive tender and freight equipment; Liberty built-up brake beams; Davis pressed steel journal box lids; Libco sectional steel buildings. Represented by Chas. J. Graham, E. H. Pape, J. M. Brown, R. P. Townsend, S. W. Midgley, J. M. Borrowdale, A. W. Preikschat, W. T. Kilborn, M. J. Folensbee, W. E. Fowler, Jr., A. D. Brown, T. L. Lawry, C. F. Flood and Geo. McP. Minetree. Space 539.

Liberty Tool Corporation, The, Baltimore, Md.—Liberty labor saving tools. Single and double cylinder portable drilling presses; rivet heating furnace; heating torch; backing out punch; heading attachment; bottom riveting rig. Represented by E. Oliver Grimes, Jr., M. J. O'Connor, H. J. Wilson, C. S. Green, M. C. Pearrell, G. L. Degenhard and C. R. Flater. Spaces 215-217.

Lincoln Electric Company, The, Cleveland, Ohio.—Lincoln 200-300 ampere welder; Lincoln motors; Lincoln motor operating under water. Represented by Robt. E. Kinkead, D. C. Anderson and O. P. Lang. Space 803.

Loco Light Company, The, Indianapolis, Ind.—One Loco light generator in operation; one Loco light generator, sectional view; headlight case. Represented by H. H. Tomlinson, C. Vossler, T. D. Kelly, B. Palmer Claiborne and Col. C. E. Bleyer. Space 718.

Locomotive Appliance Company, The, Toledo, Ohio.—Laco type of steam fire door; sleeve valve; throttle valve; valve control cylinders; steam chest; cross head connected valve gear. Represented by Chas. J. Pilliod, Geo. H. Hartman and Dan Searles. Spaces 727-729.

Locomotive Feed Water Heater Company, New York, N. Y.—Boiler feed pump; model of feed water heater; samples of various parts from service. Represented by G. M. Basford, E. A. Averill, W. H. Lovekin, C. R. Fairchild, A. R. Frankhauser, C. R. Hardy, H. V. Jones and W. T. Bennison. Spaces 414-424.

Locomotive Firebox Company, Chicago, Ill.—Working model showing Nicholson thermic syphons; also single syphon shown. Represented by John L. Nicholson, James T. Anthony, Leslie R. Pyle, C. M. Rogers, W. M. Wilson and John Stuart Hawley. Spaces 382-384-385.

Locomotive Lubricator Company, Chicago, Ill.—One sectional model of force feed locomotive lubricator and diaphragm terminal check valve; one working model of the above. Represented by W. J. Schlacks, O. H. Neal and C. W. Rudolph. Space 574.

Locomotive Stoker Company, Pittsburgh, Pa.—Full size type "D" duplex stoker with locomotive backhead; 1/3 size type "D" duplex stoker with locomotive backhead; full size type "D" slope sheet coal pusher. Represented by W. L. Bartholomew, J. J. Byrne, O. B. Capps, W. G. Clark, D. F. Crawford, A. C. Deverell, Harold Gardner, J. J. Hannahan, R. G. Kelley, N. M. Lower, L. E. Osborne, Eugene Prouty, Edward Ryan, L. V. Stevens, Karl M. Steller, A. N. Willsie and H. C. Woodbridge. Spaces 403-405-407.

Locomotive Superheater Company, New York, N. Y.—Steam superheaters for locomotives; fire tube superheater for Scotch marine boilers; Elesco superheater for stationary boilers; pipe coils; steam pyrometers. Represented by G. L. Bourne, F. A. Schaff, R. M. Ostermann, G. E. Ryder, R. R. Porterfield, W. A. Buckbee, H. B. Oatley, C. A. Brandt, Bard Browne, Geo. Fogg, A. C. Loudon, S. Macdonald, A. C. McLachlan, J. E. Mourne, K. E. Stilwell, B. N. Broido and R. A. Holme. Spaces 422-424.

Locomotive Terminal Equipment Association, Chicago, Ill.—Literature pertaining to locomotive terminal equipment. Represented by Frederic A. Gale and H. L. Hilleary. Space 748.

Long, Jr., Company, Chas. R., Louisville, Ky.—Samples of railway paints; paint panels, paint films. Represented by Chas. R. Long, Jr., G. S. Turner, W. H. Heckman, Harry Vissering, J. M. Monroe and S. W. Russell. Space 577.

Lukens Steel Company, Coatesville, Pa.—Reception booth. Represented by Harry Loeb and George L. Gordon. Space 9.

Lunkenheimer Company, The, Cincinnati, Ohio—Valves; lubricators; oil pumps; oil and grease cups; oiling devices; boiler mountings; injectors; ground key work; motor accessories. Represented by Howard J. Evans and Andrew Lauterbach. Spaces 311-313.

Luster Machinery Company, The, Philadelphia, Pa.—One 22-inch Cincinnati geared head lathe; 1 16-inch Cincinnati tool room lathe; 1 16-inch Ohio motor driven shaper. Represented by E. J. Luster. Spaces 149-151.

MacRae's Blue Book Company, Chicago, Ill.—MacRae's Blue Book; MacRae's classified list of railroad officials. Represented by Alex Smith, R. S. Lundy, Chris Anderson, F. O. Rice and Thos. H. MacRae. Space 21.

Mahr Manufacturing Company, Minneapolis, Minn.—Mahr steel car repair torches; boiler shop torches; type "T" and Jiffy torches; babbitt furnaces; rivet forges; calorizors; safety automatic shut-off valves. Represented by W. G. Barstow, R. B. Ecker and A. S. Hayes. Space 538.

Main Belting Company, Philadelphia, Pa.—Anaconda power transmission belting; M. B. C. car lighting belting; Leviathan conveyor belting; "Main" conveyor rollers; style "C" adjustable troughing roller; style "A" troughing roller; styles "R" and "S" return rollers. Represented by E. F. Hiller, H. B. Gramm and W. C. Schreiner. Space 701.

Manning, Maxwell & Moore, Inc., New York, N. Y.—Consoli-

dated safety valves; Ashcroft gauges and gauge testers; Hancock inspirators, boiler check valves; steam valves, and boiler tester, filler and washer; locomotive force feed lubricator. Represented by P. M. Brotherhood, H. D. Carlton, C. L. Brown, P. K. Dayton, J. Soule Smith, F. J. Wilson, J. Briscoe, E. M. Moore, C. Freeman and T. S. Stephens. Spaces 629-631-633.

Massachusetts Mohair Plush Company, Boston, Mass.—Mohair car seat plush and mohair velvets. Represented by William W. Melcher. Space 635.

McCabe Manufacturing Company, Lawrence, Mass.—Working model of pneumatic flanging machine; flanged flue sheets; flanged car parts. Represented by Fred H. McCabe and Hugh McCabe. Space 306.

McConway & Torley Company, The, Pittsburgh, Pa.—Automatic couplers including Pitt pivoted passenger couplers, "D" pivoted passenger couplers and 3-stem pivoted passenger couplers. Represented by Wm. McConway, Jr., Stephen C. Mason, H. C. Buhoup, I. H. Milliken, E. L. Reynolds and W. J. Regan. Spaces 501-503-505.

McCord & Company, Chicago, Ill.—Journal boxes. Represented by Judson A. Lamon and F. W. Craig. Space 610.

McCoy Manufacturing Company, The Elijah, Detroit, Mich.—McCoy Graphite lubricator for valves and cylinders, and for air pump and accessories to each. Represented by Francis H. Warren and Albert L. Stricker. Space 17.

McNab & Harlin Manufacturing Company, Paterson, N. J.—Valves and fittings of iron and brass. Represented by Ernest G. Jarvis. Spaces 719-721.

Metal & Thermit Corporation, New York, N. Y.—Therm't and appliances, sample of square single track crossing, constructed by Thermit welding. Sample of carbon-free metals and alloys produced by the Thermit process. Sample weld on 9" crank shaft. Materials for demonstrating pipe welding for the purpose of welding locomotive superheater units. Sample of superheater unit so welded. Represented by F. W. Cohen, W. R. Hulbert, H. D. Kelley, H. S. Mann, E. B. Bloom, J. G. McCarty and Wm. Aldrich. Space 184.

Midvale Steel and Ordnance Company, Philadelphia, Pa.—Knobbling furnace and samples showing all steps in the production of genuine old fashioned knobbled charcoal iron and charcoal iron boiler tubes; panels showing tools made of Midvale steels for use in Midvale shops; one Cambria heavy freight axle; one table on which are mounted samples of the larger sizes of sections rolled by the Cambria Steel Company; several samples of steel wheels; samples of piston rod and miscellaneous car forgings. Represented by R. V. Sage, J. C. C. Holding, H. O. Williams, Harry Rowe, James Conner, Samuel Griffith, W. S. Edger, Harry Neele, L. B. Morris, Charles Keenan, F. W. Sager, R. E. Sharp, F. W. Stone, R. E. Dexter, J. E. McLain, H. W. Hibshman, George A. Richardson, George E. Thackray and B. F. Faunce. Space 637.

Miller Saw-Trimmer Company, Pittsburgh, Pa.—Anyangl lighting fixtures. Represented by E. T. Russell, E. T. Spillman, G. E. McCabe and Frank V. Barhydt. Space 734.

Miner, W. H., Chicago, Ill.—Friction draft gears; side bearings; safety hand brakes; refrigerator car door fasteners; drawbar yokes. Represented by B. S. Johnson, J. R. Mitchell, W. E. Robertson, A. E. Biddle, G. Q. Lewis, A. P. Withall, J. F. O'Connor and eGo. A. Johnson. Spaces 584-585.

Monroe Calculating Machine Company, New York, N. Y.—Monroe calculating machine. Represented by J. R. Ramsay, G. W. Laine, J. V. Carroll and S. W. Reed. Space 751.

Mudge & Company, Chicago, Ill.—Solvit compound; Mudge motor cars; Mudge-Peerless ventilators. Represented by Burton Mudge, George W. Bender, Karl J. Eklund and Sherman C. Amsden. Space 201.

Nathan Manufacturing Company, New York, N. Y.—Injectors; lubricators; boiler checks; valves and locomotive fittings. Represented by E. S. Toothe, Otto Best, J. F. Farrell, W. E. Brumble, W. R. Walsh, Richard Welsh, J. C. Currie, W. S. Murrain, E. F. Boyle, W. G. Lockwood, F. C. Davern and W. D. Jenkins. Spaces 578-579.

National Brake Company, Inc., Buffalo, N. Y.—Peacock geared hand brakes for freight, coal, tank and hopper cars; geared hand brakes for baggage, express, mail and all blind-end cars. Two designs. Geared hand brake for Pullman and passenger cars; positive release ratchet brake lever; anti-friction staff bracket. Represented by Frank D. Miller and Wm. D. Brewster. Spaces 705-707.

National Car Equipment Company, Chicago, Ill.—Klasing safety hand brake. Represented by W. L. Kellogg and A. F. Klasing. Space 383.

National Car Wheel Company, Pittsburgh, Pa.—Chilled iron car wheels for 60,000- 80,000- 100,000- and 140,000- capacity cars. Represented by J. H. Yardley, E. H. Chapin, H. L. Garvin, J. F. Weisbrod, R. H. Tate, G. L. Hoen, J. D. Cunningham, H. E. McClumpha, A. Muirhead and A. Batzold. Spaces 572-573.

National Carbon Company, Inc., Cleveland, Ohio.—Columbia dry cells; Columbia hot shot and multiple batteries; Columbia high voltage caustic soda cells; carbon and metal brushes for motors; generators and headlight equipment; lighting and welding carbons; welding paste; carbon plates; carbon packing rings; special forms in carbon and carbon telephone specialties; American flashlights and batteries. Represented by Chas. S. Pflasterer, J. M. Spangler, A. E. Pratt and Walter R. Pflasterer. Spaces 744-746.

National Lock Washer Company, The, Newark, N. J.—Models of car curtains; curtain fixtures, sash locks; sash balances; window packing; national lock washers and Hipower nut locks. Represented by F. B. Archibald, J. Howard Horn, C. H. Loutrel, R. L. Cairncross, Daniel Hoyt and R. B. Cardozo. Space 541.

National Malleable Castings Company, The, Cleveland, Ohio.—Couplers of various types; journal boxes; miscellaneous car castings and railroad devices. Represented by T. W. Aishton, J. J. Byers, A. J. Bazeley, W. E. Coffin, G. R. Farrell, Charles Gaspar, R. T. Hatch, H. T. Krakau, W. C. Lewis, O. W. Loomis, G. V. Martin, H. L. Mausk, C. H. McCrea, Benjamin Nields, Jr., J. A. Slater, S. L. Smith, E. H. Schmidt, E. O. Warner and L. S. Wright. Spaces 613-615.

National Railway Appliance Company, New York, N. Y.—Garland ventilators; Dunham hopper doors; Anglo-American varnish company's products; tool steel gears and pinions; Genesco paint oils; feasible drop brake staffs; Clapp's fire resisting paint; Flaxlinum insulation samples. Represented by B. A. Hegeman, Jr., Charles C. Castle, Harold A. Hegeman, W. C. Lincoln, W. C. Peters, Fred C. J. Dell, C. H. McCormick, J. Turner Martyn and H. W. Bininger. Space 622.

National Railway Devices Company, Chicago, Ill.—Shoemaker vertical fire-doors operated automatically and constantly under air pressure. Represented by Jay G. Robinson, E. J. Gunnison and A. F. Lind. Space E.

National Tube Company, Pittsburgh, Pa.—Reception booth. Represented by George N. Riley, J. T. Goodwin, J. W. Kelly and P. J. Conrath. Spaces 546-547.

New York Air Brake Company, The, New York, N. Y.—Reception booth. Represented by Scott R. Hayes, C. E. Leach, N. A. Campbell, Thomas O'Leary, Jr., William Owens, George Kleifges, O. E. Moore, L. S. Sawyer and N. W. Lyon. Space 30.

Newton Machine Tool Works, Inc., Philadelphia, Pa.—Milling machines. Represented by Nicholas P. Lloyd and Roland G. Holmes. Spaces 117-119-121.

Niles-Bement-Pond Company, New York, N. Y.—Niles 36"-44" side head boring mill; Pond 5' right line radial drill; Pratt & Whitney 10" vertical shaper; Pratt & Whitney small tools and gages; Morris 3' plain radial drill; Stockbridge 20" two-piece crank shaper; Aurora 28" super drill. Represented by Edward L. Leeds, George Mills, D. H. Teas, B. S. Skinner, Charles Lyle, J. L. McCartney, H. Wm. Kopf, Boyd Nixon, N. C. Walpole, H. F. Welch and B. A. Tozzer. Spaces 104-110.

Norton, Incorporated, A. O., Boston, Mass.—Different types of Norton self-lowering speed-controlled jacks—100 ton; 50 ton; 50 ton inverted type—new this year. 35 ton; 25 ton; 25 ton and 35 ton ball-bearing journal jacks. Represented by H. A. Norton, Frank L. Gormley, George R. Law, F. P. Hartshorn, R. D. Bates and C. H. Smith, Jr. Space 551.

Nuttall Company, R. D., Pittsburgh, Pa.—Heat-treated gears

and pinions for electric locomotives and multiple unit cars; pantagraph trolley parts. Represented by J. E. Mullen and R. R Gartside. Space 134.

Okadee Company, The, Chicago, Ill.—Okadee blower valves; blow-off valves; tender hose couplers; front end hinges; water glass protectors. Okadee automatic drain valves. Represented by A. G. Hollingshead, Harry Vissering, Chas. R. Long, Jr., G. S. Turner, W. H. Heckman and J. M. Monroe. Space 575.

Okonite Company, The, Passaic, N. J.—Okonite rubber covered wires and cables; varnished cambric wires and cables; splicing tape, Manson friction tape. Represented by J. L. Phillips, W. R. Van Steenburgh, J. W. Hackett, J. D. Underhill, C. A. Miller and F. J. White. Space 733-735.

O'Malley Beare Valve Company, Chicago, Ill.—Globe, angle and check, also "Y" body multiplate valves; Perfection gauge cock, water glass drain and squirt hose valves, boiler checks, blow out valves, duplex blow out valve, phosphor bronze and other high class engine bearings. Represented by Edward O'Malley, Thomas O'Malley, J. E. Brown, J. N. Gallagher and Jas. M. Pigott. Space 177.

Onondaga Steel Company, Inc., Syracuse, N. Y.—Spark testing of steel scrap; sample bars high on speed steel. Represented by C. P. Whiting and O. S. Wilcox, Space 378.

Osmer, J. E., Owosso, Mich.—Exhaust pipe and controlling valve for the same. The exhaust pipe will be connected up with an air pipe line, and an operating valve will be attached to the same for operation by those who desire to investigate the operation of the device. Space 602.

Oxweld Railroad Service Company, New York, N. Y. Reception booth. Represented by George Thompson, S. P. DeLano, G. M. Crownover, E. M. Collins, L. C. Ryan, R. W. White, F. C. Hasse, R. P. Browning, A. W. Whiteford, W. F. Thatcher, H. W. Jacobs, A. Lucas, W. M. Beard, C. B. Moore, M. C. Beymer, H. W. Schulze and R. W. Harvey. Space 33.

Page Steel & Wire Company, New York, N. Y.—Armco American ingot iron electrodes and welding wire; ingot iron strand; ingot iron bond wires, telegraph wire, telephone wire, together with the latest developments of the Page company, namely:—Page Armco fence. Represented by W. T. Kyle, C. A. McCune, W. H. Beecker, Jr., E. J. Flood and C. L. Bennett. Spaces 305-307.

Paige & Jones Chemical Company, New York, N. Y.—Boiler feed water treatment; paint oil; core oil. Represented by Fred O. Paige and Harry N. Bennett. Spaces 366-368.

Pantasote Company, The, New York, N. Y.—Agasote headlining, roofs, wainscoting; Pantasote curtain material and seat covering. Represented by John M. High, Wm. A. Lake and Wm. Anderson. Space 400.

Parkesburg Iron Company, The, Parkesburg, Pa.—Small samples charcoal iron boiler tubes for marine, locomotive and stationary boilers. Represented by H. A. Beale, Jr., George Thomas, 3rd., George W. Denyven, R. J. Sheridan, W. H. S. Bateman, J. R. Wetherald, J. A. Kinkead, G. H. Woodroffe, W. P. Canby and G. A. Cardwell. Space 388.

Paxton-Mitchell Company, Omaha, Neb.—Piston rod, valve stem and air pump metallic packing. Represented by C. A. Coons, E. L. Chollman and J. J. Keliher. Space 533.

Penn Iron & Steel Company, Creighton, Pa.—Samples of staybolt and chain iron. Represented by Henry F. Gilg. Space 34.

Penn Seaboard Steel Corp., Philadelphia, Pa.—Reception booth. Space 608.

Pilliod Company, The, New York, N. Y.—Model of locomotive showing Baker valve gear; model of Sentinel low water alarm. Represented by R. H. Weatherly, K. J. Eklund, J. J. Donovan, D. Purdy, Wm. Hoffmann and J. H. Burwell. Space 189.

Pittsburgh Power Reverse Gear Company, Pittsburgh, Pa.—Power reverse gear. Represented by P. E. Donner, A. S. Osbourne and J. G. North. Space 139.

Pocket List of Railroad Officials, The, New York, N. Y.—Pocket List of Railroad Officials. Represented by Charles L. Dinsmore, Harold A. Brown and J. Alexander Brown. Space 5.

Pollak Steel Company, The, Cincinnati, Ohio.—Reception booth, furnishing valuable and expert information regarding manufacture and heat treatment of railway forgings. Represented by D. E. Sawyer. Space 523.

Pratt & Lambert, Inc., Buffalo, N. Y.—The Vitralite railway enamel system. Represented by J. P. Gowing, E. L. Georger and J. R. Mickle. Space 521.

Pressed Steel Car Company, New York, N. Y.—Booth with photographs. Represented by N. S. Reeder, J. F. MacEnulty, C. E. Postlethwaite, K. C. Gardner, H. H. Gilbert, J. S. Turner, W. H. Wilkinson, H. S. Hammond, C. C. Clark, C. W. Mourer, C. H. Jackman, L. O. Cameron, C. A. Lindstrom, J. F. Streib, F. O. Schramm and F. L. Johnson. Spaces 545-601.

Production Machine Company, Greenfield, Mass.—Polishing and grinding machines; lawn mowers for station yards. Represented by W. S. Howe and A. H. Behnke. Space 126.

Pulverized Fuel Equipment Corporation, New York, N. Y.—Reception booth with literature. Represented by A. V. Adamson. Space 422.

Pyle-National Company, The, Chicago, Ill.—A model of the Young valve gear. A complete line of turbo-generators; electric headlight sets; suburban train lighting; headlight cases of all sizes; sheet steel and cast; locomotive cab lamps; back-up lamps; switches; connectors; focusing devices for lamps. Represented by R. C. Vilas, J. Will Johnson, Wm. Miller, A. N. Martin, C. P. McGinnis, T. P. McGinnis, R. L. McIntosh, O. W. Young, R. L. Kilker, W. T. Bretherton, G. E. Haas and W. Smith. Spaces 602, 604, 606.

Q. & C. Packing and Lubricator Company, The New York, N. Y.—Piston rod packing and lubricators. Represented by E. R. Packer, C. F. Quincy, W. W. Hoit, F. F. Kister, M. M. Case, J. C. Smaltz, S. S. Whitehurst and James Smith. Space 510.

Quickwork Company, The, St. Mary's, Ohio.—Three machines, numbers 20, 30 and 40. "Quickwork" rotary shears. Represented by H. Collier Smith, A. F. Smith, H. Collier Smith, Jr., and Henry Lay. Spaces 116-118.

Racine Tool & Machine Company, Racine, Wis.—"Racine" high speed metal cutting machine; our new improved broaching machine of the milling type. Represented by Fred J. Kidd, E. R. Larson and A. H. Goetz. Space 166.

Railroad Herald, The, Atlanta, Ga.—Copies of the Railroad Herald. Represented by E. C. Laird. Space 763.

Railway Devices Company, St. Louis, Mo.—"Western" angle cock holder; "Perfection" brake ratchet; spiral pipe clamps; "Iron Horse" or pedestal; "Sta-Rite" uncoupling attachments. Represented by Louis A. Hoerr, Roland M. Hoerr, and Sterling Campbell. Space 616.

Railway Materials Co., The, Chicago, Ill.—Brake shoes. Represented by I. B. Lesh, E. C. Folsom and Geo. F. Allen. Space 561.

Railway Purchases and Stores, Chicago, Ill.—Booth with magazines only. Represented by Edward Wray. Space 717.

Railway Review, Chicago, Ill.—Copies of publication. Represented by Willard A. Smith, Harold A. Smith, Arthur E. Hooven, J. E. Gougeon, Charles L. Bates and John M. Lammedee. Spaces 12-14.

Railway Storage Battery Car Company, New York, N. Y.—One operating Edison battery car. Represented by L. Klopman, F. N. Koziell and C. A. Wipf. Space 634 and car on exhibit track.

Ralston Steel Car Company, The, Columbus, Ohio.—Reception booth. Represented by F. E. Symons, J. R. Forney, J. J. Frank, F. S. Clark, B. C. Hanna, C. S. Rea and J. F. Leonard. Space 558.

Reading Iron Company, Reading, Pa.—Genuine wrought iron pipe; charcoal iron boiler tubes; cut nails (black and galvanized.) Represented by L. E. Thomas, W. W. Williams, E.

J. Mishler, H. F. Mattern, Craig Geddis, H. S. Carland, A. R. Kinsler and Agnew T. Dice, Jr. Space 222.

Reading Specialties Company, Reading, Pa.—Car and engine replacers; car shocks; derails. Represented by M. G. Moore, J. J. O'Connell, W. J. Zimmerman and D. H. Fowler. Space 612.

Republic Iron & Steel Company, Youngstown, Ohio.—Reception booth. Space 517.

Rhodes Manufacturing Company, The, Hartford, Conn.—Rhodes shapers and slotters. Represented by Joseph H. Hazley and G. Albert Englund. Space 132.

Rice Manufacturing Company, Indianapolis, Ind.—Red Devil rivet cutters. Represented by A. G. Rice and H. A. Mansfield. Space 741.

Rich Tool Company, Chicago, Ill.—High speed twist drills; high speed structural reamers; rivet sets; chucks; high speed milling cutters; tire forming tools and other small tools. Represented by W. B. Sullivan, L. H. Whiteside, C. R. Canfield and C. M. Conner. Spaces 726-728.

Rivet Cutting Gun Company, Cincinnati, Ohio.—Cincinnati rivet cutting guns, slag guns, rivet head catchers and other safety devices. Represented by John M. Crowe and Louis K. DeBus. Space 513.

Roberts Automatic Connector Company, Sarnia, Ont., Canada.—Automatic connectors for train pipe. Represented by J. W. Roberts and William E. Saylor. Space 756.

Robinson Company, The, Boston, Mass.—Robinson exhaust nozzle. Represented by Frederic Parker. Spaces 564-565.

Robinson Connector Company, Inc., The, New York, N. Y.—The Robinson automatic connector. Represented by Herbert W. Brown, A. R. Whaley, Joseph Robinson, James L. Hagar, H. D. Cameron, Joseph A. Cameron and G. E. Matheson. Spaces 318-320-322.

Rogers Company, H. A. New York, N. Y.—Moncrieff Scotch tubular gauge glasses; Scotch reflex gauge glasses and Scotch glass protector plates for gauge glass shields. Represented by Harry S. Griffith. Space 372.

Rome Iron Mills, Inc., New York, N. Y.—Test specimens of staybolt and engine bolt irons. Represented by B. A. Clements and C. C. Osterhout. Spaces 414-416-424-422.

Ryerson & Son, Joseph T., Chicago, Ill.—Ryerson-Conradson lathes, milling machines, radial drills and planers; Ulster special staybolt iron; Ulster engine bolt iron; Ryolite tool steel. Represented by H. T. Bradley, J. H. Craigie, E. W. Kavanagh, I. H. Jones, J. C. Becker, H. A. Gray, C. E. Pynchon, J. B. Barton, J. P. Moses and A. W. Willcuts. Spaces 174-176.

Safety Car Heating and Lighting Company, New York, N. Y.—Electric and gas car lighting equipment; car lighting fixtures and reflectors; electric fans; oxy-Pintsch metal cutting equipment. Represented by W. L. Garland, J. H. Rodger, J. S. Henry, R. H. Harvey, S. I. Hopkins, A. B. Mills, H. D. Donnell, G. E. Scott, C. A. Pinyerd, J. L. Marsh, W. S. Wepf, H. K. Williams, H. W. Davies, A. P. Hagar, G. E. Hulse and L. Schepmoes. Space on platform.

Safety Equipment Service Company, The, Cleveland, Ohio.—Safety goggles, signs, gloves, clothes and leggings; machine guards; respirators; complete safety equipment of all kinds. Represented by Buell W. Nutt. Space 750.

Sargent Company, Chicago, Ill.—Sargent safety three face water gauge; "Ironclad" water glass protector; Sargent safety combination water glass gasket; Renu gauge cock; Security grease plug. Represented by George S. Garren and George H. Sargent. Space 600.

Schaefer Equipment Company, Pittsburgh, Pa.—Schaeffer truck lever connections; brake rod jaws; brake levers; K-C repair card holders and K-C collapsible stake pockets. Represented by F. A. Barbey, H. G. Doran, S. M. Hindman, Frederic Schaefer and E. J. Searles. Space 511.

Scullin Steel Company, St. Louis, Mo.—Freight car truck with pedestal truck side frame arranged for use with all standard makes of M. C. B. journal boxes. Freight car truck with pedestal truck side frame using special journal box. Represented by Frank L. Norton, G. L. L. Davis, E. S. Wortham and H. E. Doerr. Spaces 301-303.

Sellers & Company, Wm., Inc., Philadelphia, Pa.—Locomotive injectors; valves; new devices; dirfting valves; injector indicator. Represented by S. L. Kneass, Chas. T. Wilson, James R. New, John D. McClintock and E. L. Holljes. Spaces 625.

Simmons-Boardman Publishing Company, New York, N. Y.—Various papers and books devoted to shipping by land and water. The Railway Age, the Railway Mechanical Engineer, the Railway Signal Engineer, the Railway Maintenance Engineer, the Railway Electrical Engineer, Car Builders Dictionary, Locomotive Dictionary, Shipbuilding Cyclopedia, Marine Engineering, and the Boiler Maker. Represented by S. O. Dunn, R. V. Wright, A. H. Steubing, R. E. Thayer, C. B. Peck, C. N. Winter, A. G. Oehler, E. L. Woodward, L. G. Plant, C. J. Corse, C. W. Foss, F. W. Kraeger, A. Ortlinghaus, E. Rehm, L. B. Sherman, Henry Lee, F. C. Koch, H. H. Marsh, R. H. Smith, F. H. Thompson, F. S. Dinsmore, C. R. Mills, J. E. Anderson, J. M. Rutherford, H. L. Burrhus, J. P. Risque, A. R. Jarvis, F. H. Behrens, G. W. Armstrong, F. W. Hoadley, P. Traeger, E. C. Jackson, H. Foster, George Slate, R. F. Duysters and W. E. Kennedy. Space 1.

Simmons Hardware Company, St. Louis, Mo.—Welded ware; shovels; scoops; handles; tools. Represented by J. B. Webb, H. W. Jacques and S. O. Paull. Space 380.

Simonds Manufacturing Company, Fitchburg, Mass.—Circular metal cutting saws, both solid and inserted tooth, demonstrated in operation. Files and hack saw blades. Represented by H. B. McDonald, S. Patterson and B. F. Kelly. Space 308.

Smith Locomotive Adjustable Hub Plate Company, Chicago, Ill.—Model of two locomotive driving wheels mounted on axle showing adjustable hub plate application in detail. Represented by A. J. Sams. Spaces 602-604-606.

Soderling, Walter, Inc., New York, N. Y.—Respirators, gas masks, ammonia masks; dust hoods; sand blast helmets; chipping masks; babbitting masks; acid hoods; bag house helmet; goggles. Represented by Walter Soderling, F. M. Rockwell, J. F. Copeland and H. Devitt Welch. Space 753.

Southern Economy Device Company, Shreveport, La.—Removal driving box and adjustable lateral plate. Represented by H. B. Furstonburg and D. R. McFarland. Space 336.

Southern Valve Company, Knoxville, Tenn.—Model of Southern valve gear. Represented by H. A. Kibby. Space 809.

Southwark Foundry & Machine Company, Philadelphia, Pa.—Universal flue cutter; Lewis flue cutter; Gray's turret rotary shear; Mason washer making press; model of hydraulic spring banding press. Represented by W. H. Harman, F. G. Schranz, E. L. Garihan, G. Harry Case, T. M. Platt and C. B. Gray. Space 179.

Speedograph Corporation, Newark, N. J.—Speed, time and distance recording instruments for road engines and switch engines. Represented by Horace H. Smith and A. F. Wallbillich. Space 747.

Standard Brake Shoe & Foundry Company, Pine Bluff, Ark.—Locomotive driver and car brake shoes; represented by F. L. Dilley and S. F. Dilley. Space 13.

Standard Car Truck Company, Chicago, Ill.—Complete models showing different types and capacity of lateral motion trucks and working parts; roller center plates; roller side bearings and four-point bearing truck. Represented by Lee W. Barber, James T. Milner and F. L. Barber. Space 514.

Standard Coupler Company, New York, N. Y.—Sessions-Standard friction draft gears. Represented by Geo. A. Post, E. H. Walker, A. P. Dennis, Geo. A. Post, Jr., R. G. Gallagher, Jr. and Wilbur Eckels. Space 500.

Standard Forgings Company, Chicago, Ill.—Forged steel "Stanforge" draft rigging, driving axle, truck axle, piston rod, crank pin, center plate and journal wedge. Represented by E. W. Richey, C. R. Lewis, O. L. De Lano, C. R. Jernberg and M. A. Metzger. Space 537.

Standard Railway Equipment Company, Chicago, Ill.—Murphy solidsteel roof; Murphy XLA flexible roof; Ideal and Z. U. carlines; Murphy corrugated steel end; Ajax corrugated steel

hopper door, Carmer release rigging, Imperial type "B" release rigging, Imperial centering device, National side door fixture and National corrugated steel side door. Represented by W. P. Murphy, A. A. Frink, S. G. Rea, Geo. I. Cooke, A. C. Murphy, G. G. Gilpin, A. G. Bancroft, V. E. Stetson, J. F. Cralley, W. L. Jefferies, Jr., S. M. Hindman, S. Worcester Sargent, C. G. Elliott, Geo. F. Cook and Frank Bergen. Spaces 426-428.

Standard Stoker Company, Inc., New York, N. Y.—duPont type mechanical stoker for locomotives. Represented by Alexis duPont, H. L. Walker, F. H. Cunningham, J. A. Carey, F. P. Roesch and J. E. Smith. Space 4 in main building and 338 in exhibition hall.

Standard Tank Car Company, Sharon, Pa.—One tank car on the exhibit track. Represented by G. F. Woodsmith, W. H. McCartney and M. F. Covert.

Stone Franklin Company, New York, N. Y.—Complete single battery axle generator equipment; complete double battery axle generator equipment. Represented by R. G. Coburn, C. E. Walker, H. D. Rohman, J. L. Hays and W. L. Gray. Space 406.

Stucki Company, A., Pittsburgh, Pa.—Side bearings. Represented by A. Stucki and A. B. Severn. Space 731.

Sunbeam Electric Manufacturing Company, Evansville, Ind.—Type RE-3, 500 watt, 32 volt locomotive headlight turbo-generator; pattern 1018 headlight; pattern 1412 headlight; pattern 1414 headlight; an assortment of reflectors, both glass and copper silver plated; also various accessories such as lamp stands, dimming devices. W. A. Carson, F. W. Edmunds, H. A. Varney, J. Henry Schroeder, L. B. Jones, W. T. Manogue and A. J. Leonard. Spaces 321-323.

Swanson Automatic Flange Lubricator Company, Denver, Colo.—Flange lubricator; air end pump lubricator; air pump piston swab nut lock. Represented by O. W. Swanson. Space 336.

Swind Machinery Company, Philadelphia, Pa.—One No. 314 Baker drill; 21 inch Fosdick upright drill; Gray sheet metal cutter; 13 inch Willard geared head lathe. Represented by L. H. Swind, J. E. Brandt, W. J. Powers, R. W. Burk and C. H. Ott, Jr. Spaces 156-158.

Symington Company, The T. H., New York, N. Y.—Full size models Farlow draft gear attachments; Symington journal boxes; Symington journal box lid with locking attachment. Represented by C. J. Symington, J. F. Schurch, T. C. deRosset, R. H. Gwaltney, A. H. Weston, I. O. Wright, Horace White, C. R. Naylor, Hynes Sparks and J. C. Barr. Spaces 568-569.

Tacony Steel Company, Philadelphia, Pa.—Reception booth. Represented by J. B. Warren and T. Burd Zell. Space 608.

Talmage Manufacturing Company, Cleveland, Ohio.—Automatic connector; a device for distributing lubricating oil; rachet hand brake; low water alarm; drifting valve. Represented by J. G. Talmage, F. M. Roby and A. F. Leatherer. Spaces 354-355-356-357.

Terwilliger Equipment Company, Philadelphia, Pa.—Detroit square and hexagon drills. Represented by M. J. Conboy. Space 336.

Transportation Engineering Corporation, New York, N. Y.—Electric storage battery trucks and tractors for freight stations, piers, shops and storehouses. Trailers, for use with electric tractors or for hand operation; charging apparatus; switchboards; Wanamaker coated electrodes for electric arc welding; welding wire for electric and gas welding; welding accessories; electrode holders; face shields; masks; water stills. Represented by H. G. Thompson, F. V. McGinness, H. H. Smith, K. R. Hare, H. W. Stortz and W. F. Gunn. Space 614.

Trumbull Waste Manufacturing Company, Philadelphia, Pa.—Jaumave tampico fiber. Various grades of journal box packing prepared with curled Tampico fiber as a substitute for wool waste. Represented by Raymond R. Bilter and W. P. Carroll. Space 757.

Tuco Products Corporation, New York, N. Y.—Tucolith plastic composition flooring material; flexolith composition flooring material; steel preservative as applied to chanarch; Imperial and Universal car window screens; National and Universal steel trap doors; trap door locks; resisto quilt hairfelt insulation; Tucork mineral insulation. Represented by D. W. Pye, W. J. Elliott, F. N. Grigg, J. W. Coleman, M. A. Whalen and F. A. Barbey. Space F.

Underwood Corpn., H. B., Philadelphia, Pa.—Locomotive cylinder boring, bar with contracted drive; one with regular spur gear drive; one circular planer tool; one heavy type rotary valve seat planer; one dome facing machine; crank pin turning machine attached to work; new type steam engine; hand pipe bending machine. Represented by G. A. Graham and W. Weidemann. Spaces 379-381.

Union Connector Company, St. Louis, Mo.—Union automatic tram-line connectors. Represented by C. A. Alexander, L. D. Woodruff and M. H. Martin. Spaces 374-376.

Union Draft Gear Company, Chicago, Ill.—Cardwell friction draft gear, type G, class 11-A; Cardwell friction draft gear, type G, class 11-A; duplex. Represented by J. R. Cardwell, L. T. Canfield, J. W. Hathaway, J. E. Tarelton, W. G. Krauser, C. J. Gorman, H. Barnard, F. E. Schmitz and J. A. King. Spaces 413-415.

Union Railway Equipment Company, Chicago, Ill.—The Ureco reclaim coupler release rigging; improved brine valve; tank hand-hole; drop brake shaft; pipe clamp; tank support; bevel hatchway; metal box-car ladder. Represented by W. B. Hall and A. F. O'Connor. Space 508.

Union Spring & Manufacturing Company, Pittsburgh, Pa.—Reception booth. Represented by L. G. Woods, F. E. Schaeffer, W. R. Blair, A. C. Woods and J. W. Chandler. Space 553.

United Engineering & Foundry Company, Pittsburgh, Pa.—Model forging press. Represented by A. P. Bark and H. D. Kneeland. Space 540.

United States Graphite Company, The, Saginaw, Mich.—Complete line of graphite and graphite products for the steam road trade. Represented by C. M. Williamson, F. B. Goddard and C. D. McIntosh. Space 359.

U. S. Light & Heat Corporation, Niagara Falls, N. Y.—USL car lighting devices in operation; arc welder demonstration; car-lighting storage battery; Willys light and power plant with USL battery. Represented by H. A. Matthews, E. J. Blais, E. T. Sawyer, R. R. Desmond, W. L. Bliss, Geo. L. Kyle, Geo. P. Wray, J. F. Geiger, W. A. Turbayne, E. Bauger and O. R. Hildebrand. Spaces 315-317-319.

U. S. Metallic Packing Company, The, Philadelphia, Pa.—King metallic packing; Gollmar bell ringer; Leach track sanders; Indestructible oil cups; Security wrist and knuckle pins. Represented by E. Curtiss, M. B. Brewster, J. T. Luscombe, J. S. Mace, H. E. Hyslop, R. R. Wells and L. B. Miller. Spaces 566-567.

United States Rubber Company, New York, N. Y.—Rubber hose, packings pump valves, axle dynamo belts, hard rubber products, friction tape and splicing compound. Represented by J. F. Tracy, W. B. Mallette, Marvin Stoddard, W. G. Lindsey, J. C. Lockhart, R. G. Kennedy, E. Hubert, W. C. Chambers, A. B. Means, G. W. Haynes, L. S. Hungerford, Jr., J. F. McDonnell, W. B. Wise and C. S. Prosser. Space 7.

Universal Car & Hose Coupler Company, Louisville, Ky.—Automatic car and hose coupling device. Represented by J. H. Funk and J. A. Houle. Space 36.

Universal Draft Gear Attachment Company, Chicago, Ill.—Cast steel coupler yokes; cast steel reinforcing draft arms; miscellaneous draft lugs in cast steel and malleable iron. Represented by C. J. Nash, C. C. Kinsman and H. I. Wrigley. Space 515.

Vanadium Alloys Steel Company, Pittsburgh, Pa.—High speed, carbon and alloy tool steels; ferro tungsten. Represented by W. I. Crocker and John Theis. Space 360.

Van Dorn Girder Plate Company, Chicago, Ill.—Models showing applications of Van Dorn corrugated steel ends to freight cars; models of Van Dorn ventilating floorings for refrigerator

cars. Represented by H. E. Van Dorn, Wm. E. Van Dorn, Walter H. Evans and Harold S. Brooks. Spaces 706-708.

Vapor Car Heating Company, Inc., Chicago, Ill.—The Vapor system of car heating—short-circuit cut-out method; new type steam hose couplers, with take-up lock; automatic car temperature control and automatic control for reducing yard temperatures; pressure reducing valves; steam traps; train pipe valves. Represented by Egbert H. Gold, J. E. Buker, S. Higgins, Frank F. Coggin, R. P. Cooley, W. L. Garland, L. B. Rhodes, N. F. Burns, Frank A. Purdy, C. E. Lowell, E. A. Russell, P. B. Parks, E. E. Smith and Wm. Damm. Spaces 208-210-212-214-216.

Victor Tool Company, Inc., Waynesboro, Pa.—Victor nut facing machine; self opening die heads; collapsible taps; universal patternmakers' vises; floating reamer holders. Represented by R. G. Mumma, V. R. Koontz and E. E. Smith. Space 219.

Vissering & Company, Inc., Harry, Chicago, Ill.—Viloco lead lined sanders; Leach type sanders; Viloco (Improved Gollmer) bell ringers; Crescent metallic packing. Represented by Harry Vissering, Chas. R. Long, Jr., G. S. Turner, W. H. Heckman and J. M. Monroe. Space 576.

Walworth Manufacturing Company, Boston, Mass.—Cast and malleable iron fittings; brass and iron body valves; large model of genuine Walworth Stillson wrench, Walworth Bostong; Walco adjustable hex wrench and Walworth Parmelee wrench; also various sizes of these wrenches. Various pipe tools including dies and pipe cutters; Kewanee unions and Kewanee specialties; also model of Walworth Stillson wrench enclosed in case and covered with radium compound so that such wrench is luminous in the dark. Represented by L. F. Hamilton, H. S. Patterson, H. T. Goodwin, F. J. Kelly and G. E. Beves. Space 412.

Ward's Sons Company, Edgar T., Boston, Mass.—Tool steel; steel tubing; steel wires; cold rolled steel; tempered strip steel. Represented by H. L. Edgcomb, W. T. James, W. H. LeMassena and G. Robert Osgood. Space E.

Warner & Swasey Company, The, Cleveland, Ohio.—One No. 2A universal hollow hexagon turret lathe making taper studs; one No. 3A of same design making gear blanks. Represented by L. K. Berry, E. R. Gardner, W. E. Marshall and H. E. Witham. Spaces 143-145.

West Disinfecting Company, New York, N. Y.—Regular standard devices for disinfecting, fumigating and sanitary purposes. Represented by H. E. Daniels, Everett Daniels, W. L. Larry and C. P. Williams. Space 26.

Western Railway Equipment Company, St. Louis, Mo.—Linstrom locomotive syphon; Security dust guards; journal bearing wedges; Western brake jaws. Represented by Louis A. Hoerr, Sterling Campbell and Roland M. Hoerr. Space 616.

Western Steel Car & Foundry Company. See Pressed Steel Car Company. Spaces 545-601.

Westinghouse Air Brake Company, Pittsburgh, Pa.—Universal passenger equipment demonstration rack of three cars and locomotive. Illuminated electric chart showing performance of UC passenger equipment with and without the electro pneumatic feature. Empty and load brake equipment demonstration rack. Westinghouse NA-1 friction draft gear complete; also a used gear taken out of service for test purposes after 25,000 miles' service on a large locomotive tender. Represented by A. L. Humphrey, W. S. Bartholomew, G. W. Wildin, C. C. Farmer, H. F. Woernley, E. A. Craig, J. B. Wright, F. H. Parke, R. W. Williams, C. R. Ellicott, F. H. Whitney, C. H. Beck, T. L. Burton, F. M. Nellis, C. J. Olmstead, A. K. Hohmyer, J. S. Y. Fralich, H. S. Clark, C. P. Cass, H. A. Wahlert, Robt. Burgess and T. W. Newburn. Spaces 23 to 29 and 134 to 144.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.—Type 815 switch; type 809 reversing switch; type C controller class C-7440; types 815 and 816 switch; type A auto starter; type 816 switch; 500 watt 32 volt turbine generator; type F. B. controller; type S duplex controller; type HK crane motor; 175 arc welding outfit. Represented by W. H. Patterson, C. M. Harris, R. L. McLellan, C. C. Bawden, M. Clegg, R. F. Moon, R. J. Ross, E. M. Wise, D. R. Weidon, W. R. Stinemetz, C. W. Babcock, H. C. Mode, A. M. Jones, I. S. Forde, F. W. Carter, H. W. Beaumont, H. K. Smith, F. E. Wynne and C. C. Whitaker. Space 136, and reception booths 23-25-27-29.

Westinghouse Church Kerr Company, New York, N. Y.—Reception booth. Represented by H. H. Kerr. Spaces 23, 25, 27, 29.

Wheel Truing Brake Shoe Co., Detroit, Mich.—Samples of abrasive brake shoes. Represented by J. M. Griffin and F. F. Griffin. Space 507.

White American Locomotive Sander Company, Inc., Roanoke, Va.—Graham-White perfect sanders shown and demonstrated. Represented by John E. Graham, James Frantz and W. L. Rauson. Space 205.

Whiting Foundry Equipment Company, Harvey, Ill.—Working model of Whiting screw-jack locomotive hoist for wheeling and unwheeling locomotives; folios of drawings, photographs and literature covering our complete line of cranes, foundry equipment and railway specialties, locomotive and coach hoists, turntable tractors and transfer tables. Represented by R. H. Bourne, N. S. Lawrence, R. S. Hammond and G. W. Ristine, Jr. Space 178.

Whitman and Barnes Manufacturing Company, The, Akron, Ohio.—Twist drills and reamers. Represented by R. S. Carter, R. A. Ammon, H. E. Fisher, M. J. Kearins, George Hine, H. B. Garske and K. J. Grant. Space 204.

Willard Storage Battery Company, Cleveland, Ohio.—Two sectional cells TF-13 battery combination paste and plante type; one two-cell crate showing section TB-25 paste and TR-13 plante in hard rubber jars; one two-cell crate without paint or linings; miscellaneous parts. Represented by Louis Sears and E. L. Myers. Space 730.

Wilmarth & Morman Company, Grand Rapids, Mich.—Number 1 and number 0 universal cutter and reamer grinder; number 78 surface grinder; number 1 surface grinder; type "B" Pt. and type "WFL" new yankee drill grinder; type "D" Pt. electric drive; type "WPNJ" drill grinder. Represented by Walter E. Heibel, Charles Meech and Lloyd M. Manley. Space 185.

Wilson-Imperial Company, Newark, N. J.—Passenger coach cleaning—exterior and interior. Imperial car cleaners and renovators for all purposes. Represented by J. MacNaull Wilson, D. J. Giles and Frank Sherritt. Spaces 202-204.

Wilson Welder & Metals Company, Brooklyn, N. Y.—Plastic arc welding materials. Represented by J. O. Smith, C. Hartford, P. H. Miller and S. A. Douglass. Spaces 224-226.

Wine Railway Appliance Company, The, Toledo, Ohio.—Wine side bearing, fruit car ventilators and hopper door device. Represented by W. E. Wine, R. F. Tillman, Cyrus J. Holland and W. F. Cremean. Space 630.

Woods & Company, Edwin S., Chicago, Ill.—One flat ball center plate; tip roller side bearing, U. S. R. A. standard, for cars, engines and locomotive tanks; 1 single roller Woods side bearing; 1 Woods "XL" side bearing; several models of side bearings. Represented by Albert G. Welch, William B. Ross, E. G. Jackson and H. M. Perry. Space 617.

Worthington Pump & Machinery Corpn., New York, N. Y.—Locomotive feed water heater; stationary power plant open feed water heater; feather locomotive snifting valve; 2 R oil engine and enclosed pump; Glendora model 3 plunger deep well pump; steam pump. Represented by Thos. C. McBride, H. E. Troutman, Paul B. Fenlon, Thos. C. Cruthers and F. Goodman. Space 133.

Wyoming Shovel Works, The, Wyoming, Pa.—Red edge locomotive scoops. Represented by H. T. Potter, W. C. Wright and E. L. Ruby. Space 211.

Yale & Towne Manufacturing Company, Stamford, Conn.—Hoisting equipment; locks for railroad purposes; overhead trolley; industrial trucks. Represented by C. W. Beaver, H. R. Butler, H. A. White, W. C. Bigelow and L. Kregner. Spaces 148-150.

Yarnall Paint Company, Philadelphia, Pa.—Steel panels showing railroad paints. Represented by L. P. Pratt, G. C. Fisher and V. G. Avery. Space 19.

Youngstown Steel Car Company, Youngstown, Ohio.—Reception booth. Spaces 740-742.

Zapon Leather Cloth Company, New York, N. Y.—Zapon leather cloth (artificial leather). Represented by W. M. Lalor and M. J. Dowling. Space 709.

L. R. Sillcox Promoted

H. R. Warnock, general superintendent motive power of the Chicago, Milwaukee & St. Paul, has given notice, under date of June 1, that L. R. Sillcox has been appointed assistant general superintendent of motive power, with headquarters at Chicago.

Chicago Train in Two Sections

The Pennsylvania special train from Chicago was divided into two sections of nine cars each. The first section left at 3 o'clock Monday afternoon and the second section a few minutes later. Both trains were well filled with convention people.

The Pennsylvania management evidently wanted to show its railway friends how to run a special train, for they gave the passengers on the first section a fast and smooth run and arrived in Atlantic City in twenty-two and a half hours, one hour and forty minutes ahead of the scheduled time. The second section rolled into the station here shortly afterwards, also ahead of the schedule.

John Scullin Passes Away

It is with the profoundest regret that we learn of the death of John Scullin of St. Louis, who passed away there on May 28.

Mr. Scullin's name is intimately associated with the history of the great west. A pioneer in the broadest meaning of that word, he was prominently identified with the construction and development of many steam roads, as well as building and controlling for a number of years the street railways of St. Louis.

At the time of his death Mr. Scullin was chairman of the board of directors of the Scullin Steel Company of St. Louis.

R. S. M. A. Annual Meeting

The annual meeting of the Railway Supply Manufacturers' Association will be held in convention hall on the pier at 12 o'clock Saturday. District meetings for the election of executive committee members will be held Saturday morning from 10.30 to 11.30 o'clock. For the purpose of canvassing the situation and naming a ticket for officers for the coming year President Carr has appointed the following nominating committee: Samuel G. Allen, Chairman; B. A. Hegeman, Jr., A. L. Humphrey, J. Will Johnson, A. C. Ashton, Harry W. Frost and Scott H. Blewitt, all past presidents of the Railway Supplymens Manufacturers' Association with the exception of Messrs. Humphrey and Ashton.

Yale & Towne Expansion

The Yale & Towne Manufacturing Company, Stamford, Conn., announces the purchase of the industrial electric truck division of the C. W. Hunt Company, Staten Island. Hunt trucks are manufactured in several types and have been in use for years in railroad terminals, steamship piers, warehouses and manufacturing plants. The entire trucking equipment of the Panama Canal consists of Hunt trucks. This business will be combined with the Yale & Towne hoist department thus making it possible to furnish the complete equipment for moving medium and light loads either vertically or horizontally.

The Yale & Towne Manufacturing Company is also the exclusive selling agent for Brownhoist trolleys which, used on overhead rails, provide for the horizontal movement of loads between fixed points. Arrangements have been completed to manufacture the Hunt line of trucks at Stamford.

$125,000,000 For Rolling Stock

Immediate appropriation of $125,000,000 of government funds for the use of railroads to purchase new rolling stock was announced to-day by the Interstate Commerce Commission. The money will be advanced out of the $300,000,000 revolving fund provided in the Transportation act.

Appropriations for additions and betterments to promote the movement of cars were fixed at $73,000,000; to meet maturing obligations at $50,000,000, and for loans to carriers at $12,000,000. Of the total to be advanced for rolling stock $75,000,000 will be set aside for the purchase of freight cars, with preference given to 20,000 refrigerator cars to move fruit crops, and $50,000,000 for the acquisition of locomotives, with preference given to freight and switching locomotives.

In each case first allotments will be made to roads making the greatest advances to meet the government loans. In the case of the advance for locomotives applicants will be required to contribute at least 50 per cent of the costs, but before any passenger locomotives are purchased attention will be given to the need for freight and switching engines by roads which are unable to make 50 per cent advances.

Roads applying for loans for equipment and betterments also will be required to make such contributions "as it is within their power to furnish."

The commission will not recommend loans out of the $50,000,000 fund for retiring maturing obligations unless the applicants have clearly exhausted every effort to take care of maturities "by extension, by refunding and by every other means."

Time for filing applications and amendments was extended to June 19th and the Association of Railway Executives, which proposed the division of the $300,000,000 revolving fund approved by the commission, was urged to submit its recommendations so that the general distribution of the funds might begin not later than June 26th .

Registration, American Railway Association, Sec. III, Mechanical

Alleman, C. W., G. S. K., P. & L. E., Elberon.
Anderson, R. W., Asst. S. M. P., C. M. & St. P., Marlborough.
Averill, E. A., C. O., Loco. Feed Water Htr. Co., Ambassador.
Barry, F. J., M. M., N. Y. O. & W., Chalfonte.
Beattie, J. A., G. S., McKeesport Connecting, Dennis.
Bell, J. Snowden, Affiliated, Wiltshire.
Bentley, H. T., S. M. P., C. & N. W., Marlborough.
Blake, R. P., M. M., N. P., Esplanada.
Bohan, W. J., Asst. M. S., N. P., Marlborough.
Bowersox, C., M. M., T. & O. Cent., Chalfonte.
Brazier, F. W., A. to G. S. M. P., N. Y. C., Marlborough.
Brewster, E. J., G. F. C. & N. W.
Burns, John, Works Mgr., C. P., Ambassador.
Callison, W. A., S. M. P., C. I. & L., Haddon Hall.
Cantley, Wm. L., M. E., Lehigh, Dennis.
Carson, F. L., M. Supt., S. A. & A. P., Sterling.
Collett, Robert, S. F. & L. P., N. Y. C., Strand.
Cook, Adam, Gen. Car Frman., N. P.
Cooper, F. E., M. M., B. & O., Traymore.
Cooper, F. R., M. M., Gold Car Htg. & Ltg. Co., Dennis.
Cory, Chas. H., C. H. & D., Dennis.
Crawford, D. F., Loco. Stoker Co., Brighton.
Crone, S. A., Buffalo Brake Beam Co., Dennis.
Crosby, R. M., Genl. M. M., N. P., Esplanade.

Curry, H. M., M. S., N. P., Marlborough.
Cutler, T. J., Gen. M. M., N. P., Esplanade.
Davey, T. S., S. St., Erie, Pennhurst.
Davis, J. E., M. M., H. V., Chelsea.
Davis, W. P., M. M., N. Y. C., Haddon Hall.
DeWolff, F. A., Interntl. Ry. Supply Co., Chelsea.
Dooley, W. H., S. M. P., C. N. O. & T. P., Dennis.
Dukerley, W. E., M. M., N. P., Esplanade.
Egbers, G. F., M. M., N. P.
Eich, H. C., G. S. M., C. G. W., Chalfonte.
Embury, W. B., M. M., Rock Island Line.
Endsley, L. E., Prof., University of Pittsburgh, Chalfonte.
Farr, B. J., S. M. P. & Car. Dept., G. T. & W., Marlborough.
Fitzgerald, W. T., M. M., Erie, Bothwell.
Flory, B. F., S. M. P., N. Y., Ont. & West., Marlborough.
Flynn, W. H., S. M. P., Mich. Central, Marlborough.
Foque, T. A., G. M. D., M. St. P. & Ste. Marie, Traymore.
Fox, H. K., M. E., C. M. & St. P., Traymore.
Fuller, C. N., S. M. P. & R., U. P., Marlborough.
Gaines, F. F., Bd. No. 3, U. S. R. A., Marlborough.
Giles, C. F., S. M., L. & N., Chalfonte.
Goodnow, T. H., S. C. D., C. & N. W., Marlborough.
Goodwin, Geo. S., M. E., C. R. I. & O., Chalfonte.
Greaven, Louis, S. M. D., Ferro Carril Del. Sed., Breakers.
Griffin, H. G., Gen. Supt., Morris & Co., Traymore.
Griffith, W. G., M. M., Marlborough.
Grimm, E. L., M. E., N. P. Ry.
Haig, M. H., M. E., A. T. & S. F., Chelsea.
Hartman, W. J., Air Brake Inspr., Rock Island Lines, Pennhurst.
Hawthorne, V. R., Secy. Sec. III, Mech., Amer. R. R., Marlborough.
Higgins, C. C., S. M. P., St. L. & S. F., Traymore.
Hogan, C. H., A .S. M. P., N. Y. C., Marlborough.
Hussey, F. A., M. M., B. & A., Pennhurst.
Huston, F. T., M. M., Penn., Chelsea.
Kellogg, D. P., S. M. P. & M., Los Ang. & S. L., Chalfonte.
Kerwin, J. M., M. M., C. R. I. & P., Strand.
Kinney, M. A., S. M. P., H. V., Traymore.
Kinney, W. H., M. M., N. Y. O. & W. R. R. Co., Strand.
Kirkman, W. B., Pres., Cropley Phillips Co., Haddon Hall.
Kuhn, B. F., Asst. S. M. P., N. Y. C., Marlborough.
La Mar, A., M. M., Penna. Lines, Dennis.
Laughlin, Geo. F., S. C. D., Fruit Growers Express, Marlborough.
Lewis, W. H., Marlborough.
Linstrom, C. A., Ch. Eng., P. A. & Mck., Shelburne.
Littlehales, D. S., M. M., N. P., Esplanade.
McCoff, J. H, M. S., A. T. & S. F.
McDonnell, F. B., M. M., Penn. System, Chelsea.
McPherson, T. J., M. M., Green Bay & Western, Princess.
McQuillen, J E., M. S., Gulf Colo. & Santa Fe, Esplanade.
Mechling, J. E., S. M. P., Penn. System, Craig Hall.
Meloy, H. C., Supt. Elect. Apply, N. Y. C., Dennis.
Milton, J. H., S. C. D., C. R. I. & P., Chalfonte.
Moore, B. R., S. M. P., D. & I. R., Traymore.
Moore, Wm., M. M., Erie R. R., Alamac.
Morehead, L. B., M. E., C. I. & L., Traymore.
Moses, F. K., M. M., B. & O. Chgo Term.
Mulreney, John, M. M., Detroit & Mac. R. R., Princess.
Murray, F. H., Shop Supt., Erie, Susquehanna, Alamac.
Murray, G. E., Elec. & Mech. Engr., Grand Trunk Western Lines, Marlborough.
Nash, J. H., S. M. P., I. C., Chalfonte.
Neesley, F. P., M. M., I. C. R. R., St. Charles.
Neish, J. B., M. M., N. P., Esplanade.
Nelson, M. M., G. F., N. P., Esplanade.
New, W. E., M. M., K. C. Terminal R. R.
Norton, C. H., M. M., Erie, Pennhurst.
Olsen, W., S. of P. P., N. Y. C., Haddon Hall.
O'Neil, W. J., M. M., C. R. I. & R., Breakers.
Osmer, J. E., S. M. P. & C. D., Ann Arbor, Chalfonte.
Parks, G. E., M. E., M. C., Brighton.
Parsons, C. F., M. M., Mch. Div. N. Y. C., Marlborough.
Peck, C. E., A. S. M. P., Oregon, Washington R. R. & Nav. Co., Chalfonte.
Porth, H. W. L., M. C. B., Swift & Co., Traymore.
Pownall, W. A., M. Eng., Wabash Railway, Traymore.
Pratt, E. W., Marlborough.
Prendergast, A P., S. M., Tex. & Pac., Marlborough.
Preston, Robert, Asst. S. M. P., C. P., Haddon Hall.
Purcell, John, Asst. to V. P., A. T. & S. F., Marlborough.
Rae, Clark H., Asst. Supt. Machy, L. & N., Shelburne.
Ream, A. H., S. M. P., P. & S., Arlington.

Special Guests

Arn, J. G., L. & N., Chalfonte.
Blackburn, H. E., Supervisor Apprentices, Erie, Clifton.
Brehenfeld, J. C., Supt. of Shops, St. L. & S. F., Princess.
Gorman, John C., Supt., McK. Con., Galen Hall.
Davey, T. J., Gen. Boiler Insp., N. P., Esplanade.
Davis, Jas. P., Gen. Ext. Agt., McKeesport Connecting Rd., Galen Hall.
Drake, W. A., Manager, Penn Tank Line, Traymore.
Fatzinger, Thomas, Erie, Bothwell.
Hair, John, Special Engineer, B. & O., Dennis.
Hill, A. T., G. F. A., Lake Terminal, Galen Hall.
Horan, F. T., Asst. Supt., Lake Terminal, Galen Hall.
Hughen, J. M., M. C. B., Penna. Tank Line, Traymore.
Kitchcock, W. D., M. M., A. T. & S. F., Ambassador.
Jordan, Paul W., W. B. Kirkman, Haddon Hall.
McDowell, J. L., General Car Foreman, K. and I. Terminal, Orborn.
McLaughlin, D. J., Traymore.
Montgomery, H. B., Traymore.
Myers, R. B., Traymore.
Owens, R. H., M. C. B., Cosden & Co., Strand.
Pullar, John, M. M., A. T. & S. F., Ambassador.
Reisse, J. H., Ch. Draft., C. B. & Q., Marlborough.
Ritz, Austin L., Traymore.
Ross, W. C., M. M., Copper Range, Strand.
Russell, H. L., Draft. M. P. Dept., W. & L. E., Shelburne.
Stevens, F. J., M. M., Atlantic & Shore R. R. Co., Haliburton Apt.
Strous, C. E., M. M., L. & W. B., Brighton.
Thomas, F. W., Supt. Apprentices, Sante Fe, Chalfonte.
Tutt, T. I., V. P., Penn. Tank Line, Traymore.
Vought, Harry D., Secy., New York Ry. Club, Marlborough.
Wiberg, R. L., Asst. Gen. Foreman, B. & A., Pennhurst.

Conventionalities

Mr. and Mrs. George R. Carr arrived in Atlantic City several days before the conventions opened. They are at the Marlborough-Blenheim. Their early arrival was necessitated by Mr. Carr's many duties and responsibilities as president of the Railway Supply Manufacturers' Association. This is Mrs. Carr's first appearance at these conventions and her presence has already been appreciated. Mr. Carr has missed but one of these conventions since 1906. That was the convention in 1913 when Mr. and Mrs. Carr were married in San Francisco. That year surely must have been the year in which the expression originated. "Two is company, three is a convention." It may be added that Mr. and Mrs. Carr have just moved into their new home at Lake Forest, Illinois, and that during their absence their two daughters, Katherine and Martha, are taking good care of the flowers and the natural beauties of the place.

It is to be regretted that W. T. Tyler, vice-president of the Northern Pacific and former director of operation of the Railroad Administration will not be able to attend the convention. Mr. Tyler had arranged to be here but an important inspection trip over the Northern Pacific prevented. Mrs. Tyler and her two nieces, however, will be among the convention visitors.

H. G. Thompson of the R. S. M. A. executive committee certainly is handy with a nail puller and he swings a wicked hammer. Either business must be good or he has missed his calling. A first-class carpenter can call for a comfortable looking envelope on Saturday now-a-days.

William Schlafge, mechanical manager of the Erie, drove down from Ridgewood, N. J., to the Strand Hotel, 170 miles, in five hours and a half Tuesday—and got here without being arrested!

The mechanical departments of the main lines of Cuba are expected to be represented this year in the arrival today of George Knight, superintendent of motive power of the Cuba Railroad at Camaguey, Cuba, and Major Major, who occupies a similar position on the United Railways of Havana. The latter recently succeeded O. R. Hale, who resigned to enter the railway supply business on the island of Cuba.

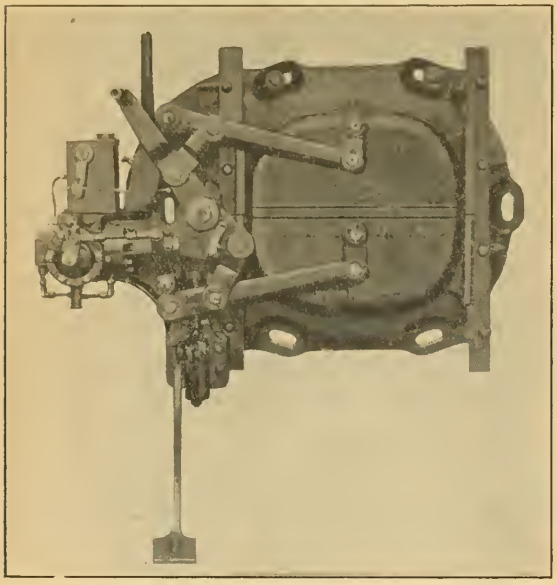
Frank DeWolff, formerly locomotive superintendent of the Cuban Central at Sagua La Grande, Cuba, is here this year in the capacity of special representative of the International Railway Supply Company. Thus has this concern annexed a second star from the field of Latin America, O. R. Hale, well known here as the former superintendent of motive power of the United Railways of Havana, having been the first.

George Green, vice-president of the National Waste Company, is playing a dual role at the convention this year. A short time ago the Universal Packing & Service Company was incorporated and Mr. Green was made president. The other officers are J. P. Landreth, vice-president, and L. Rowe, secretary and treasurer. H. W. Davis, of the Inspection and Test Section of the Railroad Administration, has recently become identified with this company.

New Devices Among the Exhibits

Laco Locomotive Firedoor

One of the most interesting features in connection with a new automatic locomotive firedoor that has been placed on the market by the Locomotive Appliance Company, Toledo, Ohio, is that it may be operated with either steam, air or, if necessary, by hand. The advantages of a firedoor that can be satisfactorily operated by steam in place of air are obvious. In the first place, the economy obtained through utilizing a primary in place of a secondary source of power is con-



Laco Steam and Air Operated Firedoor

siderable. At the most recent convention of the Air Brake Association a report was submitted showing the extent of the loss attributable to the automatic firedoor and other air operated devices. The air required to operate an automatic firedoor is considerable and there are other objections to drawing on this source of power for the operation of all of the ever-increasing number of air operated auxiliary appliances being placed on locomotives.

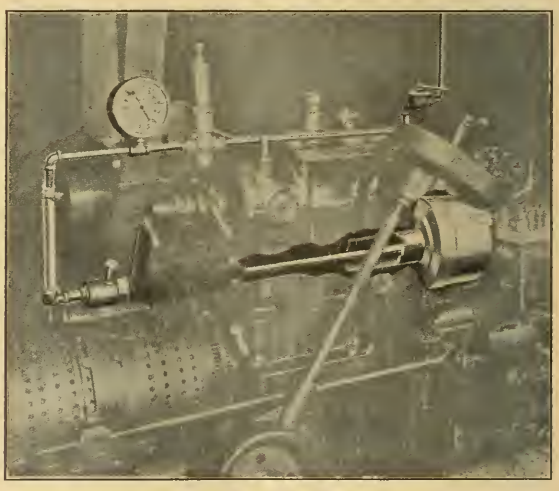
The manner in which this door operates does not differ greatly in other respects from other automatic firedoors. The foot lever is in the customary location and a hand lever is conveniently located at the left hand side of the door. In fact, anyone familiar with the operation of automatic firedoors could operate this door with equal facility. Moreover, the door is standard to all locomotives; that is, the contour ring is a separate piece which can be adjusted to fit any type of door opening.

There is nothing complicated about this device. All working parts are accessible for inspection and the wear of the operating mechanism comes entirely on pins that can be easily renewed when worn. Long wear and smooth operation, however, are insured by a positive type force feed lubricator mounted over the motor. The operation of this motor is controlled by a rotary valve. The door is both pressure opened and pressure closed. Full pressure is exerted to open the door to within one inch of its maximum opening and the cushion of the operating motor slowly completes the stroke. In closing, the customary bang and clatter is eliminated by the cushion in the operating motor which operates as in opening.

The Laco locomotive firedoor is operated by either steam or air below normal operating pressure of the locomotive and this is controlled by a pressure regulator set at 65 lb. The change from steam to air as an operating medium can be made quickly and the door can be operated by hand at any time without difficulty. A safety locking arrangement is provided, by which the door can be locked in any position, eliminating the possibility of the doors sliding shut when a mechanic is at work inside the firebox.

Reconstructed Air Chuck

The Lavoie air chuck as manufactured by the Frontier Chuck & Tool Company, Buffalo, N. Y., was originally designed for shell work during the war and when this class of production was eliminated to a large extent, steps were taken to perfect the chuck for commercial purposes. When first made no particular thought was given to shop criticisms in the way of overhang, movement of the jaw and openings in the face, due to the fact that the grip was held to be most



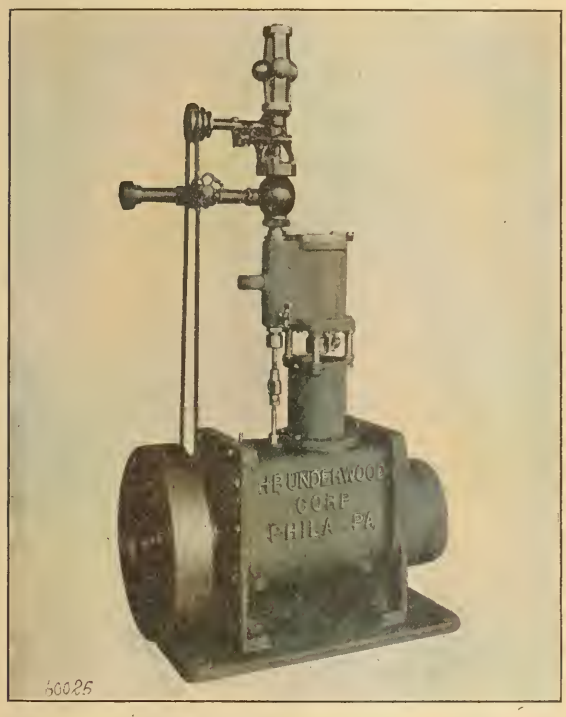
Lavoie Air Chuck Applied to Automatic

important. Since that time, however, the chuck has had to be reconstructed in order to give sufficient grip to handle general production work and at the same time reduce the overhang to a minimum. Sufficient movement of the jaw to take care of more general variations in castings and forgings and a closed face to prevent dirt from entering the chuck are additional advantages now secured. The new chucks manufactured on these lines

have proved, after extensive production tests, that the changes were well worth while. The three-jaw chuck is made in sizes ranging from 10 in. to 24 in. and the two-jaw chuck in sizes ranging from 6 in. to 12 in.

Air or Steam Operated Engine for Portable Tools

THE LATEST ADDITION to the line of portable tools manufactured by H. B. Underwood & Co., Philadelphia, Pa., is a small engine built in three and five horsepower sizes. This engine is designed to drive portable tools, such as boring bars, valve seat rotary planers, drilling machines, etc. It is constructed to use either compressed air or steam. Designed with the idea of securing maximum economy and durability, this engine is intended to equal an air or electric motor for



Underwood Air or Steam Operated Engine

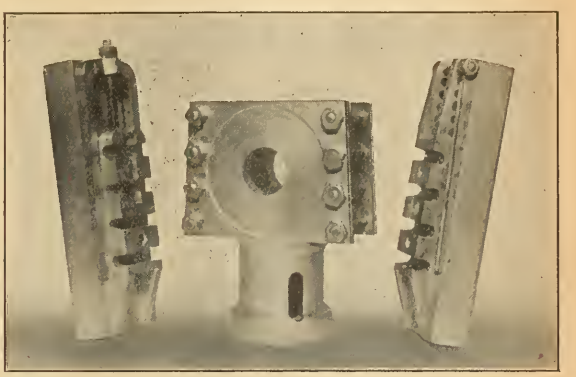
quick work and be more economical, particularly when near a line of steam or compressed air.

All working parts are enclosed in an oil-tight case, which is formed in the base of the engine, making it dustproof and reducing wear to a minimum. The cylinder of the three-horsepower engine is 3½ in. in diameter and the five-horsepower 4 in. in diameter. Both engines have a stroke of 3½ in. The design of the suction valve used reduces friction and wear to a minimum. The crank shaft is a solid steel forging, finished 1½ in. in diameter. The engine is well balanced, using 70 to 125 lb. pressure and runs at a speed of 250 r.p.m. When running at a higher speed there is little tendency to vibrate on account of the careful machine design. The floor space required for this engine is 12 in. by 21 in. and the height from the base to the top of the governor is 46 in.

Rogatchoff Adjustable Crosshead

AN ADJUSTABLE CROSSHEAD for locomotives is being exhibited at the booth of the Metal & Thermit Corporation. The distribution of this crosshead is controlled by the Theodore Rogatchoff Company, of Baltimore, Maryland, and it has given a very creditable performance in test on one of the larger Eastern railroads.

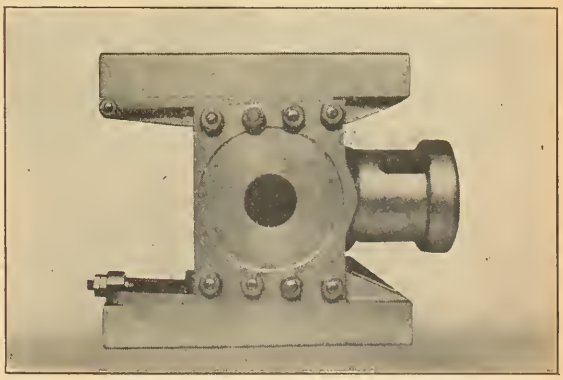
The crosshead consists of several parts, the shoes being detachable and provided with adjustable wedges by means of which the wear on the crosshead shoes may be



Details of the Rogatchoff Adjustable Crosshead

taken up and the crosshead kept in proper contact with the guides. The crosshead itself has the two sides spaced apart, as shown in the illustrations, with the inner face of each side beveled inwardly to receive a corresponding beveled projection on the crosshead shoes. The shoes are provided with open bolt slots so that they are free to adjust themselves as the adjusting wedges are moved from one position to another.

In service the operation of the adjustable crosshead is as follows: Assuming that the wear on the crosshead shoes has progressed so that there is too much play between the guides, the bolts of one of the shoes are loosened, a jack set at the front between the shoe and



Rogatchoff Adjustable Crosshead Ready for Application

the crosshead and another jack at the back between the shoe and the main rod. The wedge bolt may then be taken out, the wedge moved to another hole and the wedge bolt replaced. Both jacks are then taken off and one jack set between one of the guides and the main rod. All bolts are then tightened and the jack taken off, the

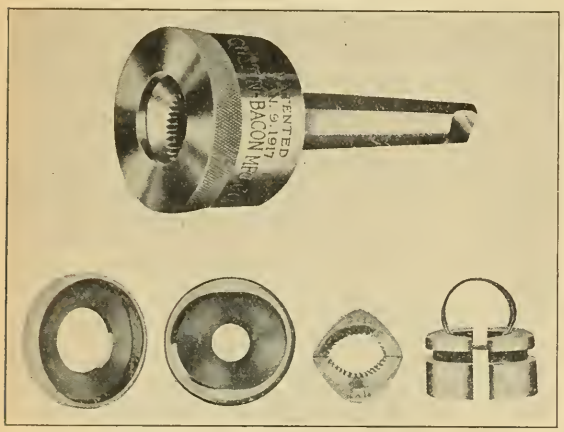
entire operation being completed and the locomotive again ready for service in a very short time.

This adjustable feature may be adapted to existing crossheads of the solid type as all the work that is required may be done in any railroad machine shop.

The performance of this adjustable crosshead, in test, gives promise that it will become an important addition to the economical operation of the modern locomotive as, because of its easy adjustment, it should reduce labor costs on crosshead work to a great extent, and for the same reason should permit a locomotive to remain in service a greater portion of the time.

Reversible Driving Chuck

THE GUSTIN-BACON MANUFACTURING COMPANY, Kansas City, Mo., has placed on the market a reversible driving chuck designed particularly for setting staybolts without the necessity for squaring the head. The device is specially applicable to setting staybolts by motor, for the reason that the jaws will retain their grip on the staybolt when the motor is reversed to return a bolt that is run too far or to remove staybolts. This reversible chuck is also applicable to driving straight shank reamers and taps. From the illustration of this device it will be seen that the chuck has two symmetrically placed jaws having an oval aperture, and that these are mounted in such a manner that the size of the chuck can be easily altered by changing the jaws. The chuck, however, will accommodate without change round bars varying 5/16 in. in diameter. It is claimed that in the operation of this chuck it will always run central, making it easy to handle the motor, and that the jaws will not lock, no matter how hard the motor pulls. In the illustration the figure in the lower right-hand corner shows the form of jaws furnished with this chuck for use on square heads. When these jaws are used the chuck will accommodate any size between 5/8 in. and 7/8 in. without change.

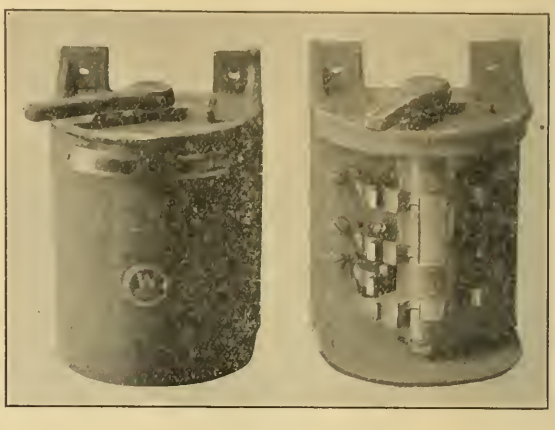


Reversible Driving Chuck

It is believed that the use of a chuck which will handle staybolts without necessitating the heads being squared will ordinarily save a considerable amount of time and material. The design of the Gustin-Bacon reversible driving chuck is such that only the jaws will need to be replaced with wear, and as these are made from tool steel, properly tempered, they will last many months under usual service conditions.

Drum-Reverse Switch

THE 809 DRUM REVERSE SWITCH shown in the exhibit of the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., is designed especially for starting and reversing small alternating and direct current motors driving auxiliary apparatus on almost all equipment in railway repair shops. It is also serviceable wherever a totally inclosed, double throw, two or three pole switch is desired. The maximum horsepower for direct-current service is as follows: 115 volts—2.5 hp.; 230 volts—5hp.; and for alternating-current service: 110 volt—2.5 hp. and 220 and 440 volts—5 hp.



Drum Reverse Switch

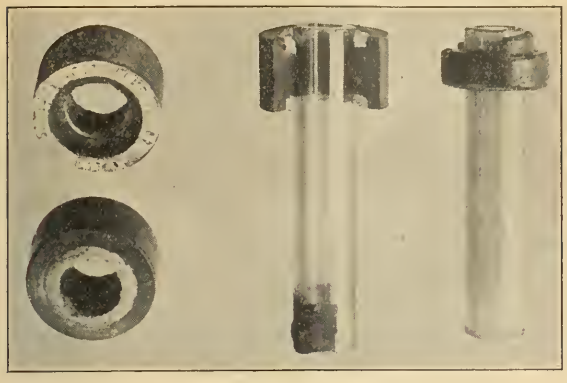
Arranged for suitable mounting on the machine base, the reverse switch is of compact construction. It is simple and rugged, neat in appearance and arranged for conduit wiring. All live parts are protected from accidental contact by means of an inclosing cover of sheet steel, lined with asbestos. The contacts, both fingers and drum segments, are of hard-drawn copper and brass, rated liberally to assure long life. The cover is easily removed to allow inspection and any adjustments that may be necessary. This switch is especially adaptable for connecting small alternating-current or direct-current motors directly across the line.

Safety Water Gage Gaskets

STOPPAGE OF CIRCULATION in water gages by flowed rubber gaskets has by record of the Interstate Commerce Commission and in the knowledge of many railway mechanical officials been a contributory cause of boiler accidents. When rubber is subjected to temperatures as high as that of the water in a gage glass it does not melt, but is liable to become plastic and flow through the clearance which must be allowed in a metal stuffing box for variance in size of the tubular glass ends and thus work into the water column so as to obstruct the passage of water to and from the gage glass. In the upper right-hand corner of the accompanying illustration will be seen an all-rubber gasket which has commenced to flow toward the end of the gage glass.

The Sargent safety water gage gasket is similar in form to the all-rubber gasket, but has two protective rings of asbestos cemented to the two points where flow would ordinarily take place. The rubber remains in contact with the gage glass, but only in the center of the gasket, there being a ring of asbestos surrounding the

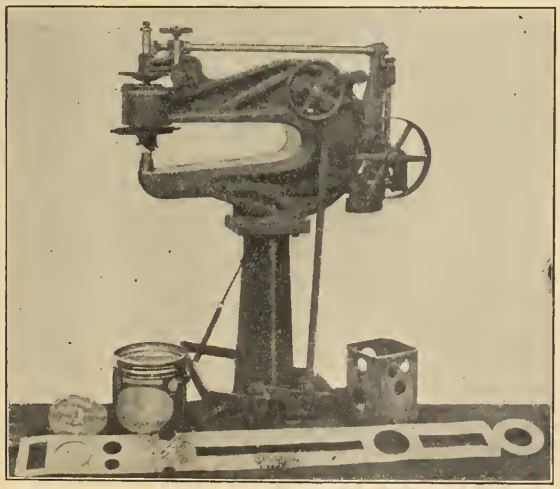
glass on either side of the gasket, as is shown in the sectional view of this gasket. This gasket is a new device, as safety gaskets previously manufactured by the Sargent Company, of Chicago, have had both ends of the rubber gasket entirely faced with asbestos. Perfection in design, particularly when it effects safety, is dependent on detail, and any water gage, no matter how well designed, may become inoperative by means of a faulty gasket. In view of this, the design of a safety gasket as described is an important development. The maintenance expense of water gage gaskets is so small an item that no pains should be spared to equip all gages with the best gaskets available.



Safety Gage Gaskets and the Ordinary Type

Turret Rotary Shears

A ROTARY SHEAR that cuts any shaped openings without cutting in from the edge and without turning the sheet, is being introduced by the Southwark Foundry and Machine Company, Philadelphia, Pa. This development in sheet and plate shearing is made possible by a turret, carrying the upper cutter, which while cutting can be changed to any degree of a circle about the lower cutter. The simultaneous driving of both cutters automatically pulls the sheet through the shear. The line to be cut is accurately followed by turning the guide wheel which controls the turret. This operation can be performed from either side of the machine. Openings in widths equal to double the throat depth and no limit on lengths can be cut.

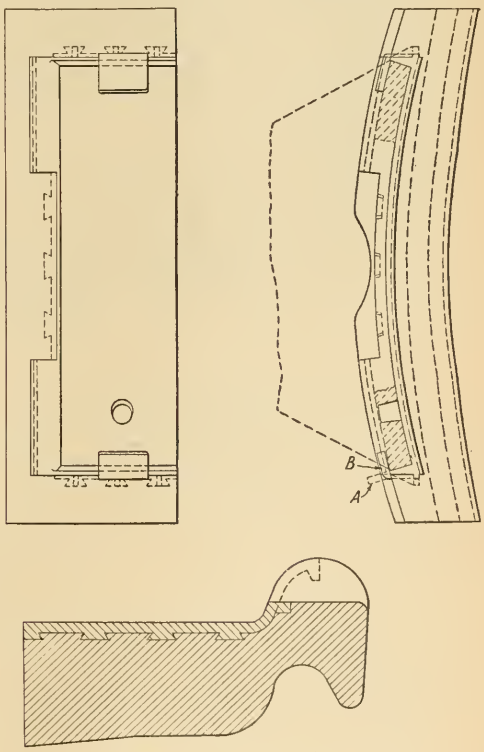


Gray's Turret Rotary Shear

The cutting of circular and oval shapes is done in a continuous operation. In cutting angles, the clutch is thrown out by means of the foot lever; the upper cutter is moved to a new position on the converging line; the power is thrown in; and the new cut is made to the first line. The cutting of zig-zag lines and small radii is made possible by a sensitive clutch controlled by the foot lever. The power is engaged by a mechanism that can be stopped and started within $\frac{1}{32}$ of an inch. The machine is made in five sizes to shear plate up to 1 in. thick.

Cast Steel Plate Back Driver Shoes

THE STANDARD BRAKE SHOE & FOUNDRY COMPANY, Pine Bluff, Ark., is exhibiting driving brake shoes with cast steel backs that embody several novel features. These brake shoe backs are all solid cast steel plates reinforced lengthwise by ribs which are dovetailed so as to engage the cast wearing portion of the shoe. This obviates the large bolt holes that must be punched through backs of the pressed steel type and provides a means of reinforcement not found on the pressed backs.



Cast Steel Plate Back Driver Shoes

A particularly interesting feature in connection with these brake shoe backs will be noted in the design of a new type of end hung shoe, in which a lug is cast integral with the back in such position that it will fit into a hole in the brake head where ordinarily a bolt is required to fasten the lower end of the brake shoe to the head. After the shoe is hung in place on the head the clip *A*

is bent over by a blow from a hammer to position *B*. The clip at the top of the brake back is made so as to engage the top of the brake head in the manner shown in the drawing of this device.

The use of a lug cast integral with the brake back and clips to engage the brake head at the top and bottom have several advantages in addition to simplicity of design. Where a bolt is used in place of the lug, the hole cast through the facing of the shoe very materially weakens it at that point and adds another item to the maintenance of the locomotive brakes. Not only must bolts be supplied where the lug is not used, but as may happen, this bolt may be left out through negligence, allowing the shoe to swing out of place or even to become detached and cause serious injury.

Air Hose Built Like a Cord Tire

GOOD AIR HOSE is an investment that readily justifies the purchase price of the best grade obtainable. The Chicago Pneumatic Tool Company, Chicago, Ill., among its products and accessories, is exhibiting a new grade of air hose that will interest users of pneumatic tools.

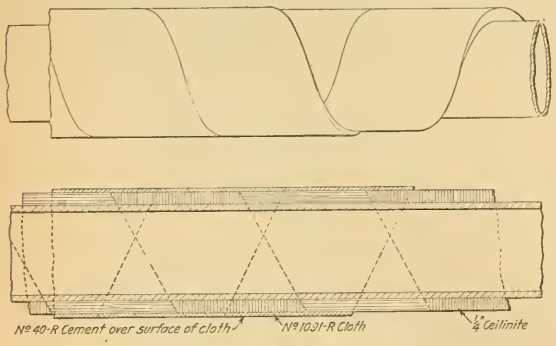
The hose is built like a cord automobile tire, is oil-proof and, it is claimed, resists deterioration to a remarkable degree. Its tough covering and braided construction results in a powerful structure which greatly reduces hose troubles and expensive replacements. Samples of this hose, sectioned to show its unusual construction, are on display.

New Johns-Manville Products

THE H. W. JOHNS-MANVILLE COMPANY, New York, has placed a number of new devices on the market since the last convention, among which the following are noted as of particular interest to railroad mechanical men.

Spiral Locomotive Pipe Insulation

This pipe insulation has been designed to provide a flexible covering that will adapt itself to the curved surfaces of small steam pipes in cab and also the main steam line to the air pump and turbo generator. A great many



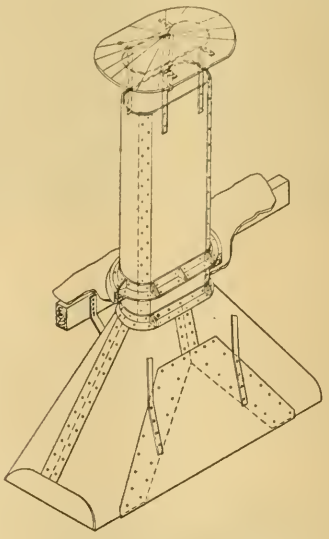
Johns-Manville Pipe Insulation

accidents have resulted in past years from engineers, firemen and hostlers putting their hands on these hot surfaces. The use of the insulation has entirely overcome this condition and in addition has acted as a conservation measure by reducing the radiation loss from pipes exposed to the outside temperatures. It was found on air pumps that when these pipes were uninsulated so much condensation was being delivered to the pump as to make it almost necessary to install a trap in the line.

The new insulation consists of the application of ¼-in. asbestos ceilinite to the outside of the pipe, wound spirally, over which is placed a layer of asbestos cloth, wound spirally in the opposite direction. The entire surface on the outside is finished with a special cement, which hardens and makes a surface that can be brushed against without deteriorating the material underneath. It can then be painted with ordinary locomotive paint to correspond with the finish.

Smoke Jack

This type of smoke jack has been designed so as to eliminate corner angles on account of the rapid deterioration that commonly occurs in the sharp angles. The smoke jack is constructed of transsite asbestos wood ⅛-in. thick, which is curved and moulded in the desired



Transite Asbestos Smoke Jack

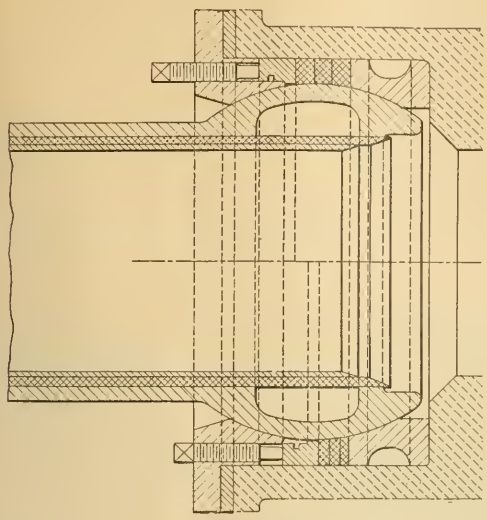
form. The use of broad curved surfaces and the elimination of angles also aids the free passage of gases and smoke, thereby assisting in the operation of locomotives under forced draft.

Exhaust and Receiver Pipe Ball Joints for Mallet Engines

A new design of these joints allows the quick application of a special packing material, all of the gland seats being flat instead of bevel, as in past practice. Packing spaces on all joints have been made a standard size: namely $2\frac{3}{16}$-in. when the packing is new, and when it has reached the limit of adjustment and the adjusting screw is against the bearing gland, the packing is renewed. By the clearance between the bearing glands and the head of the adjusting screw it can easily be determined from observation exactly how much further the packing can be compressed before it is necessary to remove it. Grooves have been turned into the packing follower so as to allow these to be easily removed by packing hooks. The diamond shaped metal ring, formerly used as a spacer between the packings, has been

eliminated, this space now being taken up by the three one-inch rings.

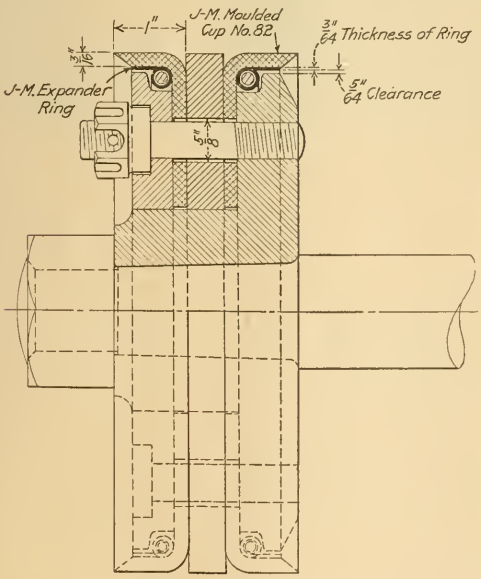
Steam leaks through the flexible joints on Mallet engines have been a source of annoyance, making it very hard for the engineer in cold weather to observe the signals. They also represent a waste of steam which this new packing arrangement is designed to overcome.



New Ball Joint for Mallet Locomotives

Reverse Gear Piston

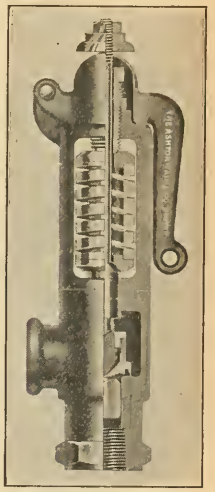
This design consists of a double piston with a metal filling piece and moulded cups with expanders between as shown in the accompanying sketch. The packing is similar to that previously designed for air brake cylinders and has already been tried on the Alco, Mellin, Lewis and other reverse gears and found to reduce air leakage in the cylinder and consequent creepage of the reverse gear. The reverse gear leakage problem is very serious, as is indicated in reports recently submitted by the Air Brake Association. The number of auxiliary devices requiring air from the brake system as a source of power has multiplied so rapidly that it is imperative that the utmost care be exercised to prevent any unnecessary loss of air through leakage. Moreover, the reliability of the reverse mechanism depends very largely on the maintenance of tight packing.



Reverse Gear Piston Packing

Pop Safety Valve for Superheated Steam

A TYPE OF POP SAFETY VALVE adapted for superheated steam service and exhibited by the Ashton Valve Company, Boston, Mass., is shown in the illustration. The special features embodied in this valve which make it particularly desirable for use on superheated steam are the cast steel body, nickel seat bushing and wing valve, strong lifting gear and general compactness of design. The spring is so located that it is entirely free from any exposure to the high temperature steam, which otherwise might affect the temper of the steel. The valve is finished with either screwed or flanged connections and in all standard sizes. The boiler code rules of the American Society of Mechanical Engineers provide for the application of safety valves on the superheaters of stationary boilers and this type of valve is well suited for the purpose.



Outside Spring Pop Safety Valve

Wertz Rod Grease Cup

ONE OF THE INTERESTING DEVICES being exhibited by L. W. Garratt, Pittsburgh, Pa., is the Wertz rod grease cup which is designed so that it will not work loose and fall off. This new device consists merely of the ordinary cup, screwed into the rod, with the usual plug inserted to force grease onto the bearing surfaces, but the new feature lies in the method used to prevent loss from the locomotive. The base of the cup is hexagonal in shape to permit use of a wrench in screwing it down, and one of the corners is tapped to take a 3/16-in. machine screw. A 3/16-in. hole is drilled in the rod directly beneath to a depth of 1/4 in., taking the machine screw and thus preventing any turning of the cup. The plug is threaded for a distance of one inch, with 12 threads, and has two recesses opposite each other, cut to a depth of 1/8 in. A stout flat spring, held in place by the head of the machine screw which enters the side rod, moves a pin through a small hole inside of the cup and enters the recess. One side of this recess, being cut to a slope, permits the plug to be screwed down as occasion demands, but the other side is cut perpendicular to the threads, and the pin actuated by the spring prevents a reverse movement. To remove the cup for filling the spring is merely drawn back while the plug is backed out.

Ball Bearing Screw Jack for Car Work

A NEW HIGH SPEED ball bearing screw jack for locomotivs was recently introduced by the Duff Manufacturing Company, Pittsburgh, Pa. The design differed from other screw jacks in having the operating mechanism in the base instead of in the head. This unique design has a number of advantages. The greater portion of the weight being concentrated at the bottom prevents the jack from being top-heavy. Another advantage is that the point at which the operating lever is pivoted does not rise with the load. This allows a full powerful stroke, regardless of the height of the load. The jack is also unusually easy to move about and place under the load to be lifted. The jack intended for locomotive use, which is of 75 tons' capacity, proved so popular that the company has now brought out a similar design of 50 tons' capacity for car work. With the increased weight and carrying capacity of freight cars used to-day the ratchet jacks are not powerful enough and are often unsafe.

The mechanical principles of the new jack are the same as used in the 75-ton locomotive jack. The load is lifted by a six-foot steel lever which operates a double threaded screw through a ratchet and gearing. The screw has a very steep pitch and turns in a bronze nut. A positive clutch holds the load at all times and a signal is provided to indicate when the jack has reached its maximum height. For lowering, a crank handle is used, and while the lowering speed is high, the load can be stopped at any point desired.

While the 75-ton jack has permanent wheels for transporting it attached to the base, the 50-ton jack has a removable buggy by which it can be wheeled wherever required. This jack is made in a variety of heights, ranging from 20 to 36 in. A removable forged steel claw can be supplied for raising loads where there is not sufficient clearance to admit the head of the jack.

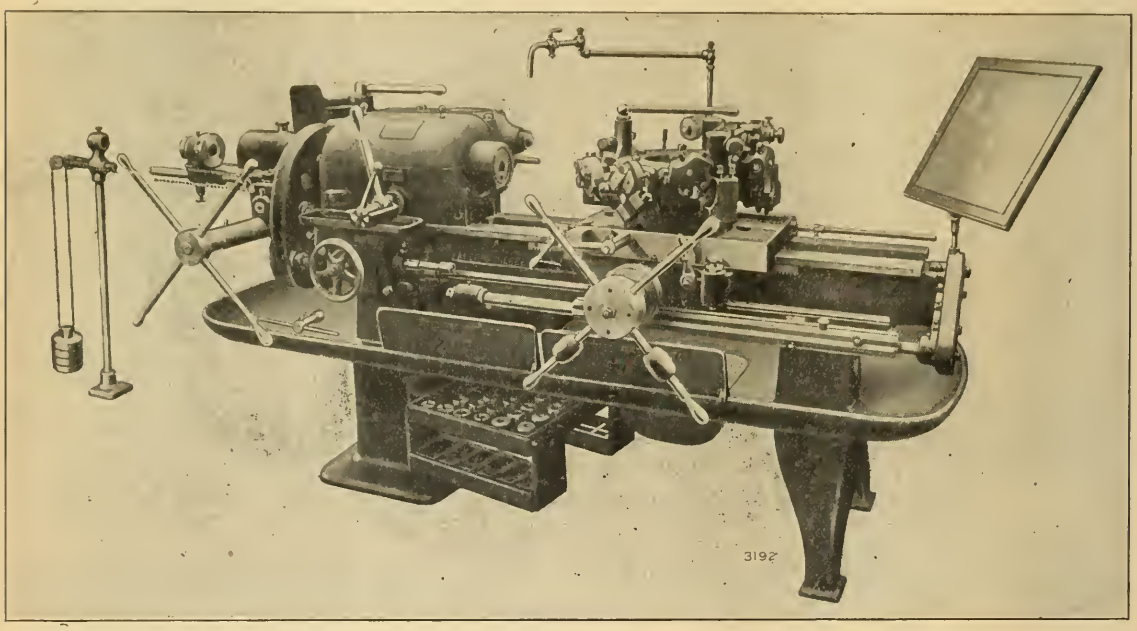
Hexagon Turret Lathe

AMONG THE MACHINES placed on the American market recently and exhibited by Alfred Herbert, Ltd., New York, is the No. 1 hexagon turret lathe shown in the illustration. This machine is designed for bar work and is made in three sizes to produce machined parts up to 3½ in. in diameter by 42 in. long. Forgings can be machined and in many cases work larger than 3½ in. in diameter can be handled. Work such as boiler staybolts having two threaded portions separated by an unthreaded portion can be produced by an arrangement of tandem die heads, the threaded portions being formed at the same time.

Taper work of greater length than can be turned by broad tools in the cut-off rest can be performed on this machine by means of a taper turner. Work of curved outline, to produce articles such as handles or balls, is done by means of broad form tools carried in the cut-off rest. A steady bush is used to support the work.

Valuable features of the No. 1 turret lathe include power rotation of the turret, quick power motion of the turret slide, patented roller steady turners, dial feed motion and self-opening die head and dies. The automatic and dead stops act in either direction. Any number of stops can be used for any tool. These stops are carried by a hexagon bar geared to rotate with the turret and extending along the front of the bed. The stops trip the feed and act as dead stops. They are adjustable throughout the entire range of the lathe and are protected in such a way as not to become clogged up with chips.

An accurate indicator is furnished which enables dead lengths to be obtained within close limits of error. Its effect is to insure uniform pressure on the stocks independent of changes in pressure on the cutting tools as they become dull.



No. 1 Hexagon Turret Lathe With Geared Draw-in Chuck

Railway Age

DAILY EDITION

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WE GUARANTEE that of this issue, 15,000 copies were printed; that of these 15,000 copies, 13,480 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 140 were mailed to advertisers, 280 were provided for counter and news companies' sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 1,100 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

If you do not care to preserve it, please hand it on to your neighbor or return it to the *Railway Age* office.

Don't Destroy Your *Daily*

Our supply of paper is limited because of the acute paper shortage. An ample number of copies have been provided for distribution at Atlantic City, but the attendance is so much larger than usual that it will be necessary to get the greatest possible use from each copy of the *Daily*.

Buying in Haste and Repenting in Leisure

Elimination of fuel and labor saving devices as a means for advancing the date of deliveries of locomotives recently ordered is inexcusable. The engines may arrive on the scene at an earlier date, but how about the time that may be subsequently lost in delays for steam because of the absence of two or three devices that would have enabled the fireman to maintain steam pressure? Difficulty in financing the purchase of new locomotives may be a more plausible excuse for eliminating devices that add to the first cost of the locomotive and it may be true that the device must return more than six per cent to justify its purchase to-day on an investment basis, but is it not a penny wise and pound foolish policy to eliminate devices that will save from 10 to 20 per cent of their first cost in a year on account of the initial cost? If the amount available for the purchase of new equipment is limited would it not be better to buy fewer locomotives perfectly equipped than a greater number of locomotives imperfectly equipped? Is not quality preferable to quantity when it comes to the most vital spot on the railroad? The address by Chairman Tollerton has answered this question in no uncertain terms. There must be no retrogression in locomotive development. The greatest single responsibility on the shoulders of mechanical executives is the responsibility for greater individual locomotive efficiency and capacity.

Stationary Boiler Plant Report

It is unfortunate that the report of the Committee on Modernizing Stationary Boiler Plants, presented during yesterday's session, was received without discussion because of lack of time. The fact that this is a subject which is perhaps not at the top of the mind of the average motive power department officer does not in the least detract from its great importance. The days of cheap fuel are past. The stationary boiler plants of the railroads, notoriously ill-equipped and loosely operated, demand attention. Chairman Tollerton's suggestion that the committee be continued, which was adopted, is to be highly commended. The committee has laid an excellent foundation for future work in the development of improved stationary practice and what is of equal importance, has also provided the members with a thoroughly practical basis on which to check up present conditions and learn, many of them for the first time, just how bad they are. As a result of this work there should be a material improvement in these conditions before the next convention. But, while the report deals largely with the possibilities for improvements in operation, accepting the equipment as it is found, it is to be hoped that the future work of the committee will lead to a full appreciation of the possibilities for economy and increased earning power of the investment in stationary power plants if they are given the same attention in the provision of modern facilities and the same care in design that is generally given to commercial and industrial installations.

Electrically Operated Planers

One of the most interesting applications of electricity has been its use in planer control. Planing machines were first belt driven with an arrangement of pulleys and belts for reversing the table motion and changing speeds. Belt drive from electric motors was then inaugurated, but was soon superseded by reversible, direct connected electric motors. The latest development has been the use of electricity to control table speeds, both before and during cuts, and the results in greater ease and flexibility of operation are most important. Among the advantages of electrical control may be mentioned the saving of time that results from speeding up the table between different pieces of work. For example, where planing operations are to be performed on a number of duplicate pieces, they are set up on the planer table and electrical control makes is possible to speed up the table when the cutting tool is in the gap between adjacent pieces. Another advantage is the possibility of speeding up between the beginning and end of a long stroke. The maximum resistance to the planer tool occurs when it first enters the work and a relatively slower speed will prevent tearing the work from the table. A slow speed at the end of the stroke is

necessary to prevent chipping off, especially in the case of cast iron. Between the beginning and end, however, the cut may be materially speeded up with a saving in time. Only a few years ago mechanical officers were struggling to get a successful pneumatic reverse for planers. To-day the job is quickly done by electricity with a much less complicated mechanism; this is typical of the way many other mechanical problems have been solved by the use of electrical apparatus.

Consider the Effect

Improved engine terminals are an outstanding necessity on practically every American railroad, but even if the increased size of locomotives did not make it imperative or the necessity for turning power quickly make it expedient, the reduction in operating and maintenance cost would alone warrant the thorough modernizing of every existing engine terminal. Consider the effect on fuel costs of engines held indefinitely under steam awaiting movement into a crowded roundhouse, or of fires kindled hours before the engine is required for service because it must be moved out of this same roundhouse to make room for another locomotive. Consider the effect on maintenance costs of postponing running repairs on account of the lack of suitable shop equipment at the terminal. It will not do to make engine terminals a dumping ground for old machinery that has been discarded from the back shop. A stitch in the engine terminal will save nine in the back shop and the tools must be available not only to make current repairs at the engine terminal, but to make them quickly. Delays occasioned by engines held at terminals while repair parts are forwarded from the main shop are more costly than machinery placed at the terminal where it will produce the repair parts. Inadequate engine terminals can increase maintenance of equipment costs tremendously and there should be a more consistent effort made to keep the equipment of the engine terminal on a parity with the back shop.

Improved Facilities Essential

Chairman Tollerton in his address very wisely emphasized the point that "the continued use of obsolete equipment, antiquated terminals and out of date equipment by any railroad or group of railroads leads to a direct tax in the form of higher freight and passenger rates." It is well known that until within recent years the cost of rendering railroad transportation steadily declined in the United States and that it continued to decline long after large increases in the wages of labor and in the prices of materials began to occur. It has commonly been said that the economies effected were due to "increased operating efficiency." This statement has been true, but it has contained only a part, and even a small part of the truth. The increases in operating efficiency which have been made have been rendered possible only by the provision, through increased investment of capital, of improved physical facilities. The great economies in the handling of freight have been due to increases in the number of tons carried per car and per train, but these increases in the number of tons carried per car and per train could never have been made if vast amounts of capital had not been invested in the reduction of grades, in improvements in terminals, in larger cars and more powerful locomotives, and in other improved facilities. In the future, as in the past, reliance for the economies which render it practicable to reduce the cost of transportation must be placed chiefly upon the investment of capital in improved facilities. This capital cannot be raised unless the railways are enabled to earn adequate net returns and the only way they can be enabled to earn adequate net returns is by letting them charge adequate rates. The gist of the problem of raising sufficient capital to provide the improved facilities which are necessary to enable the railways to operate with the maximum economy is, then, the problem of making the public realize that it must pay adequate freight and passenger rates now, and that the payment of adequate rates now is requisite to enabling them to charge relatively low freight and passenger rates in future years. Once the public is made to understand this, Mr. Tollerton's anticipation will be realized that the Transportation Act will "exert an immediate influence toward bringing into existence improvements long desired, but unobtainable on many railroads."

College Men and the Shop Agreement

Seldom has an editorial in the *Daily* attracted so many men to the *Railway Age* office on the pier as the one on "College Men on the Railroads," which was published on Wednesday morning. All of these callers were in hearty and substantial agreement on one thing, and that was the absolute necessity of getting as many technical graduates as possible into the mechanical departments of the railroads as quickly as possible and of maintaining a steady supply of recruits from this source in the years to come. There was some difference of opinion as to just how this should be accomplished. Some of the visitors maintained that the fact that the shop agreement made no reference to special apprentices and that the age limit which was specified for regular apprentices would shut out the college men, indicated that college graduates could not take a course in shop training; they supported their conclusion by saying that this interpretation had been placed on the matter by the Railroad Administration when it was in control. Other mechanical officers maintained that the fact that the shop agreement makes no reference to college men and special apprentices indicates clearly that it was not intended to keep them out of the shop; if that had been the intention it would have been clearly and positively stated. It appears therefore that some roads are taking on special apprentices—if they can get them—in the same way as they formerly did. These men are taken into the shop and given a general training in shop practice, with the distinct understanding that they are being prepared for official positions, and this is a matter entirely outside of the shop agreement and is something about which the labor unions need not concern themselves. The differences of opinion as to this point are so marked, however, that it would seem that the mechanical men should get together and have some definite understanding as to how the matter is to be handled.

The Cast Iron Fireman

The committee report on locomotive stokers was largely confined to a summarization of the replies received to questions that had been addressed to a large number of railroads, which were intended to bring out the important facts pertinent to the operation and maintenance of locomotive stokers in the light of current practice. As in all reports compiled in this manner, some interesting data were submitted relating to the subject, but there was not much that was decisive nor that pointed to definite conclusions

on important questions in regard to stoker operation. Where there was no uniformity in the replies received, it is unfortunate that the committee did not advance an opinion or theory of its own, even at the risk of erring a little on one side or the other of the question. But there was nothing evasive about the discussion; it came right to the point, which in this case appeared to be *the education of the locomotive fireman*—and the man on the other side of the cab. The discussion proved that mechanical men as a whole have arrived at a better understanding of the stoker and a better appreciation of its limitations as well as its possibilities. It was pretty generally assumed when the locomotive stoker first made its appearance that it would eliminate the human element in firing and because of the fact that it was possible to get more work out of stoker fired engines, the effect of this on the engineer so far as it affected his handling of the cut-off was widely overlooked. It is realized now, however, that the fireman must be as carefully trained to fire with stoker as to fire by hand, that reduced manual labor must not lead to relaxed mental effort and that the operation of the stoker requires constant and intelligent attention. The stoker has great possibilities, but to realize these possibilities in the form of increased locomotive efficiency and capacity the fireman must be educated. And in running the locomotive, particularly as this relates to the handling of the cut-off, the engineer must also be educated to show the same consideration for the cast iron fireman that he would have for a human fireman.

Delaying Work Because of High Costs

Chairman Tollerton in his address yesterday alluded to the fact that there might be a tendency on the part of the railways to postpone making improvements, such as those in locomotive facilities, because of present high prices and high wages. His remarks implied deprecation of any such tendency, and we believe the point cannot be too strongly emphasized that it will be a great mistake for any railway to postpone making needed improvements merely because of present high costs. In the first place, nothing could be more unsafe than to proceed on the assumption that present prices and wages are going to be reduced in the near future or even within the next few years. If past economic experience is any criterion, wages and prices ultimately will come down, but every economist knows that under present conditions there can be no certainty as to the future trend of prices or wages, and that whether they will come down or how much they will decline is purely conjectural. In the second place, for the railroads to postpone needed improvements because of present high wages of labor and prices of material, would be for them to contribute all they could toward preventing wages and prices from declining. If there is any one thing which may be said to be certain about future wages and prices, it is that there never will be any substantial and permanent decline in them until there has been a large increase of general production. Railroad transportation has become the chief factor limiting production in the United States and without an expansion of the capacity of the railroads there cannot be any substantial increase of production in this country. There can be no increase in the capacity of the railroads, in turn, without the doing of the work necessary to increase their facilities and their capacity. It necessarily follows that in the long run the railways can do more to reduce their own costs as well as to reduce wages and prices in general by going ahead with all the improvement work that present conditions make practicable, than postponing it in the hope that the cost of doing the work will decline.

Program For To-day

9.30 A. M. TO 12.30 P. M.

Discussion of Reports on:	
Fuel Economy and Smoke Prevention	9.30 A. M. to 10.30 A. M.
Auxiliary or Safety Connections between Engine and Tender	10.00 A. M. to 10.30 A. M.
Design, Maintenance and Operation of Electric Rolling Stock	10.30 A. M. to 11.00 A. M.
Scheduling and Routing Systems for Locomotive Repair Shops	11.00 A. M. to 11.30 A. M.
Superheater Locomotives	11.30 A. M. to 12.00 M.
Individual Paper on "Snow Fighting Apparatus," by W. H. Winterrowd	12.00 M. to 12.30 P. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3.30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.

4.30 P. M.—Tea will be served in Entrance Hall.

9.30 P. M.—Grand Ball, Ball Room, Million Dollar Pier.

R. H. Aishton Delayed at Washington

At yesterday's session Secretary Hawthorne read a communication from R. H. Aishton, president of the American Railroad Association, who stated that the railroad situation at the present time required his presence in Washington and expressed regret that for that reason he was unable to be present at the convention. He hoped, however, to spend at least one day in Atlantic City during the meeting. In reply Chairman Tollerton suggested that Mr. Aishton spend the weekend at the convention if possible.

Italian Railroads To Be Electrified

The New York *Sun* on Wednesday morning contained a despatch dated Rome, Italy, June 7, as follows: "Announcement was made to-day that a further sixty million lire has been appropriated for the purpose of electrifying the railroads, making a total of more than six hundred million lire for this use since January. Five thousand kilometers will be operating electrically before the end of the year, the announcement said. One hundred million lire also was appropriated to provide for construction of new railroads."

Car Heating, Limited

The gyrations of a print shop under the strain of getting out a *Daily* are usually either serious or amusing. In yesterday's *Daily*, by some juggling of type in the advertising of the Stone-Franklin Company, an announcement was made of the Stone-Franklin Car "Heating" System. This, of course, should have been Car "Lighting" System. If the Stone-Franklin representatives have been responding to inquiries about a new car heating system we can assure them that the fatherless heating system has been consigned to the hottest corner in the hell box and to-morrow morning we will return to the lighting system.

W. J. Tollerton, Chairman

Section III—Mechanical—American Railroad Association

American Railroad Association—Section III—Mechanical

Chairman Tollerton's Address the Feature of the First Session of the Convention

THE SECOND ANNUAL CONVENTION of the American Railroad Association, Section III—Mechanical, opened with a session in the Greek Temple on Young's Pier, Atlantic City, Wednesday, June 9, 1920. W. J. Tollerton, general mechanical superintendent of the Chicago, Rock Island & Pacific and chairman of the section, called the meeting to order at 9:40 a. m. The convention was opened with a prayer by the Reverend Newton W. Cadwell, D. D., pastor of the Olivet Presbyterian Church.

Chairman Tollerton then introduced Edward L. Bader, Mayor of Atlantic City, who welcomed the associations.

Address of Mayor Bader

Mayor Bader said in part: I have been interested in public life and in politics in Atlantic City, and I know that the Master Car Builders Association and the American Railway Master Mechanics Association, by which names your organization was previously known, were among the very first conventions that came to this place, some fifteen years ago, and they have always left more money in this town than any other convention that came here. (laughter.)

I know we felt the one year you left here, and I want to say right here that while I have only been in office one month, or less than a month, we don't want to lose you. We want to build up Atlantic City, and we can do that by having conventions such as this come into the town.

I was raised in the school of "hard knocks" and never thought that I would be called upon in later years to make a speech. I believe in doing things, and believe in having the cooperation of all my friends and the citizens of Atlantic City. I want to cooperate with you and if there is any time that any of you have any suggestions to offer for the benefit of Atlantic City, my door is always open and I will be glad to hear from you, and even by letter.

Always in the future remember that Atlantic City will do everything in its power to keep this convention here, because it is one of the biggest assets that Atlantic City ever had. With this in view, I present to you the key of the city.

In reply to the mayor's address Chairman Tollerton expressed his appreciation of the welcome extended in behalf of Atlantic City.

Address of Chairman W. J. Tollerton

AFTER WHAT HAS BEEN PERHAPS the most eventful year in the history of American railroads, I have again the honor to address you as Chairman of Section III-Mechanical.

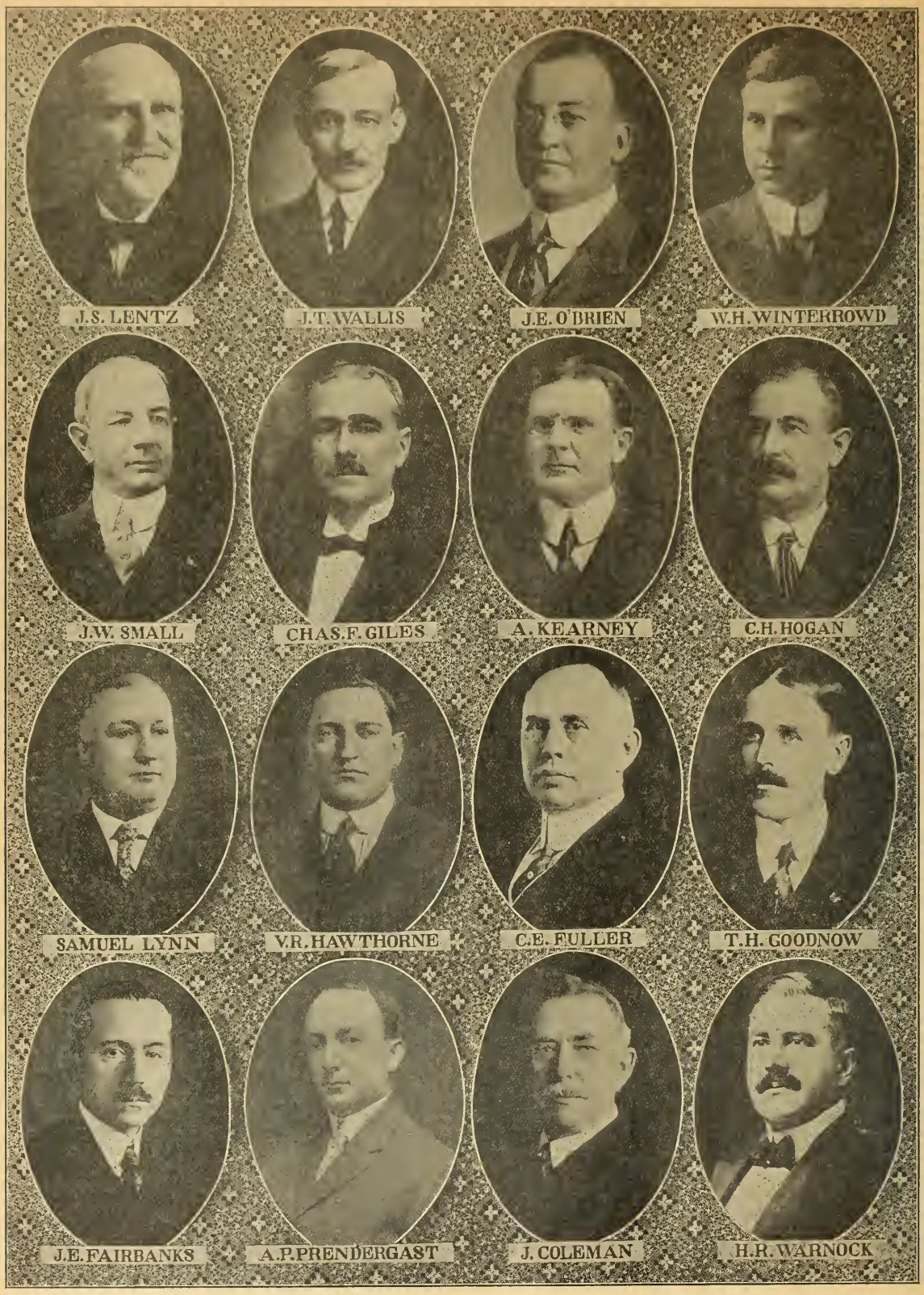
When I designate the past twelve months as the most eventful in the history of American railroads, I have in mind principally the fact that during this period the roads have been returned to private ownership under Federal legislation, which cannot help but have a very vital influence throughout the years to come. In many respects we have emerged from a cloud of uncertainty and, although numerous serious problems still remain unsolved, it seems to me that we are justified in viewing the future with a considerable degree of optimism.

It may appear that acts of Congress regulating the extent of government control and matters covered by the Transportation Act are far removed from our everyday work as mechanical department officers. While it is no doubt impossible to foresee just how much legislation is going to work out in practice, I feel that it will be advantageous for the members of Section III to study the probable effects of the Transportation Act, particularly in its relation to mechanical department affairs.

Adjustment of Labor Difficulties

One of its most important features is the proposed method for the adjustment of labor difficulties. While it may be too early to arrive at any conclusion as to the ultimate effect of this legislation upon the settlement of labor troubles, we can at least congratulate ourselves that a very excellent start has been made, and that in the establishment of a labor board means are provided tending to avoid serious disturbances, through orderly discussion and a just consideration by representatives of all concerned. If any method can be devised to relieve mechanical department officers of even a portion of their labor difficulties, it will at once lift a load of constant worry and enable us to concentrate more personal attention upon matters of operating efficiency.

In this connection I feel confident we will observe further beneficial effects of the Transportation Act. Upon examination of the provisions made under this act, enabling the roads to increase their net operating income, it seems evident that there will be a greater and more insistent demand than ever for railroad operation under conditions of maximum efficiency. This will apply particularly to those roads comprising traffic groups where high



General Committee, Section III, Mechanical—J. R. Gould Missing

rates are necessary to permit earnings of 5½ per cent on property valuation. When these rates are placed in effect it will become apparent that a close connection exists between the physical condition of railway facilities and the rates that must be charged, if the percentage allowed under the Transportation Act is to be earned. When it is clearly realized by the general public and their representatives that the continued use of obsolete locomotives, antiquated terminals, and out of date equipment by any railroad or group of railroads leads to a direct tax in the form of higher freight and passenger rates, means will undoubtedly be found to correct the situation. We may, therefore, anticipate that the Transportation Act will in all probability exert an immediate influence toward bringing into existence improvements long desired but unattainable upon many railroads.

Study New Appliances

Therefore, at this time more than ever before, it is our duty to keep thoroughly informed on all new appliances and to carefully study the merits of those devices which have as their object the bringing about of reduced operating expenses. The Railway Supply Men's Association has again assembled for your inspection a most complete display of modern railway necessities. Many of these devices are new and are worthy of earnest consideration. You are urged to spend as much time as possible in going over the exhibits, talking to the demonstrators and obtaining accurate information upon which to base intelligent recommendations for the improvement of rolling stock and repair facilities under your jurisdiction.

Speed Up Repair Work

The question of providing new equipment for immediate use in handling the traffic of the country presents a very serious problem at this time and one that should receive our careful consideration. Authorities estimate the shortage of equipment for present requirements at 262,000 freight cars, 5,000 locomotives and 5,500 passenger cars. These numbers will have to be added to very liberally during the next three to five years. As such tremendous quantities of railway equipment cannot be immediately produced, it becomes our duty to make every possible effort toward securing the utmost service from each unit now in existence. If the time locomotives and cars are held at terminals or in shops can be reduced the result is equivalent to that effected by the purchase of additional equipment; consequently, anything that can be done by the members of this association toward avoiding unnecessary delays and speeding up repair operations will be of extreme value during this crisis.

Difficulty in financing the purchase of new power and the desire to obtain rapid deliveries may in some instances exert a tendency to eliminate fuel and labor saving devices from locomotives recently ordered. As fuel represents the heaviest single item of material expense in the operation of railroads and as the indications are that this expense will continue to increase, I cannot see how it is possible to justify a policy of this kind. We should all be in a position to point out in a convincing manner the error of building locomotives today, in the construction of which we fail to incorporate those important devices of economy which have made the modern locomotive a machine of high efficiency as compared with locomotives of the older types.

It is of equal importance that every effort be extended to maintain a suitable relation between the amount of power and other equipment provided for and the available facilities for repairing and handling this equipment if we are to operate with the desired degree of efficiency. Our car and locomotive repair shops, roundhouses and terminal facilities should be improved and enlarged coincident with, or prior to, the time additional equipment is secured. In view of present abnormal conditions there may be a tendency to delay these important improvements, awaiting possible lower labor and material costs. This tendency, however, should not be permitted to extend to such a point as to postpone the installation of facilities, the lack of which will cause a loss greater than the possible, but uncertain, saving anticipated at some later date.

Mechanical Section III has a very important obligation before it in seeing that the best possible standards and recommended practices are set forth, that the new equipment will be so designed as to require minimum maintenance expense and have the greatest possible availability for service. We have a splendid organigation of committees, and there is not the slightest doubt in my mind that the Mechanical Section of the American Railroad Association will prove equal to this important duty.

Comments on Committee Reports

In this connection I desire to particularly mention the work of the Committee on Standard and Recommended Practice, and to call your attention to the fact that Section-III now has a manual containing the standard and recommended practices adopted by both the American Railway Master Mechanics' and Master Car Builders' Associations, which have been harmonized and brought up to date under the supervision of the above committees.

Numerous important and interesting reports will be presented at this meeting, representing a great deal of thought and labor on the part of committee members. Upon reading over the committee report on Modernization of Stationary Boiler Plants, it impressed me as being an exceedingly valuable addition to our knowledge upon this subject. In view of the ever-increasing cost of fuel, our stationary boiler plants will require careful attention. The committee points out where to look for inefficient conditions and how to remedy these conditions when found, together with important information pertaining to boiler plant equipment and special methods of fuel combustion.

The report on scheduling and routing systems for locomotive repair shops covers a subject of timely interest. A study of this report will enable you to understand the best systems now in use upon various railroads, and will also be of great service in the consideration of similar plans for the handling of locomotive repair operations in shops under your jurisdiction.

In my previous address before this association I advocated the establishment of a joint testing and research bureau. The committee appointed to study this matter has submitted a very instructive report and calls attention to the vast service such a bureau would be to the railroads. In order that the various phases of the subject may be thoroughly developed it is my recommendation that this committee be continued.

The Committee on Engine Terminals, Design and Operation, also the Committee on Repair Shop Layouts, have accumulated valuable information covering the general trend of terminal improvements. They have not, however, been able to submit definite recommendations, due to the fact that the various railroads express a wide difference of opinion on practically all matters pertaining to the above subjects. You will realize that many of the questions involved are governed largely by local conditions, so that it is difficult to formulate recommendations sufficiently broad to cover the entire situation. Judging by progress made I am confident that, if these committees are continued and given sufficient opportunity, it will be possible to harmonize the different ideas advanced by the various railroads and eventually secure valuable recommendations as to the best practice in the design and operation of terminal facilities.

The owners of the pier and meeting hall should also receive our hearty thanks in view of the many important improvements made since the last Convention. I will therefore suggest to the Committee on Resolutions that an appropriate resolution be prepared to this effect.

In giving consideration to the various matters pertaining to railroad affairs, we should all realize that these problems are indirectly of vital importance to the entire nation. I feel confident you will continue to give them the benefit of the same earnest thought and endeavor which has been so much in evidence during the past history of this organization.

Association Business

The minutes of the annual meeting of 1919 were approved and the chairman announced the appointment of committees as follows:

Committee on Subjects, Willard Kells, (A. C. L.); W. H. Sample, (Gd. Tk.); H. M. Curry, (N. P.) H. R. Warnock, (C. M. & St. P.) and Wm. Schlafge, (Erie).

Committee on Resolutions, C. E. Chambers, (C. of N. J.); F. W. Brazier, (N. Y. C.) and H. T. Bentley, (C. & N. W.).

Committee on Correspondence, A. W. Gibbs, (Pennsylvania); John Purcell, (A. T. & S. F.) and A. R. Ayres, (N. Y. C. & St. L.).

Report of the General Committee

Since the last annual meeting, the General Committee has held meetings on the following dates: June 23, 1919; September 23-24, 1919; November 13-14, 1919; March 30-31, 1920, and May 25, 1920.

The membership of the Section at the present time includes 198 railroads, representing 346 memberships in the American Railroad Association, and in addition thereto, 108 railroads, associate members of the American Railroad Association. These railroads, members and associate members of the American Railroad Association, have appointed 603 representatives in the Mechanical Section. In addition, there are 1235 affiliated members, and 126 life members in the Section.

Since the last session of the section the General Committee has taken action on several important subjects. This action is outlined in the following brief report and your approval is respectfully requested.

Rules of Interchange

During the year several necessary changes in the Rules of Interchange have been made and included in Supplements Nos. 1 and 2 and Circular S III-149.

Proceedings of the 1919 Annual Meeting

The proceedings of the 1919 Annual Meeting have been printed and distributed to the members.

Manual of Standard and Recommended Practice

The Standard and Recommended Practice of the Section has been brought up to date and compiled under the direction of the Committee and Recommended Practice in a loose-leaf volume designated as "The Manual of Standard and Recommended Practice." All drawings have been retraced and new cuts made and included in this one volume together with the text. Arrangements have been made to continue the printing each year of the historical record of the development of the Standards of the Section as an appendix to the Annual Proceedings.

Letter Ballots

The letter ballots ordered taken at the last session have been taken, and the result announced to the members in Circulars Nos. S III-74 to S III-85 inclusive, and appropriate changes made in the various rules and standards.

Maximum Load Markings on Freight Cars in Lieu of Nominal Capacity

The letter ballot ordered taken on this subject at the last session as a result of the report of the Committee on Car Trucks, resulted in its adoption by more than the required two-thirds majority. The General Committee has held conferences with representatives of the Traffic and Transportation Sections to provide for the necessary adjustment in tariffs, and rules will be promulgated within a short time.

Equipment Painting Division

The former Master Car and Locomotive Painters' Association has been united with the Section as the Equipment Painting Divisions, and negotiations are in progress with several other mechanical associations with a view of establishing other divisions of the Mechanical Section.

Interchange Rules Agreement

A form of Interchange Rules Agreement has been prepared which has been approved by the Executive Committee of the American Railroad Association at its session held November 19, 1919, and by the Association of Railway Executives. A list of railroads and car owners who have executed this agreement is attached to the report of the Arbitration Committee.

Scholarships

The usual circular has been issued announcing vacancies in the scholarships under the charge of the Section.

Changes in Standards and Recommended Practice

Upon recommendation of the Committee on Standard and Recommended Practice, the General Committee has eliminated the following items from the Manual of Standard and Recommended Practice:

Brake Chains.—Standard. Eliminated account of being covered by Standards for Safety Appliances.

Brake Staff Carrier Iron.—Standard. Eliminated account of being covered by Standards for Safety Appliances.

Safety Chains.—Recommended Practice. Eliminated account of their use being generally discontinued, and also in view of action taken at the session of the Section held June 19-20, 1918.

Guard Rail and Frog Wing Gage.—Eliminated account of being properly a standard of Section II-Engineering.

Nominating Committee

The General Committee offers the names of the following members as candidates for the Committee on Nominations: F. W. Brazier, New York Central; H. T. Bentley, Chicago & Northwestern; J. J. Hennessey, Chicago, Milwaukee & St. Paul; C. E. Chambers, Central of New Jersey; Wm. Schlafge, Erie; M. A. Kinney, Hocking Valley; R. W. Bell, Illinois Central; A. W. Gibbs, Pennsylvania. W. J. Robider, Canadian Pacific; J. Hainen, Southern.

Discussion

On a motion by C. E. Chambers, seconded by T. H. Goodnow, the report was received and approved.

Report of Committee on Nominations

The terms of office of the Vice-Chairman and seven members of the General Committee expire June, 1920, and the committee nominated the following to serve until June, 1922:

For Vice-Chairman, J. Coleman, S. C. D., Grand Trunk. For members of the General Committee, J. S. Lentz, M. C. B., Lehigh Valley; H. R. Warnock, G. S. M. P., Chicago, Milwaukee & St. Paul; C. E. Fuller, S. M. P. and M., Union Pacific; Willard Kells, G. S. M. P., Atlantic Coast Line; John Purcell, Ass't. to V.-P., Atchison, Topeka & Santa Fe; H. L. Ingersoll, Ass't. to Pres., New York Central, and J. J. Tatum, S. C. D., Baltimore & Ohio.

The report was signed by F. W. Brazier (Chairman), New York Central; H. T. Bentley, Chicago & North Western; J. T. Wallis, Pennsylvania; D. R. MacBain, New York Central, and J. J. Hennessey, Chicago, Milwaukee & St. Paul.

Discussion

F. W. Brazier: I would like to straighten out one thing that some of the members do not understand. If you will read your By-laws carefully, you will find the Nominating Committee have followed your By-laws correctly by presenting only one name. Any 20 members that are not satisfied with this can have the privilege of filing with the secretary other names.

The report was accepted without discussion.

Report of Committee on Mechanical Stokers

THERE are in use on the locomotives of the United States over 5,000 mechanical stokers. The stoker was first commercially a fact in the year 1910. Several types of stokers had been receiving experimental attention for several years prior to that date, but this marked the beginning of the time that railroads started the application on new power of extraordinary weight and tractive effort, realizing that to get the most out of the locomotive of high capacity some mechanical means must be provided. In 1912 demand was made by the firemen in the eastern wage application for two firemen on locomotives weighing over 200,000 lb. on the drivers; this naturally stimulated the inventive genius of the stoker manufacturers and improvements came out that made the stoker a success.

The determination of the point in locomotive size at which the application of stokers shall begin, the economy of fuel that may be expected, the cost of repairs, and not the least point to be considered, the kind and preparation of fuel, have been the subjects that the members have discussed more than any others during the past seven years in which the subject of stokers has been before the association. In order to arrive at a definite understanding as to the general opinion on these matters the committee issued a questionaire, to which replies were received from 30 railroads. The questions with the committee's comments are given below.

QUESTION 1.—State the number and kind of stokers you have and type and tractive effort of locomotives on which they are used.

Replies were received from several roads using over 100 stokers and one road reports 563 stokers in use. The Mikado, Santa Fe and Mallet types predominate, with tractive effort from 54,000 to 135,000 lb. There were a limited number of Consolidations with tractive effort as low as 51,000 lb. It is apparent that the locomotive of less than 55,000 lb. tractive effort has not received much consideration.

QUESTION 2.—What is the tonnage rating on type of locomotives in territory where operated? Is there any difference in the tonnage rating on hand-fired and stoker-fired locomotives of the same type in the same territory?

(Questions 3 and 4 are in effect the same as Question 2.—Editor.)

The difference in rating between hand-fired and stoker-fired locomotives is hard to determine, few railroads having both types of firing on the same class of locomotive. Some of the larger users of the stoker report increasing loading 150 tons on a 2,400-ton train, and 400 tons on a 4,600-ton train with the stoker-fired locomotive over the hand-fired on the same division. Where the stoker and hand firing are used on the same type of locomotive, with one exception, replies indicate as good performance can be secured with the stoker with increased tonnage as with the hand-firing with reduced rating.

QUESTION 5.—How does the condition of fire of the hand-fired locomotives compare with the stoker-fired locomotives when arriving at terminals.

The general answer to this question, "Better condition on stoker-fired," demonstrates that the firemen soon realize the advantages of the stoker and will endeavor to carry a light, even fire, which can easily be accomplished by ordinary attention.

QUESTION 6.—Do your records indicate any decrease in boiler maintenance with the stoker-fired locomotives as compared with the hand-fired locomotives, in parallel cases?

The committee calls attention to the advantages of maintaining a fire box temperature while trains are standing that will minimize the detrimental results of rapid contraction in large fire boxes. This can be accomplished by keeping a light, even fire easily controlled with the stoker.

QUESTION 7.—Do you use two firemen, or a relief fireman, or give the fireman any assistance on your hand-fired locomotives?

The majority of roads report "No."

QUESTION 8.—State what prompted you to apply stokers to particular classes of locomotives.

With one exception all answers report "Increased tonnage and size of locomotives." One representative reply was: "A better class of men can be recruited and held as firemen"; another: "The fireman can devote more time to improving himself in the necessary knowledge he requires to become an engineer." One large road states "The stoker is considered a positive necessity where coal consumption averages more than 5,000 lb. per hour." All replies, with one exception, call attention to the operation of large type locomotives under maximum conditions, stating that the mechanical stoker is essential.

QUESTION 9.—With the experience you have had with stoker-fired locomotives, please express your views on economy of fuel and efficiency of the locomotive as to speed and tonnage compared with hand firing, either with run-of-mine or prepared coal.

With one exception, the replies to this question are in line with all reports that have been made previously by the stoker committee, namely, that more coal is burned by the stoker-fired locomotives than by the hand-fired, but the increased capacity as to tonnage and speed offset any loss in amount of coal consumed for a given service. The users of stokers realize that fine coal to the extent it is handled by the stoker increases stack losses; the education of the fireman is just as essential as in hand firing, and not to be lost sight of is the fact that stoker firing is mechanical rather than a human operation, and it is for the manufacturers to improve the mechanical condition to remove human inefficiency.

QUESTION 10.—What percentage of the run-of-mine coal you receive for locomotive use is slack? If this coal is prepared at a crusher, how much is the slack increased?

Local conditions govern the answer to this question. From 20 per cent to 50 per cent of so-called slack was reported. The term "slack," as used by several roads, is the amount of fine material passing through a four mesh per sq. in. screen. One road reports the slack as increasing from 35 per cent to 50 per cent by crusher, and another from 15 per cent to 75 per cent. All others report "No coal prepared by crusher."

QUESTION 11.—What do you estimate the additional cost of maintenance where stokers are equipped with crushers?

All roads report "No data."

QUESTION 12.—Are you in favor of coal crushers with stoker equipment on locomotives? State reasons.

This question is one of the most discussed and possibly the most serious in connection with the mechanical stoker, owing to the fact that the answer depends on local conditions. The answers received to this question were practically unanimous to the effect that the locomotive equipped with the mechanical stoker, to make it a complete machine capable of operating over a wide territorial range, should have the crusher on the locomotive. The committee concurs in this where a limited number of stokers are being used, but as locomotives equipped with the stoker are centralized it becomes possible to prepare the fuel before delivery to the tenders. The manufacturers are confronted with conditions in the application of the crusher to the locomotive that will require their best talent to meet as the stoker is placed on more railroads. The hardness of the coal causes an extremely wide range of conditions the country over. The strengthening of the crusher parts and making the crusher mechanism detachable so that prepared coal can be used on crusher locomotives without continuing the operation of the crusher parts, are recommended by the committete.

The opinion has been advanced that coal should be prepared at the mines. Where railroads own their own mines and the entire output of some coal mine is controlled this suggestion has its merits, but with the unsettled conditions in the mining industry for the past few years, the changing of contracts and the uncertainty at all times of being assured a full supply of fuel for stokers, this suggestion can not be recommended. The coal, if prepared before being delivered to the tenders, should be

crushed at the railroad coal tipple or a centralized crushing plant on the railroad.

QUESTION 13.—Do you prepare coal for stokers before loading it on the locomotives? If so, by what methods and what does it cost by each of these methods?

Where coal is prepared before being placed on the locomotive it is bought in that state or screened at the railroad coal tipple. One railroad reports crushing at the fuel station but the cost is practically negligible as the coal is dropped from the car into the crusher and prepared before it is elevated. The capital expenditure necessary to install the equipment for this method will be from $6,000 to $12,000 at each coaling station where electric power is available.

Inquiry was made of the stoker manufacturers as to the number of stokers in service March 1, 1920. This information is given in the table.

NUMBER OF STOKERS IN SERVICE MARCH 1, 1920.

Kind of Stoker	Mallet	Mikado	Santa Fe	Centipede	12-Wheel	Decapod	Consolidation	Mountain	Pacific	Total
Street	424	638	357	4	14	....	21	3	36	1,497
Duplex	422	1,139	441	....	....	123	22	28	20	2,195
Standard	120	338	36	....	33	....	21	162	21	731
Hanna	70	6	73	....	16	....	....	4	....	169
Elvin	....	....	19	....	....	....	....	....	....	19
Crawford	....	50	35	....	....	....	337	....	93	515
Total	1,036	2,171	961	4	63	123	401	197	170	5,126

Lignite

The question of using so-called ignite fuel, has been referred to this committee. Reports indicate that no difficulties are being experienced in firing with this fuel, if handled properly. Stack losses and fires along the right of way are not developing. One road reports less liability of fire, on account of the more even character and regularity of the fire, and doing away with the necessity of opening the fire door, which creates sparks with this class of fuel. The only change noted in fire box or draft appliances to burn lignite, was the report of one road that one more row of fire brick is applied.

The question as to what recent changes have been made in coal space of locomotive tenders to permit the coal to flow within easy reach of the fireman, was referred to this committee. Replies state that several railroads have resorted to a mechanical device for pushing the coal forward which was reported successful in various sections. Existing power has been largely cared for by local arrangements of changes in slope sheets and raising and moving coal boards.

The report was signed by M. A. Kinney (Chairman), Hocking Valley; A. Kearney, Norfolk & Western; J. T. Carroll, Baltimore & Ohio; J. W. Cyr, Chicago, Burlington & Quincy; A. J. Fries, New York Central; A. G. Trumbull, Erie; W. C. A. Henry, Pennsylvania System; W. J. Bohan, Northern Pacific, and E. J. Brennan, Chicago, Milwaukee & St. Paul.

Discussion

C. E. Chambers (C. of N. J.): As a representative of a road which has a few locomotive stokers, I want to say something on this subject. I have noted that part of the report of the committee, in which it is stated that the stoker locomotive would burn more coal for a given amount of work than a hand-fired locomotive, but I believe that, with proper regulation and a properly designed stoker, we will see the time when we will burn less coal for a given amount of work than with hand-firing.

The great opportunity for improvement is the proper education of the fireman in the coaling of the locomotive with the stoker. If you can teach a fireman to starve his engine, it is wonderful what results you can get—you can pull a heavy-tonnage train, with a proper starving of the engine, with a much less quantity of coal than if that element is neglected, and that is one of the great things we have to do in the future, develop the fireman not to let the engine get away from him, and to educate him in letting the fire starve down all the time, so that you have a thin fire on the grate with the best combustion possible.

During the past two years the first stokers have been in service on the New Jersey Central, and the work so far performed has been very gratifying. The last locomotives placed in service have been in service for but a short time—they were designed with a wider firebox than the standard U. S. locomotive, with which we were furnished formerly, and they are giving us very greatly improved service.

The quality of coal which we burn on our railroads varies very greatly from time to time, and it makes it necessary to have a large grate area in order to get proper service, and this has been thoroughly demonstrated by increasing the firebox, and since that has been done, we have been much gratified by the results attained.

Prof. L. E. Endsley (Univ. of Pittsburgh): It is no doubt theoretically possible, at least, to draught the engine less because of the fact that you do not open the door of the firebox. When you open the door of a locomotive you reduce the vacuum in the firebox by letting a large amount of air in. That air, coming in through the door, is not doing the work that the air does when it comes through the grate, and when it comes through the grate it is warmed up and ready to do the work quickly.

In a stoker-fired engine, that inrush of cold air reduces the vacuum, and is not necessary, in my opinion, and I am wondering if any of the members have had any experience in attempting to increase the size of the nozzle in a stoker-fired locomotive, and do just what Mr. Chambers says, reduce the thickness of the fire by starving the fire.

You know that you can fire a locomotive with a thick fire, which is too thick, or a thin fire, which is too thin. The right amount of fire in a stoker locomotive can be maintained more uniformly than by the fireman putting in a large amount of coal in one place. The stoker that covers the firebox uniformly can maintain the maximum efficiency, and not have any inrush of cold air, or stoppage of the more efficient warmed air, coming through the grate, and I think, as Mr. Chambers says, when we get to a point of educating our firemen how to correctly operate the stokers and reduce that inrush of cold air, we are bound to have just as efficient a locomotive, in the case of the stoker-fired engine, as in the case of hand-fired engines, but it will not come about by maintaining the same draught all the time, by reason of having a thicker or thinner fire, and thereby getting an inefficient burning of your coal.

E. W. Pratt (C. & N. W.): I am rather surprised to hear a scientific man like Prof. Endsley tell you the air must come through the grate, as that is what I thought, until a few years ago, the Bureau of Tests showed us that in order to have efficient operation of the stoker, two-thirds of the air had to come from above the fire, and that there was practically no free oxygen two and a half inches from the bed of coal. You can all get the pamphlet issued by the Bureau of Standards on that subject, showing extensive and careful tests.

Prof. Endsley: I do not think Mr. Pratt will find in any place, as the result of investigation, that an opening 18 in. long and 12 in. wide will bring air in efficiently. Openings along the side of the grate uniformly will assist in bringing the air in efficiently, but it is not necessary to have air come through the grate, and it is not an efficient thing to open the firebox door.

No doubt you can assist combustion by putting air in all around the fire, above the grate, but you cannot assist it by putting in a large amount of air that travels almost the entire length of the flue sheet before it gets to the proper temperature.

C. E. Fuller (U. P.): Prof. Endsley made a statement I want to refute. There are certain coals which require all the air on the fire that it is possible to get through the open door from the time the engine leaves one terminal until it reaches another. In such cases the door of the engine is wide open and is never closed. By means of this practice you will get a higher temperature both of superheated and saturated steam.

I was wondering, when Mr. Chambers was talking about stokers, whether or not we are considering the size of the firebox and grate surface in the application of stokers. Are we asking the stokers to do the same thing on all engines? In other words, are we building the engines and afterward putting the stokers on or building the firebox for a stoker.

In my opinion, the one thing which makes all the difference

in the world, whether you will burn more coal with a stoker-fired engine than with a hand-fired engine, is whether or not you have the proper grate area. If you put the stoker on an engine, with a limited grate area, I think it will burn more coal than a hand-fired engine, and I do not believe you can help yourself. If you get a large grate area you will save fuel, but as to the point of leaving the door open, I believe Professor Endsley to be absolutely wrong.

There is a certain coal fired on our railroad over a division about 1,000 miles long, on which the lomocotives are equipped with the Bates door, and the door is always half open—we throw the coal in, and the door is open from the time the engine leaves one terminal until it reaches another. There is no other swinging door that can compare with it, so far as economy and efficiency are concerned.

Chairman Tollerton: I would like to hear from Mr. Kearney on the subject of stokers.

Mr. A. Kearney (N. & W.): The Norfolk & Western is the user of a great many stokers. We started out in the beginning with the over-feed stoker; then we made some tests with the Crawford, then later with the other forms of stokers as they came along, and finally we have the Duplex. In all, we have quite a number of stokers in service and all of our large engines are now so equipped.

I have never subscribed to the idea entertained by so many about the difference between hand-fired and stoker-fired locomotives, and maybe it is because I have a wrong conception of the whole thing. I think it is very unfair to compare hand-firing with stoker-firing for the reason that the stoker does not begin to do its work until after hand-firing has about ended. By that I mean, we all know in a practical way, and we have known it from actual tests, that any careful fireman can beat a stoker-fired engine. There is no doubt about it, with proper care.

But imagine a couple of parallel lines carried along—one is a stoker and the other hand-fired. When the hand-firing is at its best, and we will assume that it has the best grade of coal for hand-firing, it will beat the stoker firing; but right there the hand-firing ceases and stoker-firing begins. You can use a poorer grade of coal and get a larger capacity out of your engine. Now, imagine that curve extended twice the length, or considerably higher; then when the stoker is at its best it is unfair to drop down on your curve and pick up hand fires, and make a comparison. The hand-firing is rather limited on account of the capacity of the fireman, and you must have a good grade of coal. Therefore, the comparison is not a fair one.

With reference to the air above the fire, as mentioned by Professor Endsley, we all know from practical experience that we do open the door, and a lot of us have had engines where it was absolutely necessary to open the door and to run with the door partly open for the full length of a division in order to get sufficient steam.

Mr. Chambers: I would like to qualify my remarks in view of what Mr. Kearney has stated about the amount of coal used in a stoker vs. hand-fired engine. I do not mean for a moment that an engine strictly within the limitations of firing by hand could be beaten or even approached by stoker firing, but I had in my mind possibly 50,000 tons tractive power as the dividing line for the application of a stoker. With a 50,000-ton locomotive or over I think we should approach, with proper supervision, just as economical operation with stoker firing as with hand-firing. The fact that it is not within the power of any one man to put coal in a firebox to meet emergencies by hand that he could with a stoker means that in order to foresee and take advantage of what is in front of him he naturally must be wasteful or otherwise fail to keep up steam.

Professor Endsley: I would like to ask Mr. Fuller whether if you had 10 openings the size of your door it would be a better job than to have it all go through the one door?

Mr. Fuller: I don't know. I haven't had the 10 openings.

Professor Endsley: Well, you could get the coal in. The necessity for getting it in there doesn't mean that you have to have a big door.

Mr. Fuller: It is not a large door. It is a door split in two, but it is convenient for the fireman because he just shovels the coal in. We have the open door with the baffle over the top of it. We use a peculiar grade of coal. It requires very little spreading, being so light. It has got to be handled very carefully because it is light, and at night it looks as if the engine was running with a wood fire, with a lot of sparks going out of the stack. It is a lignite coal.

Chairman Tollerton: I would like to hear from some of the Western railroads that have a lot of stokers.

John Purcell, (A. T. & St. Fe): We have about 135 locomotives equipped with stokers, all giving satisfactory service. We have increased our tonnage from 150 to 300 tons, and we feel that after the fireman has been educated to the stoker, that we are going to burn less coal than we burn by hand-firing, and for some six or eight months past we have been getting much better results.

Mr. W. J. Bohan (N. P.): We have about 20 engines equipped with stokers, and our experience with them has not been very long. Thus far, however, we have had good success with our stokers. They are on Mikado locomotives of approximately 57,000 lb. tractive effort. We are not in a position to go into detail as to loading of trains at this time, or as to how much coal, if any, can be saved by the use of the stoker.

Mr. Kearney: I think that Mr. Purcell has brought up an important point. He said that after his firemen are educated, he does not think stokers will use any more fuel than the hand-firing method. In that connection, we come back to the capacity of the fireman. If you are beyond the capacity of the fireman, you can't make a comparison, and if it is a blast and the coal is delivered to the firebox in a finely divided condition, you are going to use more coal. The percent of coal used increases almost in proportion to its fineness. That was worked out in some tests we made two or three years ago. With a heavy blast, the fuel is carried through more or less unconsumed and losses up to 30 or 35 percent are entirely possible.

M. H. Haig (Santa Fe): If I understand the comment of the last speaker, he is discriminating between the headwork of the fireman and the strength of his back. I notice that the committee made the statement that it was impressed by the replies of one railroad which said it could improve the quality of men employed as firemen.

The mechanical stoker of today has been developed to a remarkable degree but it will probably never reach a point beyond the control of the fireman. Economy in fuel consumption depends largely on the distribution of coal over the grate which in turn depends on the interest taken by the fireman. If the fireman will spend his time adjusting the stoker and watching his fire, so that he distributes the coal evenly and obtains a good fire, he will reach a terminal with a comparatively thin fire, and without an unnecessary amount of grate shaking on the road. The stoker has provided an opportunity to fire a large locomotive, increasing the tonnage and getting over the road in a limited time, but to accomplish this result it is necessary for the fireman to use his head, and I think that better results will be obtained and less coal used when the firemen have been better educated or trained.

R. P. Blake (N. P.). We have some stoker-fired locomotives on my division, using a semi-bituminous coal, which contains a good deal of sulphur and iron. With hand-fired locomotives and a fine grade of coal we used to experience a great deal of difficulty with clinkers in the fire, especially when they were not properly handled. Our experience with the stoker is that our engines using this coal have shown a very decided reduction in delays and troubles incident to cleaning fires on the road.

The education of firemen in operating stokers is an important subject and one that requires special consideration. The tendency to overload the firebox equipped with a stoker on account of the ease in feeding coal has been one of the drawbacks, but as firemen become familiar with the operation of the engine and the proper handling of fuel they can make a vast improvement in stoker performance.

Last November, during the coal strike, we had to use a considerable quantity of coal which had been in storage for a number of years, and the percentage of fine coal on the tenders as delivered from the docks was very great, frequently being 75 or 80 per cent. With the hand-fired locomotives it was extremely difficult to secure the average tonnage train performance, but with the stoker-fired locomotives we

were able to handle the full tonnage with a very low grade of fuel and get excellent results. The delays on the railroad cleaning fires were entirely eliminated with proper firing and the locomotive's performance was fully up to the average.

The education of the fireman is the most important feature in getting good results with the stoker fire, and the added fact that our stokers have a coal conveyor enabling us to use practically 75 per cent of the coal on the tender without shoveling it forward reduces the labor of the fireman. It also increases the tendency to use up the coal rather than to carry it around on the back of the tender. Our results with the stoker have been excellent so far, although we have only 7 engines in actual service now.

F. P. Roesch (Standard Stoker Company): Among reports received by the Fuel Conservation section of the Railroad Administration was one from a section in the east where Pocahontas coal was used. They claimed that the spark losses ran as high as 40 per cent of the total amount of fuel introduced into the locomotive fire box. Now that is a rather high percentage, but in some further investigation that I made afterwards, I found that it was practically correct, and I believe you will find that the University of Illinois itself showed some 15 to 20 per cent, and on some Pennsylvania tests, it will run even higher.

In going around, trying to get some information on stoker operation, I ran across one gentleman who told me that in handling a very slack coal with one of the older type stokers, using the three distributors, he had reduced his spark loss from 20 to 30 per cent by discontinuing the use of the centre distributor. That was working along original lines, and if we carry it further, we will find that possibly the centre distributor was located a little bit too high, and that connected with it they had a low arch, and the heavy draft produced by the engineer dropping her down in a corner pulled the lighter stuff over the arch and out of the stack.

Any of you who are still using that type of stoker may be able to effect some economy, and at the same time please the brakeman on the rear of the train by cutting out the centre distributor. The man referred to claims that he got just as good results, so far as steam was concerned, and just as good fuel distribution.

Introduction of Air Above the Fire

Mr. Fuller made a point which I want to corroborate concerning the introduction of air above the fire. During the time I was connected with the Fuel Section, it was my privilege to ride on some of the locomotives on a subsidiary line, where they used a very light coal, practically a lignite. The only manner in which it differs from the lignite is that it hasn't the brown color. It is a grey, slack coal of 8,000 to 9,000 BTU. They fired it with a stoker, and with the door open using a baffle door. Strange to state, their coal consumption when figured on a cost per ton mile basis is lower than that obtained where a better grade of coal is being used.

Now, I agree with Professor Endsley that possibly better results might be obtained by dividing the air that passes above the fire into small streamlets, instead of introducing it as is done in connection with the baffle door. The air rushing into the baffle door acts as a distributor and spreads the coal where it is wanted.

As far as fuel economy is concerned, on the El Paso and Southwestern, we were obliged to reduce the tonnage upon the locomotive on account of the long gradients and the extremely hot weather.

I have a report now that since that time they have introduced stokers on this particular grade and increased the tonnage about 22 per cent with the same results as far as fuel consumption is concerned, figured on the thousand gross ton mile basis. When they go to the thousand gross ton mile per hour basis, however, they find that the fuel consumption has been reduced.

In the tests made at the Altoona testing plant, it was proven beyond the question of a doubt that when high rates of combustion were approached the stoker showed an economy over the best hand firing. At low rates of combustion, hand-firing showed an economy over the stoker.

H. C. Oviatt (New Haven): It does not appear that the question of fuel consumption or air admission to the firebox has very much to do with it. We never began to apply stokers to locomotives until we had produced locomotives where the rate of combustion was higher than the ordinary fireman could take care of. As a matter of fact, we bought locomotives in 1916 with 45,000 lb. tractive effort that have no stokers in them. And neither does it seem to me that the stoker is necessary if we can, by hand-firing, get the full efficiency of the locomotive. When we have reached the point where we cannot get the full efficiency by hand-firing, it stands to reason that we have got to have a mechanical device to put the coal into the firebox. At that point it is not a question of whether the stoker burns a little more coal than a smaller engine per ton mile worked by hand-firing. It is a question of how we are going to burn the coal in locomotives of more than 50,000 lb. tractive effort.

Locomotive Firemen

The question of the class of men we are securing today for locomotive firemen is most important. Years ago we could easily pick up a fellow who was anxious to get the job that paid that rate, even though he had to work hard. Today, while the rate is very attractive, the average young man with a high school education, is not inclined to accept that class of work on account of the labor involved. With a mechanical stoker, he is inclined to accept it because of the removal of this objection. The stoker, in my judgment, is approached from the angle of necessity on account of the heavy tractive effort and the desirability of securing better men for locomotive engineers and further promotion, due to the fact that we can get the better educated boys on account of the lesser manual labor connected with it.

As far as the air is concerned, it is very interesting to hear the remarks with reference to the air drawn in through the firebox door. I cannot see where the mechanical stoker has very much to do with it. If we provide openings in the ash pans, sufficient air for combustion can be drawn through the grates, pre-heating it, and we have not only improved the steaming qualities of the engine through better combustion, but also reduced the fuel consumption.

Educating the Engineman

W. L. Robinson (B. & O.): Several speakers have talked about some of the most important points of the stoker and, among other things, Mr. Roesch speaks of educating the engineer. This is very essential. Another feature in the reduction of fuel consumption is the selection of fuel. There has been a number of tests on the road with which I am connected, and also some further tests in the University of Illinois, under the jurisdiction of the International Railway Fuel Association. All of these tests have brought out comparisons relative to the physical characteristics of the coal.

In tests made on the Baltimore & Ohio several years ago, we found a 15 per cent difference between ¾ inch slack and 1½ inch slack from the same mine. We found much larger difference between low volatile coal and high volatile coal, and as the years have gone by it seems that we have had to take almost anything that would burn. When we talk of the stoker efficiency and the number of pounds of coal per thousand gross ton miles, I believe we will get nearer to a reduction in fuel consumption by a more careful selection and purchase of the fuel.

There have been many interruptions during the war, which resulted in the use of poor fuel, but now that we are going into the subject so extensively, it would seem that this body should exercise its influence toward inducing the management of the purchasing department in particular to do its very best to procure the proper kind of fuel. In other words, an economic size and kind of fuel should be purchased.

M. Flanagan (C. & O.): In view of the fact that there has been such a difference of opinion, particularly in regard to the introduction of air above the fire line, I feel I would like to give the experiences we have had on the C. & O. in connection with stoker-fired heavy Mikado engines.

We found that the fireman was a big factor in connection with the handling of this work. In fact, we found it was an impossibility to get uniform firing unless we had some way of governing or regulating the fireman, and in line with Professor

Endsley's idea, we have gradually opened up the nozzles on our engines until we had the engines so that they will not steam with a fire more than five or six inches thick, and the engines will steam perfectly when fired in that way.

We have 25 engines of this type operating on a crooked line with heavy tonnage, and they are almost perfect steamers. We have practically no trouble with them unless there is a defect in the way of a burst unit, or something of that kind, to cause trouble. There is no way of introducing air but at the fire line. In fact we have to open the firebox door when the engines sometimes get too hot and are popping off badly. I think the only solution of the problem is to draft your engines so they will not steam unless you fire them with a very light fire.

We had some complaints from our road foreman of engines when we first drafted them in that manner, from the fact that when the engine stopped—waiting for other trains to pass—the fireman would generally have to rebuild the fire to hold it. That difficulty, however, has not amounted to anything serious and we are still firing in that manner.

We have different kinds of coal screened at several points on the line at main coaling stations and large percentages of very fine slack are burned. Notwithstanding that condition, we have no trouble at all from bad steaming engines, and we load them to their full capacity practically all the time.

H. C. Manchester (D. L. & W.): I am here to get information on the stokers. We have not any at the present time, but if the dates of delivery which have been promised turn out to be correct, the first one will be running on the Lackawanna on July 1.

In thinking over the stoker proposition, this point occurred to me. In the last two years, we have used everything from soft coal up to run of mine anthracite, which comes in lumps as large as a half bushel basket. I was wondering what stoker would handle that best. (laughter). It has been necessary for us to do that on our road on account of the inability to get bituminous coal at any cost. We have not felt that a stoker would work out very well if those conditions should continue; however, we are going to have 10 engines equipped with stokers in July, and do the best we can with them.

I have heard a number of gentlemen in this discussion speak about educating the fireman, and someone spoke about educating the fellow on the other side. I do not believe, from what little I have learned about stokers, that you will relieve the engineer from the necessity of learning his part of the work if you are going to save fuel. I do not believe the stoker has revolutionized the locomotive to the point that the fireman can do it all. Out best success in bringing about fuel economy in the past has been from educating the engineer as well as the fireman.

We have heard the fuel conservation people talk about the great saving which can be brought about in the use of bituminous coal by wetting it, and thus avoiding it being blown off the tank by high winds. I would like to inquire if, in the use of stokers, you wet the coal; will the stoker handle wet coal?

We have on the Lackawanna Railroad a fuel instruction car, which is in operation all the time, for the purpose of instructing engineers and firemen on the proper handling of fuel. Our engineers as well as firemen will all be required to go into this car and get their instruction in operating stokers as soon as the stokers are put in service, and I want to get all the information I can to tell them how to do it.

The question of the use of anthracite coal in all sizes on 60 per cent of our locomotives, which we are having to do today on account of the inability to get soft coal, is the crux of the situation—will the stoker handle varying grades of anthracite coal from rice up to the largest sizes?

B. P. Flory (N. Y. O. & W.): I cannot give information as to what stokers will handle wet coal, but I can give information as to what stokers will not handle. We have 12 Santa Fe engines in service now practically for five years, originally equipped with a stoker not having a crusher. At the time these engines were put into operation we were able to purchase all the slack we needed. During the winter of 1917 and 1918, however, we could not get any slack and we had to break up the coal ourselves. At that time we were getting a number of different kinds of coal and the slack we made was very fine.

I remember one trip that I made on one of these engines. The coal was wet and had to be thawed out of the cars. When it got into the tank it was nearly frozen. The traveling fireman and myself were on the engine and the fireman was using his time to pick down the coal so that it would run into the conveyor and the traveling fireman and myself were pushing at the distributors all the time. That brings up the question of the use of coal crushers. It seems to me that a coal crusher is a thing one must have on the locomotive.

We are an anthracite coal road, and have been in the same state is Mr. Manchester, but we have been able to use bituminous coal on our stokers, with the exception of a few instances, when we used pea coal. The quality is not very good, and while the stoker handled it all right, we could not keep up all the steam we needed on the engines.

In the report submitted by the committee, one of the roads gave the answer that in the use of a stoker, the fireman can devote more time to improving himself in the necessary knowledge he requires to become an engineer. It is my idea that the fireman on a stoker engine, particularly on a road having grades, has got to devote all his time to running the stoker if he wants to keep a live fire, and handle it economically.

George L. Fowler (Con. Engr.): The matter of the temperature above the fire line has been brought up, and possibly a little experience I had a few years ago in making some firebox investigations, may be of interest. It shows the necessity of being careful as to the way in which air is admitted above the fire.

The investigation that I had in hand was the determination of the temperature of the two sides of the inside sheet, the fire side and the water side. I made my first determination back of the arch and there found about what I expected, that the fire side was considerably hotter than the water side.

Then I moved back beneath the arch over towards the back head, and to my astonishment I found the fire side of the sheet was 50 degrees colder than the water side. The boiler was one that was used in the Chicago district where the roads use four tubes expanded through the fire-box for steam jets for smoke prevention. I had taken these out to get them out of my way, and my first trial was about six inches ahead of one of these holes. The air was going into the hole gently, and turning and running around along the side of the sheet and keeping it cool. Simply blocking up that hole with a piece of asbestos, raised the temperature to where it ought to have been.

I found later, by putting the steam jet back and sending the air up at a velocity to get it away from the water and into the body of the fire before the air was burned, I had no such trouble in the cooling of the inside surface of the sheet.

I went into a nother place, 12 or 18 in. ahead of the side sheet, but flush with the door. Mr. Anthony, of the American Arch Co., read a paper before the New York Railroad Club, in which he made an estimate of what the temperature of that sheet ought to be, and his temperature agreed within 2 deg. F. with what I actually measured at that point. When the man opened the door, however, to fire the locomotive, the temperature of the sheet on the fire side dropped 150 deg. F. in less than 15 seconds, and I have never yet been able, as quickly as I could act, to catch the temperature of the sheet during the time that the man was opening the door. The simple matter of swinging the door was throwing so much cool air up against the side sheets that the temperature fell so rapidly that no instrument I could get would keep up with it. It would balance in a few seconds, but at the time the fire door was wide open the temperature was below anything I could measure.

In firing the boiler I also found the expansion of the tubes pushed the back tube sheet back slowly until it moved quite a measurable distance in comparison with the shell of the boiler. Then when the throttle was opened the fire burned very rapidly, and within a very few seconds the sheet moved back half as far again as it was moved during the whole period of firing up.

If you open the fire door under those conditions, the tube sheet shoots ahead as if it was shot out of a gun, and by careful manipulation of the back fire door and throttle you can move the tube sheet backwards and forwards, as you

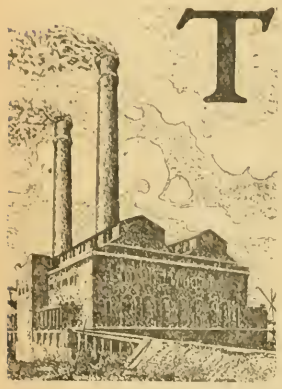
would a bellows. So this matter of the admisison of air to the firebox may improve combustion, but unless it is done very carefully, it may have a very detrimental effect on the expansion stresses in the sheets of the boiler.

Chairman Tollerton: I dislike to shut off any additional discussion on this important subject, but all the time allotted for the discussion of this paper has elapsed and a motion that the report of the committee be received or ordered printed and the committee continued will be in order.

C. E. Chambers: I so move.

(The motion was duly seconded and was then put to vote, and carried.)

Modernization of Stationary Boiler Plants



THE TOTAL QUANTITY OF FUEL used in stationary plants amounts to about 40 per cent of the country's total consumption, or in round numbers 225,000,000 tons, which is a quantity greater by about 15 per cent than the total used for locomotive purposes. It is apparent, therefore, that large possibilities for economy rest with those who supervise the use of fuel for stationary purposes, and it is fair to presume that the opportunities for such economy are relatively much greater on the average railroad than in industrial or commercial car plants, where the cost of operation may be a vital factor in the selling price of a product.

Even under the most favorable conditions, there are large unpreventable losses, but they are insignificant compared with those most readily prevented. Of the preventable losses, those encountered between the coal pile and the boiler exceed all the preventable waste between the boiler and the machinery, and of such losses by far the greater proportion are found in the furnace. The problem of modernization, therefore, concerns the extent and character of the preventable losses occurring under daily operating conditions.

Performance of Existing Plants

In order that some convenient basis of judging boiler performance might be available for reference, the committee decided that an approximate standard should be established as a guide to results, below which the efficiency could be regarded as unreasonably low, and above which excellent practical results were still obtainable. It should, however, be observed that peculiar conditions may exist on the various railroads that must be analyzed before judgment is rendered as to the performance of any plant.

Every railroad has a number of points where only a small quantity of steam or low pressure steam is required. These plants are usually for pumping or heating purposes. On account of this class of service being intermittent or seasonal the operator is usually a "coal shoveler" and not an economical fireman. For this reason, economy in operation is not the foremost point to be considered. Capacity, safety and cost of installation are of the most importance in such cases. Safety is a major factor, because such boilers do not receive the constant attention of an intelligent operator, who would wash them and fire them with a view to greater economy. Larger boilers than would ordinarily be required are installed at these points because the rates of evaporation are very low, due to scale formation, soot coatings, poor firing and steam wastes. Recognition of the existence of these wastes is rapidly causing the renewal of the boilers and the installation of motors or gas engines in many of our pumping plants.

Vertical, tubular and locomotive type boilers have formed a larger percentage of the boilers at places where the steam requirements were small or intermittent. The boilers from scrapped locomotives have formed a large proportion of such power generators. Because of the expensive settings, both the return tubular and the water tube types of boilers costs about three times as much to install as the self-contained locomotive type.

There are, however, perhaps 10 to 30 per cent of railroad stationary boilers installed in the better power houses that are operating under conditions favorable to the higher economies characteristic of the best modern practice. Such plants can be placed upon a basis of maximum economical power production with a relatively limited expenditure, and it should be recalled that economy in boiler operation is synonymous with increased capacity. The efficiency of any boiler plant is dependent upon a number of variables, such as the load carried, the coal and water used, the character of equipment, and the method of operation, so that each plant has its own particular ratings, but it is posible to establish a set of averages fairly representative of good practice. Such a set of averages is shown in the accompanying table for the different types of boilers in most general use, and from this table the curves in Fig. 1 have been developed.

With a given boiler plant, the first step preliminary to any improvements, is an analysis of present performance. This can be most readily made by obtaining the quantity of coal

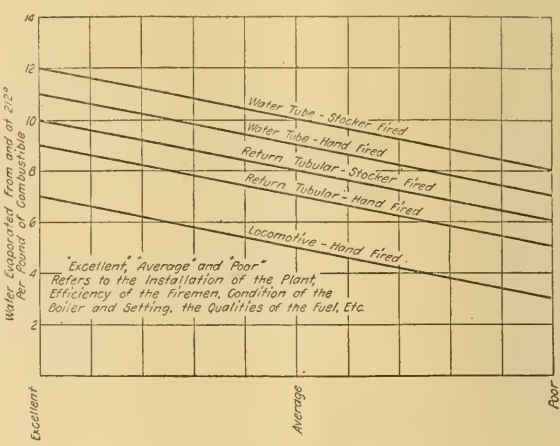


Fig. 1

burned and the corresponding quantity of water evaporated. As shown by the curves mentioned, the results expressed in the proper terms should not be less than indicated in the following table for the types of boiler specified:

Type if boiler	Evaporation from and at 212° per lb. of combustible
Water tube—stoker fired	10 lb.
Water tube—hand fired	9 lb.
Return tubular—stoker fired	8 lb.
Return tubular—hand fired	7 lb.
Locomotive—hand fired	5 lb.

If lower results are obtained, a check of plant conditions should be instituted to determine the nature and extent of the losses. These may arise through one or more of the following causes: (1) Excess air, (2) air leakage, (3) incomplete combustion, (4) short circuit in gas passages, (5) leakage of water and steam, (6) friction and radiation in steam pipes, (7) incorrect corelation of load and draft, (8) soot on heating surfaces, (9) scale in boiler, (10) heating moisture in coal, and (11) radiation.

In analyzing the boiler performance with a view to minimizing the losses, certain apparatus will be required that should be made a part of the regular plant equipment. It is useless to establish a set of ideal conditions and then remove the means through which these conditions were formed. The

first and most important items are the following: (1) differential draft gages for each boiler, (2) two good thermometers reading up to 300 deg., and (3) a simple CO_2 apparatus. With this equipment it is possible to determine the extent of the losses occasioned through excess air, these being by far the most serious of all in the average plant. Any expenditure made for the elimination of air leakage will soon pay for itself.

Leaks through the setting should be stopped with asbestos or front end cement and should be caulked with asbestos fibre

proper and thorough use of such blowers, and the committee favors the application of soot blowers designed for permanent attachment to the boilers.

Scale is formed from the evaporation of practically all water supplies for boiler feed purposes. Scale varying in thickness up to ⅛ in. may cause heat losses as high as 10 per cent.

The losses due to moisture in the coal vary directly with the percentage of moisture, an increase of 10 per cent representing an over all loss of about four per cent in efficiency. This loss increases much faster with the lower percentages of moisture.

STEAM BOILER PERFORMANCE DATA

Type of boiler	Builder's rating, h.p.	Percentage of rating developed	Method of firing	Kind of coal	Grate surface sq. ft.	Ratio of heating surface to grate area	Coal burned per sq. ft. of grate per hour	Apparent evaporation per lb. of coal as fired	Equiv. evaporation per lb. of combustible	Equiv. Evap. per sq. ft. of heating surface per hour	Combined efficiency of boiler and grate
Water tube	250	100	Hand.	No. 2 Wash. bit.	48	52	24	6.68	8.28	3.50	....
R. T.	100	108	Chain grate.	Semi-bit.	20	50	19.2	8.92	11.40	3.10	76
R. T.	100	275	Chain grate.	Semi-bit.	20	50	55	7.67	9.68	9.86	64
R. T.	150	124	Hand.	S. B.	39	46	20.1	7.8	9	4.48	60
R. T.	150	135	Chain grate.	Semi-bit.	35	51.5	18	10.56	12	4.81	80
R. T.	200	122	Hand.	S. B.	39	59	20.5	9.35	11.67	3.40	70.2
Vertical water tube...	350	98	Chain grate.	No. 3 Wash. bit.	32.5	42.5	17	8.2	11.7	3.4	70.2
Vertical tube	40	95	Hand.	Poca.	9.5	52.2	13.7	8.36	10.2	2.8	63.5
Hor. water tube	107	130	Hand.	Poca.	25	42.8	20.1	10.48	12.33	4.31	73.8
Hor. water tube	231	173	Hand.	No. 3 buck.	....	59.5	31.8	9.25	10.29	5.98	71
Hor. water tube	...	109	Hand.	No. 3 buck.	....	35.9	16.1	8.37	11.99	3.74	68.8
Hor. water tube	250	186	Hand.	Anth. pea	56	41.5	9.8	10.40	13.20	2.60	....
Water tube	412	105	Overfeed inclined stoker.	New river	74.8	35	21	9.68	12.4	3.6	74.9
Water tube	500	220	Chain.	No. 4 bit.	90	55.6	43.2	7.8	11.8	7.59	72
Hor. water tube	600	188	Underfeed stoker.	Clearfield R. M.	92	66.5	42.5	8.14	11.6	6.36	71.3
Hor. water tube	300 h.p.	206.65%	Chain grate.	12,700 B. T. W.	64	46.8	40.13#	7.25	8.164	6.79	58.12%
Hor. water tube	300 b.p.	198½%	Chain grate.	12,517 B. T. W.	64	46.8	41.5#	7.746	8.888	6.86	60%

soaked with fire clay. The setting may be tested for leaks by building a smoky fire and shutting the damper. Finally, some commercial flexible coating should be applied over the entire setting.

After the setting has been made tight, the relation between the required evaporation, the depth of the fuel, the draft and the air required should be determined for each grade of fuel used. Tests should be made at different boiler loads, and simultaneous observations made of the thickness of fuel bed, the draft and the amount of CO_2.

It will be found that with a given thickness of fuel bed, a certain draft will give a maximum CO_2 reading. A table compiled from the observations will show the fireman what damper opening and what thickness of fire should correspond with a given draft gage reading. The draft should be controlled by means of dampers in the flue and not in the ashpit doors. Where there are a number of boilers, the individual dampers should be adjusted so that each boiler will carry its proportion of the load under the most economical draft, and the draft increased with changing loads through the use of a damper in the main flue.

The loss due to incomplete combustion is probably not one-tenth that caused by excess air. It should be observed also that smoke is not necessarily an indication of the extent of this loss, since it arises from the emission of carbon monoxide, a colorless gas. This gas is highly combustible and has a heat value of 10,000 B. t. u. per pound. Its formation is due to (1) furnaces of poor design, (2) improper methods of firing, (3) improper mixing of the combustible gases with the air, (4) low furnace temperatures, so that the gases are cooled below the ignition point, and (5) deficient air supply.

Generally, incomplete combustion is due to deficient air supply caused by improper grate openings, by too little draft or by the formation of clinker over the fuel bed. Any CO_2 reading above 10 per cent warrants a check for the determination of CO (carbon monoxide) which may result in a two per cent loss for each one per cent of CO.

Short circuits in gas passages are preventable through proper inspection and repair. They occur most frequently in boilers having interior baffling, such as the water tube types.

Leakage of water and steam constitutes a large element of waste in railroad power plants. A ⅜-in. opening in a line carrying 100 lb. pressure will result in a coal and water loss aggregating about $400 per month.

Soot is one of the best non-conductors of heat yet discovered. Thickness for thickness, soot will stop five times as much heat as fine asbestos and may involve a loss of as much as seven per cent. The best and most effective means of removing soot is by the use of a hand blower, but it is usually difficult to insure the proper and thorough use of such blowers, and the committee favors the application of soot blowers designed for permanent attachment to the boilers.

It is important, therefore, that water be used sparingly on coal to keep down dust in the boiler room.

Radiation losses are easy to locate and remedy. Surfaces that are too hot to touch without discomfort represent a serious loss of heat. A one inch layer of good commercial covering will prevent the escape of 75 to 85 per cent of the heat lost from bare surfaces.

Reduced efficiency, from whatever cause, is likely to be reflected in increased flue gas temperatures, because of the necessity for increasing the rate of combustion. For plants operating on natural draft, a temperature of about 500 deg. F. is required in the stack to produce the necessary draft to operate the boilers at their normal capacity. An average temperature of 550 deg. may, therefore, be regarded as good practice. This will increase with the rate of evaporation in the same boiler, and for 250 per cent of rating may reach 560 deg. and still be within the limit of good practice. For forced drafts in four-pass boilers and exceptionally efficient operation, temperatures considerably lower than those mentioned may frequently be attained.

Abnormally high flue gas temperatures will result from (1) leaking baffles, (2) unclean water and heating surface, (3) excessive deposit of soot upon the tubes, (4) draft greater than necessary for the load, (5) insufficient heating surface per unit of stoker or grate, and (6) improper methods of operation resulting in secondary combustion.

Boiler Room Equipment

Feed water heaters produce greater economy than any other auxiliary boiler room equipment. For every 11 deg. rise in feed water temperature one per cent saving is made in fuel. The preheating of feed water also increases the steaming capacity of the boiler, reduces trouble from leaky tubes and cracked sheets, and decreases scale deposits on the heating surfaces.

The committee prefers the open type heater because it requires less maintenance and permits the precipitation of much scale forming material before entering the boiler.

Feed pumps are preferable to injectors on all except small upright boilers. Injectors do not permit preheating the feed water, consequently relatively cold water is introduced into the boilers.

The results obtained from any boiler plant are not due to the character or excellence of equipment. It is a matter of the proper use of equipment and, therefore, one involving the human element. In the larger plants it is not now unusual to establish the most efficient operation through proper study and then insure maximum operating efficiency by a system of bonus payments dependent upon the savings produced. For the average railroad boiler plant the introduction of such a system is probably not

feasible, but it is possible to establish practical methods of checking the work of the boiler room force in order that the most apparent of wasteful practices may be prevented.

Summary

The conclusions of the committee as to existing plants may be summarized as follows:

1. Eliminate air infiltration in settings by plugging cracks and applying a commercial boiler seal.
2. Apply adjustable dampers in the uptake of each boiler to permit draft control.
3. Apply a differential draft gage to each boiler.
4. Institute a system of periodical inspection of grates, brick walls and baffles.
5. Install automatic soot blowers in return tubular and water tube boilers.
6. Analyze the feed water to determine the amount of scale forming ingredients, and purchase a suitable treating compound based on guaranteed savings. Don't use a "cure all" compound.
7. Cover all exposed surfaces with a good commercial insulation.
8. Install feed water heaters in all plants of 100 hp. or over.
9. Use pumps, preferably outside packed plunger type, for boiler feed purposes.
10. See that the boiler room force is instructed in the proper operation of the equipment and follow up the instructions by periodical check observations.
11. Employ only competent, intelligent firemen.

Stokers

A vast amount of detailed information has been received, both from the committee members and from the various stoker and grate manufacturers, in regard to the principal characteristics of the various types of stokers. It is necessary to know all of the conditions in order to select the best type of stoker for the purpose in mind. Probably the most important feature is the characteristics of the fuel available as well as the size of the plant to be constructed or to which the stoker is to be applied.

In general, the underfeed type of stoker is better adapted to secure larger overload capacities from the boilers to which it is applied than any other, as well as being better able to produce flexibility of operation in falling peak loads on a boiler plant. This type of stoker, however, does not operate satisfactorily on all grades of fuel, being better adapted to the Eastern grades of coking coal having high ash fusing temperatures. Where the fuel supply makes it inadvisable to use this type of stoker, it would seem that the overfeed or chain grate types would be the best form of stoker to adopt. The overfeed type burning coking coal is of better advantage than the chain grate type.

While it is true that the installation of either overfeed or chain grate type of stokers can probably be made at less expense than that of the underfeed, it must be considered in this connection that the higher boiler rating obtainable with the underfeed stoker permits economies in capital outlay and construction cost in the boiler installation, so that the total expense of the boiler and stoker installation must be considered when comparisons are made between installation costs. The overall operating costs, when the efficiencies of the two types of stokers and their boilers are considered, would probably not be very different for any given installation.

Piping

It is important from the standpoint of economical operation that all power-plant steam piping systems should be as simple as possible, free from unnecessary bends and fittings, and laid out to secure the shortest direct routes between boilers, engines and other apparatus.

All branch lines should be provided with valves, in order that those not required for use may be cut off from the main line, thereby avoiding loss through condensation and leakage. Suitable drips should be provided for each high-pressure header and for steam separators, if used; the hot water from these drips being returned to the feed water heater.

The size and length of steam and exhaust mains will directly affect the fuel consumption. If the steam main between the boilers and prime movers is too small, or too long, it will necessitate carrying a much higher boiler pressure than would otherwise be necessary in order that the required pressure may be obtained at the engine. The drop in pressure between the boiler and throttle of any of the prime movers should not be greater than five points when the prime mover is operated at full capacity.

It is obvious that if higher pressure is necessary to overcome loss on account of improper design, there will be a corresponding loss of plant capacity, or what is the same thing, an unnecessary increase in consumption of coal and water. If the steam mains are larger than necessary, there may be no loss in pressure, but there will be a heat loss and an increase in cost of installation and maintenance.

Design of exhaust steam lines is extremely important, because it is essential that the exhaust steam be discharged at the lowest possible back pressure. In general, the pressure on exhaust steam lines should not exceed two pounds.

Pipe Covering

In the past, the railroads have paid too little attention to steam pipe insulation in respect both to material and workmanship. In most cases it pays to use the best quality of commercial pipe covering available, and the element of first cost is comparatively unimportant when the possible economies are so large.

As a guide to the selection of the most suitable and efficient covering some fundamental principles may be established. The first consideration must be that relating to any particular service condition, such as the probable influence of moisture from steam leaks, submersion, or exposure to the weather, the effects of vibration, the desirability of re-use, the necessity for repeated renewals, etc. These are features of the problems requiring specific treatment to suit the special conditions as they rise. The following recommendations are, therefore, applicable only to interior power plants, or shop piping.

The requirements for a good covering may be summarized as follows: (1) High non-conducting properties; (2) fireproof; (3) easily molded and light in weight; (4) impervious to moisture; (5) insoluble; (6) unaffected by steam; (7) non-corrosive; (8) structurally strong to resist handling and vibration, and (9) sanitary and vermin proof.

Most of the commercial brands of coverings will satisfy these specifications, but they differ considerably in insulating efficiency. Thickness for thickness, maximum insulating value can be obtained from the so-called felted asbestos coverings, while 85 per cent magnesia yields only slightly less favorable results at some saving in original cost.

Power Plants for Terminals and Shops

The design, installation and operation of a railroad stationary power plant requires considerable study, as it depends on many things to make it meet the needs for continuous and economical service.

Railroad stationary plants, from 500 boiler hp. to 3,000 boiler hp., may be of the same general design, using the same type of boiler. The smaller size plants, however, can not afford as many labor saving devices as the larger plants, but plants of the above mentioned ratings can all well afford the installation of stokers. The upkeep cost for stokers will, in general, be higher than for handfired furnaces, but stokers make possible the use of cheaper fuels with as high or higher economy than is obtainable with hand-fired furnaces using a better grade of fuel, and when used with a properly designed combustion chamber, not only serve as a labor saving device, but make it possible to obtain higher boiler ratings than can be obtained by ordinary hand firing.

The type of stoker is determined to a great extent by the available coal supply. Underfeed stokers have proved in most cases to be more desirable for the average run of bituminous coal. Chain-grate stokers with forced draft operate satisfactorily with various kinds of fine fuel, such as anthracite screenings, anthracite and bituminous mixtures, culm, etc., and, recently successful installations have been made for low-grade fuels, such as bituminous coals high in ash and lignites with excessive moisture.

Scarcity of labor has brought about the installation of many labor saving devices in the power plant. The instal-

lation of coal and ash handling equipment and mechanical soot blowers are of great importance from the standpoint of both economy and labor saving.

In selecting the location for the railroad power plant, there are three important factors that should govern: (1) The plant should be located as near as possible to the center of distribution of the load it is to supply; (2) a siding should be provided close to the boiler room so that coal and ash cars can be so placed that long haulage and extra handling of coal and ashes will be cut to a minimum; and (3) sufficient space for additional expansion should be provided.

The plant should be simple in construction and so planned that all unnecessary space is eliminated. Economy in the use of construction material can be secured by careful study of design. Unnecessary depths below ground should give way to more logical design. A large factor in economy can also be obtained by the combination of the coal bunker and roof support.

The boiler settings should be given careful study and if a hand-fired installation is being made, provision should be made to permit a future increase in the boiler capacity, which often becomes desirable, by applying stokers and increasing the height of the boiler settings to obtain the larger combustion chamber desirable in a stoker installation. Sufficient head room provided to meet this expansion means a considerable saving of both time and money, which would be involved if the higher boiler settings necessitated the raising of the boiler room roof, or the lowering of the boiler room floor to obtain the required space. It is well to remember, in designing the boiler room, that the boilers should not only have clearance for firing and withdrawing tubes, but room to inspect and repair the setting, piping and accessories. Platforms and stairways for convenience of operating valves, etc., should be especially considered in this connection.

The steam piping of a plant, as well as the yard lines of distribution, should receive careful consideration. Poor piping layout is very often the cause of water pocketing in certain parts of the piping. The pitch of all pipe should be in the direction of the flow of steam and the piping should be so arranged as to insure quick and easy repairs to the lines.

All steam lines should be well lagged to reduce the heat losses to a minimum. It is just as important to provide lagging for the piping as it is to provide pipe gaskets and proper pipe joints. Yard, steam and air distribution lines should, wherever possible, be carried above ground so that inspection and proper maintenance can be assured.

Many of the inefficient and obselete types of railroad stationary plants were created without any real study or engineering being applied to their installation. This has usually been the result of allowing the local operating force to design and install the plant more with the end in view of obtaining quick relief in an emergency than of providing satisfactory designs.

In order to determine the proper recommendations for the design and installation of power plants for roundhouse and repair shops of varying capacities, it would be well to outline just what equipment has been installed in a successful, economical and desirable installation of a railroad stationary plant of 1,500 to 2,500 boiler hp. rating, depending upon the grade of coal available and the type of stoker used.

[The committee gave in detail a list of the power requirements and plant equipment for a terminal handling 3,400 locomotives a month and 1,025 freight cars a month for all classes of repairs. Some of the recommendations follow.—Editor]

The following boiler room instruments should be supplied when deemed advisable, in the order shown: (1) feed water meter, (2) coal weighing device, (3) recording steam pressure gage, (4) draft gages, (5) breeching and stack thermometers, (6) steam flow meters, and (7) CO_2 indicator.

Superheaters are recommended for plants having turbine installations.

Economizers are not recommended because they require considerably more space than a heater of the exhaust type; additional brickwork is required, increasing the cost and maintenance, and cleaning scale and soot from economizers requires considerable expense and throws the economizers out of service during an excessive portion of the time. It is possible, however, that where coal is high in price, the saving obtained by the use of economizers might offset its expense of operation and warrant its installation.

Air compressors of the two-stage, engine-driven type are recommended. Where current is available and the distance to the air load center from the plant is great, the use of a motor driven air compressor near the center of the load is often very desirable and economical.

Special Method of Combustion

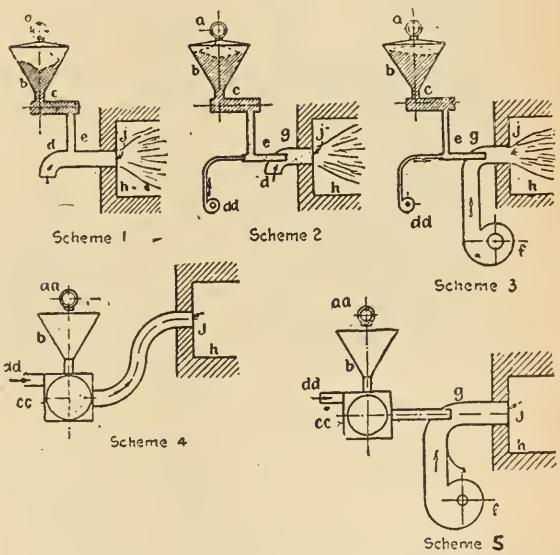
Pulverized Fuel

The Fuller Engineering Company, in a bulletin published in 1918, gave the annual consumption of powdered coal as follows:

In the manufacture of cement	6,000,000 tons
In the iron and steel industry	2,000,000 tons
In the production of copper	1,500,000 tons
In the generation of power	100,000 to 200,000 tons

The use of pulverized fuel for stationary boilers can still be considered in the experimental stage and therefore the available data of any reliability on the subject is meager.

Preparation of Pulverized Coal.—In general, the systems of preparing pulverized coal for fuel in stationary plants can be divided into two methods: (1) where coal is prepared at the same rate that it is consumed in the furnace, and (2) where sufficient storage capacity is provided so that a 24-hr. run of coal for the boilers may be pulverized in say 8 to 10 hours. Under the latter method, the pulverized coal is stored in a dust proof hopper, usually at the front of the boilers from which it is fed directly to the burners and thence to the boilers.



a, Screw conveyor for pulverized coal; *aa*, Screw conveyor for crushed coal; *b*, Hopper; *c*, Feeding device; *cc*, Self-contained pulverizing, mixing and feeding machine; *d*, Induced-draft combustion air; *dd*, Primary mixing air blower; *e*, Primary mixing chamber; *f*, Secondary air blower; *g*, Secondary mixing chamber; *h*, Hearth; *j*, Nozzle. The delivery outlet or outlets are arranged and shaped to suit the hearth, which in turn depends on the nature of the service.

Fig. 2.—Pulverized Coal Feeding Devices

In modern pulverizing plants, the amount of conveying done is small, for it is always desirable to make the entire plant as integral as possible. The conveying system from car to dryers is much the same as that used in modern stoker-fired plants. However, after pulverized coal leaves the pulverizing mill, it must be handled in dust tight conveyors. Screw conveyors have been very extensively used for this purpose, although recently one of the pulverized coal equipment companies has designed and used a pulverized coal "pump." This "pump" consists of a short screw conveyor, motor driven at 750 r. p. m., discharging the coal through a nozzled opening into a dust tight pipe. In this nozzle is introduced compressed air (3 cu. ft. of free air per cu. ft. of coal), which carries the coal through the pipe to

its several points of distribution. The air is used merely to aerate the coal, the screw conveyor doing the actual conveying.

Storage of large quantities of pulverized coal is not to be looked upon as good practice. Large quantities of pulverized coal collect moisture most readily and involve some slight hazard of explosion.

Arrangement of Burners.—There are several types of burners on the market today, all of which have about the same claim to merit. But the various arrangements in use are well illustrated in Fig. 2, taken from paper on "Pulverized Coal as a Fuel for Boilers," by E. R. Wells and W. H. Jacobi, of the J. G. White Engineering Corporation. (Presented before the A. S. M. E., see Mechanical Engineering, September, 1919.)

Scheme (1) depends entirely on induced chimney draft for air supply. Scheme (2) is a combination of natural and forced draft. Scheme (3) provides a full control of fuel and air. In schemes (4) and (5) self contained pulverizing units are employed.

Furnaces.—As in the case of burning solid coal on grates, the proper design of furnace is of prime importance. Great difficulty will be experienced with slagging if the brick work is too close to the deflagration zone. The quality of coal used will largely dictate the furnace design.

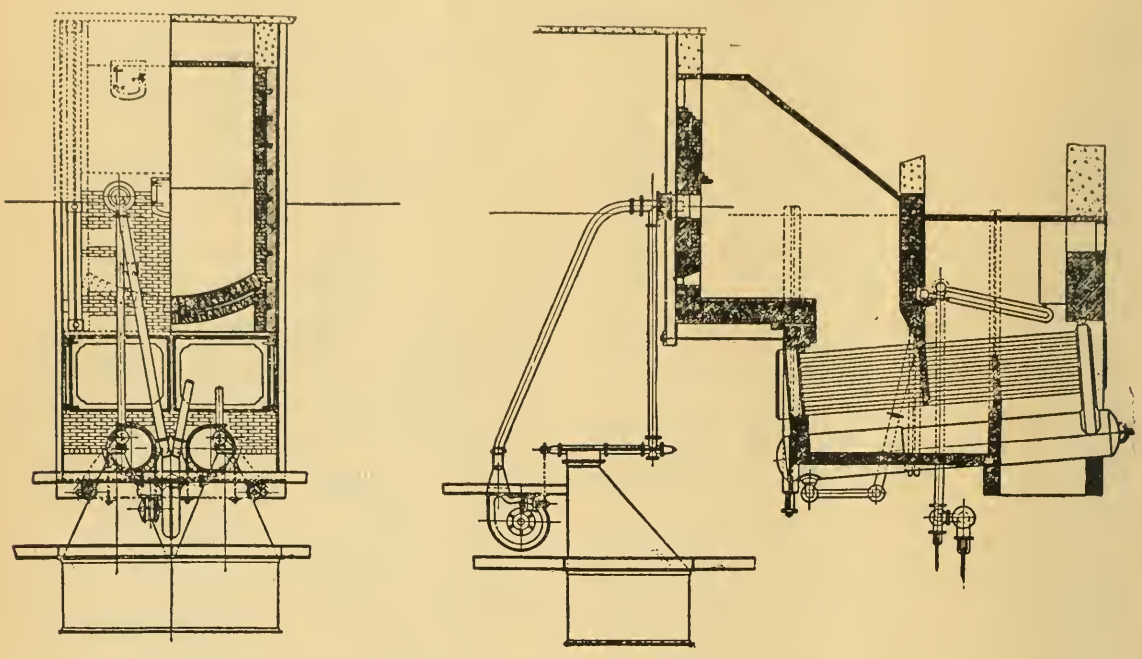
All authorities seem agreed upon the statement that low gas velocities are desirable. This is dependent somewhat upon the velocity at which the coal and air is fed to the furnace. A high velocity of fuel injection into the furnace tends to carry the deflagration zone too near the tubes, causing considerable trouble with slag formations on the tubes. On the other hand, if the velocity is not sufficient to carry the flame forward and away from the burner, difficulty with back-firing will be experienced.

Fig. 3 shows a typical furnace design with a Heine boiler.

Minimum Size of Boiler Plant for the Economical use of Pulverized Coal.—It is doubtful whether a plant that could not economically install and operate mechanical stokers, could afford the expense of installing and operating a pulverized coal plant. John Anderson, chief engineer of power plants, the Milwaukee Electric Railway & Light Company, in his article, "Use of Pulverized Fuel Under Central Station Boilers (see Tech. League, E. M. B. A., Milwaukee, February, 1920), states: "A plant of less than 2,500 developed boiler horse-power on a 24-hr. operating basis should not consider using powdered fuel."

Coal Suitable for Pulverizing.—Practically any grade of coal can be pulverized, although the harder anthracites and coke, are very severe on the mills. Bituminous lends itself very readily to pulverizing, and N. C. Harrison (see Mechanical Engineering, August, 1919) states: "Coals with less than 10 per cent ash, volatile averaging between 30 and 40 per cent, and fixed carbon between 40 and 50 per cent, low sulphur content, and high fusion point of ash, are in general the most satisfactory coals."

All authorities are not agreed as to just how much effect high sulphur content has in the burning of pulverized coal. Moisture in the coal is objectionable, not so much because of the thermal losses as because of the difficulty and increased cost of pulverizing. However, uniform quality of coal, as well as uniformity of fineness, is highly desirable.



Designed by Fuller Engineering Company, Allentown, Pa.

From "Pulverized Coal for Stationary Boilers." By F. A. Scheffler and H. G. Barnhurst, Fuller Engineering Co., before A. S. M. E.

Fig. 3.—425 H. P. Heine Boiler Arranged for Pulverized Coal Firing

Cost of Pulverizing Coal.—In "Pulverized Coal for Stationary Plants," by F. A. Scheffler and H. G. Barnhurst of the Fuller Engineering Co., (see Mechanical Engineering, August, 1919), the cost of delivering pulverized fuel to the boilers is given in the following table:

	Dollars per net ton	
	100-ton plant	1,000-ton plant
Power at ¾ cent per kw.-hr. and 17 kw. hrs.	$0.1275	$0.1275
Labor at 40 cents per hr.	0.14	0.04
Drier Coal at $5.00 per ton, delivered	0.06	0.06
Repairs	0.07	0.07
Total actual cost of pulverizing, per net ton	$0.3975	$0.2975
Interest at 6 per cent	0.105	0.039
Depreciation	0.12	0.04
Taxes and insurance	0.035	0.013
Total cost per net ton	$0.6575	$0.3895

Tests with Pulverized Coal as a Boiler Fuel.—The table on the following page gives results on a few tests that have been reported recently with pulverized coal under stationary boilers.

Pulverized Coal vs. Mechanical Stokers.—The most modern pulverized coal burning plants have been in operation such a comparatively short length of time that standards have not yet been satisfactorily worked out, and the data available is not sufficient that any definite conclusions can be based on it. How-

ever, the following figures will give some idea of the comparative results obtained with modern pulverized coal burning plants and mechanical stoker-fired plants. The table is taken directly from John Anderson's paper, to which reference has already

Tests With Pulverized Coal Under Stationary Boilers

Manufacturer	Hp.	Boilers Per cent rating	Kind of coal	Duration test hrs.	Boiler and furnace efficiency Gross	Net
Edge Moor..	468	118.4	50 per cent Youghiogheny screenings. 50 per cent East Kentucky, 12,810 B. t. u. dry.....	99	80.67	72.32
Heine	370	95.0	Kansas bituminous, 11,435 B. t. u. as fired	25 days	78.1	
B. & W.	600	126.0	Issaquah screenings, 11,660 B. t. u. as fired	24	78.95	.....
Stirling	439	155.0	Gallup, N. M., 10,680 B. t. u. as fired	6 days	79.5	.....
Edge Moor ..	468	116.7	Bituminous screenings	24	85.22	81.1

Note.—Net efficiencies are equal to gross efficiencies less deductions for fuel preparation.

been made. The modern stoker plant herein compared is the stoker formerly used at this plant, and is of the forced draft, multiple retort underfeed type. The figures are based one ton of coal burned:

	Pulv. fuel system	Modern stoker
Energy consumed by conveyors, crusher, elevators, driers, fans and feeders or stokers and blowers, kw. hrs.	5.73	10.94
Energy consumed by pulverizer, kw. hrs.....	16.72	.....
Total energy, kw. hrs.....	22.45	10.94
Coal equivalent at 1.5 lb. per kw. hr., lb.....	33.68	16.41
Coal consumed in drier furnace, lb.....	25.66	.....
Total coal and equivalent, lb.....	59.34	16.41
Cost of Fuel Preparation, Firing and Ash Disposal		
Labor—coal preparation	$0.143	$0.000
Labor—firing	.112	.140
Labor—ash removal (in plant).....	.025	.064
Dryer fuel—coal at $4.00 per ton.....	.051	.000
Electrical energy—coal per kw. hr. at 1.5 lb.....	.069	.033
Maintenance		
Labor at 3.6 cents (material at 2 cents, mf'gs. est. lubricants at 0.7 cents.....	0.063	0.007*
Total cost of fuel preparation, firing, ash disposal and maintenance	.462	.334
Price of coal as purchased, per ton.....	4.000	4.000
Total cost per ton.....	4.462	4.334
Cost per ton of coal in pulv. fuel system over modern stoker	0.128	.....
Efficiency		
Actual gross efficiency, per cent.....	80.67	76.80
Net efficiency after all incidental costs have been accounted for, per cent.....	72.32	70.88
Difference in favor of pulverized fuel system, per cent..	1.44	.....

* Labor, 4.6 cents; material, 4.9 cents, and lubricants, .2 cents.

It is to be noted that the actual increase of efficiency (net) of pulverized fuel burners over modern stokers is less than 1.5 per cent.

Combustion of Pulverized Coal.—The following table is taken from "Pulverized Coal as a Fuel for Boilers," by E. R. Welles and W. H. Jacobi (see Mech. Engineer, September, 1919), and shows the relation between CO_2, excess air and furnace temperature:

Percentage of excess air	0	25	50	75	100	125
Combustion temperature, deg. F., carbon	4,000	3,450	3,000	2,625	2,350	....
Average bituminous coal.....	4,860	4,000	3,325	2,860	2,500	2,220
CO_2, per cent.....	20.8	16.5	13.8	11.8	10.2	....

From this it is seen that, while the amount of excess air used with pulverized coal can be cut to a minimum owing to the nature of the fuel, it is never practical to do so when this fuel is used in boiler furnaces because of the resulting extreme temperatures. In fact, great care must be exercised to keep the excess air sufficient to hold the temperature down, as extremely high temperatures are not only detrimental to brick work, but cause considerable trouble with slagging. Generally speaking, the temperature of the furnace should run from 2,400 deg. to 2,500 deg. F. when the boiler is operating at normal rated capacity.

About 80 per cent of the air required for combustion is supplied by the fan blowing the coal into the boiler at about 1¼ to 4 oz. pressure. This is known as primary air. The remaining 20 per cent required is supplied either by the siphoning effect of the burner under blower pressure or by natural draft through secondary air openings in the setting. Such air is known as secondary air.

Conclusions.—Unfortunately, there seems to be no reliable data available on pulverized coal operation for continuous high overload capacities and using the poorer grades of fuel. There are any number of tests giving remarkable results with mechanical stokers, using low grade fuels and giving continuous high overload capacities, but such seem to be lacking in the pulverized coal field. Very high efficiencies were obtained at the Delray plant of the Detroit Edison Company under continued high overloads, some of these efficiencies running over 80 per cent., and it is reported that 76 per cent. was maintained throughout the year. This is with mechanical stokers.

The big losses in boiler furnace operation are carbon in the ash pit and stack losses. Stack losses are dependent on the amount of excess air used. With pulverized coal the amount of excess air can not be materially reduced over modern stoker fired operation bcause of the destructive high temperatures resulting when the amount of excess air is reduced. With pulverized coal, however, the amount of carbon in the ash pit can be reduced somewhat, but it is a question as to whether the saving in the ash pit is offset by the increased cost of preparation. The Detroit Edison Co. operate mechanical stokers with carbon in the ash as low as 10 per cent, and a gain of less than 1.5 per cent in efficiency only is shown in comparative tests.

The Schutz Crushed Coal Furnace

The Schutz Crushed Coal Furnace is a coal burning device using coal that has been finely crushed (but not pulverized) and without extracting the moisture. The crusher used is of the roll type, with magnetic separator to take out scrap iron. The coal is reduced for the furnace in the one operation of passing through the roll crusher.

The crushed coal is then elevated to a bin in front of the boilers where it falls by gravity to the feeder. The feeder is of the rotary type, carrying the coal from the chute and dropping it into an air blast where it is picked up and carried into the fire pot, where combustion of carbon and volatile takes place, with the separation of the ash and slag.

Installation Under Test.—The furnace under test at Purdue University, Lafayette, Ind., is installed under a 250 horsepower Sterling boiler. The fire pot is 28 in. in diameter at the upper lip, and 36 in. in diameter across the widest part. The coal is fed in around the periphery of the fire pot through four pipes made from 3½ in. boiler tubes.

The air (under pressure of about five inches of water) enters with the coal tangential to the perimeter of the fire pot and is carried rapidly around the inside of the fire pot. As the volatile is driven off and ignited a vortex is formed, which siphons in secondary air to complete the combustion. The ash and slag is separated while the coal is still whirling about the inside of the pot, and this slag runs out a small hole in the bottom of the pot and falls into a sealed ash pit. Secondary air is siphoned in by natural draft and the action of the vortex through doors located in the front of the setting.

Tests.—This device is installed in the boiler house of Purdue University, where it has been undergoing tests for some time. However, these tests were made to develop and perfect the burner and no evaporative tests have been run to date. Temperatures taken show that the temperature within the primary combustion chamber are about 2,800 deg. F., and over 2,900 deg. F. in the secondary combustion chamber.

Economy and Cost of Operating.—Inasmuch as this device has not yet been made a commercial proposition, no data is available as to the cost of operation and maintenance. However, it can justly be compared to a pulverized coal burning furnace in which the cost of pulverizing and drying has been eliminated. Further than this, by virtue of the method of slag separation, the higher temperatures resulting from reducing the excess air to a minimum are available without the accompanying trouble with slagging. It can be stated from personal observation that there are no slag or soot deposits on the tubes.

Because of the higher available temperatures and low carbon content in slag and ash, efficiencies as high as those obtained in

pulverized coal burning (if not higher) are to be expected. It is self evident that the cost of operation is much less than in a pulverized coal plant, and less than in most mechanical stoker plants.

The report was signed by A. C. Trumbull (Chairman), Erie; J. V. B. Duer, Pennsylvania; J. H. Davis, Baltimore & Ohio; B. B. Milner, New York Central, and L. C. Bowes, Chicago, Rock Island & Pacific.

Discussion

B. B. Milner (N. Y. C.): Mr. Trumbull was not able to be here to present the report of the committee, which has been largely his work. At a late hour yesterday he indicated to me that it would be impossible for him to be here, and asked me to represent him in the presentation of the committee report.

During the presentation of the abstract, Mr. Milner said: The committee's thought is that those attacking the subject for any group of plants on any line, should first be concerned with finding out if there is anything very radically wrong with the performances being obtained as reflected in the quantity of water evaporated per pound of coal. The committee therefore arranged Chart 5 to show the reasonable variations for the various kinds of boilers represented, the reasonable variations between what would be considered excellent performance, average, or poor performance.

C. E. Fuller: I move that the report be accepted and open for discussion.

(*Motion seconded by Mr. Chambers, put to vote, and carried*).

Chairman Tollerton: I wish to call attention to the fact that our time is up with regard to discussion for the day. The discussion on this paper, I hope, will be limited. I would like to say, however, that as expressed in the paper, the stationary boiler plant is one of the most important features to-day in the consumption of fuel. I believe that in handling this subject the committee should be continued, and made a standing committee, so that the association would have the benefit of the improved methods of modernizing stationary boiler plants.

C. E. Fuller: If there is no discussion, *I move that the report be received and printed, and the committee continued for another year.* (*Motion seconded and carried.*)

Chairman Tollerton: If there is no further discussion for the day, and as the hour for adjournment has arrived, we will adjourn until 9:30 o'clock on Thursday morning.

The Cornell Banquet

ARRANGEMENTS ARE BEING made for holding the annual Cornell banquet on Saturday evening, as in previous years. The details will be announced in a later issue of the *Daily*. Those desiring to attend should register with A. F. Stuebing at the *Railway Age* booth.

Yesterday's Entertainment Feature

THE OPENING day's entertainment features were introduced by the Albert Taylor Orchestra of New York City in the way of a morning concert in entrance hall on the pier. Let us depart a trifle from the story and say that yesterday's and last night's performances of this orchestra, which has been engaged for the entire convention, assures us of an abundance of good music while we are at Atlantic City.

In the afternoon many of the convention people enjoyed a musical program and impromptu dancing, followed by the serving of tea at 4.30 o'clock.

In the evening the first regular informal dance was enjoyed in the ballroom on the pier. The floor was filled to its capacity. Informal dress prevailed. During the intermission between the first and second parts of the program the large audience was entertained pleasingly by the figure and fancy dancing in costume of a number of Atlantic City's little girls under the direction of Joseph Dawson, amusement director of the pier, assisted by Miss Dawson. Some five or six dances were given and were greatly enjoyed and heartily applauded as a new and attractive feature of an evening of this kind.

The carrying out of the evening's program was in charge of the following sub-committee of the Entertainment Committee: L. B. Sherman, chairman; L. O. Cameron, Horace Hager, Ellsworth Haring, Langley Ingraham and W. B. Wise.

Wear Your Badge Where It Can Be Seen

YOU CAN SAVE yourself and members of the entertainment committee embarrassment if, when on the Pier, you will wear your badge where it can be seen. Persons not having badges are not entitled to be on the Pier, and if you do not wear your badge where it can be seen, do not take offense if you are asked to either show it or retire from the Pier.

New Members Interstate Commerce Commission

PRESIDENT WILSON yesterday announced recess appointments of Henry Jones Ford, James Duncan and Mark W. Potter as members of the Interstate Commerce Commission. Their nominations were sent in while Congress was in session, but the Senate did not confirm them before adjourning. The recess appointments will enable them to serve as members of the commission until the Senate meets again. Mr. Potter is president of the Carolina, Clinchfield & Ohio Railway.

Two Prominent Members Ill

TWO OF THE MOST prominent members of the Mechanical Section, J. J. Hennessey and H. R. Warnock, are unable to attend the convention this year on account of illness. At the session on Wednesday a motion was made by C. E. Fuller and unanimously carried, that the following resolution be sent to these two members:

"Mechanical Section III of the American Railroad Association, in convention assembled, regrets exceedingly your inability to be present, and extends best wishes, and hopes for your speedy recovery, and that you will be with us one year hence."

Registration Figures

UP TO THE HOUR of going to press with registration book number one (at noontime Wednesday) the following were the official figures as given to the *Daily* by Chairman Gayetty of the enrollment committee:

Members, Section 3, Mechanical	355
Purchases and Stores	9
Special guests	102
Railroad Ladies	251
Supply Ladies	354
Supply Men	1,517
Total	2,588

There is no comparative record available for Book 1 of 1919, but the total exceeds that of any previous year.

Don't Overlook the Balcony Exhibit

CHAIRMAN TOLLERTON made the following announcement near the close of the convention on Wednesday:

"The Chairman desires to announce that there has been an exhibit space provided on the balcony, around the grand ballroom. There are some very instructive and valuable exhibits in the balcony, and I particularly hope that the members will avail themselves of it. It may be that you would overlook it in the general rush of affairs, but I want particularly to call your attention to it, because the exhibitors on the balcony have made a very fine exhibit, and you should examine it as carefully as that on the main floor.

Stenographic Service at the Marlborough

FOR THE CONVENIENCE of railroad men who wish to keep in touch with their offices arrangements have been made to maintain a corps of stenographers and typists at the Marlborough-Bleinheim during the sessions of Sections III and VI. The office will be open from June 9 to 16, inclusive, and will be located in the Park Avenue Hall (Marlborough side).

The services of the stenographers and typists will be at the exclusive disposal of the representatives of members of the A. R. A., and it is hoped that the facilities provided will be used extensively and the arrangements made will enable the members to conveniently handle their correspondence while at Atlantic City.

The Track Exhibit

THE TRACK EXHIBITS which have been provided this year, while not as extensive as those of last year, are of a nature to merit the close attention of railroad men. On the Philadelphia & Reading track at Mississippi Avenue and the Boardwalk will be found a tank car exhibit which has been provided by the American Car & Foundry Company. This includes two American Railroad Association Class III tank cars, one of which is fitted with heater pipes. One end of the tank on this car has been removed in order that the arrangement of the heater pipes in the tank may be readily observed. The third car is built to American Railroad Association Class IV specifications.

A 110,000-lb. capacity Lehigh Valley hopper coal car equipped with Hewitt articulated trucks which has been in service since 1913 will also be found on the Mississippi Avenue track. This car, which was exhibited during the 1913 conventions, after a period of seven years in active service, has just been repainted in the Lehigh Valley shops, but no repairs to the car or trucks have been found necessary. All but two of the eight wheels originally applied to this car are still in service and appear to be good for some time to come. Only one journal bearing has been replaced and the absence of flange wear on the wheels and end wear on the brasses is noticeable.

A Clark dump car designed by the Clark Car Company is being shown in operation. This car has the capacity of 810 cubic ft. and 100,000 lb.

A working model showing the operation of its all metal automatic train pipe coupler is also being shown in operation by the International Couplers Company on the Mississippi Avenue track.

At the Pennsylvania electric station, Tennessee and Atlantic Avenues, the New York Central is exhibiting a Pacific type of locomotive equipped with a trailer booster for increasing the starting tractive effort of the locomotive.

Government Loans to Buy Equipment

REFERENCE WAS MADE in the *Daily* yesterday to the announcement of the Interstate Commerce Commission as to the principles which will control its action in recommending to the Secretary of the Treasury loans to railway companies from the revolving fund of $300,000,000 created by the Transportation Act. The *Daily* has now received a complete copy of the commission's announcement, and quotes from it the following which will be of interest to railway mechanical officers and the railway supply fraternity:

"It is essential that a substantial portion of the fund be put to work at once to aid in acquiring new equipment. The appropriation for this purpose will be fixed for the present at $125,000,000, to be distributed substantially as follows:

"To aid in acquisition of freight cars, $75,000,000.

"To aid in acquisition of locomotives, $50,000,000.

"Since freight cars are interchanged and enter into general use, subserving the general transportation needs of the public regardless of ownership, the commission will endeavor to apportion the $75,000,000 in such manner as will bring about the acquisition of the largest number of cars.

"The commission cannot undertake the formation of an equipment corporation or corporations, but upon presentation of a definite, well-matured and workable plan capable of application in the immediate future, it will give preferred consideration to applications for loans to or for the purpose of such a corporation. The commission believes that it is both desirable and practicable to devise such a plan in the case of refrigerator equipment, and particularly commends this matter to the attention of the railroad executives.

"The $75,000,000 apportioned for freight cars will be used primarily to aid in the acquisition of 20,000 refrigerator cars.

"The allotment for refrigerator cars will be made first to those companies which offer the largest proportional contributions to meet the advances of the government, and will be continued in the order of proportions of carrier contributions until the total of 20,000 refrigerator cars is provided for or the applications are exhausted. Other things being equal, preference will be given to loans to or for the purpose of equipment corporations supplying the needs of a number of lines.

"After providing allotments for refrigerator cars allotments for other freight cars will be made in a similar manner and with similar preferences. Where carriers, however, offer free of prior liens running gear, parts of cars or types of cars which by construction, reconstruction or re-enforcement may be converted into modern and efficient equipment at an earlier date than is possible by new construction, preference will be given to carriers making such offer.

"The $50,000,000 for locomotives will be used first to aid in acquiring freight and switching locomotives and will not be employed for passenger locomotives until and unless applications for freight and switching locomotives are met. It will be the rule to require applicants themselves to contribute at least 50 per cent of the cost of the locomotives. Other things being equal, preference will

be given to applications for loans to or for the purpose of equipment corporations. If the demand should be in excess of the allotment, with the possible exception of equipment corporations, applications for less than 25 locomotives will first be filled, 25 locomotives will be applied in order to the remaining applications, beginning with the lowest, and the remainder will be used to complete the applications so far as possible in order, beginning with the lowest. This will be done for the purpose of securing distribution of locomotives throughout the country.

"The commission will give consideration to the applications of any carriers unable to finance as much as 50 per cent of the cost of freight or switching locomotives, and for good cause shown will advance the necessary amounts before recommending loans for the requisition of passenger locomotives."

New York Railroad Club Nominates Officers

AT A MEETING LAST TUESDAY of the committee named by President H. C. Manchester of the New York Railway Club to nominate candidates for officers in 1920-1921, the following ticket was unanimously agreed upon:

For President—J. A. Droege, General Superintendent of the New Haven Railroad.

For First Vice-President—J. S. Doyle, Superintendent Car Equipment, Interboro Rapid Transit.

For Second Vice-President—F. T. Dickerson, Secretary and Treasurer, Central Railroad of New Jersey.

For Third Vice-President—F. L. Blendinger, Vice-President, Lehigh Valley Railroad.

For Treasurer—David W. Pye, President Tuco Products Company.

For Executive Member, three years—Col. Charles Hine, General Agent, Erie Railroad.

For Member of Finance Committee—George T. Cooke, President, Union Metal Products Company.

Registration, American Railroad Association, Sec. III, Mechanical

Alling, Edward W., M. M., N. Y., N. H. & H. Princess.
Allison, W. L., V. P., American Arch Co., Marlborough.
Anderson, H. P., Asst. Ch. Oper. Off., M. K. & T., Chelsea.
Ayers, A. R., S. M. P., New York, Chicago & St. L., Marlborough.
Bachman, E. L., Asst. M. M., Penn.
Balliett, H., Asst. Term Mgr., N. Y. C., Breakers.
Band, R. W., G. S. I., B. & M., Chelsea.
Barton, T. F., M. M., D. L. & W., Traymore.
Basford, G. M., Pres., Loco. Feed Water Meter Co., Marlborough.
Battley, E. R., Supt. M. P., Grand Trunk, Ambassador.
Bauer, F., M. M., C. C. C. & St. L., Breakers.
Beck, W. R., M. M., Cleveland, Cin. & Chi. & St. L., Breakers.
Bell, R. W., G. S. M. P., I. C., Marlborough.
Bennett, R. C., S. M. P., Central Div., Penn., Haddon Hall.
Besler, J. D., Asst. to Vice Pres., C. B. & O., Dennis.
Besler, W. G., Pres. & Genl. Mgr., C. R. R. of N. J., Dennis.
Biehlmeir, G. W., P. A., K. C. S., Ambassador.
Bingaman, C. A., M. Eng., P. & R., Bothwell.
Bishop, G. C., Supt. M. P., Long Island, Chelsea.
Borrell, E. A., Engr. M. P., P. & R., Bothwell.
Brandt, C. A., Loco. Heater Co., Marlborough.
Breaker, E. R., C. E., S. A. U. & C., Breakers.
Brown, F. S., M. E., Erie, Wiltshire.
Bruckert, R. H., S. K., K. & Ind. Term., Breakers.
Bryant, W. T., Rd. Foreman of Engines, H. W. & P., Princess.
Buckbee, E. J., M. M., C. C. C. & St. L., Breakers.
Budwell, Leigh, M. E., Rich. Fred. & Potomac, Marlborough.
Burton, Thos. L., C. A. B. E., N. Y. C., Marlborough.
Bushnell, F. A., P. A., G. N., Shelburne.
Bussing, G. H., G. S., Mexico North West., Haddon Hall.
Butler, W. S., M. M., C. & O., Craig Hall.
Caley, G. W., M. M., N. Y. C., Fredonia.
Carroll, J. T., S. S. M. of E., B. & O., Marlborough.
Carroll, W. P., Supt., E. B. & A. C., Whiting Fibre Co., St. Charles.
Caviston, J. C., A. R. A., Arlington.
Christian, E. R., Supt., Cornwall, Arlington.
Coddington, H. W., Eng. Tests, N. & W., Chalfonte.
Chambers, C. E., S. M. P. & E., C. R. R. of N. J., Dennis.
Chidley, Jos., S. M. P., N. Y. C., Marlborough.
Clark, Edw., Gen. Foreman, C. P. R., Arlington.
Coe, T. W., M. M., N. Y. C. & St. L., Alamac.
Coho, O. C., Asst. M. M., Penn.
Cole, F. J., C. C. E., American Locomotive Co., Traymore.
Conahan, C. F., M. M., L. V., Osborne.
Cope, E. E., M. M., Buffalo, Rock. & Pitts., Continental.
Courtney, A. S., E. M. P., Penn., Craig Hall.
Cromwell, O. C., Asst. to G. S. M. of E., B. & O., Strand.
Crownover, G. M., Oxwold Ry. Service Co., Traymore.
Cullen, T. E., M. M., Erie, Runnymeade.
Daley, W. W., M. M., N. Y. O. & W., Chalfonte.
Darden, C. M., M. E., N. C. & St. L., Brighton.
Deguire, Geo. N., Asst. Mgr. Dept. of Equip., U. S. R. A., Marlborough.
Dempster, G., M. M., Southern, Princess.
Deppe, J. A., Genl. Supervisor Frt. Car Dept., C. N. & St. P., Strand.
Desmond, D. G., M. M., Morgantown & Kingwood, Monticello.
Desmund, James Sup. Insp., Delaware & Hudson Co., Blackstone.
De Vilbiss, E. B., S. M. P., Penn., Marlborough.
Dickert, C. L., M. M., C. of Ga., Traymore.
Dickson, J., S. M. P., Spokane, Portland & Seattle.
Dichr, C. P., M. M., N. Y. C., Fredonia.
Dillon, E., A. M. S., Central Vermont, Princess.
Donaldson, T. C., M. M., B. R. & P., Arlington.
Donnellan, Jos. E., M. M., Del. & Hud., Haddon Hall.
Dow, A. M., Gen. Foreman Frt. Car Rep., El Paso & S. W., Haddon Hall.
Duke, W. D., Gen. Supt., Richmond, Fredericksburg, Breakers.
Durkley, H. J., M. M., B. & O., Schlitz.
Durham, Geo., S. M. P. & C., W. & L. E., Esplanade.
Edmonds, Geo. S., Supt. M. P., D. & H., Haddon Hall.
Elsey, W. R., Asst. M. M., Penn., Worthington.
Emley, W. B., Supt. Tools & Mchy., Erie, Princess.
Ennis, J. B., V. P., Amer. Loco. Co., Traymore.
Ettinger, R. L., C. M. P., S. R., Dennis.
Flanagan, M., M. M., C. & O., Alamac.
Flavin, J. T., N. Y. C., Marlborough.
Flynn, H. A., G. A. B. S., Delaware & Hudson, Arlington.
Fowler, Geo. L., Con. M. E., Dennis.
Freeman, L. D., Asst. S. M. P., Seahoard Air Line, Kenderton.
Fritchey, F. W., M. M., B. & O., Chelsea.
Gardner, H., M. E., B. & O., Chalfonte.
Gemlo, Wm., S. M. P. & R. S., Minn. & S. L., Haddon Hall.
Geys, H. L., M. M., Virginia, Srand.
Goodrich, Max, M. M., N. Y. C., New Holland.
Gority, John, Gen. For., Penn., Calvert.
Gowland, S. I., Asst. Genl. Storekeeper, Penn., Silverside.
Graham, Chas., Jr., Lexington.
Greenough, G., V. P. in Charge of Sales, Baldwin Loco. Wks., Marlborough.
Grewe, H. F., M. M., Akron, Canon & Youngstown, Strand.
Hall, M. A., Supt. Machinery, P. C. S., Strand.
Hallett, W. K., Gen. Mgr., Bangor & Aroostook, Marlborough.
Hambley, T., M. M., C. P., Alamac.
Hammett, Philip M., S. M. P., Maine Central, Chelsea.
Hankins, E. W., Asst. Chief M. P., Penn., Dennis.
Hartley, Geo. B., Solvay Process Co., Breakers.
Haslin, H. W., M. M., N. O. G. N., Elberon.
Hass, H. P., Engr. of Tests, N. Y. N. H. & H., Wiltshire.
Hawkins, R. D., Equipment Eng., Great Northern, Breakers.
Helme, Chas. F., M. M., Lehigh Valley, Traymore.
Henry, W. C. A., G. S. M. P., Penn. Lines, Chelsea.
Herrold, A. E., M. C. B., Monongahela Connecting, Phillips House.
Hice, Geo. T., M. M., Morgantown & Kingwood, Monticello.
Hill, J. F., M. M., W. & L. E., Esplanade.
Hinckley, A. C., S. M. P., Oregon Short Line, Esplanade.
Hoke, H. A., Asst. Eng., Penn., Princess.
Holden, E. H., G. S. of T., K. C. S., Ambassador.
Hood, J. M., Supt., Akron, Canton & Youngstown, Strand.
Hope, P., G. E., Central Vermont, Princess.
Horrigan, J., S. M. P., Elgin, Joliet & Eastern, Chelsea.
Hosack, W. K., Gen. Forman, Western Maryland, Monticello.
Howe, J., Supt. Shops, B. & O., Ambassador.
Howley, T. F., Special Agt., Erie, Runnymede.
Hunt, R. B., M. M., Fla. East Coast, Sterling.
Hunter, H. S., M. M., P. & R., Bothwell.
Hyland, Chas., Mech. Supt., Toledo Terminal, Pennhurst.
Ingersoll, H. L., Asst. to Pres., N. Y. C., Seaview Club.
Jackson, W. S., M. S., Erie, Haddon Hall.
James, Chas., M. S., Erie, Alamac.
Janson, E. W., Elec. Eng., I. C., Dennis.
Jaynes, R. T., M. M., Lehigh & Hudson River, Chalfonte.
Johnson, E. A., Foreman, B. & O., Bouvier.
Johnson, F. E., A. G. S. K., B. & O., Haddon Hall.
Jones, W. T., Asst. to Eng. of Test., N. Y. N. H. & H.
Juneau, C. G., Acting M. C. B., C. M. & St. Paul, Strand.
Karibo, J. J., M. M., C. C. C. & St. L., Breakers.
Katchan, Jno. F., Jr., Div. Storekeeper, N. Y. C., Beaumont.
Kearney, A., S. M. P., N. & W., Marlborough.
Keeney, R. P., Supt., Conora Southern, Galen Hall.
Kells, Willard, G. S. M. P., A. C. L., Llewellyn.
Kendrick, J. P., Supt. Shops, B. R. & P., Arlington.
Kennedy, S. G., G. F., A. C. L., Esplanade.
Kiesel, W. F., Mech. Eng., Penna. System, Chelsea.
Kight, H. L., Spec. Rep. Purch. Dept., W. M., Monticello.
Kight, H. R., M. M., B. & O., Monticello.
Kilpatrick, R. F., Chalfonte.
Kinney, C. D., M. M., B. C. G. & R. R., Traymore.
Knox, W. J., M. E., B. R. & P., Alamac.
Kothe, C. A., M. M., Erie, Strand.
Kuhlke, F., S. M. P., Charleston & Western Carolina, Schlitz.
Laux, J. P., M. M., Lehigh Valley, Traymore.
Lawes, T. A., M. E., N. Y. C. & St. L., Deville.
Leach, W. B.
Leman, W. W., S. M. P. & C. D., Denver & Rio Grande, Brighton.
Linderman, F. A., S. M. P., N. Y. C., Princess.
Long, J. F., Dist. Maint. of Equip. Insp., B. & O. Schlitz.
Lord, Alfred W., S. M. P., Quincy & Torch Lake, Welsh.
Lovejoy, Geo. R., MM. M., Detroit Term., St. Charles.
MacRae, A., Mech. Eng., Minneapolis & St. L., Chalfonte.
McConnell, C. H., El. Eng., P. & L. Erie.
McFeatters, F. R., Gen. Supt., Union, St. Charles.
McKinsey, C. R., Mech. Repr., Am. Car & Fdry. Co., Runnymede.
McManamy, Frank, Mgr. Dept. of Equip., U. S. R. A., Marlborough.
McNulty, F. M., S. M. P., Monongahela Connecting, Chalfonte.
McSweeny, E. J., M. M., B. & O., Ambassador.
Mackenzie, J., Grand Atlantic.
Malthaner, W., S. M. P., B. & O., Traymore.
Main, D. T., S. M. P., C. P., Marlborough.
Manchester, H. C., S. M. P., D. L. & W., Traymore.

Marriott, G. A., M. M., C. & O., Haddon Hall.
Marriott, F. I., C. D., C. & O., Seaside.
Martin, A. W., Supt. of Shops, C. C. C. of St. L., Breakers.
Maxfield, H. H., G. S. M. P., Penn. System, Brighton.
Meade, P. J., M. M., Atlantic Coast Line, Chalfonte.
Meister, C. L., M. E., A. C. L., Dennis.
Mellin, C. J., American Locomotive Co., Traymore.
Miller, G. A., S. M. P., Fla. East Coast, Sterling.
Montgomery, Hugh, S. M. P., Rutland, Dennis.
Moll, George, M. M., P. & R., Netherland.
Moran, W. F., M. M., B. & O. Ambassador.
Moseley, W. S., M. E., C. C. & O., Marlborough.
Mullinix, S. W., S. S., C. R. I. & P., Haddon Hall.
Murphy, F. K., A. S. M. P., C. C. C. & St. L., Breakers.
Murray, E. A., M. M., C. & O., Craig Hall.
Naylor, F., M. M., Miss. Cent., Princess.
Needham, R. J., Mech. & Elec. Eng., G. T., Ambassador.
Nelson, R. M., P. A., C. & O., Marlborough.
O'Brien, W. J., M. M., K. & M., Haddon Hall.
Osman, H. L., S. C. D., Morris & Co., Traymore.
Ostrander, A. E., Chief Engr., American Car & Fdry. Co., Traymore.
Oviatt, H. C., A. M. S., N. Y., N. H. & H., Traymore.
Owsley, C. W., C. I., Texas Co., Traymore.
Pack, A. G., Insp. Loco., Interstate Commerce Com., Haddon Hall.
Parker, H. H., M. M., Norfolk & Portsmouth Belt Line, Sterling.
Patterson, D., M. M., Southern, Princess.
Peddle, C. R., P. A., Penn., Traymore.
Perkinson, T. F., M. M., B. & O., Schlitz.
Perrine, W. M., M. M., Cent. R. R. of N. J., Raleigh.
Pilcher, John A., M. E., N. & W., Princess.
Platt, J. G., Hunt Spiller Mfg. Co.
Pohlman, W., G. For. Loco. Shop, N. Y., O. & W., Princess.
Poole, E. P., Supt. Shops, B. & O., Haddon Hall.
Rafferty, C. D., M. M., Algoma Cent. & Hud. Bay, St. Charles.
Ralston, J. A., M. E., Union, Marlborough.
Rasbridge, R. B., S. C. B., P. & R., Dennis.
Redding, D. J., A. S. M. P., P. & L. E., Chalfonte.
Reichard, H. W., Road Foreman of Engines, L. V., Traymore.
Reickmann, Wm. H., M. M., B. & M., Chelsea.
Reigle, S. S., Mech. Eng., D. L. & W., Arlington.
Rhuark, F. W., M. S., P. & W. V., Pennhurst.
Richardson, Louis A., M. S., C. R. I. & P., Strand.
Riley, G. E., S. M. P., Mck. Conn., Marlborough.
Rink, G. W., A. S. M. P., Cent. R. R. of N. J., Strand.
Rinter, A. R., M. M., C. R. I. & P.
Ripley, C. T., G. M. I., A. T. & S. F., Marlborough.
Robertson, H. M., M. C. B., N. P.
Robinson, L., Shop Eng., I. C., Dennis.
Robinson, W. L., M. M., B. & O., Shelburne.
Roesch, F. P., Western Mgr., Standard Stoker Co., Ambassador.
Ronaldson, F., M. M., C. P., Alamac.
Ross, W. C., M. M., Copper Range, Strand.
Ryan, T. T., M. M., A. T. & S. F., Chelsea.
Sandman, A. G., M. E., B. & O., Marlborough.
Shaffer, C. A., G. S. M. & T., I. C.
Schlafge, Wm., M. Mgr., Erie, Strand.
Schmoll, G. A., D. S. M. of E., B. & O., Marlborough.
Schulenberger, H. E., M. M., Gulf & Ship Island, Strand.
Seddon, C. W., S. M. P., D. M. & N., Traymore.
Sedgwick, E. V., Shelburne.
Seley, C. A., Pres., Amer. Flex. Bolt Co., Chalfonte.
Selloy, Samuel H., G. F. C. D., B. & A., Pennhurst.
Seiders, I. A., P. & R., Dennis.
Shaw, B. S., M. M., Durham & So., Princess.
Shay, J. M., M. M., B. & O., Haddon Hall.
Sheehy, J. Freed I., V. P. & G. M., Chi. Short Line, Marlborough.
Sherry, C. P., Supt. of Stores, Penn. Lines West, Silverside.
Shipman, H. L., Equip. Inspector, A. T. & S. F., Shoreham.
Shoemaker, H., M. S., Bangor & Aroostock, Marlborough.
Shull, G. F., M. M., C. C. & O., Marlborough.
Sible, C. G., Supt., Winston-Salem Southbound, Haddon Hall.
Simpson, James, M. M., N. P.
Sisco, G. E., M. M., Penn., Breakers.
Smith, B. H., M. M., C. R. I. & P., Flanders.
Smith, E. J., M. M., A. C. L., Osborne.
Smith, Henry J., G. C. I., D. L. & W., Princess.
Smith, J. L., M. M., P. & L. E., Princess.
Smith, J. L., M. M., Pittsburg, Shawmut & Northern, Princess.
Smith, P. F., Jr., Works Manager, Penn., Brighton.
Smith, R. D., S. M. P. & R. S., B. & A., Dennis.
Smith, R. P., Mech. Eng., Ga. Atlantic & W. P., Lexington.
Smith, W. C., Asst. M. Supt., M. P., Chalfonte.
Snyder, Jos., M. M., Monongahela R. R., Princess.
Spicer, M. T., Asst. to Pres., C. & O., Marlborough.
Storey, J. W., C. D., Cent. Ga., Arlington.
Strauss, M. H., M. M., N. Y. C., Strand.
Stough, F. B., S. C. E., Roxana Petroleum Cor., Strand.
Streeter, L. P., A. B. E., I. C., Traymore.
Stuebing, A. F., Railway Age, Dennis.
Sullivan, J. J., S. M., N. C. & St. L., Lexington.
Sullivan, T. F., Shop Supt., S. P., Strand.
Sumner, Eliot, S. M. P., Penn., Brighton.
Sutherby, A., M. M., Erie, Princess.
Sweeley, E. H., G. F. L. R., Long Island, Chalfonte.
Symonds, W. E., L. E. Frank & Clarion, Alamac.
Taylor, C. S., M. M., A. C. L., Osborne.
Taylor, S. O., For. Car Dept., A. C. L., Esplanade.
Teague, A. R., M. M., M. & O., Princess.
Terrell, C. H., A. S. M. P., C. & O., Haddon Hall.
Thibaut, Geo., M. M., Erie, Osborne.
Thomas, F. H., V. P. & G. M., Bellefonte Central, Craig Hall.
Thompson, Geo., D. M. C. B., N. Y. C., Traymore.
Thompson, J. G., M. M., Lehigh Valley, Marlborough.
Thompson, W. O., G. S. P. S., N. Y. C., Marlborough.
Tollerton, W. J., G. M. S., C. R. I. & P., Marlborough.
Townsend, W. B., Pres. & G. M., Little River, Dennis.
Towner, M. E., G. P. A., West. M., Breakers.
Tracy, W. L., S. S., Lehigh Valley, Chalfonte.
Trotter, C. E., M. M., L. E. & W., Breakers.
Tutt, F. E., M. Supt., M., K. & T., Traymore.
Van Cleve, J. R., M. M., Denver & Rio Grande.
Van Mose, J. H., Vice Pres., Penn. Tank Line, Traymore.
Wade, E. H., A. S. M. P., C. & N. W., Marlborough.
Wall, H. S., M. S., A. T. & S. F., Ambassador.
Walsh, F. O., S. M. P., Ga. Strand.
Walsh, W. F., Galena Signal Oil Co., Chalfonte.
Walther, E. W., Asst. to P. A., B. & O., Haddon Hall.
Wanamaker, E., E. E., C. R. I. & P., Chalfonte.
Wanamaker, H., S. S., N. Y. C., Traymore.
Warthen, H. J., S. M. P., R. F. & P., Marlborough.
Watson, R. E., Eng. of Tests, Erie, Dennis.
Webster, H. D., Engineer of M. P., B. & L. E., Chalfonte.
Whiteley, G., A. S. M. P., C. P., Alamac.
Whitford, W. S., M. M., C. & N. W., Mansion.
Wieseckel, G. F., S. M. P., Dennis.
Wiggin, C. H., S. M. P., B. & M., Chelsea.
Wildin, G. W., Loco. Stoker Co., Chalfonte.
Williams, A. G., E. M. P., Penn., Craig Hall.
Wilson, G. M., Supt. M. P., G. T., Marlborough.
Winterrowd, W. H., Ch. M. E., C. P., Marlborough.
Wintersteen, J., M. M., Cornwall, Arlington.
Withrow, P. C., M. E., D. & R. G., Haddon Hall.
Woodbridge, H. C., Traymore.
Wood, W. D., S. M. P., Mt. Hope Min., Traymore.
Wright, R. V., Railway Age, Dennis.
Wyman, R. L., M. M., Lehigh & New England, Pennhurst.
Wymer, C. J., Supt. Car Dept., C. & E. I., Chalfonte.
Yoery, H., S. M. P., G. N., Brighton.
Zwight, S., Asst. M. S., N. P., Esplanade.

Special Guests

Adamson, Geo. W., M. C. B., Interboro Rap. Trans., Haddon Hall.
Angerson, R. E., A. B. L., C. & O., Strand.
Arden, M. R., M. A., C. of G., Lexington.
Besler, George, C. R. R. of N. J., Dennis.
Besler, William, C. R. R. of N. J., Dennis.
Boon, Geo. A., Draftsman, A. T. & S. F., Chelsea.
Booth, Wm., Ch. Draf. M. P. Dept., Gould Trunk.
Bostic, M. K., Asst. to Pres., West. Md., Breakers.
Bowler, Roland T. E., S. S. M. & T., B. & O., Craig Hall.
Briggs, W. G., Official Reporter, Craig Hall.
Bunn, D. M., Asst. Supt., A. C. & S., Atlantic City N. J.
Carbis, N. J., Foreman, B. & O., Schlitz.
Cartwright, K., Asst. to E. of T., N. Y., N. H. & H., Wiltshire.
Chambers, James A., C. R. R. of N. J., Dennis.
Clark, J. P., Supvr. of Sig., P. & R.
Coffman, A. B., E. E., P. & R., Bothwell.
Coleman, D. D., Asst. M. M., Erie, Alamac.
Coleman, S. G., Asst. G. M., D. & M.
Cooper, J. H., Ex. Dept. of Equip., U. S. R. A., Chalfonte.
Crossman, T. E., Official Reporter, Craig Hall.
Dampman, Charles P., Supt. of Fuel, P. & R., Strand.
Davidson, E. H., I. C. C., Lexington.
Deeter, Harry E., G. F. M. S., P. & R.
Dow, T. W., Genl. A. B. Insp., Erie, Wiltshire.
Durham, Edwin, W. & L. E., Esplanade.
Edwards, R., Car Insp., Penn.
Eisenhauer, G., E. E., Erie, Wiltshire.
Fairhead, J. E., G. S., P. & W. V., Alamac.
Fogarty, J. J., E. S. F., A. C. L., Osborne.
Francis, G. E., Shop For., Penn.
Gibbs, J. H., For. M. P. Dept., B. & O., Bouvier.
Grant, P. H., Ch. Insp., Federal Tank Line, Regent.
Harrold, J. W., Ch. Cl. to Frt. Agt., W. J. & S.
Henson, H. F., R. F. of E., N. & W., Lexington.
Hill, F. J., Ch. Electr., M. C., Breakers.
Holder, J. W., Insp. of Loco., I. C. C., Lexington.
Hornig, N. F., Loco. Insp., Penn., 129 N. Rhode Island Ave.
Kadel, S. W., Asst. Eng., U. S. R. A., Princess.
Kaselau, E., I. of A., Erie, New Strathaven.
Keiber, Henry, Asst. For., M. P. & R. E. Dept., P. & R.
Kells, Paul, A. C. L., Llewellyn.
Kenney, A. F., Ch. Cl. D. M. M., B. & A., Alamac.
Kern, Leroy, B. & O., Strand.
Kern, Wm., For. M. P. Dept., B. & O., Strand.
Kissinger, Francis, Asst. G. B. I., P. & R.
Lewis, Edwin L., Genl. Pas. Agt., P. & R.
Merson, J. W., G. F. M. & E. D., B. & O., Schlitz.
Mimms, A. E., Ch. Draft., C. P., Chelsea.
Mitchell, Edgar B., Div. Frt. Agt., Penn.
Morris, J. E., Div. For., F. E. C., Sterling.
Morrison, W. M., Asst. Sig. Eng., N. Y. C., Breakers.
Munden, Dr. J. J., Med. Ex. Relief Dept., Penn., Runnymede.
Murphy, J. W., Gen. F. M. P. Dept., B. & A., Alamac.
Newman, W. A., Engr. Loco. Const., C. P., Haddon Hall.
Noodberg, C. R., P. & S., 1515 Pacific Ave.
O'Connor, Geo. A., Inspector, I. C. C., Haddon Hall.
Ogilvie, Jas., M. Expert, Bd. of Ry. Comms., De Ville.
Oplinger, Jack, A. C. L., Chalfonte.
Pack, A. G., Jr., I. C. C., Haddon Hall.
Parker, H. H., Jr., M. M., N. & P. Belt, Sterling.
Peters, J. C., Supt., P. & R., Holmhurst.
Peterson, W. A., Gen. Shops Eng., C. P., Haddon Hall.
Ploettner, E. F., Machinist, Penn., 19 S. Arkansas Ave.
Plummer, O. R., Reg. Marker, Penn.
Pribble, B. S., Ch. Cl. S. M. P., R. F. & P., Traymore.
Raps, J. F., G. B. I., I. C., Traymore.
Rommet, C. T., M. P. I., B. & O., Schlitz Hotel.
Scanell, A. S., Asst. P. A., Barre, Traymore.
Scull, A. W., Reg. Clerk, Penn.
Shaughnessy, T. J., Shop Acct., K. & Ind. Ter., Breakers.
Sheedy, J. A., Asst. M. M., Penn., St. Charles.
Sheehan, J. J., Foreman, N. & W., Alamac.
Shirley, John A., Asst. C. I., I. C. C., Haddon Hall.
Simons, A. M., T. E., P. S. & N., Terminal.
Skinner, Archie, A. B. F., A. T. & S. Fe, Phillips.
Smith, Archie, A. C. L., Osborne.
Smith, E. B., Sig. Supr. of Asst. Term., N. Y. C., Breakers.
Stabrook, F. C. E., R. F. E., N. & B., Elberon.
Thompson, E. B., Asst. Eng., C. & N. W., De Ville.
Tinder, F. S., Mat. Insp., Virginian, Strand.
Toomey, J. T., Ass. Shop For., Penn.
Torbeck, F. S., F. E. S., B. & O., Whittle.
Waldo, C., Insp. of Loco., I. C. C., Lexington.
Walls, Willard, Spec. Rep., U. S. R. A., Marlborough.
Warthen, H. J., R. F. & P., Marlborough.
Weigle, John, Retired For., W. J. & S., Elwood.
Wiegand, F. B., S. E., N. Y. C., Breakers.
Williams, J. D., St. Charles.

The Man Who Saw

The Daily Strike

"What's the matter—what's the matter?" questioned the scared general foreman of his boss who approached the roundhouse looking wild-eyed and pale. "Anything happened—anybody hurt?"

"H-s-s-t! Soft pedal. Come in here behind this tender and I'll tell you."

The two disappeared behind the roundhouse wall and what the superintendent of motive power told the foreman was clicked over the wire to headquarters in that same hour as follows:

"Mr. Beat M. Tooit, general manager, A. B. & C. R. R. No strike this morning. What is holding it back? What shall we do? Answer urgent. Jones."

The Good Old Days of Josh Billings

The Kronic Kicker is here again in the same old garb. He dropped in to tell the Man Who Saw that he hadn't washed his face for 24 hours because there wasn't any water on the car—and, besides, the porter had evidently forgotten the usual cake of soap. He advised friend K. K. to be charitable and not to forget the difficulties that beset every department of a railroad these days. K. K. went away muttering to himself as the Man Who Saw recalled something that the late Josh Billings is said to have expounded on the subject of Pullman cars to the effect that "the only time he ever travelled on those slumbering tanks, was when he needed a new cake of soap and some towels for the home nest." Here's to the eventual return of the good old days, K. K.!

Railroad Presidents and Time Tables

"Who is that?" asked the Man Who Saw, as he timorously followed Beelzebub in his search for a hot spot in the regions below. For The Man had died and was about to get what he expected for certain misdeeds on a railroad during a few years of his life on Earth.

"Who?" replied the Devil.

"I refer to that worried but dignified old gentleman over there in the corner on the hot grate with his hands full of apparently fireproof papers."

"Oh, that's the President of the High Dry & Windy R. R.—he died last year, you know."

"Yes, I remember," said The Man. "He sure had a fine funeral. I expected to see him here—but what is he doing?"

"Well," said his Satanic Majesty, with a gleeful grin, "he issued some horrible time-tables during his time, so we decided to get our Chicago agent to collect them and send them here. We had them all reprinted on asbestos and he has to spend several thousand years here on that grate, trying to figure them out. Every time he discovers a mistake we cut a year off of his time. If he works hard we believe we can sublet that corner to another railroad man next month."

Wasted Man Power

"Why don't they put electrically propelled wheel chairs on this boardwalk?" inquired the Man Who Saw.

"Well," replied his friend, "There's an ancient city ordinance that prohibits the employment of self-propelled vehicles on this boardwalk."

"What of that?" replied the Man. "There's just as ancient an ordinance in the City of Havana that says you can't erect a building whose height is more than 1½ times the width of the street upon which the building faces. As some of these streets are 12 feet wide, you can draw your own conclusions; seven-story steel buildings are going up there and the men who framed the law, if they are still alive, are wondering why they framed it. The wheel chair pusher is needed on the farm, at the mill; he's needed in production—they are crying for him at the mines."

"But there are only a few of them," interjected the friend, "Why worry?"

"These few typify the many who are throwing away their time and opportunities to better themselves," said the Man.

"Well," replied the friend, "Why pick on me? Why don't you try to enthuse that bunch out on the Pier who are exhibiting the neat little electric storage battery cars?"

The Weak Spot

Every convention seems to bring to the front the importance of attending particularly to the requirements of certain departments in the mechanical make up of a road. This year, The Man Who Saw seems to sense an unmistakable sentiment in favor of the rescue of the roundhouse from the dismal abyss of near-oblivion, to which, in many sections, it has fallen. It recalls one roundhouse—or workhouse, rather—in the West where he, ambitious to continue eating regularly, accepted a job on the night-shift. The work started at 7 p. m. and ended at 7 a. m., provided there wasn't an ounce of pep left in the tired and smoky force; in which case they could work until they dropped dead. This roundhouse, like many of the others of that day and this, hadn't had a new idea since they removed the diamond stacks and brass jacket bands from boilers. Jacking up an engine for a spring repair or something else, meant a search in the dark for two kinds of jacks—a pair for the pilot beam and a pair for the tail brace. The jacking up was the least part of it—finding the jacks was a man's job; finding a truck to drag them on, was two men's job. And they called it a roundhouse! An engineer, dissatisfied with his headlight, persuaded the night foreman by means of a night roundhouse cigar, to change his dynamo set and the Man Who Saw was instructed to take, whichever way he could, over two hundred pounds of headlight efficiency off of an engine and put it on another. But the rope on the block and tackle was frazzled. A new rope was procured but a sheave was "froze" tight. Why go on? The tale is endless! That job wasn't ready at 7 a. m. and the Man Who Saw got hell. And the S. M. P. chewed his cigar and growled at the maintenance report as he decided to visit that roundhouse and fire the whole gang.

After the S. M. P. Went Home

The motive power offices had calmed down for the day. The daylight-saving clock on the wall said it was 8, but the incoming train from Poseyville proclaimed it was 7—and the private office of the "old man" was deserted. Papers were left as they were, ready for a resumption of the struggle of to-morrow.

The beautiful engraving of No. 50, the old faithful, a pioneer 4-4-0 with its long pilot, brass jacket bands,

elaborate bell and headlight brackets and diamond stack, no longer occupied its position over the old man's desk. Instead, the relentless cruelty of time and man's fickleness had relegated it to a distant corner. In its place hung a large and neatly framed photograph of No. 787, the line's latest acquisition, a 150-ton Mikado with all the trimmings of 1920. It was a beauty in the fullest sense of the word and No. 50 felt its presence and prominence keenly. The silence became intense and something had to happen. It was the voice of the Mikado who spoke.

"You," said the voice in the frame of the big fellow, "are a piker, a has-been. You are a weak sister. You thought more of beauty than of strength. Look at me, I shake my grates myself, I feed my coal to my firebox and I'm particular about my steam—I get mine superheated; you get yours wet. I reverse myself. Look at my headlight—I could wither you by its glare! Why you haven't even got an injector. When you got thirsty you had to drop your train and run. Look at me and wonder, you shrimp!"

"I *have* been looking at you and wondering," replied No. 50 from its corner, "and I am sorry to say that you forget who you are; you are my grandson. Now, you are doing fairly well and I gladly resign my place in the old man's affections to you, but remember this:—I'm your ancestor. The men who made you, learned on me. I taught them the necessities of the improvements they hung on you—and they are going to hang on more. It's about time for you to dignify your unrestrained conceit with the addition of a feed water heater. If you don't, the old man will take you down and put you over here with me!"

The Prune Plan

The Man Who Saw is pleased to print the following letter in the hope that it will cheer the hearts of those modest ones who have long and secretly cherished the idea which it sets forth:

June 10, 1920.

The Man Who Saw,
Care Young's Million Dollar Pier, Atlantic City, N. J.

Dear Sir.—Knowing you to be a friend of the working man and anxious to give publicity to any movement whose adoption would tend to raise the level of the worker from his present lowly sphere, I enclose you an outline of a bill which it is hoped will be introduced in Congress at its next session and forthwith enacted as a law. Briefly, you will observe that the main purpose of this somewhat original document advocates the turning over of the railroads to the Railroad Supply Men's Union, of which I have the honor to be the secretary.

As you know, we have struggled for years against the whims and conservatism of superintendents of motive power, master mechanics and the rest of the mechanical oracles in the hope of making them see the light—and with little success. The bill proposes that the Supply Men's Union be given entire charge of the maintenance and operation of the lines, in return for which privilege the members offer their services, free of charge. This provision, you will readily agree, offers an unprecedented possibility of economy in the immediate abolition of millions of dollars in salaries. Think of it! Wow!

And consider the transformation that would take place! With "Modernize" as our slogan, we would soon have the equipment in this country in such shape as to exceed our most sanguine expectations! Ponder, if you will, upon the delightful sensation which would be ours in the exercise of a free hand for the good of the roads, instead of sitting out on the doormat for hours, as we often do now, wondering if they will let us in.

Trusting that you will lend your support to this worthy cause and will be able to give it a place in your columns, I am,

Yours for progress,

Hum Dinger,
Secretary, Railroad Supply Men's Union.

Conventionalities

If you want any information on how to build up worn flanges with electric arc welding see E. Wanamaker, electrical engineer, Rock Island.

The Ostrander twins, Doris and Dorothy, daughters of A. E., are again with us. Last year is the first convention they missed since they were born in September, 1909.

Louis J. Alerding, traveling storekeeper for the Chicago & Eastern Illinois since the creation of the position three years ago, has been appointed general storekeeper, with headquarters in Danville, Ill.

George A. Bardon, genial sales manager of the Duntley Pneumatic Tool Company, with Mrs. Bardon, arrived Sunday and registered at the Shelburne. This is Mr. and Mrs. Bardon's twentieth convention.

D. J. Redding, assistant superintendent motive power, of the Pittsburgh & Lake Erie arrived Wednesday morning. He is convalescing from a severe illness, but seems to be well started on the way to complete recovery.

Harry Passmore, of Grip nut fame, former railway man, is accompanied this year by Mrs. Passmore and Harry E. Passmore, Jr., their son, who is a sophomore at Lehigh University. They are quartered at Chalfonte.

Many friends of Mr. and Mrs. D. C. Noble, of Pittsburgh, will miss the presence this year of these estimable people. Both Mr. Noble and Mrs. Noble died during the past winter. They attended the conventions many years.

George Bussing, general superintendent Mexico & Northwestern, also in charge of motive power and equipment, with headquarters at Juarez, Mexico, accompanied by Mrs. Bussing, arrived yesterday and registered at Haddon Hall.

News was received at Atlantic City yesterday of the dangerous illness of W. P. Pressinger, vice-president of the Chicago Pneumatic Tool Company. Mr. Pressinger is a patient at the Roosevelt Hospital in New York, where he was operated on this week for a serious ailment.

S. C. Dinsmore of The National Refining Company had expected to attend the convention, but at the last moment found he could not get away. George C. Hannaway of The National Refining Company has taken his place on the transportation committee.

Bruce Owens, of the transportation committee, doesn't quite recognize himself. He thought he was assistant to the first vice-president of the Magnus Company, but the official booklet shows him as being with the Maginnis Company.

Frank McManamy, manager of the department of equipment, Division of Liquidation Claims, motored over from Washington on Tuesday with Mrs. McManamy, who is attending her second convention, and with his assistant, George N. DeGuire. They left Washington at eight o'clock in the morning, stopped at Baltimore for about an hour and made two wide detours, arriving at Atlantic City about six o'clock in the evening.

L. D. Freeman was the first of the Seaboard Air Line men to arrive. Mr. Freeman has been promoted to the position of assistant superintendent of motive power since last year, but is still in charge of the mechanical engineer's office on the Seaboard.

Mr. and Mrs. Joseph Chidley are registered at the Marlborough-Blenheim. Mr. Chidley is superintendent of motive power New York Central lines west of Buffalo. Miss Helen Chidley, their daughter, is also here and is greatly enjoying her first convention experiences.

Frank J. Foley comes to the conventions this year as vice-president of the Railway Steel Spring Company. He was appointed general sales manager a short time before the conventions last year, following the death of S. T. Fulton, who had been vice-president in charge of sales.

J. D. Besler, assistant to the vice-president of the Chicago, Burlington & Quincy, is expected to arrive in Atlantic City on Friday with his son, W. G. Besler, president of the Central Railroad of New Jersey. Mr. Besler, Sr., is 87 years old and is looking forward to his visit with a great deal of interest.

W. L. Greaven, superintendent of rolling stock of the Buenos Aires Great Southern, told a representative of the *Railway Age* the other day in Buenos Aires, that he would be "among those present" at this year's mechanical conventions. Mr. Greaven will be accompanied on this little ride of 5,000 miles or so by Mrs. Greaven.

Secretary Hawthorne is accompanied this year by his wife and their 16-month-old daughter, Olive. This is Mrs. Hawthorne's first convention and she seems to be getting a lot of solid enjoyment out of it. The two older children, Margaret, six years old, and John, nine years old, are at home, but will probably attend the convention next year.

Chairman W. J. Tollerton of the Mechanical Section, is accompanied to the conventions this year by Mrs. Tollerton and daughter, Frances Lee. Mr. Tollerton speaks enthusiastically about the large business the Rock Island is handling, and about its prospects if the railways of the West are given a reasonable advance in rates. He was the recipient yesterday of many compliments on the thoughtful and able address he delivered in opening the convention.

Captain Frank H. Burr, director of the Cleveland Pneumatic Tool Company's foreign department, told the *Railway Age* representative in Buenos Aires the other day that he would wait for a good boat to come home on —and he did. He returned on the S. S. Vauban, one of the Lamport & Holt New York-South American liners. Captain Burr is full of two things—pep and straight South American information. His pep is inspiring; the information is educational.

During the past year the Bureau of Locomotive Inspection has conducted a large number of tests on many roads to determine the correctness of the indications of the water glasses and gage cocks. Mr. A. G. Pack, chief of the bureau, has brought some of the data with him to the convention. Railroad men who have been accustomed to thinking of the gage cock indication as being correct under all conditions are greatly surprised when they learn that Mr. Pack determined that the gage cocks sometimes show water eight inches above the true level in the boiler. The complete data is now being compiled and will be issued by the Bureau within a short time in the form of a booklet.

Robert S. Collett, superintendent of fuel and locomotive performance on the New York Central lines, was one of the early arrivals at the convention. Mr. Collett is enthusiastic over the immediate prospect of getting a fuel instruction car going on the railroad with which he is now connected. It is understood that this will eclipse anything in the way of fuel instruction cars that have ever been put out. There are other phases of the fuel situation on his railroad about which "Bob" is enthusiastic and it looks as though the good work initiated by the Fuel Conservation Section is not only being perpetuated, but will be augmented on the New York Central.

Among the arrivals yesterday was H. M. Perry, who may perhaps be the holder of the record of attendance at these conventions. Mr. Perry attended the organization meeting of the Master Car Builders' Association at the old Massasoit Hotel, Springfield, Mass., in 1867, and joined the association in 1869. Since that time his attendance has been almost constant. The *Daily*, at this late date, is rather surprised to learn that Mr. Perry is a direct descendant of Commodore Oliver Hazzard Perry, of Lake Erie fame. In this connection it may be stated that a grandson of H. M. Perry is now in the Naval Academy at Annapolis. Mr. Perry has been on the staff of the Edwin S. Woods Company for many years and has been called the father of the side bearing industry.

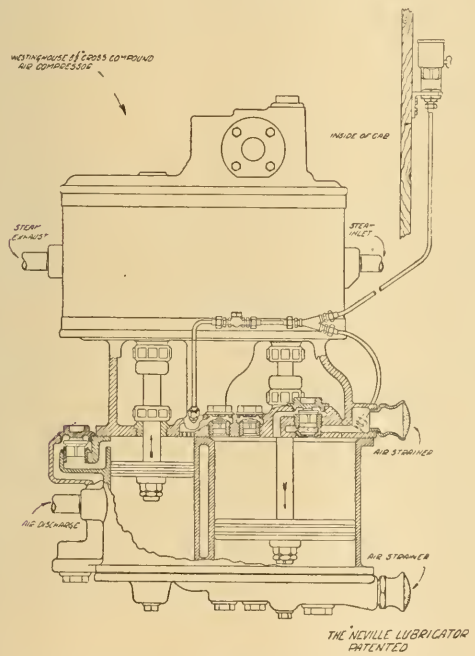
"Dick" Naylor, of the Symington Company, comes to the conventions this year with callouses on his hands, which have been acquired, not in the practice of the gentle art of hitting the elusive golf ball, but in the more practical work of building a garage. He decided in the spring to personally build a garage at his home in Chicago. He thought it would be the work of only a few holidays, Saturdays and Sundays. It proved to be a bigger job than he thought. His experience, however, was like that of Tom Sawyer in whitewashing the fence. The work of building a garage as performed by him looked so attractive to some of his friends that he began to receive proffers of assistance. His help since then has included several of his neighbors and friends, including Major Bill Allison and Gene Clifford, of the Santa Fe. The garage is now about finished, but up to the present time the work of construction has prevented Dick from playing any golf.

A. P. Van Schaick, assistant general sales manager of the American Chain Company, with headquarters in New York, is attending the conventions for the first time. Mr. Van Schaick has long been in the railway supply business, but until recently was district sales manager of the Lackawanna Steel Company at Chicago. He was for years active in the affairs of the National Railway Appliances Association, which gives the exhibit in connection with the annual convention of the American Railway Engineering Association in Chicago, and in 1914 was president of the Railway Appliances Association. He went with the American Chain Company early in 1919 and was made assistant general sales manager in New York just about a year ago. He is especially interested in developing the business of this company in the railroad field and this is the first year that it has made an exhibit at the conventions here. Mr. Van Schaick is as enthusiastic about the game of golf as he is about the game of business. He was for years a leading member and chairman of the membership committee of the Exmoor Country Club of Chicago, and since moving to New York he has joined the Scarsdale Country Club.

The Neville Lubricator

With the advent of the 8½-in. cross-compound air compressor the problem of lubricating the high pressure air cylinder presented itself, and various devices have been brought out to solve the difficulty. The Neville Lubricator Company, Pittsburgh, Pa., is now manufacturing the Neville lubricator, which is specially designed to meet this situation. Due to the fact that there is a constant pressure of about 45 lb. in the high pressure cylinder it is obvious that oil for lubrication will not enter the cylinder by gravity, nor can it be taken in by suction; pressure is the only agency for introducing the oil. The action of the compression stroke of the low pressure cylinder is successfully utilized by the Neville lubricator to force oil into the high pressure cylinder.

A neatly designed cup, holding one-half pint of oil, is attached to the left side of the boiler head by means of



Lubricator Applied to Cross Compound Air Compressor

a short iron bracket and one stud bolt, with ¼-in. copper tubing running beneath the jacket to the pump. This pipe then enters the upper opening of a brass "Y", located just above the low pressure air cylinder, and is continued from the lower opening of the "Y" to the opening in the low pressure cylinder. The piping is also carried to the opening in the high pressure cylinder, through a brass horizontal check valve, which prevents back pressure from the high pressure cylinder.

The cup itself consists of two chambers, the upper one termed the reservoir and the lower the well. These are connected by a one-inch section of ordinary lubricator glass. An adjusting screw with jamb nut is used for regulating the amount of oil allowed to pass into the well, and this amount corresponds to the quantity drawn into the pump in the same given time. A wing valve at the side of the cup allows the feed to be shut off entirely (when the pump is stopped) and opened at will, without disturbing the adjustment.

The oil is retained in the well by a check valve in the bottom connection and this is opened by the action of the suction stroke of the low pressure cylinder, a small quantity of oil being drawn into that cylinder through a port of proper size. This oil is broken up into spray by passing through a choke drilled with fine holes at the bottom of the cup, where it connects with the tubing. A portion of the oil is taken into the low pressure cylinder on this stroke and on the compression stroke the remainder is driven back through the "Y" and the line check valve into the high pressure cylinder. As this check closes with the suction stroke of the low pressure cylinder none of the oil can return from the other cylinder, while the check in the cup prevents its return to the well on the compression stroke.

This lubricator will hold sufficient oil to permit making the longest trip without refilling en route, and it needs no attention whatever outside of closing the wing valve when the pump is shut down. It has been successfully tested out on a number of roads, there being one record of a pump which gave 19 months' continuous service before it was taken down for an examination that disclosed perfect condition throughout. The Neville lubricator is being exhibited by L. W. Garratt, Pittsburgh, Pa.

Improvements in the American Automatic Connector

Certain improvements designed to overcome objections to universal automatic train pipe connection have recently been made in the automatic connector manufactured by the American Automatic Connector Company, Cleveland, Ohio. To facilitate the changing of air gaskets while cars are coupled, the portion of the freight connector head that supports the gasket and forms the air port from the hose to the face has been made removable. The removable portion is securely held in position by a key. Releasing the key permits this part to be withdrawn from the head entirely, when the old gasket can be removed and a new one inserted.

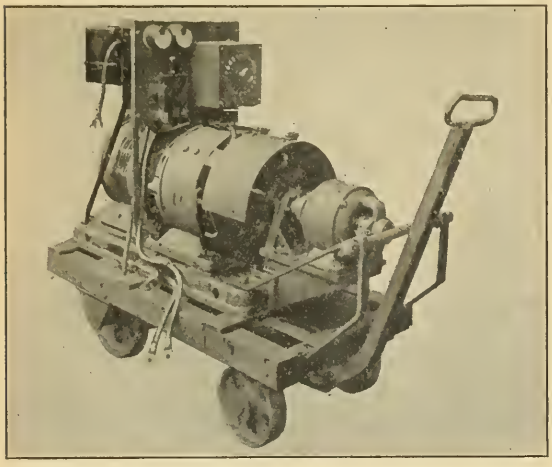
The freight interchange adaptor has been made a part of the head, being attached to the upper portion by means of a rotating link. When not in service it is thrown around behind the head, where it is always available. The link and key method of securing the adaptor in service position has been supplanted by an over-center lever which simplifies the construction materially.

To overcome the necessity of using a heavier spring in the passenger head than in the freight head to compensate for the steam line pressure, a locking device has been provided on the passenger head. This lock consists of a projection on the bottom inside face of the ring and a corresponding depression on the bottom face of the pyramid or cone. In coupling, the projection is drawn upwards into the depression by the upper face of the pyramid, thus firmly locking the connectors together. The capacity of the passenger spring and freight spring can therefore be made the same.

Single-Operator Electric-Welding Outfit

THE SINGLE-OPERATOR ELECTRIC ARC-WELDING EQUIPMENT manufactured by the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., is claimed to be exceptionally efficient because the generator operates at arc voltage and no resistance is used in circuit with the arc. The generator is designed to inherently stabilize the arc, thereby eliminating the necessity for providing automatic moving devices such as relays, solenoid control resistors, etc. These not only increase the cost of investment and maintenance, but may not be quick enough in action to follow the instantaneous changes of the arc circuit. The generator of the set has a rated capacity of 175 amperes, and is provided with commutating poles and an exceptionally long commutator which enables it to carry the momentary overload at the instant of striking the arc without special overload protection.

The design of the control is such that very close adjustment of current may be easily and quickly made, and once made, the amount of current at the weld will remain fixed within close limits until changed by the operator. There are 21 steps provided from 50 to 225 amperes. This gives a current regulation of less than 9 amperes per step which



Single Operator Electric Arc Welding Equipment

makes it much easier for a welder to do vertical or overhead work often encountered in railroad shops. Due to the special design of the generator and its exciter, it is unusually easy for the operator to strike and maintain the arc. Although the generator is strictly a short-arc machine, the arc produced is tenacious and causes the deposited metal to penetrate deeply into the work. These features are extremely desirable as they make it easier for a new operator to learn to do welding work and enable experienced welders to accomplish more in a working day.

The generator is mounted on a common shaft and bedplate with the motor. A pedestal bearing is supplied on the commutator end which carries a bracket for supporting the exciter. The latter is coupled to the common shaft of the set by means of a special coupling. Motors can be supplied for either direct or alternating current circuits. Where an alternating current motor is used leads are brought outside the motor frame for connecting for either 220 or 440 volt circuits. An electrician can change these connections in a few minutes' time. This feature is particularly desirable on portable outfits which may be moved from one shop to another having a supply circuit of different voltages. Ball bearings are used on the single operator motor generator set.

Where the equipment is required for portable service, the motor generator set with the control panel is mounted on a fabricated steel truck, equipped with roller bearing wheels. The portable equipment can be easily hauled about the shop or yards by one man. Suitable plugs and receptacles for three-phase, three-wire or two-phase, four-wire, alternating current motors allow the set to be quickly and conveniently connected to the supply circuit at any desirable point. Only one plug is required for the motor, but the number of receptacles required depends upon the number of points at which it is desired to do welding work. These plugs and receptacles are supplied on special orders.

Control for the single operator equipment consists of a small ebony asbestos panel, mounted upon angle-iron framework. The field rheostat for regulating the welding current, voltmeter, ammeter and two-pole knife switch are mounted upon the panel. The motor generators are supplied in capacities of 300, 500, 750 and 1,000 amperes and are of standard Westinghouse design and construction. The generator is compound wound, flat compounded, i. e., it delivers 60 volts at no-load and also at full-load.

The motor and generator are assembled on a common shaft and mounted compactly on a bedplate and the 300-ampere capacity sets can be supplied either portable or stationary. The sets of capacity above 300 amperes are usually used as stationary sets. Sets of 500-ampere capacity are frequently arranged for portable service but are more readily handled by means of a crane than by mounting on a truck.

In using the multiple operator equipment each operator is provided with a separate control or outlet panel so that each may take current from the same generator without interference. For convenience multiple operator equipments are divided into class 1 and class 2 equipments, depending upon the type of control supplied. The class 1 equipment has the main control panel arranged for the control of the generator and one welding circuit. The panel is made up of a single section upon which are mounted indicating instruments, protective apparatus and switches for adjusting the welding current. If additional circuits are required it is necessary to use separate outlet panels. The class 2 equipment has a main panel similar to class 1 except that it controls the generator only and separate outlets are used for all operators.

Each outlet panel consists of a slate panel on which is mounted a circuit breaker, line switch and the necessary single pole resistance adjusting switches for regulating the heat at the arc by varying the amount of current supplied. These outlet panels may be supplied for either metal or graphite electrode welding or both and may be operated simultaneously and independently of each other, the only limit being the capacity of the generator.

A metal or graphite electrode holder is supplied with each welding panel, according to the work for which the panel is designed. The holders are of light weight, well balanced and so designed that they may be used continuously without overheating. Hoods or shields, provided with colored lenses are supplied for the protection of the operator.

EDITORIAL
Railway Age

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Block Signal Mileage 1920

The annual bulletin containing tables showing length of railroad operated under the block system in the United States, prepared by the Bureau of Safety of the Interstate Commerce Commission, has appeared, somewhat earlier than last year. It shows a total increase, January 1, 1920, over January 1, 1919, of 1986.5 miles of road; but, as has been noted in connection with former reviews, this total is made up in such a way that the increases or decreases are of relatively small importance, except as they relate to automatic signals; the non-automatic are in too many cases operated under changeable or loosely administered rules. These unsatisfactory items have to do, usually, with lines of minor importance, but they affect the totals, all the same. In this year's report it appears that one company had been in doubt, as regards over 800 miles of line, whether it should or should not report the block system as in operation! The increase in automatic signals, 979 miles of road, is small, for reasons only too well known by everybody; but it is a long road that knows no turning, and we must get what comfort we can from the fact that the total this year, 37,969 miles, is 42 per cent greater than that at the beginning of the world war (26,570 miles on January 1, 1914). The small table, reproduced in our report, showing the principal increases in 1919, foots up 1,096 miles (117 miles more than the net total just mentioned), indicating, presumably, some errors in reporting. As for the future, the signal departments, like the other departments, are still awaiting the completion of the most difficult financial budgets ever known. In the meantime it seems appropriate to repeat the suggestion made in these columns last year (July 25, page 138) that the commission report more in detail concerning the use of the block system on American railroads, what practices are good, what are bad; and how, and where, and to what extent good practices are driving out the bad. The reports which have been made on numerous collisions have indicated the need of such a study and review. The annual statements are illuminating as regards quantity; let us turn for a time to the question of quality.

Accounting Rules and Betterments

For purposes of accounting it is of importance that a nice distinction be made between expenditures for additions and betterments, and expenditures for maintenance. Broadly speaking, replacement in kind is maintenance, while replacement with a more expensive type of article is maintenance and betterment. Carried to its logical conclusion this leads to pretty fine distinctions and at times to what appears to be hair splitting. On the other hand on most roads a definite appropriation is made for maintenance and it is within the discretion of the engineering officer in charge of a division or a grand division to decide on just how portions of this appropriation shall be applied. Occasions arise when the officer in charge of maintenance work knows with a considerable degree of certainty that it would be economy in the long run to make a betterment at the same time that he is making a necessary replacement. For instance, a section of track with continuous rail joints might be in need of a renewal of the joints and might be in such condition as to make it obvious that it would be an economy in the long run to use a somewhat more expensive joint to replace those taken out. The engineering officer, however, were he to follow his judgment would have to obtain a special appropriation for additions and betterments to cover the additional cost of the type of joint which he wanted to use in the renewal. Nevertheless, he might be quite certain in his own mind that there was no way in which he could spend his appropriation for maintenance more effectively than to pay the additional cost of the type of rail joint which he needed. The accounting rules were devised to enable the books to show exactly the distinction between renewals and betterments; that is, to accurately distinguish between capital charges and expenses. The rules which require a special authorization for betterment are made in order to insure the expenditure of new capital in accordance with a general plan worked out by the executive officers. Sound business judgment in the instance cited above appears to be hampered by these two necessary rules. One way of getting around this is to permit the maintenance of way officer to use a part of his maintenance allowance for additions and betterments, so long as the total amount that he spends does not exceed his maintenance allowance and provided, of course, that he keeps the auditor advised of the facts as to what is maintenance and what is betterments. The success of such practice depends partly on the quality of the judgment of the maintenance of way officer and partly on the closeness of relationship between officers directly in charge of maintenance work and their superiors and their executive officers.

A Problem for the Engineering Department

The railways are now in the peculiar position of having more business than they have equipment or facilities with which to handle it and of having in readiness completed plans and budgets for large expenditures to amplify these facilities, and yet they are taking practically no steps to provide these facilities. The season for the inauguration of construction work is already so far advanced that the indications are that so little work will be undertaken this year as to be almost negligible. This anomaly is the outgrowth of the condition in which the roads were returned to their owners at the termination of federal control. While interesting, this situation is serious, for it means a continuation in an increasingly aggravated form of the handicaps under which the roads have labored for the last three years. However, there is another effect which, while not as serious from the standpoint of the roads as a whole, is of immediate concern to the engineering department which will necessarily be in charge of construction work whenever it is undertaken. This is the disintegration of the forces in this department on many if not most of the roads. Owing to the almost complete cessation of construction activities, the roads have not maintained their former organizations and many men are leaving railway for other service. Occurring as this does at a time when the field for engineers has widened greatly and the demand is increasing in proportion, the roads are facing the extreme difficulty if not the

actual impossibility of recruiting trained men in sufficient numbers to carry on the work in prospect whenever conditions change so that it can be undertaken. Indeed, forces have decreased to such an extent that on some roads difficulty is even now being experienced in securing sufficient men to handle the exceedingly limited amount of work at present under way.

Douglas Fir Ties for Eastern Roads

One of the results of the war and federal management of the railroads was the introduction of Douglas fir ties on eastern roads. At the time that this innovation was effected it was considered by many to be purely an emergency measure, but now in the course of what we may term the period of reconstruction, certain conditions point to the continued use of Douglas fir to at least some extent by roads on the Atlantic seaboard. This has led some eastern engineers to question the durability of this timber when used so far from its native soil, but the investigations instituted as a consequence have resulted largely favorably to the merits of Douglas fir. It is an interesting commentary on this condition that almost exactly the same questions were raised with regard to the use of southern yellow pine in the north Atlantic states years ago when this material first become a competitor of the native hardwoods.

Earnings and Stock Prices

There are a few roads which are making conspicuously good showing in 1920 earnings, both gross and net. Except for the few companies that have refused the government's guarantee, a good or bad showing in net earnings does not affect the corporation's income, and will not until after September. On the other hand, since March 1 the roads have been under private management and the earnings even in January and February were indicative of the individual earning power of the different properties and reflected only to a limited degree arbitrary conditions imposed by the United States Railroad Administration. It is rather interesting, therefore, to study the range of stock prices of some of these roads that have made conspicuously good showing and to compare them with roads where the earnings have followed a downward trend established in 1918. The Santa Fe in three months, January to March inclusive, earned $14,297,000 net after taxes, compared with $5,694,000 for the same period in 1919. The Illinois Central had $4,385,000 net for the four months as against $425,000 in 1919. Missouri Pacific had $3,605,000 as against a deficit of $185,000. The Cleveland, Cincinnati, Chicago & St. Louis had $5,827,000 as against $2,017,000. The St. Louis Southwestern had $1,036,000 as against $195,000, and the Southern Railroad had $5,776,000 as against $1,471,000. Atchison sold at about 84 in the early part of January, at 81 in the last of May, and as high as 86½ in March. Illinois Central sold at about 88 in January, 85 at the end of May and high for the year was 93¾ in March. Missouri Pacific was 26 in January, 25½ at the end of May, with a high of 31⅜ at the end of February. Big Four was 45 in January, 48 in May, with a high of 55 in March. St. Louis Southwestern was 14 in January, 12 in May, with a high of 18 in February. Southern common was 22 in January, 22⅞ in May, with a high of 26⅜ in March. The St. Louis Southwestern and the Southern are both companies which refused the government's guarantee for the current six months. In contrast to the good net earnings of the roads named, the Pennsylvania shows a deficit for the first three months of 1920 of $14,566,000, after the payment of taxes, while in the corresponding three months of 1919 the road just about broke even after paying taxes. The New York, New Haven & Hartford had a deficit in 1920 of $1,342,000 and in 1919 of $807,000. The Northern Pacific had $2,382,000 net after taxes in 1920 and $3,025,000 in 1919. Pennsylvania in January sold at 40¾ per $50 share, at the end of May at 40 and had a high for the year of 43½. New Haven sold at 27¾ in January, 31 in May and 36¾ in March. Northern Pacific sold at 80¾ in January, 74¾ in May and at 84⅝ in March. There is no great contrast in trend of prices corresponding to the contrast in trend of earnings and this suggests that it is the uncertainty of the general railroad situation that is of outstanding importance in the trend of railroad stock prices at present.

Salaries of Railroad Officers

Representative Sims, who, on November 18 published in the Congressional Record a list of some 200 railroad officers who received in 1917 salaries of $20,000 a year or more, has now published in the same way the entire list, compiled by the Railroad Wage Commission, of the railroad officers who were paid $5,000 or more for that year, a part of which we reprint elsewhere in this issue. This list, from which the earlier one was taken, was furnished to the Congressman by Interstate Commerce Commissioner C. C. McChord, who was a member of the Wage Commission, which Director General McAdoo appointed early in 1918. It contains approximately 2,500 names. As Mr. Sims performed a real service in making public the original list, and thereby showing that only one man received as much as $100,000 a year, the figure which a certain type of journalism has commonly used as representative of the salaries of railroad executives generally, he has performed a still greater service in making public the more complete list which shows how small were the salaries paid to railroad officers generally. As the Interstate Commerce Commission reports show that the average salary of the 7,500 general officers in 1917 was $4,558, while the average for the 12,500 division officers was $2,099, or less than the railway labor organizations now ask as a minimum for employees, it will be noted that the entire list compiled by the Railroad Wage Commission of the salaries of $5,000 and over represents only the most highly-paid one-eighth of the total number of railroad officers.

The list is especially valuable because its publication makes possible for the first time some interesting compilations as to the exact compensation of railroad officers, which could not be made from the averages shown in the published official reports.

A classification of the salaries shown in the list made public by Mr. Sims shows that out of the total of 2,500 there were 781 who received less than $6,000, 1247 who received less than $7,000, and 1796 who received less than $10,000. In other words, only about 700 received $10,000 or over.

On the other hand, the list includes only two men shown to have received $100,000 or over. One of these is R. S. Lovett, chairman of the Union Pacific, with $104,000, and the other is J. M. Dickinson, receiver of the Chicago, Rock Island & Pacific, and we have been advised that the $120,000 shown opposite his name was not his compensation for a year, but for the entire 26 months of his service.

There are 12 names in the list shown as having received $75,000 or over (and this includes Judge Dickinson), 11 more as having received more than $60,000 and less than $75,000, 13 as having received $50,000 to $60,000, and 13 as having received more than $40,000 and less than $50,000. Only 33 individuals, therefore (aside from two law firms), were paid salaries of $50,000 a year or over and the range for the highest executive officers of a road, president or chairman, is from $5,000 to $104,000.

The classification of the list by amounts is as follows:

Salary	Number	Salary	Number
Less than $6,000	781	$15,000 to $19,999	166
$6,000 to $6,999	466	20,000 to 29,999	111
7,000 to 7,999	325	30,000 to 39,999	52
8,000 to 8,999	133	40,000 to 49,999	13
9,000 to 9,999	91	50,000 to 59,999	13
10,000 to 10,999	155	60,000 to 74,999	11
11,000 to 11,999	27	75,000 or over	12
12,000 to 12,999	88		
13,000 to 13,999	27	Total	2,492
14,000 to 14,999	21		

Without the slightest intention of doing so, Mr. Sims has completely exploded the idea that railroads pay fancy salaries generally. Doubtless he would consider any salary greater than the $7,500 received by a Congressman as excessive, but an examination of the list as a whole shows that the great majority of railroad officers were paid salaries so pitifully low in proportion to their responsibilities that it is by no means surprising to note the large number of them that are continually leaving the railroad service for the much more remunerative positions held forth to them by industrial companies. The figures naturally look smaller now than they did during 1917 and many readjustments have been made in the pay of some of the lower-paid officers since that time, but, as it is well known that the Railroad Administration while it was in control was far less generous in its treatment of the railroad general officers than it was in dealing with the employees, it is believed that very little change has been made in the average figures. This belief is supported by the fact that the Railroad Administration payroll for January, 1920, showed the compensation of general officers on the basis of an average of $4,313 for a year, as compared with $4,558 for the calendar year 1917, the last year of private operation. The 1917 figures, of course, include the more highly-paid executive officers who were not included in the Railroad Administration payroll. The division officers fared better, their average increasing from $2,099 to $2,989.

Increased Freight Handled
In Spite of Recent Strikes

THERE OFTEN IS A WIDE DIFFERENCE between popular impressions regarding matters of importance and the actual facts regarding those matters. There is a popular impression that the recent strikes on the railroads almost stopped the movement of freight traffic in many parts of the country. Surprising as it may seem, the fact is, as President S. M. Felton of the Chicago Great Western has pointed out in a recent public statement, that from the week ended March 27, when the strikes began, to the week ended May 22, the railways of the country handled 370,359 more carloads of freight than in the same months of 1919.

According to statistics compiled by the American Railroad Association covering the operations of all but a few of the large systems, the number of carloads moved in the nine weeks ended May 22, 1919, was 5,303,951, while the number moved in the corresponding weeks of 1920 was 5,979,310. Furthermore, there were only two individual weeks during this period when the railways moved less freight than in 1919, these being the weeks ended April 17 and April 24, when the strikes were at their height. When the strikes began the railways were handling an almost record-breaking business, the number of cars loaded in the week ended March 27 being 741,502. In the week ended May 22, however, normal conditions in the handling of traffic had been so far restored that the number of carloads handled was 750,978.

It is true, of course, that the business moved in 1919, with which comparison is made, was substantially smaller than that handled in 1917 and 1918. But the fact that in spite of the strikes the railways actually did during this period handle a substantially larger amount of business than in 1919 demonstrates the absurdity of the charge made by some persons and newspapers that the strikes caused them to collapse. The amount of business moved in January, February and March was larger than in either 1917 or 1918, and therefore, in spite of the strikes, the total amount of business moved from January 1 to the end of May probably was larger than ever was moved in any earlier years, except in 1917 and 1918. The railway strikes interfered seriously with the production of coal, but statistics of the Geological Survey show that between January 1 and May 22 the amount of bituminous coal produced was 35,000,000 tons more than in the same period of 1919, and it probably was larger than ever was produced in any year, except in 1917 and 1918.

If the public and public authorities could be made to appreciate the true significance of the effects produced upon the industries and finances of the United States by the railroad strikes, the chances of a real solution of the railroad problem would be greatly improved. The effects of the strikes upon the total amount of traffic moved in the first half of this year were comparatively small, and yet they demoralized industry and business. The reason should be obvious. The railways were handling a maximum business when the strikes came, and yet much more business was being offered to them than they could handle. When the traffic they were already unable to handle because of the inadequacy of their facilities had added to it a substantial amount of business which they were unable to handle because of the strikes, the total amount of business offered to them which they were unable to handle became very large, and it was the combined effect of the already existing inadequacy of facilities and the strikes which caused the serious troubles.

In considering how much business the railways will be able to handle in future, nothing could be more unsafe than to assume that they will be able at all times to operate to their capacity. There always have been and always will be developments rendering it impracticable for them to operate to their capacity. Therefore, they should, under normal conditions, have in reserve a substantial amount of surplus capacity. As long as they do not have any surplus capacity in reserve, as is the case now, any development which interferes with their working to the limit of their capacity will have effects as harmful and dangerous as those produced by the recent strikes.

Only a great enlargement of the capacity of the railroads can prevent the country from being brought to industrial and financial disaster by shortage of transportation facilities, sooner or later.

Boston & Maine

AFTER THREE YEARS of receivership the Boston & Maine was reorganized on December 1, 1919, and when the government discontinued operation on March 1, the new company took over the property. This consisted of 2,258 miles of railroad, of which 1,705 miles were owned and the remainder leased. The Fitchburg, the Boston & Lowell, the Concord & Montreal, the Connecticut River, the Lowell & Andover, the Manchester & Lawrence, and the Kennebunk & Kennebunkport, formerly leased, are now owned, and the reorganization thus added 1,071 miles to the mileage formerly owned by the Boston & Maine. The capitalization outstanding on the property consists of $81,473,000 of various classes of stock, and $100,232,000 (exclusive of bonds in sinking fund) funded debt. The tentative valuation of the property has been completed and this shows a cost of reproduction plus the market value of land as of June 30, 1914, of approximately $231,700,000, or about $50,000,000 more than the capitalization.

James H. Hustis, who was receiver and was director of the

New England District under the railroad administration, was elected president of the new company, and in his annual report for 1919 says "a general increase in rates, which would provide the railroads as a whole with an income equal to 5½ per cent [on their valuation] would not yield this return to the Boston & Maine." Assuming, however, that the new rates fixed by the Interstate Commerce Commission will yield even 4 per cent on the tentative valuation of the Boston & Maine there would be net income available for interest charges and dividends of approximately $9,268,000. Interest charges amount to $4,402,000, and dividend requirements on the preferred stock exchanged for leased line stock amount to $2,036,000, a total of about $6,500,000.

In 1919 the road under government operation earned a gross revenue of $72,584,000, and after paying operating expenses and taxes, had a remainder of $3,611,000. It is rather interesting to note that the rental paid by the government, based on the test period, amounted to $9,383,000, which compares with $9,268,000 as the estimate made above for net earnings if rates are raised sufficient to yield the Boston & Maine 4 per cent on its valuation.

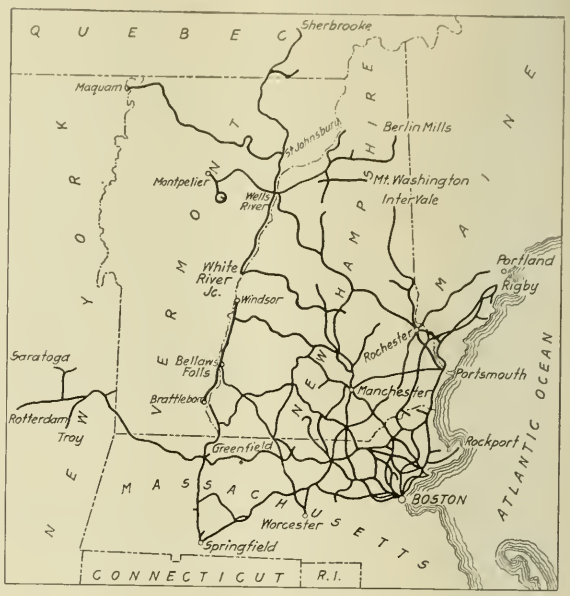
Extended comment has previously been made in these columns on the Boston & Maine reorganization. It was a thoroughly sound one, based on some sacrifices by holders of the old leased line stock, but these sacrifices were fully justified by the future prospects of the property. The balance sheet of the reorganized company, as of December 31, 1919, shows cash on hand amounting to $1,914,000, and total current liabilities of $3,417,000, which includes only $701,000 loans and bills payable. The amount owed by the government to the company was $22,784,000, and the amount which the company owed the government was $14,432,000. The rental received from the government, together with other income, amounted to $10,224,000, and from this was paid corporation expenses, interest charges and the dividends on the five classes of first preferred stock which was exchanged for leased line stocks. A balance of $525,000 remained to transfer to the credit of profit and loss.

In 1918 the Boston & Maine was being operated under peculiarly difficult conditions. In 1919 these conditions had been materially improved, and this fact is reflected in operating expenses. Maintenance of way and structure cost $9,612,000 in 1919, a decrease as compared with 1918 of $450,000. Most roads, of course, are showing large increases in maintenance of way expenses compared with 1918. The items which show largest decreases are bridges, trestles and culverts, track laying and surfacing, and removing snow, ice and sand. This latter item alone shows a saving of $408,000. There were, of course, offsetting items, notably the increase of $384,000 in the amount spent for rail and $166,000 in the amount spent for other track material.

Maintenance of equipment in 1919 was $15,288,000, an increase of $1,056,000 over 1918. Wage increases of shop forces and continued increase in the cost of materials were the reasons for the increased cost of maintenance of equipment.

Transportation expenses amounted to $38,438,000, an increase of only $770,000 over 1918. A large saving was made in the cost of fuel. This cost amounted to $7,421,000 in 1919 or $1,664,000 less than in 1918. The principal offsetting items were increases in the pay of station employees, trainmen, and crossings protection, with a large increase paid for loss and damage to freight. It is probable, however, that this was due to the payment in 1919 of claims which originated in 1918. Railroad conditions in New England in the winter of 1917 and 1918 were so congested that an entirely abnormal condition as regards loss and damage to freight is not to be wondered at.

In 1919 the total tonnage of freight carried was 26,516,000 or 11.94 per cent less than in the previous year. The average length of haul, however, was 124 miles, an increase of a little over four miles; so that the ton mileage decreased by only 8.84 per cent train loading showed an improvement. The average tonnage of revenue freight per train was 448 in 1919 as against 426 in 1918, an increase of 5.29 per cent. There was a slight falling out in car loading. The average number of tons per loaded car was 22.07 in 1919 and 22.61 in 1918. The average revenue per ton per mile received by the Boston & Maine was 1.315 cents, an increase of about 10 per cent over 1918. The average revenue per passenger per mile was 2.233 cents, an increase of 3.48 per cent. The freight revenue per ton per mile on the Boston & Maine looks high when compared with a road having a longer average haul and a large proportion of coal, but it must be remembered that the configuration of the road is such that a considerable part of its business is in the nature of a switching business rather than a through haul, and,



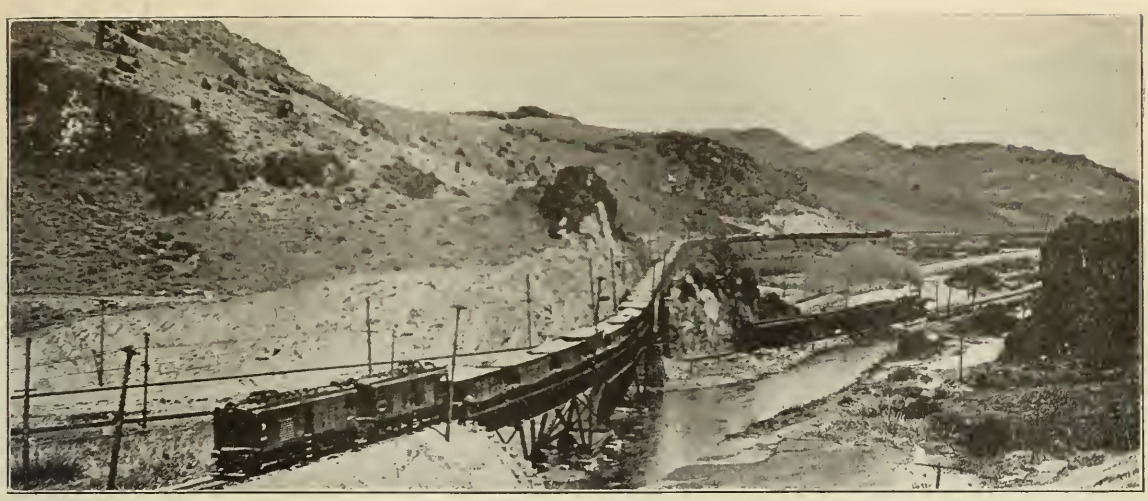
The Boston & Maine

furthermore, the percentage of coal business is small. In 1919 only 25 per cent of the total tonnage carried was products of mines and a large part of this was coal for domestic consumption, which means a few car loads of coal in trains of merchandise freight, and does not mean solid trains of coal such as can be run on the New York Central or Pennsylvania.

The future of New England is linked with its railroads. Rates into and out of New England can not be so high as to put the industrial prosperity of that section of the country in jeopardy. What the New England roads, therefore, must hope for is not a great increase in the through rate in which they participate but allotment to them of an increased proportion of a through rate which is not high enough to seriously hurt New England's industry.

The following table shows the principal figures for operation of the property by the government. This is not the corporation income account.

	1919	1918
Mileage operated	2,258	2,258
Freight revenue	$43,303,091	$43,085,382
Passenger revenue	21,798,847	19,039,026
Total operating revenues	72,583,880	69,911,393
Maintenance of way and structures	9,566,430	10,018,503
Maintenance of equipment	15,216,933	14,178,990
Traffic expenses	495,804	480,809
Transportation expenses	38,251,926	37,546,129
General expenses	2,049,136	1,827,525
Total operating expenses	66,023,668	64,490,678
Taxes	2,393,099	2,130,493
Federal net income	3,610,995	3,440,593



Ore Train on the Butte, Anaconda & Pacific. Northern Pacific Passenger Train in Background. Other Tracks Are Those of the St. Paul

Electric Operations—Butte, Anaconda & Pacific*

The Capacity of the Smelter Hill Line Has Been Increased 108 Per Cent Since the Road Was Electrified

By F. W. Bellinger
Electrical Superintendent, Butte, Anaconda & Pacific

THE BUTTE, ANACONDA & PACIFIC was built in the year 1892, principally for transfer service between the Anaconda Copper Mining Company's mines in Butte and smelter at Anaconda. The tracks connecting these two cities are approximately 26 miles long, but the yards and sidings included in the present electrification bring the total mileage up to 120.

Until the Butte, Anaconda & Pacific decided upon the electrification of its lines, for reasons of economy, it is doubtful if any such step had been made by a steam railroad. The electrification of various steam roads had been for the purpose of obviating some special condition, such as smoke nuisance in tunnels or cities, congested terminals, or to accomplish some special work for which a steam engine was not adapted.

Work on the electrification was begun in the spring of 1912 and regular operation was commenced 18 months later. Direct current at 2,400 volts was used, and 17 electric locomotives operating in pairs replaced 28 steam engines of the Mastodon type, and a substantial reduction, both in the number of crews required and in the amount of overtime worked, was effected.

Power is taken from the Montana Power Company's sub-stations at Butte and Anaconda. The advantage of purchasing electric power from this large operating company, instead of developing the required power independently, was readily apparent in the case of the Butte, Anaconda & Pacific. The road was relieved of all first cost of development and transmission of power and all operating expense up to the point of delivery at the two sub-stations. Butte sub-station is equipped with three 1,000 kw. motor-generator sets, exciter units and switchboard appurtenances, while at Anaconda the sub-station is equipped similarly, with the exception of having four 1,000 kw. motor-generator sets.

The railway makes every effort to operate its sub-stations at as high a load factor as possible and at a leading power factor. Under favorable conditions it is possible to make a 42 per cent load factor. The nature of the haul on this line is such as to make it impossible to despatch all trains, although good results are generally obtained, even in the switching service, by the co-operation of the yardmasters.

On the main line freight service between East Anaconda and Rocker, a distance of 20.1 miles, the standard train, westbound, that had been handled with steam was 50 cars, aggregating 3,500 tons, and the average running time for such a train, where no stops were made, was about 1½ hours, corresponding to an average speed of approximately 13.4 miles per hour. The electric locomotives now haul a trailing load of 4,600 tons at a speed of 16 miles per hour.

On the Smelter Hill line, a length of approximately seven miles with a grade of 1.1 per cent, 25 ore cars averaging 70 tons each and making a trailing load of 1,750 tons form a drag. The round trip is made in about one hour, thus making it possible to make eight round trips per day, or a delivery of 200 cars in 10 hours. As compared with this, a steam engine handled, under favorable conditions, 16 cars, or a trailing load of 1,120 tons, and made six round trips in 10 hours, or a delivery of 96 cars per day. Therefore, we have an increase of 108 per cent in this particular service, using the same crew and working the same hours as worked by the steam engine crew.

A comparative statement showing the cars handled per day for the months of April, 1917-1918, is as follows:

	1917	1918
Cars per day	1,043	866
Tons per day	44,597	37,917
Tons per train, east	1,449	1,560
Tons per train, west	4,198	4,625
Tons per train, average	2,797	3,098

While these figures are representative of the average business handled, they are not taken from the best month's per-

*A paper presented before the 43rd annual convention of the National Electric Light Association held at Pasadena, Cal., May 18-22.

formance, and are shown for the purpose of throwing light on the cause for electrifying. In handling the tonnages shown above, over a single-track line with limited sidings, a marked improvement was shown in the number of delays as well as in overtime to the train crews. A similar saving has been very noticeable in the mechanical department.

The figures in the table give an idea as to the cost of locomotive maintenance.

These figures will possibly carry more weight when compared with similar figures obtained from a steam locomotive performance sheet on this road for the year 1909. Maintenance per locomotive mile in cents for steam locomotive operation for the year 1909 was 16.1. Wages and materials have increased to a considerable extent since 1909, so that the ratio of costs is understated by the above figures.

The average time for each locomotive in the shop per year is ten days, while the shortest is four days. During this time a general overhauling is given to the mechanical and electrical equipment. The time for electrical inspection and repairs varies with the class of service on which the locomotive has been working. In general, the electrical work is completed in less than two days. Bad rheostat connections and tight contactor pins are the only cause for electrical work in the cab.

	1914	1915	1916	1917	1918	1919
Number electric locomotives	17	18	21	24	28	28
Average locomotive weight, tons	80	80	80	80	80	80
Repairs in dollars	27,811	35,253	49,811	55,846	54,167	35,264
Freight revenue miles	321,946	317,595	505,162	412,509	413,519	226,851
Passenger revenue miles	65,428	87,625	100,290	94,659	80,020	90,805
Switch revenue miles	136,892	161,871	404,356	367,690	324,322	197,838
Mixed and special revenue miles	.....	.....	616	456	.....	.....
Total revenue miles	524,266	567,091	1,011,424	875,314	817,861	515,474
Non-revenue miles	.....	5,507	2,477	10,796	2,957	1,142
Total locomotive miles	524,266	572,598	1,013,901	886,110	820,608	516,816
Maintenance per locomotive mile in cents	5.3	6.16	4.91	6.3	6.4	6.8

Our electric locomotives are inspected approximately every 40 days. Engines working at Butte or on Butte hill have no care except oiling and renewal of brake shoes. The maximum number of days which a locomotive has been away from the shop is 70, working two 10-hour shifts per day. Monthly inspections, as we call our 40-day periods, are made over a cinder pit, summer and winter. Two electrical men inspect a double unit in 20 minutes to an hour, making all necessary repairs and adjustments. One machinist inspects the mechanical parts in 20 minutes to an hour.

Seven machinists, two machinists' apprentices, four helpers, two drill pressmen, one wiper, one oiler, one boilermaker and his helper, three blacksmiths and three helpers, who work on steel cars principally, a pipe fitter and his helper, and a carpenter comprise the machine shop crew.

Three linemen are employed to maintain the overhead wires and feeders, and the average cost of maintenance of overhead system per mile per year for the past four years has been $137.57.

Steam engineers are used on the electric locomotives, and it has been our experience that this is the best practice. In the beginning an experienced man made several trips with each engineer before he took charge of an electric locomotive. The principal trouble they had was with the controller. The habit of pulling the throttle out to almost any position is one that is hard to break. Lectures were given to instruct the men in the operation of the locomotives and to give a practical working knowledge of the equipment in general.

It may be of interest to know how we heat our coaches. Each coach heater is of 25-kw. capacity, having a thermostat control and operated at 2,400 volts. The contactor control for each equipment receives a potential of 600 volts from a dynamotor located on the locomotive. Fresh air is introduced into the heater by means of a fan, and after being heated to a temperature of 100-105 deg. C, is forced out through longitudinal ducts placed inside the coach. The heater, principally because of high voltage, is located below the floor.

Five groups of five lamps in series are used to illuminate each coach. The voltage is 600 and is obtained from the dynamotor.

One of the first questions all visitors ask is, "How do your commutators wear?" To date we have not turned a single commutator on account of wear. We have turned a very few due to injuries received when inspection plates were allowed to fall in on the commutators. The wear is just appreciable at this time. The color could not be improved, and there is no evidence of burning or flash-overs. We are using an electro-graphitic brush which gives very good mileage and very little breakage.

Like all electric roads, we have armature trouble. However, it amounts to so little that we keep one man as an armature winder, and his time is spent principally on other equipment than armatures. Recently we went one year and 11 months without an armature failure.

In conclusion, we can sum the matter up by saying that for our service the electric locomotive is in every respect superior to the steam engine.

Photo by "International"

Students of the Polytechnic Institute of Brooklyn Get Practical Lessons in Long Island Railroad Shops

Salaries of Railroad Officers in 1917

Compilation Made by McAdoo's Wage Commission Made Public in Congressional Record

WASHINGTON, D. C.

REPRESENTATIVE THETUS W. SIMS, of Tennessee, who on November 18 published in the Congressional Record a list of the salaries of $20,000 and over paid by the railroads in 1917 [published in the *Railway Age*, October 10, 1919, page 751], taken from a compilation made by the Railroad Wage Commission in 1918, has now published the complete list then compiled by the commission showing salaries of $5,000 a year and over, furnished to him by Interstate Commerce Commissioner McChord, who was a member of the wage commission.

The list as published in the Congressional Record contains many inaccuracies and some obvious typographical errors in the names of men and of railroads, which we have endeavored to correct. It also contains some apparent discrepancies in cases where a man's name appears more than once. Where a man received a salary from two or more companies, in some instances the amount which he received from each company is shown and in others the total is given. Usually a man who left one company during the year to become connected with another is shown only in the latest position, but in some cases his salary for a year is reported and in others apparently it is shown only for the part of the year, which may account for the inclusion of amounts less that $5,000. But in one instance, H. E. Byram is listed both as vice-president of the Burlington and as president of the Chicago, Milwaukee & St. Paul, although he left the Burlington in the latter part of 1917. J. M. Dickinson, receiver of the Chicago, Rock Island & Pacific, is listed as having received $120,732, but as the *Railway Age* was advised after the publication of the list last November, this covered 26 months of service and was not an annual salary. The list contains approximately 2,500 names, but we publish below only the names of men receiving $10,000 and over and less than $20,000.

List of railroad officials showing title, railroad, and total compensation during year ending Dec. 31, 1917

Abney, B. L., chief counsel South Carolina, Southern	$10,000.00
Adams, H. C., president, Springfield Term	12,000.00
Adams, H. M., vice-president, traffic manager, Mo. Pac	16,750.00
Ainsworth, Dr. F. K., chief sur. and manager, Southern Pacific	12,060.00
Alden, E. H., secretary and assistant treasurer, Norfolk & Western	12,030.00
Alfred, Frank H., president and general manager, Pere Marquette	18,505.15
Allen, L. M., passenger traffic manager, C. R. I. & P	10,333.30
Allen, Louis B., general manager, C. B. & Q	11,024.97
Andrews, Frank, general counsel and chairman of board, N. O. T. & M	12,000.00
Ansley, Harrie C., treasurer, Southern	15,620.00
Apperson, A. B., special representative, Utah	15,000.00
Axtell, Decatur, vice-president and chairman valuation commission, C. & O	17,041.70
Bailey, W. E., general auditor, A. T. & S. F	14,250.00
Baird, F. C., freight traffic manager, B. & L. E	12,025.04
Baird, John B., freight traffic manager, Northern Pacific	10,000.00
Baker, Horace, general manager, Southern	15,000.00
Baker, James A., receiver, I. & G. N	12,000.00
Baldwin, A. S., chief engineer, I. C	12,000.00
Baldwin, Lewis W., vice-president and general manager, C. of Ga.	13,416.65
Baldwin W. W., vice-presdient, C. B. & Q	15,000.00
Bankard, E. H., purchasing agent, B. & O., acting purchasing agent C. H. & D	15,750.00
Bardo, Clinton L., assistant to president and general manager, N. Y., N. H. & H., Central New England	17,696.66
Barger, Milton S., treasurer, Mich. Central, C. C. C. & St. L., Ind. Har. Belt., Rutland R. R., T. H. & B., K. & M. Ry. Co., Clearfield Bit. Coal Corporation, Merchants' Des. T. Co., Lake E. & W. R. R., T. & O. Cent., Western T. Co., N. Y. State Rys., N. Y. & H. R. R	18,000.00
Barnwell, W. G., assistant to freight traffic manager, A. T & S. F	10,020.00
Barrett, R. W., assistant general solicitor, Lehigh Valley	10,000.00
Bates, Elmer P., assistant freight traffic manager, Pennsylvania	10,200.00
Baxter, R. W., vice-president and general manager, Alaska S. S. Co	14,400.00
Beacon, T. H., general manager, C. R. I. & P	12,120.00
Beardsley, W. H., president, Fla. East Coast	18,000.00
Beckwith, J. P., vice-president, Fla. East Coast	15,750.00
Begien, R. N., general manager, B. & O	14,500.00
Bentley, Harry T., superintendent motive power and machinery, C. & N. W	10,000.00
Beymer, W. V., compiroller, Ill. Central	12,265.00
Blabon, Joseph W., vice-president, C. G. W	12,010.00
Black, William Joseph, passenger traffic manager, A. T. & S. F	10,800.00
Blair, George A., assistant freight traffic manager, C. M. & St. Paul	11,000.00
Blake, C. O., attorney for Oklahoma, C. R. I & P	10,000.00
Blanchard, E. C., general manager, Northern Pac	15,030.00
Blount, William Alexander, general counsel, Fla. East Coast	10,000.00
Boles, E. H., general solicitor, Lehigh Valley	17,525.00
Bowen, Arthur P., director of purchase, Pullman Co	19,000.00
Bower, W. C., purchasing agent, N. Y. C	10,000.00
Boyle, Egell, Houston & Grover, general attorneys, S. A. & A. P.	12,500.00
Bracken, E. P., vice-president, C. B. & Q	19,749.99
Brand, R. A., vice-president, Atlantic Coast Line	10,300.00
Bratnober, C. P., receiver, M. St. P. Rochester, receiver, Dubuque El. Trac. Co	15,600.00
Bremner, W. H., president, Minn. & St. L	15,373.29
Brennan, T. F., vice-president, B. R. & P	10,333.33
Brigham, Edmund D., assistant freight traffic manager, C. & N. W	11,000.00
Bright, Alfred H., general counsel, M. St. P. & S. S. M	13,160.00
Brister, Chas. J., traffic manager, C. C. C. & St. L., C. N	12,320.00
Bronner, E. D., vice-president and general manager, Mich. Cen.	17,395.00
Bronson, Miles, general superintendent El. division, manager Grand Central Terminal, N. Y. C	12,000.00
Brown, B. H. Innes, advisory counsel, S. A. L	15,000.00
Brown, Clyde, general solicitor, N. Y. C	15,000.00
Brown, Edward L., president, D. & R. G	10,766.11
Brown, F. V., general attorney, Great Northern	12,000.00
Brown, S. W., assistant to general manager, Mich. Central	10,000.00
Bryson, Joseph M., general counsel, Mo., Kans. & Texas	18,000.00
Buck, Gordon M., assistant general counsel, Southern Pacific	15,820.00
Buckingham, E., vice-president and general manager, Union Stock Yards	10,000.00
Bunting, Carroll M., comptroller, Pennsylvania	14,000.00
Bunting, Guy J., comptroller, C. M. & St. Paul	10,000.00
Burch, Charles N., general solicitor, Yazoo & Miss. Valley	12,000.00
Burlingham, Veeder, Master & Fearey, solicitors, Pennsylvania	17,000.00
Burnett, Edmund T., purchasing agent, N. & W	10,000.00
Caldwell, John D., secretary, C. & N. W., C. St. P., M. & O	14,060.00
Calkins, R. M., vice-president, C. M. & St. P	12,000.00
Calloway, W. R., general passenger agent, B. & O	10,000.00
Campbell, D. W., assistant general manager, S. P	12,000.00
Campbell, Edw. T., general traffic manager, Erie	12,000.00
Campbell, George H., assistant to president, B. & O	14,159.00
Cannon, L. G., vice-president and general counsel, Nev. Northern	15,000.00
Caples, Martin J., vice-president, Hocking Valley, C. & N. O., C. & O., B. C. D. & W. Co., Pomeroy Belt, Toledo Term	15,846.95
Carr, Lewis E., resident counsel, D. & H	12,000.00
Carroll, L. S., general purchasing agent, C. & N. W	15,000.00
Carson, H. M., G. S. of C. G. Div., Penn	10,800.00
Carter, B. & Sons, solicitors, Pennsylvania System, B. C. & A. R. R., M. D. & V	11,600.00
Carter, S. M., general counsel, Maine Central	12,184.60
Cass, Louis Stephen, receiver, K. C. N. W	10,000.00
Church, Samuel H., secretary, Pennsylvania, P. C. C. & St. L	10,916.70
Churchill, Chas. S., assistant to president, Norfolk & Western	13,992.00
Clark, Byron, attorney for Nebraska district, C. B. & Q	12,000.00
Clark, Chas. A., treasurer, Northern Pacific	10,000.00
Clark, Elroy N., general attorney, Denver & Rio Grande	10,000.00
Clark, F. H., general superintendent, M. P., B. & O	15,000.00
Cobb, Cobb, McAllister, Fernberg & Heath, attorneys, Lehigh Valley	16,845.00
Cobb, Wheelwright & Dillo, atterneys, Great Northern	11,000.00
Cochrane, John T., receiver, A. T. & N	12,000.00
Cockrum, John B., general attorney, Lake Erie & Western	10,000.00
Coleman, B. Dawson, president, Cambria & Indiana	10,000.00
Collins, E. S., president, chief engineer, general manager, Sheffield & Tionesta	12,000.00
Collins, M. J., general purchasing agent, A. T. & Santa Fe	10,000.00
Connell, Joseph A., district attorney, C. B. & Q	11,333.32
Connors, Maurice S., general manager, Hocking Valley, W. & J. Belt, Pomeroy Belt	10,050.00
Constans, O. A., freight traffic manager, B. & O	10,810.00
Copeland, Edw. L., secretary and treasurer, A. T. & Santa Fe	12,750.00
Coppell, Arthur, vice-president, Denver & Rio Grande	14,583.33
Corthill, A. B., chief engineer, Boston & Maine	10,000.00
Cotter, S. E., general manager, Wabash Ry	12,000.00
Cotter, Wm., president and general manager, St. L. & O. F. Manufacturers	12,000.00
Coughlin, W. G., engineer, maintenance of way, Pennsylvania	8,400.00
Countryman, M. L., general attorney, Great Northern	12,000.00
County, A. J., vice-president, Pennsylvania, Long Island, Wash. Southern	17,400.00
Coxe, Jo. W., comptroller, Norfolk & Western	10,000.00
Cravath & Henderson, counsel, New York division, B. & O	10,000.00
Cravath & Henderson, general counsel, Missouri Pacific	14,583.31
Crawford, D. F., general manager, Pennsylvania West	15,000.00
Crosby, Geo. H., vice-president and secretary and treasurer, C. R. I. & P., P. & B. V., Ark. & Memphis	19,260.00
Crosby, G. H., freight traffic manager, C. B. & Q	12,000.00
Croxton, D. T., president, Cuyahoga Valley	11,666.62
Cushing, Hopkins & Lamb, counsel, Erie	13,000.00
Cutter, M. B., president, Tonopah & Goldfield	15,000.00
Cutts, Geo. T., comptroller and chief accounting officer, Mo., Kan. & Tex	12,000.00
Dalzell, Fisher & Hawkins, district solicitors, Pennsylvania Co., P. C. C. & St. L	10,000.00
Daly, John W., passenger traffic manager, N. Y. Cen. lines, N. Y. Cen., Mich. Cen., P. & L. E	12,000.00
Daniels, F. B., general solicitor, the Pullman Co	19,000.00
Davant, T. S., vice-president, traffic, Norfolk & Western	17,500.00
Davis, James O., general attorney, Chicago & N. W	15,000.00
de Forest, Henry W., vice-president and director, South. Pacific	13,270.00
de Forest, Robert W., vice-president and general counsel, Cen. R R. Co. of N. J., L. & W. B. Coal Co	18,000.00
Delano, Lyman, vice-president, Atlantic Coast Line	11,113.37

Denegre, Leovy & Chaffe, general attorneys, Southern Pacific, M. L. & T. R. R. & S. S	15,000.00
D'Heur, Allard, manager fuel oil department, Southern Pacific, Kern T. & Oil Co., Asso. Pipe Line Co	10,120.00
Dillingham, B. F., president, Oahu Ry. & Land Co	10,000.00
Dinkey, John Franklin, auditor and treasurer, B. R. & P	15,000.00
Douglas, Alexander, consulting auditor, St. L. & Santa Fe	12,500.00
Downing, W. C., general superintendent, Pennsylvania	10,125.00
Drew, J. G., vice president, Missouri Pacific, Sou. Ill. & Mo. Bridge Co	19,933.33
Dudley, F. M., general attorney, C. M. & St. P	10,000.00
Dumble, E. T., consulting geologist, Southern Pacific, Rio Bravo Oil Co., East Coast Oil Co	12,920.00
Duncan, W. M., president and director, Wheeling & L. E	15,560.00
Dunglinson, George, Jr., assistant to general manager, Norfolk & Western	5,447.73
Dunkle, H. O., assistant to president, Erie	10,000.00
Dunlap, Robert, western solicitor, A. T. & Santa Fe	13,500.00
Dunlop, Patrick T., general superintendent motive power, St. L. Santa Fe	10,000.00
Dyer, J. H., assistant general manager, Southern Pacific	10,020.00
Dynes, O. W., commerce counsel, C. M. & St. P	10,000.00
Edwards, Thomas O., auditor Pacific systems, Southern Pacific, Associated Oil Co., Associated Pipe Line Co	10,670.00
Eldridge, W. T., president, general manager and treasurer, Sugarland	12,000.00
Elliott, George B., general counsel, director maintenance of electrical construction, Atlantic Coast Line, A. L. & I. Co., W. Ry. Bridge Co., L. & N., Belt Line, C. & W. C., So. Car. Pac., C. U. S. Co., N. W. Ry., S. C. E. Car L. & Imp. Co	13,343.57
Elliott, Howard, chairman executive committee, Northern Pacific	18,180.00
Elliott, J. H., general manager, Texas & Pacific	10,010.00
Emerson, George H., general manager, Great Northern	16,021.44
Engel, E. J., assistant to president, A. T. & Santa Fe	15,000.00
Ennes, Stanton, general manager, W. M	10,000.00
Enslow, Fitzpatrick & Baker, counsel, West Virginia, C. & O	10,000.00
Eustis, P. S., passenger traffic manager, C. B. & Q	12,000.00
Evans, George E., fourth vice-president, L. & N., L. H. & St. L.	10,020.00
Evans, T. W., assistant general manager, New York Central	12,000.00
Ewing, Charles H., vice-president, Phila. & Reading	19,166.70
Eyman, F. P., freight traffic manager, C. & N. W	15,000.00
Farris, W. E., vice-president and general manager, N. O. Gt. N.	10,030.00
Fee, Charles S., passenger traffic manager, S. P	10,580.00
Ferguson, H. H., vice-president and general manager, Ill. Term.	12,000.00
Fernald, Gustave S., general attorney, the Pullman Co	19,000.00
Ferry, Clark B., vice-president and assistant secretary, C. M. & St. Paul	10,099.96
Field, H. H., general socilitor, C. M. & St. P	18,000.00
Finley, William H., chief engineer, C. & N. W	15,000.00
Fitzgerald, R., president and director, C. J. Ry Co	16,030.08
Flynn, P. J., vice-president, D., L. & W	19,883.26
Foley, Thos. J., vice-president, I. C. Y. & M. V	15,833.33
Folles, Hogsett, Ginn & Morley, counsel Cleveland division, B. & O	10,000.00
Foque, T. A., general mechanical superintendent, M. St. P. & S. Ste. M	12,000.00
Foreacre, W. W., general manager, Southern	12,000.00
Fornstrom, H., chief engineer, Va. Ry	10,000.00
Fort, Gerritt, passenger traffic manager, Union Pacific	12,500.00
Fox, Fred C., A. T. & S. F. general manager	16,250.00
Freeman, Thomas J., general counsel, T. & P	12,000.00
Fries, A., assistant general freight traffic manager, B. & O	10,900.00
Fripp, W. J., general manager, N. Y. C	18,000.00
Gagel, Edward, chief engineer, N. Y., N. H. & H., C. N. E	10,060.00
Gallup, David L., comptroller, A. T. & S. F	16,250.00
Gardner, Alfred A., special counsel, Long Island	14,000.00
Gardner, C. W., comptroller, M. St. P. & Ste. S. M	15,666.67
Geer, I. W., general superintendent, P. C. C. & S. L	10,200.00
Getzen-Danner, O. G., tax agent, N. Y. C	15,200.00
Gibbs, Alfred W., chief mechanical engineer, Pennsylvania	10,800.00
Gill & Linn, division counsel, B. & O	10,025.00
Glennon, Edward T., assistant vice-president, N. Y. C	17,500.00
Goodnow, C. A., vice-president, C. M. & St. P., P. S. & W. H., Gallatin Vy., Tacoma Eastern	17,500.00
Gordon, George B., special counsel, Pennsylvania	17,263.36
Gordon, J. A., general manager, C. G. W	10,000.00
Graves, Kizer & Graves, general counsel, Spokane & Inld Empire	10,000.00
Gray, G. M., superintendent motive power, Bessemer & Lake Erie	10,440.80
Gray, Henry A., comptroller, Northern Pacific	12,000.00
Green, Lincoln, vice-president, Southern	15,042.00
Greer, Benj. B., vice-president and general manager, Colo. & Southern, C. B. & Q	12,000.00
Greer, Lawrence, W. B. and general counsel, Western Maryland Ry	12,000.00
Griffin, E. R., vice-president and general manager, Great Northern	13,400.00
Gunn & Rasch, legal department counsel, Northern Pacific	14,900.00
Gutelius, F. P., vice-president, Delaware & Hudson Co	11,761.68
Hackney, Leonard J., general counsel, C. C. C. & St. L	15,120.00
Haile, Columbus, vice-president and chief T. O., M. K. & T	18,000.00
Halsted, A. S., general counsel, L. A. & S. L	10,000.00
Hamilton, Frank Hastings, secretary and treasurer, St. L. & S. F.	15,000.00
Hamilton, Geo. E., division counsel, Baltimore & Ohio	11,350.00
Hamilton, Thos. B., vice-president, P. C. C. & St. L	15,548.70
Hamilton, Thompson A., comptroller, St. L. & S. F	10,163.91
Harriman, W. A., vice-president, Union Pacific	10,930.91
Harris, George B., chairman board of directors, C. B. & Q	15,000.00
Harwood, George A., engineer assistant to vice-president, N. Y. Central	12,400.00
Havemeyer, Henry O., president-general manager, N. Y. Central	10,000.00
Hawks, G. F., vice-president and general manager, El Paso & S. W	15,450.00
Hawley, A. L., general auditor and secretary, El Paso & S. W., Nacozari, Morenci Sou., E. P. & S. W. of Tex., E. P. & N. E., Clouderoft, E. P. & S. W. Val. Com., E. P. & S. W., Bd. Ser.	12,500.00
Heebner, Charles, general solicitor, Phila. & Reading	12,500.04
Herriman, Frank E., special assistant to president, New York Central	12,000.00
Hiland, J. H., vice-president, C. M. & St. P	15,000.00
Hill, J. H., vice-president and general manager, Gal. H. & Henderson	10,000.00
Hilton, Alexander, passenger traffic manager, St. L. San Fran	10,000.00
Hobbs, George S., second vice-president, Maine Central, S. Riv. & Rang. Lakes, Bridg. & Saco River, Bridg. Teleg. Co	12,100.00
Hobbs, William J., comptroller and vice-president, Boston & Maine, York Harbor & Beach, St. Johns. & Lake Champ., Mont. & W. River, Barre & Chelsea, Troy Union	16,060.00
Hodgdon, William, traffic manager, Pennsylvania, Pitts. Cin. Chi. & St. L	16,000.00
Hodges, W. E., vice-president, A. T. & S. F	16,250.00
Hogeland, Albert H., chief engineer, Great Northern	15,000.00
Holden, James F., vice-president, Kans. City Southern	15,000.00
Holdredge, G. W., general manager, C. B. & Q	18,000.00
Holmes, George, general attorney, C. R. R. of N. J., Lehigh & Wilkes-Barre, N. Y. & Long Branch	13,010.00
Hood, William, chief engineers, Southern Pacific	14,220.00
Hopkins, L. N., purchasing agent, C. B. & Q	12,000.00
Horton, Walter S., general attorney, Illinois Central	18,000.00
Hough, William, general auditor, Pullman Co	14,000.00
Houghton, Fred B., freight traffic manager, A. T. & S. F	12,833.28
How, Charles A., general purchasing agent, Mo. Pacific	10,160.00
Howland, T. S., vice-president, secretary-treasurer, C. B. & Q	15,000.00
Hudson, Woodward, general counsel, Boston & Maine	18,000.00
Huff, Charles C., general solicitor for receiver, Mo. Kans. & Texas, Wich. Falls & N. W	12,000.00
Hughes & Dorsey, general attorneys, Union Pacific, Denver U. Term.	14,000.00
Hughes, Andrew S., general traffic manager, Denver & Rio Grande	12,000.00
Hulme, Thomas W., real estate agent, Penna. Rd. Co	17,000.00
Humphrey, Alex P., general counsel, Southern Ky. & Ind. Term.	13,650.00
Hunter, George W., receiver, La. & N. W	11,200.00
Hustis, G. E., general auditor, Del., Lack. & Western	10,332.32
Ingalls, A. S., general manager, N. Y. C	15,000.00
Ingalls, G. H., traffic manager, N. Y. C. Lines W	13,250.00
Ingersoll, A. M., assistant to vice-president, C. M. & St. P	10,000.00
Ingersoll, Charles E., president, M. V	10,000.00
Isaacs, John Dove, consulting engineer, Southern Pacific	12,500.00
Jarvis, George T., vice-president and general manager, Rutland	12,280.00
Jarvis, T. N., vice-president, Lehigh Valley	15,100.00
Jeffers, W. M., vice-president and general manager, Union Pacific	11,000.00
Jenks, C. O., assistant general manager, Gt. Nor	12,000.00
Jerome, F. J., general counsel, N. Y. C	14,570.00
Johnson, A. C., general traffic manager, C. & N. W	15,833.33
Johnson, H., auditor, secretary, D. & I. R	10,593.16
Johnson, J. M., vice-president, Missouri Pacific	17,083.30
Johnson, S. H., freight manager, C. R. I. & P	10,333.33
Johnson, S. C., general auditor, St. L. S. W	12,030.00
Jones, C. W., general manager, C. R. I. & P	13,500.00
Jones, Larz A., president and general manager, Ala. & V., V. S. & Pac., La. & M. Trans	15,150.00
Katte, Edwin B., chief engineer of electric transportation, New York Central	10,000.00
Katzenbach, L. E., secretary and treasurer, director, Great Northern	10,000.00
Keeler, D. B., vice-president, F. W. & D. C. W. V. Ry	10,000.00
Kendrick, J. W., director maintenance of electrical construction, St. L. S. F	12,000.00
Kenefick, Cooke, Mitchell & Bass, local counsel, Lehigh Valley	16,845.00
Kenly, John R., president, Atlantic Coast Line	18,600.00
Kennedy, M. C., president, Cumberland Valley	15,000.00
Kerwin, Ed. E., vice-president, the Virginian, N. & P. B. L., N. Term., Deepwater	10,450.00
Kestler, Fred, general superintendent, Birmingham & Sou	10,542.83
Kilgallen, M. H., general manager, C. H. Term. Tfr., C. H. Land Assn	12,000.00
Kittle, C. M., senior vice-president, Illinois Central	14,335.68
Kittredge, George W., chief engineer, New York Central	18,000.00
Knight, Ed. W., general counsel, the Virginian	12,000.00
Koch, John J., freight traffic manager, Penn. L. W. of P., Pennsylvania, P. C. C. & St. L	12,000.00
Koons, George C., assistant superintendent New York Division, Pennsylvania	6,300.00
Koons, T. B., vice-president and freight traffic manager, C. R. R. of N. J	15,010.00
Kramer, Le Roy, vice-president, Pullman Co	24,000.00
Kreitter, J. W., superintendent, H. & D	11,934.50
Krick, Charles S., general superintendent, Pennsylvania	11,250.00
Kurrie, E. R., president, C. I. & L., Belt, C. & W. I., K. & L. Term	17,851.18
Labau, Francis, traffic manager, N. Y. C	13,250.00
Latrobe, Gamble, general superintendent Southern Division, P. B. & W	10,350.00
Lawton, Alex. R., vice-president, Central of Ga., Syl. Cen., L. & W., etc	11,990.00
Leach, N. M., general traffic manager, T. & P	12,000.00
Leary, Jas. T., comptroller, B. & O	10,000.00
Lee, Blewett, general solicitor, Ill. Central	15,140.00
Lee, G. H., general passenger agent, Lehigh Valley	10,000.00
Lee, Elisha, general manager and acting vice-president, Pennsylvania	18,510.70
Lefber, A. W., vice-president and general manager, Mid. Valley	12,900.00
Lewis, William H., superintendent of motive power, Norfolk & Western	10,800.00
Livengood, J. G., general auditor, Missouri Pac	10,016.66
Loree, L. F., chairman of board and executive committee, Wheeling & Lake E	10,320.00
Loweth, C. F., chief engineer, C. M. & St. P	15,000.00
Loyall, G. R., assistant vice-president, Southern Ry	10,000.00
Luce, G. W., freight traffic manager, Southern Pac. Co	12,465.00
Lukens, Edmund T., real estate and tax agent, Del., Lack. & Western	10,000.00
Lyman, Alex. S., general attorney, New York Central	15,000.00
Lynde, Samuel A., vice-president and assistant secretary, C. & N. W	13,333.33
McCarty, T. F., vice-president at Detroit, Pennsylvania	16,000.00
McCarty, R. J., auditor and vice-president, K. C. Southern	17,200.00
McCrea, James A., general manager, Long Island, N. Y. & L. I. Trac., L. I. Elec	13,731.99
McFeatters, F. R., general superintendent, Union	13,068.16
McGonagle, William A., president and general manager, U. S. Steel Corporation	18,546.00
McKnight, T. H., treasurer, Pennsylvania lines	15,000.00
McLaughlin, A. A., attorney, C. & N. W., C. St. P. M. & O., Canadian Pac	10,083.33
McMaster, H. W., vice-president and general manager, Wheeling & L. E	15,500.00
Macdowell, William G., vice-president, N. & W., V. C., N. R. H. & W., W. S. U. Sta. Co., Cen. F. M. & I. Ins	18,054.97
MacKie, James Stenart, treasurer, C. & O., C. & O., of Ind	10,020.00
Manchester, Henry C., superintendent of motive power, D. L. & W	11,833.32
Manss, W. H., assistant to vice-president, B. & O	16,000.00
Mapother, W. L., first vice-president and director, L. & N., L. H. & St. L	15,659.09

Martin, Geo. R., vice-president and comptroller, G. N., Crows N. P. Coal Co.	15,500.00
Matson, J. S., general superintendent, B. & L. E.	10,440.80
Maxwell & Ramsey, solicitors, P. C. C. & St. L., Lebanon & N., Louisville Bridge Co.	19,700.00
Maxwell, W. C., vice-president, Wabash	16,500.00
May, Augustus S., treasurer, N. Y., N. H. & H., Cen. N. E., N. E. S. S., N. & N. E. Tr., Housatonic P., Westchester S., Berkshire S., N. Y. & S.	10,000.00
Meeder, Frederick H., assistant to vice-president, N. Y. C., Mich. Cen., Pittsburgh & L. E., T. & O. Cen., Raquette Lake.	10,040.00
Merriam, Frank L., general counsel, P. Marquette	18,000.00
Miller, Edward T., general attorney, St. L. S. F.	10,000.00
Miller, Henry Watkins, vice-president, Southern	15,464.60
Miller, S. F., general freight agent, C. & N. W.	10,000.00
Moody, Samuel, passenger traffic manager, Pennsylvania	11,000.00
Moore, S. W., general counsel, K. C. Term.	11,083.31
Moore, S. W., general solicitor, K. C. So.	11,166.65
Moot, Sprague, Brownell & Marcy, local attorneys, Erie, Buff. C.	13,800.00
Morrison, J. L., general auditor, Lehigh Valley	10,085.00
Morrison, J. T., superintendent of traffic, Pullman Co., Pullman R. R.	6,000.00
Morse, Charles A., chief engineer, C. R. I. & P.	18,000.00
Munroe, John A., vice-president in charge of traffic, U. P., Oreg. Short Line	15,000.00
Murphy, J. F., general manager, M. P.	15,000.00
Nay, Frank, comptroller, C. R. I. & Pac., P. & B. Val., K. & D. M.	15,100.00
Neale, S. C., attorney and chief counsel, Pennsylvania	12,000.00
Needles, A. C., general manager, N. & West	16,145.00
Neilson, Lewis, secretary, Pennsylvania	14,000.00
Newbern, Robert H., superintendent, Pennsylvania	12,000.00
Newell, A. B., president, general manager, and purchasing agent, Toledo Ter.	7,200.00
Newton, A. W., chief engineer, C. B. & Q.	12,000.00
Nichols, Edward T., vice-president, Great No.	12,500.00
Nichols, H. S. P., assistant general counsel, Pennsylvania	10,000.00
Northrop, C. B., assistant general counsel, Southern, Mobile & O., Ga. So. & Fla.	10,000.00
Norton, Thomas J., general attorney, A. T. & S. F.	12,500.00
Noyes, Walter C., general counsel, Del. & Hud., Windsor C. Co.	15,030.00
Nutt, H. C., general manager, L. A. & S. L.	18,000.00
O'Brien, J. E., vice-president and general manager, Union Pac., No. Pac. Ter.	16,020.00
O'Donnell, R. L., assistant general manager, Pennsylvania	13,096.75
Ogden, George D., freight traffic manager, Pennsylvania	12,000.00
Olyphant, Robert M., chairman executive committee, Del. & Hudson	15,000.00
Olyphant, F. M., secretary, Del. & Hudson	10,117.45
Orcutt, George N., vice-president, Erie	15,560.00
Orr, J. W., comptroller, Pennsylvania Lines, W. Pgh.	12,000.00
Osborn, William C., general counsel, El P. & S. W.	15,000.00
Owen, Thomas, superintendent, Duluth & I. R.	10,481.20
Owen, W. F., president, Gulf, M. & No.	15,220.00
Palmer, Warren S., president, general manager, N. West. Pac.	10,030.00
Park, W. L., first vice-president, Chic. Grt. Western	16,590.00
Parker, R. J., general manager, A., T. & S. F.	13,000.00
Parsons, Robt. S., assistant to president, Erie	16,414.99
Patterson, Crawford & Miller, solicitors, Pennsylvania	15,000.00
Patton, W. A., assistant to president, Pennsylvania, Phila. Bal. & Wash., W. J. & S., Phila. & Cam. Ferry, N. Y., Phila. & Nflk.	12,600.00
Paulding, Charles C., solicitor, N. Y. Central	12,750.00
Payne, John Barton, general counsel, Chicago Great Western	18,000.00
Payson, Albert H., assistant to president, A. T. & S. F.	10,030.00
Peabody, C. A., director and chairman, Illinois Central, Y. & M. V., Chgo., St. L. & N. O., Cant., Aber. & Nash., Dub. & Sioux City, Miss. Valley Co., Miss. Valley Corp.	13,495.00
Pearce, Hiram M., general traffic manager, Chgo. St. P. & O.	13,000.00
Peck, George R., general counsel, C. M. & St. P.	10,000.00
Perkins, E. B., general attorney, St. L. S. W.	10,060.00
Perkins, Edw. R., jr., president, Cleve. & Mah. Val.	13,000.00
Perry, M. J., chairman board, Norfolk South	16,080.00
Peter, J. S., director and first vice-president, San A. & Aransas Pass	10,300.00
Pettibone, Frank G., vice-president and general manager, A. T. & S. F., Gulf Col. & S. F.	16,250.00
Peyton, John Howe, president and general manager, Nash., Chat. & St. L.	12,000.00
Phelan, C. A., general manager, Mc. & No. Ark.	10,000.00
Phelps, W. G., purchasing agent, Pennsylvania	10,000.00
Phillips, C. J., general superintendent, D. L. & W., Harlem Trsfr. Co.	13,833.30
Pickens, Moores, Davidson & Pickens, solicitors, P. C. C. & St. L., Ind. & Frankfort	17,456.00
Pierce, A. S., treasurer and assistant secretary, Chgo. & N. W., Chgo., St. P., M. & O.	10,555.55
Pierce, T. M., general counsel, Term. R. R. Asso. of St. L., St. L. M. B. Term., Wig. Ferry Co., St. L. Trans., E. St. L. Con. Ry.	12,300.00
Pierpont, H. E., freight traffic manager, C. M. & St. P.	12,000.00
Plaisted, F. H., assistant director of traffic, Sou. Pacific	11,500.00
Plant, A. H., comptroller, Southern, Cin. N. O. & T. P., Ala. G. S., N. O. & N. E., North Ala., Ga. Sou. & Fla., Lenoir Car Wks., Gadsden Car Wks., Ry. Fuel Co.	18,053.16
Pollock, Benjamin R., general manager, Boston & Maine	15,000.00
Pollock, Walter B., manager marine department, N. Y. Central, W. S., Mer. Desp. Trans., West. Transit Co.	18,000.00
Pollok, Allan, superintendent, Southern Pacific	12,000.00
Porcher, Samuel, purchasing agent, Pennsylvania, Phila., Bal. & Wash., West J. & Seashore, N. Y., Phila. & Nor., Bal., Chesa. & Atlan., Md., Dela. & Va., Balto., Chesa. & At.	14,000.00
Porter, H. T., chief engineer, Bessemer & L. Erie	10,440.00
Powell, Thomas Carr, vice-president, Southern, C. N. O. & T. P., A. G. S., Nor. Alabama, H. & N. E., N. O. & N. E.	18,600.00
Pyeatt, J. S., president and general manager, N. O., Tex. & Mex., St. L. B. & Mex., Beau., S. L. & West. Orange & N. W.	15,000.00
Quayle, Robert, G. S. M. P., C. & N. W., P. R. C. & N. W., W. & N. W.	15,000.00
Ranh, S. E., president, B. R. R. & S. Y.	14,750.00
Rapelje, John W., general manager, Nor. Pac.	12,000.00
Ray, G. J., chief engineer, D. L. & W.	13,000.00
Rearick, A. C., general attorney, C. & O., H. V. Ry.	10,000.00
Reath, T. W., general solicitor, N. & W.	12,900.00
Reed, Smith, Shaw & Beal, general attorneys, P. & L. E.	15,000.00
Reid, George T., assistant to president, W. Con. Nor. Pac.	15,000.00
Reilly, F. C., freight traffic manager, St. L. S. F.	10,000.00
Remington, Carl, secretary, C. & Ohio, Hocking Val., C. & O. N.	11,500.00
Rice, N. M., vice-president, St. L. S. F.	17,919.33
Rich, Eason, A. G. S., Union Pacific	10,000.00
Richards, R. C., C. C. S. C. and G. C. A., C. & N. W.	10,000.00
Rickard, R. D., secretary and treasurer and director, N. Y. O. & W.	10,399.99
Riggs, Ed. G., executive assistant, N. Y., N. H. & H.	15,000.00
Robins, Jesse W., receiver, Trinity & Brazos Valley, Houston Belt & Ter. Ry.	10,500.00
Robinson, E. F., general manager, B. R. & P.	10,333.33
Robinson, L. A., comptroller, C. & N. W. Ry.	15,040.00
Robson, Frank E., general counsel, Michigan Central	12,010.00
Rockwell, Samuel, consulting engineer, New York Central	10,000.00
Rodgers, J. G., assistant to president, Pennsylvania, West. N. Y. & Pa. Ry., Phila., Balto. & Wash., West Jersey & Seashore	11,780.60
Rodman, William B., general solicitor, Norfolk Southern, John L. Rober Lumber Co.	15,000.00
Rogers, S. M., vice-president, Elgin, Joliet & Eastern	12,060.00
Root, F. W., solicitor, C. M. & St. P. Ry. Co.	12,000.00
Rossiter, Edw. L., treasurer, New York Central	18,180.00
Ruffin, J. R., freight traffic manager, Norfolk & Western	11,000.00
Runnells, Clive, vice-president, Pullman Co.	18,000.00
Scarritt, Scarritt, Jones & Miller, general attorneys, Chgo. & Alton	10,000.00
Schlafge, William, general mechanical superintendent, Erie, N. Y. S. & W.	10,000.00
Scholz, Carl, consulting mining engineer, C. B. & Q.	11,666.62
Schoyer, Alfred M., vice-president, Pennsylvania, Pgh. C. C. St. L., Belt Ry. of Chgo., Calumet West	18,340.85
Scott, R. B., general solicitor, C. B. & Q.	14,833.36
Scott, S. C., assistant to vice-president, Pennsylvania, Tyler-Conn., Shpsvle.	10,210.00
Seddon, William L., vice-president, Seaboard Air Line, Nea. Dub. & Sav.	13,191.64
Seneff, E. H., general solicitor, Pennsylvania, Pgh. Cin. C. & St. L.	15,000.00
Shand, Alex. C., chief engineer, Pennsylvania	13,200.00
Shaw, R. Martin, general counsel, Chgo. Grt. Northern	18,000.00
Sheldon, F. B., vice-president, Toledo & Ohio Cent.	13,880.00
Sheaffer, Charles M., general superintendent transportation, Pennsylvania	12,000.00
Shearer, Henry, general superintendent, Mich. Central	10,000.00
Sheean, James B., general solicitor, C. St. P. M. & O.	15,000.00
Shelton, E. M., assistant to general counsel, C. B. & Q.	13,166.66
Shepard, F. J., vice-president and director, Mo. Pacific, T. & P.	17,330.00
Sheppard, F. L., assistant to vice-president, Pennsylvania	10,200.00
Smart, Edw. M., assistant general counsel, Chgo. & N. W.	15,000.00
Smith, Addison R., third vice-president, L. & Nashville	12,510.00
Smith, Edward C., president, Central Vermont	12,000.00
Smith, F. Sullivan, receiver, vice-president, Pgh., Shmt. & N. W.	12,000.00
Smith, H. F., vice-president, traffic manager, N. C. & St. L.	10,000.00
Smith, L. D., vice-president, Lehigh Valley	14,583.33
Smith, Milton H., president, L. & Nash.	20,639.09
Smith, R. K., vice-president and general manager, Miss. Cen.	10,000.00
Smith, William W., division counsel, B. & O.	15,010.00
Spangler, D. E., general superintendent, N. & W.	10,500.00
Spencer, H. B., vice-president, Southern, Lenoir Car Works, G. S. & F.	19,035.16
Spens, C. E., vice-president, C. B. & Q.	13,999.98
Spock, Benjamin L., general solicitor, N. Y., N. H. & H., N. E. Steamship Co., C. N. E.	10,166.66
Spoor, J. A., chairman of board, Chicago Junction	15,000.00
Stark, B. M. O., general manager, L. & N.	10,000.00
Stephens, J. R., assistant to receiver, Missouri Pac.	12,000.00
Stevens, F. W., general counsel, N. Y. Central, C. C. C. & St. L., Cin. Northern, Mich. Central, Indiana Harbor, Boston & Albany, Pitts. & L. E., Toledo & O. Cen., Zanesville & W., Lake Erie & W., Rutland	15,000.00
Stevens, H. E., chief engineer, Nor. Pacific	10,000.00
Stevens, J. P., general manager, C. & O., F. & J. Bdge. Co., C. & C. E. R. & T. & B. Co. Nflk. & Pcts. B Line	11,100.00
Stickney, S. C., assistant to vice-president, Erie	15,000.00
Sinson, Charles H., freight traffic manager, Wabash	10,000.00
Stockton, Ed. A., deputy comptroller, Pennsylvania	10,666.55
Stokes, Walter, general counsel, Tenn. Cent	10,000.00
Stone, C. L., passenger traffic manager, Mo. Pac.	10,000.00
Stone, H. L., general counsel, L. & N.	12,000.00
Stotesbury, E. T., chairman of board, Phila. & Read.	10,180.00
Strawn, S. H., general solicitor, C. & A.	17,500.00
Strickland, S. G., general manager, C. & N. W.	15,164.98
Sturgis, C. I., general auditor, C. B. & Q.	15,000.00
Sturr, A. B., assistant to fourth vice-president, Pennsylvania	10,200.00
Sullivan, L. F., comptroller, C. & Ohio, Hocking Valley	11,000.00
Sweeney, J. C., general solicitor N. Y. N. H. & H.	10,166.66
Sweet, A. E., vice-president, D. & R. G.	16,850.00
Sloan, H. M., assistant to president C. R. I. & P., P. & B. V., K. & D. M., Belt of Chicago	12,200.00
Tait, Edwin E., president, director, and general counsel, Pittsburgh & Shawmut, Allegheny River Min. Co.	15,000.00
Taussig, J. E., vice-president, Wabash, Chi. & West. Ind. Belt, Kansas City Ter. & Amer. Refrigerator Transit Co.	17,900.00
Taylor, Jr., Henry, general solicitor, C. & O.	10,800.00
Taylor, Herbert A., general attorney, Erie	10,010.00
Taylor, Louis S., comptroller, The Pullman Co.	18,000.00
Taylor, R. V., vice-president and general manager, Mobile & Ohio, So. in Miss.	17,095.00
Terhun, Nicholas, assistant secretary and assistant treasurer, Great Northern, Paducah & Ill. R. R. Co.	10,000.00
Terry, Cavin & Mills, solicitors, Gulf, Colo., & Santa Fe, S. W. Lbr. Co. of N. J.	15,000.00
Terry, W. A., assistant freight traffic manager, New York Central, Mich. Central, Ptg. & Lake Erie, Toledo & O. Cen.	10,000.00
Thomas, Charles L., freight traffic manager Balto. & Ohio	10,800.00
Tillman, Bradley & Morrow, assistant district attorneys, Louisville & Nashville	10,000.00
Tollerton, Wm. J., general mechanical superintendent, Chicago, Rock Island & Pac.	10,000.00
Tomlinson, J. M., vice-president and comptroller, N. Y., N. H. & H., C. New Eng., New Eng. Steamship Co. New Bed. Marthas Vineyard & Nantucket S. B. Co.	14,070.01

Torrey, Frank V., general superintendent of motive power, Chicago, Burlington & Quincy	12,750.00
Towne, W. J., assistant general manager, C. & N. W.	10,125.00
Trenholm, Arthur W., vice-president and general manager, C. St. P. M. & O.	17,000.00
Trump, Michael, special assistant to general manager, Pennsylvania	10,200.00
Untermyer, S., general counsel, K. C. S.	10,000.00
Upthegrove, D., general solicitor, St. L. S. W.	12,100.00
Utter, H. L., secretary and treasurer, Mo. Pac.	12,000.00
Van Cott, Riter & Farnsworth, attorneys, Denver & Rio Grande	14,193.96
Van Deventer, A. K., treasurer, Southern Pac.	14,250.00
Veazey & Veazey, attorneys, Great Northern	10,000.00
Vredenburgh, Wall & Carey, local counsel, Pennsylvania	10,000.00
Waggener, B. P., general solicitor, Missouri Pacific	12,000.00
Wand, G. S., vice-president and general manager T. & N. O., H. E. & W. T., H. & T. C., D. Nav. Co., H. & S. Co., So. Pac Ter., G. H. & S. A.	10,030.00
Waldo, Frank O., auditor, Mich. Cen., T. H. & B., T. H. & B. Nav.	10,570.95
Walker, Bertrand, general counsel, N. Y. Central, I. H. Belt Co., C. C. & St. L.	12,000.00
Walker, Charles A., treasurer, Del & H.	12,000.00
Walker, W. W., vice-president and general manager, D. S. S. & A., M. R. R. R., Mac. Trans.	15,000.00
Wall, Garrett B., assistant to president, C. & O. Ry., C. & O. of Ind., C. & O. N., H. Val.	10,840.00
Wallis, James T., general superintendent motive power, Pennsylvania	12,000.00
Walter, Claude, general counsel, N. C. & St. L.	11,700.00
Walters, Frank, general manager, C. & N.	10,124.99
Walters, Henry, chairman board of directors, L. & N.	15,778.37
Wann, Fred A., general traffic manager, L. A. & S. L.	10,000.00
Watts, Legh R., consulting counsel, S. A. Line	10,000.00
Webb, William A., vice-president and C. O. O., M. K. & T. Lines	18,000.00
Webster, James, freight traffic manager, N. Y. C. Lines, N. Y. C. West. Mich. C., P. & L. E., T. & O. Cen.	10,833.33
Wells, May & Sanders, attorneys, Ill. C. Y. & M. V.	15,449.88
Wells, A. G., general manager, A. T. & S. F.	18,750.00
West, J. L., freight traffic manager M. K. & T.	10,000.00
West, Samuel H., general attorney, N. Y. C.	12,020.00
Whaley, A. R., pensioner, N. Y. N. H. & H., Cen. N. E. Ry.	13,936.66
Wheeler, Herbert, general manager, P. & A. R. & N., B. C. Y., B. V. Nav. Co., A. Y. Nav. Co.	10,000.00
Wheeler, Wm. G., general solicitor, C. & M. W.	15,000.00
Whitaker, Frank M., vice-president, C. & O., C. & O. of Ind., C. & O. N., H. Val. Ry., L. & J. B. Co., C. & O. N.	13,280.00
White, Edw. J., vice-president and general superintendent, Mo. Pac	16,790.00
White, R. A., general auditor, N. Y. Cen., M. C. R. R., C. C. C. & St. L., Rutland, P. & L. E., L. E. & W., T. & O. C., I. H. B	15,000.00
White, Wm. H., president and director, R. F. & P.	12,200.00
Whitehead, Chas. N., vice-president and assistant to receiver, M. K. & T.	19,500.00
Whiten, E. T., assistant general manager, Pa. Lines	10,650.00
Whiting, F. V., general counsel and attorney, N. Y. C. Lines, M. C., C. C. C. & St. La., T. & O. Cen.	11,500.00
Wickersham, Charles A., president and general manager, W. Ry. of Ala., A. & W. P., At. Ter., Ga. R. R.	12,230.00
Wickham, H. T., vice-president and general comptroller, C. & O.	15,000.00
Wight, Charles S., general freight representative, B. & O.	15,000.00
Wight, Pearl, company receiver, T. & Pac.	18,000.00
Wight, Sidney B., general purchasing agent, N. Y. C.	15,000.00
Wilbur, Rollin H., vice-president and general manager, L. & N. England	11,570.00
Wilcox, Nelson J., attorney, C. M. & St. P.	10,000.00
Williams, William H., chairman board of directors, Wabash	16,240.00
Wilson, Dabney & King, general attorney, Int. & G. No.	16,000.00
Wilson & Rector, solicitors, Hocking Val.	11,499.99
Wilson, Wm. H., assistant first vice-president, No Pac.	10,000.00
Wood, Benjamin T., assistant to president, St. L. San Fran.	10,000.00
Wood, Fred H., general attorney, So. Pac.	15,750.00
Wood, William B., general manager, G. R. & Ind.	10,000.00
Worthington, B. A., president, Cin. Ind. & W.	15,000.00
Worthington, W. A., vice-president and assistant to chairman, So. Pac., La. West.	13,520.00
Wright, C. C., general solicitor, C. & N. W. Ry.	15,000.00
Wright, R. C., traffic manager, Pennsylvania	16,000.00
Yeomans, George G., general purchasing agent, N. Y. N. H. & H., Cen. N. Eng., N. Eng. S. S. Co.	12,000.00
Yohe, James B., general manager, P. & L. Erie	15,000.00
SUPPLEMENTARY LIST	
Carthell, A. B., chief engineer, Boston & Maine	10,000.00
Clark, Henry W., counsel, Union Pacific	15,679.00
Cotton, W. W., counsel, O. W. R. R. & N. Co.	17,400.00
Gage, Foley & Gilbert, attorneys, Southern Pacific	11,100.00
Grace, J. W., superintendent, P. B. & N. E.	10,123.63
Guir, W. T., general traffic manager, Lehigh Valley	12,005.00
Hart, P. C., general manager, C. M. & St. P.	12,000.00
Hess, J. L., president, F. J. & G.	10,000.00
Jones & Miller, attorneys, Chicago & Alton	10,000.00
Long, S. C., general manager, Pennsylvania	16,000.00
Lupfer, Alexander M., chief engineer, S. P. & S.	12,400.00
Morse, W. E., vice-president and general manager, D. & St. L.	12,000.00
Ringling, John, president O. N. M. & P.	10,000.00
Scandrett, H. A., assistant director of traffic, U. P.	15,000.00
Sloan, H. M., assistant to president, C. R. I. & P., P. & B. V. K. & D. M. Belt Ry.	12,200.00
Smith, Rufus B., receiver, C. H. & D.	10,000.00
Starr, A. B., special assistant and vice-president, Pa. West.	10,200.00
Stetson, F. L., general counsel, Sou.	15,000.00
Toller, Hogsett, Ginn & Morely, counsel, B. & O.	10,000.00
Wildin, G. W., general manager, N. Y. N. H. & H.	11,249.99
Zimmerman, F., vice-president, C. I. & L., K. & I. Term.	10,033.96

"THIS SAFETY STUFF is all a joke," a car man said one day; he didn't put his blue flag up—*now* he has passed away.—*Fred Meyers.*

Report on Butting Collision at Trussville, Alabama

THE INTERSTATE COMMERCE COMMISSION has issued a report dated April 22, and signed by W. P. Borland, Chief of the Bureau of Safety, on the butting collision of freight trains near Trussville, Alabama, on the Alabama Great Southern, on Feb. 15, 1920, in which five employees were killed, including the enginemen of both trains. The trains had an order to meet at Trussville and the engineman of the northbound train ran past the meeting point; and he also passed an automatic block signal set against him. The conductor of this train is held at fault for failing to take prompt measures to stop his train when he saw the southbound was not on the side track, and his flagman is censured for not informing the conductor on this point as soon as he saw the situation.

The engineman at fault had been a runner for ten years, with a good record; but he evidently had had no sleep for about twenty-six hours. The collision occurred about 9:40 P. M. The engineman had been on duty all night the night before and had not been to his home during the day. It is the conclusion of the inspector that he was asleep at the time of the collision.

The train despatcher is censured for issuing a meeting order on form 19; if he had used form 31, requiring the train to be stopped for the signature of the conductor, the engineman and the other men on the engine might have been more thoroughly impressed with the fact that a meeting point had been established. The despatcher said that disregard of the rule requiring the use of form 31 to restrict the rights of a train was common. This, says the report, indicates lax supervision, which requires prompt corrective measures at the hands of the operating officers of the road.

Mr. Borland again recommends the use of automatic train stops.

Photograph from Wide World Photos

Car Being Loaded on Freighter at Seattle for Use on the New Alaskan Railway

A Unit Construction Method for Engine Houses

The Pennsylvania Develops Three Standard Designs With Resultant Economies in Supervision

EARLY IN 1918 it became necessary for the Pennsylvania Railroad to enter into an extensive program for the reconstruction of its engine terminals at many points along its lines. Accordingly, designs were developed by the engineering department of the road for three types of house, *i. e.*, Type 68, Type 60 and Type 48, in which the type is indicative of the number of stalls in a complete circle.

Generally speaking, the houses are similar. All were designed with six circular bays of 20 ft. each, giving a total length of stalls of 120 ft., the design in each case being predicated on the use of pre-cast reinforced concrete columns, girders, purlins, and other members required in the construction of the frames of enginehouses. Each type of house was planned for use in connection with 110-ft. turntables and in each type the distance between columns in the inner walls is 13 ft. The angle between adjacent tracks in Type 48 is 7 deg. 30 min.; in Type 60, 6 deg., and in Type 68, 5 deg. 17 min. 38 sec. The distance from the center of the table to the inner circle wall in Type 48 is 90 ft. 4⅝ in.; in Type 60, 124 ft. 2⅜ in., and in Type 68, 140 ft. 9 in. The variations in the central angles are, of course, reflected in corresponding variations in the roof girders of the various types and in the outer circle wall, the distance between the outer columns in Type 68 being 24 ft. 1 in., increasing to 25 ft. 6¾ in. in Type 60 and to 28 ft. 8⅜ in. in Type 48.

As a part of the reconstruction plan, enginehouses of the new type were erected at West Philadelphia, Pa., Marcus Hook and Pitcairn, and Gardenville, N. Y. Of these possibly the one at Pitcairn is the most interesting because of the local conditions under which the construction was carried out. At this point the plans provided for the replacement, on the same site, of an old 44-stall house of frame-and-brick construction with concrete engine pits and a 100-ft. turntable, with a Type 68 enginehouse of which 34 stalls, all of unit construction, were to be erected for which the pre-cast frame members were to be secured from the company's concrete molding plant at Morrisville, N. J. This plan was not carried out in full. Instead, 8 stalls only were constructed of pre-cast members, while 14 stalls were poured in place and 12 stalls remain uncompleted. The drawings show the standard girders, column and roof beams for a standard 68-stall house together with an erection diagram. The method followed in placing the pre-cast members in the eight stalls will appear in the sequence of this article.

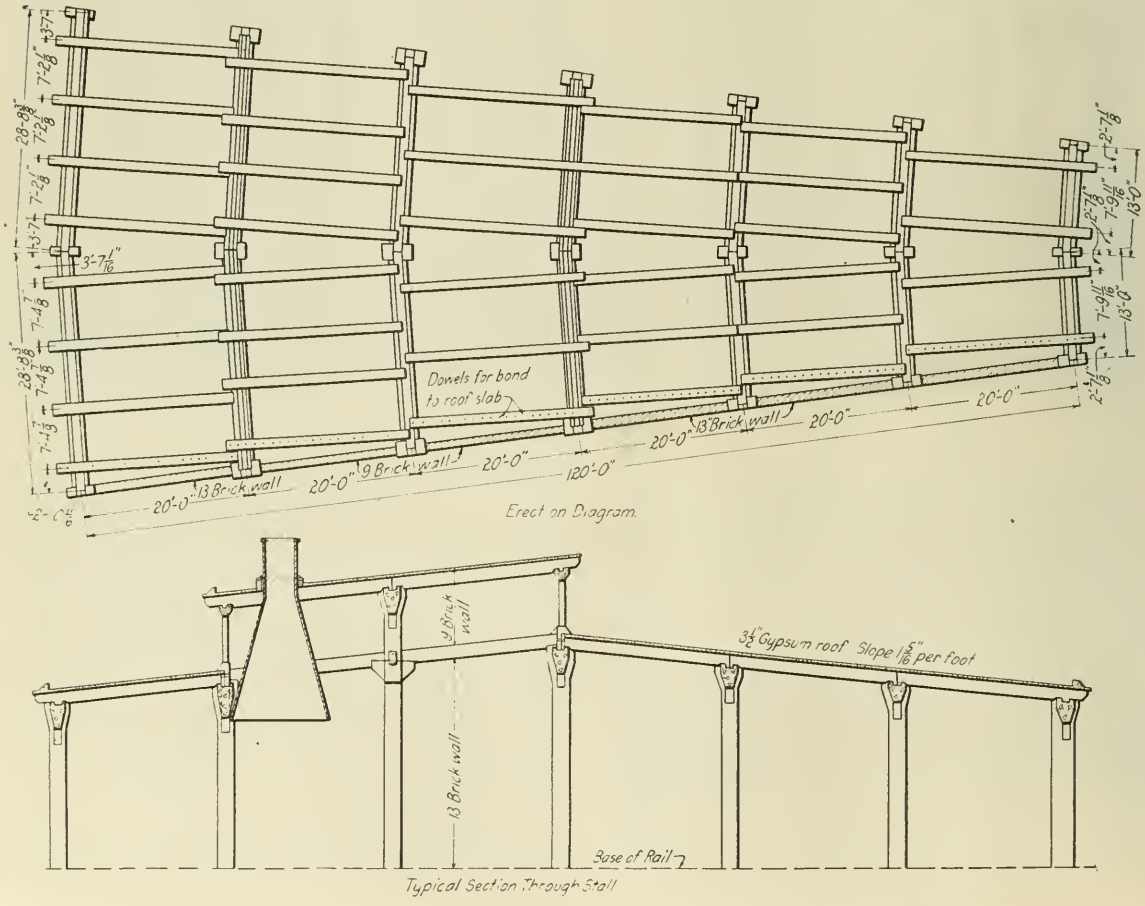
The Pitcairn House

The stress of business at Pitcairn precluded any curtailment in the capacity for handling locomotives and the construction plan was worked out accordingly. Three temporary pits with capacities for three locomotives each were fitted up under cover of an old storehouse before tearing away any portion of the old enginehouse. The wrecking of the old house was then done in sections and the erection of the new house proceeded in the same manner. By shifting the approach tracks to clear the new work and installing a temporary 100-ft. table in the pit prepared for the reception of the new 110-ft. turntable and providing a section of track connecting the old and the temporary tables, it was possible to go ahead with the wrecking of the old house and the new construction, placing the new sections in service as completed and at the same time maintaining continued use of the unwrecked portions of the old building.

The site of the improvement is in the old bed of Turtle Creek on made ground consisting of eight feet of cinder fill. The new foundations were carried down to the gravel and clay underlying the cinders, the old fill being loaded into standard-gage dump cars by a clam-shell. The removal of the old reinforced-concrete engine pits complicated the making of the excavation for the new house, it being necessary to resort to blasting, using small charges of dynamite shot under a mattress. The holes in the concrete were prepared

First Stage—The Columns in Place

Second Stage—The Girders in Place on the Columns



Typical Erection Plans for Two Stalls

by air drills and after the shooting acetylene torches were used to cut the reinforcing bars. A derrick, a steam shovel and a locomotive crane were used for loading the broken concrete into cars.

The construction of the new house was begun in the 8-stall section built in accordance with the unit-construction plan. To permit of this work nine stalls of the old house were wrecked and the concrete in the foundations and engine pits for the new structure was placed by means of a distributing tower. As the pits were completed the track rails were applied, thus providing the means for running in the locomotive cranes by which the pre-cast members were placed. In the 14-stall section, in which the members were cast in place, the tower mentioned above was also utilized for spouting the concrete to place.

Details of Design Modified After First Houses Were Constructed

The pre-cast portions of the Pitcairn house and the others mentioned were built in accordance with the original designs. During the erection of these houses certain modifications in the details of design presented themselves as desirable and have since been made.

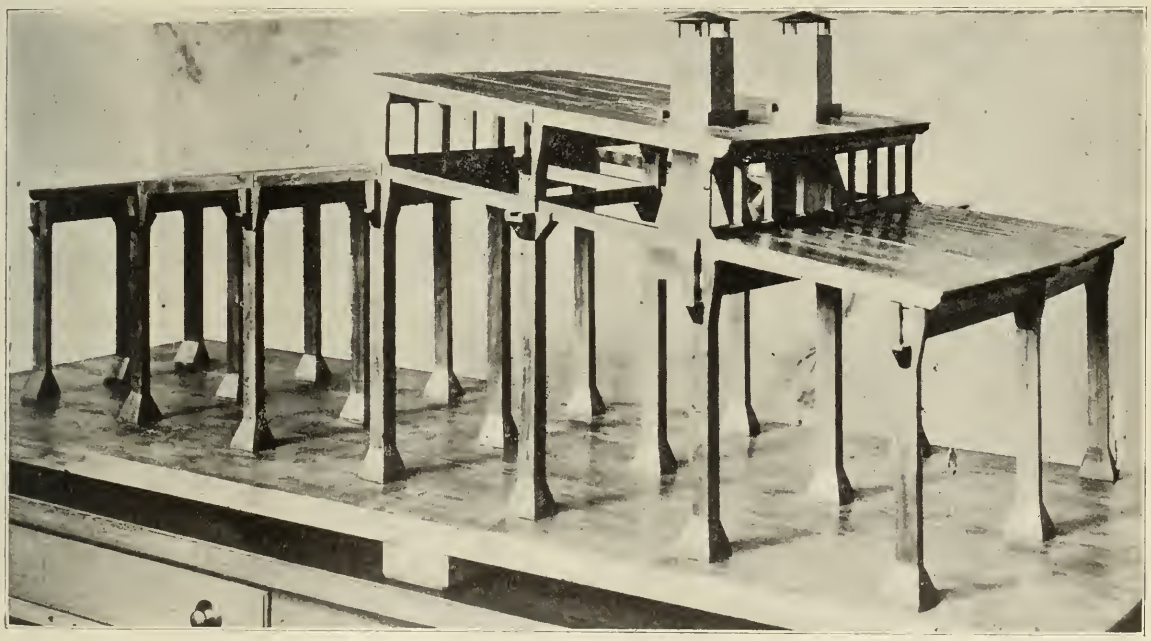
In the original designs the column lengths were varied slightly with the type and the cross-sections of similar girders varied slightly with their length. Later the plans were revised so that the same column will fit in either type of house and similar girders are of the same cross-section for all the houses. By these changes important economies in forms were effected.

Again, in the first houses, the roof slabs were cast as a unit with the roof beams. These proved to be unsatisfactory from a transportation viewpoint and for handling in the yard and at the site of the house because of their extreme size and weight. These have therefore been superseded by pre-cast roof beams supporting a poured-in-place slab of reinforced concrete or gypsum. Also the practice of pre-casting the window frames proved to be expensive and it is proposed to vary the design by doing away with the frames by carrying the columns up to the monitor roof as shown in the drawing.

One of the photographs shows a model of two stalls built to scale and in accordance with the original design, including the columns, girders, struts, roof slabs cast as a unit with the roof beams, window frames and the timber smoke jacks. As will be noted the changes mentioned above deal with details and in no way affect the general design.

In all types the peak of the roof is at the center of the house with the monitors placed over Columns 4, 5 and 6 and sloping toward the rear of the house. In the houses built with the pre-cast roof slabs constant smoke removal was obtained through the monitors by 3-in. by 8-in. vents which are permanently open, and by 2-in. by 3-in. slots through the ends of all slabs where pockets could be formed. As revised, the roofs present no pockets for the accumulation of smoke and gases. Regulated ventilation is secured through hinged sashes provided in the rear walls and in the monitors.

Fig. 2 shows the columns of the model ready for the reception of the girders which are shown in place in Fig. 3. The columns are cast with recesses in their bases for receiving 11½-in. square dowels, which are upset 3 in. from the general level of the column footings and with recesses and brackets at the top to receive the girders. The inequalities in angularity between girders in the various types occasioned by the variations in the angle at the center are compensated for by the fit of the girders in the column recesses. In all cases the joint is made a fit by filling in with mortar after the girders have been placed.



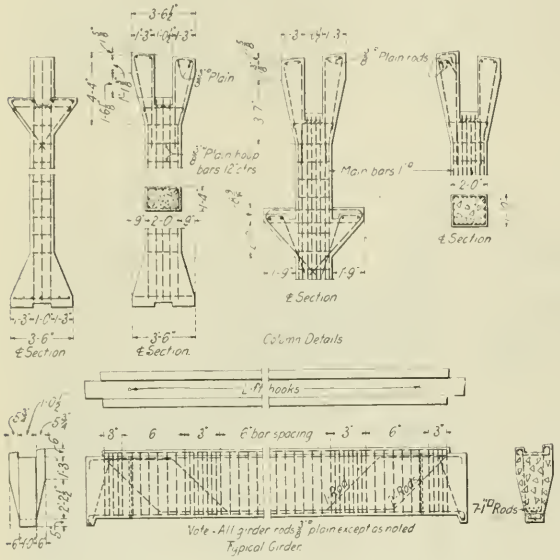
Third Stage—The Stall Complete

In erecting the frame the columns are set in place over the upset provided in the footings, locomotive cranes being generally used for the purpose. The erection of columns is simplified by the fact that the column bases are so proportioned that after once being set in place the columns are stable, and no guying is required. Once placed, the bases may be concreted in or not as desired. With the columns in place the erection of the other members follow in sequence. Where a turntable is available the locomotive cranes used in placing the pre-cast members are run in over the pit tracks,

which are installed as the pits are completed in advance of erection. In the absence of a turntable, circumferential tracks may be used for the cranes during the erection of the frame.

Mass concrete is used in the foundations and engine pits of these houses. The engine pits are 104 ft. long and 4 ft. wide. The pit side walls are 2 ft. 7 in. thick and are capped by 8 in. by 8 in. by 16 in. white oak timber rail seats which overhang the pit 3 in., giving protection to the heating pipes in the pits. The ties are spaced 18 in. on centers and the 130-lb. rails are spiked to them without the use of tie plates. The bottoms of the pits are 9 in. thick, crowned in the center with the high and low ends 2 ft. 11 in. and 3 ft. 6 in., respectively, below the level of the floor, providing a 7-in. drop in the length of the pit for drainage toward the inner circle wall where a drainage pipe is provided, extending all around the house.

The floors consist of creosoted wood blocks for the wearing surface on a 1-in. sand cushion and a 4-in. concrete



Details of the Columns and Girders

sub-floor on 8 in. of cinders. The doors in the inner circle walls are of the wooden roller type. The outer circle walls are of brick with steel sash. Slag roofing on concrete or gypsum slabs constitute the roofs.

While it is desirable to build these houses with pre-cast members the frames may be poured in place. At Pitcairn both methods were followed and at this point the forms for the poured-in-place stalls were built on the job. For the Gardenville house the forms were shipped in from the Altoona (Pa.) shops.

The plans for the standard houses were developed under the direction of A. C. Shand, chief engineer of the Pennsylvania, and H. R. Leonard, engineer of bridges and buildings, by Robert Farnham, assistant engineer of bridges and buildings, Philadelphia, Pa., to whom we are indebted for the information contained herein.

THE RAILROADS OF THE SOUTH, and of every other section, are entitled to rates which, with competent, economical management, will enable them to pay fair wages and make fair returns. That is simple justice and sound policy, and in administering justice the Interstate Commerce Commission should also remember to act promptly.—*St. Louis Post-Dispatch.*

Train Accidents in February*

THE FOLLOWING is a list of the most notable train accidents that occurred on the railways of the United States in the month of February, 1920:

COLLISIONS

Date	Road	Place	Kind of accident	Kind of train	Killed	Injured
5	Penn	Frankford	xc	P. & F.	0	14
8	Texas & Pacific	Ranger	xc	P.	1	16
15	Alabama G. S.	Trussville	bc	F. & F.	5	2
16	Mo., Kan. & Tex.	Muskogee	rc	P & F	1	0
18	{V. S. & P. / La. & W. W.}	Gibsland, La.	xc	P. & F.	2	18
21	Southern	Charleston, S. C.	bc	P. & P.	0	5

DERAILMENTS

Date	Road	Place	Cause of derailment	Kind of train	Killed	Injured
4	Missouri Pacific	Clayton	Open draw	P.	7	10
7	Seaboard A. L.	Ways	Unx.	P.	0	48
13	Ga. Southern & F.	Lake Butler	Acc. obst.	P.	0	3
13	Louisville & N.	Pleasant View, Ky.	Acc. obst.	P.	1	2
18	Danville & W.	Buford, Va.	Loose wheel	P.	1	4
18	Penn	Clarksville	b. tire	P.	0	2

OTHER ACCIDENTS

Date	Road	Place	Cause of accident	Kind of train	Killed	Injured
*10	Mo., Kan. & Tex.	Machens, Mo.	Fire	P.	0	0
*28	New York Central	Kingsville	Fire	P.	0	2

The trains in collision at Frankford Junction, Pa., on the fifth of February, were an eastbound passenger consisting of a locomotive and ten cars and a freight which was switching across the main track. The passenger train was running at about 50 miles an hour and the engine and first five cars were knocked off the track. Three freight cars were wrecked. The collision was due to misreading the distant signal. Thirteen passengers and one trainman were injured, none of the injuries being classed as serious.

The train involved in the accident near Ranger, Tex., on the morning of the 8th, about 1 o'clock, was eastbound passenger No. 12. By the malicious misplacement of a switch immediately in front of the locomotive the train was turned into a side track and collided with freight cars standing there. Two freight cars were wrecked, and the baggage car and one coach were ditched. One trespasser was killed and three trainmen, ten passengers and three other persons were injured.

The trains in collision near Trussville, Ala., on the night of the 15th, were northbound freight No. 52 and southbound freight extra No. 6587. Both engines and ten cars were wrecked and many other cars were damaged. Both enginemen and both firemen were killed or fatally injured and a brakeman was fatally scalded, and two employees were injured. The collision was due to forgetfulness on the part of the engineman of No. 52, who overlooked an order to meet the other train at Trussville.

Trains in the collision near Muskogee, Oklahoma, on the 16th, were a southbound passenger and a preceding freight. The freight had been brought to a stop because of striking a section motor car and was run into at the rear by the passenger train. The locomotive, caboose and six freight cars were wrecked. There was a light fog at the time and the view was obstructed by steam from an oil refinery which was hanging in low dense clouds. The flagman of the freight train was back 4,000 ft. and the passenger train was flagged by three different men, but none of the flags were seen by the engineman of the passenger train. The engineman was killed. The fireman jumped off and escaped serious injuries.

The trains involved in the collision at Gibbsland, La., on the 18th were westbound passenger No. 11 of the Vicksburg, Shreveport & Pacific, and southbound mixed train

*Abbreviations and marks used in Accident List: rc, Rear collision——bc, Butting collision——xc, Other collisions——b, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc, obst., Accidental obstruction——malice, Malicious obstruction of track, etc.——boiler, Explosion of locomotive on road——fire, Cars burned while running——P. or Pass., Passenger train——F. or Ft., Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

No. 22 of the Louisiana & Northwest. The collision occurred about 1:35 a. m. on a clear night. The passenger train, moving at good speed, ran into the mixed train on the crossing of the two roads, demolishing one freight car, wrecking the passenger engine and doing much other damage. Two men standing on the station platform at the left of the track were killed, and 15 persons on the platform and three employees were injured. There are no interlocking signals at this crossing and the rule requires all trains to be brought to a stop within 200 ft.; but in this case the passenger train was not stopped. The engineman had been in the service of the road only a year and a half though with a clear record; but he had had several years' experience on other railroads. He had been on duty less than three hours after being off duty two days. The Interstate Commerce Commission's report on this collision says that failure to bring trains to a full stop before passing over crossings has been observed in a number of other cases in that region; and the conclusion is reached that the rule is frequently violated. Evidence as to how the engineman of No. 11, having a bright electric headlight, came to run into the freight train, apparently without seeing it until he was within a few hundred feet of the crossing, is contradictory, and some of it apparently untruthful. So far as can be gathered from the commission's report the only tenable theory is that the engineman had been asleep until quite near the crossing.

The trains in collision near Charleston, S. C., on the 21st. were westbound passenger No. 17 and eastbound passenger No. 16 of the Southern Railway. Both engines were badly damaged and both enginemen and both firemen were injured. The conductor of train 16 was slightly injured.

The train derailed near Clayton, La., on the 4th, was westbound passenger No. 806. Moving at about ten miles an hour it ran into an open draw at the Tensas River and the engine and first two cars fell into the river. The fireman, the express messenger and three passengers were drowned or were killed by the fall and nine persons were injured. The engineman went down with his engine and was injured, but escaped from the cab after it fell into the water. The engineman was held responsible for the derailment, on account of failure to observe signals.

The train derailed near Ways, Ga., on the 17th, was southbound passenger No. 3, running at about 50 miles an hour. Four coaches fell down a bank and 47 passengers and one trainman were injured. The cause was not determined. The injuries were classed as slight.

The train derailed at Lake Butler, Fla., on the 13th, was northbound passenger No. 12. Striking a large tree which had been blown down and lodged on the track at a curve the engine and two cars were overturned. The engineman, fireman and one other employee were injured.

The train derailed at Pleasant View, Ky., on the 13th, was southbound passenger No. 33. The engine, baggage car and one pasenger car were overturned. The engineman was fatally scalded and the fireman and one passenger were slightly injured. The derailment was caused by a piece of iron placed on the track by a child of six years.

The train derailed on the Danville & Western near Buford, Va., on the 18th, was westbound passenger No. 3. The rear car was thrown off the track by the loosening of a wheel and this pulled the rest of the cars and the locomotive with it. The train was running at 20 miles an hour. The conductor was killed and one passenger and three trainmen were injured.

The train derailed on the Pennsylvania Lines at Clarksville, Pa., on the evening of the 18th, was northbound passenger No. 475, drawn by two locomotives. Running at about 45 miles an hour, the whole train except one car at the rear was thrown off the track and three of the four coaches were overturned. The station building was destroyed. One engineman and one fireman were injured, but all other persons on the train escaped with a shaking-up. The derailment is reported as due to breaking of a driving-wheel tire, the broken wheel causing the breaking of a rail.

The train involved in the accident on the Missouri, Kansas & Texas near Machens, Mo., on the night of the tenth, was southbound passenger No. 5. Fire discovered in a baggage car necessitated setting out the car; but this was not accomplished until the fire was beyond control. The car was destroyed together with express matter, mail matter and baggage. Estimated damage to express matter, $15,000. Cause not determined.

The trains involved in the accident on the New York Central at Kingsville, Ohio, on the 28th, were westbound passenger No. 81, and two freight trains. The freights had been in a slight collision, a standing local train being run into at the rear by a through freight. The collision was a slight one, but it resulted in the derailment of a carload of carbide and this car fouled, or nearly fouled, the adjacent main track, on which No. 81 was approaching. The passenger train was flagged and its locomotive came to a stop exactly opposite the derailed car. The carbide apparently became ignited by fire from this locomotive and an explosion and fire resulting destroyed the baggage car of the passenger train and its contents, and the freight house and contents. The engineman and fireman of the passenger train were severely burned.

Canada.—Eight train accidents were noticed prominently in newspapers of Canada as occurring on lines in the Dominion in the month of February. None of these accidents appears to have been attended with fatal results, and five of them were reported as resulting in no injury to persons.

Electric Car Accidents.—On the Illinois Traction line near Springfield, on the 22nd, a butting collision between a passenger train, consisting of two sleeping cars, and a freight train of 13 cars, resulted in the death of one and injury of four persons. Near Cleveland, Ohio, on the same day, a rear collision on the Lake Shore electric road was reported to have injured five. On the 27th there was a derailment on the Hudson & Manhattan in the tunnel beneath Exchange Place station, Jersey City, N. J., injuring five passengers. Trains ran into street cars, injuring considerable numbers of persons, at Birmingham, Ala., Louisville, Ky., and Pottsville, Pa.

Federated American Engineering Societies Organized

A TOTAL OF 134 DELEGATES, representing 66 engineering and other technical organizations, responded to the invitation of the Joint Conference Committee of the four founder societies to meet in Washington, D. C., on June 3 and 4. The result of the two days' deliberations held at the Cosmos Club was the formation of The Federated American Engineering Societies, composed of societies and affiliations and not of individuals. Calvert Townley, of the American Institute of Electrical Engineers, and J. C. Hoyt, of the American Society of Civil Engineers, were elected chairman and secretary, respectively.

This is the culmination of the work started by the Joint Conference Committee, the invitation and the work preparatory to this conference having been carried on by this committee on its own initiative. While the idea of the formation of a large organization with the power and duties necesssary to carry on public-welfare work wherein the engineer was concerned had met with favor wherever it was proposed, the methods proposed in the Joint Conference Committee's report was not so favorably received. Some attention had been given by the committee to the possibilities of reorganizing the present Engineering Council in order that it might

serve as a backbone or nucleus around which the larger organization could be built. However, no movement was started along this line at any time, the first action of the conference after the election of the chairman and secretary being the presentation of the following resolutions:

Resolved, that it is the sense of this convention that an organization be created to further the public welfare wherever technical knowledge and engineering experience are involved, and to consider and act upon matters of common concern to the engineering and allied technical professions.

Resolved, that it is the sense of this convention that the proposed organization should be an organization of societies and affiliations and not of individuals.

The result of this was that the discussion concentrated upon the questions presented therein. This brought forth a variety of opinions. The representatives of the American Association of Engineers, evidently believing that the new organization would possibly interfere with, or in some ways duplicate, their efforts in public welfare work, carefully sounded out the assembly on the question of a society composed of individuals. Outside of this society the question of an organization composed of individuals received but little attention, the chief objection to it being the difficulty attending its promotion. The fact was brought out that practicallly all of the active members of the local and national societies were members of two or more organizations and that as such was the case there would be great difficulty in securing a membership large enough to promote and carry on the desired work.

With the sentiment in favor of an organization composed of societies and affiliations, the American Association of Engineers yielded its point and, joining with the rest, made the vote unanimous. With the passing of the resolution, committees were appointed on constitution and by-laws, program, credentials and resolutions. The tentative program was ratified and the remainder of the first day's session was devoted to addresses by various engineers on subjects of interest and value to the engineers.

The second day's session was opened with the report of the Committee on Constitution and By-Laws. The constitution, as presented, was finally adopted with a few minor changes and one addition, a publicity clause insuring the maximum co-operation with the press. In brief, the constitution provides for an organization to be composed of national, local, state and regional engineering and allied technical organizations. The management will be vested in a body known as the American Engineering Council and an executive board composed of 30 members of the council, including the president, the four vice-presidents and the treasurer of the council. Representation on the council will be on a basis of one member for the first 100 to 1,000 members of a society and one for every additional 1,000 or major portion thereof up to a maximum of 20. This brought forth considerable discussion, the local societies claiming that the nationals would be too greatly represented. While this is in some measure true, it was shown that the affairs of the two were so closely allied and the memberships of the two were so closely interwoven that in reality it would make but slight difference. Members of the executive board will be elected by districts, the proportion being the same as on the council.

Funds for the financing of the new organization will be provided by contributions from each member-society equal to $1.50 per member for the national and $1 per person for the local, state and regional organizations. Several local societies objected to this on the basis that a large part of their membership consisted of non-voting members paying small dues and that the tax would be out of proportion.

Under the circumstances the constitution was interpreted to read that as each organization must submit its constitution and by-laws to the executive board before becoming a member, it could at that time submit a statement showing the number of voting members or members upon which it wished its representation based. The board would then be in a position to judge fairly and to decide in each case what would be equitable.

Provision was made for co-operation with and the encouraging of local, state and regional organizations in the formation of affiliations for the purpose of considering public welfare matters. In inserting a publicity clause, a provision was made for the formation of a publicity committee and in order to further their work all meetings, except executive sessions of the board, were to be open meetings, and the books and minutes of the organization were to be open for transcription at any time.

The constitution and by-laws were adopted by the conference by a unanimous vote of all voting, although several societies refrained from casting a vote, even though it was understood by all present that any decision made by a delegate was not binding upon his society. The largest organization not voting was the American Association of Engineers, whose representatives refrained from voting on the basis that as they disagreed with certain sections of the constitution they did not feel at liberty to ratify it. They did wish, however, to assure the conference of their sincere intention to co-operate to the best of their ability and along such lines as the Federated American Engineering Societies would formulate, leaving the question of ratification to a vote of the association itself.

The only delegation present with full power to accept or refuse any action of the conference was that of the American Society of Mechanical Engineers, who ratified the constitution in the name of that society. They further stated that the society was ready to enter the federated societies at any or such time as the latter found convenient to handle such work.

From the San Francisco Chronicle

"Three Strikes and Out"

Train Operation By Signal Indication*

Train Orders vs. Signal Indication; Single-Track Operation Without Written Train Orders

By Henry M. Sperry, M. Am. Soc. C. E.

In Two Parts—Part II

THE FIRST PART of this article contained a condensed description of our two principal methods of directing train operation: (a) the time interval method (clocks, time tables and train orders, with the flagman as a necessary adjunct) and (b) the space interval method or block system (an absolute interval of space between trains); this as a preliminary to the study of the problem of train operation by signal indication. On double-track roads this problem was never a serious one, except as it has been complicated by attempts to operate the system with incomplete facilities, as, for example, allowing second-class trains to clear superior trains at sidings midway between block stations. On single-track roads progress in the solution of the problem has been slow.

This second part will describe in some detail the actual work of the train despatcher under the two methods.

Under the first and time-honored method, the train despatcher's whole day, so far as it manifests itself outwardly, is devoted to the preparation of written orders, getting them delivered to conductors and enginemen and making for himself a satisfactory record that each act has been completed infallibly.

Bad Company for a Train Order

Under the second method of direction by signal indication, the despatcher is relieved of his chief burden, that of avoiding "small errors which produce great horrors," and the whole business of train operation is *simplified, accelerated* and made *safer*. These commonplace terms are so familiar that we become careless of their significance, but each one of them signifies, in itself, an element of importance on every busy railroad; for the despatcher's office is the nerve center of the whole money-earning machine, and its smooth and unobstructed action should never be regarded as of minor importance. That it should function perfectly at all times is as important in its field as that the general manager's brain should always be alert to every act and every neglect of his dozen subordinate officers. The despatcher's work should be *simplified* in every possible detail and to the last degree, so as to reduce internal friction—if I may borrow a mechanical term. Everything possible should be done to enable him to make every move in the least possible *time*, because losses of minutes at his desk may and often do result in losses of dollars out on the road. The prime duty of making train movement *safer* goes without saying. This essay is addressed mainly to the question of economy; but, fortunately, the pursuit of economical financial results and of greater security to the lives and limbs of passengers and employees can be treated as a single pursuit. There is no incompatibility and there should be no division of purpose.

*The first part was published in the issue of June 4.

Train Orders vs. Signal Indications

Train orders are written instructions that must be delivered to the conductor and engineman of the train. They must be correctly prepared, transmitted, delivered and understood. *They must not be forgotten.* On railroads *not* equipped with controlled manual or automatic block systems, safety of operation depends entirely upon the human element, for there is no check, either electrical or mechanical, to prevent an improper train movement should an error occur in the preparation of the order or should the order be misunderstood or forgotten.

Signal indications are instructions given by the aspects of fixed roadside signals. The subject is here dealt with as it relates to railroads equipped with the controlled manual or the automatic block signal system. Instructions given by signal indications require less effort in preparation and transmittal than do written instructions. *They are delivered to the engineman through the medium of the signal.* The language of the signal is easy to understand and difficult to forget.

Because the aspects are few in number, there is little opportunity for misunderstanding. Of more importance, the instructions conveyed by the signal are given at the point where they are to be executed, and no lapse of time in which to forget them is possible.

Safety of operation under signal indications does not depend entirely upon the human element as in the time interval method.

Comparison of the Two Methods

Psychologists tell us that the strength of a mental impression is greatest at the time it is received and grows weaker with the lapse of time. In the train order method, especially with the more important class of orders, the necessary lapse of time between the receipt and the execution of the order is an element of weakness.

For example, take a train order of Form A, reading: "No. 1 meet No. 2 at B." This order, as is often the case, may be for execution at a siding many miles distant. At the time that the train is to execute the order the engineman's mental impression of the order should be strong and clear. Because of the lapse of time—perhaps an hour or more—and the multitude of subsequent impressions, the train order impression is too often weak and blurred. This point has been well brought out in a recent article by George Bradshaw, supervisor of safety of the Pere Marquette Railroad, in which he exhorts enginemen to take care not to confuse their mental impression of an important train order with other impressions

not relating to it. He presents a picture which is a striking illustration of what may flash through the mind of an engineman during the lapse of time incident to the train order method.

The train order calls for deferred action; the signal indication calls for immediate action. The movement required by a train order is seldom made upon receipt of the order The signal indication is a "do-it-now" order.

Train operation by the train order method requires the delivery of the order to the train. If the train is in motion it must slacken speed or stop to receive the train order. The signal indication method, on the contrary, does not require the train either to slacken speed or to stop.

The train order method, when it thus retards the movement of trains, causes loss of time to cars, engines and men. Furthermore, it unnecessarily obstructs the particular sections of track occupied by the delayed trains, and it requires the consumption of additional fuel to regain the normal speed. The train order method therefore reduces the railroad's output of transportation, and increases train costs. To produce and sell transportation a railroad must keep its trains moving; hence any method that unnecessarily retards or stops the movement of trains tends to destroy production.

American Railway Association's Rules for Train Operation by Signal Indication

Without the block system the train order method, as usually operated, is a means both of safety and convenience (convenience with important drawbacks, which are customarily regarded as necessary evils). As soon as regular trains are much behind time they must be moved regardless of the time table. This necessitates the use of despatchers' orders to keep the trains out of each other's way—to give them the right to the road. This is a safety function. But with block signals the trains, without dependence on the despatcher, are prevented from running into one another. The despatcher's function is not so distinctively an element of safety, but his orders continue to be necessary as a convenience, for as long as passenger trains are superior to freight trains, delayed passenger trains will cause delays to freight trains, and delayed freights will delay still other freights. It is the despatcher who must reduce or prevent these delays. If trains were all of the same class, and the absolute block system were universal, there would be no need of the despatcher for safety and very little need for convenience.

When we speak of train operation by signal indication we mean the use of fixed roadside signals not only as (1) the means of preventing a train from colliding with the preceding train or as (2) a means of indicating to a train which of two or more diverging routes it shall take, but also, in addition to either or both of these, as a means (3) of indicating, at the will of the despatcher, under certain circumstances, whether or not a train shall actually make every move which the signals, if not controlled by the despatcher, would permit it to make.

For example, an automatic block signal indicates to an approaching freight train that it may proceed from B to C. The road is clear. But the despatcher desires to have the train enter a side track half way between B and C for the purpose of allowing a passenger train to pass and run ahead of the freight. To carry out his purpose he causes the automatic block signal to give a modified indication. He uses the signal where under former methods he would use the time-consuming process of a written order conveyed by wire to a station operator.

Train operation by signal indication is not new. As early as 1903 the subject was under consideration by a committee of the American Railway Association. The problem at that time was stated as follows:

"The term 'operation without train orders' is, of course, something of a misnomer. The system contemplates rather a change in the manner of delivering orders, the method of working under them, and the relief of the engine and train crews from the frequent necessity of performing more or less complicated arithmetical problems in order to determine exactly what their orders are. With a train scheduled at a certain time for every station on a division and with an order requiring it to run one hour and 30 minutes late from a certain point, the possibilities of error in the calculation of time are large. The fact also that freight trains are required to keep out of the way of trains of a superior class running in the same direction involves either undesirable delays in waiting at passing stations or the taking of long chances in getting to the next passing point. . . .

"The plan in brief is, on double track, to allow all trains to proceed under a block signal showing clear, without regard to any train of superior class that may be following. The rule on the time table covering this point is: 'The right of any train to proceed will be indicated by the position of the train order or block signal. A clear signal will give to any train for which it is displayed the right to proceed in advance of first-class trains without train orders.' The control of the train is thus vested in the despatcher. The conductor, while he is not relieved of responsibility and is required to keep himself informed as to trains of superior class, is, nevertheless, relieved of the necessity of guessing whether he has time to make a certain passing point or of asking of the despatcher permission to do so. There is, therefore, a simplification of the work of despatching, and the conductor has only to push his train along until warned by a signal against him of the necessity of making for a siding."

The American Railway Association, by the adoption in October, 1903, of Rules D-251, D-254, officially recognized train operation by signal indication on double track. The title of the rules is:

"Governing the movement of trains with the current of traffic on double track by means of block signals."

In April, 1904, Rules D-261-D-264 were added for the movement of trains *against* the current of traffic on double track by means of block signals.

Train Operation by Signal Indication on the Burlington Road

The Chicago, Burlington & Quincy Railroad, as early as 1900, began operating trains on double track between Chicago and Burlington "with the current of traffic by block signals" and without written train orders. The rules were few and simple. After several years' trial the net results were summed up as follows:

"A large saving in the time of getting trains over the road, due to the absence of any necessity for waiting for a train of superior class which may or may not be on time; a simplification in train despatching, owing to the lack of a necessity on the part of the conductor to state that he has time to make one station farther on and to secure the despatcher's order to proceed; and a measure of safety due to getting rid of the mathematical and chronological computation above referred to.

"It was formerly required on the Burlington that freight trains should keep out of the time of the fast mail by an interval of 10 minutes; of the time of an ordinary passenger train by an interval of five minutes. Of this responsibility the conductor of the freight is now relieved. On a busy section, as between Chicago and Mendota (83 miles), it is estimated that there is a saving of one-third in delays to trains."

The late F. C. Rice, general inspector of transportation of the Chicago, Burlington & Quincy, the man mainly responsible for the introduction of this method of moving trains, said in 1911: "Our scheme of running trains on double track by block signals has fulfilled our most sanguine expec-

tations. It has saved our company a great many dollars, I am sure, over the delayful practices of train rules and train despatching. We have not had an accident of any sort resulting from the change in practice—not a life lost nor a person injured."

Economic Value of Train Operation by Signal Indication

On *double track* it is now the general practice to run extra trains without train orders. Many roads are also using a distinctive form of signal at non-interlocking switches for directing trains to "hold main" or "take siding." A most notable step in this direction was made by the Erie Railroad on the Susquehanna division in 1910 by the use at non-interlocked switches of signals giving the three indications, "hold main," "take siding," or "stop." [11]

J. J. Turner[12] in his book on "The Telegraph as Applied to Train Movement" as early as 1885, set forth the advantages of train operation by signal indication on *single track*. Mr. Turner quotes an article by E. W. McKenna[13] on "A New Theory of Train Movement," from which the following is taken:

"Assume a blocked section of single-track railroad 25 miles in length after the following method: The passing sidings are five miles apart and arranged on either side of the main track and joining the main track in front of a signal station, the double track rule 'keep to the right' to apply in the use of these sidings. The junctions of the sidings with the main track should overlap,[14] that is, run by each other, so that trains from both sidings can move into the main track simultaneously.

"The four switches of the passing sidings to be controlled by the operator in the signal station are operated by the electro-hydro-pneumatic process, by which switches can be set at any distance from the point where the power is applied. This station may be on a crooked piece of line and the switches at the remote ends of the sidings not in the vision of the operator. Hence that he may know, first, the position of the switches at every movement back and forth, the switches will telegraph him their position; and second, to prevent him from throwing the switch under a moving train, the train itself by action of a track circuit will lock the switch in the position it is in when the first contact of the train closes the circuit, and keep it locked until the train has cleared the switch.[15]

"The procedure will then be as follows: In the block section there will be five blocks averaging five miles each in length. At one of the termini will be located the despatcher. Priority in rights of trains of a superior over an inferior class, as well as all questions connected with the movements, will rest absolutely in the hands of the train despatcher.

"A train approaching a signal station from either direction when one mile distant will announce itself by closing a circuit and setting an indicator. Upon this the operator will report to the train despatcher, 'train from east.' If the train from the west is to be passed the despatcher will respond 'side track,' and the operator will signify his understanding by repeating the same word and will set the switch leading into the passing siding.

"To place the matter more fully in the hands of the man who does the thinking for all these train-runners and to protect him against the possible mistakes of his operators in displaying the wrong signal, it is proposed to lock the main clearing signals at danger, by electricity, under the control of the despatcher, so that an operator cannot clear a train even when instructed to do so until the train despatcher opens the circuit that locks the signal.

"What advantages follow this? First, the elimination of the danger of accident connected with the present system. The factors that produce disaster in the handling of train orders have been discussed. They are the despatcher, the operator, the conductor and the engineer; any one of these four can produce an accident. By eliminating any one or more of these factors you make the responsibility concrete, for an individual responsibility fills its office better than a divided one.

"Accidents have been known where a conductor in doubt as to a point sits in his caboose and depends on 'Jim' in the engine to understand it. Jim is befogged on the same question, but depends on 'Bill' in the caboose, and the result of this division of responsibility is disaster.

"Under the theory discussed, the thinking is all done by

one man, the responsibility all rests upon one man, and he has under his absolute control all the appliances for carrying out the system and has only in a small degree to depend upon the intelligence and assistance of the operators and trainmen.

"The next proposition is the economies accomplished by saving of delays to trains. Upon this 25 miles of track assume that 100 trains pass daily; it is not an extravagant calculation to assume that 100 orders are issued daily. A delay of four minutes for the manipulation of each order is equal to 400 minutes, or 6 hours and 40 minutes a day. In this time a train moving at the rate of 20 miles an hour will travel 133⅓ miles. Multiply this by 365 days and it pro-

[11] See "Train Operation by Signal Indication," for description of the Erie practice. H. M. Sperry, N. Y.

[12] Now vice-president of the Pennsylvania system

[13] Formerly vice-president of the Chicago, Milwaukee & St. Paul.

[14] See article by L. F. Loree, "Lap Sidings on the Cleveland & Pittsburgh," *Railroad Gazette* September 13, 1901.

[15] Outlying switches are now operated electrically by low-voltage switch machines. These machines are for operating switches located at a low distance from the station. They will operate a switch in 35 seconds on 20 volts from a primary or secondary battery.

duces 47,650 train miles, which is certainly an addition to efficient motive power capacity."[16]

Mr. McKenna summed up the value of this method of operating a railroad as follows:

"Its capacity can be increased from 25 to 40 per cent, its train movement simplified and expedited, and a largely increased mileage produced from its motive power, with a reduction of the expenses in the wear and tear of equipment and consumption of fuel entailed by the frequent and unnecessary stoppages of trains, and in addition thereto the safety factor largely increased."

Single Track Operation Without Written Train Orders

A number of isolated installations of automatic block signals on short lengths of single track are in use today for

Delivering a "19" Train Order

operating trains by signal indication. As yet there is no such installation in the United States extending over an entire single-track division.

With the notable improvements that have been made in automatic block signaling for single track, the day is close at hand when trains will be "safely moved on single track without train orders and with but few train rules."

The following description of the operation of a single-track road in India by signal indication and without written train orders tends to confirm the above statement:

"Until recently traffic on the East Indian Railway has been handled without any officer corresponding to the American train despatcher, dependence being placed entirely on the station masters or agents using block instruments on single-track lines. It has been found that under this system frequent unnecessary delays to freight trains resulted from the desire of the agents to avoid the necessity of explaining delays to passenger trains.

"In order to relieve this situation a centralized control system has been installed. The movement of trains is placed under the control of an officer called a train controller, who directs the station masters by telephone as to which train may be held and which sent forward. The system differs only slightly from that in use on many double-track lines in England, where controllers or despatchers direct block operators as to the movements of trains. On the Indian railways the station masters direct the signalmen as to the throwing of switches and setting of signals.

"On the single-track line between Allahabad and Tundla, a distance of 262.5 miles, traffic consists of 21 trains each way in 24 hours, freight trains having a length of about 1,500 ft., with a possible load of 850 tons, and the passenger trains consisting in some cases of 12 coaches.

"This section is divided into four control districts, ranging in length from 57 miles to 86 miles, each in charge of a controller throughout the 24 hours, these men working in three shifts of eight hours each. In place of the train sheet in use by American despatchers, these Indian railway controllers make use of a plug board[17] and a graphic sheet or chart. When a train enters the section the controller takes a plug from the board and inserts it in a socket on the diagram corresponding to the terminal station. As it progresses from station to station its arrival and departure are reported by telephone to the controller, who shifts the plug correspondingly. Each plug is marked with the number of the train it represents, and its color indicates the class of the train. A station is not permitted to accept or despatch a train without orders of the controller, but ordinary single-track block operation remains in force. When a train is to be side-tracked the controller instructs the station as to which siding is to be

"Proceed, Regardless of Following Superior Trains"

Instructions Given by Signal Arms; No Paper; No Slackening of Speed

used, and as long as the train remains on that siding its plug on the controller's board is left at that point.

"The permanent record of the movement of trains is made on a chart or printed form, showing the list of stations in a column at the left, and with vertical rulings representing five-minute intervals for a period of eight hours, and a horizontal line opposite each station.[18] Different colored pencils are used for different classes of trains with which lines are

[16]The I. C. C. abstract for 1918 (Class 1 roads) shows a gross revenue per freight train mile of $5.33. At this rate 47,650 freight train miles will total $253,974 50. For a 100-mile division the amount will be four times this, or $1,014,898.

[17]J. J. Turner, in "The Telegraph as Applied to Train Movement" (1885), describes the use of a plug board in train despatching on a busy piece of single track railroad. E. W. McKenna, in 1882, devised this board and put it into use. Mr. McKenna was at that time superintendent of the Jeffersonville, Madison & Indianapolis, now a part of the Pittsburgh, Cincinnati, Chicago & St. Louis. The plug board is a crude track model.

[18]See article by L. C. Fritch (now vice-president of the Chicago, Rock Island & Pacific Railroad), "Train Despatcher's Graphic Chart," used on the Ohio & Mississippi Railway in 1891.—Engineering News, September 5, 1891.

drawn across this diagram, the interesctions of these lines with the horizontal lines indicating the time at which each train passed the given stations. As each chart represents eight hours' work, the three charts each day form a complete record for the district superintendent.

The installation of this system has effected important operating economies. The number of trains operated has increased 10 per cent, as indicated by the monthly summaries, the increase in the number of through freight trains for these periods being 15 to 35 per cent. In spite of this increased number of trains, the average time on the road was decreased 10 to 15 per cent."[19]

The important economies obtained on the East Indian Railway constitute a most favorable showing for single-track operation by signal indication, or operation without *written* train orders.

Another record of single-track operation by signal indication—a very remarkable one and not to be lost sight of—was the operation by the Jeffersonville, Madison & Indianapolis on single track without train orders and with but few train rules."

Operating Efficiency

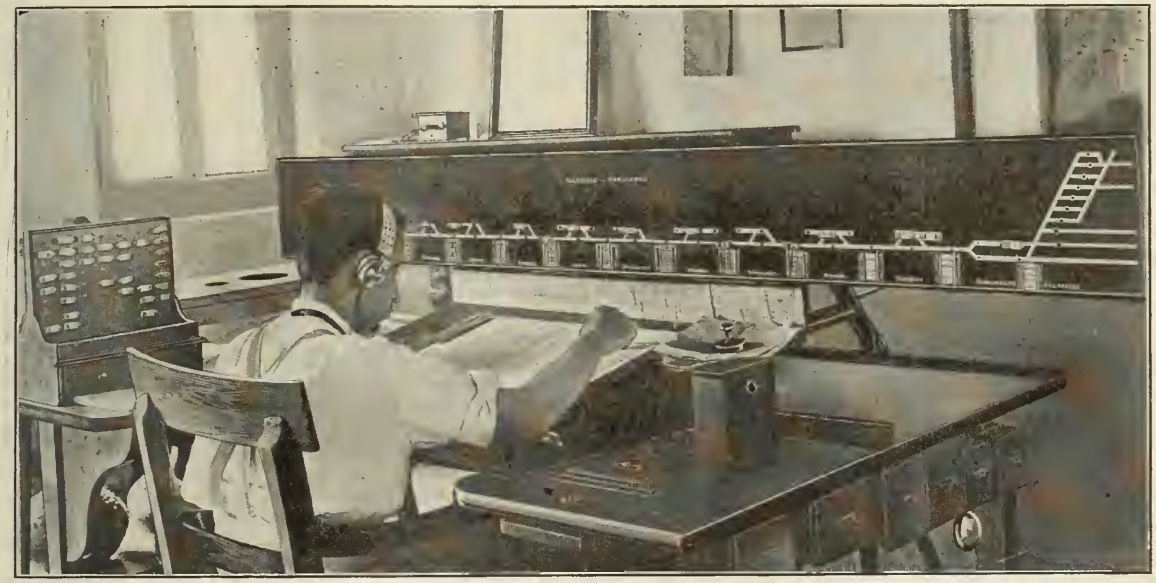
The efforts that have been made to increase operating efficiency have largely been in the direction of:

1. Increasing the tractive power of the locomotive.
2. Increasing car capacity.
3. Increasing track facilities by the addition of second, third and fourth main tracks, longer passing sidings and larger yards and terminals.
4. By the electrification of steam-operated roads.

These improvements, which require large expenditures, may fail to show an adequate return if the means for directing train operation does not keep trains moving.

Progress

The progress chart (Fig. 1) visualizes the progress made in equipping the railroads of the United States with block signals.[20] The relative progress of the two block systems,



Train Despatcher's Office, East Indian Railway, Allahabad

Graphic Train Sheet and Hand Operated Track Model

in 1882 of 225 trains a day over the Louisville bridge and adjacent tracks entirely by signals without the use of written train orders. This handling of a heavy traffic entirely by signals when the science of signaling had not reached its present high development was a most notable performance.

With the present development of the science of signaling, the equipment of a single-track division of a railroad with automatic block signals, interlocking signals and telephone train despatching for directing the movements of trains by signal indication without the use of written train orders, is in every detail simple and feasible, and can be carried out under arrangements which have the approval of the most conservative railroad authorities.

A single-track railroad thus equipped will fully meet the requirements of the block signal system described in a handbook, "Train Operation," written by William Nichols, for 10 years chairman of the board of examiners, Southern Pacific Company.

Mr. Nichols describes this block system as follows:

"With a proper block system, with signals to govern train movements in and out of sidings, trains may be safely moved

[19]See Railway Signal Engineer, July, 1917.

measured in miles of track, is shown in detail in the following table of the 12-year period from 1907 to 1919:

Table 1—Increase in Twelve Years

	1907, January 1	1919, January 1	Total increase	Avg. annual increase
	Miles of track		Miles of track	
Manual block system.....	51,685	69,830	18,145	1,512
Automatic block system.....	12,745	59,458	46,713	3,893

The average annual increase of 3,893 miles of track of the automatic block system is 2½ times the average annual increase of the manual block. In other words, for every mile of manual block installed, 2½ miles of automatic block was installed. From the standpoint of comparative progress this rate of increase of the automatic block over the manual block might be regarded as satisfactory. Yet it is not satisfactory when compared with the average annual increase of main-track mileage.

On January 1, 1918, the total miles of track of the roads equipped with automatic block signals was 57,084 miles. Deduct this from the total of 267,574 miles of main track

[20]The Progress Chart was prepared from statistics of the Interstate Commerce Commission.

in 1918 and there remains a balance of 210,490 miles of main track Class I roads[21] *not* equipped with automatic block signals.

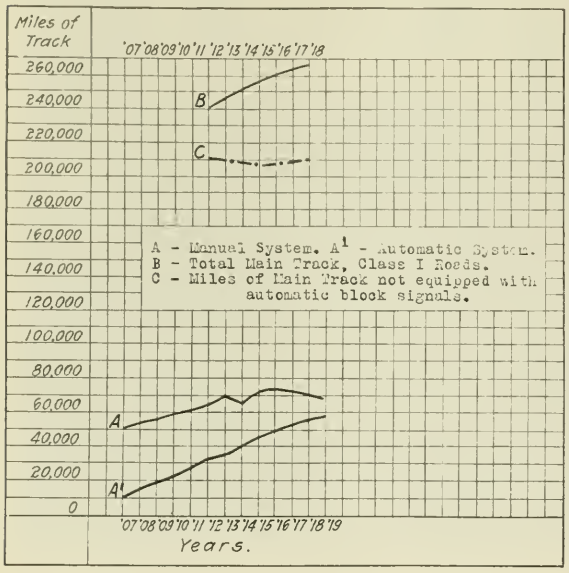
Table 2 shows the relative progress of main-track mileage and block-system mileage for six years, 1912 to 1918.

TABLE 2—AVERAGE ANNUAL INCREASE, 1912-1918

	1912, January 1	1918, January 1	Total increase	Avg. annual increase
	Miles of track		Miles of track	
Main track Class I roads	*246,747	267,574	20,827	3,471
Manual block system	66,072	71,493	5,421	904
Automatic block system	33,425	57,084	23,659	3,943
Main track not equipped with automatic block system	213,322	210,490	.....	.....

*Estimated as of January 1, 1912.

The significant point in this table is that the average annual increase for the automatic block system, 3,943 miles, is only 472 miles in excess of the average annual increase for main-track Class I roads (3,879 miles). Therefore, unless there is a marked increase in the annual mileage of the automatic block system, the main-track mileage and



Progress Chart, Railroads of the United States

automatic block mileage will continue to run nearly parallel with each other. It is acknowledged universally that the automatic block system is the ideal system of signaling for economizing track facilities and promoting prompt movement of trains, and also the best preventive of collisions. And its usefulness is not confined to lines of dense traffic. It is in use on some lines where the volume of traffic is not to be classed as heavy; but its value is evident, and is appreciated as definitely on such lines as on those which are more constantly busy.

Any railroad which aims to give the public the best possible service has a duty not only to keep up with "the state of the art" according to the very easy standards in this respect which are laid down by the courts, but to establish the *highest possible standards*. Establishing high standards at large expense may sometimes seem, because of the indifference, ignorance or hostility of legislatures and municipal and other authorities, to be a thankless task, and it is not to be denied that some of the difficulties are hard to remove. But there is still to be kept in mind the broad view, looking well to the future, that high standards of safety and efficiency do afford the most satisfactory ultimate results.

Transportation is the carriage of persons and commodities from one place to another. Transportation means movement. Movement, to be efficient, must be directed. The means for directing movement must be efficient. Automatic block signals constitute the ideal means for the direction of movement —that is, for the *direction of train operation*.

[21]Class I roads are those having each an annual operating revenue above $1,000,000.

Commission Announces Plans for Use of $125,000,000 for Equipment

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION having on May 29 afforded opportunity to all who wished to be heard in regard to the general principles which should control its action in recommending to the Secretary of the Treasury loans from the revolving fund of $300,000,000 created by section 210 of the Transportation Act, on June 7 made the following announcement:

Equipment

It is essential that a substantial portion of the fund be put to work at once to aid in acquiring new equipment. The appropriation for this purpose will be fixed for the present at $125,000,000, to be distributed substantially as follows:

To aid in acquisition of freight cars, $75,000,000.

To aid in acquisition of locomotives, $50,000,000.

Cars. Since freight cars are interchanged and enter into general use subserving the general transportation needs of the public regardless of ownership, the commission will endeavor to apportion the $75,000,000 in such manner as will bring about the acquisition of the largest number of cars. The National Association of Owners of Railroad Securities has urged the organization for this purpose of a national equipment corporation. There are strong considerations in favor of such a project and by a recent amendment to section 210, Congress has authorized loans from the revolving fund to such a corporation.

The commission cannot undertake the formation of an equipment corporation or corporations, but upon presentation of a definite, well-matured and workable plan, capable of application in the immediate future, it will give preferred consideration to applications for loans to or for the purpose of such a corporation. The commission believes that it is both desirable and practicable to devise such a plan in the case of refrigerator equipment, and particularly commends this matter to the attention of the railroad executives.

The $75,000,000 apportioned for freight cars will be used primarily to aid in the acquisition of 20,000 refrigerator cars. The allotment for refrigerator cars will be made first to those carriers or companies which offer the largest proportional contributions to meet the advances of the government, and will be continued in the order of proportions of carrier contributions until the total of 20,000 refrigerator cars is provided for or the applications are exhausted. Other things being equal, preference will be given to loans to or for the purpose of equipment corporations supplying the needs of a number of lines.

After providing allotments for refrigerator cars allotments for other freight cars will be made in a similar manner and with similar preferences. Where carriers, however, offer free of prior liens running gear, parts of cars or types of cars which by construction, reconstruction or reinforcement may be converted into modern and efficient equipment at an earlier date than is possible by new construction, preference will be given to carriers making such offer over others tendering the same or substantially the same proportional contributions to meet the loans.

Locomotives. The $50,000,000 for locomotives will be used first to aid in acquiring freight and switching locomotives and will not be employed for passenger locomotives until and unless applications for freight and switching locomotives are met. It will be the rule to require applicants themselves to contribute at least 50 per cent of the cost of the locomotives. Other things being equal, preference will be given to applications for loans to or for the purpose of equipment corporations.

If the demand should be in excess of the allotment, with the possible exception of equipment corporations, applications for less than 25 locomotives will first be filled, 25 locomotives will be applied in order to the remaining applications beginning with the lowest, and the remainder will be used to complete the applications so far as possible in order beginning with the lowest. This will be done for the purpose of securing distribution of locomotives throughout the country.

Applications for loans to or for equipment corporations sought in whole or in part to meet motive power needs of short lines will be considered in this connection.

The commission will give consideration to the applications of any carriers unable to finance as much as 50 per cent of the cost of freight or switching locomotives, and for good cause shown will advance the necessary amounts before recommending loans for the acquisition of passenger locomotives.

Additions and Betterments

The appropriation for loans to aid in additions and betterments which will promote the movement of cars will be fixed for the present at $73,000,000.

Loans for this purpose will not be recommended except upon satisfactory evidence that the additions and betterments will relieve congestion or otherwise enable existing equipment to do more work. The Association of Railway Executives has stated to the commission that its committee proposes to examine the applications of the various companies and recommend for favorable consideration the most pressing of such additions and betterments. The commission will expect such recommendations reflecting the best judgment of the executives in the interest of the entire country, and will be guided in its action by an endeavor to so use the fund that the best net results may be secured in the movement of freight.

No loans for this purpose will be recommended without satisfactory assurance that the government funds will be met by such contributions from the carriers as it is within their power to furnish.

Maturities

The appropriation for this purpose will for the present be fixed at $50,000,000.

The commission will deal separately with companies seeking loans to meet maturities, with due regard to the principles announced in the following quotation from a report of the committee of the Association of Railway Executives:

"In the judgment of your committee, every effort should be made, by extension or refunding whenever possible, to take care of all 1920 maturities, and to avoid calling upon the revolving fund except in extreme cases to protect the solvency of companies."

It will be the policy of the commission not to recommend loans in cases where applicants have not clearly exhausted every effort to take care of maturities by extension, by refunding and by every other means; and all applications for loans to meet maturities should set forth as definitely as possible by whom and in what amounts the maturing obligations are held and what steps have been taken to extend, refund or otherwise provide for them. The commission will emphasize the necessity for self help in all cases, and will expect applicants to assume their fair share of the burden.

The appropriation for loans to short line railroads will be fixed for the present at $12,000,000. The Short Line Railroad Association should submit, in accordance with the foregoing principles, its recommendations, both with respect to distribution of this allotment for short-line railroads tentamember roads and with respect to non-member lines, for the tively fixed at $12,000,000.

In General

No loans will be recommended for any purpose except upon evidence that the prospective earning power of the applicant and the character and value of the security offered are such as to furnish reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor, and to meet its other obligations in connection with such loan.

The commission is of the opinion that the contributions of private capital to meet the loans of the government should be obtained at reasonable interest charges. These funds will be invested not alone for the purpose of securing direct returns but for the purpose of gaining the indirect benefits which will accrue if carriers are enabled better to meet the transportation needs of the country. It should be possible to obtain these contributions in part from the shippers of the country who are suffering from inadequate transportation. A proper spirit of co-operation should make it possible to secure private funds at rates not in excess of the rate which the government itself accepts.

New or Amended Applications

Many of the applications which have been filed with the commission are at variance with the needs which the applicants have indicated to the Association of Railway Executives, and applicants have frequently failed to grasp the two prerequisites which the law affixes to a recommendation for a loan under section 210, to wit:—

(1) A finding by the commission, that the making in whole or in part of the proposed loan by the government is necessary to enable the applicant properly to meet the transportation needs of the public, and

(2) A finding by the commission, that the prospective earning power of the applicant and the character and value of the security offered are such as to furnish reasonable assurance of the applicant's ability to repay the loan within the time fixed therefor, and to meet its other obligations in connection with such loan.

Many applications also were filed or withheld while amendments to the Transportation Act were pending. It is evident that a fair and comprehensive administration of the act requires that all applications be amended or filed in the light of the principles above set forth, and of the knowledge now available as to the purposes and limits of the law. Opportunity will therefore be afforded to amend and supplement applications already on file and to file new applications so that all necessary information may be supplied to enable the commission to pass upon the propriety and expediency of recommending the loans.

Where applications have been filed in accordance with the commission's order of April 23, 1920, amendments may be made in summary form, referring to previous application and to this circular, and setting forth the amount of the loan now desired, the term for which it is desired, the purposes of the loan and the uses to which it will be applied within the principles above announced, the present and prospective ability of the applicant to repay the loan and meet the requirements of its obligations in that regard, the character and value of the security offered, and the extent to which the public convenience and necessity will be served. The amendments should be verified and should show authority from the board of directors as provided in original form.

The original amendment or new application should be accompanied by 11 additional copies, and, except in cases of maturities, one additional copy should be forwarded to the Association of Railway Executives, 61 Broadway, New York, where recommendations are to be made by that body, and one additional copy of short line amendments or new appli-

cations should be forwarded to American Short Line Railroad Association, 706-713 Union Trust Building, Washington, D. C.

Amendments and new applications should particularly show:

1. In case of equipment loans, (a) the kind and number of units and cost per unit and total cost, (b) the contribution to be made by the carrier to meet total cost and how such contribution will be financed, (c) whether it is proposed to employ loan to secure cars to be placed under control of a refrigerator car company or other equipment corporation, or to secure cars for individual equipment of the applicant.

2. In case of loans for additions and betterments, (a) why applicant is unable itself to finance the project, (b) what efforts applicant has made to do the work without government aid, (c) how and to what extent the proposed additions and betterments will facilitate the movement of cars, (d) the plan and details of cost of the work proposed, and (e) the proportion of total cost which will be financed by the applicant.

3. In case of loans for maturities, (a) what efforts carrier has made to finance the maturities by extension, refunding or other means, (b) as far as possible by whom and in what amounts the maturing obligations are held and the reasons the holders give for failure or refusal to extend or refund, (c) how much of the burden of financing the maturities applicant proposes to itself assume and how, (d) why applicant's regular bankers have been unable to come to its assistance, (e) whether the aid of other bankers has been solicited or public bids invited, and (f) whether there is on applicant's board of directors any member who is an officer, director or representative of any bank, bankers or trust company, stating his name and position.

Time Extended for Filing Applications and Amendments

The time for filing applications and amendments for consideration in the first general plan of distribution is extended to June 19, 1920. At the hearing on May 29, 1920, the representatives of the Association of Railway Executives indicated that the association would submit recommendations as to the amounts to be apportioned to the several roads out of the appropriation for each general purpose upon statement by the commission of rules of apportionment. It is desired that such recommendations be furnished so that the general distribution may commence not later than June 26, 1920. In the meantime, however, the commission will continue to act upon such individual applications as, in its judgment, require immediate attention.

The National Association of Owners of Railroad Securities is preparing to secure a charter under the general law, for the formation of a corporation to be used in the acquisition of equipment by such railroads that desire to purchase equipment through this source.

Annual Government Signal Bulletin

THE INTERSTATE COMMERCE COMMISSION has issued its annual bulletin showing the mileage of railroad in the United States on which the block system was in use on January 1, 1920; and the total length of railroad operated under the block system, both automatic and non-automatic, as shown in table No. 1 is 101,884 miles; this on railroads whose lines operated for passenger traffic aggregate 194,595 miles. The total mileage of railroad signalled, as here stated, is not exact, as there is a considerable mileage of road operated jointly in which the same mileage is reported by both of two roads. This duplicate mileage amounts to 314 miles, making the apparent net mileage of road under the block system 101,570 miles.

The principal totals of table No. 1 are as follows (miles of road):

	Jan. 1, 1920	Jan. 1, 1919	Jan. 1, 1918
Automatic	37,968.8	36,989.4	34,799.0
Manual	63,915.4	62,908.3	64,155.0
	101,884.2	99,897.7	98,954.0

We copy the usual table from the bulletin showing the principal items in which there is an increase in the mileage of road operated under the block system—and also the principal decreases. The total of the first column in this table is 1096.1 miles. This is larger than the net increase in this column as shown by table No. 1 which is 979.4 miles; indicating apparently some errors in reporting for the previous year.

PRINCIPAL INCREASES AND DECREASES IN 1919

	Increase.		Decrease, nonautomatic.
	Automatic.	Nonautomatic.	
Atchison, Topeka & Santa Fe System	195.6		47.4
Chicago & Northwestern			134.0
Chicago, Burlington & Quincy	186.6		186.7
Chicago, Lake Shore & South Bend		55.2	
Chicago, Milwaukee & St. Paul	11.2	203.5	
Chicago, Rock Island & Pacific			83.8
Cleveland, Southwestern & Columbus			86.0
Denver & Rio Grande [1]		116.0	
Fort Worth & Denver City [1]		114.4	
Grand Trunk Railway System [2]	22.7	843.9	
Great Northern	131.4		
Illinois Central	130.0		
Yazoo & Mississippi Valley	50.8		
Los Angeles & Salt Lake			44.2
Louisville & Nashville	67.5	30.6	
Missouri, Kansas & Texas	26.4		
Northern Pacific	90.6	13.8	
Pennsylvania—Eastern lines		59.3	
Pere Marquette	48.3		
Southern	84.6		
Southern Pacific System:			
Houston & Shreveport		39.8	
Houston & Texas Central	12.5		35.5
Houston, East & West Texas		188.5	
Pacific System Lines	8.8	251.3	
Wabash	29.1		29.1

[1] Roads which have not heretofore reported block signal mileage.
[2] The increase indicated in non-automatic block signal mileage is due to the road's failure to report properly in the preceding year.

The foot notes to the large table indicate, as usual, numerous sections of road, some of them of considerable length, which are equipped with automatic block signals, but which are used only by freight trains and the mileage of which, therefore, does not appear in the tables.

The total of the second column in the small table is 1072.4 miles after deducting the 843.9 miles reported by the Grand Trunk; and this smaller total is still larger by 425.7 miles than that of the third column, showing decreases, which totals 646.7 miles.

In table No. 2, showing kinds of automatic signals in use, there is a total of 1108 miles of road on which the signals are not classified; in this column, which includes "light" signals, a length of 595 miles of road is reported by the Chicago, Milwaukee & St. Paul (nearly all single track), which indicates an increase of 192 miles of road equipped with light signals on that company's lines.

The Chesapeake & Ohio reports 21 miles of road, single track, on which automatic train stops are in use; 14 miles more than was reported the year before.

Telephones are now in use for transmission of train orders on 119,554 miles of road, 6,114 miles more than was shown in the reports made one year before.

"PEACE GARDENERS" are the popular class nowadays on the Cumberland and Connellsville divisions of the Baltimore & Ohio; employees raising vegetables along the railroad right-of-way; the same who in 1917 and 1918 made "war gardens."

People, As Well As Railroads, Are On Trial*

Outcome of Present Test of Regulation and Private Management Will Have Important Effects on American Institutions

By Charles H. Markham
President of the Illinois Central Railroad

Mr. President and Gentlemen: We hear, everywhere, the statement that private ownership and operation of railroads is now being subjected to its final test. It is the talk of the street and of the press that the next few years will determine whether these great transportation agencies will remain under private ownership, or whether they will be taken over by the Government. The statement may be true; but it is only a partial statement of the truth. If it is the fact that private ownership of the railroads is being given its final trial, it is equally the fact that American institutions, which we have so highly cherished, are also on trial. A socialistic wave, high enough to nationalize the vast industrial life represented by the railroads, will not subside when fed with that result. Indeed, great as is the financial interest of the railroad owners and officers in the success of this branch of private management, failure, at this time, will mean more to you and every other citizen who believe in that principle of individualism which has carried our government to the foremost position in the world.

We are, therefore, engaged in a common effort; there can be no line of cleavage between the public users of the railroads and their owners and officers. There may have been too much inclination of these classes, in the past, to array themselves in hostile camps; but the time has come for an appreciation of the mutual duties and responsibilities that rest upon all, and for that cordial co-operation which is essential to the success of every great enterprise. The fact is that if the railroads fail, other lines of industry must go down. If the railroads succeed, it will be because they had your sincere and cordial support in securing and maintaining conditions essential to railroad existence.

It is safe to say that the American public is committed to the view that the transportation systems of the country, as well as the great body of our other industries, shall be in private hands depending for success upon private initiative. There is a feeling, among the saner people, that it is essential to cling to the ideals of the fathers, in so far as they teach us that the prosperity of America depends, not so much upon the functions of government, as upon the individual initiative, industry, enterprise and intelligence of the people themselves, left, as far as possible, unrestrained by the restrictive hand of government. Upon that principle we have prospered. If America is now the leading nation of the world, in the strength of its institutions, business, and views on public questions, it is due to the predominance of the ideal of individualism which has controlled the destinies of this nation from the beginning. We start, then, with the premise, that the vast majority of the American people prefer that the railroads of the country shall remain in private hands. Whether they continue to do so we believe will depend, in large measure, on whether shippers view success of the railroads as an unnecessary drain upon, or as an essential aid to, a prosperous business.

In stating the country is committed to a policy of private control, I do not mean without public regulation. We as a nation are committed to the view that railroading is so related to the public interest that reasonable regulation is essential to protect the public against unjust and discriminatory rates and to secure the necessary service. The extent to which that regulation can wisely extend is an ever-recurring question. It may be overdone, as the history of its development in the United States suggests.

Development of Regulation

Prior to 1870 there was little or no public regulation. During the first century of our national life, we, as a people, were so interested in laying broad foundations, political, social, and economic; we were so concerned in redeeming waste places by the construction of lines of railroad; we were in such need of capital for the development of business enterprises, so wedded to the doctrine of individual effort, so intent upon justifying the theory that democratic ideals and principles should prevail—in short—so busy with our private affairs that there was little or no suggestion that it was necessary to lay the hand of government upon the agencies of transportation in a restrictive way. On the contrary, there was the belief that our government was largely a protest against autocratic and bureaucratic methods which had prevailed in the older civilizations; and the need of our rapidly developing country for improved transportation was so urgent that not only did the Government refrain from obstructive regulations, but, in this period, it sought to encourage the building of railroads by donations of land, by grants, of subsidies, and by the concession of special charter privileges. This was the period of perhaps the most venturesome railroad development, due largely to the faith in individual effort when unrestricted.

It was natural, perhaps, that abuses should develop in connection with the exercise of such unlimited power, and so it happened that beginning about 1870 there was a tendency on the part of the people to control, in some measure, the activities of public service corporations.

The early regulation was exclusively by the states, in some of which railroad commissions, with broad and, often, illy defined powers, were created; in others the Legislature itself directly regulated the rates and services. Each state considered its own needs, and embarrassing conflicts in regulation resulted. Congress entered the field in 1887 by the enactment of the Interstate Commerce Act—thus bringing in the national aspects of the problem. The original act, which continued with little change until 1906, was a conservative measure, under which the chief function of the commission was to investigate and report, whereby publicity was given to railroad operation and affairs. The commission could not prescribe maximum rates and was without effective machinery to enforce its orders. In consequence, its hands necessarily rested lightly on the railroads of the country.

The period from 1870 to 1906 may be characterized as one of scattered and conflicting state regulation, influenced but little by the original Interstate Commerce Act. The field of regulation, whether by Congress or the states, reached many angles of the railroad business, but the restrictions were not of a character to seriously weaken the spirit, enthusiasm, or initiative of private management, or destroy the confidence of capital in the safety of railroad investments. And it is well to remember that it was in the years prior to 1906 that

*An address delivered before the Transportation Club of Louisville, at Louisville, Ky., on April 28, 1920.

the greatest railroad development occurred; that capital sought investment in railroad securities; that railroads were extended into undeveloped territories far beyond the limit of present adequate returns; and that this occurred while there was regulation but of the milder kind.

Yet there were unwise profiteers in that period even as today. Rebates and gross discrimination—harmful both to the railroads and the public—were common, and, because of these evils, the public demanded more stringent regulations. In 1906 there came the Hepburn bill, by which the Interstate Commerce Commission became a powerful agency, vested with authority to prescribe maximum rates, to enforce its orders under heavy penalties, to require strict observance of the carriers' published tariffs, and endowed with many other powers with which you are familiar. These powers were further increased in 1910, when the commission was empowered, among other things, to suspend rates pending investigation and the burden was put upon the carriers to justify rates made.

But neither the Hepburn bill nor the amendments of 1910 in any way restricted the powers of the states over intrastate commerce, and so it followed that the state commissions, jealous of their authority, not only imitated the Interstate Commerce Commission's restrictive orders, but frequently strove to outdo that body in the regulation of a business, the success of which is so essential to all our business life.

The period 1906 to 1920 was one of increased regulation, both state and national, with increasing and more serious conflict between the different jurisdictions. Nor was the regulation accompanied by any attempt to protect the railroads. What was the result? Every business man knows that in that period the railroads of the country early began to lag; that new railroad construction dwindled to insignificance; that in some way or on some account capital lost a large part of its confidence; and that the old enthusiasm of the railroads' management waned. If any lesson is to be drawn from that period, it is that while there should be regulation curbing the evils which come from unrestricted railroad operation, yet that the railroad business, like any other, can be strangled to death—suffocated—by too much treatment.

Changes Made by Transportation Act

Now we come to the Transportation Act, 1920, which marks the beginning of a new period. It has more intensive regulation than any law previously enacted, but, for substantially the first time since 1870, it shows a trend to the belief of the earlier period that railroads need protection as well as regulation; it vests the Interstate Commerce Commission with vast powers; but imposes duties upon that body which, fairly, intelligently interpreted, will do much to upbuild and maintain the great railroad industry. While all former regulatory laws passed by either state or national legislatures were critical, restrictive and restraining in their nature—designed to prevent the railroads from the exercise of some authority usually allowed to individuals in their private enterprises—the new Transportation Act is much calculated to encourage and strengthen the railroads. Heretofore the generally accepted theory of a business affected with a public interest has been that the public should have the benefit without sharing any of the responsibilities or burdens. In effect, the owners of the railroads have been told: "You must furnish all the moneys, take all the risks, be subject to all the demands of the public—however unjust and absurd—be without any guaranty or assurance of a fair return upon your property, except such as the courts may give in specific instances, while the public shall enjoy low Government-made rates over which you will have little control—the public assuming no responsibilities for the support and maintenance of the property."

But in three important respects the Transportation Act of 1920 recognizes the obligation resting upon the public to see that these transportation agencies are permitted to operate under conditions which will tend to assure fair service and a fair return.

First, among these stand the provisions which undertake to insure to the railroads, by legislative fiat, a certain return upon the property devoted to the public service. While the standard established is perhaps less than heretofore recognized by the courts, this law, in terms, requires its recognition by the commission and should go far to end the hesitating practices and policies which have too much prevailed where discretion was allowed.

The second of these protective provisions is that which places upon the commission the responsibility of initiating a rate basis sufficient to yield what Congress conceives to be needed revenue. Heretofore the commission's only responsibility was to decide whether rates, initiated by the carriers, were excessive—the decision of which was approached in a critical spirit—without the duty of seeing to it that the rates were sufficient to provide the railroads with reasonable returns. Under that policy it was conceived to be the function of the commission to exercise the veto power upon the carrier's actions; while now its duty is to examine the entire situation and initiate a body of rates which, while not unduly oppressing the public, will, at the same time, conserve railroad revenues and insure a fair return. The statute, wisely, recognizes the fact that since the public insists upon a large measure of regulation, it shall assume the responsibility of establishing rates which will not unduly oppress those who have invested their money in these great railroad properties.

The third of these protective features is the machinery provided for the adjustment of labor disputes. Those provisions will benefit both the owners and employees of the roads. They provide an impartial court where both sides can be heard, and a decision made, which should satisfy all who seek a fair settlement of an honest controversy. The great majority of railroad workers are not only loyal to their respective companies, but patriotic and law-abiding, and, in the end, they will welcome the provisions of this law, whereby the fairness of this stand taken may be publicly determined. These provisions will tend to expose radicalism, and protect the honest, fairminded worker.

I have said that the Transportation Act centralizes in the Interstate Commerce Commission many powers previously exercised by state commissions. We have reached that stage in the history of public regulation when greater uniformity is required. It is so not only with the railroads, but with general business as well. Most important business houses reach out beyond state lines, so that regulations of the local authorities, which, in the earlier days, were wise and helpful, have now become impediments to the best interests of trade. Congress, therefore, wisely, so framed the Transportation Act as to vest in the Interstate Commerce Commission the final word on many questions heretofore decided by the states.

To illustrate; the present law recognizes the issuance of securities and vests control thereof in the Interstate Commerce Commission. Heretofore the states undertook the regulation of the issuance of stocks and bonds of an interstate railroad, so that it was necessary for a single railroad, contemplating such issues, to obtain the consent of many states, with resulting delays and the expenditure of exorbitant fees. The railroads welcome, and the public should be satisfied with, the final approval of a single, independent and competent tribunal.

Again, the law provides that new railroads cannot be constructed, or an extension of an existing line undertaken, or any part abandoned, without securing from the Interstate Commerce Commission a certificate of public convenience and necessity—powers previously exercised by state bodies. It requires no argument to show that a single state should not

be permitted to control so important a matter as the extension or abandonment of an interstate railroad.

The law empowers the Interstate Commerce Commission to require a railroad to equip itself with new facilities—a transfer of power previously asserted by state tribunals.

Other illustrations of this centralizing tendency may be cited—the power to fix minimum as well as maximum rates—the power to regulate consolidations—the power to permit pooling—the power to prevent state authorities from establishing rates that will unduly burden or discriminate against interstate commerce, and other similar powers, which, if granted at all, should be to a single, independent, competent tribunal, so that at least uniformity in regulation may prevail.

No experienced railroad man will deny the necessity for intelligent regulation; and since there must be regulation, the power therefor should be vested in a single strong commission whose jurisdiction will include the entire line of railroad. It is not only better because of the frequent changes in the personnel of the state commissions, and the lesser opportunities thereby giving them to study the problems, but more especially because not only here, as elsewhere, do too many cooks spoil the broth, but because of the necessity for uniformity in the regulation.

Some Objectionable Features of the Act

There is indeed much that will prove helpful in the Transportation Act, if properly administered; yet there are other parts which, in my belief, should have been omitted. I refer more particularly to those provisions which do not allow a railroad to retain all its earnings under fair and nondiscriminatory rates, and which empower the commission to require one railroad to allow another the use of its equipment and terminal facilities. If a railroad company, handling traffic for rates deemed just to the shipper, enlarges its facilities, or by competent management and energy so builds up its business that, without any increase of rates, a surplus is obtained, part of it, under the law, may be appropriated to other uses. If a company, having regard to the interest of the shippers along its line, adds to its equipment and power, that equipment, at the will of the commission, may be appropriated to the use of other companies which have, perhaps, less foresight or disposition to so provide for their respective lines. If a company, looking to the future, increases its terminals, they may be appropriated by the commission to the use of others possessed of less foresight, or perhaps wilfully disposed to appropriate the advantages of others.

It may be that such provisions will tend to the advantage of the poorly served communities of the country, but they tend more to destroy, in the competently managed and provident companies, that effort and competency, which, after all, are the most essential things in railroad management. There is in the railroad business, as in every other, an inducement to effort, to accommodate, to give increased facilities, to provide new and adequate service, when that effort will result in greater reward. It is impossible for me to believe that the public is ever so well served, when the giver of the service is not to have the fruits thereof; nor can I believe the principle wise which tends to protect the inefficient, at the cost of the efficient; on the contrary, the old adage, "Toil or ye perish," should apply to the railroad business as to every other and, when applied to all, will more surely build up the railroads as a whole and give broader and better transportation facilities than can any system that takes from the well and efficiently managed and gives to the incompetent.

But, after all, success or failure under the new Transportation Act is largely dependent upon its administration by the Interstate Commerce Commission. While the law contains much for encouragement, and, if administered in the spirit of its enactment, will place the railroads of the country upon a permanently sound foundation; yet success or failure depends upon the commission to which are given vast administrative powers. The eleven men who will compose the commission are vested with power in the industrial field greater than that exercised by any other body of men in the world. Men of narrow views, of limited experience, controlled by a temperamental inclination to prejudgment, who have not grasped the full significance of the railroad problem, or do not appreciate the necessity for stimulating and building up railroad credit, who cannot, in a measure, forget the past, and look to the future, have no place upon that great tribunal.

But however competent and fairly disposed the commission may be, it is only human nature to feel the influence of public sentiment, in the making of which the business men will have chief part; and so it depends upon you whether the commission adopt toward the railroad problem a broad, wise, and efficient policy that will upbuild, or a critical, narrow, and starving course which will destroy. If the private management of railroads, and the fundamental principles therein represented, are to continue, you must join in the effort to frame a policy—a sentiment—of success.

The rate problem is one of those requiring immediate consideration. During the period preceding the return of the railroads, it was urged that their return meant the imposition of a heavy burden on the public by increased rates. It is true that rates must be increased. Indeed, private operation of the railroads must fail unless there is a generous concession of adequate rates for the services given. Congress, in the new law, recognized the fact, and fixed a standard of return; but that law must be interpreted and given effect, and, whether of benefit or not, will depend upon the manner of its execution. If the commission applies the law grudgingly to the railroads, pausing to consider whether this or that halfway measure will suffice, disaster must follow.

Why Rates Must Go Up

And why should there be hesitation? Statistics show that the wages of railroad employees have increased since 1915 on the average of more than 100 per cent—a conservative estimate. Other items of expense have kept pace. Coal, ties, rail, cars, locomotives, and all supplies now cost not only much more, but in many cases three or four times as much as five or six years ago. The economic laws, which apply to the management of the railroad business, are no different from those which govern the successful operation of other lines of endeavor. Five and five makes ten; equals added to unequals produce unequals, in the railroad business, just as in every other; and when the expenses far outstrip the revenues, the latter must be increased if bankruptcy is to be avoided.

And, broadly speaking, in this period of high wages and prices, can it be reasonably expected that in this, the most important business of all, any other principle shall apply, or any other different courses be followed, than that practiced in every other successful business in the United States? It should be recognized as a necessary detail of the period—just as, following the Civil War, when high prices prevailed, passenger and freight rates were in like proportion. It is a detail so in accord with sound business methods that argument should not be required for its endorsement by men of business who want to avoid the socialistic tendencies of the day—tendencies whose greatest, most far-reaching victory, in this country, would be the nationalization of the railroads.

The railroad companies have before them a tremendous task, and perhaps the future of not only their own but of all private industry is dependent upon the result. They must make up the lost ground; they must better their terminals; add to their equipment; give improved service; while, at the

same time, an ever-increasing traffic must be accommodated. Whether this great work will be successfully done depends, in no small degree, upon the cheerfulness with which the shipping public meet the not unreasonable demand for increased charges for transportation.

The effect of railroad failure should not be underestimated. This is an age of radical agitation. It strikes hardest and first at the lines of private business having public duties to perform. In the beginning, it proceeds by varying degrees of regulation, but in the end it takes the property for the use of the public—and the right to the benefit of individual effort grows less and less. Until two years ago the railroad business was privately managed, and so successfully that better service at lower rates was given than in any other country on the globe. When the government took over the railroads it is safe to say that the great majority of railroad employees were averse to government ownership. As a result of two years of government control the leaders of organized labor not only opposed the return of the roads to their owners but made demands, not only for their retention by the government, but under conditions which would make the employees the virtual managers and beneficiaries. When you stop to think of it, it is traveling a long way in a short time. At the increased speed which, with any success, all such movements require, how long would it take, following government ownership of the railroads, to nationalize the coal mines, the milling interests, the distribution of food and, finally, the resumption of the title to the land? Unless you favor these things ultimately, and look forward to the day of the soviet government, you will oppose not only every suggestion of government operation of railroads but every degree of regulation that does not encourage the full development of the essence of private management.

Duties of Railway Managements

I have referred to the duties of the Interstate Commerce Commission and to the responsibility of the public in the solution of the railroad problem, but I would not be candid if I in any degree minimized the heavy duty resting upon the officers and managers of these railroads. They owe to the public an obligation to administer their properties with an eye single to the public service. They face a new era in railroad regulation and development. There can be no standing still. The railroads must be equipped to handle a traffic many times as great as that now handled. Terminals must be enlarged, equipment doubled and trebled, greater results obtained from the tools at hand. Railroad management must become increasingly competent. There must be more cars handled through the terminals—greater average movement of cars—more prompt loading and unloading. The watchword of the railroad managers must be "efficiency," and to acquire that "efficiency" there must be not only thorough, expert study of the railroad situation but a sympathetic understanding of the public needs and a willingness to co-operate with the shippers in their solution. The railroad man who will not consecrate himself to the accomplishment of these duties cannot last.

Yet in this transitional period too much must not be expected. As you know, constructive work proceeds more slowly than destructive work. To use a homely and familiar expression, it will take longer to unscramble than it took to scramble these properties. The railroads cannot enlarge their equipment in the twinkling of an eye; they cannot rid themselves of practices found unscientific by the mere issuance of a word of command; and there are the added, peculiar difficulties resulting from the present disturbed economic conditions of the world. It will take time; and so I bespeak for those who are engaged in an honest effort to do constructive work in the railroad field your patient tolerance of many things which should be corrected and your hopeful trust in our determination to improve conditions. There will be errors of judgment, but in the end, under the influence of enlightened public opinion, the law will be fairly administered and the rights of private business prevail.

But after all is said and done the result will depend upon the good sense, patience and patriotism of the American people. Private management may be on trial. If the system fails it will be because the American people have deliberately determined to cast away from the traditional moorings of the past—to embark on the uncharted sea of a socialized system—to abandon the principles of our fathers—to bid farewell to the old faith in the development of the individual.

The Weekly Rest Day

"THE TRAIN DESPATCHER," the monthly magazine of the Train Despatchers' Association, having learned that two chief despatchers "on a large continental railroad" had, at their own request, been authorized by the company to work seven days each week, prints an editorial protesting against this violation of the spirit of the recently adopted rule that despatchers should work only six days a week. The substance of the editorial follows:

Any encroachment on the enforcement of the one day of rest each week must be looked upon as a threatening and dangerous entering wedge. This is a dangerous precedent, not only to the railroads but to the train despatchers. The absolute necessity of a day of rest each week is recognized everywhere. The social, physical, spiritual and moral welfare of train despatchers and their families demand that the one day of rest each week be strictly adhered to. In the interest of safer transportation, higher living standards, a longer life for employees and a superior esprit d'corps train despatchers should seek to uphold in every way the full spirit and intent of the award made by the United States Railroad Administration on July 25, 1919, viz.: "Chief, assistant chief, regular trick and regular relief despatchers (and extra despatchers who perform six days' despatching service in one week), will be allowed and required to take one day off per week, unless prevented by the requirements of the service, in which case extra compensation will be allowed pro rata in lieu of the day off."

The welfare of the whole profession should be taken into consideration and the selfish interest of a few men should not be allowed to jeopardize the very best interests of thousands of their fellow workers. For any man—particularly a man who has a good job—this is a short-sighted policy. It is true that there may be a few more dollars in their envelopes each month, but there is a loss, a distinct loss in their moral, physical and spiritual development that is not compensated for. A despatcher who works seven days every week is burning the candle of life at both ends. The sum total of his life's earning capacity is actually less than if he took his rest days. * * *

A vigorous protest will be made to the officials of this railroad. To give in to this situation would be a tacit endorsement of it and a direct denial of one of the cardinal principles of the American Train Despatchers' Association. We must show the truth of our contention that we were not asking for a day of rest each week as an indirect method of obtaining an increase of pay.

Every man is entitled to a sufficient wage from six days of work each week to support his family and meet all his needs and something besides. * * * To give way to any encroachment on the one day of rest each week would be a direct violation of our most essential principle and motto. The honor of this Association will not permit this violation of its constitution. Such weakness would return to plague us in our future actions.

Hearing on General Rate Advance Case

Railroad Witnesses Cross-Examined as to Details of Financial Showing and Rate Adjustments

WASHINGTON, D. C.

THE hearings before the Interstate Commerce Commission on the applications of the railroads for a general advance in freight rates were resumed on Monday, June 7, after a recess since May 28 and the first three days were devoted to a more or less desultory cross-examination of the railroad witnesses who had previously testified and to the presentation of additional statistical information called for by the commission and by the shippers at the close of the previous session.

The marked change in the character of the opposition to the railroads which has been evident since those hearings were started was emphasized when it was announced that Clifford Thorne, who had been selected to conduct the chief cross-examination on behalf of the representatives of the shippers on questions pertaining to valuation and general statistical matters, would not be present and that it had been decided to waive most of the cross-examination of this character. No reason for his absence was stated, but W. E. Lamb, of Chicago, who made the announcement on behalf of a committee of attorneys for shippers, said that it seemed to be the general view that the series of inquiries propounded by the commission had made unnecessary anything like an extended cross-examination on those questions and that the commission itself was much more representative of the public than the shippers' representatives and better able to analyze the replies to be submitted by the railroads.

Mr. Lamb said, however, that his committee desired to ask two questions and that if the carriers would concede the points involved further questioning would be unnecessary. One of these was whether the property investment accounts submitted include stocks and bonds put into those accounts at par prior to 1907 and if so what was the actual realization from the securities. The second was as to whether any deduction had been made from the property investment figures for accrued depreciation. R. V. Fletcher, for the southern roads, said the carriers would concede that no deduction had been made on account of the accrued depreciation reserves either for equipment or for road, and later Alfred P. Thom, counsel for the Association of Railway Executives, said the carriers would concede that the accounts do include some stocks and bonds put into the accounts at par prior to 1907 and that the exhibits do not purport to show the amount of money realized therefrom.

It appeared, however, that several attorneys for shippers desired to reserve the right to cross-examine certain of the railroad witnesses on financial testimony as well as on the traffic testimony, in which they were particularly interested, after the additional information which had been promised for Tuesday, had been submitted. S. H. Cowan of Texas said he wanted to make some further inquiries as to how the railroads had made up their figures for the constructive year ended October 31, 1919, by adjustment for the increases in the level of expenses which occurred during that year and later; and C. E. Cotterill, for the Southern Traffic League, said he had had no part in the conferences of the shippers' committee represented by Mr. Lamb and that he was prepared to cross-examine the witnesses for the Southern Lines.

J. E. Benton, solicitor for the National Association of Railway & Utilities Commissioners, said he thought there would be little cross-examination of the statistical witnesses on behalf of the states except of T. W. Hulme, vice-chairman of the President's Conference Committee on Valuation, who had presented a compilation comparing the property investment accounts of 50 roads with the cost of reproduction plus land value as shown in preliminary reports of the Bureau of Valuation. Mr. Benton took up a large part of the day with his questioning of Mr. Hulme on questions pertaining to valuation and property investment accounts, apparently trying to induce the witness to claim something that might be more vulnerable than his original testimony, which was reported in last week's issue. Mr. Hulme readily admitted the most notorious defects of the individual property investment accounts of some of the roads, which have been disclosed by investigations by the commission, but pointed out that the commission's investigations had also disclosed many instances of property not included or understated in the accounts. While he adhered to his expression of opinion that the cost of reproduction new plus land as found by the commission would considerably exceed the amount of the property investment accounts, he insisted that he had not made any claims or attempted to testify as to the value of the railroads, and that he had not used any theory of his own; but had merely compared the property investment accounts with certain facts found by the valuation bureau. He said that when he used the word "considerably" he meant that the excess of the cost of reproduction figures plus land values as of 1914 over the book accounts would be from 10 to 15 per cent for the country as a whole and over 30 per cent for the eastern roads.

Asked if only a small excess over the book accounts would not indicate that they had been improperly kept, in view of the large increase in prices over the original cost, Mr. Hulme said that Director Prouty had stated that the 1914 prices were fairly representative of the costs for 20 years back and that the costs as reported by the bureau do not reflect prices materially above the original cost.

Mr. Benton asked why land grants had been included in the figures, to which Mr. Hulme replied that the commission's reports included property found regardless of the source and that it was also his personal opinion that it should be included; but that land represents only about 10 per cent of the total figures for the 50 roads he had used and only about 12 per cent for all roads. Mr. Thom interrupted after several questions pertaining to land grants to ask Mr. Benton if he claimed that a railroad does not own property that has been given it. Mr. Benton said he was not interested in an argument at that time.

When Mr. Benton referred to several cases investigated by the commission where alleged improper entries had been made in the property accounts Mr. Hulme said that on the other hand many roads have written into their accounts property taken over from other companies at far less than the original cost. He mentioned that the Lake Shore & Michigan Southern had been taken into the New York Central accounts at the figure at which it stood on the Lake Shore books, which was far below the cost to the New York Central.

Asked why he had made no deduction for depreciation, Mr. Hulme said he had not undertaken to go beyond what the valuation bureau had reported.

Mr. Benton also asked numerous questions as to the amount of property paid for out of earnings and asked for an exhibit on that subject as complete as it is possible to make it; but was told that not even a reasonable estimate could be made in the time available.

Mr. Benton also mentioned several railroads as in the class of those whose construction had not been justified and asked

if their cost should be included in the aggregate value on which the railroads as a whole are asking a return. Mr. Hulme said that if there was no justification for the building of a road it should not be included but that in view of the present demand for transportation facilities he knew of no such road. In reply to questions, he said that individual property investment accounts include property bought for transportation purposes but not yet used, but that he had omitted $18,000,000 of such items as debatable in making up his comparison. He also admitted that the property investment account of the Mobile & Ohio includes some property destroyed during the Civil War.

Finally Mr. Benton asked whether, in view of the special facts such as the high level of prices and the cost of living resulting from the war, the commission might not give less weight to cost of reproduction figures in this case than in the ordinary case. Mr. Hulme replied that the decreased purchasing power of the dollar should be taken into consideration in the case of the railroads as well as in other matters and that on an equated basis the same weight should be given to the cost of reproduction factors as in 1914. If the railroad dollar had been treated on the same basis as other dollars, he said, the present application for a rate advance would not have been necessary.

In reply to a question by J. S. Burchmore, Mr. Hulme said the property around the New York Central and Pennsylvania terminals in New York devoted to office buildings and hotels was not carried in the railroad property accounts but in the accounts of separate real estate companies.

Glenn E. Plumb asked Mr. Hulme several questions as to the amount of railroad lands acquired by eminent domain, or under grants which, according to Mr. Plumb's theory, limit the railroad's interest in its land, etc. Mr. Hulme said he had made no study of the matter.

M. P. Blauvelt, vice-president of the Illinois Central, who had presented the statistical testimony for the southern lines, followed Mr. Hulme and was cross-examined by C. E. Cotterill and other representatives of the shippers.

Mr. Blauvelt's cross-examination was devoted mainly to an effort to show that the carriers' exhibits made too unfavorable a showing because there had been charged into the accounts for the constructive year all items of increased expense while the shippers' representatives seemed to think that insufficient allowance had been made on the revenue side for increases in rates which became effective during the latter part of the year or about January 1, or for increases in traffic. Mr. Blauvelt said that the instructions to the roads had been to include the revenue on a yearly basis for all important rate increases which became effective before January 1 and when it was shown that nothing had been added for the principal roads he said it must be because the amounts were found inconsequential. He thought an item of $100,000 for the Illinois Central might be considered too small to make an adjustment for, but Mr. Cotterill said that adjustments as small as $95 had been made on the expense side.

The inclusion in the January accounts of an estimate of the amount of back mail pay back to November 1, 1916, due from the postoffice department, caused a great deal of confusion in the minds of the shippers' attorneys. There was an item of about $8,500,000 for the Southern lines and Mr. Cotterill insisted that this should be treated as a source of increased revenue for 1920, but Mr. Blauvelt, with the assistance of two or three lawyers, explained that most of this belonged to the director general back of March 1 and that only $3,600,000 would accrue to the Southern lines for 1920. He said that a line was clearly drawn between the accounts after February 29 and that all of the cash was impounded by the director general while cash received since for transactions before that date were placed to his credit.

J. Van Norman, of Louisville, also got mixed up on the back mail pay when he produced a statement showing that the net operating income for the Southern lines in January and February had increased $12,000,000 over 1919, or 149 per cent, but it was later shown that the increase in mail revenue reported in the same statement had been nearly $11,000,000 or 764 per cent.

Mr. Cotterill said that on the basis of the adjusted year the Southern Railway would have earned only $6,000,000 net, whereas it had earned that much in four months of this year. Mr. Blauvelt showed that this included about $2,500,000 of back mail pay, and that traffic had so far this year shown an increase, but that no effort had been made in compiling the figures for the constructive year to speculate on an increase in traffic in 1920. He said March had been a good month for the Illinois Central and April had been better than April, 1919, although still showing a deficit. When Mr. Cotterill confidently predicted a continued improvement in traffic, Mr. Blauvelt remarked that his prediction would not buy anything.

When Mr. Cotterill asked whether any allowance had been made for any increased revenue the roads might receive from the increase in Pullman fares, Mr. Blauvelt replied that the question of contracts between the roads and the Pullman Company is still unsettled. Under the old contracts that existed prior to federal control some roads would share in the increase in Pullman revenues, but a new arrangement was made during federal control, which the Pullman Company wants to abrogate.

Mr. Cotterill asked about a rumor that many southern roads had increased the salaries of their executive officers, but Mr. Blauvelt said he had not heard of it.

C. R. Capps, vice-president of the Seaboard Air Line and the traffic witness for the southern lines, was questioned at length about the proposed adjustment of rates, particularly inter-territorial rates. J. Van Norman asked questions indicating opposition to percentage advances on the ground that they would disturb relationships. Commissioner Daniels asked why, since the purchasing power of money has been changed, the differentials should not be changed by the same percentage as the rates. Mr. Norman said it was not practical, but Frank Lyon, also representing shippers, took the position that long-haul rates should bear their share of the increase in expenses on the same percentage basis as short-haul rates.

As to the effect of increases in rates during the latter part of the year, Mr. Capps said that 88 per cent of the freight-rate authorities issued had been reductions, but that he was unable to say to what extent the importance of the increases overweighted the reductions in the effect on revenues. When Commissioner Aitchison asked if he had not noticed an unusual activity in increasing rates during the month preceding the termination of federal control Mr. Capps said he had not been in a position to notice anything of the kind at that time.

At the opening of the session on Tuesday morning F. H. Wood filed the answers of the carriers to the series of 13 questions propounded by the commission on May 28, calling for additional statistical information and for a statement as to how it is proposed to treat inter-territorial rates. As to two or three of the questions, it was explained that the carriers had not yet succeeded in obtaining the information so far. The reports of operating results for March and April were in a confused state because of complications in the accounts arising from the termination of federal control and it had so far been found impossible to ascertain the number of passenger miles of travel in Pullman cars, which the commission had asked for for the purpose of considering the advisability of a surtax.

Mr. Wood also filed by request a petition of the Chesapeake Bay lines and the coastwise lines operating between Atlantic ports and between Atlantic and gulf ports for

increases in rates on the same basis as the increases in rail rates.

The Mississippi-Warrior river inland waterway service, operated by the War Department, has also filed a request for an increase in joint rates by the same percentage as is applied to the rail lines.

Inter-Territorial Rates

In reply to the commission's question as to the methods proposed for increasing Inter-Territorial Joint Rates, a statement was filed in part as follows:

PROPOSED METHOD OF INCREASING INTER-TERRITORIAL JOINT RATES

Between

Official Classification Territory East of the Indiana-Illinois State Line and the Chicago Switching District

and	*Basis of Advance*
(1) Duluth, St. Paul, Minneapolis, Winona and points taking same rates; also Upper Peninsula of Michigan and Wisconsin. (Note: Rates governed by Official Classification.)	30 per cent.
(2) Western territory west of the Mississippi river, except Pacific Coast, Inter-Mountain and Southwestern territories (see note). (Note: Pacific Coast and Inter-Mountain territories include territory west of El Paso, Tex.; Albuquerque, Belen, N. M.; Provo, Salt Lake City, Ogden, Utah; Kuna, Ida., and points west of Idaho-Montana State Line. Southwestern territory includes Arkansas, Oklahoma and Texas and points in Louisiana west of the Mississippi river. Tariffs involved to be promptly reissued or supplemented so as to show specific increased rates.)	30 per cent east of junctions between C. F. A. lines and Western lines and 24 per cent west thereof.
(3) Points in Illinois, including west bank of Mississippi river points taking rates governed by the Official Classification.	30 per cent.
(4) Pacific Coast and Inter-Mountain territories, including Pacific Coast territory in Canada.	25½ per cent.

Between

All Points in Official Classification Territory, Including Points in Illinois, Wisconsin, St. Paul, Duluth, Winona, and Points Taking Same Rates; Also Mississippi River Pro-rating Points

and	*Basis of Advance*
(5) Southern Classification territory, via all-rail, rail-and-water, and rail-water-and-rail routes.	31 per cent.
(6) Eastern Canadian points, including Maritime provinces.	30 per cent.

Between

Pacific Coast, U. S. Points and Points in Inter-Mountain Territory

and	*Basis of Advance*
(7) Eastern Canadian points	25½ per cent.

Between

Points in Western Classification Territory

and	*Basis of Advance*
(8) Western Canadian points	24 per cent.

EXPORT AND IMPORT RATES VIA PACIFIC COAST

Rates made to equalize the rail and ocean rates via the North Atlantic ports to be advanced the same amounts in cents per 100 lb. as the base point rate to and from North Atlantic Coast ports is advanced.

RATES ON BITUMINOUS COAL FROM ILLINOIS AND INDIANA MINES

Rates on bituminous coal from Illinois and Indiana mines to be advanced 27 per cent to all points in Illinois territory and Wisconsin, including St. Paul and Minneapolis; to all points west of the above territory, 24 per cent.

Differentials to be adjusted upon receipt of decision of commission in the so-called Illinois Differential Case now before the commission.

ILLINOIS CLASS AND COMMODITY RATES

Between points in Illinois territory, advance rates, viz.:
Rates governed by Official Classification, 30 per cent
Rates governed by Western Classification, 24 per cent

with understanding that carriers will as soon as possible submit proposition to establish so-called Disque scale which will represent advance of 30 per cent in present Central Freight Association territory scale and be extended to 10 classes governed by Western Classification and exceptions thereto to apply throughout Illinois territory.

INTER-TERRITORIAL RATES TO AND FROM SOUTHWESTERN TERRITORY

The Official and Southern Classification territory lines propose the following:

Rates between Points in Official Classification Territory (East of Illinois-Indiana State Line) and points in the Southwest, namely, points in Arkansas, Oklahoma, Texas and Louisiana west of the Mississippi River.

(A) That these rates be increased in amounts which will approximately give to Official Classification lines an increase of 30 per cent in their present revenue to and from Ohio and Mississippi river crossings and Chicago and the Southwestern lines an increase in their revenue of 24 per cent.

Where inter-territorial joint through rates have been heretofore published on the combination of intermediate rates to and from the Ohio and Mississippi river crossings such combination rates shall be promptly revised to reflect the increase in each factor.

Rates between Points in Southern Classification Territory and points in the Southwestern Territory, namely, Arkansas, Oklahoma, Texas and Louisiana west of the Mississippi River.

(B) That these rates be increased 31 per cent.

(C) *Packing House Products, Fresh Meats, Dressed Poultry, Hides, Tallow and Fertilizer Carloads from Western Territory to Southern Territory.*

That rates or bases for rates on above commodities from producing points in Western trunk line and Southwestern territories to Southern Classification territory be increased 31 per cent.

(D) *Export and Import Rates to and from Texas Gulf Ports.*

That rates on this traffic be increased to preserve present relationship with rates to and from New Orleans.

(E) *Inter- and Intra-territorial Rates on Commodities.*

Rates on Commodities originating at Mississippi River crossings and points west thereof in Southern Missouri, Arkansas, Louisiana (west of the Mississippi River), Oklahoma and Texas which are related to those applying on the same commodities from Mississippi Valley territory.

That these rates to all territories except Pacific Coast and Inter-Mountain be increased 31 per cent. The commodities are as follows:

Sugar.
Molasses.
Rice and rice products.
Lumber and forest products.
Vegetable oils.
Vegetable oil cake, meal and hulls.
Naval stores.
Cotton and cotton linters.
Fruits, melons and vegetables.
Also Tropical fruits, sisal, coffee, asphalt, from Texas Gulf ports.

(F) *Rates between Mississippi River Crossings.*

The rates via all lines on classes and commodities between Mississippi River crossings south of Cairo and points grouped therewith (on the one hand) and Mississippi River points, Cairo and north to and including St. Paul, Minn., and points grouped therewith, and points east thereof in Illinois and Wisconsin (on the other hand) to be increased 31 per cent.

(G) *Rates from Missouri River Points to Lower Mississippi River Points.*

Rates from Missouri River points and points grouped therewith to Mississippi River crossings, Helena, Ark., and south, and points grouped therewith, when governed by the Southern Classification, to be increased 31 per cent.

Rates referred to in above paragraphs "A" to "G," inclusive, to be published in specific form where the increases cannot be handled by the blanket or percentage supplement.

RATES (EXCEPT ON GRAIN AND GRAIN PRODUCTS FROM POINTS NORTH OF THE OHIO RIVER AND NORTH OF THE STATES OF ARKANSAS, OKLAHOMA AND TEXAS

Between Southern Classification Territory

and	*Increase*
Canadian territory, not including Pacific Coast and Inter-Mountain territories.	31 per cent.
Western territory, except as otherwise provided (rates to be promptly revised to not exceed combination of rates increased 31 per cent east and 24 per cent west.)	31 per cent.
Pacific Coast and Inter-Mountain territory, including Pacific Coast points in Canada.	25½ per cent.

EXPORT RATES (EXCEPT GRAIN AND GRAIN PRODUCTS FROM ILLINOIS AND WESTERN TRUNK LINE TERRITORY TO GULF PORTS)

From C. F. A., Illinois and Western Trunk Line territories to Gulf and South Atlantic ports published by Agents Boyd and Speiden to be advanced 30 per cent.

COAL AND COKE—CARLOAD	*Increase*
From Southwest Virginia—Eastern Kentucky and Eastern Tennessee district to points north of the Ohio and points west of the Mississippi Rivers.	Same amount as from C. & O. Kanawha District.
From Western Kentucky to points north of the Ohio River and to points west of the Mississippi River.	Same amount as from Southern Illinois mines.
From Western Virginia to Carolina territory and the South.	Same percentage as from Virginia mines.
From Illinois mines to Southern territory	Same percentage as from West. Ky. mines.
From Virginia and Tennessee mines to South Atlantic ports for export and coastwise and where export and coastwise rates are published.	Same amount as from W. Va. mines to Hampton Roads ports applying outside the Capes.

COMBINATION RATES

The so-called combination tariffs, issued by Agents Morris and Speiden (Morris' I. C. C. U. S. 1 and Speiden's tariff 44A) should be cancelled. Also that all rules in other tariffs providing for single advances on certain commodities, where no through rates are in effect and charges are the combination of rates, be eliminated.

Where it is the custom to carry general traffic on joint through rates, it is the purpose of the carriers to establish joint or proportional rates on commodities provided for in the combination tariff above referred to in instances where there is a regular movement of such commodities.

Under this assurance joint through rates, or proportional rates, will be established at once on lumber and articles taking lumber rates from Pacific Coast and intermediate producing points to points in Central Freight Association territory, also from Southwestern producing points where joint tariffs are not now in effect.

MINIMUM CLASS SCALES

The percentage of increase in the respective territories should be applied to the minimum class scale in such territories. Any provisions now published, to the effect that the minimum class scale will apply to combination rates, to be cancelled allowing the minimum class scale to apply to each factor where joint through rates are not in effect.

Any provisions now shown in tariffs, making the minimum class scale subject to exceptions to the governing classification, to be cancelled, the intention being that the minimum class scale of the governing classification should be the minimum to be charged on any shipment carried at class rates.

MINIMUM PER CAR CHARGE AND PER SINGLE SHIPMENT CHARGE

The minimum charge of $15.00 per car and the final minimum shipment charge of 50 cents per single shipment to be increased in all territories, 30 per cent.

The present provision under the consolidated classification and in various tariffs to the effect that the minimum carload charges or the minimum charge per shipment would apply only once, when shipments are handled

on combination rates in the absence of joint through rates, to be cancelled allowing the minimum charge to apply to each factor.

GRAIN RATES

Western Trunk Line Territory

The rates on grain between points in the Western Trunk Line territory, other than Illinois, to be increased 24 per cent. This will include rates to Chicago, Milwaukee, Peoria, St. Louis, Minneapolis, Duluth, and Missouri River Points, etc.

Between points in Illinois and East St. Louis and St. Louis rates to be increased 30 per cent; between points in Illinois and Cairo where heretofore equalized through East St. Louis or St. Louis rates to be made 3½ cents higher than to East St. Louis or St. Louis; between other Illinois points and Cairo rates to be increased 30 per cent; between all other points in Illinois, 30 per cent.

Between points in Illinois and Milwaukee and Southern Wisconsin intermediate thereto 30 per cent.

Inter-territorial Rates

From points in Illinois to New Orleans, Memphis and Mississippi River points south of Memphis, rates to be made on combination through St. Louis, the combination through Cairo equalizing. Exception: Rates from points in extreme southern portion of Illinois will be based on Cairo.

To Louisville from Central and Northern Illinois, rates to be made 3 cents higher than to Cairo, which will equalize to Southeast against Cairo.

From Chicago and Peoria reshipping rates to Memphis and Mississippi River points south to New Orleans inclusive, to be increased so as to equalize on grain from Minneapolis as against routes through St. Louis.

From Missouri River points north of St. Joseph, Mo.; from Minneapolis, Duluth and from interior points in Iowa, Minnesota, South Dakota, Wisconsin and Northern Missouri to Cairo, Memphis, New Orleans, and Mississippi River points south of Memphis rates via all routes to be made on the combination through St. Louis, which is the present basis.

From Missouri River points, St. Joseph, Mo., and south to Memphis, New Orleans and Mississippi River points south of Memphis also to Cairo on shipments to the southeast, rates to be made one cent per 100 pound under Omaha, which is the present basis.

From points west of the Missouri River (Kansas, Nebraska, Colorado) to New Orleans, Memphis, and Mississippi River points south of Memphis, rates to be made on the combination to and from the Missouri River, except from points now taking a basic difference under the Missouri River combination; from such points the present difference will be continued.

From Missouri River points to Arkansas and Louisiana rates to be increased 24 per cent.

From points west of the Missouri River, Kansas, Nebraska and Colorado to Arkansas and Louisiana rates to be made the same difference under the combination to and from the Missouri River as of today.

From points east of the Missouri River to Arkansas and Louisiana, rates to be made the combination on Kansas City or St. Louis gateways.

From St. Louis and Cairo, also Memphis to Arkansas and Louisiana, rates to be increased 24 per cent.

Rates on export grain from Missouri River and St. Louis to Galveston and other Texas ports to be made in the same relation with New Orleans as today.

From Minneapolis and common points to Atlantic Seaboard the through rates now published via northern routes through Mackinac, Sault Ste. Marie and other northern gateways to be increased so as not to be less than the combination of rates from Minneapolis to Chicago and Chicago to the Eastern Trunk Line territory.

GRAIN PRODUCT RATES

The increased rates on grain to apply to grain products and articles related therewith now taking grain rates.

From Ohio River Crossings and Memphis to the South

From Cairo and Ohio River crossings east thereof to southeast, advance 31 per cent.

From Memphis to Southeast, make 6½ cents less than from Cairo.

*Proportional rates from Louisville to Southeast, 3 cents less than from Louisville proper.

*Proportional rates from Cincinnati to Southeast, same proportional rates as from Louisville.

*These rates to have the same application as to territory of origin as the present proportional rates.

From Cairo and Ohio River crossings east thereof to Mississippi Valley reshipping and local rates, advance 31 per cent.

From Memphis to Mississippi Valley reshipping rates, make 6½ cents under Cairo reshipping rates.

From Memphis to Mississippi Valley local rates, advance 31 per cent.

In response to inquiry No. 12, as announced by the commission, it was announced that the carriers in Official and Western Classification territories propose to apply the respective group percentages of increases in rates to all switching rates or charges, except that at junction points between carriers in Official and Western Classification territories the increase will be 30 per cent. The carriers in Southern Classification territory propose to increase all switching rates of all purely switching and terminal roads, and the intra-plant, intra-terminal and inter-terminal switching rates of other carriers 31 per cent.

The Southwestern lines, that are asking an increase of 32.8 per cent, also filed a statement of their proposed method of treating Inter-Territorial Rates.

Mr. Capps was followed by L. E. Wettling, statistician for the western roads. S. H. Cowan asked several questions as to why the railroads had based their exhibits on the adjusted year ending October 31, 1919, instead of on an actual year or upon recent months. Mr. Wettling explained that they had also filed the later statistics but that they had made up the adjusted statistics because they could no longer operate under the conditions that existed during the early part of 1919 and had, therefore, allowed for known increases in expenses, but had made no attempt at prophecy as to the conditions of 1920. When Mr. Cowan asked if the traffic delayed by the congestion would not result in future increases, Commissioner Aitchison interrupted to ask if the attempts to clear up the congestion would not result in somewhat wasteful operation such as an increase in empty-car mileage. Mr. Wettling replied that that had been the experience of the Railroad Administration when it had similar conditions to deal with.

Ralph Merriam, of Chicago, asked whether the increase in mantenance-of-way expenditures for the western roads reflected increases in quantities of rails, ties and ballast, or increases in prices and wages, Mr. Wettling said that studies made by many western roads indicate that if the same quantities had been used as in a comparative previous period maintenance of way would have cost $380,000,000 instead of $324,000,000. He said they showed less rails, ties and ballast used in 1919.

C. E. Elmquist brought out that if the Southwestern lines are allowed the advance of 32.8 per cent they have asked, the other western lines would need only about 22.5 per cent, and asked how much the transcontinental lines, treated separately, would need. Mr. Wettling had not the figure and Mr. Elmquist suggested 10 per cent. Mr. Wettling thought it might be a little higher but admitted that if 24 per cent is given the western roads as a whole the transcontinental lines would receive more than they need to make 6 per cent. Mr. Elmquist also asked why no allowance had been made for the abnormal conditions of 1919 and for increases in efficiency and in traffic in 1920. Mr. Wettling said there had never been a perfectly normal year and that there was no guaranty that the abnormal conditions of 1919 or something similar will not occur again.

Edward Chambers, vice-president of the Atchison, Topeka & Santa Fe and the traffic witness for the western roads, was questioned on Wednesday afternoon by C. E. Elmquist and other representatives of the shippers. Mr. Elmquist asked if a very large part of the traffic of 1918 and 1919 was not government traffic which was handled at land grant rates and if the railroad figures as to results for 1919 would not be erroneous to the extent of the reduction. Mr. Chambers said that land grant rates were paid on such traffic just the same as under private operation and that roads in competition with land grant roads received the same rates as the land grant roads, but he did not admit that the land grant factor rendered the exhibits erroneous. Mr. Elmquist pointed out that the Railroad Administration in increasing rates had used specific advances or at least specific maximums in increasing long haul rates on lumber, grain, etc., and asked why it was not proposed to do so at this time. Mr. Chambers said that the conditions are now different, that a difference of a few cents in the rate would not affect food prices, that the railroads need the percentage of advance which they have asked and that if any exceptions were to be made he would not know how to select them. Mr. Elmquist said that the rate on lumber from the Northwest to New York, now 80 cents, would be increased to $1.00, while a rate from the South would be increased only to 50 cents and asked if the difference would not interfere with the movement of traffic. Mr. Chambers said the difference might make it more difficult for the West to compete with Southern lumber. When Mr. Elmquist said that the price of lumber had been reduced $30 per thousand during the last two weeks, Commissioner McChord wanted to know what the price could have been before such a large reduction, but Mr. Elmquist was unable to answer.

Mr. Elmquist also quoted from a recent speech by Mr. Hines, in which he said that the Railroad Administration could get along on an increase of 7 per cent in rates. Mr. Chambers said that Mr. Hines did not get such informa-

tion from him. When Mr. Elmquist asked whether the carriers are not now expecting an improvement over the conditions of 1919, Mr. Chambers said he did not understand that they are; that while the situation was affected considerably by strikes during 1919 there had been strikes before, there had been a strike this year and probably there would be abnormal conditions in the future. The questioning of Mr. Chambers by representatives of the shippers was not completed within the time allowed for cross-examination and Chairman Clark said that it could be continued on Thursday but he suggested that the questioning be "confined to cross-examination."

The members of the commission have asked very few questions and have displayed an obvious desire to avoid delay to the proceedings by quibbling cross-examination. Commissioners Aitchison and Eastman have asked most of the questions that were asked from the bench. The three state commissioners that have been sitting with the federal commissioners have remained silent.

The hearing on Thursday was to be devoted to testimony on behalf of state commissions, the National Industrial Traffic League, whose executive committee has gone on record in favor of a percentage advance in rates, and other general testimony by shippers. The succeeding days to June 22 have been scheduled for evidence pertaining to particular commodities.

S. H. Cowan, Clifford Thorne, Graddy Cary and S. C. Rowe, representing live stock interests, have issued a circular letter expressing opposition to a rate advance greater than would be necessary to give the railroads a net operating income equal to the "standard return" guaranteed them during federal control, and urging that passenger, baggage, mail and express rates be increased as well as freight rates, and that the advances should be so adjusted as to let the least burden fall upon the food products from the farm and the ranch. "Since valuation cannot be found except on a guess," the letter says, the statutory rule prescribing a retion of 5½ or 6 per cent cannot apply, the conditions being impossible of ascertainment, and "reasonable rates" should be fixed upon "general principles" as heretofore.

Car Service Conditions

WASHINGTON, D. C.

In response to the telegram of the Interstate Commerce Commission to Daniel Willard, chairman of the Special Committee on Car Service Matters, of the Association of Railway Executives, with respect to non-compliance with the service orders of the commission, which telegram was made public on June 2, the commission announced on June 3 that it had received the following reply from Mr. Willard:

"Your message this date has just been received in New York and I have taken matter up by wire with executives of all carriers upon whom your orders one, two and three have been served. Have repeated your message in full and have urged their prompt and complete compliance therewith. I hope their response will be such as to make unnecessary further action on the part of the commission. You may be assured of the full support of myself and committtee of which I am chairman."

The Interstate Commerce Commission on June 3 made public a report made by the American Railroad Association showing the number of cars loaded with revenue freight for each week beginning with March 21 and including May 22, compared with the corresponding weeks in 1918 and 1919. This showed a falling off during the strike period and a gain since April 17, while the figures show a large increase over 1918 since May 1, although still below the high record set in 1918. The revenue loading for the weeks ending on the dates given were as follows:

	1918	1919	1920
March 27	.....	608,572	741,502
April 3	927,575	585,247	722,738
April 10	958,119	612,860	646,852
April 17	976,991	619,792	515,861
April 24	998,880	552,196	542,511
May 1	1,000,860	612,763	634,837
May 8	998,588	670,857	720,641
May 15	1,000,746	653,240	698,390
May 22	998,035	688,424	750,978

The 1919 and 1920 figures do not include the Pennsylvania and several other roads that failed to report, but which, it is estimated, would add at least 100,000 cars a week to the total. On this basis the 1920 loading would be about 80 to 85 per cent of that for the corresponding period of 1918.

The accumulation report for May 28 shows 159,209 cars held in greater numbers than could be handled or disposed of currently, as compared with 168,000 the week before and 269,000 on April 24. There has been a steady reduction in the accumulations since that date but the improvement shown has been slow, partly because of the inability of consignees to unload at places where the longshoremen's strikes are still in effect. Of the total on May 28, 48,000 cars were held because of the inability of consignees to accept them, 14,640 on account of embargoes, and 35,009 were for export.

The American Railroad Association has resumed the publication of reports showing car surpluses and shortages, or "deferred car requisitions" as they are now termed. J. E. Fairbanks, general secretary of the association, on May 28 issued a circular including a summary of the reports, compiled by the Commission on Car Service, showing an average of deferred car requisitions for the period May 1 to 8 of 79,272, as compared with 87,346 for the period April 1 to 8. The average surplus was 4,616, as compared with 6,370 in April. For the week ending May 23 the average of deferred car requisitions had increased to 98,936 and the average surplus had been reduced to 2,909.

In a circular addressed to the railroads on June 2, Chairman Kendall of the Commission on Car Service said the production of bituminous coal during April and May has been averaging two and one-half million tons per week less than what is necessary for the country's adequate fuel supply and particularly to permit a sufficient movement up lake to the northwest and ocean and rail to New England to protect next winter's consumption in those sections. The average placement on bituminous coal loading roads has been approximately fifty per cent.

In order that coal production may be increased and discrepancies in placement as between commodities made up, the circular said, it is necessary that:—

1. Railroads must distribute available coal cars for loading coal to a minimum of 50 per cent of actual requirements before distributing coal cars for loading other commodities.

2. Railroads may distribute available coal cars for loading other commodities requiring open cars to an extent not exceeding 50 per cent of actual requirements based on ability to load and ship, and any surplus as available shall be applied to increase the supply for coal loading.

3. Railroads having no coal loading will restrict the supply of coal cars for loading of other commodities requiring open cars to an extent not exceeding 50 per cent of actual requirements based on ability to load and ship. Foreign cars used in this manner must be loaded strictly in accordance with car service rules, and must not be back-hauled for loading.

4. Coal-carrying cars must not be used for the loading of automobiles and other commodities which can be transported in box-cars and other types of equipment.

In another circular Mr. Kendall said: The extended time within which the common carriers shall make their freight

cars actually in service conform to certain standards of equipment prescribed by the Interstate Commerce Commission expired on March 1, 1920. Indications are that petition for extension of this time will be denied, although the provisions for penalties accruing may be postponed until November 1, 1920. This means that the railroads will have until November 1, but not beyond, to comply with the safety appliance law and it is important that the work be completed by that date.

To meet this condition it is necessary that railroads immediately load all foreign cars on their lines not fully equipped with safety appliances, to the owning road. If load is not immediately available waybill cars empty to home road at once via the shortest route and to the nearest junction. A list of these cars will be issued to all railroads by this commission as soon as necessary information is received. Commencing with records as of July 1, and as of the first of each succeeding month, all railroads will report all such cars that may be on their line.

Railway Claim Agents

THE THIRTY-FIRST ANNUAL CONVENTION of the Association of Railway Claim Agents, which was held at Atlantic City, N. J., on the 19th, 20th and 21st, was briefly noted in our last issue, page 1584.

Restoration and re-employment of injured employees was one of the principal topics discussed by the convention. F. A. Hruska, (N. Y. C.) chairman of the committee, presented a comprehensive review of the present situation. He summarized the reports which were made last August by Dr. D. Z. Dunott, chairman of a committee appointed by the United States Railroad Administration, in which it was shown that only one road, the Illinois Central, had a reconstruction department for the education of injured employees. On 144 roads answering questions of the committee there were 222 employees totally disabled in 1918, and 2,363 partially disabled. Most of the railroads seem to feel no need for any further or different organization in this matter. The committee notices a clinic for functional re-education at No. 5 Livingston Place, New York City, where both soldiers and civilians are treated and trained. The American Red Cross Institute is another establishment in New York City (311 Fourth Avenue).

Employees generally do not take kindly to schooling; and yet the committee believes it would be wise for the American Railroad Association to consider the establishment of some school or institution. The seniority rules of the brotherhoods interfere with the placing of injured employees in positions best suited to their capabilities. The committee believes that educational work in this field should be carried on by the claim departments of the railroads, the officers of which come closely in contact with individual cases.

The committee on Compensation, F. V. Whiting (N. Y. C.) chairman, presented a review of the present status of state legislation in this field. Only six states are now without laws of this kind—Arkansas, Florida, Georgia, Mississippi, North Carolina and South Carolina. The committee recommended that efforts be made to have the broad general principles of compensation laws made uniform by legislative action in each state. The rights of the employer to insure himself should be carefully guarded; attention should be given to the six states which do not grant this right.

Publicity in the handling of claims was the subject of an interesting paper by H. B. Hull (Ill. Cent.). The newspapers give prominence to many things about damage claims which are unfavorable to the railroads, but often fail to give reasonable prominence to the other side of the matter. Mr. Hull believes it a good thing to use the employees' magazines to give their readers right impressions of results of trials of cases in court. Nothing should be concealed from employees or the public. Take special care not to exaggerate. Whenever an attempt is made to perpetrate fraud on the railroad, the matter should be made public; and if the efforts are successful it may occasionally be advisable in subsequent years to remind the public of the facts. The speaker cited cases where passengers had recovered heavy damages and afterwards were found to have deceived the court and the juries, claiming ill health falsely.

Pamphlets and advertising space in newspapers can be used to good advantage. The Illinois Central in this way made an appeal to farmers who allow their cattle to stay on the tracks, and the appeal had good results. President C. H. Markham, of the Illinois Central, believes in taking the public into his confidence and this spirit now actuates the entire organization of the railroad. This has resulted in a good many newspaper controversies but the effect on the whole is regarded as beneficial.

The committee on grade crossings, S. J. Peterson (U. P.) chairman, presented a report containing suggestions relative to reducing automobile disasters at crossings. A committee should formulate and submit to the railroad managements a plan for securing the co-operation of automobile clubs, superintendents of highways and the railroad brotherhoods. The committee submitted fifteen points on which effort should be concentrated to improve conditions at crossings, and another long list of features in which legislation ought to be sought.

H. L. Dunham (C. & O.), discussing practices developed during federal control of the railroads, with a view to seeing which of these should be deemed of permanent value, declared that the feature of *least* value was the handling of employees' damage claims through brotherhood grievance committees, instead of directly with the persons injured. The railroad may be bound by the decision reached at a conference with the grievance committee but the employee is not; and he still may go into court. The only proper course is to adhere strictly to past practices and give such employees exactly the same treatment that is accorded to all other employees.

J. Donahue (L. & N.) read a short paper on the desirability of keeping records of physical examinations. Many claims have been settled for hernia and other alleged injuries said to have been received while on duty which really were of long standing but not discovered when the man was examined; or else discovered but not properly recorded in permanent shape. An instance was cited where a machinist sustained an injury to an eye and it was discovered that the man's other eye already was sightless; in other words the injury made him totally blind. This man's wife testified that she had been married to him for several years before she learned that his vision was defective. It would be a good thing to have periodical examinations of employees in service, as a precaution against fraudulent claims. Touching upon mental examinations, Mr. Donahue said that on southern roads many good employees are men who when first taken into the service were illiterate; a rule against admitting such would be detrimental to the service. Many men from the mountains come into the service and do good work; they take advantage of the Y. M. C. A. and other educational institutions, and ultimately fit themselves for promotion.

H. H. Downs, chief claim agent of the New York Central at New York City, read a paper on fraudulent claims, citing a long list of interesting cases.

THE HUDSON VEHICULAR TUNNEL and the Delaware River Camden-Philadelphia Bridge bills were passed by the New Jersey legislature over the veto of Governor Edwards. The bills will be voted upon by the people at the next election.

Rules for Prompt Payment of Freight Charges

The Interstate Commerce Commission on June 4 issued the following rules and regulations governing the payment of freight charges, to become effective on July 1, under the authority given it by the transportation act, which will take the place of the rules prescribed by the Railroad Administration in General Order No. 25 and a subsequent circular:

1. Where retention of possession of any freight by the carrier until the tariff rates and charges thereon have been paid will retard prompt delivery or will retard prompt release of equipment or station facilities, the carrier, upon taking precautions deemed by it to be sufficient to insure payment of the tariff charges within the period of credit herein specified, may relinquish possession of the freight in advance of payment of the tariff charges thereon and may extend credit in the amount of such charges to those who undertake to pay such charges, such persons being herein called shippers, for a period of 96 hours to be computed as follows:

(A) Where the freight bill is presented to the shipper prior to, or at the time of, delivery of the freight the 96 hours of credit shall run from the first 4:00 p. m., following the delivery of the freight.

(B) Where the freight bill is presented to the shipper subsequent to the time the freight is delivered the 96 hours of credit shall run from the first 4:00 p. m., following the presentation of the freight bill.

2. Every such carrier shall present freight bills to shippers not later than the first 4:00 p. m. following delivery of the freight, except that when information sufficient to enable the carrier to compute the tariff charges is not then available to the carrier at the delivery point, the freight bill shall be presented not later than the first 4:00 p. m. following the day upon which sufficient information becomes available to the delivering agent of the carrier.

3. Shippers may elect to have their freight bills presented by means of the United States mails, and when the mail service is so used the time of mailing by the carrier shall be deemed to be the time of presentation of the bills. In case of dispute as to the time of mailing the postmark shall be accepted as showing such time.

4. Sundays and legal holidays, other than Saturday half holidays, may be excluded from the computation of the period of credit.

5. The mailing by the shipper of valid checks, drafts, or money orders which are satisfactory to the carrier in payment of the tariff charges, within the period of credit prescribed above, may be deemed to be payment of the tariff charges within the period of 96 hours of credit. In case of dispute as to the time of mailing the postmark shall be accepted as showing such time.

The carriers have estimated that the enforcement of General Order No. 25 provides them with working capital of approximately $75,000,000, which, if the customs and practices in the extension of credit to shippers in vogue prior to the enforcement of that order were restored, would generally be outstanding as unpaid transportation charges.

The carriers asked that the rules and regulations to be promulgated should follow, as nearly as is practicable, the provisions of General Order No. 25 and the circular. A large number of the shippers joined in a request that in certain cases and upon surety bonds being furnished by the shippers, the carriers should render freight bills daily, and periodical statements of the bills on the 7th, 14th, 21st, and last day of each month, and that the shippers shall pay the bills within three days after receiving the statements. The shippers and the carriers acknowledged that a large proportion of the shippers do not need, and will not ask for, credit, and that such credit is necessary only in connection with forwarding or delivery of those whose shipments are extensive or in connection with shipments received or delivered by the carriers under circumstances hereinafter described. The maximum period of credit suggested by the carriers as proper and necessary was 96 hours, and the period asked by many of the shippers was that of weekly settlement as described above. A few of the shippers, including the Lake Superior Iron Ore Association, asked that the rules and regulations should permit carriers to resume the practices antedating General Order No. 25—that is, to extend long periods of credit to shippers—but that practice is now clearly prohibited by the statute.

In its opinion the commission said in part:

"With but few exceptions the shippers have indicated that they do not expect credit for the purpose of financial accommodation in the amount of the transportation charges. The shippers ask that the rules and regulations which we promulgate shall provide for a short period of time between the delivery of the shipments or the rendering of the freight bills and the payment of the transportation charges, the following reasons being representative:

1. Several shippers have asserted that this brief extension of credit is necessary to enable them to audit the freight bills and correct erroneous applications of rates prior to payment of charges incorrectly computed by the carriers.

2. Both shippers and carriers requested that a reasonable time be granted for the computation of transportation charges, the presentation of freight bills, and the collection of charges on shipments, which, in accordance with custom and practice or tariff revisions, are collected upon destination elevator, cotton compress, official, certified, or other destination or outturn weights, the weighing being customarily done after the delivery of the shipments at destination.

3. Upon certain freight traffic, in accordance with tariff provisions for the computation of transportation charges at outturn weights or values ascertained by consignees, it is not customary for the carriers to make, or present to shippers, bills for the transportation charges until after the carriers have relinquished possession of the shipments at destination.

4. Many large shipping corporations are engaged in the operation of mines, the production of lumber, or production of raw materials, and other commodities in sparsely settled districts far removed from banking facilities, where the carriers and shipping corporations do not maintain, and can not reasonably be expected to maintain, office forces entrusted with funds for the settlement of transportation charges. A large tonnage of freight traffic is customarily shipped to and from the operations in such districts. An undue burden would be placed upon industry if rules and regulations should require financially responsible shippers, such as mining companies and other corporations, to station appropriate employees at each of their several mines or operations to pay transportation charges on shipments consigned to such operations. It is not always advisable to entrust or encumber those engaged in trucking freight for shippers with funds for the payment of transportation charges. The foregoing is a sufficient recital of the exigencies described at the hearing.

"The carriers assert that the number of erroneous freight bills has not been large, and the rendering of incorrect freight bills is a temporary war-time condition, ascribable to the unusual labor turnover during the past four years, which will soon be remedied. Section 6 of the interstate commerce act provides that no carrier subject to the provisions of that act shall demand, collect, charge, or receive a greater or less or different compensation than is provided in the published tariffs. Section 3, paragraph (2), does not authorize carriers to extend credit to shippers in order that the shippers may have time to audit freight bills and thereby guard against

claims for overcharges or undercharges subsequent to payment of the freight bills. We expect the carriers to take action that will substantially reduce the number of erroneous freight bills rendered.

"The intention of Congress to require by statute the enforcement of the provisions of General Order No. 25, as supplemented, in so far as they may be reasonably applied is manifest. Those provisions have been in force for 22 months and the business methods of the shippers and carriers have been adjusted to conform thereto. The rules and regulations which we promulgate should contemplate the collection of transportation charges prior to, or contemporaneous with, the delivery of most shipments, and, while adhering to the principle of prompt payment of charges, should, upon certain freight traffic, give opportunity for the preparation of freight bills at destination, weights to be ascertained after the carriers have relinquished possession of freight, and for the presentation of freight bills to the appropriate offices and employees of shippers by United States mail, by messenger, or by other proper means, and for payment of the charges in the regular course of business by the shippers.

"In the rules and regulations which we promulgate we will not undertake to deal with several matters which were covered by General Order No. 25. We will not prescribe rules for the collection of prepaid charges on shipments of freight, or for the collection of passenger fares or baggage charges, or for the form or character of surety bonds. We believe that our order will admit of the application to those matters of the provisions of General Order No. 25, as supplemented, or other appropriate rules to be formulated by the carriers, and that we should leave the carriers free to prescribe these and other details in the instructions which we expect that the carriers will issue for the guidance of their agents. We expect that carriers will refrain from granting undue extensions of credit that might arise from the transmission of freight bills, checks, drafts, and money orders through the mails to or from offices of shippers that are located at a considerable distance from the places where the carriers relinquish possession of the freight."

An Enclosed Jet Paint Sprayer

A PAINT SPRAYER embodying a number of innovations in design and principle has been placed on the market by the Vortex Manufacturing Company, Cleveland, Ohio, and is known as the Vortex paint sprayer. The particular features of this sprayer are involved in the design of the nozzle, which is such that the paint and air which are conducted to the nozzle through independent conduits are discharged from it through separate openings—the paint through a central port and the compressed air through an annular opening—surrounding the paint outlet. As a consequence the jet of paint is completely surrounded by a cone of compressed air which is said to afford a definite reduction in the tendencies towards spattering and the formation of paint clouds.

The nozzle affords ready adjustment for the relative discharge of paint and air in addition to a trigger control for the stopping and starting of the flow. By shutting off the supply of paint the machine may be used as an air brush to blow dust from the surfaces before painting. The sprayer is said to carry a large volume of paint, owing to the fact that it does not produce a thinly divided spray but applies a relatively heavy liquid. Good penetration of rough surfaces is insured because of the brushing effect of the high pressure air discharge. An arm or extension handle is provided for this sprayer so that the paint may be applied nearly 12 ft. away from the operator's hands. This greatly reduces the necessity for ladders and scaffolds. Recently a water tank having its top 18 ft. above the platform upon which the work was done was painted complete without the use of any staging or ladders whatever.

The device is furnished complete with an air compressor driven by a gasoline engine and a paint reservoir pressure tank, both mounted on wheels. On plain interior work

The Sprayer in Use, with the Complete Outfit in the Foreground

where conditions were favorable, experienced operators have covered as much as 2,000 sq. ft. of surface per hour, less experienced operators have readily placed 1,000 to 1,600 sq. ft. per hour. The water tank referred to above had 3,500 sq. ft. of surface, which was coated in 3½ hours.

Duplicate Tracings

A NEW PROCESS has been introduced for making waterproof tracings on cloth, paper or other pliable material, from original tracings by means of a photo-chemical process. The reproduced tracings may be either of the same size or an enlargement or reduction of the original, the lines on the reproduced tracing being formed in a waterproof coating placed upon the cloth or paper. As a consequence the lines do not rub off in the handling of the tracing, although the coating lends itself readily to erasing when alterations are to be made. The coating also permits the addition of lines to the tracing with the use of the ordinary India ink as on regular tracing cloth. The process used also provides for the elimination of any portions of the original tracing which it is desired not to reproduce. These duplicate waterproof tracings are made by the American Blueprint Paper Company, Chicago, under what is termed the Baker print process.

THE RAILWAYS OF URUGUAY, during the year ending June 30, 1919, enjoyed an increased traffic, but in spite of this, if the sections of the Central railways be excepted, although traffic and receipts had grown, expenses also increased to such an extent that the economic situation of the railways was but little improved. The Government paid both the Midland and the Northern railways the full amount of the guarantee. On the other hand, the Central returned to the State 86,120 pesos, being two-thirds of the excess over 6 per cent of the net receipts from the northern extension, eastern extensions and northwest branch.

General News Department

An airplane was kept continuously in the air, near Paris, on June 4, for 24 hours 19 minutes 7 seconds. The distance traveled during this time was estimated as 1,915 kilometres, or 1,190 miles. This record, made by Lieutenants Bossoutrot and Bernard, was more than two hours better than the best previous record.

The "Old Guard" of the Nashville, Chattanooga & St. Louis—34 veteran employees of that road—held their annual dinner at the Union Station, Nashville, Tenn., on May 31. Major William L. Danley, who entered the service in 1857, and who for about fifty years was general passenger agent, is secretary of the organization. Of the eight negroes who were present, one Lige Kaiser, said that he began his railroad service in 1849. Under the present regulations, members of this body are those who have been in the service of the road 40 years, or who were in the service prior to 1870.

The Order of Railroad Station Agents, at its biennial convention recently held at Pittsburgh, Pa., voted, after discussions lasting three days, to eliminate the word "strike" from its constitution. This action was taken because of the organization's faith in the provisions of the Transportation Act for the handling of employees' grievances. The organization also voted to remove its headquarters from Boston, Mass., to Chicago. So far as can be ascertained at the present time, this is the first organization of the kind, composed of railroad employees, which has, because of this faith, eliminated strike clauses from its constitution.

Shopmen of the Virginian Railway, who left their work and disarranged traffic for two weeks, returned to work on June 1. The strike began at the Princeton shops, where a boilermaker was discharged for refusing duty. He was reinstated, but denied two days' pay for the time which elapsed between his discharge and reinstatement. Because of the railroad's refusal to pay this two days' wage, a strike was called, and 835 men walked out at Princeton and other points on the line. The coal piers at Sewall's Point had to be operated by green hands. The terms on which the men returned to work are not published.

Store-door delivery of freight, and the economies attainable by means of it, were illustrated recently at Indianapolis, Ind., by a temporary expedient adopted to clear a congested freight station. A condition necessitating embargoes being immediately in prospect, an agreement was reached, through the Chamber of Commerce, under which consignees accepted shipments of goods from any truckman who delivered them and the truckmen arranged to load at the freight house the most readily accessible freight; and the trouble was cleared up within six days. This, says The B. F. Goodrich Rubber Company, in reporting the incident, should impress on the railroads the value of motor trucks as the essential instrumentality in securing a constant flow of shipments through freight houses. And the rubber man sees prospects of numerous orders from railroad companies for large capacity motor trucks. How these trucks can be obtained, with the factories all reporting large numbers of unfilled orders, he does not explain.

Recess Appointments to I. C. C.

President Wilson on June 9 announced recess appointments of Henry Jones Ford, James Duncan and Mark W. Potter as members of the Interstate Commerce Commission. The President's nominations of these men had not been confirmed by the Senate when Congress adjourned on June 5, but had been referred to the Senate committee on interstate commerce, which had failed to take any action on them.

Germany's Economic Position as a World Nation

In the description of the roadbed on the German railroads in the issue of April 16, on page 1199, it was stated that the maximum allowable axle load on some of the heaviest locomotives does not exceed 18,000 lb. This should have been 18,000 kilos.

Changes in Rules of Interchange

V. R. Hawthorne, secretary, American Railroad Association, section 3, announces that rule 3, section k, of the rules of interchange, 1919, has been modified to read that "No car will be accepted in interchange unless properly equipped with United States Safety Appliances, or United States Safety Appliances, Standard, except cars moving home on car service orders for equipping with safety appliances. Cars will not be accepted from owner at any time unless equipped with United States Safety Appliances or United States Safety Appliances, Standard."

Also that rule 3, section o, is modified to read "Cars built after November 1, 1920, will not be accepted in interchange unless equipped with 6 in. by 8 in. shank A.R.A. Standard Type D Couplers."

Department of Public Works Not Approved

The proposal that the Chamber of Commerce of the United States advocate the establishment of a government Department of Public Works has been voted down by the chamber's membership. The votes on the three propositions submitted were: Shall a Department of Public Works be established by the national government? In favor, 826; against, 549; necessary to carry, 917. Shall a Department of Public Works be established by a suitable modification of the existing Department of Interior? In favor, 675; against, 679. Shall a Department of Public Works be established by creation of an entirely new department? In favor, 282; against, 992. Of the 1,250 member organizations entitled to vote, 477 voted. The referendum was taken at the instance of Engineering Council.

American Society for Testing Materials Submits Specifications

The American Society for Testing Materials, at a recent meeting of the American Engineering Standards Committee, submitted five standard specifications for approval as "American Standards."

1.—Standard Specifications for Drain Pipes.

2.—Standard Test for Toughness of Rock.

3.—Standard Test for Penetration of Bituminous Materials.

4.—Standard Method for Distillation of Bituminous Materials Suitable for Road Treatment.

5.—Standard Method for Sampling Coal.

All of these specifications are included in the Proceedings of the American Society for Testing Materials. These specifications were referred to a special sub-committee to make recommendations to the American Engineering Standards Committee for final action.

Thirteen Passengers Killed Near Schenectady

In a rear collision on the New York Central about four miles west of Schenectady, N. Y., on the morning of June 9, about 1 o'clock, 13 passengers and one employee (Martin Doyle, engineman of train No. 34) were killed, and 40 passengers and one porter were injured. The leading train, eastbound express No. 28, which had been stopped because of trouble with a pipe on the locomotive, was run into at the rear by No. 34, consisting of a locomotive and nine express cars, and the rear car of No. 28, a sleeping car destined for Boston, was split nearly its whole

length. Train 34 had run past two automatic block signals, caution and stop, set against it, and also past a flagman displaying a red light. The line of road is nearly or quite straight and there was a view of the standing train for half a mile, the weather being clear. The flagman of No. 28 said that No. 34 did not heed his red light, and he threw a lighted fuse into (or at) the cab, but to no effect, so far as he could see. The flagman said that he was back "30 car lengths." The engineman had told the fireman to jump, and himself had started to get off when the engine struck the standing train.

Labor Leaders Want Congress to Stay on the Job

Officers of 16 railroad labor organizations on June 3 sent the following telegram to President Wilson, Speaker Gillette and Senator Lodge protesting against the adjournment of Congress:

"As the responsible heads of railroad labor organizations representing more than two million workers, we protest most earnestly and most emphatically against the proposed adjournment of Congress next Saturday in accordance with the plan reported in the public press. We call attention to the fact that despite the revelations as to the profiteering scandal Congress has done nothing to check the evil or to punish the evil-doers, that the cost of living continues to advance without a single remedial measure having been passed, and that there has not been even serious consideration of constructive legislation dealing with the serious problem of industrial unrest. In the circumstances it appears to us incredible that the responsible leaders of the government at Washington can assent to this seeming agreement of continuation of a 'do-nothing' policy which means that the grave economic problems of the people are to be made the plaything of politics and politicians for the next five months. It invites political chaos and business disaster. Congress should remain in session."

Freight Thefts Amounting to Millions

In the United States District Court at New York City on June 7, the Grand Jury brought indictments against forty-eight men charged with complicity in a conspiracy under which goods amounting in value to $1,000,000 have been stolen from freight cars in and around New York City during the past few months. The prosecuting officers say that the sum named represents not more than one-sixth of the total value of goods lost, and that half of the whole—$3,000,000—represents silk and other articles stolen from cars in the yards of the New York Central within the last few weeks. Among the men indicted are two wholesale merchants, the proprietor of a storage warehouse, and some employees of railroads, including a railroad detective. Of the men indicted 41 have been arrested and have been released on bail bonds of from $5,000 to $20,000 each. Officers of the New York Credit Men's Association and of the city police department co-operated with railroad police in getting the thieves.

One of the prosecuting officers cites the following example of the ingenuity of the thieves:

A carload of woolens arrived in the Erie freight yards in Jersey City. For the purpose of obliterating the identity of the car some member of the gang painted out the final numeral. With the collusion of yardmen and freight crews the car then was cut out and run to Soho, N. J., near Bloomfield. On its arrival the car would be met by trucks belonging to a trucking company. It then was removed in the automobiles to a "fence" in New York. A trucking concern was indicted.

Construction Progress on the Pacific Great Eastern

The Pacific Great Eastern, according to the report of the British Columbia Railways Department, made appreciable progress on its construction during 1919 and contemplates the completion of the line to Prince George in 1920. The line, which is projected from Vancouver, B. C., northward to Prince George on the Grand Trunk Pacific, has been under construction for a number of years, but up until the close of the European war only 181 miles of track had been laid. This included the lines from North Vancouver to Whytecliffe, 13 miles, and from Squamish Dock to Clinton, 168 miles. Considerable grading and clearing had been done on long stretches of the remaining portions of the line.

A large part of the work done during 1919 consisted in the improvement of the portion of the line which is in operation including the lining of track, the construction of bank protection, fencing, repair of tunnel cave-ins, etc. In addition, track was laid for about 77 miles from Clinton to a point about 10 miles north of Williams Lake. The work also included considerable lengths of side tracks, 250,000 cu. yd. of ballasting, 49 miles of fencing and 15 bridges containing 1,750,000 ft. of timber.

This year it is hoped to complete the road to Prince George, about 100 miles of line, which involves the restoration of the road-bed previously completed, about 20 miles of new construction in the form of a relocation north and south of Quesnel, a steel viaduct over Deep creek and a cantilever bridge across Cottonwood canyon.

A supplementary project which has been laid before the government is a branch line from the Pacific Great Eastern at Clinton in a southwesterly direction to a junction with the Canadian National Railways on the Thompson river, at Ashcroft, a distance of 41.5 miles. For 34 miles of the distance from Clinton, the line is on an almost continuous one per cent descending grade, the remaining seven miles into Ashcroft being a 2.2 per cent compensated grade which would be operated as a pusher grade. The Ashcroft-Clinton cutoff is a strategic point for railway building and any road which secures the route will control the whole traffic of the Pacific Great Eastern to Fort George and the Peace river.

Railway Returns for March

The Interstate Commerce Commission on June 9 issued a partial summary of the operating results of the railroads for March and three months of this year, showing a net railway operating income for the month of $10,206,576, as compared with $9,396,592 for March, 1919, and of $63,000,000 for the three months of 1920, as compared with $34,000,000 during the corresponding period of 1919, but it was explained that these figures include back mail pay to the extent of approximately $50,000,000, which was included in the accounts for the month of January.

Railway operating revenues for March were $450,470,217, as compared with $368,096,045 in March, 1919, but the operating expenses were $417,343,385, as compared with $341,030,031. Maintenance of way and structures expenditures showed an increase of $8,000,000 and maintenance of equipment expenditures showed an increase of $20,000,000 for the month.

Federal lap-over items settled during the month are included in the compilation for those roads that have indicated that estimates were not included for substantially all unaudited corporate items. In addition, the following amounts of lap-over items are included for those roads from which the information in regard to the inclusion of estimates is not available: Eastern District—Operating revenues, $4,260,044; operating expenses, $8,885,425. Southern District—Operating revenues, $658,921; operating expenses, $892,524. Western District—Operating revenues, $1,096,176; operating expenses, $1,936,767. It is possible that in the final summary the net operating income will be increased accordingly if complete responses from carriers indicate that the foregoing item should be excluded.

The war taxes of the corporations are included in the figures for March, 1920, but not in those for March, 1919, nor for January and February of either year.

In making comparisons with the federal figures for 1919, it should be noted that the corporate figures for 1920 include some items classified principally under the general account, general expenses, and the primary account, railway tax accruals, that did not enter into the accounting for the expenses of federal control.

Approve Rate Increases.—With very few exceptions, the request of the carriers' current application for rate increases has been seconded, or approved in principle, by commercial bodies, trade organizations and leading newspapers the country over. Rate advances are not welcomed, of course, but they are recognized as necessary, and the good of the transportation service is ranked by general consent superior to the objections against increase of transportation costs. The general demand is for efficient service, and there is a general willingness to pay the price.—*New Orleans Picayune.*

Traffic News

The number of automobiles in the country at the present time, as estimated by the B. F. Goodrich Rubber Co., is 7,596,424, of which seven-eighths are passenger cars. The number of auto trucks, now less than one million, is expected by 1926 to be nearly seven millions, as calculated by this estimator; and by 1933 it is predicted that probably there will be as many freight motors as passenger motors.

The Senate on June 4 adopted a resolution by Senator Walsh of Massachusetts calling on the Interstate Commerce Commission to furnish information as to the export movement of bituminous coal, with a view to affording a basis for possible embargo legislation. The House committee on interstate and foreign commerce on the same day failed to agree on a report on a bill by Representative Dallinger providing for an embargo on shipments of coal to foreign countries.

Priority orders for the movement of building and construction materials on the railroads as a means of relieving the housing shortage in New York and other cities have been asked by Senator William M. Calder, of New York, in a letter to the Interstate Commerce Commission. Senator Calder declares that housing conditions are becoming more acute and promise in many cities to reach an emergency as winter approaches. He asks also that no freight rate increases on building and construction materials be granted at this time.

Through trains and resumption of pre-war schedules recently announced by some of the western roads include the North Coast Limited of the Northern Pacific, which has been re-established between Chicago and Seattle running over the Chicago, Burlington & Quincy between Chicago and St. Paul; a through sleeping car between New Orleans and Denver, running over the Southern Pacific to Ft. Worth, Tex., and the Fort Worth & Denver City and the Colorado & Southern to Denver, and the Great Northern's Oriental Limited, which made its initial trip on May 30.

J. H. Beek, announcement of whose appointment as executive secretary of the National Industrial Traffic League, Chicago, was made in the *Railway Age* of June 4, (page 1586), was born in 1867, at Medina, Ont., and was in the railroad service for about 10 years from the time he was 16 until he was 26. He began as telegraph operator in 1883, on the St. Paul, Minneapolis & Manitoba, now part of the Great Northern. In 1885, he entered Hamline University, where he remained for four years, working during vacations on the railroad as a relief agent and operator. He entered the service of the Chicago, St. Paul, Minneapolis & Omaha in the office of the superintendent of telegraph in 1889, and was later transferred to the general passenger department. In 1893, he was elected secretary and traffic manager of the St. Paul Jobbers' and Manufacturers' Association. Mr. Beek graduated from the College of Law of the University of Minnesota in June, 1897, and practiced this profession for the ensuing five years. In 1903 he became credit manager for Brown & Bigelow, a manufacturing corporation, and three years later was re-engaged as a general secretary of the St. Paul Jobbers' and Manufacturers' Association, which was subsequently reorganized as the St. Paul Association of Commerce. In 1913, he was appointed traffic director of the Association since which time he has devoted his entire time to traffic work.

National Industrial Traffic League

The National Industrial Traffic League will hold its summer meeting at the Bellevue-Stratford Hotel, Philadelphia, Pa., on June 17 and 18. The two days will be occupied with reports from the Executive Committee, and committees on: Car Demurrage & Storage; Bills of Lading; Classification; Baggage; Coastwise Shipping; Rate Construction and Tariffs; Inland Waterways (a) House Bill providing for annual appropriation of $100,000,000 for next five years for inland waterway and coastwise improvements (b.) Senate Bill S-4254 amending Panama Canal act, permitting Railroads to own and operate boats on Great Lakes; Freight Claims; Diversion and Reconsignment; Export and Import Traffic (a.) Ship mortgage bill (b.) Three per cent war tax on transportation charges (c.) Demurrage and storage on export traffic; Express (a.) Proposed advance in Express Rates (b.) Proposed change in Official Express Classification; Legislation (a.) Liability of Telegraph Companies; Claims Resulting from Intensive Loading; Railroad Leases and Side-track Agreements; Car Service as Administered by Commission.

The New York State Barge Canal

Edward S. Walsh, State Superintendent of Public Works, reports that the waterways of New York are now moving 94 per cent more traffic than at this time last year; this estimate is based on the first four weeks of navigation. Because of congestion on the railroads every available boat has been pressed into service, and not since the palmy days of the old Erie Canal has freight been offered in such large volume. Over fifteen million bushels of grain, in elevators at Buffalo, would go East by canal if there were boats to take it. Large quantities of freight imported at New York are now going West over the canal; millions of bushels of flaxseed grown in Argentina; ivory nuts from Panama; skins and hides from Iceland, China and Algeria; sugar from Cuba; sisal from the Philippines, and domestic freights of every conceivable description. On the Champlain division of the canal where most of the traffic is in lumber and forest products from Canada, the tonnage has developed beyond the ability of carriers to handle it. At Buffalo recently two scows were loaded with 200 sedan auto bodies for the Franklin Automobile Company, Syracuse, and this went through in less than four days.

Coal Production

A slow but steady increase marked the production of both anthracite and bituminous coal during the week ended May 29, according to the weekly bulletin of the United States Geological Survey. The total output of soft coal, including lignite and coal coked, is estimated at 9,425,000 net tons, an increase of 173,000 tons when compared with the preceding week. The rate of production is still 11 per cent below that of the first quarter of the year, and 25 per cent below that of October, 1919. The congestion of traffic caused by the switchmen's strike continues to be the principal factor limiting production. Its serious effect is shown by the fact that in the eighth week of the strike period production was still 1,590,000 tons less than that of the latest normal week (March 14-20).

The mine reports for the week of May 22 reflect the increase in production which had already been disclosed by the figures of railroad shipments. The average running time for the country increased slightly, from 46.0 to 48.5 per cent. There was a corresponding decrease in the loss of time because of transportation disability—from 46.9 to 43.8 per cent. The week was marked by a slight improvement in the car supply. On the average the soft coal mines were closed down 43.8 per cent of full time, or 21 hours, on account of transportation alone. Other factors caused an additional loss of 7.7 per cent. The acute character of the present car shortage is directly attributable to the switchmen's strike, which during the week in question continued to delay movements through the principal junction points from the Mississippi to the Hudson.

The Coal Problem in Massachusetts

The Springfield Republican, discussing the question how to supply New England with coal for next winter, says that "an embargo on coal exports, by special act of Congress, as proposed by Mr. Treadway and Mr. Dallinger for New England's benefit, 'is nothing but a dream.' The Massachusetts legislature may keep on adopting resolutions favoring the embargo, but such things get no coal for New England industries.

"Does anyone suppose that West Virginia, or Pennsylvania or Ohio, wants a coal embargo, when foreign buyers are paying $13 a ton for bituminous at Hampton Roads, and are glad to get the coal at any price however extortionate? There should be a continuous organized scream from this section. The out-

look warrants it. Soft coal by way of the railroads is out of the question, in any but negligible quantities. The only supplies available must be shipped from Hampton Roads by water. But foreign buyers are so busy at that point that New England is virtually forgotten. Besides, there is a terrific congestion at the Roads, and the railroad tie-up is so severe that coal coming from there carries a demurrage charge of $3 or $4 and sometimes $6 and $8 a ton, due to the time the vessel has to wait for its load.

"An entirely satisfactory winter ahead may as well be thrown out of the calculation. However, let us not forget the Lever act. This war measure will remain on the federal statute book so long as a technical state of war continues. Under this the president can assume absolute control of the coal situation. He could stop absolutely all shipments of coal abroad, or could ration the foreign markets as well as provide for New England's needs. But the president, of course, would be more bitterly denounced than ever as an autocrat, a dictator, perhaps as a tyrant."

The Freight Situation in the West

In spite of another attempt on the part of "outlaw" strikers (this time including enginemen, firemen and switchmen) to cause a complete tie-up of freight traffic in the Chicago Terminal District, car movement and the general labor situation show little change. The Chicago Junction, the road most seriously affected by this new strike, reported that in one week it had fully recovered and was operating normally. Other roads operating in and about Chicago reported the same thing. Out of the total number of employees who were ordered to strike by the officers of the seceding railroad union, only 200 men actually quit work. The Chicago Junction is at present working at 90 per cent of normal. The Indiana Harbor Belt reports that an increase in car movement is shown for the first week in June, 1920, over the first week in June, 1919. During the week ending last Monday, 28,727 loaded and empty cars were moved, as compared with 22,477 for the same seven days in 1919.

The coal situation about Cincinnati, Cleveland and Pittsburgh continues to improve, although at a slow rate. Mills and foundries which were seriously affected by the shortage of coke and coal during the last month have recovered to a large extent and are rapidly re-opening their furnaces. Although labor conditions at the mines have held coal production below normal, the main source of trouble in the delivery of coal has been the shortage of cars.

Reports from Kansas City state that the confusion growing out of the switchmen's strike has been cleared; but the general shortage of cars has made it impossible to place cars for grain shippers in proper supply.

The transportation situation at St. Louis is greatly improved. Most of the roads are approaching a normal condition in both line and industrial service. There has been a steady recovery and a daily increase in the number of cars handled, and many embargoes were lifted on June 1.

At San Francisco all the terminals have cleared up materially. While there is a lack of box and refrigerator cars, the labor situation is causing most concern.

New Orleans reports that the labor situation is normal in every respect, although there is no surplus of men. There is a small shortage of freight handlers for the handling of export and import business. Railroads handling freight to Gulf ports continue to assure shippers of a normal situation.

The emergency situation in car shortage at St. Paul and Minneapolis is being handled in a satisfactory manner with the arrival of the first of the allotment of empty box cars ordered by the Interstate Commerce Commission. A quota of approximately 13,000 cars must arrive with the next two weeks. This would be 25 per cent less than the car requirements estimated as necessary by the Minneapolis Traffic Association.

Oregon and Washington lumber mills are encountering considerable trouble through the accumulation of unshipped lumber, due to a shortage of cars and also of ships. During the past week 119 mills in the Northwestern region produced 83,612,202 feet of lumber, but only shipped 46,860,000 feet by rail. There still remains a large unshipped balance for rail movement.

Commission and Court News

Interstate Commerce Commission

The Commission has issued a circular to electric railway companies subject to its jurisdiction calling for a considerable amount of statistical information required for the application of the rate-making provisions of the transportation act.

The commission has rendered an opinion, prepared by Commissioner Woolley, on the application of the United States Steel Corporation, the United States Steel Products Company and the railroad companies controlled by the steel corporation, asking a determination of the question whether the operation by the steel products company of two steamship lines through the Panama Canal is in violation of Section 5 of the interstate commerce act as amended by Section 11 of the Panama Canal act. The report finds that the ownership by the steel corporation of the stock of both the steel products company and the several applicant railway carriers (the Elgin, Joliet & Eastern, the Bessemer & Lake Erie and 17 others) constitutes an interest within the meaning of Section 5 of the interstate commerce act by the railway lines and water lines owned and operated by the steel products company, but that under present conditions, and conditions that seem probable in the near future, whatever competition there may be between the applicant railway carriers and the steamer lines of the United States Steel Products Company, operating between points on the eastern coast of the United States and ports on the western coasts of North and South America, through the Panama Canal, is unsubstantial and merely nominal.

North Carolina Rates Ordered Re-Adjusted

The Commission, in a report prepared by Commissioner Eastman, dated May 18, has ordered an extensive readjustment of freight rates from Norfolk and Richmond, Va., and other southern points, to be put into effect on or before September 10. Present rates between points in zones 1, 2, 3 and 4 in North Carolina and Norfolk and Richmond, Va., on the one hand, and points in South Carolina and the southeast, on the other; and between points in zones 1 and 2 in North Carolina and Norfolk and Richmond, on the one hand, and eastern ports and interior eastern points, on the other are found unduly prejudicial to the North Carolina points and unduly preferential of Norfolk and Richmond.

The principal complainants were the Corporation Commission of North Carolina and various commercial organizations in North Carolina cities. The North Carolina people have been pressing their demands for this re-adjustment for two years or more, and some of them are so overjoyed at the commission's decision that they talk of presenting claims for reparation amounting to many millions of dollars. One of the examples of the changes required by the decision is the following:

From New York to Richmond the rate on dry goods is 59½ cents. From New York to Raleigh the rate is $1.20, a difference of 60½ cents; this difference will be reduced to 30 cents either by raising the rate to Richmond or lowering the rate to Raleigh. The Raleigh jobber can ship to McColl, S. C., at a rate of 30 cents lower than Richmond or Norfolk, whereas he now pays the Richmond-Norfolk rate.

United States Supreme Court

The United States Supreme Court on June 28 denied the motion of the Reading Company for a modification of the decree ordering a dissolution of the Reading combination.

Stipulation as to Basis of Value of Goods for Loss or Damage Held Invalid

The Supreme Court of the United States has affirmed the judgments of the Circuit Court of Appeals, Eighth Circuit, 260 Fed. 835 and the district court, 252 Fed., 664, holding that the

Cummins Amendment has made void the stipulation in the uniform bill of lading providing that "the amount of . . . loss or damage . . . shall be computed on the basis of the value of the property at the place and time of shipment . . ." The railroad had paid a shipper of grain delivered in Montana for transportation to Omaha, $1,200 being the amount of loss so computed, but the value of the grain at the place of destination at the time when it should have been delivered, with interest, less freight charges, was $1,422. It was held that the shipper was entitled to the difference between the two sums. The Supreme Court, while appreciating the convenience of the stipulation in the bill of lading and the arguments urged in its favor, held that as, in its opinion, the decision below was right and the conclusion was required by the statute, "neither the convenience of the clause, nor any argument based upon the history of the statute or upon the policy of the later Act of August 9, 1916, C. 301, 39 Stat. 441, can prevail against what we understand to be the meaning of the words." Opinion by Justice Holmes. Decided May 17, 1920. Chief Justice White dissented.

Demurrage on Frozen Ore—The Bunching Rule

In an action by the Pennsylvania for $1,209 demurrage charges on 227 cars of iron ore, the consignee, having entered into the Average Agreement of the Uniform Demurrage Code, contended that the ore had been frozen in transit, and the detention of the cars beyond the free time had resulted from this fact, and claimed exemption from demurrage charges under the frozen shipment rule (Rule 8, Section A, Subdivision 2), declaring that none shall be collected "when shipments are frozen while in transit so as to prevent unloading during the prescribed free time." It did not appear whether the cars, which because numerous could not be unloaded within the 48 hours, came in one consignment or in many. The trial court disallowed the railroad's claim, and this was affirmed by the Pennsylvania Supreme Court. The Supreme Court of the United States has reversed the state court's judgment.

"Excessive receipts of cars is a frequent cause of detention beyond the free time even when shipments are not frozen. From the resulting hardship either the bunching rule or the average agreement ordinarily will furnish relief. If the company had not elected to enter into the average agreement, the bunching rule might have afforded relief under the circumstances which attended the deliveries here in question. Since any one of the 227 cars on which demurrage was assessed might have been unloaded within the 48 hours free time, the undue detention was not the necessary result of the ore therein being frozen, but was the result of there being an accumulation of cars so great as to exceed the unloading capacity. It does not seem probable, that those who framed and adopted the frozen shipment rule, and the Interstate Commerce Commission, which approved it, intended therein to depart from the established policy of treating the single car as the unit in applying demurrage charges as well as in applying carload freight rates."—Opinion by Mr. Justice Brandeis. Decided June 1, 1920.

Order to Install Cattle Scales Held Void

Following its decision in Great Northern v. Minnesota, 238 U. S. 340, holding that as the duty of a railroad is confined to furnishing appliances for its business of transportation and that cattle scales are not of such a character it follows that a railroad cannot be compelled to supply them as a means for building up the business of trading in cattle, however much the public would be benefited thereby, the Supreme Court of the United States has reversed a judgment of the South Dakota Supreme Court sustaining an order of the Railroad & Warehouse Commission of Minnesota directing the Great Northern to install a cattle weighing scales at Albee. The commission had found that all shipments of cattle from Albee during the three preceding years amounted practically to only 56 carloads, all moved in interstate commerce (to St. Paul) and that the universal rule is to determine the weight of cattle shipped in carload lots (as a basis of freight charges) not by weight taken at the point of shipment, but by a track scales at or adjacent to the point of delivery. The Minnesota case was held inapplicable by the commission because in South Dakota there was a common knowledge that railroad cattle scales when established were for the benefit of both the public and shippers, enabling all who took cattle into the railroad yards whether for shipment or otherwise to ascertain their weight. The United States Supreme Court disapproves of the State Supreme Court's analogy of the duty to maintain cattle scales, to the duty to maintain cattle yards, applying which the state court, "without referring to the South Dakota statutes relied upon by the board, making it obligatory upon the carrier to put in cattle pens at all stations, without imposing any such duty to put in cattle scales, but on the contrary giving power only to inspect such scales when put in, held, wholly as a matter of first impression, that the identity between the two (cattle yards and cattle scales) was so complete that the obligation which existed to erect cattle yards at every station also established the duty to install a cattle scales at every station." Opinion by Chief Justice White.—Great Northern v. Cahill & Redman. Decided May 17, 1920.

Exceptions to the Adamson Law

The Fort Smith & Western and a trustee of a mortgage to secure bonds of the road sued to enjoin the road's receiver from conforming to the Adamson Law and to enjoin the United States District Attorney from enforcing the act. (No dividends have ever been paid on the stock, and no interest has been paid on the bonds since October 1, 1907. There is a yearly deficit in the earnings.) The receiver was appointed in proceedings to foreclose the mortgage. When the suit was commenced, in 1917, the railroad was being operated under an agreement with the men which the men desired to keep, but the receiver, yielding to the District Attorney's threats of prosecution, proposed to substitute the much more onerous terms of the Adamson act. It was contended that the act if construed to apply to this case is void under the Fifth Amendment. The Federal District Court for the Western District of Arkansas dismissed the bill. The Supreme Court of the United States has reversed this decree holding that the Adamson Law does not apply to such a case.

Mr. Justice Holmes, delivering the opinion of the court, said that, while in Wilson v. New, 243 U. S. 332, it was decided that the Adamson Law was within the constitutional power of Congress to regulate commerce among the states, the bill in that case raised only the general objections to the act that were common to every railroad. "In that case it was not necessary to consider to what extremes the law might be carried or what were its constitutional limits. It was not decided, for instance, that Congress could or did require a railroad to continue in business at a loss. See Brooks-Scanlon Co. v. Railroad Commission of Louisiana, 251 U. S. 396. It was not decided that there might not be circumstances to which the act could not be applied consistently with the Fifth Amendment, or that the act, in spite of its universal language, must be construed to reach literally every railroad subject to the Act to Regulate Commerce. It is true that the first section of the statute purports to apply to any such carrier, and the third to the compensation of railway employees subject to this act. But the statute avowedly was enacted in haste to meet an emergency, and the general language necessary to satisfy the demands of the men need not be taken to go further than the emergency required or to have been intended to make trouble rather than to allay it. We cannot suppose that it was meant to forbid work being done at a less price than the rates laid down, when both parties to the bargain wished to go on as before and when the circumstances of the road were so exceptional that the lower compensation accepted would not affect the market for labor upon other roads.

"But that is the present case. An insolvent road had succeeded in making satisfactory terms with its men, enabling it to go on, barely paying its way, if it did so, not without even the mortgage security, not to speak of its capital. We must accept the allegations of the bill and must assume that the men were not merely negatively refraining from demands under the act, but, presumably appreciating the situation, desired to keep on as they were. To break up such a bargain would be at least unjust and impolitic and not at all within the ends that the Adamson Law had in view. We think it reasonable to assume that the circumstances in which, and the purposes for which the law was passed import an exception in a case like this."—Fort Smith & Western v. Mills. Decided June 1, 1920.

Foreign Railway News

Cars and Engines Wanted in Peru

Commerce Reports, for June 2, has inquiries for two locomotives and a number of passenger cars and platform cars wanted in Peru; the Bureau of Foreign and Domestic Commerce will give information; file No. 41,936. Trade Commissioner Jackson suggests that it would be well to make prices delivered c. i. f. at Callao.

American Locomotives on Portuguese East African Railways

The Lourenco Marques Railway has recently received eight American locomotives, five of the Santa Fe type and three of the Pacific type, and they have proved far superior to any of the foreign engines in use, writes Consul John A. Ray from Lourenco Marques, Portuguese East Africa, to Commerce Reports. The Lourenco Marques Railway connects the port of Lourenco Marques with the railway system of South Africa and is the principal outlet for the coal mines of the Transvaal as well as the most convenient route for imports into the region of which Johannesburg is the center.

England's Railway Exports

LONDON.

According to the Board of Trade returns, the exports of railway materials from the United Kingdom for the first three months of the present year as against the figures for the corresponding months for the year 1919, were as follows:

	First three months 1920	First three months 1919
Locomotives	£795,483	£162,989
Rails	386,691	120,917
Carriages (passenger cars)	286,202	57,414
Wagons (freight cars)	1,338,764	143,836
Wheels and axles	473,778	66,872
Tires and axles	317,135	207,389
Chairs and metal sleepers	100,327	22,870
Miscellaneous permanent way	1,831,286	290,284

The tonnage of rails exported was 22,339 for the three months ending March, 1920, as against 6,925 for the same period of 1919, and of chairs and metal sleepers 4,702 for the three months ended March 31, 1920, as against 1,327 for the same period of 1919.

During the month of March locomotives to the following value were shipped:

Argentine	£35,250
South Africa	93,576
India	97,266
Straits Settlements	31,500

Rails of the following value were shipped:

Sweden	£6,250
Argentine	4,610
India	33,943
Straits Settlements	16,908
Ceylon	15,966

Railway Notes from China

PEKING, April 24, 1920.

Work upon the unification program of the Chinese Government railways has been furthered during the past month, by a general operating conference. The delegates consisted of the traffic managers and locomotive superintendents of the several lines together with delegates from the Ministry of Communications. A tentative book of rules for train movement was introduced and adopted as basis for future decision after the delegates have had further opportunity to compare its provisions with rules now obtaining on their respective lines. The subject of signal lamps, and whistle and other signals was also under consideration.

* * *

A general traffic conference was also held, which among other things made certain alterations as to sizes and language in the uniform invoice proposed by the accountant's conference. It is understood that the forms and regulations for uniform station accounts, which have been hanging fire for over a year, due partly to objections by the traffic managers will now be promulgated very shortly. Also, the conference adopted for all the government railways, the uniform classification and the uniform "conditions for carriage" which were drawn up by the "Through Traffic" conference last fall.

The Consortium

The subject of all-absorbing interest in Peking for the past two weeks has been the Lamont mission. Mr. Lamont has made an excellent impression personally, but that gives no indication as to the reception which his project receives. Mr. Lamont has so far stood the gustatory gauntlet very well. His remarks at such occasions have been very clear and so far no one has been able to place a misconstruction upon them or to use any remark as the basis for an objection. The ground which he has held consistently is that

1. He represents the Consortium group of banks.

2. The Consortium financiers are not anxious to lend money to China, but will do so if China wants it under proper terms.

3. The Consortium can not be a success unless it has the cordial co-operation of the Chinese.

4. Loans for administrative purposes are not looked upon favorably in comparison with loans for railway and industrial purposes.

5. Japan will probably be a member of the Consortium unconditionally, because if she refuses Japan will be the worst sufferer.

The opposition to the Consortium plan has taken four forms. Officialdom has insisted that there be a loan for general political purposes as the price of a loan for any constructive purpose. It is reported that Mr. Lamont has definitely refused to advance anything further on the security of the wine and tobacco monopoly upon which the Pacific Development Company back in the winter advanced $5,000,000. The "student movement" has taken a position hostile to all loans of whatever nature, on the ground that any loan to the present government merely fattens the purses of the present militaristic clique, whose overthrow is necessary to a sound China. Japanese opposition has masked itself by appearing friendly in the direct organs of the Japanese legation, but in directing a constant fire of innuendo (than which nothing is more effective in arousing Chinese suspicion) from the columns of some 15 Chinese dailies, which are under subsidy from Japanese sources. The fourth form of opposition comes from interests represented by Liang Shih Yi, "God of Wealth" as he is known in China, who demands that a group of Chinese banks shall be admitted to the Consortium. Liang is director of the Domestic Loan Bureau of the Ministry of Communications, a prominent member of the all-powerful Anfu Club, founder of the old "Chiaotung" or "Communications Clique," and the former Minister of Finance under Yuan Shih Kai. The handling of Liang will probably determine the outcome of Consortium negotiations.

* * *

Most strenuous opposition has developed against the proposed domestic loan for $30,000,000 reported in these columns during past months, and designed among other things for the construction of a line from Shih Chia Chuang to Tehchow. It is reported that the Minister of Communications has admitted that a portion of the loan will be used for the redemption of the French loan on the Cheng-Tai (or Shansi railway) line. This makes the situation much more alarming than formerly, for it is well known that the funds for this supposedly domestic loan will come from a "certain country." It was considered bad enough to have that country put in direct contact with the borders of Shansi by means of the proposed new line which would join up almost directly with the Shantung line. But to have Shansi invaded for 175 miles by linking the Cheng Tai line to the Shantung line, as it is conceived this loan would do, passes the patience of the Chinese. It is known that a group of Shansi gentry came to Peking with a proposition to furnish the funds for the redemption of the line from the French providing that the government would give them certain concessions as to rates or equivalent guarantees. It was at this interview that the intention to redeem from the proceeds of the domestic loan was made known by the Minister of Communications.

Equipment and Supplies

Locomotives

THE CLEVELAND, CINCINNATI, CHICAGO & ST. LOUIS is inquiring for 2,000 box cars.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for two second-hand standard gage 65-ton electric locomotives.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, is inquiring for second-hand standard-gage locomotives with cylinders 17 in. or 18 in. by 24 in.; weight about 50 tons; driving wheels 56 in. to 60 in. centers.

Freight Cars

SOLAR J. A. DEL, 154 Nassau street, New York, is inquiring for 30 narrow-gage cane cars for export.

THE BALDWIN LOCOMOTIVE COMPANY, Philadelphia, Pa., is inquiring for 50 flat cars for export.

Iron and Steel

THE ILLINOIS CENTRAL has contracted with the Bettendorf Company, Bettendorf, Ia., for the repair of 1,000 steel gondola cars.

Machinery and Tools

THE CHICAGO, ROCK ISLAND & PACIFIC has issued an inquiry for a large number of tools for general shop use, including various types of drilling machines and lathes, among which are three 90-in. locomotive driving wheel lathes.

Miscellaneous

A CONTRACT FOR 60,000,000 FEET B. M. of ties has been closed with English concerns by the Douglas Fir Exportation and Export Company, and the Lewis River Tie Association, of Seattle, Wash. This is in addition to 24,000,000 feet contracted for with English buyers by the Douglas interests some time ago. The entire 84,000,000 feet will be shipped from Washington and Oregon ports to England by way of the Panama Canal.

Signaling

THE GRAND TRUNK has ordered from the General Railway Signal Co., eighteen semaphore signals, model 2A, with accessories, for an automatic block signal installation between West Paris, Me., and Oxford, about 15 miles.

THE MISSOURI, KANSAS & TEXAS has ordered from the Union Switch & Signal Company 111 automatic block signals, style "S," to be installed on the line from Wybark, Okla., southward to McAlester, 154 miles, and from Colbert, Okla., southward about five miles to the Red River. An order also has been given for signals for yard protection at San Antonio, Tex.

THE MAIN SPRINGS OF COMMERCE.—Railroads are the foundation of the vast industrial development which the twentieth century inherited from the nineteenth. It is idle to plan for increase of production as the remedy for high prices if the additional product cannot be marketed. Wipe out railroads and America would sink to the present economic status of Russia, where the cities starve and the farmers produce little more than enough for their own consumption.—*Springfield Republican.*

Supply Trade News

F. J. Foley, general sales agent, and **E. McCormick,** assistant to the president of the **Railway Steel Spring Company,** have been elected vice-presidents of the company.

John Gillen, merchant sales manager for the **Standard Gage Steel Company,** Beaver Falls, Pa., with headquarters at Chicago, has resigned to engage in other business.

The Electric Controller & Manufacturing Company, Cleveland, O., has opened a branch office in Boston, Mass., at 49 Federal street. The new office is in charge of M. D. Goodman.

George W. Clark, who has been in the service of the Northern Indiana Gas & Electric Company, Indianapolis, Ind., has been appointed comptroller of the Union Railway Equipment Company, Chicago.

B. J. Meyer, special representative in the railroad sales department of the Great Western Smelting & Refining Company, Chicago, has recently been appointed assistant to the president of that company, in charge of railroad sales, with headquarters at Chicago. Mr. Meyer was born in St. Joseph, Mich., on May 19, 1887, and attended the University of Michigan. During the Taft administration he served for four years as a special agent in the department of justice under Attorney General Wickersham. In 1913 he entered the railway supply business as a special representative in the railroad sales department of the Great Western Company and is now appointed assistant to the president of this company.

B. J. Meyer

Herman Rettinghouse, who resigned as chief engineer of the Chicago, St. Paul, Minneapolis & Omaha, on March 1, has entered into partnership with **Albert A. Chenoweth,** forming the firm of **Chenoweth & Rettinghouse,** civil and consulting engineers, Sioux Falls, S. Dak.

Ernest S. Jubell, in charge of materials at the plant of the Haskell & Barker Car Company, Michigan City, Indiana, has been appointed general superintendent of the Union Railway Equipment Company, with headquarters at Hammond, Indiana.

The Buda Company, Harvey, Ill., recently completed the construction of an additional foundry, for casting small engine parts. The building is of iron, 160 ft. wide, with concrete foundation. Within 30 days from the signing of the lease for the site the entire work of building and equipping the foundry was accomplished and metal was being poured.

The Superior Screw and Bolt Company has opened new offices at 810 Hippodrome Building, Cleveland. The company, which was recently incorporated, with a capital of $500,000, intends to manufacture a complete line of tap screws and bolts. Officers of the new corporation are: president, M. T. Jones; vice-president, M. J. Riley; secretary and treasurer, W. J. Hayes.

W. K. Kenly, purchasing agent for the **Interstate Iron & Steel Company,** Chicago, is now in charge of the Ferro alloys department of the James S. Miller Company, Chicago, dealer

in scrap iron and steel and railway supplies. The Miller Company has the exclusive agency of the United States Ferro Alloy Corporation, New York, the United States Nickel Company, New Brunswick, N. J., and the Guggenheim Mining Company.

The Greenfield Tap & Die Corporation, Greenfield, Mass., has acquired all of the common stock of the **Lincoln Twist Drill Company**, Taunton, Mass. This company manufactures twist drills, reamers and milling cutters. These added to the products of the Greenfield Tap & Die Corporation, give it a complete line of small tools. **Edward Blake, Jr.**, formerly sales manager of Wells Brothers Company, is vice-president and general manager of the Lincoln Twist Drill Company.

George H. Scott, electrical engineer with the O. K. Giant Battery Company, with headquarters at Gary, Ind., has been appointed representative of the Safety Car Heating & Lighting Company, New York, in charge of the Northwestern territory, with headquarters at Chicago. Mr. Scott was born on June 6, 1880, in Pulaski County, Mo., and was educated in the State Normal School. He entered the service of the St. Louis-San Francisco at Springfield, Mo., on February 23, 1899, working in various departments of this road until 1906, when he was appointed foreman electrician, with headquarters at St. Louis, Mo. In December, 1907, he was appointed traveling electrician on the Chicago, Rock Island & Pacific, with headquarters at Chicago, and was later promoted to general foreman in the electrical department. He was appointed foreman electrician with the Pullman Company at Cincinnati, O., on June 1, 1910, with which company he was employed in various capacities until his resignation the early part of this year, to become electrical engineer with the O. K. Giant Battery Company.

G. H. Scott

The Milwaukee Electric Railway & Light Company, after more than two years of continued use of pulverized coal under five boilers in the Oneida street plant, has decided to use this form of fuel in the new Lakeside power plant. The installation will consist of eight 1,306-h.p. Edgemoor water tube boilers. The contract for the drying, pulverizing and transportation equipment has been placed with the **Fuller Engineering Company**, Allentown, Pa. The feeders and burners will be furnished by the **Locomotive Pulverized Fuel Company**, New York. Lopulco duplex feeders with five-inch screws will be used and three Lopulco burners will be installed in each boiler. The feeders will be driven by Morse silent chain and the Reeves type variable speed mechanism.

Effective June 15, 1920, **L. Finegan** has been appointed general manager of the **American Flexible Bolt Company**, with headquarters at Pittsburgh and Zelienople, Pa. Mr. Finegan was born in California. He started his business life as a machinist apprentice in Butte, Montana. At the completion of his apprenticeship he entered the employ of the New York Central at Buffalo, and later the General Electric Company and the American Locomotive Company at Schenectady. Leaving the American Locomotive Company he went with the Delaware & Hudson as general foreman. In 1904 he became general foreman of the West Springfield shops of the Boston & Albany Railroad. In 1911 he entered the service of the Baltimore & Ohio as master mechanic at Glenwood, Pa., and was later appointed superintendent of shops at this point. In 1915 he was appointed superintendent of the Mount Clare shops, which position he held up to the time of his appointment to the position above mentioned.

Obituary

Thomas C. Davis, a retired manufacturer of railway supplies, died in Philadelphia on March 16. Mr. Davis was born in Philadelphia on July 10, 1843. After receiving his education in private schools, he made a serious study of this work for a number of years and, regardless of his other business activities in later years, he never relinquished his interest in it. In 1860 he went to work with his father in the scale business under the name A. B. Davis & Co., the old original plant now being a part of the Baldwin Locomotive Works in Philadelphia.

Some years later his father, A. B. Davis, formed the Philadelphia Wrench Company to manufacture the A. B. Davis patent wrench, and he was connected with this concern. Again some years later the scale patents were sold to the Fairbanks Scale Company and Mr. Davis joined that organization. In 1883 he joined with his brother, Nathan H. Davis, in manufacturing car springs under the name of the Diamond State Car Spring Company, Wilmington, Del. Three years later, N. H. Davis designed the Davis Pressed Steel Spring Plate and the Davis Spring Plate Company was organized. A year later it began manufacturing larger shapes and reorganized the company and changed the name to the Davis Pressed Steel Company. In 1907 the brothers organized the Davis Solid Truss Brake Beam Company to manufacture a patented type of brake beam, and with this company Mr. Davis remained until he retired in 1913.

Trade Publications

Scrap Iron.—Briggs & Turivas, Inc., dealers in scrap iron and allied metal products, Chicago, have recently published a 48-page, pocket-size booklet, entitled "Classified Scrap Iron." It contains a classification of various grades of iron and steel scrap as marketed, with tables giving grades and quantities of rails and accessories, net and gross ton equivalents, weights of plates, standard gages, and specific gravities and weights.

Railway Construction

Chicago, Burlington & Quincy.—This company has let contracts to the Ogle Construction Company, Chicago, to build two coaling stations at Buda, Ill., and one each at Clarence, Mo., and Pacific Junction, Ia. They are to be of timber construction, balance bucket type and of 150-tons capacity. These contracts in addition to those noted in the *Railway Age* of May 28 (page 1546) make a total of eight let to the same company by the Burlington.

Chicago, Rock Island & Pacific.—A branch line from Chattanooga, Okla., to Grandfield, a distance of fifteen miles, has just been completed and placed in operation.

Ringling Eastland & Gulf. This company, whose road has been under construction during the past six months, has announced the completion of 25 miles from Mangum, Tex., where the line connects with the Missouri, Kansas & Texas, north toward Breckenridge, Stephens County. This brings the line to within 10 miles of Breckenridge, the largest non-railroad city in the United States, it having a population of 6,000, paved streets, electric light plant and water works. This line will promote development in the oil industry in this important field at a reasonable transportation cost. When finally completed the line is intended to run from Brownwood on the south to New Castle, Graham or Wichita Falls on the north. The chief office is at East land, Tex. W. E. Brown is general manager. The first operating unit of this road, located in the Eastland-Stephens county oil fields, Texas, with 25 miles of line, was opened to freight service on June 1. Passenger service is expected to start June 15.

He is Fooling Himself who thinks that the railroads can be starved without industry in general suffering thereby as well as the railroad stockholders themselves.—*Minneapolis Journal.*

Railway Financial News

Chicago & North Western.—This company has declared a semi-annual dividend of 2½ per cent on the common stock, placing the stock on a 5 per cent annual basis, compared with 7 per cent paid heretofore. On the preferred stock the company declared 3½ per cent semi-annual, thus reducing the preferred dividend from 8 per cent to 7 per cent annually. Both dividends are payable July 15 to stock of record June 21.

After the dividend meeting an officer of the Chicago & North Western stated that the rate of dividends on preferred and common stocks had been reduced because, in the judgment of the board, the uncertainties of the present railroad situation made such a course advisable. Referring to the revenue sections of the new transportation act this officer said that such guarantees as were afforded the railroads by those provisions of law were at least not yet of the sort out of which cash dividends could be paid.

Evansville & Indianapolis.—This road was sold on June 3 to Garrett T. Townsend and Raymond M. Smith, of New York, representing the bondholders, for $1,005,000. The Cleveland, Cincinnati, Chicago & St. Louis operates its 142 miles of line.

Kansas City, Mexico & Orient.—The application of this company for a loan of $3,500,000 out of the $300,000,000 revolving fund provided in the transportation act was considered at a hearing before the Interstate Commerce Commission on June 3. As security the company offered a first lien on its property, the book value of which was placed at $28,000,000. The road desires to use $1,500,000 to pay receivers' certificates due December 1, $1,000,000 for working capital and betterments, and $1,000,000 to complete extension of the road from San Angelo, to Sonora, Texas, a distance of 61 miles.

San Antonio, Rock Springs & Northwestern.—This company has awarded a contract for the construction of approximately 160 miles of line from Uvalde, Tex., to San Angelo to James H. Halpin, of San Antonio, Tex.

St. Louis-San Francisco.—Speyer & Co. have concluded negotiations with the French government for the purchase of approximately $21,000,000 of St. Louis-San Francisco Railway Company Bonds, its total holdings consisting of $5,000,000 4 per cent prior lien "A" bonds; $5,800,000 6 per cent cumulative adjustment mortgage bonds, and $10,000,000 6 per cent income mortgage bonds, which is the equivalent of about $20,000,000 old St. Louis & San Francisco general lien 5 per cent bonds. The latter were bought by the French government at the beginning of the war from French citizens, in order to establish an American credit, and it is understood that, as the price paid for the bonds by Speyer & Co. is very close to the prevailing market price, the French government realizes a large profit on the transaction through the exchange rate. These $20,000,000 Frisco general lien bonds were placed by Speyer & Co. in France from 1909 to 1913 through their French correspondents. In the reorganization of the road, which was carried through shortly after the appointment of a receiver, the unpaid interest was provided for in full and the bondholders received new securities on which the interest has been paid in full, so that an original bondholder has been receiving 5½ per cent on his investment instead of 5 per cent as specified in the old bond.

St. Louis Southwestern.—The Interstate Commerce Commission has announced a hearing on July 8 at St. Louis on the application of the St. Louis Southwestern and the Valley Terminal Company for an order authorizing a lease of March 29, 1920, of the property of the terminal company to the St. Louis Southwestern.

Southern Pacific.—Kuhn, Loeb & Co. are offering an issue of $15,000,000 four to fifteen year 7 per cent equipment trust certificates at prices ranging from par, for the earlier maturities, to 101, for the later maturities. The issue is made under the Philadelphia plan.

Railway Officers

Executive

George F. Pessoney has been appointed manager of the Texas State Railroad, with headquarters at Palestine, Texas, succeeding **R. M. Wylie.**

Operating

R. W. Ellsworth has been appointed trainmaster of the Ontario division of the New York Central, succeeding **F. J. Towee,** resigned; **C. R. Conklin** has been appointed assistant trainmaster of the same division; **F. B. Greene** has been appointed chief despatcher also of that division. All appointments became effective June 1.

W. D. Post, who has been appointed superintendent of the Southern, with headquarters at Columbia, S. C., as noted in the *Railway Age* of May 7 (page 1384), served as trainmaster of the Knoxville division from June, 1918, until the termination of federal control. Mr. Post was born on March 8, 1875, at Shelby, Ohio. He received a public school education at Shelby and finished with a business course at Galion, Ohio. He began railroad work as clerk in the local freight office of the East Tennessee, Virginia & Georgia, now part of the Southern, at Newcomb, Tenn. Having served as telegraph operator and agent at Harriman, Morristown, Whitesburg and Knoxville, Tenn., respectively, he was appointed trainmaster of the Appalachia division at Bristol, Tenn, on April 1, 1917. He was transferred to the Knoxville division at the time mentioned above.

W. D. Post

R. E. Weaver, trainmaster of the Louisville & Nashville at Birmingham, Ala., has been transferred to the Birmingham-Boyles Terminals, succeeding **John Mathews,** resigned; **H. W. Milam** has been appointed assistant trainmaster of the same territory; **E. J. Smith,** trainmaster at Anniston, Ala., has been transferred to Birmingham, succeeding Mr. Weaver; **H. P. Hearon** has been appointed assistant trainmaster, with the same headquarters; **S. J. Brock,** chief despatcher between Boyles and Anniston and between Anniston and Calera, has been appointed trainmaster at Anniston, succeeding Mr. Smith, and **Q. C. L. Knox** has been appointed chief despatcher, succeeding Mr. Brock.

Victor Parvin, whose appointment as superintendent of the Ann Arbor, with headquarters at Owosso, Mich., was announced in the *Railway Age* of May 14 (page 1434), was born at Laurel, Del., on July 6, 1883. He entered railway service as a telegrapher with the Baltimore, Chesapeake & Atlantic, in November, 1899. Two years later he became agent and operator on the New York, New Haven & Hartford. From 1902 to 1904 he served as despatcher with the Baltimore, Chesapeake & Atlantic, with headquarters at Salisbury, Md. During the next four years he served as operator and despatcher on the Southern, and in 1908 was appointed chief despatcher on the New York, New Haven & Hartford, with headquarters at New Haven, Conn. In 1912, he became chief

despatcher and trainmaster on the Minneapolis & St. Louis, with headquarters at Minneapolis, Minn. From February to June, 1917, he served as car distributor in the office of the general superintendent of transportation of the Southern, with headquarters at Cincinnati, Ohio, and from June to December in the same year was yardmaster with the Baltimore and Ohio at Newark, Ohio. He was later appointed trainmaster on the Virginian, with headquarters at Princeton, W. Va., and served successively on this road as trainmaster, assistant superintendent and superintendent until May, 1920, when he was appointed superintendent on the Ann Arbor.

Traffic

R. L. Sliger has been appointed division passenger agent on Morgan's Louisiana & Texas Railroad, with headquarters at New Orleans, La., effective June 1.

Roy Pope has been appointed assistant general freight agent of the Atlanta, Birmingham & Atlantic, with headquarters at Atlanta, Ga., effective June 1.

Alexander D. Charlton, assistant general passenger agent on the Northern Pacific, with headquarters at Portland, Ore., has been promoted to general passenger agent, with the same headquarters. Mr. Charlton was born at Hamilton, Ont., on November 15, 1859, and graduated from Hamilton College in 1875. He entered railway service as a clerk in the auditor's office of the Great Western of Canada in February, 1876. One year later he was placed in charge of the return ticket office of the Chicago & Alton, with headquarters at Chicago. During seven years of service with the last named road he was successively in charge of the return ticket department, of issuing tickets and finally was promoted to rate clerk. He was appointed general western passenger agent on the Northern Pacific on February 15, 1884. He was later promoted to assistant general passenger agent, which position he held until his present appointment.

A. D. Charlton

R. L. Fuqua, who has been appointed assistant general passenger agent of the Alabama & Vicksburg and the Alabama, Shreveport & Pacific, with headquarters at Vicksburg, Miss., as noted in the *Railway Age* of April 16 (page 1223) served as passenger rate clerk of the Southwestern Passenger Association from 1915 until the termination of federal control. Mr. Fuqua was born on February 6, 1884, at St. Joseph, Mo. He began railroad work in 1900 as passenger rate clerk for the Chicago, Burlington & Quincy. From then until his recent promotion he served in the same capacity on the following roads: The El Paso & Northeastern, now part of the El Paso & Southwestern, from 1904 until 1905; the Union Pacific, from 1905 until 1907; from then until 1910 he served the Missouri, Kansas & Texas of Texas, and went from that road to the Texas & Pacific, in whose service he remained until 1914, when, as noted above, he became associated with the Southwestern Passenger Association.

E. R. Oliver, who has been appointed general freight agent of the Southern with headquarters at Cincinnati, Ohio, as noted in the *Railway Age* of March 5 (page 750) served as assistant general freight agent with headquarters at Atlanta, Ga., from 1916 until the termination of federal control. Mr. Oliver was born in Lafayette County, Miss., on February 25, 1883. He began railroad work on September 1, 1898, as clerk in the local office of the Southern at Greenville, Miss. He held other clerical positions until 1903, when he was appointed agent at Greenwood, Miss. He became traveling freight agent at Chicago on January 1, 1906, and in 1907 he was transferred to Louisville, Ky., as soliciting freight agent. In 1910 he was appointed chief clerk in the office of the assistant freight traffic manager at Louisville. He was promoted to assistant general freight agent on June 1, 1912, and in 1916 he was transferred to Washington, D. C. Shortly afterwards he was assigned to the general freight office at Atlanta.

Lawrence W. Woody, who has been appointed assistant general passenger agent of the Virginian, with headquarters at Norfolk, Va., as noted in the *Railway Age* of March 5 (page 735), served as chief clerk to the general freight and passenger agent from February, 1909, until the termination of federal control. Mr. Woody was born on April 23, 1869, at Richmond, Va. He received a public school education and began railroad work in September, 1889, as mailing clerk for the Richmond & Danville, now part of the Southern. Afterwards he was promoted to file and correspondence clerk. In May, 1900, he accepted the same position in the general passenger department of the Seaboard Air Line at Portsmouth, Va. He left the Seaboard Air Line in August, 1907, when he was appointed chief clerk in the passenger department of the Norfolk Southern. He remained in that position until 1909, when, as noted above, he became chief clerk to the general freight and passenger agent of the Virginian.

L. W. Woody

Thomas W. Proctor, whose promotion to general freight agent of the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, was announced in the *Railway Age* of May 28 (page 1547), entered railway service as a clerk in a local freight office on the Burlington, Cedar Rapids & Northern (now a part of the Rock Island) in 1885. Four years later he was appointed clerk in the general freight department. Five years later Mr. Proctor entered the service of the Chicago, Milwaukee & St. Paul in the freight claim department. In 1898 he was promoted to traveling claim agent. From 1905 to 1910 he successively served as contract freight agent, with headquarters at Minneapolis, and as traveling freight agent with headquarters at Kansas City. In 1910 he was appointed assistant commercial agent, with headquarters at Chicago. He was appointed to assistant general agent in 1912, and one year later was promoted to general agent. In 1917 Mr. Proctor was transferred to Minneapolis as assistant general freight agent and in the latter part of that year returned to Chicago in the same capacity. During the period of federal control Mr. Proctor was successively supervisor of merchandise in the Northwestern region and then regional fuel administrator of the same region. When the roads were returned he was made first assistant general freight agent of the St. Paul.

T. W. Proctor

Warren Brown has been appointed general agent of the El Paso & Southwestern and the Morenci Southern, with headquarters at Memphis, Tenn., effective June 1; **J. G. Lowe** has been appointed general agent, with headquarters at Kansas City, Mo., effective the same date.

Warner W. Croxton, who has been appointed passenger traffic manager of the Atlanta, Birmingham & Atlantic with headquarters at Atlanta, Ga., served as chairman, Standing Committee for the South, agricultural section of the Railroad Administration, during the greater part of federal control. Mr. Croxton was born in King William County, Va., on August 25, 1880. He was educated in the public schools of Richmond, Va., and began railroad work in 1900 as stenographer in the local freight traffic office of the Southern at Richmond. In 1901 he was promoted to division freight agent at Columbia, S. C., but he returned to Richmond in 1902 as chief clerk in the office of the division passenger agent and a few months later he became secretary to the general passenger agent at Washington, D. C. On February 1, 1904, he was appointed passenger agent of the Southern and Chesapeake Steamship Company at Norfolk, Va. He was promoted to traveling passenger agent of the Southern at New York on October 1, 1905, and on April 1, 1907, was transferred to Norfolk, Va., in the same capacity, again serving in addition the Chesapeake Steamship Company. Later he occupied that position at Baltimore, Md. He went to the Norfolk Southern in 1909 as assistant general passenger agent at Norfolk, Va. On October 1, 1910, he was promoted to general passenger agent in charge of passenger traffic and agricultural development service. He accepted the same duties with the Atlanta, Birmingham & Atlantic in 1913 and continued in that position during the early days of federal control, but together with the Atlanta, Birmingham & Atlantic, he also served the Atlanta & West Point, the Western of Alabama, the Georgia, and the Charleston & Western Carolina. He was then appointed chairman of the committee named above.

W. W. Croxton

The traffic department of the Los Angeles & Salt Lake has made the following appointments, effective May 1:

Name	Position	Headquarters
Alex. D. Fraser	Gen. agt.	Pittsburgh, Pa.
J. P. Thomas	Gen. agt.	Chicago
Wm. Warner	Gen. agt.	St. Louis, Mo.
W. H. Lee	Asst. gen. fr. agt.	Salt Lake City
C. H. Cutting	Asst. gen. pass. agt.	Salt Lake City
C. S. Browne	Gen. agt.	San Francisco, Cal.
C. C. Jewett	Gen. agt.	San Diego, Cal.
C. E. Emerson	Gen. agt.	Pasadena, Cal.
J. H. Burtner	Dist. fr. & pass. agt.	Riverside, Cal.
C. E. Redman	Dist. fr. & pass. agt.	San Pedro, Cal.
Marius de Brabant	Asst. gen. tr. mgr.	Los Angeles, Cal.
T. M. Sloan	Gen. fr. agt.	Los Angeles, Cal.
W. F. Lincoln	Asst. gen. fr. agt.	Los Angeles, Cal.
T. C. Peck	Gen. pass. agt.	Los Angeles, Cal.
L. M. Brown	Asst. gen. pass. agt.	Los Angeles, Cal.
Frank H. Adams	Gen. agt.	Los Angeles, Cal.
B. M. Jones	Dist. fr. agt.	Los Angeles, Cal.
John Cruickshank	Gen. agt.	Los Angeles, Cal.
C. A. Redmond	Dist. pass. agt.	Los Angeles, Cal.

Roscoe J. Doss, who has been appointed assistant general freight agent of the Atlantic Coast Line, with headquarters at Wilmington, N. C., as noted in the *Railway Age* of May 28 (page 1548), served as a member of the staff of the Southern Freight Traffic Committee of the Railroad Administration during federal control. Mr. Doss was born on March 30, 1884, at Canton, Ga. Having graduated from Etowah Institute in Canton, he began railroad work on September 1, 1900, as clerk for the Atlanta, Knoxville & Northern, now part of the Louisville & Nashville. Afterwards he served as telegraph operator and was appointed agent in January, 1904. The following year he became overcharge claim investigator in the office of the freight claim agent of the Southern at Washington, D. C. He returned to the Atlanta, Knoxville & Northern in 1906 as local agent at Canton. In 1908 he entered the general freight office of the Louisville & Nashville at Knoxville, Tenn., and a few months later was transferred to Louisville, Ky., as rate clerk, in which capacity he served until 1913, when he was appointed chief rate clerk in the general freight office of the Atlantic Coast Line at Savannah, Ga. Promoted to chief clerk in July, 1914, he was appointed assistant to the general freight agent, with headquarters at Wilmington, N. C., in December, 1916. He held that position until the establishment of federal control.

Mechanical

L. K. Sillcox, master car builder of the Chicago, Milwaukee & St. Paul at Milwaukee, Wis., has been appointed assistant general superintendent motive power, with headquarters at Chicago, Ill., effective June 1.

C. B. Young, manager of the Test Section of the United States Railroad Administration, has been reappointed mechanical engineer on the Chicago, Burlington & Quincy, with headquarters at Chicago, effective June 1.

George F. Hess, superintendent of machinery of the Kansas City Southern, has been appointed superintendent motive power of the Wabash, with headquarters at St. Louis, Mo., effective June 1, succeeding **E. F. Needham,** relieved of those duties at his own request because of ill health.

George H. Emerson, who has been appointed chief of motive power and equipment of the Baltimore & Ohio with headquarters at Baltimore, Md., as noted in the *Railway Age* of March 5 (page 737), served as Colonel of Engineers of the U. S. Army in charge of the organization of the Russian Railway Service Corps from October 20, 1917, until shortly before his appointment to the above-mentioned position on March 1. Mr. Emerson was born on August 12, 1869, and began railroad work with the Great Northern in 1880 as water boy. In 1883 he became boilermaker apprentice at St. Paul, Minn. He became journeyman boilermaker in 1887, and in 1891 fireman and engineer. From 1895 until 1897 he served as locomotive foreman at Glasgow, Mont. He was then appointed general shop foreman and master mechanic. He was promoted to general master mechanic in 1900 and in 1910 to assistant general manager. He was appointed general manager in 1912. Throughout the entire period covered by these various promotions, Mr. Emerson served the Great Northern. As noted above he entered government service and was assigned to Russia shortly after the entrance of our country into the late war.

G. H. Emerson

Engineering, Maintenance of Way and Signaling

H. S. Rogers has been appointed division engineer of the Susquehanna division of the Delaware & Hudson, with headquarters at Oneonta, N. Y., succeeding **J. M. Silliman,** resigned.

Frank D. Nash, until recently chief engineer of the Missouri and North Arkansas, has been appointed assistant valuation

engineer of the St. Louis-San Francisco, with headquarters at St. Louis, Mo.

E. G. Stradling, signal engineer of the Chicago, Indianapolis & Louisville, with headquarters at Lafayette, Ind., whose promotion to superintendent of telegraph and signals was announced in the *Railway Age* of May 28 (page 1548), was born in Indianapolis, Ind., on September 15, 1880. He was educated at Purdue University, graduating from the mechanical engineering department in 1905. He entered railway service in the same year and has held various positions in the engineering departments of the Baltimore & Ohio Southwestern and the St. Louis, Iron Mountain & Southern. Prior to entering the service of the Monon he was also engaged in construction work for the General Railway Signal Company on the Illinois Central and with the Union Pacific as signal construction foreman on the installation of automatic block signals from 1906 to 1908. On May 1, of the latter year, he was appointed signal inspector on the Chicago, Indianapolis & Louisville, in which capacity he had charge of the signal department, and on May 1, 1911, he was given the title of signal engineer, which position he held until his recent promotion as noted above.

E. G. Stradling

W. W. K. Sparrow, assistant chief engineer on the Chicago, Milwaukee & St. Paul, with headquarters at Chicago, has been appointed assistant to the president, succeeding H. M. Sloan, who resigned, effective June 1. Mr. Sparrow was born in Ireland on December 30, 1879, and was educated at Rossall, England. In 1896, he passed the examination prescribed by the Institute of Civil Engineers at London, and during the same year he entered the service of the Belfast & Northern Counties Railway (Ireland), remaining with that company until 1898, when he went to South Africa to engage in railroad location, construction and maintenance work on the Cape Government Railways and the Chartered Company of Rhodesia. From February, 1909, to July, 1912, he was in the employ of Waddell & Harrington, consulting engineers at Kansas City, Mo., as a detailer, checker and designer. From the latter date until September, 1913, he was associated with H. von Unwerth, consulting engineer at Kansas City, Mo. From September, 1913, to April 1, 1916, he was assistant chief engineer of the Missouri State Public Service Commission, and on March 20, 1916, he was appointed valuation engineer and member of the valuation committee of the Chicago, Burlington & Quincy. September 1, 1918, he was appointed chief engineer in charge of the corporate interests of the Chicago, Milwaukee & St. Paul, and on March, 1920, became assistant chief engineer in charge of valuation work, the position he held at the time of his promotion to assistant to the president.

W. W. K. Sparrow

A. A. Matthews, chief engineer of the St. Louis-Southwestern, with headquarters at Tyler, Tex., has been placed in charge of all maintenance work, the office of engineer of maintenance having been abolished. Other appointments are: **C. B. Petticrew,** division engineer, Illmo, Mo.; **W. H. Raleigh,** division engineer, Pine Bluff, Ark.; **J. F. Montgomery,** division engineer, Mt. Pleasant, Tex.; **R. B. Albaugh,** division engineer, Tyler, Tex.; **J. G. Irby,** assistant engineer, Mt. Pleasant, Tex.; **V. C. Noll,** assistant engineer, Tyler, Tex.; **W. G. Hazlewood,** assistant engineer, Illmo, Mo.

Milo M. Backus, whose promotion to district engineer of the Western lines of the Illinois Central, with headquarters at Waterloo, Iowa, was announced in the *Railway Age* of May 28 (page 1548), was born at Clinton, Iowa, on April 3, 1880. He was educated at Cornell College, Iowa, and entered railway service as a chainman with the Illinois Central on April 20, 1902. From April, 1902, to August, 1906, he served successively in the construction department as chainman, rodman and instrument man. Upon the latter date he became assistant engineer and served in this capacity on the Kentucky division until December, 1912. During the next two years he served as supervisor of track on the Carbondale district of the St. Louis division and upon the Paducah district, Kentucky division, with headquarters at Carbondale, Ill., and Princeton, Ky., respectively. In November, 1914, he was promoted to roadmaster of the Springfield division and in June, 1917, was transferred to the St. Louis division of the same road, where he was located at the time of his recent promotion.

Railroad Administration

C. S. Lake, formerly assistant to the director of the Division of Operation, has been appointed staff officer of the Railroad Administration.

Obituary

George W. Vaughan, engineer maintenance of way of the New York Central, exterior zone, lines east of Buffalo, with headquarters at New York, died on June 5 at the Mt. Vernon hospital, Mt. Vernon, N. Y. Mr. Vaughan was born in 1859 at Paucutuck, Conn. He was educated in the Warner Polytechnic School at Providence, R. I., and began railroad work in 1881 as rodman for the Pittsburgh, Cincinnati & St. Louis. Afterwards he served as assistant to the engineer maintenance of way, supervisor of track, third sub-division, and assistant engineer maintenance of way, respectively. From April, 1887, until February, 1889, he was assistant to the division engineer eastern division of the New York, Chicago & St. Louis. He was then promoted to division engineer and later to chief engineer in charge of all property, reconstruction and maintenance of way. He went to the New York Central & Hudson River in 1899 as supervisor bridges and buildings of the eastern division. He was transferred to the Pennsylvania division as division engineer in December, 1900, and the following year to the western division. On July 1, 1905, he was promoted to engineer maintenance of way of the same road, which has since become part of the New York Central.

Wonders Will Never Cease! Long Island Railroad Commuters, at a public meeting in Islip, N. Y., on June 5, adopted a resolution asking the New York State Public Service Commission to authorize the railroad to increase season-ticket rates. —*Brooklyn (N. Y.) Eagle.* [But in very guarded language: the meeting recommended to the Public Service Commission "that the Long Island Railroad Company be permitted to revise its tariffs so as to bring about a financial condition that will enable the company to provide for needed improvements and good service; * * * the Long Island Commuters' Association indorses the program of the railroad company to the extent that if the Public Service Commission after investigation proves that the company needs the relief which it seeks, prompt measures be taken to approve the revised tariffs as submitted by the company.]

Railway Age

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WE GUARANTEE that of this issue, 15,000 copies were printed; that of these 15,000 copies, 13,480 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 140 were mailed to advertisers, 280 were provided for counter and news companies' sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 1,100 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

No one can be accused of lack of forethought in not having the convention hall enlarged this year. Nevertheless, there may be some difficulty in accommodating all the members on Monday when the subjects common to both the locomotive and car departments are considered. At Wednesday's session there was hardly a vacant seat in the Greek Temple. It is safe to say that this has never happened before, with the exception of the opening session, when supply men as well as railroad members were in attendance. No stronger endorsement of the policy of the officers of the association could be given than is furnished by the record breaking attendance and the sustained interest at the meetings.

Standing Room Only

Much has been said recently relative to the marked decrease in the efficiency of labor, which is seriously affecting the output of railroad shops. It is generally conceded, not only with respect to railroad shops but in most industrial establishments, that there has been a material falling off in man-hour output since the war. The possibilities for increasing output do not, however, lie wholly with the men. It is a serious question whether the actual loss of production chargeable to the men, while actually at a job, is as great as the loss of time between jobs, for a large part of which they are in no way responsible. Under piece work conditions the men had an incentive to assume a portion of the responsibility which rightly belongs to the shop management. Their own interest in output was sufficient to cause them to take measures themselves to see that material and tools were properly lined up so that the jobs might proceed with the least possible interruption. This should be the duty of the management and by proper supervision, especially by the use of a scheduling, routing and material follow-up system, this class of delays can largely be eliminated. Present conditions are such that the supervision of any large shop can ill afford not to include such a system. Once established, it is extreely doubtful whether any shop management would consent to discontinue it even under a complete restoration to pre-war conditions.

Reduce the Time Between Jobs

The fact that there was so little apparent interest shown in the report of the Committee on the Design, Maintenance and Operation of Electric Rolling Stock indicates that there is a need for a change of method in handling such subjects. J. A. Pilcher presented the report in the absence of the chairman, C. H. Quereau. He likened electric motive power to a bucket conveyor because of its certainty of movement and constant speed. One train, he said, will not catch up with another on the road. W. J. Tollerton called for discussion, stating that this was an important question, particularly in view of the water power bill just passed by Congress and the need for fuel conservation, but there was no response to his request. The report dealt with the matter of electrification largely as a matter of economics instead of one of maintenance, design and operation, but the fact that no one felt willing to start the discussion was in itself significant. Beyond question it is a topic of rapidly increasing importance, and while comparatively few roads use electric rolling stock, a number are considering its use, and there are other electrical subjects of equal or greater importance. Some means should be provided so that electrical matters can be handled more adequately and the attention of the men most vitally interested in them be concentrated on them.

Consideration of Things Electrical

If the railroads really want college men in their shops the way is open. Does the National Agreement actually prohibit the employment of special apprentices recruited from the universities or their training along lines calculated to develop capable and efficient shop executives? It is impossible to find any real basis for interpreting the agreement in such a way as to keep the college man out of the shop if the railroads really want him. The agreement simply ignores him—why read into it something that is not there and which has no place in such an agreement? It has been suggested that the real question is, "Do the railroads really want the college man?" That is the test. Is he accepted at his real value and genuinely wanted? It is suspected that on more than one road he is ostensibly welcome, but practically *persona non grata*. But assuming that the railroads appreciate the potential mental equipment, initiative and independence of the university trained man, are they prepared to pay the price? A large majority of college graduates will enter industrial

Where There's a Will There's a Way

establishments this year at an initial salary of $125 a month. How will they be treated once they have entered the ranks? Despite the increasing number of college trained executives the railroads do not invariably have the reputation for pursuing a broad gage, fair-minded policy towards their technical employees. Is not the National Agreement too small a part of the whole big problem to be accepted as the determining factor?

The Weakest Link

The old adage that no chain is stronger than its weakest link applies with particular force to the present engine terminal situation. Bridges are constantly being rebuilt or reinforced to meet the requirements of heavier locomotives and heavier rails must precede heavier wheel loads; but larger, heavier and more complicated locomotives are being placed in service with no consideration for their effect on engine terminals until the situation at many terminals is well-nigh intolerable. How can large modern locomotives, equipped with many important auxiliary devices be handled in the average roundhouse or around the average terminal so that the potential capacity and efficiency of the equipment can be fully realized? Have not engine terminals generally reached the breaking point, making it unwise to increase the size of locomotives or add to the auxiliary equipment until these terminals are modernized? One of the best equipped railroads in this country has recently ruled against placing a single additional device on locomotives no matter how meritorius, for the reason that its engine terminal facilities are recognized as totally inadequate. Recognition of this state of affairs is commendable, but it is a situation that must be corrected or locomotive development will come to a standstill. When engine terminals have become inadequate to the upkeep of important auxiliary devices that are essential to economy and efficiency in locomotive operation, it is obviously a mistake to spend additional money on locomotives until the terminal situation, which may be said to constitute the weakest link in the chain, has been strengthened.

Heavy vs. Light Machine Tools

An important point always insisted upon by the late J. H. Manning, superintendent of motive power of the Delaware & Hudson, was the use of light machine tools for work requiring only light cutting operations. Mr. Manning maintained that whenever a heavy machine is used on light work there is not only an unnecessary waste of power, but a heavy, expensive machine is tied up on relatively light, unimportant work. For example, it used to be considered good practice to keep a big cylinder or frame planer busy on shoes and wedges in idle time. This practice has been proved uneconomical because the increased power consumption, depreciation and wear and tear on the machine, if charged to the shoes and wedges, would make them exceedingly expensive. It is not uncommon to find large planers and other large machines in shops where they occupy valuable floor space and yet stand idle for days at a time. Of course, at outlying points it is necessary to have machines of sufficient capacity to handle occasional large work, for when a cylinder or frame is wanted, it is wanted badly and the cost is not so important. There is a tendency, however, to play the game too safe and order machines for the largest work that will by any chance need to be handled. In this way a shop may be equipped with machines that will be too heavy for by far the largest proportion of the work to be done on them. Would it not be much better, by looking ahead a little, to ship the exceptionally large work away and spend the additional capital for short cut lathes, medium sized boring mills, turret lathes, drill presses, etc., thus increasing the facilities for performing the bulk of machine operations?

Why They Did It Electrically

The sphinx has spoken, and as we all suspected, it had something to say when it spoke. The sphinx in this particular instance is a composite animal and is made up of a body of men who have real information at hand concerning the electrification of steam railroads. The papers presented by representatives of ten railroads comprise the report of the Committee on Design, Maintenance and Operation of Electric Rolling Stock. These papers sum up the experience of the roads and include many interesting results of operation. They also give reasons for adopting electric traction. Some of these reasons are well known, such as tunnel and terminal conditions, city ordinances, congested traffic conditions, and possibly economy of operation, even where there is no congestion. Other reasons are not so well known. For example, it is pointed out by H. R. Warnock, general superintendent motive power, Chicago, Milwaukee & St. Paul, how the desire to develop a market for power, together with a variety of conditions and circumstances, led to the adoption of electric operation on the Butte, Anaconda & Pacific and the St. Paul. Figures on cost of operation are included relating to electric operation on the Butte, Anaconda & Pacific to show that its anticipated reduction in the cost of operation has been realized, while the quality of service has been improved. Many roads are now considering the advisability of adopting electric operation on certain sections and the report will be of great and real value to them. The men who contributed to the report should be highly commended, for only by such open policy and concerted action as theirs can rapid and intelligent progress be made in the field of railway electrification. Correlation of data and more cost data are needed, but the committee's work is a big step in the right direction.

Avoiding Discussion of A Vital Subject

The subject of labor conditions and problems has been conspicuously absent from the program of the Mechanical Section and from the discussions on the convention floor. On the other hand, labor conditions and problems on the railways have been the subject of more discussion than anything else on the part of railway men attending the conventions when they have met informally on the pier, on the boardwalk and in the hotels. The reason why there has been so much discussion of labor matters outside the convention hall is that the labor problem is the most vital and difficult problem with which the mechanical officers, as well as all other officers in the operating department of the railways, are now struggling. It is certainly remarkable that the foremost problem of current railroad operation should be receiving practically no organized study and discussion by railway officers. The mechanical officers are not open to much criticism for not tackling this problem in convention, because if they dealt with it frankly and openly in their meetings they probably would be subjected to severe criticism by the railway executives. One of the principal reasons, perhaps the principal one, why the labor problem has become so acute on the railways is that it has not been investigated, dis-

cussed, and dealt with with the courage, frankness and intelligence required. Instead of being constantly discussed in a corner as it is almost universally, the organizations of the railroad companies ought to be so changed as to enable them to deal in new and better ways with the labor problem and then the new methods adopted should be made the subject of reports, comparisons, discussion and co-operation between the various railroads in much the same way as new developments in the engineering branches of the business. When the railroad labor problem is made the subject of more scientific investigation, discussion and action and is treated less as a thing which must be whispered about in a corner, a beginning will be made in solving it, and no real beginning in solving it will be made until this is done.

Front End Design

THE conclusions of the Committee on Fuel Economy and Smoke Prevention are highly conservative, but are very definite on one point, i. e., that all preconceived ideas of exhaust jet action must be revised. In pointing out the need for a long series of test plant observations to determine the most efficient form of exhaust nozzle, the committee has gone even further and included the whole subject of front end design. No subject involving the proportioning of locomotives is in more need of experimental investigations for the purpose of developing fundamental laws of general application. In this day of large locomotives and high fuel cost, anything which will increase the capacity without increasing the size of the locomotive, or will increase the ton miles per hour or per pound of coal, should receive the earnest attention of every motive power department officer. The possibilities in these respects from improved draft appliances were clearly brought out by H. B. McFarland, engineer of tests of the Atchison, Topeka & Santa Fe, in tests, which showed the enormous amount of power required to draft the locomotive with the customary type of exhaust nozzle and front end arrangement.

That a great improvement is possible without radical change in the design of the locomotive as a whole was clearly demonstrated by the Norfolk & Western tests, a report of which was published in the Railway Mechanical Engineer in June, July and August, 1918. By a change in the shape of the exhaust nozzle and an increase in the diameter of the stack, the same draft was produced with approximately 4½ lb. cylinder back pressure which required slightly less than 11 lb. back pressure with the circular nozzzle. The theory on which this development was based is that the greatest effect in the movement of front end gases is produced by the entraining action of the jet surface exposed to the surrounding gases. If this theory is correct, it is obvious that the greatest draft which can be obtained from a given volume of exhaust steam will be produced by a form of jet having the largest practical ratio of periphery to cross-section area. Unsupported theories are of little practical value.

It should be pointed out in this connection, however, that such attempts as have been made toward increasing the draft efficiency have supported this theory and such data are sufficiently numerous to justify an investigation accepting it as a working basis in order that, if it proves to be correct, its limitations may be determined before investigations along other lines are attempted. But the shape of the exhaust nozzle should be taken up in relation to other features of the front end which have to do with the control and distribution of the draft on the fire. The possibilities for increasing locomotive economy and capacity make this a fertile field for test plant investigations.

Program For To-day

SECTION III—MECHANICAL

9.30 A. M. TO 12.30 P. M.

Discussion of Reports on:	
Locomotive Headlights and Classification Lamps	9.30 A. M. to 10.00 A. M.
Feed-Water Heaters for Locomotives	10.00 A. M. to 10.30 A. M.
Individual Paper on "Locomotives as a Big Investment," by George M. Basford	10.30 A. M. to 11.00 A. M.
Discussion of Reports on:	
Design and Maintenance of Locomotive Boilers	11.00 A. M. to 11.30 A. M.
Engine Terminals, Design and Operation	11.30 A. M. to 12.00 M.
Train Resistance and Tonnage Rating	12.00 M. to 12.30 P. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3.30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.

4.30 P. M.—Tea will be served in Entrance Hall.

9.00 P. M.—Carnival Night with Special Features, Ball Room, Million Dollar Pier.

Lost Badges

No. 5629. E. A. Emery, Gustin-Bacon Manufacturing Company.

No. 5604. J. T. Miller, Standard Car Truck Company.

No. 5334. A. L. Schuhl, Independent Pneumatic Tool Company.

Purdue Dinner

THE PURDUE MEN and their wives are planning their dinner for Saturday night, the place to be announced later. Please sign up promptly with Charlie Bird at the Bird Archer exhibit. A regular old time is promised by Prof. L. E. Endsley, B. B. Milner, engineer motive power, N. Y. C., and R. B. Watson, engineer of tests of the Erie.

The Track Exhibit—A Correction

THE NEW YORK CENTRAL LOCOMOTIVE equipped with the trailer tractive effort booster, which was incorrectly stated to be at the Pennsylvania electric station, in yesterday's issue, is actually located on the Pennsylvania tracks at Georgia Avenue and the Boardwalk. The locomotive is under steam and the trailer booster may be seen in actual operation.

Bulletins From the Republican Convention

THOSE OF OUR GUESTS who have placed bets on the Republican nomination for President of the United States and others, can ease their minds by watching the *Railway Age* bulletins which will be posted on the mirrored post in its booth near the entrance to the hall.

These bulletins will be kept up to the minute and will announce the important turns in this portentous event until the nominations are secured.

Railway Age European Editor On Visit to the United States

Robert E. Thayer, who in April, 1919, was transferred from New York to London as European editor of the *Railway Age* and other Simmons-Boardman publications, is making his first visit to the United States since he went abroad. He arrived in New York on Tuesday and came to Atlantic City on Wednesday to attend the conventions. Mr. Thayer is well known to many of the convention visitors, having been before he went abroad mechanical department editor of the *Railway Age* and managing editor of the *Railway Mechanical Engineer*. He will return to London about August 1.

During the more than a year that Mr. Thayer has been abroad he has had many interesting experiences and has had an extraordinarily good opportunity to study railroad, industrial and business conditions abroad.

Robert E. Thayer
European Editor of the Railway Age

While his headquarters are in London, he has traveled extensively on the continent. In May, 1919, a month after he arrived in London, he went to France and from there to Belgium, where he made a thorough study of the conditions on the Belgian lines. He then returned to England, where he stayed during July, August and September. He was on a trip to Scotland when the general strike on the British railways occurred and had to stay there a week, although he returned to London on the first through train that was run down from Scotland. Many of our readers will remember the interesting and comprehensive article Mr. Thayer wrote for the *Railway Age* regarding the British railway strike.

In January Mr. Thayer went to Switzerland and traveled over the lines now being electrified from Erstfeld to Bellinzona. This is a part of the St. Gothard line to Italy. While on the trip Mr. Thayer visited the subterranean station in the Simplon tunnel, which is 6,500 ft. underground.

He returned to London in the latter part of January and about the middle of February left for a trip to Holland and Germany. While in Germany he traveled extensively over the railways of that country, visiting Bremen, Hanover, Berlin, Dusseldorf, Essen, Cologne, Weisbaden, which is the headquarters of the Inter-Allied Railway Commission, and Heidelberg, returning to London about the middle of March.

Mr. Thayer was sent to Europe in order that the readers of the *Railway Age* and other publications of the Simmons-Boardman Company might be kept informed by a man familiar with American railway conditions and practice, of the railway conditions and practice in Europe, and of the conditions affecting the market for American railway equipment and supplies abroad. In order that he may carry on his editorial work efficiently it is necessary that he should keep closely in touch with conditions in the United States and he returned to this country so as to be here at the time of the conventions, because it was felt that it was essential to the continued success of his work that he should not even temporarily get out of touch with conditions in the railway and railway supply industries in the United States.

Appliances Association Officers Here

A number of the officers and directors of the National Railway Appliances Association are attending the conventions and studying the exhibits. The National Railway Appliances Association is the organization of the railway supply interests which give the exhibit at the Coliseum in Chicago each March in connection with the convention of the American Railway Engineering Association.

Among the officers and directors of this organization who are here are J. B. Strong of the Ramapo Iron Works, who is president of the association; D. W. Kelly of the Kelly-Derby Company, who is secretary-treasurer; and A. A. Taylor, of Fairbanks, Morse & Co.; George C. Isbester of the American Chain Company, and H. A. Filkins, of Paul Dickinson, Inc., all of whom are directors. An informal conference of these officers of the Railway Appliances Association was held at the Traymore yesterday.

The exhibits given in connection with the mechanical convention at Atlantic City in June and in connection with the engineering convention at Chicago in March are very much the largest exhibits of railway equipment and materials made anywhere in the world. Many railway supply companies make exhibits at both conventions. The officers of the National Railway Appliances Association feel, and undoubtedly rightly so, that study of each others methods and exhibits by the officers of their association and of the Railway Supply Manufacturers' Association, and closer co-operation between these two organizations will improve the exhibits both in Atlantic City and Chicago and thereby be helpful to both the railway and the railway supply industries.

Mr. Kelly announces that it will be possible to make the exhibit at Chicago larger than ever next March, as several thousand additional feet of space have been obtained in the Coliseum and the Coliseum annex in which the exhibits are given.

Transportation Home

The representatives of the Pennsylvania Railroad Company would like to have some knowledge of what day the members will leave, and what trains they will leave on. Kindly give Secretary Hawthorne a memorandum of the train you would like to go on, and the date, and the accommodations you will require. It will aid the company in deciding the amount of Pullman equipment to be used for that purpose.

American Railroad Association—Section III—Mechanical

Report on Safety Connections Between Engine and Tender Provokes Lively Discussion

Chairman Tollerton called the meeting to order on Thursday morning at 9.45 A. M.

Report on Fuel Economy and Smoke Prevention

IN ITS REPORT OF 1919 the committee emphasized the growing importance of fuel economy to the railroads, arising from increasing consumption and increasing cost of production. Both of these factors are likely to result in the largest fuel bills in railroad history during the present year. It is certain that there will be substantial increases in the cost of production and only the application of prompt and effective means will prevent an increased consumption out of proportion to any probable expansion in traffic. It is therefore, urged that every railroad check its current consumption with previous records with a view to the adoption of such measures as the situation may require.

Fuel Economy on Locomotives

With the return of the railroads to corporate control and operation, the Fuel Conservation Section ceased to exist. The work of this important branch of the Railroad Administration was of unquestioned value in promoting economy in the purchase, distribution and use of fuel for railroad purposes. The methods employed were substantially those advocated by the committee in previous reports and they must have continued intensive application if the cost of fuel is not to exceed even its present ratio to total operating expense.

The publication of the Fuel Conservation Section no longer bears an official status and may, therefore, fail to serve their most useful purpose unless incorporated in the official publications of the American Railroad Association. This is particularly true of the pamphlet on "The Economical Use of Railroad Fuel" most recently issued. While this incorporates many features contained in the present official publication of this Association issued under the title of "Fuel Economy on Locomotives," there is some additional material gathered as a result of greater experience in the application of the principles of fuel economy to locomotive operation as well as some subject matter not treated in the Association pamphlet, that it is believed should be incorporated and accordingly a revision of the text of Fuel Economy on Locomotives, is submitted with the recommendation that suitable action be taken to place it before the General Committee for adoption as standard practice.

[The original text of Fuel Economy on Locomotives was incorporated in the 1915 report of the committee. Some additional matter has been included in the revised text, on subjects included in the original, but the principal change is the addition of instructions relating to burning anthracite and mixed anthracite and bituminous coal, oil burning practice, stokers, draft appliances, and a number of sections dealing with locomotive maintenance.—EDITOR.]

Exhaust Nozzles

The committee was instructed to investigate the shape of exhaust nozzles to determine that which would produce the highest vacuum and least back pressure.

This is a problem requiring for its solution the preservation of practically uniform conditions throughout the investigation and, therefore, one demanding a series of test plant observations. While it may be possible to obtain rough approximations in tests under road conditions, the variables are so numerous and so great as to impair the value of conclusions demanding a reasonable degree of accuracy. Variations affecting the results by as much as five per cent would be fatal to an investigation in which such a variation is of as much importance as it is where both hauling capacity and fuel economy are involved. The facilities for the required investigation are not now at the service of the association, but through the courtesy of the Pennsylvania Railroad a partial report may be made from tests conducted in the Altoona test plant.

The investigations made by the Pennsylvania were for the

purpose of ascertaining the maximum equivalent evaporation and the least average back pressure under uniform operating conditions with different shape nozzles.

Description of Nozzles

Circular Nozzle.—This nozzle gradually tapers to the exit diameter at a distance of one inch from the exit, the sides being parallel beyond this point.

Rectangular Nozzle.—The nozzle has a circular entrance, gradually tapering into a rectangle at a distance of 2⅜ in. from the inlet. From this point the sides of the opening are parallel for a distance of one inch to the tip of the nozzle.

Four Internal Projection.—This is a circular nozzle having triangular shaped bars projecting one inch toward the center from four equal distant points on the edge of the nozzle. The bars have an edge turned toward the discharge jet.

Alligator Nozzle 12 in. High.—This is a circular nozzle having two jaws or points projecting 12 in. above the tip of the nozzle. The jaws are 6¼ in. apart at the tip, and this diameter remains constant to a point ¾ in. below the tip of the nozzle, from which point the diameter is gradually increased to the nominal dimension.

Alligator Nozzle 6 in. High.—This is similar to the 12-in. alligator nozzle already described, except that the jaws are 6 in. high.

Four Vertical Projection.—This differs from the alligator nozzle in that it has four points instead of two. The diameter is uniform to a point 1 in. below the tip of the nozzle, from which point it gradually increases to the nominal diameter at the bottom.

Vertical Projection and Splitter.—This is circular, a splitter being fitted at the top, and a conical piece attached to the splitter at the center, projecting downward 6½ in. below the tip of the nozzle.

Special Shaped Nozzle.—This consists of a circular nozzle having four projections from the tip 4 in. high, which are bored conical, the diameter at the top being ¾ in. smaller than at the bottom of the projections. These projections are 2 in. wide at the bottom and flare out to about 4 in. in width at the top.

Splitter.—This consists of a circular nozzle, across the center of which is fitted a triangular piece having one edge directed downward toward the discharge jet and having a width of ⅜ in. at the top.

Four Notched Circular.—This nozzle has four notches set into it at the top.

Summary of Results of Nozzle Tests

Description	Dry coal per hour	Equivalent evap. per hour	Average least back pressure	Rank
Four internal projections	9,421	65,129	14.9	1
Rectangular	9,810	64,316	14.3	2
Circular, area 33.29 sq. in.	4,218	49,249	9.2	6
Circular, area 30.68 sq. in.	6,734	52,223	10.5	5
Alligator, 12 in. high	5,292	47,852	9.6	11
Alligator, 6 in. high	6,186	49,129	11.2	9
Four vertical projections	5,833	50,773	8.	6
Vertical projection and splitter	7,048	59,624	10.8	5
Four notched circular	5,003	50,833	8.1	7
Splitter	7,304	58,586	10.9	4
Special shape	5,854	47,890	5.8	10

Method of Test

These tests were made on a Pacific type locomotive equipped with a superheater and a brick arch. The same arrangement of front end details was maintained throughout the tests. With each design of nozzle, the evaporative rate was increased until the boiler limit was reached, the usual observations being taken of boiler and engine performance.

Result of Tests

The results of the tests corresponding to the various shapes of nozzles are shown in the accompanying table. They indicate that under the conditions peculiar to this test with a nozzle having four internal projections it was possible to obtain a higher equivalent evaporation per hour with less back pressure than with a circular or rectangular nozzle having approximately the same net area.

Conclusions

The committee does not consider the information now available sufficiently complete to justify positive conclusions as to the most efficient shape of nozzle, and is only in position to report that the circular form of nozzle does not result in the highest vacuum and the least back pressure. What form will produce these conditions it is impossible to say without an extended investigation involving a long series of test plant observations.

It seems evident, however, that all preconceived ideas of exhausted jet action must be revised to agree with the apparent fact that the best results will be obtained when the jet contour is interrupted as is the case both with the internal projection nozzle and with the one having one axis longer than the other.

Front End Design

Your committee has given some consideration to the matter of front end appliances as affecting fuel economy and locomotive repair costs, but is unable to present a design applicable to all types of locomotives in different classes of service. In fact, a suitable general standard would not meet practical requirements, because of the variables introduced through differences in dimensions vitally affecting the problem. The best arrangement should be determined for each class of locomotive and normal service conditions using the regular fuel supply.

There is, however, opportunity for increased facility in maintenance and reduced cost of repairs through the use of the so-called "unit" front end netting arrangement. It is obvious that a design permitting the complete removal of the assembled netting will be more easily maintained, will reduce locomotive shop hours, and effect a reduction in the cost both of labor and material. For these reasons, it is the opinion of the committee that the use of some form of unit front end should be extended.

A suitable standard having been determined, the front end details should be permanently fastened to prevent further adjustments. The only variable in the front end should be the exhaust nozzle and this should never be altered to cure a steam complaint until the cause of the complaint has been determined.

Running Stoker Engines Over More Than One Division

The committee recognizes that there may be some fuel economy in running stoker-fired locomotives over more than one division, but does not find that the practice prevails.

While it may be practicable to increase the mileage of such locomotives, the net economy of operation is doubtful, especially as topographical conditions are frequently such that it is impossible to handle the most economical rating on the second division, the loss in fuel per thousand ton miles therefore exceeding the saving otherwise effected. This is a question that must be determined by local operating conditions, including terminal facilities.

The report was signed by Wm. Schlafge (Chairman), Erie; W. H. Flynn, Michigan Central; Robt. Quayle, Chicago & North-Western; D. J. Redding, Pittsburgh & Lake Erie; W. J. Tollerton, Chicago, Rock Island & Pacific; C. H. Hogan, New York Central, and F. P. Roesch, Standard Stoker Company.

Discussion

In presenting the report, Wm. Schlafge (Erie), Chairman of the committee, stated that it was "a general rehash of the subject dating back to the time of the appointment of the committee."

John A. Pilcher (N. & W.): The arrangement of the nozzles described in a series of articles commencing in the *Railway Mechanical Engineer* of June, 1918, was based on a series of experiments conducted on the Norfolk & Western, something like two years ago. The tests were conducted on a large Mountain type locomotive, in which a special form of nozzle, described in these articles, was used.

The conception of this nozzle was due to the fact that the engine choked itself from back pressure, and we could not get the speed out of it. The first thought was that if it was possible to enlarge the stack and still keep up the necessary vacuum in the smokebox to furnish the necessary draft, we would be able to reduce the back pressure.

A number of experiments were carried out, I think there

were something like 70 or 75 special trains operated simply for the purpose of developing this nozzle. We were able to increase the size of the stack from 19 in. to, I think, 26 in.

When we started out we had the engine running about 35 miles an hour on pretty heavy load, and about 11 lb. back pressure, and approximately 8 in. vacuum in smokebox. When we wound up we had something like 8 lb. of back pressure and 4 in. of vacuum in the smokebox.

We practically remade the engine. I would like to know if the committee had noticed this publication in the *Railway Mechanical Engineer*, which gave a full description of the whole test.

To give an idea of what we did to the engine, when traveling at a speed of 50 miles an hour, a drop of 7 lb. in the back pressure was equivalent to the addition of 300 HP.

B. B. Milner (N. Y. C.): The New York Central ran some extensive nozzle tests about two years ago upon all shapes and sizes and kinds of nozzles, and in connection with these tests developed a form of exhaust nozzle which would give the results to which the previous speaker has just referred; that is, a nozzle which would give the necessary draft and very greatly enlarge the opening.

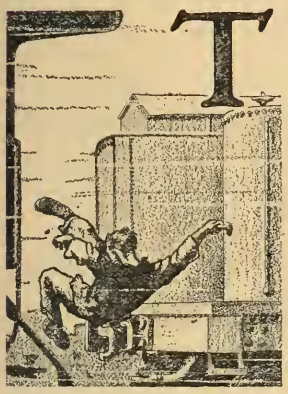
I do not know anything about the details of the Norfolk & Western design of nozzle, but the nozzle which was developed on the New York Central Lines, as the result of the experiments referred to, consists of a ring which is broken in about five or six places, so that there are about five or six streams of exhaust steam, and the smokebox gases, instead of being entrained in the exhaust jet of the circular nozzle on the outside of the stream only, are entrained in between the several streams.

No conclusive dynamometer tests have been run on engines operating these nozzles recently, in order to develop and determine the differences in the horsepower and drawbar pull, which may be developed, particularly at the higher speeds, where the increased nozzle area will be most effective, but some 8 or 10 engines have been running for a year and a half with nozzle openings about 35 per cent. greater than the nozzle opening of sister engines, running with the plain circular nozzle.

Chairman Tollerton: *A motion will be in order that the report be accepted, and such portions of it as may be necessary be referred to letter ballot.*

Such a motion was made and unanimously carried.

Safety Connections Between Engine and Tender



THE PRINCIPAL FEATURES in the safety of connections between engine and tender are: (1) A drawbar of sufficient strength to stand the pull of the locomotive and of sufficient additional strength to stand unusual shocks which suddenly increase the stress for short periods; (2) proper proportion of metal to make the strength of the bar practically the same throughout; (3) pins of proper strength to withstand the same load as drawbar and large enough, within practical limits, to reduce wear to a minimum; (4) draw castings on the engine and tender of equal or greater strength than the drawbar and secured to the engine and tender so firmly that any failure will be in the pin or the drawbar and not in the engine or tender; (5) additional draw connections between the engine and tender of such strength that in case of failure of the drawbar or pin, the safety connections will hold engine and tender against separation so that an apron of reasonable width will not fall between the engine and tender or permit any one standing on deck to fall through; (6) material in drawbar and safety connection of such quality that it will stand frequent shocks, vibrations and blows without rapid crystallization—a material that is tough without necessarily being of high tensile strength; (7) pocket in draw castings of such dimensions that there will be minimum tendency to bend the pin but sufficient space to permit the required vertical movement of the drawbar without binding.

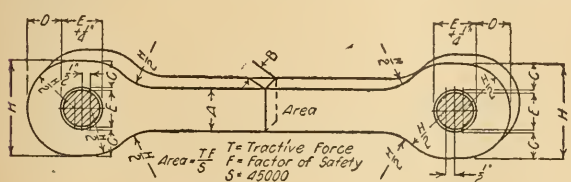


Fig 1.—Diagram of Drawbar and Method of Determining the Principal Dimensions

Design of Drawbars

Drawbars should be straight throughout their full length. Drawbars should be of such size and area that working stress based on the normal tractive effort of the locomotive should not exceed 4500 lb. per sq. in. and the factor of safety should be not less than 10. Some roads require a minimum factor of safety of 15 and others require a factor still higher. Where a central safety bar is used the same limit of stress and safety factor as in the drawbar should be required.

The following are simple formulæ for designing drawbars and pins:

$$\text{Area through body of bar} = \frac{TF}{S}$$

T = Tractive force.
F = Factor of safety — minimum, 10.
S = 45,000 = Tensile strength of wrought iron, per sq. in.
Area of each drawbar pin or safety-bar pin = 75 per cent of area through body of bar.

The area of the pin is based on the cross-section of a straight bar without bends or offsets and with depth of pocket not more than one inch greater than the thickness of the drawbar. An offset or bent bar must be of greater cross-section than a straight bar and it is not necessary to increase the size of pin accordingly.

A diagram of a satisfactory general form of drawbar, together with method of determining principal dimensions, is shown in Fig. 1. Tables of dimensions of drawbars for different tractive efforts, at factors of safety of 10, 15 and 20, are shown in Fig. 2. These tables are based on a tensile strength of 45,000 lb. per sq. in. for the higher tractive effort shown on each line.

It is recommended that the material in drawbars, safety bars, safety chains and in drawbar, safety-bar and safety-chain pins shall be of refined wrought iron of good grade, having an ultimate tensile strength of not less than 45,000 lb. per sq. in. The use of steel in any of these parts is not recommended.

Safety Bars and Safety Chains

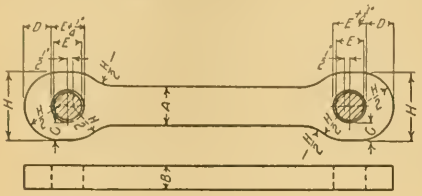
It is the opinion of the committee that all new locomotives should be built with a central safety bar located immediately beneath the drawbar. Where construction of the locomotive and tender prevents this application two safety bars should be applied, one located on each side of the drawbar and as near thereto as possible. In building new locomotives, every effort possible should be made to design surrounding parts to permit the application of a central safety bar.

Safety bars are more satisfactory than safety chains for locomotives of 45,000 lb. tractive force or over. The limit

of 45,000 lb. is proposed for the reason that chains within the limit of the prescribed stress would have to be of such size as to be impracticable and inconvenient in handling and maintaining. When locomotives of 45,000 lb. tractive force or over require new rear deck or foot plate castings, it is recommended to arrange the drawbar equipment on both the locomotive and tender to apply safety bars, using the central safety bar preferably.

Where two safety bars are used, they should be located as near as practical to the drawbar to reduce to a minimum the amount of slack required in the pin hole to permit the locomotive taking curves satisfactorily.

Where two safety bars are used, they should be of such size



Tables of Dimensions of Draw Bars for Different Tractive Forces at Factors of Safety of 10, 15 and 20

TRACTIVE FORCE	FIBRE STRESS 4500# FACTOR SAFETY 10						FIBRE STRESS 3000# FACTOR SAFETY 15						FIBRE STRESS 2250# FACTOR SAFETY 20					
	A	B	C	D	E	H	A	B	C	D	E	H	A	B	C	D	E	H
10,000 to 20,000	3	1 5/8	2	2 1/2	2 3/8	6 3/4	3 1/2	2	2 3/8	2 7/8	2 3/4	7 1/4	3 1/2	2 1/2	2 1/4	3	3	7 3/4
Over 20,000 to 30,000	3 1/2	2	2 1/4	3	3	7 3/4	4	2 1/2	2 1/2	3 1/4	3 1/2	8 1/2	4 1/2	3	2 3/4	3 3/4	4	9 3/4
Over 30,000 to 45,000	4	2 1/2	2 1/2	3 1/2	3 1/2	8 3/4	5	3	3	4	4	10 1/4	6	4	3	4	4 1/2	10 3/4
Over 45,000 to 65,000	5	3	3	4	4	10 1/4	5 1/2	4	3 3/4	4 3/4	4 3/4	11 3/4	6 3/4	4 1/2	4	5 1/4	5 1/4	13 1/4
Over 65,000 to 85,000	5 1/2	3 1/2	3 1/2	4 1/2	4 1/2	11 3/4	6 1/2	4 1/2	4	5 1/4	5 1/4	13 1/4	7 1/2	5	4 1/2	6	6	15 1/4
Over 85,000 to 110,000	6 1/2	4	4	5 1/4	5	13 1/4	7 1/2	5	4 1/2	6	6	15 1/4	9	5 1/2	5 1/2	7 1/4	7	18 1/2
Over 110,000 to 135,000	7	4 1/2	4 1/2	5 3/4	5 3/4	14 1/2	8 1/2	5 1/2	5 1/2	6 3/4	6 3/4	17 1/4	9	6 1/2	5 1/2	7 1/4	7 1/2	18 3/4

Fig 2.—Tables of Dimensions of Drawbars for Different Tractive Efforts, at Factors of Safety of 10, 15 and 20

and area that the working stress based on the normal tractive effort of the locomotive does not exceed 4,500 lb. per sq. in. in both bars considered together and the factor of safety should not be less than 10. Safety bars should be free from bends and offsets. A diagram of a satisfactory general form of safety bar located at the side of the drawbar, together with method of determining the principal dimensions, is shown in Fig. 3. Tables of dimensions of safety bars for different tractive efforts, at factors of safety of 10, 15 and 20, are shown in Fig. 4. These tables are based on a tensile strength of 45,000 lb. per sq. in. for the higher tractive force shown on each line.

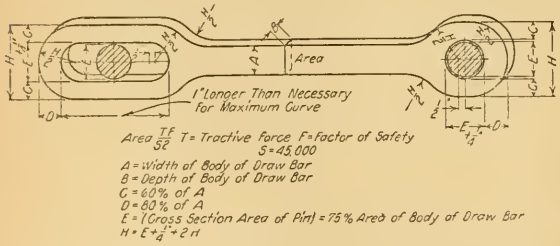


Fig 3.—Diagram of Safety Bar (at Side of Drawbar) and Method of Determining the Principal Dimensions

Safety chains, where used, should be of such area that the working stress, based on the normal tractive effort of the locomotive should not exceed 4,500 lb. per sq. in. in both chains considered together and the factor of safety should not be less than 10. All bolts in safety chain connections should have double nuts and split key or cotter key where it is possible to apply them. Where space is limited, a single nut and split key or cotter key should be applied. It is not recommended that cotter key or split key alone be used. Clevises, clevis pins and attachments must be of strength equal to the chain.

The following is a simple formula for determining size of link in safety chains:

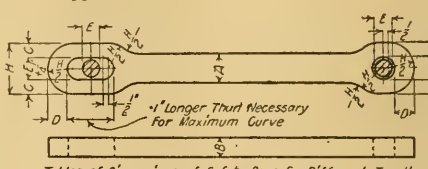
$$A = \frac{TF}{.75S4}$$

A = Area of bar of which link is made.
T = Tractive force.
F = Factor of safety — minimum, 10.
S = 45,000 = Tensile strength of wrought iron per sq. in.

Draw castings on locomotive and tender should be inspected at each regular drawbar inspection. At each locomotive general shopping, the draw casting on the locomotive should be given as thorough inspection as possible without taking down the casting and a similar inspection should be made on the tender. In addition, a thorough inspection should be made of all framing and bracing at the front of the tenders, as well as of all rivets and bolts. Where the sills, corner angles, braces, etc., are found corroded to the extent of impairing their strength, cracked or otherwise defective, these parts should be reinforced or renewed. Bolts which may be found under size should be replaced by bolts of original size.

Substitution of Safety Bars for Safety Chains

Where safety bars, one on each side of the drawbar, are of ample size without offset and have the proper arrangement of holes to give the required clearance without causing compression in either bar at any time, and where connections on the locomotive and tender are as strong as a drawbar of the required size, the cost incident to changing to a central safety bar is not considered to be justified. The committee investigated the application of additional brackets or built up ar-



Tables of Dimensions of Safety Bars for Different Tractive Forces at Factors of Safety of 10, 15 and 20

TRACTIVE FORCE	FIBRE STRESS 4500# FACTOR SAFETY 10						FIBRE STRESS 3000# FACTOR SAFETY 15						FIBRE STRESS 2250# FACTOR SAFETY 20					
	A	B	C	D	E	H	A	B	C	D	E	H	A	B	C	D	E	H
10,000 to 20,000	2	1 5/8	1 1/4	1 5/8	1 1/2	4 1/4	2 1/2	1 1/2	1 1/2	2	2	5 1/4	3	1 1/2	1 7/8	2 1/2	2 1/4	6 1/4
Over 20,000 to 30,000	2 1/2	1 7/8	1 1/2	2	2	5 1/4	3	1 7/8	2 1/4	2 1/4	2 1/4	6 1/4	3 1/2	2	2 1/4	2 1/2	2 1/2	7 1/4
Over 30,000 to 45,000	3	1 7/8	1 7/8	2 1/2	2 1/4	6 1/4	3 1/2	2 1/4	2 1/4	2 1/2	2 1/2	7 1/4	4	2 1/2	2 1/2	3 1/4	3 1/4	8 1/2
Over 45,000 to 65,000	3 1/2	2	2 1/8	2 1/2	2 3/4	7 1/4	4	2 1/4	2 1/2	3 1/4	3 1/4	8 1/2	4 1/2	3 1/4	2 3/4	3 3/4	3 3/4	9 3/4
Over 65,000 to 85,000	4	2 1/2	2 1/2	3 1/4	3 1/4	8 1/2	4 1/2	3 1/4	2 3/4	3 3/4	3 3/4	9 3/4	5	3 3/4	3	4	4 1/2	10 1/2
Over 85,000 to 110,000	4 1/2	2 3/4	2 3/4	3 3/4	3 3/4	9 3/4	5 1/2	3 3/4	3 1/4	4 1/2	4 1/2	11	6	4	3 3/4	4 3/4	4 3/4	12 3/4
Over 110,000 to 135,000	5	3	3	4	3 3/4	10	6	3 3/4	3 3/4	4 3/4	4 3/4	12 3/4	7 1/2	4	4 1/2	6	5 3/4	14 3/4

Fig 4.—Tables of Dimensions of Safety Bars (at Side of Drawbar) for Different Tractive Efforts, at Factors of 10, 15 and 20

rangements to present locomotive and tender draw equipment by which to change from safety chains to central safety bars without discontinuing present draw castings on the engine and tender. This investigation was made on locomotives of various classes on several different railroads. In some few cases it is possible to add brackets or build up draw equipment on either locomotive or tender by which central safety bar can be applied. Practically in no cases coming within the observation of the committee is it possible to add a bracket or build up equipment on both the locomotive and tender by which to obtain an arrangement of sufficient strength to justify applying a central safety bar. In most cases where possible to build up on present equipment, it is necessary to incur the expense of taking down of present castings and machining them so that additional brackets can be bolted on satisfactorily, which expense is frequently nearly as great as applying new castings. With few exceptions it is more practicable to apply new draw castings to both locomotive and tender in order to obtain a safe and reliable arrangement where conditions justify changing to a central safety bar on locomotives in service.

The investigation of the committee demonstrates very clearly that the matter of bolting must be given great care where additional brackets or built-up equipment are applied and that

the strength of the bolts and the equipment bolted on must be strong enough to stand any stresses to which the safety bar might be subjected. It is not sufficient to bolt on a makeshift arrangement that has the appearance of holding the safety bar. The equipment applied must be strong and well supported as this equipment is applied as a safeguard for human lives.

The process of welding should not be permitted in applying supplementary brackets or equipment to facilitate the application of a central safety bar. The element of uncertainty as to the possible strength of welds condemns this process in connection with parts on which so much depends in the matter of safety.

COST OF CHANGING TO CENTRAL SAFETY BARS ON LOCOMOTIVES IN SERVICE

Approximate figures based on 1920 prices for labor and material, including surcharge, for equipment applicable to large locomotives of Pacific, Mikado or Santa Fe type.

New Equipment on Locomotive and Tender

New draw casting or deck in rough, for locomotive	$235.00
New drawbar, safety bar, pin, bolts, finished	72.00
Machining deck, removing old deck, applying new deck	64.00
Equipment on locomotive, drawbar and safety bar	$371.00
New tender draw casting in rough for tender	$145.00
Pin, pin carrier, rivets	18.00
Machining tender draw casting, removing old casting and applying new	30.00
	$193.00
Total for new equipment on engine and tender, including new bars	$564.00

Modification of Both Locomotive and Tender Equipment

Locomotive equipment and safety bar	$107.00
Tender equipment	64.00
	$171.00

Modification of Locomotive Equipment and Application of New Tender Equipment

Locomotive equipment and safety bar	$107.00
New tender equipment	193.00
	$300.00

New Locomotive Equipment and Modification of Tender Equipment

New locomotive equipment, drawbar and safety bar	$371.00
Tender equipment	64.00
	$435.00

The figures given in the table are approximate estimates and will vary with different conditions and different construction. They do not include any royalty, and where a patented device is applied the price of the royalty must be added in each case. While the estimates are given of the approximate costs of different combinations of applications, investigation indicates that in most cases the application of central safety bars to locomotives already in service will involve new draw castings on engine and on tender, as well as new bars and incidental changes. With payment of a royalty, the total cost of the change will often be approximately $600 per locomotive.

Offset Drawbars

In designing and constructing drawbars for new locomotives, they should be made without bends or offsets. The use of offset bars should be eliminated as far as possible on the locomotives already in service.

Before bending or offsetting a bar the matter should be submitted to an authorized office and the stresses estimated

Fig 5.—Broken Drawbar With a Bad Offset.

before the bar is allowed in service. If drawbars are to be safe, the careless practice of offsetting drawbars for convenience in quick exchange of tenders must not be permitted.

The danger from offset drawbars justifies illustrating an example of a badly offset drawbar removed from service because of breakage. A photograph of this drawbar is shown by Fig. 5 and the following facts illustrate the effect of offset:

Locomotive tractive effort	35,000 lb.
Fiber stress per sq. in. in straight drawbar of same cross-section	1,984 lb.
Factor of safety in straight drawbar of same cross-section	22
Fiber stress per sq. in. in offset bar shown by Fig. 5	26,632 lb.
Factor of safety in the offset bar	1.4

Drawbar and Safety-Bar Pins

With central safety bars, it is permissible to use separate pins for the drawbar and for the safety bar.

Where surrounding conditions permit, it is best practice to apply draw pins from above, forming the pin with a head at the upper end and applying a split key or cotter key through the lower end of the pin to prevent its working up. Where the pin cannot be applied from above, it is satisfactory to apply it from below, but it must be securely supported. A satisfactory method of supporting pins applied from below is shown by Fig. 6.

Manufacture and Repairs

Drawbars and safety bars are not to be welded in manufacture or repairs. Each bar is to be forged in one piece. It is recommended that pin-holes in drawbars and safety bars be

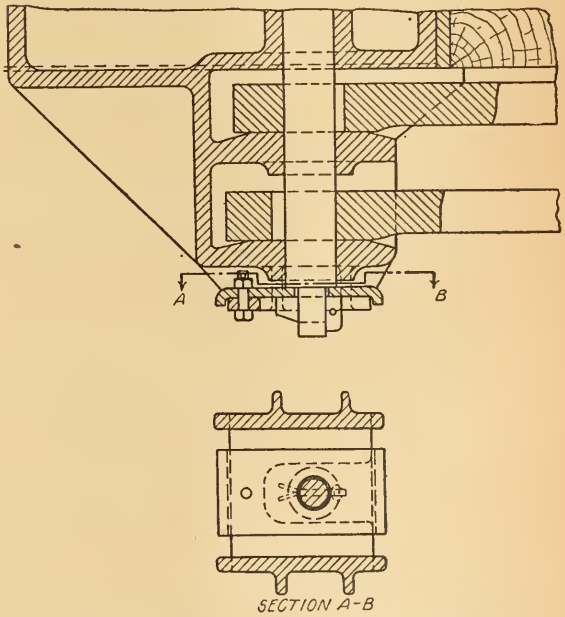


Fig 6.—Method of Securing Drawbar Pins Applied From Below

drilled when the bars are cold, and under no circumstances are they to be punched.

When drawbars are made new and when they are heated for forging or upsetting, they are to be cooled slowly. Under no circumstances are they to be quenched in water. Drawbars in service shall be thoroughly annealed at least every six months and closely inspected for defects after being annealed. Inspection at time of annealing shall serve as one of the required quarterly Federal inspections. The same practice is to be followed with safety bars, safety chains and pins.

In order that each drawbar shall carry a record of date of application, as well as date of inspection and annealing, a simple practice of marking with steel stencils is recommended. Stencil the date and place of application on the top face of the drawbar near the tender end. Keep this stenciling legible until drawbar is scrapped. Stencil the date and place of last inspection or annealing on the right side of the drawbar midway between the ends. Obliterate the previous marks in this location before restenciling. No other marks should be allowed to appear on the drawbar. To indicate the class of work, the letter *I* should be stenciled after the date when inspection only

is made, the letter *A* when annealed and the letter *N* when a new bar is applied. As a matter of record, it may be desirable to arrange for the initial of shop applying the drawbar to precede the date.

Drawbar and Safety Bar Pockets

Drawbar and safety-bar pockets should be at least as strong as the drawbar. When not cast solid with the locomotive or tender frames, the bolts or rivets securing them should be of such size and so applied that their holding power will be as strong as the drawbar. The clearance in pocket above the drawbar or safety bar must be sufficient to prevent binding of the bar when there is vertical movement between engine and tender due to inequality in the track, frog, crossings, etc., and in passing over the ends of turntable. At the same time, this clearance should not be so great as to place supports of the pin so far apart as to cause the pin to bend. This clearance should be at least ¾ in., should not usually exceed 1½ in., and 1 in. is usually good practice.

There should be ample clearance in the pockets around the sides and ends of bars to prevent the bars binding when the locomotive is passing over curves. It is good practice to provide a minimum clearance of two inches on each side and at the end.

Federal Law on Safety Bars

The second paragraph of Item No. 22 of Federal rules and instructions for the inspection and testing of locomotives and tenders is as follows:

"Two or more safety bars or safety chains of ample strength shall be provided between locomotive and tender, maintained in safe and suitable condition for service, and inspected at the same time draw gear is inspected."

Inasmuch as the government standard locomotives were equipped with central safety bars, and a great many other locomotives have been built with the same arrangement, there is evidently no tendency to enforce the letter of this law. To prevent any opportunity of confusion, it is recommended that the association request an amendment to this rule, to read as follows:

"One safety bar of the same strength as the drawbar, located immediately above or below the drawbar, or two or more safety bars or safety chains of ample strength, located one on each side of the drawbar, shall be provided between locomotive and tender, maintained in safe and suitable condition for service, and inspected at the same time draw gear is inspected."

The report was signed by M. H. Haig (Chairman), Atchison, Topeka & Santa Fe; I. A. Seiders, Philadelphia & Reading; W. S. Jackson, Erie, and H. A. Hoke, Pennsylvania System.

Discussion

At the conclusion of the presentation of the report, Mr. Haig explained that the use of the central safety bar is contrary to the letter of the Federal law, but considering the practical usefulness of the central safety bar, it is recommended that the Association shall request an amendment to the present ruling.

This proposed amendment appears on Page 20, and is as follows: "One safety bar of same strength as drawbar, located immediately above or below drawbar, or two or more safety bars or safety chains of ample strength, located one on each side of drawbar, shall be provided between locomotive and tender, maintained in safe and suitable condition for service, and inspected at the same time the draw gear is inspected."

W. H. Winterrowd (C. P.): The Canadian Pacific has used the drawbar of a built-up type, which has proved very successful in service, which covers a period of 10 years to my personal knowledge. That drawbar is built up of six ½-in. plates riveted together with two rivets at each end, sufficient metal being provided outside of the edge of the hole to permit the stress to remain reasonable.

That drawbar has indicated several advantages, the chief one being that if there should be any tendency to failure, one of the laminations can break and the entire bar not fail.

W. F. Kiesel (Pennsylvania): This report seems to require nothing but wrought iron drawbars. There are many drawbars in existence today made of axle steel. Axle steel is better and stronger than wrought iron for the purpose. It therefore seems that axle steel or any other steel of a similar carbon should be admitted.

In the car construction committee the recommendation was made that the drawbars and drawbar attachments for cars be increased from a value of 10 sq. in. to 12 sq. in. It seems reasonable that the drawbar between engine and tender should never be less than that, because if you double-headed train, the second engine becomes automatically a part of the train; therefore the drawbar connection between the engine and tender should be as strong as we require between cars. It is imperative that we should say the drawbar shall never be less than 12 sq. in. of cross-section, and on the basis of the stresses they allow, this would mean that any engine with a drawbar pull of 54,000 lb. or less must have 12 sq. in.

I fully agree with the committee that if at all possible a drawbar should be straight and not bent. A bent drawbar is always a nuisance, and I believe engines can be built with the drawbar straight.

Frank McManany (U.S.R.A.): I am inclined to disagree with the conclusions of the committee on page 2 with respect to the minimum factor of safety of drawbars between locomotive and tender. I believe a factor of 10 is entirely too low to provide proper safety. The previous speaker, referred to the simple method of placing one locomotive ahead *of the other,* and as double-heading has not gone out of practice, by any means, we have reduced the factor of safety on that drawbar to 5 if the additional locomotive is of equal tractive power; and, if greater, we have reduced it substantially lower than that. But drawbars do not fail as a general proposition under ordinary service conditions when the locomotive is pulling steadily. They fail as the result of shock and I think that we all have records of cases where, with a single locomotive, due to the application of the air from the rear of the train or some similar cause, the actual strain on the drawbar was more than five times the tractive power, and if we put another locomotive ahead of that, our factor of safety becomes a minus quantity.

In the record I wish to say that I do not intend in my remarks to use trade names. I am speaking of the individual safety bars. So that while the rule has never been changed, permission has been granted to use the individual safety bar as constituting an equally safe and perhaps a safer arrangement than the double bar. In my own opinion it is a safer proposition, and the factor of safety which would be satisfactory for the single bar might be entirely unsatisfactory for the double bar. But for either I think the factor of safety is too low.

Mr. Kiesel: In regard to what Mr. McManamy just said, I would like to ask him one question: If the drawbar at the rear of the tender has a value of only 12 sq. in., why should an engine that has a drawbar pull of 150,000 lb. have more than 30 sq. in.? It does not seem logical, because if a break occurs it certainly will break the 12 sq. in. rather than the 20 or 30, and I do not see why a factor of safety of more than 10 should be used in a case of that kind.

Mr. McManamy: There are two reasons. The first is the fact that drawbars do fail between the engine and tender, rather than at the back of the tender, and the second is the disastrous results of failure between the engine and tender rather than at the back of the tender. We want to make the failure at the rear of the tender, if we are going to have a failure, rather than between the engine and tender, and that is the reason we have a strong safety bar, and that is the reason the bar is provided between the engine and tender. The results of failure between engine and tender have proven so disastrous that it has been necessary for us to constantly keep on the lookout for improvements and additional strength in these safety bars, to prevent the serious accidents which result from failure at that point.

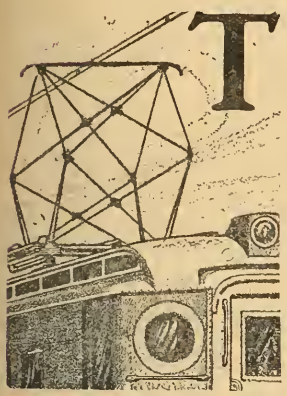
J. A. Pilcher, N. W.: In the discussion of the idea advanced by Mr. Kiesel, Mr. McManamy spoke of the break between the engine and tender, and in referring to that point I am sure he did not have in his mind any engine such as Mr. Kiesel had reference to. I do not think he will find any record of breakage of drawbars of such a size in connection with any such engine. While a factor of 10 might be raised slightly, a factor of 20 would require 60 sq. in. in the drawbar with 150,000 lb. tractive locomotive a pretty ponderous sort of a device to handle.

Mr. McManamy: I would like to ask the members, in considering what I said, to think of what I actually did say, and not of what I probably thought. As a matter of fact, records are in existence to-day of failures with very serious results on the same type of locomotive, and I think we are entirely justified, as long as the practice of double-heading exists, in asking for a factor of safety greater than 10.

There is a further question—if the average locomotive is constructed with a factor of safety of 20 or 22 why should this Association go on record as indorsing a minimum factor of 10? I have found a very strong and almost uncontrollable disposition on the part of mechanical officers of railroads to work to minimums.

A. Kearney (N. & W.): *I move that the report be received and printed in the record. This motion duly seconded and carried.*

Design, Maintenance and Operation of Electric Rolling Stock



THE REPORT OF THE COMMITTEE this year consists of individual papers, written by the various members, showing the development of several of the important electrification projects on American steam railroads, as follows:

Exhibit A.—Baltimore Tunnels, Electrification, Baltimore & Ohio.

Exhibit B.—New York Central Electrification, New York to Harmon.

Exhibit C.—Brief History of New York, New Haven & Hartford Electric Rolling Stock.

Exhibit D.—Great Northern Electrification, Cascade Tunnel.

Exhibit E.—The Hoosac Tunnel Electrification, Boston & Maine.

Exhibit F.—Electric Operation on the Butte, Anaconda & Pacific.

Exhibit G.—Historical Sketch, Norfolk & Western Electrified Lines.

Exhibit H.—Chicago, Milwaukee & St. Paul, Synopsis of Electrification.

Exhibit I.—The Long Island Electrification.

Exhibit J.—Electrification of the Southern Pacific's Oakland, Alameda and Berkeley Suburban Lines.

Abstracts of the papers, some of which are quite voluminous, are presented below.

The report is signed by C. H. Quereau, N. Y. C.; G. C. Bishop, L. I.; J. H. Davis, B. & O.; G. McCormick, S. P.; H. R. Warnock, C. M. & St. Pa.; W. L. Bean, N. Y. N. H. & H.; J. T. Wallis, Pennsylvania; J. A. Pilcher, N. & W.

Baltimore Tunnels Electrification, Baltimore & Ohio

Three general types of locomotives have been used. The first two, being pioneers for steam railroad service, are of interest primarily only from a historical point of view. The class LE-2 are still in operation, although they are of a design that would now be considered obsolete. An interesting feature with respect to these locomotives is that they are today handling the maximum tonnage freight trains operated over the division, notwithstanding the fact that during the period they have been in service steam motive power has been replaced twice in order to secure greater capacity. This has been possible due to the flexibility of multiple unit control in that when they were first built they were operated in two-unit combinations, while they are now run as a three-unit combination, thus providing a 50 per cent increase in capacity.

The locomotives purchased in 1910 and 1912 are of the Detroit tunnel type and might be considered as standard for the present electrification. This design has been found to be very satisfactory for limited zone, moderate speed service in that they are practically equally well adapted for passenger, freight and switching service. Future additions will probably be of this type with minor modifications to increase their capacity slightly.

The report included also data concerning the current collecting system and the performance of various types of rail bonds.

New York Central Railroad Electrification, New York to Harmon

This operation was begun with 35 locomotives and 180 multiple unit cars, of which 55 were trailers which were subsequently equipped with motors. At present there are 73 locomotives and 241 motor cars. A direct current, rather than alternating current, system was adopted because of insufficient practical experience with the alternating current for a trunk line problem requiring the highest possible reliability of service, restricted overhead clearance in the Park Avenue tunnel, which prevented the use of overhead conductors, and legal obstacles to the use of high voltage overhead trolley lines within New York City.

The operating service obtained from this equipment has been more reliable, with fewer delays, than was obtained from the steam locomotives which were displaced, and very satisfactory indeed, conditions in the tunnel included. The following table shows the record of train detentions due to failure of the equipment for the year 1918 for electric operation, and the year 1908 for steam. All detentions are included:

No. detentions	Miles run	Miles per detention
	Electric Operation, 1918	
	All locomotives	
37	1,854,700	50,127
	M. U. Cars	
71	5,926,301	83,469
	Steam Operation, 1908	
	Hudson Passenger Division	
664	4,014,980	6,045

The inspection, repairs and maintenance of the electric equipment of cars and locomotives has proven to be a comparatively simple and inexpensive process, costing less than that of steam equipment:

Inspection and Repairs of Electric Locomotives

Year	Cost per 1,000 miles Labor	Material	Total
1912	$18.88	$14.60	$33.22
1913	19.82	14.54	34.36
1914	21.55	21.34	42.89
1915	19.01	13.79	32.80
	Inspection and Repairs of Multiple Unit Cars		
1912	$11.34	$7.40	$18.74
1913	10.09	7.47	17.56
1914	10.13	9.19	19.32
1915	12.56	12.25	24.81

These figures, as well as those for the locomotives, are fair averages of cost for the twelve years of electric operation until the year 1918, when wages were appreciably increased by the government.

In this connection it should not be forgotten that the figures given do not include fixed charges, which must be included in arriving at the comparative cost of steam and electric operation.

Experience has shown that it requires less electric locomotives than steam for the same amount of work. This fact is due to several electric characteristics, among them two which are very evident. One of these is the fact that no time is lost by the electric equipment in having fires cleaned and supplies of coal and water furnished. Again, the electric locomotives take the slack and handle their loads with more snap than the steam engines. The following table gives the number of steam and electric locomotives required in several districts:

Engines Used—Hudson Division

Steam	Electric
53 engines and 78 coaches.....	17 engines and 97 multiple unit cars.
Harlem Division	
41 engines and 95 coaches.....	11 engines and 116 multiple unit cars.

New York, New Haven & Hartford Electric Rolling Stock

The present electric rolling equipment of the New Haven on its principal electric division, namely, New York to New Haven,

consists of 104 electric locomotives, 27 multiple unit cars and 52 trailer cars. All operate at 11,000 volts, single-phase, alternating current. Some are arranged to operate at 660 volts direct current, also, in order to enter New York City over the tracks of the New York Central or Pennsylvania.

Although designed at a time when information on the requirements of an alternating current, high voltage, high speed, heavy train capacity locomotive was very meager, the locomotives are today comparable with those designed in the light of all the experience gathered in the last thirteen years. This is the more noteworthy when it is remembered that most electrical apparatus becomes obsolete often before sufficient time has elapsed to get it erected and going. In general design the last locomotives purchased in 1910 are the same as those purchased in 1919, most of the principal improvements of the 1919 lot being in the auxiliary apparatus and the control apparatus. The general features are the same as those of the locomotives designed today, which extended service and experiment have proved best. Some of the experimenting of the New Haven was carried out by building one locomotive of each type. The locomotives of the New Haven may be divided below into two groups, (I) the standard types, (II) the experimental types.

I. Standard

		Wheel arrangement
1—Gearless motors for fast passenger service. First type built. Now obsolete for single phase	01-041	2-4-4-2
	Frt. 076-0111	2-4-4-2
2—Geared passenger, freight and switcher locomotives	Sw. 0200-0214	0-4-4-0
	Pass. 0300-0304	2-6-2-2-6-2

II. Experimental

		Wheel arrangement
Geared 3-truck fast freight or passenger locomotive.	069	2-4-4-2
Geared 2-truck fast freight or passenger locomotive.	071-2	2-4-4-2
Geared side rod freight locomotive	068	4-4-4-4
Side rod locomotive	070	2-4-4-2

The above list contains locomotives which represent every mechanical type of drive put forth to date, either in this country or in Europe, as the best solution for transmitting the torque of the motors to tractive effort at the rim of the driving wheels. The type that proved best for passenger and freight service is represented by New Haven locomotives 076-0111 and 0300-0304. This is a geared type with twin motors, that is, two motors bolted together and driving one pair of wheels through helical springs.

Through the gearless locomotive of the 2-4-4-2 type (01-041) has given very good service for the past twelve years in both local and fast express service, it is now replaced by the geared locomotive of the 0300-0304 type. The other types listed under "experimental" have not proved successful and will not be duplicated on the N. Y. N. H. & H. The type represented by locomotive 068, with a geared side rod drive and a 4-4-4-0 wheel arrangement, has been used for polyphase motor drive to obtain certain advantages possible with such a combination. These advantages are not available with single-phase commutator motors. As for the side rod type, represented by locomotive 070, wheel arrangement 2-4-4-2, no new standard gage locomotives of this type have been designed in recent years in this country. For narrow gage roads, where a large motor would not fit between wheels, the type has its advantages; but for main line, standard gage, high speed, heavy tonnage service it has not proved successful on the N. Y. N. H. & H.

Great Northern Electrification, Cascade Tunnel

In the year 1908 construction was begun of power plant, transmission line, sub-station, trolley system for Cascade Tunnel and four electric locomotives were purchased. Work was completed late in the year 1909 and operation begun, and this operation has been successful ever since. The power plant is located at a point thirty miles east of Cascade Tunnel on the Wenatchee River, and consists of three water-wheel driven generators, each of a horsepower capacity of 4000. The locomotives weigh 115 tons each. All driving wheels are traction wheels, each motor being coupled to its axle in identically the same manner as is done with street-car motors, being geared in single threads. An interesting feature is that there are no cushion springs in the gear in order to equalize the tooth pressure, as has been considered necessary on almost all heavy locomotives; and we find that there is an equal amount of wear on both pinions, the tooth pressures seem to be uniform, and the wear up to date has been almost negligible on all of these gears and pinions. The current is conducted into the locomotive by two regular street-car trolley poles and wheels located at each end of each locomotive. The speed of the driving motors is constant, being of the induction type, and drives the locomotive at a constant speed of 15 miles per hour. The reason for this constant speed was that this was supposed to be a link in a larger system in which the principle of regenration on descending grades is very desirable, and it was at the time the only method of regenration which had been developed. The results of this regeneration were such that this feature was shown to be very desirable for all electrification, especially of mountain grades, and since that time the General Electric Co. has developed the regenerating locomotive, using the series direct-current motor, something which up until a few years ago was considered almost impossible of accomplishment.

The following is data on cost of operation:

Repairs per locomotive mile	$7.53
Wages	27.39
Lubrication	.20
Supplies	.33
Total	35.45

Miles made per pint of cylinder oil, 313. Miles per pint of car oil, 19. Average gross tons per engine mile, 345. It is to be noted that every train has three electric locomotives, consequently the tonnage per train is three times this, or 1035 tons. Toal passenger car miles, 48,096. Toal number of tons one mile is 8,461,770. This data applies to the year 1918.

The Hoosac Tunnel Electrification—Boston & Maine

The Hoosac Tunnel electrification, extending for a distance of 7.9 miles east of North Adams, Massachusetts, and embracing 4¾ miles of double track tunnel, was undertaken primarily to increase the capacity of the tunnel and to make train operation more safe through the elimination of the use of steam locomotives.

The original electrical equipment comprised five alternating-current locomotives of the 2-4-4-2 type developing 51,000 lb. tractive effort as a maximum—20,500 lb. continuously—and working under a trolley pressure of 11,000 volts. Two locomotives of similar characteristics were added in 1917. These locomotives handle 1750 tons behind the steam locomotive, this being the maximum tonnage assigned for steam operation with one locomotive over this section of the division.

The results, in added capacity, safety of operation, and in decreased track maintenance, have been those indicated when the project was undertaken.

Electric Operation on the Butte, Anaconda & Pacific

The Butte, Anaconda & Pacific Railway was built in the year 1892, principally for transfer service between the ore mines in Butte and the Washoe Smelter at Anaconda. The tracks connecting these two cities are approximately twenty-six miles long, but the yards and sidings included in the present electrification bring the total mileage up to 120.

Until the Butte, Anaconda & Pacific Railway Company decided upon the electrification of its line, for economical reasons alone, it is questionable if any such steps had been made by steam line railroads. The electrification of various steam roads has been for the purpose of obviating some special condition, such as smoke nuisances in tunnels or cities, congested terminals, or to accomplish some special work which a steam engine could not be used to do.

Tabulated results from a comparison of the delays to passenger trains for the month of June, 1913, under steam operation, with the same month in 1914 under electrical operation, are shown. While the month of June is selected at random, the results are considered representative of the general performance.

The average cost of maintenance of overhead system per mile per year for the past four years is $137.57. The year 1918 will give an idea of the proportionate cost for each item considered.

Recent measurements of our trolley wires indicate that the major portion of our overhead wires will last fifteen years.

While there are a number of places that will wear out in less time, there are other places which will wear much longer than fifteen years, depending on the frequency of movement and current collected. The greatest wear, as would be expected, comes at rigid points, such as pull-offs and rigid hangers.

TABLE 1

Number of trains	Meeting points Hr.-Min.	Delays on account engine and power failures Hr.-Min.	Lost running time Hr.-Min.	Total delays all cases Hr.-Min.
Steam, 1913.....272	15-49	0-44	4-13	20-46
Electric, 1914.....280	3-54	0-51	0-25	5-10
Decrease 8*	11-55	7*	3-48	15-36
Percentage saving due to electrical operation:				2.94%*
				75.66%
				15.91%*
				90.10%
				75.12%

* Increase.

Coaches are heated in the following manner. Each coach heater is of 25 kw. capacity, having a thermostat control, and operating on 2400 volts. The contactor control for each equipment receives a potential of 600 volts from a dynamotor located on the locomotive. Fresh air is introduced into the heater by means of a fan, and after being heated to a temperature of 100° to 105° C. is forced out through longitudinal ducts placed inside the coach. The heater, principally because of high voltage, is located below the floor. Heater and piping are lagged with heat insulating material. Three electrical workers are employed

Poles and fixtures Labor	Poles and fixtures Material	Feeder Labor	Feeder Material	Trolley Labor	Trolley Material	Bonding Labor	Bonding Material
$3,261.52	$687.46	$554.10	$87.77	$3,889.79	$1,168.86	$1,410.96	$1,980.23

Total of above accounts	$13,040.69
Motor Car M 1	1,119.65
Work train	2,290.04
Total maintenance expense	$16,451.08
Number of miles operated	120.27
Cost per mile per year	$136.78

at the machine shop to make such repairs as are necessary on electric locomotives, shop light and power, coach heating and lighting, as well as assisting in the maintenance of block signals and dispatcher's telephone.

	Cost Per Year for Repairs 1914	1915	1916	1917	1918	1919
Number electric locomotives	17	18	21	24	28	28
Average locomotive weight, tons	80	.....	.....	.....	.....	.....
Installation date	1913					
Route miles electrified...	30	.....	.....	.....	.....	.....
Miles single track basis.	90	90	114	114	120	122
Maintenance of Electric Locomotives						
Repairs in dollars.....	27,811	35,253	49,811	55,846	54,167	35,264
Depreciation in dollars..	26,829	.....	24,143	36,695	32,707	33,567
Electric Locomotive Mileage						
Freight revenue miles...	321,946	317,595	505,162	412,509	413,519	226,851
Passenger revenue miles.	65,428	87,625	100,290	94,659	80,020	90,805
Switch revenue miles...	136,892	161,871	404,356	367,690	324,322	197,838
Mixed and special revenue miles	.....	.....	616	456	.....	.....
Total revenue miles.....	524,266	567,091	1,011,424	875,314	817,861	515,474
Non-revenue miles	.....	5,507	2,477	10,796	2,957	1,142
Total locomotive miles..	524,266	572,598	1,013,901	886,110	820,808	516,616
Maintenance per locomotive mile in cents. (Not including depreciation)	5.3	6.16	4.91	6.3	6.4	6.8

The average time for each locomotive in the shop per year is ten days, while the shortest is four days. During this time a general overhauling is given to the mechanical and electrical equipment. The time for electrical inspection and repairs varies with the class of service which the locomotive has been worked at most. In general, the electrical work is completed in less than two days, bad rheostat connections and tight contactor pins giving the only cause for electrical work in the cab.

It is stated in conclusion that the performance of these locomotives through heavy snow is superior to that of steam locomotives under similar conditions.

Norfolk & Western Electrified Lines

The Norfolk & Western Electrification is on a portion of the Pocahontas Division, familiarly known as the Elkhorn grade.

Along this division are numerous colliery sidings and short branches penetrating the developed coal fields, so that the normal service consists in collecting loaded cars or trains from the sidings and branches for eastbound trips and delivering empties on the return. Thus many conditions are favorable for electric traction, namely: An entire short operating division on which electric power may be substituted for steam between engine terminals without shortening or interfering with adjoining operating divisions, heavy grades where power requirements are great, and a large volume of traffic which taxes the capacity of the line because of physical limitations and slow operating speeds. In this case the primary objects of electrification were the increased capacity of the line, and economy and increased efficiency of the service generally.

With the first study the source of power was to be gas engines using waste gas from by-product coke ovens, which were to succeed the bee hive coke ovens, which were very numerous in the vicinity. The use of gas engines was abandoned when it was found that the coal in this immediate vicinity, which is the Pocahontas coal section, did not have sufficient volatile matter to make the by-products ovens profitable.

The construction was actually started in 1913 and the locomotive operation, was actually started by Gibbs & Hill in April, 1915, and by the Norfolk & Western Railway in July, 1915.

The conditions of steam operation had very materially changed since the first observations were made. The Norfolk & Western Railway Company had purchased quite a number of Mallet locomotives, each of which could take about 1080 tons up the ruling grade on this division, instead of from 580 to 600 tons.

The allowable weight per axle had increased from 42,000 lb. to 55,000 lb. At the present day the allowable load per axle on electric locomotives is 68,000 to 70,000 lb.

The eastbound load had gone up to about 50,000 gross tons per day. The capacity of the electric equipment, as installed, could handle an average of about 65,000 tons per day, in addition to handling the through freight trains by electric pushers and the passenger trains with their steam locomotives by attaching electric engines. In the latter case the necessity for an electric helper occurs only where the train is so heavy as to require doubleheading on the grade.

In connection with the steam operating conditions—it was customary under steam operation to make up the train to a maximum weight of 3250 tons behind the engine and to handle it by a Mallet road engine and a Mallet helper over the division, and, in addition, a Mallet pusher up the 1.5 per cent and 2 per cent grades, or three engines per train. In cold weather and under adverse conditions the trains were reduced to about 2900 tons. The engines were of the latest compound type fitted with mechanical stokers and superheaters. They weighed about 370,000 lb. on drivers and 540,000 lb. total, including tender, and had a tractive power of about 85,000 lb. Tonnage trains were handled normally at speeds of seven miles per hour or eight miles per hour on the grades, but on account of the ventilating conditions the speed was reduced to six miles per hour in the Elkhorn tunnel. This tunnel is equipped with the Churchill method of forced ventilation, which consists of blowing air through annular nozzles in the direction of the up-grade movement and at a slightly greater velocity than the speed of the train, thus blowing the smoke from the head of the train without having the smoke from the rear engine reach the front engine during the tunnel movement.

Because of the slow speed in this tunnel, and also because of the fact that it is of single track, a serious restriction in the capacity of the line occurs at this point and has occasioned frequent congestion and delay. Generally, however, the division is double track throughout, with frequent long passing sidings, making it in part a three-track line. Sixty per cent of the entire division is on curves, the maximum curvature being 12 deg. on the main line and 16 deg. on sidings.

The decision to electrify was arrived at about seven years ago and followed a careful study by the officials of the road of the actual steam operating costs on this particular division. This was done by keeping a complete detailed record of the operating costs, as well as a tabulation of the failures and delays of each steam locomotive. In this way it was not necessary to take average costs, which included operation on other divisions and under other conditions, in making comparisons with estimates of electric operating costs.

The question of a proper electric system was given especially careful study because of the difficult physical conditions and the unprecedentedly heavy haulage requirements. It was apparent that an electrified third rail along the tracks was not practicable under the local conditions and that some system using an overhead collector would be required. This narrowed down the problem to a decision between the high-tension direct current and the high-tension alternating current systems. Analysis of both first costs and operating cost, as well as consideration of the local operating conditions, indicated that the single-phase alternating current system was the one that should be adopted.

Attention might be called here to the fact that these heavy trains require enormous power for their movement, which in turn means large currents to be collected if the potential is low, but is effected with much smaller currents if a system with the maximum allowable potential is used. The practical difficulties of collecting large currents from an overhead wire are well known, and the adoption, therefore, of a high trolley voltage was a logical solution of this problem. Electric braking down heavy grades, accomplished in a simple manner, was another attractive operating feature of the system adopted.

In working out the details of the installation a number of novel features were introduced, notably in the adoption of three-phase motors on the locomotives in connection with single-phase current delivered to the locomotives. The required three-phase current for the motors is produced by a "phase-converter," which is a simple self-contained piece of apparatus. The three-phase motor used for driving the locomotive is an unusually rugged piece of electrical machinery requiring no commutator and having high weight efficiency, or capacity for given weight and dimensions. It has, however, a constant speed characteristic which is not desirable in some kinds of railroad operation, but for this particular service has important advantages in respect to maintaining certain predetermined and limited train speeds irrespective of the loads. Furthermore, this type of motor has the valuable characteristic of automatically returning regenerated current to the line on the down grades, this being effected without additional machinery or complication when the predetermined running speed is slightly exceeded during the coasting period. This characteristic may, at times, result in a considerable saving of power as the regenerated current is available for use in assisting to propel other trains which are in movement on the division, but its most valuable feature is that of "dynamic braking," or the holding of the train at a uniform speed on down grades without the use of air brakes.

Twelve electric locomotives have been provided for the service, replacing 34 Mallet steam locomotives. Each electric locomotive consists of two units weighing 135 tons, giving a total weight of 270 tons for the complete locomotive. The frame of each unit consists of two trucks connected by a Mallet type hinge, and each truck has two driving axles included in the rigid wheel base with a radial two-wheel leading truck. The bumping and pulling stresses are transmitted through the main trucks frame and through twin draft rigging mounted on the main trucks at each end of the unit. The main trucks each carry two motors framed into the truck and both meshing into the same gear on each end of a jackshaft. The main gears are provided with crank pins from which connection to the driving-wheel cranks is made by side rods in the usual manner. By this arrangement the motors are carried on the main locomotive springs and are thus thoroughly cushioned against shock. Each half of the locomotive is provided with a cab supported on the trucks entirely by spring cushioned friction plates. The center pins carry no weight and serve only to maintain the cab in its proper position on the trucks. The cabs contain all current controlling and transforming apparatus, air-brake pumps, reservoirs, and the usual appurtenances for the locomotive operation. There are two running speeds for the locomotive, namely, 14 miles per hour and 28 miles per hour.

The drawbar pull of the locomotive varies from a maximum of 114,000 lb. during acceleration to the 14-mile speed to 86,000 lb. when operating at this speed uniformly on a 1 per cent grade, but on test the locomotive has developed a tractive effort in excess of 170,000 lb. This indicated, however, a coefficient of adhesion which cannot be assumed in practice. The maximum guaranteed accelerating tractive effort per locomotive is 125,000 lb.

A valuable characteristic of this type of electric locomotive is its capability of safely exerting full tractive effort for a considerable time while standing. The utility of this will be seen when it is remembered that the trains hauled are generally over one-half mile in length, or three-quarters of a mile in the case of an empty train. When starting there is sometimes difficulty in getting coincident action between the head and rear locomotives, and thus it is specially important that both locomotives may be able to exert their full tractive effort for an appreciable time to take care of delays in getting into full action. Consequently, the motors have been designed to permit full load current to be applied for five minutes without movement.

Electric operation has been in service too short a time to give data as to performance, but it may be said that the estimates of increased capacity to be obtained from this equipment have been fully met and that an unusually heavy tonnage has already been handled without congestion, and the gathering and delivery tracks kept clear. The movement of the heavy tonnage trains by electricity has been effected with ease and smoothness; the trains accelerate promptly and without shock or jerk on the heavy grades, and it has been found that the full trains can be smoothly controlled by one head engine on the 2.5 per cent down grade by electric braking alone and at a uniform speed slightly above that of the regular running speed. The acceleration of one of these heavy trains is impressive as regards the amount of power required. Preliminary tests indicate that getting a train in motion up the grade requires as much as 11,000 electrical horse-power and that running at uniform speed up the grade requires 8,000 electrical h-p. to be delivered to the train. It is believed that no such amount of power has ever before been developed on a single train, either steam or electric, in regular service.

Electrification on the Chicago, Milwaukee & St. Paul

The Chicago, Milwaukee & St. Paul were first interested in electrification at the time their extension from the Missouri River to the Pacific Coast was under construction.

The section under consideration was through the Bitter Root Mountains, and the reason for its consideration was to lessen the fire hazard, as the line was building through a very extensive and important forest reserve of the United States Government.

The power was to be developed from a number of sites on the St. Joe River. The plans for this electrification were developed by consulting engineers who had decided upon a single phase trolley. The plan was abandoned owing to the insufficiency of the power available on the St. Joe River. In the meantime the road secured a site for power development on Clark's Fork of the Columbia River at Thompson's Falls, in Idaho.

The time which had elapsed did not permit of this development to provide for the initial operation of the road so that the Pacific Coast extension was placed in operation with steam locomotives using oil for fuel through the forest reserve.

The Chicago, Milwaukee & St. Paul in their operations to secure terminal facilities at Butte and to secure traffic for their new road, established relations with the Amalgamated Copper interest in Montana and acquired a substantial interest in the Butte, Anaconda & Pacific Railroad, which was owned by the Amalgamated Company. About this time the Great Falls Power Company, which was also controlled by the copper interests, was seeking a market for power from their important development, and to that end acquired the Madison River Power Company and the Butte Electric Company, which were controlled by Mr. C. A. Coffin, President of the General Electric Company, and affiliated interests, the combination being called the Montana Power Company.

About this time a representative of the General Electric Company made a report on the electrification of the Rocky Mountain Division of the Chicago, Milwaukee & St. Paul, based upon duplication of the locomotives and substation apparatus in use on the Butte, Anaconda & Pacific. The traffic was assumed to be five 1600-ton freight trains each day in each direction, two through passenger trains and one local passenger train each direction over a section of the line daily, the service to accommodate this traffic was laid out upon a train sheet and the use of power represented to be maximum of 10,000 kw. with an average of 6500, no consideration of regeneration or control of peak having been contemplated.

Based upon this report the contract was made with the Mon-

tana Power Company for a nominated sum of 10,000 kw. for the Rocky Mountain Division with options provided under certain terms for an increase to a maximum of 25,000 kw. The contract further provided that apparatus would be secured by the railroad capable of regulation of power factor, and that a minimum monthly charge would be equivalent to an average of 60 per cent of the nominated maximum power.

The railroad entered into a similar contract for the extension of the electrification to include the Missoula Division from Deer Lodge, Mont. to Avery, Ida., this involving as well the transfer of the Thompson's Falls Power site to the Montana Power Company's interests. About this time it was found that the original basis for the company's load diagram was fictitious, that the traffic was not balanced east and westbound, but fluctuated widely, due to seasonal and local variations. It was also concluded that 1600 ton trains in trans-continental service were entirely too small for the efficient movement of traffic. This led to the determination that the minimum trains should be 2500 tons hauled by a single locomotive on a one per cent grade. A third conclusion was that the topography of the road was particularly suited to regeneration and that this would be required. A fourth conclusion, which was insisted upon, was that automatic means should be provided for the limitation of the maximum demand for power.

The Westinghouse Company submiteed an analysis including an estimate on the cost of electrification, based on a single phase trolley, split phase locomotives for freight service, series commutator motors for passenger service and sub-station apparatus, to convert from 60 cycles to automatically reduce both voltage and frequency when the demand exceeded the predetermined peak setting. Each locomotive and each dispatcher's office to be equipped with frequency meters so that at all times those interested in the condition of power demand would be able to function advisedly.

At this time the question arose as to the engagement of an independent consulting engineer, but at a subsequent meeting of the Board of Directors of the Railroad Company, it was voted that the road would not employ an independent engineer and formal action was taken that the electrification would be affected by high voltage, direct current, the same as the Butte, Anaconda & Pacific, the position having been reached without engineering analysis and no further consideration has been given to the question of choice of system.

The entire undertaking was committed to a vice-president in charge of electrification, who employed as his assistant an electrical engineer to work out the technical detail. The analysis of the probable load conditions with 2500-ton trains led to the conclusion that a voltage higher than 2400 was economical and desirable and should be available.

Supporting this position was a demonstration by the Westinghouse Company of a high voltage car equipment which was operated at 6000 volts, direct current, and this led to the insistance that 3000 volts would be the nominal operating voltage to which the General Electric Company finally agreed.

The contracts finally made with the General Electric Company covered the present electrified section of 440 miles from Harlowton, Mont. to Avery, Ida. The technical requirements as to detail of sub-stations, transmission line, trolley construction, and locomotives were most precise and the response of the General Electric Company to the exacting specifications was complete, so that the execution of this electrification has been unique in the perfection of its detail.

The maintenance of the electrical equipment has been handled with equal skill. However, it is granted that the conditions local to this section of the country contribute toward this result, so that overloading, abuse or neglect in the operation of this equipment may be considered to have been entirely absent throughout its whole history.

The technical result of the electrification has been quite a success. The financial result, due particularly to fuel and labor conditions, and the indirect value due to the publicity of this operation, are equally as satisfactory.

In addition to the electrification of the Rocky Mountain and Missoula Divisions, the railroad began, in March, 1917, the electrification of an additional 207 miles of main line on the Columbia and Coast Divisions extending from Othello to Tacoma, Washington, and to Black River, nine and one-half miles south of Seattle, across the Saddle Mountains just west of the Columbia River and the Cascade Mountains.

The general character of the electrical layout is similar to that used in Montana and Idaho, except as may be noted below:

Locomotive for passenger service will be of the G. E. bi-polar type, having a total weight of aproximately 265 tons and capacity sufficient to haul over the profile at a speed of approximately 25 miles per hour a twelve-car passenger train weighing 960 tons. Delivery of these locomotives will commence in August. Locomotives for freight service will be provided by changing the gear ratio of the present passenger locomotives used on the Rocky Mountain and Missoula Divisions, and in place of the latter locomotives there will be provided for the Rocky Mountain and Missoula Divisions ten quill-type locomotives manufactured by the Westinghouse Electric & Manufacturing Company, having approximately the same weight and capacity as the bi-polar motors just referred to.

Power will be supplied over two transmission lines, one running from the Long Lake plant of the Washington Water Power Company to the Taunton sub-station, and the other from the Snoqualmie plant of the Puget Sound Traction, Light & Power Company to Cedar Falls and Renton sub-stations, these lines connecting at the sub-stations mentioned with the railroad's high tension tie line. It is planned to have this section under electrical operation by October of this year.

The Long Island Railroad Electrification

In 1905 the Long Island Railroad Company began electric operation on a portion of their lines.

It was the first complete electric service on an extensive scale of a steam railroad and is still the most extensive example of multiple unit passenger train operation.

The Long Island is essentially a passenger line, serving the residential suburbs of New York city and a heavy excursion business to the seashore of Long Island.

A network of lines of the company covers the western end of the island within 30 miles of New York City and delivers heavy commuter and excursion travel to the New York and Brooklyn terminals.

The electrification covers practically this network, and within a radius of 30 miles contains 88 route miles with a total main line track mileage of 187 miles, giving a frequent and quick service without transfer from the heart of Manhattan and Brooklyn boroughs of New York City to the terminus of the commuter zone, and to several points on the seashore.

Steam operated express trains to the eastern end of the island are taken from the Pennsylvania Station by electric locomotives to Harold Avenue, Long Island City, at which point steam locomotives are attached. It is probable that in the near future electric locomotives will haul these through trains to Jamaica, which is a central point for the various lines. The freight service is still conducted by steam, and on some portions of the electrified system steam locomotives are used to operate both freight and through passenger trains.

The third-rail, a. c. d. c. system is used with 650 volts D. C. on the third rail and three-phase, 25-cycle at 11,000 volts on the transmission lines.

The power is obtained from the Pennsylvania Railroad power house located at Long Island City and is delivered to the Long Island transmission lines at 11,000 volts.

The 134 passenger cars ordered for the lines electrified in 1905 were of steel and differed only from the New York subway trains in platform construction and other minor parts. They are 41 ft. over body corner posts, with a total length over drawbars of 51 ft. 4 in., and are 8 ft. 8 in. wide over eaves, and weigh equipped 79,664 lb.

Five wooden express cars were also provided at this time, equipped with the standard type of motor and trailer truck and with the same electrical equipment as the above passenger cars. These cars, 52 ft. 5 in. over all in length and 9 ft. 9½ in. in width, weigh about 76,500 lb. They are equipped with standard A. R. A. couplers to enable them to haul the old standard steam baggage and express cars as trailers.

In anticipation of the opening of the Pennsylvania Station and the operation of electric trains between Jamaica and points beyond, orders were placed during 1909 and 1910 for 150 steel passenger, passenger and baggage cars and seven steel baggage cars. For the same reason, 50 steel passenger cars of the same type were built in 1908 but were not electrically equipped at that time, and were used in the steam service until needed later in electric service.

In 1912 20 more passenger and five combination cars were built, and in 1913 and 1914 50 more passenger and 12 more combination cars were added. The new passenger cars differ from the first cars, in many important details of design and equipment. They are 54 ft. 6¼ in. long over body corner posts and are the new Pennsylvania standard design for suburban passenger service, with some slight modifications in the vestibules and other details to permit the installation of the electrical equipment.

On account of the increased traffic in the electric zone during the summer months, about 25 to 3 per cent more cars are needed than are in service during the remainder of the year. To take care of this increase, first, 20 steel trailers were built in 1915, 25 more in 1916 and 45 in 1917.

To keep down both the weight and the cost, it was decided to build as light weight a car as possible, but, at the same time, secure a maximum carrying capacity and therefore reduce as far as possible the investment tied up during the winter season. On further investigation, it was found that three trailers could be built for about the cost of one complete motor car.

The strength of the underframe and body, however, is equivalent to that of the motor cars with which they operate, but their weight was kept down by the use of the arched roof and the omission of the false floor, inside lining and provision for heating. The seating capacity of 80 passengers, with a total weight of 63,000 lb., gives the extremely low weight per seated passenger of 787½ lb., while the weight per seated passenger on the motor cars is about 1550 lb.

On practically the same route miles, the passenger car miles increased from 12,500,000 in 1913 to 17,8000,000 in 1919, due largely to the cantonments built on the island during the War.

Electrification of the Southern Pacific's Oakland, Alameda and Berkeley Suburban Lines

This improvement was a part of the great rehabilitation of Southern Pacific property carried on by Mr. Harriman. In the fall of 1906 instructions were given to begin electrification.

At the present time more than 900 electric trains are operated daily from the two ferry landings, and approximately thirty-two million passengers are handled annually.

The trains of from one to seven cars are operated by the Sprague multiple unit system, a train unit consisting of one motor and one trail car; the motor car carrying four 140 h-p. motors. The two motors on each truck are connected permanently in series, so that, although the equipment is a four-motor equipment, the control is of the usual two-motor type.

The total single-track mileage electrified is about one hundred, and the car equipment consists of:

60 trail coaches
50 straight motor coaches.
29 passenger and baggage motor coaches.
2 express and baggage motor cars.
10 street cars.

The system was placed in operation in the summer of 1911.

Discussion

In introducing this report, Mr. Pilcher of the Norfolk & Western commented as follows on the salient features of the subject:

Anyone who will undertake to look through the report will find that a great many different schemes have been studied for the purpose of developing this phase of railroad traction. He will also find that each member of the committee has given mainly the facts of electrification with reference to the service on his own line, and anyone reading the paper will be given an opportunity to select the matters which are of particular interest to him, according to the conditions under which he has to study his problem, and in this way enable him to choose that which is best for his particular condition.

The art of electric traction in very heavy service is a development of the last few years only. It probably seems destined now to become a greater and greater factor in railroad operation.

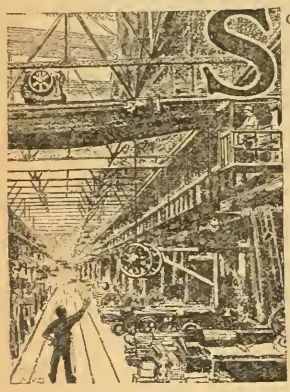
One of the things which will impress you with electric traction is the possibility of constant speed for every train running on the line, one following the other, and in this way increasing very largely the capacity of the track because of the fact that one train is not getting in the way of the other. We all have in our minds the wonderful carrying capacity of heavy buckets; although each one of them carries not a great deal in itself, the operation is continued, and one bucket does not get in the way of another, and this feature with regard to electric traction will impress any of you who study the problem of electric traction—the large increase in the carrying capacity of the railroad, due to reliable and constant speed of operation, whether up-grade, down-grade, or on the level—one train will not catch the other, and each train will move with certainty.

Chairman Tollerton: The report is now open for discussion. It is a pretty important question in view of the water power bill that recently passed Congress. One of these days a lot of us will be running electric locomotives who are not running them now. This is an important aid to conservation, when you take power out of the streams and not out of the ground.

C. F. Chambers (C. of N. J.): I move that the report be received and printed in the minutes, and also that the committee be thanked for the very excellent report which it has presented. I think few of us realize the importance of electric power as it is being developed to-day on some of the dense traffic districts and mountain roads.

This motion was duly seconded, and carried.

Scheduling and Routing Systems for Locomotive Repairs



SCHEDULING AND ROUTING in railroad shops is not new. The first schedules recorded were used in the Chicago & North Western shops in 1904. These consisted simply of working sheets and assigned dates made out and followed up by the shop supervision. Since that time more than 15 railroads have adopted some form of schedule system for repairing locomotives, all of which are more or less alike in basic principles.

Briefly, the locomotive is brought to the shop on a predetermined date or order, the tank disconnected and the engine forwarded to the stripping pit. Stripping is handled by a special gang in charge of a leader, and all parts are delivered to the proper departments of the shop. Predetermined dates are then assigned for completing the parts in time to assemble the engine in the best practical and logical sequence. These dates are obtained from master schedules which are compiled for each class of repair and for varying numbers of days required to complete the engine. All delays of material or operations are checked daily, and foremen are notified of the delays in their departments. No definite time is given in which operations shall be performed; it is only necessary that the work shall be finished on a certain day or date. The result of scheduling the complete capacity of the shop will automatically develop for each operation a stated number of hours which will very closely approximate the minimum number of hours in which that operation can be performed.

The following items cover the necessary steps to be taken for

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EDITOR'S NOTE—For descriptions of specific installations, see the *American Engineer and Railroad Journal* for May, 1905, page 159; the *Railway Age Gazette, Mechanical Edition* for August, 1913, page 423, and November, 1914, page 588, and the *Railway Mechanical Engineer* for April, 1918, page 219, and June, 1919, page 320.

installing an adequate scheduling and routing system as now in operation on some railroads:

1—Supervisor of shop schedules and assistant.
2—Schedule office for the supervisor.
3—Schedule and planning boards,
4—Shop or job blackboards.
5—Printed forms, master sheets, etc.
6—Calendar slide rules.

This list may be modified for smaller shops, but as the general methods and principles are the same, the above installation will be described. It is not advisable to introduce this system where less than 10 locomotives per month are given classified repairs.

It is also inadvisable to employ these methods in roundhouses and shops making heavy running repairs exclusively.

PITTSBURGH & LAKE ERIE RAILROAD
ERECTING SHOP

Engine No.....
Class Rep's.....
Date In.....
Date Out.....

..... Foreman

CLASS OF WORK	Date Wanted	Date Finished	MATERIAL	Wanted from Machine Shop
Engine in Shop Unwheeled			Frames or Tongues	
Engine Stripped Material Delivered			Rockers and Boxes	
Boiler off or Stripped			Cylinder Bushings	
Superheater Units Out			Valve Bushings	
Flues O. K.			Braces, Pads and Waist Sheets	
Smoke Box Work			Engine Truck Parts	
Stay Bolts			Engine Truck Wheels	
Flue Sheet			Spring Rigging Parts	
Side Sheet and Crown Sheet			Boiler Fittings, Air Pump and Parts	
Ash Pan and Grates			Motion Work	
Boiler Tested			Cross Heads	
Saddle Bolts and Boiler Waist Sheets			Main and Side Rods	
Frame Braces and Pads O. K.			Piston and Valve Packing	
Frame and Cylinder Bolts			Throttle Valve and Parts	
Cylinders Bushed or Bored			Driving and Trailer Boxes	
Valve Seats Planed or Bushing Bored			Pistons and Rods	
Shoes and Wedges and Binders O.K.			Valves and Yokes	
Spring Rigging Up			Steam Pipes and Dry Pipes	
Guides Lined			Driving and Trailer Wheels	
Motion Work Up			Eccentrics and Straps	
Engine Truck O. K.			Engine Brake Rigging Parts	
Boiler Fittings, Air Pump and Parts			Steam Chest and Cylinder Heads	
Steam Pipes and Throttle Valve In			Frame and Cylinder Bolts	
Boiler Lagged			Guides and Knees	
Engine Wheeled			Shoes and Wedges and Binders	
Boiler Jacket O. K.				
Cab and Running Boards O. K.				Wanted from Smith Shop
Superheater O. K.			Frames and Tongues	
Main Rods Up			Braces or Pads	
Valves Set			Rocker Arms or Guides	
Boiler Trimmings O. K.			Spring Rigging Parts	
Pipe Work O. K.			Engine Brake Rigging Parts	
Brake Rigging O. K.			Engine Truck Parts	
Side Rods O. K.			Binders and Yokes	
Eng. Despatched			Tender Parts	

..... General Foreman

Fig 1.—Erecting Shop Operation Sheet

1—The supervisor of shop schedules should be a man with practical experience, capable of handling men and with sufficient technical education to make clear reports and records; preferably a man who has served an apprenticeship and is familiar with all trades.

He should report to the superintendent or assistant superintendent of shops. At large shops an assistant may be required.

2—The schedule office should be located conveniently with respect to the machine and erecting shops, preferably in the office of the general foreman or opening from it. A room 10 ft. by 12 ft. will be sufficient but should be larger if possible. It is important to have this office so located that the supervision can frequently confer with the schedule supervisor and have ready access to and examine the records on the schedule boards.

3—Schedule boards are made to suit local conditions and should be about 36 in. by 58 in. or smaller. Two boards are necessary, one for the current month and one for the following month, continuing in succession from month to month. The planning

OUTPUT OF_____SHOPS

MONTH OF_____191__

Schedule Office

CLASSIFIED REPAIRS

NUMBER OF ENGINES		TOTAL NUMBER OF ENGINES			TOTAL DAYS IN SHOP		AVERAGE DAYS IN SHOP		AVERAGE DAYS PER ENGINE	
Scheduled	Carried Over	Early	On Time	Late	Schedule	Actual	Schedule	Actual	Early	Late

Total engines despatched _____
Percent of total engines scheduled _____
Number of engines rescheduled _____
Percent of total engines on time and early _____
Average number of delays per day _____

HEAVY RUNNING REPAIRS

NUMBER OF ENGINES		TOTAL NUMBER OF ENGINES			TOTAL DAYS IN SHOP		AVERAGE DAYS IN SHOP		AVERAGE DAYS PER ENGINE	
Scheduled	Carried Over	Early	On Time	Late	Schedule	Actual	Schedule	Actual	Early	Late

Total engines despatched _____
Percent of total engines scheduled _____
Number of engines rescheduled _____
Percent of total engines on time and early _____
Average number of delays per day _____

OUTPUT

Class 1 repairs _____
" 2 " _____
" 3 " _____
" 4 " _____
" 5 " _____
Total _____
Heavy running repairs _____

COPY TO

S. S.
M. M.

Fig 3.—Monthly Report

board is used for assigning engines to the shop to adjust the class of work to the organization and particularly to avoid overloading any department. This board simplifies the work of the schedule supervisor.

4—Small blackboards are used for conveying the dates the work is due finished directly to the man on the job. These blackboards may be employed to the extent of 15 or 20, as may be found desirable. Foremen of gangs, or departments, are expected to keep up these blackboards, crossing out engines and dates when the work is completed and delivered.

5—About 20 forms are used for operating this system to best advantage. These forms cover the constant or master schedules, delay sheets, check sheets and shop sheets used for conveying dates directly to the departments interested. All forms, excepting master schedules, should be printed.

6—The calendar slide rule is indispensable for transferring the constant intervals of time on the master schedules to actual dates on the shop sheets. By the use of this simple device a large number of dates can be assigned quickly and one setting of the rule is sufficient for one schedule on an engine.

The above discussion contemplates only the handling of the locomotive and its parts after arriving at the shop and is not directly concerned with the assignment of engines to the shop

and their selection for repairs. But this feature is important and has a decided bearing on the success of the system. Overloading departments with too much boiler work or too many broken cylinders or frames will result in delays and prevent schedules based on evenly apportioned work from operating effectively. The shop superintendent should have absolute control over engines to be repaired, as he is in the best position to adjust the incoming work to his organization and to the work being performed in the shop.

It is, perhaps, not pertinent to this discussion to treat at length the subject of proper inspection of incoming engines, although this matter has considerable bearing upon successful operation. One railroad has the matter of complete and careful inspection and examination of incoming engines developed to a considerable extent. A chief inspector is assigned, with one or more assistants, to go over the engine with a surface examination before stripping and during dismantling. These men select all of the parts to be removed and make out regular inspection forms, giving sizes of all fits, clearances and tolerances for renewals and repairs of these parts. They use micrometer calipers, giving all dimensions in decimal parts of an inch, reading to thousandths, thereby insuring correct and accurate fitting and alignment. This practice results in less movement of parts from one machine to another for fitting, also considerably less movement of men or foremen from one shop to another and discussion between them as to methods of making the repairs in question. Less spoiled work, standardization of parts and a prolonged life of engines will also develop.

The practical operation of the scheduling and routing system may be described as follows: An engine awaiting shop is thoroughly examined by boiler and machinery inspectors who make report as to condition. One copy of this report goes to supervisor of shop schedules, enabling him to define the classification of repairs needed and assign the proper schedule and number of working days required for completing repairs. The engine is next forwarded to the stripping pit and an itemized list of repairs needed is then forwarded by pit inspectors to supervisor of shop schedules, who is then in a position to assign exact dates and issue sheets to all departments concerned. These dates are posted by the supervisor on the schedule boards. At least once a day the supervisor and his assistant visit each foreman with the check sheets and examine the work which they have record is due or delayed on the engines under repair in the shop on that date. Returning to the schedule office a daily sheet is made out and issued to the supervision, calling their attention to the material and operations delayed, the number of days delayed in the schedule and the cause. These delays are then posted in red ink on the schedule boards where foremen and workmen can see quickly how their department stands and determine the status of their delays for the month. An excessive number of red marks in any one vertical column on the schedule board indicates forcibly that this job or department, represented by that particular vertical column, is probably the cause for delaying the engine. The supervisor of schedules has other duties, such as preparing weekly output sheets, reschedules, statements for higher officers and other reports and charts as requested. Comparative records are valuable for stimulating interest and keeping departments alive to the fact that they are falling behind and causing delay to the work in the entire shop.

The benefits derived from the use of these scheduling and routing methods are considerable. Schedule boards indicate infallibly where delays periodically or persistently occur and

SCHEDULE CONSTANTS—LOCOMOTIVE SHOPS.

ERECTING SHOP

Operations	Date Wanted
Engine in shop unwheeled	1
Engine stripped, material delivered	2
Flues out	3
Staybolts and radials out	6
Frames and Cylinders bolted	11
Cylinders bushed or bored	12
Shoes and wedges laid off	12
Spring rigging up	13
Flues set	13
Guides lined	13
Staybolts and radials in.	13
Engine truck O. K.	13
Boiler fittings O. K.	14
Boiler tested	14
Engine wheeled	14
Steam pipes in.	15
Cab and runs O. K.	15
Boiler lagged	15
Boiler jacket O. K.	16
Motion work up	16
Valves set	16
Main and side rods up	17
Ash pan and grates O. K.	17
Smoke box work and superheater O. K.	17
Engine brake rigging O. K.	17
Pipe work O. K.	18
Engine dispatched	18

Foreman

Material	Wanted in Machine Shop	Wanted from Machine Shop
Cylinder bushings		11
Engine truck wheels	2	11
Spring rigging	2	11
Boiler fittings	2	12
Cross-heads, guides and blocks	2	12
Steam pipes	2	13
Motion work, eccentric and straps	2	13
Driving and trailer wheels and boxes	2	13
Shoes and wedges	12	13
Engine brake rigging	2	15
Valves and yokes	2	15
Pistons and rods	2	16
Main and side rods	1	16

Material	Wanted in A. B. Shop	Wanted from A. B. Shop
Engine brake equipment	2	14

MACHINE SHOP — **Foreman**

Class of Work	Wanted from Erecting Shop	Wanted from Smith Shop	Wanted in Erecting Shop
Cylinder bushings			11
Engine truck wheels	2		11
Boiler fittings	2		12
Steam pipes	2		13
Driving and trailer wheels and boxes	2		13
Shoes and wedges	12		13
Valves and yokes	2		15
Pistons and rods	2		16
Spring rigging	2	9	11
Cross-heads, guides and blocks	2	9	12
Motion work, eccentric and straps	2	10	13
Engine brake rigging	2	11	15
Main and side rods	1	12	16

BOILER SHOP — **Foreman**

Class of Work	Wanted O. K. in Erecting Shop	Wanted in Smith Shop
Flues	11	3
Flue lengths		6
Flues, set	13	
Patches or fire box sheets	12	
Staybolts and radials out	6	
Staybolts and radials in	13	
Boiler tested	14	
Smoke box work and superheater	17	
Ash pan and grates	17	

PIPE, TIN AND AIR BRAKE SHOP

Class of Work	Wanted from Erecting Shop	Wanted in Erecting Shop
Engine brake equipment	2	14
Jacket	2	16
Pipe work	2	18

CAB AND TENDER SHOP

Class of Work	Wanted in Tender Shop	Wanted O. K.
Tender	5	14
Cab		15
Lagging		15

SMITH SHOP — **Foreman**

Class of Work	Wanted from Erecting Shop	Wanted in Machine Shop	Wanted in Erecting Shop
Binders	2		9
Flue lengths	6		
Flues	3		11
Spring rigging	2	9	11
Guides and blocks	2	9	12
Motion work	2	10	13
Engine brake rigging	2	11	15
Main and side rods	1	12	16

PAINT SHOP — **Foreman**

Class of Work	Wanted O. K. for Paint	Wanted Painted
Cab	15	17
Tender	14	17
Engine	16	18

Days allowed	18
Class repairs	3

H. G.
Total 130.—R. W.

Fig 2.——Constant Sheet or Master Schedule

such departments may be built up or strengthened. Under the piecework plan this system has resulted in men making more money on account of receiving material more promptly. Under the day work plan the system acts as a stimulant and to some extent takes the place of interest in the work automatically removed through abolition of piecework methods. Friction between departments is almost entirely eliminated. It is not possible to unload on one department causes for delay which belong to another.

This system to some extent establishes tasks or jobs. Every conscientious foreman or workman likes to have certain work to perform in a stated time and to feel confident that this is exactly what is wanted. Each schedule date delivered to the foreman or workman becomes a written order to that man to deliver the work on that date. Unnecessary driving will be brought to a minimum. Dates are assigned, and if the work is

BALTIMORE AND OHIO RAILROAD

M. P. DEPARTMENT—SCHEDULE OFFICE

_____S. S.

DAILY DELAY SHEET _____191—

_____G. F.

MACHINE SHOP	Engine Number	Days Late	Cause of Delay	SMITH SHOP	Engine Number	Days Late	Cause of Delay
Frames or Tongues				Frames or Tongues			
Rockers and Boxes				Braces, Pads and Waist Sheets			
Cylinder and Valve Bushings				Binders			
Braces, Pads and Waist Sheets				Flue Lengths			
Engine Truck Wheels				Flues			
Steam Pipes				Rockers and Boxes			
Spring Rigging				Spring Rigging			
Boiler Fittings				Tender Parts			
Driver Brake Fulcrums				Guides and Blocks			
Motion Work				Motion Work			
Crossheads, Guides and Blocks				Engine Truck Parts			
Driver and Trailer Wheels and Boxes				Engine Brake Rigging			
Shoes and Wedges				Main and Side Rods			
Pistons and Rods				TENDER SHOP			
Valves and Yokes				Tender O. K. for Paint			
Main and Side Rods				Cab O. K for Paint			
Engine Brake Rigging				PAINT SHOP			
Eccentrics and Straps				Cab			
BOILER SHOP				Tender			
Patches or Firebox Sheets							

SIGNED_____

Fig 4.—Daily Delay and Check Sheet

done on these dates no criticism or censure is necessary. The constant reappearance of the daily delay report stimulates foremen and workmen to better purpose than criticism.

A visit to shops where this system is in operation brought out unanimously favorable comment from superintendents and foremen relative to its operation. The general foreman's duties are greatly simplified. Heretofore he might go from one department to another trying to fix the responsibility for delays. No system can take the place of foremen, but this system can eliminate a large amount of traveling by the supervision from one department to another.

No definite figures are possible giving the saving in money resulting from the use of these methods. We may, however, consider one saving from the standpoint of the potential value of the power. Assuming that the service of a locomotive is worth, on an average, $50 a day and that one day is saved in the time each engine is held on the pit, the money saving in a shop having 25 pits and delivering two engines per pit per month, would be $2,500 per month, or $30,000 per year. This statement is based on the assumption that quicker deliveries of power are directly attributable to the methods described in this paper. Other savings, including labor, material, overhead, etc., will always result from more systematic operating methods.

The system can also be used in passenger and freight car repair shops and recommends its wider installation in locomotive repair shops.

The report was signed by Henry Gardner (Chairman), Baltimore & Ohio; S. W. Mullinix, Chicago, Rock Island & Pacific; D. J. Mullen, Cleveland, Cincinnati, Chicago & St. Louis; H. H. Maxfield, Pennsylvania System; C. J. Bodemer, Louisville & Nashville; John Purcell, Atchison, Topeka & Santa Fe; R. J. Williams, Pere Marquette, and A. A. Burkhart, New York Central.

Discussion

Henry Gardner (B. & O.): I understand that the New York Central and Michigan Central have been very successful in scheduling their system of car repair shops, and, if consistent, I would like to hear from some gentleman present on that proposition.

W. H. Flynn (M. C.): I am not qualified to speak with authority, but I will say that since we have installed this system for the locomotive shops the benefits derived from it are very noticeable, and I can heartily recommend the system to anyone who is not now using it. We have found that in addition to the advantages of scheduling the locomotive and following the work through that the meetings of foremen three times a week, after the conclusion of the day's work, are most beneficial in getting the men together. Of course, they have their little tiffs, etc., but it is all friendly, and they go back in the morning with renewed vigor and a determination to hold up their own department.

We have also found that in the routing system great advantages are attained in getting the work to the workmen and also in taking away the finished work as soon as completed. No man works as well when he has a lot of finished work laying around his machine as he does when it is taken away promptly. When it is taken away currently he realizes there is a necessity for the work and somebody wants it. We take the work and lay it either close to the engine or some place else, but in any event it is taken away from the workmen. If there is anybody who has not started a routing system, there is no better time to begin than when you go back home. It cannot be equalled under the present working conditions.

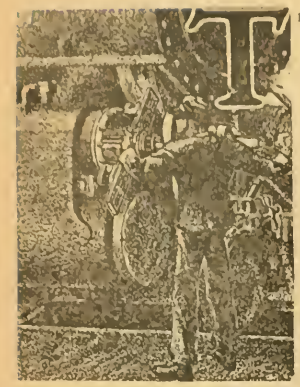
Mr. Burkhardt (N. Y. C.): We have had this system in effect at West Albany to some extent, but never on a very elaborate scale. But I know that New York Central Lines West are carrying the idea along and are having good success with it and they claim it is very successful.

Mr. Gardner: I have known of some of the railroads that are using this schedule system. I could mention the B. & M., Big Four, Santa Fe, P. & L. E., L. S. & M. S., A. C. L., P. M., M. C., Frisco, B. R. & P., N. Y. C., C. P., Pennsylvania and B. & O. I wish we could extend this to other railroads. I am sure that the scheduling and dispatch system is of great value to the shops, especially since we have abolished piece work. The system automatically takes the place of the interest which was supplied by piece work. I believe that the mechanics understand the system for car repairs as well as for the locomotive shop, and that is why I ask the question in regard to the Lake Shore & Michigan Southern. Mr. Burns, of the Canadian Pacific, has developed the system at his shop, and it would be of interest to hear from him.

C. H. Wiggin (B. & M.): I can thoroughly agree with what the previous speakers have said of this scheduling system. I started it in a brief sort of way at our Hocking Shop as early as '98. It proved quite successful in a small way, and we have gradually elaborated upon it. We feel that it is the nearest approach to piece work that can be established in any shop.

Mr. Goodnow (C. & N. W.): *I would like to move that the committee be continued to make a study of the car department methods, and recommend blanks or forms to take care of that particular branch of the work. This motion was seconded and was unanimously carried. A motion that the report be received and printed in the record was made and carried.*

Report of Committee on Superheater Locomotives



THE COMMITTEE REPORT dealt with the installation, operation, care and maintenance of superheater equipment for locomotives. Before outlining the recommended practice on this subject, the data shown in Table I was submitted with reference to providing swabbing on piston rods. These results do not strongly support the opinion that piston-rod swabbing is essential to good service and, on account of the limited information that has been furnished along this line, the committee hesitates to make recommendation either for or against the use of swabbing.

Installation of Superheater

When parts are received from manufacturers they should be coated with some protective coating and stored under shelter until used. Care should be taken to see that the wooden protection blocks over ends of units and joints in headers are in place and used.

In the installation of the header the perfection of the joints should be thoroughly established, and care exercised to see that the header is placed in a level position before it is finally secured to the boiler. The same care with reference to the condition of the ball joints on the units and their seat in the header should be exercised. It is recommended that all ground joints should be bolted in place, metal to metal, without any medium other than a coating of oil to bring the joints to set without causing any undue friction.

Bolts, either heat treated or of special steel, should be employed in securing the units to the header.

TABLE I

COMPARISON OF SERVICE OF PISTON-ROD PACKINGS AS INFLUENCED BY THE USE OF SWABBING ON PISTON RODS ON SUPERHEATER LOCOMOTIVES

Kind of Packing	ITEMS	Passenger Service 5-in. Diam. Rods Swabbing With	Passenger Service 5-in. Diam. Rods Swabbing Without	Mallet Locomotive H. P. Engine 3¼ in. Diam. Rods Swabbing With	Mallet Locomotive H. P. Engine 3¼ in. Diam. Rods Swabbing Without
	Number of rods equipped..	4	2	3	3
A	Number sets renewed	16	4	3	1
	Average mileage	7,240	20,247	9,002	18,850
	Number of rods equipped..	3	3	3	3
B	Number sets renewed	13	8	3	2
	Average mileage	6,663	8,944	14,004	12,028
	Number of rods equipped..	3	3	3	3
C	Number sets renewed	6	5	7	22
	Average mileage	14,359	18,648	2,384	2,007
	Number of rods equipped..	2	2	2	2
D	Number sets renewed	5	4	9	6
	Average mileage	9,310	8,679	3,503	2,390
	Number of rods equipped..	12	10	11	11
Total	Number sets renewed	40	21	22	31
	Average mileage	8,379	13,357	5,329	3,271

Care should be exercised to see that the operating cylinder is properly located on the damper shaft so as to give the piston sufficient movement to provide the proper opening for the dampers.

In closing the opening around the steam pipe where it passes through the smokebox, a fibrous packing or cement should not be used. A metal covering should be used in such a manner that it can be fastened both to the smokebox and to the steam pipe.

After the superheater and steam pipes are completely placed and hydrostatic test is applied, if any ball joints are found leaking they should be taken out and reground, as tightening a bolt will not repair an imperfect joint.

After superheater header and units, pistons and valves have been applied, the throttle-valve should be blocked down and steam test blown back through the steam chest and superheater units. When these parts become heated, tighten all joints.

When superheaters are installed some provision should be made for supplying a limited amount of steam for use when drifting.

A limited number of pyrometers should be applied to superheater locomotives on each division for the educational value they would possess.

When superheaters are applied to existing equipment the front end door should be made sufficiently large to permit working to advantage in removing or applying units. It is recommended that the clear opening be 42 in. in diameter. This dimension can easily be arranged on new locomotives.

Operation

Locomotives equipped with superheaters should, in general, be operated in the same manner as locomotives using saturated steam. The cylinder cocks should normally be open when the locomotive is standing under steam, and when the locomotive is started they should remain open until dry steam appears. In starting a superheater locomotive, the reverse lever should initially be placed for full travel of the valves, and at all times the water level in the boiler should be such that there will be no possibility of water being carried into the superheater.

Water carried into the superheater will be evaporated into saturated steam or steam with a low degree of superheat, seriously affecting the economics available through proper operation; also water carried into the superheater may flash into steam after the throttle has been closed, placing the locomotive to that extent beyond the control of the engineman. Water carried into the superheater in quantities sufficient to reach the valves and cylinders will remove the lubrication from these parts and may result in knocking out cylinder heads or other damage.

Superheater locomotives should be handled only when the air brakes are in operative condition.

It is essential that the oil supply for the lubrication of the valves and cylinders on a superheater locomotive should be constant, as the high temperature will cause serious damage to these parts if there is an interruption of their lubrication. When locomotives are not equipped with drifting valves the throttle should be slightly open when drifting, in order to avoid the suction of hot gases into the steam chests and cylinders. The position of the superheater damper can be determined by observing the position of the counterweight attached to the damper shaft, and the engineman should know that the damper is wide open when steam is being used.

Care and Maintenance

At regular periods, and preferably when the monthly federal inspections are made, there should be a thorough inspection of all parts which come in contact with the fire or with the products of combustion. There should be a careful inspection for steam leaks, and the entire front end arrangement should be carefully examined.

When the locomotive receives this periodical inspection, each flue in the boiler must be thoroughly cleaned by blowing out with compressed air supplied through a pipe of sufficient length to extend entirely through the flues; the flues also should be cleaned whenever necessary between the periods when the periodical inspections are made.

At the time of the periodical inspection, the superheater damper should be connected to the shop steam or air line, in order that the damper may be operated and the rigging checked for lost motion and the damper opening also checked; it should also be known that the damper piston travels through the full stroke and makes a steam-tight joint against its seat.

The special tools recommended by the Locomotive Superheater Company for installing and maintaining superheaters should be employed.

When, for any reason, superheater units are removed from the boiler, they should be tested before being returned, with a cold water pressure of at least 25 per cent in excess of nominal boiler pressure.

Unit bands and supports should be inspected whenever units are removed, and renewed if necessary, to insure units always being properly supported and in correct relation to the flues.

When replacing superheater units, bolts should be renewed when there is any evidence of deterioration either in the condition of the thread or worn or pitted condition of the bolt. In all cases, a new nut should be applied and used as the pulling nut in setting the unit in place. An old nut can then be applied as a locking feature after the unit has been properly seated.

In regrinding the ball joint of the unit and the socket joint of the header, the original contour of these surfaces should be maintained.

After removal of the units, seats should be protected with a protecting coating and covered to prevent injury to seats and entrance of foreign substances into unit pipes.

All dirt should be removed from the top of the header or tee-bolt slots before the superheater is reassembled.

Lubrication

The committee gave this matter considerable study and, for the reason that there is no definite information available on which to base conclusions, is unable to make any recommendations at this time. The committee proposes, if continued, to further study the subject and outline a program of tests to be followed on several different railroads, the data obtained from these tests to furnish a basis for drawing some definite conclusions as to the relative value of hydrostatic and force-feed lubrication.

Diameter of Piston Valves and Cylinders

The committee also reported as follows on the economical diameter of piston valves of superheater locomotives, with recommendations for standard practice in connection with various cylinder diameters:

This question has been studied at quite some length and a number of roads reported to the committee relative to the dimensions of their leading locomotives for passenger, freight and switching services. Among the items reported were the valve diameter, the cylinder diameter, the stroke of the piston, diameter of drivers, area of steam ports, maximum cut-off port opening at maximum cut-off, and several other items tending to work out a relation between the valve diameter and steam demand of the cylinders.

Among the variables encountered are the travel of the valve, the port openings, the cross sectional area of the various elements of the entire steam passageway between the boiler and the cylinder. By giving this subject a little thought it will be appreciated that no one item can be fixed as long as there are any variables to take into consideration. If such items as port area and valve travel are fixed, then the liameter of a valve can be ascertained that will supply the proper amount of steam for a certain piston displacement.

For the above reasons, the committee is unable to make any concrete recommendations at the present time.

The report is signed by H. R. Warnock (Chairman), C., M. & St. P.; H. W. Coddington, N. & W.; C. H. Hogan, N. Y. C.; R. W. Bell, I. C; W. C. A. Henry, Pennsylvania; G. W. Rink, C. R. R. of N. J.; H. P. Anderson, M., K. & T.

Discussion

C. E. Fuller (U. P.): There is just one part of that report that I do not quite understand.

That is the recommendation for new nuts in repair. I would like to hear from the committee as to that. If they had said a new bolt I would understand it, but I don't understand the new nut proposition.

H. W. Coddington (N. & W.): An old nut may be used in trying to draw the bolt in the joint to a seat, and it was recommended that always a new nut be used in installing a unit, and also, of course, a new bolt, if such was needed. Some roads seem to use those parts over, but the committee wishes to discourage the use of old nuts, unless they are in perfect condition.

C. M. Darden (N. C. & St. L.) I would like to ask the committee if it has any figures (they speak of the water being carried over into the superheater) in regard to the water level at which it could recommend that locomotives be operated.

On the N. C. & St. L. we have found that we can greatly increase the temperature of the superheat in the steam by running at a lower water level. This is as much as 75 deg. between the third gage and the second gage, and 50 deg. between the second gage and the first gage. I would like to ask the committee if it has any figures.

Mr. Coddington: I think what Mr. Darden referred to is the matter of priming, and it would be impossible for the committee to fix any standard of water level for a locomotive. By use of a pyrometer on the locomotive, the effect of the priming is very readily and accurately established. An engine may be running along at a uniform speed and all at once you notice that the pyrometer drops back, and there is only one thing that causes that with the steam pressure maintained, and that is priming, and it would be impossible to adopt a standard, for that is one thing that would have to be watched and corrected by each road for each individual power unit.

G. S. Goodwin (C. R. I. & P.): I note that the committee showed in its recommendations two practices for making the steam pipe joint, where the pipe passes through the smoke arch. I notice that it does not include the practice which is standard on almost all engines and also applied by the builders. That is, of a jacket casting on the smoke arch with some sort of packing in it. I notice by the report that it is against that. I would like to have the gentlemen elaborate a little more on why they are against that, and why they favor a connection with two more joints. Certainly we do not want more joints in the steam pipe. We have enough joints to give us trouble now.

Mr. Coddington: As to the inquiries we have had, I will say if any of these gentlemen had been at the Fuel Association convention, they would have heard a lot of talk about the leaking front end, and a good deal of the fault in the leaking of the front end is caused by the packing around the steam pipe where it passes through the smoke arch, and it was with the object of getting away from this condition that the practice as suggested was recommended.

It is true it requires more skill and greater cost to establish such joint as shown, especially the one with the casting secured to the front end, but when it is established it is like a steam pipe joint, it stays established until it is disturbed again, whereas with fibrous packing, if you put it in the morning before the engine reaches its terminal it may be blowing.

Mr. Flanagan (C. & O.): I think we would be glad to have details so that we could judge which practices are best to follow when using packing of different types. I assume that where the good results have been obtained without swabbing, Paxton-Mitchell or Trojan packing was used, which would not hug the rod tightly when drifting with closed throttle, and that it was found best to use swabbing where multi-angular rings were used. On the mountain districts of the C. & O. we have found it necessary to resort to swabs for lubricating the piston rods in order to prevent the packing rings and rods from scoring and heating.

Mr. Coddington: The multi-angular or old U. S. packing was not included, and the manufacturer's name was omitted for obvious reasons, and all four packings shown are packings of modern design, and it was also brought out that this record was established by having different kinds of packing on the same locomotives where one side of the locomotive was equipped with swabs and the other side was not equipped with swabs.

As to the heating of the rods, there is no indication in the report of anyone furnishing information that they had trouble along that line.

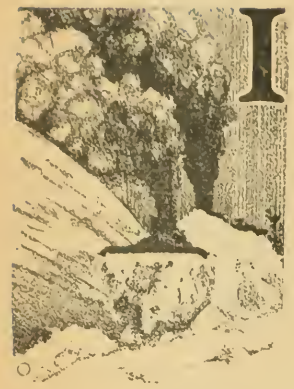
C. E. Fuller: *I move you that the report be accepted and printed in the proceedings and the committee be continued, and their duties extended to the cylinder packing rings for next year's report.*

Chairman Tollerton: A portion of it will have to be referred to letter ballot.

This motion was carried.

Development of Snow Fighting Equipment

By W. H. Winterrowd
Chief Mechanical Engineer, Canadian Pacific



In a study of snow fighting equipment, it is interesting to note that its development is very largely due to Canadians and to Canadian railways, although snow conditions in Canada are no more severe than those met with on roads passing over the Rocky or Cascade Mountains in the United States.

The well-known Russell design of snow plow was first put in service in 1885 on the Intercolonial Railway, now a part of the Canadian National.

The present rotary snow plow is a development of the invention of a compound revolving snow shovel, patented in 1869 by J. W. Elliott, a dentist of Toronto, Ontario. This elementary device was modified by Orange Jull of Orangeville, Ontario. The Jull rotary was taken up by the Leslie Brothers, also of Orangeville, who constructed a full size model which was tried out in the Parkdale yards of the Canadian Pacific in 1884. The success of this trial led the Leslie Brothers to have made for them a complete plow which was tried out by the Union Pacific during the winter of 1886-87. This plow was the forerunner of the modern rotary.

The principal types of snow fighting equipment may be generally classified as follows: Engine and pilot plows, push plows, wing plows, spreader plows, machine plows, flangers, ice cutters and snow sweepers.

Engine and Pilot Plows

As far as the writer can ascertain, the first snow plow ever built was of the push plow type. This was a wedge-shaped wooden plow mounted on trucks and pushed in front of a locomotive. As this plow derailed frequently, an endeavor was made to take advantage of the weight of the locomotive. A plow was constructed utilizing the front end of the locomotive as a support. Engine plows are still in use today and their general arrangement has not been changed, except to adapt them to larger locomotives. It is usual to apply cast-iron wearing shoes which rest on and slide along the top of the rail if the weight and force of the snow cause a depression of the nose of the plow. Several railways have advised that occasionally engine plows are permanently secured to the front of a locomotive assigned only to plow service, thus making a complete unit available at any time. For severe work this locomotive may be assisted by others.

The pilot plow was developed for use in light snow. It usually consists of mold boards of steel plate securely fastened in front of and over the pilot, and braced to the front bumper and smoke box. In moderate snows which do not pack hard or drift, and where the railway is free from deep cuts, and train operation is fairly frequent, engine and pilot plows are of great assistance in maintaining an open line.

Push Plows and Wing Plows

A push plow is a self-contained unit consisting of a substantially built car with a wedge-shaped plow attached to its front end. This plow is generally pushed by one or more locomotives. The car may be fitted with flangers for cleaning the space between the rails. When the car is equipped with wings for widening the cut it is called a wing plow.

Push plows were frequently built V-shaped, simply throwing the snow to each side without lifting it appreciably. These plows did not always prove satisfactory, as the snow was crowded aside, and if drifts were deep or in cuts it fell back on the track after the plow had passed. In hard drifts this plow packed the snow. In heavy side drifts the form of the plow tended to derailment. Also, when backing, unless shields were applied, snow was picked up on the back of the mold plates and carried into the trucks.

The square-nosed plow was developed to overcome these objections. The front of this plow consists of two wedges. The main, or bottom wedge, with its cutting edge horizontally across the track, is a plane inclined upward and backward. Its purpose is to lift the snow. The upper, or vertical superimposed wedge, is set some distance back from the front edge and is either V-shaped for single-track operation, or triangular for double-track operation. The upper wedge throws clear of the track the snow which has been lifted by the bottom wedge.

Many modern plows of this type have an additional feature known as the drop nose. This consists of a plate hinged to the front of the bottom, or lifting, plane in such a manner that it may be brought down between the rails, removing the snow to a depth of two or three inches. The nose is ordinarily operated by either hand levers or by compressed air cylinders controlled from the cupola of the plow.

Russell Plow

One well-known push plow is the Russell design. This plow is of the square-nosed type and is generally built of strong timbers reinforced with structural steel. The framing on which the mold boards are laid has as its main feature a heavy timber called the "back-bone." Power is applied directly to the front of the plow through a steel reinforced timber bar, hinged or pivoted to the "back-bone." This bar extends between the two center sills the entire length of the car frame. At its rear end the coupler is attached. A 4-in. clearance on each side of the bar permits sufficient lateral movement for adjustment on curves. This method of transmitting power directly to the front of the plow is said to be responsible for the claim that Russell plows are seldom derailed. On account of the heavy pressure on the front of the square-nosed plow, the Russell design is fitted with a front truck which has journal bearings on each side of each wheel. Each axle, therefore, has four journals.

The wings of the Russell plow are of the elevator type. The face of each wing is formed into two concave chutes called elevators. These chutes slope upward at an angle of approximately 30 deg. This type of wing first loosens the snow at the side of the cut and then carries it up and out. The distance the snow is thrown depends upon the speed at which the plow is traveling. These wings are forced out into position by means of gearing operated within the car. When not in use these wings fit into recesses in the side of the car.

Canadian Pacific Steel Plow

For many years the Canadian Pacific has constructed its plows of steel. It was the first railway to build and use an all-steel plow. The service given by this type has been very satisfactory. The all-steel plow has a number of advantages, including greater strength, lower maintenance cost, and it affords greater protection to the men operating it. These steel plows have been built for both single and double track operation, and are equipped with drop nose, wings, and in some instances with ice cutters and flangers similar to those applied to rotary snow plows, all devices being controlled from the cupola. Two styles have been built. The type shown in Fig. 1 is used in territory where light, dry snows are frequent. On this type the roof extends forward over the mold plates to prevent snow flying upward. The other type does not have the extension roof and is used where the snows are usually wet and heavy.

Trucks.—The rear truck is of the standard arch-bar freight type, with 33-in. diameter cast-iron wheels mounted on 4¼-in. by 8-in. M. C. B. axles. It is equipped with Simplex truck bolsters, M. C. B. coil springs and roller side bearings. The wheel base is 5 ft., 3 in. The front truck is a special design of arch-bar type, with 28-in. diameter steel-tired wheels mounted on 5-in. by 9-in. M. C. B. axles. Simplex truck bolsters are used, the ends of which are fitted with a combination roller and wedge lateral motion device. This truck has no springs, the space usually occupied with springs being fitted with a wooden block.

The first front trucks used under these plows had no lateral motion arrangement and the wheels were mounted on engine truck axles with inside journals. The bearings and boxes were, therefore, practically inaccessible, except when the plow was standing over a pit. This resulted in numerous hot journals. Occasionally the arch bars bent sidewise, indicating the need of some lateral motion to prevent excessive side strain when plows were passing through sharp curves and guided by the flanged wearing shoe. The present truck with outside journals and with lateral motion device has overcome these troubles.

Draft Attachment.—The rear end is equipped with draft gear. At the front a standard pilot coupler is supported in a large steel casting riveted to the sloping front of the plow.

Underframe.—The center sills consist of two 15-in., 33-lb. rolled steel channels with top and bottom cover plates. The side sills are 15-in., 33-lb. channels. The bolsters are box sections, consisting of pressed plate diaphragms with top and bottom cover plates. Approximately six feet back of the center of the

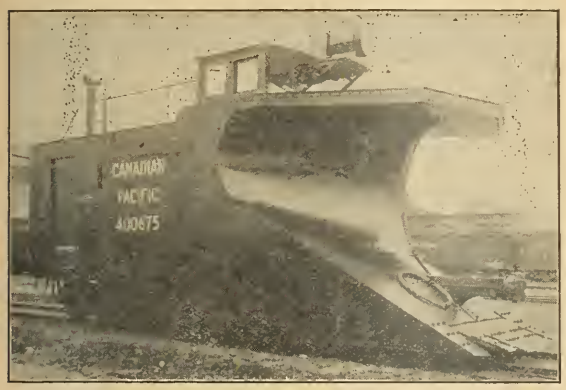


Fig. 1—Canadian Pacific Single Track Steel Snow Plow

front truck is located a very strong cross strut consisting of two 15-in., 22-lb. channels applied horizontally to the top and bottom of the center sills. The strut extends entirely across the plow.

Front End Frame.—The center end post consists of two 15-in., 33-lb. channels which extend from the top of the center sills at a point just back of the front center plate, to the roof. The center of the bottom, or lifting wedge, is supported by two 10-in., 20-lb. channels riveted to the front end of the center sill channels, and to the center end posts. The sides of the lifting wedge are supported by two 10-in., 20-lb. channels. These are supported by the front bolsters and extend diagonally upward and towards the rear to a point near the roof and about midway between the trucks. The roof extension, or hood, is built up of 3/16-in. steel plate, braced with 7-in., 9¾-lb. channels.

Side and End Construction.—The sides and ends are constructed of 3/16-in. flat steel sheets reinforced by angle iron braces and posts. Attached to the side frames are heavy corner angles extending from the bottom of the side sills to the top of the side plate.

Drop Nose.—The drop nose consists of a heavy plate carried on large cast-steel hinges. The front edge is equipped with removable flanged rail shoes provided with hardened steel wear plates. Adjustable cutter plates which extend down on either side of, and between the rails, are bolted to the front edge of the nose. These plates are beveled to a sharp edge and are applied in a number of narrow widths so that sections can be renewed if damaged. The drop nose is operated from the cupola by means of an air operated toggle arrangement placed under the nose frame.

Wings.—At the back edge of the side plates, steel extension wings are attached by means of four heavy steel hinges. The width of plow over sides is 10 ft. The width over ends of wings when fully extended is 16 ft. When folded these wings are flush with the side of the plow. The outer edges of the wings are provided with a beveled extension about four feet in height. When the wings are folded this beveled extension fits snugly against the body side sheet and extends under the side sill as far as proper clearance for the rear journal box will permit. This beveled extension prevents snow from gathering when the plow is backing up. A hasp and staple arrangement secures the wings in closed position when the plow is not in service.

Spreader Plows

The simplest form of spreader consists of a flat car with wings attached to each side, the wings being operated from the floor of the car by means of levers. In house car spreaders the drop wings are usually raised and lowered by air cylinders. The side wings are supported by jib cranes hinged to the side of the car and are held in working position by means of heavy bar braces. On some plows these braces are moved into working position by means of air cylinders. Some types of spreaders are equipped with drag wings hinged to the back corners. This type of spreader is used by some roads to widen cuts after a plain push plow has passed. When widening cuts these wings are in such position that they serve as snowbank cutters, and snow is carried in toward the center of the track, from which it can be thrown by either a wedge plow or a rotary. When equipped with drag wings these spreaders are often called cut wideners.

The large side wings, when extended to their full width, have a total spread of approximately 30 ft. The snow is first cut by the V-shaped plow and, after it is thrown or pushed to one side, the long wings push it out still further. This type of plow is

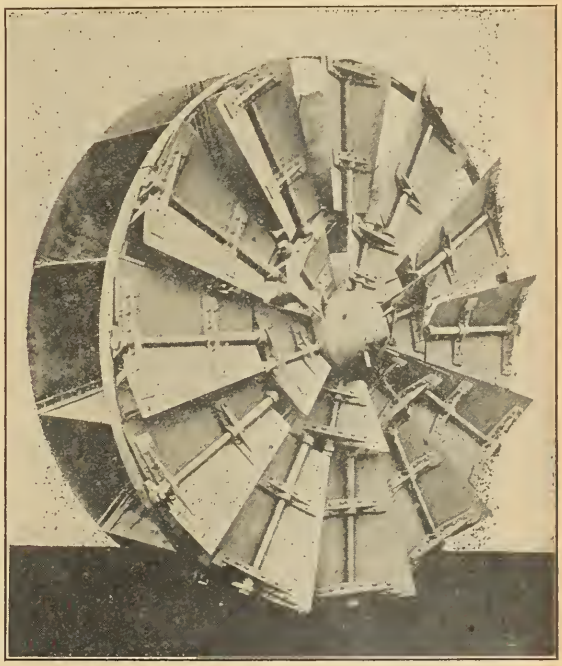


Fig. 2—Improved Fan Type Wheel

frequently used for cleaning up yards. Some roads utilize their ballast spreaders for this purpose.

Machine Plows

On roads which have to fight deep drifts, snow slides, or other conditions beyond the capacity of push plows, the rotary machine plow is used, and to date is the most effective instrument that has been developed for the purpose. These plows can work their way through deep cuts and slides where it would be impossible for any type of push plow to lift the snow and, in addition, can throw the snow clear of the track. If the snow is much higher than the top of the casing it is only necessary to loosen it and throw it down in front of the plow in order to have it picked up and thrown clear of the track.

J. W. Elliott was the original inventor of the rotary principle. His invention was improved by Orange Jull, who applied a knife or cutting wheel in front of the Elliott fan wheel. In 1883 the

Leslie Brothers built the first rotary embodying the Jull modification. The fan wheel was mounted on a hollow shaft in which revolved a solid shaft supporting the knife wheel. The fan and cutting wheels were revolved in opposite directions by means of a gear system.

During the winter of 1883-84, the Canadian Pacific gave this model a trial at Parkdale, Ontario. This preliminary trial, in which snow and ice were thrown over 300 ft., demonstrated the practicability of removing snow with a revolving wheel. This trial, however, indicated that the plow should be constructed so that snow could be thrown to either side of the track and that a flanger was necessary to prevent derailment in hard snow and ice and to leave a satisfactory rail after passing.

To overcome these objections the Leslie Brothers developed a wheel with manually reversible knives which could be changed in position to enable them to cut in either direction. They also applied a movable hood to the cylindrical portion of the casing through which snow could be thrown to either side of the track. In addition they designed an ice cutter, and a flanger, which were applied to the front truck of the plow.

A plow containing these improvements was built for them by the Cooke Locomotive Works of Paterson, N. J. This plow was put in service on the Chicago & North Western during the winter of 1885-86. It is interesting to note that the engines of this plow were equipped with Walschaert valve gear. One difficulty, however, was experienced. The friction caused by the snow passing between the knife wheel and the fan wheel absorbed more power than that required to cut and throw away the snow. The principle of opposite revolving wheels was then abandoned and the Leslie Brothers designed a single fan wheel with adjustable cutting edges. These cutting knives were attached directly to the wheel and automatically reversed their position as the direction of rotation was changed.

The Cooke Locomotive Works rebuilt the plow, embodying these improvements, and during the winter of 1886-87 it was put into service on the Union Pacific. The operation was so successful that the railway company not only purchased it, but three others in addition.

In Canada, in 1888, the Canadian Pacific built eight of these plows, applying a fan wheel which had been still further improved by the Leslie Brothers. This wheel is shown in Fig. 2.

The first rotary plows with the improved Leslie wheel were equipped with a 17-in. by 24-in. two-cylinder engine. Steam was supplied by a locomotive type boiler having 1,259 sq. ft. of heating surface and carrying 180 lb. pressure. The cutting wheel was supported by an 8½-in. diameter shaft geared to the engines. The shaft was supported in a main bearing 34 in. long.

These snow plows, as well as many other early rotaries, were equipped with a wheel of the fan type, Fig. 2. When the plow was in operation the revolving knives cut the snow and delivered it into the space between the partitions. The snow was then carried around the casing until the top opening was reached, through which it was thrown in a straight line by centrifugal force. In light and dry snow the wheels as shown were satisfactory, but in heavy work their construction proved inadequate. This fan type wheel is still in service on very many railways. It is the opinion of most users, an opinion endorsed by J. S. Leslie, that a well constructed, heavily built fan type wheel is the most efficient snow remover that has yet been devised.

The Leslies also developed the scoop type of wheel to handle the soft, fluffy, wet snow found on the Pacific slope near the citrus belt. Such snow had a tendency to adhere to and clog the partitions of the fan type wheel. The wheel is composed of the cone-shaped radially placed scoops, the backs of which

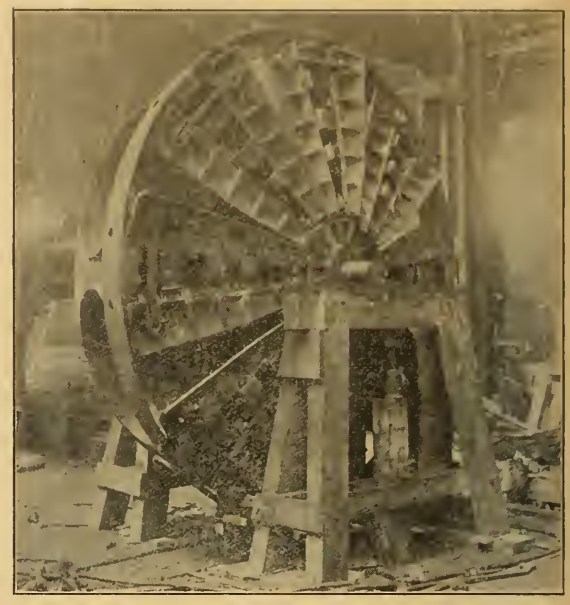


Fig. 4. Canadian Pacific Heavy Rotary Plow—Wheel Being Balanced

are fastened to a steel plate. The surface of these scoops is smooth to prevent the snow from adhering. Each scoop is open its entire length on the front side. A cutting knife is hinged on each side of the opening. These knives adjust themselves automatically into cutting position. The knives on the adjacent edges of each scoop are connected by links so that when one knife is cutting snow the other knife is depressed to afford the necessary clearance.

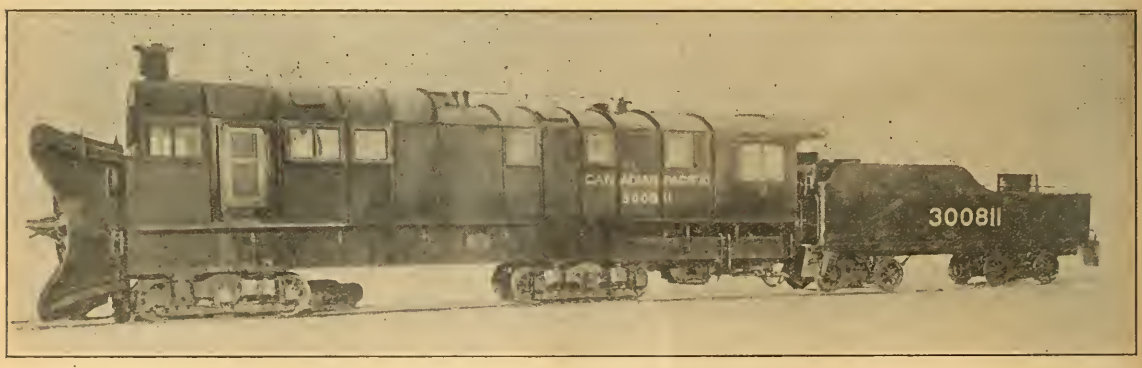


Fig. 3—Canadian Pacific Railway Heavy Rotary Plow

Union Pacific Rotary

On four rotary snow plows rebuilt by the Union Pacific the cutting wheel is built up around a cast-steel center secured in the usual manner to the front end of the wheel shaft. This casting is spool shaped. The front is 50 in. in diameter and contains a number of spokes. On three of these spokes the small center cutting knives are hinged. The outer ring of this center

casting forms the inner ring of the wheel. The outer ring is of mild steel of 1-in. by 4-in. section. Between the inner and outer rings are riveted two types of cast-steel arms. Each alternate arm is provided with bosses for hinging the knives. The front edges of the ½-in. plate partitions are riveted to the arms without bosses. The plain arms also serve as stops for the knives, which are double-edged and of cast steel, and which adjust themselves independently without connecting links. These knives are hinged to the bossed steel arms by means of continuous pins.

A drop nose and substantial cutting wings are fastened to the front casing. When not in use, the wings are drawn in by means of levers operated by a hand screw.

The boilers on these plows are equipped with superheaters. The use of highly superheated steam provides a substantial increase in power and reduces the consumption of fuel and water, enabling the plow to remain out longer without running for an additional supply.

Canadian Pacific Heavy Rotary

The greatest test of a rotary snow plow is its ability to cut through snow slides. The plow can be subjected to no heavier service, a service which is occasionally required on all roads crossing the Rocky, Cascade and Selkirk Mountains. The snow in these slides is not only packed exceedingly hard, but often contains trees and rocks. It is impossible for rotaries to overcome such obstacles. It is generally customary to probe the slide with sounding rods to locate them and, if possible, they are removed by blasting or by being pulled out. Sometimes, however, these obstacles are not discovered, and when the plow encounters them the ordinary cutting knives are generally damaged and the plow often put out of commission. The repair of the knives is generally difficult and slow.

During the winter of 1908-09, Sir George Bury, then general manager of the Canadian Pacific, Western Lines, decided that a plow was needed which would not break down, and he stated that he wished a rotary plow with cutting knives of 2-in. armor plate, and the rest of the plow built in proportion. The following spring authority was given for two such plows and arrangements were made with the Montreal Locomotive Works for their construction. H. H. Vaughan, then assistant to the vice-president of the Canadian Pacific, engaged John Player, consulting engineer of the American Locomotive Company, to prepare the designs in collaboration with him. As a result it was decided to modify considerably the construction of existing plows. It was Mr. Vaughan's idea that better results could be obtained by driving the plow wheel direct in marine engine style, and that the frame of the plow should resemble a bridge girder to thoroughly support the casing or hood. This idea has been justified, as the plows operate with practically no vibration. It was decided to build the plows, incorporating these ideas. The finished plows are shown in Fig. 3, and are the largest and most powerful that have ever been built.

The wheel was made of cast steel. As no facilities were available for machining or annealing a casting of the required size, a built-up construction was used. The center casting was made in octagon form 80 in. across the flats. Eight segments were bolted across the faces of the center casting. These segments follow the curved form of a scoop wheel and have at the outer edges 6-in. diameter bosses for 2½-in. hinge pins. The segments are bolted to the center casting with 2¼-in. bolts. The adjacent segments are bolted together through flanges at their rear edges. A band 1¼ in. thick by 10 in. wide is bolted around the segments, which helps hold them in place. The band is increased in thickness to compensate for the hinge pin and bolt holes, and is made in section with L-shaped lugs on each end which fit into grooves in the segments. The blades are ⅝ in. thick at the cutting edge.

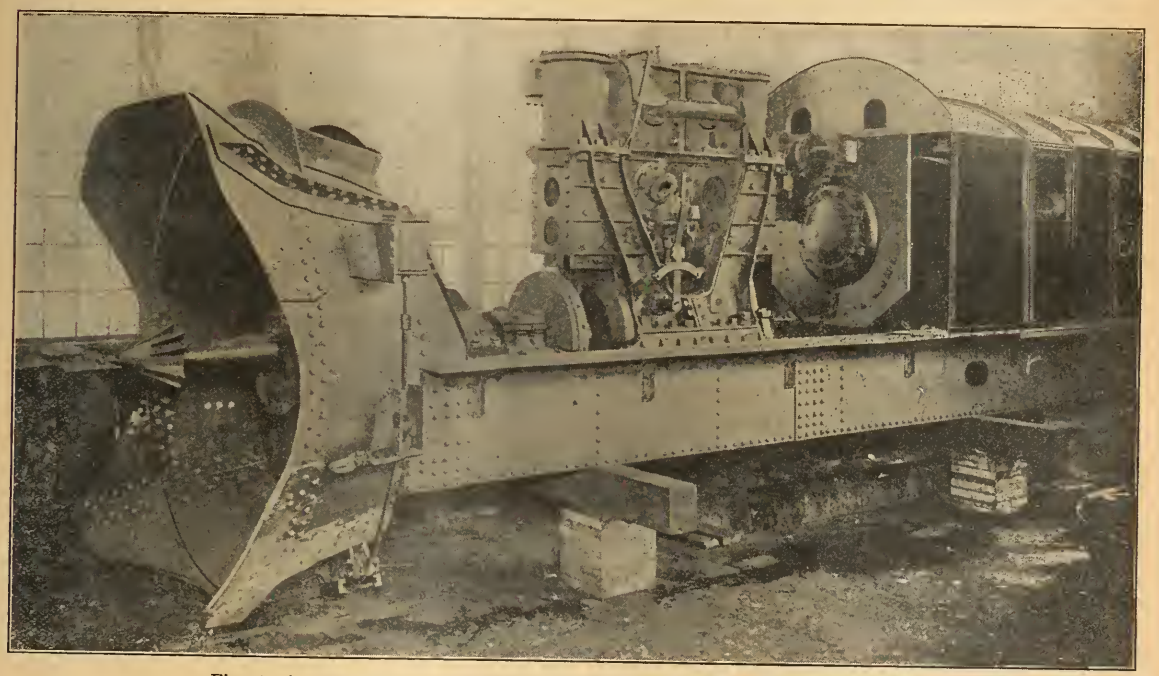


Fig. 5—Arrangement of Engine and Wheel—Canadian Pacific Heavy Rotary Plow

Fig. 4 shows the completed wheel, without the nose piece, being balanced. As shown in this view, the wheel weighed 24,000 lb. and as it was designed to run at 400 r. p. m., it was necessary to balance it accurately.

Fig. 5 shows the arrangement of the engine and plow. The casing is made of ¾-in. plate and tapered to eliminate any flat surfaces on which snow or ice might accumulate. The bottom of the casing is reinforced by an additional ¾-in. plate. The back of the casing consists of steel castings with flanges for attachment to supporting gusset plates. This view also shows the boiler and engines in place, as well as the taper wheel fit on the front end of the main shaft. The main shaft is 11⅛ in. in diameter and 12 ft. 2 in. long. The front bearing is 11⅛ in. in diameter by 28 in. long. Behind the front bearing is a marine type thrust bearing with 10 collars. There is a rear bearing 10 in. in diameter by 16½ in. long. The thrust bearing, which is peculiar to this plow, is intended to take up the thrust ordinarily

received by the back wall of the wheel casing. It has proved of decided benefit in service.

The engines are of the marine type and have cylinders 20 in. in diameter and 24-in. stroke. The supporting columns are cast steel. The crank pin of the engine was connected to a crank disc on the rear of the wheel shaft by means of a drag link coupling. This was used in case there should be any variation in alignment of the wheel shaft and engine crank shaft and to prevent any bending strains from being transmitted from one to the other.

The frames are box girders 36 in. deep at the front end. The outside plate of the girder is ⅜ in. thick and the inner ½ in. thick. The top and bottom members are 13-in. ship channels.

The boiler applied to these plows is similar to those of the Canadian Pacific class M-4 consolidation type locomotives. It has 2,108 sq. ft. of heating surface and 44 sq. ft. of grate surface, and is of greater capacity than any boilers that have been used for snow plow service.

The trucks are of the six-wheel type specially designed for the purpose, and have cast-steel frames. The axles have 7-in. by 12-in. journals, and the steel-tired wheels are 34 in. in diameter.

In working order, these plows weigh 260,000 lb. The weight is practically equal on the two trucks. The tender has a water capacity of 7,000 Imperial gallons and holds 16 tons of coal. It was made 32 ft. long over end frames, as, on account of bridge limitations, it was necessary to separate the weight of the plow from the weight of the pushing locomotives. The tender trucks are of the four-wheel, equalizer pedestal type, using standard engine-truck wheels and axles.

The performance of these plows has warranted their construction. An officer who has used them states that the knives are quite sufficient for dealing with small trees. They have cut trees 4 in. in diameter. He also states that the slight angle at which the cutting knives are placed makes the plow somewhat slower in its progress through a slide, but the knives do not break when they strike obstructions such as rocks and trees.

Flangers

In order to properly clean up the track and to clear out the space between the rails for a depth of from two to four inches, flangers are generally used. Flangers are applied either to the front of the locomotive, temporarily to box cars or flat cars, or permanently to snow plows or flanger cars. One of the early flangers used on locomotives was known as the Temple and Miller type. It consisted of a knife-like blade, one end of which was pivoted to the nose of the locomotive pilot. It was lowered and raised by means of lever connections from the locomotive cab, and when down in working position was practically parallel to the side of the pilot. The blade was made in two pieces. The lower one, which could readily be removed or replaced, formed the cutting plate or shoe, and was attached to the upper one by means of springs.

An improved type was known as the Priest flanger. Its general arrangement is similar to that of the Ray type, except that it was raised and lowered through a system of levers similar to those of the Temple and Miller flangers, the motive power being supplied by an air cylinder bolted beneath the running board of the locomotive. The manufacturers of the Priest flanger developed the Ray flanger. The air cylinders for raising and lowering the flangers are bolted to the cross tie which connects the front end of special truck equalizers. The flanger is held in raised position by a strong spring in each cylinder. The air is used only to keep the flanger down in operating position.

Ice Cutters and Sweepers

The formation of ice around and over tracks in yards is a cause of great delay. Removal by hand is slow and retards switching operations. To remove such ice quickly, the Canadian Pacific has developed and is using a type of ice cutter which is applied to the plow of a Jordan spreader car. The cutter consists of 29 two-inch square cutting tools of hardened steel, ground to a point at the bottom end. These knives are carried in a flanged channel which is fastened to the plow at the front of the spreader. This method of attachment permits the entire cutter to be raised and lowered by the existing spreader mechanism.

For removing ordinary light snows in yards, a few roads have used the well-known street railway type of sweeper. The revolving brooms at each end of the sweeper are operated by means of a single-cylinder reversible steam engine located in the body of the car. This engine takes steam from the locomotive pushing the sweeper. The writer has been advised that these cars are very efficient in removing light snow, and particularly in cleaning up terminals and terminal yards.

Operation of Equipment

Operation of equipment usually starts with the beginning of a storm. In clearing snow under ordinary conditions, pilot, push and wing plows are generally run at a good speed in order that the snow may be thrown well clear of the track. If the speed is slow the plow may catch or stall half way through the cut or drift, with the result that it may be stuck or buried and have to be shoveled out.

Particular care should be used on approaching a cut, particularly one with a side drift at the entrance, as with a double-track plow sufficient side pressure may develop to cause derailment. Such an approach is generally squared off before pushing the plow into it. If the snow is too deep for the plow to handle, it is leveled off by shoveling until reduced to a reasonable depth.

Rotary snow plows are handled in an entirely different manner from the push and wing plows. Instead of depending upon speed to get through the drifts, the rotary plow approaches the drift slowly and the cutting wheel is fed into the drift instead of bucking it. A snow bank or slide is generally approached at a speed of about three or four miles an hour with the rotary wheel revolving about 150 r. p. m. When coming close to the obstruction the speed of the wheel is increased, and the pusher engines keep moving just fast enough to keep the plow up against the drift. If the pusher engine crowds the rotary too much the pilot signals the engineer of the rotary to increase the speed of the wheel. In case the pusher engine still crowds the rotary, the pilot should apply the air brakes to check the pusher. If the pusher cannot be checked with the brakes, the pilot should signal the engineer of the pusher to shut off. He should respond quickly to prevent stalling the rotary. In case the rotary is stalled the flangers are raised and the plow drawn back four or five feet from the cut. When again ready, the wheel is started and pushed into the cut. The rotary plow should never be pushed into the bank from a distance of more than four or five feet, as failure of the rotary will result.

Discussion

Mr. Fuller: *I move you we accept the paper and extend a vote of thanks to Mr. Winterrowd for giving us this very interesting and complete history of snow fighting.*

This motion was adopted.

Adjourned.

Vauclain Trades Locomotives for Oil

WALL STREET TO-DAY (June 7) heard an interesting story which illustrates the ingenuity of some captains of industry in handling the puzzling exchange situation, according to the New York *World*. Recently Samuel Vauclain, president of the Baldwin Locomotive Works, came back from Europe with orders sufficient to keep the big Philadelphia plant busy for five years. Bankers wondered how he was to finance the orders.

"I have already arranged it," said Mr. Vauclain. "People used to trade before there was any such thing as money and foreign exchange."

He then explained that he had arranged the tentative payment by barter. Roumania needs $100,000,000 worth of locomotives, but she has little money and little credit. She did have, however, some of the richest oil fields in the world. Mr. Vauclain traded his locomotives for oil and oil options. He then went to the British Government and sold the oil at a handsome profit, payable in United States currency.

Registration Figures

CHAIRMAN GAYETTY, of the enrollment committee, announces that the comparative figures for Book No. 2 of the Official List of Enrollment is as follows:

	1919	1920
Members, Section III, Mechanical	458	490
Special guests	471	190
Railroad Ladies	550	344
Supply Ladies	350	490
Supply Men	1,825	1,955
Purchases and Stores	....	24
Total	3,654	3,493

These figures are not strictly comparable for the two years because the Car Builders met first last year.

Foreign Guests at the Convention

THE convention this year is to be particularly honored by several diplomatic representatives from foreign countries. Amongst those expected are:

Sir Auckland Geddes, British Ambassador to the United States.
Baron de Cartier de Marchienne, Belgian Ambassador.
Hipolit Gliwic, Commercial Counselor of the Legation of Poland.
Senor Manuell Y. de Négri, Commercial Attache, Mexican Legation.
V. P. Anaieff, Acting Commercial Attache to the Russian Embassy.
Capt. Carpenter, Assistant Commercial Attache to the Russian Embassy.
A. H. Saastamoinen, Finnish Legation.
Jarl Serlachius, Diplomatic Engineer, Finland.

Other foreign visitors are:

M. Santini, representative of the Paris, Lyons & Mediterranean,
Mr. Yamaguchi, Imperial Japanese Government Railway.
Walter L. Long, Assistant General Manager, United Fruit Company.
A. I. Lipetz, Chief Russian Railway Mission.

Significance of Senator Cummins' Victory

THE NEWSPAPER DISPATCHES carry the news that Senator Cummins has been renominated by the Republicans of Iowa over his opponent, S. W. Brookhart, by a large majority. This result has much significance from a railroad point of view. Mr. Cummins was one of the principal authors of the new Transportation Act. Brookhart is an advocate of government ownership, and based his campaign against Cummins chiefly on the ground that the senator had favored the return of the railroads to private operation under a fair law and had advocated the prohibition of railroad strikes and compulsory arbitration of labor disputes. The result is an endorsement by the Republicans of Iowa of the policy favored by Senator Cummins.

Yesterday's Entertainment

PRE-EMINENTLY the social event of the week was the grand ball on the Million Dollar Pier last night. All previous records for brilliancy and attendance were shattered to the seven winds. By 9 o'clock the 2,500 special dancing programs had been given out to members and their guests, and at 10 o'clock the Entertainment Committee estimated the attendance in excess of 3,500.

At 9.30 o'clock the enlarged orchestra began the grand march. It was perfectly carried out. It is doubted if the pier ballroom ever presented a prettier sight than when the 64 people abreast, one line closely following the other, in perfect alinement, slowly approached the pier entrance and came to a halt for the flashlight photograph. The exhibit booths on all sides of the ballroom and the galleries were crowded with ladies and gentlemen who had not taken part in the grand march.

The sub-committee in charge of the entertainment was as follows: R. J. Himmelright, chairman; Floyd Coffin, Oscar C. Hayward, William Melcher, S. W. Sargent, L. B. Sherman, Gardner Taylor, R. P. Townsend, W. M. Wilson and W. B. Wise.

A. R. A. Committee Meetings

J. E. FAIRBANKS, general secretary of the American Railroad Association, announces that the following meetings of committees and sections of this association will be held in Atlantic City within the next few days.

Meetings of the Committees of the Telegraph & Telephone Division, Section I—Operating, have been called to convene at The Breakers as follows:

Friday, June 11, 1920—10.00 A. M. Special Committee on Future Activities.
Saturday, June 12, 1920—10.00 A. M. Sub-Committee "A"—Maintenance and Construction of Pole Lines. Committee No. 6—Message Traffic
2.00 P. M. Committee No. 1—Construction and Maintenance—Outside Plant.
Monday, June 14, 1920— 9.30 A. M. Committee of Direction.
Tuesday, June 15, 1920—10.00 A. M. Committee No. 7—Inductive Interference.

The General Committee of Section VI—Purchases and Stores, will hold a session at the Marlborough-Blenheim on Sunday, June 13, 1920, at 11.00 A. M.

Section VII, Freight Claims, will hold a three-day session at the Chalfonte commencing Thursday, June 17, 1920.

The General Committee of that Section will hold a meeting at the Chalfonte on Wednesday, June 16, 1920.

The Committee on Operating Rules, Section I—Operating, will convene at the Chalfonte at 10.000 A. M., on Wednesday, June 16, 1920.

Senator Lodge "Roasts" Government Ownership

SENATOR LODGE, of Massachusetts, in his "keynote" speech as temporary Chairman of the Republican National Convention, paid his respects to government ownership and to the recent government operation of railroads in the following terms:

"The phrase 'government ownership' means not only that the government shall own the railroads, but also it is to be feared that those who run the railroads shall own the government.

"General government ownership under our political system would inevitably bring about the mastery of the government by those who operate the machinery of transportation or of any other industries which come into government possession. The rights of the general public, for whom all industries exist, would disappear under this scheme and nothing would be left to the people except the duty of paying taxes to support the roads. That is a very perilous position for a representative democracy.

"Our government must not be dominated by any one

man or any class or any selected body of men who represent a part of the people and not the whole people.

"During the time in which the government undertook to manage the railroads they sustained, despite a general increase in freight rate, a loss of over a million dollars a day and the total payments out of the treasury to support the railroads have reached the enormous sum of one and three-quarters billions of dollars. There was universal dissatisfaction with the government management and it was a just dissatisfaction. The experiment failed and should not be renewed."

Movies at the Convention

THE MOVIES HAVE MADE their appearance on many parts of the pier this year and have shown so many possibilities for enlarging the scope of the exhibits, particularly where the exhibitors' product cannot be demonstrated in action that next year is likely to witness a considerable extension of their use; in fact, it is not beyond the range of possibilities to picture the day when the pier will afford a range of movie attractions during convention days that will rival Broadway.

A great deal can be said in favor of the use of moving picture films in connection with the exhibits, and the exhibitors who have rigged up a screen deserve great credit for their ingenuity. The movies are not only extremely interesting and instructive, but afford the inquisitive visitor who has been on his feet all day a few moments' relaxation in which he can lounge back in a comfortable chair and see how they build locomotives down at Eddystone or where the Creco products are manufactured. But if he wants to see how they raise heavily loaded cars with Duff jacks he will have to stand on his tip-toes and peer over somebody's shoulder, as this feature film has been playing to capacity houses ever since the convention opened.

The Association of Manufacturers of Chilled Car Wheels have an excellent movie at booth 402, showing the various processes involved in manufacturing the chilled iron car wheel, including the molding, pouring, pitting and drop testing of the wheel. In addition to this, there are a series of pictures showing the measurement of temperature stresses to which the wheels are subjected, indicated by test gages. These pictures were secured through the courtesy of the officials of the Pennsylvania Railroad.

The Cleveland Pneumatic Tool Company has a miniature picture house in the back portion of booth 327, where you can experience all the thrills of attending a small town movie, save perhaps a chat with the pale blonde at the ticket window. This company is able to show more distinct pictures than is the case where the pictures are exposed to the daylight, and this is a feature that it might be well to bear in mind in preparing exhibits of this character next year, as unfortunately some of the pictures shown without any protection from the daylight are badly dimmed. The pictures shown by the Cleveland Pneumatic Tool Company include 4,000 ft. of film, illustrating all the details relating to the manufacture of modern pneumatic tools.

The Baldwin reel is making a record-breaking run in the balcony at booth 723. These pictures show general views of the Philadelphia and Eddystone plants of the company, also interior shop views showing such processes as the casting and machining of cylinders, the manufacture of forgings, and the finishing of frames, rods, crossheads and other parts. The construction of a locomotive boiler is illustrated from start to finish and there is also a series of pictures illustrating the erection of a locomotive and the running of a trial trip on the test track. Pictures of the gun mounts built for the United States navy are also shown.

The Chicago Railway Equipment Company's film is being shown on a small screen in booth 640, and gives a complete story of the manufacture of a brake beam from the acquisition of the raw material to the tested beam ready for application. All of the Creco plants are illustrated and impress one with this company's capacity for service, particularly on account of their control of the raw material.

The Scullin Steel Company, however, has a "reel" novelty in the form of an automatic motion picture machine that depicts the assembling and dismantling of this company's new universal and special types of pedestal truck side frames. This motion picture machine solves the usual difficulty that has been experienced in the use of action pictures for commercial or advertising purposes. All rewinding of the film is eliminated in this machine, which was designed under the personal supervision of the president of the Scullin Company, Harry Scullin, and will shortly be placed on the market for lease by the De Vilbliss Endless Film Machine Company, of St. Louis, a subsidiary of the Scullin Steel Company.

Last, but not least, the Purchases and Stores Section has promised to present a moving picture exhibition of a supply train in operation. This is to be featured in connection with the report of the Committee on Supply Train Operation, and will be presented in the Hippodrome on the pier, next Tuesday afternoon at three o'clock. As many storekeepers claim that the supply train is the *only* method for distributing materials out on the line of road, even up to ties and rail, the picture ought to prove interesting and mechanical officials are cordially invited to witness the performance in company with the Stores Section. It is understood that this picture comes from the Southern Pacific Railroad, and presumably was filmed in California. It is stated that the star's name is McKelligan, but probably it's just J. Warren Kerrigan. Helen Holmes, who used to do all the sensational stunts on moving trains, must be the heroine.

Registration, American Railroad Association, Sec. III, Mechanical

Anderson, H. A., A. P. A., Penn., Marlborough.
Balda, Frank E., Supt., Readville, N. Y., N. H. & H., Traymore.
Baldinger, F. A., M. M., B. & O.
Barry, J. J., Gen. M. M., N. & W.
Berg Karl, M. E., P. & L. E., Elberon.
Bixler, H. C., Supt., Penn., Marlborough.
Brower, J. E., Asst. M. M., Penn.
Buist, C. P., M. M., Public Belt, Marlborough.
Burket, C. W., Asst. Eng. M. P., Penn.
Burkhard, A. A., G. F., N. Y. C., Arlington.
Buskirk, J. H., M. E., N. Y. C., Chalfonte.
Calkins, A. E., S. R. S., N. Y. C., Chalfonte.
Carr, T. L., Gen. Foreman, Penn.
Clancy, T. B., Gen. Mgr., Central N. Y. Southern, St. Charles.
Copeland, A. H., Gen. For., G. T., Marlborough.
Cox, M. F., Mech. Eng., L. & N.
Crabbe, W. J., M. E., Western Maryland, Princess.
Cromwell, H. T., Asst. M. M., B. & O., Strand.
Daniels, O. V., Asst. Gen. Stkr., Penn.
Davis, John J., Gen. Foreman, Penn.
Dawson, E., M. M., Ariz. & New Mexico.
Demint, S. W., Chief Intercharge Inspector, Estelle.
Deets, Henry H., Gen. Forman, P. & R., Washington.
Dice, A. T., Pres., P. & R., Chelsea.
Doke, G. E., Asst. E. of T., N. Y. C.
Doyle, J. H., M. M., C. N. Y. S.
Dunkle, S. K., S. M. P., Wheeling Con. Rys.
Edmondson, O. N., Asst. M. M., Penn., Calvert.
Emerson, Geo. H., Chf. of M. P. & E., B. & O., Ambassador.
Ennis, J. E., A. F. R. S., N. Y C., Craig Hall.
Eyerly, W. S., Asst. S. of S., B. & O.
Ewing, C. H., V. P., P. & R.
Falck, F. M., Gen. Manager, P. & R.
Faris, J. M., S. M. & E. Dept., Youngstown, Shat. & Tube Co.
Fassett, W. H., Chairman Div. Safety Com., Penn.
Gibson, J. A. B., M. E., R. F. & P., Chalfonte.
Gilland, James M., Transportation Asst., P. & R.
Graham, H. E., V. P., P. A. & McK. Rocks, Traymore.

Gray, B. H., S. M. P., G. M. & N., Princess.
Grecnwood, H. F., S. S., N. & W., Marlborough.
Hall, James, M. C. R., S. P., Chalfonte.
Hammond, F. S., Gen. Supt., Pitts., Shawmut & Nor., Princess.
Hammond, R., M. M., N. Y. N. H. & H., Elberon.
Hazzard, W. L., Supt. Material Routing, N. Y. C.
Heinbach, Wilfred, Gen. Foreman, P. & R., Gage.
Hill, J. P., Dir. Stkr., Penn.
Hitchcock, W. D., M. M., Santa Fe, Ambassador.
Hoch, G. B., Gen. Foreman, Penn., Shelburne.
Huber, H. G., Asst. Engr. M. P., Penn., Chalfonte.
Hudson, T. C., Gen. M. M., Can. Nat. Rys., Marlborough.
Hyland, W. V., Gen. Mgr., Ligonier Valley, Marlborough.
Irvin, I. B., M. M., P. S. & N.
Jones, H. W., M. M., Penn., Elberon.
Jones, L. B., M. M., Penn., Dennis.
Jones, W. F., G. S. K., N. Y. C., Chalfonte.
Kelly, G. W., Gen. For., C. of N. J., Sterling.
Kelly, W. M., Gen. For., Penn.
Kerlily, J. J., M. M., B. & O.
Kneass, Strickland L., Wm. Sellers Co.
Kuhn, W. T., S. M. P., T. H. & B., 121 S. New Jersey Ave.
Lace, R. F., Gen. For. Loco. Dept., Penn., Elberon.
Leonard, L. R., Gen. A. B. & S. H. Inspr., Penn.
Lightfoot, S. S., Equip. Eng., A. T. & S. F., Esplanade.
Lipetz, A. I., Ch. Russian Mission of Ways & Communications, Marlborough.
Lower, M. J., A. G. M., Oswasco River.
McClennan, W. J., Asst. Eng. of Equip. Claims, N. Y. C., Ambassador.
McMaster, H. M., V. P. & G. M., W. & L. E.
Markland, W. H., Gen. Shop Insp., Penn.
Marsh, F. E., M. M., N. Y P. & N., Traymore.
Martin, H. W., Supt., Kinzua & Riterville.
Morris, J. M., M. M., Penn.
Morris, J. S., Asst. Engr. M. P. Dept., N. Y. C. & St. L.
Newreither, W. H., Gen. Fore., B. & O., Pleasantville.
Milner, B. R., Eng. M. P. & R. S., N. Y. C., Haddon Hall.
Miscampbell, J., M. M., Ft. Smith & Western, Ambassador.
Muelheim, L. C., Head. Light Sup., B. & O., Haddon Hall.
Nanney, T. H., M. M., Buffalo & Susquehanna, 935 Boardwalk.
Needham, H. S., Asst. M. M., Penn., Elberon.
O'Meara, William I., Road For. Elec. Loco., New Haven, Glaslyn-Chatham.
Owens, W. H., M. E., Southern, Osborne.
Pidcock, C. W., Pres., Ga. & Nor., Chalfonte.
Ralston, A. L., Mech. Supt., N. Y. N. H. & H., Glaslyn-Chatham.
Rauschart, E. A., M. M., Montour, Princess.
Reese, O. P., Penn., Marlborough.
Rice, W. L., Supt., L. & C. S. P. & R.
Riley, S. B., M. M., Penn., Chalfonte.
Robbins, F. S., M. M., Penn.
Sample, W. H., G. S., M. P. & C. D., Grand Trunk, Marlborough.
Sasser, J. W., S. M. P., N. S., Ambassador.
Scudder, C. J., Supt. of Shops, D. & L. & W., Traymore.
Shafer, S. W., Ch. Cl. to P. A., C. R. of N. J.
Sheahan, J. F., S. M. P., A. B. & A., Chalfonte.
Shelby, C. K., M. M., Penn., Chelsea.
Smith, E. W., Engr. of Transp., Penn., Chalfonte.
Smith, P. W. J., Gen. Supt., N. Y. Westchest. & Boston, Glaslyn-Chatham.
Smith, W. T., Craig Hall.
Snell, E. J., M. M., N. Y. C.
Snyder, F. M., Gen. For., Penn.
Sprowl, N. E., S. M. P., Atlantic Coast Line, Chalfonte.
Stewart, A. F., Traymore.
Stohlberger, P., M. M. M. P. & R. E. Dept., P. & R.
Summerfield, D. W., P. A., P. & W. Va.
Tate, M. K., Manager Service, Lima Loco. Works, Traymore.
Thayer, R. E., European Editor, Railway Age, Dennis.
Thomson, H. R., M. M., N. & S. S., De Ville.
Turner, Ames, M. M., Lehigh Valley.
Van Brunt, Geo. E., M. M., Penn., Schlitz.
Wagstaff, Geo., American Arch Co., Chalfonte.
Wallis, J. P., C. M. P., Penn.
Watkins, Thomas, Gen. Foreman, P. & R.
Way, E. S., S. E., Gen. Amer. Tank Car Corp., Haddon Hall.
Williams, A. D., M. M., Kansas City Southern, Estelle.
Williams, M. E., M. M., P. & R.
Wilson, D. H., Shop Supt., Florida East Coast, Sterling.
Wilson, J. O., Mgr. Mech. Dept., The Texas Co, Traymore.
Wray, R. W., M. M., Penn.
Young, Jas., Jr., Asst. Eng. M. Dept., West Jersey & seashore.

Special Guests

Alcorn, A. E., P. A., W. J. & S. S.
Allen, Wm. H., Supt. of M. P., Penn.
Andrew, A. G., Sup. M. of N., Penn.
Baldinger, Robert, B. & O.
Baldinger, Stephen, B. & O.
Barron, C. M., Mech. Eng., New S. Wales Gov. Railways, St. Charles.
Betts, E., Asst. Eng., So. Pac., Traymore.
Buckley, Thomas F., Asst. For., P. & R.
Carroll, J. S., M. Equip. Clerk, Penn.
Cathcart, Harold W., Fire Insp., A. C.
Clarkson, A. J., Sr. Draft. Eng. Dept., N. Y. C.
Conen, J. J., Supvr. Shop Practice, B. & O., Netherlands.
Coulter, A. S., Commissary Agent, W. J. & S. S.
Crabbe, W. Joseph, W. M., Princess.
Daniels, Geo., Penn.
Darlow, E. R., Pres., Buff. & Sus.
Darlow, G. M., Rate Clerk, Buffalo & Sus.
Dietrick, J. C., For. Car Shops, Penn., Elwood.
Downs, J. H., Ret. Asst. Rd Fore. Eng., Penn.
Draney, J. J., Engineman, D. L. & W.
Eddy, J. C., Traffic Engineer, New Jersey Public Utility Com., Pennhurst.
Ehrich, Thomas J., Reporter, Canfield.
Eleade, W. E., Jr., Secy., N. E. R. R. Club, Arlington.
Filippelli, F. P., Transitman M. of W., Penn.
Fisher, C. A., Ch. Train Disp., P. & R., Dennis.
Fisher, V. B., Supt., P. & R., Princess.
Gall, H. S., A. B. I., Penn.
Gallagher, John E., For. of Eng., C. R. R. of N. J., Princess.
Gardner, Henry, Jr., B. & O., Chalfonte.

Conventionalities

G. W. Denyvan of the entertainment committee, who has always stopped at the Dennis Hotel, was not able to obtain his usual rooms because of the noise made by the bagpipes he used at the convention last year.

Frank T. Hyndman, now with the American Automatic Company, motored down from Buffalo with his wife and his daughter-in-law, Mrs. R. M. Werner, and with his two grandchildren, Mary and Frank Werner.

C. H. Aiken, special representative of the Falls Hollow Staybolt Company, has called all sales agents of that company to Atlantic City to attend the convention and also hold a special sales convention of their own organization.

L. S. Carroll, formerly purchasing agent of the Chicago & North Western, will come to the convention this year in a new capacity, he having recently been appointed general purchasing agent of the American Locomotive Company.

Among the mechanical officers who have gone into the operating department during the past year is E. W. Smith, formerly superintendent motive power, now engineer of transportation of the Pennsylvania system. Mr. Smith has not lost interest in mechanical matters, however, and is attending the convention as usual.

Vice-President J. A. MacLean, of the Boss Nut Company, enjoyed a pleasant trip to Atlantic City. In company with Fred W. Moore, of the Boss Lock Nut Company, Ltd., Mr. MacLean motored from Montreal to the convention city. The trip took two and a half days, over good roads and with pleasant weather.

B. J. Meyer, former special representative of the department of justice in Chicago, and for the past four years connected with the Great Western Smelting and Refining Company, has been appointed assistant to the president of his company, in charge of railroad sales. Mr. Meyer is stopping at the Marlborough-Blenheim.

Mr. and Mrs. J. W. Motherwell are accompanied to the conventions this year by their daughter, Miss Ruth, who has just graduated from Northwestern University at Evanston, Ill. Miss Ruth, in order to attend the conventions, had to forego the privilege of attending the graduating exercises at the university, and she paid the conventions the compliment of preferring to come here.

W. O. Thompson, general superintendent of rolling stock of the New York Central, like many other railway officials, did extra duty during the recent strikes. He served for a week as a yardmaster at Buffalo; and those familiar with his performance record agree that both his methods of handling the job and his vocabulary proved entirely equal to the demands.

Two representatives of the Chicago, Milwaukee & St. Paul are receiving congratulations on recent promotions. C. G. Juneau, general supervisor of the freight car department, has been appointed acting master car builder to succeed L. K. Sillcox; and J. A. Deppe, assistant to the master car builder, has been made general supervisor of the freight car department.

M. E. Towner, purchasing agent of the Western Maryland, was one of the first members of the Purchasing and Stores Section to arrive at the convention. Mr. Towner expects to move into the Western Maryland's new office building in Baltimore at an early date. He is specially interested in several of the reports of Section III, Mechanical, and particularly the one on shop scheduling systems which was presented yesterday.

Norman C. Naylor, of the Railway Steel Spring Company, is one of the leaders among the Chicago men who not only play golf well, but are putting and keeping the golf clubs in the Chicago district on a sound basis from the standpoint of good management as well as good sport. He is president of the Westmoreland Country Club and also vice president of the Chicago District Golf Association.

J. Horrigan, superintendent motive power of the Elgin, Joliet & Eastern, is one of the early arrivals at Atlantic City. Mr. Horrigan's shop has made an enviable record in safe-ending boiler tubes, and Joliet is becoming a Mecca for men who are seeking information on the best methods of doing this work. The Elgin, Joliet & Eastern car shops have recently started building six hundred 70-ton hopper cars.

George E. Long, of the Joseph Dixon Crucible Company, is one of the old guard who will not be here this year. Mr. Long has always declared that when he reached 70 years of age he would step out of business and enjoy the remaining years. He has been connected with the Joseph Dixon Crucible Company for 43 consecutive years, retiring from the position of vice-president only recently.

In the interest of sanity and economy we would refer our many friends with budding ambitions toward aviation to visit the Barco booth. Perch yourself on their engine connection and holler for the juice to be turned on and you're due for all the fancy wiggles and bends in the deck. It won't cost you anything and you may learn a few fancy movements that will make a hit on the dance floor.

Mrs. Henry G. Ashton, widow of the late Henry G. Ashton, founder and president of the Ashton Valve Company, is again in attendance at the conventions. Her first convention visit was at Cleveland, Ohio, where the associations met in 1877. She has since been a regular attendant, with one or two exceptions, ever since. Mrs. Ashton is at the Marlborough-Blenheim with her son and daughter, Mr. and Mrs. A. C. Ashton.

President E. B. Leigh, of the Chicago Railway Equipment Company, is expected to arrive at the Traymore Sunday morning. Vice President C. Haines Williams is expected Monday. E. E. Greist's delay in arriving is due to the fire at the Franklin plant of the company. Mr. Griest, however, is expected Sunday and will stay through the remainder of the convention.

John Draney, engineer of the Lackawanna's crack train No. 6, the Lackawanna Limited, is celebrating his thirty-fifth wedding anniversary at the convention with his wife and youngest daughter, Helen. They expect to remain over until Saturday or Sunday. Mr. Draney wears a watch charm which was presented to him in recognition of breaking all records in the run from New York to Buffalo. He carried Dr. Janeway on a special train when President McKinley was assassinated, making the run of 410 miles in 6 hours and 55 minutes.

Mrs. V. R. Hawthorne had a thrilling experience in Chicago shortly before she started for the convention. She had been on a shopping expedition and among other things had purchased a lace curtain and an oak curtain pole. Near Sixty-third street she was held up by a man who demanded her pocketbook. She told him that it was in her waist and if he would hold the bundle containing the lace curtain she would get it for him. He took the bundle and she quickly hit him over the head with the curtain pole, knocking him unconscious and relieving him of two or three of his front teeth. By that time assistance had arrived and the robber was taken to the police station.

George C. Isbester is attending the conventions this year after an absence from them of 13 years. He last attended them when he was with the Railway Appliances Company. He comes this year as district sales manager of the American Chain Company at Chicago. Mr. Isbester left the railway supply mechanical field in 1912, when he went with the Rail Joint Company as its district manager in Chicago. On the very day in April, 1917, when the United States entered the war with Germany, he left civilian life and became a commander in the supply corps of the United States navy. He was first located in this capacity at Chicago, and in the early part of 1918 was transferred to London, where he served on the staff of Admiral Sims. He returned to the United States in April, 1919, and immediately after returned to civilian life. Soon after he became district sales manager of the American Chain Company. Mr. Isbester for years has been active in the work of the National Railway Appliances Association, which gives the exhibit of railway appliances in connection with the annual conventon of the American Railway Engineering Association in Chicago in March of each year. He is now vice-president of the Railway Appliances Association and is carefully looking over the exhibit here for any pointers that he may be able to get for use in connection with the exhibit in Chicago.

Mr. and Mrs. John P. Landreth gave a theatre party at the Apollo Theatre on Wednesday evening, which had more sentiment in it than the ordinary theatre party. The performance was that of the musical comedy, "Maid To Love," which is being given its initial performances in Atlantic City, and the author of the music of which is Percy Wenrich. Over 20 years ago Mr. Landreth and Mr. Wenrich were schoolmates and playmates at Joplin, Mo., and they have continued to be intimate friends ever since. Mr. Wenrich is the author of much music which has become famous, including that of the songs "Put on Your Old Gray Bonnet," "Where Do We Go From Here," and "When You Wore a Tulip and I Wore a Big Rose." One of the members of the party was J. Will Johnson, who is an old Missouri friend of Mr. Wenrich's mother. Other members of the party were C. C. Higgins, J. D. Rodger, J. S. Henry, C. R. Naylor, John Purcell, C. T. Ripley, J. E. McQuillen, J. H. McGoff, Mr. and Mrs. Claude Baker, H. T. Bentley, Miss Louise Bentley, Mr. and Mrs. E. S. Richardson, George H. Green, T. A. Foque, H. C. Manchester, R. C. Schaal, H. W. Schaefer, Charles R. Long, Jr., H. Clark Moore, C. F. Owens, F. A. DeWolf, Ralph Coburn, Mrs. A. A. Cannady, Mr. and Mrs. J. C. Weedon, Mr. and Mrs. H. B. Walls, F. W. Thomas, Major W. L. Allison, and Mary Virginia Landreth. All the members of the party agree that in writing the music of "Maid To Love," Mr. Wenrich has lived up to the high reputation established by his past productions, and that the show is sure to be successful and have a long run.

European Railway Observations

By Robert E. Thayer

European Editor, Railway Age

Oil Locomotives in France

The coal situation in France has become so acute that the railways are seeking to alleviate the situation by the use of fuel oil for locomotives. The Paris, Lyons & Mediterranean is making experiments with ten of its locomotives, and if they prove successful 200 or 300 others will be converted. An oil tank containing 320 gallons is placed on one side of the locomotive, no other changes being made in the engine with the exception of the necessary brickwork in the firebox.

Foreign Railway Visitors

One very good means of furthering the foreign business of the United States, particularly as regards railway equipment and material, is to give the foreign railway men visiting this country every facility to study and investigate our railway plant and our railway methods. The conditions on the railways of foreign countries, particularly the railways in Europe, have undergone a very decided change and have approached, to some extent, the conditions which have for many years existed in the United States. The cost of railway labor and the cost of materials have increased to an greater extent in Europe than in the United States and the European railways are faced with a new problem. They must operate more efficiently and devise every possible means of cutting down labor costs. In the latter feature particularly they can well look to the railways of the United States for suggestions and that they are, is apparent from the way in which they are beginning to interest themselves in American railway practice.

A Railway "Personnel" Bureau

Sir Henry W. Thornton, K. B. E., general manager of the Great Eastern Railway, England, and formerly of the Long Island, offered a very good suggestion for increasing the esprit-de-corps amongst the railwaymen, in a recent address before the Institute of Transport (England). He said that he thought we had now arrived at a time when, quite apart from the functions of each officer and department, it would be advantageous to establish on each large railway an organized "personnel" bureau, administered by an officer of first rank, with the poper temperament, who should make it his business to deal with all matters affecting the welfare and working conditions of the staff, to seek out their grievances and complaints and bring them immediately to the attention of the proper officer for adjustment. Through accessibility, through the sympathetic hearing and the just determination of controversies, the confidence of the staff could be gained.

Foreign Railway Shops Need Improved Devices

Many of the managers of the railway shops in Europe are very frank to admit that there is great need for improved shop machinery and more up-to-date methods in their shops now that labor costs have risen to such a great extent. For many years they have been blessed with cheap labor and have not been forced to the use of labor saving devices as have the railway shops in America.

A specific instance found in one railway shop will serve as an excellent illustration. All boiler tubes are swaged by hand in that shop. A small cup-shaped die is placed on a heavy iron plate in the floor and the tube, held in a vertical position by the workman, is jammed into this die sufficiently hard to grip it. Then the tube and the die is raised and thrown by brute force onto the plate in the floor until the tube has been properly swaged. Needless to say, this takes considerable time as the workman is continually reaching down to refit the die onto the tube. Although this is a small item and is an extreme case of inefficiency, it gives somewhat of an idea of how little labor costs have been considered in railway practice abroad.

Railway Labor in France

While the railway men of France are being used by the extremist labor leaders as a medium through which they can inflict their bolshevist demonstrations on the people of France, the railway employees have as a class been amply taken care of in the way of increased compensation. Railway labor in France has not suffered from the lack of increases in wages. Before the war the wage bill did not reach 800,000,000 francs ($160,000,000) on the six principal railway systems. To-day it is 3,500,000,000 francs ($700,000,000), or an increase of some 350 per cent. This increase is accounted for to a certain extent by the fact that the number of employees has increased by some 50 per cent, but at the same time increases to the men themselves vary between 200 and 350 per cent of the pre-war wage. All sorts of concessions are given the French railwayman in addition to a general increase in wages. He receives a residential compensation of a varying amount, depending upon the location in which he lives. In Paris this amounts to 1,200 francs ($240) a year. He also receives 720 francs ($144) a year as a bonus to meet the high cost of living. In addition a married man receives 330 francs ($66) for each of his first two children and 480 francs ($96) for each other child. Even with the increase in freight and passenger rates recently granted it is estimated that in view of this great increase in wages the expenses of the railways will not be met by earnings by at least 500,000,000 francs ($100,000,000).

English Enginemen Receive Increases

Wireless to the Daily Railway Age.

The Railway Wages Board of Great Britain has awarded an increase of seven shillings ($1.75) a week to locomotive engineers, four shillings ($1.00) to firemen of 10 years' service and under, seven shillings ($1.75) to firemen of over 10 years' service and two shillings ($.50) to cleaners. This is the result of a hearing which began May 17 on the demands of the Associated Society of Locomotive Engineers and Firemen for an advance of 27 shillings ($6.75) a week for engineers, 21 shillings ($5.25) for firemen and 15 shillings ($3.75) for cleaners. During the course of the hearing it was stated that if the full demands of the union were granted it would involve an additional charge to railway expenses of $15,000,000, which under present conditions could not be met out of the present railway revenue. With this last award a locomotive engineer will receive a daily (eight hours) wage varying from 16 shillings ($4.00) to 13 shillings ($3.25) according to length of service; a fireman will receive from 10 shillings ($2.50) to 12 shillings ($3.00), and cleaners will receive from four shillings three pence ($1.06) to seven shillings three pence ($1.81). The Railway Wages Board is made up of four representatives each from the railwaymen, the railway managers and the public.

The Man Who Saw

Smile, Durn Ye, Smile!

The Man respectfully submits that the mail bag which he installed yesterday for the use of his friends went to work at once on a 6-hour day basis and time and a half for overtime. It is bursting with protests against Hum Dinger's Prune Plan—and contained the following, from old friend Kronick Kicker:

The Man Who Saw.
Care of The Mail Bag.

Sir:

The wet steam from your leaky cylinders is causing the driving wheels in your head to slip. You had better put on a superheater for dry steam and an air sander to hold you to the track; cut out the frivolity and the ancient wheezes. Give us serious dope—that's what we came here for. We can read your kind of stuff in the barber shop.

K. K.

Thanks for the ad, K. K., the Man's column is not for you and the gloom dispensing crepe hangers. It's for those who believe that—

"A little nonsense now and then
Is relished by convention men."

The Motion Increases

The Man hasn't seen the "daddy" of it, whom he mentioned last year as having several years ago pioneered the operating exhibit under a sign which read

LOOK WHAT'S COMING OFF HERE

—but the motion is here, and more of it than ever. And there's no question of the value of motion in the exhibit—they'll just naturally hang around it like flies around a molasses jug!

And the infection is spreading to pictures. If you want to see how it's made and how it goes on, sit down—we'll go out to the factory a 1000 miles from here without moving a hair and we'll make one for you. Then we'll put it on the car or the engine—as the case may be—and we won't speed up the film to fool you on the time. When we get it on, we'll go out on the line and see how it works.

"Say," said the Man to the progressive exhibitor as he finished the interesting trip out on the line, "I think I've got a cinder in my eye. Will you look at it?"

Assorted Railroads

"Tell me" said the Supply Man to the Man Who Saw South America, "what are South American railroads like? Is it true that the sparks from wheezy old wood-burners set fire to the clothes of the passengers?"

"You've asked for more than I can tell you in the few minutes at your disposal," replied the Man Who Saw, "but I'll give you an outline. You can find railroads down there to suit the tastes of most anybody—long, short, wide, medium and narrow gage; rich, poor, French, American, and lines administered by native governments. Last, but foremost in numbers and importance, British roads.

"The first English owned road you will se in your descent of the West Coast, The Central and the Southern of Peru will surprise you by its quota of American locomotives and cars. In Bolivia you will encounter British engines, British practices and British conceptions of American cars on the narrowest little railroad—and one of the most comfortable—you ever traveled on. In Chile you'll see the Chilean Government lines and if you will look far enough you will find equipment of all makes—French, English, American, German—all kinds. It's a wide open market. The Trans-Andine railroad is British and of meter gage. Its connection on your arrival in the Argentine, is British—as is nearly everything else with the important exception of a French line and the Argentine Government railways. Ascending the East Coast you will encounter English lines dominating the traffic of Uruguay and Paraguay. In Brazil you will find three large and powerful British lines and the Brazilian Government railways.

"There's rack rail, cable operated inclines, 300 foot radius curves where special journal box lids are required to take care of excessive axle thrusts, leather water spouts and dormitory cars as big as hotels on wheels, red driving wheels and enough brass on some engines to decorate the altar of a church, and the variety of characteristics of the lines is only exceeded by that of the scenery."

"Could I sell 'em anything?" eagerly enquired the Supply Man.

"Ah, that's another matter," replied his friend, "Come and see me and I'll take a day off and tell you."

The College Man Goes to Work

"I hear you're a college man," said the superintendent of machinery to the grimy apprentice who was putting a brake shoe on the right main driver of the 'yard goat.'"

"Yes, I did manage to get through a fairly good engineering school in spite of predictions to the contrary," replied the youth.

"What do you do here?" questioned the boss.

And the young aspirant related his simple but arduous duties in the night gang at the roundhouse, whose nightly grind called for less brains than elbow grease—and paid in proportion. The old man almost felt himself slipping in his ancient grudge against the "book taught" crowd of "railroaders on paper," as he called them, as he listened to the tale.

"Come around to see me when I get back next week," invited the old man.

"Thank you, sir," was the answer, "but I won't be able to come. I am quitting on Saturday to go with the Progressive Machinery Company."

The old man turned on his heel—*and thus let him get away!*

* * * *

The Man Who Saw was that youth in the pit and that old man was a shining exponent of the clan known as the "old school" of motive power officials, a species of fish that is gradually, but painfully, retiring in the glare of progressive business methods from the electric headlight of a new age.

And The Man from his seat by the Mail Bag takes pleasure in the "talk that's going round" the Pier among the live ones this year on the subject of the college man on the railroad. He earnestly hopes—as he thinks of Goode and Wickersham and Cunningham and Gregg and the others, who, inspired by the call of a Western railroad, tackled it, but surrendered in disgust—that the successors of his disappointed old pals will be given a chance to enjoy their railroad work with assurances of such recognition as they deserve.

Railway Age

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WE GUARANTEE that of this issue, 15,000 copies were printed; that of these 15,000 copies, 13,480 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 140 were mailed to advertisers, 280 were provided for counter and news companies' sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 1,100 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

The discussion of the report of the Committee on Electric Headlights again emphasized the need for an improvement in the manner of handling electrical subjects. The discussion dealt with sizes of lamps for switch engines, types of lamps, lamp voltages and back-up lamps, and expressed a need for more concrete data concerning the standardization of certain parts of all headlight equipment. It was very brief, however, and the attitude of most of those who took part in the discussion was that they did not wish to take up the time of a large number of men among whom there were relatively few who took an active interest in the design of headlight equipment. Means should be provided whereby the electrical men would have a better opportunity to give such subjects all the attention they deserve.

Discussion of Electrical Subjects

What do you expect of a feedwater heater? Twenty per cent increase in efficiency, perhaps. But wouldn't you be satisfied with even 10 per cent? Judging from the discussion following the report on feedwater heaters presented at the convention Friday morning, railroad men are satisfied with the results of feedwater heating on the Continent; Germany is not too poor to do a little experimenting with this device and apply a few hundred heaters at a time. Does any one imagine that the full benefit of a feedwater heater can be derived without an effort to adjust the device to the locomotive or the locomotive to the device? Some mechanical men would like the full grown device, but they don't want to raise the baby. The following is a statement that was made in the discussion on this subject at the convention with reference to a single application of a feedwater heater on an American railroad: "We did not think there was a great deal of advantage to it (*the feedwater heater*), although it did show about 14 per cent saving in fuel." Wouldn't there be some advantage in saving 14 per cent of the fuel burned on American railroads at the current prices for locomotive fuel?

What Do You Expect?

When one stops to think of how much more promptly European roads have adopted various economical features in locomotive design than have the railways of the United States, we begin to wonder if the reputation of America for efficiency is not exaggerated. A few years ago it was the matter of superheaters. Some of the European roads made a standard practice of superheating before the subject was hardly considered in the United States and now history is repeating itself in the case of feed water heating. There are thousands of locomotive feed water heaters in use on the railways in Europe where there is one in use on the railways of the United States. The first argument in defense of the American railway man will be that the cost of fuel has risen to a far greater extent in Europe than in the United States. This, of course, is true and is responsible at the present time for the rapidly increasing use of feed water heaters abroad, but the argument does not stand, as European roads began to apply feed water heaters on a large scale some seven or eight years ago, and in 1912, when coal prices were normal, there were over 3,000 feed water heaters in operation. Feed water heaters abroad have become as common on some railways as superheating is to-day in the United States. This method of fuel economy has great possibilities. Its efficiency has been established beyond doubt in Europe. There is no reason why it should not be in the United States.

Is America Slow in Modernizing?

There may be no question as to whether the railroads as a whole want university trained men. There is, however, a real question as to whether college men really want employment on the railroads. Almost every college man who has ever worked for a railroad has had his "experience." This has sometimes worked out very well, and it would be unfair to say that on many railroads he will not find support that will enable him to make good by dint of tact and perseverance. But it would be evading the fact to deny that there are still a very large number of railroad officials who find a sort of grim satisfaction in "smoking out" the college man. What the university graduate knows, or soon learns on most railroads, is that he must keep his identity as such "under his hat," that he must turn his diploma to the wall if he wants to get along. The college man is not wanted, however, simply because he is a graduate, but because he has a trained mind and has initiative. If you had to pick out to-day the man who would succeed you as superintendent of motive power 10 or 15 years from now would

The End of The Rope

he be a college man? If the railroads permit the National Agreement to keep special apprentices out of their shops and persist in policies and prejudices that discourage rather than encourage college men, how long will it be before they will get to the end of the rope? Recent comment would indicate that so far as available material for many responsible positions is concerned, George Basford's prophesy, made before the Master Mechanics' Association 15 years ago, has already come true on more than one railroad.

More Engines Versus More Shops

One point was brought out forcefully in the discussion of Mr. Basford's paper. The policy of the roads with regard to motive power and shop equipment is too often dictated by expediency. The course to be followed is not carefully thought out in advance in all its ramifications and not infrequently roads buy additional locomotives when shops or terminals are needed instead. Instances could be cited of roads owning more than 1,000 locomotives that have not a single shop equipped with cranes for unwheeling heavy power. There are terminals in northern states where 30 or 40 engines are turned every day, but no facilities are provided for housing locomotives, except when they require heavy repairs. Is it surprising that some roads find the percentage of unserviceable locomotives increasing when the demand for power is greatest? Mechanical and executive officers should not lose sight of the fact brought out by Mr. McManamy that failure to provide adequate motive power destroys the only commodity the railroads sell—transportation. How many times have appropriations for shop or terminal improvements been stricken from the budget because the saving in the cost of repairs would not pay the fixed charges on the investment involved, neglecting entirely the economies that result from keeping the power in service a greater per cent of the time. Mr. Basford's paper should lead to a more thorough study by the roads of their requirements in locomotives, shops and terminals. If it puts an end to the hit-or-miss policy now in vogue, it will mark an impotent advance in the handling of motive power problems.

Limitations of Automatic Machines

When the full possibilities of automatic machines in the rapid production of duplicate parts are first realized there is always a danger that the economical limitations of the machines will be forgotten. For example, a 1¼-in. by 7-in. guide bolt with a round flat head possibly two inches in diameter, can be made quickly and cheaply on an automatic, but there is a certain waste of material in turning the body of the bolt down from the original diameter. This bolt could be formed roughly in a forging machine by upsetting the end of a round bar of stock slightly over 1¼ in. in diameter. The later machine operations would consist of cleaning up the bolt (very little metal being removed) and cutting the thread. It is probable that in this particular case the bolt can be made most cheaply on an automatic, but, as the diameter of the desired bolt head increases in proportion to the body, there will be a point beyond which the value of the waste metal, time and power will more than offset the cost of first running the bolts through a forging machine. This is not to be considered an argument against using automatic machines, but simply a reminder that automatics are not a panacea for all ills. Increased production at a smaller cost per piece is the goal of shop executives just now and in deciding which method shall be used in so simple an operation as making a bolt, it is important that no factors be left out of the consideration. Accurate records of power, labor and material costs must be kept in order to solve the problem correctly. In addition the shop executives and foremen must visit neighboring shops, read what others are doing and be continually on the alert for new and improved processes.

Convictions Without Reason or Courage

Few motive power department officers have not been cognizant in a more or less hazy way of the plain truths so forcefully stated to them by George M. Basford yesterday morning. They all believe in the modernization of power. They would all like to have modern repair shops and engine terminals. Why don't they get them? There are two reasons—lack of facts and lack of courage. The usual excuse that the money is not available is not convincing. The history of railroad development in this country is replete with instances where vast expenditures have been made for the improvement of grades and reduction of mileage. But, during this same history, how many instances can be recalled where shops and maintenance facilities have been extensively modernized? Why has it been possible to secure appropriations for improvements of the one kind and not for the other? First, because the program for permanent way expenditures have been accompanied by a convincing array of facts as to the big returns to be obtained on the investment from reduced operating costs and increased traffic capacity. Second, because these facts have been presented with a persistence and courage which would not take "no" for an answer. Too frequently requests for appropriations in the mechanical department are supported by nothing better than personal opinions. Unfortunately, detailed records of shop and equipment operating costs are not available to furnish the facts that would get the money for proposed improvement programs. With nothing but opinions on which to base a campaign for extensive capital expenditure there is not much to inspire a courageous fight. The conclusion is obvious. Take measure to record detailed facts of equipment operating and maintenance costs, not forgetting any of the items which make up overhead. Then learn to use them intelligently. With such weapons no doubt need be felt that the motive power department will have the courage to win the fight.

A Proper Balance

It is a mistake to consider that the modernized engine terminal or any other one feature is the *most* needed improvement on American railroads; but modern engine terminals are no less needed than any other feature and the important point is that a proper balance be observed between all developments in the mechanical equipment of the railroad. The purchase of Mountain type locomotives to handle suburban locals would be obviously absurd, yet the purchase of large Mallet locomotives for divisions on which there is not a single modernized engine terminal or even a turntable on which these engines can be turned,

as has occurred on more than one occasion, is just as inconsistent. In outlining the program for annual expenditures and in presenting the requirements of the mechanical department to executive officers, mechanical men cannot be too vigorous in their plea for improved engine terminals, nor too emphatic in their protests against the purchase of large locomotives for which the engine handling facilities are inadequate. The maintenance of a proper balance betwen all working parts is essential to an effective, smooth running organization, and there is no better evidence of efficiency than a consistent balance between all working parts. A very large passenger engine is out of place on a small local train and is wasteful because the locomotive does not have the opportunity to utilize its potential power. But it is just as inconsistent to have a large modern locomotive standing at a dilapidated terminal, waiting its turn at the restricted ash pit, or the single water spout and the one coal chute, only to be placed in a roundhouse with no facilities for washing the boiler with hot water or for giving prompt attention to all of the many devices that should be kept in good repair. Modernized engine terminals are indispensable to modern locomotives. A proper balance between all working parts is essential.

Assigned Locomotives and Engine Mileage

In periods of power shortage considerable attention has always been given to reducing the percentage of total locomotive hours spent in the terminal in order to meet the insistent demands of the operating department for power. In freight service the usual expedient has been to pool the locomotives. Immediate improvement during the emergency has usually been the result. This fact has led to the conclusion that the practice was justified as a permanent policy. Usually adequate records of locomotive performance were lacking either to corroborate or disprove this belief. Where actual facts are available, however, they do not justify it. In one case a comparative study of the cost of maintenance and the amount of traffic handled by the same group of locomotives for seven months of pooled service, followed by the same period of assigned service, showed a decided improvement from both standpoints while the engines were assigned. The cost of maintenance was about 30 per cent less for these engines during the assigned period and they made 18 per cent more mileage. The increase in ton-mileage was even greater because the train load was increased during the assigned period. The immediate advantage obtained by a change from assigned to pooled service is soon lost and in the long run the time lost owing to engine failures and the accumulation of neglected repairs leads to a reduction in the average proportion of running hours to total hours over that obtained from assigned locomotives. At the present time freight power is very generally in pooled service all over the country. Recent Railroad Administration statistics show that locomotives on the average are spending approximately 60 per cent of their time in engine terminals. This does not indicate any improvement over the conditons five or six years ago, before pooling became general, when N. D. Ballantine made the study of the distribution of locomotive time referred to by Mr. Basford in his paper yesterday. It seems evident that more tonage can be moved with less engines by restoring the practice of assigning locomotives. Under present conditions the engine terminal is the controlling factor and its capacity is still further decreased by the bad condition of the power whch follows the practice of pooling.

Program for To-day

The entire day has been set aside by Mechanical Section III to view the exhibits.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3.30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.

9.00 P. M.—Musicale, Entrance Hall, Million Dollar Pier.

Program for Sunday, June 13, 1920

3.30 P. M.—Sacred Concert in the Music Rooms of the Marlborough-Blenheim. The Albert Taylor Orchestra, New York City.

Lost and Found

FOUND—In a rolling chair, a black fur neck scarf. Apply to Secretary Conway's office.

LOST—Badge 6923. Return to Secretary Conway's office.

Registration Figures Grow Larger

THE FOLLOWING ARE THE comparative figures of registration up to noon yesterday, when Book No. 3 was sent to press:

	1919	1920
Members, Section III, Mechanical	458	666
Special guests	563	285
Railroad Ladies	601	413
Supply Ladies	350	649
Supply Men	1,900	1,935
Purchases and Stores	....	37
Total	3,872	3,985

These figures are not strictly comparable for the two years because the Car Builders met first last year.

Apropos of Movies

MR. FULLER (on the floor of the convention Friday morning): Do I understand the invitation from the Purchases and Store Section is to review pictures of a supply train?

Chairman Tollerton: Yes.

Mr. Fuller: I wonder if we could not get them to produce pictures of supplies. Supplies seem to be more important to-day than trains.

R. S. M. A. Election To-day

THE ANNUAL MEETING of the Railway Supply Manufacturers' Association will be held in Convention Hall at 12 o'clock noon to-day.

The Nominating Committee announced yesterday the following choices for officers of the Association for the coming year:

President—J. F. Schurch, vice-president, T. H. Symington Company, Chicago.

Vice-President—Charles D. Jenks, president, Damascus Brake Beam Company, Cleveland.

The members of the Nominating Committee were: Samuel G. Allen (Chairman), P. J. Mitchell, A. L. Humphrey, J. Will Johnson, A. C. Ashton, Harry W. Frost, Scott H. Blewitt.

Registration For Cornell Banquet

A goodly number of Cornell graduates have signified their intention of attending the annual banquet, which will be held in the club room of the Traymore at seven o'clock on Saturday evening. Those who have not already registered should leave their names with A. F. Stuebing at the *Railway Age* booth before noon to-day.

Manufacturers on the Railroad Question

Stephen C. Mason, of the McConway & Torley Company, who is attending the conventions, is president of the National Association of Manufacturers, which is the principal organization of manufacturers in this country, or in the world, for that matter. Most of the railway supply companies are members of the association, but its membership is representative of all branches of manufacturing in this country.

At its annual meeting which recently was held in New York the National Association of Manufacturers adopted a preamble and resolutions entitled "Platform for American Industry." Among other things the resolutions set forth that "It is not the function of our government to own or operate industry, but to protect and encourage its legitimate development under private ownership and management. It should therefore abstain from competition with its own citizens in any form of business which they can successfully undertake.

"The regulation of free enterprise is justified by necessity, when for the common good. But the form it assumes is vindicated only by the practical test of its effectiveness to accomplish its avowed purpose. Thirty years of drastic business restriction through the Sherman Act, demonstrates that competition should not be compelled where regulated co-operation more beneficially promotes the public interest."

Upon the subject of transportation the resolution said:

"We approve the return of the railroads to their owners who are the investing public, and favor their private ownership and operation under government regulation.

"The present condition of our railways is deplorable. They lack the funds and credit to provide the facilities and equipment for handling the present national business or to make the additions and extensions necessary to meet the constant development of production. To save the business of the country from irreparable injury, railroad rates must be speedily readjusted upon a basis which will re-establish and maintain railway credit and capacity to render adequate service.

"A shortage of transportation limits every form of production and trade and impedes all social progress. The controlling principle of public railroad administration should, therefore, be the promotion and development of a carrying service fully adequate for national needs.

"We favor the permissive consolidation of existing railway systems under such conditions as will promote economies of operation, efficiency in management, and maintain competitive rivalry in service.

"We favor the development of a definite and constructive plan of national transportation, inter-relating railroads, waterways and hard surfaced roads.

"Every available means should be employed to promote better understanding and closer co-operation between the public and the railroads. The deliberate obstruction or interruption of transportation service is intolerable. Railroad strikes inevitably become lock-outs of the farmer and factory worker and boycotts of the public."

Railway Club Secretaries Meet

The Society of Railway Club Secretaries held its annual meeting yesterday morning at the Blenheim. W. E. Cade, Jr., of Boston, vice-chairman, presided in the absence of the chairman, A. J. Merrill, of Atlanta, secretary of the Southern and Southwestern Railway Club, who is convalescing from a severe attack of the "flu."

This meeting was preceded on Thursday by a round-table luncheon at the same hotel. The guests of the society on that occasion included Daniel M. Brady, of New York, founder of the organization; H. C. Manchester, president, New York Railroad Club; D. W. Pye, treasurer, New York Railroad Club, and chairman of the finance committee of the Central Railway Club; J. E. Fairbanks, general secretary and treasurer of the American Railroad Association; Roy V. Wright, chairman, committee on subjects, New York Railroad Club; W. H. Winterrowd, president, Canadian Railway Club of Montreal, and G. M. Wilson, superintendent motive power, Grand Trunk, Montreal, and a member of the auditing committee of the Canadian Railway Club.

Probably the most important action during the extended session was an agreement designed to broaden the scope and usefulness of the society which is expected to lead to the organization of a new association whose membership will be limited to secretaries of railroad associations. This is dependent on the idea appealing to the secretaries, to whom it will be submitted. In that event, the secretary and treasurer is to prepare the necessary amendment to the present Constitution and By-laws of the society to conform to the action taken on this occasion, the intention being to later, probably in the Fall, hold a meeting of all interested. The careful consideration given to the plan contemplated resulted in the conclusion that such an association of secretaries will be conducive not only to the benefit of members, but will ultimately be advantageous to organizations they represent.

The secretary was instructed to convey to J. E. Fairbanks an expression of appreciation of the thoughtfulness which led to the big innovation which he has had made in connection with the annual meetings of Section III—Mechanical, in providing a place and facilities for the handling of the correspondence, etc., of members or their representatives.

An understanding was reached which is expected to result in making more complete each month the announcement of papers and their authors before each of the railway clubs, the object being to afford railway club members accurate and the earliest information possible as to these matters. As usual, at the end of the club season, the society will compile a complete Index of Papers and Authors that have had the attention of the various clubs during the preceding nine months—this to be published with an abstract of the minutes of the annual meeting of the society in the September issue of the proceedings of each club.

The secretaries devoted much time to an exchange of suggestions, methods and practices as a result of which they were able to give each other some new ideas calculated to promote increased efficiency and the concrete and prompt handling of club affairs with which they are entrusted under the direction and supervision of members of their respective executive committees.

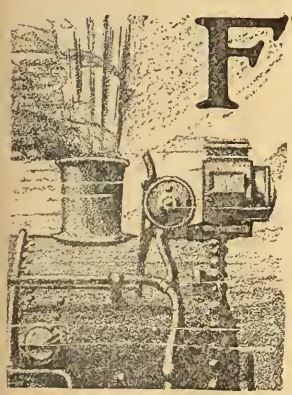
Officers were elected for the ensuing year as follows: Chairman, W. E. Cade, Jr., New England Railway Club, Boston; Vice-Chairman, W. A. Booth, Canadian Railway Club, Montreal; Secretary-Treasurer, Harry D. Vought, New York Railroad Club and Central Railway Club.

American Railroad Association—Section III—Mechanical

George Basford's Paper Leads to Spirited Discussion on Vital Needs of the Motive Power Department

Chairman Tollerton called the meeting to order on Friday morning at 9:40 o'clock.

Locomotive Headlights and Classification Lamps



FOLLOWING the progress report submitted at the 1919 convention, the committee has kept in touch with the progress and practices of the various railroads during the past year. There appears to be a desirability for uniformity in practices as to capacity of generator, type of steam driving unit, details of connections and wearing parts of both generator and steam unit, sizes of lamp, reflector, etc.

The incandescent headlight lamp has now been practically made standard on the railroads in this country. With such a lamp for that particular use on both road and switch engines, together with a generally uniform practice as to the size of lamps in cabs, markers, and classification signals, it is practical to indicate a somewhat close specification for the generator and steam driving unit. Taking into account the necessity of being able to transfer on short notice the equipment from one engine to any other engine, it is believed that such an equipment should be of 500-watt capacity, of the turbine driven type, and should be capable of developing 32 volts and full load at a steam gage pressure of 100 lb. The governor should also regulate the speed of turbine properly under a range of steam pressure between 100 lb. minimum and 250 lb. maximum.

There are many details of the generator and turbine that experience in handling somewhat similar equipments indicates should have uniformity in certain dimensions and arrangement on the equipments as furnished by the several manufacturers. This is, of course, for the express purpose of obtaining prompt interchangeability in service and reduction in the stock of renewal parts. It will be apparent that the bolt spacing of the base should be the same on all equipment, also that the size of steam pipe should be the same. It would be advantageous if the location of the steam exhaust and drain connections were identical on all turbo-generators. As to the renewal parts, the ball bearings can be made similar, brushes can all be the same size and all bolt and screw threads should be standard.

In locating the turbo-generator on the engine, four details must be considered. In the first place, short steam pipes are necessary. Long pipes are difficult to maintain and increase radiation losses. The location must be one that is accessible for inspection without interfering with the inspection and care of other parts that require both inspection and renewal. It must not interfere with the vision of the engine crew and the exhaust steam cannot be permitted to cloud up the front cab windows, condense over the cab roof, or in any way become a nuisance to the crew. It is desirable, therefore, and seems to be the general practice, to have the generator set placed near the cab. Many roads are placing it longitudinally with the boiler and on the left-hand side where the wire conduit to the headlight is placed. The generator end is usually set toward the cab to avoid the collecting of snow and ice or water inside the generator, and commutator case. This position has a further advantage of being within reach of a man standing on the running board, as well as being away from the condensation and moisture from the whistle and safety valve discharge.

There is a strong preference for the use of metal conduit in wiring cabs. For outside wiring, this is the general practice. When used in the cab, the conduit placed on the ceiling and on the sides should not be rigidly connected. All drops should be made through suitable fittings so that in ordinary maintenance or the overcoming of trouble on the road no joints in the wires will have to be disconnected.

The use of a 250-watt, G-30, 32-volt concentrated filament lamp for headlights of road engines and of a 15-watt, S-17, 33-volt special cab lamp for all lights in cabs, classification sig-

nals, markers, etc., is practically standard everywhere. For switch engine headlights there is still considerable difference of opinion as to what size lamp can be used and meet both the requirements as to the 300-foot vision and the frequent objections of yard crews to a light that is too dazzling. The National Lamp Association have under consideration a series of road tests to determine the vision range of headlight lamps of different capacities. They have requested that the committee be represented and this invitation has been accepted. The committee has suggested that the scope of the investigation include lamps of various capacities combined with reflectors of different sizes and constructions, to determine the size of lamp with type and size of reflector required to meet definite vision requirements.

Since the 1919 convention, under instructions, marker lights and other lights on rear of tender, as well as classification lights on the engine, are being wired for electric lamps. This requires a considerable change in the arrangements on most roads and the plans being followed vary considerably. A large number of the members have furnished the committee with blueprints and it is hoped that these plans can be reviewed critically and from them a recommendation made for presentation at the Convention.

There is a growing demand for a headlight reflector that will not require such constant attention to keep clean as is necessary to give the usual silvered copper reflector. Several types of reflectors are being developed along this line and it is expected that after the lamp tests are made some definite information will be available for the members.

Recommendations

Your committee would recommend the following for submitting to letter ballot as Recommended Practice:

1. For electric headlight equipment, incandescent lamps be used with a 500-watt turbo-generator capable of developing 32 volts and full load at a steam gage pressure of 100 lb., the governor to regulate the speed of turbine properly between steam pressure range of 100 lb. minimum and 250 lb. maximum without the necessity for change of nozzle or governor parts.

2. The turbo-generator should be located as near the cab as practicable, preferably set longitudinally with the boiler, on the left hand side, with generator end toward the locomotive cab and in a position so as not to obstruct the vision of the fireman. Where conditions will not permit location of turbo-generator in this manner, it should be placed on the top of boiler with dynamo end toward side equipped with the conduit system (preferably the left side).

3. The use of a 250-watt, G-30, 32-volt concentrated filament lamp in headlights of road engines.

4. The use of a 15-watt, S-17 33-volt special cab lamp in cabs, signal or engine number lights and all other outlets, other than the headlight lamp.

5. The use of a dimmer in connection with road engines' headlights, so wired that the engineer can reduce the intensity of the light as desired and in accord with the rules.

6. That all wiring in cabs be in metal conduits so applied that it may be removed intact, a loose connection being arranged between the conduit placed on the ceiling and on the sides of the cab.

7. All drops should be made through suitable fittings placed on the ceiling of cab where possible, in back of and not directly over the boiler so that they are readily accessible.

The committee requested approval of the plan to work jointly with the manufacturers of headlight turbo-generators, and the Association of Railway Electrical Engineers in developing standard practices as to: (a) Bolt spacing of the base; (b) size of steam, exhaust and drain pipes; (c) location of steam, exhaust and drain pipe connections; (d) size of ball bearing; (e) size of commutator brushes, and (f) bolt and screw threads.

The report was signed by H. T. Bentley (Chairman), Chicago & North Western; C. H. Rae, Louisville & Nashville; W. H. Flynn, Michigan Central; W. O. Moody, Illinois Central; A. R. Ayers, New York, Chicago & St. Louis; H. M. Curry, Northern Pacific; A. G. Williams, Pennsylvania System, and J. L. Minick, Pennsylvania System.

Discussion

In introducing this report the Chairman stated that the life of headlight casings is very short, due to corrosion, and that he was glad to note that the manufacturers are at last getting out a cast iron casing, which will result in greatly increasing the life of this part of the equipment.

He added that the practices of the railroads in the selection of a generator equipment and type of lamp for electric headlights, and in installing them, are very similar. The usual variations are in minor and unimportant details. Therefore, for uniformity, it is recommended that (a) the generator be of 500-watt capacity, 32-volt and turbine driven; (b) the generator be located preferably near the cab, on the left side of the locomotive and longitudinal therewith; (c) a 250-watt G-30 32-volt incandescent lamp be used in the headlight of road engines; (d) a 15-watt S-17 33-volt lamp to be used for all other lights on all engines (this refers to cab lights and not switch engine lights); (e) a dimmer be used with the headlights of road engines; (f) wiring in cabs be in metallic conduit; (g) drops be made through fittings.

It was also suggested that certain standard practices be developed for base bolt spacing, steam and exhaust connections, size of ball bearings, brushes and bolt and screw threads.

Chairman Tollerton: We have in the hall this morning representatives of the Association of Railway Electrical Engineers that assisted in the preparation of this report. They have been granted the privilege of the floor, and I would be very glad to hear from some of them on the discussion of the merits of the paper.

J. L. Minick (Pennsylvania): There is one point that I might call attention to. The Association of Railway Electrical Engineers and the American Railroad Association have both recommended the use of 33-volt, instead of 34-volt, cab lamps. That is due very largely to the fact that a great many electrical headlight equipments are used for furnishing current for the lighting of suburban trains, and the train lighting service generally throughout this country is the 33-volt. With the 34-volt cab lamp, 33-volt train lamp, and 32-volt house lighting service, all of which use the same lamp, it throws a great deal of confusion into the manufacturing of lamps, and the manufacturers are agreeable, so far as we have been able to ascertain, to standardizing everything at 33 volts.

It is questionable as to just what headlight lamps should be used in switching service. The rule issued some months ago by the Railroad Administration indicated that the 100-watt lamp was desirable. Some railroads seem to believe that a 60-watt lamp was desirable, while still others have a little more faith in a 25-watt lamp, due to the fact that with the smaller lamp you get probably a little diminution of light, but do not get the glare that you necessarily must have if you use a larger lamp.

It remains, however, for the future to show just what we should or should not use, and I expect the tests mentioned by the chairman of the committee to bring forth some real concrete data along that line.

The suggestion has been made as to the use of glass reflectors, not only in yard service, but in road service. There is some objection to the use of glass reflectors on account of the cost. The larger sizes which appear within some limited needs will be rather expensive, and it is questionable whether that expense is justified.

R. J. Needham (G. T.): We would like to know something about what has been done in the United States in regard to the back-up lamp in road service. There seems to be some necessity with the engine backing down to the yard to have a back-up lamp.

H. T. Bentley (C. & N. W.): During Railroad Administration control instructions were issued that such a lamp be provided, and a large number of roads are now going ahead with that program. I do not think there is anything compulsory about it, but to comply with the A. R. A. train rules it is necessary to have such a lamp, and the C. & N. W. is putting on the small size lamps.

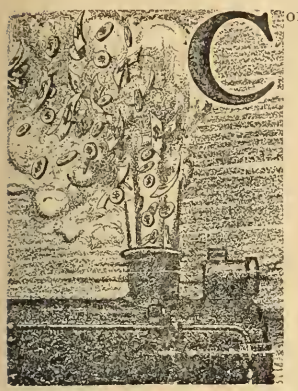
C. E. Fuller (U. P.): There are several lamps being manufactured at the present time and presented to the railroads a good deal upon the same plan as the marker light. Some are riveted on the rear of the tender, and others put in a socket, showing both red and white lens, the red lens to be used in backing down into the train yard and the white lens in case the engine is backed up on the road. Some of the railroads are using the marker light in conjunction with this feature by wiring the tenders.

As far as I can ascertain, most of the roads, if they are using this light at all, are departing from the use of the oil lamp and going to the use of the electric light. It is not compulsory, and in a great many yards it is a question whether the light is really necessary, but in large terminals, such as the New York Central

terminal in New York City, the Erie terminal, and the Chicago terminals, where they are running in conjunction with traffic, a light is necessary.

It was moved that the recommendation of the committee be submitted to letter ballot as recommended practice, and that the report be accepted and printed in the proceedings, and that the committee be instructed to work jointly with the manufacturers of the headlight Turbo-generators, and the A. R. E. E. in developing certain standards indicated. This motion was seconded and carried.

Report on Feed-Water Heaters for Locomotives



CONDITIONS NOW APPEAR to be favorable for a renewal of interest in feed-water heaters for locomotives, and while trials have been somewhat retarded by the unusual conditions of the past few years, we appear to be on the eve of an extensive application of heaters, under more favorable conditions than at any previous time, on account of the high cost of fuel and the greater need for its conservation.

The members of the association have before them the very valuable individual paper by Mr. J. Snowden Bell, Associate Member. (See 1917-1918 proceedings.) The author's conclusion is that a feed-water heater "can and will be developed and adopted with the most substantial benefit in locomotive operation."

The author of this paper classifies feed-water heaters as of two different types, which may be termed, respectively, as (a) surface or closed heaters and (b) injection or open heaters, at the same time mentioning the fact that type (a) in which the heat transfer to the feed-water is effected through walls of comparatively thin metal, has been the more frequently experimented with and, for several reasons, has heretofore seemed to be the more practical and desirable of the two types.

While this opinion has no doubt been more or less generally held, the latest developments suggest that the open heater, which operates under practically atmospheric pressure, has no small tubes as heating surface and delivers the heated feed water and condensed exhaust under suction to the boiler feed pump, using an oil separator, has fully as good, if not a better chance of final success, considering the conditions which should obtain in an efficient heater.

For the present heaters using waste gases from the flues are not considered, but only the exhaust steam as the heating medium; because (a) these two sources of heat are independent of each other and require separate heaters, and where both of them are employed in conjunction, the exhaust steam must or should be used first, although usually in tandem with the other, and (b) the exhaust steam carries much the larger portion of the waste heat (approximately six times that in the waste gases), and this heat is more readily available. With the open heater especially, it has been much more successfully employed than that of the waste gases, without interference with the working of the locomotive.

The committee began its work by endeavoring to accumulate information by means of a letter of inquiry addressed to the members, and replies were received from 86 railroads. Seven roads report that they now have, or very recently have had, feed-water heaters in service and give full replies to the circular. Four roads state that they contemplate the use of heaters. The remainder of the replies are to the effect that seventy-six roads have had no recent experience in the use of feed-water heating appliances.

A tabulation of the replies, which were made in full, describing feed-water heating systems in use at present, or but recently removed from service, is given in Appendix I (not included). Appendix II gives data on open and closed heaters tested by the Pennsylvania Railroad. Appendices III, IV and V give comments of the Baltimore & Ohio, Boston & Albany and Canadian Pacific, respectively, on their experience with feed-water heaters.

It appears from this survey that at the present time there are in use in this country but two general types of feed-water heaters, the closed heater having a number of small tubes and the open heater in which the exhaust steam is condensed by a jet of cold feed-water. Attempts at heating the feed-water while in the tender tank have been made by using the air compressor exhaust for this purpose. The arrangements were not entirely successful or satisfactory on account of the difficulty in pumping the heated water to the boiler. When the temperature of the water was low enough to be handled by an injector the saving was very small.

It has been suggested that water having a high percentage of incrusting solids would make feed heating impossible, on account of the scale deposited on the tubes of the heater. Such water would, no doubt, be troublesome if used in a closed type heater. The open type heater, however, could be expected to handle such water with no more difficulty than when injectors are used.

The location of the heater apparatus on the locomotive is of considerable importance. The exhaust steam should have short and direct passages into the heater; and heater, pumps and piping should be placed so as to be easily drained. The attachment of the heater and pumps to the side of the boiler has been found of advantage in the prevention of freezing.

It has been found that the superheat of the steam is reduced when the feed heater is used, and a new basis should be established for determining the necessary superheating surface for feed-heater locomotives. An enlargement of the superheater should be considered for new construction only, the reduction in superheat not being sufficient to require a revision of existing superheaters when feed-water heaters are applied to old locomotives.

It appears from present indications that feed-water heating for locomotives is about to be given a thorough trial on a few roads and, with the improved heaters now available, the committee believes that a satisfactory arrangement of heater can be developed and that the members should assist by installing heaters on their roads in order that data may be obtained under as many different operating conditions as possible.

The report was signed by F. M. Waring (Chairman), Pennsylvania; Wm. Schlafge, Erie; A. Kearney, Norfolk & Western, and W. H. Sample, Grand Trunk.

Appendix II—Pennsylvania Heater Tests

An open-type heater of the Worthington design was applied to a Mikado-type locomotive on the Pennsylvania Railroad in October, 1918, and three others in the early part of 1919. All are still in service and have given no serious trouble, although experience with them has shown where minor improvements can be made. They have been found thoroughly practicable, even when the heater locomotives are handled by enginemen who have had no previous experience with them.

Open-Type Heater Tests

The first of these heater locomotives was operated on the Altoona testing plant before it was used in road service. A number of changes and adjustments were made in the heater, during the early test runs, of which there were nineteen. When satisfactory working of the heater had been established seven additional tests were made, without change in the heater, and a summary of the results of these is given in Tables I to IV.

Because of the decreased draft when steam is taken from the exhaust pipes for feed heating, the exhaust nozzle was reduced from a diameter of 7 in. to 6¾ in. for these tests. This change was found necessary to obtain high evaporation, but even with the smaller nozzle the draft, in the directly comparative tests,

averaged considerably less than without the heater. It was sufficient to develop a satisfactory maximum power.

As would be expected, the decreased combustion rate resulted in a lower degree of superheat when the heater was in use. This decrease was between 30 and 40 deg.

Coal Consumption

The evaporation of 52,475 lb. per hour, and the indicated horsepower of 2,650, which were obtained with the heater, are far beyond the usual operating requirements for these locomotives.

Table I—Water Consumption During the Open-Heater Tests

Test No.	Test designation	Length of test, hrs.	Feed water from tank, lb. per hr.	Feed Water Temp. At heater inlet	Feed Water Temp. At heater outlet	Temperature rise in heater, deg. F.	Water lost from heater, lb. per hr.	Steam condensed and added to feed water	Feed water to boiler, lb. per hr.
1	2	3	4	5	6	7	8	9	10
5,000.109	60-20-F	2.0	12,746	41	178	137	2	1,735	14,480
5,000.108	80-30-F	2.0	16,828	40	190	150	3	2,538	19,364
5,000.106	80-50-F	2.0	25,958	39	202	163	8	4,285	30,238
5,000.110	120-50-F	1.0	31,439	39	208	169	18	5,398	36,820
5,000.111	120-50-F	1.0	31,237	40	209	169	28	5,383	36,594
5,000.105	120-60-F	1.0	39,905	39	208	169	92	6,819	46,640
5,000.107	160-60-F	0.5	45,072	40	211	171	354	7,722	52,474

Table II—Exhaust Steam Condensed and Steam Consumption of the Open-Heater Pump

Test No.	Test designation	Exhaust steam: Temperature at heater, deg. F.	Exhaust steam: Pressure at heater, lb. per sq. in.	Exhaust steam: Condensed and added to feed, lb.	Exhaust steam: Condensed, per cent of total feed	Steam used by feed Pump: Lb. per hr.	Steam used by feed Pump: Lb. per double stroke	Steam used by feed Pump: Per cent of feed	Speed of pump, double strokes per min.
1	2	3	4	5	6	7	8	9	10
5,000.109	60-20-F	214	1.4	1,735	12.0	384	0.38	2.7	17
5,000.108	80-30-F	215	2.0	2,538	13.1	446	0.35	2.3	21
5,000.106	80-50-F	230	3.2	4,285	14.2	630	0.32	2.1	33
5,000.110	120-50-F	238	6.0	5,298	14.7	747	0.30	2.0	41
5,000.111	120-50-F	230	6.0	5,383	14.7	747	0.30	2.0	42
5,000.105	120-60-F	270	6.4	6,819	14.6	875	0.31	1.9	47
5,000.107	160-60-F	277	9.9	7,722	14.7	912	0.29	1.7	52

Table III—Heat Recovered by the Open-Type Feed-Water Heater

Test No.	Weight of steam, lb. per min., going to: Engines	Feed pump	Safety valve	Feed heater	Heat in steam, b. t. u. per min., going to: Engines	Feed pump	Safety valve	Total	Heat recovered from exhaust steam by feed heater: B. t. u. per min.	Percentage of total heat in steam
1	2	3	4	5	6	7	8	9	10	11
5,000.108	314.5	7.4	0.8	42.3	402,749	8,876	960	415,585	50,726	12.3
5,000.106	492.8	10.5	0.7	71.4	639,063	12,594	840	652,497	85,694	13.1
5,000.110	599.1	12.5	2.1	90.0	780,867	14,994	2,519	798,380	108,063	13.5
5,000.105	757.3	14.6	6.5	113.7	996,531	17,393	6,597	1,020,521	136,736	13.4

Table IV—Coal Saved by the Open-Type Feed-Water Heater

Test No. Without heater	Test No. With heater	Test designation	Speed In M. P. H.	Indicated horsepower: Without heater	Indicated horsepower: With heater	Coal per I. H. P. Hr., lb.: Without heater	Coal per I. H. P. Hr., lb.: With heater	Coal saving by feed heating, per cent
1	2	3	4	5	6	7	8	9
5,000.79	5,000.108	80-30-F	14.6	990	965	2.2	2.0	9.1
5,000.80	5,000.106	80-50-F	14.6	1,549	1,534	2.3	2.0	13.1
5,000.81	5,000.110	120-50-F	22.0	2,001	1,949	2.3	1.9	17.4
5,000.82	5,000.105	120-60-F	22.0	2,388	2,373	2.9	2.2	24.7

The work to be done by the boiler in evaporating water is reduced in proportion to the amount of heat recovered in the heater. The saving of coal should be and is, evidently, greater than this on account of the boiler being operated at more efficient rates with the heater than without. Also, it is evident that the saving by feed heating is greater when the locomotive is exerting its greatest effort. It is assisted most by the heater when assistance is most needed.

That there is a saving in coal by the feed heater is shown in Table IV. These economies were afterwards confirmed by road testing of heaters of this type.

Steam Used by Boiler Feed Pump

The feed pump which it is necessary to use with the heater requires steam from the boiler and this steam is a direct charge against the heater, unless part of its heat can be recovered in the heater. In these tests, except No. 5000.111, the exhaust steam from the boiler feed pump was condensed and weighed. Table II shows the steam used by the feed pump at different rates of boiler feeding. This steam is between two and three per cent by weight of the total steam produced by the boiler at these rates of evaporation.

In Test No. 5000.111 the feed-pump exhaust steam was put into the main exhaust steam line going to the heater at a point in front of the oil separator, with no apparent effect on the temperature in the heater. This is about the result to be expected; the total weight of steam condensed in the heater is also about the same in the two cases. Therefore, when using the feed-pump exhaust, the main exhaust is called on for as much less steam as the feed pump supplies, thus, to some extent, reducing the necessity for making the exhaust nozzle smaller than that used without the heater. There should, therefore, be something gained by putting the pump exhaust into the heater, and in the heater arrangements used on the road the pump exhaust is used in the heater.

Weight of Exhaust Steam Condensed

With the open-type feed-water heater the exhaust steam used to heat the water is condensed and becomes a part of the boiler feed-water supply, and while it would be possible to weigh this condensation, this would be impracticable, as heat would be lost, and the regular action of the heater interfered with. Instead of weighing this condensation, its weight has been calculated from the observed temperature of the steam and water by means of the following formulæ:

$$S = \frac{W\,(h_1 - h_0)}{H - h_1} = \text{Exhaust steam condensed and added to feed water, lb. per hr.}$$

W = Weight of feed water from tank, lb. per hr. (deducting losses).
h_0 = Heat in feed water from tank, B.t.u. per lb. (cold water).
h_1 = Heat in feed water from heater, B.t.u. per lb. (hot water).
H = Heat in exhaust steam, B.t.u. per lb. (at heater).

The weight of steam condensed as found by this method was added to the weight of feed from the tank and the total was the water fed to the boiler and evaporated.

Oil in Exhaust Steam

One of the objections advanced against the use of the open heater is the possibility of cylinder oil being carried into the boiler and causing foaming and other trouble. The cylinder oil now used is a mineral oil with an added six or seven per cent of animal oil, in the form of lard oil or tallow. This animal oils is said to have acid-forming properties when in the boiler and to cause corrosion of the metal, but the principal danger seems to be the possibility of the mud or scale on the boiler and the oil uniting and forming a putty-like substance on the firebox and causing overheating of the sheets.

In tests at low rates of evaporation, the exhaust steam in the heater supply pipe appeared to be saturated and there was a dripping of oily water amounting to about 10 to 12 gallons per hour, from the oil separator. At high rates of working, the exhaust steam was superheated and there was no drip of water or oil from the separator. In the road service of these heaters no trouble from the oil has developed after a year and a half of use.

Road Service Tests

Following the tests and development work on one open heater on the testing plant, it and three others of the same general design were put into road service on Mikado-type freight locomotives. After they had been used some little time, a record of performance was made with two of these heater locomotives, using, first the heater and then the injector, during a round trip over a division about 100 miles long.

Six round trip results with heaters and four with injectors are averaged in Table V. The coal was measured by shovelfuls, and the water by levels in the tender tank which had been calibrated.

The weigts of coal and water are assumed to be fairly accurate approximations and the basis for determining the saving was the evaporation per pound of coal. The average evaporation per pound of coal for both east and west bound trips, with the heater, was 10.3 lb. and with the injectors, 9 lb., thus showing an increase in evaporation per pound of coal of 14.4 per cent.

There appears to be no reason to expect any decrease in the heating effect after long service of the heater and check temperature observations recently made on these heater locomotives show that the feed-water is still being heated to temperatures well above 200 deg. with a temperature rise of 160 dg. or more.

TABLE V—TESTS OF THE OPEN-TYPE HEATER IN ROAD SERVICE

	Without heater		With heater	
	East-bound	West-bound	East-bound	West-bound
Time in motion, hours	7.72	7.84	8.92	7.88
Ton-miles per trip	576,892	171,703	650,947	182,349
Cut-off, per cent	53.3	41.4	50.6	44.2
Coal used, lb.	20,260	16,947	18,631	18,006
Coal used, lb. per hour	2,625	2,162	2,089	2,286
Water used, lb., including steam condensed in heater	167,208	163,820	197,748	180,966
Water used, lb. per hour	21,659	20,895	22,169	22,966
Evaporation per lb. of coal	8.4	9.7	10.6	10.1
Feed-water temperature in tender tank	51	50	49.0	51
Feed-water temperature from heater	.....	.....	198	191
Feed-water temperature rise	.....	.....	149	140

TABLE VI—WATER HEATED, TEMPERATURE RISE AND STEAM CONDENSED WITH THE CLOSED TYPE HEATER

180 Brass Tubes 5/8 in. Outside Diameter, 46 in. Long, Heating Surface 113 sq. ft.

Test No.	Test designation	Length of test hours	Feed water from tank, lb. per hr.	Feed water temperature: At heater inlet	Feed water temperature: At heater outlet	Temperature rise in heater, deg. F.	Water pressure loss in heater, lb. per sq. in.	Steam condensed in heater: Lb. per hr.	Steam condensed in heater: Per cent of feed
5,067	80-30-F	2	21,011	55	207	152	6.9	3,308	15.7
5,070	80-50-F	2	31,457	53	207	154	9.4	4,850	15.4
5,069	120-50-F	1	37,947	54	207	153	13.4	6,095	16.1
5,068	120-60-F	0.75	46,797	53	210	157	16.2	7,854	16.8
5,071	160-65-F	0.50	56,510	51	212	161	16.5	8,492	15.0

192 Brass Tubes 5/8 in. Outside Diameter, 46 in. Long, Heating Surface 121 sq. ft.

5,000.18	80-30-F	2	19,160	53	209	156	....	3,210	16.8
5,000.19	80-50-F	1.5	29,077	52	212	160	....	4,948	17.0
5,000.20	120-50-F	0.75	36,824	48	213	165	....	5,742	15.6
5,000.26	120-60-F	1	46,900	52	219	167	....	7,690	16.4
5,000.21	160-65-F	0.75	60,709	49	219	170	....	9,748	15.9

TABLE VII—COAL SAVED BY THE CLOSED-TYPE HEATER

Heating Surface 113 sq. ft.

Test No.		Test designation	Speed in m. p. h.	Indicated horsepower		Coal per I. H. P., hr., lb.		Coal saving by feed heating, per cent
Without heater	With heater			Without heater	With heater	Without heater	With heater	
5,005	5,067	80-30-F	15	876.3	985.1	2.24	1.87	16.5
5,001	5,070	80-50-F	15	1,536.4	1,533.2	2.33	2.03	12.9
5,002	5,069	120-50-F	22	1,963.2	1,974.2	2.54	2.03	20.0
5,003	5,068	120-60-F	22	2,382.3	2,379.4	2.84	2.25	20.8
		Heating Surface 121 sq. ft.						
5,005	5,000.18	80-30-F	15	876.3	957.4	2.24	2.19	2.2
5,001	5,000.19	80-50-F	15	1,536.4	1,480.1	2.33	2.02	13.3
5,002	5,000.20	120-50-F	22	1,963.2	1,916.4	2.54	2.03	20.1
5,003	5,000.26	120-60-F	22	2,382.3	2,376.4	2.84	2.16	23.9

Tests of Closed Heaters

Much attention has been devoted to the development of the surface or closed heater on the Altoona test plant and the final arrangement of heater of this type has a high efficiency in heat transmission. This heater consisted of groups of small brass tubes, making up the water passages, and each tube contained a brass strip crimped and twisted to cause heat absorption by thorough agitation and mixing of the cold and heated water. The tubes were surrounded by a casing which received the exhaust steam. The feed-water was passed four times through the heater by means of divided headers and separate tube groups.

Typical test results with closed heaters are given in Tables VI and VII. These tests were made on the same Mikado-type locomotive that was used for the open-heater tests.

In tests with the closed heaters the condensed exhaust steam was not recovered, but we understand the latest design makes provision for returning this condensation to the tender tank.

Appendix III—Caille Heater on the Baltimore & Ohio

The Baltimore & Ohio Railroad contribute in substance the following:

In 1913 a Mikado (2-8-2) type saturated steam locomotive was equipped with a feed-water heater of the Caille design, a heater of French make, of the closed type and using exhaust steam drawn from the exhaust base in the smokebox.

The heater was not satisfactory for examination, cleaning or overhauling and was abandoned on account of faulty design which led to frequent failures and expensive maintenance; the apparatus not being properly designed for power of this large capacity.

There was considerable trouble in maintaining the many parts of the heater. The tubes were very light and would not remain tight in the tube sheets for any length of time. The pipe joints loosened from the water hammer of the pump and constant leakage was experienced. In the hot-water cylinder the cast-steel piston was covered with composition which in a short time would flake off and cause pump slip. Brass rings were substituted but did not prove satisfactory. The pump was of insufficient capacity to feed the boiler when working hard and the injector had to be used as an auxiliary at regular intervals.

Appendix IV—Experience of the Boston & Albany

The experience of this road with the heater during a period of six months led to the following comments and conclusions:

When the feed-water heater is used there is a slight loss due to comparatively low thermal efficiency of boiler-feed pump as compared with the thermal efficiency of the injector.

The cost of maintenance of feed pump will evidently be more than the cost of maintaining the injector. The cost of maintaining piping, valves, etc., used in conjunction with the heater will evidently be more than the cost of maintaining the injector piping.

When the locomotive is in operation the average number of strokes of boiler-feed pump is approximately 52 per minute; and at this rate the feed-pump uses approximately 665 lb. of steam per hour, according to information furnished us.

There is a loss of heat in drips from the heater which are not utilized on locomotive 561.

There is no evidence that the use of the heater instead of the injector increases the hauling power of the locomotive. Locomotive 561 can be operated in a satisfactory manner by the use of the injector, and with greater convenience to the enginemen.

The temperature of feed-water leaving the heater when the throttle is open varies from 210 deg. to 220 deg., exclusive of abnormal fluctuations. When drifting or when the locomotive is not running, the temperature of feed-water usually drops to less than 100 deg. and the effect of closing the throttle is immediately reflected in reduced temperature of feed-water. There is less danger of creatin boiler strains due to cold water by the use of the injector than there is with the heater. We consider this particularly important.

If the exhaust from the boiler-feed pump were connected into the heater the temperatures of the feed-water entering the boiler when the locomotive is drifting would be somewhat higher.

The normal back pressure of locomotive 561 when using the injector may be considered as 6 or 7 lb., and under the same

working conditions the heater apparently reduces the back pressure by 2½ lb.

As the feed water temperature in the heater varies from approximately 230 deg. to 85 deg. there is a probability of developing leaks in the heater. It has been necessary to roll heater tubes a number of times to keep them tight.

We do not consider it good operation to use the heater when the engine is working steam and the injector when the engine is drifting. If, for any reason, it is necessary to discontinue the use of heater, there is no way of closing the valves without going to the front of the locomotive and this is objectionable.

The use of the heater practically prohibits the use of a top boiler check, account of the disastrous results which might be expected if cold feed-water is allowed to strike on boiler plates at a temperature of 387 deg. F.

Our experience with the heater indicates that the injector is more reliable than the feed-water heater so far as feeding the boiler is concerned. It is more convenient to operate the injector than it is the feed-water heater, and we find that the volume of water pumped by the feed pump varies according to the steam pressure in the boiler. When the boiler pressure drops it is necessary to increase the speed of the pump to keep the water at the proper level. This means that the engineer must give the pump more attention than is needed with the injector, and it is not desirable to distract the attention of the engineer from looking ahead for signals, etc.

The feed-water heater, when in good condition, successfully heats the feed-water to a temperature of between 210 deg. and 220 deg. F., when the throttle is open, by utilizing a certain percentage of the exhaust steam, but that the abstraction of this exhaust steam adversely affects the draft of the locomotive. The use of the feed-water heater on locomotive 561 does not effect a saving in fuel, as compared with the injector, but increases maintenance cost.

The Locomotive Feed Water Heater Company claims that the heater should save one per cent of coal for each 11 deg. added to the temperature of the feed-water, which, in the case of locomotive 561, would be about 14 per cent, and the claim is also made that this is accomplished by utilizing 15 or 16 per cent of the exhaust steam for use in the heater and that the use of this percentage of exhaust steam does not affect the draft of the locomotive.

So far as locomotive 561 is concerned, we have not found any saving in coal or water due to the use of the heater, and apparently it would be difficult to improve with this feed-water heater upon results now being obtained when operated with the injector.

Our experience leads us to believe that the heater will show up to better advantage on a level road than on a road having physical characteristics of the Boston & Albany, where considerable drifting is done, but evidently the heater is still in the development stage and further improvements must be made before it will give satisfactory service without excessive maintenance charges.

Appendix V—Experience of the Canadian Pacific

The Canadian Pacific states that experiments have been made for the past fifteen years with various types of waste-gas and exhaust-steam feed-water heaters. A great deal of information has been obtained, although practically the majority of arrangements throughout the past have proven unsuitable for one reason or another.

A feed-water heater is now being designed which is to be tried out thoroughly in competition with other feed-water heaters on the market. A considerable amount of experimental work is considered necessary before any satisfactory heater is discovered for climatic conditions on this road. A new design is being developed in which the heater is an integral part of the locomotive.

Discussion

In introducing this report the chairman said that the committee could make only a brief progress report, as it is not prepared to offer definite conclusions, due to the lack of heaters in service. He also stated that the committee heartily endorses the opinion of J. Snowden Bell, given in his paper, read before the Association and appearing in the 1917-1918 proceedings.

Since this report was put in print, the committee has received some information as to the European practice, through the courtesy of Robert E. Thayer, European editor of the *Railway Age*, with regard to the use of feed water heaters on locomotives. According to this information there are over 10,000 locomotives equipped with feed water heaters in Germany alone, and the number is being added to at the rate of about 2,000 per year. The Knorr system is the standard and is being applied to both old and new locomotives.

In Switzerland there are up to the present 21 locomotives provided with Knorr feed-water heaters, and 11 others are shortly to be fitted up with them.

In Holland the Knorr system is used entirely. There are about 300 locomotives equipped out of a total of 1,000, and it is understood that their present program calls for the application of heaters to all of their principal types of locomotives.

In Belgium there are a number of locomotives which were furnished by the Germans under the terms of the armistice, a large number of these being fitted with the Knorr heaters. Ten of the consolidation locomotives which they have recently ordered from England will be fitted with the Weir heater, and five of the consolidation engines ordered from America will be fitted with the Worthington heater.

In France the Caille-Potonie system is used, and there are 146 of this type now in service, with 272 on order. It is also reported that there are 20 in service in Tunis, 8 in Belgium, 50 in Roumania and 3 in Turkey.

In England it appears that but little has been done recently, although there is a tendency to consider seriously the application of feed-water heaters to locomotives on account of the increase in cost of fuel. Out of 12 replies received, 5 railroads have none installed, one road has one, two roads have two, one has five, one has 53, and two have some heaters but the number was not stated.

W. H. Sample (G. T.): We have just got one heater installed. I expect that it is out on its first test to-day. We have tried out the Weir heater, but owing to difficulty in our cold climate with the pipe we did not think there was a great deal of advantage to it, although it did show about 14 per cent. saving in fuel.

H. T. Bentley (C. & N. W.): I would like to ask Mr. Sample what difficulty he had with the heater during cold weather. I understood that the machine was out of operation because of a freeze-up probably.

Mr. Sample: Our data in the office of the general superintendent of motive power showed that the connections to the heaters were always giving trouble, they were always leaking, and we could not keep them tight. In cold weather the heaters gave a great deal of trouble, and in fact it became a nuisance, and it was decided that there was not sufficient advantage owing to these difficulties, to perpetuate it at that time.

J. Snowden Bell: I do not think I can add anything to what was said in my individual paper, to which the chairman of the committee has referred. In the preparation of that paper I made a very exhaustive research of the practice, both in the United States and in Europe, and the result of my investigations was that I came to the conclusion, which I announced in very strong terms in that paper, in which I understand the present committee has concurred, that a feed-water heater would be a most valuable and economic addition to a locomotive. I saw no reason why, even in view of the failures which were reported, that a feed-water heater of proper design could not be provided. I think so now, and I do not think we can too strongly urge on the members the advisability of giving their best attention to the production of a feed-water heater of that kind.

The demonstrated economy cannot be denied, and with coal at the present price, I do not see how we can afford to neglect any appliance which will offer such an economy.

G. W. Rink (C. of N. J.): The Central Railroad of New Jersey has just placed in service a large Mikado engine equipped with one of these feed water heaters, but we are not in position to say now what results we expect to achieve. I believe, however, that the application of feed water heaters for large locomotives, is a step in the right direction. We certainly would not erect a large stationary power plant and neglect to install a heater and I think the same thing applies to large locomotives.

W. H. Sample (G. T.): I would like to say before the close

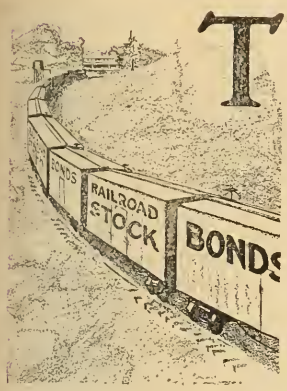
of the discussion that the committee did not think itself that there was sufficient interest taken in the subject, and the advantages which might be derived from the application from the heaters. The points in its favor were not brought out, which would have been shown had the right kind of interest been manifested in the development of the heater. I would urge all concerned to give us all the information they can and we will do the best we can with the subject in our report next year.

A motion that the report be received and printed in the records was seconded, and carried.

The Locomotive as an Investment

By George M. Basford

President, Locomotive Feed Water Heater Company



THE LOCOMOTIVE IS A BIG INVESTMENT, and it must be so considered and so treated. In no other branch of engineering development has so much progress and improvement been made in efficiency as has been made in the steam locomotive during the present official generation, and the improvement has just begun. If all new and all existing locomotives are made as efficient as the best, and it is possible to make them nearly so, private ownership and operation of railroads will be put in the way of success. But, no matter how efficient the power unit may be as a unit, its operation must be such as to obtain the benefit of the possible efficiency for the maximum number of ton miles per hour. More ton miles per hour is the only salvation of the railroads. Among other things, this calls for the best locomotives and the best use of locomotives, quick and continuous movements, reduction of idle hours, quick terminal movements, improved dispatching, improved maintenance and repair facilities and repair methods, also fuel and labor saving improvements of every possible kind. It calls for resourcefulness in keeping locomotive wheels turning most continuously and most effectively.

Steam Locomotive Here to Stay

Whatever we may have in the future, today the steam locomotive is the most vital influence in the progress of civilization. Its possibilities for assisting in meeting the problems of the present and future by reducing the cost of transportation lie beyond the imagination of all who have not made a careful study of the improvements now available for increasing capacity.

Whenever you wish you may put on the rails locomotives that, from a performance and particularly an efficiency standpoint, will hold their own with the best non-condensing power plants on land or afloat. You may at any time produce a drawbar horsepower per hour for 2.25 lb. of coal at the speed giving the maximum power of the engine. The problem is how to make all the locomotives in this country approach the standard already set, how to make the best use of facilities that are already available, also how to keep abreast of further improvements.

Importance of Overhead

It has been stated that the value of locomotives used on our railroads is 60 per cent of the total value of all the machinery, implements and tools used in all of the other industries in the country. Is this equipment used as efficiently and as effectively, when it is used, as is that of our manufacturers? A manufacturer is mighty careful about his $25,000 and his $100,000 machines to keep them busy. If he does not, he goes "broke." He puts cranes over them. He keeps raw material coming and clears away the finished product. He keeps them in repair. He works them night and day by watching operation and methods. He treats them as a big investment and keeps them going. He thinks of his machinery as being worth so many dollars per hour and he knows just how many dollars in each case. That is why he makes money.

In increased production an important lesson is learned from the electric locomotive. It costs more than the steam locomotive, and its friends have seen to it that it is given every opportunity for greater continuity of service. Expensive machinery ties up lots of capital. That machinery must produce or the carrying charge is overwhelming. The true significance of the word "Overhead" needs to be emblazoned in the railroad dictionary. Everything possible to do that will keep the wheels moving must be done. "Overhead" is the nightmare of the business man and the manufacturer, and it ought to be of the railroad man. Railroad men do not worry about it as much as they ought. Production is the answer to overhead in manufacturing business and in railroading. How to make the locomotive pull more tons per ton of coal, per ton of its own weight, per dollar of wages, per hour of the day, per year, per dollar of shop, terminal and track investment, and per mile run, is the answer on the railroad.

Figures prepared to illustrate the increased cost of locomotives built two years ago, compared with the cost of exactly similar engines today were too painful to be included in this discussion. They reveal the fact that those built most recently are up against a serious handicap. They must earn several times more than their predecessors in order to make good. Not only has the cost of new engines gone up; the value of old ones from a capital standpoint has gone up and so also has the cost of maintenance and operation. Therefore, every locomotive must produce more—as much more as is physically possible.

Motive Power Chiefs Should Be Vice-Presidents

In order to secure increased production from locomotives a serious handicap must be overcome. Railroads are essentially machines. Transportation success depends very largely upon the character and the use of the power plants that move the tons. Not all the operating officers have come to their high places with sufficient knowledge and intimate contact with the locomotive to understand and thoroughly know what a locomotive should be and what it should be expected to do. It is not their fault, but it has been unfortunate for the railroads.

Many of the members of this organization know that for many years the speaker has implored the mechanical officers of American railroads to compel the locomotive problem to take its proper place in railroad organizations and therefore in railroad operation. For years the speaker has urged a more commanding position for the mechanical officer and the mechanical department. In the present crisis this means more than it ever did. As a matter of course, traffic, accounting, legal and sometimes purchasing responsibilities are given recognition and high standing by being administered by officers of the rank of vice-president. This is as it should be. In my opinion, the pulling power of the railroads can never be what it ought to be, and what it may be, until motive power problems are solved and motive power policies are presided over by officials acknowledged and supported by the standing that the officer in charge of locomotive design, construction, operation and maintenance requires, not to mention the other question of cars. This suggests that the mechanical policies of the railroads, using 26½ per cent of the fuel of the country, involving technical responsibility for upwards of six billion dollars' worth of property, for more than four hundred million dollars spent per year in locomotive repairs and presenting possibilities to effect savings upon the expenditure of over a billion dollars per year for fuel, might with profit be presided over and decided by officers of the standing of vice-presidents. This ought to happen, but it should be done in such a way as to accomplish three things: First, safeguard

mechanical policies; second, provide for maintenance and operation of mechanical matters through the operating department; and, third, provide prospects and official standing which will constitute adequate reward for lifelong effort in a line of endeavor that requires this incentive.

On the other hand, if our railroads do not take care of their mechanical officials they will continue to lose men whose knowledge, experience and ability are needed in order to prevent public ownership and operation. They must be given the opportunity to increase production of transportation, and, fortunately, they know how to help to do it. In many cases they are obliged to plead and argue for improvements with higher officers who do not always appreciate the importance of these mechanical questions. Sometimes the decision concerning equipment is in the hands of persons or departments whose responsibility does not extend to the operating results. Too often prices only determine their decisions. Such a selection of equipment is not only detrimental to the operating results, but most discouraging to the motive power officers who must keep the locomotives going and going at the minimum cost of fuel and repairs.

Profit, Not First Cost Important

The vital thing is to make a *profit* on transportation. Profit is not determined so much by the first cost of the piece of machinery as by the economy of its performance. Under certain conditions a costly machine may be far more profitable to its owner than a cheap one, which is wasteful in its workings. Railway executives have realized this point in electric locomotive installations. Such installations have not been hampered by traditions such as exist with the steam locomotive, and the engineers are allowed a free hand to produce the best possible economic results. It would be worth while for any railroad to give an order for steam locomotives to do certain work at minimum cost per unit of work done without restriction as to the cost of the machine. The speaker knows of no record of this having been done. He predicts surprising economies when it is done.

This constitutes the strongest argument for basing locomotive recommendations upon facts that can not be questioned and for pushing plans to conclusions. High officers will yield to the insistence of arguments the strength of which is made clear to them. Show the president the meaning of the locomotive as a big investment, and, in justice to himself and the road, he can not cut money-making improvements out of his appropriations. The president always defers to some authority in mechanical matters. It is most fortunate for every one concerned when this authority is his own mechanical organization. Unhappily it is not always so.

Bigger Boilers Possible

An example of subjects which open the way to revolutionary improvements in the locomotive is dynamic augment, which opens up great possibilities in increased capacity of locomotives. About six years ago a systematic movement to reduce reciprocating weights and decrease dynamic augment was started. It was carried on successfully up to the beginning of the war and then stopped. This work must be resumed. Railroad men were beginning to realize that it was not the static or dead weight of the locomotive alone that was important, but the dead weight plus the additional weight put on the rails by the unbalanced weights at speeds. When the dynamic increase from the unbalanced weights is reduced by lighter weights of reciprocating parts more weight may be put into the boiler. This development lies right at hand. It is well worked out and is ready for immediate application.

Let us see what this means. Consider what are known as the 2-10-2 "A" and "B" classes of Administration engines. They have not enough counterweight in their main wheels to balance the rotating weights at the main pins. With ordinary open hearth steel parts, as these engines are built, there is a lack of rotating balance at the main pins of 390 lb. This produces a dynamic augment at 54.2 miles per hour equal to 50 per cent of the static weight at the main wheel. By the use of high quality steel forgings for reciprocating and rotating parts it is possible to reduce this unbalanced weight in the main wheel to very nearly zero. This would also help the overbalance in the other wheels. Of course, it must be made clear that there was insufficient time to consider this in the Administration engines.

Furthermore, if the Administration heavy Mikado is given specially designed reciprocating and revolving parts of high quality steel its destructive action upon the track at a speed between 40 and 45 miles per hour will be less than that of the Administration light Mikado that is fitted with the present corresponding parts of open hearth steel. The advantage thus gained is cheap when it costs only a change in material and refinement of design. At all speeds at which these engines are at all likely to damage the track the heavy Mikado, if built with light reciprocating parts, will be actually a safer engine than the light Mikado is now. The heavy Mikado has 10 per cent more tractive effort, 14 per cent more heating surface and its total weight is 9½ per cent greater than the light Mikado.

The excellent report to this Association in 1915 on this subject should be followed by another study of this promising development which means so much to the track and to bridges, as well as to the locomotive itself. Maintenance of way officers are now studying stresses in track. They take dynamic augment into consideration but they seem to accept it as necessarily high instead of considering it is a series of forces which may by refinement be reduced. It may be greatly reduced. The reduction will relieve the track immensely, and relieve boiler restrictions.

Boiler Design Improved

About eight years ago methods of laying out sizes, capacities and proportions of locomotive boilers changed from the empirical to the exact. New rules were established. These were based on the power of the cylinders, and the boiler was designed to produce the necessary steam. This is not as simple as it sounds. The result of the change in methods was to put locomotive designing on a higher plane, equal to that of marine and stationary engine design. What this has meant to our railroads and what it means now, with increasing weight, size and power of locomotives, is difficult to estimate, but it is safe to say that we could not build the big engines of today on the basis of the rules of design recommended by this Association in 1897. The locomotive builders have introduced these radical improvements in elementary design. Others have insistently and consistently developed improvements of factors making for better use of fuel and of steam. The use of steam in the cylinders, production of superheated steam, the subjects of combustion, stokers, steam conservation and boiler circulation are now studied in locomotive practice as they have been studied for years in the stationary and the marine fields. Locomotive combustion is being studied as it never was before. This has revealed the relative value of firebox, combustion chamber and tube heating surface and has thrown new light on the subject of air supply to the fire, baffling and mixing the gases and the form and volume of fire boxes. In fact, the fire box has been transformed into a proper furnace. If stationary and marine engineers were limited as to size and weight as locomotive designers are limited, the progress that the locomotive has made during the past few years would be appreciated.

Fix Up Old Engines

There is scarcely an item that goes to make up an efficient and safe locomotive that has not been improved to make more power and more mileage. They not only make for better use of fuel, but they keep the engine from going to the shop as early and as often and they protect the crews. These improvements need not be mentioned in detail. They are well known, are past the experimental stage and are available to transform the fuel, wage, time and tonnage wasters into money makers because the improvements are applicable to old engines as well as to new ones.

Enginemen and firemen know these things. They know how modernizing transforms an engine. They understand what these factors mean to the big new power and they can not be expected to exert themselves to the utmost and give most efficient service when so many of them must work with engines that they know to be capable of so great improvement. Not the least of the advantages of modernizing is its effect upon the men. They naturally do better work when provided with good tools.

New engines are usually well equipped for good performance. They are usually provided with most of the factors that make for increased capacity and improved economy. Their application to old engines offers a wonderful opportunity for a big money saving improvement. This application to old engines is a

gold mine ready for immediate operation. These old engines may be made, weight for weight, as good and as efficient as new ones. How many men in this meeting realize the task before them if they were asked to explain to a successful manufacturer the reason why this has not been done? How often a twelve or fifteen car engine is seen on a four or five car train. This happens on roads having hundreds of engines that if modernized would handle light trains economically while the big ones do not. This is somewhat like turning piston rings in a wheel lathe. This is difficult for a manufacturer to understand, especially when it is so easy to bring small, old engines up to date.

What Has Happened to Some Engines

Turn to page 55 of the Proceedings of this Association for the year 1917 to see how a single modernizing factor changed the maximum power of an engine. By applying this improvement to a consolidation engine on the Big Four, the power of the engine at 27 miles per hour was increased one-third. The speed at which the engine produced its maximum power was stepped up 42 per cent. This is typical of the possibilities on other engines with correspondingly greater improvement when all the modernizing factors are applied.

Not long ago, one of the largest Pacific type passenger engines in the country gave up its train because of a loose tire. A twenty-year-old eight-wheeler took the train of eight steel cars forty miles into the terminal in time to save refunding the excess fares. The little eight-wheeler had been modernized. The engineer said: "The bosses don't know what these modernized little engines will do. They do not know what we have to work with, and they do not use the old engines as they should after they are modernized. The tendency is to overlook their possibilities." Due in part to this experience, thirty more of these small engines on this road are now being modernized as they go through the shops.

When one of our big railroads was considering the application of a fuel saving and capacity increasing factor for modernizing existing engines and improving old ones, the problem of keeping one of its important passenger trains on time was pressing. The regular train had six coaches and one parlor car and was hauled on a very fast schedule by a Pacific type saturated engine which usually was unable to make the schedule with nine cars. One of the engines was modernized in the hope that it would handle ten cars. In the first test the train had seven cars. On each of the following test runs one additional car was put on until the engine handled 15 cars on schedule time. Let me here make record of the fact that one of our great railroads declined even to try out this particular improvement until its owner agreed not only to furnish it without obligation on the part of the railroad, but to remove it at his own expense if it did not satisfy the representations made for it.

In another case modernizing saved 300 old eight-wheel engines which were too ineffective to be maintained as they were. They were good to haul wooden cars, but were outclassed by steel equipment. Approximately 30 per cent in fuel was saved by modernizing and they were made sufficiently powerful for steel car trains.

Modernizing received its first good start by the improvement of a lot of Mallets. Another road has rebuilt Prairie type engines into Mikados with 21 per cent increase in tractive effort. Another road changed over 300 Consolidations into Mikados. At speeds of 35 miles per hour the last mentioned rebuilt engines have a drawbar pull of 22,300 lb., whereas the Consolidation engines gave only 8,500 lb., at that speed. These were comprehensive changes which have proved successful. Modernizing usually need not be carried as far as to change the type or wheel arrangement. Its greatest field lies in adding improvements without this change. Every railroad man knows that he has this opportunity before him. It is unnecessary to cite further notable examples, although this paper could be filled with them. The thing to do is to get into action, survey all existing engines, plan the modernizing and rejuvenate a certain number of engines per month on a real time card as they go through the shops.

In 1915 a comparison was made between two engines. One was a Consolidation which represented best practice before the time modernizing of design and introducing of fuel saving factors began, the other was a Mikado built in 1915. The Mikado delivered 82 per cent more work for the same amount of coal, which in each case was as much coal as the fireman could handle. The engines were designed for the same road and the same service and represented the advance of ten years in modernizing on the road in question, including design and the use of fuel saving, capacity increasing factors.

The locomotive of ten years ago, unmodernized, is very little more efficient than one of 70 years ago. Modernizing three of them, however, is usually equivalent to an additional engine of the same size. The rest of the problem is to get the utmost service out of the improved engine and to obtain on the road the increased capacity known to be available. The available improvements should be capitalized and made to earn money. Not only should the locomotive itself be considered as an investment, but the improvements should also be so considered.

Electric Locomotive Fallacy

Electric locomotive partisans are propagandists in arguments for electricity versus steam. They argue, however, on the basis of the steam locomotive as they knew it in the past rather than as it is today. They further weaken their case by absurd claims to the effect that electric locomotives can save two-thirds of the coal burned by all the steam locomotives in the country, and they base their claims on the steam locomotive of ten years ago. The truth is that in five years of this period the economy and the capacity of the steam locomotive has more than doubled. The object is not merely to win out against the electric, but to pit the steam locomotive against the high cost of everything. Constructive, systematic policy of locomotive engineering and operation is the way to do this and it will do it.

We Hear Too Little About This

We are told that electrics are replacing steam locomotives. We do not hear enough about the 38 steam Mikados that replaced 12 Moguls and 38 Consolidations on the Missouri, Kansas and Texas several years ago, and of the 41.8 per cent increase of train load, also of the reduction of 23 per cent in the number of trains. The Norfolk and Western replaced 57 engines with 40, with a reduction of 26 per cent in the number of trains for the same traffic. The Delaware and Hudson showed a saving of 43.8 per cent in coal by substituting Mallets for Consolidations. Each Mallet replaced two Consolidations. A year later each of these Mallets showed 7.6 per cent better fuel records and each of them continued to do the work of two Consolidations while burning less coal than one of the Consolidations. On the Chesapeake and Ohio 25 Mallets replaced 44 Consolidations, saving 37 per cent in the cost of handling freight traffic. This has been going on the country over in cases too numerous to mention, but too little is said about these improvements and too little is said about future possibilities. When every existing locomotive is thoroughly modernized and when all are operated with the study, care and supervision called for, and when coal and fuel oil are used as if they were expensive—then this Association and the men who make it will be recognized for saving the railroads. In this scheme of things the obsolete engine lacking labor saving, capacity increasing, fuel conserving and safety factors has no place.

For further development we have the tractive effort booster, also the fixing of cut-off to give maximum power at every speed of the engine to which B. B. Milner referred at this convention last year.

Scrap the Old Shops

Shops for quick and economical repairs to big engines present possibilities for revolutionary modernizing improvement. If the "average" railroad shop should be made the subject of investigation and report with a view of equipping it to put locomotives back on the road repaired as quickly and as cheaply as possible, it is the speaker's opinion that the honest recommendation of the investigator would be to salvage the old and build a new shop, from foundations up. Shops as well as locomotives need modernizing from the standpoint of being considered as a big investment. Only a short time ago the speaker watched the wheeling of a heavy engine by air jacks at one of the shops of a big railroad where he once had the honor of employment. This would be impossible if the locomotive or the shops were considered by that road as a big investment. Let us hope that an able, quick crane has replaced the dangerous sluggard jacks and time and man killing wooden blocking. Fortunately,

shops as well as locomotives may be modernized if there is a will to do it and if the policy of doing it is established on a stable basis. Bear in mind the fact that increasing the number of new big engines without increasing shop and roundhouse facilities is fatal as a business policy.

Maintenance of way officers are now engaged upon the establishment of units for comparison of track repair cost, and great improvements in track maintenance costs are expected. If costs of various locomotive repair shop jobs were compared upon a fair and really comparable basis, many shops with high costs could be put on the basis of the best shops. Improved machines, rearrangement of machines and improvement of methods, with reduction of distance traveled by material and parts, would certainly result. Many shop operations are subject to comparisons that would be intelligent and fair, but only items which are subject to fair comparison should be selected. There are many of these, and if the facts that comparisons would reveal are put up to the managements strongly, machinery fifty or more years old would disappear from our shops and roundhouses because it cannot be modernized.

In the matter of shop production methods this Association would do well to discuss the paper upon Graphic Production Control read by Mr. E. T. Spidy, of the Canadian Pacific Railway, January, 1920, before the Canadian Railway Club. Officers who desire to make a good record should study it. If Mr. Spidy's "up-to-the-minute" shop information were also applied to locomotives and their operation, railroad stockholders and the public would be happy indeed. Careful attention to the excellent report by the Committee on Shop Scheduling Systems, to be presented at this convention, is earnestly recommended in connection with the reduction of overhead.

Stitch in Time Terminals

Locomotive terminals are not all equipped to handle expensive engines promptly and economically. Has anyone charted or scheduled locomotive terminal movements with a view of short cuts in delays? Are big engines ever held in yards and sent in herds to the roundhouse for fire cleaning, coaling, sanding and roundhouse jobs, when they could as easily be sent singly to keep the roundhouse load curve more uniform? Because the "stitch in time" at the roundhouse may keep a big engine going strong, the best of mechanics and the best of tool equipment should be at the roundhouses. Is this so today? Unquestionably the round house foreman should be a man of greater authority. It would seem to be a money making scheme to give him much better standing, also to give him a yard foreman to handle the firing up of engines and all the out-of-door work, to speed up ash pit and other work that delays expensive engines from the road. An inspector who has been a locomotive engineer should meet all incoming engines and discuss with the crews the condition of the engine and the defects found. These men would save their annual pay every month. It would be very profitable to have traveling engineers spend a day or so every month at the roundhouse.

Adequate locomotive terminals laid out, organized and equipped for quick, thorough work will speed up the entire railroad. Inadequate terminals do more than anything else to slow down the entire railroad. Furthermore, locomotives may be designed and equipped for quick terminal work, particularly at the ash pit. Who knows how many new locomotives might be saved by quickening terminal operations?

Better Use of Power

In locomotive operation lies a friutful field for study and improvement. Mileage of passenger and freight runs is an item of importance. Water and coal stations that were established years ago upon the basis of engines which did not have the advantage of modernizing factors may in many cases be relocated with profit. Why should not passenger divisions be extended to 300 miles and freight divisions to 200 miles? There are difficulties, but are we sure they can not be overcome? It is much better to change crews and much cheaper than to let the engine go to a terminal so often. Is it possible to double the mileage between roundhousings or to cut in halves the time waiting for the ash pit?

As to terminal delays, have conditions improved greatly since N. D. Ballantine recorded, before the Western Railway Club five years ago, the results of an investigation of locomotive service which showed that the mechanical department had the engines 58.5 per cent of the time, and of the balance of the time 65 per cent was occupied between terminals and 36 per cent in actual running. Mr. Ballantine revealed an opportunity for remarkable saving by lengthening locomotive divisions that this Association can profitably discuss.

Coal Will Never Again Be Cheap

Individual fuel records have been advocated for a quarter century and some success has come to those patient enough to persist in this direction. Coal costs are already high enough to justify this and many other improved methods, the importance of which increases with coal costs and with the amount of fuel a big engine burns. For example, one reason for the delay in adopting feed water heating is that coal has been considered cheap. Coal must now be considered as a big investment. Fuel is no longer cheap, and in the quantities required to haul the big tonnage that is coming it never again can be cheap. Natural gas was once considered cheap. Think of the result of such opinion.

Government experts have performed wonderful work in the use of fuel. This work will be continued by individual roads, and when it is coupled with systematic application of modernizing factors to old engines the results will appear to their full value. However, fuel saving on an obsolete engine is like trying to save water that has gone over the dam. Put flash boards of modernizing on top of the dam and save that water for the wheel that turns the mill.

"Follow Up" Policies

A very wise policy has been followed for years by a motive power official who is well known among you. He believes in following up the items of maintenance upon his locomotives. For every item, for example, injectors and rod packing, and the fuel and labor saving factors, staybolts, springs, tubes, annual expenditures for which reach or exceed $100,000, he assigns an expert service man, reporting to him, whose duty is to insure the proper application, maintenance and use of the items in question. If every road would follow up its $100,000 investments in this way wonderful savings would be effected and many an engine would go out on its run instead of being held by government inspections. You know and I know what the railroads owe today to the service organizations the supply companies find it necessary to employ to insure the most efficient use of their devices. This service rendered by these companies has made the big modern efficient, economical locomotive possible. The time has come for the railroads to render these service organizations less necessary than they are today. Some years ago the writer saw the mechanical superintendent of an English railway "hit the ceiling" when a freight engine went past his office window with its piston rod packing blowing. We have much to learn concerning the value of keeping worth while improvements up to their best work. We do not worry enough about things that leak and things that may grow into engine failures.

Another fertile field for modernizing is the railroad power plant, shop plant and pumping station. These use enormous amounts of fuel in the aggregate and are proverbially wasteful. Records may be made and very easily by rounding these up and by modernizing power plants. In one case, by merely charging up the coal a plant burned, a 25 per cent saving was made. It was saved by showing that fuel is an investment.

Men who make great business successes are said to be brainy—they are brainy, but they are more than that. The number of men who know how to do things and who recognize opportunities is greater than the number that actually do them. Success comes from persistent pushing to conclusions the plans that brains conceive. Those who have won great success in modernizing locomotives are the ones who not only recognize the opportunities for applying to old engines modernizing factors that make for more ton miles per ton of metal and per ton of coal, but those who persist in definite plans for doing it. They are the ones who will take high standing in economy of locomotive operation because they schedule and program their improvements that make for higher capacity and economy.

Safeguard Money Already Spent

By spending a few thousands in modernizing, millions of dollars already invested in locomotives that are ten or more years old will return more service. These old engines stand as

a big non-paying investment. Spend the little that modernizing costs and change them into a big paying investment. A manufacturer must scrap his obsolete machinery. How much more fortunate are the railroads. They may at little cost reclaim their locomotives by methods that make them often 50 per cent better than when they were built. We should not consider a ten year old engine in the light of its depreciated value. Many of them will sell today for their original cost. On this basis they are all the more worth modernizing.

Suicide

Without question the greatest locomotive investment, and one which can not be expressed in dollars, is the organization for locomotive design, operation and maintenance. Organization constitutes the greatest opportunity of all. Constructive, consistent and persistent personnel plans are imperative. The problem is simple but the solution must be comprehensive. Every railroad should see to it that employes are (1) selected wisely, (2) trained properly, (3) promoted by merit from intimate knowledge of performance, and (4) promoted from the inside to fill all important prize positions.

To this end apprenticeship must be revived and applied to all departments in a form adapted to the great need of the times and the graduates from apprenticeship must be kept on the road by intelligent, systematic personnel plans. The plans referred to will supply every position including those requiring special technical education. Railroads will not be forgiven for neglect of apprenticeship. They are having their punishment now for neglect of it. Have you been making your quota of skilled mechanics all these years? Is one apprentice for every 18.58 mechanics, the country over, safe? Have you studied your labor turnover and made plans to reduce it? Labor is a big investment, and labor turnover is a big loss.

Vision

Vision as to conditions, possibilities and the future development is the great need now. Who is to have the vision to correct the tendency—already acquiring momentum full of danger to the railroads—for the mechanical departments to drift down to merely practical maintenance organizations?

That this Association has the power and the opportunity to bring about a proper recognition of the locomotive problem is one of the hopeful factors for the future. But this organization must get above the smaller questions and into the business questions of the pulling power of railroads, and must do it quickly.

No group of men ever had a more glorious outlook before them. No group ever had a better and stronger incentive; and no problem could possibly be accompanied as this one is, with the means ready at hand for its solution. The task is to study conditions, use factors and facilities that are all ready at hand and assist the development of new ones. The outlook is most promising, hopeful and encouraging; but quick, hard work is necessary because the situation as it stands today demands the best we have.

What are you going to do about the eight hour day? Time and a half for overtime? 100 to 200 per cent increase in wages? 100 to 200 per cent increase in fuel cost?

What are you, the individual, going to do? You know the conditions and the remedies. Put them before your superior officer in a convincing way—with a foundation and structure of facts. Give them the arguments that will get the money necessary to economical operation.

Nothing that lies ahead is as difficult as the pioneering that gave the country its wonderful railroads.

Discussion

In the presentation of this paper Mr. Basford made the following remarks: If the railroads are to stay out of the hands of the government, a lot of people have got to wake up. Mechanical department problems must be recognized. Mechanical men must be listened to. On the other hand, the mechanical men must wake up and tell what they know, and tell what they need, and get it. (*Applause.*)

You have the strongest argument in the world for the mechanical department problems. If the power is right, it is easy to run a railroad. No one can run a railroad without the power in good condition. If anybody can get what they need in the way of appropriations, help or anything else, you can. I think it is your own fault when you get turned down. Everyone of our 66,000 locomotives must pull more tons per turn of driving wheels, and must make more turns.

Chairman Tollerton: I think a vote of thanks is due Mr. Basford by the Association for the very wonderful paper he has presented, and while he has told some plain truths, it is something I think that all motive power men have realized for years. The railroads of the country have been confronted with a very difficult problem. It is unnecessary for the Chairman to elaborate what that problem has been, but with railroads, like individuals, if they haven't money to buy they have got to get along the best they can with what they have got. However, as stated in my address, the new Transportation Act has provided a means by which this money will be secured, and the railroads of the future must be run as a business showing a profit. If it does not do so, it is a direct tax on everyone.

F. W. Brazier (N. Y. C.): I feel something like a duck amongst hens, in the midst of you brilliant motive power men, I being strictly a car man. I was going to make the motion that a vote of thanks be extended to Mr. Basford for his very able, wide-awake paper, and then I want to roast you motive power men a little mite.

You come here to these conventions for what? For educational purposes. But you sit here like the Scripture says—"Why sit you here idle?"—why don't you go to work, why don't you express your opinion?

I attended a meeting of motive power men a few years ago and your able vice-president, William Garstang, whom we all love and reverence, got up and said that on the Big Four Railroad his officials would always give him all the improvements that he wanted as long as they didn't cost a damn cent. Now, that is just the position that you gentlemen are all placed in. Mr. Basford's paper is brimful of light, and he ought to be the general superintendent of motive power of the United States of America, and put some life in all the officials.

C. E. Fuller (U. P.): Knowing Mr. Basford as I do, and knowing he is very, very bashful, I was particularly pleased to hear the paper which he presented to us this morning, which is so full of interest. there are some things that he said that I think it would do us all good to take home with us, and to think them over, and study them, and one of these things is: have we been consistent with our people? Have we stood on our feet? Have we had the courage of our convictions? Have we told the story as it should have been told?

I believe that if you will take this paper which has been presented this morning, and study it, and commune over it, you will find that the disease, or the germ of the disease, is in our own body. We have not, to a large extent, gone to our people and represented to them in a forceful, plain and convincing manner what we require, what we should have, and our reasons for having it. In other words, some of our executives have been stronger than we have been, and we have been timid and week-kneed.

Mr. Basford's paper, if it has the good effect that I feel it ought to have, will help the mechanical department more than any one thing that has ever been said at this or any other convention of this Association.

Frank McManamy (U. S. R. A.): I feel that this Association is to be congratulated on having this paper presented to it, but I do not think that we should leave this meeting with the impression that the paper was intended to make the railroads spend more money. My view of the paper is that its purpose was to save money for the railroads, and every matter which Mr. Basford has mentioned will actually pay the biggest dividends on the investment that any money spent by the railroads can pay.

I think we should not overlook the fact that the only thing the railroad has to sell is transportation, and without motive power we have no transportation. Therefore, we are destroying our own merchandise and failing to lay in a new supply if we do not make proper provision for taking care of motive power, which is the only thing that brings in the money to the railroads.

The railroad men of the country have not done their full duty toward supplying labor for the departments they represent by simply hiring the men who come along, a comparatively few, and no railroads have made sufficient provision for providing a supply of efficient mechanics for the future. I speak of this matter, because within the last year I personally made a canvass

of every railroad in the country, and the conditions which I found are set forth in Mr. Basford's paper; that is, for the entire country there was a ratio of 18.5 mechanics to 1 apprentice. We have said that the ratio of 1 apprentice to 5 mechanics, which has been requested by the shop crews, which is incorporated in most of the schedules, will not furnish sufficient mechanics. In my opinion we do not know because we have never tried it.

In some trades we have as low as 1 apprentice to 300 mechanics, and on some railroads we have as low as 1 apprentice in all trades to 31 mechanics. These are conditions which the mechanical department officials must take steps to correct. It is not enough that we put on the apprentices when they apply, but a careful canvas must be made of the employes to get the apprentices. If the rate of pay is not sufficiently attractive to provide the requisite number of intelligent and able apprentices, or apprentices that will qualify for a trade, then the rate of pay and the working conditions must be made more desirable.

When we get the mechanics, the point brought out in Mr. Basford's paper, that we must have suitable facilities to take care of the work, becomes more important. Never again will we have cheap fuel, which emphasizes the necessity of proper maintenance of locomotives. I think that he could well have said, that never again will we have cheap labor, and, therefore, some of the roads which have been able to maintain their equipment with economy with mechanics at 30 to 40 cents an hour, and common labor at 17 to 25 cents an hour, and apprentices at 12 to 21 cents an hour, will find the same methods of maintenance very wasteful and expensive with the wages of mechanics running to 85 cents to a dollar an hour.

There is only one way in which we can economically maintain our power, and that is by improving facilities. Such expenditures will afford the biggest returns.

We have spoken of the expense of building shops. I know many cases today where the money spent for the last order of locomotives could have been much more profitably spent on improving the shops. When you have 20 to 25 per cent of the motive power standing idle it does not help matters permanently to buy more locomotives. You simply add to the congestion, to the investment, to the running expense, and handicap your mechanical department.

When conditions of that kind exist, instead of ordering new locomotives to tide you over a period of heavy business, the thing that ought to be presented to the officials is the necessity of providing facilities to take care of the motive power they have.

A motion that Mr. Basford's paper be received and the Association thank Mr. Basford for the paper, was seconded and passed together with an amendment to the motion that the paper be printed in pamphlet form and sent to the executives of every railroad in the United States and Canada.

Design and Maintenance of Locomotive Boilers

THE ASSOCIATION ADOPTED a resolution in connection with last year's report referring the subject of combustion chambers to this committee.

Forty-five roads have replied to questions contained in this year's circular.

Water Glass Fittings and Mountings

Out of the 45 roads making replies, 27 use tubular water glass, 14 the reflex and 4 report using both. Comparative tests of the tubular and reflex glasses have been made by four roads. One states that the reflex water glass after test was found no better than the tubular; another, that the tubular with a protector was found more satisfactory; still another, that the tubular has less visibility but lower maintenance cost, and another road reports that after trial the reflex glass was regarded as unsatisfactory. These tests in a general way appear to favor the tubular glass, although it is conceded that both types of glass have their adherents, and it is likely that local conditions have a great deal to do with this question. No valid objection can be taken to either type of glass where properly installed and maintained.

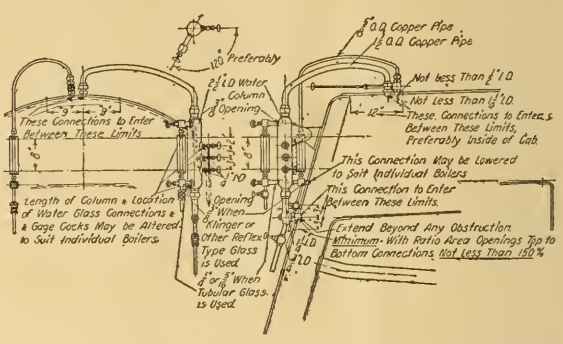
Regrinding of reflex glasses was reported as successful by four roads, with fair results by two, and without success by three. The cost of regrinding was reported as varying from 7½ cents to 45 cents per glass. Regrinding reflex glass is of questionable value.

Specifications for use in the purchase of gage glasses were reported as not used by 3 roads and in use by 6, 4 of whom use specification prepared by the New York Central. The Pennsylvania also has a specification which has recently been adopted by the Union Pacific. A test of the various bulls-eye tubular and reflex glass by the digester and dipping methods will readily convince the observer of the necessity of such a specification, and it is the recommendation of this committee that the Committee on Specifications for Materials be requested to prepare a specification for gage and water glasses for this association.

No trouble was reported from packing washers expanding and clogging the passages. The precautions taken include care in packing, the use of a proper design of connections and repacking at regular intervals, if necessary.

Water Columns

One road regards the water column as superior to all other arrangements; 11 state that the water column furnishes true readings; 6 state that the water column is satisfactory; 5 regard the water column with disfavor, while 5 state that the water column is not satisfactory. One member states that he believes the water column does not give true readings, and another states that there is a siphon action when gage cocks are open, which causes the readings to vary as much as 5 in. or 6 in. from the true water level in the boiler. In commenting on the latter



Arrangement of Water Glass and Gage Cocks Approved by the U. S. R. A. Committee on Standards

statement, it is the belief of the committee that some other unusual and undesirable condition existed, such as insufficient opening or proximity to a water tube.

With the usual types of modern wide firebox boilers having sloping back head, and generally provided with arch tubes admitting large volums of steam into the back water space, the committee believes that in order to obtain more accurate readings the application of gage cock and water glass fixtures deserves careful consideration, and presents as recommended practice of the association the arrangement of water glass and gage cock as developed and approved by the Committee on Standards, at

Washington, and as illustrated by their Drawing X-100 reproduced in this report.

Standard Practice for Beading Tools

From a comparison of the drawings of beading tools submitted, it appears that the essential detail of the tool is the throat or surface from which the bead is formed. In some cases the tool is shown straight in the circumferential direction of the flue. The curve in the radial plane of the tube determines the radius of curvature and the size of the bead. In most cases a slightly larger radius for beading tools is used on superheater flues than on ordinary boiler tubes. In some cases the same tool is used for both classes of tubes. Some use a slightly different tool for maintenance of tubes than that used in resetting new work, thus making at least four different beading tools.

For beading the regular boiler tubes, the radius of curvature reported for beads varies from ⅛ in. to 11/64 in. The radius of curvature of the throat of the tool in the other direction is usually made the same for boiler tubes and superheater flues, and varies from 5/8 in. to 2 in., although, as stated above, some were made straight. There is no essential reason for all of this variation, except the variation in the size of the bead, which is a function of the thickness of the flue. Practically all beading tools are maintained to size by regular periodical checking with standard gages.

There is considerable variation in the details of the methods of expanding flues. Most roads use both the roller and the prosser expander and follow closely in details of tools and in practice the recommendations of the Locomotive Superheater Company.

A wide variation of practice exists without any apparent reason, and the committee asks the views of the association as to the advisability of preparing and submitting next year a set of tools and operations for setting, beading and maintaining tubes and flues as recommended practice.

Proper Location of Blow-Off Cocks

The number of blow-off cocks in use per locomotive varies from one to four. Some report blow-off cocks located on the belly of the cylindrical part of the boiler but most of them are located on the water legs about the firebox. Some have one cock on each side of firebox with one on the throat sheet at the center. Some have only two blow-off cocks, one on each side of firebox, sometimes located near the center of the side, and possibly more frequently near the front corners. Two roads reported the use of a single blow-off located on one side at the back corner of firebox, and connected to a perforated pipe lying along the mud ring in the back water leg under the fire door. Quite a number report the use of one blow-off cock located over the mud ring at the center of the throat sheet. The number and location of blow-off cock is determined to a considerable extent by the kind and quality of water used for boiler feed.

Very few failures, or troubles, with any of the blow-off valves in use were reported. To reduce the danger of obstruction from scale and sludge, a great many blow-off valves are provided with some form of strainer. One road places the valve about 12 in. above the mud ring with the idea of leaving the scale in the water leg below the valve when blowing off.

The practice of blowing off on the road is employed only by those roads where water conditions make such practice necessary. The recommended essentials in construction to permit blowing off and closing on the road are a valve rigging operated from the cab or a safe position on the running board, the valve located in view of the operator and designed so that the boiler pressure will assist in closing and hold it to its seat. An auxiliary valve should be provided that can be closed in case the main valve fails. There should be a strainer to prevent scale and other obstructions from lodging in the valve. The valve should open full, have straight full passage, and be rigid in construction and positive in action.

Combustion Chambers

The number of engines reported with combustion chambers was 2,152, with chambers varying in length from 5 in. to 88 in. Of these about 300 are reported with back flue sheet welded in place while the others are riveted. Out of 23 roads reporting combustion chambers 18 use a transverse weld across the crown sheet at the rear, but 6 of these express a preference for continuous crown sheets, and the intention to apply them on renewals.

One road with about 200 combustion chambers, is of the opinion that the cost of maintenance overbalances any fuel economy obtained from their use. One road states that the combustion chamber permits of construction of longer boilers than otherwise would be practical. Another, without definite tests, can see no advantage in the combustion chamber over those of other designs. Three believe that flue troubles are reduced from the application of combustion chambers, and 11 report a belief that fuel economy is obtained from their use.

Troubles reported from combustion chambers include the collection of cinders in the chamber resulting in the warping of sheets. Six have reported trouble from cracks in the throat sheets, one reports trouble from broken stays on long combustion chambers, which was corrected by the application of flexible stays, another reported trouble in keeping the water space under the chamber free from mud; one is of the opinion that the trouble from combustion chamber increases the cost of maintenance; ten report no troubles in maintenance; one reported some trouble due to faulty design, and one says flue sheets are easier to apply with combustion chambers.

Six roads reported experience with bridge walls, three of which were of the opinion that they are desirable and three were not. One thinks a bridge wall should be used only when necessary.

One road is of the opinion that the combustion chamber is essential in aiding the distribution of weight on large engines, one that it has little effect, and fourteen consider that it is not essential for that purpose. It is the view of the committee that on large modern engines a combustion chamber is practically a necessity as a factor in proper wheel base and weight distribution, proper length of tubes and superheater equipment, and that the additional direct heating surface of the combustion chamber added to the firebox heating surface is of distinct value in aiding evaporation. If the use of combustion chambers is attended by increased maintenance, this has now become a necessary evil attending the large locomotive, and these so-called evils can be largely reduced by proper design and proportion.

The minimum distance from crown sheet to inside of wrapper sheet is given as 25 in. by one, 23½ in. by another, and 20 in. by one. Some vary the distance with the size of the boiler, two giving the rule of making it equal to 15 per cent of the diameter of the largest course; four endorse the standards followed by the locomotive builders, and eight have no standard practice. In regard to lowering the crown sheet at the expense of the heating surface, fourteen do not consider it justifiable, while two roads do, if necessary to maintain the standard minimum, and four state that it would depend upon the design.

The recommended minimum distance between bottom flues and waist sheet varies from 2 in. to 7 in., and one recommends 10 in. with combustion chamber.

To lessen the entering of water into the dry pipe, fourteen report the use of no special devices for this purpose, while four use a special throttle with inlet at the top of dome.

Three roads report on the test of special devices for promoting water circulation in boilers, two of which gave unsatisfactory results, while one claims economy by the use of the Harter circulator plate for promoting water circulation in boilers. The latter consists of a horizontal baffle plate extending from side to side of boiler and from about two feet from the front flue sheet to within six inches of the back flue sheet. It has a series of two-inch tubes at intervals along each side to conduct steam formed beneath the baffle to the space above.

The Nicholson Thermic Syphon is also referred to as a water circulating device, with the details of which all are undoubtedly familiar.

Recommendations

The committee recommends the presentation of a specification covering tubular and reflex water glasses, and bull's-eye glasses for lubricators.

The committee endorses water glasses and gage cocks applied to modern boilers in accordance with method approved by Committee on Standards, and here shown.

The report was signed by C. E. Fuller (Chairman), Union Pacific; A. W. Gibbs, Pennsylvania System; C. B. Young, United States Railroad Administration; Joseph Chidley, New York Central; W. I. Cantley, Lehigh Valley; J. Snowden Bell, and J. T. Carroll, Baltimore & Ohio.

Discussion

In presenting this report, the chairman of the committee said:

We have found in tests of glasses under various service conditions, that quite a large amount of inferior glass is being sold to the railroads, both reflex and tubular. The glasses will not stand up and their life is very short, and we believe that we would all save money by subjecting all glasses to proper tests.

A. G. Pack (I. C. C.): The question of proper water indicating devices on the modern locomotive especially has been brought to the attention of the Bureau of Locomotive Inspection for the past five years, due to the number of crown sheet failures where no contributory cause could be found other than low water. As a result of this, we have been making a number of observations and investigations under the actual operating conditions to determine what effect the circulation of water was having on the water glasses and gage cocks while under severe operating conditions.

The question was brought to the attention of this Bureau in 1914 on a road using oil for fuel, where there was a great deal of damage to crown sheets and melting of fuseable plugs. The enginemen declared they were doing this when two and three gages of water were shown by the gage cocks and the water in the water glasses was in such severe agitation that it was difficult to read them.

In that particular instance we found that the boilers were of the crown bar type, using oil for fuel with a front end burner, which severely impinged the heat on the back head and back end of the crown sheet. The back head was braced by a transverse T-iron, about in line with the back end of the crown sheet. When the safety valves opened, or the throttle valve was opened and the locomotive in operation the gage cocks filled with water, regardless of where it was registered by the water glass.

The standard water glass application had a top connection near the knuckle on the left side of the back head, with the water glass standing in a vertical position, and the gage cocks were in the back head near the knuckle in the flat portion on the right side.

Moving the gage cocks toward the vertical center line of the boiler, practically remedied the gage cocks registering a higher level of water than actually prevailed. We believe that was caused by the T-iron acting as a baffle plate and breaking the current of water moving up the back end and around the firebox. The water glasses in that instance were moved in so as to get away from the knuckles where the water evidently circulates higher than it does toward the center of the back head.

We had a water glass applied on the left side near the front end of the crown sheet, attached on top of the boiler, with the lowest reading one inch above the crown sheet. After making the changes mentioned, we got nearly comparative readings between the three devices.

The matter has been called to our attention from time to time that gage cocks were registering incorrectly, and last October the question was brought up on a certain railroad in the East, operating some large locomotives. The gage cocks, attached to a column, would fill up when the throttle was opened, regardless of where the water might be, and the water glasses were filling up when they reached the level of two to three inches when the throttle was opened and the locomotive began operation.

Our first test clearly illustrated that the point of connection to the boiler had a material effect on the water glass reading. In the next test, we had three connections made to the water column. And a water glass attached to the column, so that we could get readings between the gauge cocks. We had some gauge cocks applied in the back heads, screwed directly into the boiler using two and three water glasses applied in the usual manner each with two connections to the boiler. We could vary that reading as much as six inches by opening one valve in the connection and changing to another, and vice versa. And by changing from the connection in the back head to the one in the knuckle we could drop the water six inches in the glass instantly, and it would work normally until it got five inches of water in the glass. By closing that connection and opening the one 12 in. ahead of the knuckle, the water would immediately recede and work normally, indicating that the circulation of water was going up the back head to a sufficient height to fill the glass from the top connections.

To develop what was taking place in the boiler, a locomotive was equipped with sliding tubes that could be adjusted to 24 inches, and in that instance, in a remarkably good water district, it was developed that there was a flow of water up the back head when the locomotive was working ordinarily hard pulling a train. The fountain effect raised the water at the base to a point 12 in. out from the sheet. Three inches higher it was 9 in. thick, and 8 in. higher there was just a flutter at the back head, indicating that the water was banked up against the back head. With two inches of water indicated in three water glasses, the gauge cocks at the knuckle registered eight inches more water than either of the water glasses. In the center they showed six inches higher than was registered by either of the water glasses.

As an indication of which of these is the more nearly correct, we have taken into consideration where the greatest variation takes place when the throttle is open and closed. We have all assumed that when the water raised in the boiler it rose uniformly and not just at the back end. To further develop what was taking place, we went to a Western section of the country, where the water was extremely light and foamy. Their standard equipment was three gauge cocks. Another gauge cock was applied, also a water column, to which a water glass and three gauge cocks were attached and four adjustable tubes measuring a depth of 24 inches and a water glass with a steam pipe connection to the boiler on the left side. When working steam with the standard water glass entirely full, the four standard gauge cocks all showed full of water, while the gauge cocks supplied in the column, the water glass attached to the column and the water glass applied for experimental purposes would retain a water level of one inch. When the throttle was closed and the water agitation ceased, the column and glass and the experimental glass still retained the same level of water, or approximately so; while the water dropped as much as 8 in. on the standard glass and gauge cocks.

It was developed in that case that the extreme height or flow of water up the back head reached as much as 10 in. above the general level of the water in the boiler. That is not registered by the water glass, but is registered by gage cocks when screwed directly into the back head.

The question has been frequently asked, why that flow of water does not register in the water glass. The only reason that I can assign for that is that the water is held in that position due to its velocity, and has no static weight.

Do not understand me as saying that water glasses when properly applied and maintained, do not always register the correct height of water in the boiler, but they are subject to ailments which are more or less neglected. It is a great misfortune that we cannot find some better way of packing water glasses than with an ordinary rubber gasket. It has been our experience, in examining a great many crown sheet failures, that the water glass circulation is sometimes entirely shut off, and very frequently retarded by rubber gaskets being squeezed over the ends of the glasses, which render them unreliable.

To further demonstrate what we have already discovered, we placed a 75 watt light in the interior of a boiler under steam pressure where we could watch the agitation of the water and the circulation. By using a tube tested to 400 lb. pressure and 400 deg., and sight glasses we could see in over the crown sheet and at the back end. This test was made on an old boiler built about 25 years ago, with the vertical back head and O. G. firebox. In that case we could observe the water flowing up the back head. When the throttle was opened and the circulation started, as much as four inches registered at the gage cock but not at the water glass. It flowed up around the sides of the firebox but not to as great an extent, and up the front end of the firebox, but as much as it did on the back end.

We have had a number of tests of the water column. There are three or four roads that have used the water column quite extensively and trouble has been found in some instances where the gage cocks siphoned the water as much as four or five inches when opened wide and left open for a considerable period. That is objectionable for the reason that many engineers when they let the water go out of sight in the glass, will open the gage cocks, and go to any extremes to find water. We would like to make those things as nearly fool-proof as possible.

We believe these devices can be made to register the water accurately by a properly designed and applied water column.

The design which we have found ordinarily meets the requirements is a column of 2½ in. internal diameter with a ¾ in. bottom connection into the boiler and a steam connection to be made as short as possible, free from short bends or traps, with an internal diameter of not less than 1¼ in., preferably larger. I want to bear particularly on that. A 3½ in. column, with a 2 in. steam connection, if the locomotive is so constructed that it can be applied will remove the siphoning effect entirely, provided the gauge cocks are kept down to a standard that will serve the purpose—¼ in. internal diameter. Some roads are using gauge cocks with ⅜ in. openings. The effect is pretty nearly like opening a blow-off cock when one of them is opened wide, and, when the equilibrium in the column is disturbed the water is raised.

There is another very important subject that I want to touch on. We made an investigation two weeks ago on one of the United States standard Mikado type locomotives that had had the crown sheet damaged three times in the last year due to low water. The last engineer that got into trouble over it, had been running for many years and was considered one of the most reliable men. Having heard of the investigations we have made, the road called on us to see if we could find something wrong with that particular locomotive. We found that the gauge cocks registered five inches more water than did the properly applied water glass.

We had a water glass applied with a connection on top of the boiler near the vertical centre line of the back head, and it showed that the left water glass was registering two inches more water than the newly applied glass, and the right one 3½ in. more water, and the gage cocks 5 inches more.

As probably a majority of you know the top connections on the government engines are made through a street-L. The only thing that was wrong with these water glass cocks was that they turned the street-L around until a small pocket was formed, and when the water of condensation filled in, it caused the glass to fill. When blown out, the level came down and registered, apparently correctly but it would gradually fill up until it rendered the reading unreliable. That clearly illustrates the importance of avoiding any traps or short bends in top water glass connections, where the water of condensation may collect.

Personally, I believe that the water indicating devices are among the most important devices on a locomotive, from the viewpoint of safety as well as economical operation. If you expect to get economical operation, you must provide the engineer and fireman operating the locomotive, an easy method of knowing at all times where the water level is in the boiler. There is no fireman who can economically and successfully fire a locomotive unless he keeps track of the water level in his boiler, and the engineer must know it in order to successfully and economically operate a locomotive.

A water glass so located and constructed that a man has to study for 30 seconds to a minute to read the water in the glass, is evidently not going to be looked at as often as it would be if it is placed in a convenient location. He is not going to look at it as often as he should. If he does, he is neglecting something very important.

The matter of water circulation in the boiler is one that has been given very little study. This matter was brought to the attention of the Bureau of Locomotive Inspection in 1913. As a result of that, one of our inspectors made a miniature boiler, about 12 in. in diameter and 36 in. long that carries 30 lb. of steam with sight glasses in it, so that we could see the circulation of water. It showed the movement of the water practically as I have described it, and I have not found anything from practical demonstration that changes our theory of the water circulation in the boiler, and that gage cocks when screwed directly into the boiler do not correctly indicate the water level in the boiler, while steam is being generated and at the same time escaping. I have a full set of plates here, and I have a full description of the more extensive tests made, that I would be very glad to furnish the Secretary. I have gone sufficiently into detail in the matter, so that it is worth while for any mechanical man to study, and I have anticipated having it printed in pamphlet form, so that I might distribute it among the engine men. It is a very important matter for them to know what takes place in the interior of the boiler because it is an entire reversal of anything that we have ever been taught before.

Chairman Tollerton: The committee in its report mentioned combustion chambers. The Northern Pacific has probably had more years of experience with combustion chambers than any railroad that I am familiar with, and I would like to ask Mr. Curry if he won't give his experience with them.

H. M. Curry (N. P.): We adopted combustion chambers on our heavier power about 15 years ago, and we have without exception, had all of our engines equipped with that type of firebox since that time. We have gone further and changed, as new fireboxes were applied, all of those that were originally equipped with boilers with long flues, and we would not think of discontinuing the use of combustion chambers. We were very greatly surprised and pleased at the marked economy in coal consumption derived from the use of engines equipped with combustion chambers in comparison with those equipped with long flues without the combustion chambers, and after we became familiar wieh the proper manner of maintaining the combustion chambers, we found that the trouble we had experienced with the long flue engines was very materially reduced by the use of combustion chambers, which, of course, permitted the use of considerably shorter flue.

R. W. Bell (I. C.): I doubt if there is anyone present who has had an earlier observation of combustion chambers than I have had. We had in 1863, on the Baltimore & Ohio, two combustion chambers, both of which were found unsatisfactory and were subsequently taken out, but from my observation of them then my opinion was, and it is now, that the only objection was one of design and workmanship. In those days we did not have welded seams or any facilities for work that we have now. I feel very well satisfied that the conclusions of the committee are correct, to the effect that combustion chambers do promote combustion and do bring about fuel economy, and that any failure to do so is due simply to a matter of design. Design is a matter which we ought to be able to perfect, and I think we can and will perfect it.

M. H. Haig (A. T. & S. F.): In looking over the committee's report, my attention was attracted particularly by the comments on water rising in the water column when the gage cocks are open. The object of the water column is the introduction of a device that will register the height of the water under all conditions more accurately than it is believed to have been done in the past with gage cocks applied direct to the boiler back head. There seems to be an impression on the part of locomotive engineers that gage cocks register the height of water more accurately than the water glasses. Therefore, it is very essential that the gage cocks shall not be misleading by raising the height of the water higher than it actually is.

In a series of trials in which the representatives of the Federal Boiler Inspection Bureau took part, it was found that with a comparatively small size of water column body there was a tendency for the water to rise when the gage cock was off. For example, with 3/16 in. gage cocks, the water would be seen to rise, especially when the locomotive was working. With ¼ in. gage cock the water would rise still higher. After these initial trials were made, a larger water column was tried. The body of the water column was 3½ in. in diameter, and inside diameter of the pipe at the top was 2 in. and the connection to the boiler at the bottom of the water column was ¾ in. In a water column of these dimensions it was found in opening the gage cock two complete turns, the water would not rise more than ¼ in.

To further demonstrate the effect of the proper dimensioning of the water column, trials were made with two of the gage cocks open. Two complete revolutions, and left open two minutes. The reduction of the water was not such that it would be noticed during the ordinary movement of the locomotive.

The dimensions which I have mentioned show very conclusively that the rise of the water accompanying the opening of the gage cock could be eliminated. Also it was believed that the matter of condensation which would result from long pipes or bent pipes had some effect, and therefore the pipes were

made as short as possible, were thoroughly lagged, and, as Mr. Pack pointed out, the pockets were entirely eliminated.

S. Zwight (N. P.): I may say a few words. The first engines equipped with combustion chambers on the Northern Pacific were received in 1902, and we had trouble with the combustion chamber seam on account of the heavy lap. After we chamfered this off and cut away excessive material it did away with the checking or cracking of the seam from the rivet out, and that practically stopped that trouble. Whenever we can provide it in modern engines, we have a continuous sheet, and in that way eliminate a seam.

We have on our system many locomotives of the same kind and the same class of service without the combustion chambers, and the flame plays directly on the head of the flue, expanding it to the limit and then when the cold air comes in contracting it again, and we have leakage. When we convert them to superheaters, we also apply the combustion chamber, and we eliminate the flue trouble, and we get very much better results from the standpoint of economy, maintenance and fuel consumption than we did with the long flue engine.

Mr. Haig: I have seen quite a lot of the information prepared by the Federal Boiler Inspection Bureau, and I would like to suggest that Mr. Pack be requested to prepare a paper for presentation next year, which he can illustrate with slides, and give the members of the Association the benefit of the information he has gathered, because I know that information is very instructive.

A motion that the report be received and ordered printed was seconded and adopted.

Report on Engine Terminals, Design and Operation

On February 20, 1920, the committee issued Circular No. S-III—100, containing twenty questions and a request that all replies be in the chairman's office by March 15. Up to the date of preparation of this report eighteen roads responded to the questionnaire. However, the information received from the majority of roads responding was of such a nature that no general conclusions or recommendations can be presented and the following is offered as a progress report:

The length and capacity of ash pits is determined by the maximum number of engines handled in twenty-four hours.

One road recommends an ash pit of suitable size to take care of 50 per cent more power than is being handled, so that if the ash pit conveyor is out of commission temporarily the ash pit will be of sufficient capacity to hold cinders until repairs are made. Two roads recommend two large water cinder pits emptied by locomotive cranes, with grab buckets operated from a separate track, the pits so arranged that cinders can be flushed into cinder pit from the dump pit with water. Three roads favor a depressed track for holding cinder cars, located along the side of pits in order that cinders may be easily shoveled into the cars.

The capacity of the coal chute depends upon the maximum number of locomotives to be coaled in twenty-four hours.

Seven roads specify the coal chute, sand house and ash pit to be located between the inbound and outbound tracks from the turntable, and as close to the roundhouse as trackage will permit. Five roads prefer sanding facilities at the coal chute. One road recommends that the coal chute be equipped with an automatic sprinkler system and with crusher and scales. One road reports the coal chute located about 200 feet from the ash pits; while it is desirable, according to two other roads, to have the ash pit adjacent to, but not immediately under, the coal chute in order that men from either one can help out at the other in rush periods and the fumes from wet ashes and the ashes themselves will not corrode the steel work of coal chute.

For a cold country one road recommends that the roundhouse, turntable, ash pit, etc., all be placed under one roof, with the coal chute close by, and incoming engines to be left by the crews before coming to the coal chute.

The problem of coal chute and ash pit organization depends materially on the amount of power handled, as well as the question of roundhouse organization and the character of repairs to be made; in other words, it is based on the size of the terminal and the business handled.

Five roads report a foreman in charge of the coal chute and ash pit, whose duties are to see that all engines are properly sanded, coal and water furnished, and fires cleaned. Four roads recommend roundhouse foreman's supervision of ash pit and coal chute gang leaders, fire cleaners, ash shovelers, helpers, etc. There is not sufficient data available upon which to base a recommendation for a definite system of organization.

Regarding roundhouse operation as a whole—while only four roads replied on this subject, three agree that there has been a great deal of neglect in the proper design of roundhouses. Adequate equipment with as many labor-saving devices as possible will repay the expense of installation in a short time. Roundhouses should be equipped with proper ventilation to force out smoke and gases.

Eleven roads recommend coal stoves as the best method of drying sand, while six roads prefer steam coils. It is pointed out that drying by stove burns off organic matters and renders the sand more gritty.

A large majority of roads replying prefer the elevation of sand by compressed air, while a small number prefer the chain and bucket elevator operated by motor. Conveying sand to locomotives by gravity appears to be universal practice.

The recommended distance between the pilot and the outer wall of the roundhouse varies from 8 ft. to 15 ft, while the distance between the face of the coupler on the tender and the wall varies from 5 ft. to 10 ft. The distance from the locomotive to the side wall varies from 5 ft. to 10 ft. The ideal arrangement would provide sufficient space between the walls to permit the removal of the engine truck and both tender trucks at the same time, with the tank cut loose.

With reference to roundhouse door clearance, the replies cover doors which vary from 12 ft. 8 in. to 14 ft. in width, and from 14 ft. to 18 ft. in height. One road strongly recommends steel framed doors.

Steam heat is recommended by nine roads as the best method of heating roundhouses, while five prefer hot air and two roads prefer coal stoves. Others specify steam heat for small roundhouses and hot air for large roundhouses. The preference in location for steam heat is to place the coils in the pits, properly protected from above. It is essential that the coils set in from the side so that water drippings from thawing ice and snow on engine will not run on them. Eight out of nine roads recommending steam heat favor steam coils on the outer wall, while five roads report additional coils on the inner wall to whatever extent is permissible.

The vacuum return system of steam heat is preferred by the majority of roads, while some use exhaust steam from the air compressor and stationary engine.

Several of the roads recommending the hot air system for heating roundhouses do not heat the pits, but have outlets four feet from the floor with drop at alternate spaces between pits.

The problem of roundhouse heating depends materially upon climatic conditions first, and upon such matters as the availability of waste or exhaust steam. While the desirability for well-heated roundhouses is apparent to all, it is a local problem.

There is much difference of opinion on the question of machine tools for roundhouse work, and this subject depends very largely upon the amount of work to be taken care of. A number of roads recommend the installation of machine tools separate from, but attached to, the roundhouse, located as nearly centrally as possibly.

The majority of roads recommend drop pits to take care of

engine truck and trailer wheels, in addition to the main drop pit. Several roads report the desirability of separate drop pits to handle tender truck wheels, while one road advises that a single pit is ample. A second road recommends a driving wheel pit for every six stalls and an engine trailer pit for every ten stalls. The Whiting hoist is mentioned by several roads for driving-wheel pits in large roundhouses.

The hydraulic drop pit jack appears to be favored by the majority, although a small number of roads prefer air jacks, because the telescopic feature requires less depth of pit. One road reports an electric crane for lifting wheels, while a second road specifies the Watson & Stillman hydraulic compressed air telescope jack.

Opinion is divided between concrete, creosoted block, brick, and mastic or asphalt composition for roundhouse flooring. The majority, however, recommend creosote blocks, with concrete second. The use of jacking blocks the full length of the pit is universally recommended.

Smoke jacks are reported as made of fireproof wood, sheet metal, asbestos and cast iron, opinions being about equally divided. The views as to the hood opening at bottom range from 8 ft. to 15 ft. in length. Several roads recommend the use of dampers on smoke jack.

The recommendations regarding handling material in roundhouses include a trolley track, swing crane, overhead traveling crane, electric truck and collapsible horses.

The majority of roads recommend that all stalls be equipped with hot water wash-out facilities, while several prefer only one-half of the stalls equipped. The general view is that the washing of locomotives with hot water is at all times desirable from the standpoint of saving in time, fuel, water and of most importance, reduction in fire box repairs. The majority of roads blow off boilers through a blow-off pipe leading from the engine to the atmosphere or tanks, which in some cases are connected with the sewer. Three roads recommend a pipe line from end to end of the engine house above the locomotive domes, with a connection at each pit, and outlets at both ends of the house. This system is used by one road to connect up with a cold water system to cool down boilers. This entire subject is of the most importance in connection with engine terminals.

As to roundhouse lighting, there is about an evenly divided preference for reflector lights on the walls and lights placed between pits. All, however, favor sufficient extension plugs on post for working in pits and fire boxes. In lighting outside grounds, all roads appear to favor flood lighting of sufficient power and proper height to afford a good light on points where needed.

Conclusions

Analysis of the replies indicates the widest divergence of opinion on nearly all subjects connected with roundhouse and engine terminals—this refers to design, equipment, maintenance and operation. It is natural that varying local conditions should develop different systems at engine terminals, and there is little opportunity for standardizing on the general layout of engine terminals. As a rule, there is no choice of location and the ground available is usually limited both in area and in relation to its surroundings. It is, therefore, apparent that the layout of each engine terminal is properly a separate problem—again, the entire problem is largely a function of the size of terminal, the power handled, the estimated expansion of future business, and similar questions.

The replies, however, indicate a decided trend in the last few years toward improvement in facilities in modern terminals, especially in heating, lighting, ventilating, tool equipment, boiler washing, cleaning fires, coaling and sanding.

There might be a desirability in standardizing roundhouse design as to general dimensions and structural features, that some progress may be made in the future toward the standardization of such equipment as roundhouse cranes, drop pits and washout systems; also in lighting, heating and ventilation.

The committee requested that it be continued.

The report was signed by C. E. Fuller (Chairman), Union Pacific; W. J. Tollerton, Chicago, Rock Island & Pacific; E. W. Smith, Pennsylvania; Joseph Chidley, New York Central; John Purcell, Atchison, Topeka & Santa Fe, and J. W. Small.

Discussion

C. E. Fuller (U. P.): This seems a simple subject, but when you take into consideration the requirements of terminals for dispatching engines on roads with from 3 to 200 locomotives leaving a day, you will see that the problem is quite a large one.

No conclusion can be offered at this time. The committee received such a limited number of replies and so many features were brought into the subject, that about the only thing we have agreed on was the tools, the roundhouse and smokejack. The balance is presented as matters of individual opinion. The report can only be considered as a progress report.

Mr. Tollerton: It is a most important subject in view of the remarks of Mr. Basford this morning. Engineering Section II has appointed a committee on Shops and Terminals, which will work with the committee of Mechanical Section III, and next year you will have a better and more detailed report on this subject. Of course, it is one that constantly changes and the standardization of terminals will be an impossible thing to accomplish unless we would stop all progress. But it is of great benefit to this Association to have in our records descriptions and details of adequate terminals for the proper and economic repairs to the equipment of both engines and cars, and to have these terminals laid out in such a manner that the repairs can be made promptly and with the least possible delay.

E. W. Pratt (C. & N. W.): I suggest that this committee should have given their opinion on the sequence of operations of locomotives approaching the roundhouse. I have noticed some locomotive terminal layouts recently where the ashpit was the first mechanism approached, and after that was the coal chute, and the water crane. I have heard individuals complain very bitterly in cold weather that it was so long between the time that the fire was knocked out of the locomotive, until the locomotive was placed in the roundhouse, and the distance so great that the locomotive arrived in the roundhouse leaking.

W. H. Sample (C. T.): The question which effects us very materially in Canada, where the climate is cold, is the question of cinder cars, the handling of cinders to the cars when they are wet and unloading them afterwards. At our terminals we have ample space, and we are undertaking an arrangement now whereby we can store the cinders during the winter months, and handle them in the spring after they are thawed out, and eliminate the use of cinder cars entirely.

H. M. Curry (N. P.): We have had difficulty in securing and maintaining the character of mechanics in our roundhouses that we require, particularly in the colder sections of the country.

We have had wonderful success with our hot water boiler washing plants. I hope to see the time when every terminal on our system will be equipped with a plant of that sort. We have both steam heated and hot air heated roundhouses. We have never secured the results from hot air heated roundhouses that we hoped for. At one of our large roundhouse points, the roundhouse was originally equipped with an electric trolley, with the idea of cleaning the fires in the roundhouse, the roof of the roundhouse is high and the stalls long. It was heated with hot air. We have a fairly good sized hot air plant, with quite a liberal radiation provided, but it was utterly impossible to heat that roundhouse with hot air until we provided a return duct from the roundhouse.

C. E. Fuller: If it is true that the locomotive is the most important factor in transportation, and if it is true that the hours out of service of the locomotive are excessive, I believe you will agree with me that the starting point, or the foundation for that condition, begins at the roundhouse or the terminal yard.

To dispatch engines quickly it is necessary that when an engine arrives home it is put in the roundhouse without delay, and not allowed to stand outdoors for three, four or five hours, waiting for room, either at the ash pit, the coaling station, or for trackage in the house.

It is also true that the number of times an engine receives general repairs, or the frequency with which an engine receives general repairs, depends to a large extent on the upkeep or lack of upkeep in the roundhouse. If a terminal yard is so situated that you cannot get an efficient terminal in it, the committee is not particularly concerned with it. What we want is the best that there is. I have felt that it

was not improper to impress upon your mind, that you give thought, and possibly a little more personal attention to the circulars received from the committees.

The fact cannot be denied that we are criticized for keeping engines at terminals an excessive length of time. Why are we doing it? Either we have not a competent force or our facilities are inadequate, and are not arranged for taking care of the volume of business. In other words, a nice terminal may be built to meet your summer conditions, but in the wintertime there is 10 or 20 per cent more power to put in the territory, and under these conditions many engines must stay outdoors, waiting to get into the house. Even though you are short in your force of men, if you can get the engine into the house promptly and have it immediately thawed out and ready for work, you can, as a rule, reduce the delay very much.

I think the subject is one of the most important before you, and it is up to the members of this association to give the benefit of their knowledge of what the railroads should have in the way of terminal facilities and terminal organization to this committee, so that it may present a report embodying the very best practice.

E. Wanamaker (C. R. B. & P.): It seems as though the turntable proposition is left out of the report entirely, and my experience leads me to believe that it is one of the most important elements in the roundhouse. I would be particularly interested to know what the recommendation would be for the operation of a turntable, especially in a cold climate, what source of power could be used, and what would be the best to apply.

If you go to many roundhouses you will find the steam supply is very inadequate because the boiler plant is not properly maintained, and many times the man or men engaged to make the steam heating equipment are not sufficiently intelligent or sufficiently well instructed, to co-operate, not only to secure capacity, but to secure safety. I think this is certainly one of the most important points we have to consider, if we are to cut down the time of engines in terminals.

A motion that the report be printed and made part of the proceedings was seconded and passed.

Report on Train Resistance and Tonnage Rating

THE SUBJECT OF EQUATED TONNAGE RATING was referred to the Committee on Subjects for investigation and report to be presented at the annual meeting.

The treatment of the subject of equated tonnage method was handled in the 1914 report under the heading of "Drawbar Pull Method" (see 1914 proceedings A. R. R. M. M. A., Table 3, pages 313 and 314), in which case the tons and cars were added until the number of cars correspond to the rating shown for the locomotive, also proceedings of 1916, pages 427 and 433.

This subject is also covered fully by the report to the American Railway Engineering Association, Bulletin No. 138, dated August, 1911, by M. H. Wickhorst, and the committee has been unable to develop any new phases on the subject of better methods of application.

The committee has not been able to assemble the data which has been collected in time for a complete report on this subject for this convention and the foregoing is submitted as a progress report.

The report is signed by O. P. Reese (Chairman), Pennsylvania; H. C. Manchester, D., L. & W.; C. E. Chambers, C. R. R. N. J.; Frank Zeleny, C., B. & Q.; Jos. Chidley, N. Y. C., and E. C. Schmidt, North American Company

Discussion

A. B. Appler (D. & H.): I would like to ask if the train resistance and tonnage rating committee has any record of tests to indicate the internal friction or resistance in pounds per ton in Mallet type locomotives at different speeds.

O. P. Reese: That subject has not been given consideration in connection with this report. The resistances so far considered have been of different weights and sizes of cars, and different types of cars of the same weight. The resistance as relating to the various types of locomotives has not been given further consideration on account of the work which was previously done. The committee did not have available any recent information on locomotive resistances, that is, the new types of locomotives.

A motion that the report of the committee be received, and printed, and the committee continued was seconded and carried.

Adjournment.

Carnival Night a Big Success

LAST NIGHT'S SOCIETY EVENT on the Million Dollar Pier yielded only to the Grand Ball of the previous night in point of splendor and attendance. In the way of real pleasure, mixed with a liberal portion of real fun, it yielded nothing. Probably it will be remembered and talked about long after the event of Thursday night has been forgotten.

It was carnival night. Isn't that enough to say? The three thousand ladies and gentlemen who attended will answer, "yes." The orchestra was at its best. Given good music, a good floor and good partners, what more was to be desired.

The program consisted of 20 dances. During the intermissions between dances the members of the Entertainment Committee distributed vari-colored hats and caps, paper canes, whistles and gimcracks of many kinds.

In charge of the evening's carnival were: L. O. Cameron, chairman; Floyd Coffin, Horace Hager, Ellsworth Haring, R. J. Himmelright, T. J. Hudson, Jr., Langley Ingraham, W. W. Melcher, I. C. Rogers, S. W. Sargent, R. P. Townsend, W. M. Wilson and W. B. Wise.

W. P. Pressinger Passes Away

WHITFIELD P. PRESSINGER, vice-president of the Chicago Pneumatic Tool Company, did not survive the dangerous operation which he underwent at the Roosevelt Hospital, New York, Monday last. He passed away Thursday night. His many railway and railway supply friends throughout the country will sincerely mourn his loss.

Car Heating Decision

THE SUIT BROUGHT by the Vapor Car Heating Company against the Gold Car Heating & Lighting Company for alleged infringement of Vapor Patent No. 758,436 has been decided by the United States District Court for the Southern district of New York in favor of the Gold Car Heating & Lighting Company. By reason of this decision the Gold Car Heating & Lighting Company may continue to make and sell its vapor valves and its vapor system for use in heating railway cars (all pipes underneath car to be covered as heretofore), without infringing any of the patents of the Vapor Car Heating Company.

"Important News" For Foreign Consumption

As an instance of the "progressiveness" of foreign newspaper correspondents in the United States may be mentioned the following item which appeared on the wireless news bulletin of one of our Trans-Atlantic steamers:

"Washington, June 3. President Wilson came out yesterday with his last season's straw hat making his bow efficiently to summer in an automobile ride through the park."

Geo. H. Hazelton Dies

George H. Hazelton, formerly division superintendent of motive power of the New York Central & Hudson River at Albany, died on Thursday night. Mr. Hazelton was in the service of the New York Central, or associated lines, for more than 53 years, starting on the Rome, Watertown & Ogdensburg. He was superintendent of motive power of that road when it was taken over by the New York Central, and was made division superintendent of motive power at Albany. During recent years he has been assigned to special duties, retiring last fall, when he was 70 years of age. After his retirement, however, he was called back into the service for special work.

N. I. T. League Advocates General Rate Increase

Members of the executive committee of the National Industrial Traffic League, the largest and most representative organization of shippers in the country, testified before the Interstate Commerce Commission at the rate hearing yesterday strongly urging a general advance in freight rates, the amount of which they were willing to leave to the commission under the provisions of the Transportation Act. They declared that the need for additional and better railroad service is paramount and that lack of service is costing shippers more than double the amount of the freight rate. They also expressed the opinion that it would be better to be too liberal with the railroads than not liberal enough.

Republican Platform on Railroading

The platform of the Republican party adopted in its national convention in Chicago strongly endorses the new transportation act and claims credit for its enactment for the Republican majority in Congress. It condemns not only Government ownership and management of railroads, but also "employee operation," which is a direct blow at the Plum Plan. The plank on the railroad matter is as follows:

"We are opposed to Government ownership and operation or employee operation of the railroads. In view of the condition prevailing in the country, the expenditures of the last two years and the conclusions which may be fairly drawn from an observation of the transportation service, both for the present and future, can be furnished more certainly, economically and efficiently through private ownership and operation under proper regulation and control.

"There should be no speculative profit in rendering the service of transportation; but in order to do justice to the capital already invested in railway enterprises to restore railway credit to induce future investments at a reasonable rate and to furnish enlarged facilities to meet the requirements of the constantly increasing development and distribution, a fair return upon actual value of the railway property used in transportation should be made reasonably sure, and at the same time to provide constant employment to those engaged in transportation service with fair hours and favorable working conditions at wages or compensation at least equal to those prevailing in similar lines of industry.

"We indorse the transportation act of 1920, enacted by the Republican Congress, as a most conservative legislative achievement."

Election of Executive Committee Members

The district elections for executive committee members will be held in the executive committee room, near the Secretary-Treasurer's office, this morning between 10 and 11.30.

The members to be elected are:

1st District—New England and Canada—One member to elect.

2nd District—New York, New Jersey—One member to elect.

4th District—Ohio, Indiana, Michigan—One member to elect.

5th District—Illinois—One member to elect.

7th District—Wisconsin, Minnesota, Louisiana and States West of Mississippi River—One member to elect.

Registration, American Railroad Association, Sec. III, Mechanical

Appler, A. B., M. E., D. & H., Blenheim.
Baker, W. A., G. F., Western Railway, Alpernard.
Bell, J. Snowden, New York, Wiltshire.
Bennett, W. H., M. M., Penn., Calvert.
Booth, C. W., M. M., N. Y., N. H. & H., Seaside.
Rosenbury, J. M., S. M. P., Ill. Trac., Traymore.
Bright, W. J., Ch. Clerk to Gen Mgr., B. & O.
Burkhard, A. A., Gen. For., N. Y. C., Arlington.
Burnham, W. D., Gen. For., B. & O.
Butler, T. L., M. M., Penn., Craig Hall.
Butt, F. W., Asst. Eng., N. Y. C.
Chaffin, H. B., M. M., Penn, Esplanade
Cramer, C. B., M. M., Wash. Term. Co., Elberon.
Currie, H. A., Asst. Elec. Engr., N. Y. C.
Daley, J. H., D. M. M., N. Y., N. H. & H., Osborne.
Dambach, G. O., V. P. & G. M., Unity Rys., Sterling.
Deeter, D. H., M. M., P. & R.
Diven, J. B., M. M., Penn.
Dobson, F. L., M. M., Penn., Chalfonte.
Edmonds, Geo. S., S. M. P., S. S. Del & Hudson., Haddon Hall.
Edmondson, W. G., Asst. Eng. M. P., P. & R
Eggleston, H. D., Fore. of Engines, P. & R.
Elmer, Wm., Supt. Middle Div., Penn., Chelsea.
Filskov, T., G. E. S., Raritan River, Princess.
Finegan, L., S. S., B. & O., Marlborough.
Flinn, R. H., M. M., Penn., Craig Hall.
Galloway, A. K., G. M. M., B. & O., Haddon Hall.
Gill, C. A., S. M. of E., B. & O., Ambassador.
Hadley, Frank Pres. G. M., Interborough R. T. Ry., Shelburne.
Halliwell, C. J., M. M., W. I. & S.
Haupt, H. H., A. E. M. P., Penn.
Haynes, T. F., Asst. Eng. M. P., Penn., Craig Hall.
Hines, J. P., M. M., B. & O., Ambassador.
Hoffman, George P., G. C. F., B. & O., Terminal.
Hopkins, J. W., M. M., Penn., Esplanade.
Johnston, W. D., Genl. M. M., B. & O., Traymore.
Knight, G. E., S. M. P. & S., Cuba R. R., Alamac.
Lambeth, G. L., Mobile & Ohio, Alamac.
Lanston, G. H., M. M., Virginian, Strand.
Lightfoot, S. S., Equip. Eng., A. T. & S. F., Esplanade.
Lockwood, B. L., C. M., Pressed Steel Car Co., Chalfonte.
McAlpine, J. H., M. M., Can. Nat. Rys., Marlborough.
Maurer, W. R., Eng. of Equip. & Mchy., N. Y. N. H. & H., Haddon Hall.
Moriarity, G. A., Mech. Supt., N. Y., N. H. & H., Shelburne.
Mullen, D. J., S. M. P., C. C. C. & St. L., Breakers.
Myers, H. E., M. M., Lehigh Valley R. R., Buffalo Div., Dennis.
Overdorff, C. A., M. M., Penn., Elberon.
Parker, William, Jr., Asst. Eng. of M. P., Penn., Elberon.
Pitt, W. R., Trav. Auditor, B. & O., Worthington.
Read, S. C., Asst. M. M., Penn.
Reid, C. H., M. M., N. Y., N. H. & H., Osborne.
Rogers, J. W., Asst. M. M., Penn.

Rusling, W. J., Penn
Schneider, G. A., M. M., W. J. & Seashore, Princess.
Smith, J. A., V. P., Middletown & New York, 1515 Pacific Ave.
Stell, Geo. J., Gen. For., Logan Div. Penn.
Strunk, A. S., Foreman, P. L. V., Bluefield.
Stuart, R. T., M. M., Raritan River, Princess.
Tosh, A. C., Insp. of Trans., P. & R.
Thomas, G. W., Traveling Car Insp., St. Louis-San Francisco, Traymore.
Travers, O. H., Gen. For., Penn.
Voelker, H. R., M. M., Penn., Craig Hall.
Wallace, F. C., M. M., Erie, Dennis.
Wartug, F. M., Eng. of Tests, Penn.
Weist, C. W., Sterling.
Whitman, P. B., M. M., Penn.
Whyte, A., Asst. Secy. Loco. Dept., Rome Mfg. Co., Marlborough.
Wilson, L. M., M. M., W. J. & S.
Winterrowd, W. H., C. M. E., C. P.
Wright, J. D., Gen. For., B. & O., Arlington.

American Railroad Association, Sec. VI—Purchasing and Stores

At six o'clock Friday night the following members of Section VI had registered:

Alleman, C. W., G. S. K., P. & I. E. R. R., Elberon.
Anderson, H. A., A. P. A., Penn., Marlborough.
Beggs, J. H., P. A., C. & E. I. R., Traymore.
Bichlmeir, G. W., P. A., Kan. City S. R. R., Ambassador.
Blizzard, J. M., Storekeeper, W. J. & S.
Bruckert, R. H., S. K., Kentucky & Indiana Term., Breakers.
Buell, C. J., G. S. K., D. M. & N.
Bushnell, F. A., P. A., G. N. R. R., Shelburne.
Daniels, O. V., Asst. Genl. Stkr., P. R. R.
Driscoll, F. E., Asst. P. A., Erie, Brighton.
Dunn, W. C., Insp. of Mat., N. Y. C., Marlborough.
Farrell, W. J., Asst. Secy. A. R. A., Marlborough.
Fisher, N. B., Asst. P. A., P. & A. & McK., Traymore.
Gowland, S. I., Asst. Genl. Storekeeper, Penn. R. R., Silverside.
Hammond, F. S., Gen. Skpr., Pitts., Shawmut & Nor., Princess.
Hill, J. P., Div. Stkr., P. R. R.
Holzemer, J. F., P. A., T. & O. Cent., Chalfonte.
John, F. E., A. G. S. K., B. & O., Haddon Hall.
Kathan, John F., Jr., Div. Storekeeper, N. Y. Central, Beaumont.
Keast, K. C., Asst. Forester, Penn.
Kenzel, C. H., P. A., E. J. & E., Chelsea.
Kight, H. L., Special Representative Purch. Dept., Western Maryland R. R., Monticello.
Marris, Wm. W., Asst. to G. P. A., Penn.
Nelson, R. M., P. A., C. & O. R. R., Marlborough.
Peddle, C. R., P. A., Penn. Lines, S. W., Traymore.
Shafer, S. W., Chief Clerk to P. A., C. R. of N. J.
Sherry, C. P., Supt. of Stores, Penn. Lines West, Silverside.
Smith, Montgomery, P. A., Penn., Runnymede.
Summerfield, D. W., Pur. Agent, Pittsburgh & W. Va. R. R.
Towner, M. E., G. P. A., Western Maryland, Breakers.
Walther, E. W., Asst. to Pur. Agt., B. & O., Haddon Hall.
Wright, G. S., G. S. K., E. J. & E., Chelsea.

Special Guests

Anderson, J. B., Chief Clerk Gen. S. M. P., Penn., Runnymede.
Armstrong, W. H., Draftsman, B. & O., Arlington.
Armstrong, W. E. F., Resident Insp., B. & O.
Barrett, Charles D., Asst. Eng. Tests, Penn.
Bauman, W. J., Supervisor of Tools, B. & O., Schlitz.
Bennett, H. R., Foreman, P. R. R.
Berger, John, Spec. Eng., N. Y. C., Pennhurst.
Bowes, W. E., Asst. M. M., Penn.
Bracken, J. L., Asst. Elec. Eng., N. Y., N. H. & H.
Burleigh, R. B., Kentucky.
Busuioc, C., Dir. of Wks., State Rys. of Romania, Ambassador.
Caldwell, Samuel, Foreman, Penn., Elwood.
Churchill, A. A., M. M., J. C. Trac.
Clemson, L. C., Retired For., Penn.
Cooper, H. M., M. P. Insp., Penn., Regent.
Coull, A., Gen. Eng. House Foreman, P. & R.
Crawford, M. R., Foreman, C. R. of N. J., Louvan.
Delcher, H. C., Inspector, B. & O.
Donaldson, H. R., Asst. M. M., Penn.
Easterly, H. R., Ch. Loco. Gen. Insp., Penn., Alamac.
Filshov, A., Raritan River, Princess.
Filshov, H., Asst. Eng., Raritan River, Princess.
Finwaecher, E. H., Draftsman, B. & O., Arlington.
Finnegan, J. A., Foreman, B. & O.
Flowers, H. F., Amer. Elec. Ry. Assn., Traymore.
Foertsch, Thos. A., R. F. E., P. & R.
Galloway, L. E., G. F., B. & O., Channel.
Gibson, W. L. G., Attorney, P. & L. E., Brighton.
Ginnand, H. W., Buyer, Penn.
Goddard, W. E., For., L. I.
Goldsmith, H. A., Insp. Eng., Sterling.
Goolsby, A. C., Adv. Mgr., C. & O., Traymore.
Isaacs, J. C., For., B. & O., Bouvier.
James, H., M. E., D. L. & W., Biltmore.
Jamison, W. J., Draftsman, P. & R.
Johnson, W. R., Ry. Dept., I. C. S., Haddon Hall.
Jones, L. D., Insp. M. P., B. & O.
Jones, M. W., Asst. Supt., P. & R.
Kelly, C. W., Sec., National Railway Appliance.
King, H. A., Draftsman, B. & O., Arlington.
Kinney, Wm., For., A. C.
Koehrich, F. W., For. M. P. Dept., Long Island.
Kuhn, E. A., T. H. & B., 121 S. New Jersey.
Leonhauser, H. A., Asst. S. R. S., United Elec. Rwys.
Lohman, Chas., R. H. Foreman, C. R. R. of N. J., Brady House.
McGee, W. A., M. E., N. Y. C., Strand.
McNichold, C., Div. Frt. Agt., McK Con., Galen Hall.
Madden, T. B., Gen. Boiler Insp., Mo. Pac.
Martin, John J., R. H. Foreman, C. R. R. of N. J., Brady House.
Massey, G., Asst. Foreman, Central R. R. of N. J., Wellsboro.
Minick, J. L., Asst. Eng., Penn.
Moll, H. P., P. & R., Netherlands.
Moll, R. H., P. & R., Netherlands.
Morris, J. M., Asst. Traffic Mgr., McK. Con. & L. T., Galen Hall.
Morrissey, Tom A., Clerk, L. V., Princess.
Morton, R. C., Draftsman, B. & O., Arlington.
Mow, Fred, Kansas City Terminal, Ambassador.
Munroe, Martin, Eng., Romanian State Rys., Ambassador.
Newberry, C., M. C. B., New Orleans Pub. Belt, Elberon.
Nicholas, P. H., Asst. M. M., C. R. R. of N. J., Lyric.
Norton, A. W., Equip. Pilot Eng., B. & O., Arlington.
Parsons, D. R., Supt. Shop Schedules, B. & O.
Pietsch, T. A., Supt. of Inspection, B. & O., Arlington.
Powers, C. E., Spec. M. P. Insp., B. & O.
Pratt, H. R., Chief Eng., Western Maryland.
Price, Townson, 2nd Asst. Examiner, U. S. Patent Office, Kingston.
Reuter, Sebastian, For. M. P. Dept., Long Island.
Richards, Lewis, Foreman Engine House, P. & R., Bouvier.
Rippey, W. S., Retired Clerk, Penn., 4401 Atlantic Ave.
Robey, A. A., Asst. C. C., Southern, Osborne.
Russell, Walter L., Eng. House For., P. & R.
Ruttger, Fred W., For., L. I.
Ryan, E. J., Welder Foreman, B. & O., Ambassador.
Scheckard, J. W., Asst. Road Foreman of Engines, Phila. Div. Penn., Girard.
Schcifele, John, Jr., R. F. E., P. & R., Norwood.
Seddon, Edward, Gen. Mach. For., Lehigh Valley.
Shearer, L. D., Supt. Tel., P. & R.
Shelton, F. M., Supt. Loco. Sup., D. L. & W., Princess.
Shugars, Geo. C., P. & R.
Siegfried, M. A., Asst. Rd. For., C. R. R. of N. J.
Simpson, G. R., Primary Examiner, Dept. of the Interior, Kingston.
Sleeman, Wm. C., Car Eng., Birmingham South., Haddon Hall.
Sleuker, C. A., For. Black., L. I., Glenmore.
Smith, Russell M., Asst. R. F., Penn.
Spence, C. H., Draftsman, B. & O., Craig Hall.
Stewart, Robert, C. Repair, Penn.
Stoffert, H. A., El. Eng., P. & R., Bouvier.
Stiglmeier, A. F., Boiler Foreman, B. & O., Schlitz.
Strong, James B., Pres., National Appliance Assn., Esplanade.
Strunk, John, For. Boilermaker, A. C.
Summerfield, John, P. W. V., Marlborough.
Sykes, Louis, Shop Supt., Penn., Strand.
Taylor, Grant W., Asst. to V. P., Southern.
Thompson, F. V., Foreman Elec., Atlantic City.
Tiley, Geo. E., Supt. Tank Car Equip., General Chemical Co.
Tippett, M. W., Foreman, Washington Terminal, Elwood.
Train, A. H., Spec. Eng., N. Y. C., Pennhurst.
Turk, J. E., Supt., P. & R., Chalfonte.
Van Gundy, C. P., Dhf. Chemist, B. & O., Shelburne.
Wakely, G. B., Senior Draftsman, N. Y. C.
Walsh, H. T., Supt. Weld. Dept., N. & N. S. & B., Ambassador.
Walter, F. W., Draftsman, B. & O., Craig.
Webb, T. H., T. F., S. A. L., Schlitz.
Wang, Geo., Asst. Eng., W. M.
Warner, J. W., Clk. Mech. Dept., Staten Island Rap. Trans., New Belmont.
Weber, C. J., Foreman, B. & O., Dennis.
Wells, George W. Director of Exhibits, Am. Elec. Ry. Assn., Traymore.
Wheeler, H. B., Gen. For., B. & O.
Whitsitt, W. B., Ch. Draftsman, B. & O., Arlington.
Wilkinson, D. A., Supt. Tools, N. N. & B. D. D.
Woley, L. W., Eng., J. C., Traymore.
Woods, J. L., P. A., N. C. & St. L., Marlborough.
Woodson, E. R., Secy., Ry. Acct. Office, So. Illinois Ave.
Worden, W. E., Foreman Car Repairs, Southern-Monroe, Baltimore.
Wright, G. V., Insp. Eng. Dept., N. Y. C.
Wright, W. T., Chf. Cl. to S. M. P., N. Y. C., Chelsea.
Wyman, William I., Ch. Cl., Patent Office, St. Charles.
Yarborough, W. C., Asst. Treas., A. C. L., St. Charles.
Yost, T. William, M. P. & R. E. Dept., P. & R.
Ziegler, C. J., Ch. Electrician, Florida East Coast, De Ville.

Swiss Railways in Good Shape

No matter from which country one enters Switzerland the contrast in railways and railway equipment is particularly noticeable. The Swiss railways are extremely well kept. The cars, locomotives, roadbed and every employee presents a clean and neat appearance. The employees, regardless of their position, are provided with uniforms of a character suitable to the position in which the men work. Throughout the winter it was a pleasure to ride on the Swiss roads and almost a hardship to ride on the roads of any of the adjoining countries. The cars were well heated and well lighted. The Swiss have suffered the same as every other European nation as regards the scarcity and high cost of fuel. It was no uncommon sight to see huge piles of wood at the engine terminal points which was used to a very large extent on locomotives. It has been this shortage of fuel that has pushed the electrification of the lines. Switzerland is determined to make itself independent of foreign nations for its fuel supply and has very intensive plans for electrification which it will take from 25 to 30 years for it to fulfill.

European Railway Observations

By Robert E. Thayer

European Editor, Railway Age

English Shop Men Repudiate Piece Work

Inspired by the successes of their fellow unionists, the shopmen of the English roads are starting an active campaign against the piece work and all forms of the bonus system. It is not that their rates have not been advanced, for they have already received liberal increases, but it is because of the fact that labor there, as here, is seeking to eliminate premiums being paid for good work. This to the English railways would be a severe blow, for there the piece work system has been highly developed and is long established. The management of the English railways can well look to the results occasioned by this step in the United States.

Belgium Is Recuperating Rapidly

The railway and industrial situation in Belgium is something that is attracting considerable attention all over Europe and, as far as it is known, in the United States. That nation is to be highly congratulated on the way it has met its reconstruction problems. The wages of labor have not been increased to the same extent as in France, yet the entire population has worked with a will that has done much to build up that country. The fact that the entire country was held in subjection for four long years by the German army is given as the reason for this wonderful "esprit de corps." The people are so glad to be rid of the domination of the Hun, that they appear to be impervious to all seditions and bolshevistic propaganda. It is an example which all patriotic citizens of any country could well emulate.

Force Feed Lubrication

A mechanical appliance for locomotives that has developed to a far greater extent in both England and the Continent than in this country is the force feed lubricator. The English railways have adopted this method of lubrication to a very large extent. It is estimated that about 7,000 British locomotives are so equipped. Practically all of the German locomotives are equipped with this system of lubrication and it is used to a very large extent on the railways in South America, India and Australia. At the present time, this system is used principally for the lubrication of cylinders, but it is being rapidly developed for the lubrication of driving boxes. The foreign railways claim that more perfect lubrication is obtained by the force feed system, that the lubricating oil is used with greater efficiency, that better regulation can be obtained, that the delivery of oil to the rubbing surfaces is absolutely assured while the locomotive is in motion, and that less attention is required on the part of the engine crew. If force feed lubrication can be used successfully and efficiently on foreign railways, it can be used successfully and efficiently on American railways.

What Feed Water Heating Meant to Germany

The application of locomotive feed water heaters has become standard practice on the German railways. Every new locomotive built is provided with this appliance. All old locomotives with but few exceptions are to be so equipped. Had it not been for the fact that the locomotives of Germany were equipped with this fuel saving and *capacity increasing* device they would not, in the words of the chief mechanical engineer of the Prussian-Hessen System, have been able to have met the transportation requirements as well as they have. The feed water heater not only saves coal but increases the capacity of the locomotive and with 50 per cent of its locomotives out of service for repairs this was a tremendously important factor to the German roads. Germany began using feed water heaters eight or nine years ago, and with the price of fuel increased by some 15 per cent, it is reaping a great benefit now. It is claimed that at present prices the cost of applying a feed water heater to a locomotive is more than met within a year after its application.

Encourage Foreign Visitors to Study Our Methods

Many foreign railway men have come to the United States for the purpose of studying our methods and the impressions they have experienced has depended to a great extent upon the reception and courtesies offered them by the railway men here. In one instance, a man came away from a large shop which we consider one of the best railway shops in the United States with a decidedly wrong impression simply because of the manner in which he was treated. His request for permission to view the shops was met in a most disinterested way and after being kept waiting for some time he was turned over to a young man who was entirely unfamiliar with the interesting details of the shop's work. As a result, it was not possible for him to obtain a correct idea of the work performed by that shop and, on his return home, he classified that shop as one of the worst he had seen in the United States. While these things do not have any direct effect on the railways themselves, except in the matter of reputation, they do have a serious effect upon the business of the United States and indirectly, of course, on the business of the railways. It is, therefore, important that every facility should be granted these men who often come great distances to learn about American methods.

Reports from Roumania

As in the case of almost every other European nation Roumania is suffering greatly from the fact that its railways are not in very good operating condition. Reports coming from that country indicate that the locomotive situation is the limiting factor. In addition to this Roumania has acquired considerably increased mileage, which further complicates the situation. It has been stated that only about 35 per cent of its locomotives are in operation. The labor situation there is very serious and is accountable to a very large extent for the poor locomotive situation. It has come to such a point that when the large industries call for locomotives with which to move their freight they are told by the government that if they will undertake to repair some of those out of service they will be given the use of them. Roumania had about 1,000 locomotives before the war and regardless of the fact that it has now 2,000, acquired from various countries with which it was at war, it is stated that there is a need for a total of 4,000 locomotives. In Roumania itself labor is not inclined to work hard enough to produce them and Roumania lacks money and credit with which to buy them from other nations. A recent press dispatch to the effect that the Baldwin Locomotive Works contracted to provide 50 locomotives, payment for which was taken in oil concessions, is indicative of the manner in which business is done there.

The Man Who Saw

The Blind Man's Mail Bag

Several of the friends and associates of The Man Who Saw have advised that he is missing his vocation—that he doesn't see at all, because he was unable to witness the fall of the airplane in the ocean and other things.

The Man invokes the indulgence of his friends to explain that he is very busy answering protests to Hum Dinger's Prune Plan, circular letters and other missiles.

For fear that he will overlook the mention of things interesting to some of the friends, he respectfully requests that they advise him through the Mail Bag on his desk. He is here to serve, but only has two eyes which he nearly wore out on his trip to South America.

The Vacant Chair

The man in his rounds kept an eye out for the old friends, and as he approached the booth with the castings in it, way out in the right-hand corner of the pier, his heart warmed in friendly anticipation of the pat on the back for one of the bright spots whom he had known for years in the trade.

But the friend had gone in the Man's absence and the vacant chair bore mute testimony to the fact that he had embarked on the greatest trip of all to the land from which no traveler returns.

If the Man, but one of the hundreds who affectionately remember you could send a message to the spirit world, it would bear this inscription:

"You're gone, but not forgotten, Charlie."

They'll Need More Cars All Right!

"I'll show you an economy of 30 per cent," said the effervescent one who had managed to get in through a window behind the chief clerk's desk.

The "old man's" eyes twinkled over his glasses as he reached in the drawer of his desk and pulled out a memorandum.

"This is a list of the economies that have been offered me by various good fellows in the last two weeks," said the S. M. P. "We'll add your promise of 30 per cent" —and he added it up; it totaled about 429 per cent!

"That looks promising, doesn't it?" he asked the hopeful one whose heart was in his mouth at the prospect of an order. "You know," continued the "old man," "if we adopt all these devices, we will have to add an extra car to haul the coal they save!"

The "Biggest As Is"

The Man followed the two colored gentlemen to observe, if possible, the dark slant on things mechanical in the miles of cheerful booths strung along the pier. They missed nothing and their unconcealed admiration testified that the confident exhibitors hadn't wasted their enthusiasm—even on a waiter.

They paused in awe to get a closer look at the photograph of the latest Mallet which adorned the booth of the locomotive builder.

"Sam, what kind of a injine am dat?"

"Yo' sho is a ignorance," answered Sam with a look of superiority, "Dat am a millenium."

"An what am a mineliym?" eagerly asked the short one, not at all embarrassed by his inability to pronounce the word.

"An you don't even know what a millenium am?" criticised the superior one. "Why a millenium am de same thing as a centential only it has mo' legs." The little one merely acknowledged this outburst of wisdom with a nod of his head. He had "gotten an earful."

The "Try Weakly"

"How often do you run to Poseyville?" inquired the supply man of the agent at the junction one Monday morning.

"Tri-weekly," came the quick response from the busy one behind the grating, "Mondays, Wednesdays and Saturdays."

"Thanks," said the prospective patron, "give me a round-trip ticket." He stuck the ticket in his pocket and went outside to "look 'em over."

The modernizer sniffed at the array they called a train, standing at the platform, and he wondered whether it could make the run.

"Say," he accosted the busy one, as he emerged from his cage with a lot of mussed-up papers and a worried look, "how do you spell 'try'?"

"T-r-i," answered the official.

"Oh!" said the economizer. "Well, how do you spell weakly then?"

"W-E-E-K-L-Y," spelled the official, "say, don't you know how to spell?" he added with a sneer!

Standing Up for Argentina

The Man who Saw that there was little use in waiting for the apparently satisfied old lady to remove the three valises, the hat box, the blanket roll, an immense bouquet of flowers, the box of lunch, the umbrella, and the cage with the tired canary in it from his seat, ventured to invite two Argentine gentlemen to the diner for a glass of beer. They accepted and the thirsty parade of dusty throats started for the rear.

The Man, being thirstier than the rest and disregarding the customs of the country—true to the manners of his race—got there first.

The diner was full. At least it appeared to be. Many of the table occupants were asleep; the balance were stalling along on unfinished glasses of beer and the arrivals wondered where they could "head in." Somewhat out of patience, and thirstier at the prospect of disappointment, The Man decided to fling a bit of sarcasm at the proprietor of the alleged rolling oasis who sat in his cashier's cage, apparently happy in the thought that he had a cage to sit in.

"Excuse me, Senor," he ventured, "is this a dining car or a sleeping car?"

"Take your choice, gentlemen, we are trying to please all of our patrons here."

The trio gave up hopes and with tongues as dry as bath towels retreated forward.

The old lady in the meantime had taken advantage of the gentlemen's absence to transfer two of the valises, the hat box and the blanket roll to the vacant seat and sat unconcerned with the tired birdie and the rest of the house furnishings by her side.

Thus does this tale relate in a single instance that which is true of trains in the Argentine—crowded to the guards—apparently the only restrictions on the amount of hand baggage being the number of bundles which two or three servants could successfully push through the door, and frequently the windows. We aren't the only ones short of cars.

Conventionalities

Tom R. Brown, formerly with the Westinghouse Air Brake Company, spent a short time on the pier Friday afternoon. He is now vice-president and general manager of the Hollis Tractor Company of Pittsburgh.

T. A. Foque, general mechanical superintendent of the Minneapolis, St. Paul & Sault Ste. Marie, was able to attend the convention this week, but the demands of business will render it impossible for him to be here next week.

K. M. Hamilton of The Bettendorf Company is attending the convention after establishing a Chicago office in the McCormick Building. This company discontinued its offices in that city during the war.

John J. Nicholson, president, Murphy Varnish Company, is here with a full set of golf sticks looking for trouble. He has with him a quartet of caddies consisting of C. M. Baker, F. O. Brazier, J. K. Milligan and W. D. Horton.

B. E. D. Stafford, of the Flannery Bolt Company—everybody's friend and a friend of everybody—is not here this year, and we are sorry. "Staf" has been sick for a few weeks and is now making a job of getting well on his country place in South Jersey.

Frank A. Morrison, of the Mason Regulator Company, returned from a trip through England, Belgium and France on the Adriatic, arriving on Saturday, May 26. Mr. Morrison has arrived at Atlantic City attended by his wife and two-year-old daughter.

H. S. Covey, secretary of the Cleveland Pneumatic Tool Company, might well be termed a specialist in preparing exhibits, as he has arranged every exhibit for his company during the past 20 years and prior to that arranged exhibits in other fields for 10 years.

Ask "Scotty Airbrake" Campbell to tell you the story of his friend who made a trip abroad recently on an English liner (of course), who the morning after the night before after passing the three-mile limit asked the steward who paid the taxicab fare to bring him home.

Many have wondered and many have asked the *Daily* as to the total number of people taking part in the Grand March of the ball on the pier Thursday night. According to the entertainment committee there were 32 lines of marching people with 32 ladies and gentlemen in each line, a total of 1,024.

M. A. Kinney, superintendent motive power, Hocking Valley, is justified in taking considerable pride in the fact that his road stands at the top of the list in trainloading. He is enthusiastic about the performance of the Santa Fe locomotives which his company recently purchased from the Lehigh Valley.

Beg your pardon! In the issue of the *Daily*, June 9, among the list of exhibitors the names of Frederick A. Gale and H. L. Hilleary were given as representing the Locomotive Terminal Equipment Association. This was a mistake. Messrs. Gale and Hilleary tell us they do not represent this association.

J. E. Fairbanks, general secretary of the American Railroad Association, is accompanied to the convention by Mrs. Fairbanks. With all the meetings of the committees and sections of the American Railroad Association which are being held at the Traymore at Atlantic City, Mr. Fairbinks is a very busy man.

Miss Lavinia Morrison, daughter of Frank A. Morrison, was married to William F. Wright, vice-presdent of the Wright Manufacturing Company, of Lisbon, Ohio. Monday, June 7, at the Morrison home at Boston, Mass. Miss Morrison attended this convention last year and met Mr. Wright for the first time then. The bride and groom are including Atlantic City in the bridal trip itinerary.

Mrs. W. T. Tyler, wife of the vice-president of the Northern Pacific and former director of operation of the Railroad Administration, arrived yesterday, and is the guest of Mr. and Mrs. W. E. Sharp. The Tylers' son, Harold, who is known to many of the convention visitors and who served in the navy during the war, has entered the automobile business, and is vice-president and general manager of the Lafayette Motor Car Company at St. Louis.

A. W. Lord, of the Q. & T. L. Railroad, who is attending the conventions, believes that he is the oldest railway man in point of active service here. He began firing a locomotive in 1850, seventy years ago, and has been railroading ever since. He is now 87 years old. A record of continuous work of seventy years is one that few men have exceeded. The Q. & T. L. is a small road at Hancock, Mich., which is owned by the Quincy Mining Company.

Jim Morris, master mechanic of the Pennsylvania at Verona, Pa., who is attending the convention, served as first lieutenant and later as captain of the 35th Engineers abroad. He was located with the American commission at Coblenz after the armistice to receive the German equipment which was turned over to the Allies. Mr. Morris was in charge of the committee delegated to inspect and pass on the cars which the Germans handed over to the Allies.

The grand march in the ball room is an established institution, but John Purcell, of the Santa Fe, is responsible for the introduction of a grand march through the exhibit spaces. Instead of waiting for written reports after the convention Mr. Purcell is making a tour of the exhibits with the other mechanical officials of the Santa Fe and getting their opinions of the devices right on the ground.

Major Azel Ames, of the Kerite Company, is nursing a crippled hand acquired by trying to imitate the performances of his own youth. He participated in a baseball game a short time ago at the River Sea Club on the occasion of a celebration of the 25th anniversary of the graduation of his class from the Massachusetts Institute of Technology, and got his hand injured by thinking he could play baseball as he could 25 years ago.

H. M. Curry, mechanical superintendent of the Northern Pacific, is accompanied to the convention by Mrs. Curry. The Northern Pacific is making a splendid record as to attendance at the convention this year. Mr. Curry has brought with him all of his master mechanics, in addition to other members of his general staff.

Since the working of cranes in shops has so frequently been in the hands of women since the war, it is interesting to note that the first woman demonstrator to attend these meetings should be here in the capacity of a crane operator. The Chesapeake Iron Works, of Baltimore, brought Miss Florence C. Shaw, who has been handling a crane in the Baltimore shop, as one of the most expert and fittest to handle the 10-ton crane shown in its exhibit.

E. S. Wortham, of the Scullin Steel Company, has come to the conventions with an almost entirely new wardrobe. This is not merely because Mr. Wortham likes new clothes, either—although he does. He and Mrs. Wortham were living at the Glen View Country Club in Chicago when, on May 29th, the club house caught fire and burned to the ground. Mr. Wortham happened to be at the club and succeeded in saving a good many of his effects, but a large part of them were destroyed.

He who suspicions the advisability of a trip to Mexico in these troublous times should consult Thomas Smith, who served the Santa Fe for 16 years and was subsequently master mechanic on the Mexican Central as well as the Tehuantepec National Railways in Mexico. Mr. Smith can be found at the booth of the Q. & C. Company, where he extends an invitation to his old friends to come around and bid him a last farewell before he again enters the disturbed realm of the bandit.

C. C. Higgins, superintendent motive power of the St. Louis-San Francisco, brings very encouraging reports regarding the present business and the business prospects of his railroad. The problem of the 'Frisco, like that of most of the roads, is not that of getting enough business but that of providing facilities with which to handle the business already available. Like most of the southwestern lines, the 'Frisco especially needs a very large advance in rates. With a substantial advance in rates Mr. Higgins looks forward to the time when the 'Frisco will be a first-class property, not only physically, but financially.

Walter Smith of the Pyle-National Company, who went abroad as a first lieutenant of the 49th Engineers in June, 1917, is here at his first convention since his return to this country. Mr. Smith has some interesting tales to tell of his experiences abroad. He was stationed at Coblenz as a representative of the American commission to receive the German equipment which was turned over to the Allies under the terms of the armistice. His particular work appertained to locomotives. He says that more than half of the locomotives submitted by the Germans were rejected. The Germans were supposed to turn over 1,000 locomotives at the rate of 15 per day, but as a general rule they delivered only five or ten. As a result of the delay in delivering this equipment they were penalized by being required to turn over many more than the original thousand.

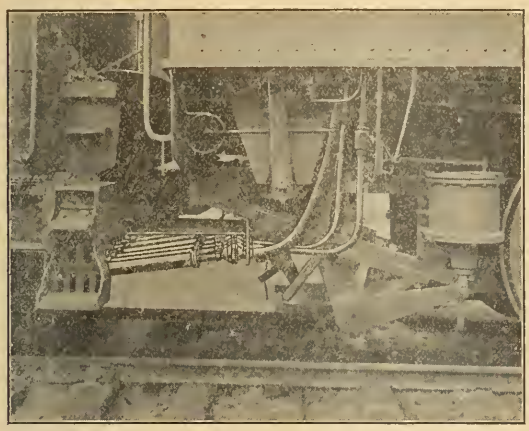
George S. Edmonds, superintendent motive power of the Delaware & Hudson, who succeeded the late J. H. Manning, has been eminently successful in keeping in intimate touch with his men. Until his promotion he was in charge of the Watervliet shops. When a large number of the men left the shop to go into service overseas he encouraged the formation of an "over here" association. This organization included all of the men in the service at Watervliet and its purpose was to keep in close touch with the boys "over there" and see that they were furnished with encouragement and comforts. After the boys returned from service the organization was changed to a "carry on" association. Its purpose is to keep in touch with all of the men at Watervliet and see that any who are ill or in need are given good cheer and such assistance as they may need. This organization is an exceedingly strong factor in promoting good fellowship among the officers and employees.

Officers of the Rock Island who are attending the convention met near the entrance of the pier at 2.30 o'clock yesterday afternoon and, under the leadership of W. J. Tollerton, general mechanical superintendent and chairman of the A. R. A., Mechanical Section, spent the afternoon visiting the exhibits in a body. The party included: S. W. Mullinix, superintendent of shops, Silvis, Ill.; L. A. Richardson, district mechanical superintendent, Des Moines; W. J. O'Neill, district mechanical superintendent, El Reno, Okla.; George S. Goodwin, mechanical engineer; E. Wanamaker, electrical engineer; J. H. Milton, superintendent car department; W. J. Hartman, general inspector; R. S. Mennie, engineer of shop improvements, Chicago; A. R. Ruiter, master mechanic, El Reno, Okla.; Bert H. Smith, master mechanic, Fairbury, Neb.; W. B. Embury, master mechanic, Armourdale, Kan.; J. M. Kerwin, master mechanic, Goodland, Kan.; W. F. Fitzgerald, master mechanic, Trenton, Mo.; J. McBrian, district car inspector. It is expected that a number of additional officers of the Rock Island will be here for the convention next week.

Hugh M. Wilson, formerly president of the Wilson Company, which until 1908 published the *Railway Age*, is one of the men well known to the convention crowd who have died since the conventions were held last year. He passed away last September. Mr. Wilson was for many years one of the men who were most active in connection with the conventions and exhibits. He was in direct charge of the publication of the *Daily* for a long time and was at one time secretary of the Railway Supply Manufacturers' Association. After the Wilson Company sold the *Railway Age* to the Railroad Gazette, Inc., —now the Simmons-Boardman Publishing Company— in May, 1908, Mr. Wilson temporarily retired and made a trip to Europe. On his return he became vice-president of the Barney & Smith Car Company. Later he became vice-president of the McGraw-Hill Publishing Company. After he had stayed there for a few years his health broke down and he was obliged to take a long rest. He seemed to have almost completely recovered, but a short time after he returned to active work he was struck by an automobile near his home at Scarsdale, N. Y., and severely injured. His health was so destroyed as a result that he retired from active business, but in 1918 he participated energetically in the government's campaign to sell Liberty bonds. His death came very suddenly. Mr. Wilson was one of the most popular men who ever attended the conventions and when he retired from the *Railway Age* in 1908 he was given a dinner at Atlantic City by his friends in the railroad and the railroad supply business, which was a remarkable tribute to him, as well as one of the most interesting social events that ever occurred in connection with the conventions.

Engine and Tender Line Couplings

AUTO-TITE flexible pipe joints and traverse expansion joints, in combination either with or without a rotary coupling, compose the Auto-Tite flexible expansion couplings for engine and tender lines manufactured by the International Couplers Company, Pittsburgh, Pa. The rotary coupling is designed to couple a pipe and a single expansion joint, or may be used to couple two expansion joints as desired. A quarter turn,



Auto-Tite Flexible Expansion Couplings Applied to Locomotive

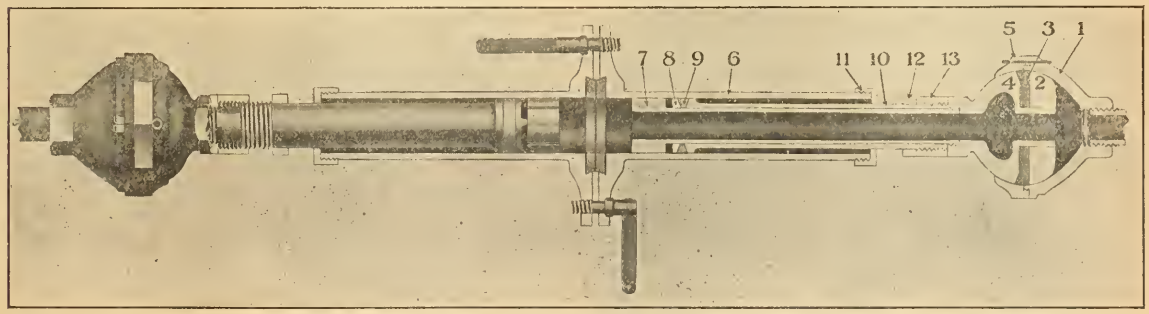
only, is necessary to make the coupling. Joints of this type were put into service on air brake and signal lines on the Western Maryland July 17, 1916, and when taken out of service January 28, 1919, both joints were tight and apparently good for further service on the same gaskets. The gaskets were not renewed during the two and a half years of operation and the joints were without attention or oil during a year and a half of this period, as the cars were away on foreign roads.

In the case of the air brake, the joint was detached from the train line when the cars returned to Baltimore, nevertheless, by reason of its adjustment on a tributary line, it was receiving every impact and expansion to which the springs of the draft gear were subjected. The flexible expansion coupling, however, on the air signal line was in operation when the coaches returned to Baltimore with the air pressure on, as evidenced by the fact that this coupling was adjusted in the line back of the cut-out valve. The trainmen of the Western Maryland said that no difficulty had been experienced with the signal air. The maintenance of both joints consisted only in the use of a little oil, the cost of which probably did not exceed a few cents, being the total upkeep for the two and a half year period.

While the couplings may be used to advantage on passenger cars used exclusively on the home road, they are mentioned particularly in connection with engine and tender service because of the fact that it is not so essential to use the hose connectors thereon, for they require to be disconnected less frequently. The advantage of Auto-Tite couplings over hose may be plainly recognized in view of the above, and in addition, there is less air friction in a straight line coupling connection than in an abrupt, tortuous passage having two or three right angle turns.

Referring to the cross sectional view, the socket cup *1* and socket nut *5* form a continuous wall on spherical lines. The two members are tightened on registering marks and a cotter key thrust through registering bores in each member to keep them from working loose. The follower *2* has a sliding engagement with the sleeve of the sleeve hemisphere *4*, and under fluid pressure acts as a piston head, compressing the gasket *3* between the planes and throwing it outward on the socket wall, all force tending to feed it tightly to a single feather edge at the juncture of the spherical lines of the ball and socket. Thus fluid pressure seeking to escape confines itself by its own pressure.

The outer circumferences of the metallic plunger *7*, automatic follower *8*, and manual follower *10*, have a sliding engagement with the inner walls of the cylinder *6*. From the inner circumferences the automatic follower and manual follower slidingly engage the plunger stem. The automatic follower has spacing lugs spacing it apart from the plunger, forming a pressure chamber. The cylinder cap *11* is screwed on the end of the cylinder, forming a retainer or keeper to prevent detachment of the plunger and assembled members. Reverse nut *12* normally covers all threads of the manual follower, and in the operation of adjustment or tightening



Cross Section of Straight Line Coupling for Engine and Tender Lines

the gasket is reversed against the abuttment shoulder *13*. The plunger is fitted with canals admitting pressure into the pressure chamber to operate the automatic follower. The automatic follower and the manual follower, providing outwardly flared opposing bevels, engage corresponding bevels of the gasket.

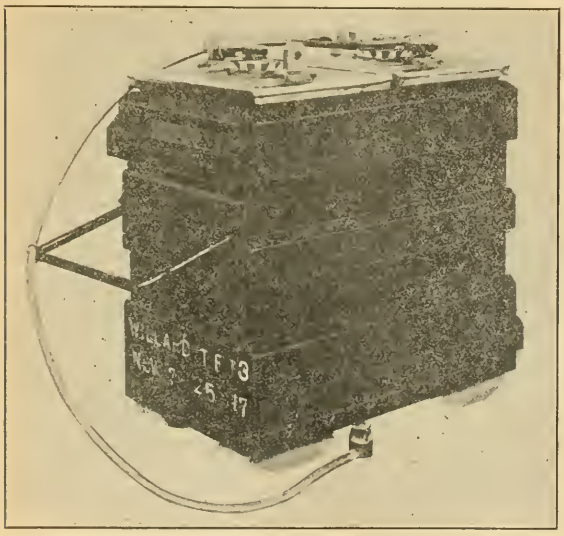
Under the act of compression, cohesion of the gasket to the cylinder walls tends to draw the gasket material tightly to a single feather edge at the juncture of the bevel of the automatic follower with the cylinder wall; while under the act of expansion, cohesion of the gasket to the cylinder wall tends to draw the gasket material to a single feather edge at the juncture of the bevel of the manual follower with the cylinder wall. Three tightening provisions are thus obtained, two of which are automatic, the remaining one being manual. The manual follower is operated by screwing it against the gasket which is molded in the form of a beveled sleeve.

It is proposed to manufacture the Auto-Tite flexible expansion couplings in standard sizes to replace signal, air brake, steam and water hose.

Combination Storage Battery

A COMBINATION STORAGE BATTERY designed during the war when lead costs were high, is being exhibited by the Willard Storage Battery Company, Cleveland, Ohio. This battery is of exceptionally light weight, being 30 per cent lighter than the straight Plante battery of the same capacity manufactured by the Willard Company. A proportionately smaller space, therefore, is required.

The negative battery plates are of bi-plane construction, the leaves on either side being cut to the center of the plate at right angles to each other. This type of negative plate has been used for ten years in railway work



Willard Combination Storage Battery

on a few sets of batteries and for three years on a large number of batteries. The estimated life of the plate is 15 to 20 years.

The positive plates are of the pasted type, made of the same material as the Willard automobile starting battery plates except that they are considerably thicker. The battery has hard rubber covers and porcelain vent plugs. It is assembled either in rubber jars or lead linings. Rubber jars are exhibited which are made to the following specifications: 15 per cent elongation, 5,000 lb. per sq. in. tensile strength. The battery is made in capacities of 300 and 400 ampere hours.

Carborundum Refractories

THE EXHIBIT of the Carborundum Company, Niagara Falls, N. Y., this year includes a distinctly new line of carborundum products known as carborundum refractories. Carborundum refractories are made in four regular grades in addition to which special mixtures are utilized in the production of carborundum saggers. The four regular grades of Carborundum refractories are known as Carbofrax *A, B* and *C,* and Refrax. All of the standard shapes in which fire clay or silica brick are made can be produced in any of the grades, in addition to which practically any special shape, including tile, muffles and saggers, can be made in any of the three Carbofrax grades.

The carborundum used in the manufacture of carborundum refractories is in the purest form obtainable. Refractories made in any of the three Carbofrax grades are composed of over 90 per cent of pure carborundum to which small percentages of exceedingly high refractory materials are added to facilitate binding. The high refractibility of carborundum is, therefore, maintained in carborundum refractories, and due to the fact that carborundum cannot be melted, and is destroyed only by decomposition at temperatures over 4,000 deg. F., it is also impossible to actually melt Carbofrax brick or special shapes. Their exceedingly low co-efficient of expansion and high thermal conductivity reduces the spalling of these refractories to a minimum, and rapid change of temperature has little effect upon them. Their resistance to abrasion is also exceedingly great, as they are composed of a substance which is one of the hardest materials known. In furnace construction required to transit heat, such as muffle walls, etc., their value is indisputable due to their exceedingly high thermal conductivity which has been shown to be at least seven times that of the average fireclay brick.

The Refrax brick has the same general characteristics as the Carbofrax, but in the production of this brick absolutely no binding material is used. Refrax brick, therefore contains 100 per cent carborundum and the bonding of the individual grains of carborundum into the form of a brick is made possible by the fact that the growth of carborundum crystals is accompanied by what is known as twinning. These brick are produced in an electric furnace which is run at a temperature sufficient to produce carborundum, which is approximately 4,000 deg. F. Refrax brick is used for the more extreme temperature conditions, but as a general rule any one of the three Carbofrax grades will meet all ordinary high temperature conditions satisfactorily.

The principal uses for carborundum refractories as developed up to date have been in the construction of boiler furnaces, water gas generators, carbonizing retorts, heat treating and forging furnaces, all types of oil burning furnaces, pottery kilns, tunnel kilns, rotary kilns, electric furnace construction, muffle furnaces, saggers, etc.

Refractory Cements

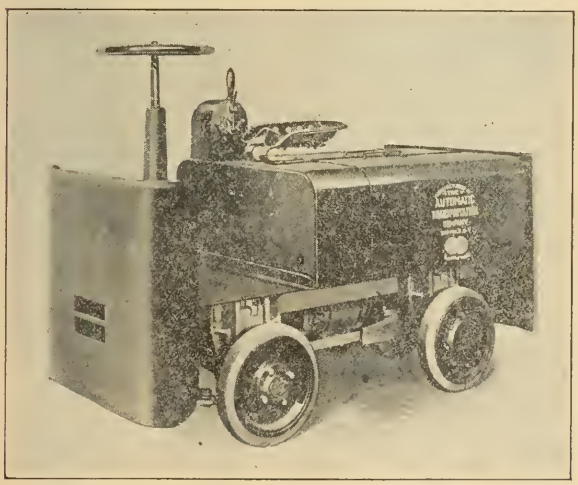
In addition to the regular line of made-up refractories, the Carborundum Company has produced a complete

line of high grade refractory cements. It has not been found possible to produce a refractory cement which will cover all conditions, and consequently ten special cements have been developed and these have been found to cover the field of requirements completely. These cements are of the highest value in the construction and maintenance of all types of high temperature furnaces. They are composed almost entirely of carborundum, and, therefore, possess its remarkable refractory properties. Used as a mortar or cement in laying up ordinary fire brick they will greatly prolong the life of furnace construction, and as a patching material they have given remarkable results. Carborundum cements should always be used in laying up Carbofrax or Refrax brick.

Tractors and Trailers

A NEW HEAVY AND EXTRA POWERFUL TYPE of electric tractor and a steel underframe trailer are exhibited by the Transportation Engineering Corporation, New York. They are manufactured by the Automatic Transportation Company, Buffalo, N. Y.

The tractor, which is known as Automatic Type M, is designed to meet the demand for a heavy duty tractor and is recommended for service in railroad shops and passenger stations. It is equipped with heavy cast steel bumper plates on both ends to facilitate the pushing of trailers and to provide extra protection to the machine

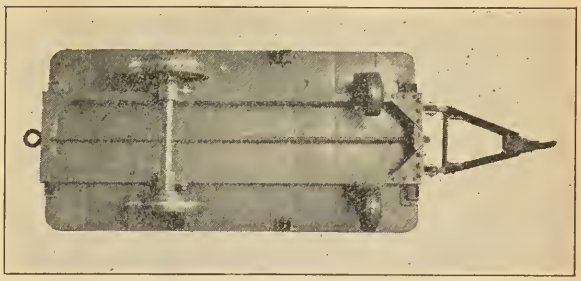


Type M "Automatic" Tractor

and the operator. A 3½ hp., 1700 r.p.m. motor suspended on springs drives the tractor through a single reduction worm and wheel. All power transmitting parts are mounted in an oil-tight, dust-proof housing. This tractor may be equipped with either a 42 cell, A-8 Edison battery or with a 24 cell, M V Y Exide Ironclad battery.

The controller is of the metal drum type and provides three speeds forward and three reverse with a maximum speed of from 5 to 6 miles an hour. The normal draw bar pull is 800 lb. while the ultimate is 2,000 lb. The total weight of the tractor without the battery is 2,420 lb. It is made with either two- or four-wheel drive, two- or four-wheel steer and with sixteen- or twenty-inch rubber tired wheels.

The trailer is of the steel underframe, caster type. The steel underframe is applied to the trailer construction for the same reasons which have led railroad mechanical men to adopt the steel underframe in passenger and freight car construction. This trailer is, therefore, adapted to the severe service met with in railroad shops and terminals. Another distinctive feature of the Automatic trailer is the special heavy duty caster with which it is equipped. This caster is not only generously proportoned in order to withstand severe shocks under heavy load, but it is provided with both roller side thrust and

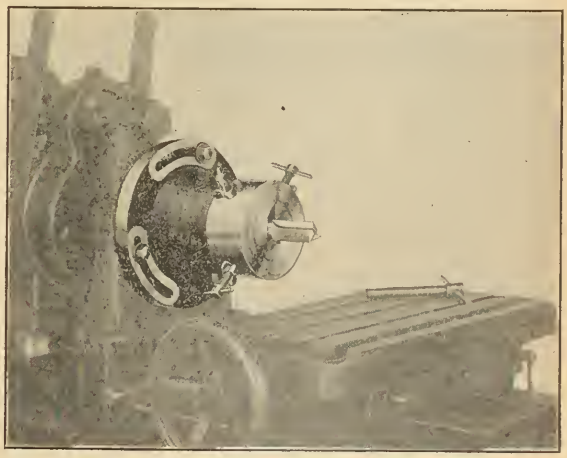


Bottom View of "Automatic" Steel Under-Frame Trailer

ball vertical thrust bearings insuring practically frictionless operaton. The rear axle is also equipped with grease packed roller bearings. The trailer is provided with a special built up coupler hook, so designed and assembled that important parts such as hook and hinge castings can easily be replaced when necessary. The weight of the trailer without end gates is approximately 500 lb. and the platform is 16 in. from the floor.

Square Hole Drilling Attachment

A PRACTICAL DEVICE for drilling square holes is being exhibited by the Fairbanks Company, New York, at Spaces 324-326. This attachment, which is based on the well-known principles of the Cardan circles, can be easily and quickly attached to any milling ma-



Radbore Head for Drilling Square Holes

chine or drill press. The body of the drill has the form of a spherical triangle, which will always touch four

sides of a circumscribed square; and, as the triangle is turned, the corners of the triangle are moved in a rectangular path following the sides of the square. The cutting part of the tools is like that of an end mill, and its action is similar, except for the rectangular displacement.

The drill will cut a square hole with rounded corners, the radius of the fillet being one-eighth the size of the hole. If desired, a drill with a special shank can be used to cut square holes with sharp corners. To make a hole with sharp corners the shank of the drill is much larger than the cutting part, and one of the corners of the

Drill Used with Radbore Head

shank is rounded so as to permit the adjacent cutting edges of the drill to enter into the corner of the square holes. The other two cutting edges of the tool serve merely to rough out the hole while the finishing cut is made by the point which lies adjacent to the rounded edge of the shank.

The Radbore attachment not only drills square holes, but bores a blind hole with a flat, square bottom. The cutters are so designed that there is no material in the bottom of the hole which is not removed by the cutting edges. Therefore, finished blind holes can be obtained in one operation.

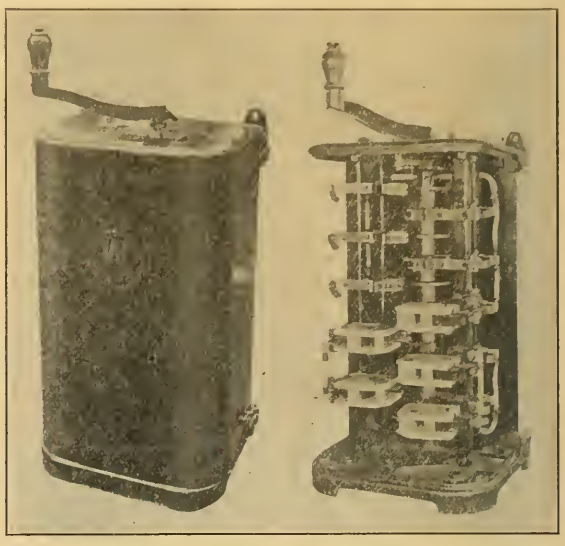
Drum-Contactor Controllers for D. C. Motors

A NEW TYPE of manually operated, drum controller, known as the type S drum contactor has been developed by the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa. It embodies practically the same principles of operation as the magnetic contactor controllers, and the originators believe it will cause great changes in present controller construction. During the past year, exhaustive tests made on these controllers have indicated that in construction they are superior to the drum and face plate controllers formerly used. They are adapted for starting and adjusting the speed of shunt, series and compound-wound direct-current motors by adjusting the resistance in series and parallel with the motor armature. They are applicable also to cranes, hoists, roll and transfer tables, and practically all applications employing this system of control.

In operation, the type S controllers employ the same principles as magnetic-contactor controllers, except that the contactors are operated by cams mounted on the controller shaft. Normal movement of the controller handle causes the contactors to open or close with a quick, positive action which reduces arcing. The arcing is further controlled by the rolling motion of the contacts, which limits all arcing and burning to the contact tips. Final contact is made with a slight wiping motion, which insures clean contact surfaces, and maximum current-carrying capacity. The line contactors, which open and close the main line circuit, are protected by magnetic blow-outs, which aid in extinguishing any arcing that may occur.

Each contactor is closed by a hard fibre cam, operating on a practically frictionless roller on the moving contact element, and opened by a strong compression spring when the cam is moved away from the roller. This prevents the shaft from becoming locked by an accident, to a single contactor, which would otherwise prevent opening of the circuit. Each contact element is complete in itself, and can be removed as a unit.

All controllers are drilled and tapped for both a horizontal and vertical handle and can be supplied with either. The horizontal handles of controllers in service can be readily replaced with vertical handles or vice versa. The vertical type is fastened to the top of the controller by four bolts spaced equally distant from the controller



Westinghouse Type S Drum Contactor Controller

shaft and from each other. This permits it to be mounted in any one of four positions, 90 degrees apart, to facilitate placing the controller in the most convenient position, and still provide easy operation from front, back or either side. In addition, this feature enables the movement of the handle in many installations to be in the same direction as, and to be used to indicate the movement of the hoist, crane or other device. Each controller embodies all such desirable features as conduit wiring, enclosed current-carrying parts, protection against the controller being locked in running position, and prevention of accidental starting or reversing.

The new Westinghouse controller is supplied both with and without dynamic braking. Controllers for use with crane hoists regulate the speed of the motor while lowering by dynamic or regenerative braking. They are so designed that if there is not sufficient weight on the hook or cage to revolve the motor and drums, the motor will assist in the lowering. The speed of the motor is always under the accurate control of the operator, both when hoisting and lowering, regardless of the load. Cranes equipped with these controllers can have high, safe lowering speeds, if the particular motor used is capable of standing such operation.

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WE GUARANTEE that of this issue, 15,500 copies were printed; that of these 15,500 copies, 13,480 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 140 were mailed to advertisers, 280 were provided for counter and news companies' sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 1,600 copies for distribution at Atlantic City.

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Open Side Planer Uses

Comparatively few open side planers are being used in railway shops; this is surprising, considering the numerous advantages afforded by their construction. Some practical shop men apparently fear that this type of planer is weak and not rigid enough for accurate production work, a belief which is refuted by the facts, since open side planers in navy yards and large commercial machine shops are successfully taking heavy cuts at the end of cross rails seven feet or more in length. It is simply a case of designing the housing and crossrail sufficiently strong to withstand the torsional stresses. The other details of design are similar to the usual planer construction, except that only one side head is available. The main advantages of open side planers are ease of set up and inspection, and the ability to handle work too large to go between the ordinary double housing arrangement. Deck castings, truck bolsters, and in fact, any large castings with short cross planing jobs can be handled to good advantage. Arrangements have been made at one car shop to remove the housing of a large planer whenever it is desired to use the machine as an open side planer. For ordinary planing jobs the housing is quickly put in place and connected up. For light work, a machine of the open side crank planer type, placed on the market recently by an eastern machine tool builder promises great adaptability. This machine is especially suited to tool room work and the machining of irregular shapes having short plane surfaces. It is faster than the ordinary planer and more accurate than a shaper. In addition, work can be set up with greater convenience and may be inspected easily during the operation of planing. Taken altogether, the advantages of open side planers of all sizes would seem to warrant more serious consideration by railway shop men than they have accorded to these machines in the past.

Rehabilitate the Old Cars

There is a shortage of over 250,000 freight cars on the railroads of the United States and Canada. The number of new cars that can be built this year will probably not exceed 75,000, which is not enough to take care of normal retirements, and these cars will cost nearly three times the pre-war prices for similar equipment. There are large numbers of old 30-ton box cars still in service, the present value of which is exceedingly small, and they constitute such a large proportion of the total number of available cars that they cannot be retired for many years to come. Most of these cars can be rehabilitated with an expenditure not exceeding the normal cost of new equipment, by the application of steel center construction or draft arms, modern draft gears and rebuilt trucks, thereby restoring their service value practically to that of new equipment. Here is an opportunity for an exceedingly profitable investment and a most promising means of helping to relieve the present car shortage.

The Electrical Engineer in Section III

It has been suggested in previous issues of the *Daily* that electrical matters should be handled by Section III in a manner which would permit of more detailed attention. Steps have been taken to accomplish this end. The Association of Railway Electrical Engineers has requested that it be taken in as a division of Section III, Mechanical, of the American Railroad Association. If this is done, much of the need for this attention will be taken care of automatically as the new division would hold separate meetings. In making this change the fact that it is impossible to divorce electrical from mechanical problems should not be lost sight of. For example, if a new air line is to be added to a motor-driven compressor, the load may be increased so that the motor can no longer handle it. Difficulties might be avoided by advising the electrical engineer of the proposed change. In view of the ever-increasing importance of electrical subjects, each railroad should have an electrical man who is big enough to cover all such matters in an advisory capacity and each one of these men should take an active part in the affairs of the electrical division.

Get Into the Discussions!

The presentation and discussion of 34 technical reports, conducting the opening exercises, and clearing the docket of association business in a total session time of 18 hours is a big job. To accomplish it successfully the members must keep clearly in mind their responsibility to take part in the discussions. If the reports are to be read and accepted without discussion there is little object in attending the convention. There was a noticeable reluctance to start discussions on some of the reports presented last week. These reports should have brought out spirited comment. No committee can present a report with which

none of the members will disagree, and the convention floor, not the exhibits, the boardwalk or the hotel lobbies, is the place to go on record with these differences of opinion. The work of the standing committees in large measure must be shaped by the trend of the discussions on the floor of the convention and the quality of their reports will be improved if the committees are compelled to defend themselves. If a report is accepted with no apparent show of interest there is little encouragement for the committee to continue the arduous labor of conducting the investigations and analyses of material required in the preparation of its future reports. The cost of attendance at the convention and the limited time which can be devoted to each report makes every minute of the sessions precious. Don't wait for someone else to start the discussions.

Facilities for Steel Car Repairs

One of the noticeable features of the bad order situation during the past year has been the large number of steel cars requiring heavy repairs that have been held out of service. Few roads have given special attention to providing facilities for repairing this equipment and while there are a few excellent steel car shops, taking the country as a whole the provisions for heavy repair work are wholly inadequate. An erroneous impression seems to exist in the minds of some that elaborate equipment is needed for heavy steel car repairs. Even in large shops it has not been found necessary to install many machines and in a small plant a few simple and comparatively inexpensive devices are sufficient for handling all ordinary work. Remarkable work has been done with portable tools equipped with special appliances for handling heavy parts. If provision is made for transporting the necessary material and for heating parts requiring flanging or straightening, the remainder of the work can be performed with a few simple machines. There is no reason for doubt that the investment required for these facilities will be fully justified by the savings effected, even at points where comparatively little steel car work is handled.

A Destructive Force

What is dynamic augment? It is a destructive force and perhaps if it were designated by a more descriptive phrase such as "rail pound" its significance might be more generally appreciated. Locomotive design would be very much simplified if the weight of the motionless engine were all that had to be considered with respect to its effect on rails and bridges. The effective weight on the rails is, however, greatly augmented by the dynamic forces generated by the heavy main and side rods. As the driving wheels revolve rapidly a blow is transmitted to the rail at every revolution and this force increases tremendously not only with the speed but with the weight of the main and side rods. This factor is always taken into consideration in estimating the maximum weight that can be placed on the driving wheels and consequently even the smallest reduction in the weight of main and side rods would make it possible to increase considerably the size and weight of other parts of the locomotive such as the boiler. It may be assumed that the design of reciprocating parts is efficient and that it would not be be possible to further reduce the weight of these parts without the use of alloy or specially treated steels. The point to bear in mind is that dynamic augment is not simply a technical phrase designed to create a market for special alloy steels, but a destructive force constantly at work decreasing the efficiency of locomotives which can only be corrected by the use of lighter reciprocating parts.

Paving the Way

Admitting the necessity for improved engine terminals, would it not be well to get down to particulars and study the exhibits with reference to improvements applicable to them? Our Ideas as to what constitutes an improved engine terminal have advanced a pace within the last few years. Consider, for instance, the effect of the type of floors on almost every operation in the roundhouse. Good floors assist the ordinary trucking of engine parts and are essential to the use of tractors, which is now becoming general practice. The convention exhibits include quite an assortment of tractors applicable to engine houses and mechanical representatives should take this opportunity to get acquainted with the tractor and find out some of the things it will do as well as some of the things it will not do, if they have not already had experience with the device. Had you arrived at the pier a day in advance of the convention you would have been amazed at the rapidity with which the exhibits, including the many heavy machine tools, were transferred from the railroad cars at the foot of Arkansas avenue and moved into place by the efficient tractors. The electric battery truck on exhibition, having a crane attached for handling rods, driving boxes, cylinder heads, pistons and other heavy parts about a locomotive, should be of interest to mechanical men who are planning improvements to engine terminals on their line. But do not overlook the fact that good floors are the foundation for this and other terminal improvements.

Systematizing Car Inspection

The percentage of increase in the wages of car inspectors during the past two years has been greater than for any other class of employees in the mechanical department. In many of the wage agreements formerly in force the eight-hour day did not apply to the car inspectors. The wage increases and the eight-hour day together have added enormously to the cost of inspection, and under these circumstances it behooves the roads to give serious consideration to the problem of reducing the labor required for inspection. Thorough inspection is, of course, essential from the standpoint of safety, but merely finding the defects does not improve the condition of the cars. Making repairs in yards is costly; it requires a large force of inspectors and often results in serious delays to trains. For this reason the best results in reducing the cost of inspection have been obtained by the roads that have directed their efforts to putting the cars in condition to make a considerable mileage without repairs, rather than making hurried and often improper repairs in the yard. If care is taken to have defects repaired when cars are empty and if through trains are handled at the originating terminal with a view to doing away with the necessity for further repairs, at least during the remainder of the trip, the cursory safety inspection at intermediate terminals should prove sufficient. One road in particular has secured excellent results by adopting this policy. The improvement in the movement of all trains has been noticeable, but the most remarkable saving has been achieved on through stock train runs where, by avoiding

the development of defects enroute and shortening the time required for intermediate inspection, one resting period has been eliminated on many of the longer runs.

High Capacity Cars

It is expected that before the car department officers finish their part of the convention there will be considerable discussion on the subject of high capacity cars; that is, cars having a capacity in excess of 55 tons. It would be disappointing if there were not. But there are two aspects of the situation with respect to high capacity cars and mechanical men should not forget that the commercial aspect is the paramount consideration. Where it is impossible or inexpedient to load 50-ton cars to capacity, there can be no object in building heavier cars, and it must not be forgotten that the use of very small car units has been economically justified abroad. On the other hand, if it is a fact that commodity conditions are favorable and it can be shown that higher capacity cars will augment train loading, this should be properly emphasized by those in a position to know the facts. A note of caution, however, should be injected into any discussion in regard to the possibilities of high capacity cars that does not take into consideration certain limitations. Enthusiasts are liable to over-estimate the extent to which the dead weight or the frictional resistance per ton of lading can be reduced with high capacity cars, and while this can unquestionably be done it must be borne in mind that the transition from a four to a six-wheel truck will in itself increase the frictional resistance at least 50 per cent. It is absurd to talk about increasing gross ton loading to any appreciable extent by means of high capacity cars, particularly on heavy gradients.

Mechanical Versus Stores Department

Upkeep of equipment is the chief function of the mechanical department and the measure of its efficiency lies in the cost of adequate maintenance. The object of a stores department or the service of supply so far as it affects the mechanical department is to provide on the ground when needed the material actually required for the repair and construction of equipment. The service of supply is not a primary but is an auxiliary service; it does not participate in the responsibility for moving trains nor furnishing the locomotives with which to move these trains. Moreover, the actual work involved in the distribution of material is performed by other departments and the chief function of the stores department is in reality largely of a supervisory character. The supply train is an excellent means for providing outlying stations with material and curbing excessive material stocks at these points, but the actual operation of this train is entrusted to the operating department and the mechanical department is responsible for providing the equipment, including the locomotive and engine crew without which the supply train would accomplish nothing. The real value of the service of supply lies in the establishment of a policy that will conserve the resources of the property without hampering the execution of its duties, but the tendency of any department permitted to dictate a policy without assuming responsibility for the ultimate effects of that policy is towards autocracy, and on this ground the stores department cannot be held altogether blameless. It may be that if the mechanical department were allowed a free hand in the ordering of material, the result would be financially disastrous, but it is equally conceivable that if the service of supply were conducted solely with a view to reducing the cost of material and material distribution, the operation of the road as a whole would soon come to a standstill. It is well to bear in mind that the railroad cannot be operated for the benefit of any one department, and that each department must be operated for the benefit of the railroad considered as a whole.

A Half Solved Problem

The remarks on the labor situation in Mr. Tollerton's address seem to have struck a responsive chord in the minds of the mechanical officers. While the "orderly discussion and just consideration by representatives of all concerned" has not been in evidence during the recent labor troubles, there is no doubt that the stand of the labor board in refusing to deal with men who have left their positions will ultimately have the desired effect and will in a large measure prevent strikes. But even though walkouts are entirely eliminated, there is nothing to prevent men "striking on the job" and without some definite measure of what constitutes a fair day's work this would be hard to combat. A partial solution of the labor problem is no doubt embodied in the transportation act. It should put an end to the protracted controversies formerly involved in making a wage schedule and should insure continuous operation, at least after a fashion, pending a settlement. But the roads cannot operate efficiently unless they can interest the men in their work and secure loyal co-operation in getting output. The sun is setting on the day of open warfare between the railroads and their employees. The first signs of the new order are to be found in the plans now being considered for arousing interest by shop committees, by stock ownership and similar means. The labor question is one of the principal topics of informal discussion at the convention. Is there any valid reason why a matter of such great importance should not be considered by the association? The labor problem on the railroads has become so acute largely because there has not been enough of the same perfectly frank study and discussion of the labor problem that has been given to engineering problems.

"Treat 'Em Rough"

We hasten to correct a wrong impression that has apparently been made in the minds of some of our friends by the series of editorials which we have published in the *Daily* on the college man and the mechanical department. Our sole intention has been to develop some practical means by which the mechanical departments could successfully recruit technically trained men—men who are absolutely vital to the future success of the railroads. We hold no brief for the college men; they are well able to take care of themselves. We do not believe the railroads should cater to them or pamper them, or try to make the job easier for them. The technical men ask for no odds. The railroads need them and must make it possible for them to enter the service and secure the right kind of training to make their work really effective. Two roads within the past year have had between 20 and 30 applications from college men to enter the mechanical department, but in both cases have had to turn them down be-

cause of the way in which the National Shop Agreement is interpreted in relation to special apprentices. In one case a senior in the mechanical engineering department of one of our colleges made a round trip of 2,800 miles to emphasize his application by a personal interview. Some provision should therefore first be made to take these men into the service and train them in the right way. Next, the men must be made to realize that hard work and lots of it will result finally, if they make good, in a substantial and worth while position. This means—and it is exactly what every mechanical department man wants and what George Basford emphasized so forcefully in the paper he read last week—that the mechanical department officer must be a real force and authority in the operation of the railroad. The head of the mechanical department must report to the very highest executive officer, should preferably be a vice-president, and should have a real say in all matters in any way affecting his department. With such a goal to work to there will be no difficulty in attracting technically trained men to the service—and of holding them. No amount of hard work will drive them away under these conditions.

Training Railroad Officers

Elsewhere in this issue will be found a proposed course of training for technical men who enter the mechanical department. The right kind of a man will profit with any sort of a course, but there are one or two modifications in the proposed course that would undoubtedly make it far more effective in accomplishing its purpose. For instance, two months only are required in roundhouse work; six months would be far better. Here the mechanical man comes in intimate contact with the transportation department and its needs and gets a far better appreciation of the business or operating end of the railroad. This he must have if he is going to qualify successfully for any important position in the mechanical department. The roundhouse also teaches him the necessity of doing work on time and helps him to see the danger and loss caused by careless or indifferent work. One mechanical department officer who has had a wide experience in developing men for official positions in the mechanical department is authority for the statement that "six months of roundhouse experience is worth more than all the rest of the course put together." Special apprentices should also be required to make periodical reports to an important officer in the mechanical organization in relation to the work on which they are engaged and these reports should be carefully criticised and returned to them. Too many railway officers, particularly in the technical departments, do not understand how to express themselves forcefully; the beginners should be given a real course in making effective reports and in using business English. A young mechanical department officer who has just been given an important promotion was commented upon in the following way by one of the older men attending the convention, who has a wide acquaintance among the higher mechanical department officers: "His higher officers have great confidence in him because they realize that he knows thoroughly what he is talking about. He supports his requests with the strongest kind of data and arguments, and for this reason they have confidence in him." In the third place, the special apprentice should be required to follow a carefully planned course of reading, directly relating to the work in which he is engaged. All of these things should be taken into consideration in the application of the proposed course of training for special apprentices.

Program For To-day

SECTION III—MECHANICAL

Discussion of Reports on:	
Autogenous and Electric Welding..	9.30 A. M. to 10.00 A. M.
Specifications and Tests for Materials	10.00 A. M. to 10.30 A. M.
Standard and Recommended Practice	10.30 A. M. to 10.45 A. M.
Election of Officers	10.45 A. M. to 11.00 A. M.
Discussion of Reports on:	
Repair Shop Layouts	11.00 A. M. to 11.20 A. M.
Amalgamation	11.20 A. M. to 11.30 A. M.
Standard Blocking for Cradles of Car Dumping Machines	11.30 A. M. to 11.40 A. M.
Standard Method of Packing Journal Boxes	11.40 A. M. to 12.10 P. M.
Establishment of a Coöperative Research Bureau	12.10 P. M. to 12.30 P. M.

SECTION VI—PURCHASES AND STORES

MORNING SESSION

Invocation	9.30 A. M. to 9.40 A. M.
Address of Welcome by Mayor of Atlantic City	9.40 A. M. to 10.00 A. M.
Response by J. H. Waterman	10.00 A. M. to 10.15 A. M.
Opening of Meeting by the Chairman.	10.15 A. M. to 10.30 A. M.
Action on Minutes of Annual Meeting 1919 (R. S. A.)	10.30 A. M. to 10.40 A. M.
Appointment of Committees: Resolutions	
Memorial	10.40 A. M. to 10.45 A. M.
New Business:	
Report of General Committee, including Announcement of Nominations for Members of Nominating Committee	10.45 A. M. to 11.30 A. M.
Discussion of General Committee's Report	11.30 A. M. to 12.30 P.M.

AFTERNOON SESSION

Discussion of Reports of Committees.	2.00 P. M. to 5.00 P. M.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS

ALL-DAY SESSION

Presentation of Progress Reports:
Committee on Trucks and Tractors.
Committee on Electric Welding.
Committee on Illumination.
Committee on Train Lighting Equipment and Practice.
Committee on Railway Stationary Power Plants.
Committee on Electric Headlights.
Committee on Electrification.
Committee on Electric Repair Shop Facilities and Equipment.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3.30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.

4.30 P. M.—Tea will be served in Entrance Hall.

9.00 P. M.—Informal Dance with Special Features, Ball Room, Million Dollar Pier.

Lost

LOST—A pair of dress trousers. Return to Al McNeill of the Transportation Committee.

LOST—Badge No. 8093. Return to Secretary Conway.

LOST—A pink cameo pin, set with pearls. Was lost in the ballroom on the pier on Saturday night. The owner requests that it be returned to the *Railway Age* booth.

Base Ball Game Tuesday

THE BASEBALL TEAM of the Parkesburg Iron Company will play the P. R. R. Motive Power team from the Harrisburg shops on the Inlet Grounds at 3.30 P. M., Tuesday, June 15th. All members of the Convention will be welcomed.

Col. G. H. Emerson's Experiences in Russia

Probably no American railway man had so extraordinary an experience during the Great War as Colonel George H. Emerson, chief of motive power and equipment of the Baltimore & Ohio, who is attending the conventions. From October, 1917, until January, 1920, he served as colonel of the corps of railway officers who were raised primarily in the northwest to go to Siberia and operate the Trans-Siberian Railway in the interest of the Allies.

When he went to Siberia the Kerensky government was in power in Russia. He saw it fall and the Kolchak government rise to power, and saw it in turn overthrown by the Bolsheviks. He was a participant in the successful effort of the Czecho-Slovak army to break through the lines of the Bolshevists on the way to Vladivostok, and he witnessed some of the severest fighting and most deadly struggles that occurred during the war. He had a remarkable experience in helping to operate the Trans-Siberian Railway.

When Russia was still fighting with the Allies it was considered necessary to supply the Russians with a force of American railway officers to enable them to rehabilitate the Trans-Siberian Railway and keep it in operation. Colonel Emerson was selected by the American government to raise 14 divisions of railway mechanical and operating officers. He did so, and sailed for Siberia in November, 1917. He had 14 divisions of mechanical and operating officers, including two general superintendents with the rank of lieutenant colonel. Superintendents in these divisions had the rank of majors; master mechanics the rank of captain; assistant superintendents, chief train dispatchers and trainmasters the rank of first lieutenants; trick dispatchers, roundhouse foremen and shop foremen the rank of second lieutenants.

He took with him 215 railway men and 73 men from the Baldwin Locomotive Works. The latter were to be used in erecting in Vladivostok locomotives that were being built in America. The privates in Colonel Emerson's corps were to be Russians and under the agreement with the Kerensky government his corps was to have charge of the operation of the Trans-Siberian between Omsk and Vladivostok. The Trans-Siberian Railway was to be used chiefly to move munitions and supplies to the Russian army on the western front.

When Colonel Emerson and his men arrived at Vladivostok in December the first thing they learned was that the Kerensky government had been overthrown by the Bolsheviks, who were in full control, and they were refused the right to land unless they would agree to work with the Soviets. They were unable to get in touch with the authorities at Washington, and therefore landed at Nagasaki, Japan, where they received instructions to await further orders.

The head of all the American railway forces in Siberia was John F. Stevens, and late in January, 1918, Mr. Stevens and Colonel Emerson decided to go to Harbin, Manchuria, to get information regarding the situation in Russia. Shortly after their arrival there they were met by the Minister of Ways and Communications of the Kerensky government, who informed them that the Soviets had agreed to carry out the original program of the Kerensky government and asked the Americans to co-operate with them for this purpose. Colonel Emerson then arranged to move his corps to Harbin. A few days later, however, while the first section of the corps was en route to Harbin, they were advised by the same man that the Soviets had reconsidered their decision. The instructions for the rest of the corps to move to Harbin was then cancelled. The first section on their arrival were placed in charge of the operation of the Chinese Eastern Railway. In April instructions were received from Washington to try to work to Vologda and connect there with the American ambassador, David R. Francis, and consult with him regarding transportation matters in European Russia.

In obedience to these instructions Colonel Emerson left Vladivostok late in April, 1918, by the Armor Railway Line, the Chinese Eastern having recently been cut by the Cossacks. In May he arrived at Irkutsk, where he found that serious trouble had developed between the Czecho-Slovaks and Soviets and he was asked to act as mediator between them. He served in the capacity of mediator for 10 days. The armies of the Czecho-Slovaks and the Bolsheviks were entrenched within a short distance of each other and Colonel Emerson, in order to carry on the mediation between them, repeatedly had to pass blindfolded from the lines of the one to the other. He finally succeeded in securing a conference, the result of which was an agreement for an armistice east of Murinsky for six days. The Czechs at this time were practically unarmed, but they decided to arm themselves, and after the armistice they suddenly attacked the Russians and captured various stations of the latter, by which means they completely equipped themselves. This left them free to work westward, and in less than two weeks they captured all points along the railroad as far as the Vologda river.

Colonel Emerson was still trying to work through to European Russia. He got as far as the Ural mountains when he was advised by the Soviet authorities that they would give him a safe passage westward, but that no communication by him would be allowed with Ambassador Francis or America's allies in Europe. He then returned to Omsk, where he met a French officer who had arrived from European Russia with the information that the Czechs had been officially recognized by the Allies and that the French were sending an expedition for their relief. This was the first time that Colonel Emerson had heard from the outside world since April. In the meantime he had come in contact with a number of German prisoners, who had reported that Paris had fallen and that the Central Powers had won the war.

The Czechs decided to try to fight their way through to Vladivostok. Colonel Emerson had with him only seven men, but he offered their services to General Guida of the Czech army and was placed in charge of the engineering department of the Czech army. In the engineering department he had 450 German war prisoners as laborers and 100 Czech soldiers as guards. He assembled such apparatus as was available and the engineering corps proceeded eastward, following the armored train of the Czechs through Siberia, the infantry of the Czech army following the engineering department. The Bolsheviks in retiring before the Czechs destroyed all the bridges and structures of the Trans-Siberian Railway that they could, including many steel structures. In the Baikal district, however, the Czechs succeeded, by a flanking movement, in saving all the tunnels but one. This one when blown up blocked the entire Czech expedition. The Bolsheviks mined this tunnel 100 ft. from the portal and exploded over 16,000 lb. of T. N. T., blowing up a 50 ft. overburden of solid granite. The Soviet forces had 12,000 troops, which they were conveying by 62 trains. The Czechs, by a flanking movement, succeeding in getting behind them and blowing up the tracks and derailing the entire 62 trains. After the great victory by the Czechs over the Soviets in the

Baikal region, in which the Czechs were completely outnumbered, no more opposition to the advance of the Czechs was encountered until they arrived in Manchuria in September.

Colonel Emerson, on arriving in Manchuria, went on to Vladivostok and reported to Mr. Stevens and the Allied representatives. On his arrival in Manchuria he received the first word of the outside world that he had in five months.

The interallied expedition against the Bolshevists was just being organized and interallied operations of the Trans-Siberian Railway was agreed upon. Colonel Emerson was placed in charge of operation for the interallied expedition, but he spent practically the whole summer of 1919 in Omsk, trying to reach an agreement with the Kolchak government, which was trying to make head against the Bolshevists. He tried to so operate the Trans-Siberian Railway as to help the Kolchak government in prosecuting its campaign against the Bolsheviks, but in spite of all he could do the military authorities of the Kolchak government insisted upon assuming practically complete control of the operation of the railway, with the result that it was made impossible effectively to operate it. The complete collapse of the Kolchak government was due both to the fact that it did not give opportunity for the efficient operation of the railway and to the fact that it did not keep its soldiers equipped and properly taken care of. When a violent typhoid epidemic broke out among them practically the only relief afforded them was rendered by the American Red Cross.

One of the interesting and remarkable things done by the American railway troops in Siberia was that of equipping the entire railway from Vladivostok to Omsk with an American dispatching system, equipped with a selected type of telephone, the work being done in less than three months.

After the collapse of the Kolchak government it became obviously impossible for the Allies to accomplish anything in Siberia. Colonel Emerson started on his return to the United States, arriving early in 1920. He returned with a very high opinion of the natural resources of Siberia and a belief that once it gets a stable government it will be able to send to the United States many products which this country needs, and at the same time become a large market for things which can best be produced in the United States.

Before going to Siberia Colonel Emerson was general manager of the Great Northern Railway. Immediately after his return Daniel Willard, president of the Baltimore & Ohio, who was chairman of the Advisory Committee of the Council of National Defense, and who was largely responsible for Colonel Emerson going to Siberia, invited him to become chief of motive power and equipment of the Baltimore & Ohio, and he entered upon the duties of this office immediately after the railways were returned to private operation.

Among the American railway officers who accompanied him to Siberia was Colonel R. V. Hawkins, who was chief mechanical officer of his expedition. Colonel Hawkins also is in Atlantic City attending the conventions.

Appointments on the New Haven

Effective Monday, June 14th, N. M. Rice is appointed general purchasing agent of the New York, New Haven & Hartford, succeeding G. G. Yeomans, who has been appointed assistant to the president with special duties to be assigned. It is expected that Mr. Rice will visit the convention Monday.

President Aishton Comments on Balcony Exhibit

One of the first places that President Aishton, of the American Railroad Association, visited on Saturday morning was the exhibit in the balcony. He was so impressed that before he left he said he hoped that every railroad man in attendance at the conventions would make it a point to carefully examine this part of the exhibit, going over it at least once.

A Big Crowd

The following table gives the comparative registration figures up to Sunday noon for all of the conventions since and including 1911. No comment is necessary.

	1911	1912	1913	1914	1915	1916	1919	1920
Members, Section III, Mechanical	712	445	575	631	592	628	630	707
Members, Section VI, Purchases and Stores	...	...	...	...	...	...	...	140
Special Guests	757	449	495	451	381	511	650	441
Railroad Ladies	699	329	426	352	344	417	600	569
Supply Ladies	399	218	282	272	224	306	450	634
Supply Men	1,684	1,446	1,574	1,403	1,178	1,453	2,246	2,262
Total	4,251	2,887	3,352	3,109	2,719	3,315	4,576	4,753

Equipment Notes

The Pere Marquette is in the market for a number of passenger train cars, including 14 coaches and 14 baggage cars.

The Baldwin Locomotive Works will make repairs to locomotives for a number of railroads, including 200 for the Pennsylvania, 25 for the Philadelphia & Reading, 25 for the Central of New Jersey, 20 to 25 for the Seaboard Air Line, also about the same number for the Atlantic Coast Line, and some for the Great Northern and the Chicago & North Western.

E. M. Tewkesbury Passes Away

Friends of E. M. Tewkesbury, for many years general superintendent of the South Buffalo Railway, will regret to know that he died last week at his home in Buffalo, his funeral taking place on Thursday. He had been in failing health during the past two years, and it had been hoped that his stay in Florida with Mrs. Tewkesbury during the past winter would bring him back to normal health. He returned in the early spring much improved, but last month began slipping back, the end coming suddenly, however.

Mr. Tewkesbury was a big factor as a witness in the extended controversy with the Interstate Commerce Commission and in the courts as to the status of so-called industrial railroads and plant lines. His intimate friends know that he virtually wrecked his physical condition by the hours he gave day and night to a study of the situation and the remarkable array of facts and figures, with other data, which he compiled, and which proved of great importance as evidence.

The deceased had been active in the affairs of the Central Railway Club, of which he was a past president, and he had done much to promote the success of that organization. For a number of years he seldom missed the mechanical conventions at Atlantic City.

The immediate surviving relatives are Mrs. Tewkesbury, a son and a daughter.

General Committee, American Railroad Association, Section VI—Purchases and Stores. D. C. Curtis, E. J. Roth and Assistant Secretary W. J. Farrell Missing

Trouble with the Bells

THROUGH AN ERROR of a reporter in the convention, the *Daily* finds itself in a position of having to offer profuse apologies to two of the members of Section III. In the discussion of the report on the Design and Maintenance of Locomotive Boilers, J. Snowden Bell, of New York, made the statement that he doubted "if there is anyone present who has had an earlier observation of combustion chambers than I have had." He then referred to his experiences on the Baltimore & Ohio in 1863. Unfortunately, the reporter ascribed this statement to R. W. Bell, general superintendent of motive power of the Illinois Central. A good many of R. W.'s friends upon reading this item marveled at the fact that he had so well preserved his youth. Meanwhile J. Snowden has lost credit for the fact he is one of the few living members of the association who can refer back to practical railroad experiences at such an early date.

Industrial Truck Manufacturers Meet

A NUMBER OF INDUSTRIAL truck manufacturers, all of them exhibitors at the convention, met at Atlantic City on Friday evening to effect an informal organization. A committee was appointed to make arrangements for co-operating with technical associations, colleges and universities in promoting interest in the problems of industrial haulage. This committee, for instance, will arrange to obtain technical papers or reports for presentation before engineering or other organizations, or it will help to start courses on industrial haulage in the colleges, or will assist in other ways in educational work along these lines.

Four companies were represented at the meeting, including the Lakewood Engineering Company, Karry-Lode Industrial Truck Company, Inc., Yale & Towne and the Automatic Transportation Company. Representatives were also present from the Edison Storage Battery Company and the Electric Storage Battery Company. Other companies which have representatives at Atlantic City and who desire to co-operate in this movement can do so by getting in touch with L. F. Mead, Lakewood Engineering Company, or J. M. Breitenbach, Karry-Lode Industrial Truck Company.

Supplementary List of Exhibitors

Additional exhibitors to those noted in the *Daily* of June 9, page 1601, are as follows:

Carbo-Hydrogen Company of America, Pittsburgh, Pa.—Cutting and welding apparatus. Represented by F. S. Austin, William T. Allen and S. R. Reed. Space 808.

Chadburn Ship Telegraph Company of America, Troy, N. Y.—Kent-Chadburn clear view screen for service in rain, snow, sleet and blizzard for steam and electric locomotives. Represented by Geo. F. Greenhill. Space 207.

Dalton Adding Machine Company, Cincinnati, Ohio.—Adding, listing and calculating machines. The Dalton shuttle carriage statement machine. Represented by H. C. Grubbs and F. E. Collins. Space 336.

Flint & Chester, Inc., New York, N. Y.—National graphite lubricator. Represented by C. B. Flint, L. S. Watres and C. E. Foye. Space 24.

Housley Flue Connection Corp., Indianapolis, Ind.—Housley Safety wash-out plugs. Represented by R. B. Housley. Space 36.

Penn Seaboard Steel Corp., Philadelphia, Pa.—Reception booth. Represented by J. B. Warren and T. Burd Zell. Space 608.

Republic Iron & Steel Company, Youngstown, Ohio.—Bolts, nuts, turnbuckles and bar iron. Represented by W. B. Topping, W. H. Oliver and N. W. Foy. Space 517.

Torchweld Equipment Company, Chicago, Ill.—Oxy-Acetylene welding and cutting apparatus. Represented by W. A. Slack and H. R. Fenstemaker. Space 5.

Youngstown Steel Car Company, Youngstown, Ohio.—Reception booth. Represented by Geo. J. Lynch, John S. Donglas and L. C. Wilkoff. Spaces 740-742.

Morton Machinery Company, Philadelphia, Pa.—Presenting the Cisco lathe. Represented by R. J. Hollen. Spaces 122-124.

Transportation Committee

Top row, left to right—W. K. Hackett, The Okonite Co., Passaic, N. J.; Al. McNeill, Central Electric Co., Chicago; Capt. W. F. Walsh, Galena Signal Oil Co., Chicago, Ill.; F. M. Condit, Fairbanks Morse & Co., Chicago; F. Coolidge, Buckeye Steel Castings Co., Chicago; Jack Ross, Westinghouse Electric & Mfg. Co., Philadelphia; Chas. D. Derby, Joyce-Cridland Co., Cleveland; E. L. Georger, Pratt & Lambert Co., Buffalo; J. W. Trent, H. W. Johns-Manville Co., St. Louis; Gilbert E. Ryder, Locomotive Superheater Co., New York; W. Jerry King, Hewitt Rubber Co., Chicago; T. J. Powell, Galena Signal Oil Co., St. Louis, Mo.; Major John W. Foyle, Gustin-Bacon Co., Kansas City. Bottom row, left to right—George C. Hannaway, National Refining Co., Chicago; Roswell P. Cooley, Vapor Car Heating Co., New York; George W. Ristine, Whiting Foundry & Equipment Co., Harvey, Ill.; Robert R. Porterfield, Locomotive Superheater Co., New York; Howard A. Glenn, Edna Brass Mfg. Co., Chicago; John C. Kuhns (Chairman), The Burden Iron Co., Chicago; W. A. Housten, Joseph Dixon Crucible Co., Baltimore; J. A. McFarland, Bird Archer Co., St. Louis; Geo. R. Berger, Gould Storage Battery Co., Chicago; Bruce P. Owens, Magnus Co., Chicago; Walter C. Doering, Southern Wheel Co., St. Louis; H. A. Daniels, West Disinfecting Co. Members of the committee not in the photograph—Herbert Shulze, Oxweld Railroad Service Co., Chicago; John Schlintz, Sherwin-Williams Co., New York; C. P. Wright, American Brake Shoe & Fdy. Co., Chicago; Harry Niel, Midvale Steel Co., Philadelphia.

McBarmma Golf Tournament

THE ANNUAL TOURNAMENT of the McBarmma Golf League was held at the Seaview Club on Saturday. The principal prize winner was H. H. Vaughan. Mr. Vaughan had the low gross and low net score in the morning, with a gross score of 89 and a net score of 81. Besides winning the prizes for these scores he won for the third time the Sargent Luck Cup, donated by George H. Sargent, and thereby became entitled to its permanent possession. However, after being awarded it, Mr. Vaughan presented the cup in perpetuity to the league.

Other winners were as follows:

Class A—First, T. C. De Rosset; second, E. W. Van Houten.

Class B—First, Samuel O. Dunn; second, George W. Bishop.

Class C—First, B. P. Flory; second, J. T. Carroll.

Samuel O. Dunn also won the Carr cup, donated by Robert F. Carr, for the player making the low net score in the afternoon play.

Frank Hedley was awarded the prize donated by James McNaughton, to be given to the most distinguished visitor present.

The following officers were elected for the ensuing year: President, E. W. Van Houten; vice-president, B. P. Flory; secretary-treasurer, Clement F. Street; directors, W. L. Conwell and George H. Sargent.

A. R. Ayres Elected President of Cornell Alumni

MORE THAN THIRTY enthusiastic Cornell graduates met at the Traymore on Saturday evening for the banquet which has been a regular feature of convention week for many years. Following the repast, E. A. Averill, president of the alumni organization, told of the activities at the university during the past year. He touched briefly on the college man in railroad work and practically all the speakers who followed him discussel this subject. All agreed on the need for college trained men on the roads, but there was considerable diversity of opinion as to the reasons for the present unfortunate condition. One of the speakers had recently returned from a large Eastern university where he had tried to secure graduates for the road with which he is connected. The students were apparently attracted by the higher rates offered in other industries. Eighty-five per cent of the graduating class were entering the automotive industries and the only ones who accepted the railroad's offer were two students from foreign countries.

The majority of the railroad officers present were of the opinion that the rates offered to college graduates should not be increased but other measures should be taken to attract graduates to the service. The necessity of changing the provisions of the National Agreement, at least removing the present age limit of 21 years for apprentices, was emphasized. There was a strong sentiment against according special treatment to the college men as it was felt that the best results would be obtained by having them start in the ranks and become familiar with the labor problem. A lack of interest in railroad service as a field of activity for the graduates had been noted at the majority of institutions visited. The suggestion was made that students should be urged to enter railroad work during the Summer vacations in order to develop an interest in railroad problems and to call attention to the possibilities for advancement which the roads offer. To overcome the present indifference toward the railroads it was suggested that measures be taken to interest the professors in the engineering problems of the motive power department. One of the speakers pointed out that the American Railroad Association might well develop an organization to interest the coleges and college men and to arrange for the employment of the graduates.

At the election of officers, A. R. Ayres, superintendent of motive power of the New York, Chicago & St. Louis, was chosen as president for the coming year, and A. F. Steubing, of the *Railway Age*, was elected secretary.

Annual Meeting of the R. S. M. A.

THE ANNUAL MEETING of the Railway Supply Manufacturers' Association was held in the Greek Temple on the Pier at 12.00 o'clock noon Saturday.

The meeting was well attended and the members evinced a keen interest in the work of the Executive Committee as outlined by George R. Carr, president of the association. Mr. Carr referred briefly to the size of the exhibit at this convention. He stated that there were 365 exhibitors, with a total floor space of 100,229 sq. ft., which exceeds the 1919 exhibit by 7,000 sq. ft. Despite the fact that additional space had been secured in the balcony, it was necessary to refuse the applications of 75 concerns who desired to exhibit their products at the convention.

Because of the fact that the members of Section VI—Purchases and Stores—will be in session both in the morning and afternoon on Monday and Tuesday and until noon on Wednesday, it was voted to establish five o'clock Wednesday afternoon as the hour of closing the exhibits, and the members of the R. S. M. A. were requested not to dismantle their exhibits before that time. The secretary was directed to write a letter to the chairman of Section III and of Section VI of the American Railroad Association informing them of the action taken by the R. S. M. A. and requesting that it be read at the sessions of those organizations.

George A. Post and Scott H. Blewitt congratulated the younger members of the association on the splendid work they are doing in making the exhibits at the conventions a source of education and upon the quality as well as quantity of the exhibits.

The recent deaths of D. C. Noble and R. T. Walbank, past presidents of the association, were feelingly touched upon by Mr. Post, and a silent tribute was paid to both by the entire assemblage.

The district elections for the Executive Committee resulted in the election of the following members:

First District—Nw England and Canada, George W. Denyvan, Parkesburg Iron Company.

Second District—New Jersey, W. K. Krepps, Crucible Steel Company of America.

Fourth District—Ohio, Indiana, Michigan, E. M. Savercool, S. F. Bowser & Company.

Fifth District—Illinois, L. B. Sherman, *Railway Age*.

Seventh District—Wisconsin, Minnesota, Louisiana and states west of the Mississippi, Sterling Campbell, Railway Devices Company, St. Louis.

The election of officers for the coming year resulted as follows:

President, J. F. Schurch, vice-president of the T. H. Symington Company, Chicago, Ill.

Vice-President, Charles D. Jenks, the Damascus Brake Beam Company, Cleveland, Ohio.

Mr. Schurch, the new president, assumed his office, and declared his intention of exerting every effort to continue the broad gage, progressive policy of his predecessor, Mr. Carr.

Special Apprenticeship Recommended

THE DISCUSSION on the use of college men in the mechanical department, in the editorial pages of the *Daily*, has developed the fact that a sub-committee of the General Committee of Section III recommended to the Railroad Administration the addition of articles to be incorporated in the National Shop Agreement covering the training of college graduates as special apprentices. For some reason the Railroad Administration took no action on this, although it was approved of by both the General Committee of Section III and the Executive Committee of the American Railroad Association. Now that the Railroad Administration is not in control, steps have been taken to have the matter given further consideration. The proposed plans for the special apprenticeship course are as follows:

Men who have taken a recognized course in mechanical or electrical engineering may be employed as "Special Technical Apprentices" and allowed one year's credit for this work. Regular apprentices may be promoted to special Technical Apprenticeships after having served one year and having qualified in a mechanical or electrical engineering course, or having passed a prescribed examination; such regular apprentices to be recommended by their Shop Superintendent or Master Mechanic, subject to approval of the Chief Mechanical Officer.

SPECIAL TECHNICAL APPRENTICESHIP COURSE

Locomotive Department.
- 3 months, Machinery side.
- 3 months, erecting side.
- 2 months, boiler shop.
- 2 months, blacksmith shop.
- 1 month, air room.
- 2 months, power house with stationary engineering and electrical work.
- 3 months, drawing room.
- 2 months, division roundhouse.

Electrical Department.
- 3 months, construction and road work.
- 2 months, shop and maintenance work.
- 1 month, train lighting.

Car Department.
- 2 months, freight car shop.
- 2 months, passenger car truck shop.
- 2 months, coach erecting shop.
- 2 months, mill.
- 2 months, cabinet shop.
- 2 months, air work, steam, gas, sheet metal and electrical light work.

Total, 36 months.

Registration, American Railroad Association

Section III, Mechanical

Agnew, S. H., M. M., River Term., Alamac.
Aishton, R. H., For., American Railroad Assn., Dennis.
Anderson, G. S., Gen. Foreman of Power Plants, Penn.
Andrewetti, Jos., A. E. E. C. & N. W., Dennis.
Appleton, W. U., M. S., Can. Nat., Ambassador.
Bickell, C. H., Tidewater Oil Co., Arlington.
Billeau, L. S., A. E. E., B. & O., Haddon Hall.
Black, R. L., M. M., N. & W., Marlborough.
Black, W. G., M. M., N. Y. C. & St. L., Alamac.
Bodemer, C. J., Asst. Supt. Mach., L. & N., Chalfonte.
Booth, J. K., Gen. Foreman, Bessemer & Lake Erie, Traymore.
Boutet, H., C. J. I., Chalfonte.
Bradshaw, J. H., S. C. D., American Cotton Oil Co., Ambassador.
Brangs, P. H., Arlington.
Brigham, E. D., Jr., Supt. No. Am. Car Co.
Brigham, H. H., Pres., Atlantic Seaboard Despatch.
Brodman, R. W., Genl. Foreman Elec. Equip., L. I., Dennis.
Brogan, Jas. P., Asst. M. C. B., D. L. & W., Blackstone.
Brown, B., Chief Accountant, Amer. Railroad Association, Marlborough.
Brown, H. M., S. S., C. & O., Craig Hall.
Bruehler, Geo. H., C. C. A., Grand Trunk, Chalfonte.
Butler, F. A., M. M., B. & A. Chalfonte.
Buzzell, O. D., G. F. C. D., A. T. & S. F., Chalfonte.
Cain, J. W., Consulting Engineer, Gulf Texas & Western, Marlborough.
Carson, G. E., D. M. C. B., N. Y. C., Dennis.
Chandler, R. L., D. M. C. B., N. Y. C., Marlborough.
Coleman, Jas., Asst. to G. S. M. P. & C. D., Grand Trunk, Fredonia.
Cotton, W. A., Asst. to Gen. Mech. Supt., Erie St. Charles.
Curry, Geo., Amer. Loco. Co., Marlborough.
Davies, E. S., Gen. For., So. Buf., Smiths.
Davis, J. E., S. K., Erie, Blackstone.
Davis, J. H., E. E., B. & O., Marlborough.
Doty, D. N., Inspr., Navy Ordnance, Strand.
Downs, J. T., Supt. R. S., M. C., Haddon Hall.
Droege, J. A., Gen. Supt., N. Y., N. H. & H., Runnymede.
Dyer, R. H., Gen. Car Insp., N. & W.
Eich, H. C., G. S. M., C. G. W., Chalfonte.
Eley, E., M. C. B., Can. Pac., Seaside.
Englebright E. W., Engineer N. Y. Offices, Union Pacific, Traymore.
Ennes, S., G. M., B. & O., Traymore.
Everett, Ira, G. C. I., Dennis.
Ewing, J. J., M. E., C. & O., Seaside.
Fairbanks, W. A., Secy. Telegraph & Telephone Div., American Railroad Assn., Breakers.
Forster, C. J., Asst. General Secretary & Treasurer, American Railroad Association, Runnymede.
Fritta, J. C., M. C. B., D. L. & W., Traymore.
Fryer, C. V., G. F. C. D., N. Y. O. & W., Arlington.
Gamcy, J. J., Gen. For. Car Dept., So. Ry., Chalfonte.
Gearheart, John F., M. Painter, Penn., Calvert.
Gibbs, A. W., C. M. E., Penn., Chelsea.
Goodnow, T. H., S. C. D., C. & N. W.
Graburn, A. L., M. E., Can. Nor. Ry., Marlborough.
Hall, E. H., S. C. D., C. G. W., Mascagni.
Hall, W. H., C. C. Insp., C. R. R. of N. J., Arlington.
Harding E. N., I. C., Alamac.
Henry, C. L., Asst. M. M., Penn.
Hogarth, Wm., Cudahy Refr. & Tank Lines, Haddon Hall.
Holverstatt, B. Z., Asst. Supt., B. & O., Princess.
Howard, Jno., S. M. P., N. Y. C., Haddon Hall.
Jacobson, C. M., Shop Supt., Seaboard Air Line, Princess.
Justus, I. J., G. C. I., N. Y. C., Pennhurst.
Kapp, J. B., M. M., Penn., Princess.
Keiser, C. B., S. M. P., Penn., Chalfonte.
Kelley, W. T., M. E., I. C., Raleigh.
Killeen, G. S., Genl. Supt., So. N. Y. Bower & Rv. Corp., 120 Madison.
King, J., S. C. D., Pac. Fruit Expr., Haddon Hall.
Kipp, A., G. C. I., N. Y. O. & W., Chalfonte.
Kleine, R. L., Asst. to C. M. P., Penn., Dennis.
Lance, I. H., G. S. K., D. L. & W., Craig Hall.
Lee, F. H., A. S. of Freight Car Maintenance, B. & O., Alamac.
Lohr, H. W., Supt. Car Refs., Penn., Haddon Hall.
Lovell, Alfred. Traymore.
Lovett, Geo. M., S. M. P., Tex. So. East, 29 S. Carolina Ave.
Lynn, Samuel, M. C. B., P. & L. E., Pennhurst.
McCormack, Ira A., Asst. G. Supt., N. Y. C., Alamac.
McCoy, C. E., M. C. B., Can. Nat., Ambassador.
McMunn, W. R., A. S. R. S., N. Y. C., Traymore.
McNaughton, Jas., Baldwin Loco. Co.
Mayer, F. A., G. M. B. M., Southern, Pennhurst.
Meyer, P. A., Asst. M. M., Penn.
Michael, J. B., M. M., Southern, Princess.
Michael, L. P., M. E., C. & N. W., Chalfonte.
Miller, R. S., M. C. B., N. Y. C. & St. L., Ambassador.
Milliken, I., Pres., Industrial Car Mfg. Institute, Brighton.
Moir, G. M., Dept. of Equip. T., U. S. R. R. A., Marlborough.
Monfee, A. J., M. M., Birm. So.
Moody, W. O., Mech. Eng., I. C., Raleigh.
Munroe, J. T., S. S., Erie, Pennhurst.
Neary, J. S., M. C. B., C. I. & L., Marlborough.
Nelson, C. J., D. M. C. B., C. & N. W., Chalfonte.
Noble, H. S., Asst. M. M., W. J. & S., Chalfonte.
Ostberg, A. H., M. E., Val. Dept., C. B. & Q., Traymore.
Painter, J. H., Shop Supt., Atlantic Coast Line, Chalfonte.
Peiffer, Charles E., M. C. B., B. R. & P., Alamac.
Phahler, E. P., C. M. E., U. S. R. A.
Pullar, John, M. M., Sante Fe, Ambassador.
Quinn, C. H., Ch. Elec. Engineer, N. & W., Dennis.
Richers, G. J., M. M., Penn., Traymore.
Robb, G. W., Gen. Supt. Co. of Canada, Traymore.
Robb, W. D., V. P. Grank Trunk, Seaview Club.
Robertson, E. J., S. C. B., M. St. P. & S. S. S. M., Ambassador.
Rohider, W. J., G. S. C. B., C. P., Marlborough.
Rodgers, H. L., Mech. Eng., T. & N. O., Breakers.
Russum, T. H., S. P. C. D., Dennis.
Schultz, F. C., C. I. L., Grand Central Station, Traymore.
Sechrist, T. O., Asst. Supt. Mch., L. & N., Chalfonte.
Seifert, S. P., Asst. Foreman, N. & W.
Shand, A. C., Ch. Eng., Penn., Traymore.
Slater, J., M. M., Erie, Martinique.
Smith, Carl B., M. E., Boston & Maine, Chelsea.
Speck, H. J., Gen. Foreman, Penn., Brighton.
Sprong, Miss, Ambassador.
Summer, A. W., Asst. M. M., Penn., Elberon.
Sweetman, E. M., M. M., Southern, Traymore.
Tatum, J. J., S. C. D., B. & O., Chelsea.
Walter, P. S., G. C. I., Penn., Craig Hall.
Warden, H. M., Supt. Reclamation, M. K. & T., Chelsea.
Weaver, G. E., Gen. Foreman, Penn.
Weedon, R. E., Supt., Roadway Shops, Southern, Strand.
Weirick, Geo. C. W., P. A., American Rwy. Co., Princess.
Williams, R. J., S. M. P., P. M., Marlborough.
Wood, H. F., D. M. M., B. & M., Chelsea.
Yates, L. L., Pac. Fruit Exp., Haddon Hall.
Young, J. P., G. I. P. C. E., Mo. Pac., Chalfonte.

Section VI, Purchases and Stores

Beatty, Wm., Lbr. Agt., Penn. System East Reg., Esplanade.
Becker, E. J., P. A., N. O. P. B., Marlborough.
Bennington, J. R., Asst. P. A., L. & W. E., Schlitz.
Bower, W. C., G. P. A., N. Y. C., Marlborough.
Burnett, E. T., G. P. A., N. & W., Traymore.
Burrell, W. G., Sta. Agt., G. T., Morton.
Calori, J. G., D. S. K., B. & O., Pennhurst.
Carroll, D. B., A. S. K., B. & M., Chelsea.
Chandler, J. E., G. S. K., D. & I. R., Glasslyn.
Clem, Wesley A., Asst. Pur. Agt., P. & R.
Clemmitt, J. H., P. A., N. & W., Haddon Hall.
Colklesser, W. R., P. A., Danville & West., Traymore.
Collins, W. R., P. A., Erie.
Concannon, H. W., D. S. K., So. Pac., Esplanade.
Cooke, G. R., Asst. P. A., C. M. & St. P., Shelburne.
Cooley, LeRoy, G. S. K., C. R. R. of N. J., Grand Atlantic.
Dearworth, C. W., Supt. Stores, Erie, Marlborough.
Dexter, J. E., Dis. Storekeeper, C. M. & St. P., Lexington.
Eckerle, G. W., P. A., D. T. & I., Haddon Hall.
Glass, Davis N., P. A., Laurel Fork, Brighton.
Goodloe, J. T., T. S. K., Southern, Traymore.
Gray, T. A., D. S. Kpr., T. & O. C., 151 Ocean Ave.
Green, L. J., A. G. S. K., N. Y. C.
Griswold, W. W., W. & L. E., Esplanade.

Hall, U. K., G. S. K., U. P., Marlborough.
Hall, W. B., G. S. K., D. & R. G., Alamac.
Harris, S., Storekeeper, R. F. & P., Haddon Hall.
Harty, E., D. S. K., So. Pac., Esplanade.
Henry, H. B., Asst. to Dir. of Pur., So. Pac., Traymore.
Herold, E. E., Sta., B. & O., Holmhurst.
Hopkins, W. A., Supply Agent, M. P., Traymore.
Huffman, R. S., A. G. S. K., N. Y. C., Pennhurst.
Hunt, Wm., G. S. K., W. & L. E., Ambassador.
Huntington, C. C., G. S. K., L. V., Galen Hall.
Jackson, R. R., Div. Storekeeper, B. & O., Ambassador.
Kane, R. R., Gen. Storekeeper, M. M.
Kilborn, J. E., P. A., Rutland, Marlborough.
King, R. E., Asst. P. A., D. L. & W., Ambassador.
Kroha, A. J., Asst. G. S., C. M. & St. P., Fredonia.
Laughton, Hunter H., Asst. to V. P., Southern, Marlborough.
Lefaivre, W. E., P. A., D. & R. G., Alamac.
Lehman, E. H., Asst. Gen. Sk., N. Y. C., Chalfonte.
McVeigh, E. J., G. S. K., G. T., Kentucky.
Mahaney, J. E., G. S. K., S. A. I., Lexington.
Manchester, W. G., P. A., M. & St. L., Traymore.
Marceau, J. E., Gen. S. K., Rutland, Regent.
Morris, R. L., G. S. K., C. O., Craig Hall.
Mueller, J. R., P. A., H. V., Chalfonte.
Murphy, J. P., G. S. K., N. Y. C. West, Marlborough.
Murphy, T. J., Asst. to P. A., B. & O., Strand.
Northam, B. L., Asst. to P. A., N. Y., N. H. & H., St. Charles.
Perry, J. E., G. S. & Supply Car Insp., So. Pac., Esplanade.
Phelps, W. G., P. M., Penn., Marlborough.
Rainey, Wm. T., P. A., Cuba No., Chelsea.
Redd, F. D., V. P., C. R. I. & P., Marlborough.
Reed, F. M., P. A., C. R. I. & P., Marlborough.
Rodgers, C. J., S. K., D. L. & W., Monticello.
Rouse, R. J., P. A., R. F. & P., Haddon Hall.
Savage, T. E., Asst. to P. A., Erie, Traymore.
Seddon, I., P. A., C. St. P. & M. & O., Traymore.
Sidey, W. J., G. S. K., B. R. & P. R. R., Chalfonte.
Sprong, J. W., P. A., D. & H., Ambassador.
Stackhouse, R. J., G. S. K., P. & R., Craig Hall.
Stern, W. E., D. S. K., B. & O., Ambassador.
Stiers, Len, A. G. S., H. V., Traymore.
Taylor, W. H., Div. S. K., Penn., Devonshire.
Turner, G. P., T. S. K., Southern, Traymore.
Vail, M., S. K. Road Dept., N. Y. O. & W., Arlington.
Waddell, J. W., Storekeeper, K. & M., Ambassador.
Wade, J. W., Genl. Storekeeper, N. & W., Strand.
Wakefield, O. C., G. S. K., N. P., Seaside.
Walsh, C. E., A. P. A., Penn., Marlborough.
Warnock, W. J., Scrap Sales Agent, N. Y. C. & H., Traymore.
White, C. S., P. A., N. Y. C., Marlborough.
Wight, S. B., Mgr. Pur. & Stores, N. Y. C., Traymore.
Williams, C. B., P. A., C. R. R. of N. J., Ambassador.
Winter, W. P., A. P. A., N. Y. C., Chalfonte.
Yoho, C. M., A. P. A., P. & L. E., Chalfonte.

Special Guests

Adair, John G., Examiner Dept. Equip., U. S. R. R. A., Osborne.
Anderson, Alan, M. K. & T.,Chelsea.
Ashe, W. O., Asst. Eng. M. P. Dept., N. Y. C., Marlborough.
Atkinson, H. C., Valuation Insp., P. & R.
Atkinson, T. G., Asst. Mech. Eng., Tas Govt. Rys., Marlborough.
Austin, F. S., G. S. K., B. & A., Chalfonte.
Barfoot, H. F., Electrician, C. & N. W., Dennis.
Barthelemy, P. P., Gen. Car Foreman, G. N., Marlborough.
Barton, William R., Ch. Draftsman, N. Y., N. H. & H., Lenox.
Beam, P., Machinist, Penn.
Beatty, J. B., Chf. Ck., Penn., Calvert.
Beatty, James R., Asst. Gen. Foreman, P. & R., Princess.
Beck, Emanuel C., Tool & Material Insp., P. & R., Pennhurst.
Beck, J. Henry, Commissioner, American National Expositions Inc., Devonshire.
Bingham, George C., Gen. Mechanical Insp., C. & N. W.
Black, W. G., Jr., M. M., N. Y. C. & St. L., Alamac.
Bradley, Ralph, Insp. Fuel Service, B. & M.
Brittain, W. M., Ch. Acct., Penn., 118 Massachusetts Ave.
Brown, F. A., Gen. For., Penn.
Brown, N. S., Foreman, East Berlin, Pleasantville, N. J.
Carlton, E. T., Ch. Car Insp., L. I., Strand.
Caskey, J. F., Supt. of Telegraph, L. V., Breakers.
Cellar, Geo. A., Genl. Supt. Tele., Penn., Breakers.
Chace, H. C., Supt. of Telegraphs, Atchinson, Top. Santa Fe, Breakers.
Charles, C. L., Draftsman Equip. Dept., N. Y. C.
Chase, E. P., Asst. Eng. Elec. Engr. Dept., Penn., Runnymede.
Chenery, E. A., Supt. Telegrapher, M. P., Breakers.
Claar, Charles N., Asst. Road Foreman, P. R., Strand.
Coggins, N. B., D. S. K., Southern, Elberon.
Coogan, J. E., Ch. Clerk Genl. Supt., Raritan River Co., Princess.
Coon, C. J., Engr. of Traction, N. Y. C., Craig Hall.
Davidson, W., G. S. K., L. C., Dennis.
Davis, H. W., Office of Comptroller, U. S. R. A.
Delk, M. S., Genl. Air Brake Instructor, Southern, Osborne.
Dobson, J. D., Secy. to Gen. Supt. M. of Equip., B & O, Bouvier
Dornberg, C. A., Ch. Lineman T. & S. Dept., Penn., Breakers.
Edmonds, C. G., Foreman, B. & O., Central.
Eiseman, C. R., Foreman, L. I.
Ellis, J. F., Machinist, Penn.
Emerick, W. H., Genl. Traveling Agt., So. Pac., Haddon Hall.
Fauth, F. W., Gen. Foreman, Penn.
Fisher, C. D., Gang Leader, Penn., Bouvier.
Fisher, O. L., Asst. Supervisor, Penn.
Fletcher, J., Gen. For. Car Dept., Seaboard, Princess.
Frenzer, P. F., Supt. of Telegraph, U. P., Breakers.
Gearhart, J. F., Gen. Foreman Painter, Penn., Calvert.
Geib, F. A., Gen. For., Penn.
Gerg, F. E., Draftsman, P. S. & N., Princess.
German, H. J., Vice Pres. & G. M., Montour Railroad Co.
Gordon, James, Foreman, A. C.
Graef, C. S., Supt. Welding, B. & O., 176 S. Carolina.
Grissinger, S. C., Railway Mail Service, Dennis.
Hackenburg, J. H., P. A., P. A. & McK., Ambassador.
Haggerty, J. J., For. R. S. Dept., N. Y. C., Arlington.
Haldo, Pedro Draceras, Grace & Co., N. Y. C., Chalfonte.
Hall, W. H., Genl. Supt., Telegraph, M. K. & T., Breakers.
Hamilton, E. A., Elec. Eng. M. P. Dept., W. & L. E., Ambassador.
Hanvey, C., For., S. A. L., Princess.
Haverstick, P. W., Supt. M. of W., Penn.
Hawksworth, W. H., Asst. Enginehouse Foreman, Penn.
Hay, S., Motive Power Dept., C. R. R. of N. J.
Haynes, J. R., A. P. A., C. B. & O., Traymore.
Heald, W. E., Supt. of Const., B. & O.
Healy, M. F., Gang Foreman Boiler Dept., B. & O., Princess.
Hedeman, W. R., Leading Draftsman, B. & O., Arlington.
Heilman, Lewis L., Gen. For., P. & R.
Henderson, M. L., Div. Storekeeper, N. Y. P. & N., Holmhurst.
Herring, W. M., Ch. Clerk to Asst. V. P., Southern, Osborne.
Hibbs, C. E., R. F of E, Penn, Elberon.
Hicks, Ralph, Strand.
Himes, Loyal, Photographic P. & S. Dept., S. P., De Ville.
Hines, F. D., Asst. G. L. I., P. & R.
Hitz, C. D., Spec. Agt. Pur. Dept., Penn., Ocean City.
Hood, G. D., Supt. of Telegraph, Chicago, R. I. & Pac., Breakers.
Hogan, Francis R., Asst. Rd. For., A. C.
Hoover, G. F., Asst. Genl. Foreman, Penn.
Hulatt, H., Mgr. of Telegraphs, G. T., Breakers.
Hutchins, Geo., Gen. Storekeeper, C. & S., Ambassador.
Hyneman, Clarence M., Asst. For., P. & R.
Jackson, O. S., C. T. H. & S. E., Castro.
Jefferson, M., M. M., L. V., Dennis.
Jeffries, W. E., Asst. Ch. Clerk, B. & O., Strand.
Johnson, Henry, Asst. Gen. Foreman, Penn., Alamac.
Johnston, Geo. E., Storekeeper, B. & O., Regent.
Kapinos, H. G., Gen. For., Schlitz.
Keegan, J. E., General Car Insp., Penn., Elberon.
Keenan, E. C., Genl. Supt. Teleg., N. Y. C. & H., Breakers.
Keller, Joseph, Supt. Fuel Dept., Lehigh Valley, Princess.
Kelly, Richard J., Foreman Painter M. P., L. I., Alamac.
Kenny, T. J., Gang Foreman Boiler Shop, B. & O., Princess.
King, E. L., Supt. of Telegraph, S. P., Breakers.
King, John H., Ch. Clerk M. & W. Dept., N. Y., Ontario & Western, Phillips House.
Kleine, Herbert J., Penn., Dennis.
Krueger, A. J., Shop Inspr., Nickle Plate, Blackstone.
Kuehner, A. T., Special M. P. Insp., B. & O., Marlborough.
Lackey, A. B., D. S. K., Southern, Traymore.
Ladd, G. T., M. E., Penn., Brighton.
Lamberger, A. H., Gen. Forman, Penn.
Lavoie, L., Asst. G. P. A., Canadian National, Breakers.
Lawson, A. B., Chief Draftsman, B. & O., Chester Inn.
Lewis, A. J., Foreman, C. R. R. of N. J., Wellsboro.
Linnell, A. P., Traffic Supervisor Tel. & Tel., G. T., Breakers.
Little, D. A., Gen. Foreman Painter, Penn., Breakers.
Logan, Geo. H., Gen. Foreman, C. & N. W., Chalfonte.
Lowd, J. B., D. S. K., Southern, Elberon.
Lowe, C. J., Secy. to G. S. M. P., B. & O., Bouvier.
Luebke, Geo. A., Ch. Insp. Test Dept., C. M. St. P.
McAuliffe, J. W., Asst. Genl. Material Agent, Penn., Traymore.
McCabe, J. J., Foreman M. P. Dept., B. & O., Schlitz.
McClain, Wilson, Storekeeper, B. & O., 25 S. Arkansas Ave.
McManamy, Carl, Asst. M. E., U. S. R. R. A., Marlborough.
McMillan, J., Mgr. of Telegraphs, Canadian Pacific, Dennis.
Malley, J. P., Gen. Boiler Insp., Frisco.
Marsh, E. P., G. F. C. D., C. & N. W., Chalfonte.
Martin, L., Chief Car Repair Acct. Bureau, B. & O.
Melvin, F. E., Ch. Clerk to Pur. Agent, Florida East Coast, Chalfonte.
Miles, Chas. H., Macb. For., P. & R., Ambassador.
Miller, Geo. A., Jr., Florida East Coast, Sterling.
Minette, J. H., Asst. Gen. Foreman, B. & A., Alamac.
Moir, W. B., Genl. Car Insp., Penn., Elberon.
Monnie, R. S., Engr. Shop Improvements, C. R. I. & P., Osborne.
Monroe, E. T., Ch. Clk., B. R. & P., Stevenson.
Montagnet, J. M., M. S. B., L. & N., Marlborough.
Nutt, A. H., Maintainer Trenton Div., Penn.
Neuhausen, O. E., Asst. Foreman M. of E. Dept., B. & O., DeVille.
Nichols, J. H., G. S. K., N. Y. C. & St. L., Haddon Hall.
Nicholson, S. M., Dist. Storekeeper, Penn., Holmhurst.
Orem, W. L., Div. Storekeeper, Penn., Apollo.
Oswald, G., Foreman, L. I.
O'Toole, W. J., Hock. Valley, Traymore.
Palmer, J. Edward, Commander, U. S. Navy, Craig Hall.
Peterson, E. W., Genl. Storekeeper, Bangor & Aroostook, Pennhurst.
Pratt, H. A., Bookkeeper Supply Dept., N. & W., Strand.
Reed, D. H., D. S. K., Southern, Elberon.
Reichelderfer, Earl, Fuel Insp., P. & R., Strand.
Reville, E. B., Division Storekeeper, C. R. O. & P., Ambassador.
Reynolds, D. E., Ch. Clerk P. A., B. & L. E., Pennhurst.
Rhoads, S., Tel. & Tel. Eng., N. Y. C., Breakers.
Rhodes, R. S., Elec. Dept., N. Y. C., Runnymede.
Richardson, L., Examiner Dept. of Equip., U. S. R. A., Haddon Hall.
Rischman, Jno., Genl. Car Insp., Penn., Craig Hall.
Ritchey, J. C., Elec. Eng., P. A. & McK., Ambassador.
Robinson, T. M., Ch. Draftsman, H. V., Traymore.
Ross, J. J., Supt. Tel., M. C., Breakers.
Ryer, F. A., P. A., B. & A., Traymore.
Sandhas, H. L., Genl. Insp., C. R. R. of N. J., Terminal.
Satchell, N. L., Motive Power Dept., N. Y. O. & W., Arlington.
Schwendt, B. J., Supt. Telegraph, N. Y. C., Breakers.
Shaffer, Charles H., Primary Examiner, U. S. Patent Office, Watkins.
Shepard, H. A., Supt. Tel., N. Y., N. H. & H., Breakers.
Sheridan, T. F., C. C. Supt., M. P., P. & L. E., Elberon.
Sicardi, E. C., V. P., Union Tank Car Co., Traymore.
Simmons, E. E., Mech. Insp., Pullman Co., New England.
Simms, Ray, Accountant Comptroller's Office, U. S. R. A.
Sixsmith, G. M., Supt. Pass. Trans., Penn., Fredonia.
Son, Frank P., Asst. to Pres., Copper Range, Dennis.
Smelts, J. H., Headlight Insp., B. & O., Terminal.
Smith, G. C., P. A., U. P., Marlborough.
Smith, J. J., Genl. Foreman, B. & O., De Ville.
Spidell, G. M., Jr., P. A., N. Y. W. & B., Richmond.
Stabrook, F. C. E., Rd. For. Engines, Northampton & Bath, Elberon.
Stewart, C. E., Mgr. Troop Movement Section, A. R. A., Clarendon.
Stidfole, B. F., Jr., Master Carpenter, Trenton Div., Penn.
Stone, A. J., Ex Vice Pres., Erie, Seaview Golf Club.
Strohmer, J. L., Sec. to S. M. E., B. & O., Dennis.
Sutton, C. G., S. K., B. & O., Pennhurst.
Swonger, W. A., Asst. Supervisor of Signals, W. J. & Seashore, Traymore.
Telford, A., Asst. Gen. P. A., Southern, 103 Metropolitan Ave.
Thomas, F. E., Bellefonte Central Craig Hall.
Thornley, E. W., A. P. A., B. & O., Haddon Hall.
Tripp, W. J., V. P., Genl Mgr., N. Y. C., Haddon Hall.

The Man Who Saw

Beauty and Brains

The Britisher from the Argentine stood with the man on the fringe of the crowd in the ball room as the imposing phalanx of participants in the grand march advanced, 32 abreast, down the hall. It was the personification of American railways on parade, and as the music turned to the strains of a waltz and the couples dispersed he turned to the man with unconcealed admiration in his face as he said:

"That's an eloquent expression of my conception of the American spirit which builds your wonderful railways and operates them. In the faces of the men I see enthusiasm; in the women, interest, co-operation, pride. You play just as you work—intensely and happily."

We thank you, son of Britain, and compliment you on the correctness of your impression. Take the message home for those who can conceive the Yankee only as a "dollar chaser."

Too Late for the Collision

The clown had the railroad men in the "bald-headed row" going.

"We're going to have a collision, gentlemen. A fast train on the Moonshine Pacific is going to smash into the Poseyville & Northeastern flyer at Poseyville crossing. I'll now go and get the Moonshine Pacific flyer."

He retreated behind the wings and emerged, dragging by a string a train of toy iron cars. "Here's the Moonshine Pacific, gentlemen," he explained. "I'll set her here on the main line, ready for the big smash—and go and bring out the Poseyville and Northeastern."

His disappearance in search of the other train stretched a score of railroad necks as the "row" waited in breathless expectancy for the great event. Seconds passed. Then minutes. Finally the clow reappeared—but without the train. Gentlemen, I'm sorry," said he, "We can't have that wreck to-day. The Poseyville & Northeastern is seven hours late."

It's for Clothes, Madam, Not Babies!

"Wow! Wow!" came the wails of a baby from somewhere down the line in an otherwise quiet Pullman car at 2.20 A. M. "W-o-w" and then some more, as the baby evidently got madder at each lurch of the car on a curve.

The railroad supply man couldn't stand it any longer, so he rang for the porter. That individual hadn't noticed it and was slow to recognize the seriousness of the disturbance, which was getting louder every minute.

"Say, porter, what's the matter with that kid down there—are they lying on it?"

"Dunno, suh, mus' be sick or gettin' a tooth or sumpin'."

"See if you can't get them to shut it up."

"Lawd, mister, ah ain't pokin' mah haid in no lady's berth, ah ain't. They knows they business—let 'em tend to it—ah dassent butt in, no suh."

"I'll find out why they don't put a grate shaker on that kid," thought the supply man as he slipped out into the aisle.

It was an easy matter to locate the source of the disturbance, and peering in between the curtains he observed "ma" pounding her ear in happy oblivion to the loud cries of her offspring, who at every lurch of the car bounced against the window pane in the hammock in which he was so uncomfortably swung.

Prune Plan Propaganda

The accumulation of mail in this office addressed to Mr. Hum Dinger, whose touching appeal for sympathy and support for the Prune Plan appeared in our column of June 10, has reached such proportions that the Editor threatens trouble. The letters bear postmarks from every State in the Union, Canada, Mexico, Cuba and Guatemala. In the meantime, Mr. Dinger has disappeared and no news is obtainable of him at booth 414. He is reported to have gone to Washington in response to an urgent wire from Congressman G. Rafter, but the Man Who Saw has been unable to verify the statement. He, therefore, respectfully requests his friends not to be impatient but to await developments. In the meantime news of Hum's whereabouts would be welcome.

As space will not permit the reproduction of the great quantity of endorsements, threats and protests in connection with this movement, the Man reprints briefly below a few of the representative "brickbats and bouquets" which have found their way to the Mail Bag, filling it up completely.

Poseyville, Ind., June 10, 1920.

The Man Who Saw,
Care the Wind Bag,
Young's Billion Dollar Pier, Atlantic City, N. J.

Dear Sir.—I greatly regret my inability to attend the conventions this year, not merely on account of the lessons it holds, but for the loss of an opportunity to assist in throwing Mr. Hum Dinger into the water, where he belongs. Every now and then somebody, who thinks he is a Moses, rises up to lead us out of the wilderness—and this gentleman is seemingly suffering from that same obsession. The intelligent motive power men of this country will oppose this nefarious scheme, which, for attempted rascality, has but once been equaled. Trusting that you will use your column in the effort to help squelch it, and assuring you of my hearty coöperation, I am

Yours very truly,
D. R. Ivingbox,
S. M. P., Poseyville & Northeastern R. R.

Windy, Tex., June 10, 1920.

The Man Who Saw,
Atlantic City, N. J.

Dear Sir.—Mr. Dinger's Prune Plan is a panacea. Please send me a copy of the bill and three membership cards by return mail.

Yours very truly,
S. M. Okestack,
S. M. P., High Dry & Windy R. R.

P. S.—I have a new main rod that will solve the dynamic augment problem; it's a peach.

TELEGRAMS

Los Angeles, Cal., June 11, 1920.

Man Who Saw,
Atlantic City.

Prune plan predicts prosperity. Unanimous support here. Send full details.

Pacific Supplymen.

Saskatoon, Sask., June 11.

The Man Who Saw,
Care Young's Pier, Atlantic City, N. J.

Intense interest in Prune Plan. Send delegate walking here right away.

Eskimo's Union.

Camaguey, Cuba, June 11.

The Man Who Saw,
Care Young's Million Dollar Pier, Atlantic City, N. J.

Hum Dinger's middle name is Bug. Look out for him.

Jim Skeevers.

European Railway Observations

By Robert E. Thayer

European Editor, Railway Age

Fuel Economy in England

With the shortage of coal that England has been experiencing during and since the war, it would naturally be supposed that the railways would make well organized efforts to see that coal is used economically. Upon inquiry it was found that fuel supervision came under the jurisdiction of the engineering department. This seemed rather strange, but the matter was explained in this way —there is no question but what the locomotives must have good coal and sufficient coal with which to operate, but, on the other hand, the consumption of fuel used in the open fireplaces of the offices must be watched carefully in order that none should be wasted.

European Business Possibilities

Railway supply men who have visited Europe recently have become impressed with the possibilities of America doing business with the railways abroad. S. M. Vauclain, president of the Baldwin Locomotive Works, has made quite an extended trip through Europe, and he thoroughly believes in the recuperative powers of the people there. He has found then desirous of securing information that will lead to a reduction in operating costs and he thoroughly believes that there are possibilities for American manufacturers. Other business men who have toured Europe are of the same opinion. It is certain that the railways must do something to improve the transportation situation.

Draft Gear Connections

Among the many questions asked in regard to foreign equipment, that of the draft gear connection is perhaps the most common. The passenger equipment throughout Europe is provided with the screw coupling. In England the freight equipment is provided with a chain and hook coupling with "oceans" of slack between the cars. On the Continent the screw coupling is used for freight equipment. On all of the European railways there is a desire to adopt an automatic coupler, particularly on freight equipment, as there is no question but that much time can be saved by the use of this device. The necessary work of reconstruction occasioned by the war, however, has deferred much active investigation in this respect. The first problem to be met in the application of automatic couplers is to obtain one that will interchange suitably with the existing couplings. In England this would not be a difficult thing to do, but on the Continent, with the screw type coupling, the problem is more complicated.

The screw coupling on passenger equipment has some advantageous features. In England, where trains are made up in units which are continuously used in the same service without being broken up, the need for an automatic coupler is not great. With the screw coupling the slack can be regulated to a nicety and with the slack thus regulated smooth train operation is obtained. The amount of slack between the cars is regulated according to the service in which the train is to be used and according to the contour of the line over which it operates. For instance, where an engine is liable to be called upon to start a train on heavy grades of curves, the couplings are not screwed as tightly as in the case of tangent track. It is understood, of course, that these couplings perform the draft function only and all buffing is taken up by spring buffers at the corners of the cars.

English Locomotives

One of the first impressions that an American receives when he reaches Great Britain is the small size of the English locomotives, and as he looks back over the train of anywhere from 10 to 15 cars he wonders how a machine of such size can haul so long a train. The English locomotives are very small when compared to the more modern locomotives used in this country, but they do their work with an apparently lack of effort that is particularly noteworthy. The English locomotive is a beautiful thing to look upon; they are well proportioned and particularly well kept. The master painter of the British roads is still a most important person and he produces a beautiful product. The locomotives themselves operate as well as they look.

The locomotives are specially well maintained compared to the locomotives in the United States and the expression that "they are built like a watch" is hardly an exaggeration. The English railways are obliged to work to much closer limitations in their construction of locomotives than we do in the United States. The weight of the locomotives is so carefully distributed on the wheels that no equalization is found necessary. Inequality in wheel loads is regulated by the tension of the driving springs. The driving boxes are fitted to the frames without the use of shoes and wedges on most of the English engines. The pedestal jaws are carefully faced to fit the driving boxes with an allowable clearance of only .008 in. All driving wheels are given a careful running balance and in some cases the motion work of the locomotives is laid out on a dummy frame before it is applied to the locomotive.

No less care is used in the construction of the boiler. No boiler plates are punched, except for a few holes which are necessary for assembling the boiler. The barrel plates are rolled and held with temporary strips while they are being assembled. The circumferential seam of the boiler barrel is of the butt type. A welt plate bored out to a diameter slightly less than that of the boiler is shrunk onto the boiler. After the barrel has thus been assembled and the longitudinal welt strips put in place with temporary bolts, the entire barrel is taken to a large boiler barrel drilling machine, where all rivet holes are drilled.

With such care taken in the construction of the English locomotive it will be readily understood that they do not suffer from any great maintenance troubles. These are further alleviated by the excellent roadbed found in England. With high grade construction and with excellence of roadbed, the riding qualities of the locomotives can well be surmised.

The writer had the privilege of riding a Midland 4-4-0 engine which had been out of the shops for 18 months and had exceeded its mileage. The engineer was a little upset because a visitor should be assigned to a locomotive in that condition and took particular pains to point out the fact that the locomotive was overdue for repairs. But its riding qualities were far superior to any of the most perfectly maintained locomotives in the States and would compare very favorably with the riding qualities of a good many of the coaches on some of our trains at the present time.

Conventionalities

Mr. and Mrs. R. H. Weatherly were joined here on Saturday by their charming daughter, Miss Virginia. The young lady has been a student during the last year at Vassar College.

A general manager who has honored the convention with his presence this year is Mr. W. J. Fripp, of the New York Central, who with Mrs. Fripp is registered at Haddon Hall.

Frank Pickard, master mechanic of the Delaware, Lackawanna & Western, had expected to attend the conventions, but found it impossible to get away from Buffalo because of special demands which are being made upon him at this time.

J. A. MacRae, mechanical engineer of the Minneapolis & St. Louis, speaks enthusiastically about conditions in the Northwest. His company has recently placed orders for a number of new locomotives.

J. E. Davis, storekeeper of the Erie at Buffalo, who is attending the conventions, has given a great deal of study to the labor problem and is a member of the Executive Committee of the Buffalo Council of the Industrial Relations Association of America.

Stanley W. Midgley, of the Liberty Steel Products Company, has not missed a convention for 18 years. A great believer in and lover of athletic sports and pastimes, "Midge" still feels spry enough to give pointers and practical teachings to the younger generation.

Oscar P. Wilkins, formerly master painter of the Norfolk & Western at Roanoke, Va., and past-president of the Master Painters' Association, is attending his first convention at Atlantic City as a supplyman. Mr. Wilkins is now representing Flood & Conklin Company.

W. E. Dunham, assistant superintendent motive power and machinery of the North Western, who has recently been appointed to fill a temporary vacancy on the Railway Board of Adjustment, has been unable to attend the conventions this year on account of illness in his family.

Chance dug down in her lucky-bag and wondered who would travel the farthest this year on the annual pilgrimage to the pier. She drew out a card, which read: "S. G. Littlejohn, manager, Ingersoll-Rand Company, Sydney, Australia."

If you seek the Britisher's slant on American machine tools stealthily approach the Niles-Bement-Pond booth and make a noise like a cup of tea. Out will step D. H. Teas, efficiency engineer for this company for a little matter of 18 years, during which period he has made 10 trips to Europe and South America.

"The training in the hard-worked enrollment booth is making some first-class ticket agents, if standing behind a counter and issuing endless cards to a well-behaved but restless crowd of patrons is any sign," says H. K. Williams, of the Safety Car Heating & Lighting Company. "I'm ready to go back to my old job for a rest," he added.

H. C. Eich, superintendent motive power of the Chicago Great Western, was in attendance at the convention last week, but was compelled to leave Saturday to be a witness in a law suit affecting another railroad—one of those old cases hinging on the size of the holes in the front end netting of No. 954 fifteen years ago.

L. S. Billau, assistant electrical engineer, and L. C. Mulheim, superintendent of electric headlights, Baltimore & Ohio, are covering the exhibits in systematic fashion. The camera that Mr. Mulheim carries suggests that he intends to make permanent records of all things of particular interest.

R. J. Williams, S. M. P. of the Pere Marquette, who says he basks in the reflected glory of having graduated from Purdue University in the same class as the somewhat widely and not unfavorably known "Jimmie" Cain, mentioned in this column, arrived Friday evening with Mrs. Williams and is a guest at the Marlborough.

F. W. Edmunds, New York manager of the Sunbeam Electric Manufacturing Company, affectionately known by the attendants of as many as 38 consecutive conventions as "Pop," distinguished himself for the thirty-ninth time last night when he and Mrs. Edmunds charmed the merry makers by their interpretation of the cakewalk and set up a new long-distance record.

R. P. C. Sanderson, London manager of the Baldwin Locomotive Works, spent a short time at the convention. Mr. Sanderson is well known among the railway men, and during his present visit has renewed many old acquaintances. This is the first convention he has attended for some time, as he has been located in London for several years.

A. C. Deverall, formerly superintendent of motive power of the Great Northern, is at the conventions this year as Western manager of the Locomotive Stoker Company. Mr. Deverall while in railway service made an enviable record in utilizing the scrap material in the Great Northern and particularly in the development of the scrap reclamation plant at St. Cloud, Minn.

A good many of our mechanical department officers, some of them at the very top, have had a lot of practical experience in the operating department in recent weeks. William Schlafge, mechanical manager of the Erie, with his entire personal staff of 22 men, spent a few days at Port Jervis, N. Y., helping to relieve the congestion at that point and to keep the Erie trains running on time.

J. A. Droege, general superintendent of the New York, New Haven & Hartford, came down from New York with Mrs. Droege over the week-end. He was very enthusiastic about the exhibit and was particularly impressed because of its value to the railroad men from a practical standpoint. Mr. Droege has just been nominated for the presidency of the New York Railroad Club.

H. G. Keller, formerly a captain of railway engineers, in charge of the detailed construction and operation of the roundhouse at Gievres, France, is in attendance at the convention. He is now identified with the Independent Pneumatic Tool Company, Chicago, representing that company as manager of its recently established Philadelphia office.

As a golf expert, Bill Gunn, of the Transportation Engineering Corporation, is hard to beat. He admits it himself. In an argument he will prove his prowess by swinging his cane in lieu of a golf stick. This performance was witnessed yesterday by some of his "fan" friends. But the cane slipped, flew over the hedge into the Shelburne court and the champion jumped the apparently short hedge. If the drop on the other side has

anything to do with the time it took him to return with the cane, it's about a mile.

J. L. Hays, formerly electrical engineer of the Seaboard Air Line, is attending the convention this year as assistant electrical engineer of the Stone Franklin Company. Since leaving the Seaboard, Mr. Hays spent a busy eighteen months in the United States Army, in which he served as a major in the Construction Division of the Quartermaster's Corps.

Memories of pleasant gardens, graceful palms and mammoth stone water jars in the patio of the Cuba Railroad Company's famous Hotel Camaguey in the Cuban city by that name, are brought here by George Knight, superintendent motive power of the Cuba Railroad at that point. Mrs. Knight accompanies him, and they are both enjoying their first convention with *"muchissimo gusto, senores"!*

Oh! the East is East and the West is West,
And never the twain shall meet
Till earth and sky stand presently
At God's great judgment seat.
But there's neither East nor West,
Border, nor breed, nor birth,
When the M. C. B. and the M. M. meet,
Though they come from the ends of the earth.

Way out on the pier, in the neighborhood of the Convention Hall, there stands an inviting enclosure full of various types of the kind of headlights that make a mouse on the track look like an elephant. In the background can be found J. Will Johnson, who will tell you that if you can evade the "clark" in the offices on the "tight little Isle" you will be accorded a hearty English welcome that you will not want to forget.

There is nothing unusual in a railroad man leaving the service to become a supply man; there are probably hundreds of such cases on the pier. But it is a rare occurrence when a supply man goes back to railroad service. T. J. Ryan, master mechanic of the Atchison, Topeka & Santa Fe at Raton, N. M., left railroad service some years ago to go into the supply field, but is now back in the big game. This is Mr. Ryan's first convention.

Mr. and Mrs. Towson Price from Washington, D. C., arrived just in time for the Grand Ball Thursday night and spent a busy Friday and Saturday viewing the exhibits. Mr. Price was formerly with the mechanical department of the Erie Railroad and the Interstate Commerce Commission, but is now assistant examiner in the Railroad Division of the Patent Office. He has specialized on cars and was very favorably impressed with a number of the side frame exhibits.

One of the members of the executive committee of the Railway Supply Manufacturers' Association had a rather difficult task to perform on Sunday morning. He found Bill Sample on the boardwalk wearing badge 3553. This happened to be a ladies' badge and Bill was informed that something was wrong and that he would not be able to enter the pier wearing it. He was able to clear himself, however, by referring to the enrollment list, showing that the badge in question belonged to his wife.

Frank Thomas, who has made such a remarkable record in heading up the training of apprentices on the Santa Fe, found it necessary to go West on Saturday. This is Mr. Thomas's second trip East within the last two weeks. He attended the annual meeting of the National Association of Corporation Schools week before last. He is one of the few railroad men who have been active factors in developing this organization to its present high point of prestige and influence.

There's a man in the vertical turret lathe booth who has been hot footing it so much between there and the Republican convention bulletins that he claims to have worn a trail between the two points. The gentleman referred to is John Bierne of the Bullard Machine Tool Company. Mr. Bierne, once a campaign manager for one of our past presidents of the United States knows what is going on and how it is done, and is watching developments like a cat at a rathole.

A. M. Dow, general foreman of freight car repairs of the El Paso & Southwestern, is interested not only in his own department but has been attending the sessions throughout the convention. It must have been modesty that kept him silent when one of the members inquired about the application of scheduling systems to car repairs, or Mr. Dow has devised a method that has enabled him to handle both the building of new cars and the making of heavy repairs in record time.

A. W. Gibbs, chief mechanical engineer of the Pennsylvania, has not been able to give the convention his usual thorough attention, his mind being more or less distracted by the marriage of his daughter "Mim" on Friday last, to Landroth Lee Layton, a business man of Georgetown, Del. Mr. Gibbs, accompanied by Mrs. Gibbs, visited the pier on Saturday with three of the bridesmaids. That he was somewhat flustered is indicated by the fact that when he was asked the name of the bridegroom he replied "L³."

Felix Harmer, son of the general manager of Alfred Herbert, Ltd., Coventry, England, is at the convention assisting in the demonstration of the machine tools Alfred Herbert, Ltd., are exhibiting. Mr. Harmer is a sales engineer for this company and is to remain in the United States for some time. This is his first visit to the United States and he has found the convention most interesting and has specially remarked upon the interest the attending members have taken in the exhibits.

The editors of the *Daily* were taken to task Friday morning by M. H. Haig, mechanical engineer of the Santa Fe and chairman of the Committee on Safety Connections Between Engine and Tender. The main purpose of this committee was to show how to prevent any possibility of accidents or failures. The artist of the *Daily,* however, in order to prepare an attractive illustration to head the report, showed a fireman falling down between the engine and tender when they became separated because of the failure of the safety connection.

Far-away Texas enters the competition with Australia and Argentina for the long-distance travel to the Pier this year in arrival of James W. Cain, a director and consulting engineer of the Gulf, Texas & Western at Houston, Texas. "Jimmie," as he is affectionately known in railway supply circles, was once on "the other side of the fence" when he was, for several years, chief engineer of the McCord Manufacturing Company, of Detroit, and subsequently vice-president of the G. F. Cotter Supply Company, of Houston.

An interesting example of the possibilities of advancement for college men in railroad service is the record of the first class in railway mechanical engineering at Cor-

nell University. Of the eight men enrolled, three are superintendents of motive power and one is a former superintendent of motive power now on the railway board of mediation. These men are George Edmunds, of the Delaware & Hudson; B. F. Flory, of the New York, Ontario & Western; W. E. Dunham, of the Chicago & Northwestern, and F. F. Gaines, of the Railroad Administration.

U. K. Hall, general storekeeper for the Union Pacific, stopped over in Washington on his way to Atlantic City from Omaha. Mr. Hall was with the Railroad Administration as assistant manager of the Stores Section and reports that the offices in the Hurley-Wright building look somewhat deserted. Work on the 1917 inventories submitted by the railroads is just getting under way, and it will be next fall before a start can be made on the inventories submitted at the termination of federal control. Mr. Hall says that he will not vote for Mr. Wilson or Mr. McAdoo if either is nominated.

The Westinghouse exhibit had an unfamiliar appearance on Saturday due to the absence of three prominent officers of the company. A. L. Humphrey, who at one time served in the Colorado legislature, could not resist the fascination of the Republican National Convention at Chicago. He will, however, attend the remaining sessions of the convention. Mr. and Mrs. W. S. Bartholomew left on the week-end to attend the commencement exercises at the Massachusetts Institute of Technology, where their son, John, graduates this year. H. H. Westinghouse was detained in Pittsburgh, but is expected to arrive to-morrow.

One of the former regular attendants at the conventions who are most missed this year is M. K. Barnum, who died a few months ago. Mr. Barnum long was one of the most prominent and influential railway mechanical officers in the country, and at the time of his death was assistant to vice-president of the Baltimore & Ohio. He had filled at one time or another almost every important office in the Master Mechanics' Association and the Master Car Builders' Association, and no man came to the conventions who was more respected and beloved by his fellow mechanical officers.

G. W. Kelly, master blacksmith of the Central Railroad of New Jersey, came down from Elizabethport to spend the week-end studying the exhibits. It will be recalled that Mr. Kelly's son, W. A., was awarded one of the Master Mechanics' Association scholarships at Stevens Institute of Technology. He is now in Kobe, Japan, for Joseph T. Ryerson & Son, installing extrusion machinery in a brass plant. Another son, Philip, was overseas with the 11th Engineers, returning as a first sergeant. He has recently been made a mechanical inspector for the Central Railroad of New Jersey at Elizabethport, and is now assigned to the drafting room.

St. Louis' genial "Vic" Bell, manager of the American Steel Foundry Company's branch in that city, sits admiringly in his booth on the pier and contemplates the graceful lines of the 120-ton capacity six-wheel truck. It weighs 6,000 lb., but if rumor has anything to do with it, that's a mere bagatelle, for "Vic" plans to use it as a model on his trips this year. He believes that his scheme will work and he plans to drag the truck into the shop yard with a locomotive. He banks on the certainty of the ensuing commotion which will bring the S. M. P. out of his hole on the jump, and therefore start an argument.

The experiences of Col. G. H. Emerson in Siberia, related elsewhere in this issue, remind us that one of the members of the General Committee of Section III, W. H. Winterrowd, chief mechanical engineer of the Canadian Pacific, had a most interesting experience in European Russia in 1916. He accompanied Sir George J. Bury, who had been sent to Russia by the British Government as a transportation advisor; indeed, it was for this service that Sir George was knighted on June 3, 1917. Conditions were anything but safe and pleasant when Sir George and Mr. Winterrowd were in Russia, and several times it was necessary for them to dodge bullets in the streets of Petrograd.

F. P. Pfahler, who was chief mechanical engineer of the Railroad Administration and recently returned to the service of the Baltimore & Ohio, spent Saturday on the pier. He is a member of a committee which has been appointed to look into the advisability of electrifying one or two divisions of the Baltimore & Ohio. With the three other members of the committee, J. H. Davis, electrical engineer; G. D. Brooke, superintendent of transportation; and A. G. Boughner, superintendent of freight train operation, he made a trip of over 9,000 miles in which the committee studied conditions on the electrified section of the Chicago, Milwaukee & St. Paul, the electrified division of the Southern Pacific out of Oakland, the Pacific Electric Railway, and the electrified sections of the New York Central, Pennsylvania and New York, New Haven & Hartford.

R. H. Aishton, president of the American Railroad Association, arrived in Atlantic City from Washington Friday, and spent Friday evening and Saturday morning visiting the exhibit on the pier and holding conferences with Chairman Tollerton of the Mechanical Section and others officers of the A. R. A. who are here. Mr. Aishton formerly was president of the Chicago & Northwestern, and under Government operation was regional director, first of the entire Western region and then of the Northwestern region. As president of the American Railroad Association since private operation was adopted he has been working very hard bringing about needed co-operation between the railways themselves and between them and the Interstate Commerce Commission. He came to the conventions last year, and was so enthusiastic about the work done and the exhibit of equipment and supplies that he had planned to spend a week here this year, but other duties made this impossible.

Henry Bartlett, formerly of the standardization committee of the United States Railroad Administration and chief mechanical engineer of the Boston & Maine, has been visiting in England for several months. In a recent visit to Sir Eric Geddes, the Minister of Transport of Great Britain, he was asked to give a detailed account of the experiences of the United States in the standardization of equipment during the time the railways were under government control. The Ministry of Transport, among other things, is working on the standardization of equipment for English railways, but as yet nothing definite has been accomplished. A committee made up of prominent mechanical officers of the English railways has been formed to handle this matter. Mr. Bartlett, from his experience with the work done in the United States, will be in an excellent position to give the Ministry of Transport some valuable information on the standardization work done in this country. In speaking to one of our representatives a short time ago he said that he was very sorry not to be able to attend the convention and desired to be remembered to all of his friends here.

New Devices Among the Exhibits

New Shop Equipment and Tools

EVERYONE FAMILIAR with the conditions governing railway shop operation at present is convinced of the imperative necessity for more machine tools and shop equipment. Especially is it necessary to replace obsolete by modern, improved equipment. Most of the new or recently improved equipment exhibited this year was described in the June Shop Equipment Number of the *Railway Mechanical Engineer,* the subscribers to which receive copies of the *Daily Railway Age.* In the following article we shall call attention briefly to these new machine tools and shop equipment.

Tap Grinding Machine

There are many advantages in the use of tap grinding machines over the old method of holding taps against the grinding wheel by hand. It is practically impossible to hold a tap in this way and obtain the proper amount of clearance, and if the clearance is correct on one flute, the chances are very small that the remaining flutes will have the same clearance. Not only is the clearance non-uniform when a tap is ground by hand, but the same condition holds with regard to the taper. In order to secure a good cutting tap with the proper clearance and flute taper, it is necessary that the grinding operation be performed on some type of machine. A line of machines developed especially for this purpose has been placed on the market recently by the Grand Rapids Griding Machine Company, Grand Rapids, Mich., and is exhibited at Space 191. A detailed description of these machines is given on pages 405 and 406 of the June *Railway Mechanical Engineer.*

High Speed Steel Saw

An interesting example of circular saws with inserted high speed steel teeth is being exhibited by the Simonds Manufacturing Company, Fitchburg, Mass., at Space 308. This line of saws was specially designed not only for use in blacksmith shops for cutting up bar stock of all kinds, but in machine shops for cutting out the forked ends of motion work and main rod straps. A description of the Simonds saws is given on page 407 of the June *Railway Mechanical Engineer.*

Portable Pneumatic Tools

Several new sizes of small portable pneumatic tools are being exhibited by the Ingersoll-Rand Company, New York. These machines were described in detail on page 413 of the June *Railway Mechanical Engineer,* and include a No. 8 close quarter drill, Nos. 601 and 602 high speed pneumatic grinders and Nos. 600 and 6 light-weight pneumatic drills. The machines are additions to the line of Little David tools developed by the Ingersoll-Rand Company. They are easy to handle and economical in air consumption, being well adapted to the lighter railway work usually done on machines of this type.

Staybolt Cutter and Yoke Type Riveter

Among the tools of particular interest to railway men being exhibited by the Baird Pneumatic Tool Company, Kansas City, Mo., are a one-man operated staybolt cutter and a yoke type riveter. Both machines are described in detail on page 419 of the June *Railway Mechanical Engineer.* The staybolt cutter has a capacity to cut staybolts up to 1⅛ in. in diameter at a rate of approximately 1,200 per hour. The machine is composed of a 15-in. air cylinder, the piston of which connects directly through a toggle joint with a pair of lever arms, into which the removable cutter knives are securely fastened. These knives are of sufficient strength to withstand the heavy pressure required in clipping staybolts. The machine is designed to be operated by one man, and, on account of its light construction and the convenient position of control valves, it can be operated easily. The yoke type riveter is designed for use in the construction of truck frames, tank frames and locomotive boiler work. Like the staybolt cutter, this machine is suspended through the center of gravity and can be easily operated by one man. Particular care has been taken in the construction of both tools to eliminate exposed moving parts which might catch the clothing or person of the workman. The operation of the lever and toggle joint practically eliminates danger of personal injury.

High Speed Milling Cutters

The exhibit by Goddard & Goddard Company, Detroit, Mich., includes two high speed milling cutters with improved tooth design. These two mills are made, one with adjustable inserted teeth and the other with deeply cut, solid teeth; their careful design and construction insure maximum life and quantity production. A detailed description of both cutters is given on page 420 of the June *Railway Mechanical Engineer.*

Electric Rivet Heater

A rivet heater of the electric conduction type with the rivets heated by the passage of an electric current is being exhibited in the booth of the American Car & Foundry Company. This rivet heater, known as the Berwick, combines the many advantages of the electric furnace, including cleanliness and the elimination of gas and smoke. The body of the rivet becomes hotter than the head, due to its smaller cross section; this is an important advantage. The heat is applied exactly where needed, and the head being cooler, is less likely to be marred by the backing-up tool. Rivets can be heated, cooled and reheated a number of times without harmful oxidation, and as many as 1,400 rivets can be heated in an hour with a single machine. The machines operate on alternating current voltages from 110 to 550 volts. A description of the heater is given on page 428 of the June *Railway Mechanical Engineer.*

Universal Milling Machine

The No. 2 universal milling machine exhibited at the booth of Joseph T. Ryerson & Son, Chicago, Ill., is a newly developed tool, designed to meet the most exacting modern milling requirements. This machine, which was described in detail in a recent issue of the *Railway Mechanical Engineer,* has a most interesting feature in the arrangement for driving by helical gears. The advantages of this form of drive in greater steadiness and more uniform cutter driving torque have long been recognized, and difficulties in obtaining a sufficient range of speeds are entirely overcome in the Ryerson-Conradson machine. Twelve spindle speeds are available, ranging from 17 to 290 r. p. m. The feed drive is positive from the primary shaft by means of a chain and sprocket. A total of 16 feed changes, ranging from 16 in. to 22.3

in. per minute can be obtained. The machine may be furnished in either the plain or universal miller type.

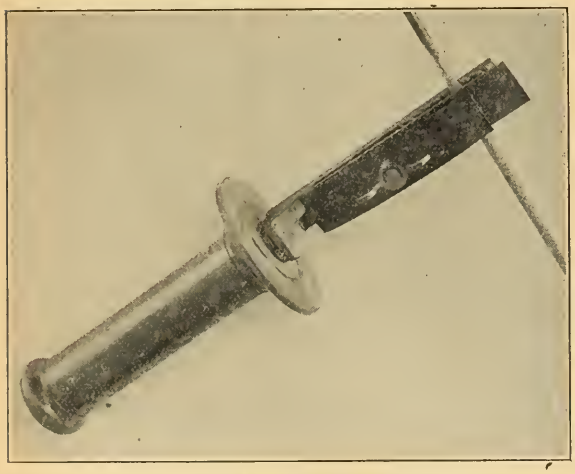
Selective Head Engine Lathe

The 22-in., high power, selective head, engine lathe exhibited at Spaces 174-176 is one of the line of Ryerson-Conradson lathes placed on the market recently by Joseph T. Ryerson & Son, Chicago, Ill. These machines, made in four sizes to swing work up to 33 in. in diameter, are intended for quantity production as well as general machine shop work. An interesting departure from the usual lathe construction consists in bolting the motor to the lathe bed and having the armature shaft direct connected to the main drive shaft. This does away with belts, tension idlers and chain drives. If for any reason a reversing motor is not desired, a constant speed motor with spindle reversing attachment may be provided. Changing from belt to motor drive, or vice versa, can be accomplished with practically no loss of time and at a small cost. Other important advantages of this line of engine lathes include a herringbone gear drive to the spindle, exceptional speed range, all gears permanently in mesh, and a special design of the apron feed mechanism. A detailed description of these lathes will be found on page 411 of the June *Railway Mechanical Engineer*.

Electrode Holder

A NEW arc welding electrode holder is being exhibited by the Transportation Engineering Corporation, New York. The special features are its simplicity and the provision made for easily replacing the parts damaged by use. It is also designed so that there are no projecting parts to be burnt off and damaged in service.

The holder consists of a copper casting provided with a leaf spring clip, the tension on which is adjusted by a

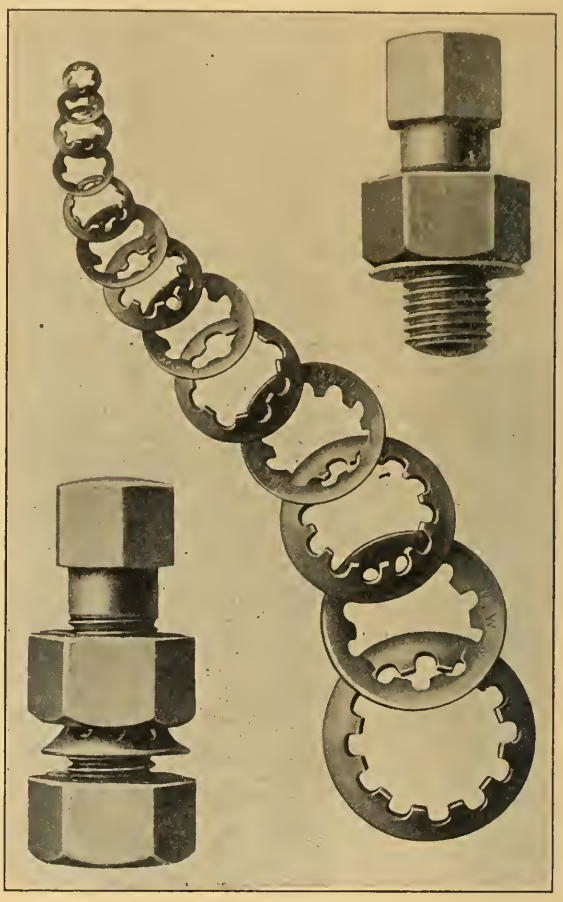


"Tecor" Welding Electrode Holder

brass wing nut. Spring adjustment is only made when changing from one size electrode to another. The holder is also provided with a wooden handle and a fiber disc shield. The copper casting is grooved at the end to hold the electrode rigid at two angles. If desired the holder is furnished with five feet of special extra flexible welding cable. To use the holder, the electrode is forced between the copper jaw and the spring clip. Then, when that electrode is burnt down, a new one is inserted and given a slight twist which pries the clip away from the copper jaw allowing the stub end to drop out. This operation is repeated as each electrode is used up.

Hold Tite Nut Lock

THE NUTLOCK CORPORATION, Brooklyn, N. Y., is manufacturing a nut lock which is entirely different in form and method of application from other nut locking devices. The lock resembles an ordinary button, the center of which has been punched out, leaving inwardly projecting teeth, the surface of which are considerably dished. This nut lock is threaded onto the bolt until the teeth come in contact with the flat surface of the nut. Then a second nut is screwed down on top of this nut lock or a larger nut is slipped over the bolt and hammered down on the lock so as to flatten it out, after which operation the second nut is removed. As the nut lock which was originally dished out has been flattened over the top of the nut, the inwardly projecting teeth engage the threads of the bolt so tightly that there is little chance of the nut lock turning. Moreover, as the lock exerts a constant pressure on the nut as well as the bolt, vibration which would tend to loosen the nut is eliminated.



Hold Tite Nut Locks

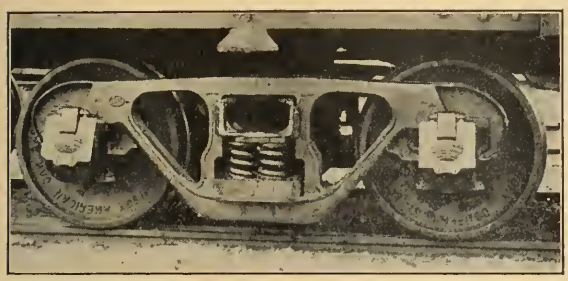
As the pressure exerted by the nut lock is against the base of the threads there is no danger of the threads being damaged.

This nut lock has all the merits of simplicity and is effective in its application. Samples of these nut locks will be found on exhibition in the booth of the Robinson Connector Company.

Two New Pedestal Type Truck Side Frames

INTERESTING VARIATIONS from conventional designs of truck side frames are found in the two new types exhibited by the Scullin Steel Company, St. Louis, Mo. Both are of the pedestal type. One uses a special design of pedestal which holds the standard A. R. A. journal box without bolts, pins or tie bars. In the other side frame the top of the pedestal is rounded to receive a new design of box which dispenses with the usual journal box wedge.

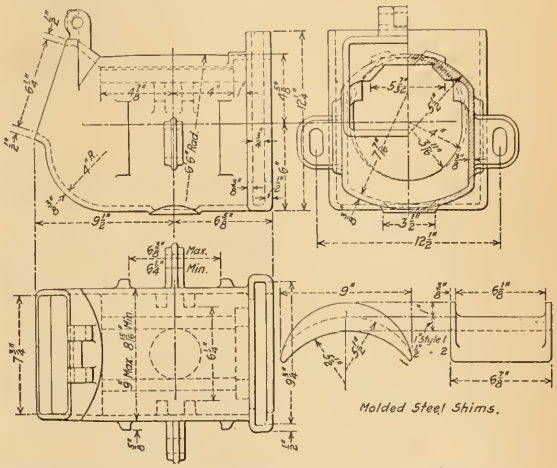
The truck side frame shown in the photograph is so arranged that it may be used with any of the A. R. A.



Pedestal Type Truck Using Standard M. C. B. Journal Box

journal boxes. It is similar in design to the U. S. R. A. frame. This frame is made in two styles, the only variation being in the width of the pedestal jaws. The jaws are applied to the journal boxes between the journal box bolt lugs and the housing for the dust guard. When applying the frame to the journal box the jaws are lowered until they clear the bottom of the journal box bolt lugs. The box is then slid inwardly until the center line of the journal box coincides with the center line of the side frame. The side frame is then lowered into the proper position. A pocket around the entire journal box bearing fits over the journal box lugs and prevents undue lateral or vertical movement between the box and the frame. The principal function of the pedestal jaws is to provent separation of the journal box and frame should the car become derailed or when raising a complete truck off the track. It is impossible for the frame and box to separate without removing the journal bearing wedge and brass. In the other type referred to the pedestal jaws are made relatively wide and are applied from the outside of the box instead of between the journal box bolt lugs and the dust guard housing.

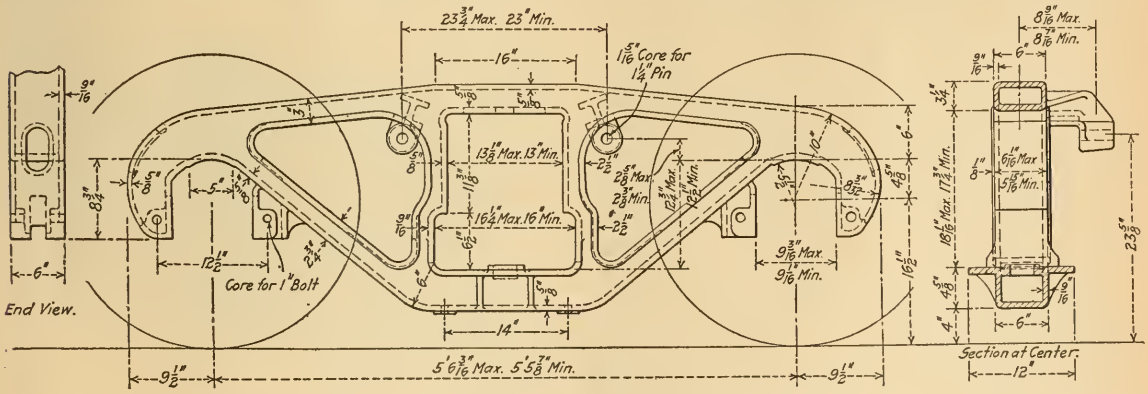
All pedestal trucks heretofore used have employed special journal boxes, making repairs to cars when on foreign lines difficult. Such trouble is avoided by this design. In addition the weight of the truck is materially



Journal Box Which Eliminates Wedge and Shims Used to Adjust Coupler Height

decreased as the journal box tie bars, rivets and brackets are therefore eliminated.

The elimination of the journal bearing wedge is the principal feature of the new Scullin truck side illustrated in the drawings. The top of the journal box is crowned so that it performs the same function as the journal bearing wedge used in connection with the A. R. A. box. The journal box bearing of this side frame is straight.



Pedestal Truck Side Designed to Use Special Journal Boxes

By making a special journal box of this type it is possible to reduce the length of the curve of the bottom side member of the side frame at the journal box bearing, which greatly reduces the stress in this member, consequently enabling the designer to make a lighter side frame. The journal box is arranged with slotted holes in the retaining lugs so that shims may be inserted betwen the journal box bearing of the side frame and the top of the journal box for adjusting coupler heights.

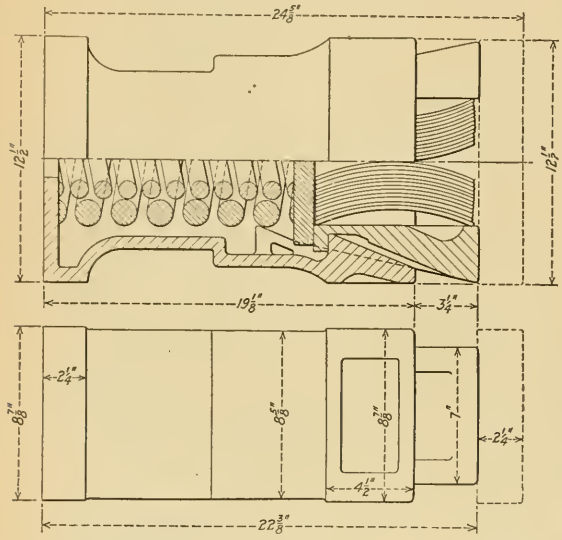
This design of truck side frame greatly reduces the weight per car, in addition to being a much stronger construction than one of equal weight using A. R. A. journal boxes.

Friction Draft Gear of High Capacity

A modification of the heavy type friction draft gear manufactured by the Gould Coupler Company, Depew, N. Y., has recently been developed for the purpose of meeting the hard service conditions imposed by cars of over 50 tons capacity and also for locomotive tenders in heavy switching service. The new design is similar to the company's type FDG 175, but has a compound angle wedge. This enables the lighter buffs or shocks to be taken up on the low angle wedge surfaces, the heavier blows being dissipated as the high angle surfaces are brought into action.

The gear, which is shown in the illustration, is designated as type FDG 325. This gear has a total friction travel of 3¼ in. and measures 8⅞ in. by 12½ in. by 22⅜ in. overall, one follower being cast integral with the gear casing. With the addition of one follower, 2¼ in. thick, this gear will fit into the present standard A. R. A. draft gear space. The gear weighs approximately 350 lb. in working order.

This gear consists essentially of a cast steel housing, provided at the open or friction end with inclined wedge faces of varying angularity. These inclined wedge faces co-operate with corresponding faces on two case-hardened cast steel wedge plates as they are moved inwardly



Gould Friction Draft Gear With 3¼ in. Travel

towards the closed end of the housing. Between the two wedge plates are interposed two sets of curved tempered steel leaf springs, the convex sides of each group facing each other and the ends of the groups bearing against each wedge plate. The inner edges of the wedge plates and the springs bear against a wrought steel follower, which moves longitudinally through the housing. A high capacity double coil release spring is placed between th closed end of the housing and this follower. It will be noted that the wedges are interlocked in the gear housing, the leaf springs being driven in under sufficient compression to facilitate handling without loss of parts.

In buffing or in pulling, the wedge plates are forced inwardly over the low angle surfaces at each corner of the wedge box or housing for a distance of approximately two inches, when they pass over to the high angle surface at the center, this movement continuing through an additional distance of 1¼ in. The inward movement of these wedge plates forces them laterally towards each other and compresses the leaf and coil springs, this action continuing until the gear is closed solid. Upon removal of the load, the wedge plates and springs are restored to their normal position by the double coil release springs.

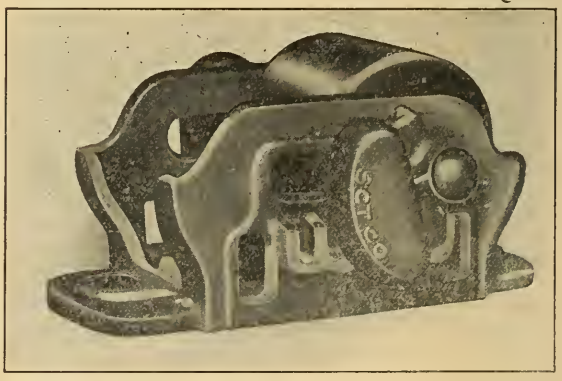
This gear, when fitted with 24 leaf springs, develops a resistance of approximately 325,000 lbs. The capacity may be decreased if desired by the removal of one or more pairs of springs. The consequent lost motion between the wedge plates may be taken up either by the use of shims or by wedge plates of increased width.

This gear is entirely self-contained and is of all-steel construction throughout. The bearing surfaces have a sufficiently large area to keep the pressure per square inch within a reasonable limit, and thus prevent the cutting or gouging out of the metal during movement.

The spring-loaded wedge principle is embodied in the design of this type of gear. By this construction the maximum bursting stress induced in the mouth of the friction housing is never greater than the stress caused by the spring load at full closure of the gear. As these stresses are well within the elastic limit of the material in the casing, no trouble is encountered by the stretching or splitting of the housing at this point.

A New Centering Side Bearing

A rack and counterweight are used to secure the self-aligning feature in the new Barber No. 5 side bearing, exhibited by the Standard Car Truck Company, Chicago. The bearing is of the single roller type, the roller being 4¼ in. in diameter and 3½ in. long. A pin passing through the roller carries on each end a counterweight with a small segmental gear. The two gear segments mesh with racks on the housing and thus the counterweights tend to return the roller to its



Side Bearing at End of Travel Showing Action of Rack and Counterweight

center position. The roller travels 1¾ in. each side of the center, which provides for 3½ in. movement between the car body and the truck bolster in either direction.

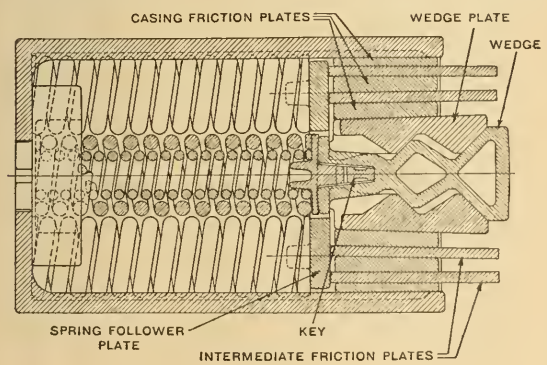
The load is distributed directly through the roller to top and bottom steel wearing plates and no load is carried on the housing or the trunnions. Large openings are provided in the housing to allow dirt to pass out. The racks are provided with inclined surfaces between the teeth for the same purpose. The roller is free to turn on the center pin at any position and ample freedom is provided at all points of contact to insure positive action and reduce wear to a minimum.

Westinghouse Type "N" Friction Draft Gear

A FRICTION DRAFT GEAR, with a low initial resistance, in which provision has been made for readily taking up wear is being exhibited by the Westinghouse Air Brake Company, Pittsburgh, Pa., during this year's convention. The movable parts of the gear are housed in a steel casing of rectangular cross section which is not subjected to wear, and the gear is entirely self-contained.

As will be seen in the drawing, the friction elements operate against a set of five coil springs. The four outer springs are connected in pairs by follower plates, against which the ends of the intermediate or movable friction plates have their bearing. In the center is a double coil spring, on which rests the inner end of a wedge, the outer end of which always bears against the follower plate. In release position the wedge extends beyond the ends of the movable friction plates, so that it is the only movable element to act on the initial compression of the gear.

In operation, as the gear is compressed the wedge tends to separate the wedge plates between which it is placed, at the same time compressing the double coil spring in the center of the case. The lateral thrust thus produced causes the casing friction plates, which are stationary, to grip the intermediate friction plates. As the motion continues the wedge plates, the outer faces of which are slightly tapered, are driven into the casing and energy is absorbed between the wedge plates and the inner casing friction plates and between the wedge plates and the



The Type "N" Friction Draft Gear

wedge itself, the latter being squeezed outward with relation to the wedge plates as they are driven inward. As the travel of the wedge proceeds the follower plate comes in contact with the ends of the intermediate friction plates and further movement is subjected to the additional resistance required to drive these plates between the heavily compressed casing plates against the outer coil springs. As this movement continues, the friction is increased by the increased lateral pressure from the wedge plates.

In release the cycle is reversed and no return motion of the intermediate friction plates takes place until the wedge has been forced back between the wedge plates by the center coil spring, thus relieving the friction on the friction plates.

The initial travel of the wedge meets with a comparatively low initial resistance until the friction plates come into operation. This provides slack to insure the smooth starting of long trains. The casing is not subjected to wear, as none of the moving parts come in contact with it. The parts subjected to wear are of simple form and are readily replaced. Replacements for wear, however, are not likely to be necessary, as the gear provides the possibility for a wide range of adjustment simply by the application of liners between the outer casing friction plates and the housing. The parts are all held together in the casing by a key and are under initial compression.

This gear has a high capacity, and the one on exhibition has been in service at the rear end of a locomotive tender for several years.

Alternating and Direct Current Headlight Sets

THE PYLE-NATIONAL COMPANY, Chicago, is exhibiting two new headlight sets. They are very similar in appearance and some of the parts of both are interchangeable.

The alternating current set includes an induction type generator and is designed to meet the demand for a 500-watt outfit that will operate with a minmum of supervision. The cast envelope has a top exhaust, a side intake, and is 20½ in. long, 11⅜ in. high and 11⅜ in. wide. The supporting surfaces of the feet are machined and interchangeability with previous designs is provided for.

The turbine is an improved radial impulse type. The exhaust pressure is reduced to a very low value and no friction packing is used. The shaft with all rotating parts attached is carried on two heavy ball bearings. These bearings are housed in renewable sleeve bushings so as to make the compensation for ball bearing race wear simply a matter of bushing replacement. A positive splash system provides lubrication for the bearings and the speed and voltage governing mechanism. Hardened steel is used for governor friction members and a novel arrangement is provided for prolonging the life of these members. Adjustment is accomplished by the screwing in of an anti-friction plug.

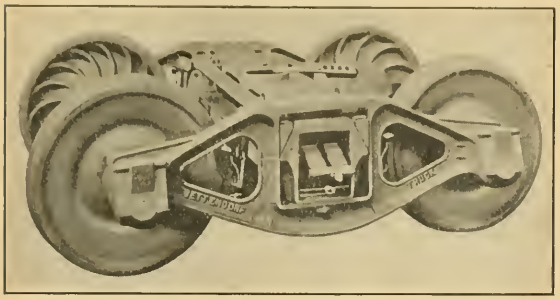
A balanced piston type governor valve controls the steam to the three-stage nozzle and no speed adjustment is necessary for steam pressures between 100 lb. and 250 lb. Should normal speed regulation fail, a safety device automatically cuts down the steam to a quantity just sufficient to support minimum illumination until the disturbing cause can be removed.

The dynamo is of the induction alternator type and consists simply of a special rotor revolving in a permanent magnetic field. The field consists of two laminated pole pieces connected by permanent magnets of low flux density. The winding consists of but two coils of a few turns each, mounted on the central extension of each pole. The machine has no commutator, no brushes, no coils on the rotor, and it is claimed that it cannot be injured by short circuits or overload.

The direct current set differs from the alternating current machine principally in the design of the generator. The turbine runners are interchangeable. The armature is of the drum type and is form wound. The field has consequent poles, vertical laminated magnets and horizontal pole pieces. Binding posts are omitted for lead terminals in view of the development of conduit wiring of locomotives. All rotating parts may be removed without disturbing the insulation or the electrical connections. The speed of the machine is 3,000 r.p.m. and it weighs 150 lb. It is claimed that the variation in speed due to steam pressure variations between 100 lb. and 250 lb. is less than one per cent.

Bettendorf Swing Motion Truck

A new adaptation of the well-known swing motion truck has been developed in the past few years by the Bettendorf Company, Bettendorf, Iowa, for cars wherein it is desirable to obtain easier riding qualities than the ordinary freight car. This truck is illustrated herewith and comprises the Bettendorf one-piece side frame, with journal boxes cast integral. The central opening in this side frame is arranged to receive a carrying transom, having at its ends interlocking bosses which fit into recesses provided in the lower member of

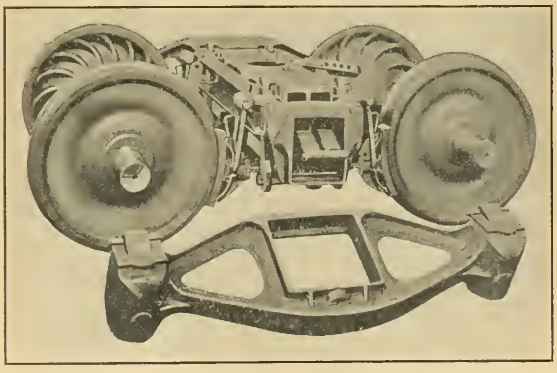


General Arrangement, New Swing Motion Truck

the side frame to hold the ends of the transom in proper relation with the side frame.

From the transom are suspended swing hanger links of the usual type, having lower pivots or axles on which a spring plank rests. The bolster in turn is supported on springs, which may be either elliptic or helical and rest in turn on the spring plank itself. This construction provides the usual swing motion wherein the spring plank, together with the springs and truck bolster, are permitted to have a limited side motion within the transom.

The Bettendorf Company states that up to the present time upwards of 5,000 cars are now equipped with this style of truck. These trucks are popular among the train



Bettendorf Swing Motion Truck, Dismantled

crews on account of the good riding qualities of caboose cars equipped with the Bettendorf swing motion truck.

To dismantle these trucks it is only necessary to raise the transom from its interlocking engagement with the side frame; the wedges and bearings are removed in the usual manner and the side frame can then be slipped off the ends of the journals without disturbing or removing any other parts from the truck, not even the brake arrangement, as shown in the accompanying illustration.

Stanforge Draft Gear

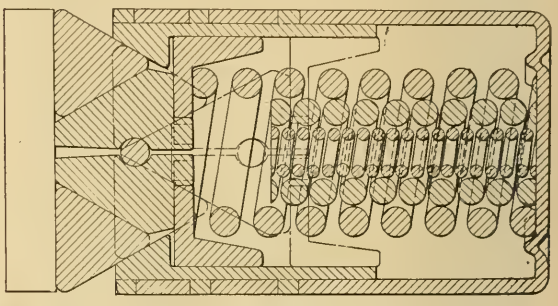
The Standard Forgings Company, Indiana Harbor, Ind., has a new draft gear on exhibition this year which embodies several interesting features. All parts entering into the construction of the Stanforge draft gear are of forged steel. By the use of drop forged steel great strength and long wearing qualities are obtained, as well as precise dimensions of all the parts. With such precision the parts of the gear fit together perfectly when assembled.

The parts are housed in a forged barrel which is never subjected to frictional wear, being protected on each side by the friction plates.

The triple coil spring with which this draft gear is equipped is made with one long outside coil to receive the initial compressions, and after the gear has been compressed to one-half of its travel, the two inner springs start to compress in conjunction with the outer coil, offering an increasing resistance as the coils approach their solid height. The springs in this gear are protected from ever being worked solid.

In action the gear is most sensitive and responds to light buffs with the same softness as the spring gear and with sufficient recoil under all conditions.

Under buff or pull, the action of the gear is the same, that is, the triangular blocks slide transversely on the follower plate toward one another and at the same time move longitudinally into the barrel, giving a resultant direction of force at a 60-deg. angle, causing a pinching action on the rocking center blocks which, in turn, rotate



Cross-Section of the Stanforge Draft Gear. Dotted Lines Show Closed Position

about the pin and open up inside the barrel so as to exert a powerful transverse pressure on each of the integral spring seat and side blocks.

The rocking center blocks and the integral spring seats and side blocks move twice as fast as the triangular blocks, therefore, have double the travel with the result that the wear on the longitudinal friction plates is distributed over double the area when compared to draft gears which do not possess this differential movement in the frictional members.

It is claimed that the superior quality of material entering into the construction and the precision with which the several parts of this gear are manufactured, insure perfect protection to a car for a long period of years without loss of capacity or length of travel. The gear is made compact and self-contained with no protruding members which might become damaged by a wreck or derailment, rendering the gear practically indestructible.

Should it become necessary to take up any wear due to friction, this is easily accomplished by introducing between the scissors or rocker blocks a pin of increased diameter, the increase being equivalent to the sum of the wear on all frictional surfaces. By so doing the

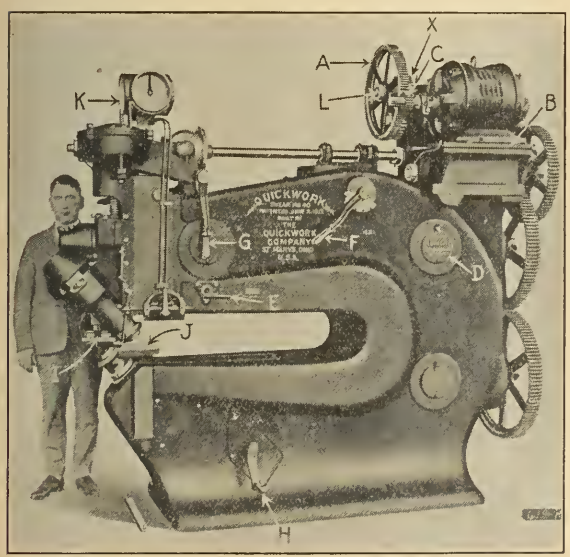
parts are restored to their original position. As the spring and other principal parts are housed they are protected from the weather and interference from outside causes.

Rotary Shears for General Work

STRAIGHT LINES ON SHEET METAL can be cut more quickly by rotary shears than by any other type of machine except long bladed shears cutting the entire length at one stroke. Furthermore, it is possible to cut irregular zigzag shapes or openings in sheets without cutting in from the sides and these different uses make rotary shears valuable general purpose machines.

Recent improvements in rotary shear construction have been embodied in the line of machines manufactured by the Quickwork Company, St. Marys, Ohio, and exhibited at spaces 116-118. These machines are made in seven sizes to cut sheet metal up to and including one inch thick. The No. 40 shear, illustrated, has a capacity up to and including one-half inch.

Either belt drive or motor drive can be provided and the specifications call for a 10-hp. motor with shaft *L*



Rotary Shear with Indicating Attachment. Shear No. 40. 48 in. Throat, Weight 13,000 lbs. Cuts ½ in. Thick Mild Steel and All Lighter Gauges

arranged to run at 294 r.p.m. The clutch *E* for starting and stopping is conveniently located and three speed changes are available by operation of lever *F*. Arrangement is made for power longitudinal movement of either cutter head, and automatic safety stops eliminate danger of running the heads too far.

Especial attention is called to the indicating attachment used to facilitate following any desired line. This indicator, *K*, comprises three faces, visible from the front, rear and end of the shear. The operator by holding a steel pointer on the marked line on the sheet indicates to the helper, through the index finger of the face of the indicator *K*, just when, which way, and how much to shift the plate to keep it in line for straight shearing. The indicator is not essential to working the shears but is a great aid to both experienced and inexperienced operators.

Double Channel Steel End

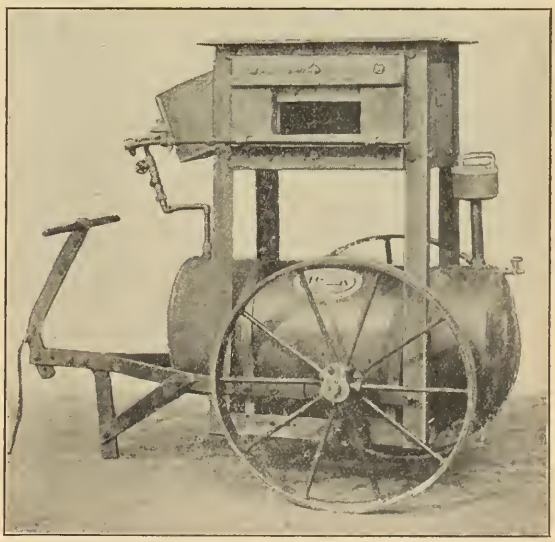
A STEEL END ADAPTED for use on box or gondola cars designed to secure the maximum strength with plates of light section, has been developed by the Hutchins Car Roofing Company, Detroit, Mich. Because of the similarity of the cross section through the face of the end to channels riveted together at their flanges with the webs placed alternately inward and outward, it has been designated the double channel end. The close resemblance to the trough flooring used in bridge construction is also noticeable.

At the end of each channel are two reinforcing ribs which extend around the vertical corners and strengthen the side flanges. The inside surfaces are made flush with the outside face of the corner posts and the depressions of the channel section are 2¼ in. deep. For box cars the end is made in two or three sections, each being of whatever thickness may be desired. For gondola cars one or two sections are used. The nailing strips for the lining for box cars bear on flat surfaces and the inner faces furnish additional support, thus permitting the use of $^{13}/_{16}$-in. end lining, if desired.

It is stated that due to the fact that the construction gives the maximum section modulus with a given thickness of plate, this end may be made of $^{3}/_{16}$-in. material and maintain the strength which is considered necessary for box or gondola cars.

Portable Rivet Forge

A PORTABLE RIVET FORGE has been placed on the market recently by the Hauck Manufacturing Company, Brooklyn, N. Y. This forge is provided with a 20-gal. oil tank, which is laid flat on the iron frame, thus lowering the center of gravity and keeping the forge well balanced at all times. Twenty-four inch



Hauck Portable Rivet Forge

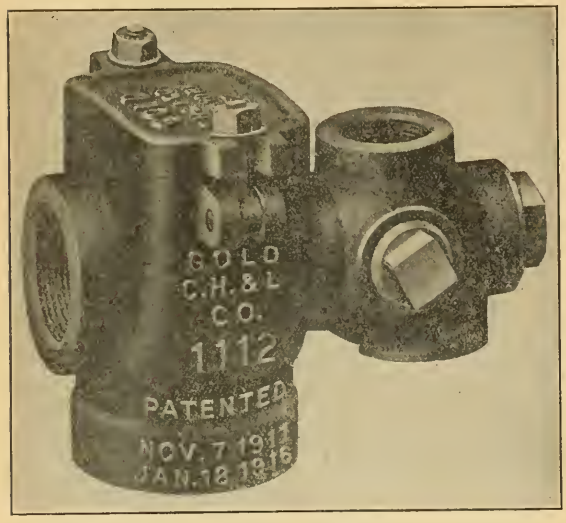
wheels used on the forge enable it to be moved about easily and it can be pulled across tracks without difficulty or loss of time. The capacity of the forge is 3,000 three-quarter inch rivets in an eight-hour day.

An additional advantage of the Hauck forge is its compactness, as the handle works on a swivel and can be

swung back when the forge is used between tracks. The burner works on the vacuum principle, the oil being siphoned from the tank. This is a safety feature, inasmuch as there is no pressure on the tank which, however, is strongly constructed and if desired it can be arranged so that the oil is fed under pressure. As shown in the illustration, the tank is equipped with a large filling funnel with a cover. This prevents dirt or dust from settling in the funnel and being washed into the tank when the tank is filled.

Improvements in Vapor Car Heating Valve

AMONG THE NEW FEATURES of the vapor car heating system exhibited by the Gold Car Heating & Lighting Company, New York, is an improved type of inside vapor valve No. 1112. With the recent modifications the construction of this valve corresponds closely to that of the No. 887 underhung type. The adjusting screw formerly used in the inside valve has been entirely eliminated; this elimination is made possible by the type of diaphragm used. It is constructed in two separate sections joined together as a unit, each section separately containing a volatile liquid. Should one section fail after long service the remaining section



Simplified Type of Inside Vapor Valve

is capable of operating the valve temporarily until another one is supplied, thus doubling the life of the diaphragm and eliminating the excessive blow of steam from the drips.

The diaphragm unit is capable of a working expansion of $\frac{9}{16}$ in., whereas $\frac{3}{16}$ in. expansion is all that is required to operate the valve; therefore, it will handle perfectly all steam pressure encountered in car heating.

The ventilating drip horn furnished materially aids in flushing the diaphragm chamber with cool air according to outside temperatures and speed of the train. At terminals where cars lay over, this cooling action is not as great and less steam is allowed to enter the radiators, the quantity being just enough to keep the cars comfortable for the receipt of passengers without overheating.

During its first try-out last season laboratory and service tests showed the diaphragm to be rugged and with a six-pipe radiation this valve handled the system satisfactorily in zero weather, giving ample heat with less blow of steam from the drips than from the ordinary type valves. The new design has reduced the weight to 16 lbs., complete, no bell cranks or mechanical movements being used in the operation of the valve. It is easily applied to old and new equipment.

Facilitating Engineering Calculations

A CHART of trigonomertic functions has recently been published in card form by the Monroe Calculating Machine Company, Orange, N. J. Engineers have frequent use for the general functions of right and oblique triangles and it was felt that if these formulæ were grouped together with illustrations it would form a chart which would save considerable time in the figure-work of the engineer. These charts have an added value inasmuch as a considerable portion of the detail work can be delegated to an assistant or clerk whose time is not so valuable and who need not understand the intricacies of trigonometry. For example, in the formulæ for the area of an oblique triangle:

$$\text{Area} = \frac{a^2 \sin B \sin C}{2 \text{ Sin } A}$$

it is a simple matter for anyone to substitute the value of a and the functions from a table of sines.

To further facilitate the handling of the calculations —multiplications and divisions, additions and subtractions—the reverse of the card gives the method of solving the formulæ on the Monroe machine. The principal difficulty in all such work, is the handling of very large size numbers, such as the result from squaring the side of a triangle or the multiplication of two factors. The chart when used with the machine simplifies such work so that it is not necessary to work out each part separately and in a number of cases all the work may be done entirely in the machine, writing only the final answer on paper. The formula in which one side, C, equals the squart root of $a^2 + b^2 - 2ab \cos C$, can be handled in a very simple manner, entirely within, and without clearing the machine.

Originally logarithms were devised to facilitate calculations, large multiplications and divisions, it being easier and presenting less opportunity for errors to creep in, to add the logarithms instead of multiplying, or to subtract them instead of dividing. Logarithms are still used by many for multiplication and in trigonometric functions also, because of the absence of sufficiently large tables of the natural functions of the angle. The natural functions are multiplied or divided the same as other numbers. With calculating machines that perform large multiplications easily logarithms are largely displaced and the tables of natural functions used instead. The tables of natural functions now published are carried out usually to five decimal places and the nearest minute of the angle. In some engineering work this is not sufficiently accurate, tables of seven decimal places and to the nearest ten seconds of angle being desired. To increase the service of the Monroe Calculating Machine to the engineering field a careful study is being made of the needs in the way of methods and tables with the idea of providing the necessary facilities to reduce the labor involved and insure the accuracy of such figure work.

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Things Are Warming Up

If there have been doubts in any minds as to the health and vigor of Section III, Mechanical, attendance at yesterday's session would have effectively dispelled them. The seating accommodations of the Greek Temple were taxed to their capacity and standing room only was available. The relations of the association to the railroads this year are such that this can indicate only one thing—interest in the work of the convention. This was fully borne out by the live and constructive value of the discussions on the more important reports.

Welding Practice

A suggestion was made during the discussion of the report of the Committee on Autogenous and Electric Welding that the welding operators should be licensed. This suggestion was opposed on the ground that while a license might mean that a man could handle his arc properly, he might apply his weld to a bad casting that would fail at some point remote from the weld. Proper supervision, it was said, was to be recommended rather than the licensing of operators. Welding schools and methods for testing welds were also mentioned. Summed up, the discussion indicated a need for all these things. Schools are needed to make operators, a license or a test is necessary to insure that the welder can make a good weld, a testing method is desirable for insuring consistent results from a welder and good supervision is essential for insuring proper applications of welding.

Tools for Steel Car Work

The report of the Committee on Repair Shop Layouts and the discussion which followed its presentation at yesterday's session of Section III, Mechanical, drew attention to a promising field for development by shop equipment manufacturers. Most of the machine tools now used in steel car repair shops are designed primarily for boiler shop work, and as far as the need for special equipment has been supplied, it is with shop made devices. These tools are usually more or less crude in construction and seldom efficient in operation. Steel cars are rapidly increasing in numbers and have now been in service long enough so that the amount of heavy steel car repair work is increasing rapidly. The problem of providing for this work is now receiving consideration by many railroads, and the opportunity is ripe for a study of the requirements of the heavy repair shop and the development of tools adapted to the special conditions encountered in the fabrication of steel car repair parts.

Autogenous Welding

The members of the Mechanical Section should be heartily commended for the active and intelligent interest shown in the discussion of the report of the Committee on Autogenous and Electric Welding. If it had not been necessary to leave time for the other reports the discussion would probably have lasted all morning. The various users do not get uniform results, and the result has been that certain practices are not considered advisable. The practice of welding parts the mechanical strength of which is responsible for safety is not generally recommended. This attitude is entirely justifiable and desirable, as safety is paramount. At the same time the members should not lose sight of the developments which have been and are being made. There are committees, societies, manufacturing companies and individual engineers giving their best efforts to the development of the art, and the railroads should not only keep in mind all the possibilities of welding, but should also give their assistance to those who are working to make autogenous welding thoroughly and completely dependable.

The Crux of Electrification

Many roads now are or soon will be considering electrification. When that question comes up the mechanical department must be in a position to pass intelligently on the ultimate economy of electric operation. Electrification has not been adopted in this country as a means of saving money under every day operating conditions. For overcoming the smoke nuisance in tunnels or large cities, or for increasing track capacity it has proved useful. Before electrification can be adopted on a large scale the economy of electric operation must be definitely established. Extravagant claims are made regarding the saving in fuel and maintenance. Some advocates of electrification claim a reduction in fuel consumption as high as 66 per cent. Other estimates based on the power consumption of electrified divisions give figures as low as 25 per cent. Widely differing statements are also made concerning the comparative costs of maintaining steam and electric motive power. There is a question as to the extent to which electrification can be justified as a business proposition. Authentic comparative data on both fixed charges and operating costs and particularly

on power or fuel costs and equipment maintenance charges are lacking. The association could perform a valuable service for the railroads by arranging to have this subject studied by the committee during the coming year.

No Stone Unturned

From a thorough inspection of the exhibits in the machinery section it would appear that the manufacturers of machine tools and hoists have left very little to be desired in the way of equipment required for the modern engine terminal. Of course, "there is many a slip 'twixt the cup and the lip" and the average mechanical superintendent may feel rather dubious over the possibility of getting any part of the splendid assortment of machinery into his engine terminals, but he will unquestionably go back with a more definite idea of just what he wants and that in itself is something. The manufacturers of machine tools and of cranes and hoists have left no stone unturned in providing for the needs of the improved engine terminals. Modernized engine terminals are a necessity. The manufacturers know that and have anticipated the requirements. Now it is up to the mechanical men to spread the propaganda for better terminals until the idea becomes ingrained in the minds of those responsible for the expenditures made to improve our railroads. Mechanical representatives of the railroads attending this convention would be derelict in their duty if they did not take particular note of some of the new shaper and small lathe models or if they overlooked the crank pin turning machine or other tools specially adapted to work in engine houses. These are all important features in the modernized engine terminal.

The Value of Co-Operative Research

There is no question about the advisability of co-operative research; it has long been recognized in principle in the virtual acceptance by many roads of the results of tests conducted by the comparatively few railroads that have been in a position thoroughly and impartially to investigate the relative merits of various devices. The tests conducted at Altoona have been of immeasurable value to all American railroads. The mechanical associations have endorsed the principle of co-operative research in the co-operative investigation of important devices and methods. The establishment of co-operative research on a permanent basis would simply create a better foundation upon which to perpetuate a well-established idea in a workable form. The railroads have no trade secrets to guard from one another and the manufacturers have nothing to lose in the elimination of inefficient and ineffective devices from the market. The publication of data resulting from rigorous comparative tests would place the equipment business on a much more satisfactory basis and save individual railroads an immense amount of money lost on devices and materials that have ultimately proved deficient. The results of the comparative tests on draft gears and locomotive reverse gears initiated by the Inspection and Test Section of the Railroad Administration will afford an impetus to the movement which should now be crystallized into a definite plan for an organization supported by all progressive railroads which can proceed to make thorough and impartial tests on a large number of devices in every day use, the comparative values of which are little known.

An Impracticable Layout

The Committee on Repair Shop Layouts has before it one of the most important tasks confronting Section III, Mechanical. The practical value of its work will be measured by the extent to which it is able to help the members in their efforts to get the right kind of shops on their individual roads. It is unfortunate in this connection that the repair shop layout presented in the committee's report did not receive some comment in the discussion. In round numbers, there are 2,400,000 railroad owned freight cars in the United States. Normally, about 4 per cent of these cars receive repairs of all classes daily, but of this 4 per cent only about one-tenth, or 10,000 cars, receive heavy repairs. The plan presented by the committee calls for an ultimate development capable of turning out 100 heavy repairs daily. Fully developed, such a plan is capable of taking care of an average of 2,000 miles of line which, with few exceptions, is far above the economic extent of territory to be served by one shop. The property required for the full development is over a mile long and a few hundred feet less than one-half mile wide for most of its length. Starting with the initial layout for 25 cars output daily, the layout provides for a future development quadrupling this output. For years after the completion of the initial unit a large part of the property required for the ultimate development must remain idle, thus placing a heavy carrying charge on the operation of the existing plant. Furthermore, changes in traffic development, the conditions in the labor market and increases in land values may completely change the economic aspects of the whole plan long before it reaches its full development. While the consideration of shop layouts is probably not the most important phase of the committee's work, it is one which should be developed in such a way as to be of maximum usefulness to the greatest number of the members, and it seems evident that to fulfill this requirement a less pretentious plan should be developed.

More "Pep" For the Electrical Men

From the semi-annual convention of the Association of Railway Electrical Engineers, which was held yesterday at the Hotel Dennis, it is evident that the time is rapidly coming when some stimulus will have to be injected into the Association if it is to continue to be a factor in the electrical problems of the railroads. Out of the number of reports outlined in the program half only were presented. Inasmuch as most of the reports at this semi-annual meeting are in the nature of progress reports, it would seem that some progress, at least, could have been reported. We have already called attention to the fact that the electrical matters which came up for discussion in the sessions of the Mechanical Section did not receive the discussion that they merited. No such lack of discussion can be said to prevail in the meetings of the Association of Railway Electrical Engineers. The difficulty that lies here is not that the members fail to talk, but that they fritter away the time in the discussion of microscopic and unimportant details and miss entirely the big opportunities that exist all around them. For this reason, if for no other, it will be a very great step forward when the A. R. E. E. joins the A. R. A. New membership will be the certain result of such a union. Duplication of reports, such as exists to-day, will be eliminated. More enthusiasm, better discussion and bigger problems will be the inevitable result of this consolidation, and a larger and stronger organization will result, whose decisions in electrical matters will have the keynote of finality.

Who Pays His Salary?

How many railroads regard the university graduate as a superfluous luxury and how many roads will appropriate money to give the college man the special training that will enable him to apply a well-trained mind to the highly specialized problem of transportation? How many railroads that have initiated special apprentice courses will be the first to eliminate this feature as the easiest way to pare down expenses in a pinch? Do these railroads flatter themselves that this is a money-saving program? Do they imagine that they are not paying a fancy price for university talent? It is safe to say that there is not a single device being exhibited at this convention in which the college man has not participated either in the design, manufacture or sale. When any of these devices are sold to the railroads, is not the college man's salary figured in the price, plus a liberal profit to the man who capitalized the college man's brains? Why should not the railroads capitalize the college man? Why should they not also maintain a strong technical staff? Do not necessarily construe this as a reflection on your own organization, Mr. Mechanical Superintendent; but consider what that organization may be 10 or 15 years from now if you have no college men in training on your road now. Who is going to get the best of the bargain when it comes to buying supplies—the organization with a strong technical organization, or the one without? The supply business is a cold-blooded game and the railroads are paying a pretty penny towards the salary of every college man that found the supply business more attractive than railroading.

Mechanical Engineer—Purchases and Stores

Of all departmental relationships on the railroad, the most delicate, yet essential, is an intimate and cordial understanding between the mechanical engineer and the storekeeper, or more broadly speaking, the mechanical department and the service of supply. The stores department is essentially a business institution; its objective is cost, and all that works to increase cost, such as interest on the money invested in material, depreciation, obsolescence and so on. The mechanical department is wholly technical in its function and the mechanical engineer has the opportunity to reconcile the technical with the business viewpoint. He should be capable of weighing the requirements of the mechanical departmnt against the limitations imposed by market conditions and the financial resources of the railroad as interpreted by the purchasing agent, and can be of immeasurable assistance to the purchasing agent and service to his company by his ability to outline in a clear-cut, unbiased form the technical advantage of one machine tool compared with another, or of an alloy steel compared with less expensive material. The relationship calls for consideration on the part of the purchasing agent and breadth of view on the part of the mechanical engineer. It must be recognized that a single machine tool or a special alloy cannot always be insisted on, that alternate machines and materials must always be given consideration. One important railroad has gone so far as to entrust its mechanical engineering staff with responsibility for the final approval of all material requisitions originating in the shops, because it is thought that in this way overestimated shop requirements are discounted without the danger of curtailing shop output, resulting from requisitions being arbitrarily slashed by the stores department.

Efficient Abrasive Wheels

With the increased use of grinding machines in railway shop practice, the selection of proper wheels for different classes of work becomes a question of more than passing importance. It has been demonstrated many times that grinding wheels affording the longest life are not necessarily the cheapest in the long run, but there is danger of forgetting this important fact. Mechanical department officials should make sure that their subordinates realize the importance of selecting grinding wheels of the proper grain and grade, not laying too much stress on the length of life of the wheels. It is evident that a wheel too hard for a given job will last longer than a softer wheel, but its cutting particles become dull, its efficiency is reduced, and the actual number of pieces ground is less than could be ground on a wheel of the proper grain and grade. In the ideal wheel the cutting particles are harder than the material ground and the binding material is just hard enough to hold the cutting particles until they become dull. Any softer bond would allow the wheel to wear away unnecessarily fast and a harder bond would hold the cutting particles until they were dull, with a resultant glazed or loaded wheel. Conditions under which grinding wheels are used vary so much that it is impossible to lay down an arbitrary rule covering wheel selection. The best method is to consult a grinding expert who can advise from long experience; but if such a man is not available or the conditions are new, it may be necessary to make preliminary tests before ordering a large number of wheels. These tests should be conducted carefully, over a considerable period of time, and by noting the relative wheel costs and reduction in weights for a given number of pieces ground, it is possible to determine which is the most efficient grinding wheel. Valuable information as to the best operating speed and conditions can also be obtained.

Non-Corrosive Plates for Cars

When all-steel cars were first introduced some railroad men anticipated that they would have an indefinitely long life, and would be retired only on account of obsolescence. The rapid corrosion of the sheets in freight cars has been a disappointment to those who were optimistic concerning the life of steel cars. The marked reduction in maintenance costs that was expected has not developed; on the contrary, there is a question whether the expense of maintaining steel cars is any lower than for cars constructed partly of wood. The mistakes in estimating the life of steel cars was a natural one. The first metal plates used in cars were made from ore containing a low percentage of impurities and the material was manufactured by other processes than those now in use. But is there any reason why the sheets used in building cars should not be made to resist better the action of the elements? There are on the market materials which cost little more than ordinary sheets, but give a much longer life when exposed to rust. The life of the plate ordinarily determines the life of the car and prolonging the life of the sheets lengthens the service life of the equipment. If the price of a non-corrosive plate is 20 per cent higher than for the ordinary plate and this material amounts to 30 per cent of the total cost of the finished car the increase in the first cost by using such material would be only six per cent. It is not unreasonable to expect an increase of 50 per cent in the service life of cars built of rust-resisting metal, so the opportunity for economy is evident. The maintenance and depreciation of freight cars amounts to an enormous sum and such a promising field for saving should be thoroughly investigated.

Program for To-day

SECTION III—MECHANICAL

Discussion of Reports on:	
Revision of Passenger Car Rules of Interchange	9.30 A. M. to 10.00 A. M.
Prices for Labor and Materials	10.00 A. M. to 10.30 A. M.
Depreciation for Freight Cars	10.30 A. M. to 11.00 A. M.
Arbitration	11.00 A. M. to 11.30 A. M.
Tank Cars	11.30 A. M. to 12.00 M.
Brake Shoe and Brake Beam Equipment	12.00 M. to 12.30 P. M.

SECTION VI—PURCHASES AND STORES

MORNING SESSION

Discussion of Reports of Committees	9.30 A. M. to 12.30 P. M.
Discussion of Reports of Committees	2.00 P. M. to 3.00 P. M.

AFTERNOON SESSION

Discussion of Report of Committee on Supply Train Operation. Moving Pictures of Supply Train on Southern Pacific	3.00 P. M. to 5.00 P. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

3.30 P. M.—Orchestral Concert and Impromptu Dancing, Entrance Hall, Million Dollar Pier.

4.30 P. M.—Tea will be served in Entrance Hall.

9.30 P. M.—Grand Ball in Ball Room on Million Dollar Pier.

Railway Car Manufacturers' Association

THE RAILWAY CAR MANUFACTURERS' ASSOCIATION will hold a luncheon to-day and a meeting at 1.30 P. M. (standard time) in the Forest Room of the Marlborough-Blenheim Hotel.

Use of Rolling Chairs

SHOULD any discourtesy be shown you by pushers of rolling chairs, which are provided by the R. S. M. A., take the number on the yellow card on the chair and report it promptly to some member of the Transportation Committee.

Registration Badges For Members Exhausted

THE SUPPLY OF BADGES for members of Mechanical Section III, A. R. A., having become exhausted on account of the heavy registration, all members registering after noon yesterday were given special guests badges numbered from 3,000 to 3,099. They were, of course, registered as members.

Registration Figures

THE COMPARATIVE REGISTRATION FIGURES up to noon Monday for each year since 1911 are shown in the following table:

	1911	1912	1913	1914	1915	1916	1919	1920
Members, Section III, Mechanical	719	644	673	730	713	754	675	805
Members, Section VI, Purchases and Stores	...	...	...	...	...	...	...	406
Special Guests	832	584	680	554	507	702	1,278	687
Railroad Ladies	705	437	505	433	403	544	875	746
Supply Ladies	385	223	308	287	232	318	470	660
Supply Men	1,662	1,516	1,666	1,484	1,248	1,533	2,300	2,465
Total	4,303	3,404	3,837	3,488	3,103	3,871	5,648	5,769

Prior to, and including 1916, the figures for members contain duplications, as many officers belonged to and registered for both the M. C. B. and M. M. Associations.

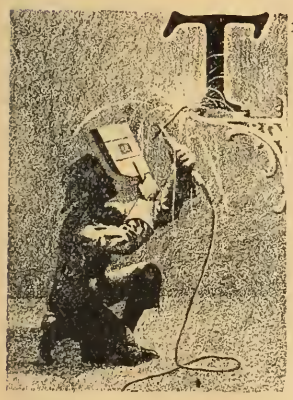
President R. H. Aishton, American Railroad Association, Visiting the Exhibit; Secretary J. E. Fairbanks, A. R. A., at the Left; President George R Carr, R. S. M. A., at the Right

American Railroad Association—Section III—Mechanical

The Report of the Committee on Repair Shop Layouts, Brings Out a Lively Discussion

Chairman Tollerton called the meeting to order at 9.45 A. M.

Report of the Committee on Autogenous Welding



THE REPORT of the committee to the last convention was adopted by letter ballot and incorporated in the American Railroad Association Code of Rules (M. C. B.) governing the condition of, and repairs to, freight and passenger cars in the interchange of traffic.

There were three subjects referred back to the committee for further investigation and report, viz.:

1.—Building up flat spots on steel and steel tired wheels.
2.—Building up of worn collars at the journal ends of axle.
3.—Welding of fractures in couplers.

The committee has done considerable work on these subjects during the past year, but has not to date concluded its investigation and tests. In addition to the subjects left over last year, the committee is making a thorough study of the relative merits of autogenous gas and electric welding on the various parts of car and locomotive equipment.

The report was signed by J. T. Wallis (Chairman), Pennsylvania System; W. O. Thompson, New York Central; G. W. Rink, Central of New Jersey; A. M. McGill, Lehigh Valley; R. W. Schulze, St. Louis-San Francisco; Willard Kells, Atlantic Coast Line; H. T. Bentley, Chicago & North Western; Geo. Durham, Wheeling & Lake Erie; T. P. Madden, Missouri Pacific; H. B. MacFarland, Atchison, Topeka & Santa Fe, and G. M. Gray, Bessemer & Lake Erie.

Discussion

After reading the report, W. O. Thompson (N. Y. C.) said: "Your committee has received considerable criticism for the conservative limits set on fractures allowed to be welded. For two or three years, I was of the same opinion as the critics, but my opinion was changed by seeing several very disastrous results, not of welding, but of soldering over the edges of fractures on different parts of cars that afterward failed, and caused serious accidents."

Prof. Alfred S. Kinsey (Stevens Institute of Tech.): As a director of the American Welding Society of New York City, I have asked the privilege of the floor to announce to you that a special committee has been appointed to take up the problem of welding as it affects organizations such as this. The committee also will co-operate with the Boiler Code Committee of the American Society of Mechanical Engineers to do everything possible to promote a mutual interest in successful autogenous welding. It has been generally supposed that the safe ending of boiler tubes was condemned by the American Society of Mechanical Engineers, but neither that society nor its boiler code committee ever took any such action so far as fire tubes are concerned. There is not anything on the records to show how they stand regarding the safe ending of fire tubes for locomotives. They do not approve of the safe ending of tubes in water tube boilers. The different societies are asked to form committees to co-operate with the welding society's committee, and the committee of the A. S. M. E., to determine how far we should go in allowing welds to be made in tension members and compression members; similarly in vessels under high pressure. The conference of all these committees should also discuss the question of licensing welders. The insurance companies are becoming very sensitive about the matter, because of the lack of control of welders. Shall we license welders? You men who are very much interested in autogenous welding in the railroad shops should have a voice in the decision of that question.

Autogenous welding has come to stay. The best engineering schools in the country are teaching autogenous welding. At Stevens Institute of Technology we are teaching every one of the 850 students passing through that school the four methods of welding, including the torch weld, the thermit weld, the elec-

tric weld, and the oxy-acetylene weld. They will never be welders, but they will know what a good weld is when they come to be assistant managers of shops, and have these welds to consider and to deal with. Night schools now are being conducted for the instruction of welders. During the war, a night school was started in New York, which is still continuing its work, because there is such a demand for gas welders.

It was my privilege to see in Mr. Pack's office in Washington a few months ago, the examples of poor welding he referred to in his report on boiler explosions. The trouble in those cases was that the men who made the welds either had no conscience, or no knowledge of how to make welds. They were the worst I ever saw, and it is not fair that they should be allowed to condemn the process of autogenous welding. I believe that Mr. Pack did not intend to condemn autogenous welding, but only wanted to call attention to the fact that the method, although a good one, was at the same time so important that it should be handled only by intelligent men; hence the thought of licensing welders, on my part.

At the meeting of the Master Boilermakers' Association a week ago, in Minneapolis, they voted to have a committee of five appointed, which was to be known as a conference committee, and which is to confer with these other committees. In a short time, we will probably have a meeting in Chicago or New York, and with all of these gentlemen sitting around the table, and officers like Mr. Pack, represented, men who are vitally interested in the subject, it is hoped that recommendations of great value will be formulated. We would appreciate very much having the co-operation of this organization. I understand you have a committee on welding, and presume the matter can be handled through that committee.

C. E. Fuller (U. P.): Am I to understand that the American Society of Mechanical Engineers is advocating the licensing of welders?

Mr. Kinsey: No, sir. I did not mean to imply that. I meant to say that some of us, in talking this over (I am a member of the A. S. M. E., but did not speak for that organization officially) are of the opinion that something should be done and must be done before long to put the stamp of aproval on good welding, and the stamp of disapproval on careless welding. We must either license the welder or his boss to bring that about. In New York City they have had a requirement for a long time that welders must be licensed. You cannot perform a welding operation in that city without submitting to an examination at City Hall and paying $5 for a license.

Mr. Fuller: I am a member of the American Society of Mechanical Engineers, and know something of their methods. The A. S. M. E. has a work to perform, and in performing that work, should we all be crucified because some of its members are representatives of insurance agencies and other interested parties? I think w had better consider this thing pretty carefully. We had our experience in the case of the boiler code. It is to be regretted that this committee did not present a report this year more in detail than it has done. We are not interested in some things, but we are interested in life and safety. There is nobody more interested in that phase of the question than the railroads. We are not doing this work haphazard, or for money. We are not being paid for the job. It makes all the difference in the world whether it is a blacksmith's shop on the outside, or whether it is one on the inside, and I for one want to protest against any action being taken here until the matter is carefully analyzed.

R. W. Bell (I. C.): We have approached the matter of welding very carefully, and want to go on record as protesting against the manner in which truck side frames have been welded.

Mr. Fuller: I am a member of the American Society of Mechanical Engineers, and know something of their methods. The A. S. M. E. has a work to perform, and in performing that work should we all be crucified because some of its members are representatives of insurance agencies and other interested parties? I think we had better consider this thing pretty carefully. We had our experience in the case of the boiler code. It is to be regretted that this committee did not present a report this year more in detail than it has done. We are not interested in some things, but we are interested in life and safety. There is nobody more interested in that phase of the question than the railroads. We are not doing this work haphazard or for money. We are not being paid for the job. It makes all the difference in the world whether it is a blacksmith's shop on the outside, or whether it is one on the inside, and I for one want to protest against any action being taken here until the matter is carefully analyzed.

R. W. Bell (I. C.): We have approached the matter of welding very carefully, and we want to go on record as protesting against the manner in which truck side frames have been welded. We have had some very bad accidents because of the fact that they were simply soldered. I do not believe that you should have licensed welders. By selecting men carefully from among our various apprentices we can do all that is necessary to train efficient welders. By appointing the most intelligent men for this class of work we can get good results.

J. J. Tatum (B. & O.): Autogenous welding is a very deep subject. At the last convention we applied the emergency brakes and stopped perhaps too short. As Mr. Bell has said, there has been some very bad welding done; in fact there have been attempts to weld, and parts of cars have been passed as being welded that were not welded. According to the description which is given by some of our men they have the appearance of being whitewashed.

We can do more welding than we have decided should be done, but it must be done under the direction of some responsible official. It is not only necessary to consider the method of welding, but the part to be welded. The question many times is the character of the casting or forging that we are undertaking to weld. Is it worth welding? We may apply a good weld to a bad casting, and if we do we have gained nothing, and therefore, good supervision is necessary to get proper welding of the proper material.

F. W. Brazier (N. Y. C.): I want to bear out what Mr. Tatum and Mr. Fuller have said. You will notice that the committee asks for further time in which to make a study of the matter. We have some mighty poor welding, and it is better not to weld at all unless we can do it right; it is better to scrap the material rather than pay in accidents on the road. We have quite a bright set of men on the railroad, and by supervision and the work which this committee is going to do I feel confident we shall develop good men.

I. S. Downing (C. C. C. & St. L.): There is just one question in my mind on this matter of welding. It is a preferred job, and under the National Agreement I suppose we will have to bulletin the job.

Prof. Kinsey: I am afraid that you have lost track of what I said first—that I came to you as a member of the American Welding Society, not of the A. S. M. E. My motive this morning was entirely an unselfish one, prompted by the desire to obtain exactly what you men want. We have asked the A. S. M. E. to hold off with any more restrictions and to stop their discussion of this whole situation until the organizations can get its committee together, discuss the question and establish the limitations. If it is not best in your judgment to license welders, then we won't license welders, that is all.

E. Wanamaker (C. R. I. & P.): The American Welding Society has done some very good work along research lines. As I understand it, they are not proposing to set any particular limitations, but to try and co-ordinate the efforts of all organizations interested in autogenous welding, in order that each one may benefit from the findings of the other. So far as that goes, it might be well to have the railway organizations coöperate, and eventually they can make definite limitations, then the autogenous welding industry is certainly in its infancy, but we do know one thing: that the complications in the reduction of costs of maintenance and operation are going to force us to use many new processes. To use them intelligently, it will require intelligent investigation and research, which no doubt will be a continuous process for some years to come. I think that we should confine our work within certain definite limitations. After it has been proved and demonstrated that we can go farther afield, then the limit should be raised, and I think that is what this organization is going to do. At present we have excellent equipment available for thermit, gas and electric autogenous welding, but there are three prime requisites to be met in any or all of these three processes, if the welding is to be successful. Agreeing with the chairman of the committee, that the failures in autogenous welded parts have been in part due to the fact that they were not welded,

if we are going to get these welds done properly, we must make sure of the three prime requisites, which are: first, proper material for making welds; second, rules for using those materials; and third, intelligent application of the process in the design, to the various mechanical devices or articles that are to be welded. To secure that cooperation we need a man who is skilled in making the weld and blowing the metal into the weld.

We should all realize that in any autogenous weld the best we can do is to put good cast iron, cast steel, or alloy steel, into the casting. That being the case, certainly no effort should be spared to secure the proper materials for welding. If we are going to join high grade materials, whether it be in truck frames or boiler steel, we should first secure good materials to go into the weld. We should spare no expense or pains in an unceasing endeavor to thoroughly train our mechanics until they are capable of making first-class welds with a good high average of efficiency and factor of safety. Everybody in the mechanical department, having to do with the application of welding, should get down on the ground and study the application, so that it can be intelligently applied.

A. M. Simons (P. S. & N.): One of the most prolific sources of poor welds is their extended operations before the welders and those in charge have time thoroughly to master the process themselves. Their ambition to make a showing in the way of saving parts that have formerly been scrapped has frequently led men in the wrong direction, and caused them to use welding where it should not have been employed. We should proceed with that degree of caution which will insure confidence in the man that is doing the work; ability to supervise in the man who is responsible for the work in its last analysis, and also the ability to judge as to whether the materials should be welded or not. As to the licensing of welders, it is simply a term, meaning qualification. That is a matter to be decided upon by the different people interested in welding. The A. S. M. E. will, of course, treat this matter in the light as it appears to them, and you gentlemen should, I believe, do the same. But I bespeak of this body, your cordial co-operation and support, and assistance in building up a society that can do you a good in this field. In doing that, you will also give yourselves added protection against what has been mentioned here to-day as unsatisfactory welds—welds of a character that cause you to look upon the problem with a degree of caution that in some instances has been taken as a condemnation. Certainly bad welding should be condemned, and good welding should be commended and extended, so far as it can be without endangering the character of the work that is being turned out.

C. F. Giles (L. & N.): Mr. Downing spoke of the requirements of the National Agreement, with respect to seniority governing the selection of men for doing this class of work, and created some levity, but in my opinion it is a very serious problem that we are dealing with in that respect, and I feel that this Association should go on record as advocating the establishment of the welding art as a separate trade, so that men can be trained for that class of work, and thus remove the embarrassment resulting from having it done by men belonging to the various crafts. It has caused a great deal of dissatisfaction ever since the present National Agreement became effective.

R. W. Bell (I. C.): If I understand the National Agreement correctly, there is nothing in that agreement which says that welding is a preferred job. In the matter of welding, you can select your men, and we do select our men as to merit and ability from the different crafts.

H. M. Curry (N. P.): I agree fully with what Mr. Giles says. On the Northern Pacific Mr. Bell could not put across his program that he just speaks of as being effective on the Illinois Central, and I hope that Mr. Giles' suggestion will be made effective. I am in hearty accord with him. There isn't any occasion for levity about the proposition. We are confronted with a mountain of trouble in connection with it, and my thought in making any remarks at all is, whether this is the proper time and place to consider a situation that must eventually be changed.

The motion that the paper be received and printed was put to a vote, and unanimously carried.

Report on Specifications and Tests for Materials

THE COMMITTEE SUBMITS its report covering the different subjects which were reviewed during the past year, with recommendations as shown under the respective exhibits. All references to page number relate to the 1917-18 Proceedings of the Master Mechanics' Association or to the 1918 Proceedings of the Master Car Builders' Association:

Exhibit A.—Specifications for Steel Tires, page 221, M. M., to be modified as shown in Exhibit *A* and adopted as Recommended Practice.

Exhibit B.—Specifications for Boiler and Fire Box Steel for Locomotive Equipment, page 244, M. M., to be modified as shown in Exhibit *B* and adopted as Standard.

Exhibit C.—Specifications for Lined Journal Bearings, page 1033, M. C. B., to be modified as shown in Exhibit *C* and adopted as Recommended Practice.

Exhibit D.—Specifications for Annealed and Unannealed Carbon Steel Axles, Shafts and other Forgings, page 254, M. M., to be modified as shown in Exhibit *D* and adopted as Recommended Practice.

Exhibit E.—Specifications for Solid Wrought Carbon Steel Wheels, page 239, M. M., to be modified as shown in Exhibit *E* and adopted as Standard.

Exhibit F.—Specifications for Bronze Bearings for Locomotives, page 304, M. M., to be modified as shown in Exhibit *F* and adopted as Recommended Practice.

Exhibit G.—Specifications for Carbon Steel Axles for Cars, Locomotive Tenders and Engine Trucks, page 229, M. M., to be modified as shown in Exhibit *G* and adopted as Standard.

Exhibit H.—Specifications for Solid Staybolt Iron, page 317, M. M., to be modified as shown in Exhibit *H* and adopted as Recommended Practice.

Exhibit I.—Specifications for Hollow Staybolt Iron—New Specification to be presented as shown in Exhibit *I* and adopted as Recommended Practice.

Exhibit J.—Specifications for Tender Tank Hose—New Specifications. To be presented as shown in Exhibit *J* and adopted as Recommended Practice.

Exhibit A—Tires, Steel—Locomotives and Cars

RECOMMENDED PRACTICE

PROPOSED FORM

1. **Classes**—(a) These specifications cover three classes of tires.
(b) The purposes for which these classes are frequently used are as follows:
Class A, for driving tires for passenger locomotives;
Class B, for driving tires for freight locomotives and tires for locomotive-truck, tender-truck, trailer and car wheels, and miscellaneous service;
Class C, for driving tires for switching locomotives.

I—MANUFACTURE

2. **Process**—(a) The steel shall be made by the open-hearth or electric process.

II—CHEMICAL PROPERTIES AND TESTS

3. **Chemical Composition**—The steel shall conform to the following requirements as to chemical composition:

Carbon:	Per cent
Class A	0.50—0.70
Class B	0.60—0.80
Class C	0.70—0.85
Manganese	0.50—0.75
Phosphorus	not over 0.05
Sulphur	not over 0.05
Silicon	0.15—0.35

4. **Ladle Analyses**—An analysis of each melt of steel shall be made by the manufacturer to determine the percentages of carbon, manganese, phosphorus, sulphur and silicon. This analysis shall be made on drillings taken at least ¼ in. beneath the surface of a test ingot taken during the

pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative and shall conform to the requirements specified in Section 3.

5. **Check Analyses**—Analyses to represent each melt may be made by the purchaser from turnings taken from a tire or from a tension test specimen, if the tension test is specified. The chemical composition thus determined shall conform to the requirements specified in Section 3.

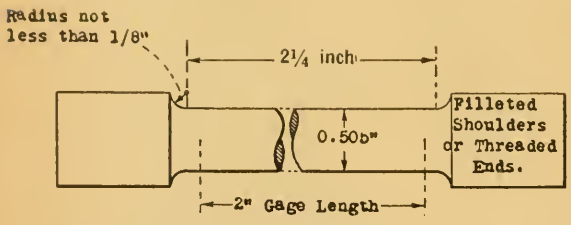
III—Physical Properties and Tests

6. **Tension Tests**—If tension tests from representative bars in accordance with Section 7 are specified by the purchaser, the tensile properties shown shall conform to the following minimum requirements:

	Class A	Class B	Class C
Tensile strength, lb. per sq. in.	105,000	115,000	125,000
Elongation in 2 in., per cent	12	10	8
Reduction of area, per cent	16	14	12

7. **Tension-Test Specimens**—(a) The tension-test specimen representing each melt shall be taken from a test ingot taken during the pouring of the melt, and shall have received approximately the same amount of work as the tires which it represents.

(b) The specimens shall conform to the dimensions shown in Fig. 1. The ends shall be of a form to fit the holders of the testing machine in such a way that the load shall be axial.



8. **Number of Tests**—(a) If specified by the purchaser, one tension test shall be made from each melt.

(b) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(c) If the percentage of elongation of any test specimen is less than that specified in Seciton 6 and any part of the fracture is more than ¾ in. from the center of the gage length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

9. **Retests**—If the results of the tension test for any melt do not conform to the requirements of Section 6, a retest may be made on a specimen cut from a tire of the same melt furnished at the expense of the manufacturer. This retest shall give results conforming to the requirements of Section 6.

IV—Mating

10. **Mating**—The tires shall be grouped as to outside diameters and shipped in sets.

V—Permissible Variations in Dimensions

11. **Permissible Variations**—Tires may be furnished with all surfaces as rolled, and shall conform to the dimensions specified within the following permissible variations:

(a) The height of flange shall not be less, but may be $\frac{1}{32}$ in. more than that specified.

(b) The thickness of flange shall not vary more than $\frac{1}{32}$ in. from that specified.

(c) The radius of throat shall not vary more than ⅛ in. over nor more than $\frac{1}{32}$ in. under that specified.

(d) The width of tire shall not vary more than ⅛ in. over nor more than $\frac{1}{32}$ in. under that specified.

(e) The rough inside diameter shall not be more, but may be ¼ in. less than that specified. When finished inside diameter only is specified, the rough diameter shall be from $\frac{1}{32}$ in. to $\frac{1}{16}$ in. less than this diameter.

(f) Unless otherwise specified, the outside diameter when 54 in. or under shall not be less, but may be ½ in. more than that specified; and when over 54 in. shall not vary more than ⅛ in. under nor more than ⅜ in. over that specified.

(g) The tires shall be furnished in sets and the variation in outside diameters in each set shall not exceed $\frac{1}{32}$ in. for tires 33 in. or under in outside diameter, nor exceed $\frac{3}{32}$ in. for tires over 33 in. in outside diameter.

(h) Tires shall not be out of round more than $\frac{1}{32}$ in. for tires 33 in. or under in outside diameter, nor more than $\frac{3}{32}$ in. for tires over 33 in. in outside diameter.

VI—Finish

12. **Finish**—The tires shall be free from injurious defects and shall have a workmanlike finish.

VII—Marking

13. **Marking**—The name or brand and serial number of the manufacturer shall be legibly stamped on the tire close to the inside edge, where they will not be removed at the last turning. Set numbers shall be legibly stenciled on each tire.

VIII—Inspection and Rejection

14. **Inspection**—The inspector representing the purchaser shall have free entry at all times while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the tires ordered. The manufacturer shall afford the inspector, free of charge, all reasonable facilities to satisfy him that the tires are being furnished in accordance with these specifications. Unless otherwise specified, all tests (except check analyses) and inspection shall be made at the place of manufacture prior to shipment.

15. **Rejections**—Tires which show injurious defects while being finished by the purchaser will be rejected, and the manufacturer shall be notified.

16. **Rehearing**—Samples tested in accordance with Section 5, which represent rejected tires, shall be preserved for two weeks from the date of the test report.

Exhibit B—Steel, Boiler and Fire-Box, for Locomotive Equipment

Standard

Proposed Form

1. **Scope**—These specification cover two grades of steel for boilers for locomotives, namely: flange and fire box.

I—Manufacture

2. **Process**—Unchanged.

II—Chemical Properties and Tests

3. **Chemical Compositions**—Manganese range for fire-box steel changed from .30—.50 per cent to .30—.60 per cent.

4. **Ladle Analyses**—No essential change.

5. **Check Analyses**—No essential change.

III—Physical Properties and Tests

6. **Tension Tests**—Unchanged.

7. **Modification in Elongation**—(a) For material over ¾ in. in thickness, a deduction of 0.5 from the percentage of elongation specified in Section 6 (a) shall be made for each increase of ¼ in. in thickness above ¾ in.

(b) For material ¼ in. or under in thickness, the elongation shall be measured on a gage length of 24 times the thickness of the specimen.

8. **Bend Test**—The test specimen shall bend cold through 180 deg. without cracking on the outside of the bent portion, as follows: For material 1 in. or under in thickness, around a pin the diameter of which is equal to the thickness of the specimen; and for material over 1 in. in thickness, around a pin the diameter of which is equal to twice the thickness of the specimen.

9. **Homogeneity Test**—Unchanged, but specified for fire-box steel.

10. **Test Specimen**—(a) Tension test specimens shall be taken longitudinally from the bottom of the finished rolled material, and bend test specimens shall be taken transversely from the middle of the top of the finished rolled material. The longitudinal test specimen shall be taken in the direction of the longitudinal axis of the ingot, and the transverse specimens at right angles to that axis.

(b) Tension and bend test specimens shall be of the full thickness of material as rolled, and shall be machined to the form and dimensions shown in Fig. 1 (unchanged), except that bend test specimens may be machined with both edges parallel.

11. **Number of Tests**—(a) One tension and one bend test shall be made from each plate as rolled. In addition, one homogeneity test shall be made from each fire-box plate as rolled.

(b) If any test specimen shows defective machining or develops flaws, it may be discarded and another specimen substituted.

(c) If the percentage of elongation of any tension test specimen is less than that specified in Section 6 (a) and any part of the fracture is outside the middle third of the gage length, as indicated by scribe scratches marked on the specimen before testing, a retest shall be allowed.

IV—Permissible Variations in Weight and Thickness

12. **Gage**—Unchanged.

13. **Weight**—Unchanged.

V—Finish

14. **Finish**—Unchanged.

VI—Marking

15. **Marking**—(a) The name or brand of the manufacturer, melt or slab number, grade, and the lowest tensile strength for its grade specified in Section 6 (a), shall be legibly stamped on each plate. The melt or slab number shall be legibly stamped on each test specimen.

(b) When specified on the order, plates shall be match-marked as defined in paragraph (c) so that the test specimens representing them may be identified. When more than one plate is sheared from a single slab or ingot each shall be match-marked so that they may all be identified with the test specimen representing them.

(c) Each match mark shall consist of two overlapping circles each not less than 1½ in. in diameter, placed upon the shear lines, and made by separate impressions of a single-circle steel die.

(d) Match-marked coupons shall match with the sheets represented and only those which match properly shall be accepted.

VII—Inspection and Rejection

16. **Inspection**—No essential change.

17. **Rejection**—Unchanged.

18. **Rehearing**—Samples tested in accordance with Section 5, which represent rejected material, shall be preserved for two weeks from the date of test report.

Exhibit C—Bearings, Journal, Lined

Recommended Practice

Proposed Form

1. **Scope**—These specifications cover journal bearings for use on locomotive tenders, passenger train cars and freight train cars.

2. **Manufacture**—Before lining, the brass backs shall be bored and thoroughly tinned in accordance with the best standard practice. The thickness of linings which is desired shall be specified in the order. If it is not specified, linings one-quarter inch thick shall be furnished. After lining, the ends of the bearings shall be made smooth by scraping, filing or machining. They must not be ground or rubbed with abrasive materials.

I—Chemical Properties and Tests

3. **Composition of Back**—

	Per Cent A	Per Cent B
Lead	16 to 24	24 to 30
Tin	5 to 7	4 (min.)
Total of other impurities, maximum	4	3
Copper	67 to 77	63 to 72

Within the ranges permitted, the tin and lead should vary, if at all, in opposite directions, the tin being increased for the lower percentages of lead.

The owner of the equipment on which the bearings are to be used shall specify which class of metal is desired. If he does not do so, metal of Class A shall be furnished.

4. Composition of Lining—

	Per Cent C	D
Tin	3 to 5	0.5 to 1.5
Antimony	8 to 10	.....
Antimony plus tin	12 to 14	3 to 5
Arsenic, maximum	0.2	.....
Total of other impurities, maximum	0.5	0.5
Lead	85 to 88	94 to 96

Metal of Class C is for linings of a nominal thickness over ⅛ in. Metal of Class D is for linings of ⅛ in. or less in nominal thickness. This classification is independent of the composition of the back. Either composition of the back may be used with the composition of lining metal specified for the thickness of lining which is ordered.

5. **Analysis**—The sample for chemical analysis of the shell shall consist of a thorough mixture of equal quantities of fine drillings taken at three points on the bearing, surface metal being discarded. The sample for analysis of the lining shall be taken by scraping the lining, after removing surface metal.

II—Physical Properties and Tests

6. **Tests**—The finished casting representing a lot for acceptance shall be broken, either longitudinally or transversely, or both, in order to ascertain the uniformity of the grain of the metal. When this fracture shows separation or imperfect mixing of component parts or dross or dirt spots, the lot shall be rejected.

7. **Number of Tests**—Unchanged.

III—Permissible Variations

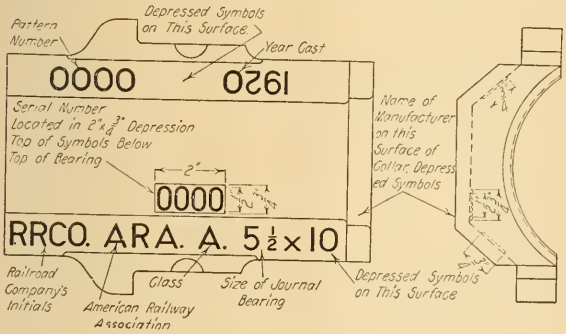
8. **Gaging**—All bearings shall conform to the latest standards of the Mechanical Section of the American Railroad Association, with respect to form and dimensions and variations therefrom.

IV—Finish

9. **Finish**—Unchanged.

V—Marking

10. **Marking**—Each lot of 300 or less shall bear a serial number, commencing with one at the beginning of the year and continuing consecutively until the end of the year, at each manufacturer's plant. The bearings shall be cast with marks as shown in Fig. 1.



VI—Inspection and Rejection

11. **Inspection**—Unchanged, except last sentence, which reads: "Such tests shall show the material to conform to Sections 3, 4, 5 and 6."

12. **Rejection**—Unchanged.

13. **Rehearing**—Samples tested in accordance with Section 11-(b), which represent rejected material, shall be preserved for 14 days from date of test report.

Exhibit D—Axles, Shafts and Other Forgings, Annealed and Unannealed

Recommended Practice

PROPOSED FORM

1. **Scope**—(a) These specifications cover two classes of forgings, distinguished, respectively, as "Medium" and "Mild." Medium forgings are intended for the important large forged parts of locomotives, such as axles, rods, rod straps, pins, guides, etc. Mild forgings are to be used only where so ordered, for parts of minor importance, and those which are to be case-hardened, etc.

(b) The manufacturer may, at his option, furnish annealed forgings when unannealed forgings are specified by the purchaser, provided they conform to the requirements specified for unannealed forgings.

(c) Unless otherwise specified, annealed material shall be furnished for medium forgings. All axles over 6 in. in diameter at center shall be annealed. Mild forgings may be furnished unannealed unless otherwise specified.

I—Manufacture

2. **Process**—The steel may be made by the open-hearth or electric process.

3. **Prolongation for Test**—The manufacturer and the purchaser shall agree upon forging on which a prolongation for test purposes shall be provided.

4. **Annealing**—(a) For annealing, the forgings shall be allowed to become cold after forging. They shall then be uniformly reheated to the proper temperature to refine the grain (a group thus reheated being known as an annealing charge) and allowed to cool uniformly.

(b) Material ordered to these specifications must under no circumstances be quenched.

II—Chemical Properties and Tests

5. **Chemical Composition**—The steel shall conform to the following requirements as to chemical composition:

	Medium forgings	Mild forgings
Carbon	0.38—0.52	0.08—0.18 per cent
Manganese	0.40—0.70	Max. 0.55 per cent
Phosphorus	Max. 0.05	Max. 0.05 per cent
Sulphur	Max. 0.05	Max. 0.05 per cent

6. **Ladle Analyses**—An analysis of each melt of steel shall be made by the manufacturer to determine the percentages of carbon, manganese, phosphorus, sulphur and silicon. This analysis shall be made on drillings taken at least ¼ in. beneath the surface of a test ingot taken during the pouring of the melt. The chemical composition thus determined shall be reported to the purchaser or his representative and shall conform to the requirements specified in Section 5.

7. **Check Analyses**—Analyses may be made by the purchaser from a forging representing each melt, which shall conform to the requirements specified in Section 5. Drillings for analysis may be taken from the forging or from a full-sized prolongation of the same, at any point midway between the center and surface, or turnings may be taken from a test specimen.

III—Physical Properties and Tests

8. **Tension Tests**—(a) Medium forgings shall conform to the following minimum requirements as to tensile properties:

For forgings whose maximum outside diameter or over all thickness is not over 12 in. when unannealed and not over 20 in. when annealed.

Unannealed

Size, outside diameter or over all thickness	Tens. str., lb. per sq. in.	Yield point, lb. per sq. in.	Elongation in 2 in., per cent Inverse ratio	Elongation in 2 in., per cent Not under	Reduction of area, per cent Inverse ratio	Reduction of area, per cent Not under
Not over 8 in.	75 000	0.5 tens. str.	1 600 000 tens. str.	18	2 200 000 tens. str.	24
Over 8 to 12 in., inclusive	75 000	0.5 tens. str.	1 500 000 tens. str.	17	2 000 000 tens. str.	22

Annealed

Not over 8 in.	80 000	0.5 tens. str.	1 800 000 tens. str.	20	2 800 000 tens. str.	32
Over 8 to 12 in., inclusive	80 000	0.5 tens. str.	1 725 000 tens. str.	19	2 640 000 tens. str.	30
Over 12 to 20 in., inclusive	80 000	0.5 tens. str.	1 650 000 tens. str.	18	2 400 000 tens. str.	28

(b) The classification by size of the forging shall be determined by the specified diameter or thickness which governs the size of the prolongation from which the test specimen is taken.

(c) Mild forgings of all sizes shall conform to the following minimum requirements as to tensile properties:

Tensile strength, lb. per sq. in.	47,000
Yield point	0.5 tensile strength
Elongation in 2 in., per cent	30
Reduction of area, per cent	45

(d) The yield point shall be determined by the drop of the beam of the testing machine, the speed of the cross head of the machine not exceeding ¼ in. per minute. For the determination of tensile strength the speed shall not exceed 1½ in. per minute.

(e) Tests of annealed forgings shall be made only after final annealing.

9. **Tension Test Specimens**—No essential change.

10. **Number of Tests**—Unchanged except:

(c) Sections 9 and 10 changed to Sections 8 and 9.

(e) Section 9 (a) changed to Section 8.

11. **Retest**—(a) Reference to Section 11 changed to Section 10.

(b) When annealed forgings are specified, if the fracture of any tension test specimen shows over 15 per cent crystalline, a second test shall be made. If the fracture of the second specimen shows over 15 per cent crystalline, the forgings represented by such specimens shall be reannealed.

IV—Workmanship and Finish

12. **Workmanship**—The forgings shall conform to the size and shapes specified by the purchaser. When centered, 60 deg. centers shall be used with large diameter or countersink not less than ⅞ in., and with clearance drilled ½ in. deep.

13. **Finish**—Unchanged.

V—Marking

14. **Marking**—Unchanged.

VI—Inspection and Rejection

15. **Inspection**—Unchanged except for the elimination of paragraph (c).

16. **Rejection**—Forgings which show injurious defects while being finished by the purchaser will be rejected and the manufacturer shall be notified.

17. **Rehearing**—Samples tested in accordance with Section 15 (b), which represent rejected forgings, shall be preserved for two weeks from the date of test report.

Exhibit E—Wheels, Solid Wrought Carbon Steel

Standard

PROPOSED FORM

1. **Scope**—These specifications cover all solid wrought carbon steel wheels for locomotives and cars.

I—Manufacture

2. **Process**—The steel shall be made by the open-hearth or electric process.

II—Chemical Properties and Tests

3. **Chemical Composition**—Unchanged.

4. **Ladle Analyses**—No essential change.

5. **Check Analyses**—No essential change.

III—Tolerances

6. Tolerances—(a) Wheels should be furnished rough-bored and with faced hubs, and have a contour of tread and flange as rolled or machined according to Figure Sheet A. R. A. 16A. They should conform to dimensions specified within the following tolerances: (Unchanged except as shown below.)

(b) The limit of wear groove to be located as shown on Sheet A. R. A. 16A.

(j) The hub may be either 10 in. or 11 in. in diameter, as specified, for car and tender wheels and outside hub of engine-truck wheels and 13½ in. and 15 in. in diameter for inside hubs on engine-truck wheels. Maximum variation of ⅛ in. below. The thickness of the wall of the finished bored hub shall not vary more than ⅜ in. at any two points on the same wheel.

(l) The depression of the hub must be made so that the distance from the outside face of the hub to the line "AB" shall not exceed 1⅛ in. for wheels used on 5½ in. axles and under, and 1⅞ in. for wheels used on 6 by 11 in. axles, as shown on Sheets A. R. A. 25, 25A, and 25B. For engine-truck wheels the distance from the inside face of the hub to the line "AB" shall not be less than 3⅛ in.

(l) Gages and tapes used shall be A. R. A. Standard or Recommended Practice, as follows:

Wheel circumference measure	A. R. A. Sheet 16-B.
Maximum flange thickness gage	A. R. A. Sheet 16.
Minimum flange thickness gage	A. R. A. Sheet 16.
Rotundity gage	A. R. A. Sheet 16-A.
Gage for measuring service metal	A. R. A. Sheet C-1.
Plane gage	A. R. A. Sheet 16-A.

IV—Branding

7. Branding—The name or brand of the manufacturer, date and manufacturer's serial number shall be legibly stamped on each wheel, also purchaser's initials and serial number, if specified, in accordance with Sheet A. R. A. C2. The tape size shall be legibly marked on each wheel.

V—Finish

8. Finish—Unchanged.

VI—Inspection

9. Inspection—(a), (b) and (c) unchanged.

(d) Wheels which show injurious defects while being finished by the purchaser shall be rejected, and manufacturer promptly notified.

(e) Samples tested in accordance with Section 5, which represent rejected wheels, shall be preserved for two weeks from the date of test report.

(f) The initials and serial number of the purchaser, referred to in Section 7, shall be obliterated from all rejected wheels in the presence of the inspector.

Exhibit F—Bearings, Bronze, for Locomotives

Recommended Practice

PROPOSED FORM

1. Scope—Unchanged.

I—Chemical Properties and Tests

2. Chemical Composition—The material shall conform to the following requirements as to chemical composition:

	Phosphor bronze	Hard bronze	Medium bronze	Soft bronze
Copper, not over, per cent.	82	80	77	69
Tin, not less, per cent.	8	8	7	4
Phosphorus, per cent.	0.4—1	0—0.1	0.2—0.6	.....
Lead, per cent.	8—13	10—15	14—20	26—33
Other elements and impurities, not over, per cent.	1	1	1	1

3. Analyses—Unchanged.

II—Physical Properties and Tests

4. Tests—The casting representing a lot for acceptance shall be broken through the center and parallel with the longitudinal axis of the bearing in order to ascertain the uniformity of the grain of the metal. When this fracture shows separation or imperfect mixing of component parts, or dross or dirt spots, the lot shall be rejected.

5. Number of Tests—One sample may be taken for chemical analyses from each lot of 5,000 lb. or less. One casting may be taken for fracture test from each lot of 100 castings or less.

III—Permissible Variation

6. Gaging—Unchanged.

IV—Finish

7. Finish—Unchanged.

V—Marking

8. Marking—Each lot of 100 castings or fraction thereof shall bear a serial number, commencing with 1 at the beginning of the year and continuing consecutively until the end of the year. All bearings shall also have cast on them the manufacturer's initials or trade-mark, the pattern number, and such other marks as are shown on the drawings.

VI—Inspection and Rejection

9. Inspection—Paragraph (c) eliminated.

10. Rejection—Material which, subsequent to above tests at the mills or elsewhere, and its acceptance, shows any defects shall be rejected and shall be replaced at the expense of the manufacturer.

11. Rehearing—Samples tested in accordance with Section 9-(b), which represent rejected material, shall be held for fourteen days from date of test report.

Exhibit G—Axles, Carbon Steel, for Cars, Locomotive Tenders and Engine Trucks

Standard

PROPOSED FORM

1. Scope—(a) These specifications cover axles up to and including those 6½ in. in diameter at the center. Axles over 6½ in. in diameter at the center shall be purchased under the latest issue of the Specifications for Annealed Carbon Steel Axles, or Specifications for Quenched and Tempered Alloy Steel Axles.

(b) Axles up to and including those 6 in. in diameter at the center may be unnealed, but all axles over 6 in. in diameter at the center shall be annealed.

I—Manufacture

2. Process—(a) Steel shall be made by the open-hearth or electric process.

(b) All axles over 6 in. in diameter at the center shall be annealed by allowing the finished forgings to become cold after forging, then uniformly reheating to the proper temperature to refine the grain, and allowing to cool uniformly.

II—Chemical Properties and Tests

3. Chemical Composition—The steel shall conform to the following requirements as to chemical composition:

Carbon, per cent.	0.38 0.52
Manganese, per cent.	0.40 0.70
Phosphorus, not over, per cent.	0.05
Sulphur, not over, per cent.	0.05

4. Ladle Analyses—No essential change.

5. Check Analyses—Analyses may be made by the purchaser from one axle representing each melt. The chemical composition thus determined shall conform to the requirements specified in Sction 3. The drillings for these analyses shall be from one end of test axle at any point midway between the center and surface, using a ⅝ in. drill.

III—Physical Properties and Tests

6. Drop Tests—(a) The test axle shall be so placed on supports 3 ft. apart that the tup will strike it midway between the ends. It shall stand without fracture five blows from a tup of 2,240 lb. falling from a height H, such that H in fect equals the square of the diameter of the axle at the center in inches, $H = d^2$. The axle shall be turned through 180 deg. after the first and third blows.

(b) The permanent set produced by the first blow shall not exceed that given by the following formulas, in which L = length of axle in inches and d = diameter of axle at center in inches.

For axles over 65 in. in length:

$$\frac{L}{1.9d} - \frac{d}{2} + \frac{1}{2} \text{ in.} \quad (1)$$

For axles 65 in. or under in length:

$$\frac{L}{1.9d} - \frac{d}{2} + 1 \text{ in.} \quad (2)$$

(c) The American Railway Association has adopted five standard sizes of axles, the requirements for which, based on the above formula (1), are given in the following table:

Size of journal, in.	Diameter of axle at center, in.	Length of axle, in.	Height of drop,	Number of blows	Maximum permanent set, in.
3¼ by 7	4½	83¼	18	5	8¾
4¼ by 8	4¾	84¼	22½	5	7½
5 by 9	5⅜	86½	29	5	6¼
5½ by 10	5⅞	88½	34½	5	5½
6 by 11	6⅛	90¾	41½	5	4¾

(d) The maximum permanent set is the difference between the distance from a straight edge to the middle point of the axle, measured before the first blow, and the distance measured in the same manner after the blow. The straight edge shall rest only on the collars or the ends of the axle.

(e) The temperature of the test axle shall be between 40° and 120° F.

7. Drop-test Machine—The anvil of the drop-test machine shall be supported on 12 springs, as shown on the A. R. A. drawings, and shall be free to move in a vertical direction, and shall weigh 17,500 lb. The radii of the striking face of the tup and of the supports shall be 5 in.

8. Number of Tests—One drop test shall be made from each melt. The weight of axles offered from any one melt shall not be less than the equivalent of the weight of thirty 6 x 11 in. axles.

IV—Workmanship and Finish

9. Workmanship—Unchanged except for the addition of the following paragraph.

(b) Freight equipment axles, unless otherwise specified, shall have the wheel seats and journals rough turned. Engine truck and passenger car axles to be rough turned all over, except collars. The rough turning to be done with a tool of such shape that the surface is free from ridges and chatter marks.

10. Finish—Unchanged.

V—Permissible Variations and Weights

11. Permissible Variation—The axles shall conform in size and shape to the standard A. R. A. drawings. Length shall not be less than shown and not more than ⅛ in. over. Diameters shall not be less than those shown or more than ⅛ in. over on smooth forged axles, or ⅜ in. over on rough turned portions.

VI—Marking and Storing

12. Marking—Unchanged.

13. Storing—Unchanged.

VII—Inspection and Rejection

14. Inspection—Paragraph (d) eliminated.

15. Rejection—Unchanged.

16. Rehearing—Samples tested in accordance with Section 5, which represent rejected material, shall be preserved fourteen days from date of test report.

Exhibit H—Staybolt Iron, Solid—Locomotives

Recommended Practice

PROPOSED FORM

1. Scope—Unchanged.

I—Manufacture

2. Process—Unchanged.

3. Definition of Terms—Unchanged.

II—Chemical Properties and Tests

4. **Chemical Composition**—Phosphorus requirement eliminated.

III—Physical Properties and Tests

5. **Tension Tests**—Unchanged.
6. **Bend Tests**—(a) and (b) unchanged.
(c) Bend tests may be made by pressure or by blows.
7. **Etch Tests**—Unchanged.
8. **Test Specimens**—Unchanged.
9. **Number of Tests**—Unchanged.

IV—Permissible Variations in Gage

10. **Permissible Variations**—Unchanged.

V—Finish

11. **Finish**—Unchanged.

VI—Marking

12. **Marking**—Unchanged.

VII—Inspection and Rejection

13. **Inspection**—Paragraph (c) eliminated.
14. **Rejection**—Unchanged.
15. **Rehearing**—Samples tested in accordance with Section 13-(b), which represents rejected material, shall be held for fourteen days from date of test report.

Exhibit I—Staybolt Iron, Hollow—Locomotive

Recommended Practice

PROPOSED FORM

I—Manufacture

1. **Process**—The iron shall be rolled from a bloom, slab pile or box pile, made wholly from reworked puddled pig iron or reworked knobbled charcoal iron. The puddle mixtures and the component parts of the bloom, slab pile, or box pile, shall be free from any admixtures of iron scrap or steel.

2. **Definition of Terms**—(a) Bloom is a solid mass of iron that has been hammered into a convenient size for rolling.
(b) Slab Pile—A slab pile is built up wholly of flat bars of iron of the full length of the pile.
(c) Box Pile—A box pile is a pile the sides, top and bottom of which are formed by four flat bars and the interior of which consists of a number of small bars the full length of the pile.
(d) Iron Scrap—This term applies only to foreign or bought scrap and does not include local mill products free from foreign or bought scrap.

II—Chemical Properties and Tests

3. **Chemical Composition**—At the option of the purchaser and when so specified, chemical analysis shall be made, and drillings taken from tension test specimens shall conform to the following requirements as to chemical composition:

Manganese, not over 0.10 per cent.

4. **Check Analyses**—(a) An analysis may be made by the purchaser from a broken tension test specimen representing each lot as specified in Section 10 (a). The chemical composition thus determined shall conform to the requirements specified in Section 3.
(b) Drillings for chemical analysis shall be so taken as to represent the entire cross section of the specimen.

III—Physical Properties and Tests

5. **Tension Tests**—(a) The iron shall conform to the following requirements as to tensile properties:

Tensile strength, lb. per sq. in.	47,000-52,000
Yield point, minimum lb. per sq. in.	0.55 tensile strength
Elongation in 8 in., minimum per cent	28
Reduction of area, minimum per cent	42

(b) The yield point shall be determined by the drop of the beam of the testing machine. The speed of the cross head of the machine shall not exceed ¾ in. per minute. For the tensile strength the speed shall not exceed 4 in. per minute.

6. **Cold-bend Tests**—(a) The test specimen shall bend cold through 180 deg. flat on itself in both directions without fracture on the outside of the bent portion.
(b) Bend tests may be made by pressure or by blows.

7. **Splitting Test**—A piece not less than 3 inches long shall be split open from end to end by driving a drift through the hole. The structure thus exhibited shall be free from signs of imperfect welding and the presence of slag or scale.

8. **Etch Tests***—The cross section of the test specimen shall be ground or polished, and etched for a sufficient period to develop the structure. This test shall show the material to have been rolled from a bloom, slab pile, or box pile, and to be free from steel.

9. **Test Specimens**—All test specimens shall be of the full section of material as rolled.

10. **Number of Tests**—(a) Bars of each size shall be sorted into lots of 100 each. Two bars shall be selected at random from each lot or fraction thereof and tested as specified in Sections 5, 6 and 7, but only one of these bars shall be tested as specified in Sections 5 and 8.
(b) If any test specimen from either of the bars originally selected to represent a lot of material contains surface defects not visible before testing but visible after testing, or if a tension test specimen breaks outside the middle third of the gage length, the individual bar shall be rejected, and one retest from a different bar will be allowed.

IV—Permissible Variations in Gage

11. **Permissible Variations**—The bars shall be truly round within 0.01 in., and shall not vary more than 0.01 in. above nor more than 0.005 in. below the specified size.

*A solution of two parts water, one part concentrated hydrochloric acid, and one part concentrated sulphuric acid is recommended for the etch test.

V—Finish

12. **Finish**—The bars shall be smoothly rolled and free from slivers, depressions, seams, crop ends, and evidences of being burnt. The hole shall be as nearly axial and as nearly round as the best manufacturing practice permits, and shall have an area equivalent to that of a round hole ⅞ in. in diameter. The hole shall be free from slag and other obstructions.

VI—Marking

13. **Marking**—The bars shall be stamped or marked with the name or brand of the manufacturer.

VII—Inspection and Rejection

14. **Inspection**—(a) The inspector representing the purchaser shall have free entry at all times, while work on the contract of the purchaser is being performed, to all parts of the manufacturer's works which concern the manufacture of the material ordered. The manufacturer shall afford the inspector, free of charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications. Tests and inspection at the place of manufacture shall be made prior to shipment.
(b) The purchaser may make the tests to govern the acceptance or rejection of material in his own laboratory or elsewhere. Such tests, however, shall be made at the expense of the purchaser.

15. **Rejection**—(a) If either of the test bars selected to represent a lot does not conform to the requirements specified in Sections 3, 5, 6, 7 or 8, the lot will be rejected.
(b) Bars which will not take a clean, sharp thread, with dies in fair condition, or which develop defects in forging or machining, will be rejected, and the manufacturer shall be notified.

16. **Rehearing**—Samples tested in accordance with Section 4-(a), which represent rejected material, shall be held for fourteen days from the date of test report.

Exhibit J—Tender Tank Hose

PROPOSED FORM

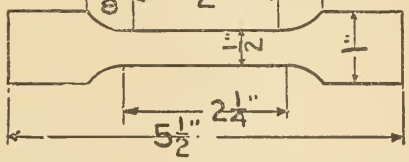
1. **Scope**—This specification covers non-collapsible corrugated suction hose for connections between locomotives and tender tanks.

2. **Classification**—These specifications cover two classes of hose, known as "A" and "B." Class "A" shall meet all the requirements of the specifications. Class "B" shall meet all the requirements of the specifications, with the exception of the requirements for the digester test.

3. **Construction**—(a) The hose shall be made up of the following parts, assembled in the order named:

Inner tube of rubber.
Two piles of frictioned cotton duck.
Helical reinforcement of wire.
Layer of rubber 0.07 in. thick.
Two piles of frictioned cotton duck.
Outer cover of rubber.

(b) The inner tube shall not be less than 0.07 in. thick, of a composition of rubber adapted to resist the action of hot water. It shall be smooth, uniform in quality and thickness and free from injurious defects.
(c) The cotton duck shall weigh not less than 18 ounces per lineal yard for material 40-in. wide. It shall be evenly woven from a high-grade cotton and shall be free from mechanical defects. It shall be well frictioned with rubber on both sides, and in addition shall have a distinct layer of rubber on both sides, readily visible when the finished hose is cut open. The frictioned fabric shall be applied on the bias, with the edges lapped at least ½ in., but not sewed. The fabric shall be of such quality and so applied as to produce a hose of maximum flexibility consistent with meeting the requirements of this specification.
(d) The helical reinforcement shall be of thoroughly galvanized No. 9 B. W. G. (0.148 in.) spring steel wire. It shall be wound with not over 1-in. pitch throughout the length of the hose, up to a point distant from each end as shown on the drawings, or order, or for a distance equal to the length of the nipple used. At this point the wire shall be turned to a straight line parallel with the axis of the hose and shall extend to a point 1 in. from the ends of the hose.
(e) The intermediate layer of rubber shall not be less than 0.07 in. thick, and shall be carefully formed around the wire and securely frictioned to the duck.
(f) The cover shall be at least 0.07 in. thick of a composition of rubber adapted to resist the action of heat, abrasion and of the weather. It



shall be smooth and uniform in quality and thickness and free from injurious defects.
(g) At each end of the hose there shall be an extra ply of duck extending 3 in. beyond the length of the nipple.
(h) The dimensions of the finished hose shall be as shown on the order or drawings. A tolerance of ¼ in. either way in length, and $\frac{1}{32}$ in. either way in inside diameter will be allowed.

4. **Tests**—(a) Bend Test—Test samples will be bent 180 deg. until the two ends are parallel. The diameter of the inside of the bend shall be equal to three times the nominal inside diameter of the hose. The hose when bent in this position shall show no kinking.
(b) Digester Test—This sample will then be cut into two pieces, one of which will be tested in its original condition, and the other will be placed in a closed digester and surrounded with dry saturated steam at 45 lb. pressure continuously for a period of 48 hours. It will then be allowed to cool for a period of 12 to 24 hours, and will be tested as specified immediately afterwards. As a result of the heating, the hose shall not develop any blisters, or loosening of any parts.
(c) Friction Test—A 1-in. section shall be taken from any part of the hose so that one wire passes along the center. This section shall be cut open and flattened out and the friction determined between the tube and canvas, between the two layers on each side of the wire, between any two layers of canvas and between the canvas and cover.
One end of this piece shall be held in a suitable clamp of a spring balance, or pendulum type testing machine, and the different plies stripped off and pulled back 180 deg. to their original position, at the rate of 20 in. per minute. Readings shall be made every five seconds for at least four readings for each ply and the average shall represent its friction.

For Class "A" hose the friction of any ply shall not be less than 18 lb. before steaming and not less than 15 lb. after steaming.

For Class "B" hose the friction of any ply shall not be less than 18 lb.

(d) Permanent Set—From the unsteamed tube and cover test pieces will be cut by means of a steel die, in accordance with Fig. 1, and will be stretched 2 in. to 5 in., held in this condition for one minute, released, and after resting for one minute the permanent set will be measured. This set shall not exceed 0.25 in

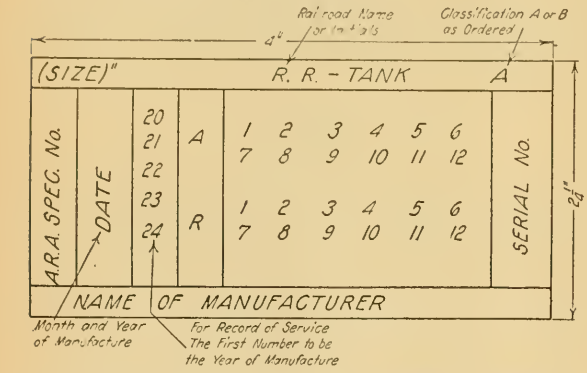
(e) Tensile Test—From both the unsteamed and the steamed tube and cover, tensile test pieces will be cut by means of a steel die, in accordance with Fig. 1. Marks 2 in. apart will be placed on the pieces which will then be placed in a suitable tensile testing machine, whose cross-head moves at the rate of 20 in. per minute. The tensile strength and ultimate elongation of both tube and cover shall be as follows, the area of each test piece being calculated from the dimensions after stripping from the canvas:

	Unsteamed	Steamed
Tensile strength, minimum lb. per sq. in.....	600	450
Ultimate elongation at rupture minimum, 2 in. to	6	4
Ultimate elongation at rupture, maximum, 2 in. to	10	8

5. Number of Tests—For each 200 pieces, or smaller lot of hose ordered, one extra piece will be furnished, and from each such lot one piece shall be taken at random for test to determine the disposition of the lot.

6. Marking—Each piece of hose shall have vulcanized on it a label of red rubber in accordance with Fig. 2. The letters and figures shall be clear and distinct and at least $\frac{1}{16}$ in. in relief.

Each piece of each test lot of hose shall carry a serial number as a part of the label. Serial numbers shall begin with one on the first of each year, and for the product of each manufacturer. If a serial of hose is rejected the serial number shall not be repeated.



7. Inspection—(a) The manufacturer shall afford the inspector, free of charge, all reasonable facilities to satisfy him that the material is being furnished in accordance with these specifications.

(b) The purchaser may make tests and inspection to govern the acceptance or rejection of the material, at his own laboratory or elsewhere. Such tests and inspections shall be made at the expense of the purchaser.

8. Rejection—Material which, subsequent to acceptance tests, shows injurious defects will be rejected. Material tested elsewhere than at the mill, failing to meet these specifications, will be rejected and shall be replaced by the manufacturer at his own expense.

9. Rehearing—Samples tested in accordance with this specification, which represent rejected material, shall be preserved for fourteen days from date of test report.

Supplementary Report

At the last convention the committee was instructed to consider the "proper fibre stress to be employed in the design of helical springs for different diameters of steel wire from ½ in. to 1½ in. diameter. The ordinary spring table calls for 80,000 lb. throughout for all sizes, but it is well known that this is not the manufacturers' practice, and in many cases it is impossible to obtain a proper spring with the smaller sizes of wire."

The committee has reviewed available data on the subject and finds a wide divergence of opinion on the question of variations in fibre stress as a function of the diameter of the bar. The committee considers a full investigation of the subject necessary, including experimental work to develop the relations between the fibre stress and diameter, and all collateral data. The opportunity and time allotted has been insufficient to carry out these experiments, and the committee therfore reports progress.

The report was signed by F. M. Waring (Chairman), Pennsylvania; J. R. Onderdonk, Baltimore & Ohio; J. J. Burch, Norfolk & Western; I. S. Downing, Big Four; Frank Zeleny, Chicago, Burlington & Quincy; A. H. Fetters, Union Pacific; H. B. MacFarland, Atchison, Topeka & Santa Fe; H. G. Burnham, Northern Pacific; H. E. Smith, United States Railroad Administration; J. C. Ramage, Southern; L. K. Sillcox, Chicago, Milwaukee & St. Paul, and C. B. Young, United States Railroad Administration.

Discussion

In addition to the printed report, F. M. Waring, chairman of the committee, submitted a mimeographed supplement, dated June 1, 1920, and also the following addition: With the approval of your executive committee, the committee on specifications and tests has coöperated with the American Society for Testing Materials to form a joint committee on steel castings for railroads. The joint committee has held two meetings at which the present specifications have been carefully reviewed and suggestions for new specifications considered. Two subcommittees have been appointed, one to draft the proposed specifications and the other to recommend standard methods for making the tensile tests, with particular reference to the determination of the elastic limit and the yield point.

There are a number of differences of opinion on this subject among both the consumers and the manufacturers that will have to be thoroughly discussed and adjusted. The manufacturers have a very complete representation among the A. S. T. M. appointees on the joint committee and the Committee on Specifications and Tests is being assisted by representatives from your Car Construction and Coupler Committees. Sufficient progress has been made to warrant the belief that the specifications can be prepared during the coming year and submitted to you for your approval at the next convention.

T. H. Goodnow: *I move that the report be received and printed in the proceedings, and submitted to letter ballot. This motion duly seconded and carried.*

Committee on Standards and Recommended Practice

The work of this committee, in conjunction with the Committee on Specifications and Tests for Material, has been confined mostly to the combining of the standards and recommended practices as recorded for the Master Car Builders' Association and the American Railway Master Mechanics' Association and in preparing the Manual in the form that it has been recently furnished.

In the review of these standards and recommended practices, attention was drawn to some duplications and inconsistencies. These were corrected.

Progress only is reported on the subject of standardization of pipe unions, both flat and ball joint type, as to the contour and interchangeability of parts. The executive committee of the American Society of Mechanical Engineers, with which this is being handled, has delayed action until final report has been received on the subject of a universal pipe screw thread.

Safety chains for steel and wooden freight cars have been shown as a recommended practice since 1894 with one revision made in 1904. The present practice of railroads is not to use these chains and the committee recommends that this be submitted to letter ballot for dropping from the records.

The standardized tinware as adopted by the Committee on Standards of the Division of Operation—Mechanical Department, U. S. R. A., varied from the A. R. A. standard in the following details:

(a) No long spout engine oil can was included.

(b) The spout of the hand torch was designed to take 1-in. wicking instead of ¾-in.

(c) The use of a metal fire bucket instead of the fiber bucket as shown was indicated.

(d) Cold-rolled steel of suitable thickness, with joints welded or brazed, was permitted where "IX" bright tin was specified.

The committee recommends that these changes, with the exception of the omitting of the long spout oiler, be submitted to letter ballot.

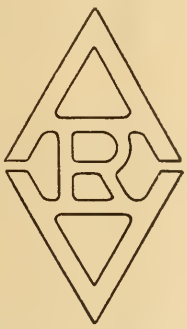
At the request of the A. S. M. E. Boiler Code Committee, a representative was present at the meeting of that society in December, 1919, and took part in the discussion in connection with a report on "Rules for Construction of Boilers of Locomotives Which Are Not Subject to Federal Inspection and Control." This code is based partly on the code for stationary boilers, but comes well within the range of the Interstate Commerce Commission rules. The sub-committee had introduced a

minimum factor of safety of four. There was considerable discussion on the part of some of the members of the Boiler Code Committee in an effort to raise the minimum factor of safety above four. All the representatives in the American Railroad Association expressed themselves as in favor of a minimum factor of safety of four, as that is the I. C. C. factor, and it has been proved by years of experience that with proper inspection and maintenance a factor of safety of three for barrels of locomotive boilers is amply safe and a factor of safety of four gives sufficient leeway for the maximum carelessness in inspection and maintenance that may be encountered.

A member suggests a special designating symbol for "heater box cars." This is a car apparently prepared for local use and therefore your committee does not approve the assigning of a special symbol.

A member suggests the use of a special designating symbol, "TI," for tank cars insulated for handling casing-head gasoline, etc., built under the specification for Class IV Tank Cars and now shown in the "TM" group. The committee recommends the use of the symbol "TMI" for such cars.

Under the instructions of the General Committee, the monogram shown has been prepared as a substitute for the M. C. B. monogram.



Proposed Substitute for the M. C. B. Monogram

To maintain uniformity in the stenciling of cars for the repacking of journal boxes as required by Rule 66, the committee suggests the following addition to the standards on lettering and the necessary changes in the drawings to correspond:

"The word 'Repacked,' together with the date (month, day and year), shop or station abbreviation and railroad reporting marks, to be stenciled in one-inch block letters on each side of the car to the right of center as near the lower edge of the side sill as practical and just to the left of the body bolster."

The report was signed by W. E. Dunham (Chairman), Chicago & North Western; A. R. Ayers, New York, Chicago & St. Louis; A. G. Trumbull, Erie; W. F. Kiesel, Jr., Pennsylvania System; A. R. Kipp, Soo Line; W. J. Robider, Canadian Pacific; J. Hainen, Southern, and C. A. Gill, Baltimore & Ohio.

Discussion

The report was presented by A. R. Ayres (N. Y. C. & St. L.).

Vice-chairman Coleman: This report is now before you for discussion and certain sections will be submitted to letter ballot.

I. S. Downing (C. C. C. & St. L.): I move that the word "day" be eliminated from the last paragraph of this report, and that it show the month and year only. That relates to the repacking of the cars.

(*The motion was duly seconded, put to vote and carried*).

Mr. Downing: Is the monogram shown on the last page of the report to be used by any other section of the American Railroad Association than the Mechanical Section?

Mr. Ayres: That question has not been taken up.

Mr. Downing: I should dislike to see the legend, "M. C. B." dropped from any of our equipment. I think we should continue to be the M. C. B. Section of the American Railroad Association. The Book of Rules of the A. R. A. is a large red book, containing many items, and it also includes the rules of interchange.

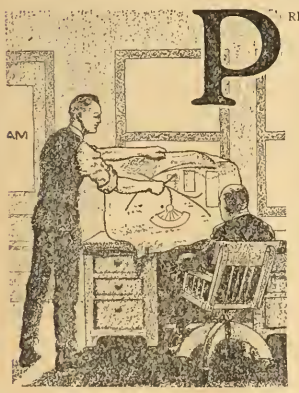
Vice-chairman Coleman: Your idea is to perpetuate the distinction of the "M. C. B." in marking the equipment, as part of the American Railroad Association?

Mr. Downing: Yes.

F. W. Brazier (N. Y. C.): If the convention will kindly wait a little longer I believe there will be a resolution offered to cover that. I do not want to see the name of the M. C. B. go, and I believe there will be a resolution offered on that subject which will meet the approval of the members of the Association.

A motion to accept the report, print it in the proceedings, and submit such parts as necessary to letter ballot was made, seconded and carried.

Report of Committee on Repair Shop Layouts



PRELIMINARY CONSIDERATION of this subject clearly indicated that the efforts of the first year should tend to establish certain basic principles rather than to develop a complete report.

The committee is submitting a tentative shop layout embodying general features, together with general observations on the subject. Criticism is invited which should tend toward the development of complete and specific recommendations in the future. From the progress made so far and the discussions which it is anticipated will follow, there will be currently available considerable information which it is hoped the members of the association will take advantage of in considering their immediate needs and work contemplated.

It was decided in the preliminary layout of a repair shop to submit the general characteristics of a shop with an ultimate 100-car daily output. Such recommendations being submitted in units providing for 25 cars a day, and the expansion program so mapped out that the layout would be expanded in units of 25 cars a day until the ultimate capacity of 100 was reached.

Shop Space Requirements

Some investigations developed the fact that space should be proportioned from the following data:

A—STEEL CAR PLANT

(1) For heavy repairs, 25 steel car spots will turn out from each spot one car every six eight-hour days, or four cars per day.

(2) For medium heavy or heavy light repairs, 25 steel car spots will turn out from each spot one car every three eight-hour days, or eight cars per day.

(3) For light repairs, 50 steel car spots will turn out one car from each spot every eight-hour day, or fifty cars per day.

B—WOOD CAR PLANT

(1) For heavy repairs, 25 wood car spots will turn out from each spot one car every six eight-hour days, or four cars per day.

(2) For medium heavy or light repairs, 25 wood car spots will turn out from each spot one car every three eight-hour days, or eight cars per day.

(3) For light repairs, 50 wood car spots will turn out one car from each spot every eight-hour day, or 50 cars per day.

While the committee provides, in the general plan of the 100-car shop, space for wood cars, and while it is recognized

that for a great many years there will be wood cars to consider and for a considerable time longer steel cars with a certain amount of wood work to be performed, the major part of the committee's considerations are devoted to steel cars.

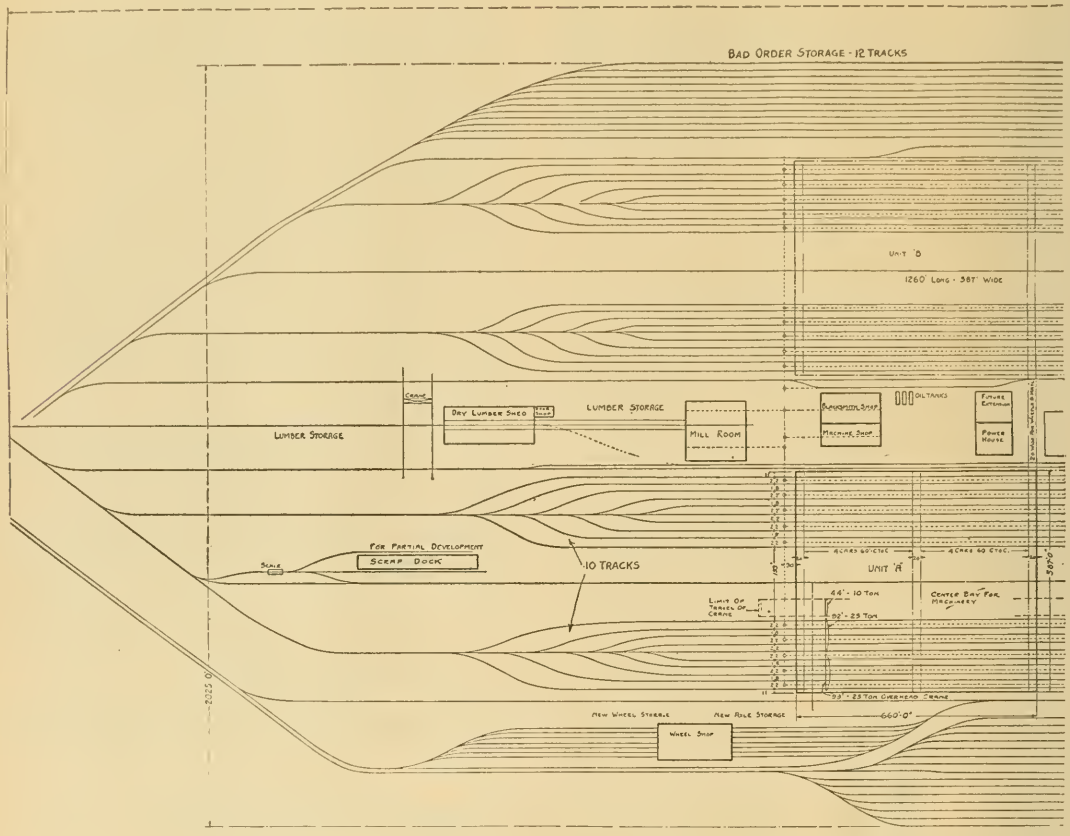
Consideration of the units of measure decided above is invited in order to develop what the actual conditions are over the country as a whole, to what extent they vary for various sections of the country, and as to just why these variations occur. Certain modifications will have to be made ultimately in such specific recommendations as are made should these units of measure vary between considerable limits.

The construction of buildings, when ultimately developed, should be the joint work of the engineering and car shop committee. For the present, it is thought sufficient to conform to buildings which in plan are practically square. Roof construction involves the geographical location of the buildings and their layout relative to the points of the compass. Several alternatives will probably have to be recommended. Building materials are largely construction matters not essential to the general subject other than in final consideration of the cost. The development of the plant and facilities as to capacity, efficiency and economy of operation should first be completed, and construction as reflected in first cost worked out as secondary considerations.

Track spacings, such as shown for larry and service tracks, are believed to be representative. Height of buildings will be largely governed by operations taking place therein and the extent to which cranes are installed. Where cranes are used, a clearance from rail to bottom of crane girder of 22 ft. is suggested. All larry track should be of standard gage with plank between the rails for tractor service.

Gas and electric cutting stations should be considered in general, but specific advantages should be more clearly established before final recommendations are made. The distribution of compressed air is largely one of local preference and conditions, but, with the ultimate capacity of the plant considered, it is deemed advisable to provide several electrically driven air compressors located near points of consumption in preference to two or more large units located at a central point, both on account of economy of distribution and continuity of service.

The question of machine tools is a matter for considerable discussion. The layout of tools and their number as shown is more as a suggestion than a recommendation. In this connection it should be recognized that, up to the present time, the steel-car repair work is carried on largely by machine tools primarily designed for locomotive work and that, no doubt, great economies can be perfected by the design of machine tools specifically adapted to car-repair work.



Proposed Plan of Buildings and Tracks for Freight Car Repair Shops.

The location of cranes and their installation, as shown by the plans of the committee, are recognized as facilities, the installation of which need not be carried on to the maximum point at the time of the initial construction of the shop, but should be provided and installed as conditions indicate their economy.

The report was signed by I. S. Downing (Chairman), Big Four; Geo. Thomson, New York Central; J. J. Tatum, Baltimore & Ohio; C. W. Renner, Pennsylvania; W. J. Robider, Canadian Pacific, and J. C. Fritts, Delaware, Lackawanna & Western.

Discussion

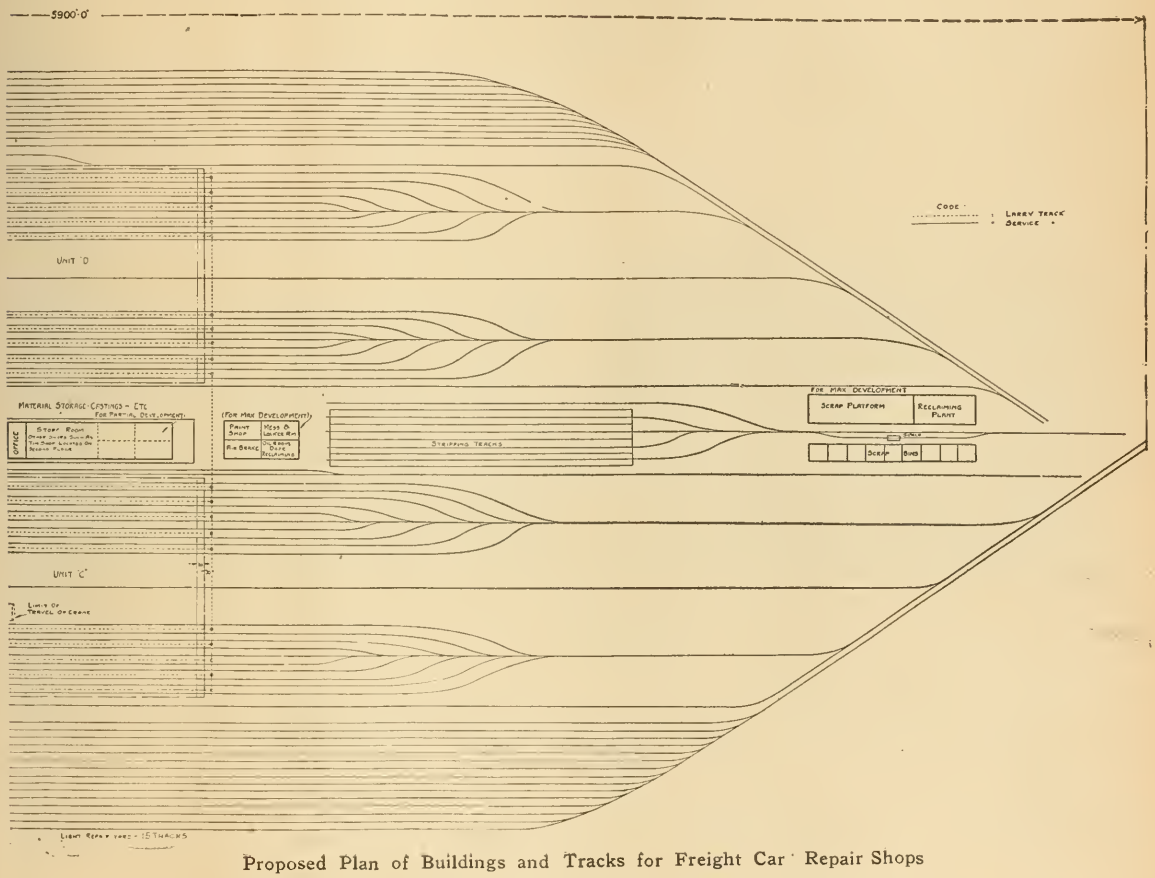
I. S. Downing (C. C. C. & St. L.) presented the report and requested that individual members criticize the layout and

advise the committee of their suggestions. Under the subject of buildings in the last paragraph, it is stated that the construction of buildings, when ultimately developed, should be the joint work of the engineering and car shop committees. Section II has appointed a committee which, I understand, includes the roundhouse. The committee will ask for instructions to work jointly with the committee of Section II. On the last page, we want to call particular attention to the next to the last paragraph, or rather the closing portion of it. Machine tools for steel car work have been manufactured by individual roads, and they are good economical machines, but the other fellow does not find out about them, and if the machine designers and supply men

eral states have passed laws requiring the sheds to be enclosed.

I would like to hear from some of the members, whether they feel that freight car repair work should be done in a shop that is enclosed, or whether sheds are preferable for general work.

F. F. Gaines (Ry. Bd. Adj.): Mr. Fuller has raised a very good question in regard to the matter of shelter. You must cover your repair tracks to a very general extent, because if you do not, you pay your labor and get no result. Men who are compelled to work out in the snow and rain, produce very little work. They are more concerned with their bodily comfort than they are with the work. Also appliances around a repair shop



Proposed Plan of Buildings and Tracks for Freight Car Repair Shops

would get busy and investigate this field and see what we need, they could manufacture tools much more cheaply than we could do it in our own shops. We hope the committee will be continued and instructed to work with this other committee.

A motion was passed that the report be accepted and printed and that the committee be continued.

C. E. Fuller (U. P.): May I ask the committee if this proposed freight car shop is to be an enclosed shop?

Mr. Downing: Yes.

Mr. Fuller: All under cover?

Mr. Downing: Yes.

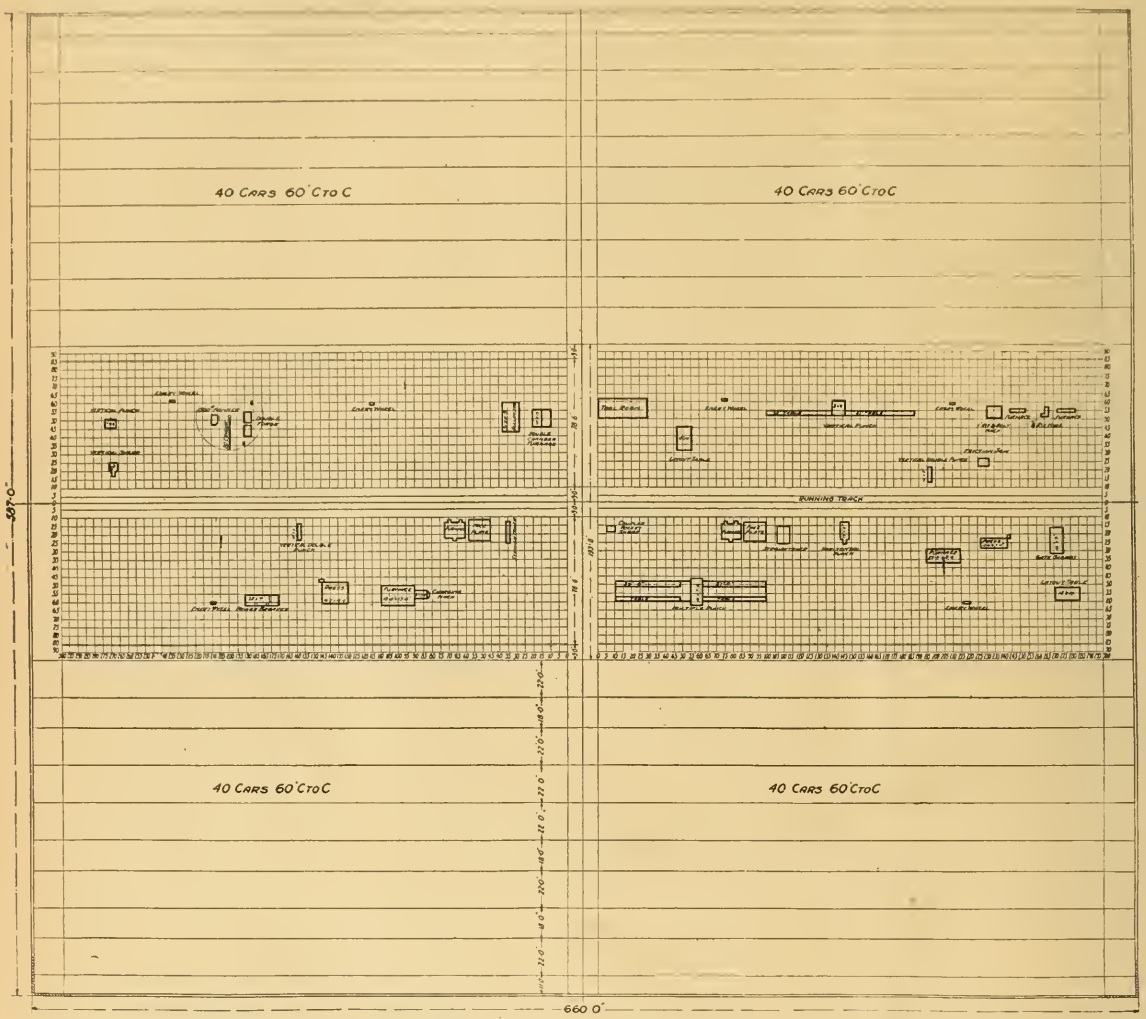
Mr. Fuller: We have members here who represent railroad systems from all parts of our country, in places where it is hot and cold, and places where it rains, and where it does not rain. Our members represent the various sections of the country, with various conditions of climate. There has been a good deal of comment made, pro and con, relative to the advisability of having enclosed shops for freight car work. Sev-

must be selected with the idea of bringing about the greatest possible economy in the handling of material. You must have appliances that will cut down the amount of common labor and facilitate the handling of material. One of the most important items in the layout of the repair shop is the installation of proper crane service. Instead of having a lot of trucks pushed by hand the time has come when we should provide runways between the different departments and install electric trucks to carry material. Another thing that is essential and has a large bearing on this question, is the necessity of providing necessary toilet facilities, good locker rooms, wash rooms, plenty of drinking water, etc. The question as to whether a repair shop should be enclosed or not depends upon the climate. In some places it is only necessary to provide shelter from snow and rain, and in others the repair shop must be closed entirely, and heated in the winter time. When this is done you can get enough extra work out of the men to pay for the extra investment involved. If you can make provisions for a track with gantry crane service and do away with jacking up the cars, it will be a very profitable

investment. It is entirely too expensive to continue to do that work by hand. In a general way, I think the committee should look at the whole thing from the standpoint that we are now paying very high wages, for both skilled and common labor, and everything that will add to the efficiency of the men is important.

C. F. Chambers (C. of N. J.): I am heartily in favor of an enclosed repair shop, where the climatic conditions require it, and further, that it be properly heated, so that a man can work in the winter time with a reasonable amount of clothing on and not be too clumsy. In the southern part of the United States I presume a roof over the repair shop is all that is necessary, as it will shield the shop from rain and snow, but in the north and west you must enclose the building if you expect to do other repairs than putting in couplers and brake beams, or other very rough work. The time has come when you should make the shop the most comfortable place around the plant. If the toilets are more comfortable than the shop itself, the men are inclined to stay in the toilets longer than they will do if the shop itself is at a comfortable temperature.

F. W. Brazier (N. Y. C.): A few years ago many railroad officials thought anything was good enough for the car department. I remember when on the Illinois Central, a certain official said that the car department, in his opinion, did not require any shops. They could repair the cars outdoors. That official never did any work in a repair shop and never worked out under a car when the temperature was 10 or 15 deg. below zero. He was strong for the roundhouse and thought it was necessary to have a roundhouse properly heated, and equipped but for the car shop, anything was good enough. In all sections of the country, the car department needs shops, and they should be enclosed in most cases. Perhaps you do not need enclosed shops in a section like New Orleans, but you need something to protect the men from the heat. In the West and in Canada you require a closed shop, and as Mr. Chambers said, it should be well heated.



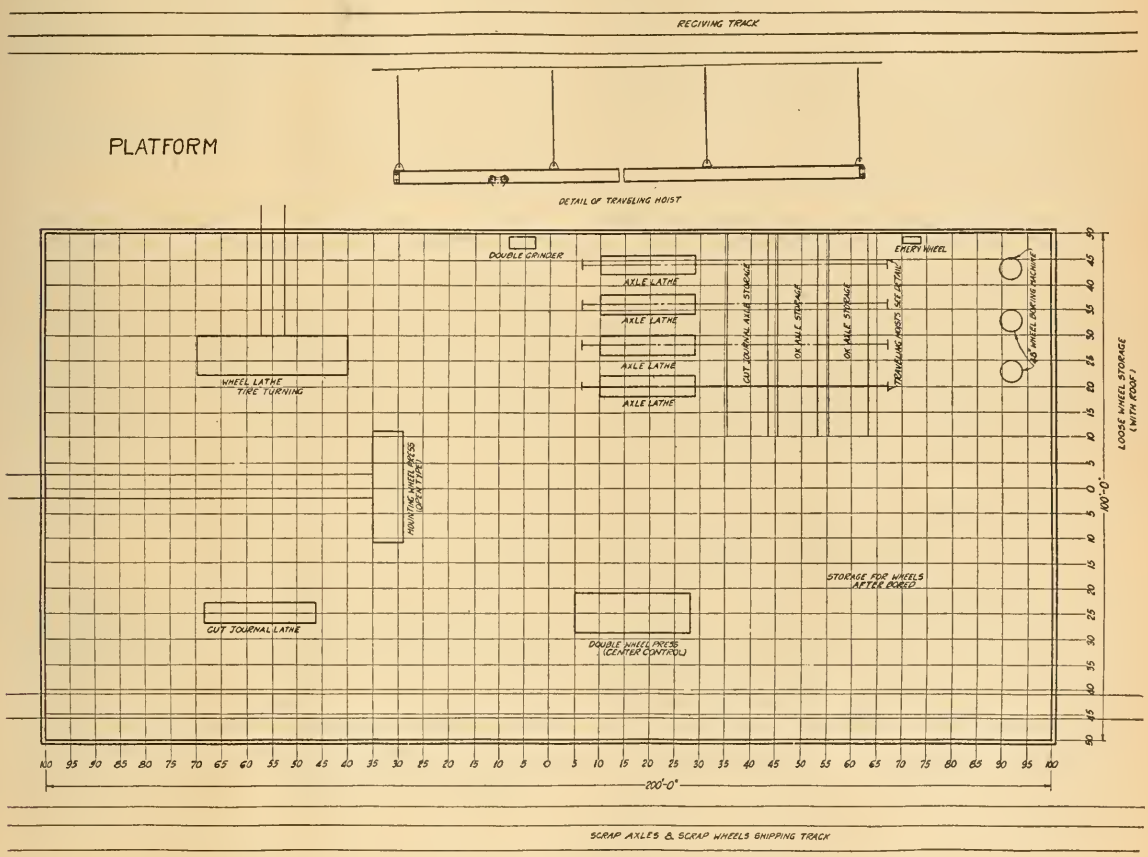
Arrangement of Tools in the Main Shop; Capacity 160 Cars; Output 25 Cars a Day

C. E. Chambers (C. of N. J.): I would like to add a word to what Mr. Gaines has said in regard to delivery of material. Few of us realize what it costs to bring the material from the mill to the car where it is to be used. If you walk through the ordinary car shop, you will see a gang of six or seven men with a truck, and about two men pulling, the other five men leaning on the truck and walking beside it. Good runways and electric trucks for carrying materials to the cars will minimize the cost.

F. F. Gaines (Ry. Bd. Adj.): One of the most important things around the car shop is a large runway with a traveling crane. The crane should have a magnet for loading and unloading car wheels and handling scrap. One man can load and unload car wheels with a little help in guiding and picking them

up, and handle all the scrap. A gang of from 10 to 20 men can be replaced by one crane.

Mr. Downing: I would like to call attention to one portion of the report which I did not read. It is as follows: "It is believed that track spacing such as shown for lorry and service tracks are representative. Height of buildings will be largely governed by operations taking place therein and the extent to which cranes are installed. Where cranes are used, a clearance from rail to bottom of crane girder of 22 ft. is suggested. All lorry track should be of standard gage, and planked between the rails for tractor service." The committee realizes that this is a very important subject. We expect to consider the handling of cars the same how far it should go. Years ago, when I worked in the locomotive shop, I found it very comfortable stripping and erecting locomotives, as the shops were well constructed, enclosed, and were properly warmed. We could take off our over clothes and do a good day's work. I think if the locomotive men will get behind the car men, it will assist the latter in getting the protection which they feel is necessary. For that reason I would like to hear more of the locomotive men talk on what they think the car men should have to do their work properly. We are paying high, hourly rate for labor, and every hour lost means so much money lost. It does not mean now, as it did a few years ago, 15 or 18 cents an hour, but in most of the cases it is now 67 cents an hour, and perhaps more. We want the help of the



Proposed A. R. A. Freight Car Repair Shop; Wheel Shop Tool Layout.

as they do in freight houses in England, without engines, and we expect to make an investigation to show how the work should be handled in different localities.

Mr. Gaines: The idea that you do not require an enclosed building in the South is a mistaken one. There may be some points in the extreme southern parts of Texas, and probably around New Orleans and Florida, where it will not be necessary to have an enclosed shop. Outside of a few places of that character, the shop which is not enclosed is heinous. In the South even, when the temperature gets down to 20 deg. above zero, the people in that section of the country who are not used to such a low temperature, do very little else than hang around a coal stove and try to keep themselves warm. The best investment you can make is to build an enclosed shop and heat it in winter. An indirect heating system for the shop can be reversed in the summer and cool air can be forced through the shop.

J. J. Tatum (B. & O.): I do not care to discuss the layout reported by the committee, being a member, but I will say that the committee feels it should have some encouragement as to locomotive men in getting these added facilities, and hope they will take the opportunity of expressing their views.

Mr. Fuller: Mr. Tatum asks how far they can go. I think from what has been said here this morning, with the suggestions of the committee, that there does not seem to be any limit. They can go as far as they want. The committee has this subject in charge. Let them make up a car repair shop layout that is 100 per cent, and we will stand back of it. I have heard Mr. Brazier talk about the nice roundhouses and how well everything is laid out in these houses. I do not think he has been in very many roundhouses or he would not talk that way. We have a committee on roundhouses and terminals, and it is up to these two committees to make terminals that will save money and give the desired results.

C. F. Giles (L. & N.): The steel underframe cars were introduced on the Louisville & Nashville about 1909. In 1912 we purchased a large number of steel coal cars. We realized that facilities must be provided for repairing and maintaining these cars, basing our judgment largely on the condition of the steel equipment operating on other rail-

roads in our territory. Apparently they were going to pieces. You simply cannot operate a railroad car built of steel or iron without taking means of preventing it from going to pieces through deterioration, rust, etc. I put the proposition up to our management, to secure authority to build a shop for the express purpose of repairing and maintaining, and if necessary, building all-steel equipment. We got an appropriation of about $300,000 and erected what was considered an up to date shop, installing improved machinery, including three cranes, and I do not believe there has been a dollar spent in connection with the Louisville & Nashville that pays a better dividend. We found these cranes adaptable for many things never before dreamed of, even in the case of wooden cars. We found it useful in building new equipment, putting the work together on the floor, and putting it on the car finished, ready to make connections.

Mr. Downing: I would like to suggest, as long as the question has come up, that we increase our committee by two men, appointing one man from the Middle West and one from the South.

Vice-chairman Coleman: The Secretary will make a note of that and present your recommendation to the Committee on Subjects.

The motion was carried that the report be received and printed in the proceedings, and the committee continued.

The Labor Question Bobs Up

C. E. Fuller (U. P.): I would ask the indulgence of the Convention just for a moment. There has been a good deal said here today, and a good deal was said the other day, in a way, about the application of these methods of producing increased economy, but I do not believe that we have considered or are considering this subject as seriously as it deserves. The amount of money spent for labor today is enormous. How can we ever hope to bring our maintenance costs down to the figures which prevailed a few years ago, or to the figures to which the costs should be brought today, if we do not get busy and give a little more thought and a little more energy to the putting up of proper terminal facilities for handling the work and methods for handling material quickly. We are all guilty, to a large extent, in accepting the idea that we can get along for another year or two. Have we realized, and do we realize now, that the dollar spent for labor today, to say nothing about the costs of materials, has gone clear out of sight, and that it is our duty to do everything we can to get the cost of labor down? There are only two ways in which to get that cost down that I know of. One is to increase your supervision, make it more effective, and the other is to strongly advocate proper facilities and tools for handling this work. I do not believe it is any hardship or trouble to plainly and emphatically make up a statement of what savings can be made by having facilities that will enable us to increase output and decrease the number of men in your service.

The question of labor to-day is a vital one and if we can put a machine or truck into operation that will do away with 6 laborers and bring material to the point where needed in one-half or one-third of the time, we should make every justifiable effort to get it.

Mr. Gaines: Mr. Fuller has struck the keynote of this whole problem. Common labor 10 or 15 years ago was a negligible factor, and we did not think it necessary to give the labor the necessary and reasonable facilities for doing the work. We allowed labor to jack up the cars and do other work of that kind which might have better been done by machinery. Mr. Fuller spoke of the supervision. We have not taken care of the supervising forces and paid them according to their responsibilities under the new schedule. If you do not take hold of this thing, they will go into manufacturing establishments, where they can make more money with less responsibility than they have to-day.

Amalgamation of Other Mechanical Organizations

THE COMMITTEE ON AMALGAMATION of Minor Associations with Section III-Mechanical can make only a progress report. One Association, namely, the Master Painters' Association, has formally accepted the invitation of Section III-Mechanical to become a part of that organization, and lively negotiations are being carried on with the other Associations with that end in view.

The report was signed by W. O. Thompson (Chairman), New York Central; T. L. Burton, New York Central; E. W. Pratt, Chicago & North Western; J. E. Fairbanks, general secretary, American Railroad Association, and V. R. Hawthorne, Secretary, Section III-Mechanical.

Discussion

The report was read by W. O. Thompson of the New York Central. *A motion to accept the report and continue the committee was carried.*

Standard Blocking for Cradles of Car Dumping Machines

THE COMMITTEE finds that two car dumping machines have been equipped with the recommended practice for blocking for cradles of car dumping machines.

As the recommended practice was adopted after the close of navigation, there has been very little opportunity to observe the working of the machines so equipped. It is felt, however, that the cars will be better supported and less damage will result to them if the recommended blocking is applied.

The committee would like to receive reports from any of the members who may observe car dumping machines equipped with the recommended blocking. Members of the committee will make inspection of the blocking on machines within their territory prior to the opening of the lake boat season and as often as possible during the season, to observe the condition of the blocking.

It was also decided to recommend to the Committee on Car Construction that for any type of car liable to be used in connection with dumping machines, it be so constructed as to fit readily to the dumping machine with the recommended standard blocking without damage to the car.

The report was signed by John McMullen (Chairman) Erie; J. W. Senger, New York Central; J. J. Tatum, Baltimore & Ohio; Geo. Durham, Wheeling & Lake Erie; T. W. Demarest, Pennsylvania System; J. E. Davis, Hocking Valley; G. M. Gray, Bessemer & Lake Erie, and J. A. Pilcher, Norfolk & Western.

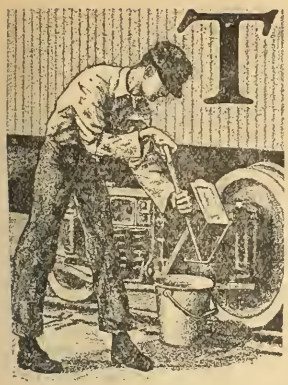
Discussion

John McMullen (Erie), chairman of the committee, presented the report, and said:

This report is submitted in the way of a progress report, and the committee would recommend that they be continued to look into the matter further.

F. W. Brazier: *I move that the report be accepted, the recommendations approved, and that we refer part of the report to the Committee on Car Construction, to carry along the work in conjunction with the work of that committee, and that the committee be continued. This motion was seconded and carried.*

Standard Method of Packing Journal Boxes



THE COMMITTEE SUBMITS the following report and recommends that it be submitted to letter ballot for adoption as Recommended Practice:

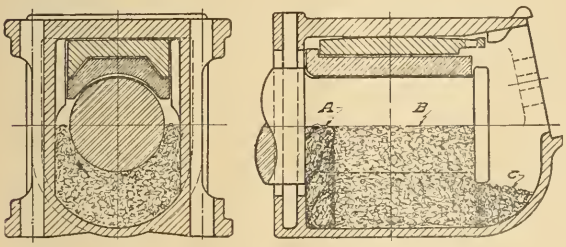
Standard Method of Packing, Cleaning and Assembling of Journal Boxes on Locomotive Tenders and Cars.

Preparation of New Packing—The waste must be loosened, placed in a saturating vat and kept completely submerged in car oil, at a temperature of not less than 70 deg. F., for a period of at least 48 hours to insure thorough saturation. It shall then be drained for the purpose of removing the excess oil, until the packing is in a resilient or elastic condition.

Prepared packing in storage should be turned over at least once each 24 hours, or the oil which has accumulated in the bottom of the container shall be drawn off and poured over the top of the prepared packing.

Preparation of Renovated Packing—All packing, when removed from journal boxes for the purpose of periodical repacking or renovating, should be pulled into a container, avoiding contact with the ground or any other place where it may pick up dirt, and taken to the waste-reclaiming plant. This packing must not be reused until renovated.

In reclaiming packing it should be first picked over carefully and dirt, metal, etc., shaken out, the knotted strands of waste pulled apart, and then placed in hot oil in a renovating tank for a short time, working it with a fork for the purpose of thoroughly washing and loosening it. It should then be rinsed in clean oil, then drained for the purpose of removing the excess oil.



Proposed Standard Method of Packing Journal Boxes

Cleaning Boxes—Before packing a journal box the oil cellar shall be thoroughly cleaned of all dirt, sand, scale and grit, and if water is present it must be removed. When new journal boxes are applied, or when reapplying journal boxes, the interior of the box, including the dust-guard well, shall be so treated, and close-fitting dust guards and lids should be applied.

Cleaning and Applying Bearings—Before applying journal bearings they shall be thoroughly clean, have a smooth bearing surface, free from irregularities, and shall have a proper bearing. Under no circumstances is it permissible to use sand paper, emery paper or emery cloth for the purpose of removing irregularities from the bearing surface. A half-round file or scraper should be used. Care must be taken that the wedge has a good contact on the crown of the journal bearing. The surface of the journal should be smooth and thoroughly clean before the bearing is applied. When applying a journal bearing a coat of lubricating oil must be applied to the bearing surface. Never wipe the bearing surface of the journal bearing with waste.

Application of Packing—(a) Inner.—In packing a journal box, twist somewhat tightly a rope of packing and place it in the extreme back part of the box, as shown at *A* in Fig. 1. Make sure that it is well up against the journal so as to properly lubricate the fillet on the journal and keep out the dust.

(b) Main.—Apply sufficient packing (preferably in one piece) to fill the space shown at B in Fig. 1. Take care to have this packing bear evenly along the full length of the lower half of the journal. The packing should not be too tight but should be tight enough to overcome any tendency to settle away from the journal. The packing should extend to approximately the center line of the journal but not above at any point, and should be pressed down evenly at the sides that no loose ends may work up under the journal bearings.

(c) Outer.—Apply a third piece of firmly twisted packing as shown at *C* in Fig. 1, and pack tightly in order to prevent displacement of the main packing. There should be no loose ends hanging out of the box as they would tend to draw out the oil.

General Remarks

In addition to the above recommended practice the committee desires to emphasize the importance of causing the observance of several other factors as follows, with the view of reducing hot boxes to the minimum:

It is very essential that journals, after being turned, should be cylindrical, free from taper, tool marks, ridges, corrugations and other defects. In other words, a turned journal should reflect first-class workmanship which is only possible of attainment through the use of machine tools, in good condition, of a design suitable for the nature of the work and capable of producing it with precision. This committee feels that an attitude of indifference prevails in many quarters with respect to the necessity of providing suitable heavy-duty lathes for the machining of axles, especially the larger sizes, and, as a result, many obsolete and worn-out axle lathes are being continued in service, whereas a close examination would disclose defects in the machining of the axles that would prove such lathes incapable of meeting the requirements and warrant their retirement from service.

It is suggested that the attention of all concerned be directed to the necessity of fully protecting journals against rust and corrosion during storage and that due care should be exercised in the handling and shipment of mounted wheels to guard against the damage which journals are subjected to through coming in contact with flanges of wheels as a result of improper loading or careless handling around shop yards.

It is also highly desirable that rigid instructions be issued to effect a more careful practice in the handling of journal bearings, especially for shipment, to prevent the indiscriminate tossing of journal bearings against each other, thus nicking and needlessly damaging the smooth bearing surface of the babbitt metal lining.

The committee submitted drawings showing two representative waste-reclaiming plants and a set of journal box packing tools.

The report is signed by C. J. Bodemer (Chairman), L. & N.; Ira Everett, L. V.; I. S. Downing, C., C. C. & St. Louis; C. J. Nelson, C. & N. W.; J. H. Milton, C., R. I. & P.; J. P. Young, M. P.; C. F. Thiele, Pennsylvania System, and G. W. Ditmore, D. & H.

Discussion

C. J. Bodemer (L. & N.) presented the report and said: I will not read the report in full, in order to allow more time for discussion, and will just pick out briefly one or two of the important parts in each paragraph. In connection with the first paragraph, "Preparation of New Packing," the road I am connected with uses presses very successfully. It gives a packing which has about the right quantity of oil mixed with the waste. We did not feel, however, that it was proper to specify, and we leave that to the managements of the railroads to pass upon. In connection with "Preparation of Renovated Packing," you will observe that all packing removed from the boxes for the purpose of periodical packing, must be renovated before it is used. We thought it well to include that point. In the general remarks, we emphasize the necessity of providing pretty good

machinery for the car department, especially the turning of journals, and to see that as good work as possible is done.

F. W. Brazier (N. Y. C.): Quite a number of our members are members of the General Car Inspectors Association, and I hope they will express their opinion on this paper.

C. F. Chambers (C. of N. J.): This method of box packing is decidedly different, I think you will all agree. I would like to ask whether or not the roads have found it required a good deal of attention to keep the ordinary box packing in position by using only this small form of wedge in front of the box. A journal rapidly turning has the tendency to crowd the waste toward the end of the box. I imagine you will find this small wedge working up to the level of the lid very often if you look into the box, which means that the packing must have settled away from the journal considerably.

I. S. Downing (C. C. C. & St. L.): The New York Central has operated very successfully without any wedge. We find it has the effect which Mr. Chambers describes, that the waste will turn around and work out, and it works the wedge out with it. The idea of using the wedge is that the oiler can get at the packing more readily. Mr. Nelson, of the New York Central, and Mr. Taylor, of the Galena Signal Oil Company, made extensive tests on our road of different methods of packing. They went into the hot box troubles very thoroughly, and we have now for the last five years operated without this wedge. While I am on the committee and signed the report, I believe you can do without the wedge.

J. J. Tatum (B. & O.): We were using the dressing in front of the journal box for a number of years, but found that the piece of waste would move up the lid and crowd its way out of the box, taking the oil with it. This added to the expense and further helped to rob the journal of lubrication, so we decided to do away with it.

T. H. Goodnow (C. & N. W.): The application of that piece in the front of the journal box as a wedge depends on how it is put in. If the wedge is put in carelessly, it does no good, but if it is put in right, it does a whole lot of good. I think the reason why Mr. Tatum is getting along so nicely is because the rest of us operate his cars and put it in, and keep it going. If the wedge is put in properly, twisted or rolled and locked under the collar of the journal, it will stay there. It saves the waste from the centre of the journal from rolling out, which it will do otherwise. It also serves the purpose of catching the dirt, and anything else that works in, when the oil box lids are missing. I am strongly in favor of this wedge, and while I believe it is not necessary to fill up the journal box to the centre line of the journal, as has commonly been done before, the small wedge there is a very essential element.

Mr. Tatum: I would agree that Mr. Goodnow was right in the matter if you had something to hold the wedge there, but as a matter of fact, you cannot have a wedge on any such place as the smooth surface of a journal box, and hold it in position. The seat wedge is crowded up to the box lid and the oil is crowded out with the waste under the journal, along with the seat piece when it gets there.

Mr. Goodnow: I would like to ask Mr. Tatum how he is going to hold the packing in the journal box if he cannot hold his wedge? The dressing of the average journal box, if it is done right, is putting the packing down along the box and simply bringing it up around. But it is necessary to leave an opening for the man to shove his packing iron down through the box and in the centre of it, and I think you are simply making trouble instead of helping it out. If Mr. Tatum cannot hold that little piece of waste there, he is not going to hold his wedge either.

Mr. Tatum: We don't hold it there any better, but we hold it just as well. During government control a very ambitious gentleman wrote the director general and told him that we were not properly treating journal boxes on the B. & O. and for that reason we were setting up a condition that would cause cars to be set out. The gentleman had to appear before me, and he explained the conditions he had to contend with, and described the fact that we left out this piece of waste in front of the journal box, and he said the cars ran but a short distance before they were hot, and had to be set out on a side track. When he gave this information, I got together our records, and showed him that the car mileage had increased from 9,000 miles per heated journal when we used the wedge piece in front of the box, to 19,000 miles when we omitted it.

R. L. Kleine (Pennsylvania System): I think this committee has presented a very good report and I believe it should be adopted, so that we get a uniform practice for packing journal boxes. In regard to the front plug; for high speed service, preference freight and passenger service, you will need the front plug. In the first place, you will have to pack your packing, which is termed No. 2 in the report, well back of the collar, and shove that packing back of the vertical line of the face of the collar, so that the collar cannot work on the strands of the waste and pull it from in back of the box.

About three years ago we wanted to do away with the front plug, and took it out of our passenger equipment cars. We found especially when we got into the winter, that the waste worked forward at the bottom although the collar at the top may hold it. It worked forward in a distance of 100 miles, so that we had to continually set up the packing en route, and we had to put that front plug back. We may some day get some other method of holding the No. 2 packing under the journal, but until we do we want to continue the front plug.

J. Snowden Bell: With reference to the tendency of packing sliding toward the lid of the box, it appears to be a very natural tendency. I have observed lately several designs intending to obviate that by making a tooth on the bottom of the box which would not interfere with the insertion of the packing, but would intend to prevent its outward movement. I would like to ask whether any of the members have ever devised any scheme of that kind.

A. V. Appler (D. & H.): I cannot too strongly endorse the recommendations of the committee regarding the proper preparation of the journal. I think a great many difficulties arise from the journals not being turned with a broad-nosed tool, causing ridges in the journal which cannot be rolled out, and have a rasping effect on the journal bearing, which destroys the lubrication. If the packing is not very carefully applied, the ultimate result will be hot journals. I think probably a great many hot boxes are blamed on the method of packing, where it is possibly more due to the method of finishing the journal. The proper size fillet is also very important, as there seems to be a tendency to make sharp fillets in re-trueing the journals, which encourages broken collars. The importance of good dust guards and tight journal box covers cannot be too strongly emphasized.

Mr. Curry: I think I have given as close attention to packing boxes in the last two or three years as anybody in this room. It seems to me that we are getting the cart before the horse in connection with this little plug of waste in front of the journal. What we need in these boxes is some oil. And furthermore we want to keep the waste at least down to the center line of the journal, and not have so much packing in them. I have demonstrated that waste grabs from the lack of oil, and too much waste is the primary cause of heating boxes. I wish to support in the strongest terms possible Mr. Goodnow's contention that we should have some waste in front of the journal for the various purposes that he outlines.

H. T. Bentley (C. & N. W.): Replying to Mr. Bell's question about teeth in the bottom of boxes: William McIntosh, in his engine truck cellars had teeth in the bottom of the cellar, so that the waste was held in position, and we are still using it on all our engine truck cellars.

Mr. Goodnow: I would like to ask the chairman of this committee a question. He touched on the question of pressing oil and draining oil. I would like to know if the committee went into that to determine which was the best method to use. I think that is quite important with this fairly heavy charge in the M. C. B. rules, allowing for the periodical packing of the equipment. Up until very recently it has always been contended that the pressing of prepared packing should not be done, but it should be allowed to drain a certain number of hours. Now, if you can use presses and take more oil out of the packing than you will by simply letting it drain itself, it is going to be quite an item of economy so far as oil is concerned. If there is any tendency to take too much oil out of it, however, and hot boxes and cut journals result, that is a very poor saving. I think that that is one method of practice that should be definitely

established, so that all the railroads will do it one way or the other.

Mr. Gaines: I have tried both processes. You can save some time and get a lot more oil by pressing, but you haven't given the waste sufficient time to take up all the oil it will. Some of the waste will absorb the oil much slower than other portions and when you are through it will not have the proper quantity of oil. It may take time to let the waste soak, but you have a well-saturated waste. The problem is not solely to save oil. Put the oil in and let the cars get over the road.

Mr. Goodnow: I am in favor of the draining process.

Mr. Giles: We have been following the practice recommended by the committee in packing journal boxes on the L. & N. for the past 15 or 16 years with great success, and yet we have been using the pressing for preparing the packing for probably five years with equal success. The point is to keep the oil in the box the same length of time that is advocated. The only difference is that when we want packing to ship it out to some outlying point, we press it and ship it out fresh with the oil saturated through the waste uniformly. When it is drained the bottom part of the waste lying on top of the strainer will necessarily contain more oil than the top part.

Referring to what Mr. Kleine said, we discovered in the interchange of equipment with the Pennsylvania that they had eliminated this ridge in front of the box. I issued instructions that they were not to replace that wedge, but let it remain out. Our experience was just exactly as Mr. Kleine states; we found it was absolutely necessary to replace it.

There is a certain amount of free oil that settles in the bottom of the box, and that wedge prevents that oil running through the front end of the box, and keeps it under the waste where it will do the most good.

Mr. Curry: I would like to ask Mr. Giles how this free oil gets into the box in the process that is being discussed.

Mr. Giles: It necessarily runs down out of the waste.

E. N. Harding (I. C.): The committee has made a good report. We will spend $1,000 for oil and $1,500 for waste. We are all trying to save that $1,000 of oil and forget all about the $1,500 we are spending for waste. If we use a little more oil we will all be better off.

Mr. Fuller: Those who are putting wedges in are furnishing waste for the other fellow. I know of a big concern that has not bought a dollar's worth of waste this year.

Cars come into this plant and the waste is removed, renovated and packed into other cars. You are furnishing the waste if you are putting in the plug. The packing houses won't use the plug, and the high speed freight trains are the packing house trains.

Plugs ought to be put in and everybody compelled to do it, or else they ought to be taken out. I don't believe there is any necessity for that plug.

The reason a lot of this waste is being brought forward in the box is rough collars. You make the journal smooth, but you take a rough cut off the edge of your collar, and that winds the waste up. The edge of the collar should be made smooth.

But really I think this Association is big enough to get on its feet and say one of two things. If you are going to call *C* a plug on the sketch, it is not a bad idea, but 90 per cent of the car men will pack the plug up to the center of the journal.

That is the plug the other fellow is taking out and putting in his vat and packing the other fellow's car, not buying any oil or waste himself.

Mr. Goodnow: I don't believe Mr. Fuller knows the latest action that has been taken so far as handling packing company cars. Most of the railroads have insisted that they be put back in. We did, and if our instructions are being carried out, the cars that come to us have the plug in.

Mr. Kleine: Some roads still continue the practice of putting free oil in the box while others are trying to operate their cars wholly on prepared packing, taking the oil can away from the oilers in the yards. I would like to ask the chairman if that has been considered at all?

Mr. Downing: We don't look at those cars in interchange by raising up the packing box. We put the men right on the passenger cars with the floors up. They have instruments that test temperature. On the cars we are getting from the northwest we are lucky to get the stuff back of the collar, let alone in front.

Mr. Tatum: The whole question is to be considered from an economical viewpoint. Do we get a greater car mileage per heated journal with the plug? Do we have less journals to remove because of being heated? Are we operating the car with the plug in front of the journal for our railroads at a greater expense than if it were out?

Has the committee made a test of cars operating with the wedge omitted from the front of the journal? If so, from which was the greatest mileage per heated journal obtained?

To put a wedge in front of the boxes on all the cars in the United States means considerable money, and if it can be saved it behooves this convention to save it. The B. & O. has made comparative tests between the two. We found we got greater car mileage with the wedge out. We had less cars set out of trains on the side tracks. We had better packing underneath the journal. Our men did a better job. We were able to inspect it and see that it was rightly done better with the wedge out than when it was in. With a greater mileage per heated journal, with a reduction in the cost of lubrication, why should we have the additional expense of a wedge in front of the journal?

Mr. Brazier: *I move the committee's report be accepted and they be continued to make tests.*

W. H. Hall (C. R. R. of N. J.): The wedge in the front of the box is practically useless. I have tried doing without it for one year and we have had beautiful success. We can get more mileage, less hot boxes, and better attention with the plug out of the front of the box, than we can with it in. It gives the man who looks after the boxes an opportunity to see the condition. With a plug covering the whole front of the journal, they simply lifted off the box lid and look in, saw a lot of packing and closed it down again.

Now every box lid is opened on the arrival of a train and the conditions are noted. If the packing has worked out, it is pushed back in the proper position, and no wedge is used at all. We have had less hot boxes within the last year than we have ever known in the history of the passenger service of the Central New Jersey. The only thing that we are lacking in to-day is a good dust guard. We haven't got that, and it is essential. The majority of the boxes heat from the back end.

Mr. Goodnow: The committee was appointed for the special purpose of determining a method of packing boxes, so that the charge that has been in the rules for the past year would be taken care of. In continuing the committee and taking no action, the Arbitration Committee is left without any foundation for handling this charge for packing cars. *I would like to offer an amendment to Mr. Brazier's motion, that the committee's report be sent to letter ballot as recommended, if Mr. Brazier will accept it.*

Mr. Brazier: I will accept the amendment. *The motion was seconded and carried.*

Establishment of a Co-Operative Research Bureau

AT THE 1919 ANNUAL CONVENTION the following resolution was adopted: *"Resolved*, That Mechanical Section III of the American Railroad Association recognizes the need of a research bureau to investigate questions of mechanical practice which should have the co-operation of all the railroads, and urges the appointment by the chairman of a committee of eight to study the question and report at the next convention."

The following classes of work would come particularly under the scope of a research bureau:

Investigation and scientific rating of apparatus supplied by manufacturers for use on railroads, with a view to advising for or against the adoption as standard or recommended practice; formulation of practical and scientific tests for apparatus used by railroads; thorough investigation of new types of apparatus with a view of recommending or advising against their adoption in service; the study of apparatus now in common use to make suggestions as to improvements; analysis of the characteristics of material and engineering structures on which full information is now lacking; the making of scientifically accurate determinations of many disputed questions in railroad practice with a view to greater degree of standardization, and the investigation of foreign practice with a view to its adoption by American railroads, provided sufficient merit was found.

Information gained from the work of the bureau, as well as that secured from various test plants throughout the country, would be available at a central source. Investigations, as a rule, would be of value to all roads on account of including the complete range of road conditions. At present many tests conducted by an individual road are valueless to other roads on account of being made to apply only to the local conditions of the road conducting the test.

Accurate tests would be conducted for the roads as a whole, which would tend to promote saving in time and labor and to increase in operating efficiency to a degree not now obtained. The bureau would make possible the establishment of the same tests for all roads, thus insuring that the use of "foreign equipment" would not reduce the operating efficiency of any road.

Engineering talent of all railroads and kindred organizations would be available to aid in any particular project. Large scale investigations would be possible, the expense of which would be prohibitive for one road under the present arrangements, but comparatively small when divided among the various roads throughout the country, as would be the case with the research bureau.

The work of the bureau will be of service to railroads as a whole through the investigations initiated by committees of the section. The cost of the service should be assessed in the usual manner on the member railroads of the association through regular appropriations by the executive committee.

The committee has collected a large amount of information and data covering the needs and requirements as well as the work to be performed by a research bureau, but desires to continue this study in its relation to the development of policies of the association before making a final report.

The report was signed by C. B. Young (Chairman), United States Railroad Administration; H. L. Ingersoll, New York Central; C. E. Chambers, Central of New Jersey; A. Kearney, Norfolk & Western; H. T. Bentley, Chicago & North Western; C. E. Fuller, Union Pacific; J. E. O'Brien, Missouri Pacific, and J. W. Small.

Discussion

In the absence of C. B. Young, the report of the committee was read by Mr. Chambers. *The report was ordered received, printed in the record, and the committee continued.*

Good Music in Abundance

A LARGE AUDIENCE OF CONVENTION PEOPLE attended the musicale on the pier Saturday night. The artists who entertained were Miss Dorothy Follis, soprano, of the Chicago Opera Company; Miss Jean Morrison, harpist; R. Norman Jolliffe, baritone; the Brunswick Quartette, of New York City, and members of the Taylor Orchestra. Informal dancing followed.

Sunday's entertainment consisted simply of a sacred concert in the music rooms of the Marlborough-Blenheim at 3.30 o'clock, given by the Albert Taylor Orchestra.

This evening another of the series of pleasant informal dances will be given on the pier, with special features promised by the Entertainment Committee.

Freight Car Situation

THE AMERICAN RAILROAD ASSOCIATION has resumed the publication of reports showing car surpluses and shortages, or "deferred car requisitions," as they are now termed. J. E. Fairbanks, general secretary of the association, on May 28 issued a circular including a summary of the reports, compiled by the Commission on Car Service showing an average of deferred car requisitions for the period May 1 to 8 of 79,272, as compared with 87,346 for the period April 1 to 8. The average surplus was 4,616, as compared with 6,370 in April. For the week ending May 23 the average of deferred car requisitions had increased to 98,936 and the average surplus had been reduced to 2,909.

Bad Judgment

THE SUPPLY CONCERN that deposited a neat little envelope on each seat of the Hippodrome in advance of the Monday morning meeting displayed more initiative than tact. It should not be forgotten that representatives of the railroads have a definite objective in attending these meetings. The exhibits will not be overlooked, ample time has been set aside for this and representatives of the supply companies have a splendid opportunity to demonstrate these interesting exhibits. However, they must not be allowed to trespass on the convention floor. The effect, if even a small number of the exhibitors resorted to this practice, would be to usurp most of the time of the meetings in perusing descriptive literature. A word to the wise should be sufficient.

Do Not Dismantle Your Exhibit

AS THE MEMBERS of Section VI—Purchases and Stores, will be in session both in the morning and afternoon on Monday and Tuesday and until noon on Wednesday, the R. S. M. A., at its meeting in the Greek Temple on Saturday, voted to keep the exhibition intact until 5 o'clock on Wednesday afternoon. This will give time for the purchasing agents and storekeepers to view the exhibits.

It is hoped that the usual confusion and partial dismantling of the exhibits on Wednesday afternoon will be avoided this year.

Ample police protection will be given to the pier and the contents of the booths will be entirely safe until they can be removed.

A Great British Manufacturer Here

F. B. T. Trevelyan, managing director of Sir W. G. Armstrong, Whitworth & Company, Ltd., at Openshaw, Manchester, England, arrived in New York on the S. S. Imperator, of the Cunard Line, on Sunday. He expects to spend all of Tuesday at Atlantic City, making his headquarters at the office of the *Daily,* on the pier.

This is Mr. Trevelyan's first visit to America. His chief object in coming is to get first hand information about the extent to which pulverized coal is burned in this country and the success with which it has met where used in the various types of steel works' furnaces. The company uses pulverized coal at its Montreal works, where it has facilities for making the fuel; while at Manchester it is being tried in two furnaces. In the latter case it has showed a saving of 75 per cent over solid bituminous coal.

Prior to the war, Sir W. G. Armstrong, Whitworth & Company, Ltd., maintained two plants—one at Newcastle-on-Tyne, known as the Elswick Works and covering over 300 acres of land, and the other at Manchester, known as the Openshaw Works, spread over some 200 acres. It built battleships and merchant vessels, marine engines, machine tools, guns and automobiles, and made, among other things, armor plate, ammunition, steel and brass castings, drop forgings, tool steel and small tools. After war broke out the facilities of both plants were greatly increased and utilized exclusively for war work. The automobile plant was turned into a shell factory and new buildings for the manufacture of aeroplanes and air ships were erected; while the number of employees of the company rose to 120,000 with a weekly payroll of close to $2,000,000. To give some idea of the work done by the firm during the war it may be stated that the output of guns ranging from 6-pounder tank guns to 18-in. 150-ton naval guns exceeded 13,000.

Since the armistice the company has been gradually getting back to a peace basis. The ammunition plant at Newcastle-on-Tyne has been changed into a locomotive building works with a capacity of 400 engines a year; while at Manchester a part of the plant is being converted into a shop for repairing from 8 to 10 locomotives a week. Also, the facilities for turning out machines for building and repairing locomotives and the semi-automatic machines on which the company specializes are being considerably enlarged. Its tool steel making plant is now producing tool steel at the rate of 2,000 tons a year.

The Elswick locomotive building plant has just been equipped with two Niles-Bement-Pond frame slotting machines, while to the Manchester repair shop are now being added the following Niles-Bement-Pond machines, the last of which is scheduled for shipment on June 25:

1 96-in. 100-ton wheel press.
1 12-in. double cutting off machine.
2 Pratt & Whitney turret lathes.
1 90-in. heavy driving wheel lathe.
1 90-in. standard Bertram driving wheel lathe.
1 60-in. standard driving wheel lathe.
1 No. 6 locomotive axle lathe.
1 84-in. heavy boring and turning mill.
1 73-in. standard boring and turning mill.
1 53-in. heavy boring and turning mill.
1 90-in. quartering machine.
1 No. 2 cotter and key seat drilling machine.

During the last 18 months Sir W. G. Armstrong, Whitworth & Company, Ltd., has been increased in size and its operations into other fields extended through the addition of the following concerns: Pearson & Knowles, Rylands & Company, with works at Warrington; the Partington Steel Works (near Manchester), a comparatively new plant with open hearth and blast furnaces and a capacity of 7,000 tons of steel a week; Armstrong, Main & Company, Ltd. (formerly James Main & Company, Ltd.), makers of structural steel and builders of structural erecting machinery with works at Glasgow, Scotland; Armstrong-Siddeley Motors, Ltd. (formerly Siddeley, Deasey & Company, Ltd.), makers of automobiles; and Crompton & Company, Ltd., of Chelmsford, makers of electric motors.

The company has branch plants in Canada, France, Italy and Japan, and has in mind erecting locomotive building and repairing works in certain countries, substantially all of the machinery for which will be supplied from their shops in Great Britain.

Mr. Trevelyan is a son-in-law of Sir Philip Watts, for some 15 years naval architect to the British Admiralty and originator of the dreadnought type of battleship.

Chief Interchange Car Inspectors' Executive Committee Meets

An executive committee meeting of the Chief Interchange Car Inspectors' and Car Foremen's Association of America has been called for three o'clock this afternoon at the Hotel Chalfonte.

A Southern Opportunity

A central and eastern sales organization of good standing is expanding its business to include an office in the South and desires to broaden its line. The present organization is developed to handle freight and passenger car appliances for steam and electric roads. Manufacturers of any standard products in this line desiring representation in this field may obtain further particulars in Booth 1, *Daily Railway Age.*

Industrial Car Manufacturers Meet

The Industrial Car Manufacturers' Institute has followed the practice established last year of holding its June monthly meetings at Atlantic City during the mechanical convention. All the meetings are being held in the Marlborough-Blenheim.

On Saturday morning, June 12th, the Board of Directors, together with the Executive Committee, held a meeting, in which was outlined a plan of work for the following six months. The Institute is now classified into groups, representing the several types of cars manufactured.

Group 1—Coal mine cars.

Group 2—Standard gage dump cars.

Group 3—All other types of standard gage cars used for industrial purposes.

Group 4—All narrow gage industrial cars other than coal mine cars.

Groups 2 and 3 held meetings Monday, and Groups 1 and 4 will hold their meeting to-day (Tuesday). All of the meetings have been largely and enthusiastically attended.

Semi-Annual Meeting of the Association of Railway Electrical Engineers

The Association of Railway Electrical Engineers held its semi-annual convention at the Hotel Dennis on Monday. The meeting was called to order at 10.15 A. M. by the president, L. S. Billau, of the Baltimore & Ohio.

During the course of the brief introductory remarks by President Billau the subject of the Association of Railway Electrical Engineers becoming a part of the American Railroad Association was again brought up. It will be recalled that this question was first introduced before the convention of the Association at Chicago last fall. At that time the railroads were under government operation, and hence this question presents slightly different aspects to-day from what it did then. There are decided advantages, however, to be gained from such consolidation, and there is every reason to believe that the Association of Railway Electrical Engineers will unite with the larger organization when certain changes have been made in the constitution of the latter.

Mr. Billau explained that in the event of the A. R. E. E. becoming a part of the A. R. A. the election of officers would be carried on by letter ballot, and that the choice of candidates would lie in the hands of a nominating committee. Furthermore, he stated, that such a committee would also be elected by letter ballot. Another change involved in rearranging the present methods of the A. R. E. E. to conform to the practices of the A. R. A. is the appointing of a Committee on Subjects from the members of the executive committee, this Committee on Subjects to present a list of subjects to be discussed for action the following year. Other minor changes were mentioned, among which was a possible change in the dates for the annual and semi-annual conventions.

Although quite a number of reports had been scheduled for the meeting, only three of them appeared in printed form. These were the Report of the Committee on Illumination, the Report of the Committee on Train Lighting and Practice, and the Report of the Committee on Electric Headlights. In order to economize in time none of the reports was read, the association members having been furnished with printed copies some time ago. The entire time was therefore available for discussion.

In submitting its progress report the Committee on Illumination stated: "The present basis of rating of train lighting lamps is to maintain the lumen output constant and vary the actual wattage as changes in efficiencies occur. For a number of manufacturing reasons it is desired to change the method to that in which the watts will remain constant and the light output vary with changes in efficiency, this being the standard method of rating for all other classes of multiple burning lamps."

The present and proposed ratings for the train and cab lighting lamps were presented in tabular form. In the new lamp schedule certain of the gas-filled Mazda type C lamps will be found, as the committee felt it was desirable to introduce this type of lamp for the reason that it would give better lighting without increasing the wattage consumption. During the discussion which followed this paper the question arose of the advisability of eliminating the 60-volt lamps and using the 30-volt lamps exclusively. In this connection, Mr. Andrucetti, of the Chicago & Northwestern, pointed out very clearly that there were many roads that were extensive users of the 60-volt lamps and to do away with this type would work considerable hardship on these roads.

In view of the fact that cab lamps are practically of the same voltage as train lighting lamps, the question of such lamps being designed with the idea of interchangeability provoked considerable discussion. One manufacturer stated that his company was giving the subject of locomotive lamps special consideration in view of the special operating conditions to which they were subjected. His company, he stated, were striving to develop a lamp with a rugged filament that would withstand locomotive service, but it could only be done at the expense of efficiency which in this case he felt was justifiable. In general, it would seem that the cab lamps were not called upon to give the same quality of illumination as demanded of the train lighting lamps, and that, therefore, it would not be advisable to attempt to design a lamp that would be interchangeable.

The Report of the Committee on Train Lighting Equipment and Practice was the most lengthy of all the reports, covering 37 pages. Of this total, however, 26 pages were devoted to a general treatment of the subject, for the committee felt that it would be desirable to discuss more or less in detail the various features that were considered. This general discussion served to explain why certain items which form a part of a complete specification were omitted, and why other items that were included were finally decided upon.

Mr. Billau, chairman of the committee, admitted that the report had purposely been drawn up in a more or less flexible manner, in order that its specifications should not be so rigid as to interfere with practice that various roads had found necessary. In other words, considerable latitude was permitted in the specifications for axle generators, in order that certain roads could make the specifications to suit their needs. One of the points in the specification which called forth much comment, but which could scarcely be considered worthy of the time consumed on it, was—much as the condition involved would be decidedly rare, was Section 6 on page 33 of the report, which was worded to read as follows: "In case of open battery circuit the generator shall continue to carry the lamp load and the generator regulator shall automatically prevent an excessive rise of voltage on the equipment." Voluminous discussion arose over what might be considered as "excessive." It was finally disposed of by voting that the "generator regulator shall automatically prevent a rise of voltage above 20 per cent of lamp voltage." Other minor corrections and changes were discussed at too great length, especially when it is taken into consideration that the specifications as presented were intended to be flexible and to cover a wide variety of conditions.

The Report of the Committee on Headlight was also a progress report. The situation was presented by J. L. Minick, of the Pennsylvania, who is a member of the Headlight Committees of both the A. R. A. and the A. R. E. E. From present indications it would seem that much of the headlight equipment had still a long way to go before it could be considered as standardized in all of its features.

Mr. Andrusetti read a very brief report of the Shop Layout Committee, following which he requested the opinions of the membes concerning the various electrical installations that had come to their notice.

The attendance at the session was excellent, about 75 members being present.

LOST

One beaded hand bag. Mrs. C. O. Taylor.

A plain gold cuff button, marked *J. S. M.* Was lost on the pier on Sunday. The finder is requested to return it to Secretary Conway's office.

American Railroad Association, Section VI, Purchases and Stores

First Annual Meeting Featured by a Broad Gage Address From the Chairman

THE FIRST ANNUAL CONVENTION of the American Railroad Association—Section VI—Purchases and Stores, opened with a session in the Hippodrome on Young's Pier, Atlantic City, Monday, June 14, 1920. H. C. Pearce, general purchasing agent of the Seaboard Air Line, called the meeting to order at 9.30 a. m. The convention was opened with a prayer by the Reverend Dr. Harris. Chairman Pearce then introduced Edward L. Bader, Mayor of Atlantic City, who welcomed the Purchase and Stores Section to Atlantic City. Following Mayor Bader's address, Chairman Pearce introduced James H. Waterman, who responded to the mayor's address as follows:

Address of Mr. James H. Waterman

I am sure that this body of men had no evil intention when they selected a "Water-man" to respond to a New Jersey Mayor. You will wonder what this splendid body of men are here for. Let me say to you that they represent 250,000 or more miles of railroad in this United States. Let me further say to you that the material they purchase, care for, distribute, and are responsible for each year, amounts to between a billion and a quarter and a billion and a half of money. They are cool, collective, thoughtful, energetic. They are everything that goes to make up strong men. If you want to build a railroad to-day, the first man, after you get your board of directors, that you would have to select would be the purchasing agent. You would have to get somebody to purchase your materials; then, following that you would have to get somebody to care for it, and that would be the storekeeper, so the Purchasing and Stores Department of the American Railway Association represents not only 250,000 miles of railroad but all the unapplied material on that railroad.

I wonder how many people of this country appreciate what the railroads mean to this country. First, in this country we must have stalwart men and women. They are the brains of the country. Next, we have the great resources of this country, our forests, our mines, our soil. The minds and the soil and the forest are the body, limbs, minds and feet of the nation. The men and the women are the brains, but the heart of the nation is the railroads of this country. What surprises me, as I go up and down the land, is that the business men are not first, last and all the time with and for the railroad. If the railroads go down to Washington and present a request for a better rate, a lot of commercial men or business men try to prove that they do not need these rates. To-day, the railroads of this country have got to have better facilities at their terminal, or the heart will stop, and when that heart stops beating then remember there will be stagnation throughout the whole land.

Address by Chairman Pearce

The Railway Storekeepers' Association at its business meeting in Chicago, January 19, 1919, adopted a resolution and appointed a committee, authorizing the transfer of the activities of the Railway Storekeepers' Association to a Section of the American Railroad Association. The Railway Storekeepers' Association arranged to transfer the affairs of the Association to a temporary General Committee of the American Railroad Association, who in turn organized a section of the American Railroad Association, to carry on the work of the Railway Storekeepers' Association. A temporary general committee of 19 members, consisting of eight storekeepers, eight purchasing agents and three members of the Railroad Administration, was appointed to develop and determine upon a plan to carry on the work of the Association.

The General Committee has appointed 18 sub-committees to develop and recommend certain standard practices. The sub-committees consist of from three to eight members, composed of experienced, practical men, personally engaged in the work covered by the subject assigned them. They have been very active and excellent practical reports and recommendations have been submitted. This section is a co-ordinated part of the American Railroad Association. Its purpose is to consider and report upon all questions affecting the purchasing, selling and storing of materials and supplies and kindred subjects, and to recommend the best practices for carrying on the service of supply.

I may be permitted to digress a moment from my text to record a matter which is perhaps not well known to you all, and that is the organized, strong and practical support given the supply department of our railroads during Federal control by the Division of Purchases. This committee, or a similar one, was organized before the United States entered the war, for the purpose of procuring and conserving materials required for the maintenance and operation on our railroads. Its chairman was Henry B. Spencer, afterwards chairman of the Central Advisory Purchasing Committee and later Director of the Division of Purchases. On this committee was George G. Yeomans, who has given the subject of stores more hard, thorough and exhaustive anaylsis than anyone in this country. Mr. Yeomans has viewed this subject from all angles. A graduate of one of our famous eastern colleges, he entered railway service with a trained

and open mind. When he reached the position of purchasing agent of one of the largest systems of railroads in this country he could very easily and naturally have sat back and looked upon the storekeeper as the man who delivered supplies over the counter to the users, as so many have done. But he chose to investigate matters on the ground for the purpose of determining for himself the character of the information furnished him, from which knowledge he expended millions of dollars annually, and he discovered the reason why the supply department is recognized to-day as an important and specialized department of our railroad organization, co-ordinate with the transportation, mechanical, engineering and traffic departments, instead of being subordinate to one of them.

The railway supply officers of this country owe a great deal to Henry B. Spencer, Samuel Porcher, George G. Yeomans and E. J. Roth. The railroads, through the American Railroad Association, will expect this Section to present to them the best and most economical plans for dealing with all questions of supply, even to the point of considering and determining the financial condition of their properties. In order to do this we must have the benefit of the best practices and fullest knowledge, and it is believed that this can be accomplished by appointing sub-committees of thoroughly trained men to develop and determine all phases of the subject, reporting to a general committee of experienced and practical men from all branches of the service and from different parts of the country. On this general committee will rest the responsibility of seeing that only practical and workable recommendations are submitted, and in order to get the fullest expression, these reports will generally be presented to all members for full and free discussion.

This now brings me up to the real purpose of this meeting, which is to discuss and dispose of all the different subjects that have been submitted, and it is the hope and belief of your chairman that you will devote yourselves to the work in an earnest and helpful manner. The committee has arranged the program in such a way that by close application we can conclude the business of the convention Tuesday night, giving us almost an entire day to visit the exhibits. In order to carry out this plan in a systematic manner, each member has been furnished a printed copy of each report with the request that all recommendations, changes, suggestions, etc., be reduced to writing. The committee having the subject in charge will be called to the platform and its chairman and members will be prepared to discuss any recommendation, suggestion or change which may be brought forward by any member. It is hoped in this way to give every member an opportunity to present his views without getting into a general discussion of other subjects. By concentrating on the one thing and having the benefit of the experience of the chairman and committee who formulated the report, we should be able to dispose of the subjects promptly and give everyone an opportunity to discuss them. Members will please bear in mind that while our time is limited, we desire to give everyone an opportunity to present their views, but it is equally desirable that unrelated subjects should not be introduced into the discussion.

Supply department officers of all grades have a great responsibility confronting them. They have been given the plan, the purpose and the machinery. It is for them as individuals to show they are worthy. If we are not big enough and broad enough to not only know our own business better than anyone else, and strong and willing enough to defend it against attacks, and wise enough to recognize and correct its faults, we will fail and deserve to. I have confidence enough in your strength of character, training and good sense to believe you will rise to the occasion and show the owners and executives what men with proper training and application can accomplish when organized and properly supported and directed.

We must so conduct this meeting and ourselves as to reflect credit to the organization and all of its members.

At the conclusion of his address the Chairman read the following communication from R. H. Aishton: "It has been my intention to attend the entire session of the Purchases and Stores Section in Atlantic City, and I have been looking forward to it with a great deal of pleasure. However, I now find that I am going to be disappointed. The railroad situation at the present time is such as to require my presence in Washington, and I have been obliged, therefore, to remain in Washington, although I am going to try to steal away for at least a day, so that I may be present at one of your sessions."

The Chairman: The minutes of the annual meeting of the Railway Storekeepers Association, 1919, were taken up as next in order. These proceedings have been printed and distributed to the members of the Railway Storekeepers Association, and the chairman asked that a motion be made that the minutes be approved. *It was moved that the minutes be approved. This motion was carried.*

Obituaries

Following the usual custom, the chairman appointed a committee to prepare a memorial to the following members who have died during the past year: Eugene Chamberlin; Charles D. Norman; W. R. Shoop and B. F. Schwaner.

A tribute to the personality and life work of Eugene Chamberlin was delivered by W. F. Jones. J. W. Gerber commented appropriately on the character of Chales Dana Norman and the chairman spoke feelingly of the loss sustained by the association in the death of W. R. Shoop.

Report of the General Committee

In its report the committee outlined the steps taken at the meeting of the Railway Storekeepers' Association in January and May, 1919, which led to the establishment of Section VI—Purchases and Stores, of the American Railroad Association.

At the meeting of the executive committee of the Railway Storekeepers' Association held at New York on May 15, 1919, a temporary general committee composed of representatives of the association was selected to carry on the work of Section VI until the general meeting was held. Tentative rules of order for the section, based on the constitution and by-laws of the Railway Storekeepers' Association and the rules of order of the American Railroad Association, were formulated. Arrangements were made for the transfer of the affairs of the Railway Storekeepers' Association to the general committee of Section VI of the American Railroad Association, which selected the committees, appointed committee members and made other provisions for carrying on the work.

The section was organized at a meeting of the temporary general committee held at New York on May 16, 1919, the chairman, vice-chairman, secretary, assistant secretary and sub-committees being appointed. Since that meeting H. S. Burr has resigned as chairman and H. C. Pearce has been elected to fill the vacancy.

The membership in the former Railway Storekeepers' Association have been transferred to the Purchases and Stores Section of the American Railroad Association. Representative members have been appointed by the railroads and others on the membership list have been elected to affiliated or life membership of Section VI.

The report of the committee included the report of the secretary-treasurer as shown on the following page.

The tentative rules of order for the section were also included in the report as a separate exhibit. The committee submitted as candidates for the Committee on Nominations the following: J. W. Gerber, (chairman) general storekeeper, Southern Railway, Washington, D. C.; W. A. Summerhays, purchasing agent, Illinois Central, Chicago; W. C. Bower, general purchasing agent, New York Central, New York; F. W. Taylor, purchasing agent, Southern Pacific, San Francisco, Cal.; J. F. Marshall, purchasing agent, Chicago & Alton, Chicago. Alternates: C. A. How, general purchasing agent, Missouri Pacific, St. Louis, Mo.; J. G. Stuart, general storekeeper, Chicago, Burlington & Quincy, Chicago; A. A. Good-

child, general storekeeper, Canadian Pacific, Montreal, Canada; H. A. Anderson, assistant purchasing agent, Pennsylvania System (Eastern region), Philadelphia, Pa.; U. K. Hall, general storekeeper, Union Pacific, Omaha, Neb.

The report is signed by H. C. Pearce (chairman), (S. A. L.); W. G. Phelps, (Pennsylvania); J. P. Murphy, (N. Y. C.);

SECRETARY-TREASURER'S REPORT

From January, 1919, to June, 5, 1919.

Active Membership January, 1919		587
New members received (including 121 taken in at January Meeting).		154
Total Active Membership		741
Honorary Members		12
Total Membership June 5, 1919		753
Receipts		
Balance, Cash in Bank January 22, 1919		$544.56
Receipts since that date:		
Dues	$762.05	
Initiation	770.00	
Matl. Classification	225.00	
Proceedings	15.00	
Interest on Liberty Bonds	22.09	
Committee, January Meeting	4.00	
		1,798.14
Total Receipts		$2,342.70
Disbursements		
Bills paid as audited since January Meeting		1,770.40
Balance Cash in Bank June 5, 1919		$572.30
Cash Assets		
Cash on hand in bank		$572.30
Liberty bonds—3d issue		500.00
Liberty bonds—4th issue		200.00
Total Cash on Hand and Bonds		$1,272.30

The books of the Secretary-Treasurer were audited, and the cash assets, above stated, were transferred to the accounts of the American Railroad Association.

H. S. Burr, (Erie); S. Porcher, (Pennsylvania); G. G. Yeomans, (N. Y., N. H. & H.); A. W. Munster, (B. & M.); E. J. Roth, (F. G. E.); E. W. Thornley, (B. & O., Western Lines); B. T. Jellison, (C. & O.); G. E. Scott, (M. K. & T.); H. H. Laughton, (Southern); W. A. Hopkins, (Mo. Pac.); F. D. Reed, (C. R. I. & P.); H. E. Ray, (A. T. & S. F.); F. A. Bushnell, (G. N.); D. C. Curtis, (C. M. & St. P.); E. N. Bender, (Can. Pac.), and E. J. McVeigh, (Grand Trunk).

Discussion

The Secretary read the report of the general committee. There are some changes recommended in the rules of order which were read by the Secretary as follows: *One:* The General Committee shall consist of 16 elective members, including the chairman and vice-chairman. The elected members shall be divided equally between the purchase department and the stores department. *Two:* The chairman and the vice-chairman of the Section shall be elected by printed ballots each year. The candidate receiving the majority votes cast shall be declared elected, and shall hold office for one year until his successor shall be appointed. *Third:* The annual meeting of the Section shall be held in May of each year at Chicago, Illinois. The time of each meeting shall be given by the committee elected at least three months in advance.

It was suggested by Mr. Yeomans that the three proposed changes be passed on separately instead of altogether and the first two changes were adopted by vote. Motion to adopt the third change making Chicago the permanent location for future conventions of the Section precipitated a lively argument on the floor:

Discussion on Location of Annual Meetings

M. E. Towner (Western Maryland): I have been able to attend the Mechanical Convention this year and see the exhibits. The service of supply is so integral a part of the section of the operation of the mechanical and other departments, and there are so many interests absolutely in common, that I do not see how we can change the meeting place to get away from other interests at their conventions, and be as successful as we might be. Personally I shall be very sorry to see a change in our meeting place. I find in connection with the supply department of the Western Maryland, that we must be in constant contact with the mechanical department for we are not only interested in the obtaining of material, but in the care of that material from the time of its purchase until it is used. I am thoroughly imbued with the idea that our convention should be held in contact with the mechanical convention each year, and I trust that our meeting place may be where they are to meet, which will be presumably here.

C. D. Young (P. R. R.): It seems to me that this is a most unusual procedure for insertion into our laws designating the location for the meetings. That would mean, if the committee of sixteen, for some reason did not care to hold the meeting in Chicago, and in May, it would be very difficult to change the place of meeting. I would like to express the thought that we should have the greatest flexibility for the general committee to designate where and when we shall meet. There may be circumstances in the future which would almost make it undesirable to go to Chicago, or perhaps to meet in May. I do not believe that any of the other sections of the American Railroad Association so designate their place of meeting in this hard and fast manner, and I hope the original motion will not prevail.

M. E. Towner: Not only the opportunity but the need of railroad advancement to-day is more education, and it is an important question to get all the members together where they can learn, which is here. (Applause.)

J. H. Waterman: Unless you do something that will interest and bring the young men in the stores department to attend Section VI when it meets you will soon have no Section VI. The life of this organization depends not only on the old heads, but it depends on the young men, and you want to have this meeting, at least some times, where many of the young men who are not known, but will be known in the future, can attend the meeting. It is very nice to meet at Atlantic City. I do not know of anything that would prevent my meeting here, but there are hundreds of storekeepers that would meet in Chicago, St. Louis, Minneapolis, or some of those middle west cities that can never come to Atlantic City. In the name of the young storekeepers of this country, I plead with you not to tie it down to Atlantic City.

G. G. Yeomans (N. Y., N. H. & H.): The amendment that was proposed by the general committee, was not merely snap judgment. Every one who has spoken on this subject, has had something to say about the educational advantages of holding the meeting in Atlantic City. The men we want to educate are the rising generation, the men who are going to take our places. We want to be in the position to reach as many of these men as we possibly can. It is almost out of the question to expect storekeepers from the Pacific Coast, California, Arizona and Texas to cross the entire continent in order to attend one of these meetings, no matter how many pieces of machinery they may see working under conditions which are calculated to prove that they could not work wrong if they tried. It is not that sort of education that we want for our storekeepers. We want to have them learn how to handle, how to distribute, and how to care for and to account for material. They might come here and spend their lives at an exhibition of this kind, and go away, knowing less than they did when they came. We want to have them come to a place where they will get the education along the lines that their business requires, and we want to make that place of meeting so convenient that the largest possible number of men can come to that meeting with the smallest possible expenditure of time.

The educational features of a meeting like this are just as great outside of the meeting hall as they are in the discussion on the floor. It comes through the interchange of opinions, ideas and discussions that go on among these men who are brought together from all parts of the country, after the meetings are over, when they are sitting around in the evenings, talking over what they have heard in the meetings, and a great many of them getting new ideas, and giving new ideas to each other, which they never can do if they are going to wander around in a sort of desultory way looking at things they do not understand, and seeing the wheels go round. The suggestion of the meeting at Chicago was made because Chicago is the most central point of a size large enough to furnish comfortable and convenient accommodations for all of the people that we expect to come there, and we ought to have it there.

I am not at all saying anything against the value of these exhibits. I do believe they are valuable. I do believe that the men to whom they are specially valuable—the men who are directing the operations of the purchase and stores section—can spend time to come here and look at them without having the entire body brought here for that purpose.

I do not believe that anybody would need more than just one look at the electric sign on the north side of the Pier to get the idea of where the Purchase and Stores Section of the American Railroad Association stands to-day in the estimation of the people who have been holding their convention here for a good many years. It was an eye opener to me, and I believe that this section is large enough, is important enough to the interests of the railroads of this country, to stand on its feet, and if it is not large enough now, the sooner we make it large enough, the sooner we make our weight felt and our importance felt by the work that we can do, the sooner we are going to occupy a more prominent place in the railroad world. The way to do that is first to get all of the men possible to attend these meetings, and then to concentrate when they are at these meetings on the work in hand. I hope you will think pretty well before you vote, first, as to changing the month in which the convention is to be held, which has been the month in which all of the Railway Storekeepers' Association meetings have been held, and I hope you will consider very strongly the thought of keeping the meeting places as central as possible and as available as possible to the great body of men who cannot attend these conferences unless it is made convenient for them to do so.

W. F. Jones (N. Y. C.): I believe that instead of changing the meeting place of our convention that we should change our policy, or in other words, be more emphatic in our policy toward the rank and file of the membership of the old Railway Storekeepers Association. I believe there are a great many of the storekeepers that feel they are not welcome in this new association that we have organized. Let us go out with this body of men at the outlying points and make them just as welcome as the purchasing agent or general storekeeper, and we will have an attendance.

An amendment to the amendment submitted by C. D. Young reading as follows, was adopted:

The annual meeting of this Section shall be held each year, the time of such meeting shall be designated by the General Committee at least three months in advance.

It was moved and seconded that the General Committee's report as a whole, which includes the rules of order as amended, be adopted. This motion was carried.

Organization of the Service of Supply

The general committee submitted the following plan for the organization of the service of supply:

In view of a possible reorganization of the corporate forces at the termination of federal control, the General Committee submitted for the consideration of the Executive Committee the following recommendations with respect to carrying on that portion of the railroad work relating to the service of supply.

The maintenance of necessary stocks of materials and supplies for railroad needs, involving the investment of 35 per cent of the gross earnings, and the care and custody of the material represented by this investment, as well as the necessity for a more effective and systematic means of controlling it than has hitherto generally existed on railroads, should be recognized as of sufficient importance to demand the best efforts of a department organized exclusively for this service. The officers and employes of such department must in all respects, rank with officers and employes of the other operating departments, both in the divisional and general organizations. It requires as long a training and as much experience and skill to produce a competent storekeeper as it does to create an efficient official of similar responsibility in any other department of the service, and unless this is recognized, men with the training and knowledge necessary to produce results cannot be obtained, nor can an effective staff be maintained in competition with the other branches of the service. These recommendations are made with the certainty derived from past experience that the operating expenses of the railroads will thereby be substantially reduced and that a definite knowledge of the results of operation with respect to this particular investment, which is not at the present generally available, will enable executive officers to exercise a closer supervision over the action of those responsible for this work than is possible under any other form of operation.

First.—The committee recommends the maintaining of such an organization on all railroads, along the following lines: The purchasing department shall be in charge of a general purchasing agent or purchasing agent. He should buy all material and supplies of every description required for use by the railroad, including new equipment, fuel, rail, bridges, ties and timber, dining car and restaurant supplies, and sell all scrap or obsolete material, including equipment.

The stores department shall be in charge of a general storekeeper, who shall be responsible for the custody, care and distribution of all material not actually in use, as well as for the quantity of material on hand, and shall have direct charge of all material not in actual use, including scrap and second-hand material and the reclaiming of usable material, and of the storehouses and storage yards or other places where material is stored. He shall also have charge of and be responsible for the primary accounting for the receipt and disbursement of all material, and shall have under his charge and on his payroll all storekeepers and all others more than half of whose time is devoted to the handling or accounting for material.

Second.—The committee recommends that the inseparable connection between the purchasing and stores department should be recognized more clearly and that both these branches of the service should be under the control of a single executive officer in exclusive charge of supplies, or that where so large an organization is unnecessary, the entire work should be under the general charge of the purchasing agent, and that the officers in charge should be selected for their fitness for the organization instead of modifying the organization to fit the individual. This form of organization has the advantage of concentrating responsibility and authority over unused material in the hands of a single department, which can be held to strict accountability and escapes the pitfalls of divided responsibility which has heretofore been the cause of untold expense.

In this connection, the committee also recommended the uniform adoption of the specific titles for designating officers and employes of the stores department on different railroads.

Third.—The committee strongly recommends and urges the adoption of a uniform method of accounting for materials and supplies by all railroads, in accordance with the standard material classification prepared and recommended by the Railway Storekeepers' Association, and particularly that the primary accounting for all material be done by the stores department organization and that the standard form of monthly material stock report selected by the Railroad Administration as the most effective and valuable report in use by any railroads prior to Federal Control, be adopted and made the uniform standard of the railroads when they return to private management.

This report presents the operating statistics of the stores department in such concise and definite form that by its use the executive officers can easily maintain as effective control over the operations of the stores department as they now do over the operations of all of the other departments.

Discussion

The Chairman: We are going to give the fullest possible opportunity for discussion, consistent with the disposal of the business. Five minutes is given to each for discussion, and as much longer as the chair may desire.

A. A. Goodchild (C. P.): The gist of this plan or reports appears to me to be summed up in recommendation No. 2. The recommendation is one which invited the most serious consideration of every member of this section of the A. R. A. and I for one, would not like to see it pass the convention in its

present form. It is to be admitted that the stores and purchasing departments have much in common, but why mention the "inseparable connection" between them any more than between the stores and mechanical department, B. & B. department, road department, transportation department, or the accounting department; the duties pertaining to each of these departments are separate and distinct and our organizations as a general rule have been based on this fact. There is just as much reason for the stores controlling the purchasing department or any of the service departments supervising any of the others as there is in this proposition. I do not view the question from the standpoint of any particular railroad system, simply as a railroad man, and as a general proposition for the bese organization of the material and supply departments of a railroad, and I consider that any such enlargement of the duties and responsibilities of the purchasing department is unwarranted and inadvisable.

The question is one of most vital importance to every railroad management on the continent for I am sure it is not conducive to good purchasing or good storekeeping to have anything but the utmost freedom of jurisdiction, one department from the other, and under no circumstance should the officer who purchases material have any jurisdiction over the officer responsible for ordering, receiving and handling it. The plan has been tried and found wanting well within the knowledge of many at this convention, and furthermore my impression is that the Railway Storekeepers Association have already placed themselves on record in so far as the jurisdiction governing the stores department is concerned. In any event it was, prior to the Federal organization, the general practice of our railroads for the general storekeeper to report to the general manager or vice president in charge of operation.

I do not think it would be wise to recommend one general officer even with the official position of vice-president to take over these two departments as a special line of duty for the simple reason that the general storekeeper alone should be held responsible for material balances which should be problematical at least under a single jurisdiction.

I would suggest that the duties of the general purchasing agent are onerous enough. Purchasing and following up deliveries of material, keeping themselves advised of market conditions, etc., in other words, meeting the requirements of the stores department that they in turn may fulfill their function of supplying the requirements of the various departments of the railroads is quite a large order.

G. G. Yeomans: I do not care to take up the time of the meeting by any elaborate defense of the suggestion of the General Committee. I can only say that this was a subject of very considerable and thorough discussion by the General Committee before the plan was formulated. It was thought advisable that some plan should be recommended to the executive officers of the railroads as to the best plan in the opinion of the men who were actually engaged in the service of supply under which an organization could be perfected that would bring about the best results for the railroad in the way of conserving its investment in material.

There was a good deal of opportunity in Washington for us to see the manner in which different railroads were investing their funds and how it might be improved on considerably. It was found by careful analysis and investigation that certain railroads in the country were procuring better results with a small investment of money than other railroads. The committee naturally looked into the question of the methods and manners by which those results were produced, and it was found that the best results were being obtained from railroads which organized along the line of the committee's recommendation. In other words, the recommendation was made as the result of experience, and not at all as a purely theoretical idea which germinated in the brain of the committee. The plan was approved by the committee with the exception of one vote. There was one negative vote, the rest were all in favor of the plan suggested. The committee felt warranted in submitting it to the meeting as a basis for discussion in regard to the question of the inseparable connection. That connection, gentlemen, exists. It is a fact, and no amount of talking can make it any other than a fact. There is an inseparable connection between the two departments, more so than between any other departments on the railroads. There is a connection between the men who will procure the material and the men who will distribute it, that is very much closer than any connection between the Purchasing and Stores Section and the users of the material, no matter what department they belong to.

The question as to subtitles to clerks was another of those questions that was very carefully thought over, and it was recommended that subtitles should not be used, the idea being merely to allow employers complete freedom with respect to any changes in their forces and in their shifts from one task to another.

The Chairman: I am going to call on members of the General Committee who are familiar with the formulation of this report. One of the men who is in a somewhat similar position to our Canadian friend, is on the Pennsylvania Lines. We are going to get all there is in this thing during this meeting. I am going to call on Samuel Porcher (applause).

Samuel Porcher (Pennsylvania): This report made by the General Committee was chiefly in the effort to bring the importance of this subject more thoroughly before the management of the railroad. A careful reading of the report will show you it was formulated at the time of Federal control. We are not under Federal control now and perhaps under these circumstances it may be necessary for this convention not to adopt a report that will be so specific in detail as to be unapplicable to some particular road. I think it may be possible that with slight alterations in this report, to still emphasize the necessity and desirability of this feature of making the service of supply a more important one than it has been, and one equal to the importance that it actually deserves at the hands of the railroad managements. I might say that in the second paragraph it might be possible to obtain all that we desire and not to make anything impossible if it were arranged like this:

We recommend that the inseparable connection between purchasing and stores departments should be recognized more clearly and that both branches of the service should be in charge of a single executive officer and that the officers in charge of these departments should be selected for their fitness for the organization, instead of organizing the organization to fit the individual. This form of organization has the advantage of concentrating responsibility and authority over unused material which can be held to strict accountability.

H. S. Burr (Erie): The question seems to hinge more particularly, as it runs in my mind, not to whom the general storekeeper, whoever he may be, is to report. I do not believe it makes much difference. Personally, I would prefer to have the stores department head report to an operating officer, and I believe if he is the right kind of a storekeeper it would not make much difference. I have no specific recommendations to make. The plan as outlined was specifically arranged, and it embodies the best in the way of handling this material.

E. W. Thornley (B. & O.): I was fortunate enough during the time of Federal control to represent the Government in the Allegheny region, and was able to see first hand the condition brought about by working under many forms of organization. I feel confident in stating that we obtained by far the best results when the stores department was made a part or parcel of the purchasing department. There seems to be a very close connection between the departments and we were able to control the material investments with satisfaction to everybody concerned on the roads that were working under that form of organization.

H. H. Laughton (Southern): Our organization is not working under this plan, nor do I believe that it is best. I favor distinct separation between the stores department and the purchasing department, just as much as between the transportation department and the stores department. I believe that the function of the purchasing agent is the procurement of material. I believe that we should buy on requisition from the stores department, which should be held responsible for the material, its balance, its issue, its accounting. I would not put them under the purchasing department, rather I would put the purchasing under stores department.

W. A. Hopkins (M. P.): On the Missouri Pacific we have had this form of organization for about ten years, and it

has been thoroughly practical in every respect. We feel that by reporting to the purchasing agent we have a head of the department that can view it from all angles and get better results than from segregating the departments and reporting to some operating officer.

F. D. Reed (C. R. I. & P.): I always believed in being practical, and I do not believe any of the purchasing agents that are here to-day will concede that they ever had more difficulty in securing material than they have at the present time, or have had in the past year. Assume for instance, a general storekeeper reported to the general manager or some general superintendent, and it becomes desirable or advisable, from the financial, as well as operating standpoint for the railroad to buy material, four, five or six months in advance. If the general storekeeper did not report to the purchasing agent, the purchasing agent would say to the general storekeeper, "I am not going to stock up my store with that stuff for you. I am going to get it when I want it." The director of purchases in most railroads reports to the executive officer who is fairly familiar with the financial conditions of the property, knows what money must be spent or has to be spent and can be spent, therefore he is more qualified to handle the expenditure for material than any other individual or officer on the railroad. I started in on railroad as a car repairer. I have been in the mechanical department. The whole aim when I was in the mechanical department was to get all the material we could get and have all we could get and have it on hand at all times, regardless of how much money was tied up in the material. When I was in the stores department, as a general storekeeper, I had that thing to fight, to keep the master mechanic, master car builder, car foremen and everyone else from hogging all the material, and let some other fellow go without it. And those are conditions that the purchasing agent can control through the general storekeeper better than any other organization. We have had this organization on the Rock Island for years and it has worked out nicely. We all work together and in picking store department representatives, we try to get diplomats. We cannot get them all to be diplomats for the salary we are paying, but we are doing the best we can, and I maintain that the most economical and most practical method is for the purchasing department to be under one organization.

J. G. Stuart (C. B. & Q.): We have been working over twenty years under the plan as proposed under this recommendation, that is, that the general storekeeper reports to the purchasing agent. We have found it very successful. It is possible that there are other ways that might be even more successful, but so far we have not been able to find one. Perhaps one of the troubles in this proposed plan is that the purchasing agent might endeavor to exercise such a close supervision over the general storekeeper that the purchasing agent would virtually be general storekeeper. If he attempted to do that, my opinion is that he is going to fail. If, however, he has a general storekeeper and he has confidence enough in the general storekeeper to expect that the general storekeeper can operate and take care of his own department properly, reporting to the purchasing agent on important things, conferring with the purchasing agent on important things, and advising with him as to the length of time necessary to maintain a stock, to get the opportune times to buy, then I am satisfied that we will have an organization that will certainly be better than these others. I remember when we did work under the other system and I am going to tell you that the store department on the Burlington before it was taken over by the purchasing department was not really a store department, it was a little side issue of the mechanical department.

E. N. Bender (C. P.): Our organization is somewhat different than you have on this side. The practice is that the stores requisitions are approved by the vice-president and sent to the general purchasing agent for execution. He has no direct control over the stores department, excepting that he has the right to suggest to the general storekeeper the issuing of requisitions when he considers the market is proper at the time for purchases. Beyond that he has had no direct control over our stores department, but I am heartily in accord with the suggestion which was made that the purchasing agent should have the same control over the stores department in Canada as in the United States.

H. E. Ray (A. T. & S. F.): This discussion has been very interesting, but it seems to me in a way somewhat futile, because whether the association passes this paragraph or not, it occurs to me that this inseparable connection between the purchasing agent and the store department will continue. The two interweave so very closely that I do not see how a well organized railroad could very well have any other kind of an organization. With us we have this organization as has been recommended in paragraph two for many years. The thought that we could find anything better never occurred to me, because of the close co-operation that has always existed between the purchasing agent and the stores department. There has been no very marked line of demarcation between the two, never has seemed any occasion why there should be.

W. G. Phelps (Pennsylvania): Until two years ago we had what would hardly be called a stores department because we had not any general storekeeper, as I have been raised in the operating department. Consequently, I thought there was no other department except the operating department. Naturally, the general storekeeper, if reporting to anyone should report to the general manager. However, when it was decided that the general storekeeper should report to the purchasing department we at once established a department along those lines, and it worked efficiently.

A motion was made to amend the amendment as follows: In the first paragraph of the plan submitted by the general committee, strike out the word "primary" in the fourth from the last line of the second paragraph making it read "he shall also have charge and be responsible for the accounting, for the receipt and disbursement, etc." Second, change the wording to read as follows: "We recommend that there shall be the closest co-operation between the purchasing and stores department, which should be recognized more clearly and that both of these branches of service should be under the control of an executive officer in charge of supplies." That eliminates the word exclusive and eliminates the wording, the inseparable connection, and that eliminates the balance of that paragraph. The next paragraph: Strike out the words. "In this connection," and start the paragraph to read: "We also recommend, etc." Third: Following change to be made, making the paragraph read as follows: "We recommend and urge the adoption of a uniform method of accounting for materials and supplies by all railroads." That "the material accounting be done by the stores department organization and that a standard form of monthly report as may be adopted by the American Railway Association be used." Change the wording of the last paragraph, third, as follows: "This report should present the operating statistics of the Stores Department in such a concise and definite form that their use by the executive officer will readily maintain an effective control over the operation of the stores department as they now do over the operation of other departments."

This motion was seconded and carried.

It was moved that this report be referred back to the General Committee, together with the amendment to the amendment, and that all the information received on this subject be referred back to the General Committee for consideration and revision. This motion was seconded and carried.

Report on Stores Department Book of Rules

THE COMMITTEE unanimously recommended the adoption of the Standard Book of Rules as adopted by the Railway Storekeepers' Association at its 1914 annual meeting with the following suggested changes:

Part II—Instructions Governing Use of Stock Book

The committee recommends that Part II, Sections 1 to 6, inclusive, as published in Form ST 5, Rules for Railroad Stores Department Operation by the United States Railroad Administration, be substituted for Part II, Sections 1 to 7, inclusive, as originally adopted by the Railway Storekeepers' Association and published in their Proceedings of 1914.

It is also recommended that Section 7 of Part II in Form ST 5 be included in Section 6, Part II, as Paragraph (f).

The committee further recommended that a new Section 7, Master Stock Book, be added, as follows:

Part II. Section VII—Master Stock Book

(a) Key sheets showing the uniform arrangement and description of material items will be used in all stock books and in the master stock book in the general storekeeper's office.

(b) Stock book sheets, Form RSA-21, will cover a period of two years with the current twelve months exposed and the following twelve months on the reverse side.

(c) Key sheets are to have the same information printed on both sides and are to be inserted in the stock book between the sheet showing the first six months period and the sheet showing the second six months period of the year.

(d) When the stock book is opened, the sheet covering the first six months period, showing January, February, March, April, May and June from left to right, is to be to the left of the key sheet, and the sheet for the last six months period for July, August, September, October, November and December, starting with July and reading from right to left, will be to the right of the key sheet.

(e) To provide a report and record for the Master stock book in the general storekeeper's office, there should be inserted under each sheet RSA-21 of the stock book, a coupon sheet, form RSA-21-A, similar in every respect to Form RSA-21, except that it is printed only on one side and perforated between months. (A copy of form RSA-21-A is shown herewith.)

(f) Monthly stock book inventories. The amount on hand is to be shown in space No. 1 on Form RSA-21. When entering other data in spaces Nos. 2, 3, 4 and 5, insert a carbon sheet between the stock book sheet Form RSA-21 and coupon sheet RSA-21-A. Trace over the figures in space No. 1 on sheet RSA-21 and enter the data for spaces 2, 3, 4 and 5.

(g) When all data has been shown detach the coupon from RSA-21-A and send it to the general storekeeper with monthly orders for each class of material Care should be taken to see that class, page and store are shown in the proper place on each coupon and that they are kept in numerical order with the lowest numbered coupon on top.

(h) The master stock book Form RSA-21-B kept in the general storekeeper's office, is to be arranged in the same class, page and item order as stock book Form RSA-21 used at the storehouses. Key sheets are to be placed in the master stock book between sheets Form RSA-21-B, on which a place is assigned for each storehouse. The space assigned to each

MASTER STOCK BOOK FORM R.S.A.-21-B

Chicago	Omaha	Denver	Kansas City	Quincy	Burlington	Keokuk

NOTE—This Form to be 13⅜ inches high; width regulated by number of stores. Print names of one-half the number of stores on one side—the rest on the reverse side.

Master Stock Book Form for General Storekeeper's Office

COUPON SHEET R.S.A.-21-A

Class / Page / Store

January			February			March			April			May			June		
Data 1 to 5	Quantity Ordered	Requisition No.	Data 1 to 5	Quantity Ordered	Requisition No.	Data 1 to 5	Quantity Ordered	Requisition No.	Data 1 to 5	Quantity Ordered	Requisition No.	Data 1 to 5	Quantity Ordered	Requisition No.	Data 1 to 5	Quantity Ordered	Requisition No.
1			1			1			1			1			1		
2			2			2			2			2			2		
3			3			3			3			3			3		
4			4			4			4			4			4		
5			5			5			5			5			5		
1			1			1			1			1			1		
2			2			2			2			2			2		
3			3			3			3			3			3		
4			4			4			4			4			4		
5			5			5			5			5			5		
1			1			1			1			1			1		
5			5			5			5			5			5		

Perforation

NOTE—Size of Form—10¾ inches wide. This includes binding margin of 1½ inches, punched for 2 hole post binder—form 13⅜ inches high 10 Groups of oblong spaces numbered 1 to 5 on each sheet.

Coupon Sheet for Stock Book

(i) Coupons RSA-21-A should be pasted in the proper place in the master stock book in the general storekeeper's office immediately upon receipt from storekeepers.

(j) The master stock book is to be used in the general storekeeper's office to check quantities ordered by storekeepers, to distribute surplus material between stores and to locate and distribute material needed in emergency cases.

(k) The record in the master stock book is temporary and for use in the current month only. The permanent record is the stock book RSA 21 at the storehouse.

(l) Additions and corrections on key sheets should be made by bulletins issued by the general storekeeper and the changes made simultaneously in all stock books at the storehouses and in the master stock book in the general storekeeper's office. When new key sheets are issued, in order to safeguard the uniformity of the stock books, the general storekeeper will require that the obsolete key sheets be returned to him with the storekeeper's acknowledgment of receipt of new key sheets.

The report is signed by J. G. Stuart (Chairman), C. B. & Q.; J. W. Gerber, Southern; W. C. Weldon, C. & S., and F. D. Reed (Ex-Officio), C. R. I. & P.

Discussion

J. G. Stuart (C. B. & Q.): I might say in presenting this report that we decided we would get the best help by appealing to the different roads, and others we thought might be particularly interested in this work, and particularly have the knowledge of it. We also took this up with each supervisor of stores under the Federal Administration, also every past-president of the Railway Storekeepers" Association, and quite a number of other men prominent in store department work. We received answers, I believe, from practically every road that we wrote to, and every individual—something over 40 replies coming in. In general, everyone seemed satisfied that the principles as put forth in the book of rules, which was adopted by the Railway Storekeepers' Association, was satisfactory, and very few changes were suggested. The committee, however, felt that we should keep abreast of the times and, after going into the matter quite extensively, decided that we would present to the association the idea of the master stock book and ask that it be substituted in our book of rules for the stock book which was originally adopted in the book of rules in 1914, and then revise and change the book used under the Federal Administration and issue the new Federal Administration book of rules, so we come to you to-day recommending that this association adopt a book of rules as originally adopted by the Railway Storekeepers Association, and next, that the master stock book idea be incorporated in Part II, in place of the stock book that is described there.

The Chairman: We are here for the purpose of determining and recommending the best practices as a whole. We realize that we cannot lay down a set of rules that is going to fit every condition, but we can lay down practices which have been found, by practical application, to meet generally all conditions, and the book of rules is that basis. Everyone is expected to ask the committee any questions, make any suggestions or changes which they think will improve these rules, so that the general committee, and the section itself, may get the best there is.

J. E. Mahaney (S. A. L.): I believe that the general stock book should be in the hands of every general storekeeper. I do not think it is necessary to have a general stock book or any part of it in the hands of a local storekeeper, such as at roundhouse points, or other points, because our traveling store inspectors and storekeepers should be in close enough touch with the materials they have on hand, so that they would not require it. I am in favor of the general stock book.

W. B. Hall (D. & R. G.): Last January we put into effect the master stock book for the first time, and I would not be without it. It opened my eyes as well as the manager's. We had some opposition to the scheme in the first place, but I am satisfied our people are in accord with it and we expect to carry it. We do not aim to have a master stock book at the small stores, such as Mr. Stewart mentioned, at roundhouses; but at our main stores, where we have stock, we are getting our monthly stubs for our master stock book.

F. A. Murphy (B. & O.): We have recently adopted the master stock book on the Baltimore & Ohio, and we believe it is going to be all right. It has been given a good trial and we are encountering a good deal of difficulty in getting it started. It may not be advisable to work it at the smaller outside points; but we believe it will work out all right in the main storehouses along the line. We have encountered considerable trouble in putting it in on certain divisions, due to the fact that so much power is switched on our railroad. But after the books have been in use for a while we feel it will be very good.

W. A. Hopkins (M. P.): The Missouri Pacific has used the master stock book for about 10 years, and we handle the stock book a little different from the way the committee suggested. We go as far as they have by what we term a temporary manner. We take our regular stock book and bring in the coupons, and do all the transferring of material, and make all the temporary records in this field book, and then transfer that into the permanent record, and this stock book is called the master stock book. There is one item to a page, and that page runs for two years. We transfer all receipts of material and everything into that item. I have samples of these sheets here, if any gentlemen are interested, and will show and explain them in detail. We feel the stock book, as far as stores is concerned, is all right, unless a general storekeeper has a record of his own.

G. G. Yeomans (N. Y., N. H. & H.): I would like to ask Mr. Stuart one question. Isn't it desirable, that thtre should be a uniform arrangement of material in the storehouses, and if so, is this any help in handling the material. Isn't the stock book one of the means of practically forcing a uniform arrangement of material for the man in charge. If the man in charge runs up against the difficulty spoken of, does he not see, that his material is arranged in such a way, as to be entered most easily in the stock book, and wouldn't that bring about of itself a uniform arrangement of the material.

J. G. Stuart: That is one of the ideas of the master stock book, by having it in every storehouse, almost of necessity, the man has got to get his stock in exactly the order, so that you will find at every storehouse the thing exactly in the same order.

O C. Wakefield (N. P.): We have had a master stock book for about 15 years. We have kept in our general storekeeper's office stocks that remained at the divisional quarters. We could not get along without it. I do not see anything the matter with the stocvk book which the committee has recommended that cannot be followed with the regular stock-books which have been adopted.

It was moved that the report of the committee be approved and adopted. This motion was seconded and carried.

Report of Committee on Material Accounting

It is the unanimous recommendation of this committee that the following report be considered as a basis of standard practice for the accounting for material on all railroads:

General Plan

The committee assumes that there is no longer any question as to the necessity on all roads for an organization whose function embraces the ordering, receipt, custody, issue, and accounting for all materials required in construction, operation, and maintenance. In addition to the movements required in the ordering and physical handling of such materials, it is manifestly within the province of the stores department to also supervise and direct the accounting for material as it affects its distribution.

The committee, therefore, recommends that on all railroads all accounting, not only for the ordering and receipt of material, but also for the final issue and distribution, be done in the stores department and under the supervision and direction of the head of this department, subject to proper checks by the accounting department. It is the opinion of the committee that this accounting should include all movements covering miscellaneous material, rails, ties, fuel, stationery, and commissaries.

The committee recommends that an organization for this purpose, under the supervision of the stores department, should

have as its active head a store accountant, reporting to the general storekeeper, and under whom the necessary force to fully cover the situation would be maintained.

It is the recommendation of the committee that as far as possible the store accountant be placed in immediate direction of all accounting for rails and ties. In fact, all movements in the accounts affecting the final charges to operation or capital accounts should be centralized in this department. The reports submitted in previous years have been very complete and cover very fully the details and fundamentals required in connection with the accounting for material in all its phases.

The committee referred to the report of the Accounting Committee as submitted at the meeting of the Storekeepers' Association in January, 1919,* and, being in entire accord with these recommendations, submitted it as part of the report.

The committee recommended that the vouchering of invoices should be handled in the office of the purchasing agent on invoices duly attested as to quantity of material and date of receipt by the stores department.

Fuel

The committee recommended in connection with accounting for fuel that a special committee be appointed to consider more fully and report at a later meeting as to the details in connection with this accounting. The committee found such a variety of methods that it was not practical to reduce them to any concise form that would be considered standard methods. The committee recommends as to fuel accounting in general that it should be handled by the stores department as far as the handling of the detail accounting in connection with the receipt and final disbursement is concerned. The committee also recommends that all fuel records of a statistical nature should be centralized in the stores department, though it has not been found possible to submit what might be called a standard method, but as fuel accounting was not touched upon in detail heretofore, submits as a basis for consideration the following plan of accounting:

Accounting for Purchases.—A daily report of fuel forwarded should be rendered by agents or fuel foremen at stations from which fuel is originally shipped or at which it is received on the line. The original should be sent to the general purchasing agent and the duplicate to the general storekeeper. The purchasing agent should originate triplicate invoices and vouchers as a basis of charge to the accounts, the original voucher and invoices supporting them to finally reach the auditing office with the attesting signature of the storekeeper, acknowledging receipt, which information he secures from the daily reports above mentioned.

Consignments of fuel shown on daily reports should be verified in the storekeeper's office against purchasing department invoices, as to weights, and in case of fuel oil, as to gallonage, temperature, and m. & b. s. deduction. At the end of each month the storekeeper should recapitulate the total tonnage or gallonage as verification against shippers' invoices.

Accounting for Receipts and Issues at Stations.—Fuel service tickets should be obtained from engineers by fuel foremen or agents for the fuel furnished. A convenient form is made in triplicate showing the quantity of fuel furnished to each engine. The original of these forms should be furnished to the engineer for his immediate information, and the duplicate sent to the storekeeper as supporting papers to the daily form for reporting fuel issued.

Fuel foremen or agents should render daily forms in duplicate to cover fuel received, issued, and forwarded to other stations, sending the original to the storekeeper and holding a carbon for record.

Fuel foremen or agents should render a daily report of fuel unloaded, in duplicate and send the original to the storekeeper, retaining a carbon.

Fuel inventories, showing actual quantities of fuel on hand at the close of each month, should be rendered by fuel foremen or agents and sent to the storekeeper on the first day of the following month.

Receipts and issues of fuel for miscellaneous purposes (other than for use of locomotives) should be accounted for in similar manner to locomotive fuel, except that the report made will be rendered to the storekeeper weekly. This would include coal used at stations, interlocking plants, roundhouses, etc. Daily reports of coal received on the line and handled by the storefuel is issued or received.

A list of cars not accounted for by the receiving station, representing cars in transit, should be drawn from the original reports of coal received on the line and handled by the storekeeper until final accounting for each individual car has been made. This would constitute a continuous "In transit" list, which should be maintained by eliminating all shipments which have been accounted for, and adding all unreported current month's shipments. This "In transit" list should be compared with cars shown on the monthly inventory and all cars should be kept down to the minimum.

The storekeeper should furnish the audit office, as soon after the end of the month as possible, a balance sheet of fuel transactions, showing thereon issues by stations to locomotives in each class of service, issues to other accounts benefited, and quantities sold, the sales being supported by a list of bills rendered.

The total receipts should include chute droppings and sump oil.

The grand total of receipts covering purchases should be balanced with the current month's purchases by adding to that allocated to stations the quantity shown "In transit from mines" and deducting that shown as "Received not vouchered."

The balance on hand at the close of each month as per inventory should be entered on the record and the book balance adjusted to agree therewith.

Fuel Distribution.—A proper form should be used for condensing daily issues by accounts, and by individual engines, respectively, so that the storekeeper can furnish the audit office, as soon after the end of the month as possible, separate reports as follows:

(*a*) Distribution of locomotive fuel, showing quantities and value chargeable to each account, by divisions, main and branch line districts and freight and passenger service, and states.

(*b*) Quantities of fuel issued for switch service.

(*c*) Separate distribution of quantities and cost in total, by accounts, of miscellaneous fuel issued.

(*d*) A consolidated distribution by accounts of both locomotive and miscellaneous fuel.

Issue Price of Fuel.—The issue price of locomotive fuel should be determined each month by the storekeeper about as follows:

(*a*) The purchase price for fuel, plus handling for the current month, should first be arrived at by using the current purchases to date as reflected by invoices with an estimated amount added for handling.

(*b*) A rate per ton for coal, or per barrel for oil, sufficient to absorb the overage or shortage in the stock account resulting from the use of the estimated average issue price for the previous month, should be added to or deducted from the purchase price determined as outlined in (*a*). This rate per ton, or per barrel, should be the difference between the actual stock price of fuel on hand at the close of the previous month and what it should have been on the basis of an estimated inventory of fuel on hand and cost thereof. The issue price of miscellaneous fuel should be based on the actual invoice price.

Fuel for Firing Up Locomotives.—The value of wood purchased for firing up locomotives should be charged direct to the fuel account. The cost of gathering old ties and other scrap wood for the same purpose should be charged monthly to the same account by a memorandum bill prepared by the storekeeper, supported by statements furnished by the superintendents.

Statistical reports showing the pounds of fuel per thousand ton miles, in various classes of service, should be prepared in the storekeeper's office along lines best suited for the individual requirements of the road, and it is not thought practical to outline any standard method of forms for any of the above movements at this time.

The committee calls attention to the fact that while previous reports from accounting committee show a very great amount of careful study of the question and embody many very valuable suggestions, yet it appears that there has not been any effort made to standardize practices on various roads commensurate with the importance of such procedure. The committee therefore recommends that if this report is adopted as a sense of the section, some definite plan be worked out whereby the recommendation of this section be submitted to the various rail-

* See *Railway Age*, January 31, 1919, page 287.

roads in such a way that the store departments interested will receive the assistance and authority from their management that will enable them to proceed along the lines recommended by the section.

The report is signed by W. E. Brady (Chairman), A. T. & S. F.; G. A. Secor, C. & A., and H. E. Ray (Ex-Officio), A. T. & S. F.

Discussion

The Chairman: This is a very important subject. I judge there will be a great deal of criticism, because it was hard to get up any report on accounting that would suit various conditions.

G. A. Secor (C. & A.): It has been the understanding for years that the stores department should account for all material as it is issued. We feel that the stores department can handle the accounting of material under the supervision of the auditing department, as accurately and cheaply as any other department. We do not think that the stores department should order the material, pay for it, and charge it out on departmental invoices as is the practice on a great many railroads where the department will charge out the material to the primary accounts. We believe that in our organization we have accountants capable of working and following out the accounting features entirely. The stores department charges to the department which has ordered the material the value of the material. This department in turn charges to the primary accounts the value of the material as it is used. Why cannot the stores department charge this material directly to the primary account as it is ordered by the using department?

This system can be followed by having the using department charge material by indicating on the requisition the account number or A. F. E. number on which the material is going to be used. This avoids duplicate handling of material. We report directly to the auditor and receive the auditor's instructions, and in that way I think that the stores department is not only a material department but an accounting department as well.

H. E. Ray (A. T. & S. F.): The great trouble with the departmental charge is that the minute the stores department charges it out to some other department they lose control of the material. The discussion has taken a turn that I did not anticipate. I thought from the last several meetings of this association that there was no longer any question but what the stores department was the proper place for the final charge to the primary account. I did not anticipate that there would be any comments along that line. The stores department is the place for all the material business accounting. It is simply one movement of the general plan. It has worked so well on the roads that do that sort of thing, that I hope the association will not consider seriously the question of diverting the accounts from the stores department.

G. G. Yeomans (N. Y., N. H. & H.): I had thought that the question of the propriety of the store department accounting for the material up to the primary accounts was so thoroughly established that it could not be questioned. Of course, it is the idea that no material will be drawn by requisition until it has to be used. The minute that you stop that practice, and simply charge the department, you open the door at once for these departments to make requisitions ad libitum, for any amount of material that they desire without being obliged to make a definite charge.

You immediately begin an open door to building up duplicate stocks in the hands of all departments over which the store department has no control whatever, because the minute a traveling storekeeper goes out on the line and sees a lot of material lying there, which has been there for months, he orders that material sent into the storehouse. He is immediately met with the objection, that is my material, not yours. That is charged out. That is charged to me and belongs to me, and he has lost control of that material.

When I first became connected with the New Haven, the divisional accounting methods were in effect. The different division engineers, maintenance and mechanical men made their charges to the accounts that simply made requisition on the stores. I took the question up with the comptroller with a view to getting it changed. He would not consider a change. He said the only possible correct way of accounting for material was to have the man that was using the material charge it out and refer the charge to him, because he was the only man that knew what it was going to be used for and when it was used. To-day the comptroller of the New Haven would not have anybody fool with the material accounts except the storekeeper and the stores accountant.

There are so many things that could be said on that subject that it is almost impossible to know when to stop, and I am going to stop right now. But I do hope that this committee will never let go of that one vital feature of proper storekeeping on the American railroads, and that is that the stores department must have the entire charge and control of accounting for material from the time it is received on the railroad until it is actually put in use.

F. D. Reed (C. R. I. & P.): This subject has been hashed over in the convention of the railway storekeepers for the last fifteen years to my personal knowledge, and as the saying is, every fence has two sides. I believe that all storekeepers will concede that the accounting for materials and primary accounts can be more economically done by the store department than it can be by the maintenance of roadway or the operating department. The storekeeper when he makes a charge on a requisition or an order properly approved and designating an account to the roadway engineer or mechanical department accounts, with a little more effort could charge that to freight car repairs, locomotive repairs, construction betterments, or any other account that might be benefited or involved, just the same as he could by transferring that with one accountant to the mechanical department, roadway or some other department, who have to have another accountant to boil that down and get it in shape to put it up to the department of disbursements. I believe it is to the interest of the railroad companies that the material accounting for primary accounts should be done in the storekeepers office and a great deal more economically than it could be done by transferring it to the various departments.

Mr. Hall: We must not look at this narrowly as merely a store department proposition. We have got to look at it as the road as a whole. Now, while the machinery is all set up and the train in operation, rather than to stop the train and turn that invoice over to somebody else to take it up again, and the engine start in again, it is better to keep going right straight through and finish it..

The meeting then adjourned to Tuesday, at 9.30.

A motion that the report be accepted and adopted by the Accounting Committee as far as the accounting for material is concerned, and a recommendation to investigate further on fuel was seconded and adopted.

Lost and Found

LOST BADGES

No. 5604 J. T. Miller, Standard Car Truck Co.
No. 5629 E. A. Emery, Gustin-Bacon Manufacturing Co,
No. 5933 H. E. Creer, The Camel Company.
No. 5334 A. L. Schuhl, Independent Pneumatic Tool Co.
No. 8093 Mrs. A. R. Jarvis, care of *Railway Age*.
No. 6893 S. T. Hopkins, Safety Car Heating & Lighting Co.
No. 5749 Geo. W. Lyndon, Association of Mfrs. of Chilled Car Wheels.
No. 5298 G. T. Aitken, Frontier Chuck & Tool Co.
No. 5813 J. Will Johnson, The Pyle National Co.
No. 6369 W. H. Moore, Metal & Thermit Corpn.
No. 6083 H. J. Tierney, Grip Nut Co.
No. 5759 E. W. Kavanagh, Joseph T. Ryerson & Son.
No. 6770 Geo. A. Rogers, Lowe Brothers Co.

FOUND

One return railroad pass or ticket. Apply Blue Rose Tea Room, 2505 Boardwalk.

Leather memorandum book. Apply to Secretary Conway, Million Dollar Pier.

An Evening of Surprises

THE CONVENTION week program told us that there would be special features during the dances last night. There were. During the intermission the audience was delightfully entertained by the little Atlantic City girl dancers who entertained us last Wednesday night. Under the direction of their teachers, Joseph Dawson and his daughter, they gave seven dance numbers, all of which were heartily applauded. Then the surprise came. George R. Carr, president of the Railway Supply Manufactuers' Association, was called to the middle of the ball room and was presented, for his extremely able services in behalf of the Association, with what was apparently a large box of American Beauty roses. Mr. Carr showed his great surprise at the gift, but gracefully thanked the audience and was about to carry the gift away when one side of the box suddenly opened and out stepped a little four-year-old Atlantic City maiden, beautifully dressed as a ballet dancer, who proceeded to dance to the great amusement of all. She was one of Miss Dawson's pupils. The entire "act" was staged in secret and was greatly enjoyed by all.

Those of the Entertainment Committee who were in Charge of last evening's entertainment were: S. W. Sargent, chairman; Oscar C. Hayward, R. J. Himmelright, Langley M. Graham, I. C. Rogers, L. B. Sherman, Gardner Taylor and W. B. Wise.

Section III Elects Officers

THE RESULT of the balloting for officers of Section III, Mechanical, was announced during yesterday's session. The balloting was confined to vice-chairman and members of the General Committee.

J. Coleman, superintendent car department of the Grand Trunk, was unanimously elected vice-chairman, and the following were elected members of the General Committee:

F. W. Brazier, N. Y. C.; H. T. Bentley, C. & N. W.; J. J. Hennessey, C. M. & St. P.; C. E. Chambers, C. R. R. of N. J., and Wm. Schlafge, Erie.

Following the announcement of the election, F. W. Brazier presented the following resolution:

"*Resolved*, That the officers of Mechanical Section III of the American Railroad Association should be elected annually instead of every two years, in order that a greater number of members may enjoy the honor of being officers of the Section."

This resolution was unanimously carried.

Chile in Market for Locomotives

THE NEW YORK TIMES states that the Chilean Government is in the market for $8,000,000 worth of railway rolling stock. The railways in Chile are government owned and during the war but few improvements were made; now it is necessary that something be done to meet the growing commerce of that country.

A series of articles on the principles of car lighting by electricity will be published in the *Railway Electrical Engineer* beginning with the July issue. These articles are being prepared by Charles W. T. Stuart, chief electrician, car lighting department, Pennsylvania Railroad. Mr. Stuart is spending a few days of his vacation at the conventions in company with Mrs. Stuart and Miss Marjorie.

The Man Who Saw

Use Your Brakes—Not Your Whistle

The worm turned with a start when the raucus horn of a flivver rattled close to his left ear as he crossed the street. He worked in the general offices of the High Dry & Windy R. R., and was so busy wondering how he could get all the other worms to subscribe to his petition for a six-hour day and no Saturdays, that he did not notice the hurried approach of the Machinist's Helper in his brand new car.

As he landed safely on the curb he shook his fist at the departing magnate with an oath and an admonition to the effect that "if he was half as apt with his brakes as he was with horn the undertakers in his community would lose their hopeful looks."

He was reminded of the Air Brake Man's clever advertisement in his railroad paper. It said, "The real measure of a train's safety is its ability to stop."

Jazz Time Thinkers

"Tell me," said the English railway gentleman visiting an American railroad convention for the first time, as he nervously twisted the head of his cane, "I say, how can you Americans really manage to think and work around here with this noise—the music and all that hubbub, don't you know? It would drive me mad. Really, I shouldn't be able to concentrate at all, you see. At home, you know," he continued, "we have our machinery expositions and all that, but we don't make such a bally big fuss about it. Our parties and balls—our social activities are jolly well separate affairs, I assure you."

"Well," said the Man, as he unconsciously remembered the psychological differences in the temperaments of the two great races, "the American in convention is a jazz-bo—a natural rag-timer—a high stepper. He mixes business here with music, laughter and handshakes just as he used to mix his cocktails—and he thrives on the mixture."

"I don't quite 'get you,'" commented the Briton on this illuminating answer, using an expression he had picked up on the boat, "but your accomplishments are, I should say, 'rawther extraordinary,' in spite of it."

"Thanks," said the Man, "that's what really buys baby's shoes after all, isn't it?" The Briton nodded a puzzled head as he turned to go and he thought to himself, "Queer chaps these Yankees, eh what?"

The College Man Makes a Call

The "old man" put on his second pair of specs and squinted at the name on the card. "Well, well, if it ain't 'Smithy.' You remember him," said he, addressing the chief clerk, "the young graduate of Boston Tech we had here last year?"

"Oh, yes," said the clerk hurrying to agree with his boss as usual, "he put on brake shoes in the night roundhouse, didn't he?"

"Yep," said the S. M. P., "that's the feller—let him in."

The clean, good-looking Smith that entered and saluted his former employer had the same old snap in his eye that the old man remembered in the greasy youth who struggled with the brake shoe; but the man had grown. The year seemed to have added ten to his experience.

"How are you getting along Smith?" inquired the "old man" as soon as they were seated.

"Fine—fine. I'm now an officer in our company."

It was with difficulty that the S. M. P. was able to concentrate on his former subordinate's compelling sales talk as he inwardly regretted his loss in the promising boy.

"Why didn't I raise him? I might as well have; he's getting twice as much now—and, by jingo, I'm paying for it," thought he, as he made a mental picture of the array of new tools on the order he had been saving for him.

Help Wanted—Male

The Mechanical Engineer and the Supply Man were checking up the details of the 100 new Mikados.

"Seems to me," said the Mechanical Engineer, "that this dimension is wrong. If we built these engines according to this drawing the frame would be too long by about 8 inches. I'll call in the man who perpetrated it."

In response to the buzzer, the culprit appeared. To the Man Who Saw, he appeared as mentally short as his disheveled hair was long. His explanation of the error was punctuated by his scratching his head with his pen. It seemed evident that he was unaware of the trouble as he withdrew with the blue print in embarrassment.

"How much do you pay that jewel?" inquired the Supply Man.

"$50 a week," answered the Mechanical Engineer.

The Return of Mr. Dinger

Mr. Hum B. Dinger, who arrived in the night in order to be here in time to take up his "work" among the car builders, called for his mail this morning with a motor truck, much to the relief of the crowded editor. The Man, pleased at his re-appearance, regrets having been unable to extract much information from this interesting figure whose interviews in Washington evidently foreshadow events of momentous importance.

The only response to the eager interviewer's rapid-fire questions brought the hurried reply, "Too busy to talk—nothing to say—except that you spilled the beans by publishing that telegram from Jim Skeevers advertising my middle name as 'Bug.' I don't mind fair criticism of my activities ——"

"But," interrupted the Man anxiously, "your middle name *is* Bug, isn't it?"

"What of it?" replied Hum, trying to sidestep the admission.

"Well, it seems to me, you'd change it if you really have hopes for the ultimate success of the Prune Plan—the name Hum Bug is invariably associated with Bunko games, you know."

"Forget it," ejaculated Hum, shifting his heavy bundle of mail to the other arm, "every knock is a boost. I'll turn the railroads of this country over to the supply man yet—watch me!"

And as the celebrated Mr. Hum Bug Dinger tore out of the booth, the Man wondered, "He might be a national figure yet," thought the Man to himself, as he resumed his grind of grist for the editor's mill.

The convention is entertaining another visitor from the land of the crysanthemum, in the person of T. Nagata, of the Nippon Locomotive & Car Manufacturing Company, Osaka, Japan.

Lone Star Entertains

The railroad man from Texas was seated in a booth surrounded by the old friends of his supply trade youth. "Tell us a story, Jimmie," said his old college mate, the S. M. P. from Detroit. As Jimmie related the following tales, the Man hoped that they would produce a snicker from those who so far have not had the time to smile.

"Three negroes sat on a baggage truck at a country station. Sam was 'showing off,' as he called the names of the railroads indicated by the initials on the box cars of a slowly passing freight. S. P., M. K. & T., C. & O. and others were all correctly explained to the enlightenment of his less able friends when along came the sticker—C. B. & Q. 'What's dat railroad, Sam?' inquired one of the dusky ones. 'Chicago, Beaumont & Cuba,' replied Sam, with confidence."

* * * *

"It was back in the days of the struggle for a standard contour for M. C. B. knuckles when the coupler manufacturer decided to send Heeser Mixer out on the road. Not that Heeser was much of a technical man, but a good mixer, as his name implied; he invariably got into the "inner office"—and that's what really counted after all, thought the manufacturer.

"Heeser was on the 'inside' in his first call and had just finished up a fine coupler speech for the edification of the S. M. P., who listened attentively as he inspected the model.

"'But you haven't got the contour,' ventured the old man.

"'Well, what do you know about that?' answered the unabashed Heezer, 'that doggone shipping clerk forgot to put it in—I'll wire him for it right away—I can get it here to-morrow!'"

* * * *

"The general manager had decided that the best way to settle the new mail crane question was to call a meeting of all concerned, which was duly done.

"At the meeting sat the salesman whose crane was under serious consideration for adoption, a bright new shiny model of which reposed before him. All the arguments were in and it looked pretty much like a whale of an order, when from the back row rose a serious-looking individual, who threw the following monkey wrench into the machinery:

"'Gentleman,' said the inconsiderate one, clearing his throat for the assault, "you've all noticed that this crane is mounted on a platform and you have to climb to get to it.' Silence and a closer examination of the model carried conviction to the salesman as he squirmed a little, wondering what the goof was going to spring.

"'Now you probably know, gentlemen,' continued the crepe-hanger, evading the glare of the salesman, 'that we have a great many one-legged station agents on our line who are handicapped with wooden stumps. Imagine them climbing up on this platform with the mail bag—why, it's a joke!'

"Thus relieved of his burden, the informer sat down, as the salesman rose to his feet, quick in the emergency that threatened his prospects. 'Gentlemen—just a minute. In consideration of this man's testimony, I'll make you the following proposition:

"'Give me all the two-legged stations and I'll concede the one-legged ones to my competitors!'"

European Railway Observations

By Robert E. Thayer

European Editor, Railway Age

Foreign Three-Cylinder Locomotives

The railways of Europe are given to a very extended use of the crank axle with either three or four cylinders, but now that the cost of labor and materials has increased and difficulties are experienced in having the work done properly, the railways are questioning the desirability of the continuation of this type of locomotive.

In England the railways are rather forced to use three or four cylinders in order to obtain the required amount of power. The reason for this is that the clearance limitations are too small for enough power to be obtained with two cylinders outside the frame. The English roads have, of course, had a great deal of experience with the crank axle, but the cost of making these axles has increased to such an extent that they would be glad of an opportunity to rid themselves of it. Before the war the cost of manufacturing a crank axle varied between $600 and $650, whereas now the cost is between $1,650 and $2.500.

In France, where the clearance limitations are not as restricted, there is a very decided tendency to eliminate all crank axles. The standard locomotives which are being designed by a committee of French railway engineers are of the two-cylinder type. The same thing applies to the railways in Germany. It is the tendency in both of those countries now to give up the construction of any more inside cylinder engines and particularly the compound engine. With superheaters so well developed and, in Germany, with the successful use of the feed water heater, it is claimed that there is not sufficient advantage in compounding to warrant the construction of such a complicated design.

Railway Conditions in Italy

The Italian railways, like almost all other railways in Europe, have suffered greatly from the restlessness of labor and in particular from the shortage of coal. Coal at the present time costs $35 a ton at the prevailing rate of exchange, but at the normal rate of exchange it would have a representative value of $70 a ton. Travelers returning from that country, particularly last winter, speak of real hardships in traveling. There was no heat in the passenger trains, the cars were not lighted enough at night to permit one to read (storage batteries are used very generally throughout the country for car lighting), there were very few sleeping and dining cars, and as a result the sleeping space was at a premium. Both freight and passenger service were greatly curtailed and passenger trains were loaded to the limit.

The design of the Italian equipment indicates some very good engineering ability. Passenger engines are particularly well proportioned, but, of course, are light compared with the locomotives of the United States. A number of four-cylinder locomotives are used and operated economically. Throughout Italy the locomotives are coaled by hand.

Efficiency of the shop men has materially decreased, due to the general attitude of labor throughout Europe. The mechanics in the shops, however, are a high grade of men and must pass a rigid examination before they are admitted to the shops.

All of the rolling stock is provided with the screw type coupling, and all except the freight equipment is provided with brakes. The passenger cars use the clasp brake and the Westinghouse equipment.

Bad Order Cars in England

Frequent questions have been asked regarding the bad order car situation in England and the condition of the "rip tracks." The situation in this respect is interesting. It is impossible for one to find a "rip track" in England similar to those which are found in the United States. The English railroads, despite the large amount of rain for which England is noted, have but few house cars. Most of the cars are of the open top type and the freight is protected by means of tarpaulins which are spread over the car and securely tied to the sills. The cars themselves are of light capacity, carrying on an average slightly over 10 tons. The construction is exceedingly simple—there are no brakes to take care of, the couplers consist simply of a three-link chain attached to draw hooks, and the buffers are generally of a simple spring type placed at the ends of the side sills. Some of the older cars are not provided with any spring buffers, and in this case the side sills are extended beyond the end of the car to take the shocks. The cars are almost entirely of wood, there being but comparatively few with steel underframes. But very few of the cars are provided with automatic brakes. With this simple construction the difficulties of maintenance are not great. England's car situation is complicated somewhat by the fact that about half of the freight cars are owned by private companies, which require the cars to be returned empty to their originating point; but with a country as small as England, this does not make a very difficult problem.

Steel Versus Copper Fireboxes

An interesting article was published recently in the *Revue Generale des Chemin de Fer,* written by Paul Conte, assistant to the chief engineer of the Central Office of the Railways in France for the study of railway equipment. Mr. Conte described comparative service tests that had been made with copper and steel fireboxes, many of which were handled on the Paris-Orleans. His conclusions are extremely interesting and indicate a strong desire of the European roads to adopt steel fireboxes. He says that, "We are convinced that by using special precautions, steel or composite fireboxes can be substituted for copper ones." It has not been found that the difference in life between the two types of fireboxes is sufficiently great to warrant the use of the more expensive copper boxes; but the difficulty has been that the European roads have not had sufficient experience with steel fireboxes to know how to handle them properly. Mr. Conte suggests to those roads which are planning to substitute the steel firebox for the copper to begin by making it a general custom to wash and fill the boilers with hot water in order that this will be the general practice before the steel fireboxes are put into service. He believes that the failure to do this has been the greatest source of difficulty.

The European roads still adhere to the copper construction in their locomotives. On one important English road it was found that the amount of copper used in one locomotive amounted to something over 10,000 lb., which with copper castings at $45 per hundred pounds and ingot copper at $40 per hundred pounds, involves an investment of some $4,500 in a locomotive for copper alone. Some of the roads make their driving boxes entirely of bronze and in addition to the copper firebox sheets and staybolts use a copper dry pipe. It is thus apparent that if steel could be used in place of copper a large saving in carrying charges could be made.

Conventionalities

J. J. Edwards, secretary and treasurer of The O. M. Edwards Company, Syracuse, N. Y., is attending the convention for the first time in eleven years. He is stopping at the Marlborough-Blenheim with Mrs. J. J. Edwards.

Dr. W. F. M. Goss, president of the Railway Car Manufacturers' Association, has arrived to attend the convention. Doctor Goss used to come to the conventions as dean of the College of Engineering of the University of Illinois.

The many friends of Mrs. Charles D. Jenks will regret to learn that Mrs. Jenks is quite ill and under the doctor's care in her room at the Marlborough-Blenheim. It is hoped that her illness will not prove serious, although she has been suffering very greatly.

Several friends of B. E. D. Stafford, of the Flannery Bolt Company, visited him at his country place, Millville, N. J., on Sunday. He is slowly but steadily recuperating from his illness. Strawberries are just ripening and he sent the *Daily* a box of choice ones from his patch.

George W. Denyven, the newly elected member of the executive committee of the R. S. M. A., representing the first district, should be classified as representing George W. Denyven, rather than as shown in the report of the election published in Monday morning's *Daily*.

Robert Carr, president of the Dearborn Chemical Company, will have to miss the convention again this year. He is a member of the board of trustees of the University of Illinois and his presence is required at that institution in connection with the commencement exercises.

It is greatly to be regretted that convention attendants generally paid so little attention to the fact that yesterday—Monday—was Flag Day. It was good to see R. D. Smith wearing a flag in his lapel and appealing to the patriotism of his fellows. We have appointed him a committee of one to see that the *Daily* gives conventioners advance notice next year.

Lawford H. Fry of the Standard Steel Works is at the convention this year with W. A. Charles Thorpe of the Indian State Railways and A. H. Bone of Rendel, Palmer & Tritton, London, as guests. Mr. Thorpe is investigating the development the use of powdered fuel in this country, and Mr. Bone has charge of the inspection of the locomotives being built for the Egyptian State Railways.

The discussion on autogenous welding Monday brought out the need for the scientific analysis and control of welding processes. O. H. Eschholz, research engineer of the Westinghouse Electric & Manufacturing Company, has prepared a bulletin on this subject. It discusses the fusion phenomena occurring in electric welding and suggests a practical training course for operators as well as methods by which their proficiency can be gaged.

Favorable news has been received at the conventions regarding the cases of H. R. Warnock, general superintendent of motive power, and J. J. Hennessy, assistant master car builder of the Chicago, Milwaukee & St. Paul, both of whom have been ill. The news is that Mr. Hennessy after having had an operation has recovered sufficiently to be sitting up in a wheel chair in the hospital, and that Mr. Warnock has become well enough to be moved to his former home in Maryland.

J. E. McQuillen, mechanical superintendent of the Gulf, Colorado & Santa Fe, who is attending the convention, told something the other day which indicates one of the principal reasons why the Santa Fe System has been so successfully managed. At a recent meeting of the officers of the G. C. & S. F. it was found that there were only two men present who had been with the road less than 20 years, these two being the vice-president and general manager, and Mr. McQuillen, and both of them had been with the property 18 years.

R. L. McIntosh, of the Pyle-National Company, who has recently made an extended visit to Europe, has returned to the United States and is at the conventions with many interesting stories to tell of his experiences. He was much impressed with the engineering abilities of the foreign railways, particularly of the Italian roads. He says the Italian locomotives are very well designed and present an artistic appearance. The largest freight engine in Italy is of the 0-10-0 type, while there are a number of Prairie and Pacific type engines in use in passenger service. The passenger engines have high wheels and operate at high speeds.

Col. M. C. Kennedy, vice-president, Pennsylvania Railroad, registered with his son, M. C. Kennedy, Jr., on Monday morning. Col. Kennedy was formerly president of the Cumberland Valley and under the new organization of the Pennsylvania, was appointed vice-president in charge of real estate, purchases and insurance. During the war he was a deputy director-general of the Transportation Corps of the American Expeditionary Force, with office in London. Col. Kennedy is one of the most widely-known men personally in the railroad business. In each October he gives a luncheon to his railroad and other friends at his country home, Ragged Edge, near Cumberland, Pa., and this annual function has now grown so large that three or four special trains to Cumberland are run from different points, and the party always includes many of the leading railroad officers of the country.

When it comes to golf the convention visitors could organize a team which probably could compete successfully against any team that could be organized by any convention in this country. D. E. Sawyer, of the Pollok Steel Company, who has been one of the regular visitors at the conventions for a good many years, arrived yesterday, accompanied by Mrs. Sawyer and covered with the glory won by him last week in capturing the golf championship of the metropolitan district of New York. "Ned's" score in the first round of the tournament was a sparkling 71. Another of our first-class golfers is Clayton Ingraham of the American Waste Company, who is here attending the convention, accompanied by Mrs. Ingraham, and who went around the Sea View course Sunday morning in 76. Another of our extraordinary convention golf players is Charles T. Ripley of the Santa Fe, who also is here. Mr. Ripley became a crack golfer in his college days. Within recent years he has not been able to play much and during the last year has hardly played at all. Golf is always supposed to be a game which, if a man is to play it well, requires constant practice and playing, but after having played only two games before this year, Charlie Ripley went out recently and shot an 82. There is much curiosity among Mr. Ripley's

friends as to just how good a game he would play if he played as much as most of the leading golfers. He broke the record of the Chatham course in Massachusetts some years ago by shooting a 67.

Among the convention visitors on Sunday and Monday was C. W. Galloway, vice-president in charge of operation of the Baltimore & Ohio.

R. S. Mounce, general car foreman of the Erie at Jersey City, who registered Sunday, has been seen on the Boardwalk wearing an expansive smile.

In going over last year's *Daily* we find that Karl J. Eklund, of Mudge & Co. was attending the conventions as "general manager." This year he comes as vice-president. Next year?

The many friends of C. B. Young were disappointed to learn definitely that he would not attend the convention this year. Mr. Young has recently left the Inspection and Test Section of the Railroad Administration to return to the Chicago, Burlington & Quincy and is making an extended trip over the lines.

H. C. A. Carpenter, commercial secretary of the British Embassy, has spent several days at the conventions this year and has found them exceedingly interesting. The information Mr. Carpenter has obtained here has been of considerable assistance to him in his work as a commercial representative of the Britsh government.

Some of the friends of Leslie R. Pyle, of the Locomotive Firebox Company, are lamenting the fact that the Entertainment Committee has not availed itself of the talent among the supply men. Before entering railroad service Mr. Pyle was on the stage, and as an officer of the Fuel Association his baritone solos were features of the convention.

The amiable chairman of the Enrollment Committee, Charles H. Gayetty, is a busy man these days, working both early and late. He has not even had a dip in the ocean. This is Richard's last year on the Enrollment Committee and after serving eight years his many friends would like to see on the Executive Committee the next time the Philadelphia district has a vacancy.

Three generations of the Besler family have attended the conventions this year. The first generation was represented by J. D. Besler, of the Burlington, who is a veteran among railroad veterans; the second generation was represented by W. G. Besler, president of the Central Railroad of New Jersey, and the third generation by Mr. Besler's son, George. They are a fine railroad family.

Arthur Haller, of the American Locomotive Company, is here this year in a new role. Mr. Haller, who for years has been at the head of the publicity department of that company, was assigned to the sales department last January with headquarters in Chicago. His mileage record to date consistently indicates that he is demonstrating in a practical manner what he has been writing about for years—"service."

Just before W. T. Hanna arranged for his exhibit equipment he was called upon to decide between giving the A. R. A. members a slant at his latest type stoker or complying with the urgent demands of a large railway system and shipping his one and only completed stoker for immediate installation. When you visit space 183 you'll have to admit that the Hanna locomotive stoker is "out of sight."

Those who attended the annual meeting of the Western Railway Club in Chicago on May 17 were strongly impressed with the splendid showing made by the Silvis Shops Glee Club of the Chicago, Rock Island & Pacific, which furnished the most interesting feature of the program. S. M. Mullinix, superintendent of shops at Silvis, who is a convention attendant, is justly proud of the musical talent developed by these boys from the ranks of his organization.

The reporter of the local daily paper who claimed that representatives from all climes were coming here to the Car Builders' convention, was right. The latest arrival hails from the far away land of cherryblossoms and progress in the person of W. M. Oka, a representative of the firm of railway supply dealers, Sale & Krazar, Ltd., of Tokio. Mr. Oka's six months' vacation commenced with his visit here and will carry him on a trip throughout the United States.

There is a very attractive bachelor apartment in Chicago which apparently will soon be to let. Until recently it was occupied by Haines Williams, Clark Moore and Jack Rodger. Jack broke away and got married last spring. Now comes the news that Haines Williams is married. There is reason for suspecting that Clark Moore is finding life lonesome and is considering leaving the apartment, although Clark refuses to confirm this for publication. Mr. Williams was married to Miss Caroline Willard on March 27. Mrs. Williams accompanied him to New York, but will not come down to the conventions.

Our private wire to the Casino clicks the following: "100 yard race between L. S. Kinnard, S. M. P., C. & E. I. and S. R. Brown, Galena Signal Oil Company, won by 10 yards by Mr. Kinnard. Time 9 3-5" Our instrument did not make it clear whether it was seconds, minutes or hours. Charlie Brown, of Manning, Maxwell & Moore, acted as the starter; G. S. Goodwin, mechanical engineer of the Rock Island, timed it, and A. W. Clokey, Chicago manager of the American Arch Company, refereed the race. Russell Walsh, of the Glidden Varnish Company, "spectated" and wants to know why they let the railroad man get away with it.

Maximilian N. Groten and Simon T. Gorbounoff, both mechanical engineers connected with the Russian Mission of Ways of Communications in New York City, are attending the conventions this year. Both of these gentlemen have been in the United States for a few years, but on account of the war have been unable to carry out the extended plans they had in mind when they came. Furthermore, they have been unable to return to Russia because that the government is in the hands of the Bolshevists. Mr. Groten, however, is to return to Germany soon to visit his daughter. While he has been in this country he has investigated refrigerator cars. Before the war he had developed an interesting system of perishable freight refrigeration, consisting of an ammonia refrigerating machine placed in one car, where the brine was refrigerated and circulated by means of a pump through five cars on either side of the refrigerating car. Because of the fact that there was not a large demand for this class of equipment it did not develop to a very great extent. Mr. Groten has also interested himself while here in an automatic coupler to be used in connection with the screw couplings which are the present standard type of coupling in Europe. Both Mr. Groten and Mr. Gorbounoff are optimistic as to the future conditions in Russia and believe that it is now only a question of time when the Bolshevistic regime will be overthrown.

Special Guests

Heiser, Chas. E., Draftsman, P. & R., Chester Inn.
Hemmway, T. N., D. C. F., D. & H., Princess.
Hemphill, Joseph C., Examiner Eastern R. R. Asso., Dennis.
Hendricks, L. W., Supt. Shops, N. Y., N. H. & H., Traymore.
Hengstler J., Foreman, Penn., Luella.
Henley, R. G., M. M., N. & W., Chalfonte.
Hill, S. W., Asst. A. of D., B. & O., Breakers.
Hinkel, G. C., Draftsman, B. & O., 161 S. Tennessee Ave.
Hofammann, K. E., Asst. Engr. of Test, P. R. R., Haddon Hall.
Hoffman, P. H., Jr., Ch. Clek Pur. Agt., Penn., Blackstone.
Honsville, Chas. H., A. To. P. A., A. T. & S. Fe., 50 Tallahasse Ave.
Holder, J. A., G. M. B. M., Seaboard, Chelsea.
Holland, H. L., Dratt., B. & O., Arlington.
Hopson, Homer P., Inspr. Safety Appliances, I. C. C., Blackstone.
Hull, F. A., Traveling Storekeeper N. Y., N. H. & H.
Hunt, R., M. E., Seabord Air Line, Chelsea.
Hyland, A. T., Asst. S. S., N. Y. N. H. & H., Princess.
Jensen, J. S., Asst. Engr., N. Y., N. H. & H.
Keim, W., Elec. For., N. Y. C., Pennhurst.
Keyes, R. W., Asst. Chief Mat. Insp., N. Y., N. H. & H.
Kidd, C. M., Gen. Air Brake Insp., M. & W., Marlborough.
Kidd, W. C., Sec. & Treas., Track Supply Assn., Chelsea.
Kleber, William, Mach. Shop. For., C. R. R. of N. J., New Brady House.
Kimmett, P. F., U. S. Army, Avondale.
Kinney, Frank J., Ch. Clk. Sta. Dept., P. & R.
Kleinhaus, F. J., Car Acc., Int. Tank Corp., Breakers.
Kliest, R. A., C. F., B. & O., Edison.
Knapp, C. S., Mech. Eng., Pullman Co., Penn.
Knesen, Franklin I., Price Clerk, W. J. & S.
Knoth, F. W., M. M., S. A. L., Osborne
Knudsen, Knud Vendelbo, Tech. Dir., Ind. Financura Argent.
Kunnett, Mrs. P. E., C. R. of N. J., Arondale.
Lance, C. C., S. Eng., S. A. L., Chelsea.
La Rue, Henry, Sr. Insp. Car Equip., Inter. Com. Com.
Lathrop, C. L., Supt. Tele. & Signal, P. S. & N., Princess.
Leonard, W. W., Sup. C. L., B. & O., Hayden.
Leppington, W., Asst. For., C. R. R. of N. J., New Brady House.
Lilley, Donald L., Supt., Int. T. C. C., Breakers.
Lindner, W. C., Chf. Car Insp., Penn., Chalfonte.
Linthicum, Frank, Asst. Road For. Engines, Penn.
Luers, H. L., Draft., B. & O.
Dynan, T. J., Secy. Asst. to Pres., N. Y. C., Marlborough.
Lynch, George, chf. Joint Insp. Car Dept., All Lines, Bouvier.
Lyne, S. F., F. C. D., P. & R., Mt. Carmel.
McAfee, W. K., For. M. P. Dept.
McBrearty, Frank B., Gang Leader M. P. Dept., Penn.
McBrian, James, D. C. I., C. R. I. & R., Lexington.
McClelland, John W., Supt. of Signals, P. & R.
McDonnell, Dr. M. E., Asst. Chief Chemist, Penn.
McHugh, T. J., Secy. Supervisor Shops, B. & O., Elberon.
McPhail, O. G., M. M., A. B. & A., Traymore.
Mack, G. J., Mech. Supvr., U. S. Industrial Alcohol Co., Traymore.
Machab, E. S. M., Car Light. Eng., C. P. R., Craig Hall.
Mahar, Thomas, Traveling Engineer, American Arch., Traymore.
Mallard, J. T., M. M., N. S., Osborne.
Marks, G., Asst. to G. Mgr., N. Y. N. H. & H., Shelburne.
Martz, Edward R., B. & L. E., St. Charles.
Masters, J. A., M. C. B. Bill. Inst., S. A. L., Monticello.
Matthews, Wm. H., Jr., Asst. R. F. E., Penn., Melita.
Mattingly, E. H., J. G. C. F., B. & O., Edison.
Meskill, M. J., Engineer, Penn., Princess.
Messimer, N. B., S. S. R. S. Dept., N. Y. C., Princess.
Mewshaw, T. E., Gen. For., B. & O., Regent.
Meyer, W. C., Gen. For. Car Dept., Penn., Luella.
Midlaugh, W. H., D. C. F., Erie, Pennhurst.
Miller, A. T., C. C. to Supt. M. P., A. & W. P., Lexington.
Miller, B. E., Master Painter, D. L. & W., Alamac.
Miller, L. C., Gen. Car Foreman, B. & O., Lexington.
Miller, R. N., Asst. Eng., Penn., Princess.
Moncure, A. H., G. F. C. D., R. F. & R., Esplanade.
Morales, Sr. P. C., S. de F. M. y Mag., Mexican, Sterling.
Monroe, J. W., M. M., Penn., Mt. Carmel.
Moore, L. D., Elec. Engr., Mo. Pac., Craig Hall.
Morningstar, E. E., Draftsman, B. & O.
Moses, E. P., G. C. I., N. Y. C., Pennhurst.
Mudd, Frank X., Pres. & Gen. Mgr., Live Poultry Transit Co., Haddon Hall.
Mulcahy, C. W., Chf. Clerk, M. C., Breakers.
Nettles, E. H., C. C. to G. S., N. Y. C., Alamac.
Nickols, W. H., Chf. Insp. Car Dept., D. & H., Marlborough.
O'Connor, E. P., M. E., K. C. S., Princess
O'Dea, P. J., Gen. Insp. Mech. Dept., Erie, Pennhurst.
Otter, John, Shop Supt., M. C., Shelburne.
Paight, J. T., Gen. Oxweld Insp., N. Y. N. H. & H., Traymore.
Paskey, D., For. Insp., C. R. R. of N. J., Hamilton.
Patterson, W. J., Asst. Chief Bureau of Safety, I. C. C., Blackstone.
Rauck, Capt. J. M., Capt., U. S. A., Runnymede
Peach, J. F., Supt. M. of E., B. & O., Alamac.
Peck, F. H., For., N. Y. C., Pennhurst.
Peck, W. F., S. A. B., B. & O., Mullica
Peebles, Wm. L., Traveling Freight Agt., P. E. R.
Perry, M. R., Ch. Car Repair Acct., B. & O., Bouvier.
Pettit, A. M., Sec. to Gen. Mgr., N. Y. C., New Clarion
Phipps, J. W., Gen. Pass. Car Insp., B. & O., Revere.
Piper, W. F., Asst. M. M., Penn., Haddon Hall
Poor, Stephen W. E., Foreman, A. C.
Potts, Leroy C., Draftsman, P. & R.
Pratt, Ira D., G. F., Penn., Stanley.
Prettyman, A. J., E. F., N. Y. C. & H., Pennhurst.
Price, C. W., Asst. Car Ltg. Supervisor, B. & O.
Purcell, Mark, Gen. A. B., N. Pac., Marlborough.
Rasmussen, S. M., Chief Train Clerk, Penn.
Raudenbush, J. W., Acc., U. S. R. A., Silverton.
Raymond, A. A., Service Test Eng., N. Y. C.
Reed, M. R., M. M., Penn., Craig Hall.
Ricci, Edward T., Tinancura Argentina.
Richards, E. C., Asst. to S. R. S., M. C., Shelburne.
Richards, S. R., M. M., N. Y. N. H. & H., Chalfonte.
Robh, E. H., Acting Asst. Engineer, L. I., Arlington.
Roderick, M. B., I. T. & M., Erie.
Romig, J. S., Asst. M. M., Penn.
Root, I. J., M. E., Union Tank Car Co., Traymore.
Ross, B. B., General Foreman, L. I., Devonshire.
Rush, R., Headlight Insp., N. Y. N. H. & H., Princess.
Rutland, C. B., Asst. R. F. E., Penn., Melita.
Sapirstein, Chas., Asst. Gen. For., L. I.
Saunders, T. A., Gen. For. Car Dept., Tennessee Central, Princess.
Schuyler, A. J., G. C. I., Virginian, Osborne.
Schwindy, H. H., G. F., Penn., Craig Hall.
Scoho W. C., Foreman, I. C., Kentucky.
Shubley, C. K., Fireman Instructor, Penn.
Sheehan, J. E., Gen. Car Insp., N. Y., N. H. & H., Princess.
Shepherd, J., Asst. For., C. R. R. of N. J.
Sickel, Samuel R., Chief Clerk, P. & R.
Singleton, John H., S. H. I., Erie, Alamac.
Sindall, G. E. M., Asst. Gen. F., Penn.
Sloan, J. R., Chief Elect., Penn.
Smith, Abram E., M. C. B., Union Tank Car Co., Traymore.
Smith, H. E., Material Engineer, N. Y. C.
Smith, C. M., Tie & Timber Dept., N. Y. C., 160 States Ave.
Spinkler, Chas. F., Gang Leader, Penn.
Stackpole, W. S., G. S., Pub. Ser. R. R., Haddon Hall.
Stadelman, J. H., Asst. Eng., Penn.
Stanton, E., Ch. C. I., N. & P. Belt, Osborne
Steele, Robert J., Supervisor of Signals, P. & R.
Steins, C. K., Asst. Eng. M. P., Penn., Pennhurst
Stier, J. E., Leading Draftsman, B. & O.
Stoll, W. J., Chf. Inter. Insp., N. Y. Central Pennhurst
Straub, C. F., Supt. Car Rep., P. & R., Lexington.
Stuart, Chas. W., Gang Foreman Elec. Dept., Penn., Dennis.
Stumpf, F. L., Gen. Air Brake & Steam Htg., Penn., Lexington.
Sullivan, T. L., Asst. to G. F. C. R., Erie, Pennhurst
Sweeny, U. L., Asst. Ch. Clk. S. M. P., A. C. L., Traymore.
Swope, B. M., Asst. Eng. M. P., Penn., Seaside.
Tapman, W. H., Gen. Mech. Insp., B. & O., Arlington.
Taylor, C. M., Supt. Creosot. Plant, P. & R., Marlborough.
Thorpe, W. A. C., Indian State Rys., Strand.
Timpson, J. E., Insp., Long Island, Pine Hall.
Tobias, E. A., P. Agt., Chili State Rys., Strand.
Todd, John, C. F., Erie, Alamac.
Tudhall, J. H., Asst. Auditor, C. I. & W., Chelsea.
Turley, Wm. S. S., K. C. S., Princess
Turley, Wm., Jr., K. C. S., Princess.
Van Alslyn, H. M., Asst. Div. G. F., N. Y. C., Pennhurst.
Voight, A. E., Car Lighting Engineer, A. T. & S. F., Arlington.
Walker, H. J., Auditor of Expenditures, Penn., S. Massachusetts Ave.
Walker, J. W., Ch. Air Brake Insp., Penn.
Wall, Geo., Elec. F. M. P. & E., D. L. & W.
Walsh, J. J., M. M., Penn., Elberon.
Walther, A. G., A. S. S., B. & O., Haddon Hall.
Walton, J. O., Elect. Eng., Seaboard Air Line, Princess.
Wakefield, O. C., Jr., N. P., Seaside.
Warden, H. M., Supt. Reclamation, N. K. T., Chelsea.
Warnecke, J. G., D. S. K., I. C., Esplanade.
Warner, Bruce M., Exhibition Mgr. & Secy., Bakery Equip. Mfg. Assn., Ambassador.
Warner, W. W., S. S., Erie, Princess.
Waugh, J. E., Asst. Chf. Clk. G. S. K., B. & O., Hillcrest.
Weaver, W. M., Conductor, Seaboard Air Line, Princess.
Weightman, J. J., Ch. Clerk, P. & R.
Wells, A. P., E. T., C. of G., Pennhurst.
Wells, L. S., Supt. Tele. & Elec., L. I., Breakers.
Wenzel, C. F., F. F. C. I., Penn.
Wertman, John, Foreman, Penn.
Wescoe, F. B., Ch. Car Insp., Penn., Craig Hall.
Wildrick, F. B., C. C. to M. S., Erie, Chalfonte.
Williamson, G. B., C. R. Acct., B. & O., Bouvier.
Wilson, O. A., C. C. I., Penn., Elberon.
Winfield, J. H., Gen. Insp., Erie, Martinique.
White, E. E., G. C. I., Penn., Princess
White, E. P., Test. Supervisor, N. Y., N. H. & H., Chelsea.
White, G. A., Asst. M. P. C., P. B. & W., Chalfonte.
Whitman, R. C., Insp., B. & O.
Wilbur, F. T., Supt. of Tel., I. C., Breakers.
Williams, Edgar, P. & R., Arlington.
Winding, E. G., Insp. Test Dept., C. M. & St. P.
Wood, G. H., Gen. Air Brake Insp., A. T. & S. F., Fredonia.
Wood, H. I., Chief Draftsman, N. Y. C.
Wortman, J. R., Supply Clerk, B. & O., Haddon Hall.
Wrenshall, John C., Jr., Div. Engineer, P. & R.
Yarwood, J. G., For. Hostlers, Long Island.
Yates, R. C., Haddon Hall.
Yeager, J. P., Gen. Car Foreman, P. S. & N., K C.
Yeager, J. R., Gen. Foreman, W. M. R. R., Monticello.

(See also other registrations elsewhere in this issue)

Supply Train Movie at Three O'clock

THE SOUTHERN PACIFIC, Pacific System, has developed a system of delivering material to fill the monthly requisitions of the maintenance of way and bridge and building departments, pumping stations and station agencies by the use of a supply train, which has resulted in a saving of over $11,000 a month as compared with the practice of delivering supplies in way freight trains. The operation of this train will be shown by a six-reel moving picture at the afternoon session of Section VI—Purchases and Stores—in the Hippodrome to-day. Members of Section III—Mechanical—are invited to witness the picture, which will be shown at three o'clock and will require about one hour and ten minutes. The operation of this train has developed many advantages other than the saving in the expense of delivering materials, and while the picture does not show them all, it is suggestive of the great possibilities by the supply train scheme.

A Tribute to Eugene Chamberlain

W. F. JONES, general storekeeper of the New York Central at West Albany, N. Y., paid the following touching tribute to the late Eugene Chamberlain at the opening session of Section VI yesterday morning:

Eugene Chamberlain, an honored member of this Association, a member of the Master Car Builders' Association, past president of the New York Railway Club, and of the Central Railway Club, has gone beyond, and we take this hour to publicly testify to his worth as a citizen and to give credit for the many good things he did for this Association.

You will remember the big jovial, whole-souled "Gene," the man who many times at our annual conventions related his experiences, gave you advice and with his benediction sent you to your homes with light hearts and with the firmer conviction that life was worth living.

His life was one of devotion to his family, his church and his friends. He had a high regard for his citizenship and endeavored to so live that his ideal could be attained.

The same patriotic spirit that led his father to respond with alacrity to the first call for troops in the Civil War, was duplicated in the son, and induced him before he was out of his "teens" to enter the ranks of the Federal army, but like many others he was laid low, by camp disease, and disqualified for the brave service he would have given had it been otherwise. He was always sensitively reticent with regard to being unable to fight as well as serve for the preservation of the Union, and few there were until after his life was ended, even among his most intimate acquaintances, who knew he was a veteran of that great struggle for the Stars and Stripes.

He knew the frailities and shortcomings of humanity, and while he would not condone a willful fault, he was generous in his sympathy for one who would fall and helpful by kindness and advice to those who needed assistance.

Many men, among them myself, can truthfully say that to him they are indebted for wise counsel and advice which aided them in their struggle for success.

He was not a dreamer, but he had a broad vision in connection with a keen intellect, and he was also a reader of character. His trying experiences in his younger days, coupled with his successes of after years, gave him a diversity of knowledge that enabled him to pass upon questions promptly, intelligently and effectively.

He was active in his duties when he became a member of this Association, which membership he prized so highly, for he realized we were an organization of men devoted to our calling with high ideals and with progress and service as our watchwords. He wanted to be one of this group of men that he could better and to a greater extent aid us in our endeavors. Aid us he did, and to him we owe a debt that cannot be paid. He gave us incentives for work which led to progress, he gave us service which we are passing along. His work will endure since he gave us the fundamentals on which we built our structure and this structure still stands.

It was in the flesh that he answered his first roll-call. He is not here to respond to-day. He is enrolled in the Great Beyond, his name in shining letters. He answers only to his Maker.

Enrollment Committee

Top Row, Left to Right—L. D. Mitchell, Detroit Graphite Company; F. H. Smith, Gold Car Heating & Lighting Co.; F. C. Koch, *Railway Age*; S. H. Campbell, Western Railway Equipment Co.; S. Inglis Leslie, the Leslie Company; F. E. Dodson, U. S. Rubber Co.; Harry Jacques, Simmons Hardware Co.; Geo. W. Denyven, Boston, Mass.; James A. Stevens, DeVoe & Raynolds Co., and C. L. Bates, *Railway Review*.
Bottom Row, Left to Right—Geo. A. Barden, Duntley Pneumatic Tool Co.; H. K. Williams, Safety Car Heating & Lighting Co.; Chas. H. Gayetty, Chairman, Quaker City Rubber Co.; Jos. E. Brown, O'Malley-Beare Valve Co.; F. V. McGinness, Transportation Engineering Corporation.

Registration, American Railroad Association

Section III, Mechanical

Adamson, E. A., M. C. B., C. of C., Pennhurst.
Arp, A., Gen. For., Penn., Craig Hall.
Attridge, O. T., M. M., Georgia, Lexington.
Baker, Geo. T., G. C. I., Penn., Worthington.
Barnes, P. H., G. C. E., B. & O., Warnick.
Barr, L. S., S. C. D. Live Poultry Transit C., U. S. Yards, Haddon Hall.
Barrett, R. W., G. F. C. D., N. & S., Princess.
Barthelemy, P. P., A. G. C. E., G. N., Marlborough.
Bean, W. L., Mech. Asst. to Pres., N. Y., N. H. & H., Ambassador.
Beaghen, Thos., Mexican Petroleum Corp., Traymore.
Beaumont, H. A., G. F. C. D., B. & O., Haddon Hall.
Bentley, W. F., Bouvier.
Bettcher, W. H., M. C. B., C. I. & W., Chelsea.
Brady, C., E. C. C., C. P., Fredonia.
Brady, J. F., Asst. M. M., B. & O., Regent.
Burch, J. J., G. F. C. D., N. W., Traymore.
Burell, W. C., M. M., B. & O., Sterling.
Calder, W. W., M. C. B., B. & O., Haddon Hall.
Carmer, J. R., G. F., P. B. & W., Princess.
Carty, F. J., M. E., B. & A., Alamac.
Caton, S. W., G. C. I., Western Maryland, Monticello.
Clark, I. N., M. C. B., G. T., Chalfonte.
Coffman, B. J., Asst. M. E., R. F. & P., Princess.
Corinth, A. B., G. C. I., A. C. L., Shelburne.
Coulter, A. F., Gen. Car For., Union, Channel.
Courson, J. F., G. F. Wall Shop, Penn., Seaside.
Craig, James, Ch. Draft., B. & M., Colonial.
Cunningham, J. L., S. M. O., Penn., West. Div., Traymore.
Curran, J. W., Dist. M. C. B., B. & O., Princess.
Davis, A. S., Supt. M. P., Penn., Devonshire.
Deems, W. A., M. M., S. I. R. T., Haddon Hall.
Demarest, T. W., G. S. M. P., Penn., Brighton.
Dickinson, F. W., M. C. B., B. & L., St. Charles.
Dittmore, Geo. W., D. & H., Marlborough.
Downing, I. S., G. M. C. B., C. C. C. & St. L., Traymore.
Dugan, G. A., M. M., P. & R., Dennis.
Eberle, Wm. F., G. F., Penn., New Princess.
Ewald, Wm., Supt., M. P., C. & P., Osborne.
Fetner, W. H., S. M. P., C. of G., Traymore.
Fisher, D. Wallace, Motive Power Insp., P. & R., Dennis.
Fouse, F., N. C. B., G. T., Ambassador.
Fox, Geo. P., Shop Supt., N. Y. C., Pennhurst.
Fravel, Geo. B., Supt. M. P., Penn., Dennis.
Freeman, J. D., G. F. C. D., Sunset Central, Strand.
Fry, Lawford H., Standard Steel Works.
Frye, A. D., S. M. P., P. & N.
Gordan, H. D., Marlborough.
Gosnell, C. B., C. C. F., Morgantown & Kingwood, Augustine.
Goss, W. F. M., Pres., Ry. Car Mfg. Assn., Marlborough.
Gray, C. B., M. M., Penn.
Greenwood, B. E., S. S., Seaboard Air Line, Princess.
Gross, E. G., M. M., C. of G., Blackstone.
Gutteridge, J., Gen. Car For., K. C. S., Princess.
Halbert, M. W., Chf. Interchange Inspector, Haddon Hall.
Hampton, J. N., F. C. D., A. C. L., Osborne.
Hanlin, J. M. M., S. A. L., Princess.
Harvey, H. H., G. C. F., C. B. & Q., Chelsea.
Hayes, A. C., F. G. C., N. Y. C., Pennhurst.
Hellman, Chas., G. C. F., Pitts. & Shawmut, Terminal.
Henry, J. M., A. C. S. M. P., Penn., Traymore.
Hildreth, Fred F., A. E. M. P., P. C. C. & St. L., Craig Hall.
Hodges, A. H., M. M., B. & O., Arlington.
Jackson, R. E., S. M. P., Virginian, Traymore.
Jenkins, E. M., M. E., Virg., Traymore.
Jennings, J. F., Asst. S. M. P., M. C., St. Charles.
Johnson, J. O., Southern, Fredonia.
Jones, E. S., Gen. Car Insp., B. & A., Pennhurst.
Joy, C. U., M. M., N. Y., N. H. & H.
Keene, J. C., Chf. Car Insp., Wabash, Alamac.
Kent, F. S., G. C. I., Penn., Marlborough.
Keppelmann, H. S., G. C. I., P. & R., Chalfonte.
Kimmett, M. A., G. F. C. D., C. R. R. of N. J., Avondale.
Kittle, Walker, Gen. For., Penn., Princess.
Lentz, J. S., M. C. B., L. V., Dennis.
Levesque, Geo. F., M. M., G. M. & So., Princess.
Lindley, W. M., Asst. M. M., Penn., Craig Hall.
McCullough, M. M., M. M., Penn.
McGahey, R. E., M. M., Washington & Southern, St. Charles.
McGary, Alex., G. F. E. C. L. E., N. Y. C., Breakers.
McGunty, T. M., Gen. For. Car Insp., Penn., Princess.
McIlvaine, C. L., S. M. P., Northern Div. Penn., Brighton.
McIntosh, J. W., M. M., N. Y., N. H. & H., Princess.
McMillian, A. E., M. M., B. & O., Arlington.
McMullen, J., S. C. D., Erie, Ambassador.
Maddox C. W., C. C. I., C. & O., Chalfonte.
Manderson, A. R., A. S. M. P., Maine Central, Chelsea.
Martin, K. H., Gen. Equip. Insp., Southern, Breakers.
Mehan, J. E., Gen. Car For., C. M. & St. P., Strand.
Mengel, J. C., M. M., Penn., Chelsea.
Meyers, Samuel, G. S. K., L. & H., Holmhurst.
Millar, E. T., G. C. I., D. & M., Colonial.
Miller, E. N., Motive Power Insp.
Minick, Eli, Genl. Foreman, Atlantic City, Monticello.
Montague, W. T., M. Mech., Penn. Marlborough.
Moore, A. F., Gen. For. Car Dept., Penn., Princess.
Mounce, R. S., G. F. C. R., Erie, Pennhurst.
Nelson, F. W., M. M., N. Y., N. H. & H., Princess.
Nevins, B. E., M. M., Virginian, Osborne.
Nowell, H. T., M. S., Cent. Vt., Elwood.
Nystrom, K. F., Engr. Car Constr., Grand Trunk, Ambassador.
O'Donnell, T. J., Arbitrator, N. F. C. I., Pennhurst.
Onderdonk, J. R., Eng. Tests, B. & O., Traymore.
Palmer L. W., M. M., East Broad Top, Richmond.
Pardue, W. J., M. C. B., Seaboard, Chelsea.
Parks, O. J., G. S., Gen. Amer. Tank Car, Haddon Hall.
Pattison, J. H., Gen. For., N. & W.
Patton, C. S., S. M. P., Seaboard, Chelsea.
Penderton, Harry J., Asst. M. M., Penn., Craig Hall.
Peters, J. W., M. C. B., G. T., Marlborough.
Pitt, W. A., Gen. M. C. B., G. T., Ambassador.
Porcher Samuel, P. A., Penn., Traymore.
Potts, C. H., P. R. R., Chalfonte.
Quinn, J. H., G. F., Penn., Princess.
Quinn, M. H., G. M. S., Erie, Pennhurst.
Ramage, J. C., Supt. Tests, Southern, Southland.
Reed, James, M. C. B., N. Y. C., Breakers.
Renner, C. W., A. G. F. C. S., Penn., Princess.
Rockfellow, W. E., D. C. F., N. Y. C., Pennhurst.
Roush, C. S., Gen. Foreman, Buffalo Div., Penn.
Senger, J. W., S. R. S., N. Y. C., Esplanade.
Schrader, P. G. C. F., N. Y. C., Strand.
Shackford, J. M., C. D., D. L. & W., Traymore.
Simms, H. A., Mech. Supt., Amer. Ry. Exp., Chalfonte.
Slagle, C. G., S. M. P., C. I. & W., Chelsea.
Smart, G. E., G. M. C. B., C. N., Ambassador.
Smith, J. C., M. M., Western Md., Grand Atlantic.
Spoor, C. E., M. C. B., B. & S., Somerset.
Stewart, T. R., Shop Supt., B. & O., Haddon Hall.
Sugg, Chas. R., E. E., Coast Line, Marlborough.
Taylor, F. C., G. C. I., P. B. & W., Berkshire Inn.
Thomas, I. B., P. A., Penn., Traymore.
Thompson, Geo., M. C. B., N. Y. C., Breakers.
Thorn, W. H., M. C. B., C. St. P. M. & O., Pennhurst.
Tierney, H. J., Traymore.
Trapnell, F. W., C. I. I., Kansas City Car, Chalfonte.
Vittum, J. E., Ch. Joint Inspector, Columbus, Colwyn.
Walker, Wm., Supt. Shop, M. K. & T., Blackstone.
Wagoner, J. V., M. M., Georgia Florida & Alabama, Arlington.
Weight, G. C., G. C. I., Penn., Garden Inn.
Wiese, A. J., Dist. M. C. B., B. & O., Alamac.
Yergy, J. P., G. F. C. S., Penn.

Section VI, Purchases and Stores

Abel, A. W., Stat. S. K., Penn.
Agner, R. L., D. S. K., Southern, Schlitz.
Aikens, B. A., P. A., M. C., Ambassador.
Baldwin, C. D., P. A., B. & A., Alamac.
Ballinger, A. L., Storekpr., Penn., Craig Hall.
Barrows, C. D., P. A., Maine Cent., Ambassador.
Beernett, C. D., Storekeeper, Western Maryland, Elberon.
Bender, E. N., G. P. A., C. P., Marlborough.
Bennett, J. L., P. A., C. of G., Traymore.
Berry, H. K., P. A., C. & I., Alamac.
Blackburn, R. M., G. S. K., C. & N. W., Chalfonte.
Bogan, J. E., D. S. K., Mo. Pac., Strand.
Bond, J. L., Div. Store., Penn., Craig Hall.
Brady, W. E., Ch. Acct., A. T. & S. F., Princess.
Brown, N. J., S. K., B. & S., Somerset.
Brown, R. W., D. S. K., C. C. & O.
Burr, H. S., Gen. Super. of Stores, Erie, Esplanade.
Butterworth, Jos. A., Ch. Cl. to P. A., So. Ry., Grand Atlantic.
Byron, J. E., G. S. K., H. & M., Monticello.
Clark, J. E., S. K., Erie, Lexington.
Creel, C. C., Div. S. K., Penn., Princess.
Dale, A. R., Genl. Storekeeper, Florida East Coast, Marlborough.
Daniel, A. D., P. A., A. B. & A., Marlborough.
Davis, C. I., S. K., D. L. & W., Arlington.
Davis, H. G., Store., Erie, Blackstone.
Dawson, V. N., Div. Sk., B. & O., Pennhurst.
Deery, James, Asst. to Pur. Agt., Penn.
Dernam, W. M., D. S. K., S. A. L., Princess.
Dewart, H. M., P. A., C. V., St. Charles.
Dibble, C. C., Supt. of Stores, N. Y. C., Traymore.
Dickinson, T. R., D. S. K., B. & L. E., St. Charles.
Dixon, W., Insp. of Stores, Miss. Pac., Strand.
Drayton, H. S., D. S. K., N. Y., N. H. & H., Princess.
Elder, S. M., Asst. Ticket Agent, B. & O., Haddon Hall.
Enscol, John R., Trav. Storek., N. Y., N. H. & H., Princess.
Fechtig, F. H., P. A., A. C. L., Chalfonte.
Feemster, J. L., G. S. K., C. G. W.
Fisher, O. D., Div. Store., Penn.
Fitzpatrick, Wm. H., Trav. Store., C. & N. W., Chalfonte.
Foley, F. I., Gen. Stores Acct., N. Y., N. H. & H., Princess.
Forde, T. J., Hog Island Belt, Shelburne.
Foss, N. C., P. A., G. T. W. L., Marlborough.
Frazee, W. H., Ch. Acct. P. A. Dept., Penn.
Frier, T. J., P. A., Wabash, Marlborough.
Gage, A. M., S. K., Lake Erie & W., Princess.
Gaines, E. C., For., M. P., N. & W.
Galleher, J. W., Asst. Store., Erie, Freemont.
Galloway, W. S., P. A., B. & O., Ambassador.
Garnett, J. E., D. S. K., Southern.
Gerber, J. W., G. S. K., Southern, Traymore.
Godard, E. E., Asst. Eng. Elec. Car Ltg., Penn.
Goodchild, A. A., G. S. K., C. P., Marlborough.
Graham, R. K., Gen. Supt., A. T. & S. F., Princess.
Graham, W. A., P. A. & S. K., Temisk. & No. Ont., Wilmington.
Greetham, E. S., S. K., Quehec, Mont. & S., Princess.
Grier, G. W., D. S. K., Southern, Schlitz.
Grubhs, F. C., Div. Stkr., Penn., Blackstone.
Hadley, A. W., Supt. Recia Plant, N. Y., N. H. & H., Princess.
Harris, P. D., Local S. K., Mich. Cent.
Harris, R. C., G. S. K., Penn. Central Region, Traymore.
Hartzell, J. L., Div. Store., West. Md., Wiltshire.
Harvey, Wm. A., Div. S. K., Penn., Craig Hall.
Heazlitt, B. Y., Pur. Dept., Ky. & Ind. Ter., Traymore.
Herhau, M. V., Dist. Store., Ann Harbor, Regent.
Hiner, W. J., P. A., C. C. C. & St. L., Marlborough.
Hinkey, W. M., Supt., of Materials, B. & O., Blackstone.
Hisatome, Yoshisato, S. K., Imp. Gov. Rys. of Japan, Breakers.
Hodges, H. B., P. A., L. I., Esplanade.
Holmes, A. M., P. A., Lehigh & H. R., Chalfonte.
Hubbell, C. C., P. A., D. L. & W., Ambassador.
Huft, R. H., Local S. K., Mich. Cent.
Hughes, E. S., Fuel Agent, A. B. & A., Marlborough.
Jackson, J. C., G. S. K., G. T. West Lines Blackstone.
Jellison, B. T., G. P. A., C. & O., Marlborough.
Jones, M. G., Div. Storekeeper, Penn.
Justice, H. B., Storekeeper, Penn., Avon Inn.
Karl, J. H., S. K., Erie, Craig Hall.
Kavanagh, D., G. S. K., Union, Esplanade.
Kelly, T. F., Road. Stkp., N. Y., N. H. & H., Princess.
Kemmerling, B. B., Dist. Storekeeper, Penn., Craig Hall.

Kenneoy, M. C., V. P. Charge Pur., Penn.
Kennedy, M. C., Jr., Penn.
Kilgore, John W., Div. S. K., Penn., Craig Hall.
Kincaid, C. R., Div. S. K., B. & O., Alamac.
King, B. C., Gen. Storekeeper, Virginian, Strand.
Kinnear, G. W., Gen. Store., Penn.
Kohler, L. G., Div. Storekeeper, B. & O., Blackstone.
Krezschmer, E. E., P. A., Chicago L., Alamac.
Kreglow, A. F., Store., Wash. Term. Alamac.
Kukis, John J., Storehouse Insp., Erie, Marlborough.

Landers, E. H., G. S. K., C. C. C. & St. L., Traymore.
Lawton, E. W., Storekeeper, Penn.
Lehesch, G. H., Div. Storekeeper, Penn.
Lewis, H., Mgr. P. & S., C. I. & W., Chelsea.
Lithgow, J. A., S. K., B. & M., Monticello.
Lovett, C. C., S. K., B. & H.
Lynch, J. F., Storekeeper, C. R. R. of N. J., New Brady House.

McAndrew, R., G. S. K., D. & L. E., St. Charles.
McCall, P. F., Gen. Storekeeper, Chicago, Alamac.
McCann, J. L., Supt. Reclamation Plant, B. & O., Pennhurst.
McCarthy, J. H., Dist. S. K., W. J. & S., Malatesta.
McDonald, J. J., Gen. Storekeeper, C. P. & St. L., Marlborough.
McGough, P. J., Div. Storekeeper, P. & R.
McKeand, C. H., P. A., Toledo Term., Breakers.
McMahon, John E., G. S. K., C. St. P. M. & O., Princess.
McQuade, H. J., P. A., L. V., Ambassador.
McQuilkin, H. P., G. S. K., B. & O., Haddon Hall.
Marshall, J. F., P. A., C. & A., Haddon Hall.
Meyers, Samuel, Jr., G. S. K., L. & H., Holmhurst.
Michael, W. B., D. S. K., Southern, Schlitz.
Miller, E. J., Store., Erie, Traymore.
Mills, O. B., Genl. Storekeeper, Penn., Blackstone.
Minton, W. F., D. S. K., Southern, Schlitz.
Mitchell, W. R., A. S. K., Erie, Lexington.
Moore, Tom, P. A., Virg., Traymore.
Morgan, D. C., Jr., Pur. Agt., Pittsburg & Shawmut, Dennis.
Moser, H. S., Store., W. M., Wiltshire.
Munster, A. W., P. A., B. & M., Ambassador.
Murphy, F. A., D. S. K., B. & O., Seaside.

Nettles, W. B., D. S. K., Southern, Schlitz.
Nicodemus, E. H., Dist. Stkr., Penn., Blackstone.

O'Connor, F. J., Asst. Gen. Storekeeper, C. M. & St. P., Fredonia.
Otto, C. A., Equip. Agt., Penn.

Pace, R. T., P. A., A. & W. P., Ambassador.
Pearce, H. C., C. P. A., Seaboard Air Line, Marlborough.
Phillippe, B. P., A. P. A., Penn., Chelsea.
Porcher, S., G. P. A., Penn., Traymore.
Pitrer, E. L., S. K., Sav. & Atla., Haddon Hall.
Pomeroy, R. I., Div. S. K., Penn.
Price, E. H., Asst. to G. S. K., N. Y., N. H. & H., Princess.

Quigley, G. V., S. K., A. A., Regent.

Rainie, H. M., A. S. K., B. & M., Rothwell.
Rankin, Ray, Asst. Store., Erie., Sea Crest.
Ray, H. B., G. S. K., A. T. & S. F., Traymore.
Ray, H. C., Dist. Store., Penn., Wiltshire.
Reardon, F. C., Supt. of Stores, D. & H., Princess.
Reed, C. B., Gen. Storekeeper, P. & S., Chalfonte.
Reyno, E. R., Storekeeper, Camden, Penn.
Richie, C. A., S. K., Erie, Lexington.
Roberts, E. G., Div. Store., R. I., Continental.
Robinson, E. C., A. P. A., O. J., Princess.
Rook, D. E., Dis. Storekeeper, Penn., Blackstone.
Ruston, W. E., Supt. Stores, B. & M., Monticello.

Scott, F. L., P. A., L. V. C. Co., Ambassador.
Seaybe, H. J., Asst. P. A., B. & M., St. Charles.
Secor, G. A., G. S. K., C. & A., Haddon Hall.
Sedwick, T. D., Eng. of Tests, C. R. I. & P., Traymor.e
Sheehan, M. L., S. K., B. & A., Alamac.
Shoemaker, H., S. K., B. & O., Blackstone.
Sitgreaves, G. W., G. S. K., L. & N. E., Pennhurst.
Smith, Harry C., Storekeeper, Penn., Esplanade.
Smith, J. H., Div. Storekeeper, Southern, Schlitz.
Sowell, A. W., B. S. K., C. of G., Pennhurst.
Stanwood, W. E., Storekeeper Pavonia Shops, Penn.
Starrett, W. A., P. A., C. C. & O.
Stokes, W. D., A. G. S. K., I. C., Esplanade.
Stout, Harry D., Insp., Penn.
Stowasser, W. H., S. K., C. & O., Osborne.
Stuart, J. G., G. S. K., C. B. & O., Esplanade.
Sutton, G. W., S. K., C. & O., Davenport.
Sweeney, J. H., Supt. Stores, Erie, Marlborough.

Talbot, F. J., Supt. Stores, Erie, Breakers.
Taylor, C. M., Div. Stkpr., Penn., Blackstone.
Tice, H. E., S. K., Erie, Alamac.
Tillett, A. A., Dis. Stkp., Penn., West, Esplanade.
Tobey, C. B., A. G. K. S., L. V., Belfort.
Thomas, I. B., P. A., Penn., Traymore.
Traister, W. G., S. K., Staten Island R. T.
Trimble, R. D., Storekpr., B. & A., Pennhurst.
Tucker, F. B., S. K., Erie, Breakers.

Vaughn, A. C., S. K., Erie, Monticello.

Wagner, A. C., S. K., Erie, Alamac.
Wagner, John M., P. A., Copper Range, Haddon Hall.
Walker, E. G., A. P. A., A. T. & S. F., Dennis.
Walsh, P. H., G. S. K., A. G. L., Chalfonte.
Walther, A. D., Gen. Storekeeper, T. P., Haddon Hall.
Warden, H. M., Supt. Reclamation Plant, M. K. & T., Chelsea.
Warne, C. C., A. P. A., N. Y. C., Traymore.
Wart, W. C., D. S. K., B. & O., Alamac.
Waterman, J. H., Supt. Tim. Pres., C. B. & Q., Haddon Hall.
Whalen, T. F., D. S. K., N. Y., N. H. & H., Princess.
White, Geo. D., Storekeeper, Penn., Traymore.
Williams, D. A., Asst. to P. A., B. & O., Strand.
Wnyder, G. W., 2d, G. S. K., Penn, Fredonia.
Wonnell, G., Dept. Storekeeper, Penn., Blackstone.
Workman, E. A., D. S. K., B. & O., Arlington.
Wright, Eugene, G. S. K., L. I., Esplanade.

Yeamans, C. W., P. A., C. & W. I., Dennis.
Yeomans, Geo. G., S. A. to Pres., N. Y., N. H. & H., Esplanade.
Young, C. D., Gen. Supt. of Stores, P. H., Brighton.
Young, Wm. H., Storekeeper, Penn.

Special Guests

Abbott, R. B., Asst. Gen. Supt, P. & R., 5465 Ventnor Ave.
Abrams, H. N., Gen. For. M. P. Dept., L. I.
Ale, E. R., Foreman Elec. Laboratory, Penn., Marlborough.
Anderson, A. L., Enginehouse For., L. I.
Anderson, H. A., Asst. E. M. P., Penn., Morton.
Andrews, S. B., Engineering Acct., Virginian, Monticello.
Armstrong, A., Ch. C. I., So., Princess.
Arnold, Harry M., Acct. Off. General Storekeeper, P. & R.
Attridge O. C., Georgia, Lexington.
Barnum, Ward, Senior Elec. Engr., Interstate Com. Com., Chalfonte.
Bear, C. A., Pass. For., N. Y. C., Pennhurst.
Beasley, S. F., M. C. B., Sinclair Ref. Co., Strand.
Beaumont, J., Representative, Chilean State Rys. Marlborough.
Bebout, C. W., Elec. & Shop Eng., C. & O., Chalfonte.
Beck, Jos., Chf. Electrician, D. & I. R., Dennis.
Berder W. A., G. C. F., B. & O., Arlington.
Bennett, H. J., G. F., Penn., Princess.
Benson, I. N., S. M. C., N. Y. N. H. & H., Breakers.
Bernhardt, C. F. M., F C. D., Georgia, Lexington.
Blair, Geo. A., V. P., Wilson Car Lines, Haddon Hall.
Blanchard, W. P., Asst. M. C. B., Sinclair Ref. Co., Strand.
Bierne, G., For. C. I. R. R. of N. J., Mt. Vernon.
Bone, A. H., Inspecting Engr., Egyptian State Rys.
Borer, F. J., For. Frt. Shop, C. R. R. of N. J., Terminal.
Borland, W. D., Ch. Bureau of Safety, I. C. C., Blackstone.
Borup, O. V., Draftsman, B. & O., Arlington.
Boucher, E. F., Gen. For. Loco. Repairs, Wash. Terminal Co., Elberon.
Bowers, B. A., Term. Asst. M. M., B. & O., Regent.
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(*See also other registrations elsewhere in this issue*)

New Devices Among the Exhibits

Klasing Hand Brake

A HAND BRAKE in which the brake staff and wheel are replaced by a tension rod and lever operating in a vertical plane is being exhibited in its booth on the pier by the National Car Equipment Company, Chicago. The device is known as the Klasing safety hand brake and is fully applied with a force equal to that of a full application of the air brake by a single movement of the handle through a vertical angle of 90 deg.

The outstanding feature of the device is the specially designed bell crank by which the vertical pull of the tension rod on the end of the car is transmitted to the brake rod. The pivot of this bell crank is not fixed, but is fitted with a gear segment which rolls on an inclined rack, the angle of which causes the motion to be downward and toward the end of the car when the brake is applied. The chain is attached at a point below and slightly back of the pivot center when the bell crank is in release position and is wrapped over a cam surface as the application movement progresses. The combined motion of the rolling center and the cam face of the lever produces a quick take-up of slack with an increase of leverage toward the end of the travel. The device has a take-up capacity of 14 in. of chain.

The Klasing Safety Hand Brake

The operating mechanism consists of an application handle connected to a short gear shaft through a ratchet and pawl, the gear operating between fixed and movable vertical racks. The outside of the movable rack is provided with ratchet teeth which engage a dog held in position by a reversible weight pivoted in the housing. The brake is applied by one hand; an upward pull of 175 lb. on the handle produces a pull of 3,500 lb. in the brake rods.

To release the brake the weight is turned to release position, the handle raised slightly to release the pawl and then dropped. It is carried down by the lever ratchet, which carries it slightly beyond the normal release position, causing the heel of the pawl to strike the housing. This disengages the pawl and allows the movable track to drop freely. As it reaches the bottom of its travel its upper end automatically trips the rack pawl and weight to the application position. To graduate the brake on and off sufficiently to make an accurate stop, the weight is placed in release position, the pawl released, which leaves the handle free to be lowered and raised as conditions require.

The position of the handle and the direction of its application motion is such that the element of danger always present when the usual type of hand brake is removed. A further safeguard is provided in that the operator has one hand free with which to grasp a grab iron. In releasing the brake, there is no shock on the handle to endanger the operator.

Headlights, Back-Up Lamps and Headlight Switches

NEW TYPES OF HEADLIGHTS, back-up lamps and headlight switches, all in cast-metal cases, are being exhibited by the Pyle National Company, Chicago. The headlight case is cast in one piece without seams or rivets and is fitted with a 16-inch glass reflector. The reflector is designed to meet the range of vision demanded by headlight requirements and at the same time to give a sufficient spread to illuminate the sides of the right of way. Means are provided for focusing the lamp and provision is made for a rigid conduit connection to the body of the case when desired. The case complete weighs about 110 lb.

The back-up lamps are also cast in one piece, are tapped at the top for continuous conduit and are provided with supporting lugs. The front door is hinged, fitted with a standard signal lens and closes with a spring latch. A receptacle with lamp grips is used. The connections are accessible for testing the lamp circuit. A plate glass covers an opening in the bottom of the case through which a beam of light is thrown downward and outward, lighting the coupler and step and providing positive assurance to the engine crew that the lamp is lighted. The beam of light is augmented by mirrors placed inside the case and at a suitable angle to reflect additional light to the outer portion of the lighted area.

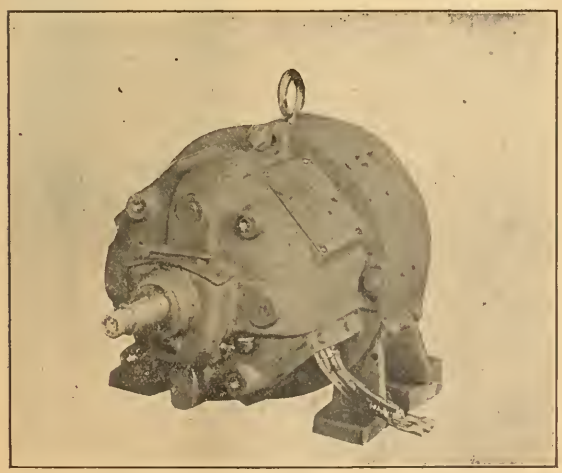
The switch is of the condulet type, tapped for conduit. The terminals are enclosed by the case and the handle is locked in its three positions. The terminals are raised from the side of the box to permit accessibility with the box mounted in any position.

D.-C. Series Motor for Crane and Hoist Service

FOR INTERMITTENT, VARYING SPEED SERVICE where heavy starting torque is required, such as for cranes and hoists, the Westinghouse Electric & Manufacturing Company, Pittsburgh, Pa., has recently brought out the type HK direct-current, series-wound motors. These motors are especially designed for use where the work requires a series of starts, stops and reversals, the motor being idle for only short periods of time. The motors are of enclosed construction with small openings in the lower part for ventilation. Covered openings in the top half of the frame give access to the brushes and the commutator. Compact construction, giving small overall dimensions, light weight and great mechanical strength are prominent features.

The HK motor has a forged open-hearth steel frame and solid forged-steel feet. The motors above 3 hp. rating are equipped with commutating poles so that high momentary loads can be carried without sparking, and long life of the commutator and brushes is thereby insured. All field coils are thoroughly insulated and impregnated. The brackets are strong and rigid, each being complete with an oil well and bearing housing. Oil ring lubrication is used. The brush holders are clamped to insulated rods mounted on the front brackets, which are dowelled in place. The position of the brushes is thereby fixed for both directions of rotation.

Armature coils are form-wound and thoroughly insulated and impregnated before being placed in the slots. A blower is placed in the rotor which effectively ventilates both the armature and the field windings. This allows a smaller diameter armature to be used, resulting in low flywheel effect, consequently little energy is required to start and stop the motor thereby reducing to a minimum wear and tear on the bearings and brakes. Electrically operated shoe type brakes are supplied when ordered. They are bolted to the machined lugs on the motor bracket, making a compact unit of motor and brake. The brake is simple and rugged and provision is made for adjusting for wear of parts.



Type H-K Series Wound D. C. Motor

The ability of any motor to do its daily work, as far as temperature rise is concerned, is determined by the continuous rating it will carry at a safe temperature. A ventilated motor has a larger continuous rating than a non-ventilated motor of the same short time rating. A ventilated motor rated at 7½ hp. one-quarter hour, has about 30 per cent more continuous capacity than the non-ventilated motor rated at 7½ hp. one-half hour. In order to utilize to advantage the ventilated feature, the HK line of motors has been rated on the one-quarter hour basis. Comparison of the whole line shows that on this basis the motors have a larger continuous rating than non-ventilated motors of the same half-hour rating.

Drinking-Cup Machine

AN INTERESTING CONTRIBUTION in the field of sanitary appliances is being exhibited at the booth of the West Disinfecting Company, in the form of a new drinking-cup machine. This device, which is manufactured by the Germproof Cup Corporation, New York, produces a perfectly formed, water-tight paper cup from a roll of paper. The operation of the machine is of a novel character and produces an inexpensive sanitary, individual drinking cup. The machine is a self-contained device, approximately the size of many containers now used for holding flat paper cups. A paper roll is inserted in the top and the turning of a handle unwinds a small portion of the roll and cuts, shapes and forms it into a drinking cup, which is delivered instantly. The cups are made and delivered with great rapidity, but the gearing is so arranged that there is no waste and the cups are discharged one at a time.

Machine for Making Paper Drinking Cups

This machine is simple and ingenious in construction, and the results obtained with it are most interesting. Paper alone must be purchased and all the labor connected with the making of the cup is supplied by the actual user. It is claimed that the machine will soon pay for itself through the saving effected by its use. Another feature equally important is the sanitary character of the cup produced. Inasmuch as the paper is supplied in rolls, the cup is not made until the moment that it is to be used and is as sanitary a cup as could be obtained. From the time that the paper is made at the mill to the time that the finished cup is delivered from the machine the entire process is mechanical and no hand need ever come in contact with it. Furthermore, no glue is used in forming the cup which is absolutely tasteless and odorless.

As the cups are produced one at a time, it is impossible to obtain a number by mistake. Not only is there no waste, but the machine provides a most convenient method of obtaining a cup, and the fold on one edge

provides a double drinking surface, which is pleasant and safe to drink from. Where large quantities of cups are used the supply of rolls can be stored in less space than is required by packages of finished cups. Each roll of paper as now manufactured produces 500 cups and occupies a space less than 5 in. by 5 in. by 4 in. Germproof machines have been in operation for over six months.

A New Journal Jack

At its exhibit the Duff Manufacturing Co., Pittsburgh, Pa., is presenting for the first time an improved type of journal jack, which entirely eliminated the dangerous possibility of raising the load too far. With previous types of journal jacks there was often the chance of a careless workman continuing to operate the jack until the standard was pushed up out of the base, with likelihood of damage and serious injury. The new Duff journal jack is so constructed that it cannot be raised beyond its maximum height.

Another new feature of this jack is that the head is unusually small. While amply large to carry the load,

Huff Ball Bearing Screw Type Journal Jack

the small diameter facilitates placing the jack in confined places and compels even the most careless workman to place the jack squarely under the journal box. The standard is keyed to prevent the jacks from rotating under load.

The jack is of the ball-bearing screw type. Large ball bearings, of alloy steel, are used to support the load, reducing friction. Each ball is capable of withstanding, without crushing, a pressure equal to the maximum rated capacity of the jack. The lifting screw of high carbon crucible steel heat treated and the nut in which the screw rotates is of a special alloy, which combines extreme toughness with a very low co-efficient of friction. The gears are machine cut from special steel, case hardened and heat treated. The new Duff Journal Jack is made with capacities of 15 and 25 tons, and with heights of 8, 9⅜ and 11 in.

Electric Water Cooler

The Safety Car Heating & Lighting Company, New York, has produced an electric water cooler so designed that it can be applied to an ordinary car cooler or be used in the space now occupied by one. No ice is required, the machine being operated by a motor.

The lower part of the cooler is of the well-known inverted bottle type except that there is a coil of pipe and a thermostat in the small tank below the bottle. The bottle has a capacity of two gallons. Above the bottle is a radiator and an electric motor which drives a small compressor and a fan. The system contains a small quantity of refrigerating medium.

When the temperature of the water in the tank rises to 45 deg. the thermostat causes an automatic switch to close which starts the motor, compressing the refrigerant to a liquid state in the radiator while the fan, blowing air over the radiator, carries away the heat of compression. The liquefied gas then flows to the cooling coil in the tank where it is expanded, absorbing heat from the water around the coil. The expanded gas then goes again to the compressor and the cycle is repeated. The motor is stopped by the thermostat when the temperature of the water falls to 40 deg.

Two Gallon Electric Water Cooler

The complete outfit is contained in a cylinder 3 ft. 9 in. long by 10 in. in diameter. The device can be operated from any source of electric power for which fractional horsepower motors are designed.

Easily Controlled Air Hoist

A newly developed pneumatic motor hoist, which was described in the May *Railway Mechanical Engineer*, is being exhibited by the Independent Pneumatic Tool Company, Chicago, Ill. This hoist is made in ½-ton, 1-ton and 2-ton sizes and owing to the use of a throttle valve with graduated opening, it is exceptionally easy to control the motor speed. The motor is reversed by shifting the eccentric with throttle chains, while the valve is shut off. The hoist is provided with a large worm gear drive. Safety in operation is secured by the worm gear which holds the load even should the motor be entirely removed for repairs. Automatic stops prevent injury to either the load or the hoist.

The Wiederwax Preheater

In perfect preheating for welding three elements are necessary: even heat, control, and facility of handling. Up to the present time charcoal has been the almost universal method of preheating, on account of the fairly even heat obtainable. But though it can be made to burn evenly, a charcoal fire is not always controllable, and moreover is difficult to work with in more ways than one. There are, in addition to charcoal, torches and furnaces of various sorts. While these are adapted to certain kinds of work with more or less successful results, their work is not always efficient, and their scope is decidedly limited.

The Wiederwax preheater, manufactured by the Geist Manufacturing Company, Atlantic City, N. J., is a continuous heating medium using for fuel, artificial or natural gas or gasoline. It is square in shape, with a large flat table surface. This table consists of a heavy metal grating, between the bars of which is placed a special heat-absorbing element reaching downward to a depth of about six inches. This refractory heating substance

Floor Model, Wiederwax Preheater

absorbs the heat furnished by a series of specially constructed burners, and distributes it until it becomes a cherry red all over, thus giving off a soft radiant heat whose temperature is the same at all points of the heating surface, and which is controllable at all times, to almost any degree of temperature.

The burners supplying the heat are placed in rows, each row running from the side to the center, and each row controlled by its own valve. This arrangement makes it possible to use any number of burners and thus, any part of the heating surface desired either in width or depth.

Immediately beneath the burners is the cooling oven, the ceiling of which is formed by a series of perforated pipes, whose open ends run outward through the sides of the preheater, just between the burner valves. As soon as they become hot from the fire over them, air is automatically circulated through them, heated and radiated into the oven underneath.

This oven is square and roomy and is provided for the cooling of finished jobs. It retains a heat ranging downward from 500 deg. F., according to the number of burners in operation, is free of all draught, and reduces the heat of the finished piece with a slow even contraction, thus removing the danger of warping and cracking.

Welding with the Wiederwax preheater has many advantages over the use of charcoal, the chief drawback to which is the trouble it requires in preparing for a preheating job, and the awkwardness and uncertainty in handling the job once it is upon the fire. First an oven of fire-brick must be built, the charcoal placed in it and fired, and then carefully nursed to the point where it will burn evenly. The slightest draught may heat the fire in spots, which at once endangers the piece being preheated. Such a process requires time, in the case of the ordinary charcoal fire, from a half hour to an hour.

If there is more than one piece to be welded, the chances are that a separate fire must be built for each one, for usually when the weld is completed and the piece taken off, the fire is either broken down or scattered. If the piece is a big one, requiring several welds at different points, it is next to impossible to turn it without breaking down the fire. This necessitates long waits between welding, and much labor and time in attending to fires. The operator, working with charcoal, is at a disadvantage. He must bend low over the charcoal fire to do his welding. He works in the face of smoke, fumes and flying sparks.

With the Wiederwax preheater, the operator turns on the number of burners he may require, strikes a match, and his fire is ready. In this operation, from one-half to one hour is saved in labor and time on each job, for as high as six, or even more, jobs may be heated upon this preheater at one time, each job requiring a different degree of temperature. This is made possible by the arrangement of the burners, which may be used wholly or in part. Any part of the heating surface may be used by one man while another, and even a third, may use still another part, each man utilizing a different degree of heat. Or if there be only one operator, he can weld one job while the next is heating.

The operator stands in the normally erect position while working. His eyes are clear of smoke, his lungs free of fumes, and he moves about with perfect freedom and ease. The job upon which he may be working may require any number of welds. It may be turned very easily, without breaking down a fire, or losing any of its heat, thus saving both time and annoyance. As fast as one job is finished it may be transferred to the cooling oven with very little effort, and the next piece set in its place for preheating.

The Wiederwax Floor Model

This model is designed specially for large castings of all kinds, and obviates all danger of uneven heating. Its construction and operating methods are precisely the same as in the table models, though because of its size and range, the cooling oven has been dispensed with and the frame supporting the burners is placed on a foundation at the floor level. Some remarkable welding work has been accomplished with this preheater and large castings have been successfully preheated which could not possibly have been handled with a less efficient preheater.

Locomotive Recorders

Instruments for recording the speed and actual mileage of both road engines and switchers are being exhibited at Space 747, in the balcony, by the Speedograph Corporation, Newark, N. J. A detailed description of the Model K recorder designed for use on road engines is given on page 306 of the *Railway Mechanical Engineer*. Complete and important information regarding train operation over a division can be obtained. Maximum allowable speeds on curves and at other points where there are speed restrictions may not be exceeded without leaving a tell-tale record on the recording tape. This results in increased safety and a reduction of wear and tear on rolling stock. The Model L recorder gives the same information for switchers. Both instruments

are of comparatively simple, rugged construction, and do not require expert mechanical ability to keep them in operating condition.

Wheel and Ratchet Lever Brake Tests

THERE HAS BEEN A GREAT DEAL OF CONTROVERSY in the past as to the force developed on the brake chain with various diameters of brake wheels and also as to the power that could be developed with ratchet brake levers. In order to arrive at some definite conclusions a series of tests was recently conducted by R. H. Blackall, Pittsburgh, Pa. The accompanying tabulation shows the chain pulls recorded through a dynamometer under the conditions noted. The chain was of 7/16-in. diameter and the winding drum of 1½-in. diameter.

RESULTS OF TESTS

	Avg. pull made by 3 brakemen and 7 office men	Avg. of all pulls made on tests
15 in. ratchet lever brake		1,540 lb.
18 in. ratchet lever brake	2,080 lb.	2,040 lb.
24 in. ratchet lever brake	2,320 lb.	2,410 lb.
15 in. brake wheel		1,300 lb.
15 in. brake wheel (with 28 in. club)		2,040 lb.
16 in. brake wheel		1,440 lb.
16 in. brake wheel (with 28 in. club)		2,280 lb.
18 in. brake wheel		1,440 lb.
18 in. brake wheel (with 28 in. club)		2,560 lb.

Variation of results from which the averages were made, aside from difference in the strength of the operators, was due largely to the position of the chain on the shaft at the time each obtained his maximum pull. This, however, is the condition found in actual practice.

The leverage is greater when the vertical link starts to mount the shaft than it is when the horizontal link is in a corresponding position. Also, as the horizontal link starts to mount the shaft, the small curvature of the chain shoulders the shaft and presents an obstruction which has to be overcome before the chain can be wound up further and thus register a greater reading on the dynamometer.

A comparison of the average pull made on these same tests by the one brakeman and those made by three brakemen and seven spectators, demonstrated that the spectators caused a drop in the average chain pull of but 100 lb. with both the 18 and 24-in. lever tests, while with the 16-in. diameter wheel the average was pulled down 350 lb. This was also the case in the test with a 28-in. club used on the 16-in. wheel. This would indicate that an inexperienced man can obtain approximately full power with a lever brake, whereas experience is required to obtain the usual power with a wheel or with a wheel and a club.

The difference in the results obtained with the 15-in., 16-in. and 18-in. wheels in connection with a club can be explained by the fact that the smaller the diameter of the wheel the more nearly vertical is the position the club assumes. This means an actual loss in leverage with the smaller wheels, as is shown by the tabulation. A dished wheel has the same effect as a smaller diameter wheel. It will be noted that an 18-in leveraged ratchet is a little less powerful than a 16-in. brake wheel with a 28-in. club, and that a 24-in leveraged ratchet is more powerful than a 16-in. wheel used in conjunction with a 28-in. club.

Ratchets have been condemned many times by brakemen because the length of the old "pick handle" looked good to them, not realizing that, so long as the brake was efficient, it mattered not whether the power was obtained by the length of the pick handle or by a ratchet brake lever in connection with a properly designed foundation gear. Knowing that a pick handle would be used, it has been the practice of railroads, in order to avoid wheel sliding when a club was used, purposely to design a hand brake of low efficiency. This meant a very low braking power when the club was not available, and a brake, when the club was used, proportionate to the length of the club.

By the use of a ratchet a pre-determined leverage can be used and the foundation gear arranged to provide a hand brake equivalent in efficiency to that of the air brake. The ratchet not only provides an efficient brake, but also, as it is located below the top of the car, eliminates bent brake shafts which are accountable for switching charges, per diem charges, labor and material, loss of earning power of car, and it also reduces car shortage.

There are now approximately 250,000 ratchets in service on open top cars and the brakemen are ceasing to object to this innovation.

It should be borne in mind that, in operating a ratchet, a brakeman must of necessity hold with one hand to a grab iron or the top of the car, which adds an element of safety to the operation of this type of brake when compared with the ordinary type. In using a club the theoretical way is to stand to the left of the shaft and pull. Usually, however, a brakeman will stand on the right of the shaft and push. In this position, if the chain should break, the brakeman is in a very precarious position. The chain is tested at the factory when manufactured but is not designed with the expectation of a long pick handle being used; sometimes two brakemen double back over the hand brakes with two clubs on heavy grades. From this it will readily be seen that a properly designed ratchet is a long step towards "Safety First."

A Tiering Truck

THE "TIER-LIFT" TRUCK exhibited by the Lakewood Engineering Company, Cleveland, is a new type of tiering truck which was described in detail in a recent issue of the *Railway Age*. The functions of the truck are to quickly and economically pick up and carry loads to their destination and to elevate the loads to heights sufficient for piling material in box cars, store rooms and other places where cranes are not available.

Sophie Tucker Operating a Tier Lift Truck

The machine combines the features of a load carrying truck and a tiering machine. It is built for three tiering heights, namely, 42, 60 and 76 in.

Sophie Tucker has taken her turn at operating the machine and she suggests that women should have no difficulty in operating these trucks, and that they will be a factor in reducing the high cost of everything.

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WE GUARANTEE that of this issue, 15,000 copies were printed; that of these 15,000 copies, 13,480 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 140 were mailed to advertisers, 280 were provided for counter and news companies' sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 1,100 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

One of the most interesting events that have occurred on the Pier was the showing yesterday afternoon at the meeting of the Purchases and Stores Section of a moving picture of one of the Southern Pacific's supply trains. The presentation of the picture was in charge of J. E. Perry, general stores inspector of the Southern Pacific. The picture had been worked out in an excellent way, and was admirably adapted to show just how the supply train service is handled. It was seen not only by those here to attend the Purchases and Stores Section convention, but also by many mechanical officers and railway supply men. The picture is a striking exemplification of the way in which movies can be used to show new and improved methods used in railroad operation. No written description could make anywhere near so clear what a supply train is and the way its service is rendered.

The Supply Train Moving Picture

It would be interesting to make a comparison of the relative expenditures for tools for locomotive and car shops if the figures were available. The proportion spent for car shop facilities would probably be surprisingly low. The work on wooden parts has not increased appreciably, due to the prevalence of steel construction and the small amount of heavy work on steel cars during the first few years they are in service seems to have led to the conclusion that special equipment for this work was unnecessary except at a few large shops. It would be quite as foolish to allow men to frame draft timbers and similar parts by hand as to try to handle steel cars in a repair yard that is handicapped by having no more equipment than was provided for wooden cars. Yet this is the condition that actually exists at a great many shop points. Failure to provide necessary tools is a costly mistake even with cheap labor. With the wages now being paid to repair men the roads cannot afford to continue their neglect of steel car work. Unless more attention is given to this important subject the cost of car repairs will increase out of proportion to other mechanical department expenditures. Many of the early steel cars will require rebuilding in the next few years. There is an excellent opportunity to reduce the cost of this work by studying the requirements and installing labor saving machinery for handling it. This is not a problem for the future. Every day's delay is costly. The time to act is now.

Handicapping The Repair Track

If the suggestion made during the discussion of the paper on scheduling and routing systems is carried out, the car department will have a chance during the coming year to test this method of expediting work which has given such excellent results in locomotive shops. The question should be approached with an open mind and an earnest effort should be made to secure the greatest possible benefit from the scheduling system. It is hardly to be expected that the methods used in locomotive shops will prove applicable in the car shops without important changes, though its operation in passenger car work might be quite successful. The greatest benefit resulting from routing and scheduling work is the assurance that the various parts needed to complete the repairs will be ready at the proper time to enable the equipment to be finished on the scheduled date. On light repair work there are very few jobs that are done especially for the single car. Most of the parts are made in quantities to be placed in stock, and under these circumstances it is problematical whether the scheduling system would expedite the work enough to justify the additional expense involved. Even where diversified heavy repairs are handled it may not prove worth while. However, where heavy repairs are made to a limited number of different types of cars, the principles embodied in the scheduling and routing system modified to suit the conditions should prove valuable in saving time and reducing the cost of repairs.

Scheduling Systems For Car Shops

Altogether too little attention is paid to the importance of increased tap life and the production of tapped holes made possible by correctly grinding the flute taper and clearance. In many railway shops the method of procedure is to let broken and worn taps accumulate until finally a man is assigned the job of scrapping those that are too badly broken and sharpening the rest by grinding. With all due respect to experienced machinists who may be able to grind a tap correctly holding it by hand, the fact of the matter is that nine out of ten of these taps will not cut nearly as efficiently as if properly ground. When held by hand against a grinding wheel there is no means of determining whether the tap has the proper clearance or whether the clearance is the same on each flute. Too little clearance makes the tap cut hard and too much weakens it unnecessarily. There is also no certainty that the taper will be the same on each flute and, if not, the tap in entering a hole is thrown off center and cuts an imperfect thread; if all the work is done by one flute there is the additional liability of tap breakage, and more

Tap Grinding Machines

power is required to turn the tap. A machine or attachment for grinding taps correctly should be installed in every railway shop, because the initial cost of installation will be more than offset by reduced tap breakage and increased production of tapped holes. Any one who has ever tugged at the end of a five-foot pipe in tapping out washout plug holes, for example, will appreciate the advantages of having sharp taps, ground with the proper flute clearance and taper.

Do You Want Them?

When the convention opened the national shop agreement, in the minds of many, loomed up big as an obstruction to the future employment of college men in the capacity of special apprentices on our railroads. Frankly, we cannot see that there is any justification for this point of view at this time; there may have been when the Railroad Administration was in charge, assuming that it interpreted the agreement in such a way as to shut out college men. But it is not in control now. The agreement says absolutely nothing about special apprentices or technical graduates. Why read them into it? The agreement does have something to say about *training shop employees.* It has absolutely nothing to do with *training officers.* Regardless of the agreement it should not be forgotten that in pre-war days mechanical executives generally were hesitant over the practicability, or even the advisability of employing college men in the capacity of special apprentices. Do they really want them now?

A Lack of Incentive

The purpose of the interchange rules to give to all cars "equal care as to inspection and repairs, regardless of responsibility for expense of repairs," is clearly set forth in Rule 1. The most important factor affecting the accomplishment of this purpose is the scale of prices for labor and material to which billing charges for repairs to foreign cars must conform. The revisions proposed by the Committee on Prices for Labor and Materials in this year's report, if adopted, in most cases should remove the injustice of the inadequate prices now in force. But is not the policy of the association, expressed in the committee's report by the statement that "with the adoption of these proposed rules it will be possible to perform each item of work for other carriers, without resultant losses," attacking the problem from the wrong angle to bring about a real observance of the spirit of Rule 1? In commercial or industrial affairs it is not the assurance of freedom from loss that furnishes the incentive to accomplishment. The world's business structure is based on the prospect of profit. That this same principle applies to the car repair situation is amply demonstrated by the unsatisfactory conditions which have always existed in respect to foreign car repairs. Even under normal market conditions prices are subject to fluctuations, and it is impossible to establish a fixed scale of charges, some of which will not be in need of modification long before the revision of the scale as a whole can be practicably considered. It seems, therefore, that a scale which is intended never to show a profit will in some particulars always show a loss. The practicability and desirability of fixing prices for labor and material higher than the market, plus overhead, by a reasonable percentage deserves consideration. Such a scale would provide a margin within which an upward trend in prices would not produce actual losses to the repairing lines. But what is of greater importance, it would provide the only effective incentive for giving proper attention to foreign car repairs—the prospect of a reasonable profit.

Do We Expect Something For Nothing?

Some railroad men have an idea that college men are spoiled, that they require special privileges and have to be paid on a basis that is all out of proportion to their actual value as shop apprentices. They may be right—we are inclined to question it—but how much do we get in this world without giving something in return? Too many railroads expect the college man to concede everything! they are not willing to meet him half-way. He must surrender a part of his individuality, forget that he is a university graduate and work several years at an insignificant salary. And when he has mastered these preliminaries, he is generally the first to lose out with any change in the management. Would it not be worth something to your railroad if you were instrumental in making the young man stick? Would it not be a great personal satisfaction to know that your fatherly advice or kindly efforts were responsible for the young man's promotion to a position of responsibility on the railroads? This is a service that is never forgotten. Railroad men do not always understand the college man, they do not appreciate that it is not the mathematics he has studied that will make him a valuable man, but rather the rigorous mental training acquired during a formative period that makes him capable of analyzing problems scientifically and logically and deciding them on their real merit, which may not necessarily be the way they were decided last year, or the year before. We are all willing to pay the doctor a good fee because we know that his education required a lot of time and money. Why should we not show the technical graduate the same consideration?

Co-operate With Section VI

One of the strongest arguments advanced at the initial meeting of the Purchases and Stores Section for continuing their conventions in Atlantic City was based on an appreciation of the value of meeting in company with the Mechanical Section. Mechanical officers appreciate the compliment and it may be assumed that necessity for attendance in their own convention hall is the only reason mechanical men are not attending the Purchases and Stores meetings in greater numbers. Our railroads are a democratic organization to the core and whatever the duties and responsibilities of each department, no section can claim the ascendancy. The P. and S. electric sign on Young's Pier shines just as brightly as the others, and the mechanical and stores departments are rubbing shoulders and exchanging opinions and ideas with an intimacy that would be out of the question back on the railroad. The purchasing agents and storekeepers are tremendously in earnest. They are shouldering a big responsibility in these days, and if any mechanical officer is skeptical let him assume the responsibility of contracting for sufficient coal of a decent quality to keep his railroad running through the coming winter, or let him go out and buy boiler steel or tires, or any other of the forty thousand odd items that it takes to keep a railroad running, at prices that will not bankrupt the property. There has been a noticeable lack of understanding between the mechanical and stores departments that this convention should go a long way towards dispelling. Mechanical superintendents should get over the idea that the storekeeper is "holding out on them"; they should realize the fact that the stock book, which is in reality a statistical record of past consumption, is often a better index to future needs than the shop superintendent's estimate, and that an excess stock of any material represents a continuous drain on the treasury. Mechanical officers have

much to learn from the storekeepers—they should meet them half way. The advantages of a coincident convention at Atlantic City apply equally to all sections of the American Railway Association.

Boiler Hygiene

How did the plunge into the cool depths of the old swimming hole feel in the good old summertime? But what happened when you sometimes jumped in when you were overheated and did not take time to cool off? What happens to your locomotive boilers when they are hustled into a roundhouse after a strenuous run and doused with cold water? And what happens when these same locomotive boilers are summarily fired up and dispatched on another errand? Is it any wonder that locomotive boilers sometimes contract spinal meningitis as the result of such unmerciful treatment? After all, the boiler is not very different from the human and will respond to a plentiful cleansing dose of warm water just as will the human system. If you expect a soldier to fight you must feed him, said Napoleon. If you expect a boiler to do business you must wash him, says "The Man Who Saw." Not Monday, but every day should be wash day for the locomotive boiler, except where water conditions are exceptionally good. Boiler washing outfits suitable for engine terminals are not greatly in evidence among the convention exhibits. But perhaps that is because it is not an apparatus that can be easily set up in shape for exhibition. It is said that an ounce of prevention is worth a pound of cure, and on this theory it is unfortunate that suitable boiler washing apparatus is not as conspicuous among the exhibits as some of the internal treatments exhibited for curing boiler ills.

Do Some Real Thinking

In the discussions of several of the reports presented at yesterday's session the handicap which the rigid restrictions of the national shop agreement place on output received considerable attention. Who is to blame for this situation? What are its causes? These are questions the public discussion of which is very carefully avoided. The now generally unsatisfactory conditions did not develop without natural causes, and at the outset it must be recognized that these causes do not lie in the possession of unnatural human qualities by any class or group. What were accepted as sound principles in dealing with labor a few years ago, however, left largely out of consideration the fact that the whole problem is fundamentally one of human relationships. This omission is the cause of the growth of much suspicion and misunderstanding which has now led to the establishment of the incongruous and economically unjustifiable restrictions of the national agreement. Clear thinking, absolute fairness, and a willingness to forget past unpleasantnesses are essential to the re-establishment of satisfactory relations between the railways and their employees. One of the first points that must be clearly recognized is that in any cases where the national agreement is abrogated with good results in future, this will be done only after every possible effort has been made by the railroad management to get the point of view of its employees and to gain their co-operation in working out and adopting something better. It is all right, no doubt, to abuse the labor unions and the Railroad Administration for the national agreement, but it is quite possible it never would have existed if the managements of the railway companies had not themselves made some very serious mistakes in dealing with their employees.

Program For To-day

SECTION III—MECHANICAL

Discussion of reports on:

Couplers and Draft Gear	9.30 A. M. to 9.50 A. M.
Car Wheels	9.50 A. M. to 10.20 A. M.
Car Construction	10.20 A. M. to 10.50 A. M.
Safety Appliances	10.50 A. M. to 10.55 A. M.
Loading Rules	10.55 A. M. to 11.20 A. M.
Train Brake and Signal Equipment	11.20 A. M. to 11.50 A. M.
Train Lighting and Equipment	11.50 A. M. to 12.20 P. M.
Subjects	12.20 P. M. to 12.30 P. M.

SECTION VI—PURCHASING AND STORES

Consideration of Rules of Order	9.30 A. M. to 10.00 A. M.
Report of Nominating Committee	10.00 A. M. to 10.30 A. M.
Election of Officers, General Committee and Nominating Committee	10.30 A. M. to 11.00 A. M.

ENTERTAINMENT

10.30 A. M.—Orchestral Concert, Entrance Hall, Million Dollar Pier.

Lost Badges

No. 2164. I. W. Benson.
No. 8035. Mrs. M. A. Ross, care of The Buda Co.
No. 5428. John L. Nicholson, Locomotive Firebox Co.
No. 6879. D. E. Cooke, Chicago Pneumatic Tool Co.
No. 6863. J. W. Brice, Jr., The U. S. Metallic Packing Co.

A Large Machine Tool Order

SPEAKING OF BEING ON THE JOB, it is reported that on June 8 the Niles-Bement-Pond Company landed an order for $500,000 worth of shop equipment from the Atlantic Coast Line. A large number of roads are getting active on this class of purchases, among them being the New York, New Haven & Hartford; Long Island; New York Central; Erie; Delaware, Lackawanna & Western; Delaware & Hudson, and the Frisco.

Chairman Pearce Visits Section III

H. C. PEARCE, chairman of Section VI, Purchases & Stores, visited Section III yesterday to extend to its members an invitation to attend an exhibition of the moving pictures of the supply train service on the Southern Pacific.

He also made the following remarks:

"I also take the opportunity at this time to acknowledge the very courteous treatment your president has extended to our Section, and to me personally, and in recognition of the substantial help he has been to us.

"We have many things in common, in fact they are nearly all in common. By meetings of this kind, and the interchange of ideas through committees and conventions, we are bound to accomplish much in the way of unified helpfulness.

"I have just one subject that I wish to mention, and that is the minimum specification which Mr. Tollerton has handled with me, and which we believe will be of great benefit to us all. I will not take the time of your meeting to express what must appear to be very obvious, the great advantage of a minimum specification, and by co-operation between the two Sections, the users and the procurers, I feel that a very great work will be accomplished."

Grand Ball In Honor of Section VI

THE ENTERTAINMENT PROGRAM for the conventions was closed and the curtain run down last night at the conclusion of the Grand Ball in honor of the Purchases and Stores Section. The attendance, as was expected, again broke all records, not less than 3,000 people enjoying the evening's entertainment.

The feature of the ball was the grand march at 9.30 o'clock. Actual figures of the number in the line of march were not taken by the entertainment committee, but the estimate was that those taking part in the march last night exceeded in number the total of last Thursday night. Good dance music was furnished by the Taylor orchestra and refreshments were enjoyed between dances.

The Entertainment Committee in charge of the ball was composed of: W. M. Wilson, Chairman; L. O. Cameron, L. B. Sherman, R. J. Himmelright, Floyd Coffin, Horace Hager, Ellsworth Haring, William Melcher, I. C. Rogers and R. P. Townsend.

R. S. M. A. Committee Chairmen Appointed

NEWLY ELECTED PRESIDENT John F. Schurch, of the Railway Supply Manufacturers' Association, announces through the *Daily* his appointments of chairmen of the committees for the 1921 conventions. They are as follows:

Entertainment—R. J. Himmelright, American Arch Company, New York.

Exhibit—Charles W. Beaver, Yale & Towne Manufacturing Company, New York.

Hotels—Leroy S. Wright, The National Malleable Castings Company, Chicago.

Transportation—Harry E. Daniels, West Disinfecting Company, Chicago.

Enrollment—F. H. Smith, Gold Car Heating & Lighting Company, New York.

Finance—George A. Cooper, Frost Railway Supply Company, Detroit.

Registration Passes 6,000 Mark

YESTERDAY NOON, for the first time in history, the total registration at the conventions exceeded 6,000, reaching the record-breaking figure of 6,073. This was not entirely due to the fact that the Purchases and Stores as well as the Mechanical Section was meeting here, but to this and to an increase in attendance of almost all classes of visitors. The number of members of the Mechanical Section here exceeds all records. The detailed figures are as follows:

Members, Section III	875
Members, Section VI	364
Special Guests	785
Railroad Ladies	798
Supply Ladies	676
Supply Men	2,575
Total	6,073

These are the General Committee Members

THROUGH AN ERROR in the report of the proceedings of Section III, Mechanical, the names of the newly elected members of the Committee on Nominations were announced in yesterday's issue of the *Daily Railway Age* as having been elected members of the General Committee. The names of those who were elected members of the General Committe are as follows:

J. S. Lentz, Master Car Builder, Lehigh Valley.

H. R. Warnock, General Superintendent Motive Power, Chicago, Milwaukee & St. Paul.

C. E. Fuller, Superintendent Motive Power and Machinery, Union Pacific.

Willard Kells, General Superintendent Motive Power, Atlantic Coast Line.

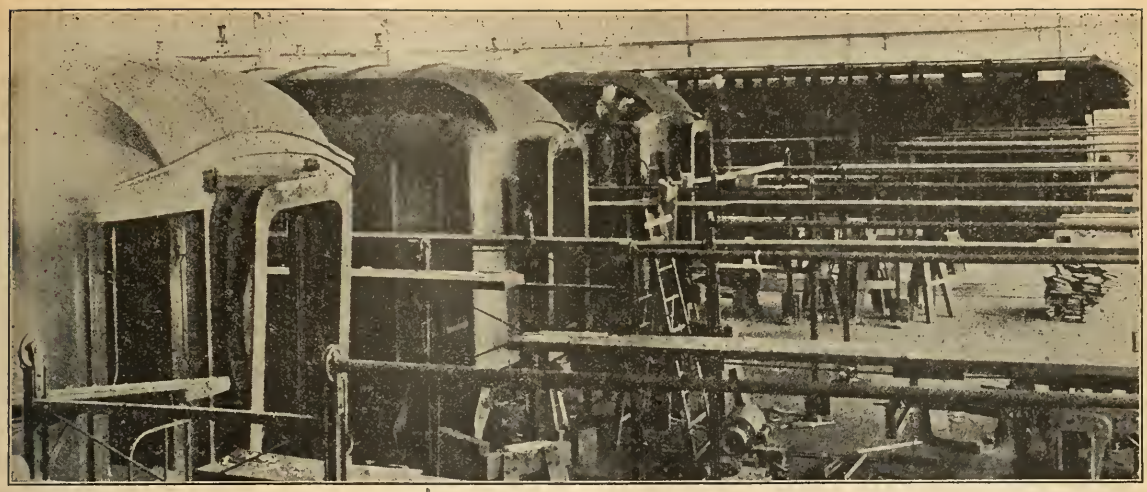
John Purcell, Assistant to Vice-President, Atchison, Topeka & Santa Fe.

H. L. Ingersoll, Assistant to President, New York Central Lines.

J. J. Tatum, Superintendent Car Department, Baltimore & Ohio.

Entertainment Committee

Top Row, Left to Right—W. B. Wise, John B. McClintock, I. C. Rogers, Elworth Harring, Gardner W. Taylor, H. A. Varney, J. W. Fogg, W. E. Greenwood, Langley Ingraham, J. R. Forney, William Melcher, Raymond P. Townsend, Horace Hager.
Bottom Row, Left to Right—L. O. Cameron, R. J. Himmelright, Dan Eubanks, W. K. Krepps, W. M. Wilson, S. W. Sargent, Floyd Coffin.



American Railroad Association—Section III—Mechanical

Several Important Reports Received Relating to Car Department Practices

Chairman Tollerton called the meeting to order at 9.45 A. M.

Revision of Passenger Car Rules of Interchange

THE COMMITTEE SUBMITS the following for your consideration:

Rule 7.—Change paragraph (12), Section (f), to read: "Wrought steel wheels may be substituted for cast steel or steel-tired wheels."

Rule 8.—Add following interpretation under paragraph (a):

Q.—What is known theft of parts of car occurring on handling line intended to cover?

A.—Where the handling line knows, beyond question of doubt, that the items were stolen while car was in their possession, the car owner can not be held responsible, and the missing material should be classed as a delivering line defect.

Change paragraph (g) to read: "Missing brake cylinders, reservoirs, triple valves, control valves, pressure retaining valves, cut-out cocks, angle cocks, air hose, steam hose, end steam valves, signal hose, and any portion of steam train line missing with end steam valves."

Change paragraph (h) to read as follows: "Burst or broken steam pipes and fittings, damaged steam valves, traps, and parts of same (inside of car), when due to freezing, on cars equipped with a combined steam heat cut-out and drain valve, also on cars equipped with hot water system of heating, except when accompanied by porter furnished by car owner."

Rule 10.—Change paragraph (b) to read: "This charge of five mills is to cover the expenses of operation, maintenance, depreciation and interest on the electrical equipment; therefore, all expenses incident to the operation and maintenance of such special features (except inspection, lubrication and distilled water for batteries) shall be charges against the car owner, unless due to unfair usage."

Rule 11.—Change to read as follows: "Information as to mileage made by cars must be furnished promptly on request of owners by railways over which cars are run, and when cars make no mileage on any calendar day the report must so specify."

Rule 13.—Make last sentence of "Answer" to "Interpretation" read: "Therefore, labor used in renewing or repairing other items is permissible at the rate per hour as shown in item 20 of Rule 21."

Rule 18—Change to read as follows: "The depreciation of all passenger equipment cars due to age shall be figured at three per cent per annum upon the yearly depreciated value of same, to continue not to exceed 50 per cent of its original value. The above method of depreciation applies equally to either body, air brakes or trucks of such cars. The excess cost of betterments applied, depreciated from the date of application, may be added to the depreciated value of the car."

Rules 20, 21 and 22—Change to conform with the recommendations of the Committee on Prices for Labor and Material.

The report is signed by H. H. Harvey (Chairman), Chicago, Burlington & Quincy; C. J. Nelson, Chicago & North Western; W. R. McMunn, New York Central; J. E. Mehan, Chicago, Milwaukee & St. Paul; T. J. Boring, Pennsylvania; I. N. Clark, Grand Trunk, and C. S. Patton, Seaboard Air Line.

Discussion

The report was presented by H. H. Harvey (C. B. & Q.), who, in the course of his remarks, said: In regard to Rule 18, since the committee's report was written the committee on Freight Car Depreciation has gotten up a report which changes the basis of settlement for destroyed cars. If that report carries it will mean that the passenger car rules would also have to be changed, but it is my thought that that could safely go over another year because there are very few passenger cars destroyed.

Mr. Goodnow (C. & N. W.): *I move the report be accepted and approved.*

The motion, on being seconded and put to vote, was unanimously carried.

Report on Prices For Labor and Material

IN CONFORMITY WITH A MOTION carried at the 1919 convention, the committee continued the work of analyzing the prices for labor and material (as outlined by the Committee on Compensation for Freight Car Repairs in their report to the 1915 convention) and submits complete revision of present Rules 98, 101, 107 and 111 in freight, and Rules 21 and 22 in passenger car code.

Material prices set forth in the annexed recommendations for 1920-21 rules are representative of market conditions in February, 1920, basic prices having been obtained from the Chicago, Kansas City and Omaha offices of the Division of Purchases and Stores, and from eight railroads in same region. Suitable allowances were added to the basic prices to cover foreign, deadhead and distributing freight charges, direct and indirect store expense, fabricating labor when involved, and interest on stock investment, based on average monthly inventory balance multiplied by the interest rate, and the result divided by the total annual material disbursements.

Your attention is especially directed to Items 192 and 193 in proposed Rule 101 which would restore the practice of applying and charging the owner for second hand cast iron and cast steel wheels. It is felt that this will prevent the tremendous economic waste which has recently resulted through withholding cars from service during shortages of new wheels, and the resultant scrapping of serviceable second-hand wheels because of the low percentage of owned cars, to which they could be applied, which is now being operated by carriers. Prices of second hand wheels are fixed at 55 per cent of new prices so that exorbitant charges will not be made for applying them.

Scrap materials were averaged and market prices, less transportation charges to the scrap plant, were set up as credits.

Labor allowances (shown in hours and tenths) as proposed in the annexed report are felt to be representative of conditions prevalent today throughout the country, being in the main based upon 2,529 time studies conducted by the sub-committee in 1915 and 1916 at 34 shops in 27 cities throughout the United States and part of Canada. As most of the operations were performed at that time on piecework basis, the committee added a fixed percentage based on a study made by one large road covering 39,641 output hours, to such piecework hours in order to make the proposed time allowances more commensurate with the time being consumed today under a general day work system. The results were checked and supplemented with time consumed on four of the largest systems in the country.

The basic hourly rate for applied labor on wooden, steel and composite freight train car repairs throughout the country was found to be 65 cents, being a weighted average of 19,797 hourly rates paid on wooden, steel and composite freight car repairs by six roads.

Upon receipt of replies to its circular of December 13, 1919, the committee set up 48 per cent for direct overhead, (which is the figure reached by the Committee on Compensation for Car Repairs in their report to the 1915 convention), and 6 per cent for indirect overhead, or a total of 54 per cent to cover the expenses stipulated in Rule 107. This 65 cents per hour, plus 54 per cent, resulted in the $1.00 per hour labor allowance recommended by the committee.

The details of practically all items are radically modified to avoid inconsistent overlapping of labor, such as the inclusion of bolts, fascia and deadwood in the labor allowance for renewing sheathing, as set forth in interpretation of present rules.

With the adoption of these proposed rules, it will be possible for all roads to perform each item of work for other carriers, without resultant losses.

The report was signed by G. E. Carson (Chairman), New York Central; J. E. Mehan, Chicago, Milwaukee & St. Paul; Ira Everett, Lehigh Valley; E. W. Smith, Pennsylvania; H. H. Harvey, Chicago, Burlington & Quincy; J. H. Milton, Chicago, Rock Island & Pacific; C. N. Swanson, Atchison, Topeka & Santa Fe; H. L. Osman, Morris & Company, and A. E. Smith, Union Tank Line.

Proposed Changes and Revisions in Rule 98

Bills rendered for material and labor cost of wheels and axles shall be in accordance with the schedule of prices, with the proper debits and credits as shown in Rules 101 and 107.

All non-A. R. A. standard axles shall be charged and credited at the average credit price shown in Rule 101 for such axles, except as follows: New non-A. R. A. standard axles applied, of odd over-all length or odd journal dimensions, for which A. R. A. standard axle can not be substituted, shall be charged at price, new, for such axle.

Items 201, 202 and 203 in Rule 101 shall cover new and average credit prices for non-A. R. A. standard axle.

For non-A. R. A. standard axles of a capacity other than those shown in Rule 101, Items 201, 202 and 203, use the new and scrap prices shown for A. R. A. standard axle of the same capacity; if the same capacity is not shown, use new and scrap prices shown for A. R. A. standard axle of the next lower capacity.

If new wheels and axles are substituted for average credit price wheels and second hand or average credit axle, proper charges and credits shall be allowed, although such substitution be made on account of only one loose or defective wheel or a defective axle, with the following exceptions; in case the owner of a car removes a damaged wheel or axle, no charge shall be made for any difference in value between the parts used and those removed that are not damaged.

In Case of Owner's Defects

No credit will be allowed owner for loss of service metal due to turning off wheels. Should there be a further loss of service metal, however, due to the application of other wheels, the proper credit for such additional loss must be given the owner. Any increase in the amount of service metal, due to the application of other wheels, may be charged to the owner.

Delivering Line Defects

When repairs are not covered by defect card, the proper credit for any loss of service metal must be given the owner, at the rate of $2.21 for each $\frac{1}{32}$ in. of service metal removed, measured on radius of tread, in connection with full standard tread and contour, and charge shall be made against owner for any increase in the amount of service metal due to application of other wheel.

When the repairs are covered by the defect card of another company, charge covering such repairs shall be made against the owner of the car, the defect card and the billing repair card to be attached to the bill. The owner to render counter-bill on the authority of the defect card against the company issuing same, including an additional charge to cover the loss of service metal on account of the defects covered by the card. Should there be an additional loss of service metal, on account of the application of other wheels, the company making the repairs shall allow the proper credit to the owner to cover such additional loss of metal. Should there be an increase in the amount of service metal, due to the application of other wheel, such increase may be charged to the owner.

The above provisions shall govern any loss or increase of service metal on account of the mate wheel, even if same is not defective, when both wheels are turned off to correspond.

The necessary information must be given in all cases, as provided in Rules 9 and 10.

In cases of side-flat wheels, $\frac{1}{16}$ in. for loss of service metal will be allowed for flat spots 2½ in. long, and $\frac{1}{32}$ in. for each additional inch or fraction thereof.

Any additional loss of service metal that it is necessary to remove on account of worn flange or tread must be borne by car owner.

Proposed Changes and Revisions in Rule 101

[The committee presented a complete comparison of the proposed and the present prices (including 30 per cent) for 214 items of material and for labor. In the latter case the increase was from $0.871 to $1.00 an hour.—Editor.]

Proposed Changes and Revisions in Rule 107

The following table shows the labor charge which may be made for performing the various operations shown. Unless otherwise specified, the labor allowances include all work necessary to complete each item of repairs.

All previous decisions or interpretations of the Arbitration Committee respecting labor charges in the A. R. A. Rules then effective which in any way conflict with the instructions set forth in each item of A. R. A. Rules 98 and 107 are hereby cancelled, effective with the adoption of the revised rule.

The labor charges of $1.00 per hour (Item 172, Rule 101, and $1.25 per hour, Item. 443, Rule 107) in addition to including the actual labor cost of performing the work, include the following items of indirect expense:

Wages of foremen, work inspectors, clerks, laborers, etc., working on freight repairs.

Proportion of the expense of operating power plant and of wages of

shop or gang foremen, shop clerks, etc., whose time is not charged direct to freight repairs.

Shop switching, including repairs, depreciation, interest, taxes, fuel, lubrication, water, other supplies, fuel station and engine house expenses, wages of engnemen and firemen, switch crews and switch tenders.

Proportion of salaries and expenses of G. S. M. P. and M. and clerks, S. M. P. and M. and clerks, master mechanics and clerks, and general foremen.

[The table included in the proposed revision of Rule 107, presented a comparison of the present and the proposed number of hours, or changes allowed for performing 452 operations. Included in these were the following labor rates:

For straightening or repairing parts in place on damaged cars, $1.00 per hour proposed; $0.67 per hour present.

Repairing steel tanks of steel cars, $1.25 per hour proposed; $0.72 per hour present.—Editor.]

Rules 109 and 110

Remove second and third paragraphs of Rule 109.

Eliminate Rule 110.

Proposed Changes and Revisions in Rule 111

When angle cocks, cut-out cocks, pressure retaining valves and release valves, or detail parts of same, are renewed, ground in or otherwise repaired, account defective or missing, charge shall be made for complete cock or valve and average credit allowed according to prices shown in Rule 101.

[The present and proposed labor charges for air brake repair work were tabulated, a number of items as they appear in the present rule being eliminated in the proposed revision.—Editor.]

Passenger Car Rules 21 and 22

In addition to the proposed changes in labor charges shown in the table accompanying Rule 21, the following revision was proposed:

The labor prices as shown in Rule 111 for freight cars shall be used for ordinary quick-action triple valves, and for cylinders 14 in. or less in diameter on passenger cars.

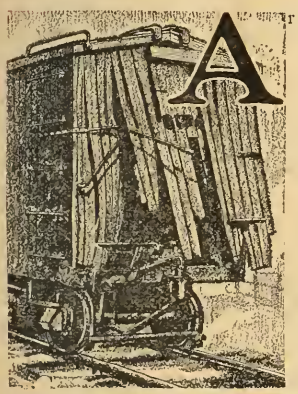
Changes in the charges for material shown in Rule 22 were presented in comparison with the present prices.

Discussion

The report was presented by G. E. Carson (N. Y. C.), Chairman of the committee.

C. E. Fuller (U. P.): *I move the report be accepted and printed in the proceedings, and that we approve the changes in the rules as reported by the committee. (The motion was seconded and carried.)*

Report on the Depreciation of Freight Cars



AT THE 1919 CONVENTION THE report of the committee was accepted only in so far as the recommended rate for depreciation is concerned, and was returned to the committee for further consideration.

The committee has held five meetings during the year and has also held two conferences with the following committee representing the Railway Accounting Officers' Association: *W. H. Williams* (Chairman), Delaware & Hudson; *H. D. Foster,* Chicago, Burlington & Quincy; *G. E. Bissonnett,* Union Pacific; *H. H. Laughton,* Southern Railway, and *J. W. Orr,* Pennsylvania.

Basis of Settlement

Present Interchange Rule 112 provides for three bases of settlement for destroyed or damaged cars. Cars built prior to October 1, 1914, are to be settled for at arbitrary values shown in the rules, depreciated from the date the car was originally built, plus an allowance for certain specified additions and betterments depreciated from the date applied. Cars built on or after October 1, 1914, are to be settled for on the basis of original cost price, new, depreciated from the date the car was built new, plus allowances for certain specified additions and betterments depreciated from the date applied. Bodies of refrigerator cars, stock cars permanently fitted for stall shipments, and other freight cars designed for special purposes, not referred to above, shall be settled for at the present cost price, as may be agreed to by the parties in interest, less the depreciation due to age, which latter shall be on the basis as for regular freight car equipment.

The committee recommends that the rule be amended to provide that destroyed or damaged freight cars be settled for on the basis of reproduction cost.

Method of Arriving at Reproduction Cost

The committee recommends that the reproduction cost of cars on which depreciation is figured be based on the per pound basis for the various classes of cars specified, with an additional allowance for wrought-steel wheels which shall be the difference between the cost of cast-iron and wrought-steel wheels.

The committee recommends that the Committee on Prices for Labor and Material determine the reproduction value of the various classes of cars as specified in the following table, and base the per pound price on the average cost of cars built in the United States and Canada; the prices for the year previous to the effective date in the rules to be determined annually and coninue in effect the same as the Rules of Interchange:

	Refgr.	Tank	All other
Class A—All steel.			
Class B—Steel underframe with steel superstructure frame.			
Class C—All steel underframe.			
Class D—All wood, with continuous metal center sill construction, with not less than 24 in. of sectional area between draft back stops, and with not less than one top or bottom cover plate from draft back stops to draft back stop.			
Class E—All wood, with not less than 8-in. continuous metal center sills *of not less than 18 lb. per foot per member,* with not less than one top or bottom cover plate from bolster to bolster.			
All wood, with not less than 8-in. continuous metal draft *of not less than 18 lb. per foot per member,* with not less than one top or bottom cover plate from bolster to bolster.			
All wood, with not less than 8-in. continuous metal draft *of not less than 18 lb. per foot per member,* securely fastened to wooden center sills not less than 4-in. x 8-in.			

Class F—All wood.

NOTE 1—Cars which do not conform to Classes A, B, C, D and E, such as metal draft arms bolted to wooden sills, and cars with center sill sections, cover plates, etc., below those specified, shall be settled for as all wood cars under Class F.

NOTE 2—Where cast or pressed steel extensions are used and riveted to metal center or draft sills between bolsters, they shall be considered as continuous.

NOTE 3—Cover plate may be part top and part bottom, providing the specified length is covered.

Rate of Depreciation

The committee recommends the following rates for depreciation, straight depreciation basis, of freight cars to be prefaced with the following note:

These rules are for the purpose of settlement between carriers and between carriers and private lines, for destroyed or damaged cars, handled under the Rules of Interchange, and are not intended to be applied to cars of the same particular types in the accounting of individual carriers:

All steel	3 per cent
Steel underfr. me with steel superstructure frame	3 per cent
All steel underframe	3 per cent
All wood, with continuous metal center sill construction, with not less than 24 in. of sectional area between draft back stops, and with not less than one top or bottom cover plate from draft back stops to draft back stops	3½ per cent
All wood, with not less than 8-in. continuous metal center sills *of not less than 18 lb. per foot per member,* with not less than one top or bottom cover plate from bolster to bolster.	

All wood, with not less than 8-in. continuous metal draft *of not less than 18 lb. per foot per member*, with not less than one top or bottom cover plate from bolster to bolster. 4 per cent
All wood, with not less than 8-in. continuous metal draft *of not less than 18 lb. per foot per member, securely fastened* to wooden center sills not less than 4 in. by 8-in. 3¼ per cent
All wood 4 per cent
All other cars 4 per cent
Tank cars for non corrosive commodities Same rate as other cars of similar construction.

Tank cars for corrosive commodities of any construction 4 per cent

NOTE—Depreciation rates as applying to different classes of cars include trucks and air brakes.

NOTE—A steel superstructure frame car indicates a car having the side and end uprights, braces and plates riveted together.

NOTE—Allowances for depreciation shall in no case exceed 80 per cent of the value new.

NOTE—On cars damaged or destroyed after March 1, 1919, depreciation shall be figured from month of the year built to month of the year damaged or destroyed. No fractional parts of a month to be considered.

Rebuilt Cars

It was the unanimous opinion of your committee that the so-called rebuilt cars should not be given any special consideration in making settlement when destroyed unless, in rebuilding, cars were made to form to certain construction standards. The committee therefore recommends the following addition to this rule to cover settlement for rebuilt cars:

A car may be considered as rebuilt and be so stenciled, when the cost of repairs (including additions and betterments) exceeds one-half of the cost of reproduction at actual cost new in kind at date of rebuilding, as shown in Section —— of the Interchange Rules on cars of similar type, provided the car, as to couplers, wheels and axles, brake equipment, and, center sill and end construction, was made to conform with the then existing A. R. A. Standards for reinforcing equipment.

If this recommendation is adopted it will be necessary for the Committee on Car Construction to provide immediately a standard strength requirement for the rebuilt car.

The report was signed by C. E. Chambers (Chairman), Central of New Jersey; J. Hainen, Southern; A. E. Calkins, New York Central; L. K. Sillcox, Chicago, Milwaukee & St. Paul; R. L. Kleine, Pennsylvania; J. W. Sasser, Norfolk Southern; W. J. Robider, Canadian Pacific, and H. L. Osman, Morris & Company.

Discussion

The report was presented by R. L. Kleine (Penn.), a member of the committee. After reading the report, Mr. Kleine said that, at the suggestion of the Tank Car Committee, a rearrangement of the headings would be made with the following additional notes. Note 4. The reproduction costs include the bodies and trucks. In the case of tank cars the trucks are included with the underframe. Where tank cars are built without underframes the couplers, draft gear and brakes are to be in included with the trucks; the remaining fittings, such as saddles, striking castings, etc., are to be included with the tank. Insulation and jackets are part of the tank.

After the item near the bottom of page 4, "All other cars.... 4 per cent.", Mr. Kleine said: In order to be consistent with the change on the preceding page, we depreciate the tank car underframe with the truck the same as with other cars, and make a change in the tank itself, depreciating the tank separately. Therefore, we suggest a change in the next two items, making then read as follows:

"Tank cars for non-corrosive commodities, 3 per cent.", or in other words, the same as for steel cars.

"Tank cars for corrosive commodities of any construction, 5 per cent."

C. F. Giles (L. & N.): Under the caption of "Method of Arriving at Reproduction Cost," I note that an additional allowance is made for wrought steel wheels. I would like to ask Mr. Kleine why no additional allowance is made for cast steel wheels; they are being used very largely in freight service, and some consideration I think should be given to them.

Mr. Kleine: We considered the cast steel wheel, but felt that the cast steel wheel was more or less experimental, not a standard of the Association, and a one-mileage wheel. In other words, the committee confined itself to the present standards of the Association.

Mr. Giles: *I move that the committee be instructed to make a provision for an additional allowance for cast steel wheels.*

The motion was seconded and on being put to vote, was unanimously carried.

Mr. Giles: *I move you that the report be accepted and submitted to letter ballot.*

Mr. Fuller: *I second the motion.*

Mr. Kleine: As this is an interchange rule matter, I do not see why it should go to letter ballot. It should be adopted the same as the interchange rules on the floor of this convention.

F. W. Brazier (N. Y. C.): If the question of Rebuilt Cars hasn't been a bugbear to all of us I don't know what has, and now you have something which is complete. If we wait to get a letter ballot and get the different opinions we won't know where we are at, and I want to stand by Mr. Kleine's report.

Mr. Giles: *I will withdraw that part of my motion that it be submitted to letter ballot, and move that it be accepted and printed in the papers.*

Mr. Fuller: *I accept the amendment, and second the motion.*

The motion, on being put to a vote, was unanimously carried.

Report of the Arbitration Committee

THE COMMITTEE, during the year, has decided cases 1156 to 1170, inclusive, and copies have been sent to the members. A vote of concurrence in the decisions is requested by the committee.

With the approval of the General Committee this committee has continued the rendering of interpretations of such questions as have been asked by the members regarding the rules. These interpretations have been issued in Supplements Nos. 1 and 2 to the Rules of Interchange.

Effective March 1, 1920, with the return of the railroads to private control, all modifications of the Interchange Rules having special application only to railroads under U. S. Federal control as indicated in the rules, were cancelled, being superseded by the general rules.

The changes in the Rules of Interchange promulgated in Supplements Nos. 1 and 2 will be made in the rules when reissued, with the exception of changes in prices for labor and material, which will be revised in accordance with action taken on report of the Committee on Prices for Labor and Material.

The committee did not this year request the members, railroad clubs, etc., to submit recommendations for changes in the rules; however, all recommendations received have been considered and where approved, changes have been recommended. The committee has also considered the necessity for changes in the rules as developed in connection with the various decisions and interpretations rendered during the year.

Recommended Changes in the Rules of Interchange

(Proposed changes in the present rules are printed italics.)

RULE 2.

The committee recommends that the following paragraph be added to this rule as the third paragraph of Section (b):

Cars using lighting outfits operated by gasoline engines will not be accepted in interchange.

The committee recommends that Section (c) of Rule 2 be modified in accordance with the proposed form shown below:

PRESENT FORM.—Rule 2, section (c). Cars improperly loaded (not complying with the Loading Rules) when transfer or rearrangement of lading is necessary.

Cars of 80,000 lb. capacity and over, equipped with A. R. A. Standard axles, may be loaded to maximum shown in Column "A" of Rule 86, which is the total weight of car and lading for the respective capacities given.

PROPOSED FORM.—Rule 2, section (c). Cars improperly loaded (not complying with the Loading Rules) when transfer or rearrangement of lading is necessary.

Cars loaded in excess of the maximum of Column "A," table under Rule 86, which is the total weight of car and lading on rails for respective dimensions of axles shown.

RULE 3.

The committee recommends that the effective date of second paragraph, Section (d) of Rule 3, be extended to October 1, 1922, in accordance with proposed form shown below:

Cars built prior to October 1, 1915, will not be accepted in interchange after *October 1, 1922,* unless equipped with A. R. A. Standard axles.

The committee recommends that the effective date of the first paragraph, Section (h) of Rule 3, be extended to January 1, 1922, and that the rule be modified in accordance with proposed form shown below:

PRESENT FORM.—Rule 3, section (h). After October 1, 1920, no car will be accepted in interchange unless the body is stenciled light weight and capacity in pounds, as provided for in Rule 86. Tank cars shall be weighed and stenciled by the tank car companies only, or by authorized representatives of the tank car companies.

After October 1, 1918, when cars equipped with short draft arms receive general repairs, long metal draft arms extending beyond the body bolster, steel draft members extending full length of car, steel center sills or steel underframes must be applied.

PROPOSED FORM.—Rule 3, section (h). After *January 1, 1922,* no car will be accepted in interchange unless *car* is stenciled *maximum load, light weight and total weight* in pounds, as provided for in Rules 30 and 86.

Tank cars *and refrigerator cars* of private ownership shall be weighed and stenciled by the *owner* only, or by authorized representative of the *owner.*

After October 1, 1918, when cars equipped with short draft arms receive general repairs, long metal draft arms extending beyond the body bolster, steel draft members extending full length of car, *transom droft gear,* steel center sills or steel underframes must be applied.

The committee recommends that the effective date of Section (i) Rule 3, be extended to October 1, 1922, and the rule modified in accordance with the form shown below:

PROPOSED FORM.—Rule 3, section (i). After October 1, 1922, no car with trucks of less than 60,000 lb. capacity will be accepted in interchange unless equipped with wooden or metal draft arms extending beyond the body bolster, or metal draft arms integral with body bolster, or metal draft arms extending to metal body bolster and securely riveted to same, *or transom draft gear.*

RULE 4.

The committee recommends that the second paragraph of this rule be modified in accordance with the proposed form shown below:

PROPOSED FORM.—Rule 4, (second paragraph). Defect cards shall not be required for any damage so slight that no repairs are required, nor for raked or cornered sheathing, roof boards, fascia, or bent or cornered end sills, not necessitating the shopping of the car *before reloading.*

RULE 9.

The committee recommends that the requirement for showing on billing repair cards, the markings on axles R and R be eliminated.

RULE 17.

The committee recommends that an additional paragraph be added to the answer of Interpretation No. 7 of this rule as shown in Supplement No. 1 to the Rules of Interchange, the interpretation to read as shown below:

PROPOSED FORM.—Rule 17, (Interpretation No. 7):

Q.—Does the substitution of A. R. A. Standard K-1 and K-2 triple valves for valves of other types constitute wrong repairs for which defect card should be issued? If not, what should be the basis for charge and credit?

A.—No. A. R. A. Standard K-1 and K-2 triple valves may be substituted for any non-Standard valves if applied to proper size equipment. In the substitution for any convertible non-Standard valve, the charge and credit shall be on the basis of the conversion price ($10.00) plus allowance for removing, repairing and replacing triple valves, as per Item No. 29, Rule 111. In the substitution for non-convertible valves on cars built prior to January 1, 1915, charge and credit shall also be on the same basis. In the substitution for non-convertible valves on cars built on or after January 1, 1915, charge and credit shall be on basis of prevailing price for K valves, plus A. R. A. average price for removing, repairing and replacing, as per Item No. 29, Rule 111, with *average* scrap credit *($1.00)* for non-convertible valve removed. *When Standard A. R. A. valve K-1 or K-2 is applied to replace any non-Standard A. R. A. valve, the stenciling on car body showing valve standard to the car must be changed to conform to valve applied, for which ½ hour labor may be charged.*

When any valve applied is of different type from that removed, or from that standard to the car, the billing repair card must also show valve standard to the car, as indicated by the stenciling on car body; also show date built for car on which K-1 or K-2 valve replaced any non-convertible valve.

RULE 30.

The committee recommends that Rule 30 be modified in accordance with the proposed form shown below. (The present form of section (a) in which the most important changes are proposed is shown also.)

PRESENT FORM.—Rule 30. (a) All freight cars shall be light weighted as follows; and shall be marked in accordance with A. R. A. Interchange Rules with the following marks:*

(1) The light weight, which shall be the multiple of 100 lb. nearest the scale weight, except that when the scale weight indicates an even 50 lb. the lower multiple shall be used.

(2) Capacity in pounds. Cubical capacity, except for flat and tank cars.

(3) Station symbol.

(4) Date of weighing, month and year.

(5) Each new car must be weighed separately and marked at the car works, under the supervision of the owner's inspection. The accuracy of the scales used must be certified to by a railroad-scale inspector appointed by the car owner.

These provisions to be incorporated in the contract covering the purchase of the equipment.

PROPOSED FORM.—Rule 30. (a) All freight cars shall be light weighted as follows; and shall be marked in accordance with A. R. A. Interchange Rules (M. C. B.) with the following marks:*

MAX LOAD 000 000 lb.
LIGHT WT 00 000 lb. New 0-'00

TOTAL WT 000 000 lb.
CUBICAL CAPACITY (except for flat and tank cars)
Station symbol
Date of weighing, month and year.

TOTAL WT is the total allowable weight of car and lading (including temporary racks, false floors, bracing, cooperage, ice in bunkers, etc.) on rails, as indicated in the table of A. R. A. Interchange Rule 86.

LIGHT WT *shall be* the multiple of 100 lb. nearest the scale weight of empty car, except that when the scale weight indicates an even 50 lb. the lower multiple shall be used.

MAX LOAD shall be the difference between the total weight and light weight, and represent the maximum net weight of lading (including temporary racks, false floors, bracing, cooperage, ice in bunkers, etc.) which may be carried on car.

Letters and figures shall conform to the standard of the section for lettering and marking of freight cars.

(b) Each new car must be weighed separately and marked at the car works, under the supervision of the owner's inspection.

* Tank cars and refrigerator cars of private ownership shall be weighed and stenciled by the owner only, or by authorized representative of the owner.

The accuracy of the scales used must be certified to by a railroad-scale inspector appointed by the car owner.

These provisions to be incorporated in the contract covering the purchase of the equipment.

(c) Wooden and steel underframe cars (except refrigerator cars) should be reweighed and remarked each year during the first two years the cars are in service and thereafter once every two years. All-steel cars and all refrigerator cars should be reweighed and remarked at least once every three years. This weighing should be done at any favorable time during the year in which the car is due to be weighed, regardless of the month in which the previous weight was obtained. This paragraph does not apply to tank cars.

Effective July 1, 1920, for cars not due for reweighing, where the marking does not conform with that shown in Section (a), cars shall be restenciled in accordance therewith. If this work is performed by other than car owner charge shall be made in accordance with A. R. A. Interchange Rule 107.

(d) When a car is materially changed by repairs, alterations or repainting, it should be reweighed and remarked. (See paragraph (f) (8).)

(e) Any car without marking should be immediately weighed and marked. Any car (except tank cars) which has not been reweighed and remarked within the prescribed period should be immediately reweighed and remarked. If the car (except tank cars) is reweighed at any time and is found to have a variation of 300 lb. or more (for refrigerator cars, 500 lb. or more) between the marked and actual weight, it should be immediately remarked.

(f) (1) When empty cars are received in yards for inspection for defects, or while empty cars are on shop tracks for repairs, there should be selected the cars whose condition and whose date of last weighing, etc., indicates that they should be reweighed and remarked. The number of cars selected will be regulated in accordance with facilities and traffic conditions.

(2) The initials and numbers of cars selected, *total weight* and old light weight marks shall be reported to the weighmaster on the prescribed blank.

(3) Cars should then be cleaned and swept out under the supervision of the yardmaster or some one especially designated. Cars should be dry and free from snow, ice, *temporary* false floors, removable stakes, posts, or anything else affecting the weight.

(4) Missing parts, such as side or end doors, or parts peculiar to certain types of cars, should be replaced and included in the *light* weight.

(5) Temporary double decks in stock cars should be removed before cars are weighed.

(6) The old *stencil* marks *shall* be entirely painted out with quick-drying paint (*including former nominal capacity marks*).

(7) Before cars are weighed, the accuracy of the scale must be regularly certified by the scale department, scale must be properly balanced and free from interference, and the weighmaster must know that cars are clean and that paragraphs (3) and (4) have been complied with.

(8) Cars should not be light weighed during rain, snow, sleet or heavy winds; except that when cars have been materially changed by repairs, alterations or repainting they must be weighed and remarked, even if it is necessary to do so under unfavorable weather conditions.

(9) Cars should be light weighed at rest, uncoupled and free at both ends.

(10) The *light* weight *and maximum load weight* so obtained, *as well as the total weight, as per A. R. A. Interchange Rule 86,* should be furnished immediately on the prescribed blank to the car marker who will mark the car as provided in paragraph (a). When desired, any portion of the marks which will not be changed may be marked on the car before reweighing.

Complete reports of such reweighing and remarking should be forwarded on prescribed form to the designated transportation and mechanical officers and a copy retained by weighmaster.

(g) When a car is remarked the car owner should be notified of the old and the new weights, with place and date. The proper officer to whom these reports should be made will be designated in The Official Railway Equipment Register.

(h) Whenever a weighmaster at a point not equipped for marking freight cars as provided in paragraph (f), the light weight of a car which is not marked in accordance with this rule, he shall attach to the car the prescribed "Light Weight Card" with the light weight and send two copies of the card to the designated officer of the railroad on which the scale is located, one copy to be sent to the owner of the car. The presence of the Light Weight Card on the car shall be authority for remarking the car at first available station.

RULE 31.

The committee recommends that Rule 31 be modified in accordance with the form shown below:

PROPOSED FORM.—Rule 31. The reweighing *and remarking* of cars provided above to be charged to car owner, except when the weight of the car is changed on account of repairs due to unfair usage; when such repairs are made on authority of defect card, charge for reweighing may be included on same authority.

RULE 32.

The committee recommends that Section (d) of Rule 32, be modified in accordance with the form shown below:

PROPOSED FORM.—Rule 32, section (d). Collision, or impact other than that occurring in regular switching, *such as:*

(1) Misplaced switches.

(2) Wrong or misinterpreted signals or failure to observe signals.

(3) Letting cars get away on incline.

(4) No rider protection when necessary.

(5) Coupling on with locomotive at speed exceeding limits of safety.

The committee recommends that the last paragraph of Rule 32 be modified in accordance with the proposed form shown below:

PROPOSED FORM.—Rule 32, (last paragraph). Defect cards shall not be required for any damage so slight that no repairs are required, nor for raked or cornered sheathing, roofing, fascia, or bent or cornered end sills, *not necessitating* the shopping of the car *before reloading,* the receiving line to be the judge.

RULE 43.

The committee recommends that the following note be added to rule 43:

NOTE—In the case of damage to more than five longitudinal sills on wooden underframe cars, more than four longitudinal sills on composite wooden and steel underframe cars, more than three steel longitudinal sills on steel or steel underframe cars and both steel center members on tank cars with two steel longitudinal sills only, the company on whose line such damage occurred must furnish owner statement showing the circumstances under which the damage occurred, if it is claimed that the damage was the result of ordinary handling. This statement, in the case of cars reported under Rule 120, to accompany request for disposition of car, and in cases where it is not necessary to report car under Rule 120 to accompany the bill for repairs.

The committee recommends that, in view of the foregoing note, the first interpretation of Rule 43 shown at the top of page 54 of the 1919 Rules of Interchange, be eliminated.

RULE 66.

The committee recommends that Section (a) of Rule 66, be modified in accordance with the proposed form shown below:

PROPOSED FORM.—Rule 66, section (a). All journal boxes shall be repacked with properly prepared packing (new or renovated) at least once every twelve months, at which time all packing will be removed from the boxes and the boxes cleaned; dust guards to be renewed (*if necessary*) *or replaced,* when wheels are changed.

RULE 86.

The committee recommends that Section (a) of Rule 86, be modified in accordance with the proposed form shown below. The present form of the first paragraphs of this section, in which the principal changes occur, is shown also.

PRESENT FORM.—Rule 86 (a).

FOR CARS WITH NON-A. R. A. STANDARD AXLES (FOUR AXLES PER CAR).

(a) Non-A. R. A. Standard axles less than the following prescribed limits must be removed from service:

Capacity, lb.	Journal, in.	Wheel seat, in.	Axle center, in.
70,000	4	5⅜	4⅞
60,000	3¾	5	4⅜
50,000	3½	4¾	4⅛
40,000	3¼	4½	3⅞

NOTE—Axles heretofore known as 70,000 lb. and 50,000 lb. capacity axles are not A. R. A. Standard axles.

PROPOSED FORM.—Rule 86 (a).

FOR CARS WITH NON-A. R. A. STANDARD AXLES (FOUR AXLES PER CAR).

(a) Non-A. R. A. Standard axles less than the prescribed limit of wear shown in Table No. 1, must be removed from service.

Until such non-A. R. A. Standard axles are removed from service, they may be used for total permissible weight of car and its lading on rail, as shown under Column "A."

TABLE No. 1

A	B	C	D	E
Total Permissible Weight of Car and Lading on Rail	Normal Capacity	Journal Diameter Worn Limit	Wheel Seat Diameter Worn Limit	Center Diameter Worn Limit
Lb.	Lb.	In.	In.	In.
148,000	100,000	5	6 1/16	5 5/16
105,000	70,000	4	5 5/16	4 7/8
78,000	60,000	3 3/4	5	4 3/8
66,000	50,000	3 1/2	4 3/4	4 1/8
56,000	40,000	3 1/4	4 5/16	3 7/8

FOR CARS WITH A. R. A. STANDARD AXLES (FOUR AXLES PER CAR).

The total weight of car and its lading on rail must not exceed weight given in Column "A." Column "B" is the nominal capacity *heretofore* stenciled on cars. Axles must be removed from service when less than the prescribed limits in Columns "C," "D," "E," or when the condemning limits in Columns "F" and "H" are reached.

All cars to have their light weight and capacity in pounds stenciled on them as per *Rule 30.*

The committee recommends that the second paragraph of Section (e) of Rule 86, reading as follows, be eliminated:

See paragraph (c), Rule 2.—Cars of 80,000-lb. capacity and over, equipped with A. R. A. Standard axles, may be loaded to maximum shown in Column "A," which is the total weight of car and lading for the respective capacities given.

RULE 91.

The committee recommends that Section (f) of Rule 91, be modified in accordance with the form shown below:

PROPOSED FORM.—Rule 91, section (f). All bills should be rendered promptly. Bills rendered after one year from date of repairs may be declined. *No bill should be rendered for repairs to cars after the time limit has expired, even though previous attempts have been made to ascertain proper ownership.*

RULE 92.

The committee recommends that Rule 92 be modified in accordance with the proposed form shown below:

PRESENT FORM.—Rule 92. In rendering bills, cars shall be treated as belonging to companies or individuals whose name or initials they bear, except that bills for repairs to leased cars or cars of other ownership shall be rendered direct if so directed in the billing instructions in The Official Railway Equipment Register.

PROPOSED FORM.—Rule 92. In rendering bills, cars shall be treated as belonging to companies or individuals whose name or initials they bear.

RULE 93.

The committee recommends that Rule 93 be modified in accordance with the proposed form shown below:

PRESENT FORM.—Rule 93. Separate bills must be rendered for cars destroyed.

All charges for repairs made to cars on account of owner's defects, defect cards and rebuttal authorities must be consolidated against any one company into one bill, except that a separate bill shall be made for the period prior to January 1, 1918.

Separate statements to be made:

First. For owner's defects for each calendar month.

Second. For all charges based on defect cards, including rebuttal charges.

NOTE—Totals only of these statements to be shown on the recapitulation.

The title and address of officer to whom correspondence should be forwarded relative to exceptions to charges should appear on the bill.

PROPOSED FORM.—Rule 93. Separate bills *shall* be rendered for cars destroyed.

Separate bills shall be rendered for the periodical repacking of journal boxes.

All charges for repairs made to cars on account of owner's defects, defect card and rebuttal authorities *shall* be consolidated against any one company into one bill, *however,* separate bill shall be *rendered* for the period *subsequent to February 29, 1920.*

Separate statements to be made:

First. For owner's defects for each calendar month.

Second. For all charges based on defect cards, including rebuttal charges.

NOTE—Totals only of these statements to be shown on the recapitulation.

The title and address of officer to whom correspondence should be forwarded relative to exceptions to charges should appear on the bill.

RULE 108.

The committee recommends that Rule 108 be modified in accordance with the proposed form shown below:

PRESENT FORM.—Rule 108. No labor to be charged for the inspection of cars, testing or adjusting brakes, adjusting angle cocks, tightening unions or spreading cotters; sill steps, ladder treads or handholds, tightening or straightening on car.

No material or labor to be charged for the following items of repairs:

(1) Air-hose gaskets, applied, except with hose complete, applied.

(2) Brake pins or key bolts, applied.

(3) Brake ratchet wheel keys, applied.

(4) Brake shaft-rings, applied.

(5) Brake-shoe keys, applied.

(6) Carrier iron, Bettendorf type, when turned over, no charge for adjustment.

(7) Coupler release clevises, clevis links or chains, clevis pins or bolts, applied.

(8) Lag screws, applied, except when used to complete other items of repairs not herein listed.

(9) Nuts or lag screws, tightened.

(10) Nuts, 3/4 in. or less, applied, except when used in renewal of bolts.

(11) Nut locks, or lock nuts, applied.

(12) Release-valve rods, repaired or applied.

(13) Straightening brake shafts and uncoupling levers when not removed from car.

(14) Spring cotters and split keys, applied.

(15) Staples, applied.

(16) Wood screws, applied, except when used in renewal of running board.

(17) Washers, applied, except when used in renewal of bolts.

No charge to be made for the material or labor of lubrication, except as provided in Rule 66.

PROPOSED FORM.—Rule 108. No labor to be charged for the inspection of cars, testing or adjusting brakes, adjusting angle cocks, tightening unions, *nuts or lag screws* or spreading cotters; sill steps, ladder treads or handholds, tightening or straightening on car; *brake shafts or uncoupling levers straightened when not removed from car.*

No charge to be made for the material or labor of lubrication, except as provided in Rule 66.

Passenger Car Rules

RULE 2.

The committee recommends that the following be added to Rule 2 as Section (b):

Cars, loaded or empty, using lighting outfits, operated by gasoline engines, will not be accepted in interchange.

RULE 21.

The committee recommends that the first paragraph of this rule, relative to labor charge for cleaning, oiling, testing and stenciling ordinary quick-action triple valves, and for cleaning, oiling and stenciling brake cylinders 14 in, or less in diameter, be eliminated, and that the price formerly shown in Rule 111 of the Freight Car Code, for separate charges for triple valves and cylinders, be added to this rule with the same percentage of increase as recommended by the Committee on Prices for Labor and Material to Freight Car Rule 111.

The report is signed by T. H. Goodnow (chairman), Chicago & North Western; J. J. Hennessy, Chicago, Milwaukee & St. Paul; J. Coleman, Grand Trunk; F. W. Brazier, New York Central; P. F. Smith, Jr., Pennsylvania System; J. E. O'Brien, Missouri Pacific and G. F. Laughlin, Armour Car Lines.

Discussion

The report of the committee was presented by T. H. Goodnow (C. & N. W.), chairman, who said: The committee felt, with the return of the railroads to private ownership, that the fewer changes made in the rules this year the better, on account of the number of comparisons being made. The committee does not desire to be misunderstood by this as discouraging the submitting of recommendations or suggestions for changes in the rules. It has been the practice in the past to mention all suggestions which were made, but the committee feels that hereafter it should report on only those suggestions which were concurred in and adopted. The changes in the rules are of minor importance, but the more important have to do with changing the capacity stenciling on cars, also the rules in connection with that branch of the subject.

Since the report was printed the committee has received a request from the Industrial Car Manufacturers' Institute for a rule which will permit the handling of export cars, or industrial cars not fully complying with the A. R. A. requirements. At a meeting of the Arbitration Committee, held yesterday afternon, the following action was taken, and is now offered as a part of this report:

Industrial or other cars not intended for interchange service, when empty and moving on their own wheels, may be accepted in interchange in their initial movement from manufacturer to destination (or seaboard) without meeting the requirements of Section *A*, insofar as the retaining valve and A. R. A. standard triple valve is concerned, second paragraph of Section *C* for No. 2, A. R. A. brake beams, Sections *H*, *M* and *O* and specifications for Tank Cars. To each side of such cars a card shall be attached by shippers, reading as follows:

Industrial or Export Car
shipped in accordance with
A. R. A. Rule 3.
Signed.....
Shipper.

I wish to call attention to Rule 32. There is an error in printing Section (d)—the two commas following "collision" and "switching" should be omitted, which, I think, will clarify the rule. The committee, on account of the non-A. R. A., standard axles, 5¼ in. by 9 in., and 4½ in. by 7 in., has considered it advisable to recommend a change which will allow a second-hand credit rather than a scrap credit for these axles, where they can be turned to 5 in. by 9 in., or 4¼ in. by 7 in., without any other work in connection with the axles. This matter is offered as follows, to be included as part of the report: "Your committee suggests that present Rule 98 be revised to provide that the non-standard 100,000-lb. capacity axle which has 5¼ in. by 9 in. journals and the 70,000-lb. capacity axle which has 4½ in. by 8 in. journals, the over-all length conforming to A. R. A. standards for 80,000 and 60,000-lb. axles respectively, when removed from service and replaced with A. R. A. standard axles, shall be credited at second-hand values for A. R. A. standard 80,000-lb. and 60,000-lb. axles respectively, provided such axles can be turned to the required dimensions for the second-hand axles mentioned." It is felt that such axles should not be credited as scrap inasmuch as they can be reclaimed for use as A. R. A. standard axles.

C. E. Fuller (U. P.): *I move that the report be accepted and adopted as read.*

Mr. Goodnow: I find I have omitted one change. In connection with the charge for periodic repacking of freight equipment the committee would recommend the following:

"To justify bill, the repacking must be done in accordance with A. R. A. Recommended Practice." The above to be a new sentence to first paragraph of Rule 66.

G. F. Laughlin (Armour Car Lines): I do not see it in the committee's report, but it is my understanding in the adoption of the report of the Committee on Prices, the percentage now included in Rule 160 be eliminated.

Mr. Goodnow: I would rather have Mr. Carson, the chairman of the Committee on Prices, answer that question, but it is my understanding that the revision of the prices both for labor and material, eliminate the perecentage which has been added heretofore in the prices.

The motion to accept and adopt the report was carried.

J. H. Milton (C. R. I. & P.): I want to ask if it can be arranged that the prices on materials should be made effective as early as possible, as I feel that all the railroads are very deeply interested in getting that rule into effect.

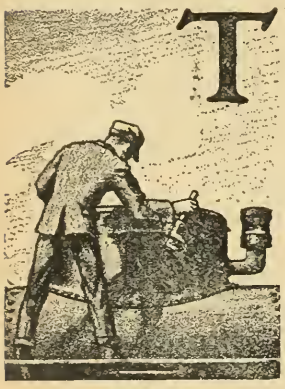
C. E. Chambers (C. of N. J.): On behalf of the Committee on Resolutions, I wish to make the following report: The Committee on Prices for Labor and Material have been at work constantly for three or four years trying to revise the prices and keep even with the upward tendency. The committee offers the following:

RESOLVED: That the report of the Committee on Prices for Labor and Material be made effective at as early a date as the necessary circulars can be issued and gotten out to the members.

RESOLVED: That the use of salt with ice for refrigeration be prohibited in all cars not equipped with brine tanks, except those carrying meat, dressed poultry, game, fresh fish, sea foods and eggs.

A motion to adopt both resolutions was duly seconded and carried.

Report of the Committee on Tank Cars



THE WORK OF THE TANK CAR COMMITTEE during the past year has been largely devoted to details of construction calling for improvement, most of which have been referred to in previous reports. As these details have not yet been settled in a manner satisfactory to the committee, this report is principally one of progress.

Safety Valves—The safety valve in various modified forms has been subjected to an extensive series of steam tests at Altoona.

The first requirement of a tank car safety valve, of course, is that it shall adequately relieve internal pressure. The necessity for this is emphasized by the reports of the behavior of numerous tanks which have been involved in wrecks accompanied by fire. In these cases, nothwithstanding the high bursting strength which it is required the tanks shall be calculated to meet, many tanks when weakened by the high fire temperature have stretched, and some have burst. Therefore, no valve of a capacity less than the standard can be considered. So far none of the modified valves tested has shown a capacity equal to that of the standard design.

The greatest difficulty appears to be in securing complete tightness up to the popping pressure. All of the tests indicate that leakage begins below that pressure, in some cases very materially below. With the old straight refinery gasolines this was not a matter of prime importance because of the low vapor tension of the product. The situation is very different today with the products, either straight or blended, derived from natural gas. Some of these very volatile products have a vapor tension as high as 20 lb. at 100° F., and it is important to prevent the escape of the vapor, not only from the standpoint of conservation of the product, but because of the dangers arising from the escaping vapor.

In addition to stock valves of the standard form, the tests included one valve which was accurately machined to the standard dimensions throughout, and others with special non-corrosive seats. Special springs of a better quality and more carefully made than the ordinary springs were obtained and tested in connection with the different valves. It has not been possible, however, to

secure complete tightness, indicating that the difficulty is not altogether one of workmanship but includes, as well, that of design.

To widen the field as much as possible, the problem has been taken up with several manufacturers of locomotive safety valves who have been encouraged to submit their own designs, the only restriction being that such valves shall have a discharge capacity at least equal to that of the standard valve and that they shall be interchangeable with the standard valve so far as the fitting on the dome is concerned. Three concerns have been working on the problem and two of them have submitted valves. Tests of these valves developed shortcomings and they have been returned to the makers for modifications with a view to overcoming the difficulties, after which further tests will be made.

Tolerance in Capacity of Tank Taking One Safety Valve—Section 20, Safety Valves, of the specifications, requires that

> (b) One valve shall be provided for a tank of a capacity of 6,500 gallons or less, and two valves for a tank of a capacity of more than 6,500 gallons.

It appears that in some cases tanks of a nominal capacity of 6,500 gallons exceed that capacity slightly because of variations in construction, and the committee recommends that Section 20 be amended to read as follows, to permit a tolerance to cover this condition:

> (b) One valve shall be provided for a tank of a capacity of 6,500 gallons or less, with a tolerance of not over 150 gallons to take care of variations due to workmanship in construction, and two valves for a tank of a capacity of more than 6,500 gallons plus the tolerance.

Safety Valve Adjustment When Tested—To make it clear that it is not necessary to adjust a safety valve which when tested opens between the prescribed minimum and maximum scale readings, the committee recommends that the first paragraph of Section 24, Tests of Safety Valves, in each of the specifications, be amended to read:

> "Safety valves shall be tested, and if necessary adjusted, at intervals of not over two years (or whatever period is shown), those on new cars to be tested and adjusted before the cars are placed in service."

Safety Valve, 1916 Design—The committee recommends that Circular S-111—90, Application of Washer and Jam Nuts to Valve Stem, be included in the Tank Car Specifications.

Bottom Outlet Valve—The reports of the Bureau of Explosives continue to emphasize the shortcomings of the existing bottom outlet valves. After discussion of the subject at a meeting of the committee at which were present representatives of the Bureau of Explosives and members of the newly organized American Petroleum Institute, a sub-committee, consisting of A. G. Trumbull (chairman), Erie; John Purcell, Atchison, Topeka & Santa Fe, and J. E. Grant, Bureau of Explosives, was appointed to investigate the whole subject.

This sub-committee examined all designs of bottom outlet valves that had been submitted by the inventors, and also secured and examined the designs used by the principal tank car builders, and all patents covering bottom outlet valves. Its report, which is attached as an appendix, outlines certain features desirable in the bottom outlet valve. The Tank Car Committee recommends that these features be stated in the Tank Car Specifications, not as requirements, but as a general guide in designing a valve.

It is realized that the inclusion in one valve of all the features described is hardly to be hoped for immediately, but compliance with a majority of them will be an improvement on the valves now available.

The American Petroleum Institute, through its Technical Committee, is co-operating in the effort to secure a better valve, and has agreed to have its members make actual trials of any valves which promise satisfactory results.

Bottom Outlet Pipe—A prominent feature of the reports of accidents involving tank cars is the unseating of the valve by breaking of the bottom outlet pipe from being struck by derailment of the car or excessive shifting of the tank. This frequently results in the loss of the entire contents of the tank, which in many cases are ignited by friction sparks. The outlet pipe projects below the sills for the attachment of the unloading connection and is consequently very vulnerable. The specifications have, for a long time, required a groove in the casting to insure that when struck in case of accident the break will occur at a point which will not involve the valve. There has not been any requirement as to the depth of the groove, and, in many cases it has been found that the depth was not sufficient to locate the break as intended. A service condition that has to be met is that, after the tank is loaded, the cap is screwed home with a long wrench, sometimes with the aid of a sledge. The committee has made experiments to determine the thickness of metal necessary at the bottom of the groove to give sufficient strength to meet service conditions and at the same time locate the break in case of accident, and recommends that the first paragraph of Section 7, Bottom Outlet Valve, be amended to read:

> The outlet valve casting shall be so designed that breakage will not unseat the valve, the preferable construction being to cut (not cast) a "V" groove in the upper part of the casting at a point immediately below any part of the valve, to a depth that will leave the thickness of the casting at the root of the "V" not over ⅛ in. (See Fig. 2.)

Dome Closing Arrangement—With the screwed dome cover which is in general use there is danger from its being prematurely released by defective threads, or insufficient length of threads, and also of its being removed through stupidity before the pressure in the tank has been relieved. There is also leakage due to worn threads and defective gaskets.

Designs of covers of the bolted type and of the boiler manhole type have been submitted to the committee and approved for experimental use. At least one of these designs has been in service for about four years with reported satisfactory results. Both types have the advantage that they can not be removed until the internal pressure has been relieved.

The American Petroleum Institute is co-operating with the committee in the endeavor to improve this feature, and the committee expects to make definite recommendations later.

Heater Pipes.—In view of the diversity of the methods of application of heater pipes at present and of the products carried in cars so equipped, a sub-committee has been appointed, representing the different interests, to investigate the whole subject. After this has been done the committee will make such recommendations as the situation may call for.

Openings in Heads of Tanks.—Where heater pipes are used it is frequently the practice to make an opening in one head of the tank for handling the pipes in and out. This opening, as a rule, is closed by a plug screwed through the sheet or through a flanged fitting. There have been a number of failures of these plugs involving, in addition to loss of contents of the tank, injury and loss of life. In all cases it developed that the failure was due to the use of a cast plug cored on the inside for lightness.

The committee recommends that the specifications require that where plugs are used in the heads of tanks of new tank cars, or as replacements in the case of existing cars, they shall be solid, of a good grade of gray cast iron, standard pipe thread and taper, and of a length which will screw at least six threads inside the face of fitting or tank.

Quality of Steel Plates for Tanks—In 1916, after full discussion in which representatives of the tank car builders and owners took part, the Tank Car Committee recommended and the Association adopted the requirement that for tank cars built after May 1, 1917:

> All plates for tank and dome shall be of steel complying with the American Society for Testing Materials Specifications for Boiler Plate Steel, Flange Quality.

Before this requirement became effective the demand for steel for war purposes made it desirable to postpone its enforcement in the case of the Class III, or general service car, for the duration of the war. Because of the unsettled condition due to the strike in the steel industry the effective date has been further extended several times, the last extension being to May 31, 1920, to permit the completion of cars under construction or for which material on order had been delayed in delivery.

In the meantime, while certain purchasers of tank cars have insisted upon A. S. T. M. boiler plate steel flange quality, most of the tank car builders have been making tanks of tank quality steel. Tank steel is not subject to any specification; it may include good metal, but there is no assurance of that fact. The principal difficulty in securing an adequate supply of the quality steel called for by the Tank Car Specifications is the objection of the steel companies to the curtailment of their output by the amount of testing necessary, one set of physical tests being required for each plate as rolled. The steel people claim that this calls for so many tests that, with their present practice, they have not room to store the plates awaiting test. It has not been shown that this is an insuperable difficulty.

Anchorage Bolts—In view of cases of shifting of the tank due to loss of anchorage bolts because they were inserted from the bottom and dropped out when the nuts were lost, the committee recommends adding to the fifth paragraph of Section 13, Anchorage, in specifications for Classes III, IV and V cars, a sentence reading:

> When, because of the construction, bolts can not be inserted from the top so that the nuts will be on the bottom, nut locks shall be applied to both bolts and nuts, or rivets shall be used.

The report was signed by A. W. Gibbs (Chairman), Pennsylvania; C. E. Chambers, Central of New Jersey; Wm. Schlafge, Erie; S. Lynn, Pittsburgh & Lake Erie; Jno. Purcell, Atchison, Topeka & Santa Fe; Geo. McCormick, Southern Pacific; A. E. Smith, Union Tank Line; Geo. Hartley, Semet-Solvay Company, and C. W. Owsley, The Texas Company.

Appendix A—Report of Sub-Committee on Design of Bottom Outlet Valve

In view of the fact that the subject of the design of the bottom outlet valve for tank cars is of such present interest and the problem is being considered by many interested parties, including the American Petroleum Institute, it seemed desirable that an outline specification should be prepared as a guide for the development of the ideal bottom outlet valve, and the sub-committee submits the following:

1. The valve seat should be independent of the outlet chamber, so that if the outlet-chamber flange is accidentally torn off the tank, the contents of the tank will not escape.
2. The construction should be such that the tank may be completely emptied through the valve.
3. In order that the valve may not lift from its seat in the event of an accident separating the discharge chamber from the shell, the valve should have no wings or stem projecting below the bottom of the tank.
4. The valve must remain seated under vapor and liquor pressure within the tank.
5. The valve chamber or valve should not distort because of the changing contour of the shell due to lading, expansion or other usual causes.
6. The valve should not tighten on its seat under the vibratory action of the stem.
7. The design should be such as not to create a tendency to lock or wedge the valve on its seat.
8. It should not be possible to displace the valve on its seat because of the movement of the car, vibration of the tank or the effect of the movement of the liquid contents of the tank.
9. The design should not permit side-lifting of the valve because of uneven spring tension.
10. The design should not permit displacement of the valve through pressure from below.
11. The valve should operate from the interior of the tank, but in the event the rod is carried through the dome, leaking shall be prevented by packing in stuffing box and cap nut.
12. The valve operating gear must have means of compensating for variations in the vertical diameter of the tank produced by expansion, weight of the liquid contents, or other usual causes.
13. The valve and seat should be so designed as to permit expansion of freezing liquids.
14. The valve and seat should be readily removable for repairs, including grinding.
15. It is desirable that the design of valve operating mechanism shall be such that the dome cover can not be applied until the valve is closed.

In its deliberations the sub-committee has recognized the fact that great opposition to the elimination of the bottom outlet would doubtless be encountered at the present time, and the report, therefore, contemplates the perpetuation of this feature of tank car construction; but it is rcognized that it will be decidedly preferable to adopt other means of discharging tank cars, thereby avoiding all risks which can not be eliminated as long as the bottom outlet is maintained.

Discussion

The report of the committee was presented by A. W. Gibbs (Penn.), who said: The work of the Tank Car Committee during the past year has been largely devoted to details of construction calling for improvements, most of which have been referred to in a previous report. As these details have not been settled in a manner satisfactory to the committee, the report is principally one of progress. Additional tests have been made at Altoona of safety valves of the standard design, modified in certain respects; also of valves designed by certain manufacturers of locomotive safety valves, who are endeavoring to produce a valve which will satisfactorily meet tank car requirements. Two of these latter valves have since been modified and are now at Altoona for further test, together with a valve submitted by a third concern, which will be tested at the same time. The bottom outlet valve is still the most difficult subject to deal with. If any of you will take the time and trouble to read the report of the Bureau of Explosives, you will see that derailments are quite frequent, and you will see that they result in the loss of the contents of the car from breaking the outlet pipe.

We have had offers of co-operation from two organizations, the American Petroleum Institute and the National Petroleum Association. So far we have not accomplished much, but we have their promise to try any devices which seem sufficiently promising to effect an improvement. To assist in that the committee has framed an appendix, containing some recommendations of the conditions which will be met by a successful valve. In a great many cases of derailment, the extension of the bottom pipe is broken off, and in many cases it has dislodged the valve, resulting in some very extensive fires. Therefore, the committee determined that the present requirement that the pipe should be nicked below the valve, should be more specifically covered. A number of independent examinations have been made on this subject, and all of them have closely agreed as to the thickness of the pipe, which should remain at the bottom of the groove. The thickest was ⅜ in. and the others were 5/16 in., and therefore the committee wishes to have that defined in the drawing.

To show how little some of the car owners appreciate the importance of this subject, I will say that a number of cars have been reported in which nipples and supplementary valves have been applied extending a very considerable distance below the seals, and the explanation given by these people is that the valves are so bad that the consignors are afraid to take the caps off for fear that the contents will run out, so they transfer the burden of the thing to us. These cars are a continual invitation to trouble, and the trouble that the consignee fears we get. Therefore, that matter will be covered in a subsequent recommendation.

In the dome closing arrangement there are improvements over the present screw-threaded arrangment on file, and it is hoped that eventually something better can be specified. We are not ready to do that. The same holds true in regard to heated pipes, which are complicated more or less by patent conditions, and we are not sure that any is so much better than another as to justify a recommendation at present.

The most important thing, aside from the bottom discharge valve, is the quality of the steel plate for cars. During the war, you will remember that owing to the shortage of steel we had to waive the requirement for boiler flange steel for the tanks, and that extended to a period after the war. Some manufacturers have a considerable amount of tank steel on hand, and the committee is convinced that that is an unsatisfactory material. It is not a specification material at all, as there is no specification for tanks. We made this recommendation and had a further hearing yesterday afternoon, at which the tank car people were represented. The burden of their claim was that they had difficulty in getting flange steel because the requirement is that each slab as rolled shall be tested. Some of the manufacturers wished to substitute structural steel for cars, which calls for one or two tests per mill, but in no way safeguards the buyer against insufficient discard in the cutting of the slab.

The manufacturers' principal objection is the amount of testing required, but after hearing all sides, the committee feels that it should not again extend the time for the use of other than flange steel. This should apply to all. Some manufacturers have been very fair in ordering flange steel in advance and making cars of it; some others have loaded up with tank steel far beyond any possibility of delivery wtihin the time specified, and to extend further is to put a penalty on the people who have tried to meet our views. Therefore, the committee recommends, as an addition to the report, that the requirements for boiler flange steel as specified by the American Society for Testing Materials, as per extension expiring June 1, 1920, shall be made effective at that date. As regards nipples and valves, of which some have been applied, your committee considers that it is a direct invitation to trouble in case of derailment, and would add to the report a requirement that cars so fitted shall not be accepted in interchange.

F. W. Brazier (N. Y. C.): I move that we accept the committee's report and also that a vote of thanks be extended to Mr. Gibbs for the work he has done on this committee in the years past. My motion also carries with it the recommendation

that such changes may be approved. I make a motion that the committee's report be accepted and their recommendations on pages 3 and 5 be adopted.

T. H. Goodnow (C. & N. W.): I second the motion.

Geo. Hartley (Semet Solvey Co.): The Tank Car Committee, I think, has done a good thing, and I hope that this matter of boiler flange steel will be accepted. The committee has endeavored to make the tank good under the accepted formula with reference to strength of cylinders, lateral strength of seams and the material that goes into the cylinder, and unless we have a well-flanged steel, with good tensile strength and worked upon the foundation or base, all formulas with reference to the strength of cylinders and otherwise are useless. The only way we can actually get good material to do good work on the rest of the cylinder is to get a flange steel, and we fail to see why people won't take that into consideration, particularly the tank car owners. That we should be given a steel that we don't know anything about to put in a tank car loaded with casing-head gasoline or benzol or gasoline and have that become cracked along the road and distribute its contents to become ignited by some passing engine, seems absurd. We must have boiler flange steel.

Mr. Gibbs: I think that we are making some of our own trouble. We recently had a complaint from one of the large shippers, asking us to remove one of our inspectors because he insisted on the cars being loaded with the cap off, and that made us wonder what other people were doing. It that man was so unreasonable, are the other inspectors so unreasonable, and if so, why aren't they complained of' It was an eye-opener to me to have a request of that kind, and I suspect that if we were ourselves on the receiving tracks, insisting that we see the car before the cap is on, we might save very much of this trouble.

The motion that the committee's report be received and a vote of thanks be extended to Mr. Gibbs was unanimously adopted.

Report on Brake Shoe and Brake Beam Equipment

THIS COMMITTEE HAS PURSUED the lines of investigation and study suggested in its report of last year.

The No. 2 brake beam capacity question remains somewhat involved, at least there is evident lack of agreement among the members on the question of whether or not the capacity of such beams should be increased from 12,000 lb., the figure at which it has stood for years, to 15,000 lb., as per the 1918 Standard.

On account of the general situation, the committee agreed upon the advisability of the following inquiry to representative members on this capacity question:

"Per the Brake Shoe and Brake Beam Equipment Committee's report of last year, by letter ballot of 1917, the No. 2 brake beam shown on sheet *R* of that year had been adopted as recommended practice, by close margin.

"The required capacity of this beam remained at 12,000 lb. As a result of Executive Committee action taken in New York City, October 11, 1918, there appeared in 1918, upon M. C. B. Sheet 17-B, a 'No. 2 standard brake beam with details' specifying definitely 1¼-in. tension member and in the specification an increase in the 'capacity' of the No. 2 beam from 12,000 to 15,000 lb. It appears that without further action No. 2 brake beam capacity stands at 15,000 lb., and the size of the tension member definitely at 1¼ in.

"Regardless of this situation, the committee desires the benefit of your reply to the following questions:

"(A) Whether or not you are of the opinion that present service requires a '15,000-lb. beam'; (B) whether abolition of the '12,000-lb. beam' is required or desirable; (C) if a '15-000-lb. beam' is desirable, for what weights of cars should it be required; (D) if the abolition of the '12,000-lb. beam' is desirable, from what weights of cars should its use be barred, and as of what date would you suggest that the use thereof should be eliminated or restricted; (E) could or should '12,000-lb. beams' and '15,000-lb. beams' be applied and accepted indiscriminately, or should '15,000-lb. beams' be used to replace '12,000-lb. beams' on cars exceeding a specified weight, or should '15,00-lb. beams' be used on all cars; (F) if 15,000-lb. beam is adjudged desirable or required, should it be known as a 'No. 2 Beam' or as a 'No. 2½ Beam,' as has been suggested, in order to differentiate between the higher capacity 15,000-lb. beams and the large quantity of 12,000-lb. No. 2 beams already in service; (G) if, in your judgment, the No. 2 brake beam capacity question should be opened, on what grounds would you suggest the matter be opened?"

From replies received thereto, the committee is well supported in recommending that, by appropriate letter ballot action, there should be recognized in the standards "12,000-lb. beams" and "15,000-lb. beams." That is, that the "12,000-lb. beams" should not be eliminated from the standards.

It has been suggested that the capacity of brake beams be increased for the purpose of lowering the cost of beam maintenance and increasing the efficiency of brake beam service. The committee questions the expediency of brake beam capacity increase on these grounds, and, in view of its study of brake beam failures and maintenance practice, is of the opinion that unsatisfactory brake beam service and cost of maintenance are chargeable to brake beam failures in which strength is not a factor, to brake beam design cramped because of limiting truck conditions imposed, to unfair brake beam treatment represented in the interchange of beams which are not interchangeable, and to general practices obtaining with regard to the repair of beams. The committee is of the opinion that present 12,000-lb. beams are not failing on any accounts which either prescription of 1¼-in. tension members or increase in required capacity from 12,000 to 15,000 lb. will correct.

In last year's report the committee suggested the possibility of its recommending this year the re-establishment of the 12,000-lb. beam to be known as heretofore as "No. 2 Beam" and the recognition of the 15,000-lb. capacity beam to be known as "No. 2½ Beam." The committee suggests that if this general plan of covering the situation is pursued, the 2½-in. be replaced by "2X," for the reason that the suggested "2X" designation will serve all purposes and will be susceptible of more clear designation in casting. The Committee on Car Construction is apparently in accord with the idea that both 12,000-lb. and 15,000-lb. beams ought to be represented in the standards, and has given attention to the matter of marking. It is, therefore, the consensus of this committee's opinion that the question of beam markings should be covered by an appropriately arranged letter ballot question which will embrace simultaneously the suggestions of this committee and those of the Car Construction Committee in this particular.

It is the opinion of this committee that "No. 2" should be preserved as the designation applying to the 12,000-lb. beams on the grounds that, because of being placed in a position of either changing the designation on the very large quantity of 12,000-lb. beams now in use, or of changing the designation on the comparatively few 15,000-lb. beams now in use bearing this same designation, it would be better to change such designation as applied to the smaller number of such 15,000-lb. beams involved.

On account of the comparatively few No. 3, 4, 5 and 6 beams now in service, it has, and with reason, been suggested that the new 15,000-lb. beam be introduced as No. 3 and the numbers applying to the higher capacity beams be moved up to make room for this insertion.

The committee suggests the need of some attention to revising interchange rules on this matter of beam capacity. These have required, for some time, that "The No. 1 beam (6,500 lb. capacity) must not be used on cars having a light weight in excess of 35,000 lb." Although many cars of weight exceeding this limit are operating with beams which would classify as No. 1 or less, the committee appreciates the developing necessity

of there being determined a maximum weight of car from which the use of a 12,000-lb. beam should probably be barred, and in this connection suggests the consideration of a rule to the effect that the combined capacity of the beams carried by a car should not be less than the light weight thereof. The committee does not assume to make specific recommendations on this matter because the Car Construction Committee has had it under consideration.

Such a rule would cover nearly 100 per cent braking power, would permit the use of the No. 1 beam only on cars of less than 26,000 lb. light weight, of which cars there are of course very few, and would permit the use of 12,000-lb. beams upon cars weighing light not in excess of 48,000 lb., or almost up to the light weight of recently constructed 70-ton cars, and would prescribe the use of a 15,000-lb. capacity beam upon cars weighing light from 48,000 to 60,000 lb. The equity of such an arrangement is apparent so long as established practices regarding the percentages of braking power remain undisturbed.

In connection with this matter of interchanging "non-interchangeable" beams, and with the necessity of beginning

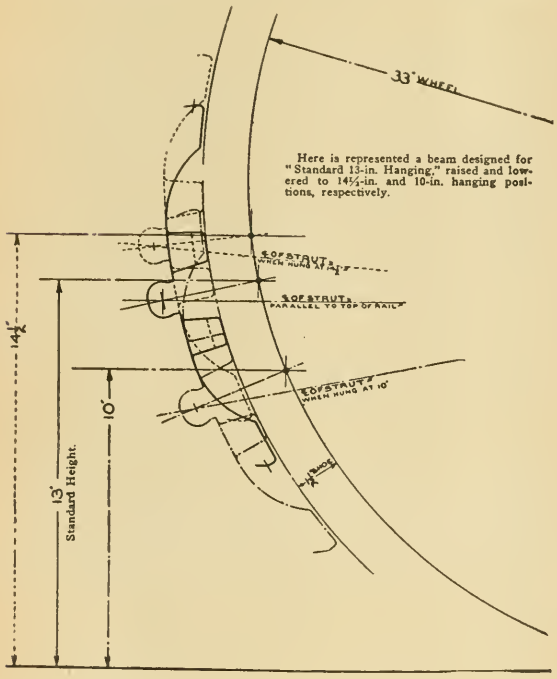


Fig. 1.—Effect of Improper Hanging on Stresses in Beam

at the bottom of brake beam design, as indicated in the committee's last year's report, Fig. 1 is submitted. This figure is intended to present the punishment imposed upon beams which are hung at other than that height of hanging in which the line of strut remains in the plane parallel to the top of the rail, that is, of the normal line of pull. It appears unreasonable to expect beams to withstand successfully the transverse stresses imposed by the application of loads in directions other than those of the strut center line or what may properly be termed the "plane of the beam."

In order to get beams hung at proper heights by repairmen, it will be necessary to arrange means by which such men can readily determine, from a ready and prompt inspection, the heights for which beams are designed. This committee is undertaking to arrange a gage with which these hanging heights may be so determined.

The maintenance practices obtaining with regard to brake beam repairs already referred to are, in the judgment of the committee, very important factors in brake beam maintenance costs and their service efficiencies.

In the large, brake beam repairing facilities and practices are surprisingly crude and comparison can hardly be made between the beams delivered by manufacturers under A. R. A. specifications and those turned out repaired or manufactured at the carriers' plants. With the former, the No. 2 beams, for example, have been required to withstand 12,000 lb. load with a maximum deflection of .07 in., then a set load of 24,000 lb. with which the permanent set shall not exceed .01 in., and a further movement of the testing machine head of 2 in. without breakage of any beam parts.

Carriers' practices and facilities which have been witnessed do not provide for or include any such tests and, from the crude practices and conditions observed, the committee may very fairly state that practically none of the carriers' overhauled beams are fit for subjection to any such tests as are imposed by the specifications under which new beams are purchased. At an important repair point on one line, one repaired No. 2 beam of a lot of six, tested to the required 12,000 lb. capacity tests; others took at 1/16 in. deflection only 9,000, 8,580, 7,580, 10,550 and 9,960 lb., respectively.

It will be appreciated that repaired beams go into exactly the same service as new beams and it may, therefore, be reasonably expected that under present conditions beams once repaired become repeatedly candidates for further repair. The committee is of the opinion that the percentage of brake beam failures in fair service which might be allocated to repaired beams would be found to be surprisingly great.

The carriers' interchange of "non-interchangeable" beams has been referred to, along with which reference should be made to interchange of hangers or the continued use of hangers which will give the beam other than the designed hanging conditions. Not infrequently a difference in hanging conditions is found to obtain on opposite ends of the same beam.

The committee volunteers to make this question of beam maintenance conditions, facilities and practices the subject of particular study during the coming year and hopes to be able, in its next report, to make definite recommendations including a code of standards which should be met in brake beam repair work.

The committee has made a careful study of the information obtained through the medium of the questionnaire, accompanied by the diagram and table of desired brake beam limiting condition information, represented in Fig. 1 of last year's report. Fig. 2, showing graphically a small portion of the information obtained, indicates clearly the necessity of providing in the Standards some more shallow depth brake heads than represented in 1918 Sheet 17-B because on large quantities of existing cars, which will be in service for a long time, there is not the room required for its use, that is, it can not be applied. This is perhaps more pointedly indicated by Fig. 3.

Having analyzed the situation, the committee submits as its recommended solution of the brake head depth question the adoption by letter ballot of the three depths of heads exhibited as types *A*, *B* and *C* of Fig. No. 4 herewith.

Type *A* is of the center hung variety the same, so far as concerns depth, as shown on Sheet 17-B of 1918 and represents the maximum condition acceptable within the clearance diagram.

Type *B* meets an intermediate condition which will not admit the use of the center stirrup hanger.

Type *C* is arranged for those conditions which will not permit the use of either types *A* or *B* but will permit of good stable construction where the restricted head depth represented is absolutely required.

These head depths take care of practically all of the prevailing conditions on equipment now offered in interchange. There will, however, be some conditions to be met that will not allow the use of either types *A*, *B* or *C*, in which cases, comparatively rare, the committee submits that the equipment having such conditions be considered "special" and the solution of the problem presented be left for the present, at least, in the hands of the individual carriers or interested manufacturers.

While the committee has every reason to believe that the most shallow head presented in the type *C* permits of good stable construction, there may arise some question as to the limit of head depth decrease which should not be exceeded. The committee anticipates the advisability of ultimately in-

serting the brake beam specifications a requirement of head strength based upon the application of a suitably determined load to the back of the head, set up upon supports in contact with the top and bottom toe lugs.

The committee understands that one of the larger roads has made use of such head test for some time and will probably be able to make definite recommendations as to the advisability of seeing some such test incorporated in the specifications, together with suggested or recommended details thereof, at next year's meeting. This is a question the committee will make the subject of some study.

Fig 4 was circulated to representative members with request for replies to the following questions:

1. Have you any objection to adopting the general plan of brake head layout represented in the attached cut, this layout plan being that represented in Fig. 2 of the committee's report last year and referred to in text thereof?

2. Have you any objection to the committee recommending for adoption brake heads of the three depths shown by Type *A*, maximum conditions, Type *B* and Type *C*, minimum conditions, shown on the attached cut? In other words, do the limiting conditions on your own equipment prohibit general use thereon of the largest Type *A* head? If so, could the smaller types *B* and *C* be used?

To the first question replies were almost unanimously approving, that is, there were no objections registered to adopting the general plan of brake head layout represented.

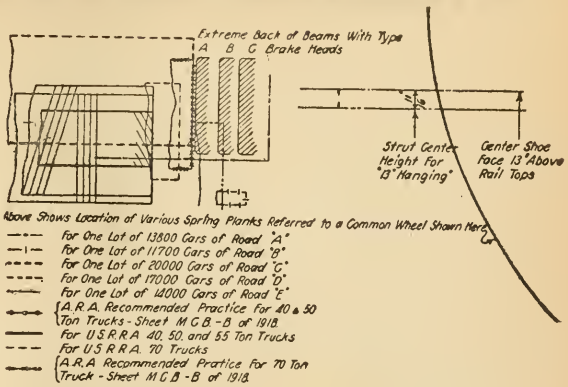


Fig 3.—Location of Spring Planks Relative to Wheel

assured that no error will be made by adopting the *A*, *B* and *C* heads as recommended.

The report included the method of laying out the brake head

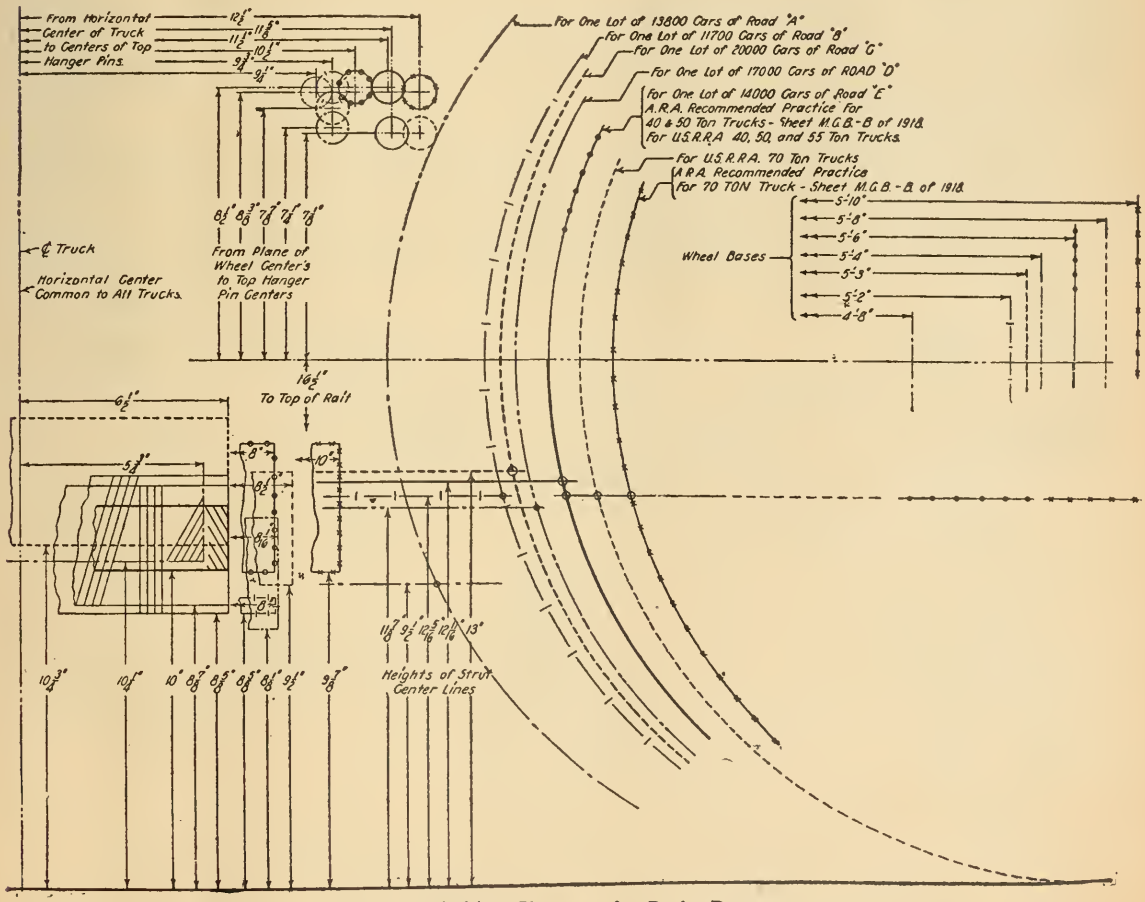


Fig 2.—Limiting Clearance for Brake Beams

To the second question there were practically no objections to the adoption of the three brake head depths, but quantities of reponents made statement that it would be impossible for them to make use of the largest *A* head; some of either the *A* head and the smaller *B* head. The committee is, therefore, which was shown in Fig. 2 of the 1919 report, with a development of the vertical section of the brake head face, as shown in Fig. 5, and the brake head gage copied from the latest

standard. The committee recommended that this figure be submitted to letter ballot for adoption as standard.

In Fig. 5 is represented a decrease in the vertical spread between the upper and lower loop hanger openings from 3⅛ in. to 3 in., which was in general use and in the standards for years prior to 1917. The increase from 3 in. to 3⅛ in. was required with an increase in the width of lug face above 1¼ in. This width of lug face is, in the judgment of the committee, satisfactory and much above the widths now more generally in service, most of which, as a matter of fact, do not exceed 1 in. While the general use of the 1¼-in. lug face will significantly improve existing conditions, the committee is of the opinion that any further increase in this width could not be well supported now that the opposite dimension of these lug faces has been for some time extended to the sides of the brakehead.

The center of the pot-hook eye opening is shown as 1¾ in. above the center of the upper loop hanger opening, and back thereof ⅜ in. on a radial line. This latter figure has been increased from ¼ in. to conform to a general practice suggested, if not actually forced, by conditions encountered in design. The previously allowed tolerance of 1/16 in. minus, as applying to the faces of the top and bottom toe lugs, is covered in the figure referred to by note.

The adoption of the conditions and practices represented upon this Fig. No. 5 is basic, so far as concerns much of the further work of your committee, and will operate to significantly and beneficially stabilize brake beam design.

In last year's report the committee made the statement that it would not be, for some time, in position to recommend your adoption a beam having all of its detailed dimensions duly standardized, but assumed to see included in its subsequent report a complete beam fully dimensioned, for the benefit of any who might be concerned in making use of such information. In response to this commitment, Fig. 6 is herewith submitted.

In its last year's report the committee suggested the advisability of eliminating from the Standard and Recommended Practice text all unnecessary duplication, and of reducing it to little if anything more than specifications for brake beams and brake shoes. This has been effected through contribution, consistent with the committee's thought on this matter, to the manual. The committee's thought that the proceedings should be classified and

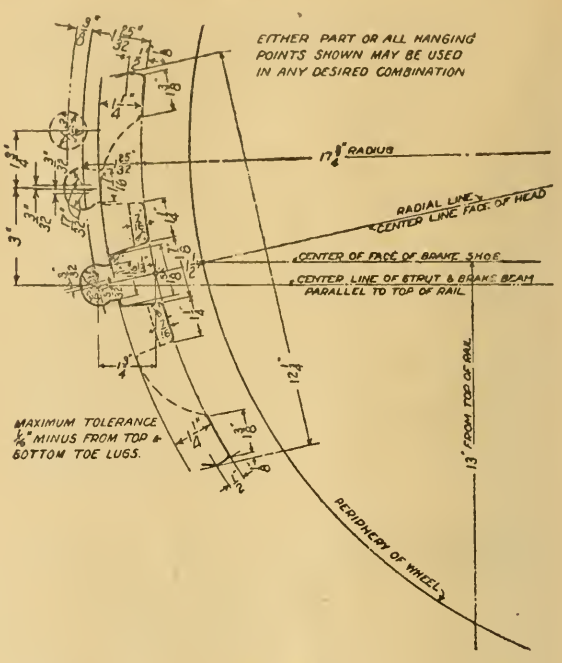


Fig 5.—Details of Brake Head and Hanging Points

given the advisability of presenting a report on the state of the art as regards brake beams and brake shoes, particularly the latter, on account of freedom which could be exercised this year by reason of patent expirations, to the consideration of replacing previous existing cast iron shoe design with design covering the practically universally used "steel-backed" shoe. Through circular inquiry of representative members and of

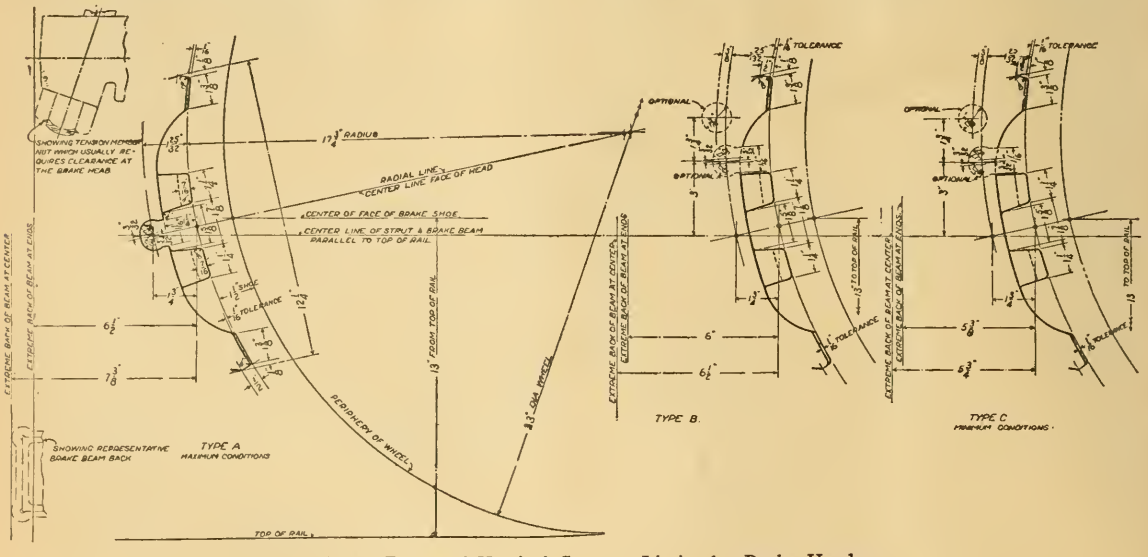


Fig 4.—Proposed Vertical Contour Limits for Brake Heads

indexed so that any part of the history of the subject, in so far as the proceedings reflect, should be immediately available to any one interested therein, has been covered in the general proceedings' index which, it is understood, has been arranged by the secretary.

This committee reported last year that consideration was being

brake shoe manufacturers located, the committee finds that the "steel-backed" shoe, in some form, is in practically universal use; although, by prints submitted from many roads, the M. C. B. cast iron shoe is represented. The committee is of the opinion that in arranging Fig. No. 7 herewith, the adoption of which is recommended, the committee is

merely giving form to or interpreting an almost universal demand, or conforming to what is now very nearly universal practice. The changes in the shoe design which are represented in the figure referred to, from previous standard sheets, are as follows:

1. The shoe will be steel backed instead of cast iron, the former being practically universally used throughout the country.
2. The 1/8-in. recess heretofore shown at the back of the shoe between the center fastening lug and the shoe ends has been eliminated because, although shown in the M. C. B. Proceedings for years, it has not been used for a long time. As a matter of fact, this recess could only create breakage liability
3. The overall length of the shoe has been increased by the addition of 3/16 in. metal at the top and bottom of the shoe, that is, by increasing the overall length from 13 3/8 in. to 13 3/4 in., which has been very generally adopted practice for some time. Aside from affording additional strength for the lugs which pass over the ends of the brake head, as in the case of the ordinary cast iron shoe, this additional length and strength was forced with the use of the steel backs which generally extend from the center of the shoe out to near the ends thereof farther than the inside face of the top and bottom lugs.
4. The top and bottom guide lugs, instead of being recessed as heretofore shown, have been shown built up to the height of the adjacent top and bottom cross bearing lugs. The new arrangement is in almost universal use and the old one, aside from the fact that it has not been used for some time, is unsuitable and unnecessarily complicated.
5. The key slot has been shown increased from 9/16 in. to 13/16 in. depth by removing the metal from the bottom of the key opening which is outside the 17 3/4-in. radius which sweeps the back of the shoe.
6. In conformity with what has been actually very general practice throughout the country, the committee has selected as the inside brake shoe radius 17 in. in lieu of 16 3/8 in., which has been shown upon the standard sheets for years.

On account of the variation in the diameters and radii of various wheel sections, that is, since a new 33-in. wheel is of that diameter only at the "taping" point, and the further fact that all diameters, and with them the inside radii of shoes, fit one another very shortly after the first application of brakes and from then on throughout the life of the shoe and wheel, the precise selection of the initial inside shoe radius is of comparatively little import so long as it is reasonable. The committee recommends the continued use of the 17-in. inside shoe radius for, in part, the reason that the use of this radius will give initial shoe bearing upon the center brake head lugs, whereas the 16 3/8-in. radius previously shown by your standards will give upon any wheel not well worn, initial bearing at the shoe

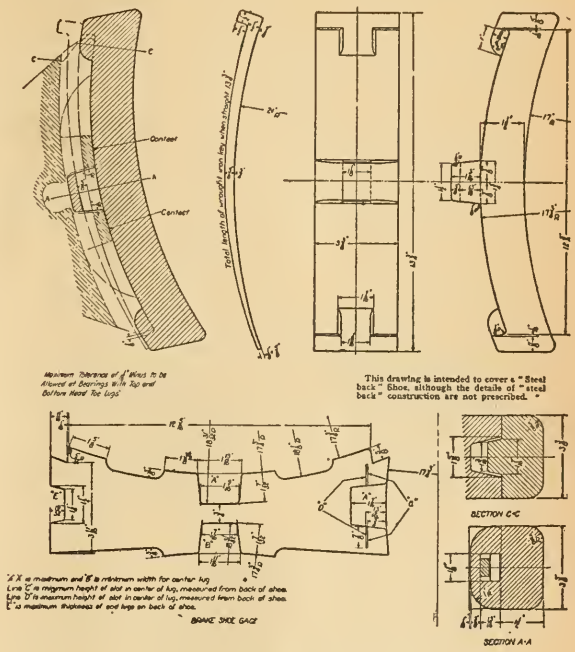


Fig 7.—Proposed Standard Steel Back Brake Shoe

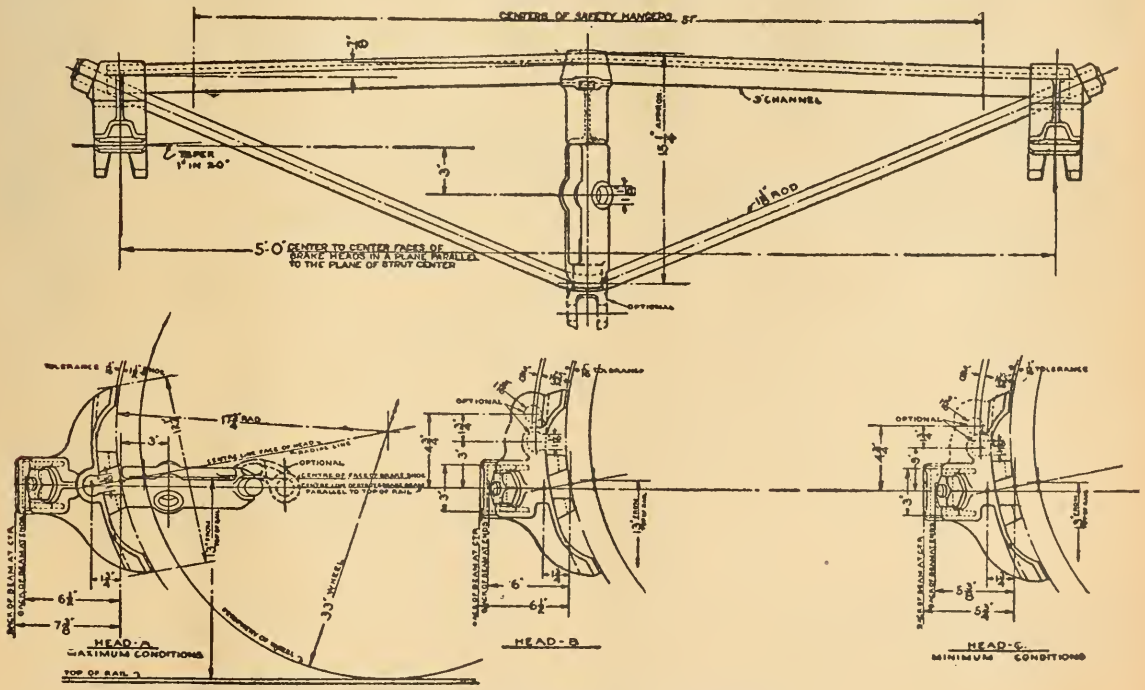


Fig 6.—Design of 12,000 Lb. Brake Beam

ends, thereby introducing the possibility of early shoe breakage.

It has been suggested that the thickness of the shoe should be increased from 1½ in. to 1¾ in. with a corresponding increase in weight from 20 lb. to 23 lb., the argument for such increase being based upon a decreased cost of shoe material consumed and a decreased cost of applying shoes which is represented in the following statement:

1½ in.—20 lb. shoe at 3 cents per lb.....$.60 per shoe.
10 lb.. scrap recovered at 1½ cents per lb.....$.15 Reclamation value.
10 lb. of shoe consumed at $.045 per lb.....$.45 Net cost per shoe.

This amounts to $90.00 per ton of shoes consumed.

1¾ in.—23 lb. shoe at 3 cents per lb.....$.69 per shoe.
10 lb. scrap recovered at 1½ cents per lb.....$.15 Reclamation value.
13 lb. of shoe consumed at $.0415 per lb.....$.54 Net cost of shoe.

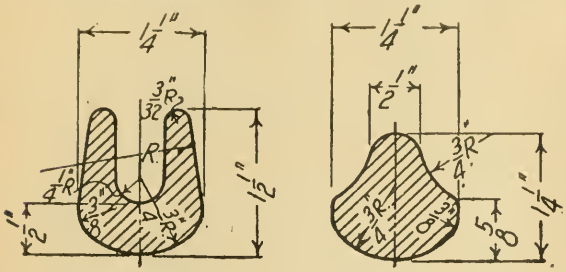


Fig 8.—Section of Metal Surrounding Pot-hook Hanger Hole

This amounts to $83.00 per ton of shoes consumed, a saving of $7.00 per ton.

In addition thereto, there will be labor savings in application, since the application of 100,000 lighter shoes will give 1,000,000 lb. consumed shoe material, which, if consumed at the rate of 13 lb. per shoe of the heavier type will necessitate the application of but 78,000 shoes versus 100,000, that is, a saving in the application of 22,000 shoes per 1,000,000 lb. of shoe material consumed.

The committee assumes to make this matter the subject of study during the coming year, which will, of course, involve application and other difficulties which the increased shoe thicknesses may involve. It is known that upon several roads use is now being made of shoe thicknesses above 1½ in. and in some cases the 1¾ in. suggested.

The committee appreciates the advisability of making the contour of the outside corners of the top and bottom head lugs, together with the form of the adjacent recesses in the shoe, the subject of some study during the coming year. Attention will also be given to some alterations which appear advisable in the details of key design in conjunction with attention to the dimensions of both shoe and head face, which concern the fit of the shoe, head face and key, when the latter is in place, also shoe and brake head bearing areas. Inconsistency in present key dimensions will be apparent from a comparison of the three section dimensions now and heretofore shown, the use of which obviously can not result in uniformity of taper in both section dimensions. The inside top corner of the key obviously should show a larger radius for shop reasons.

The design of pot-hook hanger eye section shown by Standard Sheet 17-B of 1918 appears to be objectionable, and it is recommended that this section be replaced by the suggested section exhibited by Fig. 8.

In the first place, the present section necessitates the use of a core objectionable, for obvious reasons, from a cost and production standpoint. Patterns must be arranged to provide for the additional core and special care must be exercised to avoid core shifting and consequent casting losses. A larger size of flask must also be used, together with more sand, which increases the weight of the mold and production cost. All of the above operates to force the work from machine to hand or bench patterns. The advantages of the proposed section from the standpoints cited should ultimately, if not promptly, revert to the consumer in cost adjustment. Having considered the points involved in the case, the committee is of one mind in recommending replacing the present U-shaped section with the recommended section of the figure referred to.

In accordance with the suggestion in the committee's report of last year, there has been arranged a new brake beam limiting outline drawing represented in Fig. 9. The distance, 1¼ in., shown in Sheet 17-A of 1918 between the extreme limit of the brake beam back to the extreme back of the head opening has been reduced to ⅞ in., as required by beams manufactured for some years and in extensive current use, in accordance with an understanding which files indicate was conclusively considered some years ago by the committee; however, not cared for in drawings—evidently inadvertently.

Within the tendered limiting outline are shown the brake lever angle, the location of brake lever pin hole with reference to the brake head faces, the spacing between shoes definitely defined, and the backs of both brake heads and the strut castings in the case of brake heads of the types *A*, *B* and *C* referred to in this report. Adherence to the brake pin location prescribed, that is, either 2 in. or 3 in. ahead of the center of brake head faces, will contribute significantly to the improvement of brake beam conditions. The importance of approaching a standard in this regard must be apparent when one gives thought to the results of exchanging beams wherein the locations of the pin holes referred to are at variance. The committee is unable to recommend exclusively either the 2 in. or the 3 in. for the reason that use of the one or the other is dependent upon the beam hanging arrangement, that is,

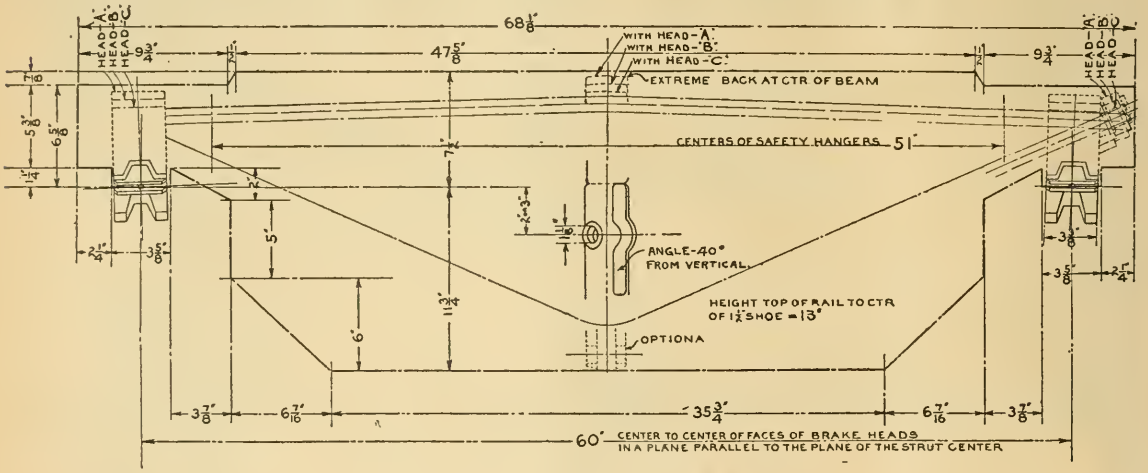


Fig 9.—Limiting Outline for Brake Beams

more particularly to whether the lower loop hanger opening is used or not. While this pin hole location is found to frequently vary from the 2 in. or 3 in. dimensions referred to, the 2 in. dimension is generally conceded as the favored location in connection with the upper loop or pot-hook hanging, and the 3 in. location with the center or lower loop hanger opening.

The committee is of the belief that opinions will crystallize ultimately about the exclusive use of the 3 in. location, and contemplates giving the matter particular attention during the coming year, upon basis of which it is hoped that specific recommendations may be made in the next year's report in connection with the general brake beam hanging question.

As arranged, the limiting outline tendered in Fig. 9 should replace those portions of Sheet 17-A of 1918 headed "Brake Beam" and "Limiting Outline for Brake Beams," all information therein being covered with the exception of the "limiting contour gagehead" which, so far as the committee is advised, has never been used. This figure the committee recommends passage to letter ballot for adoption.

The committee recommended that drawings taken from Sheets 17-A and 17-B of 1918 covering brake beam gage, details thereof, angle gage for strut, lever pin hole gage, malleable iron strut and markings be passed to letter ballot for adoption. In the gage drawing changes have been made in two dimensions to render it consistent with the brake head layout procedure which the committee is, in this report, recommending for adoption. No other changes from previously existing standards are represented.

The committee, in making some study of the "reversible strut" finds that the idea originated some twenty years ago. Records show that reversible struts were used on brake beams more than fifteen years ago, but that their use was shortly afterwards abandoned as the struts did not prove entirely satisfactory. The committee's investigation points out conclusively that a substantial strut in a brake beam is very necessary.

The only advantage in the reversible strut beam is that, being convertible into either right or left, as may be required, it assures the protection of all requirements with minimum stock. It eliminates the possibility of having on hand a large stock of rights and no lefts, or vice versa. It is particularly desirable for isolated repair points where very small stocks of parts are maintained, at which the use of the reversible strut makes it possible to supply occasional brake beam needs more promptly and without delay to equipment.

The reversible strut of present three-piece design is not satisfactory for application with higher capacity brake beams, although it seems that it performs acceptable service in connection with lighter capacity brake beams. The reversible strut is more expensive to manufacture than the rigid one-piece strut. It is impossible for a reversible strut of present three-piece design to be as stable and serviceable as the one-piece solid strut because of the number of parts of which the reversible strut is composed. The strut carries the brake lever and all stresses are delivered through it, and it is, therefore, necessary that this part must be strong and substantial.

A general survey of the information furnished by the brake beam manufacturers, as well as that obtained from the different railroads, indicates that the reversible strut is not now being applied to any great extent, in fact, its use has been largely curtailed. A design has not yet been worked up and marketed which has been accepted as satisfactory for present-day equipment.

While brake beam manufacturers are generally not in favor of the reversible strut and are reluctant to recommend its use, it is believed that the subject should not be passed without further study, which the committee assumes to see the subject given during the coming year. A reversible strut of ample strength so constructed as to transmit satisfactorily the stresses imposed by the brake lever should meet the conditions of the present one-piece strut without fear of weakness and failure.

In the previous standards, the deflection load for the No. 5 beam is shown as 30,000 lb. The commercial sizes of material which may be most efficiently used for the construction of beams approximating this capacity lend themselves neatly to the construction of a 28,000-lb. beam, on which account the committee recommends that the deflection load for the No. 5 beams be changed from 30,000 to 28,000 lb. In order to produce a 30,000-lb. beam, it is necessary for the manufacturers to resort to the use of material of commercial sizes, which lend themselves to the construction of a much higher capacity beam than it was intended should be represented in this No. 5 beam. Of course, consistent modifications in set loads and ratio of set loads to deflection loads should carry through with this alteration.

Summarizing, the committee assumes during the coming year to give attention to the following subjects:

1. The development of a gage to be used for the purpose of determining the "hanging heights" of existing beams.
2. Some code of instructions governing brake beam maintenance practices.
3. The advisability of introducing into the specifications some form of brake head strength test.
4. The advisability of increasing the initial brake shoe thickness from 1½ to 1¾ in.
5. Details of contour for top and bottom head lugs and the recesses of brake shoes adjacent thereto.
6. Brake shoe key design and details involved in the fit of shoes, head faces and the key.
7. The general brake beam hanging question.
8. The reversible strut question.

The committee recommends for letter ballot action, the following:

1. The adoption as standard of brake beams of both 12,000 lb. and 15,000 lb. capacities.
2. The adoption of the *A, B* and *C* brake head depths shown on Fig. 4.
3. The procedure for laying out brake beam drawings and other information shown upon Fig. 5.
4. Brake shoe key and brake shoe gage, shown upon Fig. 7.
5. The adoption of the altered section of the loop hanger eye, represented in Fig. 8.
6. The recommended limiting outline shown as Fig. 9.
7. Brake beam gage and strut information with recommended changes.
8. Alteration of the deflection load of No. 5 beams from 30,000 to 28,000 lb. with appropriate alterations in set loads and in ratio of set loads to deflection loads.

The report is signed by B. B. Milner (Chairman), N. Y. C.; C. B. Young, C., B. & Q.; H. K. Fox, M. & St. P.; F. M. Waring, Pennsylvania System; W. J. Bohan, N. P.; M. H. Haig, A. T. & S. F.; C. F. Thiele, Pennsylvania System, and C. H. Benjamin, Purdue University.

Discussion

The committee's report was read by W. J. Bohan (N. P.) and the room darkened to show moving pictures of brake beam hanging conditions as found on cars today.

T. H. Goodnow (C. & N. W.): It is the intention to show the details of the No. 2 beam in the M. C. B. standard sheets. If I remember correctly, the No. 2, 12,000-lb. beam, is not shown at the present time, it is simply mentioned in the text, and I note in the summary that nothing is said about that. I feel that the 12,000-lb. beam is going to be acted upon as suggested here; that it would also be necessary to show the details of construction of that beam in the standard. I note that the attachment of the head to the beam is shown. It has been customary in the past to show only the contour of the head and leave the attachment for the particular side of beam the heads were used on. In Fig. 6, for the 12,000-lb. beam, I notice the attachment of the head is shown also. Is it the intention to include that at this time?

Mr. Milner: Fig. 6 is inserted in the report as a matter of information only to those who may be concerned. We do not desire you to pass Fig. 6 to letter ballot for consideration. So far as concerns any conflict in the design details, which will be represented in questions submitted to letter ballot between 12,000 lb. beam and 15,000 lb. beam, the committee has not yet proceeded so far with the details of brake beam design to meet any question in which there is any conflict in design.

A. R. Ayres (N. Y. C. & St. L.): In regard to the three proposed types of head, A, B and C, I would like to ask if the suggested head with a minimum clearance is a satisfactory head, what particular purpose is served by having two other designs. What I have in mind in connection with that question is the

Conventionalities

During the noon hour yesterday the members of the Entertainment Committee gathered in the executive offices on the pier and presented their chairman, W. E. Krepps, with a handsome suitcase.

James Coleman, assistant to general superintendent motive power and car department of the Grand Trunk, and vice-chairman of the Mechanical Section, is accompanied to the conventions by Mrs. Coleman and their daughter, Miss Nora.

Mr. and Mrs. J. F. Dunn, of Salt Lake City, are not here this year. They have just returned from a trip to Honolulu to their California home. Mr. Dunn was for many years superintendent of motive power of the Oregon Short Line. It is hoped that next year Mr. and Mrs. Dunn's many friends will see them at the convention.

Two of the real veterans at the convention are Miss Mary Fuller, daughter of Mr. and Mrs. C. E. Fuller, and Miss Emily Spear, daughter of Mr. and Mrs. Grant W. Spear. They both began coming nine years ago, which, considering their ages then and now, undoubtedly enables them to qualify as veterans. Their fathers, however, have been using that word "veterans" with an implication that is threatening trouble.

The Rock Island was represented on the Pier by two of its vice-presidents yesterday. They were L. C. Fritch, to whom the valuation, mechanical and engineering and maintenance of ways departments report, and George W. Reed, vice-president and purchasing agent. Mr. Reed came to attend the Purchases and Stores convention and is accompanied by Mrs. Reed and their son, George.

The National Railways of Mexico are represented by Sr. F. P. De Hoyos, general agent and purchasing agent, and Sr. H. V. Garza, assistant general purchasing agent, both with headquarters in the Woolworth building, New York. Mr. Garza states that telegraphic inquiries are coming in for tires, flues and other varieties of railroad supplies.

Former General Superintendent of Motive Power H. J. Small, of the Southern Pacific, found it impossible to come to Atlantic City this year. To friends he sends his regrets at being unable to be here. Those who know of Mr. Small's untiring work for years in making the mechanical associations and their conventions bigger and better will regret their inability to extend to Mr. Small their tokens of admiration and friendship.

Mr. and Mrs. Burton W. Mudge are not accompanied to the convention this year by their son, Burton, Jr., who formerly was a regular attendant. Burton, Jr., is very busily engaged just at present in preparing for the examinations preliminary to his entrance to college. His friends will regret to learn that Burton, Jr., recently suffered an accident, being hit on the nose by a ball while playing base ball. The injury was properly cared for at once, however, and it is believed that he will not be disfigured.

Joseph Robinson, of the Robinson Connector Company, is attending the conventions this year for the first time since 1916. Mr. Robinson is one of the pioneers in the automatic connectors and if the interest displayed by railroad men at this convention is an indication of the trend of events, it is quite probable that in the near future we will be discussing automatic couplers in the same "take it for granted" way that we do many of the essential devices now in use. A number of roads have already installed experimental equipment with a view to more complete installation.

There is an impression growing on the boardwalk that the Railway Supply Manufacturers' Association considers personal pulchritude as well as business ability and other qualifications in selecting its officers. Its president this year is George Carr; its newly elected president is Jack Schurch; its newly elected vice-president is Charlie Jenks. Do you know of three better looking men who attend the conventions? Will Sharp the other day dubbed them the Three Musketeers and himself was immediately nominated for the part of d'Artagnan, who it will be remembered played the fourth hand in Dumas' immortal romances.

Mr. and Mrs. George H. Ross are meeting many old-time friends in Atlantic City. They are stopping at Galen Hall. Mr. Ross, now retired, was one of the best known railway executives in the United States. He was born in Boston, Mass., in 1854, and entered railway service in 1877 as expense bill clerk for the Chicago, Burlington & Quincy. He made rapid advancement and remained with this road until August, 1898, when he went to the Indiana, Illinois & Iowa as traffic manager. In December, 1902, he became president of the Union Depot Bridge & Terminal Company, of Kansas City. In 1904 he went to the Toledo, St. Louis & Western as general traffic manager, and in March, 1905, he became vice-president of this road. Later he became executive vice-president of the Hawley group of railroads.

Practically all of the former regional fuel supervisors are attending the convention this year. Among those holding forth in the supply booths are H. C. Woodbridge, F. P. Roesch, and Leslie R. Pyle, formerly fuel supervisors in the Allegheny, Northwestern and Central Western regions, respectively, and C. M. Freeman, formerly assistant supervisor of the Central Western region. Mr. Woodbridge is now with the Locomotive Stoker Company, Mr. Roesch with the Standard Stoker Company and Mr. Pyle with the Locomotive Firebox Company. Mr. Freeman is a representative of the brass goods department of Manning, Maxwell & Moore at St. Louis. The only former fuel supervisor, still in railroad service, who has been in attendance at the convention is Robert Collett, now in charge of the fuel department of the New York Central.

(*Proceedings continued from preceding page.*)

carrying of a stock of beams for the cars of other roads. If you had a *C* type of head, which was the standard, it would go anywhere.

Mr. Milner: The point which Mr. Ayres raises is well taken, and has been considered by the committee. The committee hopes to be able within two years, perhaps sooner, to recommend that the three heads now suggested be replaced by one or two instead of three. We are not in position, at this time, to suggest that it is possible to arrange satisfactory heads of the minimum depth represented by the type *C*.

A motion that the report be printed and referred to letter ballot was carried. The meeting was adjourned until 9.30 o'clock on Wednesday morning.

American Railroad Association, Section VI, Purchases and Stores

Moving Picture of the Southern Pacific Supply Train Operation a Feature of the Session

THE meeting was called to order by the chairman at 9:30 a. m. In opening the meeting Chairman Pearce made the following remarks: We have a very busy day before us in order to accomplish even a portion of the work which we must accomplish. The program is to try and complete all of the subjects before three o'clock, when the exhibition of the moving pictures will be given, but we will not do that at the expense of running over reports. We prefer to dispose of a report rather than to partially finish it.

Report on Reclamation of Material

THE COMMITTEE ON RECLAMATION OF MATERIAL has considered thoroughly this constantly broadening subject, and is of the opinion that the excellent report at the 1915 meeting, fully covers the basic features, also the paper read by Mr. Stuart at the 1919 meeting deserves careful perusal.

The committee has taken for granted in the absence of a better ruling that any article found in the scrap at a general scrap yard, which is picked out and repaired satisfactorily and put back into stock or into use, after having been discarded by the department using it, is thereby reclaimed. Also articles that are manufactured from material found in the scrap is reclamation. A few articles should be included in this classification that are manufactured at the reclamation plant from material sent in for that purpose as if too fine a line is drawn it may serve as a damper to the movement.

The reclamation movement should contain a plant centrally located off by itself where no other department will interfere with its organization. On many railroads the committee has found reclamation committees consisting of the division storekeeper as chairman and containing the heads of division departments, meeting periodically, have worked wonders, even going beyond their best expectations. These committees meet and send minutes of their meetings to a head committee. The head committee circulates the best in these minutes all over the railroad so that everyone will benefit by the new ideas. This gets the other departments interested in savings and co-operatively working with the stores departments. Also a page or two of the monthly employes' magazine devoted to reclamation and scrap handling has created enthusiasm. What is needed in reclamation work is the support and co-operation of all departments as well as the backing of all the officials.

The committee also finds that quite a few of the railroads keep insufficient records of their reclamation costs, or scrap handling. This is a vital part of the work. No reclamation should ordinarily be done unless it is a saving and when there are no figures or accounting system the department is placed in an awkward position. Our officials also wish to know if our work is on a business footing and warrants its continuance. We think it is and probably at some remote period made a test run to see how much of a saving was made.

Due to the lack of proper accounting for reclamation and scrap handling on a number of railroads, the committee submitted forms to be used in arriving at this end, which it is hoped will satisfactorily apply to all railroads.

The report included forms for a daily report of cars held under load, for a record of material received at the reclamation plant, for the superintendent of reclamation plant's shipping notice on general storekeeper, record of scrap material shipped from reclamation plant, standard list of reclamation orders, and reclamation time sheet.

Reclamation Plant Shop Order Ledger

Form 3-7 is prepared on the first day of the month to cover each reclamation plant order, per Form 3-5, standard list of reclamation orders. This form is dated the first day of each month, and in the caption "Account Chargeable To" the reclamation plant order is inserted. In the space provided, complete description of the article is written, designating whether the material is for the stores department, if so, requisition reference is given, or if the material is for the mechanical department, this information is shown.

At the close of each day's business, all labor is posted from the reclamation time sheet. Also all material is abstracted from material ticket covering new material received from the store house and scrap material that is received from the scrap dock.

By posting material and labor daily, it can be ascertained at

any time of the day, week, or month, the saving that is being effected, which is of special value. At the close of the month, invoices for material delivered from the reclamation plant to the stores department and the mechanical department are abstracted on this form, which reflects the number of items repaired, the value new as shown by the storehouse, and the total value of the material reclaimed. Each form is then totalled in

ACCOUNT CHARGEABLE TO _____

DATE ISSUED _____ 191__ **SHOP ORDER LEDGER** SHOP ORDER No. _____

For _____

Store Department Requisition Reference.

Date of Labor Charge	Amount of Labor	Date of Material Charge	MATERIAL	Amount of Material	Total Labor For Month	Total Material For Month	CLOSING TOTAL

Form for Compiling Labor and Material Charges

order that the total figures be used in preparing the operating statement.

Statement of Operation at Reclamation Plant

Form 3-8 is prepared at the close of each month's business by the Superintendent of Reclamation, securing data from Form 3-7, showing the following information:—

Month and year—Reclamation Order Number—Class of Material—Net Weight—Quantity Reclaimed—Value of Scrap Material Used—Value of New Material Used—Total Labor—Supervision—Miscellaneous Shop Expense. Columns 5, 6, 7, 8 and 9 equal column No. 11. Column No. 10 is secured by dividing total of column No. 4 into column No. 11. Column No. 12 is secured by dividing column No. 4 into column No. 13. Column No. 14 is arrived at by the difference between column No. 10 and column No. 12. Column No. 15 is secured by subtracting column No. 11 from column No. 13.

to regard the reworking of old material, especially parts not used locally or of which they have on hand an ample supply, of secondary importance. The storekeeper on the other hand is directly interested in keeping purchases of new material at a minimum, and therefore, in utilizing old material to the fullest extent possible. He will not be influenced in the recovery of old material by the situation at any local point, but will consider the question from the general standpoint of the requirements of the road as a whole. It, therefore, seems to the committee that the general subject of reclamation on the different roads should be supervised by the general storekeepers to the end that the fullest use consistent with safe and economical operation shall be made of second-hand material, and to that extent avoid greater expenditures for new material that would otherwise be necessary. As previously indicated, however, it is of the greatest importance that there be the closest co-operation among all departments in handling this matter in order that the work incident to restoring second-hand parts to a serviceable condition may be performed in the most economical manner, and that the repaired parts may be satisfactory for the service to which they are to be applied.

The organization necessary for handling the scrap dock and reclamation plant work including foreman or other supervisors, clerks, machine hands or mechanics, scrap sorters and laborers

STATEMENT OF OPERATION AT RECLAMATION PLANT

For the Month of _____ 191__

Reclamation Order No.	CLASS OF MATERIAL	Net Weight	Quantity Reclaimed	Value of Scrap	Value of New Material	Labor	Supervision	Misc. Shop Expense	COST Per Unit	COST Total	VALUE OF NEW Per Unit	VALUE OF NEW Total	SAVING Per Unit	SAVING Total

Summary of Charges and Savings Effected

A recapitulation is prepared to cover each month's statement. This statement is used to arrive at journal vouchers, which reflects to material delivered to stores stock, and the difference between the value of new material and cost of repairs.

The reclamation of second-hand parts to secure maximum economy should be based on exact knowledge of the demand for the parts in question as such or for other parts in the manufacture of which second-hand material can be used as well as of the best and most economical means for the handling of such reworking of the material as may be necessary.

These requirements presuppose a knowledge of mechanical processes as well as of material in stock and in demand. The storekeeper has the most complete information concerning second-hand material available as well as the demand for new material of all kinds. The department using the material are best qualified to determine whether the reworked or repaired article will be satisfactory for the service intended. It is, therefore, vitally important that there be the closest co-operation between the stores and other departments to insure the best and most economical results.

The shop people while vitally interested in costs, must get from their plant the required output of cars and locomotives, and particularly if working at high pressure, will tend naturally will vary with the size of the plant and the amount of work to be handled. It is, therefore, deemed inadvisable to attempt to outline a proper personnel for such an organization.

In preparing the accompanying statement of suggested practices the committee made no check of costs and the foregoing comments should therefore not be lost sight of in making these practices effective.

The report is signed by Wm. Hunt (Chairman), W. & L. E.; D. A. Williams, B. & O.; R. J. Elliot, N. P.; J. E. Mahaney, S. A. L., and H. E. Ray (Ex-Officio), A. T. & S. F.

Discussion

Chairman Pearce: The subject of reclamation is so broad and intricate that it cannot be expected that we can dispose of all the details relating to it at this time. This committee has studied the work that has been done on different railroads, and its report is based on the most practical operation which it has found, and, as such, is merely a resumé of the best practices which they have discovered in operation.

Wm. Hunt: (W. & L. E.) The report is merely an elaboration of the report that was gotten out by the committee

SUGGESTED PRACTICES TO BE FOLLOWED IN SALVAGING OR REWORKING SECOND-HAND MATERIAL.

Item	*Operation*	*Equipment Required*
Axles, scrap	Upset and refinished to smaller size.	Work done on forging machine, air operated press or battering ram.
Axles, scrap	Larger sizes of car axles turned down to make engine truck axles.	Engine Lathe.
Axles, scrap	Worked over under steam hammer to make miscellaneous forgings including knuckle joint pins, piston rods, equalizers, crank pins, valve rods, valve yokes, crosshead keys, track wrenches, crosshead arms, back end of main rod keys, key bolts, spring plank carriers, eccentric cranks, link bridles, lap and lead levers, radius rods, crosshead guides, side rods and other motion parts, also forge down into round stock from which knuckle joint pins, brake pins engine bolts and similar parts are made. Also rework into arch bars of odd sizes and other forgings for passenger and freight cars. This material also used for making tamping and clay pick ends, and for making machine tool bodies.	Steam hammer, drop hammer, dies, engine and turret lathe.
Bars, claw	Redress and straighten. Apply new ends as needed.	Small oil furnace, small power hammer.
Bars, angle	Worn holes plugged by riveting and new holes drilled.	Pneumatic hammer and small frogs.
Bars, angle	Straightened.	Steam hammer. dies and oil furnace.
Bolts, large diameter	Long bolts 1 in. diameter, and larger made by welding two pieces of old bolts together.	Smith Shop Equipment.
Bolts, Car	Straighten, sort to size, shear to required length and rethread.	Quick acting power hammer, power shear, multiple spindle bolt cutter.
Bolts, Engine	Cut down to make smaller sizes of finished bolts. If desired bolts can first be rehexed and annealed. It may be possible to rework valve motion pins to some extent to make smaller sizes.	Usual machine shop equipment, lathes, bolt skimmer, etc.
Bolts, Track	Straightened if necessary and rechase threader recut thread to smaller size. Where threads will stand rechasing a very satisfactory job can be made using slightly opened standard dies. Where original thread is gone a new thread can be cut of smaller diameter and reclaimed bolts used in yard and side tracks and possibly on unimportant branches.	Quick acting power hammer, multiple spindle bolt cutter.
Beams, Brake	Straighten beams and renew damaged parts. Worn brake heads may be built up by electric welding.	Assembly table equipped with air operated clamps, oil furnace, power press for reforming beams and truss rods; pneumatic riveter, electric welding. (If brake heads are built up.)
Borings, Brass and Turnings	Separated from iron and steel by magnet separator and used or sold. Tailings also sold.	Magnet separator.
Butts, Old Pile and Bridge Timber	Resawed to make standard size lumber.	Resaw plant.
Cable, second-hand steel	Good portions saved by splicing larger sizes made into switch ropes for caboose equipment.	No special equipment.
Carpets, old car	Reclaimed and used for patching. To some extent used for making rugs.	Usual upholstering shop equipment.
Compound, Old Driving Journal	Put into receptacle formula add water, lye, graphite, valve oil, stir thoroughly. Remove and cool, press into suitable forms.	Metal receptacle for boiling.
Cans, Empty Carbide	Made into shop waste receptacles.	Tinshop Equipment
Couplers	Bent shanks straightened.	Steam hammer or hydraulic press.
Couplers	Cracks welded. Wide variation of opinion as to advisability. A great deal depends upon education. and ability of operator.	Oxy-Acetylene or Electric Welder.
Couplers	Butts rebuilt, adding stock to make different size butt.	Acetylene Torch.
Cutters, Rail	Redress.	Small power hammer, forming dies, emery wheel, small oil furnace.
Cocks, angle and cutout	Repair and regrind.	Angle cock grinding machine, small speed lathe.
Doors, Grain	Make ordinary repairs.	No special equipment.
Drills, Track	Repaired and returned to service using old serviceable parts as far as practicable.	No special equipment.
Fittings, Pipe	Remove from second-hand pipe, retap where necessary, soak in oil and return to stock.	Pipe vise, bench equipped with necessary taps, oil vat and immersing cage for dipping fittings.
Frogs, Worn Rail	Repaired by building up worn surfaces with acetylene welding equipment. Also worn frog points and wings repaired by heating and swedging to standard height.	Acetylene welding equipment, portable power driven emery wheel. Nickel steel or No. 2 commercial welding rods are stated to give good results.
Frogs, Worn Rail	Repaired by renewing worn parts using second-hand parts as far as possible. Also worn frog points and wings repaired by heating and swedging to standard height.	Frog shop equipment, planer, etc.
Glasses, Klinger water gauge	Refaced by grinding with emery and oil.	Hand Operation.
Hose, air steam and signal	Strip off old hose and remount fittings. Test when completed.	Air operated machine for removing fittings. Air operated shear for cutting air hose clamp bolts, air operated clamp for applying air hose clamps. Conveniently mounted crank wrench for applying nuts to clamp bolts. Hose baler.
Iron, scrap sheet iron and steel	Cut up serviceable parts to make patches for steel frt. car repairs.	Throatless or other power shears. Could also use cutting torch.
do	Cut into washers on washer machine.	Power shears, washer machine.
Iron, scrap bar	Certain sizes drop forged into chain hooks.	Drop hammer, furnace, etc.
do	Certain sizes made into roping staples.	Bradley hammer and bulldozer being used for this work.
do	Certain sizes made into car door rod ends.	Forging machine and furnace.
do	Certain sizes made into axles for baggage, warehouse and express trucks.	Smith and machine shop equipment.
Iron, old bridge, flat diagonals	Made into coupler yokes, and variety of articles.	Smith shop equipment.
Jacks, Track	Repaired. Apply new parts as needed.	Ordinary hand tools.
Knuckles, Coupler	Repaired by building up worn surfaces by acetylene welding.	Oxy-acetylene welding equipment, contour gauges, etc.
Kegs, Metal White Lead	Remove one end and equip with bail. Used for sand buckets, fire buckets, etc.	Usual tin shop equipment.
Lagging, scrap magnesia	Pulverized in rotating macerator mixed with sawdust and water molded into blocks and baked in steam-heated kiln. In some cases small amount asbestos cement added. Some pulverize and apply in plaster form.	Macerator, mixing trough, molds. drying kiln.
Levers, brake, guides, connections, etc.	Straighten and return to service. Also worn holes plugged and redrilled.	Smith shop equipment.
Lumber, old	Make into flag sticks.	Cabinet shop equipment.
Nuts	Sort to size, retap and return to stock.	Nut sorting table with required number of pockets, chutes and receptacles, multiple spindle nut tapper. Rattler and dipping vat.
Picks, Earth and Tamping	Redress. Apply new ends if required. New ends can be made from scrap tire or axle steel.	Small oil furnace, small steam or power hammer.

Item	Operation	Equipment Required
Packing, Journal Box or Dope, old	Cleaned and reapplied.	Equipment for removing dirt from waste and oil and resoaking waste for further service, as follows: The best equipment seen included centrifugal oil extractor and filter, power driven rotating tube shaped sifter diagonally hung made of front end netting for removing dirt and grit from the waste, necessary soaking and draining tanks, etc.
Pins, old crank	Annealed and turned down to make smaller sizes crank pins.	Usual shop equipment.
Pipe, old wrought	Recut into nipples.	Nipple or pipe cutting machine. Can use ordinary bolt cutter equipped with pipe dies.
Pins, old knuckle	Straightened and returned to stock.	Smith shop equipment.
Planks, scrap spring	Good parts of two defective planks spliced using channel section applied by riveting as reinforcing piece.	Smith shop equipment.
Plush, old car seat	Used to make cabin car cushions. Also for patching.	Usual upholstering shop equipment.
Refuse from reclaimed journal box packing or dope	Burn to reclaim small pieces of babbitt.	Improvised open air furnace with means for collecting melted soft metal.
Roofing, old car	Worked over to make buckets, oil cans, spouting, etc. Also to make tire shims.	Usual tinshop equipment.
Shovels, Scoops Ballast Forks	Cut off rivet heads, knock out rivets, equip-good blades with new or second-hand handles or apply D grips to handles where grip only is damaged. Dress blade if necessary and dip blade in paint.	Machinists' vise, hand hammer and chisels, punches, etc., small portable air or electric drill for drilling rivet holes in handle, small dipping vat.
Scrap coil springs (car)	Straighten and convert into bars of various kinds, drifts, nail pullers, slice bars, chisels for locomotive and cabin car equipment, etc.	Usual blacksmith shop equipment including oil furnace and power hammer.
Scrap coil springs (Brake Cylinder)	Worked over to make packing hooks, packing knives, etc.	Small oil furnace and power hammer.
Scrap eliptic spring steel	Made into Spring Clips, and Car Repair Wrenches.	Steam or drop hammer and dies.
Shavings	Sold or used to build fires in locomotives.	Some roads use baler to prepare shavings for convenient handling
Scrap staybolts	Cleaned by rattling and used as follows: Piled with other iron and worked up into forgings. Tate flexible staybolts annealed, cut to shorter lengths and threads rechased. Radial staybolts cut down to make rigid staybolts. Crown bolts worked over to make patch bolts. Short staybolts worked over into rivets. Radial staybolts made over into studs.	Usual shop equipment.
Spikes, Track	Straighten spikes not cut under throat. Straighten and upset cut throat spikes.	For straightening only use quick action power hammer. For cut throat spikes straighten and upset in forging machine, first heating in oil furnace. There is a new machine on the market for straightening spikes by hand.
Scrap, wrought iron	Sheared, piled and worked up under steam hammer into blooms. Used for making locomotive forgings such as frame sections, slide rod ends, drawbars and drawbar pins, equalizers, knuckle joint pins, left shafts, spring hangers, crosshead arms, levers, brake rods, boiler valve stem crossheads, brake brace jaws and similar parts.	Heating furnace, steam hammer, drop hammer, dies, etc.
Old Paint Skims	Scraped out of barrels and other containers and boiled in a vat.	Boiling vat and furnace.
Scrap Tire Steel	Forged into follower plates.	Usual smith shop equipment. Power press for applying tip to body of tool. This may also be done with electric or acetylene welding equipment.
Scrap Tire Steel	Forged down to make lathe and other metal cutting tools when equipped with high speed steel tips.	Usual smith shop equipment.
Scrap Tire Steel	Forged to make such parts as clay and tamping pick ends, lining bars, pinch bars, blacksmith tools, spike mauls, claw bars and chisel bars for car work, the latter tipped with a short piece of tool steel.	Drop hammer, furnace, steam hammer, etc.
Scrap brass foundry sand	Washed to remove particles of brass and sold.	Centrifugal washing machine and settling tanks.
Sacks, cement	Cleaned in rotating rattler made of front end netting. This cleans sacks and reclaims cement.	Power driven enclosed rattler.
Scrap coupler yokes and arch bars	Worked over into passenger car safety chain hooks.	Steam or drop hammer and dies.
Scrap coupler yokes and arch bars	Made into coupler carrier irons.	Smith shop equipment.
Scrap coupler yokes and arch bars	Split, headed and rerolled.	Rerolling mill, special shears, oil furnace.
Scrap coupler yokes and arch bars	Cut to short lengths and used with other wrought iron scrap as piling iron and forged under steam hammer.	Heating furnace and steam hammer.
Switch points	Worn and broken points built up with acetylene torch and dressed with portable emery grinder.	Acetylene welding equipment, portable power driven grinder.
Switch points	Worn points swedged to standard height and redressed on planer.	Frog shop equipment, planers, steam hammer, furnaces, etc.
Switch slide plates	When bent should be heated and straightened.	Smith shop equipment.
Switch stands	Make standard repairs.	No special equipment.
Scrap boiler plate	Used to make ends for locomotive fire scrappers. Plate sheared to size, punched and rectangular hole and handle riveted on.	Usual blacksmith shop equipment.
Scrap boiler plate	Made into washers for crank, knuckle joint, and valve motion pins.	Steam or drop hammer with necessary dies.
Scrap boiler tubes	Cut to suitable lengths flatten at ends, and use to make pilot ribs. Tubes must first be rattled to remove scale. Old shop shapes tube on bulldozer to semi-circular section.	Usual shop equipment of rattler, shear and power hammer.
Scrap boiler tubes	Shear to suitable length and use for fence posts, the tube being punched for wire fencing.	Usual shop equipment.
Scrap boiler tubes	Cut to suitable lengths, flattened at ends, use to make slats for coke car gates.	Usual shop equipment.
Scrap boiler tubes	Flatten and cut into washers.	Steam or power hammer, washer machine.
Washers	Sort to size, return to stock. Some roads clean in rattler. This effectually removes rust and dirt and we believe is good practice.	Rattler, sorting table with necessary pockets, chutes and receptacles.
Scrap Shop Wood	Sold or cut up and used for firing up engines.	Wood splitting machine (home-made).
Tie Plates, old	Repunched for use under different rail, also beated and straightened.	Power punch, steam hammer and dies.
Truss rods, brake staffs, and other bar scrap	Heated and rerolled into smaller size stock.	Rerolling mill and oil furnace.
Truss rods, brake staffs, and other bar scrap	Cut to required lengths and made into bolts or other forgings for which suitable.	Shears bolt heading machinery, etc.
Wrenches, Alligator	Anneal, recut teeth and retemper.	Annealing and tempering furnace and usual tool room equipment.
Screw type wrenches	Repair by renewing damaged parts. So far as possible use parts reclaimed from discarded wrenches.	Ordinary hand and bench tools.
Cast iron wheels, slid flat	Ground to standard contour.	Wheel grinding machine.
Cast steel wheels, sharp flanges	Built up to contour by electric welder.	Electric welder.
Old cotton waste	Cleaned and returned to service.	Centrifugal washing machine, oven for drying.

of 1915. The proceedings of that year devoted practically 150 pages to it, and there is really nothing more to add to it with the exception that we have attempted to cover the operation of reclaiming, the principle involved ,showing the operation and the equipment necessary for such operation.

A. W. Hadley (N. Y., N. H. & H.): In reading over the pamphlet, I find that the larger part of it we are practically doing at our plant at the present time, and I was glad to see one thing in regard to manufacture. That is something that I feel that we ought to do more than we have in the past. There is one thing that the reclamation plants of all the roads are up against. That is in the other departments thinking that they cannot use our material because it has once been called scrap. But I think that has been overcome to a great extent because we have advanced so fast that they have come to find that the reclamation plant is the salvation when they cannot get material anywhere else.

C. D. Young (Pennsylvania): There is one thought that comes to my attention, and that is that we can go too far in attempting to make a showing on reclamation. I think reclamation ought to start at the source of the material when it is discarded or set aside for active application. There is entirely too much material coming to reclamation plants that should never arrive at that point. It ought to be picked out and set aside and used over again or repaired, and put back in service without going through the formalities of being reclaimed and thus handled two or thre times, and perhaps transported some number of miles.

There is a tendency, perhaps, in the store department—if you set up competition among your various divisions and your district storekeepers to make a good showing on reclamation—to transport materials to some central point, so as to get that material into their reclamation report, and I think that that should be carefully watched by the general supervision of the general storekeepers in order to prevent that practice. Reports and prepared forms for this kind of work should be guarded by close supervision to prevent having materials going through reclamation work, to have a showing on paper as to what you save. I thing the putting down of how much you have saved on some hypothetical figure either through present market value of new material or otherwise is a waste of time, and if the committee's report includes a suggestion for showing any money saving, I think that it is a loss of time and a waste of money to make long, laborious calculations as to how much you have saved, when the facts can be very readily stated by simply showing the transfer from scrap back into material accounts.

H. E. Ray (A., T. & S. F.): The question is so important that if you would cover it fully it would take considerable time.

I am in favor of the report as it stands. We on the Santa Fe have done a good bit of reclamation work. We tried to reclaim only what was worth reclaiming. We safeguarded ourselves against making paper records. All those are matters of detail that have to be worked out. It is a common-sense proposition, the same as any other store department job. A great deal depends on the character and the type of men that are put in charge of it. Very much depends on the co-operation you get from the operating and mechanical people. Very much, indeed, depends on the backing and support you get from the management. All that sort of things are fundamentals that go to make up a successful reclamation plant. It is a question that takes a lot of study, and most of you will have to work out your own plan, depending on your local conditions. It is simply a question of common-sense handling, good business judgment and proper organization and the proper backing.

U. K. Hall (U. P.): There is no subject that is more important to our roads than reclamation. There is no phase of our work that we can slip over, and fool ourselves on easier than we can on reclamation. The committee has provided a blank so that each operation can be watched to see whether or not it pays. We can lose money on reclamation, and fool ourselves into thinking we are making a big saving. I do not think there is any safeguard that we can throw upon this operation in the matter of accounts that is wasted. We might just as well say that as long as John Wanamaker had plenty of money to pay his bills, he would not need to keep books. He knew he made money because he had it. I do not think, as an Association, we should for one minute countenance any lack of records or any let up in the dollar and cents proposition of our reclamation because it must be watched closely. There is tremendous profit and there is liability of a tremendous loss, and I feel the matter of records is just as important to us as it is to any merchant in the country.

J. G. Stuart (C. B. & Q.): Some reference has been made to tonnage basis. There must be no tonnage basis in it at all. It must be individual items, and you must get individual cost on each individual item. You may save good money on 15 items and lose good money on the sixteenth, and if you attempt to lump them together you are simply reclaiming something that you are reclaiming at a loss. I agree with Mr. Hall that we do want records—not necessarily long, extended records—but we do want complete and full records of each item we are claiming until we have reached the stage where we are entirely satisfied that it does pay us to reclaim that individual item.

C. D. Young (Pennsylvania): The word "tonnage basis" was probably used a little unfortunately and too broadly. You must analyze your individual item, and see that you have accomplished something by reclamation. In stores departments a great many operations are theoretical savings, because you must take the figure between what it has cost, and something else, and that something else is a very difficult thing to define, whether it shall be a loss price or an average price, or 80 or 75 per cent of the new value. From my point of view, I do not see anything to be gained by the application of your cost to some other figure. We should know definitely what we are doing with each item before we go into it and spend labor on the material to put it back in stock.

A motion that the report as read be adopted was carried.

Report of Committee on Stationery

THE COMMITTEE unanimously recommends that the purchasing of stationery and printing (to include all stationery forms and supplies, tariffs, tickets and mechanical appliances used in connection with clerical work) shall be made by the purchasing department with their regular machinery, and that the principle of competitive bidding on standard forms and stationery supplies be maintained.

Contracting for Standard Forms

All standard forms should be contracted for in quantities as large as the requirements will warrant; the reason being that through this method the best prices are obtainable, as it gives the printers an opportunity to set up their forms and print at a time most convenient to them.

It enables the stock to be kept at a minimum by saving the time required to solicit fresh bids and all clerical work incidental thereto.

The contracts should be made so that the storekeeper will only order in such quantities as required, and his storage facilities will permit.

Grouping of similar forms under one contract is desired for the purpose of obtaining the lowest price, uniform quality and workmanship.

Stationery and Printing Committee

All railroads should have a stationery and printing committee composed of a member of the purchasing department and representatives of using departments. The decisions of this committee shall be recorded in stock books of the stores department. The committee should have as its chairman a direct representative of the chief executive officer.

No changes in existing forms or no new forms shall be introduced without the approval of this committee. They should

insist on a clear and correct copy for all printed matter to avoid waste of money in altering proofs.

This committee shall determine the quality of paper and size to be used for all forms. They shall also designate the kinds and quality of all standard stationery and office supplies and mechanical appliances.

General Recommendations

Every railroad should have sufficient equipment to take care of its emergency printing and such standard forms as can be printed most economically. The committee desires to call particular attention to the advantage of the contract method of purchasing stationery and printing, and that the contract period should not exceed one year, this method of buying having advantages of not only assuring the lowest prices and uniform quality, but the very important item of stock control, in that it saves time.

Attention is called to the importance of delegating, to the stationer or storekeeper, authority to curtail requisitions no matter by whom approved. It is believed that the stationer or storekeeper has the only reliable data to intelligently check requisitions, and by reason of his experience and undivided attention is in the best position of any official on the railroad to determine generally the quantity of stationery required.

The report is signed by W. D. Stokes (Chairman) I. C.; W. J. Hiner, C., C., C. & St. L.; W. G. Burrell, G. G., and H. C. Pearce (Chairman Ex-Officio), S. A. L.

Discussion

G. W. Snyder (Pennsylvania): I notice in the report under the heading of Storage "Every item of stationery shall have an identification number." We are using for correspondence within the organization blank sheets 8 in. x 10½ in. to write letters on. Is it the idea of the committee that perfectly blank sheets of paper shall have identification numbers?

Mr. Burrell: The idea of the committee on that point was that every item should have some distinguishing number, not printed, not stamped necessarily, but something that it can be known by in the catalog, so that you will know it under a certain number. Now, your blank paper might come under P-5, or something of that kind, carbon paper of a certain size and quality would come under a specification number. On the Grand Trunk we call it under P-38, which means it is a certain sized carbon paper of a certain quality.

Mr. Stokes: That paragraph was put in to meet normal conditions.

Mr. Davidson: I think that ought to go in. I think this is a little too technical.

Mr. Stokes: I see no objection to that.

H. H. Laughton (Southern): I think that the report made by the committee is excellent. I do not think that we should eliminate one line. We have a stationer, and we have confidence in him. Let him cut the requisition and then take it up and apologize afterwards. That is what I have got a stationer for, to cut requisitions, and that is what we expect the division storekeepers to do. Now, let us take no authority away from him. Let us extend it.

H. B. Hodges (Pennsylvania): I do not agree that the stationer should have the authority to cut down requisitions which have been approved by the general manager. If the stationer feels that an unnecessarily large amount is required, he should take the matter up with the general manager, and get full authority, but it might complicate matters very much if the stationer would have that authority for the reason that for some motive unknown to the stationer there may have been a large amount required. He does not know what is going on in the mind of the general manager, and I certainly object to giving the stationer authority. I do not think any storekeeper should have authority to cut down requisitions approved by the general manager.

M. E. Towner (W. M.): There is a principle involved in this entire question. You must have authority, and when you appoint a stationer and he is the right man, he should have authority to do the right thing, and one of the right things to do is not to issue too much stationery. If his records are correct, he will not issue too much stationery, whether the requisition calls for it or not. I remember very well when Frank Stokes was stationer on the New Haven Railroad and Frank said to me: "I am cutting requisitions in two, I am saving fifty per cent." But he did not get onto the fact that the officers were asking for twice as much as they needed and he did not have the proper records from which he could get at that fact. The management of any railroad will help any one that is trying to keep down their expenses. That is what it means. You have got to give your stationers authority. Our stationer has it on the Western Maryland, and we get splendid results.

G. W. Snyder (Pennsylvania): This proposition distinctly says the stationer shall have the authority to cut our requisitions at his discretion. No such proposition will ever get by on the Pennsylvania Railroad. You are going to be the judge of how much stationery you need, in the last analysis, and I am going to be the judge of how much stationery I need in the last analysis. There is no disposition whatever to restrict the stationer in questioning the propriety of any requisition he gets, but the judge of the thing in its last analysis is the officer who is responsible for the requisition. Now, you propose to give this stationer authority, you propose to tell him where he will get off. No such Bolshevistic scheme will ever prevail on the Pennsylvania Railroad. *A motion to adopt this report as submitted was seconded and carried.*

Report of Committee on Classification of Material

The committee on Classification of Material sent out an inquiry to one hundred or more roads asking for any important changes that should be made in the Material Classification of the Railway Storekeepers' Association, and which was adopted by the United States Railroad Administration, and to this inquiry received fifty replies, which, briefly summarized, are as follows:

Classification not used	13
Satisfactory as at present	9
Not thought satisfactory for use	2
Various changes recommended	13
No change to recommend at present	20
Objected to division by departments	3
Too much detail to get desired results	2
Cost too much to produce accurate results	1
Should have less classes and be same as sectional arrangement of material	1
Should be no symbols as 1-A, 1-B, etc	1
Book of material alphabetically arranged by classes should be revised adding new items used since list was prepared	1

As it develops so few roads have been using the present classification up to the time it was adopted by the U. S. R. A., and not having had sufficient experience in handling same from an ordering, disbursing and accounting standpoint, also that those who recently adopted it have incurred more or less expense in rearranging material to conform, in addition to expense of printing forms, etc., the committee recommends that the present classification, which is quite complete and should meet the demand of most roads, be continued as it reads for at least another year, giving it a fair trial, developing changes which are of consequence and which when altered will result beneficially to the roads using it.

The report is signed by: C. H. Rost, C. R. I. & P., chairman; F. H. Fechtig, A. C. L.; H. P. McQuilkin, B. & O.; W. S. Moorehead, I. C.; G. T. Dunn, M. C.

Discussion

Mr. Reid (B. & O.): I would like to hear from someone who has had experience with this classification: what their experience is with their inventory. Whether they find very great discrepancies. That is quite an elaborate classificaton, and it offers a good many opportunities for errors in accounting. Of course, any records or information that is

not correct merely misleads. It is worse than no information at all. I would like to know the experience of someone who has been operating it for some time.

A. R. Dale: My experience with it has been that where we have had deficiency, or shortages, or alterages, the classification tends to point out where the trouble is.

Mr. Reid: The classification would not be responsible for that. It would be the application of it, the same as taking stock, rendering your stock book or anything else. We have used that ever since it has been adopted by the Storekeepers Assn., and I believe that was 10 years ago. We used it successfully when some of our classes needed looking up, and we saw what was wrong.

A motion to accept this report was carried.

Report of Committee on Fuel

In connection with the report on Subject 9—Fuel, it developed that the general committee has not seen this report nor taken action on it.

As under the rules it should first come before the general committee, and then be referred to the open meeting, *a motion that the report of the committee be referred back to the general committee for such action as they deemed proper, was carried.*

Report of Committee on Scrap Classification, Handling and Sales

The committee recommends the use of the following form in connection with the sale of scrap.

Terms of Sale: Please quote on this sheet price per unit specified on the following scrap materials. This scrap will be sold f. o. b. any point on our lines. Show in your bid tonnage and delivery point desired.

Sealed bids for this scrap to receive consideration must be in this office by 12 o'clock noon on.....

Envelopes containing bids should be marked in the lower left hand corner "bid on scrap," and no change in your quotation will be permitted after that time.

The right to accept or reject part or all of your bid is reserved. If accepted, the following terms and conditions will govern, and will be made a part of the transaction.

Shipment: Final shipping directions must be furnished within ten (10) days from date of award. When shipping directions for material are not furnished within ten (10) days from date of award, it shall be optional with this company to cancel the sale at any time thereafter.

Shipment will ordinarily be made within thirty (30) days after receipt of shipping directions unless prevented by causes beyond our control. If shipment is not made within sixty (60) days, prevented by causes beyond our control, it will be optional with either party to cancel balance due, within ten days thereafter.

Current tariff switching charges will be made for delivery to connecting lines.

Terms: Sight draft attached to bill of lading, or certified check before car is delivered. Our classification and track scale weights at point of loading to govern.

Please send your shipping directions to conform with above terms of sale.

The report is signed by G. W. Hayden (Chairman), N. Y., N. H. & H.; J. C. Kirk, C., R. I. & P.; J. R. Haynes, C., B. & Q.; I. B. Thomas, Pennsylvania; W. F. Jones, N. Y. C., and A. W. Munster (Chairman Ex-Officio), B. & M.

Discussion

Wm. Davidson (I. C.): I presume everyone in this convention realizes that this is a pretty important paper. I was on the Scrap Committee two or three sessions, and one of the points we made was that we could not do very much changing the classifications, we found it was pretty satisfactory to the railroads.

I have taken the opportunity of discussing freely with the scrap dealers, and I found out that the scrap classification adopted by the R. S. A. in many cases was not satisfactory to the scrap dealers.

G. G. Yeomans (N. Y. N. H. & H.): There seems to be some doubt in Mr. Burr's (Erie) mind regarding the legality of optional cancelation at the end of sixty days if shipment is prevented by causes beyond our control. I think such a doubt as that can be dispelled immediately. Anything is legal which is agreed to before the transaction is completed. It becomes a part of the transaction itself, and there is no question then whatever as to its legality or illegality. I think the report is an admirable one, and I have studied over these terms pretty carefully. I do not believe that the interests of the railroad companies in disposing of their scrap can be any better safeguarded than they are safeguarded by the rules that this committee has proposed.

The Chairman: Please confine remarks to the 60-day provision. Is there any one else in the house excepting Mr. Burr or his purchasing department who has any objection to this one?

H. B. Hodges (Pennsylvania): My objection to 60 days is that in many cases the scrap dealer makes a purchase with some definite idea as to its disposal. He wants to ship it abroad, maybe, or have some other customers who will require the material right away. I think putting in that clause is an unnecessary hardship on the scrap dealer. It is my idea that it will prevent many scrap dealers from making disposals.

C. D. Young (Pennsylvania): I suggest that we take up the report item by item. If there are objections, we will note them, and if they are acceptable we can pass them. I have quite a number of items that I would like to suggest—they are all matters of detail.

It was regularly moved, seconded and carried, that the members so desiring retire with the committee to the Marlborough-Blenheim Committee room, and prepare written criticisms on this report and present it back to the meeting at 2.30 o'clock.

Report on Purchasing, Storage and Distribution of Ice

The subject of the purchase, storage and distribution of ice involves two main questions, (1) The requirements of the railroads and the source of supply; (2) Practices, methods and facilities employed in caring for and handling the supply. The subject is accordingly treated from the standpoint of these two questions.

The matter presented is based mainly on information obtained from railroads and other large consumers and from manufacturers and dealers of ice throughout the country through means of questionnaires.

The Requirements of the Railroads and the Sources of Supply

It is estimated that in all services the railways of the country consume annually in the neighborhood of six million tons of ice. The importance of the purposes served and the peculiar

nature of the commodity handled makes the subject one of considerable interest.

The figures gathered indicate that the ice used is about evenly divided as between natural and artificial. The railroads store annually in the neighborhood of 2,500,000 tons of natural ice. They manufacture in the neighborhood of 100,000 tons of artificial ice. The balance of the requirements, natural and artificial, practically 55 per cent. of the total, is delivered from the storage houses and manufacturing plants of dealers.

Location is the principal factor that controls the method of obtaining the supply. Several of the railroads in the North do their own harvesting, but in the majority of the cases the ice is harvested and shipped by people engaged in the business and the railroads store the ice themselves. The railroads do not seem to have entered into the manufacture of ice to any material extent. The Santa Fe operates two plants and a few other roads manufacture in small quantities.

The supply of ice is generally contracted for from season to season. Some long-time contracts have been made as an inducement to dealers to erect artificial ice plants.

The consumption of ice has been increasing at a very rapid rate, and the present sources of supply as well as the facilities for taking care of the ice are overtaxed.

This state of affairs has been brought about mainly through the increase in the transportation of perishable products. It is estimated that in ten years this business of shipping perishable products under refrigeration has at least doubled. There is not only the volume of it to be considered, but in general the freight is hauled long distances and consequently requires a great deal of ice to insure its safe carriage.

As this business will undoubtedly continue to grow, provisions must be made to meet the increased demand for ice. The ideal plan would seem to be to develop some portable means of producing the refrigeration required. Some attempts have been made along this line and this is encouraging.

Railroads in the North, able unfailingly to obtain an unlimited supply of good natural ice, will probably continue the present method. Their problem is merely one of expansion of storage and icing facilities. For the railroads in the Southern sections the problem is definitely one of developing the sources of supply for artificial ice. For the railroads in the Middle section depending at present largely on natural ice, the problem is more complex. Let us, therefore, consider their situation.

While many of these railroads usually have regular sources to draw from, the irregularity of weather conditions cause them to shift from source to source.

Another thing to be taken into account in the case of railroads obliged to ship their ice from distant points, is the element of transportation. The gathering of the ice occurs at a time of the year when there is a scarcity of equipment and labor. When we take into account the general interference with traffic conditions and the inconvenience to and displacement of earning traffic which it causes, we are led to question whether it is not a pretty expensive way of providing the ice supply. It would seem that the more dependable and perhaps more economical method in many cases will be to develop production of artificial ice. The demand for artificial ice to meet the requirements of the railroads will become very great. Provided the railroads are able to obtain the ice from manufacturers at about what it would cost themselves to make it, it will not be desirable for them to enter into the ice manufacturing business. Quantity has a great deal to do with the cost of making ice and by combining the needs of the railroads, which are usually large, with the general commercial demand the manufacturer can obtain the benefit of quantity output. The ice manufacturer occasionally adds the cold storage business to his ice business which further helps him in obtaining the maximum output of his plant. This combination of benefits available to the commercial plant from sale of storage and ice should put the commercial plant in position to furnish the ice to the railroads at a price that would be attractive.

There will, of course, be exceptional cases where requirements of a railroad or a group of railroads combined are of such magnitude as to make it desirable to confine the output of the plant strictly to the uses of the railroads.

Practices, Methods and Facilities Employed in Caring for and Handling the Supply

The questionnaire sent out to the railroads and dealers contained this query: "What is the approximate shrinkage loss?" The answers ranged from 1 per cent to 40 per cent. While it is not possible to do away with shrinkage altogether, there is a minimum to which it can be reduced. The elements which control it are climate, methods of harvesting, distance transported, housing and protection.

Harvesting.—A great deal of the so-called shrinkage in ice is the result of not properly removing the soft ice in the field, the breakage in loading and unloading and the delay in handling the cars from the ice field to the ice house. In other words, a good share of the loss occurs before the ice is ever put into the ice house.*

Considerable difference of opinion seems to exist as to the size to which ice should be cut. As to thickness, the consensus of opinion seems to be that ice should be 10 in. to 16 in. Weather conditions and prospects for the ice crop govern this. It is sometimes wise to start harvesting when the ice is 8 in. thick. As to horizontal dimensions, different localities seem to have their preference. Along the Hudson the size of cake is 22 in. by 32 in. In the Northwest it is 22 in. by 22 in. Some of the packers cut their ice 22 in. by 44 in. with a seam which permits of splitting cakes when removing from the house. For artificial ice the 300-lb. cake seems to be the one generally preferred. Commercial custom and facilities for handling govern this.

The committee recommends that:

1. Attention should be given to sanitation in locating the field.
2. Particular care must be given to planing. All snow, slush and dirt should be removed.
3. The minimum thickness of natural ice should be 10 in.

Storage Houses.—Storage buildings may be divided as to purpose into three general classes, *i. e.*, combination storage and icing plants, general storage buildings and service buildings.

Ice house construction is, of course, a matter of engineering and we shall not attempt to go into it in detail.

The size of the compartments in which ice is stored should be limited in order to avoid having more ice exposed than is necessary while the ice is being removed from the building. This is regulated by the rapidity with which the ice is required for use.

The floors of ice chambers should incline slightly toward the center so as to avoid the danger of throwing the pressure of the contents on the walls, and to assist drainage.

Storage houses must be well drained and drains must be trapped in such a way as to prevent admission of air to the ice chamber.

There should be a loft over the ice chamber which should be well ventilated and the floor of this loft should be covered by a thick layer of insulating material.

Insulation is one of the important features of ice-house construction. It is reported that in a completely insulated house the season shrinkage is 8 per cent, while in a poorly insulated house the shrinkage is from 30 per cent to 40 per cent. It seems to be the opinion that the dead air spaces in walls have not very much insulating value. It is admitted that air is a good insulator provided it can be prevented from circulating. It is explained, however, that air currents are set up and the air instead of acting as a bar to the transmission of heat acts as a conveyor of heat.

Storing.—There is a good deal of difference of opinion as to whether the ice should be placed flat or on edge and whether joints should be butted together, separated or broken. The packers and dealers all favor laying the cakes flat with spaces of from two to three inches between the tiers in one direction, the top two or three layers to be closed tight. By laying the ice closely with broken joints or with butted joints a larger amount can be stored and as this way of laying excludes the air, it is likely that the shrinkage will be less. Broken joints also avoid the danger of the ice

* Get the pamphlet "How to Harvest Ice," by Gifford Wood Co., Hudson, N. Y.

slipping and forcing the walls. The objection to that plan is that the cakes freeze together and they cannot be removed without considerable breakage and excess labor. Storing the ice on edge or alternately edge and flat permits of removal in good shape, but it is said to require more time and labor in storing. There is a majority among the large users of all classes in favor of laying the ice flat with the edges apart in one direction. It is claimed that the better condition in which the ice can be removed from the ice house justifies this practice. Copies of instructions in force on the C. B. & Q. Railroad describing their method of storing ice will be of interest.

The larger users say that it is not necessary to put any covering on ice stored in completely insulated houses. Where ice is stored in ordinary storage buildings it is recommended that it be covered with hay or straw. It is stated that one ton of dry hay should be used to every 600 square feet of space. They also recommend a covering of heavy insulating paper laid over the hay. In full insulated houses the ice may be placed against the walls. In the ordinary type of house the ice should be kept away from the wall at least 8 in. and a packing of sawdust should be maintained between the ice and the walls.

Ice stored in connection with ice manufacturing plants is kept under refrigeration and shrinkage loss is practically eliminated.

The Missouri Pacific have installed refrigerating equipment in connection with some of their ice houses. This enables them to fill their ice houses with either natural or artificial ice. If the natural crop fails they purchase the surplus output of neighboring dealers and store it for use during the icing season. The equipment consists of a motor, ammonia compressor and piping. A plant installed in 1915 cost $8,500. It is estimated that it costs 50 cents per ton per year to maintain the required temperature in the storage house.

Inquiry was made of the outside users and dealers as to the practicability of storing manufactured ice without refrigeration. With one exception the answers were opposed to it. The one exception was one of the largest ice dealers in the country. They referred the matter to their Chief Refrigerating Engineer and we quote his statement:

"We stored fifteen hundred tons of artificial ice in a natural house last year in the following manner:

"We spaced the ice with spacing strips both ways and put water-proof paper between each tier to prevent the cakes freezing together. This ice was put in in April during rainy weather and when the temperature was really too high for storing ice properly and taken out in the latter part of June. Our actual shrinkage was 19 per cent. I am satisfied if ice were put in during cold weather the shrinkage would not exceed 15 per cent."

The committee recommends that:

1. Ice should be placed flat with 1½ in. spaces between tiers in one direction, except the three top tiers, which should be laid with broken joints and edges butted together.

2. Covering may be omitted in fully insulated houses. In houses not so insulated a suitable covering of hay should be laid on the ice and the ice should be laid not less than 8 in. away from outer walls, the spaces between the outer walls and the ice to be packed with sawdust or shavings as the ice is put in.

3. Consideration should be given to the installation of ice machinery for the purpose of producing refrigeration to protect ice in storage (either natural or artificial), and such equipment should be installed where the condition will justify.

4. Artificial ice should not be stored without refrigeration, except in emergency cases.

Reference to the question of fire protection should not be omitted. Attention should be given to the following requirements:

1. Proper equipment of hydrants, hose, water barrels, buckets and extinguishers as the character of the building and surrounding conditions may warrant.

2. Lighting and wiring should be installed according to approved practices.

3. Prohibition of the use of torches and smoking on the premises.

4. Keeping premises clean and free from inflammable materials of all kinds.

5. Inspection at frequent intervals.

Icing Cars.—About 40 per cent. of the ice purchased by railroads is used for the protection of perishable products. The Federal Ice Refrigerating Company erected a plant at Blue Island, Chicago, about a year ago with a manufacturing capacity of 700 tons per day. This plant is equipped to ice 40 cars at a setting, twenty on each side of the icing platform. The time required for icing is one minute per car. The Burlington has a modern plant at Galesburg with a capacity for icing 30 cars at one time. It is equipped with platforms at two levels, the lower one level with the car roof used for cake icing and by the men in salting and tamping the bunkers. Crushed ice is delivered to the bunkers from the upper level through chutes operated on carriers.

A great deal of icing is done on the team tracks in the larger terminals. The latest thing for this purpose is a special ice bed and frame which may be mounted on the chassis of a motor truck. The truck is drawn up along side of the car by four spiral columns operated on the principle of the screw jack, the power being taken from the motor of the truck. There is a side opening in the ice bed from which the ice is shunted into the bunker of the car.

Transferring.—Storage houses should as far as possible be located so as to reduce this transferring to the minimum.

On account of limited storage supply at certain points it is sometimes necessary to transfer ice from reserve storage houses. In these cases it is best to arrange the transfer as far as practicable so that it will be made during the cooler months, leaving the ice in the local storage undisturbed until the warm weather sets in. Refrigerators should be used for transferring ice when available.

Ice for outlying stations and maintenance of way gangs is supplied in some cases by shipment from division points in baggage cars, the ice being packed in ice boxes or sacks. A better plan, however, seems to be to purchase the ice from the local dealers whenever this can be done.

Accounting.—A very large part of the ice purchased is used in the protection of perishable products and in many cases this ice is chargeable to the shipper as a part of the charge for protective service.

One of the first things in connection with accounting is to require detailed accounts of the cost of the ice. The next thing is to require that the ice be charged out as used on an approximately accurate basis and not on any arbitrary basis. Unless an accurate account is kept of the ice disbursed the shrinkage cannot be determined.

After the cost of the ice is ascertained the shrinkage should be estimated based on past experience and the anticipated shrinkage should be taken care of in the price of the ice. Differences should be adjusted at inventory time or at the end of the season.

We are informed by the Committee on Perishable Freight, Section IV, that it is endeavoring in connection with the Interstate Commerce Commission to work up a set of uniform reports.

The committee recommends that:

1. A ledger account should be kept of each ice house and the account should be debited with the cost of ice, freight, labor and incidental expenses.

2. Cost should be calculated as soon as the storage has been completed and the price to be charged for the ice used from that house during the season established. The price should cover the estimated shrinkage.

3. Requisitions should be required for ice used and the actual amount used as nearly as it can reasonably be ascertained should be charged.

4. Monthly inventory should be taken for stock purposes and as a check against unusual meltage.

5. Inventory should be taken at the end of the season, the account balanced and the overage or shortage adjusted, or this may be done at the regular inventory time.

Supervision.—Centralized responsibility for the handling of this matter in all its phases is essential to satisfactory results. The particular department that is made responsible is not so important as it is that such centralized control be provided. The committee recommends, however, that the purchase of ice be in the hands of the purchasing agent and the care and handling in the hands of the general storekeeper.

The report is signed by: T. J. Frier (chairman), Wabash; T. W. Flannagan, M. St. P. & S. S. M.; O. C. Wakefield, Nor. Pac., and G. E. Scott, M. K. & T.

Discussion

T. J. Frier (Wab.): The committee concluded to deal with the subject under two general heads. One, the requirements of the railroads and the sources of supply; the other practices, methods and facilities employed in caring for and handling the supply. Under the first question the requirements of the railroads and sources of supply—the committee has attempted to give the members general information which would seem to be of interest. The report points out the growing magnitude of the ice supply and the importance of it. The growth in the use of perishable products is having quite an effect on the ice business, and it has overtaxed the facilities, and is changing the practice on a number of railroads as to the method of obtaining the supply. Under the range of conditions, however, that obtained, they are so great that it is impossible to make definite recommendations under this head. Each case of each railroad must be determined by the application of business judgment in the particular case.

Under the second question—the practice, method and facilities employed in caring for and handling ice—the committee has attempted to give the members the benefit of the experience of the largest users and dealers, both in railroads and commercial fields on the different important phases of the question. The report under this head deals with the harvesting, distribution of ice houses, methods of storing, disbursing, accounting and supervision; under each of these various heads is submitted recommendations which are justified by the concensus of opinion of those who should be best informed to give information on the subject.

The last part of the report contains the summary and recommendations which the committee thought proper to submit.

A motion that the report as presented by the committee be adopted was seconded and carried.

Report of Committee on Purchasing Agent's Office Records

THE FOLLOWING is a brief description of some of the forms recommended by this committee:

Form No. 12-2 (a)—Price Record card form size 5 by 8, should be kept for a permanent record of current prices on miscellaneous material not covered by contract. This does not include machinery, tools and such special items. When current prices are received they are first entered in the permanent price column in typewriter or ink, after which enter them in present price column in pencil so they may be erased when changed. Double spacing is provided for the purpose of entering the date on the top line and the price on the bottom line.

Form No. 12-3—Price Inquiry Form—Size, 8 by 10½, or 8½ by 11.

Two copies are to be sent out for quotations—one copy to be returned, the other to be retained by the bidder.

Form No. 12-5-1—Invoice Record—This form is for a record of invoices in the purchasing agents' office, and will show the purchases from each concern; also will give a complete history of each invoice. By the use of this record, the purchasing agent may determine at all times the number of unpaid bills.

Form No. 12-7 Record of purchases taken from invoices. Size 14 by 17. This form will give a complete record of material by commodities that may be necessary to keep record of, and the sheets may be filed alphabetically, according to material or classification number.

The report is signed by C. E. Walsh (Chairman), Pennsylvania; W. C. Bower, N. Y. C.; A. H. Lillengren, G. N.; C. R. Craig, Southern; E. G. Walker, A., T. & S. F.; E. Langham, Can. Nor.; J. F. Marshall, C. & A., and W. G. Phelps (chairman Ex-Officio), Pennsylvania.

Discussion

In connection with this report Chairman Pearce said: I heard outside that the purchasing agents felt yesterday that the discussion was very largely confined to store matters. Now, here is an opportunity for them to discuss a purchasing matter—an intensely personal one to every purchasing officer.

C. E. Walsh (Pennsylvania): The samples, as described in the report, do not give a very good idea of just what they are, and for that reason we have with us copies of the forms as recommended. We did not make any comment on the weight or quality of paper. We thought that should be left with the purchasing agent or railroad interested.

W. L. Lefaivere (D. & R. G.): The report speaks for itself, it is comprehensive. It depends entirely on your office force as to how your records are kept. If you are working for some road that has considerable money, you have considerable help.

If you are working for a road that is poor, you have a smaller amount of help. Unfortunately we have not the help that we would like to have, but our records are kept in such shape that we are able to present a statement at any period to our management. I believe the report has covered quite a comprehensive field. We are not able to adopt and put into effect all the conditions as outlined, but I would recommend very strongly its adoption. We are trying to work to that end ourselves by having an additional force added to our present forces.

The committee is to be congratulated on the amount of the work and the quality of the work that it has done in framing this report; in reading it over very carefully there is only one question that occurred to me that I would like to have the chairman of the committee answer, and that is, "What, if any, provision has been made in the records of the purchasing department to determine when any particular order or any particular requisition has been filled and completed. I did not see that covered by any exhibits or forms.

C. E. Walsh: We did not touch on that, because we expected to take up the form of requisition. We had it under consideration, and at the time we considered the form of requisition it was our idea to go into the practice and the handling of the requisition in the purchasing agent's office, but we felt that the requisition form was really a stores department form, the purchasing agent being only interested in the first copy, where they use four or five sheets. This is just a partial report, the committee were anxious to find out and get some idea as to what the general committee and the section would do with this report before it proceeded further.

A motion that the partial report of the committee be adopted, and the committee continue to complete its investigations and make a report at the next convention was carried.

Report of Committee on Lumber

THE COMMITTEE recommend the following:

1. The precise grade required should be specified in every instance. Terms such as best, No. 1, good, clear, etc., should be avoided except as contained in specifications generally known in the trade and therein designated.

Specifications should be, insofar as possible, commercial, and should be drawn from the printed booklets of the several lumber associations.

Special railroad specifications should be used only where commercial specifications will not answer or do not exist, and in the event of their use should be definitely designated that there may be no misunderstanding as to which specification is intended.

2. Bidders should be listed as to classes of lumber handled, and within each material class should be included all reliable dealers. The purchasing officer should familiarize himself with

the facilities of the prospective shipper before placing the order, and should, where he can, investigate the conditions which exist at the points of production.

3. Bids should be obtained to cover all purchases. All reliable dealers should have a chance at the business.

4. Preferably bids should be received sealed, and opened in concert by two responsible employes at the time set for that purpose in the tender.

5. These bids should be tabulated promptly, and the practice of holding schedules open beyond the days specified should be discouraged. The delivery price of the material should be calculated by considering the freight rates in connection with the estimated weight of the commodity, and, other factors being equal, business should be awarded to the lowest responsible bidder.

6. Opportunity should not be afforded any bidder to change his figures after the bids have been opened.

7. Inspection should be performed by a competent force of men, carefully trained, constantly supervised, and responsible alone to a designated general officer, and in no case to the consignee.

8. Inspection should, insofar as consistent with trade practices and possibilities, be performed at point of shipment, the materials there to be branded by means of a stamping hammer carried only by the railroad's inspector and difficult, if not impossible, of imitation. The use of crayons or paint should be prohibited.

9. Where material is of necessity shipped through to destination for inspection, it should be inspected in accordance with paragraph 7, and in no case by the consignee. To insure this, the consignee should be required to report to the general officer in charge of inspectors any incoming car which contains lumber not bearing the inspector's hammer brand. Such general officer should at intervals institute an independent check of incoming lumber.

10. Purchasing agent's order should state, where shipments are made subject to inspection at destination—(1) That rejects will be held not more than 30 days subject to shipper's disposition, after which the railroad will not be responsible, the 30 days to date from date of such rejection notice to shipper. (2) That freight, storage and handling chargeable to rejects must be paid by the shipper.

11. Consignees should acquaint the purchasing agent with each rejection very promptly, in order that he may notify the shipper within ten days of the time of the actual rejection.

12. A definite order directing what disposition should be made of the material will be received from the purchasing agent in each instance of rejection. The material may not be disposed of in any way except as directed by this order.

13. Should the disposition order not be received at destination within 60 days of the date of rejection, notice should be sent to the purchasing agent that the material is still on hand, and request for disposition should be traced.

14. In the event of disposition of rejected material, either by reshipment, destruction or sale, freight charges at commercial rates to destination, and storage and handling charges must be assessed against the shipper.

15. The railroad should not feel obligated to buy rejected lumber, in order to relieve the shipper of all or any part of these charges. In case such a purchase is made, the allowance should not exceed 15 per cent to 20 per cent of the invoiced price paid, based on mill delivery.

16. Rejected lumber should be given the same protection as accepted lumber; should be piled separately, and at least one piece in each lot should bear a tag showing: Car initial and number, name of shipper, date of receipt, and where possible, order number and bill number.

The report is signed by Wm. Beatty (Chairman), Pennsylvania; J. A. Laughlin, N. Y. C.; C. O. Deabler, M. P.; Howard Hayes, G. N.; F. W. Taylor, S. P.; M. E. Towner, W. M.; C. M. Smith, N. Y. C., and E. W. Thornley (Chairman Ex-Officio), B. & O.

Discussion

William Beatty (Pennsylvania): The first principle back of the preparation of this report was that we made it short with the hope that you would read it. There are, so far as we know, no experiments in this report. There may be some practices recommended which are novel to some of the members, but every recommendation is not only the unanimous thought of the committee but the result of actual experience, either with one road or several.

F. H. Fechtig (A. C. L.): The conditions on the A. C. L. with reference to lumber are not the same that you gentlemen have to deal with who deal with the middleman in a large number of cases. We go direct to the mill and therefore have been able to get our lumber anywhere from $20 to $30 lower than they get it in the North. I have read this report very carefully, and I am sure these gentlemen have given a great deal of thought to it and I recommend its adoption.

T. J. Frier (Wabash): In articles 5 and 6 of the report we are directed to provide that the practice of holding schedules open beyond the date specified should be discouraged and opportunity should not be afforded any bidder to change his figure. I think those are matters of a business judgment. If a buyer believes that the market is on a decline when he has an inquiry out, I see no reason why he should not defer awarding the business. I do not believe that we are justified in tying ourselves up too much by rigid regulations or business methods.

Wm. Beatty: With regard to point 6, that an opportunity should not be afforded any bidder to change his figure after bids had been opened. I find that if a lumber bidder has the impression that he will be called in and asked to revise his figures, his first tendency is to bid high enough to allow room to shade, and we believe that the best way to buy lumber is to give a fair and open opportunity to everybody to bid, and to have it generally known that there would be only a fair opportunity given, so that bidders at a distance may be afforded the same opportunity and have a fair chance at the business as people further away from them. There are, of course, certain circumstances which render inspection at the point of shipment impractical. You cannot very well inspect at the point of shipment material which is tied up in bundles, such as maple flooring or car siding or roofing or materials of that general character. You can inspect practically everything else.

If you have a force available or if your neighbors and friends will loan you a force—as an illustration—I cite the Pennsylvania. We co-operate very largely with our Baltimore & Ohio friends in inspecting. They have forces in certain territories where we do not have forces, and in certain territories they do not have any. We interchange. Also where we buy material out of our territory, as in the case of woods from the Pacific Coast, we ask our friends there if they will inspect for us.

F. D. Reed (C. R. I. & P.): The question of inspecting lumber is a very important one and can be handled in different ways, but the method should be governed by a great extent from the party whom you purchase it. It is the practice on the Rock Island to buy lumber not from dealers but direct from manufacturers. In that way we buy it first-handed and we arrange for the purchase of material of specified grades, and it permits us to make inspection at destination. We can do that for the reason that the manufacturers in all instances know exactly what material is wanted. They know the grades and they make every effort to please the customer.

I think all of us ought to give more attention to the question of buying lumber from manufacturers direct. It is important. You can specify what you want and cut out the middleman, or the irresponsible dealer, and you get material more nearly up to grade inspection at destination, because there it is easily done by the foreman or assistant foreman of your lumber yard, and it practically costs you nothing. Where you maintain a force of inspectors in the field, in many instances it is very remote from your road, and it costs a lot of money. I think all of you ought to give that careful consideration.

A motion that the report be adopted was carried.

Report of Committee on Rail, Handling and Distribution

In the records of proceedings of the Railway Storekeepers' Association of 1916, a recommendation was made in favor of the short ton of 2000 lb. and the discontinuance of the unit of 2240 lb. in reporting and accounting for quantities and values received. It was anticipated that something definite could be incorporated in this report regarding the subject, but such is not the case, and further than emphasizing the recommendation the committee can only add that the time appears to be ripe for definite action on the part of all railroads to make this standard practice.

New Rails—Handling and Distribution

The stores department does not maintain labor gangs sufficient for the purpose of handling or distributing rails. Such rails should be and generally are shipped direct to destination, and all the work incidental to handling and distribution should be done by the track department through the regular section or extra gangs and the expenses involved distributed directly to the job and accounts concerned.

As a general rule it is stores department practice not to take cognizance of material until it reaches destination from the consignor and the committee is of the opinion that the stores department should handle all invoices, shipping, and other records connected therewith.

When a railroad receives sufficient quantities of rail, it is good practice to decide on the points where long stretches of rail should be taken out and new rail put in, special shipping instructions being given for each lot of rail to destination. If only small shipments are possible due to inability of mills to supply or from other causes, it is more desirable to ship the complete allotment for an entire district to one point, and make distribution according to requirements at the time of receipt of rail.

The weight of present-day new rails has made it necessary to resort to mechanical means to unload them and inquiries of a number of roads show a variety of devices used, such as rail loaders, various types of locomotive cranes, ditching machines and steam derricks, some of the last three types being made at local shops. Obviously the machines used will depend upon the tonnage to be handled. It is the opinion of the committee that economies could be effected on many roads by a more general use of these mechanical aids than is now observed.

The unloading of new rails into stock piles is not an economical operation—they should be unloaded by distributing them along the tracks. When loaded into box cars, it is more economical to unload on to flat cars before distributing.

Released Rails (Fit)

Distribution—Those not required for immediate use should be concentrated at division or general division points to be inspected, sorted, resawed when that is the practice, and stored ready for prompt shipment as ordered.

Inspection—Theoretically, no doubt, this should be made by the m. w. & s. dept., but as it is chiefly done at yards in charge of the stores department, it is more convenient and satisfactory to have it done at such yards or docks by stores department inspectors, whose qualifications should be satisfactory to the engineering department. The rails should be determined to be fit for use: (1) In main tracks. (2) In main tracks of unimportant branches where the smoothness necessary to fast passenger service is not required and yard running tracks and passing sidings. (3) In yards and sidings in which there is no movement of passenger or fast freight trains.

It would be advisable for these three classes to have standard designations, with identification marks generally understood. Tentatively, the committee suggests painted ends, green for the first class, white for the second class and red for the third class. It will be necessary to further differentiate not only by section but by height denoting the amount of vertical wear as determined by a gauge to the nearest 32d of an inch; this may be done by Roman numerals, I, II, III, IV, painted on the web of each rail.

Handling—At the rail docks, fit rails should be piled, each class and the subdivisions of each class by themselves. The piles should consist first of rows or layers parallel to the track, as wide as the length of a rail. One set of ends should be neatly lined up to permit ready counting and measurement. The area of the supporting stringers should be such that the load on the ground shall not exceed one ton per square foot. Upon the bottom layer of rails stringer rails over the supporting stringers should be laid, upon which the next layer of rails parallel with the track should be placed just like the bottom layer. This process may be continued to a height as great as the loading or unloading machine will operate. The best apparatus for such a yard or dock is probably a gantry crane with runway. It is probable that railroads lose a great deal of money annually for want of apparatus to handle fit rails economically.

Scrap Rails

Inspection and shipping of Scrap Rails are frequently left to the discretion of supervisors or roadmasters and it is suspected that this has resulted in the sale of a great deal of rail as scrap which the purchasers have reclassified and sold as fit All rails alleged to be scrap should be concentrated at division, district or general stores, and should be reclassified or otherwise disposed of from such points only.

The report is signed by A. A. Goodchild (Chairman), C. P.; R. D. Long, C., B. & Q.; J. W. Taylor, C., M. & St. P.; G. W. Snyder, II, Pennsylvania; C. L. Wright, M., K. & T., and E. N. Bender (Chairman Ex-Officio), C. P.

Discussion

J. G. Warnecke (I. C.): We have at Centralia a plant where I find that we made a great saving in rails. I believe every railroad should do more of this. We have a building 60 ft. by 120 ft. with platforms at each end about 200 feet long. We have the rail conveyor system and skids used to move the rails from the platform to the plant. We use a derrick to carry the rail, operated by compressed air. In rolling rail, they use skids in preference to the derrick. The time to saw a 90-lb. rail is 21 sec. The capacity is about 10,000 feet in 8 hours.

During the month of April, the cost was $13,523.66. There are about 21 men usually employed, and we find that the cost is less than $1 per ton, where they have plenty of rails to keep them busy.

J. G. Stuart (C. B. & Q.): We have a large rail mill on the Burlington at Galesburg and another at Havelock, Nebraska. We saw a great deal of our rail. The rail is released on the road, and the store department has charge of it. The store department gives instructions to the superintendent to pick it up and ship it to the point where it is to be used. If it is to be sawed it is shipped in to either Galesburg or Havelock, according to the haul where it is to be used and sawed. It is shipped from there to points where it is to be used. We make a specialty to send rail out in pairs, that is, if we have a rail shorter than the standard, we save that rail until we have another rail of that length—then the two short rails are put on one side of the car, so that when we unload they will be opposite each other and make no carry. In inspecting our rail we inspect it according to No. 1, 2 and 3 grades. The No. 1, of course, going to the higher grade lines; the No. 2, to the lower grade lines, or to the important leads in yards, and the No. 3 to the unimportant tracks. The same grading is carried on whether the rail is to be sawed or laid in its present condition. If it is to be sawed it is marked so that the men picking it up know exactly where it should go. In addition to inspecting these 1, 2 and 3 grades, we inspect it as to its height. By picking all the rails that would come to one height, and making a differentiation of 1/16 in. we get a decidedly better track. It adds a little extra cost, and work at the mill, but when we send out rail we know that it is all within a 1/32 in. of the same height. The second rail of the same grade is just as good as the first, except it is a little bit lower, and by putting the low No. 1 in a stretch and the high No. 1 in a stretch, we get a better road. We aim also when sending out our rail to send out the necessary fittings, the spikes, bolts, tie plates and angle bars. If

it is a job of several miles we do not attempt to put the amount of angle bars on the same car, but where it is a small job we send everything complete on one car. Our management thinks we get wonderfully good results from the sawing of the rail.

G. W. Snyder (Pennsylvania): While the committee has claimed responsibility for the figures given as to cost of resawing, etc., at Savannah, we have not the cost. We did not have the data necessary. While the St. Paul people say their cost was 49 cents a ton, the figures that we saw at Galesburg indicate that the C., B. & Q. costs were about $4.50 a ton. The members accepting this report and talking to their officers about establishing such a thing, had better take the C., B. & Q. figures, which are something like the truth.

A motion that the report of the committee be adopted was carried.

Tuesday Afternoon Session

The meeting was called to order by Chairman Pearce at 2.30 P. M.

Action on Scrap Classification Report

Chairman Pearce announced at the commencement of the afternoon session that the committee which retired to complete its work has returned and that a motion was in order.

A motion that Subject 10—Scrap Classification, be accepted as amended, as recommended practices and the committee continued to make such further changes as may be necessary was carried.

Report of Committee on Buildings and Structures

The committee finds that the subject matter assigned to it was handled in so thorough a manner by the committee reporting in 1916, that this report is based very materially on the former report, bringing out at this time such additional recommendations or matters that have come up subsequent to the above date.

Buildings

The members of the committee have had the opportunity of visiting many store properties, and can speak authoritatively of the tremendous loss to the railroads due to the lack of facilities for the proper storing of materials. It is felt that this matter has not been given the attention it merits, on many railroads, and the committee most emphatically urges that this question be constantly agitated and figures and facts be presented in all cases requiring additional storage, and the need of same clearly set forth by detailing damage and losses to material and supplies on account of lack of proper facilities, which were never more urgently needed than now on account of the greatly increased cost of material and supplies. The need of fireproof storehouses and facilities to properly and economically handle materials so as to eliminate loss from fire, obsolescence, etc., is emphasized.

It is recommended that future improvements should be along a definite, practical and established line of standardized facilities for each road. Each road should decide upon standard types of buildings for various purposes, shelving for use at various types of stores, standard racks for such material as sheet steel, bar iron, tools, knuckles, castings, etc., and issue blueprints for each facility representing the most efficient and practical design.

The committee believes that the matter of facilities such as buildings and yards for the handling and storing of maintenance of way material has been seriously neglected. Such layouts should consist of the necessary trackage to permit of storing of lumber, piling, posts, switch ties, cross arms, frogs, switches, fittings of all kinds, signal materials, wire, etc., and buildings for the storing of lime, cement, finished lumber, and other small and valuable materials.

Generally speaking, the yard or docks for the handling of maintenance of way scrap should also be located at such yards.

Location—The proper location of store facilities and future extension should be given due consideration in order to reduce to a minimum the cost of delivery of materials. In all cases, in locating store facilities consideration should be given to their proximity to repair tracks, shops, roundhouses, etc., which they are to serve, and to the necessary trackage for receiving and shipping material. Properly constructed driveways should also be provided.

Basement, and Additional Floors—The committee finds that in the construction of a building the question of a basement should be very carefully considered, dealing particularly with the question of light and dampness. Where basements are found essential, all the light and heat necessary should be provided to properly protect materials stored therein.

An additional floor or necessary space is recommended, where possible, for the assembling of material complete before shipping to a job or location. This is another phase of railroad storekeeping that has not been given the attention it deserves and the railroads have lost thousands of dollars on account of material shipped incomplete.

While not within the province of this committee to enter into a thorough discussion of this phase, it urgently recommends that such additional space be considered when contemplating additional buildings or alterations.

It is recommended that walls of buildings be constructed of sufficient strength to permit additional floors when necessary.

Fire Protection—The committee recommends filling in or boarding up under all platforms in order to reduce the fire hazard. It also recommends, for proper protection, the placing of sufficient hose houses throughout the yards and around buildings, also standpipes with proper connection, sufficient hose and fire extinguishers in buildings, and further that all roads fully comply with the rules and regulations prescribed by the National Board of Fire Underwriters.

Floors—The committee, after additional study, especially recommends that the following govern in reference to the load to be carried on various floors: The ground floor and platforms of all buildings should be constructed so as to carry any load that may be stored thereon, the second floor to carry 1000 lb. per square foot, and all additional floors to carry 500 lb. per square foot.

Ventilation, Heat and Lighting—The committee find that ventilation should be given more study, not only dealing with the storage of materials but even more so in the housing of employees. The committee recommends that a study be made of the various systems and methods of ventilation when erecting or altering building, and that proper arrangements be made for natural light and correct installation of artificial lights so as to bring about the utmost saving in labor in the handling of material.

Cases—The committee urges the elimination of any shelving that requires the use of ladders, and recommends, where necessary to have a partition in the center of the shelving, that netting be used, which will admit better light and air, add very materially to the lighting effect of the store, and make it more convenient to keep the shelving clean, which can be done with compressed air; it also entirely eliminates any dark corners. In many instances it will be found preferable to not use any partition and thereby get more flexibility out of the shelving. Steel shelving gives 20 per cent. more space than wood construction. Shelving should be built independent of the floor, so as to permit of rearranging when necessary, making the storage space more elastic. Only sufficient space for trucking and necessary work should be allowed between the cases; allowing more space invites storing of material therein, a practice which should not be permitted.

Platforms—Platforms around buildings should be not over eight feet wide, which will allow sufficient trackage space. They should not be used for storage.

Inside Finish—A gloss white or enamel finish is recommended for the outside of shelving and inside of the pockets of same where the nature of the material warrants, except that the counters and the first 6 inches from the floor should be painted black; also for inside of buildings to within 5 feet of the floor, 4 feet 6 inches of which should be pearl grey and 6 inches from the floor to be painted black.

Casting Platform

The committee recommends serious consideration of the so-called unit system of platforms now in use on some railroads. These platforms vary from 4 to 8 feet in width, are about 6 inches above ground level, and any length necessary according to space available, and with sufficient gravel, cinders, or otherwise prepared ground space between, to permit of trucking.

This system eliminates possibility of material being piled so as to interfere with tracking, permits of economical platform repairs, and adds to the appearances of all material piled.

Trucking on the ground reduces materially the maintenance of the platform as it prevents the wearing out of same.

More attention should be given to cases or shelving for the storage of small castings, forgings, etc., which are usually piled outside. Properly constructed cases will protect material, permit of piling to accomplish ready count and to allow a neat and orderly condition to prevail at all times.

Oil House

The committee recommends that at small stores the oil house be placed under the building or platforms with necessary retaining walls for fire protection, tanks to be equipped with necessary pumps so located as to permit the issuing of small quantities of oil at the counter in the store proper. The committee suggest cancelling previous recommendation that oil houses be not located within 200 ft. of any other building, and as a substitute that the local building ordinances be observed.

Tanks—The committee recommends storage tanks at district and sub-store houses of sufficient capacity and so located and equipped as to permit the shipment of oils from the main distributing store in tank cars, thus one car supplying, if necessary, two or more local points.

Storage tanks should be of sufficient capacity at all points where consumption warrants, such as section tool houses, coal chutes, pumping plants, signal towers, etc., so that oils or gasoline can be delivered direct by tank cars in supply trains or local freights. Such installation will tend greatly to reduce operating expenses through the discontinuance of the ordinary shipping drums, which are very expensive to handle at all points, and also causing great loss through leakage.

Pumps—From further study the committee recommend, where conditions warrant, the installation of self-measuring pumps and modern oil handling equipment in oil houses, paint shops, etc., tending to produce a saving in labor, elimination of fire and personal injury hazards, saving in space required, and resulting effect of cleanliness, order and neatness upon employees generally.

Buildings for Explosives

Bulletin No. 5 of the Railway Fire Protection Association states that buildings for fuses and torpedoes should be preferably 40 ft. from other buildings or lumber storage. The entire situation relative to the storage of explosives, is, however, usually covered by local, state and city ordinances and laws, and any report adopted must be subservient to the above.

Where the laws will permit, the committee recommends the construction of reinforced concrete vault with proper ventilation, equipped with steel doors and necessary partitions for the storage of fuses, torpedoes and matches, to be built inside of the storehouse proper.

The report is signed by U. K. Hall (Chairman), U. P.; G. J. Fleisch, A., T. & S. F.; J. E. Byron, B. & M., and D. C. Curtis (Chairman Ex Officio), C., M. & St. P.

Discussion

U. K. Hall (U. P.): The report in detail is based very largely on the report that was adopted at the convention in Detroit, with such new subjects as have come up since that time. The principal feature is the one that was developed in our investigations during the period of federal control and the practices that were found to exist. It developed there was absolutely no standardization of structures or fixtures on many of the roads, not only the smaller roads, but the larger ones as well. The principal theme of this report is the recommendation of the study and installation of common standard practices on the various roads. That is, a road will adopt a certain type of building or a certain type of shelving and then work toward that common standard practice, realizing that it cannot be done all at once. By establishing practices and bringing out through blueprints a theory showing the type of fixtures and structures, anything that is done is done along a definite line, and that is the particular basis of this report. Under A-14 there is a slight typographical error. It reads: "Platforms around buildings should not be over eight feet wide, which would allow sufficient trackage space." That should be "truckage" space. There are some radical changes here from many of the practices followed on the roads.

G. G. Yeomans (N. Y., N. H. & H.): I am just as much in favor of fine buildings and good equipment as anybody possibly can be. The only point that occurs to me is that elaborate buildings are not necessary for good storekeeping. A man can control his stock and can handle and distribute it just exactly as well without elaborate buildings and elaborate machinery for handling, if he uses the proper methods and if he has the proper organization and the right methods. Of course, that is going to be a very much more expensive way of doing it—there is no question about that—it is going to cost you a lot more to do it that way, but where the buildings and the equipment play their part is in reducing the labor cost and not necessarily affecting the amount of stock which you are obliged to carry on hand. I do not know that I can say any more than that.

C. D. Young (Penn.): It is not necessary to have fine buildings to make a fine storehouse. Some of the best kept storehouses are in some very poor buildings. However, there should be some guide for those who have sufficient funds to build, to determine what they shall do when they come to spend the money for new buildings. I understand that to be the purpose of this report. The report is one of great value. In going around over the railroads you will find structures built within the last ten years that certainly are not recognizing the desirability of low ceilings and low bins, avoiding step-ladders to get to the bins, so that you may know what stock is in the sections. During the war the Government developed some very good designs for warehousing and storage houses, and if this committee is continued it might be well for it to review the work of the quartermaster's department of the army, and see if there are not some points that can be obtained from standard construction warehouses and storehouses that would be of very material advantage to our association. Much study was given to the construction of these buildings. They are not expensive, they can be made fairly fireproof, and the handling of material in and out of the buildings can be done in a very expeditious and cheap manner. Generally speaking, it requires a large location to carry out the Government's scheme of warehousing, and that would prohibit the consideration of a sub-store, so this is a problem as between the general warehouse and sub-storehouse.

There is a diagram of material racks in the last part of the report which coincides with my view. One thing is omitted from this diagram, however, that I think is desirable, and that is to set between the maximum and minimum the aisle spacing between racks. In discussing this question with the storekeepers, you can find views varying from 24 in. to about six feet as to the width of the aisle between racks. Certainly that is too wide a divergence. The man who wants six feet is wasting valuable floor space, and the man who wants two feet is not getting his material in and out in an economical manner. It would be of assistance to us to know what that should be. If you have the same limitation on the width of aisle in using the width of material racks as specified, then a general construction can be worked out, spacing the columns in the buildings so that they will come in proper relationship to the aisles and bins. Too many buildings have been built with the posts put in before it was known where the material racks were to be put in.

Mr. Hall: Under A-13, Cases, we recommend that shelving be built independent of the floor, to permit rearranging when necessary, making the storage space more elastic. I can quote an instance that came under our observation just re-

cently where a store building was organized 165 feet long and afterwards cut down to 100 ft. The same amount of shelves are in that 100 ft. that were originally intended to be put into the 165 ft. The shelves are too close; there is about 2½ ft. in the aisle. If there was plenty of room, 65 ft., it would permit working space.

But that is the one feature of having shelving built independent of the floor. The shelving can be arranged according to the needs. We have also called attention to the so-called overhead lighting, or transom effect. There are no windows except above the shelving and that permits putting the shelving in any position on the floor. Mr. Young's question is one that would have to be solved according to the conditions.

A motion was made that the report be adopted as recommended practice and the committee continued.

Mr. Hall: You can get the finest results in the world out of shelving having absolutely no partitions, but there are certain items where it is necessary. The mesh and the gauge must be dependent entirely upon the character of material that is to be stored there. It must be heavy enough to meet the weight and if it is light material, there is no use going to the expense of a heavier gauge.

Mr. Yeomans: I would like to ask Mr. Hall if he differentiates between shop scrap and maintenance of way scrap. If he proposes to have one yard for shop scrap and another yard for maintenance of way scrap?

Mr. Hall: It would depend upon the geographical location and the direction in which your scrap was going for the market. If you had maintenance of way material all located on your railroad at such a place that you would have to haul your scrap right past that point to reach the market, I would say it could probably be arranged to take all your scrap. On the other hand, if scrap would go in the opposite direction you would probably handle your mechanical scrap at the shop yard. And in practically all cases it would be necessary to handle your mechanical scrap separate from maintenance of way scrap.

A motion that the report be adopted was carried.

Report on Standards

PRECEDING the showing of the pictures of the supply train in operation, F. D. Reed, vice-president, Chicago, Rock Island & Pacific in charge of purchases and stores, read his report on Subject 17, Standards. Mr. Reed commented as follows on this report: "I feel that this subject should not have been referred to the committee on standards, but should have been referred to the committee on lumber. Their subject is lumber, purchasing, inspection and distribution, and as that will require a great deal of detailed information to get up the report I would recommend that that be referred to that committee. I shall be glad to submit to them the data I have received for their information and guidance."

A motion that this report be adopted was carried.

Supply Train Pictures

Moving pictures of the Southern Pacific supply train were shown by J. E. Peery, general stores inspector, Southern Pacific.

Mr. Peery: These pictures were made along the Southern Pacific route. They were taken at various times and put together and not all the advantages of the supply train are shown. There are many titles which we have not attempted to film because it would go into 13 or 14 reels. The Powers Proection Machine Company of New York have kindly consented to furnish the projection machines, the same as we are using on the Southern Pacific.

Report of Committee on Supply Train Operation

THE COMMITTEE recommends the following:

1. Essential features of supply trains are services of supply and delivering materials to points where required for use.

2. Where an article is exchangeable, the old article should be turned in at time delivery is made of new.

3. The basis of quantities of supplies to be delivered rests with the originator of requisitions, subject to joint check on the ground at the time of delivery by the supply train operatives and consignee.

4. It is desirable to notify consignee in writing in detail of items delivered at time delivery is made.

5. Where check of conditions on the ground shows necessity of change in original requisition, correction must be made at time of delivery.

6. Under present conditions it is recommended a thirty-day schedule is most desirable.

7. New material not required on line, also scrap, wastepaper, and obsolete material, will be loaded on supply train each trip.

8. The supply train should be used wherever possible to eliminate work trains.

9. All company material, of any nature, even in carload lots, should be delivered by the supply train when possible, and set out at stations or sidings where required, in order to eliminate handling in way freights.

10. To make the operation of the supply train most effective and result in maximum economy of the company maintaining it, all unapplied material (including stationery) should be under control of the general storekeeper as to concentration, distribution, etc.

11. In order to properly inaugurate supply train on a railroad, it is essential that practical men be directed to observe the operation of such practice or unit on some railroad where practice is in vogue.

12. In busy and congested territories, it is desirable that all company material which can be delivered through the medium of the supply train be so handled, in place of handling through local freight houses and on way trains.

13. The following items are to be delivered by supply train: All of maintenance of way material, including frogs, switch points, switch stands, continuous joints, bolts, spikes, etc., less than carload lots of lumber, bridge and building hardware and material for assembled jobs, push, hand and velocipede cars, warehouse and baggage trucks, mail carts, crossing and right-of-way signs, etc., Distillate for pumping plants, gasoline for section and signal maintainers' headquarters, lime and soda ash for water-treating plants, coal for station agencies, ice for use in stations, sections, b. & b. gangs, etc. (where not contracted for local delivery), all oils used in signal, m. of w. and b. & b. departments, as well as pumping plants and station agencies, miscellaneous material required for maintenance of signal department, pumping plants, station agencies, etc., all small outside stores in supply train territory to be supplied, and all other substores where possible.

14. It is further unanimously recommended that supply train service be extended and adopted on all railroads. The committee submits as a basis for this recommendation the following statements of cost of efficient supply train operation versus other methods. The savings brought about by good service have not been considered in these statements, as this element cannot be computed in dollars and cents.

STATEMENT SHOWING COST OF OPERATING SUPPLY TRAINS

	Monthly
Labor at stores in loading supply train	$500.00
Wages of supply train storekeepers and helpers	1,085.00
Personal expenses of supply train storekeepers and helpers and store department proportion of expense incident to performance of cook and living cars operated in connection with supply trains	550.00
Charges from transportation department for wages of train and engine crews, roundhouse expenses, and other incidental expenses; also fuel	4,700.00
Track laborers accompanying supply train	600.00
Total	$7,435.00

STATEMENT SHOWING ESTIMATED COST OF HANDLING BY LOCAL FREIGHT MATERIAL NOT DELIVERED BY SUPPLY TRAIN

	Monthly
Estimated cost of overtime to local trains and engine crews, if material was handled by local freight	$3,280.00
Estimated cost of local freight houses of handling, transferring and billing (on basis of 50% of material passing through freight houses), at 57c. ton	1,681.00
Estimated loss account material damaged or lost in transit, etc. (using as a basis 3% of material delivered)	420.00
Estimated cost of picking up scrap and cost of handling, sorting, etc., at division stores, before shipping to general scrap head quarters, also overtime to local freight train and engine crews	2,500.00
Approximate cost of packing, tagging, loading, waybilling, etc., at shipping stores	5,040.00
Stock on hand would have to be increased at all division stores approximately $160,000, if each had to provide for their division requirements. (Interest on investment at rate of 6% per annum)	800.00
Estimated value of additional track tools, hand, push and velocipede cars, which would be required on line if no regular exchange system was in effect, $64,000. (Interest on investment at rate of 6% per annum)	320.00
Estimated cost of motor car maintenance and operator for use of watch inspectors on monthly trip of watch inspection	255.00
Estimated cost of doing work by work train, such as distribution of ties, gravel, ice, sprinkling right of way with fuel oil, etc., which is now handled by supply train	1,125.00
Estimated cost of labor necessary to deliver material from freight house to section and signal tool houses, B. & B. and extra gangs on line, etc.	3,600.00
Total	$19,021.00

The report is signed by A. S. McKelligon (Chairman), S. P.; J. E. Perry, S. P.; W. Dixon, M. P.; H. P. McQuilken, B. & O.; L. G. Pearson, E. P. & S. W.; C. A. How, M. P.; J. P. Murphy, N. Y. C.; R. C. Harris, Pennsylvania; I. L. Ward, Pacific Electric; U. K. Hall, U. P., and D. C. Curtis (Chairman Ex-Officio), C. M. & St. P.

Discussion

D. D. Cain (Sou. Brass Works): I was storekeeper at Bakersfield on the Southern Pacific 17 years ago. Mr. Pearce, then a young man from the East, started the idea of the supply train and it grew and grew and it was not more than three or four years until the superintendents began to put their private cars on the rear end to go over the line. I wish you men who have really no knowledge of the supply train could take your managers to the Pacific Coast and see how they really operate and deliver supplies. It would be a revelation to you.

Mr. Burr: In delivering material on a requisition, if you are short of supplies what action is taken to furnish them?

Mr. Peery: We carefully check and wherever possible we do without delivering the material, but if we find that we have to issue some, we divide it up between the places where it is needed.

Mr. Hall: I have seen the Southern Pacific train in operation, and I have seen our own train in operation. Our management takes the stand that the supply train is one of the biggest operating assets to the railroad. These trains permit monthly inspection, they permit even distribution of supplies.

Mr. Bushnell: I would like to ask whether on 9,000 miles, it would require three trains?

Mr. Peery: It would require four trains. We have four trains on the Southern Pacific.

Mr. Stokes: The Illinois Central operate three supply trains that run monthly.

J. G. Stuart (C. B. & Q.): Our experiments with supply cars a number of years ago were not at all satisfactory. They were not operated as a train, but were attached to a local freight. And the experiment, while having some good features, was not at all satisfactory at that time. We have made too much of an effort in getting up our figures to show a money saving. While we did see a splendid saving on the screen, it is doubtful if the actual money saving is as great as it might be shown. We should put more stress on the service and the moral effect on our employees rather than on the actual dollars and cents.

E. Harty (S. P.): In a general store the size of that at Sacramento, time is a great factor, and the elimination of way freight shipments and other shipments direct on the line will pay for approximately two-thirds of the cost of the operation of the entire supply train. That is a saving that is estimated from the experience we had in going from handling way freight shipments to supply cars, and from that to supply trains. The savings may not be as important in dollars and cents saved, but the elimination of this work that is necessary to prepare the shipment for the different divisions is a very great factor. The second factor is the fact that in operating the reclaiming plant and large scrap, many roads find themselves handicapped seriously by what they call the periodical cleanup, when four or five thousand tons of scrap is being shipped in in a very short time. The pictures as shown may have indicated to you the cleanly condition of the right of way on the Southern Pacific, which I consider remarkable.

Resolution of Thanks

A resolution was presented by Mr. Waterman, extending a vote of thanks to William C. Sproul, president of the Southern Pacific; A. S. McKelligon, general storekeeper of the Southern Pacific and J. E. Perry, his assistant, for affording the convention an opportunity to view the moving pictures of the supply train and reclamation plant of the Southern Pacific Railroad.

Adjournment.

Registration, American Railroad Association

Section III, Mechanical

Blair, H. A., Supvr. C. R., Allegheny Region, U. S. R. A., Alamac.
Davis, M. J., A. E. M. P., Penn., Princess.
Drawbaugh, E. L., Gen. Car Foreman, Penn., Chalfonte.
Enbody, A. B., M. M., Cent. R. R. of N. J., De Ville.
Foster, H. D., Gen. Auditor, C. B. & O., Chelsea.
Gallagher, F. S., A. E. R. S., N. Y. C., Brighton.
Jones, C. H., M. M., Huntington & Broad Top Mtn.
Long, J. F., Dis. Maint. of Equip. Insp., B. & O., Schlitz.
O'Donnell, J. J., Gen. Foreman, L. I., Dennis.
Umpleby, C. H., M. M., St. Lawrence Div., Princess.
Wallace, L. W., Marlborough.
Walther, G. C., Gen. Foreman Frt. Car Insp., Penn., Alamac.

Section VI, Purchases and Stores

Barr, A. W., Div. S. K., Penn., Clyde.
Clark, R. C., Supt. For. Prod., P. & L. E., Traymore.
Clay, W. J., D. S. K., P. & R.
Criste, A. D., Div. Storekeeper, Penn., Phillips House.
Dwyer, J. A., Asst. to P. A., P. C. & I. Co.
Farraday, C. L., Gen. Mat. Agent, Penn.
Hayden, G. W., A. P. A., N. Y., N. H. & H., Traymore.
Hisatome, Yoshisato, Storekeeper, Imperial Government Rys. of Japan, Breakers.
Hough, J. H., Penn.
Hughes, E., P. A., Lehigh & New Eng., Pennhurst.
Jordon, John J., Lumber Storekeeper, D. L. & W.
Keane, E. L., P. A., P. C. & I. Co.
Keating, N. M., D. S. K., N. Y., N. H. & H., Schlitz.
Marshall, H. A., Sta., N. Y., N. H. & H., Princess.
Pembleton, H. V., D. S. K., N. Y., N. H. & H., Schlitz.

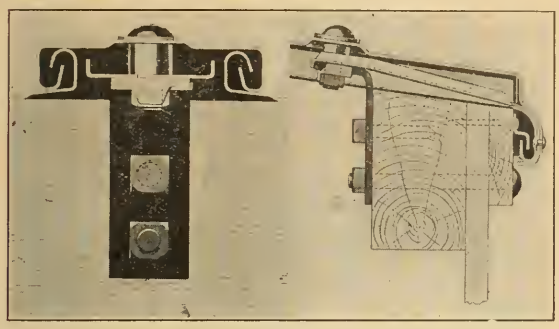
Special Guests

Anderson, B. T., Asst. Sig. Eng., D. L. & W.
Barnum, Ward, Ser. Elec. Eng., Interstate Com., Chalfonte.
Baynes, Peter T., Insp. Pass. Equip., Penn.
Blossom, H. F., D. Equip. Dept., N. Y. C.
Bingman, P. R., Gen. For., Penn., Blackstone.
Bissell, E., S. K., N. Y., N. H. & H., Schlitz.
Bixby, O. M., Asst. Eng., N. Y. C.
Bond, R. J., Div. Eng., Penn.
Boring, T. J., Gen. For., Penn., Craig Hall.
Boston, R. W., Car Repair Acct., B. & O.
Caruthers, E. W., Asst. Eng. M. of W., Penn.
Clarke, A. B., Gen. For., P. & R., Shelburne.
Coffey, J. E., For. Frt. Car Insp., C. R. R. of N. J., Lyric.
Cornell, J. Albert, Representative, Penn. R. R. Employees Magazine, Traymore.
Crowley, M. D., T. S. K., N. Y., N. H. & H., Erskine.
Doyle, Lester A., Stenographer, P. & L., Craig Hall.
Dyson, C. H., Fuel Agent, B. & O.
Ellenberger, E. G., Div. Storekeeper, Penn., Castro.
Erb, Chas. W., Div. Storekeeper, Penn., Clyde.
Ernst, Wm., D. Equip. Dept., N. Y. C.
Farley, L. M., For. Battery Plant, The Wast. T. Co., Elwood.
Foltz, T. F., Elec. Eng., Wash. Term.
Funnell, Walter, Gen. For. Mch. Shops, N. Y. O. & W., Dennis.
Geist, J. R., Spec. Passenger Car Insp., B. & O., Revere.
Gehert, Fred A., Penn.
Gehert, S. S., Gen. For., Penn.
Goike, Elmer J., Asst. Gen. Stores Acct., N. Y., N. H. & H., Schlitz.
Goldsmith, A. C., Gen. For., Penn., Bingham.
Guam, A. F., Mech. Eng., Traymore.
Gurnee, W. H., Gen. Jt. For., Cent. New Eng., Princess.
Hamilton, Geo., Supt. of Elec. Reprs. Mech., Erie, Mt. Vernon.
Hardy, R. A., Head Car Draft., P. & R., Elberon.
Hart, B. C., D. S. K., N. Y., N. H. & H., Princess.
Hassett, J. C., M. E., N. Y., N. H. & H., Wiltshire.
Hawk, E. Thompson, For. Engine House, P. & R., Monticello.
Heinmiller, H. O., Insp., B. & O., Schlitz.
Hengstler, D., Foreman, Penn.
Irving, H. E., Insp., B. & O., Schlitz.
Jenks, W. J., Gen. Mgr., N. & W., Marlborough.
Jones, Edw., Asst. Pur. Agt., Western Md., Wiltshire.
Kestenbaum, Maurice C., Stenographer, P. & S., Craig Hall.
Kline, W. R., Stenographer Office Ch. M. P., Penn.

New Devices Among the Exhibits

All-Steel Flexible Roof

THE HUTCHINS CAR ROOFING COMPANY, Detroit, Mich., is exhibiting models of all-steel flexible roofs for new box cars and for replacement on old cars, both models incorporating recent improvements. Of particular interest is the design of the all-steel flexible roof as adapted for replacing inside and outside metal roofs on

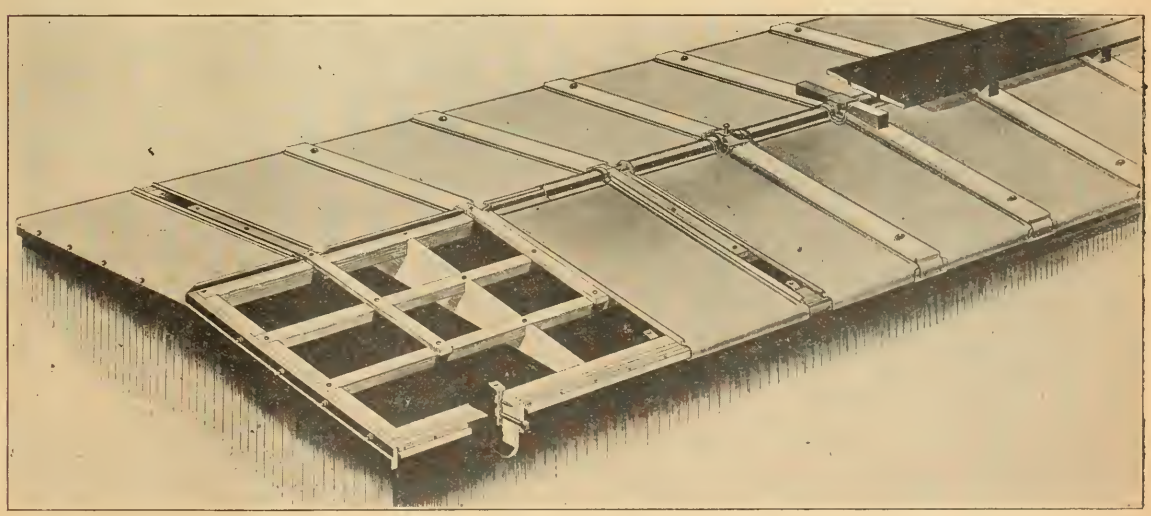


Sections Through Ridge Pole and Side Plate

old box cars. The latest improvement of this design is in the method of interlocking the roof sheet flanges and transverse joint cap flanges to insure a weatherproof joint, even though the surfaces on which the roof sheets are supported are irregular, as is apt to be the case on old cars. The method of fastening the joint caps to brackets located on the inside surface of the side roof plates has been improved to give a weatherproof joint even in case there is considerable variation in the distance from the upper surface of the purlines to the carlines.

This replacement roof, made of No. 18 or No. 20 gage steel, galvanized, is intended to be placed on top of the old wooden or steel carlines and the old purlines and ridge pole and because the surfaces so provided are very apt to be irregular, it was considered best to interlock the roof sheet flanges with the transverse joint cap flanges to insure weather-proof joints as shown in the sectional view. This illustration shows also the shoulder bolt which is riveted to the joint cap. The shoulder of the bolt rests upon the side plate bracket, the eaves re-enforcing piece being placed between the shoulder and the bracket, and when the nut is drawn up on the shoulder bolt the joint cap and re-enforcing piece are secured to the bracket. The other section is taken transverse to the side plate and shows clearly the bracket located on the inside face of the side plate, the fastening of the joint cap and re-enforcing piece and the engagement of the eaves flashing with the return bend of the roofing sheets and joint caps.

Instead of the customary lapped joint a double locked joint with considerable vertical and side clearance is made between the joint caps and the side roof plates. The caps are slid into position after the side plates are in place and the special roof cap consolidates the structure and makes it entirely weatherproof.



Arrangement of the Sheets and Joint Caps

The Locomotive Booster

ONE OF THE MOST significant locomotive developments of the year calls for a revision of thought. The old slogan "Be a booster" has appeared in a new dress; it's now, "Adopt the booster"—a two-cylinder, horizontal engine geared to the axle of any locomotive trailer, adding to that locomotive 28 per cent in starting efficiency. No, you're wrong. It has nothing whatever to do with the old dream-book scheme of lift-

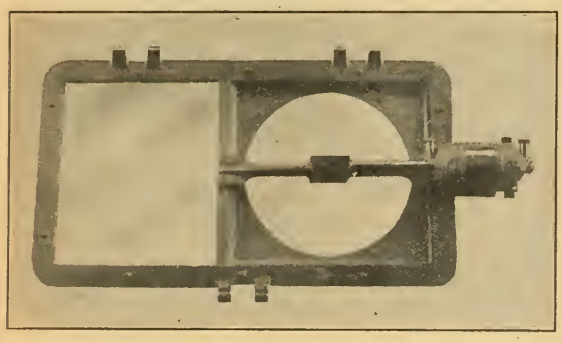
ing the weight of the engine off the trailer and engine trucks, thus overloading the driving boxes. It's merely a clever means of utilizing the inactive tractive force which you never thought was there. Photographs and drawings are being shown in the Franklin Railway Supply Company's booth, and a locomotive equipped with it will be found on the railroad track on Georgia avenue.

The locomotive is No. 3149, a big 4-6-2 of the New York Central. If, on account of a poor head for figures, you are unable to appreciate Frank Peter's statement that No. 3149's tractive power of 36,000 lb. is 47,000 lb. with the booster "cut in," climb up on the foot plate and talk to Engineer George Spink. He will tell you that he fools the brakemen along the line who, to the usual difficult and frequently impossible start of a too heavy train, disregard his advice to "get aboard" and "get left" instead.

He will show you an absence of complications in the cab and explain that if it was not for the quick get-away and the sound of the exhaust of the trailer's two-cylinder engine through and out to the rear of the tender, he might forget the booster was there. He will start with his lever full forward and call your attention to the action of the trailer engine as it does its added 28 per cent in its oil and dust-proof case underneath. When he "hooks her up" you may not realize at first how it is done, but the trailer emerges from its new role of a pusher and automatically resumes its old function of the trailer that you know.

A New Type of Clear Vision Window

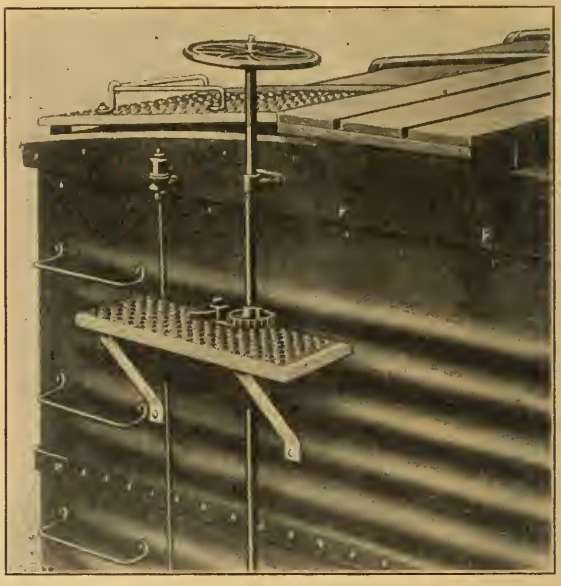
THE PROBLEM OF INSURING a clear vision for enginemen during rain or snow storms has received considerable attention. While the provisions of the Locomotive Inspection Act require the roads to equip locomotives with a small hinged pane in the front cab window, this has met with considerable objection. It is, therefore, interesting to note that a device for providing an unobstructed view under all conditions, based on a new principle, is being exhibited in the booth of the Detroit Lubricator Company by the Chadburn Ship Telegraph Company, Troy, N. Y. This device, which is known as the clear view screen, consists of a glass disc rotated rapidly in its own plane on a central bearing by electric power at such a speed that rain, spray or snow are instantly thrown off and perfect transparency is maintained. The speed required is not excessive, being about 1500 r. p. m. The motor and frame can be mounted directly on the window and the clearance around the screen is so formed that it is impossible for rain or spray to drive through. No loss of light or definition can be detected from the screen up to the point where the glass makes an angle of 60 deg. with the line of sight. The clear view screen has been applied to locomotives on British railways, the illustration herewith showing the arrangement used on a Northeastern Railway locomotive.



Clear View Screen Fitted to a Cab Window

Safety Tread for Brake Step and Latitudinal Running Boards

THE SAFETY OF TRAINMEN makes it desirable to provide a firm footing and a non-slipping surface on the tops of cars, and particularly on the hand-brake steps and latitudinal running board extensions. Wooden platforms and running boards become very slippery in wet weather and often shrink or split, allowing the boards to become loose or detached. To overcome these defects the Dunbar Manufacturing Company, Chicago, is manufacturing hand-brake steps and running board extensions of pressed steel having the Kass safety tread surface. This tread consists of small bosses pressed on a plate, ⅛-in. holes being perforated through the center of each boss. The raised buttons make the tread non-slipping and insure safety to trainmen applying brakes or climbing on or off roofs of cars.



Non-Slipping Pressed Steel Brake Step and Running Board Extension

The steps and platforms are made of ⅛-in. material and can be furnished of copper bearing non-corrosive steel. The size can be varied to suit the railroad company's standards and the brake step can be furnished with pawl, plate, pivot and brackets ready for application to the car, or without these accessories, as desired.

Mr. and Mrs. T. H. Symington, of Morristown, New Jersey, are at the Brighton. Miss Mae Breen, of New York, is their guest. Mr. Symington is the chairman of the board of T. H. Symington Company.

Railway Age

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EDITORIAL STAFF:

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WE GUARANTEE that of this issue, 14,000 copies were printed; that of these 14,000 copies, 13,480 were mailed to regular paid subscribers to the Railway Age and the Railway Mechanical Engineer; 140 were mailed to advertisers, 280 were provided for counter and news companies' sales, new subscriptions, bound volumes, samples, copies lost in the mail and office use; and 100 copies for distribution at Atlantic City.

THE RAILWAY AGE is a member of the Associated Business Papers (A. B. P.) and of the Audit Bureau of Circulations (A. B. C.).

Several times during the convention the *Daily* has commented on the national shop agreement in relation to the training of college men in railway shops. A large number of railway men have visited the *Daily* to comment upon these editorials. We have been surprised at the very general impression on the part of railroad officers that the Transportation Act makes it necessary to continue the national shop agreement in effect until next September. The Transportation Act does not mention the shop agreement, but it does state that there must be no revision downward of the wages paid to the men before next September. It therefore has absolutely no relation to those provisions of the agreement which do not affect the wages paid to the men.

The Shop Agreement

The failure to keep the development of engine terminals apace with the size and number of locomotives in service has not only slowed up the movement of power through the terminals, but has thrown an added burden on the back shops. There are many roundhouses which are unable to take care of their heavy running repairs because of a lack of drop pit facilities. To produce the maximum output per unit of labor, the back shop program must be interfered with as little as possible, and the best results are obtained where the classified repairs do not have to be interrupted to take care of heavy running repair work. In many cases engine terminals may be made capable of keeping up with their heavy running repairs with a comparatively small expenditure required to provide the much needed drop pit facilities. Since the locomotive inspection rules of the Interstate Commerce Commission have gone into effect drop pit work has materially increased, because of the narrow limits placed on driving box lateral. The ability to take care of all of this work at all times when the shopping of the locomotive is unnecessary and to take care of all engine truck repairs, would relieve the back shop and keep locomotives in service.

Drop Pit Facilities

One of the most interesting features of the closing session was the discussion on the grinding of chilled iron car wheels. In its reports the Committee on Car Wheels has considered mainly the engineering problems of design, though it has necessarily given some attention to wheel mounting practice. There seems to be no reason why the activities of the committee should not be extended to embrace the reclamation of wheels by grinding. This practice has been thoroughly tried on several roads and without exception the results have been satisfactory. It is difficult to explain the dilatoriness of the other roads in adopting it, for it is evident that there is considerable interest in the subject. The grinding process has not been recognized in the past, and perhaps this silence on the part of the committee has been construed by some as a condemnation of the practice. The information incorporated in the proceedings will no doubt be of value to roads that are considering this practice. The matter is so important that the committee would be justified in conducting investigations to determine the limitations of car wheel grinding in order that they might be incorporated in the recommended practices of the association.

Grinding Car Wheels

The conventions held and the exhibit given this year go into history as the most successful railway conventions ever held and the most successful railway equipment and supply exhibit ever given since the earliest meetings of the M. M. and M. C. B. Associations. The *Daily* has frankly expressed its criticism because of the failure of members of the Mechanical Section to discuss certain important problems of their department; especially the labor problem. It is only fair to say, however, that on the whole the reports and discussion this year were unusually interesting and instructive. The reports and discussions in the Purchases and Stores Convention undoubtedly were the best in relation to the subjects with which they dealt ever presented at any convention. The exhibit of equipment and supplies far surpassed all previous exhibits in the amount of space occupied, in the number of exhibitors, and in the number, variety and importance of the devices and materials shown. Too much praise cannot be bestowed upon Chairman Tollerton, of the Mechanical Section; Chairman Pearce, of the Purchases and Stores Section, and President Carr, of the Railway Supply Manufacturers' Association, for the way in which they did their work. All the organizations concerned have had first-class leadership, and it was largely due to this leadership that the conventions and exhibits were made so successful.

The Greatest Conventions and Exhibit

Generally speaking, on clearing all foreign repair bills the net financial result of a scale of prices for labor and material so fixed as to show a profit on foreign car repairs will not be greatly different than it is at present. Objections will probably be most loudly voiced by the roads regularly showing a debit balance in their car repair billing accounts. Any road which consistently neglects foreign equipment will be penalized in the increase in this debit balance, but is this a serious objection? The remedy will not be difficult to apply. The incentive to reduce the penalty and, if possible, change the debit to a credit balance will undoubtedly insure its application. Where foreign cars are now neglected so that when they reach the home rails they are practically in need of rebuilding, they will be kept in good serviceable condition and repairs made currently. In the long run it is improbable that this will increase the actual amount of labor and material used on equipment maintenance. A large amount of the labor and material now required is used in making temporary repairs calculated to get bad order cars off the lines of one carrier to another, or even off one division to the next. Eventually the same repairs must be made which, if made at the outset, would have kept the cars in service for months without appearing on the repair tracks. It is, therefore, reasonable to assume that once the slack is caught up, a stitch-in-time policy will be followed, which will result in more cars in serviceable condition and less delays to traffic from the continual switching out of bad orders.

More Serviceable Cars

It is a matter of regret that the coupler and draft gear committee was unable to present a report on the tests of draft gears conducted at the Rochester plant. The introduction of cars of extremely high capacity has led to additional difficulties in draft gear maintenance by increasing the work that must be absorbed by each gear. There seems to be little agreement as to the best method of improving the situation. A longer draft gear travel is advocated by some. Others object to this on the ground that it will cause an increase in slack and aggravate the trouble instead of lessening it. While with some types of draft gear an increase in the travel might increase the slack, there is no inherent reason why a gear could not be designed to overcome this objection. An increase in the maximum resistance of the gear without increased travel should be feasible on cars with heavy underframes, but the added capacity which could be obtained within the limits of strength of the coupler and underframe members would be small. Some who have given the draft gear problem careful consideration believe that most of the troubles now encountered can be overcome by a campaign of education among the trainmen. Strong arguments can be presented to support this view. Undoubtedly a large share of the damage to cars occurs in switching, and if the speeds in this service could be kept down the capacity of some of the gears now in use should be ample. Most brakemen do not realize that an increase in the speed at impact from four to six miles an hour more than doubles the energy stored in the car. To educate them and keep them educated would require an extensive campaign. It would probably be easier and cheaper to develop a draft gear with a capacity high enough to absorb the shocks developed in coupling heavy cars.

The Draft Gear Question

All of the members who discussed the proposed car repair shop layouts agreed that cranes for lifting cars would be a profitable investment. Further support for this opinion is to be found in the revision of the prices for labor and material. The committee has proposed increasing the price for jacking up one end of a car to $1.50, with similar increases in the charges for changing wheels. This should serve to drive home the loss that is occurring every day because the roads have not made provision for saving expensive labor by the introduction of improved equipment. Probably changing wheels is responsible for more jacking than all other car work combined. Conditions would be greatly improved if this work could be handled by power-driven appliances. For passenger car work a drop pit is most suitable because it is particularly adapted for pedestal type trucks. The gantry crane is proposed for handling freight cars, but at some of the smaller points the expenditure might not be warranted by the savings. In such cases a stationary hoist of sufficient capacity or a power operated jack should prove useful. If a suitable location were available cars could be handled by a winch, thus avoiding the necessity of using a switch engine. But the methods of handling are of secondary importance. The main thing is to eliminate the waste of man power that is costing the railroads huge sums of money in repairing cars.

Jacking Cars by Hand Costs Money

Perfection in engine terminals, and that is what every railroad should be striving for, is very largely a matter of detail. Probably fifty or more important devices directly applicable to engine terminal use were exhibited at the convention. Mechanical men returning home may have at this moment a rather confused recollection of all the devices coming under their observation at the convention. But once more in actual contact with the unpleasant realities of poorly designed, inadequately equipped engine terminals, it is likely that some of the many excellent devices shown on the pier will be vividly recalled. The elaborate smoke removal system recently installed in a Pennsylvania roundhouse may not be equally applicable to a smaller terminal but the neat asbestos fibre smoke jacks should have a wide appeal. Certainly some of the blower fittings on exhibit would be a godsend to the average roundhouse today. While little was shown in the way of heating and lighting arrangements for terminals a good deal could be found in the booths that was more or less intimately related to this. The heating and lighting of roundhouses is generally inadequate and it is to be hoped that most of the mechanical men attending the convention went home with a better conception of the necessity for improving this and many other important details in engine-house construction.

Perfection in Detail

Some of the reports presented before Section III—Mechanical, especially those on comparatively new subjects which came up during last week's sessions, were of an importance far greater than the apparent lack of interest in the discussion would seem to indicate. There are several causes for the lack of discussion over which the officers of the association did not have control. Under the con-

Improve the Discussions—A Suggestion

ditions which have confronted them this year it was impossible to send out the advance copies of the reports in time so that they could be studied before the conventions. Where time limitations make it necessary to present the reports in abstract this is essential if the subjects are to receive intelligent discussion. However, even though these conditions were fulfilled there is frequently a reluctance to start the discussions and valuable time is wasted. This time might be saved if a few of the members known to be particularly interested in the subjects in question, but not members of the committees, were asked in advance of the convention to prepare formal discussions. These members might be selected by the chairmen of the committees or they might be picked by the General Committee from lists submitted by the committee chairmen. Prepared discussions of limited length not only would make use of the time frequently lost in getting the discussions started, but, being confined closely to the subject-matter of the report, would tend to keep the informal discussion more nearly to the point than is usually the case where the entire discussion is informal.

The Storekeeper's Viewpoint

The storekeepers have a commendable faculty of getting down to questions of real cost and actual profit in the conduct of their department. The discussion relating to the subject of reclamation presented at Tuesday's meeting of the Purchases and Stores Section is highly illuminating, not so much for any cost figures actually disclosed as for the keen appreciation of the economics of the proposition expressed in dollars and cents. This section of the American Railroad Association has evidently acquired the ability to discriminate between actual profit and loss and paper profits and losses. While the value of a report detailing the operation of a reclamation plant is appreciated, there is apparently no general disposition on the part of the storekeepers to accept this report as the sole evidence of a profit. Good business judgment, which is to a certain extent intuitive, is perhaps the surest guide in deciding whether the various operations on the railroad are profitable or unprofitable, and while the accumulation of cost data must be encouraged, it is unsafe to rely wholly on these statistics as an index to actual profit or loss, particularly in the operation of a reclamation plant. The storekeepers are merchants, and if they operate a reclamation plant they are manufacturers. Many money-making methods successfully employed by successful merchants and manufacturers can be applied to the service of supply. The storekeepers are primarily business men, and there is much in this week's proceedings of the Purchases and Stores Section that would not only interest mechanical men, but that affords a valuable exposition of the business viewpoint often conspicuous for its absence from the conduct of many railroad departments.

Future of Electric Arc Welding

There is no industry that presents a field for electric arc welding that begins to compare in magnitude with that offered by the railroads. The places where arc welding can be successfully applied are almost without number. The stumbling block that has hampered the more rapid extension of arc welding is the fact that so many welds have failed when subjected to high tensile stresses. As a matter of fact in practically every such instance the failure was not chargeable against the art of electric arc welding, but was due solely to the ignorance of workmen who had the effrontery to style themselves arc welders. There are two things at least that are absolutely fundamental for the successful accomplishment of arc welding; one of these is the use of proper welding materials and the second is a broad knowledge of the work. Because a man's vocal chords are capable of emitting sounds, is no sign that he can speak Chinese; neither is it any indication that because a man can strike an arc he is a welder. And yet, that seems to be about the impression that exists in the minds of many who have not made a study of arc welding. It is no wonder that welds made under such circumstances fail; indeed the wonder would be if they did not. The fact is that the parts are not really welded at all. Notwithstanding the unfortunate stigma that has attached itself to the art of arc welding through the activities of poor workmen, wonderful progress has been made by those who have had the vision, courage and foresight to study deeply into the factors which are so vitally important to successful welding. One road at least is having no difficulty in applying arc welding to any application that seems desirable. The time is coming when the man who poses as an arc welder will have to be all that he claims to be. A long and exacting course of training, as well as adequate supervision of the welders during the course and afterwards are absolute essentials in the production of efficient welders.

Labor Problem Fundamentals

The problems confronting railway executives in handling labor are not identical with those to be solved by manufacturers, and yet fundamental considerations are practically the same in both cases. The same difficulties in securing sufficient help, retaining men now employed and getting each workman to do his share of the work are being experienced by all employers. The way in which these difficulties have been overcome by an eastern machine tool builder is worth more than passing comment because of the breadth of view and the understanding of the economics of the problem. According to this company, there is only one foundation on which satisfactory relations between employer and employee can be based to insure stability of labor and efficiency of production. The principles are: That respect and confidence between employer and employee shall be established and maintained; that a proper and equitable incentive must be provided for both; that there must be established a measure for determining a rate of wage; and that the rate of wage must be definitely related to the energy, skill, experience and knowledge required to perform the work. The way in which these principles are carried out will, of course, vary for each particular case, but there can be no permanent solution of the labor problem until they are fully understood and acted upon. To obtain increased productive capacity is not merely a problem of increasing the number of operators, but rather one involving the retention of operators and increasing their skill and ability. Operators cannot be retained unless they are contented and they cannot do their best work unless a suitable incentive is provided. The organization must be "developed and directed in accordance with certain definite fixed principles of equity and justice, exercised in a broad and intelligent manner."

Shop Committees and Supervision

During the last three years much attention has been given to a number of so-called shop committee schemes, the purpose of which is to provide for the participation of the employees in the settlement of all questions involving working conditions. Essentially those schemes which have been regularly organized by certain large industrial establishments, and the usual shop craft committees of organized labor do not differ greatly so far as the machinery is concerned. Both types can be and have been operated with some degree of success. With any such scheme, however, there is one point which has not been given as much consideration as it merits. This is the effect of the committee plans on the supervision. There is an inevitable tendency where regularly organized committees serve as the medium for intercourse between management and men toward going over the heads of the foremen with many matters which they should logically handle. Where such a practice is encouraged the control of the foremen over the men is seriously affected. The foremen are responsible for output, but the sense of this responsibility is lost because of this lack of control. The result is demoralizing, and if such conditions become established there will be considerable difficulty in developing the quality of supervision that is needed in railroad shops. This difficulty has actually been encountered, and is one of the problems in connection with the present labor situation which must not be lost sight of.

Ground Cutting Tools

Many advantages result from the standardization of lathe, planer, shaper and slotter tools and this standardization has been made possible by grinding the tools from solid stock to previously determined, approved designs. The process does away with rough, inaccurate forging methods in which the steel is often damaged by working either at too low or too high a temperature. The argument that forged tools are better because the steel is worked may hold in the case of poor quality steel, but with good quality high speed steel the possibility of harming it by forgings very much exceeds the possibility of improving it. When ground from the rough stock with considerable metal to be removed, the tools are ground before hardening and with ordinary care there is no harmful effect on the steel. There is a big saving in time, however. In fact, the tool can usually be ground to shape in the length of time that would be required by a blacksmith to heat the metal preliminary to forging. Besides the advantages of decreased cost and better quality, standard tools are more efficient in removing metal. They are all designed and made with the proper profile, rake, clearance and angle of cutting edge to tool shank to remove the metal quickly and with the least consumption of power. The old days have passed when each machinist ground his own tools and there were as many different standards as there were machinists. The more modern practice is to install universal tool grinders in the tool room, and not only make all new tools, but regrind all old ones on these machines. An operator from the machine shop can then replace a broken or worn tool by simply stepping to the tool room window and exchanging it for a good one. No time is lost in grinding; the operator's machine is not idle; and the tool he secures is more efficient than one ground by hand.

Scope of the Service of Supply

Most of the committee reports presented at the first annual meeting of the Purchases and Stores Section of the American Railroad Association have to deal with the technical phases of the service of supply rather than the broad aspects of this service, particularly in its relation to the mechanical and other departments of the railroad. The reports, however, contain many statements or, taken collectively, reveal an attitude that will challenge the attention of mechanical executives and other department heads. The storekeepers represent a highly trained and a highly specialized branch of the railroad service; they are certainly better fitted than any other branch to conduct the service of supply and it may be that they are better equipped to perform duties which at present are assigned to other departments. The assertion, however, that the stores department should assume this or that function is not in itself sufficient; the stores department must demonstrate its superior fitness to undertake the handling of all fuel consumption statistics, and the fact that the association cannot at this time submit any approved method for the compilation of these statistics does not strengthen the argument in favor of the storekeepers taking over a duty that is ordinarily assigned to the operating or the mechanical department. Responsibility for the inspection of new material, including fuel, and of released rail to determine whether this should be classed as fit or scrap should remain with the mechanical and civil engineering staffs until the storekeepers can submit a more convincing argument than will be found in the committee's report in favor of this responsibility being assigned to the stores department.

Locomotive Boiler Circulation

What factor other than size has determined locomotive boiler design in recent years? Have not maximum clearance dimensions been the paramount consideration rather than refinements in design that would tend to make locomotive boilers more effective? In stationary practice circulation is regarded as the keynote to efficiency and capacity. In a water tube boiler the water must travel in a defined path and it does this with great velocity, thus scouring all the internal surfaces and absorbing a greater amount of heat per square foot of heating surface. The limitations imposed on the locomotive boiler are very great in comparison with the stationary boiler and nothing less than a bold stroke will suffice to break away from conventional lines and arrive at something that will put the locomotive boiler on a par with stationary practice so far as circulation is concerned. In attempting this, the mistake has sometimes been made of copying the details of a stationary boiler. The result desired is improved circulation and there are means at hand for securing this without departing from standards of construction that are recognized as practical and safe. Experiments on the Missouri Pacific have shown that a horizontal shield bisecting the boiler shell from the firebox to a point near the front tube sheet will produce a rapid circulation throughout the entire boiler, and autogenous welding has made possible development of the thermic syphon. The results that have been secured with this device may be attributed in a large measure to the greatly improved water circulation obtained.

American Railroad Association—Section III—Mechanical

Interesting Discussion of Car Wheel Grinding Follows Presentation of Committee Report

Chairman Tollerton called the meeting to order at 9.45 A. M.

Report on Couplers and Draft Gears

SINCE THE ADOPTION of the *D* Coupler as a standard of the Association, and rules governing the application of the standard coupler to both new and existing cars, the committee has followed closely the performance of the couplers and kept in touch with the manufacture and gaging of the product.

Slight changes in detail of construction, as well as minor modifications in gages, that tend to improve the manufacture and gaging of the couplers, have been brought to the attention of the committee from time to time by the manufacturers. All such suggestions have been carefully investigated and, if found desirable and in no way affecting the strength or interchangeability of the parts, are approved without submitting to action by the Association.

At the request of the Secretary, your committee furnished information covering couplers for the manual of standards.

The United States Railroad Administration, under the direction of C. B. Young, manager of the inspection and test section, has been conducting very valuable tests on draft gears and attachments. The members of the committee have witnessed some of these tests and have had a representative working with the Administration on these tests. The committee has been advised that a complete report covering all draft gear investigation work done by the Administration will be turned over to them as soon as it is possible to finish tabulation of the data. From the study of this data the committee will be able to prepare a program of such further tests and investigations that are essential, which will be submitted to the General Committee for approval, to the end that final recommendations may be made to the association on this subject.

The report is signed by R. L. Kleine (Chairman), Pennsylvania; F. W. Brazier, New York Central; J. C. Fritts, Lackawanna & Western; G. W. Rink, Central of New Jersey; J. R. Onderdonk, Baltimore & Ohio; J. A. Pilcher, Norfolk & Western; C. B. Young, United States Railroad Administration; L. K. Sillcox, Chicago, Milwaukee & St. Paul, and Prof. L. E. Endsley, University of Pittsburgh.

Discussion

The report was presented by R. L. Kleine (Penn.), chairman of the committee.

C. E. Fuller (U. P.): *I move that the report be accepted and printed, and the committee continued.*

F. W. Brazier (N. Y. C.): I second the motion.

The motion, on being put to a vote, was unanimously carried.

Report of Committee on Car Wheels

THE REPORT OF THIS COMMITTEE submitted to the 1919 convention referred to cast-iron wheels of the so-called arch plate design of 700 and 850 lb. weight respectively, adopted in 1917. The committee now wishes to recommend for adoption as recommended practice wheels of the same general design and of 650 and 750 lb. nominal weight respectively, to take the place of the present 625 and 725 lb. wheels.

These designs are in accordance with recommendations of the Association of Manufacturers of Chilled Car Wheels, and the committee is recommending them for adoption on account of the universally favorable reports on the performance of the 700-lb. arch plate wheel in comparison with the 650-lb. wheel of the former design. Exhibits *A* and *B* show proposed designs for the 650 and 750 lb. wheels. If adopted, these wheels would be marked "A. R. A. 1920," and specifications changed accordingly.

There has again been referred to this committee for recommendation the proposition of increasing the thickness of flanges of cast-iron wheels, and Exhibit *C* is copy of a letter written by E. H. Fritch, secretary, American Railway Engineering Association, to J. E. Fairbanks, general secretary, American Railroad Association, giving the news of the American Railway Engineering Association on this subject.

Exhibit C

The following letter has been received from E. H. Fritch, secretary, American Railway Engineering Association.

"Referring to the contour of chilled car-wheels and throat clearance for frogs, guard rails and crossings, this topic has been under consideration by the Committee on Track of the American Railway Engineering Association, and the following report is made thereon by that committee, and is transmitted to you for your information:

"'The Track Committee is willing to agree that the flanges can be increased as recommended by the chilled car wheel people, without any serious detriment from a track standpoint, provided:

"'1. That the wheels are in all cases accurately mounted to 3/16 in. additional spread gage.

"'2. That the allowable flange wear before wheels are removed be changed so that wheels will be removed when the flange is worn to within 3/16 in. of the present limit of removal.

"'3. That more care be used in matching wheels on any given axle on account of the reduction in play and the corresponding reduction in compensation from coning.

"'4. That this flange width be confined to flanges of four wheel freight car tracks.

"'5. That this conclusion on the part of the Track Committee be not construed as an invitation to increase the axle load.

"'With the above provisions, it is believed that it will be unnecessary to make any difference in the width of flangeway of frogs and crossings, or change the present method of track construction.'"

No information has been received that causes the committee

to change its opinion as expressed in the report submitted to the 1916 convention, and, after a full consideration, it is still the opinion that nothing will be gained in the interests of safety or economy by adding material to any portion of the flange of cast-iron car wheels in such location as will affect track clearances, and, furthermore, that such change is unwarranted and inadvisable.

It has been recommended thatt the present method of stenciling the tape size of cast-iron wheels be discontinued and instead a permanent record of this information be provided as follows: Five small lugs ⅜ in. in diameter by ⅜ in. high, to be cast on the inner plate near the hub as shown on sketch, Exhibit *D*. As each wheel is taped the necessary number of lugs are to be broken or cut off, those remaining to indicate the tape size. For example, for a normal wheel tape size 3, two lugs to be broken or cut off, the three remaining indicating a tape 3 wheel. This practice is now being followed by some roads and the information is found to be of value when grinding second-hand wheels. This recommendation is concurred in by the committee.

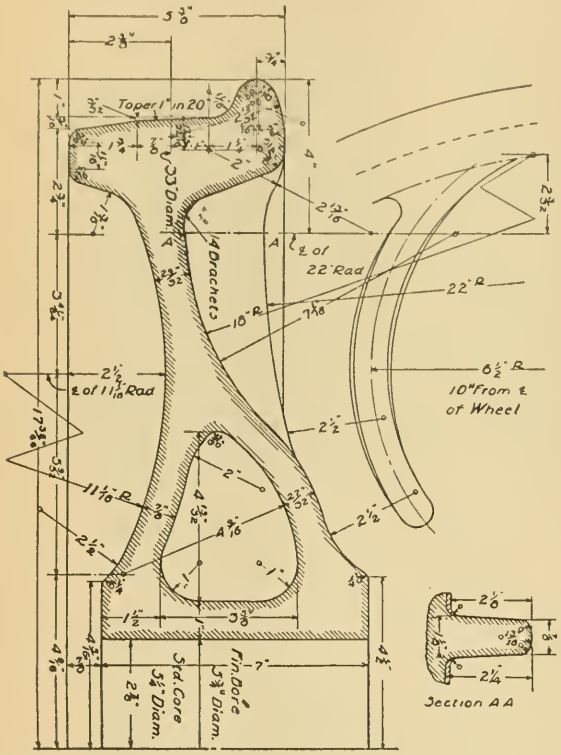


Exhibit A.—Recommended Practice for 33 in. Cast Iron Wheels for Cars of Maximum Gross Weight Not to Exceed 95,000 Pounds

Attention has been called to the fact that when the gaging points of the maximum and minimum flange thickness gage for cast-iron wheels (M. C. B. Sheet 16) wear, it is necessary to condemn the gages; whereas, if the sides of the opening above the gaging points were made parallel and perpendicular it would be possible to regrind the gages and bring them back to standard and it is recommended that these gages be changed accordingly, as shown in Exhibit *E*.

In 1912 the contour of the back of the flange of steel and steel-tired wheels was changed so as to be identical with the flange contour of cast-iron wheels between the base line and the top of the flange, the total width of rim being increased from 5½ to 5 19/32 in., which is the same as the corresponding portion of the cast-iron wheel.

The process of manufacture of wrought-steel wheels is such that the present contour is very difficult to produce, and as far as the committee is able to learn, it is not being furnished by any of the manufacturers, but instead all wrought-steel and steel-tired wheels are being manufactured with the flange in accordance with the design adopted in 1909. Under the circumstances, it is felt that the present contour should be withdrawn from the Standards and the 1909 contour adopted.

In this connection, the committee wishes to state that the design of the wheel check and mounting gage is such that no errors will be introduced on account of this change in the back of the flange.

Complaint has been made of errors in billing for service metal in steel and steel-tired wheels and the matter has been referred to this committee by the Arbitration Committee with the recommendation that a method of measuring service metal and a simpler gage than the present one be outlined. The amount of service metal in a wheel is dependent not only upon the thickness of the tread, but upon the thickness and contour of the flange as well, and only the metal remaining after restoring the standard contour can be considered as service metal.

The gage for measuring steel wheels to restore contour (M. C. B. Sheet C-1) is simple in operation and gives accurate readings, and the committee does not feel that it will be possible to design a simpler gage that will take into account all the dimensions necessary to determine the service metal remaining in wheels. The errors in billing complained of are very evidently due to lack of care in taking measurements and it is also apparent that the gage above referred to is not being generally used.

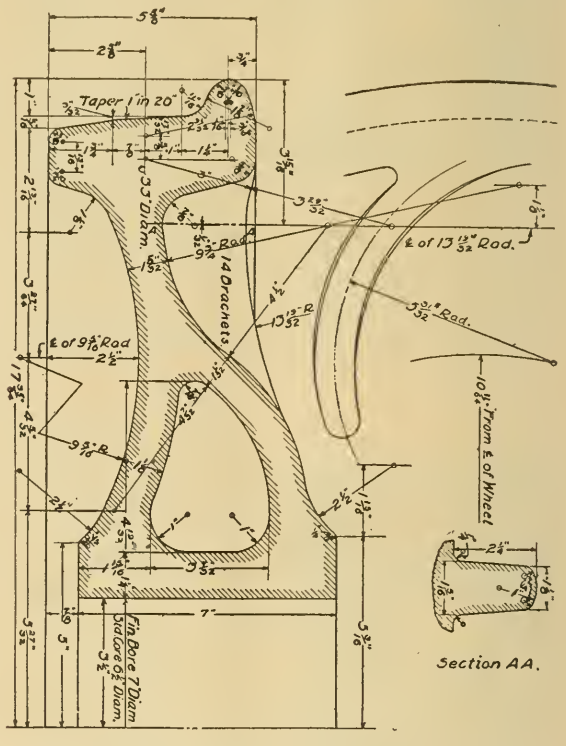


Exhibit B.—Recommended Practice for 33 in. Cast Iron Wheels for Cars of Maximum Gross Weight Not to Exceed 161,000 Lb.

In order to correct the conditions complained of, the committee recommends that the second paragraph, Rule 98, 1919 Rules of Interchange, be modified as follows, the modification being italicised.

The price for new wrought-steel wheels shall be based on the scrap value of $8.00 for metal inside the condemning limit (which is ¼ in. above the limit groove) plus $1.75 for each 1/16 in. of service metal (on radius of tread) in connection with standard full flange contour, as *determined by gage for measuring steel wheels to restore con-*

tour, M C. B. Sheet C-1, also base of limit groove must not be less than 29½ in. in diameter; in no case shall a charge or credit for service metal be made in excess of 1½ in.

It is also recommended that the present recommended practice

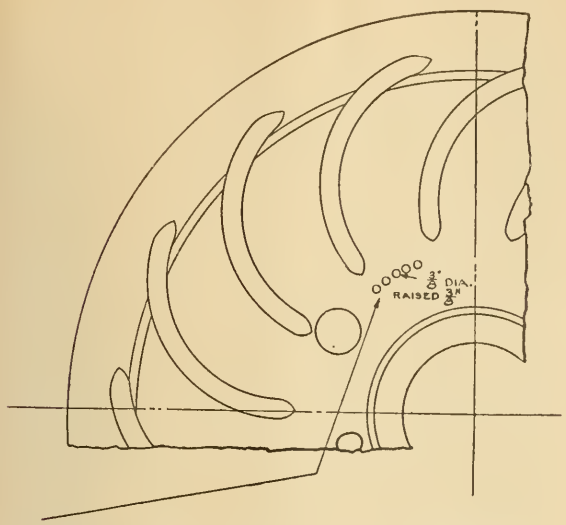


Exhibit D.—Lugs Cast on Hub for Recording Tape Size

gage for measuring steel wheels to restore contour, as shown on M. C. B. Sheet C-1, be advanced from recommended to Standard practice.

The minimum diameter of base of limit of wear of grooves of wrought-steel wheels should be added to sheets as follows, and arrangements have been made accordingly:

M. C. B. Sheet 25 ..... Not less than 29½ in.
M. C. B. Sheet 25A ..... Not less than 32½ in.
M. C. B. Sheet 25B ..... Not less than 34½ in.

Recommendation has been made by one of the companies manufacturing steel wheels that the specifications require wheels to be machined to exact diameter. The committee can see no justification for this added expense, together with the loss of service metal, which is, from the standpoint of wear, the most useful in the wheel. The recommendation, therefore, is not concurred in.

Recommendation has been made by certain of the manufacturers of wrought-steel wheels that the 38-in. wheel be dropped from the standards. Replies to a circular of inquiry indicate that the number of such wheels used is small and that their use is being discontinued as a general practice. It is, however, necessary to use wheels of this diameter in certain cases under motor cars in order to afford proper clearance between the motor housing and the track.

While the use of the 38-in. wheel should be discouraged in the interest of keeping down the number of sizes that have to be carried in stock, the committee feels that as it is a recognized standard of the association it should be allowed to remain among the standards as long as there is need for wheels of this diameter.

It appears to be desirable to revise and amplify the recommended practice of this association for mounting wheels and the following is submitted with the recommendation that it be adopted in place of the present recommended practice for mounting wheels:

Recommended Practice for Mounting of Wheels

1. Standard table of mounting pressure:

MOUNTING PRESSURES IN TONS.

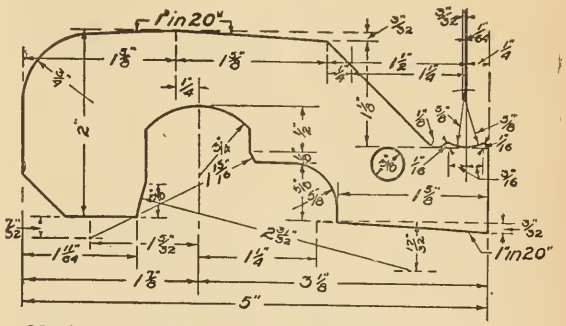
Axle	Wheel seat diameter	Cast iron wheels Minimum	Cast iron wheels Maximum	Steel wheels Minimum	Steel wheels Maximum
A	5⅛ in.	30	45	45	60
B	5¾ in.	35	50	50	70
C	6½ in.	40	60	60	80
D	7 in.	45	65	65	85
E	7⅝ in.	50	70	70	95

2. Wheels having flanges worn so as to take limit gages for remounting cast-iron wheels shown on M. C. B. Sheet 16-A shall not be remounted.

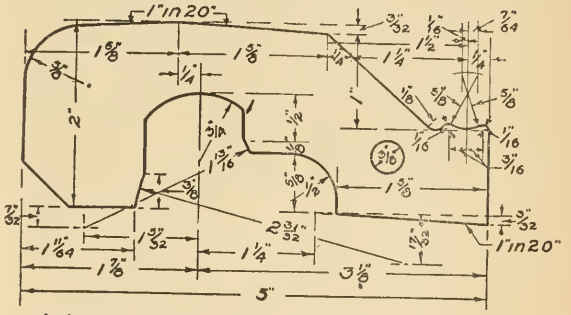
3. The thickness of flanges of wheels fitted on the same axle should be equal and should never vary more than 1/16 in.

4. In mounting of wheels, new or second-hand, the standard wheel mounting and check gage should be used in the following manner:

After one wheel is pressed into position, place the stop "A" or "B" of the check gage against the inside of the flange of the wheel with the thinner flange with the corresponding tread stop "C" or "D" against the tread of the wheel. Press the other wheel on the axle until the opposite tread stop comes in contact with the tread of the corresponding gage point "E" or "F" in contact with the outside of the thicker flange.



Maximum Flange Thickness Gage For Cast Iron Wheels and Maximum Flange Thickness, Height and Throat Radius Gage For Solid Steel and Steel Tired Wheels.



Minimum Flange Thickness Gage For Cast Iron Wheels and Minimum Flange Thickness, Height and Throat Radius Gage For Solid Steel and Steel Tired Wheels.

Exhibit E.—Flange Thickness Gage

5. The wheel seats on all axles must be turned to uniform diameter throughout the entire length of each wheel seat and must be smooth and free from ridges so as to provide even bearing for the wheel fit throughout. The mounting of wheels on axles having the wheel fit tapered is not permissible. The wheels must also have a straight bore with the exception of the chamfering for not more than ⅜ in. at the back hub face which may be allowed to facilitate application to axles.

6. Wheels should be mounted centrally on the axle. All axles should be center punched and some form of gage be used to measure the location of the wheel from this center punch mark. The central mounting of wheels is necessary in order to secure proper running of the wheels and to prevent hot boxes.

7. Wheels should ordinarily be fitted to axles and not axles fitted to the wheels. It is usually unnecessary to turn the wheel seat of second-hand axles unless they are found a tapered fit.

8. In mounting, either new or second-hand wheels, care should be used to see that the wheels are of the same diameter. In the

case of new wheels the wheels should be taped in order to check the tape size marking, and in no case should wheels of different tape sizes be applied to the same axle.

9. The alignment of axle lathe, the trueness of the centers and the jaws on boring mills should be checked frequently in order to insure proper mounting of the wheels.

10. While the wheels are being bored the high spots on the flange should be marked, and in mating the high spots should be put opposite low spots on the mate wheels.

The report is signed by W. C. A. Henry (chairman), Pennsylvania System; W. H. Winterrowd, C. P.; J. A. Pilcher, N. & W.; O. C. Cromwell, B. & O.; J. M. Shackford, D. L. & W.; C. T. Ripley, A. T. & S. F.; E. J. Brennan, C. M. & St. P., and H. Stillman, S. P.

Discussion

W. C. A. Henry, chairman of the committee, presented the report and said: The committee has gone into the subject of the thicker flange, and feels as it did in 1916, that nothing will be gained by making the flange thicker and that this change is inadvisable.

T. H. Goodnow (C. & N. W.) I move that the report be accepted, ordered printed, and that such portions of it as may be necessary be submitted to letter ballot.

The motion was seconded.

F. W. Brazier (N. Y. C.):. I wish that the young men who are in attendance at the meeting would get up and express their opinion on these reports which come before us. We should have more discussion on these reports and it is very desirable that the younger men in the Association should make a start in discussing the various subjects. Referring to the report of this committee, I want to say that you will be surprised if you check up your wheel gages at the presses where the wheels are mounted. I have found, in my experience, that gages will wear as much as ¼ in. The men will keep on using worn gages. They come in contact with the metals and are worn by frequent use. I am giving you this hint—check up your gages when you go home and see if they are not surprised to find how much they have worn.

W. H. Caddington (N. & W.): There is a point brought out in reference to the rolled finished surface of the tread being the most suitable for service. On the N. & W. we have followed the service of steel wheels and it has paid handsomely for the attention given. We have found wheels, in the second and third period of service, that have been turned give far less trouble in tender service on account of wearing than wheels that are rolled. In that respect we anticipate adopting a standard practice of using wheels in tender service that have had the surface metal turned, or wheels in the second or third period of service.

T. H. Goodnow: In connection with the question of the reinforced flange, it was found two or three years ago, that some of the roads using the reinforced flange were not using a mounting gage for that type of flange. I think some of the roads have gone to the reinforced flange. It seems to me, regardless of whether or not the committee approved it, that possibly it would be a good idea for them to show a mounting gage for mounting wheels where the reinforced flange is used for the benefit of the roads that are using them. They are going to get the back side of the flange cut if they mount them with the regular gage.

W. C. A. Henry: The committee received replies from seven different roads that were using flanges thicker than the standard. They are now all alike, however. The committee does not see how they can prepare a standard gage for a non-standard design. In other words there is no specific flange design that is in use by the roads using the thicker flange. Some roads are using wheels which are thicker through the thread or measured at an angle of 45 deg. through the tread and the flange, but those particular designs do not affect track clearances and they are not referred to in the committee's report. We have had reference only to the flange that was thicker at the base line.

B. B. Milner (N. Y. C.): How many lines are using the flanges thickened below the face line, at an angle of 45 deg. through the flange, approximately?

W. C. A. Henry: I cannot tell you. The committee has no information, except that I have heard of a few roads that are doing it. These particular wheels are not thickened in any way so as to affect track clearance, however.

C. T. Ripley (A. T. & S. F.): It is the practice on the road I am connected with to take a light trueing cut on rolled steel wheels after they are mounted. We think there is a distinct advantage in this. We place them on the lathe and then put the tool against them in order to take out any possible eccentricity of mounting as well as of the wheel itself. That doesn't mean we take an appreciable cut off the wheel tread. On some wheels there is practically no cut and we save this skin metal because the skin metal has been proven to give a better wearing surface than metal further in on the wheel. If the roads will swing the wheels this way in the lathe and take a cut off, it would be necessary to pay the enforced high price called for by finishing mills. I think it should be mentioned on the other side of the question that these finishing mills sometimes take out small defects found in the wheel.

There is one other thing that the committee report does not lay particular stress on which I think should be treated, and that is the matter of grinding the slid-flat cast iron wheels. The cast iron wheels now are worth a great deal of money. We have been doing this work for about 10 years, and it has been one of the best saving propositions that was ever adopted on our railroad, and I do not think that any railroad can afford to let it pass. During the period of federal control, we ground a good many wheels for other roads, and so far as we can learn, there was never any dissatisfaction with the results. In fact, many people felt that this ground wheel is better than a new wheel. It is truly round and hasn't as much tendency to slide-flat. In these times of high prices, I think the committee on car wheels could certainly lay more stress on the savings such as can be effected by grinding slid-flat cast iron wheels.

C. E. Fuller (U. P.): I would like to ask the gentleman what method he has of determining the depth of chill on wheels that he is regrinding.

C. T. Ripley: Before starting regrinding we broke up a great many wheels, went through the records of all inspections of drop tests and terminal tests of wheels which are broken up at the plant. We plotted curves showing the chill in all kinds of wheels with different tape sizes. We measured this chill from the original tape size and the tape size at the time of grinding and prepared tables showing exactly the length of the slid-flat spots which can be ground. With the original tape size known and with the tape size at the date of grinding, a definite depth of chill is determined. I personally have gone over a pile of wheels in the shop, and to date have never found a wheel worn through the chill in one of our re-ground wheels, simply due to the fact that we have properly selected the wheels for grinding. All wheels should not be ground, but if the men have such tables, and have the experience, they can easily select the wheels which can be ground.

C. E. Fuller: Do you find any difference in the thickness of chill; that is, thicker on one side than the other?

C. T. Ripley: Very little. There is a slight difference but not much. We play on the safe side in the regrinding so that we never run into them.

C. E. Fuller: I was wondering what that safe side is.

C. T. Ripley: I haven't the tables with me, but the tables leave enough chill in the wheel so that you will not wear more than ¼ in. on the tread of a cast-iron wheel. If you leave ⅜ in. to ½ in. of chilled metal I think you will not have any trouble.

C. E. Fuller: Did I understand you to say that you selected your wheels from different types? Is there any type wheel you do not grind?

C. T. Ripley: No, sir. We grind a shorter slid-flat spot on a high tape wheel.

C. E. Fuller: The subject is a very interesting one, and if there is any positive method of determining the thickness of chill to which you can grind wheels safely, I think the subject is worth a good deal of consideration.

O. C. Cromwell (B. & O.): Mr. Brazier spoke of checking the gages. We have been having a very rapid turnover in labor that takes care of wheels. I believe if the members of this convention would go home and check the wheels they will find something more interesting than they will find in checking the gages. We find the labor is not always educated as to their duties and they think mounting a wheel is an ordinary proposition. If you examine the wheels you will find in many instances that one will have a sharp flange and the other a whole flange. We can't go back to the manufacturer and get

a replacement on that kind of a wheel. The railroads have to pay for them, and that trouble is due to improper wheel mounting. Some of you gentlemen don't believe the actual wheel fits are eccentric. If you will go into a wheel shop and examine the axles that have been removed from some cars you will find that the wheel fits are not round. This condition contributes to sharp flanges. The pressmen that roll the wheel in the press let it lean on one side and start to press the axle in, which results in a cocked axle. It is more important to look after the wheel fits than it is to check gages. I think that this question of providing another gage for a reinforced flange ought not to be considered at all. If we are going to have a standard flange we ought to hold on to it. The committee chairman has emphasized the question of the new marking recommended for the taped sizes of wheels. We find that wheels after they have been in the service for a while, are covered with grease on the outside, and that the tape markings have been eliminated. By putting the permanent marking on the inside of the wheel it is possible to check when two wheels of the same tape size are on the same axle.

W. H. Coddington (N. & W.): May I refer to the subject again of grinding cast-iron wheels? In the investigation of derailments, due to burst cast iron wheels, we almost invariably find that this bursting of the wheel originates in fine transverse tread cracks that have been brought about by the sliding of the wheel at that particular point. We have provided machinery for grinding cast-iron wheels, but considered it a rather treacherous proposition, due to the punishment the wheel has received on account of sliding. I would bring up that point and ask Mr. Ripley what his observations have been in that respect on his road.

C. T. Ripley (A. T. & S. F.): In our experience most of the wheels that burst, burst in the other direction, rather than from the hub. If the wheel bursts from the hub to the bottom, the breakage usually starts from the hub rather than from the ring. We also have wheels that break through the ring, but as a rule that starts in the plate. A piece comes out and breaks through the ring and that break may be found at a point where there has been a brake burn. I never thought that the breaks I have referred to were due to these brake burn checks. We do not regrind the badly brake-burned wheel, but the small check does no harm. I have never had a defective wheel so far as those slid flats places are concerned.

C. E. Fuller (U. P.): I would like to ask Mr. Ripley what has been the average cost of grinding these wheels.

C. T. Ripley: Before the war, the cost of grinding was 53 cents, including all overhead, depreciation, interest charges, in connection with the grinding of the wheel and the labor for handling and turning. The cost now is up around $1. I have made a recent investigation of two types of machines, and as a result I find that the early machines were only about half as efficient as the later machines, due to the fact that it took longer to get the wheels in and out. We have discontinued the earlier type of machine.

C. E. Fuller: You mated the wheels and reground them?

C. T. Ripley: We take them out of the service as they come in.

C. E. Fuller: You have to pull off some wheels and put on other wheels before mating them up for grinding?

C. T. Ripley: Occasionally that occurs, but as a rule you will find the wheels on two sides are very similar; the slid-flats are about the same.

W. C. A. Henry: The question of machining the tread of the steel wheel seems to have been taken exception to. The surface metal on account of the working is denser than the metal nearer the center of the rim. It is very hard to see why we do not get more mileage from the metal near the surface than further in, and I will ask Mr. Ripley whether in machining steel wheels, that is not for the purpose of insuring that they are mounted centrally on the axle?

C. T. Ripley: There is another element, and that is the one of trueing up the wheels, due both to eccentric mounting and eccentricities in the wheel. We have to specify a certain tolerance for steel wheels. When a wheel passes the specifications, allowing an eccentricity of 1-16 in. we take that out and put it in the lathe, making it a true running wheel.

T. H. Goodnow (C. & N. W.): Mr. Cromwell's remarks about the cutting of the flange, bring out a point I want to make. As there are roads using this kind of car wheel, and the manufacturers have decided on what the reinforced flange would be, I think that a gage could be shown, which would show a flange of certain thickness, and thus be a guide for those who had occasion to mount the wheel.

W. C. A. Henry: In answer to that statement, I do not know what the flange is, and I do not know how I can design a gage for it.

P. P. Barthelemy (Gt. Nor.): We have made a number of tests, taking a trueing cut on newly set tires and have found them considerably off. Another point which has not been brought out in the discussion is the turning down of steel wheels. I have noticed that in these hurry-up days a number of roads take a roughing cut, thus heating the surface of the wheels, which comes out very rough, and the result is that the calibrations are not true in each wheel, and after the wheels have run a while and worn off the markings, they have different diameters. As a result, there is considerable sharp flange wear on the small rail. As to marking the calibrations on cast wheels, I have always assumed it was the practice to check the second-hand wheels before mounting and not take any old markings.

J. A. Pilcher (N. & W.): In reference to Section D, item 1, I understand the wheels are in all cases actually mounted with 3-16 in. additional spread. That means that the advantage of coning is not secured under that plan.

The motion to accept the report was carried.

Report of Committee on Car Construction

CHANGES ARE SUGGESTED in existing standards and practice on the following subjects referred to the committee for this year's report.

Pressed Steel Journal Boxes

An opinion was requested whether the application of pressed steel journal boxes in repairs constituted wrong repairs. The sheets showing standard journal boxes for journals 5 in. by 9 in., 5½ in. by 10 in. and 6 in. by 11 in. contain notes permitting the use of cast iron, malleable iron, pressed steel, or cast steel, provided all the essential dimensions are adhered to.

The bottom lugs on these boxes are an essential part of the box, both in strength and location, for all trucks which depend for their integrity on the proper holding power of the bottom tie bars, but these bottom lugs are not an essential part of the box for trucks with cast-steel or other side frames which do not require the bottom tie bar.

RECOMMENDATIONS

Add the following note to each sheet showing standard freight car journal boxes:

When used with side frames of such design that the bottom tie bar is omitted or is not an essential strength member for carrying the load, the bottom box lugs may be omitted. When used in connection with other side frames, the bottom box lugs must be equivalent, both in location and strength, to those shown.

Add the completed notes to all other freight car journal box drawings.

Automobile Side Doors

The 1919 report made reference to a request of the General Motors Corporation that 10-ft. double side doors with movable post should be used on all box cars. This request has been renewed, and the committee has adopted the following resolution,

and recommended sending it to the executive committee of the American Railroad Association:

Resolved, That the committee is opposed to any consideration of the rebuilding of existing cars providing them with wide side doors, as the framing will be inadequate, unless entirely rebuilt, and does not recommend that all box cars should be built with wide doors to facilitate the loading of automobiles, for the reason that the cost of coopering such cars will be approximately twice the cost of coopering a car with six-foot doors. The failures of double doors in service will result in a very considerable increase in the number of cars out of service for defective doors. The first as well as the maintenance cost will be increased.

The cars with wide side doors should be considered as special cars—only to be provided in such numbers as traffic conditions warrant.

It is recommended that the executive committee of the Association endeavor to bring about very close co-operation between railroads and manufacturers, who ship raw materials or parts to automobile manufacturers, to the end that orders for cars for such shipments shall specify that automobile cars are to be furnished to as great an extent as available. This arrangement will automatically return to the automobile manufacturers many automobile cars which are now being sent elsewhere.

Car Doors and Fixtures

The subject of box car doors has been brought very prominently to the attention of your committee, in many different phases, and demands immediate, decisive and constructive action by this Association.

The causes for complaint set forth in a number of communications relating to defective door fastenings are broken door fastenings, door guides fastened with lag screws, or fastened with bolts in such a way that guides could easily be removed.

It is the observation of the committee that car doors equipped with door fastenings, bottom Z-bar and door guides in accordance with, or equivalent to, the designs shown on Sheet 30, are very seldom found defective as to these parts. There are, however, many thousands of cars in service which have no metal protection on the bottom edge of the door, so that the corners of the door decay and may readily be forced over the guides and opened at the back edge without breaking the seals. There are thousands of cars in service with hasps cored so that the metal is barely ⅛ in. thick, and with the door lock, consisting of a small malleable casting, fastened on the face of the wooden door stop with only two bolts and with the door hasp fastener or staple, consisting of a small hook, fastened with only one bolt. It is the usual condition of cars equipped with this small staple either to have the staple torn off or the front edge of the door broken off.

In 1914 the committee revised several of the important details on sheet 30, Standard Box Car, Outside Hung Side Door, and submitted a specification for reinforcing doors on existing box cars, which, however, was not adopted and when again submitted in 1916 was again rejected. The complaints previously referred to in this report are legitimate, and it is our duty to remove the causes for them. If this is to be done, it is necessary that this Association should adopt some form of specification governing the reinforcement of doors on existing cars.

The committee submits, for the third time, the specification for this purpose, which has been amplified to include, among other things, a Z-bar at the bottom of the door.

It is believed that complaints in regard to opening of doors without breaking seals comes from cars having doors without bottom Z-bar protection, so that the doors decay at the corners and can readily be lifted over the bottom guides. That portion of the loss which is made possible by the removal of bottom guides would be eliminated by the use of guides which can not be removed when door is in closed position, as called for by the specification submitted in 1914.

In submitting the new design of hasp a note is added that when the hasp is drop forged, or of steel plate, the ribs may be omitted.

All-steel doors should have locks, hasp and fastenings considerably stronger than are being recommended on Sheet 30, in view of the greater weight and inertia of such doors; but, as the all-steel doors are comparatively few in number, the committee feels that it is preferable to have the present standard designs of the Association cover wooden doors only, including steel framed wooden doors, and let the all-steel doors be covered by special designs.

The hasp provided for the all-steel doors should interchange with the American Railroad Association standard.

Recommendations

The addition of notes in the present specification for complete new doors is recommended as follows:

The adoption of the modifications of Sheet 30, as described in this report.

Door starters should be provided to move the door two inches or more from its fully closed position.

Means shall be provided, where necessary, for forcing the door into its fully closed position.

Lumber used in the construction of doors shall not contain more than five per cent moisture.

Door rollers must be carried on turned or cold-rolled steel pins. Pins must be a driving fit in bracket or housing. Rollers must be drilled not more than 0.01 in. larger than pin, and outside of roller must be turned or ground so that it will be round and concentric with the bore.

If bottom supported door is used, the lap of the Z-bars, both top and bottom, shall be equivalent to bottom Z-bar, as shown on Sheet 30. Rollers must conform to the above specification, and there shall be sufficient rollers provided so that door is always carried on at least two rollers.

That the specification for new car doors, adopted in 1915, and revised as above, should be extended to cover the application of complete new doors and door fixtures to existing cars.

The adoption of the following specification for reinforcing existing car doors is recommended:

Top of door shall be reinforced by a 1½-in. by 1½-in. by ⅜-in. angle, or its equivalent, extending horizontally the full width of the door and not more than 12 in. from the top.

Bottom of door must be reinforced by 2½-in. by 1¾-in. by ⅜-in. Z-bar, or its equivalent, applied as shown in Sheet 30.

Depending leg of Z-bar, or other construction which engages bottom guides, must not be less than 1¾ in.

There shall be not less than four bottom door guides on each side of car, located as shown on Sheet 30, and of the same or equivalent design.

If the design of door is such that the removal of the door guide next to the back door post would permit the door to be pulled away from the car, then this door guide shall be of the same design as shown on Sheet 30, or its equivalent, for this particular location.

Door hasp fastener shall be at least 24 in. long, the same as, or equivalent to, the design on Sheet 30, fastened with not less than five, ⅜ in. carriage bolts, with nuts on inside of door and bolts riveted over. Fastener shall be of such design that hasp can not be removed without removing bolts from fastener.

Door locks shall be secured by not less than two ½-in. carriage bolts through the closed door stop, and one additional ½-in. bolt through the side of car, with all nuts on inside and bolts riveted over nuts.

Closed door stop shall have two or more lips extending at least 1½-in. over the door to support it against bulging outward. Where all wood closed door stops are used, they should be strengthened against splitting, and should have at least two metal reinforcement brackets similar to closed door stop casting on Sheet 30.

Open door stops, if all wood, should extend the full height of the door, and be strengthened against splitting.

Door starters shall be provided to move the door two inches or more from its fully closed position.

Means shall be provided, if necessary, for forcing the door into its fully closed position.

Lumber used in the construction of doors shall not contain more than five per cent moisture.

Lap of door over door post shall not be less that 2½-in.

The proper clearance must be provided so that ⅜-in. bulging of side of car will not interefere with the free movement of the door.

Door rollers must be carried on turned or cold-rolled steel pins. Pins must be a driving fit in bracket or housing. Rollers must be drilled not more than 0.01 in. larger than pin, and outside of roller must be turned or ground so that it will be round and concentric with the bore.

Door must be designed and vertical clearance provided so that under any service conditions there will be no binding of the door on account of vertical interference of door guides or track.

If the bottom supported door is used, the lap of the Z-bars, both top and bottom, shall be equivalent to bottom Z-bars, as shown on Sheet 30.

Rollers must conform to the above specification, and there shall be sufficient rollers provided so that door is always carried on at least two rollers.

Fastening of End Doors

Resolution adopted by the Association of Railroad Chiefs of Police recommends the fastening of small end doors on the inside before loading, and removal of seal fastening from doors that are so fastened.

In 1913, the Master Car Builders' Association adopted as recommended practice, that end doors must be so constructed that, when closed, they lock automatically by means of a lock accessible from the inside of the car, thus avoiding the necessity of taking seal records. Sheet 30 shows a design of inside fastening which is not automatic, and the committee recommends that recommended practice adopted in 1913 should be advanced to standard, and that the design of inside latch shown on Sheet F should be removed, and a note substituted that the fastening should lock the door automatically from the inside of the car.

Revision of Manual

The committee has modified certain details on Sheet 30, and has added others for your consideration, as follows:

Door hasp has been strengthened by the addition of ribs.

and certain unimportant dimensions have been modified, which will greatly increase its strength. The new design is entirely interchangeable with the former design.

The bottom door guide has been considerably strengthened by the addition of ribs, and two designs have been shown, one for use where the guide is riveted directly to steel side sills, and the other, which is extended downward to provide more bearing surface for use when bolted against wooden sheathing. A note has been added that door guide bolts should be applied with nuts on the inside of the sill, and bolts thoroughly riveted over the nuts.

A design of burglar-proof bottom door guide has been added in which the guide is fastened with carriage bolts, with the heads inside, and the nuts applied with a socket wrench. When the door is in place the bottom Z-bar covers up the nuts so that the guide can not be removed. This design has another advantage in having the fastening bolts directly behind the point where the strain comes on the guide so that the tendency to pull guides downward and away from the side of the car will be much less than with designs where the bolts are lower down. (See Fig. 1.)

The construction of the door itself has been changed to eliminate four diagonal braces and add one more horizontal batten, the object being to reduce the cost of constructing the door, and at the same time provide greater stiffness and strength. (See Fig. 2.)

The section at C-D has been modified to show a distance of one inch from the face of the sheathing to the edge of floor at doorway, to permit the use of a spark strip at the back of the door. A detail has been added to show one form of spark strip; the door clearance provided will permit the use of other forms.

The cross section at C-D, also the side elevation of the complete door, have been modified to show the addition of 5/32 in. steel plates, inside and outside, for the purpose of supporting the bottom Z-bar.

The cross section through closed door post has been modified to reduce the width of the wooden door stop to 3 in. and increase the lap of the door over the door post to 2½ in. to provide better water-proofing.

Prevention of Grain Leaks

Communications received included statistics showing considerable loss, both on account of grain leaks between side sills and loose siding boards, and on account of pockets back of lining, which can not be emptied without cutting the lining.

Where sheathing is nailed to the outside of sills it should be further held in place by angle iron, channel iron, or strap, securely bolted in place to insure sheathing being held tight against side sill, to prevent grain leaks, bolts to have single nuts and be riveted over. The spacing of bolts shall not exceed 12 in. The preferable construction is to use

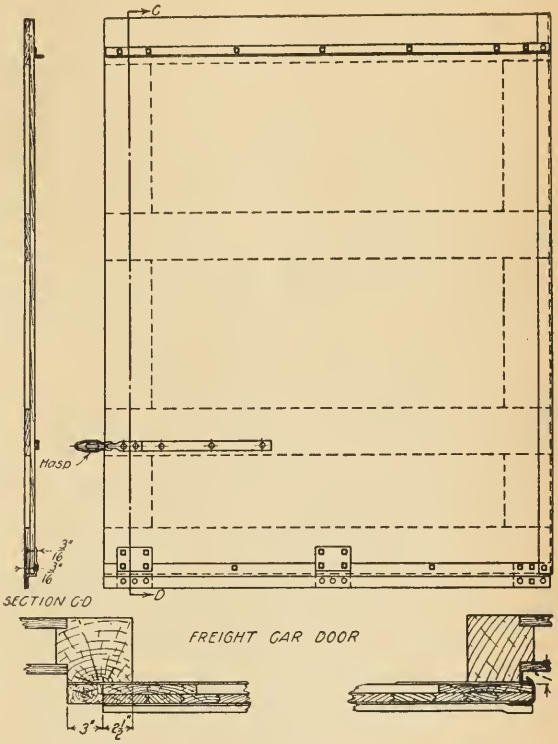


FIG. 2

dropper bar D-24, Jones & Laughlin catalogue, 0.84 lb. per ft. These reinforcing bars shall be located as near top of side sill as construction will permit. After the sheathing has been thus thoroughly secured the space between the ends of floor boards and sheathing shall be carefully filled with a plastic compound which does not become brittle in cold weather. It should then be further protected with triangular grain strips, not less than 3 in. by 3 in.

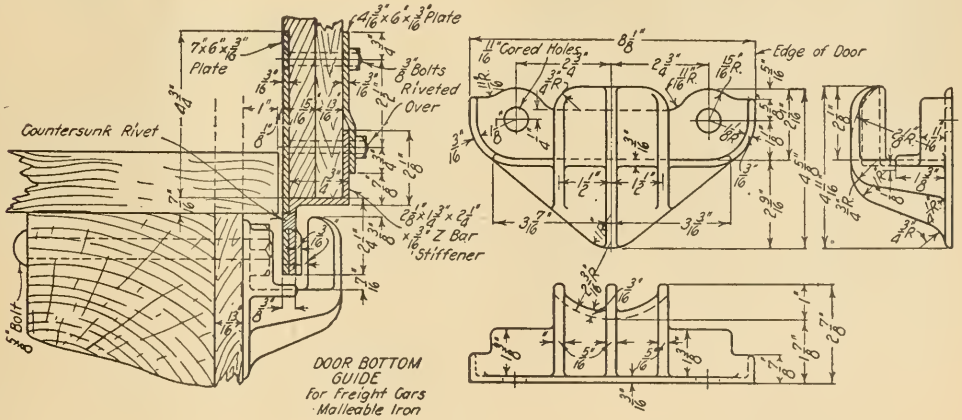


FIG. 1

RECOMMENDATION.

Section 10, of Circular 8, issued by the Assistant Director, Division of Operation, United States Railroad Administration, modified as indicated in the text below, should be made standard:

When wooden lining is used it should have a space between floor and bottom of lining of about 2½ in. Where diagonal braces meet posts, thereby forming pockets, opening shall be provided in the lining of sufficient size to permit free passage of any grain that may possibly lodge behind wooden side linings. The vertical dimension of the opening for this free passageway above the point of pocket, formed by the intersection between post and brace, shall be about 2 in.

Brine Drippings on Rail

Reports presented to the American Railway Engineering Association, on Injury to Signal Equipment, Bridges and Tracks, Due to Brine Drippings from Refrigerator Cars, indicate a necessity for definite action.

Recommendation

The following rules, which are now recommended practice, should be advanced to standard:

All salt-water drippings should be retained in the ice tanks and drained off only at icing stations.

The total capacity of drain openings should not exceed the capacity of traps, and the capacity of both drains and traps should be sufficient to release all drippings within the time limit of icing the train.

The mechanism adopted for handling drain valves should be simple and positive, and so designed as to insure closing the valves before hatch plugs can be returned to their places.

Salt drippings should be conducted from ice tanks through the regular traps and drain pipes.

Paragraph F, of Interchange Rule 3, has been extended from time to time. It recommended that no further extension be made, and that this rule be enforced beginning October 1 1920.

Minor Adjustments of Standards

On account of additions to standards at intervals of time by different committees, some of the present standards differ slightly in unimportant dimensions. It is, therefore, deemed advisable to establish uniformity.

Breakage of lugs on journal bearings has been reported, and strengthening of them has been suggested.

Journal box lids now standard are claimed to be unsatisfactory, and request was made to improve them .

Present axle capacities increase by steps, which can be made more uniform by increasing the capacity of the axle with 5½-in. by 10-in. journals from 38,000 to 40,000 lb., the present dimensions being such that the allowable stresses will not be exceeded. It was suggested to add another axle with 6½-in. by 12-in. journals, capacity 60,000 lb. and bearing, wedge and box to suit.

To avoid the usual confusion in nomenclature of axles, boxes, trucks and cars, it is thought advisable to classify the axles according to their letter, and to use this as a classification basis for boxes and contained parts also for trucks and cars.

The Committee on Axles, in its splendid report of 1896, did not specifically cover the locus of the points of application of load for calculating the part of the axle between wheel seats. Frames above the journals of the same axle can not spread more than one inch, therefore, the calculations for diameters of axle sections between wheel fits should be based on length between center of journals plus one inch.

Brake Power and Brake Beams.

An important question in connection with car design is necessary brake power. The present standard is that the brake power shall be 60 per cent of the light weight of the car based on 50 lb. unit cylinder pressure. Cars in which the ratio of light weight to loaded weight is very low will then have a very low brake power, when cars are fully loaded. Cars in which this ratio is high have a relatively high brake power when cars are fully loaded. It is, therefore, deemed advisable to make a change, and to base the total brake power of the car on 40 per cent of the sum of the light weight plus 25 per cent of the maximum allowable load, and to base this on 50 lb. unit cylinder pressure. This will serve to more nearly equalize the brake power on freight cars with average loads. The possible maximum per cent of brake power for the lightest cars would be 75 per cent of the light weight of the car, based on 50 lb. unit cylinder pressure. The formulæ for brake power will then be as follows:

$$0.40\left\{\frac{W-w}{4}+w\right\}=0.1W+0.3w.$$

but not more than 0.75w.

in which W = Loaded weight of car, maximum,
w = Empty weight of car,
W-w = Maximum allowable load.

As this is based on 50 lb. air pressure per square. in. in the cylinder, and the maximum unit pressure may be from 85 to 88 lb. the maximum brake pressure will be 1.75 (0.1W+4.3W), which, divided by the number of brake beams, will be the required deflection load per beam.

The brake beam set load, which should be somewhat within the elastic limit of the beam, should be approximately 1¾ of this amount.

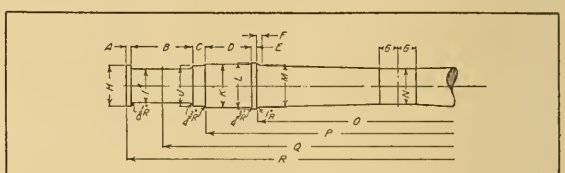
It is recommended that the 6,500-lb. capacity beam be dropped from the standards and that the 12,000-lb. capacity beam be denominated as the No. 1 beam, and that the interchange rules should be amended to conform.

[The committee recommended a number of slight changes in the dimensions of axles and journal bearings, the latter to strengthen the lugs and the use the letters "A" to "F." to designate, respectively, the 3¾-in. by 7-in. to the 6¼-in. by 12-in. axles, inclusive. The use of prefix numbers, as "2A," "3A," etc., were recommended for use with the axle designating letter, to indicate the number of axles per truck. Similarly "4A," "6A," etc., is recommended to designate the number and class of axles under the car.—Editor.]

Raise the capacity of the "D" axle to 40,000 lb. without changing the dimensions. No existing cars shall be marked up in capacity on account of this increase in allowable axle load until it has been determined that the body and trucks are safe under such a load.

Add axle "F," journal box "F," journal bearing "F," wedge "F" and dust guard "F," as given in tabulations. (See Figs. 3, 4, 5 and 6.)

Make the distance from the center of the dust guard to the top of such that when in place with box, bearing, and wedge of full standard dimensions, the top of the dust guard is 1⅛ in. below the top of the dust guard cavity in the box; the boxes not now provided with an offset at the dust guard opening to hold the wedge to be so provided.



CLASSIFICATION OF AXLE	SIZE OF JOURNAL	DIMENSION															
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R
A	3¾"×7"	5⅞	7"	2⅝"	7/16"	13/16"	23/32"	1½"	4⅝"	3⅞"	4⅜"	5½"	5¼"	4⅞"	4¼"	3'-10"	5'-3"	6'-3"	6'-11¾"
B	4¼"×8"	5⅞	8"	2"	7/16"	13/16"	23/32"	1½"	5¼"	4¼"	5⅛"	5⅞"	6⅛"	5⅝"	4⅞"	3'-10"	5'-3"	6'-3"	7'-0⅛"
C	5"×9"	5⅞	9"	2"	7/16"	13/16"	23/32"	1½"	6⅛"	5"	6⅛"	6⅞"	6¼"	6⅜"	5⅝"	3'-10"	5'-3"	6'-0"	7'-2⅛"
D	5½"×10"	5⅞	10"	2"	7/16"	13/16"	23/32"	3"	6⅞"	5½"	6⅝"	7"	7⅛"	6⅞"	5⅞"	3'-10"	5'-3"	6'-5"	7'-4⅛"
E	6"×11"	5⅞	11"	2⅛"	0⅛"	1⅜"	7/8"	3"	7⅛"	6"	7⅛"	7⅞"	8"	7⅜"	6⅝"	3'-6⅛"	5'-2⅛"	6'-6"	7'-6⅛"
F	6½"×12"	5⅞	12"	2⅛"	0⅛"	1⅜"	7/8"	3"	7⅞"	6⅛"	7⅞"	0⅛"	0⅛"	7⅞"	6⅞"	3'-6⅛"	5'-2⅛"	6'-7"	7'-8⅛"

Fig. 3

Increase the width of the dust guard cavity in the 3¾-in. by 7-in. box to 6¾ in., and in the 4¼-in. by 8-in. box to 8 in.

The committee's attention was called to the fact that the standard passenger car pedestals have shown weakness and a large number of them break, indicating a necessity for redesign. It is recommended that Sheets 21 and 22 of the book of standard drawings showing standard passenger car pedestals for 3¾-in by 7-in., 4¼-in by 8-in. and 5-in. by 9-in. journals be eliminated; that pedestals shown in Fig. 7 be substituted for these pedestals for use on trucks with single bottom equalizers.

The present standard journal box lids and bolts should be withdrawn and the following specification for lids substituted:

1. *Scope*—This specification covers all lids for use on A. R. A. standard journal boxes.

2. *Material*—Lids may be made of malleable iron or pressed steel. Material to be not less than 3/32 in. thick.

3. *Functions*—(a) Lid must protect the journal by preventing the entrance into the journal box of dust, sand, fine coal, or other foreign matter.

(b) Lid should prevent oil from working out of the end of the journal box.

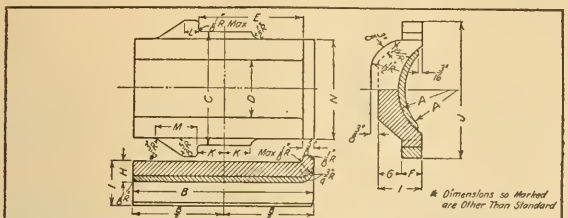
4. *Construction*—(a) Lid to be attached to the journal box by a suitable fastening so arranged that it can be easily opened and closed, but it must retain itself in a fully open position without danger of closing.

(b) When closed, the tension between the lid and fastening must be sufficient to prevent vibration of lid or any parts thereof.

(c) Lids of the hinged type to have the hinge located at the top of the journal box, so arranged that the lid will open outward and upward to an angle of 90 deg. with the lid face of the journal box. Lids of other types should provide an equivalent opening.

(d) A tight contact between the lid and the face of the journal box must be maintained in order to meet the requirements as stated under item No. 3. For journal boxes used on passenger train equipment a machined fit is recommended.
(e) A ledge, flange, or other suitable arrangement, should be provided on the inside of the lid, particularly along the lower part, so that oil thrown against the inside face will drain back into the box.
(f) Springs should be of the coiled type when possible.
(g) The eyes of the lid must be integrally closed.

For calculating the diameters of axles between wheel seats, assume that the loads take effect ½ in. from center

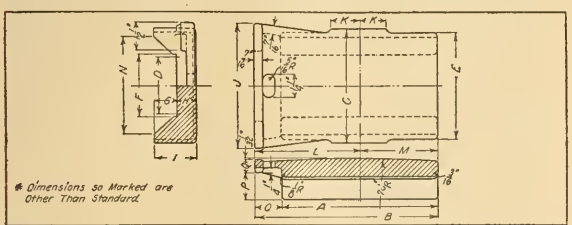


CLASSIFICATION OF WHEEL	SIZE OF JOURNAL	DIMENSION — INCHES A	B	C	D	E	F	G	H	I	J	K	L	M	N
A	3¼×7	1 3/32	6 3/4	4 1/2	2	*4	7/8	1 1/4	1	2	5 1/2	1 1/2	* 1 5/8	* 1 5/8	3 3/4
B	4¼×8	2 5/32	7 3/4	4 7/8	2 3/16	4 1/2	* 15/32	1 5/32	1	*2 1/2	5 7/8	1 1/2	* 1 5/8	* 1 3/4	4 3/4
C	5×9	2 17/32	8 3/4	5 3/8	3 1/4	5 3/16	* 1/2	* 1 7/16	1 1/8	2 1/4	6 7/8	1 7/16	* 1 11/16	* 2 1/4	4 3/4
D	5½×10	2 25/32	9 3/4	6 1/4	3 1/2	5 11/16	1 1/16	1 5/8	1 1/4	2 3/4	7 3/8	1 7/16	* 1 3/4	* 2 1/4	5 3/8
E	6×11	3 1/32	10 3/4	7 1/8	3 1/2	6 1/8	1 1/4	1 1/2	1 1/2	2 3/4	8 3/8	1 7/8	* 1 13/16	* 2 1/4	6 1/4
F	6½×12	3 1/2	11 3/4	7 3/8	4	7 1/8	1 1/16	1 1/8	1 3/8	3	8 3/4	1 7/8	1 7/8	2 3/8	6 1/2

FIG. 4

of journal at each end of axle, making the distance between assumed points of load application 1 in. more than the distance between centers of journals. For calculating the diameters of axles outside of wheel seats, assume a lever arm from the section under consideration to the center of journal, plus one-fourth of the standard journal diameter, and allow a unit stress of 10,500 lb. per sq. in. to determine the diameter for minimum road limit.

The Committee on Standard and Recommended Practice suggested revision of center plate drawings to show contour only, and recommend definitely specifying the material of which the center plates may be made. The recommendations of this committee are to eliminate Sheet 20, which is not



CLASSIFICATION OF WHEEL	SIZE OF JOURNAL	DIMENSION — INCHES A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q
A	3¼×7	5 3/8	*6 3/4	4 1/2	2 3/8	3 3/8	2 1/4	1	7/8	1 1/2	5	1 1/4	3 3/8	*2 11/16	3 3/8	*1 3/8	1	27/32
B	4¼×8	6 3/8	7 3/4	4 7/8	2 5/16	4 1/2	2 9/16	1 1/16	7/8	1 15/16	5	1 1/4	4 3/8	3 3/16	4 1/16	1 3/8	1 1/16	27/32
C	5×9	7 3/8	8 3/4	5 3/8	3 3/8	5 1/4	3 3/8	1 1/16	1	2 1/16	6 3/8	1 1/16	5 1/16	3 11/16	4 3/4	1 3/8	1 5/16	1 3/32
D	5½×10	8 3/8	9 13/16	6 1/4	3 3/16	5 3/4	3 3/8	1 1/16	1	2 1/16	6 3/8	1 1/16	5 5/16	4 1/16	5 5/16	1 7/16	1 7/16	1 3/32
E	6×11	9 3/8	10 3/4	7 1/8	3 3/8	6 3/4	3 3/8	1 3/8	1 3/8	2 1/4	7 3/8	1 1/16	6 1/4	4 11/16	6 1/4	1 1/2	1 11/16	1 5/16
F	6½×12	10 3/8	11 13/16	7 3/8	4 1/16	7 3/8	4 1/4	1 1/2	1 3/8	2 1/4	8 3/4	1 1/16	6 5/8	5 3/16	6 7/16	1 7/16	1 5/16	1 7/8

FIG. 5

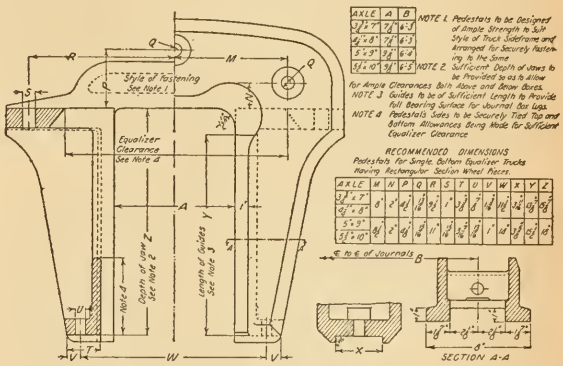
used in present standard constructions, and advance Sheet "F," which represents present practice, to standard. If the body center plate on Sheet "F" is used in conjunction with the truck center plate on Sheet 20, a 3/16-in. liner should be applied to prevent the body center plate from riding on the outer rim of the truck center plate.

Center plates shall be made either of drop forged or cast steel.

Quality of Steel

Specifications for materials used in car construction are varied from time to time. It has been found that the tendency to lower the requirements for elastic limit and elongation for steel have endangered details which have been based on certain stresses, also the close adherence to requirements for ultimate strength and chemistry has caused rejection of material which was superior to material acceptable under the specifications. It is suggested that the basic requirements which will insure meeting unit stresses allowed in the past be fixed by this committee, that unnecessary restrictions be eliminated, and that the Committee on Specifications and Tests embodying these basic requirements in a specification.

Unit stresses commonly allowed for detail parts of cars made of steel, and which are subject to variable loads and occasional light shock, are 12,500 and 16,000 lb. per sq. in. The minimum elastic limit should be double this amount,



AXLE	A	B
3½×7	7½	6-3
4½×8	7½	6-3
5×9	7½	6-3
5½×10	7½	6-3

NOTE 1. Pedestals to be Designed of Ample Strength to Suit Style of Truck Sideframe and Arranged for Securely Fastening to the Same
NOTE 2. Sufficient Depth of Jaws to be Provided so as to Allow for Ample Clearances Both Above and Below Boxes.
NOTE 3. Guides to be of Sufficient Length to Provide Full Bearing Surface for Journal Box Lugs.
NOTE 4. Pedestals Sides to be Securely Tied Top and Bottom Allowances Being Made for Sufficient Equalizer Clearance

RECOMMENDED DIMENSIONS
Pedestals for Single Bottom Equalizer Trucks Having Rectangular Section Wheel Pieces

AXLE	M	N	P	Q	R	S	T	U	V	W	X	Y	Z
3½×7	8'	2'	4½	3½	1'	3½	4½	3½	1'	4½	3½	2½	6'
4½×8	8'	2'	4½	3½	1'	4½	4½	3½	1'	4½	3½	2½	6'
5×9	8'	2'	4½	3½	1'	5	4½	3½	1'	4½	3½	2½	6'
5½×10	8'	2'	4½	3½	1'	5½	4½	3½	1'	4½	3½	2½	6'

FIG. 6

and the product of elastic limit and elongation should not be less than fifty times the allowable stress. As the test piece usually shows better physical properties than the casting or forging, the requirement for the product of elastic limit and elongation should be increased by 50,000, making it fifty times the allowable stress plus 50,000. The reduction of area is considered secondary in importance. It should be seventy-five times the allowable stress. An addition of 50,000 for variation between the test piece and the casting or forging may be made, but is considered unnecessary. The ultimate strength, content of carbon, manganese and silicon should be left optional, as the other requirements

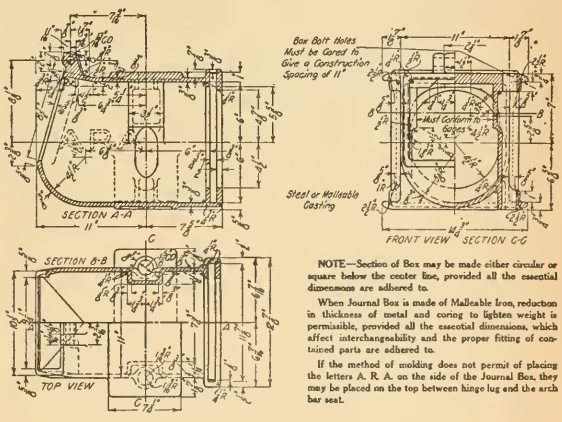


FIG. 7

control these sufficiently and the restrictions used in specifications heretofore have caused rejection of good serviceable material.

The specifications should clearly circumscribe annealing and methods of making tests, the latter to insure uniformly comparative results from different laboratories. The resulting specifications should be made optional for at least one year, to permit manufacturers to adjust themselves thereto.

The resulting specifications should be made optional for

at least one year, to permit manufacturers to adjust themselves thereto.

RECOMMENDATIONS

Provide specifications for all forged and cast steel used in car construction of two grades, based on fundamental requirements given below:

Grade of steel	A	B
Minimum elastic limit (lb.)	26,000	32,000
Product of elastic limit and elongation	700,000	850,000
Product of elastic limit and reduction of area	975,000	1,200,000

The ultimate strength, carbon, manganese and silicon shall be optional.
Sulphur shall not exceed .05 per cent.
Phosphorus shall not exceed .05 per cent.
The elastic limit shall be determined by extensometer.
The elongation shall be measured in a length of 2 in.

Grade "A" steel shall be annealed if the carbon content exceeds .30 per cent, or if the manganese content exceeds .75 per cent. Grade "B" steel shall be annealed if the carbon content exceeds .22 per cent, or if the manganese exceeds .65 pr cent. Pieces of irregular section and of less carbon or manganese content, where shrinkage or other internal strains may be suspected, should also be annealed. Unimportant details may be accepted on surface inspection only.

Fundamentals of Design

In order to prepare the way for the design and adoption of additional standards, it is advisable to confirm or change existing fundamentals and add thereto. The existing fundamentals, both actual and implied, have been discussed in committee. Those recommended for change and those which are added are presented below with reasons for the recommendations. All others given in the list, under the heading of Recommendations, are now either standard or recommended practice and should be affirmed as standard. The committee can then proceed with the consideration of standard detail designs.

HEIGHT FROM RAIL TO CENTER PLATE BEARING SURFACE

Consideration was given to the standard height of 27¾ in. and to the U. S. R. A. height of 25¾ in. The former height would result in a distance from bottom of sills to center line of draft gear of about 4 in., an ideal condition for sills 10 in. deep, and generally satisfactory for sills 12 in. deep. The latter height is ideal for sills 14 in. or 15 in. deep, and moderately satisfactory for sills 12 in. deep. The reason for its use was apparently to eliminate bottom angles in the center sill construction and to somewhat speed up production. However, the elimination of the bottom angles, in connection with the 12-in. channel sills, results in an unbalanced section. A balanced section of the same area will have about 20 per cent greater resisting moment.

With a height of 26¾ in. from rail to center plate bearing face, 12-in. center sills can be arranged as a balanced section and the preferable relation of center line of draft to neutral axis of center sill construction can be maintained, making this the ideal arrangement. A center sill construction with 10-in. channels can also be made generally satisfactory. Little difficulty will be experienced to adjust existing equipment of either 27¾ in. or 25¾ in. height to center plate bearing surface to the proposed height of 26¾ in. The height from the rail to the top of the truck side bearing will necessarily have to be adjusted to suit, to maintain the relative distance of ⅞ in, from center plate bearing face to top of side bearing.

DISTANCE BETWEEN CENTERS OF SIDE BEARINGS

The present rules allow various distances, and it is desirable to concentrate on one distance. The committee has selected a distance of 50. in. between centers of side bearings.

STRENGTH REQUIREMENTS FOR SILLS AND DRAFT ATTACHMENTS

In 1913 this committee adopted a basic figure for strength of draft attachments of 10 sq. in. of steel equivalent to grade "A" material for tension. This strength requirement was somewhat in excess of the strength of the coupler used at that time. A stronger coupler, type "D," has now been adopted, the strength value of which is equivalent to at least 12 sq. in. of steel of the same material.

In order to meet the increased requirements, and compare closely with the increased strength of the coupler, it is desirable to increase the strength requirements for draft gear attachments and center sills by about 20 per cent.

DISTANCE FROM CENTER OF BOLSTER TO FACE OF END SILL CASTING

In order to have uniform construction for draft and draft attachments, it is important that this dimension should be definitely fixed. The committee has selected this distance as 5 ft., which seems to meet all necessary requirements for cars with four-wheel trucks.

DRAFT GEAR TRAVEL, COUPLER HORN CLEARANCE, AND COUPLER SIDE CLEARANCE

Many cars of a length of 40 ft. and more are deficient in side clearance for couplers, and it is imperative that the side clearance be increased. Experience with cars with the draft gear located between center sills indicates that it is undesirable to permit the horn of the coupler to strike the end sill, and that all of the strain should be carried through the rear follower into the center sills at a distance of about one inch below the neutral axis of the center sill construction. Until the Committee on Couplers and Draft Gear has had an opportunity to demonstrate by test that some other travel is preferable, we recommend adopting a draft gear travel with draft gear in place on the car of 2¾ in. The coupler horn clearance should be ¼ in. more, or 3 in. The total coupler side clearance should be increased from 2½ in. to 3 in.

A minimum draft gear capacity of 150,000 lb. is recommended.

RECOMMENDATIONS

The values given in the tabulation below should be approved as standard fundamentals for future design:

1.	Height from rail to center of brake shoe face	13 in.
2.	Height from rail to brake beam hanger fulcrum	24⅞ in.
3.	Height from rail to bottom of truck springs	10⅜ in.
4.	Height from rail to top of springs (empty car)	18¾ in.
5.	Height from rail to center plate wearing surface	26¾ in.
6.	Height from rail to top of truck side bearing	27⅝ in.
7.	Distance from center to center of side bearing	50 in.
8.	Average clearance per side bearing per truck:	
	Minimum	⅛ in.
	Maximum	⅞ in.
9.	Height from rail to floor of box car (minimum)	42 in.
10.	Height from rail to floor of refrigerator car (minimum)	48 in.
11.	Distance between center sills	12⅞ in.
12.	Area of center sill construction between rear followers (minimum)	30 sq. in.
13.	Distance from center of truck to end sill face for cars with 4-wheel trucks	5 ft. 0 in.
14.	Draft gear travel (on car)	2¾ in.
15.	Coupler horn clearance	3 in.
16.	Minimum draft gear capacity	150,000 lb.
17.	Coupler shank side clearance, total	3 in.
18.	Draft gear follower thickness	2¼ in.
19.	Ratio of unit stress to end load (maximum) for center sills	.05
20.	Ratio of unit stress to end load (maximum) for draft attachments	.125
21.	For draft attachments the area of steel in square inches equivalent to the minimum required strength values is:	
21.	Tension or compression (square inches, Grade "A" steel)	12
22.	For shear (sq. in.)	15
23.	For bearing (sq. in.)	7½
	Inside Dimensions of Box Cars:	
24.	Length	40 ft. 6 in.
25.	Width	8 ft. 6 in.
26.	Height	8 ft. 6 in.

27. Hardwood, when used, must have strength values four times those given for steel.

Minor Car Construction Matters

REINFORCING EXISTING BOX CAR ENDS

Various inquiries on this subject indicate the necessity of adopting fixed rules for repairs to existing box car ends. It is recommended that:

1. When ends of cars are broken they should be replaced with ends specified for new cars.

2. The rules for box car ends should be modified by eliminating paragraphs 5 and 6 permitting hard wood or yellow pine posts and braces, thereby making the use of steel posts and braces obligatory.

The revised rules are as follows:

BOX CAR END, DESIGN AND STRENGTH

New cars should have corrugated steel ends, or steel plate ends ¼ in. thick, reinforced between corner posts with the equivalent of either two

vertical steel braces with a total section modulus of not less than 9; or one vertical and two diagonal steel braces with a total section modulus of not less than 10; or three horizontal steel braces with a total section modulus of not less than 10.

New cars may have the following alternative arrangement: Three or more steel braces, two of which run diagonally, with a total section modulus of not less than 12½, and wood lining 1¾ in. thick.

To concentrate strength at a point near floor line on vertical center line of car, diagonal braces should extend from the center sills to the side plates, and not from the bottom corner to the ridge.

The attachments for the braces and the members to which they are attached must be sufficiently strong to realize the full strength of the braces.

Lining at car ends should be supported at intervals not greater than 30 times the thickness.

Two 4-in. by 3-in. Z-bars, 12.4 lb. per ft. have a total section modulus of 9.34.

Two 5-in. I-beams, 9.75 lb. per ft. have a total section modulus of 9.6.

Three 4-in. I-beams, 9.5 lb. per ft. have a total section modulus of 10.2

Three 3-in. Z-bars, 14.2 lb. per ft. have a total section modulus of 10.3.

The corrugated ends referred to may be made of one or more pieces. If made of one piece it should be not less than ¼ in. thick. If made of more than one piece the lower third must be not less than ¼ in. thick, and the remainder should be not less than ⅜ in. thick.

Hopper and Gondola Car Cross Ties

Request was made for specification of the proper number of cross ties to be used in hopper gondola coal cars.

It is recommended that the distance between cross ties or braces in hopper or high-side gondola cars shall be less than twenty times the width of the top chord of the car side.

Consideration should be given to providing necessary space for use of clam shell buckets in loading or unloading. If the dimensions for distance between cross ties is less than the space required for operating clam shell buckets, the ties shall be alternated with braces extending from the center ridge or floor to a location corresponding with the tie anchorage.

Thickness of Splice Plates for Center Sills When Web of Sills is More Than One-Half Inch Thick

Attention was directed to the use of center sills on some tank cars with webs ⅞ in. thick, and that the rules for splicing of steel center sills would require butt plates of the same thickness, which is inconsistent, and would interfere with proper riveting.

It is recommended that paragraph 2, of the rules for splicing steel center sills be modified as follows:

> The splice for center sills, except as otherwise herein stated, to be located not less than 7 in. from either side of the body bolster, consisting of butt joints. The butt joints to be reinforced by plates on both sides to be not less than twice the length of the protruding end, but not exceeding 24 in. and not less than same thickness of web plate, *but not more than ½ in. thick*, with the one on the flange side of channel to include flanges, while the outside plate should only cover the web. The rivets to be spaced as shown on Figs. "A" and "B," Sheet 28.

The report was signed by W. F. Kiesel, Jr. (Chairman), Mechanical Engineer; A. R. Ayers, New York, Chicago & St. Louis; C. E. Fuller, Union Pacific; J. C. Fritts, Delaware, Lackawanna & Western; C. L. Meister, Atlantic Coast Line; J. Coleman, Grand Trunk; W. J. Robider, Canadian Pacific; J. McMullen, Erie; T. H. Goodnow, Chicago & North Western; C. C. Higgins, St. Louis-San Francisco; Jno. Purcell, Atchison, Topeka & Santa Fe; W. H. Fetner, Central of Georgia; W. O. Moody, Illinois Central; J. A. Pilcher, Norfolk & Western, and H. L. Ingersoll, New York Central.

Discussion

W. F. Kiesel, Jr. (Penn.), chairman of the committee, presented the report and said: We have submitted our ideas in regard to what the results of the marking of the steel should be so that the Car Construction Committee will know the stresses to allow. The steel companies can make this steel and we believe that they could readily work to such specifications, but this question will have to be adjusted with the Specification Committee. The distance between the center of side bearings has been established at 50 in. The former rule was between one dimension and another dimension. Standardization is the only thing if design of cars are to be made. Therefore, we think we can all agree on the intermediate dimensions, such as 50 in., so that all future designs will be standard. The fundamentals which we have proposed should be carefully studied and voted on.

C. F. Giles (L. & N.): *I move that the report be received and printed in the proceedings, and such parts of it as are necessary referred to letter ballot.*

The motion was carried.

More Discussion on Brake Beam Report

B. B. Milner (N. Y. C.): Originally, brake beams were numbered 1, 2, 3, 4, etc. for 6,500 lb., 12,000 lb., 18,000 lb. and so on. In 1918 the capacity of the No. 2 beam was increased to 15,000 lb. We believe you will approve the idea of having represented in your standards both the 12,000-lb. and the 15,000-lb. beams. Therefore, it is necessary to include some form of designation for the additional beams.

There are three or four schemes before us. The Brake Beam Committee considered first reporting the proposition of having the 12,000-lb. beam under the No. 2 designation and introducing No. 2½ for the 15,000-lb. beam. This seemed objectionable from a casting standpoint, as it is a little difficult to show a 2½ designation on the strut castings. The committee thought it would be better to call the additional beam 2x. Further thought on the matter suggests that 2+ would be a designation which would mean something to the car repair men who have these beams to handle.

A further proposition was that we eliminate from the standards entirely the 6,500-lb. brake beam, and give the 12,000-lb. brake beam the No. 1 designation, the 15,000-lb. beam the No. 2 designation, and the remaining beams to remain unchanged. Another proposition is to maintain No. 1 for the 6,500-lb., No. 2 for the 12,000-lb., and No. 3 for the 15,000-lb. brake beams, and change the numbers on all of the higher capacity beams.

The proposition to call the additional beam 2+ is the preferred method, and the committee would like to have passed to letter ballot the question of whether that designation is to be used or not.

A motion that the matter be referred to letter ballot was carried.

Report of Committee on Safety Appliances

No advance report was printed by this committee as it was not possible to get the information together in time to prepare such report.

On May 24, 1920, a hearing was held by the Interstate Commerce Commission relative to an extension of time within which to comply with the commission's order of August 29, 1919, concerning the application of safety appliances. Extension was not granted by the commission, however, arrangements has been made to have the Commission on Car Service issue instructions to require the loading of cars not fully equipped with United States Safety Appliances or United States Safety Appliances, Standard, to the car owner by any route.

In view of this action, Circular S III-149 was issued May 29, 1920, effective June 1, 1920, modifying Section K of Rule 3 to read as follows:

> "After March 1, 1920, no car will be accepted in interchange unless properly equipped with United States Safety Appliances or United States Safety Appliances, Standard, *except cars moving home on car service orders for equipping with safety appliances. Cars will not be accepted from owner at any time unless equipped with United States Safety Appliances or United States Safety Appliances, Standard.*"

Every effort should be made to complete the equipment of such cars with Safety Appliances at the earliest possible date.

[A statement showing the number of freight cars to be equipped with safety appliances of February 1, 1920, will be included with the report in the official proceedings of the Section.—Editor.]

The report was signed by C. E. Chambers (Chairman), Central of New Jersey; C. E. Fuller, Union Pacific; H. T. Bentley, Chicago & North Western; W. J. Tollerton, Chicago, Rock Island and Pacific; J. T. Wallis, Pennsylvania, and C. F. Giles, Louisville & Nashville.

Discussion

The report of the committee was read by the secretary.

A motion that the report be accepted was duly seconded and carried.

Report of Committee on Loading Rules

THE COMMITTEE HAS RECEIVED a number of recommendations and suggestions from shippers of various commodities relative to new rules and changes in existing rules in the present code. These suggestions have been investigated, and where changes are deemed necessary the rules have been revised or new rules provided.

Attention is called to a proposed plan, outlined herein, covering a rearrangement of the loading rules book. The purpose of this rearrangement is to eliminate duplication of various rules and tables and to group the rules in such manner that the whole book can be covered in six pamphlets, for the convenience of shippers who desire the rules in one pamphlet form covering their particular commodity.

Following is a list of the new rules and changes in existing rules presented for approval:

Supplement No. 2, page 2—Fig. 3-A.—Substitute composite spacing-block shown for composite spacing-blocks now shown on Fig. 3-A.

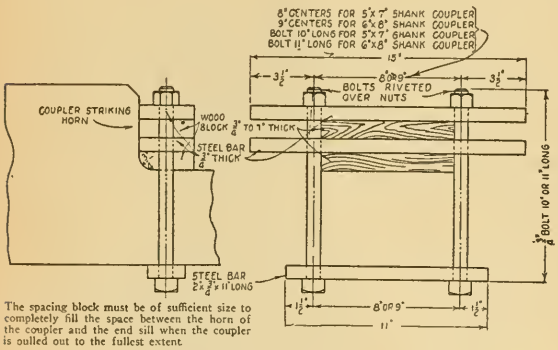


Fig. 3-A—Composite Spacing Block for Twin or Triple Loaders—Alternative Arrangement

Supplement No. 2, page 2.—Change word "blocks" to "block" in note referring to Fig. 3-A. *Explanation.*—The design of composite spacing-block shown above is substituted for the two designs shown on Fig. 3-A, Supplement No. 2, on account of improvement in design.

Maximum Weight Tables, pages 14, 26, 58 and 102.—Change tables as follows: First column, change heading to read, "length of car over end sills." Fifth column, headed "(capacity of car, 100,000 Lb.)," substitute the limits now appearing in the sixth column, headed "(capacity of car, 110,000 Lb.)," for those appearing in the fifth column. Omit sixth column from table. *Explanation.*—Heading changed and sixth column omitted to clarify rule. Limits for 100,000 lb. capacity cars increased to obtain maximum allowable loading.

Paragraph 7, page 4.—Change 46 in. to 50 in. in third line of paragraph, *Explanation.*—Limit on height of car sides extended to fifty (50) in. to permit use of additional cars.

Paragraph 513, page 3, Supplement No. 2,—Change third sentence of third paragraph to read as follows: "Total weight of plates loaded diagonally must not exceed 75 per cent of the load weight, as per Paragraph 509." *Explanation.*—To make Paragraph 513 conform with table in Rule 509.

Paragraph 513, page 4, Supplement No. 2.—Beginning with word "plates" in thirteenth line, revise the paragraph to read as follows: "Plates may be loaded diagonally with one side resting on top of car side. On cars with fish-belly type side sills the total weight of plates loaded in this manner must not exceed 50 per cent of the car capacity when load is distributed uniformly over full length of car. Other cars of steel or steel underframe construction may be loaded in this manner up to 25 per cent of capacity. In all cases, supporting posts 4 in. by 4 in., placed in inside stake pockets or bolted to car sides, shall be used for each 9000 lb. of lading, with a minimum of two posts per load." *Explanation.*—Paragraph revised to more clearly define manner of loading plates diagonally with one side resting on top of car side, and to establish limits for this type of load.

Paragraph 513, page 3, Supplement No. 2,—Substitute following table for table contained in this paragraph:

Maximum load allowed per post	Size of posts	Length of posts	Diagonal (post) tie rods Number	Diam.	Bolts securing each post to side boards Number	Diam.
17,000 lbs.	6 by 8 in.	5 ft. or less	1 per post	⅞ in.	2	⅞ in.
13,000 lbs.	6 by 8 in.	over 5 ft.	1 per post	⅞ in.	2	⅞ in.
12,000 lbs.	6 by 6 in.	5 ft. or less	1 per post	¾ in.	2	¾ in.
9,000 lbs.	6 by 6 in.	over 5 ft.	1 per post	¾ in.	2	¾ in.

Explanation.—Table revised to permit increased loading within safe limits.

Paragraph 513, page 4, Supplement No. 2.—Under heading "round plates, flat or flanged," revise text to read as follows: "round plates, flat or flanged, may be loaded as per Figs. 38-B, 38-C or 38-F. This manner of loading is the same as for ordinary plates, except that when loading according to Figs. 38-B and 38-C a 4 in. by 8 in. horizontal bearing piece is bolted at top of posts to form a rest for the plates. Longitudinal shifting to be prevented by tie rods running across the car and bearing against edge of plates or by stop blocks 6 in. by 8 in. bolted to the floor of the car or secured by cleats spiked to sides and floor of car." *Explanation.*—Paragraph revised to include method of

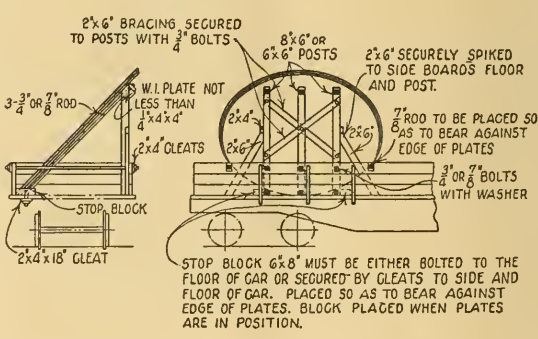


Fig. 38-F—Manner of Securing Round Flat Plates Loaded Diagonally on Gondola Cars Having Wooden Side Boards

loading shown on Fig. 38-F as an alternative and to include tie rods across the car as an additional means to prevent longitudinal shifting.

Figs. 38 and 38-A, page 88; Figs. 38-B and 38-C, page 5, Supplement No. 2.—Change these figures to show horizontal tie rods and stop blocks to prevent longitudinal shifting and add the following notes: "⅞ in. rod to be placed so as to bear against edge of plates," and "stop blocks 6 in. by 8 in. must be either bolted to the floor of car or secured by cleats spiked to sides and floor of car." *Explanation.*—To conform with revised Rule 513, Supplement No. 2.

Paragraph 514, page 4, Supplement No. 2.—Revise paragraph to read as follows: "Gondola cars loaded with plates or other material on floor of car may have plates that are too wide for the car loaded on top of car sides when height of sides does not exceed three (3) ft. (See Fig. 38-D or 38-E.) Such superimposed plates must be supported by posts 4 in. by 6 in., one set of posts for each 6 ft. length of lading, with a minimum of 3 sets of posts

for each tier of plates. Side motion to be prevented by not less than 2 clamps constructed as shown on Figs. 38-D or 38-E. Longitudinal motion to be prevented by struts 2 in. by 8 in. against end of lading and spiked or bolted to sides of car. Total weight of plates loaded in this manner must not exceed 75 per cent of the load weight, as per paragraph 509." *Explanation.*—Rule revised to include an alternate method of loading as shown on Fig. 38-E. Maximum weight allowance also provided for.

Paragraph 527, page 7, Supplement No. 2.—Revise to read as

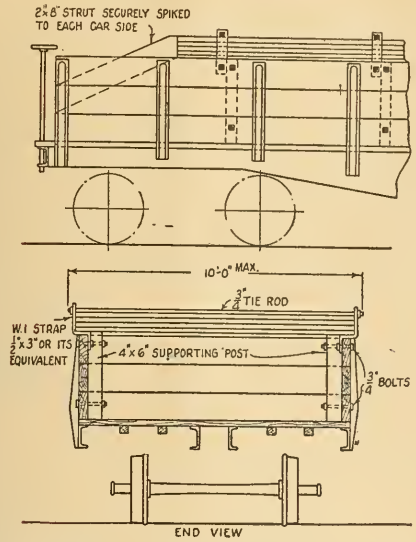


Fig. 38-E—Manner of Securing Flat Plates Loaded on Top of Car Sides

follows: "When one or both bearing pieces are placed on the car floor they must be located over the car body-bolster or between car body-bolsters, and must never be placed between car body-bolster and end of car unless special provision is made therefor in detail instructions. When one or both bearing-pieces are placed on top of car sides they may be located within 12 in. either side of the center line of car body-bolsters."

Paragraph 530, pages 103 and 104.—Insert the following, clause for clause, beginning with "The" in the third line: "The bearing-piece to be placed on the floor above car body-bolster or between car body-bolsters and extending the width of car, and must be secured from shifting by cleats nailed or bolted to the floor."

Paragraph 546, page 112.—Change second sentence to read as follows: "When there is but one bearing-piece per car, either on floor or on top of car sides, it must be placed at least 12 in. from center of car body-bolster toward center of car." *Explanation.*—Paragraphs 527, 530 and 546 revised to clarify rules with regard to location of bearing-pieces.

Paragraph 535, page 104.—Add Figs. 47 and 48 in first line of rule. *Explanation.*—To cover loads on sides of steel cars.

Paragraph 534, page 104.—Beginning with word "this" in fifth line of second paragraph, change the paragraph to read as follows: "This bearing-piece may rest on top of car sides within 1 ft. of either side of center line of car body-bolster on cars having wooden sides not more than 5 in. high and not less than 3 in. thick, or on top of steel sides especially reinforced to carry such top loads, or bearing-piece may rest on the car floor over the car body-bolster or between car body-bolsters. Bearing-piece on top of car sides must have ends notched for the side boards and be securely braced to prevent both lateral and longitudinal motion, as well as bending and rolling. Figs. 48, 49 and 50 show substantially how bearing-pieces are to be supported and held in place. Steel gondola cars, suitable for carrying loads on top of car sides as shown on Fig. 48, should have 15/16 in. holes spaced 12 in., center to center, drilled in top side angles on each side of car and located 6 in. each side of center line of car body-bolster. Lading must not be placed on top of wooden cars having sides less than 3 in. thick or steel cars having sides not of sufficient strength to carry the lading." *Explanation.*—Rule changed to cover flexible material loaded on car floor and to include limits for height and thickness of car sides. Also changed to direct attention of railroads to the necessity of providing bolt holes in side angles of steel cars to secure bearing pieces.

Paragraph 547, page 112.—In second line of paragraph, change 46 in. to 50 in. *Explanation.*—Limit on height of car sides extended to 50 in. to permit use of additional cars.

Paragraph 548 C, page 117.—Add the following to paragraph: "For loads on top of sides of gondola cars, the distance from top of rail to center of load, measured at bearing-pieces, must not exceed 9 ft. 3 in.." *Explanation.*—Paragraph added to make rule conform with Paragraph 15-D of the general rules.

Paragraph 55-G, page 2, Supplement No. 1.—Revise to read as follows: "Loads are limited to 6 ft. in height. For allowable weight of load see Paragraphs 548-A, 548-B and 548-C." *Explanation.*—Paragraph revised to make weight allowance conform with existing rules.

Figs. 49 and 50.—Change diagonal braces spiked to the side of the car from 2 in. by 6 in. to 2 in. by 8 in. *Explanation.*—To provide for safety of load, as it has been found that present size of braces is inadequate.

Paragraph 558, page 7, Supplement No. 2.—Change last sentence of paragraph to read as follows: "The bearing-pieces must be secured to the car in the manner described in paragraphs 547, page 112, and 555, page 2, Supplement No. 1, and the material must be clamped together in the manner described in paragraph 559 to prevent it from shifting. *Explanation.*—Rule changed to show proper references for bearing-pieces and clamping-pieces.

Paragraph 559, page 8, Supplement No. 2.—Change paragraph to read as follows: "When the lading requires two bearing-pieces and two or more sliding-pieces, the bearing-pieces are to be provided with clamps consisting of a hardwood top clamping-piece 6 in. by 8 in. in section and 2 vertical rods 1¼ in. in diameter placed close to load and passing through clamping-piece and bearing-piece, for loads placed on top of car sides, and through clamping-piece, bearing-piece and floor of car for loads resting on car floor. Clamps to be applied in the manner shown on Figs. 42 or 54. When the load, measured from top of bearing-piece to top of load, exceeds 24 in. in height the bracing for clamping piece on top of load must be same as shown in Fig. 46." *Explanation.*—Paragraph revised to more clearly define manner of clamping at bearing-pieces.

Paragraph 562, page 127.—Change first sentence of paragraph to read as follows: "Binders consisting of two horizontal hardwood pieces of timber 4 in. by 6 in. in section (with ½ in. bolts and suitable washer under head and nut in each end to prevent splitting), drawn together by means of two 1¼ in. rods placed close to load, shall be applied midway between bearing-pieces." *Explanation.*—Paragraph revised to cover application of binders.

Fig. 60, page 126; Fig. 61, page 129.—Insert word "plate" after word "flexible" in the heading of these figures. Show one binder located midway between bolsters on each figure in place of two binders for the load, as now shown. *Explanation.*—The heading of figure is changed to more clearly define the character of lading. The requirement for binders has been modified with a view of economy within the limit of safety.

Paragraph 806, page 156.—Add the following sentence at the end of this paragraph: "Boards, when used to tie stakes together longitudinally with side of car, must be secured to the inside of the stakes and must not, under any circumstances, be nailed to the outside of the stakes." *Explanation.*—To provide safety where such boards are used.

Paragraph 814, page 158.—Change third sentence, beginning with the word "opposite" on eighth line, to read: "Opposite stakes should then be secured by wire as close to top of car sides as practicable, but not over 18 in. above top of same, and further loading of pipe should be placed on this wire." *Explanation.*—Rule revised to permit wiring for stakes to be located within 18 in. of top of car sides to conform with notes on Figs. 74, 75 and 76.

"Paragraph 814, page 158.—In the eleventh line of this paragraph, the reference to Paragraph 812 for wiring should be changed to Paragraph 811. *Explanation.*—Paragraph 811 covers wiring and Paragraph 812 refers to weights.

Paragraphs 815, 818, 819 and 823, pages 159, 160 and 167.—The reference in these paragraphs, reading as follows: "See Paragraphs 809 and 812 for wiring and staking" should be changed to read "See Paragraphs 806 to 811, inclusive, for wiring

and staking." *Explanation.*—Paragraphs 809 and 812, at present referred to, do not cover wiring and staking instructions.

Fig. 76, page 163.—In the explanatory note of Fig. 76 the word "intermediate" at the end of third line from bottom of page should be changed to "this." *Explanation.*—To clarify meaning of the note.

Rule Governing Loading of Boxed Automobiles on Flat and Open Top Cars

The following rule governs the loading of boxed automobiles on flat and open top cars:

Single Tier Loading—Flat Cars—Figs. 100-P, 100-Q, 100-R, 100-S, 100-T.

1358. End plank to be 2 in. by 6 in., preferably one piece, extending entire width of load and securely toe-nailed to car floor. See Figs. 100-P, 100-R, 100-S and 100-T.

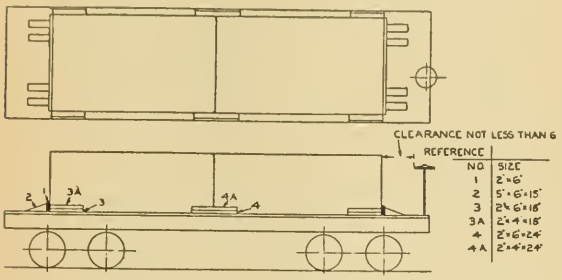


Fig. 100-P—Boxed Automobiles—Side and End Blocking. One Box to Width of Car

1359. Where there are two boxes to width of car, each box must have at least two heel blocks per end. See Figs. 100-R, 100-S and 100-T.

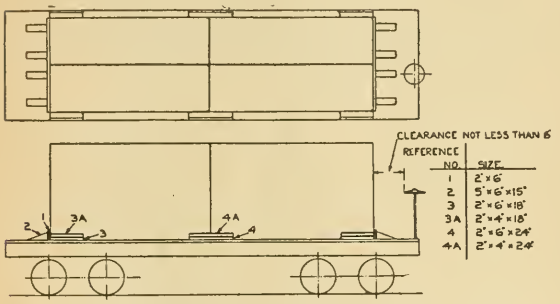


Fig. 100-R—Boxed Automobiles—Side and End Blocking. Two Boxes to Width of Car

1360. Where there is but one box to width of car, there must be at least four heel blocks per end. See Fig. 100-P.

1361.—Heel blocks to be at least 5 in. high, 6 in. wide and 15 in. long, each block to be secured to car floor with six 40d nails (cement-coated preferred). See Figs. 100-P, 100-R, 100-S and 100-T.

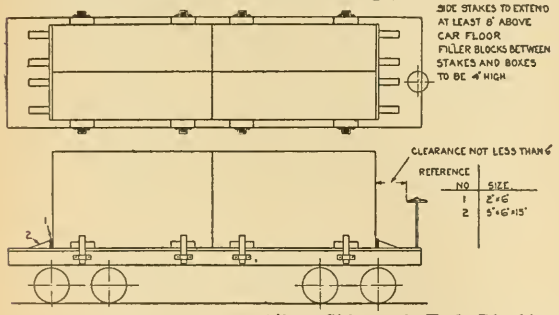


Fig. 100-S—Boxed Automobiles—Side and End Blocking When Side Stakes are Used

1362. Heel blocks 4 in. high, 4 in. wide and 15 in. long may be used, provided one additional block per box is used, blocks to be secured to floor with four 40d nails (cement-coated preferred).

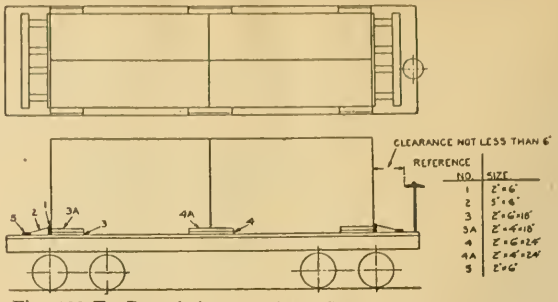


Fig. 100-T—Boxed Automobiles—Side and End Blocking When Weight of Load Exceeds 22,500 Lbs.

1363. Where there is insufficient space at end of load to apply heel blocks, as specified in Paragraphs 1361 and 1362, then plan shown in Fig. 100-Q should be followed for end blocking.

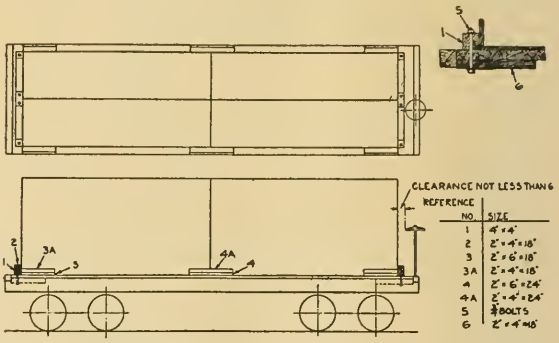


Fig. 100-Q—Boxed Automobiles—Side and End Blocking. Where Heel Blocks Cannot be Used

1364. Side blocking to consist of, preferably, one piece 2 in. by 6 in. securely nailed to floor with 20d nails (cement-coated preferred) and one piece 2 in. by 4 in. securely nailed on top of 2 in. by 6 in. with 20d nails (cement-coated preferred). As an alternative, 4 in. by 4 in. may be used if securely toe-nailed to car floor with 20d nails (cement-coated preferred). Side blocks (end) to be 18 in. long and side blocks (center) to be 24 in. long.

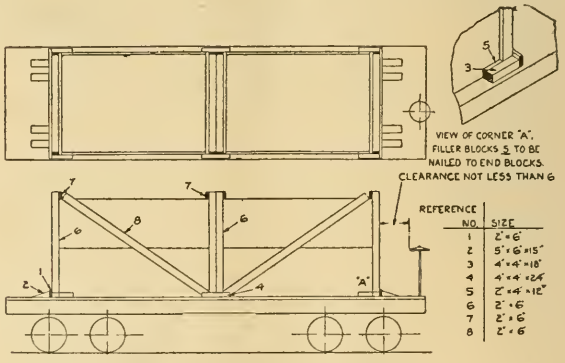


Fig. 100-U—Boxed Automobiles—Double Deck Loading

When there is insufficient space to use side blocks as specified, two side stakes with 8 in. above car floor must be used to each side of each box and space between the box and side stakes must be completely filled in with blocking at least 4 in. high, which must be securely nailed to car floor. See Fig. 100-S.

1365. For loads above 22,500 lb., all heel blocks must be backed up by one plank 2 in. by 6 in. extending full width of load and securely nailed to floor. See Fig. 100-T.

1366. Any arrangement of equal strength to that specified herein will be accepted as an alternative.

Double Tier Loading—Flat Cars—Figs. 100-U and 100-V.

1367. Double deck loading shall be in accordance with Figs. 100-U and 100-V.

When total load exceeds 22,500 lb., reinforced end blocking should be used, as shown in Fig. 100-U.

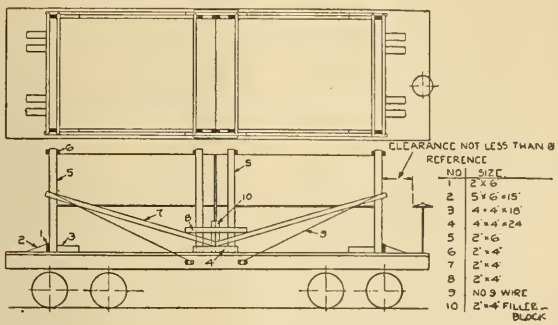


Fig. 100-V—Boxed Automobiles—Double Deck Loading

Any arrangement of equal strength to that specified herein will be accepted as an alternative.

Pyramid Loading—Flat Cars.—Fig. 100-W.

1368. Pyramid loading shall be in accordance with Fig. 100-W.

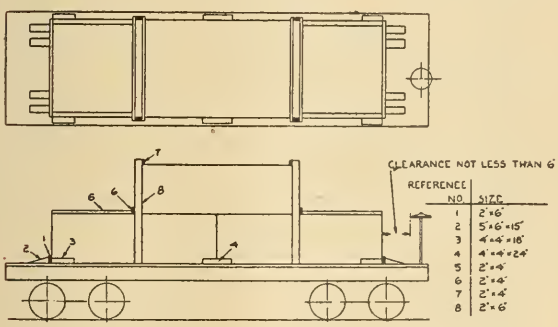


Fig. 100-W—Boxed Automobiles—Pyramid Loading

Any arrangement of equal strength to that specified herein will be accepted as an alternative.

Single Tier Loading in Gondola Cars.

1369. Load may be placed against end gate or end of car opposite brake mast.

The other end of load to be blocked as shown in Figs. 100-P or 100-R. When there is insufficient space at end of load to use heel blocks, one 2 in. by 6 in. extending full width of load and securely nailed to floor of car with not less than 20d nails (cement-coated preferred) may be substituted.

Any arrangement of equal strength to that specified herein will be accepted as an alternative.

Double Tier and Pyramid Loading in Gondola Cars.

1370. Load may be placed against end gate or end of car opposite brake mast.

The other end of load to be blocked as shown in Figs. 100-P or 100-R. When there is insufficient space at end of load to use heel blocks, one 2 in. by 6 in. extending full width of load and securely nailed to floor of car with not less than 20d nails (cement-coated preferred) may be substituted.

Boxes at top of load are to be secured in the manner shown on Figs. 100-U, 100-V and 100-W.

Any arrangement of equal strength to that specified herein will be accepted as an alternative.

Proposed Rearrangement of the Loading Rules

It has been decided by the committee to rearrange the loading rules book, with a view of cutting down the number of separate groups of rules that have been issued in pamphlet form. This will be accomplished by placing all rules, such as lumber, timber, logs, ties, etc., in one group. By this arrangement the rules can be reduced considerably in size, as a large number of repetitions of general rules will be eliminated. The following is an outline of the proposed rearrangement:

Group No. 1.—To be included with each pamphlet issued. General paragraphs, pages 1 to 32, inclusive.

Group No. 2.—Rule governing the loading of lumber or timber on open cars. Paragraphs 100 to 168, inclusive.

Rule governing the loading of logs, telegraph and telephone poles, piling and props on open cars. Paragraphs 200 to 249, inclusive.

Rule governing the loading of tan bark, slab wood and lath on open cars. Paragraphs 300 to 314, inclusive.

Rule governing the loading of ties, fence posts and similar material. Paragraphs 400 to 408, inclusive.

Rule governing loading barrel staves, fence posts, wooden billets, lath, tan bark and similar short wood in box or stock cars. Paragraphs 2100 to 2106, inclusive.

Rule governing loading of ties in box or stock cars. Paragraphs 2200 to 2207, inclusive.

Rule governing loading of barrels in box or stock cars. Paragraphs 2000 to 2006, inclusive.

Group No. 3.—Rule governing the loading of structural material, plates, girders, etc., on open cars. Paragraphs 500 to 566-J, inclusive.

Rule governing the loading of rolled material of small sectional area, short billets, rails, small castings, wheels and tires on open cars. Paragraphs 600 to 612, inclusive.

Rule governing the loading of turntables. Paragraphs 700 to 723, inclusive.

Rule governing the loading of mounted wheels on open cars. Paragraphs 1600 to 1608, inclusive.

Rule governing loading tires in box or stock cars. Paragraphs 2300 to 2307, inclusive.

Rule governing loading of car wheels in box or stock cars. Paragraphs 2400 to 2407, inclusive.

Rule governing loading of metal sheets or plates in box cars. Paragraphs 2900 to 2908, inclusive.

Rule governing the loading of pipe on open cars. Paragraphs 800 to 823, inclusive.

Rule governing loading of scrap, junk and similar material on cars with or without racks. Paragraphs 1700 to 1708, inclusive.

Rule governing loading of iron ore, limestone or similar material on open cars. Paragraphs 1800 to 1805, inclusive.

Group No. 4.—Rule governing the loading of cylindrical boiler shells or tanks. Paragraphs 1100 to 1120, inclusive.

Rule governing loading of engines and similar machinery. Paragraphs 1200 to 1212, inclusive.

Rule governing loading of heavy machinery such as lathes, planers, boring machines, etc., in box or stock cars. Paragraphs 2600 to 2606, inclusive.

Rule governing loading greased shaftings in box or stock cars. Paragraphs 2700 to 2707, inclusive.

Rule governing the loading of mining cars, dump cars, and similar vehicles on open cars. Paragraphs 900 to 913, inclusive.

Rule governing loading of derrick cars, steam shovels, and similar pivoted machinery. Paragraphs 1400 to 1410, inclusive.

Rule governing loading of plate glass on flat or gondola cars. Paragraphs 1500 to 1507, inclusive.

Rule governing loading of scrap, junk and similar material on cars with or without racks. Paragraphs 1700 to 1708, inclusive.

Group No. 5—Rule governing loading concrete culvert pipe on flat cars. Paragraph 824.

Rule governing loading of stone or brick on open cars. Paragraphs 1000 to 1023, inclusive.

Rule governing loading brick and building tile in box or stock cars. Paragraphs 1900 to 1907, inclusive.

Rule governing loading of sewer pipe or drain tile in box or stock cars. Paragraphs 2500 to 2507, inclusive.

Group No. 6.—Rule governing loading of automobiles, trucks and trailers on freight cars. Rules 1300 to 1357, inclusive.

The attention of your committee has been directed to certain drop end gondola cars, recently constructed, in which the reinforcement for the corner stake at end of car narrows the drop end gate opening to such an extent that such cars are practically useless for twin shipments loaded on floor of car, requiring 18 in. clearance on each side of the lading for curving. It is suggested that this subject be referred to the car construction committee with the recommendation that a minimum width clear opening be established between corner stake reinforcements for cars of future construction so that these cars, which are a mill district car, may not be barred from hauling twin shipments.

The report is signed by R. L. Kleine, Pennsylvania; J. J. Burch, N. & W.; E. J. Robertson, Soo Line; J. E. Mehan, C., M. & St. P.; Samuel Lynn, P. & L. E.; Ira Everett, L. V.; T. O. Sechrist, L. & N.; E. N. Harding, I. C. and G. R. Lovejoy, Detroit Terminal.

Discussion

R. L. Kleine (Penna.), chairman of the committee said: The work of your Loading Committee during the past year consisted mostly of considering the changes recommended by members and shippers, particularly steel and automobile shippers. We held a number of joint conferences with these shippers, and I am glad to say that our conference work has gone along satisfactorily. The steel shippers, however, still have some objections to our requirements. They think they are too rigid, but we are ironing them out from time to time. Your committee does not feel like making any changes in the rules where a question of safety is involved, or where in their opinion there is any doubt as to a question of safety.

For example, there was a meeting of steel shippers yesterday afternoon to consider the binder question on double loads. They wanted a modification in the number of binders specified last year. The committee had considered that at two previous meetings. It did not feel that any further modifications could be made. The suggestion was offered that where three binders had been specified in the double load—formerly only one was required—we would try out the omission of the centre binder. This committee would like to have authority to do that without making any change in the rules, and with the idea that if it does not get us into any difficulties, we will recommend that change during the year.

The composite spacing block has been tried out and found to be very successful, and therefore the committee would recommend that as a substitute for the present composite block, the standard steel spacing block not to be changed. The recommendations of the committee on automobile loading are the result of joint conferences with the shippers. There is no disagreement in regard to the details presented.

A motion was made and seconded that the report be received, and submitted to letter ballot.

W. F. Kiesel, Jr. (Penna.): The Loading Committee has put up a question to the Car Construction Committee in the last paragraph which cannot be answered unless we have a specified design of car. It would be preferable if the Loading Committee would specify the narrowest limits we can work to, so that the Car Construction Committee could state, when the question of designing comes up, whether or not the design can be made to conform with these rules.

Mr. Kleine: It is not a question of the narrowest limits we want there; it is a question of the widest limits. I believe the Car Construction Committee ought to set a minimum. This particular feature was brought out very strongly by the steel shippers. There have been a number of drop-end gondola cars designed to carry products into the mills, and they cannot be loaded out on account of the narrow clearance at the drop-end gate. To reinforce the corner post drop-end gate, plates of such width have been used that there is insufficient room for fully loading the car, and it is within the province of the Car Construction Committee at least to recommend a minimum width of opening.

Samuel Lynn (P. & L. E.): We are building a car for the purpose of loading long material. Then we get the wide gusset plate, and we get the car out of the service for which it is built. That is a matter which the Car Construction Committee should consider.

P. P. Barthelemy (Great Northern): On our road we haul a great deal of lumber, double loads and long timbers, and we have experienced considerable trouble with that class of car. The construction ought to be such that we would have practically as large clearance at the end gate, with the exception of some slight reinforcement, as the general opening between the posts of the car.

C. F. Giles (L. & N.): We all recognize the authority of this association to make rules, but it is up to the individual members of the association to see that these rules are carried out. A great deal of dissatisfaction and trouble, and great delays, are caused at interchange points by reason of the fact that cars are not loaded in accordance with the loading rules, and the interchange point is not the place for this thing to be taken care of. It should be taken care of at the point where the cars are loaded, and this applies especially to the way in which the lading is put on the cars and the protection of the side doors.

On our road, and I have no doubt that many other roads have the same experience, many cars are stopped at interchange points by reason of the doors not being properly protected. I want to emphasize the importance of individual members of the association handling the matter with proper authority to see if the cars cannot be properly laden at loading points.

Chairman Tollerton: The chairman will be glad to extend the privilege of the floor to the steel shippers who are present at the meeting, and we will be glad to hear from them.

Charles Orchard: I think Mr. Kleine has summed up the arguments we introduced in our conferences in respect to the additional clearances desired. It is a matter of intensive loading—we desire to get the largest possible tonnage on the cars that will be safe. We are held down by the loading rules to 75 per cent of the marked capacity on these floor loads, and where there is considerable space taken up by these gussets, it is impossible to get the required 18 in. clearance. In our desires to avoid any unsafe loading, there is a great probability that the cars will go out short of the loading we desire to get on them.

The gusset braces and braces to the ends of the car restrict us, not only in the weight desired to be loaded on some of the cars, but in the use of the cars at all, and it results in our sending the cars out with loads that are not as safe as they would be otherwise with the larger space. I hope that Mr. Kleine's suggestion can be given careful consideration.

T. H. Goodnow (C. & N. W.): I believe the only way by which we are ever going to enforce the proper loading of cars is to bill back on the originating line for the improper loading, insecure door protection, and features of a similar character. Some roads do not seem to exercise any supervision over these matters, and the car is passed in interchange until it comes to some of the larger gateways, where a closer check is being made, and there it is held up. Unless you can penalize the loading line, instead of the intermediate line, I am afraid that practice will continue as it does at the present time. The question has been up several times and never been acted upon, and possibly it is one for the Traffic Section to settle.

J. S. Neary (Monon): We have many cars loaded in the stone districts and there is some objection from the connecting lines in regard to the end braces. Three-fifths of the flat cars coming into that territory are not equipped with stake pockets. The absence of these stake pockets is the fault of the roads themselves, instead of the stone shippers, and some action should be taken to requite the equipment of all cars with stake pockets.

The motion to accept the report and refer it to letter ballot was put to a vote and carried.

Report on Train Brake and Signal Equipment

PART I—Retaining Valves For Freight Equipment Cars

THE SUBJECT REFERRED to the Committee on Train Brake and Signal Equipment during the past year, on which the following report is submitted, were 10 in number.

The committee recommend in its 1919 report, "for adoption as recommended practice, two-pressure spring-type retaining valves of such capacity as may be required by individual roads, leaving the question of standard capacity open for further consideration." This was adopted by letter ballot, and the committee was requested to report on the question of standard capacity for retaining valves of the two-pressure spring type.

The committee appointed a sub-committee to make, subject to the approval of the general committee, such observations and road tests as will be required in determining what capacity retaining valves should be recommended. Pending completion of these observations, the committee reports progress and asks for further time on the question of retaining valve capacity.

PART II—Standard For Air Brakes, M. C. B. Sheet No. 18

It has been suggested that M C. B. Sheet No. 18 should be revised to show (a) the material of which the brake details shown thereon should be made; (b) the omission of the second hole from the end of the dead lever guide which is attached to the bolster, as it is seldom, if ever, practical to connect the guide at this point to the dead lever; (c) a curved dead lever guide, as straight guides do not always clear the car framing when dead lever is connected close to bolster; and, (d) to provide for dead lever guides made of malleable iron.

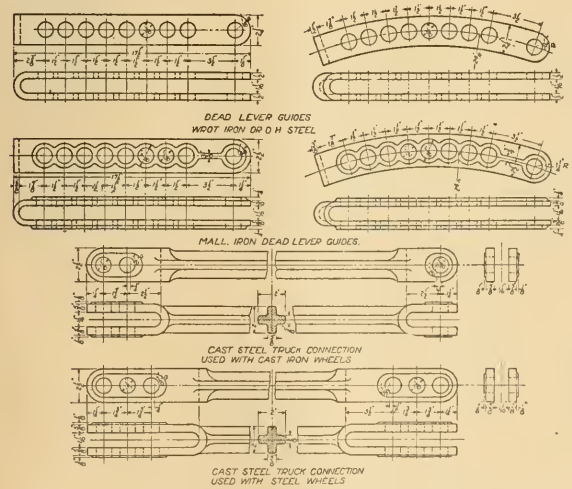


Fig. 1—Dead Lever Guides and Truck Connections

All brake details shown on the sheet in question are to be made of wrought iron or steel, except the truck lever connector (bottom rod) which may be cast steel and for which there are no detail drawings. The committee, therefore, recommends replacing the dead lever guide and the note on the use of cast steel bottom rods with the details shown in Fig. 1.

PART III—Brake Chain Failures on Tank Cars

A request was received to report on the failure of hand brake chains on tank cars caused by these chains rubbing on the axle. This investigation was made by a sub-committee which examined a large number of cars, 45 per cent of which were found with hand brake rods and chains arranged as shown in Fig. 2, Group 1, on which these chain failures were to be expected.

Fifty-five per cent of the cars examined by the committee had the parts in question arranged as shown in Group 2, with which there was no indication of the chains coming in contact with the axle.

It is recommended that the chain rods be made long enough to reach the center of axle preferably extend two inches forward of the axle center and be suspended six inches above the axle, as shown in Group 2. Group 3 shows, as a matter of information, preferred means of suspending the hand brake rod to prevent it coming in contact with the axle.

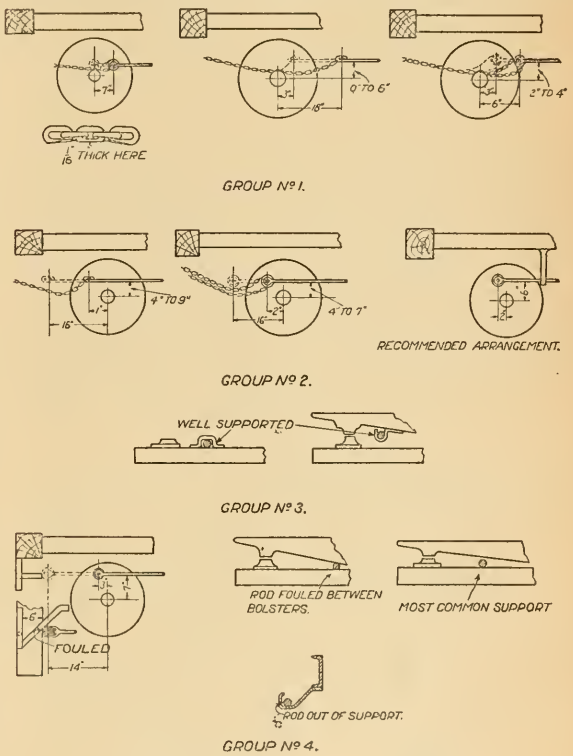


Fig. 2—Hand Brake Chains on Tank Cars

PART IV—Location of Angle Cocks

The standard location of angle cock on freight cars as shown on M. C. B. Sheet No. 18 is, for wooden cars, 13 in. from the center of the car and 13 in. back of the pulling face of the knuckle, and for steel cars built after 1916, 15 in. from the center of the car and 9 in. back of the knuckle face. These dimensions are tabulated as *B* and *C*, respectively. The sheet also contains a note reading: "Dimension *B* must bear a fixed relation to dimension *C*. When dimension *B* must be increased or decreased from dimensions shown in table, dimension *C* shall be determined from the formula $C = 39 - 2B$."

C. B. Young advised that through slight variations in construction the angle cock on a large number of new cars built for the U. S. R. A. is 15½ in. and 9 in., respectively, from center of car and knuckle face, and recommended changing the formula on M. C. B. Sheet No. 18 to $C = 40\ 2B$.

This subject was referred to a sub-committee to investigate the question of clearance between couplers and angle cocks or hose, possible stretching of hose with draft gear under tension and cars on curves, and the effect on air hose of the angle of the cock key to the vertical. The sub-committee's findings are shown in the accompanying drawings.

Fig. 3 shows at Section *A-A* a clearance of practically ¼ in. between the guard arm of the type "*D*" coupler and hose adjacent to angle cock on a car measuring 33 ft. 10 in. over striking faces, with the car on a 66-ft. radius curve, the brake pipe located 15½ in. from center of the car, the angle cock key 9 in. back of the "neutral coupling line" and the coupler against the side stop.

Substantially the same clearance is shown in Fig. 4 for a type "D" coupler on a U. S. R. A. 50-ton low-side gondola car having the brake pipe located 15½ in. from the center of the car and the angle cock 8 in. back of the pulling face of the coupler and at an angle of 30 deg. from the vertical. This clearance is increased to 1⅛ in. with the angle cock 20 deg. from the vertical.

Fig. 5 shows the relative position of adjacent angle cocks on two cars, of the length shown in the drawing, coupled on a No. 6 crossover, with brake pipe and angle cocks in the several positions indicated in the table. It will be noted from Column *D*, under 30 Degrees, that the proposed change in the formula is equivalent to shortening each air hose 7-16 in., which the committee does not believe should be done. It will also be noted by comparing Columns *D* under 30 and 20 Degrees, that making the angle of the cock key less than 30 deg. from the vertical is equivalent to shortening the hose in substantially the same ratio as increasing the distance from the center of the car to the center of the brake pipe.

The committee has also made some experiments to determine if reducing the angle of the cock to the vertical, to provide better clearance between the hose and the coupler guard arm, would have an important bearing on kinking the air hose. It is found that when cars are on straight track and the draft gear compressed solid, there is slightly less kinking of the hose with a 20 deg. angle than with the 30 deg. angle; but when the has been experienced with hose couplings leaking at the packing rings in cold weather, changing the angle of the cock is not considered advisable.

It is conclusive from the foregoing that the brake pipe on a car having type "D" couplers with a side movement of 2½ in. should be not less than 15½ in. from the center of the car at the angle cock. The committee, therefore recommends that no

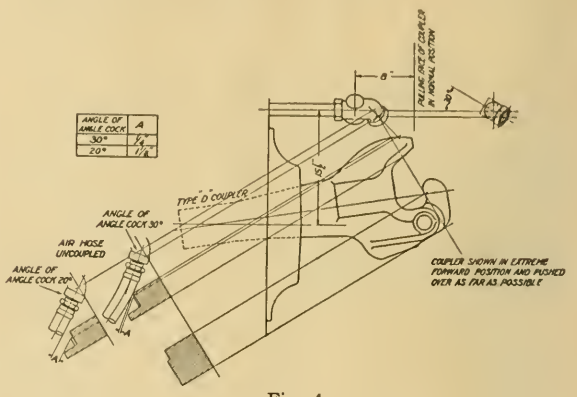


Fig. 4

change be made in the present standard location of angle cock, but that a new line be added to the table on M. C. B. Sheet No. 18 showing *B* and *C* to be 15½ in. and 8 in., respectively, for new cars or cars having type "D" couplers.

PART V—Text For Standard Manual

The committee has prepared and submitted to the secretary, for the standard manual, text on (a) air brakes, (b) use of air

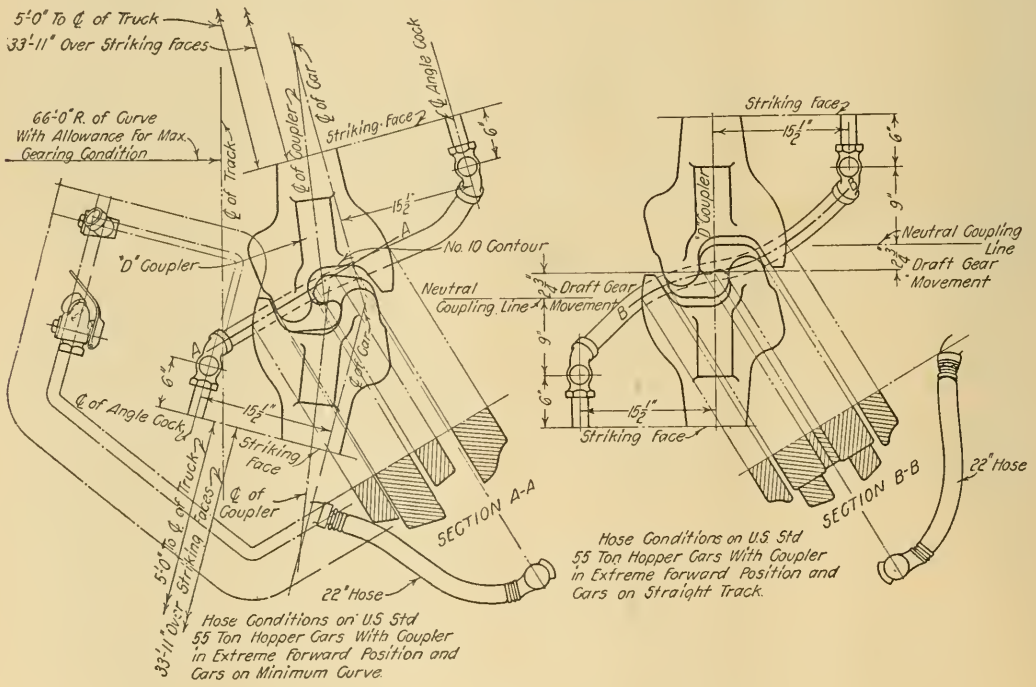


Fig. 3

adjacent angle cocks on two cars coupled are in their extreme positions, on curves with the draft gear under tension, the 30 deg. angle is the preferable one; and, owing to difficulty which

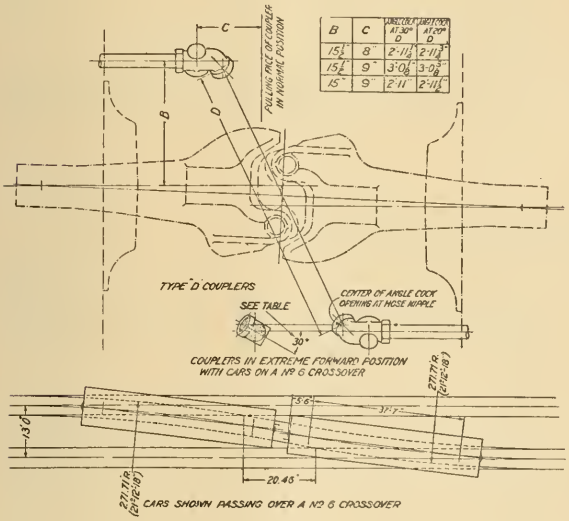
brake defect card, (c) air brake hose, (d) gages for air brake hose, (e) gage for air brake hose coupling packing rings, and (f) air brake appliances.

Part VI—Automatic Hose Connectors

Owing to the magnitude of this subject, the committee has done little more than outline a plan to be followed in investigating the subject, and reports progress and recommends that the subject be continued, for which a special committee should be appointed or another member added to the Train Brake and Signal Committee, in order that a sub-committee may be selected to handle the subject of automatic connectors.

Part VII—Substitution of Triple Valve—Cleaning and Stenciling Cylinders and Triples

The proper substitution of triple valves when making repairs to freight cars in interchange service has been the subject of



B	C	VARIOUS D AT 30° D	VARIOUS D AT 20° D
15½"	8"	2'-11½"	2'-11½"
15½"	9"	3'-0⅝"	3'-0⅝"
15"	9"	2'-11"	2'-11½"

Fig. 5

some correspondence between the Arbitration Committee and this committee, the latter committee's recommendations having been submitted to and approved by the Arbitration Committee.

Part VIII—Brake Cylinder Packing

The question of leather substitutes for brake cylinder packing has been considered, and, due to the conflicting results of tests conducted on the several roads represented on the committee, the committee does not feel that it could consistently recommend the use of brake cylinder packing made of leather substitutes. It is recommended, however, that the subject be continued for further investigation.

Part IX—Cleaning, Lubricating and Testing Triple Valves

The present instructions on lubricating triple valves provide for the application of more graphite than the committee believes should be used, and it is recommended that Section 13 in the standard instructions on cleaning, lubricating and testing triple valves be revised to read: "Lubricate the seat and face of the slide valve and slide-valve graduating valve with high-grade, very fine, dry graphite, rubbing it on to the surface and the upper portion of the bushing where the slide-valve spring bears with a flat-pointed stick, over the end of which a piece of chamois skin has been glued, taking care to work the graphite into the pores of the metal, but leave no loose graphite on the seat. The chamois skin can be dispensed with provided the stick is made of soft wood, such as white pine, which will easily hold all the graphite that can be rubbed into the surfaces of the metal. The parts to be lubricated with graphite must be free from oil or grease."

Part X—Adjustment of Brake Power on Freight Cars

This subject was received too late for the committee to take action on this year, but it is the belief of the committee that the present requirements for adequate hand brake power on cars other than tank cars are very indefinite, and that the correctness of the requirements will have to be demonstrated by actual trial. The committee will consider this subject during the coming year.

The report was signed by T. L. Burton (Chairman), New York Central; B. P. Flory, New York, Ontario & Western; J. M. Henry, Pennsylvania; L. P. Streeter, Illinois Central; R. B. Rasbridge, Philadelphia & Reading; G. H. Wood, Atchison, Topeka & Santa Fe, and H. M. Curry, Northern Pacific.

Discussion

T. L. Burton (N. Y. C.): At a recent meeting of the committee a communication was read from R. W. Bell of the Illinois Central calling attention to damaged freight equipment caused by bursted air hose, and also calling attention to some consideration which had been given that subject by the Air Brake Association, and urging the importance of something being done to relieve the situation. In due course this subject will receive the proper consideration of the committee. Meanwhile attention is called to the standard practice which was adopted last year of testing air brake hose with soap suds when cars receive testing or air brake repairs on shop and repair tracks, which, if properly followed up, should afford great relief from the source complained of.

A motion to accept the report and refer such items as are necessary to letter ballot was made and carried.

Report of the Committee on Resolutions

C. E. Chambers, chairman of the committee, submitted the following resolution:

Resolved, That Section III Mechanical, of the American Railroad Association, is opposed to legislation making the use of the metric system of weights and measures obligatory to the exclusion of the English system or the American system at present in general use.

A motion to adopt the resolution was made and carried.

Change in Name of Section

Mr. Fuller presented the following resolution:

Resolved, That it is the sense of this convention that Section III—Mechanical does not clearly indicate the scope and identity of the organizations interested; that these organizations have functioned for so many years and are recognized more clearly by the original names, that the name of Section III—Mechanical, be changed to read "American Railroad Association, Section III—Master Mechanics, Master Car Builders, and Subordinate Mechanical Organizations," this being more clearly in line with the other sections which have retained their individual names in the reorganization.

Mr. Brazier: I am a member of the Committee on Resolutions, and I want to say that this thing is very near to my heart. There is nothing like a good name, and there is no name in the history of American railroading that stands higher than the names Master Car Builders' Association and American Railway Master Mechanics' Association, in this country and in Canada. (applause).

A motion that the resolution be adopted was made and carried.

Mr. Fuller: In connection with the resolution adopted by the convention Monday last, to the effect that presiding officers rotate annually, we wish to offer the following resolution:

Resolved: It is the sense of this convention that the Nominating Committee be instructed to consider only members of the General Committee when nominating members for presiding officers, i. e., Chairman and Vice-Chairman; also, that

in so far as possible past-presidents of the organizations be considered for members of the General Committee, not to exceed one-half of the total personnel of the committee.

A motion to adopt the resolution was made and carried.

Mr. Fuller: The committee desires to offer the following:

Resolved, That it is the sense of this convention that when practicable the approved recommendations of this organization be put into practice on locomotives, cars and in shops, and that executive officers be requested to lend their good offices to bring about this result.

A motion that the resolution be adopted was made and carried.

Mr. Fuller presented the following:

Whereas, The Railway Supply Men's Association has gathered together for our benefit the largest and most comprehensive exhibit of railway mechanical machinery and appliances ever collected at one time, have carried out such an acceptable program of entertainment for the members of the section, their friends and families, and without confusion have enrolled the largest attendance of any mechanical convention; and

Whereas, the Atlantic City Hotel Men's Association have in their usual manner provided so acceptably for our welfare and comfort; and

Whereas, the Executive Committee of the American Railroad Association have indicated their fullest approval of the work of the section in the convention, together with enthusiastic inspiration for future work; and

Whereas, the meetings have been so ably planned and guided by the officers, and special thanks are due the secretary for his untiring efforts and for the very able manner in which committee meetings have been handled and reports furnished in ample time for perusal before the meetings; therefore be it

Resolved, that the appreciation of Section III—Mechanical of the American Railroad Association be extended to the Railway Supply Men's Association for preparing the exhibits and furnishing our entertainments; the Atlantic City Hotel Men's Association; the management of Young's Steel Pier for the improvement made since our last convention, and the co-operation so freely given; the Executive Committee of the American Railroad Association, and the secretary and retiring officers of the section; and to the *Railway Age* warm thanks are extended for the up-to-the-minute reports of our proceedings.

A motion to adopt the resolution was made and carried.

A motion that a vote of thanks be extended to the Resolutions Committee for the work they have done in connection with these resolutions and others that have been offered was made and carried.

Report on Train Lighting and Equipment

THE COMMITTEE WAS INSTRUCTED to prepare, in so far as it was possible, a specification for axle generators. Similar work had been assigned to a committee of the Association of Railway Electrical Engineers. The members of the committee were also members of the A. R. E. E. Committee and the two committees therefore decided to hold joint meetings.

Representatives of the axle generator manufacturers were invited to attend the meetings of the committee and considerable correspondence was conducted with them and also with the manufacturers of ball bearings.

Before presenting the result of the work of the committee in the shape of a specification, it seems desirable to discuss, in more or less detail, the various features that were considered. This discussion will serve to explain why certain items, which form a part of a complete specification were omitted; and why items that were included were finally decided upon.

Generator Frame Material

Generator frames may be made of rolled or cast steel or of cast iron. Cast iron is lower in cost per pound than steel, but has a lower magnetic permeability, therefore requiring a greater weight to obtain the same electrical effect. From a service standpoint each material is acceptable and the decision which to use is really based on economic considerations; modified by the space requirements that must be observed. Where space is a factor, the frame should be of cast or rolled steel. Where space is not a factor, cast iron may be used.

Armature Shaft Material

Armature shafts were formerly made of mild steel and trouble with these shafts breaking or bending at the pulley end, was encountered. This trouble was probably due in some cases to the strain caused by excessive belt tension, in others to the shock of coupling or to torsion developed when the bearings seized. The use of ball bearings has practically eliminated the latter cause and at the same time, has necessitated, in order to mount properly the bearing and permit its removal and reapplication, the use of a better grade of steel. It, therefore, seems desirable to specify the characteristics that a steel suitable for this purpose should possess.

Assembly of Armature

For years the armatures of axle generators were built with the laminations and end plates keyed directly to the armature shaft, a construction that necessitated scrapping the armature when the shaft was damaged. Modern armatures of all types of electrical machines have the laminations and end plates and also the commutator assembled on a quill and the quill is then keyed to the shaft. This construction permits the removal and replacement of the shaft.

Bearings

The sleeve bearings that were originally used on axle generators were a most prolific source of trouble, due to wearing, running hot and seizing. Also the bearings were not interchangeable, almost every make and type of generator requiring a different bearing. These conditions required that the bearings be frequently and carefully inspected, as excessive wear would permit the armature to drop and strike on the pole face damaging both field and armatures. In order to guard against this condition and postpone the day on which it would be necessary to renew the bearings on account of legitimate wear, it was customary to design the generator with an air gap having a liberal mechanical clearance, which of course tended to increase the size of the generator and also the cost. Ball bearings seemed to offer a remedy for this trouble, inasmuch as they had been standardized by the manufacturers in a series of definite sizes, so that ball bearings of any given size, no matter by whom manufactured were interchangeable and due to the construction of the bearing the clearance of the air gap could be reduced materially without danger to the armature striking on the pole faces.

The movement to standardize ball bearings was started at the time the use of ball bearings was first begun. After consultations with the ball bearing and axle generator manufacturers a series of sizes was selected and reported by the committee. (See M. C. B. Proceedings, Vol. 51, 1917, Page 98, and Vol. 52, 1918, Pages 137 and 1007.)

The committee recommends that two additional sizes be added, as shown in the table on sizes of ball bearings, as given in the specification.

It is essential to obtain good service that ball bearings be not overloaded and also the manner in which the bearings

are mounted is of great importance in determining the service to be obtained. Thus one bearing must approximately be fixed in position, while the other must have a longitudinal movement so that it can accommodate itself to the change in length of the armature shaft as these changes occur with

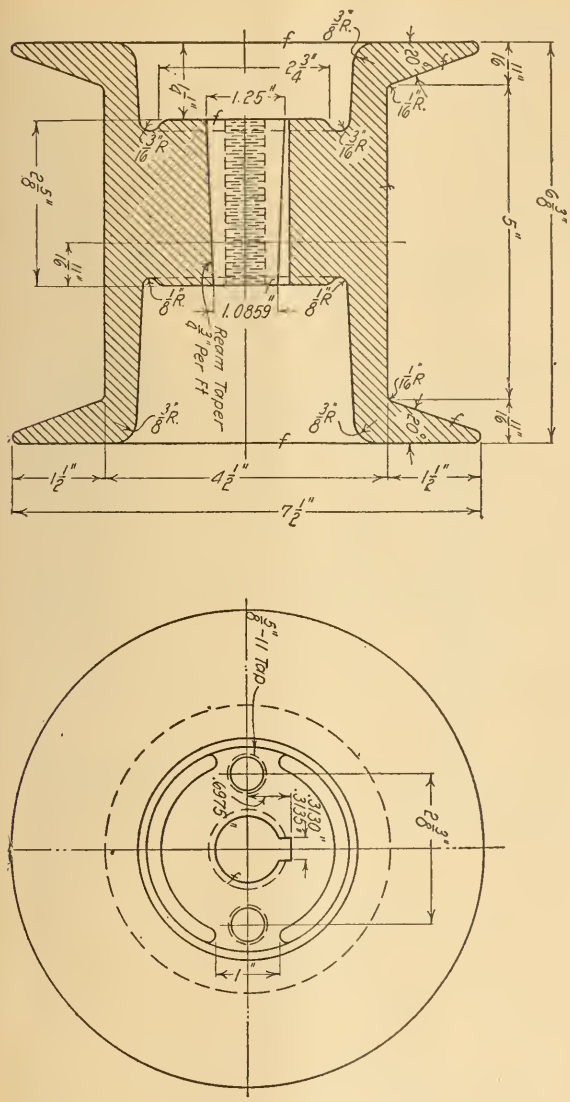


Fig. 1—4½ in. Pulley for Controlled Speed Generator

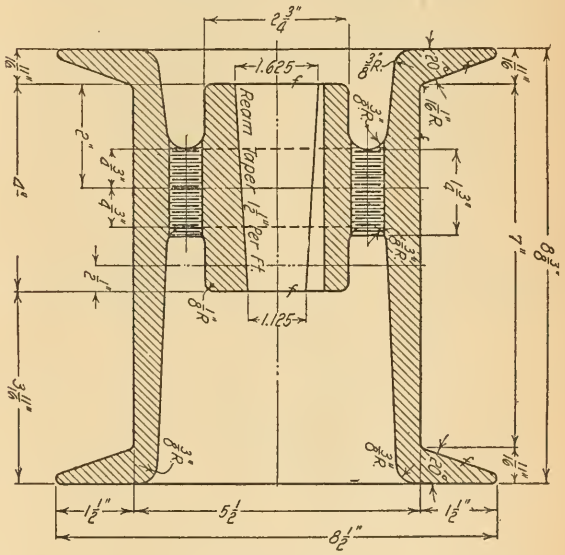
varying temperatures. The load on a bearing is either radial, thrust, or a combination of the two. From the nature of the design the greater part of the radial load must be borne by the pulley bearing, and it is therefore, customary, in order to equalize the load, to make the commutator end-bearing sustain the thrust.

It is also essential that a proper fit of the shaft in the bearing and of the bearing in the housing be obtained. If the shaft is too small or the housing either too large or too small, the bearing will not function as a bearing. If the shaft is too large the inner race of the bearing will probably crack when the attempt is made to mount the bearing on the shaft.

In the past such terms as "sucking fit," "press fit," and "light drive fit," were used to describe the various kinds of fit desired, but these terms were not accurate and it seems best that certain dimensions with allowable tolerances be fixed. The question was therefore taken up with the ball bearing manufacturers and information obtained relative to the above, together with corresponding data concerning the bearings themselves.

Grease Retainers

When sleeve bearings were used, oil was the lubricant employed, and this oil would travel along the shaft and into frame, where it would become mixed with carbon dust and cause grounds; or become deposited on the commutator causing the generator to fail to generate. With ball bearings, which in this service, ordinarily use grease as a lubricant; the same trouble is sometimes experienced during very warm weather, if an excessive amount of grease be placed in the bearing and some provision be not made to retain it. This trouble can be prevented if grooves be machined in the bore of the end housings and felt washers fitting the shaft snugly be applied to the inner side of the commutator end housing and to both sides of the pulley end housing.



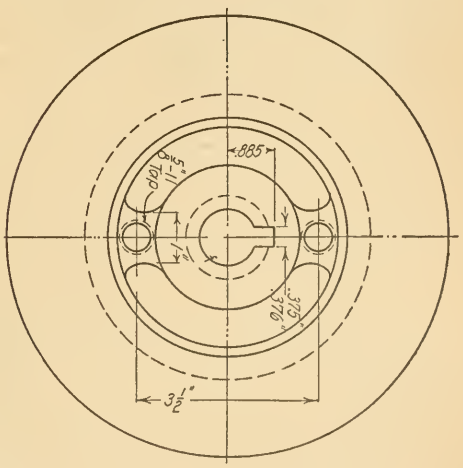


Fig. 2.— 5½ in. Pulley for Controlled Speed Generator

Pulleys, Pulley Nuts and Keys

In past years the committee has made recommendations relative armature pulleys, pulley nuts and keys, see M. C. B. Proceedings as noted on the next page.

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" 47-1	1913	"	414
" 49-1	1915	"	424
" 51	1917	"	102
" 46	1912	"	331
" 48-1	1914	"	332
" 50-1	1916	"	380

Drawing Sheet U-7, A. R. A.

The idea on which these recommendations were based was to standardize fully the armature pulley so that renewals could be promptly made to foreign cars, and three sizes,

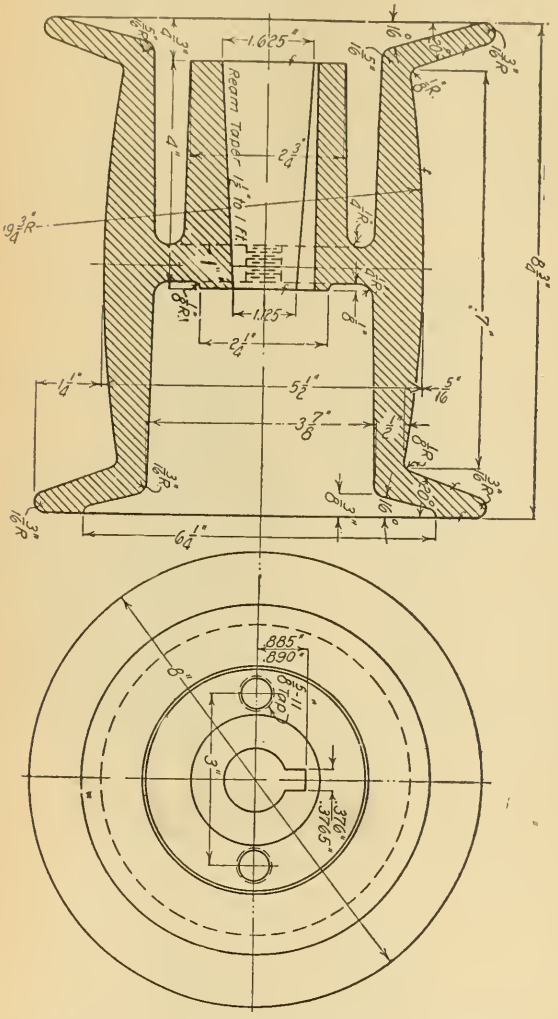


Fig. 3.—5½ in. Pulley for Free Speed Generator

i. e., 5½ in., 8 in. and 11 in. diameter were selected. It now appears advisable, in view of the advent of the "controlled speed" axle generator and what will later be said on the subject of "capacity" and "minimum full load speed," to increase the number of pulleys as determined by the diameter, while retaining the other dimensions, such as bore, taper, etc., which will enable one to renew a broken pulley even though the pulley applied be not of proper diameter to obtain the minimum full load train speed for which the generator was intended.

Armature pulleys have been made of pressed steel, cast steel, malleable iron, cast iron and various composite structures. General experience indicates that of these various materials, cast iron, everything considered, is the most suitable for the work, and that much of the trouble that has been experienced with cast iron pulleys has been due to the design.

The committee has therefore prepared design for cast iron pulleys in the following sizes:

Controlled speed generators Diameter of pulley—inches	Free speed generators Diameter of pulley—inches
4½	5½
5½	6½
	8
	10

The designs being such that it is hoped that the trouble, i. e., broken flanges, will be at least partially overcome. These designs are shown on Figs. 1 and 2 for controlled speed generators and Figs. 3 to 6, inclusive, for the free speed generators.

Pulleys of these designs for free speed type of generators are interchangeable for all makes and sizes of generators of the general type having the pulley fit shown on drawing U-7 for axle generator having ball bearings.

The size of the armature pulley that should be used in any given case will depend upon the maximum load, the mini-

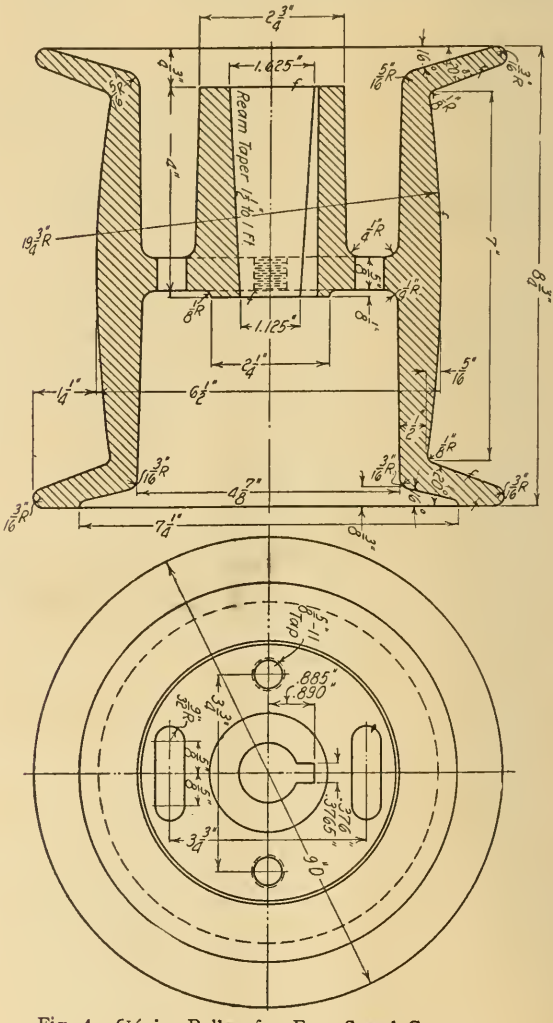


Fig. 4.—6½ in. Pulley for Free Speed Generator

mum full load speed desired, the pulley ratio, the maximum size pulley permissible and the belt clearances.

The present recommended standard armature pulley nut is of the castellated type as shown on M. C. B. Sheet U-7. It is not practicable to use a castellated nut on pulleys less

than 8 in. in diameter on account of lack of space to insert the cotter pin. Furthermore with the pulley seat having a taper of 1½ in. per ft. it is not always possible to turn the nut forward so that the slots in the nut coincide with the hole in the shaft and the nut must therefore be backed off to permit insertion of the cotter. This leaves the pulley loose on the shaft and the keyways are soon ruined. The committee has recommended that the castellated nut and cotter key be eliminated and that a locking nut of a type acceptable to the purchaser be used. (See M. C. B. Proceedings, Vol. 51, 1917, Page 102.)

Field Coils

When field coils are constructed so that there are no means other than the outer layers of tape, for holding the several turns fixed in their relation to one another, movement of the several turns results due to the vibration occurring from service conditions.

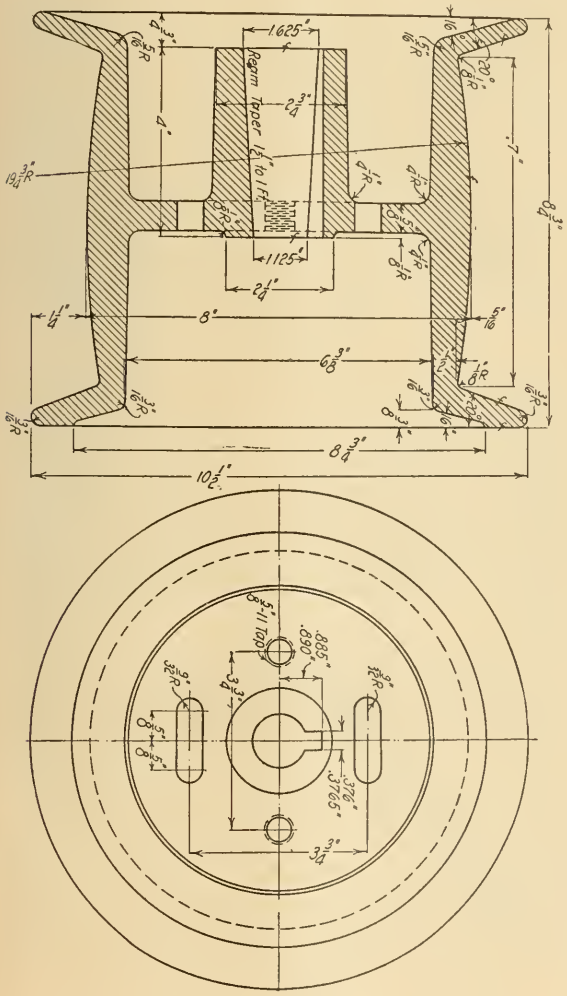


Fig. 5.—8 in. Pulley for Free Speed Generator

As the cotton insulation that is generally used, will in time char due to the heat generated by the operation of the generator, this movement will flake off the charred insulation and the turns will be short-circuited, or in other words, the coil will be burned out. The vibration will, in time, similarly affect a similar coil insulated with Class "B" insulation. It is therefore important that the several turns and layers be so held that no relative movement can occur. This can be accomplished by impregnating the coils with an insulating compound which binds the several layers and turns into one solid mass so that no relative movement can result. Therefore field coils should be impregnated to conform with established practices of electrical manufacturers or thoroughly saturated by dipping process with insulating material and then baked.

Air Gap

The smaller the air gap, that is, the distance radially between the iron of the armature and the pole face the less the reluctance of the magnetic circuit, and therefore the less the number of ampere turns which are required to energize the field. Decreasing the air gap therefore tends to reduce the size of the generators and also its first cost. The use of ball bearings permits the use of a small air gap as little provision for wear is necessary. Experience has shown that when using ball bearings, the mechanical clearance in the air gap will be sufficient, if it is possible to pass in a direction parallel to the shaft, at all points between the armature and the pole faces an oval feeler ½ in. wide and 0.05 in. thick.

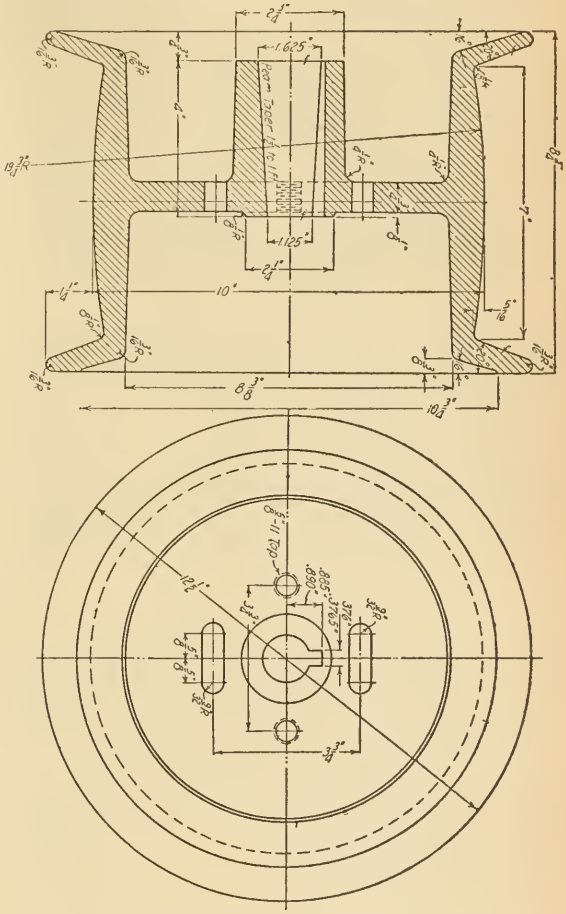


Fig. 6.—10 in. Pulley for Free Speed Generator

Regulator—Location of Holes for Supporting Bolts

The two Z-bars or other shapes by which the generator and lamp regulator panels are supported are ordinarily, most conveniently placed in the regular cabinet in a vertical position. Therefore, if the horizontal distance between the centers of the holes in the panels through which the supporting bolts pass is standardized, one location of these regulator supports may be employed which will tend to simplify the car construction. It is, of course, desirable that the vertical centers of the same holes be also standardized but not so

important as it is for the horizontal holes. The committee investigated this matter and found the horizontal center of these holes varied from 13 to 14¾ in. while the vertical centers varied from eight to 31 in.

By agreement with the axle generator manufacturers, the width of all panels, both generator and lamp regulator panels has been made 16 in. and the horizontal distance between

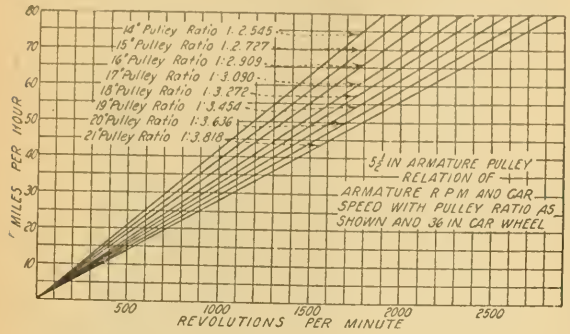


Fig. 7

center of holes which are 7/16 in. in diameter, has been made 14 in., they being placed 1 in. from each side and also 1 in. from each end of the panel.

In order to prevent the supporting frame work short-circuiting the wiring on the rear of the panels, it is frequently necessary to have clearance at this point.

The corner bracket used for this purpose to be interchangeable and to make all panels interchangeable should be designed so that the holes for the supporting bolts shall be the same size as the hole in the panel, i. e., 7/16 in. and when mounted on the panel should have the same horizontal distance between centers, i. e., 14 in.

Minimum Full Load Speed

The minimum r. p. m. of the armature, or the minimum miles per hour of car travel, at which the generator will carry full rated load, is known as the "minimum full load speed."

It will be noted that the relative values of the two ways of expressing this speed will vary with the pulley ratio and size of wheel.

This relation is shown on Fig. 7 to 10, inclusive.

The "minimum full load speed," expressed as r. p. m. of the armature, is a factor of prime importance in the design of the axle generator; a lower r. p. m. generally necessitating a larger generator. Until quite recent years, axle generators were purchased principally for use on cars operated in through service on the main line of railroads, where ordi-

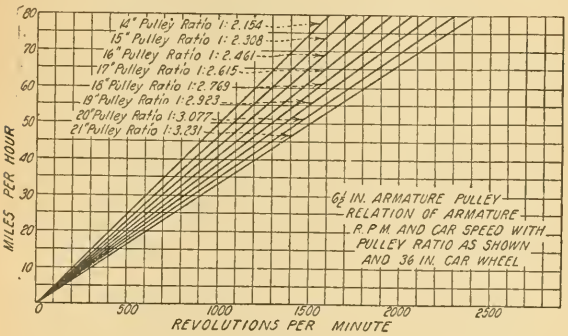


Fig 8

narily the distance and therefore the time interval between stops, was considerable, while the average rate of speed was comparatively high. Under these circumstances a minimum full load speed of approximately 25 miles per hour was low enough to give satisfactory operation.

However, a point has lately been reached in equipping passenger cars with electric light that makes it necessary to consider the conditions which obtain when the cars to be lighted are operated in branch line or local service.

The operating conditions that are generally characteristic of branch line and local service are:

(a). A less distance between stops than is generally encountered on main lines, and therefore a less time interval between stops.

(b). A lower schedule speed, both average and maximum.

(c). A less total distance to traverse in a day.

Therefore, the actual time that the axle generator is in operation per day is generally less in branch line and local service than it is in main line service, and the percentage of

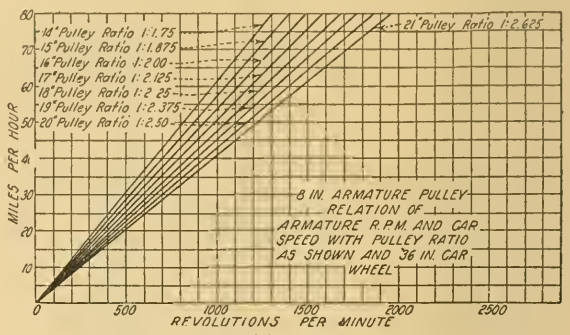


Fig. 9

the total elapsed time of the run that the train speed is above a given figure, is also less.

It is therefore apparent, that an axle generator which will maintain the lighting of a car in main line service, may give entirely unsatisfactory results when the car is operated in branch line or local service; but that a generator that will maintain the lighting in branch line and local service will also maintain the lighting in main line service. In other words, the generator with the low minimum full load speed will maintain the lighting in both classes of service.

As operating conditions may cause cars assigned to branch line or local service to be shifted to main line service and

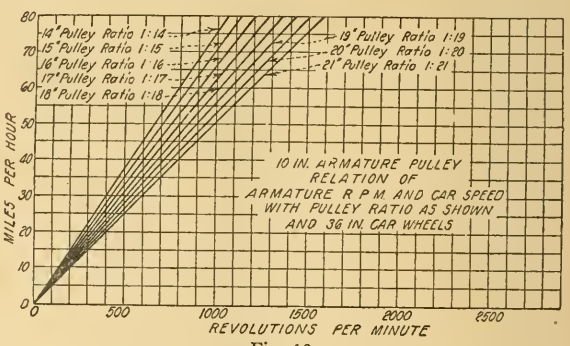


Fig. 10

vice-versa, it would seem desirable, from an operating point of view, to have all cars equipped with generators which will permit the car to be used wherever it may seem desirable.

If generators with a given minimum full load speed will not satisfactorily maintain the lighting of the car, there are only two remedies in so far as the axle generator is concerned:

(a). Decrease the minimum full load speed so as to have the generator in action a greater proportion of the time.

(b). Increase the net ampere capacity of the generator.

Both courses result in an increase in the total ampere hour output of the generator and both will entail a generator of larger physical dimensions.

It is a comparatively simple matter to take a series of speed time curves and from an inspection of them, determine a proper minimum full load speed, and then calculate the net ampere capacity required of the generator. It is a much more difficult problem to assume a new ampere capacity and determine the maximum possible value of the minimum full load speed.

Typical speed time curves of branch line operation are shown on Fig. 11.

The question is further discussed under the caption, "Net ampere capacity for axle generators."

Designation of Axle Generator Capacity

Heretofore it has been customary to refer to axle generators as having a certain kilowatt capacity. In view of the Association in 1919 having adopted as Recommended Practice that the rating of axle generators shall be expressed in amperes, it appears preferable to refer to them hereafter as having a certain "net current capacity."

Net Current Capacity of Axle Generators

In determining the minimum net current capacity of an axle generator that will be required to maintain successfully the electric service on a certain run, consideration must be given to several conditions.

The two factors which determine the minimum generator capacity are the amperes on battery discharge and the battery capacity, and these vary with:

(a). The size of the car, that is the number and voltage of the lamps, fans, etc., installed on the car.

(b). The amperes required to operate the lamps, fans, etc., when the maximum number in service at any one time is turned on.

(c). The magnitude and duration of the various discharges of the battery and the time at which each occurs with respect to the full cycle of operation of the car.

(d). The speed time curve of the car for its full cycle of operation taking into consideration the question of the relation of the time at which current will be required with respect to this speed time curve.

(e). Having decided upon the voltage of the battery, a study of conditions (a), (b) and (c) will determine the ampere hour capacity of the battery to be used; and the capacity determines the normal rate of charge and discharge of the battery.

(f). Conditions (c), (d) and (e) must then be studied to determine the net ampere capacity of the axle generator.

To do this a minimum full load speed must first be assumed. Then the generator while running at this or higher speeds must furnish all current required by the lamps, fans, etc., and in addition it must replace in the battery the ampere hours consumed when the speed is less than the assumed minimum speed plus additional ampere hours sufficient to compensate for the ampere hour efficiency or inherent losses of the battery.

Of course, the higher the minimum full load speed is assumed, the greater the net current capacity of the generator must be; as in the same cycle of operation of the car, it is in action a lesser time, while the ampere hour requirements may be and generally are, increased.

From the above it will be seen that to cover the entire field, i. e., all classes of cars, kinds of service and character of runs, the calculated minimum net ampere capacity would probably vary with each possible combination.

It should also be noted that, while a higher minimum full load speed in miles per hour, entails a larger output in ampere hours, and ordinarily would require a generator of larger capacity, this is not necessarily so, and in fact the reverse may be the case.

The reason for this is, that as yet, the question of the minimum armature r. p. m., at which the generator will carry the desired net amperes, has not been considered.

Minimum Armature Speed

The minimum armature speed depends upon:

(a). The minimum train speed at which the generator must carry the desired net amperes.

(b). The diameter of the car wheel.

(c). The relative diameter of the axle and armature pulley, i. e., the ratio of reduction.

When considering the minimum armature r. p. m. at which the net ampere capacity is to be generated and the ratio of reduction to be used, the question of the maximum armature r. p. m. must not be lost sight of, as otherwise, as high train speeds, the r. p. m. of the armature may be so great as to be dangerous.

Consideration of the above indicates that for any given case a great number of solutions is possible, and that, when all cases are considered the number of possible solutions of the minimum net ampere capacity is infinite.

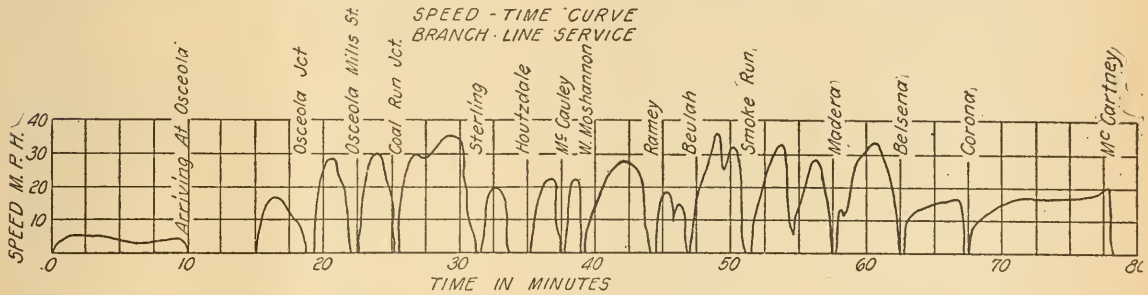


Fig. 11

When theory is reduced to practice, a number of factors, such as clearance, practical pulley ratios, belt strength, etc., operate to reduce greatly the number of practical solutions.

The committee considers that experience has demonstrated that the following combination will cover the entire field:

CLASS OF SERVICE	Approximate maximum load demand	Ampere hour capacity of battery Min.	Ampere hour capacity of battery Max.	Ampere capacity of generator	Minimum full load speed M. P. H.
Official, sleeping, parlor, mail and dining cars having heavy lighting loads, or severe operating conditions	50	350	600	100	26
Mail, dining cars, etc., where the lighting loads are not so heavy or the operating conditions so severe	35	300	350	75	26
Coaches, passenger baggage cars, baggage cars under average operating conditions	25	200	300	50	21
Same cars as next above operating in slow speed branch line or local service	25	150	225	50	16

It is, however, an open question as to how far to apply this table. The question should be determined by each railroad from a study of the conditions under which their cars

must operate; giving full consideration to the first cost of equipment; value of stock to be carried for repair, etc.

For instance, if the conditions on any road are such that the majority of cars require, for successful lighting, an axle generator having a minimum full load speed of, say 16 miles per hour, and conditions of operation are such that the cars are liable to be transferred from one class of service to another, it would seem desirable to make all generators of the one design, even though the first cost of some of the generators was greater than necessary. The advantage of no restrictions on the operating department in the manipulation of the cars and of having one type of generator and the decrease in the amount of repair parts to be carried in stock should outweigh the additional first cost.

On the other hand, if the cars are restricted to certain runs and if the requirements of the service indicate that a considerable number of cars requires generators having minimum full load speed of 21 miles per hour or both 21 and 26 miles per hour, it might be desirable to have generators of different minimum full load speed.

Main Generator Fuse Clips

It is desirable that the various pieces of apparatus that are mounted upon the generator regulator and lamp regulator panels may be removed and reapplied without it being necessary to remove the panel from its support.

The contracts of the generator main fuse in the armature circuit now shown on M. C. B. Sheet U-5, are one of the parts that it is necessary to renew. To comply with the above recommendation, the committee submits Fig. 12, showing a main fuse contact on which the clips can be removed without disturbing the panel.

Regulator Adjustments for Different Types of Battery

In former years the lead-acid-lead battery was used exclusively in car lighting service, but of late the nickel-alkali-iron battery is also used.

The charging characteristics of the two types of battery are radically different and it appears advisable that the generator regulator be so constructed that they may readily be adjusted to suit either type of battery.

Your committee in its 1919 report, recommended that the net ampere capacity of an axle generator be based upon a maximum observable rise in temperature of 70° and 110° C, instead of the corresponding figures of the American Institute of Electrical Engineers of 65° C and 105° C respectively.

This was done under a misapprehension of the true meaning of the A. I. E. E. figures and because a comparison of similar tests run on road and bench indicated that on the road the generator would operate at a temperature several degrees lower than on the bench.

This recommendation was sent to letter ballot and adopted as Recommended Practice. However, the recommendation has been severely criticized on the ground that it does not conform to A. I. E. E. practice.

On looking into the matter further, your committee feels that the criticism is well founded.

The A. I. E. E. standardization Rules specify that the *rating* of motors and generators shall be based upon a maximum observable rise in temperature of 65° C and a maximum observable temperature of 105° C when class "A" insulation is used, the rating taking no account of the conditions of service.

The A. I. E. E., however, recognizes, especially in the case of railway motors, which in their service conditions are more nearly comparable to an axle generator than any other class of motor, that there is a difference between the temperature at which a machine is rated and the temperature at which it may be allowed to operate.

Therefore, the committee has, in submitting these specifications, used the standard temperature values of the A. I. E. E., but would call attention to the fact that under similar conditions of test an axle generator will operate several degrees cooler on the road than on the bench.

Having discussed the various features that must be considered, your committee herewith presents the following specifications for axle generators:

Specification for Axle Generators

1. *General*—(a) This specification is intended to cover axle generator equipment for the A. B. and C. Railroad, delivery to be made f. o. b. manufacturers' works.

(b) Submission of bid will be understood to imply that the manufacturer fully understands and accepts the requirements imposed by, and will furnish apparatus which will comply with this specification.

(c) These axle generators are intended for service on cars having a total load, lamps, fans, etc., of.....amperes at 32

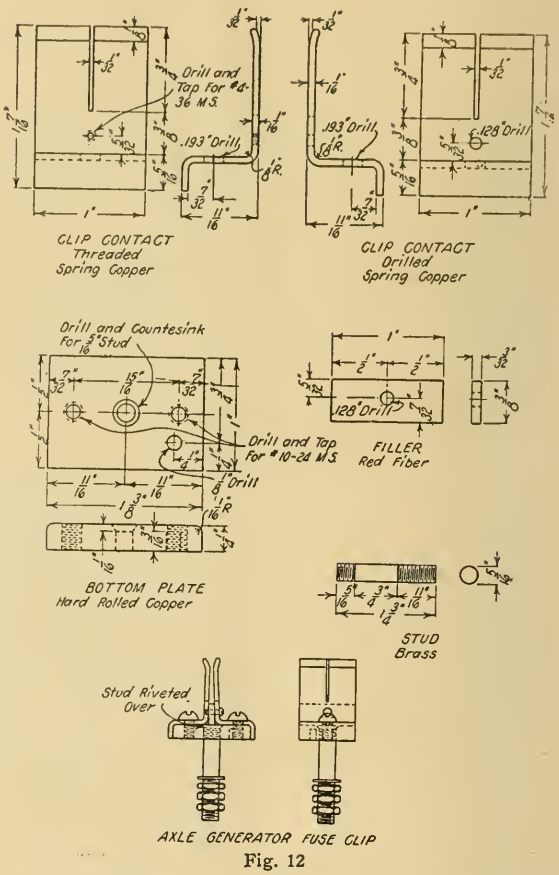


Fig. 12

volts. Each car will be equipped with.....cells of battery of.....ampere hours capacity.

Note.—The railroad company shall specify whether the lead-acid-lead or nickel-alkali-iron battery will be used.

(a) The generator shall carry full load at.....miles per hour. (For recommended values of minimum full load speeds, see below.)

CLASS OF SERVICE	Approximate maximum load demand	Ampere hour capacity of battery Min.	Ampere hour capacity of battery Max.	Ampere capacity of generator	Minimum full load speed M. P. H.
Official, sleeping, parlor, mail and dining cars having heavy lighting loads, or severe operating conditions	50	350	600	100	26
Mail, dining cars, etc., where the lighting loads are not so heavy or the operating conditions so severe	35	300	350	75	26
Coaches, passenger-baggage cars, baggage cars under average operating conditions	25	200	300	50	21
Same cars as next above operating in slow speed branch line or local service	25	150	225	50	16

(e) The material and workmanship shall be the best of their respective kinds.

(f) The accredited representative of the A. B. and C. Railroad shall be the sole judge, on all questions that are not capable of measurement and record, as to whether or not the apparatus complies with the specification.

(g) The apparatus to be furnished shall consist of:

Axle Generator,
Axle Generator Pulley,
Generator Leads,
Generator Lead Terminal Block (to be mounted on car body),
Generator Suspension,
Generator Regulator (with corner brackets),
Lamp Voltage Regulator (with corner brackets),
Axle Pulley,
Axle Pulley Bushing,
Belt and Fasteners,
Lamp Circuit Distributing Panel.

Note.—Any item not desired shall be crossed out.

2. *Axle Generator*—(a) The axle generator suspension lugs shall be of such design and cross section as to eliminate, as far as possible, liability to blow holes, bubbles or other manufacturing defects which may tend to weaken the material in the lug or section of frame adjacent to the lug.

The holes in the lug shall not be cored. The design and location of the lug shall be aproved by the railroad company. Where there is movement of suspension links or pins in the lugs, the hole in the lugs shall be suitably bushed, the bushing being placed in the lug in such manner that it cannot be lost or move relative to the lug.

(b) The generator frame, pole pieces and end housings shall be machined so that all are in accurate alignment and interchangeable from one generator to another of the same make, size and type.

(c) The end housings shall be machined for the ball bearings with allowance for fit as given below:

Housing Fits

Bearing No.	Outside diameter, in. Nominal	Maximum	Minimum	Allowance, in. Maximum	Minimum
304	2.0473	2.0473	2.0465	+.0026	+.0008
307	3.1496	3.1496	3.1488	+.0026	+.0008
308	3.5433	3.5433	3.5425	+.0026	+.0008
312	5.1181	5.1181	5.1173	+.0030	+.0012
407	3.9370	3.9370	3.9362	+.0030	+.0012
409	4.7244	4.7244	4.7236	+.0033	+.0015
412	5.9055	5.9055	5.9043	+.0037	+.0015

Above allowances are based on a total tolerance of 0.0010 in. for housing bore.

(e) The armature shaft at the fits for the inner race of the ball bearings will preferably be ground to the diameter with allowable tolerances as given below for the size of ball bearing to be used.

Shaft Fits

Bearing No.	Bore Nom.	Max.	Pressed fit allowance, in. Min.	Max.	Min.	Desired.	Sliding fit allowance, in. Max.	Min.
304	0.7874	0.7876	0.7870	+.0011	+.0001	+.0003	—.0001	—.0011
307	1.3780	1.3782	1.3776	+.0012	+.0002	+.0005	—.0001	—.0011
308	1.5748	1.5750	1.5744	+.0012	+.0002	+.0005	—.0001	—.0011
312	2.3622	2.3624	2.3617	+.0015	+.0004	+.0007	—.0001	—.0012
407	1.3780	1.3782	1.3776	+.0013	+.0003	+.0006	—.0001	—.0011
409	1.7717	1.7719	1.7713	+.0014	+.0004	+.0007	—.0001	—.0011
412	2.3622	2.3624	2.3617	+.0017	+.0006	+.0010	—.0001	—.0012

Above allowances are based on a total tolerance of 0.0004 in. for shaft diameter at fit.

Should the bearing be mounted on the shaft by means of an expansion device instead of a press or sliding fit, this expansion device shall be so constructed as to relatively secure the bearing to the shaft and to lock positively under any and all service conditions.

(f) The armature shaft for all axle generators at the pulley fit shall conform to the dimensions shown on M. C. B. Sheet U-7.

(g) The armature shaft pulley nut shall be of the..... locking nut type. The face of the nut adjacent to the hub of the pulley shall be finished square with the axis of the thread.

(h) The armature, as a whole, shall be designed as a unit to permit the ready renewal of the shaft without disturbing any part of the winding.

(i) The commutator bars shall be hard-drawn, drop forged or cast-swedged copper with solid risers. The insulation between bars shall be high grade mica of such design and quality as will wear at the same rate as the bars. The commutator bars shall be insulated from the shell by built-up forms of high grade mica.

The commutator shall be thoroughly seasoned and securely fastened on the shell.

The armature conductors shall be of copper, insulated, preferably with American Institute of Electrical Engineers Class "B" insulation.

(l) The end housing shall have one or more circuar U-shaped grooves machined in the bore through which the shaft passes; and felt washers, fitting the shaft snugly, shall be applied to the inner side of the commutator end housing and to both sides of the pulley end housing.

(m) The field coils shall be wound with copper, insulated,

(j) Bearings shall be of the annular ball type and of the size specified as follows:

Truck Suspended		BODY SUSPENDED Width of belt required Free speed 5 in.		4 in.		to transmit necessary power 3 in.		Controlled speeed 4 in.		3 in.	
Pulley	Comm.	Pulley	Comm.	Pulley	Comm.	Pulley	Comm.	Pulley	Comm.	Pulley	Comm.
412	412	412	*412	409	*409	407	407	312	312	307	307
...	...	...	‡409	...	‡407	...	...	...	‡308	...	‡304

*Preferred. ‡Alternate.

Bearings shall conform to the following dimensions with the allowance and tolerance as given: (S. A. E. Standard).

Bearing No.	Inside diameter inches Nom.	Max.	Min.	Outside diameter inches Nom.	Max.	Min.	width inches Nom.	Max.	Min.	Eccentricity tolerance's inches Inner	Outer
304	0.7874	0.7876	0.7870	2.0473	2.0473	2.0465	0.5906	0.5906	0.5856	0.0006	0.0012
307	1.3780	1.3782	1.3776	3.1496	3.1496	3.1488	0.8268	0.8268	0.8218	0.0008	0.0012
308	1.5748	1.5750	1.5744	3.5433	3.5433	3.5425	0.9055	0.9055	0.9005	0.0008	0.0012
312	2.3622	2.3624	2.3617	5.1181	5.1181	5.1173	1.2205	1.2205	1.2155	0.0010	0.0016
407	1.3780	1.3782	1.3776	3.9370	3.9370	3.9362	0.9843	0.9843	0.9793	0.0008	0.0012
409	1.7717	1.7719	1.7713	4.7244	4.7244	4.7236	1.1417	1.1417	1.1367	0.0010	0.0016
412	2.3622	2.3624	2.3617	5.9055	5.9055	5.9043	1.3780	1.3780	1.3730	0.0010	0.0016

(k) One end bearing shall be mounted so that the bearing shall have approximately 0.01 in. play is the longitudinal direction of the shaft. The other end sall be mounted so that it shall have at least $\frac{1}{16}$ in. play in the longitudinal direction of the shaft.

(d) The armature shaft shall be annealed carbon steel having characteristics equal to or better than the following:

Carbon	0.38 to 0.52 per cent
Manganese	0.40 to 0.75 per cent
Phosphorus (not more than)	0.05 per cent
Sulphur (not more than)	0.05 per cent
Tensile strength, lbs. per sq. in. (not less than)	80,000
Yield point, lbs. per sq. in. (not less than)	0.5 tensile strength
Elongation in 2 in., per cent inverse ratio, 1,800,000 ÷ tensile strength	
Elongation in 2 in. (not less than)	20 per cent
Reduction in area (not less than)	32 per cent
Reduction in area, per cent inverse ratio, 2,800,000 ÷ tensile strength	

Note.—See specification of the Railway Master Mechanics Association for annealed carbon steel, Vol. L, 1917-1918, page 254.

preferably with the Class "B" insulation of the American Institute of Electrical Engineers.

The field coils shall be form wound, impregnated with a suitable insulating compound to conform to established practices of electrical manufacturers, or thoroughly saturated by the dipping process with insulating material and then baked. The coils shall be covered with at least two layers of insulating tape laid with a half lap. The ends of each coil shall be marked to indicate the inner and outer ends of the coil. The coil shall be placed over the pole pieces and so held as to prevent positively any relative movement of the coil with respect to the pole piece.

(n) The pole changer shall be of such design as to throw com-

pletely, from one position to the other, in not more than ten revolutions of the armature shaft.

(o) The armature pulley shall be———in. in diameter in accordance with A. R. A. Drawing No..... and is intended to be driven by a ....in. .....ply belt from an axle pulley ....in. in diameter.

(p) Main generator and field leads shall be not less than 40 in. long and shall consist of No. 4 A. W. G. cable of not less than 61 strands, 1/64 in. wall of 30 per cent Para rubber insulation, or equivalent, covered with two braids.

(q) The generator shall be designed to generate rated voltage (40 volts) at load side of generator regulator and to carry full load, ...amperes (net current capacity, that is, total generated, less all field, control and regulating current used in the generator regulator and lamp voltage regulator), at an armature speed not to exceed.....r. p. m.

$$\frac{560}{60} \times \frac{\text{Diam. Axle Pulley} \times \text{Min. full load speed of car in miles per hour}}{\text{Diam. Armature Pulley}} = \text{r. p. m. of armature shaft.}$$

This value shall be known as the "minimum full load speed" in r. p. m. of the generator. (For recommended values in miles per hour see table in Section 1-d.)

(r) The generator, with an armature r. p. m. of not more than 75 per cent of the above speed, shall generate sufficient voltage and current to close the automatic switch at the voltage setting as given for same, this speed being known as the "cutting in speed" in r. p. m.

(s) The generator shall be safe to operate both electrically and mechanically at an armature r. p. m. of

$$\frac{560}{36} \times \frac{36}{33} \times \frac{\text{Diam. Axle Pulley} \times 75 \times \text{Factor of Safety 1.2}}{\text{Diam. Armature Pulley}} = \text{Max. Armature r. p. m.}$$

This value shall be known as the "maximum speed" in r. p. m. of the generator.

(t) At all speeds from cutting in to maximum speed, and at all loads from zero to full rated ampere capacity, the generator shall operate without destructive or excessive sparking at the brushes, and the armature and armature pulley shall rotate in good mechanical balance.

(u) The generator shall be capable of delivering rated net amperes within a range of 37 to 48 volts. (This requirement is not intended to conflict with the heat test.)

3. *Suspension.*—(a) The generators shall be ..... suspended. (The Railroad Company shall insert "truck" or "body.")

(b) The suspension shall be in accordance with the following drawings of the A. B. and C. Railroad, which are hereby made a part of this specification, or they may be in accordance with the manufacturers' standard if the railroad company so elect. (List drawings or cross out section applying to same.)

4. *Belt Tension Device.*—(a) The belt tension device shall be in accordance with the following drawings of the A. B. and C. Railroad, which are hereby made a part of this specification, or they may be in accordance with the manufacturers' standard if the railroad company so elect. (List drawing or cross out section applying to same.)

5. *Generator Regulator.*—(a) The generator regulator panel shall be composed of a non-conducting, non-combustible material having a horizontal dimension of 16 in. and a thickness of at least 3/4 in.

(b) The panel shall have four holes drilled in same for the supporting bolts. These holes shall be 7/16 in. in diameter and located 1 in. from the sides and 1 in. from the ends of the panel, giving a horizontal distance, center to center of these holes, of 14 in. (Should it be desired to use a corner bracket with the panel, same shall have the supporting bolt holes drilled 7/16 in. in diameter and so located that when mounted on the panel the horizontal distance between center of holes is 14 in. For attachment to the panel the corner bracket shall be drilled and tapped for a 3/8-in. bolt having 16 threads per in.)

(c) The terminals on the generator regulator panel shall be arranged so that, in a horizontal direction, the positive is at the right and in a vertical direction the positive is at the top.

(d) Each terminal shall be stamped for identification and polarity.

(e) There shall be included with the generator regulator panel, wire terminals for attachment of the wires to the panel terminals; these wire terminals being stamped to correspond to the panel terminals to which they are to be connected.

(f) The apparatus will, preferably, be so mounted on the panel that it may be removed and reapplied without it being necessary to remove the panel from its supports.

(g) The connections between the various pieces of apparatus on the panel shall be, so far as is possible, on the back of the panel and preferably soldered after final adjustment has been made.

(h) The panel shall be supported by four 3/8-in. bolts having 16 threads per inch.

(i) Fuses, fuse contracts and fuse terminals shall conform to A. R. A. Drawing No....,

(j) The generator regulator automatic switch shall be set to close at any and all operating temperatures at not more than 34 volts, this voltage being attained by the generator at not more than 75 per cent of minimum full load speed.

(k) The automatic switch must open and close without chattering, pumping, sticking or excessive arching.

(l) The generator regulating apparatus and battery protective devices shall be of such design as to satisfactorily perform all the following functions:

1. Close the main circuit of the generator, by means of an automatic switch, in order to permit current to flow from the generator to the battery and lamps whenever the generator develops proper voltage.

2. Open the main circuit of the generator, by means of an automatic switch, in order to prevent the discharge of the battery through the generator when the r. p. m. of the armature has decreased to a point where its voltage is less than the battery voltage.

3. Automatically prevent the overloading of the generator.

4. Automatically control the rate of charge of the battery.

5. Automatically prevent overcharging the battery either in amperes or ampere hours.

6. In case of open battery circuit the generator shall continue to carry the lamp load and the generator regulator shall automatically prevent an excessive rise of voltage on the equipment.

7. Means will preferably be provided whereby the adjustment of the regulator can readily be changed from the voltage and current suitable for a lead-acid-lead battery to the voltage and current suitable for a nickel-alkali-iron battery of the same ampere hour capacity, the voltage being capable of being varied independently in the latter case from 1.72 to 1.8 to 1.88 per cell to take care of temperature conditions.

8. For any given condition of battery with any variations of speed at and above 150 per cent of minimum full load speed the regulator shall maintain regulation within 5 per cent, plus or minus, of the value for which the regulator is set for operation. This value to apply equally whether the type of regulation is potential, current, watts or any combination of same.

9. When submitting proposition, the axle generator manufacturers shall describe in detail the type of control of generator output and battery charging that they propose to furnish, submitting such curves as are necessary to afford a complete explanation.

NOTE.—Railroads may substitute for section 5-l detailed specifications covering such type or types of regulation that they desire to consider, provided that the limits are not greater than those given in tbis specification.

6. *Lamp Regulator*—(a) The lamp regulator panel shall be composed of a non-conducting, non-combustible material having a horizontal over-all dimension of 16 in. and a thickness of at least 3/4 in.

(b) This panel shall have four holes drilled in same for the supporting bolts. These holes shall be 7/16 in. in diameter and located 1 in. from the sides and 1 in. from the ends, giving a horizontal distance, center to center of these holes, of 14 in. (Should it be desired to use corner brackets with the panels, same shall conform to the requirements as given under "Generator Regulator.")

(c) The terminals on the panels shall be so arranged that, in a horizontal direction, the positive is at the right, and in a vertical direction the positive is at the top.

(d) Each terminal shall be stamped for identification and polarity.

(e) There shall be included with the lamp regulator panel, wire terminals for attachment of the wires to the panel terminals, these wire terminals being stamped to correspond to the panel terminals to which they are to be connected.

(f) All apparatus will preferably be so mounted on the panel that it may be removed and reapplied without it being necessary to remove the panel from its supports.

(g) The connections between the various pieces of apparatus on the panel shall be, so far as is possible, on the back of the panel, and preferably, soldered after final adjustment has been made.

(h) The panel shall be supported by four ⅜-in. bolts having 16 threads per inch.

(i) The lamp regulator shall be so designed that with the complete equipment operating in the normal manner, on bench test or in service, it will maintain the voltage across the lamp mains on the load side of the regulator under the conditions of test as specified below, within the following limits:

1. With the battery discharging and with the battery voltage 31 volts or less, the drop in voltage across the lamp regulator resistance shall not exceed one volt with 40 amperes flowing.

2. With armature r. p. m. increasing at an approximately uniform rate from minimum full load speed to maximum speed in not more than five minutes and again decreasing to its original value, the voltage shall be maintained at.....volts, plus or minus one volt at any current value not exceeding 40 amperes.

3. With the armature r. p. m. held constant at any given speed between the limits of minimum full load speed and maximum speed, and with the current instantaneously varied by 5 ampere steps, both increasing and decreasing, the voltage shall be maintained at.....volts plus or minus one volt.

4. Conditions 2 and 3 shall be complied with under any condition of charge of battery.

NOTE.—Insert value at which it is desired voltage shall be maintained.

7. *Net Ampere Capacity*—(a) The generator shall have a net ampere capacity of.....amperes. (Net ampere capacity equals total current generated less all current used by fields, control, generator regulator and lamp regulator. For recommended values see Section 1-d.)

8. *Heat Test*—(a) Connect the generator, generator regulator and lamp regulator (if used) in the normal manner, using rheostat or lamp bank in the battery and lamp circuits.

(b) Remove hand hole covers and operate generator continuously for five hours at the armature r. p. m. corresponding to minimum full load speed with the generator delivering continuously .....net amperes at 40 volts.

(c) Under the above conditions, and with temperatures measured by the thermometer method, no part shall at any time attain a temperature higher than the values given below:

PART OF APPARATUS	Insulation A. I. E. E. Classification Class "A" Maximum observable temperature degrees C.	Class "A" Maximum observable rise in temperature degrees C.	Class "B" Maximum observable temperature degrees C.	Class "B" Maximum observable rise in temperature degrees C.
Any part of generator regulator, except resistance units, carbon piles, commutator, brushes, brush rigging and bare copper solenoids	105	65	125	85
Commutator, brushes, brush rigging and bare copper solenoids	125	85	125	85

(d) Bearings.—Maximum observable temperature 65° C.

(e) The net ampere capacity shall be determined by the maximum net amperes that can be generated without the above temperatures being exceeded.

9. *Insulation Test*—(a) Immediately after the heat test all parts of the equipment shall withstand, without breakdown, an alternating potential of 1000 volts, applied between conductors and ground, for a period of one minute, all metallic parts except conductors being grounded.

10. *Badge Plate*—(a) Each generator shall have attached to it a badge plate on which the following information shall be shown:

1. Manufacturer's name.
2. Manufacturer's type and serial number.
3. Nominal voltage.
4. Rating in amperes.
5. Minimum full load speed in r. p. m.
6. Pulley ratio. (Example, 2 to 1.)

11. *Rejection*—The A. B. & C. Railroad reserves the right to reject:

(a) Any equipment, or part thereof, that fails to comply with the requirements of the specification when inspected at time of delivery.

(b) Any equipment, or part thereof, that is defective in any way (material, workmanship or details of design) which might reasonably have been overlooked when approving the plans.

(c) Any equipment, or part thereof, that is responsible for an excessive number of failures in service, or that is found to be defective in material or workmanship within one year of date of delivery.

12. *Patents*—(a) The manufacturer shall insure the A. B. & C. Railroad against any and every loss arising from claim that the apparatus, as furnished, infringes patents not owned or controlled by the manufacturer and shall furnish the A. B. & C. Railroad, when requested, a satisfactory bond to cover such contingency.

13. *Guarantee*—(a) The manufacturer shall correct, without charge to the A. B. & C. Railroad, any defect due to design, material or workmanship which develops within one year from date of delivery of the equipment.

14. *Data*—(a) Dimension drawings in as full detail as may be necessary to afford thorough understanding of the equipment offered shall be submitted to and approved by the A. B. & C. Railroad before manufacture is begun.

15. *Shipment*—(a) No equipment shall be shipped until same has been accepted by the A. B. & C. Railroad or inspection waived and shipment authorized.

NOTE.—The railroad company when requesting bids shall fill in all blanks indicated thus.....

The committee would then recommend as follows:

(a) That the report be received as submitted.

(b) That the 4½ in. and 5½ in. pulleys shown on drawings Nos. 1 and 2, be substituted for the 5½ in. pulley shown on M. C. B. Sheet U-7. (See pages 6 and 7.)

(c) That the 5½ in., 6½ in., 8 in. and 10 in. pulleys shown on Drawings Nos. 3 to 6, inclusive, be substituted for the pulley shown in the upper left hand corner of M. C. B. Sheet U-7. (See pages 8, 9, 10 and 11.)

(d) That the castellated nuts and cotter keys shown on M. C. B. Sheet U-7 be eliminated, and that locking nut of a type acceptable to the purchaser be used.

(e) That the main fuse clips shown on Drawing No. 16 be substituted for the corresponding clip shown on M. C. B. Sheet U-5. (See page 26.)

(f) That the temperature for rating as established by the Standardization Rules of the A. I E. E. be substituted for the temperatures given in the 1919 committee report.

(g) That each of the above recommendations and the specification in its entirety be individually submitted to letter ballot as Recommended Practice.

The committee feels that with the adoption of the report they have covered the work assigned to the committee, in so far as they can now see, but would further recommend that the committee be continued with instructions to watch the developments of train lighting practice and report such features as may appear interesting or such as may necessitate a revision of present recommended or standard practices.

The report is signed by J. R. Sloane (Chairman), Pennsylvania System; C. H. Quinn, Norfolk & Western; E. W. Jansen, Illinois Central; E. Wanamaker, Chicago, Rock Island & Pacific; A. McGary, New York Central; L. S. Billau, Baltimore & Ohio, and A. J. Farrelly, Chicago & North Western.

Discussion

A motion that the report be accepted and referred to letter ballot was made and carried.

Report of the Committee on Subjects

THE COMMITTEE HAS CAREFULLY REVIEWED the replies received to Circular No. S 111-102, requesting suggestions for subjects to be investigated by the committees during the year ending June, 1921, and has made recommendation to the general committee for their assignment to standing or special committees.

The report was signed by C. F. Giles (Chairman), Louisville & Nashville; C. E. Fuller, Union Pacific; T. H. Goodnow, Chicago & North Western; F. W. Brazier, New York Central, and H. R. Warnock, Chicago, Milwaukee & St. Paul.

Discussion

After presenting the report Mr. Giles said: We have not received any additional subjects or suggestions in accordance with the extract from Section 10-A of the Rules of the order of the American Railroad Association, but if any members have any subjects that they would like to have considered that have not already been suggested in their replies to the circulars referred, we will be very glad to receive them through the secretary within the next 30 days, because we expect to have a meeting of the Committee on Subjects and the Committee on Committees, and will get the work started as promptly as possible, because unquestionably we are going to have a big year's work before us.

A motion that the report be received and the recommendations adopted was made and carried.

Chairman Tollerton: We have now reached the end of the papers for discussion and we will in a very few minutes adjourn the Second Annual Convention of Section III, Mechanical, of the American Railway Association.

I want to take this opportunity as chairman of that section to express the honor and pleasure that I have felt in presiding over this body. The attendance has been very large; the enthusiasm has been great, and I want to thank the chairmen of the committees and all of the members for their aid and assistance to the chairman in making the convention the success it has been.

In adjourning the meeting, I want to express to all of you, members and families, my best wishes for good health, long life and good luck. The convention will again convene on this pier one year hence; the date has already been agreed upon, which is from June 15th to June 22d. In saying good-bye I want to wish you all a safe and pleasant journey home (applause).

Convention adjourned.

Date of Next Convention

THE CONVENTION of Section III, Mechanical, will be held at Atlantic City next year, June 15-22.

G. F. Hess Goes to Wabash

G. F. HESS, superintendent of machinery of the Kansas City Southern, has been appointed superintendent of motive power of the Wabash at Decatur, Ill., succeeding E. F. Needham, who has retired on account of ill health.

Final Registration Figures

AT THE CLOSE of the convention the Enrollment Committee announced the total official attendance at the meetings as follows:

Members, Section III	875
Members, Section VI	475
Special Guests	838
Railroad Ladies	832
Supply Ladies	678
Supply Men	2,575
Total	6,273

Chairman Pearce on the Conventions

JUST BEFORE Chairman Pearce of Section VI left yesterday he stopped in at the *Daily* office and made this statement. "We have surely been royally welcomed at Atlantic City and greatly appreciate the co-operation which we received from Section III. Section VI, which absorbed the activities of the Railway Storekeeper's Association, had its foundation and success as a thorough going, practical, capable organization because of the vision and foresight of J. P. Murphy, the secretary, who founded the association 15 years ago."

Mr. Pearce said that in his opinion the results had amply vindicated the decision of the Purchases and Stores Section to meet in Atlantic City at the time that the Mechanical Section was meeting here and the exhibit was being given. He praised the exhibit in the highest terms, and said that the purchases and stores officers had derived great benefit from them. He expressed the opinion that future conventions of the Purchases and Stores Section should be held in Atlantic City, but that only morning sessions should be held in order that the members should have ample opportunity to see the exhibits. He criticised the meeting hall in which the Purchases and Stores convention is held, and said that in future he would favor having its sessions somewhere off the pier.

The *Daily* must modestly admit that Mr. Pearce was also warm in his commendations of the reports given in its columns of the meetings of the Purchases and Stores Section.

P. and S. Report on Standards

ON TUESDAY AFTERNOON F. D. Reed, vice-President of the C. R. I. & P and chairman of the committee on standards, Section VI, submitted the following report:

There have been no subjects referred to this committee for consideration with the exception of the question of establishing a standard shipping tag for freight shipments, as suggested by Secretary Quigg, of Section IV—Traffic—and the question of revision of specifications for lumber, shown in the 1918 proceedings of the Master Car Builders' Association and the American Railway Master Mechanics' Association proceedings, which Section VI requested be revised. The question of standard specification for shipping tags was handled and recommendations forwarded to the chairman.

The question of revision of the specifications for lumber as recommended by Mechanical Section III will entail a large amount of detail work, and this is now being gone over by the various lumber associations with a view of securing their recommendations in connection with having our specifications conform as closely as possible to commercial practices, which will entail considerable time. It will be impossible to complete the report on this until later in the year.

The present specifications are fairly complete, but in a great many instances they conflict with commercial practices, and it requires special cutting to furnish lumber to these specifications, which entails higher costs than would be necessary if commercial sizes and grades were used. This whole feature will be covered before final report is submitted.

The action which was taken on this report was recorded in the June 16 Daily, page 1873.

American Railroad Association, Section VI, Purchases and Stores

Closing Session of a Most Successful Convention Devoted Largely to Association Business

The meeting was called to order by Chairman Pearce at 9.30 A. M. Wednesday morning.

Committee on Memorials

The committee on Memorials, Section VI, Purchases and Stores, American Railroad Association, submitted resolutions of sympathy and an expression of the loss felt by the association through the death during the year of the following members: W. F. Lamb, Southern; E. Chamberlain, N. Y. C. Lines; R. F. Schwaner, Sou. Pac.; C. J. Norman, Southern; W. R. Shoop, B. R. & P. These resolutions were signed by J. H. Waterman, I. H. Lance, W. F. Stokes.

A motion that these resolutions be adopted was carried.

Election of Officers

The nominating committee reported as follows: Officers for the ensuing year: Chairman, H. C. Pearce; Vice-Chairman, H. E. Gray. On the General Committee, members for two years, E. N. Bender, F. A. Bushnell, J. P. Murphy, H. H. Laughton, W. G. Phelps, J. G. Stuart, W. A. Summerhays. Members for one year: U K. Hall, W. A. Hopkins, D. K. Jellison, F. D. Reed, F. B. Wight, H. P. McQuilkin and E. J. McVeigh.

After the announcement by the nominating committee the following discussion ensued:

Mr. Pearce: Thinking over this matter carefully as I have, since the beginning of these meetings, it has occurred to me that it might be a good plan to revise our rules of order whereby the chairman and vice-chairman would be elected by letter ballot, giving all members of the Section, whether present or absent at these meetings, an opportunity to express their preference. The General Committee of this Section is the important, fundamental, governing party and should, of course, be elected on the floor at these meetings.

A motion was carried that the Secretary cast one ballot for the members in favor of those who were nominated for the General Committee.

Address by Mr. Pearce

I take this occasion to express and record my heartfelt appreciation of the splendid cooperation that I received.

On my left is our vice-chairman, Mr. W. G. Phelps. I served with him at Washington as his subordinate, and no man ever had a better director or advisor, and no man has ever had a better and more useful assistant—always ready to do his duty, and capable beyond measure. It is with the greatest pleasure that I am able to express to you the close friendship that has existed between us since we became associated together.

I wish to express my appreciation of the cooperation of the general committee. No organization ever had a more loyal, capable, frank, open and able directing body than this section. I wish at this time to express my appreciation of their services, and the knowledge that most of them will continue to serve is a bright spot in my thoughts of the future administration of the affairs of the section. I also wish to express to the members and individuals that I have known for years their splendid cooperation and those to whom I am not so well known, the assistance they have been to me in carrying on a meeting which had some parts wherein it could not be carried on as we would have liked to have done it. The time was rather short to accomplish all we had laid out.

We must realize the grave responsibilities which rest upon us at a very critical period in the formation of our organization and the operation of our railroads. We must co-ordinate our endeavors that we can command the respect and consideration of the owners and executives of the individual properties which we represent. It will be due almost entirely to the efforts of the subcommittees which do the work for your section during the year. These are the men that are the foundation of this organization. Their study, analysis and reports, based on practical knowledge of conditions, is the only thing which will enable us to accomplish our purpose, and the diligent work of these committees, if continued, will be the ultimate strength and perpetuation of this section.

Remarks by Mr. Roth

I regret greatly that it was impossible for me to be here during the time that you were considering the many important matters covered by your committee reports. While I am not at the present connected with the particular phase of railroading that I have been in the past and that you gentlemen are in now, I shall never lose my interest in the service of supply on the railroad. The responsibility resting on the officer in that department of the railroads is greater, and becoming greater each year than most of us have realized in the past. Through your association in the work of this Section the interchange of ideas—

things which you are able to recommend after study and consideration which you have given them—your value to the railroads is bound to greatly increase.

Nothing in my railroad experience has been so helpful to me, no other one thing will be so greatly responsible for any success which I may in the future achieve as my association with the Railway Storekeepers' Association, now Section VI of the American Railroad Association. The opportunity I had to associate at the meetings of that Association with men who knew from hard study and practical experience what must be done properly, is of inestimable value to me.

Address by Vice-Chairman Ray

Usually I much prefer to run the errands and carry the water and do the odd jobs that some of us have to do. In the old days when I went to school and we had dramatic performances, I was usually the dead body, and I rather fancy that sort of thing; but if the Association and officers have seen fit to make me vice-chairman I assure you I will do all in my power to make the Association what it should be, a representative gathering of storekeepers and purchasing agents, who will, I think, take their place with all the other associations, if we have not already done so.

Comment by Mr. Reed

I heard it mentioned before I came to this convention that there was a possibility of a number of the storekeepers on the different railroads feeling that the purchasing agents were going to control the affairs of this section, and that, I think, is what prompted our worthy president to be careful about taking the position for another year. I have heard it suggested, since I have been here, that the small attendance of storekeepers was probably due to that cause. Now, I want all of you to realize that this association was started by storekeepers, and it is going to continue to be of interest to storekeepers, just as much now as it ever was. We want all of the storekeepers to feel that they are just as interested in this part of the game as they ever were, and they are going to receive just as much consideration as they ever did, and we will expect them to do just as much work, if not more, than they ever did.

The purchasing agents are the spenders and the storekeepers are the savers. The savers are the fellows that are going to save the railroad, and the purchasing agents, if they did not have any storekeepers, would wreck them.

Remarks by Mr. Phelps

One of the greatest pleasures that I expect to get from this association is that I will get to know the storekeepers, district storekeepers, division storekeepers, and the general storekeepers, and I only wish the foremen and the other men were here so that we would know them all. I can learn from them, they are good fellows, and I want to know them all, and so far as the purchasing agents are concerned, they do not want to do all the work, they want the storekeepers to do it. If they want to do it all, personally, I am willing that they do it all. I say this, because I am a purchasing agent. While the general storekeeper did report to me, he does not do so now. That is, he does, but no one else knows it except the interested parties, and I report to him, too. The latch string of my office is out for any of them. I like to have them come in, no matter what their position is in the stores department. We are all railroad men, we are working for the best interests of the railroad, and we will have harmony and good feeling if we know each other better, and I hope if there are any that meet me hereafter that they will speak to me and tell me who they are. I have been up here on exhibition and maybe you have seen me and I have not seen you.

Mr. Waterman on J. P. Murphy

You do not know how much pleasure I personally get out of the convention. I think I know. I attended the first convention, and I want at this time to say something about our good friend Murphy. Murphy had a vision. Men that do things have visions. Murphy had a vision of the possibilities of the Railway Storekeepers' Association, and in that vision he saw before him the storekeepers of not only the United States but Canada, and he sent out messages to them. He gathered a little bunch in Chicago, and there originated what now is Section VI of the American Railway Association. He worked day and night, all the time, fearlessly, conscientiously and sometimes impulsively. And men, let this govern in our conventions in the future—forget the things in a man's life that are not pleasant and always think of the good. I think some time ago I gave this illustration:—I was out West, in South Dakota, and I saw a man down in a stream digging in the sand. He took a little pan and he put some dirt into the pan and stirred it around. He took a little more water in it, and he kept stirring it around, and at last I said, "What are you doing?" He said, "I am getting the gold out of the sand." Men, there is gold in every one of you, in every one of us, if you will just let the dross go and remember only the gold. I know the purchasing agent. I never had any better friends in my life than the purchasing agents and I never saw the time when I could not open the door and go in their office and they welcomed me. But why? Because I knew when to go out. There are lots of people here with whom we do not agree, but what is a convention for? Only to open up and express our opinions. I tell you young men of Section VI, this Section will do more to build you up and make you strong than any other one organization in the country, and I hope during the year you will do whatever work is assigned to you, and I believe you will, and work will be assigned to the young men. Storekeepers, get busy and do something.

The first annual meeting of Section VI—Purchases and Stores—was declared closed.

European Railway Observations

By Robert E. Thayer

European Editor, Railway Age

French Coal Shortage

Press despatches from the *London Times* give an idea of the coal situation in France to-day. It is said that the prospect for the oncoming winter is not encouraging. The output of the French mines for 1919 was a little less than 19,000,000 tons. France is to receive 9,000,000 tons from Great Britain, or 45 per cent of its export coal, and in addition is to receive coal from Germany under the peace treaty up to a total of 39,000,000 tons. The Germans, however, have not been living up to the treaty demands. With a yearly consumption of about 65,000,000 tons it will be seen that France must buy coal abroad in order to meet the demands. This imported coal will cost from 450 to 500 francs a ton, as against 75 francs a ton for the coal mined in France. The following figures show how the production of coal has decreased in France, regardless of the fact that the number of miners has increased:

Year	Number of miners	Coal produced, tons	Coal produced per miner
1913	203,000	41,000,000	202
1915	105,000	19,533,000	186
1919	157,374	19,000,000	122

Of course, it should be understood that there were less miners working in 1915 than in 1913, as there were fewer mines working, but the disquieting feature is that the production of the individual miner has decreased. The reduction per man is to some extent due to the fact that the hours of working have been reduced, only 6 hours and 17 minutes per day being now spent in the pit.

Automatic Couplers in Japan

As in all European countries, the question of automatic couplers is being considered in Japan. This nation includes a group of islands, and on all but one island nothing but the screw type of coupling is used, both for freight and passenger equipment. To the north, on the island of Hokkaido, both Sharon and Penn automatic couplers are used; the gage on these lines is 3 ft. 6 in. The couplers are similar in design to those used in the United States, but about three-quarters of the size. The lines in South Manchuria and Korea are equipped with the U. S. standard automatic coupler.

The question of gage is a very live one in Japan. The main island and the islands of Kyushu, Shikoku, Kokkaido, and Formosa all have the 3-ft. 6-in. gage, whereas South Manchuria and Korea have the standard 4 ft. 8½ in. gage. The island of Kyushu has extensive coal fields and at the present time the coal is carried from this island to the main island by train ferries. Plans have been developed, however, for constructing a tunnel, about 2 miles long, between these two islands. With this tunnel there would be a continuous line to Tokio, the industrial district of Japan. The distance between the coal fields and Tokio is some 800 miles, and with the standard gage the transportation of coal could be expedited and efficiency increased. None of the freight cars in Japan is equipped with brakes, but the standard passenger car brake uses the steam vacuum, similar to that used in England.

Further Wage Increases in England

At the same time that the Railway Wages Board of Great Britain awarded an increase in wages to the locomotive men, as reported in our June 11 issue, an increase was granted to the conciliation grades, made up of porters, trainmen and other men of the lower wage scales. The demands for these men were presented by the National Union of Railwaymen and the weekly increases vary from 2s. 6d. (60 cents) to 7s. 6d. ($1.90), which gives as a maximum increase (for the porters) of 197 per cent over the pre-war rate. This award was granted on demands for a 20s. weekly increase.

The Railway Wages Board, which has previously been mentioned, is made up of four representatives each of the railway companies, the railway men and the railway users, with a chairman appointed by the government. The award was signed by 12 of the 13 members of the committee and in presenting its report the board stated that unless additional revenue can be secured to meet this additional expenditure the awards will involve the companies in an actual net loss. It is stated that a further advance of 20 per cent on present-day rates for both passenger and freight traffic would be necessary to meet additional expenditure, apart from any concessions made by the Board. This would bring the 50 per cent advance on ordinary passenger rates and the 50 per cent average additional to freight rates up to 80 per cent over the pre-war rates. If the full claims of the railway men, as submitted to the Board, had been approved a further 20 per cent increase in both passenger and freight rates would be necessary, thus making both passenger and freight rates 110 per cent above the pre-war level.

The dissenting member of the board, Donald A. Matheson, general manager of the Caledonian Railway in Scotland, said that while the affairs of the country are of a transitory character there should be no alteration of any of the rates of wages fixed under recent agreements, with the exception of a few of the grades. He said there should be a realization, first, of the fact that the burdens recently put on the railways have already produced a breaking strain, and, second, of the fallacy connected with the charging of higher rates and fares for conveyance than the traffic can bear.

It is exceedingly interesting to note that all of the railwaymen's representatives approved of the rates granted, which were from 87½ per cent to 62½ per cent lower than that which was demanded. What the reaction will be amongst the men themselves remains to be seen. Undoubtedly there will be considerable denunciation amongst the extremist section as a matter of course. The new rates will give a total weekly wage as shown below:

	New rates	
	English money	U. S. equivalent
Porters, grade 1 (London and industrial areas)	67s. 6d.	$16.90
Porters (rural areas)	65s. 6d.	$16.38
Ticket collectors, class 1 (London and industrial areas)	74s.	$18.50
Ticket collectors (rural areas)	71s.	$17.75
Guards, first year	68s.	$17.00
Guards, sixth year	78s. 6d.	$19.63
Shunters, class 1	78s. 6d.	$19.63
Station foremen, class 1	79s. 6d.	$19.88
Traffic regulators	90s. 6d.	$22.63
Goods depot checkers (London)	74s. 6d.	$18.63
Goods depot checkers (rural districts)	67s. 6d.	$16.88
Head carters (London)	74s. 6d.	$18.63
Permanent way gangers (London termini)	81s. 6d.	$20.38

The Man Who Saw

Wash Your Boiler With Hot Water

"You're operating under difficult conditions," said the doctor in response to his client's eager questioning. "Your stomach is not functioning properly. Here's a tonic that will keep you well. I've used it on other patients with great success."

The roundhouse foreman nodded a weak assent. "Now," said the doctor, "you're under a strain—you're overworked—your pushing your generating capacity to the limit and I advise you not only to follow the directions on this bottle, but to drink hot water every morning. This will thoroughly wash out your stomach and tend to prevent the accumulation of secretions which do not belong there. Do it often, do it well—you'll soon notice the difference."

And as he took up his hat and medicine case to go, the railroad man wondered what doctors knew about locomotive boilers, anyway! He seemed to speak with a significant familiarity.

Fuller Pep Says He's Fuller Prunes

Fuller Pep's eyes sure had an amusing sparkle in them as he made his way toward the mail bag.

"I came in to thank you for your paragraph about K. K. introducing me," he said, extending his hand. "I hadn't thought about the number of exhibitors clamoring for write-ups and your interesting calculations put it before me very clearly—67,081 things to describe! When you come to think of it, it's ridiculous to try to favor any of them."

He turned to go, but hesitated. "Say," he said, thumbing the head of the cane with the Moorish design on it, "that feller Hum Dinger is fuller prunes. Tell him I said so, will you? Tell him I've got a plan that's right—that will suit both sides. I'll tell you about it next year, so long."

"So long," answered the Man, as he wondered what the gingery one had up his sleeve.

The Early Struggles of a Supply Man

"They had a hard time," said Lone Star, indicating a railroad supply booth over his shoulder, as the expression which accompanies the thought of a pleasant reminiscence spread over his face. "The outfit had a good thing," he continued, "but they didn't have enough money to swing it. It was a case of scratching gravel right along. The railroads wanted their product all right, but it was a job to get it out. Well, they were resourceful and won out; the little concern of that day is the million dollar one now.

"One of the firm conceived the brilliant idea of pulling off a pre-arranged collision and he bought two wheezy old eight-wheelers from his friend and patron, S. M. Okestack, S. M. P. of the High Dry & Windy Railroad. He then purchased a lot of old canvas from an itinerant circus and cut it up to serve as an eight-foot fence around the space he had laid out for the staging of the big show. The news of the coming excitement spread far and wide and the hurriedly improvised tickets sold like proverbial hot cakes at a dollar per.

"The big day finally arrived, the arena was packed and the two principals stood at respective extremes of the track outside of the enclosure with steam up and ready for the fray that would put them in the scrap pile where they were long overdue. The excitement was intense as the enthusiastic promoter admonished each engineer to 'tie down the whistle and open her wide up so they'd be sure to meet in the middle.'

"The blowing of the whistles proclaimed the start as the necks of thousands of sweating fans craned for advantage—and the fun began.

"But all they saw was a shricking streak of No. 1 as it tore through the space in front of them and smashed into No. 2 in its place on the outside of the enclosure. It looked as if somebody had gummed the works, laughed Lone Star, No. 2's drivers were slipping wildly and she never budged an inch! The crowd on the outside enjoyed the party, wrote the hilarious reporter in the *Evening Taddle-Tale*."

K. K. Introduces Fuller Pep

The Man Who Saw counts that day lost when Kronic Kicker fails to light up the scenery by the Mail Bag with his unconvincing smile. This time he brings in his old friend, Fuller Pep, a well and favorably known satellite of the railroad supply world on the pier to complain that we didn't give Mr. Pep a write-up this year.

Now, gentlemen, *please* be reasonable. There are 359 exhibits this year and in each booth there are 359 items of portentous importance to the railroad man. 359 x 359 = 67,081 things to write about.

It can't be done, gentlemen, with equal fairness to them all, but The Man Who Saw and his associates have between grinds for the relentless mill of The Editor, tried to at least look it over and pack away for future use the many lessons that they hold, and in this connection may he not remind you that it's news he wants and it's news he's paid for. Bring in the new; they're familiar with the unchanged old.

A Letter From Hinky Dee

In response to the hundreds of requests from the friends and followers of the celebrated car lighting expert, Mr. Hinky Dee, we publish the following letter, which, due to Hum Dinger's gumming of the Mail Bag's works, could not be published sooner:

WINDY, TEXAS, *June* 14, 1920.

Idiotur Mail Bag, care Man Who Seen, Atlantic City.

dear sir:

I am the chief electrishin here on the high dry & windy RR now. Don't publish nothin' about this here letter becorse my boss, mister S. M. Okestack, the S.M.P., would fire me for what I think en not fur what i am. i seen that there letter of his'n what he rote you an said the prune plan is a pancake. I'll say so. If they eat it they'll get the dandiest bellyake they ever had. all i got to say is that mister S. M. Okestack thinks moar of selling ther mane rod then he dus about this here job. If you realy want the strait doap, send fur me next year en doant wait to the last minit like you done this year.

Yors fur infernal progress of the railroad electrical department.

HINKEY DEE.

Lord Robert and the Man Went Fishing

There was a rumor being whispered merrily around the Pier yesterday to the effect that the missing page of the Man Who Saw in the issue of Wednesday, the 16th, is the result of a row. Some of them have gone so far as to assert that they have it on good authority that the Man sassed the Editor, who told him to go to—— and, furthermore, in the free-for-all that followed, Lord Robert, the Londoner whose page is also missing, seeing that his boss was being worsted and his pay check in

danger, jumped in in its behalf. The Man Who Saw hastens to deny these allegations and says that both he and Lord Robert decided to take a day off and trust that the friends will refute all rumors which contradict this statement.

The Man Who Saw is not only still on the job, but his readers will doubtless be delighted to hear that Lone Star has promised to drag a delegation of railroaders here next year that will fairly bust up the Man's column with excitement. Bring 'em along, L. S., we'll introduce them to nuts Hum Bug Dinger, Fuller Pep and Hinky Dee.

Goodbye, Old Friends!

The Man Who Saw acknowledges the Mail Bag's receipt of a letter, upon the closing of the great convention, wishing him well in the year that ensues. It bore the signatures of his friends and contributors, the Daddy of Motion, Lone Star, the College Man, Hum Bug Dinger, Kronic Kicker, S. M. Okestack, Beat M. Tooit, D. R. Ivingbox, Jim Skeevrs and the Editor.

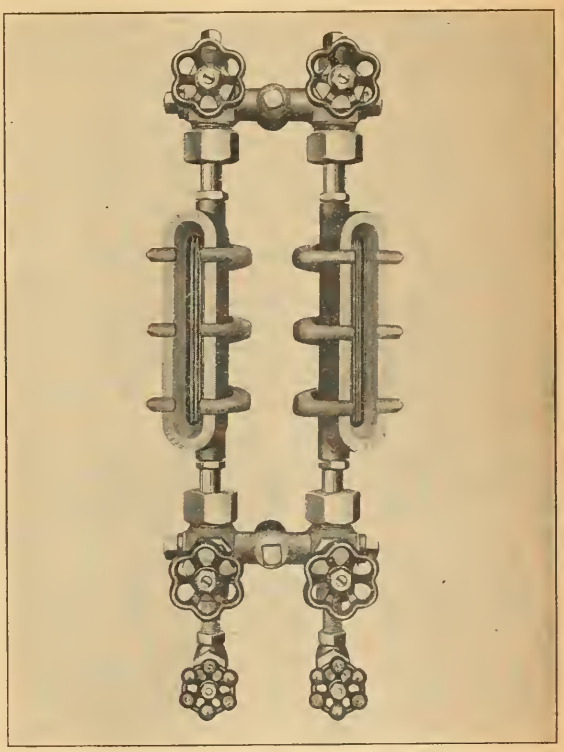
The Man thanks you all for this pleasant expression of your sentiments as well as for your splendid cooperation in his humble grind of grist from the seat by the Mail Bag. He especially thanks the Daddy of Motion for his example, Lone Star for his tales, the College Man for his lesson of hopefulness, Hum Dinger for his unparalleled exhibition of nerve, Kronic Kicker for his unfailing daily attentions and the Editor for his apparently unlimited patience. He regretfully bids you goodbye, good health and good luck in the name of all the friends in the country's biggest game and adds,

—"you came to look and learn and play,
he hopes you'll come another day."

When Papa Gets Home From the Convention

Edna Duplex Water Gage

THE EDNA BRASS MANUFACTURING COMPANY, Cincinnati, O., is exhibiting an entirely new water gage designated as type 1920-M, which has been designed to embrace the desirable features of the Edna type M reflex water gage and to comply with the government requirement that the water level can be checked from either side of the locomotive cab. As will be noted in the illustration of this gage it is in fact a duplex arrangement in which two reflex water gages are mounted on a parallel frame, each having the same boiler connection.



New Duplex Water Gage

One glass may therefore be set so as to face the engineman, while the other may be set at any angle convenient to the fireman. The use of two individual reflex glasses mounted so that either may be cut out in the event of breakage has the advantage of greater reliability over a gage having a single glass, and at the same time eliminates many of the difficulties involved in the construction of a gage with a single glass visible from either side of the cab.

In other respects the construction of this new gage does not differ materially from the type M gage in which no bolts or hinges are used. The body parts are held securely in place by a series of clamps which put the pressure directly on the packing gaskets, so that there will be no strains in the body lines which might tend to distort the packing surfaces. A further advantage found in the type M gages, including the 1920 type, is that the glass and gasket can be removed without disturbing the frame in the boiler mounting. High grade steam metal is used in the construction of these gages and the clamps are of non-corrosive bronze. The gages are made in several sizes with respect to gage stems and boiler fittings. They are all thoroughly tested and are guaranteed to stand 300-lb. boiler pressure.

Conventionalities

Frederick L. Sivyer, president of the Joliet Railway Supply Company, arrived yesterday and joined Mr. and Mrs. C. A. Carscadin and Mr. and Mrs. R. W. Burnett here. Mrs. Sivyer was here last year but is not coming this year.

Among those who arrived at the convention yesterday was H. T. Nowell, mechanical superintendent of the Central Vermont. Mr. Nowell reports that he was detained owing to the fact that one of his roundhouses burned down.

The exhibits are gradually assuming the proportions of a world's fair. George Wall, electrical foreman, car lighting department, arrived Saturday, intending to see everything in two days, but on Monday had to send a wire to headquarters saying it would take another day.

W. K. Dowe, general manager of the Cuban Air Reduction Corporation, was a visitor Tuesday and spent considerable time watching the working exhibits of the different welding concerns in their space beyond Convention Hall. The plant of the Cuban Air Reduction Corporation is the first of its kind to be established in Cuba for the production of oxygen for welding and cutting.

E. H. Hall, superintendent of the car department of the Chicago Great Western, seems to have missed his calling; at least those who have heard of his recent exploits agree that he would make an excellent movie star. On Monday Mr. Hall put out a fire on the roof of Young's pier and on Tuesday he stopped a runaway of a two-horse team, thereby probably averting serious injury to an automobile party.

Readville, Mass., is a suburb of Boston and headquarters of the stores department of the Eastern lines of the New Haven road, as well as the location of the largest shops on the system. B. C. Hart, division storekeeper for the New Haven at that point, arrived Tuesday evening. His comment on the Atlantic City conventions is to the effect that it is a step in the right direction for both the stores as well as the mechanical department.

Among the railway supply companies interested in foreign business is the Independent Pneumatic Tool Company of Chicago. This company is sending R. S. Cooper, its vice-president and general sales manager, to London shortly for the purpose of opening an European office. Mr. Cooper has been with this company for a number of years. It is interesting to note that there is an increasingly large number of American business concerns who believe in and see the possibilities of the European market.

At the morning session of Section III on Monday in connection with the report of the Committee on Autogenous Welding, Prof. A. S. Kinsey of Stevens Institute of Technology, Hoboken, N. J., emphasized the need of the training of oxy-acetylene welders. We learn that the professor has from time to time assisted a number of engineering plants in the organization of their welding departments, and that he has been retained by the Air Reduction Company, New York, to organize a corps of expert gas welders. These men are being sent over the country to give instruction in the making of safe welds of all the engineering metals. This will go far toward carrying out the recommendations of the prominent engineering societies, that something constructive be done to assure the making of good fusion welds.

Angello Conti, chief engineer of the Emergency Fleet Corporation, visited the exhibit hall Sunday afternoon on an invitation of Harry B. Oatley of the Locomotive Superheater Company. Mr. Conti has been with the Emergency Fleet Corporation as its chief engineering officer since the outbreak of the war. He is well known in marine engineering circles and was instrumental in establishing the engineering construction details which have prevailed in the Emergency Fleet Corporation work. Mr. Conti was much impressed with the exhibit.

George S. Smardon, who is attending the conventions, and who represents the Anchor Packing Company of Philadelphia, is a recent recruit from the railroad to the railroad supply business. He was secretary to Cary R. Gray, now president of the Union Pacific, when Mr. Gray was president of the Western Maryland, and later when he was Director of Operations of the United States Railroad Administration. Previously Mr. Smardon was secretary to J. M. Fitzgerald when he was president of the Western Maryland. Before going to the Western Maryland, Mr. Smardon served on the Baltimore & Ohio and with the Pullman Company.

Chairman H. C. Pearce, of the Purchases and Stores section, was one of the most interested spectators during the movie of the Southern Pacific supply train yesterday afternoon, he being an old Southern Pacific man. Mr. Pearce, who is general purchasing agent of the Seaboard Air Line, was accompanied to the convention by his daughter, Miss Catherine. He was formerly general storekeeper of the Southern Pacific, and while he was holding this office he originated the plan of running supply trains. When he was in San Francisco last spring he first saw the movie of a supply train, and it was at his request that it was brought to the convention.

Louis Greaven, superintendent of motive power of the Buenos Aires Southern Railway, is attending the convention this year for the first time. Mr. Greaven has been through some very trying years on his road during the war. Even though the Argentine was not directly embroiled in the world's conflict there were many patriotic citizens of England and his road suffered particularly from the loss of men who went to the war. In addition to that the Argentine, as is well known, has suffered to a large extent from labor troubles. This, with other things, such as a public demand for excellent service, has made a terrific drain on the railway forces there. Mr. Greaven tells also of the great trouble the Argentine roads have had in getting coal. At present locomotive coal costs about $40 a ton, and for a while during the war it was only possible to obtain 25 per cent of the quantity required. This necessitated converting the engines to burn wood, of which the Argentine has a large supply. The wood is of such a quality that two tons is the equivalent of one ton of coal. It was necessary to run branch lines 100 miles into the forests in order to bring out this wood, and the Buenos Aires Southern drew its wood from seven different sources of supply. This railway has 700 locomotives, is 3,700 miles long and has a 5 ft. 6 in. gage. It runs a highly specialized service to a seaside resort 300 miles from Buenos Aires, and during the season trains of twenty sleeping cars are operated in four sections.

EDITORIAL

Railway Age

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The situation with respect to the building of new freight cars is anything but satisfactory. There never was a time when the railways needed so much new equipment, or needed it so acutely, as they do now. The estimates of those who have made the most careful studies of the subject agree that in order to handle satisfactorily the traffic the country can offer the railways at the present time, the roads should have in service about a quarter of a million cars more than they have. In spite of the fact that this great shortage of cars exists the number on order with the car manufacturing companies on June 1, has been ascertained to have been only 43,000, and most of the orders for these were placed in the immediately preceding weeks. This is less than one-half as many as are needed annually not to increase the supply, but merely to replace those that must be scrapped. The number of orders became so small for a time that in the month of May the total number of cars built was only 2,700. When it is considered that the car manufacturers of this country have a capacity of about 27,000 a month, or 320,000 a year, and that they actually have built 240,000 cars for the railways of the United States in a single year, the significance of the figures given regarding the small number recently built and the small number now on order becomes apparent. If the railways get a prompt and favorable decision in the rate advance case there undoubtedly will be within a short time a large increase of orders, but it is too late now for many cars ordered in future to be delivered in the year 1920. The delays in ordering cars have been due to the delay in returning the railways to private operation. This, of course, rendered it impracticable for the Interstate Commerce Commission to make advances in rates under the new law early in the year, and as long as the rate question is unsettled it is financially impossible for most roads to commit themselves to large expenditures for equipment or anything else. The sooner the commission renders its decision, and the more favorable it is to the railways, the sooner the railways will become able to begin placing orders for cars that will tend to make up the enormous shortage of transportation facilities. At present this shortage of facilities is rapidly growing greater every day.

Small Orders for Freight Cars

Not the least important of the numerous recent developments favorable to the railways has been the preliminary findings of the Division of Valuation. These were summarized by Thomas W. Hulme, vice-chairman of the President's Conference Committee on Valuation in a statement presented before the Interstate Commerce Commission on May 27 and abstracted on page 1567 of the issue of last week. In this statement Mr. Hulme offered a comparative summary of the Division of Valuation's cost of reproduction new, including land, and of the carriers book records of investment in road and equipment for 50 Class 1 roads, the data for nine of which was taken from tentative valuations which had been served formally on the roads and for the remainder from preliminary reports which had been served on the roads informally. This comparison showed a total valuation of $3,203,782,543 as compared with an investment in road and equipment of $3,158,275,156. When it is considered that the figures of the commission are minimum figures containing only those items which it is prepared to concede and that any revisions made as a result of showings by the roads or the reversion of rulings of the Division of Valuation will be upward, there is further cause for gratification. It should also be remembered that the roads selected for first attention (those whose findings are included in the figures above) were in many cases those which had been in financial difficulties in recent years and may, therefore, be expected to show less favorable results than many of the stronger and more prosperous roads which have been able to plow back into their properties large amounts from earnings. The Valuation Act became a law primarily through the efforts of those who had been active opponents of the roads and who thought to further harass them by securing data to support their statements as to excessive capitalization. That the findings are not going to be in accordance with the expectations (and the hopes) of the advocates of this law is becoming increasingly evident. The provision in the new transportation law that the valuation shall provide the basis on which rates are to be computed and the indication that this valuation bids fair to exceed the book cost of road and equipment after a detailed study and inventory which has never been equalled for thoroughness, is now proving the valuation to be a boon to the railways and a boomerang to their former opponents.

The Valuation a Boomerang

Chairman Clark of the Interstate Commerce Commission in replying to the letter of F. J. Lisman printed elsewhere in this issue, says that Mr. Lisman is the first, so far as he knows, who has attempted to define the term "re-establishing railroad credit." He attempts to do so positively and negatively but negatively is much easier. In the appendix to Mr. Lisman's letter, he lists and comments on the credit of each of the Class I roads. We have reprinted the comments on the larger railroads only, but these comments are particularly interesting because Mr. Lisman is one of the few bankers who still specialize in railroad securities. It is rather interesting to supplement his letter with a study of the railroad maturities within the next twelve months. There are eight of the larger railroad companies having to take care of considerable issues of bonds exclusive of equipment trust certificates in the fiscal year ending June 30, 1921. The Chicago, Milwaukee & St. Paul has $4,494,000 first mortgage 6 per cent bonds of the Dubuque division; $1,486,000 first mortgage 6 per cent bonds of the Wisconsin Valley division; and $25,334,000 Chicago & Pacific Western division first 5's; a total of over $32,000,000 maturing before July 1, 1921. The Erie has $16,891,000 consolidated 7's; $3,699,000 New York, Lake Erie & Western first consolidated funded coupons; and $2,926,000 New York & Erie fourth gold 5's maturing. The Pennsylvania has various issues of bonds maturing but, as Mr. Lisman says, has just completed the sale of $50,000,000 of bonds partly for refunding purposes. The Pennsylvania Company, however, has $12,705,000 3¾ per cent French loan and its $26,470,000 4½ per cent gold

Refunding in the Next Twelve Months

loan to take care of. The Great Northern has $20,000,000 three-year 5 per cent notes maturing. The Chicago & North Western has $10,000,000 thirty-year debenture 5's maturing. The Delaware & Hudson has $9,000,000 five-year 5 per cent notes and its Rensselaer & Saratoga first consolidated 7's (not guaranteed as to principal) amounting to $2,000,000, maturing. The Louisville & Nashville has $3,500,000 Southeastern & St. Louis division 6's maturing. The Western Maryland has $5,000,000 7 per cent notes maturing and an additional $1,000,000 coal and iron first 5's. Not one of these companies has common stock selling at par on the open market. The securities of most of these companies are held in part by savings banks, insurance companies and trustees of estates. There is an immediate problem presented here which must be faced by the Interstate Commerce Commission in its consideration of the present rate case. The transportation act has specifically placed some responsibility on the Interstate Commerce Commission and no longer are the banks and the executive officers of the railroads solely responsible to the investing public and the savings bank depositors for finding the money necessary to meet maturing obligations.

Imperilling Private Management

THERE NEVER WAS A TIME when conditions more imperatively demanded that the railways should subordinate their individual interests to the welfare of the railways as a whole and of the country as a whole than they do now. Even when the United States entered the war in April, 1917, the need for this was hardly greater than at present. The most salutary way in which the railways can subordinate their individual interests to the welfare of the railways as a whole and of the country as a whole is by so co-operating as to move the maximum amount of traffic possible and rendering the best service practicable in doing so.

In the emergency of war the railways voluntarily organized the Railroads' War Board and delegated to it authority to supervise the operations of all of them and to disregard the special interests of individual lines when this was necessary to the public welfare. They carried out very well the general plan adopted at that time, although there was more than one case in which the general agreement entered into was not strictly observed and when the orders of the Railroads' War Board were not explicitly obeyed.

When the railroads were returned to private operation their facilities were much more inadequate than they were at the time the nation entered the war. The need for them to pull together in their own interest, as well as in the interest of the country, was obvious. This need was greatly accentuated when the railroad strikes began within a month after private operation was resumed. Considering the difficulties with which they have been confronted, the railways since private operation was resumed have made a good record in moving business. They have not, however, been working together as their own interests and the welfare of the country demand. They established the Commission on Car Service at Washington and most of them signed an agreement to obey its orders in the handling of cars. Without entering into disagreeable details, attention must be called to the fact that some roads have not lived up either to the letter or the spirit of their agreement, and that some have not even signed it. There have been numerous cases of flagrant disregard of car service rules and of the orders of the Commission on Car Service.

In fact, from the time when private operation was resumed there has been manifested a strong disposition on the part of the managements of many lines to operate their properties with a view to what they have conceived to be their individual interests, almost regardless of the effects on the general transportation situation. That this has been the case is known not merely to railway officers but to the Interstate Commerce Commission. The Commission finally was appealed to by a large number of railways to exercise the powers delegated to it by Congress in the Transportation Act to redistribute railroad equipment. The Commission subsequently felt called upon to issue a statement warning the railways that the Transportation Act provided penalties for violations of its car service orders and that unless they were strictly obeyed prosecutions would follow. These prosecutions, if successful, would result in heavy fines being imposed upon the offending companies.

Perhaps it should not be surprising, but it certainly is most discreditable and discouraging, that after all the experience the railroads have had with the results of their failures in past years to keep their agreements with each other and to work together in good faith there should have been within a few weeks after the resumption of private operation the recurrence of developments such as those which have caused much of the restrictive regulation to which the roads have been subjected and which even contributed in no small measure to causing the adoption of government operation. Surely there must be very few railway officers who do not realize that private ownership and management of railroads is now being put to what probably will prove to be its crucial test, and that developments such as those to which we have referred are bound to tend to change the attitude of the public and the regulating authorities from one which is highly favorable to private management to one which will be unfavorable. The public and the regulating authorities are not going to form their final judgment of private management by the service any individual railroad renders to its own patrons. They are going to form their judgment by what the railroads as a whole do for the public, and the railroads as a whole cannot and will not render to the people of the United States the best service of which they are capable and put themselves in the best position in which to defend themselves unless they co-operate fairly and fully with each other.

It has been demonstrated beyond question by all the experience we have had under private management that the railways never will co-operate fairly and fully with each other in the distribution of equipment and in the handling of traffic until every individual line is forced to do its duty to other lines either by some organization or agency established by the railroads themselves or by some governmental agency. It is not desirable that any governmental agency should be continuously engaged in forcing the individual railroads to do what they ought to do, for the result of this would be to throw more and more of the control of the details of railroad management into the hands of the government, and the more government intervention there is the more restrictions will be imposed upon private management and the more arguments there will be created for government ownership. From the standpoint of the welfare of the railroads themselves and the public, therefore, the correct conclusion seems to be that the railroads should establish some organization or agency of their own for coercing themselves. They should first establish sound rules and principles, and then punish railroads which do not live up to these rules and principles. Once it has been made clear that when a railroad which has violated a car service rule or disregarded an order of the Commission on Car Service will be punished, perhaps by having wide publicity given to the facts or even by being denied the opportunity to exchange equipment with other railroads until it has given satisfactory reason to believe it will act fairly and honestly in future, there will begin to be ground for confidence that the railways will pull together sensibly and fairly in future, and probably not before.

Many of the recent developments affecting directly the relations between the railroads themselves and indirectly the

service rendered to the public and public opinion regarding private operation have been so indefensible that it is difficult to decide to what reason to attribute them. It would seem that some railway officers put on blinders to keep from seeing anything except what is on the rights of way of their own lines. It is high time that a good many railway managers awakened to a realization of the conditions with which the railroads of the country are confronted and adapted their methods to the requirements of those conditions. Otherwise they will soon destroy the present favorable public sentiment toward private management and perhaps in the long run destroy private management itself.

A Call for More Efficient Signaling

THE STUDY of train operation, by H. M. Sperry, printed in the *Railway Age* of June 4 and June 11, brings together numerous scattered facts and arguments concerning train despatching and signaling, with which most of us are already familiar but which we sometimes neglect because, apparently, of the very fact that they are familiar. He includes numerous things which we already know, but do not know well enough. He proposes what seems like a radical change—to abandon all written orders and convey instructions to enginemen wholly by means of signal arms supported on roadside posts. And yet the proposal is not radical, for the practice proposed is already in use, and familiar to everybody, in large interlockings, at dozens of cities; and the only change in fundamentals that is here suggested is to extend this practice; to extend a limit of two miles, to one of two hundred miles. Or, to take another comparison, the proposal is that the perfect facility with which trains are moved under automatic block signals on a double-track road, with blocks less than a mile in length, ought to be availed of in varied situations where we have all along assumed that such facility was impracticable or too costly. And it is only because of a lack of foresight, or of money, or energy, or enterprise, that the progress here proposed has not been already accomplished. We are called upon to more carefully take account of our resources.

The problem outlined by Mr. Sperry ought to be divided into two problems: one pertaining to lines of less dense traffic, where the manual block system is the appropriate method; and the other to divisions or parts of division where block sections must be short and where, consequently, automatic block signals are needed. If any one thinks that the essay is too long, he can divide it by thus picking out the points bearing on one or the other of these two problems. Another suggestion, to any one who thinks it a burden to read more than one page at a sitting, is that Mr. Sperry has on several occasions printed some of the salient points of his argument on the outside back cover of the *Railway Age*. The editor has no prejudice against the advertising pages!

Mr. Sperry puts his claim for a hearing in the form of a plea for the more formal or definite recognition of signaling as a cardinal element in operating efficiency. Near the end of his article he says:

> OPERATING EFFICIENCY
>
> The efforts that have been made to increase operating efficiency have largely been in the direction of:
>
> 1. Increasing the tractive power of the locomotive.
> 2. Increasing car capacity.
> 3. Increasing track facilities by the addition of second, third and fourth main tracks, longer passing sidings and larger yards and terminals.
> 4. By the electrification of steam-operated roads.
>
> These improvements, which require large expenditures, may fail to show an adequate return if the means for directing train operation does not keep trains moving.

In other words, a fifth head should be added to these four. Progress in the four features has been made along well-known and unmistakable paths, apparent to all. This progress has been reasonably steady (until the abnormal times of the past three years) because competent judges have been fairly unanimous in their views as to what was needed and how the needs should be met. But is there not an equally intelligent unanimity as to the value of those features of signaling which are emphasized by Mr. Sperry? In other words, is there any reason for disagreeing with him on any important point?

The American despatching system has done great things, and has a fascinating history; but if there could be taken a composite motion-picture of the freight-train movements of a day in, say, the whole "Eastern Region," *showing clearly the percentage of trains standing motionless on the main track* (or on sidings awaiting right to the main track) because of the lack of adequate fixed signals, the force of this argument for an advance in efficiency would be overwhelming.

Pere Marquette

THE Pere Marquette is one of the very few companies which refused to accept the continuation of a guaranteed net equal to the government rental for the current six months. The rental was based on average net earnings in the three years, 1915, 1916 and 1917. In 1917, freight revenue on the Pere Marquette amounted to $16,850,000; in 1918, to $22,200,000; in 1919, to $26,504,000; an increase of $9,654,000 in 1919 as compared with 1917. Furthermore, this increase is due to an increase in traffic as well as to increased rates. Of the increase, $2,108,000 is estimated to be due to increased freight traffic alone exclusive of increases due to rates or any other causes. In 1919, the Pere Marquette's operating ratio was only 75. The rental which the government paid in 1919 was approximately $3,748,000. The operating income of the property under government operation in 1919, after the payment of expenses and taxes, was $8,046,000.

It seems hard to believe that only a few years ago, the Pere Marquette was a byword for one of the, seemingly, most hopelessly insolvent railroad companies in the country. Attempted consolidation with the Cincinnati, Hamilton & Dayton when that property was still independent, broke the back of the Cincinnati, Hamilton & Dayton and when the Baltimore & Ohio took that road, it refused the Pere Marquette.

Automobiles and a most drastic reorganization are important contributing factors to the immense change that is taking place in the financial standing of the Pere Marquette. When we speak of automobiles being an important factor, it is in the sense that cotton is an important factor in the prosperity of the Southern Railway. Automobiles themselves furnish a small traffic to the Pere Marquette directly. It is freight of all classes which follows the establishment of great manufacturing plants such as those at Detroit that has so greatly increased the business of the road. The tonnage of automobiles carried was only 264,000 and represented but 1.78 per cent of the total tonnage carried by the road. In 1918, only 139,000 tons, or less than 1 per cent of the total tonnage, was automobiles.

The Pere Marquette operates 2,232 miles of road and, in 1919, had $8,046,000 operating income as previously mentioned. The company which took over the road from the government has outstanding only $30,455,000 of long term bonds and $5,870,000 collateral trust bonds, but also has $5,000,000 bills payable. The total interest charges in 1919, including interest on bills payable, was $1,727,000 so that a combined income account of the government and the company would have shown a surplus available for dividends after the payment of interest, rentals, war taxes, etc., of $4,867,000. The company has $11,200,000 cumulative 5 per

cent prior preference stock; $12,429,000 cumulative preferred; and $45,046,000 common. Five per cent of both classes of preferred would have called for less than $1,200,000 so that the margin for the common would have been over $3,000,000 or at the rate of 8 per cent.

Emphasis has been laid on the growth of freight business but passenger business, of course, has also kept pace with the growth of the industrial community. Passenger revenue on the Pere Marquette in 1919 amounted to $6,127,000, an increase of $1,894,000 over 1918.

Operating expenses were held down remarkably well. The total operating expenses in 1919 amounted to $26,724,000, an increase of $3,408,000 or 14.6 per cent.

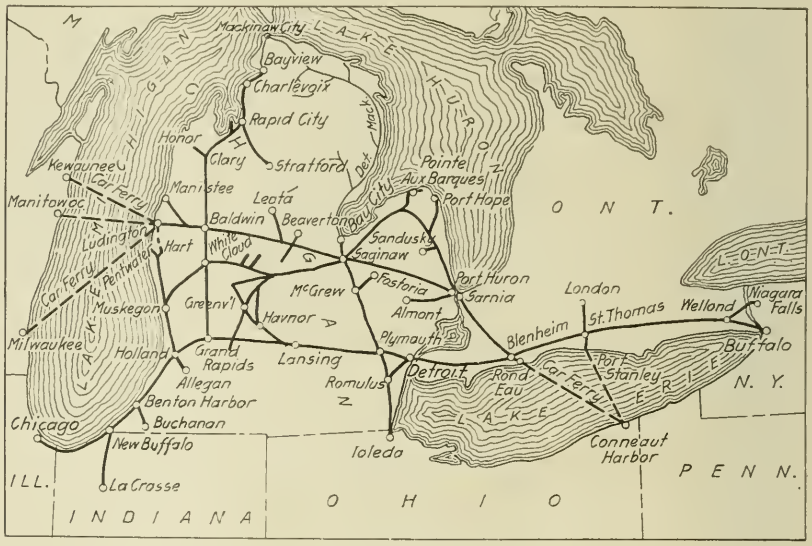
The annual report of the Pere Marquette is admirable in the full explanation which is given of changes in figures from year to year. Maintenance of way and structures cost $3,495,000 in 1919, a decrease of 7.8 per cent as compared with the previous year. The principal reason for this decrease was a bookkeeping decrease of $211,000 in the cost of rail and other track material due to clearing reserves created in 1918 and adjustment of inventory as of December 31, 1917. The Pere Marquette, like nearly all of the other roads which have reported for 1919, shows a considerable increase in the cost of maintenance of equipment. This cost in 1919 amounted to $7,132,000 or 16.1 per cent more than in 1918. Besides the increases in cost of material and the higher wage scale, equipment which had been put in very thorough repair, required comparatively little maintenance expenditures in 1918 but came in for heavy repairs in 1919.

Transportation expenses amounted to $14,764,000, an increase of 20.7 per cent and the greater part of this increase is due to higher wages paid to telegraphers, trainmen and enginemen as a result of awards made by the Railroad Administration effective October 1 and December 1, 1918, and December 1, 1919. The Pere Marquette was notably successful in its fuel economy campaign. Revenue locomotive mileage increased 666,000 miles but the fuel consumption was less by more than 10,000 tons. There was 7.6 per cent more mileage gotten out of locomotives on the average per ton of coal in 1919 than in 1918.

The following table shows the principal figures for federal operation of the road in 1918 as compared with 1919. This is not the corporation income account.

	1919	1918
Average miles operated	2,232	2,239
Freight revenue	$26,504,204	$22,200,348
Passenger revenue	6,127,461	4,233,797
Total operating revenues	35,443,137	28,955,012
Maintenance of way and structures	3,495,488	3,790,387
Maintenance of equipment	7,132,499	6,143,894
Traffic expense	337,974	344,773
Transportation expense	14,764,362	12,233,619
General expense	877,318	753,118
Total operating expense	26,723,825	23,315,551
Taxes	670,865	697,488
Operating income	8,046,078	4,940,470
Surplus after rentals, etc.	6,717,880	3,851,484

A TRAINMAN kicked a drawbar, he knew it could be done; he used to wear some nifty shoes—now he wears but one.—*Fred Meyers.*



The Pere Marquette

New Books

Non-Technical Chats on Iron and Steel. By LaVerne W. Spring, metallurgist, Crane & Co., Chicago. 6½ in. by 8 in. Bound in cloth. 358 pages, illustrated. Published by Frederick A. Stokes Company, 443 Fourth avenue, New York.

The title of this book suggests a popular treatment, but while the work is in fact free from complicating technicalities there is nothing about the style used which would detract from the value of the book to the student or engineer accustomed to the perusal of serious works. In general, the book may be said to give a bird'seye view of the metallurgy of iron and steel and the iron and steel industry, including the mining of the ore, the production of the coke, charcoal and limestone used in the manufacturing processes, the manufacture of the various basic iron and steel products, as well as some of the semi-finished and finished materials, such as wire, pipe, etc. The first chapter of the early history of iron is of particular value for the manner in which it differentiates between wrought iron and cast iron. In fact, this particular feature exemplifies one of the notable merits of the book, the manner in which the complex relationships of these and other products of iron ore are clearly differentiated. Such involved subjects as metallography are treated in a manner that is easily understood. The arrangement of the book is simple. The various primary manufacturing processes are treated in order, followed by chapters on each of the principal products from cast iron to high-speed steel. The last third of the book is devoted to an exposition of the various finishing processes, including forging, rolling, wire drawing and pipe manufacture, with a final section on the various properties of iron and steel and their relation to heat treatment, etc.

Metal Statistics, 1920. *528 pages including advertising, 3½ in. by 6 in., bound in cloth. Published by the American Metal Market and Daily Iron and Steel Report, 81 Fulton Street, New York.*

This book probably contains the most complete data concerning metal prices and production for many years past that is available in the form of a pocket handbook and as such the book may be recommended to railroad purchasing agents; although in the present erratic state of the market a study of previous price fluctuations would not appear to be of much value as an index to future price levels.

A Personnel Department for the Railways

Advocates Methods for Selection and Training of Employees Found Successful in Other Industries

By J. C. Clark

Assistant to General Manager, Oregon Short Line

Considered solely as a transportation agency, a railroad consists of two essential features; the physical property and the human organization that operates the property. Since the first locomotive was built and the first rail laid, the physical property has been improved wondrously. Experts have been employed to consider the merits of every improvement and enormous sums of money have been spent to obtain the best possible material and the latest devices. The human organization, however, has not received the same attention that has been given to the physical property although it is undoubtedly true that successful operation depends in a large part upon the human element. A good organization can, and often does, accomplish good results with inadequate and poorly maintained equipment, but a poor organization cannot produce other than poor results even with the equipment entirely adequate and well maintained. There have been many changes in methods of organization since the early days of railroading, but the work of selecting and training the individual units of the organization has largely been neglected. The work of selecting and training men requires special study, and the importance of the work deserves special consideration. In some industrial organizations a personnel department has been organized to carry on such work. It is entirely practicable and feasible to establish such a department in railroad organization.

Work of a Personnel Department

The work of a personnel department on a railroad should have three essential features: First, to obtain the best grade of labor from the available supply; second, to train the individual to perform his particular duties efficiently and safely; third, to make the individual contented in his employment. There is no question of the importance of this work. The department should be placed in charge of a vice-president, at least an officer of sufficient authority to carry on the work successfully. The head of the department should divide his organization into the three divisions—employment, training and service. A responsible officer should be placed in charge of each division.

Employment

In order to function properly, the employment division must be familiar with the requirements of the organization it is to serve, both as to quantity and quality of labor. The quantity of labor required by a railroad varies from day to day and from month to month, but it is possible to anticipate the requirements to a certain extent. In order to estimate the requirements, an adequate system of "labor turnover" reports should be established. These reports should indicate the number of persons leaving the service, the number entering the service and the number transferred from one department or class to another. In addition to weekly or monthly "labor turnover" reports, the employment division should be advised of the daily requirements of each department. It is in this way that the most equitable distribution of labor can be obtained. In times of labor shortage the employment division could distribute labor to the points where it is most needed and thus obviate competition between the various departments on the road.

Under the system of employment now followed on most railroads each department head employs his own men and is more or less familiar with the particular job for which a man is employed. In order that an employment division may select men intelligently for the various jobs, it would be necessary to analyze each job or class of jobs and specifications prepared for them. This can be done by descriptive outlining of the work to be performed or by setting down the chief mental, moral and physical characteristics required. The work of analyzing would alone be productive of good. Few railroads have attempted to analyze the work performed by their employees with a view to obtaining the greatest efficiency. Many skilled men are spending a part of their time in doing work that should be performed by common labor.

Development of the Labor Supply

Another important duty of the employment division would be the development of labor supply in the territory served. There are thousands of young men who would enter railroad service if they knew how to go about it. The young man finishing high school usually seeks employment with a local concern, and unless he lives at a division point on the railroad he knows little or nothing about the opportunities in railroad service. A systematic development of the labor material available will do much in remedying labor conditions.

Selecting and Placing New Employees

Perhaps the most important function of the employment division would be the selecting and placing of new employees. Psychological tests have been developed that determine, to a certain extent, the qualifications of the applicant. Such tests should be developed for each class of employment, and this can be done only by extensive experimental work. In placing an applicant serious consideration should be given to his own preferences. No employee will be contented with a job that he dislikes, and he will not give the best service of which he is capable unless he is contented. It is evident that employment offices should be established at various points along the line in order to carry out the work successfully.

Training

The officer in charge of the training division should have one or more representatives on each division or in each department of the railroad. These representatives may be called personnel officers, and they would have direct supervision of the training of employees, both new and old. They might also co-operate with the employment division in developing the labor supply.

In order to train an employee intelligently it is first necessary to determine his weak points. To do this, some industries have used a method known as that of "limited impressions." This method consists in naming the chief qualities necessary for success in a particular class of work. Without some arbitrary limitations the qualities with which a worker may be credited or debited would be limited only by the descriptive vocabulary of the person making the estimate. Estimates of this character made of the same employee by two or more supervising officers could not be compared, but by limiting the qualifications and giving each qualification a definite value the various estimates can be compared and an average obtained. For example, the chief qualifications of

a conductor might be stated as judgment, intelligence, sense of responsibility, loyalty, obedience of rules, vigilance or alertness, team work, powers of observation, punctuality and steadiness and knowledge of equipment. Each of these qualifications should be given a definite value and the total should be 100. The supervising officer will be required to make a report of each employee, giving a rating of excellent, good, fair or poor for each qualification. When a number of these reports have been made by various supervising officers, an average could be obtained that would give a very definite and correct estimate of the employee's value to the service. In connection with the qualifications named, however, an estimate should also be obtained of the character and habits, disposition and temperament of each employee.

The value to an organization of such a system would be great. Under present conditions, as long as an employee's work progresses satisfactorily, the employee is regarded as a useful fixture and little or no attempt is made to study him or to gage his capacities. When the employee gets into trouble or is up for a promotion, a hurried estimate must be made of his abilities. By having individual progress reports made at stated intervals the officers of the company have at all times a definite estimate of each employee's qualifications and abilities. For example, a list of all conductors on a division is made with a figure following each name as follows: 482—The four indicates that four individual progress reports have been made on the conductor and that the average of these four reports was 82. Such a report would at once indicate the conductors on the division who had the poorest qualifications in the judgment of the men best qualified to judge. These men could be singled out for special supervision and training, and thus the service would be improved. On the other hand, if it was desired to select a conductor for promotion the list would show the men having the highest qualifications and a number of these could be given special study to determine which was best qualified to undertake more responsible work.

It is not asserted that this method will entirely eliminate that prolific source of trouble—prejudice. However, it has been proven in industrial plants which have adopted this method that the evil effects of prejudices have been very largely eliminated. The fact that these opinions must be recorded and signed will do much to reduce the degree of prejudice expressed. The further fact that the supervising officer making the report knows that his report will be checked against reports made by other division officers, and some of them his superiors, will be an incentive to study his men closely and express his very best judgment in making the report. An important feature of this method is the defining of the qualifications named on each card. Each supervising officer making these reports will have the same understanding of the qualifications named.

With the information obtained from this system of rating available the personnel officer or any other officer of the company would know where to concentrate his efforts. It would probably be advisable to establish a minimum rating of, say, 60, and any employee who fell below this would be discharged from the service automatically. When an employee's rating fell to, say, 75, he could be given special consideration, his faults could be pointed out and he could be given instructions for improvement. I believe that if this system of rating is fully developed and put in operation it will supplant other systems of discipline now in use.

Service

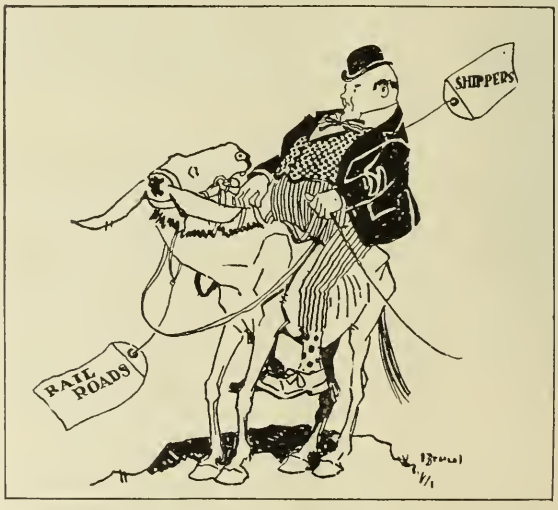
The service division of a personnel department would have charge of safety, sanitation, health, housing and any other matters that directly affect the welfare or contentment of employees. Safety work is well organized and needs no comment. Sanitation on a number of roads is handled in connection with safety, but has not been given the attention it deserves. A sanitary inspector should be employed on every railroad and his work should include all questions of sanitation affecting either the employees or the public. Most railroads have a well-organized medical or hospital department, and the necessity for it is generally recognized. The work of this department should include a periodical examination of all employees not only as to sight and hearing but as to general physical condition.

The question of housing is of great importance and has been neglected on most railroads. Employees will not be satisfied or contented in their employment if their living conditions are unsatisfactory. In cases where the railroad furnishes living quarters for section foremen, agents or others, these quarters should be such as to meet the ordinary man's idea of a home. A standard railroad house with standard paint, set beside the track, will not meet this condition. Few women are contented to live and raise families in such houses, and if the wife is not contented the husband will be discontented as well.

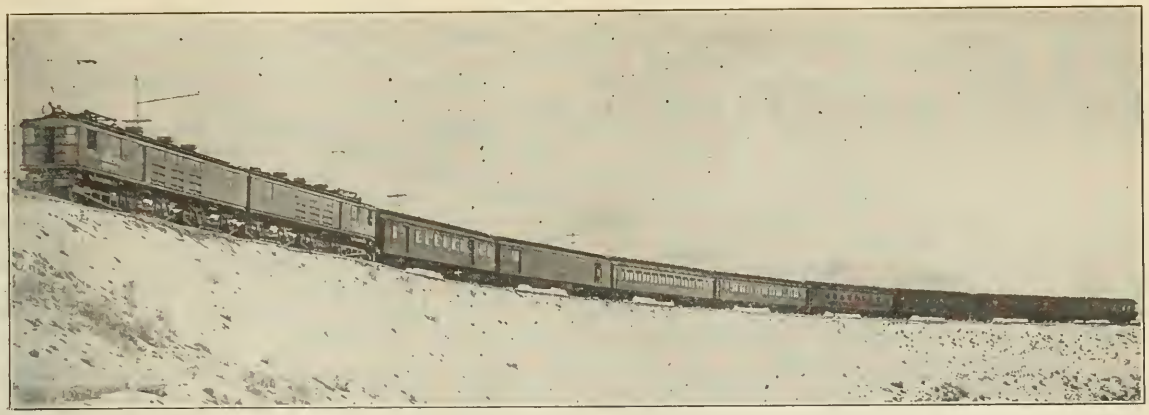
Railroad companies should make provision for taking care of employees to whom they do not furnish living quarters. This could be done by setting aside a sufficient sum of money as a revolving fund to buy property and build houses to be either rented or sold to employees. Such a fund should be placed in the hands of a competent business manager and handled separately from other railroad business. It could be made to pay a nominal dividend.

Relationship to Other Departments

It is apparent from the foregoing that a personnel department would necessarily work in very close co-operation with all other departments. It would relieve the other departments of the responsibility and work of employment and it would assist in handling discipline. If any department head was dissatisfied with an employee, the employee could be sent to the personnel department with a statement of the trouble and he could be placed in some other class of work. By making transfers of this kind a large number of employees would eventually be placed where they would render the best service. When fully organized the personnel department would handle all personal grievances of employees and thus relieve operating officers and allow them more time to attend to other problems.



Impoverished Steed (to Overfed Driver)—"If You Would Ride Me, You Must Also Feed Me"



Electric Passenger Train on the Rocky Mountain Division of the St. Paul

Notes on the C. M. & St. Paul Electrification*

Delays Reduced While Locomotive Maintenance and Train and Engine Crew Expense Is Decreased

By R. Beeuwkes
Electrical Engineer, C. M. & St. P.

THE ELECTRIFIED TERRITORY of the Chicago, Milwaukee & St. Paul now extends from Harlowton, Mont., to Avery, Ida., and from Othello to Tacoma, Wash., a total distance of 645 route miles, or of about one-third more track miles.

The first portion to be put into electrical operation was that between Three Forks and Deer Lodge, the west sub-division of the Rocky Mountain division. This was in December, 1915. The second portion, Three Forks to Harlowton, the east sub-division of the Rocky Mountain division, began to be electrically operated in April, 1916, and the section from Deer Lodge to Avery, the Missoula division, in November and December, 1916.

Electric helper service was installed on the Saddle mountains, west of Othello, in August, 1919, and on the Cascade mountains in November of the same year. Electric road freight service is being installed as rapidly as the conversion, by change of gear ratio, of the original passenger locomotives of the Rocky Mountain and Missoula divisions into freight locomotives will permit. Regular electric passenger service west of Othello was started in March of this year. This section now comprises the west sub-division of the Columbia division, extending from Othello to Cle Elum, and the coast division extending from Cle Elum to Tacoma and Seattle, two engine divisions, but the entire district will shortly be merged into and operated as one electrified division.

The following general notes regarding some of the items of a list suggested as representing matters of particular interest in connection with electrification work are based on experience with the above installations.

First Costs

The electrification work on the Rocky Mountain and Missoula division was carried on during the years 1914, 1915 and 1916, when labor and material conditions were comparatively stable and arrangements for the supply of both could be made in such a way as to avoid the delays to which the work west of Othello, carried on largely during the war, was more or less subject. Costs for the former work are, therefore, believed to be the more capable of application of the necessary corrective factors corresponding to present and other assumed price standards and approximate figures are given in Table I.

TABLE I

Route miles	438
Actual mileage transmission line	364
Total kw. capacity of sub-stations	59,500

Number of locomotives—12 passenger, 30 freight and two switching locomotives.
Number of sub-stations, 14. Two operators' buildings at each station.
Automatic signals—Existing battery fed track circuit and semaphore signals were replaced with alternating current light signals fed from a 4,400-volt primary circuit connected to sub-stations; costs not included.

Item	Average cost per route mile	Various average unit costs	Per cent item cost to total, excl'd locomotives
Trolley system complete	$8,390	.....	47.7
Transmission system complete	2,360	.....	13.3
Per mile of transmission line	.....	$2,835.00	....
Sub-station layout complete	6,050	.....	34.4
Per station	.....	189,400.00	....
Per kw.	.....	45.00	....
Sub-station building and grounds:			
Per station	.....	38,400.00	....
Per kw.	.....	9.50	....
Operators' dwellings, etc.:			
Per station	.....	6,100.00	....
Per kw.	.....	1.50	....
Sub-station apparatus:			
Per station	.....	144,900.00	....
Per kw.	.....	34.00	....
Miscellaneous, including right-of-way, changes in telegraph and telephone lines to clear transmission and trolley, store-houses, minor apparatus at shops and roundhouses, etc.	265	.....	1.7
Engineering and administration, except that for drafting and inspection for sub-stations, charged direct	514	.....	2.9
Locomotives, including transportation, messenger and miscellaneous charges:			
Per road locomotive	.....	122,500.00	....
Per switching locomotive	.....	37,700.00	....
Total per route mile, excluding locomotives	17,579	.....	100.00

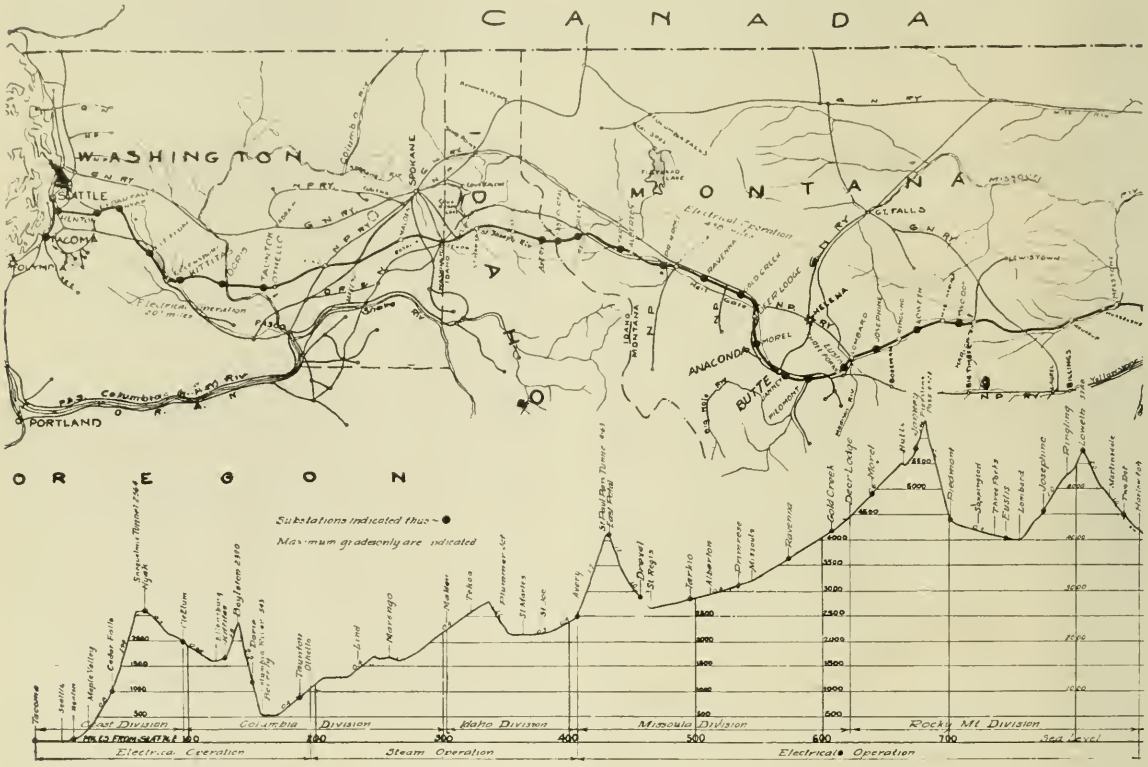
The figures shown in Table I, without a detailed knowledge of the labor and material figures on which they are

*A paper presented before the 43rd annual convention of the National Electric Light Association held at Pasadena, Cal., May 18-22.

based, would, of course, be of only very rough value in estimating the costs of electrification in other cases, and their main purpose is to give an approximate idea of the relative importance, from a cost standpoint, of the different items involved.

Comparative Operating Costs

Table II indicates, as between the electrified Rocky Mountain and Missoula divisions and the adjacent steam-operated divisions, the relative magnitude of the more important items of freight operating expense, which are affected by the type of motive power employed, costs for the Missoula division being taken as unity. The figures apply for the last six months of the year 1918, this period being taken due to the fact that the data had already been worked up for other purposes and was therefore most readily available.



Map and Profile Showing the Two Electrified Sections of the St. Paul and the Steam Operated Section Between Them

TABLE II

Item	Columbia Division	Idaho Division	Missoula Division	Rocky Mtn. Division	Musselshell Division
Steam or electric locomotive repairs	$1.97	$2.34	$1.00	$0.86	$2.26
Train conductors and brakemen	2.78	3.05	1.00	1.46	1.61
Train enginemen and motormen	1.84	2.17	1.00	1.30	1.21
Train locomotive fuel or power	2.05	2.34	1.00	1.04	1.38
Engine-house expense, train	3.15	2.50	1.00	.80	3.71
Total yard service*	.78	1.12	1.00	.99	.71
Total of items of expense affected by type of motive power†	1.67	1.90	1.00	1.11	1.33

*In 1918 a considerable portion of the switching was still done by steam, sufficient electric switching locomotives not having yet been received.

†Includes superintendence, maintenance of sub-stations, transmission and trolley systems, water and fuel stations, shops and engine-houses; also locomotive and train supplies, in addition to the items for which individual comparison is given in the tabulation.

In considering the above it should be noted, as shown on the attached profile, that the Musselshell division is of low grade, maximum of 0.4 per cent, while the Rocky Mountain division, crossing both the Belt and Rocky mountain ranges, and formerly under steam operation, constituting "the neck of the bottle" as far as operation was concerned, has long mountain grades of 1.7 and 2.0 per cent.

The Missoula division, crossing the Bitter Root mountains with long 1.7 per cent grades, would not from the profile appear to involve as difficult operating problems as the Columbia division with its long 2.2 per cent grade on the east slope of the Saddle mountains and its comparatively long 1.6 per cent grade on the west slope, but the much more unfavorable weather and topographical conditions existing on the Missoula division more than offset the difference in grades.

Some of the more prominent reasons for the advantageous results secured under electrical operation are as follows:

Cost of engine repairs per thousand-ton miles is much decreased, due to the fact that not only is the cost of repairs per engine mile of the electric locomotive much less than that of the average steam locomotive replaced, but the number of engine miles per thousand-ton miles is, on account of the greater capacity of the electric locomotive, much less. The engine miles per thousand-ton miles for the Missoula division under electric operation in the 1918 period taken above was only about 55 per cent of that of the latter half of 1915 under steam operation.

Train conductor and brakemen expense per thousand-ton miles is reduced under electrical operation, due to increased ton miles per train mile and increased train speed. This item for the Missoula division for the 1918 period was about nine or ten per cent less than that of the 1915 steam period, while the Idaho and Columbia divisions, still operated by steam, the expense per thousand-ton miles more than doubled.

Enginemen's expense decreased under electrical operation, due to the same causes which decrease trainmen's expense.

For the Missoula division this item increased only a few per cent for the 1918 period as compared with the 1915 period, while for the Idaho and Columbia divisions it practically doubled.

Regarding the items of train locomotive fuel, it should be stated that the factors given are based not on the actual cost of fuel for the particular divisions involved but on the average fuel price for the system. Cost of fuel haul is not taken into account.

The above is at best only an incomplete statement of some of the more direct benefits derived from electrical operation. Constant improvement is to be expected as further advantages are recognized and developed through operating experience.

Reliability of Service

The question of the relative reliability of steam and electrical operation is one that is frequently raised, and it is believed the "Recapitulation of Passenger Train Performance" shown in Table III will be of interest in this connection.

This recapitulation gives the delays to passenger trains, on basis of miles of line operated, for the various railway divisions of the St. Paul west of Mobridge. Similar information is not conveniently available for freight train performance, but delays to freight service would naturally be reflected in the passenger train performance.

TABLE III

Recapitulation of "Passenger Train Performance," Showing Delays to Passenger Trains on the Basis of Miles of Line Operated; Lines West of Mobridge; Months October, November and December, 1919, and January, February and March, 1920

Division	Mobridge to Marmouth	Marmouth to Harlowton	Harlowton to Avery	Avery to Cle Elum	Cle Elum* to Seattle
	Delayed time in minutes per mile of line operated				
Motive power	Steam	Steam	Electricity	Steam*	Steam
Miles	190	340	437	325	90
Item					
1. Meeting and blocked behind passenger	18.83	11.33	15.15	10.33	12.60
2. Meeting and blocked behind freight	14.03	5.88	6.49	1.98	2.89
3. Extra cars	1.33	0.58	0.02	2.35	1.37
4. Excess time switching	1.35	2.69	2.16	1.54	4.51
5. Electric block signals	0	0.13	9.52	4.07	10.62
6. Slow orders	4.54	1.37	1.29	0.33	5.38
7. Bad weather and poor coal	109.2	13.59	3.53	3.48	4.91
8. Engine condition	20.92	25.20	11.43	9.39	10.54
9. Accidents and derailments due to engine	2.63	2.25	0.15	3.85	2.05
10. Trolley and sub-station	0	0	3.93	0.03	0
11. Total of items 1 to 10 inclusive, which are affected by the type of motive power used	172.65	62.95	52.73	35.34	54.93
12. Average of items 1 to 10 inclusive, for the four steam divisions..74.75					
13. Awaiting connections	0	1.16	0.02	1.82	1.94
14. Handling extra heavy bag mail and express	6.79	3.26	2.09	1.20	0.97
15. Extra stops for passengers and railway crossings	0.92	0.97	1.99	0.22	1.13
16. Car conditions	8.63	18.05	9.75	6.87	6.10
17. Accidents and derailments not due to engine	27.69	12.51	17.75	14.63	30.49
18. Slides, earth, rock and snow	2.53	0	3.64	3.86	13.80
19. All other causes	11.30	1.78	11.03	4.91	9.95
20. Total of items 13 to 19 inclusive, which are not affected by the type of motive power	57.80	37.85	46.30	33.86	103.69
21. Average of items 13 to 19 inclusive, for the four steam divisions..46.77					
22. Total of all items	230.45	100.80	99.03	69.20	158.62
23. Average of items 13 to 19 inclusive for the four steam divisions..121.52					
24. Minutes lost on schedule running time per mile of line operated	205.5	69.7	8.94	0.00	162.2
25. Minutes made up per mile of line operated	46.6	35.6	100.00	81.00	11.54

*Electrical operation commenced in March.

It will be noted from item 11 that the electrically operated territory shows less time delayed than any of the steam operated divisions, except that between Avery and Cle Elum, a district particularly favored as regards its freedom from climatic, topographical and other conditions which tend to cause delays. Attention is also called to the favorable showing, for electricity, of items 24 and 25.

Conclusion

In no respect have the results of the electrification failed to equal the expectations of the railway organization, and in most respects these expectations have been far exceeded. The extent of the electrification is such as to leave no doubt as to the practicability of indefinite expansion with an insurance of increased reliability and safety and a marked and determinable increase in capacity. Items of operating expense dependent on whether steam or electricity is used as a motive power we have found by experience and estimates to be so reduced and the benefits indirectly obtained to be so great as to render justifiable, even with the increased investment charges, the serious consideration of indefinite extension of electrification, even for lighter grades.

The Ninth International Railway Congress

L. WEISSENBRUCH, secretary of the International Railway Association, 11 Rue de Louvain, Brussels, Belgium, has issued a list of questions to be discussed at the ninth congress of the Association, which it is proposed to hold in Rome, Italy, from April 18 to May 1, 1922.

Following are the principal heads in the program of subjects, with names of the men who are to prepare papers, where these are given. Where the letter "X" is shown the "reporter" is to be a person, yet to be appointed, from the country named.

Section I: Way and Works

Construction of roadbed and track: Denmark, Sweden and Norway; K. Ahlberg, Swedish State Railroads. Great Britain, E. F. C. Trench, L. & N. W. America, X. Other countries, Mr. Henry, Eastern of France, and Mr. Candelier, Northern of France.

Maintenance and supervision of track: Great Britain, C. J. Brown, Great Northern. America, X. Other countries, X (an Italian).

Special steels: America, W. C. Cushing, Pennsylvania. France, Mr. Mesnager. Other countries, Mr. Sand, Swiss State Railroads.

Reinforced concrete: Denmark, Sweden and Norway, C. Ernst, and P. M. Bulow, Danish State Railroads. Holland, C. Leemans, Holland State Railroad. Great Britain, W. W. Grierson, Great Western. America, G. A. Haggander, C. B. & Q. Other countries, Mr. Golard, Belgian State Railroads.

Section II: Locomotives and Cars

Superheaters, feed-water heaters, etc.: Countries using the English language, G. J. Churchward, Great Western (Eng-

land). Other countries, Mr. Lacoin, Orleans Railroad, France.

Locomotive trucks, axles and springs: Countries using the English language, George Hughes, L. & Y. Belgium, Denmark, Sweden and Norway, E. Minsart, Belgian State Railroads. Other countries, Mr. Bochet, inspector to the Minister of Public Works, France.

Passenger cars: Spain, Portugal, etc., F. de Vargas, Northern Railroad of Spain, Great Britain, R. W. Reid, Midland. America, X. Other countries, Mr. Biard, Eastern Railroad of France.

Electric Traction: Holland and Great Britain, J. J. W. van Loenen Martinet, State Railroads of Holland. Belgium, Ernest Gerard, Belgian State Railroads. Denmark, Sweden and Norway, Mr. Ofverholm, Swedish State Railroads. Italy, X. Switzerland, Emile Huber, Swiss State Railroads. America, George Gibbs, Long Island Railroad. Other countries, Mr. Sabouret, Orleans Railroad of France.

Section III: Operation

Operation of passenger terminals: Countries using the English language, X (an American). Other countries, X (an Italian).

Freight stations; organization, simplification of switching; mechanical appliances: Italy, X (an Italian). Countries using the English language, H. G. Kelley, Grand Trunk of Canada. Other countries, Mr. Moutier, Northern of France, and Mr. Jullien, Orleans Railroad.

Slow freight traffic; organization, speeds, make-up of trains, etc.: America, X. Belgium and France, X (a Frenchman). Great Britain, Sir H. A. Walker, L. & S. W. Other countries, Edilio Ehrenfreund, Italian State railroads.

Locomotive cab signals, including speed recorders: France, A. Herdner, Southern Railroad of France. Other countries, X (an Italian).

Section IV: General

Cost of transportation, passengers and freight; relation to rates: America, X. Other countries, Henry Gerard, Orleans Railroad of France.

Customs examination: All countries, Mr. Jourdain and Mr. Prudent, P. L. & M. (France).

Interchange of freight cars; penalties, demurrage, etc.: America, X. Other countries, Mr. Charron, Southern Railroad of France.

Workmen's dwellings: America, A. F. Banks, Elgin J. & E. Other countries, X (an Italian).

Section V: Light Railways

Passenger and freight cars; facilities for transhipment and change of gage: All countries, X (an Italian).

Operation, light railways; working rules; issuance of tickets, collecting fares, auditing. All countries, F. Level (France). Special methods of traction; America, H. B. Spencer. Other countries, X (an Italian).

Safety appliances; cheap appliances for light railways: All countries, Mr. Bonnevie, Brussels.

The Good Railway Service Association, of California, recently organized to assist in the solution of various railroad problems in regard to shortage of cars, industrial disturbances and other factors consequent upon the return of the roads to private control, has instituted a campaign to help relieve the car shortage emergency. Attractive posters, reminding shippers that an increase of two tons per loaded car will add 200,000 cars at once to those now available for public use, are being displayed at all important loading points in the state. The Southern Pacific and other railroads have cooperated with the association and have instructed agents to display the association's posters. Headquarters for the association are in San Francisco.

Accident Bulletin No. 73

The Interstate Commerce Commission has issued its quarterly Accident Bulletin, Number 73, dated April 19, 1920, giving statistics of railroad accidents in the United States in the months of July, August and September, 1919. The total number of persons killed in train accidents in the quarter under review was 156, and of injured 2247; and the total number of casualties on the railroads of the country from all causes, in that quarter, was 43,180, as shown in the table below. The term "other persons" includes, under the head of trespassers, some employees.

A comparison with the corresponding quarters of 1918 and 1917 appears, as follows:

Casualties in Three Months—July, August, September

	1919		1918		1917	
	Killed	Injured	Killed	Injured	Killed	Injured
In Train Accidents—						
Passengers	17	1,294	129	1,118	39	1,406
Employees	126	904	153	939	108	995
Other persons	13	49	66	90	48	160
Total	156	2,247	348	2,147	195	2,561
In Train-service Accidents—						
All classes	1,607	12,491	2,081	14,299	2,524	16,309
Total	1,763	14,738	2,429	16,446	2,719	18.870
In Non-train Accidents	116	26,563	171	29,180	122	31,967
Grand total	1,879	41,301	2,600	45,626	2,841	50,837

The number of collisions reported during the quarter was 2072, of derailments 4120, and of other train accidents 899, and the total damage to railway property was $6,403,750. This sum is no less than 32.6 per cent more than the corresponding total for the quarter immediately preceding; a difference entirely consistent with the well-known fact that the second quarter of the year always shows a lighter accident record than either of the other three quarters.

Reports of investigations of train accidents made by the Bureau of Safety are now printed in a separate publication and the present bulletin consists of only thirteen pages.

Reports of Accident Investigations

The Interstate Commerce Commission has issued its "Summary of Accident Investigation Reports, No. 1," for the months of July, August and September, 1919, containing reports, made by the Bureau of Safety, on collisions and derailments investigated by the Bureau during the months named; the matter heretofore included in the quarterly statistical report of accidents.

This is a pamphlet of sixty pages, 6 in. by 9 in., and contains the reports noted in the table below. Some of these reports have been made public before, and in these cases the present record is somewhat condensed.

Train Accident Investigations

Road	Place	Date (1919)	Kind of accident
N. Y. Central	Dunkirk	July 1	Rear collision
Monong. Coun'g	Pittsburgh	July 9	Derailment
Union	Munhall, Pa.	July 14	Derailment
N. Y., N. H. & H.	Montowese	July 14	Rear collision
Lehigh Valley	Upton, N. Y.	July 19	Rear collision
Phila. & Reading	Linfield	July 30	Derailment
N. Y., N. H. & H.	E. Pt Chester	July 31	Rear collision
Nash. C. & St. L.	Estill Springs	Aug. 1	Rear collision
Kansas City Southern	Lyons, Ok.	Aug. 2	Derailment
St. Louis- S. Fe	Adamsville	Aug. 9	Butting collision
Colo. & Southern	Walsenburg	Aug. 12	Derailment
Baltimore & Ohio	Parmaco, W. Va	Aug. 14	Street car struck loco.
Pere Marquette	Beitner	Aug. 20	Butting collision
N. J. & Seashore	Elwood, N. J	Aug. 24	Rear collision
St. Louis, S. W.	Bassetts, Tex	Aug. 24	Derailment
C. R. I & Pacific	Hudson, N. M	Aug. 27	Derailment
Delaware & Hudson	Carbondale	Sept. 1	Rear collision
Baltimore & Ohio	Brooklyn, O	Sept. 15	Butting collision
Wabash	St. Louis	Sept. 18	Derailment
Great Northern	Warland	Sept. 19	Rear collision
N. Y. Central	Buffalo	Sept. 19	Rear collision
Phila. & Reading	Belfry, Pa	Sept. 21	Butting collision
Baltimore & Ohio	Confluence	Sept. 23	Derailment
Seaboard A. L.	Seacoast	Sept. 27	Derailment
Central New Eng.	Holmes	Sept. 29	Rear collision

There are twenty-five reports, covering ten rear collisions, four butting collisions, ten derailments and a collision with a

street car. The monthly accounts of train accidents published in the *Railway Age* for the quarter under review will be found in the volume for that half year, as follows: July, page 579; August, page 750; September, page 939.

The Car Record Office of the A. E. F.

By G. W. Wright

Chief Clerk to the Superintendent of Car Service, Long Island Railroad, Jamaica, N. Y.

THE CAR SERVICE DEPARTMENT of the American Expeditionary Force had to be developed in a country where the system of controlling car movements by the aid of records from a central point was practically unknown, and a review of its operations affords an interesting study. The French have no system of keeping track of cars from a central point.

The army had just about commenced its enlarged program of rushing troops and supplies to Europe when it was discovered that many important shipments which were urgently needed had been lost and it was impossible to locate them without long and extensive search by following the car from its originating point, from junction to junction; and frequently this method met with no success. To correct this condition the Car Record Office was established by an order from General Headquarters dated January 30, 1918. The duties of the Car Record Office were clearly set forth and would serve as model instructions for any railroad. Briefly, the order directed that all departments of the army co-operate with reports so that the efficiency of available car supply could be increased to the utmost. At all times in France there was a serious shortage of cars.

At this time the American freight cars had not been built and European cars had to be used. As the army was only interested in these cars while they contained American freight, a system of individual car records was devised. Station numbers were based on the number of miles from the port, preceded by a letter indicating the branch of the railroad. A railroad transportation officer (R. T. O.) at the shipping point (or if no R. T. O. was stationed there, the commanding officer making the shipment) wired the car record office daily the initial, number, contents, consignee, destination and train on which forwarded, of every car shipped. Passing records were wired from important junction points. When the car reached its destination the transaction was completed and the record card was filed. But this system proved burdensome, and plans had been devised for a book system when the war ended and all plans for improvement were dropped.

In the spring of 1918 U. S. A. cars began to come over rapidly. Consecutive movement records of U. S. A. cars were from the start kept in book form, similar to those used in the United States. As the volume of traffic increased, solid convoyed trains were run from the ports to the regulating stations. These trains carried a symbol number for the entire trip and were reported by wire at passing stations along the line, so that practically the records of cars in such trains were instantly available. About August, 1918, full American crews were placed on many trains, and from these a standard cut-up mileage report was made by the conductor.

A special tracing bureau in the car record office was established, for which were assigned a large number of commissioned officers familiar with French railroad customs and geography. Shipments were traced all over France and Belgium, and later in Germany. The tracing bureau was in operation 24 hours daily and rendered most valuable service locating and expediting urgently required shipments. Delays were followed up vigorously. Officers on outside duty were required to investigate and take action to correct delays

In Europe there is no standard system of marking cars, and the letters and figures are very small, leading to many errors in reporting. The standard lettering of American cars is warmly appreciated by any one who had to take yard checks in France.

Approximately 19,500 American cars were in service. In addition to this, large numbers of British, French, Italian, Swiss, Belgian and German cars were required to transport the enormous tonnage required by the American army.

The number of cars in service constitutes only a partial index of the work of the car record office, as it had also to keep account of the thousands of tarpaulins used with open cars to cover freight liable to damage by water.

Officers newly arrived from the United States were in many instances assigned temporarily to the car record office, as it afforded the best and quickest way to become familiar with French railroad geography.

The French and British made exhaustive studies of the American system of recording and applying car records; but they seem to hesitate at its adoption because of the expense. It is certain, however, that the more efficient use they would make of their cars would largely offset the expense.

Accounting for Maintenance Expenditures

THE INTERSTATE COMMERCE COMMISSION Division No. 4, has issued the following notice regarding its interpretation of Paragraph (3) of Section 209 (f) of the Transportation Act, 1920, dealing with the method of computing railway accounting income for the guaranty period, from March to August, 1920, inclusive, which reads as follows:

> 'There shall not be included in operating expenses, for maintenance of way and structures, or for maintenance of equipment, more than an amount fixed by the commission. In fixing such amount the commission shall so far as practicable apply the rule set forth in the proviso in paragraph (a) of section 5 of the "standard contract" between the United States and the carriers (whether or not such contract has been entered into with the carrier whose railway operating income is being computed).'

The notice says: "The commission, having received from various carriers inquiries regarding procedure under the above provision, announces it will fix the amount of maintenance that may be included in operating expenses for the purpose of determining if the operating income for the guaranty period as a whole for any carrier is in excess of or below the amount of the 'guaranty,' on the basis of one-half of the average annual maintenance expenditures and charges of each carrier for the three years ended June 30, 1917, properly equated in accordance with the rule set forth in the proviso in paragraph (a) of Section 5 of the standard contract. The carriers are invited to submit briefs to the commission, on or before July 17, 1920, setting forth their views with respect to the interpretation and application of said proviso in this connection.

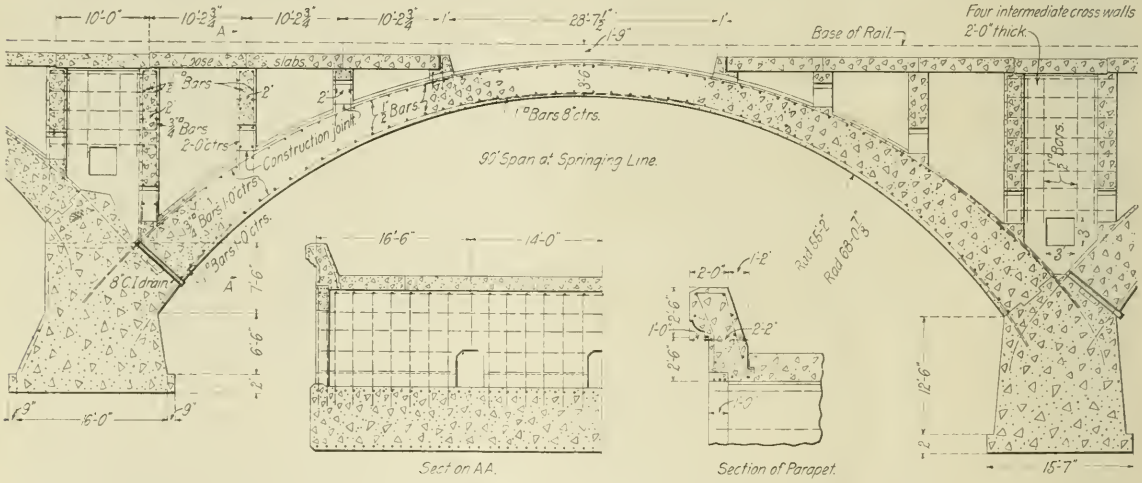
"The foregoing is not to be construed as prohibiting any carrier from expending for maintenance purposes such amounts as it sees fit, but it should be understood that in computing railway operating income for the purpose of determining whether such income is in excess of or below the amount of the 'guaranty,' the commission will not allow for maintenance any amount in excess of the amount fixed by it. The charges to operating expenses should be made in accordance with the accounting regulations of the commission regardless of the limit for maintenance hereafter to be fixed in computing the amount of the guaranty under Section 209. In other words, it is not expected that the operating income reported monthly will, without modification, necessarily indicate the operating income which will be used in computing the amount of the guaranty."

Train Movements Facilitated By New Bridge

Illinois Central Completed Four-Track Reinforced Concrete Structure at Kankakee, Ill.

TRAFFIC CONDITIONS on the Chicago-New Orleans main line of the Illinois Central have been greatly relieved in the vicinity of Kankakee, Ill., by the completion of a new 4-track reinforced concrete arch bridge over the Kankakee river at that point. The new bridge replaces a three-span, through-truss structure over which traffic has been handled for the past 34 years, more recently by means of gauntlet tracks, governed by interlocking. This arrangement proved inadequate to meet the demands upon it and in order to improve conditions at this point a new structure was designed and industrial plants located on one side of the river and the freight yards on the other. The congestion was further aggravated by the handling across this bridge of interchange freight between the Illinois Central yards and the Big Four freight houses. As a result of these conditions it was decided to build a structure which would not only take care of the present traffic conditions but which would be entirely adequate for any further increases that might be expected in the near future.

The conditions surrounding the construction of the new



Part Longitudinal Section Through the Bridge, Showing Details of the 90-ft. Arch the Spandrel Construction

constructed in two double-track sections, making a completed structure 62 ft. wide and 626 ft. long.

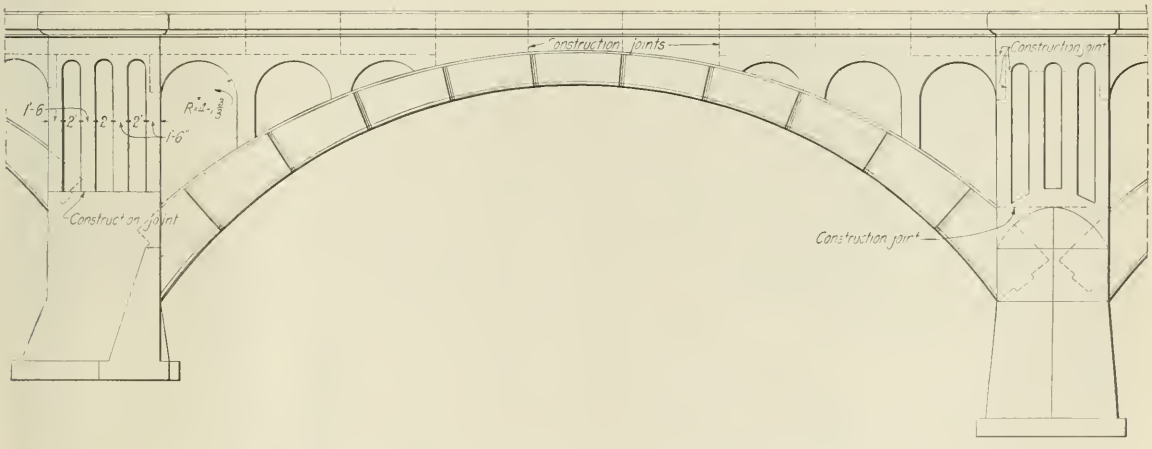
Since the double tracking of the main line of the Illinois Central from Chicago to Cairo, Ill., in 1900-1902, the congestion over this old structure gradually became worse until it reached a point where serious delays were occurring. This was due primarily to the increase in the amount of through freight hauled over this section of the main line but was augmented by the large amount of switching between the bridge made it imperative that a design be selected that would not interfere in any way with the already existing track arrangements during the period of construction. The main line of the Illinois Central through Kankakee is on a tangent with the station and numerous other buildings on the east of it. This made it necessary that all new work be carried on to the west of the main line. The amount of freight handled at this point practically limited the size of the structure that could be built to a minimum of two tracks,

South End of Completed Bridge

and so it was decided to build a double-track structure to which a second section of the same capacity could be added after the first had been completed and the old steel bridge removed.

The type selected consisted of a reinforced concrete open spandrel arch bridge having five arches of 90-ft. span and 23-ft. rise over the river and one of 60-ft. span and 14-ft. 6-in. rise over a street car line which parallels the north river bank at this point. All arches are segments of a true circle, the two arch rings having a minimum depth at the top of 3 ft.

In order to secure the proper proportions in the arches the grade was raised three feet at this time and in this connection the dead load was so figured as to make allowance for a possible future additional raise of 10 ft. This future raise also influenced the choice of track slabs above the main arches rather than spandrel arches, as the spandrel walls can be built higher and the track slabs used again. With this in view, construction joints were made at the ends of the spandrel arches and at the top of the panels in the piers, while the parapet was built in sections with papered joints



Elevation of the 90-ft. Arch Adjacent to the 60-ft. Span

6 in. and 2 ft. 6 in., respectively. The arches are supported by four river piers, one shore pier and two abutments, of which the four river piers were so located that they could be constructed in their entirety without interfering with the old masonry piers.

Design Influenced by Possibility of Future Grade Change

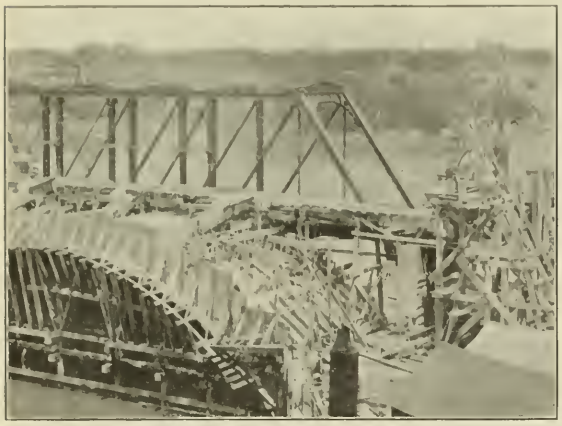
Except for a length of 28 ft. on the crown where the filling rests directly on the arch, the track on the 90-ft. arches is carried on spans of reinforced concrete floor slabs which rest on eight transverse walls, 10 ft. 2¾ in., center to center. These walls are built monolithic with the arch but the slabs are of unit constructure cast separately and set into place. On the two sides of the structure the tops of the spandrel walls are joined by a parapet built in place, the junction of the parapet and walls being filleted by false arches. Similar construction was used for the 60-ft. arch.

at all surfaces of contact to facilitate removal and replacement.

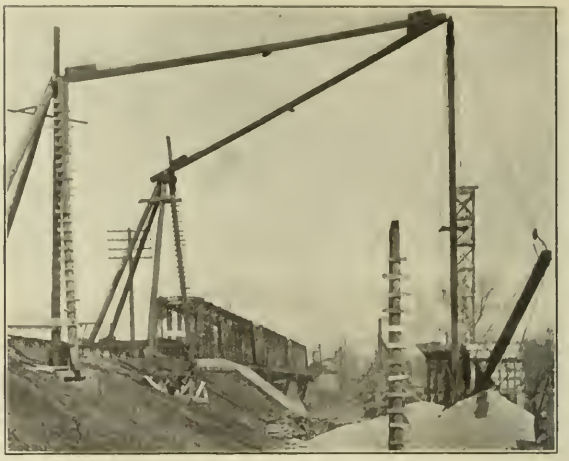
The actual work of construction began in September, 1917, when a temporary side track was laid to the south approach of the proposed bridge for the delivery of the necessary construction materials. Owing to the restricted space between the embankment at this point and an adjacent street some difficulty arose in developing an economical method of unloading the materials from the cars set out on the material track. This resulted primarily from the refusal of property owners across the street to allow the guy wires of an unloading derrick to be run across their land. In order to overcome this, a stiff-leg derrick was erected, which is of interest.

Two heavy concrete footings were set along the shoulder of the embankment, about 50 ft. apart and approximately 68 ft. from the location of the mast. Two 4-post towers about 50 to 55 ft. in height were then erected on these footings and connected to the 75-ft. mast by a 12 in. by 12 in.

trussed timber, after which wire cables were run from the masthead to sheaves at the top of each tower, and then down to the concrete footings, where they were securely anchored. This permitted the operation of a 65-ft. boom and a clam-shell bucket, the range of the boom being but little over a semi-circle. Any tendency for the back legs of the derrick to tip up with the boom swung in an extreme position was prevented by the tension of the cable running over the back leg more nearly opposite the line of the boom. By means of this arrangement the unloading of open top cars was greatly facilitated, the bucket picking up the material and dumping it into pre-arranged stock piles and later, or as called for, delivering it to the material bin for charging the main mixer.



The Main Mixing Plant and Delivery System



The Stiff-Leg Derrick

The mixing plant consisted of a ½ cu. yd. steam-driven mixer, which was set up at the elevation of the bridge floor on the south end, and a smaller mixer installed at the north end so that the work could proceed at the same time on the north abutment, shore pier and arch. The main mixer discharged directly into industrial side-dump cars, which were operated on a narrow-gage track cantilevered from the west side of the old steel bridge. Other materials were transported from the shore to the sites of the cofferdam by three material barges, and in addition, two derrick barges and two workers barges were also built to facilitate the erection of the false-work, etc.

The Second Section Near Completion

The river bed at this point is solid rock with practically

no silt deposit, the water being kept at a minimum depth of 11 ft. by a power dam located a short distance downstream. Puddled cofferdams were used, with two walls of 3-in. sheet piling spaced 7 ft. apart around the entire dam, and the intervening space filled with clay. The sheet piling was assembled in 20-ft. sections, this work being done on the material barges which were towed to the location of the piers and the section lowered into place by the derrick barges. A diver was employed throughout the work to see that the sheeting was closed at all points, and that no obstructions prevented it from resting directly on the bed of the river. The wales were 10-in. by 10-in. timbers. The clay filling was brought out by the barges and unloaded by a clam-shell bucket. This construction proved very satisfactory, for little seepage developed during the work and no appreciable damage resulted during a short period when the river was frozen over.

The placing of the pier foundations was preceded by the removal of the surface rock to a depth of two feet, the pits so excavated by drilling and blasting being 80 ft. long and about

Placing the Concrete Deck Slabs

16 ft. wide. Each of the pits made in this manner was filled with concrete to form the footing for the river piers. In the case of the two abutments and the shore pier, only the west half of the work could be completed, the remainder being left until the old bridge could be dismantled and the masonry removed. In order to secure the maximum allowable width, both during the construction of the abutments and of the arch rings, the old piers and abutments were cut off flush with the west edge of the steel bridge. After the foundation footings were in place the work of pouring the piers and abutments proceeded rapidly, the preliminary work on them being considered complete when they reached the height of the skew-backs.

Falsework Was Re-Used in the Second Section

As soon as the first abutment and pier were approaching completion the erection of the falsework was begun. All of the details of this had been worked out carefully in advance and the contractors were required to follow the plans exactly, as it was necessary that the material should not only be interchangeable, but also easily dismantled so that it could be used again in the construction of the second half of the bridge. In order to accomplish this all parts had to be drilled for bolts

To facilitate this work an electrically driven drill was mounted in a light frame which acted as a guide to insure the drilling of the holes perpendicular to the surface of the timber.

The arch centering was supported on pile bents spaced 12 ft. apart with piles 4 ft. center to center in the bents. The small amount of sedimentation on the river bed rendered it difficult to obtain a substantial support for the bases of the piles, and in several instances it became necessary to anchor the bents in position until the caps and stringers could be fastened.

The sections of the arch ring were poured alternately, commencing at each pier and working towards the center. The construction of the spandrel walls and the parapet followed the completion of the arch rings, making a completed section 28 ft. wide with finished surfaces on the west side and a vertical surface on the east, to which the second section could be bonded, the necessary reinforcing rods being extended through the bulkhead for this purpose. Each section of the falsework was left in place until the adjacent ring could be completed, and in addition a minimum period of 42 days after pouring was required in order to allow the concrete to set thoroughly. The bridge floor consisted of heavy concrete slabs, which had been cast in a nearby yard, the largest of the slabs being approximately 10 ft. 2½ in. long, 6 ft. 11¾ in. wide, and 1 ft. 6 in. thick. The laying of the tracks and the ballasting followed immediately, and by October, 1918, the west half of the bridge was completed and the first train permitted to pass over it.

The three truss spans were next dismantled and the masonry piers and foundations removed. The mixing plants were brought into position at the ends of the new second section and the falsework and centering, which has been carefully taken down and stored, were again set up, the additional width of the second section making it necessary to use some of the material a third time before the work could be completely finished. The construction methods followed closely those used in the first work, the concrete being delivered in a similar manner by cars operating on a narrow-gage track supported by heavy timbers held in place by the deck slabs. No difficulties of any consequence were experienced in the final work on the bridge, the construction of the second half of the abutments and the pouring of the sections being accomplished in a satisfactory manner.

The Kankakee bridge was designed by and constructed under the direction of the engineering department of the Illinois Central; F. L. Thompson, chief engineer, and C. C. Westfall, engineer of bridges, with J. H. Graham, resident engineer in charge of the field work. The contractors were the Gould Construction Company and the Walsh Construction Company, of Davenport, Iowa.

Photograph from Underwood & Underwood, N. Y.

Heavily Armored German Car Passing Through Berlin During the Recent Revolution

Car Service

WASHINGTON, D. C.

A MARKED improvement in clearing up the congestion of freight cars caused largely by the switchmen's strike was noted in the report of freight car accumulations received by the Commission on Car Service for the week ended June 4. The accumulations had been reduced to 125,000, as compared with 159,000 for the preceding week. The accompanying chart, prepared from reports received by the Commission on Car Service and the Interstate Commerce Commission, showing the extent of the accumulations since the first of the year, shows in a graphic way the effect of the strike, which began about the first of April, and the rapid improvement made since the peak on April 16, when the total accumulation was 290,000. The accumulation of 125,000 cars on June 4 indicates a condition not much worse than that which the railroads inherited from the United States Railroad Administration on March 1, when the total was about 105,000. The figures refer to the number of cars held in greater numbers than could be handled or disposed of currently.

The deferred car requisitions, however, are showing a slight increase. For the week ended June 1 the total for the United States was 105,807, including 31,681 coal cars, and the total including Canada was 113,189. At the same time there was a surplus of 1,853 cars. For the first week of May the deferred car requisitions averaged 79,272, and for the week ending May 23 this had increased to 98,936.

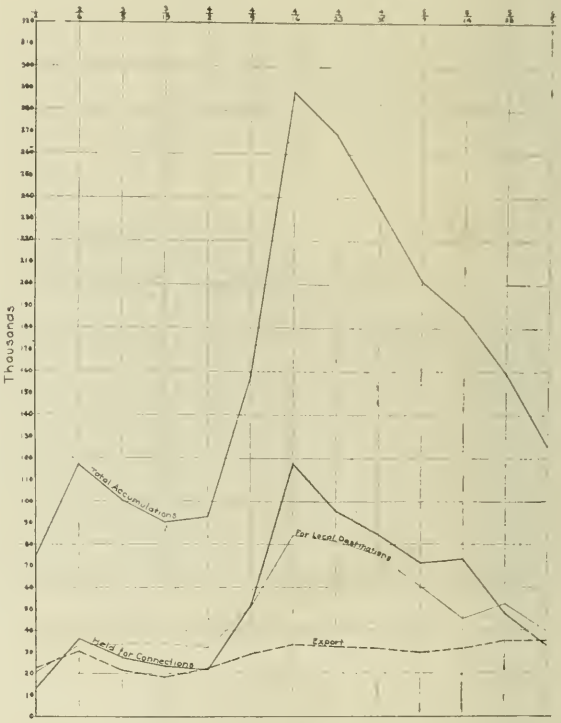
The Interstate Commerce Commission on June 9 issued its first preference and priority order for the purpose of promoting the pooling of lake cargo coal in a manner similar to that followed after the United States entered the war. The railroads and the Commission on Car Service have been trying to bring about the formation of such a pool, but were hampered to some extent until the commission gave its encouragement to the plan by fear on the part of the coal operators of the interpretation some one might be inclined to place on it in connection with the anti-combination laws. The order, which is Service Order No. 5, gives preference and priority for pooled over non-pooled lake cargo coal and places the movement of non-pooled coal under the permit system under the direction of H. M. Griggs, manager of the Ore and Coal Exchange at Cleveland, who is also general coal agent of the New York Central. The commission held a conference on June 10 with the lake coal shippers and on the following day gave out a telegram received from Thomas K. Maher, chairman of the executive committee of lake coal shippers, advising that in accordance with the promise made to the commission the shippers had met and perfected arrangements for the complete pooling of all lake coal shipments for this season.

Service Order No. 5 states that in the opinion of the commission, because of the shortage of equipment and congestion of traffic which exists upon the lines serving the lake cargo traffic, an emergency exists which requires immediate action with respect to the transportation of bituminous coal to Lake Erie ports for transshipment by water. It therefore ordered the railroads, effective June 13 and until further order, in the transportation of bituminous coal consigned to Lake Erie ports for transshipment by water either as cargo or bunkerage coal, including the supply of cars therefor and the movement of such traffic, to give preference and priority to carloads consigned to Mr. Griggs at any Lake Erie port as a part of a pool or pools and to place an embargo upon the supply of cars for or the movement of all other bituminous coal in carloads for transshipment at Lake Erie ports except upon a permit and direction therefor issued by Mr. Griggs, who was designated as the agent of the commission therefor, and who was directed to issue permits only upon a showing that the consignees will be able to unload the coal without delay to the rail equipment and without impeding the preference and priority for the pool coal.

The Interstate Commerce Commission on June 9 issued the following notice to carriers and shippers:

"Service Order No. 1 which ordered and directed common carriers by railroad to divert freight via the routes most available to expedite its movement and to relieve congestion also ordered and directed the carrier responsible for the diversion to mail a notice to the consignee of the traffic stating the car number, places and dates of shipment and other essential information. It has been urged that a telegraphic notice should be sent to the consignor by the carrier responsible for diversion as to shipments in private cars subject to equalization of empty mileage, and also as to fruits and vegetables, live poultry and other shipments customarily reconsigned upon instructions of the consignor.

"While the commission does not consider it necessary at this time to amend Service Order No. 1 in this respect, it is of the opinion that a telegraphic notice of the diversion should be sent to the consignor by the carrier responsible therefor in the case of shipments in private cars, which are subject to equalization of empty mileage, and also of fruits and vegetables, live poultry and other shipments customarily reconsigned upon instructions of the consignor."



Principal Commercial Accumulation in 1920 Carloads

The Interstate Commerce Commission on June 11 sent to the Senate its reply to a resolution introduced by Senator Harding of Ohio inquiring by what authority it had issued its order of April 15 authorizing railroads to assign cars to mines for railroad fuel loading in accordance with previous decisions of the commission. The commission reviews the history of its orders and the litigation on this subject and says its order was issued in accordance with the authority conferred upon it by the transportation act and in accordance with its previous decisions which had been sustained by the

Supreme Court. In justification for its action the commission says in part:

"The rule of law on this subject thus established remained the controlling rule for carriers generally, and apparently without friction or controversy, until during the war and under the rules of the Fuel Administration, including its zoning system, and while the roads were under federal control, the rule was changed and the use of assigned cars for loading with railroad fuel was abandoned. This change was followed by the imperative necessity of railroads resorting to confiscation of coal in transit in order to keep their roads in operation. In many instances the coal was confiscated at the mouth of the mine. Those familiar with these subjects are apparently unanimous in saying that the practice of confiscation is attended by more evils than is the practice of assigned cars for railway fuel.

"When federal control terminated there was in effect on all roads under federal control a set of rules that had been formulated by the Railroad Coal Association, and in order that there might not be confusion because of different lines of action being followed by different individual roads the commission on March 2, 1920, issued a notice to carriers and shippers recommending that until experience and study demonstrated that other rules would be more effective and beneficial the uniform rules as contained in the Railroad Administration's Car Service Section Circular CS-31 (Revised) be continued in effect.

"With the suspension of the activities of the Fuel Administrator and regulations which he had prescribed some railroads that did not have more than two or three days' supply of coal and that were and for some time had been securing their necessary fuel supply by confiscation at the mouth of the mines were sued for damages on account of such confiscation, injunctions were sought in state courts against the practice of confiscation, and when it was learned that the carriers were contemplating return to the use of assigned cars, injunctions were sought in state courts against the same carriers restraining them from using assigned cars. Numerous informal conferences were had between the commission and representatives of the coal operators and representatives of the railroads in an effort to find some way by which the carrier could be assured of a fuel supply without the use of assigned cars or resort to confiscation. A conference was arranged between a committee representing the railroads and a committee representing the National Coal Association for the purpose of devising, if possible, some plan that would effect that purpose, but no concrete or definite suggestion to that end resulted. Transportation conditions in the country were serious. Railroads that were unable to meet the demands upon them for transportation would be wholly unable to function if they could not secure coal and many of them had not more than two or three days' supply.

"No other definite rule or practical plan has been suggested by the interested parties in the many conferences that have been had on this subject. No rule other than that laid down by the commission and sustained by the Supreme Court had been presented or tried after the decision of the Supreme Court, hereinbefore cited, until, as stated, the rule was changed under war conditions when the railroads were under federal control and the production, distribution and marketing of coal was under a wartime federal administration. The passing of the roads from federal control and the suspension of the operation of the Fuel Administration's rules, together with the transportation conditions and shortage of fuel on hand, created an emergency in which the commission acted in accordance with its best judgment. Both before and since that action was taken parties interested in or affected thereby have been freely invited to suggest some workable concrete plan under which the railroads can get a dependable supply of the quality of fuel adapted to their uses which can fairly be substituted for the rule to which some objections have been made. No one has suggested such a substitute rule. The nearest approach to it has been an expressed belief that a form of preferential contract could be devised under which the contracting railroad would have first call upon the output of a mine, but so far as we are advised no such form of contract has been framed. It seems not inappropriate to say that the coal operators are not able to entirely agree among themselves as to the advantages or disadvantages of the assigned car practice.

"Paragraph (15) of section 1 of the interstate commerce act, as amended by section 402 of the Transportation Act, 1920, authorizes the commission to direct priorities in transportation. If priorities were to be prescribed in transportation of bituminous coal it would obviously be necessary to give first priority to that for railway fuel, as was done when priorities were issued by the President's priority agent during the war."

A gradual improvement in conditions affecting the production of coal continued during the week ended June 5, according to the weekly bulletin of the Geological Survey. The occurrence of Memorial Day, which is observed as a holiday in some districts but not in others, renders uncertain interpretation of the figures of output. It is clear, however, that while the total production declined, the rate during the time actually worked went up. The week of Memorial Day, as shown by mine reports in former years, is equivalent over the country as a whole to only 5.3 to 5.5 full working days. Production for the week is estimated at 9,138,000 net tons, an absolute decrease, compared with the week preceding, of 410,000 tons. But as significant of the steady improvement of the situation it may be noted that the output in this short week was nearly as great as in the 6-day week of May 22, only a fortnight before. The congestion of traffic continued serious. The switchmen's strike, to which it is chiefly attributable, has been irregular and ill-defined. It is evident, however, that lack of labor, either because men were still on strike or because they have drifted into other occupations, continued to retard the movement of freight at many important terminals and junction points.

The special committee on car service matters of the Association of Railway Executives, of which Daniel Willard, president of the Baltimore & Ohio, is chairman, held a two-day meeting at Washington on June 15 and 16, considering the entire car service situation and the possibility of forming an organization somewhat similar to the former Railroads' War Board to co-operate with the Interstate Commerce Commission. No announcement was made of the results of the meeting but a report was made of recommendations to be submitted to the members of the association. There have been two important differences of opinion among the executives, one that the railroads themselves should form a strong organization to direct the co-operative activities of the railroads and to obviate the necessity for the issuance of orders by the Interstate Commerce Commission wherever it is possible for the railroads to handle the situation themselves, while others are understood to have taken the position that it is necessary for the commission to issue formal orders where the situation as a whole requires a discrimination against individuals in order to protect the roads both against the danger of legal complications and to define the extent to which selfish interests must be ignored.

J. H. Thomas, the British Labor Leader, says: "Every time we secure a wage increase it is followed by an inevitable advance in the cost of living, which not only nullifies the increase, but creates a heavier burden on a large part of the community. We cannot be a party to such a vicious system if we call ourselves fit to govern. It is a wrong system and stands condemned."

Pere Marquette "Resort Special" In Head-On Collision

In a butting collision between two Pere Marquette trains on Baltimore & Ohio tracks near 103rd street, Chicago, about 7:45 a. m., June 14, one employee was killed and 14 persons seriously injured. The trains involved in the accident were passenger train No. 10, westbound, and an extra freight train, eastbound, the Pere Marquette having trackage rights over the Baltimore & Ohio tracks from Pine Junction, Ind., to 95th St., Chicago, a distance of about seven miles. The passenger train, known as the "Resort Special," which runs at present on a twice-a-week schedule, was making its second trip of the season from northern resort points in Michigan.

Earlier in the morning a B. & O. westbound freight train had pulled out a drawbar, blocking the westbound main track between the Indiana-Illinois state line and the South Chicago yards. Pere Marquette passenger train No. 8 and B. & O. passenger train No. 15 were run around this train on the east-bound main from Whiting, Ind., to the interlocking plant at Calumet Draw, South Chicago. After these trains had cleared, the freight involved in the collision started east on the eastward track, from Rock Island Junction (95th street). In the meantime, evidently through a confusion of orders, Pere Marquette passenger train No. 10 was diverted to the eastward main at Whiting, Ind., about three miles east of the point of the accident, and was proceeding toward Chicago at about 30 miles an hour when the accident happened at a point approximately 700 ft. west of the Indiana-Illinois state line. The morning was clear, the track is a tangent to the west, while a 1-deg. curve to the south started at the automatic signal location E257-12, approximately 500 feet west of the state line, after which the track is again tangent into Whiting, Ind., the view being fairly unobstructed except for a pole line between the B. & O. and New York Central tracks, which are parallel at this point.

The force of the collision smashed in the front ends of the engines, and they were locked in position with the smoke stacks and steam chests together. The impact telescoped the baggage car and one combination coach, which were of wood frame construction, between the passenger engine tender and the heavy steel Pullmans, killing the conductor, who was in the baggage car, and injuring those in the combination car. One Pullman car was slightly damaged. The tender of the freight engine was driven into the boiler head, destroying the cab; the steel frame box car back of the tender was demolished and the steel underframe was doubled back against the engine frame. A number of the weaker cars in the freight train were also wrecked.

While the road is equipped with automatic block signals, the passenger train, in running against the current of traffic, had no signal protection on that track, signals being set against an eastbound train ahead of the train going west, as this train entered the different track circuits controlling the signals. Train movements, as a rule, in the South Chicago yard limits, which extends from South Chicago to Pine Junction, Ind., a distance of approximately seven miles, are handled locally instead of under the jurisdiction of the train despatcher. In this territory there are four interlocking plants located at Calumet Draw, South Chicago, Whiting, Ind., and Indiana Harbor and Pine Junction, between which these movements are made. An investigation of the signal system showed it to be in perfect working condition, it being in no way involved in the accident.

The Pere Marquette operates under trackage rights over the B. & O. from Pine Junction, Ind., to Rock Island Junction (95th St.), Ill.

The Engines After the Impact. The Telescoped Baggage Car Shown at the Right

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Colombia's Transportation System consists of the Magdelena River steamers and 11 railroads connecting either directly or indirectly with river ports. These 11 railroads have a combined mileage of 492 miles.

High wages and lessened efficiency still support high prices. There are as many workingmen in the country today as there were a year ago, or two years ago. But their output is not so great and their wages much higher. Production costs are therefore increased. Strikes, holidays, vacations and diminished output per man all add to the price of goods, and hold up the price level. Labor inefficiency and sabotage are to be found in the transportation question, affecting distribution and hindering an orderly recession of prices.—*The Wall Street Journal.*

An Analysis of American Railroad Credit

First Class First Mortgage Railroad Bonds Are Selling at Prices to Yield Six to Seven Per Cent

THE FOLLOWING is the substance of a letter written by F. J. Lisman, of F. J. Lisman & Co., bankers, of New York, to Edgar E. Clark, chairman of the Interstate Commerce Commission, and printed with Chairman Clark's permission:

I would define the problem of re-establishing railroad credit as follows: Whenever there is a free market at par for the stock of the seasoned, well-established, strong railroad companies, paying a substantial return on the investment so that they can sell stock in large amounts for their capital requirements, then railroad credit will be rehabilitated, and not before then.

Congress apparently has allotted to the Interstate Commerce Commission the herculean, if not the impossible, job under present conditions of trying to re-establish railroad credit, limiting you, however, to a rate structure which will show 6 per cent earned on the fair value of the railroads to be arranged by the commission in regions. Only 5½ per cent of this, however, will presumably be used for interest and the very trifling remainder for obsolescence or unproductive improvements.

As a matter of fact a fair rate of interest today on money, on the best security, averages 7½ per cent. A fair rate of interest for one or two years is 8½ per cent, and for longer periods up to 20 years it is about 7 per cent to 8 per cent, and possibly a trifle less for a still longer time. As a proof of these statements, I enclose the credit standing of all the Class A roads. By credit standing I mean the rate of interest on the money which can be obtained by buying the securities of these various roads at the present market prices.

I am free to admit that an increase in earning power through a liberal rate advance will somewhat improve railroad credit, but whether it will enable the roads to get the necessary capital on the terms which are normally considered reasonable, is quite another question. Naturally, the companies do not want to borrow money for a short period, that is, for two, three or even five years, because it is very difficult to tell in the present unsettled condition of the world what money is going to be worth within the next year or two. While many people expect a reaction in general business, with some reduction in the present price for money, the opposite is not at all impossible, in view of the many unsettled international problems and needs. Up to the outbreak of the war 4½ per cent was a fair return on the best bonds, and 6 per cent and upwards on the more doubtful bonds and on stocks, depending on the risk. Now, 5½ per cent, free of taxes, is considered a fair return on the best of securities, and a higher scale in proportion to the risk. With the present tax laws 5½ per cent net means a gross return of approximately 6 per cent on taxable securities, for the very smallest investor having an income of less than $5,000 per year, because about 4/10 per cent is the amount of minimum Federal income tax payable by him. There must also be taken into consideration the fact that railroad securities are subject to the State income tax in New York, Massachusetts and Wisconsin, and undoubtedly soon in most other States; in fact, income taxes for cities are now being discussed.

A 5½ per cent net return to an individual investor with a large income means a necessary gross return of from 6½ to 19 per cent, as from 8 per cent to 71 per cent of this gross amount will have to be paid out by the investor in Federal taxes, depending on the total amount of his income.

It is now possible to buy securities which are practically tax exempt everywhere at prices to pay from 5 per cent to 5½ per cent, such as bonds of the large cities like Chicago, Cleveland, Minneapolis and many others.

United States Government bonds, which, however, become taxable in the course of about two years, can be bought at prices to pay 6 per cent.

Naturally the railroad companies are fearful lest the 5½ per cent minimum net return which they are supposed to be allowed on their value, may not be increased at the end of two years, and whenever they borrow money on which they have to pay a minimum of 7½ per cent, they are likely to permanently injure the value of their junior securities and stock. I may cite as an example the case of the Pennsylvania Railroad, which recently borrowed $50,000,000 for ten years at 7 per cent, although it actually cost them 7½ per cent, taking syndicate expenses, etc., into consideration. The difference between 5½ per cent and 7½ per cent interest on $50,000,000 amounts to $1,000,000 per year, or about ¼ per cent on the $450,000,000 of Pennsylvania stock. This $50,000,000 netted the company only about $30,000,000 new money as $20,000,000 was used for the purpose of paying off at maturity an old mortgage. An annual investment for improvements on the part of the Pennsylvania system of $30,000,000 is much below the average, and much less than it ought to be, and no doubt than it would be if the company could borrow money within the limitation of 5½ per cent or even 6 per cent. Naturally, though, the Pennsylvania Railroad would not be justified in spending at this time $100,000,000, because this might mean that it would permanently have to reduce its dividend by ½ of 1 per cent on account of the cost of one year's new capital. If such a transaction were repeated for a few years, the value of railroad stocks would necessarily be greatly reduced and eventually wiped out, if all new money were raised through bonds. Under prevailing conditions the financial structures are becoming more and more top-heavy, because the proportion of bonds to capital stock is being steadily increased. What the railroads need, the same as other corporations, is fewer creditors and more stockholders, or partners. At present it is impossible to sell stock. There are not more than three railroad companies which could sell any substantial quantity of stock at par. I, therefore, beg to reiterate the statement made at the beginning of this letter, that railroad credit will not be re-esablished until there is a free market at par for the stock of well-established railroad corporations.

It is but just to say that the decline in railroad securities is not entirely due to the uncertainty of the railroad situation, but it is really due to three causes:

1. The present system of taxation, above referred to.

2. The greatly increased value of money due to the fact that there is now a great demand for new capital the world over for reconstruction purposes, for labor saving machinery of all kinds; also because capital is not accumulating throughout the world because it is confiscated at the source by the present tax legislation. The man with an income of $1,000,000 a year, who probably formerly had not less than $900,000 additional capital for investment purposes, now has not to exceed $150,000 left over for investment, as he is subject to 71 per cent Federal tax, to increase State and local taxes and increased cost of living.

3. The credit of railroad companies was declining before the war and the present system of taxation, because the prevailing system of Federal and State legislation and regulation

did not make this field of investment attractive. The war with the great demand for wage increases and the uncertainty of the future of the railroads rather accentuated this feeling of distrust.

Atchison, Topeka & Santa Fe Ry.—This is one of the strongest systems in the country. Its closed first mortgage bonds are selling on a 5½ per cent basis. Other first mortgage bonds of the system are selling on a 6⅛ per cent basis. The 4 per cent debentures of the system, which is the only security the company could sell, are now offered at a price to yield over 7 per cent. The common stock of the company at present prices yields close to 8 per cent.

Atlanta, Birmingham & Atlantic Ry.—The valuation of this road has been completed, and works out in the neighborhood of $27,000,000. It has one issue of $4,000,000 first mortgage bonds outstanding, offered on a 9 per cent basis.

Atlantic Coast Line securities are now offered on a 7¼ per cent basis, with practically no market for same.

Baltimore & Ohio R. R System.—Some of the closed first mortgage bonds, due in five years, like the Southwestern Division 3½s, can be bought at prices to yield over 11 per cent. These bonds are a first mortgage on the lines from Parkersburg to Cincinnati, Louisville, St. Louis and branches. The longer bonds, like the Pittsburgh, Lake Erie & West Virginia 4s, due 1941, selling at about 54, yield 7½ per cent on the money, irrespective of maturity.

Toledo-Cincinnati Division 4s, selling at 46, yield 8½ per cent on the money. The 5 per cent general mortgage bonds of the system, due 1996, are selling on a 7½ per cent basis.

The 4½ per cent bonds, secured by a general mortgage on the property, are selling on about a 10 per cent basis.

Boston & Albany R. R.—This is a subsidiary of the New York Central System. Its 8¼ per cent guaranteed stock has a small market on about a 6 per cent basis.

Boston & Maine R. R.—This road has no credit, having recently been financed by the Government. Some of its guaranteed securities can be bought on a 10 per cent basis.

Buffalo, Rochester & Pittsburgh Ry.—The junior mortgage bonds of this system are a legal investment for savings banks in New York State and elsewhere, but nevertheless, there is only a small market for same on a 6½ per cent basis.

Carolina, Clinchfield & Ohio Ry.—This is one of the strongest of the shorter systems which has not accepted the Government guarantee for six months in the expectation of doing better, nevertheless, its first mortgage bonds are selling on about an 8½ per cent basis, and its comparatively short securities, due in two years, can be bought at prices to pay about 12 per cent.

Central of Georgia Ry.—This is a subsidiary of the Illinois Central system. The consolidated Mortgage bonds of this road are due in 1945, and are selling on about a 7 per cent basis. The ten year 6s are selling on about an 8 per cent basis.

Central R. R. of New Jersey.—This is one of the strongest railroads in the country. There is a small market for its first mortgage bonds, which are legal for savings banks everywhere on about a 5½ per cent basis. This company has a bond issue due July, 1921, which covers its terminals on New York Harbor, and these bonds are offered on an 8 per cent basis.

Chesapeake & Ohio Ry.—The closed first mortgage bonds of this system are selling on a 6 per cent basis. Various other issues of the system can be bought at prices to yield from 7 per cent to 10 per cent on the money.

Chicago & Alton R. R.—The first mortgage bonds of this system are selling on about a 7 per cent basis. The next issue of long time, closed mortgage bonds is selling on about an 11 per cent basis.

Chicago & Eastern Illinois R.R.—Is in financial difficulties, although the Commission has ruled that the road is entitled to a standard return which would aggregate more than its entire fixed charges. Its closed first mortgage bonds, on which interest is being paid promptly, are offered on a 6½ per cent basis. Another issue of first mortgage bonds which mature next year, sold recently on a 16 per cent basis. The next issues of bonds on which interest has been earned throughout the difficult times, are selling at less than half their par value.

Chicago & Northwestern Ry.—This is a road which partakes of the highest credit. There is only a small market for its securities now on about a 6½ per cent to 7 per cent basis.

Chicago, Burlington & Quincy.—This is one of the strongest companies in the country. Its general mortgage bonds have a small market on a 5¾ per cent basis, but bonds with the guarantee of this company can be bought to pay over 6½ per cent. The bonds generally known as Chicago, Burlington & Quincy Joint 4s, which are a joint and several obligation of the Great Northern and Northern Pacific, of which $200,000,000 are outstanding, secured by the stock of the Chicago, Burlington & Quincy, due 1921, are selling in the neighborhood of 94, which is a 10 per cent basis.

Chicago, Great Western Ry.—Its first mortgage bonds are selling on an 8 per cent basis, while the bonds of a subsidiary corporation, which in a way are a prior lien to the Great Western 4s, that is, Mason City & Fort Dodge 4s, can be bought at a price to pay over 9 per cent on the money.

Chicago, Milwaukee & St. Paul Ry.—Bonds are selling at prices to yield from 6 per cent to 11 per cent, the latter basis being obtainable on an issue of 4 per cent bonds, due 1925.

Chicago, Rock Island & Pacific Ry.—Some of the first mortgage bonds of this system can be bought at a price to yield 9½ per cent. Its refunding mortgage 4s, on which the company depends for its financing, are selling on about an 8½ per cent basis, and its preferred dividend-paying stocks at prices to pay over 9 per cent.

Cleveland, Cincinnati, Chicago & St. Louis Ry.—The securities of this company can be bought to pay over 8 per cent on the money.

Colorado & Southern Ry.—This road is a subsidiary of the Chicago, Burlington & Quincy, but, nevertheless, its refunding mortgage bonds are selling on an 8 per cent basis.

Delaware & Hudson R. R.—The convertible bonds of this company have a small market on a 7½ per cent basis.

Delaware, Lackawanna & Western R. R.—This road has no direct bonds, but the short obligation of its subsidiary corporation, which are a mortgage on the line in New York State, and which mature within a few years, are selling at prices to pay from 7 per cent to 9 per cent.

Denver & Rio Grande R. R.—The closed first mortgage bonds of this company are selling on a 9 per cent basis. Its junior guaranteed bonds are selling at prices to yield from 10 per cent to 14 per cent.

Erie R. R.—This company has a variety of closed mortgages which are selling at prices to pay from 6 per cent to 14 per cent. Its 7 per cent bonds, due next September, or about three months hence, are offered at prices to pay over 15 per cent.

Illinois Central R. R.—The bonds of this company are selling at prices to yield from 6 per cent to 7 per cent on the money. No large quantity could be sold on a 7 per cent basis.

International & Great Northern Ry.—The closed first mortgage bonds of this railroad, which has been valued by the Texas R. R. Commission as worth three times the amount of the first mortgage, have recently sold on an 11 per cent basis.

Kansas City Southern Ry.—The bonds of this company are selling in the market to yield about 8 per cent to 8½ per cent.

Lehigh Valley R. R.—There is a small market for the bonds of this Company on a 6 per cent to 7 per cent basis.

Long Island R. R.—The refunding bonds of this company, guaranteed principal and interest by the Pennsylvania R. R., are selling on about a 7 per cent basis. Some of its junior bonds are selling on about a 9 per cent basis.

Louisville & Nashville R. R.—The bonds of this company have a small market at prices paying from 6 per cent to 8 per cent.

Michigan Central R. R.—Some of the bonds of this company can be bought at prices to pay about 7½ per cent.

Missouri, Kansas & Texas Ry.—This road has been in the hands of receivers for five years, during which period it has doubled its gross earnings. It is paying interest to the extent of only one-fifth of its interest charges. The interest-paying bonds can be bought at prices to pay from 8 per cent upwards.

Missouri Pacific R. R.—The bonds of this important system are selling at prices to yield from 6 per cent to over 10 per cent on the money.

Mobile & Ohio R. R.—The bonds of this system are selling at prices to pay from 6 per cent to 10 per cent on the money.

Nashville, Chattanooga & St. Louis Ry.—There is a small market for the closed first mortgage bonds of this company at prices to pay around 6 per cent.

New York Central R. R.—The junior bonds of this system are selling at prices to pay 7 per cent and upwards.

New York, Chicago & St. Louis R. R.—The junior bonds of this system are selling at prices to pay from 7 per cent to 8 per cent.

New York, New Haven & Hartford R. R.—The bonds of this system are selling at prices to pay from 9 per cent to 12 per cent.

New York, Ontario & Western Ry.—The closed first mortgage bonds of this system are selling at prices to yield over 7½ per cent.

Norfolk & Western Ry.—It is possible to buy some of the bonds of this strong railroad at prices to pay over 7 per cent.

Norfolk Southern R. R.—The first and refunding mortgage bonds of this system are selling on about a 9½ per cent basis.

Northern Pacific Ry.—The refunding bonds of this very strong system, which are legal for savings banks nearly everywhere, are offered on a 6½ per cent basis, with no market.

Pennsylvania Co. Lines West.—The securities of this system are selling at prices to yield from 6 per cent to 7 per cent, with a narrow market.

Pennsylvania R. R. Lines East.—The long time bonds of this system are selling at prices to yield from 5¾ per cent to 6¾ per cent.

Pere Marquette Ry.—The bonds of this system have a narrow market on about a 6½ per cent basis.

Philadelphia & Reading Ry.—The bonds of this system are particularly favored on account of their tax exemption in the State of Pennsylvania. They are selling on about a 5½ per cent to 6 per cent basis.

Pittsburgh, Cincinnati, Ohio & St. Louis R. R.—The new bonds of this system now about to be issued are selling on a 7½ per cent basis.

Rutland R. R.—The bonds of this system are selling on a 7 per cent to 9 per cent basis.

St. Louis-San Francisco Ry.—The bonds of this system are selling at prices to yield from 7½ to 12 per cent.

St. Louis Southwestern Ry.—All the bonds, excepting the closed first mortgage bonds, are selling at prices to yield from 8 per cent to 11 per cent.

Seaboard Air Line Ry.—The bonds of this system are selling at prices to yield from 7 per cent to 12 per cent.

Southern Pacific Ry.—The junior bonds of this system are selling at prices to yield 8 per cent.

Southern Ry.—The junior bonds of this system are selling at prices to yield from 7 per cent to 9½ per cent.

Texas & Pacific Ry.—The bonds of this company are selling at prices to yield from 6½ per cent to 10 per cent.

Union Pacific R. R.—The direct obligations of this road, due in eight years, are offered on an 8 per cent basis. Its senior mortgage bonds have a small market at about a 6¾ per cent basis.

THERE IS JUST ONE WAY to force prices down under present conditions—that is for us all to pitch in and produce so much of everything that at the same time prices can and must go down. Cut the cost and boost the supply and prices must drop. But as long as we go on cutting the supply and boosting the cost by loafing on our jobs, prices will hold their upward course.—*Saturday Evening Post.*

Minority Report On the $300,000,000 Car Fund

Two Members of the Committee of the Railroad Executives Discuss the Utilization of Freight Cars

L. F. Loree, president of the Delaware & Hudson, has prepared a minority report, in which C. J. Pearson president of the New York, New Haven & Hartford, concurs, for the committee on the $300,000,000 car fund and has submitted it to E. N. Brown, chairman of the committee. In submitting this report to the railroad executives committee, Mr. Loree explains that his views are widely at variance with the minority report of the committee, of which he and Mr. Pearson are members. The memorandum of Mr. Loree and Mr. Pearson follows:

For the fullest and most economical use of a railroad there must be a balance of its several parts; that is, an equation must be maintained between the main tracks and sidings, the working yards and delivery tracks, the number of engines, the number of passenger cars, the number of freight cars and the shop facilities for caring for the equipment. In the growth of the American railways, from a variety of causes there has accumulated a supply of freight equipment (except refrigerator cars, of which the 20,000 proposed by the Committee is not excessive) that is out of all proportion in its relation to the other elements which alone make its use adequate and economical.

So much complaint was made about car supply in 1905 and 1906 that, at the beginning of 1907, the railroads collected and tabulated information for the whole country showing the number of cars ordered, the number of cars supplied in filling orders and the number of cars in equipment stock in excess of the cars ordered. The publication of these statistics was abandoned when the government took over the control of the railroads, but the statements and charts show the situation and the huge blocks indicating equipment serving no useful purpose are most impressive. It must be kept in mind that these figures are based on the assumption that the orders placed by shippers for cars for loading represent their actual needs, whereas it is common knowledge that these are commonly duplicated at competitive points and usually exaggerated, sometimes most grossly, by nearly all shippers, the hope apparently being that the larger the order the more nearly the actual want will be satisfied. It would seem likely, therefore, that the zero line should be removed considerably lower, especially at times when there is an active movement.

In 1916 the railroads secured the highest average miles per car per day, 26.9 miles. There is reflected on the chart the effect on each year's performance, based on the assumption that a similar mileage had been secured in each of the other years.

In the fall of 1917 an effort was made to secure an increase in the loading of cars and this effort was continued through 1919, the maximum being attained in 1919, when the average was 29.1 tons per car. (U. S. R. R. A. figures.)

The average capacity of the cars in 1919 was 41 tons, thus indicating the average loading as being 70.97 per cent of the marked capacity of the car. It will be noted by Column "H," on attached statement that had a similar percentage of the average car capacity been attained in other years there would have been an increase of 2.4 tons in 1918, 3.6 tons in 1917 and over 5.5 tons per car in the years 1910 to 1916, both inclusive. The reports for January and February, 1920, indicate some reduction in the loading per car and this was the subject of discussion with T. C. Powell (director of Capital Expenditure) prior to his leaving the railroad administration. He informed me that they were no longer in position to insist upon shippers loading to capacity. It is quite evident that if we let the situation go back to the old conditions, we will have a loss of about 6 tons per car in the average loading.

To prevent this the Interstate Commerce Commission should permit a raising of the minimum loading of cars so as to provide that cars shall be loaded to marked capacity, or to the cubical content capcaity, as the case may be. Inasmuch as the carrying capacity of cars today is 10 per cent above the marked capacity, this gives reasonable leeway for the shippers.

Comparing, for example, 1915 and 1919, the average capacity of cars in 1915 was 60 tons and the average loading was 21.15 tons, or only 52.87 per cent of the average car capacity. Had the 1919 loading been only 52.87 per cent of the marked capacity, the average loading would have been only 21.67 tons per car instead of 29.1 tons per car.

The United States Railroad Administration's performance sheets show 7.1 per cent of the freight cars as unserviceable on December 31, 1919, as compared with 5.6 per cent on December 31, 1917, a difference of 1.5 per cent—and 1.5 per cent of 2,385,476 cars would equal 35,782 cars.

The average mileage made by the cars during the fiscal year ended June 30, 1917, was 26.1 miles per car per day, as compared with 23.1 miles per car per day in 1919. This mileage reflects the cars out of service on account of "bad order" and slowing up of movement due to congestion on the railroads, or failure of the shippers to promptly load and unload.

The average miles per car per day in 1917 was 13 per cent greater than in the year 1919. An increase in mileage of 13 per cent as applied to 2,385,476 cars would result in a saving of 274,435 cars.

As stated, during the years 1917, 1918 and 1919, a very determined effort was made to secure a better loading of freight cars and under the spur of patriotic impulse and the recognition of the benefit to the common nced, through a common exertion, the load per car was substantially increased to 70.97 per cent of capacity, viz. in 1919, and, as has already been shown, the railroads secured their highest average miles per car per day in 1916, viz. 26.9 miles.

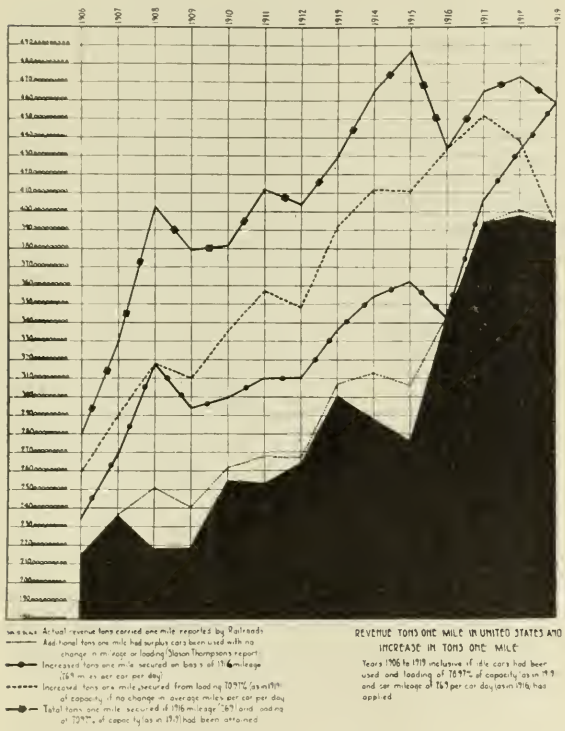
In 1918 the tons carried one mile were three hundred and ninety-eight billions, plus, with an average miles per car per day of 24.9 and an average tons per car of 26.64. If, however, the mileage per car per day had been speeded up to 26.9 (as in 1916) and the average load increased to 70.97 per cent of capacity (as in 1919) the available equipment would, under like operating conditions, have handled four hundred seventy-three billion tons plus, one mile, or an increase of 18.7 per cent.

In 1919 the miles per car per day decreased to 23.1 but the loading in this year reached its maximum of 70.97 per cent of capacity. The total tons carried one mile amounted to three hundred ninety-four billions plus. Had the cars been speeded up to the mileage of 1916, the available equipment, under similar operating conditions, would have handled four hundred fifty-nine billions plus, or an additional tonnage of sixty-five billions plus, or 16.4 per cent.

The charts reflect that the number of tons handled one mile in the years 1917, 1918 and 1919 was in excess of three hundred ninety-four billions or more than one hundred billions in excess of any of the years 1906 to 1917, inclusive, with the exception of the year 1913, when it was approximately ninety-four billions in excess and in 1916

approximately fifty-one billions in excess. When it is considered that the years 1917 to 1919 covered the war period, and when production was speeded up to the maximum, these years may reasonably be said to reflect maximum production and the maximum that may be expected for the next two or three years to come. But conceding that those tonnages will be materially exceeded, the statement reflects that if the maximum mileage and maximum loading are applied the present freight equipment can handle a tonnage almost 18 per cent in excess of the tonnages of 1917, 1918 and 1919.

It should be borne in mind, also, that during the three-year period 1917, 1918 and 1919 (or war period), our exports reached their maximum. In 1916 the ratio of imports to exports was over 50 per cent, while during the three-year period 1917 to 1919, inclusive, the ratio of imports to exports was 45.4 per cent. This clearly illustrates that because of our exports a larger percentage of business handled in connection with foreign trade was destined to seaboard during the period mentioned than obtained in the years previous thereto, thus producing a loaded movement largely one way and a material increase in empty car mileage which would not have resulted in normal periods when the traffic would have more evenly balanced. This to our mind was the contributing factor in causing an empty car movement during



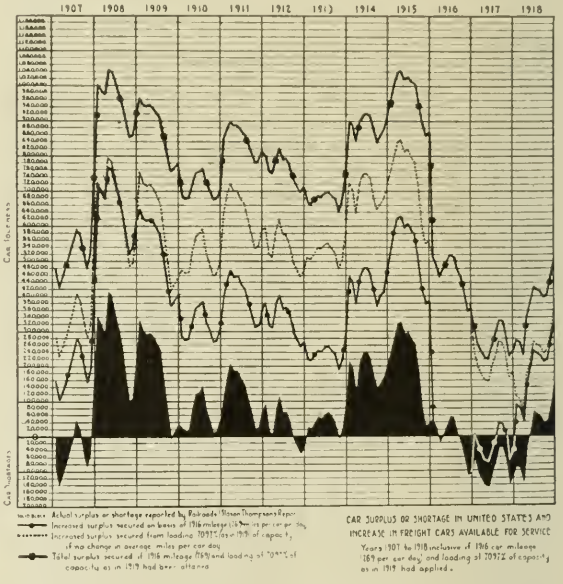
REVENUE TONS ONE MILE IN UNITED STATES AND INCREASE IN TONS ONE MILE

Years 1906 to 1919 inclusive if idle cars had been used and loading of 70.97% of capacity as in 1919 and car mileage of 1.69 per car day, as in 1916, had applied

this three-year period of over 31 per cent of the freight car mileage as compared with 29.8 per cent obtaining in the year 1916.

There has been very little change in the number of cars per thousand ton miles moved since 1906, and the number of cars added annually to the equipment stock during that period was 41,572. This, however, does not fully reflect the effect on the movement of traffic, since the average capacity of the cars had increased from 32 tons in 1906 to 41 tons in 1918, or 28 per cent. It is true that many cars were purchased annually above this number, but many of them were purchased in replacement of cars of light capacity or otherwise considered obsolete, and this special demand for new equipment is now largely eliminated, since there were on June 30, 1916 (the latest date for which I have the information) only 86,506 cars under 60,000 lb. capacity, and 665,494 cars from and including 60,000 lb. but under 80,000 lb. capacity, of all Class I and II lines in the country.

Consideration must also be given to the effect of changes in construction from the old wooden sill car, supported by hog chain truss, to the present practice of steel underframes, one consequence of which was the loading of the modern equipment to 110 per cent of its marked capacity. If to the marked capacity of the equipment of 1919 (98 million tons



CAR SURPLUS OR SHORTAGE IN UNITED STATES AND INCREASE IN FREIGHT CARS AVAILABLE FOR SERVICE

Years 1907 to 1918 inclusive if 1916 car mileage (1.69 per car day) and loading at 70.97% of capacity as in 1919 had been applied.

plus) this 10 per cent be added the capacity would be one hundred and eight millions tons plus, as contrasted with fifty-nine millions tons in 1906 or an increase of over 83 per cent. The ton mileage in 1906 was two hundred and fifteen billions plus, and if the loading in that year had been 70.97 per cent of capacity, as in 1919, the equipment of 1906 would be capable of two hundred and fifty-nine millions tons, plus. The increase in tons miles in 1919 as compared with this figure is one hundred and thirty-five billions plus, an increase of but 52.36 per cent. The increase in car capacity offered was evidently over 30 per cent over the increased demand. It may well have been that it was this 30 per cent that was drawn on to take care of the larger ton mile movement in 1918, or that it was not used and that if the cars had been utilized to their full excess above marked capacity, the margin might have been much in excess of 30 per cent. This could only be ascertained by careful analysis of other factors affecting the use of the equipment.

Owing to the seasonal demands made upon equipment, the peak of the load is usually about October 10, and one of the questions always to be borne in mind is the extent to which this should be taken care of by the railroads, or by grain elevators, cotton platforms and other reservoirs for storage. It is evident that it is not to the interest of the country that equipment for which use can only be found for a period of perhaps six weeks in the fall should be supplied under the penalty of standing idle during the balance of the year.

It is evident then, to meet the demands of the traffic, one of two courses may be taken:

(a) Substantial additions may be made to the freight

equipment stock. This will involve large additional investment and expensive upkeep of the same, a large amount of idle equipment over the major portion of the year and a substantial increase in all the freight elements of the railroad. Many years ago the Interstate Commerce Commission consolidated in its published statistics the items of "Road" and "Equipment" in the Balance Sheet; but based on the commission's estimated cost of reproduction now of the Kansas City Southern, it would appear that upon a line where the equipment is ample the value of the equipment is approximately 28 per cent of the Road and Equipment Account. It would indicate that for each dollar spent for new equipment three additional dollars would have to be spent for its economical use.

(b) The serviceability of the existing equipment can be substantially increased in the following ways: By heavier loading of cars, a great stimulus of which would be the raising of the minimum weights for carload shipments, and this is especially important in the loading of cars moving in the direction of the current of loaded traffic, having the effect of reducing the amount of empty car mileage in the return direction. As an example, approximately 60 per cent of the cars going into New England loaded now return empty and to the extent heavier loading can be obtained, the number moving into New England would be reduced and the empty mileage correspondingly reduced.

A reduction in the detention of the cars, a great stimulus toward which would be an adequate and flexible application of demurrage penalities.

A change in the reconsignment, fabrication during transit, and other similar practices, limiting many of those privileges and making a charge for others designed to reduce their number and use; similar action on unlimited free time allowances covering detention to cars billed on through rate via rail and water routes, free time allowance at Pacific ports; detentions due to use of cars for movement of shipments from shipper's warehouse to freight station, and use of cars for transporting shipments from one point to another in the same city.

A marked restriction in the use of "to order" bills of lading, the absolute prohibition of some and a charge designed to the restriction of other uses of this device.

A gradual elimination of the use of the bill of lading as a commercial instrument, which should be possible with the growth and the improvement of the banking system of the country, and the restriction of the bill of lading to a receipt for goods and an obligation for their carriage. This would have a potent effect in holding back unwarranted shipments now greatly stimulated by the ability to collect on the sale of goods as soon as bill of lading covering them is issued.

For more than one-third of its life the car is in the possession of the shipper or receiver of freight; that is, of the 2,242,379 revenue service freight train cars shown for Class I carriers as of June 30, 1916, by the report of the Interstate Commerce Comission, approximately 747,459 are so located. It is not too much to say that it is within the power of the Interstate Commerce Commission, by the resolute exercise of its authority under circumstances that would not distress the shipper but would mean much toward his relief, to add to the effectiveness of the freight equipment of the country the equivalent of at least one-half million cars, and this not only without adding one dollar to the capital account but producing changes in the practice that would cut many thousands of dollars from the operating expenses.

Unfortunately the tendency seems to be in the opposite direction, as indicated by the commission's circular letter of April 27, last, regarding minimum weights and proposed double loading of grain and grain products, in which it is suggested that the minimum weight might be reduced from 60,000 to 40,000 pounds and that a certain amount of circuitous and back hauling be permitted, the basic idea of double loading having already been shown to be impracticable of accomplishment to any considerable extent due to the fact that it is a too highly specialized arrangement to fit into railway operation

Nor does this exhaust the possibility of better use of present equipment. The freight car is in actual train movement on main line track on an average of only two hours and twenty-four minutes out of each 24 hours. The speed of freight train cars can be increased only at the sacrifice of a part of the tonnage which the locomotive can haul, and the abandonment of some of the collateral economies, increase in the expense of up-keep of the track, of fuel and supplies used and an increase in the danger of operation. Were it possible to increase the speed so much as 15 per cent the gain in time would be only 22 minutes, involving sacrifices that the railroads could not possibly afford. Eliminating this feature there remains to be accounted for about one-half the life of the car. About 28 per cent of this life is accounted for in road delays, movement through intermediate yards and interchanging between railroads where more than one railroad is involved, 5 per cent in the movement of surplus cars, 9 per cent in movements connected with the keeping of the cars in repair and 11.6 per cent in the movements connected with the relation of the railroad with the shipper or consignee. If, in the immediate future, the new moneys applied to railroads were largely spent in eliminating and reducing these delays, which involve fully one-half the life of the car, the addition to the effectiveness of the equipment would perhaps not equal that gained by the other measures suggested but it might reasonably approximate it.

All of the above relates to what might be considered the normal practice of the railroad, but conditions are now very abnormal in that during Federal control all restrictions of ownership were ignored and the cars were scattered throughout the country and their repairs sadly neglected. Efforts should now be made to bring them back as promptly as possible to the owning line and every effort should be made to as rapidly as possible put them in proper repair. Labor is, of course, also much less effective than formerly owing to the many restrictions thrown about its employment during the period of the war, of which perhaps none is quite so costly as the imposition of the eight hour day, with penalty for overtime. This very much increased the number of men on the payroll and it is leading to changes in practices uneconomical in themselves but not so costly as the penalties imposed.

Photo by Kadel & Herbert, N. Y.

Vendors of Sweets at Okayama, Japan

Hearing on General Rate Advance Case

Shippers and State Commission Show Appreciation of Need for Higher Rates to Improve Service

WASHINGTON, D. C.

WIDE DIFFERENCES OF OPINION, among differently situated shippers and also among the state commissioners, as to how the Interstate Commerce Commission should deal with the applications of the railroads for general advances in freight rates, manifested themselves at the hearing before the commission last week and this week. A special committee of the National Industrial Traffic League, which is the most representative organization of shippers in matters pertaining to their relations with the railroads, strongly advocated an increase in rates, the amount of which they were entirely willing to leave to the judgment of the commission, on the ground that it is necessary to improve the condition of the railroads in order that the shippers may have adequate service. This statement aroused a storm of protest from the attorneys present who are attacking the position of the railroads on behalf of shippers, or state commissions, in an effort to reduce the amount of the advance below the percentages asked by the railroads or to change the method of the proposed adjustment in the interest of certain classes of shippers or communities. They immediately began a line of cross-examination intended to show that the league committee was not warranted in speaking for individual members of the league.

The opposition to the railroads in this case is confined mainly to the shippers of the northwest and southwest interested in long-haul traffic, whose rates would be increased under a percentage advance by greater amounts in dollars and cents than the rates of some of their competitors, and to the representatives of shippers of live-stock and agricultural products who claim that they pay the freight rate direct because it is deducted from a base price instead of being able to add it to their selling price. Representatives of the state commissions in the intermountain country asked an exemption on the ground that other rates which they claim are discriminatory against them should be advanced first, and the Southern Traffic League is taking the position that the southern lines need less of an advance than they have asked for.

Comparatively little direct opposition to any advance in rates has been voiced during the hearing, but the attitude of the protestants has rather been that of an attempt to whittle down the amount of the advance in any way possible by attacking the statistics used by the railroads, by insisting upon an optimistic view of the volume of traffic or the level of expenses to be expected in the future, or by efforts to change the proposed adjustment of the rates themselves.

Cross-examination of the railroad witnesses was concluded on June 10 and after H. H. Raymond, president of the Clyde and Mallory lines, had testified in support of the application of the Chesapeake Bay and Atlantic and Gulf coastwise steamship lines for advances in their rates corresponding to those allowed by the railroads, the testimony on behalf of shippers was begun by R. M. Field, of Peoria, Ill., as chairman of a special committee appointed by the executive committee of the National Industrial Traffic League, who read the following statement:

Statement of the National Industrial Traffic League

"It is a well known fact that transportation is the life blood of commerce and our railroad systems the arteries of trade. We know that in the human body, when the arteries are clogged and the blood fails to circulate freely, this means severe illness and ultimate death. Our business life is in this condition today and unless relief is speedily given, more serious results than have yet shown will be apparent. To obtain this relief we must have a transportation service that will serve adequately, and transport our traffic in such quantity and with such regularity as the needs of our growing business require. This is the big, outstanding vital point before us today. It dwarfs all other questions and considerations and in this case now being considered by your honorable commission other factors and features are merely incidental. It is a matter of surprise to note in the progress of this hearing the tendency to introduce and dwell upon various elements important, no doubt, in an ordinary rate case, but in this case, which is of an extraordinary and special nature, not germane in any particular to this, the main issue, the restoration of service to the shipping public.

"For this purpose the Congress of the United States considered and held hearings for eight months on proposed new legislation designed to improve transportation conditions and solve this problem, which culminated in the Transportation Act, 1920, passed February 20 of this year. For this purpose, the act provided an insurance of a reasonable revenue return to the railroads, to be provided for by the establishment by this commission, under specified conditions, of rates that would produce such a result. There was but one object in view,—to save our transportation facilities and build them up as speedily as possible to a condition enabling them to function in conformity with the present and ever increasing needs of commercial business traffic. It isn't the present cost of this accomplishment that counts. It isn't the question of whether the available valuation data on one basis or another shows a variation of a few millions of dollars. It isn't the question of whether the railroads can operate by special efforts and economies on a less basis this year than last. It isn't the question of whether certain more prosperous roads are going to earn a little more than the prescribed return. It isn't the question of whether or not certain roads are or have been wisely constructed or operated. All these things are overshadowed by the main issue, the crying need for adequate transportation. Let the work of restoration and rehabilitation be done first, and then let these minor questions be taken up and adjusted at such time and in such a manner as can then be accomplished without disturbing the welfare and prosperity of this country. We have no time for the consideration of such matters now. Our national prosperity is bound up with the proper growth and functioning of our railroads, and no detail matters or technicalities can be permitted to interfere with such speedy action as is necessary to accomplish the big vital result, viz., to put the roads on their feet.

"The National Industrial Traffic League has made a thorough investigation of the transportation conditions at present existing in the United States and has arrived at the conclusion that the following needs are clearly apparent:

"1. An additional supply of cars, locomotives and other equipment.

"2. More adequate and extended terminal facilities with such improvement and betterment of the existing terminals as will enable them to care for the present increased flow of business without delays and congestion.

"3. A general rehabilitation of other railroad properties of all description to cope with the movement of current and future business.

"It is estimated that a sum amounting to six billions of

dollars will have to be spent on our railroads to provide the above within a period of three years, and that at least a billion and a half dollars will have to be spent in addition each year for current upkeep and additional necessary facilities on basis of present costs.

"A fair and proper earning capacity is necessary to enable the railroads to meet current obligations and expenses, to establish their credit upon such a basis as will make the negotiation of further necessary loans possible, and place them upon such a sound financial footing as will attract capital investment in future. This program should be worked out as speedily as possible, for it is clearly apparent that an increase in rates is necessary to bring the revenue return of the railroads up to the basis prescribed by the law, and as this action will materially assist in the restoration of proper transportation service the commission is urged to act without delay. The present transportation situation is deplorable in the extreme and we are paying today indirectly for a lack of service more than we would be called upon to pay in rates made sufficiently high to enable an adequate service to be maintained. Sales, production and transportation are the three great factors of industry and successful business requires that each shall keep pace with the other. When transportation fails to measure up to sales and production, there is both an actual and a potential loss difficult to measure accurately, but reflected decidedly in general profits.

"The league makes no argument or comment on the measure of the rate advance, believing that as the law clearly prescribes the basis on which this shall be determined, it is the right and duty of the commission to make its own determination under the law, and that, we hope, speedily. However, as to the application of the rate advance in various features and details, there are certain points which the league has carefully considered and on which we would like to submit our views for the commission's consideration, as follows:

"1. Advance in state and interstate rates:

"It is the view of the league that rates should be advanced on state as well as interstate traffic, and that these advances shall be made in so far as may be possible simultaneously. The league feels that it would be a grave mistake to have different advances on state and interstate rates within the same territory so widely apart as to cause discrimination and general business disturbance, and is willing to lend its efforts in co-operating with the railroads and the Interstate and State Commissions to see that the intrastate and interstate rate advances are properly alined.

"2. Freight rates:

"No objections will be offered by the league at this time to the contemplated advance being made on freight rates alone.

"3. Switching rates:

"In view of the chaotic condition of switching rates throughout the country, the league opposes any advance in switching rates in general including the present minimum class scale of rates when applied to switching service, but believes this matter should be left for adjustment by the local communities. Our position is forced by the fact that in the last two years many switching rates have been advanced as much as 300 to 400 per cent. Adjustments have been made which have put many communities on a basis of switching rates abnormally high and these rates instead of being further advanced should be reduced to a normal basis. The application of this minimum class scale of rates, as provided in General Order No. 28 to switching service, has resulted in many excessive charges which should not be further advanced. In view, therefore, of the many necessary adjustments in these rates, the league goes on record, as before stated, that this matter of switching rates should not be included in the general advance but handled separately and and on its own merits.

"4. Differentials:

"Resolution has been adopted by the league as follows:

" 'It is the view of the league, where there is a recognized or established rate relationship between points of origin or points of destination, a change in the level of the rates, either by advances or reductions, shall be effected by increasing or decreasing the base point rates, and then establishing the rates to or from related points of origin or destination by using the established arbitraries or differentials over or under the base point rates, or by using the established percentage of the base point rates where rates are related on a percentage basis. This is not intended as an approval of all recognized or established rate relationships, but merely as expressing the view that such relationships should be changed only where the propriety is directly in issue, and not as an incident in connection with an advance or reduction in the rate level.'

"In explanation, we shall say, that the league is in favor of the maintenance of established, recognized differentials, many of which were disturbed under General Order No. 28, and up to date never restored. The new adjustment should provide for the restoration and establishment of such differentials as are recognized and proper, believing that only by the preservation of these differential relationships can the trade relations between communities and territories, which have been built up during the last 40 years or more, be satisfactorily maintained. The league, being a national organization, does not here attempt to define or designate in any manner what specific differentials or relationships existing in the rate structure of this country are recognized and proper, but merely places itself on record as endorsing the general principle of same as explained above.

"5. Disposition of fractions:

"The league favors the disposition of fractions in cents per hundred pounds on the even or one-half cent, whichever is closer, thus observing the rule of the Interstate Commerce Commission; rates per ton or per car should be figured on the nearest even cent. As to the disposition of fractions covering rates made in cents per hundred pounds, we believe that comment is unnecessary because it has been the general rule of the commission in all general rate adjustments to follow the principle advocated above. However, as to rates made in cents per ton, or per car, we believe that the disposition of fractions by any other method than as outlined above would have the effect of permitting increases for some communities or districts on a basis less than the percentage advance, and for others greater than the percentage advance, thus causing discrimination in favor of one and against the other. There are many low grade commodities on which the freight charges are greater than the value of the material. These are sold on a close margin and a difference of one to three cents per ton will in many cases work a severe hardship on the producer or consumer. This would be avoided if our method for disposing of fractions was adopted. In the final analysis, there would be practically no effect on the revenue accruing to the railroads, and our method, as stated above, would adjust the advance so as to avoid discrimination to producers, shippers or consumers.

"6. Inter-territorial rates:

"After a thorough investigation of this subject and various conferences with the railroads' representatives, the league feels that this problem resolves itself into more or less of a sectional matter on which the different communities and territories interested will have to express their own views. The league, being a national organization, does not feel that it can properly commit itself to any definite plan or policy on this subject, the same being bound up to a great extent with the subject of differentials and relationships upon which we

have already expressed our views as to the general principle.

"7. Combination rates:

"From consideration of the applications presented to the commission by the eastern, western and southern railroads, asking for advanced rates, it appeared that in some cases advances were proposed on some commodities in specific amounts per hundred pounds or per ton instead of on a straight percentage basis, and the league has taken the position that in such cases combination rates should be advanced by applying the one advance to the through combination rate instead of applying the specific amounts of advance to each factor of the combination. It appears that now the railroads have decided not to ask for advances based on specific amounts but on a percentage basis, and with this understanding we feel that the matter of combination rates will probably adjust itself if the application of the rule for disposition of fractions is followed as previously outlined by the league. The league is opposed to the proposal of the carriers that the minimum class scale of rates, the minimum charge per car and the minimum charge per single shipment be applied to each factor of rates or charges on shipments upon which the through rate or charge is based upon the aggregate of the intermediate rates. We recommend that these minima should be applied to the through charge and not to each factor.

"8. Export rates:

"The league believes that in view of the unusual commercial conditions surrounding export traffic, special consideration should be given by the commission, and the railroads, to the proper adjustment of export rates under a general percentage increase so as to preserve long standing and recognized port differentials and relationships.

"With reference to the general statement made by the league in regard to the existing transportation situation, if the commission please, the league would like to put on three special witnesses each representing a large industrial concern, who will testify for the commission's information specifically as to the present conditions and how the same are affecting the particular business, which he represents. It would easily be possible for the league to put on several hundreds of such witnesses, whose testimony would cover practically the same ground, but not wishing to take up the time of the commission and others interested in this hearing, it is believed that the testimony of these three witnesses will be sufficiently typical of the existing conditions."

Commissioner Aitchison interrupted the witness at one point to ask why he had not mentioned the labor question in discussing the causes for the "deplorable" transportation conditions. Mr. Field said he thought the labor question hardly had a bearing on the present rate question. Mr. Aitchison said that if the rates were raised over night transportation conditions would not be improved until the labor situation is improved.

J. N. Teal, of Portland, Ore., questioned the witness sharply in an effort to show that the executive committee of the league did not represent the views of all of its members, which Mr. Field readily admitted, saying that the statement was prepared by a special committee of nine, under instructions from the executive committee, which derived its authority from a meeting of the league attended by about 450 members in March. Mr. Teal said that if the league has any members in the west the statement directly misrepresented them. He asked if the members were not principally jobbers. Mr. Field said he thought they are mostly manufacturers, but that they include all kinds of shippers and that the membership is largely made up of chambers of commerce and boards of trade. J. B. Campbell, of Spokane, and S. H. Cowan and R. C. Fulbright, of Texas, also denied that the committee had any authority to speak for the individual members. F. T. Bentley, traffic manager of the Illinois Steel Company, asked Mr. Field questions to bring out the history of the statement and the numerous meetings and conferences at which the position to be taken by the league as an organization had been determined without any attempt to bind any individual member.

Mr. Field said that speaking personally he was not afraid that the railroads would get too much but that he was inclined to fear they would not get enough. This also aroused some indignation among those who are opposing the rate advance, and Commissioner McChord asked why he was afraid the roads would not get enough. Mr. Field hastened to reply that he meant he feared the railroads had not asked for enough and that the amount they would receive from the general advance would be reduced in making later readjustments.

Shippers Want Better Service

J. M. Belleville, traffic manager of the Pittsburgh Plate Glass Company, said he could not recall a time when the transportation service was as poor as it now is and that during the past six months his company would have been "money ahead" if it had paid double rates and had had a normal movement of its freight. The business of its warehouses had been curtailed and its distributing expense had been doubled by shortage of transportation service, he said, and in endeavoring to keep its factories in operation the company had used circuitous routes, paid double rates and had made "extravagant use" of motor trucks, sometimes for a distance of as much as 200 miles. Commissioner Aitchison again interrupted to ask if the witness were not discussing the effects of congestion caused by strikes and Commissioner McChord said that the conditions described did not represent shortage of equipment. Mr. Belleville said that the conditions had been recently made much more acute by the strike and when Mr. Aitchison asked whether freight rates had anything to do with the strike, he replied in the negative.

Mr. Belleville continued, saying that his company and many other shippers he had talked with felt that under present conditions the great need of the country is for increased production and that they do not believe that can be brought about without a great improvement in transportation service, which cannot be furnished unless it is paid for. Asked whether the railroads are making an honest effort to give proper service, Mr. Belleville said he knew that in the Pittsburgh and Chicago districts all operating officials have been working day and night and in operating their yards with voluntary forces and in the face of the greatest obstacles had accomplished things he had not believed possible. He thought the bulk of the operating officials are "doing their level best." When he spoke of the necessity for co-operation between carriers, shippers and the commission, Mr. Aitchison asked why he had not mentioned labor. Mr. Belleville said he should have mentioned labor and in reply to the commissioner he said he had never seen a time when labor conditions were as critical as at present.

W. E. Lamb asked whether present difficulties are caused by a shortage of equipment or by shortage of labor. The witness answered that there is a shortage of both and when Mr. Lamb asked if the Railroad Administration had not turned back to the roads 100,000 more cars than it took over in 1917 Mr. Belleville said that there was not enough equipment in 1917. Much of the present acute difficulty, he said, is due to labor conditions, but there was also trouble from congestion before federal control terminated.

Commissioner Meyer referred to reports received by the commission indicating 50 per cent or less of the normal number of switching crews at work at Pittsburgh and other large terminals and asked if the congestion would not have been worse if there were 200,000 or 300,000 more cars on the tracks. Mr. Belleville said perhaps that would be the case.

Mr. Lamb asked why more cars are needed now than were

available in 1917, and whether there is more tonnage in sight than was handled in 1917. Mr. Belleville said he thought there is more in sight. D. A. DeVane, counsel for the Florida commission, asked if the best way to get service from the railroads would not be to so fix the rates as to make them "hustle." Mr. Belleville thought the commission would continue to function and that the rates would not be so fixed as to eliminate entirely the need for hustling. C. E. Cotterill, of the Southern Traffic League, asked if Mr. Belleville's willingness to pay higher rates is influenced by the fact that his company sells its glass generally on a delivered basis so that the freight is "passed on." Mr. Belleville said his company pays the freight on a large tonnage of raw materials. He admitted that it sells to railroads just as it sells to any one else.

M. J. Parlin, traffic manager of the Belknap Hardware & Manufacturing Company, of Louisville, testified that because of railroad congestion and shortage of cars the company had had to employ a large additional amount of capital, 10 to 20 per cent, because of money being tied up longer in goods in transit. Commissioner McChord asked whether he meant that there was a real shortage of cars or merely that he couldn't get them. Mr. Parlin replied that there had been no strike at Louisville, although there had been some shortage of labor, and that the car supply was insufficient, also that the condition of the cars was "very bad." "The shortage of cars," he said, "is one of the main causes today of the high cost of living and there has been both shortage and congestion before, during and since the period of federal control."

J. H. Beek, executive secretary of the National Industrial Traffic League, also gave similar testimony.

C. L. Lingo, traffic manager of the Inland Steel Company, testified on behalf of the Illinois Manufacturers' Association and he began by endorsing what had been said by the representatives of the National Industrial Traffic League. He said the railroads should have all the law permits in the way of increased revenue and that a straight percentage advance is the most equitable method of accomplishing the result. Mr. Lingo said there is a large potential business in the country to be handled "if we can get our transportation machine in good shape" and "the railroads have got to have money to work on." He added that the effect of the rate advance would not be immediate but that it would take time to bring about the needed improvement. He said the reply to a question asked by Mr. Lamb of a previous witness as to whether the Railroad Administration had not turned back as many cars to the railroads as it took over was that it "turned back the same number of car numbers but not of serviceable cars" and that there are thousands of cars stored on side tracks and still on the books that he did not believe could be put into condition again for the cost of new cars. In addition to cars in such condition, he said, the cars that are being used are in bad condition and when an effort is made to get expedited movement by making up a solid trainload it is hardly possible to get over a division without setting out several cars. He expressed the opinion that the railroads are short 250,000 to 300,000 cars and that the railroads have not bought them because they had not had the money and during the war could not have got them if they had had the money. This, he said, implied no criticism of the railroads or of the Railroad Administration. It was the result of a natural situation resulting from the war and he thought "everybody had done the best they could," but one of the results is that instead of the railroads soliciting business the shippers are now begging them for transportation service. When S. H. Cowan asked if the National Industrial Traffic League is not made up principally of shippers who are not materially concerned with the amount of the freight rate because they can add it to their prices, Mr. Lingo read from a list of members to show that it includes all classes of shippers. He said: "The consumer pays for everything always."

In discussing the question of railroad credit with the witness, J. N. Teal read an advertisement of an issue of railroad notes which stated that the entire issue had already been sold. Commissioner Clark interposed to say that the commission itself is following up and informing itself regarding all issues of securities since March 1, as to the conditions of the sales, the net cost to the carriers, any discounts, etc.

Commissioner Eastman asked whether, if the commission should reach the conclusion that rates sufficient to allow a return of 5½ per cent would not be sufficient to rehabilitate the credit of the railroads, it should use a higher valuation as a basis than it otherwise would, for that purpose. Mr. Lingo said the commission could not disregard the law but that it should be as liberal as the law will permit.

Commissioner Aitchison referred to the labor question again, asking whether, even if the credit of the railroads is rehabilitated, the service will be adequate unless labor is satisfied. Mr. Lingo replied that, of course, it is essential that there should be an adequate supply of labor.

Mr. Aitchison also aroused a discussion by asking Mr. Lingo whether he expected that the railroads would buy cars out of the revenue from rates. Mr. Lingo said that personally he thought they should, that no other business expects to be successful by depending entirely on borrowed capital without putting a part of the earnings into the property.

Alfred P. Thom asked the witness who would suffer if a mistake should be made and the railroads should receive too little financial support. "The great American public," replied Mr. Lingo.

Chairman Clark after a time reminded Mr. Thom that some of his questions were more in the nature of argument than of cross-examination. Mr. Thom said the point was probably well taken but that as so many of the other counsel had used the cross-examination for the purpose of argument he thought he could do some of it. The chairman said that for that reason he had allowed him to proceed for a while but that too much time was being taken up on points which would not assist the commission. Mr. Lamb retorted saying that witnesses were taking up too much time in "hearsay" testimony as to matters of which they had no personal knowledge. He particularly objected to too many references to estimates made by the *Railway Age* as to the need for additional equipment. Mr. Clark said that the commission was able to notice when hearsay testimony was offered and to give it its due weight without having its attention called to the fact by a series of questions by half a dozen lawyers.

Position of State Commissioners

Testimony on behalf of state commissions was begun on June 11. A. L. Flinn, rate expert of the Minnesota railroad commission, submitted a statement saying the Minnesota commission agrees that some increases in rates probably are necessary but that it has no definite information on the subject; that so far as its present information goes no objection has so far appeared to a straight percentage increase so long as proper relationships are maintained. If increases are granted the commission requests that some understanding be had as to how the proceeds are to be used so far as the purchase of new equipment is concerned and what new facilities are actually contemplated; that special consideration be given to the question of increases on rail, lake and rail coal for the northwest, to the end that no unnecessary burden be placed on the consuming public in Minnesota and surrounding states; that special rates on roadmaking material for states or municipalities be continued; that the same consideration be given rates on iron ore shipments via the lakes as is given coal shipments in order to save the low grade iron mines of the

state from practical ruin; and that the present practice of applying minimum rates be discontinued and proper consideration be given to published exceptions to the classification. The commission also objected to certain suggestions that had been made as to adjustments. Mr. Flinn said he thought the opinion of the commission was that passenger fares should not be increased and said that on September 1 the state will go on a two-cent a mile basis unless the statute is changed.

H. M. Slater, transportation rate expert of the Illinois commission, pointed out several objections to the proposed interterritorial rate adjustment which he said would work out unfairly in its application to parts of Illinois that are in two rate territories. When he said he understood that the relation between state and interstate rates is not now under consideration, Mr. Thom said it was the understanding that a common record was being made in this case for use later in proceedings before the state commissions to which the railroads have applied for similar advances. J. B. Campbell, representing several state commissions in the intermountain territory, said he had no such understanding, and Chairman Clark remarked that neither the interstate commission nor the state commissions could be bound by any understanding. J. E. Benton, solicitor for the state commissioners' association, explained that an understanding had been reached that the common record could be used for convenience but that no attempt had been or would be made to limit any evidence that might be called for in addition and that the understanding did not intend to bind any commission. Mr. Slater suggested that the Interstate Commerce Commission should lay down rules for the readjustment of rates to preserve relationships which the railroads have promised to make after the general advances have been made, as otherwise, he said, it might take the carriers years to make them. He asked that the Illinois district as a whole should be made subject only to a single uniform percentage advance.

J. B. Campbell, appearing as counsel for the state commissions of Washington, Montana, Idaho, Utah, New Mexico, Nevada and Arizona, made a statement saying that these commissions are not antagonistic to the railroads but do not concede to the Interstate Commerce Commission exclusive jurisdiction in this case and believe it is the duty of the state commissions to hold hearings and conduct an investigation on their own account. He urged that the rates be properly related and equalized before a general advance is made, saying that if that is done large sums of additional revenue for the railroads could be raised without hardship, but he expressed the opinion that the carriers serving the northwest need only a small increase and he would segregate them. He declared that the carriers ought to be able to take care of their needs by an increase in efficiency and made the point that there had been no showing that the conditions mentioned in the act as to honest, efficient and economical management have been met.

Fred A. Williams, of the Oregon commission, said he wanted the railroads to prosper but that many industries of the northwest cannot survive if rates are made much higher. They now pay the highest rates, he said, while the railroads serving them are generally prosperous, and he was not fully convinced that they deserve the increase they have asked. He also thought the 1919 basis was not a fair one on which to base calculations. He admitted he had not looked up the figures as to the recent earnings or operating ratio of the northwestern roads and in reply to a question by Chairman Clark as to what would be a proper operating ratio he said he was not competent to answer. Commissioner Aitchison asked what is the position of the northwestern section as to an increase in passenger fares, since the fares were already on a basis of three cents or more when the increase was made by the Railroad Administration. Mr. Williams thought an increase would not be very popular. He said the railroads have plenty of cars but that they are in the east and that what the railroads need is greater efficiency. When Fred H. Wood asked to what, in his opinion, the inefficiency is due, Mr. Williams said there seems to be a general lack of interest on the part of all the railroad men he came in contact with.

A. O. Calderhead, traffic expert of the Washington commission, declined to admit that the railroads are entitled to what they have asked and said the results obtained last year under federal control are not sufficient evidence on which to base the results to be expected in the future. He said it is a grave question as to whether the carriers are operating efficiently and that the congestion cannot be explained entirely by the strike because there was congestion during federal control. If all the car space were properly utilized the carriers would not need additional cars but they have failed to offer the shippers any inducement to incur the extra expense of loading large cars and they can hardly be expected to do so for the sole benefit of the roads. He also said that a percentage basis of increase is wrong. It might be correct if rates were based on cost but they are not and a percentage penalizes the long haul. On the first class rate of $4.62 from New York to Puget Sound, he said, a 25 per cent increase would result in a greater increase per ton per mile than it would make on the first class rate from New York to Chicago of $1.12. When Chairman Clark asked the witness if he thought the operating ratio of the Great Northern is satisfactory Mr. Calderhead referred to a surplus it had earned several years ago. "Then your position is that the railroads should live off their fat until conditions change," said Mr. Clark.

Mr. Calderhead said that the railroads had abandoned the unified operation of terminals put into effect by the Railroad Administration and had thereby increased their costs. He said that at Seattle prior to 1918 five railroads operated their yards individually. These were consolidated under a terminal superintendent without changing any tracks and the average delay to cars in passing through the yards was reduced from 15 days to 5 days. Since the termination of federal control the roads have adopted a zone system in which each railroad switches for all the roads in its own zone but the time has been increased to 9 days.

J. E. Benton asked the witness if he knew of any money wasted in the construction of roads in the northwest. Mr. Calderhead said it was the contention of his commission that the construction of the Spokane, Portland & Seattle and the competitive lines in the Des Chutes canyon served no public interest and that they ought to be junked and the rails and ties used somewhere else. Commissioner Aitchison led the witness through the history of the construction of those lines and of the rivalry between the Hill and Harriman interests saying that the Oregon-Washington company had acquired expensive terminal property in Seattle and Tacoma while Mr. Hill seemed to be planning the construction of a line south to San Francisco and that both projects had been discontinued at about the same time. Mr. Aitchison also brought out that the unused terminal property is included in the book investment account and Mr. Calderhead said that the cost of the roads built for competitive purposes and not needed should be eliminated from consideration in the rate case. He said the rival interests had sought to make it as expensive as possible for each other and that operating officials to-day are showing the same disposition rather than attempting to cooperate. Asked what he would do if he were a railroad general manager, Mr. Calderhead said he would resign, because the operating officials do not have the proper support from their executives.

J. F. Shaughnessy, of the Nevada commission, also appearing for the Intermediate Rate Association, representing

Nevada, Eastern Washington, Eastern Oregon, Montana, Idaho, Utah, Arizona and New Mexico, urged that the intermountain territory should be exempted from the 24 per cent increase proposed by the western lines on the ground that there should first be an equalization of the rates that discriminate against that section before a further advance is made and that the shippers of the section cannot stand a further increase at this time. He read telegrams and letters from the state commissions and various shippers and also from officers of short line railroads expressing the opinion that the proposed increase would "dry up traffic." He read a long statement of the position of the intermountain state commissions which Chairman Clark said was largely argumentative but might be continued with the understanding that the argumentative part of it should not be taken as an excuse for a long cross-examination of the same character.

Mr. Shaughnessy said that the revenues of 1919 should not be considered as a proper basis because so large a proportion of the freight traffic of the western roads was government business handled at land grant rates and that this traffic is now being replaced by commercial traffic at full rates. When Mr. Wood asked him if he had any idea of the amount of money involved in the land grant reduction Chairman Clark said that Mr. Chambers had testified that it amounted to about $5,000,000. Mr. Shaughnessy insisted that this figure was too low and that it ought to be at least a billion dollars for the two years 1918 and 1919. It was pointed out to him that land grant reductions did not apply on all roads and only on parts of those roads, although competing lines met the land grant rates for the portion of the haul covered by land grants, and Mr. Wood asked him if he would change his estimate any in view of the fact that the freight earnings of all the western roads last year amounted only to about $1,500,000,000, Mr. Shaughnessy suggested that the commission make an investigation of the matter. Mr. Shaughnessy thought the railroads ought to follow the example set by the United States Steel Corporation in refraining from increasing steel prices in the interest of an effort to stabilize conditions.

M. M. Caskie, representing the Southern Traffic League, presented an exhibit made up from the monthly reports of the southern roads for the first three months of 1920 to show that they had already in those months earned more net operating income than the results for a full year shown by the exhibits based on the year ended October 31, 1919, readjusted for increases in expenses. He said his league is a member of the National Industrial Traffic League but did not entirely agree with the position expressed by its committee. His exhibit showed that the southern lines in three months had earned $17,000,000 net operating income, as compared with the $16,000,000 for the constructive year and that on the basis of the three months figures being equal to 21 per cent of a full year they would earn for the year a net operating income of $80,885,000. Therefore, he said, they would need an increase of only $48,000,000 to produce the $129,435,000 required to make a 6 per cent return on property investment, which would mean an increase in freight revenues of only 12.9 per cent instead of the 31 per cent asked by the southern lines. The net operating income for the three months had shown an increase of 115 per cent over 1919, after deducting the retroactive mail pay included in the January accounts and after paying the increased expenses which the railroads had used in making up their figures. He had not included the month of April because it was "abnormal." Counsel for the railroads asked for time to examine the exhibit and the work sheets from which it was made up before beginning cross-examination on it because it was subject to some arbitrary adjustments. For example most of the revenue of the Illinois Central had been attributed to the southern line. C. E. Cotterill, counsel for the Southern Traffic League, also filed a statement recently made by the governor of the Federal Reserve Board indicating an effort toward deflation which Mr. Cotterill said indicated some possibility of a reduction of prices. R. V. Fletcher, of the Illinois Central, asked if he had taken into consideration the possible reduction in tonnage which might accompany a deflation.

H. T. Moore, traffic manager of the Atlanta Freight Bureau, said he was a member of the special committee of the National Industrial Traffic League and that its statement does not represent the views of those he represents. W. A. Wimbish, counsel for the freight bureau, brought out from the witness that there are many outstanding orders of the Interstate Commerce Commission affecting rate adjustments in the south which if the wishes of the carriers prevail may result in substantial increases in revenues.

H. W. Prickett, traffic manager of the Utah Traffic League, of Salt Lake City, said there is no opposition to a proper increase in rates but that there is opposition all over the country to the disturbance in relationships that he said would result if the carriers' proposals are adopted, and he thought the transcontinental lines are not in need of an advance and should be segregated. He also thought an exception should be made in advance of the low grade ore traffic, which he said would not move if subjected to the 24 per cent advance. Mr. Wood brought out from the witness that there would be great differences of opinion as to what lines should be grouped as transcontinental lines or which should be segregated and that if the Union Pacific, which the witness had used as a basis for an exhibit, were to be taken as the standard it would probably result in preventing any increase for the other lines. Mr. Wood also brought out that there would be great differences of opinion among shippers as to what adjustments should be made if an effort were made to preserve relationships at the time the general advance is made. Mr. Wood said it would take several years to get the views of all shippers on the subject but that the roads would undertake to make the adjustments on which shippers could agree.

H. R. Brashear, traffic commissioner of the St. Louis Chamber of Commerce, objected to any attempt to apply a percentage advance while retaining fixed differentials in cents per hundred pounds, on the ground that the effect would be to the disadvantage of St. Louis as compared with Chicago. He said a straight percentage should be applied even if it widens the differential and that the relation thus established should be maintained. The St. Louis shippers would not want to have preserved either the present differential or the one that applied before General Order No. 28.

M. C. Moore, rate expert of the Mississippi Commission, said the railroads should be allowed a 5½ or 6 per cent return, but he presented numerous exhibits to show that rates in Mississippi are already higher than they ought to be relatively and should not be increased as much as other rates.

J. E. Benton read a statement on behalf of the National Association of Railway and Utilities Commissioners, which as an association has taken no position regarding the rate advance, saying that it is the disposition of most of the state commissioners to rely on the thoroughness of the investigation to be made by the Interstate Commerce Commission. The record of the hearings is being distributed to the various state commissions by the association at the expense of the railroads and it was the view of the commissioners who attended a recent conference at Chicago that any hearings to be held subsequently by state commissioners might be expedited by its use without the necessity of recalling the same witnesses, but each commission would determine for itself what supplemental evidence should be taken and the association had not even made a recommendation to the commissions as to what use should be made of the record.

Mr. Benton also read statements from three commissions that had asked him to present their views. The Railroad

Commission of Louisiana said it would make no objection to a reasonable advance because the demand of the carriers seems well founded but it wished to reserve the right to make any necessary local adjustments later and it objected to the application of the Southwestern lines for a larger increase than that asked by the western roads generally. It also expressed the opinion that a uniform percentage advance is the best way of accomplishing the desired result. The record of the hearings so far has been convincing that the railroads need an advance, although the figures seemed somewhat high, but the inclination of the Louisiana commission is to follow the action of the Interstate Commerce Commission in applying the advance to state rates in so far as that can be done without undue hardship, because it would be impractical and unwise for each state to make its own investigation and put into effect different amounts of advance.

The Public Utilities Commission of Connecticut expressed itself in favor of co-operation between the federal and state commissions and in general recognized that the necessity for improved transportation service requires rates more in keeping with the present level of prices.

The Public Utilities Commission of Maine urged that the increase in rates should not exceed 30 per cent and that no higher increase be allowed in New England than in Official Classification territory generally.

In closing Mr. Benton expressed appreciation of the action taken by the Interstate Commerce Commission in inviting three state commissioners to sit with it during the hearings, as a step in the right direction.

Mr. Benton then introduced James Q. Gulmac, president of the Maine Chamber of Commerce, who had been delegated by a conference representing the state commission and the business interests of the state generally to present their views as to the necessity for a rate advance in order to enable the railroads to give the "same kind of good service which they remember." Recent experiences with poor transportation service, he said, had made the shippers realize how great an interest they have in the prosperity of the railroads and they are willing that their rates shall be increased by whatever amount is necessary to give good service. "We propose to pay our share," he said. "The only thing that we ask is that it be a percentage advance and the same for New England as for the rest of the eastern section."

The sawmills, he said, are dependent upon regular transportation service, and the shortage of cars has seriously interfered with the production of potatoes, pulpwood, lumber and ties. He thought that if it were possible to furnish cars they would have been supplied for ties, but it had been necessary to pile them up for long periods to await cars for loading. Shippers are also affected by the inability of connecting lines to deliver shipments promptly after they are once started on their way. He mentioned an instance where a shipper had been given a trial order for shooks for Poughkeepsie, N. Y., on condition he could make prompt shipments, but the load had to be transferred and didn't get to Poughkeepsie for a month, with the result that the new customer was lost. The potato crop will be reduced this year because of the inability to get enough shipments of fertilizer and it was necessary to carry over a part of last year's crop through the winter because of car shortage last fall while many of the shipments made during the winter were lost because of a shortage of heated equipment. Mr. Gulmac said he did not believe the inefficiency of labor is peculiar to the railroad business because the same thing has been experienced in other lines of business. For instance, Maine woodsmen have had their wages increased over 100 per cent and, generally speaking, the same men are still employed, but they are doing less work than formerly.

"The lack of the service we remember once having received made us realize our interest in the railroads," he said, "and we know that the railroads have no mysterious way of paying their bills except from the rates which we as shippers must pay. We also have come to a realization that we are interested in railroad securities through mutual savings banks and insurance companies, but some of our banks have so much of their resources in railroad securities that they have asked us not to talk about it too much. We think it is about time to stop this antagonism to the railroads and this talking about the abuses of the past and as shippers we are prepared to do our part."

Mason Manghum, representing the Virginia Corporation Commission, stated that the commission feels it has not the facilities and is in no position to determine what increases the carriers need, but it will be in sympathy with anything the Interstate Commerce Commission may find them entitled to. It is of the opinion, however, that an increase in rates alone will not solve the transportation problem or improve the credit of the railroads and that there should be an intensive campaign for increasing economy and efficiency. If rates are to be increased it is in favor of a straight percentage advance.

R. C. Fulbright, representing the Southwestern Industrial Traffic League, said he was not opposed to substantial rate increases, but that the 32 per cent asked by the Southwestern railroads is not necessary and that the solution of the rate question alone will not bring about the necessary improvement in transportation conditions. The railroads, he said, face three major problems, first, the labor problem; second, the revenue problem, and, third, the tax problem. He said it would be difficult to induce investors to become interested in railroad securities as long as they are burdened with heavy income taxes which reduce the return below that of tax free governmental securities.

On June 15 the presentation of general testimony was completed and the program until June 22 provides for the hearing of those interested in particular commodities. Several representatives of coal shippers testified regarding the adjustment of rates as between the different fields. They did not object to an advance in rates, but some were in favor of a general percentage increase, while others insisted upon the maintenance of existing specific differentials, while others are in favor of a percentage advance in some rates, but the maintenance of fixed differentials in other places. F. T. Bentley, traffic manager of the Illinois Steel Company, in advocating a straight percentage advance, including the application of the percentage to differentials, said that "to a man who has 7,000 carloads of freight on the ground and is threatened with having his mills shut down at any time, the question of rate adjustments seems like small potatoes."

In reply to a question asked by the commission as to the number of passenger miles in Pullman or parlor cars which would be subject to a surcharge if applied in the same manner as used by the director general for 1918 a statement was filed by the railroads based on an estimate made by the Pullman company that the paying passengers carried one mile in 1919 were 13,593,000,000, and that a surcharge of one-half cent per mile applied to that figure would yield $67,965,000.

A statement was also filed in reply to a question by the commission showing the roads that would earn more than 6 per cent on their property investment on the basis of the constructive year ended October 31, 1919, as adjusted by the carriers in their exhibits to reflect conditions at the end of the year, after applying the proposed percentages of increase. This showed 20 roads in the Eastern district that would earn $104,492,168 in excess of 6 per cent, 15 roads in the Southern district that would earn $25,769,801 in excess of 6 per cent, and 20 roads in the western district that would earn $85,480,810 in excess of 6 per cent.

That the passenger service on many roads is now relatively

more profitable than the freight business, because of the greater increase in ordinary passenger fares than in freight rates made by order of the Railroad Administration and because of the larger number of passengers carried per train since the passenger service was curtailed, was indicated by a statement filed at the request of the commission analyzing the freight and passenger earnings and expenses for 13 representative roads for the year 1919. On 10 of the 13 roads a lower operating ratio was shown for the passenger service than for the freight service, after making the separation of expenses as between the two services in accordance with the commission's rules. The revenues, expenses and ratios for the 13 roads were as follows:

RATIO OF FREIGHT AND PASSENGER SERVICE EXPENSES TO FREIGHT AND PASSENGER SERVICE REVENUES

	Freight service	Passenger service
Atchison, Topeka & Santa Fe:		
Revenues	$126,284,953	$53,619,545
Expenses	94,126,057	36,376,187
Ratio—per cent	74.53	67.84
Atlantic Coast Line:		
Revenues	$40,883,937	$21,058,082
Expenses	36,608,794	16,891,117
Ratio—per cent	89.54	80.21
Baltimore & Ohio R. R.:		
Revenues	$142,139,030	$40,480,986
Expenses	139,121,312	30,747,813
Ratio—per cent	97.88	75.96
Chicago & North Western Ry.:		
Revenues	$93,840,645	$45,749,271
Expenses	84,842,474	34,736,913
Ratio—per cent	90.41	75.93
Chicago, Burlington & Quincy:		
Revenues	$107,019,788	$42,168,537
Expenses	91,825,897	28,667,065
Ratio—per cent	85.80	67.98
Erie System:		
Revenues	$84,757,710	$22,916,321
Expenses	81,150,881	20,560,633
Ratio—per cent	95.74	89.72
Great Northern Ry. System:		
Revenues	$80,016,453	$27,011,981
Expenses	64,576,561	22,689,116
Ratio—per cent	80.70	84.00
Louisville & Nashville R. R.:		
Revenues	$78,335,155	$29,179,811
Expenses	73,987,280	19,243,979
Ratio—per cent	94.45	65.95
New York Central R. R.:		
Revenues	$197,336,000	$113,696,821
Expenses	180,470,870	68,469,765
Ratio—per cent	91.45	60.22
Cincinnati Northern R. R.:		
Revenues	$2,581,960	$290,309
Expenses	1,833,260	328,335
Ratio—per cent	71.00	113.10
Cleveland, Cincinnati, Chicago & St. Louis:		
Revenues	$52,405,309	$21,451,147
Expenses	43,732,129	13,695,323
Ratio—per cent	83.45	63.84
Pennsylvania R. R.—Eastern Lines:		
Revenues	$237,304,970	$120,555,489
Expenses	232,932,107	119,537,432
Ratio—per cent	98.16	99.16
Southern Ry.:		
Revenues	$81,811,428	$42,302,970
Expenses	80,580,504	33,164,308
Ratio—per cent	93.50	78.40

Advances in Rates on Foreign Railways

THE COMPARATIVE ADVANCES in freight and passenger rates in foreign countries and in the United States was the theme of an editorial in the *Railway Age* of May 7, page 1335. Since that time the official "Journal" of the British Board of Trade compiled similar data summarizing the total advances in rates which have been made by the principal countries of the world since the beginning of the war. This summary, which follows, amplifies and amends the figures contained in the *Railway Age's* editorial and is accordingly presented without comment.

In France passenger fares have been advanced as follows: First class, 80 per cent; second class, 75 per cent; third class, 70 per cent. An increase of 25 per cent was imposed in March, 1918; the further advance to the above percentages is provisional and has been so far sanctioned only for 1920. The provisional increase in freight rates for 1920, with a corresponding advance in subsidiary charges, brings the total increase in rates to 140 per cent. There has been allowed a graduated system of abatements in passenger fares for members of families—the larger the family the greater the abatement. Soldiers with 50 per cent disability and over are carried at quarter fares.

In Belgium both passenger fares and freight rates have been advanced by 100 per cent above pre-war charges.

In Italy, as in France, the advances in fares are graduated according to class. The increase for first class is 120 per cent, for second class 100 per cent, for third class 60 per cent, and for passengers' luggage 120 per cent. The rates on foodstuffs, fuel, certain raw materials and building materials have been advanced by 40 per cent; other goods pay 100 per cent more.

In Greece rate advances have totaled 30 per cent, the advance to continue for one year after the end of the war.

Portugal has imposed a 57 per cent increase on both passenger fares and freight rates.

In Holland passenger fares have been advanced about 75 per cent, and the advances in freight rates range from 70 to 140 per cent.

Passenger fares in *Switzerland* have increased by about 100 per cent, and freight rates by about 180 per cent.

In Sweden the graduated system has been applied to passenger fares, so that first class passengers pay 200 per cent more than before the war, the second class pay 150 per cent more, and the third class 100 per cent more. The advance in freight rates is 200 per cent.

Norway has also graduated the increases in fares as follows: First class, 180 per cent; second class, 80 per cent; third class, 60 per cent. Freight rates have been increased by about 150 per cent.

The actual increases in *Spain* amount to no more than 15 per cent, but the following additional increases are proposed: First class passengers, 50 per cent; second class, 48 per cent; third class, 45 per cent; freight, 50 per cent.

In so far as can be ascertained, passenger fares in *Austria* have increased by about 290 per cent, and freight rates by about 390 per cent. Demurrage rates have increased by 200 per cent.

Hungary has advanced passenger fares by about 240 per cent, and freight rates by about 300 per cent, and further increases have been proposed.

In Canada the increases in force amount on the average to about 40 per cent on passenger fares and freight rates. Further increases of from 30 to 40 per cent are proposed.

In New South Wales passenger fares have gone up by from 5 to 50 per cent, and freight rates by 10 per cent.

Victoria has advanced passenger fares by from 5 to 10 per cent. and parcels by 10 per cent. Freight rates have gone up by from 5 to 33 1/3 per cent. Further increases have been proposed.

South Australia has abolished return fares and some other railway privileges. Freight rates have been put up by 10 per cent generally, though grain rates remain unchanged.

Western Australia has abolished privileges, such as traders' and commercial travelers' tickets, and has increased season tickets. Parcels rates have also been advanced.

In Egypt passenger fares have advanced by about 100 per cent, and freight rates by from 50 to 150 per cent.

In Brazil, on the state-owned Central Railway, fares and rates have been advanced 20 per cent.

Freight rates have been advanced by about one-third on the *Argentine* railways.

Information from *Russia* cannot be depended upon. But it may be of interest to mention that the advance in Russian passenger fares is stated to be 1400 per cent, and the advance in freight rates 3400 per cent. These figures indicate depreciated currency rather than increased working costs, though no doubt there has been a substantial real rise in costs.

The increases in *England* have been as follows: Passenger fares, 50 per cent; freight rates, 25 to 100 per cent, plus terminal charges per ton of 3d to 1s. Average freight rate increase (estimated), 71 per cent.

General News Department

The Signal Division of the American Railroad Association holds its annual meeting at Alexandria Bay, N. Y., on July 14, 15 and 16; not in June, as stated in our issue of June 4.

The American Train Despatchers' Association is holding its third annual meeting in New York City, Hotel Commodore, this week. The number of members in attendance is about 250. They have listened to addresses by William G. McAdoo, L. E. Shepherd and J. L. Cone.

Automobile travel between New York and Philadelphia is now hindered by bad roads; the increase in freight traffic by automobile trucks, due to congestion on the railroads, has put the highways in such bad condition that the Automobile Club of America advises persons touring for pleasure to go by one of the roundabout routes.

The Louisville & Nashville has been ordered by the Public Service Commission of Alabama to re-establish telegraph service at 21 towns on its line where the Western Union has gone out of business. Following protracted litigation, the telegraph wires and apparatus operated by the Western Union were on May 1 turned over to the railroad company. Calling upon the railroad to do a general telegraph business, the officers of the state call attention to the fact that some years ago, in connection with its controversy with the telegraph company, the road advertised its readiness to transmit messages for the public.

Two all-metal airplanes, racing, were flown from Washington, D. C., to Central Park, Long Island, on Saturday, June 12, in less than two hours and a half, the estimated speed of the winner being 102.5 miles an hour for the estimated distance, 248 miles. The second one arrived six minutes behind the first. The aviators were Colonel Wilson and Colonel Gilmore, and each car carried five other army officers. The airplanes were the new Larsen monoplanes, built entirely of metal, with internally braced wings. Colonel Wilson, the winner, said that on the trip he wrote three letters. "The writing is legible and firmer than if I had done it on a Pullman car."

The Chamber of Commerce of the United States has asked its organization members to vote on two recommendations: (a) Strikes by employees of all public service corporations, performing public service essential to the lives, health, well being and comfort of the people should be explicitly prohibited by law. (b) Suitable tribunals should be created by the law to adjudicate differences between employees of public service corporations and their employers, and the decisions of such tribunals should be final and binding upon both parties. The subject came before the Chamber from the Merchants' Association and other business organizations of New York City.

In a rear collision of northbound trains on the elevated structure of the Interborough Rapid Transit Co., at Freeman street, New York City, on the 10th of June, a motorman was killed and nine passengers were injured, one of them fatally. The leading train was at a standstill, and its rear car (steel) was crushed for a length of about fifteen feet. In connection with the investigation of this accident the view was expressed that the motormen, after running several miles underground and then emerging on to an elevated structure are inclined to turn their eyes away from the line ahead; and it was said that the Public Service Commission of the State had informally recommended that the windows at the side of the motorman's cab should be made of ground glass.

Director General Payne of the Railroad Administration announces that J. A. Franklin having resigned, the offices of labor assistants to the director general of railroads were abolished on June 1. Executives of railroads heretofore under federal control are requested to dispose of labor matters involving grievances or service rights arising prior to March 1, in accordance with the provisions of the general orders, supplements, interpretations and national agreements, referring to C. S. Lake, staff officer of the Railroad Administration, matters upon which agreements are not reached involving payments of money for services claimed to have been rendered for which payment has not been made or those involving the payment of money in excess of nominal amounts to cover settlements mutually agreed upon.

Master Blacksmiths' Association

The International Railway Master Blacksmiths' Association will hold its next annual convention at Tutwiler Hotel, Birmingham, Ala., on August 17, 18 and 19. The president of the association is A. L. Woodworth, Lima, Ohio. The president of the Supply Men's Organization is H. D. Kelley, 1427 Western Avenue, N. S., Pittsburgh, Pa.

K. C. S. Valuation

The Interstate Commerce Commission has announced a hearing in the Kansas City Southern valuation case for the purpose of receiving evidence tending to establish the present cost of condemnation and damages or of purchase of lands, exclusive of improvements thereon, included in the right of way and terminals of the Kansas City Southern system, in excess of the original cost and in excess of the present value. This is the evidence which the commission is required to take into consideration by reason of the recent decision of the Supreme Court. The hearing will be held before Examiner Hillyer at Kansas City on June 21 and will be continued to such places and times as may be necessary.

Train Orders by Telephone

The telephone did not displace the telegraph as a safer method but as a quicker one. There will never be a telephone built that will be as safe for the transmission of train orders as the telegraph. There are certain different words which over the telephone sound so identically the same that the difference often is not detected. I have in mind a telephone order which I once issued for two trains to meet at SLATER. Although in sending this order I spelled out Slater, letter for letter and then pronounced it, yet one of the operators somehow received it CORDER. Strange to say, when he repeated it Corder, it sounded so much like Slater that I doubt whether the keenest perception could have detected the error. I did not. But, as all despatchers know, there are times when something tells us that things are not right. Luckily this feeling came to me and I had the operator repeat again. With the second repeating the word CORDER came clear and distinct so that the error was caught and corrected. During the long term of years that I have been using the 'phone, at least a dozen cases similar to the above have put in their appearance; but, fortunately, I have so far managed to detect them before it was too late.—E. A. Howard, in *The Train Despatcher.*

Motor Trucks Substituted for Work Train

On the Middle division of the Pennsylvania Railroad, and also on the Philadelphia division, automobile trucks, running on the highway, have been in use during the past year for delivering supplies to stations, taking the place of a work train, and it is estimated that, taking the two experiments together, there has been made an annual saving of over $5,000.

From a brief statement printed in the Mutual Magazine of

the Pennsylvania railroad employees, it appears that these trucks were put into use in January, 1919, between Philadelphia and Paoli, about twenty miles, and in the vicinity of Newport, Pa. In both cases the public highways are parallel to the railroad, and except in the case of two signal cabins, access to all points is convenient. Delivery of coal and removal of ashes constituted the heaviest work done; but supplies for stations and for carpenter work, cement, gravel and other things were carried. The plan was adopted because of the increased track work demanded of the work trains. One of the trucks is of two tons capacity and the other five tons. The use of the trucks has also done away with some expense items formerly necessary in the hiring of teams.

The annual operating expenses of the two trucks, including interest and depreciation, amount to $10,375. Compared with this is the annual cost of the work trains and of hired teams, $15,899; annual saving $5,524.

The Republican Railroad Plank

The Republican party is unalterably opposed to any form of government ownership of the nation's railroads. This attitude was expressed in plain terms at the recent national convention of the party held at Chicago from June 8 to June 12. In preparing the party's platform, much consideration was given to this subject with the result that the following plank was prepared and adopted without dissent:

"We are opposed to government ownership and operation or employee operation of the railroads. In view of the conditions prevailing in this country, the experience of the last two years, and the conclusions which may fairly be drawn from an observation of the transportation systems of other countries, it is clear that adequate transportation service both for the present and future can be furnished more certainly, economically and efficiently through private ownership and operation under proper regulation and control.

"There should be no speculative profit in rendering the service of transportation, but in order to do justice to the capital already invested in railway enterprises, to restore railway credit, to induce future investments at a reasonable rate, and to furnish enlarged facilities to meet the requirements of the constantly increasing development and distribution, a fair return upon actual value of the railway property used in transportation should be made reasonably sure, and at the same time to provide constant employment to those engaged in transportation service, with fair hours and favorable working conditions at wages or compensation at least equal to those prevailing in similar lines of industry. We indorse the transportation act of 1920 enacted by the Republican congress as a most constructive legislative achievement."

The Canadian National

The Grand Trunk and the Canadian National Railways are being made into a single organization as rapidly as possible. Consolidation of dual offices at various points has already been decided on. The passenger tariff bureaus of the two roads will be consolidated by transfer to the Grand Trunk offices. At Montreal and Ottawa the work of the Grand Trunk ticket offices will be transferred to the Canadian National, and the work of the Canadian National city ticket offices at Toronto and Hamilton will be taken care of in Grand Trunk offices. Separate offices will no longer be necessary at New York. The Canadian National freight substation at Dufferin street, Toronto, will be consolidated with the Grand Trunk sub-stations at Parkdale and West Toronto.

A connection will be made between the two systems at Pembroke, Ont., to permit the interchange of freight and passengers, and the joint use of the Grand Trunk terminals. The consolidation of the Canadian Express and the National Express Companies is expected.

Combined through passenger services have been authorized as follows, to take effect June 27:

(1) Daily passenger train service between Montreal and Sudbury, via Grand Trunk to Ottawa, thence Canadian National Railways to Sudbury via Capreol. Also the tri-weekly operation of this train to and from Winnipeg.

(2) Daily passenger train service between Toronto and Winnipeg, over the Grand Trunk to North Bay, the Temiskaming & Northern Ontario to Cochrane, thence Canadian National to Winnipeg. These trains connect at Winnipeg with daily passenger trains between Winnipeg and Vancouver, over both the Grand Trunk Pacific and the Canadian National.

Views of the Illinois Manufacturers' Association on Wages

A statement, outlining the views of the Illinois Manufacturers' Association on the billion dollar demands of railroad workers now being considered by the Railroad Labor Board, was filed with the secretary of that board on June 5. It says, in part:

"1.—The practice of basing wages on the cost of living, without taking into account the work performed for the wage, is, in our opinion, at the very bottom of the present disturbed and unsatisfactory labor condition. It is usual now, in presenting claims for wage advances, to attach an estimated family budget, upon which the percentage of wage increase is predicated. Unfortunately this family budget is presented only to further the claims of a particular body, but we believe it to be the duty of your board to consider where a universal application of the budget presented in the railroad case would lead.

"If we accept the statement that $1,700 represents the lowest subsistence level and $2,500 the lowest comfort level for an American family, and base the scale of wages on the assumption that every man engaged in transportation service, no matter where he lives, whether married or single, is entitled to a wage based on a scale with those figures as minimums, would it not be fair to assume that every wage earner in every character of employment everywhere in this country is entitled to a scale based on that same minimum? * * * If so, the farms, the mines, and the industries would be wholly unable to meet it on a straight time basis. You would improve the living conditions of railroad employees by impairing those of all the other workers.

"Your Board can render a signal service to the country by indicating to these claimants that while wages should be equalized in those cases that have lagged behind in the wage readjustment, wages cannot be paid unless they are earned, and that we cannot get more out of the common pot than we put into it.

"2.—The divorce of wages from production has been one of the calamities of the war, for it has created in the mind of the wage earner the delusion that, irrespective of output, performance, or character of service rendered, he is entitled to live on a certain scale. When the consumption of commodities has expanded, and world production of commodities has been greatly impaired, we have established a shorter working day, have abolished piece and premium forms of payment, and have imbued the wage earner with the idea that he is entitled to a good living if he but spends eight hours at a job. * * * We have no intention of arguing against a fair increase. * * * You should emphasize the necessity, during these times of extraordinary prices, that part at least of the increased cost of living shall be met by longer hours of service and increased output, and that piece and premium rates of payment, which during Government operation of the roads were wholly abolished, should be reestablished.

"3.—The industries have for the past 18 months been adjusting their wage scales to meet the changed conditions. We think your Board should be guided by the rates obtaining in similar crafts in the industries, or you will force another readjustment, to be followed by another increase in the price of commodities. The industries can quickly adjust themselves to conditions of supply and demand in the labor market, but the scale fixed by your Board will be of a rather permanent character. Unless provision is made for readjustment when conditions change, high wage rates and their concomitants, high freight rates, are likely to endure longer than conditions justify.

"4.—The advances in cost of living have affected most adversely the lowest paid wage earners, and the increases in the wages paid unskilled labor have, therefore, been largest. It is only fair to suggest to your Board, therefore, that no uniform percentage increase in wages be granted, but that the rate of wage increase be greater in the lower paid classes than in the higher."

Traffic News

Schedules of suburban trains on Chicago railroads were changed on June 13 to conform to the daylight saving ordinance which became effective in that city on that day. Other schedules were left unchanged.

Attendance at the Republican National Convention of 1920, which opened at Chicago on June 7, failed to approach the high total expected by railroad men. The number of visitors, which at former times has been as high as 150,000, fell to about 40,000 this year.

Among the bills affecting railroad interests not acted upon by Congress before it adjourned on June 5 was the bill introduced by Senator Frelinghuysen and favorably reported by the committee on interstate commerce, providing for seasonal freight rates on coal to promote coal buying and production during the summer months.

Representatives of railroads operating in western classification territory in Louisiana held a meeting at New Orleans, La., on May 28, to form an organization for the purpose of interchanging information with regard to rates, rules and regulations. Joseph Lallande, general freight agent of Morgan's Louisiana & Texas, New Orleans, acted as chairman. At a later date formal organization will be effected.

The Southern Freight Rate Committee has appointed subcommittees at Atlanta, Ga.; Jacksonville, Fla.; Louisville, Ky.; Memphis, Tenn.; New Orleans, La.; and Richmond, Va. Each of these sub-committees will meet regularly on Monday of each week and interested persons may appear before them on any subject assigned for hearing. Boards of Trade, Chambers of Commerce and other associations, as well as individual shippers, may express their views upon any contemplated changes in freight rates or regulations.

The New York Central has asked the Interstate Commerce Commission to investigate the situation that would be created if the New York Public Service Commission should order the railroad to restore the two-cent rate for passenger fares. The law authorizing the consolidation of the New York Central and the Hudson River imposed a maximum of two cents a mile for local passengers between Albany and Buffalo and resulted in forcing down the through fare and other fares in the state of New York. New York Central fares are now three cents a mile, the rate put into effect by the Railroad Administration, which rate continues in effect, by virtue of the federal Transportation Act, until September 1.

Pre-payment of freight charges on all carload shipments of watermelons which have not been treated against the stem-end rot disease will be absolutely required by the railroads in Georgia this year, according to notices in Southern papers. This action is taken in an effort to control this disease, which has threatened the watermelon industry. The Atlantic Coast Line has issued statements through its agents notifying the shippers in regard to the matter. All agents have been notified to give their co-operation in inspecting the melons to be shipped and seeing that the treatment for the stem rot is applied. This treatment is in the shape of a paste that is applied to the stem of the melon. Agents are asked to get the drug stores to lay in a supply of the powder used for the paste.

The Marinette, Tomahawk & Western has been ordered by the Wisconsin Railroad Commission to resume freight train operation on its Spirit Falls branch line and to operate such trains as are necessary to move the products available for shipment. Not less than one train in each direction, on three stated days of each week must be operated, provided, however, that on such stated days, when there is no demand for transportation in either direction, individual trips may be annulled. The order results from an informal complaint made to the Commission that operation had been suspended on the branch named. The Commission's investigation and public hearing brought out the fact that the branch in question had been sold and that the purchasers refused to consider the line a common carrier, even while operating and receiving pay for transporting freight. The Commission found that there is much potential traffic along the branch and that transportation is a necessity.

Observations of a Shipper

A trainload of flour from Kansas City arrived in New York on June 9 in charge of H. D. MacCarthy, traffic manager for the Southwestern Milling Company, and who ten days ago brought through another trainload for the same concern. Mr. MacCarthy says, as quoted in the Journal of Commerce, that while conditions along the way appeared somewhat better than they did on his last trip, they are still bad enough, and it was a very difficult matter to get single cars through without very serious delays. He had read so much in the papers about whole trains of empties going west to move grain that he was on the lookout for them, but failed to see an empty car moving westward; Kansas City is getting more cars from western roads than from the east and eastern roads are still jammed full of loaded cars moving toward the seaboard. He says that the switchmen's strikes are not clearing up as much as reported, and that his talks with the trainmen lead him to believe that they are contemplating going out unless they get more pay.

The General Freight Congestion

The freight situation in the east is recovering slowly. In New York city the strikes of longshoremen and the sympathetic boycotting by teamsters, which are the main present causes of the widespread costly and troublesome delays, continue unabated, but active efforts at a solution of the deadlock are reported daily. Conferences in New York and Washington give hope that the coastwise steamship lines will soon be authorized by the Interstate Commerce Commission to advance freight rates and that this will remove their chief objection to granting the increases of wages that are asked for. The merchants who propose to establish an independent "open-shop" trucking corporation in Manhattan are carrying out their plans, but have not yet started any trucks.

The federal court in Brooklyn, N. Y., has granted an injunction against truck drivers, certain unions and others, forbidding discrimination against a lumber shipper whose employees are on strike.

Transportation in the West

The transportation situation still remains acute in practically all of the larger terminals in the west and middle west, and during the past week has shown little improvement over the preceding week. In spite of the efforts of the car service commissions and terminal committees, appointed by the Interstate Commerce Commission, the problem of shipping essentials and non-essentials is no nearer solution. A shortage of cars and labor is still the predominating factor in the situation and until this condition is materially improved it is not likely that the shippers can expect much relief. The coal situation throughout Ohio is still bad and the expected results of the work of the Car Service Commission have not yet been noticeable. While in certain instances the supply of cars for coal mines has been greater, as has been the situation with regard to other industries, many mines have also had a smaller supply of cars during the past week than they have had for several weeks. Production has shown no increase in output and in the meanwhile the scarcity of fuel exists as much as ever. The prices of coal have shown a slight increase. Due to the lack of fuel and raw materials, various industries have announced that they are taking on no new men and in some places are laying off men.

Comparative figures in car loading on some of the larger roads are given below:

	1919	1920
Chicago & Northwestern (two weeks ending June 12)....	41,975	43,981
Atchison, Topeka & Santa Fe (week ending June 11)...	25,647	27,988
Chicago, Burlington & Quincy (week ending June 12)..	34,460	27,988

The Indiana Harbor Belt moved 3,911 more cars during the second week of June, 1920, than in the same week in 1919.

Commission and Court News

Interstate Commerce Commission

The Commission has issued an amendment of its order to fourth section order No. 3,700 to provide that a longer line or route may reduce the rates in effect between the same points or groups of points to meet the rates of a shorter line or route under the following circumstances: (a) where the longer line is meeting a reduction in rates initiated by the shorter line; (b) where the longer line has not at any time heretofore met the rates of the shorter line.

The Interstate Commerce Commission has requested that the carriers by railroad submit on or before August 1, 1920, tentative forms of through export bills of lading which they may desire to issue in connection with carriers by water whose vessels are registered under the laws of the United States, and in connection with carriers by water whose vessels are of foreign registry. It is further requested that 500 copies of these forms of through export bills of lading be furnished the commission for distribution to export shippers, and other parties interested, in order that they may have the opportunity to file any objections or suggestions they may desire to make with respect to the form and substance, it being the purpose of the commission to hold hearings and conferences with a view to reconciling as far as possible such differences as may be developed and to define the issues with respect to such differences as cannot be reconciled.

Standard Time Zones Altered

The Commission by a decision issued May 18, prepared by Commissioner Aitchison, modifies the limits of the Eastern time zone so as to include Mount Vernon, Ohio, within that zone. A petition to change the panhandles of Texas and Oklahoma from the Mountain to the Central time zone was denied.

Lower Minimum Weights on Grain Products

In reduced Rate Order No. 488 the Interstate Commerce Commission has ordered certain modifications in the minimum weights on grain products which were put into effect by the Railroad Administration and continued in effect by authority of the commission, because the commission has received complaints that the effect of the emergency minima is in some instances injurious to certain interests. The order was issued after an investigation of the complaints had been made at a conference in St. Louis under the direction of W. V. Hardie, the commission's director of traffic, which was attended by representatives of the shippers and carriers. The order is in part as follows:

It appearing that while transportation conditions are still such as to make a return to pre-war minima at this time undesirable, certain modifications in the existing emergency minima, as indicated in paragraphs 1 to 9 below, should be promptly made by all rail carriers.

And it appearing that there may also be local situations in sparsely settled regions of the country, such as the western portions of Nebraska and South Dakota, where further modifications may be necessary to adequately care for the situation, but the commission is not in possession of detailed information to enable specific findings with respect thereto to be made at this time.

It is ordered that all carriers be, and they are hereby, authorized to establish upon not less than five days' notice to the commission and the public, by filing and posting in the regular manner the minimum weights, rules and regulations specifically set forth in paragraphs 1 to 9 inclusive below, and it is recommended to carriers that an investigation be made of local situations as outlined in the preceding paragraph and applications filed for authority to make such further regulations as appear necessary or appropriate.

(1) Establish upon "molasses feeds" and other so-called "wet" mixed stock feeds rules permitting shipment subject to minimum weight of 60,000 pounds with the provise that actual weight, but not less than 40,000 pounds, will apply when cars are loaded to within three feet of the roof.

(2) Establish upon all grain products (including other commodities now authorized by tariffs to be shipped in mixed carloads with grain products) now subject to a minimum weight of 60,000 pounds, rules authorizing the shipment of two consignments in one car subject to the provisions of paragraphs (3) to (9) below, such rules to apply alternatively with the existing minimum of 60,000 pounds on single carloads.

(3) Each of the two consignments shall be subject to a minimum weight of 40,000 pounds, with the proviso that if the car be loaded to full visible capacity, the minimum weight on the shipment consigned to the second destination (point farthest distant from the point of origin) will be actual weight, but not less than 24,000 pounds. (See also paragraph 9 below.)

(Note.—When shipments consist of "molasses feed" or other "wet" mixed stock feeds, cars will be considered as loaded to full visible capacity if loaded to within three feet of the roof.)

(4) The destination of one of such shipments shall be directly intermediate to the destination of the second shipment via some route authorized in the tariffs between the point of origin (or in the case of transit shipments, the transit point) and the destination of such second shipment. (See also paragraph 5.)

(5) Circuitous or back hauling to reach the last point of consignment through the first point of consignment will be permitted over the lines of the same carriers not exceeding 25 per cent of the distance to the last point of consignment from the point of origin or the transit point, as the case may be.

(6) The distance from the destination of the first shipment to the destination of the last shipment over the route of movement shall not be greater than one-half the total distance from the point of origin (or in the case of transit shipments, the transit point) to the last destination point via the first destination.

(7) Shippers should load cars in the manner best calculated to facilitate the unloading of each consignment with the least possibility of confusion, error, loss or damage.

(8) Agents at points where cars are partly unloaded should carefully supervise the unloading and get definite check on the quantity removed and condition thereof; also arrange the remaining shipment to prevent damage which might result from movement of car after removal of part of its contents. Agent at point of origin should note on each waybill that shipment is part of a double load.

(9) When both shipments are for the same destination the shipper will be required to indicate at time and place of shipment which consignment shall be considered the first delivery. In such cases notice of arrival and demurrage will be handled as follows:

(a) Where both consignments take team track delivery both consignees will be promptly notified of arrival of car in order that simultaneous unloading may be accomplished. Consignees responsible for detaining a car beyond free period must pay the demurrage charges. In the event of both consignees failing to remove contents within free period demurrage will be collected pro rata.

(b) Where one consignee takes team track delivery and the other private track delivery, or both private track delivery, each transaction will be independent of the other and demurrage will be charged accordingly.

(Note. Reduced Rate Order No. 32 is superseded by the terms of this order and said order is hereby revoked and canceled as of this date.

This order does not authorize cancellation or extension of the present expiration date applicable to emergency minimum weights on grain or grain products).

St. Louis Bridge Differential Approved

The Interstate Commerce Commission, in its decision in the case instituted by the St. Louis Chamber of Commerce, finds that the relationship of rates on coal from mines in Illinois and Indiana, under which the rate to St. Louis, Mo., on the west bank of the Mississippi river, is 20 cents a ton higher than the contemporaneous rate to East St. Louis, Ill., directly opposite on the east bank, is not improper. Owing to the short haul on this coal, the volume of the rate to East St. Louis is held to be insufficient, without an undue depletion of line-haul revenues, to require the absorption of this differential, which is the charge of the Terminal Railroad Association of St. Louis for the transfer of the coal across its Mississippi river bridges and ferries and its delivery in St. Louis. Difference in treatment of differentials on long and short haul traffic is discussed, and the commission says that the mere fact that certain of the lines that bring this coal from the mines to East St. Louis, as a part of the transportation to St. Louis, are proprietary lines of the terminal association referred to, which operates their joint terminals as a unit in and between the St. Louis and East St. Louis rate districts, does not require, as a matter of correct legal interpretation, the application of a common rate to the two districts. Nor is it material to the issue presented in this case whether the cities of St. Louis and East St. Louis are to be viewed as together comprising but a single industrial and economic unit.

The report of the commission says that only a small part of the coal in question originates at the Indiana mines, which are distant from 161 to 229 miles from East St. Louis. Most of it originates at the Illinois mines, which are distant from 9 to 124 miles from East St. Louis, and which are divided for rate-making purposes into 13 related groups. As a matter of fact, the real issue relates to the adjustment from the nearest and largest of these Illinois groups, which is group 2, or the so-called "inner group." It is in this group that

about 80 per cent of the combined St. Louis-East St. Louis coal originates. The nearest mine in this group is 9 miles, and the farthest 82 miles, from East St. Louis. The weighted-average haul from this group to East St. Louis is about 24 miles.

At the time the complaint was filed the rates, per ton, from group 2 were 52½ cents to East St. Louis and 72½ cents to St. Louis. The maximum rates from the other Illinois groups, which were also the rates from the Indiana mines, were 75 cents to East St. Louis and 95 cents to St. Louis. By General Order No. 28 of the director general of railroads these rates have since been increased 20 cents from the Illinois mines and 25 cents from the Indiana mines.

It was the contention of the complainant that, in view of this extensive grouping of the mines, St. Louis and East St. Louis, as destination points separated only by the Mississippi river, should also be grouped, on the theory that together the two cities form in reality but one industrial district, to which a common rate should apply. In this connection reference is made by the complainant to the fact that the two cities are treated as one industrial district in boat rates on the river; live stock rates from the west; lumber rates from the south; and rates on classes and commodities generally, except in some instances on coal, from and to points beyond a hundred-mile zone.

The differential has been 20 cents since 1906. Prior to that time, when the rate to St. Louis was the combination on East St. Louis, it was 30 cents. The Illinois commission has permitted changes from time to time in the intrastate rates to East St. Louis, contemporaneously with changes in the interstate rates to St. Louis, in order to preserve the present differential.

For the year 1916 the tax valuation of the Eads bridge was $4,200,005, and for the Merchants' bridge $1,420,205. Based on valuation per mile of Illinois railroads, as determined by the Illinois State Board of Equalization, the tax valuation of the Eads bridge is equivalent, using these roads as illustrative, to 174 miles of the Chicago & Eastern Illinois; 269 miles of the Louisville & Nashville; 360 miles of the Chicago, Peoria & St. Louis; 470 miles of the Litchfield & Madison; and 197 miles of the St. Louis & O'Fallon. Similarly with respect to the Merchants' bridge the figures for these roads range from 58 to 187 miles. At the St. Louis end of the Eads bridge the coal passes through a tunnel about a mile long through a congested portion of St. Louis.

"It was urged by the complainant," the commission says, "that the facilities of the terminal association have been acquired, managed and operated as a unit, embracing both sides of the river and the transfer across, and that they can not be diivded for the sole purpose of making different rates to the respective points—in short, that 'a unified terminal means a uniform rate therein.' In other words, the complainant views the matter as one of law, in which the question of greater service by the terminal association on St. Louis coal than on East St. Louis coal has no more place than has the similar question of difference in cost of service by the association on coal destined to different industries in St. Louis itself, which is not reflected in the rate.

"In this connection criticism is made by the complainant of the fact that on East St. Louis coal the proprietary lines absorb the terminal association's charge of 10 cents a ton for terminal delivery, whereas on St. Louis coal they make no absorption of any part of that association's charge of 20 cents a ton, but retain their full rate for the same service that they render on their East St. Louis coal. The reason for this absorption on the east-side coal is said by the defendants to be the competition of carriers that make deliveries on their own lines direct from the mines, with the result that unless the lines that do not reach those same industries with their own rails absorb the terminal association's charge, they will be shut out of those industries with their coal. This 10 cents a ton, it should be explained, is the maximum of the east-side absorption. When another line, in addition to the terminal association, performs a second terminal service, the shipper is required to pay for that service $3 a car.

"It is the assertion of the proprietary lines, and particularly of certain nonproprietary lines, that they could not continue also to absorb this 13 cents a ton, if they should be required, as a result of this proceeding, to absorb the terminal association's charge of 20 cents a ton, and that the result would accordingly be that the shippers of nearly two-thirds of the entire coal tonnage of the St. Louis district would be required to pay 13 cents a ton more than the shippers of the other third, in order that the one-third might be placed on a rate parity with the shippers of the East St. Louis coal. Although the allegations of the petition are directed against rates which apply to the whole of the St. Louis district, it appears that the primary concern of the complainant is in the rates to points of delivery reached by the terminal association. It seems to be the contention of the complainant with respect to shipments destined to points of delivery beyond the rails of that association, on which the 13 cents a ton is absorbed, that this is a matter of competition for the east-side lines to settle for themselves, and with which the complainant is not concerned.

"In addition to the 14 proprietary lines of the terminal association the allegations of the petition are directed also against 7 nonproprietary lines, or lines which have no stock interest in the terminal association and which in 1917 originated and transported to East St. Louis, for interchange with that association for completion of the transportation, about 55 per cent of the total volume of St. Louis coal received from the Illinois mines. Five of these are short roads carrying coal almost exclusively. These nonproprietary lines, however, are permitted the use of the facilities of the terminal association on the same terms as the proprietary lines. They make the same absorptions of 10 cents a ton on the East St. Louis coal and 13 cents a ton on the St. Louis coal that the proprietary lines do.

"Substantially the foregoing general situation was presented in *The Illinois Coal Cases*, 32 I. C. C., 659, decided January 29, 1915, where the propriety of this same differential of 20 cents a ton was upheld. Conditions have not essentially changed since then. Neither the subsequent increase in the rates to both St. Louis and East St. Louis, nor the direct operation of the railroads by the federal government has changed either the fact or the amount of this differential. Nor has the subsequent construction by the city of St. Louis of the new Municipal bridge to connect the point with East St. Louis, stressed particularly and at great length by the complainant, any material effect upon the present issue. Perhaps the only power that the commission, in any event, would have in connection with the use of this bridge by the trunk lines would be to require them, on a reasonable and proper basis, to establish through routes and joint rates with some municipal or other railway which might in future be organized and constructed to operate over it.

"The record clearly indicates that the service rendered by the transportation agencies in the through routes from the mines to final points of delivery is greater, both from the standpoint of mileage and of expense per mile, on the St. Louis coal than it is on the East St. Louis coal. The service beyond East St. Louis on the St. Louis coal is over expensive bridges and through a congested metropolitan city district, where the cost of terminal acquisition and upkeep is very great.

"This case is not one to be decided on technical theories, but as a practical proposition of rate making, in which the interests, not only of the shippers of the St. Louis district, but as well those of the East St. Louis district, are to be carefully considered. East St. Louis is in a real sense located right at the door of the Illinois coal deposits, where its cost of transportation is favorably affected by the short distance from the mines, and by its location on the near side of a great river, and is entitled, within the reasonable limits of rate making, to all the benefits of that location. The two cities are in active competition with each other in the location of new industries. Each city has its advantages and disadvantages, industrial and economic. It must be recognized, however, that East St. Louis has a natural advantage of location over St. Louis with respect to this Illinois coal, of which it should be deprived by a readjustment of rates only upon a clear showing of justification. East St. Louis has grown rapidly in recent years, but there is no showing upon this record that this has been due to any maladjustment of the rates on this Illinois coal, at the expense of St. Louis, which has also made rapid progress industrially."

The St. Louis Chamber of Commerce was represented in this case by Joseph W. Folk, who resigned as chief counsel for the Interstate Commerce Commission to become counsel for the association.

State Commissions

The Public Utilities Commission of the State of Idaho has brought an action before the Interstate Commerce Commission asking that the Northern Pacific Railroad, the Oregon-Washington Railroad & Navigation Company, and the Camas Prairie Railroad Company (the latter controlled by the two others) be ordered to extend the Camas Prairie Railroad from Senn, Idaho, to connect with the Pacific & Idaho Northern at New Meadows, Idaho. The line of the proposed extension lies entirely within the state of Idaho. This action is taken to improve transportation facilities between the north and south ends of the state. It is declared that competition will be stimulated between the railroads and that this line will open up new mineral deposits, lumber and agricultural possibilities. It will reduce distance and time between Boise, Idaho, and Spokane, Wash. At the present time it is necessary in going from northern to southern Idaho by rail to travel through the states of Washington and Oregon by a roundabout route, taking 22 hours to go from Boise to Lewiston, and 25 hours from Boise to Spokane, Wash. The distance from Boise to Lewiston over the present route is approximately 453 miles, and to Spokane about 517 miles. The proposed railroad would shorten this distance by approximately 118 miles. The hearing will be held on September 16.

Personnel of Commissions

Henry Jones Ford, professor of politics at Princeton University, who was given a recess appointment as a member of the Interstate Commerce Commission by the President after the Senate had failed to confirm his appointment and that of James Duncan and Mark W. Potter, took the oath of office in Washington on June 11 and was expected to begin participating in the work of the commission this week. By virtue of the recess appointment he is entitled to sit with the commission until the Senate has had an opportunity to confirm the appointment at the next session; but his salary for the period depends upon his confirmation at that time, unless it should be taken care of by a special appropriation.

The Bureau of Service of the Interstate Commerce Commission, of which F. G. Robbins is director, is increasing its organization, by the appointment of three assistant directors. E. H. De Groot, formerly superintendent of transportation of the Chicago & Eastern Illinois, director of the Bureau of Car Service of the Interstate Commerce Commission in 1917, assistant manager of the Car Service Section of the Railroad Administration in 1918 and assistant to the director of the Division of Operation in 1919, has joined the staff this week, and R. E. Quirk, examiner of the Interstate Commerce Commission, and J. C. Roth, formerly of the Pacific Coast office of the Commission on Car Service, have also been appointed. F. C. Smith, an inspector for the Interstate Commerce Commission, has been appointed chief inspector Since the termination of federal control Mr. De Groot has been winding up the affairs of the Division of Operation.

Court News

Carrier May Waive Limitation of Time for Bringing Action

The Minnesota Supreme Court holds that a carrier, issuing a bill of lading containing a four months limitation provision for making claim for loss for failure to deliver, may waive such provision.—Welch Co. v. Chicago, M. & St. P. (Minn.), 175 N. W. 100.

Extra Switchman—Course of Employment

An extra switchman, employed from day to day, reported for work, and, after being told there was no employment, climbed on a moving freight train for his own convenience in going home, and was struck by a viaduct under which the train passed. The Illinois Supreme Court holds that the accident did not arise out of and in the course of his employment within the Workmen's Compensation Act, his employment having ceased and his act having no connection with employment by the railroad.—Michigan Central v. Industrial Commission (Ill.), 125 N. E. 278.

Automobile Driver's Negligence at Crossing Imputed to Occupant

The South Carolina Supreme Court holds that where an automobile driver, in driving the automobile to a station, acted on the directions of occupants of the car, who wanted to board a train, the management of the automobile was the concurrent act of the driver and the occupants and the negligence of the driver in driving at excessive speed was imputed to an occupant precluding recovery from the railroad for injuries at the crossing.—Langley v. Southern (S. Car.), 101 S. E. 286.

Overvaluation of Railroad Bridge Property Properly Reduced

In an action by a railroad against a city, attacking the valuation of a bridge for taxation, the Iowa Supreme Court held the evidence insufficient to show that the taxing authorities sought to impose an unequal burden on the railroad, although they were evidently induced, on account of the large income from the bridge, which was leased by its owner to various other railroad corporations at a large annual rental, to greatly overestimate its actual value, which was properly reduced by the trial court.—Union Pac. v. Council Bluffs (Iowa), 175 N. W. 7.

Workmen's Compensation Act—Burden of Proof of Cause of Gunshot

An engine hostler was last seen alive working on an engine, and ten minutes thereafter was found lying by the engine dead from a bullet wound. There was nothing to indicate suicide, or by whom the shot was fired. Claim was made for his death under the Pennsylvania Workmen's Compensation Act, article 3 of which provides that the term "injury by an accident in the course of his employment," as used in the act, shall not include an injury "caused by an act of a third person intended to injure the employee because of reasons personal to him, and not directed against him as an employee or because of his employment." It was held by the Pennsylvania Supreme Court that the burden was upon the employer, seeking to escape liability, to show that the injury came within this exception.—Keyes v. New York, Ontario & Western (Pa.), 108 Atl. 406.

Unforeseen Derailment—A Bull's Combativeness

In an action for the death of a fireman, due to a bull going on the track and causing a derailment, it appeared that the bull was grazing 15 or 20 steps from the track until the train was within 40 feet of the point of impact, when he started across the track, derailing the train. The North Carolina Supreme Court held that a nonsuit was proper, though the whistle was not blown when the animal was seen. It is not the absolute duty of the railroad company to sound the whistle in all cases when the animals are near the track. After contrasting the nervous and excitable characteristics of the horse, dog and turkey with the phlegmatic nature and slow movements of the goose, as shown in railroad damage cases, the court said that so characteristic of the bull is its refusal to yield to warning, persuasion, or force that the sounding of the whistle would in all probability have been regarded as the challenge for battle.—Enloe v. Southern (N. Car.), 101 S. E. 556.

Railroad's Application for Certificate of Convenience and Necessity

The New York Court of Appeals holds that, in granting permission to construct a railroad under section 53 of the state Public Service Commission Law, the commission cannot predicate its permission upon the condition that an exact line of construction specified by the commission shall be adopted. Where the commission granted a certificate of convenience and necessity, under Railroad Law, § 9, with the erroneous idea that it could specify the exact location of the proposed road when granting permission to construct under

section 53, the order granting the certificate was held invalid, as well as the one under the Commissions Law, since the orders are interdependent, and not separable. In an application for such a certificate the railroad need not file a map indicating with precision the proposed location of the road, nor is the commission limited to a consideration of the routes shown by maps filed during the proceedings.—People ex rel New York Central (N. Y.), 125 N. E. 438.

Crossing Accident—Contributing Negligence of Automobile Passenger

In an action against a railroad for injuries to a passenger in an automobile, instructions to the jury were held erroneous as misleading which told the jury that the railroad had the burden of showing its freedom from negligence, and that a showing that it had given the statutory signals, at the crossing in question, of the train's approach, did not relieve it of such burden. Smoke from a freight train, trees, weeds and foliage obscuring the view of approaching trains, and the conformation of the ground in the vicinity of the crossing, were proper to be considered by the jury in determining whether the plaintiff had exercised reasonable care for her own safety. An instruction on contributory negligence should not have embraced facts and circumstances "that may appear in the evidence in this case," but should have been limited to facts and circumstances existing or occurring prior to the collision. Judgment for the plaintiff was reversed and a new trial ordered.—Lake Erie & Western v. Douglas (Ind.), 125 N. E. 474.

Liability for Defective Locomotive Boiler

In an action under the federal Employers' Liability Act for injuries to a locomotive fireman while attempting to tap the valve of blow-off cock when the valve would not close, the specification of negligence being that the blow-off cock was defective as to its valve and its discharge pipe, an instruction that the railroad was bound to furnish the plaintiff a locomotive boiler which was safe to be used both as to the boiler and as to its appurtenances, and to keep and maintain the same in such condition at all times so as not to expose the plaintiff to hazard or risk, was held by the Iowa Supreme Court to conform to the Locomotive Boiler Act as amended and the federal Employers' Liability Act, and not subject to objection because it ignored the question of negligence. Since the latter act and the Safety Appliance Act enjoin certain specific duties upon employers, a breach of which is declared to be unlawful and punishable, a breach constitutes negligence as a matter of law, and it is immaterial whether the term "negligence" is used for the purpose of submission of the case to the jury. The question whether the Locomotive Boiler Act imposes on the railroad an absolute duty, or only a duty to use due care, is not open to the state court, the Supreme Court of the United States having construed the Safety Appliance Acts as imposing an absolute duty as distinguished from the qualified duty at common law to use due care.—Thornton v. Minneapolis & St. L. (Iowa), 175 N. W. 71.

Nature and Extent of Railroad's Right to Its Way

In a suit by a railroad to have its rights declared under two deeds to it of land for railway purposes the question presented was whether the railroad company was entitled to 100 feet on each side of the center line of its main line or only to enough land for a main line and a side track. The Tennessee Supreme Court holds that the grantor as owner of the fee, subject to the railroad's easement, could subject the land to any use which he saw proper, but so as not to interfere with the use of the land for railroad purposes. Such occupation by the grantor is not adverse to the company's claim. Therefore the fact that the owner and his successors had occupied the land for many years was no bar to the railroad company's right to recover possession of the right of way. A right of way "for a railroad, according to the provisions of the charter," was conveyed by deed, in which the width of the right of way was left blank. It was held that the deed did not convey merely the width of the main line and side track, but a right of way of the width of 200 feet, as determined by the company's charter, though a later deed described a station site 175 wide on one side of the track. The fact that the company does not require the full width of the right of way at any particular time for railroad purposes, and therefore does not use it in connection with the construction and operation of its road, is no evidence of an abandonment. Before an abandonment can be established there must be shown the intention on the part of the company to cease maintaining and operating its road over the right of way. The adverse holding of the surface of the land by the owner of the fee, and an acquiescence therein by the company, are no indications of an abandonment. A railroad company is without power to divest itself of any part of its right of way so as to cripple it in the discharge of its duties to the public—Southern v. Vann (Tenn.), 216 S. W. 727.

United States Supreme Court

Interstate Movement of Coal Weighed Enroute

A claim was made under the Pennsylvania Workmen's Compensation Act for the death of a trainman of the Philadelphia & Reading and an award allowed. The case was taken to the United States Supreme Court. The man's duties never took him out of Pennsylvania and when injured be belonged to a crew moving a train of loaded cars from Locust Gap Colliery to Locust Summit Yard, two miles. The ultimate destination of some of these cars was outside of Pennsylvania. This appeared from cards or memoranda delivered to the conductor. The cars were inspected, weighed and billed at Shamokin Scales. Freight charges at through rates were assessed and paid for the entire distance, beginning at the mine.

The claimants maintained that the coal in cars carded for transportation as above described did not become part of interstate commerce until the cars reached Shamokin Scales and were there weighed and billed. The Supreme Court holds that the coal was in the course of transportation to another state when the cars left the mine, and the judgment was therefore reversed. Mr. Justice Clarke dissented. Decided June 1, 1920.

Right of Way Over Public Lands in Indian Reservation

The Union Pacific has won its suit to obtain possession of certain lands in Kansas, formerly part of the Pottawatomie Indian Reservation, which lie in the margins of the 400-foot strip claimed by it as legal successor of the original grantee, the Leavenworth, Pawnee & Western. The question in the case was, Were the lands involved "public lands" within the meaning of the Acts of Congress of July 1, 1862, and July 2, 1864, granting a right of way to the Leavenworth, Pawnee & Western and its successors? The case was tried in the court below on an agreed statement of facts and resulted in a judgment for the railroad, without opinion. The Supreme Court of the United States has affirmed that judgment. The opinion, by Mr. Justice McReynolds, reads, in part: "In Kindred v. Union Pacific, 225 U. S. 582, 596, lands in the Delaware Diminished Indian Reservation—east of the Pottawatomies—were declared 'public lands' within the intendment of the right of way clause, act of 1862, although then actually occupied by individual members of the Tribe under assignments executed as provided by treaty. That case renders clear the definite purpose of Congress to treat Indian Reservations, subject to its control, as public lands within the right of way provision. This provision is not to be regarded as bestowing bounty on the railroad; it stands upon a somewhat different footing from private grants and should receive liberal construction favorable to the purposes in view. United States v. Denver & Rio Grande, 150 U. S. 1, 8, 14." The right of way provision in the act of 1862 is of "200 feet in width on each side of said railroad where it may pass over the public lands." Mr. Justice Clarke dissented. Justices Holmes, Pitney and Brandeis did not participate in the decision. Decided June 7, 1920.

Foreign Railway News

The government of Chile is planning to buy in the United States cars and locomotives to the amount of $8,000,000; and the Chilean Embassy, at Washington, announces that bids are to be asked for.

The South African Government has acquired three prize vessels, the Spattle, 5,133 tons, the Huntress, 4,997 tons, and the Apolda, 4,939 tons gross register. These vessels are being worked by the Administration and are being used to take to South Africa large quantities of overdue material of which there is such urgent need, and to carry cargoes of South African products in the outward direction.

The Exports of Cars in April

The exports of railway cars from the United States in the month of April, as reported by the Bureau of Foreign & Domestic Commerce, amounted to seventeen passenger cars and 2,761 freight cars, of a total value of $5,615,185. Of the passenger cars one went to Mexico, fourteen to Cuba, one to Argentina, and one to New Zealand. The distribution of the freight cars, and other items from the table, are shown below. The total in the last column includes ten items not here shown, all of them less than $1,000 each:

Countries	Freight and miscel. Number	Freight and miscel.	For other railways Number	For other railways	Parts of cars
France	986	$2,335,864	...	.....	$166,446
Italy	1,060	1,915,640	...	.....	1,921
England	...	.....	...	.....	1,341
Canada	39	83,983	52	$7,548	41,512
Honduras	50	45,650	...	.....	.....
Mexico	15	5,629	20	1,804	2,541
Cuba	489	686,829	25	22,368	166,083
Dominican Republic	20	2,400	10	5,500	866
Argentina	...	.....	...	.....	1,834
Bolivia	2	8.180	2	900	.....
Brazil	...	.....	...	.....	16,409
Peru	...	.....	20	45,040	.....
Venezuela	...	.....	...	.....	2,447
China	...	.....	150	15,300	33,910
Kwantung	...	.....	2	4,900	3,925
Japan	...	.....	8	5,206	40,494
Philippine Islands	...	.....	4	625	41,556
French Africa	100	298,786	2	574	.....
Total	2,761	$5,382,961	295	$109,765	$524,918

Exports of Locomotives

Exports of steam locomotives from the United States in the month of April, as reported by the Bureau of Foreign and Domestic Commerce, amounted in value to about four and one-half millions, as shown below:

Countries	Number		Countries	Number	
Poland and Danzig	42	$1,960,870	Colombia	1	$43,975
Italy	55	578,000	Peru	5	120,410
Canada	5	41,900	China	8	486,800
Mexico	2	21,700	Kwantung	3	127,755
Jamaica	3	106,770	Philippine Islands	9	180,511
Cuba	5	72,850	British South Africa	7	364,990
French West Indies	1	9,205			
Brazil	11	334,000	Total	157	$4,449,736

Condition of Rolling Stock in South Africa

Notwithstanding the number of new engines and cars placed in service recently, rolling stock conditions, as reported by the Railroad Administration, are still serious, especially in respect of engine power. The following stock is out of commission under or waiting repair:

	No. out of service	Percentage of total
Engines	452	27.50
Coaches	355	13.01
Goods vehicles	1,292	4.43

The workshop accommodation and machinery are inadequate. Difficulty was experienced during the war in carrying out workshop extensions and improvements and in obtaining delivery of the new machinery required, so that though traffic was increasing with extraordinary rapidity, the administration was unable to obtain cars and engines to handle it properly. This year's program in respect of workshops and machinery provided for an expenditure of £360,000. Proposals had previously been sanctioned but not carried out, owing to the war, so that works are now in hand and machinery on order estimated to cost roughly something over £1,000,000.

Export of Wheels and Axles in April

The exports from this country of car wheels and axles during the month of April, as reported by the Bureau of Foreign and Domestic Commerce, amounted in value to $593,394. From the list of amounts by countries we take the following, omitting eleven items which are less than $500 each:

Countries		Countries	
France	$282,633	Brazil	$3,286
Italy	12,996	Chile	3,720
Spain	4,985	Colombia	8,991
England	962	Peru	5,594
Canada	36,768	China	21,469
Mexico	35,820	Kwantung	38,632
Cuba	48,716	Dutch East Indies	14,675
Dominican Republic	1,161	Japan	67,323
Argentina	905	Philippine Islands	2,928

Free Conveyance of Baggage Restored in England

The British Minister of Transport has restored as from June 14 the description and weight of personal luggage and certain goods which a railway passenger may convey with him free of charge, making the allowance the same as before the war. The weight of luggage which a passenger is allowed to carry free is approximately as follows:

1st class 150 lb. 2nd class 120 lb. 3rd class 100 lb.

Commercial travelers, lecturers, theatrical touring companies, etc., are allowed a rather larger quantity.

The charges in Great Britain (and between Great Britain and Ireland) for ordinary personal luggage and certain goods in excess of the above weight will be as follows:

For distances not exceeding 50 miles..... Half-penny a pound
For distances exceeding 50 but not exceeding 100 miles. One penny a pound
For distances exceeding 100 miles..... 1½d. a pound

No excess charge will be made when the amount payable is less than six pence (12 cents). These charges are reduced by 50 per cent in the case of commercial travelers, lecturers, emigrants, fishworkers, merchant seamen, ships' crews, shipwrecked mariners, theatrical companies and music hall "artists."

During the war passengers were not under any circumstances allowed to take more than 100 lb. of personal baggage.

The Paralyzed Railroads in Russia

The London Times, quoting official Bolshevist publications, says that the railways of Russia have served the Soviet's military purposes very well, but for general purposes they have failed. The army has monopolized the railways since the commencement of the war, and the people are learning to do without them. The bulk of the export traffic was completely suspended three years before the advent of Bolshevism in November, 1917. Ordinary commercial traffic has throughout been reduced almost to the vanishing point. The present railway position, though no doubt calamitous, does not amount to a catastrophe. It is not new to Russia.

The Russian transport problem has never been measurable in terms even of locomotive horse-power. The president of the Soviet Economic Committee complained in a recent report that the proportion of disabled locomotives amounted to 59.5 per cent, as compared with a maximum of 15 per cent before the war. Before the war the rate of repair in the locomotive shops was about 8 per cent a month and during some part of the war repairs were done at higher pressure, but since the revolution in November, 1917, the rate of repair has been down to 1 per cent a month; today it has risen to "not over 2 per cent," and the stock of locomotives is being reduced at the rate of 200 a month, thus further curtailing the transport of raw materials from the newly conquered territories to the manufacturing centers, while factory hands are idle. Up to the present time the Bolshevists have only

been able to clear one single mineral train per month from the Urals.

Exports of Materials in April

Exports of rails from the United States in the month of April, as reported by the Bureau of Foreign and Domestic Commerce, amounted to 46,564 tons, and the value of these and other track materials exported during the month aggregated $3,618,408, as shown in the table below:

Countries	Spikes		Steel rails		Switches, frogs, splice bars, etc.
	Pounds		Tons		
Belgium	.....	.....	201	$12,791	$650
Denmark	.....	.....	160	6,219	102,044
France	.....	.....	1,286	76,272	3,400
Germany	.....	.....	45	2,772	.....
Netherlands	.....	.....	70	3,549	65
Norway	.....	.....	267	23,806	5,563
Portugal	.....	.....	11	635	50
Roumania	13,650	$467	.....	.....	.....
Spain	.....	.....	287	19,163	497
England	.....	.....	3	656	.....
Scotland	.....	.....	.....	.....	112
Canada	147,822	5,477	133	8,583	25,267
Costa Rica	10,000	960	.....	.....	.....
Guatemala	.....	.....	.....	.....	88
Honduras	22,900	1,324	664	43,552	6,940
Nicaragua	2,000	126	76	3,750	89
Panama	75,770	5,475	.....	.....	1,920
Salvador	1,200	66	.....	.....	.....
Mexico	211,768	8,174	196	12,675	18,390
Jamaica	30,400	1,352	1,124	60,785	4,445
Trinidad and Tobago	.....	.....	48	2,736	.....
Other B. West Indies	.....	.....	190	9,935	378
Cuba	928,643	36,934	10,325	551,958	167,979
French West Indies	19,290	2,390	1	82	975
Dominican Republic	3,600	330	560	30,800	3,307
Argentina	31,430	1,283	.....	.....	7,025
Bolivia	.....	.....	15	900	1,059
Brazil	527,124	31,884	2,583	167,440	106,594
Chile	23,300	1,315	829	42,915	14,525
Colombia	2,400	133	1	122	86
Ecuador	10,000	525	5	269	1,412
British Guiana	210	68	.....	.....	.....
Dutch Guiana	3,600	165	.....	.....	.....
Paraguay	4,579	362	.....	.....	.....
Peru	67,417	2,637	1,359	73,503	23,152
Uruguay	.....	.....	77	4,498	.....
Venezuela	14,285	1,081	.....	.....	111
China	40,720	980	218	13,055	16,877
Kwantung	160,800	3,335	28	5,100	.....
British India	334,500	17,982	32	2,025	5,572
Straits Settlements	.....	.....	30	1,134	3,424
Dutch East Indies	940	42	3,817	221,033	15,521
Hongkong	52,000	845	.....	.....	.....
Japan	910,679	36,361	17,549	1,063,201	85,357
New Zealand	.....	.....	15	821	898
Philippine Islands	205,808	7,684	2,456	136,332	24,692
British South Africa	117,102	9,168	1,863	107,215	74,410
Portuguese Africa	.....	.....	50	2,798	3,529
Total	3,913,937	178,925	46,564	2,713,080	726,403

Construction Work on the Trans-Zambesia Railway

According to reports in the local press construction work on the Trans-Zambesia Railway will begin immediately, continues Mr. Ray. The contract has been let to an English firm (Messrs. Pauling & Co.), which has undertaken to turn over the line in complete working order by the end of March, 1922. The contract price is £810,000 ($3,941,865 at par), and for this sum it is to build the line, with stations, bridges, buildings, and other necessary work, including telegraph and telephone lines, in accordance with the specifications and plans prepared by the company's engineers. Rolling stock will be an additional charge and will be supplied by the company. The line will run from about mile 18 on the Beira Junction Railway to a point on the Zambesi River opposite Chindio, the terminus of the Central Africa Railway, and will have a length of about 165 miles. It will rise to a height of 1,200 feet and no serious engineering difficulties are anticipated. The line will form part of a through route from Cape Town to Lake Nyasa, via Bulawayo, Salisbury, and Beira.

Although this railroad runs entirely within Portuguese territory, it is primarily a British enterprise for the purpose of opening up the British Nyasaland Protectorate, which will gain thereby direct access to the sea through the port of Beira. At present the route to British Nyasaland lies through the port of Chinde, Portuguese East Africa, with transshipment from the river boats to the railway at Chindio. The government of British Nyasaland, in view of the advantages to be derived from the operation of this line, has guaranteed an annual return of 6 per cent for 25 years on the debentures, which amount to £1,200,000 ($5,839,800 at par), and also a redemption fund of £30,000 ($145,995 at par) during a period of 20 years beginning five years hence, which is equivalent to a guarantee of half the capital.

Supply Trade News

Walter Brinton, manager of the American Manganese Steel Company at New Castle, Del., has been elected vice-president of the company.

The address of The Material Handling Machinery Manufacturers' Association has been changed from 35 West Thirty ninth street, New York City, to 110 West Fortieth street, New York City.

The Yale & Towne Manufacturing Company has purchased the Industrial Truck Division of the C. W. Hunt Company, of Staten Island, New York. That business will be combined with the hoist department of the Yale & Towne Manufacturing Company.

Jerome A. Turivas, son of Louis Turivas, of the Great Western Smelting & Refining ompany, and **Samuel W. Pass** have formed the Turpass Railway Supply Company, of Chicago, with headquarters in the Peoples Gas Building, Chicago. They will handle cotton and wool waste and other specialties.

George B. Hild, formerly general agent of the Southern Pacific lines, with headquarters at Chicago, and more recently with the American Sugar Refining Company, at New York, has been appointed vice-president and director of sales of the **Chicago Railway Printing Company,** with headquarters at Chicago, effective May 15.

Chas. H. Small has withdrawn his interests from the firm of Small, Shade & Co., of San Francisco, effective June 1, and is contemplating operating his own establishment in that city, for the sale of railway, industrial, mining and marine equipment. Prior to the war Mr. Small was connected with the American Brake Shoe & Foundry Company at its Mahwah, N. J., plant, and represented that company at the Panama-Pacific International Exposition at San Francisco, Cal., in 1915.

H. M. Sloan, assistant to the president of the Chicago, Milwaukee & St. Paul, has been appointed treasurer of the Buda Company, Harvey, Ill., with headquarters at Chicago, effective June 1. Mr. Sloan entered railway service with the Fremont, Elkhorn & Missouri Valley and was later transferred to the vice-president's office, with headquarters at Chicago. He resigned this position in 1902 to enter the comptroller's office of the Chicago, Rock Island & Pacific. In 1904 he was promoted to chief clerk and on January 1, 1905, was appointed auditor of disbursements. In July, 1906, he was appointed assistant to the vice-president with headquarters at New York, and later to assistant to the chairman of the executive committee. On December 1, 1900, he was appointed assistant to the vice-president of the Chicago, Rock Island & Pacific, holding this office until receivership, at which time he was appointed as sistant to the receiver. During the period of federal control Mr. Sloan served on the War Industry Board. He was appointed assistant to the president of the Chicago, Milwaukee & St. Paul when the roads were returned to private control on March 1, 1920.

H. M. Sloan

Obituary

Whitfield P. Pressinger, first vice-president and general manager of the Chicago Pneumatic Tool Company, with headquarters in New York, died recently at the Roosevelt Hospital in New York following an operation. Mr. Pressinger was born at New York on September 27, 1871. He received a public school education and shortly after he finished and began work he entered the employ of the company in whose service he rose to the rank he occupied at the time of his death. Mr. Pressinger was the author of "Advances of Compressed Air," which has been translated into several languages. Besides being a member of many other clubs, he was also a member of the New York Railroad Club and the American Society of Civil Engineers. He also served for nine years with Company A, Seventh Regiment.

Trade Publications

Industrial Sermonettes.—Frank D. Chase, Inc., industrial engineers, Chicago, have issued a 16-page booklet of "sermonettes" on building construction, accompanied by illustrations of plants designed and built by this firm for railway supply concerns and other industries.

Bulletins 41, 42, 44 and 47. These four bulletins are a part of a series of eight bulletins issued by the Wellman-Seaver-Morgan Company, Akron, Ohio, and dealing with the various products manufactured by that company. Bulletins 41, 42, 44 and 47 are devoted to the railway field and are concerned respectively with coal and ore handling machinery, special cranes, hoisting and mining machinery and port and terminal equipment. Actual installations of the various types and sizes of the machinery manufactured by this company are shown by means of photographs while the opposite or adjacent page contains a working blueprint of the machine illustrated. Sufficient data is given beneath each illustration to give a general idea of its capacity and size, etc.

Railway Construction

Detroit, Toledo & Ironton.—The Strauss Bascule Bridge Company reports that it has sold a Strauss trunnion bascule bridge to this company for erection over a canal at Detroit, Mich. The bridge is a double-track structure, with a main span 145 feet long. H. B. Watters is chief engineer.

The Southern Pacific has completed a six-ton electric furnace and steel foundry at Sacramento, Cal. It has under construction a new boiler shop at Visitacion yard, San Francisco, and a new foundry and spring shop at Sacramento.

Freight Cars

The Illinois Central has issued an inquiry for 300 stock cars.

Two Reasons for Buying Coal.—An interesting angle of the situation regarding a shortage of coal and of transportation has been given by John M. Taylor, president and general manager of the John M. Taylor Coal Company, Columbus, Ohio. After saying that the railroads and the Interstate Commerce Commission are doing all in their power to solve the problem, and expressing his belief that conditions will be greatly improved within the next two months, Mr. Taylor said: "Another important element entering into the present wild scramble for coal at exorbitant prices, on the part of certain industries, is the fact that it is a clever way to secure cars for the shipment of their own product. Many of them are buying more coal than they actually need in order to obtain the cars for shipment of their product, and in the case of automobiles, pipes, tires and even steel products these cars from the middle western coal roads are shipped to points in Texas, California and New England, and in many cases do not return to the original coal roads for from six to ten months. This practice adds to the acuteness of the coal car shortage."

Railway Financial News

Arkansas & Louisiana Midland.—This property, offered at receiver's sale at Monroe, La., on June 8, elicited a bid of $287,500, with an agreement to continue the entire line in operation, and another bid of $346,000 for the road, with the privilege of scrapping all or any part of the property. All bids will be submitted to Judge George W. Jack, of the Federal District Court, who will decide the purchaser.

Atlanta, Birmingham & Atlantic.—George C. Clarke, Jr., of New York, has been elected a director to succeed Charles F. Ayer, of Boston.

Central Railroad of New Jersey.—The New Jersey Public Utility Commission has approved this company's application to issue $5,775,000 6 per cent notes to pay for equipment purchased from the Railroad Administration.

Chicago & North Western.—Kuhn, Loeb & Co. and the National City Company have sold at par and interest $15,000,000 10-year 7 per cent secured gold bonds, dated June 1, 1920, due June 1, 1930.

Missouri Pacific.—Authorization for an issue of $12,730,000 in bonds and $600,000 in notes has been granted by the Missouri State Public Service Commission. The proceeds will be used to retire a first mortgage 5 per cent bond issue of $6,397,600, for a like issue of 6 per cent bonds, and for the purchase of property equipment and making improvements.

New York, New Haven & Hartford.—Counsel F. A. Farnham has asked the Massachusetts Department of Public Utilities to approve $17,658,000 4 per cent bonds, dated July 1, 1920, to enable the company to take over the same amount of securities held by the Providence Securities Company, of Connecticut, maturing July 1, and guaranteed by the New Haven. The securities represent ownership of various trolley lines in Rhode Island. A mortgage on the New Haven property shall be executed to guarantee the new issue.

San Francisco-Oakland Terminal.—This company was authorized by the Railroad Commission of California, on June 8, to issue notes to the amount of $124,279.04 as part payment of a contract for 25 new cars from the American Car Company of St. Louis.

Photograph from Underwood & Underwood, N. Y.

French Tanks Guarding Railroad Station at Frankfort, Germany

Railway Officers

Executive

E. W. Beatty, president of the Canadian Pacific, has been elected vice-president of the Toronto, Hamilton & Buffalo, with headquarters at Montreal, Que., succeeding Lord Shaughnessy, resigned.

G. G. Yeomans, general purchasing agent of the New York, New Haven & Hartford, with headquarters at New Haven, Conn., has been appointed special assistant to the president, handling all matters assigned relating to materials and supplies; **N. M. Rice** has been appointed general purchasing agent, succeeding Mr Yeomans, effective June 7.

Financial, Legal and Accounting

W. L. Spicer, auditor disbursements of the New York, New Haven & Hartford, has been appointed assistant to the comptroller having charge of all accounting outside of the general accounting office; **J. J. Ward, Jr.**, assistant auditor disbursements, has been appointed auditor disbursements, succeeding Mr. Spicer; **G. T. Carmichael**, assistant to the comptroller, has been appointed general auditor. These appointments became effective June 9.

Operating

The headquarters of **G. L. Lambeth**, superintendent of motive power and car equipment, have been moved from Mobile, Ala., to St. Louis, Mo.

H. C. Taylor has been appointed superintendent of car service on the Eastern lines of the Canadian Pacific, with headquarters at Montreal, Canada.

T. H. Sears, general superintendent of the southern district, western lines of the Atchison, Topeka & Santa Fe, with headquarters at Amarillo, Tex., died in Amarillo on June 12 of pneumonia.

W. T. Long, Jr., chief clerk to the general manager of the Texas & Pacific, with headquarters at Dallas, Tex., has been promoted to trainmaster of the Paris-Sherman division, effective June 1.

R. G. Prosole, has been appointed trainmaster of the Tucson division of the Southern Pacific, with headquarters at Lordsburg, N. Mex., succeeding J. I. McCrossin, returned to train service, effective June 1.

H. C. James, Jr., has been appointed assistant superintendent of telegraph of the Northern Pacific, with jurisdiction over lines east of Paradise, Mont., effective June 10, with office at St. Paul, Minn.

W. L. King, trainmaster of the Southern at Charlotte, N. C., has been promoted to superintendent of the Appalachia division, with headquarters at Big Stone Gap, Va., effective June 15, succeeding **C. E. Burchfield.**

W. G. Choate, assistant general manager of the Gulf Coast Lines, with headquarters at Houston, Tex., has been appointed general manager, effective May 15, the office of assistant general manager having been abolished.

L. S. Emery, superintendent of the Buffalo division of the New York Central Lines East, with headquarters at Buffalo, N. Y., has been appointed general manager of the Lake Erie & Western, with headquarters at Indianapolis, Ind., effective June 1, succeeding **H. A. Boomer**, deceased.

C. H. Calkins, superintendent of the Adirondack division of the New York Central, has been transferred to the Buffalo division, with headquarters at Buffalo, N. Y., succeeding L. S. Emery; **G. D. Dager**, trainmaster at Utica, N. Y., has been appointed superintendent, succeeding Mr. Calkins. These changes became effective June 7.

George Dunglinson, Jr., assistant to the general manager of the Norfolk & Western, with headquarters at Bluefield, W. Va., has had his title changed to manager of the fuel department, with the same headquarters. **G. E. Bruch** has been appointed assistant to the general manager, with headquarters at Roanoke, Va. These changes became effective June 1.

Traffic

Henry T. Drane has been appointed general agent of the Louisville & Nashville, the Nashville, Chattanooga & St. Louis and the Louisville, Henderson & St. Louis, at Washington, D. C., effective June 15.

Mechanical

C. I. Walker has been appointed master car repairer at the Los Angeles, Cal., general shops of the Southern Pacific, effective June 1.

James Davis has been appointed road foreman of engines on the Southern Pacific, with headquarters at Sparks, Nevada, succeeding S. A. Canady, who has been assigned to other duties, effective June 1.

Engineering, Maintenance of Way and Signaling

John Lansdale has been appointed valuation engineer of Morgan's Louisiana & Texas Railroad & Steamship Company and other roads, effective June 1, succeeding **I. A. Cottingham,** resigned.

W. F. Turner, assistant division engineer on the Southern Pacific, has been promoted to division engineer of the Tucson division, with headquarters at Tucson, Ariz., succeeding **H. L. Archbold**, who has been transferred.

W. F. Miller advises that he is division engineer of the Maryland division of the Pennsylvania, with headquarters at Wilmington, Del., and not of the Delaware division, as noted in the *Railway Age* of May 21 (page 1498).

D. Rounseville, assistant engineer of maintenance of lines east of the Missouri river of the Chicago & North Western, with headquarters at Chicago, has been promoted to assistant chief engineer, with the same headquarters, effective June 1.

C. T. Dike, assistant general manager of the Chicago & North Western, of the lines west of the Missouri river, with headquarters at Omaha, Neb., has been promoted to engineer of maintenance, with headquarters at Chicago, succeeding W. J. Towne, effective June 1.

H. S. Winn has been appointed assistant engineer on the Michigan Central, with headquarters at Detroit, Mich., succeeding **E. L. Brandt**, who has been appointed assistant secretary of the American Association of Engineers, Chicago, in charge of the railroad department.

Railroad Administration

E. Marvin Underwood has resigned as general counsel for the United States Railroad Administration, effective June 15. Mr. Underwood states that he is going to take two or three months' rest, after which he will return to his home in Atlanta, Georgia, to reopen his office for the general practice of law.

Obituary

Orlo D. James, former auditor of the Chesapeake & Ohio, died at his home in Richmond, Va., on June 11.

Elmer M. Tewkesbury, vice-president and general manager of the South Buffalo, died recently at his home in Buffalo, N. Y.

EDITORIAL

Railway Age

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Economics of Engine Terminals

What does a locomotive cost and how much does it add to the burden of fixed charges annually assessed against income? It is not, as a matter of fact, the seven per cent on the seventy-five thousand dollars that may recently have been borrowed to cover the first cost of the locomotive, but a sum that varies in direct proportion to the average number of hours per day, days per month, or months per year, that the locomotive is actively in service. The cost per service-hour is the cost that counts and the problem of equipping and operating the railroads so as to get the maximum service-hours out of each locomotive is of outstanding importance.. It is the terminal equipment that in nine cases out of ten determines how much of each day an engine must be held out of active service. Inadequate engine terminals not only retard the daily movement of locomotives, but prolong that portion of every year spent in the back shop resulting from neglected maintenance occasioned by inadequate terminal facilities. If the average time required to turn 24 engines at a terminal can be reduced one hour, this in itself is equivalent to adding one locomotive to the service, or in this day it would be equivalent to reducing the bonded debt of the railroad to the extent of about seventy-five thousand dollars. If improved terminal facilities will assist in reducing the average time required for handling engines through the terminal, is not the question deserving of greater consideration?

Once More the "Practical" and "Theoretical"

An English contemporary, in discussing reinforced concrete design, compares the rule of thumb methods with those followed by "experts," criticising the latter for unwarranted refinement, such as the spacing of bars to the "sixty-fourth of an inch." The argument is carried further by pointing to the limitations in actual construction which make such dimensioning ridiculous. Such discussion ceased to be popular in this country some 15 years ago. Speculation on the relative merits of "practical" and "theoretical" men have become passe, and it is now thoroughly established that, insofar as design is concerned, engineers must be possessed of *all* the necessary requirements, including not only a thorough understanding of the mathematics involved, but also a working knowledge of the actual construction methods. To attempt a design without a knowledge of the necessary mathematics is just as impractical as to proceed without knowing the physical conditions to be encountered, and just how the constructors must proceed in putting the design into effect. With the large number of men now being turned out year after year by the technical schools of this country, there is no excuse for the employment of a non-technical man on design work. Faulty designing practice on American railroads, when it is encountered, usually concerns the smaller roads where the diversified classes of work to be done occur at such infrequent intervals that men thoroughly experienced are not always to be found in the organization. The result is that a design is attempted without a thorough knowledge of what has been done by others. The solution in such cases is to build up a special organization as required, with men from the outside or to retain a consulting engineer specializing in this class of work.

White for Clear Is a Dangerous Color

The use of white for clear as a night signal indication has been the primary cause of a number of serious railroad accidents. This color, when used for that signal aspect, is dangerous, yet some roads still use it to indicate a safe condition. It is unnecessary to review the various ways in which a false-clear signal may be caused through the use of such a color—the facts are too well known. However, it may be of interest to analyze the progress that has been made during the past few years in the replacement of the white light as a clear signal indication with a more favorable color such as green. The annual report of the Interstate Commerce Commission on block signals, compiled by the Bureau of Safety, shows that in 1913 almost forty per cent of all of the roads reporting used the white light for clear. During the next five years this percentage was gradually reduced until the railroads were taken over by the government, at which time approximately twenty-eight per cent still used white for clear, and by the end of the first year of government operation the percentage had dropped to 22. This decrease of six per cent in the one year, although in excess of the average annual replacement, was probably due to the carrying over of the program of unfinished work undertaken prior to government operation. The second year under the Railroad Administration, and the last year for which figures are available, the reduction in the use of white for clear was less than two-tenths of one per cent. In other words, the activities in this direction were practically at a standstill. It is evident that a definite program was under way prior to government operation with a view of reducing eventually the use of white for clear to a minimum, if not entirely eliminating it. Even though the costs of material and labor are now high, with little signs of reduction in the near future, the continuation of this program, now that the roads have been returned to private operation, should again receive the attention of the managements.

Short Lines and the Revolving Fund

The short lines have been allotted $12,000,000 of the revolving fund and may possibly get a somewhat larger amount. Applications for a share of this have already begun to come in and the director of capital expenditures of the Railroad Administration has asked the aid of the American Short Line Railroad Association in passing on the applications. The total applications received amount to considerably more than the amount to be allotted and the director general, in turning over to the Short Line Association committee the letters of application, laid down certain general principles for the guidance of the committee. These principles are of especial interest because presumably they throw light on the management of the revolving fund and its application to the larger roads as well as to the short lines. Refunding of maturing securities, except in some exceptional cases where bankruptcy would be followed by discontinuance of essential service, is not to be considered a legitimate use for the revolving fund. Improvements to roadway and structures are only to be considered where it is shown that the addition or betterment will

facilitate and expedite the movement of freight. Thus grade reduction, which would effect an economy but not expedite freight movement, would not be a legitimate object for borrowing from the revolving fund. Additional passing tracks possibly would be legitimate objects for the use of the fund. Where short lines desire to buy second-hand equipment from trunk lines the money received by the trunk lines must be reinvested in additional equipment. In other words, the use of the revolving fund must result in an actual addition to the total equipment in service in the country. The same thing applies to the purchase of freight locomotives. Additional passenger equipment will probably not be considered in making loans from the fund. It is significant that the American Short Line Railroad Association has been asked to act in an advisory capacity, and there is reason to believe that the advice of the committee will be accepted by the director of capital expenditures.

It is Time To Make a Change

AN industry is in an unfortunate condition when men solicit employment in it only when they are unable to secure work elsewhere, for in times of depression labor works in it only as a temporary expedient, flocking to more favored industries in times of activity. This is the condition in which the maintenance of way department finds itself today. While the wage scale is of paramount importance, it is not the only consideration which handicaps the railways. One of the developments in the industrial life of the country during the last few years has been the increasing attention paid to the welfare of employees. The railways have participated in this movement only to a limited extent, and in the maintenance of way department, the largest employer of labor, almost not at all. It is not therefore surprising that this branch of railway service is one of the first to suffer and suffers most acutely during each recurring period of labor shortage. The continued interference with the season's program of work which this condition creates appears to have made little impression on the managements.

Only a couple of decades ago railway work was eagerly sought by the newly arriving immigrants from northern Europe and the country boys living along the roadside. Today this labor has almost entirely disappeared and only the dregs of the market are, in general, to be found on the tracks. To correct this condition it is necessary for railway men to change their attitude towards these employees and to realize that it is necessary that they be treated as skilled laborers. The nature of their work requires them to be located in small groups at intervals along the line or in camps which can be moved from place to place. This makes it necessary for the road to provide housing accommodations for many of these gangs; it is here that one of the principal difficulties arises, for the type of accommodations provided in the past has been one of the strongest factors tending to drive men into other work. The time has come when camps or houses must be provided which will be attractive to laborers. Equal attention must be given to the provision of adequate food of the proper character, while roads must provide other facilities, such as shower baths, if they are to compete with other industries.

No class of labor in railway service today is given as little attention or provided with as few comforts as maintenance of way employees. Maintenance officers must assume the largest part of the responsibility for this condition, for they have not impressed upon the managements the necessity for adequate care of their employees as successfully as have those officers in other departments. While final authority rests with the managements, the initiative is in the hands of the maintenance officers and they must exercise it more forcefully than they have in the past if the disintegration of their forces is to be arrested.

The High Cost of Railroading

THE PUBLIC KNOWS that the prices of almost all the things it buys have advanced greatly within recent years. It apparently does not realize that the prices of most of the things that enter into the cost of living of the railways have increased much more in proportion than the prices of commodities in general, but this is a fact, and it is the principal reason why such large advances in rates are necessary. The public knows pretty well how much the railroad payroll has been increased. Here are a few illustrations of typical increases in the prices of things that railways have to buy:

A locomotive which in 1914 cost $27,876 will now cost $75,750, an increase of 171 per cent. In 1914 a railway had to pay only about 5 per cent interest on the money it invested in a locomotive, while now it must pay about 7½ per cent. Therefore, its interest charges on a locomotive bought six years ago were $1,394 a year, while on a locomotive bought now they will be about $5,681 a year, an increase in fixed charges of 310 per cent.

An average box car bought in 1914 cost about $1,000, while now it would cost about $3,000, an increase of 200 per cent. The interest on the investment in the car in 1914 would have been about $50 a year, while now it would be about $225 a year, an increase of 350 per cent.

The foregoing statistics illustrate the advances which have occurred in the prices of equipment and in the interest that must be paid on the investment in it. The increases in the cost of constructing track and bridges have not been so great but they have been very large. In 1915 a 90-foot through girder bridge could be bought and installed—not including masonry—for $6,427. It would now cost $15,117, an increase of 135 per cent. These figures are based upon records of the actual expenditures of a certain road. In 1915 this road paid $12,550 per mile for merely the rail track fastenings, ties and ballast used in the construction of a new main track. The same materials would now cost $26,234, an increase of 110 per cent. For like classes of materials used in building a mile of side track, including two main track turnouts, this road in 1915 paid $8,620. The same materials would now cost $16,904, an increase of 96 per cent.

One important cause of the increase in railway expenses is the advance in the prices of all commodities and therefore in the amounts that the railways have to pay for loss and damage to freight. A carload of apples in 1909 was worth $900, while today it is worth $2,300, an increase of 155 per cent. In 1909 the freight revenue on a carload of apples from Yakima, Wash., to St. Paul was $255, while today it is $319.50, an increase of only 25 per cent. If a railroad paid a claim for the complete loss of a carload of apples in 1909, it took the freight revenue from three and a half carloads of apples, while now it would take the freight revenue from seven carloads.

A certain railway recently was presented a claim for $4,511 for the loss of a carload of beef. The high value of the beef was of course principally due to the increases in prices within recent years. The freight earnings from the shipment were $113.40. Therefore, if the railway has to pay the entire claim it will take the revenue from forty similar carloads of freight—an entire trainload.

There is hardly a branch of railroad operation in which unit costs have not increased 100 to 300 per cent within the last five years.

The Railways Must Work Together Better

THE PRINCIPAL WEAKNESS, from an operating standpoint, of the organization of the railways under government control, was that it centralized authority so much that the initiative of the managers of the individual lines was largely destroyed.

The principal weakness, from an operating standpoint, of private management of railways in this country always has been that there has not been enough co-operation regarding transportation matters between the various railroads. The managements of the individual companies have devoted themselves so exclusively to trying to improve the operation and promote the selfish interests of their own lines that many times the interests of the railways as a whole and of the general public have been more or less sacrificed.

In the long run, and especially when conditions are normal, decentralized private management, with the struggles it causes between the various roads to get traffic and to surpass each other in the efficiency and economy with which they handle it, is far better for the railways and the public, than centralized government management with its destruction of the rivalries and the initiative of the managements of the various lines.

But under private operation even when conditions are normal, and the facilities of the railways are equal to the demands of commerce, a large measure of co-operation between the various lines is essential to rendering service, and especially freight service, economically and satisfactorily. The fact that freight cars circulate throughout the country, regardless of their ownership, would alone create the necessity for a large measure of co-operation.

The necessity for co-operation in larger and larger measure becomes more and more imperative as the demands of traffic become greater in proportion to the facilities available for handling it. Under such conditions the tendency is for the number of cars on the railways that are large originators of tonnage to become smaller and smaller and for the number on the intermediate and terminal lines to become larger and larger, until acute congestions and car shortages develop, which reduce the total amount of business the railways as a whole otherwise could handle and do great injury to the railways as a whole and to the public.

The weakness of private management referred to, which has been manifested on so many occasions in the past, again has been felt since the railways were returned to private operation, and the entire question of what the railway managements are going to do to bring about better co-ordination of their operations, and thereby further their common interests as well as those of the public, while not sacrificing the interests of any individual road or its patrons, is up for consideration. It has been referred for study and report to a very able and territorially representative committee composed of the heads of the Baltimore & Ohio, the New York Central, the Pennsylvania, the Illinois Central, the Missouri Pacific, the Burlington, the New Haven, the Santa Fe, and the Northern Pacific systems. It is to be hoped that this committee will make a vigorous and constructive report, and that measures will be adopted which will solve the problem presented in a more satisfactory manner than it has been solved in the past.

In order to insure that each road will provide cars roughly in proportion to the amount of its own traffic, it is necessary to enforce the principle that ordinarily each road shall be allowed to use cars roughly equivalent in number to those it provides. The car service rules seek to do this by imposing per diem charges for the use by a railway of cars not its own; and by requiring, under penalty, that foreign cars when unloaded, shall be started toward home. These rules cause cars to be distributed roughly in proportion to the demand of traffic and the ownership of the various roads when the total car supply is adequate to the demands of business. When, however, the total business offered is excessive in proportion to the total car supply it is necessary to have some less automatic and more arbitrary means of sending cars where they are most needed, and seeing that each railway and its shippers get their fair share of them. To serve this purpose the commission on car service was created.

The necessity for car service rules is obvious. Without them it would be impossible to carry on the general interchange of cars. It is equally obvious that the rules are valuable only in proportion to the extent to which they are observed; that every violation of them reduces their value; and that general disregard of them would make them worthless. And yet, under private operation, in every period of heavy traffic, when each individual road has been offered more business than it could handle satisfactorily, and at the same time use cars and deliver them to connections as the car service rules require, there have begun wholesale violations of the car service rules, the purpose of which has been to enable the roads committing the violations to get or keep more cars than they could get or keep if they obeyed the rules. These violations of the rules have sometimes been defended by the managements of individual lines on the ground that other roads have been violating the rules, or that they could not observe them and properly serve their own shippers, or that the rules are unjust. Such excuses have no validity whatever. If an individual road thinks the rules are not just, the thing for it to do is not to violate them, but to obey them and meantime try to get them made what it thinks they should be. If it cannot get them made what it thinks they should be, it should obey them anyway. It is utterly unreasonable for the management of an individual road to proceed on the assumption that it knows better what the rules ought to be than all the roads that join in making them.

The roads are pledged to obey orders of the Commission on Car Service just as they are pledged to obey the car service rules. Obviously, the orders of the Commission on Car Service must be implicitly obeyed if it is to do any good, or even if it is to be ascertained whether the commission can do any good. And yet, in every period of heavy traffic, when, if ever, the Commission on Car Service could do good, its orders, as well as the car service rules, have been frequently, and sometimes wantonly violated. These violations, like those of the car service rules, have been defended on the ground that the orders have been unjust or impracticable, or that the road obeying them would have to deprive its own shippers of cars that they needed. But if the managements of all the individual roads are to set themselves up as the final judges of whether they shall obey or even try to obey the orders of the Commission on Car Service, there is obviously no use in having a Commission on Car Service. And it is equally obvious that if some roads obey its orders and others do not, injustice and harm result to the roads and the shippers of the roads that do obey them, the beneficiaries of the injustice being the roads that violate or disregard them.

Prior to the adoption of government control long periods of normal traffic when the car service rules were fairly well observed and were practically all that were needed to secure reasonably satisfactory distribution of cars, alternated with periods of heavy traffic when the rules and the orders of the Car Service Commission invariably were violated in numerous cases. These periods of very heavy business, however, were usually short, and just about the time a good row had been started about the violations of rules and orders the business fell off, making the supply of cars sufficient to go around; the row was stopped and nothing much resulted from the abuses except a lot of criminations and recrimina-

tions. The problem the railways are now facing differs from those they ever faced in past years. It appears almost certain that for months and even years to come the demands of commerce will be continuously greater than the railways can meet. If, therefore, shortage of cars is to be accompanied in the future as it has been in the past by violations of car service rules and orders, these violations will become so numerous and chronic that a condition of utter anarchy will be created in the car service relations of the railways.

Such a condition would apparently justify the Interstate Commerce Commission in exercising continuously the authority given it by the Transportation Act to take direct control of car service matters. But to give the commission justification for doing this, except in the emergencies contemplated by the law, would be to admit that the railway managements are incapable of handling matters, which, it is their plain duty to themselves, to their stockholders and to the public for them to handle. It would be a long step toward a return to government operation, and the railway managements would have afforded seeming justification for it.

Perhaps no one can reasonably quarrel with the railway manager who says that he intends to put the stockholders and customers of his own railway first. But it is very easy to differ from the railway manager who thinks he is furthering the real interests of his own stockholders or patrons when he fails to co-operate fully and in good faith with the managers of all the other lines under present conditions to enable the railways as a whole to render the largest and best public service of which they are capable. There is enough traffic available at present to make every road in the country, with the full complement of equipment to which it is entitled on its own lines, work to its capacity. Any road which under present conditions tries to keep on its own lines more equipment than it is entitled to is simply playing a crooked game with its fellow roads, while any road which tries to handle more than its reasonable share of the business is simply trying to do what, under present conditions, it is incapable of doing and thereby jeopardizing its own maximum efficiency as well as that of the railways as a whole.

If the railways are themselves to solve the problem of getting freight cars handled with the greatest practicable justice and efficiency it would appear that sterner measures for policing themselves must be adopted by them than ever have been adopted in the past. If car service rules and orders of a Commission on Car Service are to be relied on to secure proper handling of cars the penalties for violating the rules and orders must be made heavy enough really to deter violations of them. Provision must also be made for promptly detecting every violation and strictly enforcing the full penalties against the responsible parties. To carry on the supervisory and investigating work properly will require a strong organization, having the active backing of the railway executives themselves; and some railway managers strongly object to the upbuilding by the railways of organizations to control or even supervise what the management of any individual road shall do about almost anything—even including what it shall do with cars that do not belong to it, but to other railroads! Isn't it about time, however, that all railway managers learned that failure on the part of the railways to do individually or collectively the thing that they ought to do individually or collectively simply results in the exercise of increased governmental power? And, in view of past experience can any railway manager really believe that all the railways will in future, without government intervention, faithfully carry out the car service rules and orders of the Commission on Car Service unless all the railways join together in creating some more effective means for getting these rules and orders obeyed than they have in the past?

Southern Pacific

Southern Pacific stock is selling at around 93 on the New York stock exchange. The company cannot, therefore, under present conditions, finance new capital requirements through the sale of stock at par, which is a suggested criterion for sound railroad credit. Nevertheless the Southern Pacific is one of the very few American railroad companies which even under present circumstances has good credit when compared with the strongest industrial companies. As a proof of this, in 1919, holders of $26,670,000 four per cent convertible Southern Pacific bonds exchanged their bonds for stock at 130. The reasons that led to this exchange are numerous and varied, but whatever the particular circumstances were which led individual holders to desire to change a 4 per cent bond for a 6 per cent stock, it seems safe to say that it is an indication that the Southern Pacific stock is still an attractive investment. The history of the Southern Pacific convertible bonds throws some rather interesting sidelights on the recent history of American railroad credit.

In 1909 the Southern Pacific offered to stockholders to the extent of 30 per cent of their holdings $82,000,000 of 4 per cent twenty-year convertible bonds at 96. The bonds were convertible into stock at 130 up to June 1, 1919. All but about $200,000 of the $82,000,000 bonds were subscribed for. They sold in the open market in 1910 at above par. They went below 80 in 1914 and again in 1915, and in 1918 sold as low as 75½. In the six months of 1919 to June 30, that is the last six months during which the conversion privilege of the bonds attached to them, they sold as high as 87⅞. Prior to January 1, 1919, only about $1,000,000 of the convertible bonds had been exchanged for stock. The fact that over $26,000,000 of the bonds were converted shows how highly Southern Pacific stock is still regarded by investors; but, on the other hand, the fact that over $50,000,000 of these bonds were not converted and will have to be refunded in 1929, shows how far below the hopes of the Southern Pacific's bankers the market for the best railroad securities now is.

The Southern Pacific made a good showing in 1919, although the comparison with 1918 is not on its face favorable. Under government operation the road earned $239,657,000 gross—an increase of $18,046,000 over 1918, or 8.14 per cent. Almost the entire increase in revenue, however, is due to increased rates. The ton mileage of revenue freight was 6.52 per cent less in 1919 than in 1918 and the passenger miles were but 7.28 per cent greater. Ton mileage in 1919 amounted to 11,933,000,000 and the passenger mileage to 2,379,000,000. The revenue per ton per mile of freight was 1.286 cents in 1919 as against 1.113 cents in 1918, and the revenue per passenger per mile was 2.471 cents in 1919 and 2.390 cents in 1918.

Operating expenses, as with other roads, rose out of all proportion to the business handled. Total operating expenses in 1919 were $186,927,000—an increase of $24,205,000 over 1918, or 14.88 per cent. In 1917, the year before the government took over the operation of the property, revenues amounted to $193,971,000 with the then existing rates, and net after the payment of expenses amounted to $73,370,000. This net compares with $58,889,000 in 1918 and $52,730,000 in 1919.

The government sustained a loss of $4,334,000 after paying the rental in 1919, as contrasted with the profit in 1918 of $7,758,000. The total increases in wages and material prices in the two years of federal operation was $53,171,000, which accounts for an increase of about 40 per cent in operating expenses. It is rather interesting to note that of the increase of $18,046,000 in expenses in 1919, as com-

pared with 1918, $5,372,000 is accounted for by increases other than those in wages or prices.

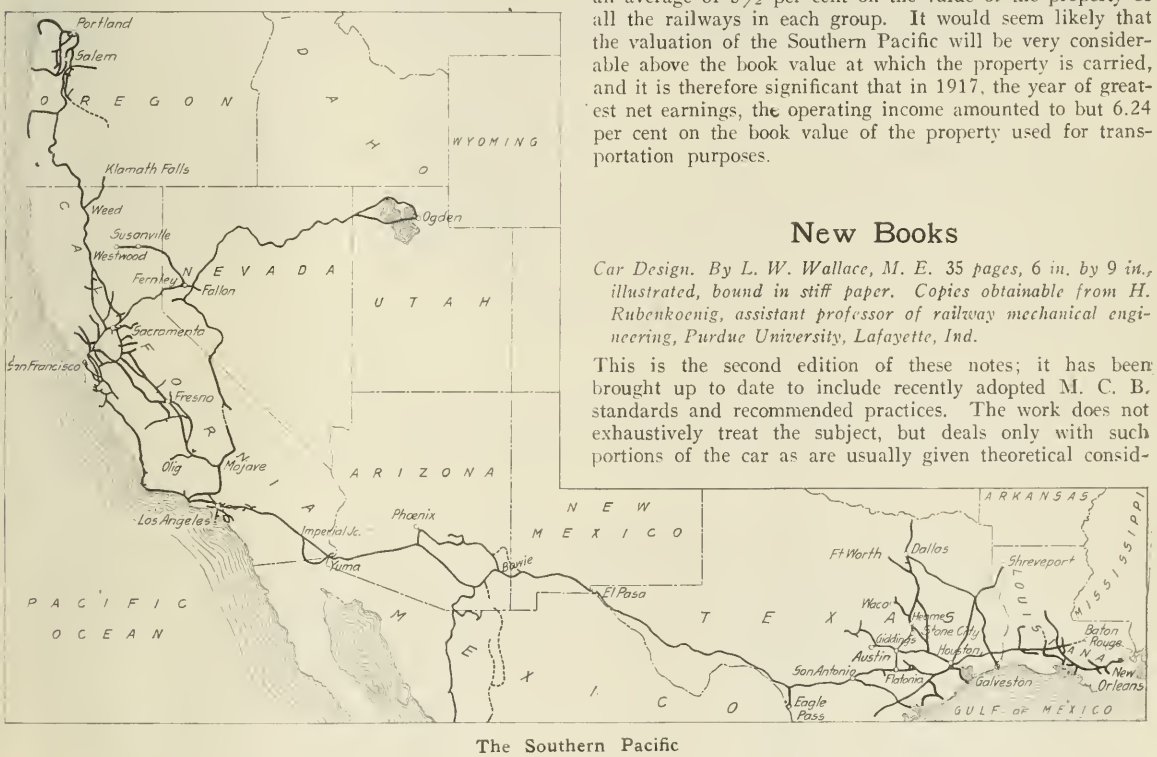
Measuring the performance of the Southern Pacific in units other than dollars and cents, the operations compared favorably even with 1917. The average train load of all freight was 641 tons in 1919, a fraction of a ton less in 1918, and 603 tons in 1917. This was notwithstanding the fact that in 1919 the percentage of loaded to total freight car miles was only 69.74, whereas in 1918 it was 71.02 and in 1917, 72.14. Car loading has already begun to drop off. The average loading per loaded car in 1919 was 25.42 tons. It was gotten up in 1918 to an average of 26.98 tons. In 1917 it was 25.34 tons. A saving was made in fuel consumption. In 1919 in passenger service a gross weight of 5.08 tons was moved per pound of coal; in 1918, 5.05 tons and in 1917, 5.10 tons. In freight service 6.67 tons were moved per pound of coal in 1919, 6.06 in 1918, and 6.11 in 1917. The use of superheaters is in part responsible for this saving.

Maintenance expenses in 1919 increased very considerably. Especially is this so of maintenance of way, the total cost of which was $34,800,000 in 1919, or 34.75 per cent more than in 1918. Maintenance of equipment cost $47,969,000—an increase over the previous year of 17.72 per cent.

The company was forced to accept 1,000 box cars at a cost which is to be between $2,815,000 and $3,072,000. The company has now placed orders for 42 locomotives, 50 passenger cars, 750 freight cars and 130 electric cars. It is building in its own shops 30 locomotives and 4,065 freight cars. The cost of this equipment is to be provided for through the issue of equipment trust certificates.

An important factor in the price at which Southern Pacific stock now sells is the ownership of oil lands by the Southern Pacific. These lands were the subject of suits by the government. In one class of cases the government has won a final decree. Julius Kruttschnitt, chairman of the executive committee, in his annual report says that the oil lands involved in the suit which the government won are non-productive lands not regarded as valuable by the company. In the other class of cases, the company now has a final and conclusive decision in its favor. These suits involved 161 acres of "productive and valuable" oil lands. The United States District Court decided on August 28, 1919, in favor of the Southern Pacific, and the attorney general, on December 5, 1919, announced that he would take no appeal to the Supreme court and, since it is now more than six months since the cases were decided apparently no appeal can be taken, so that the long disputed title to the oil lands is now safely with the Southern Pacific.

Just a word more might be said about the financial standing of the company. The Transportation Act provides for an average of 5½ per cent on the value of the property of all the railways in each group. It would seem likely that the valuation of the Southern Pacific will be very considerable above the book value at which the property is carried, and it is therefore significant that in 1917, the year of greatest net earnings, the operating income amounted to but 6.24 per cent on the book value of the property used for transportation purposes.



The Southern Pacific

New Books

Car Design. By L. W. Wallace, M. E. 35 pages, 6 in. by 9 in., illustrated, bound in stiff paper. Copies obtainable from H. Rubenkoenig, assistant professor of railway mechanical engineering, Purdue University, Lafayette, Ind.

This is the second edition of these notes; it has been brought up to date to include recently adopted M. C. B. standards and recommended practices. The work does not exhaustively treat the subject, but deals only with such portions of the car as are usually given theoretical consideration by the car designer. It is only intended to meet the needs of classroom work, and is especially valuable to those technical schools giving railway mechanical engineering courses which include car design. The practical car designer may also derive some benefit from the work.

THERE WAS A MAN in our shop, he was so wondrous wise; he wouldn't wear his goggles—now he has no eyes.—*Fred Meyers.*

POWDERED COAL is to be used throughout for firing boilers and furnaces in the New sheet mill of the Falcon Steel Company now being erected at Niles, Ohio. The power plant boilers will be powdered-coal fired, using the Quigley compressed-air system for transporting and burning the coal. The pulverized coal will be transported from the milling plant through standard 4-in. diameter wrought pipes to furnaces and boilers for various distances aggregating approximately 800 ft. and will be switched from the main distribution line to a storage bin in the power house for use as required.—*Power.*

Multiple Unit Train on the Long Island

New Electric Motor Cars for the Long Island

Very Few Changes Have Been Made for Purpose of Perfecting Equipment Built 15 Years Ago

By S. B. Schenck
Westinghouse Electric and Manufacturing Company

The Long Island Railroad recently ordered from the American Car and Foundry Company, twenty electric motor cars and fifty trailer cars for use in suburban service on its electrified zone which extends over much of the western part of Long Island.

The electrification has been in operation since 1905 and at present comprises over 88 miles of route with 208 miles of electrified track. This installation represents the first large scale electrification of a steam railroad and it is the most extensive example of multiple unit passenger service in operation.

The fast, frequent, and reliable train service given by electric operation has played an important part in the remarkable growth of Long Island's population and consequent freight traffic. Since beginning electric operation the passenger traffic has increased approximately 385 per cent, freight traffic about 193 per cent, and earnings 197 per cent. Statistics for the year 1918 show that the Long Island stands first among all railroads for density of passenger traffic. At present, there are over 532 scheduled electric trains operating daily over this road giving an annual service of over 600,000,000 passenger miles.

This passenger traffic is transported mainly by multiple unit trains operating out of the Pennsylvania Station, New York City, through the East River Tunnel and from the Flatbush Avenue Terminal, Brooklyn, to the adjacent suburban territory and seashore resorts. A small part of the traffic is carried by express trains hauled to and from the Pennsylvania Station by electric locomotives. The traffic to the seashore has increased greatly during the past four or five years and the new equipment ordered recently will provide added facilities for handling this traffic.

The multiple unit trains render possible the operation of schedules with close headway because of the ability of such trains to reach a maximum speed in a very short time. The use of motor and trailer cars provides a very flexible system for caring for the varying volume of passenger traffic.

The electric operation over elevated structures, in subways, on the surface, and also the desirability of a system of electric distribution which was standard on connecting lines led to the adoption of the third rail contact line and direct-current of 600 volts. The direct current is obtained from rotary converter substations which, in turn, receive alternating current from the Long Island City Power House through an 11,000 volt, 3-phase transmission line.

When the 20 motor cars and 50 trailers are placed in service, the Long Island Railroad will then have in operation a total of 488 motor cars and 140 trailers. One hundred and thirty-four of the motor cars are equipped with 200 horsepower motors and the other three hundred and fifty-four motor cars, including the new cars, are all equipped with 225 horsepower motors. The increase in motor capacity is due largely to increased weight of the cars. All motor cars are equipped with Westinghouse automatic type unit switch control.

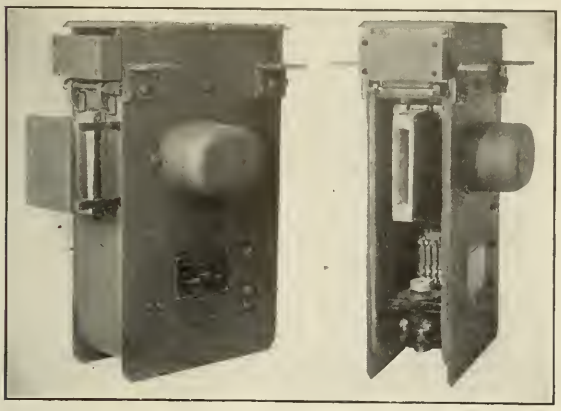
Trailer cars have been used since the inauguration of electric operation on this road. Some of the trailers are used only during the summer months when the passenger traffic to the seashore is greatly increased in volume. All trailer cars are equpiped with control train line, but they are not provided with apparatus for train control from the vestibule, this feature being obtainable from either end of the motor cars that are placed at the ends of the train.

Each new motor car will be equipped with two motors. The type No. 308, commutating pole motor embodies the box frame construction. The frame is a one-piece steel casting with large openings bored out at each end for receiving the armature bearing housings and permitting ready removal of the armature for overhauling. Both armature and axle bearings are arranged for oil and waste lubrication. Nose suspension is employed.

Type "BP" gears and pinions, with helical teeth, transmit the torque from the motor armature shaft to the axles. The pinion has 25 teeth, 2 diametral pitch, and is cut from

a solid steel forging. It is pressed and keyed on the armature shaft. The gear has 48 teeth, and is machined from a solid steel forging, and pressed on the axle. The gear case is of malleable iron, divided in halves horizontally and supported at the front and rear ends by lugs projecting from the motor frame and motor axle cap.

The automatic type unit switch control equipments ordered for the new motor cars are duplicates of the control equipments furnished for the motor cars in 1905, except for a few minor changes. The original control equipments are still in operation. Electro-pneumatic unit switches are used throughout. These switches are operated by com-

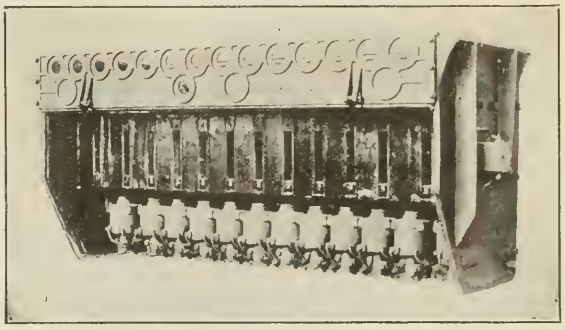


Line Switch with Overload Relay for Protection of Contactors and Motors

pressed air, governed from control circuits that are energized from a low voltage storage battery. Such an arrangement provides action of the switches regardless of the third rail voltage. The heavy pressure obtainable by the use of a pneumatic switch insures good electrical contact of the switch jaws. The low voltage battery control circuits are free from insulation breakdown. The battery provides a means for obtaining emergency braking at any time and also is a source of energy for signal or emergency lights when power is not available from the third rail.

The automatic type control embodies the use of a small master controller which directs, through the "train line," the operation of the electro-pneumatic unit switches and reverser which effect the necessary connections between the third rail, resistor and motors. The operation of the unit switches is made automatic by means of a limit relay which operates at a predetermined current value to close the switches in correct sequence and accelerate the car at a constant rate. The use of a limit relay to obtain constant accelerating rates prevents abuse of the motors in starting.

The master controller, limit relay, and control train line



Unit Switch Group

details are of standard Westinghouse construction for such service and present no unusual features. The main power circuit control apparatus has some interesting features and a somewhat detailed description of this apparatus follows:

One of the features of the control on both the old and the new cars is the use of a circuit breaker or "line switch" mounted separate from the main group of unit switches. This line switch is operated electro-pneumatically in the same manner as the unit switches. It acts as a circuit breaker to disconnect the motors from the line in case of overloads or grounds on the motors. Any heavy abnormal arcs are thus removed entirely from the switch group and confined to one piece of apparatus built for heavy arcing duty.

The twelve individual electro-pneumatic switches are assembled with blowout coils in one group. These switches, like the line switch, are closed by compressed air working against a heavy spring that normally holds the switch open. The heavy spring insures a positive opening of the switch. The compressed air is admitted to the switch cylinder by means of a small air valve which is operated by an electro magnet. This magnet is energized from the control train line circuit which extends through the entire train from the master controller at the head end of the train.

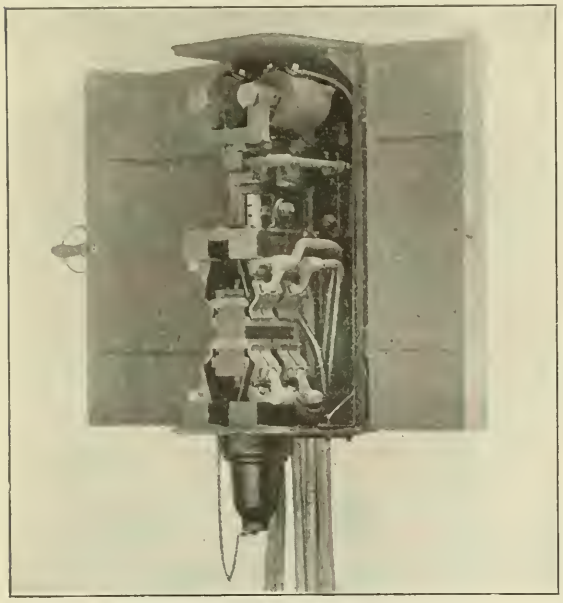
The direction of motion of each car is governed by the reverser. One reverser is mounted on each car. The reverser changes the direction of rotation of the motors by interchanging the connections to the motor fields. This interchange is

Type of Motor Used on Motor Cars

made by contacts carried on a two position movable plunger that is moved to one or the other position by compressed air admitted to pistons through the air valves. These valves are similar in operation to those in the switch group.

At both ends of the car the bus and the train lines are run to their respective receptacles and also to respective jumper heads. The receptacle is fastened directly to the car. The jumper head is attached to a length of flexible cable that is permanently connected to the circuit on the cars. When cars are coupled together the jumper head on one car is inserted in the receptacle on the other car, thus extending the circuits from car to car. When not in use in this manner, the jumper head is held in a "dummy" receptacle fastened to the end of the car.

The control train line is energized from a 14-volt storage battery. Two batteries per car are employed, one battery being used to operate the control, while the other battery is being charged. When charging, the battery is shunted by



Reverser Which Changes Motor Field Connections

resistance that is connected in series with the motor of the air compressor. A relay disconnects the battery from both the shunt and compressor motor circuits when the compressor motor is not running.

All the control apparatus except the master controller, limit relay, and small control cut out switches is located beneath the car body. The wiring connections between the various pieces of apparatus are carried on iron conduits, making a very substantial and reliable construction. The apparatus is so located on the car that quick and thorough inspection is facilitated.

The control equipment is practically a duplicate of that installed 15 years ago. The motors are duplicates of those in service for the past 10 years.

THE FREIGHT CAR SETS THE PACE.—Because the freight car sets the pace, the progress of the country is in danger of being slowed down to a crawl. Government and other agencies will have to establish a definite transportation program and persistently, systematically and effectively strive to put it into operation. —Chicago News.

Transportation in Bolshevist Russia in 1920

By Gregory Alexinsky

DURING MY RECENT TRIP to Finland and Esthonia I had the opportunity to gather material which elucidates the economic situation of Bolshevist Russia. This material represents a special value, in the first place, because it belongs to the end of January of the current year, consequently contains the very latest available data, and, in the second place, because it emanates from official Bolshevist sources and thus represents an economic portrayal of the Bolshevist regime drawn by the leaders of this regime themselves.

Among the documents in my possession I have the stenographic reports of A. Rykov, the chairman of the Supreme Council of National Economy, of M. Tomski, the chairman of the Central Council of Trade Unions, of Trotzky and Lenine, and of Kameney, the chairman of the Moscow Soviet. Let us see how they are characterizing the economic situation of Bolshevist Russia in January, 1920.

On January 25, 1920, Rykov read a report to the joint congress of delegates from councils of national economy, trade unions, and the Moscow Soviet. He said, among other things:

"The civil war having caused an unparalleled waste of the human and material resources of the Republic, has engendered an economic and productive crisis. In its main features this crisis is one of transportation, fuel and human labor power.

"Before the war the percentage of disabled locomotives, even in the worst of times, never rose above 15 per cent. At the present time, however, we have 59.5 per cent of disabled locomotives. The repair of disabled locomotives also keeps on declining with extraordinary rapidity: before the war we used to repair up to 8 per cent; this percentage after the October revolution sometimes dropped to 1 per cent; now we have gone up, but only 1 per cent, and we are now repairing 2 per cent of our locomotives. Under present conditions of railway transportation the repairs do not keep abreast of the deterioration of our locomotives, and every month we have in absolute figures 200 locomotives less than the preceding month. It is indispensable that we raise the repair of locomotives from 2 per cent up to 10 per cent, in order to stop the decline and further disintegration of railway transportation, in order to maintain it at least on the level on which it stands at the present time. As for the broad masses of the population, the workers and peasants of Soviet Russia, these figures simply mean that there is no possibility of utilizing any one of those grain-producing regions, nor those which have raw material and fuel, that have been added to Soviet Russia as a result of the victory of the Red Army."

Rykov then cites the concrete examples which most clearly illustrate the results of the Bolshevist policy in the field of railway transportation.

"We have a metallurgical region in the Ural mountains; but we have at our disposal until now but one single special train a month to carry metals from the Urals to Central Russia. In order to transport 10 million poods (1 pood equals 36 lb.) of metal by one single train per month several decades would be required, should we be able to utilize those scanty supplies of metal which are ready in the Urals.

"In order to deliver cotton from Turkestan to the textile factories in Moscow, we have to carry more than one-half million poods per month—up to 600,000 poods. But at this time we have only about two trains a month, i.e., scores of years will be required for transporting under present conditions from Turkestan those 8,000,000 poods of cotton

which we could convert, but are unable to deliver to the factories."

But it would be a mistake to imagine that the shortage of raw materials is caused only by the transportation crisis. In the same report of Rykov we read on:

"On account of the disorganized state of transportation we are unable to obtain cotton now, as the railroads are unable to carry it here. But even as regards those raw materials which are produced in the central parts of Soviet Russia, such as flax, wool, hemp, hides, even in these raw stuffs Soviet Russia is experiencing a severe crisis."

As regards coal, Rykov claims (according to inaccurate data, it is true) that in the Donetz Basin there are more than 100,000,000 poods of coal on the surface, ready to be shipped. "But until the reconstruction of bridges and re-establishment of railroad communications in the Donetz territory these coal supplies cannot be be utilized." But also that other mineral coal region—near Moscow—which has all the time been at the disposal of the Bolsheviki, being outside of the civil war territory, "has until now not only not yielded what it should yield to the fuel supply of Soviet Russia, but production during the past year remained on the same low level as the previous year, falling short even of 30,000,000 poods of coal." Rykov complains that even "under the Czar, during the Imperialistic war, the Czarist officials, with the aid of war-prisoners, succeeded in raising the production of coal in the Moscow coal-fields to a goodly 40,000,000 poods," while under the Soviet government it has not increased but decreased.

Rykov, of course, does not draw from this fact the logical, but to the Bolshevist authorities disadvantageous, conclusion that their officials are even worse than those of the old regime and that the workers of a "communist" country have been brought by this administration to such a condition as to be unable to stand in productivity of labor on the level even with war-prisoners!

"If the workers and peasants," says he, "have until now received no bread, and if up to this time a food shortage exists in the greater part of the starving consuming localities, the cause does not lie in inadequate preparations but in the fact that we are unable to ship and distribute the grain already carted and stored in the granaries."

The Bolshevist government, of course, cannot satisfy this sensible demand, as an official return to free trade would be tantamount to an official confession of the total bankruptcy of the economic policy of Bolshevism. Hence Rykov preters to let the matter rest at a few phrases about the need of "making the strongest effort" towards the improvement of transportation, etc. As a practical way out, according to information by Rykov, "The Council of People's Commissaries has already decided to call upon individual workmen as well as groups of them to repair the rolling stock, granting them the right to use the equipment which they shall have repaired with their own forces for the transportation of food to those factories and mills which repair the locomotives and cars. Recently this decision has been also extended to the fuel supply. Each factory and each mill now has the opportunity to carry its own fuel, provided they repair with their own forces the disabled locomotives and cars they obtain from the commissariat of ways and communications."

It is hardly possible to conceive a less successful expedient than the one conceived in this particular instance by the People's Commissaries. To leave it to each factory, instead of to a single, well-planned organization, to repair for itself locomotives and cars so as to carry for its own needs food and fuel, that only means smashing up those few shreds of transportation that still remain. To turn over to separate groups of citizens the transportation system, i.e., that which serves as the fundamental means of communication between the several parts of the country, to tear to shreds this connection, is not even Bolshevism, but simply an absurdity apparently dictated by a state of despair on the part of men who realize the hopelessness of their position.

I must point out, by the way, that Rykov still looks too optimistically upon the conditions of transportation. This, at least, is the impression one gains by comparing the figures cited by Rykov with the statements made at that same congress by Trotzky, according to which the number of disabled locomotives exceeds the number quoted by Rykov, for Trotzky says:

"We frequently call, sound, half-disabled locomotives which threaten to drop out completely on the morrow."

Priority for Coal Shipments

WASHINGTON, D. C.

THE INTERSTATE COMMERCE COMMISSION on June 19 issued two additional priority orders in favor of bituminous coal shipments, one giving preference to pooled coal for trans-shipment at tidewater for movement to New England and other coastwise points, which amounts practically to a temporary embargo on export coal, and the other giving bituminous coal the preference in the use of open top cars east of the Mississippi river for 30 days and providing for an embargo against consignees that do not unload coal cars within 24 hours.

The commission had previously issued a priority order for pooled lake cargo coal. The additional orders were issued in response to urgent appeals from New England for an embargo against exports of coal accompanied by representations of a serious condition threatened by a shortage of coal shipments and in response to repeated demands from coal operators for an improved car supply, backed up by industries and public utilities that have already experienced or have been seriously threatened with a shortage of fuel.

Both orders state that, in the opinion of the commission, "because of a shortage of equipment and congestion of traffic, aggravated by unfavorable labor conditions which continue to exist," and "because of the inability of common carriers properly and completely to serve the public in the transportation of coal," an emergency exists which requires immediate action.

Service Order No. 6 orders:

"That the common carriers by railroad hereinbefore described be, and they are hereby, authorized and directed, effective June 24, 1920, and until the further order of the commission, in the transportation of bituminous coal consigned to any tidewater coal transshipment pier at or north of Charleston, S. C., and in the supply of cars therefor, and in the movement of such traffic, (a) to give preference and priority to carloads of such coal consigned to James J. Storrow, whose address is Boston, Mass., as a part of a pool or pools of bituminous coal at any such port for transshipment by water to any New England coastwise destination, or consigned as a part of a pool or pools of bituminous coal at any such port for transshipment by water to any United States coastwise destination other than New England; (b) and to furnish transportation of bituminous coal and cars therefor, consigned to any of said ports either for bunkerage or for cargo purposes, only upon a permit and direction therefor issued by J. W. Howe, Commissioner, Tidewater Coal Exchange, Inc., New York, for piers within New York Harbor, Philadelphia, Pa., and Baltimore, Md.; by E. I. Ford, Commissioner, Newport News Coal Exchange, Newport News, Va., for piers at Newport News, Va.; by E. M. Graham, Manager, Lamberts Point Coal Exchange, Norfolk, Va., for piers at Lamberts Point, Norfolk, Va.; by S. T. Snead, Commissioner, Sewalls Point Coal Exchange, Norfolk, Va., for piers at Sewalls Point, Norfolk, Va.; and by Frank McCabe, General Agent, Southern Railway Company,

Charleston, S. C., for piers at Charleston, S. C., each of whom is hereby designated as an agent of the commission therefor, which permit and direction shall be issued only upon a showing that the destination of the water movement of such coal is a United States coastwise point, or if otherwise, that the preference and priority hereby directed will not be impeded thereby, and in any event, that the shipper or consignee will be able to unload such coal at the port of transshipment without delay to the rail equipment.

"*It is further ordered*, That each of said common carriers by railroad shall establish such rules and regulations respecting the placement of cars for unloading and of vessels for loading at such piers as will effect the preference and priority in transportation hereby directed, including the dumping of cars."

Service Order No. 7 directs the roads east of the Mississippi River which serve coal mines, whether located upon the line of said railroad or customarily dependent upon it for car supply for the period of 30 consecutive days beginning with June 21, 1920, to furnish such coal mines with open top cars suitable for the loading and transportation of coal in preference to any other use, supply, movement, distribution, exchange, interchange, or return of such coal cars; provided, that such coal cars may be used in service moving in the direction of the mine or mines to be supplied, on the return movement, after the discharge of the coal lading thereof, upon a route not materially out of line and to points not beyond such mine or mines.

Non-coal-loading carriers are ordered during said period to deliver daily to a connecting coal-loading carrier or carriers, empty or loaded coal cars up to the maximum ability of each such non-coal-loading carrier to make such deliveries, and of each such connecting coal-loading carrier to receive and use the coal cars so delivered for the preferential purposes set forth.

Carriers are directed forthwith, and during said period, to discontinue the use of coal cars for the transportation of commodities otherwise than as hereinbefore specified (a) as to each coal-loading carrier, so long as any coal mine remains to be served by it with coal cars, and (b) as to each non-coal-loading carrier, so long as deliveries of any coal cars to connecting carriers may be due or remain to be performed under the terms of order.

Carriers are also authorized and directed, effective June 23, and until the further order of the commission, to place an embargo against the receipt of coal by any consignee, and against the placement of coal cars for consignment to any consignee, who shall fail or refuse to unload coal placed for unloading within 24 hours after such placement, until all coal so placed has been unloaded by such consignee, provided, that this authorization and direction shall not interfere with the movement of coal under permit to any coal pool or pools when authorized by any order heretofore or hereafter entered by the commission.

It is further ordered, that all rules, regulations and practices of said carriers with respect to car service are hereby suspended in so far only as conflicting with the directions made; and that the authorizations and directions are to be considered as not conflicting with or superseding any service order heretofore entered by the commission.

The final appeal on behalf of New England was made on June 16 by the lieutenant-governors of Massachusetts and New Hampshire and a delegation who held a conference with Chairman Clark and Commissioner Aitchison, who is in charge of car service matters for the commission. Several other conferences followed in which President Aishton of the American Railroad Association and members of the Commission on Car Service took part before the orders were issued.

An order giving coal a preference over road-building and construction materials and other commodities in the use of open top cars has been expected for some time by the interests who desired or feared such a step, but it is understood that the commission was most reluctant to order any priorities unless the situation became so acute as to make it absolutely necessary. The coal operators, who have been receiving scarcely half of a full car supply for some time, have made repeated demands for a greater supply of cars, while the sand and gravel interests have protested vigorously against any such action, representing the public need for their commodities for road-building and for housing and objecting particularly to any preference for coal unless there is a discrimination between the essential and non-essential uses of coal. The coal interests also have vigorously objected to any embargo on exports, pointing out that domestic coal is used for the manufacture of other articles of which no one has endeavored to prevent the exportation.

The Commission on Car Service on June 2 had issued an order directing the roads to use open-top cars for coal up to 50 per cent of the coal loading requirements before using them for any other commodity.

Opposes Embargo on Coal Exports

J. D. A. Morrow, vice-president of the National Coal Association, on June 16 issued a statement arguing against an embargo on exports, in which he said in part:

"The only reason that more coal is not produced is the fact that the operators do not have the railroad cars to ship the coal from the mines to the consumers. The Geological Survey reports show that during the month of May the mines were prevented from shipping 45 per cent of the coal they might have shipped through lack of cars. Thus, even if no coal were being shipped abroad we would still be running from 5,000,000 to 7,000,000 tons per month below the requirements of the United States alone. And nothing will help that situation except more railroad cars at the mines to move the coal to consumers.

"The Interstate Commerce Commission has full authority to give that relief. The railroads several weeks ago requested the commission to direct the placing of additional cars at the coal mines. The National Coal Association a month ago also requested the Interstate Commerce Commission to take prompt, decisive action, so as to enable the operators to produce and distribute adequate supplies of coal.

"In the meantime an unlawful and unfair distribution of railroad cars among the mines, put into effect by the carriers with the apparent sanction of the commission, has made matters worse.

"As yet the Interstate Commerce Comission has done nothing which deals effectively with the car shortage at the coal mines. Officials of the National Coal Association are taking the matter up again with the commission, urging immediate action to provide the coal cars needed. If such action is forthcoming it will end any danger of coal shortage."

The Advisory Council of the National Sand and Gravel Association also gave out a press statement objecting to the "rationing" of cars in favor of the coal industry on the ground that the operators by various methods had brought about a false famine and were using the present opportunity to boost profits and profiteer in a shameless manner. It was asserted that on practically every line in the country thousands of open top cars suitable for carrying coal were lying idle or filled were choking traffic because of the vast number of cars used in moving this one commodity.

The Shipping Board has arranged to assist in the movement of coal to New England by allocating for that purpose a number of ships that have been utilized for export coal.

The American Society for Testing Materials

Several Reports Were Presented Which Are of Considerable Importance to the Railroads

THE TWENTY-THIRD ANNUAL MEETING of the American Society for Testing Materials was held this year at Asbury Park, N. J., instead of Atlantic City. The attendance was large and an extensive program was given covering 60 separate reports, papers and addresses.

The following officers were elected for the ensuing year: President, Geo. S. Webster; vice-president, Geo. K. Burgess; four members of the executive committee, L. G. Blackmer, D. E. Douty, Prevost Hubbard and R. S. Whiting.

J. A. Capp, the retiring president, made an address on the growth of the work done by the society and the responsibilities of the members in furthering the expansion of the society and its aims.

A summary of the important papers which are of special interest to the railways is given below.

Phosphorus and Sulphur Requirements in Steel

In connection with the presentation of the report of Committee A-1 last year it was stated that the committee had under consideration "the creation of a special committee to make a study of the influence of phosphorus and sulphur in steel and to determine whether the phosphorus and sulphur limits in the A.S.T.M. steel specifications are proper ones."

Accordingly the Committee on Steel recommended to the Executive Committee of the society that a thoroughly representative joint committee be formed consisting of representatives from those organizations and industries having a particular interest in the subject, and a joint committee was formally organized on November 29, 1919, the personnel of which includes George K. Burgess and H. L. Whittemore representing the Bureau of Standards, Washington, D. C.; F. M. Waring, engineer of tests, Pennsylvania Railroad, Altoona, Pa., and H. B. MacFarland, engineer of tests, A., T. & S. F., representing the American Railroad Association, Mechanical Section; Robert W. Hunt & Co., Chicago, and T. D. Lynch, Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., representing the American Society for Testing Materials; E. F. Kenney, Midvale Steel Company, Philadelphia, Pa., and J. J. Shuman, Jones & Laughlin Steel Company, Pittsburgh, Pa., representing the Association of American Steel Manufacturers; J. E. McCauley, Birdsboro Steel Foundry & Machine Company, Birdsboro, Pa., representing the Steel Founders Society of America; and John H. Hall, Taylor Wharton Iron & Steel Company, Highbridge, N. J., representing the National Research Council. Mr. Burgess is chairman of the committee and C. L. Warwick, secretary-treasurer of the American Society for Testing Materials, Philadelphia, Pa., is secretary.

The tests to be conducted are divided into two series. Series "A" includes six groups of material each typical of their classes as to carbon and manganese, and with phosphorus and sulphur ranging from 0.02 to 0.08 per cent, it being understood that when studying the effect of sulphur, the phosphorus content is to be as nearly constant as possible and equal to the usual value for that group of material, and vice-versa. Also, the sulphur in the steels of this series is to be "residual sulphur," that is, sulphur present in the steel through fuel or from pig iron or scrap.

Series "B" is designed to provide for higher sulphurs than can, generally speaking, be obtained as "residual sulphur." In this series, therefore, sulphur may be added during the later stages of manufacture. Any heats originally prepared for series "A" which run too high in phosphorous or sulphur may be diverted to series "B."

The tests planned in Series "A" are of more immediate economic importance, dealing as they do with the usual ranges of sulphur and phosphorus, extending in each instance up to limits which are not likely to be exceeded in ordinary practice. The tests under Series "B," however, are necessary in order to carry the tests, if possible, to a point where the material will unquestionably fail from the effect of higher impurities.

The Committee on Manufacture has supervised the manufacture of a number of tons of rivet steel, and will select all material which is approximately constant in chemical content as to carbon, manganese and phosphorus, with sulphur varying from 0.03 to 0.08 per cent. About a ton of material in each grade will be obtained, of which half will be submitted to the Committee on Tests and the remainder held in reserve for purposes of check tests. This material falls under group No. 1 of Series "A" tests. A beginning has been made in the tests of Series "B" by arranging with a large steel company for the manufacture of three heats of steel—covering plate and structural steels, forging steels, and wheel, tire and rail steels—from each of which eight ingots will be poured to obtain varying sulphur content from 0.04 to 0.15 per cent, by the addition of sulphur or iron pyrites in the pouring box.

A revision was proposed in the tentative specifications for steel tie plates by which the permissible variation in rolled width of plates with shoulders perpendicular to the direction of rolling was increased from 1-8 inch to 3-16 in. In the tentative specifications for plates for forge welding the minimum tensile strength for all plates was increased to 50,000 pounds per square inch and the carbon content for plates over three-fourths inch in thickness was raised to not over 0.20 per cent. The minimum manganese limit was also raised to 0.40 per cent.

Specifications for Shipping Boxes

One of the most important reports presented at the convention from the standpoint of the railways is the work of Committee D-10 on shipping containers, which had worked in co-operation with the United States Forest Products Laboratory and a considerable number of manufacturers organizations interested in the manufacture of containers as well as the American Railway Express Company, the American Railroad Association and others. Specifications were submitted for "wooden boxes, nailed and lock-corner construction" which are presented below:

PROPOSED TENTATIVE GENERAL SPECIFICATIONS FOR WOODEN BOXES, NAILED AND LOCK-CORNER CONSTRUCTION.

1. These specifications are intended to apply to wooden boxes of nailed and lock-corner construction, and are directly applicable to the styles of boxes illustrated in Fig 1.

I. MATERIAL.

2. The lumber shall be thoroughly seasoned, that is, shall have an average moisture content of 12 to 18 per cent, based

on the weight of the wood after oven-drying to a constant weight.

5. All defects in the lumber that materially lessen the strength of the part, expose contents to damage, or interfere with proper nailing, shall be eliminated.

4. Ends, sides, tops, bottoms and other parts of a box shall be well manufactured and cut true to size.

II. Grouping of Woods.

5. The principal woods used for boxes are classed for the purpose of specifications into four groups, as follows:

Group I.: White pine, Norway pine, aspen (poplar), spruce, western (yellow) pine, cottonwood, yellow poplar, balsam fir, chestnut, sugar pine, cypress, basswood, willow, noble fir, magnolia, buckeye, white fir, cedar, redwood, butternut, cucumber, alpine fir, lodgepole pine and jack pine.

Group II.: Southern yellow pine, hemlock, North Carolina pine, douglas fir, larch (tamarack).

Group III.: White elm, red gum, sycamore, pumpkin ash, black ash, black gum, tupelo, maple, soft or silver.

Group IV.: Hard maple, beech, oak, hackberry, birch, rock elm, white ash, hickory.

III. Dimensions of Parts.

6. (*a*) The thicknesses called for in specifications for boxes of any given commodity will, unless otherwise specified, be understood as applying to woods of Groups I and II.

(*b*) When the material is specified (for Group I and II woods) of the thicknesses indicated in the following table, woods of Groups III and IV may be used with the following permissible reductions in thickness:

Specified thickness of parts (Group I and II woods)	Allowable reduction in thickness if Group III and IV woods are used
⅜ to ½ in., incl.	1/16 in.
Over ½ to 1 in., incl.	⅛ in.
Over 1 to 2 in., incl.	¼ in.

7. The permissible variation below the thickness of parts specified in Section 6 shall not exceed one-eighth of the thickness of the part.

8. (*a*) The maximum number of pieces allowed in any side, top, bottom or end of a box shall be as follows:

Width of face	Maximum number of pieces
5 in. or under	1
Over 5 to 8 in., incl.	2
Over 8 to 12 in., incl.	3
Over 12 to 20 in., incl.	4
For each additional 5 in. in width of face	1*

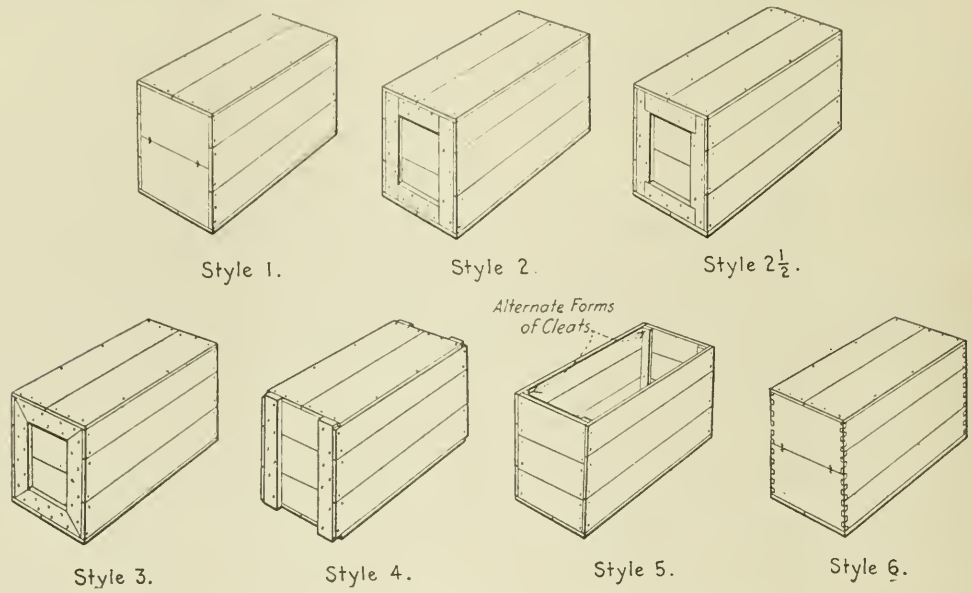
*Additional piece may be used.

(*b*) Two or more pieces Lindermann-jointed shall be considered as one piece. No piece less than 2½ in. in width of face at either end may be used in any part, except for cleats or battens.

IV. Manufacture of Boxes.

9. The outside surfaces of boxes shall be sufficiently smooth to permit of legible marking.

10. (*a*) Ends 1 in. or less in thickness, if made of two or more pieces, shall be either (1) butt jointed or matched and fastened with two or more corrugated fasteners; or (2) cleated.



Styles of Wooden Boxes, Nailed and Lock-Corner Construction

(*b*) The size of corrugated fasteners to be used shall be as follows:

Thickness at ends	Size of corrugated Fasteners
7/16 in.	1 by ⅜ in.
5/8 in.	1 by ½ in.
¾, 13/16 and 7/8 in.	1 by ⅝ in.

Schedule of Nailing.

11. (*a*) All nails specified in these specifications are standard cement-coated box nails.

Size of Cement-Coated Nails for Different Species and Thickness of Material

(The sizes of nails are given in "penny.")

Species of wood holding nails	Thickness of ends or cleats to which sides, tops and bottoms are nailed, in.								Thickness of sides to which top and bottom are nailed, in.		
	⅜ or less	7/16	½	9/16	⅝	11/16 to ¾	13/16	⅞	Less than ½	½ to 9/16	⅝ to ⅞
Group I woods	4	5	5	6	7	8	8	9	4	6	7
Group II woods	4	4	5	5	6	7	7	8	4	5	6
Group III woods	3	4	4	5	5	6	7	7	3	4	5
Group IV woods	3	3	4	4	4	5	6	7	3	4	5

(*b*) If other than cement-coated nails are used, 25 per cent more nails shall be driven then specified for cement-coated nails. Plain nails driven through and clinched may be used for cleating.

12. The size of nails to be used is determined by the species and thickness of the material in which the points of the nails are held, and shall be in accordance with the table shown on the preceding page.

13. (*a*) The spacing of nails holding the side, top or bottom to the ends of a box shall be as follows:

Size of nails, "penny"	Space when side grain of end	Driven into end grain of end
6 or less	2 in.	1¾ in.
7	2¼ in.	2 in.
8	2½ in.	2¼ in.
9	2¾ in.	2½ in.
10	3 in.	2¾ in.

(*b*) The spacing of nails holding the top and bottom to the sides of a box shall be 6 to 8 in. When material in the sides is less than ½ in. in thickness, side nailing shall not be used unless otherwise specified.

(*c*) No board shall have less than two nails at each nailing end. Where cleats of thickness not less than the thickness of the ends are used, approximately 50 per cent of the nails shall be driven into the cleats.

14. Nails shall be driven flush.

(Over-driving of nails materially weakens the container.)

15. Specification to be supplied by the committee when the information is available.

Unit Weight of Aggregates for Cement Concrete

Sub-committee VI of Committee C-9 on concrete and concrete aggregate presented a tentative method for determining the unit weight of aggregates for cement concrete, supporting this with the account of a series of tests of nine different methods which have been proposed at different times for this purpose. The problem involves the question of a standard method of filling or compacting the material placed in the measure of volume for the purpose of weighing and the nine methods included various schemes for filling and striking, jarring or tamping the material to obtain the standardized degree of concentration.

The method selected as the result of these tests, namely, the rod method which is the one covered in the specification, is described briefly as follows:

"Fill the measure one-third full, level off the top surface with the fingers, tamp with a pointed rod 25 times. Fill the measure two-thirds full and tamp 25 times. Fill the measure to overflowing, tamp 25 times. Strike off surplus aggregate, using the rod as a straight edge and weigh."

Structural Douglas Fir

Committee D-7 on timber presented a revised tentative specification for structural Douglas fir which conforms substantially to the specification presented by the Committtee on Wooden Bridges and Trestles of the American Railway Engineering Association in Bulletin No. 225 of that organization, which was reprinted in the *Railway Age* of March 18, 1920, page 915. The forms of the two specifications differ somewhat in that the latter was designed to cover both southern yellow pine and Douglas fir in a single specification and give particular reference to railway structural timbers, whereas the American Society for Testing Materials specification is general and covers Douglas fir alone.

Cement

Committee C-1 on cement proposed that the society withdraw from standard specifications and tests for Portland cement, Section 36 on Permissible Variation in Fineness, which reads:

"A permissible variation of 1 will be allowed, and all results in excess of the specified limit but within this permissible variation shall be reported at 22 per cent," such action to become effective on January 1, 1921.

Gypsum

The increasing importance of gypsum as a structural material is noted in the presentation of a revised specification for gypsum and gypsum products, the present specification embodying extensive revisions from the tentative specification submitted by the committtee last year.

Effect of Tannic Acid on the Strength of Concrete

By Duff A. Abrams

It has long been recognized that impurities of an organic nature have the effect of reducing the strength of concrete or entirely destroying the hydraulic properties of the cement. While this fact has been pointed out by a number of writers, there is still a tendency among concrete engineers to disregard the effect of such impurities. A general investigation of this subject was inaugurated in 1915 and has been continued during the past four years as a part of the investigations being carried out through the co-operation of Lewis Institute and the Portland Cement Association.

It was impossible to secure natural sands containing graduated percentages of organic impurities for a study of the *quantitative* effect of such impurities. Consequently, we prepared aggregate samples in which known quantities of organic impurities were present, by applying tannic acid as a surface coating in quantities up to 0.40 per cent by weight. Compression tests were made on 3 by 6-in. concrete cylinders. The mix varied from 1:5 to 1:2; the size of aggregate ranged from a fine sand to a ¾-in. graded aggregate. Tests were made on all mixtures and sizes of aggregate at ages of 7 days, 28 days, 3 months, 1 year, and 2 years. Specimens were stored in damp sand. This series included about 2,000 concrete tests.

Following are the principal conclusions from this investigation:

1. It is believed that the results of these tests are typical of the effect produced by organic impurities in concrete.

2. The strength of concrete was reduced for all percentages of tannic acid, for all mixes and ages covered by these tests. Less than 0.1 per cent of tannic acid in terms of the weight of the aggregate may reduce the strength of the concrete to one-half its normal value.

3. Lean mixtures are more affected by tannic acid than the rich ones.

4. The mixtures from the finer aggregates are less affected by tannic acid than those from the coarser aggregates.

5. All of the effects mentioned above may be summed up by saying that the reduction in strength of concrete is a function of the *concentration* of tannic acid in the mixing water. An equation is given which represents this relation for the 28-day tests.

6. The results of these tests indicate that the wetter consistencies would be less affected by the presence of organic impurities than the drier ones.

7. The strength falls off rapidly for small percentages of tannic acid and less rapidly as higher percentages are reached.

8. The 7 and 28-day strengths are reduced to a greater extent by tannic acid than at ages of 1 and 2 years.

9. Some of the 1:5 mixes in which the higher percentages of tannic acid and the finer sands were used (2 to 3-per-cent solution) disintegrated before the time of test.

10. The tests confirm the results of many other investigations made in this Laboratory in showing the fundamental

dependency of strength of concrete on the quantity of mixing water as expressed by the water-ratio.

Care should be taken to eliminate surface loam from concrete sands. Loam can generally be removed by washing.

Effect of Rodding Concrete

By F. E. Giesecke

Rodding concrete is accomplished by repeatedly pushing a pointed rod into the concrete, the direct effect being to expel entrapped air and excess water, and to compact the concrete; the indirect effect being a material increase in the strength.

The difference between tamping and rodding concrete is that, in tamping, the upper portion of the concrete is compacted and forms a cushion which protects the lower portion of the concrete and prevents or retards the escape of entrapped air and excess water, whereas, in rodding concrete, a pressure is exerted on the concrete as deep as the rod penetrates, and the escape of entrapped air and excess water is thereby facilitated.

Rodding concrete has an important bearing on the practice as well as on the theory of concrete construction. It is important in actual construction because, when generally applied, a considerable increase in the strength of the concrete or a corresponding saving in cement will be effected. With the ordinary 1:2:4 mix and as much excess water as is generally necessary in reinforced concrete work, thorough rodding will effect an increase in strength of about 100 per cent. The cost of the additional 100 per cent produced by the rodding is very much less than the cost of the original 100 per cent, and the consequent saving is considerable.

Rodding concrete is important in the theory of concrete construction because it has been shown that concrete can be rodded with beneficial effect long after the degree of hardening, known as the initial set, has taken place; this indicates that the hardening of cement paste is primarily due to colloidal action and not to crystallization, and that the fear of injuring concrete by disturbing it during the early portion of the hardening period is not well founded.

The beneficial effect of rodding was noted in a number of experiments made in 1917 by Mr. G. A. Parkinson, Assistant Testing Engineer, University of Texas. Since then, other tests have been made which demonstrate further the advantages of rodding concrete. In all the tests, it is conclusively demonstrated that rodding substantially increases the strength of concrete. In many cases this increase is more than 100 per cent. It is therefore seen that rodding has an important bearing on actual construction, either by increasing the strength of the concrete, or by effecting a saving in cement.

Other Papers

C. H. Marshall presented a description of a new elastic limit recorder consisting of a very simple attachment to the standard testing machine. This consists in mounting on the poise of the testing machine, a card having graduations corresponding to the beam. This card moves in a horizontal direction in front of a punching device which is caused to move vertically at a speed proportioned to the elongation as shown by an extensometer attached to the test specimen. The record made is in the form of a series of punch marks which are the points for a stress-strain curve. These points are joined by a line drawn in by hand and the elastic limit determined on this curve. If desired, two or more cards may be placed in the machine and records made simultaneously.

James E. Howard, physicist, Interstate Commerce Commission, presented a paper discussing the relation of the recently discovered interior shattered zones or regions of fine shrinkage cracks found in steel rails to the cause of transverse fissures in which he contended that these shattered zones might have some bearing on the subject, but were not necessarily a basic cause of the transverse fissures. The discussion was in substance the same as that presented in connection with the I. C. C. report of the derailment on the Chesapeake & Ohio near Hardware, Va., an abstract of which was presented in the *Railway Age* of May 21, 1920, page 1466.

Freight Congestion and Embargoes

STRIKES HAVE AGAIN disturbed freight traffic on the Eastern Trunk Lines, and at the beginning of the week new embargoes had to be placed against shipments to or from many cities. In Philadelphia, Wilmington and Baltimore several hundred yardmen struck on Saturday the 19th and freight-switching was seriously impeded. These men were nearly all brakemen and were characterized as "bolters from the outlaws," having disregarded the advice or orders not only of the government, of their employers, and the officers of the regular brotherhoods, but also those of their new mushroom organization. Their only tangible grievance was that the governmental wage board, sitting at Chicago, was unreasonably slow in reaching a decision. The Governor of Pennsylvania took the part of the strikers to the extent of carrying their plea to Washington.

This strike-movement appeared in Syracuse, N. Y., New Haven, Conn., and a few other places; but by Tuesday the 22d, a considerable portion of the men had returned to work, or were asking for their jobs, and it was believed that the movement would very soon die out.

Representatives of the Chicago Yardmen's Association began agitation in Philadelphia about June 13. Several hundred men struck at the yards of the Philadelphia & Reading, including the Port Richmond coal terminal. On the Pennsylvania between 300 and 400 went out. At Baltimore the estimate was 500. At Syracuse about 200 men struck at the New York Central yards and less than one hundred at the yards of the Delaware, Lackawanna & Western.

At New Haven about 100 men left their work, or perhaps 15 or 20 per cent of the whole force.

Embargoes were at once announced on all freight, except perishables and live stock; but road service was not badly affected and a large percentage of freight movement was kept up in spite of the disturbances.

Several hundred former yard men—those who struck more than a month ago, and who are still out—held a meeting in Jersey City on the 22nd and gave out the usual newspaper statements threatening trouble; but it does not appear that any of the yards around New York City were at all affected.

There was a small strike in the yard of the New York Central at New York City on the 22nd, but this seems to have made little trouble; and the officers of the road said that there was nothing unusual in connection with their freight traffic except at Syracuse; and there the percentage of men out was small.

The New Haven road reported on Tuesday night, that the men who struck on Monday, the 22nd, had largely returned.

In Philadelphia on Tuesday officers of the Pennsylvania said that about 1,100 men were still absent from their yard forces, but that, with the aid of volunteers, 100 crews were at work, out of a total normal force of 118 crews. No enginemen or firemen had struck. At Baltimore yard serv-

ice was 75 per cent normal. At Wilmington the strikers had all returned to work on Tuesday.

The situation at New York City has been slowly improving, the Citizens' Transportation Committee having increased its forces for moving freight from the steamship piers where the union truckmen have combined with the striking longshoremen to keep up the blockade of freight. The new strike of yardmen at other cities had, however, helped to delay freight movements and the shortage of coal for street railways and lighting companies in New York had by the 22nd become acute. The New York State Public Service Commission, First District, sent a representative to Washington to ask President Wilson to order priority for coal shipments.

The Citizens' Transportation Committee had in service last week 65 automobile trucks. These trucks were used mainly to carry freight to and from the docks of the coastwise steamships. One lot of cotton, 16 truckloads, was carted from the Morgan Line at Pier 49, North River, to Mott Haven, about seven miles, for shipment to New England over the New York, New Haven & Hartford, this to get around the difficulty of transferring by strike-ridden lighters, which is the usual means. The Morgan line piers have been so badly congested that six of the company's vessels, loaded with 36,000 tons of freight, have been waiting from thirty to sixty days, with still no prospects of unloading.

About 200 captains in New York Harbor lighterage service who had been on strike in sympathy with the longshoremen returned to work last week.

On Wednesday the 23rd, the president of the Merchants' Association declared the longshoremen's strike surely lost. On that day a second independent non-union trucking concern took a large quantity of freight from one of the steamship piers.

At Baltimore the congestion was so great through the first two weeks of June that the Baltimore & Ohio on June 14 placed an embargo on all inbound shipments for export, except coal, and on the 17th coal was included. The Baltimore & Ohio issued a statement calling on the coal shippers to get together to discuss the situation and to seek some remedy which would insure prompter movement of coal from the Curtis Bay piers of the company. At the date of the statement there were at Curtis Bay and standing outside within terminal limits 1,785 carloads of coal awaiting transshipment over the piers, while west of Baltimore and set off at various points and terminals were 2,749 additional cars, a total of 4,534 cars. "There would seem to be no reasonable excuse," said the statement, "for this one port having 4,534 loads of coal crowding it when vessels are available in all directions, some of which have lain in the port of Baltimore as much as 30 days awaiting coal. The coal was here, but shippers for some reason did not or would not pool it to an extent sufficiently flexible to increase the dumping and thereby increase the number of cars available for distribution at the mines."

At Newbern, N. C., last week the shortage of coal was so serious that the officers of the city issued a general appeal, for wood fuel, the city lighting plant having nearly emptied its fuel bins.

At Boston the export movement of grain is said to have entirely ceased and many steamers scheduled to sail for Europe have had to be sent to other ports for loads.

President Urges Labor Board

President Wilson has sent a telegram to Chairman Barton of the Railroad Labor Board urging the importance of an early decision, it was announced at the White House on Wednesday, after W. N. Doak, vice-president of the Brotherhood of Railroad Trainmen, had called and discussed the labor situation with Secretary Tumulty. Mr. Doak later gave out a statement placing the blame for the strikes on the delay of the board in reaching a decision and declaring that the method of adjudicating labor disputes provided in the transportation act so far is "a rank and hopeless failure."

Labor Board Trying to Expedite Decision

Although press reports from Washington stated that President Wilson has asked the Railroad Labor Board to make an immediate award in the present wage controversy to allay the unrest among the railway employees, Judge R. M. Barton, chairman of the board, announced that no communication had been received from the President late Wednesday evening. In addition, Judge Barton stated that the board was doing everything possible to expedite its decision, citing the mass of evidence that has been presented, and the necessity for digesting this material before arriving at the final award. The board is holding executive sessions every day. However, it has been intimated several times that the award will not be ready for at least two weeks.

The unrest among yardmen in the East has not spread to Western points and the majority of these workers are patiently awaiting the award of the Labor Board.

John Grunau, president of the Chicago Yardmen's Association, and Harold E. Reading, president of the United Enginemen's Association, the two organizations whose men started the recent switchmen's strike, have called a meeting for Friday night "to give the public the actual truth about the situation." Grunau has also wired President Wilson asking that the outlaw organizations be recognized when the final award of the Labor Board is made.

B. & O. Passing Report

With a view to furnishing prompt replies to inquiries from shippers and consignees concerning the movement of freight, and to facilitate measures for discovering and preventing delays, the Baltimore & Ohio has adopted a new passing report, to be used at all important terminals and division points. By this report information concerning the movements of individual cars (from each reporting point) is in the hands of the freight department officers of the road at all important cities and junctions within 24 hours (or less) after the filling out of the report. Reports are made up each evening.

The sheet on which this report is made is 21 in. wide and 24 in. high, and the portion shown in the illustration (reduced) is about 11 in. wide and 6 in. high. Each report is made for a 24-hour period ending at 3 p. m. and the one illustrated is for January 27. This was the second and last sheet of the record for that station for that day.

The passing report is primarily for the traffic department, but it serves the transportation department equally well. It becomes the basic record of the yards and terminals which compile it, in place of the large index record books. It is, in fact, a loose-leaf car record of great elasticity and contains more "wheel report" information than it is possible readily to enter in the index books.

There are 100 squares in the form, numbered from 00 to 99, each square accommodating ten car initials and numbers. The printed numbers in the squares denote the last two figures of a car number ending with those particular figures. The recording clerk does not enter the last two figures of a car number, the terminating figures in the squares supplying that information. If a number has six figures in it, only the first four are entered; if it has five figures, only the first three are entered; if four, only the first two; if three, only the

first figure; if two, nothing but the initial is entered; and if there is only one figure in the car number it is written out in full; for example "Three" in the 03 square.

The train and engine, name of conductor, time and date of departure and destination of the first train for the 24-hour period, are written on the first line at top of the sheet, which is prefixed by the code letter "A." Then, as each car number and initial on that conductor's report are entered in the squares, corresponding to the two terminating figures of the car numbers, such car number is prefixed, on the same line at the left, by the letter "A." The next train is written up on the "B" line at the top and all its car numbers are prefixed in the body of the report by the letter B; and so on. While it is desirable that trains be entered at the top in the order of their departure, this is not essential, for any one locating a car looks first for the indexed figures, and the train and time afterwards.

they are laid face-down on a duplicating machine for two or three minutes and then removed, and then blank sheets of paper of the size of the "master sheets" are laid on the same surface, one at a time, until the required number of copies are taken. At present about forty-five copies are required to fill the mailing list and to provide sufficient office copies. The mailing list comprises all freight traffic department offices on the system, the superintendent of Car Service, and as many offices local to the point of compilation as have occasion regularly to call upon the divisional car record office for records.

For the most part these reports close about 3 p. m. and they reach about seventy-five per cent of the addresses by or before 10 o'clock the following morning. When it is considered that a record of all loaded cars forwarded from a point like Brunswick or Connellsville or Grafton for twenty-four hours up to 3 p. m. one day, is in the hands of inter-

BALTIMORE AND OHIO RAIL
EASTERN LINES WESTERN LINES

Passing Report of Loaded Cars Forwarded from Phila, Pa (East Side) Yard, for the 24 Hours Ending

CODE	TRAIN	ENGINE	CONDUCTOR	DEPARTED	TO	CODE	TRAIN	ENGINE	CONDUCTOR	DEPARTED	T
A	2/97	4016	McNeil	5.28 P.M. 1/26	Brunswick	I	Local	1325	Larking	10.59 a.M. 1/27	Local
B	Et	4543	Lott	7.22 P.M. 1/26	Washington	K	1/87	4269	Litchfield	10.50 a.M. 1/27	Brun
C	Et	4527	Hampton	9.28 P.M. 1/26	Locust Pt.	L	Drag	353	Lewis	8.30 P.M. 1/26	PoR.
D	Et	4587	Offet	11.53 P.M. 1/26	Camden-McClure	M					
E	Et	4028	W. O. Morris	12.55 a.m. 1/27	Bay View	N					
F	Et	4598	Jamega	2.29 a.m. 1/27	Brunswick	O					
G	Et	4033	E. B. Symes	6.00 a.m. 1/27	Wilmington	P					
H	Et	4518	Griffith	9.35 a.m. 1/27	Wash.-Pat yd	R					

CODE	INITIAL	CAR No.	CODE	INITIAL	CAR No.	CODE	INITIAL	CAR No.	CODE	INITIAL	CAR No.	CODE	INITIAL	CAR No.	CODE	INITIAL	CAR No.	CODE
D	C&I	134 00	A	NC&StL	29801	A	CE&I	52002	D	PRR	5003	C	PoR	378 04	C	NYC	341605	A
D	CNJ	846	B	Rd	460	C	NYC	3489	F	KaM	50	H	LC	672	H	CM&StP	5053	B
F	PRR	1546	D	Rd	404	C	PRR	3813	F	PL	7428	d	CNJ	607				D
		1000	E	PoR	761	C	NC&StL	360	g	Erie	525	K	WJ&Y	319				H
			F	Erie	319	F	PL	6831										
			F	PRR	1964													
			H	Erie	1000													
			K	Soy	3016													
			L	PL	8703													
H	CA	275 10	B	SVE	140811	A	Erie	90412	A	NP	97213	C	LV	19514	C	PoR	325 15	B
L	WP	1243	C	PRR	2965	C	BO	1326	F	LN	563	E	PRR	1633	H	BO	1720	F
			D	CNJ	359	D	PRR	3845				K	B/L	534	d	PoR	278	H
			D	CB&L	1154	K	WJ&Y	66				K	WJ&Y	317	K	WJ&Y	312	d
			K	NJSB	285													
			L	OC&Y	17													

Part of Baltimore & Ohio "Passing Report" of Freight Cars

Suppose a consignee at Louisville has had several cars shipped to him from New York; he goes into the division freight agent's office at Louisville, and gives him the car numbers. Suppose for example, that N. C. St. L. 29801 is one of the cars. The division freight agent calls for the passing reports from Philadelphia, and, glancing at the square in the report ending in "01" immediately locates his patron's car, noting that this car is prefixed by the letter "A." He finds, at the top of the sheet that this car left East Side, Philadelphia, on Train 2nd No. 97, at 5.28 p. m., January 26, for Brunswick, and, of course, is in a position to give this information to the consignee "right off the bat." The consignee is satisfied that his cars are rolling. A day or two later he may find from the passing reports from Brunswick that his cars have left that point. Later on the passing reports from Grafton and Parkersburg will show the passage of the cars through those terminals, and so on until they have passed through Cincinnati. When a car is empty the number is followed by a dash.

These forms are printed in duplicating ink and are termed "master sheets." All wheel report information is written on them in duplicating ink; when the sheets are completed

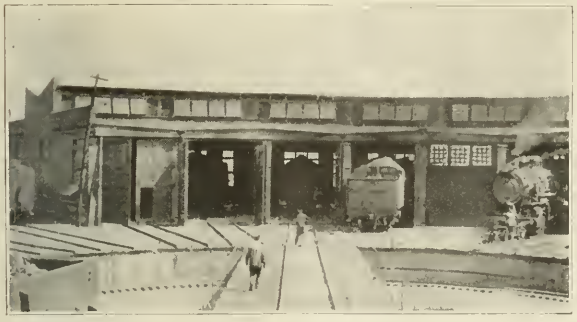
ested officers several hundred miles away the following forenoon, some conception of the value of these reports to the Freight Traffic Department may be had.

These reports are now made at Philadelphia, Brunswick, Connellsville, New Castle Junction, Wheeling, Grafton, Parkersville, Willard and Cincinnati, and will soon be extended to other points. Frederick C. Syze, supervisor of transportation, from whose description in the Baltimore & Ohio Employees' Magazine this information is taken, says that the results so far obtained from the reports are very gratifying. There has already been a considerable decrease in the demands previously made upon car record offices for car information.

The clerks had long been accustomed to quickly jotting down car information in the books in lead pencil, but when it came to carefully writing more complete information in duplicating ink on these forms, they found the task quite different. But they soon succeeded in turning out most creditable work; not having to turn continually the pages of a large book (for practically every entry) went a long way towards offsetting the slightly longer time required to make the entries on one sheet in ink.

An Engine House for Mallet Compound Locomotives

In order to provide adequate facilities for the housing of Mallet Compound locomotives it has been necessary for many railroads to enlarge their roundhouses in order to secure greater track space and longer engine pits within the structure, or to design and construct separate enginehouses especially for this class of locomotives. One of the latest structures resulting from this condition has recently been



Partial End View Showing Ventilating Features

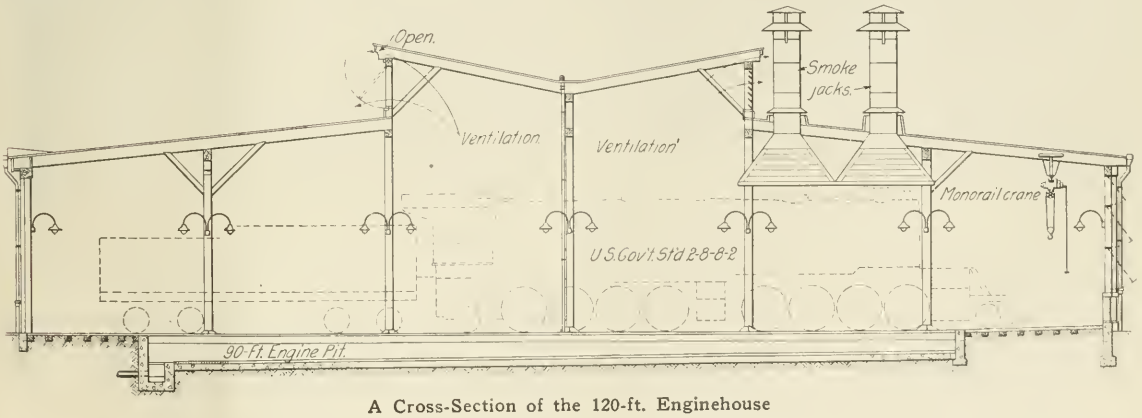
completed by the Chesapeake & Ohio at its Fulton terminal, Richmond, Va.

The new 8-stall roundhouse built at this point has a total depth of 120 ft. from the center of the columns on the inner circle to the inside of the wall at the back or outer circle of the building. It was constructed upon concrete foundations with concrete engine pits 90 ft. long and a floor of the same material. The outer or back wall is also concrete, with the exception of the panels radially opposite the end of each engine pit, which consist of brick walls 12 ft. wide and 9 in. thick, this type of construction being used in order to reduce the cost of replacing the walls in case a locomotive should run through the building. The superstructure was built of timber throughout, covered with a 2-in. wood-sheathed roof decking supporting a built-up asphalt slag surface roofing. The window sash installed in the ends, walls, back walls and monitors were of wood, with ⅛-in. glazed rough glass, the top and bottom sections in the outer wall being top hung and provided with mechanical operators, permitting them to be opened from the floor. In order to aid the ventilation, mechanically-operated sash was installed in the monitors, occupying two-thirds of the space on one side and three-fourths on the other, the remainder being fitted with wood louvres.

A free passage was obtained for the smoke and gases along the underside of the roof decking towards the monitor by laying the roof purlins radially throughout the building, with the roof sheathing laid crosswise on them, thus eliminating any pockets which would hold or retard the smoke. The space between the top timbers over the monitor and underneath the roof decking and between the rafters or purlins was left open on both sides of the monitor to give a free outlet to the atmosphere. Any wind blowing across the roof thus creates, to a certain extent, a condition similar to that produced by a large ventilator, and this, together with the action of the two cast-iron smoke jacks which have been installed over each engine pit, has been found to carry the smoke and gases from the building satisfactorily, improving the natural lighting diffused from the windows.

The roundhouse doors are of a heavy design, constructed of wood and thoroughly reinforced with heavy iron hinges and trussed rods to prevent sagging. Substantial iron locking devices are provided to secure the doors in either the open or closed position, the device for holding the doors in an open position consisting of a rail vertically imbedded in concrete and stiffened at the top by iron braces extending from the building. In addition each door is provided with three wood blocks or bumpers and a heavy iron automatic latch, so arranged that when the door is opened against the bumpers it is securely locked and held in an open position. Any tendency to twist or warp, or any danger of its swinging shut in front of a moving locomotive and being damaged thereby, is thus eliminated. The upper section of the door is provided with windows with ¼-in. glazed rough wire glass.

The drainage from the roof is carried to underground sewers through iron downspouts. Where they are within the building, a convenient clean-out has been provided at the foot of each to permit flushing the sewers in case they should become clogged. The water, steam, air and boiler washing piping was installed in the usual manner, the pipe lines being supported from the columns and roof purlins. The main electric light wiring was carried outside of the building in conduits, the branch wiring running across the building being laid in the concrete floor, with risers at the columns extending to the lamp fixtures, which are attached to the columns. In this way the deterioration of the conduits and their subsequent and frequent replacements due to the destructive action of the gases ordinarily found in roundhouses was reduced to the minimum. An installation of a 2-ton monorail electric traveling crane, running on an I-beam track extending around the



A Cross-Section of the 120-ft. Enginehouse

rear of the building and on through into the adjoining machine shop provides a means for conveying heavy parts between the machine shop and any locomotive in the roundhouse upon which running repairs are being made.

The design of the enginehouse was developed by the Arnold Company, Chicago, working in conjunction with the motive power department of the Chesapeake & Ohio, the Arnold Company having charge of the engineering and the construction of the building itself.

Prussian-Hessian Railways' Financial Position

By Robert E. Thayer

European Editor of the *Railway Age*

IN A RECENT ARTICLE on the railway situation in Germany (*Railway Age*, April 16) reference was made to the heavy deficits on the Prussian-Hessian railways and to the fact that all rates (freight and passenger) had been increased 100 per cent on March 1. Since that article was written more definite and authoritative information has been received.

The rates for freight and livestock on the Prussian-Hessian system have been repeatedly increased since the outbreak of the war. A 7 per cent tax was put into effect in August, 1917. Since then there have been four increases; one of 15 per cent on April 1, 1918; 60 per cent on April 1, 1919; 50 per cent on October 1, 1919, and 100 per cent on March 1, 1920. When the 50 per cent increase was made last October it was stated that to balance a deficit of 3,456,000,000 marks it would be necessary to double the revenues. Not wishing to place too heavy a burden on industry, and, moreover, as it was not deemed impossible that the conditions might improve, an increase of only 50 per cent was made.

The expectation that the financial condition of the railroads would improve has not been fulfilled. In consequence of the continued increase of prices for material and salaries both of officers and workmen, also because of the decline of the individual working power, and finally because a scarcity of coal and locomotives hampered the development of traffic (in October, 1919, passenger traffic was stopped altogether for 10 days), matters have been going from bad to worse.

An estimate for the year of 1920, made up in accordance with the results obtained in the last 10 months of 1919, shows in *millions* of marks the amounts set out below. Under normal exchange the mark is valued at 24 cents, but at this writing it is quoted in New York at 2.06 cents, or about one-twelfth its former value.

ESTIMATES FOR YEAR 1920

Revenues, passenger	1,685
Revenues, freight	3,716
Income from various sources	193
Total for the year 1920	5,594
Annual expenditures for operating the railways were estimated in December, 1919, at	7,140
In consequence of increases made in January, 1920, this sum had to be increased as follows:	
(a) New rate of wages for workmen beginning with January 1, 1920	1,200
(b) One hundred and fifty per cent increase on extraordinary payments to railroad officers and for pensions to meet high cost of living	900
(c) Increase of contributions to pension fund	40
(d) Increase of coal prices and increase of prices for water, gas, electricity and oil	580
(e) Enormous advance of prices for iron materials and increased prices charged for car repairs done in private shops	1,380
Total expenses	11,240
Total revenues estimated as above	5,594
Result: A deficit of	5,646
This deficit is increased by:	
(a) Payments on railroads' debt for the year 1920 (interest and redemption)	888
(b) Allowance for extras for the year of 1920	164
Total deficit for 1920, *millions of marks*	6,698

The estimate dealing with the revenue is on a very optimistic scale, and the expenses will certainly be much higher than given above, owing to the continued advance of prices for all things, especially for coal. The new wage scale for officers, which has been insufficiently estimated at 900,000,000 marks, will also burden the expense column considerably.

The foregoing gives the causes that are leading to a further decline of returns made by the Prussian-Hessian System. Marked improvement of these conditions can be expected in the near future. On the other hand, it was not deemed justifiable to burden the taxpayer with the obligation to meet the deficit in the financial returns of the state railroad.

It is estimated that the recent increase of 100 per cent on the rates for freight and livestock and passengers* will, under the most favorable circumstances, provide 5,400,000,000 marks of the estimated deficit of 6,700,000,000 marks which has to be balanced. To this sum further expenses, as mentioned above, will have to be added. An attempt will be made to balance these sums through rigid economy and by the cutting down of expenses in other places. For this purpose it is intended that special commissions will be attached to the various railroad administrations to examine where and by what means expenses may be cut down, and further increases of rates must be expected in the near future.

TABLE I—FREIGHT RATES FOR A TON-KILOMETER (IN PFENNIGS)

	Piece goods class (l. c. l.)			
	Express freight		Ordinary freight	
Distance carried	General	Special class	General	Special class
Up to 300 kilometers	121.44	60.72	60.72	49.68
From 301 to 400 kilometers	110.40	55.20	55.20	44.16
From 401 to 500 kilometers	99.36	49.68	49.68	38.64
From 501 to 600 kilometers	88.32	44.16	44.16	33.12
Over 600 kilometers	66.24	33.12	33.12	33.12

Note—One kilometer = 0.62 mile
One ton-kilometer = 0.685 ton-mile.
One pfennig = 0.25 cent (standard rate of exchange).
To change pfennigs per ton-kilometer to cents per ton-mile multiply by .1644 or roughly ⅙ (standard rate of exchange).

The new uniform rates for goods traffic are shown in Tables I and II. In carload lots the rates per ton-kilometer vary, according to the different classes, from 36.984 pfennigs to 12.144 pfennigs, or from 6.077 to 1.996 cents per ton-mile, regardless of the distance traveled. The increase in rates, though it is a large one, will have to be borne, and it is believed that it can be borne, particularly as all prices for living and for all necessities both in Germany and in the markets of the world have climbed up to a much higher average. The results from the last increase of tariff rates have, speaking from a financial point of view, not been unfavorable.

TABLE II—FREIGHT RATES FOR UNITS OF 100 KILOGRAMS (IN PFENNIGS)

Distance carried	General express	Special rates for express goods	General car loads	Special car loads
From 1 to 10 kilometers	110.40	55.20	44.16	32.12
From 11 to 20 kilometers	121.44	60.72	49.68	32.12
From 21 to 30 kilometers	132.48	66.24	55.20	32.12
From 31 to 40 kilometers	143.52	71.76	60.72	32.12
From 41 to 50 kilometers	154.56	77.28	66.24	32.12
From 51 to 60 kilometers	165.60	82.80	66.24	49.68
From 61 to 70 kilometers	176.64	88.32	66.24	49.68
From 71 to 80 kilometers	187.68	93.84	66.24	49.68
From 81 to 90 kilometers	198.72	99.36	66.24	49.68
From 91 to 100 kilometers	209.76	104.88	66.24	49.68
Over 100 kilometers	220.80	110.40	66.24	66.24

Note—100 kilograms = 220.4 lb.
1 kilometer = 0.62 mile.
1 pfennig = 0.24 cent.

*The increase in passenger rates per 100 kilometers is as follows:

INCREASES IN PASSENGER FARES

	Pre-war, marks	Today, marks	Percentage increase
First class	7.80	54.00	693
Second class	4.70	24.00	510
Third class	3.10	14.80	478
Fourth class	2.00	8.10	405

Hearing in the General Rate Advance Case

Testimony as to Individual Commodities Principally Confined to Question of Percentage or Specific Advance

WASHINGTON, D. C.

COMPETITIVE CONDITIONS in the various industries and conflicts of interest between differently situated shippers as to the method of applying an advance in freight rates have taken the place of discussions of transportation conditions and the finances of the railroads at the hearing before the Interstate Commerce Commission in the general rate advance case. The testimony during the past week or so has been devoted to the rates on particular commodities, and while it has brought out practically no opposition to a general advance in rates, has brought out differences among the shippers as to whether the advance should be made on a percentage basis or whether it should be on the basis of specific increases in cents or a percentage with a maximum in cents. Generally the shippers who have the shortest haul to the markets favor a percentage basis, while their long-haul competitors object vigorously to such a method and ask for the preservation of existing differentials in cents or a maximum. Most of the shippers who have given testimony as to special commodities have also given reasons why they believe their industry should receive special consideration and be subjected only to a minimum advance.

In most cases when the counsel for the railroads have asked if their prices have not been increased by much greater percentages than the freight rates it has been admitted but the witness usually has some reason as to why any further increase would give his business to a competitor.

Henry Jones Ford, the new member of the commission under a recess appointment, took his place at the commission's bench on Monday, but the other recess appointees have not yet taken the oath of office. James Duncan was re-elected first vice-president of the American Federation of Labor at its Montreal convention last week.

Commissioner Robert W. Woolley, who during the past year or so has made many speeches expressing concern as to the effect of an increase in freight rates on the cost of living, has been conspicuous by his absence from the hearing for several days. It is reported that he is making an inspection of the Western Pacific as a member of the compensation board that is to report on the amount of its just compensation for the use of its property by the government during federal control. Before his departure in the direction of San Francisco Mr. Woolley's chief interest in the hearing, as indicated by his questions, seemed to be in cross-examination of witnesses who seemed to make any reflection on federal control.

Grain and Livestock

Testimony regarding the rates on grain and grain products was heard on June 17. Clifford Thorne, representing the National Farmers' and Grain Dealers' Association, made a brief statement, saying that the freight cost of the initial shipment of grain from the farm to the primary market is borne by the producer. He asked that instead of a percentage advance the increase on grain be limited to a maximum of 6 cents per 100 lb., as in General Order No. 28. He also objected to the proposal to put all of Illinois territory into the eastern district where it would be subject to a 30 per cent advance as compared with 24 per cent for the western district, and he asked that market relations be preserved. Testimony of other witnesses on grain dealt largely with questions pertaining to the relative adjustment of rates.

Representatives of the live-stock shippers pictured their industry as in much the same condition as that of the railroads, and entitled to special consideration. Some of them attributed their condition to too much government control during the war. While not objecting to a general advance in freight rates, they criticised the railroads for inefficiency and declared that live-stock could stand only a minimum advance, if any.

A. Sykes, president of the Corn Belt Meat Producers' Association, said his returns from his farm at Ida Grove, Ia., last year were only 3 per cent on a fair cash value of his property. He said the railroads would earn additional revenue when they handle all the business that has been delayed by lack of cars, and while the railroads need an increase in rates the live-stock industry is already overburdened and should be protected. He said something is wrong with the railroad service and he didn't know just what is the matter, but that the shippers feel that if they were in charge they would "put it over or quit."

When Mr. Thom referred to Mr. Sykes' recent testimony before the Senate committee, urging that Congress appropriate an additional loan fund to enable the roads to acquire more cars, Mr. Sykes said the government should have financed the railroads until they were put in good condition instead of placing the burden on "a few of us who cannot pass the buck." He admitted that since the government has not financed the railroads the problem still remains and must be worked out. He also admitted that one of the great problems before the country is the restoration of the proper relation between production and distribution, but he referred to it as a problem "for the railroads." He said he knew of no reason why the railroads could not have postponed dividends and purchased equipment.

W. E. McCornack, on behalf of interior Iowa packers, said that the maximum of 7 cents applied on live-stock by General Order No. 28 when the rates of live-stock products were increased 25 per cent, had destroyed the relation between live-stock and products to the Atlantic coast and he asked that the commission now readjust the rates by adding 25 per cent to those in effect prior to General Order No. 28, and then applying whatever percentage is determined upon in this proceeding.

E. B. Spiller, secretary and general manager of the Cattle Raisers' Association of Texas, said he was not asking that there be no advance on live-stock, but that in the case of a commodity sold at less than the cost of production the increase should be the absolute minimum which the commission finds necessary.

A. H. Mercer, president of the National Livestock Shippers' League, said that transportation is the very life of the live-stock industry but that the railroads are also very largely dependent upon the live-stock traffic. He said the live-stock industry under the control of the Food Administration had sustained greater losses than had the railroads, because the railroads were guaranteed, and that it is now more difficult to finance it even than it is to finance railroads. He thought the government should loan money to rehabilitate the railroads before allowing any increase in live-stock rates because of the precarious condition of the industry.

R. D. Rynder appeared on behalf of the Swift, Morris, Armour, Wilson and Cudahy packing companies, not to oppose an advance in rates, but to say that they would want to be heard on the subsequent adjustment of rates to preserve relationships.

The shippers of sand, gravel, cement, building stone, brick, etc., who appeared on June 18 and 19, had very lit-

tle to say regarding a general advance in rates but asserted that these commodities could not sustain more than a minimum increase because of their low value. It was stated that the present rates on sand and gravel are approximately the equivalent of the cost of the raw materials and that any addition would so increase the price as to hinder building operations and highway construction. The sand and gravel representatives also objected to the proposal for giving preference in the use of open-top cars to coal, unless a discrimination is made between essential and non-essential uses of coal.

Sand, Gravel, Cement, Etc.

V. O. Johnston, president of the National Association of Sand and Gravel Producers, attracted particular attention to his industry by reading a long statement of the history and uses of sand written in such a way as to furnish some entertainment in the course of what has come to be rather a tedious proceeding. He said the price of his product was less than the profit on coal and asked who ever heard of a "sand king" or a "gravel baron." He said that car supply is vital to his business and is the most uncertain element in it but that a rate advance would be disastrous. One of the cement shippers said he would not object to an increase in the rate on his product nor on many of the commodities which he buys, but said he would have to go out of business if there is an advance on his principal raw materials.

B. L. Glover, of the Iowa Cement Mills Traffic Association, said he was not opposed to an increase in rates for the carriers but that any increase on cement should be made by specific amounts instead of a percentage.

W. E. McCornack, on behalf of the Indiana building stone interests, asked that the increase on this commodity be made 2 cents instead of a percentage increase, and F. B. Dow, on behalf of the terra cotta interests, said they would ask that the same method of increase be applied to terra as to stone.

Representatives of the brick and tile shippers seemed more concerned with the competitive adjustment of rates. One asked that no increase be allowed until the preservation of relations has been worked out in advance and another that any increase be postponed until after the commission completes its investigation in a pending case involving the general adjustment of brick and tile rates.

Testimony on cement rates was continued on June 21, when traffic managers of three large cement companies were heard. F. E. Paulson, general traffic manager of the Lehigh Portland Cement Company, urged a flat advance instead of a percentage, saying he was not opposing any increase but that the short haul mills could shut out the competition of the long haul mills if the differentials were increased. F. T. Bentley asked if he was not making the assumption that an increase in rate necessarily affects the selling price regardless of the way prices are actually made. The witness said he was not familiar with the making of prices. When the witness referred to the demand for cement for road-building, Commissioner Aitchison asked if there had not been a persistent propaganda on the part of the Association of Portland Cement Manufacturers to induce the use of cement for road-building in spite of the fact that there is a car shortage. He said the commission had received hundreds of telegrams urging the claims of the road-building interests which had been inspired by the cement manufacturers.

Walter Young, general traffic manager of the Atlas Portland Cement Company, supported the application of the carriers for a percentage increase on cement and said that while the cement rate structure needs many adjustments, the railroads are in such dire need that they ought not to be compelled to await the readjustment. He said the flat increase made by General Order No. 28 had resulted in great injustice to many of the cement companies and he thought commercial relations could be more nearly preserved by an attempt to maintain differentials in cents. He said a percentage advance tends to result in the supplying of a commodity from points having a short haul and thereby in the conservation of equipment and he expresed the opinion that the present shortage of cars is due partly to the fact that the rate structure encourages long haul shipments. He said the railroads have made subnormal rates from the Lehigh cement district which have enabled the shippers in that district to compete with mills nearer the point of consumption that are operating at less than capacity. He said he had asked the Railroad Administration to apply the interstate scale to state traffic, but it had declined and his company has now asked such rate adjustment in Illinois and proposes to make a similar application as to all western states.

F. E. Guy, traffic manager of the Universal Portland Cement Company, said he was in favor of an advance in freight rates, the amount of which he was willing to leave to the commission, but that his company felt it should be spread equitably over the entire industry on a percentage basis. He said railroad officials have told him that by the 15 per cent case and the general advance made by the Railroad Administration the subnormal rates had been brought up so that it would now be fair to apply a percentage advance.

Oil

The presentation of testimony on oil rates was begun by F. M. Swacker, representing seven of the largest western oil refining companies who are located near points of water shipment and therefore do business on a short rail haul and who are in favor of a percentage advance and thought that 4½ per cent arbitrary advance made by the Railroad Administration in place of the 25 per cent advance at the request of Clifford Thorne was "all wrong." Mr. Swacker put on several witnesses who gave similar testimony in favor of the percentage advance.

F. B. Dow, on behalf of the National Petroleum association, presented as a witness, F. W. Boltz, traffic manager of the association, who said he was speaking for 51 refining companies in the east, who are members of that association, and are opposed to the percentage advance urged by other members represented by Mr. Swacker. His principal point was that a percentage advance works to the disadvantage of the independent refineries who ship by rail from their refineries located near the point of oil production in competition with the Standard Oil Company that uses pipe lines to its refineries and has a short rail haul. While he did not oppose any increase in rates, he said he would not concede that the railroads are entitled to an increase on petroleum or its products, which have sustained very large advances since 1907 and, in his opinion, are already standing more than their proportion of the cost of transportation. He favored a percentage advance with a maximum which would limit it to a nominal amount.

When Mr. Thom asked the witness whether his price had increased by a greater percentage than the freight rates, Mr. Boltz said he was not familiar with prices, but that the price of crude oil has increased 400 per cent since 1907. Mr. Dow filed as an exhibit a report on the price of petroleum products, saying that most of the independent refiners are not producers and have to pay the high prices for crude oil, while the prices of their products show that they have not fully absorbed the increased cost of the crude oil.

Clifford Thorne presented a statement on behalf of 412 independent western refining companies favoring a flat increase or at least a maximum if a percentage increase is applied, saying that over 90 per cent of the oil refineries in

the country primarily dependent on rail shipments are in favor of this plan. Mr. Thorne said the oil industry is unique among the industries appearing in this case, because between one-half and two-thirds of the oil is handled in pipe lines and because of competitive conditions it is essential that a flat increase be made because a percentage would create hardship and a burden which most of the independent companies could not stand. Mr. Thorne put on several witnesses, including A. C. Holmes, traffic manager of the Empire Refineries, who filed exhibits to show that oil is already paying more than its proportionate share of the transportation charges.

Testimony on lumber rates was presented on June 22 and 23 and brought out the same conflict of interest between competing sections as had been shown in the case of other commodities, although there was no objection to an advance in rates and some of the lumber representatives strongly urged an advance. W. J. Stroebel, traffic manager of the North Carolina Pine Association, advocated a straight percentage advance as being the fairest way to give the railroads the increase in revenue which they need and which he hoped would enable them to give better service.

A. L. Osborn, of the Northern Hemlock Manufacturers' Association, said the 100 mills represented by this association are not unanimous; some desire that their natural advantages be preserved by a percentage advance and others are willing to have a percentage advance but with a specific maximum. Personally, he thought that in the long run a percentage basis would be best for the industry, the railroads and the public. "We all want to see the railroads put on a basis where they can be considered prosperous," he said, "so far as it can be done under the law, and we especially would like to see the railroad employees taken care of so they will be efficient and do what they ought to do. We will pay cheerfully whatever the commission finds is necessary to give the railroads funds which will enable them to furnish the service we have been short of." In reply to questions Mr. Osborn said that most of the business of the mills for which he was speaking is short haul business, handled on rates of 12½ to 14 cents.

C. E. Elmquist, representing western lumber producers, asked questions to bring out that Mr. Osborn, as traffic manager of the National Lumber Association, has presided over a recent meeting of representatives of the associations forming the membership of the national organization, at which a resolution recommended by the traffic committee had been adopted expressing the view that if rates on lumber should be raised existing competitive relations should be maintained by a percentage with a specific maximum. R. C. Fulbright, who appeared as counsel for the witness, then brought out that the resolution had been adopted only with the understanding that it would be ineffective unless all of the constituent associations ratified it, and that several had not. He also asked if Mr. Elmquist had not been the author of the resolution. Mr. Osborn said Mr. Elmquist was the "principal author" of it and that Mr. Elmquist represents lumber that is hauled "about as far as any he knew of" but that it was intended as a "harmony resolution," intended to reconcile conflicting views. Chairman Clark remarked that he thought they had "done pretty well to get the lumber people to agree that far."

Mr. Osborn said that a flat increase on lumber would be "the last step of iniquity."

Ray Williams, of the Cairo Association of Commerce, favored a percentage advance and urged that the commission apply whatever increase is proper to the rates, as they stood prior to General Order No. 28 to eliminate the changes in relationship resulting from the percentage and maximum basis then applied. He said he had nothing to say about the measure of the increase.

A. G. T. Moore, traffic manager of the Southern Pine Association, said the carriers should have a general advance in rates to meet the heavy increases in operating expenses, but he expressed no opinion as to the amount. He also favored the proposed straight percentage increase on the ground that the burden should be borne by shippers in proportion to the cost of operation. Any other method would result in preference to some and prejudice to others, and he didn't believe the commission in this proceeding should inquire into relative adjustments except in the broadest way because the situation demands quick treatment. He did not think the commission has the time to enter upon a detailed consideration of commercial market conditions, because if it were to do so it would be necessary to consider many other factors than the rate, such as the comparative weight of competitive kinds of lumber.

J. H. Snell, a member of the transportation committee of the Southern Pine Association, gave some testimony regarding prices. He said that yellow pine since February 15 has declined from $45 to $48 per at the mills to $30 to $32. He thought the reason was that lumber went so high in the flurry last winter as to stop the demand.

W. E. Gardner, of the Georgia-Florida Sawmill Association, said the mills he represents have a rather long haul and compete with others better located geographically, but he favored a percentage increase on the ground that an attempt to maintain a parity of relations by a flat advance would not take care of the difference in weights in competitive woods and would give the short haul an abnormally high increase while the long haul would be partially protected.

E. L. Carpenter, of the Northern and Western Pine Manufacturing Associations, said that lumber which is shipped long distances cannot absorb a greater differential over the rates of the short haul competition.

A statement was presented on behalf of the Associated Cooperage Industries, saying they were not opposed to an advance in rates, but favor a flat advance rather than a percentage.

C. E. Elmquist read a resolution adopted by the American Wholesale Lumber Association approving in principle the application of the railroads for an advance in rates, but urging a percentage increase subject to a maximum.

E. E. Williamson, on behalf of the Northern Pine Association, the Western Pine Association, the California White and Sugar Pine Association, and the Southern Hardwood Traffic Association, presented elaborate exhibits showing the freight rates now paid by western lumber, with comparisons showing the effect of a percentage increase as compared with the effect on the short haul traffic. Commissioner Daniels said that Mr. Williamson's plan of a percentage increase without a maximum would assign the same amount of increase to a 600-mile haul as to the haul of over 2,000 miles from the Pacific coast. Mr. Williamson said he thought it was sound economically to make this lumber available in the eastern markets in competition with the local product.

Mr. Williamson was followed by D. C. Conn, who represented the same associations, and who presented exhibits comparing the mill cost of lumber and the freight rates and showing the disadvantage already borne by western lumber in meeting eastern and southern competition in the eastern markets. Mr. Conn also said that various substitutes for lumber, such as cement and steel, move for shorter distances than lumber and would take its place to a large extent if a percentage increase were applied to the long haul shipments of lumber. He also took the position that the net operating income of the railroads should be increased in the future because they will not have to spend so much as they have in the past for maintenance, and he presented exhibits to show that the transcontinental lines need a less percentage of increase than western roads generally.

The lumber testimony was interrupted for a short time on Wednesday while J. C. Chase, president of Chase &

Company, Jacksonville, Fla., growers and distributors of fruits and vegetables, was allowed to testify. He also represented various growers' exchanges and, he said, the great majority of the fruit and vegetable growers of Florida. Mr. Chase made the point that the market price of fruits and vegetables is not influenced by the cost of production and of transportation and, therefore, that an increase in freight rates cannot be passed on to the consumer. He said that fruit-growing is a hazardous business, a large percentage of the growers have operated at a loss, and that there is danger of the rates being so high as to interfere with their movement. Therefore, he thought, a 31 per cent increase would not be justified on this traffic. He also contended that the rates on fruits and vegetables from Florida are now as high as the traffic will bear, are comparatively higher than the rates on other traffic, that the traffic is already highly profitable to the carriers, and that the Florida East Coast and the Atlantic Coast Line, which handle 80 per cent of the perishable traffic of Florida, during the first three months of this year have earned a net operating income which, if continued throughout the year, will give them considerably more than 6 per cent on their property investment.

The commission has received a petition from the Detroit & Cleveland Navigation Company and the Cleveland & Buffalo Transit Company asking for an increase in rail and lake rates by the same percentage as is applied to the all-rail rates.

F. H. Wood on June 21 read into the record a joint telegram signed by J. H. O'Neill, general manager of the Great Northern; E. C. Blanchard, of the Northern Pacific; M. Nicholson, of the Chicago, Milwaukee & St. Paul, and J. P. O'Brien of the Oregon-Washington Railroad & Navigation Company, correcting a few of the erroneous statements made by O. O. Calderhead of the Washington Public Service Commission, while he was on the stand, regarding matters of railroad construction and operation in his state, and particularly his statement that unification of the Seattle terminals by the Railroad Administration had reduced the average detention of cars to 5 days, as compared with 15 days under separate operation, and that under the zone system adopted in March of this year the detention had been increased to 9 days. Mr. Calderhead said he had taken his information from a statement prepared by or under the supervision of Mr. O'Neill. The telegram said Mr. O'Neill had never prepared such a statement and that no complete check had ever been made, but that a careful estimate had shown an average detention of 8.96 days in March, 1920, as compared with 8.71 days in March, 1919, and that no such record as 5 days had ever been made. It was also stated that the shippers have stated that the service at Seattle under the zone system is as good as or better than under federal control.

Pullman Company Objects to Surcharge

The Pullman Company on June 22 filed with the commission a statement covering its reasons for opposing the re-establishment of a surcharge for Pullman occupancy, it being its understanding that this method of raising additional revenue for the railroads was under consideration.

As of June 10, 1918, the director general of railroads established an additional charge of ½ cent per mile to passengers occupying Pullman accommodations, with the result, according to the statement, that Pullman revenue immediately showed a decided falling off against the revenue of the preceding three months when compared with the same period of the preceding year. A statement was attached showing, by weeks, the comparison of gross earnings for the period from March 1 to September 30, 1918, with the corresponding weeks of the previous year, showing that the change took place immediately after the establishment of the additional charge, and the Pullman Company believes that should this surcharge be re-established, it will have a very serious effect on the volume of its business and the company will not be enabled to correspondingly reduce expenses. The statement continued:

Will Decrease Passenger Revenues

"The commission has recently granted the Pullman Company authority to increase its rates as of May 1, 1920, approximately 20 per cent, to offset the very great increase in expenses of all kinds, particularly wages, which has taken place during the past three years, and it is the opinion of the company, should this surcharge be revived, the benefit of this increase will be more than offset by the falling off in gross revenue, without corresponding reduction in expenses. The application of a surcharge of ½ cent per mile, the amount which was in effect from June 10 to November 30, 1918, would be approximately equal to the Pullman rates in effect prior to May 1, 1920, and would result in increasing those rates, taking into consideration the increases in Pullman fares of approximately 20 per cent, to practically 120 per cent over the rates in effect prior to May 1. It is our firm belief that such an increase would greatly discourage the use of Pullman accommodations, and while it would result in an apparent increase in revenue to the railroads, this increase would be more theoretical than actual, as there can be no doubt but that large numbers of passengers who ordinarily take Pullman accommodations would travel in day coaches, resulting in a loss of revenue to the Pullman Company and to the railroads, through their participation in the Pullman Company's revenue under their contracts. This would be particularly true in our parlor car service, and the traveling public would undoubtedly find the expense of traveling so heavy that it would either entirely forego or greatly reduce the distance it would travel on vacation tourist and pleasure trips.

"To illustrate, the expense of Pullman occupancy from Chicago to points on the Pacific Coast would be so great that such travel would be diverted to closer points, and this would result in a loss to the railroads in long haul service, and would undoubtedly bring out protests from resort cities and hotels, especially those located in Florida and California.

"Exhibit A, attached, shows that for the period from March 5 to June 16, 1917, our gross earnings were $14,726,300.70 and for the same period in the year 1918, prior to the application of the surcharge, the gross earnings were $16,979,554.42, an increase of $2,253,253.72, or 15.30 per cent, while for the period from June 17 to September 29, 1917, gross earnings were $17,538,376.39 and for the same period in 1918, $15,695,967.53, a decrease of $1,842,408.86, or 10.50 per cent. This indicates that the application of a surcharge had the effect of reducing our gross revenue 25.8 per cent, and we have every reason to believe that the re-establishment of this surcharge would have the same effect on our gross revenues.

"It is sincerely hoped that your commission, in taking this matter under advisement, will give consideration to the facts above stated, as well as to those contained in letters addressed to your secretary, Mr. George B. McGinty, under date of April 27, May 7, and May 25, particularly the last two mentioned, in which additional information was furnished as to the number of Pullman cars operated during the first half and second half of the calendar year 1918; the revenues derived from Pullman service during the year 1918, divided between that covered by government and state transportation requests, and that from all other sources; and the number of passengers carried on government and state transportation requests, and all others.

"It is believed that the effect of a surcharge on our business during the period it was in force clearly indicates that

its re-establishment will have a tendency to greatly reduce the Pullman Company's revenue, and indirectly reduce the revenue of the railroads from their passenger service, as well as their share of the earnings of the Pullman Company accruing to them under their contracts with that company." The exhibit referred to was as follows:

STATEMENT SHOWING BY WEEKS COMPARISON OF GROSS EARNINGS OF THE PERIOD MARCH 1 TO SEPTEMBER 30, 1918, WITH CORRESPONDING WEEKS OF PREVIOUS YEAR

	1917	1918	Increase	Decrease
March 5-10	$999,054.83	$1,122,908.37	$123,853.54	.....
12-17	963,778.95	1,059,699.48	95,920.53	.....
19-24	943,013.82	1,040,279.00	97,265.18	.....
26-31	956,507.56	1,191,083.88	234,576.32	.....
April 2-7	1,035,762.07	1,106,850.76	71,088.69	.....
9-14	1,047,595.22	1,131,213.26	83,618.04	.....
16-21	993,888.82	1,088,571.14	94,682.32	.....
23-28	933,918.03	1,089,791.72	155,873.69	.....
30-May 5	978,867.00	1,095,410.50	116,543.50	.....
May 7-12	951,149.90	1,188,287.03	237,137.13	.....
14-19	975,082.56	1,106,722.04	131,639.48	.....
21-26	922,605.35	1,172,054.29	249,448.94	.....
28-June 2	913,426.89	1,107,465.00	194,038.11	.....
June 4-9	1,051,617.31	1,138,817.77	87,200.46	.....
11-16	1,060,032.39	1,340,400.18	280,367.79	.....
18-23	1,089,658.23	1,033,796.27	.....	$55,861.96
25-30	1,104,976.75	1,045,020.22	.....	59,956.53
July 2-7	1,095,234.82	975,377.17	.....	119,857.65
9-14	1,052,557.22	1,031,798.85	.....	20,758.37
16-21	1,050,812.39	949,691.11	.....	101,121.28
23-28	1,045,974.45	957,292.97	.....	88,681.48
30-Aug. 4	1,106,398.61	934,615.47	.....	171,783.14
Aug. 6-11	1,110,295.31	1,028,375.79	.....	81,919.52
13-18	1,170,301.33	1,022,346.72	.....	147,954.61
20-25	1,273,811.58	1,091,642.32	.....	182,169.26
27-Sept. 1	1,281,678.98	1,047,056.92	.....	234,622.06
Sept. 3-8	1,350,619.44	1,200,208.12	.....	150,411.32
10-15	1,270,798.53	1,160,600.43	.....	110,198.10
17-22	1,291,169.47	1,105,461.14	.....	175,708.33
24-29	1,254,089.28	1,112,684.03	.....	141,405.25
	$32,264,677.09	$32,675,521.95	$2,253,253.72	$1,842,408.86

The railroads had filed a statement at the request of the commission estimating that the application of a ½ cent surcharge to the business of 1919 would produce a revenue of $67,000,000.

Additional testimony is yet to be heard on fruits and vegetables and on iron and steel, to be followed by some rebuttal testimony on behalf of the carriers and oral arguments, with the expectation that the hearing will be brought to a close at the end of next week.

Chairman Clark announced that the commission desires to hear oral argument at the conclusion of the testimony to a reasonable but limited extent, and those desiring time for that purpose were asked to submit their names with an estimate of the time required.

THE AMERICAN FEDERATION OF LABOR seems not to have been much impressed by Mr. Gompers' argument against Government ownership and operation of railroads. That this policy would at once turn the 2,000,000 railroad employees into Government employees seemed to the great majority of the delegates a point in favor of it. No lack of confidence in their own ability to keep together in politics and control the Government under conditions of widened public ownership is here displayed. But it is to be noticed that the railroad employees did not do much dictating either to Congress or to the Executive when the roads were under Government operation. . . . The delegates voting for public ownership talked and acted as if they represented a majority of those having the elective franchise in the United States; but there is no evidence that they represent a majority even of organized labor.—*New York World.*

Delegates to the National Foreign Trade Convention at San Francisco in May Pose Before One of the New St. Paul Locomotives

These delegates had three special trains, one of which went over the St. Paul. Through the courtesy of that road each delegate was permitted to ride for a while in the locomotive. Another feature of the trip was the securing by telegraph for their benefit the closing stock market prices of some leading 40 stocks at New York. At one station the list was put on the train in the same manner as train orders—by means of the hoop.

Train Accidents in March[1]

THE FOLLOWING IS A LIST of the most notable train accidents that occurred on the railways of the United States in the month of March, 1920:

Collisions

Date	Road	Place	Kind of accident	Kind of train	Killed	Injured
3	Central N. J.	Elizabethport	xc	P & P	5	9
8	Southern	Belleville	rc	F & P	1	2
†11	Rutland	Riverside	bc	P & F	10	32
18	Missouri Pacific	Texarkana	bc	P & F	2	5
22	Texas & Pacific	Forney	xc	P	0	0
24	C.R.I. & P., Wabash.	Des Moines	xc	P & F	0	0

Derailments

Date	Road	Place	Cause of derailment	Kind of train	Killed	Injured
5	Atlantic C. L.	Lucama	b rail	P	2	12
8	Pennsylvania	Millport, N. Y.	...	P	0	3
17	M. K. & Tex.	Lewis, Mo.	d. eq.	P	2	3
†25	Pennsylvania	Longfellow	b rail	P	1	15
26	Southern	Ettrick, Ga.	malice	P	2	0
27	Pennsylvania	Dublin, Ind.	b rail	P	0	3
28	C. C. C. & St. L.	Crawfordsville	...	F	...	...
30	Buffalo, R. & P.	Savan, Pa.	b rail	P	0	24

The trains in collision at Elizabethport, N. J., on the 3rd were westbound passenger No. 123, which was running at about 40 miles an hour, and a local passenger train being moved across the main track. The switching passenger train was moving backward, and the two engines bore the brunt of the collision. Both enginemen and two other persons were killed, and eleven passengers were injured. Train 123 had passed distant and home block signals set against it. The engineman was seen to be standing, apparently attentive, after he passed the distant signal.

The Interstate Commerce Commission investigated this collision and made a report on April 8. The signals were found in good condition. The evidence seemed to indicate that the engineman of train 123 must have suffered some lapse of his faculties, but the nature of this lapse could not be determined. He had been an engineman for about six years, with a good record. The local passenger train was southbound and had crossed the main line for the purpose of reaching the passenger station; and it was setting backward in order to proceed through a Y track to the main line and to continue its run to Dunellen, N. J. The report observes that if there were a platform for passengers adjacent to the Y track north of the main line this crossing movement would not be necessary and the safety of operation would be materially increased.

The trains in collision at Belleville, Ill., on the 8th, were an eastbound freight and an eastbound passenger, the freight (consisting of an engine and a caboose) running into the rear of the passenger while it was standing at the station. A news agent was killed, and a train master and a mail clerk were injured. The freight had left the last preceding station only five minutes behind the passenger, instead of ten minutes as required by rule; and the men in charge of the freight overlooked the schedule of the passenger train.

The trains in collision at Riverside, Vt., on the 14th, were a northbound passenger and a southbound freight; both engines, ten freight cars and the first three cars in the passenger train were wrecked. Five passengers and five trainmen were killed, and twenty-five passengers and seven trainmen were injured. The collision was due to misreading of a train order by the men in charge of the freight train; "Bartonsville," poorly written, was taken to be "Bellows Falls." This collision was reported in the *Railway Age* June 4, page 1572.

The trains in collision near Texarkana, Tex., on the 18th were a southbound passenger train and a northbound equipment train. Both engines and two cars were badly damaged. The trains were moving at about 15 or 20 miles an hour when they came together; and two trainmen were killed, and five injured. The collision was due to improper flagging on the part of the yard crew and excessive speed on the part of the passenger train.

The train involved in the collision at Forney, Tex., on the 22nd, was southbound passenger No. 3. Running over a misplaced switch at about 40 miles an hour, it crashed into a string of freight cars standing on a side track. The locomotive was badly damaged and three cars were ditched. No serious injuries were reported.

The trains in collision at Des Moines, Iowa, on the evening of the 24th were a local passenger train of the Rock Island, No. 478, and a freight train of the Wabash. The passenger train struck the freight at the crossing of the two roads at East Fourteenth street, and the engine and one car of the passenger train were ditched. No person was seriously injured. There are no signals at the crossing.

The train derailed near Lucama, N. C., on the 5th, was northbound passenger No. 86. The engine and first two cars were damaged and the engineman and fireman were killed. Twelve passengers were slightly injured. The road was blocked eighteen hours. The derailment was due to broken rail.

The train derailed at Millport, N. Y., on the 8th, was a northbound passenger.

The train derailed at Lewis, Mo., on the 17th, was southbound passenger No. 5. Running at about 60 miles an hour over a curve of 2 deg., the two locomotives were derailed and overturned, and the first three cars were damaged. Two trainmen were killed and three were injured. The cause of the derailment was the failure of a brake-hanger post on the second engine, which dropped on the track.

The train derailed near Longfellow, Pa., on the morning of the 25th was eastbound passenger No. 20, the Keystone Express. Running at about 60 miles an hour the last five cars in the train were thrown off the track by a broken rail. This train was on track No. 2; and one of the cars fell against a freight train moving westward on track No. 1 and ten loaded cars in that train were derailed. Ten passengers were injured, one of them fatally; and four employees were injured. The broken rail, open-hearth steel, 130 lb., was found to be piped ⅛ inch under the center of the head.

The train derailed at Ettrick, Ga., 18 miles south of Macon, on the 26th, about 2:30 a. m. was a northbound express, the Royal Palm Limited. The train was derailed at a maliciously misplaced switch and the locomotive was overturned. The engineman and fireman were killed. The switch lock had been broken and the switch set for the side track.

The train derailed near Dublin, Ind., on the 27th was eastbound passenger No. 114. While running at about 50 miles an hour, two coaches were derailed by a broken rail and overturned; and two passengers and one mail clerk were slightly injured.

The train derailed near Crawfordsville, Ind., on the 28th was an eastbound freight. A car in the train near the rear end, was derailed near the bridge over Sugar Creek and, with five other cars and the caboose, fell to the stream below.

The train derailed at Savan, Pa., on the 30th was a southbound passenger, No. 111. Running at about 30 miles an hour the first four cars were thrown off the track by a broken rail. Four trainmen and 20 passengers were slightly injured.

Canada.—In the derailment of an eastbound express train on the Canadian National at Belleville, N. S., on the 22nd of March, two passenger cars were overturned and fell down a bank, and 13 passengers were injured.

Electric Car Accidents.—In a rear collision of street cars at McKeesport, Pa., on the 10th of March, one passenger was killed and three were injured.

[1]Abbreviations and marks used in Accident List:
rc, Rear collision——bc, Butting collision——xc, Other collisions——bb, Broken——d, Defective——unf, Unforeseen obstruction——unx, Unexplained——derail, Open derailing switch——ms, Misplaced switch——acc, obst., Accidental obstruction——malice, Malicious obstruction of track, etc. ——boiler, Explosion of locomotive on road——fire, Cars burned while running——P, or Pass., Passenger train——F. or Ft, Freight train (including empty engines, work trains, etc.)——Asterisk, Wreck wholly or partly destroyed by fire——Dagger, One or more passengers killed.

Operations of Supply Trains on Southern Pacific

Company Materials Are Handled More Efficiently and More Economically by Special Service

BY THE PROPER OPERATION of store trains on the Southern Pacific, approximately $11,586 has been saved monthly in the delivery of company material, according to A. S. McKelligon, general storekeeper, who recently addressed the Pacific Railway Club, San Francisco, Cal., on this subject. The actual results which have been accomplished on this road were described in a letter, part of which was quoted in the *Railway Age* of January 2 (page 86), from Mr. McKelligon to J. D. Stuart, supervisor of stores of the United States Railroad Administration. After giving in brief the savings made in the cost of delivering and collecting company material by regularly established supply trains and describing the operation of these trains, Mr. McKelligon presented several statements which show in detail the service performed by supply trains, their cost, and an estimate of the cost if the material handled by these trains had been handled as local freight. These statements follow:

STATEMENT SHOWING SERVICE PERFORMED BY SUPPLY CARS MONTHLY

Number of supply trains in service operating	4
Number of miles covered by main line and branch	5,175
Value of material delivered	$140,000
Approximate amount in tons of coal, l. c. l. lumber, distillate, oils, track material, hand push and velocipede cars, and all other miscellaneous material and supplies delivered by supply train	5,900
Approximate amount in tons of second-hand and scrap material picked up by supply trains	3,000
Approximate number of requisitions handled	7,200

STATEMENT SHOWING COST OF OPERATING SUPPLY TRAINS MONTHLY

Labor at stores in loading supply cars	$ 500
Wages of supply car storekeepers and helpers	1,085
Personal expenses of supply car storekeepers and helpers and store department proportion of expenses incident to performance of cook and living cars operated in connection with supply trains	550
Charges from transportation department for wages of train and engine crews, roundhouse expense and other incidental expenses, also fuel	4,700
Track laborers accompanying supply train	600
	$7,435

STATEMENT SHOWING ESTIMATED COST OF HANDLING BY LOCAL FREIGHT MATERIAL NOT DELIVERED BY SUPPLY TRAIN MONTHLY

Estimated cost of overtime to local trains and engine crews, if material was handled by local freight	$ 3,280
Estimated cost at local freight houses of handling, transferring and billing (on basis of 50 per cent of material passing through freight houses) at 57 cents per ton	1,681
Estimated loss account material damaged or lost in transit, etc. (using as a basis 3 per cent of material delivered)	420
Estimated cost of picking up scrap and cost of handling, sorting, etc., at division stores, before shipping to general scrap headquarters, also overtime to local freight train and engine crews	2,500
Approximate cost of packing, tagging, loading, waybilling, etc., at shipping stores	5,040
Stock on hand would have to be increased at all division stores approximately $160,000, if each had to provide for their division requirements. (Interest on investment at rate of 6 per cent per annum)	800
Estimated value of additional track tools, hand, push and velocipede cars, which would be required on line if no regular exchange system was in effect, $64,000. (Interest on investment at rate of 6 per cent per annum)	320
Estimated cost of motor car maintenance and operator for use of watch inspector on monthly trip of watch inspection	255
Estimated cost of doing work by work train, such as distribution of ties, gravel, ice, sprinkling right of way with fuel oil, etc., which is now handled by supply train	1,125
Estimated cost of labor necessary to deliver material from freight house to section and signal tool houses, B. & B. and extra gangs on line, etc	3,600
	$19,021

Description of the Service

The number of trains in this service on the Southern Pacific total four and they are operated from the Los Angeles, Cal., and Sacramento general stores. They cover a territory of approximately 5,175 miles and operate on a regular schedule every 30 days on the main line and every 60 days on the less important branches.

The supply train itself consists of from 17 to 25 cars, the number of cars depending upon the territory served. Five of these cars are specially fitted for this service. Car No. 1 is equipped with a desk and bunks for the supply car storekeeper and his helper, and also with racks and bins for station supplies and light hardware, etc. Car No. 2, the oil car, is supplied with 500 and 1,000 gal. oil tanks with Bowser pumps. Car No. 3 is fitted with racks for carrying all track tools, handles, brooms and other bulky supplies. Cars No. 4 and 5 are equipped for the transporting of miscellaneous materials. The balance of the train consists of carloads of other supplies for delivery and of flat cars for the transporting of scrap, second-hand and surplus materials picked up on the line.

Materials Handled

The classes of materials handled by the supply train include all of the supplies used in maintenance of way work, including frogs, switch points, switch stands, joints, bolts, spikes, etc. In addition, l.c.l. lots of lumber, push, hand and velocipede cars, warehouse and baggage trucks, mail carts, crossing and right-of-way signs, drums of distillate for pumping plants, and of gasoline for section and signal maintainers' headquarters, lime and soda ash for water treating plants, coal, ice, oils to be used in the signal, maintenance of way and bridge and building departments, pumping plants and station agencies, and miscellaneous material are carried on this train. The value of the material handled monthly is approximately $140,000. In addition, approximately 3,000 tons of second-hand and scrap materials are picked up monthly by the supply train. In a large majority of cases division superintendents, division engineers, signal or assistant signal supervisors, roadmasters and division storekeepers use this train as a means of making regular inspections of their respective territories.

Method of Handling Requisitions

Requisitions, totaling approximately 7,200 monthly, are usually made up by the roadmaster and sent direct to the division storekeeper, who inspects them and forwards them to the general store from which the supply train operates. It is not considered necessary to have the superintendent and division engineer's approval on these requisitions, inasmuch as both of the latter usually accompany the supply train and the materials furnished may be investigated on the ground.

On account of the supply trains being on the road practically the entire month, a supply train clerk has been established at the two general stores from which the trains operate

and when requisitions are received at these points they are registered and turned over to his clerk, who prepares a summary of all material called for on the requisitions, and arranges for its assembly so that when supply trains arrive for loading there is little delay. This clerk also attends to the expediting of material to and from the shops, requests the general office for emergency purchases and ships needed material to meet the supply trains at various points. In addition to these precautions to meet emergency conditions the supply trains carry surplus material in order to be able to take care of such emergency requirements as have become necessary after the making of requisitions.

Previous to starting each day's work, the supply car storekeeper prepares an unloading list by stations for the day. This list is made in triplicate, the supply car storekeeper retaining the original, one copy going to the helper and the other to the division storekeeper. Between stations the division storekeeper checks his copy of the unloading list and determines the number and class of tools, etc., to be exchanged, as well as the material which has been ordered. Upon arrival at the tool house he immediately checks the amount of stock on hand, in most cases with the roadmaster and quite frequently with the division superintendent and division engineer. It is then determined whether or not the quantity ordered is over or above what is actually needed for a 30-day period or if the amount ordered should be increased. In either case the material decided upon is delivered and the requisition is changed accordingly.

Exchange of Materials

The exchange of tools and other exchangeable material is watched very closely in this manner. The fact that everything that can be exchanged is exchanged, without doubt saves considerable money to the railroad, as it eliminates abuses, losses through theft and other practices which have been costly in the past.

Three other functions are performed by the supply train, one of which is the distribution of illuminating and lubricating oils, which are apportioned according to a prepared schedule showing the amount of these oils that will be required at the various points by various departments monthly. In addition, all of the maintenance of way scrap accumulation is collected by the supply train from the section headquarters. The signal, bridge and building departments, pumping plant, station agencies and others gather scrap, obsolete, surplus and second-hand material in a similar manner, and this material is in turn picked up by the supply train. The last function of the supply train is to pick up tools for repairs and bring them to the two general stores where all tools for the system are repaired.

Photo copyright by Kodel & Herbert, N. Y.

A Scene in British East Africa

Fuel Stations*

At the 1915 convention several devices were reported for measuring the coal as delivered to locomotives, but at that time none of the suggested equipments had been extensively used. Since that date, however, there has been a considerable number of at least two of the suggested types of equipments installed and maintained regularly in service.

One of the earliest installations is that of the Nashville, Chattanooga & St. Louis at Cowan, Tennessee. These machines have been operating since 1916 with an average issue

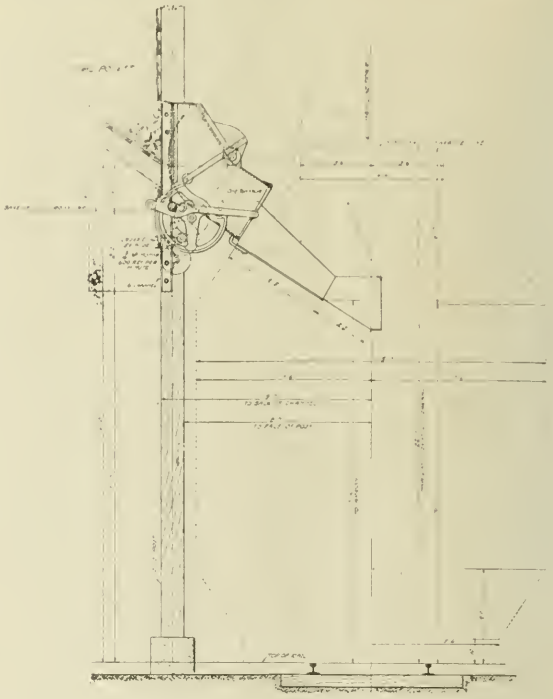


Fig. 1. **Coal Measuring Device, N. C. & St. L.**

of 200 tons of coal per day and have handled up to a recent date approximately 192,000 tons. This railroad also has six additional equipments of the same type at three other points. At one of these stations the record for the past twenty months, with no break-down, indicates 150,000 tons of coal issued, one device recording 88,234 tons.

Fig. 1 outlines the general arrangement of this type of measuring device and illustrates its application to an existing chute. This machine is operated with a two-horsepower electric motor in one continuous rotary movement in one direction. It is so designed that as the delivery gate is opened, the undercut gate arm rolls on the surface of the large cam, in that way locking it. When the undercut gate is down, ready to receive the issue of coal from the bin, the delivery gate is also locked, and these movements alternate so that it is impossible to have both gates open at the same time and thus release a bin full of coal. The ordinary operation is five cycles per minute. As first constructed, the cut gears used were made of cast iron. These broke in several instances so that all steel gears are now used with the equipment.

There is one feature in connection with the use of such power driven machinery as this which should be mentioned, and that is, that it is a practical necessity to have the coal

*Abstract of a report presented at the convention of the International Railway Fuel Association.

issued by the assigned operator at the coaling station. Such a mechanism should not be handled promiscuously by many different men, most of whom would know nothing beforehand of its construction or method of operation. This equipment, the same as other parts of mechanically operated coal chutes, requires regular and systematic attention and maintenance.

As illustrating the second type of measuring device, the Chicago, Milwaukee & St. Paul in 1918, installed the equipment shown in Fig. 2 on a 75-ton coal chute at Jack-

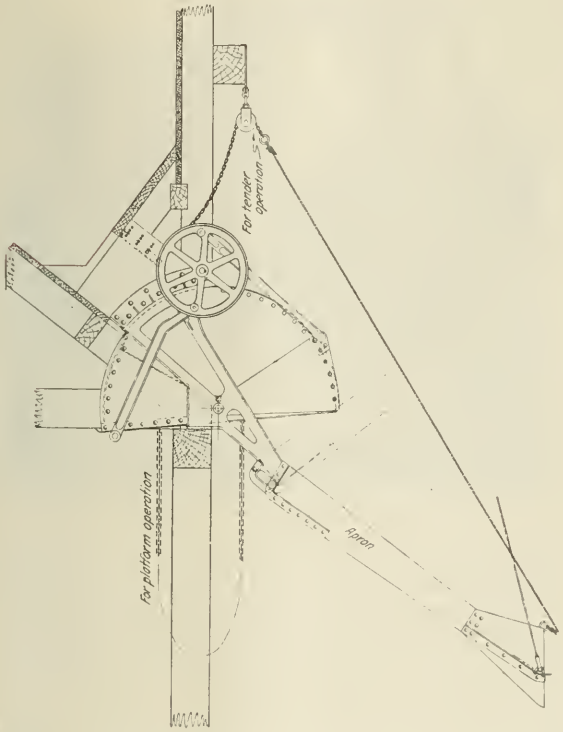


Fig. 2. Coal Measuring Device, Jackson, Minn., C. M. & St. P.

son, Minn. With this equipment the operator, after lowering the chute into position, discharges the coal from the measure by pulling on the operating rope. The locked-in position of the unbalanced measure is thus released and the entrained coal is discharged, the inlet gate being automatically closed. When the measured coal is all discharged, a second pull on the operating rope tilts the measure back again to the filling position, closes the outlet gate and opens the inlet gate. As the measure is again filled the operations are repeated. The reported time for taking five measures or five tons of coal is three minutes, that is, from the instant that the engine stopped in front of the chute until it started away. There are 14 engines taking coal at this point, averaging 5.8 tons per engine. A recent report on this particular installation advises that, "There is no question in our minds, however, but that this device gives much closer approximation to correct weights than the old method of estimating weights. The device appears to be satisfactory to all concerned and it costs much less to install than scales."

Discussions and reports presented at the convention from year to year have called attention to the necessity of delivering the coal into the storage bin in such a manner that the fine and coarse coal will not segregate, with the resulting effect that one locomotive tender will receive all coarse lump coal and the next one get only the fine and in some cases almost powdered coal. The coal should be delivered into the storage bin directly over the opening for the discharge of the coal to the locomotive tender. In other words, the coal should fall on the pile in the bin at a point directly

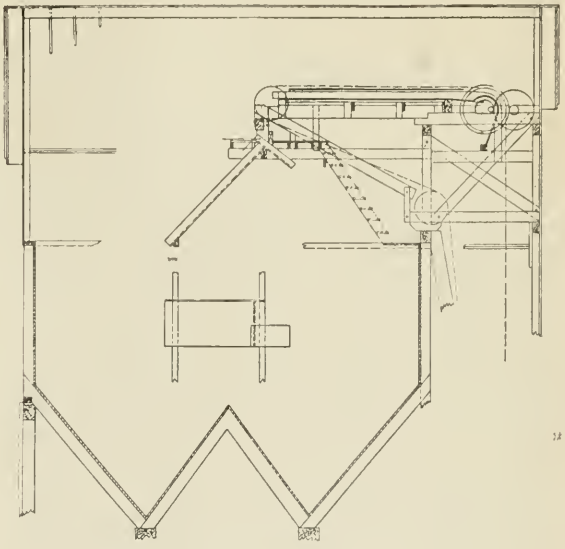


Fig 3. Improper Discharge of Coal to Storage Bins

over the discharge opening. The natural separation of the coarse coal toward the lower edge of the pile will not then materially affect a fairly uniform mixture of the coarse and fine coal at the point of discharge. As illustrating corrections necessary to overcome the difficulty of locomotives on one track receiving all fine coal and the locomotives on the

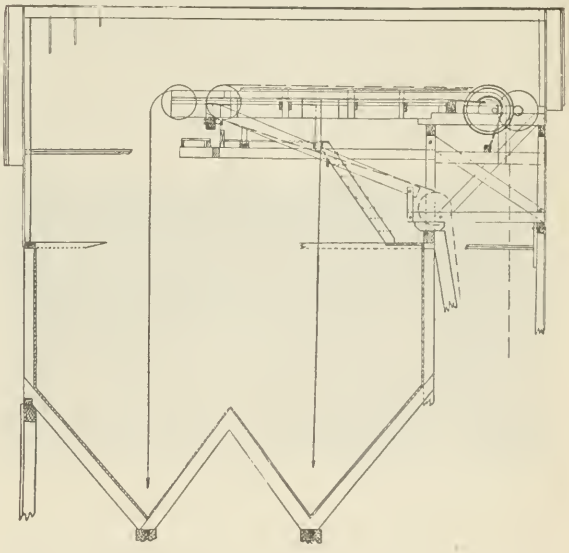


Fig. 4. Correction in Discharge of Coal to Storage Bin

second track receiving all coarse coal from the discharge openings of one bin, Figs. 3 and 4 are shown. Fig. 3 illustrates the arrangement which caused the trouble. The bucket conveyor delivered the coal over the idler at the center of the bin. The coal then dropped to the upper ends of

the two inclines shown, but in passing over the edge of the conveyor, practically all the lumps threw over onto the long incline and only fine coal dropped onto the short incline. Further, the momentum of the coal on the long incline was such that the coarse coal was all delivered on the pile against the left hand wall of the bin and as the bin was filled full only fine coal worked over the center ridge to the right hand discharge opening. By eliminating the inclines and providing a discharge opening in the conveyor directly over the center of the right half of the bin, coal is being delivered to each of the two tracks well and uniformly mixed.

Another railway reports satisfactory improvement in the mixing of the coarse and fine coal by the use of a baffle at the lower end of the distributing chutes. The purpose is to deflect the lumps downward so that they will fall vertically with the slack instead of falling over to one side of the pocket and there forming a mass of lump coal. However, this does not, as arranged, apparently entirely eliminate the separation trouble.

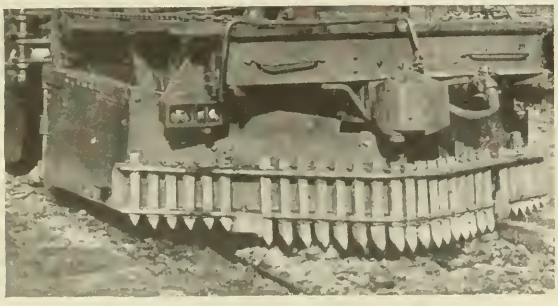
In the design of any fuel oil station advantage is usually taken as far as possible of gravity flow of the oil. In many cases, however, there is no opportunity for utilizing that flow, due to local topography and conditions surrounding the point where it is desired to locate the station. As a result many and various arrangements of facilities have been resorted to. The following illustrations, however, it is believed will indicate the general practice in handling this kind of fuel in storage and delivery plants.

[The report included a number of illustrations of typical fuel oil stations, which were presented without critical comment.—EDITOR.]

The report was signed by W. E. Dunham (Chairman), C. & N. W.; E. E. Barrett, J. C. Flanagan, J. W. Hardy, W. T. Krausch, R. A. Ogle, J. L. Rippey, C. F. Ludington, C. M. & St. P., and J. E. Nellegar.

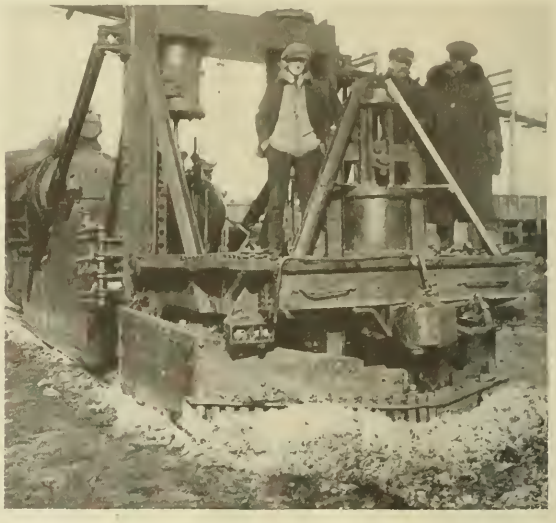
Using a Ballast Spreader to Remove Ice from Tracks

ICE BETWEEN THE RAILS, which has ordinarily been removed only by the laborious and expensive use of hand picks, has been cut out successfully during the past two winters with an attachment designed to fit on the plow front of a Jordan spreader, where it is held by special bolts without necessitating the removal of any parts from the spreader. A steel frame composed of a channel holds a series of 29 interchangeable chisels or steel teeth, arranged so that there are six on the outside of each rail and 17 between the two. Each chisel is held independently in the frame in such a way that it can be adjusted quickly to regulate the depth of cut below the top of rail, or it can be removed entirely for redressing. In this way the chisel teeth can be used for a long time, their term of life being limited only by their over-all length and the amount of metal removed on regrinding. Flanged shoes are fastened under the frame and the spreader plow front, which ride the rails in a manner similar to that of a snowplow and, besides doing considerable work in clearing the rail, act as a lining device to keep the attachment well centered between the rails.



How the Teeth Are Mounted in the Frame

In actual operation one man controls the spreader, raising and lowering the attachment by means of the air lift on the front plow in order to clear obstructions or to work in and around switches, etc. The results obtained have proved satisfactory in ice, frozen cinders, and similar materials encountered in winter operation at terminals and freight yards, which materials were easily broken out, leaving the rails clean and with a good flange-way.



Jordan Spreader With Ice Cutter Attached

This arrangement was devised by the Canadian Pacific and tried out during the fall of 1918 and spring of 1919 and proved so successful that over 20 of these attachments were in service on its Eastern lines during the past winter.

Aerial View of New Union Station at Washington, D. C.

General News Department

The Canadian National denies the reports which have appeared recently in various newspapers to the effect that business men of Western Canada have launched a movement for the flotation of a $5,000,000 bond issue to aid the completion of the Hudson Bay Railway.

Violation of the Lever Act, by participating in the switchmen's strike in April, charged against 31 railroad employees in the United States District Court at Los Angeles, Cal., resulted on June 19 in a verdict of guilty against five men; not guilty in the cases of 14, and disagreements in 12 cases.

H. R. Safford, assistant to the president of the Chicago, Burlington & Quincy and formerly chief engineer of the Grand Trunk, has received from Purdue University the honorary degree of Doctor of Engineering. Dr. Safford is this year president of the American Railway Engineering Association.

Airplanes in the service of the Post Office Department traveled during the month of May nearly 50,000 miles and only two forced landings were made because of mechanical trouble. Deliveries were made on time on more than 80 per cent of the trip except between Cleveland and Chicago, where the percentage was sixty-five.

A call has been issued for a convention of railroad employees at Chicago on June 29 to perfect the organization of "one big union," according to information received by the Department of Justice at Washington. The origin of the call has not yet been determined, but the department proposes to watch for such a meeting. The call was published in the Butte (Mont.) Daily Bulletin signed by "The Committee."

The American Train Despatchers' Association closed its annual meeting in New York City on Saturday, June 19. J. G. Luhrsen, of Spokane, Wash., was re-elected president, and C. L. Darling, Spokane, secretary and treasurer. The meeting decided that hereafter there shall be three vice-presidents, who are to devote their entire time to the work of the association; and those elected to these places were W. J. Potts, Little Rock, Ark.; O. H. Braese, of New York City, and A. M. Gorman, of Portland, Ore. On Thursday, the 17th, the association listened to an address by Henry M. Sperry, of New York, representative of the four principal signal companies, on Train Operation by Signal Indication.

"The Big Four Daily" is a four-page sheet which the Publicity Department of the Cleveland, Cincinnati, Chicago & St. Louis is printing each day in a car of the first section of the special train which was made up by that road and which is carrying Ohio democrats—fifteen carloads of them—to San Francisco, with the irresistible purpose of nominating the governor of their State, James M. Cox, for President of the United States. The price of this paper is $5 a copy, but it is "given away to friends of the New York Central Lines." It starts out with a Democratic tone and the first page bears a portrait of Governor Cox; but further along the editor declares that in politics he is neutral; and the thing on his mind for the most of the time is to advertise the New York Central Lines. One page is taken up with the names of the occupants of the 15 sleeping cars. Copies of the paper will be "mailed when printed," the publication being "entered at the nearest post office as first-class mail matter."

Earnings for April—Large Deficit

During the first four months of this year the railroads of the United States have earned a net operating income of only about $5,000,000, although the government has been guaranteeing them approximately $75,000,000 a month. This appears from a partial summary for April and four months issued by the Interstate Commerce Commission, in which, however, four large roads and 21 smaller ones are missing. The net operating income for four months is shown as $55,059,637, as compared with $51,575,726, for the first four months of 1919; but this includes about $50,000,000 back mail pay taken into the January accounts. For April the roads reporting show a deficit of $15,625,529, as compared with a net for April, 1919, of $20,703,196. The complete reports for March and April have been delayed by the accounting complications resulting from the termination of federal control. The partial summary as issued by the commission is given in the double column table:

OPERATING REVENUES, EXPENSES AND INCOME; MONTH OF APRIL AND FOUR MONTHS JANUARY 1—APRIL 30

	Freight	Passenger	Railway operating revenues	Maintenance of way and structures	Maintenance of equipment	Railway operating expenses	Net railway operating income	War taxes	Miles of road operated
Eastern District:									
April, 1920	$83,953,055	$28,010,597	$127,080,772	$20,358,888	$39,127,770	$133,157,076	(D)$14,729,880	$659,082	$48,930.35
April, 1919	85,314,244	27,753,848	126,544,195	17,993,777	32,094,442	115,359,535	4,825,292	.....	48,829.35
Four months 1920	383,194,558	105,072,935	566,450,062	72,365,471	161,707,799	556,329,360	(D)18,471,876	1,125,688	48,811.73
Four months 1919	336,347,950	101,948,673	489,357,697	69,169,344	129,379,999	462,501,384	2,436,914	.....	48,835.72
Southern District:									
April, 1920	49,545,537	14,896,400	70,035,994	11,401,800	18,341,783	64,619,155	2,388,913	457,742	43,762.81
April, 1919	44,301,482	15,368,521	64,168,922	10,756,575	16,095,283	56,506,686	5,281,911	.....	43,299.75
Four months 1920	213,381,850	58,154,951	303,566,328	44,858,783	73,680,201	261,695,149	30,680,201	720,652	43,653.85
Four months 1919	173,162,782	62,593,150	252,480,284	41,608,269	63,370,254	223,688,097	18,328,727	.....	43,288.87
Western District:									
April, 1920	89,700,717	30,273,317	131,768,979	27,241,935	32,014,685	124,562,554	(D) 3,284,562	969,324	109,901.75
April, 1919	85,238,753	27,651,320	122,138,226	22,829,174	27,094,470	104,710,569	10,595,993	.....	109,622.96
Four months 1920	395,377,124	120,371,053	584,159,531	92,683,626	132,141,160	502,842,902	42,851,312	1,940,332	109,856.57
Four months 1919	354,356,352	108,037,234	475,293,306	80,202,028	111,603 160	418,587,612	30,810,085	.....	109,618.26
United States:									
April, 1920	223,199,309	73,180,314	328,885,745	59,002,623	89,484,238	322,338,785	(D) 15,625,529	2,086,148	202,594.91
April, 1919	214,854,479	70,773,689	312,851,343	51,579,526	75,284,195	276,576,790	20,703,196	.....	201,752.06
Four months 1920	991,953,532	283,598,939	1,454,175,921	209,907,880	367,529,160	1,320,867,411	55,059,637	3,786,672	202,322.15
Four months 1919	843,867,084	272,579,057	1,217,131,287	190,979,641	304,353,413	1,104,777,093	51,575,726	.....	201,742.85

NOTE—Federal lap-over items settled during the month are included in the above compilation for those roads that have indicated that estimates were not included for substantially all unaudited corporate items.

The figures for four months include the back mail pay, which was included in the accounts for the month of January to the extent of approximately $50,000,000.

The war taxes of the corporations are included in the figures for March and April, 1920, only.

In making comparisons with the federal figures for 1919, it should be noted that in addition to war taxes, the corporate figures for 1920 include some items classified principally under general expenses, that did not enter into the accounting for the expenses of federal control.

It should also be noted that hire of equipment charges and credits are now made between roads, which was not done for the corresponding months of 1919. This may affect the comparison of net railway operating income as between districts, but not for the country as a whole.

This summary omits reports of the Pennsylvania, the Pittsburgh, Cincinnati, Chicago & St. Louis, the Chicago, Burlington & Quincy, and the Southern Pacific, as well as 21 smaller roads which have not filed their reports.

REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF CALENDAR YEAR, 1920

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Passenger.	Total (Inc. misc.)	Operating expenses: Maintenance of Way and structures.	Maintenance of Equipment.	Traffic.	Transportation.	General.	Total.	Operating ratio.	Net from railway operation	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Vicks., Shreveport & Pacific	171	$207,632	$91,405	$323,974	$40,181	$60,076	$4,857	$123,671	$10,981	$243,138	75.04	[illegible]	[illegible]	[illegible]	[illegible]
Virginian	523	1,151,646	58,303	1,330,778	125,765	262,912	6,828	499,998	27,807	926,182	69.59	[illegible]	[illegible]	[illegible]	[illegible]
Wabash	2,472	3,301,755	747,368	4,373,493	654,320	968,115	76,239	2,296,580	146,165	4,169,273	75.33	[illegible]	[illegible]	[illegible]	[illegible]
Western Maryland	797	1,268,014	78,991	1,440,572	227,799	459,408	18,912	535,049	44,565	1,299,516	90.21	[illegible]	[illegible]	[illegible]	[illegible]
Western Pacific	1,011	762,643	141,136	949,719	171,686	180,926	29,317	352,934	36,684	791,695	83.36	[illegible]	[illegible]	[illegible]	[illegible]
Wheeling & Lake Erie	511	902,585	61,085	1,039,054	140,682	312,423	7,824	501,280	32,937	998,380	96.09	[illegible]	[illegible]	[illegible]	[illegible]
Wichita Falls & N. W.	328	175,306	34,198	222,846	43,309	23,155	194	78,354	35,003	180,015	80.78	[illegible]	[illegible]	[illegible]	[illegible]
Wichita Valley	256	112,314	33,715	152,759	30,904	7,593	3	57,940	711	97,125	63.57	[illegible]	[illegible]	[illegible]	[illegible]
Alabama & Vicksburg	141	484,162	200,419	778,300	113,816	159,606	15,281	300,025	28,977	626,910	80.54	151,3	[illegible]	112,376	[illegible]
Alabama Great Southern	312	1,846,436	501,023	2,606,650	315,918	655,438	53,332	946,670	60,434	2,047,558	78.55	559,1	[illegible]	475,515	[illegible]
Atchison, Topeka & Santa Fe	8,682	34,650,246	12,079,808	53,043,814	6,418,362	11,278,170	474,193	17,079,889	799,184	36,042,544	67.94	17,0	[illegible]	[illegible]	[illegible]
Atlanta, Birmingham & Atlantic	639	1,034,965	206,130	1,418,105	270,516	396,614	50,036	695,864	42,538	1,455,762	102.66	[illegible]	[illegible]	[illegible]	[illegible]
Atlantic City	177	326,607	368,568	755,046	134,791	103,852	3,317	526,355	3,537	772,132	102.26	17	[illegible]	[illegible]	[illegible]
Atlantic & St. Lawrence	166	642,511	82,594	767,893	192,709	186,206	8,896	514,384	44,477	949,833	123.6	[illegible]	[illegible]	[illegible]	[illegible]
Baltimore & Ohio Chicago Terminal	90	.....	.....	646,864	70,831	156,632	3,507	471,796	33,487	748,628	115.73	[illegible]	[illegible]	[illegible]	[illegible]
Atlantic Coast Line	4,891	12,293,817	5,049,963	19,338,194	2,292,892	3,630,480	223,097	8,119,240	364,633	14,786,838	76.46	4,251,3	[illegible]	[illegible]	[illegible]
Baltimore, Chesapeake & Atlantic	87	172,675	55,475	257,706	23,869	121,560	3,016	189,106	11,242	348,793	135.34	—91,0	[illegible]	[illegible]	[illegible]
Bangor & Aroostook	658	1,076,917	228,140	1,451,593	361,721	400,179	11,601	647,324	42,308	1,482,460	102.13	[illegible]	[illegible]	[illegible]	[illegible]
Beaumont, Sour Lake & Western	118	362,785	87,433	476,044	112,696	61,135	5,434	153,512	14,391	347,068	72.91	128,9	[illegible]	[illegible]	[illegible]
Belt Ry. Co. of Chicago	31	.....	.....	1,167,876	87,434	229,026	1,220	742,096	22,712	1,082,490	92.68	85,3	[illegible]	[illegible]	[illegible]
Bessemer & L. E.	217	1,671,062	108,327	1,879,057	180,216	964,106	32,079	844,829	77,034	2,116,433	112.63	—237,3	[illegible]	[illegible]	[illegible]
Bingham & Garfield	36	428,429	5,436	440,300	88,197	107,425	5,239	104,668	10,052	321,429	73.00	118,8	[illegible]	[illegible]	[illegible]
Birmingham Southern	31	86,372	.....	121,651	12,181	19,729	3,259	78,373	10,288	123,839	101.79	—2,1	[illegible]	[illegible]	[illegible]
Boston & Maine	2,304	10,245,198	4,939,758	17,464,724	3,118,411	4,443,232	124,848	11,203,450	588,326	19,552,437	111.95	—2,087,7	[illegible]	[illegible]	[illegible]
Buffalo, Rochester & Pitts.	589	3,546,951	382,141	4,101,744	539,869	1,498,128	42,197	2,027,463	98,584	4,213,254	102.71	—111,5	[illegible]	[illegible]	[illegible]
Canadian Pacific Lines in Maine	233	671,682	267,278	915,353	128,949	230,951	8,692	659,487	10,612	1,038,692	113.47	—123,3	[illegible]	[illegible]	[illegible]
Central New England	301	1,132,410	71,375	1,285,484	390,083	478,105	8,224	931,202	46,991	1,854,877	144.29	—569,3	[illegible]	[illegible]	[illegible]
Central of Georgia	1,924	3,962,080	1,534,265	6,465,315	1,019,132	1,235,540	122,519	2,658,908	196,636	5,242,151	81.08	1,225,1	[illegible]	[illegible]	[illegible]
Central Vermont	413	998,399	249,063	1,446,445	222,625	477,552	33,640	1,065,372	55,042	1,861,280	128.67	—414,8	[illegible]	[illegible]	[illegible]
Charleston & W. Carolina	342	644,431	152,373	842,589	172,781	198,951	11,982	432,127	5,746	821,587	97.51	21,0	[illegible]	[illegible]	[illegible]
Chesapeake & Ohio	2,516	15,024,820	2,189,381	18,856,924	2,463,159	5,009,457	145,025	7,772,457	388,297	15,863,592	84.12	2,993,3	[illegible]	[illegible]	[illegible]
Chicago & Alton	1,050	4,531,055	1,390,220	6,787,146	742,147	1,889,694	75,394	3,262,440	173,916	6,176,499	91.00	610,6	[illegible]	[illegible]	[illegible]
Chicago & E. Illinois	1,111	4,888,851	1,204,574	7,301,144	588,649	2,282,261	65,261	3,052,862	178,948	6,200,337	84.92	1,100,8	[illegible]	[illegible]	[illegible]
Chicago & Erie	269	2,153,925	169,722	2,654,948	227,863	509,192	36,891	1,561,818	80,362	2,426,187	91.38	228,7	[illegible]	[illegible]	[illegible]
Chicago Great Western	1,496	3,757,245	1,287,511	5,818,119	673,244	1,494,180	82,617	2,868,359	150,610	5,317,211	91.39	500,9	[illegible]	[illegible]	[illegible]
Chicago Junction	12	.....	.....	931,056	132,801	190,331	1,183	782,001	23,146	1,129,463	121.30	198,4	[illegible]	[illegible]	[illegible]
Chicago, Milwaukee & St. Paul	10,628	26,636,072	6,698,082	39,242,809	5,091,142	10,140,779	285,717	20,207,336	1,101,165	37,031,218	94.36	2,211,5	[illegible]	[illegible]	[illegible]
Cincinnati, Ind. & Western	321	787,383	150,673	1,074,558	143,266	382,237	20,340	492,021	46,405	1,087,170	101.17	—12,6	[illegible]	[illegible]	[illegible]
Cincinnati, New Orleans & Texas Pacific	337	3,355,578	893,082	4,748,479	583,379	1,256,321	91,710	1,754,518	109,933	3,838,416	80.83	910,0	[illegible]	[illegible]	[illegible]
Cincinnati Northern	251	655,759	57,783	772,269	70,182	152,101	9,489	291,429	15,618	538,796	69.76	—33,4	[illegible]	[illegible]	[illegible]
Cleveland, Cincinati, Chicago & St. L.	2,408	14,487,582	3,924,075	21,167,602	1,565,050	3,921,738	318,094	8,481,970	357,539	14,770,214	69.77	6,397,3	[illegible]	[illegible]	[illegible]
Colorado & Southern	1,099	2,486,488	553,247	3,421,825	380,395	738,982	31,271	1,190,215	113,924	2,476,020	72.35	945,8	[illegible]	[illegible]	[illegible]
Colorado & Wyoming	43	44,239	2,529	187,550	31,652	46,335	711	94,647	11,806	185,151	98.72	2,3	[illegible]	[illegible]	[illegible]
Delaware, Lack. & Western	955	11,494,138	2,654,408	16,511,302	1,674,723	4,152,298	211,634	9,036,777	376,474	15,640,868	94.72	870,4	[illegible]	[illegible]	[illegible]
Denver & Rio Grande	2,585	6,952,660	1,316,528	9,065,616	921,857	2,133,029	89,813	3,090,017	217,711	6,583,973	72.63	2,481,6	[illegible]	[illegible]	[illegible]
Denver & Salt Lake	255	533,444	73,757	645,873	181,267	312,531	2,684	430,458	20,405	947,346	146.67	—301,4	[illegible]	[illegible]	[illegible]
Detroit & Mackinac	376	271,449	97,872	425,231	70,458	135,334	8,621	243,704	32,522	490,587	115.36	— 65,3	[illegible]	[illegible]	[illegible]
Detroit, Toledo & Ironton	454	1,014,442	41,411	1,148,106	160,770	252,665	14,322	599,864	47,199	1,073,238	93.47	74,8	[illegible]	[illegible]	[illegible]
Duluth & Iron Range	292	267,438	67,922	397,609	195,085	304,115	1,685	380,206	45,141	927,432	233.25	—529,8	[illegible]	[illegible]	[illegible]
Dulnth, Missabe & Northern	407	292,001	131,631	521,648	373,048	542,664	6,783	516,444	50,979	1,494,837	286.56	—973,1	[illegible]	[illegible]	[illegible]
Duluth, South Shore & Atlantic	614	586,857	240,223	1,031,085	185,006	242,516	15,019	677,625	32,862	1,167,673	113.24	—136,5	[illegible]	[illegible]	[illegible]
Duluth, Winnipeg & Pacific	178	486,344	88,428	584,969	67,664	114,507	7,690	284,571	24,803	499,240	85.34	85,7	[illegible]	[illegible]	[illegible]
El Paso & Southwestern	1,027	2,662,953	656,318	3,628,291	723,388	662,490	33,925	961,201	92,459	2,493,669	68.72	1,134,6	[illegible]	[illegible]	[illegible]
Elgin, Joliet & Eastern	832	4,718,812	12	5,558,213	423,758	1,331,836	18,674	2,272,628	94,310	4,141,059	75.49	1,417,1	[illegible]	[illegible]	[illegible]
Erie	1,989	17,890,667	2,944,368	23,701,545	2,561,607	8,108,414	200,095	12,742,453	625,286	24,411,682	102.99	710,1	[illegible]	[illegible]	[illegible]
Florida East Coast	764	1,945,803	1,473,695	3,992,819	372,518	558,569	30,872	1,313,306	66,160	2,381,299	59.63	1,611,5	[illegible]	[illegible]	[illegible]
Fonda, Johnstown & Gloversville	88	103,253	194,353	312,858	43,060	29,298	1,298	119,204	15,543	208,405	66.61	104,4	[illegible]	[illegible]	[illegible]
Ft. Smith & Western	253	337,944	87,784	454,658	110,763	112,039	12,231	202,494	20,109	461,302	101.46	—6,6	[illegible]	[illegible]	[illegible]
Ft. Worth & Denver City	454	1,828,114	890,622	2,924,130	439,451	641,211	15,952	1,301,201	91,946	2,496,532	85.37	427,5	[illegible]	[illegible]	[illegible]
Ft. Worth & Rio Grande	235	269,334	183,241	493,829	120,420	77,192	5,941	274,229	19,849	497,631	100.76	—3,8	[illegible]	[illegible]	[illegible]
Galveston Wharf	13	.....	.....	274,365	74,399	5,416	574	120,721	6,190	249,081	90.78	25,2	[illegible]	[illegible]	[illegible]
Georgia	328	1,056,801	394,487	1,568,487	181,682	331,937	31,771	863,951	50,035	1,459,990	93.08	108,4	[illegible]	[illegible]	[illegible]
Georgia, Southern & Fla.	402	830,357	444,089	1,444,305	203,106	330,541	22,483	642,724	36,233	1,243,737	86.11	200,5	[illegible]	[illegible]	[illegible]
Grand Trunk Western Ry. Co.	350	2,923,691	557,820	3,879,829	303,003	1,120,982	46,691	1,786,279	113,635	3,391,571	87.41	488,2	[illegible]	[illegible]	[illegible]
Great Northern	8,176	15,813,091	4,278,826	25,117,871	4,421,071	5,797,195	174,951	12,005,853	512,964	23,291,034	92.72	1,826,8	[illegible]	[illegible]	[illegible]
Gulf & Ship Island	307	478,553	131,973	692,001	184,156	169,858	16,296	280,788	31,949	684,308	98.88	7,6	[illegible]	[illegible]	[illegible]
Gulf, Colorado & Santa Fe	1,927	4,485,163	1,442,595	6,623,579	1,539,062	1,207,618	59,582	2,655,884	162,553	5,601,070	84.56	1,022,5	[illegible]	[illegible]	[illegible]
Gulf, Mobile & Northern	469	627,761	156,929	886,415	257,311	204,135	28,547	377,677	36,907	904,577	102.04	—18,1	[illegible]	[illegible]	[illegible]
Hocking Valley	350	2,840,889	286,132	3,312,720	322,310	1,060,217	38,076	1,312,720	86,230	2,819,548	85.11	493,1	[illegible]	[illegible]	[illegible]
Indiana Harbor Belt	120	.....	.....	2,047,334	282,853	451,757	6,811	1,446,544	53,724	2,241,688	109.49	194,3	[illegible]	[illegible]	[illegible]

REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF CALENDAR YEAR, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses					Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of									
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
International & Great Northern	1,159	$3,052,297	$757,758	$4,306,792	$1,009,334	$1,110,967	$48,622	$2,099,088	$130,797	$4,419,233	102.61	—$112,440	$97,503	—$210,780	$271,682
Kanawha & Michigan	176	878,306	137,404	1,075,068	144,889	406,587	7,333	423,950	36,133	1,019,497	94.83	55,570	75,000	—19,431	309,063
Kansas City, Mexico & Orient	272	311,970	51,496	401,103	142,267	148,331	11,168	223,535	27,547	552,848	137.84	151,146	23,115	174,910	39,179
Kansas City, Mexico & Orient of Texas	465	335,298	67,991	455,985	144,713	161,000	9,561	227,068	31,681	574,023	125.88	—188,039	18,919	137,786	80,884
Kansas City Southern	774	3,249,837	684,809	4,389,235	581,998	1,055,317	81,079	1,721,706	142,296	3,580,871	81.58	808,364	180,042	627,055	482,246
Lake Erie & Western	741	2,074,575	186,222	2,457,205	267,666	719,446	46,246	1,104,869	71,323	2,209,550	89.92	247,655	135,001	110,853	154,791
Lake Superior & Ishpeming	34	16,559	814	20,870	56,946	54,953	717	30,430	7,687	150,733	722.24	—129,864	12,683	—142,546	—19,845
Lake Terminal	12	.....	830	288,613	34,800	71,014	.....	209,392	—99	315,305	109.24	—26,692	17,582	—44,274	—56,479
Lehigh & New England	230	946,555	7,314	995,938	105,811	243,496	25,085	379,795	36,010	788,069	79.13	207,869	49,523	158,346	156,922
Lehigh Valley	1,435	12,650,634	1,446,251	15,605,287	2,193,440	4,892,592	130,900	9,094,180	309,293	16,680,835	106.89	—1,075,548	528,000	—1,604,416	—1,458,814
Long Island	398	1,465,510	2,630,511	4,721,077	769,497	1,197,371	35,039	3,301,045	155,853	5,494,788	116.38	—773,711	310,764	—1,086,037	—792,140
Los Angeles & Salt Lake	1,168	2,890,710	1,274,614	4,654,826	586,477	841,588	53,527	1,583,870	96,732	3,295,649	70.80	1,359,176	635,160	1,123,220	375,442
Louisiana & Ark	302	856,251	153,664	1,072,208	153,184	139,515	12,351	351,580	23,039	678,280	63.26	393,928	44,509	349,355	388,618
Louisiana Ry. & Nav Co	343	811,881	118,461	980,144	246,740	172,961	12,393	411,939	31,228	875,261	89.29	104,883	42,000	62,834	165,071
Louisville & Nashville	5,040	20,656,511	5,732,341	29,656,679	4,751,444	7,764,473	565,289	12,708,663	622,173	26,562,006	89.56	3,094,672	975,813	2,116,433	—283,901
Louisville, Henderson & St. Louis	199	495,908	163,371	747,331	126,394	93,249	13,389	267,844	24,716	525,592	70.32	221,739	—5,932	227,659	106,171
Maine Central	1,216	2,539,394	957,163	3,969,179	916,507	1,133,760	30,395	2,572,858	123,475	4,777,379	120.36	—808,200	261,225	—1,069,570	—513,962
Maryland, Delaware & Virginia	82	127,769	47,534	191,156	21,160	104,860	1,797	167,347	7,196	302,360	158.17	—111,204	6,000	—117,204	100,660
Michigan Central	1,862	13,881,201	4,044,482	20,489,948	1,802,756	4,610,894	179,494	9,088,837	345,932	16,336,054	79.72	4,153,894	735,000	3,416,681	632,165
Mineral Range	101	140,744	815	146,884	41,950	58,361	889	93,815	3,001	198,016	134.81	51,131	10,800	—61,931	—68,355
Minneapolis & St. Louis	1,646	2,803,714	673,511	3,855,960	382,104	997,343	43,768	1,953,261	96,969	3,474,735	90.11	381,224	169,211	211,704	623,411
Minneapolis, St. Paul & Sault Ste. Marie	4,243	6,412,629	1,778,619	9,406,766	1,453,867	2,182,249	89,911	4,971,631	256,177	9,001,541	95.69	405,225	828,792	—423,743	—988,683
Minnesota & International	194	210,177	89,744	326,238	26,188	61,682	1,537	176,634	11,452	277,493	85.05	48,745	16,380	32,343	39,637
Mississippi Central	164	140,321	60,343	225,841	103,922	99,950	5,735	152,627	25,901	388,135	171.86	—162,294	11,216	—173,671	—133,184
Missouri & North Arkansas	365	284,469	130,915	470,388	162,678	97,514	7,999	236,034	24,898	529,123	112.48	—58,734	18,376	—77,143	—126,031
Missouri, Kansas & Texas Railroad	1,715	6,201,776	1,870,035	9,156,868	1,467,121	2,518,488	93,804	3,227,178	282,406	7,639,384	83.43	1,517,484	329,968	1,186,109	1,032,267
Missouri, Kansas & Texas of Texas	1,777	3,962,619	2,090,536	6,927,011	1,509,265	1,504,287	78,804	4,180,304	240,852	7,594,957	109.64	—667,947	178,624	—845,118	—591,144
Missouri Pacific	7,299	19,865,087	4,447,557	27,947,009	4,863,901	5,899,572	318,916	11,447,123	710,660	23,455,247	83.56	4,591,762	980,581	3,605,319	3,790,179
Mobile & Ohio	1,018	3,666,441	538,540	4,646,048	741,119	1,371,253	87,316	2,121,793	133,931	4,457,952	95.95	188,097	182,652	5,136	440,022
Monongahela Connecting	7	.....	.....	730,126	71,747	107,451	1,674	329,128	18,261	528,263	72.35	201,863	8,621	193,243	267,276
Montour R. R	56	189,752	4,052	202,433	54,584	117,130	3,256	97,576	20,014	297,581	147.00	95,148	7,040	102,189	—3,056
Nashville, Chattanooga & St. L	1,247	3,849,832	1,202,723	5,786,995	838,460	1,818,339	160,460	2,403,541	142,447	5,398,429	93.28	388,429	134,500	253,034	667,246
Nevada Northern	166	427,510	29,416	473,240	86,490	89,756	2,379	127,381	13,436	319,863	67.59	153,377	24,802	128,575	20,130
New Jersey & New York	47	43,578	236,776	307,907	29,017	55,679	4,923	199,021	6,673	295,313	95.90	12,593	7,654	4,933	27,767
New Orleans & N. E	203	1,405,872	286,726	1,936,907	299,849	401,632	35,091	716,739	44,068	1,509,190	77.92	427,716	112,023	315,274	382,520
New Orleans Great Northern	284	472,162	120,323	619,940	124,680	148,648	9,283	249,063	26,676	559,589	90.26	60,351	34,031	26,282	18,593
New Orleans, Texas & Mexico	191	394,162	118,895	556,485	151,527	104,078	10,835	189,688	21,603	478,200	85.93	78,284	34,167	44,031	52,299
New York Central	6,065	42,436,642	18,721,096	76,752,473	7,661,268	18,377,802	727,479	40,164,645	1,995,243	70,175,805	91.43	6,576,667	2,872,969	3,692,732	—1,899,575
New York, Chicago & St. L	574	6,110,121	235,831	6,617,836	571,458	1,238,380	105,335	3,026,731	186,955	5,141,741	77.69	1,476,095	145,000	1,329,306	—41,680
New York, New Haven & Hartford	1,965	10,974,867	10,530,870	26,321,911	3,941,721	6,455,254	130,515	14,788,754	880,979	26,691,202	101.40	—369,291	967,000	—1,341,919	—535,019
New York, Susquehanna & Western	135	677,142	193,706	1,002,034	135,324	258,995	8,052	854,222	24,884	1,281,477	127.88	—279,443	71,935	—354,368	—291,790
Newburg & South Shore	7	.....	.....	399,855	39,848	92,014	.....	250,030	12,819	394,711	98.71	5,144	23,076	—17,932	65,143
Norfolk & Western	2,202	14,474,248	1,964,771	17,877,488	2,561,784	6,735,960	153,775	7,848,970	382,252	17,777,916	99.44	99,572	995,000	—897,001	—3,210,185
Northern Pacific	6,646	18,229,389	4,297,422	25,821,403	3,550,742	5,650,588	232,516	10,666,201	676,892	21,116,370	81.72	4,705,032	2,319,187	2,382,259	—642,417
Northwestern Pacific	538	825,217	497,507	1,538,730	373,703	225,496	15,667	716,348	44,434	1,382,465	89.84	156,265	76,774	79,033	200,696
Northern Alabama	110	308,116	41,414	385,641	81,428	17,315	4,907	168,646	4,730	277,027	71.84	108,614	11,964	96,599	109,674
Panhandle & Santa Fe	772	1,361,596	401,125	1,956,148	408,326	667,080	11,799	849,729	49,529	1,984,790	101.46	—28,642	61,311	—89,885	318,276
Peoria & Pekin Union	19	104,726	12,086	447,312	37,515	108,161	851	269,069	13,255	488,850	95.87	—18,462	28,500	—10,038	110,395
Perkiomen	41	241,018	25,856	291,356	24,123	12,673	42	124,752	764	162,408	55.74	128,948	3,966	124,982	35,378
Phila. & Reading	1,126	16,815,071	2,365,248	20,525,539	1,894,158	6,691,362	131,236	10,598,139	457,357	19,834,219	96.62	691,320	341,612	349,198	2,047,947
Phila., Bethlehem & N. E	71	.....	.....	238,346	40,730	40,613	1,230	221,453	4,838	308,865	129.58	—70,520	3,090	—73,610	—105,835
Pitts. & W. Va	63	380,938	26,259	458,233	93,685	223,790	5,046	200,461	21,982	570,132	124.41	—111,899	42,622	—155,047	29,179
Pitts. & Shawmut	103	376,053	14,467	393,867	69,794	95,212	4,518	149,948	13,298	332,769	84.48	61,098	335	60,763	131,042
Port Reading	21	405,884	.....	567,382	43,909	49,136	62	336,679	5,574	435,360	76.73	132,022	8,758	123,264	—6,929
Richmond, Fred. & Potomac	116	1,325,946	930,664	2,968,557	218,436	454,065	23,980	1,140,530	68,411	1,916,208	64.55	1,052,349	82,417	969,909	—436,607
Rutland	415	596,609	297,986	1,156,601	199,108	310,915	15,885	695,083	41,526	1,267,210	109.56	—110,609	56,657	—167,276	37,178
St. Joseph & Grand Island	258	620,623	114,851	810,951	154,993	134,887	6,265	426,504	37,886	762,343	94.00	48,608	33,711	14,859	102,476
St. Louis, Brownsville & Mexico	548	970,044	521,013	1,655,989	424,373	331,543	20,631	555,495	66,035	1,394,174	84.19	261,814	31,900	229,376	—81,491
St. Louis-San Francisco	4,761	14,752,698	5,435,533	21,472,623	3,077,068	4,648,075	177,776	8,898,456	621,341	17,392,305	80.99	4,080,318	672,834	3,402,757	1,545,192
St. Louis, San Francisco & Texas	134	323,912	54,643	410,144	88,094	75,431	5,682	251,418	19,203	439,829	107.26	—29,685	5,640	—35,334	19,443
San Antonio & Aransas Pass	736	658,706	254,171	1,074,804	404,272	338,192	18,539	564,359	54,297	1,379,143	128.31	—304,339	45,000	349,608	—87,297
Seaboard Air Line	3,562	8,584,647	2,481,047	13,166,753	1,831,259	2,649,874	243,863	6,064,157	342,771	11,305,812	85.86	1,860,940	450,000	1,409,099	869,703
South Buffalo	11	117,663	.....	293,042	18,146	47,887	1,329	192,538	4,699	264,598	90.29	28,444	—10,740	17,704	67,698
Southern	6,971	24,389,692	7,753,319	37,404,561	5,187,380	7,189,667	471,494	16,366,953	895,346	30,470,656	81.46	6,933,905	1,152,531	5,776,295	4,305,200
Southern Ry. in Miss	278	515,029	154,727	531,339	131,219	76,458	9,696	257,368	14,329	489,072	92.05	42,267	29,400	12,850	41,148
Spokane International	156	305,853	52,343	368,518	45,537	33,081	7,032	117,513	15,572	218,572	59.31	149,945	14,858	135,049	95,318
Spokane, Portland & Seattle	538	1,404,416	409,256	2,064,380	381,646	232,607	18,585	686,189	66,814	1,419,122	70.80	585,258	235,003	349,913	205,765
Staten Island Rapid Transit	23	238,156	211,776	485,994	85,921	113,592	3,734	314,199	27,685	545,131	112.16	—59,137	45,000	—104,137	—108,302
Tennessee Central	292	516,064	125,176	714,418	132,008	160,603	13,955	336,743	29,024	672,333	94.11	42,086	15,899	26,182	170,894
Texas & Ft. Smith	87	289,466	65 909	415,433	56,400	55,368	2 827	103,052	10,149	229,936	55.34	185,498	46,916	138,564	103,467

REVENUES AND EXPENSES OF RAILWAYS

THREE MONTHS OF CALENDAR YEAR, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Operating revenues: Passenger.	Operating revenues: Total (Inc. misc.)	Operating expenses: Maintenance of Way and structures.	Operating expenses: Maintenance of Equipment.	Operating expenses: Traffic.	Operating expenses: Transportation.	Operating expenses: General.	Operating expenses: Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
Texas & Pacific	1,946	$5,867,545	$2,962,260	$9,847,624	$1,744,244	$2,207,373	$104,955	$4,327,255	$233,026	$8,741,274	88.76	$1,106,350	$367,[illegible]45	[illegible]	[illegible]
Toledo & Ohio Central	458	2,228,064	188,306	2,568,734	247,850	784,233	34,160	1,236,746	54,445	2,366,663	92.13	202,071	112,274	89,767	[illegible]
Toledo, Peoria & Western	247	286,935	151,184	498,981	52,530	108,999	6,863	249,499	19,796	437,683	87.71	61,298	[illegible]	[illegible]	[illegible]
Toledo, St. Louis & Western	454	2,170,904	90,260	2,434,196	305,869	491,921	22,514	1,097,972	34,465	1,952,688	80.21	481,507	93,[illegible]0	[illegible]	[illegible]
Trinity & Brazos Valley	368	395,678	58,061	487,996	230,561	150,577	5,326	232,839	23,942	643,245	131.81	—155,249	26,771	—182,115	[illegible]
Ulster & Delaware	128	103,037	43,605	236,543	50,042	60,506	4,655	169,268	17,725	303,593	128.34	67,051	15,[illegible]	—82,04[illegible]	1,5[illegible]3
Union R. R. of Penna.	40	......	......	1,852,299	182,965	610,204	851	1,261,317	23,509	2,078,847	112.18	—226,548	[illegible]	[illegible]	451,361
Union Pacific	3,614	20,578,714	4,505,771	29,715,949	3,177,149	5,285,514	155,913	8,907,710	787,184	18,969,903	63.83	10,746,045	1,014,[illegible]	9,7[illegible]	[illegible]
Utah	98	494,250	1,662	497,257	35,519	88,268	606	117,953	7,515	249,86[illegible]	50.24	247,395	14,156	233,240	13[illegible],593
Vicks., Shreveport & Pacific	171	671,961	277,992	1,061,011	117,712	187,595	19,067	429,309	31,008	795,976	75.02	265,035	37,445	227,5[illegible]	[illegible]
Virginian	523	2,971,835	166,599	3,521,079	364,197	740,852	15,265	1,475,892	62,522	2,658,772	75.51	862,3[illegible]	15[illegible],061	710,239	[illegible]
Wabash	2,472	9,571,524	2,235,995	13,531,433	1,831,559	3,545,582	194,346	6,863,036	401,496	12,911,296	95.41	620,136	375,760	242,554	[illegible]
Western Md.	725	3,613,839	227,530	4,180,650	745,177	1,657,999	124,477	1,629,178	130,085	4,324,554	103.44	—143,904	136,4[illegible]	[illegible]	[illegible]
Western Pacific	1,031	2,742,940	399,241	3,335,452	568,537	610,148	64,126	1,133,268	92,040	2,528,643	75.81	806,809	177,027	629,544	[illegible]
Wheeling & Lake Erie	511	2,743,026	175,141	3,208,206	368,076	952,354	36,572	1,554,530	82,381	3,003,032	93.61	205,174	193,900	11,273	467,[illegible]74
Wichita Falls & N. W.	328	488,706	142,964	685,177	153,488	84,385	4,261	349,729	47,462	639,325	...	45,852	33,535	12,10[illegible]	[illegible]
Wichita Valley	256	329,337	119,983	484,219	76,942	29,215	278	202,861	5,722	314,993	65.05	169,226	15,879	153,345	1[illegible],597
MONTH OF APRIL, 1920															
Alabama & Vicksburg	141	$184,189	$62,295	$264,779	$40,362	$41,179	$5,187	$38,548	$10,148	$188,198	71.02	$76,580	$14,[illegible]44	$62,3[illegible]2	[illegible]
Ann Arbor	301	239,521	53,258	312,543	55,643	78,770	5,657	179,777	12,728	332,579	106.41	—20,036	17,5[illegible]0	—37,538	[illegible]5,111
Atchison, Topeka & Santa Fe	8,723	9,566,132	3,839,386	14,911,807	2,682,650	4,058,543	208,247	5,335,599	304,308	12,567,650	84.27	2,344,157	[illegible]09,145	1,434,617	[illegible]
Atlanta, Birmingham & Atlanta	639	339,588	70,105	441,767	114,596	130,286	17,844	243,241	16,680	522,722	118.32	—80,955	16,299	—97,583	59,096
Atlantic City	177	106,348	178,849	299,369	55,930	46,002	1,606	178,602	1,820	284,045	94.86	15,323	14,5[illegible]0	[illegible]	[illegible]
Atlantic Coast Line	4,891	4,181,596	1,712,642	6,339,465	770,066	1,171,384	54,088	2,672,426	132,287	4,842,647	76.54	1,496,818	300,[illegible]0	1,195,378	[illegible]
Atlantic & St. Lawrence	166	148,009	33,395	201,189	47,430	54,859	2,828	134,294	8,677	248,087	123.31	—46,898	12,478	59,432	[illegible]
Baltimore & Ohio Chicago Terminal	90	......	......	88,272	58,690	57,351	1,080	78,184	8,[illegible]86	208,043	235.67	119,771	30,669	—150,440	[illegible]
Baltimore & Ohio	5,153	11,828,223	2,225,069	15,226,698	2,716,821	4,770,661	165,960	6,661,260	456,976	14,896,979	97.83	329,719	350,000	22,057	[illegible]
Baltimore, Chesapeake & Atlanta	87	87,149	34,711	128,410	10,115	58,692	926	71,156	3,725	144,885	112.83	16,475	3,700	20,175	26,5[illegible]
Bangor & Aroostook	658	557,650	97,005	680,621	106,730	103,976	3,116	213,117	19,119	452,032	66.41	228,589	26,996	201,594	134,4[illegible]
Beaumont, Salt Lake & Western	118	138,816	29,022	174,415	23,958	23,056	3,226	69,287	5,638	125,076	71.71	49,339	2,850	46,512	[illegible]
Belt Railway Co. of Chicago	31	......	......	118,854	41,739	58,841	858	107,000	8,959	217,398	182.91	98,543	20,824	119,367	1[illegible],742
Bessemer & Lake Erie	217	810,467	35,479	876,625	127,778	277,134	11,986	316,985	27,861	769,375	87.76	107,250	15,800	91,450	73,44[illegible]
Bingham & Garfield	36	137,400	1,504	142,239	35,858	42,321	1,401	34,709	3,247	118,155	83.06	24,084	7,425	16,654	32,[illegible]
Birmingham Southern	31	37,549	......	55,133	5,078	8,006	721	34,263	3,340	51,408	93.24	3,725	1,755	1,962	12,925
Boston & Maine	2,304	4,037,143	1,785,560	6,517,188	894,796	1,477,864	36,778	3,979,069	218,681	6,639,890	101.88	—122,703	238,726	—361,432	602,97[illegible]
Brooklyn, Eastern District Terminal	9	15,934	......	21,213	15,877	12,153	160	39,411	4,220	71,821	338.57	—50,608	6,003	—56,611	19,8[illegible]
Buffalo & Susquehanna	296	214,305	7,453	226,279	45,687	94,588	2,110	84,966	8,470	235,821	104.22	—9,542	3,200	—12,742	[illegible]
Buffalo, Rochester & Pittsburgh	589	1,214,711	142,140	1,410,399	218,527	601,834	13,682	634,896	38,115	1,510,072	107.06	—99,673	35,000	—134,673	45,3[illegible]
Canadian Pacific Lines (in Maine)	233	203,654	66,049	283,439	49,106	71,069	3,185	173,580	3,388	300,326	105.95	—16,887	12,200	—29,087	—32,[illegible]74
Central of Georgia	1,924	1,259,287	486,756	1,957,022	348,416	334,523	41,802	878,303	66,655	1,669,233	85.29	287,790	82,307	205,714	13,4[illegible]
Central Railway of New Jersey	686	1,474,806	605,585	2,354,940	381,764	978,550	20,287	1,448,646	96,553	2,953,756	125.42	—598,815	264,654	—863,475	—1,190,046
Central Vermont	413	287,425	90,543	431,810	73,600	125,516	7,486	351,509	20,769	580,818	134.51	—149,008	17,400	—166,422	—114,159
Charleston & Western Carolina	342	224,286	49,631	293,972	50,197	64,591	4,869	152,099	4,159	275,914	93.85	18,059	11,626	6,433	54,667
Chesapeake & Ohio	2,520	4,877,355	847,295	6,199,907	850,834	1,735,622	44,840	2,403,876	140,575	5,204,572	83.94	995,355	229,810	765,242	—296,837
Chicago & Alton	1,050	1,025,380	506,124	1,682,121	328,295	520,445	28,052	819,539	59,011	1,771,040	105.29	—88,919	67,254	—156,220	—282,90[illegible]
Chicago & Eastern Illinois	1,130	1,289,572	366,715	1,852,939	317,225	685,973	18,310	850,475	63,941	1,949,432	105.20	—96,494	100,000	—197,806	—29,966
Chicago, Detroit & Canada Grand Trunk Jct.	62	61,224	13,767	83,335	14,336	23,885	1,255	56,260	3,413	99,148	118.97	—15,813	4,596	—20,410	—61,053
Chicago & Erie	269	448,495	63,143	583,418	114,154	150,913	11,366	371,416	29,322	682,136	116.92	—98,718	40,909	—139,643	—144,59[illegible]
Chicago & Northwestern	8,090	6,626,024	2,796,148	10,525,992	1,844,256	2,684,995	101,353	5,145,439	323,415	10,210,576	97.00	315,416	710,000	—394,631	—828,579
Chicago, Great Western	1,496	1,039,755	412,034	1,615,241	561,742	416,765	28,801	754,445	54,650	1,833,073	113.48	—217,832	64,763	—282,733	194,75[illegible]
Chicago, Indianapolis & Louisville	654	675,763	248,929	1,030,990	156,562	405,932	25,865	452,746	28,721	1,085,200	105.25	—54,210	50,677	—104,887	288,445
Chicago Junction	12	......	......	94,679	50,045	24,448	121	127,038	10,478	212,129	224.05	—117,450	2,995	—120,446	—19,64[illegible]
Chicago, Milwaukee & St. Paul	10,629	8,317,675	2,301,527	11,879,407	1,828,028	2,995,188	106,827	5,317,192	375,025	10,704,456	90.10	1,174,957	677,263	503,534	111,48[illegible]
Chicago, Rock Island & Gulf	463	343,128	95,122	476,600	86,879	57,261	8,089	185,180	13,963	352,855	74.03	123,745	17,833	105,911	49,78[illegible]
Chicago, Rock Island & Pacific	7,656	5,787,753	2,403,461	8,960,969	1,764,990	2,420,026	112,998	4,342,217	244,799	8,949,211	99.86	11,758	417,881	—436,745	1,639,379
Chicago, St. Paul, Minnesota & Omaha	1,749	1,522,694	639,733	2,328,242	245,008	363,636	26,754	980,285	79,274	1,707,314	73.32	626,927	116,814	503,397	240,783
Chicago, Terre Haute & South Eastern	374	205,890	24,063	239,528	71,846	143,127	3,528	126,497	11,475	357,693	149.33	—118,165	19,500	—137,665	82,173
Cincinnati, Indianapolis & Western	....	209,511	49,413	281,346	55,055	127,988	8,261	140,425	17,579	345,327	127.74	—63,982	13,539	—77,520	—41,347
Cincinnati Northern	251	205,961	18,373	236,279	41,917	45,370	3,168	88,489	5,922	184,866	78.24	51,413	10,465	40,948	—22,512
Cleveland Cin., Chicago & St. Louis	2,408	3,711,646	1,435,198	5,722,436	617,909	1,226,936	76,306	2,373,285	129,595	4,477,267	78.24	1,245,168	234,510	1,010,151	89,949
Colorado & Southern	1,099	781,582	210,175	1,069,505	153,795	176,391	9,044	363,283	44,540	754,789	70.57	314,716	59,791	254,839	88,192
Colorado & Wyoming	43	23,026	936	81,711	11,917	19,921	267	41,253	4,405	77,763	95.05	3,948	5,000	—1,052	—20,535
Delaware & Hudson	858	2,577,975	293,454	3,020,560	276,822	888,597	33,165	1,380,369	135,193	2,733,268	90.18	287,293	81,500	205,793	164,64[illegible]
Delaware, Lackawanna & Western	956	2,743,293	919,425	4,402,573	529,812	1,094,766	67,878	2,199,390	148,509	4,134,496	93.91	268,076	389,583	—121,527	—842,196
Denver & Rio Grande	2,585	1,700,481	599,673	2,490,172	384,687	608,193	34,580	800,333	83,285	1,958,775	78.66	531,397	125,000	405,689	245,657
Denver & Salt Lake	255	35,436	8,160	49,526	78,295	67,656	623	52,318	11,008	209,901	423.81	—160,375	10,583	—170,958	—83,176
Detroit & Mackinaw	376	93,983	35,328	137,492	22,346	36,600	2,223	67,986	5,791	134,837	98.06	2,655	9,204	—6,549	31,487
Detroit, Grand Haven & Milwaukee	195	243,635	43,426	322,372	44,153	77,118	4,766	187,297	12,179	325,510	100.97	—3,088	3,084	—6,232	—59,918
Detroit, Toledo & Ironton	454	257,128	12,895	285,913	87,030	70,897	4,731	159,461	14,085	336,204	117.58	—50,291	8,831	—59,160	—11,514
Duluth & Iron Range	292	170,621	22,430	217,753	97,414	104,192	775	124,355	18,578	345,984	158.89	—128,231	11,981	—140,282	—337,051
Duluth, Missabe & Northern	407	243,077	55,893	341,123	169,502	87,923	4,072	172,202	24,278	459,875	134.81	—118,752	19,884	—138,635	—648,683

REVENUES AND EXPENSES OF RAILWAYS

MONTH OF APRIL, 1920—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance of										
		Freight.	Passenger.	Total (inc. misc.)	Way and structures.	Equipment.	Traffic.	Transportation.	General.	Total.					
Duluth, South Shore & Atlantic	614	$278,690	$109,474	$410,887	$58,649	$65,608	$6,149	$175,486	$11,321	$323,022	78.61	$87,866	$20,500	$67,358	$69,275
Duluth, Winnipeg & Pacific	178	180,482	26,238	209,930	31,994	39,155	4,528	90,502	90,235	175,414	83.55	34,516	10,556	23,959	23,929
El Paso & Southwestern	1,027	738,830	229,361	1,031,502	167,591	205,084	13,149	265,670	44,171	703,819	68.23	327,683	100,415	227,265	—145,560
Elgin, Joliet & Eastern	833	1,283,731	6	1,477,557	185,970	447,418	6,920	666,943	36,516	1,343,617	90.93	133,940	51,600	82,340	—273,740
Erie	1,989	4,044,993	897,375	5,556,497	1,032,186	2,612,283	94,678	3,278,635	222,364	7,305,917	131.48	—1,749,419	247,599	—1,997,390	—722,569
Florida East Coast	764	671,796	317,810	1,110,436	134,943	165,719	7,076	409,737	23,154	740,862	66.71	369,574	39,583	329,980	315,983
Electric	31	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Fonda, Johnstown & Gloversville, steam	57	34,300	70,958	109,882	10,705	9,205	494	41,603	5,346	67,355	61.29	42,528	5,075	37,453	1,150
Ft. Smith & Western	253	100,079	26,443	136,678	37,452	34,603	4,479	59,626	6,889	144,162	105.48	—7,484	5,000	—12,503	—12,715
Ft. Worth & Denver City	454	554,259	304,589	903,274	163,472	189,846	4,821	365,932	29,941	788,242	87.26	115,033	23,100	91,871	—154,407
Ft. Worth & Rio Grande	235	92,319	56,191	158,542	37,701	26,246	1,514	76,535	4,666	146,661	92.51	11,880	3,785	8,095	32,628
Galveston Wharf	13	.....	.....	124,205	29,962	3,507	652	34,913	2,759	88,311	71.10	35,894	14,500	21,394	19,732
Georgia	328	364,945	134,481	538,700	54,247	111,954	9,304	270,127	23,385	469,228	87.10	69,472	5,950	63,522	—64,968
Georgia & Florida	405	77,487	23,829	110,148	51,859	22,280	5,775	77,174	8,895	165,983	150.69	—55,835	6,378	—62,402	—22,550
Grand Trunk Western Railway	350	571,827	196,629	847,124	118,998	291,931	14,555	484,283	37,430	953,388	112.54	—106,265	51,084	—157,359	—285,388
Great Northern	8,175	6,535,736	1,459,233	8,953,850	1,946,092	1,812,021	80,178	3,581,730	234,748	7,785,437	86.95	1,168,413	794,571	369,148	410,527
Gulf & Ship Island	307	164,771	41,129	222,099	60,210	58,146	4,444	91,951	12,659	227,844	102.59	—5,745	11,022	—16,830	5,168
Georgia Gulf, Colorado & Santa Fe	1,907	1,259,986	452,149	1,861,985	529,923	472,637	23,575	825,523	47,789	1,901,115	102.01	—39,129	87,016	—126,164	—174,262
Gulf, Mobile & Northern	470	235,235	53,846	305,767	76,541	64,803	10,298	120,703	12,980	285,324	93.31	20,443	11,745	8,698	57,340
Hocking Valley	350	638,639	98,582	780,837	143,708	350,417	3,944	322,053	32,882	855,000	109.49	—74,164	68,458	—142,621	—190,384
Illinois Central	4,799	6,596,010	2,051,317	9,475,760	1,934,363	3,035,232	101,522	4,271,469	277,739	9,722,866	102.61	—247,106	571,585	—818,774	—338,727
Illinois Terminal	24	57,357	.....	64,593	4,928	9,375	819	19,269	5,095	39,487	61.13	25,107	1,117	23,990	—19,916
Indiana, Harbor Belt	120	.....	.....	322,147	120,608	87,930	2,828	249,866	18,010	479,241	148.76	—157,094	10,686	—167,924	—77,208
International & Great Northern	1,159	880,745	250,171	1,229,998	353,170	316,109	19,927	817,194	49,091	1,559,859	126 81	—329,860	32,500	—364,989	—124,883
Kanawha & Michigan	176	227,873	50,716	295,097	74,607	130,845	2,887	134,755	11,486	354,579	120.15	—59,482	25,000	—84,482	—156,773
Kansas City, Mexico & O	272	86,600	15 428	168,896	36,444	36,404	3,498	51,597	10,425	138,368	127.06	—29,471	7,700	—37,171	—18,591
Kansas City, Mexico & O. of Texas	465	69,617	19,877	97,107	80,416	37,312	3,533	71,898	10,212	203,372	209.43	—106,264	6,250	—112,514	—51,488
Kansas City Southern	779	920,686	229,206	1,266,235	244,397	269,310	28,940	461,730	74,720	1,079,011	85.21	187,223	73,037	114,119	25,897
Lake Erie & Western	741	576,887	59,328	677,677	104,060	164,940	14,356	310,990	24,895	619,197	91.37	58,480	35,000	23,480	75,021
Lake Superior & Ishpeming	34	5,716	274	6,858	18,937	21,399	215	11,121	2,362	54,034	78.78	—47,177	4,954	—52,131	—631
Lake Terminal	12	.....	160	96,378	18,508	35,682	.....	68,400	99	122,689	127.29	—26,312	5,835	—32,146	—32,719
Lehigh & Hudson River	96	149,819	3,120	163,365	24,273	40,900	1,649	83,203	7,179	157,203	96.22	6,161	8,600	—2,439	—33,842
Lehigh & New England Railway	229	264,632	2,120	281,050	44,027	69,875	3,117	121,868	12,873	251,759	89.57	29,291	14,803	14,488	—61,049
Lehigh Valley	1,435	3,296,230	567,642	4,250,114	927,749	1,485,867	71,697	2,337,238	125.536	4,970,028	116.93	—719,914	206,000	—926,063	—1,250,505
Long Island	398	296,595	1,004,768	1,477,449	298,165	375,614	12,028	976,985	55,172	1,732,592	117.27	—255,143	101,096	—356,302	—717,795
Los Angeles & Salt Lake	1,168	529,622	379,524	1,028,957	213,447	251,667	20,954	451,861	42,809	1,023,704	99.48	5,253	77,021	—71,769	—404,538
Louisiana & Arkansas	302	275,523	47,743	335,410	76,248	46,092	5,838	105,346	7,786	241,316	71.94	94,100	20,527	73,529	62,858
Louisiana Ry & Nav. Co	343	288,308	41,393	348,113	84,940	56,214	4,809	144,439	12,638	303,039	87.05	45,074	14,000	31,041	49,876
Louisville & Nashville	5,040	6,391,400	1,940,768	8,920,404	1,522,863	2,384,399	109,510	3,981,204	249,056	8,299,224	93.04	621,179	315,861	305,058	—700,728
Louisville, Henderson & St. Louis	199	152,960	56,155	226,490	79,498	24,336	4,485	64,037	8,962	181,319	80.05	45,171	7,215	37,953	24,304
Maine Central	1,216	1,159,907	373,131	1,647,266	336,261	380,302	10,745	855,809	45 046	1,629,054	98.89	18,211	95,742	—77,530	51,080
Maryland, Delaware and Virginia	82	67,924	27,306	98,998	8,693	29,971	557	75,530	2,177	116,908	118.09	—17,909	2,000	—19,909	14,805
Michigan Central	1,862	2,437,633	1,599,178	4,687,542	783,957	1,638,296	76,462	2,266,806	129,548	4,992,694	106.51	—305,153	258,000	—563,411	—1,710,230
Midland Valley	388	166,293	88,572	267,771	77,334	53,330	2,747	128,789	13,234	275,424	.....	7,652	7,183	—14,836	—73,031
Mineral Range	101	68,846	420	71,098	10,271	16,662	81	26,884	804	54,703	76.94	16,394	3,600	12,795	15,346
Minneapolis & St. Louis	1,646	923,960	213,628	1,202,325	221,678	341,706	18,645	599,071	38,274	1,219,732	101.45	—17,406	68,454	—86,193	—2,706
Minneapolis, St. Paul & S. Ste. Marie	4,243	2,108,063	641,285	3,039,766	604,423	599,940	31,991	1,414,488	100,351	2,774,413	91.27	265,353	290,943	—26,470	—259,519
Minnesota & International	194	88,124	29,228	124,204	25,920	18,564	459	50,403	3,468	98,814	79.55	25,391	6,176	19,233	16,696
Mississippi Central	164	56,277	19,401	80,824	25,609	28,648	2,017	30,637	7,693	94,603	117.04	—13,779	3,399	—17,178	4,890
Missouri & North Arkansas	364	96,836	37,799	144,219	50,620	30,269	2,847	63,689	7,201	154,625	107.21	—10,406	5,893	—16,298	40,206
Missouri, Kansas & Texas R. R	1,715	1,794,347	657,454	2,669,604	586,628	813,938	37,628	905,493	96.695	2,455,438	91.97	214,166	112,321	101,814	—87,423
Missouri, Kansas & Texas R. R. of Texas	1,739	1,430,663	720,573	2,313,707	598,654	390,003	25,314	1,092,018	77,298	2,209,020	95.47	104,687	59,583	45,049	—49,752
Kansas, Oklahoma & Gulf	329	163,861	21,965	195,628	35,634	38,978	2,309	90,568	9,410	177,149	90.55	18,479	11,900	6,575	91,177
Missouri Pacific	7,299	5,071,677	1,877,715	7,587,079	1,931,569	1,870,312	141,586	3,223,172	243,920	7,475,062	98.52	112,017	238,070	—134,117	—608,106
Mobile & Ohio	1,168	1,052,060	177,707	1,329,289	221,743	460,955	29,435	612,538	48,332	1,373,951	103.35	—44,662	59,653	—104,315	53,366
Monongahela	108	231,849	25,526	262,910	214,226	38,514	331	89,146	6,858	349,074	132.77	—86,164	6,293	—92,457	—116,673
Monongahela Connecting	7	.....	.....	260,372	21,993	41,128	562	112,980	6,753	183,415	70.44	76,957	3,257	73,699	86,742
Montour	56	86,147	1,424	90,116	21,311	58,379	1,353	31,198	9,506	121,554	138.21	—34,437	2,430	—36,868	—25,930
Nashville, Chattanooga & St. Louis	1,247	1,387,350	404,621	1,930,754	265,129	396,989	45,417	793,696	51,814	1,557,177	80.65	373,577	42,500	331,068	139,899
Nevada Northern	165	117,194	8,807	131,747	26,712	22,352	1,324	38,030	3,964	92,506	70.21	39,241	8,267	30,973	20,372
New Jersey & New York	47	10,059	61,210	76,860	9,116	13,919	1,311	46,500	2,228	73,073	95 07	3,786	1,927	1,852	17,526
New Orleans Great Northern	284	147,293	46,804	202,393	39,804	33,935	3,849	83,681	10,123	171,809	84 88	30,584	12,304	18,278	10,291
New Orleans, Texas & Mexico	191	165,590	36,659	207,645	45,631	36,305	4,662	61,077	8,648	156,083	75.16	51,562	12,167	39,396	39,586
New York Central	6,069	14,757,254	7,075,053	25,331,087	2,898,211	6,361,632	229,986	11,735,713	684,501	22,343,083	88.20	2,988,004	796,198	2,190,558	829,128
New York, Chicago & St. Louis	574	1,431,508	81,887	1,591,793	233,671	325,909	37,250	663,844	63,158	1,268,399	79.68	323,394	25,000	298,229	—145,253
New York, New Haven & Hartford	1,965	3,543,529	3,863,541	8,596,735	1,230,185	2,223,269	41,378	4,215,836	323,797	8,188,706	95.25	408,029	345,000	60,836	—611,876
New York, Ontario & Western	569	470,700	134,401	747,703	166,112	252,623	10,788	372,767	27,705	829,993	111.01	—82,290	29,100	—111,393	—80,642
New York, Susquehanna & Western	135	142,865	46,340	224,387	43,632	60,342	2,596	165,317	10,145	282,032	125.68	57,644	18,673	76,319	—39,242
Newburgh & South Shore	7	.....	.....	115,437	17,706	35,529	.....	87,836	4,282	145,353	125.91	—29,916	7,599	—37,515	—63,319
Norfolk & Western	2,201	5,006,663	682,654	5,999,464	1,065,614	1,834,414	43,887	2,223,229	155,322	5,346,495	89.11	652,969	425,000	227,463	—653,185
Norfolk Southern	905	481,388	150,439	675,742	149,183	109,907	10,642	314,821	30,984	615,723	91.11	60,019	17,332	42,349	68,613
Northern Pacific	6,655	6,311,313	1,549,745	8,602,248	2,664,727	1,558,967	73,766	3,329,273	224,549	7,954,606	92.47	647,643	737,962	—92,010	—1,156,285
Northwestern Pacific	538	243,185	194,583	503,323	164,624	74,110	4,370	230,606	14,971	431,273	85.68	72,050	25,591	46,458	—17,006
Oregon Short Line	2,347	1,886,660	572,329	2,705,544	441,274	526,507	29,677	974,185	124,978	2,159,464	79.81	546,081	291,978	253,991	—223,500
Oregon-Washington R R & Nav. Co	2,223	1,410,108	542,797	2,173,492	343,490	406,049	34,731	948,208	119,540	1,886,771	86.80	286,722	145,803	140,905	—48,896

REVENUES AND EXPENSES OF RAILWAYS

Month of April, 1920—Continued

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Operating revenues: Passenger.	Operating revenues: Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Operating expenses: Maintenance of Equipment.	Operating expenses: Traffic.	Operating expenses: Transportation.	Operating expenses: General.	Operating expenses: Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase or decrease compared with last year
Panhandle & Santa Fe Ry.	773	$464,920	$125,018	$632,595	$157,819	$221,709	$4,115	$355,135	$16,201	$754,980	119.34	—$122,385	$20,435	[illegible]	[illegible]
Peoria & Pekin Union	19	17,045	4,792	82,613	17,305	33,937	7	56,119	4,973	112,341	135.98	—29,728	9,5[illegible]	[illegible]	4,341
Pere Marquette	2,230	1,467,234	486,029	2,215,524	452,155	589,164	41,552	1,190,218	109,234	2,392,360	107.98	—176,836	61,717	—238,6[illegible]	—5[illegible],711
Perkiomen R. R.	41	73,729	8,966	86,249	7,203	3,997	16	35,597	534	47,365	54.91	38,88[illegible]	3,276	35,[illegible]	—1[illegible]
Philadelphia, Bethlehem & Northeastern	10	......	......	110,341	13,604	21,553	457	73,317	1,356	110,282	99.94	60	1,03[illegible]	—971	[illegible]
Philadelphia & Reading	1,126	5,010,113	969,732	6,369,019	721,771	1,887,538	54,938	3,293,418	193,957	6,173,422	96.92	195,597	209,583	—15,[illegible]	—193,6[illegible]
Pittsburgh & Lake Erie	224	1,296,538	218,974	1,635,391	327,848	764,004	18,747	696,253	58,081	1,866,433	114.12	231,042	151,570	—[illegible],613	3[illegible],7[illegible]
Pittsburgh & Shawmut	103	107,166	6,244	114,474	24,195	28,451	1,245	45,654	6,617	106,162	92.73	8,313	107	8,[illegible]	[illegible]
Pittsburgh & West Virginia	63	47,484	9,997	73,052	37,837	30,836	1,267	47,737	10,191	136,066	186.25	63,014	14,103	—77,[illegible]	[illegible]
Pittsburgh, Shawmut & Northern	209	83,691	7,137	93,775	26,913	53,268	1,163	54,808	18,812	154,968	165.25	61,193	1,863	63,[illegible]	—16,436
Port Reading	21	57,654	......	69,470	17,782	8,867	18	72,511	4,800	103,979	149.67	—34,509	12,[illegible]7	46,516	[illegible]
Richmond, Fredericksburg and Potomac	116	340,101	347,187	831,711	84,786	133,080	5,889	341,117	24,979	612,620	73.65	219,091	31,653	187,[illegible]	1,334
Rutland	415	307,208	118,130	493,618	70,496	96,190	4,055	219,669	14,082	405,119	82.07	88,499	18,158	7[illegible],341	64,4[illegible]
St. Joseph & Grand Island	238	152,698	36,732	206,205	73,687	36,829	2,027	23,435	12,214	252,477	122.43	46,272	11,[illegible]	[illegible]	[illegible]
St. Louis, Brownsville & Mexico	548	515,184	171,185	720,495	122,197	85,267	12,423	247,644	23,571	490,959	68.14	229,536	12,3[illegible]	217,[illegible]	[illegible]
St. Louis-San Francisco	4,757	4,380,911	1,773,004	6,556,382	1,045,066	1,605,972	59,708	2,624,266	204,422	5,522,960	84.23	1,033,422	229,319	803,5[illegible]	—[illegible]
St. Louis, San Francisco & Texas	134	126,925	18,120	124,918	28,312	27,994	1,457	71,588	5,212	134,563	107.72	-9,645	1,880	11,5[illegible]	[illegible]
San Antonio & Aransas Pass	736	262,84[illegible]	88,941	378,980	102,224	78,903	6,689	220,293	18,713	426,808	112.65	—47,828	15,[illegible]	—63,8[illegible]	[illegible]
San Antonio, Uvalde & Gulf	317	99,679	40,201	146,798	37,184	22,315	1,800	64,071	5,569	130,940	89.19	15,857	2,200	13,611	13,16[illegible]
Seaboard Air Line	3,563	2,376,270	855,497	3,636,522	752,987	1,100,810	81,641	2,016,374	131,475	4,126,801	113.48	490,279	150,0[illegible]	—64[illegible]	—[illegible],664
South Buffalo Ry.	11	53,907	......	116,914	7,528	9,709	448	59,964	1,461	79,110	67.66	37,804	3,5[illegible]	34,[illegible]	12,75[illegible]
Southern R. R.	6,971	7,734,798	2,773,584	11,517,227	1,368,558	1,875,966	146,044	4,961,449	296,727	8,765,188	76.11	2,752,029	416,964	2,33[illegible]	1,8[illegible]
Alabama Great Southern	320	507,667	182,546	743,705	65,929	190,685	16,104	291,848	21,211	593,229	79.76	150,476	34,414	116,[illegible]	27,[illegible]
Cin., New Orleans & Texas Pacific	338	1,072,674	327,890	1,494,493	140,725	431,297	17,280	529,241	35,506	1,166,186	78.09	328,307	58,966	[illegible]	[illegible]
Georgia Southern & Florida	402	284,506	113,224	427,669	45,843	88,813	6,560	195,105	8,512	346,293	80.97	81,377	19,25[illegible]	62,[illegible]	[illegible]
New Orleans & Northeastern	207	323,146	104,974	487,687	75,111	137,166	7,588	218,429	15,395	458,298	93.97	29,389	35,119	—5,7[illegible]	[illegible]
Northern Alabama	110	111,162	14,051	127,386	15,899	6,309	1,422	59,143	1,659	84,432	66.28	42,953	4,580	38,373	[illegible],54[illegible]
Southern Ry. in Mississippi	278	69,765	45,313	126,248	47,186	20,817	2,255	84,217	8,600	163,076	129.17	—36,828	9,800	—46,62[illegible]	[illegible]
Spokane International	156	101,932	17,412	123,105	17,306	11,724	2,256	37,925	5,020	75,300	61.16	47,805	5,170	42,634	37,513
Spokane, Portland & Seattle	538	430,935	151,850	632,808	78,956	76,710	4,981	209,426	22,701	401,338	63.42	231,470	90,6[illegible]	14[illegible],870	[illegible]196
Staten Island Rapid Transit	23	51,912	60,636	130,417	29,294	33,695	1,102	86,376	9,935	160,404	123.00	—29,987	15,000	—44,[illegible]	[illegible]4,134
Tennessee Central	292	174,201	46,301	236,206	37,451	52,451	4,505	109,417	10,959	214,767	90.92	21,439	5,687	15,748	3[illegible]
Texarkana & Ft. Smith	93	175,386	20,951	203,993	26,462	11,724	618	68,440	6,843	113,939	5,585	90,054	8,269	81,780	[illegible]
Texas & Pacific	1,946	1,798,267	927,708	2,949,457	604,664	637,770	33,989	1,286,806	102,972	2,706,953	91.77	242,504	120,800	120,8[illegible]	—163,5[illegible]
Toledo & Ohio Central	503	535,336	63,230	628,105	117,372	245,559	7,178	320,296	21,763	715,206	113.87	—87,102	37,568	—124,667	[illegible]
Toledo, Peoria & Western	247	48,962	46,523	105,408	31,123	27,307	1,753	71,526	4,119	135,826	128.85	—30,418	8,500	—38,918	—1[illegible]
Toledo, St. Louis & Western	454	670,020	34,001	745,648	149,246	150,218	10,882	279,548	12,215	602,102	80.74	143,547	31,000	112,547	[illegible]
Trinity & Brazos Valley	368	90,282	18,359	115,385	66,625	38,259	672	57,391	9,966	172,912	139.85	—57,528	7,209	—64,736	—[illegible],74[illegible]
Ulster & Delaware	128	56,248	16,749	97,778	15,712	20,725	2,166	64,407	7,882	111,467	114.00	—13,690	5,000	—18,690	13,48[illegible]
Union R. R. Co.	40	......	......	712,395	107,103	156,624	243	500,043	7,599	771,615	108.31	—59,220	7,728	—66,948	—73,[illegible]
Union Pacific	3,614	4,784,148	1,631,007	7,279,067	1,286,258	1,878,069	72,411	2,505,763	304,325	6,274,622	86.21	1,004,445	508,095	496,208	—1,663,268
Utah Ry.	98	104,260	596	105,306	16,011	25,483	162	24,816	2,249	68,722	65.25	36,984	4,066	32,518	5,651
Vicksburg, Shreveport & Pacific	171	268,085	90,938	382,321	49,951	57,377	5,971	123,430	10,447	250,540	65.53	131,782	13,717	112,354	86,1[illegible]
Virginian	523	1,138,172	64,504	1,327,510	162,297	296,262	7,469	497,880	33,001	997,077	75.10	330,433	62,061	268,372	219,775
Wabash	2,473	1,787,442	815,809	2,926,393	1,005,346	1,140,070	87,475	1,911,697	149,362	4,323,954	147.75	—1,397,561	130,735	—1,528,367	—1,95[illegible],[illegible]36
Western Maryland	797	1,081,539	83,230	1,245,919	223,274	391,368	20,553	551,922	45,372	1,245,920	100.00	—2	50,000	—50,002	—24,57[illegible]
Western Pacific	1,011	540,964	203,008	792,810	170,231	143,206	28,139	282,274	28,279	675,020	85.14	117,789	57,486	60,266	73,860
Wheeling & Lake Erie	511	860,357	62,123	1,018,183	201,267	218,619	10,010	413,311	28,185	875,312	85.96	142,871	65,900	76,971	2,816
Wichita Valley R. R.	256	70,721	34,793	112,705	37,463	5,687	3	48,104	1,325	92,524	82.09	20,181	5,707	14,446	—9,846
Yazoo & Mississippi Valley	1,381	1,417,674	472,817	2,003,526	537,045	585,305	26,643	849,887	64,842	2,068,125	103.22	—65,599	81,417	147,020	—243,572

For Four Months of Calendar Year 1920

Name of road.	Average mileage operated during period.	Operating revenues: Freight.	Operating revenues: Passenger.	Operating revenues: Total (inc. misc.)	Operating expenses: Maintenance of Way and structures.	Operating expenses: Maintenance of Equipment.	Operating expenses: Traffic.	Operating expenses: Transportation.	Operating expenses: General.	Operating expenses: Total.	Operating ratio.	Net from railway operation.	Railway tax accruals.	Operating income (or loss).	Increase or decrease compared with last year
Alabama & Vicksburg Ry.	141	668,352	262,714	1,043,079	154,177	200,784	20,469	388,573	39,126	815,108	78.14	227,971	53,197	174,698	142,[illegible]2
Ann Arbor R. R.	301	1,124,873	196,735	1,445,056	180,240	336,620	22,349	771,262	46,251	1,356,757	93.88	88,299	68,400	19,874	—[illegible]9,711
Atchison, Topeka & Santa Fe	8,692	44,216,378	15,919,194	67,955,622	9,101,012	15,336,713	682,441	22,415,488	1,103,492	48,610,194	71.53	19,345,427	3,209,394	16,131,752	8,31[illegible],835
Atlanta, Birmingham & Atlantic Ry.	639	1,374,553	276,235	1,859,872	385,112	526,901	67,881	939,106	59,218	1,978,484	106.37	-118,612	64,778	—184,233	368,738
Atlantic City R. R.	177	432,955	547,417	1,054,415	190,721	149,854	4,924	704,956	5,356	1,056,177	106.16	—1,762	55,143	56,9[illegible]	88,655
Atlantic Coast Line R. R.	4,891	16,475,413	6,762,604	25,677,658	3,062,958	4,801,864	277,185	10,791,666	496,920	19,629,485	76.44	6,048,173	1,070,000	4,772,738	1,184,096
Atlantic & St. Lawrence	166	790,520	115,989	969,081	240,140	241,065	11,724	648,677	53,154	1,197,920	123.61	—228,839	49,380	—278,274	22,743
Baltimore & Ohio Chicago Term. R. R.	90	......	......	735,136	129,521	213,982	4,588	549,980	42,273	956,671	130.14	—221,535	114,423	—335,958	184,539
Baltimore & Ohio R. R.	5,153	49,394,067	8,326,248	63,938,696	8,664,979	20,184,676	780,754	30,730,352	1,723,422	62,523,986	97.78	1,414,710	1,859,015	—456,578	5,[illegible]57,513
Baltimore, Chesapeake & Atlantic	87	259,824	90,186	386,116	33,985	180,521	3,943	260,262	14,968	493,678	127.85	—107,562	14,800	—122,362	111,8[illegible]
Bangor & Aroostook R. R.	658	1,635,637	325,246	2,133,327	465,629	467,221	13,907	852,296	61,098	1,885,407	88.37	247,920	103,190	144,725	[illegible]1,439
Beaumont, Sour Lake & Western	118	501,601	116,455	650,459	136,654	84,191	8,661	222,799	20,029	472,144	72.58	178,315	10,400	167,899	134,5[illegible]
Belt Ry. Co. of Chicago	31	......	......	1,286,730	129,174	287,867	2,079	849,096	31,671	1,299,888	101.62	—13,157	71,572	—84,73[illegible]	27,879

Kansas City Southern Valuation

The hearing before an examiner of the Interstate Commerce Commission on the Kansas City Southern valuation case, set for June 21, at Kansas City, has been cancelled.

A. S. C. E. Convention

The preliminary details for the fiftieth annual convention of the American Society of Civil Engineers, which will be held in Portland, Ore., August 10, 11 and 12, have just been announced. The convention will be called to order at 10 a. m. Tuesday, and that day will be spent in business sessions, while Wednesday and Thursday will be devoted to trips to points of interest in the vicinity of Portland, including a visit to one of the large logging camps.

A. S. M. E. Railroad Section

In accordance with certain changes in the organization of the American Society of Mechanical Engineers, allowing for the formation of professional sections, a Railroad Section has recently been organized. The following officers have been elected: Chairman, Edwin B. Katte, chief engineer electric traction, New York Central; vice-chairman, George W. Rink, assistant superintendent of motive power, Central Railroad of New Jersey; other members of the executive committee, C. W. Huntington, president, Virginian Railway; Harry B. Oatley, Locomotive Superheater Company, and W. H. Winterrowd, chief mechanical engineer, Canadian Pacific Railway. It is understood that the Railroad Section will arrange for a special part in the program at the annual meeting of the society in New York next December.

Statistics Show Large Increase in Tonnage

The Interstate Commerce Commission has issued a partial summary, for March and three months of this year, of the traffic statistics which it has arranged to keep up as a continuation of the monthly report maintained by the Railroad Administration. The report is only for 177,650 miles of road, as several large systems have been unable to file the monthly reports on time. In a final summary to be issued later, more complete data will be given, with averages and percentages. The partial summary shows the movement of 24,781,775,000 net ton miles of freight in March, as compared with 19,249,182 in March, 1919, and 70,473,826,000 for three months compared with 56,602,363,000. Freight service train miles for three months totalled 111,183,111, as compared with 93,863,512 in 1919 and passenger service train miles totalled 92,531,123, as compared with 87,136,438. Loaded freight car miles totalled 2,621,198,063, as compared with 2,105,415,516, and empty freight car miles 1,009,820,927, as compared with 969,960,813.

Group Insurance on the Bangor & Aroostook

At a conference between officers of the Bangor & Aroostook and locomotive enginemen and firemen of the company, held at Houlton, Me., on June 14, president Percy R. Todd announced that the company had taken out life insurance for all these employees, 165 men, on the group plan, and that the insurance was already in force. Each man was requested to designate his beneficiary. The amounts of the policies are based on the following schedule:

Engineers hired in that capacity (not firemen promoted to be engineers), are entitled to no insurance for the first three months that they are in the service.

From three to six months	$1,000
For six months to one year	$2,000
After one year	$3,000

Firemen during the first three months will not be insured.

From three to six months	$ 500
From six months to one year	$1,000
After one year	$2,000

Since 1913, when the brotherhood enginemen and firemen on this road struck, the engines have been manned by non-union forces, and the company took this course to put these employees on an equality, as regards insurance, to men in the same positions on other roads. The present arrangement, however, is radically different from any other—or from any life insurance scheme on any standard railroad—in that the company bears the whole expense.

Traffic News

Suits complaining of unfair distribution of coal cars have been begun in the courts by coal operators against the railroads at Charleston, W. Va., and Birmingham, Ala.

The American Railway Express Company has applied to the Corporation Commission of North Carolina for authority to increase its rates for the transportation of merchandise.

The Philadelphia & Reading has made large additions to its passenger service for the summer, including four expresses between Philadelphia and Reading and ten new local trains on the New York division.

The Philadelphia & Reading and the Central of New Jersey have restored thirteen of the through passenger expresses between New York and Philadelphia which were taken off during the prevalence of war-time pressure.

In southern Texas cattle for market are in some cases being driven from fifteen to thirty miles for shipment by railroad, this because of the shortage of stock cars and intolerable delays in shipping from the usual shipping points.

The Philadelphia & Reading has launched two new steel ferryboats for use on the Delaware river at Philadelphia, bringing the company's fleet up to nine vessels. The new boats are the "Ventnor" and the "Haddon Heights," each 170 ft. long and 55 ft. 6 in. wide.

The National Live Stock Exchange, at its annual convention in Chicago on June 18, adopted resolutions declaring that present railroad facilities ought to be better utilized before increased freight rates are allowed for the purpose of acquiring additional facilities; also that passenger rates ought to be increased as well as freight rates.

The Chicago & Alton will place in service, on July 1, a daily mail train running between Chicago and St. Louis, making the run in 6½ hours. The train, which is exclusively for mail, has been established following the granting of the mail contract to the Alton after strong competition on the part of two other roads. The train will leave Chicago at 7 p. m.

Lumber Association on Freight Rates

The American Wholesale Lumber Association was recently organized in Chicago by United States lumbermen, and the first directors' meeting was held on June 15, completing the organization. Committees to handle the constructive activities for which the association was formed, were named. The readjustment of freight rates received considerable attention and regret was expressed by those present that the entire lumber industry had not agreed upon a definite plan and so reported to the Interstate Commerce Commission. The following resolution was adopted:

"Be it resolved, That the American Wholesale Lumber Association approves in principle the application of the railroads of the United States for an increase in freight rates necessary for the restoration of their credit and rehabilitation of their property and the resumption of adequate and efficient transportation service, and,

"Be it further resolved, That the American Wholesale Lumber Association, representing the wholesale branch of the lumber industry whose members deal in all classes of woods in all sections of the country, earnestly recommends that the rate increase, if any, granted by the Interstate Commerce Commission be so formulated as to preserve competitive relationships to prevent a restriction upon the shipment of forest products from any producing territory and protect the interests of the public, and that necessary increases should be made on a percentage basis, subject to a reasonable maximum increase, in cents per hundred pounds, an dlimited to a single increase on a through haul."

C. E. Dobson, of New Orleans, La., was recommended by the association for appointment on the United States Shipping Board. The matter of a $10 per day storage charge for lumber in transit was said to be discriminatory and the Transportation

Committee was requested to bring this matter before the Interstate Commerce Commission for further consideration.

Coal Production

A steady increase in the production of soft coal carried the output during the week ended June 12 to the highest level attained since before the switchmen's strike, according to the weekly bulletin of the United States Geological Survey. The total output, including bituminous, lignite and coal coked at the mine, is estimated at 10,332,000 net tons. Compared with the 9,568,000 tons produced in the latest preceding full week (May 23-29), this was an increase of 8 per cent. The average production per working day was 1,722,000 net tons. This was still 6 per cent below the rate just before the switchmen's strike, and 17 per cent below that of October, 1919.

Production during the first 140 working days of the last four years has been as follows:

1917	246,540,000	1919	192,489,000
1918	253,563,000	1920	231,380,000

The year 1920 is thus 38,900,000 tons ahead of 1919, but is 15,200,000 tons behind 1917 and 22,200,000 tons behind 1918.

For the week of June 5 the figures of losses due to transportation suggest a widespread improvement over the week before, the bulletin says. This was largely due to the effect of the holiday in reducing the demand for cars, and in enabling the railroads to catch up in their work. It is evident, however, that this was not the only factor in the improvement. The congestion of traffic is gradually yielding to the efforts of the railroads and it is probable that even without the occurrence of the May 30 holiday an improvement in the car supply would have been registered. The average loss due to transportation dropped from 43.3 to 39.7 per cent of full time. The betterment was most marked in the districts observing the holiday, but was not confined exclusively to them.

N. I. T. League Holds Summer Meeting

The National Industrial Traffic League held its summer meeting at the Bellevue-Stratford Hotel, Philadelphia, Pa., on June 17 and June 18. W. H. Chandler, manager of the transportation bureau of the Boston Chamber of Commerce and president of the League, presided.

Thursday's session was characterized by a vote sanctioning the recent statement of the League before the Interstate Commerce Commission in favor of the proposed increase in freight rates. It also considered the traffic situation and adopted a resolution calling for the appointment of a committee "to ascertain to what extent daily yard checks are available to the several special terminal committees and to what extent uniform records are being kept" and to take up this matter with the American Railroad Association and the Interstate Commerce Commission "if it appears available to insure the most effective steps being taken to prevent car delays both on the part of the carriers and the shippers, with the further end in view of making as liquid as possible the available car supply, by making a careful check of the movements from the time of arrival at the terminals until the cars depart therefrom."

On Friday the meeting engaged in a general discussion of the freight situation. There was much criticism of embargoes, many localities reporting that embargoes had been placed without sufficient justification and enforced a longer time than was necessary. Some prominent members believed it desirable to get the Interstate Commerce Commission to regulate embargoes by requiring carriers to come to the commission for permission before placing any restriction on shipments. An embargo at Buffalo, N. Y., recently caused such embarrassment to lumber merchants that protest was made and it had to be modified. It was resolved that all grievances in this matter should be reported promptly to the executive committee of the League, which committee would take them up with local terminal committees or with the Interstate Commerce Commission.

A resolution was adopted calling for the appointment of a standing committee of the League to keep in touch with transportation questions in connection with the use of refrigerator and heater cars.

Foreign Railway News

LONDON.

German protests in connection with the Montjoie railway have been overruled by the Commission appointed by the Supreme Council, and the railway is to be returned to Belgium.

Jamaica Railways Building Wagons

LONDON.

A news item in the Times Trade Supplement says that Jamaica railway workshops are successfully undertaking the building of coaches and wagons. The frames are imported from North America.

Mexico Returns Railways

Press despatches from Mexico City, dated June 20, report that the Mexican Railway was given back to its British owners on the day preceding the order of President de la Huerta.

R. A. Comford, representing the English corporation, received the road and rolling stock between Grizaba and Vera Cruz at the end of the line nearest Mexico City. Passenger traffic was inaugurated June 20.

Railway Material Required by Egypt

LONDON.

The Ministry of Public Works for Egypt is calling for estimates for the laying of 6 miles of railway track together with 50 steel double-tip freight cars, 40 cu. ft. heavy type. The track is to be of 24 in. gage, with 18 lb. rails, and closed end type steel ties and is to be complete with all fittings and accessories, sidings, switches, etc.

Indian Railways Burning Oil Fuel

LONDON.

It was stated in the last report of the Indian Railways that 112 locomotives were burning oil fuel. It is anticipated that, owing to the increased output of oil from the Persian concessions of the Anglo-Persian Oil Company, the use of oil fuel on the railways of Western India will in the near future be extended. Tests conducted on this system on 20 engines fitted with different types of burners showed that the work done by one ton of oil would require 1.8 tons of coal.

Another Railway Projected

It has been announced lately that the Portuguese Government has granted to the local agent of an American concern, a concession to build a railway in the District of Mozambique. The "District of Mozambique" is not to be confused with the territory of the Mozambique Co. The railway is to run from a point on the mainland opposite the city of Mozambique to Lake Nyasa. It will open up what is considered the most promising agricultural district in Portuguese East Africa. No details have yet been given out, and it is not known when actual construction is likely to commence.

Austrian Railways to Be Electrified

LONDON.

The Austrian Government has asked for a grant for the electrification of the State railways, says an article in "Engineering," London. The present projects provide only for hydro-electric plants of about 22,000 h. p. and the estimate would be very much smaller were it not for the depreciation of the Austrian credit. With the actual prices for imported coal and the passing of the Austrian coalfields into the possession of newly created states, the electrification of the railways has really become a vital question. The Vienna metropolitan railway is practically closed owing to the want of fuel and all the capital is lying idle. Nothing can be done without the aid of foreign capitalists, and the financial situation makes both the borrower and the lender hesitate.

Railway Supplies in Belgium

Belgian railroad builders apparently are not yet ready to execute big contracts of their own government, for it has just ordered from the W. C. Armstrong Works in England 200 powerful locomotives. The order involves $15,000,000, writes Consul General Henry H. Morgan from Brussels.

The Belgian railroad department has decided that hereafter in the matter of bidding for supplies of material preference will be given to Belgian industry, even if the amounts involved are greater by 5 per cent than those of foreign competition. Eventually, however, the Belgian bidder is to agree to make his price similar to that of the foreign bidder.

Australia to Build Locomotives for Tasmanian Railway

London.

The Times Trade Supplement says that the Tasmanian Railway Department has recently placed an order for ten passenger and freight locomotives with a South Australian firm. The price quoted was somewhere about $5,000 each below that quoted by English firms. The price is for delivery in Tasmania and the first locomotive is to be delivered within nine months. The long time required for delivery by English manufacturers and the high rate of exchange in the United States hindered placing the order outside Australia.

Railway Strike in Italy

London.

A general strike on the Italian railways was declared on May 7, and the train service was stopped. The railwaymen give as an excuse for the strike the removal of a yardman at Bari. Looting and anarchist elements evidently led some of the demonstrators. A correspondent to the London "Daily Telegraph" said that the demonstrators acted as if revolution had already come and a reign of Bolshevik terror inaugurated. The real cause of the strike was said to be the Italian government's raising the price of bread, the price of which has not been increased to the same extent as other commodities.

Railway Rolling Stock for New Zealand Government

The New Zealand Government has announced, writes Consul General Alfred A. Winslow from Auckland on April 10, as noted in Commerce Reports, that the railway department will expend about $8,516,375 for the purchase of rolling stock for government railroads of this Dominion, covering 65 locomotives, 35 passenger cars, 12 brake vans, and 4,092 freight cars.

It is announced that the Government proposes to invite tenders in England for the manufacture of 25 large locomotives and 2,500 freight cars; and tenders in New Zealand for the building of 1,000 freight cars to be delivered in the shortest possible time.

In addition to the above the department is providing for the building of 20 locomotives, 35 passengers cars, 12 brake vans, and 592 freight cars in its own shops at the different centers. Twenty locomotives are now being built under contract by A. & G. Price, all to be delivered within five years.

Rolling stock is greatly needed, since the Government railroads are not able to meet the increasing amount of freight offered for transportation, and the accumulation of all classes of traffic throughout the Dominion is very great, there being approximately 25,000,000 feet of lumber ready for delivery where it is greatly needed in order to house the people and accommodate business throughout the Dominion.

It would seem, adds Mr. Winslow, that it would pay American interests to investigate this opening, for it is not probable that British manufacturers will be able to deliver these locomotives and cars in time to relieve the freight situation within a reasonable time, and rolling stock allotted for construction in this dominion cannot be supplied within the next four or five years unless labor conditions change very materially. In any event much of the material to be used in the construction of this rolling stock in New Zealand must come from outside and will call for hardware, car-building accessories, and certain lines of timber.

Interested parties should correspond with the Minister of Railways covering the general contracts, and with A. & G. Price at Thames or Auckland relative to supplies for the 20 locomotives they are building.

Anticipated Rise in England's Railway Rates

London.

The English public does not seem to realize fully that a further rise in passenger fares and freight rates is inevitable, although announcements have repeatedly been made to this effect. This additional increase in rates is quite apart from the consequences of the new increase in railwaymen's wages just conceded by the National Wages Board. The London Times states that the budget figures quite correctly conveyed the inference that the 50 per cent increase in freight rates January last would place the railways on a sound financial footing, and would render any further subsidy unnecessary. But several things have happened since that time which have altered this inference. The railway shopmen have received an award amounting to $12,500,000; the wages of other railway men have been increased under the sliding scale based upon the cost of living. The sliding scale increase means another $17,500,000 a year.

It is further estimated that the increased cost of coal due to the recent advance in miners' wages and the increased cost of other materials, will involve the railways in a further annual expenditure of $77,500,000, making in all a new total outlay of $107,500,000. It is said that the present average return on capital invested in railways is a little over 3½ per cent, and the government guarantee of net receipts has not yet expired. There is no money available for the above expenditure and it must either be found by a renewed government subsidy or by a new increase in freight and passenger rates. The government and the railwaymen's leaders are agreed that a return to the unsound and ruinous policy of subsidies is impossible and therefore the only alternative is to raise the rates.

Sir Eric Geddes, the Minister of Transport, has no power to raise the rates without first consulting the Rates Advisory Committee, which he is now doing on the broader question of a general basis of rates. It is estimated, says the London Times, that the new expenditure can only be met by the addition of 20 per cent to the fares now in force, which are already 50 per cent higher than the pre-war figures. The National Wages Board has now made further concessions to the railwaymen based on an entirely new principle. Having been granted under the sliding scale the increase required by the higher cost of living, the railwaymen have now received further wages additions in response to the plea that men in other trades are getting more. The cost of this fresh increase is roughly expected to be about $50,000,000, which will mean that the coming inevitable increase in railway rates and fares will be nearer 30 per cent than 20 per cent above the present rates. This, therefore, means that the public and business communities will pay for travel and for freight something like 90 per cent above pre-war charges.

It is well to realize, says the London Times, the direction in which these increases are working. They mean, in the first place, there will be a substantial reduction in passengers. On the other hand great hardship will be laid upon those who are compelled to travel, whatever the cost, and it is pointed out that there must be a substantial increase on the charges for season and workmen's tickets. As to freight rates, J. A. Hobson, the president of the British Association of Chambers of Commerce, pointed out that a further advance in these rates beyond the 20 per cent originally contemplated might "precipitate a serious collapse in trade in many parts of the country." He also said that if the freight rates were further increased there would be a substantial transfer of traffic to the roads. The road motor industry is becoming well organized and its promoters are able to lower their charges by arranging for return loads. Another consequence of the new doubts about railway prosperity is that the companies find it increasingly difficult to raise fresh capital. J. H. Thomas, secretary of the National Federation of Railwaymen, states that neither the public at large nor the business community have any right to expect cheap transportation at the expense of the railwaymen. This the London Times agrees with, but adds that the issue is long past that stage, and the railwaymen are now nearing the point at which they will be confronted with the unalterable economic fact that there is a limit to the working charges of any industry. When that limit is passed, the industry collapses and the men are thrown out of work.

Equipment and Supplies

Locomotives

THE CHICAGO & NORTH WESTERN is inquiring for 20 Pacific and 50 Mikado locomotives.

THE NOROESTE DE BRAZIL has ordered 20 locomotives from the Baldwin Locomotive Works.

THE SUGARLAND RAILWAY has ordered one locomotive from the Baldwin Locomotive Works.

THE MOGYANA RAILROAD (Brazil) has ordered 2 locomotives from the American Locomotive Company.

THE MINNEAPOLIS & ST LOUIS has ordered 15 locomotives from the American Locomotive Company.

THE ATLANTA & WEST POINT has ordered 2 Pacific type locomotives from the American Locomotive Company.

THE CHICAGO, ST. PAUL, MINNEAPOLIS & OMAHA is inquiring for 6 Mikado and 4 six-wheel switching locomotives.

THE FUJI MONBUC RAILWAY (Japan) has ordered one 2-6-2 type locomotive from the Baldwin Locomotive Works.

THE MANILA RAILROAD is inquiring for 30 locomotives, to consist of 10 each of 50 ton, 60 ton and 75 ton locomotives.

MITSUI & CO., 65 Broadway, New York, is inquiring for 40 Prairie type locomotives for the Peking-Hankow Railway.

THE FAJARDO SUGAR COMPANY, Porto Rico, has ordered one 4-wheel, oil-burning, plantation locomotive from the Bell Locomotive Works.

THE PAMPANGA SUGAR DEVELOPMENT COMPANY, Manila, P. I., has ordered 4, 4-wheel, oil-burning, plantation locomotives from the Bell Locomotive Works.

THE TEMISKAMING & NORTHERN ONTARIO, reported in the *Railway Age* of April 23 as being in the market for 4 Mikado type locomotives, has ordered this equipment from the Canadian Locomotive Company.

THE SOUTH MANCHURIAN RAILWAY (Korean lines), reported in the *Railway Age* of March 19 as being in the market for 24 Pacific locomotives, has ordered 12 of these locomotives from the Baldwin Locomotive Works.

THE PERE MARQUETTE, reported in the *Railway Age* of February 6, as inquiring for 10 Pacific type locomotives, has ordered 12 Pacific type locomotives from the American Locomotive Company. These locomotives will have 23 by 28 in. cylinders and a total weight in working order of 240,000 lbs.

Freight Cars

THE CHICAGO & NORTH WESTERN is inquiring for 500, 40-ton stock cars.

THE RAINEY-WOOD COKE COMPANY, New York, is inquiring for 500, 70-ton hopper cars.

THE H. C. FRICK COKE COMPANY, Pittsburgh, Pa., is inquiring for 1,000, 70-ton hopper cars.

THE UNITED ALLOY STEEL CORPORATION, Canton, Ohio, is inquiring for from 25 to 50 hopper cars.

THE NATIONAL TUBE COMPANY, Pittsburgh, Pa., is inquiring for six tank cars of 12,500 gal. capacity.

THE CARNEGIE STEEL COMPANY, Pittsburgh, Pa., is renewing its inquiries for 500, 50-ton hopper car bodies.

THE MATHERS-COLLIERS COMPANY, Cleveland, Ohio, is inquiring for from 400 to 700, 70-ton hopper cars.

THE PITTSBURGH MACHINERY COMPANY, Pittsburgh, Pa., is inquiring for from 50 to 100 7,000 gal. tank cars.

W. H. WARNER & CO., Pittsburgh, Pa., have ordered 250, 55-ton hopper cars from the Pressed Steel Car Company.

THE NASHVILLE, CHATTANOOGA & ST. LOUIS is inquiring for 100 cars, to consist of gondola, dump or hopper cars.

THE RAINEY-WOOD COKE COMPANY, New York, has ordered 500, 70-ton hopper cars from the Cambria Steel Company.

THE AMERICAN STEEL & WIRE COMPANY has ordered 250, 70-ton steel hopper cars from the Pressed Steel Car Company.

THE STRUTHERS FURNACE COMPANY, Cleveland, Ohio, has ordered 60, 55-ton hopper cars from the Pressed Steel Car Company.

THE ALUMINUM COMPANY OF AMERICA, Pittsburgh, Pa., has ordered 25 70-ton hopper cars from the Pressed Steel Car Company.

THE YOUNGSTOWN SHEET & TUBE COMPANY, Youngstown, Ohio, has ordered 500, 70-ton hopper cars from the Cambria Steel Company.

THE REPUBLIC STEEL & IRON COMPANY, Youngstown, Ohio, has ordered 160, 70-ton hopper cars from the Pressed Steel Car Company.

THE H. KOPPERS COMPANY, Chicago, has ordered 900, 50-ton hopper cars, and 104, 70-ton hopper cars from the Standard Steel Car Company.

THE CHILEAN STATE RAILWAYS are in the market for 50 flat cars, 85 gondolas, 30 box, 35 stock and 5 refrigerator cars, all to be of meter gage and 30 metric tons' capacity.

THE PENNSYLVANIA-OKLAHOMA OIL CORPORATION, Pittsburgh, Pa., is inquiring for from 50 to 100 tank cars of 8,000-gal. capacity and for from 50 to 100 tank cars of 10,000-gal. capacity.

THE PENNSYLVANIA EQUIPMENT COMPANY, 1420 Chestnut street, Philadelphia, Pa., is in the market for 15 second-hand steel, self-clearing, hopper coal cars and for 160 wooden gondola cars of 40-ton capacity.

THE HAVANA CENTRAL, reported in the *Railway Age* of April 23 as being in the market for 200, 30-ton freight cars, and reported on May 7 as being in the market for 50 narrow gage flat cars and 50 narrow gage box cars, has ordered this equipment from the Standard Steel Car Company, and has also ordered 75 hopper cars from the same company.

Passenger Cars

THE PERE MARQUETTE is in the market for a number of passenger train cars, including 14 coaches and 14 baggage cars.

THE CHILEAN STATE RAILWAYS are in the market for 5 sleeping cars, 2 dining cars, 5 first-class, 11 third-class, 7 baggage, and 4 composite cars, all to be of meter gage.

THE CITIZENS' TRANSPORTATION COMMITTEE in supplying trucks and drivers to relieve freight congestion at the New York piers is not making war upon union labor, as leaders of the teamsters and longshoremen proclaim. It was no use sending freight here if it was to be piled up on the docks and neglected by ukase of the labor leaders who would not make terms with the steamship companies. Business was being diverted to other ports. There would have been no attempt to organize independent trucking if the union truckmen had listened to reason and if certain steamship companies by their feebleness of initiative had not played into the hands of the strikers. The public, the third party, is always concerned in a strike that affects the prosperity and welfare of the community. The longshoremen's and truckmen's strikes, which threatened the peace as well as the welfare of New York, had become intolerable. One labor leader declares that the Merchants' Association has raised a fund to wage "open shop" warfare, when all it did was to provide for the expense of moving freight that the strikers would not touch and that steamship companies allowed to lie on their piers rather than make a final issue with the strikers.—*New York Times.*

Supply Trade News

C. H. Tucker, chief engineer of the **Toledo Bridge & Crane Company,** Toledo, Ohio, has resigned.

The Reincke-Ellis Company, advertising counsellors, has removed its offices from the Transportation Building, to 209-215 North Michigan avenue, Chicago.

The Lincoln Lumber Company, a newly organized concern, equipped to serve the railroads, has established its offices at Room 1063, McCormick Building, Chicago.

A new supply sub-warehouse of the **Western Electric Company, Incorporated,** New York, has been opened in Youngstown, Ohio, at 930 West Rayan avenue. The new office reports to the Pittsburgh distributing house. **C. A. Strouss** is in charge of sales and **H. B. Bergmann** in charge of stores.

Allan E. Goodhue, who was managing director of the Chicago Pneumatic Tool Company's English subsidiary, the Consolidated Pneumatic Tool Company, London, England, since May 1, 1919, also director of European sales for the **Chicago Pneumatic Tool Company,** New York, has been elected vice-president in charge of sales of the latter company, with headquarters at New York. Mr. Goodhue was formerly, for a number of years, connected with the sales department of the Midvale Steel Company and the Midvale Steel & Ordnance Company in Philadelphia, Chicago and Boston, and left that company in March, 1918, to enter the service of the United States Government. He was assistant manager of the steel and raw material section, Production Division of the Emergency Fleet Corporation, until January, 1919, when he became connected with the Chicago Pneumatic Tool Company.

A. E. Goodhue

J. H. Kuhns, manager of the railroad department of the Republic Rubber Company, has been elected vice-president of the **Union Asbestos & Rubber Company,** Chicago, which company has been appointed the western railroad sales agent for the Republic Rubber Company. His headquarters will be at 231 South Wells street, Chicago.

At a special meeting of the board of directors of the **SKF Industries, Inc.,** New York, on May 13, the resignation of **B. G. Prytz** as president was accepted, Mr. Prytz having been elected managing director of the parent company, with headquarters at Gothenburg, Sweden. **F. B. Kirkbride,** vice-president since the organization of the company, was elected president to succeed Mr. Prytz.

F. L. Easton has been appointed district sales manager of the Denver, Colo., office of the **Economy Fuse & Manufacturing Company,** Chicago, makers of Economy renewable fuses. Mr. Easton succeeds **R. M. Olsen,** who resigned recently. Mr. Easton formerly was connected with the Economy Fuse & Manufacturing Company, but more recently has been doing sales promotion work for the Gates Rubber Company.

Edward C. Waldvogel, who has been in the service of the **Yale & Towne Company** for fifteen years, during the past four years of which he was general manager in charge of all sales and advertising, has been elected a director of the company. He began work in a retail hardware store and later served in the hardware jobbing business both as a buyer and a salesman. He subsequently became a traveling salesman for the Yale & Towne Company and was consecutively promoted to a position in the general offices, assistant general manager, and in 1916, general manager.

A. Burton Cohen, concrete engineer on the Delaware, Lackawanna & Western, with headquarters at Hoboken, N. J., has resigned to enter private practice as a consulting engineer with headquarters in New York and specializing in reinforced concrete design and construction of bridges, buildings and railroad structures. Mr. Cohen was born in Chicago on March 9, 1882, and was graduated from Purdue University in 1905, receiving his degree in civil engineering in 1910 for a thesis description of the Delaware river viaduct on the Lackawanna. He entered railway service in the engineering department with the Lackawanna and was assigned to preliminary estimating and location work on the 28-mile grade revision improvement and cut-off line across the western part of New Jersey. He subsequently served as chief draftsman on the locating party and assisted in the design of the masonry structures involved in this improvement. In 1910 he was promoted to assistant engineer in charge of the design of reinforced concrete structures and later was promoted to concrete engineer. In the latter position he had charge of the design of all the concrete structures built on the cut-off line west of Scranton, Pa., including the Martins creek and Tunkhaanock creek viaducts, the largest structures of their kind in the world. Later he designed the flat-slab viaduct of the Buffalo terminal improvement which carries seven tracks and train shed.

A. B. Cohen

Willard L. Case has been elected treasurer of the **Yale & Towne Manufacturing Company,** Stamford, Conn., succeeding **John B. Milliken,** resigned. Mr. Case was educated at Peddie Institute and Brown University and subsequently took up the study and practice of industrial engineering. He served as advisory engineer to the Audit Company, New York, and in 1910 he opened offices of his own and was engaged in consulting practice relating to problems of construction, operation, management and finance in connection with manufacturing plants, and more recently he was a special member of a firm of certified public accountants.

Recent advertisements of the **Westinghouse Union Battery Company,** Swissvale, Pa., have, unfortunately, led many to assume that the Westinghouse Electric & Manufacturing Company was entering the storage battery field. In order to clear away any misunderstanding, the Westinghouse Electric & Manufacturing Company authorizes the statement that the Westinghouse Union Battery Company is owned and controlled by the Westinghouse Air Brake Company, Wilmerding, Pa., and the Westinghouse Electric & Manufacturing Company is not in any way connected with the manufacture, sale, distribution or service of its product.

George F. Smardon, who served as secretary and assistant to Carl R. Gray, director of operation, United States Railroad Administration, during federal control, has become associated with the **Anchor Packing Company,** of Philadelphia, manufacturers of packings, mechanical rubber goods and asbestos products, as railway representative, eastern railroads, effective June 4. Prior to federal control Mr. Smardon served as secretary to President J. F. Fitzgerald of the

Western Maryland from July, 1913, to March, 1914, and secretary to Carl R. Gray from March, 1914, until Mr. Gray, in December 31, 1919, became president of the Union Pacific.

The **Westinghouse Electric International Company**, New York, has made appointments as follows: At East Pittsburgh, Pa., **H. F. Griffith**, assistant to general manager, **R. W. Everson**, manager of merchandising department, **H. C. Soule**, manager apparatus department, and **H. S. Reizenstein**, manager price department. At New York: **G. H. Bucher**, assistant to general manager; **J. H. Payne**, supervisor of agencies, and **F. M. Sammis**, manager of incandescent lamp department. **A. B. Cole**, assistant manager, department of publicity, Westinghouse Electric & Manufacturing Company, has been placed in charge of the advertising and promotion work for the Westinghouse International Company, and the following have been appointed foreign managers of the Westinghouse Electric International Company: **F. M. Rodgers**, London, England, European manager; **J. W. White**, Royal Bank of Canada building, Havana, Cuba, manager for Cuba, and **L. T. Peck**, Bartolome Mitre 754, Buenos Aires, manager for the Argentine.

The personnel of the **Elvin Mechanical Stoker Company**, New York is now as follows: **John B. Given**, president, **Albert G. Elvin**, vice-president in charge of operation and treasurer; **F. H. Elvin**, assistant to vice-president in charge of operation; **Frank H. Clark**, vice-president; **Frederick P. Whitaker**, secretary; **A. B. Fahnestock**, chief engineer; **H. D. Eckerson**, manager of road service, and the directors are: E. M. Richardson, Sherwin-Williams Paint Company; F. P. Whitaker, Hardy, Stancliffe & Whitaker; Frank H. Clark, president Chambers Valve Company; Albert G. Elvin, formerly of the Franklin Railway Supply Company; John B. Given, formerly associated with General Charles Miller on the executive staff of the Galena Signal Oil Company. The headquarters of the company are at 23 West 43rd street, New York. The Elvin stoker has been in operation on the Erie for three years and is now being tested out on the Grand Trunk. A description of this stoker and its use on the Erie was published in the *Railway Age* of January 17, 1919, page 202.

Due to the retirement of **A. F. Stillman** from active interest in the management of **The Watson-Stillman Company**, New York, several changes in the personnel have been made. **E. A. Stillman** remains as president and also has full supervision of the sales. **Carl Wigtel**, chief engineer, has been elected vice-president, **J. D. Brocks**, treasurer, and **A. Parker Nevin**, secretary; **LeRoy T. Brown** has been appointed works manager, **J. W. Delano**, assistant works manager, and **W. H. Martin**, purchasing agent. The offices of general manager and superintendent are discontinued, and **G. D. Kershaw** and **J. F. Lary**, who held these positions, are no longer connected with the company. The board of directors now consists of **E. A. Stillman, A. F. Stillman, Carl Wigtel, A. Parker Nevin, W. L. Wright**, president of the Savage Arms Company, **George T. Ordway**, of Bertram Griscom Company, and **F. A. Hutson**. Carl Wigtel, vice-president and chief engineer of the Watson Stillman Company, sailed on June 14 for a ten weeks' trip to Scandinavian countries. He also expects to visit England, France, Belgium and Holland. While Mr. Wigtel is going mainly for a vacation, he will also investigate new developments in the line of hydraulic machinery in all of the above countries.

The personnel of the railway department of the **Westinghouse Electric & Manufacturing Company**, East Pittsburgh, Pa., has been rearranged and promotions have been made as follows: **W. R. Stinemetz**, manager of the heavy traction section, with **Franklin W. Carter** in charge of both foreign and domestic negotiations; E. D. Lynch, manager of the light traction equipment section, with **George Skipton** in charge of negotiations; **J. L. Crouse**, manager of the new railway apparatus and supply section, and **K. A. Simmon**, manager of the safety car and foreign railway equipment section. Recent promotions in the service department are as follows: **G. W. Canney**, formerly service manager at East Pittsburgh, has been transferred to the office of **W. K. Dunlap**, assistant to vice-president; **L. C. Richards**, formerly district service manager at New York, has been transferred to East Pittsburgh as electrical manager in charge of service department work in connection with all electrical apparatus including service shops; **A. D. Hunt**, of the South Philadelphia works, has been made steam service manager in charge of service department work in connection with all steam apparatus; **W. H. Keller** has been made office service manager at East Pittsburgh in charge of all clerical, cost and accounting details of the service department. And will report directly to **W. K. Dunlap**, assistant to vice-president, in charge of service.

R. J. Barry, heretofore superintendent of car service of the Southern Pacific, Lonisiana and Texas lines, has been appointed general manager of the **National Oil Company**, New York, with headquarters at Houston, Tex. Mr. Barry was born in Ireland on November 13, 1876 and was educated at Blackrock College. He entered railway service in October, 1896 with the Boston & Maine as a laborer at a fuel station at Lawrence, Mass. He was promoted to switchman in 1897. In 1898 he became a reporter, serving as war correspondent for the Boston Globe during the Boer War. In 1903 he went to the Southern Pacific and was a clerk at Oakland, Cal., and served successively, until 1909, as timekeeper in the superintendent's office, yard clerk, agent at Oakland Wharf station, supervisor of yards and stations, and inspector of transportation. For the following three years he was general agent for the Alaska Steamship Company and general freight and passenger agent of the Copper River & Northwestern, with headquarters at Cordova, Alaska. In 1912 he returned to the Southern Pacific as chief clerk to the superintendent, with headquarters at Sacramento, Cal., and one year later was appointed inspector of transportation in Louisiana and Texas. In 1914 he was appointed superintendent of the Austin division and in 1915 was transferred to the Houston and Galveston divisions. He was promoted to superintendent of car service and acting superintendent of transportation in 1917, which position he held until his recent appointment. Mr. Barry has specialized in fuel consumption and the use of fuel oil for locomotives, and in his new work will have charge of all terminals in Mexico and the United States and the operation of a fleet of oil ships, tugs and barges between Tampico, Mex., and United States ports.

Obituary

Charles Blizard, third vice-president of the **Electric Storage Battery Company**, died on Saturday, June 12. He was born at Stevens Point, Wis., in 1864, and was educated in the east, graduating from the Brooklyn Polytechnic Institute. In October, 1893, he became associated with the Electric Storage Battery Company and was in the service of the company a total of 27 years. He was at first manager of the New York office and in 1900 he was moved to the home office in Philadelphia in charge of sales. In April, 1906, he was made third vice-president, which position he retained until the time of his death. Mr. Blizard was a prominent figure at conventions of Central Lighting and Power Companies, and for years served on the exhibition committee. He was also an active member of the Electric Vehicle Association, serving on various committees, and he later continued his activities in the electric vehicle section of the National Electric Light Association. He was a member of the board of governors, chairman of the finance committee of the Associated Manufacturers of Electrical Supplies, and was his company's official representative in the Motor Accessory Manufacturers' Association.

C. Blizard

ANNUAL REPORT

Southern Pacific Company—Report of the Board of Directors

NEW YORK, N. Y., June 17, 1920

TO THE STOCKHOLDERS OF THE SOUTHERN PACIFIC COMPANY:

Your Board of Directors submits this report of the operations and affairs of the Southern Pacific Company and of its Proprietary Companies for the fiscal year ended December 31, 1919.

The Federal Government, which took over the railroad and steamship lines of your Company on December 28, 1917, as explained in last year's report, continued, during the year 1919, in the possession and control of your Company's properties.

The following table shows the results of Federal operation of your Company's lines during 1919 compared with the results of Federal operation during 1918:

	Calendar Year 1919	Calendar Year 1918	+ Increase — Decrease	Per Cent
1. Average miles of road operated..	11,043.11	11,161.54 —	58.43	.53
RAILWAY OPERATING REVENUES				
2. Freight	$163,011,660.07	$151,079,622.80 +	$11,932,037.27	7.90
3. Passenger	59,371,140.37	53,247,921.76 +	6,123,218.61	11.50
4. Mail and express	7,838,257.82	7,839,380.77 —	1,122.95	.01
5. All other transportation	2,446,116.63	3,548,305.77 —	1,102,189.14	31.06
6. Incidental	6,886,516.60	5,851,254.45 +	1,035,262.15	17.69
7. Joint facility — Credit	128,988.99	83,207.96 +	45,781.03	55.02
8. Joint facility — Debit	25,408.13	38,487.30 +	13,079.17	33.98
9. Total railway operating revenues.	$239,657,272.35	$221,611,206.21 +	$18,046,066.14	8.14
RAILWAY OPERATING EXPENSES				
10. Maintenance of way and structures	$34,799,542.71	$25,824,725.78 +	$8,974,816.93	34.75
11. Maintenance of equipment	47,969,373.75	40,747,834.97 +	7,221,538.78	17.72
12. Total maintenance	$82,768,916.46	$66,572,560.75 +	$16,196,355.71	24.33
13. Traffic	2,162,186.46	2,249,360.43 —	87,173.97	3.88
14. Transportation ..	93,274,666.63	86,084,897.92 +	7,189,768.71	8.35
15. Miscellaneous operations	4,231,266.21	3,330,398.66 +	900,867.55	27.05
16. General	4,880,882.38	4,925,247.01 —	44,364.63	.90
17. Transportation for investment — Credit	390,435.63	440,092.93 +	49,657.30	11.28
18. Total railway operating expenses.	$186,927,482.51	$162,722,371.84 +	$24,205,110.67	14.88
19. Net revenue from railway operations	$52,729,789.84	$58,888,834.37 —	$6,159,044.53	10.46
20. Railway tax accruals	$9,478,376.72	$9,398,681.08 +	$79,695.64	.85
21. Uncollectible railway revenues.	51,694.91	59,675.69 —	7,980.78	13.37
22. Railway operating income...	$43,199,718.21	$49,430,477.60 —	$6,230,759.39	12.61
23. Equipment rents (Net credit)..	378,081.20	3,661,808.59 —	3,283,727.39	89.68
24. Joint facility rent (Net credit)..	*9,423.90	195,089.66 —	204,513.56	104.83
25. Net of items 22, 23, and 24	$43,568,375.51	$53,287,375.85 —	$9,719,000.34	18.24
26. Miscellaneous income	418,906.59	104,901.62 +	314,004.97	299.33
27. Expenses in excess of revenues prior to January 1, 1918, included in above, but charged against the corporation	§76,977.51	2,533,000.13 —	2,609,977.64	103.04
28. Net income from Federal operations	$43,910,304.59	$55,925,277.60 —	$12,014,973.01	21.48
29. Standard return‡	48,244,660.03	48,167,342.56 +	77,317.47	.16
30. Standard return in excess of Federal income for 1919	$4,334,355.44	.....	.....	....
31. Federal income for 1918, in excess of standard return ...	.....	$7,757,935.04	.....	....

*Debit. §Represents revenues in excess of expenses prior to January 1, 1918, included in above statement, but credited to the corporation. ‡Represents the annual compensation payable by U. S. Government for use of Southern Pacific Transportation System, as fixed in the agreement with the Director General of Railroads.

Following is a summary of operating revenues, operating expenses, and net revenue from railway operations for years 1919 and 1918 under Federal control; also, for comparative purposes, for the year 1917—the last year of private operation preceding Government control:

	1919	1918	1919 Compared with 1918 +Increase —Decrease	Percent	1917
Operating revenues	$239,657,272.35	$221,611,206.21 +	$18,046,066.14	8.14	$193,971,489.54
Operating expenses	186,927,482.51	162,722,371.84 +	24,205,110.67	14.88	120,601,822.82
Net revenue from railway operations	52,729,789.84	58,888,834.37 —	6,159,044.53	10.46	73,369,666.72
Operating ratio, Pct	78.00	73.43 +	4.57	6.22	62.18

The above table illustrates the disproportionate increase in expenses compared with revenues and the fall in net despite higher gross. In 1919 after paying expenses of operating, there was left out of each dollar of revenue only 22 cents, compared with 38 cents remaining in the last year previous to Federal control.

Comparing 1919 with 1918, the increase in operating revenue of $18,046,066.14, or 8.14%, resulted principally from the fact that passenger and freight rates were not increased until June of 1918 and the beneficial effect of this increase was felt in only half of that year.

There was a decrease of 6.52% in ton miles of revenue freight, attributable chiefly to the diversion of traffic from your lines during the whole of 1919, which was practiced during only a part of 1918. This diversion of traffic during the operation of your lines by the Government resulted from the closing of traffic agencies, the disturbance of relationship of both rates and service, and arbitrary routing of freight by Governmental agencies.

The revenue passengers carried one mile increased 7.28% which, partially offset the decrease in the volume of freight business, and was due to the transportation of discharged and furloughed soldiers and to the general prosperity of the people of the country.

The increase of $24,205,110.67, or 14.88%, in operating expenses, compared with a decrease of 5.71% in train mileage, was due principally to additional increases in wages and prices of material, the effect of these increases over previous year being:

Increased wages	$11,420,000
Increase in price of fuel	2,534,500
Increase in prices of other materials	4,879,000
Total increase in wages and material prices	$18,833,500

The annual report showed increases in 1918 over 1917 from these causes amounting to $34,338,000, the total increase in wages and material prices in the two years of Federal control, therefore, being $53,171,000, which increased operating expenses substantially forty per cent.

There was an increase of $5,371,611 in operating expenses in 1919 over 1918 not accounted for by increased wages or prices.

Considerable improvement due principally to reduction in speed and to superheating was effected in fuel consumption in 1919 over 1918, which year had fallen below the record of the year previous. The gross ton miles moved per pound of coal (oil equated to coal on basis of four barrels of oil to one ton of coal) were:

	Passenger Service	*Freight Service*
1919	5.08	6.67
1918	5.05	6.06
1917	5.10	6.11

Other transportation results for the year 1919 were as follows:

	Tons All Freight per Loaded Car	Percent Loaded to Total Freight Car Miles	Tons All Freight per Train	Passengers per Train
1919	25.42	69.74	641.41	81.76
1918	26.98	71.02	641.28	73.27
1917	25.34	72.14	602.98	62.82

PROPERTIES AND MILEAGE

The transportation lines of the Southern Pacific Company, and of certain affiliated companies herein referred to as "Proprietary Companies," constituting the Southern Pacific System, operated by the Government at December 31, 1919, were as follows:

DIVISIONS	First Main Track	Additional Main Track	Sidings	Ferries	Water Lines
A—MILEAGE OF LINES OWNED BY OR LEASED TO SOUTHERN PACIFIC COMPANY:					
1. Owned by Southern Pacific Company	528.06	15.35	202.53	...	4,400.00
2. Leased from Proprietary companies:					
(a) Central Pacific Railway	2,289.00	431.42	931.62	9.90	125.00
(b) Oregon & California Railroad	701.38	4.57	187.53	...	....
(c) Southern Pacific Railroad	3,475.74	208.16	1,510.20	3.00	....
(d) South Pacific Coast Railway	106.70	20.46	49.25	3.00	....
B—MILEAGE OF LINES OWNED BY OR LEASED TO THE FOLLOWING PROPRIETARY COMPANIES:					
1. Arizona Eastern R. R. Co.	377.74	....	78.86	...	....
2. Houston & Texas Central R. R. Co.....	856.57	12.94	265.52	..	.. ..
3. Galveston, Harrisburg & San Antonio Ry. Co...	1,381.90	40.87	385.41	...	..
4. Texas & New Orleans R. R. Co.....	469.65	8.78	220.57	...	....
5. Houston, East & West Texas Ry. Co.....	190.94	....	57.93	...	....
6. Houston & Shreveport R. R. Co.....	40.72	.69	7.42	...	....
7. Morgan's Louisiana & Texas R. R. & S. S. Co.	400.67	58.35	250.56	3.00	....

9 Louisiana Western R. R. Co.	107.74		83.98		
10 Lake Charles & Northern R. R. Co.	72.66		11.32		
10 Iberia & Vermilion R. R. Co.	7.41		10.95		
11 Sunset Pacific Terminal Co.			25.68		
Total	11,120.91	801.59	4,279.33	18.90	4,525.00
Less mileage used in connection with property of two or more of above companies and included in mileage of each	31.23	29.99	30.33		
Total miles of road operated by Government at December 31, 1919	*11,089.68	771.60	4,249.00	18.90	4,525.00
Total miles of road operated by Government at December 31, 1918	11,085.32	763.62	†4,235.88	18.90	4,525.00
Increase	4.36	7.98	13.12		
Average miles of road operated by Government during year 1919	11,043.11	771.13			

*Includes 2.48 miles owned jointly with other companies, 4.37 miles leased from other companies, and 79.27 miles operated under trackage rights; and excludes 41.34 miles of owned lines leased to other companies. †Excludes .49 miles of siding at Maricopa, Arizona, owned jointly by Arizona Eastern R. R. Co. and Southern Pacific R. R. Co. which was duplicated in last year's report.

In addition to the mileage above tabulated, the Southern Pacific Company solely controls through ownership of capital stock, 863.89 miles of Affiliated Companies and 1,240.52 miles of the Southern Pacific R. R. Co. of Mexico, and jointly controls (through ownership of capital stock in equal proportions with the Atchison, Topeka & Santa Fe Ry. Co.) 523.46 miles of the Northwestern Pacific Railroad, and 59.66 miles of the Sunset Railway, A GRAND TOTAL OF 13,777.21 MILES.

INCOME ACCOUNT

SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES, COMBINED
(Excluding offsetting accounts)

	Year ended December 31, 1919	Year ended December 31, 1918	+Increase —Decrease	Per Cent
1. Standard return.*	$48,244,660.03	$48,167,342.56	+ $77,317.47	.16
Operating Income				
2. Revenues from miscellaneous operations	$14,033,155.75	$20,397,863.81	—$6,364,708.06	31.20
3. Expenses of miscellaneous operations	7,565,331.96	15,921,426.68	— 8,356,094.72	52.48
4. Net revenue from miscellaneous operations	$6,467,823.79	$4,476,437.13	+$1,991,386.66	44.49
5. Taxes on miscellaneous operating property	223,706.58	159,239.80	+ 64,466.78	40.48
6. Miscellaneous operating income	$6,244,117.21	$4,317,197.33	+ $1,926,919.88	44.63
7. Total of items 1 and 6	$54,488,777.24	$52,484,539.89	+$2,004,237.35	3.82
Nonoperating Income				
8. Income from lease of road	$28,497.04	$27,031.90	+ $1,465.14	5.42
9. Miscellaneous rent income	731,015.97	683,722.22	+ 47,293.75	6.92
10. Miscellaneous nonoperating physical property	360,069.30	420,681.73	— 60,612.43	14.41
11. Separately operated properties—Profit	24,909.46	50,176.24	— 25,266.78	50.36
12. Dividend income	1,182,038.97	2,304,208.06	— 1,122,169.09	48.70
13. Income from funded securities—Bonds and notes—Affiliated and other companies	2,370,301.11	2,297,166.57	+ 73,134.54	3.18
14. Income from funded securities—Investment advances—Affiliated companies	413,942.36	298,335.09	+ 145,607.27	48.81
15. Income from unfunded securities and accounts	355,563.95	556,093.61	— 200,529.66	36.06
16. Income from sinking and other reserve funds	742,040.20	714,439.71	+ 27,600.49	3.86
17. Miscellaneous income	207,327.72	102,839.25	+ 104,498.47	101.61
18. Revenues prior to January 1, 1918	414,834.36	535,046.94	— 120,212.58	22.47
19. Total nonoperating income	$6,860,550.44	$7,989,741.32	—$1,129,190.88	14.13
20. Gross income	$61,349,327.68	$60,474,281.21	+ $875,046.47	1.45
Deductions from Gross Income				
21. Rent for leased roads	$267,019.89	$329,588.93	— $62,569.04	18.98
22. Miscellaneous rents	717,692.48	590,407.88	+ 127,284.60	21.56
23. Miscellaneous tax accruals	706,591.76	684,460.70	+ 22,131.06	3.23
24. Railway tax accruals—War taxes	2,433,617.90	1,707,269.24	+ 726,348.66	42.54
25. Interest on funded debt—Bonds and notes	22,701,121.06	23,767,103.53	— 1,065,982.47	4.49
26. Interest on funded debt—Nonnegotiable debt to affiliated companies	147,496.30	114,256.18	+ 33,240.12	29.09
27. Interest on unfunded debt	375,066.93	146,352.61	+ 228,714.31	156.28
28. Amortization of discount on funded debt	292,131.27	286,965.82	+ 5,165.45	1.80
29. Corporate operating expenses	1,489,844.83	726,191.58	+ 763,653.25	105.16
30. Miscellaneous income charges	332,281.36	368,721.49	— 36,440.13	9.88
31. Expenses prior to January 1, 1918	337,856.85	3,068,047.07	— 2,730,190.22	88.99
32. Total deductions from gross income	$29,800,720.62	$31,789,365.03	—$1,988,644.41	6.26
33. Net income	$31,548,607.06	$28,684,916.18	+$2,863,690.88	9.98
Disposition of Net Income				
34. Income applied to sinking and other reserve funds	$1,022,863.92	$997,111.48	+ $25,752.44	2.58
35. Dividend appropriations of income†	17,478,459.12	16,404,509.25	+ 1,073,949.87	6.55
36. Total appropriations	$18,501,323.04	$17,401,620.73	+$1,099,702.31	6.32
37. Income balance transferred to credit of profit and loss	$13,047,284.02	$11,283,295.45	+$1,763,988.57	15.63
38. Per cent of net income on outstanding capital stock of Southern Pacific Company	10.45	10.38	+ .07	.67

*Represents the annual compensation payable by U. S. Government for use of Southern Pacific Transportation System, as fixed in the agreement with the Director General of Railroads. †This year's figures include $334.00, and last year's figures, $454.00, representing dividends on stocks of Proprietary Companies held by the Public.

The increase of $77,317.47 in Standard Return (line No. 1) is due to the fact that the amount of the standard return of the Southern Pacific Terminal Company shown in last year's report was based on the compensation for terminal properties operated by the Director General; while the figures for this year include the compensation for Terminal Company properties leased

to the public, as well as for those operated by the Director General, such leased properties having been included in the agreement with the Director General executed January 10, 1920. This increase is partially offset by a decrease of $38,303.12 in Miscellaneous Rent Income, representing the rental for last year from such leased properties, which was dealt with in last year's report as accruing to the Company.

As complete data are not yet available for the computation of interest on the accounts with the Government, or for the computation of the additional compensation payable to the Company for use of additions and betterments, new equipment, and road extensions completed during Federal control, the income statement does not include any amount representing such interest or such additional compensation. It is estimated, however, that the interest due the Company is in excess of that due to the Government: and that a considerable amount of additional compensation is due to the Company under the terms of our contract with the Director General.

Operating Income

Of the increase of $1,926,919.88 in Miscellaneous Operating Income (line No. 6) $1,925,629.63 represents the increase in the net operating income of the California Fuel Oil Department, the result, principally, of an increase of 1,418,000 barrels, or 20 per cent, in sales of produced oil, and of an increase of 15.85 cents in the average price per barrel due to an advance of 25 cents per barrel in the price of produced oil which went into effect in May, 1918. The decrease in gross revenues from, and in expenses of, Miscellaneous Operations (lines Nos. 2 and 3), is due to the fact that during the year 1919 the Federal Administration purchased from the Fuel Oil Department only a small amount of fuel oil other than that produced from the company's own wells, with the result that the Fuel Oil Department's dealings in purchased oil decreased 6,529,000 barrels, or about 79 per cent.

The increase of $47,293.75 in Miscellaneous Rent Income (line No. 9) is the result, principally, of an increase of about $90,000 in rent received for use of property not required for railway operations, caused by an increase in the rental rate, less the decrease of $38,303.12 on account of rental for last year from properties of the Southern Pacific Terminal Company, which was dealt with in last year's report as accruing to the Company instead of to the Director General, as explained above.

The decrease of $60,612.43 in Miscellaneous Nonoperating Physical Property (line No. 10) is due, principally, to a decrease in the net income from lands belonging to Central Pacific Railway Company and pledged under that company's Three and One-half Per Cent. Mortgage.

The decrease of $25,266.78 in Separately Operated Properties—Profit (line No. 11) represents this company's proportion of the decrease in profits from operation of Pintsch gas plants at Houston and Portland.

The increase of $145,607.27 in Income from Funded Securities Investment Advances (line No. 14) is the result, principally, of crediting to income this year interest on investment advances which were repaid during the year.

The decrease of $200,529.66 in Income from Unfunded Securities and Accounts (line No. 15) is due, principally, to a decrease in the interest received on bank balances.

The increase of $104,498.47 in Miscellaneous Income (line No. 17) represents, principally, the gain in exchange on funds remitted to Paris in payment of interest on Central Pacific Railway Company Four Per Cent. Thirty-Five Year European Loan bonds.

The credits to Revenues Prior to January 1, 1918, (line No. 18) and the debits to Expenses Prior to January 1, 1918, (line No. 31) represent, respectively, the collection and payment during the year, through the Federal Administration, of revenues and expenses, commonly called "lap-over" items, applicable to the period prior to January 1, 1918. For the reason set forth in the last paragraph on page 15 of last year's report the treatment of these items as credits and debits to income, as required by the Interstate Commerce Commission, has had the effect of understating the income for last year by $2,533,000.13, and of overstating the income for this year by $76,977.51.

Deductions from Gross Income

The decrease in Rent for Leased Roads (line No. 21) is the result, principally, of a rental payment made last year, covering rental accrued prior to January 1, 1918, which had been in controversy for several years.

The increase of $127,284.60 in Miscellaneous Rents (line No. 22) represents, principally, an increase in rental for pipe line used by the Fuel Oil Department.

Of the decrease of $1,065,982.47 in Interest on Funded Debt—Bonds and Notes (line No. 25) the sum of $920,429.89 is due to the conversion of Southern Pacific Company Four Per Cent. and Five Per Cent. Convertible Bonds into common stock; and the remainder is due to the retirement of bonds, principally through accretions to sinking funds.

The increase of $228,714.31 in Interest on Unfunded Debt (line No. 27) represents, principally, interest paid on funds borrowed for the purchase of Liberty Loan Bonds.

The increase in Corporate Operating Expenses (line No. 29) is due to the fact that such expenses for the period from January 1, 1918, up to the time of the appointment of Federal Managers, in the latter part of June, 1918, were borne by the Federal Administration.

The increase of $1,073,949.87 in Dividend Appropriations of Income (line No. 35) is due to the issue of Common stock against Southern Pacific Company Four Per Cent and Five Per Cent Convertible Bonds surrendered and cancelled.

On December 31, 1919, the principal of advances to the Southern Pacific Railroad Company of Mexico amounted to $39,546,127.19. Interest accruing on these advances has not been taken into the income of the Southern Pacific Company.

CAPITAL STOCK

The capital stock of the Southern Pacific Company outstanding at the beginning of the year amounted to		$276,442,905.64
Issued during the year:		
Common Stock issued at 130 in exchange for $26,657,150.00, par value, Four Per Cent. Twenty-Year Convertible Gold Bonds and Bond Scrip, at par, surrendered and cancelled	$20,505,500.00	
Common stock issued in exchange for a like amount of Five Per Cent. Twenty-Year Convertible Gold Bonds surrendered and cancelled	5,076,500.00	25,582,000.00
Amount of Southern Pacific Company capital stock outstanding December 31, 1919		$302,024,905.64

There was no change during the year in the capital stocks of the Proprietary Companies.

The amount outstanding December 31, 1919, was as follows:

Preferred stock	$29,400,000.00
Common stock	317,432,400.00
	$346,832,400.00

Capital stocks of Proprietary Companies outstanding December 31, 1919, were held as follows:

In hands of public		$76,100.00
Owned by Southern Pacific Company	$346,456,300.00	
Owned by Morgan's Louisiana & Texas Railroad & Steamship Company	300,000.00	
		346,756,300.00
		$346,832,400.00

FUNDED DEBT

The funded and other fixed interest-bearing debt of the Southern Pacific Company and of its Proprietary Companies, outstanding December 31, 1918, was as follows:

Southern Pacific Company	$201,189,710.00	
Proprietary Companies	445,298,789.78	
Total outstanding December 31, 1918		$646,488,499.78
Retired during the year:		
Southern Pacific Company		
Four Per Cent. Twenty-Year Convertible Gold Bonds:		
Retired at par in exchange for $20,505,500.00, par value, common stock issued at 130	$26,657,150.00	
San Francisco Terminal First Mortgage Four Per Cent. Bonds:		
Purchased from payments to sinking fund	6,300.00	
Five Per Cent. Twenty-Year Convertible Gold Bonds:		
Retired in exchange for a like amount of common stock issued	5,076,500.00	
Equipment Trust Certificates:		
Series A, Due March 1, 1919, paid off	$1,012,000.00	
Series B, Due September 1, 1919, paid off	201,000.00	
Series C, Due December 1, 1919, paid off	117,000.00	
Series D, due May 1, 1919, paid off	511,000.00	1,841,000.00
Central Pacific Railway Company		
First Refunding Mortgage Four Per Cent. Bonds:		
Purchased from payments to sinking fund	$31,000.00	
Three and One-half Per Cent. Mortgage Gold Bonds:		
Purchased from proceeds of sale of lands	$372,000.00	
Purchased from payments to sinking fund	29,000.00	401,000.00
		432,000.00
Oregon & California Railroad Company		
First Mortgage Five Per Cent. Bonds:		
Purchased from payments to sinking fund		140,000.00
South Pacific Coast Railway Company		
First Mortgage Four Per Cent. Bonds:		
Purchased from payments to sinking fund		227,000.00
Southern Pacific Railroad Company		
First Refunding Mortgage Four Per Cent. Gold Bonds:		
Purchased from payments to sinking fund		15,000.00
Texas & New Orleans Railroad Company		
Payment to State of Texas account of School Fund Debt		4,888.05
Total retired during the year		34,399,838.05
Amount of funded and other fixed interest-bearing debt of the Southern Pacific Company and of its Proprietary Companies, outstanding December 31, 1919		$612,088,661.73

The outstanding securities are held as follows:

In hands of public		$509,765,445.31
Owned by Southern Pacific Company	$87,119,216.42	
Owned by Proprietary Companies	2,337,000.00	
Held in sinking funds of Proprietary Companies	12,867,000.00	102,323,216.42
Total		$612,088,661.73

As a result of protracted negotiations your Company has entered into an agreement, dated January 15, 1920, with the Director General of Railroads providing that payment for the 1,000 box cars, which the Company was compelled to take over from the Director General as explained on page 10 of last year's report, is to be made in fifteen equal annual installments, evidenced by Equipment Trust Notes, dated January 15, 1920, divided into fifteen series, each for an aggregate principal amount equal to one-fifteenth of the total purchase price of the equipment, maturing, respectively, on the 15th day of January in each of the years 1921 to 1935, both inclusive, with interest at 6 per cent. per annum, payable semi-annually on January 15th and July 15th in each year. The agreement stipulates that while the precise purchase price of the 1,000 cars has not been finally computed it shall not be less than $2,815,000 nor more than $3,072,450. The minimum purchase price of $2,815,000 has been paid by the execution of notes aggregating $2,814,000, and the payment of $1,000 in cash; and upon the delivery of a certificate of the Director General and the manufacturers of the equipment, on or before August 1, 1920, specifying the total purchase price of such equipment, additional notes are to be executed and delivered to an aggregate amount equal to the difference between the total purchase price, as specified in such certificate, and the minimum purchase price. The aggregate amount of all notes to be executed and delivered under the agreement shall not, however, in any event, exceed the maximum purchase price of $3,072,450.

BALANCE SHEET

SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES, COMBINED
ASSETS DECEMBER 31, 1919, COMPARED WITH DECEMBER 31, 1918, EXCLUDING OFFSETTING ACCOUNTS

Assets	December 31, 1919	December 31, 1918	Increase	Decrease
INVESTMENTS				
Investment in road and equipment	$1,007,467,713.46	$996,741,568.97	$10,726,144.49	
Improvements on leased railway property	4,181,212.60	1,416,086.78	2,765,125.82	
Sinking funds	15,072,997.66	14,597,652.09	475,345.57	
Deposits in lieu of mortgaged property sold	954.09	935.30	18.79	
Miscellaneous physical property (a)	32,550,029.13	31,805,766.84	744,262.29	
Investments in affiliated companies:				
Stocks	276,077,877.61	273,317,127.61	2,760,750.00	
Bonds	142,891,570.60	134,690,024.70	8,201,545.90	
Stocks } Cost inseparable	11,917,751.70	12,192,301.70		$274,550.00
Bonds } Cost inseparable				
Notes	1,208,529.17	873,654.99	334,874.18	
Advances	107,990,144.96	107,667,866.75	322,278.21	
Other investments:				
Stocks	156,710.29	156,710.29		
Bonds	15,649,902.44	16,282,632.34		632,729.90
Notes	2,328,227.78	6,436,716.11		4,108,488.33
Advances	381,240.98	434,063.30		52,822.32
Miscellaneous	2,115,678.98	1,847,845.29	267,833.69	
Total	$1,619,990,541.45	$1,598,460,953.06	$21,529,588.39	
CURRENT ASSETS				
Cash	$12,281,635.76	$10,264,657.88	$2,016,977.88	
Special deposits	37,876.78	59,287.52		$21,410.74
Loans and bills receivable	194,590.05	3,351,520.52		3,156,930.47
Traffic and car-service balances receivable	183,363.95	267,880.32		84,516.37
Miscellaneous accounts receivable	3,256,128.77	3,503,017.08		246,888.31
Material and supplies (b)	1,555,151.07	1,692,207.19		137,056.12
Interest and dividends receivable	2,230,709.00	2,239,583.11		8,874.11
Rents receivable	1,221,141.82	1,667,116.12		445,974.30
Other current assets	23,726.95	46,824.40		23,097.45
Total	$20,984,324.15	$23,092,094.14		$2,107,769.99
ACCOUNTS WITH U. S. GOVERNMENT				
Standard return	$96,489,320.06	$48,167,342.56	$48,321,977.50	
Less received on account	61,625,000.00	16,000,000.00	45,625,000.00	
Balance due from U. S. Government	$34,864,320.06	$32,167,342.56	$2,696,977.50	
Cash and agents' and conductors' balances taken over January 1, 1918, revenues prior to January 1, 1918, and other corporate assets collected, etc.	37,775,606.19	36,435,380.91	1,340,225.28	
Material and supplies, December 31, 1917	23,468,531.66	23,581,109.84		$112,578.18
Depreciation and other reserves	8,670,321.83	4,058,073.23	4,612,248.60	
Road and equipment retired and not replaced	1,257,102.56	431,432.86	825,669.70	
Total	$106,035,882.30	$96,673,339.40	$9,362,542.90	
DEFERRED ASSETS				
Working fund advances	$43,908.18	$46,928.08		$3,919.90
Insurance and other funds	16,360.00		$16,360.00	
Other deferred assets	7,177,875.02	5,493,027.77	1,684,847.25	
Total	$7,237,243.20	$5,539,955.85	$1,697,287.35	
UNADJUSTED DEBITS				
Rents and insurance premiums paid in advance	$90,285.79	$122,184.72		$31,898.93
Discount on capital stock	3,988,600.00	3,988,600.00		
Discount on funded debt	3,039,679.78	3,331,811.05		292,131.27
Other unadjusted debits	3,581,020.76	5,121,547.86		1,540,527.10
Securities issued or assumed—Unpledged	(d) 5,924,675.00	(d) 5,849,425.00	(d) 75,250.00	
Securities issued or assumed—Pledged	(d) 156,500.00	(d) 231,750.00		(d) 75,250.00
Total	$10,699,586.33	$12,564,143.63		$1,864,557.30
Total assets	$1,764,947,577.43	$1,736,330,486.08	$28,617,091.35	

(a) The value of the unsold Central Pacific Railway Company and Oregon & California Railroad Company land grant lands is not included in the above statement of assets. (b) Represents material and supplies of California Fuel Oil Department. (d) Excluded from total assets and a corresponding amount excluded from outstanding funded debt in accordance with regulations of Interstate Commerce Commission.

To replace equipment vacated and to provide for increased requirements your company has placed orders with outside concerns for 42 locomotives, 50 passenger-train cars, 750 freight-train cars, and 130 electric cars; and is building at company shops 30 locomotives and 4,065 freight-train cars. Orders have been placed, also, for three ocean-going freight steamers (El Estero, El Isleo, and El Lago) of 7,825 tons displacement, each, and one ocean-going tank steamer (Tamihua) of 22,900 tons displacement. The cost of this new rolling stock and floating equipment will be approximately $29,700,000, all of which, except the cost of the steamers, it is proposed to provide by means of an equipment trust.

THE SUIT INVOLVING THE RIGHT OF THE SOUTHERN PACIFIC COMPANY TO OWN THE STOCK OF THE CENTRAL PACIFIC RAILWAY COMPANY.

On March 9, 1917, the United States District Court at Salt Lake City, composed of three Circuit Judges, decided this suit in favor of the Southern Pacific Company. From this decision the Government took an appeal to the Supreme Court of the United States. Before the appeal could be fixed for hearing the railroads were taken over by the United States under the Federal Control Act of March 21, 1918. Thereupon the Attorney General applied for and obtained orders of continuance for the purpose of postponing hearing upon the appeal during the period of Federal control. Such control having now ended by the return of the railroads to their owners, it is expected that the appeal will be pressed for hearing. Hence the probabilities are that the case will be argued and submitted early in the October term, 1920.

CONTROVERSY ARISING OUT OF THE OREGON AND CALIFORNIA RAILROAD'S LAND GRANT

This is an accounting suit brought in 1917 by the United States seeking to off-set against the compensation of $2.50 per acre, due the Company for the unsold lands, moneys received by the Company, in excess of $2.50 per acre, by reason of past sales, leases and otherwise, as well as taxes levied since the forfeiture decision in 1913 and voluntarily paid by the Federal

BALANCE SHEET

SOUTHERN PACIFIC COMPANY AND PROPRIETARY COMPANIES, COMBINED

LIABILITIES—DECEMBER 31, 1919, COMPARED WITH DECEMBER 31, 1918, EXCLUDING OFFSETTING ACCOUNTS

LIABILITIES	December 31, 1919	December 31, 1918	Increase	Decrease
STOCK				
Capital stock of Southern Pacific Company	$302,024,905.64	$276,442,905.64	$25,582,000.00	.....
Capital stock of Proprietary Companies (a)	346,832,400.00	346,832,400.00	.....	.....
Total stock outstanding	$648,857,305.64	$623,275,305.64	$25,582,000.00	.....
Premium on capital stock of Southern Pacific Company	$6,304,440.00	.....	6,304,440.00	.....
Total	$655,161,745.64	$623,275,305.64	$31,886,440.00	.....
LONG TERM DEBT				
Funded debt unmatured:				
Book liability	$618,169,836.73	$652,569,674.78	.....	$34,399,838.05
Less held by or for company	6,081,175.00	6,081,175.00	.....	.....
Actually outstanding:				
Southern Pacific Company	$167,608,760.00	$201,189,710.00	.....	$33,580,950.00
Proprietary Companies (a)	444,479,901.73	445,298,789.78	.....	818,888.05
Total funded debt	$612,088,661.73	$646,488,499.78	.....	$34,399,838.05
Nonnegotiable debt to affiliated companies:				
Open accounts	5,482,434.97	3,227,258.81	$2,255,176.16	.....
Total	$617,571,096.70	$649,715,758.59	.....	$32,144,661.89
CURRENT LIABILITIES				
Loans and bills payable	.....	(g) $6,050,000.00	.....	$6,050,000.00
Traffic and car-service balances payable	$82,354.41	94,353.40	.....	11,998.99
Audited accounts and wages payable	1,134,611.16	1,142,662.12	.....	8,050.96
Miscellaneous accounts payable	1,654,735.02	1,517,448.30	$137,286.72	.....
Interest matured unpaid	5,030,633.14	6,296,515.21	.....	1,265,882.07
Dividends matured unpaid	4,622,115.76	4,274,988.62	347,127.14	.....
Funded debt matured unpaid	62,213.92	127,213.92	.....	65,000.00
Unmatured interest accrued	4,813,872.14	5,261,940.89	.....	448,068.75
Unmatured rents accrued	288,393.77	247,446.18	40,947.59	.....
Other current liabilities	51,492.17	81,287.83	.....	29,795.66
Total	$17,740,421.49	$25,093,856.47	.....	$7,353,434.98
ACCOUNTS WITH U. S. GOVERNMENT				
Advances for additions and betterments	$24,592,835.48	$13,855,161.98	$10,737,673.50	.....
Advances for expenses prior to January 1, 1918, and other corporate liabilities paid, etc	47,811,802.81	45,951,353.23	1,860,449.58	.....
Total	$72,404,638.29	$59,806,515.21	$12,598,123.08	.....
DEFERRED LIABILITIES				
Other deferred liabilities	$53,476.61	$57,331.47	.....	$3,854.86
UNADJUSTED CREDITS				
Tax liability	$4,166,294.49	$4,266,757.28	.....	$100,462.79
Insurance and casualty reserves	3,309,723.29	3,264,555.78	$45,167.51	.....
Accrued depreciation—Road (d)	1,322,017.17	1,165,281.37	156,735.80	.....
Accrued depreciation—Equipment	51,348,247.38	47,597,739.57	3,750,507.81	.....
Accrued depreciation—Miscellaneous physical property (e)	8,541,207.84	7,650,520.81	890,687.03	.....
Other unadjusted credits (f)	58,439,936.81	50,639,151.63	7,800,785.18	.....
Total	$127,127,426.98	$114,584,006.44	$12,543,420.54	.....
CORPORATE SURPLUS				
Additions to property through income and surplus	$1,404,504.31	$1,271,691.65	$132,812.66	.....
Funded debt retired through income and surplus	22,302,877.20	21,566,803.76	736,073.44	.....
Sinking fund reserves	11,177,796.69	10,337,920.61	839,876.08	.....
Appropriated surplus not specifically invested	3,818,177.83	3,818,177.83	.....	.....
Total appropriated surplus	$38,703,356.03	$36,994,593.85	$1,708,762.18	.....
Profit and loss—Balance	236,185,415.69	226,803,118.41	9,382,297.28	.....
Total corporate surplus	$274,888,771.72	$263,797,712.26	$11,091,059.46	.....
Total liabilities	$1,764,947,577.43	$1,736,330,486.08	$28,617,091.35	.....

(a) The outstanding capital stock and funded debt include capital stock and funded debt of Proprietary Companies of the par value of $346,756,300 and $102,323,216.42, respectively, a total of $449,079,516.42, which securities are owned by the Southern Pacific Company or by Proprietary Companies, or are held in sinking funds of Proprietary Companies. The cost of these securities is included in the investments shown above. Of the said amount, stocks of the par value of $249,653,161, which stand charged on the books at $232,932,667.41, are pledged against the issue of Southern Pacific Company stock and bonds. (d) Represents accrued depreciation on electric power plants and substations, general office building at San Francisco, wood preserving works, Sacramento rolling mill, oil storage plants, grain elevators, and similar facilities. (e) Represents accrued depreciation on oil lands and improvements acquired from Kern Trading & Oil Company. (f) Represents, principally, interest on construction advances which have not been repaid. (g) Represents notes, issued in connection with the purchase of Liberty Loan Bonds, paid off during the year.

Government to the State of Oregon. The preparation for the trial of this case has involved an extensive examination and comparison of the records of the Company and of the Federal Land Department, local and at Washington. This preparatory work is now about completed and it is believed that the case will be heard in the United States District Court of Oregon some time during 1920.

THE SUITS INVOLVING TITLE TO THE OIL LANDS

These suits may be divided into two classes—one involving lands alleged by the Government to be valuable oil lands, but not proven or regarded as such by the Southern Pacific Company; and the other involving the Company's productive and valuable oil lands. Both classes of suits have now been disposed of by final judgments of Court, the Government winning the suit for the non-productive oil lands and the Company winning the suits covering its productive and valuable oil lands.

The suit involving non-productive oil lands was known as the Elk Hills Case. It was brought to cancel a patent for 6,109.17 acres which was issued to the Company by the Government in December, 1904, long subsequent to the patents involved in the other suits described in the paragraph below. This case was decided in favor of the Company by the United States Circuit Court of Appeals, but, on November 17, 1919, the Supreme Court of the United States, reversing the Circuit Court of Appeals, directed the entry of a final decree in favor of the United States.

The suits involving our productive and valuable oil lands, six in number and embracing 161,000 acres, were decided in favor of the Company by Judge Bledsoe of the United States District Court for the Southern District of California. The date of this decision and the decree in accordance therewith was August 28, 1919. The law applicable to such cases gave the Government six months within which to appeal. The result of failure to appeal within the time limit is to make the decree final and conclusive. The review of the evidence in the opinion of Judge Bledsoe clearly showed

[illegible] any fraud or bad faith in connection with the patents in the [illegible] question. The decision of the Supreme Court in the Elk Hills case showed that without clear proof of fraud or bad faith the Government could not win the case. The Attorney General, accordingly, on December 3, 1919, publicly announced that the United States would take no appeal from Judge Bledsoe's decision. Six months have elapsed from the date of the decision and, no appeal having been taken, the decrees in favor of the Company in the six cases are now final and conclusive.

TERMINATION OF FEDERAL CONTROL

The Federal Control Act of March 21, 1918, under the terms of which your Company's railroads and steamship lines have been operated by the Federal Government since December 28, 1917, provides, in Section 16, "that this Act is expressly declared to be emergency legislation enacted to meet conditions growing out of war * * * *", and in Section 14, that "the President may relinquish all railroads and systems of transportation under Federal control at any time he shall deem such action needful or desirable." In accordance with these provisions the President of the United States, on December 24, 1919, issued a proclamation relinquishing control of all railroads and steamship lines at 12:01 A.M., March 1, 1920. The terms and conditions under which the properties are returned to their owners are set forth in the Act of Congress, approved February 28, 1920, known as the "Transportation Act, 1920."

Under the terms of the Transportation Act each railroad company is given the option of accepting or refusing a guaranty by the Government to the effect that the Company's railway operating income for the six months' period beginning March 1, 1920, as a whole, in the case of railroads with which a contract has been made fixing the amount of annual compensation under the Federal Control Act, shall be not less than one-half of its annual compensation as fixed in such contract including additional compensation for use of additions and betterments, with the proviso that, in event of the acceptance of such guaranty, if the railway operating income for such guaranty period shall exceed the amount of the guaranty, the Company shall pay such excess to the Government. Your Company accepted this guaranty for itself and all its system lines.

The Transportation Act provides that all transportation rates in effect on February 29, 1920, shall continue in effect until changed by Federal or State authority, and that prior to September 1, 1920 (the end of the guaranty period) no such rate shall be reduced except upon authority of the Interstate Commerce Commission. The Commission is directed to establish rates which will be adequate to provide the railroads as a whole (or as a whole in each of such rate groups or territories as the Commission may designate) with a fair return upon the value, as fixed by the Commission, of the railroad property held for and used in transportation service: *Provided* that during the two years beginning March 1, 1920, the Commission shall take as such fair return a sum equal to 5½ per cent. of such value, but may add thereto a sum equal to one-half of one per cent. of such value to provide for a return upon expenditures for additions and betterments chargeable to capital account. If, however, any railroad, or system of railroads under common control, shall receive for any year a net railway operating income in excess of 6 per cent. of the value of its transportation property one-half of such excess must be placed in a reserve fund to be established by the railroad, and the remaining one-half paid over to the Interstate Commerce Commission to establish a railroad contingent fund. This fund to be used by the Commission either (1) in making loans to railroads to meet expenditures chargeable to capital account or to refund maturing securities originally issued for capital account, or (2) in purchasing transportation equipment and facilities to be leased to the railroads. If for any year the net railway operating income is less than 6 per cent. of the value of the transportation property the reserve fund maintained by the railroad may be drawn upon by it to the extent of such deficit, for the purpose of paying dividends on stock, interest on bonds and other securities, and rent for leased roads, but for no other purpose. This reserve fund is required to be accumulated until it reaches a maximum sum equal to 5 per cent. of the value of the transportation property; and thereafter the portion of its excess income retained by the railroad which is not required to maintain the reserve fund at such maximum sum may be used for any lawful purpose.

In connection with the provisions of the Act limiting the return which a railroad may earn on the value of its transportation property, attention is called to the statement given below showing the per cent. earned by Southern Pacific System on the book value of its transportation property during the years 1909 to 1919, both inclusive, after deducting from Net Railway Operating Income the amounts paid for Miscellaneous Rents and Leased Road Rents:

Year ended June 30			1909,	5.11	per cent
"	"	"	1910,	5.65	" "
"	"	"	1911,	4.94	" "
"	"	"	1912,	4.29	" "
"	"	"	1913,	4.60	" "
"	"	"	1914,	3.92	" "
"	"	"	1915,	3.78	" "
"	"	"	1916,	4.93	" "
"	"	Dec. 31,	1916,	5.25	" "
"	"	"	1917,	6.24	" "
"	"	"	1918,	4.60	" "
"	"	"	1919,	4.48	" "

As stated in last year's report, the officers having immediate supervision of the maintenance and operation of your Company's lines at the time such lines were taken over by the Government, continued, as a rule, as Federal appointees, to supervise the maintenance and operation of your properties under Federal control. Substantially all such officers were elected to their former positions effective with the termination of Federal control.

GENERAL

Dividends on the capital stock of your Company were declared during the year, payable as follows:

1½ per cent. paid April 1, 1919	$4,146,646.53
1½ per cent. paid July 1, 1919	4,281,716.70
1½ per cent. paid October 1, 1919	4,521,853.55
1½ per cent. payable January 2, 1920	4,527,908.34
	$17,478,125.12

There has been no material change in the conditions along the line of the Southern Pacific Railroad of Mexico from those reported last year. The average miles of road operated during the year was 1,003 miles, but only such maintenance work was done as was necessary to make possible the operations of trains over those portions of the line open for traffic. The company, during the year, has been unable to make any collection on account of its claims against the Mexican Government. A revised estimate places the cost of property destroyed from the beginning of the Madero Revolution, in 1910, to December 31, 1919, at 4,898,000 pesos, equivalent to $2,449,350; and the amount due the company for freight and passenger service performed, for rental of road and equipment, and for material furnished to or confiscated by the various military authorities, at 8,947,000 pesos.

In addition to the completed lines of railway reported under Properties and Mileage, and the still incompleted line of the Southern Pacific Railroad Company of Mexico, construction is progressing on the lines of the following companies, viz.:

	Length of Projected Line Miles	Track Completed Miles	Grading Completed Miles	Grading Progressing Miles
SOUTHERN PACIFIC RAILROAD:				
Kern Junction to Silvert, Cal.	11.60	† 3.13	8.47	
SOUTHERN PACIFIC COMPANY:				
Sutter Basin Branch—				
Near Knight's Landing to Tisdale Bypass, Cal.*	19.24	16.49	2.75	
HOUSTON & TEXAS CENTRAL RAILROAD:				
Dallas, Texas—Belt Line around city	15.54	5.96		9.58

*Line will not be opened to public for traffic until ballasting is completed. †2.58 miles opened to public for traffic August 9, 1919.

With the completion of the 12 miles of the San Diego and Arizona Railway in Carriso Gorge, and the placing in operation, on December 1, 1919, of the last section of the line between Campo and El Centro, Cal., the entire line between San Diego and El Centro was opened to the public for traffic. This line, which is owned jointly by your Company and Messrs. John D. and A. B. Spreckels, will enable your Company to serve San Diego with the shortest line from the middle West.

To provide for the purchase of 4,000 new refrigerator cars, for new icing stations, and for the payment of its existing indebtedness to the parent companies, the Pacific Fruit Express Company, which is owned jointly by your Company and the Union Pacific Railroad Company, and which furnishes refrigerator cars to, and operates icing stations for, the Southern Pacific and Union Pacific Systems, has issued and sold $25,000,000, par value, seven per cent. equipment trust certificates dated June 1, 1920, and maturing, serially, on June 1st in each year from 1925 to 1935, both inclusive. All such certificates have been guaranteed jointly and severally by the Southern Pacific Company and the Union Pacific Railroad Company.

The status of the accounts of your Company and its Proprietary Companies with the United States Government in connection with the control and operation of your properties, is shown in the balance sheet. The net balance of $33,631,244.01 due from the Government as shown by these accounts, is made up as follows:

Net amount due from Government account of standard return, cash and agents' and conductors' balances taken over January 1, 1918, and corporate assets collected, after deducting advances for additions and betterments and corporate liabilities, paid, subject to current settlement	$235,287.96
Depreciation and other reserves and road and equipment retirements, not subject to current settlement	9,927,424.39
Material and supplies taken over January 1, 1918, for which material and supplies equal in quantity, quality, and relative usefulness are to be returned at end of Federal control	23,468,531.66
Total	$33,631,244.01

For the reasons stated in the second paragraph under "Income Account" these accounts do not include any interest due from or to the Government, or the additional compensation due from the Government for use of additions and betterments.

In the annual report for 1917, attention was called to the fact that the physical condition of your Company's property at the time it was taken over by the Government, on January 1, 1918, had reached a higher standard than was ever before attained. As an inspection indicates that the Federal Railroad Administration has not maintained your property, especially the lines in Louisiana and Texas, at this high standard, a special investigation of undermaintenance during Federal control is now being made. Whilst definite figures are not yet available some idea of the extent to which the lines in Louisiana and Texas have been undermaintained during Federal control may be obtained from the following comparison of the average quantities of rail and ties per year used in repairs and renewals on such lines during the two years ended December 31, 1919, with similar averages for the test period, viz.:

	Average per year for the two years ended Dec. 31, 1919	Average per year for the Test period	±Increase —Decrease	Per Cent
New rail ....(Tons)	21,033	23,527	— 2,494	10.60
Ties	1,182,419	1,565,183	—382,764	24.45

By order of the Board of Directors,

JULIUS KRUTTSCHNITT,
Chairman of the Executive Committee.

[ADV.]

Railway Officers

Executive

Edward F. Smith has been appointed assistant to the president of the Central Vermont, with headquarters at St. Albans, Vermont, effective June 15.

Francisco Perez, general superintendent of the National Railways of Mexico, has been appointed director general succeeding **Paulino Fontes,** resigned. Mr. Perez began railroad work as telegraph operator for the Mexican Central, now part of the National Railways of Mexico, in 1900. He became agent of the Aguascalientes division in 1903 and retained that position until 1905 when he was appointed train despatcher. He was promoted to superintendent of the Mexico-Queretaro division in 1907. He became general superintendent in 1914.

Financial, Legal and Accounting

Jay V. Hare, who has been appointed secretary of the Reading Company and the Philadelphia & Reading, with headquarters at the Reading Terminal, Philadelphia, as noted in the *Railway Age* of April 30 (page 1329), served as secretary of the Reading Company and assistant secretary of the Philadelphia & Reading from October, 1912, until his recent appointment on April 21, 1920. Mr. Hare was born on May 24, 1878 at Schodack, Rensselaer County, N. Y. He was educated in the Jamestown (N. Y.) High School and in the New York State University at Albany, N. Y. He began railroad work on September 8, 1897, as junior clerk in the passenger department of the Philadelphia & Reading. He afterwards became clerk in the secretary's department and in January, 1906, was promoted to chief clerk in the same department. He held the latter position until the appointment he received in 1912, which is noted above.

John J. Ekin, who has been appointed comptroller of the Baltimore & Ohio, with headquarters at Baltimore, Md., as noted in the *Railway Age* of March 5 (page 737), served as federal auditor of the Baltimore & Ohio, the Western Maryland, the Cumberland Valley and other roads, from July 1, 1918, until the termination of federal control. Mr. Ekin was born on June 8, 1873, at Whitestown, Butler County, Pa. He studied at Ellwood City High School and began railroad work on May 21, 1895, as warehouseman and yard clerk in a local freight office of the Pittsburgh & Western, now part of the Baltimore & Ohio. Afterwards he served until 1895 consecutively as bill clerk, cashier and agent. Then he became rate and revision clerk in the auditor's office. Having filled other clerical positions in the same department he was appointed general bookkeeper and afterwards chief clerk to the author. On March 1, 1902, he was transferred to the service of the Baltimore & Ohio as bookkeeper and general clerk in the office of the auditor of subsidiary lines. While holding that position he was promoted to chief clerk to the auditor. On January 1, 1908, he was appointed auditor and secretary to the board of managers. His next position was superintendent of the relief department of the Washington Terminals. He re-entered the employ of the Baltimore & Ohio in 1913 upon being appointed general accountant. He then became secretary of the valuation committee. He was promoted to general auditor on July 1, 1915, and retained that position until his appointment as federal auditor.

J. J. Ekin

Operating

H. G. McCarthy has been appointed assistant trainmaster of the Shasta division of the Southern Pacific, with headquarters at Ashland, Ore., effective June 16.

P. F. Coleman has been appointed chief supervising agent of the New York Central, lines east of Buffalo, with headquarters at Syracuse, N. Y., effective June 21.

C. R. Moore, assistant to the vice-president of the Grand Trunk, with headquarters at Montreal, Que., has been appointed general superintendent of car service, with the same headquarters, effective May 17, succeeding **J. E. Duval,** deceased.

W. B. Kirkland, assistant trainmaster on the Stockton division of the Southern Pacific, with headquarters at Tracy, Cal., has been promoted to trainmaster, with the same headquarters, effective June 1. The position of assistant trainmaster of the Stockton division has been abolished.

J. T. Stanford, general yardmaster on the Illinois Central, with headquarters at Champaign, Ill., has been promoted to trainmaster of the Chicago, Pontiac and Tracy districts and the Gilman line, of the Illinois division, with headquarters at Chicago, effective June 15. He succeeds **E. H. Baker,** who has been promoted, as noted elsewhere in these columns.

G. C. Nichols, superintendent of motor power and equipment of the Alabama, Tennessee and Northern, with headquarters at York, Ala., has been promoted to superintendent, with the same headquarters, effective June 15, and his authority has been extended over the maintenance of way and the transportation departments.

F. M. Hair, chief despatcher of the North End Charlotte division of the Southern, with headquarters at Charlotte, N. C., has been appointed trainmaster of the same division, with the same headquarters, succeeding **W. L. King,** promoted; **E. R. Rector,** assistant chief despatcher of the North End Charlotte division, has been appointed chief despatcher, succeeding Mr. Hair, and **J. W. Shelton** has been appointed assistant chief despatcher, succeeding Mr. Rector. These appointments became effective June 15.

N. P. Thurber, superintendent of the Kansas City division of the Chicago, Milwaukee & St. Paul, with headquarters at Ottumwa Junction, Iowa, has been transferred to the Chicago & Milwaukee and Northern divisions, with headquarters at Milwaukee, effective June 15. Mr. Thurber succeeds **P. L. Rupp,** who has been granted an extended leave of absence, after forty-three years of continuous service. **B. F. Hoehn,** superintendent of terminals at Milwaukee, Wis., succeeds Mr. Thurber at Ottumwa Junction, Iowa.

Louis S. Emery, whose appointment as general manager of the Lake Erie & Western, with headquarters at Indianapolis, Ind., was announced in the *Railway Age* of June 18 (page 1958), was born at Adrian, Mich., on December 30, 1878. Mr. Emery entered railway service as a clerk in one of the local freight offices at Youngstown, O., in August, 1897. From 1898 to 1899 he served as a yard clerk on the New York Central with headquarters at Toledo, O. During the next three years he was a clerk in the ticket office, with the same headquarters. In 1902, he served in the signal department, with headquarters at New York City and a year later was appointed superintendent of the Marcellis & Otisco Lake with headquarters at Marcellis, N. Y. He was appointed yardmaster for the New York Central at Auburn, N. Y., in 1905, and after one year of service was promoted to trainmaster. In 1911, he was promoted to assistant superintendent with headquarters at Syracuse, N. Y. After a service of two months during the latter part of 1907 as superintendent of the Oswego & Watertown, a subsidiary of the New York Central, he was promoted to superintendent on the New York Central with headquarters at Buffalo, N. Y., the position he held at the time of his appointment as general manager of the Lake Erie & Western.

Olin B. **Castle** who served as superintendent of car service on the Southern Pacific, Louisiana and Texas lines, with headquarters at Houston, Tex., prior to federal control, has been appointed assistant superintendent of transportation, with headquarters at Houston, effective June 1. The position of superintendent of car service was abolished on this date. Mr. Castle was born at Brownsville, Pa., on January 22, 1874, and entered railway service in 1892 as a messenger in the telegraph department of the Pennsylvania Lines at Dennison, Ohio. He was promoted to operator in 1893, and filled various positions in the telegraph service on the Pittsburgh division until 1900. In October, 1900, he entered the service of the Baltimore & Ohio at Baltimore, Md., where he was given charge of mileage accounts and statistics in the office of the superintendent of car service. He was later promoted to assistant chief clerk of the department. In March, 1902, he was transferred to the general manager's office and in June, 1903, he was appointed chief clerk to the superintendent of the Butler division. He went to Chicago in May, 1907, with Arthur Hale, agent of the American Railway Association, and assisted in the organization of the American Railway clearing house and the committee on car efficiency of the American Railway Association. He worked with the Commission on the interchange of freight cars, in making a scientific study of the value of freight cars, resulting in the adoption, in 1910, of the 30 and 35-cent variable per diem rate. He was appointed car service agent on the Central System of the Southern Pacific on August 15, 1911, and in 1917 was promoted to superintendent of car service. During federal control Mr. Castle was furloughed for service with the United States Railroad Administration, and from January, 1918, to January, 1919, served as special assistant, Car Service Section, at Washington, D. C., and from January, 1919, to March 1, 1920, as staff officer of transportation to the regional director of the Southern region. From March 1 to June 1, 1920, he served as a special assistant on the Commission of Car Service of the American Railroad Association, with headquarters at Washington, which position he held at the time of his appointment as noted above.

O. C. Castle

Traffic

Ira W. Morris has been appointed assistant general freight agent of the Hocking Valley, with headquarters at Columbus, Ohio, effective July 1.

E. L. Carey, has been appointed general agent of the passenger department of the Northern Pacific, with headquarters at Seattle, Wash., effective June 21.

L. B. Smith, foreign freight agent of the Southern, with headquarters at New Orleans, La., has been appointed assistant general freight agent, with headquarters at Charleston, S. C., effective May 20.

Engineering, Maintenance of Way and Signaling

Walter J. Towne, engineer of maintenance of the Chicago & Northwestern, with headquarters at Chicago, has been promoted to chief engineer with the same headquarters, succeeding **L. J. Putnam,** deceased. A sketch of Mr. Towne's career appeared in the issue of the *Railway Age* for March 5 (page 737).

Frank C. Huffman, principal assistant engineer on the Chicago & Northwestern, with headquarters at Chicago, has been appointed assistant engineer of maintenance of lines east of the Missouri river, with the same headquarters, effective June 1. He succeeds **D. C. Rounesville.**

L. H. Bond, whose promotion to district engineer of the Northern lines of the Illinois Central, with headquarters at Chicago, was announced in the *Railway Age* of June 4 (page 1592), was born on November 14, 1879, at Louisville, Ky. Mr. Bond was educated at Du Pont Technical College, completing his work there in 1899. He entered railway service on Sept. 30, 1899, as a chainman with the Illinois Central. During the next five years he served successively as chainman, rodman, masonry inspector and instrument man. In 1904, he was appointed assistant engineer at Vicksburg, Miss. From 1905 to 1907, he served as supervisor on the St. Louis division, and upon the latter date was promoted to assistant engineer on this division, which position he held until 1910, when he was appointed roadmaster of the Springfield division. From 1914 to 1917, he served as roadmaster of the St. Louis division. In 1917 he became assistant engineer of maintenance of way, and in June, 1919, he was appointed assistant engineer of the Illinois Central Company (corporate), which position he held at the time of his promotion on May 20.

J. V. Neubert, engineer of track of the New York Central Lines East of Buffalo, exterior zone, with headquarters at New York, has been promoted to engineer maintenance of way of the same zone and region, with the same headquarters, succeeding G. W. Vaughan, deceased. Mr. Neubert was born at Kittanning, Pa., and graduated from the Pennsylvania State College in 1899. He entered the employ of the New York Central on July 3 of that year as a clerk, being transferred six weeks later as a chainman to the engineering department. He subsequently served as a rodman and as an inspector in that department, until September 1, 1900, when he was promoted to assistant supervisor of track. On May 1, 1902, he was promoted supervisor of track, serving in that position until January 1, 1903, when he was promoted to assistant engineer in a division engineer's office, being transferred in 1904 to the office of the engineer maintenance of way. On April 1, 1907, he was promoted to division engineer, with headquarters at Albany, N. Y., where he remained until April, 1909, when he was promoted to engineer of track of the Lines East of Buffalo, exterior zone, continuing in that capacity until his recent promotion as noted above.

J. V. Neubert

Special

E. H. Baker, trainmaster on the Illinois division of the Illinois Central, with headquarters at Champaign, Ill., has been promoted to the newly created position of supervisor of passenger service employees, with headquarters at Chicago, effective June 15. He will have jurisdiction over all station and passenger train employees.

Obituary

R. Marpole, executive agent of the Canadian Pacific, with headquarters at Vancouver, B. C., died in Vancouver on June 8.

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